CKD

Vacuum System Components SELVACS

Ejector system | Vacuum pump system

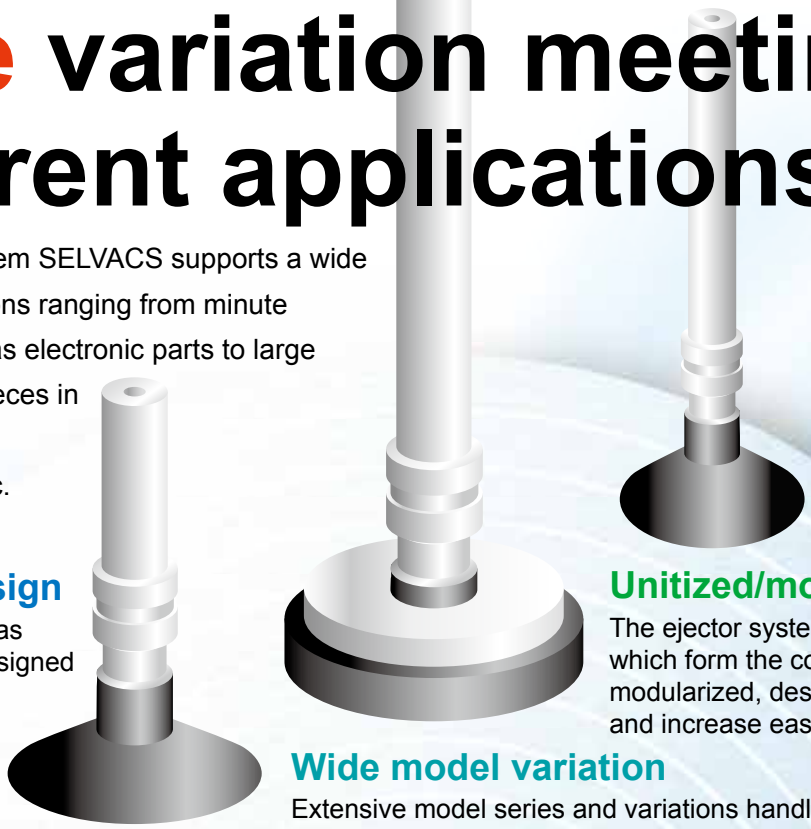
Suction pad | Vacuum-related products

Ver. 5

Catalog No. CC-796A-5

Wide variation meeting different applications.

New vacuum system SELVACS supports a wide range of applications ranging from minute workpieces such as electronic parts to large and heavy workpieces in automobile manufacturing, etc.



Compact design

Each component has been compactly designed to save space.

Unitized/modularized

The ejector system/vacuum pump system which form the core are unitized and modularized, designed to save space and increase ease of use.

Wide model variation

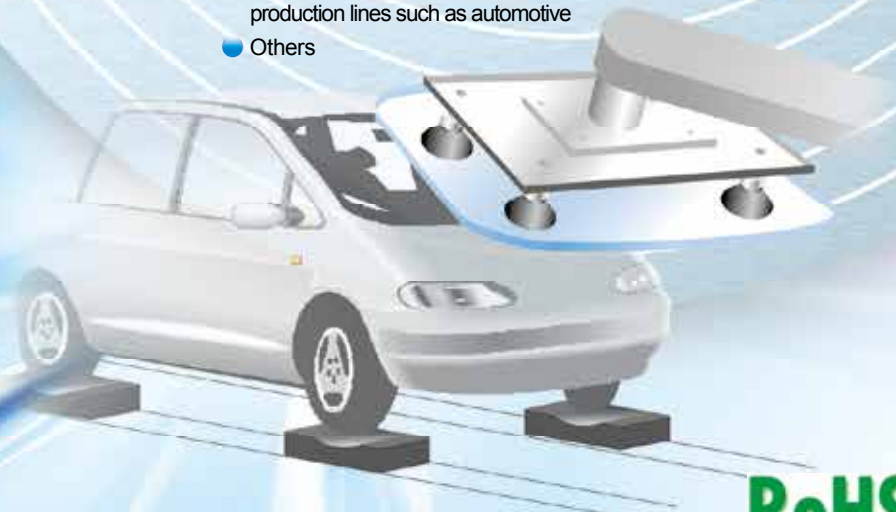
Extensive model series and variations handle a wide range of fields and applications.

New Vacuum system components

SELVACS now available

Convey and transport various products and parts
Can be used for insertion, positioning, box packing, etc.

- Suction transport of various electronic components, semiconductor substrates, wafers, DVDs, etc.
- Assembly insertion of small parts
- Transport of liquid crystal panels, glass panels, etc.
- Box packing of canned beer, canned juice, etc.
- Transporting and moving boxes in logistics warehouses
- Transporting light, medium and heavy objects in various production lines such as automotive
- Others

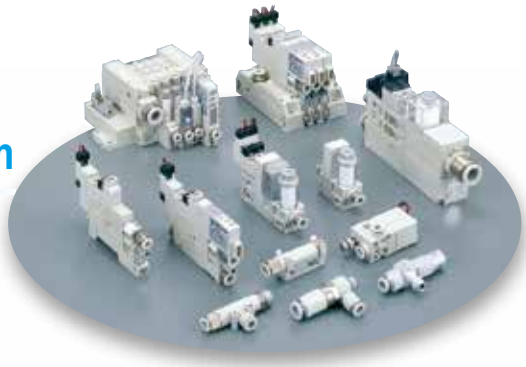


RoHS RoHS compliant

SELVACS | System configuration

Ejector system/vacuum pump system

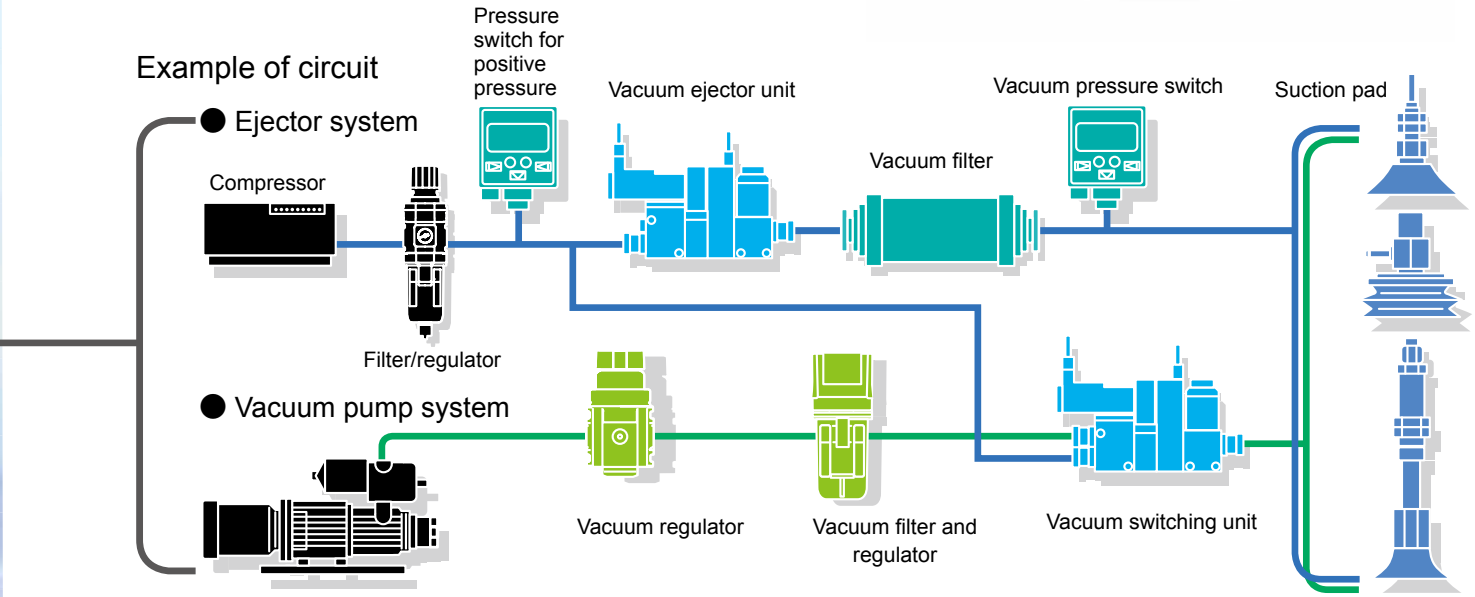
Ejector system and vacuum pump system form the core of the vacuum system.
Various units are available from single units to those combining related products.



Suction pad

Attachment that directly suctions workpieces.
Various materials, shapes and pad diameters are available according to the size, weight and characteristics of the workpiece.

Example of circuit

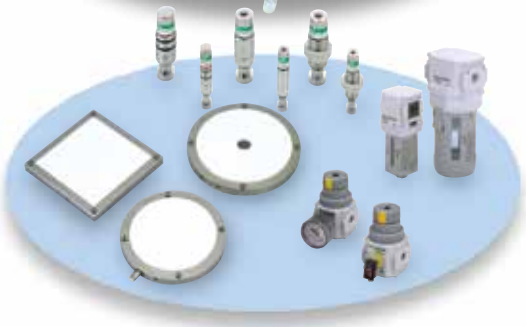


Vacuum-related products

Various related products such as vacuum burst valve, vacuum pressure switch and vacuum filter are available according to the usage of the vacuum system.

Related products

Related products suitable for more advanced vacuum systems such as vacuum filter, vacuum regulator, quick valve, precise suction plate and buffer unit are available.



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Vacuum System Components
SELVACS

SELVACS

Ejector system/vacuum pump system

Suction pad

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CKD Corporation

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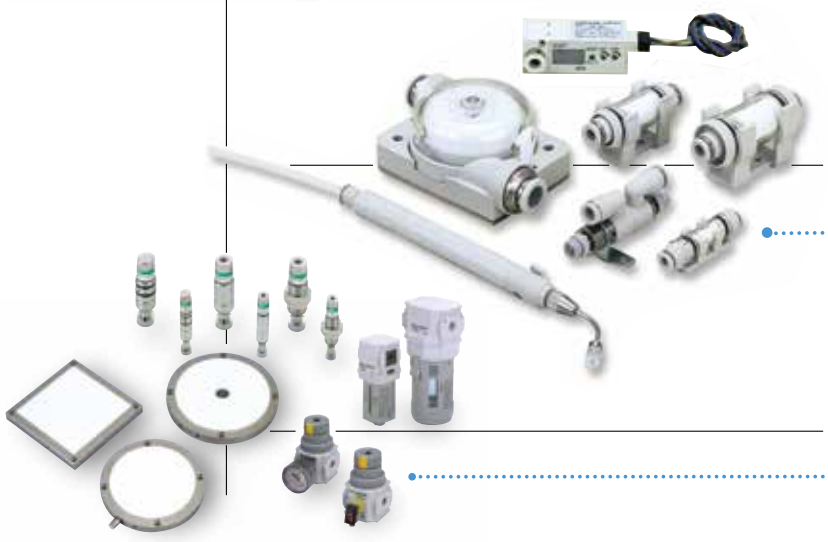

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Series variation

Ejector system
Single unit

Model		Series		Single unit/width dimension (mm)	Single unit/weight (g)	Manifold	Components					
							With valve		With switch			
							For generation	Breaking the vacuum	Mechanical	Switch output	Analog output	
Ejector system	Single unit	**VSY Series** With vacuum burst function · Ejector and vacuum burst function are integrated · Compact and lightweight, it can be used at the end of vacuum piping		11	19 to 25.5							
		VSH Series Solenoid valve direct mounting (supply port thread) · Air supply port size: Solenoid valve can be directly mounted from M5 to R1/4 Series · A wide range of nozzle diameter variations from ø0.5 to ø2.0		ø9.8 to ø28	13 to 116							
		VSU Series Tubular · Installable in the middle of piping since the vacuum port and air supply port form a straight line. · Dedicated bracket is available		ø13	17 to 23							
		VSB Series Square · Square silencer built in, enabling body mounting and fixing · Option for mechanical vacuum switch can be selected.		12.2	17.5 to 48.5				○			
		VSC Series Pad direct mounting (vacuum port thread) · Vacuum port size: Vacuum pads can be directly mounted from M5 to R1/4 Series · A wide range of nozzle diameter variations from ø0.5 to ø2.0		8 to ø24	14.5 to 109							

Ejector characteristics table

Nozzle diameter		Achieved vacuum pressure (-kPa) *1			Intake flow rate (ℓ/min (ANR))			Consumption flow rate (ℓ/min (ANR))		
Model No.	(mm)	H	L	E	H	L	E	H	L	E
05	0.5	90 to 91	66 to 67	90 to 92	7	11 to 12	3 to 10	11.5		8 to 17
07	0.7	90 to 93.1			12 to 13	18 to 26	9 to 10.5	23		17
10	1	93			20 to 28	26 to 42	19 to 21	46		34
12	1.2			90.4 to 92	38	50	27	70		47
15	1.5		66	92	63	95	42	100		70
20	2.0				104 to 110	174 to 180	82 to 84	200		150

*1: Supply pressure of H and L is 0.5 MPa and supply pressure of E is 0.35 MPa.
*2. H High vacuum/medium flow = high vacuum
L Medium vacuum/large flow = large flow
E High vacuum/low flow = low supply pressure, High vacuum (energy saving)

●: Standard equipment ○: Option

Components				Nozzle diameter (mm)								Achieved vacuum pressure (-kPa) *1			Intake flow rate (ℓ/min (ANR))			Consumption flow rate (ℓ/min (ANR))			Page
With vacuum filter	With silencer	Common exhaust	With check valve	04 (0.4)	05 (0.5)	06 (0.6)	07 (0.7)	10 (1.0)	12 (1.2)	15 (1.5)	20 (2.0)	H	L	E	H	L	E	H	L	E	
○	○	○			○							90	66	90	7	12	3	11.5		8	6
							○								12.5	18/21	9	23		17	
	○	○			○							90	66	92	7	12		11.5			14
							○					93			13	26	10.5	23		17	
								○							28	42	21	46		34	
									○						38		27	70		47	
										○					63	95	42	100		70	
											○				104	174	82	200		150	
●	○	○			○							90	66	90	7	12	10	11.5		17	14
							○					92			12.5	20/22		23			
	●				○							90	66	92	7	12		11.5			14
							○					93			13	26	10.5	23		17	
								○							28	42	21	46		34	
									○						38		27	70		47	
	○	○			○							90	66	92	7	11		11.5			14
							○					93			13	26	10.5	23		17	
								○							28	42	21	46		34	
									○						38		27	70		47	
										○					63	95	42	100		70	
											○				110	180	84	200		150	

*1: Supply pressure of H and L is 0.5 MPa and supply pressure of E is 0.35 MPa.
*2. Values in ( ) for the VSQ twin nozzle are for small bore size nozzle.

Series variation

Ejector system
Unit combination

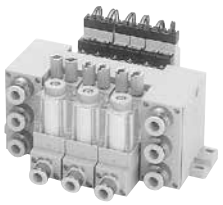
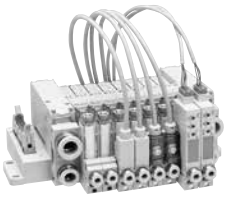
Model	Series		Single unit/width dimension (mm)	Single unit/weight (g)	Manifold	Components: With valve: For generation	Components: With valve: Breaking the vacuum	Components: With switch: Mechanical	Components: With switch: Switch output	Components: With switch: Analog output
Ejector system / Unit combination	**VSG Series** Comprehensive type that emphasizes basic performance · Dedicated single unit · Valve, vacuum pressure switch and filter are unitized. Select according to your application.		20	47 to 128		●	●		○	○
	VSK/VSKM Series Ample variations are available · Modularization of each unit enables optimal unit selection. · Built-in check valve and vacuum burst valve with air timer can be selected.		16	60 to 153	○	○	○	○	○ (A model with digital display can also be selected)	○
	VSJ/VSJM Series Preventing workpieces from being blown away due to burst air flow rate and pressure control · A self-hold model that supports power saving in vacuum generating valve is also available. · Vacuum burst circuit relief function realizes shortening of vacuum burst time.		20	156 to 175.5	○	●	●		○ (With digital display)	○
	VSN/VSNM Series Fast and stable response · Compact and lightweight. The height dimension is made especially compact. · A direct acting valve is used as the main valve to achieve ON/OFF responsivity of 5 msec or less		10.3	50.5 to 171	○	●	●		○	○ (The type with a digital display can also be selected)
	VSX/VSXM Series Lightweight and compact · Direct mount and DIN rail are available for mounting. · A self-hold model that supports power saving in vacuum generating valve is also available.		10.5	71 to 84	○	●	●		○ (The type with a digital display can also be selected)	○
	VSQ Series Large vacuum unit ideal for controlling large flow rates · Standardized three types of nozzle: single, double and twin · A self-hold model that supports power saving in vacuum generating valve is also available (single nozzle only).		31.5	400 to 470		●	●		○ (With digital display)	
	VSZM Series Dedicated manifold, reduced wiring (flat cable/D sub-connector) compatible · With atmospheric pressure relief valve installed, atmosphere burst at high flow rate is possible, shortening the vacuum burst time · Self-hold energy-saving type is also available, with valve power consumption of 0.55 W		11	Contact CKD for details.	●	●	●		○ (The type with a digital display can also be selected)	○

●: Standard equipment ○: Option

Components				Nozzle diameter (mm)								Achieved vacuum pressure (-kPa) *1			Intake flow rate (ℓ/min (ANR))			Consumption flow rate (ℓ/min (ANR))			Page
With vacuum filter	With silencer	Common exhaust	With check valve	04 (0.4)	05 (0.5)	06 (0.6)	07 (0.7)	10 (1.0)	12 (1.2)	15 (1.5)	20 (2.0)	H	L	E	H	L	E	H	L	E	
●	●				○		○	○				90	66	90	7	12		11.5			32
												93			13	26	10.5	23		17	
								○							27	40	21	46		34	
●	○	○	○		○		○	○				91	67	91	7	11		11.5			40
												93			13	26		23			
								○							27	40	21	46		34	
									○						38	50	27	70		47	
●	○	○			○		○					90.4	66.5	90.4	7	11		11.5			66
								○				93.1			13	26	10.5	23		17	
															27	40	21	46		34	
									○						38		27	70		47	
	○	○		○								90.4		90.4			2			6	86
					○										7		3	11.5		8	
						○									9.5		4.5	16		12	
●	○	○			○		○					90.4	66.5	90.4	7	12	3	11.5		8	112
								○				93.1			13	24/22	10.5	23		17	
															24/20	26	20/19	46		34	
●	○	○								○		93	66	92	63	95	42	100		70	142
											○				110	180	84	200		150	
							○	2-stage nozzle				93			24			23			
								○	2-stage nozzle						36			46			
									○	2-stage nozzle					40			70			
					Twin nozzle		○			○					40 (24) *2			100 (23) *2			
						Twin nozzle		○			○				70 (36) *2			200 (46) *2			
●	○	○			○							90.4	66.5	90.4	7	12		11.5			170
							○					93.1			13	24	10	23		17	
								○							24		20	46		34	

Series variation

Vacuum pump system

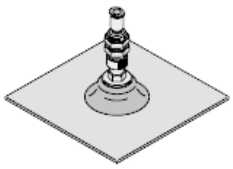
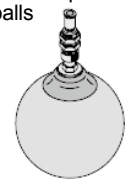
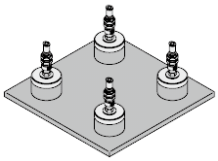
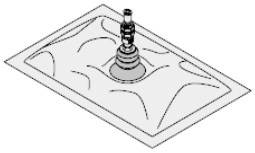
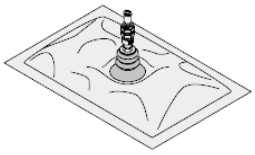
Model		Series	
Vacuum pump system	Vacuum switching unit	**VSJP/VSJPM Series** Preventing workpieces from being blown away due to burst air flow rate and pressure control · A self-hold model that supports power saving in vacuum generating valve is also available. · Vacuum burst circuit relief function realizes shortening of vacuum burst time.	
		VSNP/VSNPM Series Fast and stable response · Compact and lightweight. The height dimension is made especially compact. · A direct acting valve is used as the main valve to achieve ON/OFF responsivity of 5 msec or less	
		VSXP/VSXPM Series Lightweight and compact · Direct mount and DIN rail are available for mounting. · 3-way valve specification realizes a substantial reduction of vacuum burst time by using a 3-way vacuum supply valve.	
		VSQP Series Large vacuum unit ideal for controlling large flow rates · Normally open and normally closed types are available for vacuum supply valves.	
		VSZPM Series Manifold dedicated, reduced wiring (flat cable/D sub-connector) compatible · With atmospheric pressure relief valve installed, atmosphere burst at high flow rate is possible, shortening the vacuum burst time · Self-hold energy-saving type is also available, with valve power consumption of 0.55 W	

●: Standard equipment ○: Option

Single unit/width dimension (mm)	Single unit/ weight (g)	Manifold	Components							Effective cross-sectional area of vacuum valve	Page
			With valve		With switch		With filter	With silencer	Check valve		
			For generation	Breaking the vacuum	Switch output	Analog output					
20	125.5 to 158.5	●	●	●	○	○	●			3.5 mm^2(ø4), 5 mm^2(ø6)	194
10.3	52.5 to 171	●	●	●	○	○ (A model with a digital display can also be selected)				0.4 mm^2	210
10.5	78 to 88	●	●	●	○	○ (A model with a digital display can also be selected)	●			2-way valve specification: 3.5 mm^2 (ø4), 4.5 mm^2(ø6) 3-way valve specification: 3.0 mm^2 (ø4), 3.6 mm^2(ø6)	230
31.5			●	●	○ (With digital display)		●			16.5 mm^2	260
11		○	●	●	○	○	●			4.5 mm^2	272

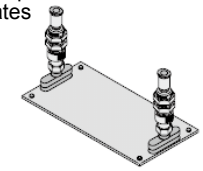
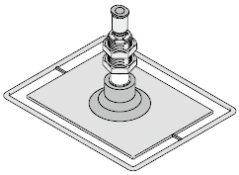
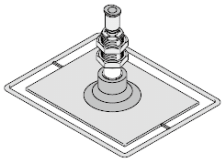
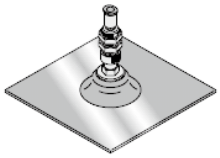
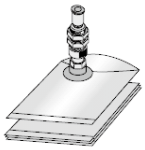
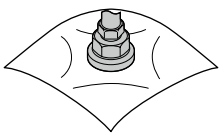
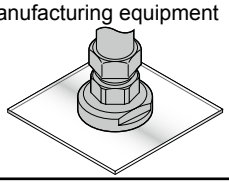
Series variation

Suction pad

Pad shape	Applications	Pad diameter guideline				
			0.7 to 10	15 to 50	60 to 100	150 to 200
Compact standard	Thick and flat workpieces 					
Deep	Spherical workpieces such as round balls 					
Sponge	Workpieces with uneven surface such as outer walls 					
Bellows	Workpieces containing food, etc. 					
Multi-stage bellows	Tilted workpieces or plastic packaging products 					

Holder (bracket) shape

MA, A	MB, B	MC, C	MD, D	ME, E	F	
Fixed, Vacuum outlet top	Fixed, Vacuum outlet side	Spring, Vacuum outlet top	Spring, Vacuum outlet side	Direct mounting, Fixed	Direct mounting, Spring	
HC	HD	HE	AE	BE	HDW	HEW
Spring, Vacuum outlet top	Spring, Vacuum outlet side	Direct mounting, Vacuum outlet side	Screw-in, Vacuum outlet top	Screw-in, Vacuum outlet side	Spring, Vacuum outlet both sides	Direct mounting, Vacuum outlet both sides

Pad shape	Applications	Pad diameter guideline					
			0.7 to 10	15 to 50	60 to 100	150 to 200	
Oval	Workpieces with limited suction space such as substrates 						
Soft	Workpieces that are prone to scratches 						
Soft bellows	Paper or workpieces that are prone to scratches 						
Anti-slip	Slippery workpieces with oil adhered, etc. 						
Thin object	Thin workpieces such as paper and vinyl 						
Flat	Thin workpieces such as sheets and vinyl 						
Suction mark prevention	Liquid crystal glass, painting process and semiconductor manufacturing equipment 						

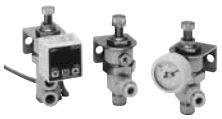
Series variation

Vacuum-related products

[Position locking valve]

Series	Model No.	Port size		Remarks	Page
		Vacuum generator side	Workpiece side		
VSECV Series · Even if the workpiece comes off, vacuum is maintained for workpieces in other circuits. · Compatible with SELVACS suction pad series.	VSECV-M3	M3×0.5			556
	VSECV-M4	M4×0.7			
	VSECV-M5	M5×0.8			
	VSECV-M6	M6×1			
	VSECV-M10	M10×1.5			
	VSECV-6A	R1/8, Rc1/8			

[Compact vacuum regulator]

Series	Model No.	Port size		Remarks	Page
		ø6	ø8		
VSRVV Series · Both source pressure and terminals can be controlled. · Vacuum pressure switch with digital display or pressure gauge for vacuum can also be selected. 	VSRVV-*A*	○	○	Elbow (output: male thread)	560
	VSRVV-*B*	○	○	Elbow (supply: male thread)	
	VSRVV-*U*	○	○	Union type	

[Vacuum burst unit]

Series	Model No.	Port size		Remarks	Page
		Vacuum generator side	Workpiece side		
VSLF Series · Controls the vacuum burst air while maintaining the vacuum characteristics of the vacuum ejector. · Vacuum burst circuit relief function realizes shortening of vacuum burst time.	VSLF-44	ø4	ø4		570
	VSLF-66	ø6	ø6		
	VSLF-46A	ø4	R1/8		
	VSLF-66A	ø6	R1/8		

[Vacuum filter]

●: Standard equipment ○: Optional selection

Series	Model No.	Port size M5	ø4	ø6	ø8	ø10	ø12	Remarks	Page
VSFB Series Large capacity union · Dust and water droplets are removed by cyclone effect and element. · Dust scattering is prevented because the entire dust case can be detached with one touch.	VSFB-66			●				Filtration area: 20 cm^2	574
	VSFB-88				●			Filtration area: 20 cm^2	
	VSFB-1010					●		Filtration area: 20 cm^2	
	VSFB-1212						●	Filtration area: 20 cm^2	
VSFU Series Compact union · Replacement and cleaning of element requires no tools. · Inline type that can be easily installed in the middle of the piping.	VSFU-1S	○	○	○				Filtration area: 2.8cm^2	
	VSFU-1L	○	○	○				Filtration area: 4.7cm^2	
	VSFU-2	○	○	○				Filtration area: 7.5cm^2	
	VSFU-3			○	○	○		Filtration area: 12.5cm^2	
VSFJ Series Compact socket · Ideal for single ejector without built-in vacuum filter.	VSFJ-44		●					Filtration area: 0.8cm^2	
	VSFJ-66			●				Filtration area: 1.1cm^2	
FSL Series Inline · Compact, lightweight and space saving inline type · Use either positive or negative pressure	FSL100		●	●				Filtration area: 4.7cm^2	582
	FSL200		●	●				Filtration area: 7.5cm^2	
	FSL500			●	●	●		Filtration area: 12.7cm^2	

[Vacuum pressure switch]

Series	Model No.	Port size M5	ø4	ø6	ø8	Direct mount	Remarks	Page
VSUS Series · 2-point output and analog output are available. · Three types of pipe connection are available: push-in fitting, M5 female thread and direct mount.	VSUS-NW	○	○	○	○	○	NPN: 2-point output	586
	VSUS-NA	○	○	○	○	○	NPN: Analog output	
	VSUS-PW	○	○	○	○	○	PNP: 2-point output	
	VSUS-PA	○	○	○	○	○	PNP: Analog output	

[Air tweezers]

Series	Model No.	Pad diameter ø2	ø4	ø6	ø8	Pad rubber material	Holder type	Page
VST Series · Built-in suction pad and ejector in pen type body. · Ideal for assembling small parts. · Package type is also available.	VAT-A*N	○	○	○	○	Nitrile rubber	No valve	592
	VAT-A*S	○	○	○	○	Silicone rubber	No valve	
	VAT-B*N	○	○	○	○	Nitrile rubber	Integrated valve	
	VAT-B*S	○	○	○	○	Silicone rubber	Integrated valve	

Safety Precautions

Be sure to read this section before use.

When designing and manufacturing equipment using CKD products, the manufacturer is obligated to ensure that the safety of the mechanism, pneumatic control circuit and/or water control circuit and the system that runs the electrical controls are secured.
It is important to select, use, handle and maintain CKD products appropriately to ensure their safe usage.
Observe warnings and precautions to ensure device safety.
Check that device safety is ensured, and manufacture a safe device.

⚠ WARNING

1 This product is designed and manufactured as a general industrial machine part.
It must be handled by an operator having sufficient knowledge and experience.

2 Use this product in accordance with specifications.

This product must be used within its stated specifications. In addition, never modify or additionally machine this product.
This product is intended for use in general industrial machinery equipment or parts. It is not intended for use outdoors (except for products with outdoor specifications) or for use under the following conditions or environments.
(Note that this product can be used when CKD is consulted prior to its usage and the customer consents to CKD product specifications. The customer should provide safety measures to avoid danger in the event of problems.)

❶ Use for applications requiring safety, including nuclear energy, railways, aircraft, marine vessels, vehicles, medical devices, devices or applications in contact with beverages or foodstuffs, amusement devices, emergency cutoff circuits, press machines, brake circuits, or safety devices or applications.
❷ Use for applications where life or assets could be significantly affected, and special safety measures are required.

3 Observe organization standards and regulations, etc., related to the safety of the device design and control, etc.

ISO4414, JIS B 8370 (General rules for pneumatic systems)
JFPS2008 (Principles for pneumatic cylinder selection and use)
Including the High Pressure Gas Safety Act, Industrial Safety and Health Act, other safety rules, organization standards and regulations, etc.

4 Do not handle, pipe, or remove devices before confirming safety.

❶ Inspect and service the machine and devices after confirming safety of all systems related to this product.
❷ Note that there may be hot or charged sections even after operation is stopped.
❸ When inspecting or servicing the device, turn OFF the energy source (air supply or water supply), and turn OFF power to the facility. Discharge any compressed air from the system, and pay attention to possible water leakage and leakage of electricity.
❹ When starting or restarting a machine or device that incorporates pneumatic components, make sure that the system safety, such as pop-out prevention measures, is secured.

5 Observe the warnings and cautions on the following pages to prevent accidents.

■ Precautions are ranked as “DANGER”, “WARNING”, and “CAUTION” in this section.

⚠DANGER:	In the case where the product operation is mishandled and/or when the urgency of a dangerous situation is high, it may lead to fatalities or serious injuries.
⚠WARNING:	A dangerous situation may occur if handling is mistaken, leading to fatal or serious injuries.
⚠CAUTION:	A dangerous situation may occur if handling is mistaken, leading to minor injuries or property damage.

Note that some items indicated with “CAUTION” may lead to serious results depending on the conditions.
All items contain important information and must be observed.

Limited warranty and disclaimer

1 Warranty period

This warranty is valid for one (1) year after delivery to the customer's designated site.

2 Scope of warranty

In case any defect clearly attributable to CKD is found during the warranty period, CKD shall, at its own discretion, repair the defect or replace the relevant product in whole or in part and at no cost, according to its own judgment.

Note that the following failures are excluded from the warranty scope:
(1) Failures due to use outside the conditions and environments set forth in the catalog or these specifications.
(2) Failures resulting from factors other than this product.
(3) Failures caused by improper use of the product.
(4) Failures resulting from modifications or repairs made without CKD consent.
(5) Failures caused by matters that could not be predicted with the technologies in practice when the product was delivered.
(6) Failures resulting from natural disasters or accidents for which CKD is not liable.

The warranty covers the actual delivered product, as a single unit, and does not cover any damages resulting from losses induced by malfunctions in the delivered product.

3 Compatibility check

The customer is responsible for confirming the compatibility of CKD products with the customer's systems, machines and equipment.

Precautions for export

1 Security Trade Control

The products in this catalog and their related technologies may require approval before export or provision. For the sake of maintaining world peace and safety, there may be cases in which approval under the Foreign Exchange and Foreign Trade Control Law is required in advance, depending on the country to where the product or related technology is being exported or provided.
The scope of products and related technologies requiring approval is listed in the Export Trade Control Order Appendix Table 1 or Foreign Exchange Order Appendix Table.
The Export Trade Control Order Appendix Table 1 and Foreign Exchange Order Appendix Table contain the following two types of information:

- "List controls" specified for items 1 to 15
- "Catch-all controls" that do not indicate specifications by item, but restriction by application (Section 16)

An application for approval is received by the Security Export Licensing Division of the Ministry of Economy, Trade and Industry or local bureaus of the Ministry of Economy, Trade and Industry.

2 Products and related technologies in this catalog

The products and related technologies in this catalog are subject to the catch-all control of the Foreign Exchange and Foreign Trade Control Law.
When exporting or providing the products or related technologies in this catalog, ensure that they are not used for arms or weapons.

3 Contact

Contact your local CKD Sales Office for information on the Security Trade Control of products and related technologies in this catalog.

Safety Precautions

Be sure to read this section before use.
Refer to "⚠ Safety precautions" for detailed precautions for individual series.

General precautions for vacuum system components

Design/selection

⚠ WARNING

■ If the suctioned object (workpiece) is at the risk of falling off, be sure to provide a preventive measure for safety.

■ This product does not have an explosion-proof structure. Do not use in flammable or explosive gases, fluids, or atmospheres. Also, avoid use with pressures of 0.1 MPa or greater that are constantly applied to the vacuum circuit side.

■ Be careful of vacuum pressure drop due to trouble with supply air and power supply. As there is a danger of the suctioned object falling due to decreased suction force, be sure to take safety measures.

■ When two or more pads are piped to a single ejector in a vacuum circuit, if one pad suffers suction failure (leakage), there is a danger that the other pads may be detached due to decreased vacuum pressure.

■ Vacuum retention function type and check valve function type allow vacuum leakage, so take other safety measures if the vacuum state needs to be maintained for long periods.

⚠ CAUTION

■ Supply pressure (catalog specification value) of the ejector is the value when the ejector is in operation. Consider the pressure drop and make sure the catalog specification value is achieved. If the specification value is not satisfied, the ejector will emit abnormal noise at a specific supply pressure and the performance will become unstable, which may affect the sensor and cause problems.

■ The ejector may produce abnormal noise (soft clicking sound) at the supply pressure just before reaching the peak vacuum. When this abnormal noise occurs, the characteristics become unstable and operation becomes louder. Reset the supply pressure, as it may affect the sensor, etc., and cause trouble.
* The area in which abnormal noise (soft clicking) is produced varies depending on the influence of atmospheric pressure, etc.

■ With regard to the effective cross-sectional area on the ejector supply pressure side, carry out piping and equipment selection with 3 times the effective cross-sectional area of the nozzle diameter cross-sectional area as a guideline. If the supply flow rate is insufficient, it may cause the performance to degrade.

■ Confirm before use that the product will withstand the working environment.
- Cannot be used in environments where its functions will be impeded.
  Such environments include high temperatures, chemical atmospheres, or where chemical liquids, vibration, moisture, water dripping or gas is present. Environments where ozone is generated.
- Do not use the product in a place where it could come in direct contact with cutting oil, coolant or spatter, etc.

■ Rubber parts deteriorate and service life is shortened if ultra dry air is used.

Mounting, installation and adjustment

⚠ WARNING

■ Check each port of the ejector according to this text and the display on the body when piping. Incorrect piping may damage the body.

■ Remove drainage and dirt from the ejector supply air and use clean air. Do not lubricate using a lubricator. Impurities and oil contained in compressed air may cause malfunction or degrade performance.

■ When operating the valve, make sure that the leakage current is no more than 1 mA. Otherwise, there is a risk of malfunctions caused by leakage current.

■ If energization to the valve continues for long periods, heat is generated from the coil. Heat risks causing burns and impacting peripheral devices.

■ Use a protective cover where there is direct sunlight.

⚠ CAUTION

■ Do not use a spiral hose.
Especially when used at the vacuum side, malfunction due to the piping resistance will occur as below.
(1) Delay of vacuum achievement time
(2) Loss of vacuum at the suction end due to lowering of flow rate
(3) Unstable operation of the vacuum switch

■ Be sure that the vacuum side piping is as short as and with the largest I.D. possible. Piping that is too long or thin may cause the response time to be delayed when releasing, and make it difficult to ensure the required suction flow rate.

■ Pipe the vacuum pressure switch and ejector with vacuum pressure switch as close to the end of vacuum piping as possible. If the vacuum pressure switch and the end of the vacuum piping are far apart, the piping resistance and sensor degree of vacuum may increase even when there is no suction, which may cause malfunction in the vacuum pressure switch.

■ In the manifold vacuum ejector, when an operating ejector and an inoperative ejector are mixed, exhaust air is led into the ejector not in operation and output from the vacuum port. For example, lightweight workpieces may be blown away. Therefore, do not use under conditions which might affect the workpiece.
[Compatible models]
VSNM Series all types
VSXM Series all types
VSKM Series (Unit combination: G, J and L types)
VSZM Series all types

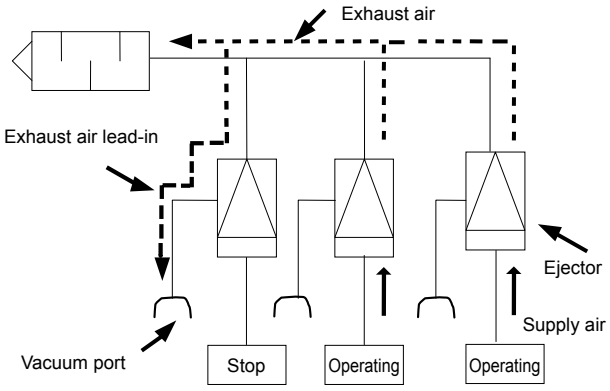


Figure 1: Example of exhaust lead-in (VSXM)

Use/maintenance

⚠ WARNING

■ Do not use the product so as to block the exhaust port of the ejector or increase the exhaust resistance. It may prevent vacuum generation or cause the vacuum pressure to drop.

■ Regularly perform maintenance and inspection for the silencer element of the ejector and filter element of the vacuum filter. A clogged element could decrease performance and cause other problems.

■ When replacing the element, be sure to understand the section about the vacuum ejector replacement element in this text.

■ Do not apply high tensile force or bending force to the lead wire. Failure to observe this could lead to disconnection.

■ If the product uses a lock nut, tighten it securely by hand without using a tool. Tightening with a tool may cause damage to the lock nut or the body. Also, if not tightened securely, the lock nut may loosen and cause errors in the initial setting.

■ Do not forcibly oscillate or rotate products with rotating resin bodies. It could damage or cause leakage in the body.

⚠ CAUTION

■ The filter's clear cover for VSG, VSK, VSJ, VSZ and VSX is made of special polyester. Avoid using in an atmosphere containing chemicals (see below) or in a place where these chemicals could come in contact, as there is a risk of damage.

● Table: Chemical names

Chemical name
All alcohols
Paint thinner
Carbon tetrachloride
Chloroform
Acetic ester
Aniline
Cyclohexane
Trichloroethylene
Sulfuric acid
Lactic acid
Water-soluble cutting oil (alkaline)

* There are other chemicals which cannot be used. Contact the nearest CKD Sales Office for details.

■ The clear cover of the vacuum filter (VSFU and VSQ Series) is made of nylon. Avoid using in an atmosphere containing chemicals (see table below) or in a place where these chemicals could come in contact, as there is a risk of damage.

● Table: Chemical names

Chemical name
Methanol
Ethanol
Nitric acid
Sulfuric acid
Hydrochloric acid
Lactic acid
Acetone
Chloroform
Aniline
Trichloroethylene
Hydrogen peroxide

* There are other chemicals which cannot be used. Contact the nearest CKD Sales Office for details.

Product-specific cautions: Mechanical vacuum pressure switch

Design/selection

⚠ WARNING

■ Do not use the mechanical vacuum pressure switch in flammable or explosive gases, fluids, or atmospheres. This risks causing fire or explosion, as the vacuum switch does not have an explosion-proof structure.

⚠ CAUTION

■ Do not use this product in areas containing water droplets, oil droplets, dust, etc. This risks causing damage, as the mechanical vacuum pressure switch does not have a drip-proof or dust-proof structure.

■ The mechanical vacuum pressure switch performance will not change even if pressure of about 0.5 MPa is instantaneously applied, but do not apply pressures of 0.2 MPa or greater during vacuum burst. If constantly applied, it risks damaging the switch.

■ Use the mechanical vacuum pressure switch within the specification pressure range. If used outside the set pressure range, hysteresis may cause malfunction.

Mounting, installation and adjustment

⚠ CAUTION

■ Make sure to turn the power OFF before wiring the mechanical vacuum pressure switch. Also, be sure to check the color of the lead wire and take care to avoid miswiring.

Product-specific cautions: Electronic vacuum pressure switch

Design/selection

⚠ WARNING

■ Do not use in flammable or explosive gases, fluids, or atmospheres. This risks causing fire or explosion, as the vacuum pressure switch does not have an explosion-proof structure.

⚠ CAUTION

■ Do not use in atmospheres or gases containing corrosive substances. There is a danger that it could damage the vacuum pressure switch.

■ Do not perform wiring or usage that would introduce noise (surge), etc. There is a danger that it could damage the vacuum pressure switch.

■ Do not use this product in areas containing water droplets, oil droplets, dust, etc. This risks causing damage, as the vacuum pressure switch does not have a drip-proof or dust-proof structure.

■ Do not use where the heat generated risks exceeding the operating temperature range. There is a danger that it could damage the vacuum pressure switch.

■ The vacuum pressure switch performance will not change even if pressure of about 0.5 MPa is instantaneously applied, but do not apply pressure of 0.2 MPa or greater during vacuum burst. If constantly applied, it risks damaging the vacuum pressure switch.

Mounting, installation and adjustment

⚠ CAUTION

■ Make sure to turn the power OFF before wiring. During wiring, check the wire color and do not short-circuit the output terminal and power supply terminal or common terminal. Short-circuiting could cause vacuum pressure switch malfunction.

■ Do not apply high tensile force or bending force to the extraction cable. It risks causing disconnection or damage to the connector unit.

■ When setting the pressure and hysteresis, use a small screwdriver and gently rotate within the rotation range of the trimmer, without applying excessive force. If excessive force is applied during adjustment, it risks damaging the trimmer and base.

- Use a stable DC power supply.
- Avoid use with surge voltage absorbing circuit current exceeding 80 mA when connecting to an output terminal or power supply terminal (relay, solenoid valve etc.).
- When using a unit power supply such as switching power supply, ground the F.G. (frame ground).

Suction pad

Product-specific cautions: Suction pad

Design/selection

⚠ WARNING

- If the suctioned object (workpiece) is at risk of falling off, be sure to provide a preventive measure for safety.
- Take care when swiveling transportation is performed with a screw-fixed pad. The screws may loosen due to turning, causing problems and leading to dangerous conditions.
- When performing transport with the pad, consider the acceleration, impact and wind pressure. The suctioned object may come off during transportation.
- Because the compact suction pad holder is smaller and lighter than the conventional suction pad holder, the load resistance is inferior to the conventional accessory. Make sure that the load setting is sufficient and be sure to check using the actual device.

⚠ CAUTION

- The buffer type holder is suitable for the suction of objects with irregular heights or those prone to damage due to external force. Be sure to check the buffer force and stroke length in the catalog before use.
- When using the buffer type holder, make sure that the lateral force is minimized as it has a sliding part. Failure to do so could lead to decreased holder service life or malfunction.
- For compact suction pads, when mounting pads with diameter ø0.7, ø1 or ø1.5 mm, do not apply a load of 0.4 (N) or greater to the lip during suction. If an excessive load is applied to the lip, the pad bore may collapse due to rubber elasticity, and may prevent it from suctioning workpieces, causing the suction confirmation signal to malfunction.
- The fiber tube antistatic UP-9402 Series and the fiber tube for barbed fitting UP-9102 Series cannot be used for push-in fittings with port size of ø1.8. (Recommended tube: fiber tube clean-room EH-5802 Series or polyurethane tube UB01810 Series manufactured by PISCO Japan.)
- When using a conductive suction pad, select the suction pad holder carefully and take measures to let static electricity escape through a metal plate, etc. Static electricity may remain charged in the suction pad. Non-conductive holders are also available.
- Pad frames of pad O.D. ø80 mm or greater have no conductivity. When using suction pads of static dissipative rubber, conductive rubber (low resistance) or conductive NBR (low resistance), take measures to let electricity pass directly from the pad rubber.
- When setting a free holder with optional settings and using a conductive suction pad, be sure to take measures to let electricity escape directly from the pad rubber.
- Due to the nature of rubber, additives and other substances contained in the suction pad may float to the surface over time.
- Depending on the conditions of use, the workpiece and rubber pad may come in contact with each other and refuse to separate. Be sure to check using the actual device.
- Pads with bellows shape may stick to each other due to the characteristics of the material, depending on the usage.
  In addition, since stickiness may increase due to operating environment and pad wear, review the pad shape, material, quantity, etc. as necessary.

Mounting, installation and adjustment

⚠ WARNING

■ When mounting the pad holder, be sure to fix it securely. Looseness may cause malfunction.

⚠ CAUTION

■ Standard suction pads VSP-□1R□ to □4R□ cannot be mounted on compact suction pad holders. These pads support use with the standard suction pad holder.

■ When using the buffer type holder, make sure that the lateral force is minimized as it has a sliding part. It may cause a decrease in the life of the holder or malfunction.

■ When mounting and fixing using the partition wall of the standard pad holder and compact pad holder, be sure to check the dimensions in the catalog, use appropriate tools according to the recommended tightening torque below and tighten without looseness using the hexagonal part of the holder outer diameter.

● Table Recommended tightening torque

Pad holder type	Standard		Compact	
Pad holder shape	Fixed	Buffer	Fixed	Buffer
Nut size (mm)	Tightening torque			
M3×0.5	0.7 N·m	-	0.7 N·m	-
M4×0.5	-	-	1 to 1.2 N·m	-
M4×0.7	1 to 1.2 N·m	-	-	-
M5×0.5	1.5 to 2 N·m	-	1.5 to 2 N·m	-
M5×0.8	1 to 1.5 N·m	-	1 to 1.5 N·m	-
M6×0.75	2 to 3 N·m	-	2 to 3 N·m	
M8×0.75	2.5 to 3.5 N·m	1.8 to 2.4 N·m	2.5 to 3.5 N·m	
M8×1	-	1.8 to 2.4 N·m	-	-
M10×1	5 to 7 N·m	4.5 to 6 N·m	5 to 7 N·m	4 to 6 N·m
M12×1	12 to 14 N·m	8 to 10 N·m	-	-
M14×1	18 to 21 N·m	4.5 to 6 N·m	-	-
M16×1	-	2 to 3 N·m	-	-
M20×1	19 to 21 N·m	-	-	-
M22×1	-	16 to 20 N·m	-	-
M24×2	40 to 50 N·m	-	-	-
M30×2	-	42 to 54 N·m	-	-

Use/maintenance

⚠ WARNING

■ Malfunctions may occur due to leakage or clogging in the vacuum circuit as well as abrasion, cracking or deterioration of the pad, galling of the sliding part of the pad holder, or loose connections. Be sure to perform maintenance checks regularly.

⚠ CAUTION

■ When replacing the pad, be sure to check the suction pad configuration diagram in the catalog, use appropriate tools according to the recommended tightening torque below and tighten without looseness using the hexagonal part of the holder outer diameter.

● Table Recommended tightening torque

Pad holder type	Standard	Compact
Pad thread size (mm)	Tightening torque	
M3×0.5	-	0.7 N·m
M4×0.7	0.5 to 1.0 N·m	0.9 to 1.1 N·m
M5×0.8	1 to 1.5 N·m	
M6×1	2 to 2.7 N·m	
M10×1.5	5 to 7 N·m	-
M20×2	9 to 10 N·m	-

■ When replacing a soft or soft bellows type pad adaptor, be sure to check the suction pad configuration diagram in the catalog, use appropriate tools according to the recommended tightening torque below and tighten without looseness using the hexagonal part of the holder outer diameter.

● Table Recommended tightening torque

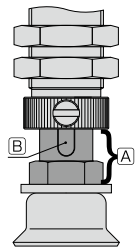
Pad thread size (mm)	Tightening torque
M4×0.7	0.7 to 0.8 N·m
M6×1	1.5 to 2.0 N·m

■ When replacing the standard type pad rubber with pad diameter of ø80 or ø100 mm and bellows type of ø80 mm, be sure to check the configuration diagram in the catalog, use appropriate tools according to the recommended tightening torque below and tighten without looseness using the hexagonal part of the holder outer diameter.

● Table Recommended tightening torque

Thread size (mm)	Tightening torque
M4×0.7	0.5 to 0.7 N·m
M5×0.8	

■ When mounting the buffer type pad holder, do not use a wrench or the like on the shaft (refer to Ⓐ in the figure at right). Also, when replacing the pad, be sure to fix the hexagonal head bolt with a wrench or the like. Malfunction may be caused by deformation of the key groove of the shaft (refer to Ⓑ in the figure at right).



Vacuum generator selection guide

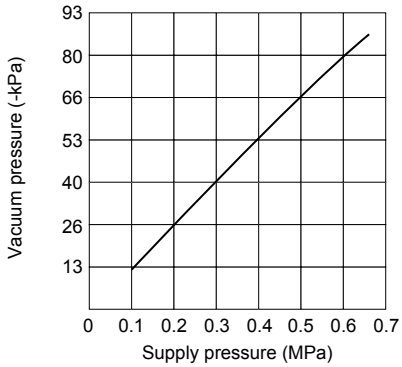
There are basically three types of CKD vacuum generator according to performance: H: high vacuum, L: large flow (efficiency emphasized), E: low supply pressure, high vacuum. Select according to the condition of use.

- Deciding between H (high vacuum) and E (low supply pressure high vacuum)
  If high vacuum is required and supply pressure of 0.5 MPa can be secured, use H. If it cannot be secured or in order to conserve consumed air, use E at 0.35 to 0.4 MPa.

- Deciding between H (high vacuum) and L (large flow type (efficiency emphasized))
  Use H when high vacuum is required and L to adjust the vacuum pressure, setting the desired vacuum pressure by adjusting the supply pressure with a regulator or the like.
  The vacuum pressure characteristics of L are essentially proportional to the supply pressure, and are set as shown in Fig. 1 between 0.2 to 0.6 MPa. Although differences of -5% to +15% with respect to the target value will occur, the vacuum pressure can be set based on the supply pressure.

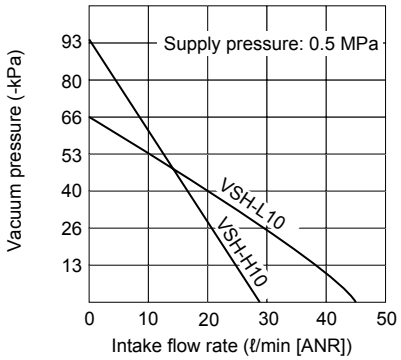
- When the pad does not make complete contact
  If the workpiece cannot adhere completely to the suction pad, the criterion for deciding between H or L comes down to the degree of vacuum pressure in the vacuum system. Fig. 2 Vacuum pressure - intake flow rate shows that H is preferable at vacuum pressure -53 kPa or greater, and L at -40 kPa or less.

L achieved vacuum characteristics



(Fig. 1)

Vacuum pressure - Intake flow rate for VSH-H10 and VSH-L10



(Fig. 2)

Other precautions

- Valve used
  When using a solenoid valve or the like, be sure to allow a sufficient flow rate.
  (Use a valve with effective cross-sectional area three times or greater than the cross-sectional area of the nozzle.)

- Vacuum piping
  The piping resistance in vacuum is surprisingly large. Shorten the vacuum piping as much as possible and use a large inner diameter. Excessive piping resistance may cause malfunction, especially when a vacuum switch or the like is used. Also, ejector intake flow rate will decrease, which may result in performance degradation due to insufficient flow rate.

- Supply side piping
  Pay attention to air supply side piping as well. Be sure to perform piping so that the prescribed pressure is secured at the ejector input.

Vacuum

■ Vacuum

Pressure higher than atmospheric pressure is generally referred to as "positive pressure" and pressure lower than atmospheric pressure is called "vacuum" or "negative pressure".

Vacuum pressure

The word pressure refers to two different things.

· Absolute pressure: Pressure based on a perfect vacuum state

· Gauge pressure: Pressure based on atmospheric pressure

If the vacuum pressure is not very high, it is commonly expressed by gauge pressure.

For high vacuum close to perfect vacuum, at standard atmospheric pressure, perfect vacuum is defined as -101.3 kPa, but since the atmospheric pressure is always fluctuating, the perfect vacuum pressure may become unclear and cannot be shown with gauge pressure. For this reason, high vacuum is commonly expressed with absolute pressure.

CKD's vacuum generator is in the low vacuum range and shows the vacuum pressure in gauge pressure.

Atmospheric pressure and vacuum pressure

Air has weight, as it is "matter". On earth, anything with mass will be affected by gravity. This includes the atmosphere, which causes a force (weight) that pushes on the ground surface. This is atmospheric pressure, which is force generated by the weight of the atmosphere per unit area.

Atmospheric pressure varies according to elevation. It is also constantly fluctuating due to weather conditions.

In other words, when using gauge pressure, there will be dispersion in the atmospheric pressure according to elevation and weather conditions, so even if the same vacuum pressure is applied, the value indicated by the gauge will be different depending on these factors. For this reason, correction values converted to standard atmospheric pressure are used for gauge pressure values.

Standard atmospheric pressure is expressed as a value based on atmospheric pressure at 0 m above sea level.

The conversion method is as follows:

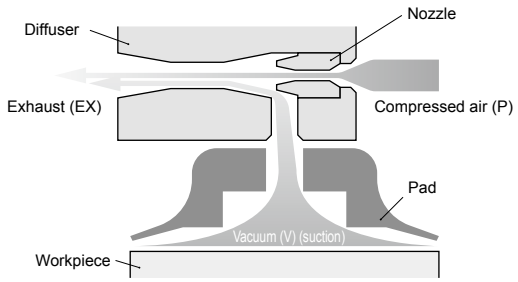
Standard atmospheric pressure converted value (-kPa) =
1013.25 (hPa)/atmospheric pressure (hPa) at measurement location x measured achieved vacuum pressure (-kPa)

Principles of the vacuum generator

■ The vacuum generator is a device that generates vacuum by feeding compressed air.

■ Compressed air is restricted by the nozzle, discharged at high speed and fed into the diffuser. When jetted at high speed, the pressure drops and vacuum is generated, for use in transporting workpieces.

■ In order to obtain a high speed jet and high degree of vacuum, structures called nozzle and diffuser are constructed, with shapes and sizes determining the achieved vacuum pressure, intake flow rate and consumption flow rate.



Vacuum component display units

■ Vacuum component parameters

The following three parameters are used as performance indicators for vacuum components.

· Achieved vacuum pressure ... Vacuum pressure in vacuum circuit (unit: -kPa)

· Intake flow rate ... Flow rate in vacuum circuit (unit: ℓ/min (ANR))

· Consumption flow rate ... Flow rate of supply air (unit: ℓ/min (ANR))

■ Pressure parameters

kPa	MPa	bar	kgf/cm^2	mmHg
1	1×10^{-3}	1×10^{-2}	1.01972×10^{-2}	7.50062
1×10^{3}	1	1×10	1.01972×10	7.50062×10^{3}
1×10^{2}	1×10^{-1}	1	1.01972	7.50062×10^{2}
9.80665×10	9.80665×10^{-2}	9.80665×10^{-1}	1	7.35559×10^{2}
1.33322×10^{-1}	1.33322×10^{-4}	1.33322×10^{-3}	1.35951×10^{-3}	1

■ Force parameters

N	kgf
1	1.01972×10^{-1}
9.80665	1

Vacuum system components

Vacuum components selection method

When suctioning and conveying workpieces by vacuum, select the suction pad, vacuum generator and vacuum switching valve according to the following Vacuum component selection method. The Vacuum component selection method here is only a guideline for selecting equipment. In actual use, be sure to evaluate the actual device, check the precautions for selection and confirm that the equipment is problem-free.

Vacuum component selection method

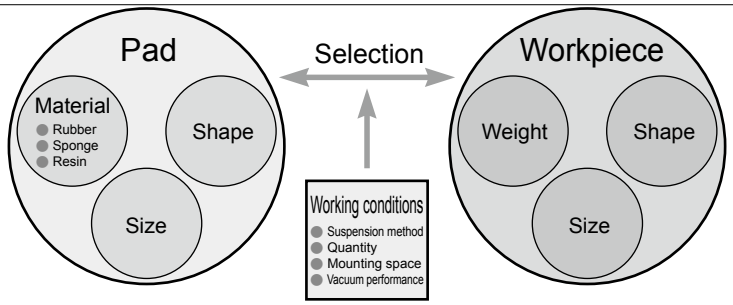
1 Selecting the pad
- ① How to determine the suction force
- ② How to calculate the pad diameter from the suspension load of the workpiece
- ③ Selecting the pad shape
- ④ Selecting the pad material
- ⑤ Note on model No. selection

2 Selecting the vacuum generator/vacuum switching valve
- ① Various working conditions
- ② Selection procedure
- ③ Note on model No. selection

1 ▶ Selecting the pad

Three main items (pad, workpiece and use conditions) are involved in selecting pads as shown on the right. Understand these well when selecting pads.

The pad size (diameter) is obtained by calculating the suction force of the pad.



① How to determine the suction force

● How to calculate from the formula

The suction force of the suction pad can be calculated by assigning values to the following formula.

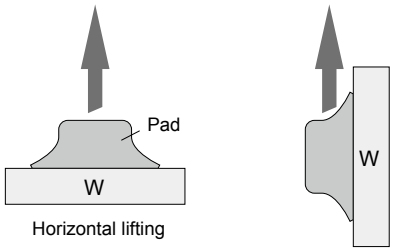
$$W = \frac{C \times P}{101} \times 10.13 \times f$$

W: Suction force (N), C: Pad area (cm^2), P: Vacuum pressure (-kPa)
f: Safety factor (horizontal lifting: 1/4 or greater, vertical lifting: 1/8 or greater)

● Selecting from the theoretical suction force table

The theoretical suction force of the suction pad can be obtained from the following table. However, safety ratios are not included in the values in the following table. Take the safety factor into account when obtaining the suction force.
Suction force (N) = theoretical suction force (N)/f (safety factor)

1 Theoretical suction force table (suction force = $\frac{C \times P}{101} \times 10.13$)



* The basic suspension method is horizontal.

■ For circular pad

Unit: N

Pad diameter (ømm)		0.7	1	1.5	2	3	4	6	8	10	15	20	25	30	35	40	50	60	70	80	100	150	200
Suction area (cm^2)		0.004	0.008	0.018	0.031	0.071	0.126	0.283	0.502	0.785	1.766	3.14	4.906	7.065	9.616	12.56	19.63	28.26	38.47	50.24	78.5	176.6	314
Vacuum pressure (kPa)	-85	0.034	0.068	0.153	0.264	0.604	1.07	2.41	4.27	6.67	15.01	26.7	41.7	60.05	81.74	106.8	166.9	240.2	327	427	667.3	1501	2669
	-80	0.032	0.064	0.144	0.248	0.568	1.01	2.26	4.016	6.28	14.13	25.1	39.25	56.52	76.93	100.5	157	226.1	307.8	401.9	628	1413	2512
	-75	0.03	0.06	0.135	0.233	0.533	0.945	2.12	3.765	5.89	13.25	23.6	36.8	52.99	72.12	94.2	147.2	212	288.5	376.8	588.8	1325	2355
	-70	0.028	0.056	0.126	0.217	0.497	0.882	1.98	3.514	5.5	12.36	22	34.34	49.46	67.31	87.92	137.4	197.8	269.3	351.7	549.5	1236	2198
	-65	0.026	0.052	0.117	0.202	0.462	0.819	1.84	3.263	5.1	11.48	20.4	31.89	45.92	62.5	81.64	127.6	183.7	250.1	326.6	510.3	1148	2041
	-60	0.024	0.048	0.108	0.186	0.426	0.756	1.7	3.012	4.71	10.6	18.8	29.44	42.39	57.7	75.36	117.8	169.6	230.8	301.4	471	1060	1884
	-55	0.022	0.044	0.099	0.171	0.391	0.693	1.56	2.761	4.32	9.713	17.3	26.98	38.86	52.89	69.08	108	155.4	211.6	276.3	431.8	971.3	1727
	-50	0.02	0.04	0.09	0.155	0.355	0.63	1.42	2.51	3.93	8.83	15.7	24.53	35.33	48.08	62.8	98.15	141.3	192.4	251.2	392.5	883	1570
	-45	0.018	0.036	0.081	0.14	0.32	0.567	1.27	2.259	3.53	7.95	14.1	22.08	31.79	43.27	56.52	88.34	127.2	173.1	226.1	353.3	794.7	1413
	-40	0.016	0.032	0.072	0.124	0.284	0.504	1.13	2.008	3.14	7.064	12.6	19.62	28.26	38.46	50.24	78.52	113	153.9	201	314	706.4	1256

■ For oval pad

Unit: N

Pad diameter (ømm)		4×10	4×20	4×30	5×10	5×20	5×30	6×10	6×20	6×30	8×20	8×30
Suction area (cm^2)		0.365	0.765	1.165	0.446	0.946	1.446	0.522	1.122	1.722	1.462	2.262
Vacuum pressure (kPa)	-85	3.103	6.503	9.903	3.791	8.041	12.29	4.437	9.537	14.64	12.43	19.23
	-80	2.92	6.12	9.32	3.568	7.568	11.57	4.176	8.976	13.78	11.7	18.1
	-75	2.738	5.738	8.738	3.345	7.095	10.85	3.915	8.415	12.92	10.97	16.97
	-70	2.555	5.355	8.155	3.122	6.622	10.12	3.654	7.854	12.05	10.23	15.83
	-65	2.373	4.973	7.573	2.899	6.149	9.399	3.393	7.293	11.19	9.503	14.7
	-60	2.19	4.59	6.99	2.676	5.676	8.676	3.132	6.732	10.33	8.772	13.57
	-55	2.008	4.208	6.408	2.453	5.203	7.953	2.871	6.171	9.471	8.041	12.44
	-50	1.825	3.825	5.825	2.23	4.73	7.23	2.61	5.61	8.61	7.31	11.31
	-45	1.643	3.443	5.243	2.007	4.257	6.507	2.349	5.049	7.749	6.579	10.18
	-40	1.46	3.06	4.66	1.784	3.784	5.784	2.088	4.488	6.888	5.848	9.048

Vacuum components selection method

1 ▶ Selecting the pad

② How to calculate the pad diameter from the suspension load of the workpiece

● How to calculate from the formula

The vacuum pad diameter can be calculated from the required suction force.

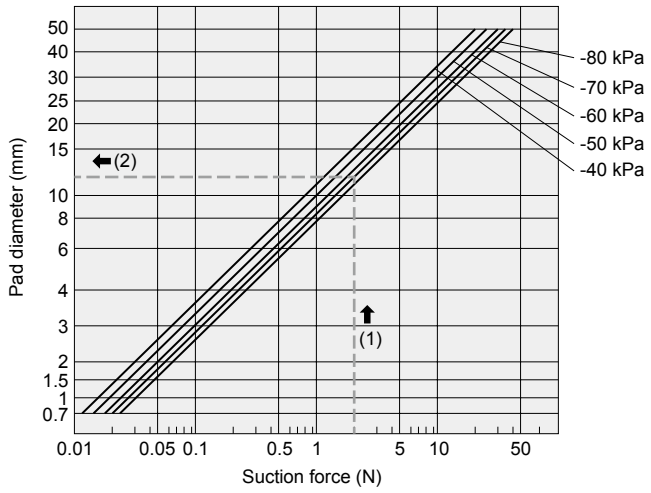
$$D = \sqrt{\frac{4}{3.14} \times \frac{1}{P} \times \frac{W}{n} \times \frac{1}{f} \times 1000}$$

D: Pad diameter (mm), n: Pad quantity for workpiece, W: Suction force (N), P: Vacuum pressure (-kPa), f: Safety factor (horizontal suspension: 1/4 or greater, vertical suspension: 1/8 or greater)

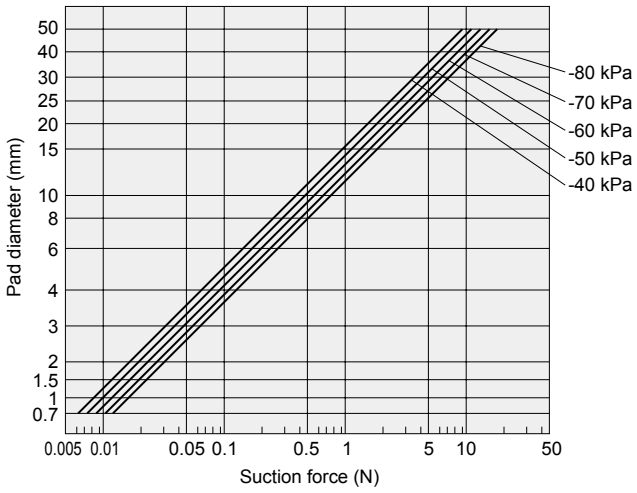
● Selecting from selection graph

The suction pad diameter can be obtained from the following table based on the suspension method (vertical or horizontal) to be used and required suction force per vacuum pad.

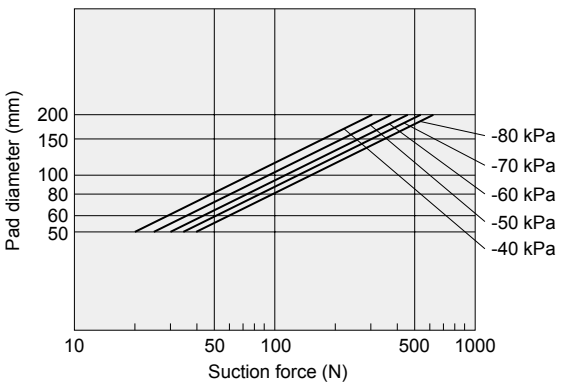
Selection graph 1-1 Graph of pad diameter selection by suction force
Horizontal suspension (ø2 to ø50)



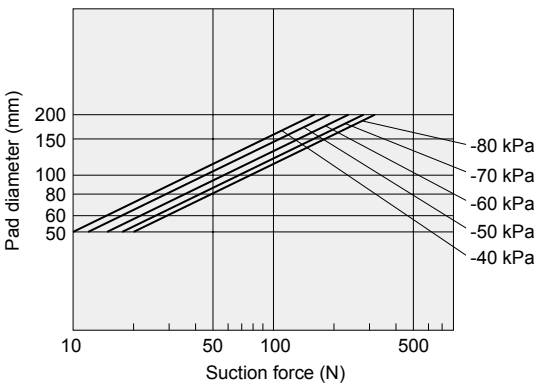
Selection graph 2-1 Graph of pad diameter selection by suction force
Vertical suspension (ø2 to ø50)



Selection graph 1-2 Graph of pad diameter selection by suction force
Horizontal suspension (ø50 to ø200)



Selection graph 2-2 Graph of pad diameter selection by suction force
Vertical suspension (ø50 to ø200)



Example (selecting pad diameter)

When the weight of the workpiece is 8 N:
- · Number of pads: 4
- · Vacuum pressure: -70 kPa
- · Suspension method: Horizontal

Obtain the vacuum pad diameter.

Using the formula

$$D = \sqrt{\frac{4}{3.14} \times \frac{1}{P} \times \frac{W}{n} \times \frac{1}{f} \times 1000} = \sqrt{\frac{4}{3.14} \times \frac{1}{70} \times \frac{8}{4} \times 4 \times 1000} = 12.06$$

Therefore, select a pad of ø15 mm or greater.

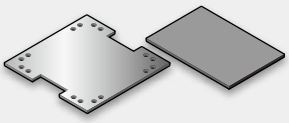
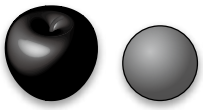
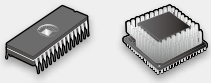
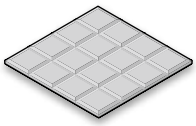
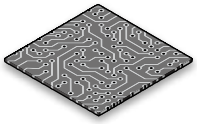
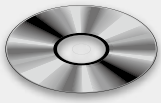
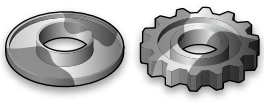
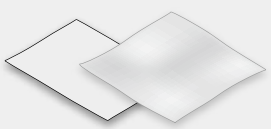
Using the selection graph

Conditions show that the suction force per pad is 2N (8N/4 pieces = 2N).
As the suspension method is horizontal (selection graph 1) and vacuum pressure is -70 kPa (horizontal axis of selection graph), we see that the pad diameter is equivalent to ø12 mm. Therefore, select a pad of diameter ø15 mm or greater. (Selection graph 1 ① → ② order)

Vacuum system components

③ Selecting the pad shape

Select the shape of the pad according to the shape and material of the workpiece. If you need to perform suction tests on the sample, consult the nearest CKD Sales Office.

Pad shape	Recommended workpiece	Features
Standard: Standard	 Ideal for flat workpieces (hard and inflexible)	• Compatible with a wide variety of pad sizes (18 types, ø1 to ø200) and pad materials (8 types) as standard
Standard: Deep	 Ideal for spherical workpieces (apples, balls, etc.)	• The deep inner pad makes it ideal for workpieces with spherical surfaces or protrusions
Standard: Compact	 Ideal for semiconductor components	• Small diameter sizes of ø0.7, ø1.0 and ø1.5 are available for compatibility with compact semiconductor parts • 10 types of pad materials are available, corresponding to various environmental conditions
Sponge	 Ideal for workpieces such as building outer wall materials, small stones and shells	• New lineup of silicone rubber sponges suitable for food-related workpieces is available
Bellows	Ideal for retort-packs and bags containing food, etc.	• Usable when the spring buffer cannot be attached or when the workpiece is tilted • Now available: a new retrofitting resin attachment (for bellows) ideal for workpieces which must not have suction traces
Multi-stage bellows		
Oval	 Ideal for long workpieces like substrates, round bars and semiconductor parts	• Small sizes (2 x 4, 3.5 x 7) that correspond to workpieces with small suction surfaces available
Soft	 Ideal for taking out molded parts or easily damaged workpieces	• Pad is flexible and can suction paper, etc.
Soft bellows		• Pad is flexible and can suction paper, etc. • Usable when the spring buffer cannot be attached or when the workpiece is tilted
Anti-slip	 Ideal for workpieces with oil adhered such as press parts	• Grip grooves are provided on the pad suction surface to prevent slippage when transporting oily iron plates
Thin object	 Ideal for thin workpieces such as copy paper and vinyl	• Thin pad lips improve adhesion to workpieces, allowing use on thin workpieces and reducing overlap suction • Since the pad surface is flat, it causes fewer wrinkles
Flat	Ideal for thin workpieces such as sheets and vinyl	• The workpiece suction surface is flattened to reduce deformation/wrinkling of the workpiece during suction
Suction mark prevention	Ideal for liquid crystal glass, painting process and semiconductor manufacturing equipment, etc.	• Resin pad reduces suction marks • The holder is equipped as standard with a flexible mechanism for better adaptability to the workpiece

Vacuum components selection method

1 ▶ Selecting the pad

④ Selecting the pad material

Select suitable materials according to usage conditions, used fluids and atmosphere. For the main characteristics, refer to the table below.

■ Pad material list

		Pad material															
		Rubber material													Resin material		
		Nitrile rubber	Silicone rubber	Urethane rubber	Fluoro rubber	Chloroprene rubber	Fluorosilicone rubber	HNBR	EPDM	Static dissipative silicone rubber	Conductive rubber (low resistance)	Conductive NBR (low resistance)	NBR compatible with Food Sanitation Act	Oil-resistant NBR	PEEK	POM	Conductive PEEK
		N	S	U	F	Blank	FS	HN	EP	SE	E	NE	G	NH	K	M	KE
High-temperature usage limits		110°C	180°C	60°C	230°C	80°C	180°C	140°C	150°C	180°C	100°C	110°C	110°C	110°C	250°C	95°C	250°C
Low-temperature usage limits		-30°C	-40°C	-20°C	-10°C	-45°C	-50°C	-30°C	-40°C	-40°C	-50°C	-30°C	-30°C	-30°C	-50°C	-60°C	-50°C
Weather resistance		△	◎	○	○	○	○	○	◎	◎	○	△	△	△	◎	○	◎
Ozone resistance		×	◎	◎	◎	○	◎	○	◎	◎	×	△	×	×	-	-	-
Acid resistance		△	○	×	◎	△	○	△	◎	○	△	△	△	△	◎	×	◎
Alkali resistance		○	◎	×	×	◎	◎	○	◎	◎	○	○	○	○	◎	○	◎
Oil resistance	(Gasoline/light oil)	◎	△	◎	◎	×	△	◎	×	△	×	◎	◎	◎	-	-	-
	(Benzene/toluene)	△	△	△	◎	△	△	×	×	△	×	△	△	△	-	-	-
Self-lubrication		-	-	-	-	-	-	-	-	-	-	-	-	-	○	○	○
Abrasion resistance		-	-	-	-	-	-	-	-	-	-	-	-	-	◎	○	◎
Volume resistance ratio		-	-	-	-	-	-	-	-	10^5 Ω·cm or less	200 Ω·cm or less	200 Ω·cm or less	-	-	-	-	10^5 to 10^6 Ω·cm

Reading the rating ⇒ ◎ : Ideal, ○ : Suitable, △ : Good, x: Unsuitable

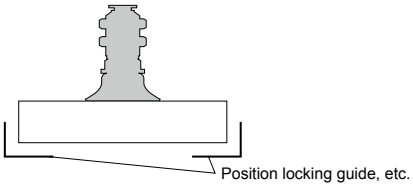
■ Main application classification by pad material/shape

			Recommended workpieces, environments, etc.															
			Cardboard	Plywood	Iron plate	Food-related	Semiconductor	Molded products	Thin object	Chemical atmospheres	High temperature workpieces	Low ozone environments	Light resistance, ozone resistance required	Moist atmospheres	Uneven surfaces	Packaging machine	Electronic device parts	Liquid crystal manufacturing equipment
Pad material	Rubber material	Nitrile rubber	○	○	○	○								○		○		
		Silicone rubber				○	○	○	○		○	○		○		○		
		Urethane rubber	○	○	○							○				○		
		Fluoro rubber					○			○	○	○		○		○		
		Chloroprene rubber (sponge)				○								○	○			
		Fluorosilicone rubber						○			○	○		○		○		
		HNBR	○	○	○	○						○		○				
		EPDM										○	○	○				
		Static dissipative silicone rubber				○	○	○	○		○			○		○	○	
		Conductive rubber (low resistance)					○										○	
		Conductive NBR (low resistance)	○	○	○	○								○		○	○	
		NBR compatible with Food Sanitation Act	○	○	○	○								○				
		Oil-resistant NBR	○	○	○	○								○		○		
	Resin material	PEEK					○							○				○
		POM										○		○		○		
		Conductive PEEK					○							○			○	○
Pad shape	Standard	Standard	○	○	○		○			○	○						○	
		Deep				○	○			○	○							
		Compact					○			○	○	○	○	○			○	
	Sponge					○	○								○			
	Bellows		○	○	○	○	○			○	○	○	○	○			○	
	Multi-stage bellows		○	○	○	○	○			○	○	○	○	○				
	Oval		○	○	○	○	○			○	○						○	
	Soft						○	○									○	
	Soft bellows		○	○	○		○	○				○	○	○				
	Anti-slip		○	○	○	○	○	○		○	○							
	For thin objects		○	○	○	○	○	○	○	○	○					○		
	Flat					○	○		○	○	○					○		
	Suction mark prevention						○									○	○	○

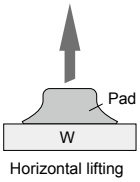
⑤ Note on model No. selection

CAUTION 1. Notes on selecting suction pads

- If the suctioned object (workpiece) is at risk of falling off, be sure to provide a preventive measure for safety.



- Consider horizontal suspension the basic method and select with a sufficient safety factor.



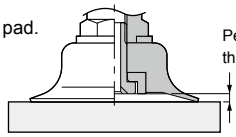
Horizontal lifting

- Calculate the suction force with consideration of not only the weight of the workpiece but the acceleration and impact as well.
- When setting the pad diameter, number of pads and suction position, be sure to fully understand the suction force in the catalog and select with a sufficient margin.
- Depending on the operating environment and usability, select the pad material with reference to the selection method in the catalog.
- The suitable pad shape (type) depends on the suctioned object and its shape, so read the Selection method carefully before selection.

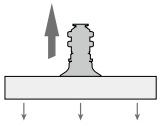
CAUTION 2. Notes for the use conditions of the suction pad

- When two or more pads are piped to a single vacuum source in a vacuum circuit, if one pad suffers suction failure (leakage), there is a danger that the other pads may be detached due to a decrease in vacuum pressure.
  As countermeasures, 1. Position locking valve
  2. Needle valve
  3. Vacuum switching valve
  can be used effectively.
  Also, when using a vacuum pump, a chamber (tank) can be effective aside from the 3 items above.

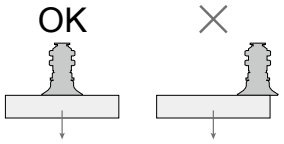
- When suctioning a workpiece, do not apply excessive impact or load to the suction pad. It may cause a drastic decrease in the durability of the suction pad. As a guideline, we recommend the deformation range of the lip or a setting in which it touches lightly.



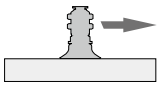
- The suction position of the workpiece by suction pad should be set so that moment will not be generated.



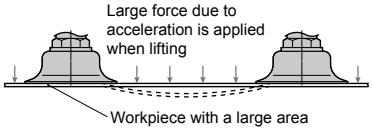
- Mount so that the suction pad does not protrude from the workpiece. Degradation of the degree of vacuum may cause the workpiece to fall.



- Reduce the acceleration of the lateral movement of the workpiece as much as possible.
  Depending on the friction coefficient of the workpiece, it may slip sideways.

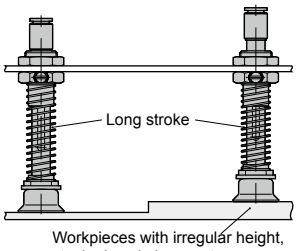


- When using a large, thin workpiece such as a glass plate or mounting substrate, be sure to consider the placement and moving acceleration of the suction pads.
  The workpiece may be deformed or damaged due to the position of the suction pad and acceleration.



- In environments where the workpiece may fall, please use an aid such as a position locking guide.

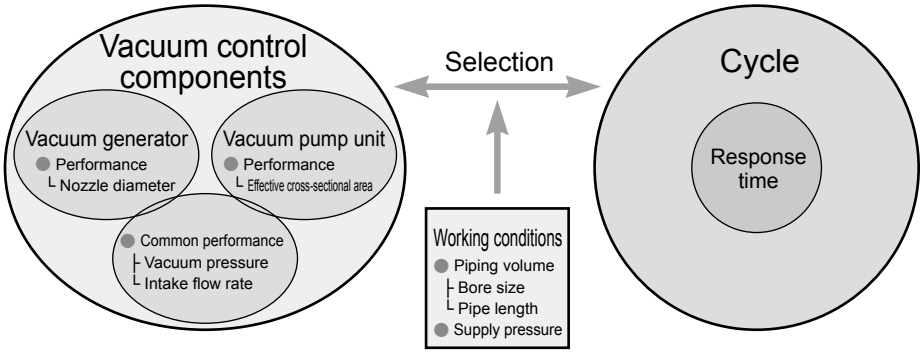
- The spring holder or long stroke type holder is suitable for the suction of objects with irregular height, those with steps, or those prone to damage due to external force.



Vacuum components selection method

2 ▶ Selecting the vacuum generator/vacuum switching valve

Three main items (vacuum control equipment, cycle and use condition) are involved in selecting the vacuum generator/vacuum pump compatible unit as shown on the right.
Understand these well when selecting vacuum generators/ vacuum switching valves.



① Various working conditions

A Vacuum piping volume

● How to calculate from the formula

The piping volume of the vacuum system can be calculated by assigning values to the following formula.

Piping volume

$$V = \frac{3.14}{4} D^2 \times L \times \frac{1}{1000}$$

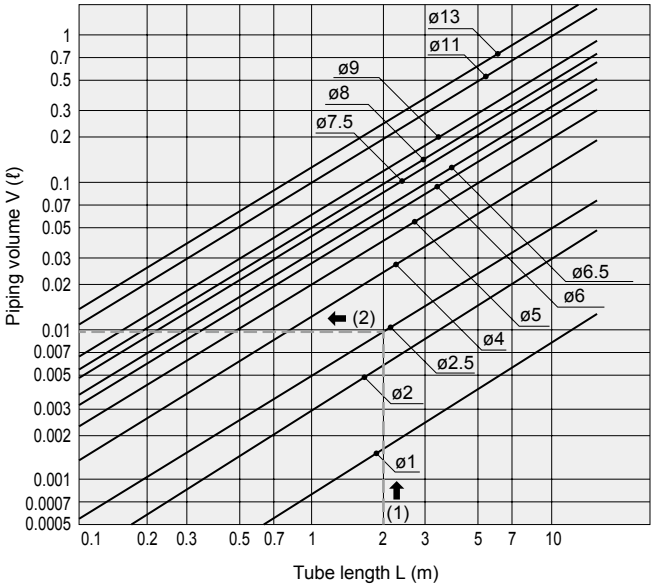
D: Piping bore size (mm)
L: Length from vacuum generator and switching valve to pad (m)
V: Piping volume from vacuum generator and switching valve to pad (ℓ)

● Selecting from selection graph

■ Obtain the piping volume of the vacuum system tube

Piping volume can be obtained from the table below.

Selection graph 3 Piping volume by tube inner diameter



Example

▶ When obtaining the volume of tubes with inner diameter of 2.5 mm (ø4 mm O.D.) and length of 2 m.

Using the formula

$$V = \frac{3.14}{4} D^2 \times L \times \frac{1}{1000} = \frac{3.14}{4} \times 2.5^2 \times 2 \times \frac{1}{1000} = 0.0098 \approx 0.01(\ell)$$

Using the selection graph

From the intersection of the horizontal tube with length 2 m and tube with inner diameter ø2.5 mm (ø4 mm O.D.), extend the piping to the left and obtain the piping volume ≈ 0.01 ℓ on the vertical axis.
Piping volume ≈ 0.01 ℓ

B Information on vacuum control components

Representative performance (information) of the vacuum control components (vacuum generator/vacuum pump compatible unit) is listed here. (For more information, refer to the ejector characteristics in this catalog.)

● For vacuum generator (VSH, VSU, VSB, VSC)

Vacuum characteristics list

Nozzle diameter (mm)	High vacuum: H		Large flow rate: L		Low supply pressure high vacuum: E	
	Vacuum pressure (kPa)	Intake flow rate (ℓ/min (ANR))	Vacuum pressure (kPa)	Intake flow rate (ℓ/min (ANR))	Vacuum pressure (kPa)	Intake flow rate (ℓ/min (ANR))
0.3	-90	2	-66	3 to 4	-88	1
0.4	-90	4	-66	7 to 7.5	-90	2
0.5	-90	7	-66	12	-90	3
0.7	-93 to -92	12.5 to 13	-66	22 to 26	-92 to -90	10 to 10.5
1	-93	28	-66	42	-92	21
1.2	-93	38	-	-	-92	27
1.5	-93	63	-66	95	-92	42
2	-93	110	-66	180	-92	84

*1. The supply pressure is high vacuum (H)/large flow (L): 0.5 MPa and low supply pressure high vacuum (E): 0.35 MPa.
*2. For vacuum generators other than the above, refer to the catalog text.

● For vacuum pump compatible units

Valve effective cross-sectional area list for vacuum pump compatible switching valve

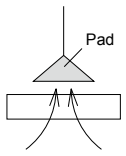
Type	Effective cross-sectional area (mm^2)		
	Vacuum supply solenoid valve		
VSJP	PV port size	ø4 mm	3.5
		ø6 mm	5
VSXP	PV port size	ø4 mm	3.5
		ø6 mm	4.5
VSXP-T	PV port size	ø4 mm	3
		ø6 mm	3.6
VSZPM	4.5		
VSQP	16.5		
VSNP	0.9		

① Various working conditions

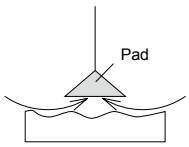
C Consideration when there is leakage

If leakage occurs between the pad and workpiece, it needs to be taken into account when quantifying the response time and selecting the vacuum control components.
If there is leakage, the vacuum pressure will inevitably decrease, which also needs to be taken into account.

Even in actual use, depending on the workpiece, leakage may occur, causing the vacuum pressure to decrease.
When selecting a vacuum generator and vacuum switching valve, it is necessary to take the amount of leakage into account.



Ventilated workpiece



Workpiece with rough surface

The following describes two methods, "How to calculate the amount of leakage when the effective cross-sectional area of the workpiece is known" and "How to calculate the amount of leakage by suction test".

● How to calculate the amount of leakage when the effective cross-sectional area of the workpiece is known

If the effective cross-sectional area (S_L) of the workpiece and opening of the suction pad is known, the amount of leakage can be calculated by the following formula.

Amount of leakage $Q_L = 11.1 \times S_L$

Q_L: Amount of leakage (ℓ/min (ANR))
S_L: Clearance between the workpiece and pad, and effective cross-sectional area of the opening of the workpiece (mm^2)

From the calculated leakage amount and flow rate characteristic diagrams of the vacuum generator and vacuum pump, it is possible to predict how much the value will drop using the gauge pressure.

Example

When using the vacuum generator (VSC-E12) to obtain the vacuum pressure that can be secured when the effective cross-sectional area of the workpiece and opening of suction pad is 0.4 mm^2.

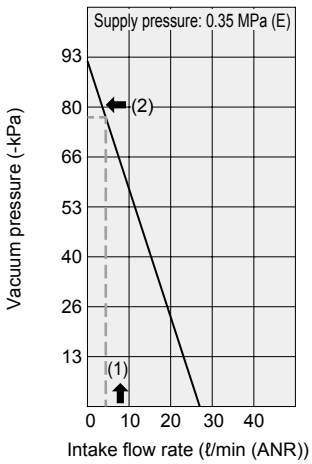
Point

Since the effective cross-sectional area of the workpiece and opening of the suction pad is known, the amount of leakage is calculated from the formula.
$Q_L = 11.1 \times S_L = 11.1 \times 0.4 = 4.4$ ℓ/min (ANR)
The actual vacuum pressure is calculated from the flow characteristics of the vacuum generator.

Answer

With the above formula for leakage amount,
$Q_L = 11.1 \times S_L = 11.1 \times 0.4 = 4.4$ ℓ/min (ANR)
From the flow characteristics of VSC-E12 (right figure), it can be predicted that a vacuum pressure of -77 kPa can be obtained if there is leakage of 4.4 ℓ/min (ANR).

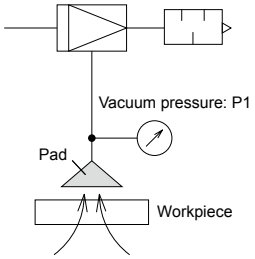
Flow characteristics



* Although the vacuum pressure for VSC-E12 is -92 to -90 kPa in the catalog, it can be seen that the actual vacuum pressure drops to -77 kPa due to the effective cross-sectional area of the workpiece and opening of the suction pad, so be sure to select the vacuum components in consideration of this effective sectional area.

● How to calculate the amount of leakage by suction test

If you do not know the effective cross-sectional area of the workpiece and opening of the suction pad, perform a test with the actual device and measure the amount of leakage as shown in the figure below.



Example

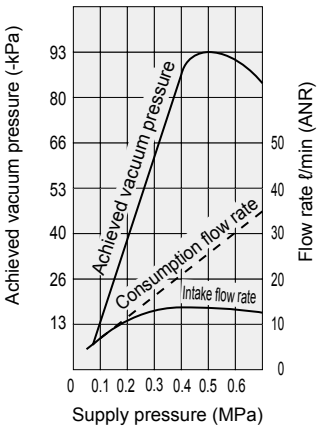
When suctioning a leaky workpiece with a vacuum generator (VSB-H07) at the supply pressure of 0.5 MPa, the vacuum gauge pressure showed -45 kPa. Calculate the amount of leakage from this workpiece.

Answer

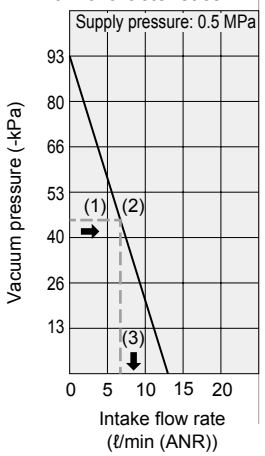
From the flow characteristics of the vacuum generator VSB-H07, it is found that the intake flow rate for -45 kPa is about 7 ℓ/min (ANR).
(in order of (1) → (2) → (3))
Amount of leakage ≈ 7 ℓ/min (ANR)

VSB-H07

Vacuum characteristics



Flow characteristics



* Regarding the flow characteristics of vacuum generators other than VSB-H07, refer to the characteristics of each product in the catalog.

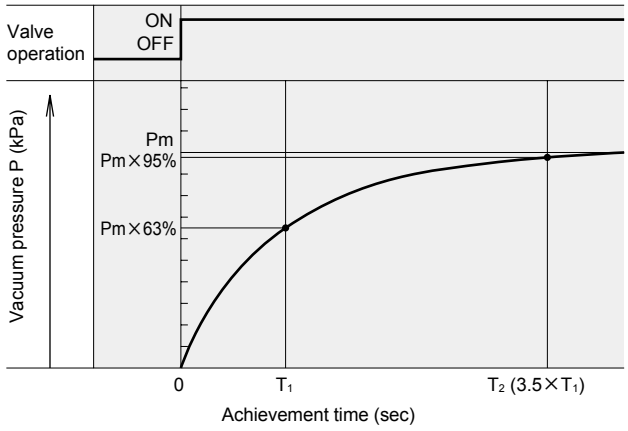
Vacuum components selection method

2 ▶ Selecting the vacuum generator/vacuum switching valve

② Selection procedure

Ⓐ Obtaining response time (when there is no leakage)

When the vacuum control components and use conditions are clear, the approximate response time (reference value) can be quantified.



P_m: Final vacuum pressure, T_1: Time to reach 63% of final vacuum pressure P_m
T_2: Time to reach 95% of final vacuum pressure P_m

● How to calculate from the formula

Suction response time T_1 and T_2 can be calculated from the following formula.

Suction response time $T_1 = \dfrac{V \times 60}{Q}$

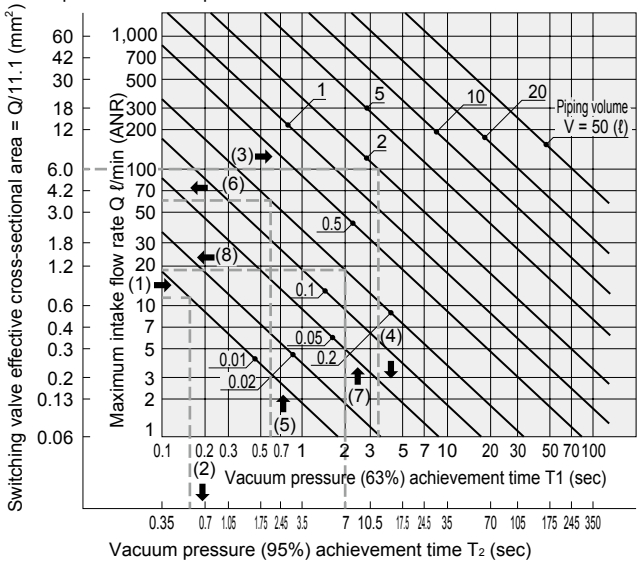
Suction response time $T_2 = 3.5 \times T_1$

T_1 : Time to reach 63% of final vacuum pressure P_m (sec)
T_2 : Time to reach 95% of final vacuum pressure P_m (sec)
V : Piping volume from vacuum generator and switching valve to pad (m)
Q : Average intake flow rate (ℓ/min (ANR))
Calculating the average intake flow rate
For vacuum generator ▶ Q = (1/3) x Vacuum generator maximum intake flow rate (ℓ/min (ANR))
For vacuum pump ▶ Q = (1/2) x 11.1 x Effective area of switching valve (mm^2)

● Obtaining from the selection graph

Suction response time T_1 and T_2 can be obtained from the following table.

Graph Ⓓ Suction response time



* From the suction response time, it is possible to conversely obtain the size of the vacuum generator and switching valve of the vacuum pump system.

Example①

Obtain the suction response time when the pressure in the piping system with piping volume of 0.01 ℓ is made to reach the final vacuum pressure of -87 kPa using the maximum intake flow rate of 12 ℓ/min (ANR) in the vacuum generator (VSU-H07).

Point

Obtain the piping volume by referring to the formula on page 28 or selection graph Ⓒ.
-87 kPa ≈ -92 (kPa) x 95 (%)
From this, the suction response time T_2 in the above equation can be obtained.
In addition, the average intake flow rate is calculated from the list of vacuum characteristics on page 28:
Q = (1/3) x 12 = 1/3 x 12 = 4ℓ/min(ANR) is used.

Using the formula

$T_1 = \dfrac{V \times 60}{Q} = \dfrac{0.01 \times 60}{4} = 0.15$ (sec)

It can be seen from

$T_2 = 3.5 \times T_1 = 3.5 \times 0.15 = 0.525$(sec)

that the actual suction response time needs to be about 0.5 (sec).

Using the selection graph

The suction response time T_2 to reach 95% of the maximum vacuum pressure is obtained from the intersection point of the maximum suction flow rate of 12 ℓ/min (ANR) and the piping volume of 0.01 ℓ for the vacuum generator (VSU-H07). (Selection graph Ⓓ (1) → (2) order)
$T_2 \approx 0.5$(sec)

Example②

Obtaining the suction response time when increasing the internal pressure up to 63% of the final vacuum pressure in a 2ℓ tank by using a valve with an effective cross-sectional area of 6 mm^2.

Using the formula

$T_1 = \dfrac{V \times 60}{1/2 \times 11.1 \times S} = \dfrac{2 \times 60}{1/2 \times 11.1 \times 6} = \dfrac{120}{33.3} = 3.6$ (sec)

Using the selection graph

Response time T_1 to reach 63% of the maximum vacuum pressure is obtained from the intersection point of the valve effective cross-sectional area 6 mm^2 and piping volume 2 ℓ.
(Selection graph Ⓓ (3) → (4) order)
$T_1 \approx 3.5$(sec)

B Selecting the vacuum generator and vacuum pump compatible unit

When response time and usage conditions are clear, it is possible to select the optimal vacuum generator and vacuum pump compatible unit.

1. Size of vacuum generator and vacuum switching valve (when there is no leakage)

● Using the formula

a Average intake flow rate

$$Q = \frac{V \times 60}{T_1}$$

$$T_2 = 3.5 \times T_1$$

Q : Average intake flow rate (ℓ/min (ANR))
V : Piping volume (ℓ)
T_1 : Time (sec) to reach 63% of stable pressure P after suction
T_2 : Time (sec) to reach 95% of stable pressure P after suction

b Maximum intake flow rate (specification intake flow rate of vacuum components)

For vacuum generator ▶ Qmax = 3 x Q [ℓ/min (ANR)]
For vacuum pump ▶ Qmax = 2 x Q [ℓ/min (ANR)]

Point

■ For vacuum generator

It is necessary to select a vacuum generator with suction flow rate larger than Qmax in the formula above.

■ For vacuum switching valve

$$\text{Effective cross-sectional area } S = \frac{Qmax}{11.1} \ (mm^2)$$

* It is necessary to select a switching valve larger than the effective cross-sectional area in the formula above.

● Method using the selection graph

a Tube volume

Calculate using "piping volume by tube inside diameter" in the selection graph 3 (Intro Page 28).

b Maximum intake flow rate Qmax

Calculate the required maximum intake flow rate Q from the suction response time (T_1, T_2) and tube volume from the selection graph 4 (Intro Page 30) "suction response time".

Point

■ For vacuum generator

It is necessary to select a vacuum generator with maximum intake flow rate larger than Q obtained from the graph.

■ For vacuum switching valve

It is necessary to select a vacuum switching valve larger than the effective cross-sectional area of the valve obtained from the graph.

Example

Selecting a vacuum generator to achieve vacuum pressure of -58 kPa in about 0.6 seconds using a tank with piping volume 0.2 ℓ. (0.5 MPa secured for supply pressure)

Point

-58 kPa = -93 (kPa) x 63 (%)
"H" is considered suitable when compared with our catalog value, given that the supply pressure of 0.5 MPa is likely to be secured.

Using the formula

■ a From the calculation formula of average intake flow rate

$$Q = \frac{V \times 60}{T_1} = \frac{0.2 \times 60}{0.6} = 20$$

■ b From the calculation formula of maximum intake flow rate

Qmax = 3 × Q = 3 × 20 = 60 ℓ/min(ANR)

From the above formula, we see that the suction flow rate of the vacuum generator should be 60 ℓ/min (ANR).

Using the selection graph

The maximum intake flow rate is obtained from the intersection point where the suction response time is 0.6 seconds and piping volume is 0.2 ℓ. (Selection graph 4 (5) → (6) order)
Q ≈ 60 ℓ/min(ANR)

* Since we already know that "H" is suitable from the above points, compared with the CKD catalog value, we see from the calculated value selection graph that the vacuum characteristics of H15 (intake flow rate: 63 ℓ/min (ANR)) are ideal.

Vacuum components selection method

2 ▶ Selecting the vacuum generator/vacuum switching valve

② Selection procedure

B Selecting the vacuum generator and vacuum pump compatible unit

2. Size of vacuum generator and vacuum switching valve (when there is leakage)

If there is leakage from the workpiece, the size of the necessary vacuum generator/vacuum switching valve can be calculated by adding the leakage amount to the maximum intake flow rate.

● Using the formula

a Average intake flow rate with leakage taken into account

$$Q = \frac{V \times 60}{T_1} + Q_L$$

$$T_2 = 3.5 \times T_1$$

Q : Average intake flow rate (ℓ/min (ANR))
V : Piping volume (ℓ)
T_1 : Time (sec) to reach 63% of stable pressure P after suction
T_2 : Time (sec) to reach 95% of stable pressure P after suction
Q_L : Amount of leakage during workpiece suction (ℓ/min (ANR))

b Maximum intake flow rate (specification intake flow rate of vacuum components)

For vacuum generator ▶ Qmax = 3 x Q [ℓ/min (ANR)]
For vacuum pump ▶ Qmax = 2 x Q [ℓ/min (ANR)]

Point

■ For vacuum generator
It is necessary to select a vacuum generator with suction flow rate larger than Qmax in the formula above.

■ For vacuum switching valve

$$\text{Effective cross-sectional area } S = \frac{Qmax}{11.1}\ (mm^2)$$

* It is necessary to select a switching valve with an effective cross-sectional area larger than S in the above formula.

● Method using the selection graph

a Tube volume

Calculate using "piping volume by tube inside diameter" in the selection graph 3 (Intro Page 28).

b Maximum intake flow rate Qmax

From the suction response time (T_1, T_2) and tube volume from selection graph 4 (Intro Page 30) "Suction response time", obtain the required maximum intake flow rate Q that does not include the leakage amount Q_L.

Maximum intake flow rate

For vacuum generator ▶ Qmax = Q + (2 x Q_L)
For vacuum pump ▶ Qmax = Q + (3 x Q_L)
Q : Maximum intake flow rate (ℓ/min (ANR)) obtained from selection graph 4 (Intro Page 30)
Q_L: Leakage amount (ℓ/min (ANR)) (Intro Page 29) Values taking into consideration leakage during workpiece suction

Point

■ For vacuum generator
It is necessary to select a vacuum generator with maximum intake flow rate larger than Q obtained from the graph.

■ For vacuum switching valve
It is necessary to select a vacuum switching valve larger than the effective cross-sectional area of the valve obtained from the graph.

Example

We want to satisfy the workpiece and opening of the vacuum pad of 4.4 ℓ/min (ANR) and piping volume of 0.2 ℓ. Time to achieve 95% of stable pressure Pm after suction: 7 sec.
Find out what type of vacuum generator to select.

Point

Refer to the example in "Extracting usage conditions" on Intro Page 28 for the piping volume and "When there is leakage" on Intro Page 29 for the amount of leakage after workpiece suction.

Using the formula

From $T_2 = 3.5 \times T_1$,

$$T_1 = \frac{T_2}{3.5} = \frac{7}{3.5} = 2\ (sec)$$

$$Q = \frac{V \times 60}{T_1} + Q_L = \frac{0.2 \times 60}{2} + 4.4 = 10.4\ (ℓ/min(ANR))$$

Therefore, the maximum intake flow rate is
Qmax = 3 × Q = 3 × 10.4 = 31.2 ℓ/min(ANR)
From the above formula, we see that it is reasonable to select a vacuum generator with intake flow rate of 31.2 ℓ/min (ANR) or greater.

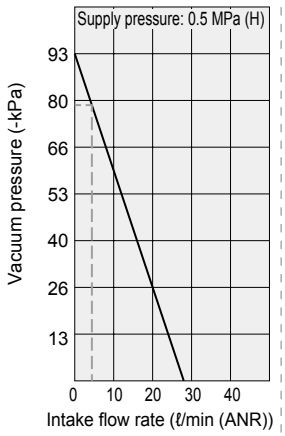
Using the selection graph

The maximum intake flow rate is obtained from the intersection point of the vacuum pressure (95%) achievement time of 7 sec and piping volume of 0.2 ℓ. (Selection graph 4 on Intro Page 30, in order of (7) → (8))
Q ≈ 20 ℓ/min(ANR)
Qmax = 20 + (3 × 4.4) = 33.2 ℓ/min(ANR)

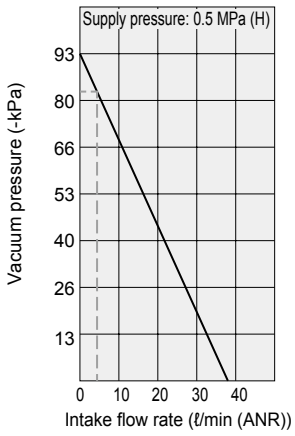
[Supplement]

If a maximum intake flow rate of about 33 ℓ/min (ANR)) and supply pressure of 0.5 MPa can be secured, high vacuum (H) with nozzle diameter ø1 mm or ø1.2 mm will be suitable. However, as the maximum vacuum pressure will be -79 kPa for H10 and -83 kPa for H12 based on the leakage amount of 4.4 ℓ/min (ANR) of the workpiece and opening of the vacuum pad and flow characteristics in the figure below, it is necessary to select the vacuum components with consideration of the required maximum pressure.

Flow characteristics (for H10)



Flow characteristics (for H12)



③ Note on model No. selection

CAUTION 1. Notes on selecting vacuum components

- Be careful of vacuum pressure drop due to trouble with supply air and power supply.
- As there is a danger of the suctioned object falling due to decreased suction force, be sure to take safety measures.
- Remove drainage and dirt from the ejector supply air and use clean air. Do not lubricate using a lubricator. Impurities and oil contained in compressed air may cause malfunction or degrade performance.
- Supply pressure (catalog specification value) of the ejector is the value when the ejector is in operation. Consider the pressure drop and make sure the catalog specification value is achieved. If the specification value is not satisfied, the ejector will emit abnormal noise at a specific supply pressure and the performance will become unstable, which may affect the sensor and cause problems.
- Vacuum retention function type and check valve function type allow vacuum leakage, so take other safety measures if the vacuum state needs to be maintained for long periods.
- If energization to the valve continues for long periods, heat is generated from the coil. Heat generation may lead to shortened product service life, malfunction, etc. Also, heat risks causing burns and impacting peripheral devices.
- When the manifold specification is used, the combination of manifold stations and mounting units may degrade performance or affect other station vacuum ports.

CAUTION 2. Notes on selecting vacuum generator nozzle diameter

- With regard to the effective cross-sectional area on the ejector supply pressure side, carry out piping and equipment selection with 3 times the effective cross-sectional area of the nozzle diameter cross-sectional area as a guideline. If the supply flow rate is insufficient, it may cause the performance to degrade.

CAUTION 3. Notes on selecting vacuum line components

- Select related products according to the maximum flow rate of the vacuum source.

Regarding the effective cross-sectional area of related products, calculate the total based on the calculation of
S (effective cross-sectional area) = Qmax (maximum flow rate: ℓ/min (ANR)) / 11.1 (mm^2)
when making a selection.
Note: This approximate formula applies to vacuum lines, but not to positive pressure lines.

For calculation with positive pressure lines, use the following formula.

■ MPa unit $P_1 > 1.89P_2$

$$Q = 113 \times S \times P_1 \left(S = \frac{Q}{113 \times P_1} \right)$$

■ kgf/cm^2 unit $P_1 > 1.89P_2$

$$Q = 11.1 \times S \times P_1 \left(S = \frac{Q}{11.1 \times P_1} \right)$$

P_1: Primary side absolute pressure
P_2: Secondary side absolute pressure

CAUTION 4. Notes on selecting the vacuum filter

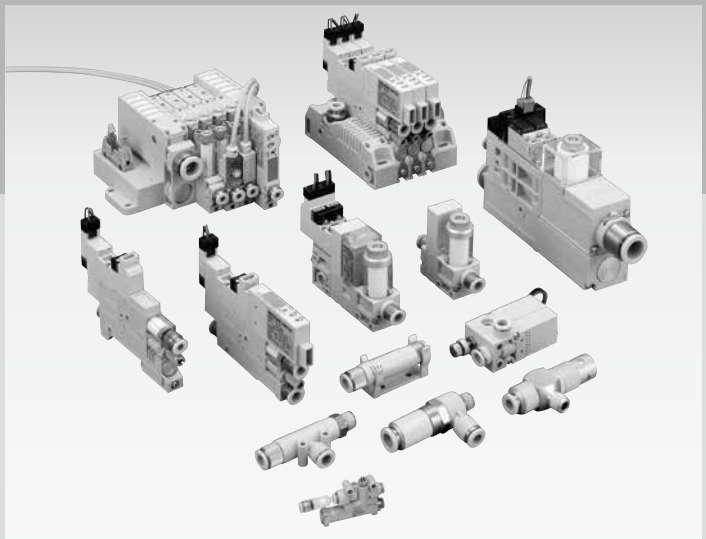
- Never apply positive pressure for vacuum burst to the vacuum filter. Not an explosion-proof structure. Also, due to low pressure resistance, damage to the product body may cause injuries.

CAUTION 5. Notes on using vacuum equipment

- When operating the valve, make sure that the leakage current is 1 mA or less. Otherwise, there is a risk of malfunctions caused by leakage current.
- Do not apply pressures of 0.1 MPa or greater to the vacuum circuit side of the vacuum generator or vacuum pump unit. This risks causing damage to the body, as the vacuum component does not have an explosion-proof structure.
- When two or more pads are piped to a single ejector in a vacuum circuit, if one pad suffers suction failure (leakage), there is a danger that the workpiece may be detached due to decreased vacuum pressure.
- Do not use the product so as to block the exhaust port of the ejector or increase the exhaust resistance. It may prevent vacuum generation or cause the vacuum pressure to drop.

Ejector system
VS*

■ **Vacuum components**



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● 16 mm width integrated (VSK/VSKM)	40
● 20 mm width integrated (VSJ/VSJM)	66
● 10.3 mm width integrated (VSN/VSNM)	86
● 10.5 mm width integrated (VSX/VSXM)	112
● 31.5 mm width dedicated single unit (VSQ)	142
● 11 mm pitch manifold (VSZM)	170

Series variation

Ejector system
Single unit

Model		Series		Single unit/width dimension (mm)	Single unit/weight (g)	Manifold	Components					
							With valve		With switch			
							For generation	Breaking the vacuum	Mechanical	Switch output	Analog output	
Ejector system	Single unit	**VSY Series** With vacuum burst function · Ejector and vacuum burst function are integrated · Compact and lightweight, it can be used at the end of vacuum piping		11	19 to 25.5							
		VSH Series Solenoid valve direct mounting (supply port thread) · Air supply port size: Solenoid valve can be directly mounted from M5 to R1/4 Series · A wide range of nozzle diameter variations from ø0.5 to ø2.0		ø9.8 to ø28	13 to 116							
		VSU Series Tubular · Installable in the middle of piping since the vacuum port and air supply port form a straight line. · Dedicated bracket is available		ø13	17 to 23							
		VSB Series Square · Square silencer built in, enabling body mounting and fixing · Option for mechanical vacuum switch can be selected.		12.2	17.5 to 48.5				○			
		VSC Series Pad direct mounting (vacuum port thread) · Vacuum port size: Vacuum pads can be directly mounted from M5 to R1/4 Series · A wide range of nozzle diameter variations from ø0.5 to ø2.0		8 to ø24	14.5 to 109							

Ejector characteristics table

Nozzle diameter		Achieved vacuum pressure (-kPa) *1			Intake flow rate (ℓ/min (ANR))			Consumption flow rate (ℓ/min (ANR))		
Model No.	(mm)	H	L	E	H	L	E	H	L	E
05	0.5	90 to 91	66 to 67	90 to 92	7	11 to 12	3 to 10	11.5		8 to 17
07	0.7	90 to 93.1			12 to 13	18 to 26	9 to 10.5	23		17
10	1	93			20 to 28	26 to 42	19 to 21	46		34
12	1.2			90.4 to 92	38	50	27	70		47
15	1.5		66	92	63	95	42	100		70
20	2.0				104 to 110	174 to 180	82 to 84	200		150

*1: Supply pressure of H and L is 0.5 MPa and supply pressure of E is 0.35 MPa.
*2: H High vacuum/medium flow = high vacuum
L Medium vacuum/large flow = large flow
E High vacuum/low flow rate = low supply pressure, high vacuum (energy saving)

●: Standard equipment ○: Option

Components				Nozzle diameter (mm)								Achieved vacuum pressure (-kPa) *1			Intake flow rate (ℓ/min (ANR))			Consumption flow rate (ℓ/min (ANR))			Page
With vacuum filter	With silencer	Common exhaust	With check valve	04 (0.4)	05 (0.5)	06 (0.6)	07 (0.7)	10 (1.0)	12 (1.2)	15 (1.5)	20 (2.0)	H	L	E	H	L	E	H	L	E	
○	○	○			○							90	66	90	7	12	3	11.5		8	6
							○								12.5	18/21	9	23		17	
	○	○			○							90	66	92	7	12		11.5			14
							○					93			13	26	10.5	23		17	
								○							28	42	21	46		34	
									○						38		27	70		47	
										○					63	95	42	100		70	
											○				104	174	82	200		150	
●	○	○			○							90	66	90	7	12	10	11.5		17	14
							○					92			12.5	20/22		23			
	●				○							90	66	92	7	12		11.5			14
							○					93			13	26	10.5	23		17	
								○							28	42	21	46		34	
									○						38		27	70		47	
	○	○			○							90	66	92	7	11		11.5			14
							○					93			13	26	10.5	23		17	
								○							28	42	21	46		34	
									○						38		27	70		47	
										○					63	95	42	100		70	
											○				110	180	84	200		150	

*1: Supply pressure of H and L is 0.5 MPa and supply pressure of E is 0.35 MPa.
*2: Values in ( ) for the VSQ twin nozzle are for small bore size nozzle.

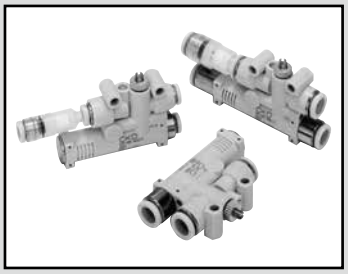
Series variation

Ejector system
Unit combination

Model	Series		Single unit/width dimension (mm)	Single unit/ weight (g)	Manifold	Components: With valve: For generation	Components: With valve: Breaking the vacuum	Components: With switch: Mechanical	Components: With switch: Switch output	Components: With switch: Analog output
Ejector system — Unit combination	**VSG Series** Comprehensive type that emphasizes basic performance · Dedicated single unit · Valve, vacuum pressure switch and filter are unitized. Select according to your application.		20	47 to 128		●	●		○	○
	VSK/VSKM Series Ample variations are available · Modularization of each unit enables optimal unit selection. · Built-in check valve and air timer vacuum burst valve can be selected.		16	60 to 153	○	○	○	○	○ (A model with digital display can also be selected)	○
	VSJ/VSJM Series Prevents workpieces from blowing away due to burst air and press control · A self-hold model that supports power saving in vacuum generating valve is also available. · Vacuum burst circuit relief function realizes shortening of vacuum burst time.		20	156 to 175.5	○	●	●		○ (With digital display)	○
	VSN/VSNM Series Fast and stable response · Compact and lightweight. The height dimension is made especially compact. · A direct acting valve is used as the main valve to achieve ON/OFF responsivity of 5 msec or less		10.3	50.5 to 171	○	●	●		○	○ (A model with digital display can also be selected)
	VSX/VSXM Series Lightweight and compact · Direct mount and DIN rail are available for mounting. · A self-hold model that supports power saving in vacuum generating valve is also available.		10.5	71 to 84	○	●	●		○ (A model with digital display can also be selected)	○
	VSQ Series Large vacuum unit ideal for controlling large flow rates · Standardized three types of nozzle: single, double and twin · A self-hold model that supports power saving in vacuum generating valve is also available (single nozzle only).		31.5	400 to 470		●	●		○ (With digital display)	
	VSZM Series Dedicated manifold, reduced wiring (flat cable/D sub-connector) compatible · With atmospheric pressure relief valve installed, atmosphere burst at high flow rate is possible, shortening the vacuum burst time · Self-hold energy-saving type is also available, with valve power consumption of 0.55 W		11	Contact CKD for details.	●	●	●		○ (A model with digital display can also be selected)	○

●: Standard equipment ○: Option

Components				Nozzle diameter (mm)								Achieved vacuum pressure (-kPa) *1			Intake flow rate (ℓ/min (ANR))			Consumption flow rate (ℓ/min (ANR))			Page
With vacuum filter	With silencer	Common exhaust	With check valve	04 (0.4)	05 (0.5)	06 (0.6)	07 (0.7)	10 (1.0)	12 (1.2)	15 (1.5)	20 (2.0)	H	L	E	H	L	E	H	L	E	
●	●				○		○	○				90	66	90	7	12		11.5			32
												93			13	26	10.5	23		17	
															27	40	21	46		34	
●	○	○	○		○		○	○				91	67	91	7	11		11.5			40
												93			13	26		23			
															27	40	21	46		34	
									○						38	50	27	70		47	
●	○	○			○		○					90.4	66.5	90.4	7	11		11.5			66
												93.1			13	26	10.5	23		17	
															27	40	21	46		34	
									○						38		27	70		47	
	○	○		○								90.4		90.4			2			6	86
					○										7		3	11.5		8	
						○						93.1			9.5		4.5	16		12	
●	○	○			○		○					90.4	66.5	90.4	7	12	3	11.5		8	112
								○				93.1			13	24/22	10.5	23		17	
															24/20	26	20/19	46		34	
●	○	○								○		93	66	92	63	95	42	100		70	142
											○				110	180	84	200		150	
							○	2-stage nozzle							24			23			
								○	2-stage nozzle						36			46			
									○	2-stage nozzle					40			70 *2			
				Twin nozzle			○			○					40 (24) *2			100 (23) *2			
					Twin nozzle			○			○				70 (36) *2			200 (46) *2			
●	○	○			○							90.4	66.5	90.4	7	12		11.5			170
							○					93.1			13	24	10	23		17	
								○							24		20	46		34	



Vacuum ejector with vacuum burst function

VSY Series

● Nozzle diameter: ø0.5, ø0.7
Integration of the ejector and vacuum burst function achieves high speed suction and burst cycle.

RoHS

Features

■ Compact and lightweight, it can be used at the end of vacuum piping.
Also, the shutoff valve achieves high-speed suction and burst cycle.

■ With additional function to release burst air to the ejector.
It is capable of reliable vacuum burst compared to the conventional single ejector.

■ Ejector and vacuum burst function are integrated.
Switch between vacuum generation and burst air by turning the ejector air supply ON/OFF. (Refer to Usage methods on page 13.)

Specifications

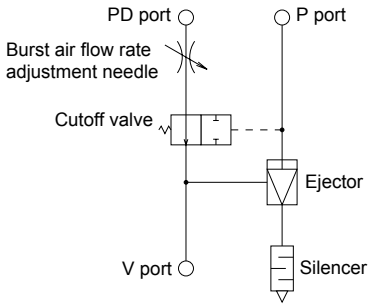
Descriptions	VSY
Working fluid	Air
Working pressure MPa	0.3 to 0.7
Ambient/fluid temperatures °C	5 to 50
Lubrication	Not required

Vacuum filter specifications

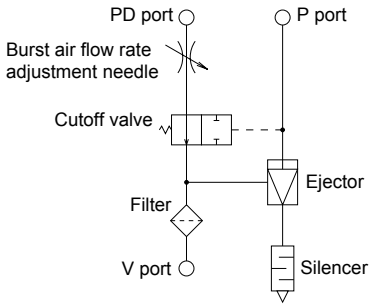
Descriptions	Vacuum filter
Working fluid	Air
Working pressure kPa	-100 to 0
Filtration rating μm	10
Ambient/fluid temperatures °C	0 to 60
Filtration area cm^2	Port size ø4: 0.8
	Port size ø6: 1.1

Circuit diagram

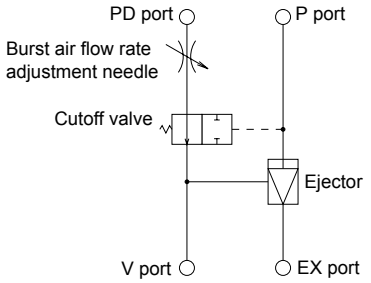
● VSY-*S (atmospheric release with silencer)



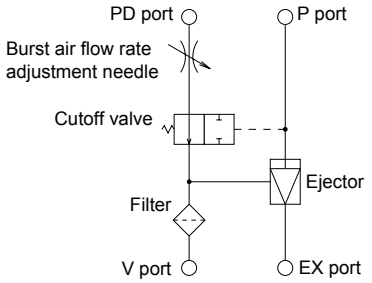
● VSY-*S-F (atmospheric release with silencer, with vacuum filter)



● VSY-*-J (common exhaust)



● VSY-*J-F (common exhaust, with vacuum filter)



How to order

● Vacuum ejector with vacuum burst function

VSY - H 07 - 6 6 6 S - F

- Ⓐ Vacuum characteristics
- Ⓑ Nozzle diameter
- Ⓒ Vacuum port (V)
- Ⓓ Vacuum generation air supply port (P)
- Ⓔ Vacuum burst air supply port (PD)
- Ⓕ Exhaust port (EX)
- Ⓖ Vacuum filter

Code	Content
Ⓐ Vacuum characteristics	
H	High vacuum/medium flow rate
L	Medium vacuum/large flow rate
E	High vacuum/low flow rate
Ⓑ Nozzle diameter	
05	ø0.5
07	ø0.7
Ⓒ Vacuum port (V) *1	
4	ø4 push-in fitting
6	ø6 push-in fitting
Ⓓ Vacuum generation air supply port (P) *1	
4	ø4 push-in fitting
6	ø6 push-in fitting
Ⓔ Vacuum burst air supply port (PD) *1	
4	ø4 push-in fitting
6	ø6 push-in fitting
Ⓕ Exhaust port (EX)	
S	Atmospheric release with silencer
J	Common exhaust
Ⓖ Vacuum filter	
Blank	None
F	With vacuum filter

⚠ Precautions for model No. selection

*1: Only 444 or 666 can be selected for the combination of Ⓒ, Ⓓ and Ⓔ.

● Maintenance part model No.

● Replacement vacuum filter

VSY - F - 44M

- Ⓐ Port size

Code	Content
Ⓐ Port size	
44M	For VSY-*444*
66M	For VSY-*666*

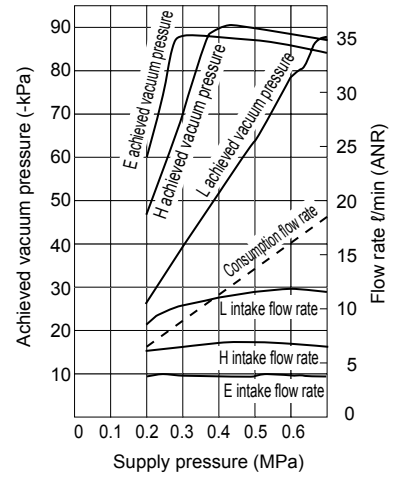
● Dedicated bracket

VSY - B

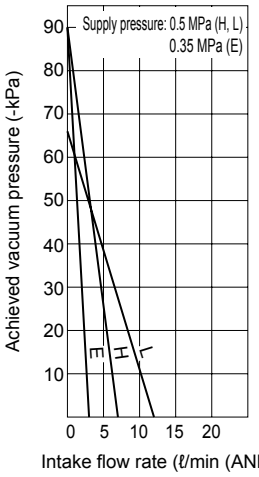
Vacuum characteristics, flow characteristics

● VSY-□05

Vacuum characteristics

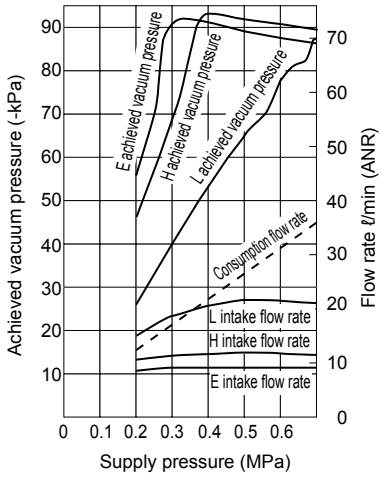


Flow characteristics

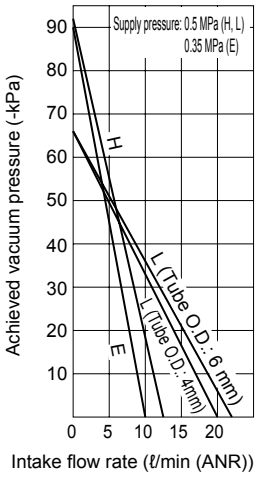


● VSY-□07

Vacuum characteristics



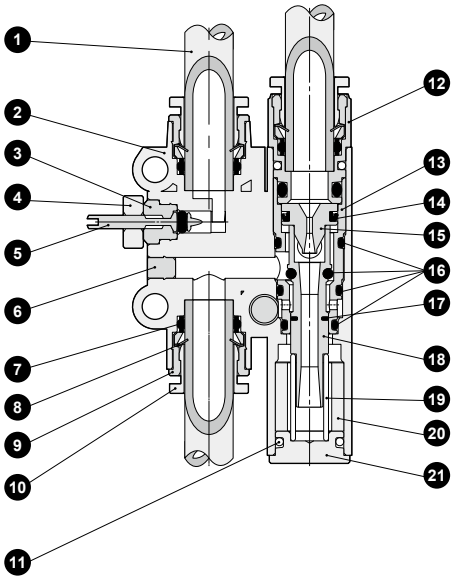
Flow characteristics



1. Supply pressure with the characteristics described above occurs at vacuum generation.
2. Achieved vacuum pressure with the characteristics described above produces abnormal noise (soft clicking sound) at supply pressure just before reaching the peak value. When this abnormal noise occurs, the characteristics become unstable and operation becomes louder. Reset the supply pressure, as it may affect the sensor, etc., and cause trouble.
   Ex. 1: Source pressure is 0.5 MPa with the H vacuum ejector. During vacuum ejector operation, supply pressure drops to 0.43 MPa due to pressure drop, and abnormal noise is generated. → Reset supply pressure to 0.5 MPa during vacuum ejector operation.
3. Carry out piping or equipment selection with 3 times the effective cross-sectional area of the nozzle diameter cross-sectional area as a guideline. Satisfactory vacuum characteristics cannot be obtained if adequate supply air flow rate is not maintained.
   (A soft clicking sound occurs at set pressure. Insufficient intake flow rate, insufficient achievement of achieved vacuum pressure, etc.)
   Ex. 2: Abnormal noise occurs even when pressure is 0.5 MPa with H vacuum ejector during vacuum ejector operation. → Insufficient supply air flow rate. (Supply air flow rate is restricted in front of the vacuum ejector by piping resistance, etc., and supply air flow rate satisfying the properties is not obtained. → Select piping components that can secure the required effective cross-sectional area.)
   Ex. 3: For vacuum ejector with 0.7 mm nozzle diameter, cross-sectional area is $0.35^2 \times \pi = 0.785\ mm^2 \times 3 = 1.15\ mm^2$. Therefore, carry out piping and equipment selection that ensures an effective cross-sectional area of 1.1 mm^2 or greater.

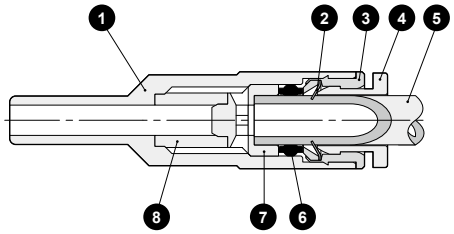
Internal structure

● VSY



No.	Part name	Material
1	Tube	-
2	Resin body	PBT
3	Upper plug	Copper alloy, electroless nickeling
4	Lock nut	Aluminum
5	Burst needle	SUS303 or equiv.
6	Plug 2	Copper alloy, electroless nickeling
7	Elastic sleeve	NBR
8	Lock claw	Stainless steel
9	Guide ring	Copper alloy, electroless nickeling
10	Release ring	POM
11	Spring pin	Stainless steel
12	Cartridge	-
13	Sleeve	Copper alloy, electroless nickeling
14	Y packing	NBR
15	Nozzle piston	Copper alloy, electroless nickeling
16	O-ring	NBR
17	Spool packing	H-NBR
18	Diffuser spool	Copper alloy, electroless nickeling
19	Diffuser spring	Stainless steel
20	Silencer element	PVF
21	End plug	Copper alloy, electroless nickeling

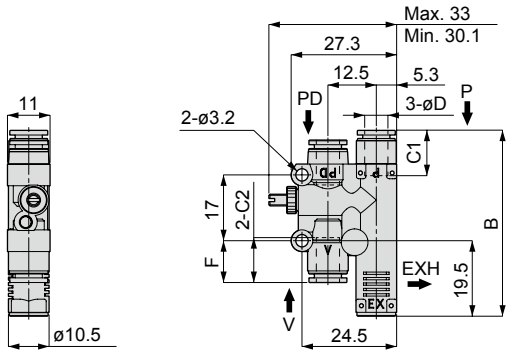
● Vacuum filter



No.	Part name	Material
1	Resin body	PP
2	Lock claw	Stainless steel
3	Guide ring	Copper alloy, electroless nickeling
4	Release ring	POM
5	Tube	Urethane or nylon
6	Elastic sleeve	NBR
7	Element holder	POM
8	Filter element	PVF

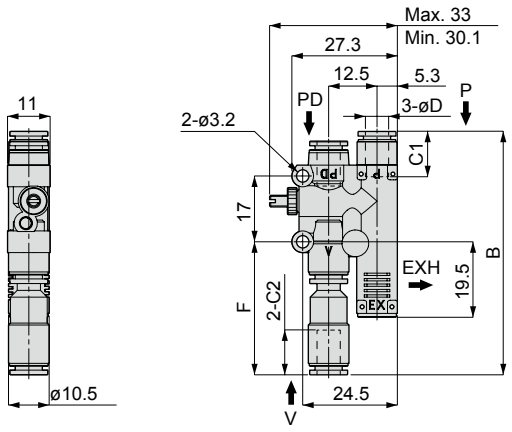
Dimensions

● VSY-*S (atmospheric release with silencer)



Model No.	Tube O.D. øD	B	F	C1	C2	Nozzle diameter	Rated pressure (MPa)	Achieved vac press (-kPa)	Intake flow rate (ℓ/min(ANR))	Air consump rate (ℓ/min(ANR))	Weight (g)
VSY-H05-444S	4	45.4	10.7	11.2	11.3	0.5	0.5	90	7	11.5	19
VSY-H05-666S	6	48.2	11	11.9	11.8						20
VSY-H07-444S	4	45.4	10.7	11.2	11.3	0.7		92	12.5	23	20
VSY-H07-666S	6	48.2	11	11.9	11.8						
VSY-L05-444S	4	45.4	10.7	11.2	11.3	0.5		66	12	11.5	19
VSY-L05-666S	6	48.2	11	11.9	11.8						20
VSY-L07-444S	4	45.4	10.7	11.2	11.3	0.7			18	23	19
VSY-L07-666S	6	48.2	11	11.9	11.8				21		20
VSY-E05-444S	4	45.4	10.7	11.2	11.3	0.5	0.35	90	3	8	19
VSY-E05-666S	6	48.2	11	11.9	11.8						20
VSY-E07-444S	4	45.4	10.7	11.2	11.3	0.7			9	17	20
VSY-E07-666S	6	48.2	11	11.9	11.8						20

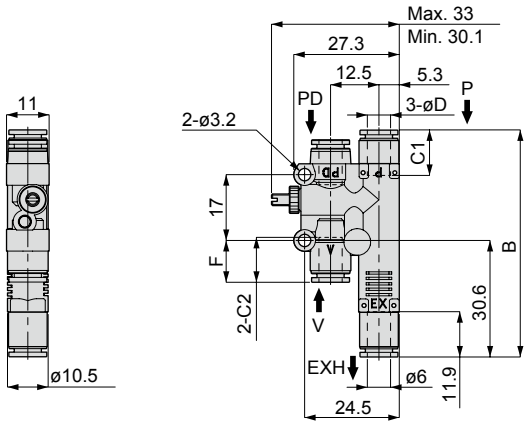
● VSY-*S-F (atmospheric release with silencer, with vacuum filter)



Model No.	Tube O.D. øD	B	F	C1	C2	Nozzle diameter	Rated pressure (MPa)	Achieved vac press (-kPa)	Intake flow rate (ℓ/min(ANR))	Air consump rate (ℓ/min(ANR))	Weight (g)
VSY-H05-444S-F	4	60.3	34.4	11.2	11.3	0.5	0.5	90	7	11.5	21
VSY-H05-666S-F	6	63.3	34.6	11.9	11.8						22
VSY-H07-444S-F	4	60.3	34.4	11.2	11.3	0.7		92	12.5	23	21
VSY-H07-666S-F	6	63.3	34.6	11.9	11.8						22
VSY-L05-444S-F	4	60.3	34.4	11.2	11.3	0.5		66	12	11.5	21
VSY-L05-666S-F	6	63.3	34.6	11.9	11.8						22
VSY-L07-444S-F	4	60.3	34.4	11.2	11.3	0.7			18	23	21
VSY-L07-666S-F	6	63.3	34.6	11.9	11.8				21		22
VSY-E05-444S-F	4	60.3	34.4	11.2	11.3	0.5	0.35	90	3	8	21
VSY-E05-666S-F	6	63.3	34.6	11.9	11.8						22
VSY-E07-444S-F	4	60.3	34.4	11.2	11.3	0.7			9	17	21
VSY-E07-666S-F	6	63.3	34.6	11.9	11.8						22

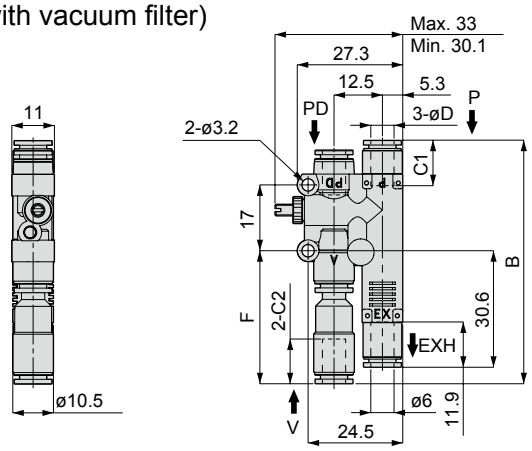
Dimensions

● VSY-*J (common exhaust)



Model No.	Tube O.D. øD	B	F	C1	C2	Nozzle diameter	Rated pressure (MPa)	Achieved vac press (-kPa)	Intake flow rate (ℓ/min(ANR))	Air consump rate (ℓ/min(ANR))	Weight (g)
VSY-H05-444J	4	56.3	10.7	11.2	11.3	0.5	0.5	90	7	11.5	23
VSY-H05-666J	6	59	11	11.9	11.8						
VSY-H07-444J	4	56.3	10.7	11.2	11.3	0.7		92	12.5	23	
VSY-H07-666J	6	59	11	11.9	11.8						
VSY-L05-444J	4	56.3	10.7	11.2	11.3	0.5		66	12	11.5	23
VSY-L05-666J	6	59	11	11.9	11.8						23
VSY-L07-444J	4	56.3	10.7	11.2	11.3	0.7			18	23	23
VSY-L07-666J	6	59	11	11.9	11.8				21		23
VSY-E05-444J	4	56.3	10.7	11.2	11.3	0.5	0.35	90	3	8	23
VSY-E05-666J	6	59	11	11.9	11.8						
VSY-E07-444J	4	56.3	10.7	11.2	11.3	0.7			9	17	
VSY-E07-666J	6	59	11	11.9	11.8						24

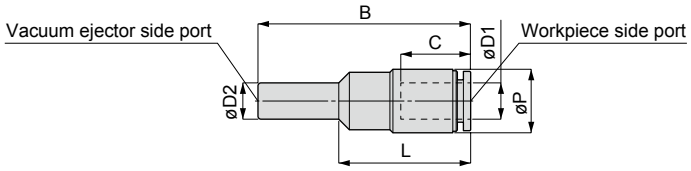
● VSY-*J-F (common exhaust, with vacuum filter)



Model No.	Tube O.D. øD	B	F	C1	C2	Nozzle diameter	Rated pressure (MPa)	Achieved vac press (-kPa)	Intake flow rate (ℓ/min(ANR))	Air consump rate (ℓ/min(ANR))	Weight (g)
VSY-H05-444J-F	4	60.3	34.4	11.2	11.3	0.5	0.5	90	7	11.5	24
VSY-H05-666J-F	6	63.3	34.6	11.9	11.8						25
VSY-H07-444J-F	4	60.3	34.4	11.2	11.3	0.7		92	12.5	23	24
VSY-H07-666J-F	6	63.3	34.6	11.9	11.8						25
VSY-L05-444J-F	4	60.3	34.4	11.2	11.3	0.5		66	12	11.5	24
VSY-L05-666J-F	6	63.3	34.6	11.9	11.8						25
VSY-L07-444J-F	4	60.3	34.4	11.2	11.3	0.7			18	23	24
VSY-L07-666J-F	6	63.3	34.6	11.9	11.8				21		25
VSY-E05-444J-F	4	60.3	34.4	11.2	11.3	0.5	0.35	90	3	8	24
VSY-E05-666J-F	6	63.3	34.6	11.9	11.8						25
VSY-E07-444J-F	4	60.3	34.4	11.2	11.3	0.7			9	17	25
VSY-E07-666J-F	6	63.3	34.6	11.9	11.8						26

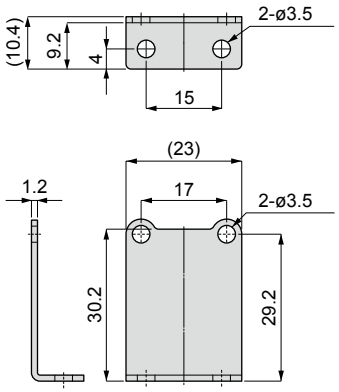
Dimensions

● VSY-F (replacement vacuum filter)



Model No.	Tube O.D. øD1	Fitting diameter øD2	B	L	C	øP	Filtration area (cm^2)	Weight (g)
VSY-F-44M	4	4	35	21.8	11.3	8	0.8	1.5
VSY-F-66M	6	6	35.4	22	11.8	10.5	1.1	2.5

● VSY-B (bracket)



Safety precautions

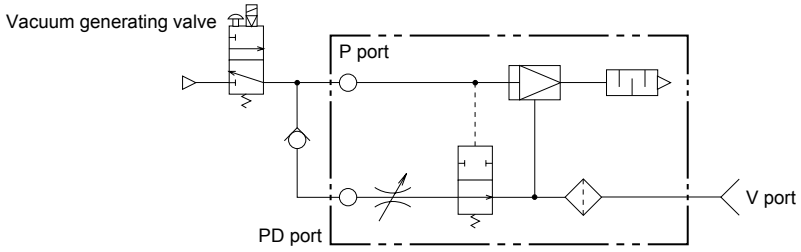
Refer to Intro Pages 15 and 16 for general precautions on vacuum system components.

WARNING

- Read the catalog carefully regarding the piping method of VSY vacuum ejector. Errors in the piping method may cause injury or component damage.
- Since the filter body material is PP, the resin may deteriorate due to direct sunlight or ultraviolet rays.

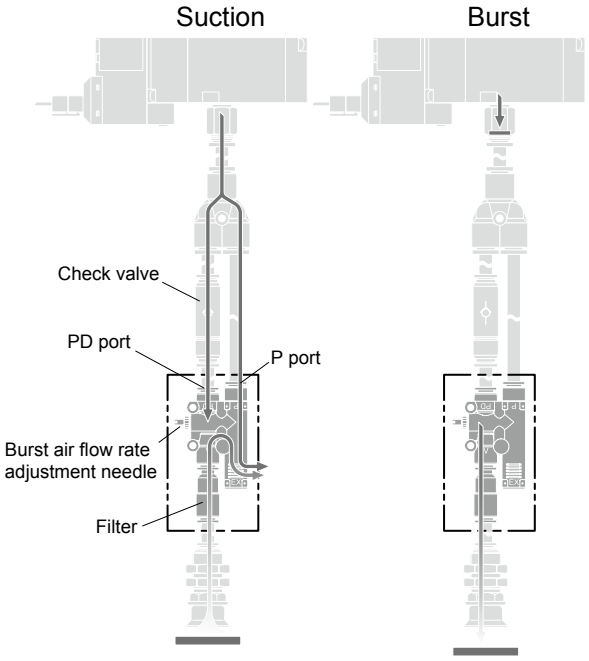
CAUTION

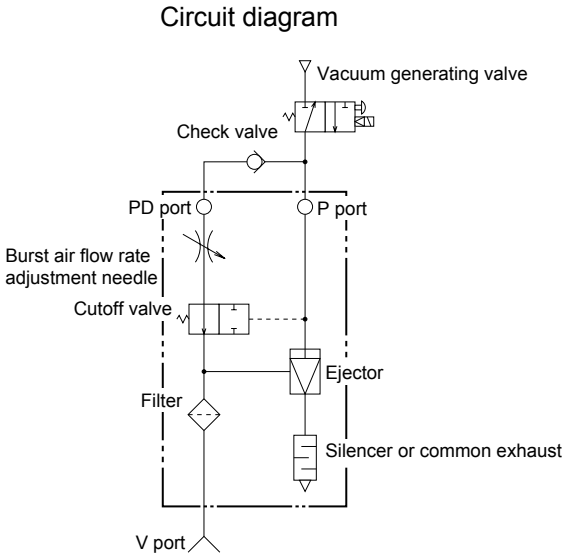
- Read the catalog carefully regarding flow rate adjustment and burst time adjustment for burst air.
- The built-in vacuum filter cannot be replaced by a single element. For replacement during maintenance inspections, etc., the filter body should be replaced.
- When using different pressures for supply air for vacuum generation and vacuum burst, be sure to set the pressure for vacuum burst lower than that of vacuum generation.
  If set higher than the supply air pressure for vacuum generation, it may lead to leakage.
- When using the following piping method, burst air may enter instantaneously from the check valve and be emitted from the V port until the shut-off valve completes switching.



Usage methods

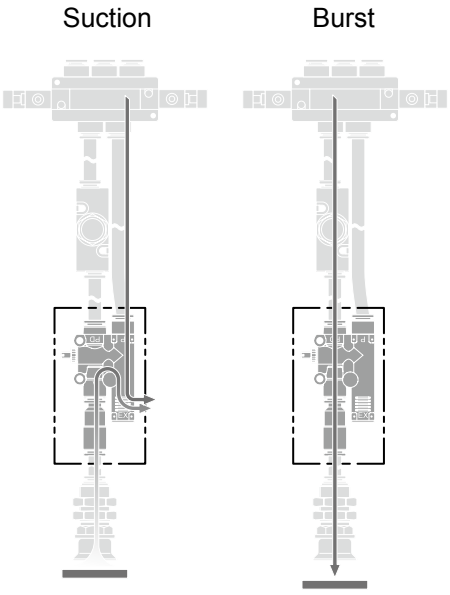
[Example 1]

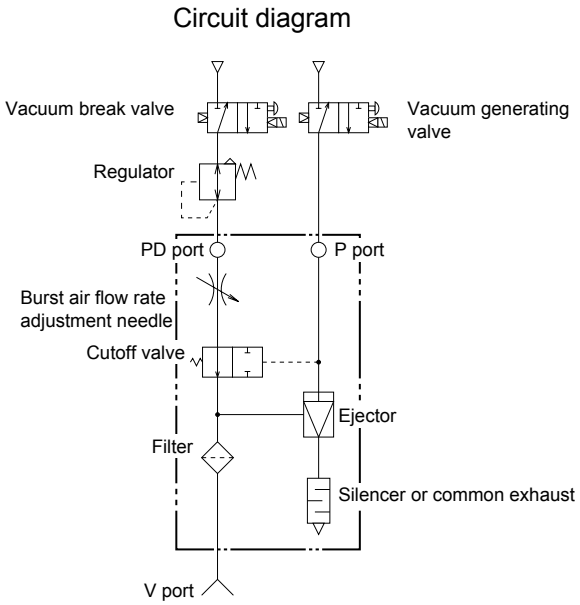




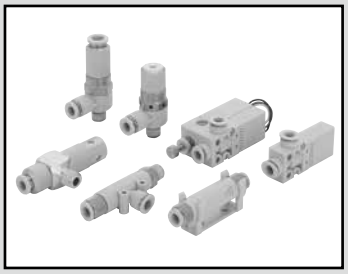
Connect the P port and PD port with a check valve (separately purchased) and use the residual pressure between the check valve and the PD port as burst air.
The burst air flow rate can be adjusted with the burst air flow adjustment needle, and the burst time can be adjusted with the length of the tube connecting the check valve and PD port.

[Example 2]





When instantaneously removing a workpiece with vacuum burst air, adjust the burst air pressure and flow rate, but be careful not to blow off the workpiece. The figure above is an example of using different pressures for the supply air for vacuum generation and vacuum burst, such as when lowering the air pressure for vacuum burst. (Note: supply pressure for vacuum generation ≥ supply pressure for vacuum burst.)
Adjust the flow rate of the vacuum burst air with the burst air flow adjustment needle, and control the burst time by controlling the vacuum burst valve or the like.



Single ejectors compatible with various piping conditions

VSH/VSU/VSB/VSC Series

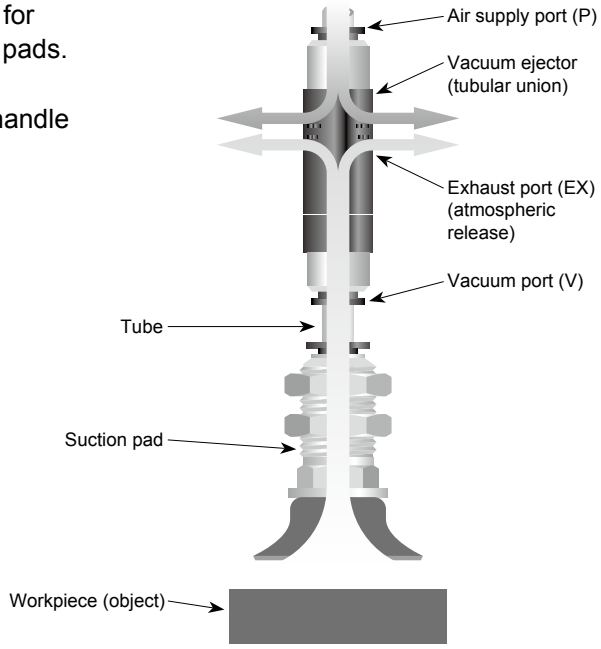
● Nozzle diameter: ø0.5, ø0.7, ø1.0, ø1.2, ø1.5, ø2.0
Various types of performance and shape are available to handle various conditions.

RoHS

Features

■ By changing the compressed air to vacuum, it can be used for conveying workpieces (objects) in combination with suction pads.

■ Various types of performance and shapes are available to handle various conditions.



Common specifications

Descriptions	VSH/VSU/VSB/VSC
Working fluid	Air
Working pressure MPa	0.15 to 0.7
Ambient/fluid temperatures °C	0 to 60

Square/vacuum pressure switch equipped (VSB)/Mechanical vacuum pressure switch specification

Descriptions	Mechanical vacuum pressure switch
Pressure detection method	Diaphragm - Micro switch
Working fluid	Air
Operating ambient temperature °C	0 to 60 (no freezing)
Electric capacity	3 A 250 V
Set pressure kPa	-66 to -20
Repeatability kPa	±5
Hysteresis kPa	22 or less
Factory default pressure kPa	Approx. -50

How to order

* Refer to model No. sections on dimensions pages 20 to 30 for combinations of model No.

VS H - H 07 - 10 8A J

- Ⓐ Shape
- Ⓑ Vacuum characteristics
- Ⓒ Nozzle diameter
- Ⓓ Vacuum port (V)
- Ⓔ Air supply port (P)
- Ⓕ Additional functions

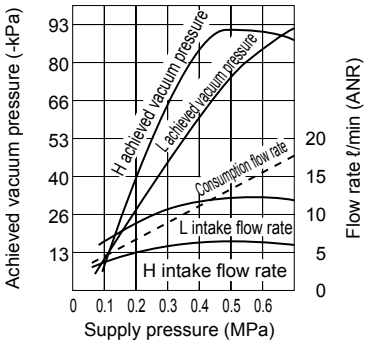
Code	Content
Ⓐ Shape	
H	Solenoid valve direct mounting
U	Tubular
C	Pad direct mounting
B	Square
Ⓑ Vacuum characteristics	
H	High vacuum/medium flow rate
L	Medium vacuum/large flow rate
E	High vacuum/low flow rate
Ⓒ Nozzle diameter	
05	ø0.5
07	ø0.7
10	ø1.0
12	ø1.2
15	ø1.5
20	ø2.0
Ⓓ Vacuum port (V)	
4	ø4 push-in fitting
6	ø6 push-in fitting
8	ø8 push-in fitting
10	ø10 push-in fitting
12	ø12 push-in fitting
M5	M5×0.5
6A	R1/8
8A	R1/4
10A	R3/8
Ⓔ Air supply port (P)	
4	ø4 push-in fitting
6	ø6 push-in fitting
6L	ø6 push-in fitting elbow
8	ø8 push-in fitting
8L	ø8 push-in fitting elbow
10	ø10 push-in fitting
10L	ø10 push-in fitting elbow
12	ø12 push-in fitting
M5	M5×0.5
6A	R1/8
8A	R1/4
Ⓕ Additional functions	
S	Atmospheric release with silencer (VSH, VSU, VSC)
J	Common exhaust (VSH, VSU, VSC)
V	With mechanical pressure vacuum switch (VSB)
Blank	Without vacuum pressure switch (VSB)

Vacuum characteristics, flow characteristics

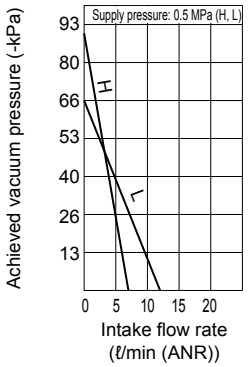
Supply pressure - achieved vacuum pressure, intake flow rate, air consumption rate

● VSH-$^{H}_{L}$05, VSB-$^{H}_{L}$05

Vacuum characteristics

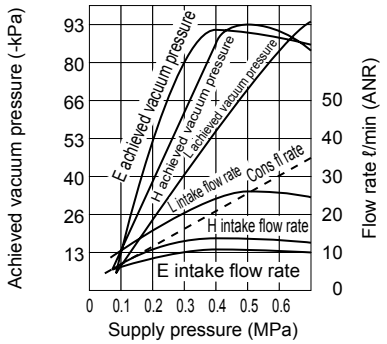


Flow characteristics

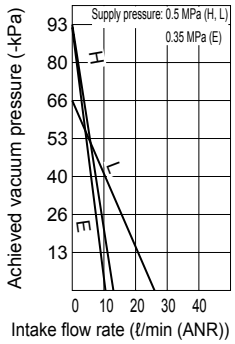


● VSH-*07, VSB-*07, VSC-*07

Vacuum characteristics

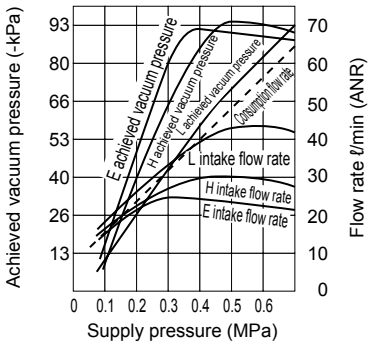


Flow characteristics

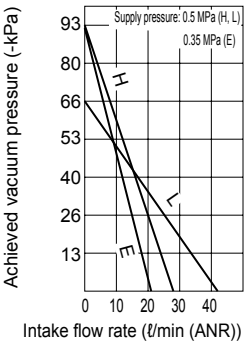


● VSH-*10, VSB-*10, VSC-*10

Vacuum characteristics

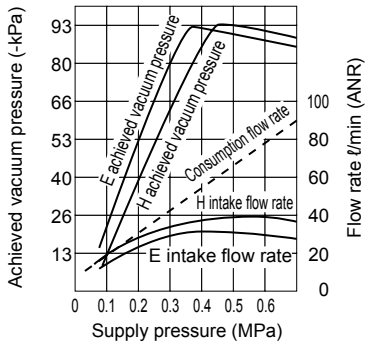


Flow characteristics

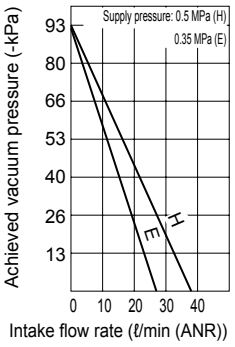


● VSH-*12, VSB-*12, VSC-*12

Vacuum characteristics

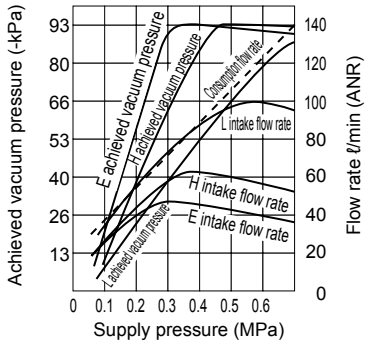


Flow characteristics

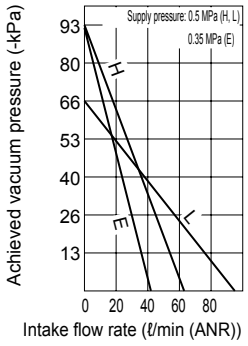


● VSH-*15, VSC-*15

Vacuum characteristics

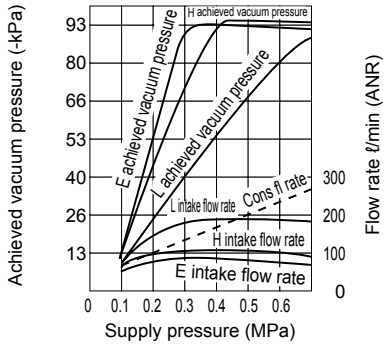


Flow characteristics

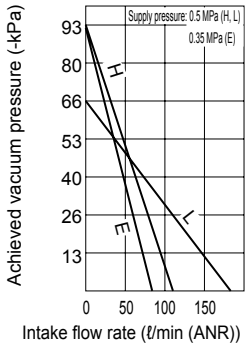


● VSH-*20, VSC-*20

Vacuum characteristics



Flow characteristics

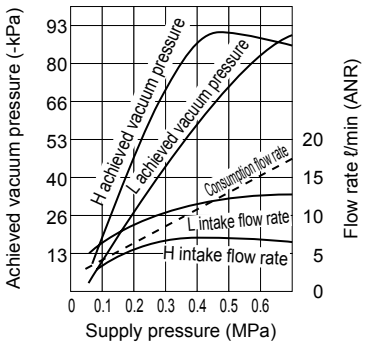


Vacuum characteristics, flow characteristics

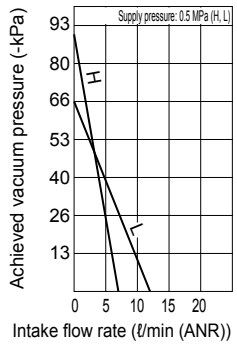
Supply pressure - achieved vacuum pressure, intake flow rate, air consumption rate

● VSU-H/L05, VSC-H/L05

Vacuum characteristics

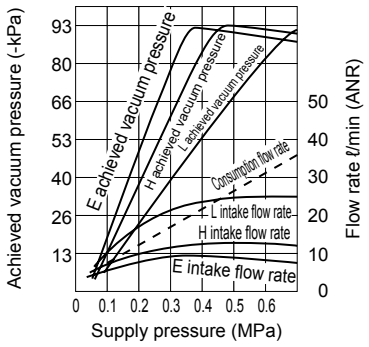


Flow characteristics

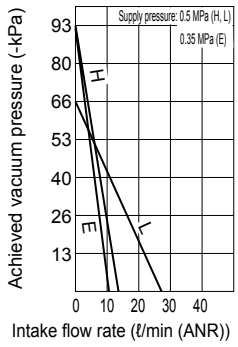


● VSU-*07

Vacuum characteristics



Flow characteristics



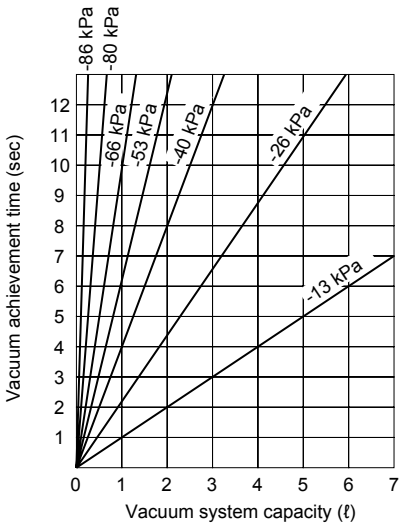
1. Supply pressure with the characteristics described above occurs at vacuum generation.
2. Achieved vacuum pressure with the characteristics described above produces abnormal noise (soft clicking sound) at supply pressure just before reaching the peak value. When this abnormal noise occurs, the characteristics become unstable and operation becomes louder. Reset the supply pressure, as it may affect the sensor, etc., and cause trouble.
   Ex. 1: Source pressure is 0.5 MPa with the H vacuum ejector. During vacuum ejector operation, supply pressure drops to 0.43 MPa due to pressure drop, and abnormal noise is generated. → Reset supply pressure to 0.5 MPa during vacuum ejector operation.
3. Carry out piping or equipment selection with 3 times the effective cross-sectional area of the nozzle diameter cross-sectional area as a guideline. Satisfactory vacuum characteristics cannot be obtained if adequate supply air flow rate is not maintained.
   (A soft clicking sound occurs at set pressure. Insufficient intake flow rate, insufficient achievement of achieved vacuum pressure, etc.)
   Ex. 2: Abnormal noise occurs even when pressure is 0.5 MPa with H vacuum ejector during vacuum ejector operation. → Insufficient supply air flow rate. (Supply air flow rate is restricted in front of the vacuum ejector by piping resistance, etc., and supply air flow rate satisfying the properties is not obtained. → Select piping components that can secure the required effective cross-sectional area.)
   Ex. 3: For vacuum ejector with 1.0mm nozzle diameter, cross-sectional area is $0.5^2 \times \pi = 0.785\ mm^2 \times 3 = 2.35mm^2$. Therefore, carry out piping and equipment selection that ensures an effective cross-sectional area of $2.3mm^2$ or greater.

Vacuum characteristics

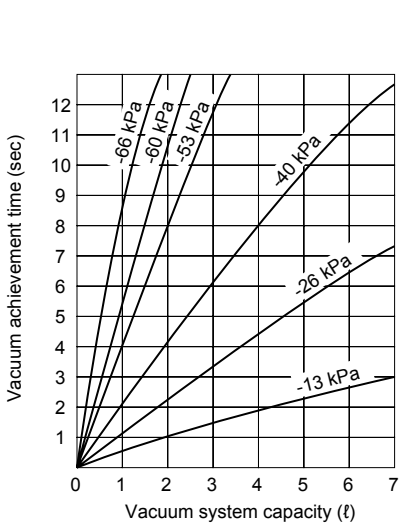
(Reference) Vacuum achievement time (supply pressure H: 0.5 MPa, L: 0.5 MPa, E: 0.3 to 0.5 MPa)

* Since the values change according to the vacuum system pipe shape, use them as a guideline.

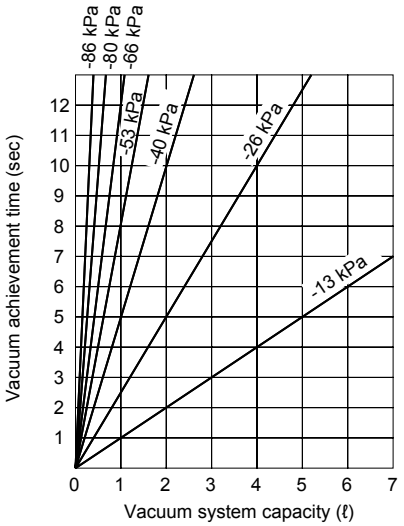
● VSH-H05, VSB-H05



● VSH-L05, VSB-L05



● VSU-H05

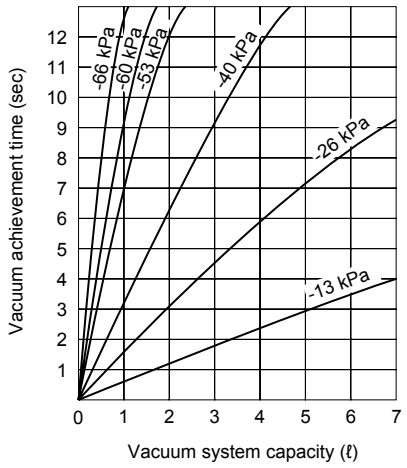


Vacuum characteristics

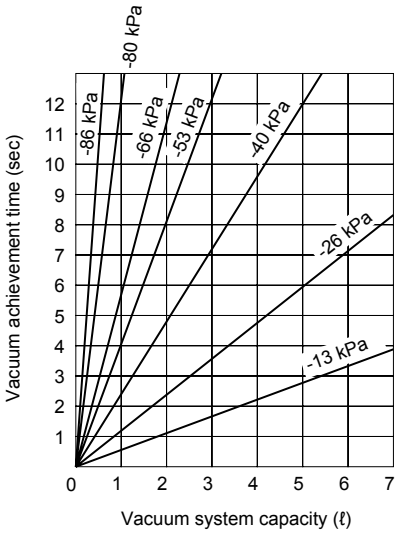
(Reference) Vacuum achievement time (supply pressure H: 0.5 MPa, L: 0.5 MPa, E: 0.3 to 0.5 MPa)

* Since the values change according to the vacuum system pipe shape, use them as a guideline.

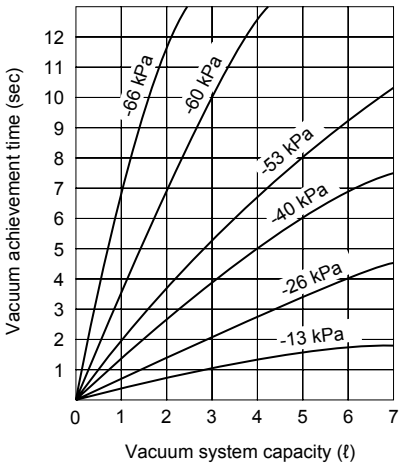
● VSU-L05



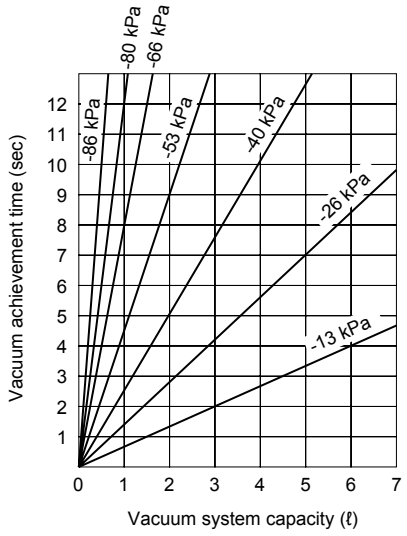
● VSU-H07



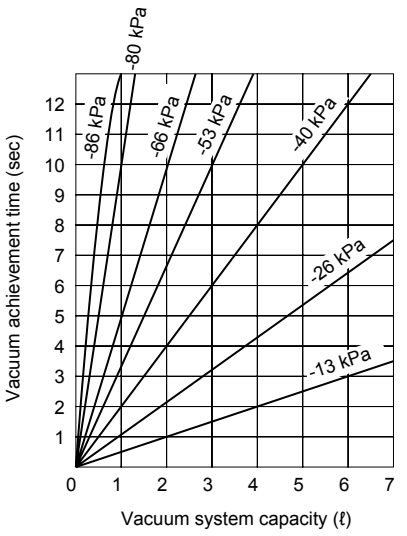
● VSU-L07



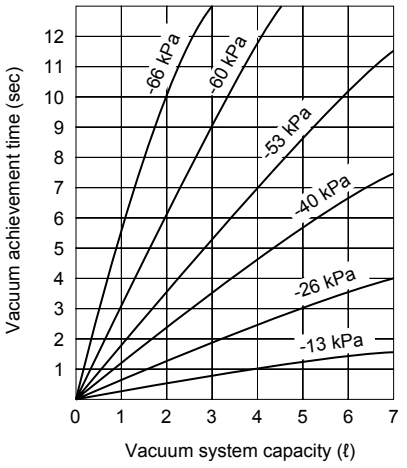
● VSU-E07



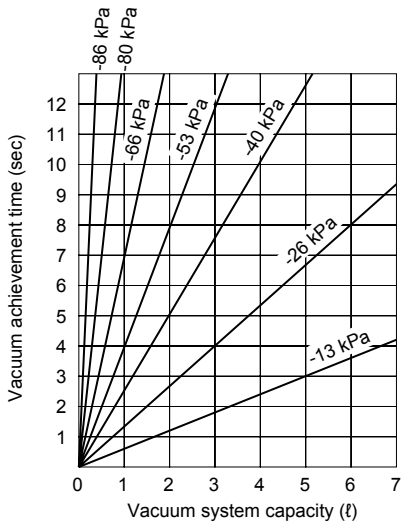
● VSH-H07, VSB-H07



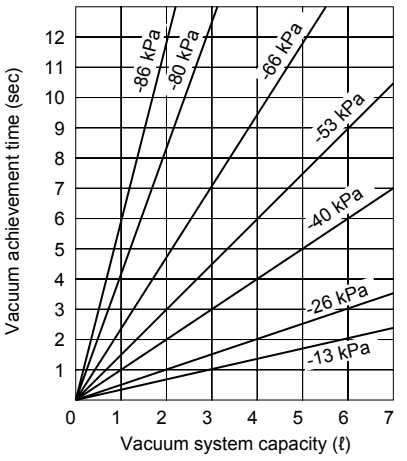
● VSH-L07, VSB-L07



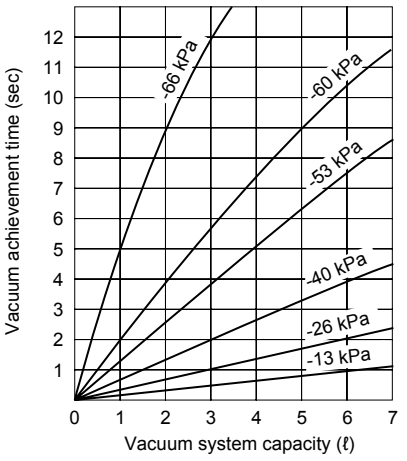
● VSH-E07, VSB-E07



● VSH-H10, VSB-H10



● VSH-L10, VSB-L10

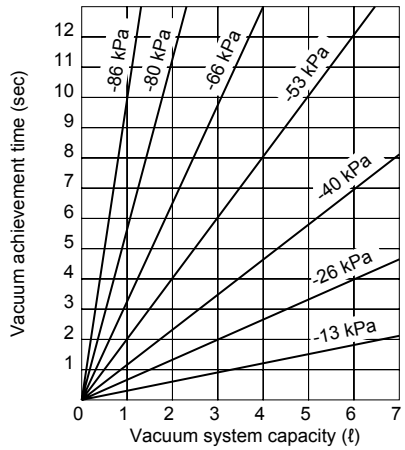


Vacuum characteristics

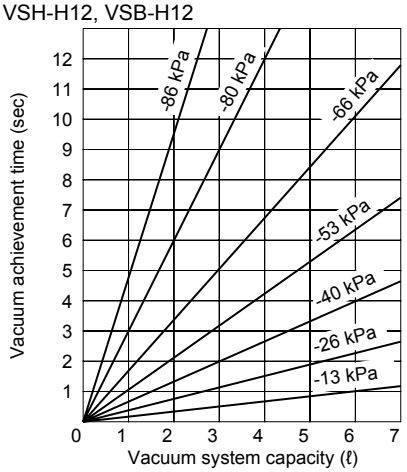
(Reference) Vacuum achievement time (supply pressure H: 0.5 MPa, L: 0.5 MPa, E: 0.3 to 0.5 MPa)

* Since the values change according to the vacuum system pipe shape, use them as a guideline.

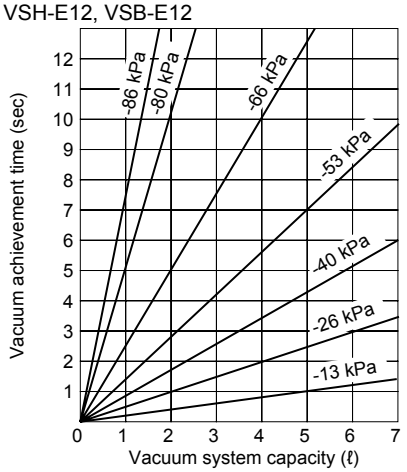
● VSH-E10



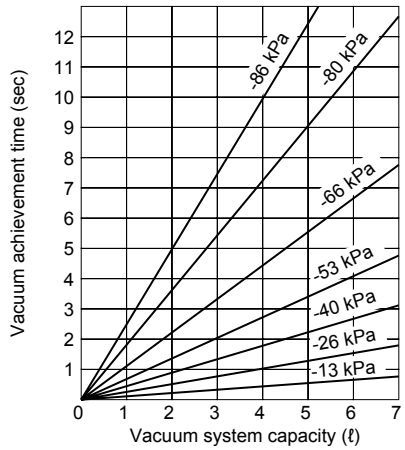
● VSH-H12, VSB-H12



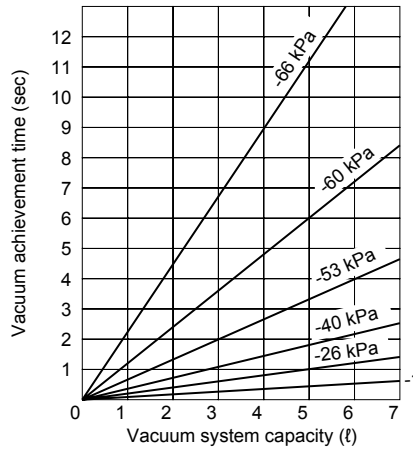
● VSH-E12, VSB-E12



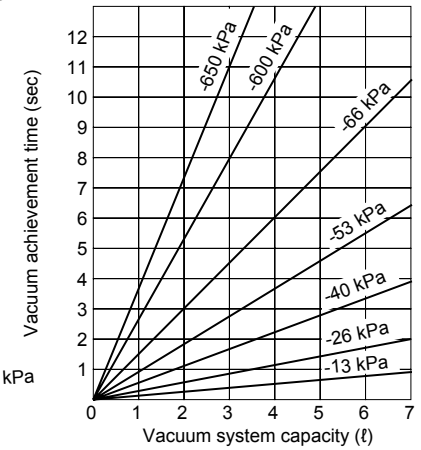
● VSH-H15



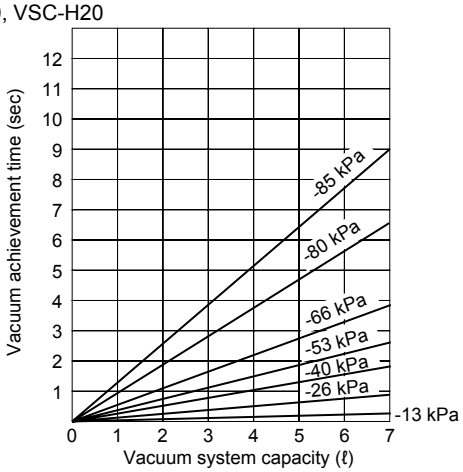
● VSH-L15



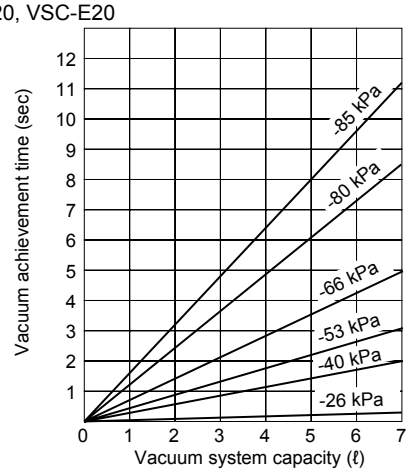
● VSH-E15



● VSH-H20, VSC-H20

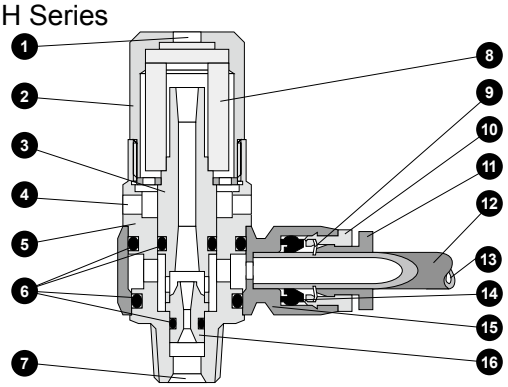


● VSH-E20, VSC-E20



Internal structure and parts list

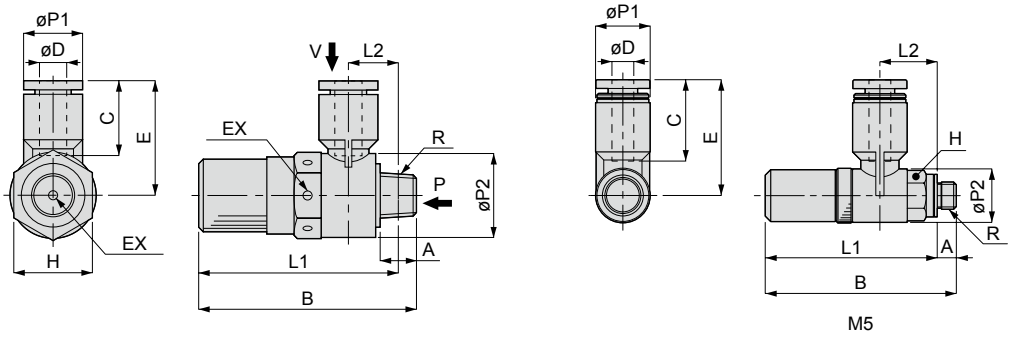
● VSH Series



No.	Part name	Material	Remarks
1	Exhaust port (EX)		
2	Cap	Aluminum	
3	Diffuser	Copper alloy	Electroless nickel plating
4	Exhaust port (EX)		
5	Metal body	Copper alloy	Electroless nickel plating
6	O-ring	Nitrile rubber	
7	Air supply port (P)		
8	Silencer element	Polyvinyl formal	
9	Lock claw	Stainless steel	
10	Guide ring	Copper alloy	Electroless nickel plating
11	Release ring	Polyacetal	
12	Tube		
13	Vacuum port (V)		
14	Elastic sleeve	Nitrile rubber	
15	Resin body	Polybutylene terephthalate	
16	Nozzle	Copper alloy	Electroless nickel plating

Dimensions

● VSH-□-□S (atmospheric release with silencer)



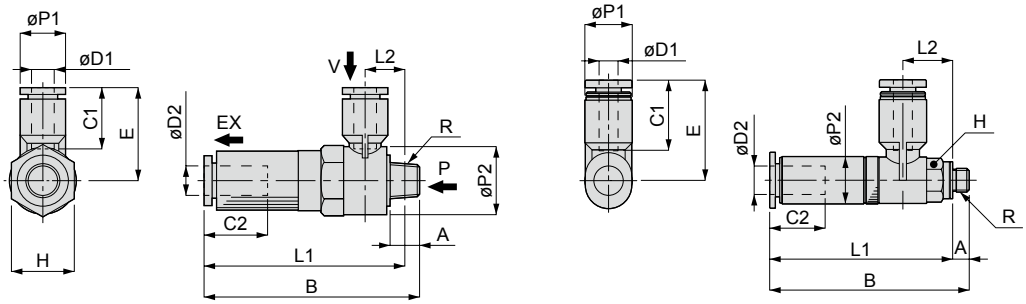
Unit: mm

Model No.	Tube O.D. øD	R	A	B	L1	L2	øP1	øP2	C	E	Opposite side H	Nozzle diameter (mm)	Working pressure (MPa)	Achieved vac press (-kPa)	Intake flow rate (ℓ/min (ANR))	Air consump rate (ℓ/min (ANR))	Weight (g)
VSH-H05-4M5S	4	M5×0.8	3	34.5	31.5	10.5	10	9.8	14.9	21.2	8	0.5	0.5	90	7	11.5	13
VSH-H05-66AS	6	R1/8	8	48	44	11.4	12.4	18.4	17	25.5	17	0.5	0.5	90	7	11.5	37
VSH-H07-66AS	6	R1/8	8	48	44	11.4	12.4	18.4	17	25.5	17	0.7	0.5	93	13	23	37
VSH-H10-66AS	6	R1/8	8	48	44	11.4	12.4	18.4	17	25.5	17	1	0.5	93	28	46	37
VSH-H12-66AS	6	R1/8	8	48	44	11.4	12.4	18.4	17	25.5	17	1.2	0.5	93	38	70	37
VSH-H10-86AS	8	R1/8	8	48	44	12.4	14.5	18.4	18.1	28.4	17	1	0.5	93	28	46	38
VSH-H12-86AS	8	R1/8	8	48	44	12.4	14.5	18.4	18.1	28.4	17	1.2	0.5	93	38	70	38
VSH-H15-88AS	8	R1/4	11	71.5	65.5	13.5	14.5	22	18.1	28.9	22	1.5	0.5	93	63	100	77
VSH-H15-108AS	10	R1/4	11	71.5	65.5	14.8	17.6	22	20.2	31.2	22	1.5	0.5	93	63	100	80
VSH-H20-108AS	10	R1/4	11	99.6	93.5	15.1	17.6	28	20.2	33.6	24	2.0	0.5	93	104	200	116
VSH-H20-128AS	12	R1/4	11	99.6	93.5	16.8	21	28	23.4	36.4	24	2.0	0.5	93	104	200	116
VSH-L05-4M5S	4	M5×0.8	3	34.5	31.5	10.5	10	9.8	14.9	21.2	8	0.5	0.5	66	12	11.5	13
VSH-L05-66AS	6	R1/8	8	48	44	11.4	12.4	18.4	17	25.5	17	0.5	0.5	66	12	11.5	37
VSH-L07-66AS	6	R1/8	8	48	44	11.4	12.4	18.4	17	25.5	17	0.7	0.5	66	26	23	37
VSH-L10-66AS	6	R1/8	8	48	44	11.4	12.4	18.4	17	25.5	17	1	0.5	66	42	46	36
VSH-L07-86AS	8	R1/8	8	48	44	12.4	14.5	18.4	18.1	28.4	17	0.7	0.5	66	26	23	39
VSH-L10-86AS	8	R1/8	8	48	44	12.4	14.5	18.4	18.1	28.4	17	1	0.5	66	42	46	38
VSH-L15-88AS	8	R1/4	11	71.5	65.5	13.5	14.5	22	18.1	28.9	22	1.5	0.5	66	95	100	75
VSH-L15-108AS	10	R1/4	11	71.5	65.5	14.8	17.6	22	20.2	31.2	22	1.5	0.5	66	95	100	78
VSH-L15-128AS	12	R1/4	11	71.5	65.5	16.5	21	22	23.4	36.9	22	1.5	0.5	66	95	100	82
VSH-L20-108AS	10	R1/4	11	99.6	93.5	15.1	17.6	28	20.2	33.6	24	2.0	0.5	66	174	200	116
VSH-L20-128AS	12	R1/4	11	99.6	93.5	16.8	21	28	23.4	36.4	24	2.0	0.5	66	174	200	116
VSH-E07-66AS	6	R1/8	8	48	44	11.4	12.4	18.4	17	25.5	17	0.7	0.35	92	10.5	17	37
VSH-E10-66AS	6	R1/8	8	48	44	11.4	12.4	18.4	17	25.5	17	1	0.35	92	21	34	37
VSH-E12-66AS	6	R1/8	8	48	44	11.4	12.4	18.4	17	25.5	17	1.2	0.35	92	27	47	37
VSH-E10-86AS	8	R1/8	8	48	44	12.4	14.5	18.4	18.1	28.4	17	1	0.35	92	21	34	39
VSH-E12-86AS	8	R1/8	8	48	44	12.4	14.5	18.4	18.1	28.4	17	1.2	0.35	92	27	47	38
VSH-E15-88AS	8	R1/4	11	71.5	65.5	13.5	14.5	22	18.1	28.9	22	1.5	0.35	92	42	70	78
VSH-E15-108AS	10	R1/4	11	71.5	65.5	14.8	17.6	22	20.2	31.2	22	1.5	0.35	92	42	70	80
VSH-E20-108AS	10	R1/4	11	99.6	93.5	15.1	17.6	28	20.2	33.6	24	2.0	0.35	92	82	150	116
VSH-E20-128AS	12	R1/4	11	99.6	93.5	16.8	21	28	23.4	36.4	24	2.0	0.35	92	82	150	116

Note : The taper thread L1 and L2 dimensions are the reference dimensions after tightening.

Dimensions

● VSH-□-□J (common exhaust)



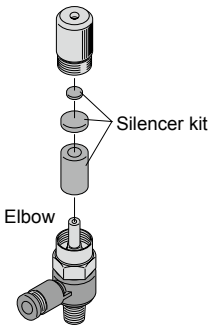
Unit: mm

Model No.	Tube O.D. øD1	Tube O.D. øD2	R	A	B	L1	L2	øP1	øP2	C1	C2	E	Opposite side H	Nozzle diameter (mm)	Working pressure (MPa)	Achieved vac press (-kPa)	Intake flow rate (ℓ/min (ANR))	Air consump rate (ℓ/min (ANR))	Weight (g)
VSH-H05-4M5J	4	6	M5×0.8	3	41.8	38.8	10.5	10	10	14.9	11.9	21.2	8	0.5	0.5	90	7	11.5	18
VSH-H05-66AJ	6	8	R1/8	8	58.4	54.4	11.4	12.4	18.4	17	18.2	25.5	17						45
VSH-H07-66AJ														0.7		93	13	23	46
VSH-H10-66AJ														1			28	46	45
VSH-H12-66AJ														1.2			38	70	44
VSH-H10-86AJ	8						12.4	14.5		18.1		28.4		1			28	46	46
VSH-H12-86AJ														1.2			38	70	46
VSH-H15-88AJ	10	12	R1/4	11	76.9	70.9	13.5	17.6	22	20.2	23.3	28.9	22	1.5			63	100	92
VSH-H15-108AJ							14.8					31.2							95
VSH-H20-108AJ					89.4	83.3	15.1		28	20.2		33.6	24	2.0			104	200	128
VSH-H20-128AJ	12						16.8	21		23.4		36.4							
VSH-L05-4M5J	4	6	M5×0.8	3	41.8	38.8	10.5	10	10	14.9	11.9	21.2	8	0.5	0.5	66	12	11.5	18
VSH-L05-66AJ	6	8	R1/8	8	58.4	54.4	11.4	12.4	18.4	17	18.2	25.5	17						45
VSH-L07-66AJ														0.7			26	23	
VSH-L10-66AJ														1			42	46	44
VSH-L07-86AJ	8						12.4	14.5		18.1		28.4		0.7			26	23	46
VSH-L10-86AJ														1			42	46	45
VSH-L15-88AJ	10	12	R1/4	11	76.9	70.9	13.5	17.6	22	20.2	23.3	28.9	22	1.5			95	100	90
VSH-L15-108AJ							14.8					31.2							93
VSH-L15-128AJ	12						16.5	21		23.4		36.9							97
VSH-L20-108AJ	10				89.4	83.3	15.1	17.6	28	20.2		33.6	24	2.0			174	200	128
VSH-L20-128AJ	12						16.8	21		23.4		36.4							
VSH-E07-66AJ	6	8	R1/8	8	58.4	54.4	11.4	12.4	18.4	17	18.2	25.5	17	0.7	0.35	92	10.5	17	45
VSH-E10-66AJ														1			21	34	
VSH-E12-66AJ														1.2			27	47	
VSH-E10-86AJ	8						12.4	14.5		18.1		28.4		1			21	34	47
VSH-E12-86AJ														1.2			27	47	46
VSH-E15-88AJ	10	12	R1/4	11	76.9	70.9	13.5	17.6	22	20.2	23.3	28.9	22	1.5			42	70	92
VSH-E15-108AJ							14.8					31.2							96
VSH-E20-108AJ					89.4	83.3	15.1		28	20.2		33.6	24	2.0			82	150	128
VSH-E20-128AJ	12						16.8	21		23.4		36.4							

Note : The taper thread L1 and L2 dimensions are the reference dimensions after tightening.

Maintenance part model No.

● Silencer kit



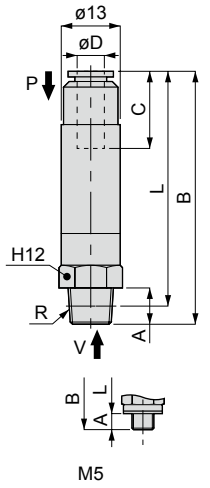
Silencer kit model No.	Vacuum ejector model No.
VSH-M5-SK	VSH-□□-□M5S
VSH-6A-SK	VSH-□□-□6AS
VSH-8A-SK	VSH-□□-□8AS

Note : VSH-□20-□□□ uses VSC-20-SK (silencer kit for VSC-20).

Dimensions

● VSU-□-□S (atmospheric release with silencer)

Unit: mm

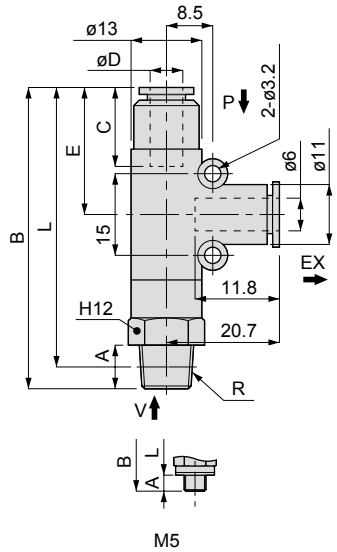


Model No.	Tube O.D. øD	R	A	B	L	C	Nozzle diameter (mm)	Achieved vac press (-kPa)	Intake flow rate (ℓ/min (ANR))	Air consump rate (ℓ/min (ANR))	Weight (g)
VSU-H05-M54S	4	M5×0.8	3	50.3	47.3	10.9	0.5	90	7	11.5	18
VSU-H05-M56S	6			51.3	48.3	11.7					17
VSU-H05-6A4S	4	R1/8	8	54.3	50.3	10.9					20
VSU-H05-6A6S	6			55.3	51.3	11.7					
VSU-H07-M54S	4	M5×0.8	3	57.1	54.1	10.9	0.7	92	12.5	23	19
VSU-H07-M56S	6			57.8	54.8	11.7					18
VSU-H07-6A4S	4	R1/8	8	61.1	57.1	10.9					21
VSU-H07-6A6S	6			61.8	57.8	11.7					
VSU-L05-M54S	4	M5×0.8	3	50.3	47.3	10.9	0.5	66	12	11.5	18
VSU-L05-M56S	6			51.3	48.3	11.7					17
VSU-L05-6A4S	4	R1/8	8	54.3	50.3	10.9					20
VSU-L05-6A6S	6			55.3	51.3	11.7					
VSU-L07-M54S	4	M5×0.8	3	57.1	54.1	10.9	0.7		20	23	19
VSU-L07-M56S	6			57.8	54.8	11.7					18
VSU-L07-6A4S	4	R1/8	8	61.1	57.1	10.9			22		21
VSU-L07-6A6S	6			61.8	57.8	11.7					
VSU-E07-M54S	4	M5×0.8	3	57.1	54.1	10.9	0.7	90	10	17	19
VSU-E07-M56S	6			57.8	54.8	11.7					
VSU-E07-6A4S	4	R1/8	8	61.1	57.1	10.9					22
VSU-E07-6A6S	6			61.8	57.8	11.7					21

*1 : The taper thread L dimensions are the reference dimensions after tightening.
*2 : M5 screw is knurled at the hex opposite side. Also, H12 is for 6A (R1/8) screws.

● VSU-□-□J (common exhaust)

Unit: mm

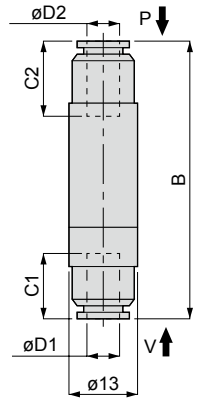


Model No.	Tube O.D. øD	R	A	B	L	C	E	Nozzle diameter (mm)	Achieved vac press (-kPa)	Intake flow rate (ℓ/min (ANR))	Air consump rate (ℓ/min (ANR))	Weight (g)
VSU-H05-M54J	4	M5×0.8	3	50.3	47.3	11.2	22.3	0.5	90	7	11.5	20
VSU-H05-M56J	6			51.3	48.3	11.9	23.3					
VSU-H05-6A4J	4	R1/8	8	54.3	50.3	11.2	22.3					23
VSU-H05-6A6J	6			55.3	51.3	11.9	23.3					22
VSU-H07-M54J	4	M5×0.8	3	57.1	54.1	11.2	29.1	0.7	92	12.5	23	21
VSU-H07-M56J	6			57.8	54.8	11.9	29.8					
VSU-H07-6A4J	4	R1/8	8	61.1	57.1	11.2	29.1					24
VSU-H07-6A6J	6			61.8	57.8	11.9	29.8					23
VSU-L05-M54J	4	M5×0.8	3	50.3	47.3	11.2	22.3	0.5	66	12	11.5	20
VSU-L05-M56J	6			51.3	48.3	11.9	23.3					
VSU-L05-6A4J	4	R1/8	8	54.3	50.3	11.2	22.3					22
VSU-L05-6A6J	6			55.3	51.3	11.9	23.3					
VSU-L07-M54J	4	M5×0.8	3	57.1	54.1	11.2	29.1	0.7		20	23	20
VSU-L07-M56J	6			57.8	54.8	11.9	29.8					
VSU-L07-6A4J	4	R1/8	8	61.1	57.1	11.2	29.1			22		23
VSU-L07-6A6J	6			61.8	57.8	11.9	29.8					
VSU-E07-M54J	4	M5×0.8	3	57.1	54.1	11.2	29.1	0.7	90	10	17	22
VSU-E07-M56J	6			57.8	54.8	11.9	29.8					21
VSU-E07-6A4J	4	R1/8	8	61.1	57.1	11.2	29.1					24
VSU-E07-6A6J	6			61.8	57.8	11.9	29.8					23

*1 : The taper thread L dimensions are the reference dimensions after tightening.
*2 : M5 screw is knurled at the hex opposite side. Also, H12 is for 6A (R1/8) screws.

Dimensions

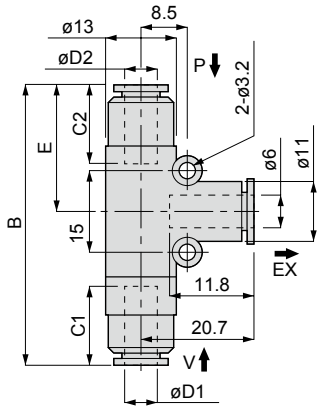
● VSU-□-□S (union, atmospheric release with silencer)



Unit: mm

Model No.	Tube O.D. øD1	Tube O.D. øD2	B	C1	C2	Nozzle diameter (mm)	Achieved vac press (-kPa)	Intake flow rate (ℓ/min (ANR))	Air consump rate (ℓ/min (ANR))	Weight (g)
VSU-H05-44S	4	4	49.9	11.2	11.2	0.5	90	7	11.5	19
VSU-H05-46S		6	50.9		11.9					
VSU-H05-64S	6	4	50.6	11.9	11.2					18
VSU-H05-66S		6	51.6		11.9					
VSU-H07-44S	4	4	56.7	11.2	11.2	0.7	92	12.5	23	20
VSU-H07-46S		6	57.4		11.9					
VSU-H07-64S	6	4		11.9	11.2					19
VSU-H07-66S		6	58.1		11.9					
VSU-L05-44S	4	4	49.9	11.2	11.2	0.5	66	12	11.5	19
VSU-L05-46S		6	50.9		11.9					
VSU-L05-64S	6	4	50.6	11.9	11.2					18
VSU-L05-66S		6	51.6		11.9					
VSU-L07-44S	4	4	56.7	11.2	11.2	0.7		20	23	20
VSU-L07-46S		6	57.4		11.9					19
VSU-L07-64S	6	4		11.9	11.2			22		
VSU-L07-66S		6	58.1		11.9					18
VSU-E07-44S	4	4	56.7	11.2	11.2	0.7	90	10	17	21
VSU-E07-46S		6	57.4		11.9					20
VSU-E07-64S	6	4		11.9	11.2					19
VSU-E07-66S		6	58.1		11.9					

● VSU-□-□J (union, common exhaust)

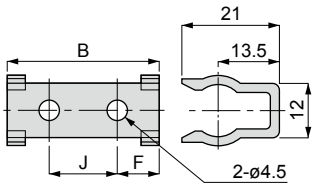


Unit: mm

Model No.	Tube O.D. øD1	Tube O.D. øD2	B	C1	C2	E	Nozzle diameter (mm)	Achieved vac press (-kPa)	Intake flow rate (ℓ/min (ANR))	Air consump rate (ℓ/min (ANR))	Weight (g)
VSU-H05-44J	4	4	49.9	11.2	11.2	22.3	0.5	90	7	11.5	21
VSU-H05-46J		6	50.9		11.9	23.3					
VSU-H05-64J	6	4		11.9	11.2	22.3					20
VSU-H05-66J		6	51.6		11.9	23.3					
VSU-H07-44J	4	4	56.7	11.2	11.2	29.1	0.7	92	12.5	23	23
VSU-H07-46J		6	57.4		11.9	29.8					22
VSU-H07-64J	6	4		11.9	11.2	29.1					
VSU-H07-66J		6	58.1		11.9	29.8					21
VSU-L05-44J	4	4	49.9	11.2	11.2	22.3	0.5	66	12	11.5	21
VSU-L05-46J		6	50.9		11.9	23.3					
VSU-L05-64J	6	4	50.6	11.9	11.2	22.3					20
VSU-L05-66J		6	51.6		11.9	23.3					
VSU-L07-44J	4	4	56.7	11.2	11.2	29.1	0.7		20	23	22
VSU-L07-46J		6	57.4		11.9	29.8					
VSU-L07-64J	6	4		11.9	11.2	29.1			22		
VSU-L07-66J		6	58.1		11.9	29.8					21
VSU-E07-44J	4	4	56.7	11.2	11.2	29.1	0.7	90	10	17	22
VSU-E07-46J		6	57.4		11.9	29.8					
VSU-E07-64J	6	4		11.9	11.2	29.1					
VSU-E07-66J		6	58.1		11.9	29.8					21

Dimensions

● Bracket for VSU



Unit: mm

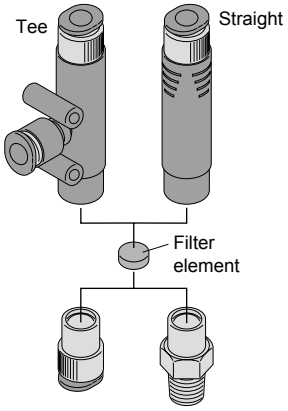
Model No.	B	F	J	Weight (g)
VSU-05-B	33.2	9	15	2
VSU-07-B	39.2	10	20	2

Note : VSU-05-B is for nozzle diameter of 0.5 mm and VSU-07-B for nozzle diameter of 0.7 mm.

Maintenance part model No.

● Filter element

VSU-E



Safety precautions

⚠ WARNING

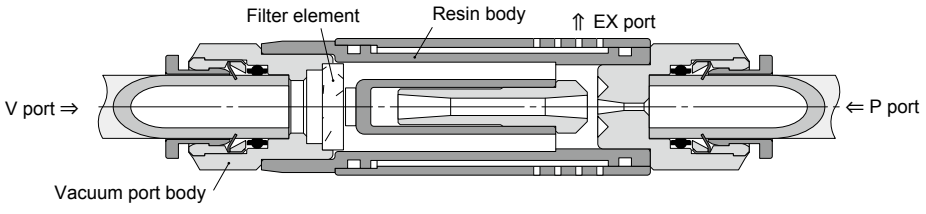
● For the VSU, do not apply load to the body in the tension direction. The metal body may detach from the resin body due to tensile load.

● Avoid use of the VSU in which excessive internal pressure is applied to the ejector. The metal body may detach from the resin body.

⚠ CAUTION

● The VSU may not exhibit satisfactory performance if, during filter element maintenance, appropriate parts are not installed in the correct positions (no gap between the resin body and vacuum port body) as shown in the structural diagram below.

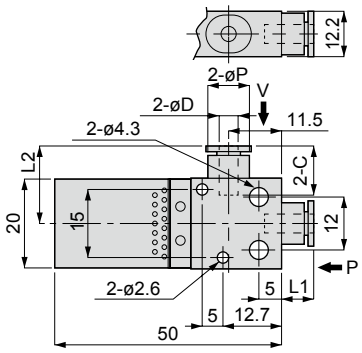
● VSU structural diagram



Dimensions

● VSB-□-□ (atmospheric release)

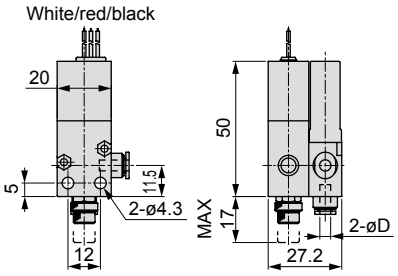
Unit: mm



Model No.	Tube O.D. øD	øP	C	L1	L2	Nozzle diameter (mm)	Working pressure (MPa)	Achieved vac press (-kPa)	Intake flow rate (ℓ/min (ANR))	Air consump rate (ℓ/min (ANR))	Weight (g)
VSB-H05-44	4	9	11.3	6.9	16.9	0.5	0.5	90	7	11.5	18
VSB-H07-66	6	10.6	11.8	7.2	17.2	0.7	0.5	93	13	23	19
VSB-H10-66						1			28	46	
VSB-H12-66						1.2			38	70	18
VSB-L05-44	4	9	11.3	6.9	16.9	0.5	0.45	66	12	11.5	18
VSB-L07-66	6	10.6	11.8	7.2	17.2	0.7			26	23	19
VSB-L10-66						1			42	46	18
VSB-E07-66	6	10.6	11.8	7.2	17.2	0.7	0.4	92	10.5	17	19
VSB-E10-66						1			21	34	
VSB-E12-66						1.2			27	47	18

● VSB-□-□V (with vacuum switch)

Unit: mm

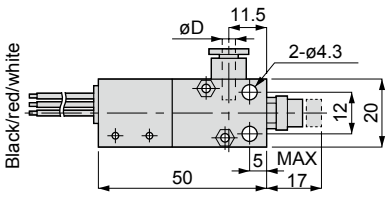


Model No.	Tube O.D. øD	Nozzle diameter (mm)	Working pressure (MPa)	Achieved vacuum pressure (-kPa)	Intake flow rate (ℓ/min (ANR))	Air consumption rate (ℓ/min (ANR))	Weight (g)
VSB-H05-44V	4	0.5	0.5	90	7	11.5	47
VSB-H07-66V	6	0.7	0.5	93	13	23	46
VSB-H10-66V		1			28	46	47
VSB-H12-66V		1.2			38	70	48
VSB-L05-44V	4	0.5	0.45	66	12	11.5	47
VSB-L07-66V	6	0.7			26	23	48
VSB-L10-66V		1			42	46	47
VSB-E07-66V	6	0.7	0.4	92	10.5	17	49
VSB-E10-66V		1			21	34	
VSB-E12-66V		1.2			27	47	48

Note : Lead wire, White : COMMON
Red : NC
Black : NO

● VSB-VUSM-□ Mechanical vacuum switch, single unit

Unit: mm

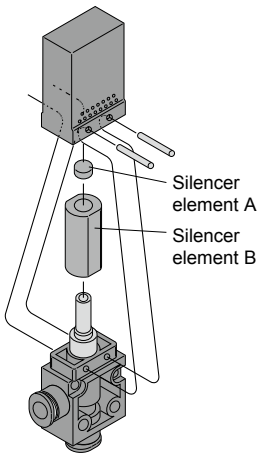


Model No.	Tube O.D. øD	Weight (g)
VSB-VUSM-4	4	29
VSB-VUSM-6	6	29

Note : Lead wire, White : COMMON
Length approx. 300 mm Red : NC
(AWG#24) Black : NO

Maintenance part model No.

● Silencer element

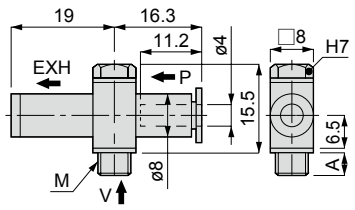


Element model A	Element model B
VSB-EA	VSB-EB
Note: VSB, VSG, VSJ common parts	Note: VSB, VSG common parts

Dimensions

● VSC-□-□S (straight, atmospheric release with silencer)

Unit: mm

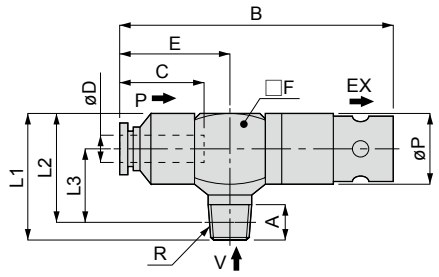


Model No.	M	A	Nozzle diameter (mm)	Achieved vacuum pressure (-kPa)	Intake flow rate (ℓ/min (ANR))	Air consumption rate (ℓ/min (ANR))	Weight (g)
VSC-H05-M54S	M5×0.8	3	0.5	90	7	11.5	15
VSC-L05-M54S	M5×0.8	3	0.5	66	11	11.5	17

Note : Please note that the piping direction cannot be changed after mounting the body.

Dimensions

● VSC-□-□S (atmospheric release with silencer)



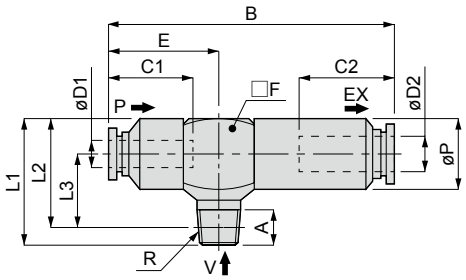
Unit: mm

Model No.	Tube O.D. øD	R	A	L1	L2	L3	øP	B	E	C	□F	Nozzle diameter (mm)	Achieved vac press (-kPa)	Intake flow rate (ℓ/min (ANR))	Air consump rate (ℓ/min (ANR))	Weight (g)
VSC-H07-6A6S	6	R1/8	8	28	24	16	16	62.5	24.5	17	16	0.7	93	13	23	32
VSC-H07-6A8S	8							65.2	27.2	18.2						
VSC-H10-6A6S	6							62.5	24.5	17		1		28	46	
VSC-H10-6A8S	8							65.2	27.2	18.2						
VSC-H12-6A6S	6							62.5	24.5	17		1.2		38	70	
VSC-H12-6A8S	8							65.2	27.2	18.2						
VSC-H15-8A8S	8	R1/4	11	39	33	21	24	104.2	29.2	18.2	22	1.5		63	100	87
VSC-H15-10A8S		R3/8	12		32.7	20.7										88
VSC-H15-8A10S	10	R1/4	11		33	21		105.9	30.9	20.7						
VSC-H15-10A10S		R3/8	12		32.7	20.7										89
VSC-H20-8A8S	8	R1/4	11		33	21		104.2	29.2	18.2		2		110	200	91
VSC-H20-10A8S		R3/8	12		32.7	20.7										92
VSC-H20-8A10S	10	R1/4	11		33	21		105.9	30.9	20.7						93
VSC-H20-10A10S		R3/8	12		32.7	20.7										94
VSC-L07-6A6S	6	R1/8	8	28	24	16	16	62.5	24.5	17	16	0.7	66	26	23	32
VSC-L07-6A8S	8							65.2	27.2	18.2						
VSC-L10-6A6S	6							62.5	24.5	17		1		42	46	
VSC-L10-6A8S	8							65.2	27.2	18.2						
VSC-L15-8A8S	8	R1/4	11	39	33	21	24	104.2	29.2	18.2	22	1.5		95	100	85
VSC-L15-10A8S		R3/8	12		32.7	20.7										86
VSC-L15-8A10S	10	R1/4	11		33	21		105.9	30.9	20.7						87
VSC-L15-10A10S		R3/8	12		32.7	20.7										88
VSC-L20-8A8S	8	R1/4	11		33	21		104.2	29.2	18.2		2		180	200	87
VSC-L20-10A8S		R3/8	12		32.7	20.7										88
VSC-L20-8A10S	10	R1/4	11		33	21		105.9	30.9	20.7						
VSC-L20-10A10S		R3/8	12		32.7	20.7										89
VSC-E07-6A6S	6	R1/8	8	28	24	16	16	62.5	24.5	17	16	0.7	92	10.5	17	32
VSC-E07-6A8S	8							65.2	27.2	18.2						
VSC-E10-6A6S	6							62.5	24.5	17		1		21	34	
VSC-E10-6A8S	8							65.2	27.2	18.2						
VSC-E12-6A6S	6							62.5	24.5	17		1.2		27	47	
VSC-E12-6A8S	8							65.2	27.2	18.2						
VSC-E15-8A8S	8	R1/4	11	39	33	21	24	104.2	29.2	18.2	22	1.5		42	70	88
VSC-E15-10A8S		R3/8	12		32.7	20.7										89
VSC-E15-8A10S	10	R1/4	11		33	21		105.9	30.9	20.7						
VSC-E15-10A10S		R3/8	12		32.7	20.7										90
VSC-E20-8A8S	8	R1/4	11		33	21		104.2	29.2	18.2		2		84	150	93
VSC-E20-10A8S		R3/8	12		32.7	20.7										94
VSC-E20-8A10S	10	R1/4	11		33	21		105.9	30.9	20.7						
VSC-E20-10A10S		R3/8	12		32.7	20.7										95

Note : L1, L2 and L3 dimensions are reference dimensions after tightening.

Dimensions

● VSC-□-□J (common exhaust)



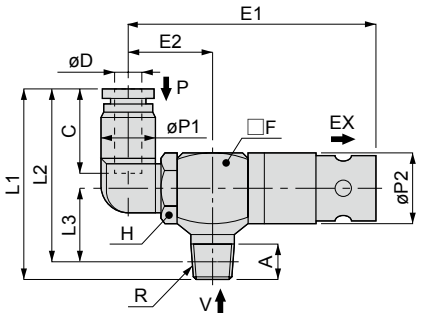
Unit: mm

Model No.	Tube O.D. øD1	Tube O.D. øD2	R	A	L1	L2	L3	øP	B	E	C1	C2	□F	Nozzle diameter (mm)	Achieved vac press (-kPa)	Intake flow rate (ℓ/min (ANR))	Air consump rate (ℓ/min (ANR))	Weight (g)
VSC-H07-6A6J	6	8	R1/8	8	28	24	16	16	64.7	24.5	17	18.2	16	0.7	93	13	23	37
VSC-H07-6A8J	8								67.4	27.2	18.2							
VSC-H10-6A6J	6								64.7	24.5	17			1		28	46	
VSC-H10-6A8J	8								67.4	27.2	18.2							
VSC-H12-6A6J	6								64.7	24.5	17			1.2		38	70	
VSC-H12-6A8J	8								67.4	27.2	18.2							
VSC-H15-8A8J	8	12	R1/4	11	38	32	21	22	94	29.2	18.2	23.3	22	1.5		63	100	99
VSC-H15-10A8J			R3/8	12		31.7	20.7											100
VSC-H15-8A10J	10		R1/4	11		32	21		95.7	30.9	20.7							
VSC-H15-10A10J			R3/8	12		31.7	20.7											101
VSC-H20-8A8J	8		R1/4	11		32	21		94	29.2	18.2			2	93	110	200	103
VSC-H20-10A8J			R3/8	12		31.7	20.7											104
VSC-H20-8A10J	10		R1/4	11		32	21		95.7	30.9	20.7							
VSC-H20-10A10J			R3/8	12		31.7	20.7											105
VSC-L07-6A6J	6	8	R1/8	8	28	24	16	16	64.7	24.5	17	18.2	16	0.7	66	26	23	37
VSC-L07-6A8J	8								67.4	27.2	18.2							
VSC-L10-6A6J	6								64.7	24.5	17			1		42	46	
VSC-L10-6A8J	8								67.4	27.2	18.2							
VSC-L15-8A8J	8	12	R1/4	11	38	32	21	22	94	29.2	18.2	23.3	22	1.5		95	100	97
VSC-L15-10A8J			R3/8	12		31.7	20.7											98
VSC-L15-8A10J	10		R1/4	11		32	21		95.7	30.9	20.7							
VSC-L15-10A10J			R3/8	12		31.7	20.7											99
VSC-L20-8A8J	8		R1/4	11		32	21		94	29.2	18.2			2		180	200	
VSC-L20-10A8J			R3/8	12		31.7	20.7											100
VSC-L20-8A10J	10		R1/4	11		32	21		95.7	30.9	20.7							
VSC-L20-10A10J			R3/8	12		31.7	20.7											101
VSC-E07-6A6J	6	8	R1/8	8	28	24	16	16	64.7	24.5	17	18.2	16	0.7	92	10.5	17	37
VSC-E07-6A8J	8								67.4	27.2	18.2							
VSC-E10-6A6J	6								64.7	24.5	17			1		21	34	
VSC-E10-6A8J	8								67.4	27.2	18.2							
VSC-E12-6A6J	6								64.7	24.5	17			1.2		27	47	
VSC-E12-6A8J	8								67.4	27.2	18.2							
VSC-E15-8A8J	8	12	R1/4	11	38	32	21	22	94	29.2	18.2	23.3	22	1.5		42	70	100
VSC-E15-10A8J			R3/8	12		31.7	20.7											101
VSC-E15-8A10J	10		R1/4	11		32	21		95.7	30.9	20.7							
VSC-E15-10A10J			R3/8	12		31.7	20.7											102
VSC-E20-8A8J	8		R1/4	11		32	21		94	29.2	18.2			2		84	150	105
VSC-E20-10A8J			R3/8	12		31.7	20.7											106
VSC-E20-8A10J	10		R1/4	11		32	21		95.7	30.9	20.7							
VSC-E20-10A10J			R3/8	12		31.7	20.7											107

Note : L1, L2 and L3 dimensions are reference dimensions after tightening.

Dimensions

● VSC-□-□S (air supply port elbow, atmospheric release with silencer)



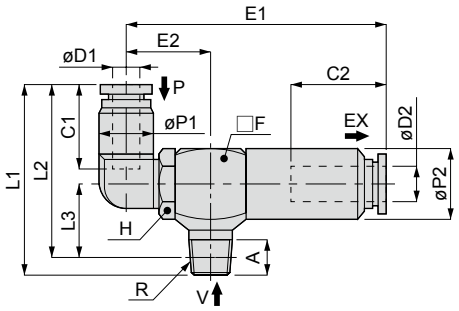
Unit: mm

Model No.	Tube O.D. øD1	R	A	L1	L2	L3	E1	E2	øP1	øP2	C	Opposite side H	□F	Nozzle diameter (mm)	Achieved vac press (-kPa)	Intake flow rate (ℓ/min (ANR))	Air consump rate (ℓ/min (ANR))	Weight (g)
VSC-H07-6A6LS	6	R1/8	8	42.8	38.8	16	57.3	19.3	12.5	16	17	14	16	0.7	93	13	23	32
VSC-H07-6A8LS	8			45.7	41.7		58.3	20.3	14.5		18.1							34
VSC-H10-6A6LS	6			42.8	38.8		57.3	19.3	12.5		17			1		28	46	32
VSC-H10-6A8LS	8			45.7	41.7		58.3	20.3	14.5		18.1							34
VSC-H12-6A6LS	6			42.8	38.8		57.3	19.3	12.5		17			1.2		38	70	32
VSC-H12-6A8LS	8			45.7	41.7		58.3	20.3	14.5		18.1							34
VSC-H15-8A8LS	8	R1/4	11	52.7	46.7	21	98.3	23.3		24		19	22	1.5		63	100	86
VSC-H15-10A8LS		R3/8	12		46.4	20.7												87
VSC-H15-8A10LS	10	R1/4	11	56.5	50.5	21	100.8	25.8	17.5		20.2							91
VSC-H15-10A10LS		R3/8	12		50.2	20.7												92
VSC-H20-8A8LS	8	R1/4	11	52.7	46.7	21	98.3	23.3	14.5		18.1			2	93	110	200	90
VSC-H20-10A8LS		R3/8	12		46.4	20.7												91
VSC-H20-8A10LS	10	R1/4	11	56.5	50.5	21	100.8	25.8	17.5		20.2							95
VSC-H20-10A10LS		R3/8	12		50.2	20.7												96
VSC-L07-6A6LS	6	R1/8	8	42.8	38.8	16	57.3	19.3	12.5	16	17	14	16	0.7	66	26	23	32
VSC-L07-6A8LS	8			45.7	41.7		58.3	20.3	14.5		18.1							34
VSC-L10-6A6LS	6			42.8	38.8		57.3	19.3	12.5		17			1		42	46	32
VSC-L10-6A8LS	8			45.7	41.7		58.3	20.3	14.5		18.1							34
VSC-L15-8A8LS	8	R1/4	11	52.7	46.7	21	98.3	23.3		24		19	22	1.5		95	100	84
VSC-L15-10A8LS		R3/8	12		46.4	20.7												85
VSC-L15-8A10LS	10	R1/4	11	56.5	50.5	21	100.8	25.8	17.5		20.2							89
VSC-L15-10A10LS		R3/8	12		50.2	20.7												90
VSC-L20-8A8LS	8	R1/4	11	52.7	46.7	21	98.3	23.3	14.5		18.1			2		180	200	86
VSC-L20-10A8LS		R3/8	12		46.4	20.7												87
VSC-L20-8A10LS	10	R1/4	11	56.5	50.5	21	100.8	25.8	17.5		20.2							91
VSC-L20-10A10LS		R3/8	12		50.2	20.7												92
VSC-E07-6A6LS	6	R1/8	8	42.8	38.8	16	57.3	19.3	12.5	16	17	14	16	0.7	92	10.5	17	32
VSC-E07-6A8LS	8			45.7	41.7		58.3	20.3	14.5		18.1							34
VSC-E10-6A6LS	6			42.8	38.8		57.3	19.3	12.5		17			1		21	34	32
VSC-E10-6A8LS	8			45.7	41.7		58.3	20.3	14.5		18.1							34
VSC-E12-6A6LS	6			42.8	38.8		57.3	19.3	12.5		17			1.2		27	47	32
VSC-E12-6A8LS	8			45.7	41.7		58.3	20.3	14.5		18.1							34
VSC-E15-8A8LS	8	R1/4	11	52.7	46.7	21	98.3	23.3		24		19	22	1.5		42	70	87
VSC-E15-10A8LS		R3/8	12		46.4	20.7												88
VSC-E15-8A10LS	10	R1/4	11	56.5	50.5	21	100.8	25.8	17.5		20.2							92
VSC-E15-10A10LS		R3/8	12		50.2	20.7												93
VSC-E20-8A8LS	8	R1/4	11	52.7	46.7	21	98.3	23.3	14.5		18.1			2		84	150	92
VSC-E20-10A8LS		R3/8	12		46.4	20.7												93
VSC-E20-8A10LS	10	R1/4	11	56.5	50.5	21	100.8	25.8	17.5		20.2							97
VSC-E20-10A10LS		R3/8	12		50.2	20.7												98

Note : L1, L2 and L3 dimensions are reference dimensions after tightening.

Dimensions

● VSC-□-□J (air supply port elbow, common exhaust)



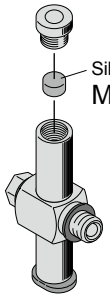
Unit: mm

Model No.	Tube O.D. øD1	Tube O.D. øD2	R	A	L1	L2	L3	E1	E2	øP1	øP2	C1	C2	Opposite side H	□F	Nozzle diameter (mm)	Achieved vac press (-kPa)	Intake flow rate (ℓ/min (ANR))	Air consump rate (ℓ/min (ANR))	Weight (g)
VSC-H07-6A6LJ	6	8	R1/8	8	42.8	38.8	16	59.5	19.3	12.5	16	17	18.2	14	16	0.7	93	13	23	36
VSC-H07-6A8LJ	8				45.7	41.7		60.5	20.3	14.5		18.2								38
VSC-H10-6A6LJ	6				42.8	38.8		59.5	19.3	12.5		17				1		28	46	36
VSC-H10-6A8LJ	8				45.7	41.7		60.5	20.3	14.5		18.2								38
VSC-H12-6A6LJ	6				42.8	38.8		59.5	19.3	12.5		17				1.2		38	70	36
VSC-H12-6A8LJ	8				45.7	41.7		60.5	20.3											38
VSC-H15-8A8LJ	8	12	R1/4	11	52.7	46.7	21	88.1	23.3	14.5	22	18.2	23.3	19	22	1.5		63	100	98
VSC-H15-10A8LJ			R3/8	12		46.4	20.7													99
VSC-H15-8A10LJ	10		R1/4	11	56.5	50.5	21	90.6	25.8	17.5		20.2								102
VSC-H15-10A10LJ			R3/8	12		50.2	20.7													103
VSC-H20-8A8LJ	8		R1/4	11	52.7	46.7	21	88.1	23.3	14.5		18.2				2		110	200	102
VSC-H20-10A8LJ			R3/8	12		46.4	20.7													103
VSC-H20-8A10LJ	10		R1/4	11	56.5	50.5	21	90.6	25.8	17.5		20.2								107
VSC-H20-10A10LJ			R3/8	12		50.2	20.7													108
VSC-L07-6A6LJ	6	8	R1/8	8	42.8	38.8	16	59.5	19.3	12.5	16	17	18.2	14	16	0.7	66	26	23	36
VSC-L07-6A8LJ	8				45.7	41.7		60.5	20.3	14.5		18.2								38
VSC-L10-6A6LJ	6				42.8	38.8		59.5	19.3	12.5		17				1		42	46	36
VSC-L10-6A8LJ	8				45.7	41.7		60.5	20.3											38
VSC-L15-8A8LJ	8	12	R1/4	11	52.7	46.7	21	88.1	23.3	14.5	22	18.2	23.3	19	22	1.5		95	100	96
VSC-L15-10A8LJ			R3/8	12		46.4	20.7													97
VSC-L15-8A10LJ	10		R1/4	11	56.5	50.5	21	90.6	25.8	17.5		20.2								101
VSC-L15-10A10LJ			R3/8	12		50.2	20.7													102
VSC-L20-8A8LJ	8		R1/4	11	52.7	46.7	21	88.1	23.3	14.5		18.2				2		180	200	97
VSC-L20-10A8LJ			R3/8	12		46.4	20.7													98
VSC-L20-8A10LJ	10		R1/4	11	56.5	50.5	21	90.6	25.8	17.5		20.2								102
VSC-L20-10A10LJ			R3/8	12		50.2	20.7													103
VSC-E07-6A6LJ	6	8	R1/8	8	42.8	38.8	16	59.5	19.3	12.5	16	17	18.2	14	16	0.7	92	10.5	17	36
VSC-E07-6A8LJ	8				45.7	41.7		60.5	20.3	14.5		18.2								38
VSC-E10-6A6LJ	6				42.8	38.8		59.5	19.3	12.5		17				1		21	34	36
VSC-E10-6A8LJ	8				45.7	41.7		60.5	20.3	14.5		18.2								38
VSC-E12-6A6LJ	6				42.8	38.8		59.5	19.3	12.5		17				1.2		27	47	36
VSC-E12-6A8LJ	8				45.7	41.7		60.5	20.3											38
VSC-E15-8A8LJ	8	12	R1/4	11	52.7	46.7	21	88.1	23.3	14.5	22	18.2	23.3	19	22	1.5		42	70	98
VSC-E15-10A8LJ			R3/8	12		46.4	20.7													99
VSC-E15-8A10LJ	10		R1/4	11	56.5	50.5	21	90.6	25.8	17.5		20.2								103
VSC-E15-10A10LJ			R3/8	12		50.2	20.7													104
VSC-E20-8A8LJ	8		R1/4	11	52.7	46.7	21	88.1	23.3	14.5		18.2				2		84	150	103
VSC-E20-10A8LJ			R3/8	12		46.4	20.7													104
VSC-E20-8A10LJ	10		R1/4	11	56.5	50.5	21	90.6	25.8	17.5		20.2								108
VSC-E20-10A10LJ			R3/8	12		50.2	20.7													109

Note : L1, L2 and L3 dimensions are reference dimensions after tightening.

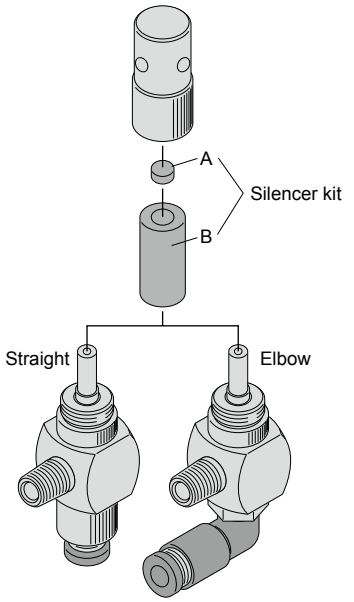
Maintenance part model No.

● Silencer element



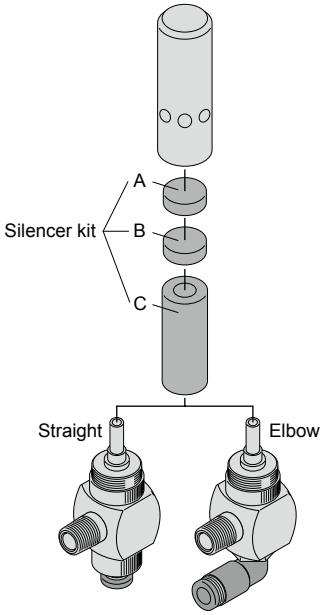
● Silencer kit

· VSC-□07, 10, 12

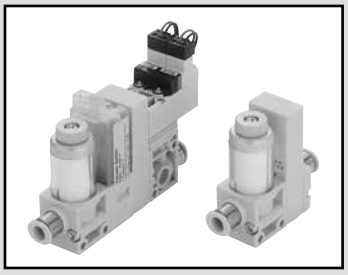


Silencer kit model No.	Vacuum ejector model No.
VSC-12-SK	VSC-□07-6A□(L)S
	VSC-□10-6A□(L)S
	VSC-□12-6A□(L)S

· VSC-□15, 20



Silencer kit model No.	Vacuum ejector model No.
VSC-15-SK	VSC-□15-8A8□(L)S
	VSC-□15-10A8□(L)S
	VSC-□15-8A10□(L)S
	VSC-□15-10A10□(L)S
VSC-20-SK	VSC-□20-8A8□(L)S
	VSC-□20-10A8□(L)S
	VSC-□20-8A10□(L)S
	VSC-□20-10A10□(L)S



Integrated vacuum ejector unit that emphasizes basic performance

VSG Series

● Nozzle diameter: ø0.5, ø0.7, ø1.0

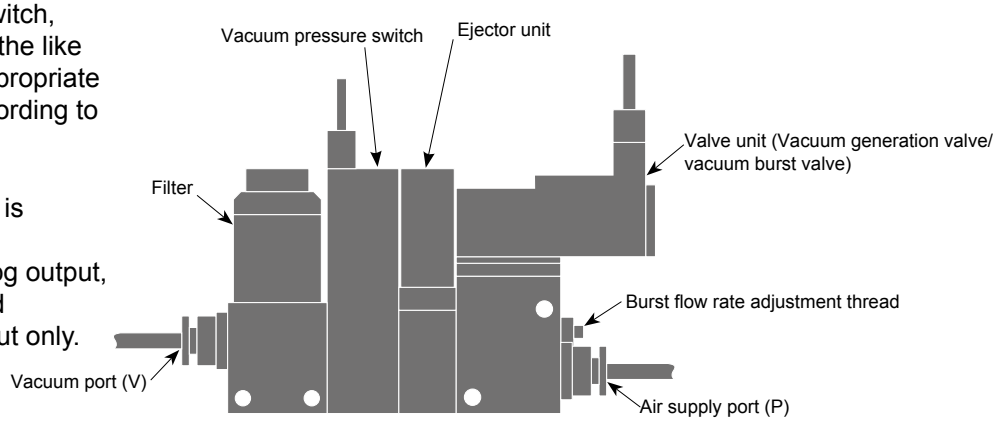
The vacuum pressure switch, vacuum burst valve and the like are unitized, allowing appropriate types to be selected according to the purpose of use.

RoHS

Features

■ The vacuum pressure switch, vacuum burst valve and the like are unitized, allowing appropriate types to be selected according to the purpose of use.

■ Vacuum pressure switch is available in 3 output specifications: with analog output, 2-point switch output and inexpensive analog output only.



Specifications

Descriptions		VSG
Working fluid		Air
Working pressure	MPa	0.25 to 0.7
Ambient/fluid temperatures	°C	5 to 50
Lubrication		Not required

Supply valve specifications

Descriptions		Supply valve	
Valve and operation		Pilot operated poppet valve	
Rated voltage	V	24 DC ±10%	100 AC ±10%
Surge suppressor		Varistor (24 VDC)	Bridge diode (100 VAC)
Power consumption		1.2 W (with LED)	1.5 VA (with LED)
Effective cross-sectional area	mm^2	5	
Manual override		Non-locking push type	

Vacuum burst valve specifications

Descriptions		Vacuum break valve	
Valve and operation		Direct acting poppet valve	
Rated voltage	V	24 DC ±10%	100 AC ±10%
Surge suppressor		Varistor (24 VDC)	Bridge diode (100 VAC)
Power consumption		1.2 W (with LED)	1.5 VA (with LED)
Effective cross-sectional area	mm^2	0.3	
Manual override		Non-locking push type	

Vacuum filter specifications

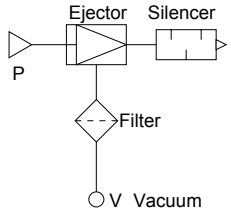
Descriptions		Vacuum filter
Material	Element	Polyvinyl formal
	Cover	Special polyester transparent
	Body	PBT
Filtration rating	μm	10

Vacuum pressure switch specifications

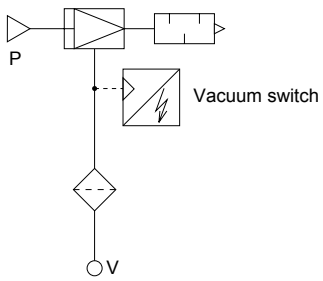
Descriptions			Vacuum pressure switch		
Model No.			VSG… -NA	VSG… -NW	VSG… -A
Output specifications			Switch output 1 points	Switch output 2 points	-
			Analog output 1 point	-	Analog output 1 point
Power supply voltage		V	12 to 24 DC ±10% Ripple content rate 10% (P-P) or less		
Power consumption (24 VDC)			17 mA or less (when 1 switch is ON)	25 mA or less (when 2 switches are ON)	15 mA or less (with 0 mA output current)
Working fluid			Air, inert gas		
Working pressure		kPa	-100 to 0		
Proof pressure		kPa	200		
Operating ambient temperature		°C	0 to 50		
Ambient humidity			35 to 85% RH (no condensation)		
Switch output	Output points		1	2	-
	Output type		NPN transistor/open collector		-
	Set pressure	kPa	-100 to 0		-
	Repeatability		±3% F.S. (at 25°C)		-
	Hysteresis		Approx. 1 to 15% of set value	2% F.S. or less	-
	Switch rating		30 VDC, 80 mA or less		-
	Residual voltage	V	0.8 or less		-
Analog output	Output voltage	V	1 to 5	-	1 to 5
	Zero point voltage	V	1±0.1	-	1±0.1
	Span voltage	V	4±0.1	-	4±0.1
	Output current	mA	1 or less	-	1 or less
	Linearity/hysteresis		±0.5% F.S. or less	-	±0.5% F.S. or less

Circuit diagram

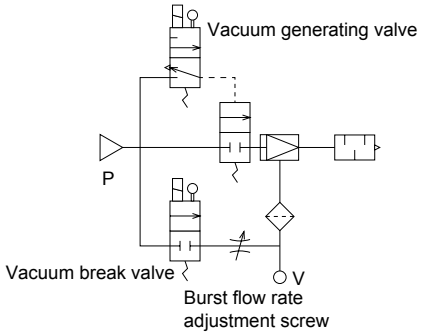
● VSG-*A-* (Unit combination: A)



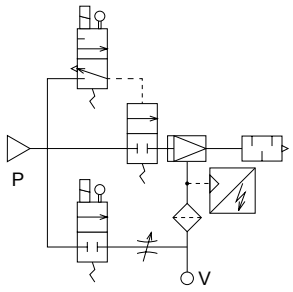
● VSG-*B-* (Unit combination: B)



● VSG-*E-* (Unit combination: E)



● VSG-*F-* (Unit combination: F)



How to order

● 20 mm width single dedicated vacuum ejector unit

VSG - H 07 F - 6 6 - 3 - NW

- Ⓐ Vacuum characteristics
- Ⓑ Nozzle diameter
- Ⓒ Unit combination
- Ⓓ Vacuum port (V)
- Ⓔ Air supply port (P)
- Ⓕ Solenoid valve voltage
- Ⓖ Vacuum pressure switch specifications

Code	Content
Ⓐ Vacuum characteristics *1	
H	High vacuum/medium flow rate
L	Medium vacuum/large flow rate
E	High vacuum/low flow rate
Ⓑ Nozzle diameter *1, *3, *4	
05	ø0.5
07	ø0.7
10	ø1.0
Ⓒ Unit combination *5, *6	
Refer to Appendix 1 for unit combination.	
Ⓓ Vacuum port (V) *2, *3, *4	
4	ø4 push-in fitting
6	ø6 push-in fitting
Ⓔ Air supply port (P) *2, *3, *4	
4	ø4 push-in fitting
6	ø6 push-in fitting
Ⓕ Solenoid valve voltage *5	
1	100 VAC
3	24 VDC
Ⓖ Vacuum pressure switch specifications *6	
NW	NPN output 2 points
NA	NPN output 1 point + analog output
A	Analog output

⚠ Precautions for model No. selection

*1 : "E05" cannot be combined with the combination of Ⓐ and Ⓑ.
*2 : Only "44" or "66" can be selected for the combination of Ⓓ and Ⓔ.
*3 : Only "44" can be selected for Ⓓ and Ⓔ when Ⓑ is "05".
*4 : Only "66" can be selected for Ⓓ and Ⓔ when Ⓑ is "07" or "10".
*5 : When Ⓒ Unit combination is "A" or "B", Ⓕ Solenoid valve voltage cannot be selected.
*6 : When Ⓒ Unit combination is "A" or "E", Ⓖ Vacuum pressure switch specifications cannot be selected.

● Maintenance part model No.

· Replacement filter element

VSG-E

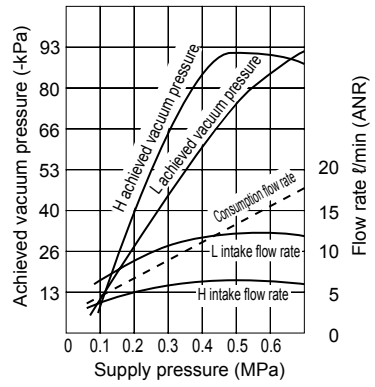
Appendix 1

Unit combination				
Code	Filter	Vacuum pressure switch with LED display	Vacuum generating valve	Vacuum break valve
A	●	-	-	-
B	●	●	-	-
E	●	-	●	●
F	●	●	●	●

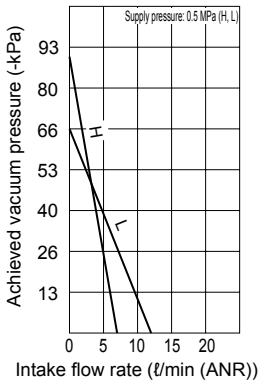
Vacuum characteristics

● VSG-$^{H}_{L}$05

Vacuum characteristics

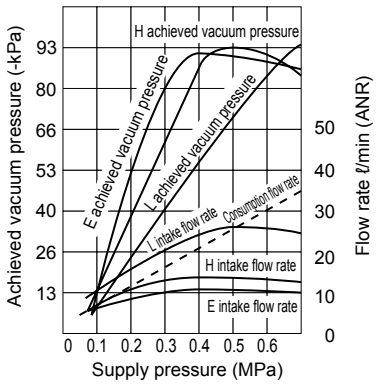


Flow characteristics

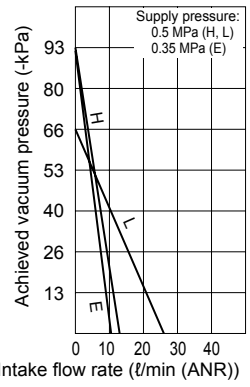


● VSG-*07

Vacuum characteristics

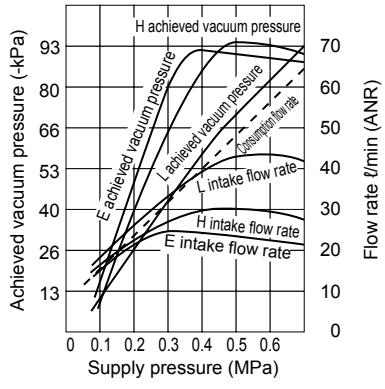


Flow characteristics

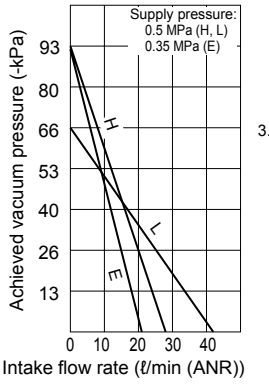


● VSG-*10

Vacuum characteristics



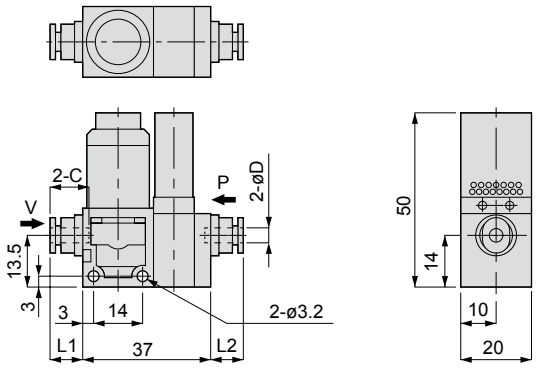
Flow characteristics



1. Supply pressure with the characteristics described above occurs at vacuum generation.
2. Achieved vacuum pressure with the characteristics described above produces abnormal noise (soft clicking sound) at supply pressure just before reaching the peak value. When this abnormal noise occurs, the characteristics become unstable and operation becomes louder. Reset the supply pressure, as it may affect the sensor, etc., and cause trouble.
   Ex. 1: Source pressure is 0.5 MPa with the H type vacuum ejector. During vacuum ejector operation, supply pressure drops to 0.43 MPa due to pressure drop, and abnormal noise is generated. → Reset supply pressure to 0.5 MPa during vacuum ejector operation.
3. Carry out piping or equipment selection with 3 times the effective cross-sectional area of the nozzle diameter cross-sectional area as a guideline. Satisfactory vacuum characteristics cannot be obtained if adequate supply air flow rate is not maintained.
   (A soft clicking sound occurs at set pressure. Insufficient intake flow rate, insufficient achievement of achieved vacuum pressure, etc.)
   Ex. 2: Abnormal noise occurs even when pressure is 0.5 MPa with H type vacuum ejector during vacuum ejector operation. → Insufficient supply air flow rate. (Supply air flow rate is restricted in front of the vacuum ejector by piping resistance, etc., and supply air flow rate satisfying the properties is not obtained. → Select piping components that can secure the required effective cross-sectional area.)
   Ex. 3: For vacuum ejector with 1.0mm nozzle diameter, cross-sectional area is $0.5^2 \times \pi = 0.785\ mm^2 \times 3 = 2.35mm^2$. Therefore, carry out piping and equipment selection that ensures an effective cross-sectional area of $2.3mm^2$ or greater.

Dimensions

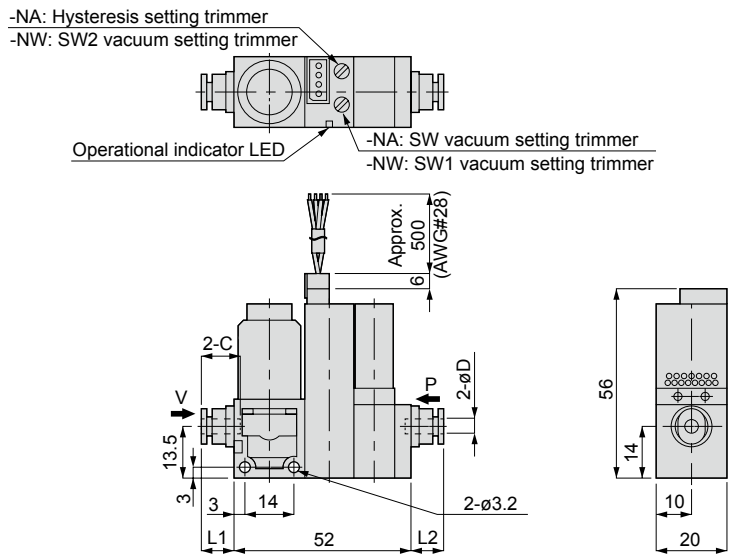
● VSG-*A-* (Unit combination: A)



Unit: mm

Model No.	Tube O.D. øD	L1	L2	C	Nozzle diameter (mm)	Achieved vacuum pressure (-kPa)	Intake flow rate (ℓ/min (ANR))	Air consumption rate (ℓ/min (ANR))	Weight (g)
VSG-H 05A-44	4	9.9	9.4	11.2	0.5	90	7	11.5	47
VSG-H 07A-66	6	12.3	11.8	11.9	0.7	93	13	23	49
VSG-H 10A-66					1		27	46	48
VSG-L 05A-44	4	9.9	9.4	11.2	0.5	66	12	11.5	46
VSG-L 07A-66	6	12.3	11.8	11.9	0.7		26	23	48
VSG-L 10A-66					1		40	46	47
VSG-E 07A-66	6	12.3	11.8	11.9	0.7	90	10.5	17	48
VSG-E 10A-66					1		21	34	

● VSG-*B-* (Unit combination: B)



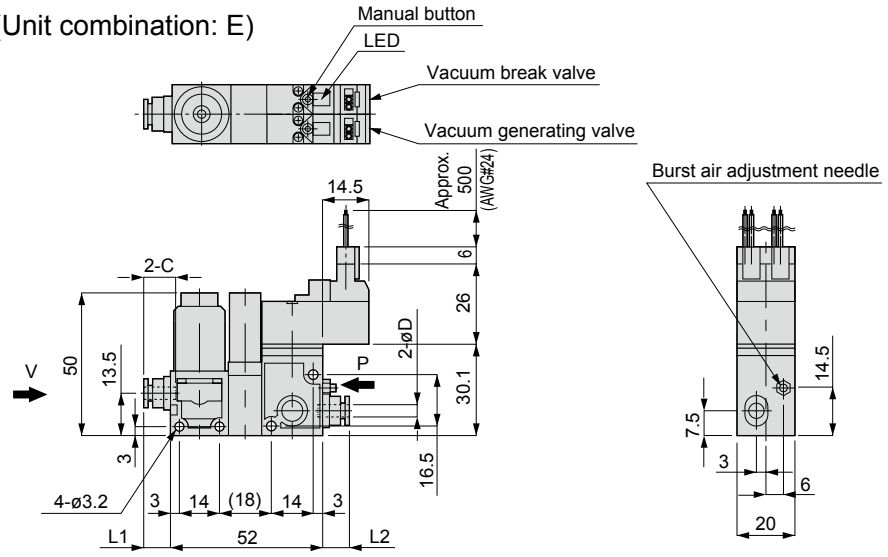
Note : The operational indicator LED and vacuum setting trimmer are not included with the analog output (-A).

Unit: mm

Model No.	Tube O.D. øD	L1	L2	C	Nozzle diameter (mm)	Achieved vacuum pressure (-kPa)	Intake flow rate (ℓ/min (ANR))	Air consumption rate (ℓ/min (ANR))	Weight (g)
VSG-H 05B-44-□	4	9.9	9.4	11.2	0.5	90	7	11.5	74
VSG-H 07B-66-□	6	12.3	11.8	11.9	0.7	93	13	23	75
VSG-H 10B-66-□					1		27	46	
VSG-L 05B-44-□	4	9.9	9.4	11.2	0.5	66	12	11.5	73
VSG-L 07B-66-□	6	12.3	11.8	11.9	0.7		26	23	75
VSG-L 10B-66-□					1		40	46	74
VSG-E 07B-66-□	6	12.3	11.8	11.9	0.7	90	10.5	17	75
VSG-E 10B-66-□					1		21	34	74

Dimensions

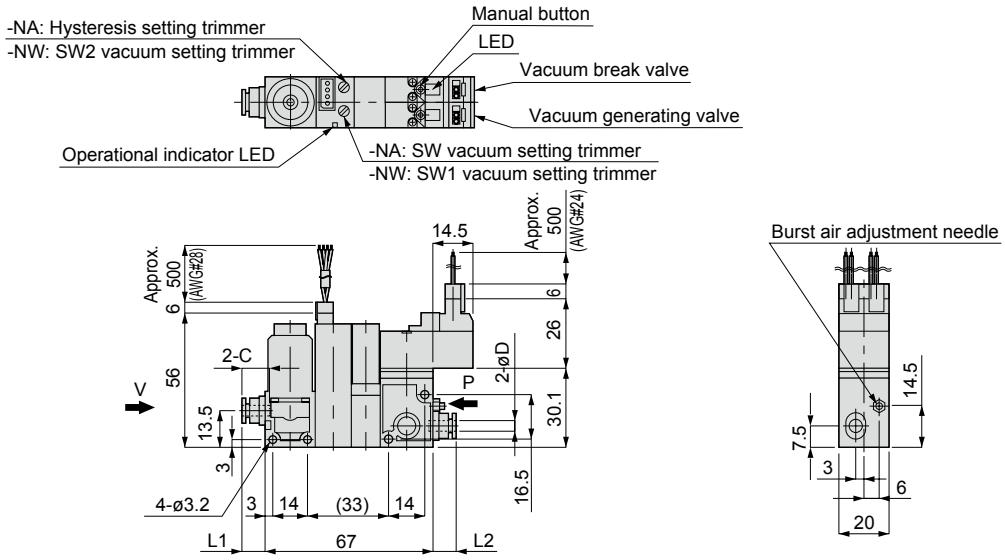
● VSG-*E-* (Unit combination: E)



Unit: mm

Model No.	Tube O.D. øD	L1	L2	C	Nozzle diameter (mm)	Achieved vacuum pressure (-kPa)	Intake flow rate (ℓ/min (ANR))	Air consumption rate (ℓ/min (ANR))	Weight (g)
VSG-H 05E-44-□	4	9.9	7.9	11.2	0.5	90	7	11.5	99
VSG-H 07E-66-□	6	12.3	10.3	11.9	0.7	93	13	23	100
VSG-H 10E-66-□					1		27	46	101
VSG-L 05E-44-□	4	9.9	7.9	11.2	0.5	66	12	11.5	99
VSG-L 07E-66-□	6	12.3	10.3	11.9	0.7		26	23	101
VSG-L 10E-66-□					1		40	46	100
VSG-E 07E-66-□	6	12.3	10.3	11.9	0.7	90	10.5	17	101
VSG-E 10E-66-□					1		21	34	100

● VSG-*F-* (Unit combination: F)



Note : The operational indicator LED and vacuum setting trimmer are not included with the analog output (-A).

Unit: mm

Model No.	Tube O.D. øD	L1	L2	C	Nozzle diameter (mm)	Achieved vacuum pressure (-kPa)	Intake flow rate (ℓ/min (ANR))	Air consumption rate (ℓ/min (ANR))	Weight (g)
VSG-H 05F-44-□-□	4	9.9	7.9	11.2	0.5	90	7	11.5	125
VSG-H 07F-66-□-□	6	12.3	10.3	11.9	0.7	93	13	23	128
VSG-H 10F-66-□-□					1		27	46	127
VSG-L 05F-44-□-□	4	9.9	7.9	11.2	0.5	66	12	11.5	127
VSG-L 07F-66-□-□	6	12.3	10.3	11.9	0.7		26	23	
VSG-L 10F-66-□-□					1		40	46	
VSG-E 07F-66-□-□	6	12.3	10.3	11.9	0.7	90	10.5	17	128
VSG-E 10F-66-□-□					1		21	34	

Safety precautions

Refer to Intro Pages 15 and 16 for general precautions for vacuum system components.

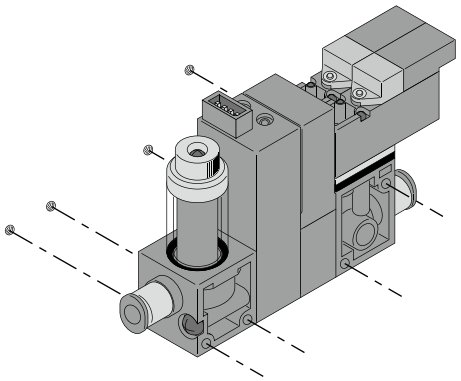
⚠ CAUTION

■ Be careful when the piping resistance or required burst flow rate is large. It may cause malfunction due to insufficient burst flow rate. Be sure to check the specifications thoroughly.

Usage methods

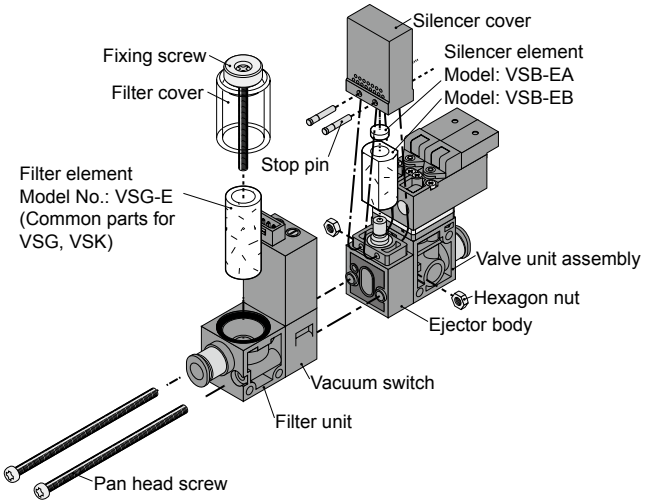
1. Fixing method

To fix the vacuum ejector unit VSG, fasten M3 screws through the fixing holes on the resin body.
(Refer to the dimensions for the fixing hole pitch.)



2. How to replace the element

Remove the fixing screws to replace the filter element. After replacing the filter element and checking that the filter packing has not fallen out, securely fix it with tightening torque of 0.18 to 0.22 N·m.

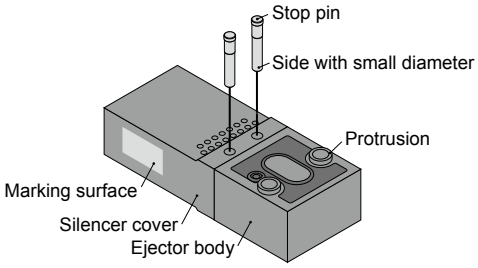


■ Replacing the silencer element

● Remove the 2 pan head screws and 2 stop pins that connect the unit.
* Be careful not to lose the 2 hex nuts.

■ After replacing the silencer element

● Install the silencer cover on the ejector body and insert 2 stop pins from the ejector body side with protrusions, so that the side with smaller stop pin diameter faces toward the ejector body as shown on the right. Make sure that the packing of each unit does not fall out when connecting the units. Using a suitable Phillips screwdriver, secure the pan-head screws and hex nuts with tightening torque of 0.35 to 0.4 N·m.



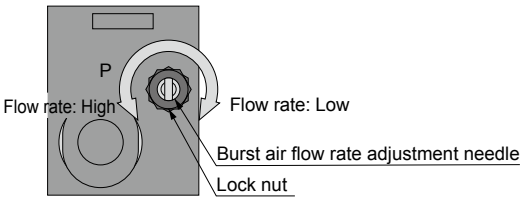
Usage methods

3. How to adjust the burst valve

■ How to adjust the burst air

● The burst air flow rate is decreased by turning the burst air adjustment needle to the right (clockwise) and increased by turning it to the left (counterclockwise).

* Once the burst air is adjusted, be sure to tighten the lock nut so that the setting will not waver.



4. How to attach and remove individual plug-in connectors

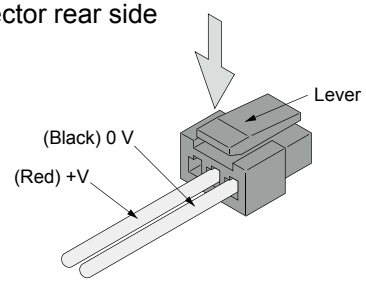
■ How to attach individual plug-in connectors

● To attach an individual plug-in connector, simply insert it until it stops.

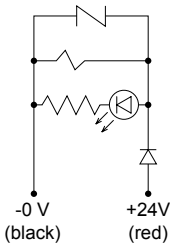
■ How to remove individual plug-in connectors

● To remove the individual plug-in connector, pull it out while pushing the lever at the rear side of the connector in the direction of the arrow.

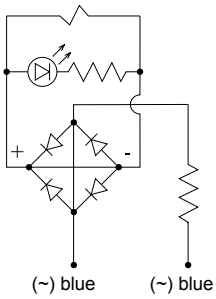
■ Connector rear side



● 24 VDC



● 100 VAC



5. How to handle the vacuum pressure switch

1. Pressure setting

(1)Energization (supply DC power after confirming the wiring.)

(2)Turn the hysteresis setting trimmer (HYS) fully counterclockwise to set hysteresis to minimum. (Vacuum pressure switch with analog output (-NA) only)

Note: If the vacuum pressure is unstable, the output will also become unstable if the hysteresis is minimized.

(3)Align to the desired setting value by adjusting the pressure setting trimmer (S1 or S2, SW).

Note: Use a vacuum gauge or check the set pressure when adjusting the machine.

(4)Apply pressure and confirm actual operation.

(For vacuum pressure switch with analog output (-NA))

Switch output (SW): Operation indicator lamp (red LED) turns ON at set pressure or greater.

(For vacuum pressure switch with 2-point switch output (-NW))

Switch output 1 (S1): Operation indicator lamp (red LED) turns ON at set pressure or greater.

Switch output 2 (S2): Operation indicator lamp (green LED) turns ON at set pressure or greater.

2. Hysteresis setting (Vacuum pressure switch with analog output (-NA) only)

(1)Hysteresis can be adjusted by the hysteresis setting trimmer (HYS).

(2)Hysteresis adjusting range is approx. 1 to 15% of the set value. Hysteresis increases when the trimmer is rotated clockwise.

(3)Hysteresis confirmation

Gradually raise and lower the pressure around the set pressure, and read the ON/OFF value of the operation indicator lamp using the vacuum gauge. Hysteresis is the difference between the pressure indication values in ON and OFF states.

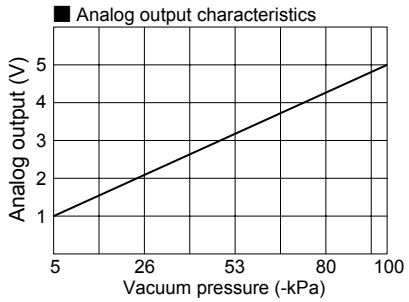
(4)Hysteresis adjustment application examples

· When the pressure is pulsating and the output cuts out at fine intervals, increase the hysteresis.

· When setting the allowable range of pressure drop.

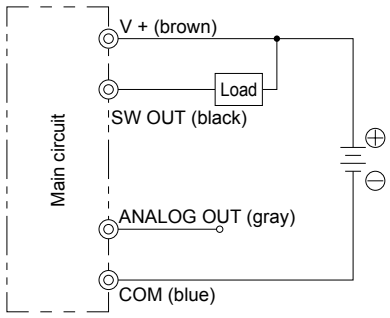
Usage methods

3. Output characteristics of vacuum pressure switch with analog output (-A)

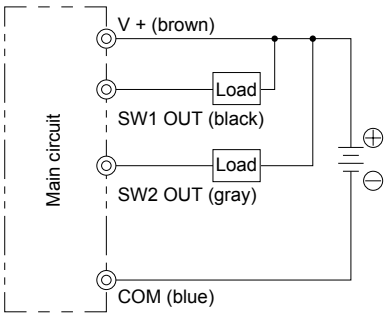


4. Wiring and piping

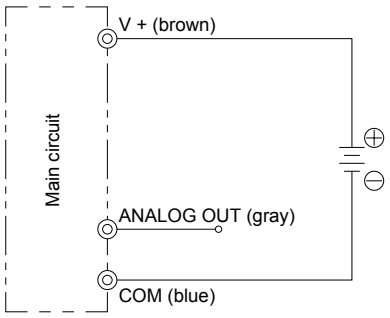
(1) Be sure to turn the power OFF before wiring.
(2) When wiring, be sure to check the color and terminal output of the lead wire.
(3) For connection, refer to the connection method in Figure 1.
(4) Do not apply high tensile force or bending force to the extraction cable.
(5) The cable may detach from the connector. When detaching the cable, hold the connector part and pull out the cable while pressing the stopper. Since load is applied to the switch base when detaching or attaching, we recommend that you avoid attaching and detaching whenever possible.



NPN output 1 point + vacuum pressure switch with analog output (-NA) connection diagram



Vacuum pressure switch with 2-point switch output (-NW) connection diagram

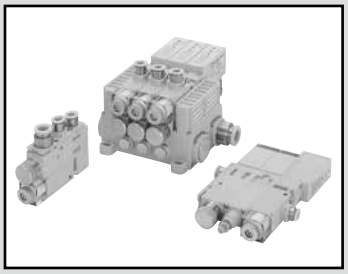


Vacuum pressure switch with analog output (-A) connection diagram

Figure 1. Connection method

5. Precautions

(1)This product does not have an drip-proof/dust-proof structure. Avoid using in places where the product is exposed to dripping water, oil or dust.
(2)This product does not have an explosion-proof structure. Do not use in flammable or explosive gases, fluids, or atmospheres.
(3)Do not use where the heat generated exceeds the operating temperature range. It risks damaging the switch.
(4)Do not apply pressures of 0.2 MPa or greater when positive pressure is applied, such as at vacuum burst.
(5)Do not use in atmospheres or gases containing corrosive substances.
(6)Keep the working fluid as clean as possible.
(7)Use a stable DC power supply.
(8)For a relay, solenoid valve, etc., connected to an output terminal or power supply terminal, install a surge voltage absorption circuit. Avoid usage where current may exceed 80 mA.
(9)When using a unit power supply such as switching power supply, ground the F.G. (frame ground).
(10)Do not short-circuit the output terminal (black and gray) and other terminals.
(11)Do not apply excessive external force to the switch body.
(12)Wiring or application that applies noise or the like may cause damage.
(13)When setting the pressure and hysteresis, use the supplied screwdriver and gently rotate within the rotation range of the trimmer, without applying excessive force.



Integrated ejector with various modularized units that can be selected according to the purpose of use

VSK Series

● Nozzle diameter: ø0.5, ø0.7, ø1.0, ø1.2

RoHS

Features

■Through modularization of each unit and combination of various units, an ideal unit can be selected according to the purpose of use.

■Vacuum burst valves can be selected from solenoid valve and air timer types. With a built-in switching valve, air blow from the vacuum burst can be achieved in a short time and fine adjustments of the burst air can be made.

*Air timer burst
After generating vacuum by electrical signals, compressed air is automatically sent to the vacuum circuit for a fixed time when the electric signal breaks off. During this time, the pad will be retracted from the workpiece. When the burst operation ends, the vacuum circuit will be closed.

■There are 2 types of vacuum pressure switches, one with a digital display and another that is low cost and easy to use.

■2-point switch output and 1-point switch output + analog output are available for the vacuum pressure switch with digital display, which can be selected according to the application.

■4 types of nozzle diameters are standardized: 05 (ø0.5 mm), 07 (ø0.7 mm), 10 (ø1.0 mm) and 12 (ø1.2 mm).

Specifications

Descriptions	VSK
Working fluid	Air
Working pressure MPa	0.25 to 0.7
Ambient/fluid temperatures °C	5 to 50
Lubrication	Not required

Ejector characteristics

Model No.	Nozzle diameter (mm)	Rated supply pressure (MPa)	Achieved vacuum pressure (-kPa)	Intake flow rate (ℓ/min (ANR))	Air consumption rate (ℓ/min (ANR))
VSK-□H05…	0.5	0.5	91	7	11.5
		0.35	73		9
VSK-□L05…		0.5	67	11	11.5
VSK-□H07…	0.7	0.5	93	13	23
		0.35	73		17
VSK-□L07…		0.5	67	26	23
VSK-□E07…		0.35	91	10.5	17
VSK-□H10…	1.0	0.5	93	27	46
		0.35	73		34
VSK-□L10…		0.5	67	40	46
VSK-□E10…		0.35	91	21	34
VSK-□H12…	1.2	0.5	93	38	70
		0.35	73	36	47
VSK-□L12…		0.5	67	50	70
VSK-□E12…		0.35	91	27	47

*1 : When operating the vacuum ejector, be sure to secure the supply pressure above. (Consider pressure drop.)
*2 : Values in table are representative values. Suction flow rate differs with the vacuum piping conditions (vacuum port size, pipe length).

Valve (for vacuum generation, burst) specifications

Descriptions	Solenoid valve (for vacuum generation, burst)					
Configuration	Vacuum generating valve				Vacuum break valve	
Rated voltage V	24 DC		100 AC		24 DC	100 AC
Voltage fluctuation range V	21.6 to 26.4 DC (24 DC ±10%)		90 to 110 AC (100 AC ±10%)		21.6 to 26.4 DC (24 DC ±10%)	90 to 110 AC (100 AC ±10%)
Surge suppressor	Varistor		Bridge diode		Varistor	Bridge diode
Power consumption	0.8 W		1 VA		0.8 W	1 VA
Valve and operation	Pilot operated poppet valve					
Durability class	Class B or equivalent					
Manual override	Push locking					
Operation display	Red LED lights at coil excitation operation					
Method and lead wire length	Connector: 500 mm					
Proof pressure MPa	1.05					
Actuation category	NC	NO	NC	NO	NC	
Effective cross-sectional area mm^2	3.5	3.5	3.5	3.5	0.6	

Lead wire color

Vacuum generating valve only		For vacuum generating and burst valve combination	
24 VDC	100 VAC	24 VDC	100 VAC
Red (+) Black (-)	Blue	Black (-: vacuum supply solenoid valve)	White (common)
		Red (+: common)	Blue (vacuum supply solenoid valve)
		White (-: burst solenoid valve)	Black (burst solenoid valve)

Vacuum pressure switch with digital display specifications

Descriptions		Vacuum pressure switch with digital display			
Specifications		With 2-point switch output (-NW)	With analog output (-NA)	With 2-point switch output (-PW)	With analog output (-PA)
Current consumption mA		40 or less			
Pressure sensitive element		Diffused semiconductor pressure switch			
Working pressure kPa		-100 to 0			
Set pressure kPa		-99 to 0			
Proof pressure MPa		0.2			
Storage temperature °C		-20 to 70 (atmospheric pressure, humidity 60% RH or less)			
Operating temperature °C		0 to 50 (no freezing)			
Operating humidity		35 to 85% RH (no condensation)			
Power supply voltage V		12 to 24 DC ±10% ripple (P-P) 10% or less			
Degree of protection		IEC standards IP40 or equivalent			
Output points		2	1	2	1
Repeatability		±3%F.S. max(at Ta=25°C)			
Hysteresis		Fixed (2% F.S. or less)	Variable (Approx. 0 to 15% F.S.)	Fixed (2% F.S. or less)	Variable (Approx. 0 to 15% F.S.)
Switch output		NPN transistor/open collector output 30 V 80 mA or less Residual voltage 0.8 V or less		PNP transistor/open collector output Power supply voltage 80 mA or less Residual voltage 0.8 V or less	
Analog output	Output voltage V	-	1 to 5	-	1 to 5
	Zero point voltage V	-	1±0.1	-	1±0.1
	Span voltage V	-	4±0.1	-	4±0.1
	Output current mA	-	1 or less (load resistance 5 kΩ or more)	-	1 or less (load resistance 5 kΩ or more)
	Linearity/hysteresis	-	±0.5% F.S. or less	-	±0.5% F.S. or less
Responsivity ms		Approx. 2 or less			
Display kPa		-99 to 0 (2-digit red LED display)			
Display frequency		Approx. 4 times/sec			
Display accuracy		±3%F.S. ±2digit			
Resolution		1digit			
Operation display		SW1: Red LED lights at set pressure and over SW2: Green LED lights at set pressure and over	Red LED lights at set pressure and over	SW1: Red LED lights at set pressure and over SW2: Green LED lights at set pressure and over	Red LED lights at set pressure and over
Function		1. MODE change-over switch (ME or S1 or S2) 2. S1 set trimmer (2/3 rotation trimmer) 3. S2 set trimmer (2/3 rotation trimmer)	1. MODE change-over switch (ME or SW) 2. SW set trimmer (2/3 rotation trimmer) 3. HYS setting trimmer (approx. 0 to 15% of set value)	1. MODE change-over switch (ME or S1 or S2) 2. S1 set trimmer (2/3 rotation trimmer) 3. S2 set trimmer (2/3 rotation trimmer)	1. MODE change-over switch (ME or SW) 2. SW set trimmer (2/3 rotation trimmer) 3. HYS setting trimmer (approx. 0 to 15% of set value)

Mechanical vacuum pressure switch specifications

Descriptions		Mechanical vacuum pressure switch
Pressure detection method		Diaphragm - Micro switch
Set pressure	kPa	-80 to -20
Setting method		Stepless through nut rotation
Switch terminal		Common, NO, NC
Repeatability	kPa	±4
Hysteresis	kPa	16 or less
Micro switch used		QJ (AM8100) Matsushita or J-7 OMRON
Electric capacity		7 A 250 V AC
Default pressure	kPa	Approx. -50

Air timer type vacuum burst valve specifications

Descriptions		Air timer type vacuum burst valve
Structure		Delay type with timer air cylinder, poppet type and 2 way valve
Burst time		Approx. 0.3 to 3 seconds after closing the vacuum generation valve
Break air flow rate	ℓ/min (ANR)	0 to 40 (at supply pressure 0.5 MPa)
Time setting method		Control with timer air cylinder speed controller

Vacuum filter specifications

Descriptions		Vacuum filter
Element material		Polyvinyl formal
Filtration rating	μm	10
Filtration area	mm^2	1130
Replacement filter element model No.		VSG-E

Weight table

Unit Combination code	Weight (g) for single unit		Weight (g) for manifold	
	VSK-A…	VSK-B…	VSKM…-S…	VSKM…-T…
A	60	60	76	78
B	60	60	76	78
C	79	79	94	96
D	79	79	94	96
E	85	85	100	102
F	85	85	100	102
G	81	81	97	99
H	81	81	97	99
J	100	100	115	117
K	100	100	115	117
L	106	106	121	123
M	106	106	121	123
P	134	134	150	152
Q	153	153	168	170
R	159	159	174	176
S	129	129	144	146
T	147	147	163	165
W	153	153	169	171

Manifold		Weight (g)
Side block	VSKM…-…S1…	73
	VSKM…-…S2…	84
	VSKM…-…S3…	73
	VSKM…-……	61
Intermediate block	VSKM-.....-..... (without plug)	21
	VSKM-...P-..... (with plug)	22

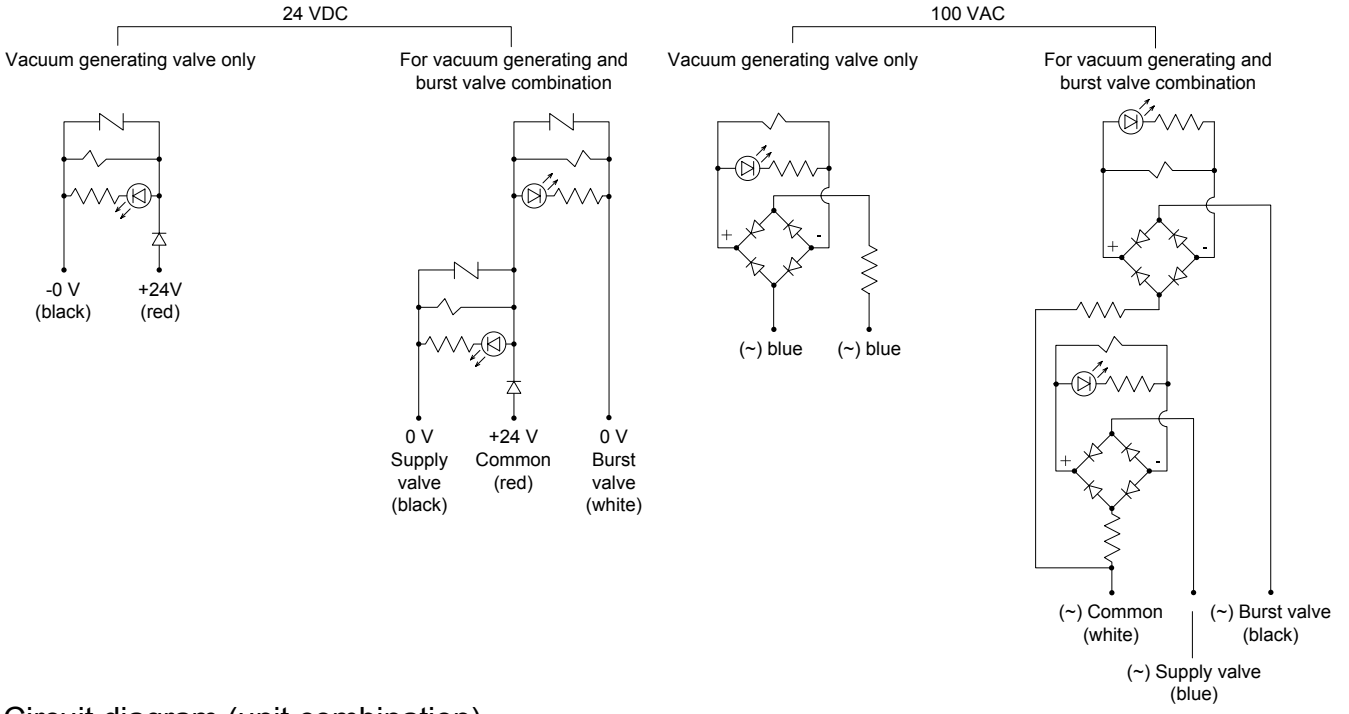
Block plate	Weight (g)
VSKM…-MB	6

Silencer	Weight (g)
Single unit atmospheric release	2

Cartridge for single unit	Weight (g)
ø4 push-in fitting	3.5
ø6 push-in fitting	3.5
ø8 push-in fitting	10
Plug cartridge	1.5

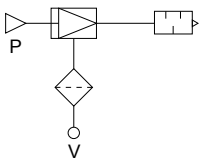
Cartridge for manifold	Weight (g)
ø6 push-in fitting	21
ø8 push-in fitting	20
ø10 push-in fitting	19
ø12 push-in fitting	26
ø8 elbow push-in fitting	25
ø10 elbow push-in fitting	32
ø12 elbow push-in fitting	38
Rc1/4 cartridge	44
Rc3/8 cartridge	35
Rc1/2 cartridge	38
Plug cartridge	6

Electric circuit (solenoid valve)

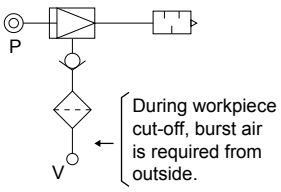


Circuit diagram (unit combination)

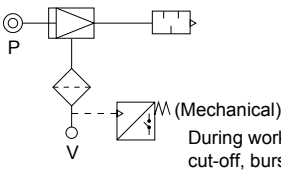
● Unit combination: A



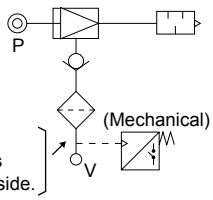
● Unit combination: B



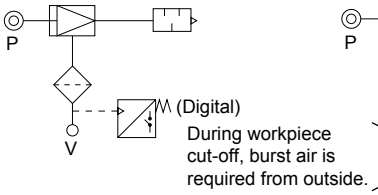
● Unit combination: C



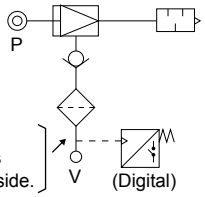
● Unit combination: D



● Unit combination: E

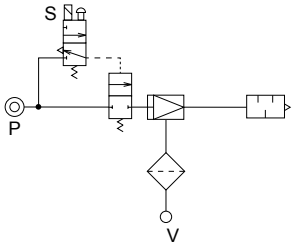


● Unit combination: F

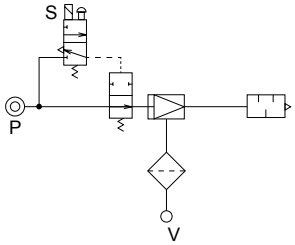


● Unit combination: G

(normally closed)

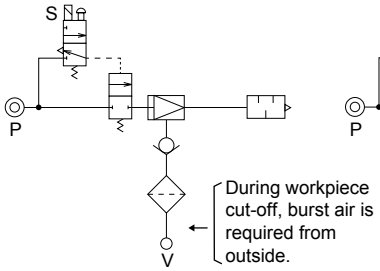


(normally open)

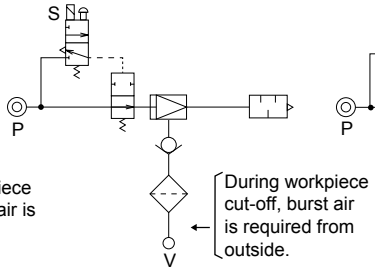


● Unit combination: H

(normally closed)

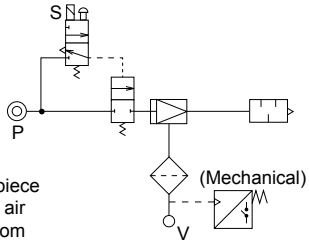


(normally open)

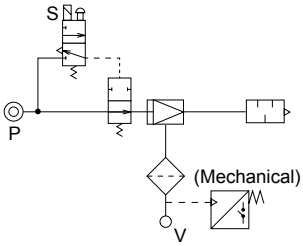


● Unit combination: J

(normally closed)

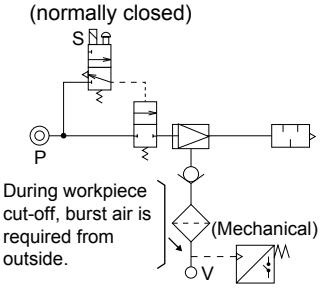


(normally open)

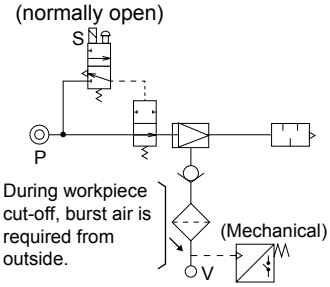


● Unit combination: K

(normally closed)

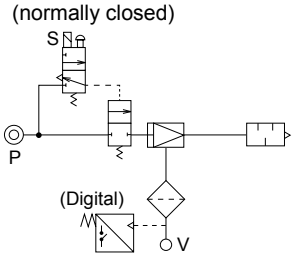


(normally open)

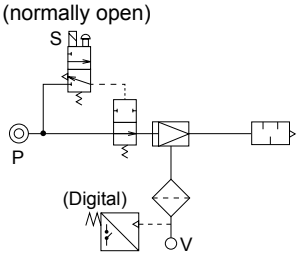


● Unit combination: L

(normally closed)

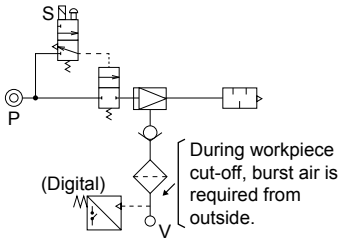


(normally open)

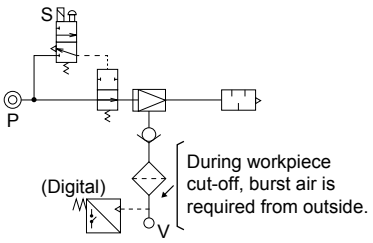


Circuit diagram (unit combination)

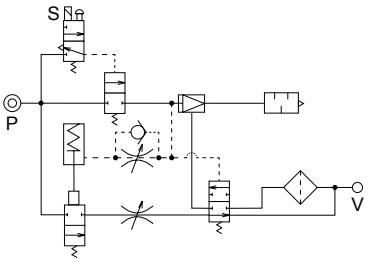
● Unit combination: M
(normally closed)



(normally open)



● Unit combination: P
(normally closed)



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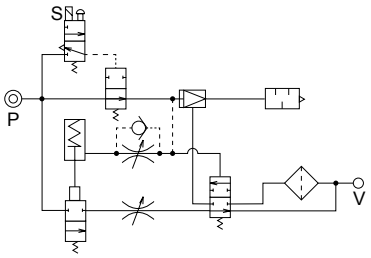
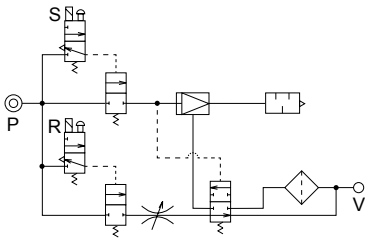


● Unit combination: S
(normally closed)



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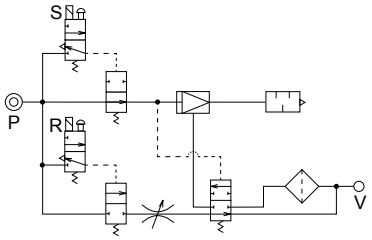
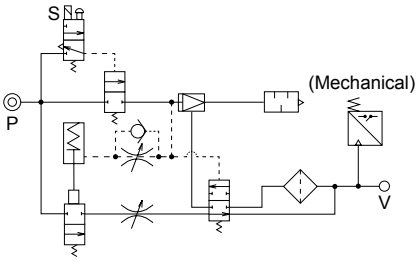
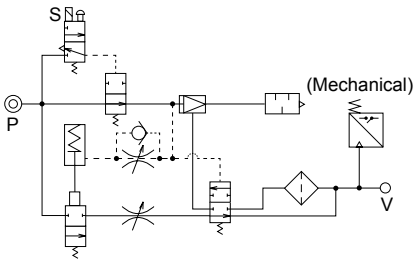


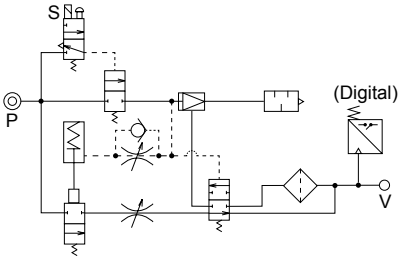
● Unit combination: Q
(normally closed)



(normally open)



● Unit combination: R
(normally closed)



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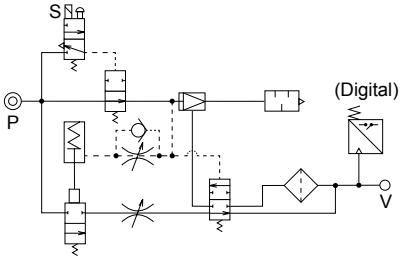
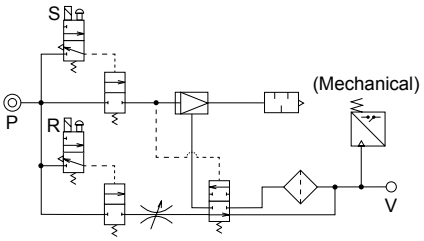


● Unit combination: T
(normally closed)



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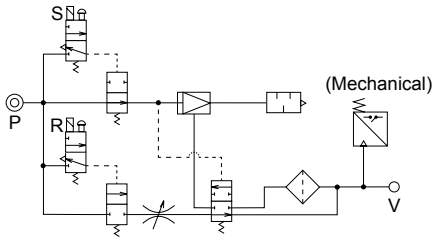
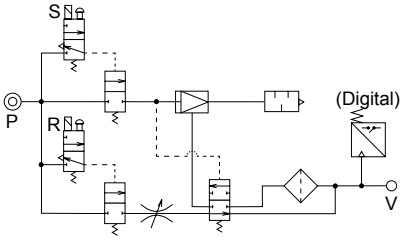
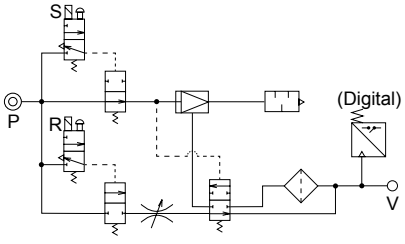


● Unit combination: W
(normally closed)



(normally open)



How to order

● Single unit model No.

VSK - A H 07 W - 4 6 8L - 3 B - NW

Ⓐ Port position
Ⓑ Vacuum characteristics
Ⓒ Nozzle diameter
Ⓓ Unit combination
Ⓔ Vacuum port
Ⓕ Air supply port
Ⓖ Exhaust port
Ⓗ Solenoid valve voltage
Ⓘ Valve
Ⓙ Vacuum pressure switch specifications

Code	Content
Ⓐ Port position	
A	Single unit connection port 2-surface
B	Single unit connection port 1-surface
Ⓑ Vacuum characteristics *1	
H	High vacuum/medium flow rate
L	Medium vacuum/large flow rate
E	High vacuum/low flow rate
Ⓒ Nozzle diameter *1, *2	
05	ø0.5
07	ø0.7
10	ø1.0
12	ø1.2
Ⓓ Unit combination *3, *4	
Refer to Appendix 1 for unit combination.	
Ⓔ Vacuum port (V) *2	
4	ø4 push-in fitting
6	ø6 push-in fitting
8	ø8 push-in fitting
Ⓕ Air supply port (P) *2	
4	ø4 push-in fitting
6	ø6 push-in fitting
8	ø8 push-in fitting
Ⓖ Exhaust port (EX)	
S	Atmospheric release with silencer
8	ø8 push-in fitting straight common exhaust
8L	ø8 push-in fitting elbow common exhaust
Ⓗ Solenoid valve voltage *3	
1	100 VAC
3	24 VDC
Ⓘ Valve *3	
A	Normally open (NO)
B	Normally closed
Ⓙ Vacuum pressure switch specifications *4	
NW	With digital display, NPN output 2 points
NA	With digital display, NPN output 1 point + analog output
PW	With digital display, PNP output 2 points
PA	With digital display, PNP output 1 point + analog output

⚠ Precautions for model No. selection

*1 : The combination of Ⓑ E and Ⓒ 05 cannot be selected.
*2 : When Ⓔ or Ⓕ is 4, Ⓒ 10 or 12 cannot be selected.
*3 : When Ⓓ Unit combination is “A, B, C, D, E or F”, Ⓗ Solenoid valve voltage and Ⓘ Valve unit cannot be selected.
*4 : When Ⓓ Unit combination is “E, F, L, M, R or W”, select Ⓙ Vacuum pressure switch specifications.

Appendix 1 (common with manifold)

Unit combination

Code	Filter	Vacuum generating valve	Check valve (vacuum hold)	Mechanical vacuum pressure switch	Vacuum pressure switch with digital display	Air timer type vacuum burst valve	Vacuum break valve
A	●						
B	●		●				
C	●			●			
D	●		●	●			
E	●				●		
F	●		●		●		
G	●	●					
H	●	●	●				
J	●	●		●			
K	●	●	●	●			
L	●	●			●		
M	●	●	●		●		
P	●	●				●	
Q	●	●		●		●	
R	●	●			●	●	
S	●	●	● *1				●
T	●	●	● *1	●			●
W	●	●	● *1		●		●
Z	For mixed specifications (indicate the breakdown in the specifications sheet.) [Applicable to manifold]						

*1: Vacuum self-holding valve is built in.

How to order

● Manifold model No.

VSKM - H 07 W - T4 20 S2 - 3 B - 10 - NW

● Manifold single unit model No.

VSKM - H 07 W - T4 — 3 B — NW

● Manifold base only model No.

VSKM — T4 20 S2 — 10

With the manifold, exhaust air is led into the ejector not in operation and output from the vacuum port. Contact CKD when exhaust air lead-in has adverse effects.

Ⓐ Vacuum characteristics
Ⓑ Nozzle diameter
Ⓒ Unit combination
Ⓓ Vacuum port
Ⓔ Air supply port
Ⓕ Exhaust port
Ⓖ Solenoid valve voltage
Ⓗ Valve
Ⓘ Manifold station No.
Ⓙ Vacuum pressure switch specifications

Code	Content	Type: Manifold	Single unit for manifold	Manifold only
Ⓐ Vacuum characteristics *1, *2, *5				
H	High vacuum/medium flow rate	●	●	
L	Medium vacuum/large flow rate	●	●	
E	High vacuum/low flow rate	●	●	
Z	For mixed specs (indicate breakdown on specs sheet.)	●		
Ⓑ Nozzle diameter *1, *2, *5, *9				
05	ø0.5	●	●	
07	ø0.7	●	●	
10	ø1.0	●	●	
12	ø1.2	●	●	
00	For mixed specs (indicate breakdown on specs sheet.)	●		
Ⓒ Unit combination *2, *3, *4, *8				
Refer to Appendix 1 (common for single unit) for unit combination.		●	●	
Ⓓ Vacuum port (V) *2, *6, *9				
PP	Plug port position side	●		●
S4	ø4 push-in fitting port position side	●		●
S6	ø6 push-in fitting port position side	●		●
S8	ø8 push-in fitting port position side	●		●
T4	ø4 push-in fitting port position top	●	●	
T6	ø6 push-in fitting port position top	●	●	
T8	ø8 push-in fitting port position top	●	●	
00	Single unit for manifold with port position on the side		●	
CX	For mixed fittings (indicate breakdown on specs sheet.)	●		
Ⓔ Air supply port (P)				
Refer to Appendix 2 for the air supply port.		●		●
Ⓕ Exhaust port (EX)				
Refer to Appendix 3 for the exhaust port.		●		●
Ⓖ Solenoid valve voltage *3				
1	100 VAC	●	●	
3	24 VDC	●	●	
Ⓗ Valve *2, *3				
A	Normally open (NO)	●	●	
B	Normally closed	●	●	
Z	For mixed specs (indicate breakdown on specs sheet.)	●		
Ⓘ Manifold station No. *7				
2 to 10	2 stations / to / 10 stations	●		●
Ⓙ Vacuum pressure switch specifications *2, *4				
NW	With digital display, NPN output 2 points	●	●	
NA	With digital display, NPN output 1 point + analog output	●	●	
PW	With digital display, PNP output 2 points	●	●	
PA	With digital display, PNP output 1 point + analog output	●	●	
Z	For mixed specs (indicate breakdown on specs sheet.)	●		

⚠ Precautions for model No. selection

*1 : The combination of ⒶE and Ⓑ 05 cannot be selected.
*2 : Be sure to fill in the "mix manifold specifications sheet" in the case of mixed specifications.
*3 : When Ⓒ Unit combination is "A, B, C, D, E or F", Ⓖ Solenoid valve voltage and Ⓗ Valve unit cannot be selected.
*4 : When Ⓒ Unit combination is "E, F, L, M, R or W", select Ⓙ Vacuum switch specifications.
*5 : When Ⓐ is Z, only Ⓑ 00 can be selected. When Ⓑ is 00, only Ⓐ Z can be selected.
*6 : When installing a masking block, select Ⓓ CX and indicate the mounting position and quantity in the manifold specification sheet.
*7 : The number of stations that can be simultaneously operated differs depending on the combination of nozzle diameter and port size. Contact CKD for details.
*8 : For manifold models, "A, B, C, D, E and F" cannot be selected for Ⓒ Unit combination.
*9 : When Ⓓ is "S4" or "T4", Ⓑ "10" and "12" cannot be selected.

Appendix 2

Ⓔ Air supply port								
Port shape		Straight fitting				Elbow fitting		
Code	R side only	16	18	10	12	48	40	42
	Both sides	26	28	20	22	58	50	52
	L side only	36	38	30	32	68	60	62
Fitting size (mm)		ø6	ø8	ø10	ø12	ø8	ø10	ø12

Appendix 3

Ⓕ Exhaust port											
Port shape		Atmospheric release silencer	Common exhaust: Straight fitting			Elbow fitting			Taper female pipe thread		
Code	R side only	S1	18	10	12	48	40	42	72	73	74
	Both sides	S2	28	20	22	58	50	52	82	83	84
	L side only	S3	38	30	32	68	60	62	92	93	94
Fitting size (mm)		-	ø8	ø10	ø12	ø8	ø10	ø12	Rc1/4	Rc3/8	Rc1/2

Maintenance part model No.

● Nozzle kit

VSK - H 07 - NK

Ⓐ Vacuum characteristics

Ⓑ Nozzle diameter

Code	Content
Ⓐ Vacuum characteristics *1	
H	High vacuum/medium flow rate
L	Medium vacuum/large flow rate
E	High vacuum/low flow rate
Ⓑ Nozzle diameter *1	
05	ø0.5
07	ø0.7
10	ø1.0
12	ø1.2

⚠ Precautions for model No. selection

*1 : The combination of Ⓐ and Ⓑ E05 cannot be selected.

● Filter element for vacuum

VSG-E

● Silencer element for single unit

VSK-SE

● Silencer kit for manifold

VSKM-SK

● Masking block for manifold

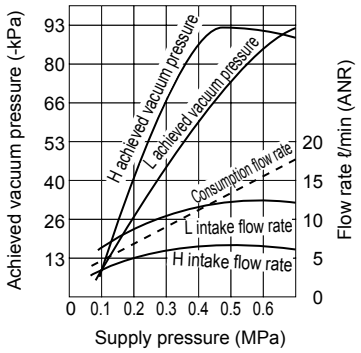
VSKM-MB

Vacuum characteristics, flow characteristics

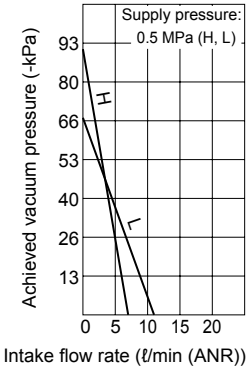
Supply pressure - achieved vacuum pressure, intake flow rate, air consumption rate

● VSK-□H05, VSK-□L05

Vacuum characteristics

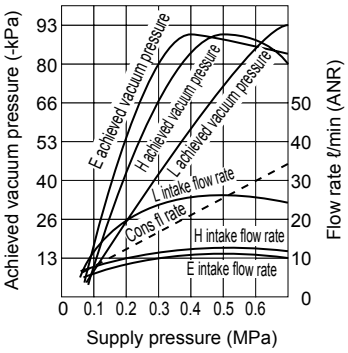


Flow characteristics

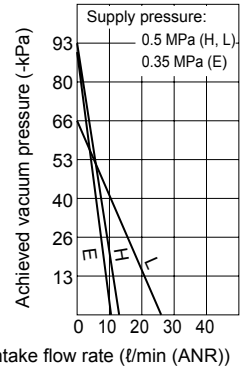


● VSK-□H07, VSK-□L07, VSK-□E07

Vacuum characteristics

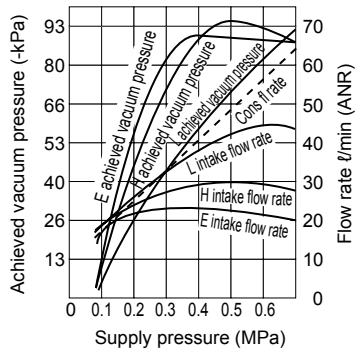


Flow characteristics

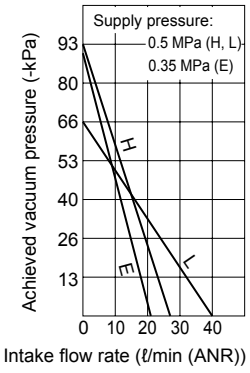


● VSK-□H10, VSK-□L10, VSK-□E10

Vacuum characteristics

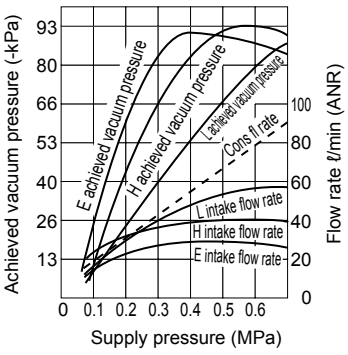


Flow characteristics

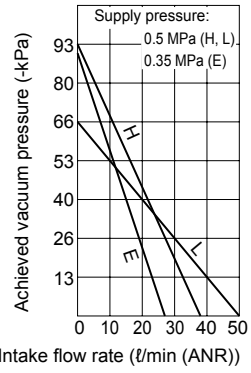


● VSK-□H12, VSK-□L12, VSK-□E12

Vacuum characteristics



Flow characteristics

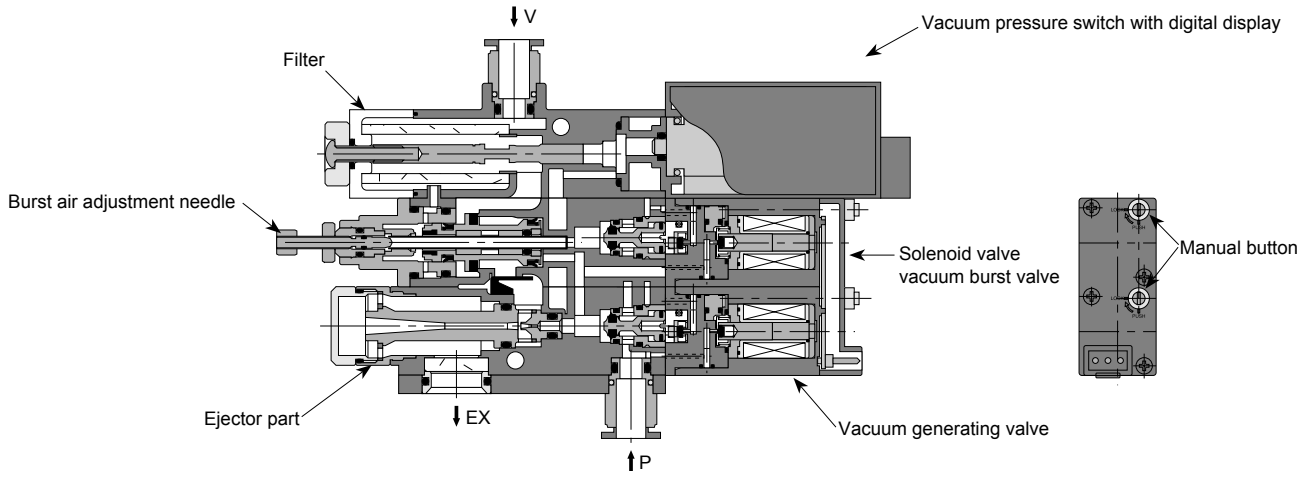


1. Supply pressure with the characteristics described above occurs at vacuum generation.
2. Achieved vacuum pressure with the characteristics described above produces abnormal noise (soft clicking sound) at supply pressure just before reaching the peak value. When this abnormal noise occurs, the characteristics become unstable and operation becomes louder. Reset the supply pressure, as it may affect the sensor, etc., and cause trouble.
   Ex. 1: Source pressure is 0.5 MPa with the H type vacuum ejector. During vacuum ejector operation, supply pressure drops to 0.43 MPa due to pressure drop, and abnormal noise is generated. → Reset supply pressure to 0.5 MPa during vacuum ejector operation.
3. Carry out piping or equipment selection with 3 times the effective cross-sectional area of the nozzle diameter cross-sectional area as a guideline. Satisfactory vacuum characteristics cannot be obtained if adequate supply air flow rate is not maintained. (A soft clicking sound occurs at set pressure. Insufficient intake flow rate, insufficient achievement of achieved vacuum pressure, etc.)
   Ex. 2: Abnormal noise occurs even when pressure is 0.5 MPa with H type vacuum ejector during vacuum ejector operation. → Insufficient supply air flow rate. (Supply air flow rate is restricted in front of the vacuum ejector by piping resistance, etc., and supply air flow rate satisfying the properties is not obtained. → Select piping components that can secure the required effective cross-sectional area.)
   Ex. 3: For vacuum ejector with 1.0 mm nozzle diameter, cross-sectional area is $0.5^2 \times \pi = 0.785\ mm^2 \times 3 = 2.35\ mm^2$. Therefore, carry out piping and equipment selection that ensures an effective cross-sectional area of 2.3 mm^2 or greater.

Internal structure

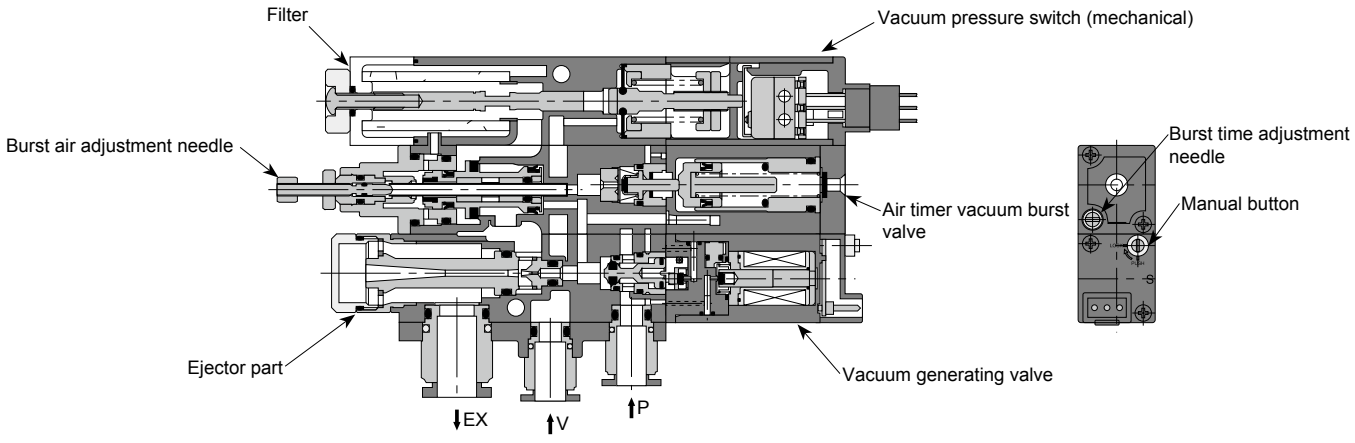
Piping direction 2-surface VSK-A

● VSK-A□□W (with solenoid valve vacuum burst valve, normally closed)



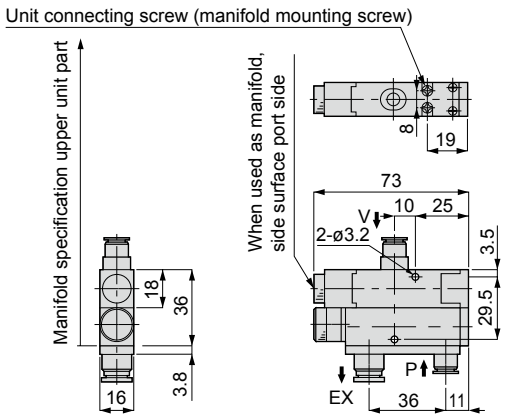
Piping direction 1-surface VSK-B

● VSK-B□□Q (with air timer vacuum burst valve, normally closed)

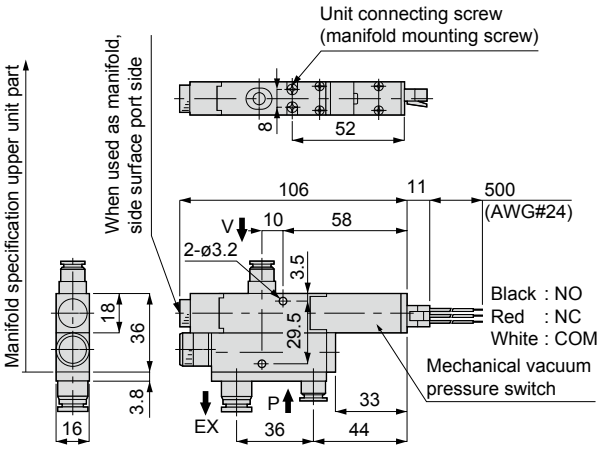


Dimensions (piping method 2-surface VSK-A)

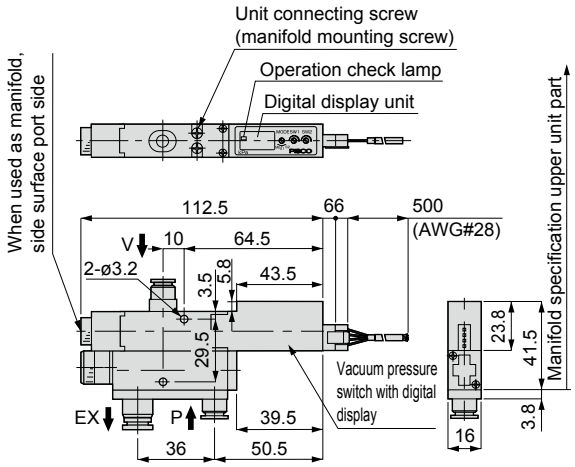
● Unit combination: A, B



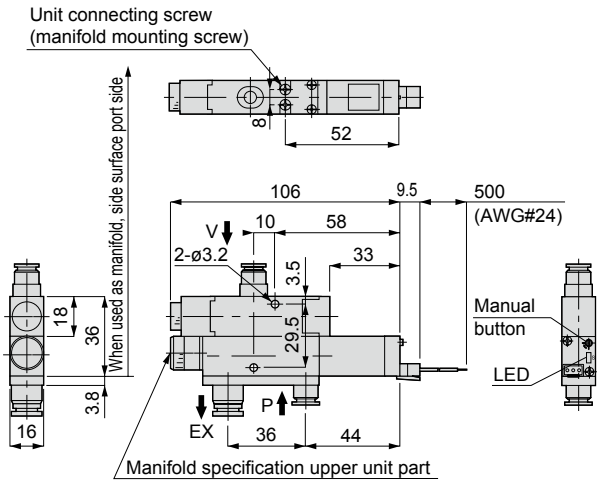
● Unit combination: C, D



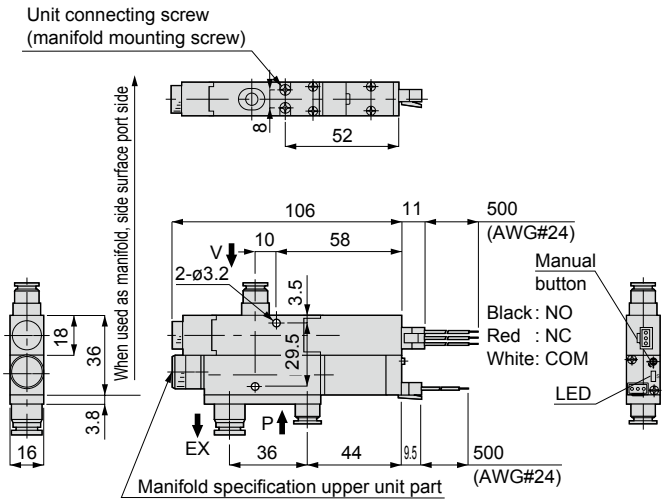
● Unit combination: E, F



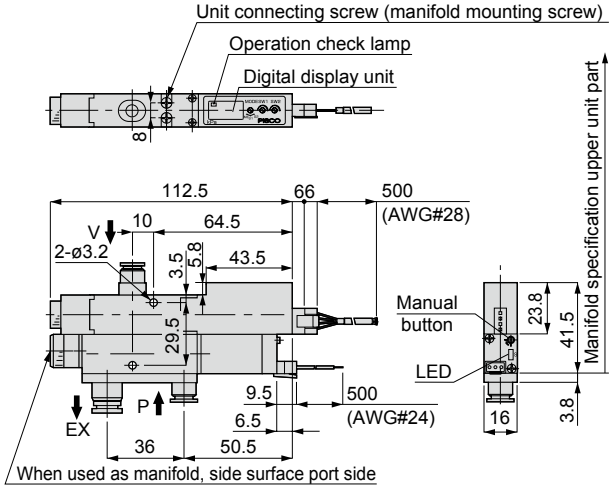
● Unit combination: G, H



● Unit combination: J, K

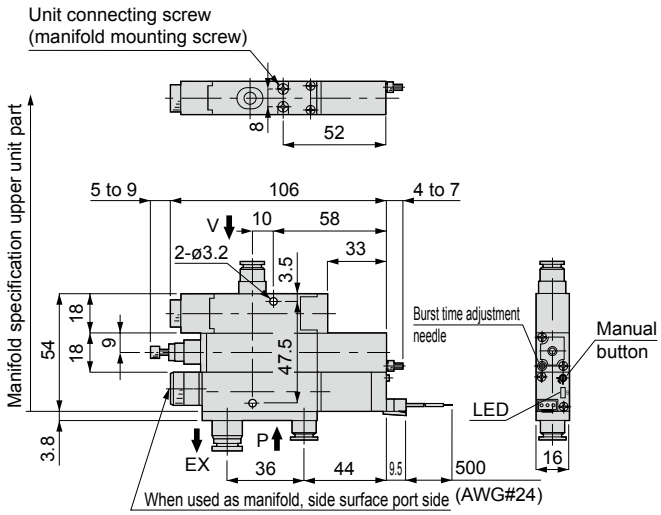


● Unit combination: L, M

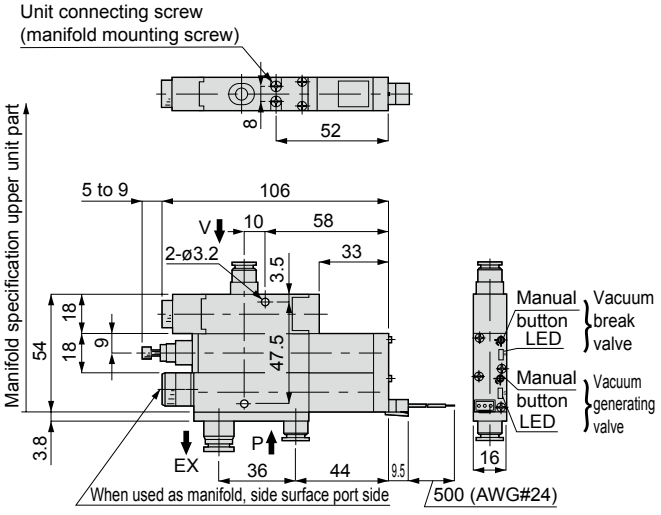


Dimensions (piping method 2-surface VSK-A)

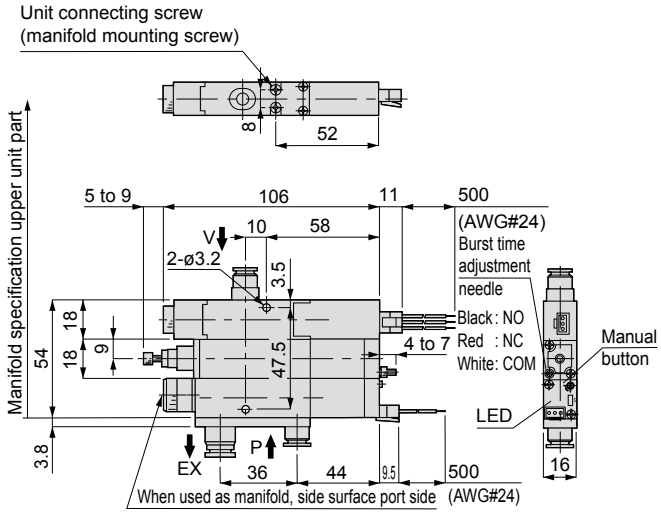
● Unit combination: P



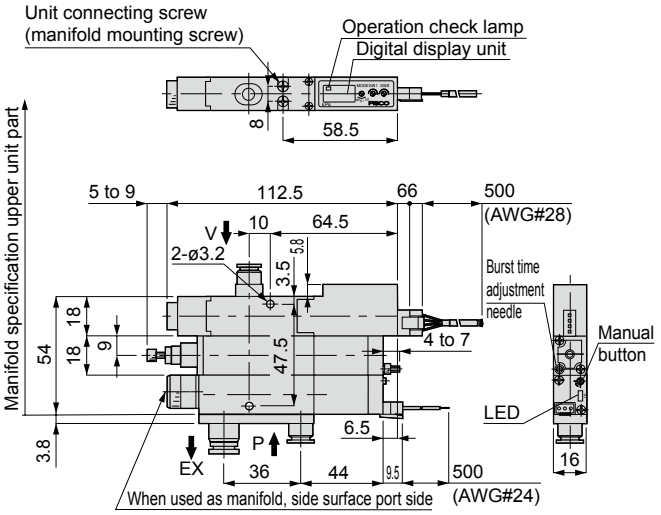
● Unit combination: S



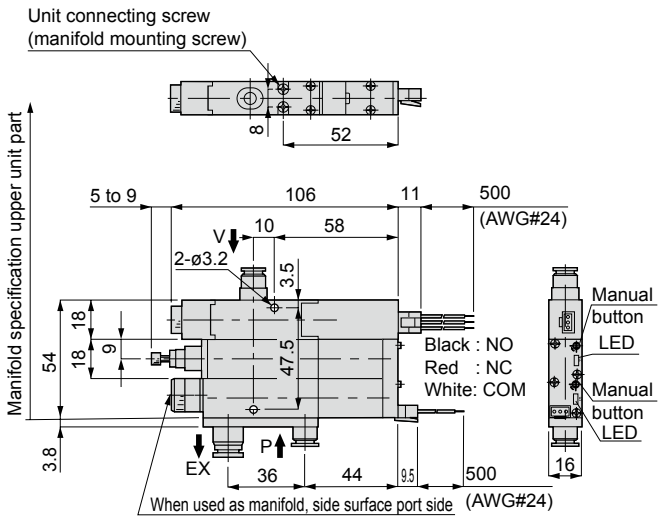
● Unit combination: Q



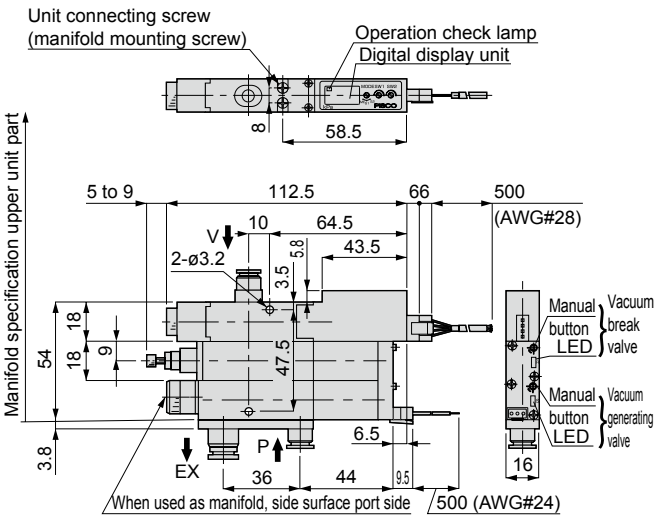
● Unit combination: R



● Unit combination: T

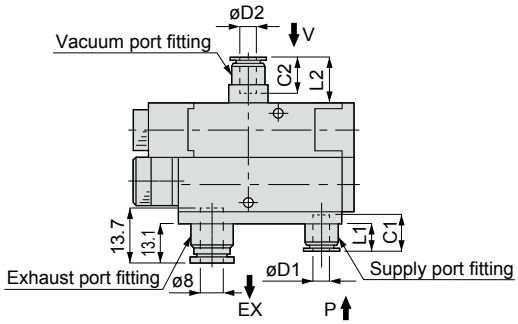


● Unit combination: W



Dimensions (piping method 2-surface VSK-A)

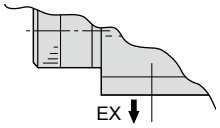
● Fitting dimensions



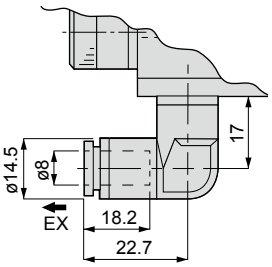
Unit: mm

	Tube O.D. øD1	Tube O.D. øD2	L1	L2	C1	C2
P port	4	-	6.1	-	11.2	-
	6	-	8.9	-	11.9	-
	8	-	17.3	-	18.2	-
V port	-	4	-	11.6	-	11.2
	-	6	-	14.4	-	11.9
	-	8	-	22.8	-	18.2

● Silencer (atmospheric release)

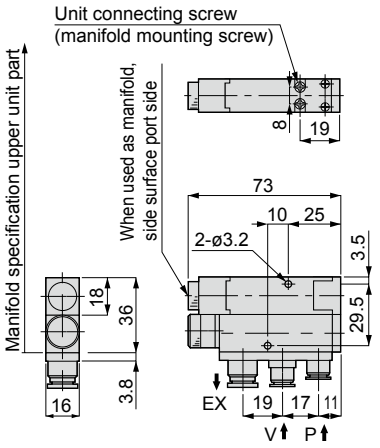


● Exhaust fitting (elbow)

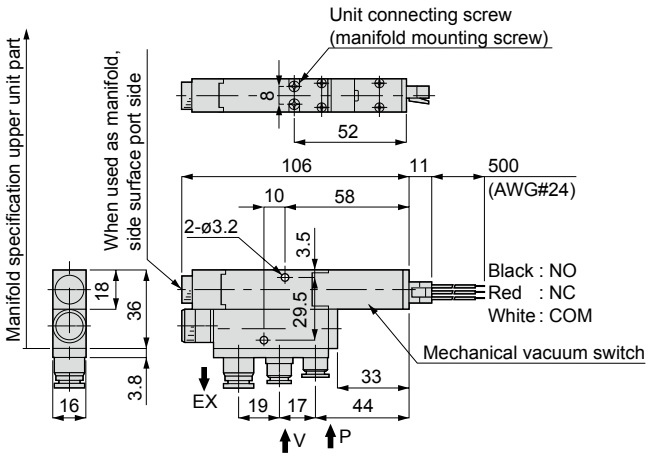


Dimensions (piping method 1-surface VSK-B)

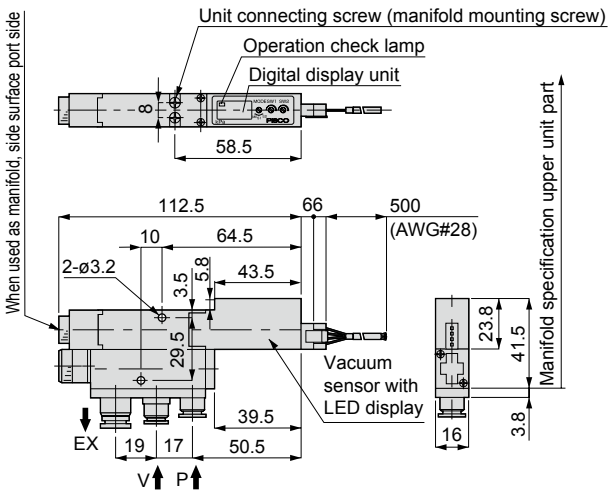
● Unit combination: A, B



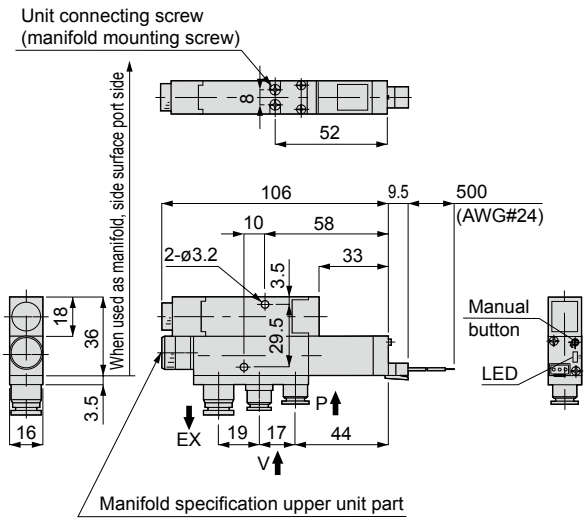
● Unit combination: C, D



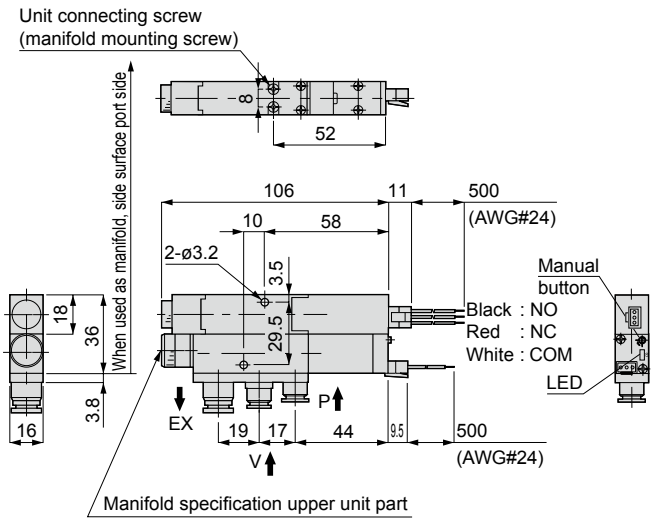
● Unit combination: E, F



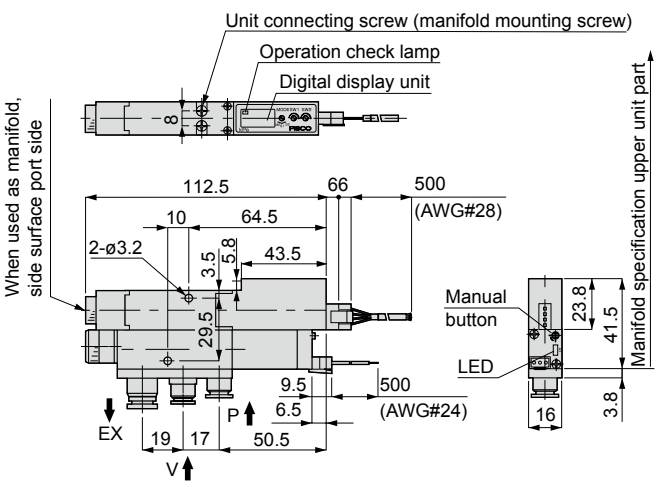
● Unit combination: G, H



● Unit combination: J, K

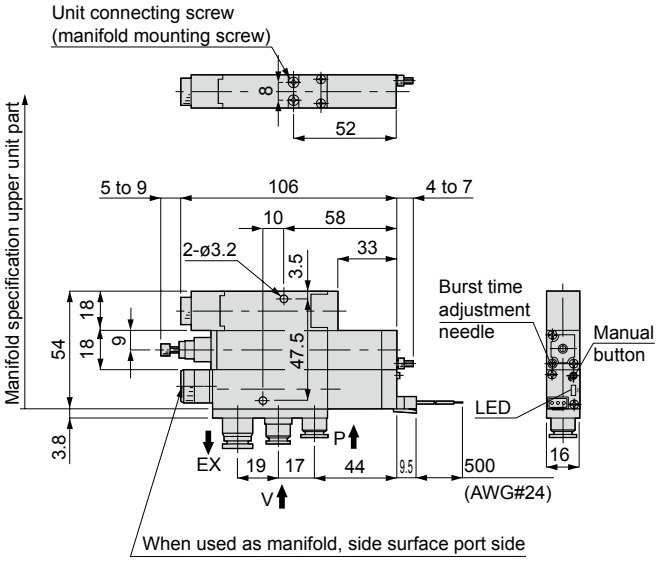


● Unit combination: L, M

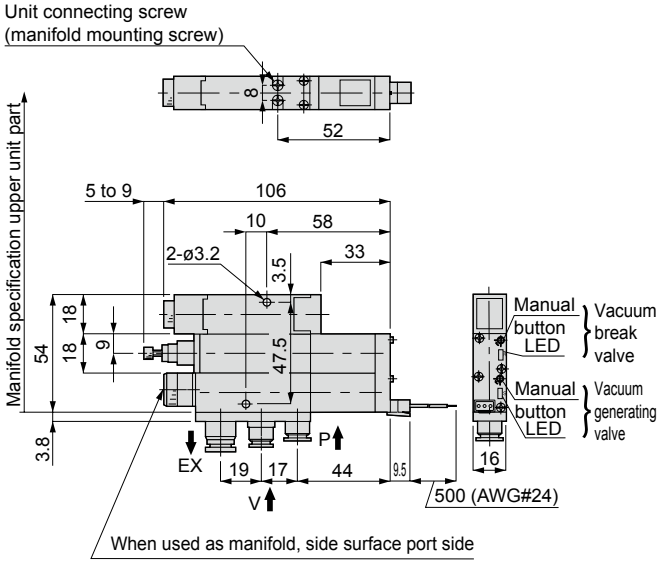


Dimensions (piping method 1-surface VSK-B)

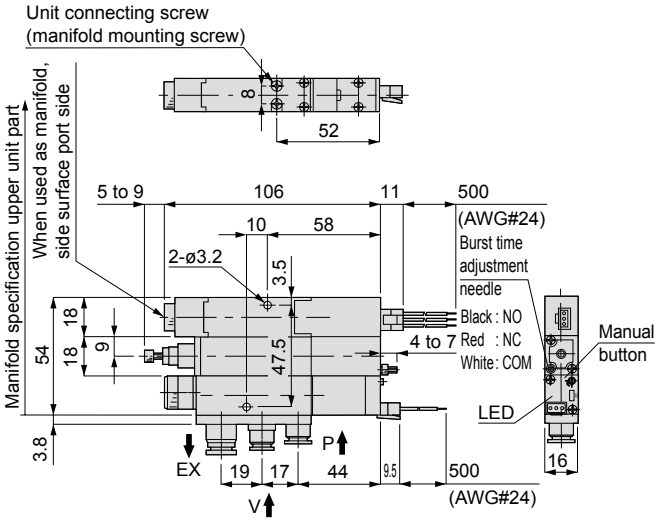
● Unit combination: P



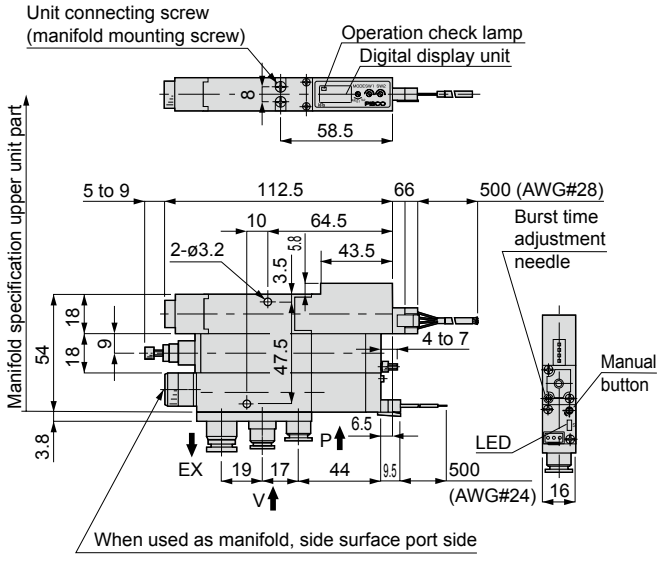
● Unit combination: S



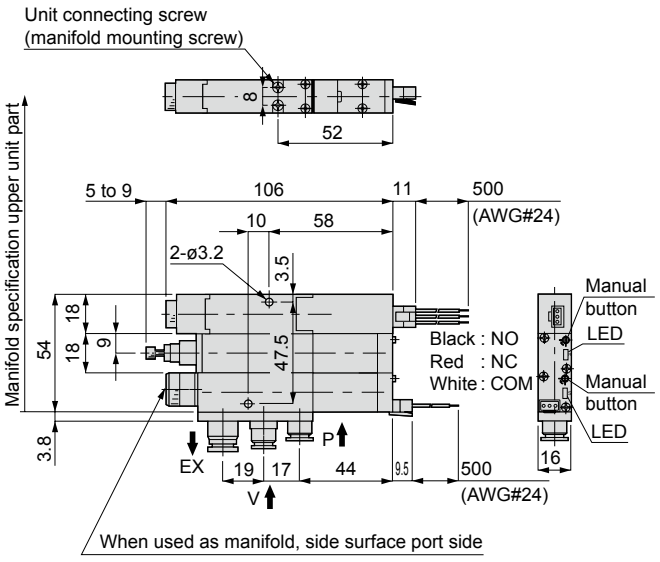
● Unit combination: Q



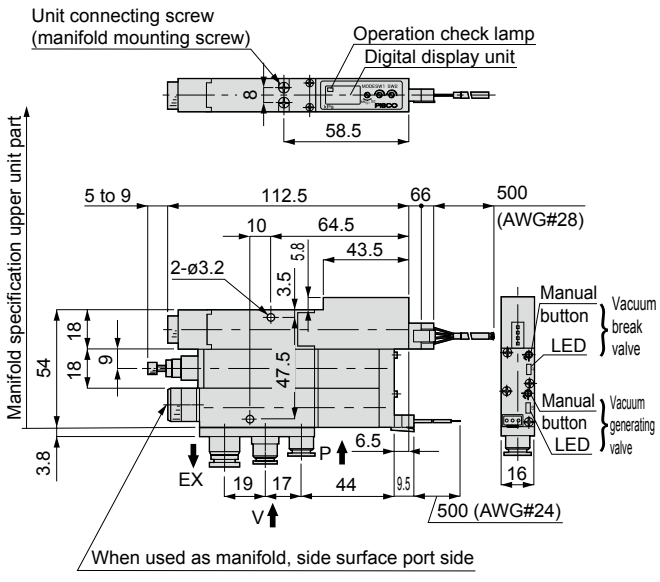
● Unit combination: R



● Unit combination: T

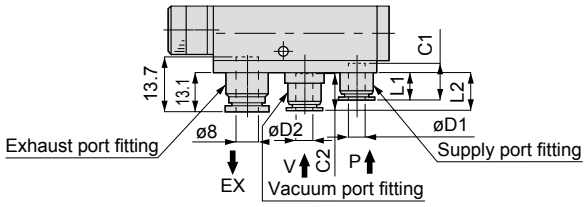


● Unit combination: W



Dimensions (piping method 1-surface VSK-B)

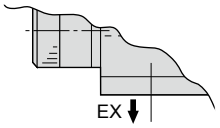
● Fitting dimensions



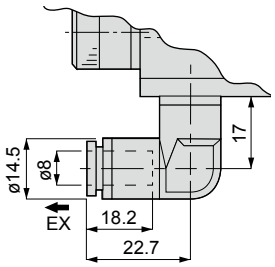
Unit: mm

	Tube O.D. øD1	Tube O.D. øD2	L1	L2	C1	C2
P port	4	-	6.1	-	11.2	-
	6	-	8.9	-	11.9	-
	8	-	17.3	-	18.2	-
V port	-	4	-	9.8	-	11.2
	-	6	-	12.6	-	11.9
	-	8	-	21	-	18.2

● Silencer (atmospheric release)

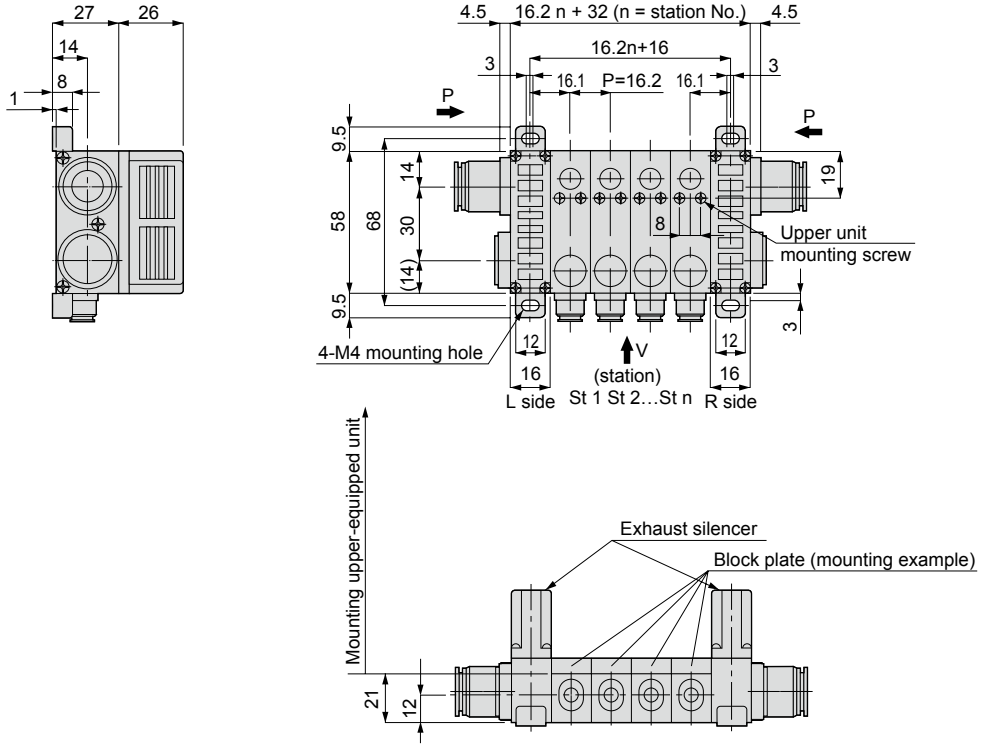


● Exhaust fitting (elbow)

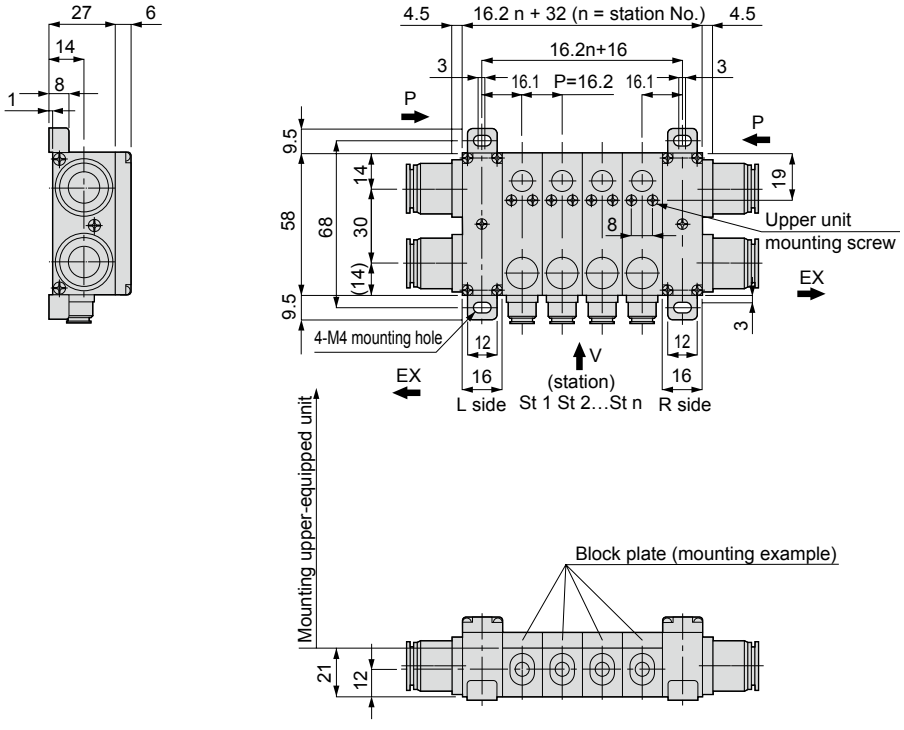


Dimensions (manifold, VSKM)

● Manifold (atmosphere release)



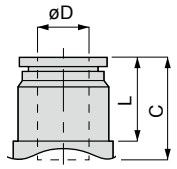
● Manifold (common exhaust)



Dimensions (manifold, VSKM)

● Supply port fitting dimensions

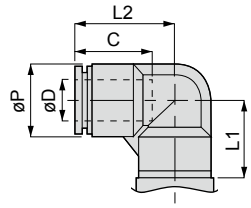
· Straight



Unit: mm

Tube O.D. øD	L	C
6	11.1	17
8	12.2	18.2
10	14.7	20.7
12	18.8	23.3

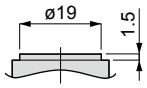
· Elbow



Unit: mm

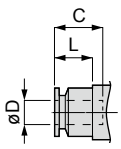
Tube O.D. øD	øP	C	L1	L2
8	14.5	18.2	17	22.7
10	17.7	20.2	21	26.2
12	21	23.4	23	29.4

· Plug



● Vacuum port fitting dimensions

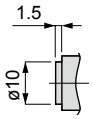
· Straight



Unit: mm

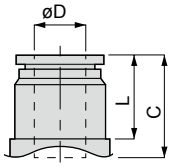
Tube O.D. øD	L	C
4	6.1	11.2
6	8.9	11.9
8	17.3	18.2

· Plug



● Exhaust port fitting dimensions

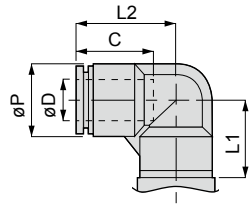
· Straight



Unit: mm

Tube O.D. øD	L	C
8	12.2	18.2
10	14.7	20.7
12	18.8	23.3
16	23.9	24.8

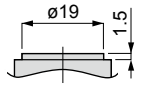
· Elbow



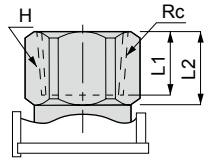
Unit: mm

Tube O.D. øD	øP	C	L1	L2
8	14.5	18.2	17	22.7
10	17.7	20.2	21	26.2
12	21	23.4	23	29.4

· Plug



· Female thread



Unit: mm

Rc	Opposite side H	L1	L2
Rc1/4	22	11	14
Rc3/8	22	12	14
Rc1/2	24	13	17

Safety precautions

Refer to Intro Pages 15 and 16 for general precautions for vacuum system components.

⚠ CAUTION

- By removing the stop pin, it is possible to detach the cartridge fitting, timer cylinder and element for maintenance. Make sure the stop pin is securely inserted after installation.
- Do not remove the gripper on the body coupling part. Although it can be attached and detached several times, it may cause damage to the body due to decreased bonding strength.
- The operating temperature range of the vacuum ejector unit VSK is 5°C to 50°C. Do not use it beyond this range.
- Compressed air contains a large amount of drainage (water, oil oxides, tar, foreign matter). Since drain significantly reduces the performance of the vacuum ejector VSK, dehumidify with aftercooler and dryer to improve the air quality.
- Do not use a lubricator.
- As rust and the like inside the piping may cause malfunctions, be sure to insert a filter of 5 μm or less in front of the supply port.
- Do not use the product in areas containing corrosive or flammable gases. Do not use as a fluid.
- Avoid as far as possible the suction of dust, salt, iron powder and the like.
- When generating vacuum, do not operate the vacuum burst solenoid valve.

Manifold safety precautions

- Increased manifold stations may cause degraded performance or malfunction due to the following reasons. Contact CKD for details.

1. Decreased vacuum performance due to insufficient supply air
   Countermeasure: (1)Confirm supply air capacity, etc.
   (2)Piping length as short as possible
   (3)Larger fitting size
   (4)For one-side supply, supply from both sides of the manifold

2. Exhaust port capacity becomes insufficient, and the vacuum performance is degraded or exhaust air is emitted from the vacuum port of another station.
   → The number of stations for which performance can be maintained when used as manifold depends on the nozzle size, vacuum performance, etc. Contact CKD for details.
   Cause: For the silencer (atmospheric release), exhaust resistance increases and performance deteriorates due to the insufficient silencer capacity.
   Countermeasure: (1)If the silencer is only on one side, use one on both sides.
   (2)Use individual exhaust for each station. (custom order)
   (3)Avoid places that interfere with the exhaust.
   (4)Reduce the station No.
   Cause: For the common exhaust type, the performance deteriorates due to the large piping resistance.
   Countermeasure: (1)If the exhaust is only on one side, use exhaust on both sides.
   (2)Shorten the pipe length as much as possible.
   (3)Increase the exhaust fitting size.
   (4)Use individual exhaust for each station. (custom order)
   (5)Reduce the station No.

- Unit combination: For G, J and L type, in the manifold vacuum ejector, when an operating ejector and an inoperative ejector are mixed, exhaust air is led into the ejector not in operation and output from the vacuum port. For example, lightweight workpieces may be blown away. Therefore, do not use under conditions which might affect the workpiece.

Usage methods

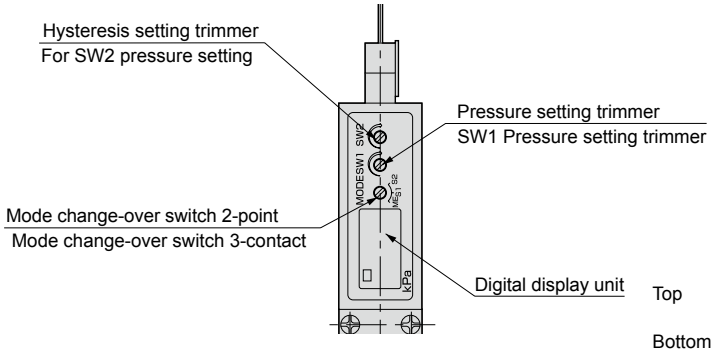
1. Vacuum pressure switch with digital display

(1) Pressure setting procedure

(1)Energization (supply DC power after confirming the wiring.)
(2)-1 Set the display change-over switch to pressure setting mode (ME → S1 or S2, SW).
(2)-2 (vacuum pressure switch with analog output only)
Turn the hysteresis setting trimmer (HYS) fully counterclockwise to set hysteresis to minimum.
(3)Align to the desired setting value by turning the pressure setting trimmer (S1 or S2, SW) with a small screwdriver, etc.
(4)Set the display change-over switch to ME, apply pressure and confirm actual operation.
(For vacuum pressure switch with 2-point switch output)
Switch output 1 (S1): Operation indicator lamp (red LED) turns ON at set pressure or greater.
Switch output 2 (S2): Operation indicator lamp (green LED) turns ON at set pressure or greater.
(For vacuum pressure switch with analog output)
Switch output (SW): Operation indicator lamp (red LED) turns ON at set pressure or greater.

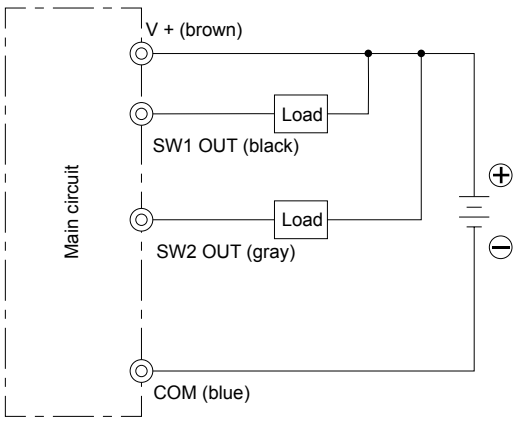
(2) Hysteresis setting

(1)Hysteresis can be adjusted by the hysteresis setting trimmer (HYS).
(2)Hysteresis adjusting range is approx. 0 to 15% of the set value. Hysteresis increases when the trimmer is rotated clockwise.
(3)Hysteresis confirmation
Set the display change-over switch to pressure display mode (ME), and gradually increase/decrease the pressure so that it will be over and under the set pressure.
Then, read the values displayed when the operation indicator lamp turns ON and OFF. The display value difference is the hysteresis.
(4)Hysteresis adjustment application examples
· When the pressure is pulsating and the output cuts out at fine intervals, increase the hysteresis.
· When setting the allowable range of pressure drop.

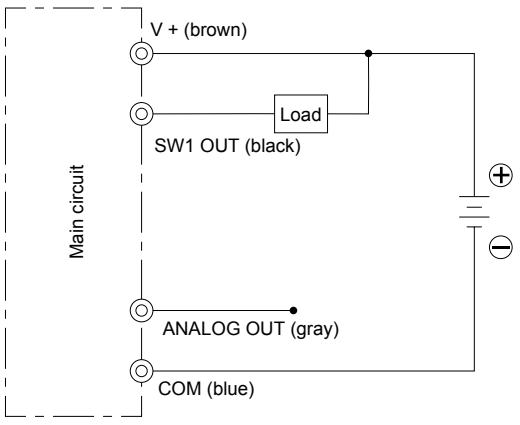


Top : Vacuum pressure switch with analog output
Bottom: Vacuum pressure switch with 2-point switch output

(3) How to wire



Vacuum pressure switch with 2-point switch output



Vacuum pressure switch with analog output

Usage methods

2. Precautions for vacuum pressure switch with digital display

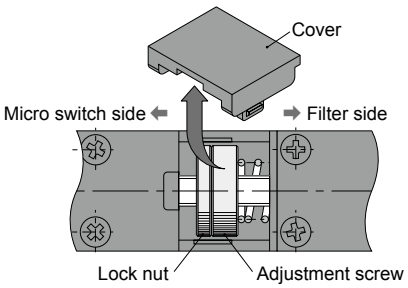
(1)Do not use in atmospheres or gases containing corrosive substances. It risks damaging the switch.
(2)Do not perform wiring or usage that would introduce noise (surge), etc. It risks damaging the switch.
(3)Do not use in flammable or explosive gases, liquids, or atmospheres. This may cause fire or explosion, as the product does not have an explosion-proof structure.
(4)Avoid using in places where the product is exposed to dripping water, oil, dust, etc. This may cause malfunction, as the product does not have a drip-proof structure.
(5)Do not use where the heat generated exceeds the operating temperature range. It risks damaging the switch.
(6)Make sure to turn the power OFF before wiring. During wiring, check the lead wire color and do not short-circuit the output terminal and power supply terminal or COM terminal. Short-circuiting could cause switch malfunction.
(7)Do not apply high tensile force or bending force to the connector cable. It could cause disconnection or damage to the connector unit.
(8)At vacuum burst, do not constantly apply pressures of 0.2 MPa or greater. If constantly applied, it could damage the switch.
(9)When setting the pressure and hysteresis, use a small screwdriver and gently rotate within the rotation range of the trimmer, without applying excessive force. If excessive force is applied during adjustment, it could damage the trimmer and base.
(10)Use a stable DC power supply.
(11)To connect to an output terminal or power supply terminal (relay, solenoid valve, etc.), install a surge voltage absorption circuit. Avoid usage where current exceeds 80 mA.
(12)When using a unit power supply such as switching power supply, ground the F.G. (frame ground).
(13)Do not short-circuit the output terminal (black/gray lead wire) with other terminals.
(14)Do not apply strong external impact or excessive force to the switch body.

3. Mechanical vacuum pressure switch

■ The vacuum ejector VSK has a vacuum pressure switch with connector type lead wire. Wire with reference to the figure below.

■ To adjust the pressure, pry open the cover with a screwdriver or the like and adjust using the setting screw. Turning it right (clockwise) will increase the set vacuum. The adjustment screw is fixed with a lock nut, which needs to be loosened first. After adjustment, fix the adjusting screw by hand or the like and tighten the lock nut. When removing the cover, be sure to hold it down gently by hand so that it will not fall.

* In the unlikely event of a failure, contact the nearest CKD Sales Office for repair.



Lead wire color	
White	Common
Red	NC
Black	NO

4. Notes on mechanical vacuum pressure switch with digital display

■ When using the vacuum ejector VSK with vacuum pressure switch, be sure to shorten the vacuum piping as much as possible.

■ While vacuum is generated, if the vacuum piping is long, the piping resistance and sensor degree of vacuum may increase even when there is no suction, which may cause malfunction in the switch. If the piping must be long, be sure to place a pad or the like with sensor single unit specification near the end of the piping.

Usage methods

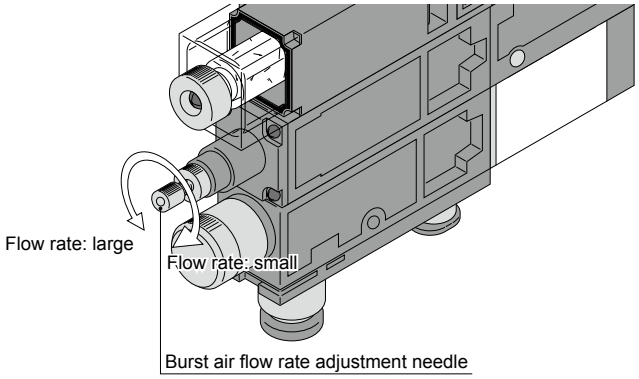
5. How to adjust vacuum burst valve

■ Burst air (solenoid valve vacuum burst valve, air timer vacuum burst valve)

· The burst air flow rate is decreased by turning the burst air adjustment needle to the right (clockwise) and increased by turning it to the left (counterclockwise). Also, after adjusting the burst air of the solenoid valve vacuum burst valve, be sure to read ① and ② below before tightening the lock nut so that the setting will be secure.

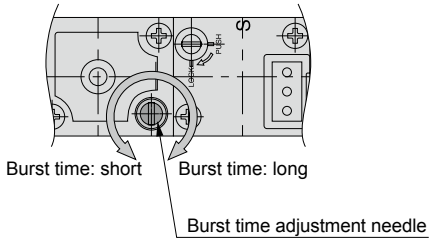
①Using a suitable tool (such as needle-nosed pliers), tighten the lock nut by 20° to 30° from the place where it touches the needle guide.

②Please note that excessive tightening may cause damage such as wear on knurled parts, deformation of female thread, etc.



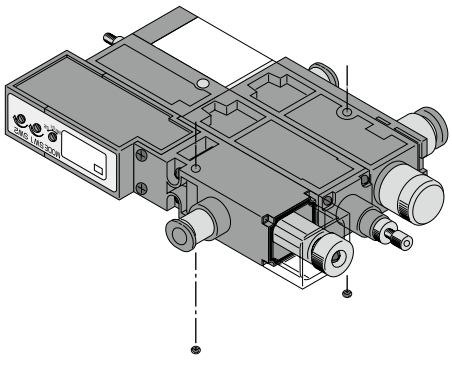
■ Air timer vacuum burst valve burst time

· The burst time of the air timer vacuum burst valve will be longer if the burst time adjustment needle is turned to the right (clockwise) and shorter if turned to the left (counterclockwise).



6. Fixing method

To secure the vacuum ejector unit VSK, fasten M3 screws through the fixing holes on the resin body. (Refer to the dimensions for the fixing hole pitch.)



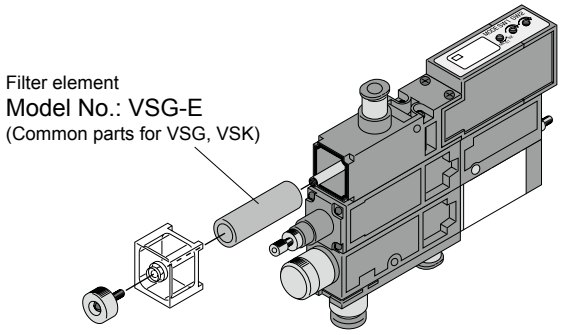
Usage methods

7. How to replace the element

● Single unit

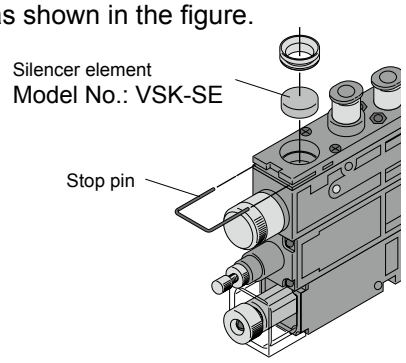
· Filter element

■ Remove the fixing screws to replace the filter element. After replacing the filter element and checking that the filter packing has not fallen out, securely fix it with tightening torque of 0.3 to 0.5 N·m.



· Silencer element

■ When replacing the silencer element, use a flathead screwdriver to remove the stop pin first. After replacing the silencer element, securely insert the stop pin. The stop pin is bent to prevent it from coming off. Insert it with the curved side facing inward as shown in the figure.



● Manifold

· Silencer kit

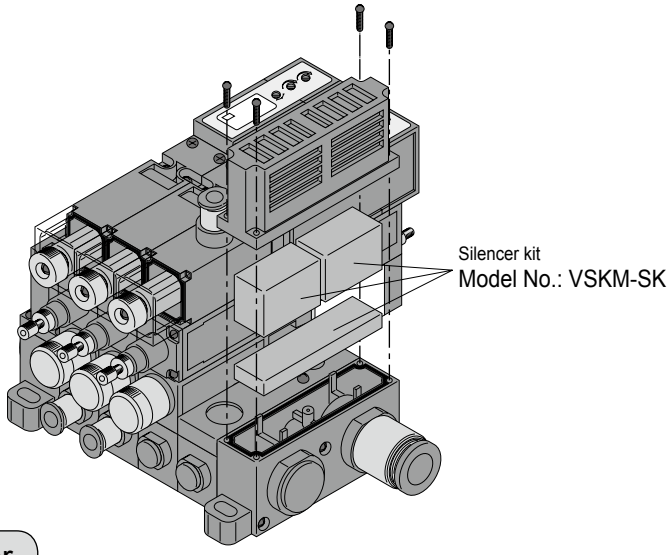
■ How to remove silencer element

· Use a suitable Phillips screwdriver to remove the four tapping screws.

· Remove the element cover and replace the silencer element (model: VSKM-SK).

■ How to install silencer element

· Using a suitable Phillips screwdriver, secure the four tapping screws with tightening torque of 0.3 to 0.4 N·m.



8. Removal and cleaning of nozzle and diffuser

■ Removal of nozzle and diffuser

To remove the diffuser, remove the cover and diffuser retainer and pull out using pliers or the like. To prevent the nozzle from popping out, cover the exhaust port with cushioning material such as a sponge and supply the air for vacuum generation. Since the nozzle will pop out due to the force of air, remove the cushioning material and take out the nozzle.

* Do not point the nozzle outlet at a person while supplying air to the product. The nozzle may pop out and cause injury.

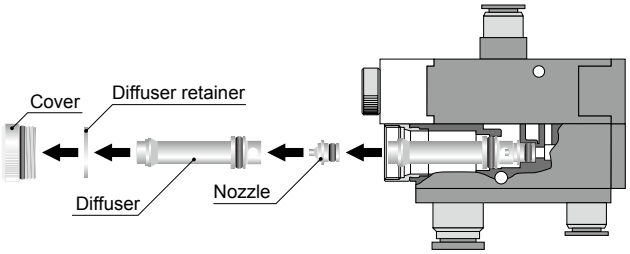
■ Washing nozzle and diffuser

Remove the deposits on the nozzle, diffuser bore and seal by air blow or wiping.

* Do not scratch the inner diameter of the nozzle, diffuser, seal or main body seal. This will cause performance degradation.

■ Installing nozzle and diffuser

Assemble the nozzle on the diffuser and supply to the body so that the nozzle does not come off. Push in the diffuser, fit the diffuser retainer in the diffuser and tighten the cover with tightening torque of 0.2 to 0.25 N·m.



MEMO

How to fill out VSKM mix manifold specifications sheet

● Mix manifold model No. (example)

	Ⓐ	Ⓑ	Ⓒ		Ⓓ	Ⓔ	Ⓕ		Ⓖ	Ⓗ		Ⓘ		Ⓙ
VSKM-	Z	00	Z	-	CX	28	S2	-	3	Z	-	5	-	Z

● Mix manifold specifications sheet (example)

Vacuum ejector model No.							Layout position										Quantity
Ⓐ	Ⓑ	Ⓒ	Ⓓ	Ⓖ	Ⓗ	Ⓙ	1	2	3	4	5	6	7	8	9	10	
VSKM- H	07	G	- S8	- 3	A	-	○	○									2
VSKM- E	10	W	- S6	- 3	B	- NW			○								1
VSKM- E	10	W	- T6	- 3	B	- NW					○						1
VSKM-			-	-													
VSKM-			-	-													
Masking block model No.																	
VSKM- MB			- S6							○							1

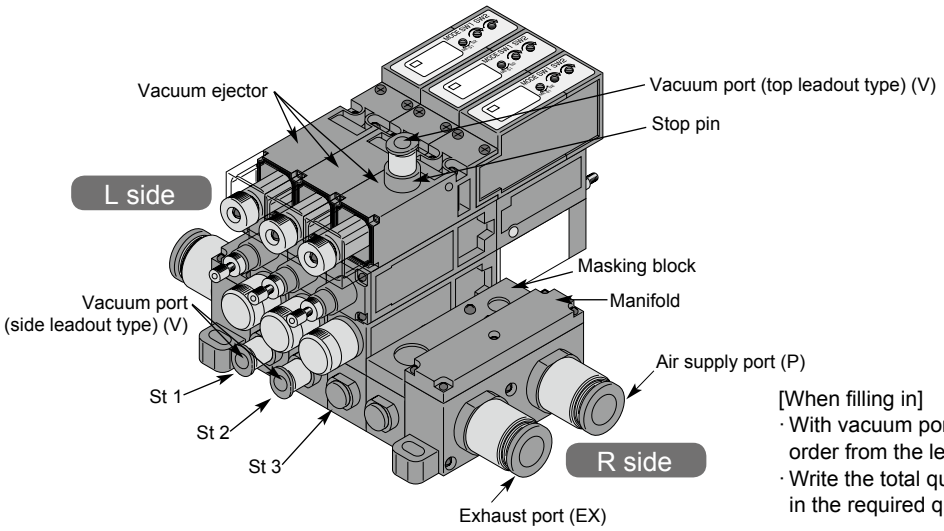
[For output port size only fitting mix specification]

● Mix manifold model No. (example)

	Ⓐ	Ⓑ	Ⓒ		Ⓓ	Ⓔ	Ⓕ		Ⓖ	Ⓗ		Ⓘ		Ⓙ
VSKM-	H	07	W	-	CX	28	S2	-	3	B	-	5	-	NW

● Mix manifold specifications sheet (example)

Vacuum ejector model No.							Layout position										Quantity
Ⓐ	Ⓑ	Ⓒ	Ⓓ	Ⓖ	Ⓗ	Ⓙ	1	2	3	4	5	6	7	8	9	10	
VSKM- H	07	W	- S8	- 3	B	- NW	○	○									2
VSKM- H	07	W	- S6	- 3	B	- NW			○	○							2
VSKM- H	07	W	- T6	- 3	B	- NW					○						1
VSKM-			-	-													
VSKM-			-	-													
Masking block model No.																	
VSKM- MB			-														



[When filling in]
- With vacuum port facing front, set piping positions in order from the left.
- Write the total quantity of product model No. specified in the required quantity field at the table far right.

VSKM mix manifold specifications sheet

Issued / /

Company name

Contact Quantity Set Delivery date /

Contact

Slip No. Order No.

Order No.

● Mix manifold model No.

VSKM- Ⓐ Ⓑ Ⓒ - Ⓓ Ⓔ Ⓕ - Ⓖ Ⓗ - Ⓘ - Ⓙ

Ⓐ Vacuum characteristics *1, *2, *3	
H	High vacuum/medium flow rate
L	Medium vacuum/large flow rate
E	High vacuum/low flow rate
Z	For mixed specs (indicate breakdown on specs sheet.)

Ⓑ Nozzle diameter *1, *2, *3	
05	ø0.5
07	ø0.7
10	ø1.0
12	ø1.2
00	For mixed specs (indicate breakdown on specs sheet.)

Ⓒ Unit combination *2, *4, *5
Refer to Appendix 1 on page 45 for unit combination.

Ⓓ Vacuum port (V) *2, *6	
PP	Plug port position side
S4	ø4 push-in fitting port position side
S6	ø6 push-in fitting port position side
S8	ø8 push-in fitting port position side
T4	ø4 push-in fitting port position top
T6	ø6 push-in fitting port position top
T8	ø8 push-in fitting port position top
CX	For mixed fittings (indicate breakdown on specs sheet.)

Ⓔ Air supply port (P)
Refer to Appendix 2 on page 46 for the air supply port.

Ⓕ Exhaust port (EX)
Refer to Appendix 3 on page 46 for exhaust port.

Ⓖ Solenoid valve voltage *4	
1	100 VAC
3	24 VDC

Ⓗ Valve *2, *4	
A	Normally open (NO)
B	Normally closed
Z	For mixed specs (indicate breakdown on specs sheet.)

Ⓘ Manifold station No.	
2 to 10	2 to 10 stations

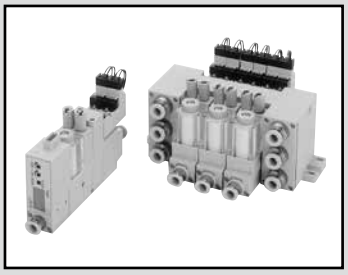
Ⓙ Vacuum pressure switch specifications *2, *5	
NW	NPN output 2 points
NA	NPN output 1 point + analog output
PW	PNP output 2 points
PA	PNP output 1 point + analog output
Z	For mixed specs (indicate breakdown on specs sheet.)

⚠ Precautions for model No. selection

*1 : The combination of Ⓐ E and Ⓑ 05 cannot be selected.
*2 : Be sure to fill in the “mix manifold specifications sheet” in the case of mixed specifications.
*3 : When Ⓐ is Z, only Ⓑ 00 can be selected.
When Ⓑ is 00, only Ⓐ Z can be selected.
*4 : When Ⓒ Unit combination is “A, B, C, D, E or F”, Ⓖ Solenoid valve voltage and Ⓗ Vacuum supply valve cannot be selected.
*5 : When Ⓒ Unit combination is “E, F, L, M, R or W”, select Ⓙ Vacuum sensor specifications.
*6 : When installing a masking block, select Ⓓ CX and indicate the mounting position and quantity in the manifold specification sheet.

● Mix manifold specifications sheet

Vacuum ejector model No. Ⓐ Ⓑ Ⓒ Ⓓ Ⓖ Ⓗ Ⓙ	Layout position 1	2	3	4	5	6	7	8	9	10	Quantity
VSKM- - - -											
VSKM- - - -											
VSKM- - - -											
VSKM- - - -											
VSKM- - - -											
Masking block model No.											
VSKM- **MB** -											



Burst air flow rate & integrated vacuum ejector unit
with relief pressure adjustment needle

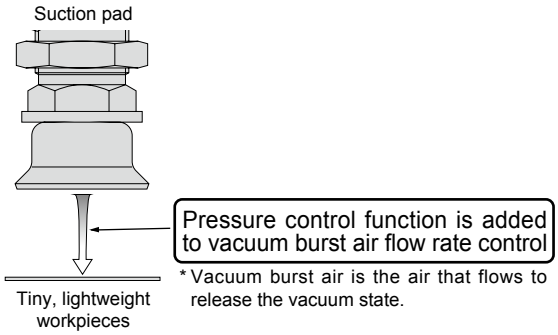
VSJ Series

● Nozzle diameter: ø0.5, ø0.7, ø1.0, ø1.2

RoHS

Features

■ Pressure control is added to the conventional flow rate control for vacuum burst air to prevent workpieces from being blown away.



* Vacuum burst air is the air that flows to release the vacuum state.

■ Since manifold is also available, reduced piping is possible. There are two types of pipe leadout directions, front side and rear side, which can be selected according to the installation location.

■ Three types of vacuum generating valves are available: self-hold, normally closed and normally open. Power-saving self-hold is ideal for special applications where vacuum must be generated for long periods.

■ Digital display is used for vacuum pressure switch display to improve visibility. 2-point switch output and analog output are available for the vacuum pressure switch, selectable according to the application. In addition, wiring layout can be done easily using a connector system.

■ 4 types of nozzle diameters are standardized: 05, 07, 10 and 12.

Specifications

Descriptions	VSJ
Working fluid	Air
Working pressure MPa	0.3 to 0.7
Ambient/fluid temperatures °C	5 to 50

Ejector characteristics

Model No.	Nozzle diameter (mm)	Rated supply pressure (MPa)	Achieved vacuum pressure (-kPa)	Intake flow rate (ℓ/min (ANR))	Air consumption rate (ℓ/min (ANR))
VSJ-H05…	0.5	0.5	90.4	7	11.5
VSJ-L05…		0.35	66.5	11	11.5
VSJ-H07…	0.7	0.5	93.1	13	23
VSJ-L07…		0.5	66.5	26	23
VSJ-E07…		0.35	90.4	10.5	17
VSJ-H10…	1.0	0.5	93.1	27	46
VSJ-L10…		0.5	66.5	40	46
VSJ-E10…		0.35	90.4	21	34
VSJ-H12…	1.2	0.5	93.1	38	70
VSJ-E12…		0.35	90.4	27	47

*1 : When operating the vacuum ejector, be sure to secure the supply pressure above. (Consider pressure drop.)
*2 : Values in table are representative values. Suction flow rate differs with the vacuum piping conditions (vacuum port size, pipe length).

Valve (for vacuum generation, vacuum burst) specifications

● Pilot solenoid valve

Descriptions	Vacuum generating valve		Vacuum break valve	
Valve and operation	Direct acting poppet valve			
Rated voltage V	24 DC	100 AC	24 DC	100 AC
Voltage fluctuation range V	24 DC ±10%	100 AC ±10%	24 DC ±10%	100 AC ±10%
Surge protective circuit	Varistor	Bridge diode	Varistor	Bridge diode
Power consumption	1.2 W (with LED)	1.5 VA (with LED)	1.2 W (with LED)	1.5 VA (with LED)
Manual override	Push non-locking			
Operation display	At coil excitation operation: Red LED lights			
Connection	Connector (cable length: 500 mm)			
	Red: 24 VDC Black: COM	Blue	Red: 24 VDC Black: COM	Blue

● Main valve

Descriptions	Vacuum generating valve		Vacuum break valve
Valve and operation	Pilot operated poppet valve		
Proof pressure MPa	1.05		
Valve	Self-hold, normally closed, normally open		Normally closed
Lubrication	Not required		
Effective cross-sectional area mm^2	Air supply (PS) port size	ø4:3.5	1
		ø6:5	

Vacuum pressure switch specifications with LED display

Descriptions		With 2-point switch output (-W)	With analog output (-A)
Factory setting value kPa		-50(SW1), -10(SW2)	-50
Current consumption mA		40 or less	
Pressure sensitive element		Diffused semiconductor pressure switch	
Working pressure kPa		-100 to 0	
Set pressure kPa		-99 to 0	
Proof pressure MPa		0.2	
Storage temperature °C		-20 to 80 (atmospheric pressure, humidity 60% RH or less)	
Operating temperature °C		0 to 50 (no freezing)	
Operating humidity		35 to 85% RH (no freezing)	
Power supply voltage V		12 to 24 DC ±10% ripple (P-P) 10% or less	
Degree of protection		IEC standards IP40 or equivalent	
Output points		2	1
Repeatability		±3% F. S. max(at Ta=25°C)	
Hysteresis		Fixed (2% F.S. max.)	Variable (approx. 0 to 15% of set value)
Switch output		NPN transistor/open collector output 30 V 80 mA or less Residual voltage 0.8 V or less	
Analog output	Output voltage V	-	1 to 5
	Zero point voltage V	-	1±0.1
	Span voltage V	-	4±0.1
	Output current mA	-	1 or less (load resistance 5 kΩ or more)
	Linearity/hysteresis	-	±0.5% F. S. max.
Responsivity ms		2 max.	
Display kPa		0 to -99 (2-digit red LED display)	
Display frequency		Approx. 4 times/second	
Display accuracy		±3% F. S. ±2 digit	
Resolution		1 digit	
Operation display		SW1: Red LED lights at set pressure and over	Red LED lights at set pressure and over
		SW2: Green LED lights at set pressure and over	
Function		1. MODE change-over switch (ME or S1 or S2)	1. MODE change-over switch (ME or SW)
		2. S1 set trimmer (2/3 rotation trimmer)	2. SW set trimmer (2/3 rotation trimmer)
		3. S2 set trimmer (2/3 rotation trimmer)	3. HYS setting trimmer (approx. 0 to 15% of set value)

Vacuum break function specifications

Descriptions	Vacuum burst function
Break air flow rate ℓ/min (ANR)	0 to 50 (at supply pressure 0.5 MPa)
Burst air relief valve structure	Elastic sealing, poppet valve
Relief pressure setting range kPa	-25 to 25

Vacuum filter specifications

Descriptions		Vacuum filter
Element material		PVF (Polyvinyl formal)
Filtration rating	μm	10
Filtration area	mm^2	1130
Replacement filter element model No.	Vacuum	VSG-E
	Breaking the vacuum	VSJ-PE

Weight table

①Single unit

VSJ		Weight (g)	Remarks
Atmospheric release, with sensor	VSJ-□□□-□□S-□□-□	165	Vacuum port: ø4, ø6
	VSJ-□□□-□8S-□□-□	171	Vacuum port: ø8
Atmospheric release, without sensor	VSJ-□□□-□□S-□□	156	Vacuum port: ø4, ø6
	VSJ-□□□-8□S-□□	163	Vacuum port: ø8
Common exhaust, with sensor	VSJ-□□□-□□8-□□-□	169	Vacuum port: ø4, ø6
	VSJ-□□□-8□8-□□-□	176	Vacuum port: ø8
Common exhaust, without sensor	VSJ-□□□-□□8-□□	161	Vacuum port: ø4, ø6
	VSJ-□□□-8□8-□□	167	Vacuum port: ø8

②Manifold intermediate block

	Weight (g)	Remarks
Manifold intermediate block	19	For 1 station

③Manifold side block

VSJ	Weight (g)	Remarks
Vacuum ejector unit (atmospheric release)	118	No. of cartridges used: 2 (PS port) Stopcock included with PV and EX ports
Vacuum ejector unit (common exhaust)	112	No. of cartridges used: 4 (PS, EX ports) Stopcock included with PV port

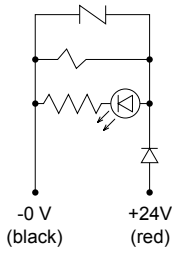
④Cartridge (input/exhaust port)

	Weight (g)	Remarks
Push-in fitting for ø6	12	
Push-in fitting for ø8	10	
Push-in fitting for ø10	13	

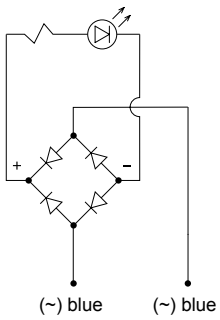
■ Calculate the manifold weight using the formula below.
Manifold weight = (①VSJ single unit + ②manifold intermediate block) × station No. + ③manifold side block + ④cartridge × No. used

Electric circuit (solenoid valve)

● 24 VDC specification Valve for vacuum generation and vacuum burst

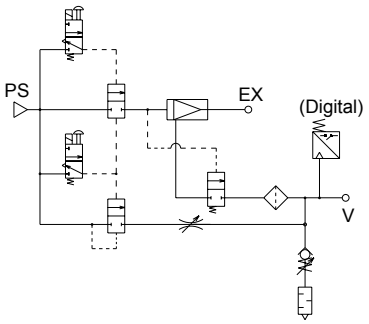


● 100 VAC specification Valve for vacuum generation and vacuum burst

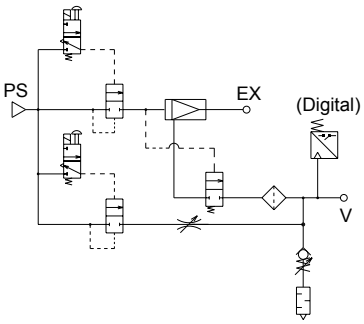


Circuit diagram

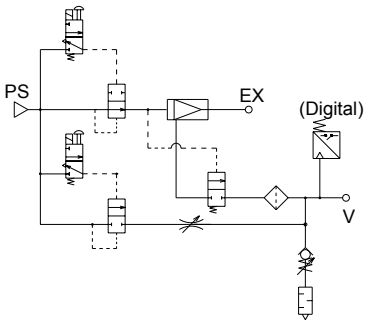
● Self-hold type



● Normally closed



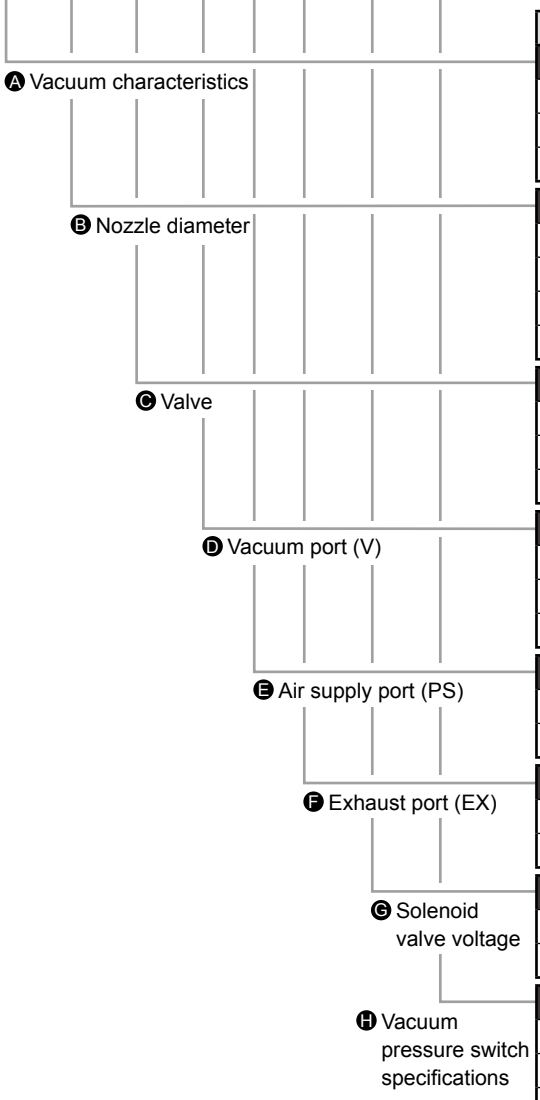
● Normally open



How to order (single unit)

● 20 mm width integrated vacuum ejector unit, single unit

VSJ - H 07 A - 6 6 8 - 3 - W



Code	Content
Ⓐ Vacuum characteristics	*1
H	High vacuum/medium flow rate
L	Medium vacuum/large flow rate
E	High vacuum/low flow rate
Ⓑ Nozzle diameter	*1
05	ø0.5
07	ø0.7
10	ø1.0
12	ø1.2
Ⓒ Valve	
A	Normally open (NO)
B	Normally closed
D	Self hold type
Ⓓ Vacuum port (V)	
4	ø4 push-in fitting
6	ø6 push-in fitting
8	ø8 push-in fitting
Ⓔ Air supply port (PS)	
4	ø4 push-in fitting
6	ø6 push-in fitting
Ⓕ Exhaust port (EX)	
S	Atmospheric release with silencer
8	ø8 push-in fitting common exhaust
Ⓖ Solenoid valve voltage	
1	100 VAC
3	24 VDC
Ⓗ Vacuum pressure switch specifications	
Blank	Without vacuum pressure switch
W	With digital display, NPN output 2 points
A	With digital display, NPN output 1 point + analog output

⚠ Precautions for model No. selection

*1 :"E05" and "L12" cannot be combined for the combination of Ⓐ and Ⓑ.

How to order (manifold)

● 20 mm width integrated vacuum ejector unit manifold

VSJM - H 07 A - 8 8 10 - 3 - 10 A - W

Code	Content
Ⓐ Vacuum characteristics	***1, *2, *3**
H	High vacuum/medium flow rate
L	Medium vacuum/large flow rate
E	High vacuum/low flow rate
Z	For mixed specs (indicate breakdown on specs sheet.)
Ⓑ Nozzle diameter	***1, *2, *3**
05	ø0.5
07	ø0.7
10	ø1.0
12	ø1.2
00	For mixed specs (indicate breakdown on specs sheet.)
Ⓒ Valve	***3**
A	Normally open (NO)
B	Normally closed
D	Self hold type
Z	For mixed specs (indicate breakdown on specs sheet.)
Ⓓ Vacuum port (V)	***3**
4	ø4 push-in fitting
6	ø6 push-in fitting
8	ø8 push-in fitting
CX	For mixed fittings (indicate breakdown on specs sheet.)
Ⓔ Air supply port (PS)	
6	ø6 push-in fitting
8	ø8 push-in fitting
10	ø10 push-in fitting
Ⓕ Exhaust port (EX)	
S	Atmospheric release with silencer
8	ø8 push-in fitting common exhaust
10	ø10 push-in fitting common exhaust
Ⓖ Solenoid valve voltage	
1	100 VAC
3	24 VDC
Ⓗ Manifold station No.	***4**
2	2 stations
to	to
10	10 stations
Ⓘ Common piping leadout direction	
A	Vacuum port side
B	Supply port side
Ⓙ Vacuum pressure switch specifications	***3**
Blank	Without vacuum pressure switch
W	With digital display, NPN output 2 points
A	With digital display, NPN output 1 point + analog output
Z	For mixed specs (indicate breakdown on specs sheet.)

⚠ Precautions for model No. selection

*1 : "E05" and "L12" cannot be combined for the combination of Ⓐ and Ⓑ.
*2 : When Ⓐ is "Z", Ⓑ is "00" only.
When Ⓑ is "00", only Ⓐ "Z" can be selected.
*3 : Indicate on the "mix manifold specifications sheet" in the case of mixed specifications. Refer to pages 84 and 85 for details.
*4 : The number of stations that can be simultaneously operated differs depending on the combination of nozzle diameter and port size. Contact CKD for details.

● Maintenance part model No.

· Vacuum side filter element
VSG-E

· Burst side filter element
VSJ-PE

· Silencer element A
VSB-EA

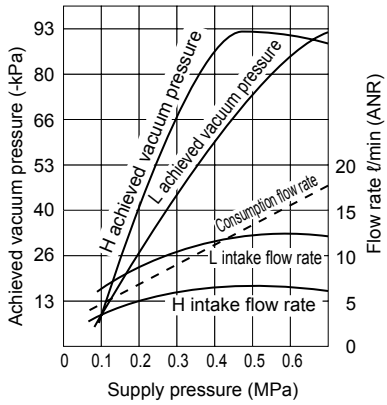
· Silencer element C
VSJ-EC

Vacuum characteristics, flow characteristics

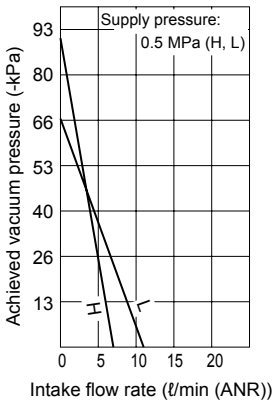
Supply pressure - achieved vacuum pressure, intake flow rate, air consumption rate

● VSJ-H 05, VSJ-L 05

Vacuum characteristics

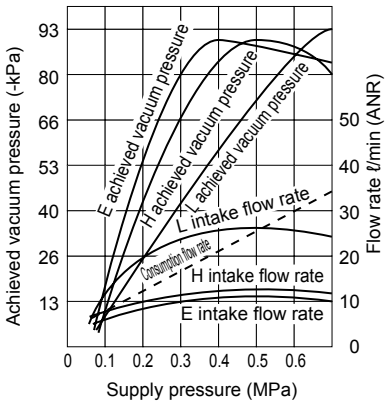


Flow characteristics

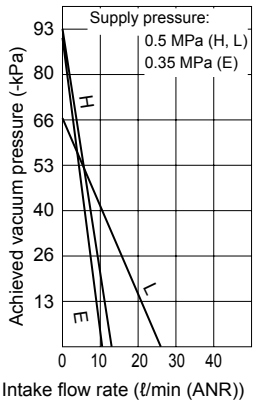


● VSJ-H 07, VSJ-L 07, VSJ-E 07

Vacuum characteristics

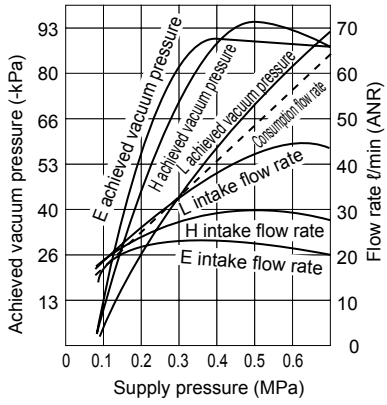


Flow characteristics

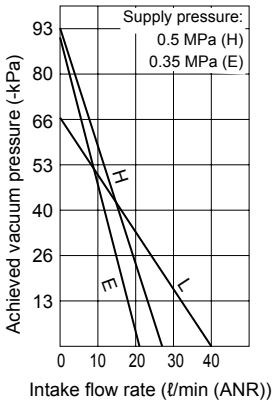


● VSJ-H 10, VSJ-L 10, VSJ-E 10

Vacuum characteristics

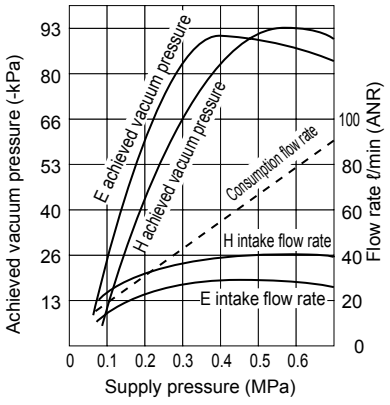


Flow characteristics

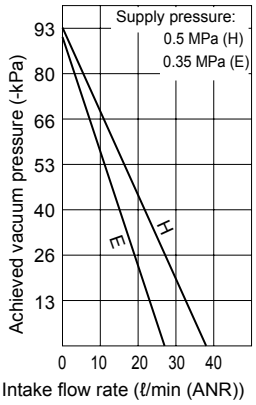


● VSJ-H 12, VSJ-E 12

Vacuum characteristics



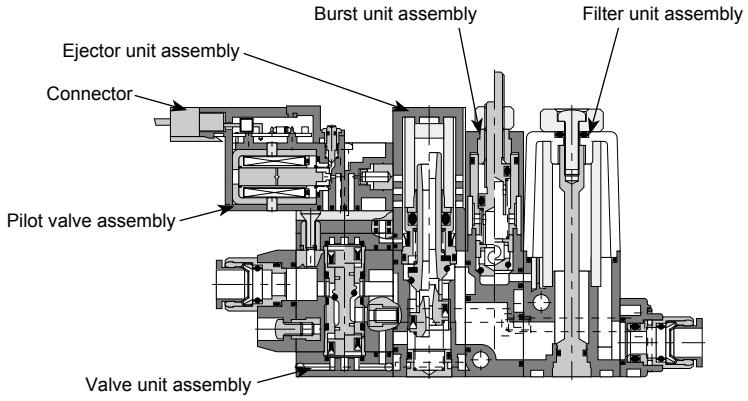
Flow characteristics



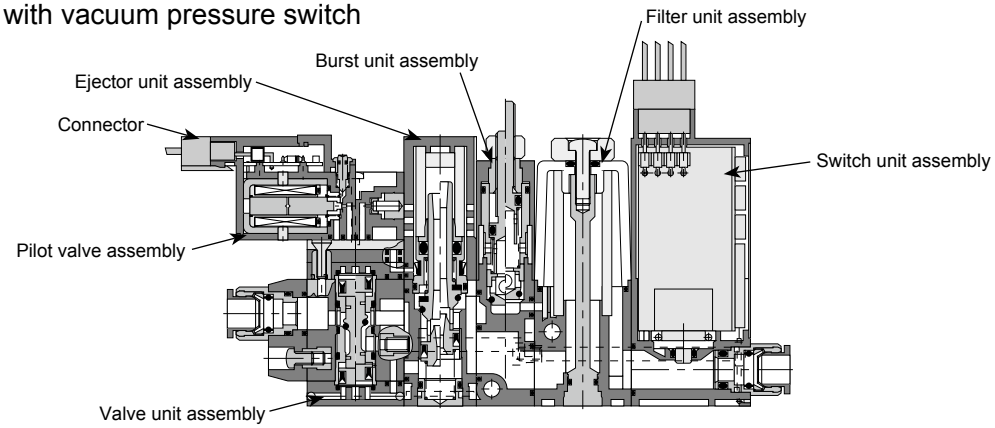
1. Supply pressure with the characteristics described above occurs at vacuum generation.
2. Achieved vacuum pressure with the characteristics described above produces abnormal noise (soft clicking sound) at supply pressure just before reaching the peak value. When this abnormal noise occurs, the characteristics become unstable and operation becomes louder. Reset the supply pressure, as it may affect the sensor, etc., and cause trouble.
   Ex. 1: Source pressure is 0.5 MPa with the H vacuum ejector. During vacuum ejector operation, supply pressure drops to 0.43 MPa due to pressure drop, and abnormal noise is generated. → Reset supply pressure to 0.5 MPa during vacuum ejector operation.
3. Carry out piping or equipment selection with 3 times the effective cross-sectional area of the nozzle diameter cross-sectional area as a guideline. Satisfactory vacuum characteristics cannot be obtained if adequate supply air flow rate is not maintained.
   (A soft clicking sound occurs at set pressure. Insufficient intake flow rate, insufficient achievement of achieved vacuum pressure, etc.)
   Ex. 2: Abnormal noise occurs even when pressure is 0.5 MPa with H vacuum ejector during vacuum ejector operation. → Insufficient supply air flow rate. (Supply air flow rate is restricted in front of the vacuum ejector by piping resistance, etc., and supply air flow rate satisfying the properties is not obtained. → Select piping components that can secure the required effective cross-sectional area.)
   Ex. 3: For vacuum ejector with 1.0mm nozzle diameter, cross-sectional area is $0.5^2 \times \pi = 0.785\ mm^2 \times 3 = 2.35mm^2$. Therefore, carry out piping and equipment selection that ensures an effective cross-sectional area of $2.3mm^2$ or greater.

Internal structure

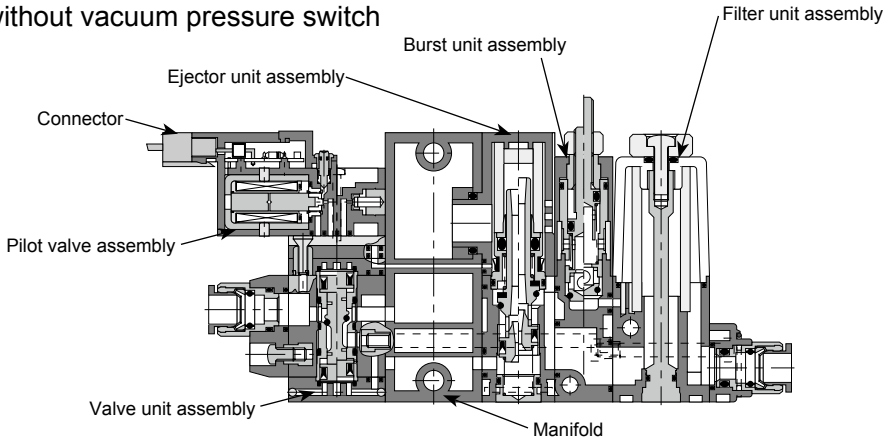
● Single unit VSJ, without vacuum pressure switch



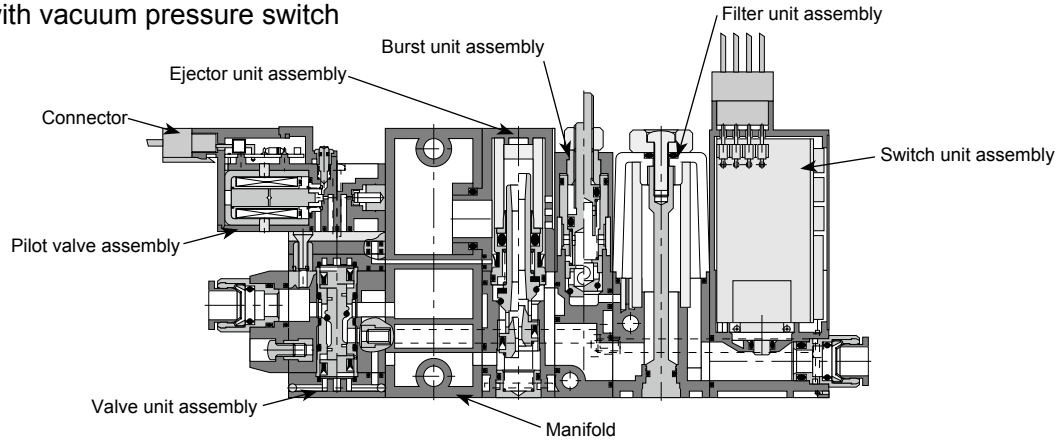
● Single unit VSJ, with vacuum pressure switch



● Manifold VSJM, without vacuum pressure switch

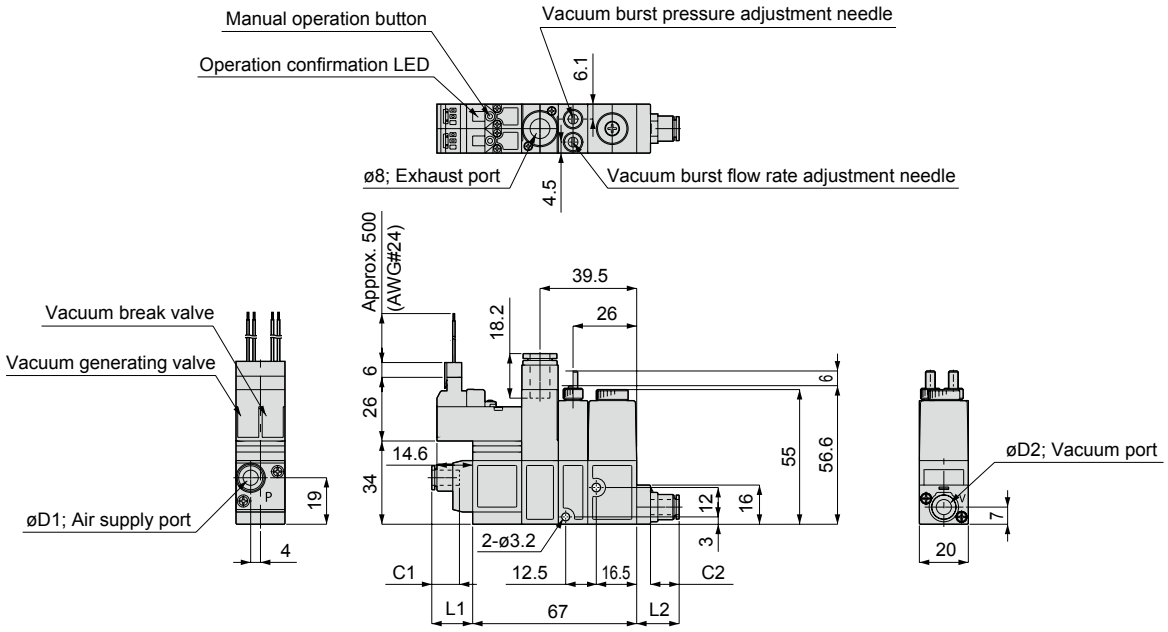


● Manifold VSJM, with vacuum pressure switch



Dimensions (single unit VSJ)

● Common exhaust, without vacuum pressure switch



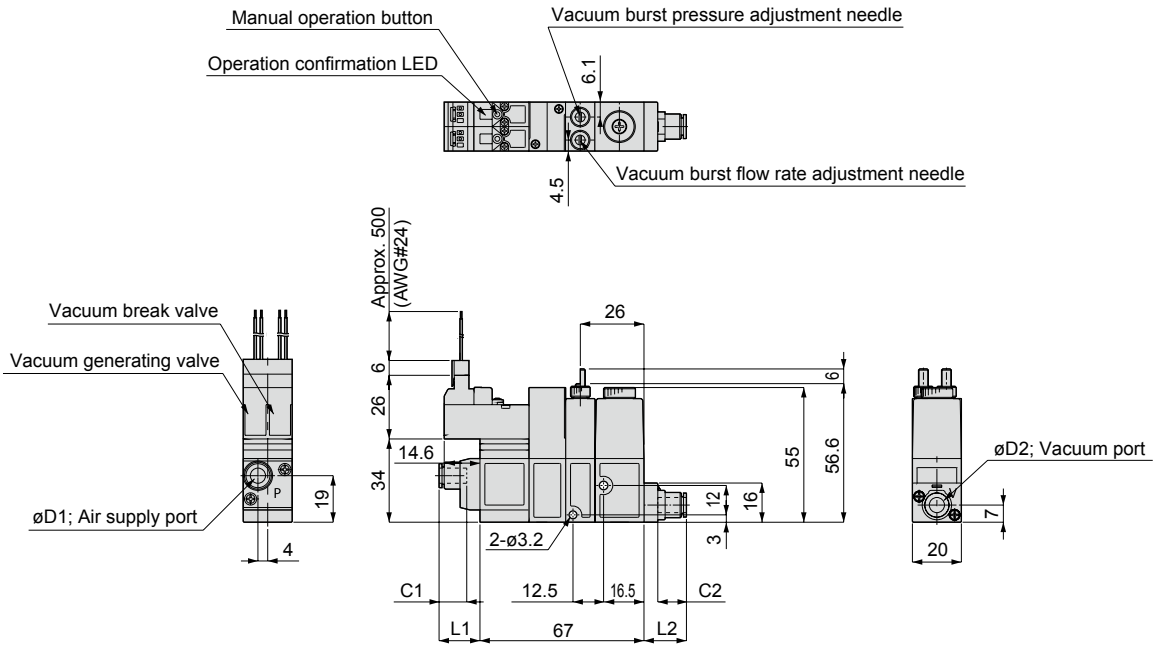
Unit: mm

Air supply port Tube O.D. øD1	C1	L1
4	11.5	14.9
6	11.9	17.3

Unit: mm

Vacuum port Tube O.D. øD2	C2	L2
4	11.2	14.6
6	11.9	17.4
8	18.2	25.8

● Atmospheric release, without vacuum pressure switch



Unit: mm

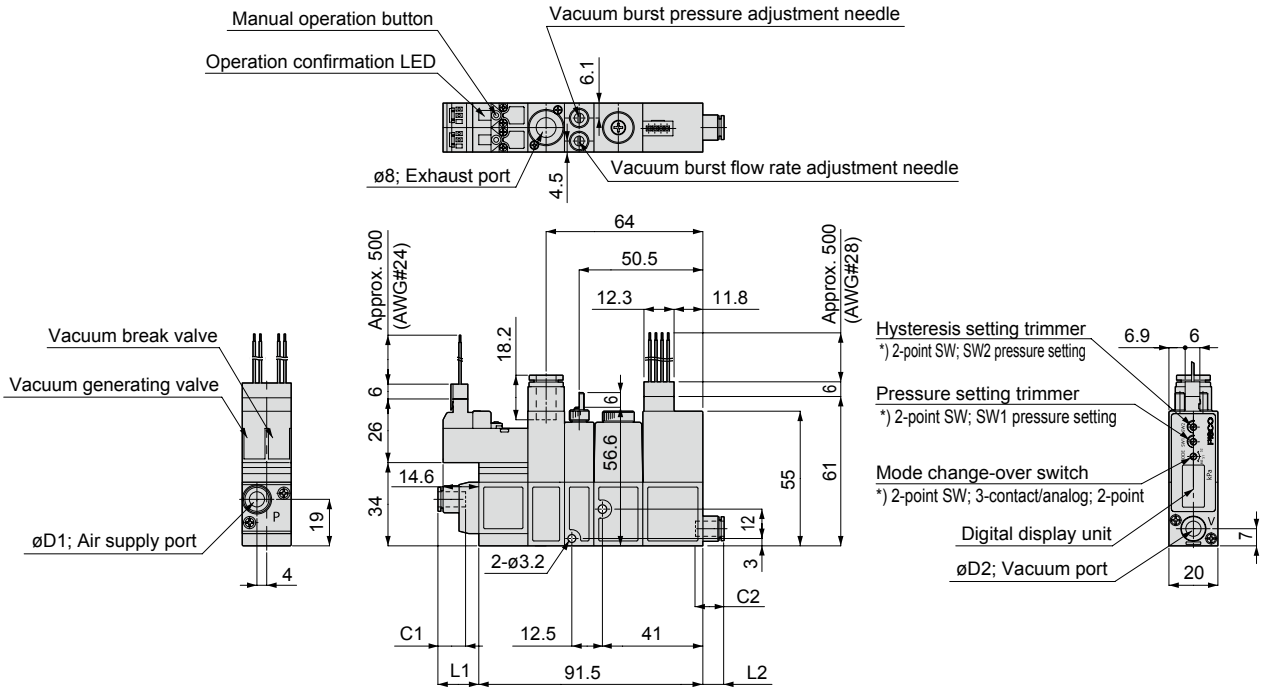
Air supply port Tube O.D. øD1	C1	L1
4	11.5	14.9
6	11.9	17.3

Unit: mm

Vacuum port Tube O.D. øD2	C2	L2
4	11.2	14.6
6	11.9	17.4
8	18.2	25.8

Dimensions (single unit VSJ)

● Common exhaust, with vacuum pressure switch



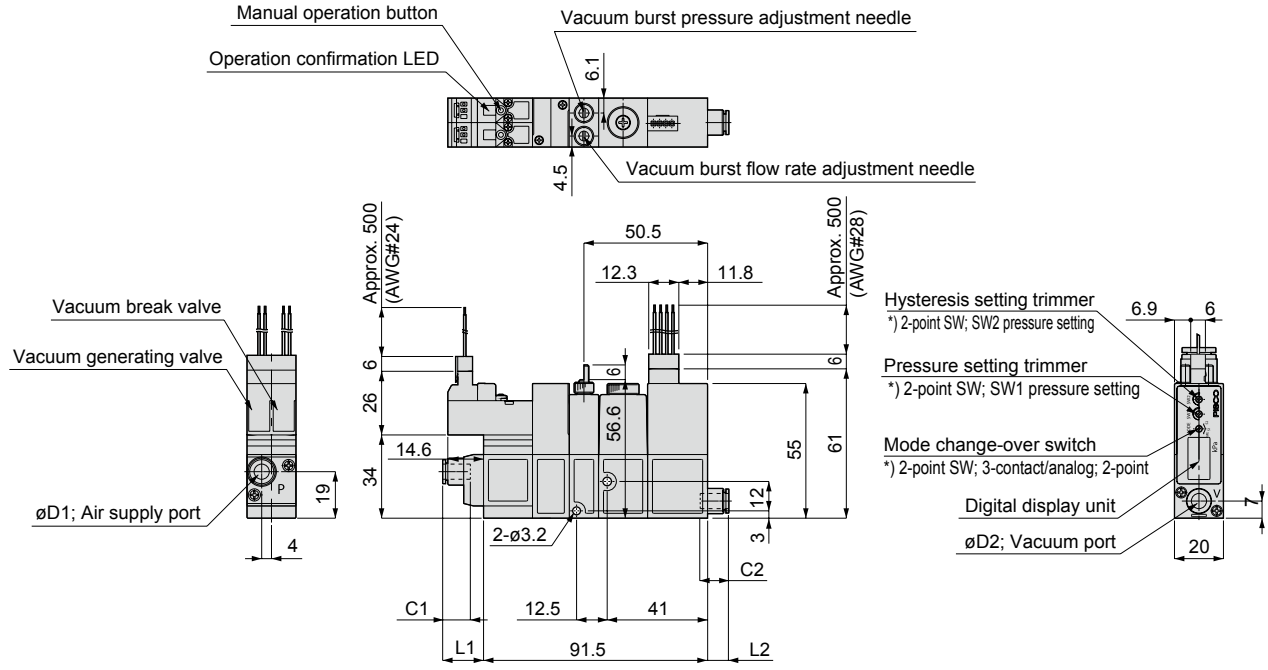
Unit: mm

Air supply port Tube O.D. øD1	C1	L1
4	11.5	14.9
6	11.9	17.3

Unit: mm

Vacuum port Tube O.D. øD2	C2	L2
4	11.2	6.1
6	11.9	8.9
8	18.2	17.3

● Atmospheric release, with vacuum pressure switch



Unit: mm

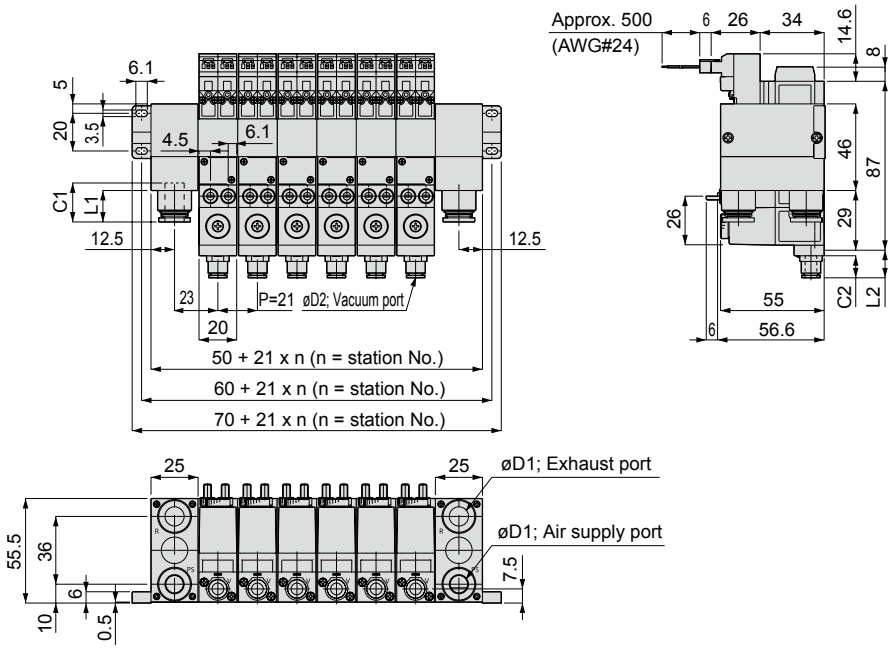
Air supply port Tube O.D. øD1	C1	L1
4	11.5	14.9
6	11.9	17.3

Unit: mm

Vacuum port Tube O.D. øD2	C2	L2
4	11.2	6.1
6	11.9	8.9
8	18.2	17.3

Dimensions (manifold, VSJM)

● Common exhaust, common piping leadout direction on vacuum port side, without vacuum pressure switch



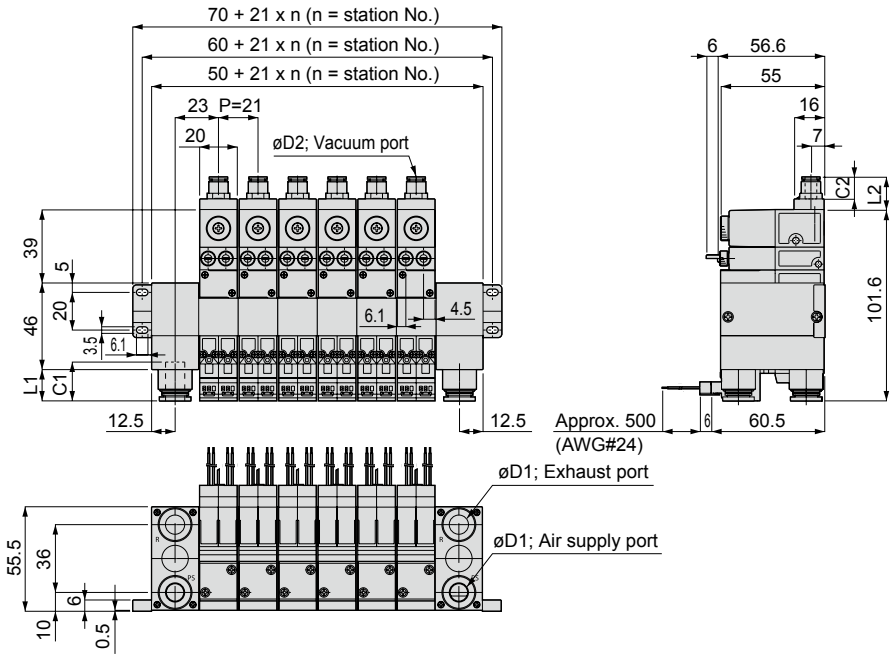
Unit: mm

Air supply port Tube O.D. øD1	C1	L1
6	17	11.6
8	18.2	13.1
10	20.7	16.7

Unit: mm

Vacuum port Tube O.D. øD2	C2	L2
4	11.2	14.6
6	11.9	17.4
8	18.2	23.0

● Common exhaust, common piping leadout direction on supply port side, without vacuum pressure switch



Unit: mm

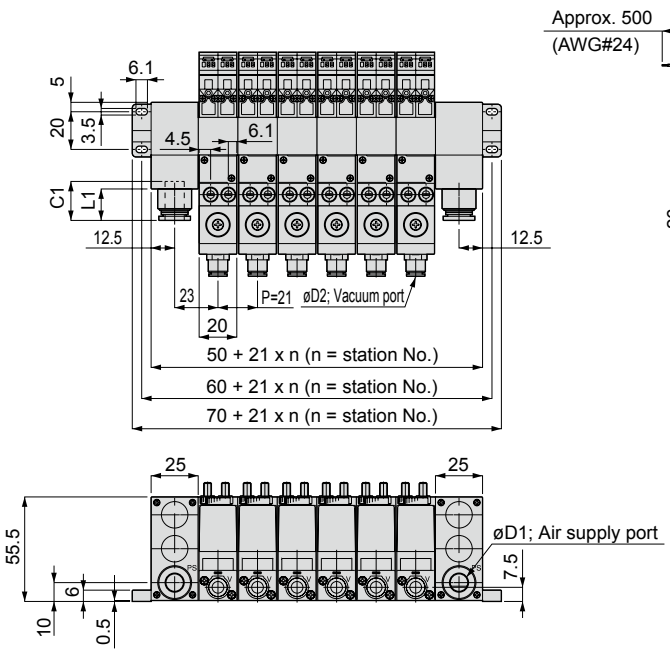
Air supply port Tube O.D. øD1	C1	L1
6	17	11.6
8	18.2	13.1
10	20.7	16.7

Unit: mm

Vacuum port Tube O.D. øD2	C2	L2
4	11.2	14.6
6	11.9	17.4
8	18.2	23.0

Dimensions (manifold, VSJM)

● Atmospheric release, common piping leadout direction on vacuum port side, without vacuum pressure switch



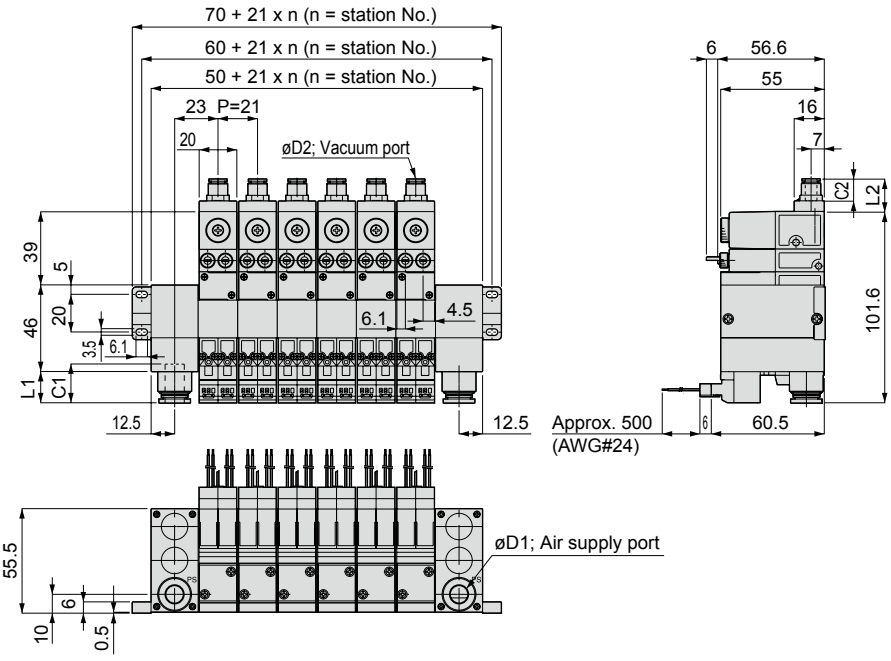
Unit: mm

Air supply port Tube O.D. øD1	C1	L1
6	17	11.6
8	18.2	13.1
10	20.7	16.7

Unit: mm

Vacuum port Tube O.D. øD2	C2	L2
4	11.2	14.6
6	11.9	17.4
8	18.2	23.0

● Atmospheric release, common piping leadout direction on supply port side, without vacuum pressure switch



Unit: mm

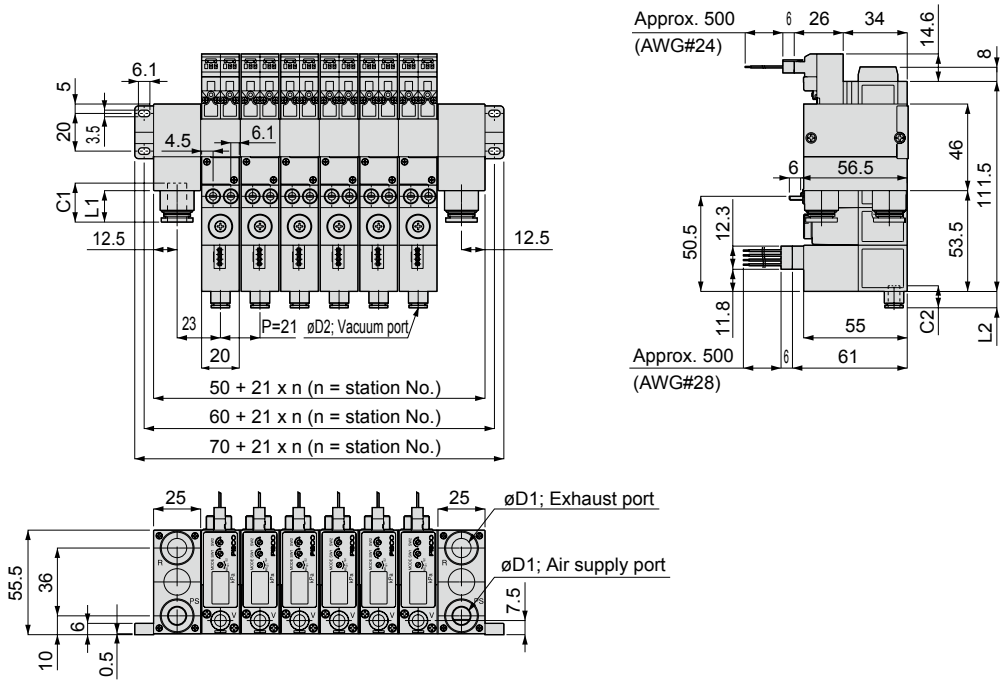
Air supply port Tube O.D. øD1	C1	L1
6	17	11.6
8	18.2	13.1
10	20.7	16.7

Unit: mm

Vacuum port Tube O.D. øD2	C2	L2
4	11.2	14.6
6	11.9	17.4
8	18.2	23.0

Dimensions (manifold, VSJM)

● Common exhaust, common piping leadout direction on vacuum port side, with vacuum pressure switch



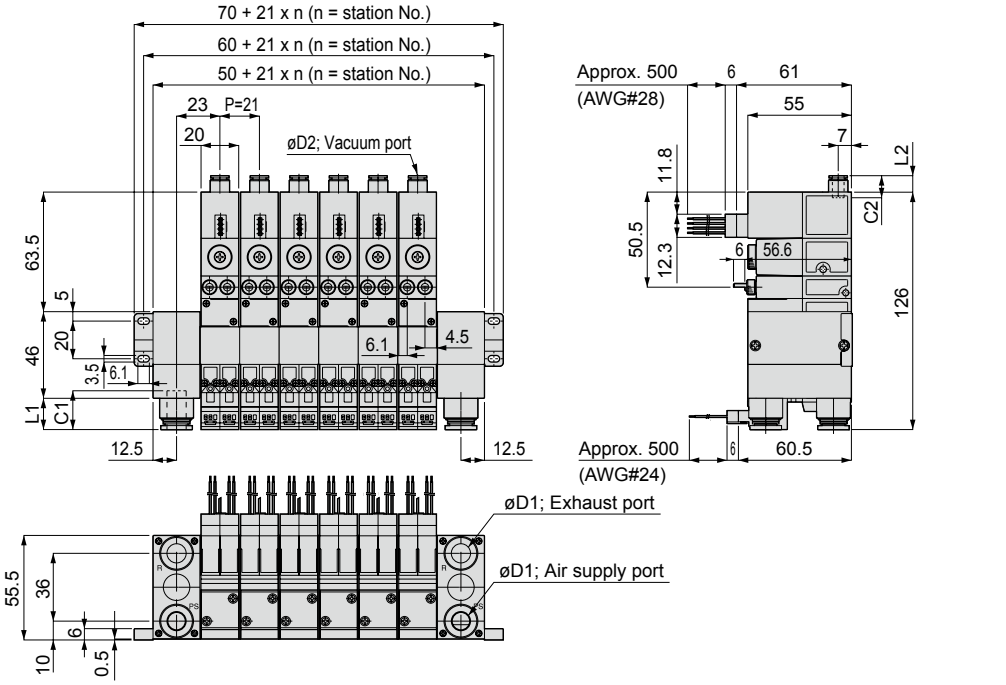
Unit: mm

Air supply port Tube O.D. øD1	C1	L1
6	17	11.6
8	18.2	13.1
10	20.7	16.7

Unit: mm

Vacuum port Tube O.D. øD2	C2	L2
4	11.2	6.1
6	11.9	8.9
8	18.2	17.3

● Common exhaust, common piping leadout direction on supply port side, with vacuum pressure switch



Unit: mm

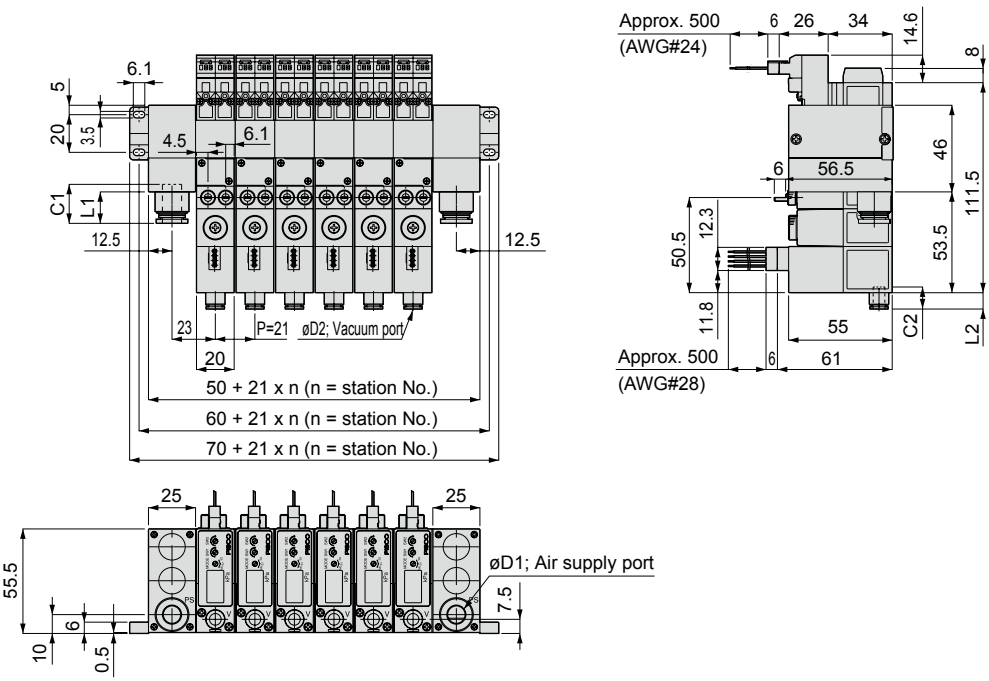
Air supply port Tube O.D. øD1	C1	L1
6	17	11.6
8	18.2	13.1
10	20.7	16.7

Unit: mm

Vacuum port Tube O.D. øD2	C2	L2
4	11.2	6.1
6	11.9	8.9
8	18.2	17.3

Dimensions (manifold, VSJM)

● Atmospheric release, common piping leadout direction on vacuum port side, with vacuum pressure switch



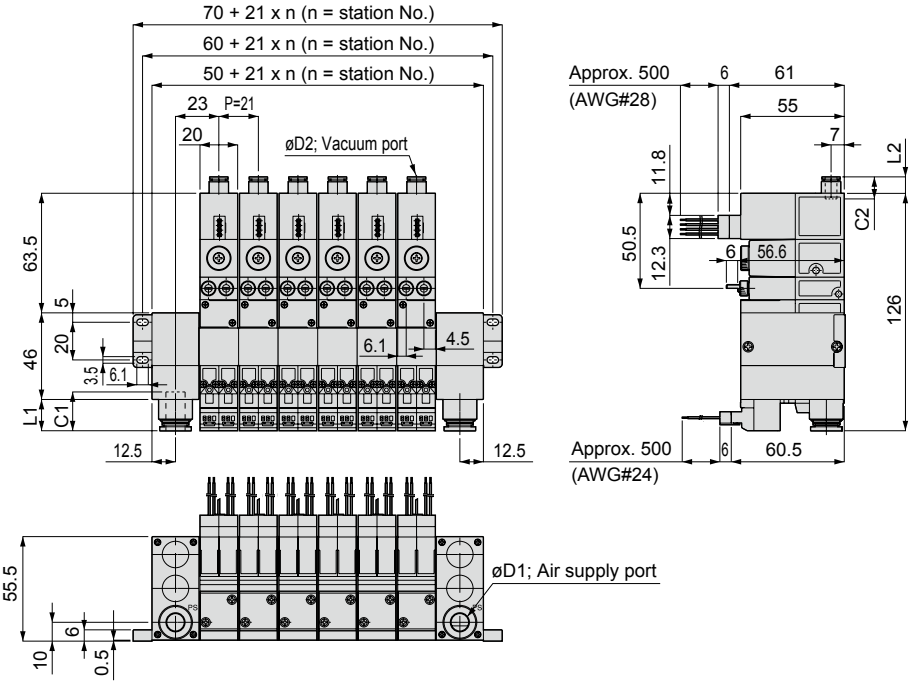
Unit: mm

Air supply port Tube O.D. øD1	C1	L1
6	17	11.6
8	18.2	13.1
10	20.7	16.7

Unit: mm

Vacuum port Tube O.D. øD2	C2	L2
4	11.2	6.1
6	11.9	8.9
8	18.2	17.3

● Atmospheric release, common piping leadout direction on supply port side, with vacuum pressure switch



Unit: mm

Air supply port Tube O.D. øD1	C1	L1
6	17	11.6
8	18.2	13.1
10	20.7	16.7

Unit: mm

Vacuum port Tube O.D. øD2	C2	L2
4	11.2	6.1
6	11.9	8.9
8	18.2	17.3

Safety precautions

Refer to Intro Pages 15 and 16 for general precautions on vacuum system components.

⚠ WARNING

- When operating the valve, make sure that the leakage current is 1 mA or less. Otherwise, there is a risk of malfunctions caused by leakage current.
- Vacuum retention function allows vacuum leakage. Hence, take other safety measures if vacuum retention for long periods is required.
- If energization to the pilot valve continues for long periods, heat is generated from the coil. Heat could cause burns and impact peripheral devices. Consult with CKD if continuously energizing for long periods.
- For the self-hold (VSJ-□□D...), when resupplying after the pilot air supply is stopped (including the first use after shipment), the position of the switching valve is in neutral. When re-supplying the pilot air, be sure either to input a signal to the pilot valve or to perform switching manually.

⚠ CAUTION

- Do not apply high tensile force or bending force to the pilot valve or vacuum pressure switch lead wire. It could cause disconnection or damage to the connector unit.
- When using the manifold specifications, note that the combination of manifold stations and mounting units may degrade performance or affect other station vacuum ports. Contact CKD with any questions.
- Compressed air contains a large amount of drainage (water, oil oxides, tar, foreign matter). Since drain significantly reduces device performance, dehumidify with after-cooler and dryer to improve air quality.
- Do not use a lubricator.
- As rust inside the piping may cause malfunctions, be sure to insert a filter of 5 μm or less in front of the supply port.
- Avoid using in atmospheres containing corrosive or flammable gases. Do not use as a fluid.
- When vacuum is generated, do not operate the vacuum burst valve.
- When replacing the cartridge fitting of the vacuum port, be sure to remove the deposits in the vicinity and then securely insert the stop pin.
- When replacing the supply port fitting block, make sure that the packing does not fall out, remove the deposits in the vicinity, then securely tighten it at the specified tightening torque.

Manifold safety precautions

- As the number of manifold stations increases, malfunctions such as the deterioration of vacuum performance due to shortage of supply air or insufficient exhaust port capacity and exhaust flowing into the vacuum port may occur. The allowable number of stations in simultaneous operation varies depending on the nozzle size, vacuum performance, etc. Contact CKD for details.

Usage methods

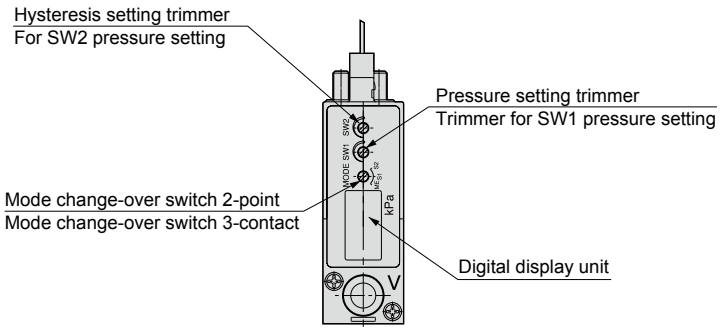
1. Vacuum pressure switch

(1) Pressure setting procedure

(1)Energization (supply DC power after confirming the wiring.)
(2)Set the display change-over switch to pressure setting mode (ME → S1 or S2, SW).
* (vacuum pressure switch with analog output only)
Turn the hysteresis setting trimmer (HYS) fully counterclockwise to set hysteresis to minimum.
(3)Align to the desired setting value by turning the pressure setting trimmer (S1 or S2, SW) with a small screwdriver, etc.
(4)Set the display change-over switch to ME, apply pressure and confirm actual operation.
(For vacuum pressure switch with 2-point switch output)
Switch output 1 (S1): Operation indicator lamp (red LED) turns ON at set pressure or greater.
Switch output 2 (S2): Operation indicator lamp (green LED) turns ON at set pressure or greater.
(For vacuum pressure switch with analog output)
Switch output (SW): Operation indicator lamp (red LED) turns ON at set pressure or greater.

(2) Hysteresis setting

(1)Hysteresis can be adjusted by the hysteresis setting trimmer (HYS).
(2)Hysteresis adjusting range is approx. 0 to 15% of the set value. Hysteresis increases when the trimmer is rotated clockwise.
(3)Hysteresis confirmation
Set the display change-over switch to pressure display mode (ME), and gradually increase/decrease the pressure so that it will be over and under the set pressure.
Then, read the values displayed when the operation indicator lamp turns ON and OFF. The display value difference is the hysteresis.
(4)Hysteresis adjustment application examples
· When the pressure is pulsating and the output cuts out at fine intervals, increase the hysteresis.



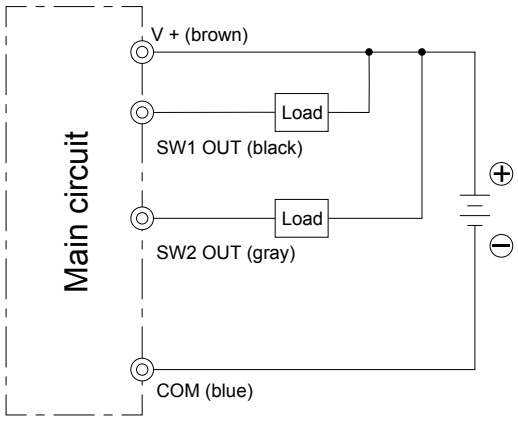
Top: Vacuum pressure switch with analog output
Bottom: Vacuum pressure switch with 2-point switch output

⚠ Caution

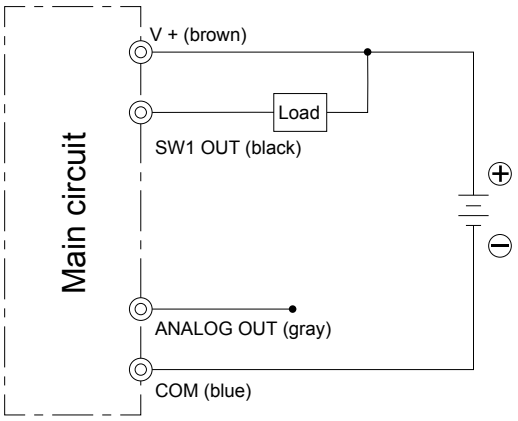
(1)Do not use in atmospheres or gases containing corrosive substances. It risks damaging the switch.
(2)Do not perform wiring or usage that would introduce noise (surge), etc. It risks damaging the switch.
(3)Do not use in flammable or explosive gases, liquids, or atmospheres. This may cause fire or explosion, as the product does not have an explosion-proof structure.
(4)Avoid using in places where the product is exposed to dripping water, oil, dust, etc. This may cause malfunction, as the product does not have a drip-proof structure.
(5)Do not use where the heat generated exceeds the operating temperature range. It risks damaging the switch.
(6)Make sure to turn the power OFF before wiring. During wiring, check the lead wire color and do not short-circuit the output terminal and power supply terminal or COM terminal. Short-circuiting could cause switch malfunction.
(7)Do not apply high tensile force or bending force to the connector cable. It could cause disconnection or damage to the connector unit.
(8)At vacuum burst, do not constantly apply pressures of 0.2 MPa or greater. If constantly applied, it could damage the switch.
(9)When setting the pressure and hysteresis, use a small screwdriver and gently rotate within the rotation range of the trimmer, without applying excessive force. If excessive force is applied during adjustment, it could damage the trimmer and base.
(10)Use a stable DC power supply.
(11)To connect to an output terminal or power supply terminal (relay, solenoid valve, etc.), install a surge voltage absorption circuit. Avoid usage where current exceeds 80 mA.
(12)When using a unit power supply such as switching power supply, ground the F.G. (frame ground).
(13)Do not short-circuit the output terminal (black/gray lead wire) with other terminals.
(14)Do not apply strong external impact or excessive force to the sensor body.

Usage methods

(3) How to wire



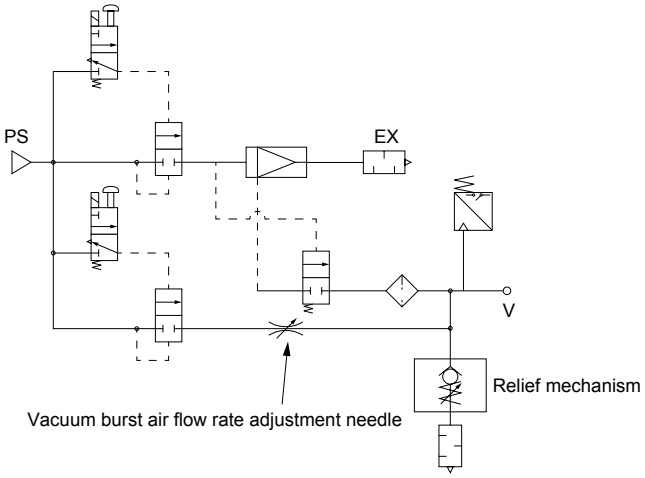
Vacuum sensor with 2-point switch output



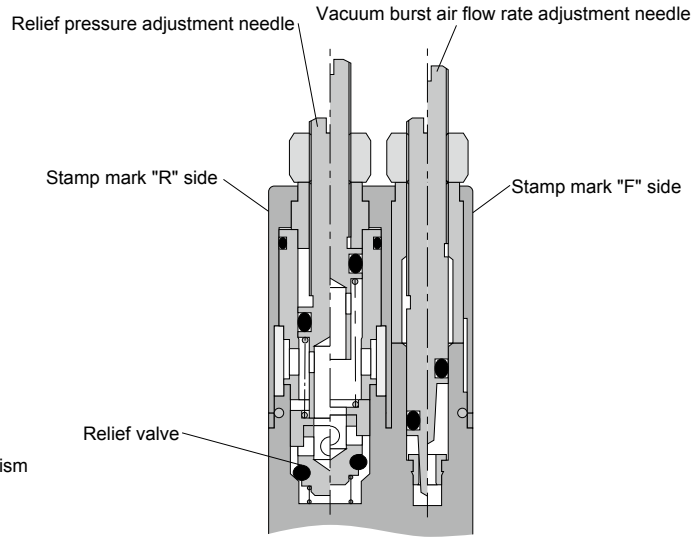
Vacuum sensor with analog output

2. Adjusting the relief valve

(1) Circuit diagram, structure diagram



Circuit diagram (VSJ-□□B, normally closed)



Vacuum burst unit structure diagram

(2) Adjust the relief needle according to the relief needle opening limit in Table 1 below when setting the relief pressure.

Table 1. Relief needle opening limit

Vacuum characteristics	H: (High vacuum medium flow rate)				L: (Medium vacuum large flow rate)			E: (High vacuum low flow rate)		
Nozzle diameter (mm)	0.5	0.7	1.0	1.2	0.5	0.7	1.0	0.7	1.0	1.2
Maximum opening (rotation)	6.5	7.5	8.5	9.0	7.5	8.0	9.0	7.5	8.0	8.5

* The values in Table 1 are for the rated air pressure supply. The opening limit of the relief needle varies depending on factors such as the supply air pressure, vacuum characteristics, vacuum side piping (volume), etc. Therefore, consider the values in Table 1 to be reference values.

(3) After setting the relief needle, check once again that there is no abnormality in the vacuum characteristics and vacuum rise time.

* Note that exceeding the relief needle opening limit in Table 1 may cause delayed vacuum rise time or inability to obtain normal vacuum. (See “(5) Other” on page 83)

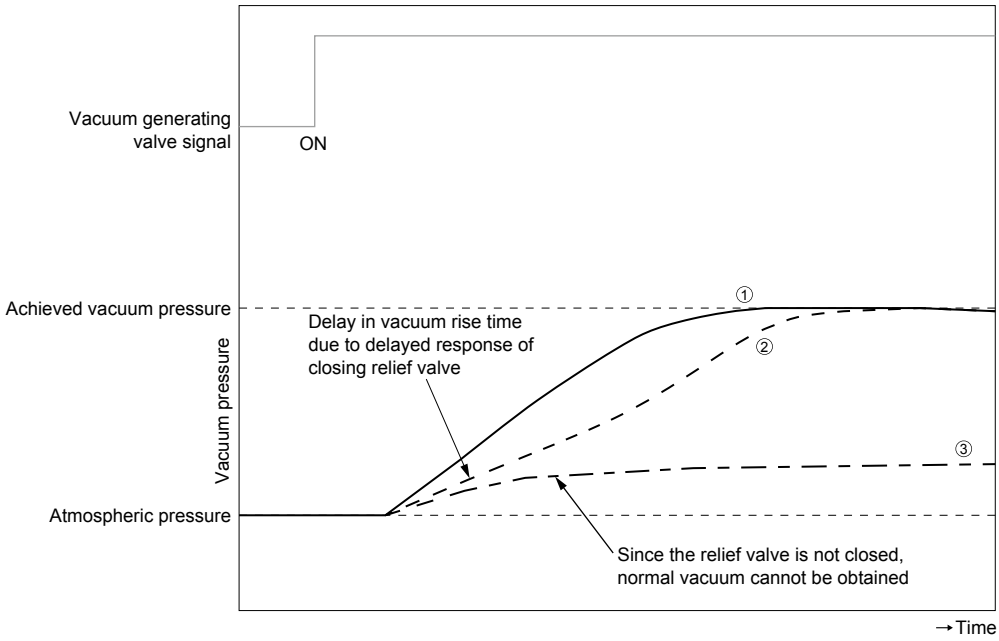
(4) Set to the required vacuum burst flow rate with the vacuum burst flow rate adjustment needle.

* To reduce the vacuum burst time, increase the vacuum burst air flow rate.
* If workpieces are blown away or the like, reduce the vacuum burst air flow rate.

Usage methods

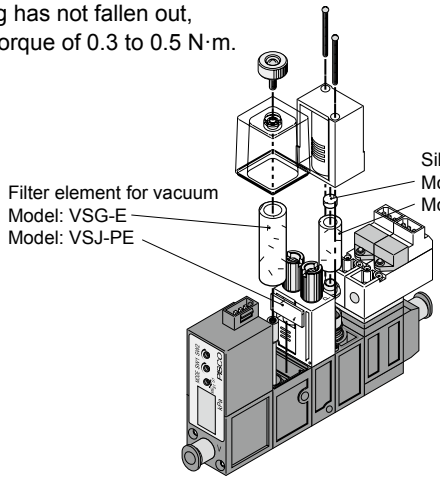
(5) Other

1) When the relief needle opening is within the appropriate range, the vacuum rise status of the below graph ① is set.
2) When the relief needle limit is exceeded, the vacuum rise status of the below graph ② is set and a delay occurs in the vacuum rise time.
3) Furthermore, as the relief needle is opened, it reaches the status shown in the graph ③ below, at which point normal vacuum cannot be obtained.



3. How to replace the element

■ Remove the fixing screws to replace the filter element. After replacing the filter element and checking that the filter packing has not fallen out, securely fix it with tightening torque of 0.3 to 0.5 N·m.



■ How to remove silencer element
· Use a suitable Phillips screwdriver to remove the two fixing screws.
· Remove the silencer cover and replace the silencer element (model: VSB-EA, VSJ-EC).

■ How to install silencer element
· Using a suitable Phillips screwdriver, secure the two fixing screws with tightening torque of 0.18 to 0.2 N·m.

How to fill out VSJM mix manifold specifications sheet

● Mix manifold model No. (example)

	Ⓐ	Ⓑ	Ⓒ		Ⓓ	Ⓔ	Ⓕ		Ⓖ		Ⓗ	Ⓘ		Ⓙ
VSJM -	Z	00	Z	-	CX	8	8	-	3	-	5	B	-	Z

● Mix manifold specifications sheet (example)

Vacuum ejector model No. Ⓐ Ⓑ Ⓒ Ⓓ Ⓙ	Layout position 1	2	3	4	5	6	7	8	9	10	Quantity
VSJM - H 07 B - 4 - W	○	○									2
VSJM - H 07 A - 4 - W			○	○							2
VSJM - E 10 B - 6 - A					○						1
VSJM -											
VSJM -											

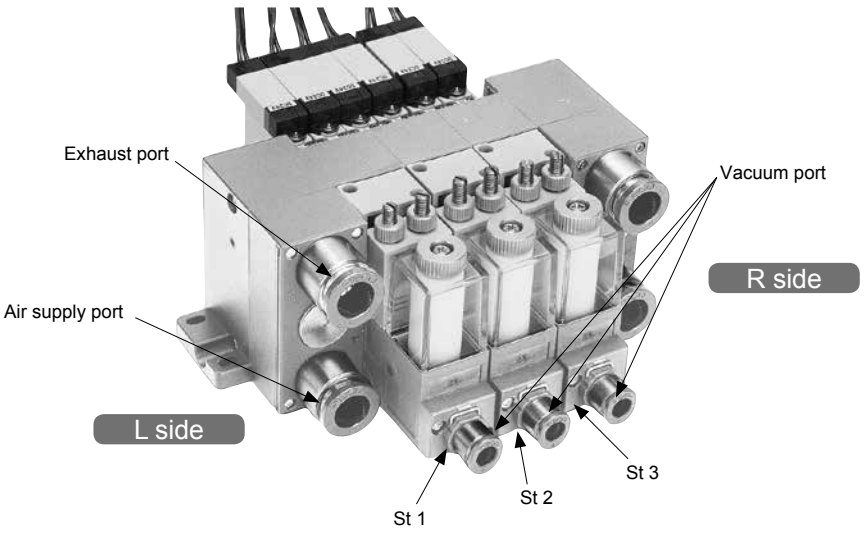
[For output port size only fitting mix specification]

● Mix manifold model No. (example)

	Ⓐ	Ⓑ	Ⓒ		Ⓓ	Ⓔ	Ⓕ		Ⓖ		Ⓗ	Ⓘ		Ⓙ
VSJM -	H	07	B	-	CX	8	5	-	3	-	5	B	-	W

● Mix manifold specifications sheet (example)

Vacuum ejector model No. Ⓐ Ⓑ Ⓒ Ⓓ Ⓙ	Layout position 1	2	3	4	5	6	7	8	9	10	Quantity
VSJM - H 07 B - 4 - W	○	○									2
VSJM - H 07 B - 6 - W			○	○							2
VSJM - H 07 B - 8 - W					○						1
VSJM -											
VSJM -											



* The station No. will be St.1, St.2 ..... St. 10 from the L side with the vacuum port in front.

[When filling in]
- With vacuum port facing front, set piping positions in order from the left.
- Write the total quantity of product model No. specified in the required quantity field at the table far right.

VSJM mix manifold specifications sheet

Contact _____ Quantity _____ Set Delivery date / /

Slip No. _____ Order No. _____

Issued / /

Company name _____

Contact _____

Order No. _____

● Mix manifold model No.

VSJM - Ⓐ Ⓑ Ⓒ - Ⓓ Ⓔ Ⓕ - Ⓖ - Ⓗ Ⓘ - Ⓙ

Ⓐ Vacuum characteristics *1, *2, *3	
H	High vacuum/medium flow rate
L	Medium vacuum/large flow rate
E	High vacuum/low flow rate
Z	For mixed specs (indicate breakdown on specs sheet.)

Ⓑ Nozzle diameter *1, *2	
05	ø0.5
07	ø0.7
10	ø1.0
12	ø1.2
00	For mixed specs (indicate breakdown on specs sheet.)

Ⓒ Valve	
A	Normally open (NO)
B	Normally closed
D	Double solenoid
Z	For mixed specs (indicate breakdown on specs sheet.)

Ⓓ Vacuum port (V)	
4	ø4 push-in fitting
6	ø6 push-in fitting
8	ø8 push-in fitting
CX	For mixed fittings (indicate breakdown on specs sheet.)

Ⓔ Air supply port (PS)	
6	ø6 push-in fitting
8	ø8 push-in fitting
10	ø10 push-in fitting

Ⓕ Exhaust port (EX)	
S	Atmospheric release with silencer
8	ø8 push-in fitting common exhaust
10	ø10 push-in fitting common exhaust

Ⓖ Solenoid valve voltage	
1	100 VAC
3	24 VDC

Ⓗ Manifold station No.	
2 to 10	2 to 10 stations

Ⓘ Common piping leadout direction	
A	Vacuum port side
B	Supply port side

Ⓙ Vacuum pressure switch specifications	
Blank	Without vacuum pressure switch
W	With digital display, NPN output 2 points
A	With digital display, NPN output 1 point + analog output
Z	For mixed specs (indicate breakdown on specs sheet.)

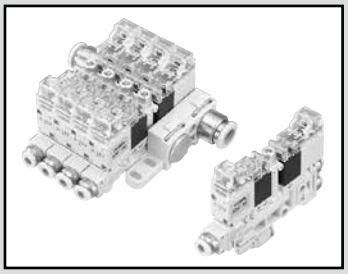
⚠ Precautions for model No. selection

*1 : The combination of Ⓐ E and Ⓑ 05, and Ⓐ L and Ⓑ 12 cannot be selected.

*3 : When Ⓐ is Z, only Ⓑ 00 can be selected.
When Ⓑ is 00, only Ⓐ Z can be selected.

● Mix manifold specifications sheet

Vacuum ejector model No. Ⓐ Ⓑ Ⓒ Ⓓ Ⓙ	Layout position 1	2	3	4	5	6	7	8	9	10	Quantity
VSJM - ☐☐☐ - ☐ - ☐											
VSJM - ☐☐☐ - ☐ - ☐											
VSJM - ☐☐☐ - ☐ - ☐											
VSJM - ☐☐☐ - ☐ - ☐											
VSJM - ☐☐☐ - ☐ - ☐											



Compact ejector unit that achieves high speed and stable response

VSN Series

● Nozzle diameter: ø0.4, ø0.5, ø0.6

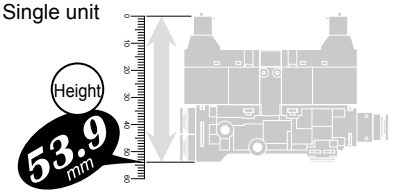
RoHS

Features

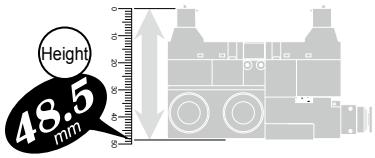
Ideal for restricted mounting space.

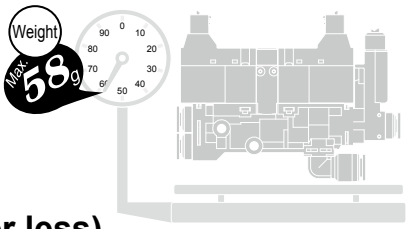
Compact and lightweight vacuum ejector unit. The product height is notably reduced.

● Single unit



● Manifold

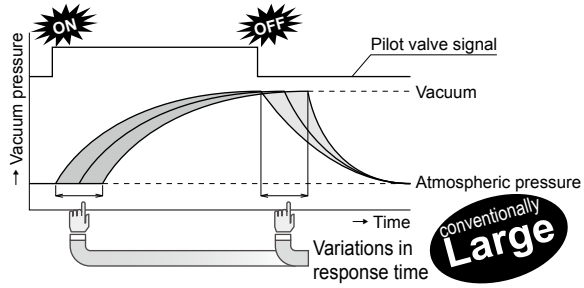




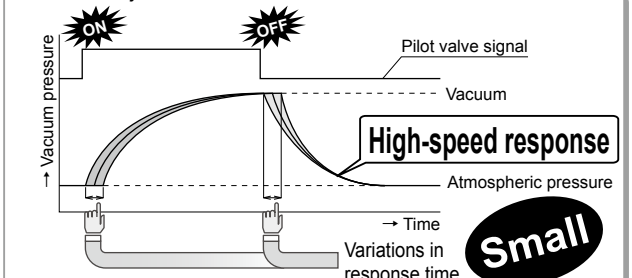
Achieves fast and stable response. (ON/OFF = 5 msec or less)

Direct acting valve is used for the main valve.

● Conventional vacuum ejector unit

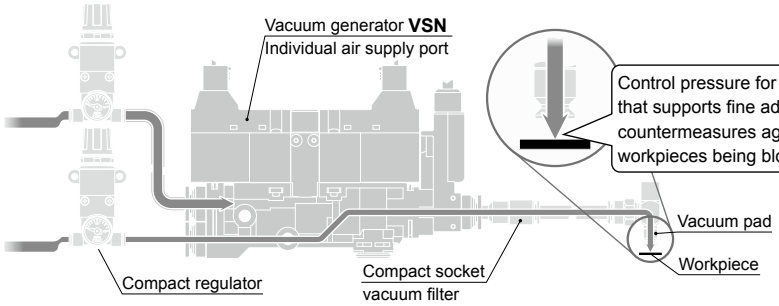


● Vacuum ejector unit **VSN**

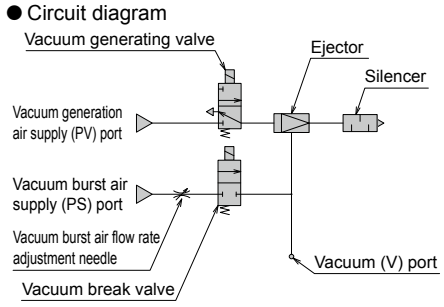


Gently removes small workpieces at vacuum burst.

Vacuum burst air supply port is made independent (optional). Therefore, pressure regulation by external regulator becomes possible in addition to the conventional flow rate adjustment, enabling easy adjustment of the vacuum burst air.



● Circuit diagram

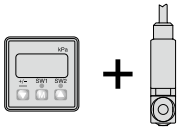
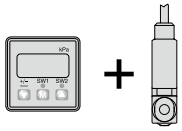


Common supply ports are also available.

* Supply port: The air supply port is common for vacuum generation and vacuum burst.

Four types of analog outputs are available for the pressure sensor.

Analog output sensor for negative pressure, Separated digital pressure display + Analog output sensor for negative pressure, Analog output sensor for compound pressure and Separated digital pressure display + Analog output sensor for compound pressure.

	For negative pressure	For compound pressure
Analog switch		
Separated digital pressure display + analog switch		

Vacuum burst air flow rate of 20 ℓ/min is secured.

Vacuum filter is externally mounted (separately purchased).

Miniaturization of the product does away with the inconvenience of replacing the filter.

* This product is not equipped with a vacuum filter.
For longer product service life, be sure to use CKD's vacuum filter (see below) for vacuum piping.

VSFU Compact union	**VSFJ** Socket
Model/VSFU	Model/VSFJ
VSFU-2-44	VSFJ-44

Specifications

Descriptions		Vacuum ejector unit VSN
Working fluid		Air
Working pressure	MPa	0 to 0.55
Ambient/fluid temperatures	°C	5 to 50
Ambient humidity		35 to 85% RH (no condensation)
Degree of protection		IEC standards IP40 or equivalent
Vibration/impact resistance	m/s^2	50 or less/150 or less

Ejector characteristics

Model No.	Nozzle diameter (mm)	Rated supply pressure (MPa)	Achieved vacuum pressure (-kPa)	Intake flow rate (ℓ/min [ANR])	Consumption flow rate (ℓ/min [ANR])
VSN-E04	0.4	0.35	90.4	2	6
VSN-H05	0.5	0.5		7	11.5
VSN-E05		0.35		3	8
VSN-H06	0.6	0.5		9.5	16
VSN-E06		0.35		4.5	12

Note : Values in table are representative values. Suction flow rate differs with the vacuum piping conditions (vacuum port size, pipe length).

Valve specifications

Descriptions \ Unit		Vacuum ejector unit VSN	
		Vacuum generating valve	Vacuum break valve
Valve and operation		Direct acting poppet valve	
Rated voltage	V	24 DC	
Voltage fluctuation range		±10%	
Surge suppressor		Equipped with surge suppressor	
Power consumption	W	When starting: 2.2 When holding: 0.6 (energy-saving circuit built in)	
Operation indicator		Green LED	
Working pressure	MPa	0 to 0.55	0 to 0.55
Valve		Normally closed	
Response time (*1)	ms	Both vacuum generation (OFF → ON) and vacuum stop (ON → OFF) are 5 or less	
Wiring method and lead wire length		Connector: 500 mm	
		Red lead wire: +24 VDC, black lead wire: -0 V	

*1 : Response time is the time until pressure change is detected at the vacuum port when rated pressure and rated voltage are supplied. Vacuum achievement time at the pipe end (workpiece) and vacuum burst time differ depending on conditions such as ejector characteristics, capacity (vacuum pipe length), vacuum burst flow rate, etc.

Vacuum burst function

Descriptions		
Break air flow rate	ℓ/min (ANR)	0 to 20 (Indicates the value when air is supplied at 0.5 MPa.)

Note : Variable with vacuum burst air flow rate adjustment needle.

Vacuum pressure switch specifications

Vacuum pressure switch specifications

Descriptions		Negative pressure specifications (-V1□)	Compound pressure specifications (-R1)
Power supply voltage V		10.8 to 30 DC (including ripple)	
Current consumption mA		20 or less	
Pressure sensitive element		Diffused semiconductor pressure sensor	
Working pressure kPa		-100 to 0	-100 to 300
Proof pressure kPa		200	600
Storage temperature °C		-20 to 70 (atmospheric pressure, humidity: 65% RH or less)	
Operating temperature °C		-10 to 60 (no condensation)	
Operating humidity		35 to 85% RH (no condensation)	
Degree of protection		IEC standards IP40 or equivalent	
Analog output	Output voltage V	1 to 5	
	Zero point voltage V	1 ±0.04 (= at atmospheric pressure)	1 ±0.1 (= -100 kPa)
	Max pressure point voltage V	4.6 ±0.04 (= -100 kPa)	5 ±0.1 (= at 300 kPa)
	Linearity/hysteresis	±0.5% F.S. or less (at Ta = 25°C)	
	Temperature characteristics	±2% F.S. or less (0 to 50°C, Ta = 25°C)	
	Output current mA	0.195 or less (load resistance: 10 kΩ or less)	1 or less (load resistance: 5 kΩ or less)
	Output impedance kΩ	1	-

Separated digital display specifications (-V2□, -R2)

Descriptions		Separated digital display
Power supply voltage V		10.8 to 26.4 DC
Current consumption mA		40 max. (no load)
Repeatability		±0.1% F.S. ±1 digit or less
Hysteresis		Adjustment is possible
Responsivity ms		2.5 or less (malfunction prevention function: select from 25, 100, 250, 500, 1000 or 1500)
Output short-circuit protection		Yes
Pressure display	Display unit	kPa
	Display magn. resolution	0.1
	Display frequency	5 times/second
	Display accuracy	±1% F.S. ±1 digit or less
	Operational indicator lamp	Orange 1 & 2 indicator lamps
	Digital display	Main display: 2 colors (red, green), sub-display: orange
Sensor input specifications	Voltage input signal V	1 to 5
	Input impedance MΩ	1
Switch output	Output points	2-point output (OUT1, OUT2)
	Output method	NPN open collector
	Switch rating	30 VDC 125 mA max.
	Internal voltage drop V	1.5 or less
Analog output	Output voltage V	1 to 5 ±2.5% F.S. or less
	Linearity	±1% F.S. or less
	Output impedance KΩ	1
Environmental resistance	Degree of protection	IEC standards IP40 or equivalent
	Storage temperature °C	-10 to 60 (no condensation or freezing)
	Operating temperature °C	0 to 50
	Operating humidity	35 to 85% RH (no freezing)
	Withstand voltage	1000 VAC 1 minute (between lead wire and case)
	Insulation resistance	50 MΩ or more (500 VDC) (between lead wire and case)
	Vibration resistance	Compound amplitude 1.5 mm or 100 m/s^2, 10 to 55 Hz, 2 hours each in X, Y, Z directions
	Shock resistance	100 m/s^2, 2 hours each in X, Y, Z directions
Temperature characteristics		±0.5% F.S. (0 to 50°C, base temperature: 25°C)

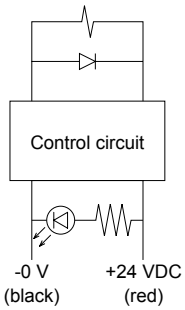
Weight table

Model No.	Unit contents	Weight (g)
VSN-□□-□□□S-3-□	Single unit, individual air supply port, atmospheric release, with sensor	56
VSN-□□-□□□S-3	Single unit, individual air supply port, atmospheric release, without sensor	53
VSN-□□-□□□J-3-□	Single unit, individual air supply port, common exhaust, with sensor	58
VSN-□□-□□□J-3	Single unit, individual air supply port, common exhaust, without sensor	55
VSN-□□-□□NS-3-□	Single unit, common air supply port, atmospheric release, with sensor	54
VSN-□□-□□NS-3	Single unit, common air supply port, atmospheric release, without sensor	51
VSN-□□-□□NJ-3-□	Single unit, common air supply port, common exhaust, with sensor	56
VSN-□□-□□NJ-3	Single unit, common air supply port, common exhaust, without sensor	53
VSNM-□□-□□NS-3-2-□	Manifold, individual/common air supply port, with sensor	171
VSNM-□□-□□NS-3-2	Manifold, individual/common air supply port, without sensor	164

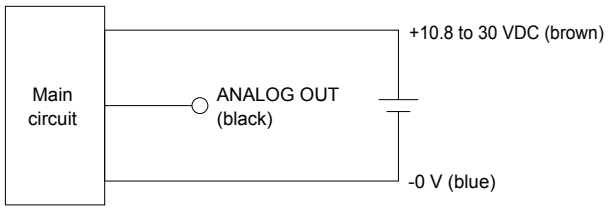
■ For the manifold, with each station increase, the unit with sensor becomes heavier by 47 grams and the unit with no sensor becomes heavier by 43 grams. Example: The weight of vacuum ejector unit, with sensor, quadruple manifold is 171 + (2 × 47) = 265 g → Weight of double manifold: 171 g with the weight of 2 units with sensor: 94 g.

Electric circuit Fig.

● Solenoid valve



● Vacuum pressure switch



How to order

- 10.3 mm wide compact vacuum unit (ejector system compatible)
- Vacuum ejector unit single

VSN - H 05 - 4 4 4 S - 3 - V1

- Ⓐ Vacuum characteristics
- Ⓑ Nozzle diameter
- Ⓒ Vacuum port
- Ⓓ Vacuum generating air supply port
- Ⓔ Vacuum burst air supply port
- Ⓕ Exhaust port
- Ⓖ Solenoid valve voltage
- Ⓗ Vacuum pressure switch specifications

Code	Content
Ⓐ Vacuum characteristics *1	
H	High vacuum/medium flow rate
E	High vacuum/low flow rate
Ⓑ Nozzle diameter *1	
04	ø0.4
05	ø0.5
06	ø0.6
Ⓒ Vacuum port (V)	
4	ø4 straight push-in fitting
4L	ø4 elbow push-in fitting
Ⓓ Vacuum generating air supply port (PV)	
4	ø4 straight push-in fitting
Ⓔ Vacuum burst air supply port (PS)	
4	ø4 straight push-in fitting
N	Common for vacuum generation/vacuum burst air
Ⓕ Exhaust port (EX) *1	
S	Atmospheric release with silencer
J	ø6 push-in fitting common exhaust
Ⓖ Solenoid valve voltage	
3	24 VDC
Ⓗ Vacuum pressure switch specifications	
Blank	Without vacuum pressure switch
V1CO	Negative pressure analog output/connector lead wire 500 mm
V1C1	Negative pressure analog output/connector lead wire 1,000 mm
V1C2	Negative pressure analog output/connector lead wire 2,000 mm
V1C3	Negative pressure analog output/connector lead wire 3,000 mm
V2C0	Separated LED display + (-'ve) press analog output/connector lead wire 500 mm
V2C1	Separated LED display + (-'ve) press analog output/connector lead wire 1,000 mm
V2C2	Separated LED display + (-'ve) press analog output/connector lead wire 2,000 mm
V2C3	Separated LED display + (-'ve) press analog output/connector lead wire 3,000 mm
R1	Compound pressure analog output/grommet lead wire 3,000 mm
R2	Separated LED display + Compound pressure analog output/grommet lead wire 3,000 mm

⚠ Precautions for model No. selection

*1: The combinations of Ⓐ and Ⓑ are "E04", "H05", "E05", "H06" and "E06" only.

Maintenance parts

· Spare silencer element
VSN-E

· Dedicated bracket (common to VSN and VSNP)
VSN-B

· Separated digital display
VSN-SED-31N

· Sensor connection connector (e-con)
VSN-EC

How to order

- 10.3 mm wide compact vacuum unit (ejector system compatible)
- Vacuum ejector unit manifold

VSNM -H 05 -4 4 4 S -3 -10 -V1

Ⓐ Vacuum characteristics
Ⓑ Nozzle diameter
Ⓒ Vacuum port
Ⓓ Vacuum generating air supply port
Ⓔ Vacuum burst air supply port
Ⓕ Exhaust port
Ⓖ Solenoid valve voltage
Ⓗ Manifold station
Ⓘ Vacuum pressure switch specifications

With the manifold, exhaust air is led into the ejector not in operation and output from the vacuum port. Contact CKD when exhaust air lead-in has adverse effects.

Code	Content
Ⓐ Vacuum characteristics *1, *2	
H	High vacuum/medium flow rate
E	High vacuum/low flow rate
Z	For mixed specs (indicate breakdown on specs sheet.)
Ⓑ Nozzle diameter *1, *2	
04	ø0.4
05	ø0.5
06	ø0.6
00	For mixed specs (indicate breakdown on specs sheet.)
Ⓒ Vacuum port (V) *2	
4	ø4 straight push-in fitting
4L	ø4 elbow push-in fitting
CX	For mixed specs (indicate breakdown on specs sheet.)
Ⓓ Vacuum generating air supply port (PV)	
Refer to Appendix 1 for the air supply port for vacuum generation.	
Ⓔ Vacuum burst air supply port (PS)	
Refer to Appendix 2 for vacuum burst air supply port.	
Ⓕ Exhaust port (EX)	
S	Atmospheric release with silencer
Ⓖ Solenoid valve voltage	
3	24 VDC
Ⓗ Manifold station No.	
2	2 stations
to	to
10	10 stations
Ⓘ Vacuum pressure switch specifications *2	
Blank	Without vacuum pressure switch
V1C0	Negative pressure analog output/connector lead wire 500 mm
V1C1	Negative pressure analog output/connector lead wire 1,000 mm
V1C2	Negative pressure analog output/connector lead wire 2,000 mm
V1C3	Negative pressure analog output/connector lead wire 3,000 mm
V2C0	Separated LED display + (-'ve) press analog output/connector lead wire 500 mm
V2C1	Separated LED display + (-'ve) press analog output/connector lead wire 1,000 mm
V2C2	Separated LED display + (-'ve) press analog output/connector lead wire 2,000 mm
V2C3	Separated LED display + (-'ve) press analog output/connector lead wire 3,000 mm
R1	Compound pressure analog output/grommet lead wire 3,000 mm
R2	Separated LED display + Compound pressure analog output/grommet lead wire 3,000 mm
Z	For mixed specs (indicate breakdown on specs sheet.)

Precautions for model No. selection

*1: The combinations of Ⓐ and Ⓑ are "E04", "H05", "E05", "H06", "E06" and "Z00" only.
*2: Be sure to fill in the "mix manifold specifications sheet" in the case of mixed specifications. Refer to pages 110 and 111 for details.

Appendix 1

Ⓓ Vacuum generating air supply port (PV)							
Port shape		Straight fitting			Elbow fitting		
Fitting size (mm)		ø4	ø6	ø8	ø4	ø6	ø8
Code	R side only	4R	6R	8R	4LR	6LR	8LR
	Both sides	4	6	8	4L	6L	8L
	L side only	4H	6H	8H	4LH	6LH	8LH

Appendix 2

Ⓔ Vacuum burst air supply port (PS)							
Port shape		Straight fitting			Elbow fitting		
Fitting size (mm)		ø4	ø6	ø8	ø4	ø6	ø8
Code	R side only	4R	6R	8R	4LR	6LR	8LR
	Both sides	4	6	8	4L	6L	8L
	L side only	4H	6H	8H	4LH	6LH	8LH
	Common for vacuum generation/vacuum burst	N					

Maintenance parts

· Spare silencer element
VSNM-E

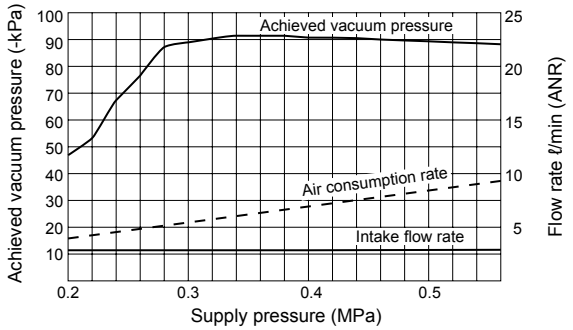
· Separated digital display
VSN-SED-31N

· Sensor connection connector (e-con)
VSN-EC

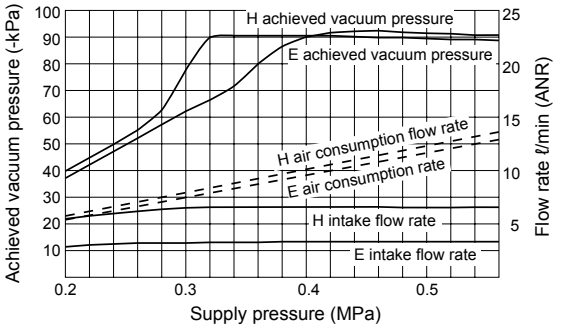
Vacuum characteristics

Supply pressure - achieved vacuum pressure, intake flow rate, consumption flow rate

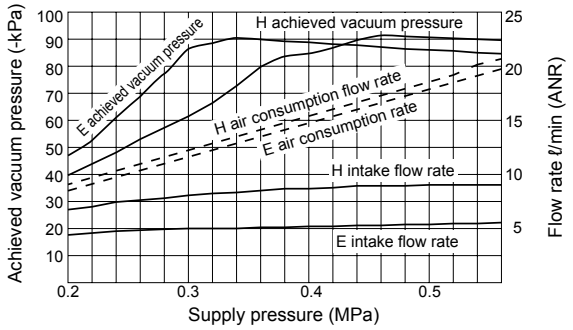
● VSN-E04



● VSN-H05, VSN-E05



● VSN-H06, VSN-E06

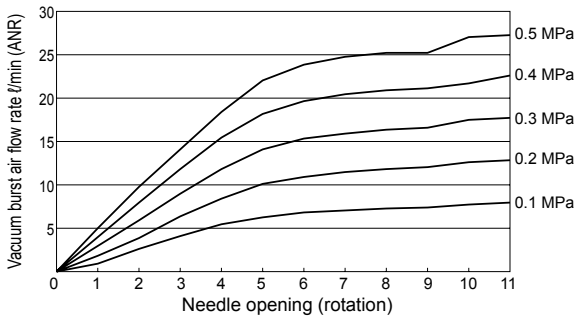


1. Supply pressure with the characteristics described above occurs at vacuum generation.
2. Achieved vacuum pressure with the characteristics described above produces abnormal noise (soft clicking sound) at supply pressure just before reaching the peak value. When this abnormal noise occurs, the characteristics become unstable and operation becomes louder. Reset the supply pressure, as it may affect the sensor, etc., and cause trouble.
   Ex. 1: Source pressure is 0.5 MPa with the H type vacuum ejector. During vacuum ejector operation, supply pressure drops to 0.43 MPa due to pressure drop, and abnormal noise is generated. → Reset supply pressure to 0.5 MPa during vacuum ejector operation.
3. Carry out piping or equipment selection with 3 times the effective cross-sectional area of the nozzle diameter cross-sectional area as a guideline. Satisfactory vacuum characteristics cannot be obtained if adequate supply air flow rate is not maintained.
   (A soft clicking sound occurs at set pressure. Insufficient intake flow rate, insufficient achievement of achieved vacuum, etc.)
   Ex. 2: Abnormal noise occurs even when pressure is 0.5 MPa with H type vacuum ejector during vacuum ejector operation. → Insufficient supply air flow rate. (Supply air flow rate is restricted in front of the vacuum ejector by piping resistance, etc., and supply air flow rate satisfying the properties is not obtained. → Select piping components that can secure the required effective cross-sectional area.)
   Ex. 3: For vacuum ejector with 0.6 mm nozzle diameter, cross-sectional area is $0.3^2 \times \pi = 0.282\ mm^2 \times 3 = 0.84\ mm^2$. Therefore, carry out piping and equipment selection that ensures an effective cross-sectional area of 0.9 mm^2 or greater.

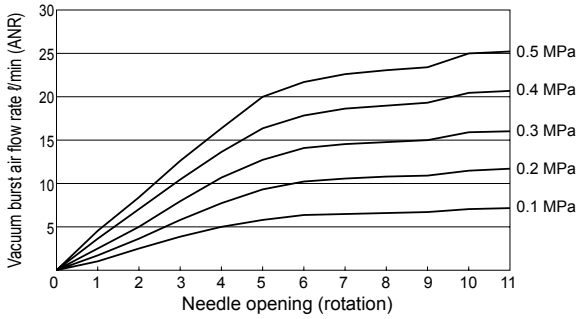
Vacuum characteristics

Vacuum burst air flow rate characteristics

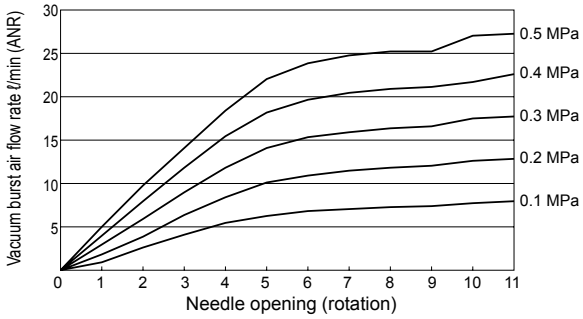
● VSN-E04



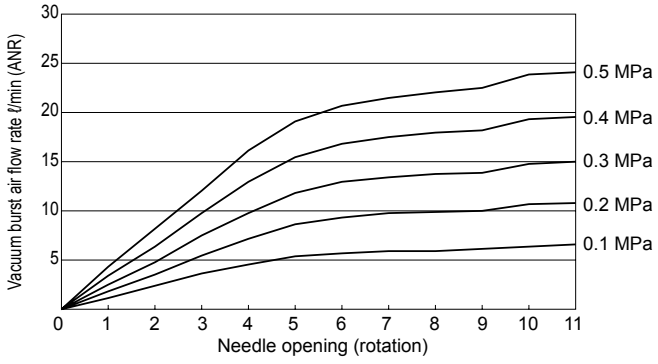
● VSN-H05



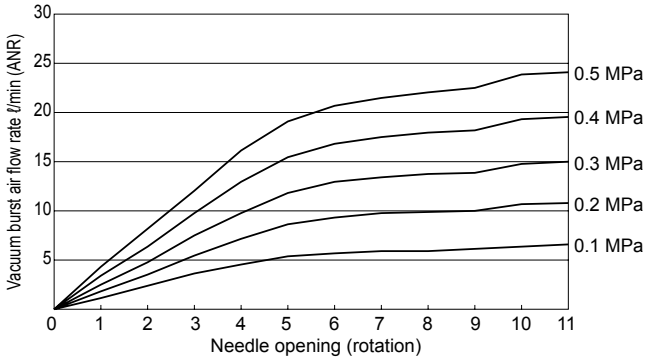
● VSN-E05



● VSN-H06



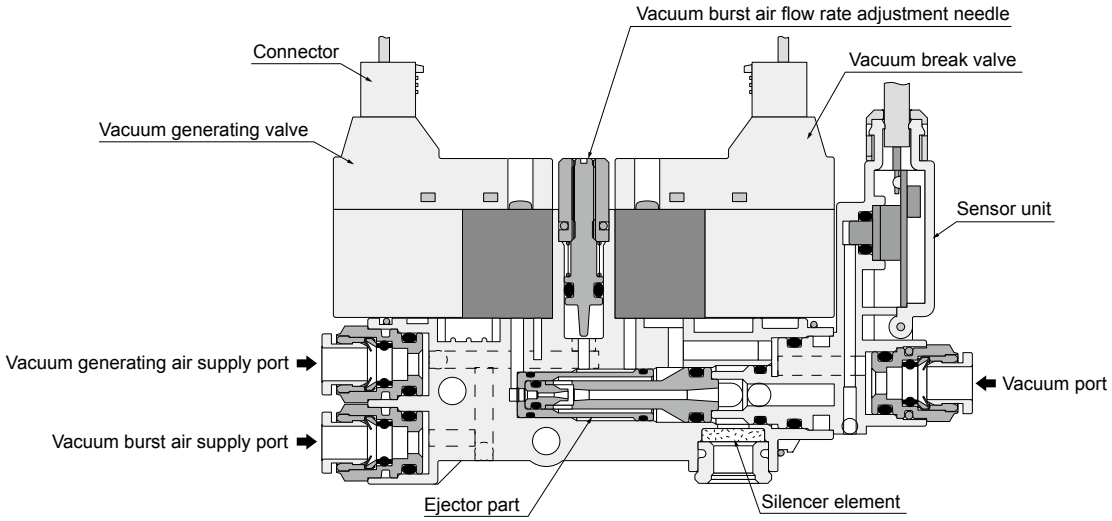
● VSN-E06



Internal structure

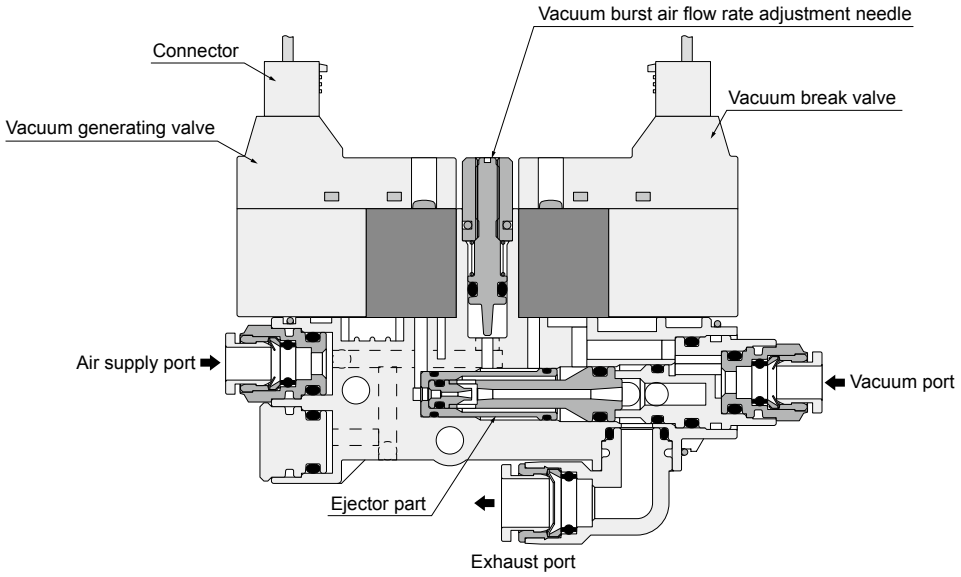
● Vacuum ejector single unit

· Individual air supply port, atmospheric release, with vacuum pressure switch



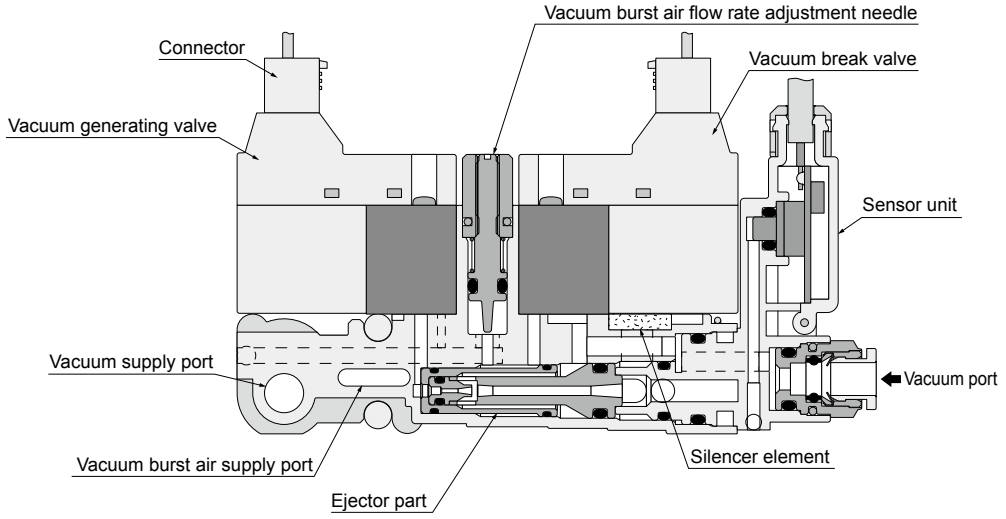
● Vacuum ejector single unit

· Common air supply port, common exhaust, without vacuum pressure switch



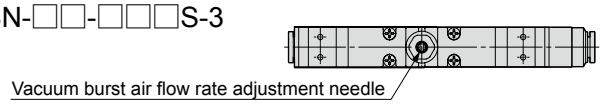
● Vacuum ejector unit manifold

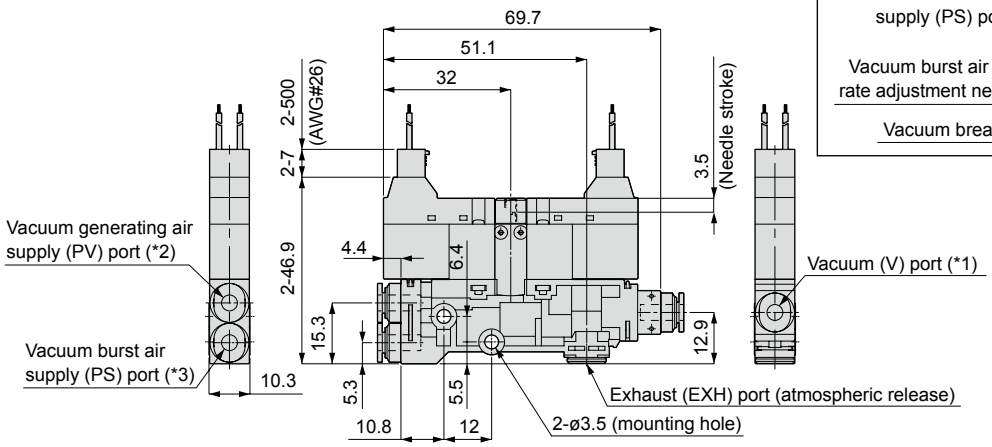
· With vacuum pressure switch

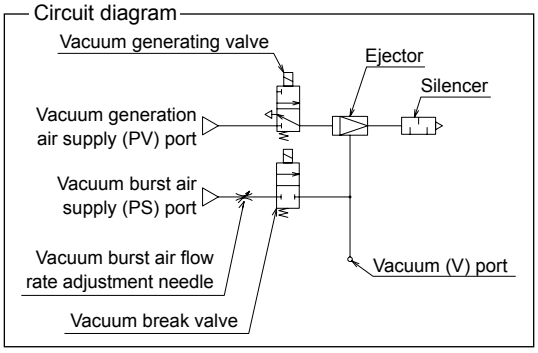


Dimensions (single unit)

● Individual air supply port, atmospheric release, without vacuum pressure switch
· VSN-□□-□□□S-3

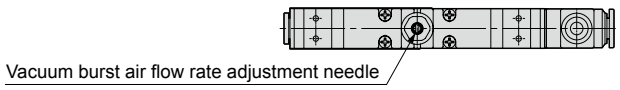


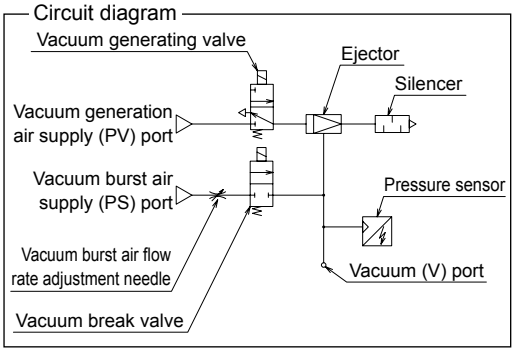




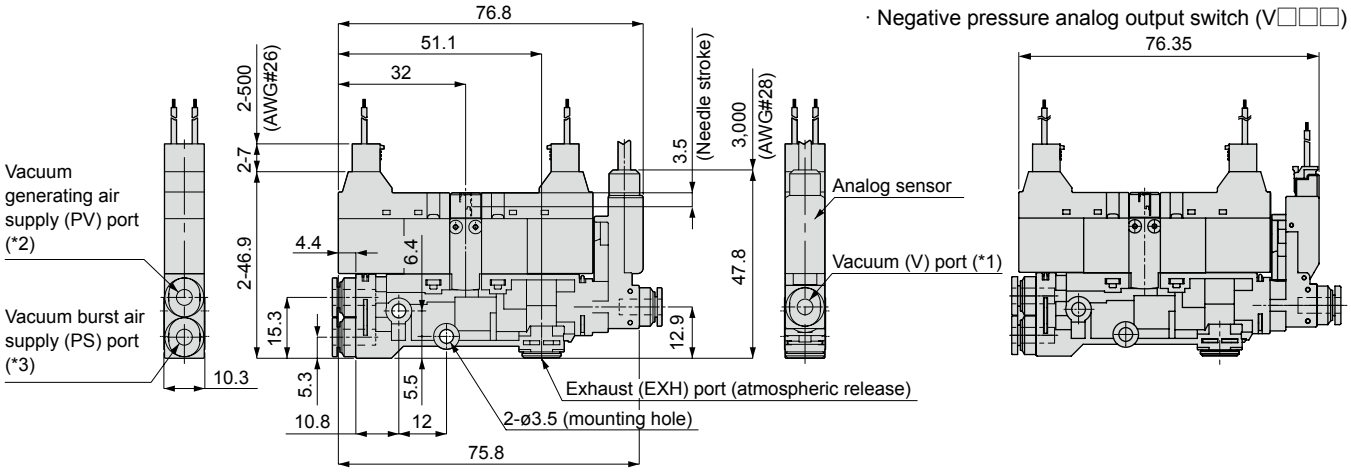
● Individual air supply port, atmospheric release, with vacuum pressure switch
· VSN-□□-□□□S-3-V□□□/R□

· Compound pressure analog output switch (R□)





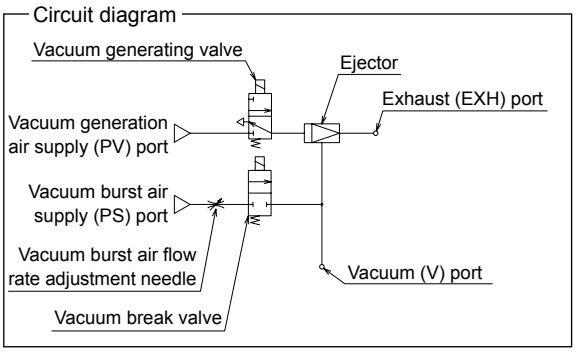
· Negative pressure analog output switch (V□□□)

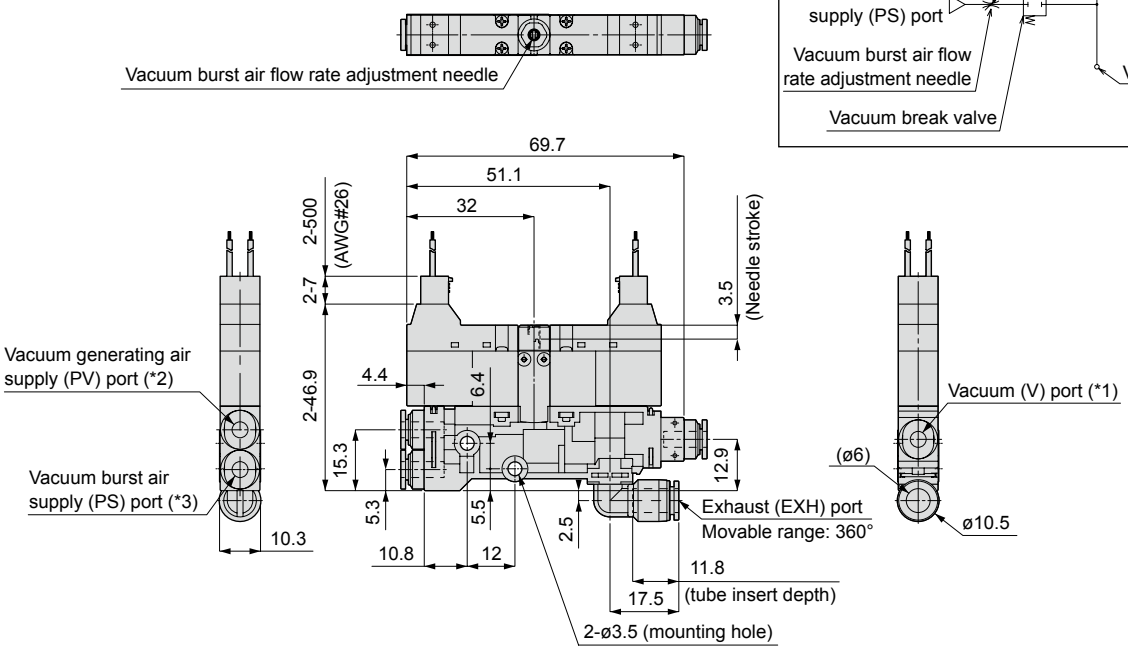


*1 : For vacuum (V) port dimensions, refer to Table 1 on page 99.
*2 : For vacuum generation air supply port (PV) dimensions, refer to Table 2 on page 99.
*3 : For vacuum burst air supply (PS) port dimensions, refer to Table 2 on page 99.

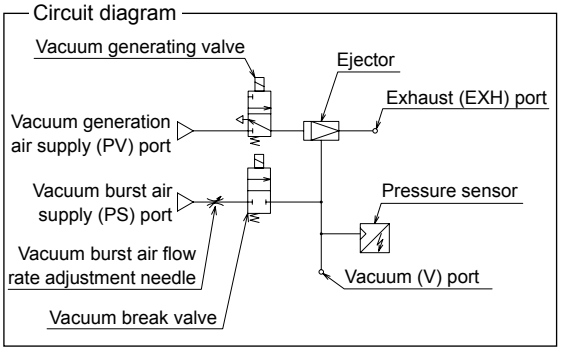
Dimensions (single unit)

● Individual air supply port, common exhaust, without vacuum pressure switch
· VSN-□□-□□□J-3

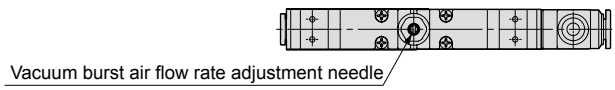


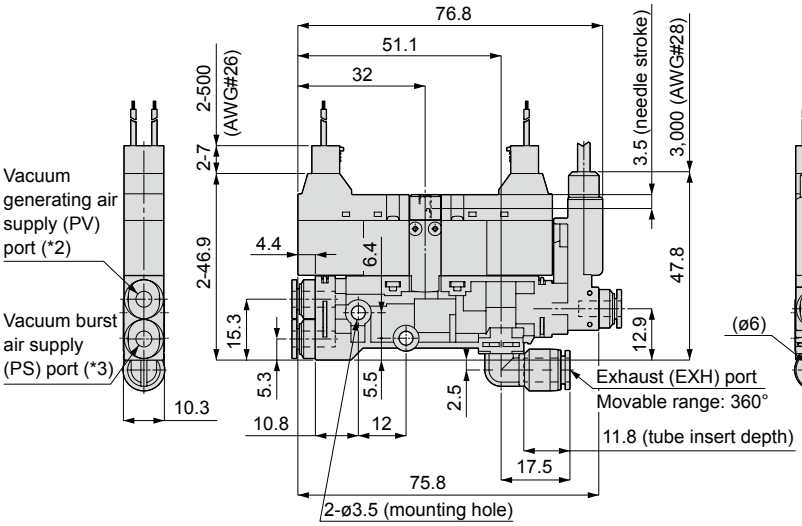


● Individual air supply port, common exhaust, with vacuum pressure switch
· VSN-□□-□□□J-3-V□□□/R□

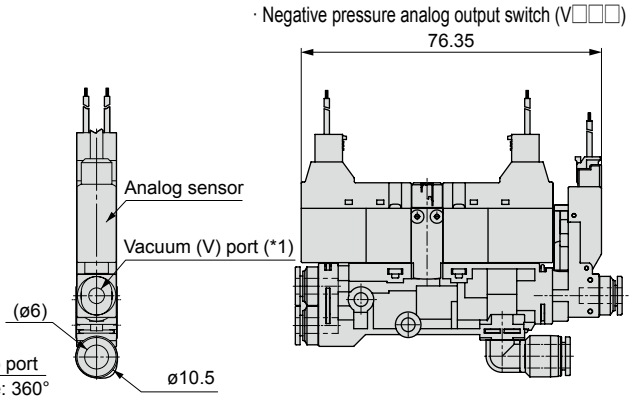


· Compound pressure analog output switch (R□)





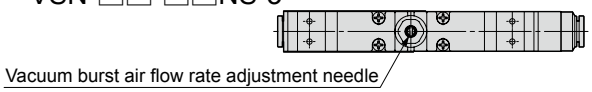
· Negative pressure analog output switch (V□□□)

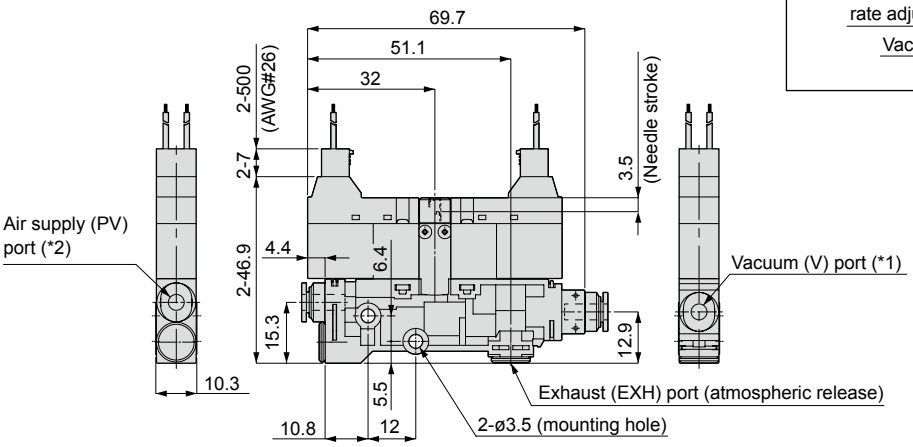


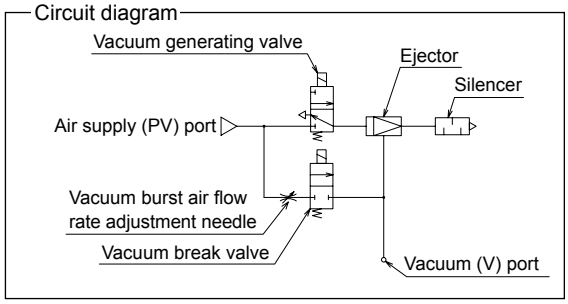
*1 : For vacuum (V) port dimensions, refer to Table 1 on page 99.
*2 : For vacuum generation air supply port (PV) dimensions, refer to Table 2 on page 99.
*3 : For vacuum burst air supply (PS) port dimensions, refer to Table 2 on page 99.

Dimensions (single unit)

● Common air supply port, atmospheric release, without vacuum pressure switch
· VSN-□□-□□NS-3



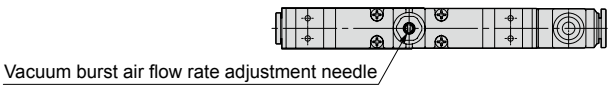


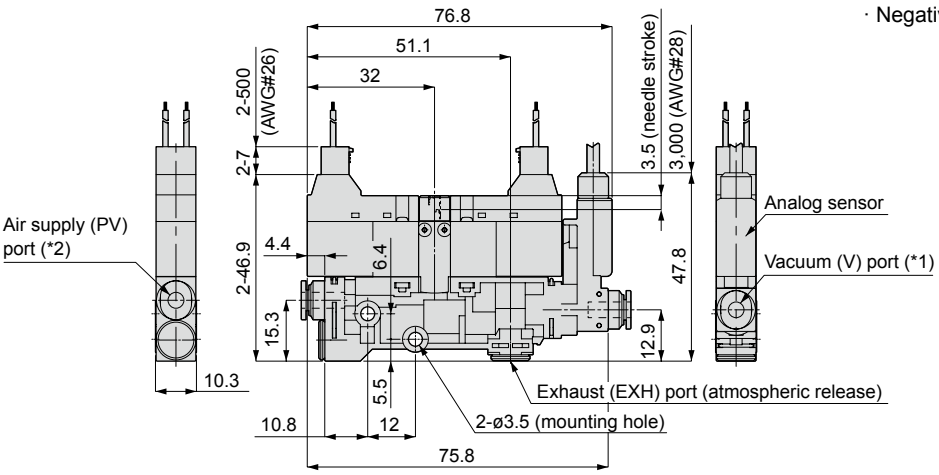


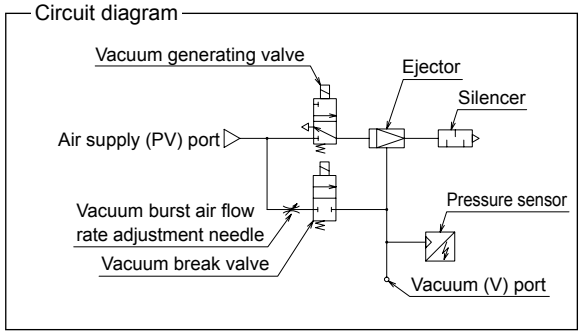
*1 : For vacuum (V) port dimensions, refer to Table 1 on page 99.
*2 : For air supply (PV) port dimensions, refer to Table 2 on page 99.

● Common air supply port, atmospheric release, with vacuum pressure switch
· VSN-□□-□□NS-3-V□□□/R□

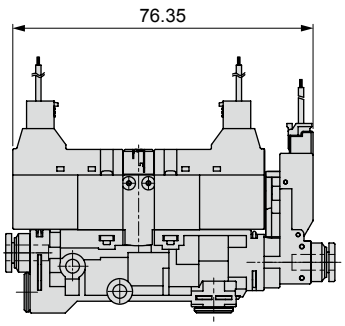
· Compound pressure analog output switch (R□)







· Negative pressure analog output switch (V□□□)

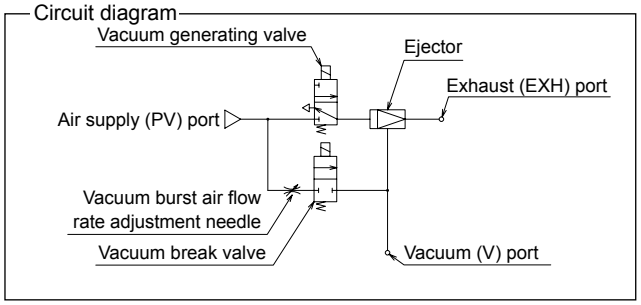


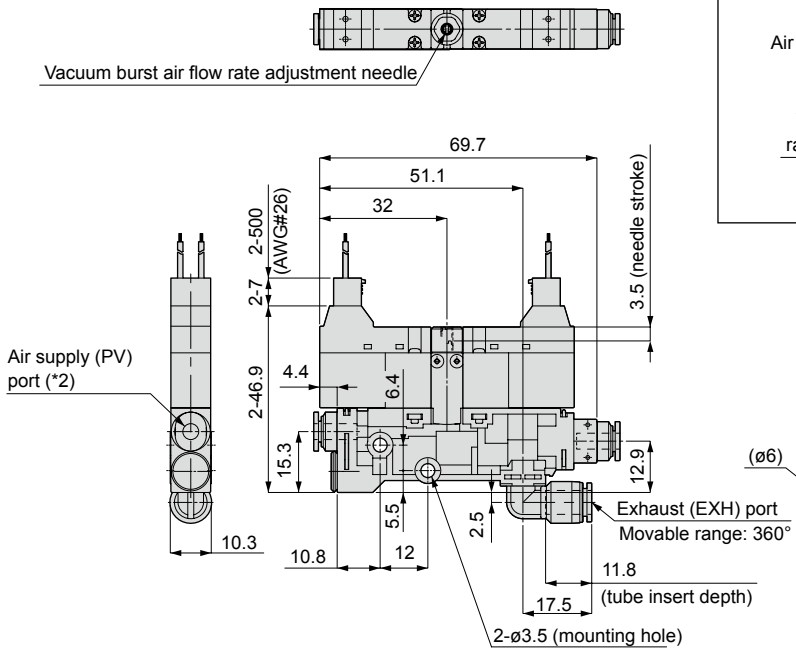
*1 : For vacuum (V) port dimensions, refer to Table 1 on page 99.
*2 : For air supply (PV) port dimensions, refer to Table 2 on page 99.

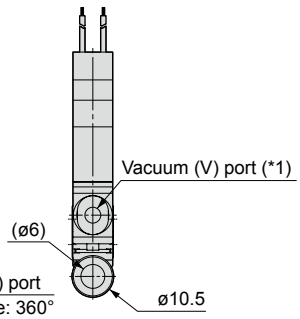
Dimensions (single unit)

● Common air supply port, common exhaust, without vacuum pressure switch

· VSN-□□-□□NJ-3

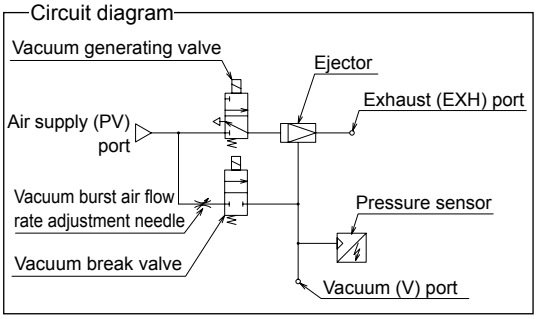




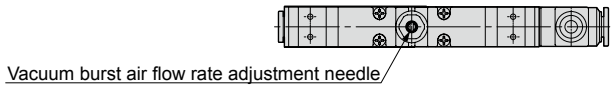


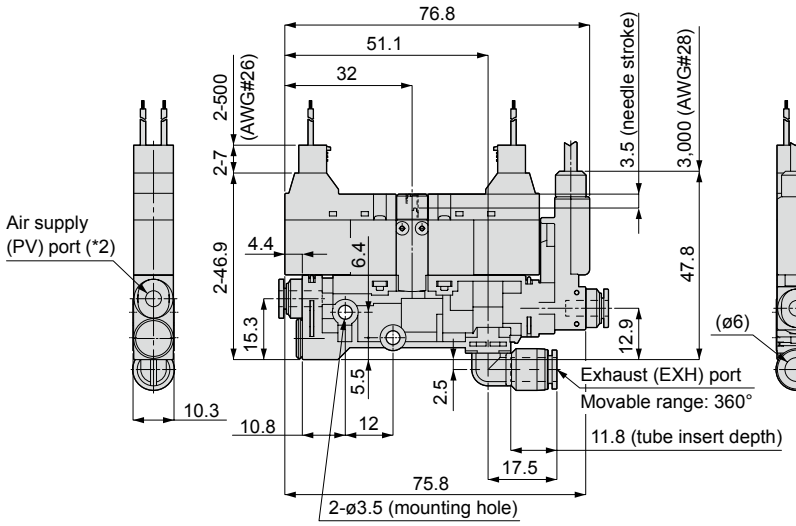
● Common air supply port, common exhaust, with vacuum pressure switch

· VSN-□□-□□NJ-3-V□□□/R□

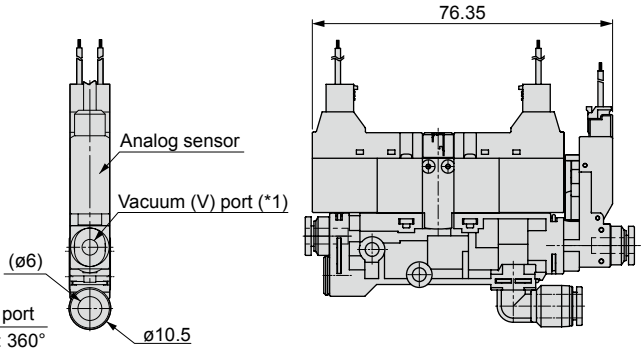


· Compound pressure analog output switch (R□)





· Negative pressure analog output switch (V□□□)



*1 : For vacuum (V) port dimensions, refer to Table 1 on page 99.

*2 : For air supply (PV) port dimensions, refer to Table 2 on page 99.

Dimensions

● Single unit fitting dimensions

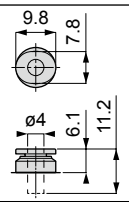
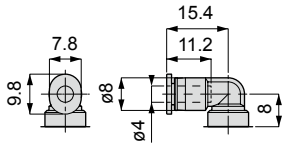
	
ø4 straight push-in fitting	ø4 elbow push-in fitting

Table 1: Vacuum port push-in fitting shape

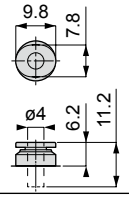
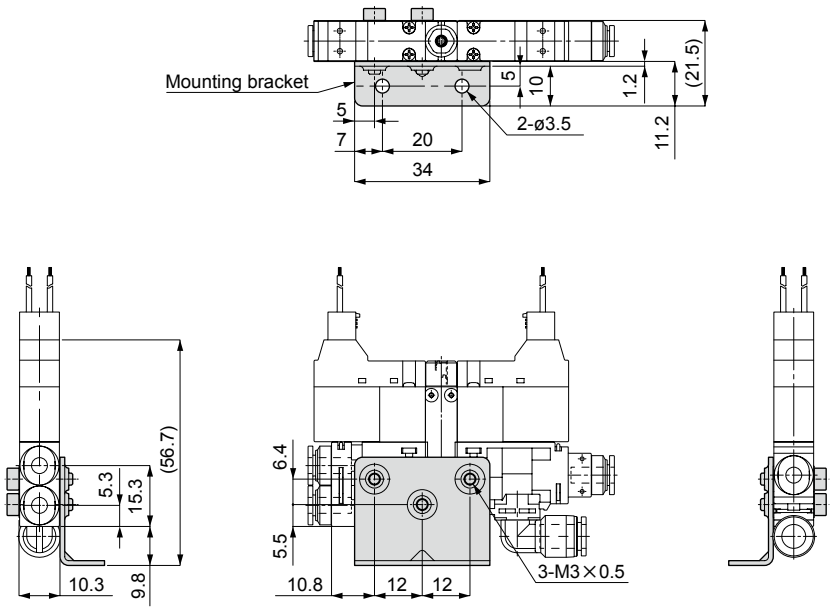

4 (ø4 straight)

Table 2: Supply port push-in fitting shape

● Dedicated bracket for single unit

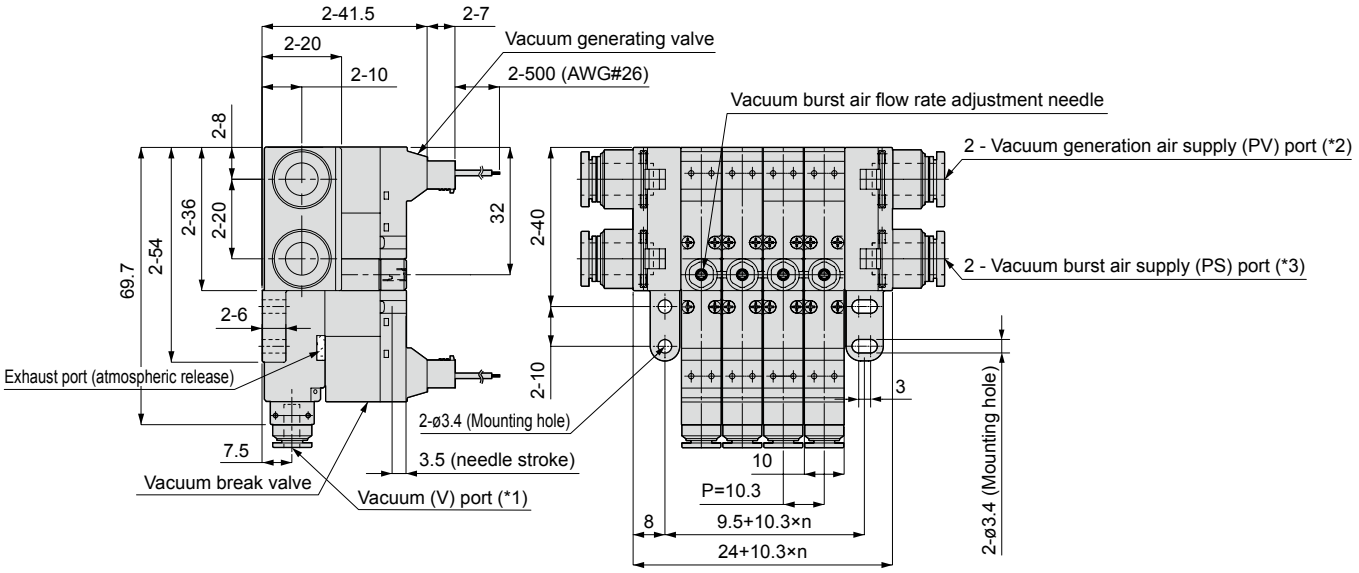
· VSN-B



Dimensions (manifold)

● Individual air supply port, without vacuum pressure switch

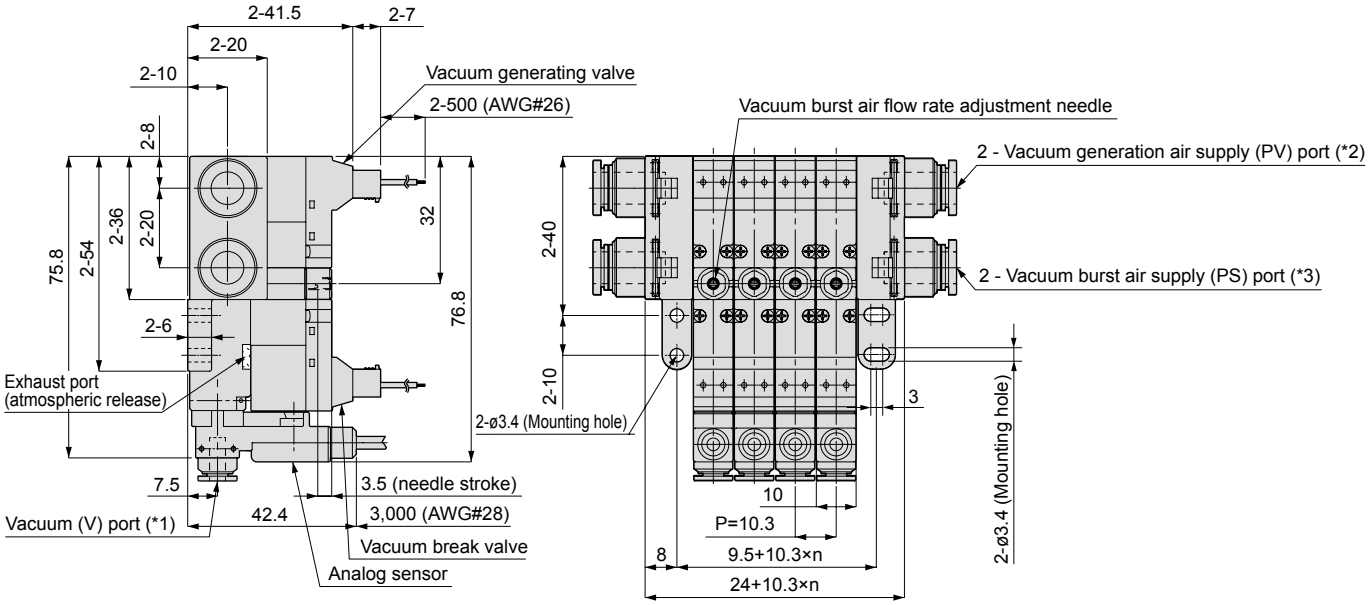
· VSNM-□□-□□□S-3-□



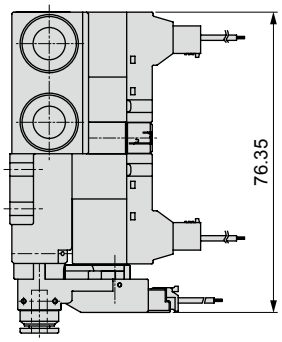
● Individual air supply port, with vacuum pressure switch

· VSNM-□□-□□□S-3-□-V□□□/R□

· Compound pressure analog output switch (R□)



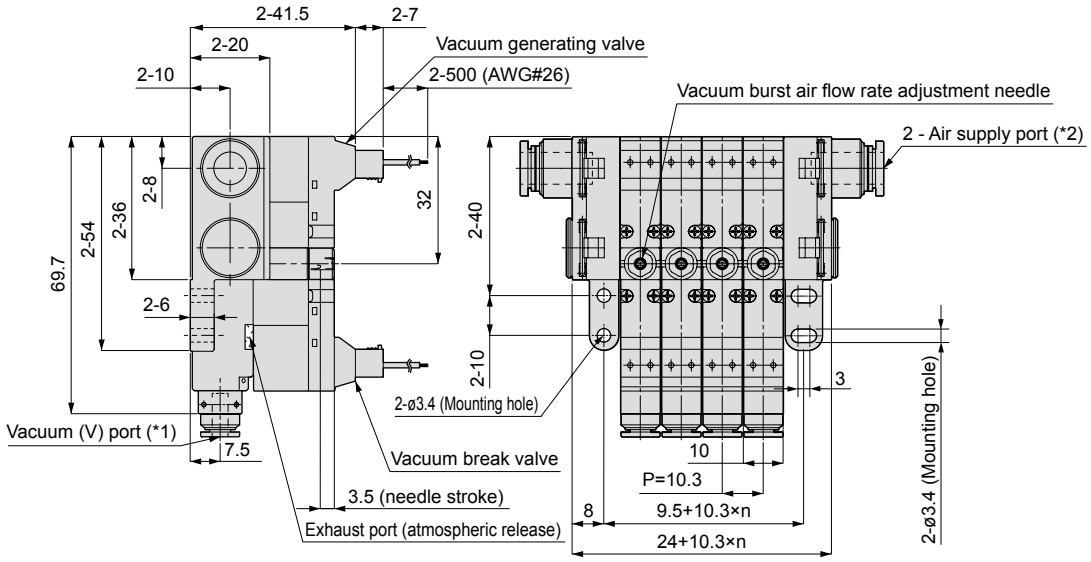
· Negative pressure analog output switch (V□□□)



*1 : For vacuum port dimensions, refer to Table 1 on page 102.
*2 : For vacuum generation air supply port (PV) dimensions, refer to Table 2 on page 102.
*3 : For vacuum burst air supply port dimensions, refer to Table 2 on page 102.

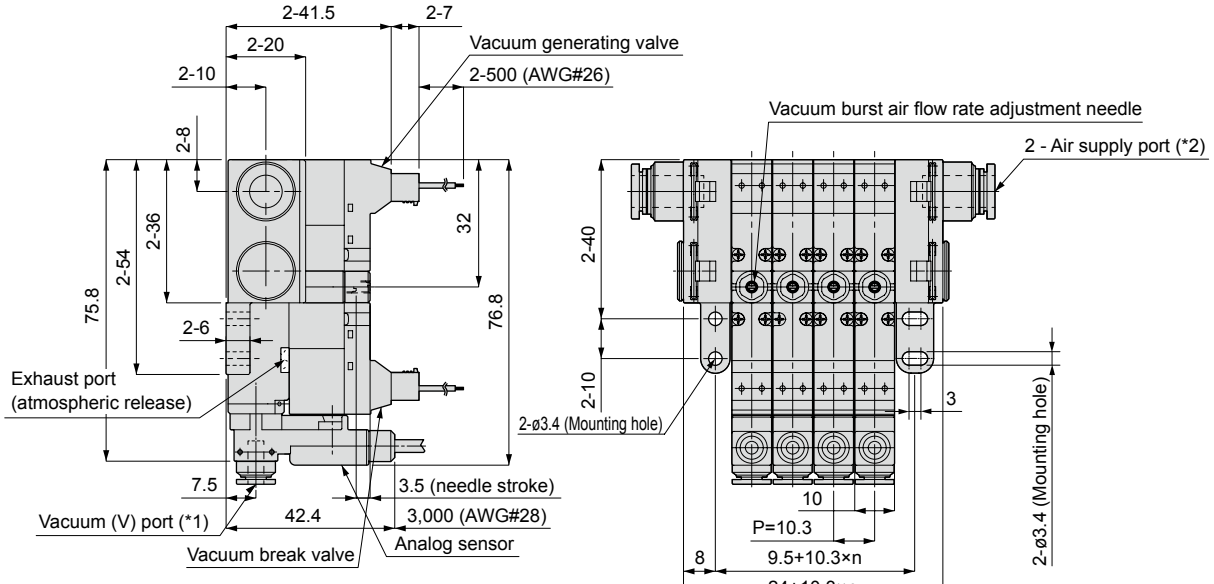
Dimensions (manifold)

● Common air supply port, without vacuum pressure switch
· VSNM-□□-□□NS-3-□

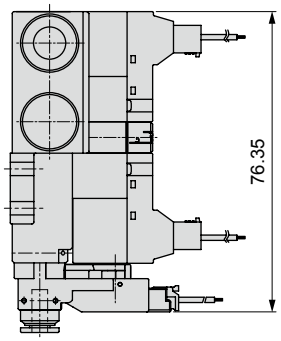


● Common air supply port, with vacuum pressure switch
· VSNM-□□-□□NS-3-□-V□□□/R□

· Compound pressure analog output switch (R□)



· Negative pressure analog output switch (V□□□)



*1 : For vacuum port dimensions, refer to Table 1 on page 102.
*2 : For air supply port dimensions, refer to Table 2 on page 102.

Dimensions (manifold)

● Manifold fitting dimensions

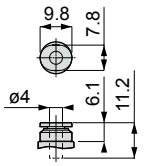
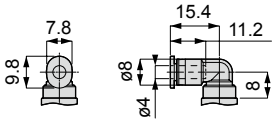
	
ø4 straight push-in fitting	ø4 elbow push-in fitting

Table 1: Vacuum port push-in fitting shape

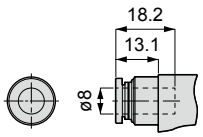
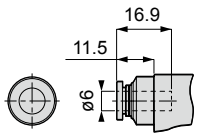
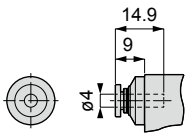
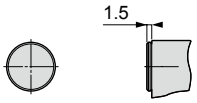
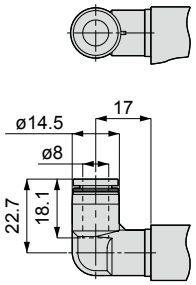
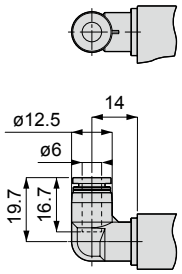
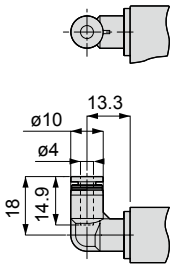
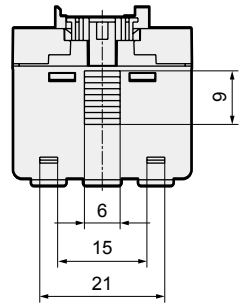
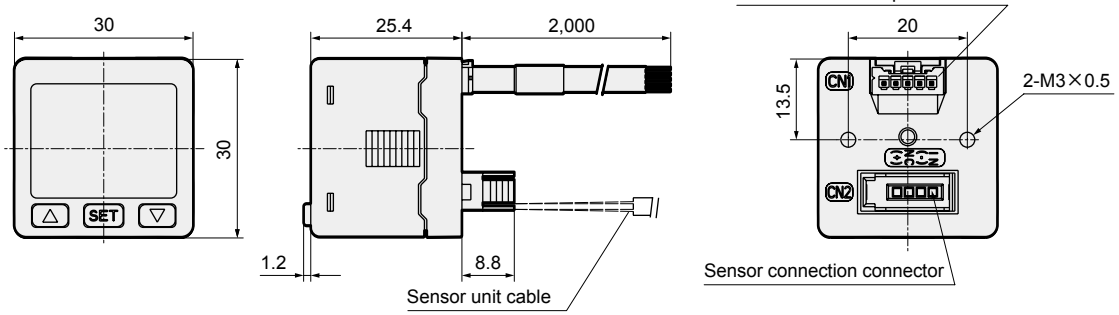
			
ø8 straight push-in fitting	ø6 straight push-in fitting	ø4 straight push-in fitting	Plug
			
ø8 elbow push-in fitting	ø6 elbow push-in fitting	ø4 elbow push-in fitting	

Table 2: Supply port push-in fitting shape

Dimensions

● Separated digital display





· Power line and output wiring specifications

Line color	Content
Brown	Power supply (10.8 to 26.4 VDC)
Orange	Analog output (1 to 5 V)
White	OUT2 output
Black	OUT1 output
Blue	COMMON

· Sensor unit connection wiring specifications

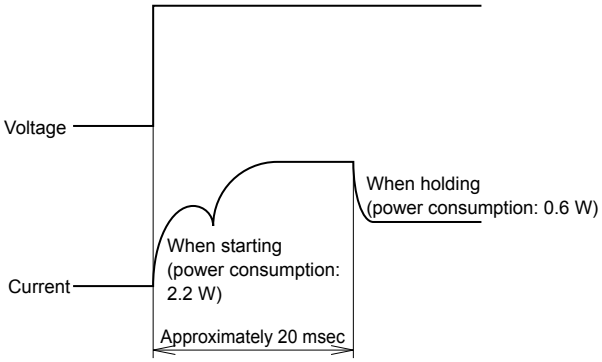
Line color	Content
Brown	DC+
Blue	DC-
Black	IN

* Refer to page 109 for the wiring method of the sensor connector.

Safety precautions Refer to Intro Pages 15 and 16 for general precautions on vacuum system components.

WARNING

- When operating the solenoid valve, make sure that the leakage current is no greater than 1 mA. Otherwise, there is a risk of malfunctions caused by leakage current.
- Do not apply vibration or shock outside the specifications to the product. It could lead to damage of the product or malfunction of the solenoid valve.
- If energization to the solenoid valve continues for long periods, heat is generated from the coil. Heat could cause burns and impact peripheral devices. Consult with CKD if continuously energizing for long periods.
- The solenoid valve of this product uses a current control circuit, serving as a mechanism to reduce the current value when the coil is kept energized. Never use in environments where vibration or impact applied is outside the specifications. The valve could malfunction.



Current/voltage waveform when solenoid valve is energized

- Do not step onto the product or place objects on it. This may result in falling, knocking the product over, injury due to falling, malfunctions due to product damage, etc.
- Do not wash with water or solvent, or paint the body. Damage of resin parts due to solvents or plugged ports due to paint may cause malfunction.
- When conducting checks, adjustment, etc., turn the power OFF, shut off the supply air and make sure that there is no residual pressure.
- Be sure to turn the power OFF before wiring and piping. Before turning the power ON or supplying air, check that there is no incorrect wiring or piping.
- Tighten the screws of each part with appropriate torque. The recommended tightening torque for product mounting is described in point (2) of “Fixing method” on page 106 and the recommended tightening torque for solenoid valves in “How to replace the element” on page 106. Failure to tighten properly may lead to air leakage, product falling and damage to various parts of the product.

⚠ CAUTION

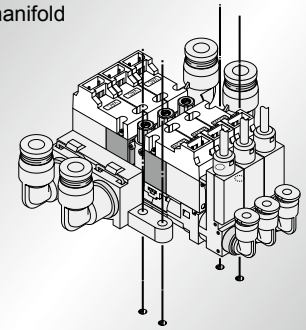
- Do not apply high tensile force or bending force to the solenoid valve or the lead wire of the sensor. It could cause disconnection or damage to the connector unit.
- Compressed air contains a large amount of drainage (water, oil oxides, tar, foreign matter). Since drain significantly reduces product performance, dehumidify with after-cooler and dryer to improve air quality.
- Do not use a lubricator.
- Rust and foreign matter entering the pipes may lead to product failure, malfunction and performance degradation. Insert a filter of 5 μm or less just before the supply port. In addition, flushing of pipes is recommended before use and at appropriate intervals.
- Avoid using in atmospheres containing corrosive or flammable gases. Do not use as the working fluid. This may cause fire or explosion, as the product does not have an explosion-proof structure.
- Avoid using in places where the product is exposed to dripping water, oil, dust, etc. This may cause damage of the product and performance degradation, since the product does not have a drip-proof/dust-proof structure.
- The solenoid valve lead wire of this product has polarity. If the polarity is different, the solenoid valve will not operate.
- Select piping diameter and pipe length so that sufficient effective cross-sectional area can be secured for piping connected to vacuum (V) port. If the effective cross-sectional area is not sufficient, product performance such as intake flow rate and vacuum burst air flow rate may not be sufficiently obtained.
- Select piping diameter and pipe length so that sufficient effective cross-sectional area can be secured for piping connected to supply (PS, PV) ports. If the effective cross-sectional area is not sufficient, supply of compressed air or vacuum may be insufficient and sufficient product performance may not be obtained.
- This product does not have a vacuum filter. Use CKD's vacuum filter series for the vacuum filter. If a vacuum filter is not used, suctioned dust will accumulate in the product and may lead to decreased vacuum performance (ejector system compatible unit) and leakage/malfunction of the solenoid valve (ejector system compatible unit, vacuum pump system compatible unit) etc.
  (Recommended vacuum filter: VSFU series, VSFJ series)
- In the manifold, the number of units that can operate at the same time is limited due to the conditions of the air supply amount (supply port size, pipe length, regulator processing flow rate, etc.) and ejector air consumption (vacuum characteristics), etc. Contact CKD for methods allowing simultaneous operation when used as manifold.
- In the manifold vacuum ejector, when an operating ejector and an inoperative ejector are mixed, exhaust air is led into the ejector not in operation and output from the vacuum port. For example, lightweight workpieces may be blown away. Therefore, do not use under conditions which might affect the workpiece.
- The solenoid valve of this product essentially operates continuously. When energizing continuously for more than 15 minutes, do not use more than 10 times/day. Return to normal operation after continuous energization.
- When replacing the cartridge of the supply (PS, PV) and vacuum (V) ports, remove the deposits from the seal and then securely insert the stop pin.
- If a large amount of dust and dirt adheres to the filter element of the silencer element of the ejector system compatible unit or the vacuum pump system compatible unit (single unit), product performance may be reduced. Cleaning and replacing the element frequently at appropriate times is recommended.

Usage methods

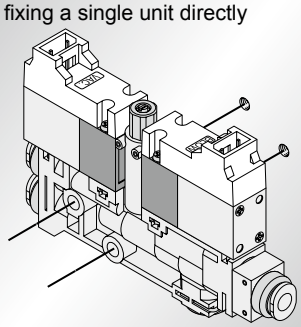
1. Fixing method

Tighten and fix with M3 screws using the mounting holes (2 places) on the resin body. The recommended tightening torque for this is 0.3 to 0.5 N m. Tightening outside the recommended tightening torque range may lead to product falling or damage.
(Refer to the dimensions for the mounting hole pitch.)

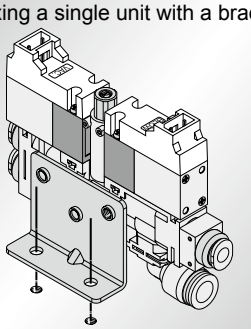
For manifold



When fixing a single unit directly

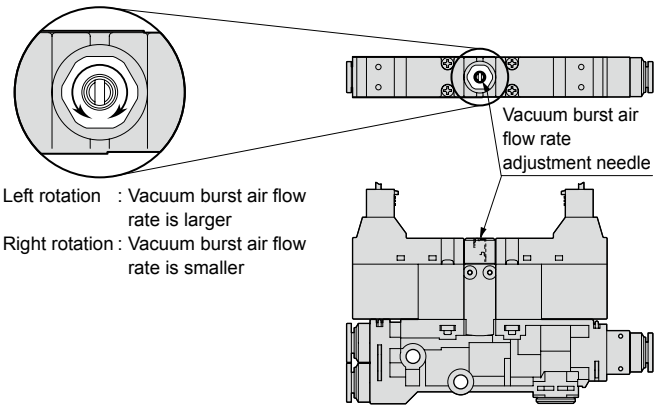


When fixing a single unit with a bracket



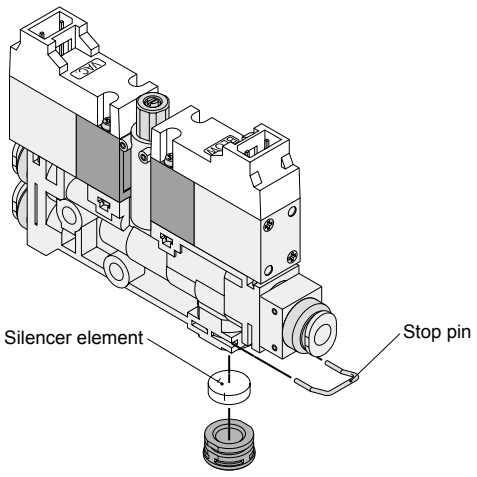
2. How to adjust vacuum burst air flow rate

- The vacuum burst air flow rate is decreased by turning the vacuum burst air flow adjustment needle to the right (clockwise) and increased by turning it to the left (counterclockwise).
- * Be sure to use an appropriate flathead screwdriver for adjusting the vacuum burst air flow rate.
- * Since this product has an internal spring to stop the rotation of the needle, there is no lock nut. Do not turn the hexagonal part with a wrench, etc. It may cause damage to the product.



3. How to replace the silencer element

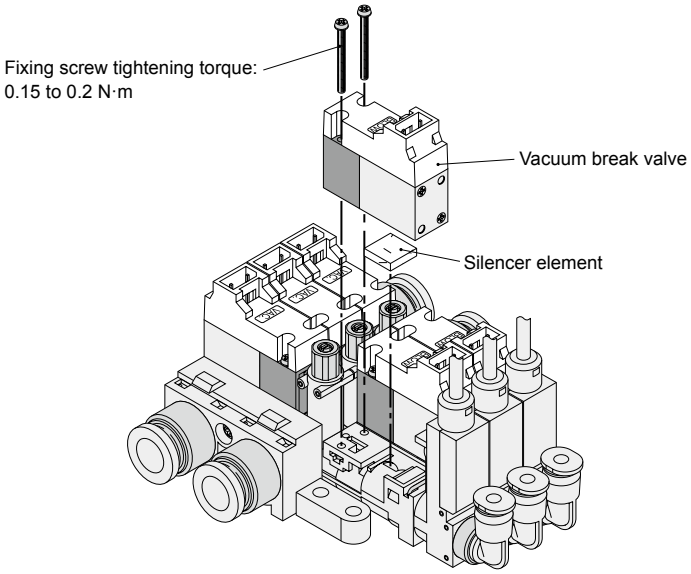
- To replace the vacuum ejector single unit silencer element (Model No.: VSN-E), use a flathead screwdriver and remove the stop pin first. After replacing the silencer element, securely insert the stop pin.
- * Pay attention to the orientation of the stop pin. If inserted backward, the stop pin may fall out during use due to vibration.



Usage methods

4. How to replace the silencer element

■ To replace the silencer element of vacuum ejector unit manifold (Model No.: VSNM-E), remove the vacuum burst valve using an appropriate Phillips screwdriver. After replacing the silencer element, securely inserting the stop pin and confirming that the packing of the valve for vacuum supply has not fallen out, tighten the fixing screw with tightening torque of 0.15 to 0.2 N m and securely install.



5. Removal and cleaning of ejector type nozzle and diffuser

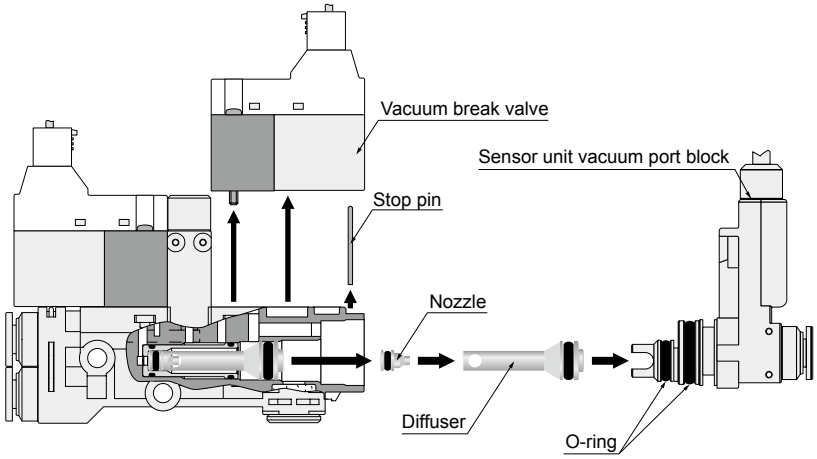
■ Remove the vacuum burst valve, the stop pin for fixing vacuum port and the sensor unit or the vacuum port block, before pulling out the diffuser using needle-nosed pliers. To prevent the nozzle from popping out, cover the body with cushioning material such as a sponge, supply vacuum generating air (*1) and energize the vacuum generating valve. Since the nozzle will pop out due to the force of air, remove the cushioning material and take out the nozzle.
Remove the deposits on the nozzle, diffuser bore and seal by air blow or wiping (*2).
Assemble the nozzle on the diffuser and supply to the body so that the nozzle does not come off. Push the diffuser and install the sensor unit or the vacuum port so as not to damage the tip of the diffuser. After securely inserting the stop pin for vacuum port fixing, tighten the fixing screw of the vacuum burst solenoid valve with tightening torque of 0.15 to 0.2 N m. For mounting the silencer element, refer to “How to replace the silencer element”.

(*1) [Warning] Do not point the nozzle outlet at a person while supplying air to the product. The nozzle may pop out and cause injury.

(*2) [Warning] If air is supplied with the vacuum burst valve removed, the burst air is blown out from the square hole of the valve. If air is supplied with the vacuum burst valve removed, fully close the vacuum break air flow adjustment needle.

(*3) When mounting the vacuum port block to the body, ensure that there is no dirt, fluff, etc., adhering to the O-ring.

(*4) Do not damage the nozzle, diffuser bore, seal, seal parts (O-ring) or body bore part. Will cause performance degradation.



Usage methods

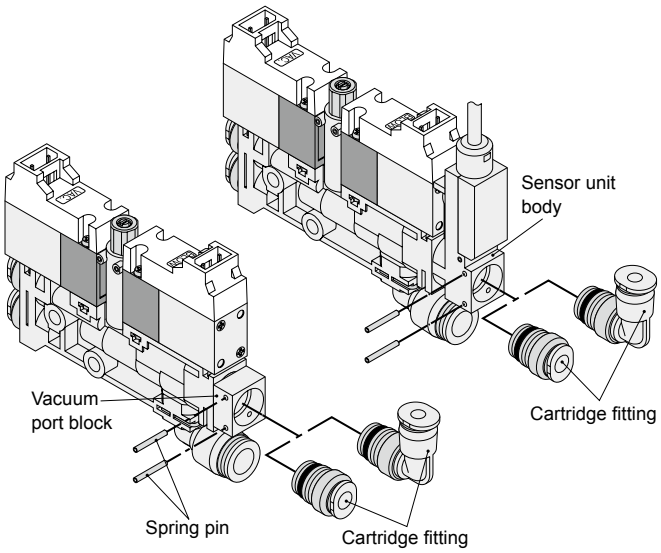
6. How to replace the cartridge fitting

[Vacuum port]

■ For single units

For the vacuum port cartridge fittings, remove the spring pins (2 pcs) inserted from the side of the sensor unit body or vacuum port block with a jig for ø1 mm pin and replace the cartridge fittings.

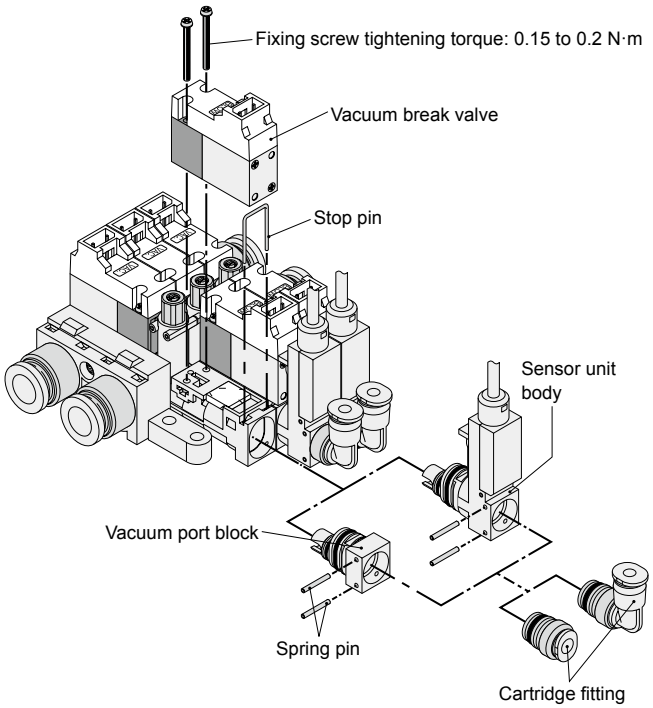
* When mounting the cartridge fitting on the body, ensure that there is no dirt, fluff, etc., adhering to the O-ring. Ensure that the O-ring and body bore are not damaged. Vacuum circuit leakage could decrease performance.



■ For manifolds

Remove the vacuum burst valve with an appropriate Phillips screwdriver. Pull out the vacuum port block or the stop pin for sensor unit body fixing with a flathead screwdriver and remove from the body. For the vacuum port cartridge fittings, remove the spring pins (2 pcs) inserted from the side of the sensor unit body or vacuum port block with a jig for ø1 mm pin and replace the cartridge fittings. After that, confirm that the packing of the valve for vacuum supply has not fallen out, tighten the fixing screw with tightening torque of 0.15 to 0.2 N·m and securely install.

* When mounting the cartridge fitting on the body, ensure that there is no dirt, fluff, etc., adhering to the O-ring. Ensure that the O-ring and body bore are not damaged. Vacuum circuit leakage could decrease performance.

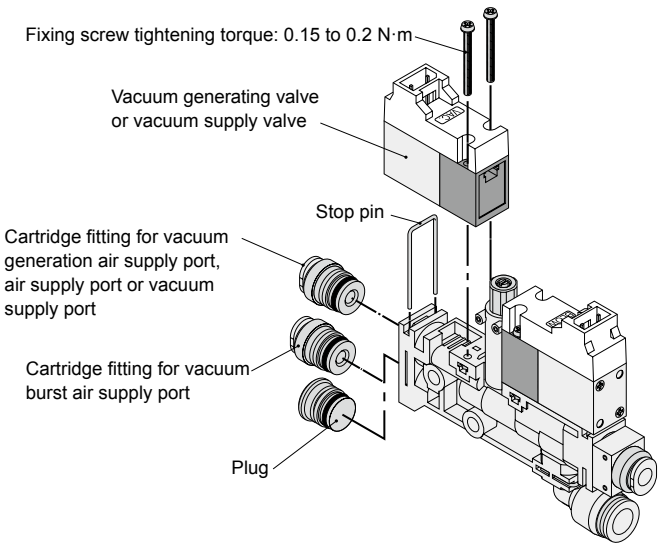


[Supply port]

■ For single units

Remove the vacuum generating valve or the vacuum supply valve with an appropriate Phillips screwdriver. Pull out the stop pin of the vacuum generating air supply port and vacuum burst air supply port or air supply port with a flathead screwdriver and replace the cartridge fittings. After that, confirm that the packing of the valve for vacuum supply has not fallen out, tighten the fixing screw with tightening torque of 0.15 to 0.2 N·m and securely install.

* When mounting the cartridge fitting on the body, ensure that there is no dirt, fluff, etc., adhering to the O-ring. Ensure that the O-ring and body bore are not damaged. Otherwise, air leakage may result.



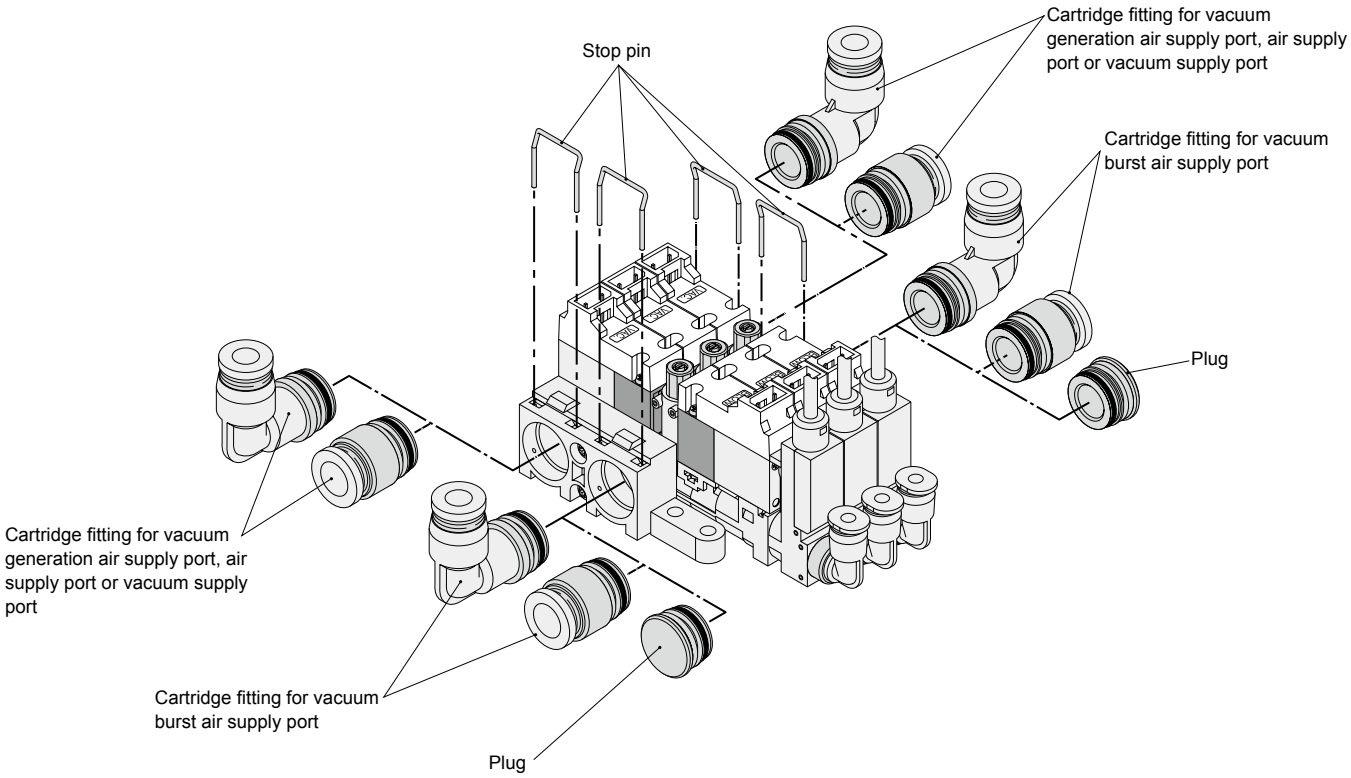
Usage methods

■ For manifolds

Pull out the stop pin with a flathead screwdriver and replace the cartridge fittings.

* When mounting the cartridge fitting on the body, ensure that there is no dirt, fluff, etc., adhering to the O-ring. Ensure that the O-ring and body bore are not damaged. Otherwise, air leakage may result.

* Pay attention to the orientation of the stop pin. If inserted backward, the stop pin may fall out during use due to vibration.



■ How to connect sensor connection connector (e-con)

When connecting the sensor connection connector, cut the half-stripped section at the end of the cable lead wire before using.

Insert the lead wire through to the back of the connector, and securely crimp with pliers, etc.

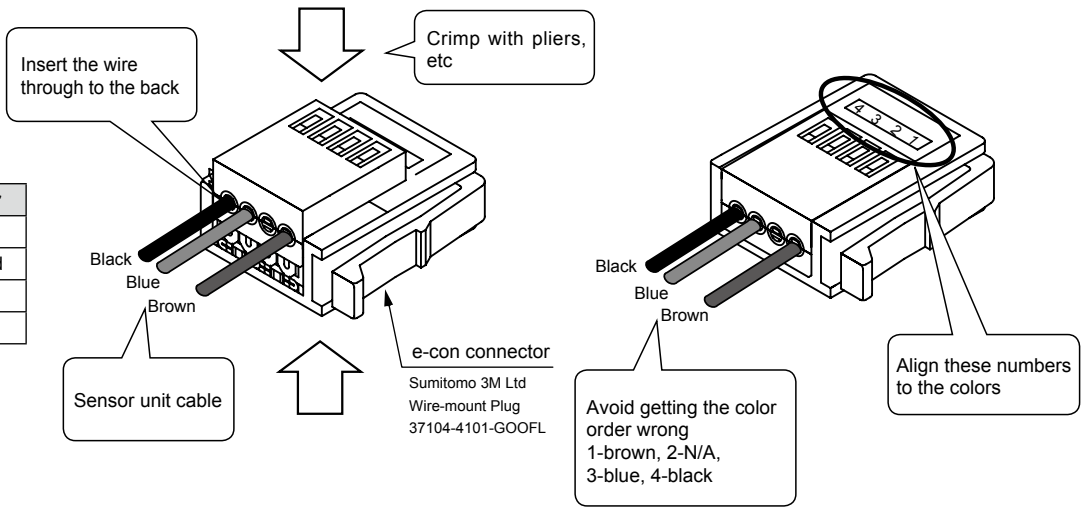
· The lead wire sheath does not need to be removed.

· Since incorrect wiring can lead to sensor or display damage, faults or malfunction, check the pin No. and the electric wire color during pressure welding and ensure there are no mistakes.

· Sensor connection connector cannot be reused once crimped. If wiring or lead wire insertion has been done incorrectly, use a new sensor connection connector.

· Wiring specifications

Pin No.	Cable color
1	Brown (DC+)
2	Not connected
3	Brown (DC-)
4	Black (IN)



How to fill out VSNM mix manifold specifications sheet

● Mix manifold model No. (example)

	Ⓐ	Ⓑ		Ⓒ	Ⓓ	Ⓔ	Ⓕ		Ⓖ		Ⓗ		Ⓘ
VSNM-	Z	00	-	CX	4R	N	S	-	3	-	5	-	Z

● Mix manifold specifications sheet

Vacuum ejector unit model No. Ⓐ Ⓑ Ⓒ Ⓘ	Layout position 1	2	3	4	5	6	7	8	9	10	Quantity
VSNM- H 05 - 4 - R1	○	○									2
VSNM- E 05 - 4 - R2			○	○							2
VSNM- E 05 - 4L - R2					○						1
VSNM- - - - -											
VSNM- - - - -											

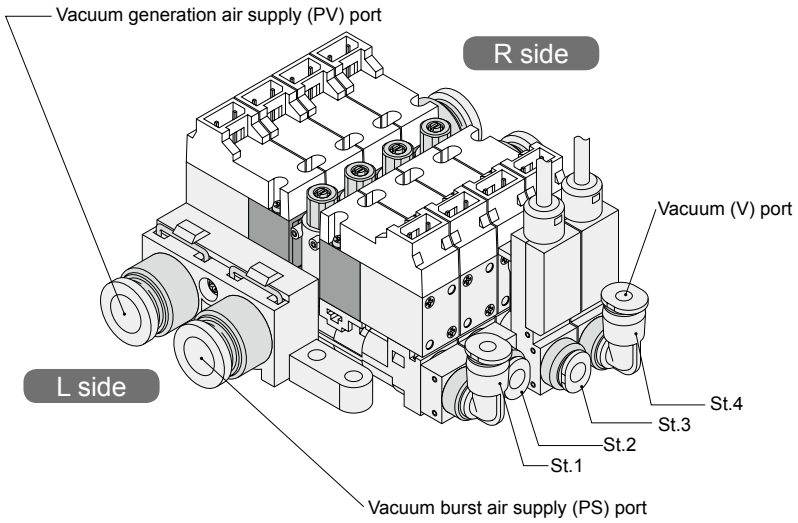
[For vacuum port size only fitting mix specification]

● Mix manifold model No. (example)

	Ⓐ	Ⓑ		Ⓒ	Ⓓ	Ⓔ	Ⓕ		Ⓖ		Ⓗ		Ⓘ
VSNM-	H	05	-	CX	4R	N	S	-	3	-	5	-	V1C1

● Mix manifold specifications sheet

Vacuum ejector unit model No. Ⓐ Ⓑ Ⓒ Ⓘ	Layout position 1	2	3	4	5	6	7	8	9	10	Quantity
VSNM- H 05 - 4 - V1C1	○	○									2
VSNM- H 05 - 4L - V1C1			○	○	○						3
VSNM- - - - -											
VSNM- - - - -											
VSNM- - - - -											



[When filling in]
· With vacuum port facing front, set piping positions in order from the left.
· Write the total quantity of product model No. specified in the required quantity field at the table far right.

VSNM mix manifold specifications sheet

Issued / /

Company name

Contact Quantity Set Delivery date /

Contact

Slip No. Order No.

Order No.

● Mix manifold model No.

VSNM- Ⓐ Ⓑ - Ⓒ Ⓓ Ⓔ Ⓕ - Ⓖ - Ⓗ - Ⓘ

Ⓐ Vacuum characteristics *1, 2	
H	High vacuum/medium flow rate
E	High vacuum/low flow rate
Z	For mixed specs (indicate breakdown on specs sheet.)

Ⓑ Nozzle diameter *1, 2	
04	ø0.4
05	ø0.5
06	ø0.6
00	For mixed specs (indicate breakdown on specs sheet.)

Ⓒ Vacuum port (V)	
4	ø4 straight push-in fitting
4L	ø6 elbow push-in fitting
CX	For mixed fittings (indicate breakdown on specs sheet.)

Ⓓ Vacuum generating air supply port (PV)
Refer to Appendix 1 on page 91 for unit combination.

Ⓔ Vacuum burst air supply port (PS)
Refer to Appendix 2 on page 91 for unit combination.

Ⓕ Exhaust port (EX)	
S	Atmospheric release with silencer

Ⓖ Solenoid valve voltage	
3	24 VDC

Ⓗ Manifold station No.	
2	2 stations
to	to
10	10 stations

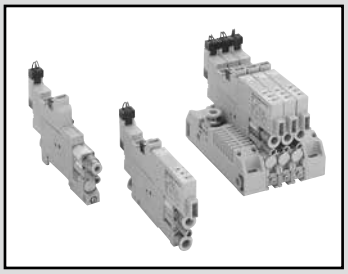
Ⓘ Vacuum sensor specification	
Blank	Without vacuum pressure switch
V1C0	Negative pressure analog output/connector lead wire 500 mm
V1C1	Negative pressure analog output/connector lead wire 1,000 mm
V1C2	Negative pressure analog output/connector lead wire 2,000 mm
V1C3	Negative pressure analog output/connector lead wire 3,000 mm
V2C0	Separated LED display + (-'ve) press analog output/connector lead wire 500 mm
V2C1	Separated LED display + (-'ve) press analog output/connector lead wire 1,000 mm
V2C2	Separated LED display + (-'ve) press analog output/connector lead wire 2,000 mm
V2C3	Separated LED display + (-'ve) press analog output/connector lead wire 3,000 mm
R1	Compound pressure analog output/grommet lead wire 3,000 mm
R2	Separated LED display + Compound pressure analog output/grommet lead wire 3,000 mm
Z	For mixed specs (indicate breakdown on specs sheet.)

⚠ Precautions for model No. selection

*1 : The combinations of Ⓐ and Ⓑ are “E04”, “H05”, “E05”, “H06”, “E06” and “Z00” only.

● Mix manifold specifications sheet

Vacuum ejector unit model No. Ⓐ Ⓑ Ⓒ Ⓘ	Layout position 1	2	3	4	5	6	7	8	9	10	Quantity
VSNM- - -											
VSNM- - -											
VSNM- - -											
VSNM- - -											
VSNM- - -											



Vacuum ejector unit which is lightweight and compact in appearance and has a high-cycle vacuum system

VSX Series

● Nozzle diameter: ø0.5, ø0.7, ø1.0

RoHS

Features

■ A lightweight, compact vacuum unit that meets market needs.

■ Vacuum generating valves available include normally closed and energy-saving self-hold types. Both valves attain the best possible response time, realizing high-cycle vacuum systems.

■ Vacuum unit VSX fixing methods include direct mount, fixable from the side with screws, etc., and DIN rail mount for mounting on a DIN rail. Select the mounting method according to the application.

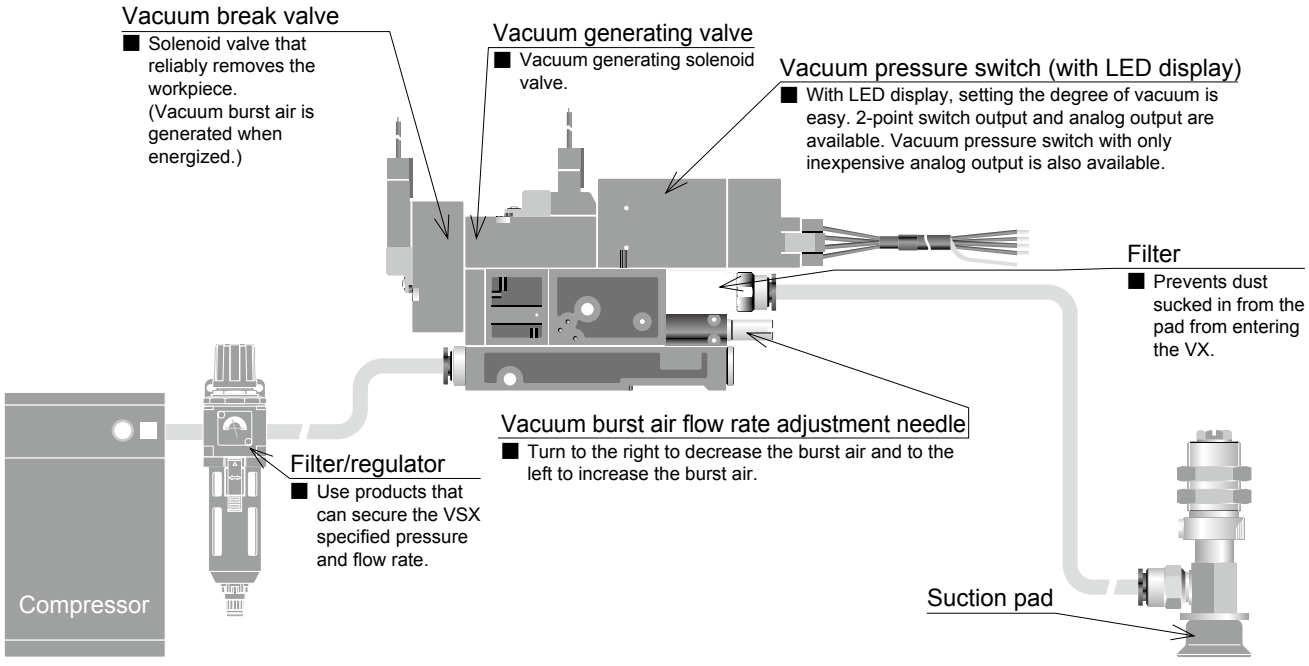
■ Vacuum pressure switch types include those with digital display for good visibility and those with only inexpensive analog output. 2-point switch output and analog output are available for the vacuum pressure switch with LED display. Select according to various applications and cost. In addition, wiring layout can be done easily using a connector system.

■ Three types of nozzle diameters are standardized: 05 (ø0.5), 07 (ø0.7) and 10 (ø1.0).

Note : The above weight is the value of vacuum ejector unit, common exhaust type and type with vacuum pressure switch with LED display.

■ When used as manifold, the piping specifications are such that, up to 10 manifold stations can be used.

Ejector system compatible type application examples



Specifications

Descriptions	VSX
Working fluid	Air
Working pressure MPa	0.3 to 0.7
Operating ambient temperature °C	5 to 50

Ejector characteristics

Model No.		Nozzle diameter (mm)	Rated supply pressure (MPa)	Achieved vacuum pressure (-kPa)	Intake flow rat (ℓ /min (ANR))	Air consumption rate (ℓ /min (ANR))
VSX-H05…	Atmospheric release Common exhaust	0.5	0.5	90.4	7	11.5
VSX-L05…	Atmospheric release Common exhaust			66.5	12	
VSX-E05…	Atmospheric release Common exhaust		0.35	90.4	3	8
VSX-H07…	Atmospheric release Common exhaust	0.7	0.5	93.1	13	23
VSX-L07…S	Atmospheric release			66.5	24	
VSX-L07…J	Common exhaust				22	
VSX-E07…	Atmospheric release Common exhaust		0.35	90.4	10.5	17
VSX-H10…S	Atmospheric release	1.0	0.5	93.1	24	46
VSX-H10…J	Common exhaust				20	
VSX-L10…S	Atmospheric release			66.5	26	
VSX-E10…S	Atmospheric release		0.35	90.4	20	34
VSX-E10…J	Common exhaust				19	

Note : Values in table are representative values. Suction flow rate differs with the vacuum piping conditions (vacuum port size, pipe length).

Valve specifications

● Pilot valve

Descriptions	Vacuum generating valve		Vacuum break valve	
Valve and operation	Direct acting poppet valve			
Rated voltage V	24 DC	100 AC	24 DC	100 AC
Allowable voltage fluctuation range V	24 DC ±10%	100 AC ±10%	24 DC ±10%	100 AC ±10%
Surge protective circuit	Varistor	Bridge diode	Varistor	Bridge diode
Power consumption	1.2 W (with LED)	1.5 VA (with LED)	1.2 W (with LED)	1.5 VA (with LED)
Manual override	Non-locking push			
Operation display	At coil excitation operation: Red LED lights			
Connection	Connector: 500 mm			
	Red: 24 VDC Black: COM	Blue	Red: 24 VDC Black: COM	Blue

● Main valve

Descriptions	Vacuum generating valve
Valve and operation	Pilot operated poppet valve
Proof pressure MPa	1.05
Valve	Normally closed
Lubrication	Not required
Effective cross-sectional area mm^2	Air supply port size ø4: 3.5 Air supply port size ø6: 4.5

Vacuum pressure switch specifications

Descriptions		Type with digital display		Type without display
		With 2-point switch output (-DW)	With analog output (-DA)	Analog output only (-A0)
Factory default pressure kPa		-50 (SW1), -10(SW2)	-50	-
Current consumption mA		40 or less		15 or less
Pressure sensitive element		Diffused semiconductor pressure switch		
Working pressure kPa		-100 to 0		
Set pressure kPa		-99 to 0		-
Proof pressure MPa		0.2		
Storage temperature °C		-20 to 80 (atmospheric pressure, humidity 60% RH or less)		
Operating temperature °C		0 to 50 (no freezing)		
Operating humidity		35 to 85% RH (no condensation)		
Power supply voltage V		12 to 24 DC ±10% ripple (P-P) 10% or less		
Degree of protection		IEC standards IP40 or equivalent		
Output points		2	1	-
Repeatability		±3%F.S. max.(at Ta=25°C)		-
Hysteresis		Fixed (2% F.S. or less)	Variable (Approx. 0 to 15% F.S.)	-
Switch output		NPN transistor open collector output 30V 80mA or less Residual voltage 0.8V or less		-
Analog output	Output voltage V	-	1 to 5	
	Zero point voltage V	-	1±0.1	
	Span voltage V	-	4±0.1	
	Output current mA	-	1 or less (load resistance 5 kΩ or more)	
	Linearity/hysteresis	-	±0.5%F.S.max.	±0.5%F.S.max.
Display kPa		-99 to 0 (2-digit red LED display)		-
Display frequency		Approx. 4 times/second		-
Display accuracy		±3%F.S. ±2digit		-
Resolution		1digit		-
Operation display		SW1: Red LED lights at set pressure and over	Red LED lights at set pressure and over	-
		SW2: Green LED lights at set pressure and over		
Function		1. MODE change-over switch (ME or S1 or S2)	1. MODE change-over switch (ME or SW)	-
		2. S1 set trimmer (2/3 rotation trimmer)	2. SW set trimmer (2/3 rotation trimmer)	-
		3. S2 set trimmer (2/3 rotation trimmer)	3. HYS set trimmer (Approx. 0 to 15% F.S.)	-

Vacuum break function specifications

Valve	Burst air flow rate ℓ/min (ANR)
Normally closed	0 to 7.5
Self hold type	0.2 to 2

*1 : Value at supply pressure of 0.5 MPa.
*2 : Note that for self hold type, the valve response specifications cannot be met outside the above flow rate setting range.
*3 : The burst air flow rate will vary with the diameter and length (piping resistance, etc.) of the vacuum side piping.

Vacuum filter specifications

Descriptions	Vacuum filter
Element material	PVF (Polyvinyl formal)
Filtration rating μm	10
Filtration area mm^2	502
Replacement filter element model No.	VSX-E

Weight table

● Single unit

Model No.	Unit contents	Weight (g)
VSX-□□-□□S-□-D□	Vacuum ejector unit (atmospheric release, with vacuum pressure switch with LED display)	81
VSX-□□-□□J-□-D□	Vacuum ejector unit (common exhaust, with vacuum pressure switch with LED display)	84
VSX-□□-□□S-□-A0	Vacuum ejector unit (atmospheric release, with vacuum pressure switch with analog output)	78
VSX-□□-□□J-□-A0	Vacuum ejector unit (common exhaust, with vacuum pressure switch with analog output)	81
VSX-□□-□□S-□	Vacuum ejector unit (atmospheric release, vacuum pressure switch)	71
VSX-□□-□□J-□	Vacuum ejector unit (common exhaust, vacuum pressure switch)	74

*1 : DIN rail mount is heavier than the above weight by approx. 5 g.

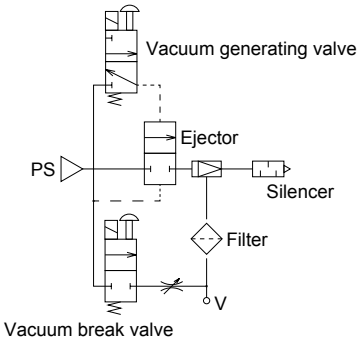
● Manifold

Model No.	Manifold mounting unit content	Weight (g)
VSXM-□□□-□□S-□□-D□-2	Vacuum ejector unit, atmospheric release, with vacuum pressure switch with LED display, 2-station manifold	310
VSXM-□□□-□□□-□□-D□-2	Vacuum ejector unit, common exhaust, with vacuum pressure switch with LED display, 2-station manifold	330

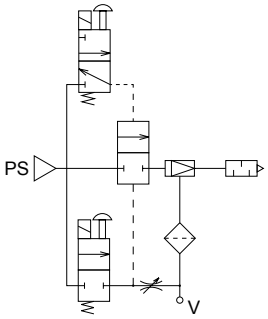
*1 : 90 g heavier with each station increase.
*2 : The above weight is for the type equipped with vacuum pressure switch with LED display. Vacuum pressure switch with analog output built in is lighter than the above weight by 3 g/station, while the type without vacuum pressure switch is lighter than the above weight by 10 g/station.

Circuit diagram

● Normally closed



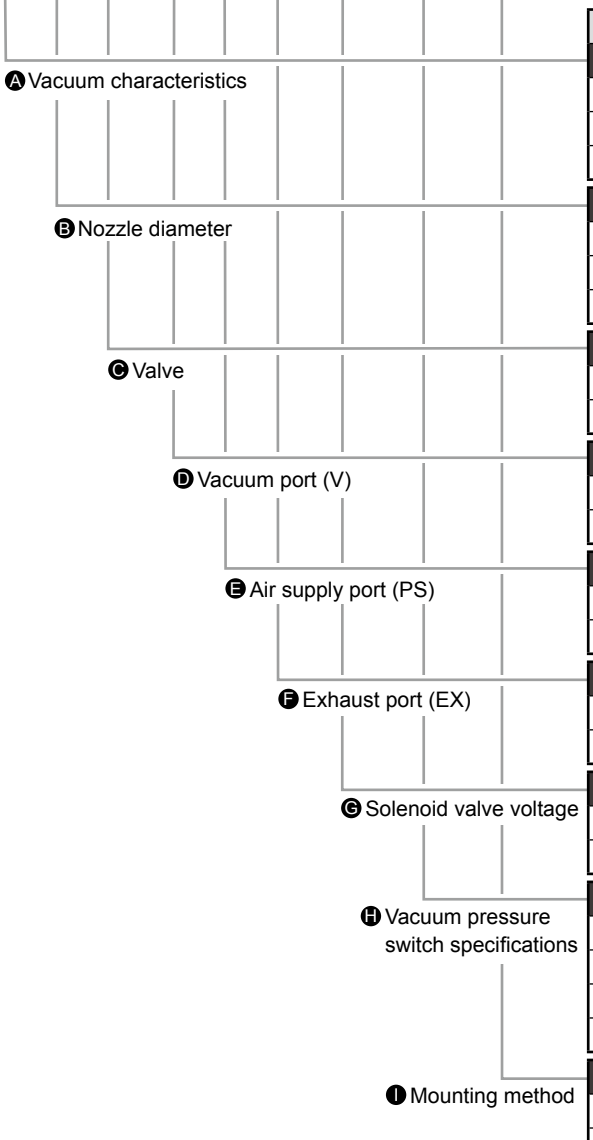
● Self hold type



How to order (single unit)

● 10.5 mm width integrated vacuum ejector unit, single unit

VSX - H 07 D - 6 6 J - 3 - DW - D



Code	Content
Ⓐ Vacuum characteristics *1	
H	High vacuum/medium flow rate
L	Medium vacuum/large flow rate
E	High vacuum/low flow rate
Ⓑ Nozzle diameter *1	
05	ø0.5
07	ø0.7
10	ø1.0
Ⓒ Valve	
B	Normally closed
D	Self hold type
Ⓓ Vacuum port (V)	
4	ø4 push-in fitting
6	ø6 push-in fitting
Ⓔ Air supply port (PS)	
4	ø4 push-in fitting
6	ø6 push-in fitting
Ⓕ Exhaust port (EX) *1	
S	Atmospheric release with silencer
J	ø6 push-in fitting common exhaust
Ⓖ Solenoid valve voltage	
1	100 VAC
3	24 VDC
Ⓗ Vacuum pressure switch specifications	
Blank	Without vacuum pressure switch
DW	With digital display, NPN output 2 points
DA	With digital display, NPN output 1 point + analog output
AO	Analog output
Ⓘ Mounting method	
D	DIN rail mount
Blank	Direct mount

⚠ Precautions for model No. selection

*1 : With the combination of Ⓐ and Ⓑ for “L10”, Ⓕ “J” cannot be selected.

How to order (manifold)

● 10.5 mm width integrated vacuum ejector unit manifold

VSXM - H 07 D - 6 10 10 - 3 - 10 - DW

● 10.5 mm width integrated vacuum ejector unit manifold single unit

VSXM - H 07 D - 6 ——— 3 ——— DW

● 10.5 mm width integrated vacuum ejector unit manifold only

VSXM ——— 10 10 ——— 10

Code	Content	Type: Manifold	Type: Single unit for manifold	Type: Manifold only
Ⓐ Vacuum characteristics *1, *2				
H	High vacuum/medium flow rate	●	●	
L	Medium vacuum/large flow rate	●	●	
E	High vacuum/low flow rate	●	●	
Z	For mixed specs (indicate breakdown on specs sheet.)	●		
Ⓑ Nozzle diameter *1, *2				
05	ø0.5	●	●	
07	ø0.7	●	●	
10	ø1.0	●	●	
00	For mixed specs (indicate breakdown on specs sheet.)	●		
Ⓒ Valve *1				
B	Normally closed	●	●	
D	Self hold type	●	●	
Z	For mixed specs (indicate breakdown on specs sheet.)	●		
Ⓓ Vacuum port (V) *1				
4	ø4 push-in fitting	●	●	
6	ø6 push-in fitting	●	●	
CX	For mixed fittings (indicate breakdown on specs sheet.)	●		
Ⓔ Air supply port (PS)				
4	ø4 push-in fitting	●		●
6	ø6 push-in fitting	●		●
8	ø8 push-in fitting	●		●
10	ø10 push-in fitting	●		●
Ⓕ Exhaust port (EX) *3				
S	Atmospheric release with silencer	●		●
6	ø6 push-in fitting common exhaust	●		●
8	ø8 push-in fitting common exhaust	●		●
10	ø10 push-in fitting common exhaust	●		●
Ⓖ Solenoid valve voltage				
1	100 VAC	●	●	
3	24 VDC	●	●	
Ⓗ Manifold station No. *4				
2	2 stations	●		●
to	to			
10	10 stations			
Ⓘ Vacuum pressure switch specifications *1				
Blank	Without vacuum pressure switch	●	●	
DW	With digital display, NPN output 2 points	●	●	
DA	With digital display, NPN output 1 point + analog output	●	●	
AO	Analog output	●	●	
Z	For mixed specs (indicate breakdown on specs sheet.)	●		

Ⓐ Vacuum characteristics

Ⓑ Nozzle diameter

Ⓒ Valve

Ⓓ Vacuum port (V)

With the manifold, exhaust air is led into the ejector not in operation and output from the vacuum port. Contact CKD when exhaust air lead-in has adverse effects.

Ⓔ Air supply port (PS)

Ⓕ Exhaust port (EX)

Ⓖ Solenoid valve voltage

Ⓗ Manifold station No.

Ⓘ Vacuum pressure switch specifications

⚠ Precautions for model No. selection

*1 : Indicate on the "mix manifold specifications sheet" in the case of mixed specifications. Refer to pages 140 and 141 for details.

*2 : When Ⓐ is "Z", Ⓑ is "00" only. When Ⓑ is "00", Ⓐ is "Z" only.

*3 : When common exhaust type (6, 8, 10) is selected for Ⓕ, depending on usage conditions, exhaust air may be disrupted due to insufficient exhaust capacity. Contact CKD for details.

*4 : The number of stations that can be simultaneously operated differs depending on the combination of nozzle diameter and port size. Contact CKD for details.

● Maintenance part model No.

· Filter element

VSX-E

· Silencer element

VSX-SE

· Silencer element F

VSX-EF

· Silencer element D

VSX-ED

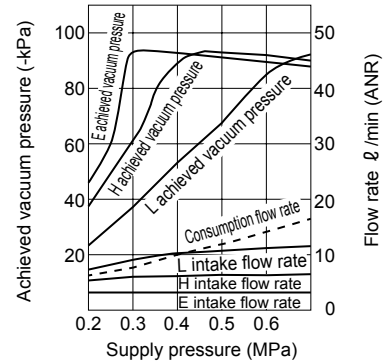
· Silencer element for manifold

VSXPM-SE

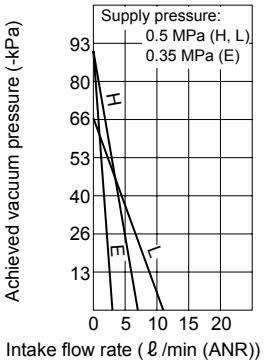
Vacuum characteristics, flow characteristics

●VSX-H05, VSX-L05, VSX-E05

Vacuum characteristics

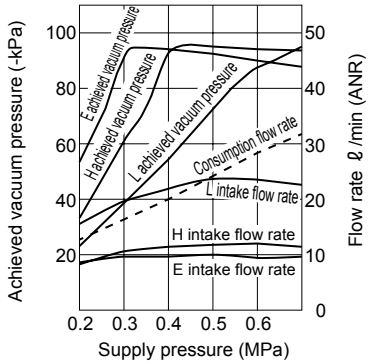


Flow characteristics

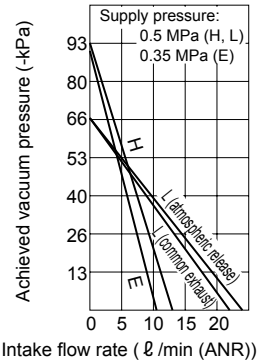


●VSX-H07, VSX-L07, VSX-E07

Vacuum characteristics

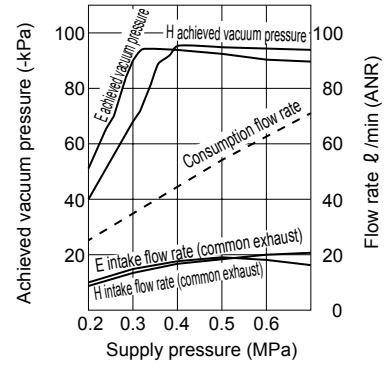


Flow characteristics

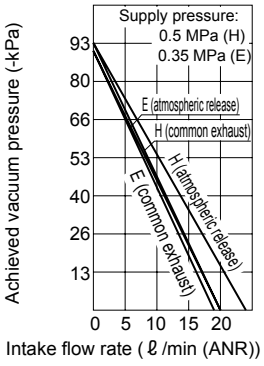


●VSX-H10□-□□J, VSX-L10□-□□J, VSX-E10□-□□J

Vacuum characteristics

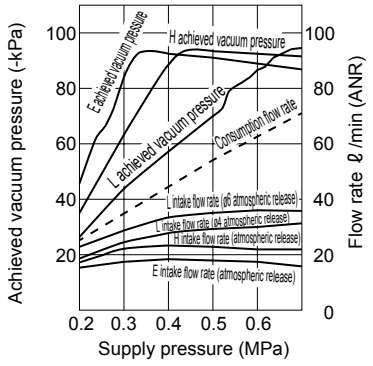


Flow characteristics

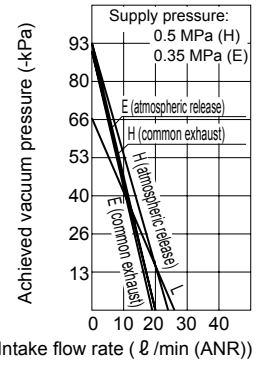


●VSX-H10□-□□S, VSX-L10□-□□S, VSX-E10□-□□S

Vacuum characteristics



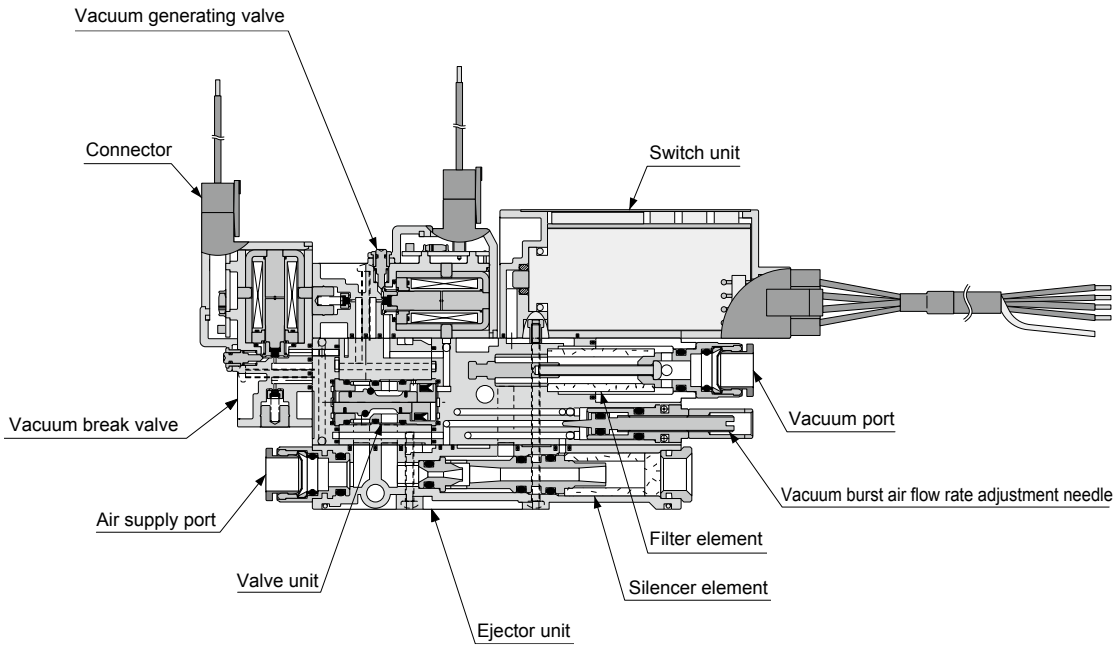
Flow characteristics



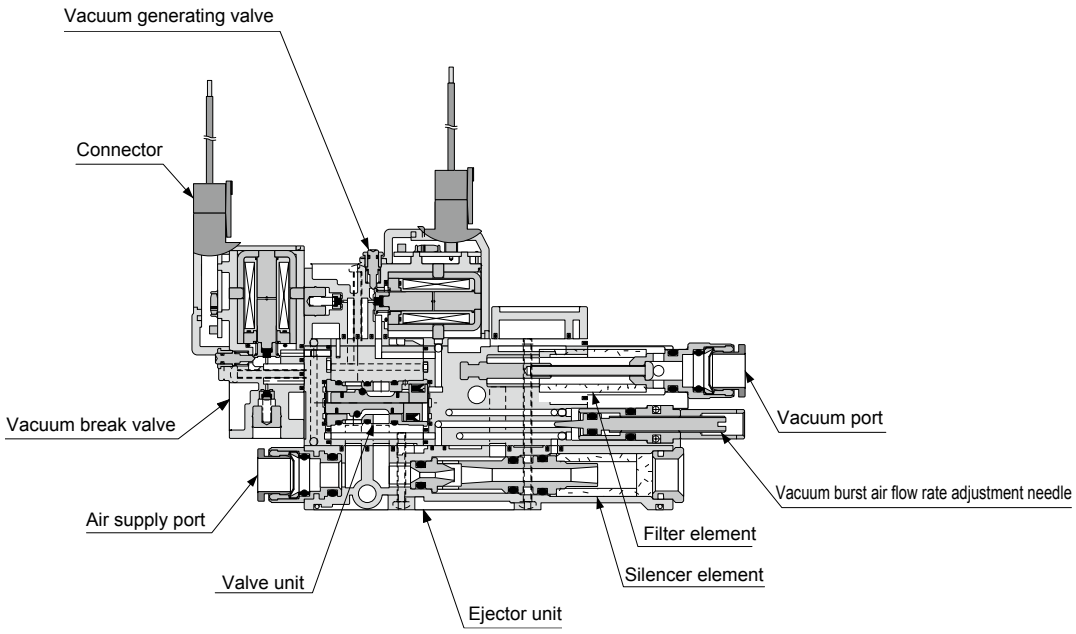
1. Supply pressure with the characteristics described above occurs at vacuum generation.
2. Achieved vacuum pressure with the characteristics described above produces abnormal noise (soft clicking sound) at supply pressure just before reaching the peak value. When this abnormal noise occurs, the characteristics become unstable and operation becomes louder. Reset the supply pressure, as it may affect the sensor, etc., and cause trouble.
   Ex. 1 : Source pressure is 0.5 MPa with the H vacuum ejector. During vacuum ejector operation, supply pressure drops to 0.43 MPa due to pressure drop, and abnormal noise is generated. → Reset supply pressure to 0.5 MPa during vacuum ejector operation.
3. Carry out piping or equipment selection with 3 times the effective cross-sectional area of the nozzle diameter cross-sectional area as a guideline. Satisfactory vacuum characteristics cannot be obtained if adequate supply air flow rate is not maintained.
   (A soft clicking sound occurs at set pressure. Insufficient intake flow rate, insufficient achievement of achieved vacuum pressure, etc.)
   Ex. 2 : Abnormal noise occurs even when pressure is 0.5 MPa with H vacuum ejector during vacuum ejector operation. → Insufficient supply air flow rate. (Supply air flow rate is restricted in front of the vacuum ejector by piping resistance, etc., and supply air flow rate satisfying the properties is not obtained. → Select piping components that can secure the required effective cross-sectional area.)
   Ex. 3 : For vacuum ejector with 1.0 mm nozzle diameter, cross-sectional area is $0.5^2 \times \pi = 0.785\ mm^2 \times 3 = 2.35\ mm^2$. Therefore, carry out piping and equipment selection that ensures an effective cross-sectional area of 2.3 mm^2 or greater.

Internal structure (single unit)

Example) VSX-□□□-□□S-□-□
Type with vacuum pressure switch

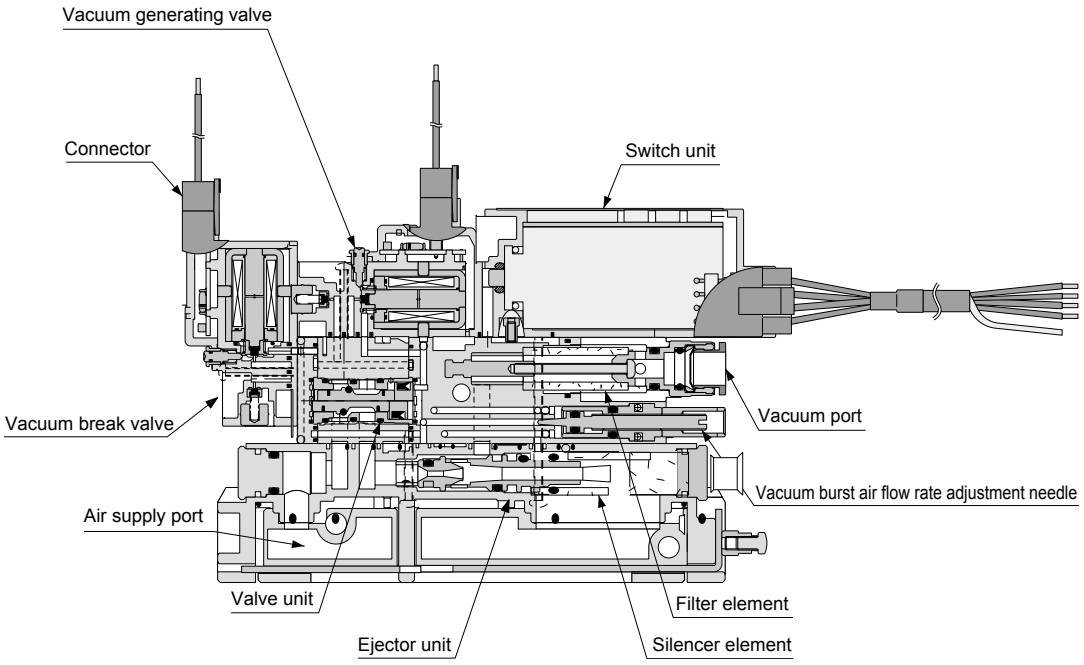


Example) VSX-□□□-□□S-□
Type without vacuum pressure switch

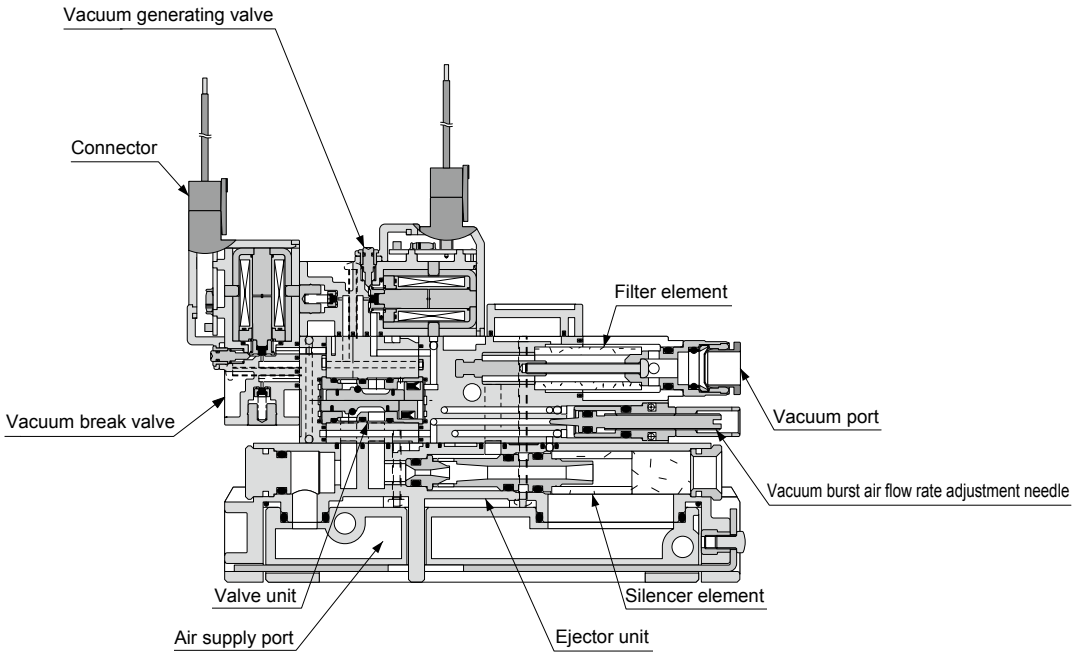


Internal structure (manifold)

Example) VSXM-□□□-□□S-□-□-□
Type with vacuum pressure switch

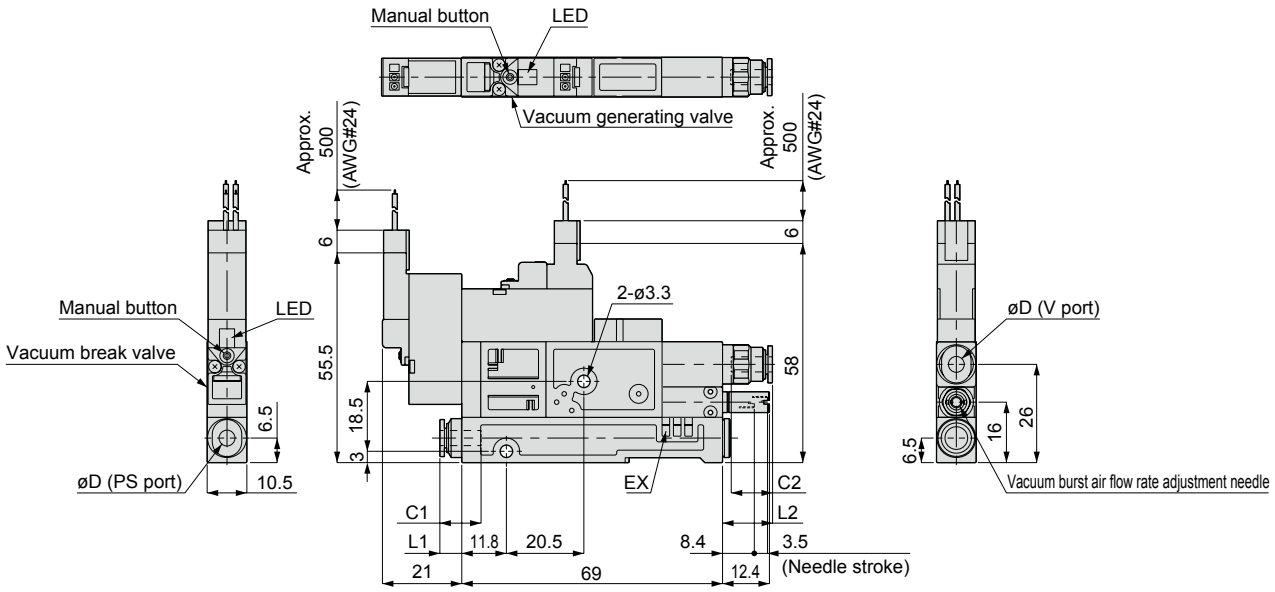


Example) VSXM-□□□-□□S-□-□
Type without vacuum pressure switch



Dimensions (single unit, atmospheric release, without vacuum pressure switch)

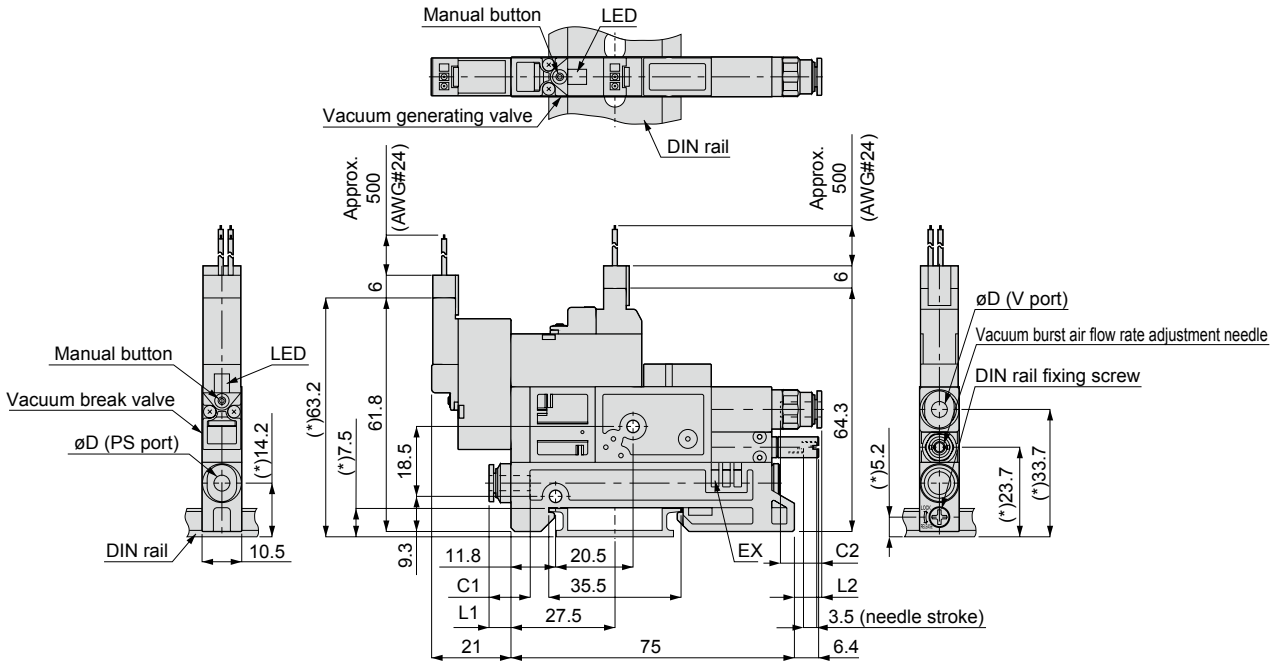
● Direct mounting



Unit: mm

Model No.	Tube O.D. (øD)	C1	C2	L1	L2
VSX-□□□-□□S-□	4	11.2	11.2	6.1	13.5
	6	11.9	11.9	8.9	13.7

● DIN rail mounting



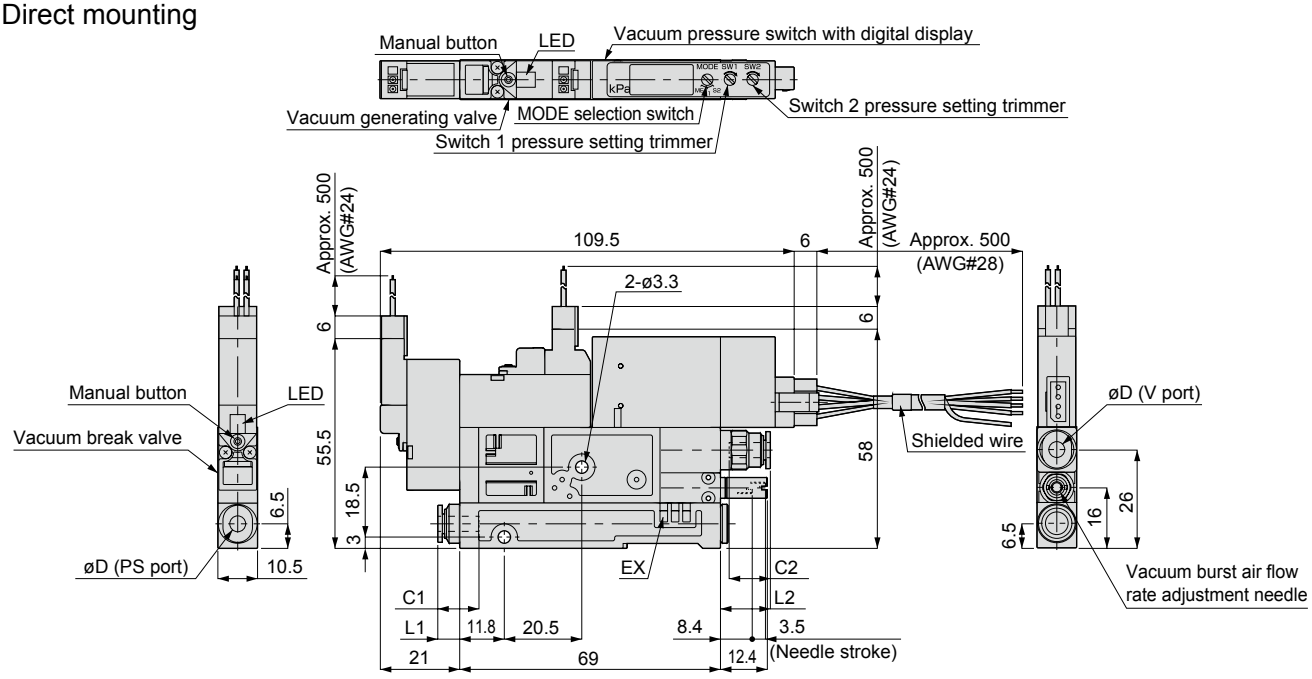
Note) Dimensions of the part with (*) mark are the values when DIN rail height is 7.5 mm.

Unit: mm

Model No.	Tube O.D. (øD)	C1	C2	L1	L2
VSX-□□□-□□S-□-D	4	11.2	11.2	6.1	7.5
	6	11.9	11.9	8.9	7.7

Dimensions (single unit, atmospheric release, with vacuum pressure switch with 2-point switch output with digital display)

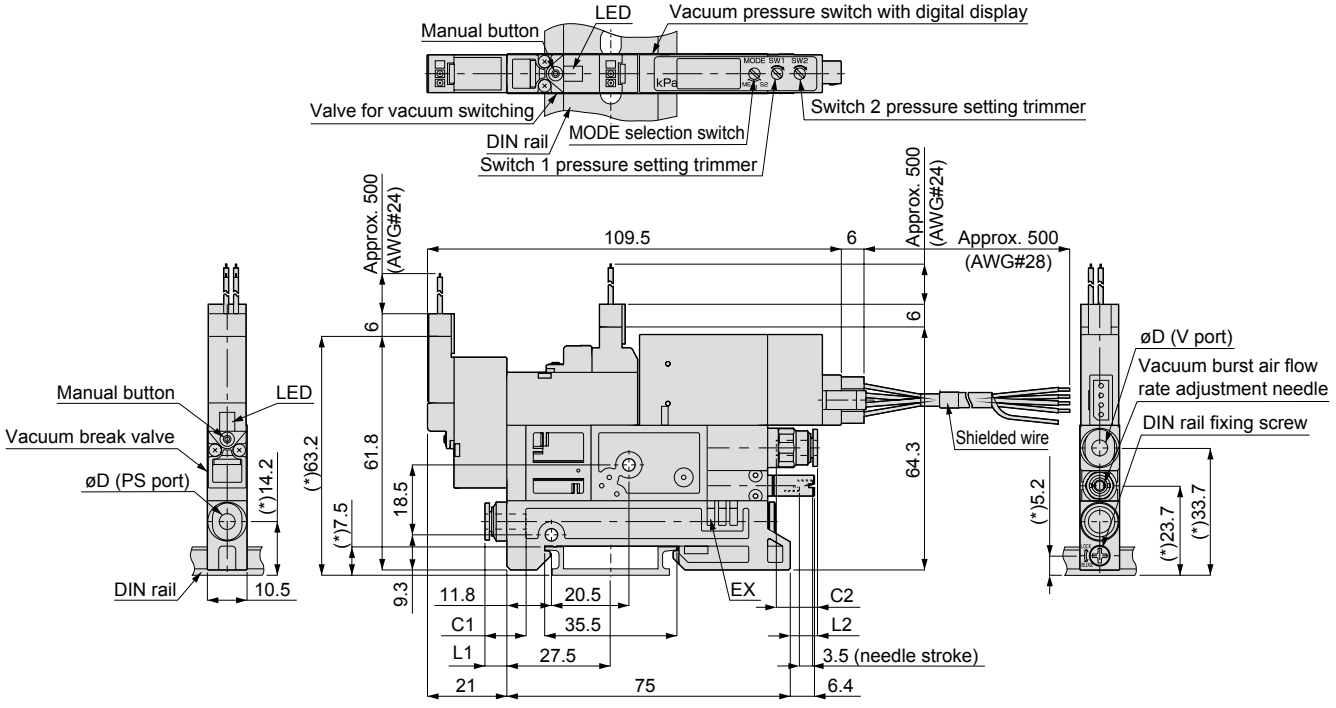
● Direct mounting



Unit: mm

Model No.	Tube O.D. (øD)	C1	C2	L1	L2
VSX-□□□-□□S-□-DW	4	11.2	11.2	6.1	13.5
	6	11.9	11.9	8.9	13.7

● DIN rail mounting



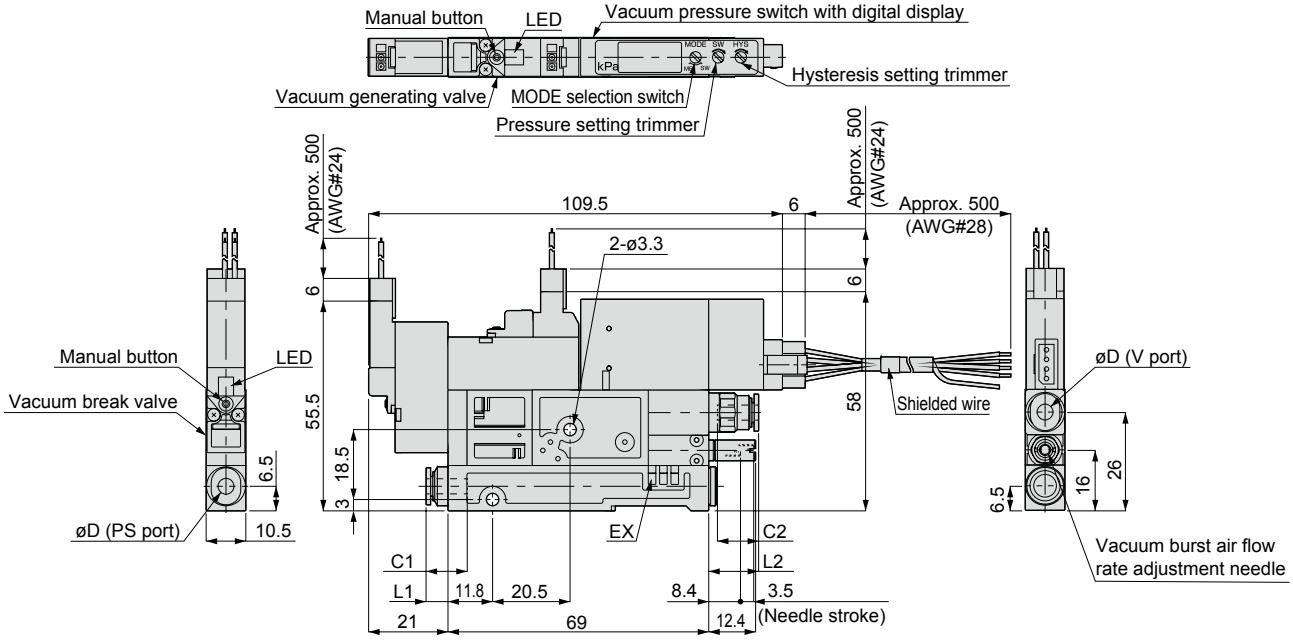
Note) Dimensions of the part with (*) mark are the values when DIN rail height is 7.5 mm.

Unit: mm

Model No.	Tube O.D. (øD)	C1	C2	L1	L2
VSX-□□□-□□S-□-DW-D	4	11.2	11.2	6.1	7.5
	6	11.9	11.9	8.9	7.7

Dimensions (single unit, atmospheric release, analog output with digital display, with vacuum pressure switch with switch output)

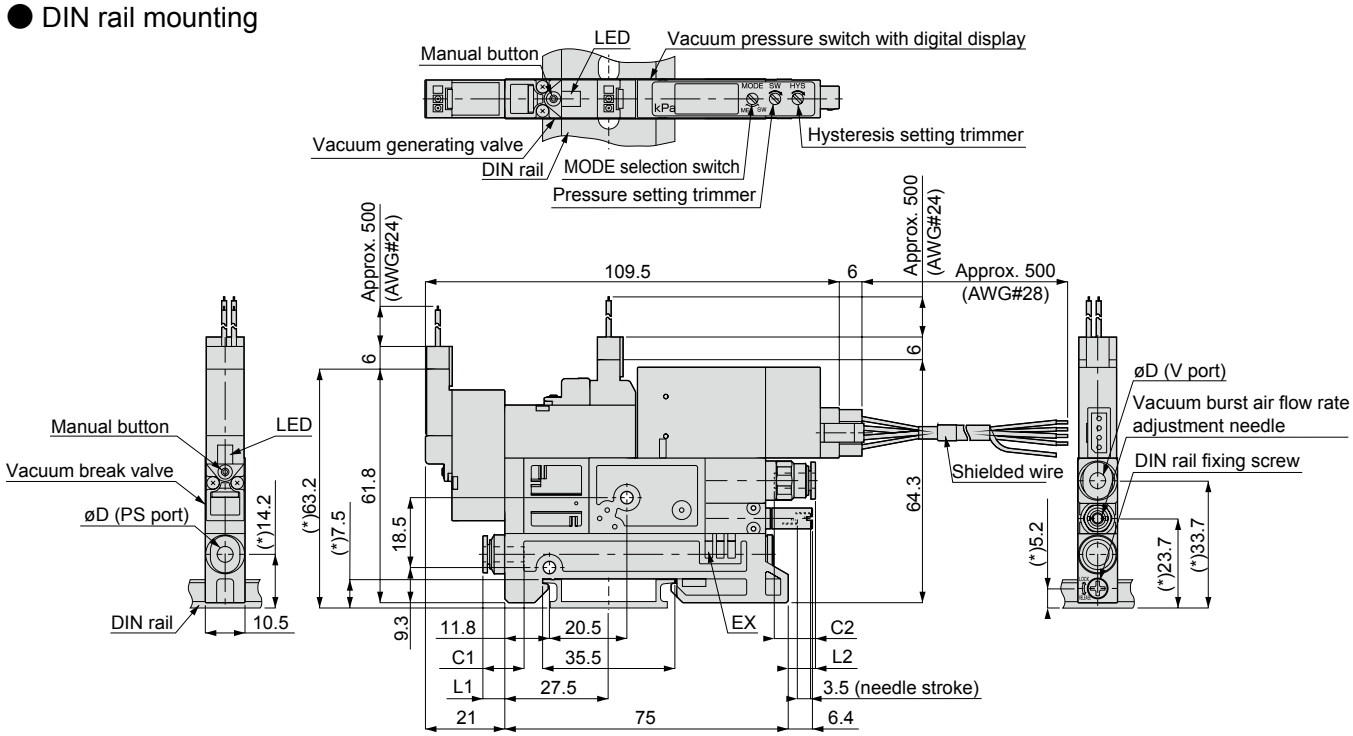
● Direct mounting



Unit: mm

Model No.	Tube O.D. (øD)	C1	C2	L1	L2
VSX-□□□-□□S-□-DA	4	11.2	11.2	6.1	13.5
	6	11.9	11.9	8.9	13.7

● DIN rail mounting



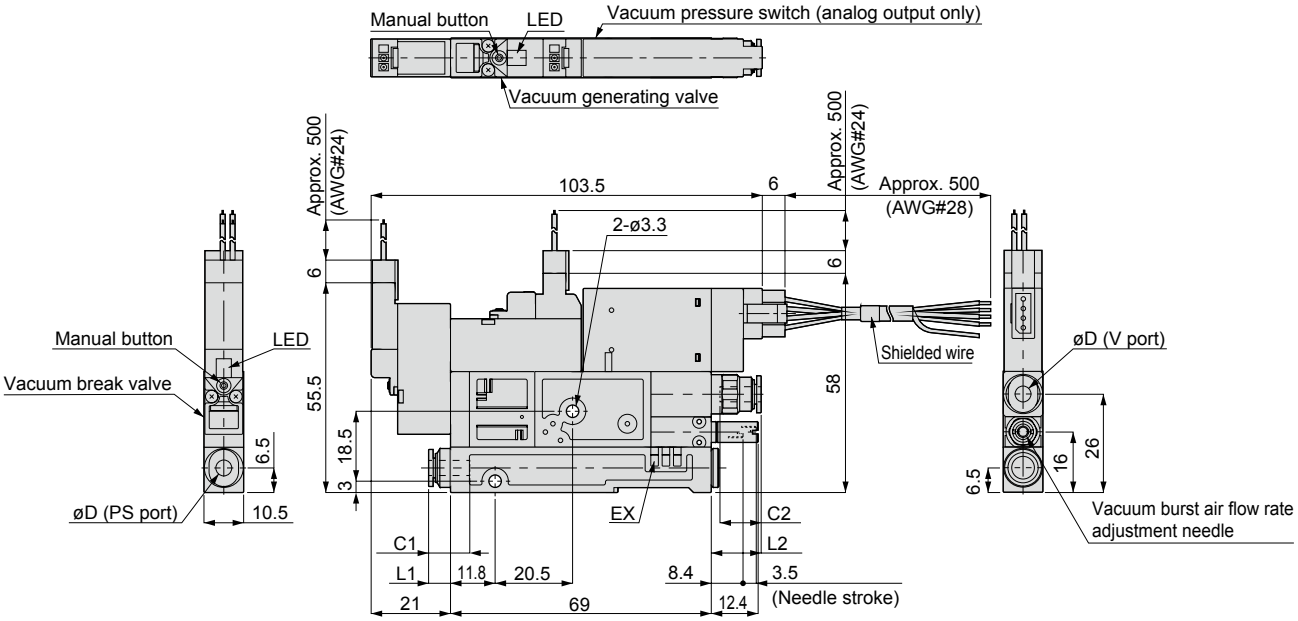
Note) Dimensions of the part with (*) mark are the values when DIN rail height is 7.5 mm.

Unit: mm

Model No.	Tube O.D. (øD)	C1	C2	L1	L2
VSX-□□□-□□S-□-DA-D	4	11.2	11.2	6.1	7.5
	6	11.9	11.9	8.9	7.7

Dimensions (single unit, atmospheric release, with vacuum pressure switch with analog output)

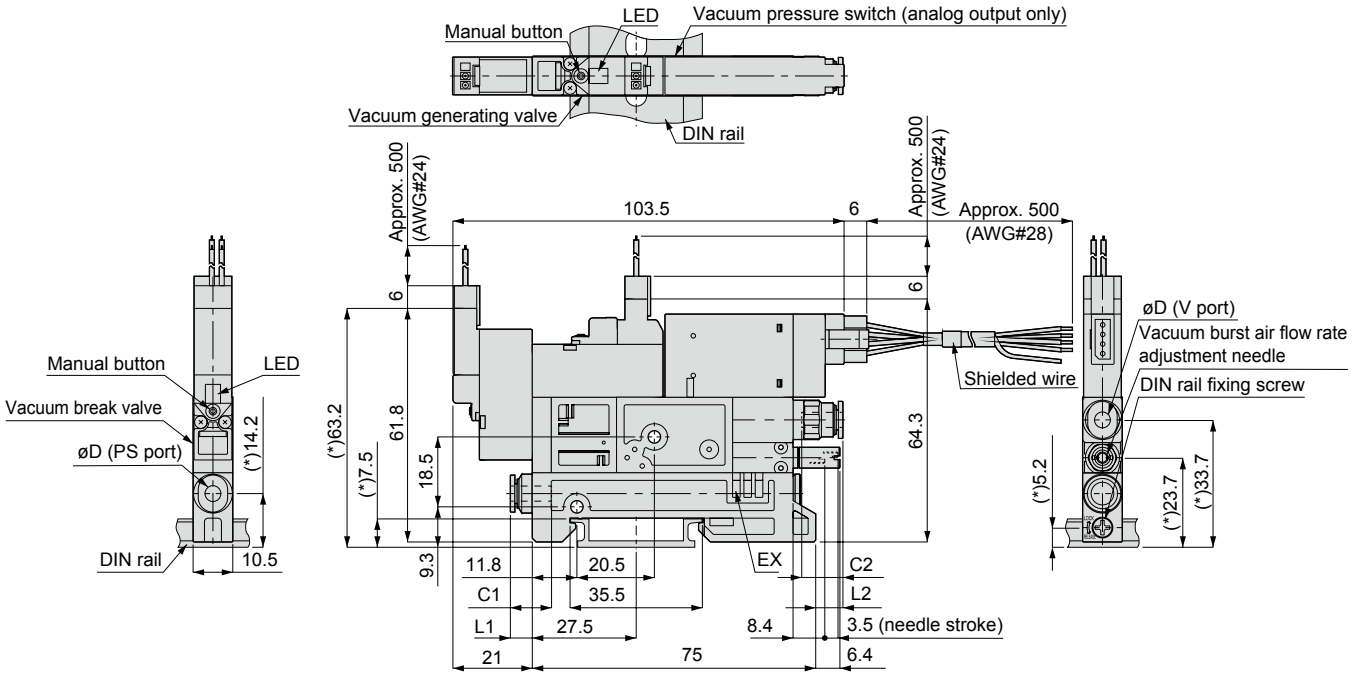
● Direct mounting



Unit: mm

Model No.	Tube O.D. (øD)	C1	C2	L1	L2
VSX-□□□-□□S-□-A0	4	11.2	11.2	6.1	13.5
	6	11.9	11.9	8.9	13.7

● DIN rail mounting



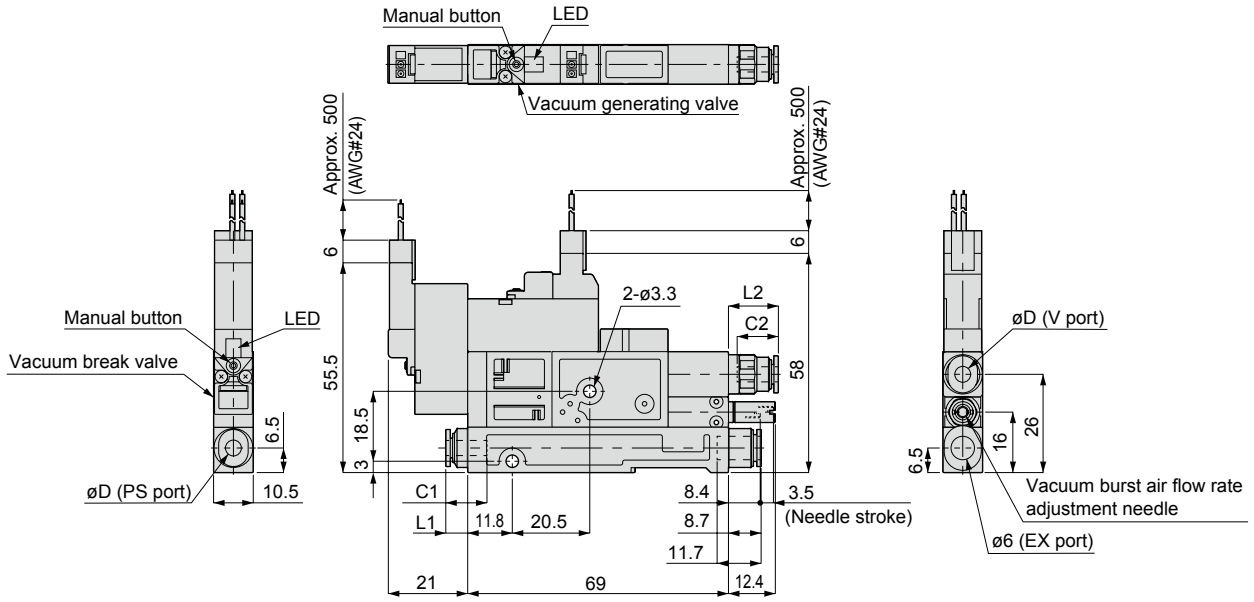
Note) Dimensions of the part with (*) mark are the values when DIN rail height is 7.5 mm.

Unit: mm

Model No.	Tube O.D. (øD)	C1	C2	L1	L2
VSX-□□□-□□S-□-A0-D	4	11.2	11.2	6.1	7.5
	6	11.9	11.9	8.9	7.7

Dimensions (single unit, common exhaust, without vacuum pressure switch)

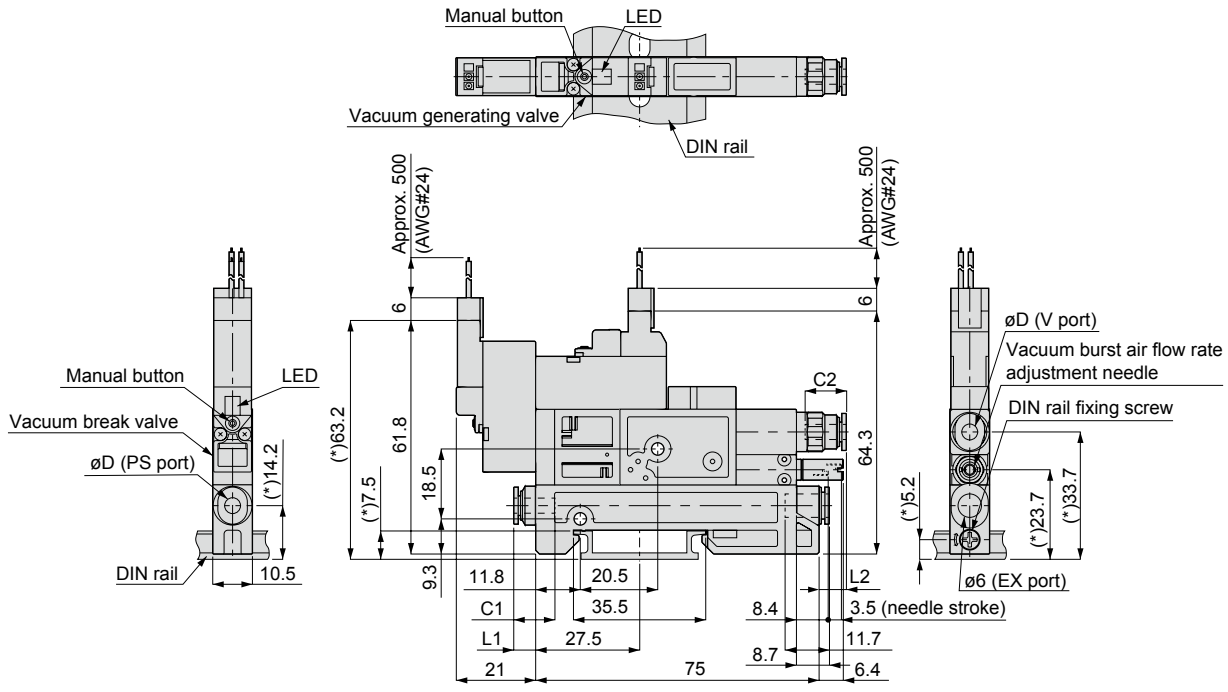
● Direct mounting



Unit: mm

Model No.	Tube O.D. (øD)	C1	C2	L1	L2
VSX-□□□-□□J-□	4	11.2	11.2	6.1	13.5
	6	11.9	11.9	8.9	13.7

● DIN rail mounting



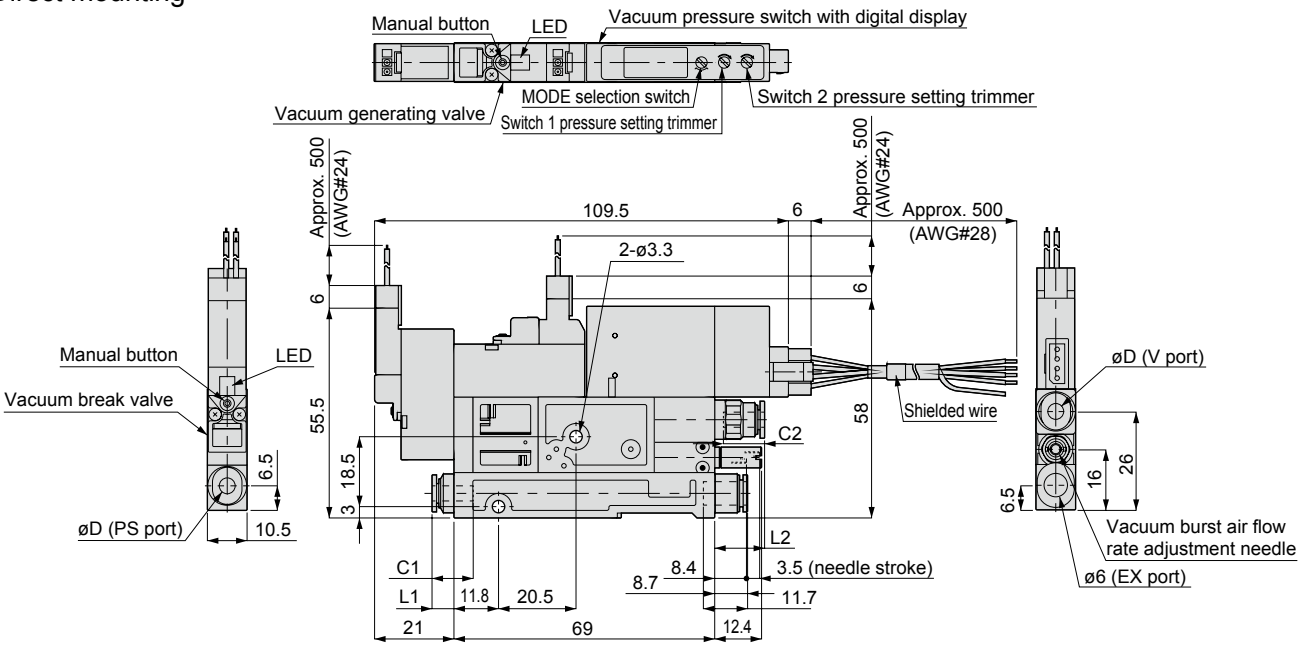
Note) Dimensions of the part with (*) mark are the values when DIN rail height is 7.5 mm.

Unit: mm

Model No.	Tube O.D. (øD)	C1	C2	L1	L2
VSX-□□□-□□J-□-D	4	11.2	11.2	6.1	7.5
	6	11.9	11.9	8.9	7.7

Dimensions (single unit, common exhaust, with vacuum pressure switch with 2-point switch output with digital display)

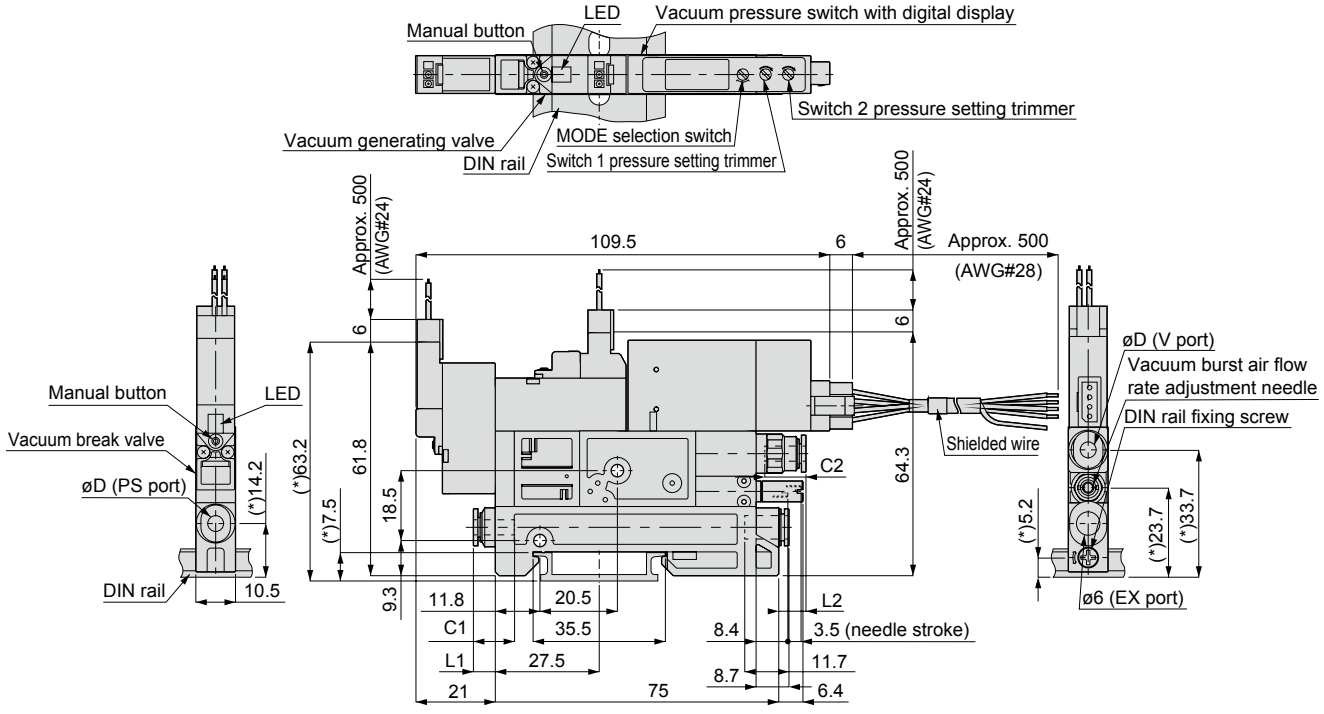
● Direct mounting



Unit: mm

Model No.	Tube O.D. (øD)	C1	C2	L1	L2
VSX-□□□-□□J-□-DW	4	11.2	11.2	6.1	13.5
	6	11.9	11.9	8.9	13.7

● DIN rail mounting



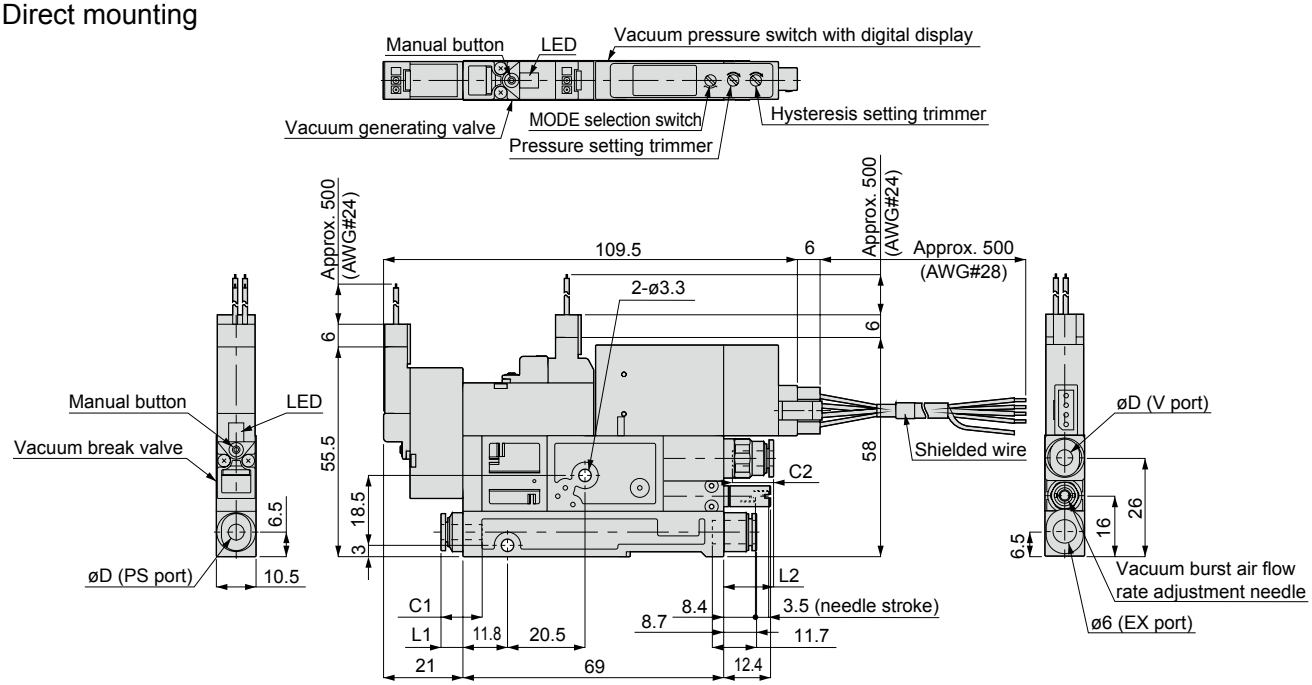
Note) Dimensions of the part with (*) mark are the values when DIN rail height is 7.5 mm.

Unit: mm

Model No.	Tube O.D. (øD)	C1	C2	L1	L2
VSX-□□□-□□J-□-DW-D	4	11.2	11.2	6.1	7.5
	6	11.9	11.9	8.9	7.7

Dimensions (single unit, common exhaust, analog output with digital display, with vacuum pressure switch with switch output)

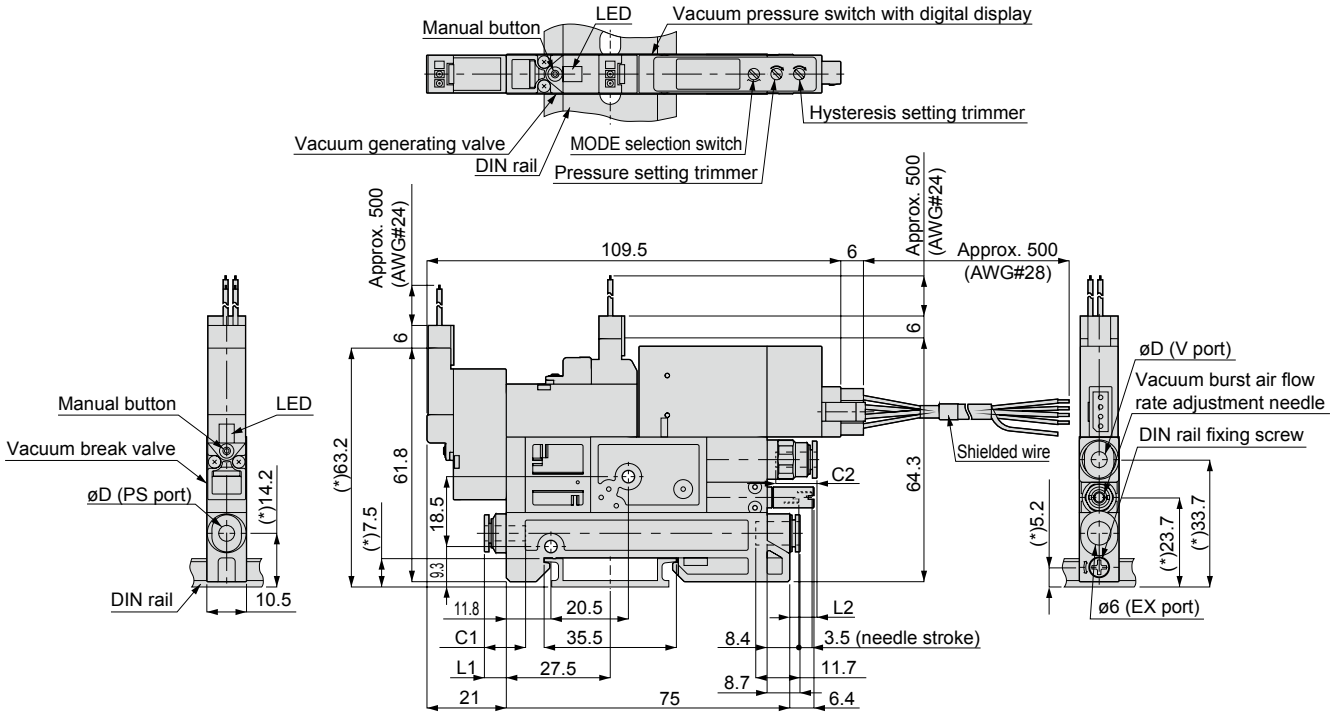
● Direct mounting



Unit: mm

Model No.	Tube O.D. (øD)	C1	C2	L1	L2
VSX-□□□-□□J-□-DA	4	11.2	11.2	6.1	13.5
	6	11.9	11.9	8.9	13.7

● DIN rail mounting



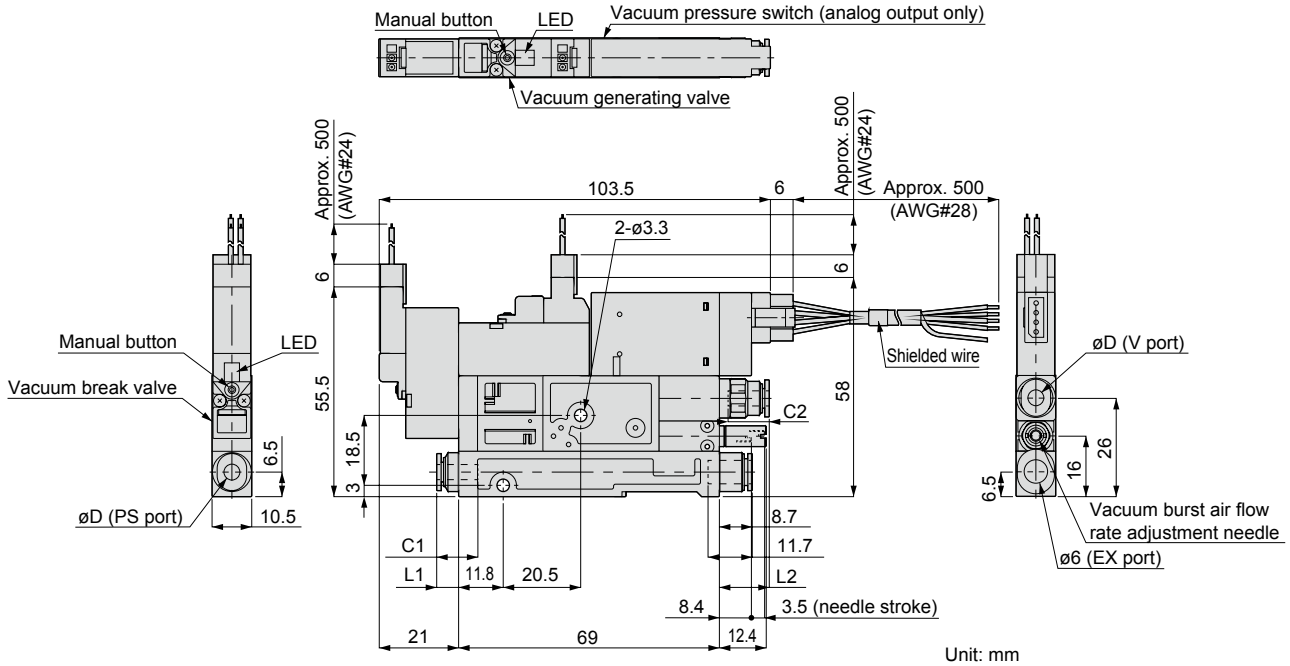
Note) Dimensions of the part with (*) mark are the values when DIN rail height is 7.5 mm.

Unit: mm

Model No.	Tube O.D. (øD)	C1	C2	L1	L2
VSX-□□□-□□J-□-DA-D	4	11.2	11.2	6.1	7.5
	6	11.9	11.9	8.9	7.7

Dimensions (single unit, common exhaust with vacuum pressure switch with analog output)

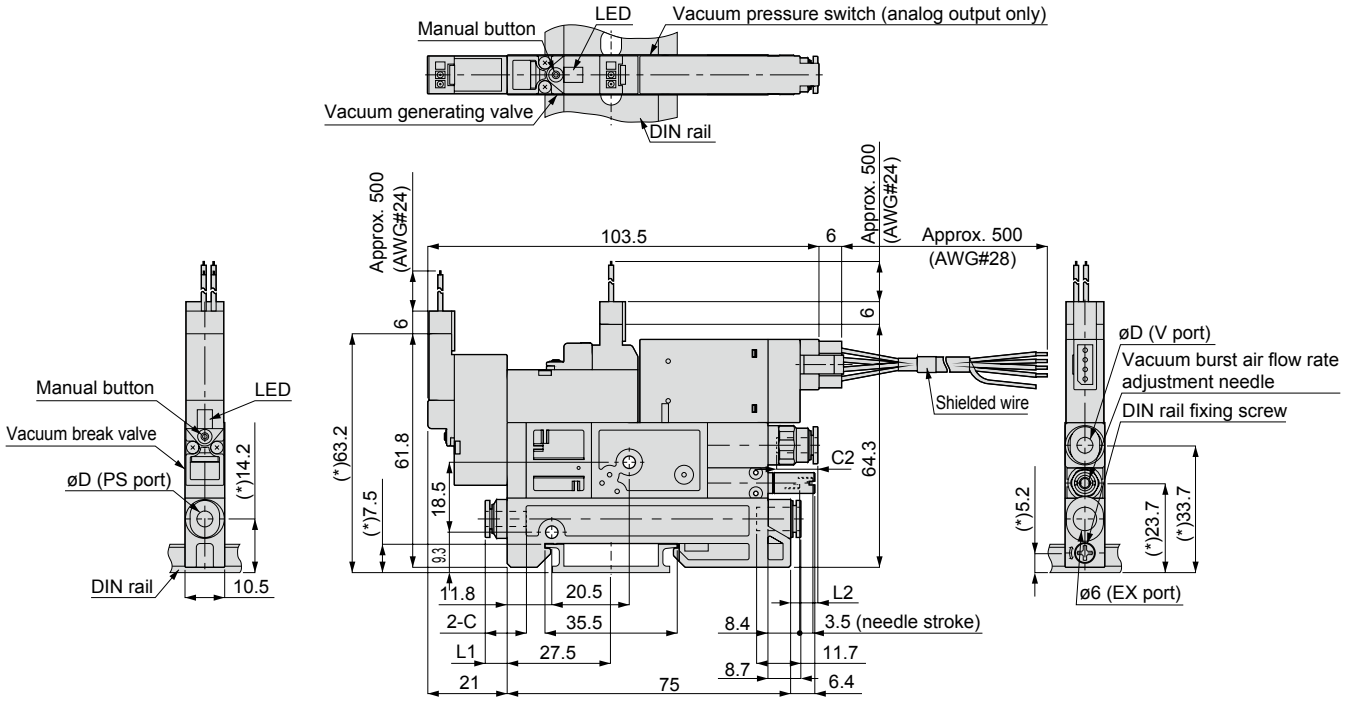
● Direct mounting



Unit: mm

Model No.	Tube O.D. (øD)	C1	C2	L1	L2
VSX-□□□-□□J-□-A0	4	11.2	11.2	6.1	13.5
	6	11.9	11.9	8.9	13.7

● DIN rail mounting



Note) Dimensions of the part with (*) mark are the values when DIN rail height is 7.5 mm.

Unit: mm

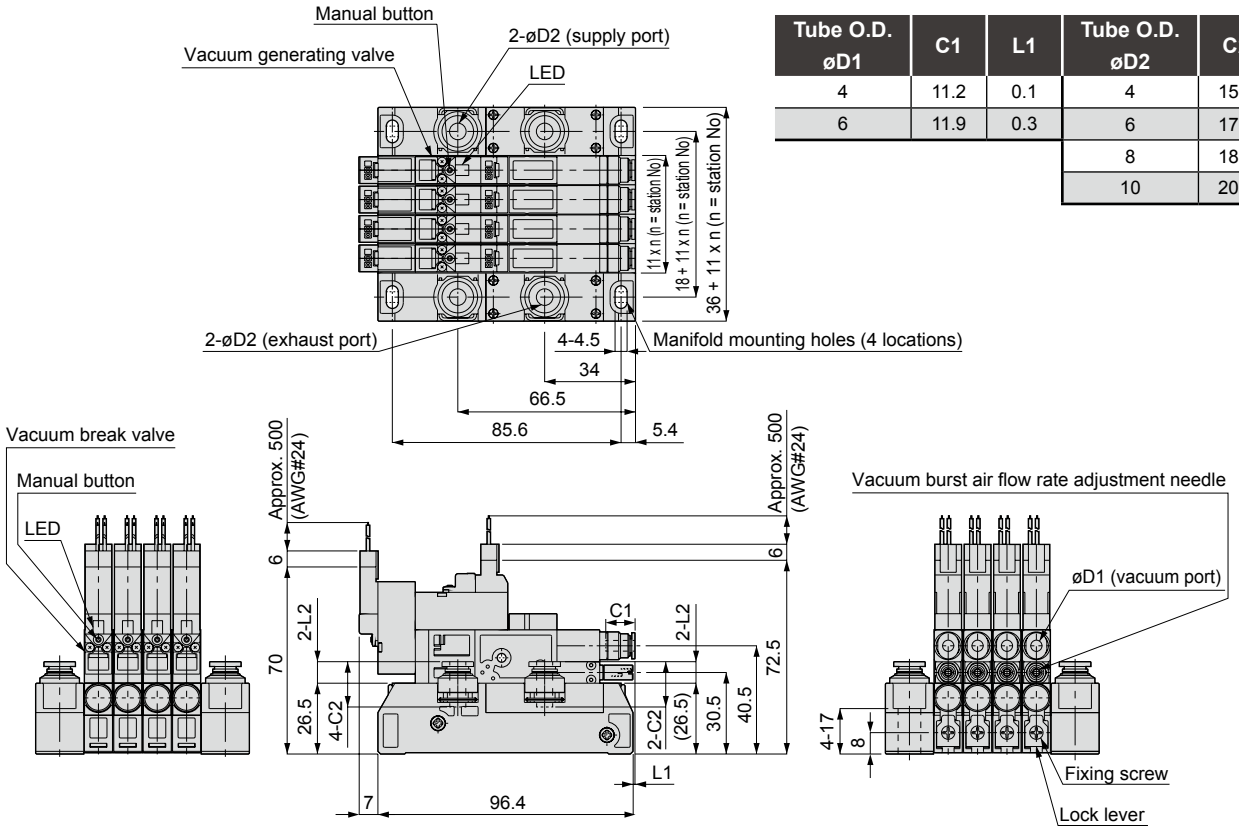
Model No.	Tube O.D. (øD)	C1	C2	L1	L2
VSX-□□□-□□J-□-A0-D	4	11.2	11.2	6.1	7.5
	6	11.9	11.9	8.9	7.7

Dimensions (manifold, VSXM, without vacuum pressure switch)

● Common exhaust

Unit: mm

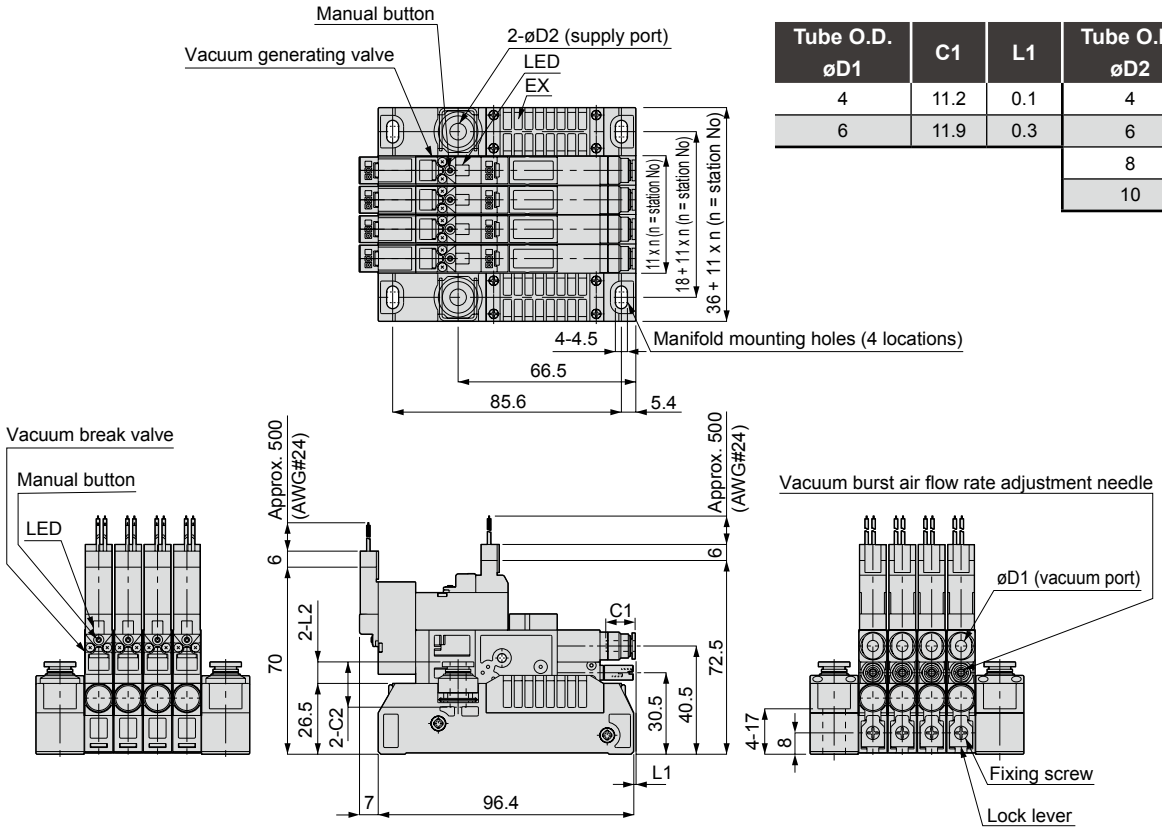
Tube O.D. øD1	C1	L1	Tube O.D. øD2	C2	L2
4	11.2	0.1	4	15.2	3.8
6	11.9	0.3	6	17.2	8.3
			8	18.2	9.6
			10	20.7	13.2



● Atmosphere release

Unit: mm

Tube O.D. øD1	C1	L1	Tube O.D. øD2	C2	L2
4	11.2	0.1	4	15.2	3.8
6	11.9	0.3	6	17.2	8.3
			8	18.2	9.6
			10	20.7	13.2

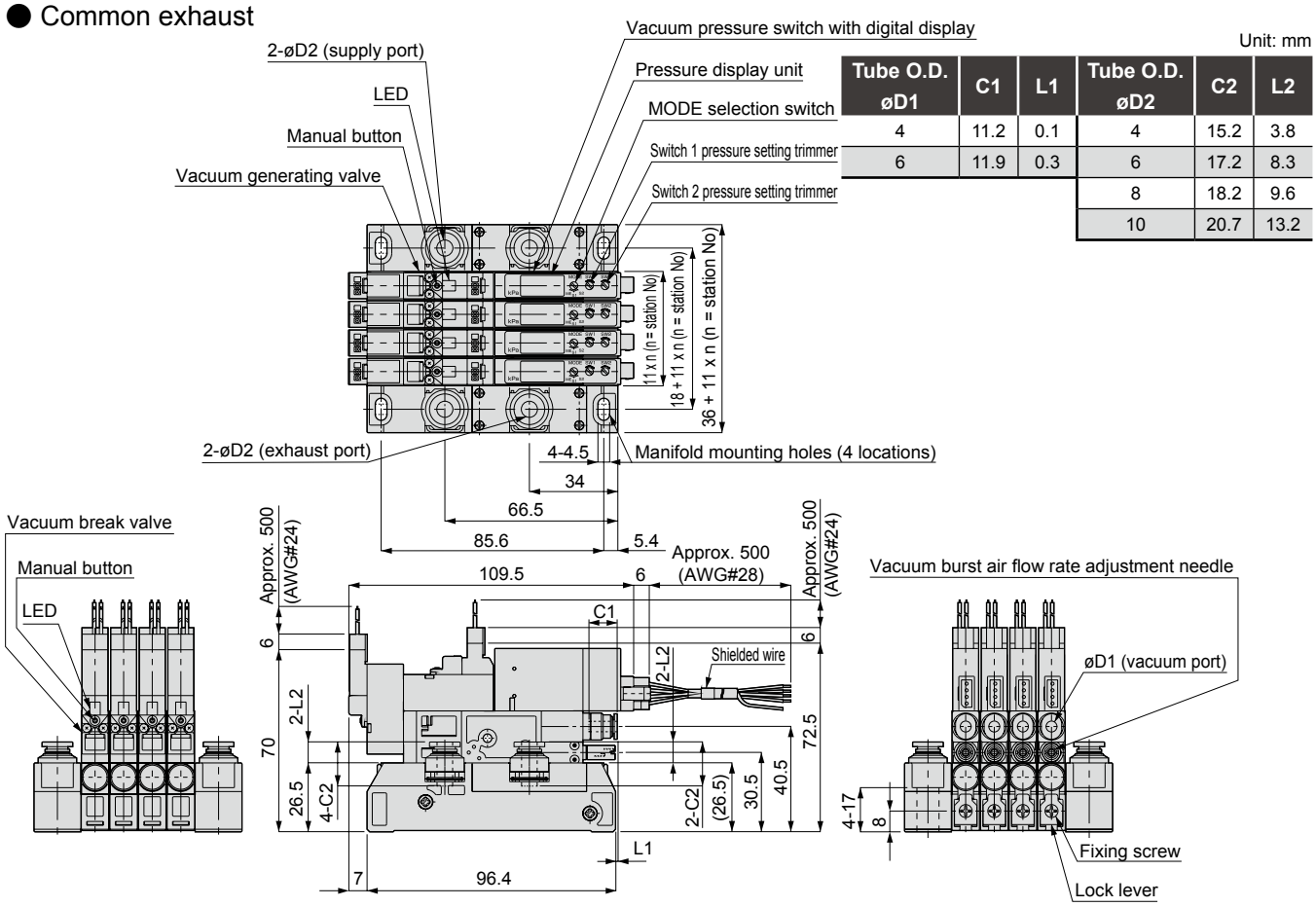


Dimensions (manifold VSXM, with 2-point switch output with digital display, with vacuum pressure switch)

● Common exhaust

Unit: mm

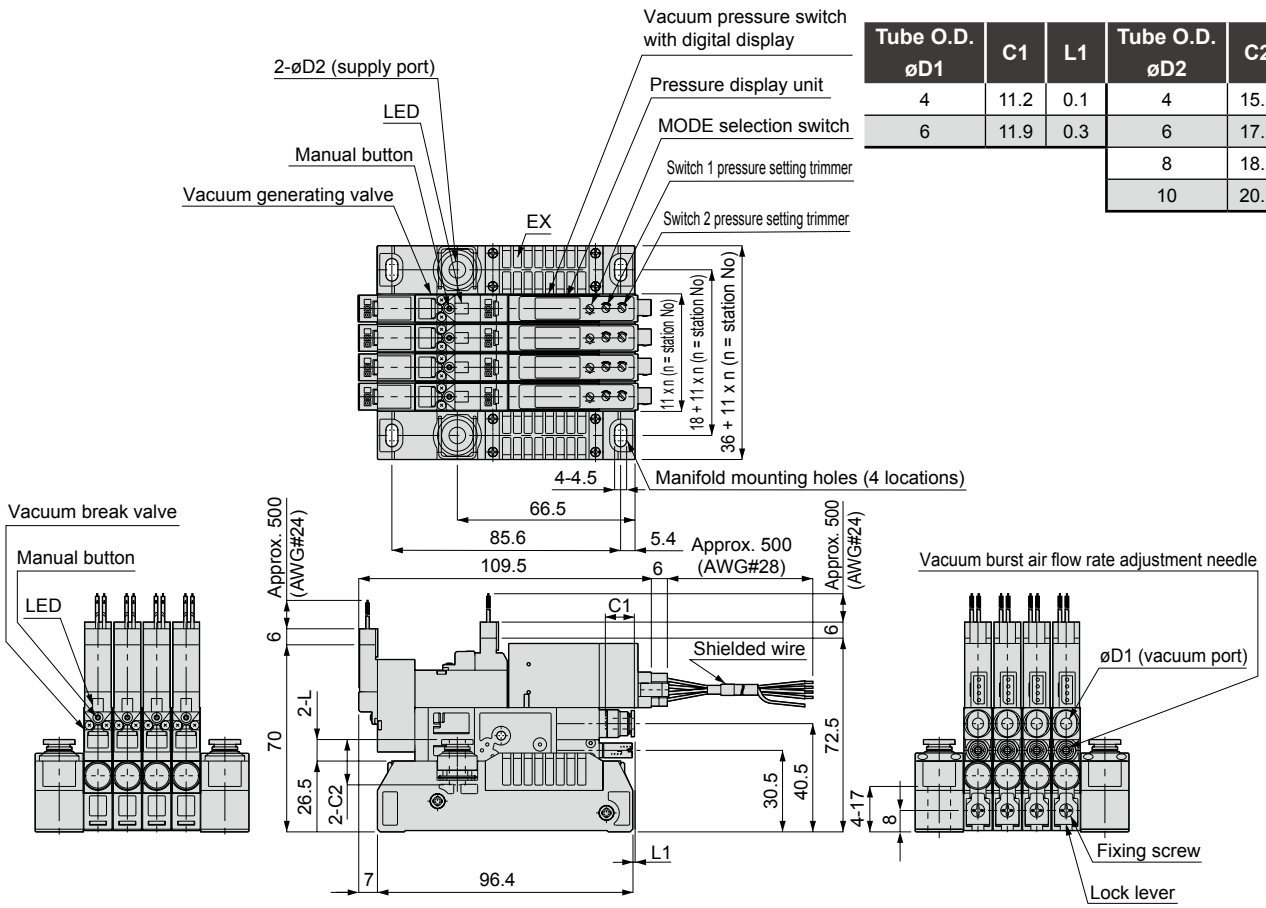
Tube O.D. øD1	C1	L1	Tube O.D. øD2	C2	L2
4	11.2	0.1	4	15.2	3.8
6	11.9	0.3	6	17.2	8.3
			8	18.2	9.6
			10	20.7	13.2



● Atmosphere release

Unit: mm

Tube O.D. øD1	C1	L1	Tube O.D. øD2	C2	L2
4	11.2	0.1	4	15.2	3.8
6	11.9	0.3	6	17.2	8.3
			8	18.2	9.6
			10	20.7	13.2

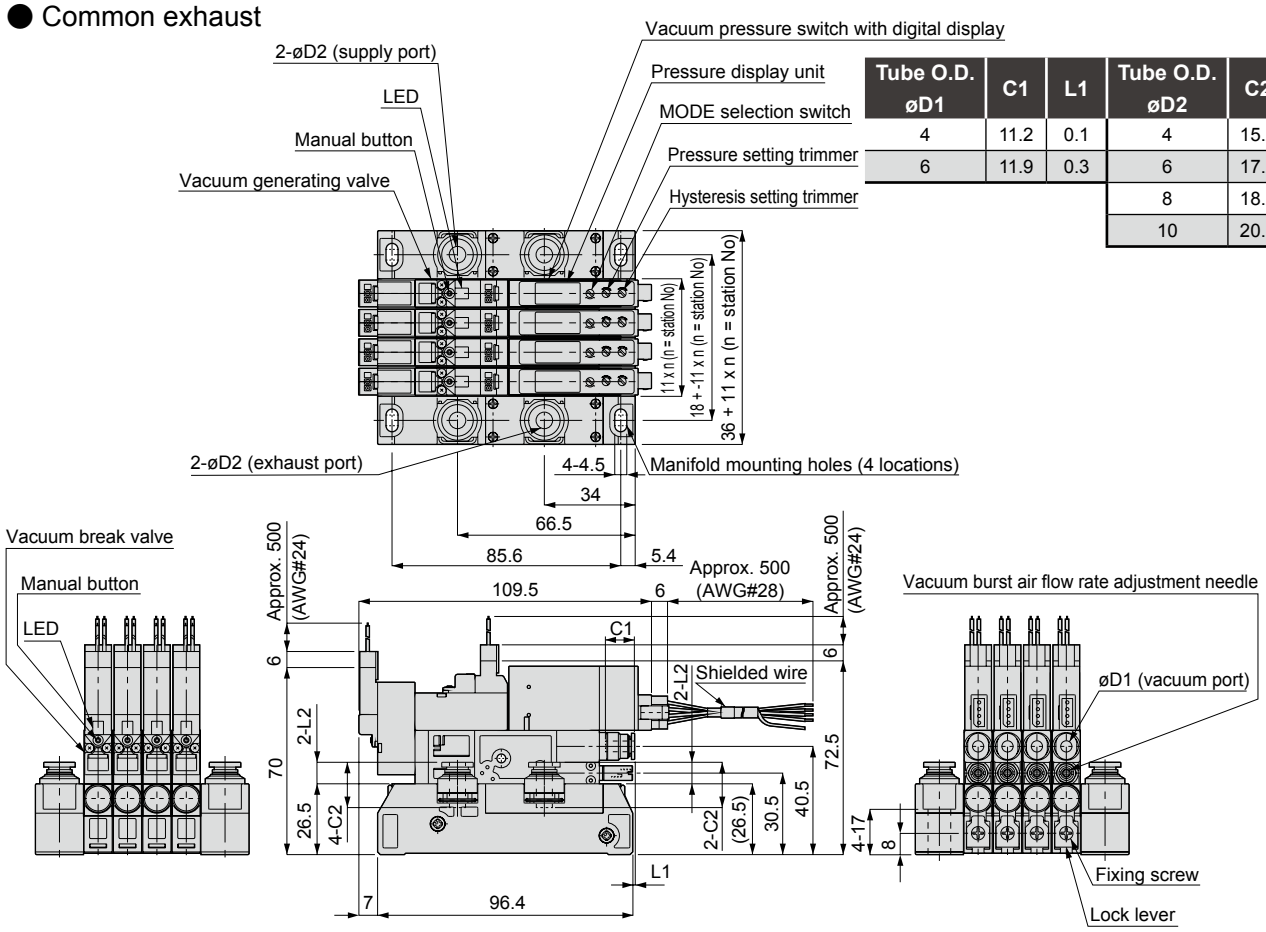


Dimensions (manifold VSXM, analog output with digital display, with vacuum pressure switch with switch output)

● Common exhaust

Unit: mm

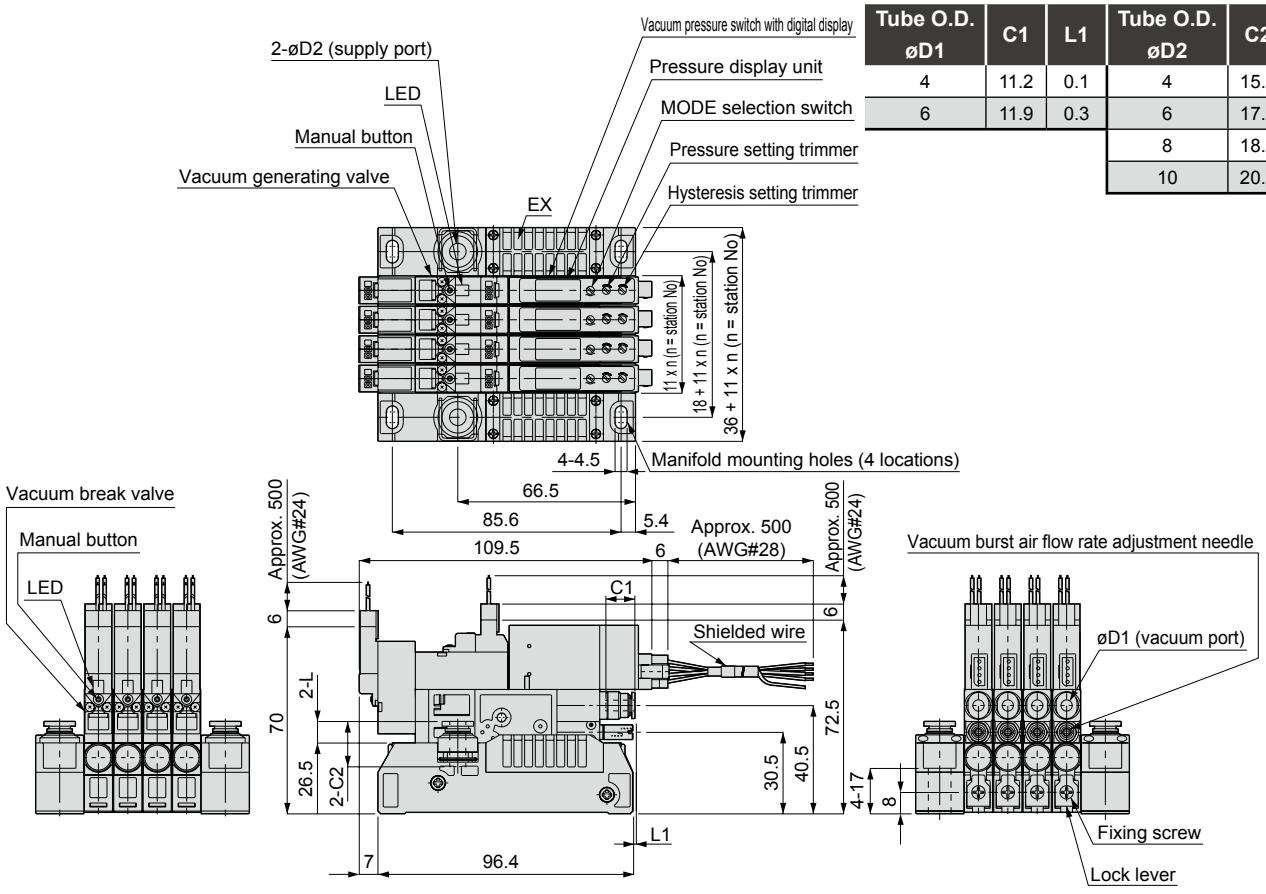
Tube O.D. øD1	C1	L1	Tube O.D. øD2	C2	L2
4	11.2	0.1	4	15.2	3.8
6	11.9	0.3	6	17.2	8.3
			8	18.2	9.6
			10	20.7	13.2



● Atmosphere release

Unit: mm

Tube O.D. øD1	C1	L1	Tube O.D. øD2	C2	L2
4	11.2	0.1	4	15.2	3.8
6	11.9	0.3	6	17.2	8.3
			8	18.2	9.6
			10	20.7	13.2

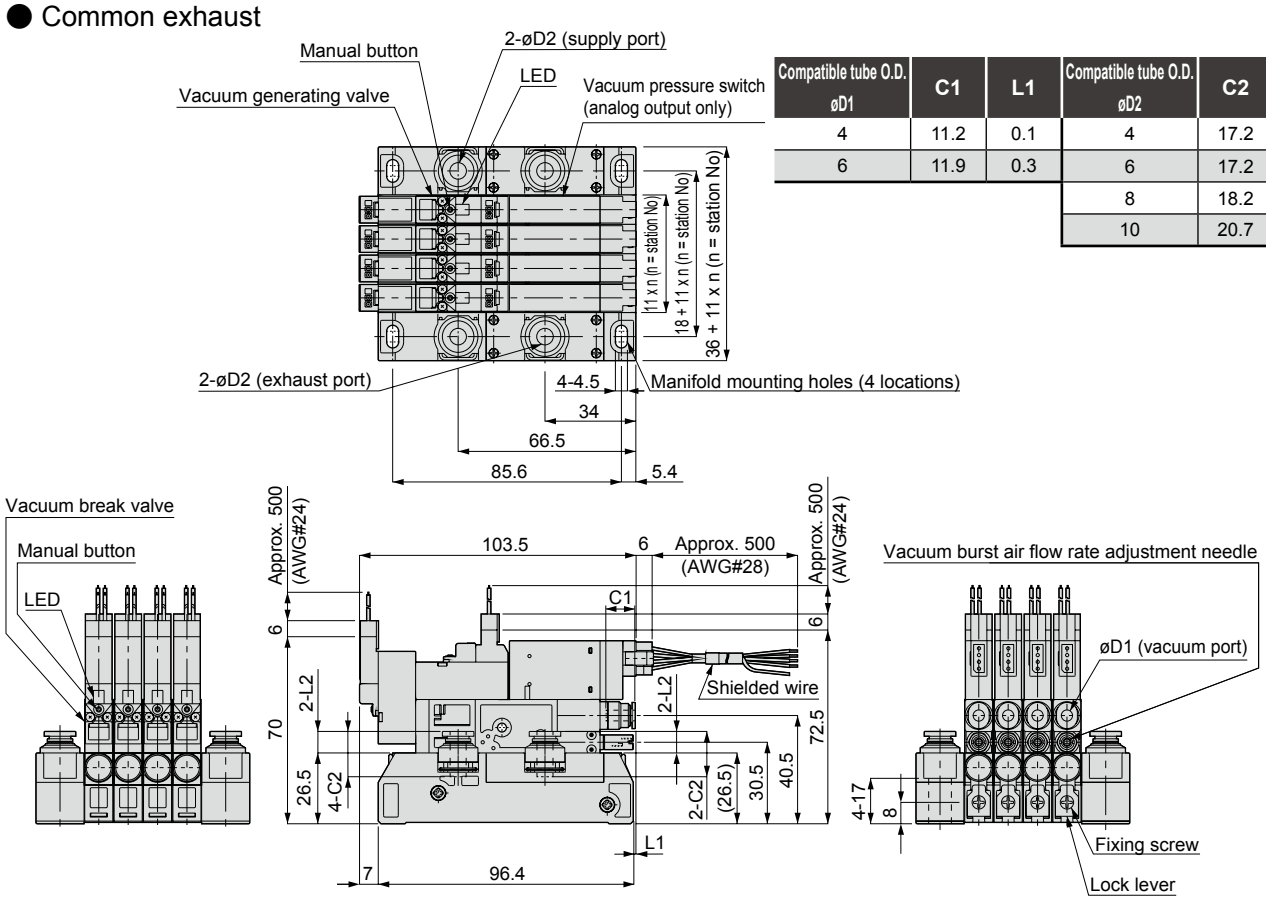


Dimensions (manifold VSXM, with vacuum pressure switch with analog output)

● Common exhaust

Unit: mm

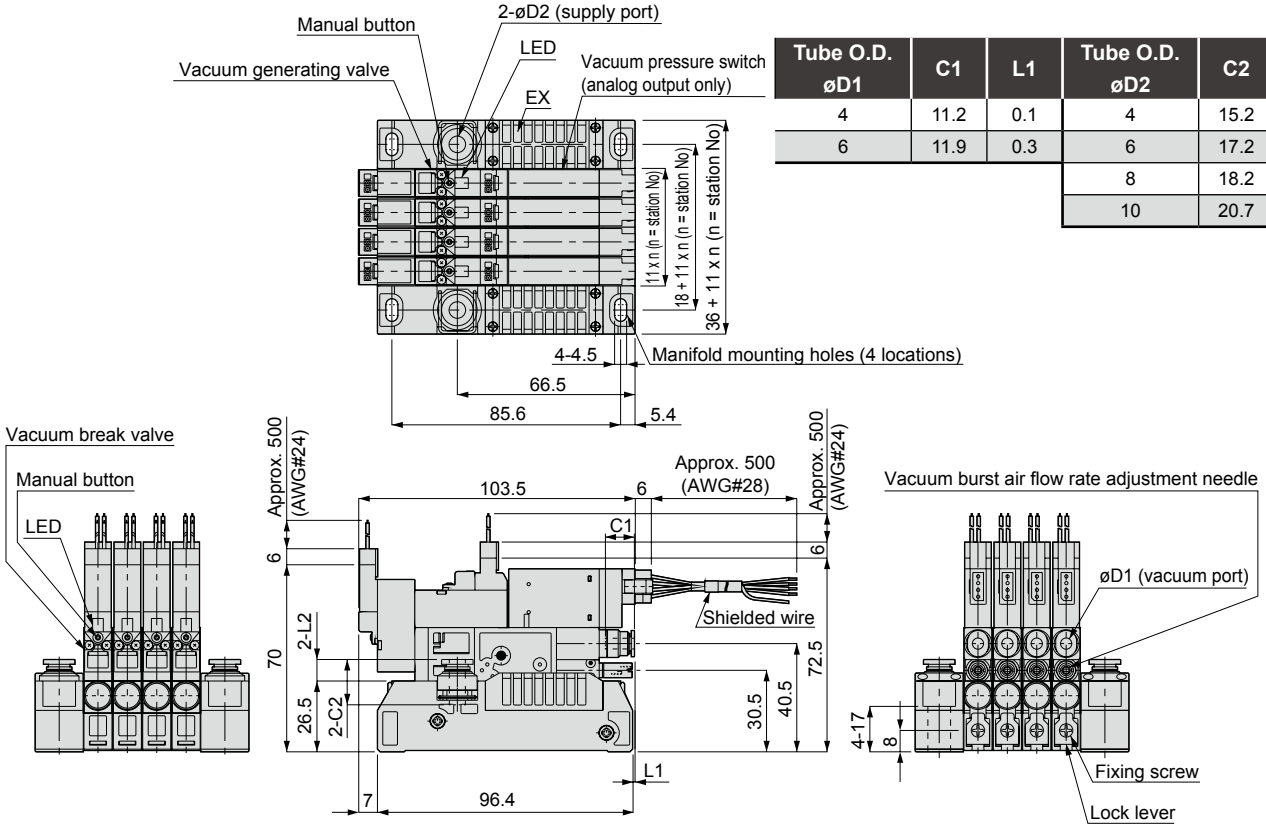
Compatible tube O.D. øD1	C1	L1	Compatible tube O.D. øD2	C2	L2
4	11.2	0.1	4	17.2	15.2
6	11.9	0.3	6	17.2	8.3
			8	18.2	9.6
			10	20.7	13.2



● Atmosphere release

Unit: mm

Tube O.D. øD1	C1	L1	Tube O.D. øD2	C2	L2
4	11.2	0.1	4	15.2	3.8
6	11.9	0.3	6	17.2	8.3
			8	18.2	9.6
			10	20.7	13.2



Safety precautions

Refer to Intro Pages 15 and 16 for general precautions on vacuum system components.

⚠ WARNING

- When operating the valve, make sure that the leakage current is no greater than 1 mA. Otherwise, there is a risk of malfunctions caused by leakage current.
- If energization to the pilot valve continues for long periods, heat is generated from the coil. Heat could cause burns and impact peripheral devices. Consult with CKD if continuously energizing for long periods.
- For the self-hold (VSX-□□D...), when resupplying after the pilot air supply is stopped (including the first use after shipment), the position of the switching valve is in neutral. When re-supplying the pilot air, be sure either to input a signal to the pilot valve or to perform switching manually.
- When using the DIN rail, if vibration or impact may be applied to the product, use commercially available DIN rail fixing brackets on both sides for safety and install securely.
- When removing or attaching the unit from/to the manifold, first stop the supply air and securely exhaust the residual pressure.
- When installing the unit in the manifold, insert the lock lever to the end and fix it securely with screws. Vibration may cause the lock lever to come off and the unit to pop out.

⚠ CAUTION

- Do not apply high tensile force or bending force to the pilot valve or vacuum pressure switch lead wire. It could cause disconnection or damage to the connector unit.
- Compressed air contains a large amount of drainage (water, oil oxides, tar, foreign matter). Since drain significantly reduces product performance, dehumidify with after-cooler and dryer to improve air quality.
- Do not use a lubricator.
- As rust inside the piping may cause malfunctions, be sure to insert a filter of 5 μm or less in front of the supply port. In addition, flushing of pipes is recommended before use and at appropriate intervals.
- Avoid using in corrosive gas or flammable gas atmospheres. Do not use as the working fluid.
- When replacing the cartridge fitting of the supply (PS, PV) port, remove the deposits from the seal and then securely insert the stop pin.
- When replacing the cartridge fitting of the vacuum (V) port, remove the deposits on the seal part after checking that the window packing has not fallen off and securely fix the screws with the prescribed tightening torque.
- When mounting the unit in the manifold, check that there is no fallout or protrusion of the O-ring of air supply (vacuum supply) and exhaust (air supply) ports.
- Set the piping (supply port) diameter, pipe length and other components so that sufficient effective cross-sectional area can be secured for the vacuum port.
- In the manifold vacuum ejector, when an operating ejector and an inoperative ejector are mixed, exhaust air is led into the ejector not in operation and output from the vacuum port. For example, lightweight workpieces may be blown away. Therefore, do not use under conditions which might affect the workpiece.

Manifold safety precautions

■ Increased manifold stations may cause degraded performance or malfunction due to the following reasons. Contact CKD for details.

1. Decreased vacuum performance due to insufficient supply air
   Countermeasure : (1) Confirm supply air capacity, etc.
   (2) Piping length as short as possible
   (3) Larger fitting size
   (4) For one-side supply, supply from both sides of the manifold

2. Exhaust port capacity becomes insufficient, and the vacuum performance is degraded or exhaust air is emitted from the vacuum port of another station.
   → The number of stations for which performance can be maintained when used as a manifold depends on the nozzle size, vacuum performance, etc. Contact CKD for details.
   Cause : For the silencer (atmospheric release), exhaust resistance increases and performance deteriorates due to the insufficient silencer capacity.
   Countermeasure : (1) Use individual exhaust for each station. (custom order)
   (2) Avoid places that interfere with the exhaust.
   (3) Reduce the station No.
   Cause : For the common exhaust type, the performance deteriorates due to the large piping resistance.
   Countermeasure : (1) Shorten the pipe length as much as possible.
   (2) Increase the exhaust fitting size.
   (3) Use individual exhaust for each station. (custom order)
   (4) Reduce the station No.

Usage methods

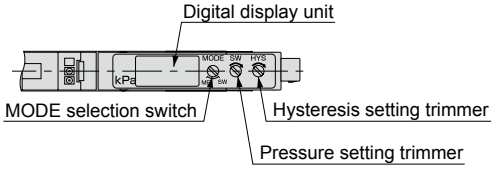
1. How to handle the vacuum pressure switch

(1) Pressure setting procedure

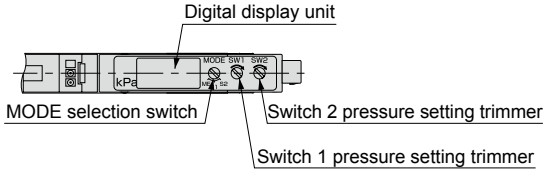
(1)Energization (supply DC power after confirming the wiring.)
(2)Set the MODE change-over switch to pressure setting mode (ME → S1 or S2, SW).
(2)-2. (vacuum pressure switch with analog output only)
Turn the hysteresis setting trimmer (HYS) fully counterclockwise to set hysteresis to minimum.
(3)Align to the desired setting value by turning the pressure setting trimmer (S1 or S2, SW) with a small screwdriver, etc.
(4)Set the MODE change-over switch to pressure display mode (ME), apply pressure and confirm actual operation.
· For vacuum pressure switch with 2-point switch output:
Switch output 1 (S1) : Operation indicator lamp (red LED) turns ON at set pressure or greater.
Switch output 2 (S2) : Operation indicator lamp (green LED) turns ON at set pressure or greater.
· For vacuum pressure switch with analog output:
Switch output (SW) : Operation indicator lamp (red LED) turns ON at set pressure or greater.

(2) Hysteresis setting

(1)Hysteresis can be adjusted by the hysteresis setting trimmer (HYS).
(2)Hysteresis adjusting range is approx. 0 to 15% F.S. Hysteresis increases when the trimmer is rotated clockwise.
(3)Hysteresis confirmation
Set the MODE change-over switch to pressure display mode (ME), and gradually increase/decrease the pressure so that it will be over and under the set pressure. Then, read the values displayed when the operation indicator lamp turns ON and OFF. The display value difference is the hysteresis.
[Hysteresis adjustment application examples]
· When the pressure is pulsating and the output cuts out at fine intervals, increase the hysteresis.
· When setting the allowable range of pressure drop.



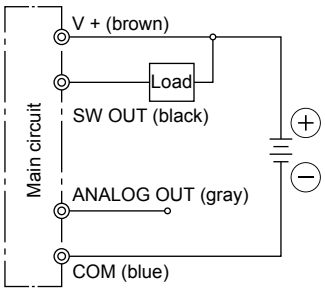
Vacuum pressure switch with digital display
(Analog output, with switch output type)



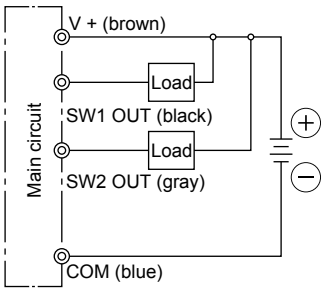
Vacuum pressure switch with digital display
(type with 2-point switch output)

Usage methods

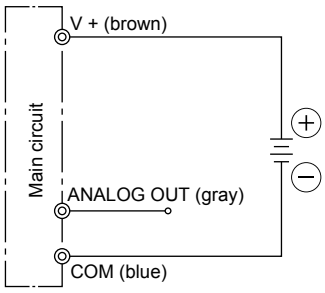
(3) How to wire



Vacuum pressure switch with LED display
(Analog output, with switch output type)



Vacuum pressure switch with LED display
(type with 2-point switch output)



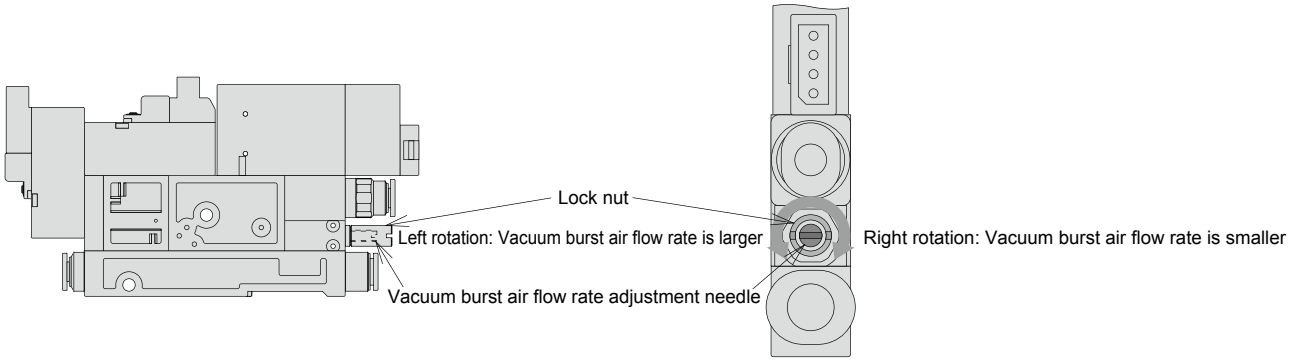
Vacuum pressure switch with
analog output

2. Safety precautions for vacuum pressure switch

(1)Do not use in atmospheres or gases containing corrosive substances. It risks damaging the switch.
(2)Do not perform wiring or usage that would introduce noise (surge), etc. It risks damaging the switch.
(3)Do not use in flammable or explosive gases, liquids, or atmospheres. This may cause fire or explosion, as the product does not have an explosion-proof structure.
(4)Avoid using in places where the product is exposed to dripping water, oil, dust, etc. This may cause malfunction, as the product does not have a drip-proof structure.
(5)Do not use where the heat generated exceeds the operating temperature range. It risks damaging the switch.
(6)Make sure to turn the power OFF before wiring. During wiring, check the lead wire color and do not short-circuit the output terminal and power supply terminal or COM terminal. Short-circuiting could cause switch malfunction.
(7)Do not apply high tensile force or bending force to the connector cable. It could cause disconnection or damage to the connector unit.
(8)The performance will not change even if pressure of about 0.5 MPa is instantaneously applied, but do not apply pressures of 0.2 MPa or greater during vacuum burst. If constantly applied, it could damage the switch.
(9)When setting the pressure and hysteresis, use a small screwdriver and gently rotate within the rotation range of the trimmer, without applying excessive force. If excessive force is applied during adjustment, it could damage the trimmer and base.
(10)Use a stable DC power supply.
(11)To connect to an output terminal or power supply terminal (relay, solenoid valve, etc.), install a surge voltage absorption circuit. Avoid usage where current exceeds 80 mA.
(12)When using a unit power supply such as switching power supply, ground the F.G. (frame ground).
(13)Do not short-circuit the output terminal (black/gray lead wire) with other terminals.
(14)Do not apply strong external impact or excessive force to the switch body.

3. How to adjust vacuum burst air flow rate

■ The vacuum burst air flow rate is decreased by turning the vacuum burst air flow adjustment needle to the right (clockwise) and increased by turning it to the left (counterclockwise). After adjusting, securely tighten the lock nut with tightening torque of 0.1 to 0.2 N·m.
* Be sure to use an appropriate flathead screwdriver for adjusting the vacuum burst air flow rate.

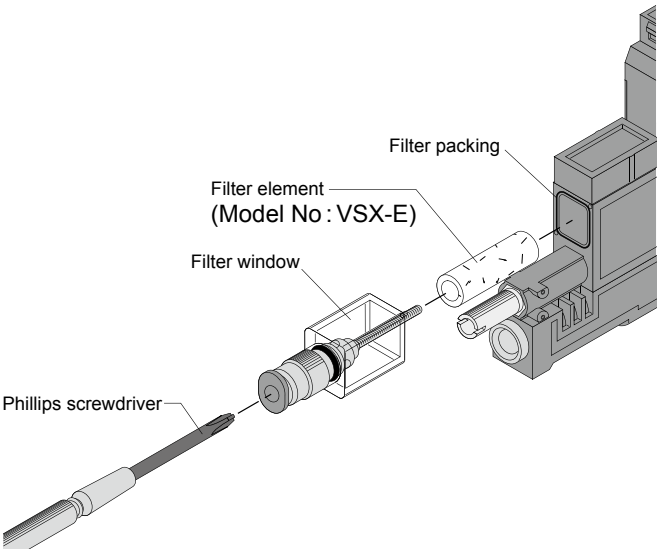


Usage methods

4. How to replace the filter element

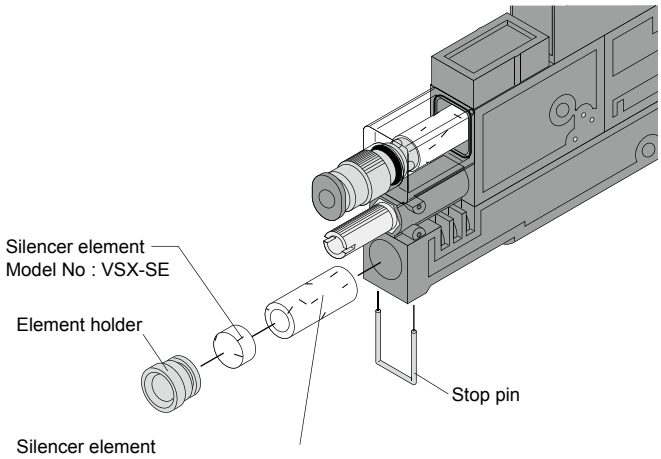
■ To replace the filter element, remove the piping of the vacuum port, loosen the screw inside the fitting (inside the tube insertion port) using a Phillips screwdriver (Note) with O.D. of 2.5 mm or less, remove the vacuum port and replace. After replacing the filter element and checking that the filter packing has not fallen out, attach the filter element and filter window to the vacuum port and then fasten the vacuum port to the main body. Tighten the screw securely with tightening torque of 0.1 to 0.15 N·m.

(Note) Ensure that the locking claw and the driver do not interfere with one another. Scratches or deformation of the lock claw may decrease the tensile strength of the tube.

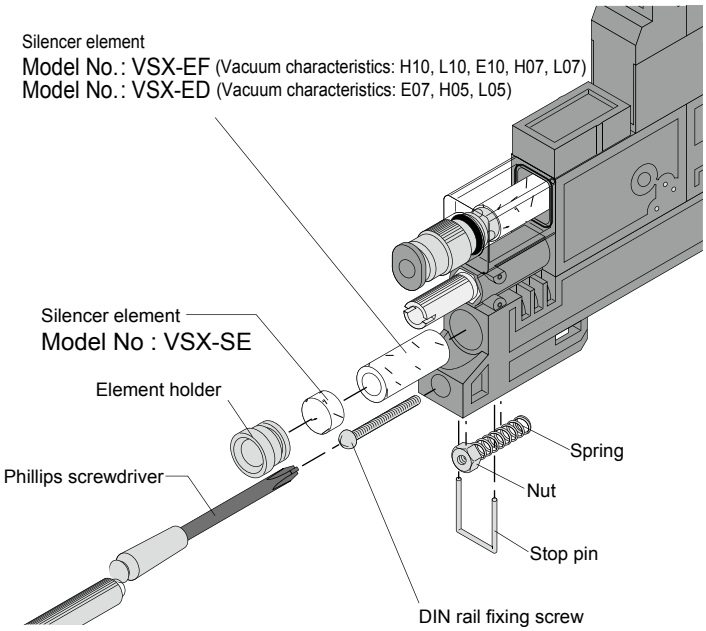


5. How to replace the silencer element

■ When replacing the direct mount silencer element, use a flathead screwdriver to remove the stop pin first. After replacing the silencer element, securely insert the stop pin.



■ To replace the DIN rail mount silencer element, use an appropriate Phillips screwdriver to remove the DIN rail fixing screws. Next, use a flathead screwdriver to remove the stop pin before replacing. After replacing the silencer element, securely insert the stop pin and fix the DIN rail fixing screws. (Recommended tightening torque: 0.1 to 0.15 N·m)



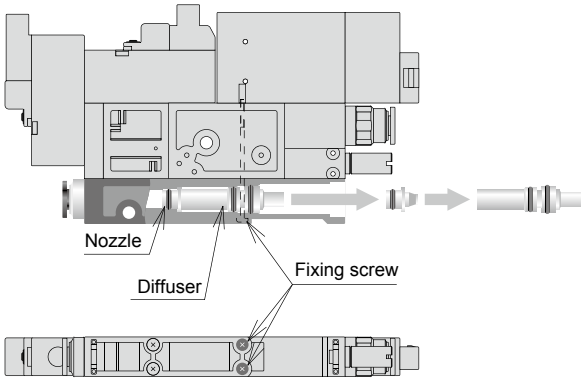
Usage methods

6. Removal and cleaning of nozzle and diffuser

■ Remove the silencer element and fixing screws (see figure below) and pull out the diffuser using needle-nosed pliers. To prevent the nozzle from popping out, cover the exhaust port with cushioning material such as a sponge and supply the air for vacuum generation (*5). Since the nozzle will pop out due to the force of air, remove the cushioning material and take out the nozzle.
Remove the deposits on the nozzle, diffuser bore and seal by air blow or wiping (*6).
Assemble the nozzle on the diffuser and supply to the body so that the nozzle does not come off. Push the diffuser in (see figure below) until the diffuser groove aligns with the hole of the fixing screw, and tighten the fixing screw with tightening torque of 0.25 to 0.35 N·m. For mounting the silencer element, refer to "How to replace the silencer element".

(*5) [Warning] Do not point the nozzle outlet at a person while supplying air to the product. The nozzle may pop out and cause injury.

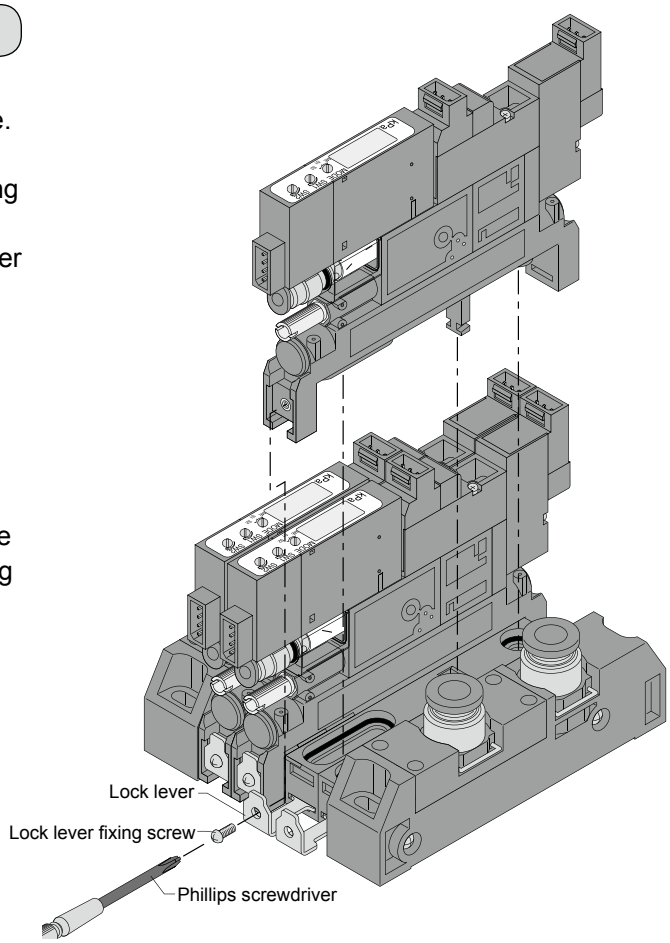
(*6) Do not damage the nozzle, diffuser bore or seal. This will cause performance degradation.



7. How to replace the manifold mounting unit

■ How to remove the unit
- Stop the supply air and exhaust the residual pressure.
- Turn the power OFF and remove the wiring.
- Use a suitable Phillips screwdriver to remove the fixing screw.
- Pull out the lock lever fully using a flathead screwdriver and remove the unit.

■ How to install the unit
- Check that the O-ring of the supply port and exhaust port has not fallen out.
- Pull out the lock lever fully to the front and install the unit.
- Push the lock lever while pressing the unit from above and securely fix the lock lever with the lock lever fixing screw.
  (Fixing screw tightening torque: 0.15 to 0.2 N·m)



Usage methods

8. How to replace the silencer element for manifold

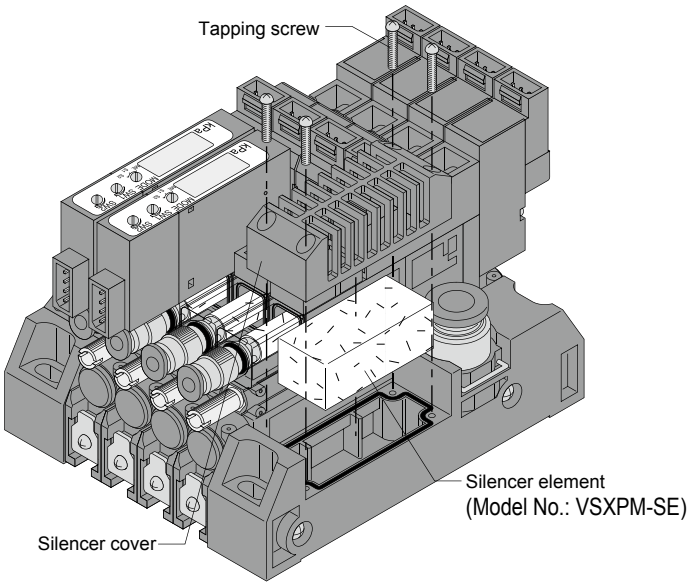
■ How to remove silencer element

·Use a suitable Phillips screwdriver to remove the four tapping screws.

·Remove the element cover and replace the silencer element (Model No.: VSXPM-SE).

■ How to install silencer element

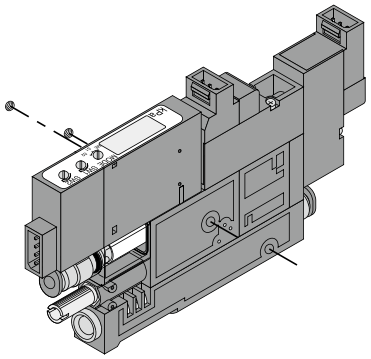
·Using a suitable Phillips screwdriver, tighten the four tapping screws with tightening torque of 0.3 to 0.4 N·m.



Fixing method

(1) Direct mount

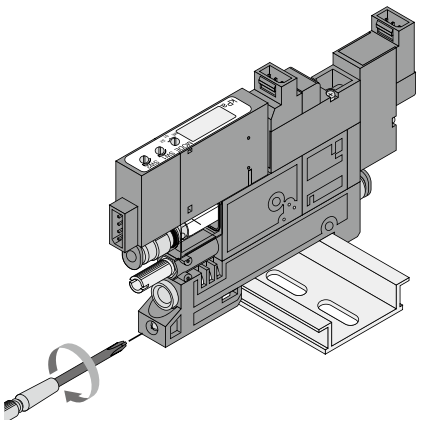
Tighten and fix with M3 screws using the fixing holes (2 places) on the resin body. (Refer to the dimensions for the fixing hole pitch.)



(2) DIN rail mount

Fit the product into the DIN rail and tighten the DIN rail fixing screw using a suitable Phillips screwdriver.

■ If vibration or impact may be applied to the product, install commercially available DIN rail fixing brackets on both sides of the product and fix securely.



MEMO

How to fill out VSXM mix manifold specifications sheet

● Mix manifold model No. (example)

	Ⓐ	Ⓑ	Ⓒ		Ⓓ	Ⓔ	Ⓕ		Ⓖ		Ⓗ		Ⓘ
VSXM-	Z	00	Z	-	CX	6	5	-	3	-	5	-	B

● Mix manifold specifications sheet (example)

Vacuum ejector model No.							Layout position										Quantity
Ⓐ	Ⓑ	Ⓒ	Ⓓ	Ⓖ	Ⓘ		1	2	3	4	5	6	7	8	9	10	
VSXM- H	07	B	- 4	- 3	- DW		○	○									2
VSXM- E	07	B	- 6	- 3	- DW				○		○						2
VSXM- E	07	A	- 6	-	- DA					○							1
VSXM-			-	-	-												
VSXM-			-	-	-												

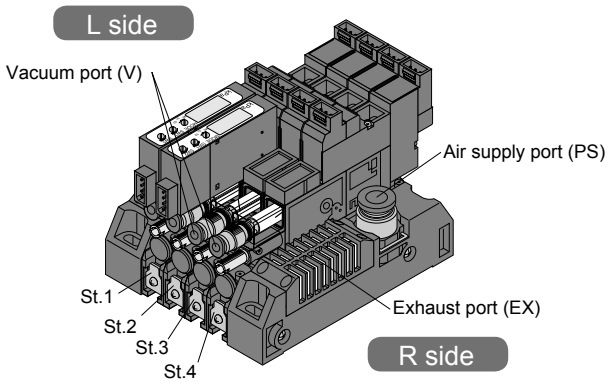
[For output port size only fitting mix specification]

● Mix manifold model No. (example)

	Ⓐ	Ⓑ	Ⓒ		Ⓓ	Ⓔ	Ⓕ		Ⓖ		Ⓗ	Ⓘ
VSXM-	H	07	B	-	CX	4	4	-	3	-	5	DW

● Mix manifold specifications sheet (example)

Vacuum ejector model No.							Layout position										Quantity
Ⓐ	Ⓑ	Ⓒ	Ⓓ	Ⓖ	Ⓘ		1	2	3	4	5	6	7	8	9	10	
VSXM- H	07	B	- 4	- 3	- DW		○	○									2
VSXM- H	07	B	- 6	- 3	- DW				○	○	○						3
VSXM-			-	-	-												
VSXM-			-	-	-												
VSXM-			-	-	-												



[When filling in]
- With vacuum port facing front, set piping positions in order from the left.
- Write the total quantity of product model No. specified in the required quantity field at the table far right.

VSXM mix manifold specifications sheet

Issued / /

Company name

Contact Quantity Set Delivery date /

Contact

Slip No. Order No.

Order No.

● Mix manifold model No.

VSXM- Ⓐ Ⓑ Ⓒ - Ⓓ Ⓔ Ⓕ - Ⓖ - Ⓗ - Ⓘ

Ⓐ Vacuum characteristics *1, 2	
H	High vacuum/medium flow rate
L	Medium vacuum/large flow rate
E	High vacuum/low flow rate
Z	For mixed specs (indicate breakdown on specs sheet.)

Ⓑ Nozzle diameter *1, 2	
05	ø0.5
07	ø0.7
10	ø1.0
00	For mixed specs (indicate breakdown on specs sheet.)

Ⓒ Valve	
B	Normally closed
D	Self hold type
Z	For mixed specs (indicate breakdown on specs sheet.)

Ⓓ Vacuum port (V)	
4	ø4 push-in fitting
6	ø6 push-in fitting
CX	For mixed fittings (indicate breakdown on specs sheet.)

Ⓔ Air supply port (PS)	
4	ø4 push-in fitting
6	ø6 push-in fitting
8	ø8 push-in fitting
10	ø10 push-in fitting

Ⓕ Exhaust port (EX)	
S	Atmospheric release with silencer
6	ø6 push-in fitting common exhaust
8	ø8 push-in fitting common exhaust
10	ø10 push-in fitting common exhaust

Ⓖ Solenoid valve voltage	
1	100 VAC
3	24 VDC

Ⓗ Manifold station No.	
2 to 10	2 to 10 stations

Ⓘ Vacuum pressure switch specifications	
Blank	Without vacuum pressure switch
DW	With digital display, NPN output 2 points
DA	With digital display, NPN output 1 point + analog output
AO	Analog output
Z	For mixed specs (indicate breakdown on specs sheet.)

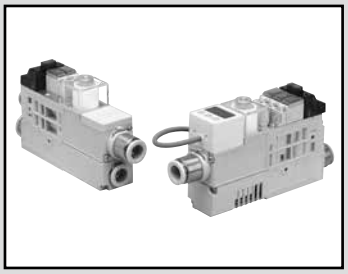
⚠ Precautions for model No. selection

*1 : The combination of Ⓐ E and Ⓑ 05 cannot be selected.

*2 : When Ⓐ is Z, only Ⓑ 00 can be selected.
When Ⓑ is 00, only Ⓐ Z can be selected.

● Mix manifold specifications sheet

Vacuum ejector model No. Ⓐ Ⓑ Ⓒ Ⓓ Ⓖ Ⓘ	Layout position 1	2	3	4	5	6	7	8	9	10	Quantity
VSXM- - - - - -											
VSXM- - - - - -											
VSXM- - - - - -											
VSXM- - - - - -											
VSXM- - - - - -											



Vacuum ejector unit ideal for controlling large flow rates

VSQ Series

● Nozzle diameter: ø0.7, ø1.0, ø1.2, ø1.5, ø2.0

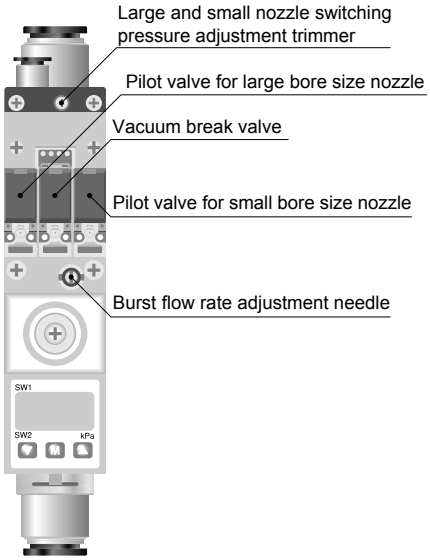
RoHS

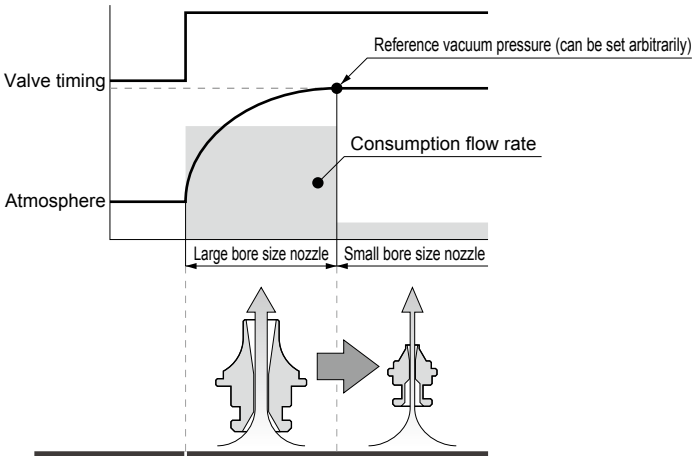
Features

■ 31.5 mm width vacuum unit ideal for large flow rate control.

■ Three types of vacuum ejector unit have been standardized: single nozzle, 2-stage nozzle, twin nozzle.

■ The twin nozzle is ideal for use with long suction time and transportation time.
- ●Since vacuum rise is controlled up to the reference vacuum pressure by the large bore size nozzle and above the reference vacuum pressure by the small bore size nozzle, consumption flow rate can be significantly reduced. (Patent pending)
- ●The signal for vacuum generation can be controlled with one signal.





Nozzle	Consumption flow rate	
T15	100	23
T20	200	46

■ The suction flow rate of the 2-stage nozzle has been increased by about 40% compared to the conventional single type.

■ The single nozzle is an orthodox integrated large flow rate vacuum ejector.

■ Wide variety of vacuum generating valves.
- ● Single nozzle: normally open, normally closed, self-hold
- ● 2-stage nozzle: normally open, normally closed
- ● Twin nozzle: normally closed

Specifications

Descriptions	VSQ
Working fluid	Air
Working pressure MPa	0.3 to 0.7
Ambient/fluid temperatures °C	5 to 50

Ejector characteristics

Nozzle		Nozzle diameter (mm)		Rated supply pressure (MPa)	Achieved vacuum pressure (-kPa)	Intake flow rate (ℓ/min(ANR))	Air consumption rate (ℓ/min(ANR))
Single nozzle	H15	1.5	-	0.5	93	63	100
	L15				66	95	
	E15			0.35	92	42	70
	H20	2.0	-	0.5	93	110	200
	L20				66	180	
	E20			0.35	92	84	150
Twin nozzle	T15	0.7 (Small bore size)	1.5 (Large bore size)	0.5	93(93)	40(24)	100(23)
	T20	1.0 (Small bore size)	2.0 (Large bore size)			70(36)	200(46)
2-stage nozzle	D07	0.7	-	0.5	93	52	23
	D10	1.0	-			75	46
	D12	1.2	-			85	70

*1 : Values in ( ) for twin nozzle ( ) are the values of small bore size nozzles.
*2 : Values in table are representative values. Suction flow rate differs with the vacuum piping conditions (vacuum port size, pipe length).

Valve specifications

● Pilot valve

Descriptions	Pilot valve	
Valve and operation	Direct acting poppet valve	
Rated voltage V	24 DC	100 AC
Voltage fluctuation range V	24 DC ±10%	100 AC ±10%
Surge suppressor	Varistor	Bridge diode
Power consumption	0.55 W	1 VA
Manual override	Push locking	
Operation display	At coil excitation operation: Red LED lights	

● Switching valve

· Twin nozzle

Descriptions	Small bore size valve	Large bore size valve	Vacuum break valve
Valve and operation	Pilot operated poppet valve		
Valve	Normally closed	Normally closed	Normally closed
Lubrication	Not required		
Effective cross-sectional area mm² (Cv)	3.5(0.19)	16.5(0.89)	3.5(0.19)

· 2-stage nozzle

Descriptions	Vacuum generating valve	Vacuum break valve
Valve and operation	Pilot operated poppet valve	
Valve	Normally closed, normally open	Normally closed
Lubrication	Not required	
Effective cross-sectional area mm² (Cv)	3.5(0.19)	3.5(0.19)

· Single nozzle

Descriptions	Vacuum generating valve	Vacuum break valve
Valve and operation	Pilot operated poppet valve	
Valve	Normally closed, normally open, self-hold	Normally closed
Lubrication	Not required	
Effective cross-sectional area mm² (Cv)	16.5(0.89)	3.5(0.19)
Min. excitation time ms	50 or more	

Vacuum pressure switch specifications

Descriptions		Vacuum pressure switch
Working pressure kPa		-100 to 100
Proof pressure kPa		500
Environmental resistance	Ambient temperature (in storage) °C	-10 to 60 (no condensation or freezing)
	Ambient temperature (in use) °C	0 to 50 (no condensation or freezing)
	Ambient humidity (in storage / in use)	35 to 85% RH (no condensation)
	Degree of protection	IEC standards IP40 or equivalent
Power supply voltage V		12 to 24 VDC ±10% ripple (P-P) ±10% or less
Current consumption mA		40 or less (no load)
Pressure display	Display frequency	5 cycles/second
	Display accuracy	±2% F.S. ±1 digit
	Digital display	Main display: 2 colors (red, sub-display: orange)
Switch output	No. of I/O points	2 points
	Output method	NPN open collector
	Switch rating	30 VDC, 125 mA or less
	Internal voltage drop	1.5 V or less
Temperature characteristics		±2% F.S. or less (0 to 50°C, at 25°C)
Repeatability		±0.2% F.S. ±1 digit
Hysteresis		Adjustment is possible
Responsivity		Selectable (50/250/500/1,000/2,000/3,000 ms)

Vacuum filter specifications

Descriptions	Vacuum filter
Element material	PVF (Polyvinyl formal)
Filtration rating μm	10
Filtration area mm^2	1507
Replacement filter element model No.	VSQ-E

Vacuum burst function

Descriptions	Vacuum burst function
Break air flow rate ℓ/min(ANR)	0 to 50 (at supply pressure 0.5 MPa)

Valve lead wire color

● 24 VDC specifications

Nozzle	Black	Gray	Blue	Brown
Twin nozzle	Vacuum generation (-)	Vacuum burst (-)	Minus (-)	24 VDC(+common)
2-stage nozzle	Vacuum generation (-)	Vacuum burst (-)	- (*1)	24 VDC(+common)
Single nozzle	Vacuum generation (-)	Vacuum burst (-)	- (*1)	24 VDC(+common)

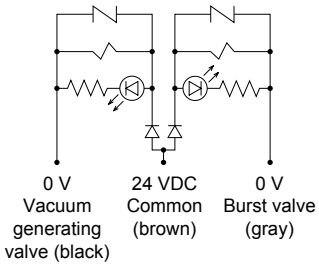
● 100 VAC specifications

Nozzle	Black	Gray	Blue	Brown
2-stage nozzle	Vacuum generation (-)	Vacuum burst (-)	- (*1)	common
Single nozzle	Vacuum generation (-)	Vacuum burst (-)	- (*1)	common

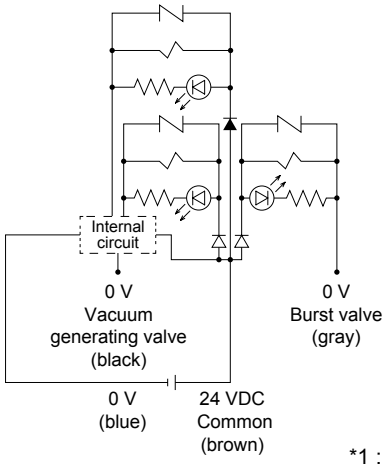
*1 : Blue lead wires are not used for 2-stage nozzles and single nozzles.

Electric circuit (solenoid valve)

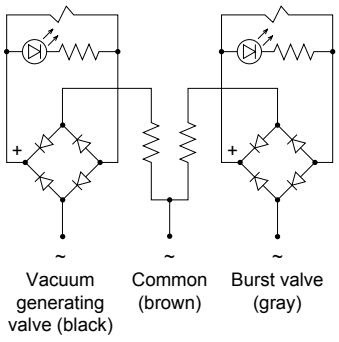
●24 VDC
· Single nozzle
· 2-stage nozzle



· Twin nozzle

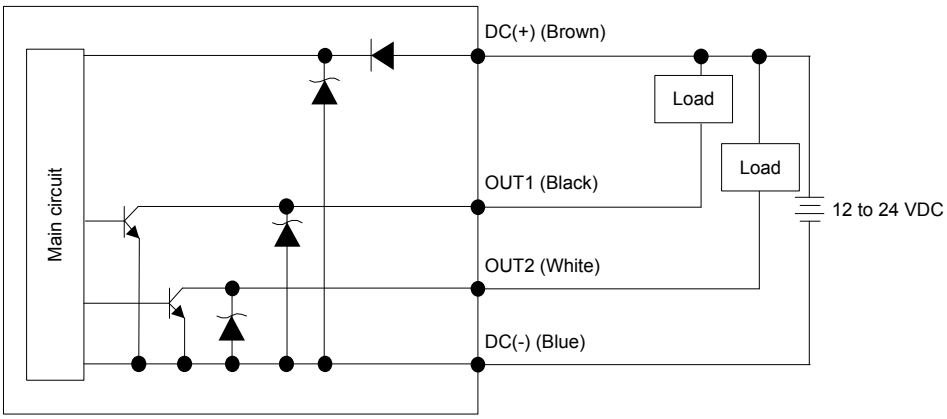


●100 VAC
· Single nozzle
· 2-stage nozzle



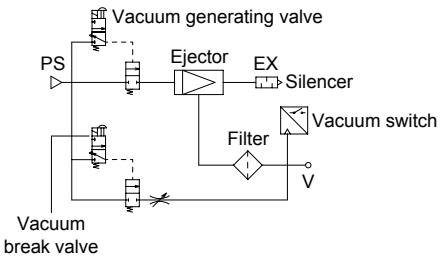
*1 : The attached blue lead wire is not used.

Vacuum pressure switch electric circuit diagram

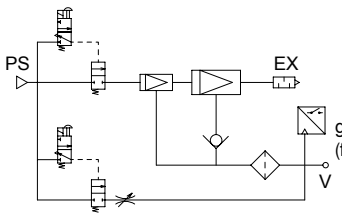


Circuit diagram

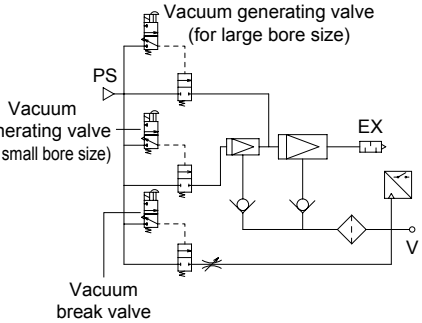
● Single nozzle



● 2-stage nozzle



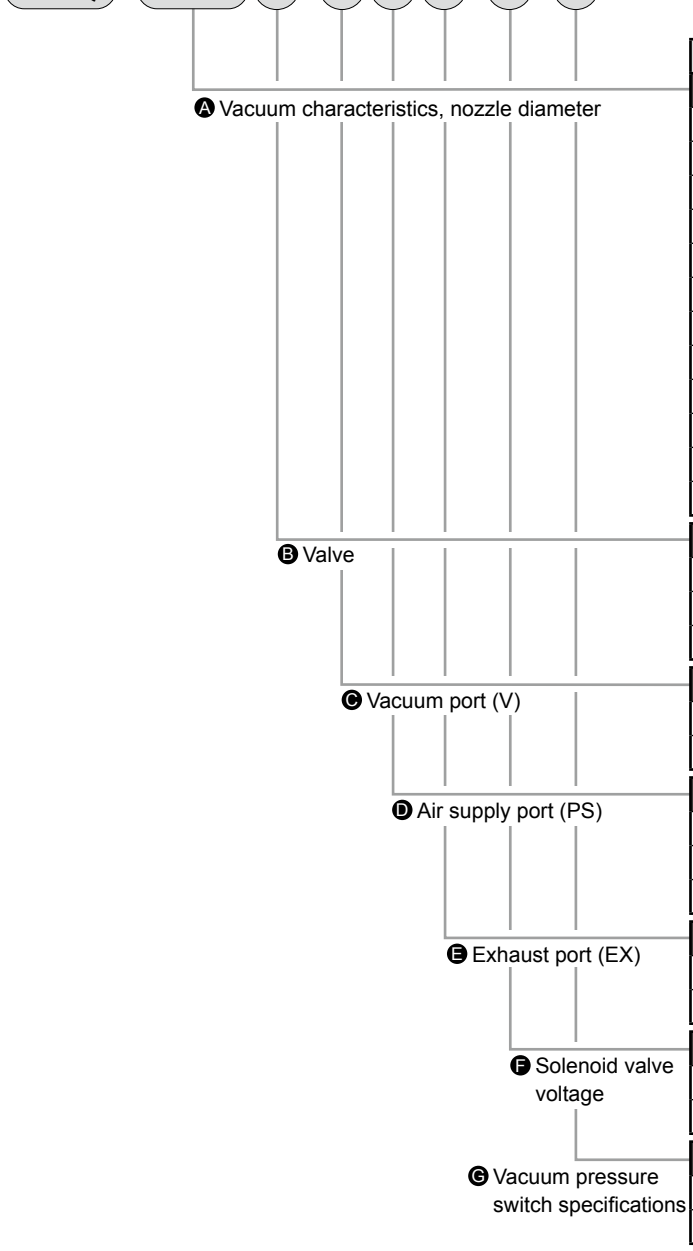
● Twin nozzle



How to order

● 31.5 mm width single unit dedicated vacuum ejector unit

VSQ - T15 B - 10 10 J - 3 - R



Code	Content	
Ⓐ Vacuum characteristics, nozzle diameter *1, *2, *3, *4		
	Vacuum characteristics	Nozzle diameter
H15	High vacuum/medium flow rate	ø1.5
L15	Medium vacuum/large flow rate	ø1.5
E15	High vacuum/low flow rate	ø1.5
H20	High vacuum/medium flow rate	ø2.0
L20	Medium vacuum/large flow rate	ø2.0
E20	High vacuum/low flow rate	ø2.0
T15	Twin nozzle	ø1.5(ø0.7)
T20	Twin nozzle	ø2.0(ø1.0)
D07	2-stage nozzle	ø0.7
D10	2-stage nozzle	ø1.0
D12	2-stage nozzle	ø1.2
Ⓑ Valve *1, 2		
A	Normally open (NO)	
B	Normally closed	
D	Self hold type	
Ⓒ Vacuum port (V)		
8	ø8 push-in fitting	
10	ø10 push-in fitting	
Ⓓ Air supply port (PS) *3		
6	ø6 push-in fitting	
8	ø8 push-in fitting	
10	ø10 push-in fitting	
Ⓔ Exhaust port (EX)		
S	Atmospheric release with silencer	
J	ø12 push-in fitting common exhaust	
Ⓕ Solenoid valve voltage *4		
1	100 VAC	
3	24 VDC	
Ⓖ Vacuum pressure switch specifications		
Blank	Without vacuum pressure switch	
R	With digital display, NPN output 2 points	

⚠ Precautions for model No. selection

*1 : When Ⓐ is “T15” or “T20”, Ⓑ “A” and “D” cannot be selected.
*2 : When Ⓐ is “D07”, “D10” or “D12”, Ⓑ “D” cannot be selected.
*3 : Ⓓ “6” can be selected only for Ⓐ “D07”, “D10” and “D12”.
*4 : When Ⓐ is “T15” or “T20”, Ⓕ “1” cannot be selected.

● Maintenance part model No.

· Filter element
VSQ-E

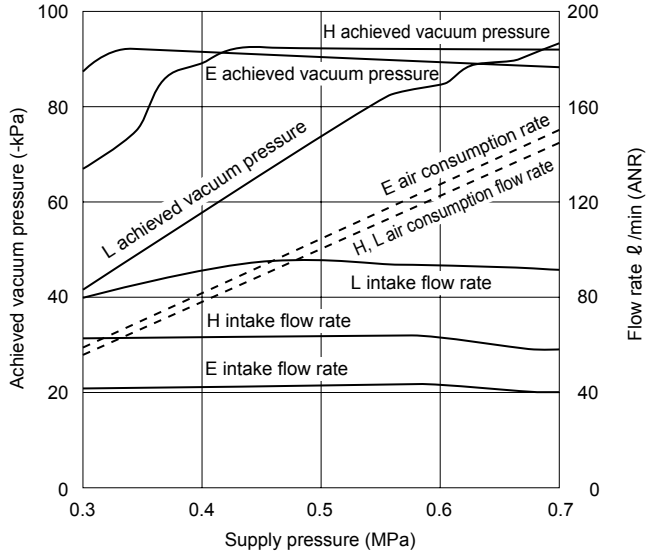
· Silencer element A
VSQ-SEZA

· Silencer element B
VSQ-SEZB

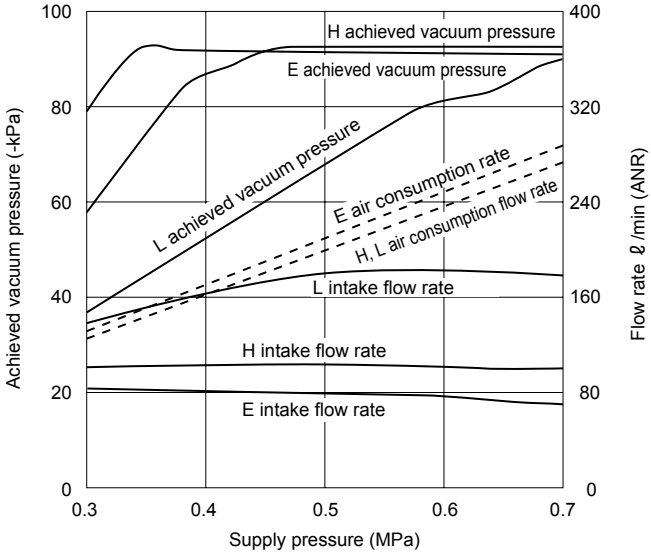
Vacuum characteristics

● Single nozzle

· VSQ-H15□-□□□-□-□
· VSQ-L15□-□□□-□-□
· VSQ-E15□-□□□-□-□ Vacuum characteristics diagram

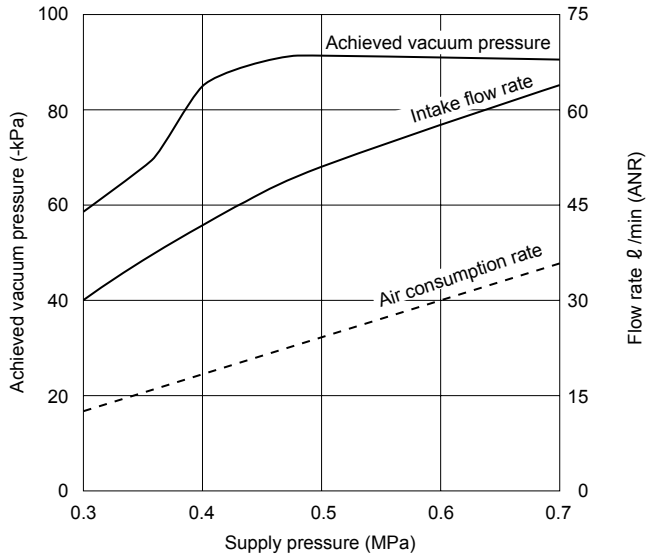


· VSQ-H20□-□□□-□-□
· VSQ-L20□-□□□-□-□
· VSQ-E20□-□□□-□-□ Vacuum characteristics diagram

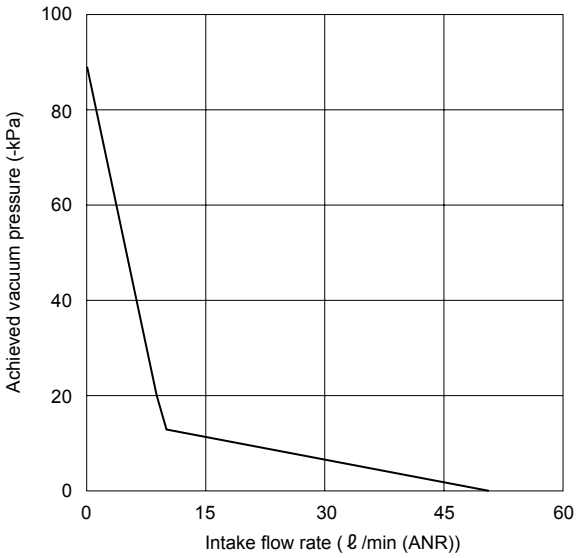


● 2-stage nozzle

· VSQ-D07□-□□□-□-□ Vacuum characteristics diagram



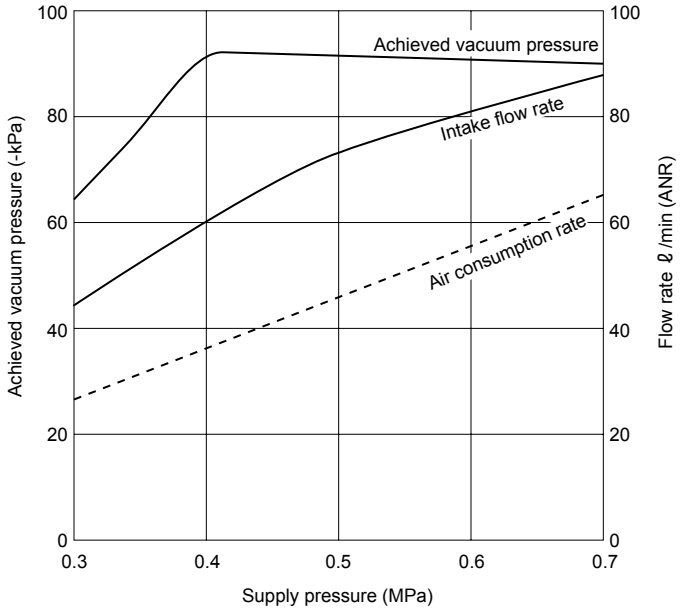
· VSQ-D07□-□□□-□-□ Flow characteristics diagram



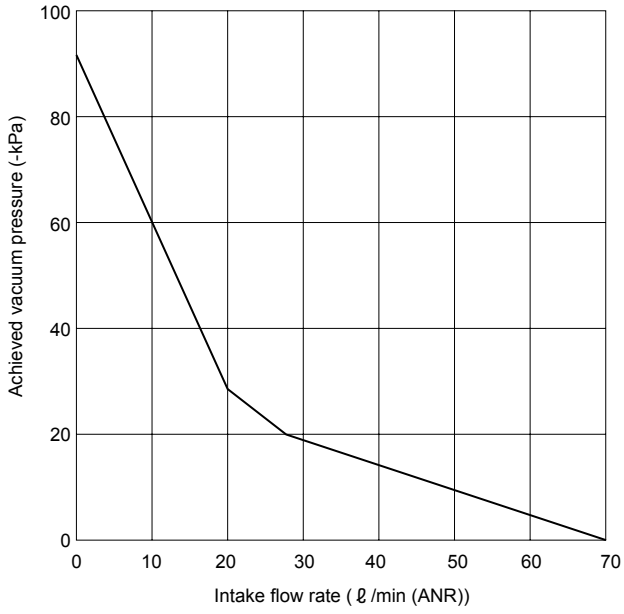
Vacuum characteristics

● 2-stage nozzle

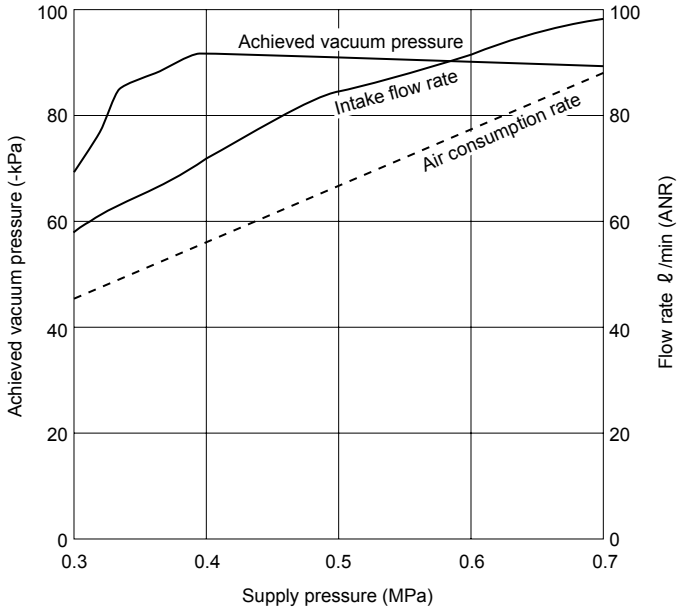
· VSQ-D10□-□□□-□-□ Vacuum characteristics diagram



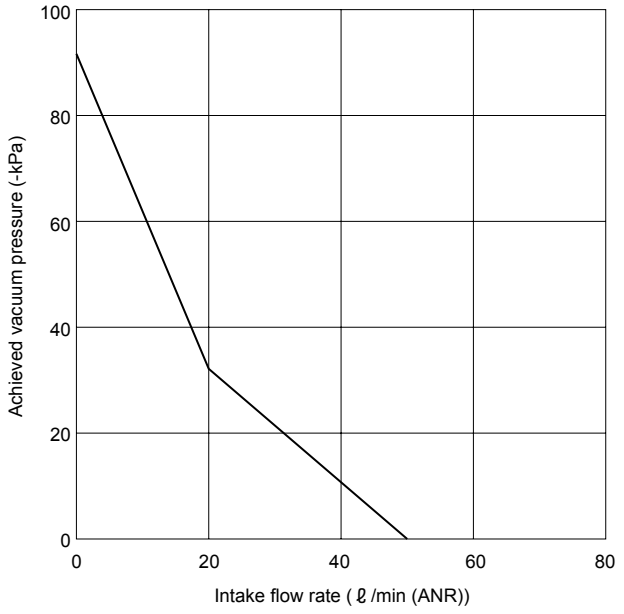
· VSQ-D10□-□□□-□-□ Flow characteristics diagram



· VSQ-D12□-□□□-□-□ Vacuum characteristics diagram



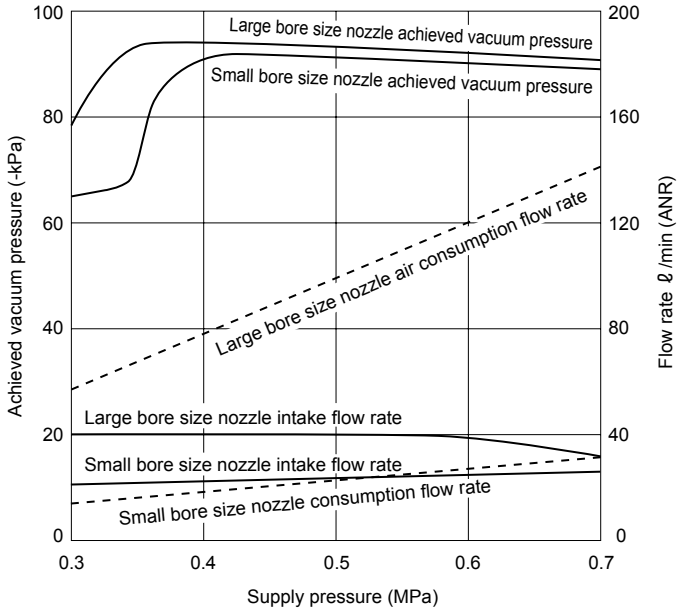
· VSQ-D12□-□□□-□-□ Flow characteristics diagram



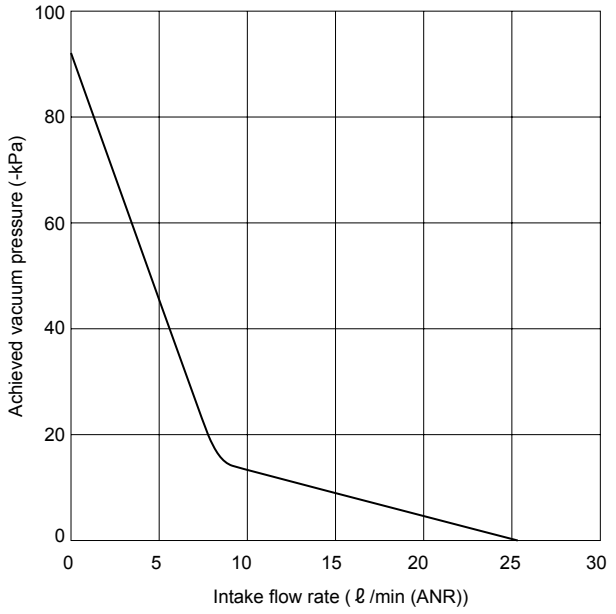
Vacuum characteristics

● Twin nozzle

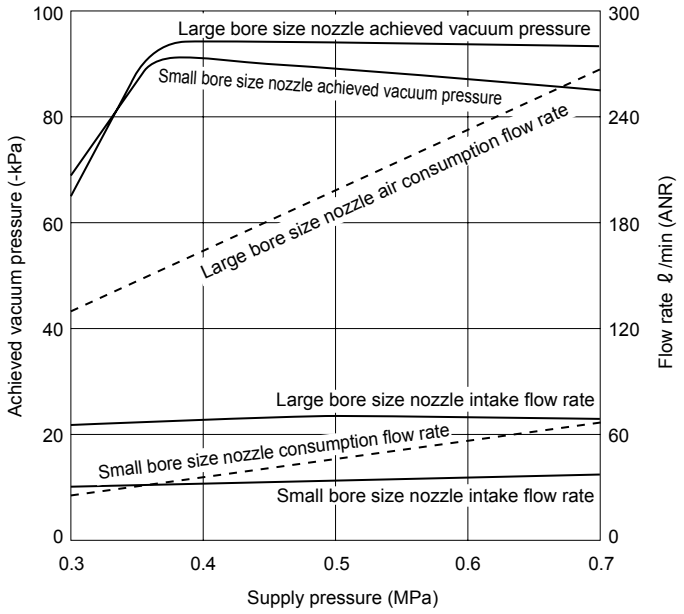
· VSQ-T15B-□□□-□-□ Vacuum characteristics diagram



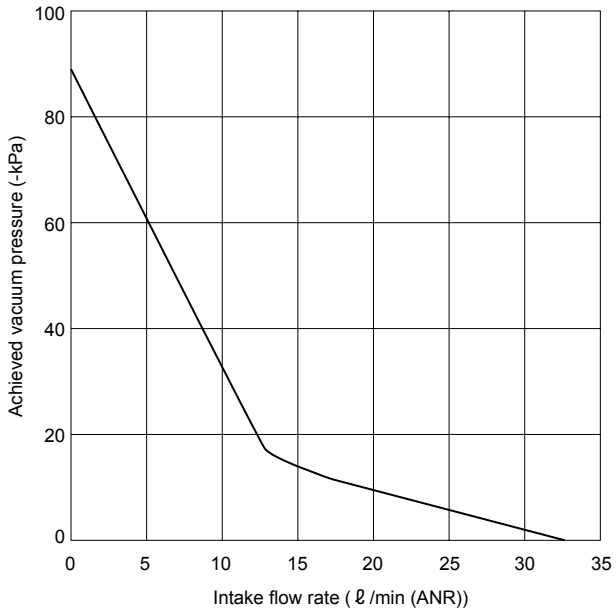
· VSQ-T15B-□□□-□-□ Vacuum characteristics diagram (small bore size nozzle)



· VSQ-T20B-□□□-□-□ Vacuum characteristics diagram



· VSQ-T20B-□□□-□-□ Vacuum characteristics diagram (small bore size nozzle)

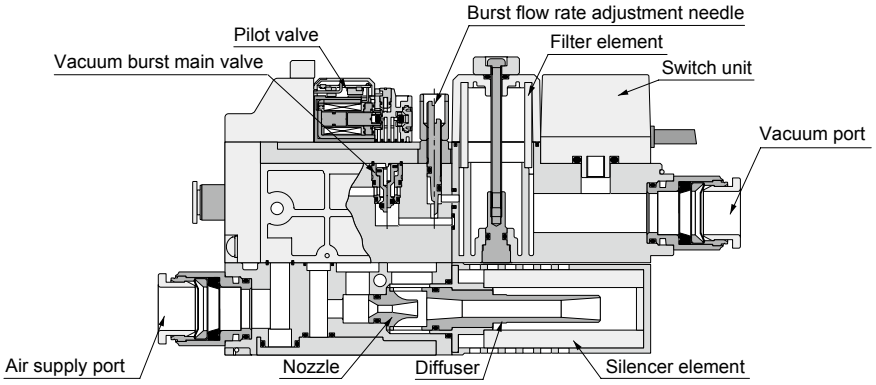


1. Supply pressure with the characteristics described above occurs at vacuum generation.
2. Achieved vacuum pressure with the characteristics described above produces abnormal noise (soft clicking sound) at supply pressure just before reaching the peak value. When this abnormal noise occurs, the characteristics become unstable and operation becomes louder. Reset the supply pressure, as it may affect the sensor, etc., and cause trouble.
   Ex. 1 : Source pressure is 0.5 MPa with the H vacuum ejector. During vacuum ejector operation, supply pressure drops to 0.43 MPa due to pressure drop, and abnormal noise is generated. → Reset supply pressure to 0.5 MPa during vacuum ejector operation.
3. Carry out piping or equipment selection with 3 times the effective cross-sectional area of the nozzle diameter cross-sectional area as a guideline. Satisfactory vacuum characteristics cannot be obtained if adequate supply air flow rate is not maintained.
   (A soft clicking sound occurs at set pressure. Insufficient intake flow rate, insufficient achievement of achieved vacuum pressure, etc.)
   Ex. 2 : Abnormal noise occurs even when pressure is 0.5 MPa with H vacuum ejector during vacuum ejector operation. → Insufficient supply air flow rate. (Supply air flow rate is restricted in front of the vacuum ejector by piping resistance, etc., and supply air flow rate satisfying the properties is not obtained. → Select piping components that can secure the required effective cross-sectional area.)
   Ex. 3 : For vacuum ejector with 1.0mm nozzle diameter, cross-sectional area is $0.5^2 \times \pi = 0.785\ mm^2 \times 3 = 2.35mm^2$. Therefore, carry out piping and equipment selection that ensures an effective cross-sectional area of $2.3mm^2$ or greater.

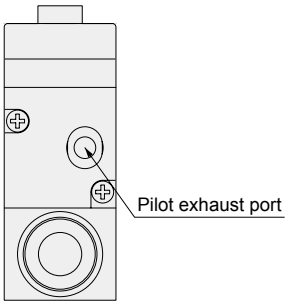
Internal structure

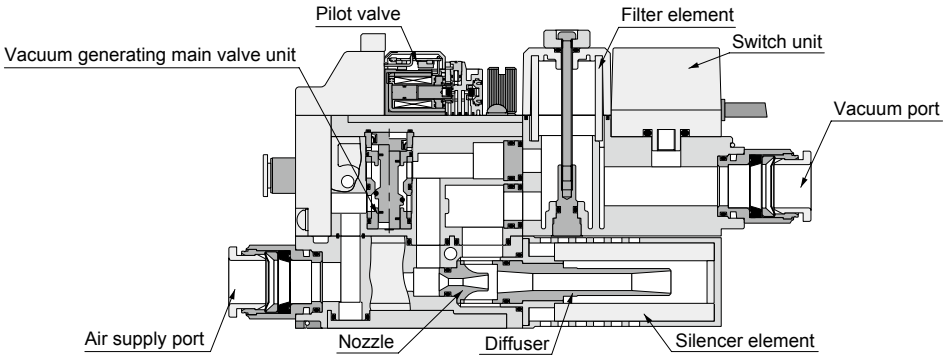
● Single nozzle

· Burst circuit



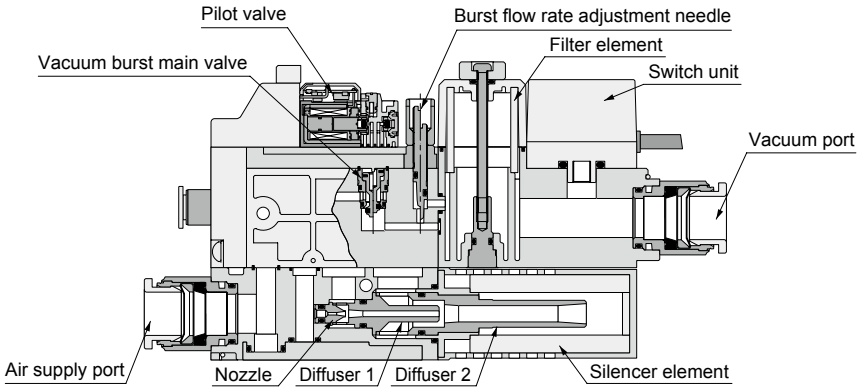
· Vacuum circuit



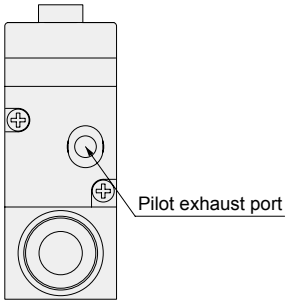


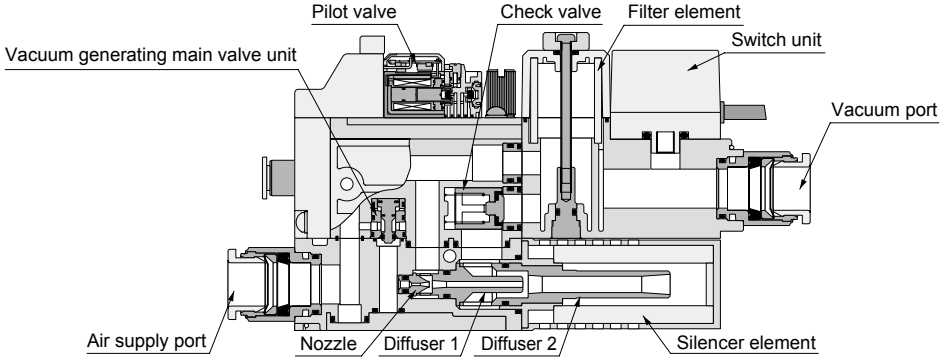
● 2-stage nozzle

· Burst circuit



· Vacuum circuit

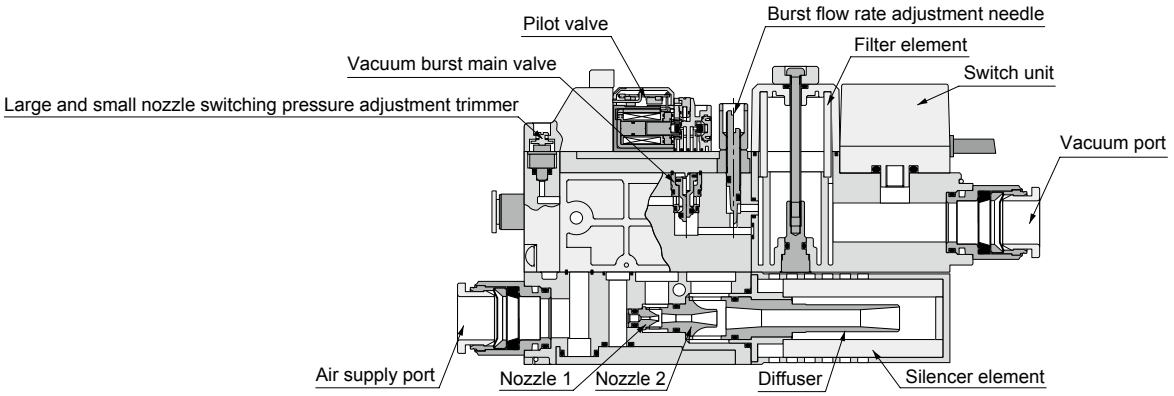




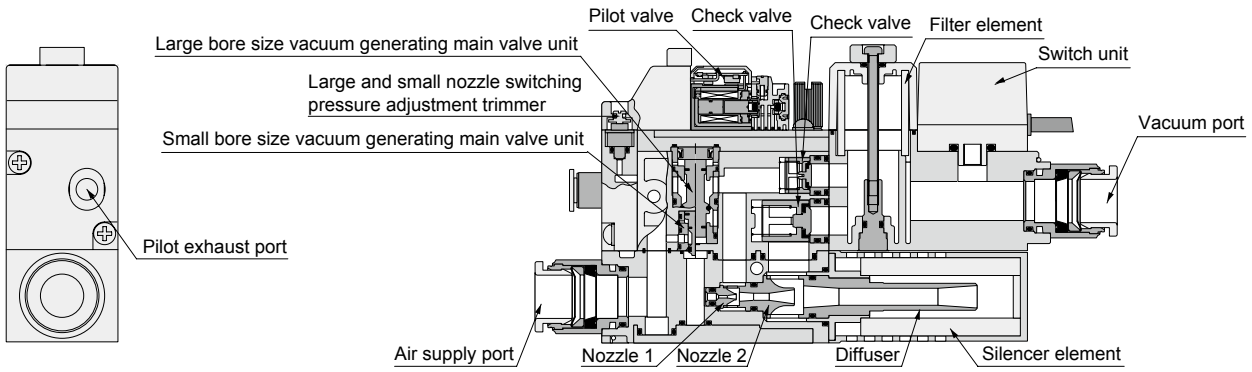
Internal structure

● Twin nozzle

· Burst circuit



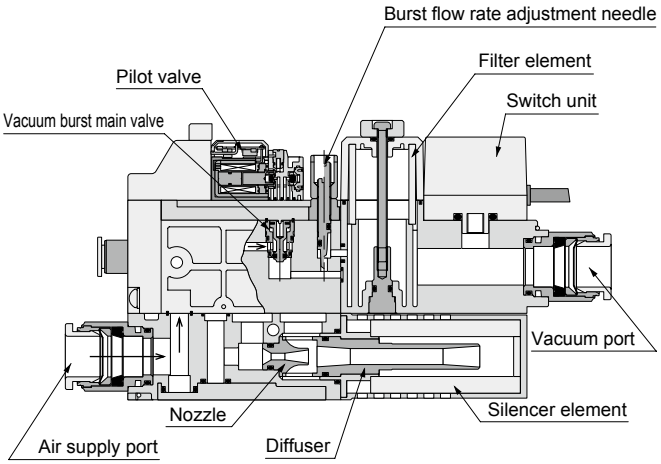
· Vacuum circuit



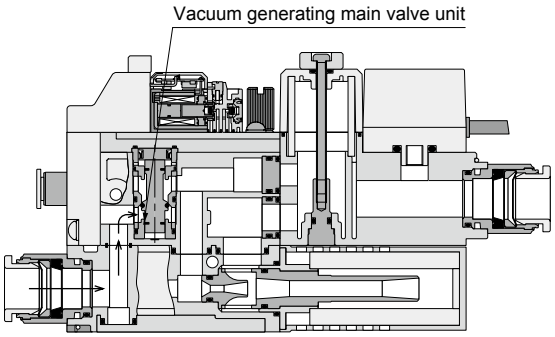
Operational explanation drawing (Single nozzle, normally closed)

● Vacuum generation stopped

· Burst circuit

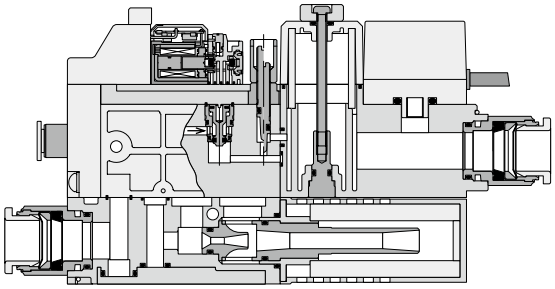


· Vacuum circuit

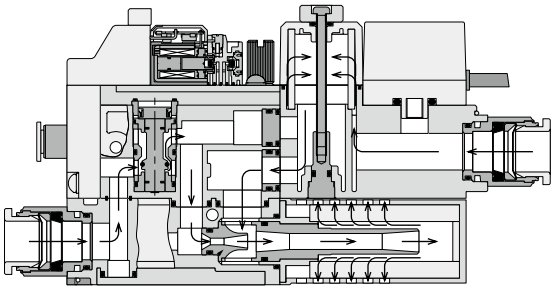


● Vacuum generation status

· Burst circuit

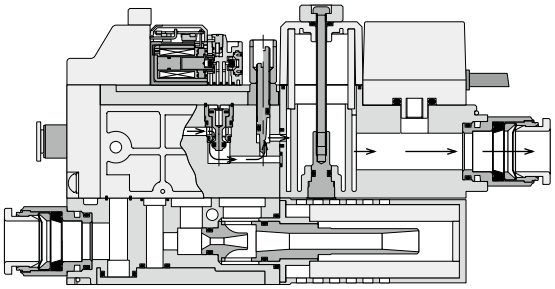


· Vacuum circuit

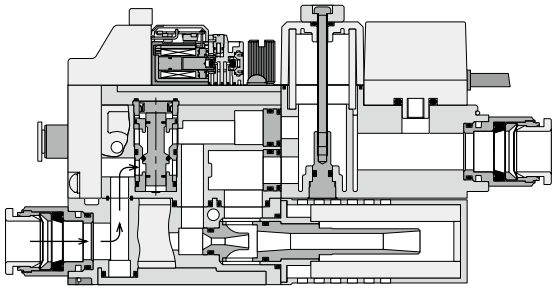


● Vacuum burst air supply

· Burst circuit



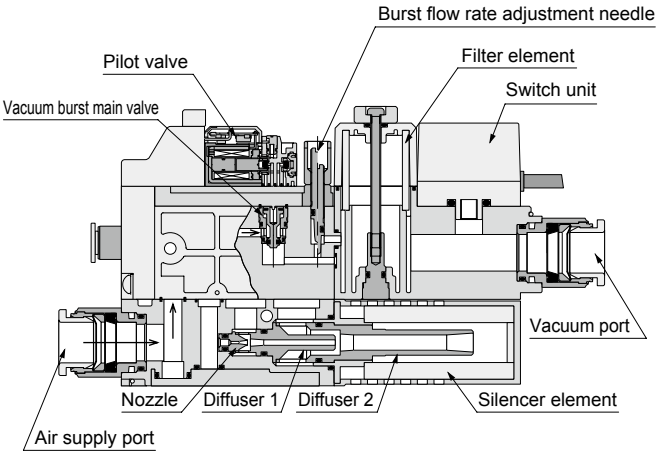
· Vacuum circuit



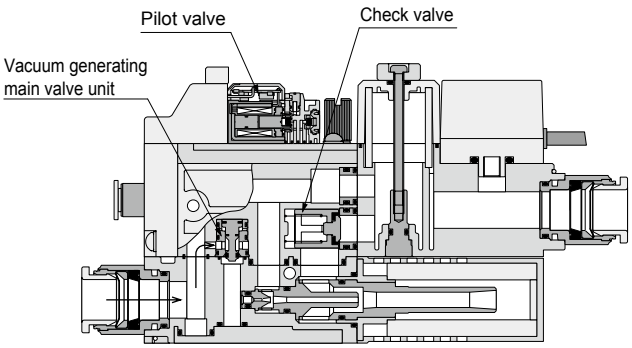
Operational explanation drawing (2-stage nozzle, normally closed)

● Vacuum generation stopped

· Burst circuit

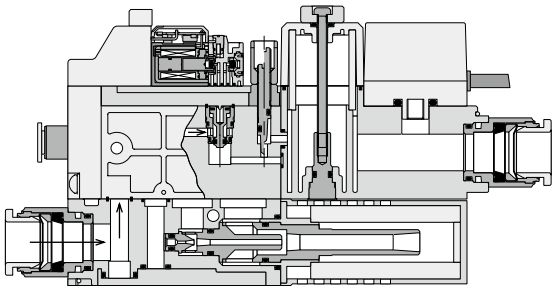


· Vacuum circuit

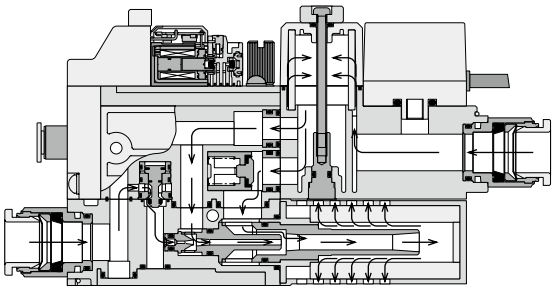


● Vacuum generation status

· Burst circuit

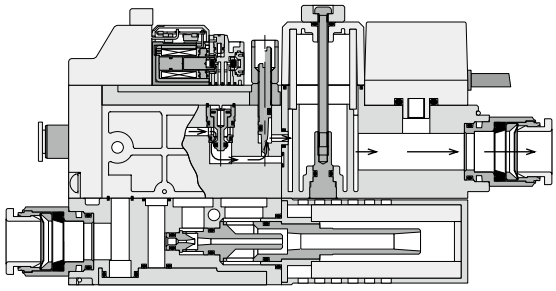


· Vacuum circuit

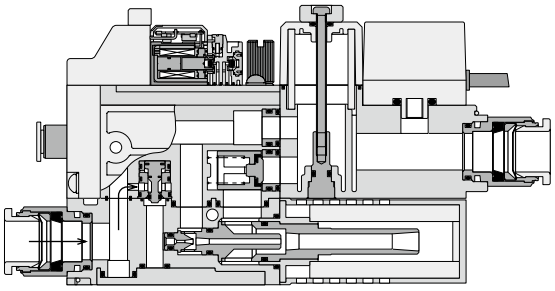


● Vacuum burst air supply

· Burst circuit



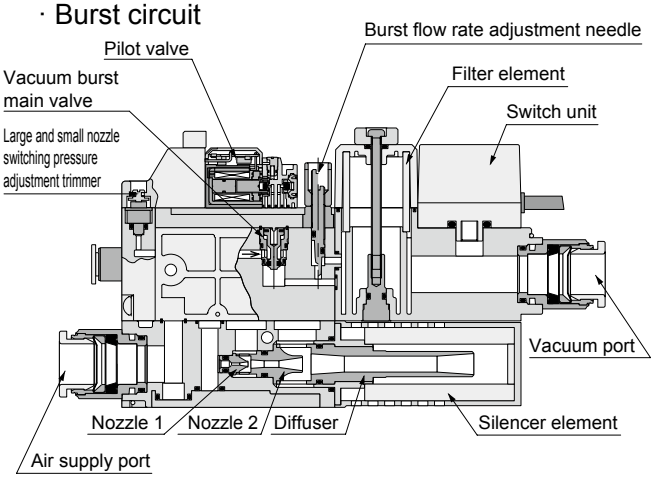
· Vacuum circuit



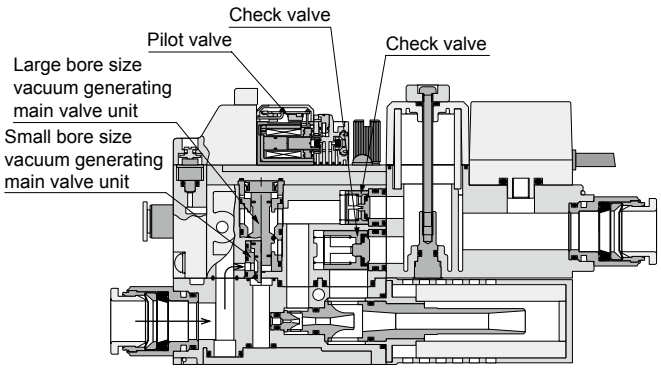
Operational explanation drawing (twin nozzle)

● Vacuum generation stopped

· Burst circuit

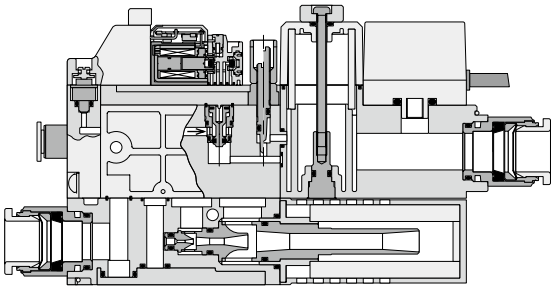


· Vacuum circuit

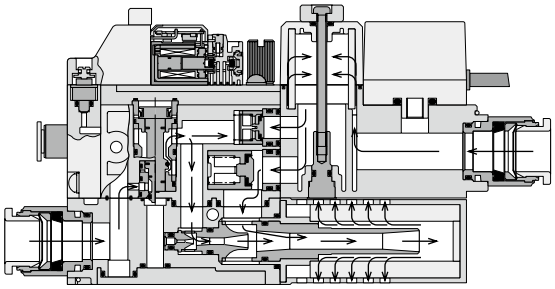


● Vacuum generation status (vacuum rise to reference vacuum pressure: large bore size nozzle)

· Burst circuit

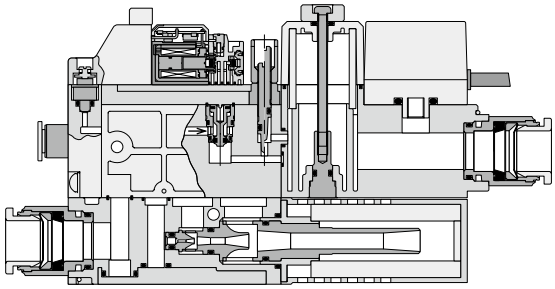


· Vacuum circuit

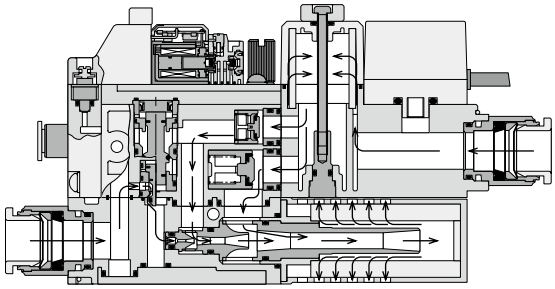


● Vacuum generation status (above reference vacuum pressure: small bore size nozzle)

· Burst circuit

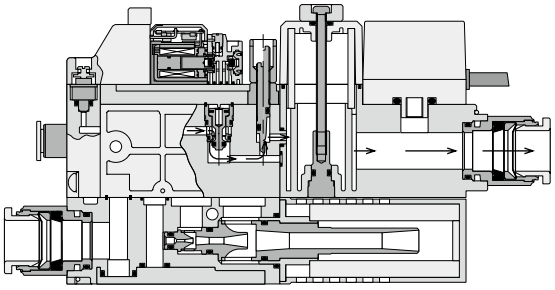


· Vacuum circuit

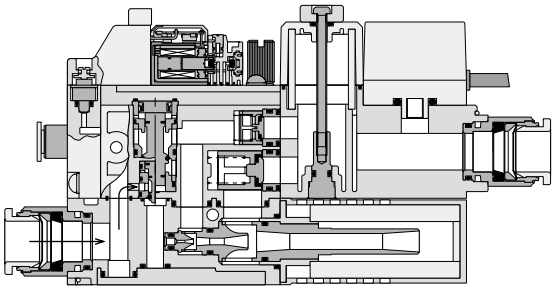


● Vacuum burst air supply

· Burst circuit



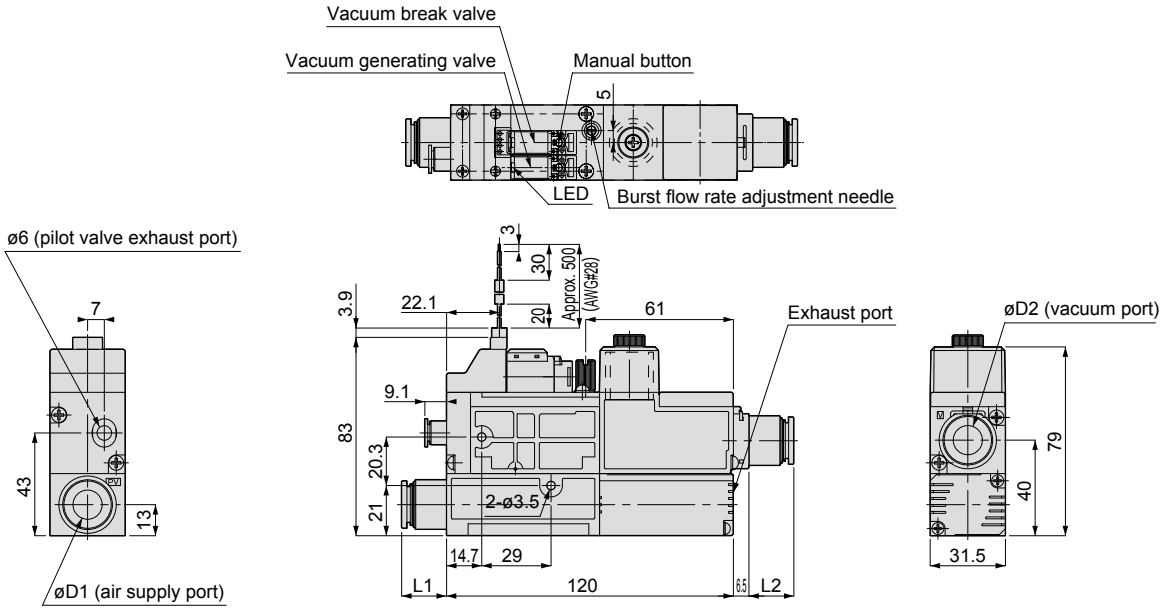
· Vacuum circuit



MEMO

Dimensions (single nozzle, atmospheric release)

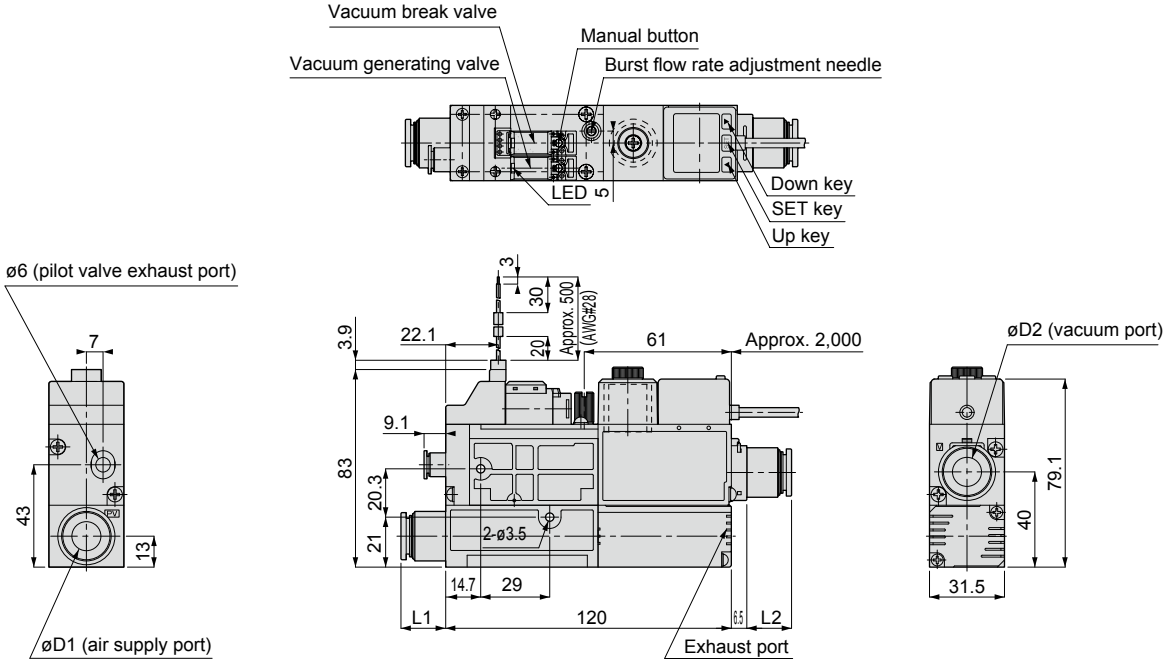
● Without vacuum pressure switch



Unit: mm

	Tube O.D. øD1	L1	Tube O.D. øD2	L2
Air supply port	8	12.2	-	-
	10	14.7	-	-
Vacuum port	-	-	8	12.2
	-	-	10	14.7

● With NPN output 2-point vacuum pressure switch with digital display

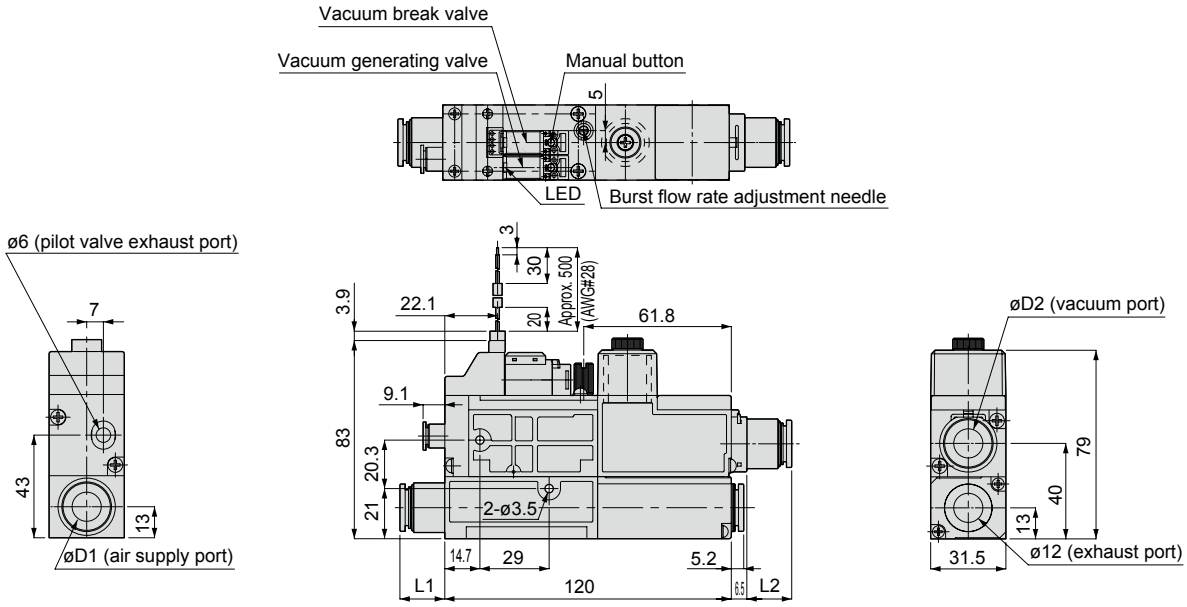


Unit: mm

	Tube O.D. øD1	L1	Tube O.D. øD2	L2
Air supply port	8	12.2	-	-
	10	14.7	-	-
Vacuum port	-	-	8	12.2
	-	-	10	14.7

Dimensions (single nozzle, common exhaust)

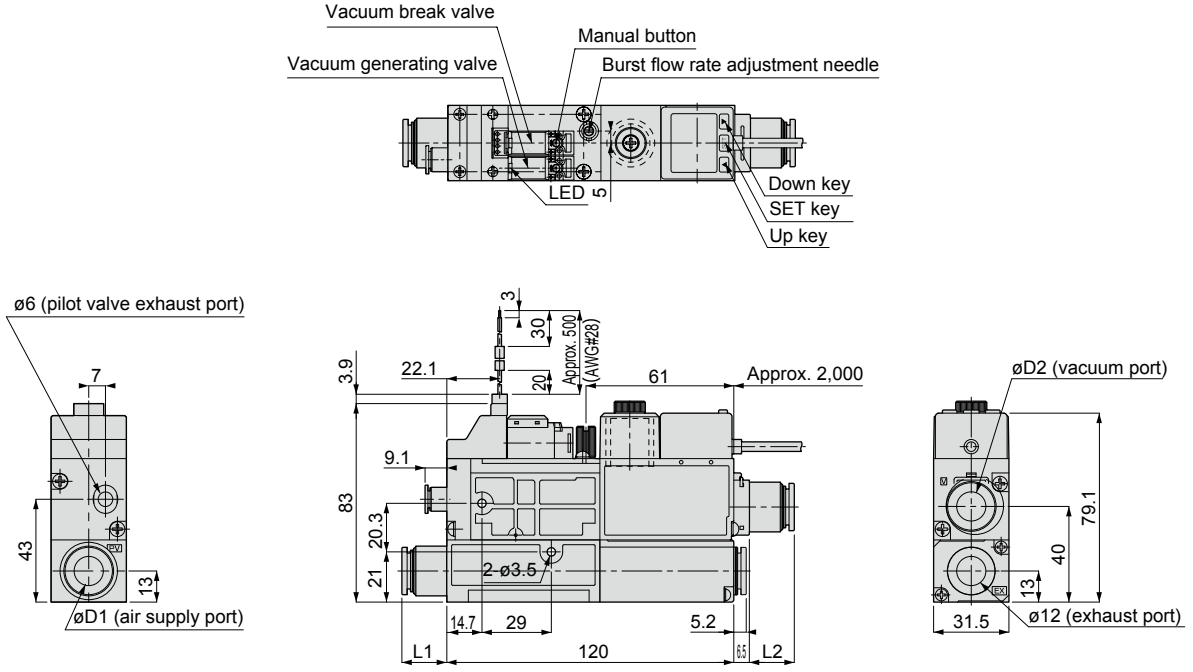
● Without vacuum pressure switch



Unit: mm

	Tube O.D. øD1	L1	Tube O.D. øD2	L2
Air supply port	8	12.2	-	-
	10	14.7	-	-
Vacuum port	-	-	8	12.2
	-	-	10	14.7

● With NPN output 2-point vacuum pressure switch with digital display

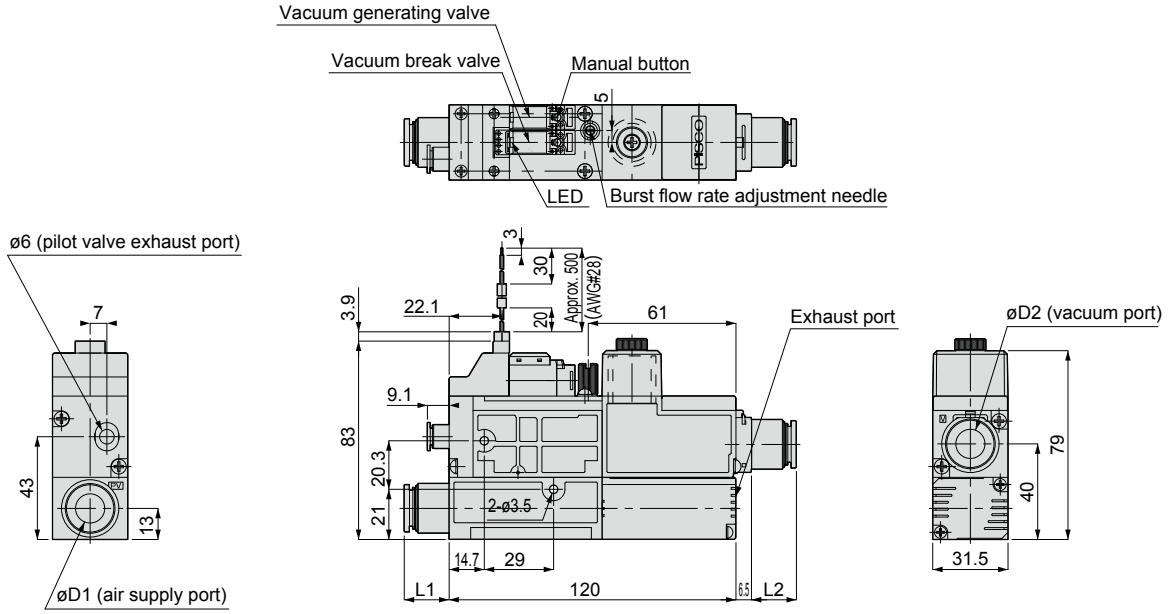


Unit: mm

	Tube O.D. øD1	L1	Tube O.D. øD2	L2
Air supply port	8	12.2	-	-
	10	14.7	-	-
Vacuum port	-	-	8	12.2
	-	-	10	14.7

Dimensions (2-stage nozzle, atmospheric release)

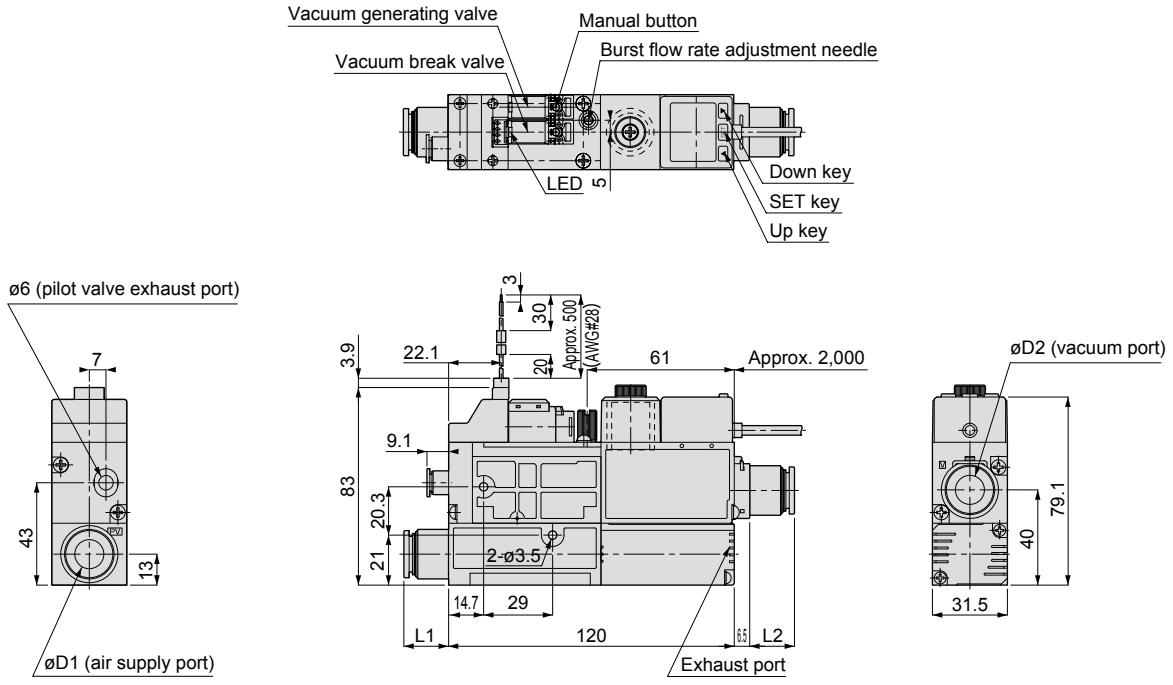
● Without vacuum pressure switch



Unit: mm

	Tube O.D. øD1	L1	Tube O.D. øD2	L2
Air supply port	6	11.1	-	-
	8	12.2	-	-
	10	14.7	-	-
Vacuum port	-	-	8	12.2
	-	-	10	14.7

● With NPN output 2-point vacuum pressure switch with digital display

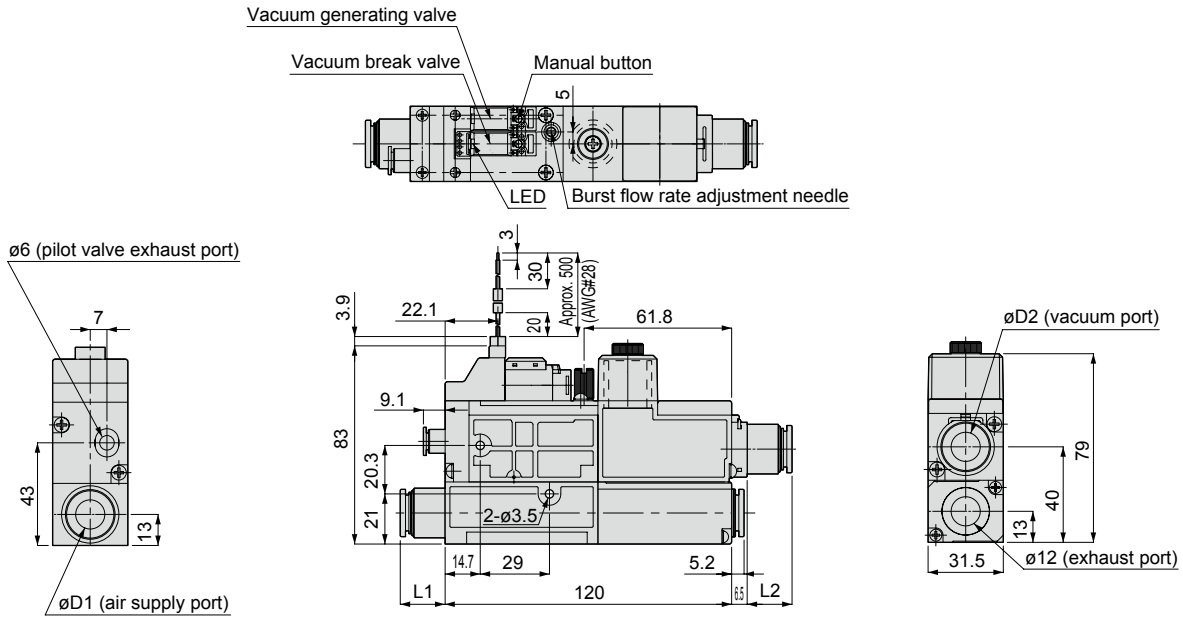


Unit: mm

	Tube O.D. øD1	L1	Tube O.D. øD2	L2
Air supply port	6	11.1	-	-
	8	12.2	-	-
	10	14.7	-	-
Vacuum port	-	-	8	12.2
	-	-	10	14.7

Dimensions (2-stage nozzle, common exhaust)

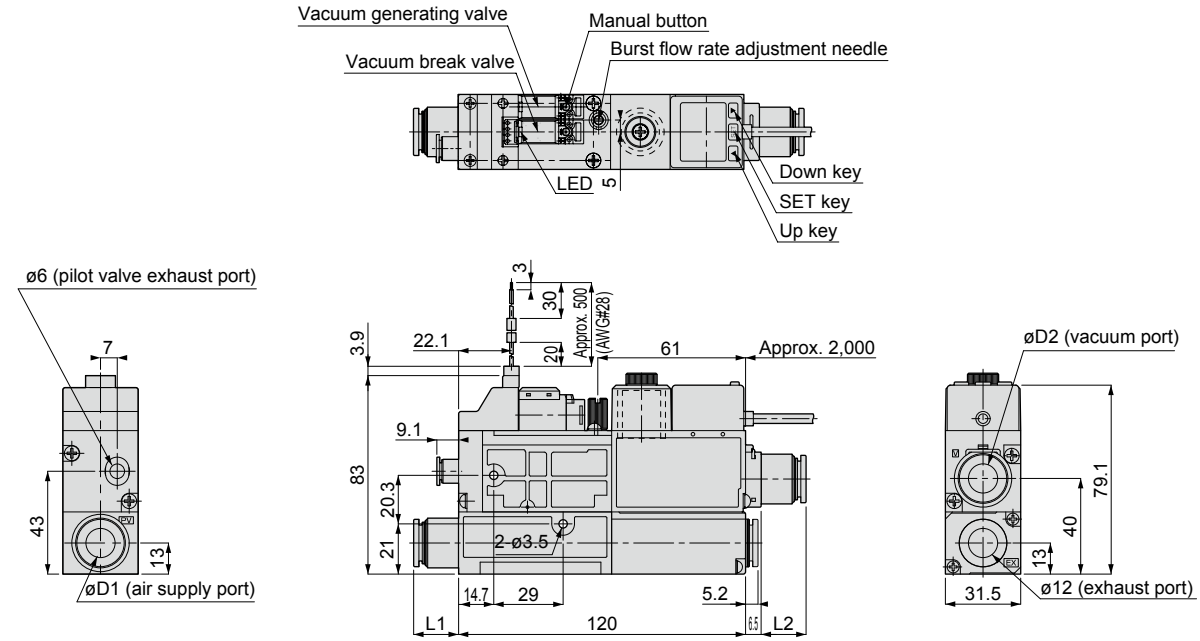
● Without vacuum pressure switch



Unit: mm

	Tube O.D. øD1	L1	Tube O.D. øD2	L2
Air supply port	6	11.1	-	-
	8	12.2	-	-
	10	14.7	-	-
Vacuum port	-	-	8	12.2
	-	-	10	14.7

● With NPN output 2-point vacuum pressure switch with digital display

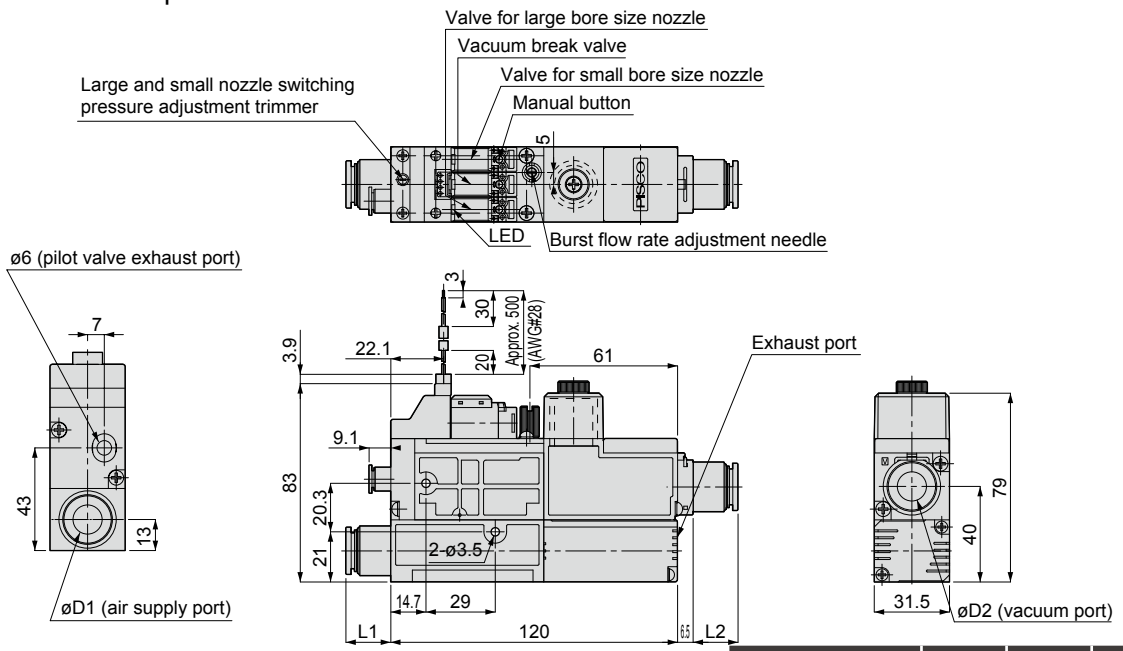


Unit: mm

	Tube O.D. øD1	L1	Tube O.D. øD2	L2
Air supply port	6	11.1	-	-
	8	12.2	-	-
	10	14.7	-	-
Vacuum port	-	-	8	12.2
	-	-	10	14.7

Dimensions (twin nozzle, atmospheric release)

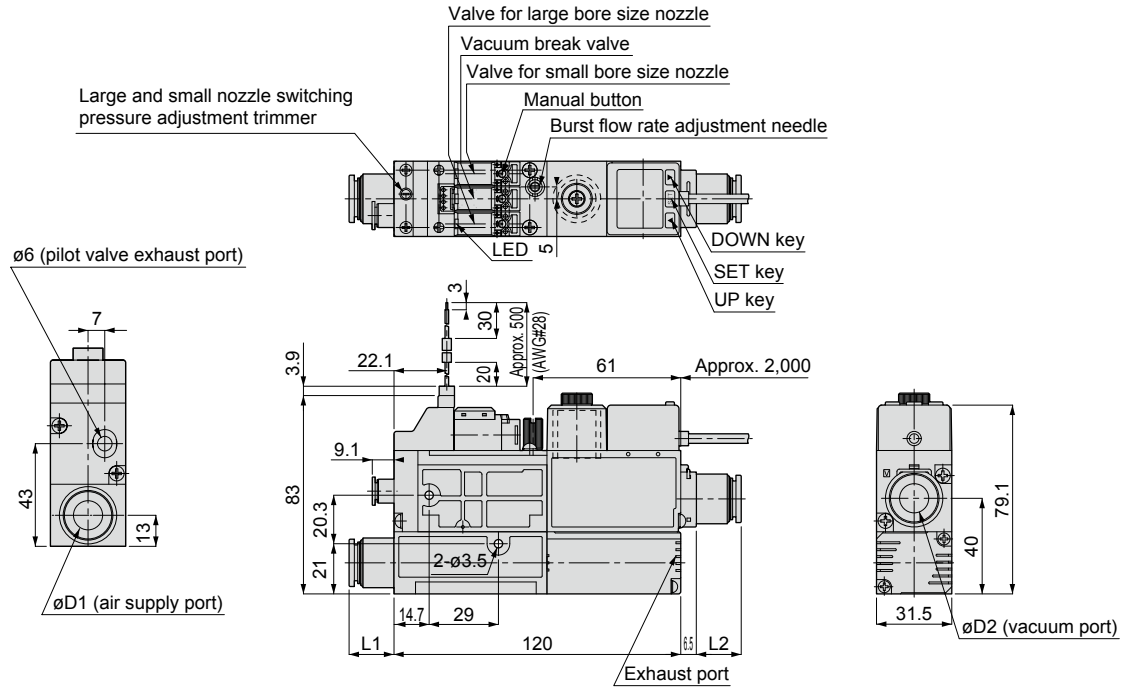
● Without vacuum pressure switch



Unit: mm

	Tube O.D. øD1	L1	Tube O.D. øD2	L2
Air supply port	8	12.2	-	-
	10	14.7	-	-
Vacuum port	-	-	8	12.2
	-	-	10	14.7

● With NPN output 2-point vacuum pressure switch with digital display

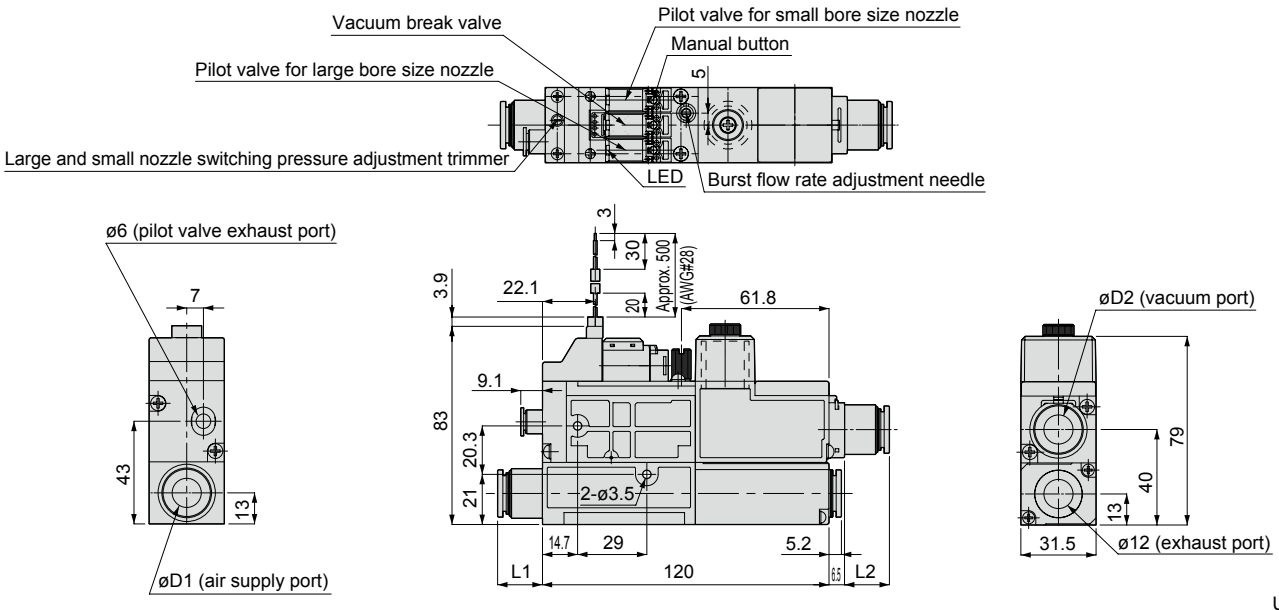


Unit: mm

	Tube O.D. øD1	L1	Tube O.D. øD2	L2
Air supply port	8	12.2	-	-
	10	14.7	-	-
Vacuum port	-	-	8	12.2
	-	-	10	14.7

Dimensions (single nozzle, common exhaust)

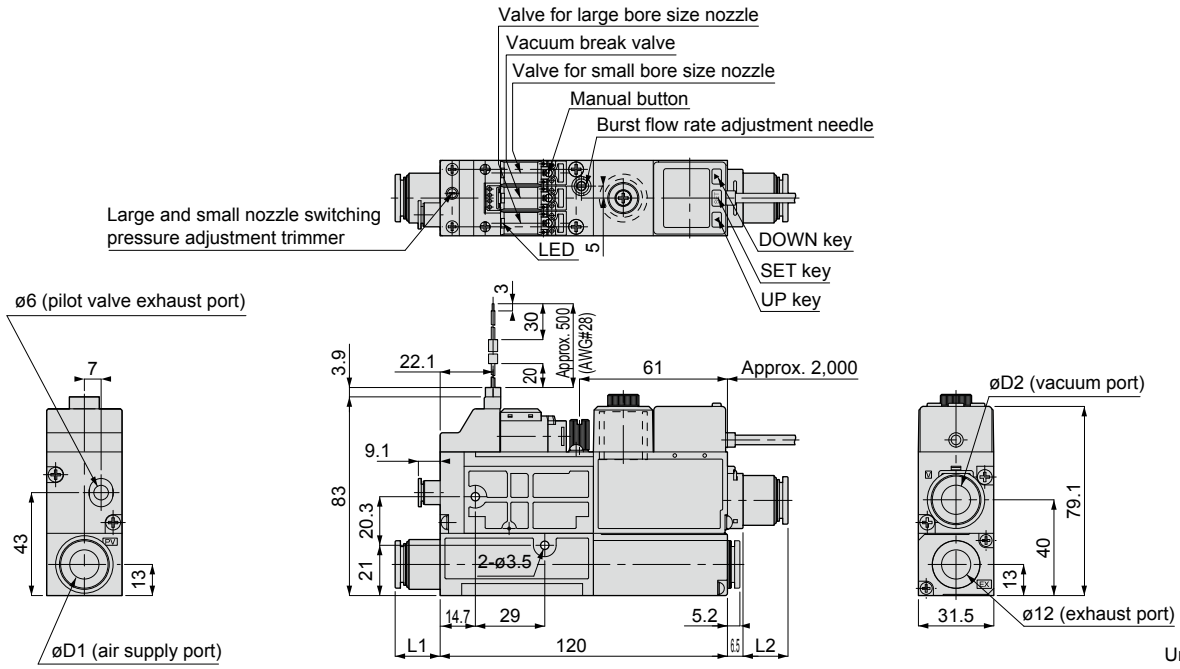
● Without vacuum pressure switch



Unit: mm

	Tube O.D. øD1	L1	Tube O.D. øD2	L2
Air supply port	8	12.2	-	-
	10	14.7	-	-
Vacuum port	-	-	8	12.2
	-	-	10	14.7

● With NPN output 2-point vacuum pressure switch with digital display



Unit: mm

	Tube O.D. øD1	L1	Tube O.D. øD2	L2
Air supply port	8	12.2	-	-
	10	14.7	-	-
Vacuum port	-	-	8	12.2
	-	-	10	14.7

Safety precautions

Refer to Intro Pages 15 and 16 for general precautions on vacuum system components.

⚠ WARNING

- Since the operating temperature is 5 to 50°C, do not use it under any other temperature conditions.
- If energization to the pilot valve continues for long periods, heat is generated from the coil. Heat could cause burns and impact peripheral devices. Contact the nearest CKD Sales Office if continuously energizing for long periods.
- For the self-hold, when resupplying after the pilot air supply is stopped (including the first use after shipment), the status of the switching valve is in neutral. When re-supplying the pilot air, be sure either to input a signal to the pilot valve or to perform switching manually before using.
- When operating the valve, make sure that the leakage current is 1 mA or less. Otherwise, there is a risk of malfunctions caused by leakage current.
- Do not use in atmospheres or gases containing corrosive substances.
- Do not use in flammable or explosive gases, liquids, or atmospheres. This risks causing fire or explosion, as the product does not have an explosion-proof structure.
- Do not use where the heat generated exceeds the operating temperature range. It risks damaging the switch.
- Make sure to turn the power OFF before wiring. During wiring, check the lead wire color, terminal No., etc. and do not short-circuit the output terminal and power supply terminal or common terminal. Short-circuiting could cause switch malfunction.

⚠ CAUTION

- Compressed air contains a large amount of drainage (water, oil oxides, tar, foreign matter). Since drain significantly reduces performance, dehumidify with after-cooler and dryer to improve air quality.
- Do not use a lubricator.
- As rust and the like inside the piping may cause malfunctions, be sure to insert a filter of 5 μm or less in front of the supply port. In addition, flushing of pipes is recommended before use and at appropriate intervals.
- Do not apply high tensile force or bending force to the pilot valve or vacuum pressure switch lead wire. It could cause disconnection or damage to the connector unit.
- Avoid using in areas containing corrosive or flammable gases. Do not use as a fluid.
- This product does not have a drip-proof/dust-proof structure. Do not use in places where the product is exposed to dripping water, oil, dust, etc.
- Avoid as far as possible the suction of dust, salt, iron powder and the like.
- When vacuum is generated, do not operate the vacuum burst valve.
- When replacing the supply and vacuum port cartridge fittings, remove the deposits from the seal and then securely insert the pin.
- Keep the piping of vacuum, common exhaust, pilot exhaust and supply as short as possible. Due to piping resistance, the original performance of the vacuum components may not be fully attainable.
- Use a stable DC power supply.
- To connect to an output terminal or power supply terminal (relay, valve, etc.), install a surge voltage absorption circuit. Avoid applications that exceed the rated current.
- When using a unit power supply such as switching power supply, ground the F.G. (frame ground).
- Do not short-circuit the output terminal with other terminals.
- Do not apply excessive load to the body. It may cause damage.
- Wiring or application that applies noise or the like may cause damage.
- When using the twin nozzle, allow margin for the degree of vacuum when suctioning the workpiece and the setting value of the pressure switch for switching large and small nozzles. If the degree of vacuum is the same as the set value, the large and small bore size pilot valves may operate together.

Usage methods

1. How to operate the valve

- Energization (supply power after confirming the wiring.)
- Energize the lead wire (black: vacuum, gray: vacuum burst) of the solenoid valve that you want to operate. The valve will operate.

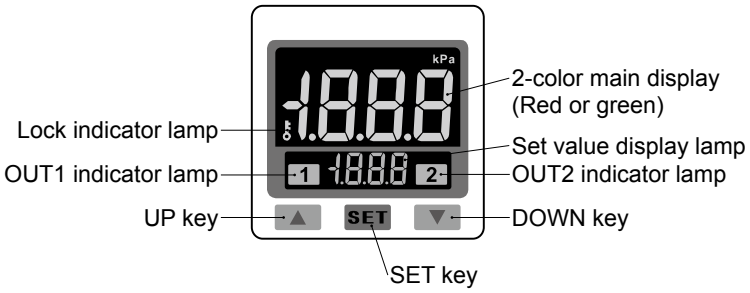
2. How to operate the twin-nozzle valve

- When using the twin nozzle, apply normal voltage to the brown/blue lead wire.
- Adjust the reference vacuum pressure setting with the large and small nozzle switching pressure adjustment trimmer.

* Switching of large and small nozzles is controlled by the internal circuit by energizing the vacuum generating valve.

3. Usage methods of the pressure sensor

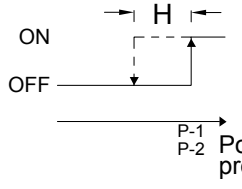
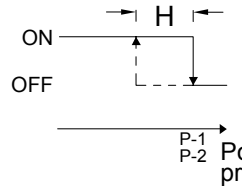
The names and functions of each part



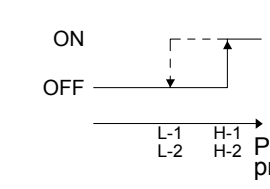
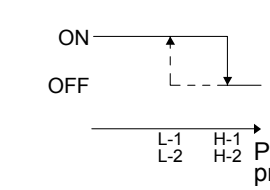
Switch output

Switch output operation can be selected from below.

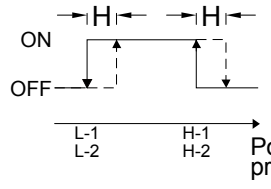
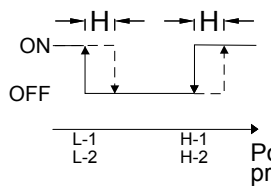
● One-point setting mode

Normally open mode	Normally closed mode
Compound pressure VUS-33R	Compound pressure VUS-33R
	

● Hysteresis mode

Normally open mode	Normally closed mode
Compound pressure VUS-33R	Compound pressure VUS-33R
	

● Window comparator mode

Normally open mode	Normally closed mode
Compound pressure VUS-33R	Compound pressure VUS-33R
	

*1. When the hysteresis is set to 2 digits or less, if the input pressure is very close to the set pressure, malfunction may occur in the sensor output.

*2. In the window comparator mode, if the two set points are smaller than the fixed hysteresis set value, the switch output may not operate.

Usage methods

Hysteresis setting

Hysteresis setting helps prevent chattering due to pressure pulsation, etc.

Response time

Response time of the switch output can be set.
Setting the response time helps prevent erroneous detection due to unexpected pressure fluctuations.

Changing the display color

The display color when the switch output is ON/OFF can be set from red and green.

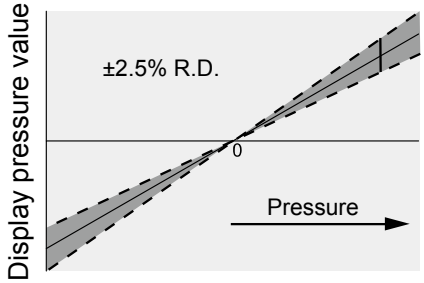
Power saving mode

This function switches to the power saving mode if no button is pressed for 30 seconds.
Operate any button while in power saving mode to return to measurement mode.

Fine adjustment mode

This function allows fine adjustment of the displayed value within ±2.5% range.
It unifies variations in the display value when using multiple pressure sensors.

This function eliminates small pressure errors in the output value and makes the displayed value uniform.
The value displayed on the pressure sensor can be set within ±2.5% R.D.



—— The initial setting is the value set at the factory (factory setting).
Pressure setting display value - Allowable setting range

R.D. (Real Detect measured value)
* Setting resolution: ±0.1% R.D.

Usage methods

■ Zero value setting

This function forces the display pressure to be set to zero.
If a pressure of atmospheric pressure ± 3% or more is applied, an error will be displayed and the "Zero value setting" will not be possible.

■ Maximum/minimum value display

This function displays the maximum and minimum pressure values since the power was turned ON.
The values are reset when the power is turned OFF.

■ Button lock/unlock mode

The lock function mode is used to lock the keys and prevent erroneous outputting of the switch due to an incorrect key being pressed. When the button is locked, a key marker appears on the main display.

■ Error display description

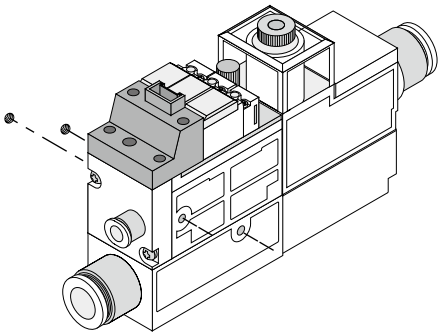
Error name		Error display	Content	Processing method
Overcurrent error	out1	Er 1	The load current of output 1 exceeds 125 mA.	Turn off the power and check the cause of the overcurrent. Next, lower the load current to 125 mA or less and then turn ON the power again.
	out2	Er2	The load current of output 2 exceeds 125 mA.	
Residual pressure error		Er3	At zero clear setting, the atmospheric pressure is ±3% F.S. or more.	Perform zero clear again after setting the applied pressure to the atmospheric pressure state.
Working pressure error		HHH	The applied pressure exceeds the upper limit of the pressure setting value.	Adjust applied pressure to within the working pressure range.
		LLL	The applied pressure exceeds the lower limit of the pressure setting value.	
System error		Er4	Internal system error	Turn OFF the power and then turn it ON again. If the error is not resolved, contact us.
		Er5		
		Er6	Internal data error	
		Er7		

Refer to the Instruction Manual for details about how to set each function.

Usage methods

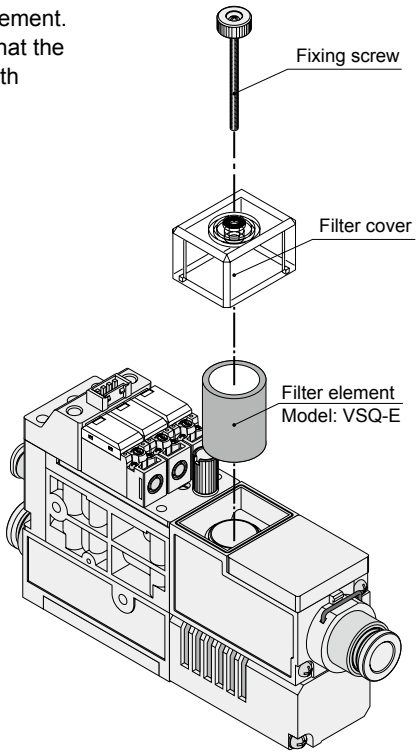
4. Fixing method

To secure the vacuum unit VSQ, fasten M3 screws through the fixing holes on the resin body. (Refer to the dimensions for the fixing hole pitch.)



5. How to replace the filter element

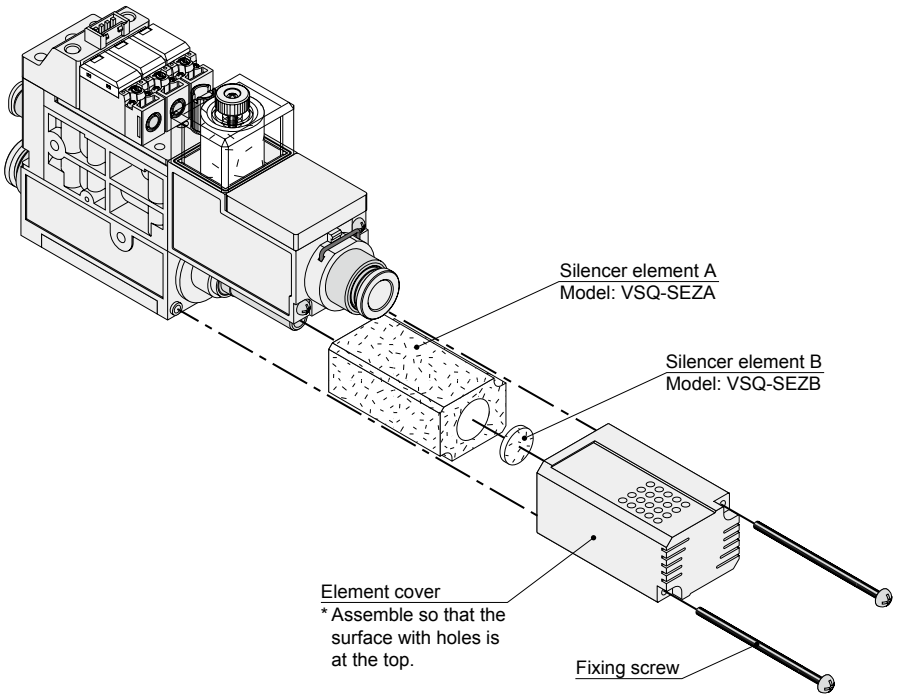
Remove the fixing screws to replace the filter element. After replacing the filter element and checking that the filter packing has not fallen out, securely fix it with tightening torque of 0.3 to 0.5 N·m.



Usage methods

6. How to replace the silencer element

To replace the silencer element, follow the procedure below.
(1)Remove the element cover fixing screws (2 pcs).
(2)Remove the element.
(3)Insert the element and fix the element cover securely with tightening torque of 0.4 to 0.5 N·m.

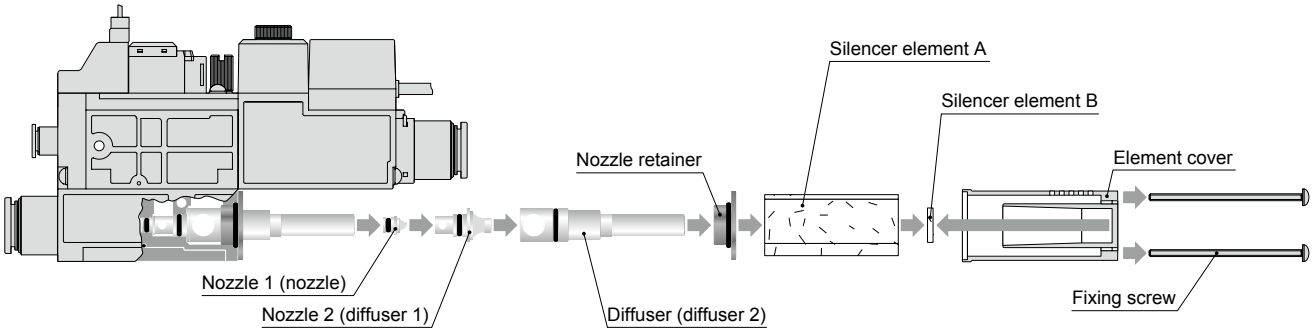


Usage methods

7. Replacing and cleaning nozzle and diffuser

To replace and clean the nozzle, follow the procedure below.

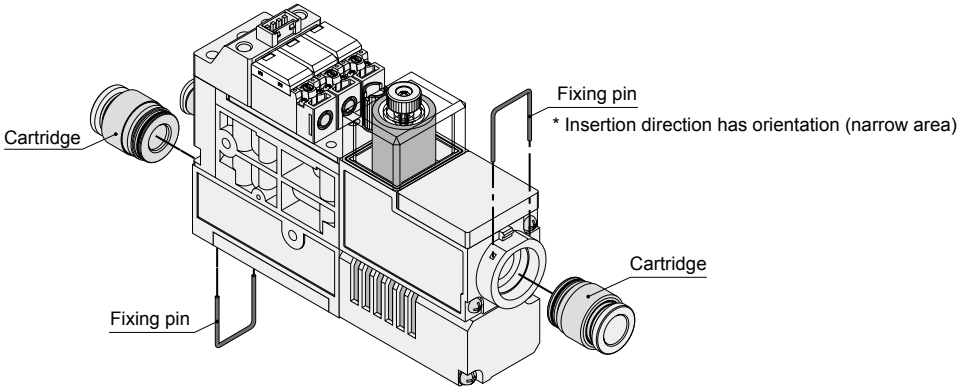
(1) Remove the element cover fixing screws (2 pcs) with an appropriate Phillips screwdriver and remove the element cover.
(2)-1. For single nozzle: Pull out in the order of nozzle retainer, diffuser, nozzle 1.
(2)-2. For twin nozzle: Pull out in the order of nozzle retainer, diffuser, nozzle 2, nozzle 1.
(2)-3. For 2-stage nozzle: Pull out in the order of nozzle retainer, diffuser 2, diffuser 1, nozzle.
(3)-1. For single nozzle: Remove deposits on nozzle 1, diffuser bore part and seal by air blow or wiping.
(3)-2. For twin nozzle: Remove deposits on nozzle 1, 2, diffuser bore part and seal by air blow or wiping.
(3)-3. For 2-stage nozzle: Remove deposits on nozzle, diffuser 1, diffuser 2 bore part and seal by air blow or wiping.
(Note) Do not damage the nozzle, diffuser bore or seal.
(4)-1. For single nozzle: Insert into the body in the order of nozzle 1, diffuser, nozzle retainer.
(4)-2. For twin nozzle: Insert into the body in the order of nozzle 1, 2, diffuser, nozzle retainer.
(4)-3. For 2-stage nozzle: Insert into the body in the order of nozzle, diffuser 1, diffuser 2, nozzle retainer.
(5) Attach the element cover and securely fix the fixing screw with tightening torque of 0.4 to 0.5 N·m.



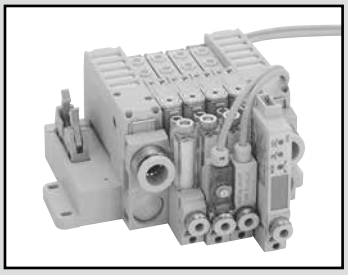
* Values in ( ) are for 2-stage nozzle

8. How to replace the cartridge fitting

Cartridge fittings can be replaced according to the following procedure.
(1)Pull out the stop pin with a flathead screwdriver, etc.
(2)Pull out the cartridge in the connection direction.
(Note) When mounting the cartridge to the body, mount after checking that there is no dirt, fluff, etc. adhering to the O-ring.



MEMO



Compact, lightweight manifold dedicated vacuum ejector unit greatly reduces the vacuum burst time

VSZM Series

● Nozzle diameter: ø0.5, ø0.7, ø1.0

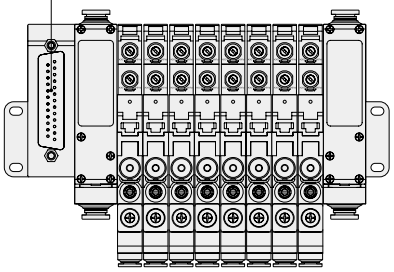
RoHS

Features

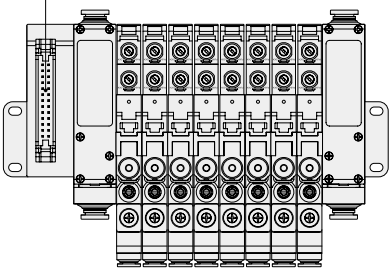
■ By installing an atmospheric pressure relief valve, large flow rate atmospheric burst is possible and the vacuum burst time can be drastically reduced.

■ Vacuum generating valve/vacuum burst valve wiring has been centralized collectively.

D sub-connector specifications



Flat cable connector specifications

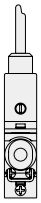


■ Supply valve can be selected from normally closed and self-hold.

■ Power consumption of the valve reduced to 0.55 W, effectively saving energy.

■ A wide range of applications are supported by wide variations of the vacuum pressure switch.

Analog output type



1-point output without display

1-point output with digital display + analog output type

2-point output type with digital display

■ Maintenance work is easy due to a structure that takes maintainability into consideration.

■ Since the push-in fitting and female thread specification are standardized for piping, selection is possible in accordance with the piping application.

■ Three types of nozzle diameters are available: ø0.5 mm, ø0.7 mm, ø1.0 mm.

Specifications

Descriptions	VSZM
Working fluid	Air
Working pressure MPa	0.3 to 0.7
Ambient/fluid temperatures °C	5 to 50

Ejector characteristics

Model No.	Nozzle diameter (mm)	Rated supply pressure (MPa)	Achieved vacuum pressure (-kPa)	Intake flow rate (ℓ/min(ANR))	Air consumption rate (ℓ/min(ANR))
VSZM-H05	0.5	0.5	90.4	7	11.5
VSZM-L05			66.5	12	
VSZM-H07	0.7	0.5	93.1	13	23
VSZM-L07			66.5	24	
VSZM-E07		0.35	90.4	10	17
VSZM-H10	1.0	0.5	93.1	24	46
VSZM-E10		0.35	90.4	20	34

Valve specifications

● Pilot valve

Descriptions	Vacuum generating valve	Vacuum break valve
Valve and operation	Direct acting pilot valve	
Rated voltage V	24 DC	
Voltage fluctuation range V	21.6 DC to 26.4 DC	
Surge	Varistor	
Power consumption W	0.55 (with LED)	
Operational indicator lamp	At coil excitation: Red LED lights	At coil excitation: Yellow-green LED lights
Manual override	Push locking	
Wiring method	D sub-connector, flat cable connector	

● Switching valve

Descriptions	Vacuum generating valve	Vacuum break valve
Valve and operation	Pilot operated pilot valve	
Valve	Normally closed, self-hold	Normally closed
Proof pressure MPa	1.05	
Lubrication	Not required	
Effective cross-sectional area mm^2 (Cv)	4.5(0.24)	3.5(0.19)

Vacuum pressure switch specifications

Descriptions		With digital display		Without display	Separate	Analog
		2-point switch output	1-point switch output	1-point switch output	Pressure indicator with switch	
Current consumption mA		40		20	50	20
Pressure sensitive element		Diffused semiconductor pressure sensor			-	Diffused semiconductor pressure sensor
Working pressure kPa		-100 to 0			-	-100 to 0
Set pressure		-99 to 0 kPa			-999 to 999 counts	-
Proof pressure MPa		0.2			-	0.2
Storage temperature °C		-20 to 80		-20 to 70		
Operating temperature °C		0 to 50		-10 to 60	-10 to 50	-10 to 60
Operating humidity		35 to 85%RH				
Power supply voltage V		12 to 24 DC ±10% ripple (P-P) 10% or less		10.8 to 30 DC (including ripple)		
Degree of protection		IEC standards IP40 or equivalent				
Switch output point		2	1	1	2	-
Repeatability		±0.3%F.S. Max.(at Ta=25°C)				-
Hysteresis		Lock	Variable	Lock	Variable	-
Switch output		NPN transistor/open collector output				-
Analog output	Output voltage V	-	1 to 5	-	1 to 5	
	Zero point voltage V	-	1±01	-	1±01	
	Span voltage V	-	4±0.1	-	4±0.1	
	Output current mA	-	1 or less	-	0.5 or less	1 or less
	Linearity/hysteresis	-	±0.5%F.S. Max.	-	±0.5%F.S. Max.	
Display		0 to -99 kPa (2-digit red LED display)		-	3-digit red LED display	-
Display frequency		Approx. 4 times/second		-	Approx. 4 times/second	-
Display accuracy		±3%F.S. ±2digit		-	±1%F.S.	-
Resolution		1digit		-	1digit	-
Switch operation indicator lamp		SW1: Red LED lights when output is ON			SW1: Green LED lights when output is ON	-
		SW2: Green LED lights when output is ON	-		SW2: Red LED lights when output is ON	-

Vacuum burst function

Descriptions		Vacuum burst valve
Break air flow rate ℓ/min(ANR)		When air is supplied at 0 to 50 0.5 MPa
Atmospheric pressure release valve	Actuation	Indirect operation by pneumatic pressure
	Valve structure	Elastic sealing, poppet valve
	Valve	Normally open
	Lubrication	Not required
	Orifice size mm	3.5 or equiv.

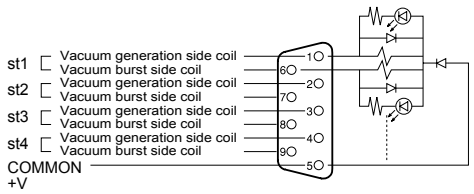
Vacuum filter specifications

Descriptions	Vacuum filter
Element material	PVF (Polyvinyl formal)
Filtration rating μm	10
Filtration area mm^2	660
Replacement filter element model No.	VSZM-E

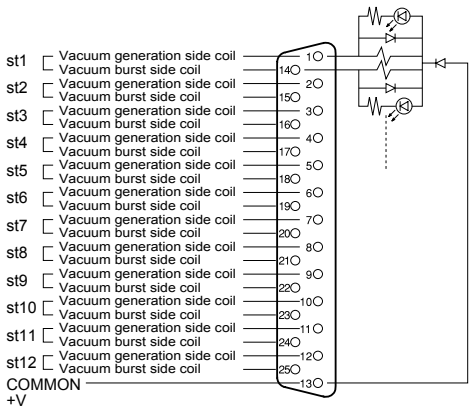
Electric circuit (solenoid valve)

● D sub-connector

9-pin

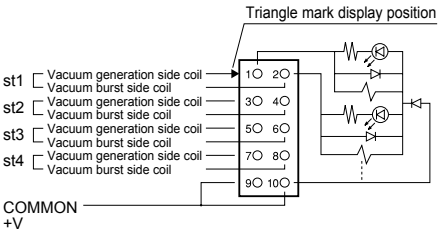


25-pin



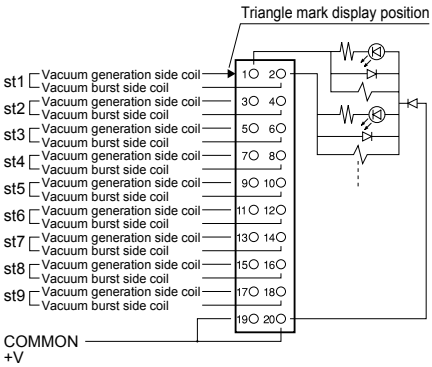
● Flat cable connector

10-pin



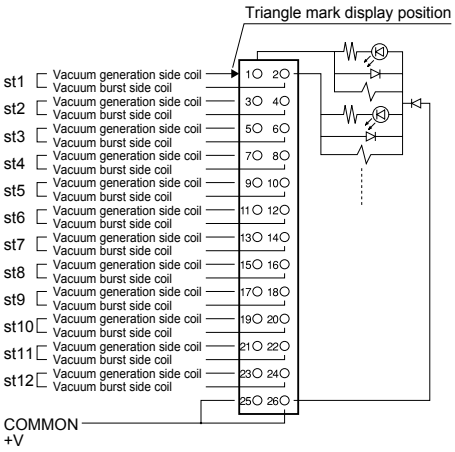
(Note) COMMON (+ V) pin No. 9/10 is short-circuited internally.

20-pin



(Note) COMMON (+ V) pin No. 19/20 is short-circuited internally.

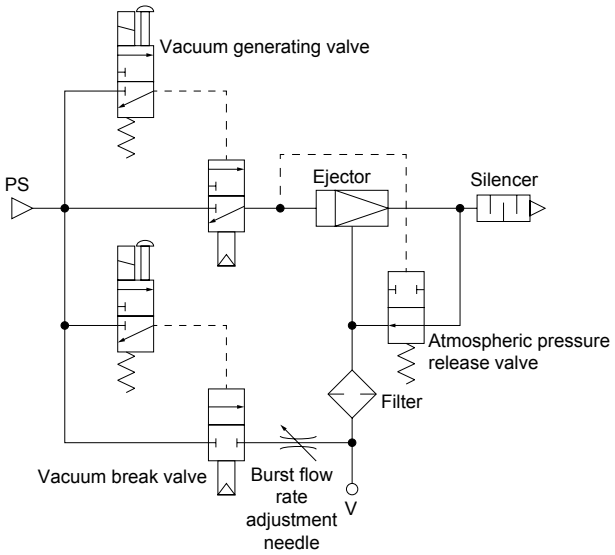
26-pin



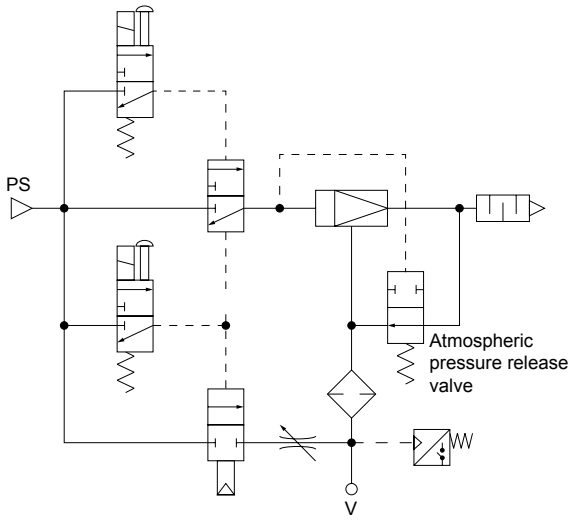
(Note) COMMON (+ V) pin No. 25/26 is short-circuited internally.

Circuit diagram

● Normally closed



● Self-hold type



How to order

● 11 mm pitch manifold dedicated vacuum ejector unit

VSZM - H 05 D - 6 8 8 - 3 - 8 - S - F 20

● Ejector unit assembly for 11 mm pitch manifold dedicated vacuum ejector unit

VSZM - H 07 — M5 — S

● Valve unit assembly for 11 mm pitch manifold dedicated vacuum ejector unit

VSZM — V D — 3

● Manifold only for 11 mm pitch manifold dedicated vacuum ejector unit

VSZM — 10 10 — 8 — F 20

With the manifold, exhaust air is led into the ejector not in operation and output from the vacuum port. Contact CKD when exhaust air lead-in has adverse effects.

Ⓐ Vacuum characteristics
Ⓑ Nozzle diameter
Ⓒ Valve
Ⓓ Vacuum port (V)
Ⓔ Air supply port (PS)
Ⓕ Exhaust port (EX)
Ⓖ Solenoid valve voltage
Ⓗ Manifold station No.
Ⓘ Vacuum pressure switch specifications
Ⓙ Wiring specifications
Ⓚ No. of connector pins specified

Code	Content	Type: Manifold	Ejector unit assembly	Valve unit assembly	Manifold only
Ⓐ Vacuum characteristics *1, *2, *3					
H	High vacuum/medium flow rate	●	●		
L	Medium vacuum/large flow rate	●	●		
E	High vacuum/low flow rate	●	●		
Z	For mixed specs (indicate breakdown on specs sheet.)	●			
Ⓑ Nozzle diameter *1, *2, *3					
05	ø0.5	●	●		
07	ø0.7	●	●		
10	ø1.0	●	●		
00	For mixed specs (indicate breakdown on specs sheet.)	●			
Ⓒ Valve *2					
B	Normally closed	●		●	
D	Self hold type	●		●	
Z	For mixed specs (indicate breakdown on specs sheet.)	●			
Ⓓ Vacuum port (V) *2					
4	ø4 push-in fitting	●	●		
6	ø6 push-in fitting	●	●		
M5	M5×0.8	●	●		
CX	For mixed fittings (indicate breakdown on specs sheet.)	●			
Ⓔ Air supply port (PS)					
6	ø6 push-in fitting	●			●
8	ø8 push-in fitting	●			●
10	ø10 push-in fitting	●			●
Ⓕ Exhaust port (EX)					
S	Atmospheric release with silencer	●			●
6	ø6 push-in fitting common exhaust	●			●
8	ø8 push-in fitting common exhaust	●			●
10	ø10 push-in fitting common exhaust	●			●
Ⓖ Solenoid valve voltage					
3	24 VDC	●		●	
Ⓗ Manifold station No. *5					
2	2 stations	●			●
to	to				
12	12 stations				
Ⓘ Vacuum pressure switch specifications *2					
Blank	Without vacuum pressure switch	●	●		
DW	With digital display, NPN output 2 points	●	●		
DA	With digital display, NPN output 1 point + analog output	●	●		
S	NPN output 1-point without display	●	●		
V1	Negative pressure analog output	●	●		
R1	Compound pressure analog output	●	●		
Z	For mixed specs (indicate breakdown on specs sheet.)	●			
Ⓙ Wiring specifications *4					
F	Flat cable connector	●			●
D	D sub-connector	●			●
Ⓚ No. of connector pins specified *4					
Refer to Appendix 1 for No. of connector pins specified.		●			●

Precautions for model No. selection

*1 : Ⓐ, Ⓑ "E05" and "L10" combination is not possible.
*2 : Indicate on the "mix manifold specifications sheet" in the case of mixed specifications. Refer to page 188 for details.
*3 : When Ⓐ is "Z", Ⓑ is "00" only. When Ⓑ is "00", Ⓐ is "Z" only.
*4 : When Ⓚ is "20" or "26", Ⓙ "D" cannot be selected. When Ⓚ is "25", Ⓙ "F" cannot be selected.
*5 : The number of stations that can be simultaneously operated differs depending on the combination of nozzle diameter and port size. Contact CKD for details.
*6 : For Ⓗ "5" to "9", select Blank.
*7 : For Ⓗ "10" to "12", select Blank.
*8 : For Ⓗ "5" to "12", select Blank.

● Maintenance part model No.

· Filter element

VSZM-E

· Silencer element

VSZM-SE

Appendix 1

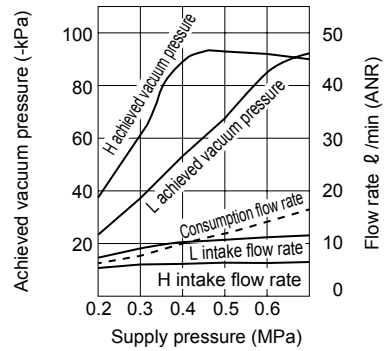
Number of connector pins specified		
Blank	For flat cable specifications 2 to 4 stations: 10 pins 5 to 9 stations: 20 pins 10 to 12 stations: 26 pins For D sub-connector specification 2 to 4 stations: 9 pins 5 to 12 stations: 25 pins	
20	20-pin flat cable connector (max. 9 stations)	*6
26	26-pin flat cable connector (max. 12 stations)	*7
25	25-pin D sub-connector (max. 12 stations)	*8

Vacuum characteristics

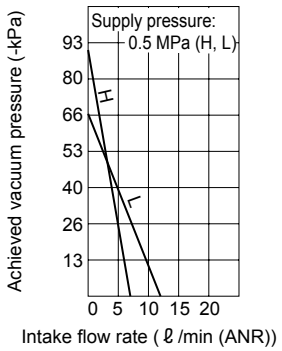
Supply pressure - achieved vacuum pressure, intake flow rate, consumption flow rate

●VSZM-H05, VSZM-L05

Vacuum characteristics

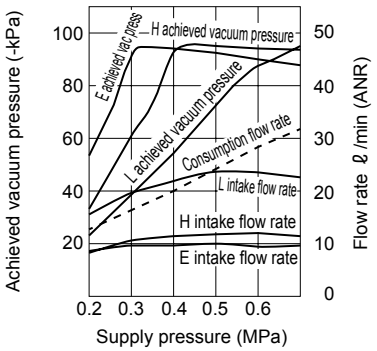


Flow characteristics

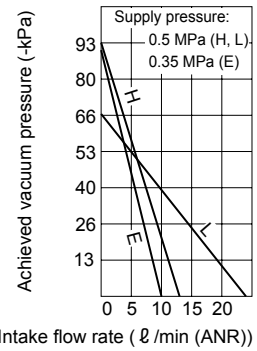


●VSZM-H07, VSZM-L07, VSZM-E07

Vacuum characteristics

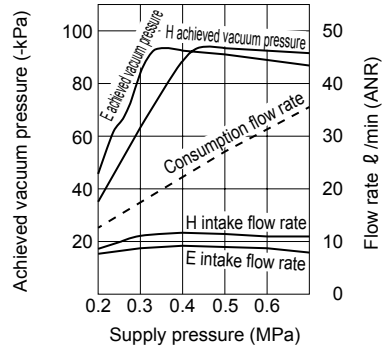


Flow characteristics

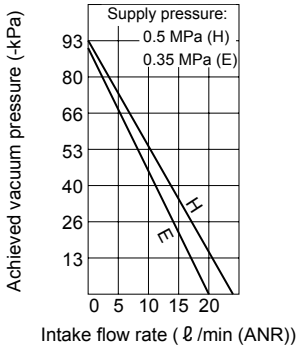


●VSZM-H10, VSZM-E10

Vacuum characteristics



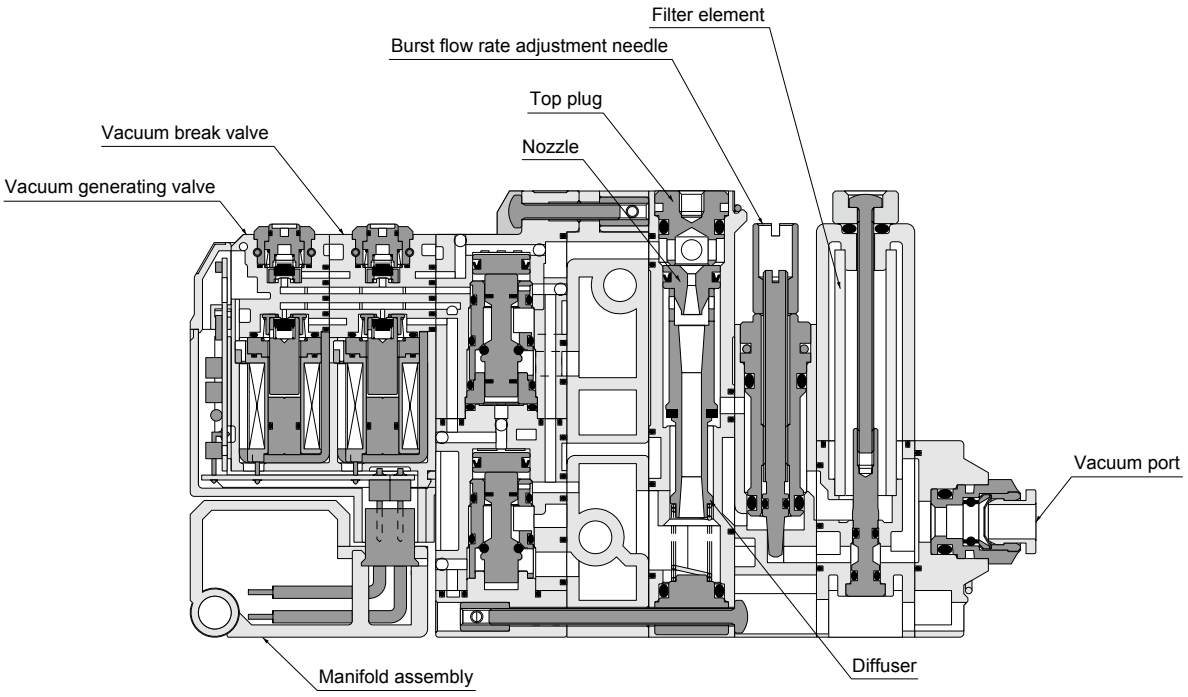
Flow characteristics



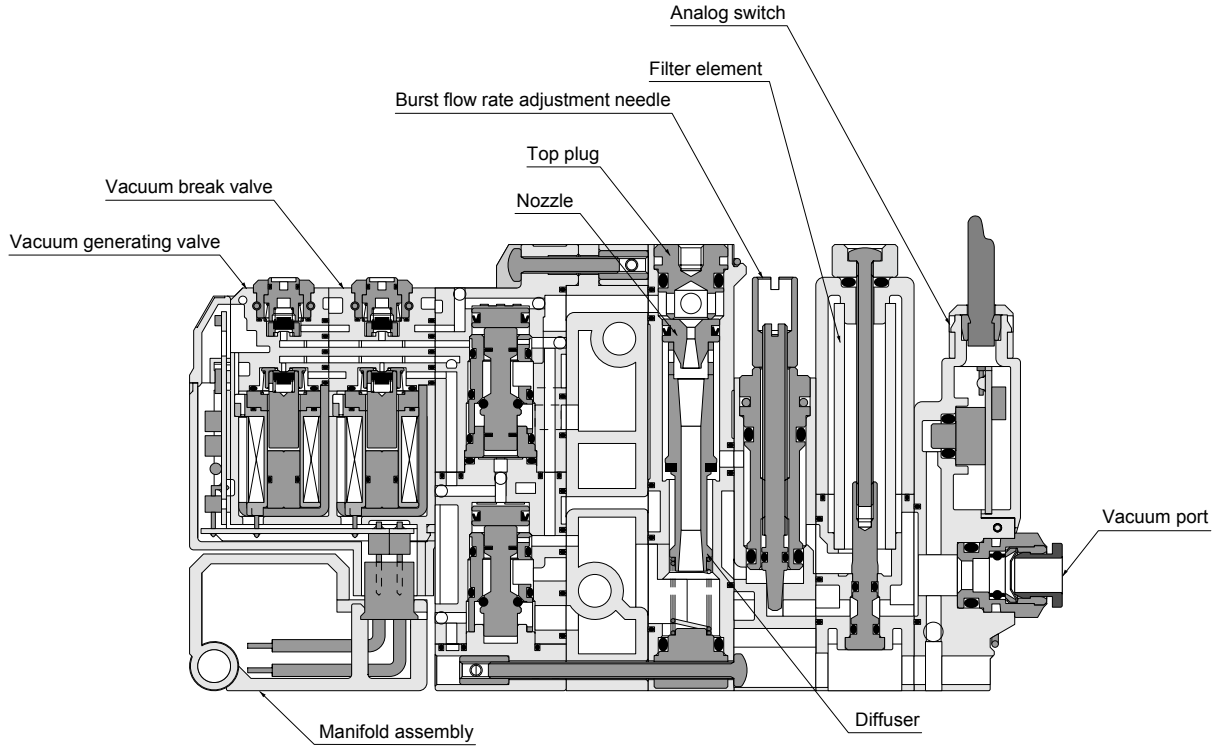
1. Supply pressure with the characteristics described above occurs at vacuum generation.
2. Achieved vacuum pressure with the characteristics described above produces abnormal noise (soft clicking sound) at supply pressure just before reaching the peak value. When this abnormal noise occurs, the characteristics become unstable and operation becomes louder. Reset the supply pressure, as it may affect the sensor, etc., and cause trouble.
   Ex. 1 : Source pressure is 0.5 MPa with the H vacuum ejector. During vacuum ejector operation, supply pressure drops to 0.43 MPa due to pressure drop, and abnormal noise is generated. → Reset supply pressure to 0.5 MPa during vacuum ejector operation.
3. Carry out piping or equipment selection with 3 times the effective cross-sectional area of the nozzle diameter cross-sectional area as a guideline. Satisfactory vacuum characteristics cannot be obtained if adequate supply air flow rate is not maintained.
   (A soft clicking sound occurs at set pressure. Insufficient intake flow rate, insufficient achievement of achieved vacuum, etc.)
   Ex. 2 : Abnormal noise occurs even when pressure is 0.5 MPa with H vacuum ejector during vacuum ejector operation. → Insufficient supply air flow rate. (Supply air flow rate is restricted in front of the vacuum ejector by piping resistance, etc., and supply air flow rate satisfying the properties is not obtained. → Select piping components that can secure the required effective cross-sectional area.)
   Ex. 3 : For vacuum ejector with 1.0 mm nozzle diameter, cross-sectional area is $0.5^2 \times \pi = 0.785\ mm^2 \times 3 = 2.35\ mm^2$. Therefore, carry out piping and equipment selection that ensures an effective cross-sectional area of 2.3 mm^2 or greater.

Internal structure

● Without vacuum pressure switch

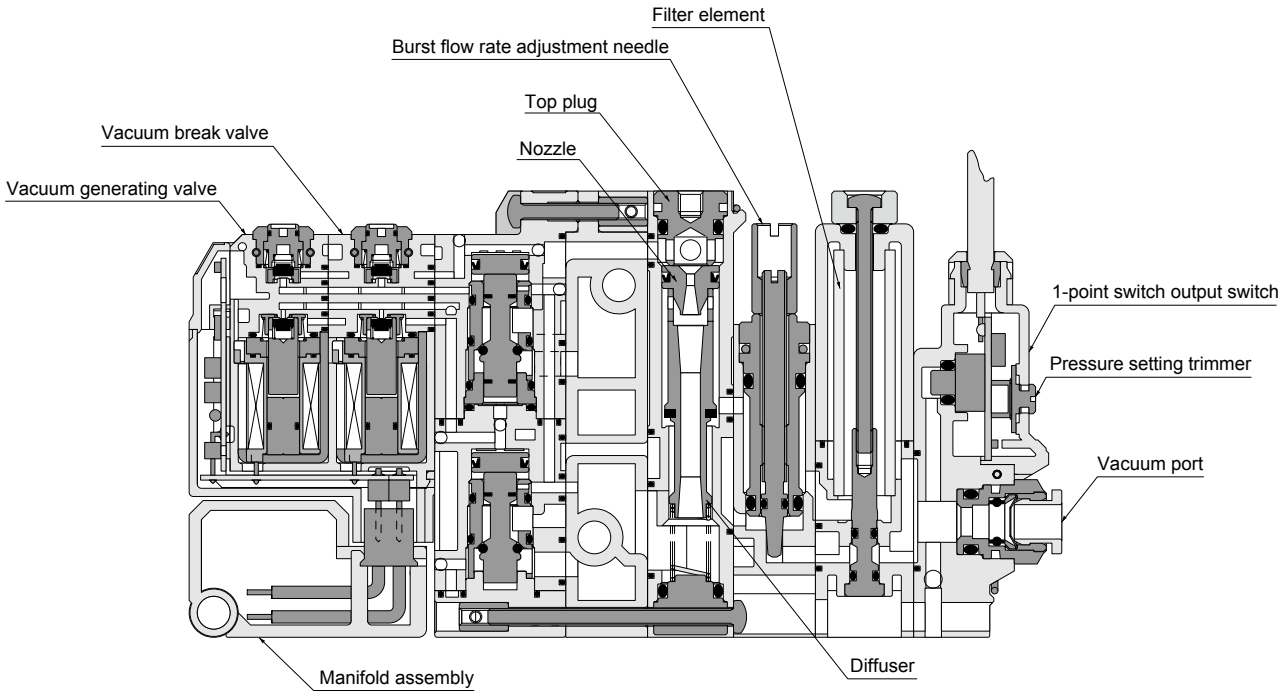


● Vacuum pressure switch with analog output

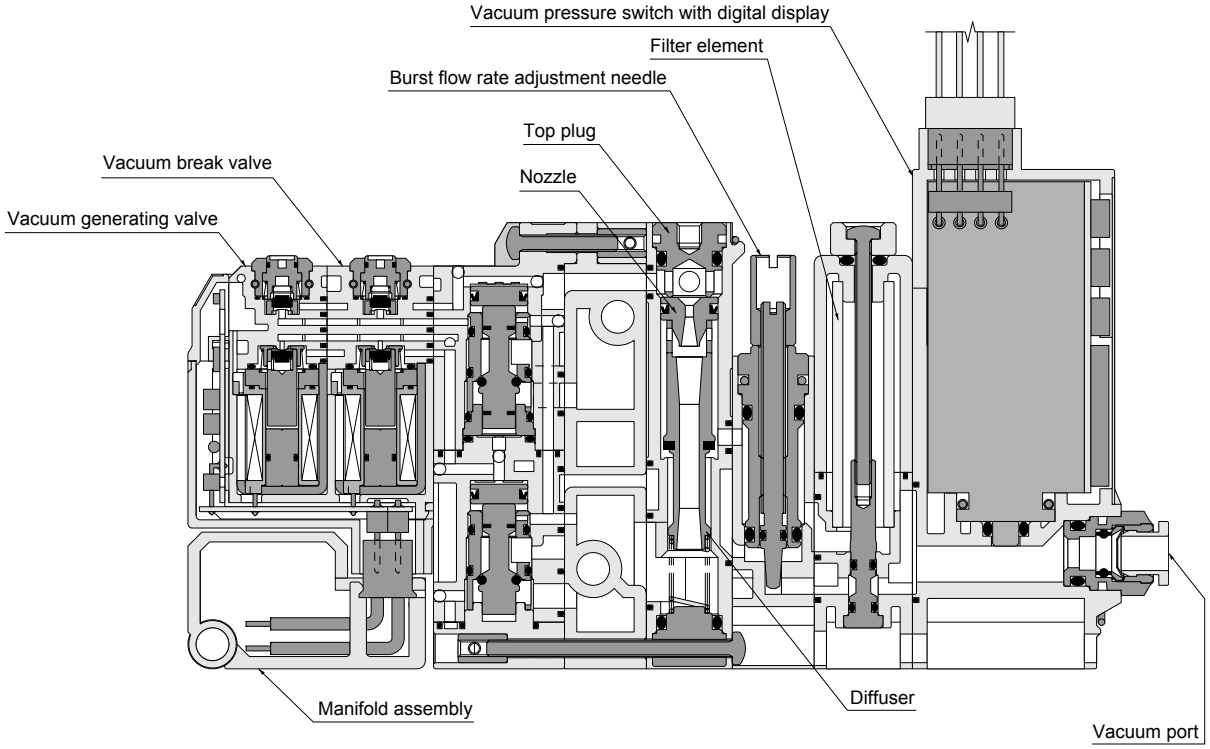


Internal structure

● Vacuum pressure switch with 1-point switch output

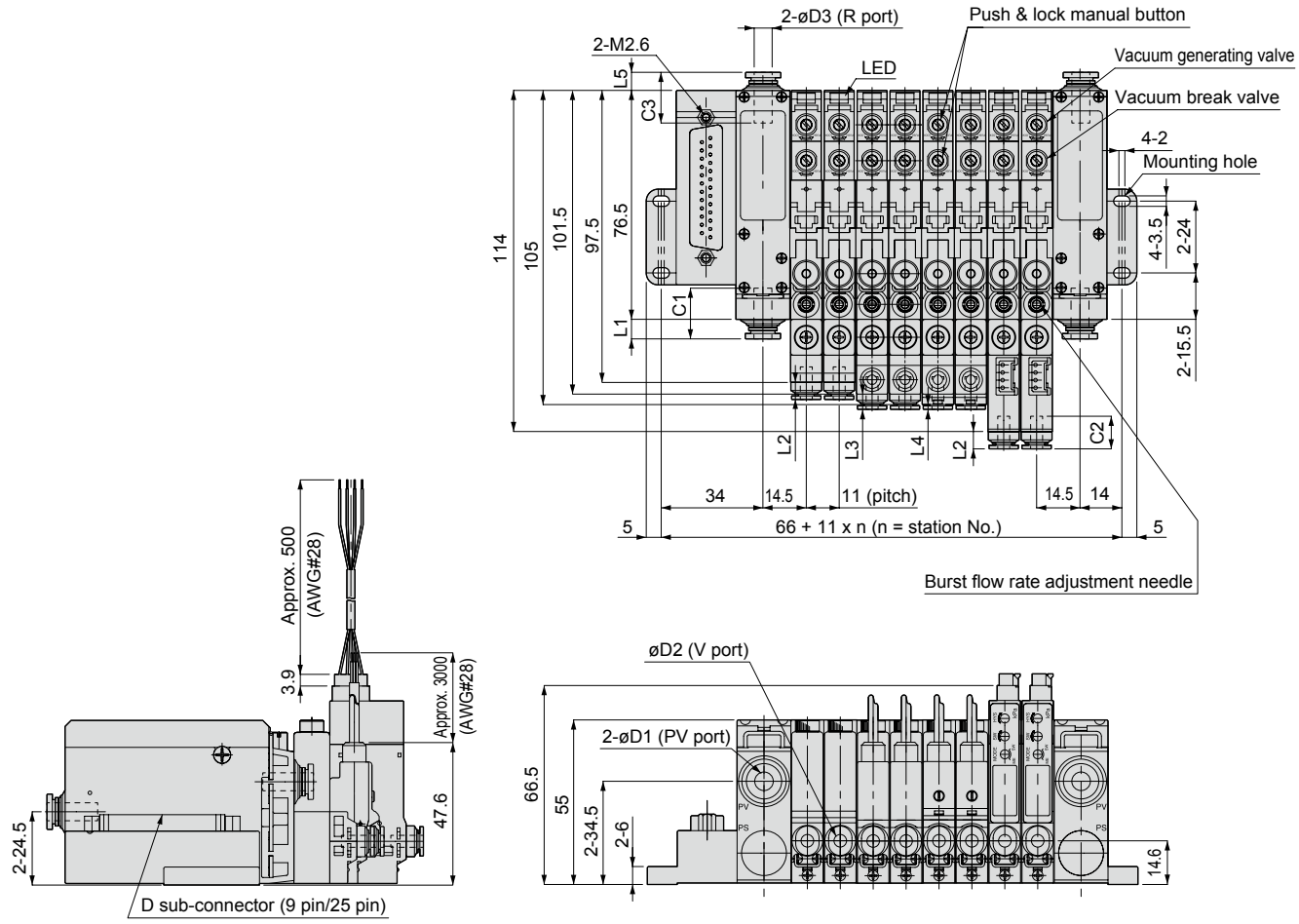


● Vacuum pressure switch with digital display



Dimensions (D sub-connector specifications)

● Common exhaust

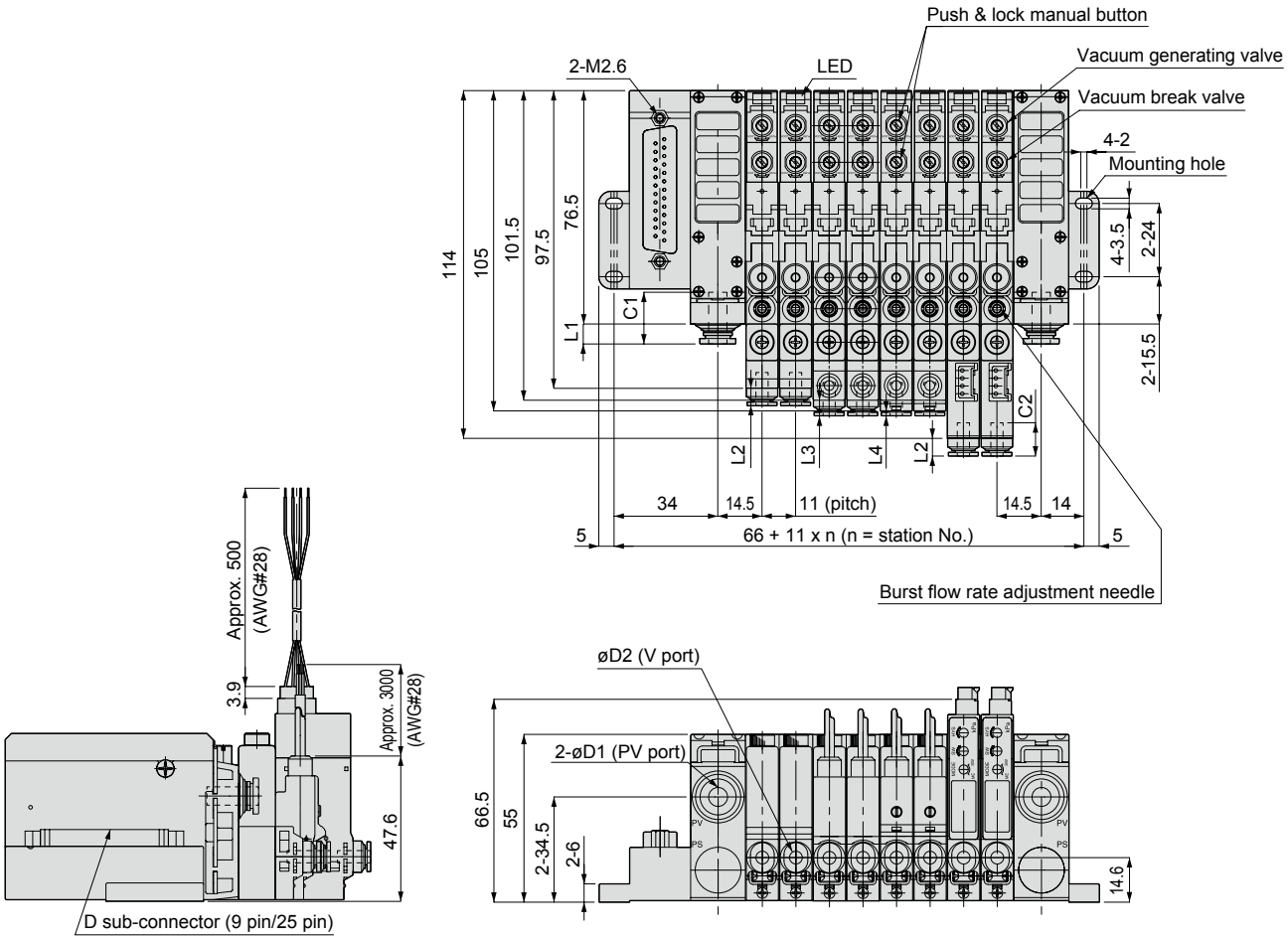


Unit: mm

PV port øD1	C1	L1	V port øD2	C2	L2	L3	L4	R port øD3	C3	L5
6	17	6.6	4	11.2	6.1	5.4	1.9	6	17	6.1
8	18.2	8.1	6	10	8.9	8.2	4.7	8	18.2	7.6
10	20.7	11.7	M5 (female thread)	-	4	3.3	-0.2	10	20.7	11.2

Dimensions (D sub-connector specifications)

● Atmosphere release

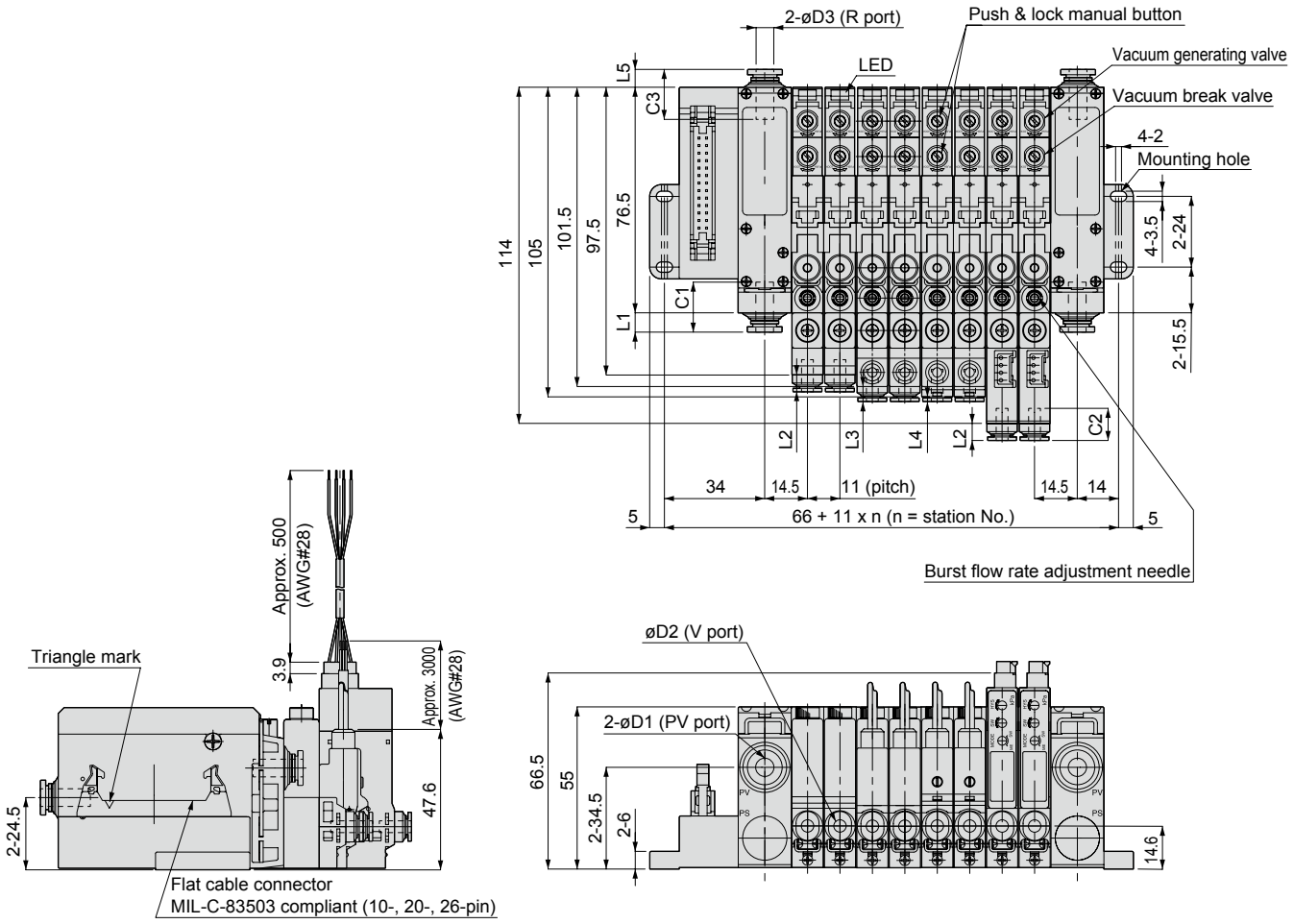


Unit: mm

PV port øD1	C1	L1	V port øD2	C2	L2	L3	L4
6	17	6.6	4	11.2	6.1	5.4	1.9
8	18.2	8.1	6	10	8.9	8.2	4.7
10	20.7	11.7	M5 (female thread)	-	4	3.3	-0.2

Dimensions (flat cable connector specifications)

● Common exhaust

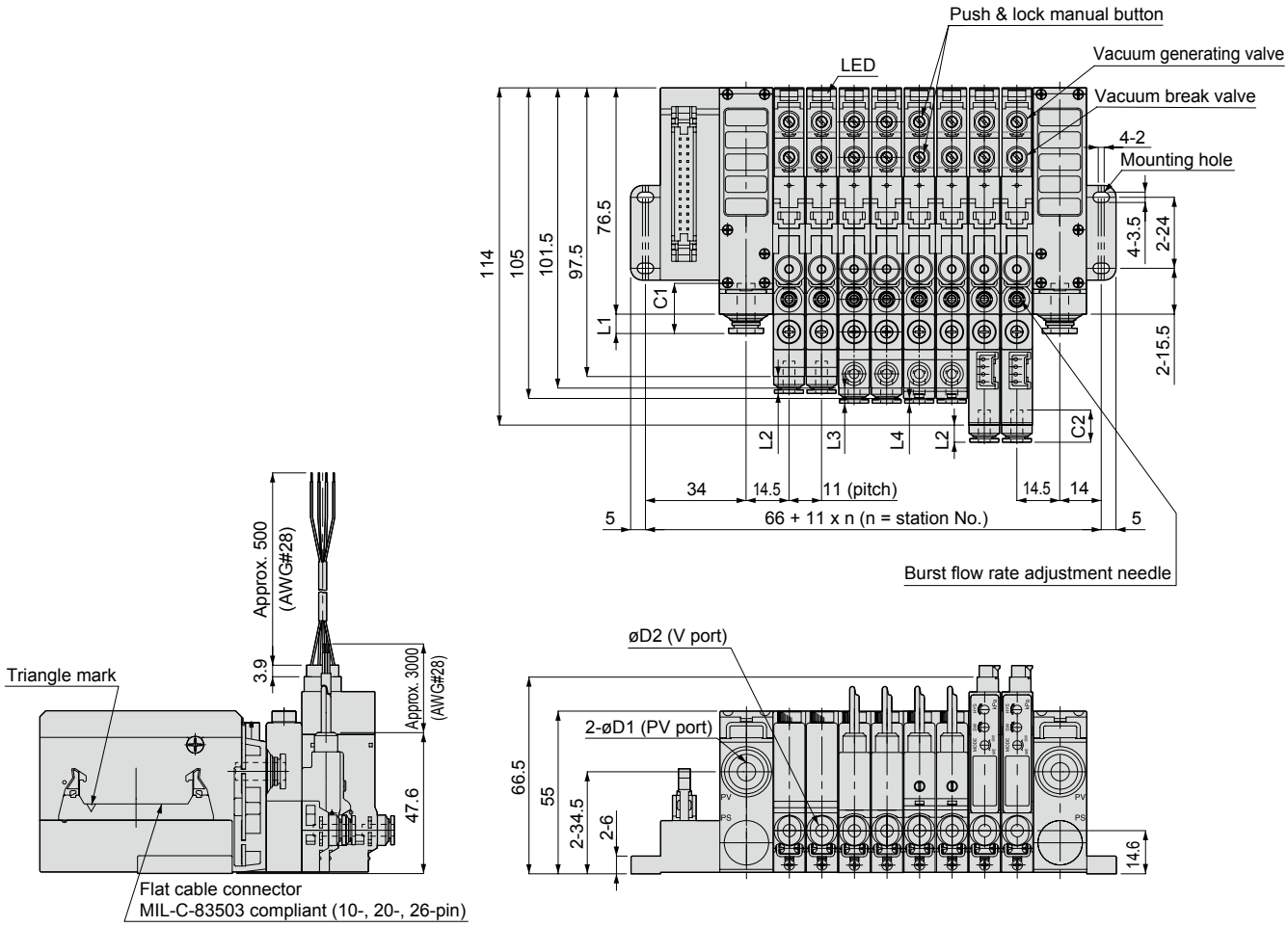


Unit: mm

PV port øD1	C1	L1	V port øD2	C2	L2	L3	L4	R port øD3	C3	L5
6	17	6.6	4	11.2	6.1	5.4	1.9	6	17	6.1
8	18.2	8.1	6	10	8.9	8.2	4.7	8	18.2	7.6
10	20.7	11.7	M5 (female thread)	-	4	3.3	-0.2	10	20.7	11.2

Dimensions (flat cable connector specifications)

● Atmosphere release



Unit: mm

PV port øD1	C1	L1	V port øD2	C2	L2	L3	L4
6	17	6.6	4	11.2	6.1	5.4	1.9
8	18.2	8.1	6	10	8.9	8.2	4.7
10	20.7	11.7	M5 (female thread)	-	4	3.3	-0.2

Safety precautions

Refer to Intro Pages 15 and 16 for general precautions on vacuum system components.

⚠ WARNING

- When operating the valve, make sure that the leakage current is 1 mA or less. Otherwise, there is a risk of malfunctions caused by leakage current.
- If energization to the pilot valve continues for long periods, heat is generated from the coil. Heat could cause burns and impact peripheral devices. Contact the nearest CKD Sales Office if continuously energizing for long periods.
- For the self-hold (VSZ-D...), after stopping the supply of pilot air (including the first use after shipment), the position of the switching valve (main valve) is in neutral. When re-supplying the pilot air, be sure either to input a signal to the pilot valve or to switch to the required state manually.
- When removing or attaching the unit from/to the manifold, first stop the supply air and securely exhaust the residual pressure.
- Do not use in locations with excessive vibration and impact. It may cause malfunction or failure. (Use with vibration of acceleration 49 m/s^2 or less.)
- When using self-hold (VSZ-D...) under vibration, install so that the direction of vibration is perpendicular to the switching valve (main valve).

⚠ CAUTION

- Do not apply high tensile force or bending force to the valve or vacuum pressure switch lead wire. It could cause disconnection or damage to the connector unit.
- Compressed air contains a large amount of drainage (water, oil oxides, tar, foreign matter). Since drain significantly reduces product performance, dehumidify with after-cooler and dryer to improve air quality.
- Do not use a lubricator.
- As foreign matter such as rust and debris inside the piping may cause malfunctions, be sure to insert a filter of 5 µm or less in front of the supply port. In addition, flushing of pipes is recommended before use and at appropriate intervals.
- Avoid using in atmospheres containing corrosive or flammable gases. Do not use as the working fluid.
- When removing or installing the cartridge fitting and the ejector top plug, remove the deposits from the seal and then securely insert the stop pin. Fully read and understand the “Safety precautions” in this section before carrying out work.
- Manifold silencer specification may cause performance degradation and trouble due to element clogging. Periodically perform maintenance and inspection.
- When mounting each unit on the manifold, securely fix with screws after removing the deposits on the seal. Fully read and understand the “Safety precautions” in this section before carrying out work.
- Wire the D sub-connector and flat cable connector after checking the electric circuit diagram of the body given in this catalog.
- Depending on usage conditions, the manifold may undergo deterioration of vacuum performance or trouble. Hence, fully understand the manifold safety precautions in this catalog before use.

Manifold safety precautions

■ Increased manifold stations may cause degraded performance or malfunction due to the following reasons. Contact the nearest CKD Sales Office.

The number of stations (concurrently operable stations) for which performance can be maintained depends on the nozzle size, vacuum characteristics, manifold specifications, etc. Contact CKD for details.

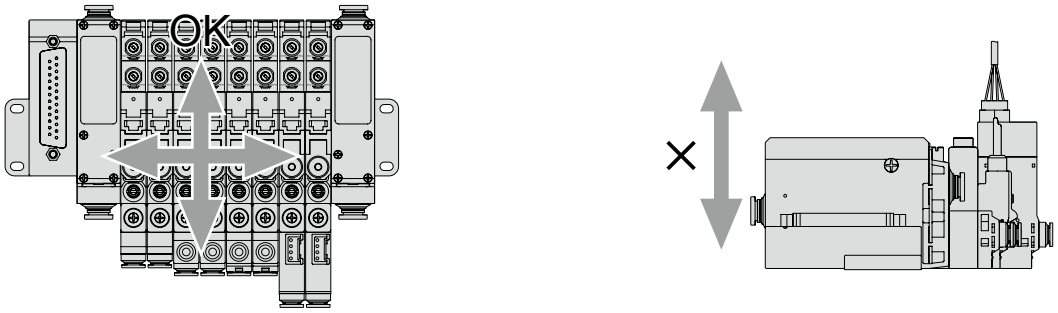
1. Decreased vacuum performance due to insufficient supply air
   Countermeasures
   (1)Confirm supply air capacity, etc.
   (2)Shorten piping as much as possible.
   (3)Increase the fitting size.
2. Degradation of vacuum performance due to insufficient exhaust port capacity or exhaust air interference to other stations
   Cause: Due to insufficient capacity of the silencer or piping, exhaust resistance is high and performance degrades.
   Countermeasures
   (1)Common piping (exhaust) specifications → Make piping length as thick and short as possible.
   (2)Avoid places that interfere with the exhaust.
   (3)Reduce the number of units that operate simultaneously.

In the manifold vacuum ejector, when an operating ejector and an inoperative ejector are mixed, exhaust air is led into the ejector not in operation and output from the vacuum port. For example, lightweight workpieces may be blown away. Therefore, do not use under conditions which might affect the workpiece.

Usage methods

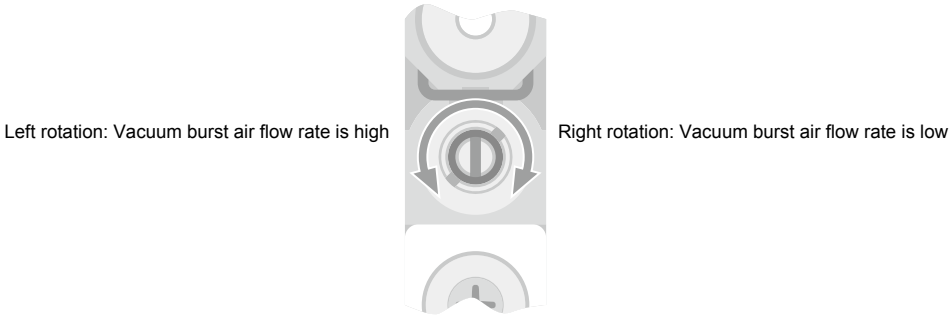
1. Installation

When the installation location vibrates, install so that the direction of vibration is perpendicular to the switching valve.



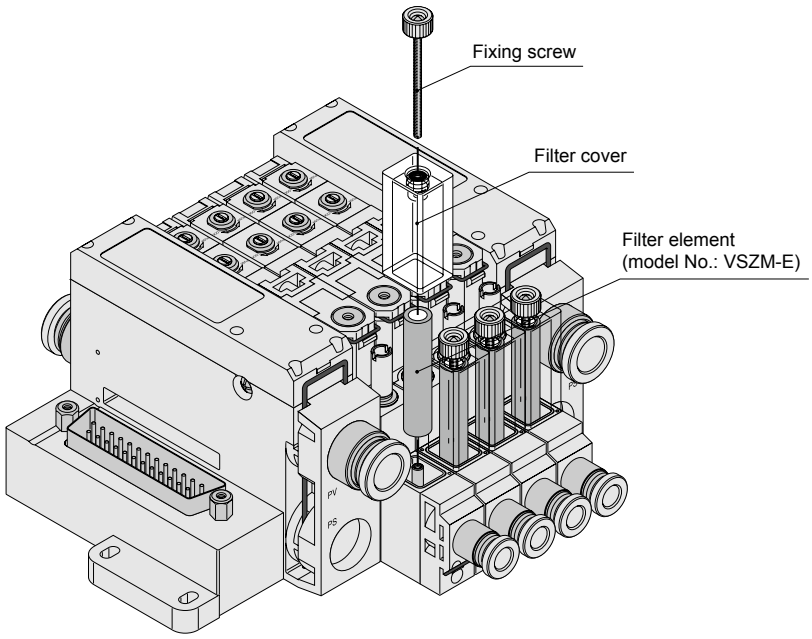
2. How to adjust vacuum burst air flow rate

The vacuum burst air flow rate is decreased by turning the air flow adjustment needle to the right (clockwise) and increased by turning it to the left (counterclockwise). After adjusting the flow rate, securely fix the lock nut with tightening torque of 0.1 to 0.3 N·m.



3. How to replace the filter element

Remove the fixing screws to replace the filter element. After replacing the filter element and checking that the filter packing has not fallen out, securely fix it with tightening torque of 0.3 to 0.5 N·m.



Usage methods

4. How to replace the silencer element

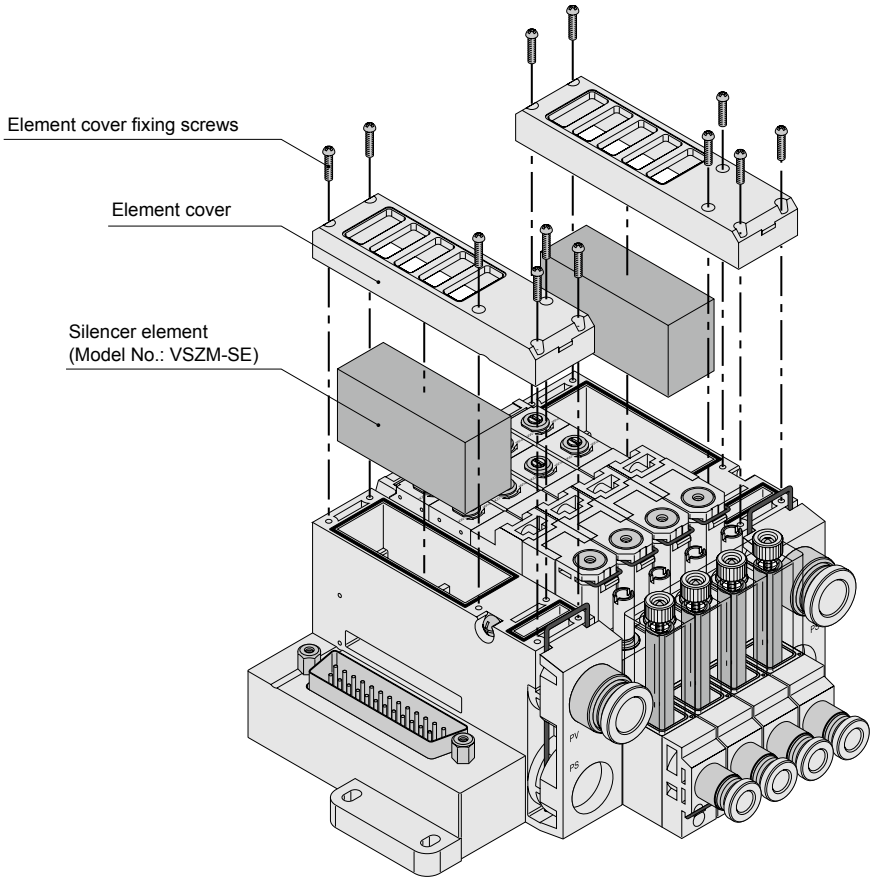
To replace the silencer element, follow the procedure below.

(1)Remove the element cover mounting screws (6 pcs).

(2)Remove the element.

(3)Insert the element and fix the element cover securely with tightening torque of 0.4 to 0.5 N·m.

(Note) Since the mounting screws are tapping screws for resin, confirm the initial engagement with a precision screwdriver and then fully tighten.

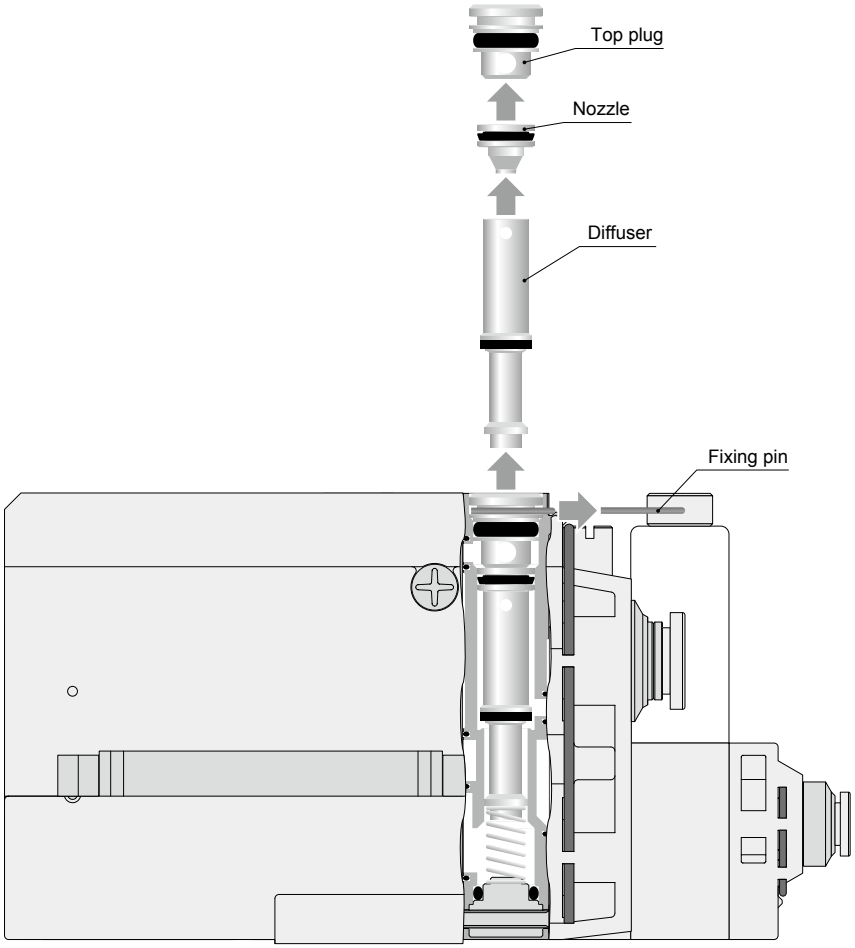


Usage methods

5. Replacing and cleaning nozzle and diffuser

To replace and clean the nozzle and diffuser, follow the procedure below.

(1)Pull out the top plug fixing pin of the ejector body with a flathead screwdriver.
(2)Pull out the top plug, nozzle and diffuser.
(3)Remove deposits on nozzle, diffuser bore part and seal by air blow or wiping.
(Note) Do not damage the nozzle, diffuser bore or seal.
(4)Apply grease to the piston packing of the nozzle as necessary.
(*1) When grease has spattered onto the packing part, lightly apply grease all around the packing. Use a grease that does not degrade rubber and resin.
(*2) Note that dust and fluff easily adhere to the packing due to grease.
(5)Insert into the body in the order of diffuser, nozzle, top plug.
(6)Insert the top plug fixing pin.

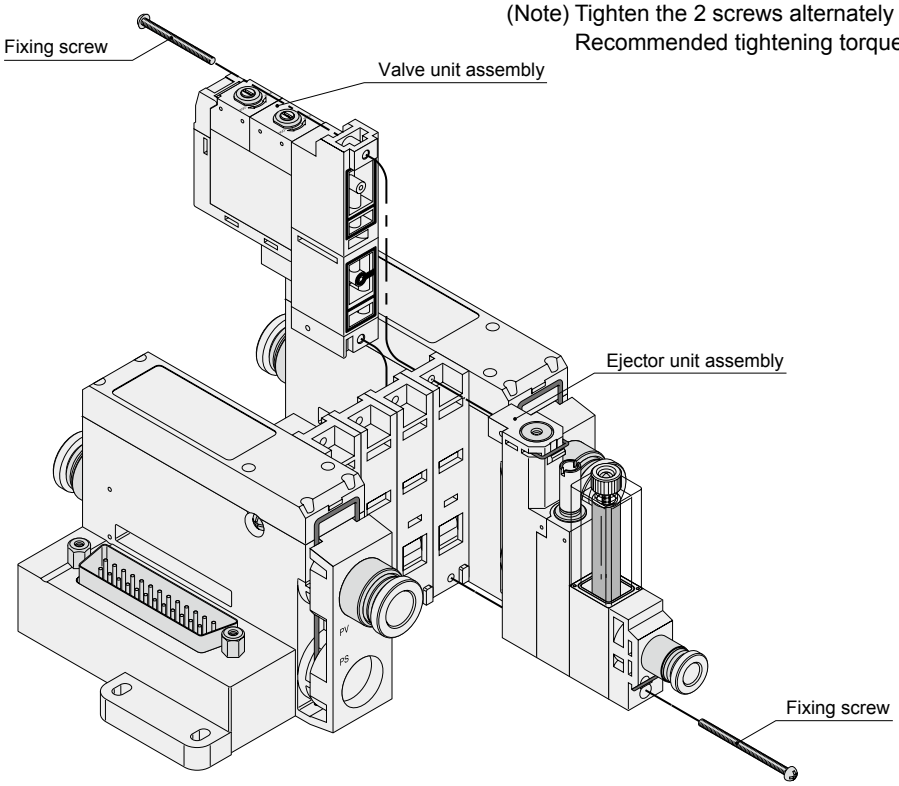


Usage methods

6. How to mount and remove manifold

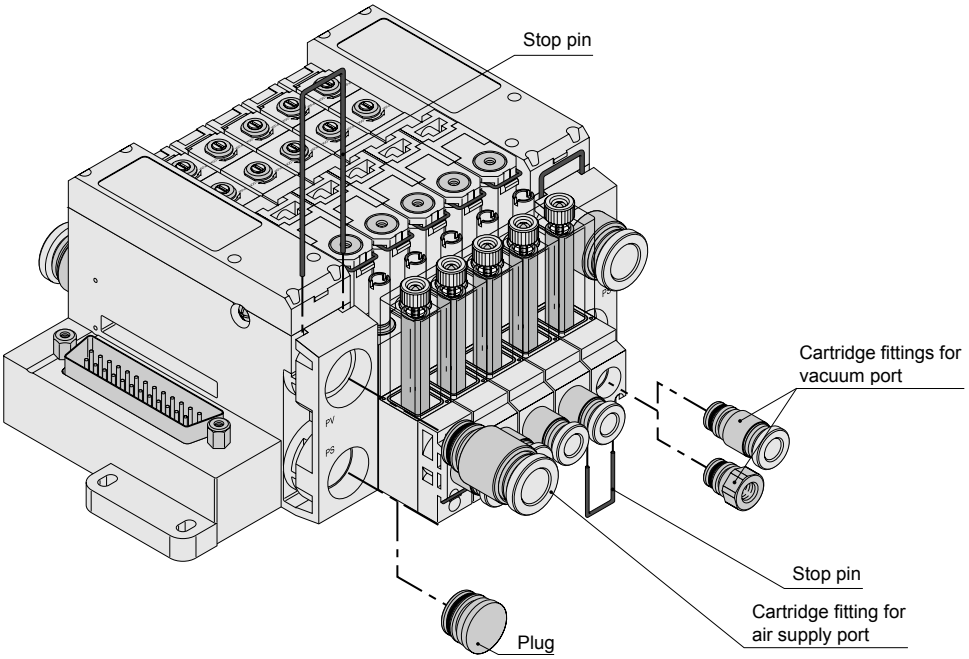
[Removing method]
To remove and attach the unit from/to the manifold, follow the procedure below.
(1)Stop the supply air and release the interior piping pressure.
(2)Remove the fixing screws (2 pcs.) with an appropriate tool.
(3)Remove each unit from the manifold.

[Mounting method]
(1)Check that the packing has not fallen out and that there is no adhered foreign matter.
(2)Mount each unit on the manifold.
(3)Confirm that the unit positioning fits securely.
(4)Tighten the fixing screws (2 pcs.) with an appropriate tool.
(Note) Tighten the 2 screws alternately and gradually.
Recommended tightening torque: 0.4 to 0.5 N·m



7. How to replace the cartridge fitting

Cartridge fittings and M5 female thread can be replaced according to the following procedure.
(1)Pull out the stop pin with a flathead screwdriver, etc.
(2)Pull out the cartridge in the connection direction.
(Note) When mounting the cartridge to the body, mount after checking that there is no dirt, fluff, etc. adhering to the O-ring.



How to fill out VSZM mix manifold specifications sheet

● Mix manifold model No. (example)

	Ⓐ	Ⓑ	Ⓒ	Ⓓ	Ⓔ	Ⓕ	Ⓖ	Ⓗ	Ⓘ	Ⓙ	Ⓚ
VSZM-	Z	00	Z	CX	8	6	3	5	Z	F	26

● Mix manifold specifications sheet (example)

Vacuum ejector model No. Ⓐ Ⓑ Ⓒ Ⓓ Ⓘ	Layout position 1	2	3	4	5	6	7	8	9	10	11	12	Quantity
VSZM- H 05 B - 4 - DW	○	○											2
VSZM- H 07 B - 6 - DA			○	○									2
VSZM- H 07 D - 6 -					○								1
VSZM- - -													
VSZM- - -													

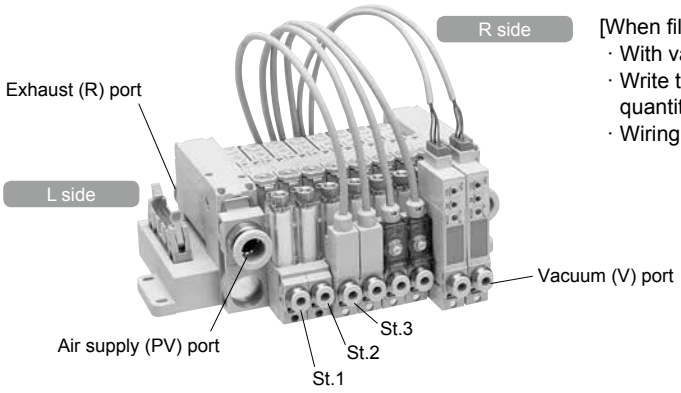
[For output port size only fitting mix specification]

● Mix manifold model No. (example)

	Ⓐ	Ⓑ	Ⓒ	Ⓓ	Ⓔ	Ⓕ	Ⓖ	Ⓗ	Ⓘ	Ⓙ	Ⓚ
VSZM-	H	07	B	CX	8	5	3	5	DW	F	26

● Mix manifold specifications sheet (example)

Vacuum ejector model No. Ⓐ Ⓑ Ⓒ Ⓓ Ⓘ	Layout position 1	2	3	4	5	6	7	8	9	10	11	12	Quantity
VSZM- H 07 B - 6 - DW	○			○									2
VSZM- H 07 B - 4 - DW		○			○								2
VSZM- H 07 B - M5 - DW			○										1
VSZM- - -													
VSZM- - -													



[When filling in]
- With vacuum port facing front, set piping positions in order from the left.
- Write the total quantity of product model No. specified in the required quantity field at the table far right.
- Wiring connector assembly is fixed on the L side of the manifold.

VSZM mix manifold specifications sheet

Contact | Quantity Set | Delivery date /

Issued / /

Company name

Slip No. | Order No.

Contact

Order No.

● Mix manifold model No.

VSZM - Ⓐ Ⓑ Ⓒ - Ⓓ Ⓔ Ⓕ - Ⓖ - Ⓗ - Ⓘ - Ⓙ Ⓚ

Ⓐ Vacuum characteristics *1, 2	
H	High vacuum/medium flow rate
L	Medium vacuum/large flow rate
E	High vacuum/low flow rate
Z	For mixed specs (indicate breakdown on specs sheet.)

Ⓑ Nozzle diameter *1, 2	
05	ø0.5
07	ø0.7
10	ø1.0
00	For mixed specs (indicate breakdown on specs sheet.)

Ⓒ Valve	
B	Normally closed
D	Self hold type
Z	For mixed specs (indicate breakdown on specs sheet.)

Ⓓ Vacuum port (V)	
4	ø4 push-in fitting
6	ø6 push-in fitting
M5	M5×0.8
CX	For mixed fittings (indicate breakdown on specs sheet.)

Ⓔ Air supply port (PS)	
6	ø6 push-in fitting
8	ø8 push-in fitting
10	ø10 push-in fitting

Ⓕ Exhaust port (EX)	
S	Atmospheric release with silencer
6	ø6 push-in fitting common exhaust
8	ø8 push-in fitting common exhaust
10	ø10 push-in fitting common exhaust

Ⓖ Solenoid valve voltage	
3	24 VDC

Ⓗ Manifold station No.	
2 to 12	2 to 12 stations

Ⓘ Vacuum pressure switch specifications	
Blank	Without vacuum pressure switch
DW	Output with digital display 2-point
DA	With digital display, output 1-point + analog output
S	NPN output 1-point without display
V1	Negative pressure analog output
R1	Compound pressure analog output
Z	For mixed specs (indicate breakdown on specs sheet.)

Ⓙ Wiring specifications	
F	Flat cable connector
D	D sub-connector

Ⓚ Number of connector pins specified	
Blank	For flat cable connector specification 2 to 4 stations 10-pin 5 to 9 stations 20-pin 10 to 12 stations 26-pin For D sub-connector specification 2 to 4 stations 9-pin 5 to 12 stations 25-pin
20	20-pin flat cable connector (max. 9 stations)
26	26-pin flat cable connector (max. 12 stations)
25	25-pin D sub-connector (max. 12 stations)

⚠ Precautions for model No. selection

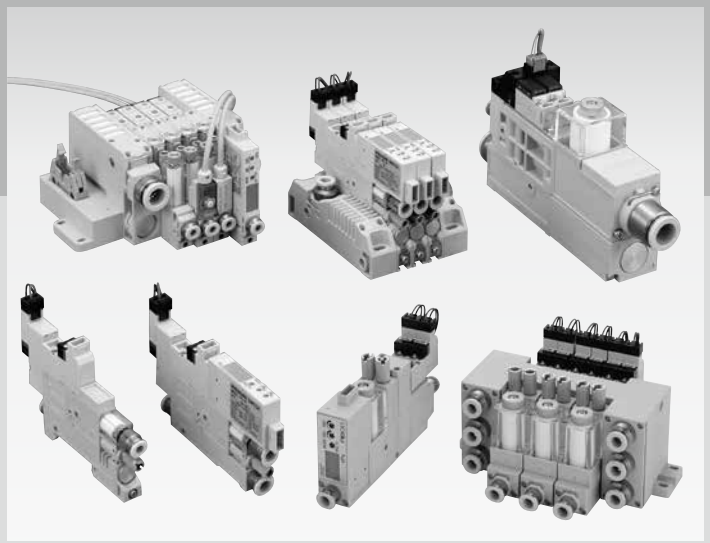
*1 : The combination of Ⓐ E and Ⓑ 05, and
Ⓐ L and Ⓑ10 cannot be selected.
*3 : When Ⓐ is Z, only Ⓑ 00 can be selected.
When Ⓑ is 00, only Ⓐ Z can be selected.

● Mix manifold specifications sheet

Vacuum ejector model No. Ⓐ Ⓑ Ⓒ Ⓓ Ⓘ	Layout position 1	2	3	4	5	6	7	8	9	10	11	12	Quantity
VSZM- - -													
VSZM- - -													
VSZM- - -													
VSZM- - -													
VSZM- - -													

Vacuum pump system
VS*P

■ Vacuum components

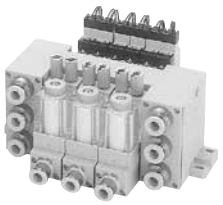
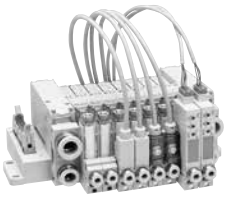


CONTENTS

Series variation	192
● 20 mm width integrated (VSJP/VSJPM)	194
● 10.3 mm width integrated (VSNP/VSNPM)	210
● 10.5 mm width integrated (VSXP/VSXPM)	230
● 31.5 mm width single unit dedicated (VSQP)	260
● 11 mm pitch manifold dedicated (VSZPM)	272

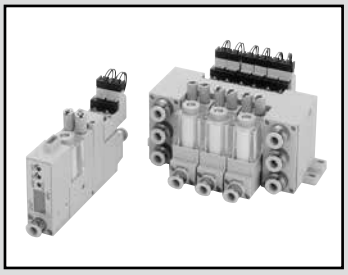
Series variation

Vacuum pump system
Vacuum switching unit

Model		Series	
Vacuum pump system	Vacuum switching unit	**VSJP/VSJPM Series** Preventing workpieces from being blown away due to burst air flow rate and pressure control · A self-hold model is available supporting power savings in vacuum generating valves. · Vacuum burst circuit relief function realizes shortening of vacuum burst time.	
		VSNP/VSNPM Series Fast and stable response · Compact and lightweight. The height dimension is made especially compact. · Direct acting valve is used as the main valve to achieve ON/OFF responsivity of 5 msec or less	
		VSXP/VSXPM Series Lightweight and compact · Direct mount and DIN rail are available for mounting. · 3-way valve specification realizes a substantial reduction of vacuum burst time by using a 3-way vacuum supply valve.	
		VSQP Series Large vacuum unit ideal for controlling large flow rates · Normally open and normally closed types are available for vacuum supply valves.	
		VSZPM Series Dedicated manifold, reduced wiring (flat cable/D sub-connector) compatible · With atmospheric pressure relief valve installed, atmosphere burst at high flow rate is possible, shortening the vacuum burst time · Self-hold energy-saving type is available, with valve power consumption of 0.55 W	

●: Standard equipment ○: Option

	Single unit/width dimension (mm)	Single unit/weight (g)	Manifold	Components							Effective cross-sectional area of vacuum valve	Page
				With valve		With switch		With filter	With silencer	Check valve		
				For generation	Vacuum breaking	Switch output	Analog output					
	20	125.5 to 158.5	●	●	●	○	○	●			3.5 mm^2(ø4), 5 mm^2(ø6)	194
	10.3	52.5 to 171	●	●	●	○	○ (With digital display available)				0.4 mm^2	210
	10.5	78 to 88	●	●	●	○ (With digital display available)	○	●			2-way valve specification : 3.5 mm^2 (ø4), 4.5 mm^2 (ø6) 3-way valve specification : 3.0 mm^2 (ø4), 3.6 mm^2 (ø6)	230
	31.5			●	●	○ (With digital display)		●			16.5 mm^2	260
	11		○	●	●	○	○	●			4.5 mm^2	272



Burst air flow rate & integrated vacuum switching unit
with relief pressure adjustment needle

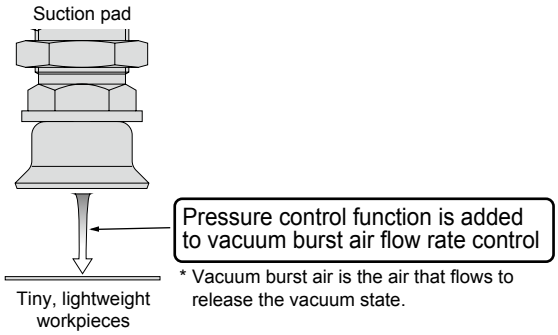
VSJP Series

RoHS

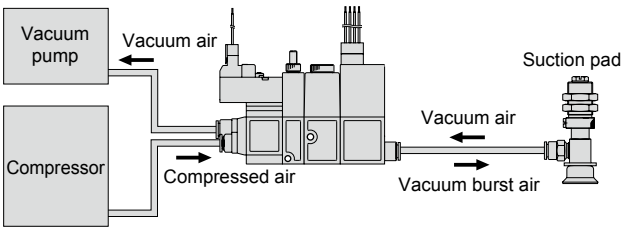
Features

■ Pressure control is added to the conventional flow rate control for vacuum burst air to prevent workpieces from being blown away.

■ Shortening of vacuum burst time is realized by providing a relief function in the vacuum burst circuit (function to relieve extra pressure).



■ Vacuum pump compatible system handles vacuum pumps when a large amount of vacuum air is required or when vacuum generation is required for long periods.



■ Since manifold is also available, reduced piping is possible. There are two types of pipe leadout directions, front side and rear side, which can be selected according to the installation location.

■ Three types of vacuum supply valves are available: self-hold, normally closed and normally open. Power-saving self-hold is ideal for special applications where vacuum must be generated for long periods.

■ Digital display is used for vacuum pressure switch display to improve visibility. A 2-point switch output and analog output are available for the vacuum pressure switch, selectable according to the application. In addition, wiring layout can be done easily using a connector system.

Specifications

Descriptions	VSJP
Working fluid	Air
Working pressure MPa	0.3 to 0.7
Ambient/fluid temperatures °C	5 to 50
Vacuum pressure kPa	-100 to 0

Valve (for vacuum generation, vacuum burst) specifications

● Pilot solenoid valve

Descriptions	Vacuum supply valve		Vacuum break valve	
Valve and operation	Direct acting poppet valve			
Rated voltage V	24 DC	100 AC	24 DC	100 AC
Voltage fluctuation range V	24 DC ±10%	100 AC ±10%	24 DC ±10%	100 AC ±10%
Surge protective circuit	Varistor	Bridge diode	Varistor	Bridge diode
Power consumption	1.2 W (with LED)	1.5 VA (with LED)	1.2 W (with LED)	1.5 VA (with LED)
Manual override	Push non-locking			
Operation display	At coil excitation operation: Red LED lights			
Connection	Connector (cable length: 500 mm)			
	Red: 24 VDC Black: COM	Blue	Red: 24 VDC Black: COM	Blue

● Main valve

Descriptions	Vacuum supply valve		Vacuum break valve
Valve and operation	Pilot operated poppet valve		
Proof pressure MPa	1.05		
Valve	Self-hold, normally closed, normally open		Normally closed
Lubrication	Not required		
Effective cross-sectional area mm^2	Air supply (PS) port size	ø4:3.5	1
		ø6:5	

Vacuum pressure switch specifications with LED display

Descriptions		With 2-point switch output (-W)	With analog output (-A)
Default setting value kPa		-50(SW1), -10(SW2)	-50
Current consumption mA		40 or less	
Pressure sensitive element		Diffused semiconductor pressure switch	
Working pressure kPa		-100 to 0	
Set pressure kPa		-99 to 0	
Proof pressure MPa		0.2	
Storage temperature °C		-20 to 80 (atmospheric pressure, humidity 60% RH or less)	
Operating temperature °C		0 to 50 (no freezing)	
Operating humidity		35 to 85% RH (no freezing)	
Power supply voltage V		12 to 24 DC ±10% ripple (P-P) 10% or less	
Degree of protection		IEC standards IP40 or equivalent	
Output points		2	1
Repeatability		±3% F. S. max(at Ta=25°C)	
Hysteresis		Fixed (2% F.S. max.)	Variable (approx. 0 to 15% of set value)
Switch output		NPN transistor/open collector output 30 V 80 mA or less Residual voltage 0.8 V or less	
Analog output	Output voltage V	-	1 to 5
	Zero point voltage V	-	1±0.1
	Span voltage V	-	4±0.1
	Output current mA	-	1 or less (load resistance 5 kΩ or more)
	Linearity/hysteresis	-	±0.5% F. S. max.
Responsivity ms		2 max.	
Display kPa		0 to -99 (2-digit red LED display)	
Display frequency		Approx. 4 times/second	
Display accuracy		±3% F. S. ±2 digit	
Resolution		1 digit	
Operation display		SW1: Red LED lights at set pressure and over	Red LED lights at set pressure and over
		SW2: Green LED lights at set pressure and over	
Function		1. MODE change-over switch (ME or S1 or S2)	1. MODE change-over switch (ME or SW)
		2. S1 set trimmer (2/3 rotation trimmer)	2. SW set trimmer (2/3 rotation trimmer)
		3. S2 set trimmer (2/3 rotation trimmer)	3. HYS setting trimmer (approx. 0 to 15% of set value)

Vacuum break function specifications

Descriptions	Vacuum burst function
Break air flow rate ℓ/min(ANR)	At 0 to 50 (supply pressure 0.5 MPa)
Burst air relief valve structure	Elastic sealing, poppet valve
Relief pressure setting range kPa	-25 to 25

Vacuum filter specifications

Descriptions		Vacuum filter
Element material		PVF (Polyvinyl formal)
Filtration rating	μm	10
Filtration area	mm^2	1130
Replacement filter element model No.	Vacuum	VSG-E
	Breaking the vacuum	VSJ-PE

Weight table

①Single unit

VSJP		Weight (g)	Remarks
With sensor	VSJP-□-□□□□-□□-□	152	Vacuum port: ø4, ø6
	VSJP-□-8□□□-□□-□	159	Vacuum port: ø8
Without sensor	VSJP-□-□□□□-□□	126	Vacuum port: ø4, ø6
	VSJP-□-8□□□-□□	132	Vacuum port: ø8

②Manifold intermediate block

	Weight (g)	Remarks
Manifold intermediate block	19	For 1 station

③Manifold side block

VSJP	Weight (g)	Remarks
Vacuum switching unit	106	No. of cartridges used: 6

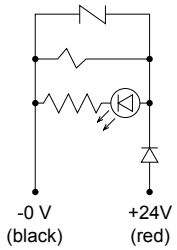
④Cartridge (input/exhaust port)

	Weight (g)	Remarks
Push-in fitting for ø6	12	
Push-in fitting for ø8	10	
Push-in fitting for ø10	13	

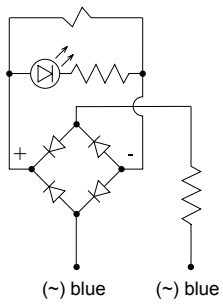
■ Calculate the manifold weight using the formula below.
Manifold weight = (①VSJP single unit + ②manifold intermediate block) × station No. + ③manifold side block + ④cartridge × No. used

Electric circuit (solenoid valve)

● 24 VDC specification Valve for vacuum supply and vacuum burst

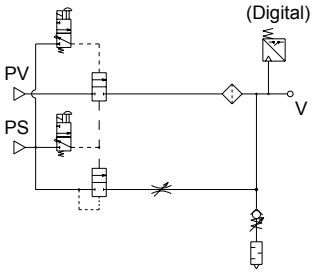


● 100 VAC specification Valve for vacuum supply and vacuum burst

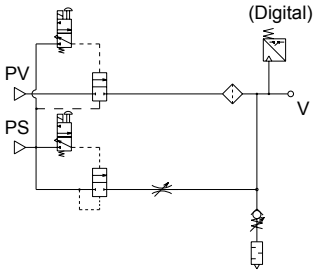


Circuit diagram

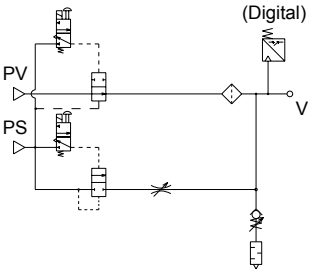
● Self-hold



● Normally closed



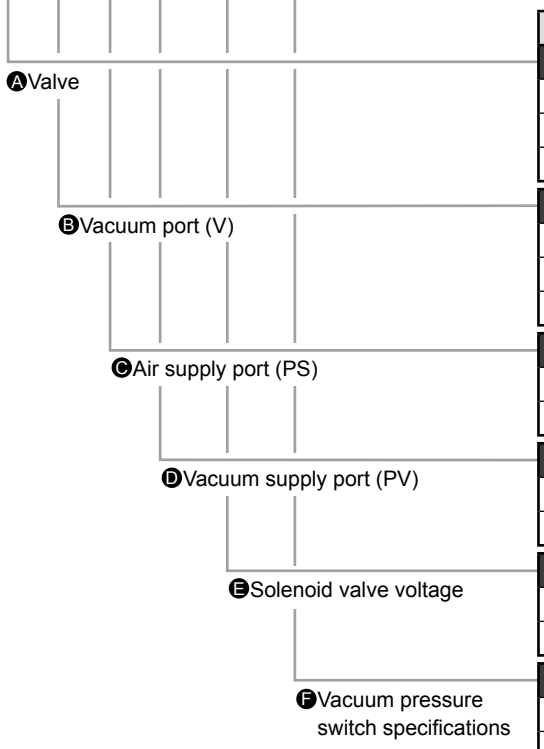
● Normally open



How to order (single unit)

● 20 mm width integrated vacuum switching unit single unit

VSJP - A 6 6 6 - 3 - W



Code	Content
Ⓐ Valve	
A	Normally open (NO)
B	Normally closed
D	Self hold
Ⓑ Vacuum port (V)	
4	ø4 push-in fitting
6	ø6 push-in fitting
8	ø8 push-in fitting
Ⓒ Air supply port (PS)	
4	ø4 push-in fitting
6	ø6 push-in fitting
Ⓓ Vacuum supply port (PV)	
4	ø4 push-in fitting
6	ø6 push-in fitting
Ⓔ Solenoid valve voltage	
1	100 VAC
3	24 VDC
Ⓕ Vacuum pressure switch specifications	
Blank	Without vacuum pressure switch
W	With digital display, NPN output 2 points
A	With digital display, NPN output 1 point + analog output

How to order (manifold)

● 20 mm width integrated vacuum switching unit manifold

VSJPM - D 6 10 10 10 - 3 - 10 A - W

Code	Content
Ⓐ Valve *1	
A	Normally open (NO)
B	Normally closed
D	Self hold
Z	For mixed specs (indicate the breakdown on the specs sheet)
Ⓑ Vacuum port (V) *1	
4	ø4 push-in fitting
6	ø6 push-in fitting
8	ø8 push-in fitting
CX	For mixed fittings (indicate the breakdown on the specs sheet)
Ⓒ Air supply port (PS)	
6	ø6 push-in fitting
8	ø8 push-in fitting
10	ø10 push-in fitting
Ⓓ Exhaust port (EX)	
6	ø6 push-in fitting common exhaust
8	ø8 push-in fitting common exhaust
10	ø10 push-in fitting common exhaust
Ⓔ Vacuum supply port (PV)	
6	ø6 push-in fitting
8	ø8 push-in fitting
10	ø10 push-in fitting
Ⓕ Solenoid valve voltage	
1	100 VAC
3	24 VDC
Ⓖ Manifold station No.	
2	2 stations
to	to
10	10 stations
Ⓗ Common piping leadout direction	
A	Vacuum port side
B	Supply port side
Ⓘ Vacuum pressure switch specifications *1	
Blank	Without vacuum pressure switch
W	With digital display, NPN output 2 points
A	With digital display, NPN output 1 point + analog output
Z	For mixed specs (indicate the breakdown on the specs sheet)

Ⓐ Valve

Ⓑ Vacuum port (V)

Ⓒ Air supply port (PS)

Ⓓ Exhaust port (EX)

Ⓔ Vacuum supply port (PV)

Ⓕ Solenoid valve voltage

Ⓖ Manifold station No.

Ⓗ Common piping leadout direction

Ⓘ Vacuum pressure switch specifications

⚠ Precautions for model No. selection

*1: Indicate on the “mix manifold specifications sheet” in the case of mixed specifications. Refer to pages 208 and 209 for details.

● Maintenance part model No.

· Vacuum side filter element

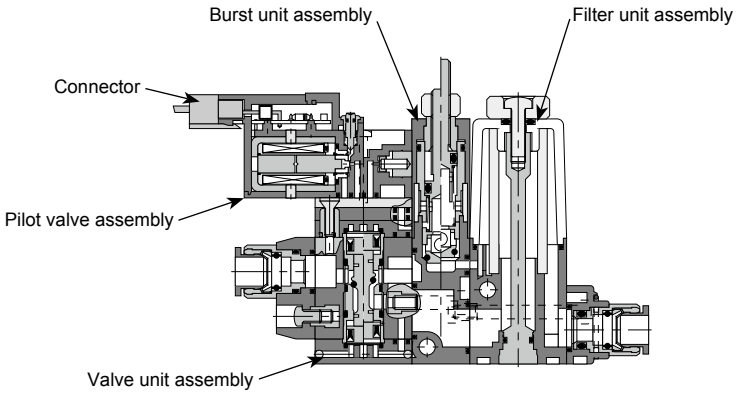
VSG-E

· Burst side filter element

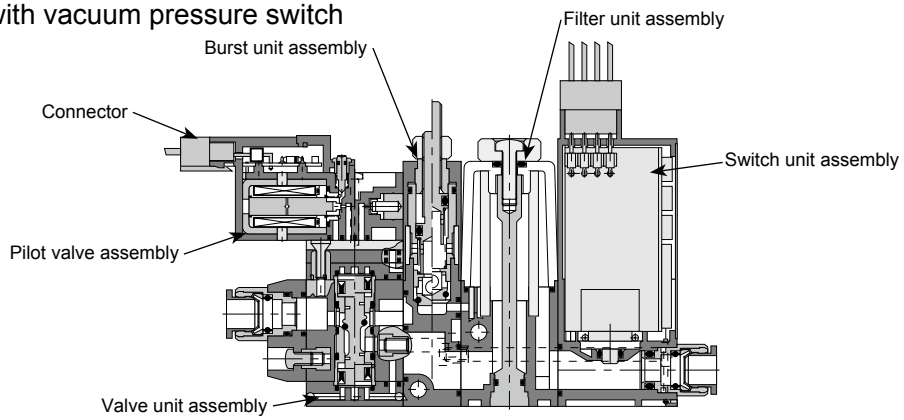
VSJ-PE

Internal structure

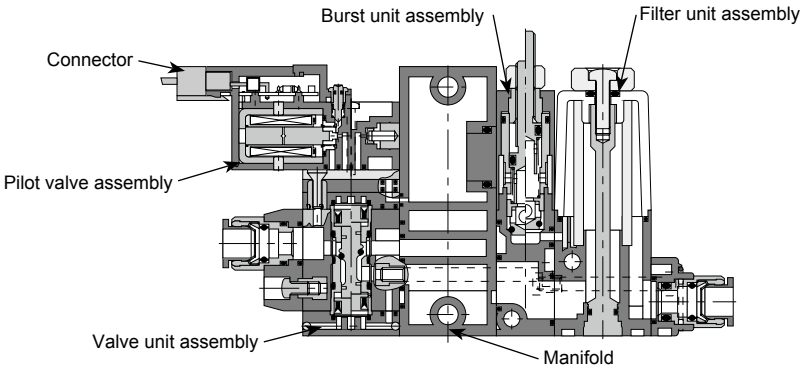
● Single unit, without vacuum pressure switch



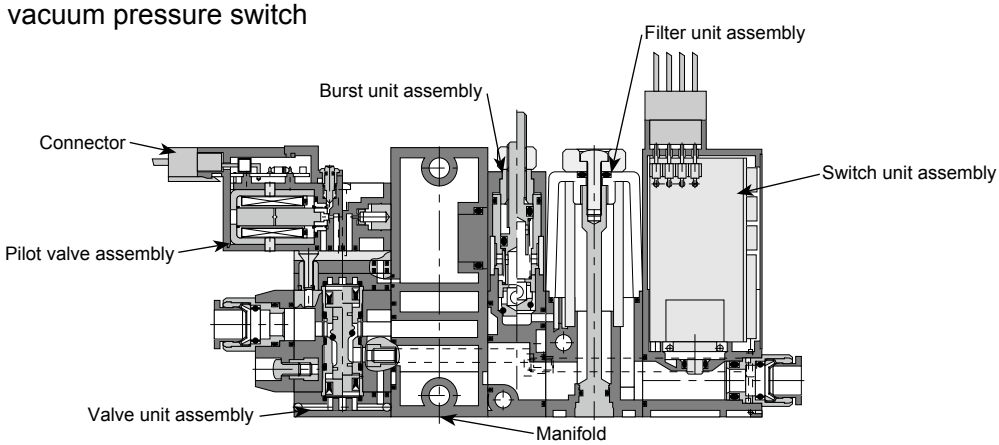
● Single unit, with vacuum pressure switch



● Manifold, without vacuum pressure switch

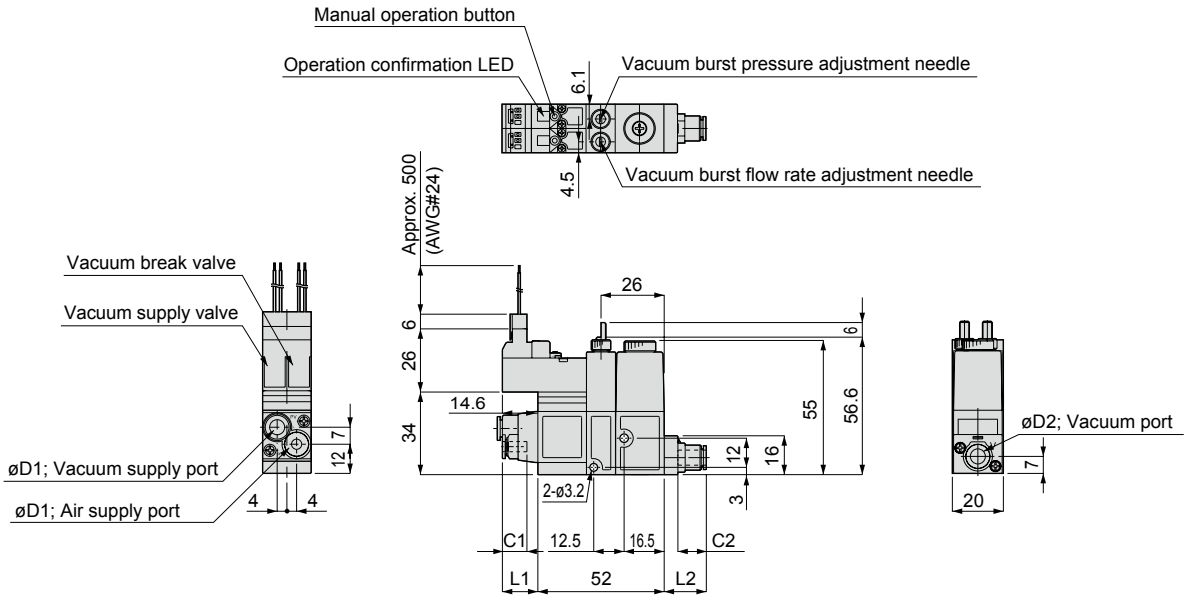


● Manifold, with vacuum pressure switch



Dimensions (single unit)

● Without vacuum pressure switch



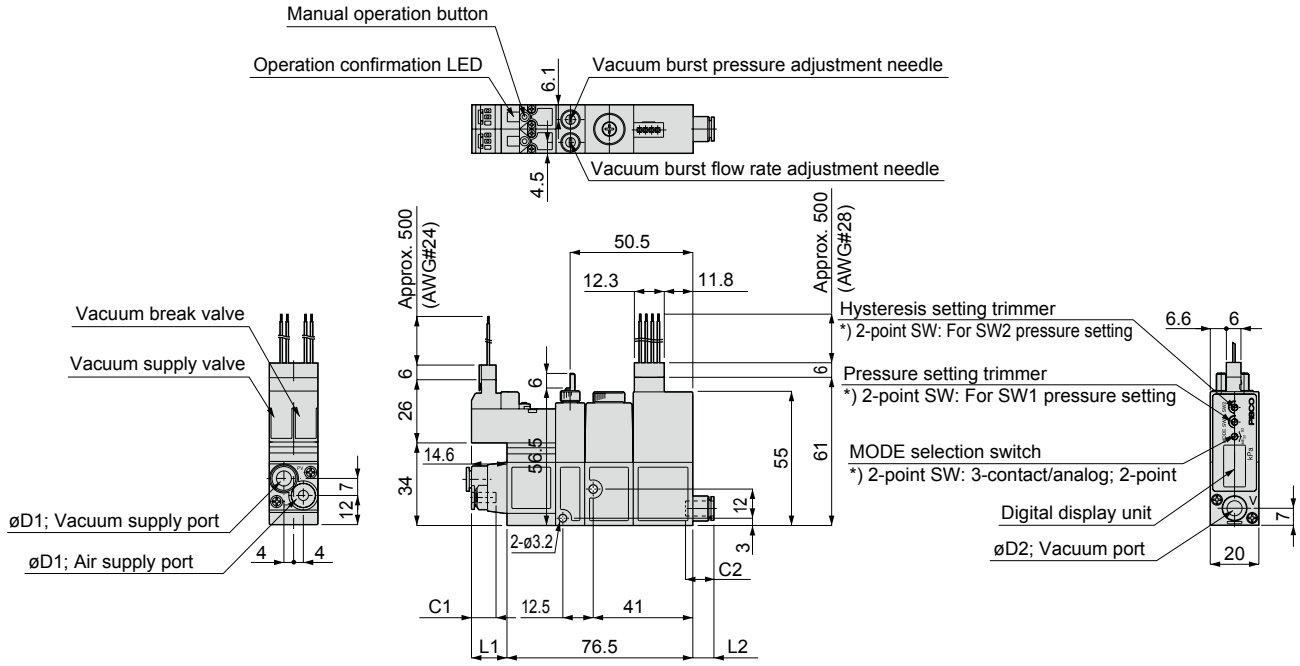
Unit: mm

Air supply port Tube O.D. øD1	C1	L1
4	11.5	14.9
6	11.9	17.3

Unit: mm

Vacuum port Tube O.D. øD2	C2	L2
4	11.2	14.6
6	11.9	17.4
8	18.2	25.8

● With vacuum pressure switch



Unit: mm

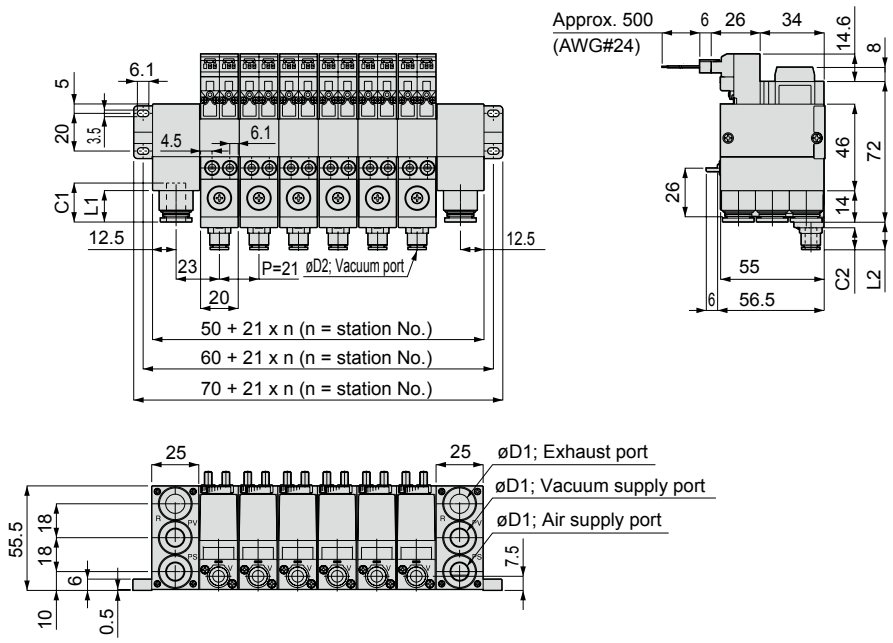
Air supply port Tube O.D. øD1	C1	L1
4	11.5	14.9
6	11.9	17.3

Unit: mm

Vacuum port Tube O.D. øD2	C2	L2
4	11.2	6.1
6	11.9	8.9
8	18.2	17.3

Dimensions (manifold VSJPM)

● Common exhaust, common piping leadout direction on vacuum port side, without vacuum pressure switch



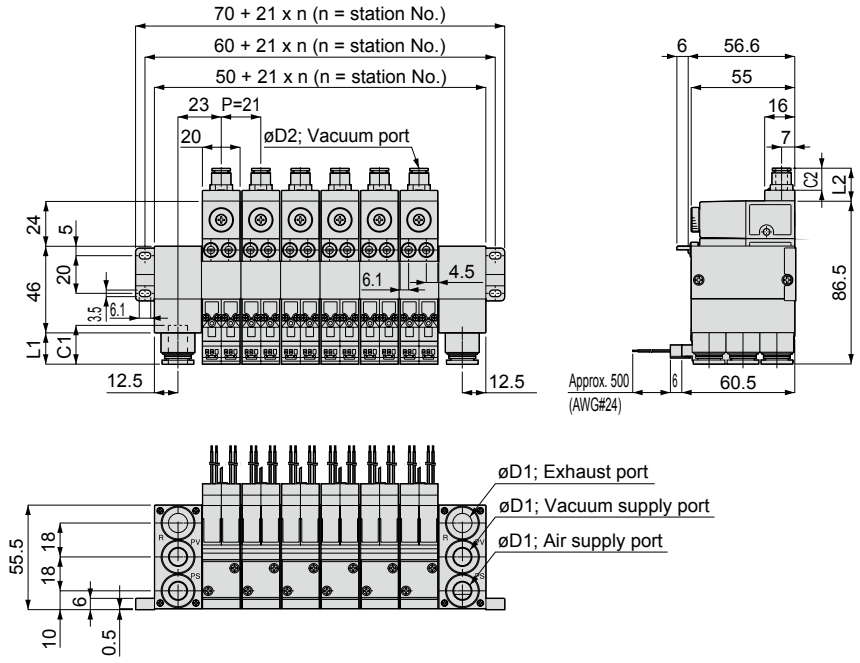
Unit: mm

Air supply port Tube O.D. øD1	C1	L1
6	17	11.6
8	18.2	13.1
10	20.7	16.7

Unit: mm

Vacuum port Tube O.D. øD2	C2	L2
4	11.2	14.6
6	11.9	17.4
8	18.2	23.0

● Common exhaust, common piping leadout direction on supply port side, without vacuum pressure switch



Unit: mm

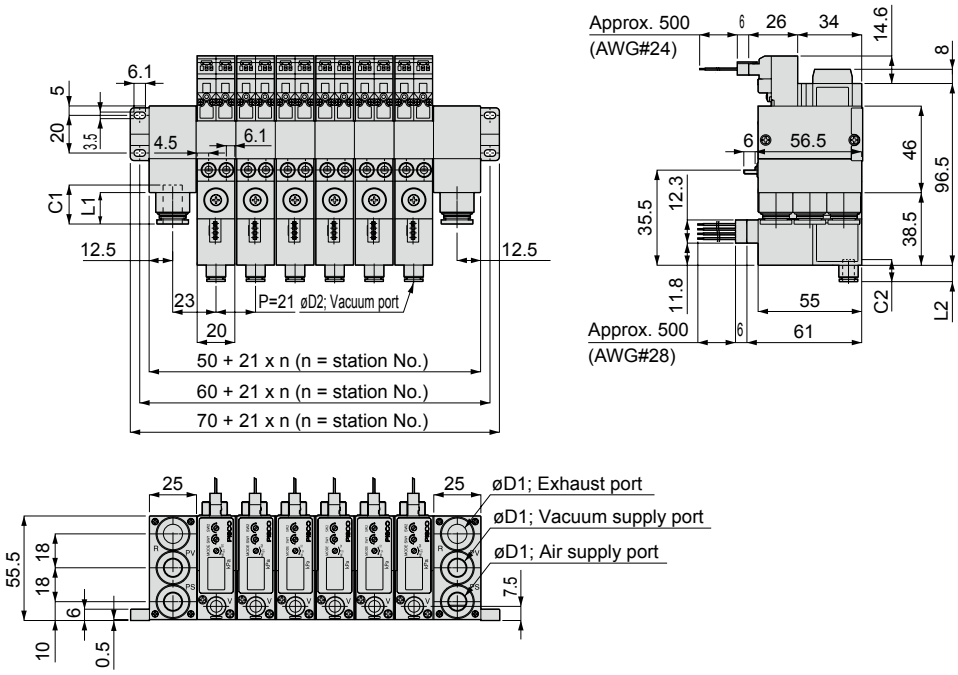
Air supply port Tube O.D. øD1	C1	L1
6	17	11.6
8	18.2	13.1
10	20.7	16.7

Unit: mm

Vacuum port Tube O.D. øD2	C2	L2
4	11.2	14.6
6	11.9	17.4
8	18.2	23.0

Dimensions (manifold VSJPM)

● Common exhaust, common piping leadout direction on vacuum port side, with vacuum pressure switch



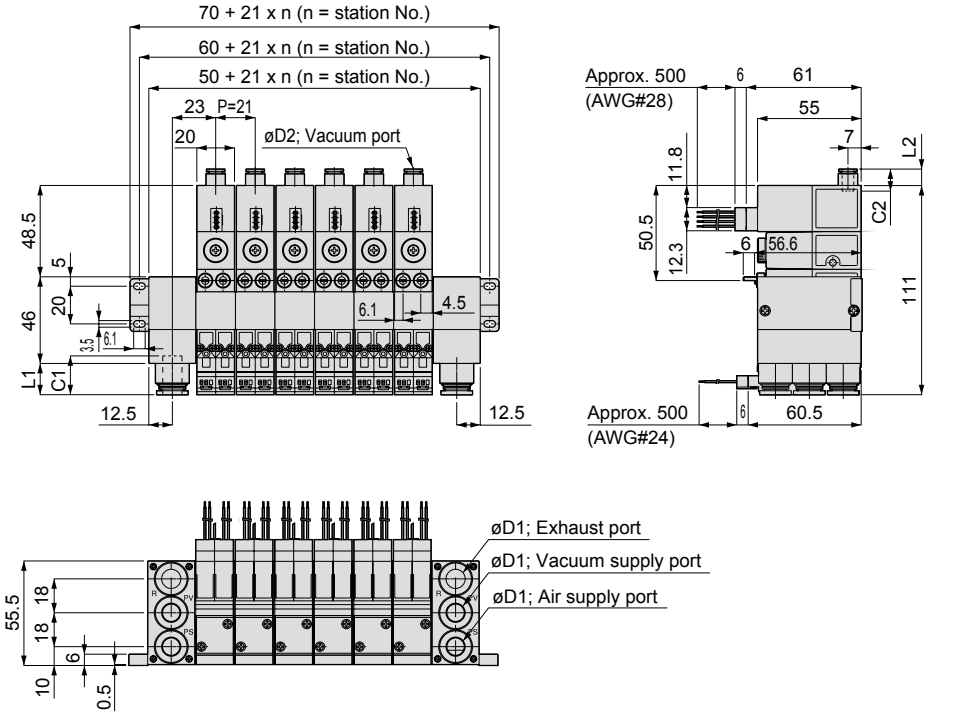
Unit: mm

Air supply port Tube O.D. øD1	C1	L1
6	17	11.6
8	18.2	13.1
10	20.7	16.7

Unit: mm

Vacuum port Tube O.D. øD2	C2	L2
4	11.2	6.1
6	11.9	8.9
8	18.2	17.3

● Common exhaust, common piping leadout direction on supply port side, with vacuum pressure switch



Unit: mm

Air supply port Tube O.D. øD1	C1	L1
6	17	11.6
8	18.2	13.1
10	20.7	16.7

Unit: mm

Vacuum port Tube O.D. øD2	C2	L2
4	11.2	6.1
6	11.9	8.9
8	18.2	17.3

Safety precautions | Refer to Intro Pages 15 and 16 for general precautions on vacuum system components.

⚠ WARNING

- When operating the valve, make sure that the current leakage is 1 mA or less. Otherwise, there is a risk of malfunctions caused by current leakage.
- Vacuum retention function allows vacuum leakage. Hence, take other safety measures if vacuum retention for long periods is required.
- If energization to the pilot valve continues for long periods, heat is generated from the coil. Heat could cause burns and impact peripheral devices. Consult with CKD if continuously energizing for long periods.
- For the self-hold (VSJ-□□D...), when resupplying after the pilot air supply is stopped (including the first use after shipment), the position of the switching valve is in neutral. When re-supplying the pilot air, be sure either to input a signal to the pilot valve or to perform switching manually.

⚠ CAUTION

- Do not apply high tensile force or bending force to the pilot valve or vacuum pressure switch lead wire. It could cause disconnection or damage to the connector unit.
- When using the manifold specifications, note that the combination of manifold stations and mounting units may degrade performance or affect other station vacuum ports. Contact CKD with any questions.
- Compressed air contains a large amount of drainage (water, oil oxides, tar, foreign matter). Since drain significantly reduces device performance, dehumidify with after-cooler and dryer to improve air quality.
- Do not use a lubricator.
- As rust inside the piping may cause malfunctions, be sure to insert a filter of 5 μm or less in front of the supply port.
- Avoid using in atmospheres containing corrosive or flammable gases. Do not use as a fluid.
- When vacuum is generated, do not operate the vacuum burst valve.
- When replacing the cartridge fitting of the vacuum port, be sure to remove the deposits in the vicinity and then securely insert the stop pin.
- When replacing the supply port fitting block, make sure that the packing does not fall out, remove the deposits in the vicinity, then securely tighten it at the specified tightening torque.

Usage methods

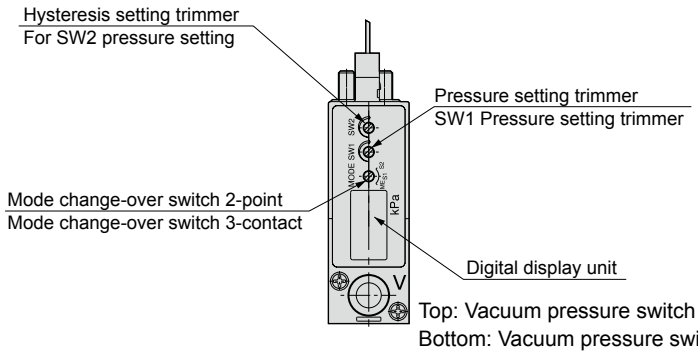
1. Vacuum pressure switch

(1) Pressure setting procedure

(1)Energization (supply DC power after confirming the wiring.)
(2)-1 Set the display change-over switch to pressure setting mode (ME → S1 or S2, SW).
(2)-2 (vacuum pressure switch with analog output only)
Turn the hysteresis setting trimmer (HYS) fully counterclockwise to set hysteresis to minimum.
(3)Align to the desired setting value by turning the pressure setting trimmer (S1 or S2, SW) with a small screwdriver, etc.
(4)Set the display change-over switch to ME, apply pressure and confirm actual operation.
(For vacuum pressure switch with 2-point switch output)
Switch output 1 (S1): Operation indicator lamp (red LED) turns ON at set pressure or more.
Switch output 2 (S2): Operation indicator lamp (green LED) turns ON at set pressure or more.
(For vacuum pressure switch with analog output)
Switch output (SW): Operation indicator lamp (red LED) turns ON at set pressure or more.

(2) Hysteresis setting

(1)Hysteresis can be adjusted by the hysteresis setting trimmer (HYS).
(2)Hysteresis adjusting range is approx. 0 to 15% of the set value. Hysteresis increases when the trimmer is rotated clockwise.
(3)Hysteresis confirmation
Set the display change-over switch to pressure display mode (ME), and gradually increase/decrease the pressure so that it will be over and under the set pressure. Then, read the values displayed when the operation indicator lamp turns ON and OFF. The display value difference is the hysteresis.
(4)Hysteresis adjustment application examples
· When the pressure is pulsating and the output cuts out at fine intervals, increase the hysteresis.



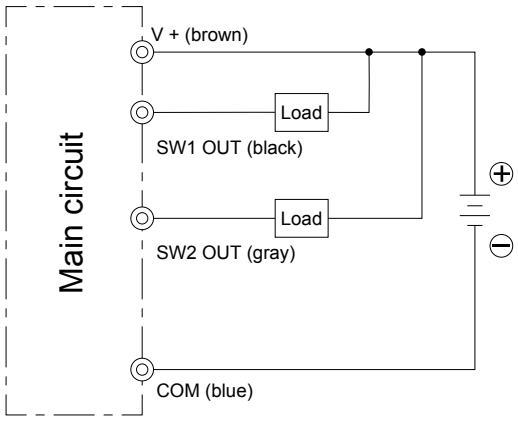
Top: Vacuum pressure switch with analog output
Bottom: Vacuum pressure switch with 2-point switch output

⚠ Caution

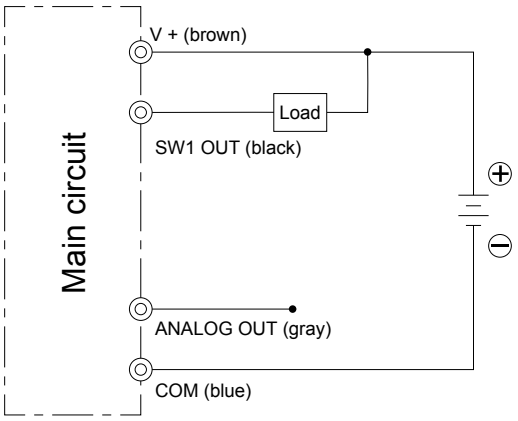
(1)Do not use in atmospheres or gases containing corrosive substances. It risks damaging the switch.
(2)Do not perform wiring or usage that would introduce noise (surge), etc. It risks damaging the switch.
(3)Do not use in flammable or explosive gases, liquids, or atmospheres. This may cause fire or explosion, as the product does not have an explosion-proof structure.
(4)Avoid using in places where the product is exposed to dripping water, oil, dust, etc. This may cause malfunction, as the product does not have a drip-proof structure.
(5)Do not use where the heat generated exceeds the operating temperature range. It risks damaging the switch.
(6)Make sure to turn the power OFF before wiring. During wiring, check the lead wire color and do not short-circuit the output terminal and power supply terminal or COM terminal. Short-circuiting could cause switch malfunction.
(7)Do not apply high tensile force or bending force to the connector cable. It could cause disconnection or damage to the connector unit.
(8)At vacuum burst, do not constantly apply pressure of 0.2 MPa or more. If constantly applied, it could damage the switch.
(9)When setting the pressure and hysteresis, use a small screwdriver and gently rotate within the rotation range of the trimmer, without applying excessive force. If excessive force is applied during adjustment, it could damage the trimmer and base.
(10)Use a stable DC power supply.
(11)To connect to an output terminal or power supply terminal (relay, solenoid valve, etc.), install a surge voltage absorption circuit. Avoid usage where current exceeds 80 mA.
(12)When using a unit power supply such as switching power supply, ground the F.G. (frame ground).
(13)Do not short-circuit the output terminal (black/gray lead wire) with other terminals.
(14)Do not apply strong external impact or excessive force to the switch body.

Usage methods

(3) How to wire



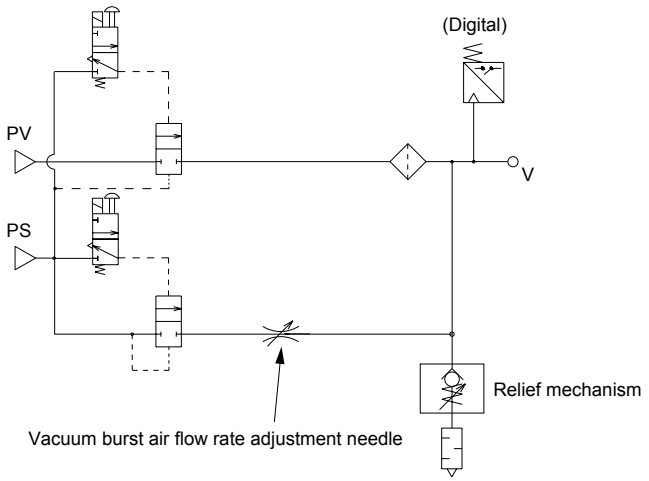
Vacuum pressure switch with 2-point switch output



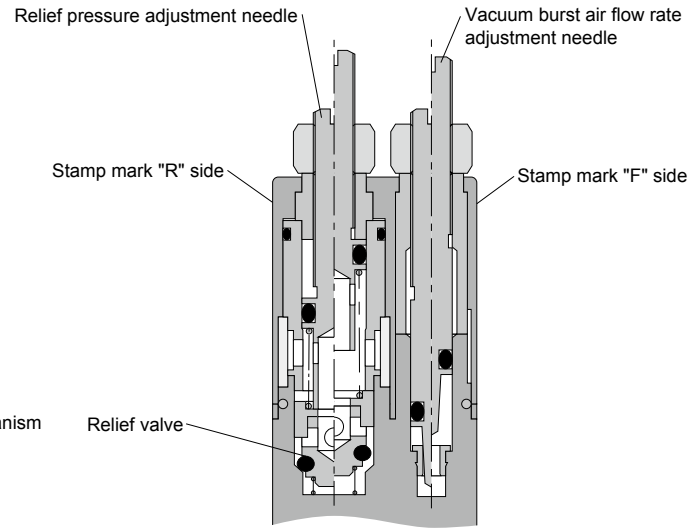
Vacuum pressure switch with analog output

2. Adjusting the relief valve

(1) Circuit diagram, structure diagram



Circuit diagram.(VSJP-□□B Normally closed)



Vacuum burst unit structure diagram

(2) Since the needle opening limit of the vacuum pump compatible unit (VSJP□) varies depending on the vacuum pump performance, set the needle opening in conditions that do not affect the vacuum rise time and degree of vacuum.

(3) After setting the relief needle, check once again that there is no abnormality in the vacuum characteristics and vacuum rise time.

* Note that exceeding the relief needle opening limit in Table 1 may cause delayed vacuum rise time or inability to obtain normal vacuum. (See “(5) Other” on page 207)

(4) Set to the required vacuum burst flow rate with the vacuum burst flow rate adjustment needle.

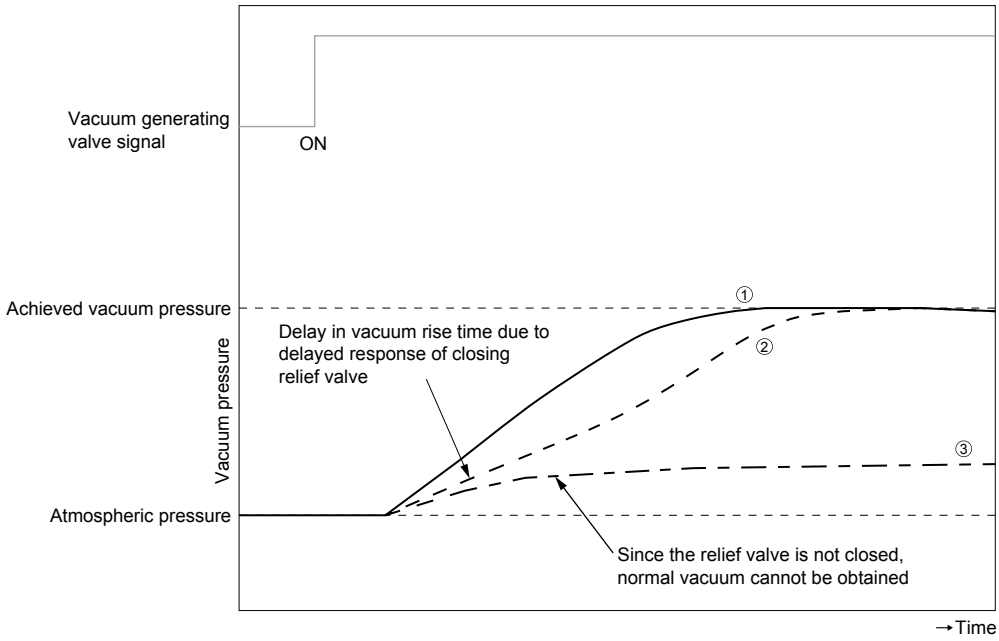
* To reduce the vacuum burst time, increase the vacuum burst air flow rate.

* If workpieces are blown away or the like, reduce the vacuum burst air flow rate.

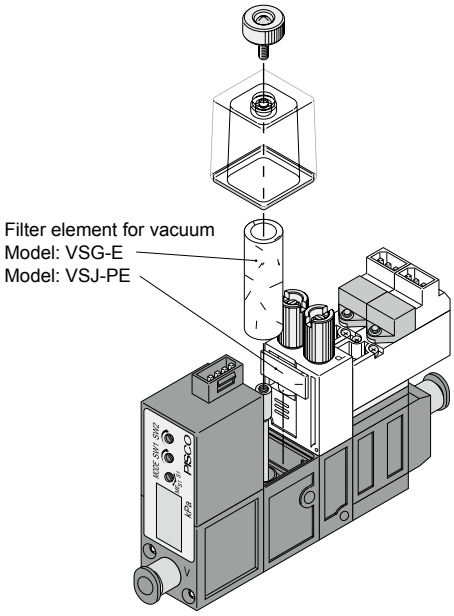
Usage methods

(5) Other

1) When the relief needle opening is within the appropriate range, the vacuum rise status of the below graph ① is set.
2) When the relief needle limit is exceeded, the vacuum rise status of the below graph ② is set and a delay occurs in the vacuum rise time.
3) Furthermore, as the relief needle is opened, it reaches the status shown in the graph ③ below, at which point normal vacuum cannot be obtained.



3. How to replace the element



How to fill out VSJPM mix manifold specifications sheet

● Mix manifold model No. (example)

	Ⓐ	Ⓑ	Ⓒ	Ⓓ	Ⓔ		Ⓕ		Ⓖ	Ⓗ		Ⓘ
VSJPM -	Z	CX	8	8	8	-	3	-	5	B	-	Z

● Mix manifold specifications sheet (example)

Vacuum switching unit model No. Ⓐ Ⓑ Ⓘ	Layout position 1	2	3	4	5	6	7	8	9	10	Quantity
VSJPM - B 4 - W	○	○	○								3
VSJPM - B 6 - A				○							1
VSJPM - B 8 - W					○						1
VSJPM -											
VSJPM -											

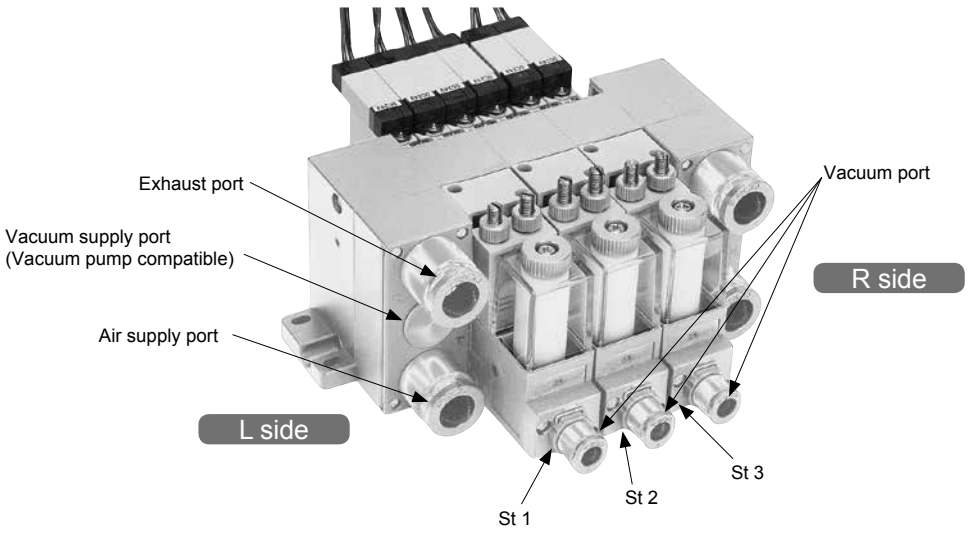
[For output port size only fitting mix specification]

● Mix manifold model No. (example)

	Ⓐ	Ⓑ	Ⓒ	Ⓓ	Ⓔ		Ⓕ		Ⓖ	Ⓗ		Ⓘ
VSJPM -	B	CX	6	8	8	-	3	-	5	B	-	W

● Mix manifold specifications sheet (example)

Vacuum switching unit model No. Ⓐ Ⓑ Ⓘ	Layout position 1	2	3	4	5	6	7	8	9	10	Quantity
VSJPM - B 4 - W	○		○		○						3
VSJPM - B 6 - W		○									1
VSJPM - B 8 - W				○							1
VSJPM -											
VSJPM -											



* The station numbers are St.1, St.2 ..... St. 10 from the L side with the vacuum port facing forward.

[When filling in]
- With vacuum port facing front, set piping positions in order from the left.
- Write the total quantity of product model No. specified in the required quantity field in the table far right.

VSJPM mix manifold specifications sheet

Contact _____ Quantity _____ Set Delivery date / /

Slip No. _____ Order No. _____

Issued / /

Company name

Contact

Order No.

● Mix manifold model No.

VSJPM - Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ - Ⓕ - Ⓖ Ⓗ - Ⓘ

Ⓐ Valve	
A	Normally open (NO)
B	Normally closed
D	Self hold
Z	For mixed specs (indicate the breakdown on the specs sheet)

Ⓑ Vacuum port (V)	
4	ø4 push-in fitting
6	ø6 push-in fitting
8	ø8 push-in fitting
CX	For mixed fittings (indicate the breakdown on the specs sheet)

Ⓒ Air supply port (PS)	
6	ø6 push-in fitting
8	ø8 push-in fitting
10	ø10 push-in fitting

Ⓓ Exhaust port (EX)	
6	ø6 push-in fitting common exhaust
8	ø8 push-in fitting common exhaust
10	ø10 push-in fitting common exhaust

Ⓔ Vacuum supply port (PV)	
6	ø6 push-in fitting
8	ø8 push-in fitting
10	ø10 push-in fitting

Ⓕ Solenoid valve voltage	
1	100 VAC
3	24 VDC

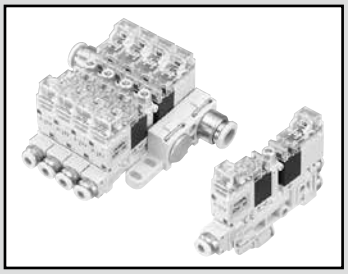
Ⓖ Manifold station No.	
2 to 10	2 to 10 stations

Ⓗ Common piping leadout direction	
A	Vacuum port side
B	Supply port side

Ⓘ Vacuum pressure switch specifications	
Blank	Without vacuum pressure switch
W	With digital display, NPN output 2 points
A	With digital display, NPN output 1 point + analog output
Z	For mixed specs (indicate the breakdown on the specs sheet)

● Mix manifold specifications sheet

Vacuum switching unit model No. Ⓐ Ⓑ Ⓘ	Layout position 1	2	3	4	5	6	7	8	9	10	Quantity
VSJPM - -											
VSJPM - -											
VSJPM - -											
VSJPM - -											
VSJPM - -											



Vacuum switching unit that achieves fast and stable response

VSNP Series

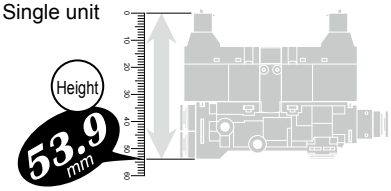
RoHS

Features

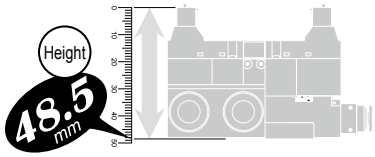
Ideal for restricted mounting space.

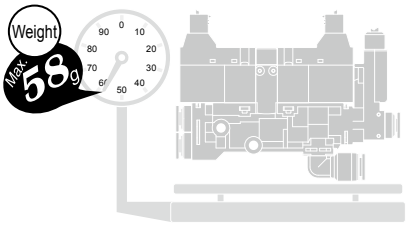
Compact and lightweight vacuum switching unit. The product height is notably reduced.

● Single unit



● Manifold

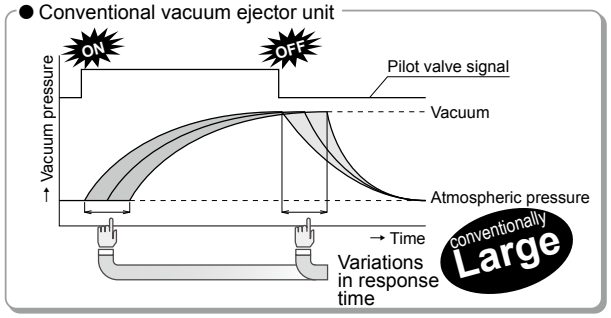




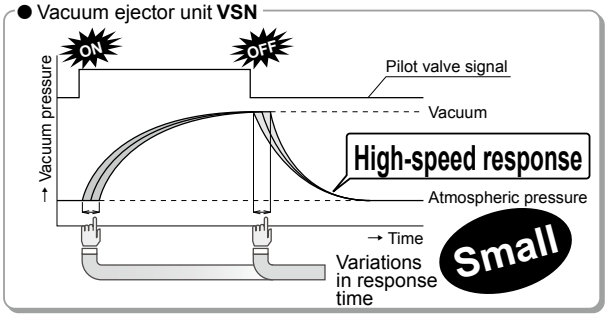
Achieves fast and stable response. (ON/OFF = 5 msec or less)

Direct acting valve is used for the main valve.

● Conventional vacuum ejector unit



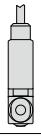
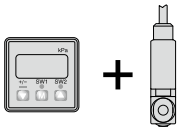
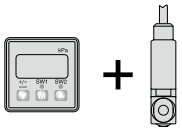
● Vacuum ejector unit **VSN**



Vacuum burst air flow rate of 20 ℓ/min is secured.

Four types of analog outputs are available for the pressure sensor.

Analog output sensor for negative pressure, Separated digital pressure display + Analog output sensor for negative pressure, Analog output sensor for compound pressure and Separated digital pressure display + Analog output sensor for compound pressure.

	For negative pressure	For compound pressure
Analog switch		
Separated digital pressure display + analog switch		

Vacuum filter is externally mounted (separately purchased).

Miniaturization of the product does away with the inconvenience of replacing the filter.

* This product is not equipped with a vacuum filter.
For longer product service life, be sure to use CKD's vacuum filter (see below) for vacuum piping.

VSFU	VSFJ
Compact union ø4 ø4	Socket ø4 ø4
Model/VSFU	Model/VSFJ
VSFU-2-44	VSFJ-44

Specifications

Descriptions		Vacuum switching unit VSNP
Working fluid		Air
Working pressure	MPa	0 to 0.55
Ambient/fluid temperatures	°C	5 to 50
Ambient humidity		35 to 85% RH (no condensation)
Degree of protection		IEC standards IP40 or equivalent
Vibration/impact resistance	m/s^2	50 or less/150 or less
Vacuum pressure	kPa	-100 to 0

Valve specifications

Descriptions \ Unit		Vacuum switching unit VSNP	
		Vacuum supply valve	Vacuum break valve
Valve and operation		Direct acting poppet valve	
Rated voltage	V	24 DC	
Voltage fluctuation range		±10%	
Surge suppressor		Surge suppressor built in	
Power consumption	W	When starting: 2.2 When holding: 0.6 (energy-saving circuit built in)	
Operation indicator		Green LED	
Working pressure	MPa	0 to 0.55	
Valve		Normally closed	
Response time (*1)	ms	Both vacuum generation (OFF → ON) and vacuum stop (ON → OFF) are 5 or less	
Wire connections and lead wire length		Connector: 500 mm	
		Red lead wire: +24 VDC, black lead wire: -0 V	

*1 : Response time is the time until pressure change is detected at the vacuum port when rated pressure and rated voltage are supplied. Vacuum achievement time at the pipe end (workpiece) and vacuum burst time differ depending on conditions such as ejector characteristics, capacity (vacuum pipe length), vacuum burst flow rate, etc.

Vacuum flow rate

Descriptions		
Vacuum flow rate	ℓ/min(ANR)	8 (with supply at -80 kPa)

Vacuum burst function

Descriptions		
Break air flow rate	ℓ/min(ANR)	0 to 20 (Indicates the value when air is supplied at 0.5 MPa.)

Note: Variable with vacuum burst air flow rate adjustment needle.

Vacuum pressure switch specifications

Descriptions		Negative pressure specifications (-V1□)	Compound pressure specifications (-R1)
Power supply voltage V		10.8 to 30 DC (including ripple)	
Current consumption mA		20 or less	
Pressure sensitive element		Diffused semiconductor pressure sensor	
Working pressure range kPa		-100 to 0	-100 to 300
Proof pressure kPa		200	600
Storage temperature range °C		-20 to 70 (atmospheric pressure, humidity: 65% RH or less)	
Operating temperature range °C		-10 to 60 (no condensation)	
Operating humidity range		35 to 85% RH (no condensation)	
Degree of protection		IEC standards IP40 or equivalent	
Analog output	Output voltage V	1 to 5	
	Zero point voltage V	1 ±0.04 (= at atmospheric pressure)	1 ±0.1 (= -100 kPa)
	Max pressure point voltage V	4.6 ±0.04 (= -100 kPa)	5 ±0.1 (= at 300 kPa)
	Linearity/hysteresis	±0.5% F.S. or less (at Ta = 25°C)	
	Temperature characteristics	±2% F.S. or less (0 to 50°C, Ta = 25°C)	
	Output current mA	0.195 or less (load resistance: 10 kΩ or less)	1 or less (load resistance: 5 kΩ or less)
	Output impedance kΩ	1	-

Separated digital display specifications (-V2□, -R2)

Descriptions		Separated digital display
Power supply voltage V		10.8 to 26.4 DC
Current consumption mA		40 max. (no load)
Repeatability		±0.1% F.S. ±1 digit or less
Hysteresis		Adjustment is possible
Responsivity ms		2.5 or less (malfunction prevention function: select from 25, 100, 250, 500, 1000 or 1500)
Output short-circuit protection		Yes
Pressure display	Display unit	kPa
	Display magn resolution	0.1
	Display frequency	5 times/second
	Display accuracy	±1% F.S. ±1 digit or less
	Operational indicator lamp	Orange 1 & 2 indicator lamps
	Digital display	Main display: 2 colors (red, green), sub-display: orange
Sensor input specifications	Voltage input signal V	1 to 5
	Input impedance MΩ	1
Switch output	Output points	2-point output (OUT1, OUT2)
	Output method	NPN open collector
	Switch rating	30 VDC 125 mA max.
	Internal voltage drop V	1.5 or less
Analog output	Output voltage V	1 to 5 ±2.5% F.S. or less
	Linearity	±1% F.S. or less
	Output impedance KΩ	1
Environmental resistance	Degree of protection	IEC standards IP40 or equivalent
	Storage temperature °C	-10 to 60 (no condensation or freezing)
	Operating temperature °C	0 to 50
	Operating humidity	35 to 85% RH (no freezing)
	Withstand voltage	1000 VAC 1 minute (between lead wire and case)
	Insulation resistance	50 MΩ or more (500 VDC) (between lead wire and case)
	Vibration resistance	Compound amplitude 1.5 mm or 100 m/s^2, 10 to 55 Hz, 2 hours each in X, Y, Z directions
	Shock resistance	100 m/s^2, 2 hours each in X, Y, Z directions
Temperature characteristics		±0.5% F.S. (0 to 50°C, base temperature: 25°C)

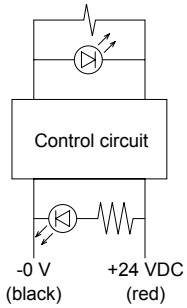
Weight table

Model No.	Unit contents	Weight (g)
VSNP-□□□-3-□	Single unit, individual air/vacuum supply port, atmospheric release, with sensor	56
VSNP-□□□-3	Single unit, individual air/vacuum supply port, atmospheric release, without sensor	53
VSNPM-□□□-3-2-□	Manifold, individual air/vacuum supply port, with sensor	171
VSNPM-□□□-3-2	Manifold, individual air/vacuum supply port, without sensor	164

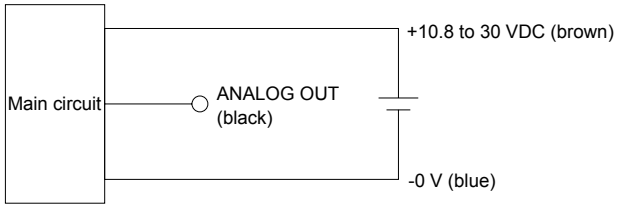
■ With each station increase, the manifold is heavier by 56 g for unit with sensor and 53 g for unit without sensor.
Example: The weight of vacuum switching unit, with sensor, quadruple manifold is 171 + (2 × 56) = 283g → Weight of double manifold: 171 g with the weight of 2 units with sensor: 112g.

Electric circuit Fig.

● Solenoid valve



● Vacuum pressure switch



How to order

- 10.3 mm width small vacuum unit (vacuum pump system compatible)
- Vacuum switching unit single unit

VSNP - 4 4 4 - 3 - V1

- Ⓐ Vacuum port
- Ⓑ Vacuum supply port
- Ⓒ Vacuum burst air supply port
- Ⓓ Solenoid valve voltage
- Ⓔ Vacuum pressure switch specifications

Code	Content
Ⓐ Vacuum port (V)	
4	ø4 straight push-in fitting
4L	ø4 elbow push-in fitting
Ⓑ Vacuum supply port (PV)	
4	ø4 straight push-in fitting
Ⓒ Vacuum burst air supply port (PS)	
4	ø4 straight push-in fitting
Ⓓ Solenoid valve voltage	
3	24 VDC
Ⓔ Vacuum pressure switch specifications	
Blank	Without vacuum pressure switch
V1C0	Negative pressure analog output/connector lead wire 500 mm
V1C1	Negative pressure analog output/connector lead wire 1,000 mm
V1C2	Negative pressure analog output/connector lead wire 2,000 mm
V1C3	Negative pressure analog output/connector lead wire 3,000 mm
V2C0	Separated LED display + (-'ve) press analog output/connector lead wire 500 mm
V2C1	Separated LED display + (-'ve) press analog output/connector lead wire 1,000 mm
V2C2	Separated LED display + (-'ve) press analog output/connector lead wire 2,000 mm
V2C3	Separated LED display + (-'ve) press analog output/connector lead wire 3,000 mm
R1	Compound pressure analog output/grommet lead wire 3,000 mm
R2	Separated LED display + Compound pressure analog output/grommet lead wire 3,000 mm

● Maintenance parts

· Silencer element for replacement
VSNP-E

· Dedicated bracket (VSN, VSNP common)
VSN-B

· Separated digital display
VSN-SED-31N

· Sensor connection connector (e-con)
VSN-EC

How to order

- 10.3 mm width small vacuum unit (vacuum pump system compatible)
- Vacuum switching unit manifold

VSNPM - 4 4 4 - 3 - 10 - V1

- Ⓐ Vacuum port
- Ⓑ Vacuum supply port
- Ⓒ Vacuum burst air supply port
- Ⓓ Solenoid valve voltage
- Ⓔ Manifold station No.
- Ⓕ Vacuum pressure switch specifications

Code	Content
Ⓐ Vacuum port (V) *1	
4	ø4 straight push-in fitting
4L	ø4 elbow push-in fitting
CX	For mixed specs (indicate the breakdown on the specs sheet)
Ⓑ Vacuum supply port (PV)	
Refer to Appendix 1 for the vacuum supply port.	
Ⓒ Vacuum burst air supply port (PS)	
Refer to Appendix 2 for vacuum burst air supply port.	
Ⓓ Solenoid valve voltage	
3	24 VDC
Ⓔ Manifold station No.	
2	2 stations
to	to
10	10 stations
Ⓕ Vacuum pressure switch specifications *1	
Blank	Without vacuum pressure switch
V1C0	Negative pressure analog output/connector lead wire 500 mm
V1C1	Negative pressure analog output/connector lead wire 1,000 mm
V1C2	Negative pressure analog output/connector lead wire 2,000 mm
V1C3	Negative pressure analog output/connector lead wire 3,000 mm
V2C0	Separated LED display + (-'ve) press analog output/connector lead wire 500 mm
V2C1	Separated LED display + (-'ve) press analog output/connector lead wire 1,000 mm
V2C2	Separated LED display + (-'ve) press analog output/connector lead wire 2,000 mm
V2C3	Separated LED display + (-'ve) press analog output/connector lead wire 3,000 mm
R1	Compound pressure analog output/grommet lead wire 3,000 mm
R2	Separated LED display + Compound pressure analog output/grommet lead wire 3,000 mm
Z	For mixed specs (indicate the breakdown on the specs sheet)

⚠ Precautions for model No. selection

*1 : Be sure to fill in the "mix manifold specifications sheet" in the case of mixed specifications. Refer to pages 228 and 229 for details.

Appendix 1

Ⓑ Vacuum supply port (PV)							
Port shape		Straight fitting			Elbow fitting		
Fitting size (mm)		ø4	ø6	ø8	ø4	ø6	ø8
Code	R side only	4R	6R	8R	4LR	6LR	8LR
	Both sides	4	6	8	4L	6L	8L
	L side only	4H	6H	8H	4LH	6LH	8LH

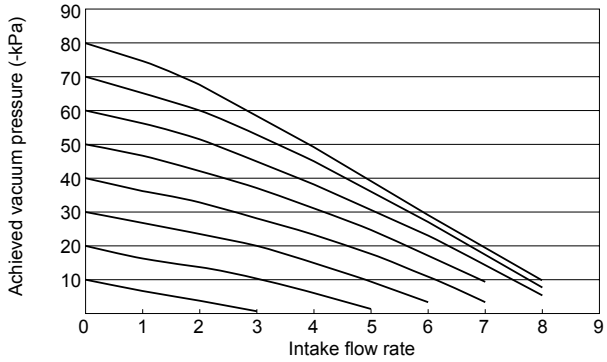
Appendix 2

Ⓒ Vacuum burst air supply port (PS)							
Port shape		Straight fitting			Elbow fitting		
Fitting size (mm)		ø4	ø6	ø8	ø4	ø6	ø8
Code	R side only	4R	6R	8R	4LR	6LR	8LR
	Both sides	4	6	8	4L	6L	8L
	L side only	4H	6H	8H	4LH	6LH	8LH
	Common for vacuum generation/vacuum burst	N					

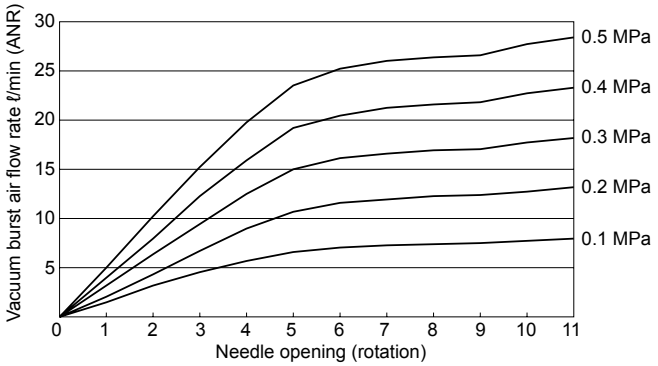
- Maintenance parts
  - Separated digital display
    VSN-SED-31N
  - Sensor connection connector (e-con)
    VSN-EC

Vacuum characteristics

VSNP flow characteristics

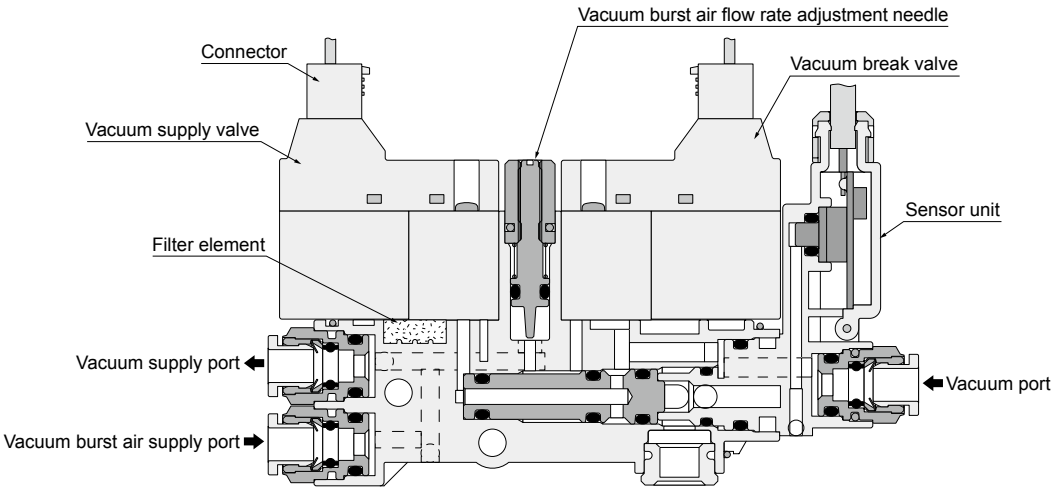


VSNP vacuum burst air flow rate characteristics

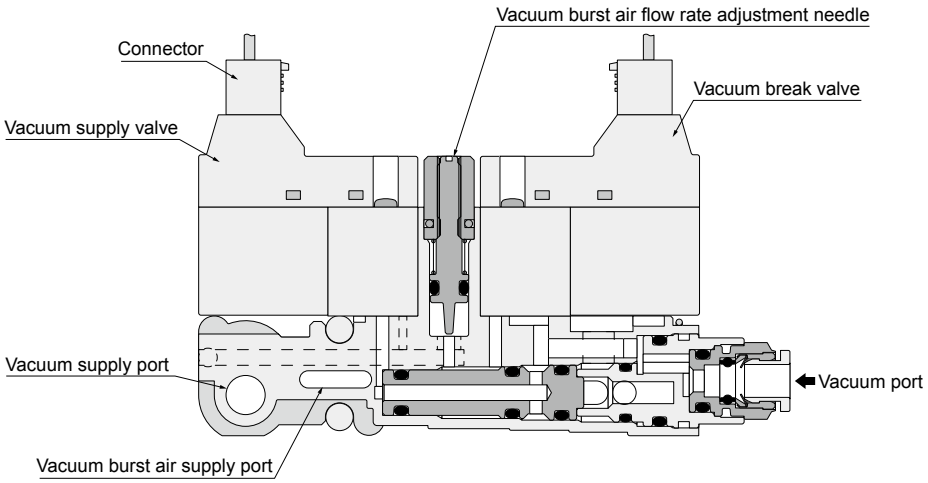


Internal structure

● Vacuum switching unit single unit
· with pressure switch for vacuum



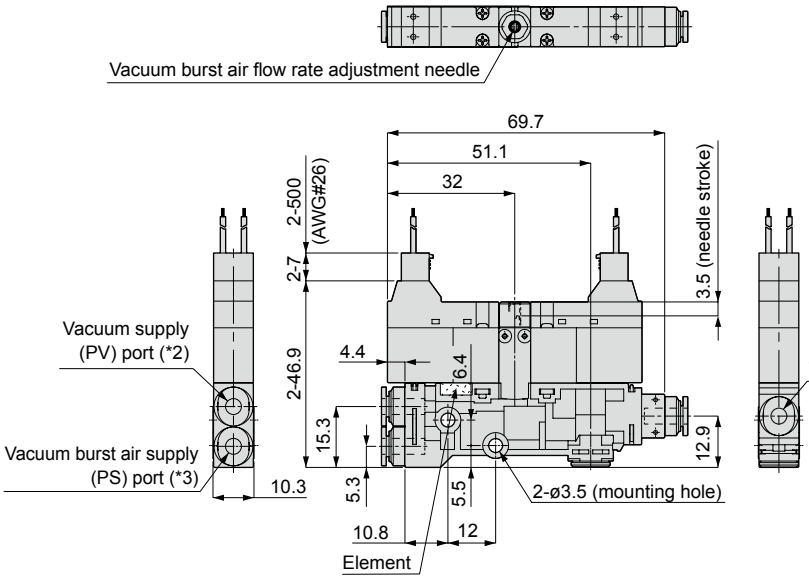
● Vacuum switching unit manifold
· without pressure switch for vacuum

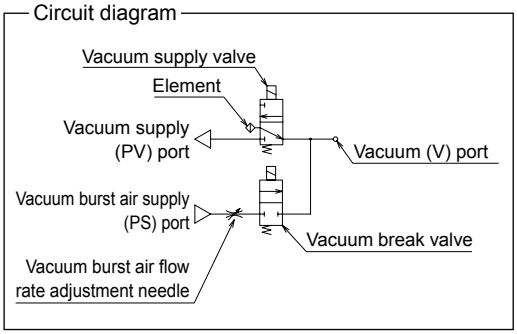


Dimensions (single unit)

● Without vacuum pressure switch

· VSNP-□□□-3

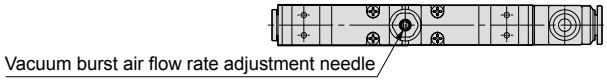


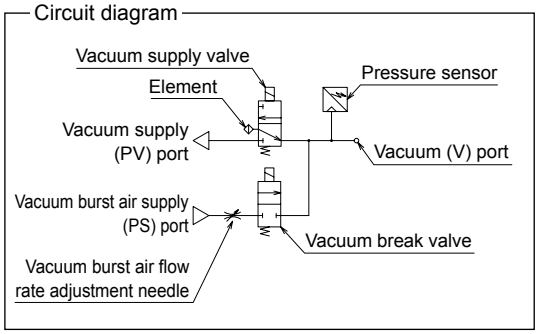


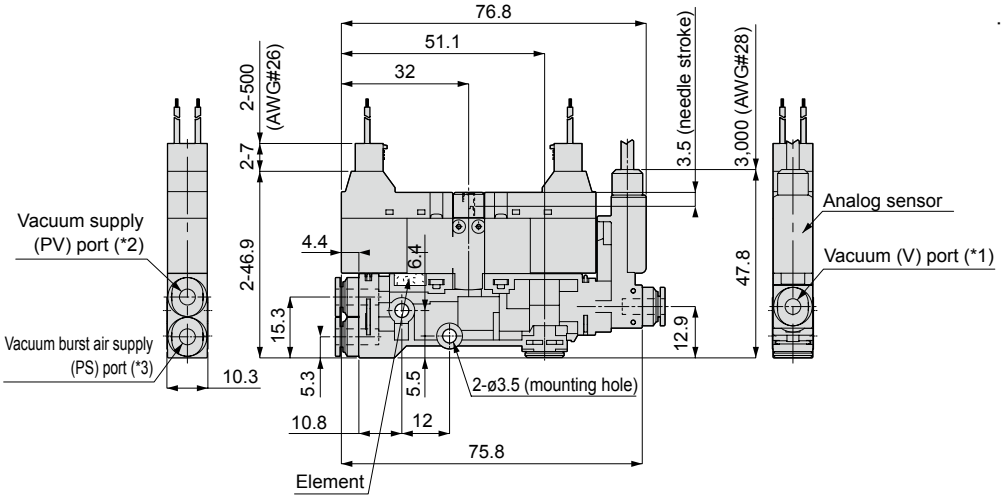
● With vacuum pressure switch

· VSNP-□□□-3-V□□□/R□

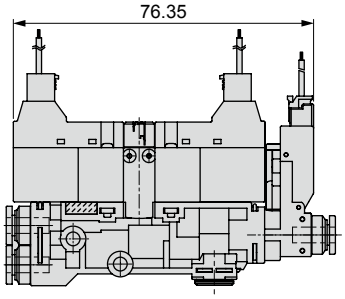
· Compound pressure analog output switch (R□)







· Negative pressure analog output switch (V□□□)



*1 : For vacuum (V) port dimensions, refer to Table 1 on page 219.

*2 : For vacuum supply (PV) port dimensions, refer to Table 2 on page 219.

*3 : For vacuum burst air supply (PS) port dimensions, refer to Table 2 on page 219.

Dimensions

● Single unit fitting dimensions

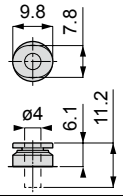
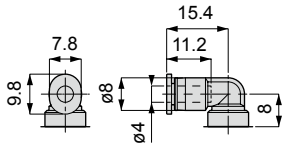
	
ø4 straight push-in fitting	ø4 elbow push-in fitting

Table 1: Vacuum port push-in fitting shape

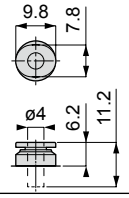
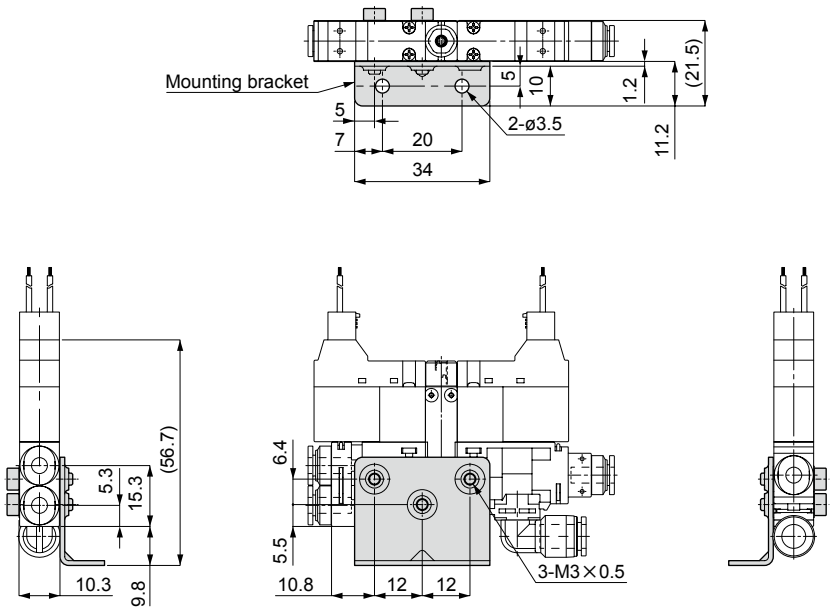

4 (ø4 straight)

Table 2: Supply port push-in fitting shape

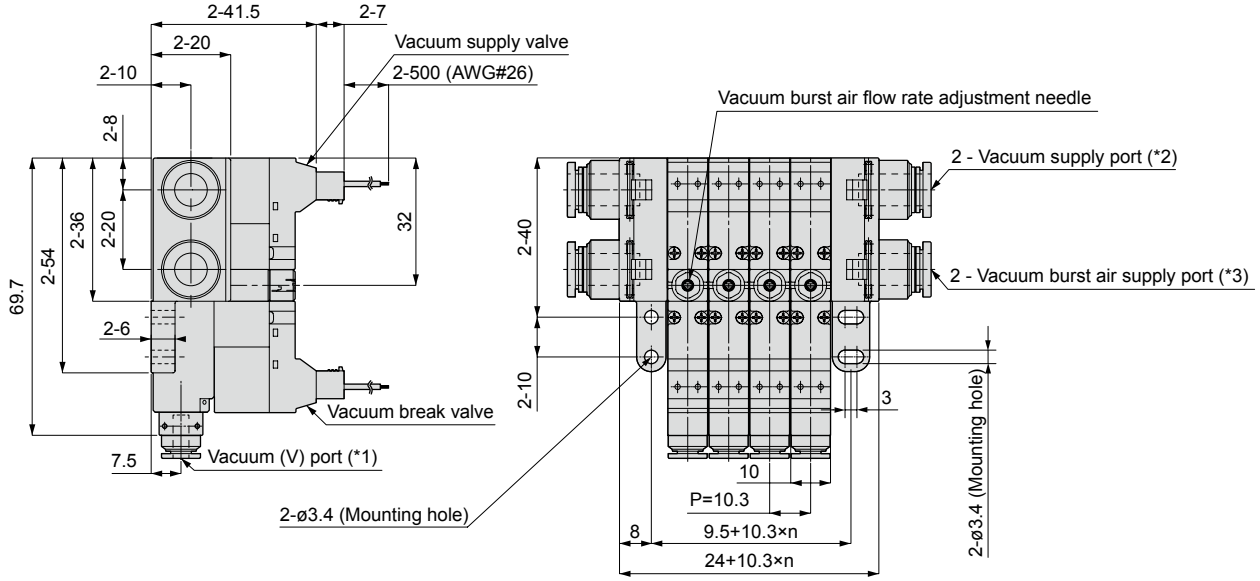
● Dedicated bracket for single unit
· VSN-B



Dimensions (manifold)

● Without vacuum pressure switch

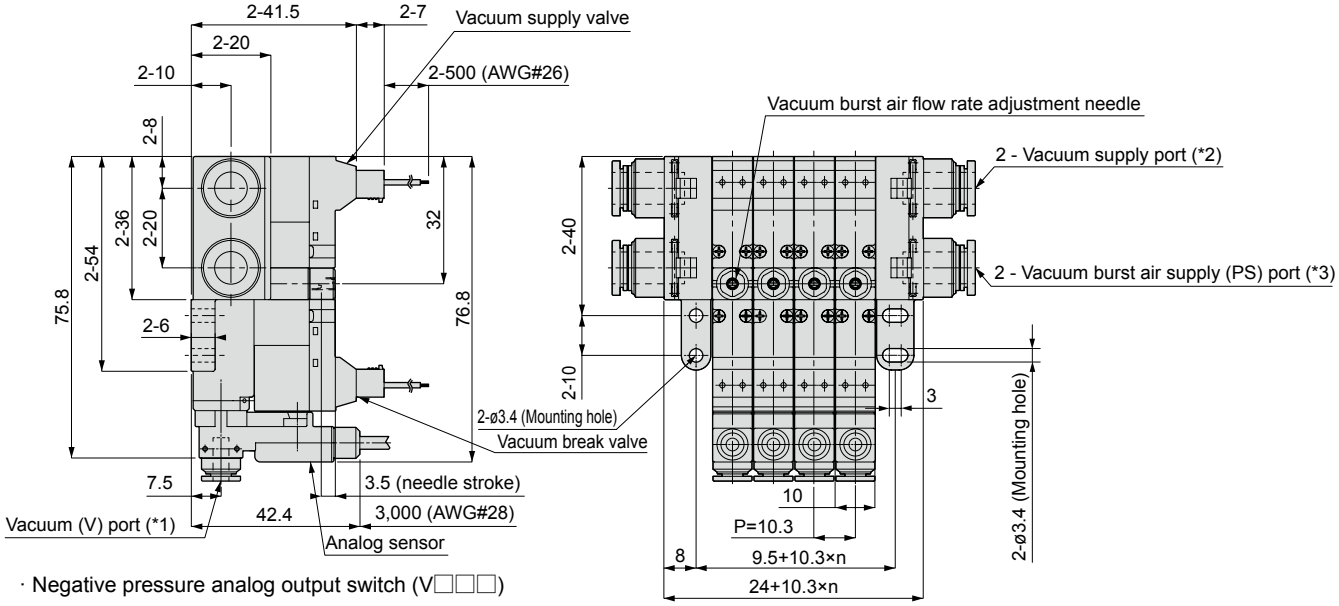
· VSNPM-□□□-3-□



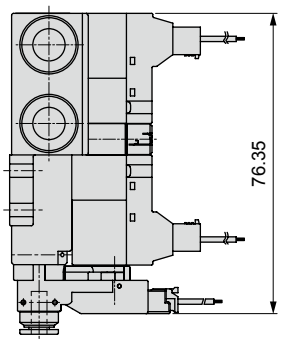
● With vacuum pressure switch

· VSNPM-□□□-3-□-V□□□/R□

· Compound pressure analog output switch (R□)



· Negative pressure analog output switch (V□□□)



*1 : For vacuum port dimensions, refer to Table 1 on page 221.
*2 : For vacuum supply port dimensions, refer to Table 2 on page 221.
*3 : For vacuum burst air supply port dimensions, refer to Table 2 on page 221.

Dimensions

● Manifold fitting dimensions

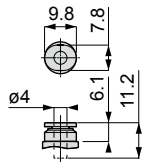
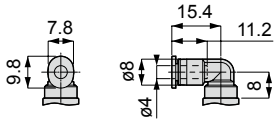
	
ø4 straight push-in fitting	ø4 elbow push-in fitting

Table 1: Vacuum port push-in fitting shape

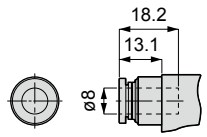
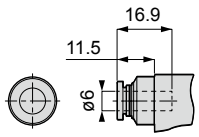
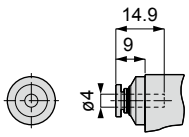
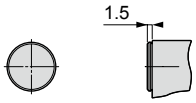
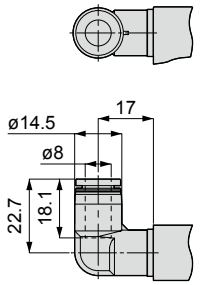
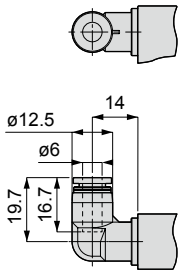
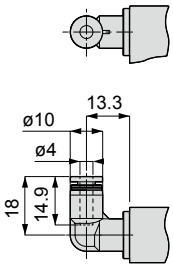
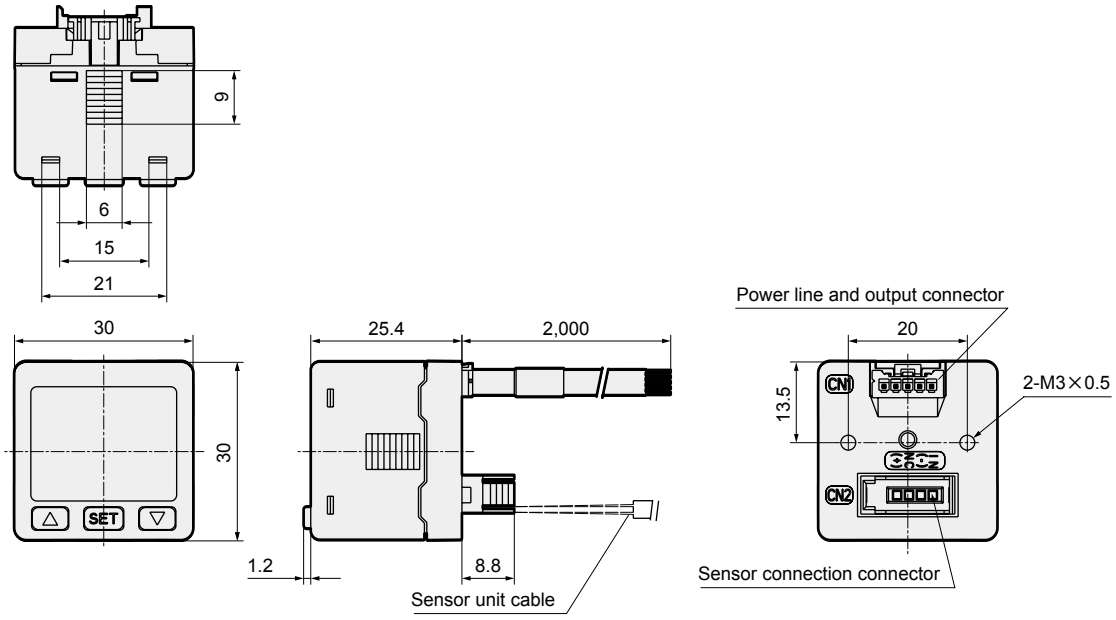
			
ø8 straight push-in fitting	ø6 straight push-in fitting	ø4 straight push-in fitting	Plug
			
ø8 elbow push-in fitting	ø6 elbow push-in fitting	ø4 elbow push-in fitting	

Table 2: Supply port push-in fitting shape

● Separated digital display



· Power line and output wiring specifications

Line color	Content
Brown	Power supply (10.8 to 26.4 VDC)
Orange	Analog output (1 to 5 V)
White	OUT2 output
Black	OUT1 output
Blue	COMMON

· Sensor unit connection wiring specifications

Line color	Content
Brown	DC+
Blue	DC-
Black	IN

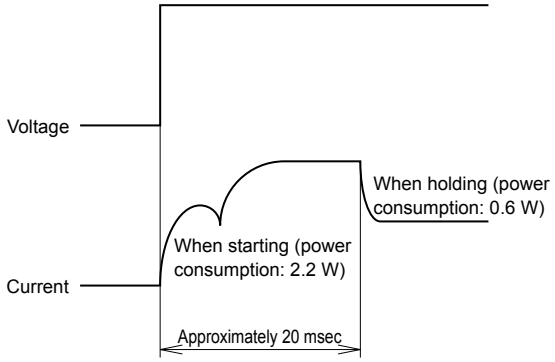
* Refer to page 226 for the wiring method of the sensor connector.

Safety precautions

Refer to Intro Pages 15 and 16 for general precautions on vacuum system components.

WARNING

- When operating the solenoid valve, make sure that the current leakage is 1 mA or less. Otherwise, there is a risk of malfunctions caused by current leakage.
- Do not apply vibration or shock outside the specifications to the product. It could lead to damage of the product or malfunction of the solenoid valve.
- If energization to the solenoid valve continues for long periods, heat is generated from the coil. Heat could cause burns and impact peripheral devices. Consult with CKD if continuously energizing for long periods.
- The solenoid valve of this product uses a current control circuit, serving as a mechanism to reduce the current value when the coil is kept energized. Never use in environments where vibration or impact applied is outside the specifications. The valve could malfunction.



Current/voltage waveform when solenoid valve is energized

- Do not step onto the product or place objects on it. This may result in falling, knocking the product over, injury due to falling, malfunctions due to product damage, etc.
- Do not wash with water or solvent, or paint the body. Damage of resin parts due to solvents or plugged ports due to paint may cause malfunction.
- When conducting checks, adjustment, etc., turn the power OFF, shut off the supply air and make sure that there is no residual pressure.
- Be sure to turn the power OFF before wiring and piping. Before turning the power ON or supplying air, check that the wiring and piping are correct.
- Tighten the screws of each part with appropriate torque. The recommended tightening torque for product mounting is described in point (2) of “Fixing method” on page 224 and the recommended tightening torque for solenoid valves in “How to replace the element” on page 224. Failure to tighten properly may lead to air leakage, product falling and damage to various parts of the product.

⚠ CAUTION

- Do not apply high tensile force or bending force to the solenoid valve or the lead wire of the sensor. It could cause disconnection or damage to the connector unit.

- Compressed air contains a large amount of drainage (water, oil oxides, tar, foreign matter). Since drain significantly reduces product performance, dehumidify with an after-cooler and dryer to improve air quality.

- Do not use a lubricator.

- Rust and foreign matter entering the pipes may lead to product failure, malfunction and performance degradation. Insert a filter of 5 μm or less just before the supply port. In addition, flushing of pipes is recommended before use and at appropriate intervals.

- Avoid using in atmospheres containing corrosive or flammable gases. Do not use as the working fluid. This may cause fire or explosion, as the product does not have an explosion-proof structure.

- Avoid using in places where the product is exposed to dripping water, oil, dust, etc. This may cause damage of the product and performance degradation, since the product does not have a drip-proof/dust-proof structure.

- The solenoid valve lead wire of this product has polarity. If the polarity is different, the solenoid valve will not operate.

- Select piping diameter and pipe length so that sufficient effective cross-sectional area can be secured for piping connected to vacuum (V) port. If the effective cross-sectional area is not sufficient, product performance such as intake flow rate and vacuum burst air flow rate may not be sufficiently obtained.

- This product does not have a vacuum filter. Use CKD's vacuum filter series for the vacuum filter. If a vacuum filter is not used, suctioned dust will accumulate in the product and may lead to decreased vacuum performance (ejector system compatible unit) and leakage/malfunction of the solenoid valve (ejector system compatible unit, vacuum pump system compatible unit) etc.
  (Recommended vacuum filter: VSFU series, VSFJ series)

- In the manifold, the number of units that can operate at the same time is limited due to the conditions of the air supply amount (supply port size, pipe length, regulator processing flow rate, etc.) and ejector air consumption (vacuum characteristics), etc. Contact CKD for methods allowing simultaneous operation with manifold.

- The solenoid valve of this product essentially operates continuously. When energizing continuously for more than 15 minutes, do not use more than 10 times/day. Return to normal operation after continuous energization.

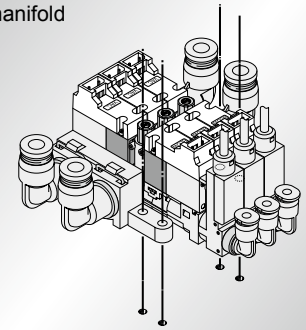
- When leaving for more than 24 hours at pressure 0 to 0.1 MPa/OFF state, perform a trial run of the solenoid valve (energization 1 sec or more x 5 times or more) before operation.

Usage methods

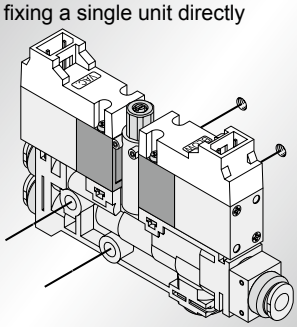
1. Fixing method

Tighten and fix with M3 screws using the mounting holes (2 places) on the resin body. The recommended tightening torque for this is 0.3 to 0.5 N·m. Tightening outside the recommended tightening torque range may lead to product falling or damage.
(Refer to the dimensions for the mounting hole pitch.)

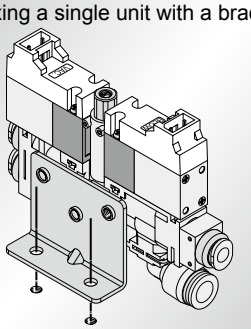
For manifold



When fixing a single unit directly

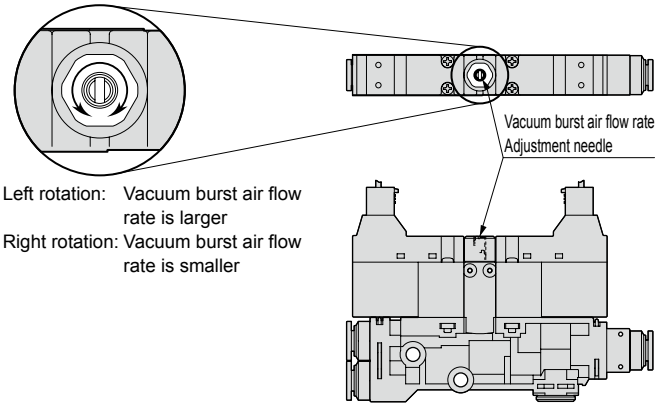


When fixing a single unit with a bracket



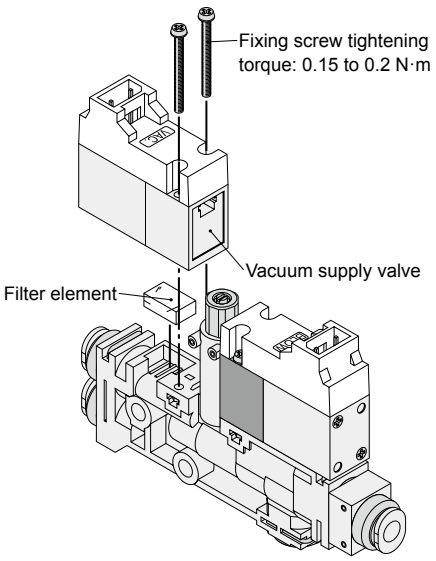
2. How to adjust vacuum burst air flow rate

■ The vacuum burst air flow rate is decreased by turning the vacuum burst air flow adjustment needle to the right (clockwise) and increased by turning it to the left (counterclockwise).
* Be sure to use an appropriate flathead screwdriver for adjusting the vacuum burst air flow rate.
* Since this product has an internal spring to stop the rotation of the needle, there is no lock nut. Do not turn the hexagonal part with a wrench, etc. It may cause damage to the product.



3. How to replace the filter element

■ To replace the filter element of the vacuum switching single unit (Model No.: VSNP-E), remove the fixing screws for vacuum supply valve and replace using an appropriate screwdriver. After replacing the filter element and confirming that the packing of the valve for vacuum supply has not fallen out, tighten the fixing screw with tightening torque of 0.15 to 0.2 N·m and securely install.



Usage methods

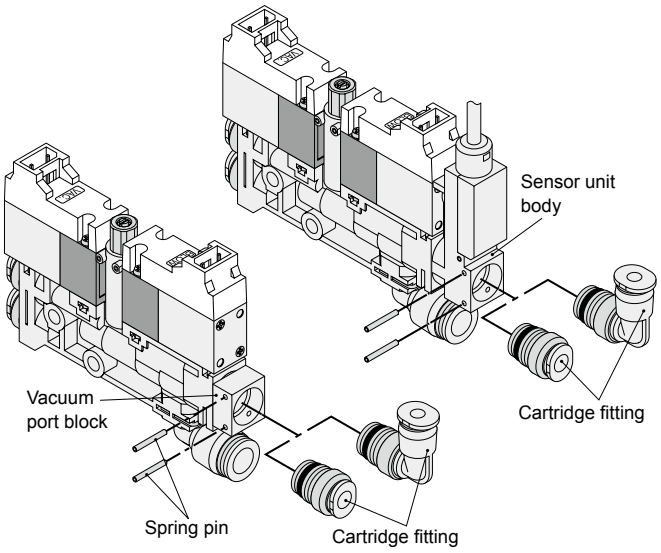
4. How to replace the cartridge fitting

[Vacuum port]

■ For single units

For the vacuum port cartridge fittings, remove the spring pins (2 pcs) inserted from the side of the sensor unit body or vacuum port block with a jig for ø1 mm pin and replace the cartridge fittings.

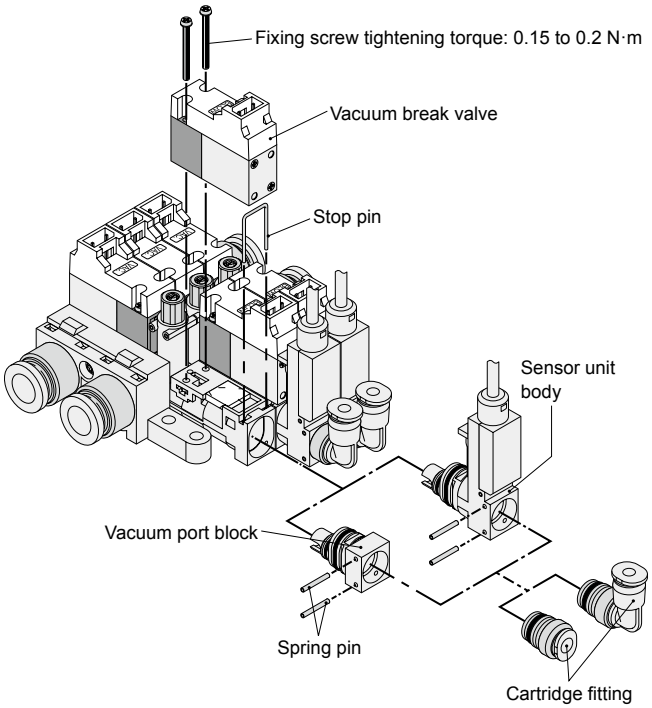
* When mounting the cartridge fitting on the body, ensure that there is no dirt, fluff, etc., adhering to the O-ring. Ensure that the O-ring and body bore are not damaged. Vacuum circuit leakage could decrease performance.



■ For manifolds

Remove the vacuum burst valve with an appropriate Phillips screwdriver. Pull out the vacuum port block or the stop pin for sensor unit body fixing with a flathead screwdriver and remove from the body. For the vacuum port cartridge fittings, remove the spring pins (2 pcs) inserted from the side of the sensor unit body or vacuum port block with a jig for ø1 mm pin and replace the cartridge fittings. After that, confirm that the packing of the valve for vacuum supply has not fallen out, tighten the fixing screw with tightening torque of 0.15 to 0.2 N·m and securely install.

* When mounting the cartridge fitting on the body, ensure that there is no dirt, fluff, etc., adhering to the O-ring. Ensure that the O-ring and body bore are not damaged. Vacuum circuit leakage could decrease performance.

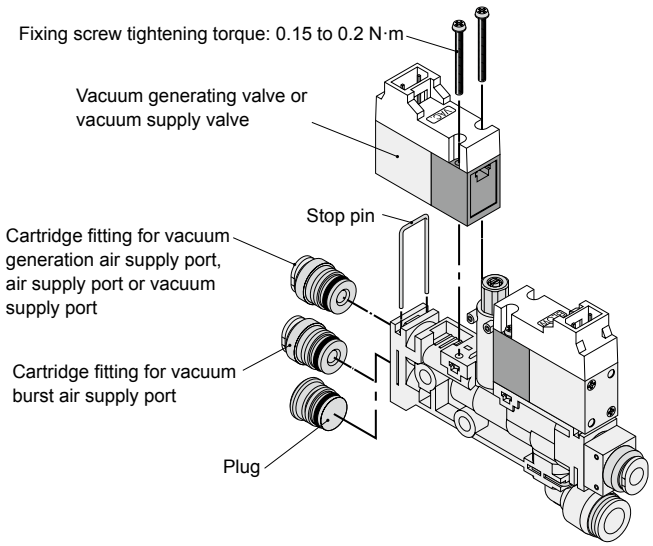


[Supply port]

■ For single units

Remove the vacuum generating valve or the vacuum supply valve with an appropriate Phillips screwdriver. Pull out the stop pin of the vacuum generating air supply port and vacuum burst air supply port or air supply port with a flathead screwdriver and replace the cartridge fittings. After that, confirm that the packing of the valve for vacuum supply has not fallen out, tighten the fixing screw with tightening torque of 0.15 to 0.2 N·m and securely install.

* When mounting the cartridge fitting on the body, ensure that there is no dirt, fluff, etc., adhering to the O-ring. Ensure that the O-ring and body bore are not damaged. Otherwise, air leakage may result.



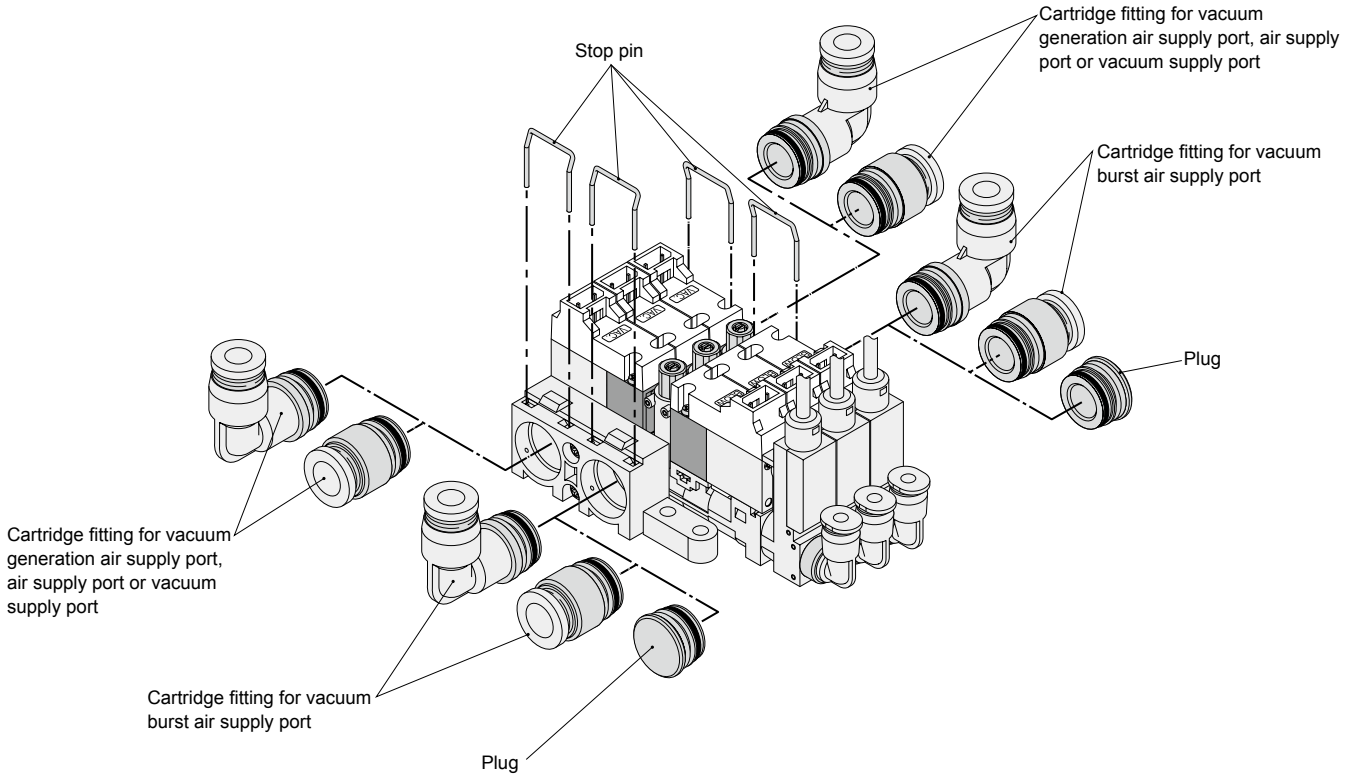
Usage methods

■ For manifolds

Pull out the stop pin with a flathead screwdriver and replace the cartridge fittings.

* When mounting the cartridge fitting on the body, ensure that there is no dirt, fluff, etc., adhering to the O-ring. Ensure that the O-ring and body bore are not damaged. Otherwise, air leakage may result.

* Pay attention to the orientation of the stop pin. If inserted backward, the stop pin may fall out during use due to vibration.



■ How to connect sensor connection connector (e-con)

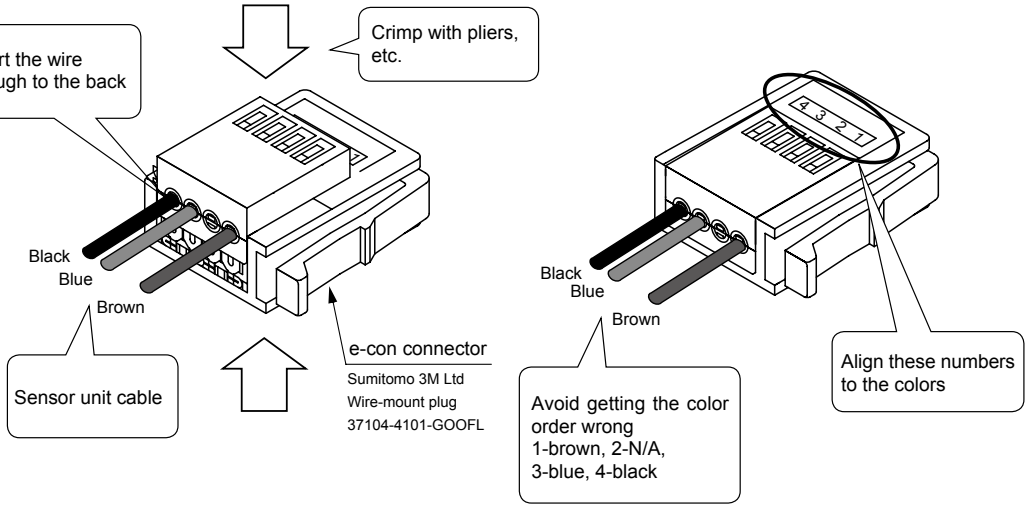
When connecting the sensor connection connector, cut the half-stripped section at the end of the cable lead wire before using.

Insert the lead wire through to the back of the connector, and securely crimp with pliers, etc.

· The lead wire sheath does not need to be removed.

· Since incorrect wiring can lead to sensor or display damage, faults or malfunction, check the pin No. and the electric wire color during pressure welding and ensure there are no mistakes.

· Sensor connection connector cannot be reused once crimped. If wiring or lead wire insertion has been done incorrectly, use a new sensor connection connector.



· Wiring specifications

Pin No.	Cable color
1	Brown (DC+)
2	Not connected
3	Brown (DC-)
4	Black (IN)

MEMO

How to fill out VSNPM mix manifold specifications sheet

● Mix manifold model No. (example)

	Ⓐ	Ⓑ	Ⓒ		Ⓓ		Ⓔ		Ⓕ
VSNPM-	CX	4R	4	-	3	-	5	-	Z

● Mix manifold specifications sheet

Vacuum switching unit model No. Ⓐ - Ⓕ	Layout position 1	2	3	4	5	6	7	8	9	10	Quantity
VSNPM- 4 - V2	○	○			○						3
VSNPM- 4L - V2			○								1
VSNPM- 4L - V1				○							1
VSNPM- -											
VSNPM- -											

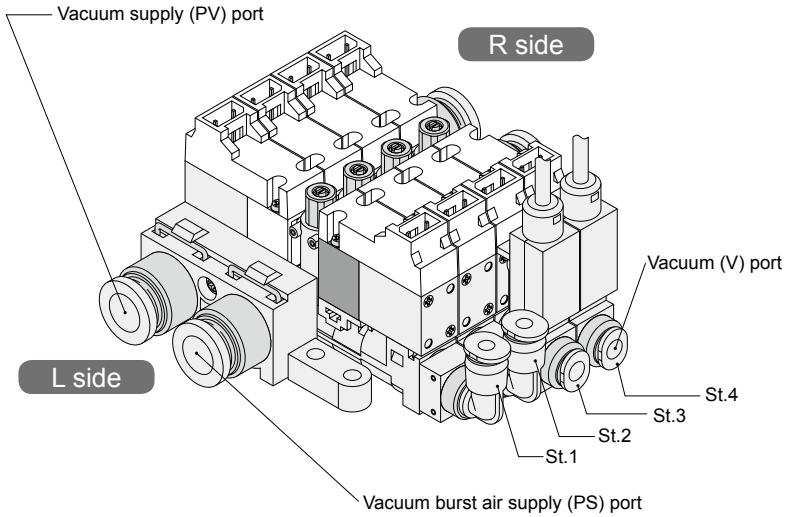
[For vacuum port size only fitting mix specification]

● Mix manifold model No. (example)

	Ⓐ	Ⓑ	Ⓒ		Ⓓ		Ⓕ		Ⓖ
VSNPM-	CX	4	4	-	3	-	5	-	V2

● Mix manifold specifications sheet

Vacuum switching unit model No. Ⓐ - Ⓕ	Layout position 1	2	3	4	5	6	7	8	9	10	Quantity
VSNPM- 4 - V2	○	○		○	○						4
VSNPM- 4L - V2			○								1
VSNPM- -											
VSNPM- -											
VSNPM- -											



[When filling in]
- With vacuum port facing front, set piping positions in order from the left.
- Write the total quantity of product model No. specified in the required quantity field in the table far right.

VSNPM mix manifold specifications sheet

Issued / /

Company name

Contact Quantity Set Delivery date /

Contact

Slip No. Order No.

Order No.

● Mix manifold model No.

VSNPM- Ⓐ Ⓑ Ⓒ - Ⓓ - Ⓔ - Ⓕ

Ⓐ Vacuum port (V)	
4	ø4 straight push-in fitting
4L	ø4 elbow push-in fitting
CX	For mixed fittings (indicate the breakdown on the specs sheet)

Ⓑ Vacuum generating air supply port (PV)
Refer to Appendix 1 on page 215 for unit combination.

Ⓒ Vacuum burst air supply port (PS)
Refer to Appendix 2 on page 215 for unit combination.

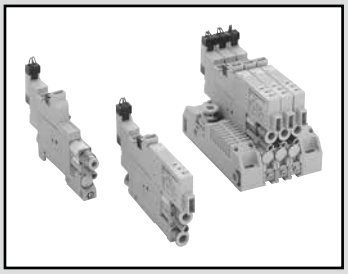
Ⓓ Solenoid valve voltage	
3	24 VDC

Ⓔ Manifold station No.	
2	2 stations
to	to
10	10 stations

Ⓕ Vacuum sensor specification	
Blank	Without vacuum pressure switch
V1C0	Negative pressure analog output/connector lead wire 500 mm
V1C1	Negative pressure analog output/connector lead wire 1,000 mm
V1C2	Negative pressure analog output/connector lead wire 2,000 mm
V1C3	Negative pressure analog output/connector lead wire 3,000 mm
V2C0	Separated LED display + (-'ve) press analog output/connector lead wire 500 mm
V2C1	Separated LED display + (-'ve) press analog output/connector lead wire 1,000 mm
V2C2	Separated LED display + (-'ve) press analog output/connector lead wire 2,000 mm
V2C3	Separated LED display + (-'ve) press analog output/connector lead wire 3,000 mm
R1	Compound pressure analog output/grommet lead wire 3,000 mm
R2	Separated LED display + Compound pressure analog output/grommet lead wire 3,000 mm
Z	For mixed specs (indicate the breakdown on the specs sheet)

● Mix manifold specifications sheet

Vacuum switching unit model No. Ⓐ Ⓕ	Layout position 1	2	3	4	5	6	7	8	9	10	Quantity
VSNPM- -											
VSNPM- -											
VSNPM- -											
VSNPM- -											
VSNPM- -											



Vacuum switching unit which is lightweight and compact in appearance and has a high-cycle vacuum system

VSXP Series

RoHS

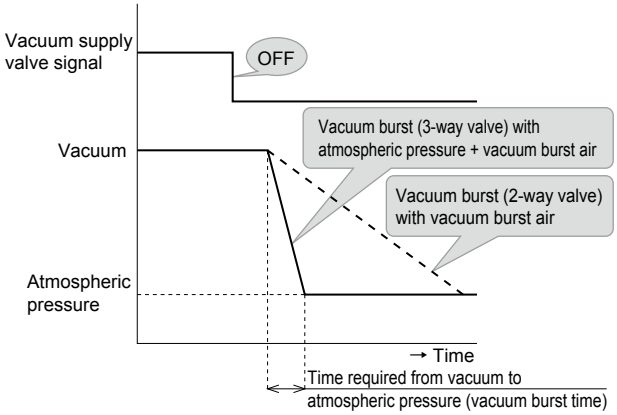
Features

■ A lightweight, compact vacuum unit that meets market needs.

■ Vacuum unit VSXP fixing methods include direct mount, fixable from the side with screws, etc., and DIN rail mount for mounting on a DIN rail. Select the mounting method according to the application.

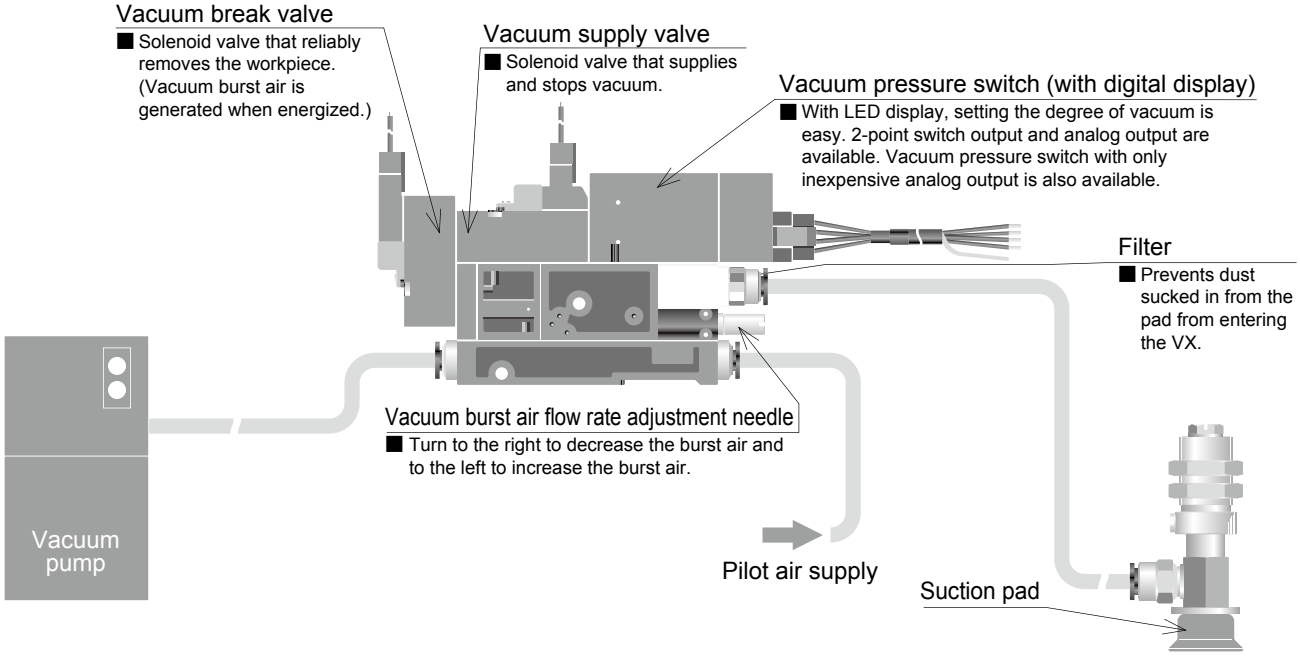
■ Vacuum pressure switch types include those with digital display for good visibility and those with only inexpensive analog output. 2-point switch output and analog output are available for the vacuum pressure switch with digital display. Select according to various applications and cost. In addition, wiring layout can be done easily using a connector system.

■ Vacuum pump system compatible 3-way valve specification has greatly reduced the time required to go from vacuum to atmospheric pressure (vacuum burst time) by using a 3-way valve for the vacuum supply main valve. (Since the 2-way valve (VSXP-D) retains vacuum immediately after the main valve is turned OFF, vacuum burst takes place only with vacuum burst air. In the 3-way valve specification (VSXP-T), atmospheric air is supplied to the vacuum circuit when the main valve is turned OFF and vacuum burst takes place with atmospheric pressure + vacuum burst air.)



■ With manifold piping specifications, up to 10 manifold stations can be used.

Vacuum pump system compatible application examples



Specifications

Descriptions	VSXP
Working fluid	Air
Working pressure MPa	0.3 to 0.7
Ambient/fluid temperatures °C	5 to 50
Vacuum pressure kPa	-101 to 0

Solenoid valve specifications

● Pilot valve

Descriptions	Vacuum supply valve		Vacuum break valve	
Valve and operation	Direct acting poppet valve			
Rated voltage V	24 DC	100 AC	24 DC	100 AC
Voltage fluctuation range V	24 DC ±10%	100 AC ±10%	24 DC ±10%	100 AC ±10%
Surge suppressor	Varistor	Bridge diode	Varistor	Bridge diode
Power consumption	1.2 W (with LED)	1.5 VA (with LED)	1.2 W (with LED)	1.5 VA (with LED)
Manual operation	Non-locking push			
Operation display	At coil excitation operation: Red LED lights			
Connection	Connector: 500 mm			
	Red: 24 VDC Black: COM	Blue	Red: 24 VDC Black: COM	Blue

● Switching valve 2-way valve specifications VSXP-D

Descriptions	Vacuum supply valve
Valve and operation	Direct acting poppet valve
Proof pressure MPa	1.05
Valve	Normally closed
Lubrication	Not required
Effective cross-sectional area mm^2	Air supply port size ø4: 3.5
	Air supply port size ø6: 4.5

● Switching valve 3-way valve specifications VSXP-T

Descriptions	Vacuum generating valve
Valve and operation	Direct acting poppet valve
Proof pressure MPa	1.05
Valve	Normally closed
Lubrication	Not required
Effective cross-sectional area mm^2	Vacuum supply port size ø4: 3.0
	Vacuum supply port size ø6: 3.6

Vacuum pressure switch specifications

Descriptions		With digital display		Without display
		With 2-point switch output (-DW)	With analog output (-DA)	Analog output only (-A0)
Default pressure kPa		-50 (SW1), -10(SW2)	-50	-
Current consumption mA		40 or less		15 or less
Pressure sensitive element		Diffused semiconductor pressure switch		
Working pressure kPa		-100 to 0		
Set pressure kPa		-99 to 0		-
Proof pressure MPa		0.2		
Storage temperature °C		-20 to 80 (atmospheric pressure, humidity 60% RH or less)		
Operating temperature °C		0 to 50 (no freezing)		
Operating humidity		35 to 85% RH (no condensation)		
Power supply voltage V		12 to 24 DC ±10% ripple (P-P) 10% or less		
Degree of protection		IEC standards IP40 or equivalent		
Output points		2	1	-
Repeatability		±3%F.S. max.(at Ta=25°C)		-
Hysteresis		Fixed (2% F.S. or less)	Variable (Approx. 0 to 15% F.S.)	-
Switch output		NPN transistor open collector output 30V 80mA or less Residual voltage 0.8V or less		-
Analog output	Output voltage V	-	1 to 5	
	Zero point voltage V	-	1±0.1	
	Span voltage V	-	4±0.1	
	Output current mA	-	1 or less (load resistance 5 kΩ or more)	
	Linearity/hysteresis	-	±0.5%F.S.max.	±0.5%F.S.max.
Display kPa		0 to -99 (2-digit red LED display)		-
Display frequency		Approx. 4 times/second		-
Display accuracy		±3%F.S. ±2digit		-
Resolution		1digit		-
Operation display		SW1: Red LED lights at set pressure and over SW2: Green LED lights at set pressure and over	Red LED lights at set pressure and over	-
Function		1. MODE change-over switch (ME or S1 or S2) 2. S1 set trimmer (2/3 rotation trimmer) 3. S2 set trimmer (2/3 rotation trimmer)	1. MODE change-over switch (ME or SW) 2. SW set trimmer (2/3 rotation trimmer) 3. HYS set trimmer (Approx. 0 to 15% F.S.)	- - -

Vacuum break function specifications

● 2-way valve specifications VSXP-D

Valve	Burst air flow rate ℓ/min (ANR)
Normally closed	0 to 11.0

*1 : Value at supply pressure of 0.5 MPa.
*2 : The burst air flow rate will vary with the diameter and length (piping resistance, etc.) of the vacuum side pipe.

● 3-way valve specifications VSXP-T

Valve	Burst air flow rate ℓ/min (ANR)
Normally closed	0 to 7.5

*1 : Value at supply pressure of 0.5 MPa.
*2 : The burst air flow rate will vary with the diameter and length (piping resistance, etc.) of the vacuum side pipe.

Vacuum filter specifications

Descriptions	Vacuum filter
Element material	PVF (Polyvinyl formal)
Filtration rating μm	10
Filtration area mm^2	502
Replacement filter element model No.	VSX-E

Weight table

● Single unit

Model No.	Unit contents	Weight (g)
VSXP-D□□□-□-D□	Vacuum switching unit 2-way valve specification (vacuum pressure switch with digital display)	85
VSXP-D□□□-□-A0	Vacuum switching unit 2-way valve specification (vacuum pressure switch with analog output)	82
VSXP-D□□□-□	Vacuum switching unit 2-way valve specification (without vacuum pressure switch)	75
VSXP-T□□□-□-D□	Vacuum switching unit 3-way valve specification (vacuum pressure switch with digital display)	88
VSXP-T□□□-□-A0	Vacuum switching unit 3-way valve specification (vacuum pressure switch with analog output)	85
VSXP-T□□□-□	Vacuum switching unit 3-way valve specification (without vacuum pressure switch)	78

*1 : DIN rail mount is heavier than the above weight by approx. 5 g.

● Manifold

Model No.	Manifold mounting unit content	Weight (g)
VSXPM-D□□□-□□-D□-2	Vacuum switching unit 2-way valve specification Vacuum sensor with digital display 2-station manifold	340

*1 : 95g heavier with each station increase.

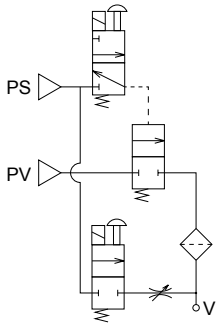
VSXPM-T□□□-□□-D□-2	Vacuum switching unit 3-way valve specification Vacuum sensor with digital display 2-station manifold	350

*1 : 100g heavier with each station increase.

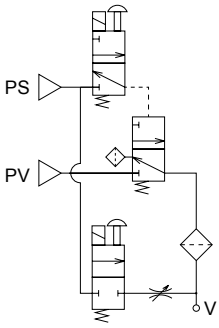
*2 : The above weight is for the type equipped with vacuum pressure switch and LED display. Vacuum pressure switch with analog output built in (vacuum pressure switch without display) is lighter than the above weight by 3 g/station, while the type without vacuum pressure switch is lighter than the above weight by 10 g/station.

Circuit diagram

● Normally closed 2-way valve specification



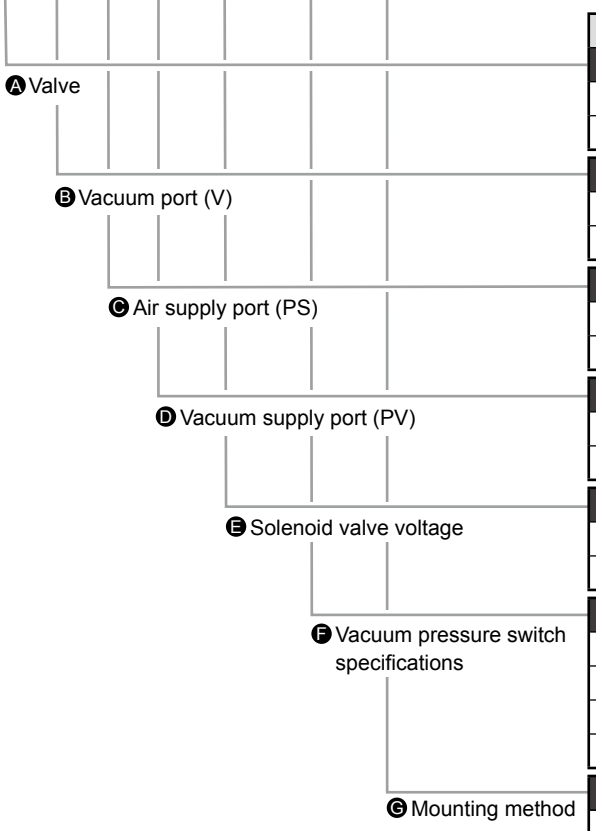
● Normally closed 3-way valve specification



How to order (single unit)

● 10.5 mm width integrated vacuum switching unit single unit

VSXP - D 6 6 6 - 4 - DW - D



Code	Content
Ⓐ Valve	
D	2-way valve specifications
T	3-way valve specifications
Ⓑ Vacuum port (V)	
4	ø4 push-in fitting
6	ø6 push-in fitting
Ⓒ Air supply port (PS)	
4	ø4 push-in fitting
6	ø6 push-in fitting
Ⓓ Vacuum supply port (PV)	
4	ø4 push-in fitting
6	ø6 push-in fitting
Ⓔ Solenoid valve voltage	
1	100 VAC
3	24 VDC
Ⓕ Vacuum pressure switch specifications	
Blank	Without vacuum pressure switch
DW	With digital display, NPN output 2 points
DA	With digital display, NPN output 1 point + analog output
AO	Analog output
Ⓖ Mounting method	
D	DIN rail mount
Blank	Direct mount

How to order (manifold)

● 10.5 mm width integrated vacuum switching unit manifold

VSXPM - T 6 10 10 - 3 - 10 - DW

● 10.5 mm width integrated vacuum switching unit manifold single unit

VSXPM - T 6 —— 3 —— DW

● 10.5 mm width integrated vacuum switching unit manifold only

VSXPM —— 10 10 —— 10

Code	Content	Type: Manifold	Type: Single unit for manifold	Type: Manifold only
Ⓐ Valve *1				
D	2-way valve specifications	●	●	
T	3-way valve specifications	●	●	
Z	For mixed specs (indicate the breakdown on the specs sheet)	●		
Ⓑ Vacuum port (V) *1				
4	ø4 push-in fitting	●	●	
6	ø6 push-in fitting	●	●	
CX	For mixed fittings (indicate the breakdown on the specs sheet)	●		
Ⓒ Air supply port (PS)				
4	ø4 push-in fitting	●		●
6	ø6 push-in fitting	●		●
8	ø8 push-in fitting	●		●
10	ø10 push-in fitting	●		●
Ⓓ Vacuum supply port (PV)				
4	ø4 push-in fitting	●		●
6	ø6 push-in fitting	●		●
8	ø8 push-in fitting	●		●
10	ø10 push-in fitting	●		●
Ⓔ Solenoid valve voltage				
1	100 VAC	●	●	
3	24 VDC	●	●	
Ⓕ Manifold station No.				
2	2 stations	●		●
to	to			
10	10 stations			
Ⓖ Vacuum pressure switch specifications *1				
Blank	Without vacuum pressure switch	●	●	
DW	With digital display, NPN output 2 points	●	●	
DA	With digital display, NPN output 1 point + analog output	●	●	
AO	Analog output	●	●	
Z	For mixed specs (indicate the breakdown on the specs sheet)	●		

Ⓐ Valve

Ⓑ Vacuum port (V)

Ⓒ Air supply port (PS)

Ⓓ Vacuum supply port (PV)

Ⓔ Solenoid valve voltage

Ⓕ Manifold station No.

Ⓖ Vacuum pressure switch specifications

⚠ Precautions for model No. selection

*1 : Indicate on the “mix manifold specifications sheet” in the case of mixed specifications. Refer to pages 258 and 259 for details.

● Maintenance part model No.

· Filter element

VSX-E

· Filter element for valve

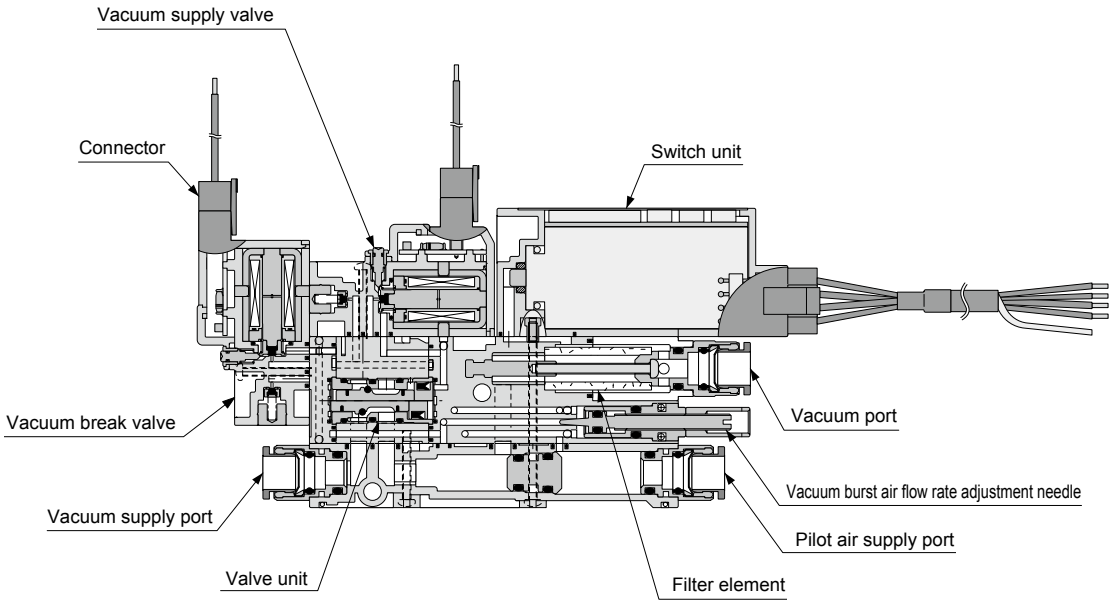
VSXP-E

Internal structure (single unit)

● 2-way valve specifications VSXP-D

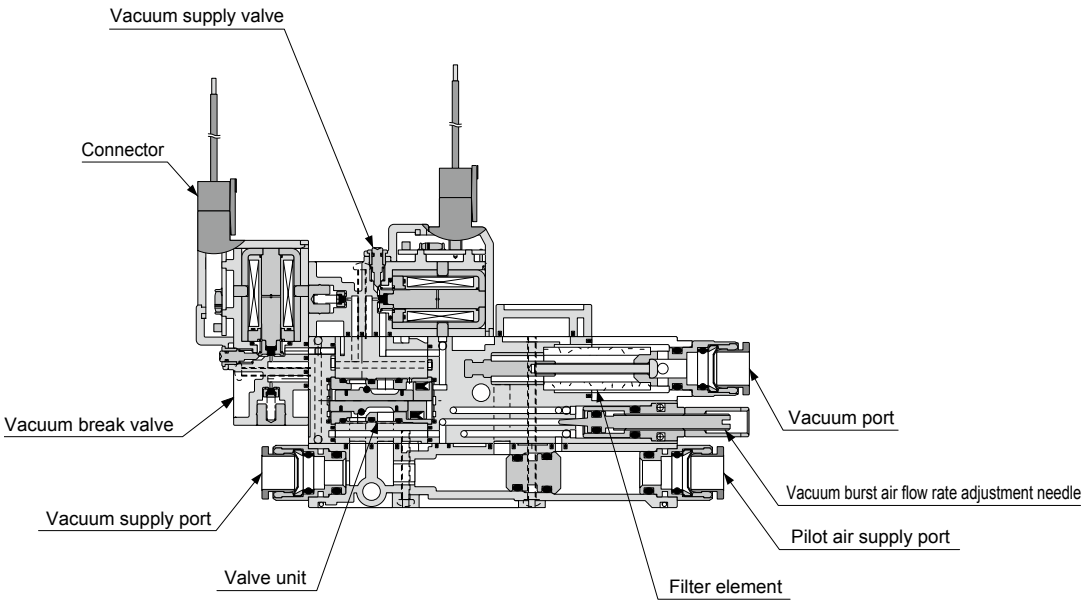
Example) VSXP-D□□□-□-□

With vacuum pressure switch



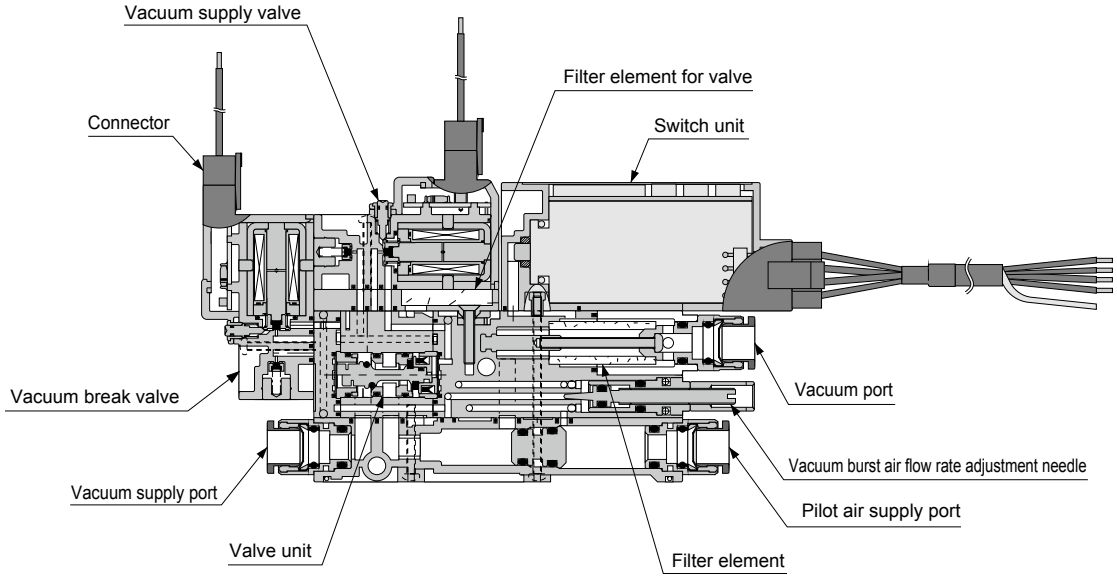
Example) VSXP-D□□□-□

Without vacuum pressure switch

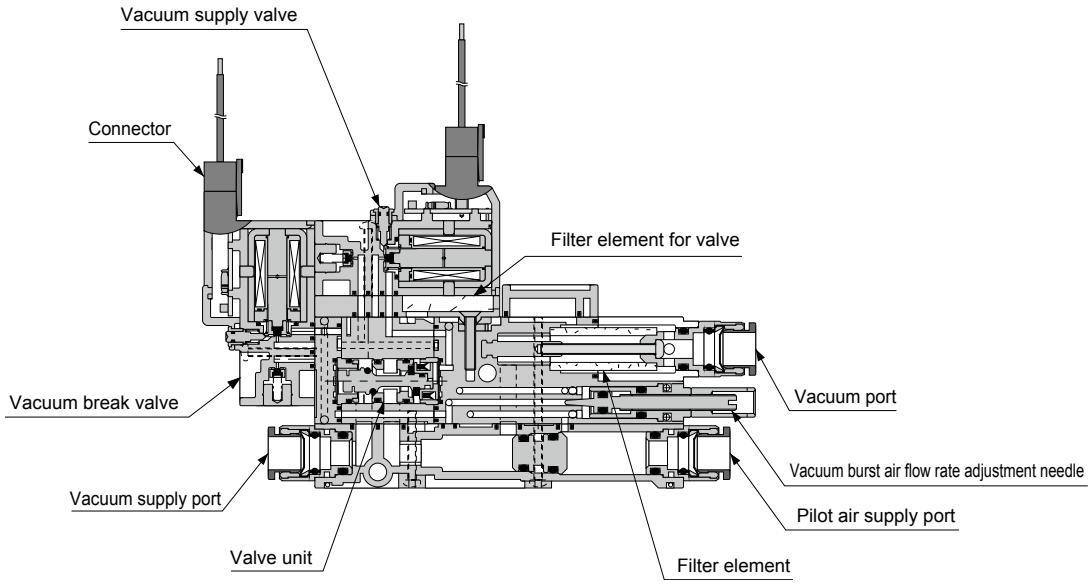


Internal structure (single unit)

● 3-way valve specifications VSXP-T
Example) VSXP-T□□□-□-□
With vacuum pressure switch



Example) VSXP-T□□□-□
Without vacuum pressure switch

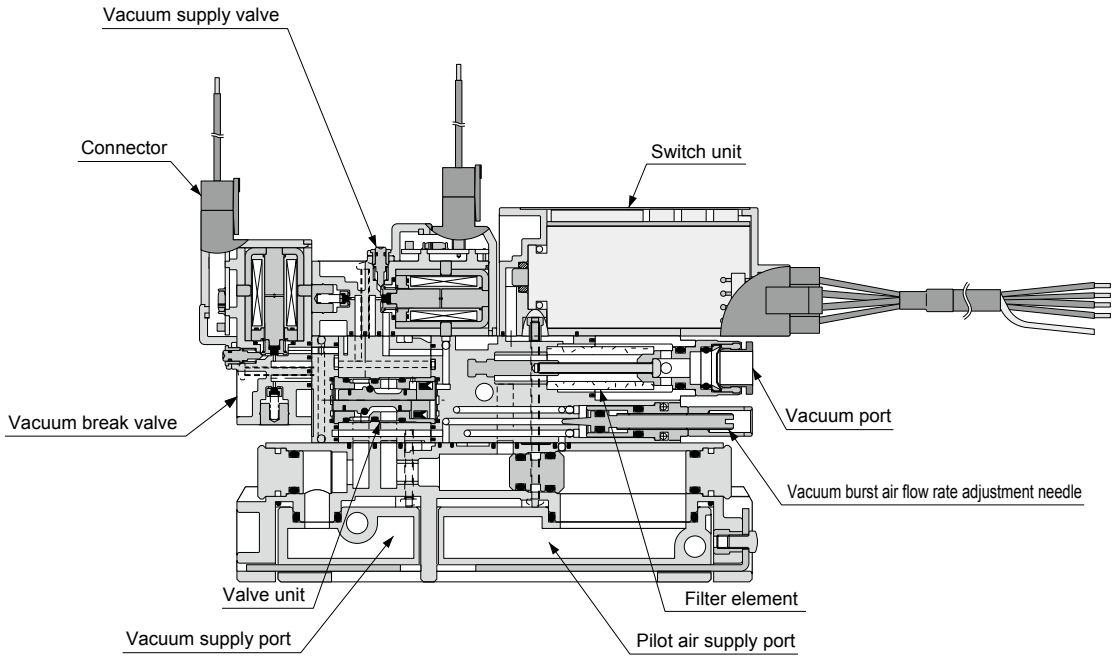


Internal structure (manifold)

● 2-way valve specifications VSXPM-D

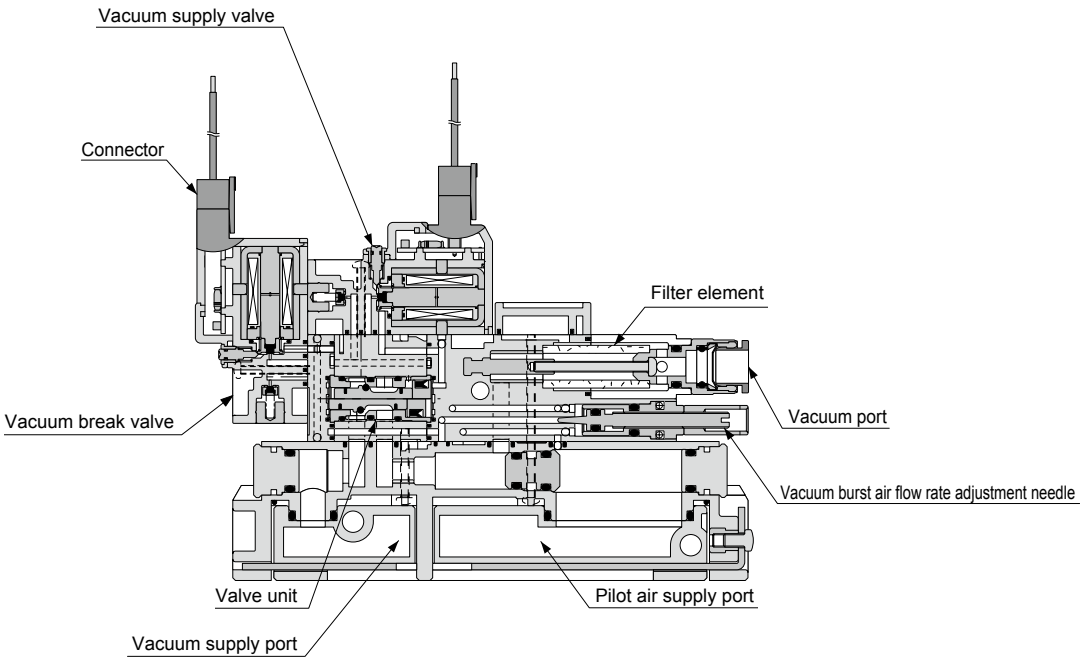
Example) VSXPM-D□□□-□-□-□

With vacuum pressure switch



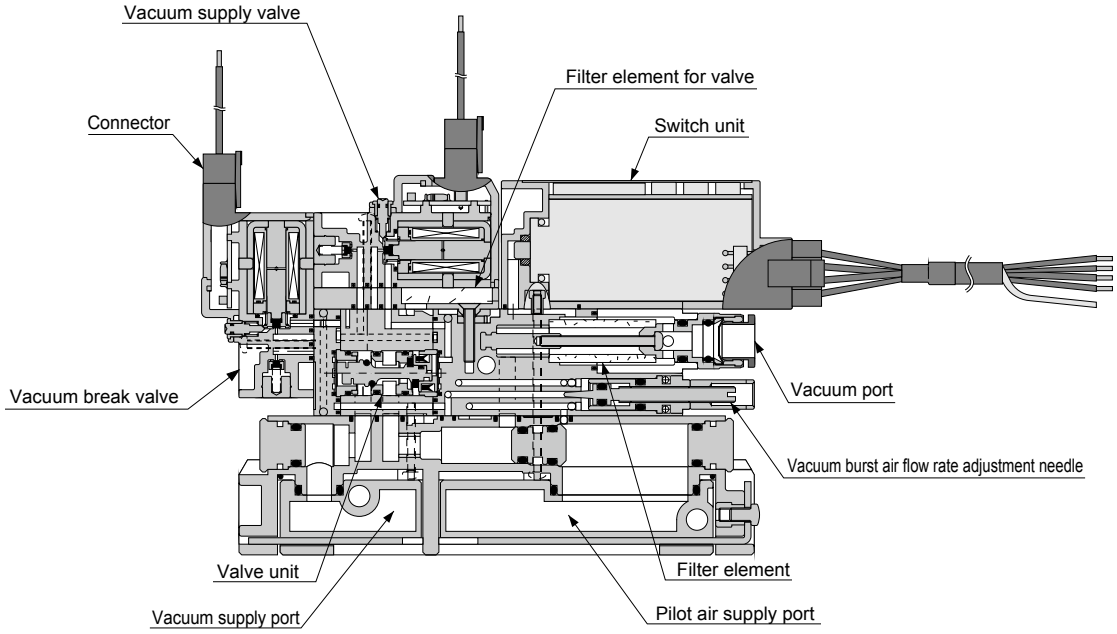
Example) VSXPM-D□□□-□-□

Without vacuum pressure switch

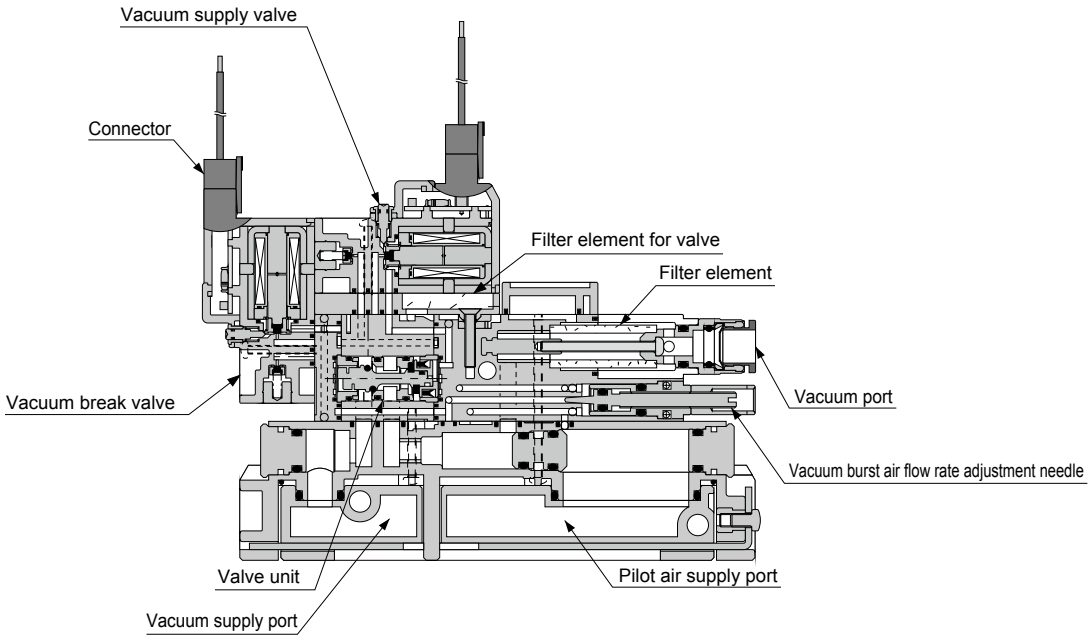


Internal structure (manifold)

● 3-way valve specifications VSXPM-T
Example) VSXPM-T□□□-□-□-□
With vacuum pressure switch

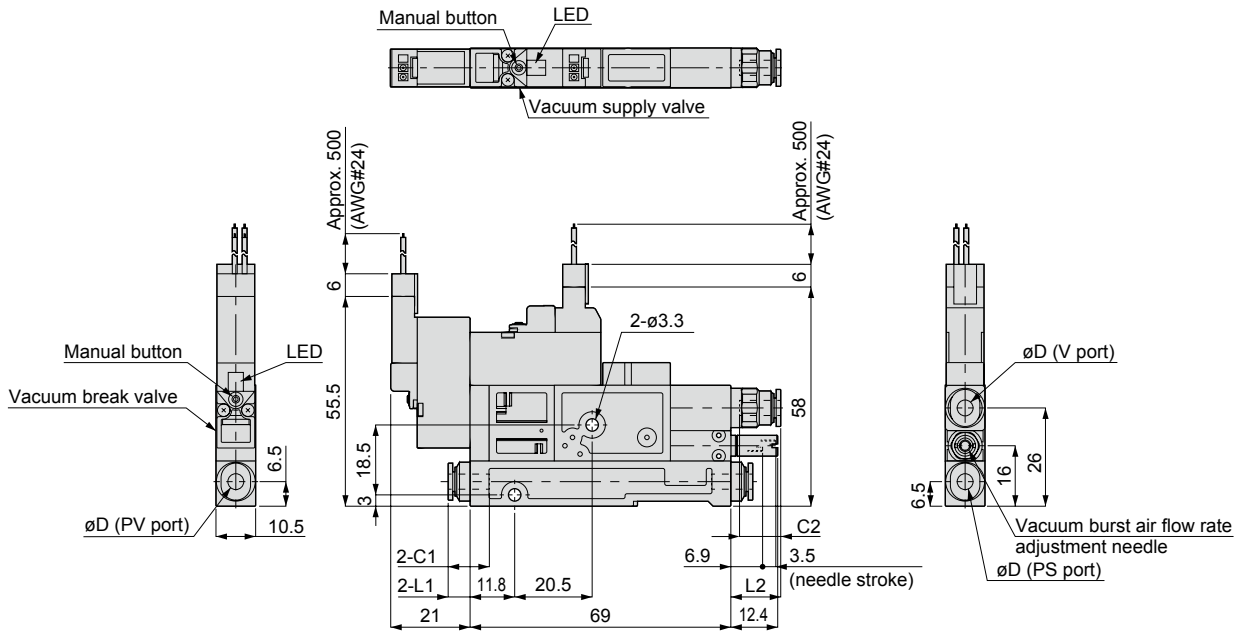


Example) VSXPM-T□□□-□-□
Without vacuum pressure switch



Dimensions (single unit, 2-way valve specifications, without vacuum pressure switch)

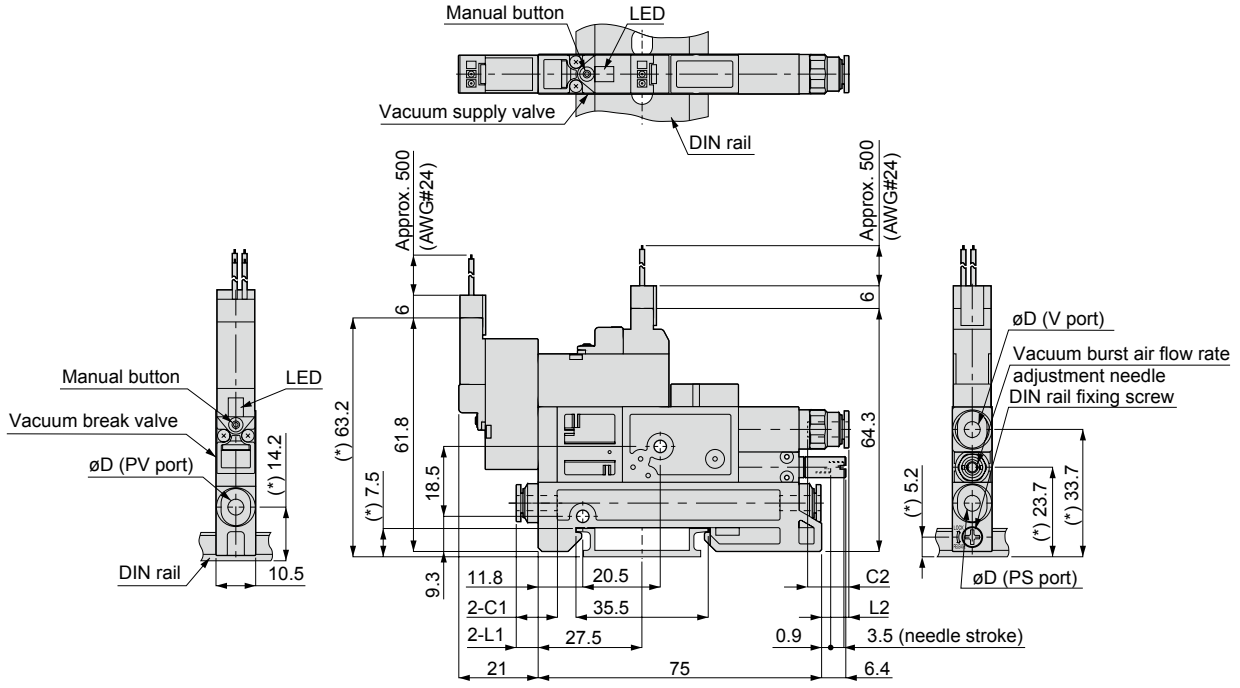
● Direct mounting



Unit: mm

Model No.	Tube O.D. (øD)	C1	C2	L1	L2
VSXP-D□□□-□	4	11.2	11.2	6.1	13.5
	6	11.9	11.9	8.9	13.7

● DIN rail mounting



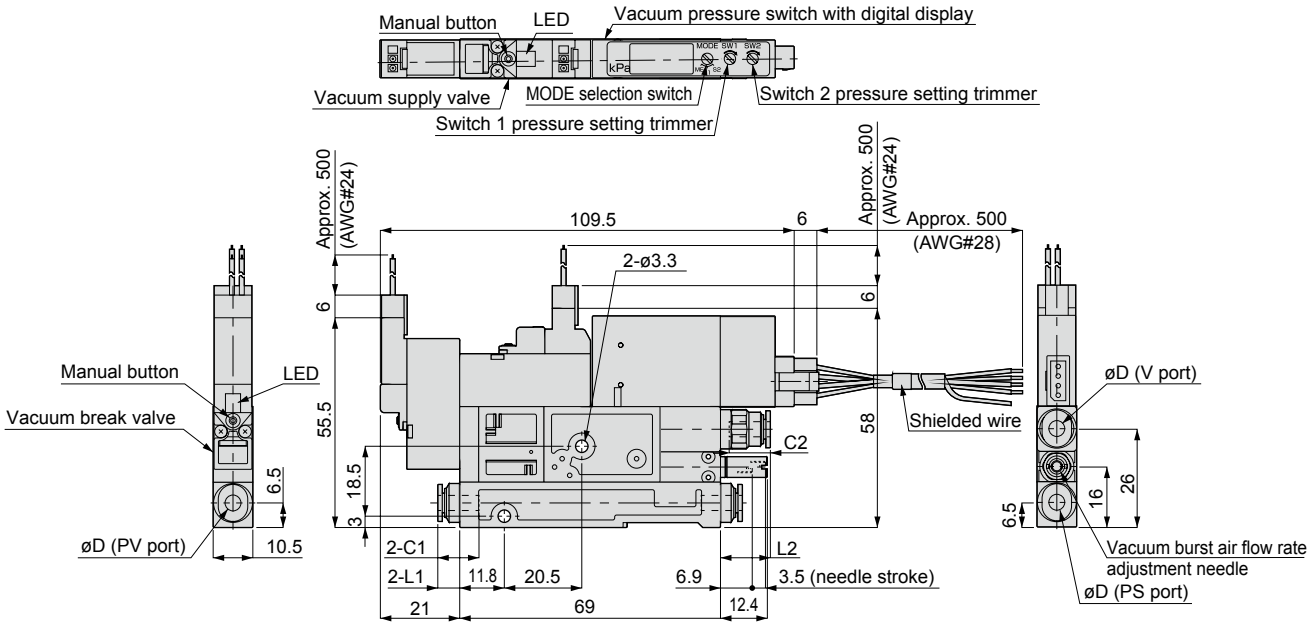
Note) Dimensions of the part with (*) mark are the values when DIN rail height is 7.5 mm.

Unit: mm

Model No.	Tube O.D. (øD)	C1	C2	L1	L2
VSXP-D□□□-□-D	4	11.2	11.2	6.1	7.5
	6	11.9	11.9	8.9	7.7

Dimensions (single unit, 2-way valve specifications, with vacuum pressure switch and 2-point switch output with digital display)

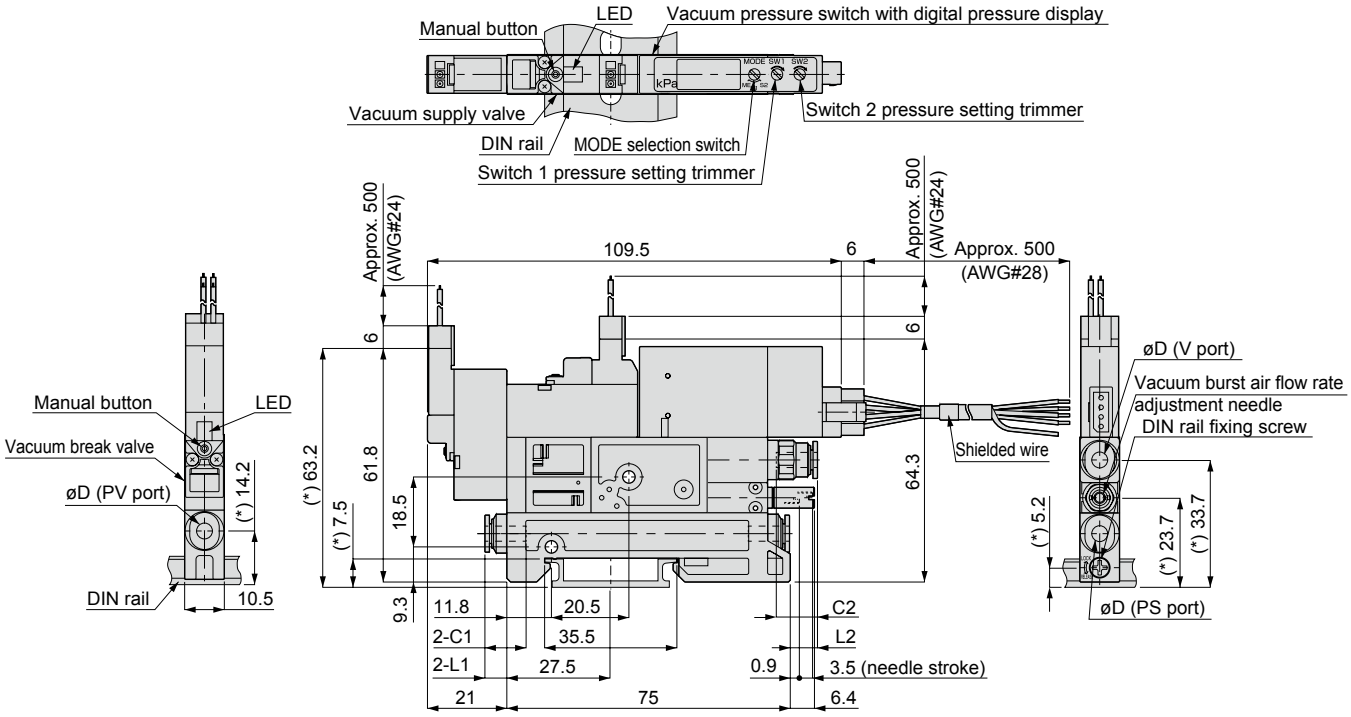
● Direct mounting



Unit: mm

Model No.	Tube O.D. (øD)	C1	C2	L1	L2
VSXP-D□□□-□-DW	4	11.2	11.2	6.1	13.5
	6	11.9	11.9	8.9	13.7

● DIN rail mounting



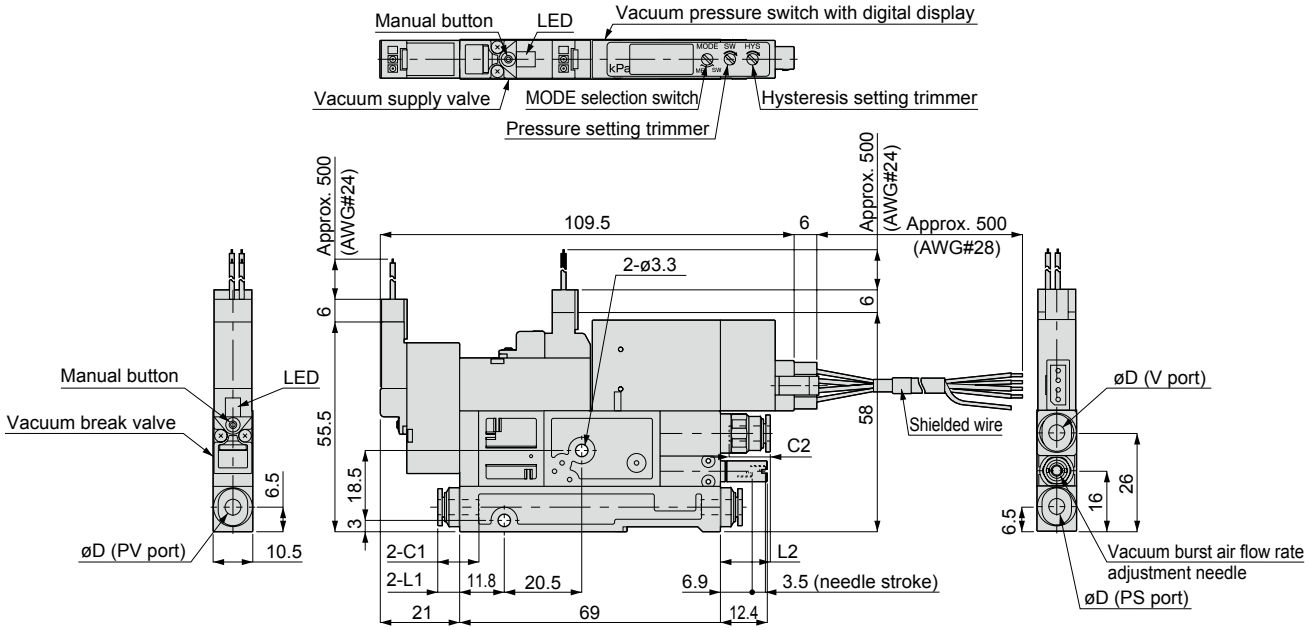
Note) Dimensions of the part with (*) mark are the values when DIN rail height is 7.5 mm.

Unit: mm

Model No.	Tube O.D. (øD)	C1	C2	L1	L2
VSXP-D□□□-□-DW-D	4	11.2	11.2	6.1	7.5
	6	11.9	11.9	8.9	7.7

Dimensions (single unit, 2-way valve specifications, analog output with digital display, and vacuum pressure switch with switch output)

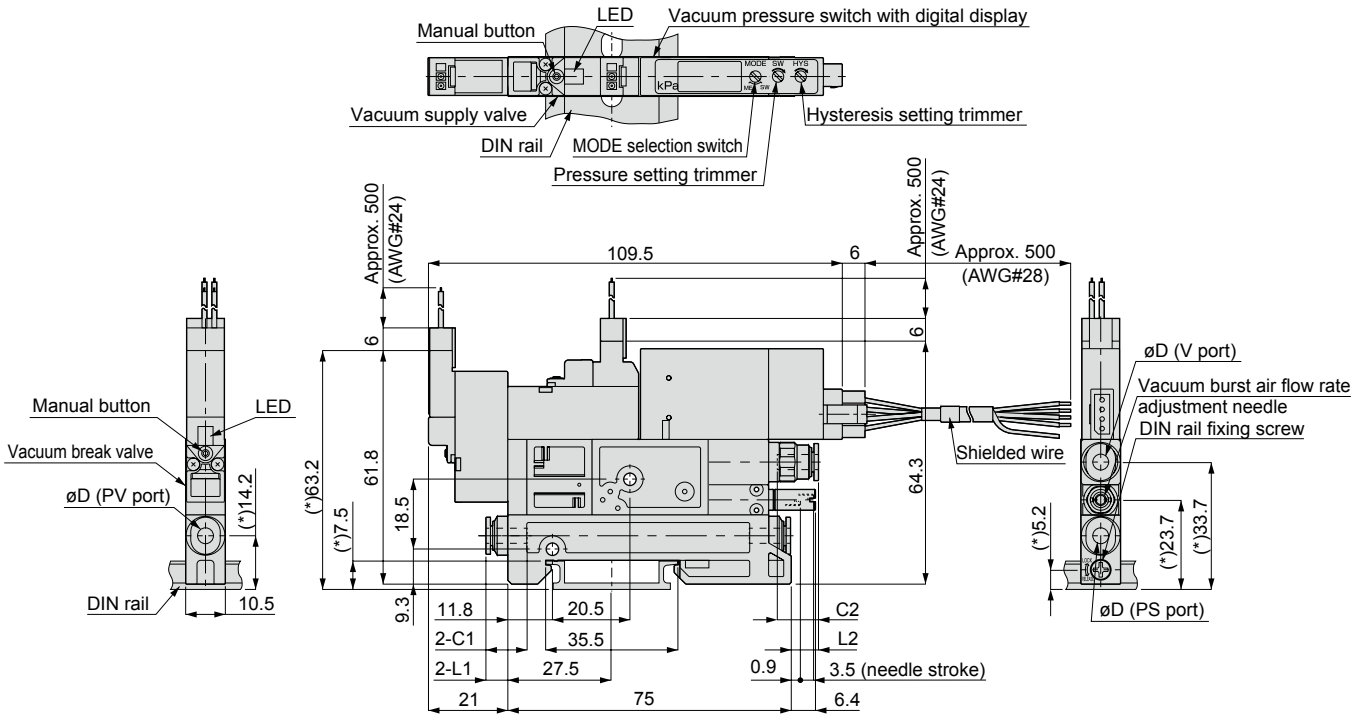
● Direct mounting



Unit: mm

Model No.	Tube O.D. (øD)	C1	C2	L1	L2
VSXP-D□□□-□-DA	4	11.2	11.2	6.1	13.5
	6	11.9	11.9	8.9	13.7

● DIN rail mounting



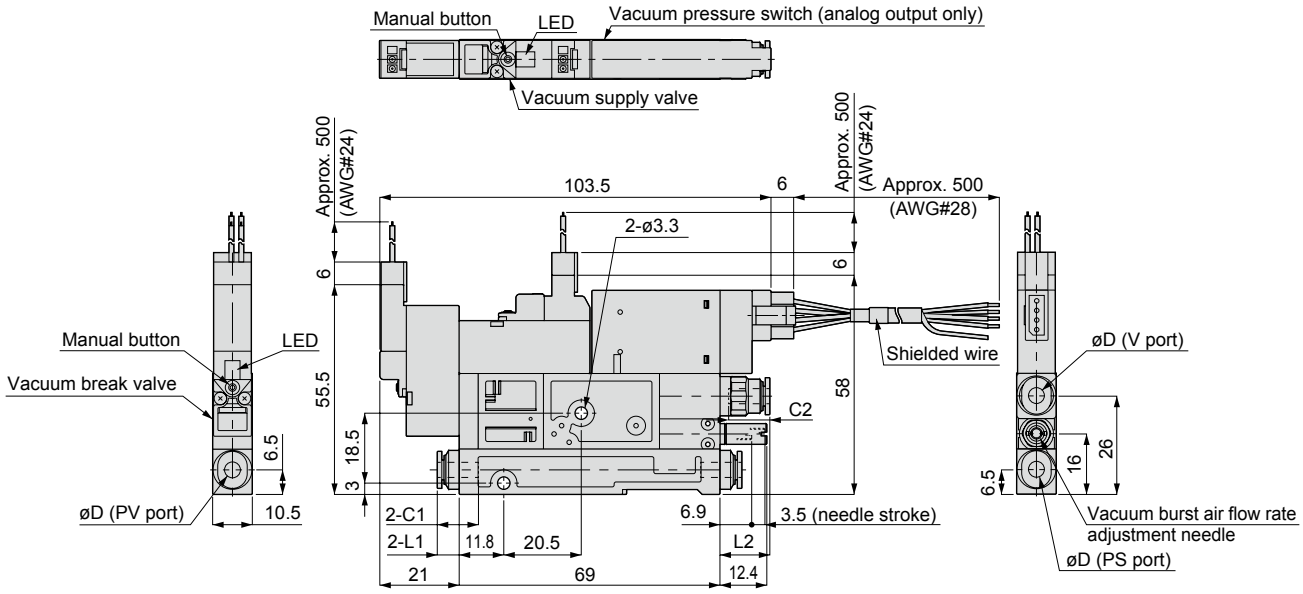
Note) Dimensions of the part with (*) mark are the values when DIN rail height is 7.5 mm.

Unit: mm

Model No.	Tube O.D. (øD)	C1	C2	L1	L2
VSXP-D□□□-□-DA-D	4	11.2	11.2	6.1	7.5
	6	11.9	11.9	8.9	7.7

Dimensions (single unit, 2-way valve specifications, with vacuum pressure switch and analog output)

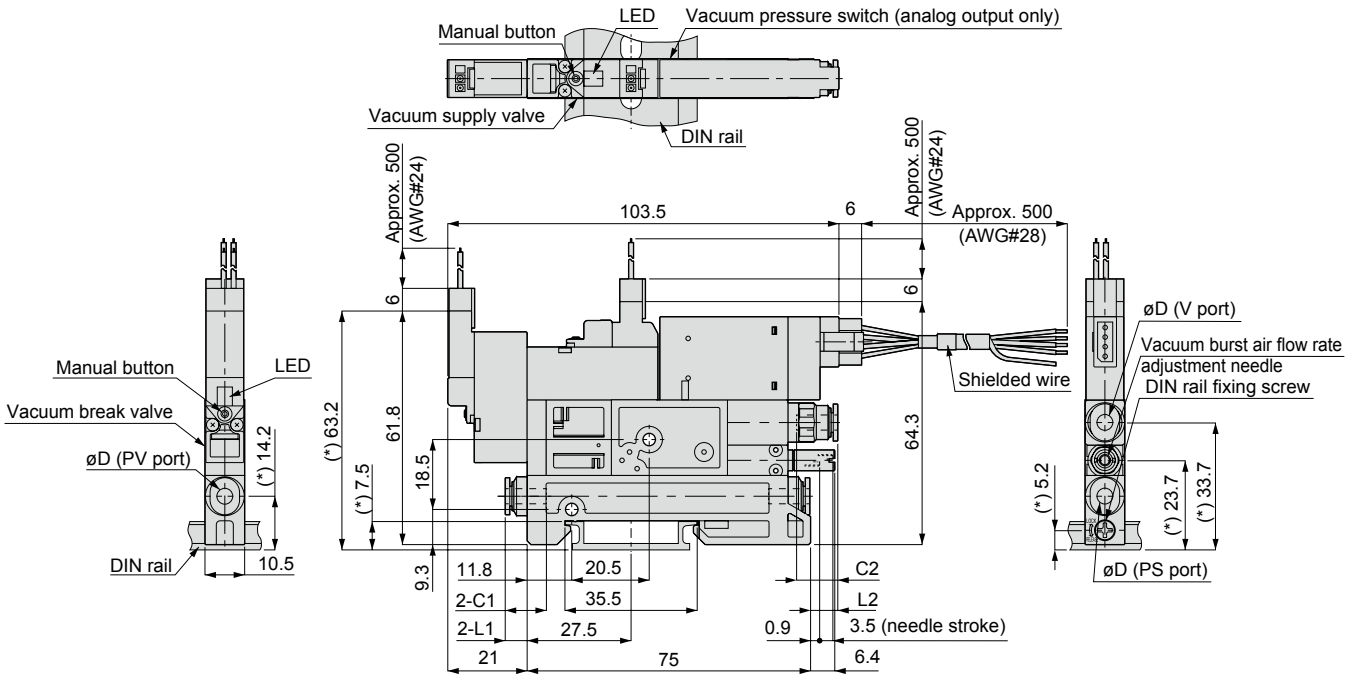
● Direct mounting



Unit: mm

Model No.	Tube O.D. (øD)	C1	C2	L1	L2
VSXP-D□□□-□-A0	4	11.2	11.2	6.1	13.5
	6	11.9	11.9	8.9	13.7

● DIN rail mounting



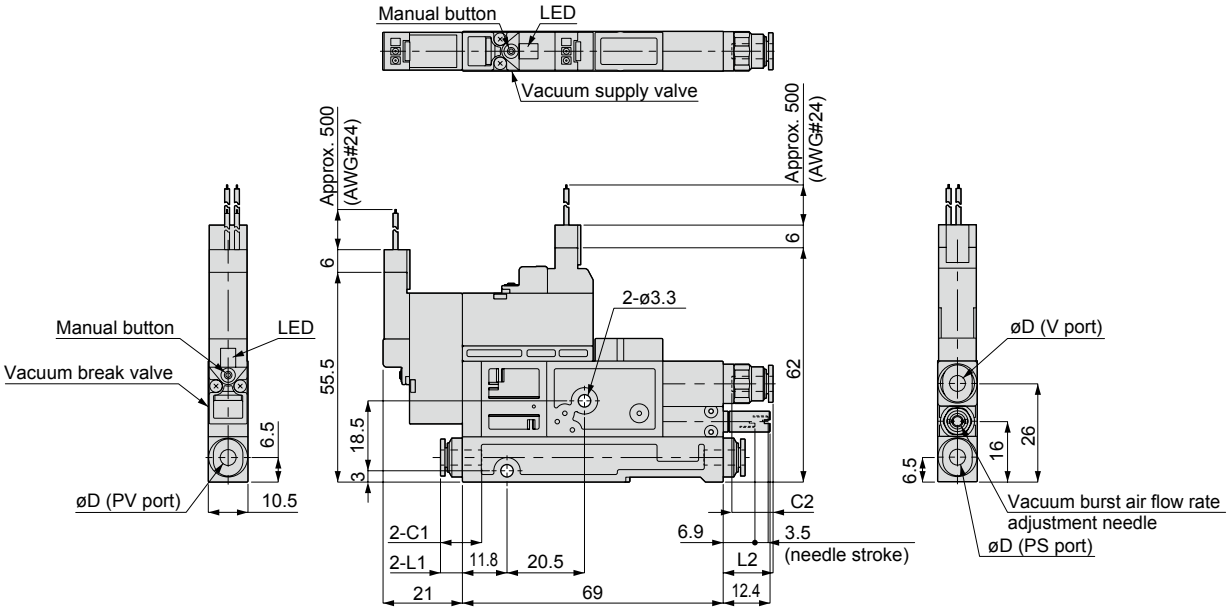
Note) Dimensions of the part with (*) mark are the values when DIN rail height is 7.5 mm.

Unit: mm

Model No.	Tube O.D. (øD)	C1	C2	L1	L2
VSXP-D□□□-□-A0-D	4	11.2	11.2	6.1	7.5
	6	11.9	11.9	8.9	7.7

Dimensions (single unit, 3-way valve specifications, without vacuum pressure switch)

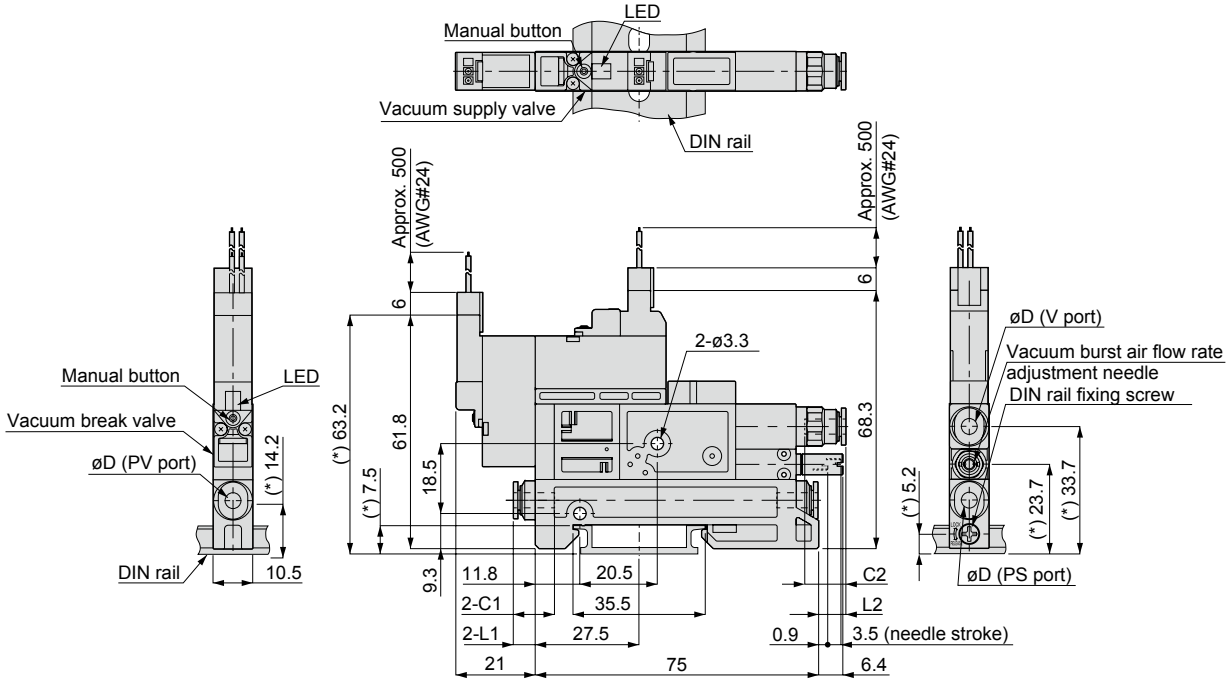
● Direct mounting



Unit: mm

Model No.	Tube O.D. (øD)	C1	C2	L1	L2
VSXP-T□□□-□	4	11.2	11.2	6.1	13.5
	6	11.9	11.9	8.9	13.7

● DIN rail mounting



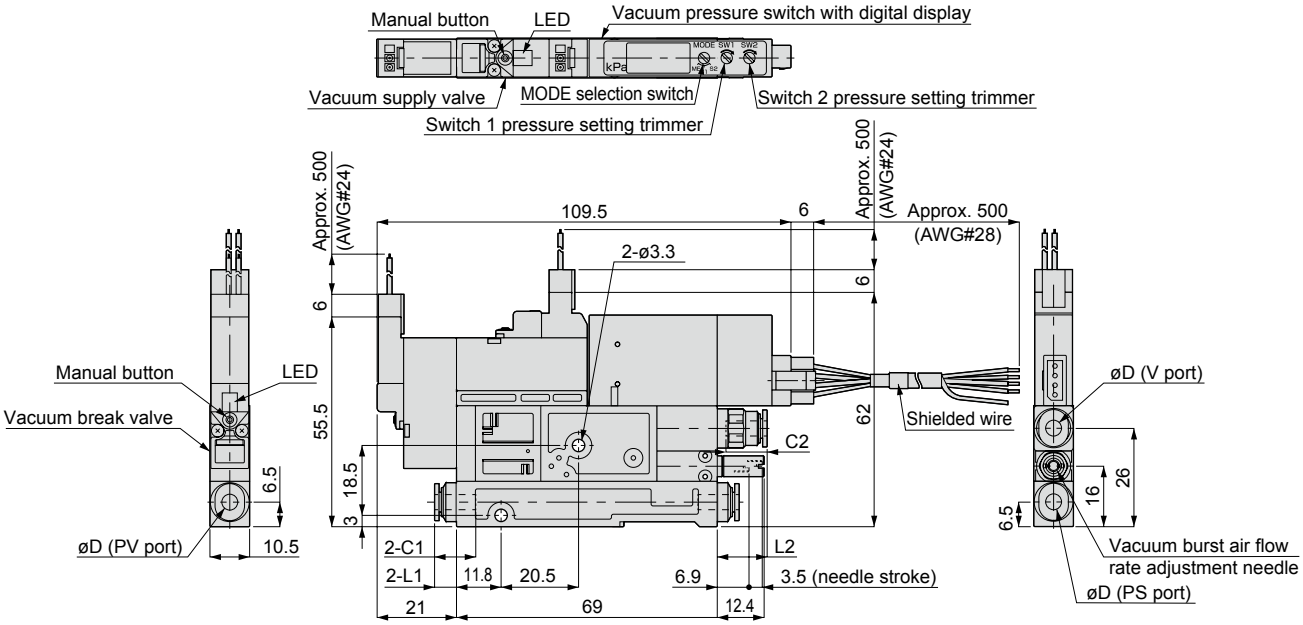
Note) Dimensions of the part with (*) mark are the values when DIN rail height is 7.5 mm.

Unit: mm

Model No.	Tube O.D. (øD)	C1	C2	L1	L2
VSXP-T□□□-□-D	4	11.2	11.2	6.1	7.5
	6	11.9	11.9	8.9	7.7

Dimensions (single unit, 3-way valve specifications, with vacuum pressure switch and 2-point switch output with digital display)

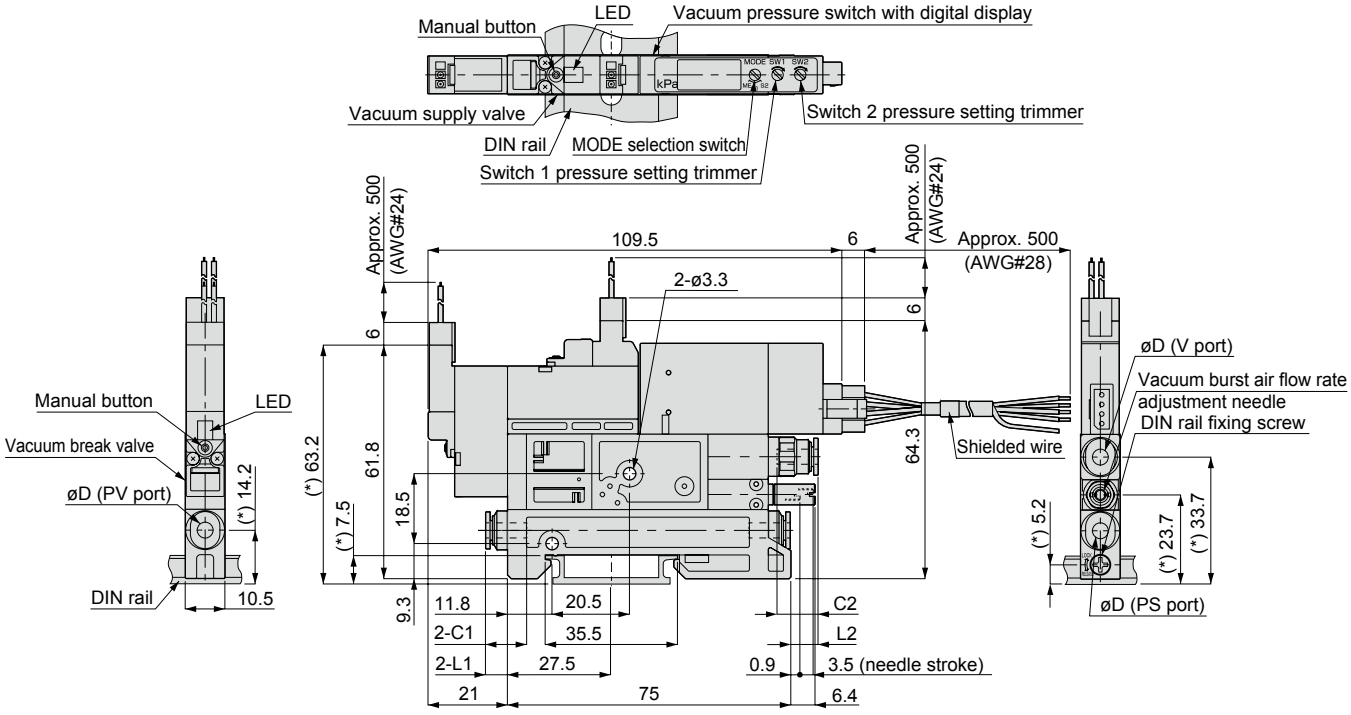
● Direct mounting



Unit: mm

Model No.	Tube O.D. (øD)	C1	C2	L1	L2
VSXP-T□□□-□-DW	4	11.2	11.2	6.1	13.5
	6	11.9	11.9	8.9	13.7

● DIN rail mounting



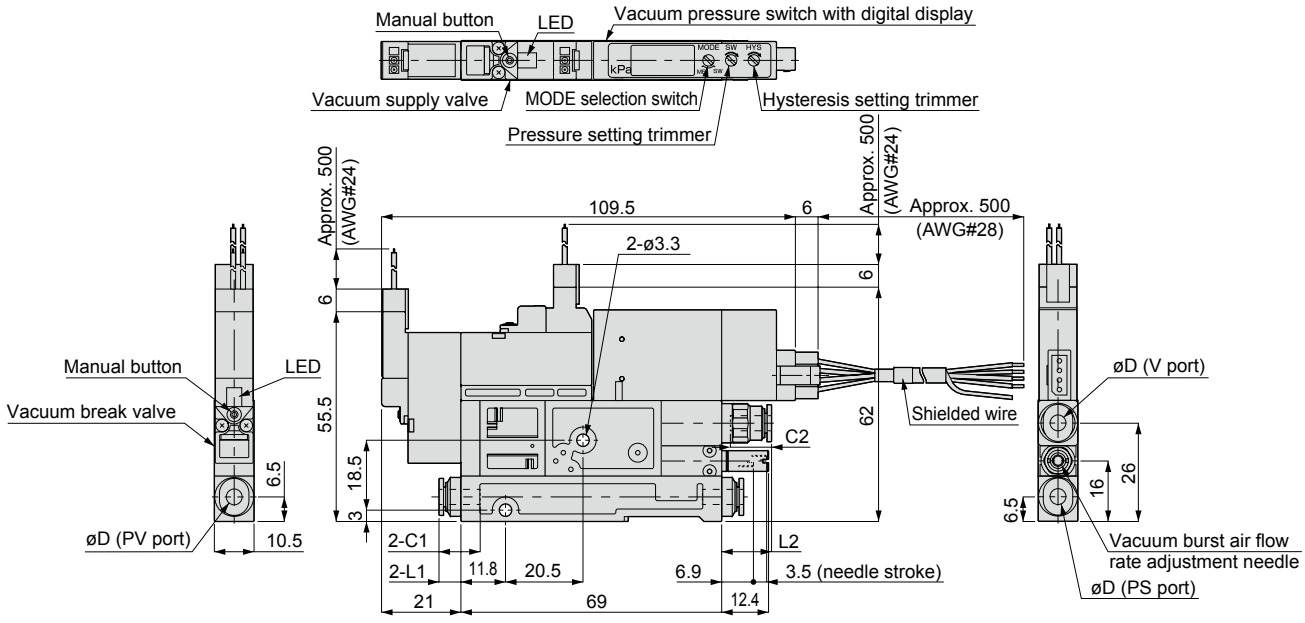
Note) Dimensions of the part with (*) mark are the values when DIN rail height is 7.5 mm.

Unit: mm

Model No.	Tube O.D. (øD)	C1	C2	L1	L2
VSXP-T□□□-□-DW-D	4	11.2	11.2	6.1	7.5
	6	11.9	11.9	8.9	7.7

Dimensions (single unit, 3-way valve specifications, analog output with digital display, and vacuum pressure switch with switch output)

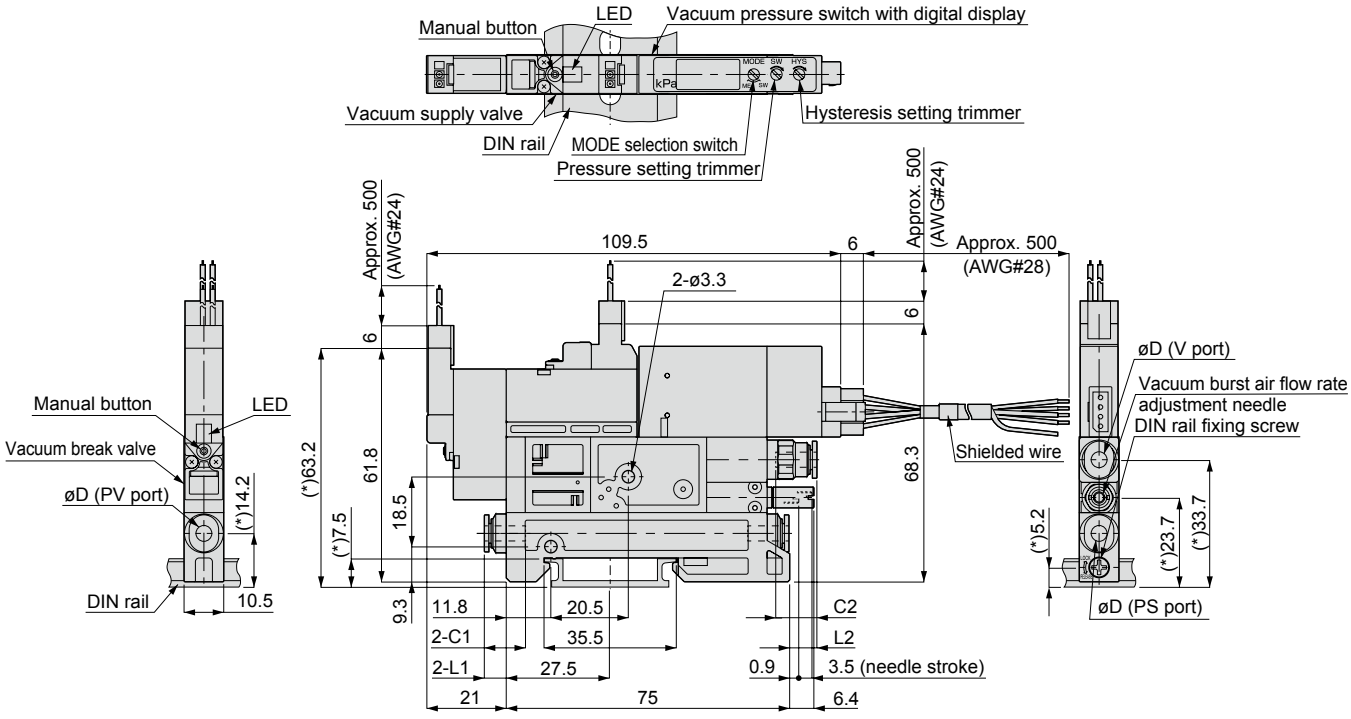
● Direct mounting



Unit: mm

Model No.	Tube O.D. (øD)	C1	C2	L1	L2
VSXP-T□□□-□-DA	4	11.2	11.2	6.1	13.5
	6	11.9	11.9	8.9	13.7

● DIN rail mounting



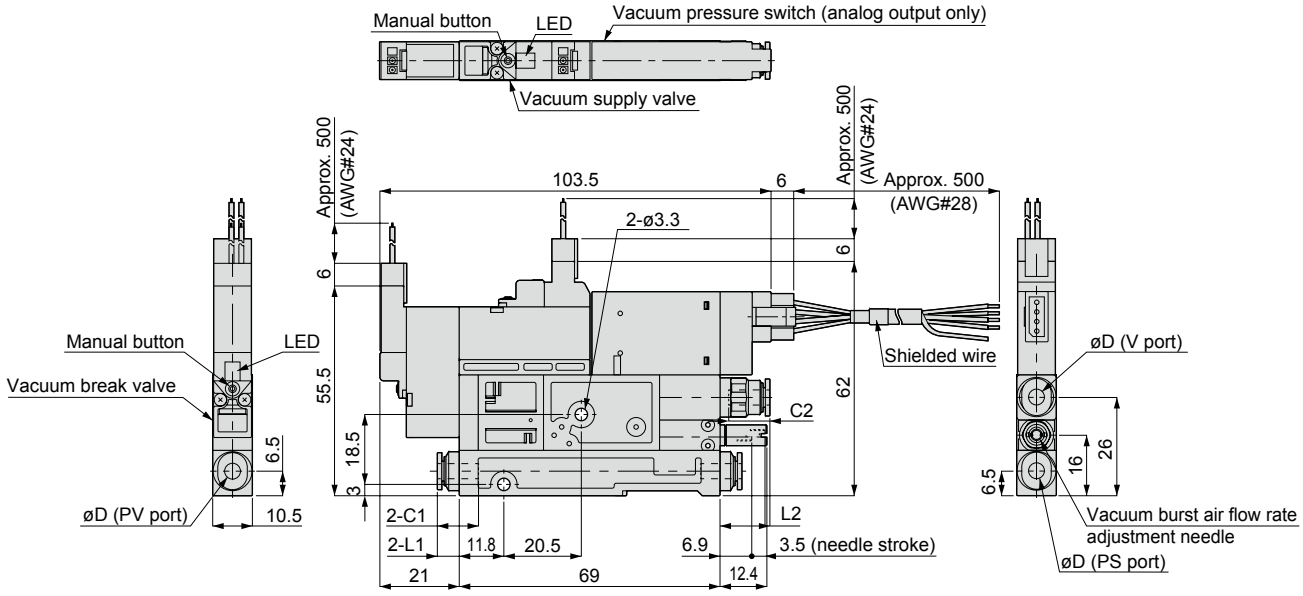
Note) Dimensions of the part with (*) mark are the values when DIN rail height is 7.5 mm.

Unit: mm

Model No.	Tube O.D. (øD)	C1	C2	L1	L2
VSXP-T□□□-□-DA-D	4	11.2	11.2	6.1	7.5
	6	11.9	11.9	8.9	7.7

Dimensions (single unit, 3-way valve specifications, and vacuum pressure switch with analog output)

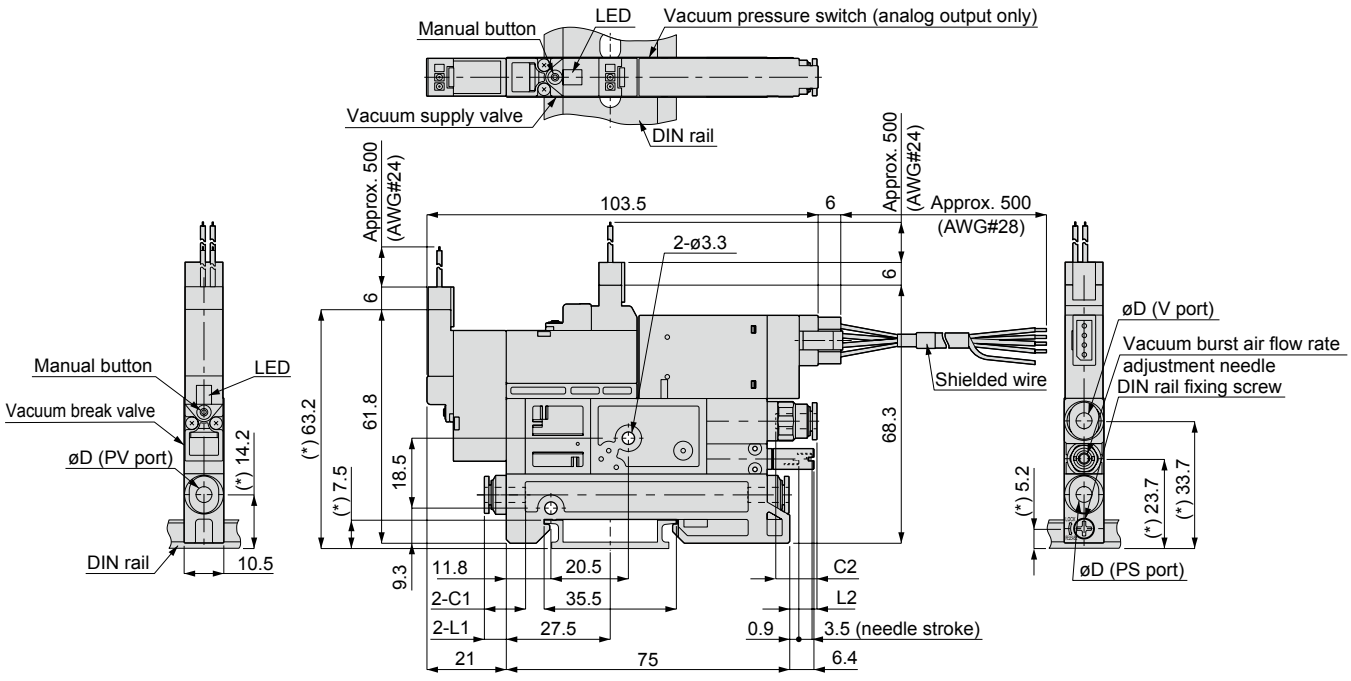
● Direct mounting



Unit: mm

Model No.	Tube O.D. (øD)	C1	C2	L1	L2
VSXP-T□□□-□-A0	4	11.2	11.2	6.1	13.5
	6	11.9	11.9	8.9	13.7

● DIN rail mounting



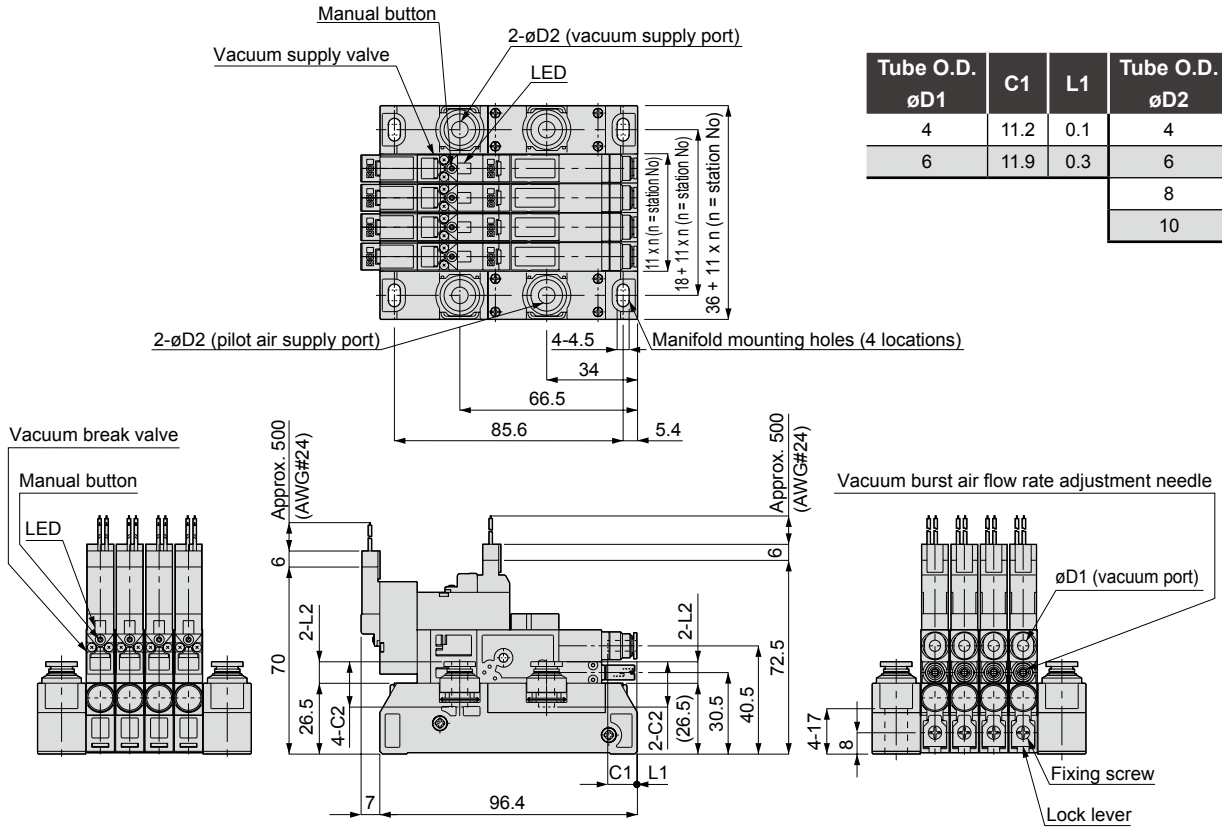
Note) Dimensions of the part with (*) mark are the values when DIN rail height is 7.5 mm.

Unit: mm

Model No.	Tube O.D. (øD)	C1	C2	L1	L2
VSXP-T□□□-□-A0-D	4	11.2	11.2	6.1	7.5
	6	11.9	11.9	8.9	7.7

Dimensions (manifold, 2-way valve specifications VSXPM-D)

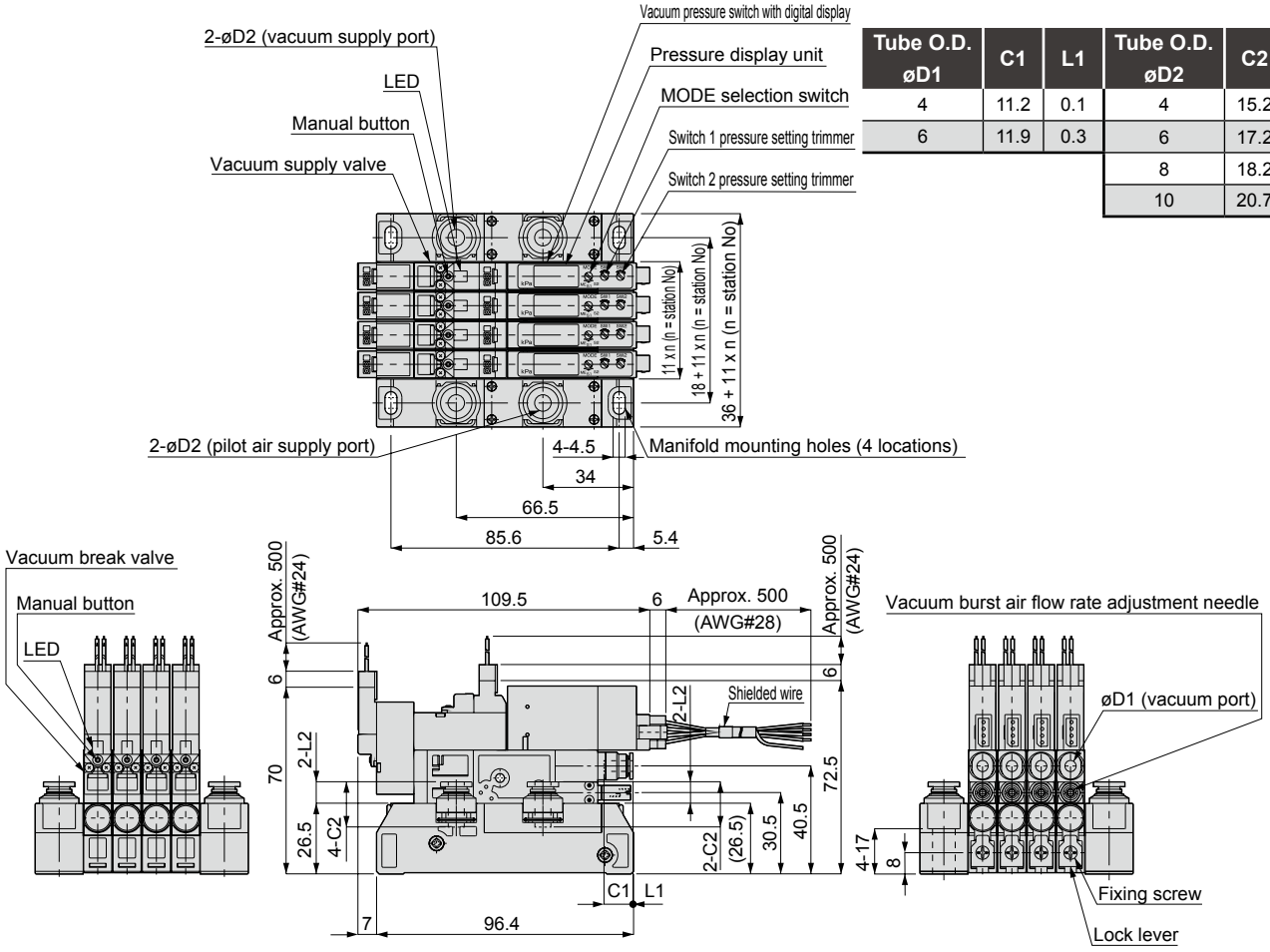
● Without vacuum pressure switch



Unit: mm

Tube O.D. øD1	C1	L1	Tube O.D. øD2	C2	L2
4	11.2	0.1	4	15.2	3.8
6	11.9	0.3	6	17.2	8.3
			8	18.2	9.6
			10	20.7	13.2

● With vacuum pressure switch and 2-point switch output with LED display



Unit: mm

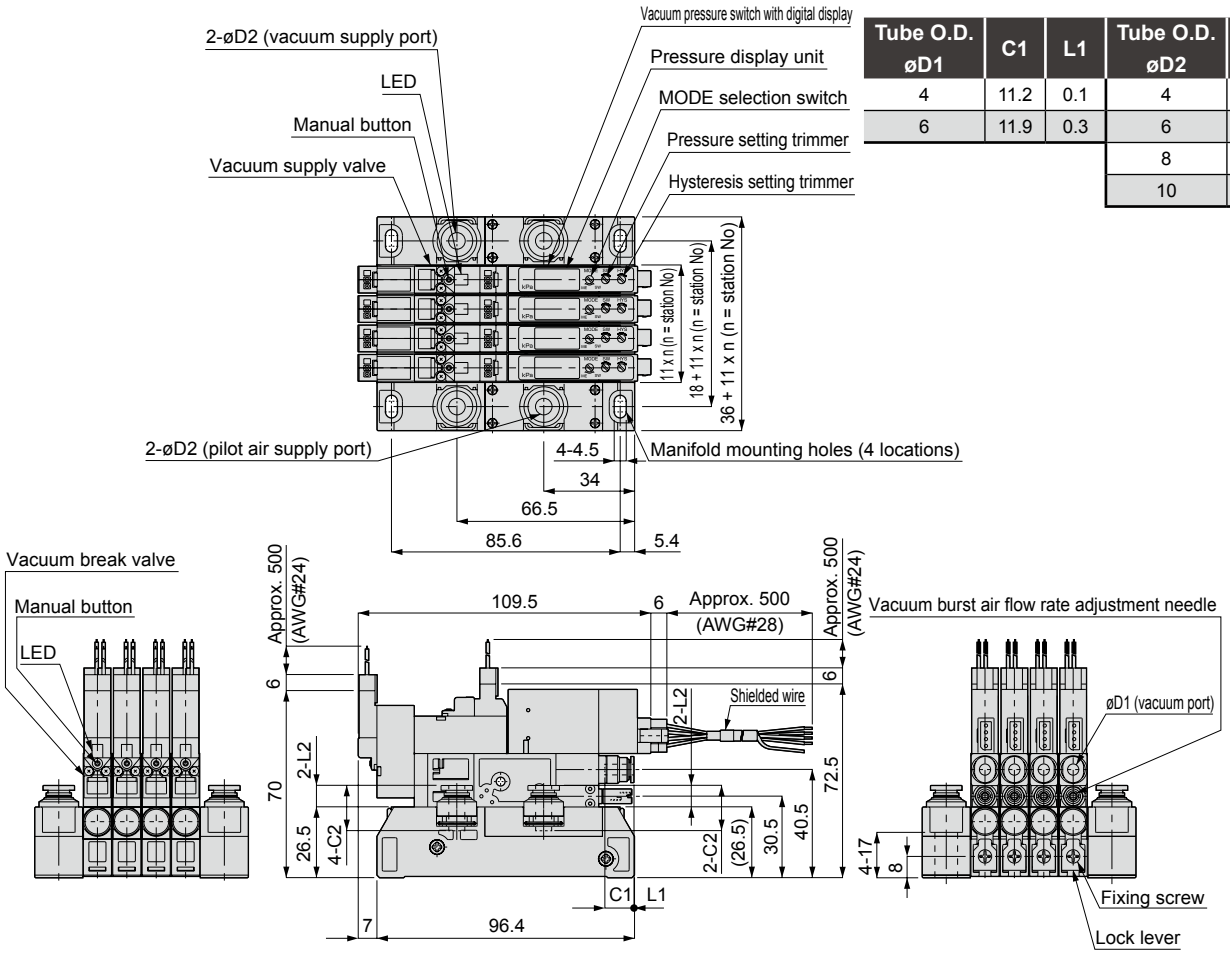
Tube O.D. øD1	C1	L1	Tube O.D. øD2	C2	L2
4	11.2	0.1	4	15.2	3.8
6	11.9	0.3	6	17.2	8.3
			8	18.2	9.6
			10	20.7	13.2

Dimensions (manifold, 2-way valve specifications, VSXPM-D)

● Analog output with LED display, and vacuum pressure switch with switch output

Unit: mm

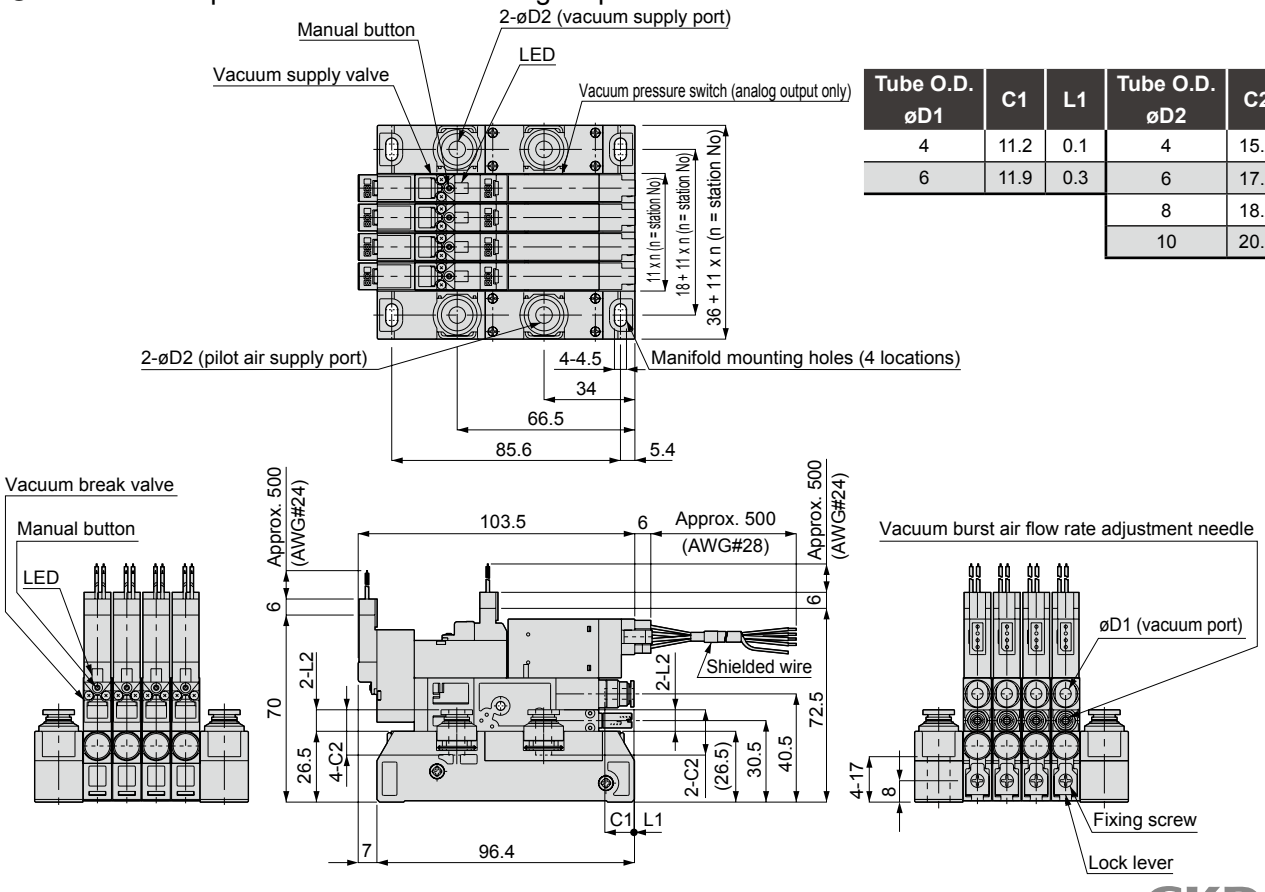
Tube O.D. øD1	C1	L1	Tube O.D. øD2	C2	L2
4	11.2	0.1	4	15.2	3.8
6	11.9	0.3	6	17.2	8.3
			8	18.2	9.6
			10	20.7	13.2



● With vacuum pressure switch and analog output

Unit: mm

Tube O.D. øD1	C1	L1	Tube O.D. øD2	C2	L2
4	11.2	0.1	4	15.2	3.8
6	11.9	0.3	6	17.2	8.3
			8	18.2	9.6
			10	20.7	13.2

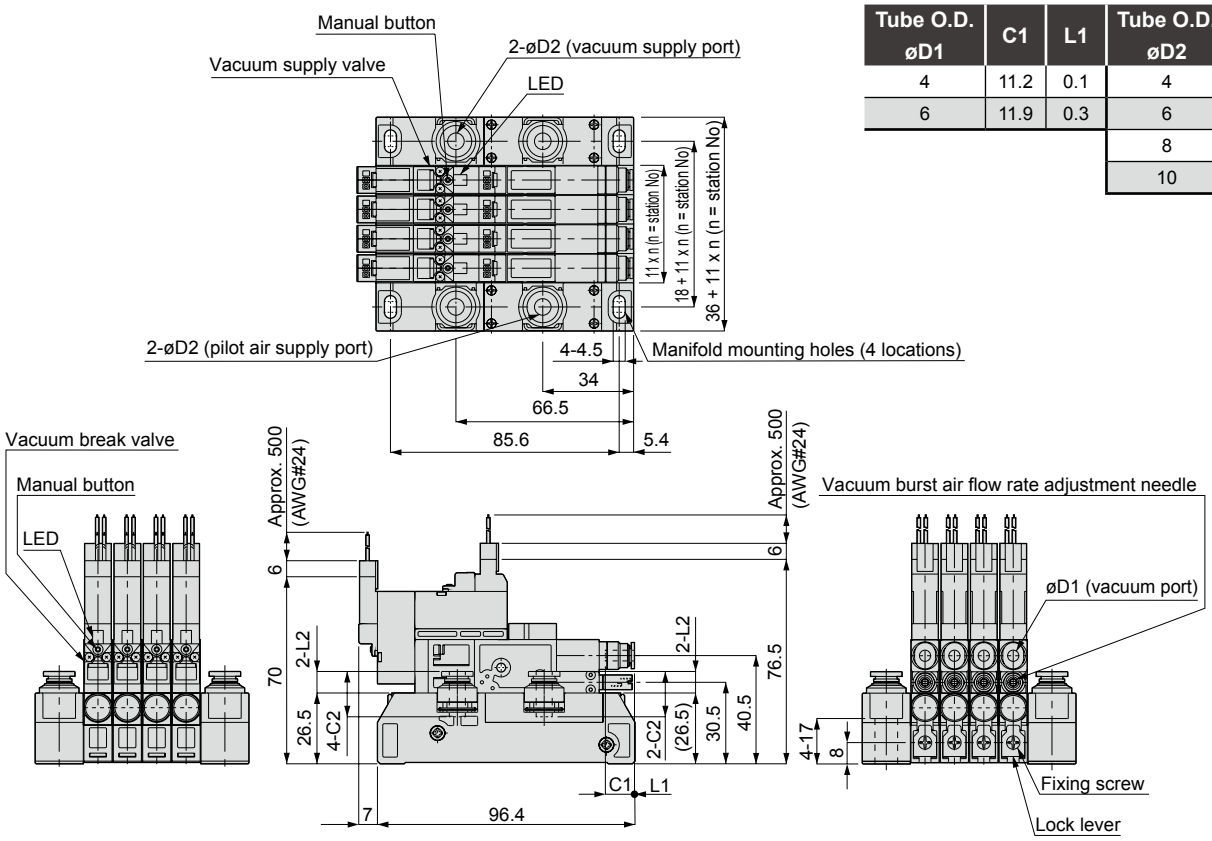


Dimensions (manifold, 3-way valve specifications VSXPM-T)

● Without vacuum pressure switch

Unit: mm

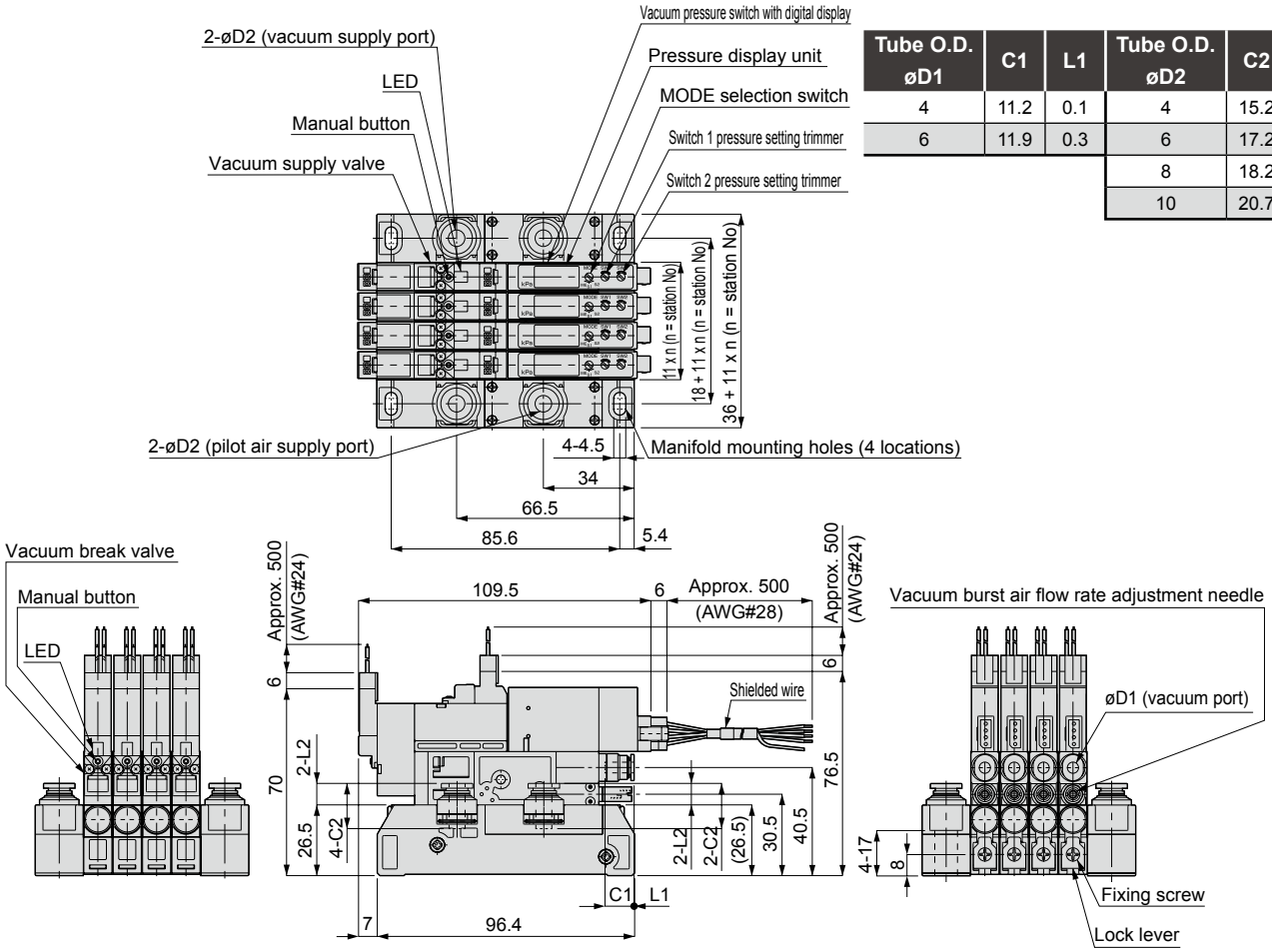
Tube O.D. øD1	C1	L1	Tube O.D. øD2	C2	L2
4	11.2	0.1	4	15.2	3.8
6	11.9	0.3	6	17.2	8.3
			8	18.2	9.6
			10	20.7	13.2



● With vacuum pressure switch and 2-point switch output with LED display

Unit: mm

Tube O.D. øD1	C1	L1	Tube O.D. øD2	C2	L2
4	11.2	0.1	4	15.2	3.8
6	11.9	0.3	6	17.2	8.3
			8	18.2	9.6
			10	20.7	13.2

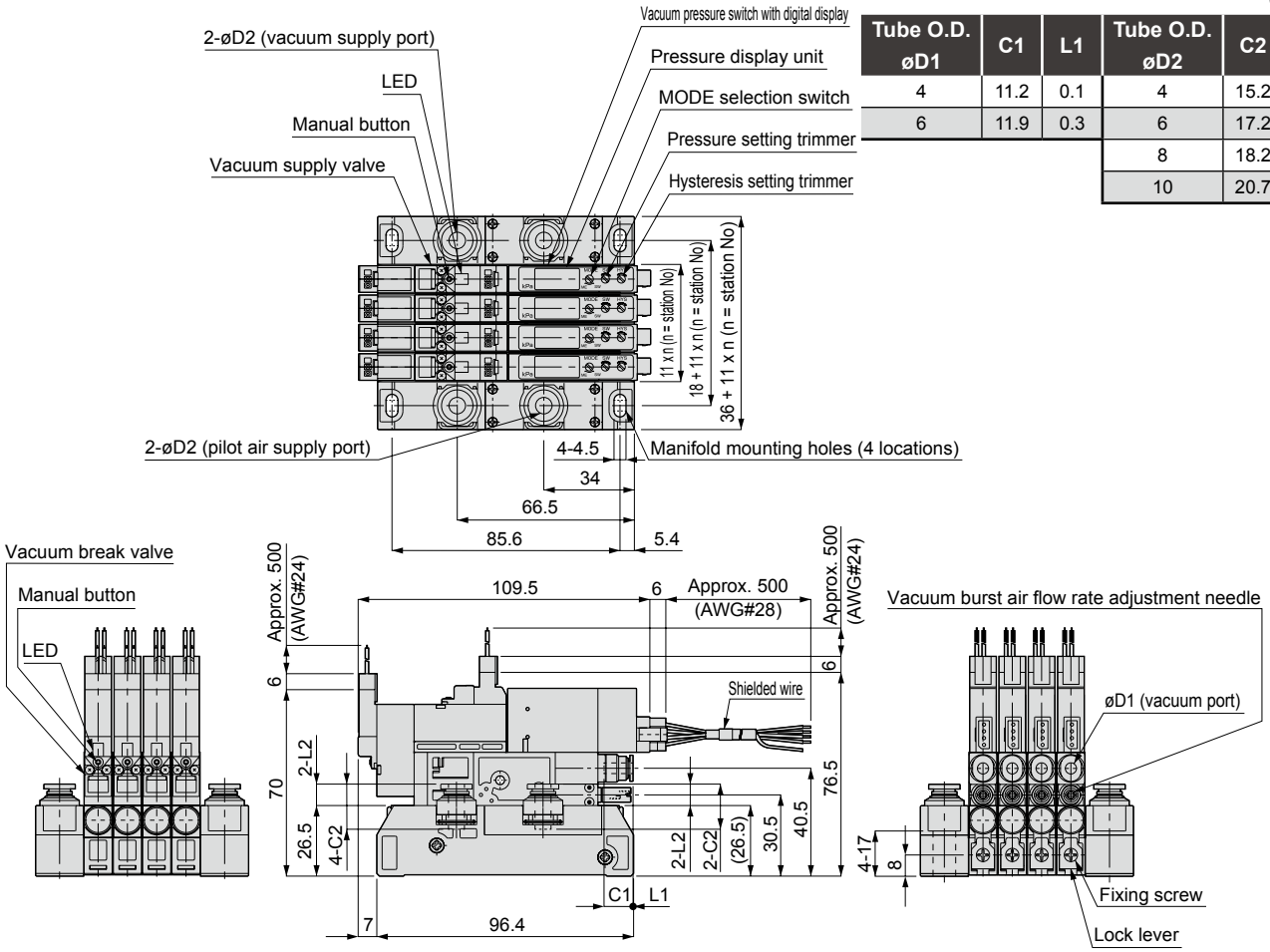


Dimensions (manifold, 3-way valve specifications VSXPM-T)

● Analog output with LED display, and vacuum pressure switch with switch output

Unit: mm

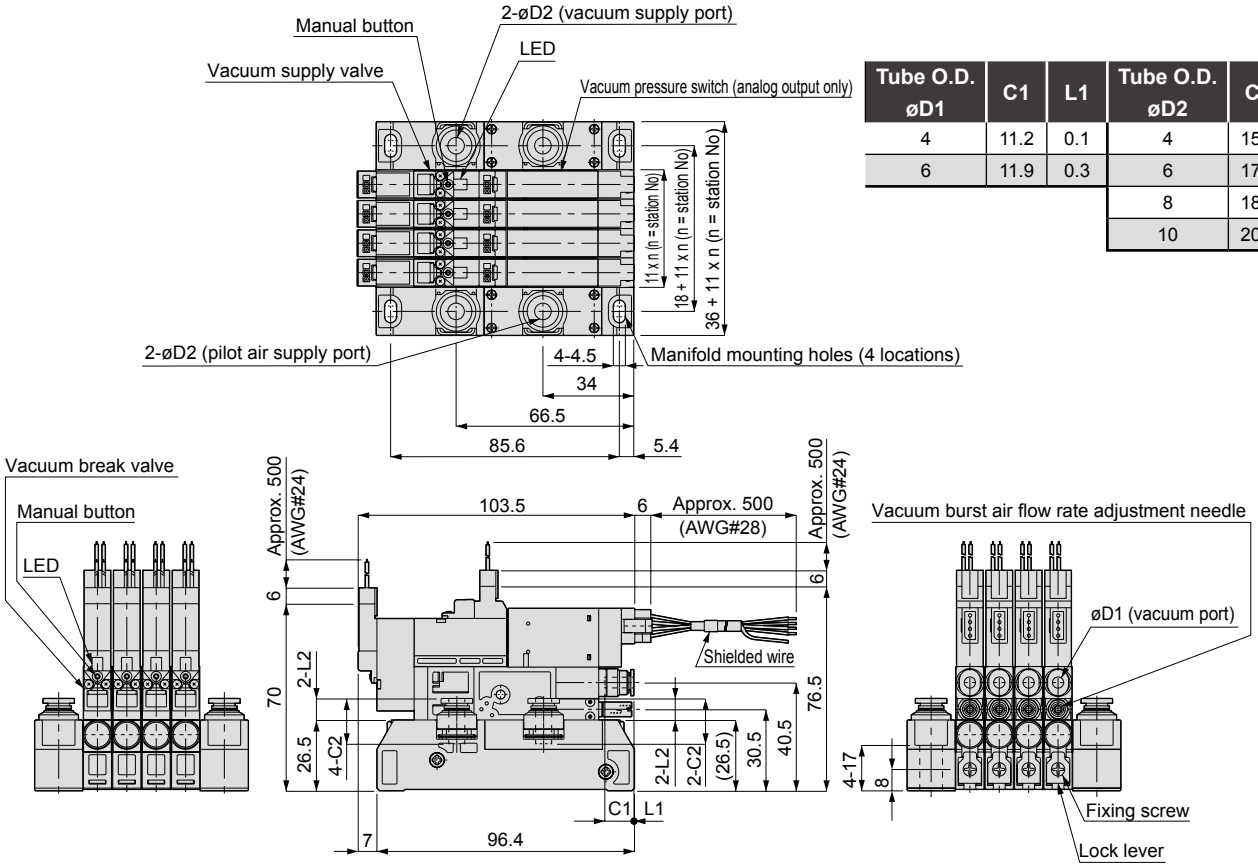
Tube O.D. øD1	C1	L1	Tube O.D. øD2	C2	L2
4	11.2	0.1	4	15.2	3.8
6	11.9	0.3	6	17.2	8.3
			8	18.2	9.6
			10	20.7	13.2



● With vacuum pressure switch and analog output

Unit: mm

Tube O.D. øD1	C1	L1	Tube O.D. øD2	C2	L2
4	11.2	0.1	4	15.2	3.8
6	11.9	0.3	6	17.2	8.3
			8	18.2	9.6
			10	20.7	13.2



Safety precautions

Refer to Intro Pages 15 and 16 for general precautions for vacuum system components.

⚠ WARNING

- When operating the valve, make sure that the current leakage is 1 mA or less. Otherwise, there is a risk of malfunctions caused by current leakage.
- Vacuum retention function of vacuum pump system compatible 2-way valve specifications (VSXP-D) allows leakage. Hence, take other safety measures if vacuum retention for long periods is required. Note that the 3-way valve specifications (VSXP-T) has no vacuum retention function.
- If energization to the pilot valve continues for long periods, heat is generated from the coil. Heat could cause burns and impact peripheral devices. Consult with CKD if continuously energizing for long periods.
- When using the DIN rail, if vibration or impact may be applied to the product, use commercially available DIN rail fixing brackets on both sides for safety and install securely.
- When removing or attaching the unit from/to the manifold, first stop the supply air and make certain to exhaust the residual pressure.
- When installing the unit in the manifold, insert the lock lever to the end and fix it securely with screws. Vibration may cause the lock lever to come off and the unit to pop out.

⚠ CAUTION

- Do not apply high tensile force or bending force to the pilot valve or vacuum pressure switch lead wire. It could cause disconnection or damage to the connector unit.
- Compressed air contains a large amount of drainage (water, oil oxides, tar, foreign matter). Since drain significantly reduces product performance, dehumidify with after-cooler and dryer to improve air quality.
- Do not use a lubricator.
- As rust inside the piping may cause malfunctions, be sure to insert a filter of 5 μm or less in front of the supply port. In addition, flushing of pipes is recommended before use and at appropriate intervals.
- Avoid using in corrosive gas or flammable gas atmospheres. Do not use as the working fluid.
- When replacing the cartridge fitting of the supply (PS, PV) port, remove the deposits from the seal and then securely insert the stop pin.
- When replacing the cartridge fitting of the vacuum (V) port, remove the deposits on the seal part after checking that the window packing has not fallen off and securely fix the screws with the prescribed tightening torque.
- Vacuum burst is created by atmospheric pressure in vacuum pump system compatible 3-way valve specifications. Therefore, if a large amount of dust, dirt, etc. adheres to the filter element for the valve, the pressure loss of the filter element will increase and there may be delays in the vacuum burst time. Cleaning and replacing of the filter element for the valve frequently at appropriate intervals is recommended.
- When mounting the unit in the manifold, check that there is no fallout or protrusion of the O-ring of air supply (vacuum supply) and exhaust (air supply) ports.
- Set the piping (supply port) diameter, pipe length and other components so that sufficient effective cross-sectional area can be secured for the vacuum port.
- In the manifold, when all units are not operated at the same time, the ejector exhaust of the operating unit leads to the vacuum port of the stopped unit. Contact CKD when exhaust air lead-in has adverse effects.

Usage methods

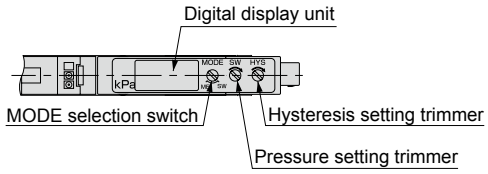
1. How to handle the vacuum pressure switch

(1) Pressure setting procedure

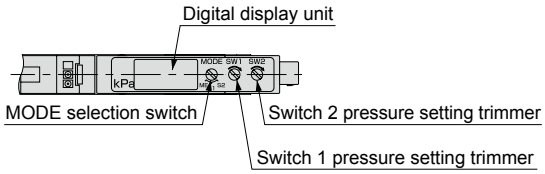
(1) Energization (supply DC power after confirming the wiring.)
(2)-1 Set the mode change-over switch to pressure setting mode (ME → S1 or S2, SW).
(2)-2 (vacuum pressure switch with analog output only)
Turn the hysteresis setting trimmer (HYS) fully counterclockwise to set hysteresis to minimum.
(3) Align to the desired setting value by turning the pressure setting trimmer (S1 or S2, SW) with a small screwdriver, etc.
(4) Set the mode change-over switch to pressure display mode (ME), apply pressure and confirm actual operation.
· For vacuum pressure switch with 2-point switch output:
Switch output 1 (S1): Operation indicator lamp (red LED) turns ON at set pressure or more.
Switch output 2 (S2): Operation indicator lamp (green LED) turns ON at set pressure or more.
· For vacuum pressure switch with analog output:
Switch output (SW): Operation indicator lamp (red LED) turns ON at set pressure or more.

(2) Hysteresis setting

(1)Hysteresis can be adjusted by the hysteresis setting trimmer (HYS).
(2)Hysteresis adjusting range is approx. 0 to 15% F.S. Hysteresis increases when the trimmer is rotated clockwise.
(3)Hysteresis confirmation
Set the mode change-over switch to pressure display mode (ME), and gradually increase/decrease the pressure so that it will be over and under the set pressure. Then, read the values displayed when the operation indicator lamp turns ON and OFF. The display value difference is the hysteresis.
[Hysteresis adjustment application examples]
· When the pressure is pulsating and the output cuts out at fine intervals, increase the hysteresis.
· When setting the allowable range of pressure drop.

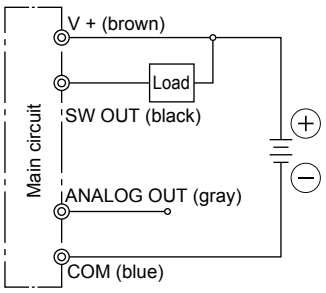


Vacuum pressure switch with digital display
(With analog output, switch output)

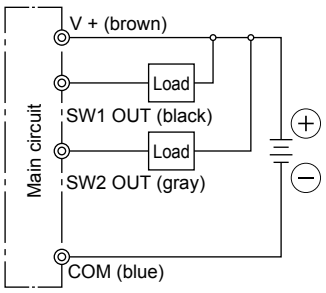


Vacuum pressure switch with digital display
(With 2-point switch output)

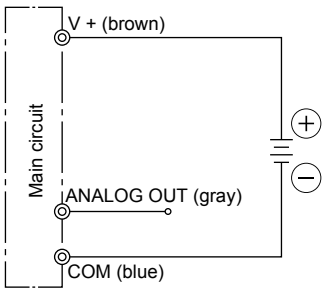
(3) How to wire



Vacuum pressure switch with digital display
(With analog output, switch output)



Vacuum pressure switch with digital display
(With 2-point switch output)



Vacuum pressure switch with
analog output

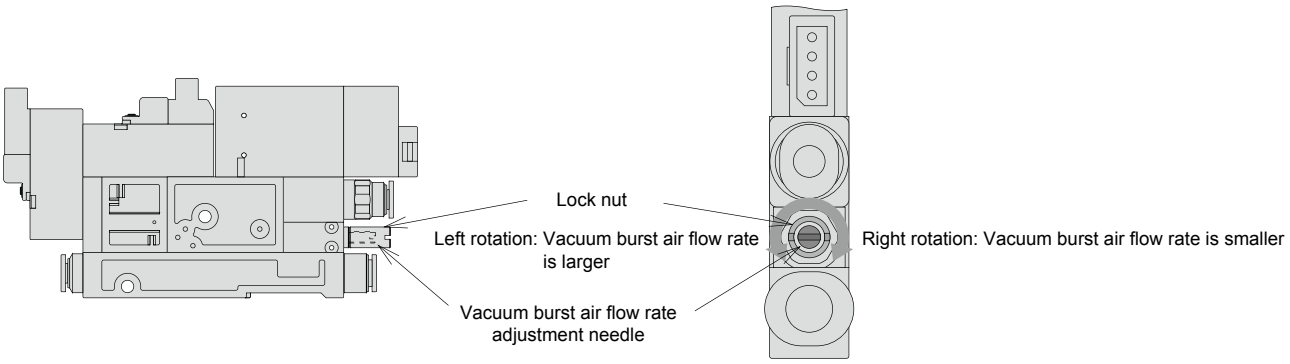
Usage methods

2. Safety precautions for vacuum pressure switch

(1)Do not use in atmospheres or gases containing corrosive substances. It risks damaging the switch.
(2)Do not perform wiring or usage that would introduce noise (surge), etc. It risks damaging the switch.
(3)Do not use in flammable or explosive gases, liquids, or atmospheres. This may cause fire or explosion, as the product does not have an explosion-proof structure.
(4)Avoid using in places where the product is exposed to dripping water, oil, dust, etc. This may cause malfunction, as the product does not have a drip-proof structure.
(5)Do not use where the heat generated exceeds the operating temperature range. It risks damaging the switch.
(6)Make sure to turn the power OFF before wiring. During wiring, check the lead wire color and do not short-circuit the output terminal and power supply terminal or COM terminal. Short-circuiting could cause switch malfunction.
(7)Do not apply high tensile force or bending force to the connector cable. It could cause disconnection or damage to the connector unit.
(8)The performance will not change even if pressure of about 0.5 MPa is instantaneously applied, but do not apply pressure of 0.2 MPa or more during vacuum burst. If constantly applied, it could damage the switch.
(9)When setting the pressure and hysteresis, use a small screwdriver and gently rotate within the rotation range of the trimmer, without applying excessive force. If excessive force is applied during adjustment, it could damage the trimmer and base.
(10)Use a stable DC power supply.
(11)To connect to an output terminal or power supply terminal (relay, solenoid valve, etc.), install a surge voltage absorption circuit. Avoid usage where current exceeds 80 mA.
(12)When using a unit power supply such as switching power supply, ground the F.G. (frame ground).
(13)Do not short-circuit the output terminal (black/gray lead wire) with other terminals.
(14)Do not apply strong external impact or excessive force to the switch body.

3. How to adjust vacuum burst air flow rate

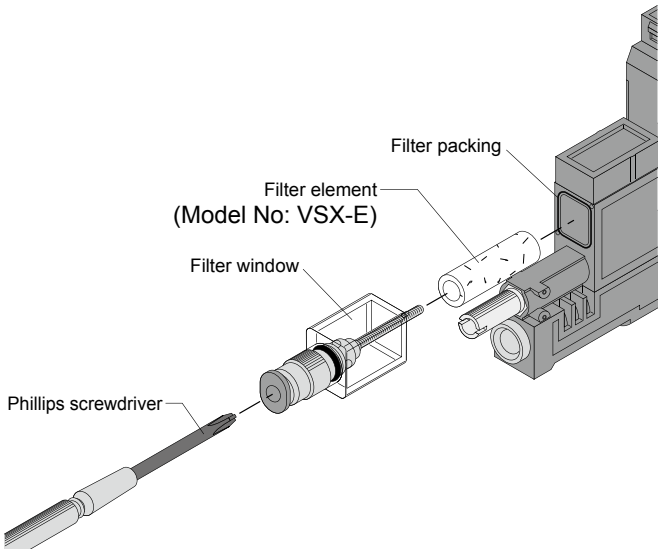
■ The vacuum burst air flow rate is decreased by turning the vacuum burst air flow adjustment needle to the right (clockwise) and increased by turning it to the left (counterclockwise). After adjusting, securely tighten the lock nut with tightening torque of 0.1 to 0.2 N·m.
* Be sure to use an appropriate flathead screwdriver for adjusting the vacuum burst air flow rate.



Usage methods

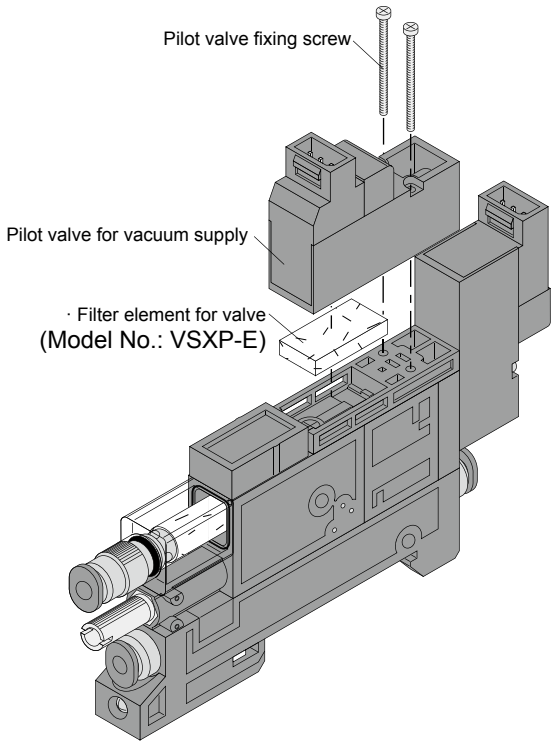
4. How to replace the filter element

■ To replace the filter element, remove the piping of the vacuum port, loosen the screw inside the fitting (inside the tube insertion port) using a Phillips screwdriver (Note) with O.D. of 2.5 mm or less, remove the vacuum port and replace. After replacing the filter element and checking that the filter packing has not fallen out, attach the filter element and filter window to the vacuum port and then fasten the vacuum port to the main body. Tighten the screw securely with tightening torque of 0.1 to 0.15 N·m.
(Note) Ensure that the locking claw and the driver do not interfere with one another. Scratches or deformation of the lock claw may decrease the tensile strength of the tube.



5. How to replace the filter element for valve

■ Remove the pilot valve for vacuum supply and replace the filter element for valve. After replacing the filter element for valve and confirming that the pilot packing of the pilot valve for vacuum supply has not fallen out, tighten the mounting screw with tightening torque of 0.3 to 0.35 N·m and securely install.



Usage methods

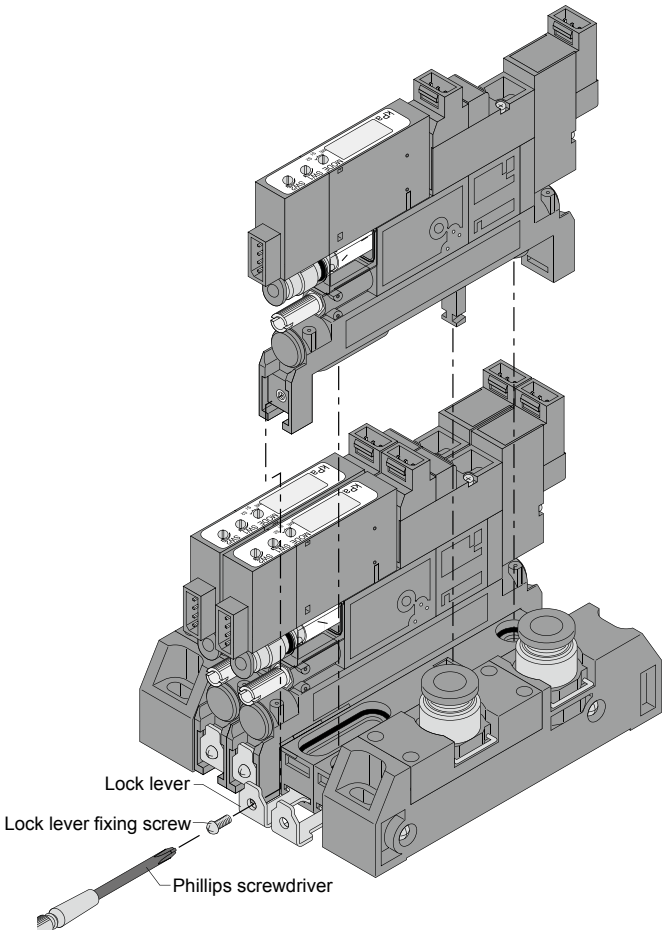
6. How to replace the manifold mounting unit

■ How to remove the unit

· Stop the supply air and exhaust the residual pressure.
· Turn the power OFF and remove the wiring.
· Use a suitable Phillips screwdriver to remove the fixing screw.
· Pull out the lock lever fully using a flathead screwdriver and remove the unit.

■ How to install the unit

· Check that the O-ring of the supply port and exhaust port has not fallen out.
· Pull out the lock lever fully to the front and install the unit.
· Push the lock lever while pressing the unit from above and securely fix the lock lever with the lock lever fixing screw.
(Fixing screw tightening torque: 0.15 to 0.2 N·m)



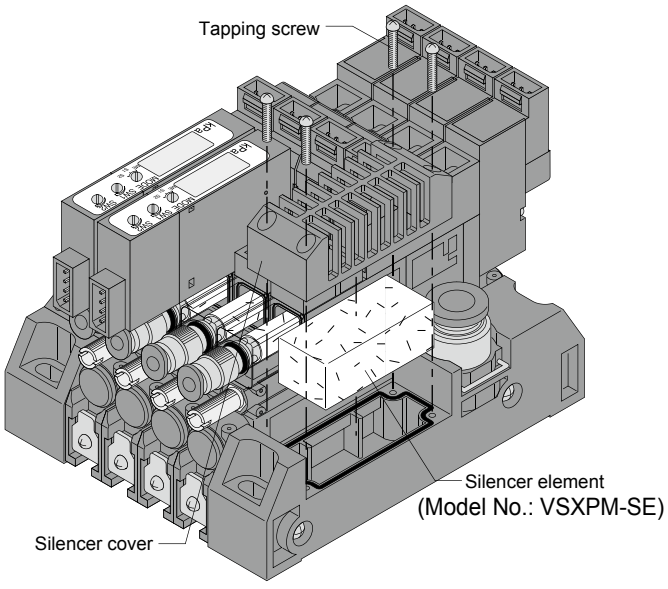
7. How to replace the silencer element for manifold

■ How to remove silencer element

· Use a suitable Phillips screwdriver to remove the four tapping screws.
· Remove the element cover and replace the silencer element (Model No.: VSXPM-SE).

■ How to install silencer element

· Using a suitable Phillips screwdriver, tighten the four tapping screws with tightening torque of 0.3 to 0.4 N·m.

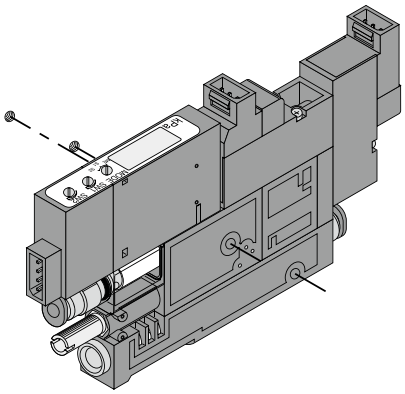


Usage methods

8. Fixing method

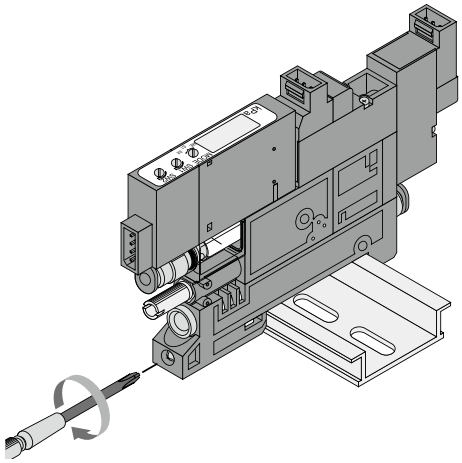
(1)Direct mount

Tighten and fix with M3 screws using the fixing holes (2 places) on the resin body. (Refer to the dimensions for the fixing hole pitch.)



(2)DIN rail mount

Fit the product into the DIN rail and tighten the DIN rail fixing screw using a suitable Phillips screwdriver. If vibration or impact may be applied to the product, install commercially available DIN rail fixing brackets on both sides of the product and fix securely.



How to fill out VSXPM mix manifold specifications sheet

● Mix manifold model No. (example)

	Ⓐ	Ⓑ	Ⓒ	Ⓓ		Ⓔ		Ⓕ		Ⓖ
VSXPM-	Z	CX	6	8	-	3	-	5	-	Z

● Mix manifold specifications sheet (example)

Vacuum switching unit model No. Ⓐ Ⓑ Ⓔ Ⓖ	Layout position 1	2	3	4	5	6	7	8	9	10	Quantity
VSXPM- D 4 - 3 - DW	○	○	○								3
VSXPM- D 4 - 3 - DA				○							1
VSXPM- T 6 - - DW					○						1
VSXPM- - - - - -											
VSXPM- - - - - -											

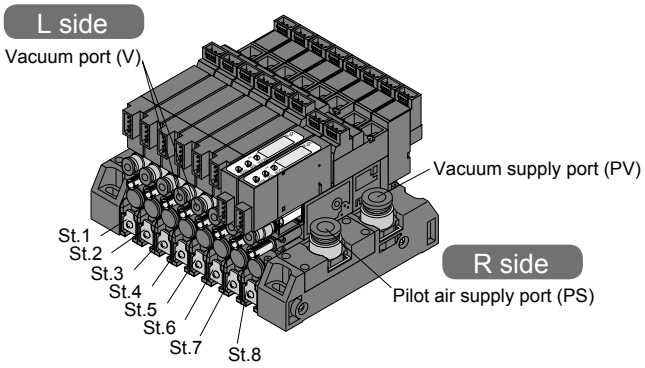
[For output port size only fitting mix specification]

● Mix manifold model No. (example)

	Ⓐ	Ⓑ	Ⓒ	Ⓓ		Ⓔ		Ⓕ		Ⓖ
VSXPM-	D	CX	6	6	-	3	-	5	-	DW

● Mix manifold specifications sheet (example)

Vacuum switching unit model No. Ⓐ Ⓑ Ⓔ Ⓖ	Layout position 1	2	3	4	5	6	7	8	9	10	Quantity
VSXPM- D 4 - 3 - DW	○	○	○								3
VSXPM- D 6 - 3 - DW				○							1
VSXPM- - - - - -					○						1
VSXPM- - - - - -											
VSXPM- - - - - -											



[When filling in]
- With vacuum port facing front, set piping positions in order from the left.
- Write the total quantity of product model No. specified in the required quantity field in the table far right.

VSXPM mix manifold specifications sheet

Issued / /

Company name

Contact Quantity Set Delivery date /

Contact

Slip No. Order No.

Order No.

● Mix manifold model No.

VSXPM- Ⓐ Ⓑ Ⓒ Ⓓ - Ⓔ - Ⓕ - Ⓖ

Ⓐ Valve	
D	2-way valve specifications
T	3-way valve specifications
Z	For mixed specs (indicate the breakdown on the specs sheet)

Ⓑ Vacuum port (V)	
4	ø4 push-in fitting
6	ø6 push-in fitting
CX	For mixed fittings (indicate the breakdown on the specs sheet)

Ⓒ Air supply port (PS)	
4	ø4 push-in fitting
6	ø6 push-in fitting
8	ø8 push-in fitting
10	ø10 push-in fitting

Ⓓ Vacuum supply port (PV)	
4	ø4 push-in fitting
6	ø6 push-in fitting
8	ø8 push-in fitting
10	ø10 push-in fitting

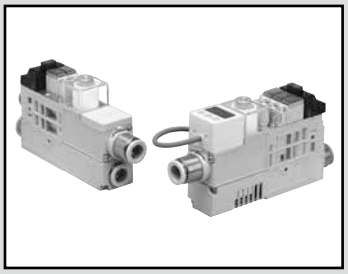
Ⓔ Solenoid valve voltage	
1	100 VAC
3	24 VDC

Ⓕ Manifold station No.	
2 to 10	2 to 12 stations

Ⓖ Vacuum pressure switch specifications	
Blank	Without vacuum pressure switch
DW	With digital display, NPN output 2 points
DA	With digital display, NPN output 1 point + analog output
AO	Analog output
Z	For mixed specs (indicate the breakdown on the specs sheet)

● Mix manifold specifications sheet

Vacuum switching unit model No. Ⓐ Ⓑ Ⓔ Ⓖ	Layout position 1	2	3	4	5	6	7	8	9	10	Quantity
VSXPM- - -											
VSXPM- - -											
VSXPM- - -											
VSXPM- - -											
VSXPM- - -											



Vacuum switching unit ideal
for controlling large flow rate vacuum pressure

VSQP Series

RoHS

Features

■ 31.5 mm width vacuum unit ideal for large flow rate control.

■ A wide range of vacuum supply valves (normally open, normally closed) are available.

Specifications

Descriptions	VSQP
Working fluid	Air
Working pressure MPa	0.3 to 0.7
Ambient/fluid temperatures °C	5 to 50
Vacuum pressure kPa	-100 to 0

Solenoid valve specifications

● Pilot valve

Descriptions	Pilot valve	
Valve and operation	Direct acting poppet valve	
Rated voltage V	24 DC	100 AC
Voltage fluctuation range V	24 DC ±10%	100 AC ±10%
Surge suppressor	Varistor	Bridge diode
Power consumption	0.55 W	1 VA
Manual override	Push locking	
Operation display	At coil excitation operation: Red LED lights	

● Switching valve

Descriptions	Vacuum supply valve	Vacuum break valve
Valve and operation	Pilot operated poppet valve	
Valve	Normally closed, normally open	Normally closed
Lubrication	Not required	
Effective cross-sectional area mm^2 (Cv)	16.5(0.89)	3.5(0.19)

Vacuum pressure switch specifications

Descriptions		Vacuum pressure switch
Working pressure kPa		-100 to 100
Proof pressure kPa		500
Environmental resistance	Ambient temperature (in storage) °C	-10 to 60 (no condensation or freezing)
	Ambient temperature (in use) °C	0 to 50 (no condensation or freezing)
	Ambient humidity (in storage / in use)	35 to 85% RH (no condensation)
	Degree of protection	IEC standards IP40 or equivalent
Power supply voltage V		12 to 24 VDC ±10% ripple (P-P) ±10% or less
Current consumption mA		40 or less (no load)
Pressure display	Display frequency	5 cycles/second
	Display accuracy	±2% F.S. ±1 digit
	Digital display	Main display: 2 colors (red, sub-display: orange)
Switch output	No. of I/O points	2 points
	Output method	NPN open collector
	Switch rating	30 VDC, 125 mA or less
	Internal voltage drop	1.5 V or less
Temperature characteristics		±2% F.S. or less (0 to 50°C, at 25°C)
Repeatability		±0.2%F.S. ±1digit
Hysteresis		Adjustment is possible
Responsivity		Selectable (50/250/500/1,000/2,000/3,000 ms)

Vacuum filter specifications

Descriptions	Vacuum filter
Element material	PVF (Polyvinyl formal)
Filtration rating μm	10
Filtration area mm^2	1507
Replacement filter element model No.	VSQ-E

Vacuum burst function

Descriptions	Vacuum burst function
Break air flow rate ℓ/min(ANR)	0 to 50 (at supply pressure 0.5 MPa)

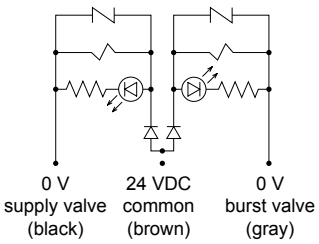
Valve lead wire color

Descriptions	Black	Gray	Blue	Brown
24 VDC specifications	Vacuum generation (-)	Vacuum burst (-)	- (*1)	24 VDC(+common)
100 VAC specifications	Vacuum generation (-)	Vacuum burst (-)	- (*1)	common

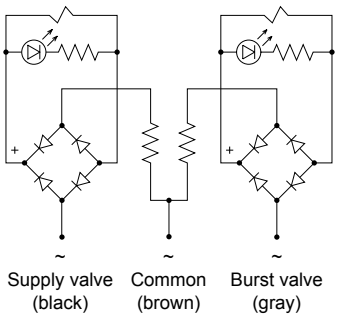
*1 : For this model, the attached blue lead wire is not used.

Electric circuit (solenoid valve)

● 24 VDC

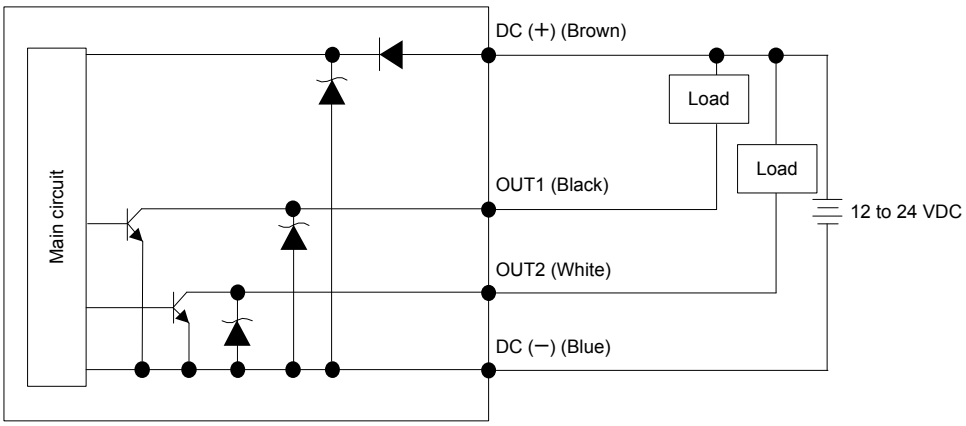


● 100 VAC



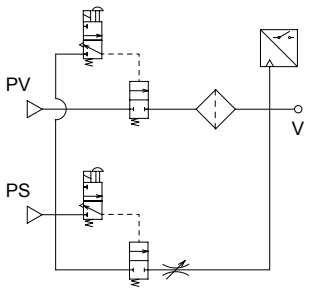
*1: For this model, the attached blue lead wire is not used.

Vacuum pressure switch electric circuit diagram



Circuit diagram

● Normally closed



How to order

● 31.5 mm width single unit dedicated vacuum ejector unit

VSQP - B 10 10 - 3 - R

- Ⓐ Valve
- Ⓑ Vacuum port (V)
- Ⓒ Vacuum supply port (PV)
- Ⓓ Solenoid valve voltage
- Ⓔ Vacuum pressure switch specifications

Code	Content
Ⓐ Valve	
A	Normally open (NO)
B	Normally closed
Ⓑ Vacuum port (V)	
10	ø10 push-in fitting
12	ø12 push-in fitting
Ⓒ Vacuum supply port (PV)	
10	ø10 push-in fitting
12	ø12 push-in fitting
Ⓓ Solenoid valve voltage	
1	100 VAC
3	24 VDC
Ⓔ Vacuum pressure switch specifications	
Blank	Without vacuum pressure switch
R	With digital display, NPN output 2 points

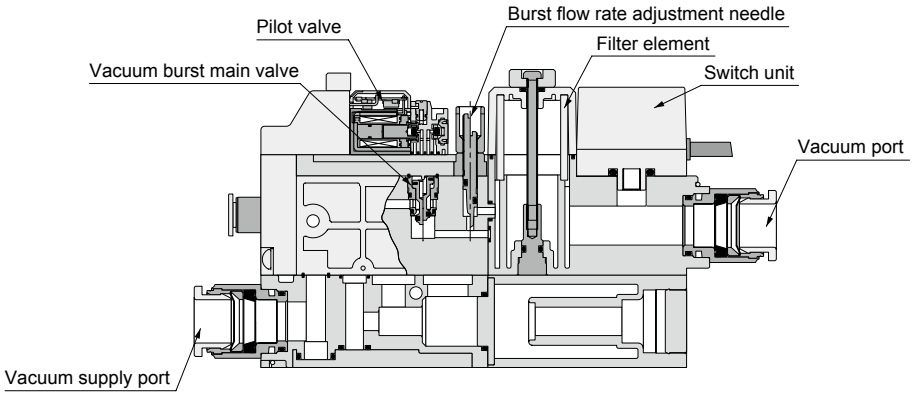
● Maintenance part model No.

· Filter element

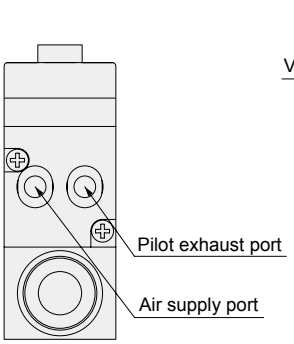
VSQ-E

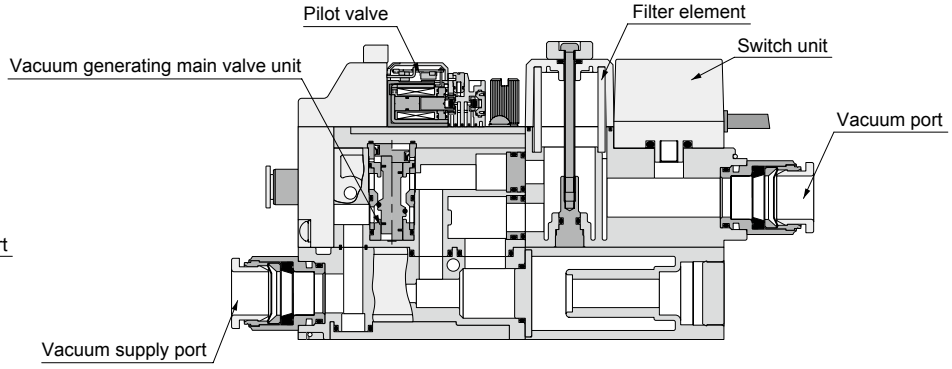
Internal structure

● Burst circuit



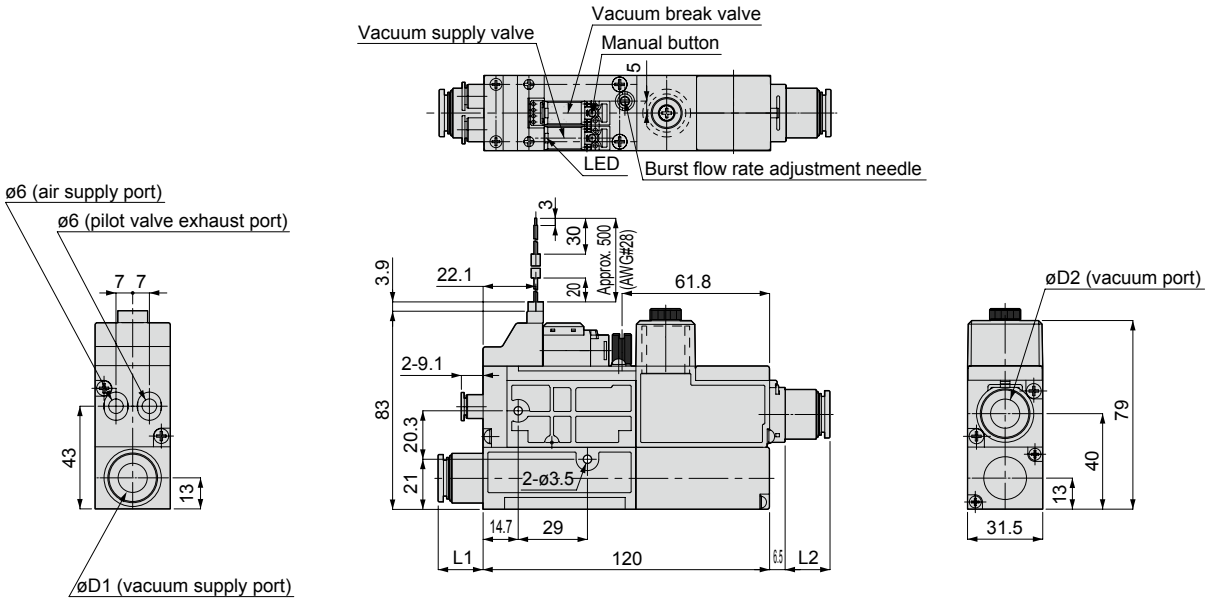
● Vacuum circuit





Dimensions

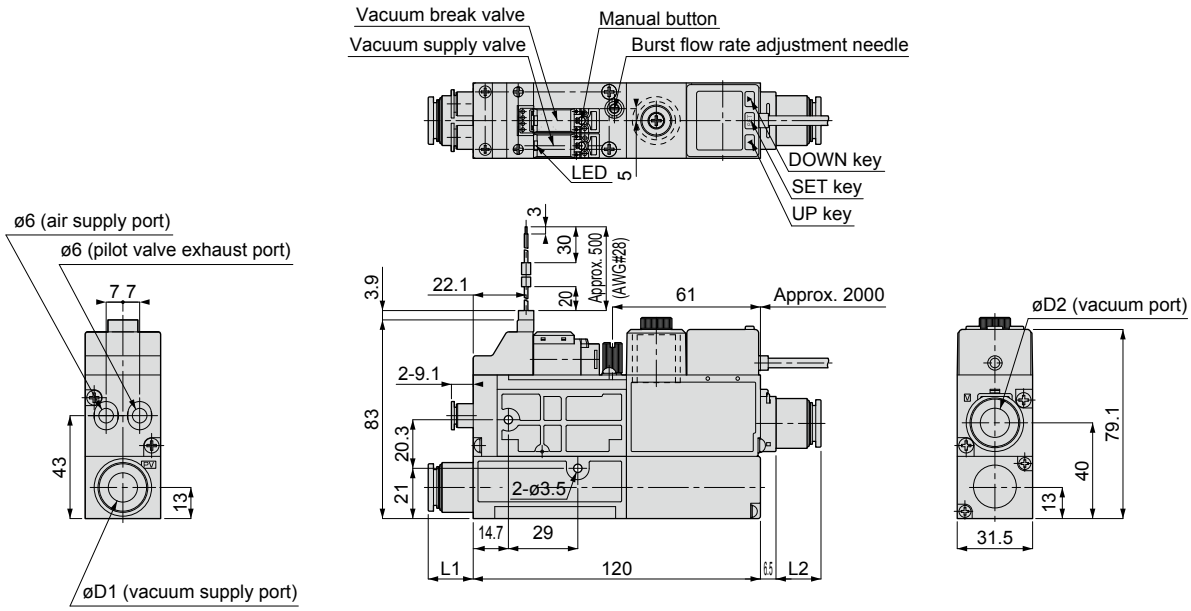
● Without vacuum pressure switch



Unit: mm

	Tube O.D. øD1	L1	Tube O.D. øD2	L2
Air supply port	10	14.7	-	-
	12	18.8	-	-
Vacuum port	-	-	10	14.7
	-	-	12	18.8

● With NPN output 2-point vacuum pressure switch with digital display



Unit: mm

	Tube O.D. øD1	L1	Tube O.D. øD2	L2
Air supply port	10	14.7	-	-
	12	18.8	-	-
Vacuum port	-	-	10	14.7
	-	-	12	18.8

Safety precautions

Refer to Intro Pages 15 and 16 for general precautions on vacuum system components.

⚠ WARNING

- Since the operating temperature is 5 to 50°C, do not use it under any other temperature conditions.
- If energization to the pilot valve continues for long periods, heat is generated from the coil. Heat could cause burns and impact peripheral devices. Contact the nearest CKD Sales Office if continuously energizing for long periods.
- When operating the valve, make sure that the current leakage is 1 mA or less. Otherwise, there is a risk of malfunctions caused by current leakage.
- The vacuum retention function of the vacuum switching unit allows leakage. Hence, take other safety measures if vacuum retention for long periods is required.
- Do not use in atmospheres or gases containing corrosive substances.
- Do not use in flammable or explosive gases, liquids, or atmospheres. This risks causing fire or explosion, as the product does not have an explosion-proof structure.
- Do not use where the heat generated exceeds the operating temperature range. It risks damaging the switch.
- Make sure to turn the power OFF before wiring. During wiring, check the lead wire color, terminal No., etc. and do not short-circuit the output terminal and power supply terminal or common terminal. Short-circuiting could cause sensor malfunction.

⚠ CAUTION

- Compressed air contains a large amount of drainage (water, oil oxides, tar, foreign matter). Since drain significantly reduces performance, dehumidify with after-cooler and dryer to improve air quality.
- Do not use a lubricator.
- As rust and the like inside the piping may cause malfunctions, be sure to insert a filter of 5 µm or less in front of the supply port. In addition, flushing of pipes is recommended before use and at appropriate intervals.
- Do not apply high tensile force or bending force to the pilot valve or vacuum pressure switch lead wire. It could cause disconnection or damage to the connector unit.
- Avoid using in areas containing corrosive or flammable gases. Do not use as a fluid.
- This product does not have a drip-proof/dust-proof structure. Do not use in places where the product is exposed to dripping water, oil, dust, etc.
- Avoid as far as possible the suction of dust, salt, iron powder and the like.
- When vacuum is generated, do not operate the vacuum burst valve.
- When replacing the supply and vacuum port cartridge fittings, remove the deposits from the seal and then securely insert the pin.
- Keep the piping of vacuum, common exhaust, pilot exhaust and supply as short as possible. Due to piping resistance, the original performance of the vacuum components may not be fully attainable.
- Use a stable DC power supply.
- To connect to an output terminal or power supply terminal (relay, valve, etc.), install a surge voltage absorption circuit. Avoid applications that exceed the rated current.
- When using a unit power supply such as switching power supply, ground the F.G. (frame ground).
- Do not short-circuit the output terminal with other terminals.
- Do not apply excessive load to the body. It may cause damage.

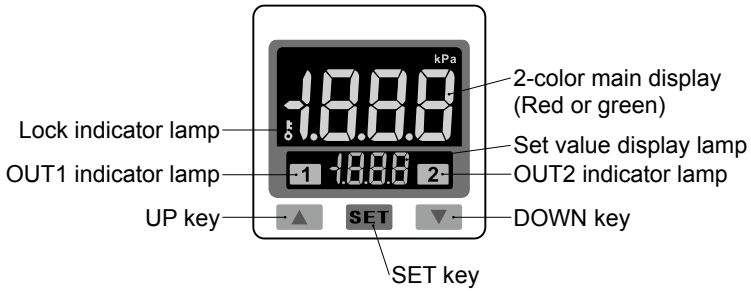
Usage methods

1. How to operate the valve

- Energization (supply power after confirming the wiring.)
- Energize the lead wire (black: vacuum, gray: vacuum burst) of the solenoid valve that you want to operate. The valve will operate.

2.Usage methods of the pressure sensor

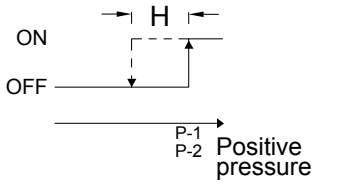
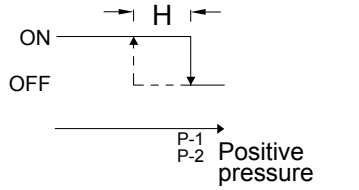
■ The names and functions of each part



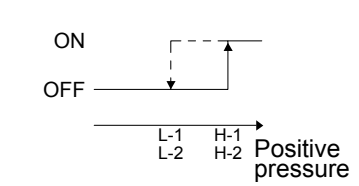
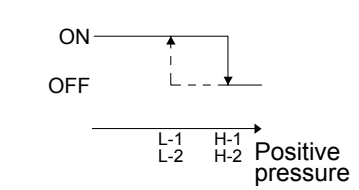
■ Switch output

Switch output operation can be selected from below.

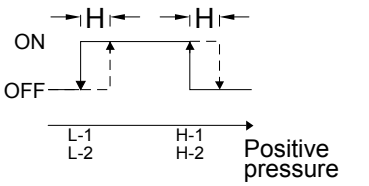
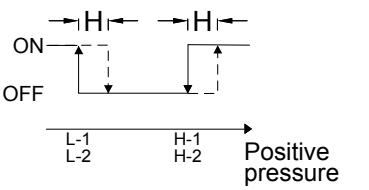
● One-point setting mode

Normally open mode	Normally closed mode
Compound pressure VUS-33R	Compound pressure VUS-33R
	

● Hysteresis mode

Normally open mode	Normally closed mode
Compound pressure VUS-33R	Compound pressure VUS-33R
	

● Window comparator mode

Normally open mode	Normally closed mode
Compound pressure VUS-33R	Compound pressure VUS-33R
	

*1. When the hysteresis is set to 2 digits or less, if the input pressure is very close to the set pressure, malfunction may occur in the sensor output.

*2. In the window comparator mode, if the two set points are smaller than the fixed hysteresis set value, the switch output may not operate.

Usage methods

Hysteresis setting

Hysteresis setting helps prevent chattering due to pressure pulsation, etc.

Response time

Response time of the switch output can be set.
Setting the response time helps prevent erroneous detection due to unexpected pressure fluctuations.

Changing the display color

The display color when the switch output is ON/OFF can be set from red and green.

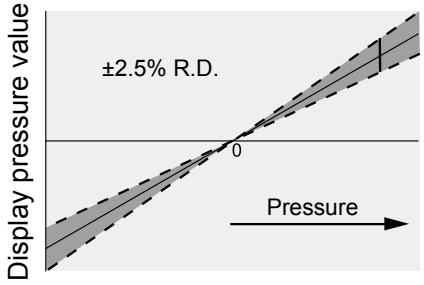
Power saving mode

This function switches to the power saving mode if no button is pressed for 30 seconds.
Operate any button while in power saving mode to return to measurement mode.

Fine adjustment mode

This function allows fine adjustment of the displayed value within ±2.5% range.
It unifies variations in the display value when using multiple pressure sensors.

This function eliminates small pressure errors in the output value and makes the displayed value uniform.
The value displayed on the pressure sensor can be set within ±2.5% R.D.



— The initial setting is the value set at the factory (factory setting).
Pressure setting display value - Allowable setting range

R.D. (Real Detect measured value)
* Setting resolution: ±0.1% R.D.

Usage methods

Zero value setting

This function forces the display pressure to be set to zero.
If a pressure of atmospheric pressure ± 3% or more is applied, an error will be displayed and the "Zero value setting" will not be possible.

Maximum/minimum value display

This function displays the maximum and minimum pressure values since the power was turned ON.
The values are reset when the power is turned OFF.

Button lock/unlock mode

The lock function mode is used to lock the keys and prevent erroneous outputting of the switch due to an incorrect key being pressed. When the button is locked, a key marker appears on the main display.

Error display description

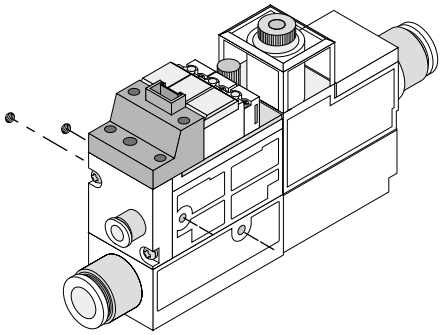
Error name		Error display	Content	Processing method
Overcurrent error	out1	Er1	The load current of output 1 exceeds 125 mA.	Turn off the power and check the cause of the overcurrent. Next, lower the load current to 125 mA or less and then turn ON the power again.
	out2	Er2	The load current of output 2 exceeds 125 mA.	
Residual pressure error		Er3	At zero clear setting, the atmospheric pressure is ±3% F.S. or more.	Perform zero clear again after setting the applied pressure to the atmospheric pressure state.
Working pressure error		HHH	The applied pressure exceeds the upper limit of the pressure setting value.	Adjust applied pressure to within the working pressure range.
		LLL	The applied pressure exceeds the lower limit of the pressure setting value.	
System error		Er4	Internal system error	Turn OFF the power and then turn it ON again. If the error is not resolved, contact us.
		Er5		
		Er6	Internal data error	
		Er7		

Refer to the Instruction Manual for details about how to set each function.

Usage methods

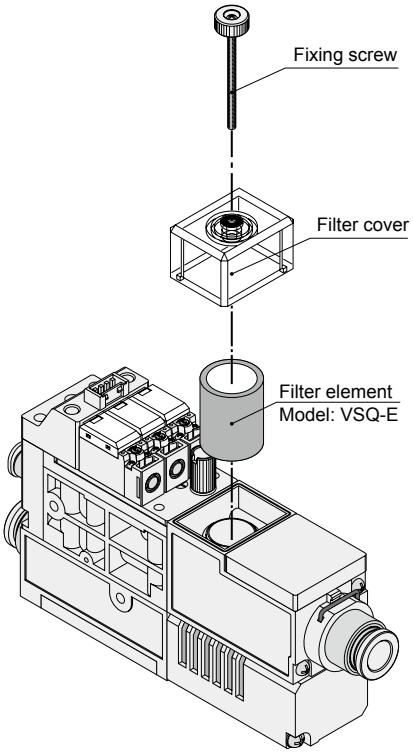
3. Fixing method

To secure the vacuum unit VSQP, fasten M3 screws through the fixing holes on the resin body. (Refer to the dimensions for the fixing hole pitch.)



4. How to replace the filter element

Remove the fixing screws to replace the filter element. After replacing the filter element and checking that the filter packing has not fallen out, securely fix it with tightening torque of 0.3 to 0.5 N·m.



Usage methods

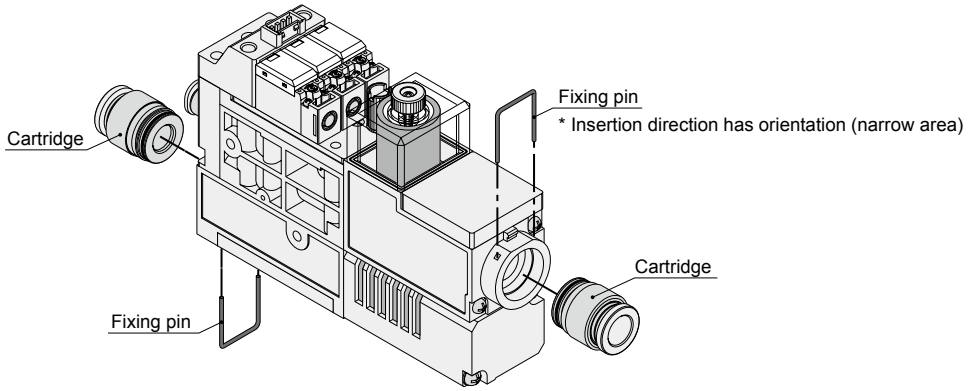
5. How to replace the cartridge fitting

Cartridge fittings can be replaced according to the following procedure.

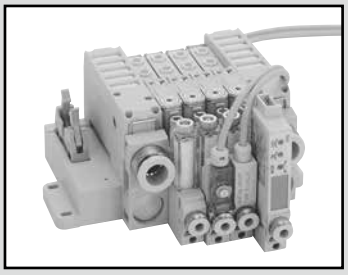
(1)Pull out the stop pin with a flathead screwdriver, etc.

(2)Pull out the cartridge in the connection direction.

(Note) When mounting the cartridge to the body, mount after checking that there is no dirt, fluff, etc. adhering to the O-ring.



MEMO



Compact, lightweight manifold dedicated vacuum switching unit greatly reduces the vacuum burst time

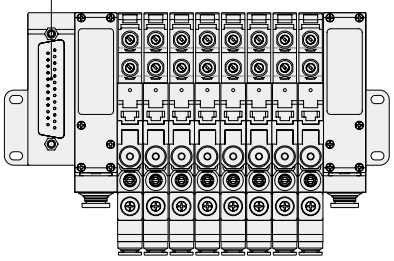
VSZPM Series

RoHS

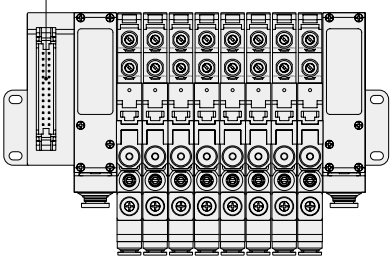
Features

■ Supply valve/burst valve wiring has been centralized collectively.

D sub-connector specifications



Flat cable connector specifications



■ Power consumption of the valve reduced to 0.55 W, effectively saving energy.

■ A wide range of applications are supported by wide variations of the vacuum pressure switch.

Analog switch

1-point switch vacuum pressure switch

1-point switch vacuum pressure switch with digital display

2-point switch vacuum pressure switch with digital display

■ Maintenance work is easy due to a structure that takes maintainability into consideration.

■ Since the push-in fitting and female thread specification are standardized for piping, selection is possible in accordance with the piping application.

Specifications

Descriptions	VSZPM
Working fluid	Air
Working pressure MPa	0.3 to 0.7
Ambient/fluid temperatures °C	5 to 50
Vacuum pressure kPa	0 to -100

Solenoid valve specifications

● Pilot valve

Descriptions	Vacuum supply valve	Vacuum burst valve
Valve and operation	Direct acting poppet valve	
Rated voltage V	24 DC	
Allowable voltage fluctuation range V	21.6 DC to 26.4 DC	
Surge protective circuit	Varistor	
Power consumption W	0.55 (with LED)	
Operational indicator lamp	At coil excitation: Red LED lights	At coil excitation: Yellow-green LED lights
Manual operation	Push & locking	
Wiring method	D sub-connector, flat cable connector	

● Switching valve

Descriptions	Vacuum supply valve	Vacuum burst valve
Valve and operation	Pilot operated poppet valve	
Valve function	Single	
Valve	Normally closed	
Proof pressure MPa	1.05	
Lubrication	Not required	
Effective cross-sectional area mm^2 (Cv)	4.5(0.24)	3.5(0.19)

Vacuum pressure switch specifications

Descriptions		With digital display		Without display	Separate	Analog
		2-point switch output	1-point switch output	1-point switch output	Pressure indicator with switch	
Current consumption mA		40		20	50	20
Pressure sensitive element		Diffused semiconductor pressure sensor			-	Diffused semiconductor pressure sensor
Working pressure kPa		-100 to 0			-	-100 to 0
Set pressure		-99 to 0 kPa			-999 to 999 counts	-
Proof pressure MPa		0.2			-	0.2
Storage temperature °C		-20 to 80		-20 to 70		
Operating temperature °C		0 to 50		-10 to 60	-10 to 50	-10 to 60
Operating humidity		35 to 85%RH				
Power supply voltage V		12 to 24 DC ±10% ripple (P-P) 10% or less		10.8 to 30 DC (including ripple)		
Degree of protection		IEC standards IP40 or equivalent				
Switch output point		2	1	1	2	-
Repeatability		±0.3%F.S. Max.(at Ta=25°C)				-
Hysteresis		Lock	Variable	Lock	Variable	-
Switch output		NPN transistor/open collector output				-
Analog output	Output voltage V	-	1 to 5	-	1 to 5	
	Zero point voltage V	-	1±01	-	1±01	
	Span voltage V	-	4±0.1	-	4±0.1	
	Output current mA	-	1 or less	-	0.5 or less	1 or less
	Hysteresis	-	±0.5%F.S. Max.	-	±0.5% F.S. Max.	
Display		0 to -99 kPa (2-digit red LED display)		-	3-digit red LED display	-
Display frequency		Approx. 4 times/second		-	Approx. 4 times/second	-
Display accuracy		±3%F.S. ±2digit		-	±1%F.S.	-
Resolution		1digit		-	1digit	-
Switch operation indicator lamp		SW1: Red LED lights when output is ON			SW1: Green LED lights when output is ON	-
		SW2: Green LED lights when output is ON	-		SW2: Red LED lights when output is ON	-

Vacuum burst function

Descriptions	Vacuum burst valve
Break air flow rate ℓ/min(ANR)	0 to 50 (Indicates the value when air is supplied at 0.5 MPa.)

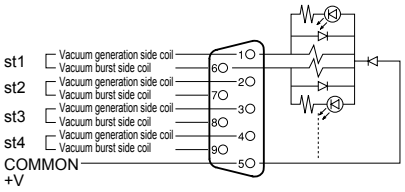
Vacuum filter specifications

Descriptions	Vacuum filter
Element material	PVF (Polyvinyl formal)
Filtration rating μm	10
Filtration area mm^2	660
Replacement filter element model No.	VSZM-E

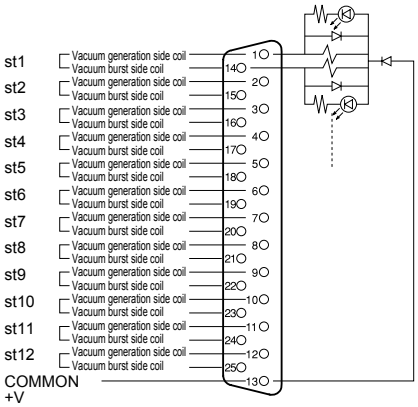
Electric circuit (solenoid valve)

● D sub-connector

9-pin

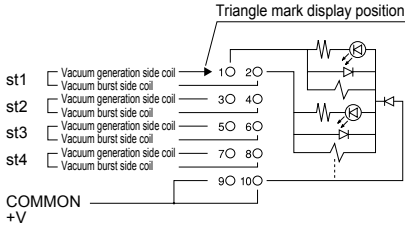


25-pin



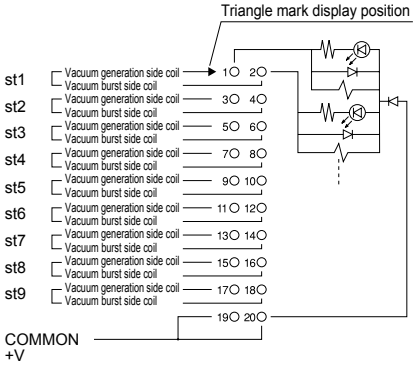
● Flat cable connector

10-pin



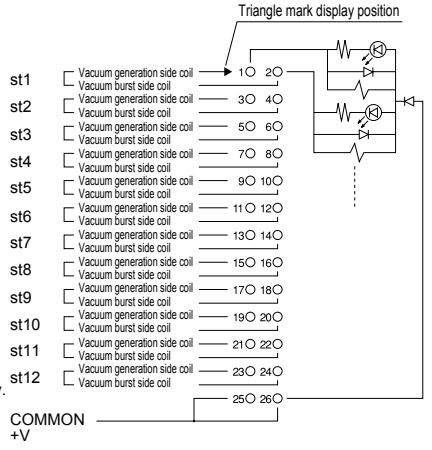
(Note) COMMON (+ V) pin No. 9/10 is short-circuited internally.

20-pin



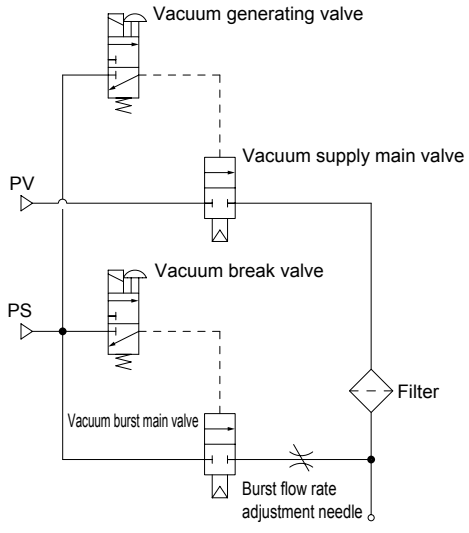
(Note) COMMON (+ V) pin No. 19/20 is short-circuited internally.

26-pin

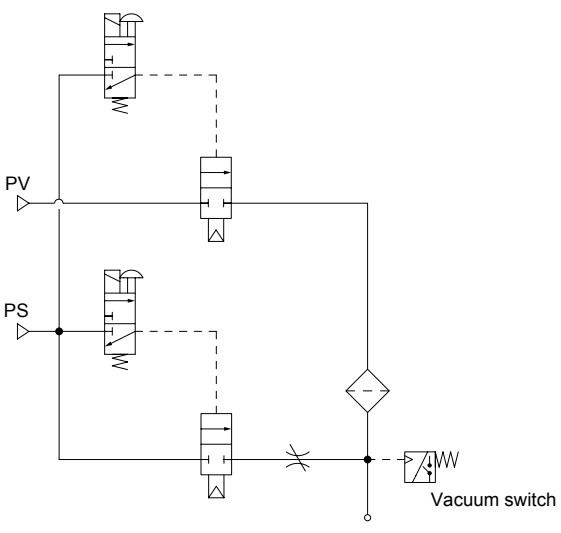


(Note) COMMON (+ V) pin No. 25/26 is short-circuited internally.

Circuit diagram



Without vacuum switch



With vacuum switch

How to order

● 11 mm pitch manifold dedicated vacuum switching unit

VSZPM - M5 6 10 - 3 - 12 - DA - F 26

● Pump unit assembly for 11 mm pitch manifold dedicated vacuum switching unit

VSZPM - M5 ——— DA

● Valve unit assembly for 11 mm pitch manifold dedicated vacuum switching unit

VSZPM ——— V - 3

● Valve unit assembly for 11 mm pitch manifold dedicated vacuum switching unit manifold only

VSZPM ——— 10 10 ——— 8 ——— F 20

Ⓖ Wiring specifications

Ⓔ Manifold station No. Ⓗ No. of connector pins specified

Ⓐ Vacuum port (V)

Ⓑ Air supply port (PS)

Ⓒ Vacuum supply port (PV)

Ⓓ Solenoid valve voltage

Ⓕ Vacuum pressure switch specifications

Code	Content	Type: Manifold	Pump unit assembly	Valve unit assembly	Manifold only
Ⓐ Vacuum port (V) *1					
4	ø4 push-in fitting	●	●		
6	ø6 push-in fitting	●	●		
M5	M5×0.8	●	●		
CX	For mixed fittings (indicate the breakdown on the specs sheet)	●			
Ⓑ Air supply port (PS)					
4	ø4 push-in fitting	●			●
6	ø6 push-in fitting	●			●
8	ø8 push-in fitting	●			●
Ⓒ Vacuum supply port (PV)					
6	ø6 push-in fitting	●			●
8	ø8 push-in fitting	●			●
10	ø10 push-in fitting	●			●
Ⓓ Solenoid valve voltage					
3	24 VDC	●		●	
Ⓔ Manifold station No.					
2	2 stations	●			●
to	to				
12	12 stations				
Ⓕ Vacuum pressure switch specifications *1					
Blank	Without vacuum pressure switch	●	●		
DW	With digital display, NPN output 2 points	●	●		
DA	With digital display, NPN output 1 point + analog output	●	●		
S	NPN output 1-point without display	●	●		
V1	Negative pressure analog output	●	●		
R1	Compound pressure analog output	●	●		
Z	For mixed specs (indicate the breakdown on the specs sheet)	●			
Ⓖ Wiring specifications *2					
F	Flat cable connector	●			●
D	D sub-connector	●			●
Ⓗ No. of connector pins specified *2					
Refer to Appendix 1 for No. of connector pins specified.		●			●

⚠ Precautions for model No. selection

*1 : Indicate on the "mix manifold specifications sheet" in the case of mixed specifications. Refer to page 282 for details.

*2 : When Ⓗ is "20", "26" Ⓖ"D" cannot be selected. When Ⓗ is "25", Ⓖ "F" cannot be selected.

*3 : For Ⓔ "5" to "9", select Blank.

*4 : For Ⓔ "10" to "12", select Blank.

*5 : For Ⓔ"5" to "12", select Blank.

● Maintenance part model No.

· Filter element

VSZM-E

· Silencer element

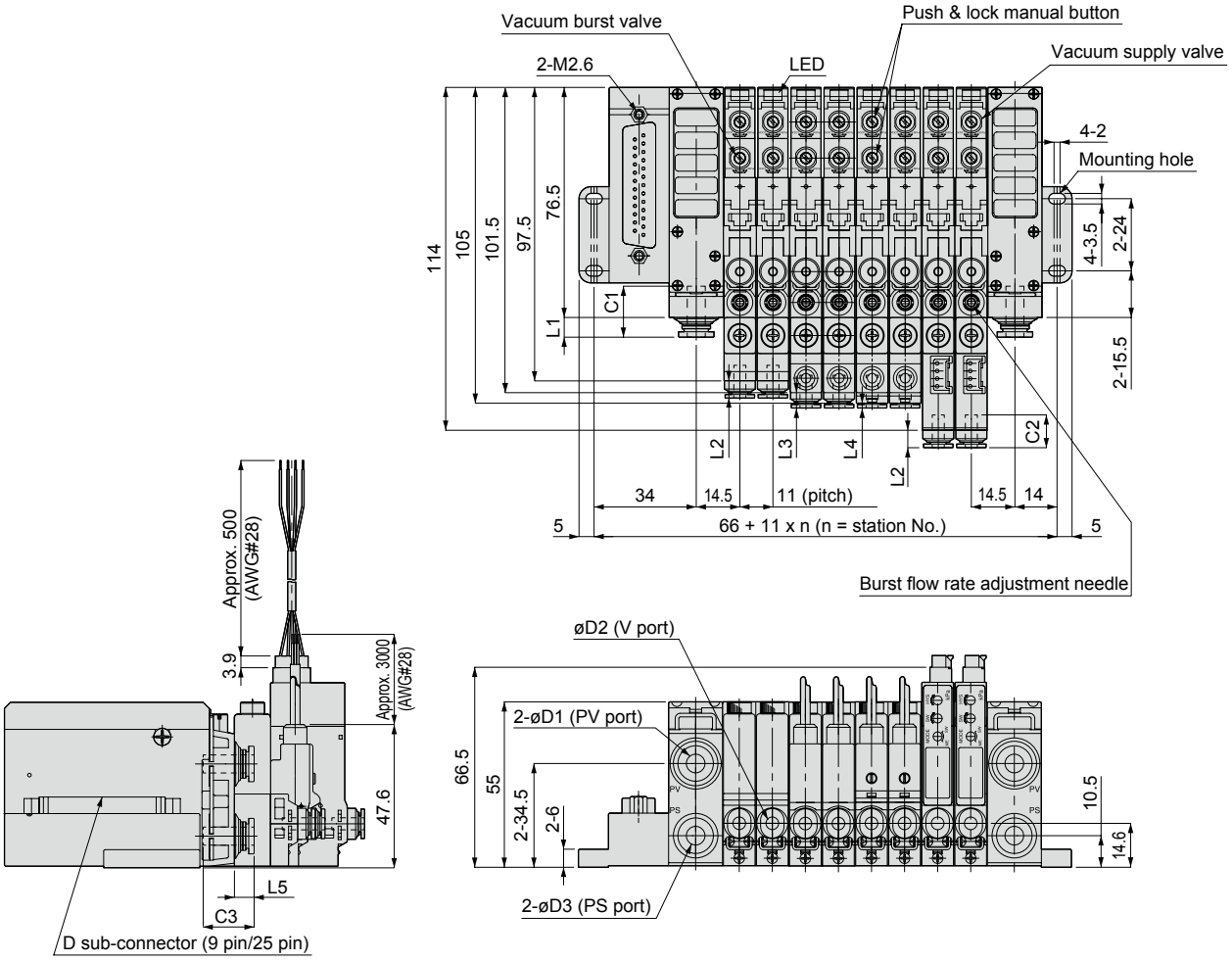
VSZM-SE

Appendix 1

Number of connector pins specified		
Blank	For flat cable specifications 2 to 4 stations: 10 pins 5 to 9 stations: 20 pins 10 to 12 stations: 26 pins For D sub-connector specification 2 to 4 stations: 9 pins 5 to 12 stations: 25 pins	
20	20-pin flat cable connector (max. 9 stations)	*3
26	26-pin flat cable connector (max. 12 stations)	*4
25	25-pin D sub-connector (max. 12 stations)	*5

Dimensions

● D sub-connector specifications

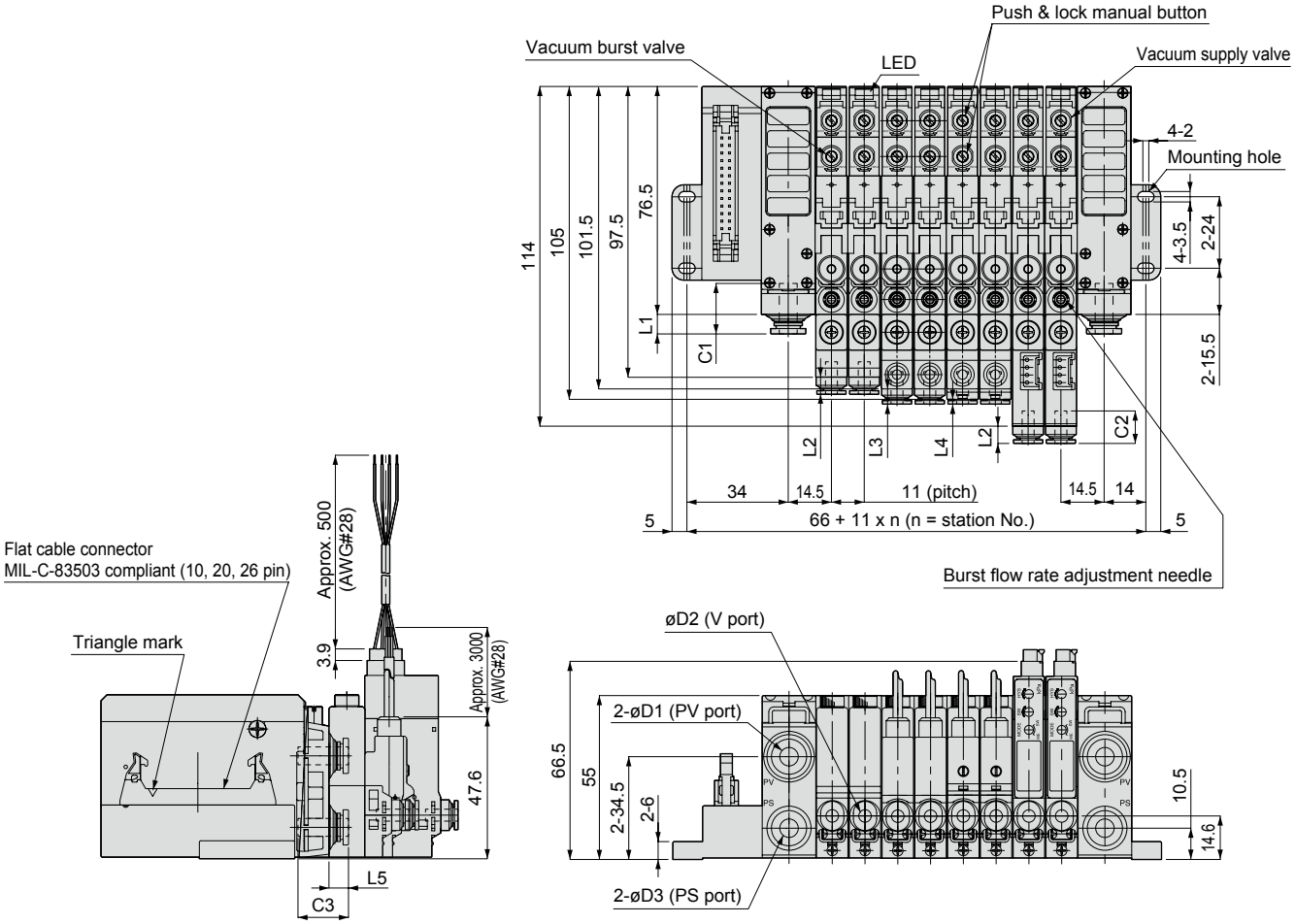


Unit: mm

PV port øD1	C1	L1	V port øD2	C2	L2	L3	L4	PS port øD3	C3	L5
6	17	6.6	4	11.2	6.1	5.4	1.9	4	14.9	2
8	18.2	8.1	6	10	8.9	8.2	4.7	6	17	6.6
10	20.7	11.7	M5 (female thread)	-	4	3.3	-0.2	8	18.2	8.1

Dimensions

● Flat cable connector specifications



Unit: mm

PV port øD1	C1	L1	V port øD2	C2	L2	L3	L4	PS port øD3	C3	L5
6	17	6.6	4	11.2	6.1	5.4	1.9	4	14.9	2
8	18.2	8.1	6	10	8.9	8.2	4.7	6	17	6.6
10	20.7	11.7	M5 (female thread)	-	4	3.3	-0.2	8	18.2	8.1

Safety precautions

Refer to Intro Pages 15 and 16 for general precautions on vacuum system components.

⚠ WARNING

- When operating the valve, make sure that the current leakage is 1 mA or less. Otherwise, there is a risk of malfunctions caused by current leakage.
- The vacuum switching unit (VSZP) allows leakage. Hence, take other safety measures if vacuum retention for long periods is required.
- If energization to the pilot valve continues for long periods, heat is generated from the coil. Heat could cause burns and impact peripheral devices. Contact the nearest CKD Sales Office if continuously energizing for long periods.
- When removing or attaching the unit from/to the manifold, first stop the supply air and make certain to exhaust the residual pressure.
- Do not use in locations with excessive vibration and impact. It may cause malfunction or failure. (Use with vibration of acceleration 49 m/s^2 or less.)

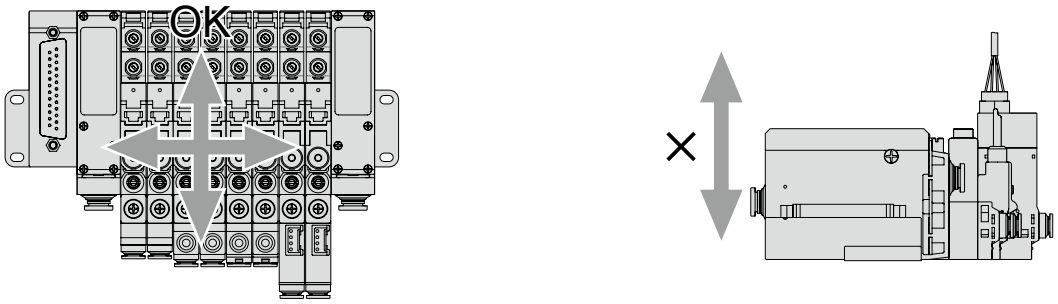
⚠ CAUTION

- Do not apply high tensile force or bending force to the valve or vacuum pressure switch lead wire. It could cause disconnection or damage to the connector unit.
- Compressed air contains a large amount of drainage (water, oil oxides, tar, foreign matter). Since drain significantly reduces product performance, dehumidify with after-cooler and dryer to improve air quality.
- Do not use a lubricator.
- As foreign matter such as rust and debris inside the piping may cause malfunctions, be sure to insert a filter of 5 µm or less in front of the supply port. In addition, flushing of pipes is recommended before use and at appropriate intervals.
- Avoid using in atmospheres containing corrosive or flammable gases. Do not use as the working fluid.
- When removing or installing the cartridge fitting, remove the deposits from the seal and then securely insert the stop pin. Fully read and understand the “Safety precautions” in this section before carrying out work.
- Manifold silencer specification may cause performance degradation and trouble due to element clogging. Periodically perform maintenance and inspection.
- When mounting each unit on the manifold, securely fix with screws after removing the deposits on the seal. Fully read and understand the “Safety precautions” in this section before carrying out work.
- Wire the D sub-connector and flat cable connector after checking the electric circuit diagram of the body given in this catalog.
- Depending on usage conditions, the manifold may undergo deterioration of vacuum performance or trouble. Hence, fully understand the manifold safety precautions in this catalog before use.
- When all units are not operated at the same time, the ejector exhaust of the operating unit leads to the vacuum port of the stopped unit. Contact CKD when exhaust air lead-in has adverse effects.

Usage methods

1. Installation

When the installation location vibrates, install so that the direction of vibration is perpendicular to the switching valve.



2. How to adjust vacuum burst air flow rate

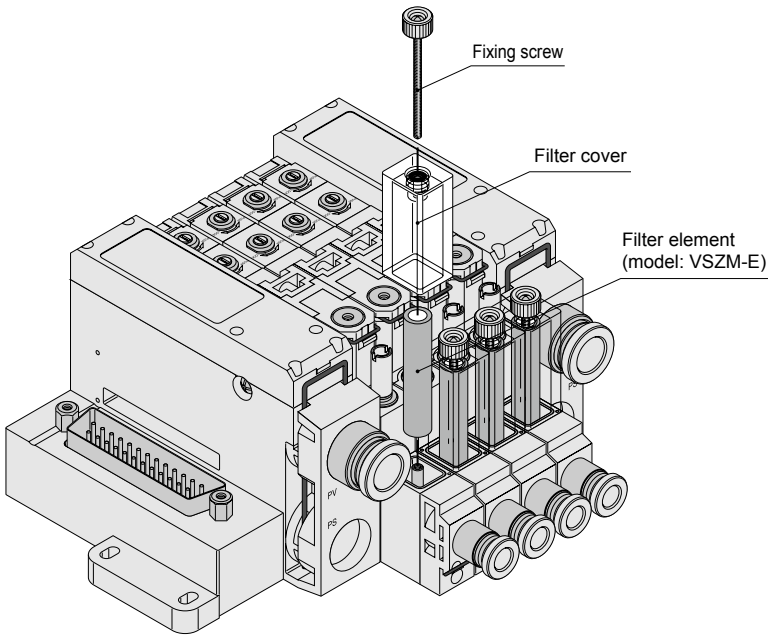
■ The vacuum burst air flow rate is decreased by turning the air flow adjustment needle to the right (clockwise) and increased by turning it to the left (counterclockwise). After adjusting the flow rate, securely fix the lock nut with tightening torque of 0.1 to 0.3 N·m.

Left rotation: Vacuum burst air flow rate is high

Right rotation: Vacuum burst air flow rate is low

3. How to replace the filter element

Remove the fixing screws to replace the filter element. After replacing the filter element and checking that the filter packing has not fallen out, securely fix it with tightening torque of 0.3 to 0.5 N·m.

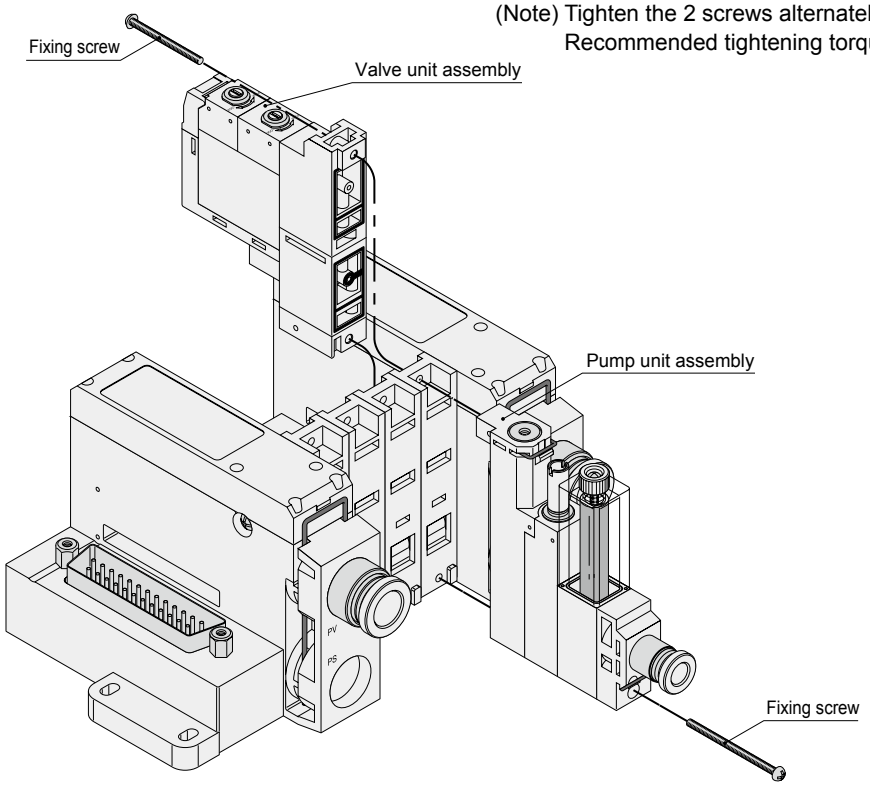


Usage methods

4. How to mount and remove manifold

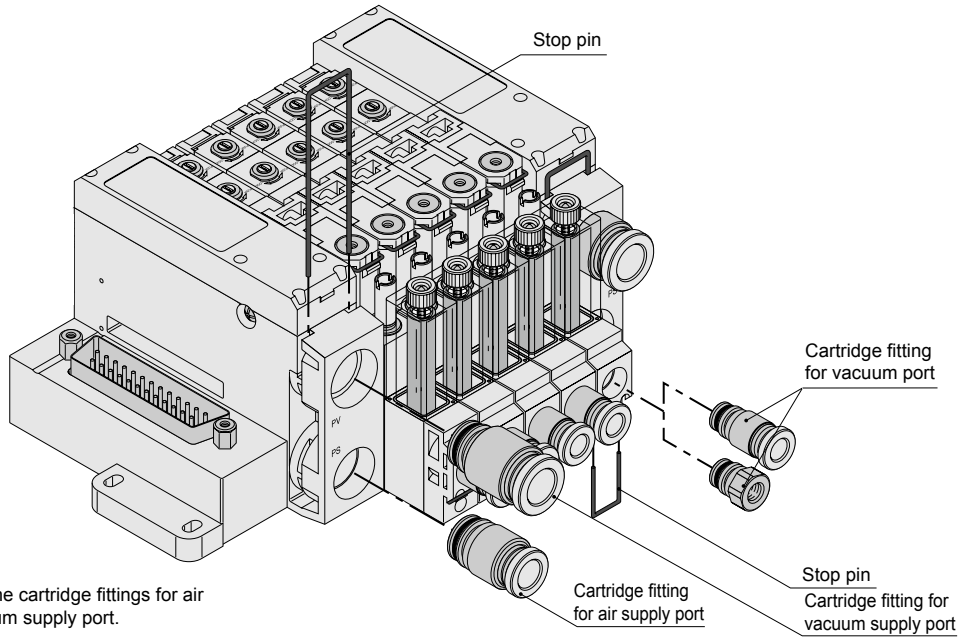
[Removing method]
To remove and attach the unit from/to the manifold, follow the procedure below.
(1)Stop the supply air and release the interior piping pressure.
(2)Remove the fixing screws (2 pcs.) with an appropriate tool.
(3)Remove each unit from the manifold.

[Mounting method]
(1)Check that the packing has not fallen out and that there is no adhered foreign matter.
(2)Mount each unit on the manifold.
(3)Confirm that the unit positioning fits securely.
(4)Tighten the fixing screws (2 pcs.) with an appropriate tool.
(Note) Tighten the 2 screws alternately and gradually.
Recommended tightening torque: 0.4 to 0.5 N·m



5. How to replace the cartridge fitting

Cartridge fittings and M5 female thread can be replaced according to the following procedure.
(1)Pull out the stop pin with a flathead screwdriver, etc.
(2)Pull out the cartridge in the connection direction.
(Note) When mounting the cartridge to the body, mount after checking that there is no dirt, fluff, etc. adhering to the O-ring.



* Not compatible with the cartridge fittings for air supply port and vacuum supply port.

How to fill out VSZPM mix manifold specifications sheet

● Mix manifold model No. (example)

	Ⓐ	Ⓑ	Ⓒ		Ⓓ		Ⓔ		Ⓕ		Ⓖ	Ⓗ
VSZPM -	CX	6	8	-	3	-	5	-	Z	-	F	26

● Mix manifold specifications sheet (example)

Vacuum switching unit model No. Ⓐ Ⓕ	Layout position 1	2	3	4	5	6	7	8	9	10	11	12	Quantity
VSZPM- 6 - DW	○	○											2
VSZPM- 6 - DA			○		○								2
VSZPM- 4 -				○									1
VSZPM- -													
VSZPM- -													

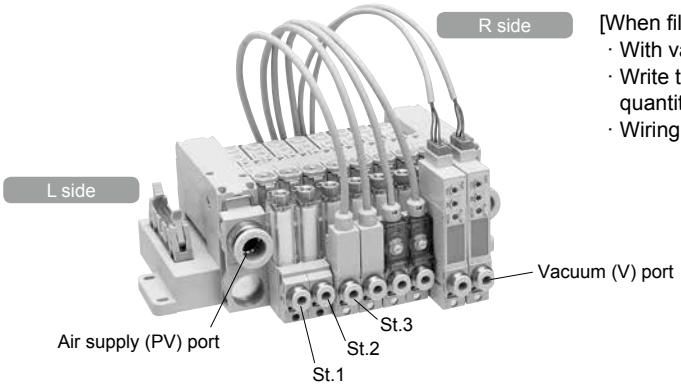
[For output port size only fitting mix specification]

● Mix manifold model No. (example)

	Ⓐ	Ⓑ	Ⓒ		Ⓓ		Ⓔ		Ⓕ		Ⓖ	Ⓗ
VSZPM -	CX	6	6	-	3	-	5	-	DW	-	F	26

● Mix manifold specifications sheet (example)

Vacuum switching unit model No. Ⓐ Ⓕ	Layout position 1	2	3	4	5	6	7	8	9	10	11	12	Quantity
VSZPM- M5 - DW	○	○											2
VSZPM- 6 - DW			○		○								2
VSZPM- 4 - DW				○									1
VSZPM- -													
VSZPM- -													



[When filling in]
- With vacuum port facing front, set piping positions in order from the left.
- Write the total quantity of product model No. specified in the required quantity field in the table far right.
- Wiring connector assembly is fixed on the L side of the manifold.

VSZPM mix manifold specifications sheet

Contact _____ Quantity _____ Set Delivery date / /

Slip No. _____ Order No. _____

Issued / /

Company name _____

Contact _____

Order No. _____

● Mix manifold model No.

VSZPM - Ⓐ Ⓑ Ⓒ - Ⓓ - Ⓔ - Ⓕ - Ⓖ Ⓗ

Ⓐ Vacuum port (V)	
4	ø4 push-in fitting
6	ø6 push-in fitting
M5	M5×0.8
CX	For mixed fittings (indicate the breakdown on the specs sheet)

Ⓑ Air supply port (PS)	
4	ø4 push-in fitting
6	ø6 push-in fitting
8	ø8 push-in fitting

Ⓒ Vacuum supply port (PV)	
6	ø6 push-in fitting
8	ø8 push-in fitting
10	ø10 push-in fitting

Ⓓ Solenoid valve voltage	
3	24 VDC

Ⓔ Manifold station No.	
2 to 12	2 to 12 stations

Ⓕ Vacuum pressure switch specifications	
Blank	Without vacuum pressure switch
DW	With digital display, NPN output 2 points
DA	With digital display, NPN output 1 point + analog output
S	NPN output 1-point without display
V1	Negative pressure analog output
R1	Compound pressure analog output
Z	For mixed specs (indicate the breakdown on the specs sheet)

Ⓖ Wiring specifications	
F	Flat cable connector
D	D sub-connector

Ⓗ Number of connector pins specified	
Blank	For flat cable connector specification 2 to 4 stations 10-pin 5 to 9 stations 20-pin 10 to 12 stations 26-pin For D sub-connector specification 2 to 4 stations 9-pin 5 to 12 stations 25-pin
20	20-pin flat cable connector (max. 9 stations)
26	26-pin flat cable connector (max. 12 stations)
25	25-pin D sub-connector (max. 12 stations)

● Mix manifold specifications sheet

Vacuum switching unit model No. Ⓐ Ⓕ	Layout position 1	2	3	4	5	6	7	8	9	10	11	12	Quantity
VSZPM- -													
VSZPM- -													
VSZPM- -													
VSZPM- -													
VSZPM- -													

Suction pad
VSP

■ **Vacuum components**

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Pad shape - pad size/pad material/option list

Pad shape		Pad shape code	Pad size																	
			0.7	1	1.5	2	3	3.5	4	5	6	8	10	15	20	25	30	35	40	50
Standard	Standard	R	-	●	-	●	●	-	●	-	●	●	●	●	●	●	●	-	●	●
	Deep	A	-	-	-	-	-	-	-	-	-	-	-	●	●	●	●	-	●	●
	Compact	RM	●	●	●	●	●	-	●	-	-	-	-	-	-	-	-	-	-	-
Sponge		S	-	-	-	-	-	-	-	-	-	-	●	●	●	●	●	●	-	●
Bellows		B	-	-	-	-	-	-	-	-	●	●	●	●	●	●	●	-	●	●
Multi-stage bellows		W	-	-	-	-	-	-	-	-	-	-	●	-	●	-	●	-	●	●
Oval		E	-	-	-	2 × 4 ●	-	3.5 × 7 ●	4 × 10 4 × 20 4 × 30 ●	5 × 10 5 × 20 5 × 30 ●	6 × 10 6 × 20 6 × 30 ●	8 × 20 8 × 30 ●	-	-	-	-	-	-	-	-
Soft		L	-	-	-	-	-	-	●	-	●	●	●	●	●	-	●	-	●	-
Soft bellows		LB	-	-	-	-	-	-	-	-	●	●	●	●	●	-	-	-	-	-
Anti-slip		K	-	-	-	-	-	-	-	-	-	-	●	-	●	-	●	-	●	●
Thin object		P	-	-	-	-	-	-	-	-	-	●	●	●	●	-	-	-	-	-
Flat		F	-	-	-	-	-	-	-	-	-	-	●	●	●	●	●	-	-	-
Suction mark prevention		Q	-	-	-	-	-	-	-	-	-	-	●	-	●	-	●	-	-	-

Pad shape - holder shape list

Pad shape \ Holder shape	VSP-A	VSP-B	VSP-C	VSP-D	VSP-E	VSP-F	VSP-HC	VSP-HD	VSP-HDW	VSP-HE	VSP-HEW	VSP-AE	VSP-BE
	VSP-MA	VSP-MB	VSP-MC	VSP-MD	VSP-ME								
Standard	●	●	●	●	●	●	-	-	-	-	-	-	-
	●	●	●	●	●								
Sponge	●	●	●	●	-	●	-	-	-	-	-	-	-
	●	●	●	●	-								
Bellows	●	●	●	●	-	●	-	-	-	-	-	-	-
	●	●	●	●	-								
Multi-stage bellows	●	●	●	●	-	●	-	-	-	-	-	-	-
	●	●	●	●	-								
Oval	●	●	●	●	-	●	-	-	-	-	-	●	●
	●	●	●	●	-								
Soft	●	●	●	●	-	●	●	●	●	●	●	-	-
	●	●	●	●	-								
Soft bellows	●	●	●	●	-	●	●	●	●	●	●	-	-
	●	●	●	●	-								
Anti-slip	●	●	●	●	●	●	-	-	-	-	-	-	-
	●	●	●	●	●								
Thin object	●	●	●	●	-	●	-	-	-	-	-	-	-
	●	●	●	●	-								
Flat	●	●	●	●	-	●	-	-	-	-	-	-	-
	●	●	●	●	-								
Suction mark prevention	●	●	●	●	-	●	-	-	-	-	-	-	-
	●	●	●	●	-								

							Pad material																Option		
	60	70	80	100	150	200	Nitrile rubber	Silicone rubber	Urethane rubber	Fluoro rubber	Chloroprene rubber	Fluorosilicone rubber	HNBR	EPDM	Static dissipative silicone rubber	Conductive rubber (low resistance)	Conductive NBR (low resistance)	NBR compatible with Food Sanitation Act	Oil-resistant NBR	PEEK	POM	Conductive PEEK	Free holder (swinging)	Position locking valve	Resin attachment
							N	S	U	F	Blank	FS	HN	EP	SE	E	NE	G	NH	K	M	KE			
	●	-	●	●	●	●	●	●	●	●	-	-	-	-	●	●	●	●	-	-	-	-	●	●	-
	●	-	●	●	-	-	●	●	●	●	-	-	-	-	-	-	●	●	-	-	-	-	●	●	-
	-	-	-	-	-	-	●	●	●	●	-	-	●	●	●	●	●	●	-	-	-	-	●	●	-
	-	●	-	●	-	-	-	●	-	-	●	-	-	-	-	-	-	-	-	-	-	-	●	●	-
	●	-	●	●	-	-	●	●	●	●	-	-	●	●	●	-	●	-	-	-	-	-	●	●	● For installation Parts
	-	-	-	-	-	-	●	●	●	●	-	-	●	●	-	-	●	●	-	-	-	-	-	●	-
	-	-	-	-	-	-	●	●	●	●	-	-	-	-	●	●	●	-	-	-	-	-	●	●	-
	-	-	-	-	-	-	●	●	-	-	-	●	-	-	●	-	●	-	-	-	-	-	●	●	-
	-	-	-	-	-	-	●	●	●	-	-	-	●	●	-	-	●	-	-	-	-	-	●	●	-
	-	-	-	-	-	-	-	●	●	●	-	-	-	-	-	-	●	-	●	-	-	-	●	●	-
	-	-	-	-	-	-	●	●	●	●	-	●	-	-	-	-	●	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	●	●	●	●	-	-	-	-	●	-	●	-	-	-	-	-	●	●	-
	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	●	●	●	-	●	-

Holder shape

Code							
Standard	VSP-A	VSP-B	VSP-C	VSP-D	VSP-E	VSP-F	VSP-HC
Compact	VSP-MA	VSP-MB	VSP-MC	VSP-MD	VSP-ME	-	-
Shape	Fixed Vacuum outlet top	Fixed Vacuum outlet side	Buffer Vacuum outlet top	Buffer Vacuum outlet side	Direct mounting, Fixed	Direct mounting, Buffer	Buffer Vacuum outlet top

Code	Standard	VSP-HD	VSP-HE	VSP-AE	VSP-BE	VSP-HDW	VSP-HEW
Shape		Buffer Vacuum outlet side	Direct mounting, Fixed, Vacuum outlet side	Screw-in Vacuum outlet top	Screw-in Vacuum outlet side	Buffer Vacuum outlet both sides	Direct mounting, Fixed, Vacuum outlet both sides

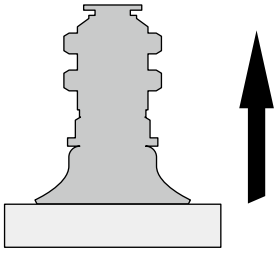
Selection method for suction pad

Theoretical suction force

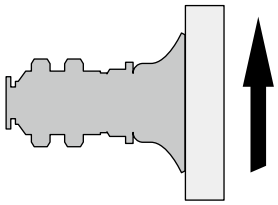
The theoretical suction force can be obtained from the area of the pad and the vacuum pressure generated when using this pad. Use the calculated value as the reference value, carry out suction testing as necessary and confirm.

Since the theoretical suction force is a numerical value at static condition, allow sufficient margin in consideration of the force due to acceleration during workpiece weight and movement (lifting, stopping, turning etc.).

Also, allow enough margin when deciding on the quantity and layout of pads.



Horizontal lifting



Perpendicular lifting

(1) Using the formula

$$W=\frac{C\times P}{101}\times 10.13\times f$$

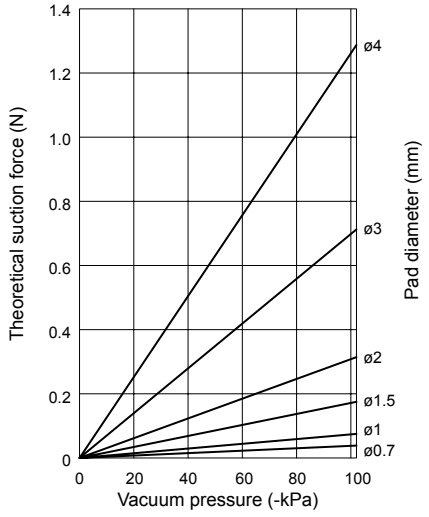
W: Suction force (N)
C : Pad area (cm²)
P : Vacuum pressure (-kPa)
f : Safety factor during horizontal lifting (refer to the figure at right): 1/4
during vertical lifting (refer to the figure at right): 1/8

*1: For the sponge pad, refer to the table on the right, as calculation uses the sponge pad section bore.
*2: For the flat pad, refer to the table on the next page, as calculation uses the grooves on the suction surface.
*3: For the suction force of the bellows (multi-stage bellows)/soft (soft bellows)/ thin object pad, the theoretical suction force may exceed the strength of the pad itself due to the pad characteristics and degree of vacuum. Hence, confirm performance with an actual device.

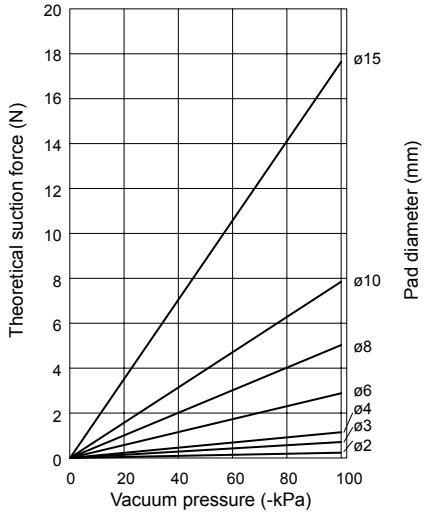
(2) Theoretical suction force graph [Add the safety factor to the numerical value obtained from the graph.]

Standard/bellows/multi-stage bellows/soft/soft bellows/anti-slip/for thin objects/suction mark prevention pad (*)

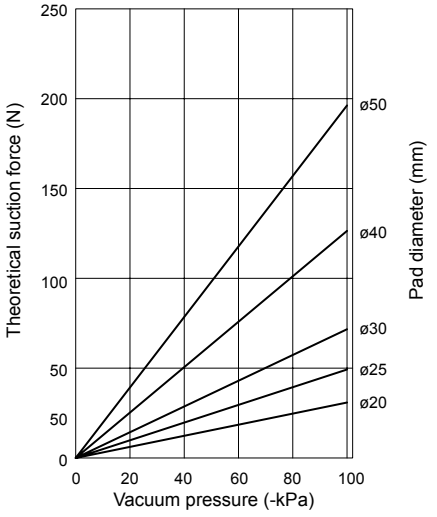
● Pad diameter (compact): ø0.7 mm to ø4 mm



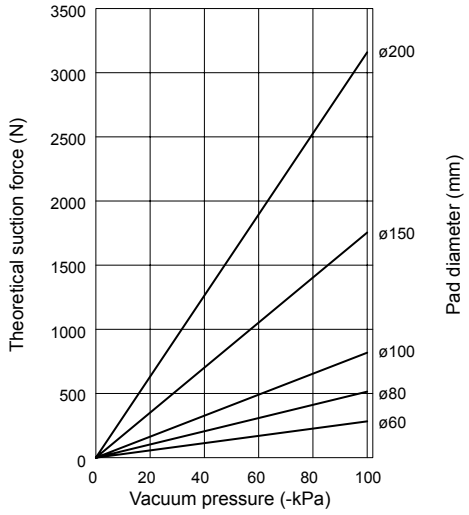
● Pad diameter ø2 mm to ø15 mm



● Pad diameter: ø20 mm to ø50 mm



● Pad diameter ø60 mm to ø200 mm

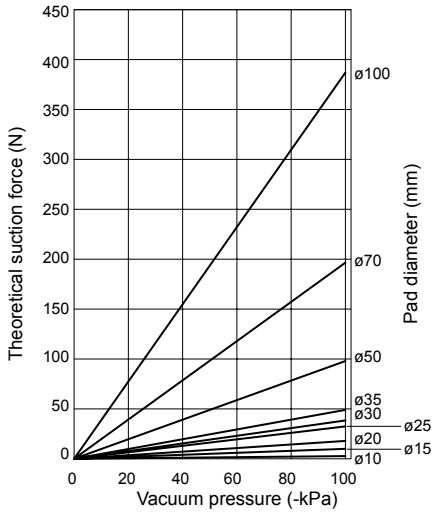


* Depending on the shape of the pad, there may be no setting for the pad diameter indicated in the graph. Check the size with the pad size list in the table below.

Pad shape		Standard	Bellows	Multi-stage bellows	Soft	Soft bellows	Anti-slip	For thin objects	Mark prevention
Pad diameter (mm)	ø0.7 to ø3	●	-	-	-	-	-	-	-
	ø4	●	-	-	●	-	-	-	-
	ø6	●	●	-	●	●	-	-	-
	ø8	●	●	-	●	●	-	●	-
	ø10	●	●	●	●	●	●	●	●
	ø15	●	●	-	●	●	-	●	-
	ø20	●	●	●	●	●	●	●	●
	ø25	●	●	-	-	-	-	-	-
	ø30	●	●	●	●	-	●	-	●
	ø40	●	●	●	●	-	●	-	-
	ø50	●	●	●	-	-	●	-	-
	ø60	●	●	-	-	-	-	-	-
	ø80	●	●	-	-	-	-	-	-
	ø100	●	●	-	-	-	-	-	-
	ø150	●	-	-	-	-	-	-	-
	ø200	●	-	-	-	-	-	-	-

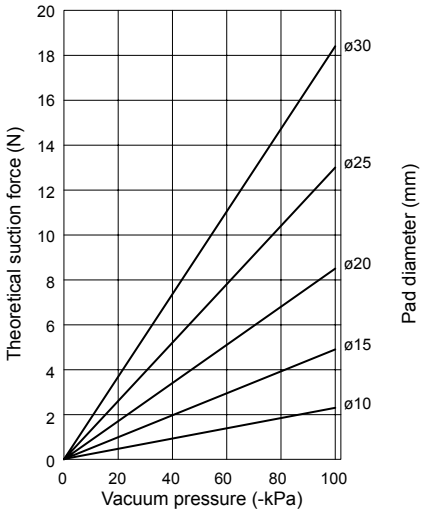
Sponge pad

● Pad diameter: ø10 mm to ø100 mm



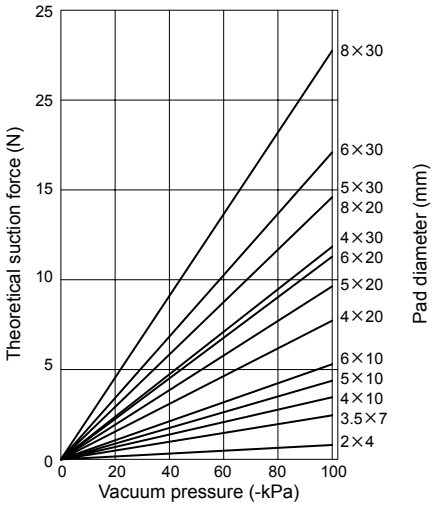
Flat pad

● Pad diameter: ø10 mm to ø30 mm



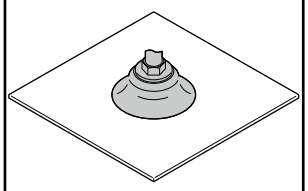
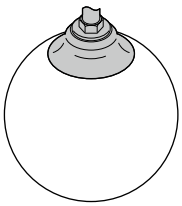
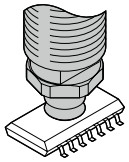
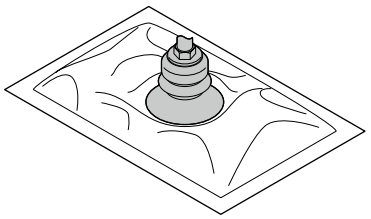
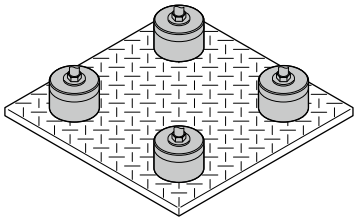
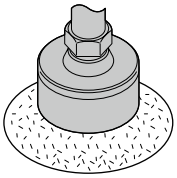
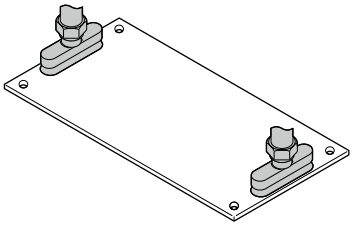
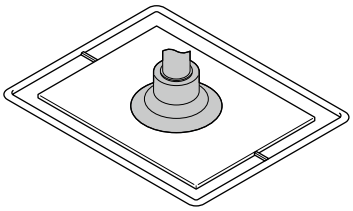
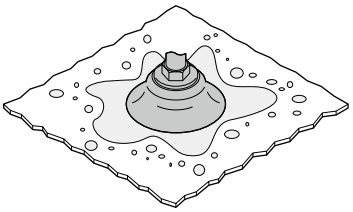
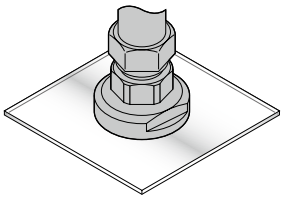
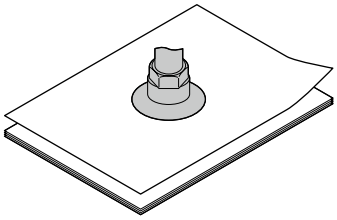
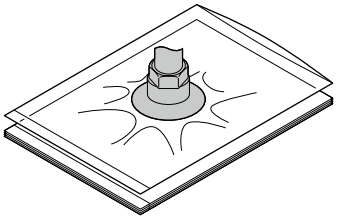
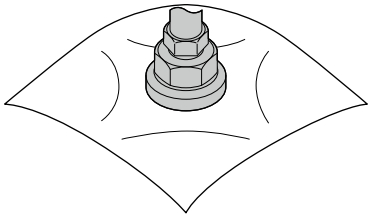
Oval pad

● Pad size: 2 x 4 mm to 8 x 30 mm



Suction pad

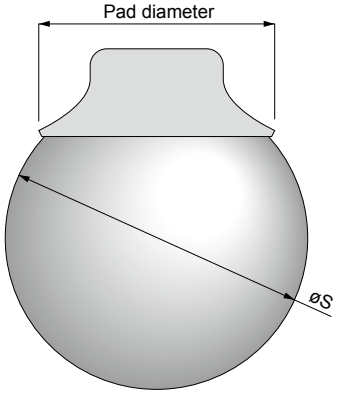
Suction pad shape

<table>
<tr><th colspan="3">Standard</th><th>Bellows/multi-stage bellows</th></tr>
<tr><td>Standard
  </td><td>Deep
  </td><td>Compact
  </td><td>  </td></tr>
<tr><td>Thick and flat workpieces.</td><td>Round fruits (apples, etc.) and round balls.</td><td>Compact workpieces and semiconductor manufacturing facilities.</td><td>Retort-packs and bags containing food, etc.</td></tr>
<tr><th colspan="2">Sponge</th><th colspan="2">Oval</th></tr>
<tr><td colspan="2"> 
  </td><td colspan="2">  </td></tr>
<tr><td colspan="2">Workpieces such as building outer wall materials, small stones and shells</td><td colspan="2">Long workpieces like substrates and semiconductors.</td></tr>
<tr><th>Soft/soft bellows</th><th>Anti-slip</th><th colspan="2">Suction mark prevention</th></tr>
<tr><td>  </td><td>  </td><td colspan="2">  </td></tr>
<tr><td>Taking out molded products and easily damaged workpieces.</td><td>Workpieces with oil adhered such as press parts.</td><td colspan="2">Liquid crystal glass, painting process, semiconductor manufacturing facilities.</td></tr>
<tr><th colspan="2">Thin object</th><th colspan="2">Flat</th></tr>
<tr><td colspan="2"> 
  </td><td colspan="2">  </td></tr>
<tr><td colspan="2">Thin workpieces such as copy paper and vinyl.</td><td colspan="2">Thin workpieces such as sheets and vinyl.</td></tr>
</table>

● Suction of spherical surfaces (deep pad)

Minimum diameter for suction

Pad diameter (mm)	ø15	ø20	ø25	ø30	ø40	ø50	ø60	ø80	ø100
Sphere diameter (øS mm)	20	30	40	50	80	100	120	160	200



Characteristics of each pad material

■ Rubber material, sponge material

Descriptions	Pad material	Nitrile rubber	NBR compatible with Food Sanitation Act	HNBR	Silicone rubber	Conductive silicone rubber	Urethane rubber	Fluoro rubber	Fluorosilicone rubber	EPDM	Conductive butadiene rubber (low resistance)	Conductive NBR (low resistance)	Chloroprene rubber (sponge)	Silicone rubber (sponge)
	Order code	N, NH(*1)	G	HN	S	SE	U	F	FS	EP	E	NE	-	S
Applications		Cardboard Plywood Iron plate Food-related Other general workpieces		Cardboard Plywood Iron plate Food-related Other general workpieces Low-concentration ozone specifications usage	Semiconductor Taking out molded products Thin workpieces Food-related		Cardboard Plywood Iron plate	Chemical atmospheres, hot workpieces	Molded parts removal	Used in applications requiring light resistance and ozone resistance, wet atmospheres	General semiconductor workpieces (antistatic measures)	Semiconductor	Workpieces with uneven surface	Workpieces with uneven surface Food-related
Pad color		Black	Gray	Black	Natural	Black	Blue	Gray	Salmon pink	Black	Black	Black	Black	Salmon pink
Characteristics	Surface hardness by pad shape (Shore A) Standard	50° to 80°	60° to 70°	50° to 70°	50°	60°	55° to 70°	60° to 70°	-	50° to 70°	70°	60° to 70°	-	-
	Bellows	50°	-	50°	50°	60°	55°	60°	-	50°	-	60°	-	-
	Multi-stage bellows	50°	50°	50°	50°	-	55°	50°	-	50°	-	60°	-	-
	Oval	40° to 50°	-	-	40° to 50°	50° to 60°	55°	50°	-	-	70°	70°	-	-
	Soft	40°	-	-	40°	60°	-	-	40°	-	-	50°	-	-
	Soft bellows	40°	-	50°	40°	-	55°	-	-	50°	-	60°	-	-
	Anti-slip	50°	-	-	50°	-	55°	60°	-	-	-	60°	-	-
	Flat	60°	-	-	40°	40°	50°	50°	-	-	-	60°	-	-
	Thin object	40°	-	-	40°	-	55°	50°	40°	-	-	60°	-	-
	High-temperature usage limits	110°C		140°C	180°C		60°C	230°C	180°C	150°C	100°C	110°C	80°C	180°C
	Low-temperature usage limits	-30°C		-30°C	-40°C		-20°C	-10°C	-50°C	-40°C	-50°C	-30°C	-45°C	-40°C
	Weather resistance	△		○	◎		○	○	○	◎	○	△	○	◎
	Ozone resistance	×		○	◎		◎	◎	◎	◎	×	×	○	◎
	Acid resistance	△		△	○		×	◎	○	◎	△	△	△	○
	Alkali resistance	○		○	◎		×	×	◎	◎	○	○	◎	◎
	Oil resistance (Gasoline/light oil)	◎		◎	△		◎	◎	△	×	×	◎	×	△
	Oil resistance (Benzene/toluene)	△		×	△		△	◎	△	×	×	△	△	△
	Volume resistance ratio	-		-	-	10^5 Ω·cm or less	-	-	-	-	200 Ω·cm or less	200 Ω·cm or less	-	-

Reading the rating ➡ ◎: Ideal, ○: Suitable, △: Acceptable, ×: Unsuitable

*1 : Pad material order code: NH is set only for anti-slip type.

*1 : Characteristics of general synthetic rubbers used for the pad material are indicated in the table of characteristics.

*2 : The values for the temperature usage limits are for very short periods of use. Therefore, careful consideration should be employed for usage extending for a constant period of time.

■ Resin material

Descriptions	Pad material	PEEK	POM	Conductive PEEK
	Order code	K	M	KE
Applications		Semiconductor/LCD manufacturing equipment	Various manufacturing lines Food-related products Packaging machine	Semiconductor/LCD manufacturing equipment Electronic device parts
Pad color		Natural	White	Black
Characteristics	High-temperature usage limits	250°C	95°C	250°C
	Low-temperature usage limits	-50°C	-60°C	-50°C
	Weather resistance	◎	×	◎
	Acid resistance	◎	×	◎
	Alkali resistance	◎	△	◎
	Self-lubrication	○	◎	○
	Abrasion resistance	◎	◎	◎
	Volume resistance ratio	-	-	10^5 to 10^6 Ω·cm

Reading the rating ➡ ◎: Ideal, ○: Suitable, △: Acceptable, ×: Unsuitable

*1 : Characteristics are those of pad resin material and do not include the suction mark prevention pad holder. Select with consideration to the vacuum pad holder to be used and the specifications of the suction mark prevention pad holder.

*2 : Characteristics are general characteristics of each material and not guaranteed values. Confirm performance with an actual device.

*3 : The values for the high temperature usage limits are for very short periods of use. Therefore, careful consideration should be employed for usage extending for a constant period of time.

*4 : The volume resistance ratio is a representative value released by the material manufacturers and not a guaranteed value.

Suction pad

Pad diameter compatibility table by material

Pad material		N: Nitrile								
Pad shape		Standard			Bellows	Multi-stage bellows	Soft	Soft bellows	Thin object	Flat
		Standard	Deep	Compact						
Pad diameter (mm)	ø0.7			●						
	ø1	●		●						
	ø1.5			●						
	ø2	●		●						
	ø3	●		●						
	ø4	●		●			●			
	ø6	●			●		●	●		
	ø8	●			●		●	●	●	
	ø10	●			●	●	●	●	●	●
	ø15	●	●		●		●	●	●	●
	ø20	●	●		●	●	●	●	●	●
	ø25	●	●		●					●
	ø30	●	●		●	●	●			●
	ø40	●	●		●	●	●			
	ø50	●	●		●	●				
	ø60	●	●		●					
	ø80	●	●		●					
	ø100	●	●		●					
	ø150	●								
	ø200	●								

Pad material		S: Silicone										
Pad shape		Standard			Bellows	Multi-stage bellows	Soft	Soft bellows	Flat	Anti-slip	Thin object	Sponge
		Standard	Deep	Compact								
Pad diameter (mm)	ø0.7			●								
	ø1	●		●								
	ø1.5			●								
	ø2	●		●								
	ø3	●		●								
	ø4	●		●			●					
	ø6	●			●		●	●				
	ø8	●			●		●	●			●	
	ø10	●			●	●	●	●	●	●	●	●
	ø15	●	●		●		●	●	●		●	●
	ø20	●	●		●	●	●	●	●	●	●	●
	ø25	●	●		●				●			●
	ø30	●	●		●	●	●		●	●		●
	ø35											●
	ø40	●	●		●	●	●			●		
	ø50	●	●		●	●				●		●
	ø60	●	●		●							
	ø70											●
	ø80	●	●		●							
	ø100	●	●		●							●
	ø150	●										
	ø200	●										

Pad material		U: Urethane								
Pad shape		Standard			Bellows	Multi-stage bellows	Soft bellows	Anti-slip	Thin object	Flat
		Standard	Deep	Compact						
Pad diameter (mm)	ø0.7			●						
	ø1	●		●						
	ø1.5			●						
	ø2	●		●						
	ø3	●		●						
	ø4	●		●						
	ø6	●			●		●			
	ø8	●			●		●		●	
	ø10	●			●	●	●	●	●	●
	ø15	●	●		●		●		●	●
	ø20	●	●		●	●	●	●	●	●
	ø25	●	●		●					●
	ø30	●	●		●	●		●		●
	ø40	●	●		●	●		●		
	ø50	●	●		●	●		●		
	ø60	●	●		●					
	ø80	●	●		●					
	ø100	●	●		●					
	ø150	●								
	ø200	●								

Pad material		F: Fluorine								G: NBR compatible with Food Sanitation Act			
Pad shape		Standard			Bellows	Multi-stage bellows	Anti-slip	Thin object	Flat	Standard			Multi-stage bellows
		Standard	Deep	Compact						Standard	Deep	Compact	
Pad diameter (mm)	ø0.7			●								●	
	ø1	●		●						●		●	
	ø1.5			●								●	
	ø2	●		●						●		●	
	ø3	●		●						●		●	
	ø4	●		●						●		●	
	ø6	●			●					●			
	ø8	●			●			●		●			
	ø10	●			●	●	●	●	●	●			●
	ø15	●	●		●			●	●	●	●		
	ø20	●	●		●	●	●	●	●	●	●		●
	ø25	●	●		●				●	●	●		
	ø30	●	●		●	●	●		●	●	●		●
	ø40	●	●		●	●	●			●	●		●
	ø50	●	●		●	●	●			●	●		●
	ø60	●	●		●								
	ø80	●	●		●								
	ø100	●	●		●								
	ø150	●											
	ø200	●											

Suction pad

Pad material		SE: Conductive silicone					E: Conductive butadiene rubber (low resistance)		S:Chloroprene	NH: Oil-resistant NBR
Pad shape		Standard		Bellows	Soft	Flat	Standard		Sponge	Anti-slip
		Standard	Compact				Standard	Compact		
Pad diameter (mm)	ø0.7		●					●		
	ø1	●	●				●	●		
	ø1.5		●					●		
	ø2	●	●				●	●		
	ø3	●	●				●	●		
	ø4	●	●		●		●	●		
	ø6	●		●	●		●			
	ø8	●		●	●		●			
	ø10	●		●	●	●	●		●	●
	ø15	●		●	●	●	●		●	
	ø20	●		●	●	●	●		●	●
	ø25	●		●		●	●		●	
	ø30	●		●	●	●	●		●	●
	ø35								●	
	ø40	●		●	●		●			●
	ø50	●		●			●		●	●
	ø60	●		●						
	ø70								●	
	ø80	●		●						
	ø100	●		●					●	
	ø150	●								
	ø200	●								

Pad material		NE: Conductive NBR (low resistance)									
Pad shape		Standard			Bellows	Multi-stage bellows	Soft	Soft bellows	Anti-slip	Thin object	Flat
		Standard	Deep	Compact							
Pad diameter (mm)	ø0.7			●							
	ø1	●		●							
	ø1.5			●							
	ø2	●		●							
	ø3	●		●							
	ø4	●		●			●				
	ø6	●			●		●	●			
	ø8	●			●		●	●		●	
	ø10	●			●	●	●	●	●	●	●
	ø15	●	●		●		●	●		●	●
	ø20	●	●		●	●	●	●	●	●	●
	ø25	●	●		●						●
	ø30	●	●		●	●	●		●		●
	ø40	●	●		●	●	●		●		
	ø50	●	●		●	●			●		
	ø60	●	●		●						
	ø80	●			●						
	ø100	●	●		●						
	ø150	●									
	ø200	●									

Pad material		HN: HNBR				EP: EPDM				FS: Fluorosilicone	
Pad shape		Standard Compact	Bellows	Multi-stage bellows	Soft bellows	Standard Compact	Bellows	Multi-stage bellows	Soft bellows	Soft	Thin object
Pad diameter (mm)	ø0.7	●				●					
	ø1	●				●					
	ø1.5	●				●					
	ø2	●				●					
	ø3	●				●					
	ø4	●				●				●	
	ø6		●		●		●		●	●	
	ø8		●		●		●		●	●	●
	ø10		●	●	●		●	●	●	●	●
	ø15		●		●		●		●	●	●
	ø20		●	●	●		●	●	●	●	●
	ø25		●				●				
	ø30		●	●			●	●		●	
	ø40		●	●			●	●		●	
	ø50		●	●			●	●			
	ø60		●				●				
	ø80		●				●				
	ø100		●				●				

Pad material		N: Nitrile	S: Silicone	U: Urethane	F: Fluorine	SE: Conductive silicone	E: Conductive butadiene rubber (low resistance)	NE: Conductive NBR (low resistance)
Pad shape		Oval						
Pad size (mm)	2×4	●	●	●	●	●		●
	3.5×7	●	●	●	●	●		●
	4×10	●	●	●	●	●	●	●
	4×20	●	●	●	●	●	●	●
	4×30	●	●			●	●	●
	5×10	●	●	●	●	●	●	●
	5×20	●	●	●	●	●	●	●
	5×30	●	●	●	●	●	●	●
	6×10	●	●	●	●	●	●	●
	6×20	●	●	●	●	●	●	●
	6×30	●	●	●	●	●	●	●
	8×20	●	●	●	●	●	●	●
	8×30	●	●	●	●	●	●	●

Pad material		K: PEEK	M: POM	KE: Conductive PEEK
Pad shape		Suction mark prevention		
Pad diameter (mm)	ø10	●	●	●
	ø20	●	●	●
	ø30	●	●	●

Pad material		K: PEEK	M: POM	KE: Conductive PEEK
Pad shape		Resin attachment for suction mark prevention bellows		
Pad diameter (mm)	ø10	●	●	●
	ø15	●	●	●
	ø20	●	●	●
	ø25	●	●	●
	ø30	●	●	●

Suction pad for flat workpieces & spheres
Suction pad standard (standard, deep, compact)

VSP-*R*, *A*, *RM* Series

● Pad diameter: ø0.7 to ø200

RoHS

Features

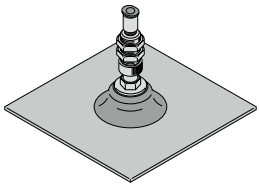
■ Standard suction pad with a wide range of pad diameters, materials and holder shapes.

- Pad shape: 3 types (standard, deep, compact)
- Pad diameter: 20 types (ø0.7, ø1, ø1.5, ø2, ø3, ø4 ø6, ø8, ø10, ø15, ø20, ø25, ø30, ø40, ø50, ø60, ø80, ø100, ø150, ø200)
- Pad material: 10 types (nitrile rubber, silicone rubber, urethane rubber, fluoro rubber, HNBR, EPDM, conductive silicone rubber, antistatic butadiene rubber, conductive NBR, NBR compatible with the Food Sanitation Act)
- Holder shape: 11 types (6 standard, 5 compact)
- Free holder (swinging): 2 types (30° angle, 10° angle) [Compatible pad diameter: ø10 to ø100]
- Position locking valve: Compatible pad diameter (ø1.5 to ø100)

Applications

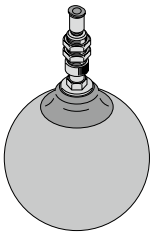
Standard (general)

● Flat workpieces
(hard and inflexible workpieces)

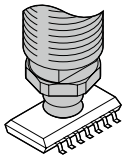


Standard (deep)

● Round fruits (apples, etc.) and round balls



Standard (compact)



How to order

* Refer to model No. sections on dimensions pages 300 to 327 for combinations of model No.

● Suction pad/standard (R), deep (A), compact (RM)

VSP - A 40 R N — 6T - ○ - V

● Pad rubber only/standard (R), deep (A), compact (RM)

VSPG — 40 R N A

Ⓐ Holder shape
Ⓑ Pad diameter
Ⓒ Pad shape
Ⓓ Pad material
Ⓔ Frame
Ⓕ Port size/shape
Ⓖ Free holder (swinging)
Ⓗ Position locking valve

Code	Content
Ⓐ Holder shape *1, *2	
A	Fixed, Vacuum outlet top
B	Fixed, Vacuum outlet side
C	Buffer, Vacuum outlet top
D	Buffer, Vacuum outlet side
E	Direct mounting, Fixed
F	Direct mounting, Buffer
MA	Compact Fixed, Vacuum outlet top
MB	Compact Fixed, Vacuum outlet side
MC	Compact Buffer, Vacuum outlet top
MD	Compact Buffer, Vacuum outlet side
ME	Compact Direct mounting, Fixed (pad shape: RM only)

Ⓑ Pad diameter *1, *2

Refer to Appendix 1 for pad diameter.

Ⓒ Pad shape	
R	Standard, general
A	Standard, deep
RM	Standard, compact

Ⓓ Pad material		**R**	**A**	**RM**
N	Nitrile rubber	●	●	●
S	Silicone rubber	●	●	●
U	Urethane rubber	●	●	●
F	Fluoro rubber	●	●	●
HN	HNBR			●
EP	EPDM			●
SE	Conductive silicone rubber	●		●
E	Antistatic butadiene rubber (low resistance)	●		●
NE	Conductive NBR (low resistance)	●	●	●
G	NBR compatible with Food Sanitation Act	●	●	●

Ⓔ Frame	
Blank	Without frame
A	With frame (compatible pad diameter: ø80 to ø200)

Ⓕ Port size/shape *1	
2	ø1.8 push-in fitting *5
4	ø4 push-in fitting
4T	ø4 barbed fitting
6	ø6 push-in fitting
6T	ø6 barbed fitting
M3	M3 x 0.5 (compact holder shape: ME only)
M5	M5 x 0.5 (compact holder shape: ME only)
6A	Rp1/8
8A	Rp1/4
Blank	(Holder shape: Selected with E, F)

Ⓖ Free holder (swinging) *1, *3, *4 Page 550	
F1	With free holder swing angle 30°
F2	With free holder swing angle 15°
Blank	Without free holder

Ⓗ Position locking valve *2, *3, *4 Page 556	
V	With position locking valve
Blank	None

⚠ Precautions for model No. selection

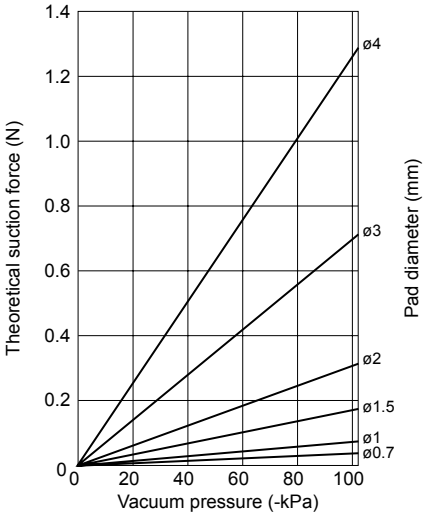
*1 : When Ⓖis "F1" or "F2", Ⓑ10 to 100 can be selected.
ⒶM□ (compact holder) cannot be selected.
*2 : When Ⓗis "V", only Ⓐ"E" and "ME" can be selected for Ⓑ1 to 8.
When Ⓑis 10 to 50, Ⓐ"E" and "ME" cannot be selected.
When Ⓑis 60 to 100, Ⓐ"E", "ME" and "F" cannot be selected.
Cannot be selected for Ⓑ150 to 200.
*3 : Ⓖ"F1", "F2" and Ⓗ"V" cannot be selected together.
*4 : Refer to page 550 for details on free holders (F1, F2) and page 556 for details on position locking valves (V). In addition, refer to the target suction pad list (page 558) for applicable pad size shape.
*5 : Use a compatible tube of the fiber tube clean-room EH-5802 Series or polyurethane tube UB01810 Series manufactured by PISCO Japan Co., Ltd.

Appendix 1: Pad diameter - shape - material combinations

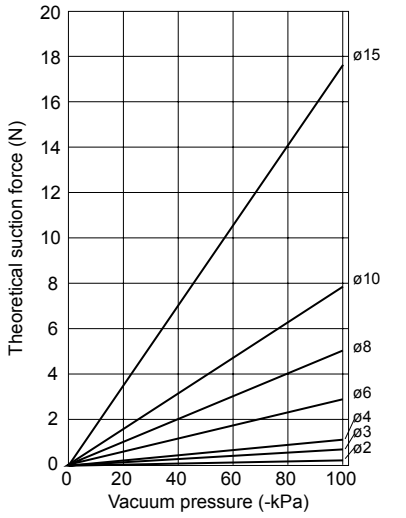
Pad shape		Standard (R)										Deep (A)										Compact (RM)									
Pad material		N	S	U	F	HN	EP	SE	E	NE	G	N	S	U	F	HN	EP	SE	E	NE	G	N	S	U	F	HN	EP	SE	E	NE	G
Pad diameter	0.7 Ø0.7																					●	●	●	●	●	●	●	●	●	●
	1 Ø1	●	●	●	●			●	●	●	●											●	●	●	●	●	●	●	●	●	●
	1.5 Ø1.5																					●	●	●	●	●	●	●	●	●	●
	2 Ø2	●	●	●	●			●	●	●	●											●	●	●	●	●	●	●	●	●	●
	3 Ø3	●	●	●	●			●	●	●	●											●	●	●	●	●	●	●	●	●	●
	4 Ø4	●	●	●	●			●	●	●	●											●	●	●	●	●	●	●	●	●	●
	6 Ø6	●	●	●	●			●	●	●	●																				
	8 Ø8	●	●	●	●			●	●	●	●																				
	10 Ø10	●	●	●	●			●	●	●	●																				
	15 Ø15	●	●	●	●			●	●	●	●	●	●	●	●					●	●										
	20 Ø20	●	●	●	●			●	●	●	●	●	●	●	●					●	●										
	25 Ø25	●	●	●	●			●	●	●	●	●	●	●	●					●	●										
	30 Ø30	●	●	●	●			●	●	●	●	●	●	●	●					●	●										
	40 Ø40	●	●	●	●			●	●	●	●	●	●	●	●					●	●										
	50 Ø50	●	●	●	●			●	●	●	●	●	●	●	●					●	●										
	60 Ø60	●	●	●	●			●		●		●	●	●	●					●											
	80 Ø80	●	●	●	●			●		●		●	●	●	●					●											
	100 Ø100	●	●	●	●			●		●		●	●	●	●					●											
	150 Ø150	●	●	●	●			●		●																					
	200 Ø200	●	●	●	●			●		●																					

Theoretical suction force

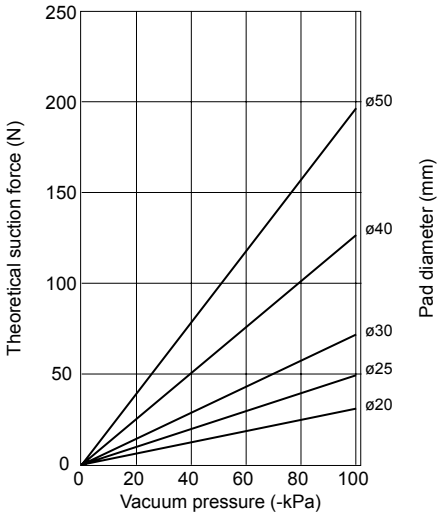
Pad diameter (compact): ø0.7mm to ø4mm



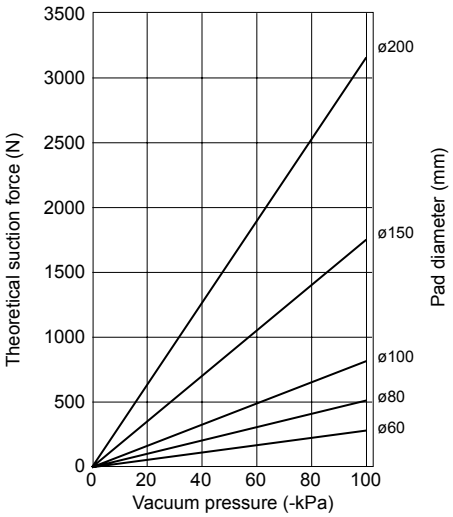
Pad diameter: ø2 mm to 15 mm



Pad diameter: ø20 mm to 50mm



Pad diameter: ø60 mm to 200 mm

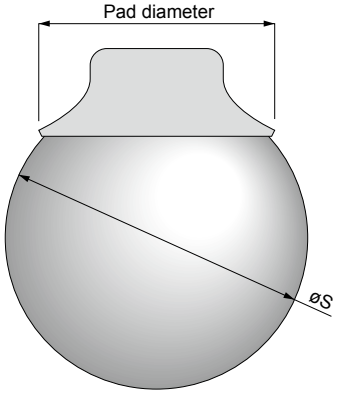


Because the theoretical suction force is the value at static conditions, adopt a safety factor of 1/4 for horizontal lifting and 1/8 for vertical lifting in actual use.

● Suction of spherical surfaces (deep pad)

Minimum diameter for suction

Pad diameter (mm)	ø15	ø20	ø25	ø30	ø40	ø50	ø60	ø80	ø100
Sphere diameter (øS mm)	20	30	40	50	80	100	120	160	200



Safety precautions

⚠ CAUTION

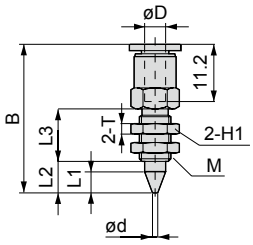
■ Standard suction pads VSP-□1R□ to □4R□ cannot be mounted on compact suction pad holders. These pads support use with the standard suction pad holder.

■ For compact suction pads, when mounting pads with diameter ø0.7, ø1 or ø1.5 mm, do not apply a load of 0.4 (N) or more to the lip during suction. If an excessive load is applied to the lip, the pad bore collapses due to rubber elasticity, which may prevent it from suctioning workpieces and cause the suction confirmation signal to malfunction.

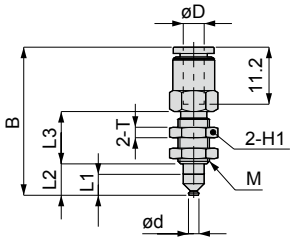
■ Pad frames of pad O.D. ø80 mm or more have no conductivity. When using suction pads of static dissipative rubber, conductive rubber (low resistance) or conductive NBR (low resistance), take measures to let electricity pass directly from the pad rubber.

Dimensions (fixed, vacuum outlet top VSP-A, push-in fitting)

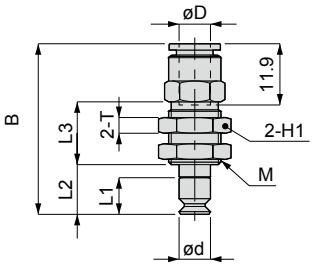
●VSP-A1R□-4



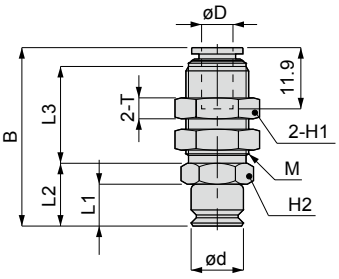
●VSP-A2 to 4R□-4



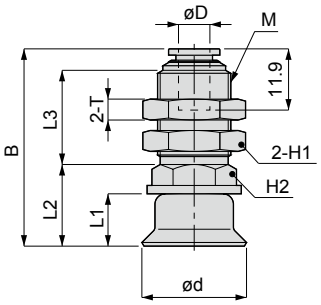
● VSP-A6, 8R□-6



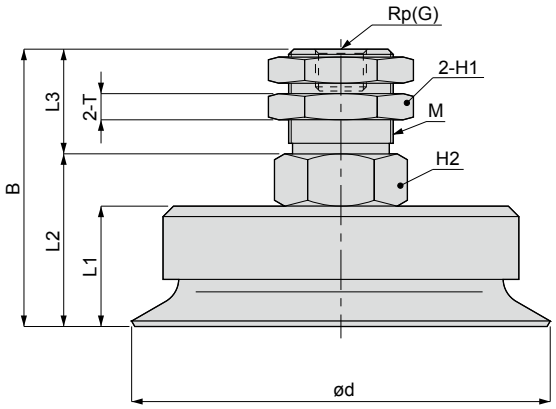
●VSP-A10R□-6



●VSP-A15 to 50R(A)□-6



●VSP-A60 to 200R□-6A/8A



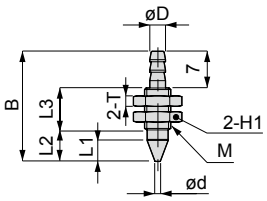
Unit: mm

Model No.	Tube O.D. øD	Pad diameter ød	Rp (G)	Mounting screw M	B	L1	L2	L3	Opposite side H1	Opposite side H2	T	Weight (g)
VSP-A 1R□-4	4	1	-	M6 × 0.75	28.6	4	6	10	8	-	2	6
VSP-A 2R□-4	4	2	-	M6 × 0.75	28.6	4	6	10	8	-	2	6
VSP-A 3R□-4	4	3	-	M6 × 0.75	28.6	4	6	10	8	-	2	6
VSP-A 4R□-4	4	4	-	M6 × 0.75	28.6	4	6	10	8	-	2	6
VSP-A 6R□-6	6	6	-	M10 × 1	32.8	7	9.5	12	12	-	3	13
VSP-A 8R□-6	6	8	-	M10 × 1	31.3	5.5	8	12	12	-	3	13
VSP-A 10R□-6	6	10	-	M12 × 1	34.3	8	12	18.5	14	12	4	21
VSP-A 15R(A)□-6	6	15	-	M12 × 1	35.3(36.3)	9(10)	13(14)	18.5	14	12	4	22
VSP-A 20R(A)□-6	6	20	-	M14 × 1	37.9(38.9)	10(11)	15.6(16.6)	18	17	12	4	37
VSP-A 25R(A)□-6	6	25	-	M14 × 1	38.9(39.9)	11(12)	16.6(17.6)	18	17	12	4	37
VSP-A 30R(A)□-6	6	30	-	M14 × 1	38.9(41.9)	11(14)	16.6(19.6)	18	17	12	4	39
VSP-A 40R(A)□-6	6	40	-	M14 × 1	41.9(45.4)	14(17.5)	19.6(23.1)	18	17	12	4	46(47)
VSP-A 50R(A)□-6	6	50	-	M14 × 1	42.9(45.9)	15(18)	20.6(23.6)	18	17	12	4	52(54)
VSP-A 60R(A)□-6A	-	60	1/8	M20 × 1	50.6(57.6)	18(25)	30.6(37.6)	20	24	22	5	133(133)
VSP-A 80R(A)□-6A	-	80	1/8	M20 × 1	53(63)	23(33)	33(43)	20	24	22	5	217(226)
VSP-A 100R(A)□-6A	-	100	1/8	M20 × 1	55(64)	25(34)	35(44)	20	24	22	5	307(313)
VSP-A 150R□-8A	-	150	1/4	M24 × 2	95	45	65	30	30	27	10	923
VSP-A 200R□-8A	-	200	1/4	M24 × 2	100	50	70	30	30	27	10	1403

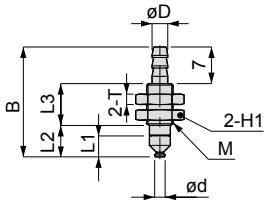
*1 : Dimensions in ( ) are dimensions of the deep pad.

Dimensions (fixed, vacuum outlet top VSP-A, barbed fitting)

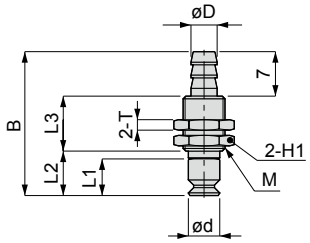
●VSP-A1R□-4T



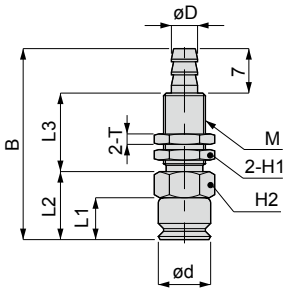
●VSP-A2 to 4R□-4T



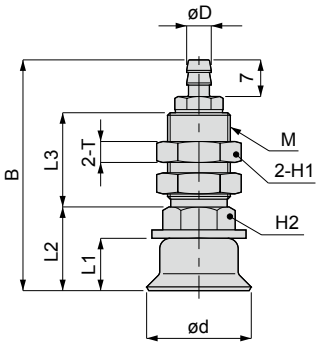
● VSP-A6, 8R□-6T



●VSP-A10R□-6T



●VSP-A15 to 50R(A)□-6T



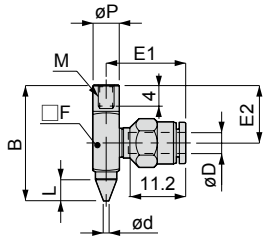
Unit: mm

Model No.	Tube O.D. x I.D. øD	Pad diameter ød	Mounting screw M	B	L1	L2	L3	Opposite side H1	Opposite side H2	T	Weight (g)
VSP-A 1R□-4T	4 × 2.5	1	M5 × 0.5	21	4	6	8	8	-	2	3
VSP-A 2R□-4T	4 × 2.5	2	M5 × 0.5	21	4	6	8	8	-	2	3
VSP-A 3R□-4T	4 × 2.5	3	M5 × 0.5	21	4	6	8	8	-	2	3
VSP-A 4R□-4T	4 × 2.5	4	M5 × 0.5	21	4	6	8	8	-	2	3
VSP-A 6R□-6T	6 × 4	6	M8 × 0.75	27.5	7	8.5	10.5	10	-	2	7
VSP-A 8R□-6T	6 × 4	8	M8 × 0.75	26	5.5	7	10.5	10	-	2	7
VSP-A 10R□-6T	6 × 4	10	M8 × 0.75	36.5	8	13	15	10	10	2	12
VSP-A 15R(A)□-6T	6 × 4	15	M8 × 0.75	37.5(38.5)	9(10)	14(15)	15	10	10	2	12
VSP-A 20R(A)□-6T	6 × 4	20	M12 × 1	44(45)	10(11)	16(17)	18	14	12	4	30
VSP-A 25R(A)□-6T	6 × 4	25	M12 × 1	45(46)	11(12)	17(18)	18	14	12	4	31
VSP-A 30R(A)□-6T	6 × 4	30	M12 × 1	45(48)	11(14)	17(20)	18	14	12	4	33
VSP-A 40R(A)□-6T	6 × 4	40	M12 × 1	48(51.5)	14(17.5)	20(23.5)	18	14	12	4	40(41)
VSP-A 50R(A)□-6T	6 × 4	50	M12 × 1	49(52)	15(18)	21(24)	18	14	12	4	46(47)

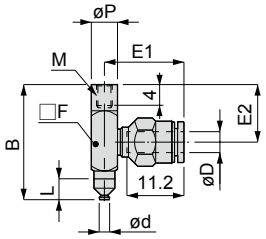
*1 : Dimensions in ( ) are dimensions of the deep pad.

Dimensions (fixed, vacuum outlet side VSP-B, push-in fitting)

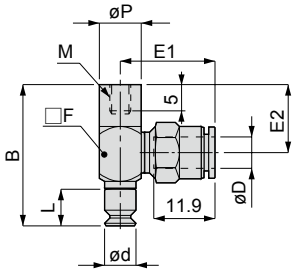
●VSP-B1R□-4



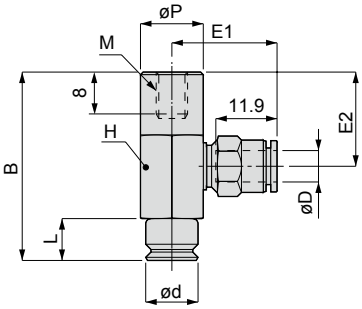
●VSP-B2 to 4R□-4



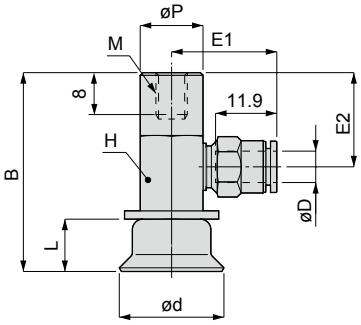
●VSP-B6, 8R□-6



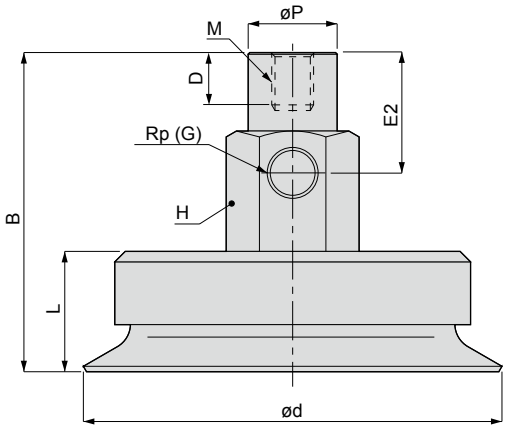
●VSP-B10R□-6



●VSP-B15 to 50R(A)□-6



●VSP-B60 to 200R□-6A/8A



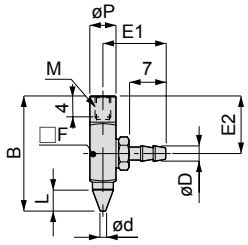
Unit: mm

Model No.	Tube O.D. øD	Pad diameter ød	Rp (G)	Mounting screw M	B	L	øP	D	E1	E2	Opposite side H	□F	Weight (g)
VSP-B 1R□-4	4	1	-	M3 × 0.5	22	4	5	-	15.5	11	-	5	6
VSP-B 2R□-4	4	2	-	M3 × 0.5	22	4	5	-	15.5	11	-	5	6
VSP-B 3R□-4	4	3	-	M3 × 0.5	22	4	5	-	15.5	11	-	5	6
VSP-B 4R□-4	4	4	-	M3 × 0.5	22	4	5	-	15.5	11	-	5	6
VSP-B 6R□-6	6	6	-	M4 × 0.7	27	7	8	-	18.3	13	-	8	13
VSP-B 8R□-6	6	8	-	M4 × 0.7	25.5	5.5	8	-	18.3	13	-	8	13
VSP-B 10R□-6	6	10	-	M6 × 1	36	8	12	-	20.3	18	12	-	30
VSP-B 15R(A)□-6	6	15	-	M6 × 1	37(38)	9(10)	12	-	20.3	18	12	-	31
VSP-B 20R(A)□-6	6	20	-	M6 × 1	38(39)	10(11)	12	-	20.3	18	12	-	34
VSP-B 25R(A)□-6	6	25	-	M6 × 1	39(40)	11(12)	12	-	20.3	18	12	-	35
VSP-B 30R(A)□-6	6	30	-	M6 × 1	39(42)	11(14)	12	-	20.3	18	12	-	37
VSP-B 40R(A)□-6	6	40	-	M6 × 1	42(45.5)	14(17.5)	12	-	20.3	18	12	-	44(45)
VSP-B 50R(A)□-6	6	50	-	M6 × 1	43(46)	15(18)	12	-	20.3	18	12	-	50(51)
VSP-B 60R(A)□-6A	-	60	1/8	M8 × 1.25	58.6(65.6)	18(25)	17	10	-	23	22	-	140(139)
VSP-B 80R(A)□-6A	-	80	1/8	M8 × 1.25	61(71)	23(33)	17	10	-	23	22	-	224(232)
VSP-B 100R(A)□-6A	-	100	1/8	M8 × 1.25	63(72)	25(34)	17	10	-	23	22	-	313(319)
VSP-B 150R□-8A	-	150	1/4	M16 × 2	110	45	26	20	-	40	30	-	995
VSP-B 200R□-8A	-	200	1/4	M16 × 2	115	50	26	20	-	40	30	-	1474

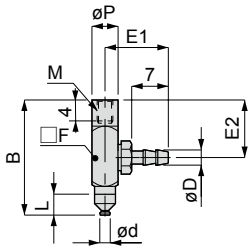
*1 : Dimensions in ( ) are dimensions of the deep pad.

Dimensions (fixed, vacuum outlet side VSP-B, barbed fitting)

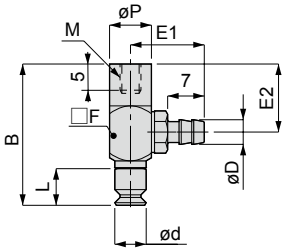
●VSP-B1R□-4T



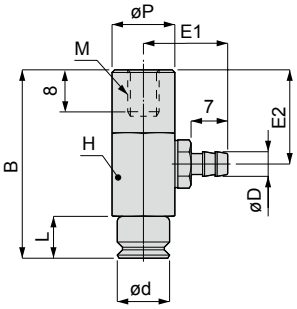
●VSP-B2 to 4R□-4T



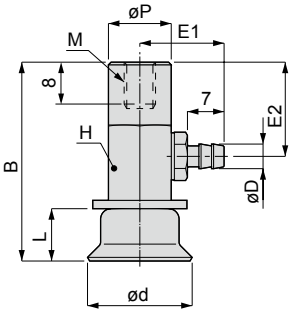
●VSP-B6, 8R□-6T



●VSP-B10R□-6T



●VSP-B15 to 50R(A)□-6T



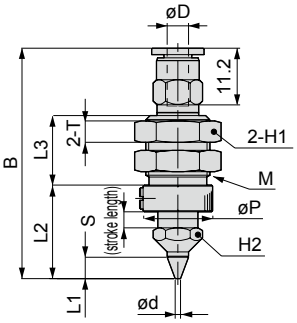
Unit: mm

Model No.	Tube O.D. x I.D. øD	Pad diameter ød	M	B	L	øP	E1	E2	Opposite side H	□F	Weight (g)
VSP-B 1R□-4T	4×2.5	1	M3×0.5	22	4	5	12	11	-	5	4
VSP-B 2R□-4T	4×2.5	2	M3×0.5	22	4	5	12	11	-	5	4
VSP-B 3R□-4T	4×2.5	3	M3×0.5	22	4	5	12	11	-	5	4
VSP-B 4R□-4T	4×2.5	4	M3×0.5	22	4	5	12	11	-	5	4
VSP-B 6R□-6T	6×4	6	M4×0.7	27	7	8	14	13	-	8	11
VSP-B 8R□-6T	6×4	8	M4×0.7	25.5	5.5	8	14	13	-	8	11
VSP-B 10R□-6T	6×4	10	M6×1	36	8	12	16	18	12	-	29
VSP-B 15R(A)□-6T	6×4	15	M6×1	37(38)	9(10)	12	16	18	12	-	29
VSP-B 20R(A)□-6T	6×4	20	M6×1	38(39)	10(11)	12	16	18	12	-	32
VSP-B 25R(A)□-6T	6×4	25	M6×1	39(40)	11(12)	12	16	18	12	-	33
VSP-B 30R(A)□-6T	6×4	30	M6×1	39(42)	11(14)	12	16	18	12	-	35
VSP-B 40R(A)□-6T	6×4	40	M6×1	42(45.5)	14(17.5)	12	16	18	12	-	42(43)
VSP-B 50R(A)□-6T	6×4	50	M6×1	43(46)	15(18)	12	16	18	12	-	48(49)

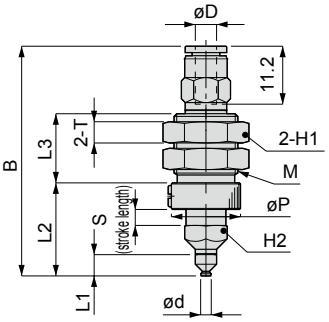
*1 : Dimensions in ( ) are dimensions of the deep pad.

Dimensions (buffer, vacuum outlet top VSP-C, push-in fitting)

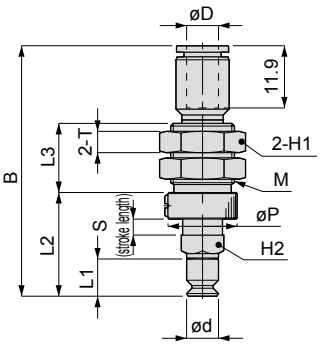
●VSP-C1R□-4



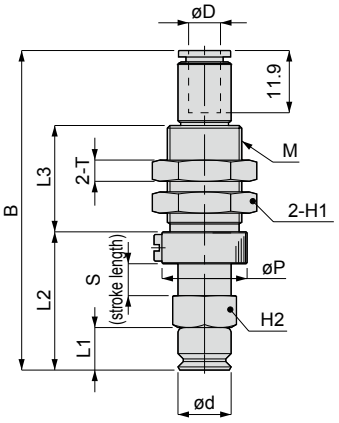
●VSP-C2 to 4R□-4



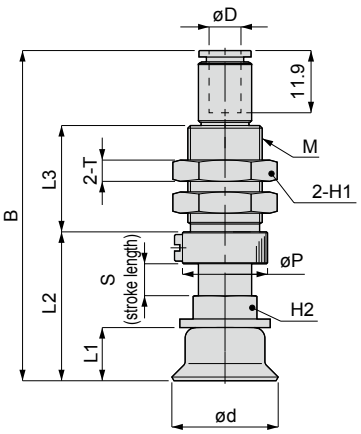
●VSP-C6, 8R□-6



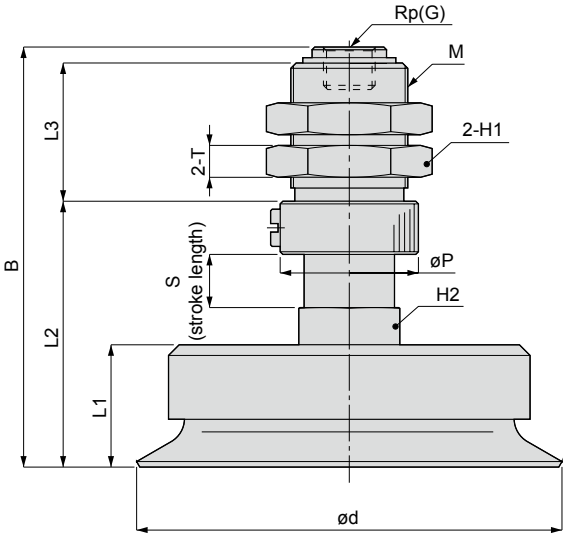
●VSP-C10R□-6



●VSP-C15 to 50R(A)□-6



●VSP-C60 to 200R□-6A/8A



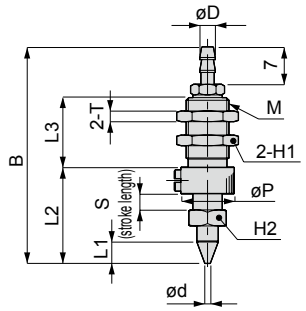
Unit: mm

Model No.	Tube O.D. øD	Pad diameter ød	Rp (G)	Mounting screw M	B	L1	L2	L3	øP	Stroke length S	Opposite side H1	Opposite side H2	T	Spring force (N)	Weight (g)
VSP-C 1R□-4	4	1	-	M12 × 1	43.5	4	17.5	13	13	3	14	8	4	0.9 to 1.9	17
VSP-C 2R□-4	4	2	-	M12 × 1	43.5	4	17.5	13	13	3	14	8	4	0.9 to 1.9	17
VSP-C 3R□-4	4	3	-	M12 × 1	43.5	4	17.5	13	13	3	14	8	4	0.9 to 1.9	17
VSP-C 4R□-4	4	4	-	M12 × 1	43.5	4	17.5	13	13	3	14	8	4	0.9 to 1.9	17
VSP-C 6R□-6	6	6	-	M12 × 1	47.3	7	19.5	13	13	3	14	8	4	0.9 to 1.9	19
VSP-C 8R□-6	6	8	-	M12 × 1	45.8	5.5	18	13	13	3	14	8	4	0.9 to 1.9	19
VSP-C 10R□-6	6	10	-	M14 × 1	60.3	8	26	20	16	6	17	12	4	4 to 7.1	36
VSP-C 15R(A)□-6	6	15	-	M14 × 1	61.3(62.3)	9(10)	27(28)	20	16	6	17	12	4	4 to 7.1	36
VSP-C 20R(A)□-6	6	20	-	M14 × 1	62.3(63.3)	10(11)	28(29)	20	16	6	17	12	4	7 to 12.6	40
VSP-C 25R(A)□-6	6	25	-	M14 × 1	63.3(64.3)	11(12)	29(30)	20	16	6	17	12	4	7 to 12.6	40
VSP-C 30R(A)□-6	6	30	-	M14 × 1	63.3(66.3)	11(14)	29(32)	20	16	6	17	12	4	7 to 12.6	43
VSP-C 40R(A)□-6	6	40	-	M14 × 1	66.3(69.8)	14(17.5)	32(35.5)	20	16	6	17	12	4	7 to 12.6	50(51)
VSP-C 50R(A)□-6	6	50	-	M14 × 1	67.3(70.3)	15(18)	33(36)	20	16	6	17	12	4	7 to 12.6	55(57)
VSP-C 60R(A)□-6A	-	60	1/8	M22 × 1	76.6(83.6)	18(25)	47.6(54.6)	26	26	10	27	19	6	10.1 to 15.8	161(161)
VSP-C 80R(A)□-6A	-	80	1/8	M22 × 1	79(89)	23(33)	50(60)	26	26	10	27	19	6	10.1 to 15.8	245(254)
VSP-C 100R(A)□-6A	-	100	1/8	M22 × 1	81(90)	25(34)	52(61)	26	26	10	27	19	6	10.1 to 15.8	335(341)
VSP-C 150R□-8A	-	150	1/4	M30 × 2	164	45	112	48	35	20	36	30	10	14 to 25.5	1196
VSP-C 200R□-8A	-	200	1/4	M30 × 2	169	50	117	48	35	20	36	30	10	14 to 25.5	1675

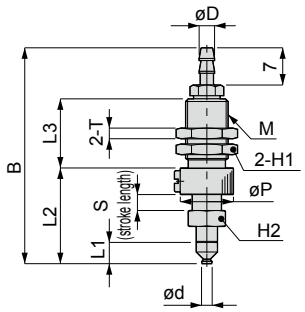
*1 : Dimensions in ( ) are dimensions of the deep pad.

Dimensions (buffer, vacuum outlet top VSP-C, barbed fitting)

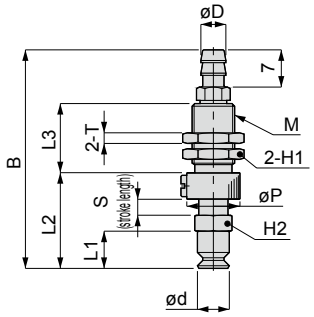
●VSP-C1R□-4T



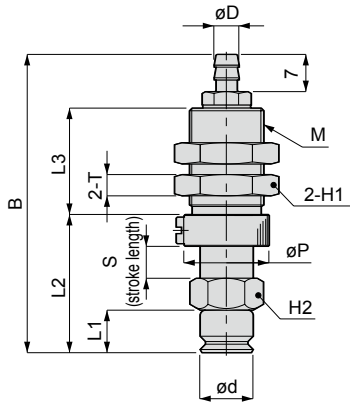
●VSP-C2 to 4R□-4T



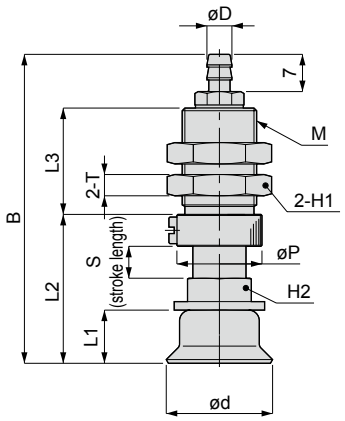
●VSP-C6, 8R□-6T



●VSP-C10R□-6T



●VSP-C15 to 50R(A)□-6T



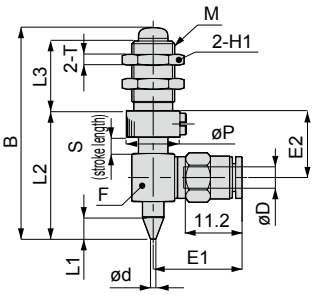
Unit: mm

Model No.	Tube O.D. x I.D. øD	Pad diameter ød	Mounting screw M	B	L1	L2	L3	øP	Stroke length S	Opposite side H1	Opposite side H2	T	Spring force (N)	Weight (g)
VSP-C 1R□-4T	4×2.5	1	M8×0.75	40.5	4	18	13	10	3	10	7	2	0.9 to 1.9	8
VSP-C 2R□-4T	4×2.5	2	M8×0.75	40.5	4	18	13	10	3	10	7	2	0.9 to 1.9	8
VSP-C 3R□-4T	4×2.5	3	M8×0.75	40.5	4	18	13	10	3	10	7	2	0.9 to 1.9	8
VSP-C 4R□-4T	4×2.5	4	M8×0.75	40.5	4	18	13	10	3	10	7	2	0.9 to 1.9	8
VSP-C 6R□-6T	6×4	6	M8×0.75	41.0	7	18	13	10	3	10	7	2	0.9 to 1.9	9
VSP-C 8R□-6T	6×4	8	M8×0.75	39.5	5.5	16.5	13	10	3	10	7	2	0.9 to 1.9	9
VSP-C 10R□-6T	6×4	10	M14×1	56.1	8	26	20	16	6	17	12	4	4 to 7.1	34
VSP-C 15R(A)□-6T	6×4	15	M14×1	57.1(58)	9(10)	27(28)	20	16	6	17	12	4	4 to 7.1	34
VSP-C 20R(A)□-6T	6×4	20	M14×1	58.1(59)	10(11)	28(29)	20	16	6	17	12	4	7 to 12.6	38
VSP-C 25R(A)□-6T	6×4	25	M14×1	59.1(60)	11(12)	29(30)	20	16	6	17	12	4	7 to 12.6	38
VSP-C 30R(A)□-6T	6×4	30	M14×1	59.1(62)	11(14)	29(32)	20	16	6	17	12	4	7 to 12.6	40
VSP-C 40R(A)□-6T	6×4	40	M14×1	62.1(65.5)	14(17.5)	32(35.5)	20	16	6	17	12	4	7 to 12.6	47(48)
VSP-C 50R(A)□-6T	6×4	50	M14×1	63.1(66)	15(18)	33(36)	20	16	6	17	12	4	7 to 12.6	53(55)

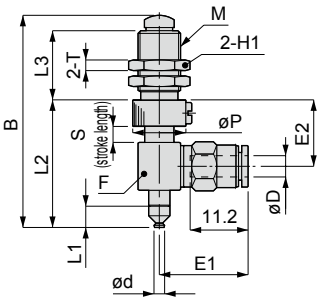
*1 : Dimensions in ( ) are dimensions of the deep pad.

Dimensions (buffer, vacuum outlet side VSP-D, push-in fitting)

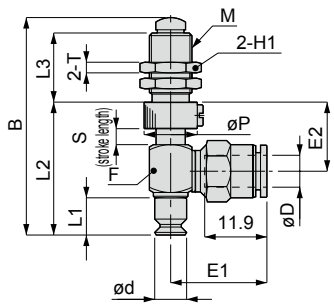
●VSP-D1R□-4



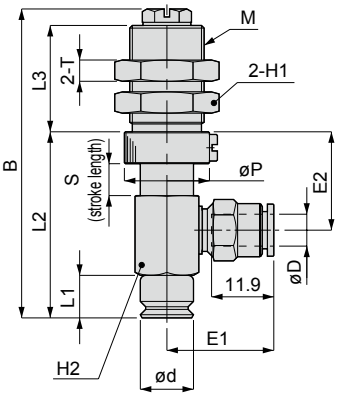
●VSP-D2 to 4R□-4



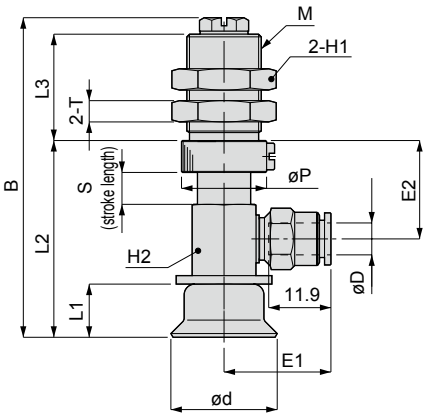
●VSP-D6, 8R□-6



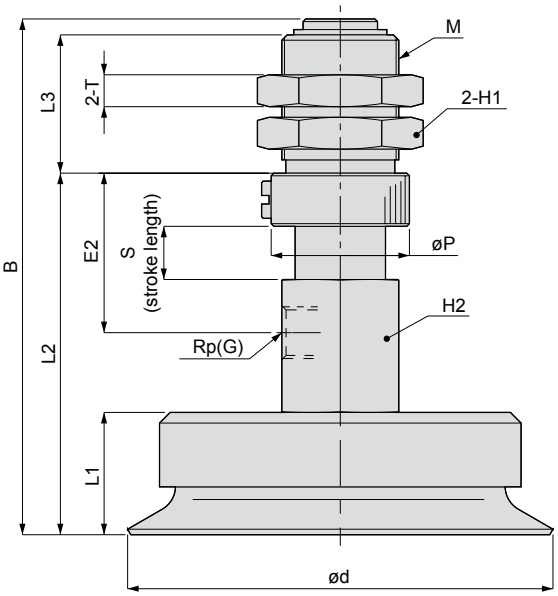
●VSP-D10R□-6



●VSP-D15 to 50R(A)□-6



●VSP-D60 to 200R□-6A/8A



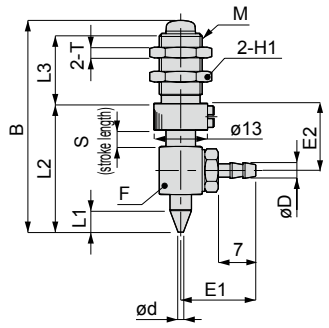
Unit: mm

Model No.	Tube O.D. øD	Pad diameter ød	Rp (G)	Mounting screw M	B	L1	L2	L3	øP	Stroke length S	E1	E2	Opposite side H1	Opposite side H2 or F	T	Spring force (N)	Weight (g)
VSP-D 1R□-4	4	1	-	M8×0.75	40	4	24	13	10	3	17	12.5	10	□8	2	0.9 to 1.9	14
VSP-D 2R□-4	4	2	-	M8×0.75	40	4	24	13	10	3	17	12.5	10	□8	2	0.9 to 1.9	14
VSP-D 3R□-4	4	3	-	M8×0.75	40	4	24	13	10	3	17	12.5	10	□8	2	0.9 to 1.9	14
VSP-D 4R□-4	4	4	-	M8×0.75	40	4	24	13	10	3	17	12.5	10	□8	2	0.9 to 1.9	14
VSP-D 6R□-6	6	6	-	M8×0.75	41	7	25	13	10	3	18.3	13	10	□8	2	0.9 to 1.9	16
VSP-D 8R□-6	6	8	-	M8×0.75	39.5	5.5	23.5	13	10	3	18.3	13	10	□8	2	0.9 to 1.9	16
VSP-D 10R□-6	6	10	-	M14×1	58.1	8	35	20	16	6	20.3	18.5	17	12	4	4.9 to 6.9	48
VSP-D 15R(A)□-6	6	15	-	M14×1	59.1(60.1)	9(10)	36(37)	20	16	6	20.3	18.5	17	12	4	4.9 to 6.9	48
VSP-D 20R(A)□-6	6	20	-	M14×1	60.1(61.1)	10(11)	37(38)	20	16	6	20.3	18.5	17	12	4	7.8 to 11.8	52
VSP-D 25R(A)□-6	6	25	-	M14×1	61.1(62.1)	11(12)	38(39)	20	16	6	20.3	18.5	17	12	4	7.8 to 11.8	52
VSP-D 30R(A)□-6	6	30	-	M14×1	61.1(64.1)	11(14)	38(41)	20	16	6	20.3	18.5	17	12	4	7.8 to 11.8	54
VSP-D 40R(A)□-6	6	40	-	M14×1	64.1(67.6)	14(17.5)	41(44.5)	20	16	6	20.3	18.5	17	12	4	7.8 to 11.8	61(62)
VSP-D 50R(A)□-6	6	50	-	M14×1	65.1(68.1)	15(18)	42(45)	20	16	6	20.3	18.5	17	12	4	7.8 to 11.8	67(69)
VSP-D 60R(A)□-6A	-	60	1/8	M22×1	94.6(101.6)	18(25)	65.5(72.5)	26	26	10	-	30	27	22	6	11.8 to 14.7	244(243)
VSP-D 80R(A)□-6A	-	80	1/8	M22×1	97(107)	23(33)	68(78)	26	26	10	-	30	27	22	6	11.8 to 14.7	328(336)
VSP-D 100R(A)□-6A	-	100	1/8	M22×1	99(108)	25(34)	70(79)	26	26	10	-	30	27	22	6	11.8 to 14.7	417(423)
VSP-D 150R□-8A	-	150	1/4	M30×2	164	45	112	48	35	20	-	42	36	30	10	11.8 to 21.6	1196
VSP-D 200R□-8A	-	200	1/4	M30×2	169	50	117	48	35	20	-	42	36	30	10	11.8 to 21.6	1675

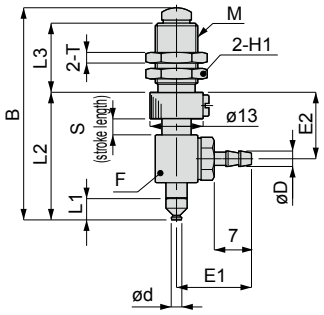
*1 : Dimensions in ( ) are dimensions of the deep pad.

Dimensions (buffer, vacuum outlet side VSP-D, barbed fitting)

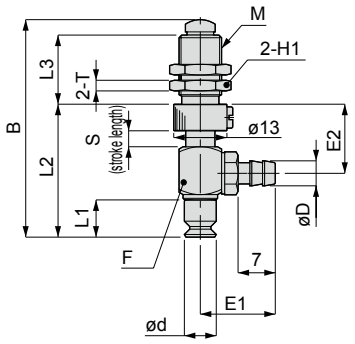
●VSP-D1R□-4T



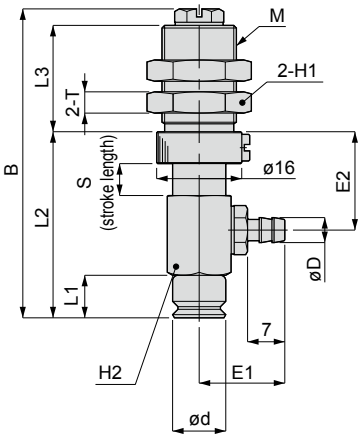
●VSP-D2 to 4R□-4T



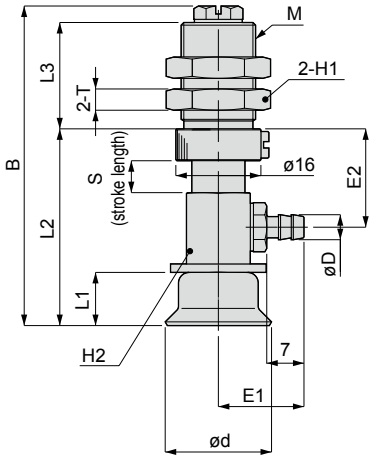
●VSP-D6, 8R□-6T



●VSP-D10R□-6T



●VSP-D15 to 50R(A)□-6T



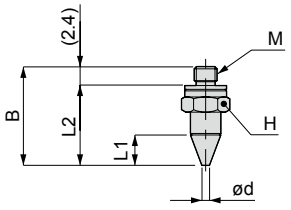
Unit: mm

Model No.	Tube O.D. x I.D. øD	Pad diameter ød	Mounting screw M	B	L1	L2	L3	Stroke length S	E1	E2	Opposite side H1	Opposite side H2 or F	T	Spring force (N)	Weight (g)
VSP-D 1R□-4T	4×2.5	1	M8×0.75	40	4	24	10	3	14	12.5	10	□8	2	0.9 to 1.9	12
VSP-D 2R□-4T	4×2.5	2	M8×0.75	40	4	24	10	3	14	12.5	10	□8	2	0.9 to 1.9	12
VSP-D 3R□-4T	4×2.5	3	M8×0.75	40	4	24	10	3	14	12.5	10	□8	2	0.9 to 1.9	12
VSP-D 4R□-4T	4×2.5	4	M8×0.75	40	4	24	10	3	14	12.5	10	□8	2	0.9 to 1.9	12
VSP-D 6R□-6T	6×4	6	M8×0.75	41	7	25	10	3	14	13	10	□8	2	0.9 to 1.9	13
VSP-D 8R□-6T	6×4	8	M8×0.75	39.5	5.5	23.5	10	3	14	13	10	□8	2	0.9 to 1.9	13
VSP-D 10R□-6T	6×4	10	M14×1	58	8	35	20	6	16	18.5	17	12	4	4.9 to 6.9	46
VSP-D 15R(A)□-6T	6×4	15	M14×1	59(60)	9(10)	36(37)	20	6	16	18.5	17	12	4	4.9 to 6.9	46
VSP-D 20R(A)□-6T	6×4	20	M14×1	60(61)	10(11)	37(38)	20	6	16	18.5	17	12	4	7.8 to 11.8	49
VSP-D 25R(A)□-6T	6×4	25	M14×1	61(62)	11(12)	38(39)	20	6	16	18.5	17	12	4	7.8 to 11.8	50
VSP-D 30R(A)□-6T	6×4	30	M14×1	61(64)	11(14)	38(41)	20	6	16	18.5	17	12	4	7.8 to 11.8	52
VSP-D 40R(A)□-6T	6×4	40	M14×1	64(67.5)	14(17.5)	41(44.5)	20	6	16	18.5	17	12	4	7.8 to 11.8	56(60)
VSP-D 50R(A)□-6T	6×4	50	M14×1	65(68)	15(18)	42(45)	20	6	16	18.5	17	12	4	7.8 to 11.8	65(66)

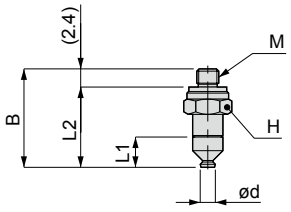
*1 : Dimensions in ( ) are dimensions of the deep pad.

Dimensions (direct mounting, fixed VSP-E, metric thread)

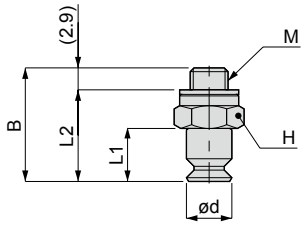
●VSP-E1R□



●VSP-E2 to 4R□



●VSP-E6, 8R□



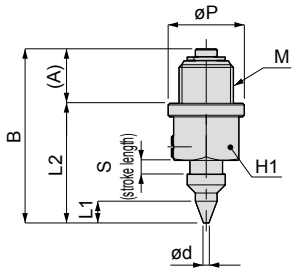
Unit: mm

Model No.	Pad diameter ød	M	B	L1	L2	Opposite side H	Weight (g)
VSP-E 1R□	1	M3×0.5	13	4	10.6	5.5	1.5
VSP-E 2R□	2	M3×0.5	13	4	10.6	5.5	1.5
VSP-E 3R□	3	M3×0.5	13	4	10.6	5.5	1.5
VSP-E 4R□	4	M3×0.5	13	4	10.6	5.5	1.5
VSP-E 6R□	6	M5×0.8	15	7	12.1	8	3
VSP-E 8R□	8	M5×0.8	13.5	5.5	10.6	8	3

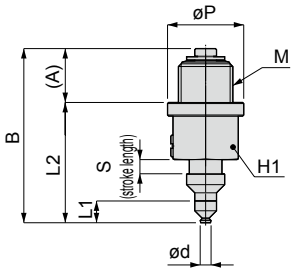
*1 : Dimensions in ( ) are dimensions of the deep pad.

Dimensions (direct mounting, buffer VSP-F, metric thread)

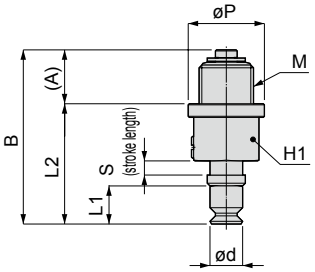
●VSP-F1R□



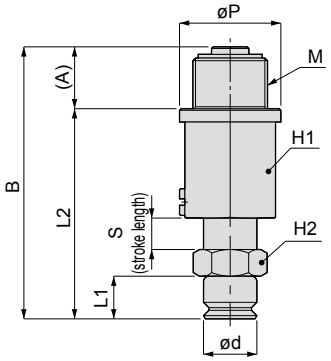
●VSP-F2 to 4R□



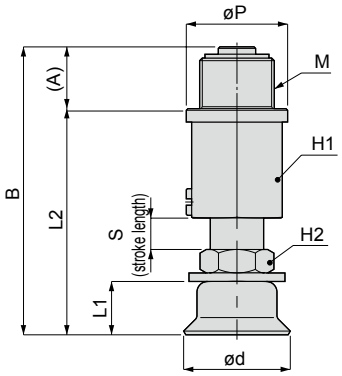
●VSP-F6, 8R□



●VSP-F10R□



●VSP-F15 to 50R(A)□



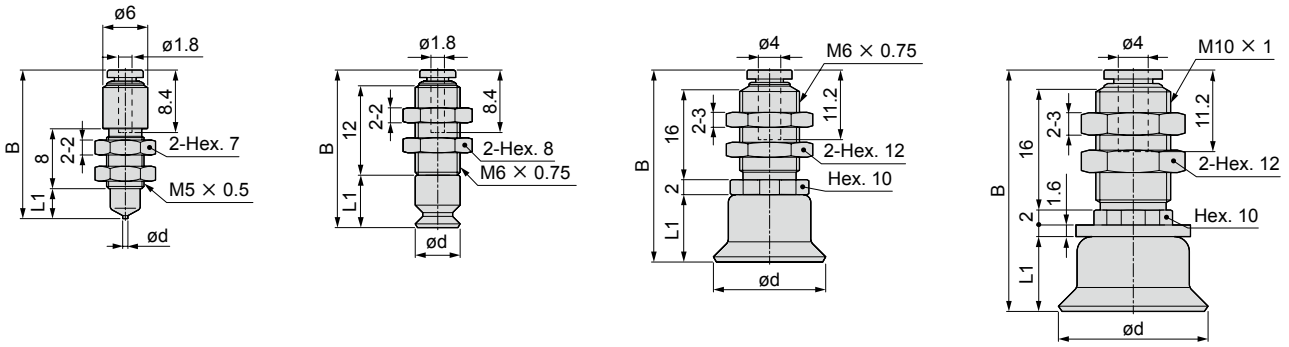
Unit: mm

Model No.	Pad diameter ød	Mounting screw M	A	B	L1	L2	øP	Stroke length S	Opposite side H1	Opposite side H2	Spring force (N)	Weight (g)
VSP-F 1R□	1	M10×1	9.5	32	4	22.5	14	2.5	12	-	2.3 to 3.9	15
VSP-F 2R□	2	M10×1	9.5	32	4	22.5	14	2.5	12	-	2.3 to 3.9	15
VSP-F 3R□	3	M10×1	9.5	32	4	22.5	14	2.5	12	-	2.3 to 3.9	15
VSP-F 4R□	4	M10×1	9.5	32	4	22.5	14	2.5	12	-	2.3 to 3.9	15
VSP-F 6R□	6	M10×1	9.5	32	7	22.5	14	2.5	12	-	2.3 to 3.9	15
VSP-F 8R□	8	M10×1	9.5	30.5	5.5	21	14	2.5	12	-	2.3 to 3.9	15
VSP-F 10R□	10	M14×1	11.6	51	8	39.3	19	6	17	12	7.9 to 15	56
VSP-F 15R(A)□	15	M14×1	11.6	52(53)	9(10)	40.3(41.3)	19	6	17	12	7.9 to 15	56
VSP-F 20R(A)□	20	M14×1	11.6	54(55)	10(11)	42.3(43.3)	19	6	17	12	7.9 to 15	59
VSP-F 25R(A)□	25	M14×1	11.6	55(56)	11(12)	43.3(44.3)	19	6	17	12	7.9 to 15	59
VSP-F 30R(A)□	30	M14×1	11.6	55(58)	11(14)	43.3(46.3)	19	6	17	12	7.9 to 15	61
VSP-F 40R(A)□	40	M14×1	11.6	58(61.5)	14(17.5)	46.3(49.8)	19	6	17	12	7.9 to 15	68(69)
VSP-F 50R(A)□	50	M14×1	11.6	59(62)	15(18)	47.3(50.3)	19	6	17	12	7.9 to 15	74(76)

*1 : Dimensions in ( ) are dimensions of the deep pad.

Dimensions (compact fixed, vacuum outlet top VSP-MA, push-in fitting)

●VSP-MA0.7 to 4RM□-2 ●VSP-MA6 to 8R□-2 ●VSP-MA10 to 15R(A)□-4 ●VSP-MA20 to 30R(A)□-4



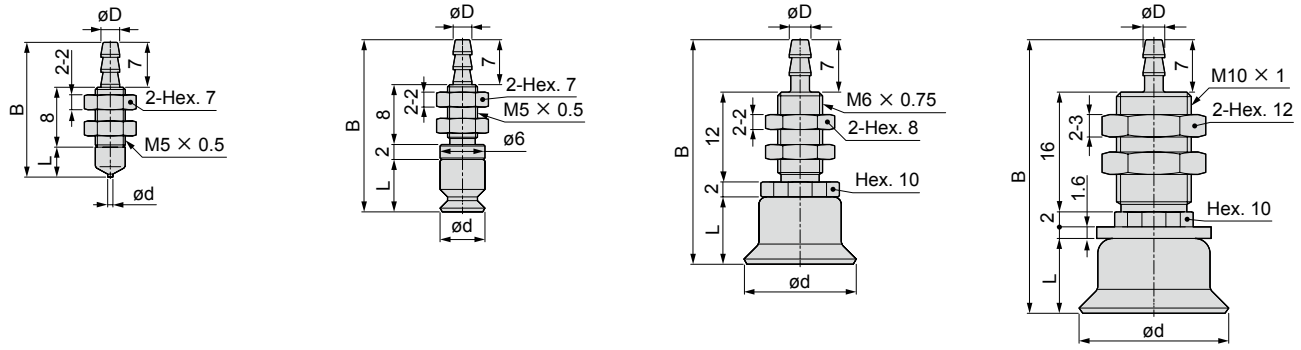
Unit: mm

Model No.	Pad diameter ød	B	L1	Weight (g)
VSP-MA0.7RM□-2	0.7	19.9	4	1.8
VSP-MA1RM□-2	1	19.9	4	1.8
VSP-MA1.5RM□-2	1.5	19.9	4	1.8
VSP-MA2RM□-2	2	19.9	4	1.8
VSP-MA3RM□-2	3	19.9	4	1.8
VSP-MA4RM□-2	4	19.9	4	1.8
VSP-MA6R□-2	6	21.1	7	2
VSP-MA8R□-2	8	19.6	5.5	2
VSP-MA10R□-4	10	29	8	6.4
VSP-MA15R(A)□-4	15	30(31)	9(10)	6.7(6.8)
VSP-MA20R(A)□-4	20	32.6(33.6)	10(11)	12(12)
VSP-MA25R(A)□-4	25	33.6(34.6)	11(12)	13(13)
VSP-MA30R(A)□-4	30	33.6(36.6)	11(14)	15(15)

*1: Dimensions in ( ) are dimensions of the deep pad.

Dimensions (compact fixed, vacuum outlet top VSP-MA, barbed fitting)

●VSP-MA0.7 to 4RM□-4T ●VSP-MA6 to 8R(A)□-4T ●VSP-MA10 to 15R(A)□-4T ●VSP-MA20 to 30R(A)□-4T/6T



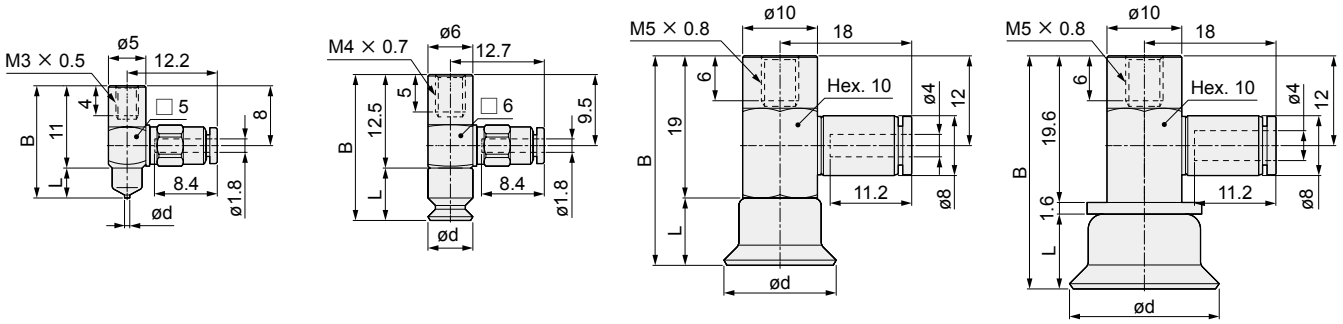
Unit: mm

Model No.	Tube O.D. x I.D. øD	Pad diameter ød	B	L	Weight (g)
VSP-MA0.7RM□-4T	4×2.5	0.7	19	4	1.3
VSP-MA1RM□-4T	4×2.5	1	19	4	1.3
VSP-MA1.5RM□-4T	4×2.5	1.5	19	4	1.3
VSP-MA2RM□-4T	4×2.5	2	19	4	1.3
VSP-MA3RM□-4T	4×2.5	3	19	4	1.3
VSP-MA4RM□-4T	4×2.5	4	19	4	1.3
VSP-MA6R□-4T	4×2.5	6	24	7	1.6
VSP-MA8R□-4T	4×2.5	8	22.5	5.5	1.6
VSP-MA10R□-4T	4×2.5	10	29	8	3.6
VSP-MA15R(A)□-4T	4×2.5	15	30(31)	9(10)	3.9(4)
VSP-MA20R(A)□-4T	4×2.5	20	36.6(37.6)	10(11)	12(12)
VSP-MA20R(A)□-6T	6×4				
VSP-MA25R(A)□-4T	4×2.5	25	37.6(38.6)	11(12)	13(13)
VSP-MA25R(A)□-6T	6×4				
VSP-MA30R(A)□-4T	4×2.5	30	37.6(40.6)	11(14)	15(15)
VSP-MA30R(A)□-6T	6×4				

*1: Dimensions in ( ) are dimensions or weight of the deep pad.

Dimensions (compact fixed, vacuum outlet side VSP-MB, push-in fitting)

●VSP-MB0.7 to 4RM□-2 ●VSP-MB6 to 8R□-2 ●VSP-MB10 to 15R(A)□-4 ●VSP-MB20 to 30R(A)□-4



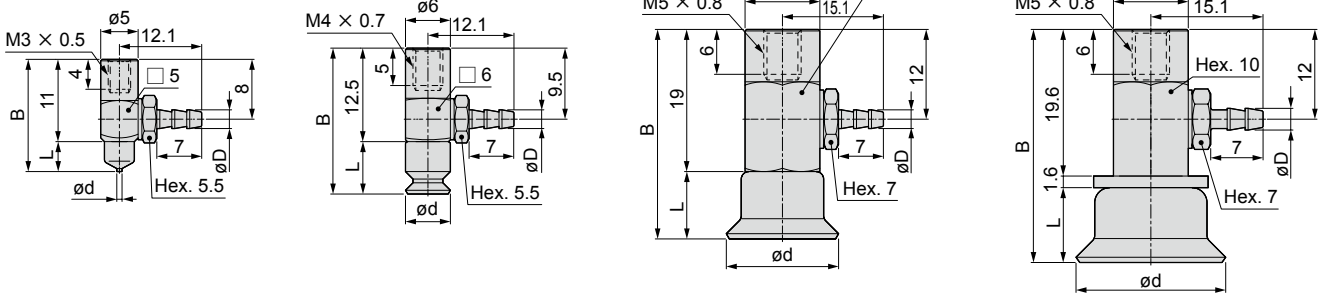
Unit: mm

Model No.	Pad diameter ød	B	L	Weight (g)
VSP-MB0.7RM□-2	0.7	15	4	1.5
VSP-MB1RM□-2	1	15	4	1.5
VSP-MB1.5RM□-2	1.5	15	4	1.5
VSP-MB2RM□-2	2	15	4	1.5
VSP-MB3RM□-2	3	15	4	1.5
VSP-MB4RM□-2	4	15	4	1.5
VSP-MB6R□-2	6	19.5	7	2
VSP-MB8R□-2	8	18	5.5	2
VSP-MB10R□-4	10	27	8	8.1
VSP-MB15R(A)□-4	15	28(29)	9(10)	8.5(8.5)
VSP-MB20R(A)□-4	20	31.2(32.2)	10(11)	13(13)
VSP-MB25R(A)□-4	25	32.2(33.2)	11(12)	14(14)
VSP-MB30R(A)□-4	30	32.2(35.2)	11(14)	16(16)

*1: Dimensions in ( ) are dimensions of the deep pad.

Dimensions (compact fixed, vacuum outlet side VSP-MB, barbed fitting)

●VSP-MB0.7 to 4RM□-4T ●VSP-MB6 to 8R□-4T ●VSP-MB10 to 15R(A)□-4T ●VSP-MB20 to 30R(A)□-4T/6T



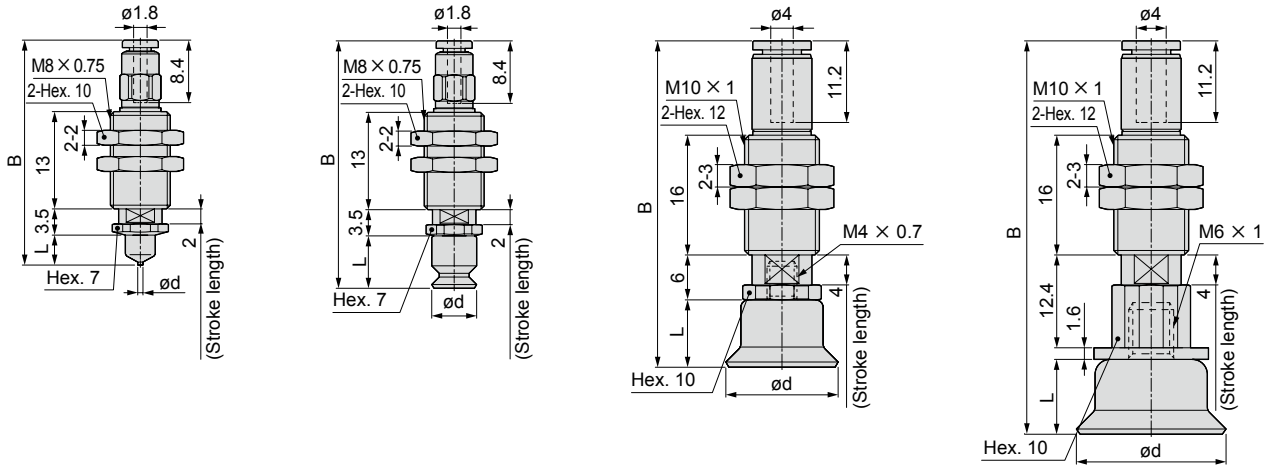
Unit: mm

Model No.	Tube O.D. x I.D. øD	Pad diameter ød	B	L	Weight (g)
VSP-MB0.7RM□-4T	4×2.5	0.7	15	4	1.4
VSP-MB1RM□-4T	4×2.5	1	15	4	1.4
VSP-MB1.5RM□-4T	4×2.5	1.5	15	4	1.4
VSP-MB2RM□-4T	4×2.5	2	15	4	1.4
VSP-MB3RM□-4T	4×2.5	3	15	4	1.4
VSP-MB4RM□-4T	4×2.5	4	15	4	1.4
VSP-MB6R□-4T	4×2.5	6	19.5	7	1.8
VSP-MB8R□-4T	4×2.5	8	18	5.5	1.8
VSP-MB10R□-4T	4×2.5	10	27	8	6.7
VSP-MB15R(A)□-4T	4×2.5	15	28(29)	9(10)	7.1(7.1)
VSP-MB20R(A)□-4T	4×2.5	20	31.2(32.2)	10(11)	12(12)
VSP-MB20R(A)□-6T	6×4				
VSP-MB25R(A)□-4T	4×2.5	25	32.2(33.2)	11(12)	12(12)
VSP-MB25R(A)□-6T	6×4				13(13)
VSP-MB30R(A)□-4T	4×2.5	30	32.2(35.2)	11(14)	14(14)
VSP-MB30R(A)□-6T	6×4				15(15)

*1: Dimensions in ( ) are dimensions or weight of the deep pad.

Dimensions (compact buffer, vacuum outlet top VSP-MC, push-in fitting)

●VSP-MC0.7 to 4RM□-2 ●VSP-MC6 to 8R□-2 ●VSP-MC10 to 15R(A)□-4 ●VSP-MC20 to 30R(A)□-4



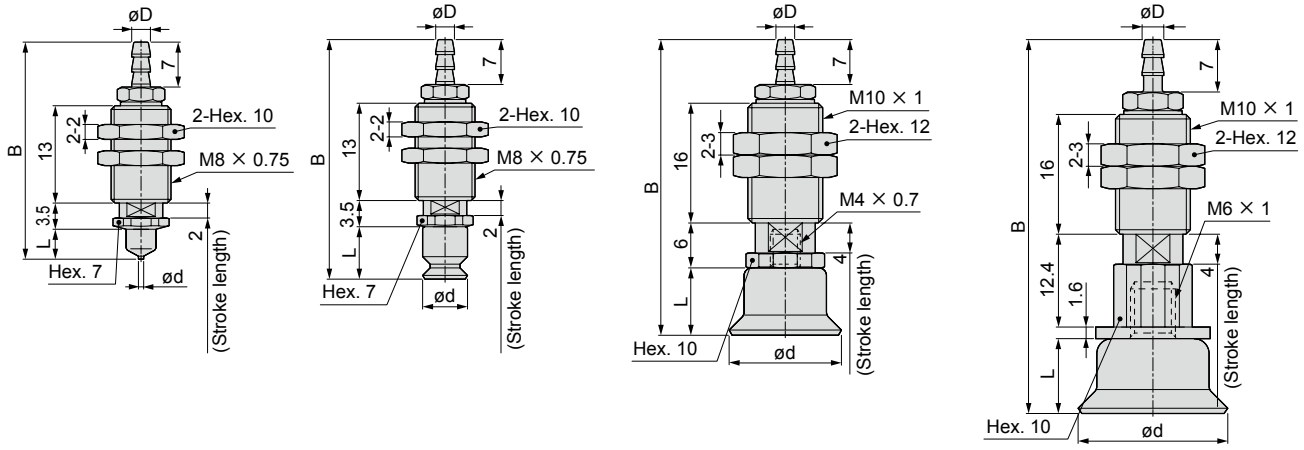
Unit: mm

Model No.	Pad diameter ød	B	L	Spring force (N)	Weight (g)
VSP-MC0.7RM□-2	0.7	30.2	4	0.2 to 0.3	6.5
VSP-MC1RM□-2	1	30.2	4	0.2 to 0.3	6.5
VSP-MC1.5RM□-2	1.5	30.2	4	0.2 to 0.3	6.5
VSP-MC2RM□-2	2	30.2	4	0.2 to 0.3	6.5
VSP-MC3RM□-2	3	30.2	4	0.2 to 0.3	6.5
VSP-MC4RM□-2	4	30.2	4	0.2 to 0.3	6.5
VSP-MC6R□-2	6	33.2	7	0.5 to 0.6	6.8
VSP-MC8R□-2	8	31.7	5.5	0.5 to 0.6	6.8
VSP-MC10R□-4	10	43	8	1 to 1.3	16
VSP-MC15R(A)□-4	15	44(45)	9(10)	1 to 1.3	16(16)
VSP-MC20R(A)□-4	20	53(54)	10(11)	1 to 1.3	24(24)
VSP-MC25R(A)□-4	25	54(55)	11(12)	1 to 1.3	25(25)
VSP-MC30R(A)□-4	30	54(57)	11(14)	1 to 1.3	27(27)

*1: Dimensions in ( ) are dimensions of the deep pad.

Dimensions (compact buffer, vacuum outlet top VSP-MC, barbed fitting)

●VSP-MC0.7 to 4RM□-4T ●VSP-MC6 to 8R□-4T ●VSP-MC10 to 15R(A)□-4T ●VSP-MC20 to 30R(A)□-4T/6T



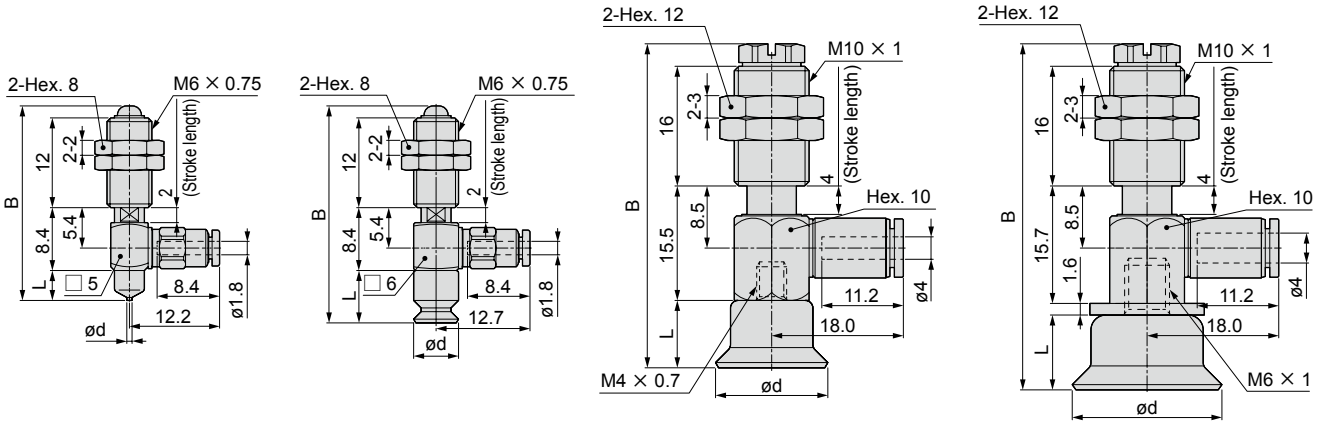
Unit: mm

Model No.	Tube O.D. x I.D. øD	Pad diameter ød	B	L	Spring force (N)	Weight (g)
VSP-MC0.7RM□-4T	4×2.5	0.7	30.1	4	0.2 to 0.3	6.3
VSP-MC1RM□-4T	4×2.5	1	30.1	4	0.2 to 0.3	6.4
VSP-MC1.5RM□-4T	4×2.5	1.5	30.1	4	0.2 to 0.3	6.4
VSP-MC2RM□-4T	4×2.5	2	30.1	4	0.2 to 0.3	6.4
VSP-MC3RM□-4T	4×2.5	3	30.1	4	0.2 to 0.3	6.3
VSP-MC4RM□-4T	4×2.5	4	30.1	4	0.2 to 0.3	6.4
VSP-MC6R□-4T	4×2.5	6	33.1	7	0.5 to 0.6	6.6
VSP-MC8R□-4T	4×2.5	8	31.6	5.5	0.5 to 0.6	6.6
VSP-MC10R□-4T	4×2.5	10	40.1	8	1 to 1.3	14
VSP-MC15R(A)□-4T	4×2.5	15	41.1(42.1)	9(10)	1 to 1.3	15(15)
VSP-MC20R(A)□-4T	4×2.5	20	50.1(51.1)	10(11)	1 to 1.3	23(23)
VSP-MC20R(A)□-6T	6×4					
VSP-MC25R(A)□-4T	4×2.5	25	51.1(52.1)	11(12)	1 to 1.3	23(23)
VSP-MC25R(A)□-6T	6×4					24(24)
VSP-MC30R(A)□-4T	4×2.5	30	51.1(54.1)	11(14)	1 to 1.3	24(24)
VSP-MC30R(A)□-6T	6×4					25(25)

*1: Dimensions in ( ) are dimensions or weight of the deep pad.

Dimensions (compact buffer, vacuum outlet side VSP-MD, push-in fitting)

●VSP-MD0.7 to 4RM□-2 ●VSP-MD6 to 8R□-2 ●VSP-MD10 to 15R(A)□-4 ●VSP-MD20 to 30R(A)□-4



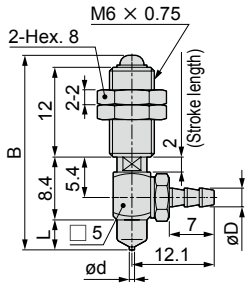
Unit: mm

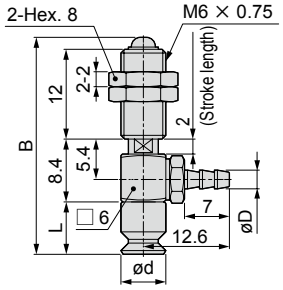
Model No.	Pad diameter ød	B	L	Spring force (N)	Weight (g)
VSP-MD0.7RM□-2	0.7	26	4	0.2 to 0.3	5.3
VSP-MD1RM□-2	1	26	4	0.2 to 0.3	5.3
VSP-MD1.5RM□-2	1.5	26	4	0.2 to 0.3	5.3
VSP-MD2RM□-2	2	26	4	0.2 to 0.3	5.3
VSP-MD3RM□-2	3	26	4	0.2 to 0.3	5.3
VSP-MD4RM□-2	4	26	4	0.2 to 0.3	5.3
VSP-MD6R□-2	6	29	7	0.5 to 0.6	6.1
VSP-MD8R□-2	8	27.5	5.5	0.5 to 0.6	6.1
VSP-MD10R□-4	10	42.5	8	1 to 1.3	23
VSP-MD15R(A)□-4	15	43.5(44.5)	9(10)	1 to 1.3	24(24)
VSP-MD20R(A)□-4	20	46.3(47.3)	10(11)	1 to 1.3	28(28)
VSP-MD25R(A)□-4	25	47.3(48.3)	11(12)	1 to 1.3	28(28)
VSP-MD30R(A)□-4	30	47.3(50.3)	11(14)	1 to 1.3	30(30)

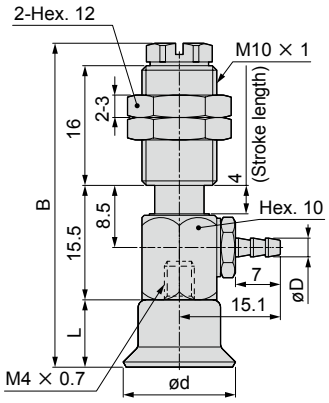
*1: Dimensions in ( ) are dimensions of the deep pad.

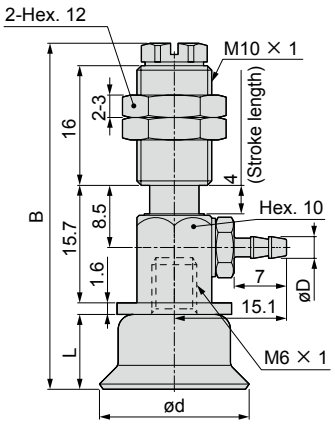
Dimensions (compact buffer, vacuum outlet side VSP-MD, barbed fitting)

●VSP-MD0.7 to 4RM□-4T ●VSP-MD6 to 8R□-4T ●VSP-MD10 to 15R(A)□-4T ●VSP-MD20 to 30R(A)□-4T/6T









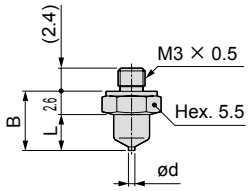
Unit: mm

Model No.	Tube O.D. x I.D. øD	Pad diameter ød	B	L	Spring force (N)	Weight (g)
VSP-MD0.7RM□-4T	4×2.5	0.7	26	4	0.2 to 0.3	5.2
VSP-MD1RM□-4T	4×2.5	1	26	4	0.2 to 0.3	5.2
VSP-MD1.5RM□-4T	4×2.5	1.5	26	4	0.2 to 0.3	5.2
VSP-MD2RM□-4T	4×2.5	2	26	4	0.2 to 0.3	5.2
VSP-MD3RM□-4T	4×2.5	3	26	4	0.2 to 0.3	5.2
VSP-MD4RM□-4T	4×2.5	4	26	4	0.2 to 0.3	5.2
VSP-MD6R□-4T	4×2.5	6	29	7	0.5 to 0.6	5.9
VSP-MD8R□-4T	4×2.5	8	27.5	5.5	0.5 to 0.6	5.9
VSP-MD10R□-4T	4×2.5	10	42.7	8	1 to 1.3	22
VSP-MD15R(A)□-4T	4×2.5	15	43.5(44.5)	9(10)	1 to 1.3	22(22)
VSP-MD20R(A)□-4T	4×2.5	20	46.3(47.3)	10(11)	1 to 1.3	26(26)
VSP-MD20R(A)□-6T	6×4					26(26)
VSP-MD25R(A)□-4T	4×2.5	25	47.3(48.3)	11(12)	1 to 1.3	27(27)
VSP-MD25R(A)□-6T	6×4					27(27)
VSP-MD30R(A)□-4T	4×2.5	30	47.3(50.3)	11(14)	1 to 1.3	29(29)
VSP-MD30R(A)□-6T	6×4					29(29)

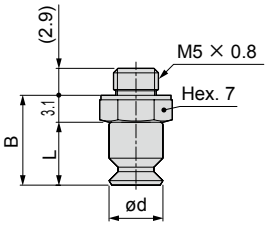
*1: Dimensions in ( ) are dimensions or weight of the deep pad.

Dimensions (compact direct mounting, fixed VSP-ME, metric thread)

●VSP-ME0.7 to 4RM□-M3



●VSP-ME6 to 8RM□-M5



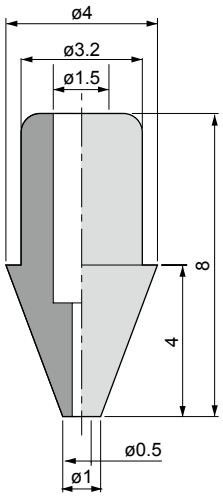
Unit: mm

Model No.	Pad diameter ød	B	L	Weight (g)
VSP-ME0.7RM□-M3	0.7	6.6	4	0.6
VSP-ME1RM□-M3	1	6.6	4	0.6
VSP-ME1.5RM□-M3	1.5	6.6	4	0.6
VSP-ME2RM□-M3	2	6.6	4	0.6
VSP-ME3RM□-M3	3	6.6	4	0.6
VSP-ME4RM□-M3	4	6.6	4	0.6
VSP-ME6R□-M5	6	10.1	7	1.6
VSP-ME8R□-M5	8	8.6	5.5	1.6

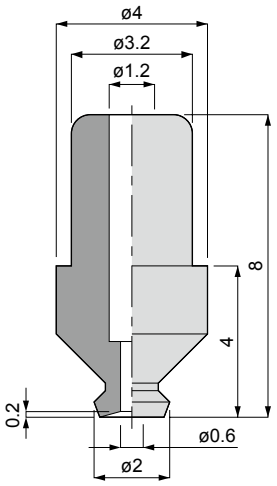
MEMO

Dimensions: pad only (standard, without frame)

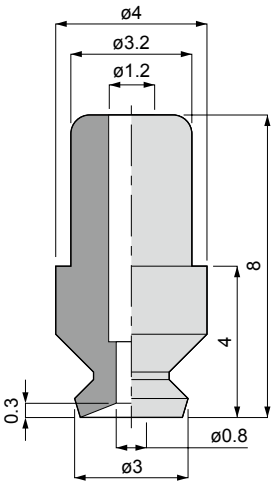
●VSPG-1R□



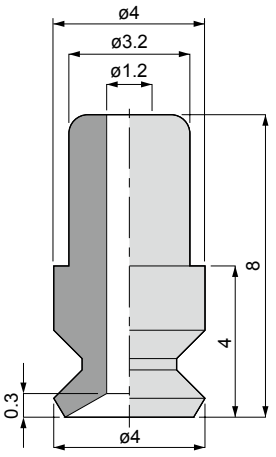
●VSPG-2R□



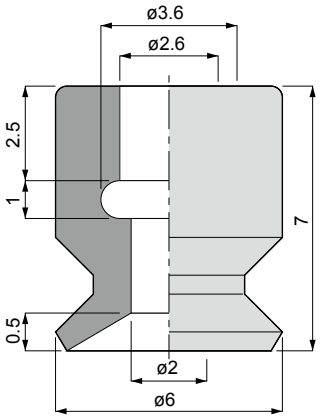
●VSPG-3R□



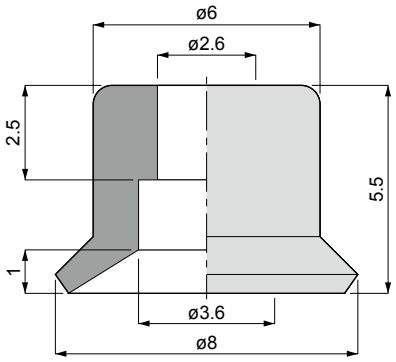
●VSPG-4R□



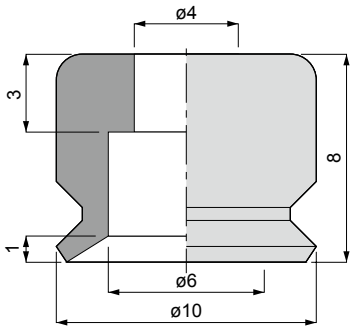
●VSPG-6R□



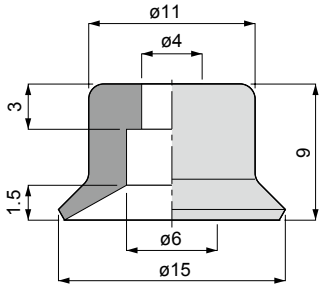
●VSPG-8R□



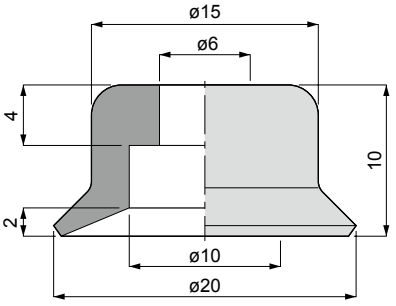
●VSPG-10R□



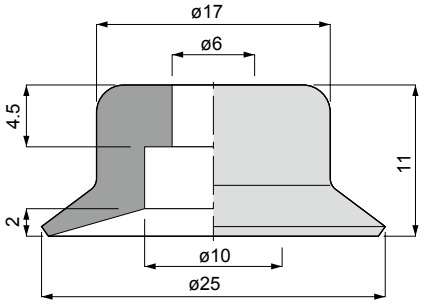
●VSPG-15R□



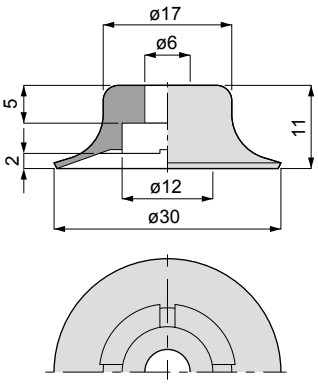
●VSPG-20R□



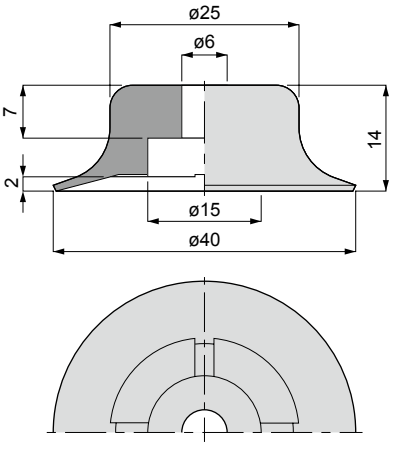
●VSPG-25R□



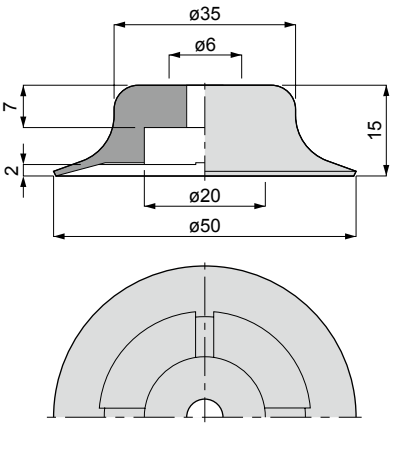
●VSPG-30R□



●VSPG-40R□

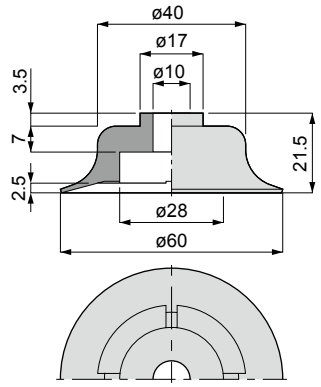


●VSPG-50R□

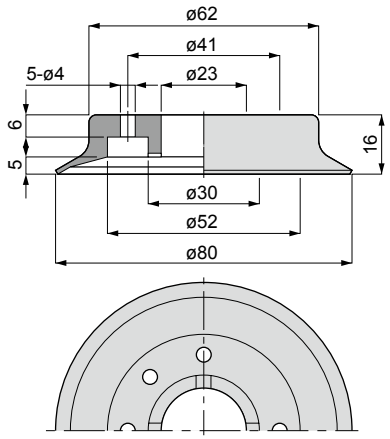


Dimensions: pad only (standard, without frame)

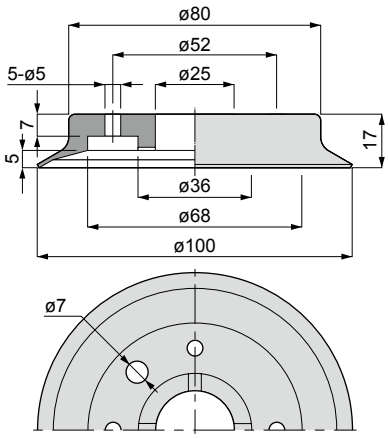
●VSPG-60R□



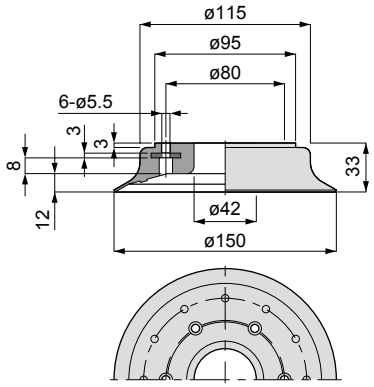
●VSPG-80R□



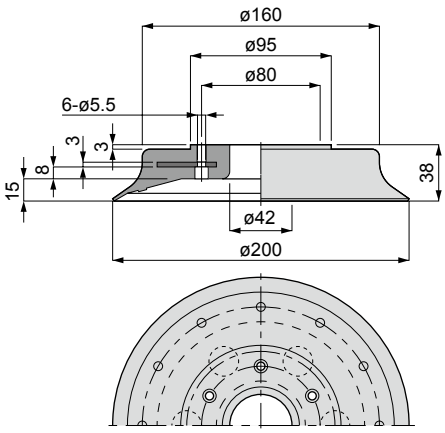
●VSPG-100R□



●VSPG-150R□

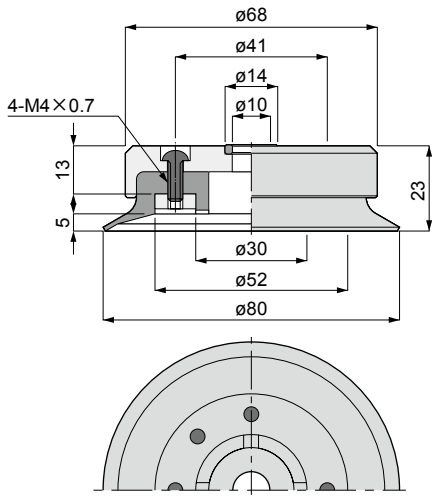


●VSPG-200R□

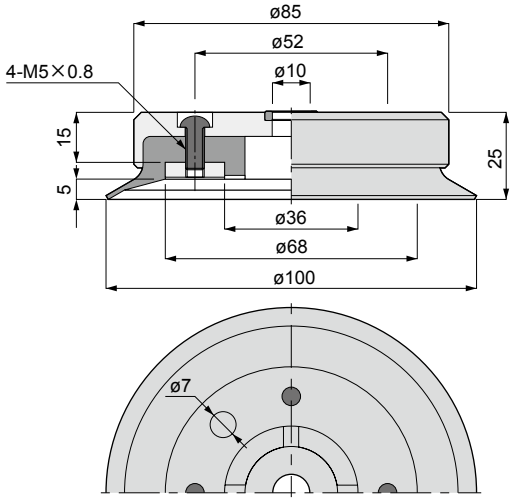


Dimensions: pad only (standard, with frame)

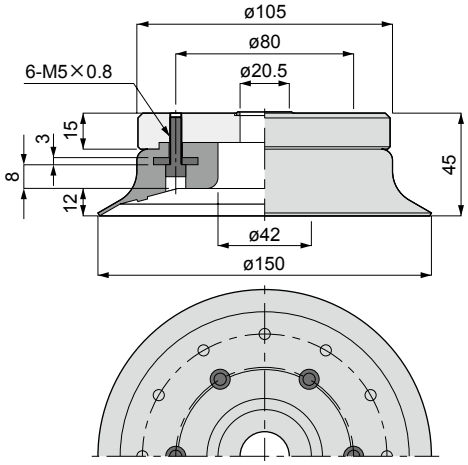
●VSPG-80R□A



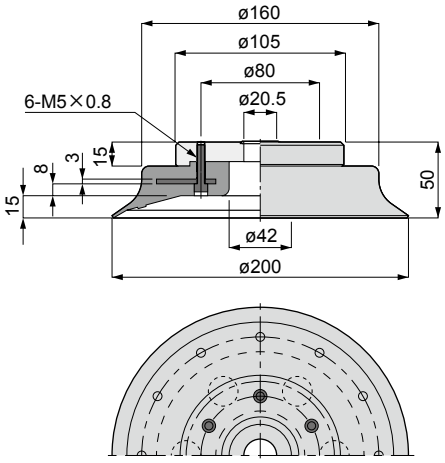
●VSPG-100R□A



●VSPG-150R□A



●VSPG-200R□A



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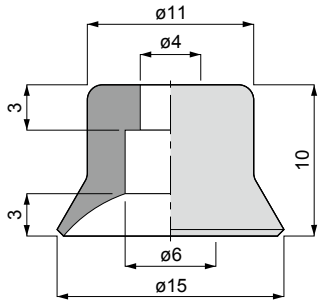
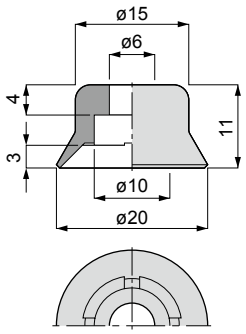
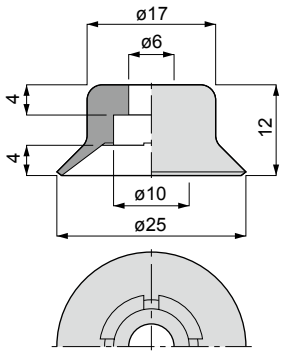
●VSPG-15A□



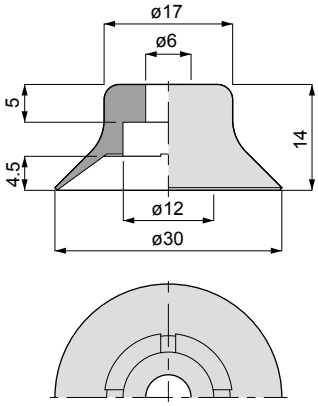
●VSPG-20A□



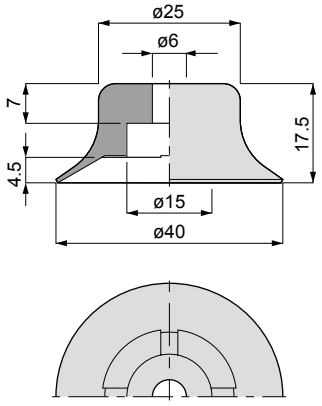
●VSPG-25A□



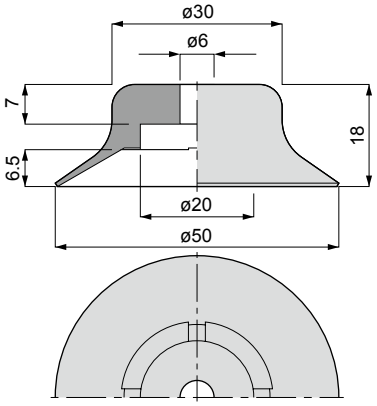
●VSPG-30A□



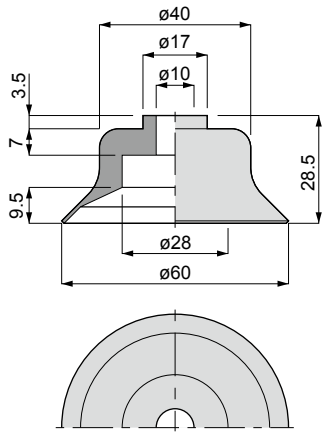
●VSPG-40A□



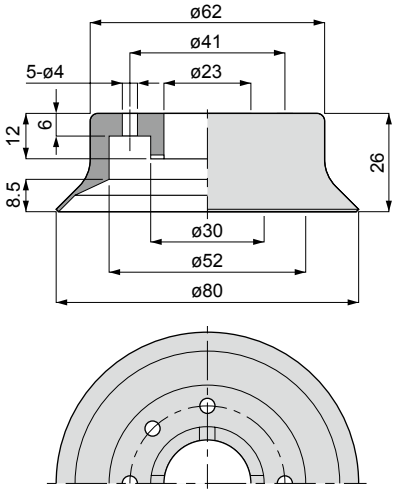
●VSPG-50A□



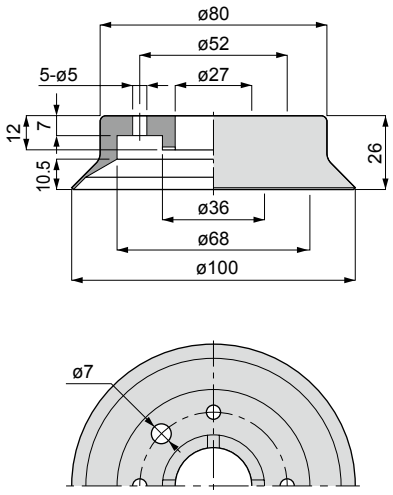
●VSPG-60A□



●VSPG-80A□

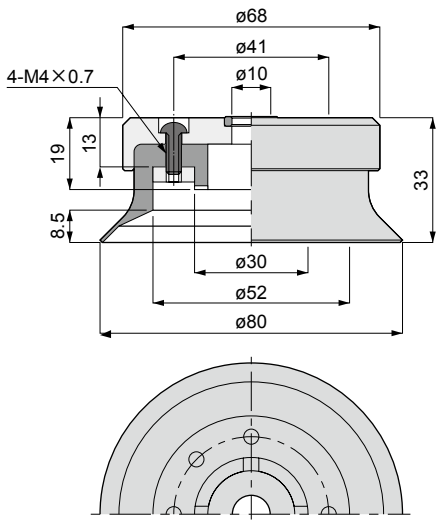


●VSPG-100A□

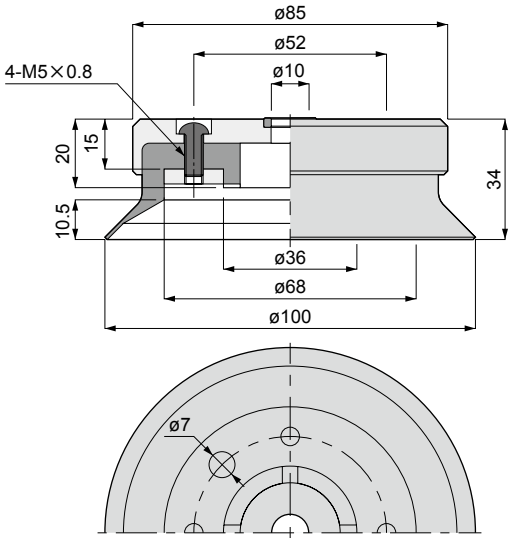


Dimensions: pad only (deep, with frame)

●VSPG-80A□A

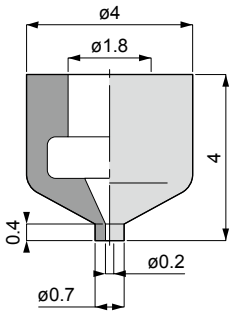


●VSPG-100A□A

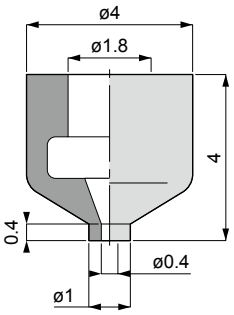


Dimensions: pad only (compact)

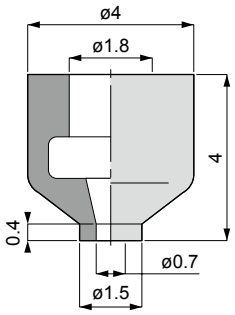
●VSPG-0.7RM□



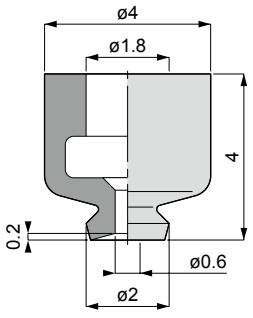
●VSPG-1RM□



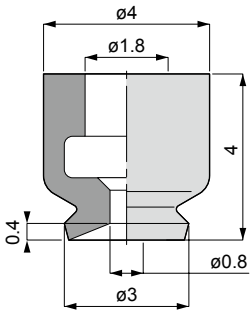
●VSPG-1.5RM□



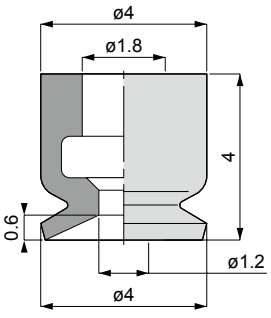
●VSPG-2RM□



●VSPG-3RM□

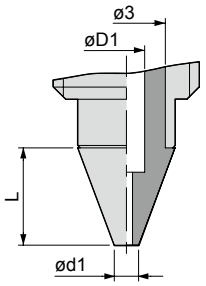


●VSPG-4RM□

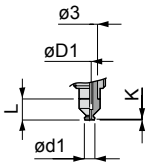


Detailed view of pad and holder fixing part (standard)

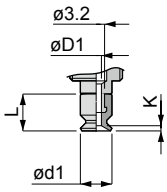
●VSPG-1R□



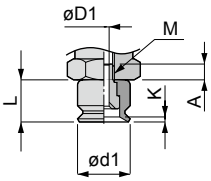
●VSPG-2 to 4R□



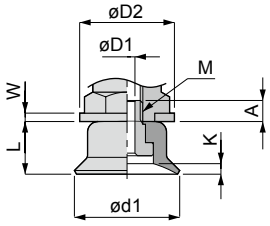
● VSPG-6, 8R□



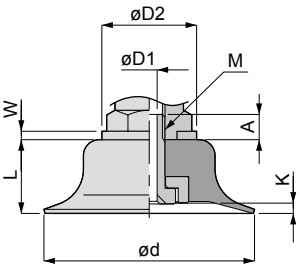
● VSPG-10, 15R□



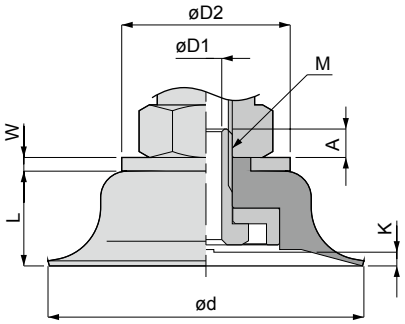
●VSPG-20 to 30R□



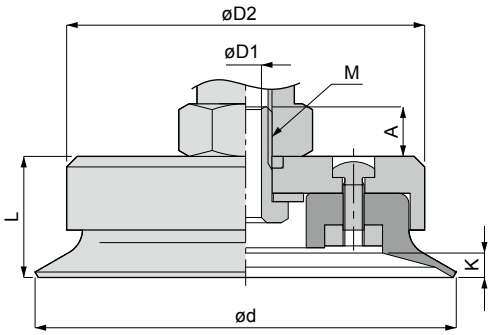
● VSPG-40, 50R□



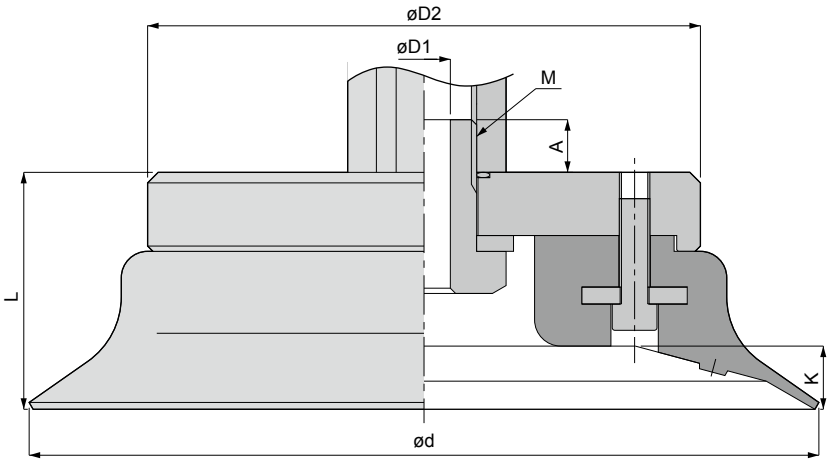
●VSPG-60R□



● VSPG-80, 100R□A



● VSPG-150, 200R□A

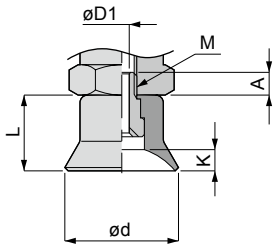


Unit: mm

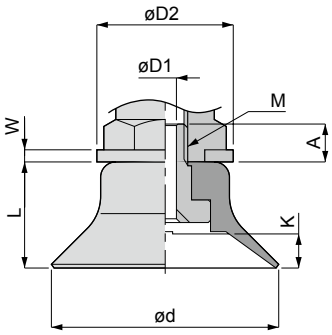
Model No.	Pad diameter ød	L	Lip internal height K	Fixing screw M	A	øD1	øD2	W
VSPG-1R□	1	4	-	-	-	1.2	-	-
VSPG-2R□	2	4	0.2	-	-	1.2	-	-
VSPG-3R□	3	4	0.2	-	-	1.2	-	-
VSPG-4R□	4	4	0.6	-	-	1.2	-	-
VSPG-6R□	6	7	1	-	-	2	-	-
VSPG-8R□	8	5.5	1.1	-	-	2	-	-
VSPG-10R□	10	8	1	M4×0.7	3.5	2	-	-
VSPG-15R□	15	9	2.4	M4×0.7	3.5	2	-	-
VSPG-20R□	20	10	1.8	M6×1	4.5	3	18	1.6
VSPG-25R□	25	11	2	M6×1	4.5	3	18	1.6
VSPG-30R□	30	11	2	M6×1	5.5	3	18	1.6
VSPG-40R□	40	14	1.9	M6×1	5.3	3	22	1.6
VSPG-50R□	50	15	1.9	M6×1	5.3	3	22	1.6
VSPG-60R□	60	18	2.6	M10×1.5	5.4	6	32	2.6
VSPG-80R□A	80	23	4.7	M10×1.5	9.4	6	68	-
VSPG-100R□A	100	25	5.5	M10×1.5	8.4	6	85	-
VSPG-150R□A	150	45	12	M20×2	11	10	105	-
VSPG-200R□A	200	50	15	M20×2	11	10	105	-

Detailed view of pad and holder fixing part (deep)

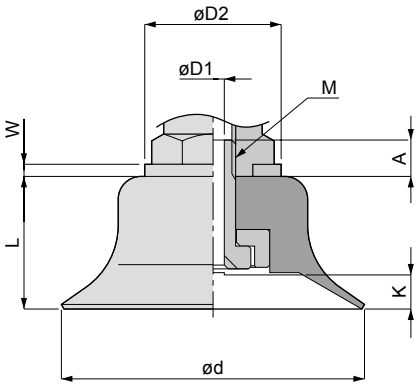
●VSPG-15A□



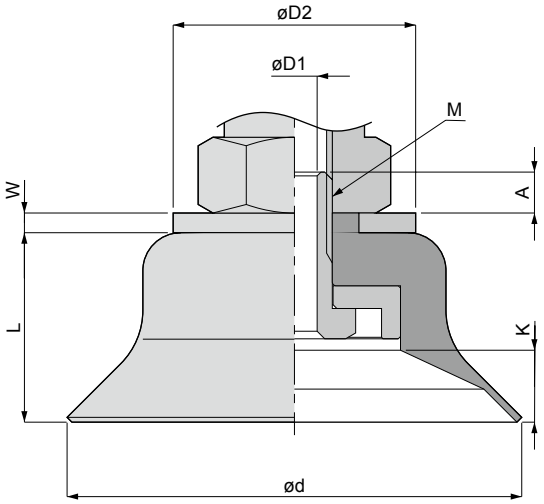
●VSPG-20 to 30A□



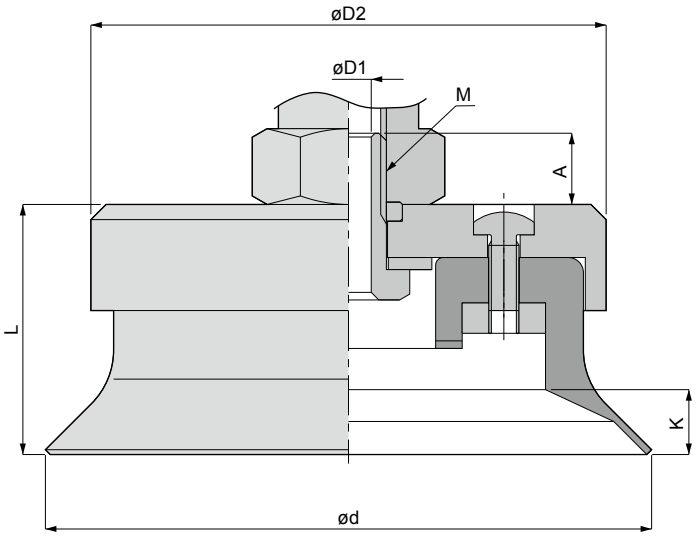
● VSPG-40, 50A□



●VSPG-60A□



● VSPG-80, 100A□A

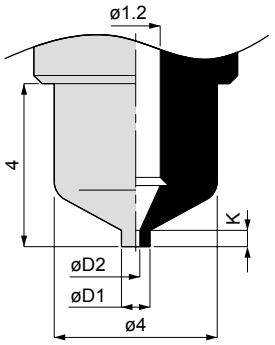


Unit: mm

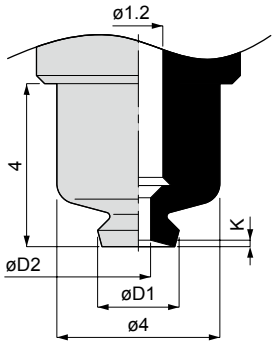
Model No.	Pad diameter ød	L	Lip internal height K	Fixing screw M	A	øD1	øD2	W
VSPG-15A□	15	10	2.8	M4×0.7	3.5	2	-	-
VSPG-20A□	20	11	3	M6×1	4.5	3	18	1.6
VSPG-25A□	25	12	4	M6×1	4.5	3	18	1.6
VSPG-30A□	30	14	4.5	M6×1	5.5	3	18	1.6
VSPG-40A□	40	17.5	4.5	M6×1	5.3	3	22	1.6
VSPG-50A□	50	18	6.5	M6×1	5.3	3	22	1.6
VSPG-60A□	60	25	9.5	M10×1.5	5.4	6	32	2.6
VSPG-80A□A	80	33	8.6	M10×1.5	9.4	6	68	-
VSPG-100A□A	100	34	10.7	M10×1.5	8.4	6	85	-

Detailed view of pad and holder fixing part (compact)

●VSPG-0.7RM□, VSPG-1RM□, VSPG-1.5RM□



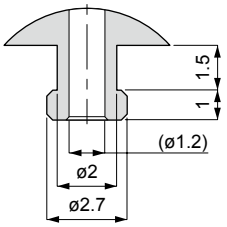
●VSPG-2RM□, VSPG-3RM□, VSPG-4RM□



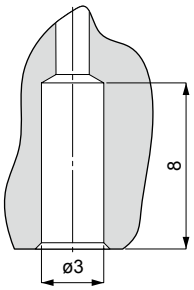
Model No.	Pad O.D. øD1	Pad O.D. øD2	K	Weight (g)
VSPG-0.7RM□	0.7	0.2	0.4	0.1
VSPG-1RM□	1	0.4	0.4	0.1
VSPG-1.5RM□	1.5	0.7	0.4	0.1
VSPG-2RM□	2	0.6	0.2	0.1
VSPG-3RM□	3	0.8	0.4	0.1
VSPG-4RM□	4	1.2	0.6	0.1

Pad fitting part dimensions (standard, compact)

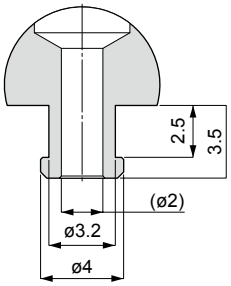
●VSPG-0.7 to 4RM□



●VSPG-1 to 4R□



●VSPG-6 to 8R□



Suction pad for external wall material & stone
Suction pad, sponge

VSP-*S* Series

● Pad diameter: ø10 to ø100

RoHS

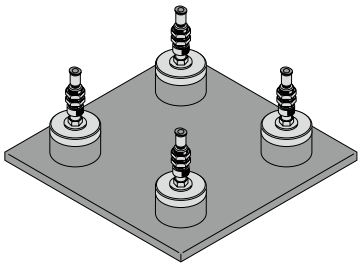
Features

■ Ideal for workpieces with uneven surfaces.

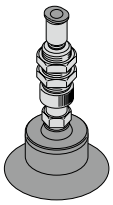
- ● Pad diameter: 9 types (ø10, ø15, ø20, ø25, ø30, ø35, ø50, ø70, ø100)
- ● Pad material: 2 types (chloroprene rubber, silicone rubber)
- ● Holder shape: 9 types (5 standard, 4 compact)
- ● Free holder (swinging): 2 types (30° angle, 10° angle) [Compatible pad diameter: all sizes]
- ● Position locking valve: Compatible pad diameter (all sizes)

Applications

● Building outer wall materials



● Workpieces such as small stones and shells



How to order

* Refer to model No. sections on dimensions pages 331 to 341 for combinations of model No.

● Suction pad/sponge

VSP - A 30 S ○ — 6T - ○ - V

● Pad rubber only/sponge

VSPG — 30 S ○ A

Code	Content
Ⓐ Holder shape *1	
A	Fixed, Vacuum outlet top
B	Fixed, Vacuum outlet side
C	Buffer, Vacuum outlet top
D	Buffer, Vacuum outlet side
F	Direct mounting, Buffer
MA	Compact Fixed, Vacuum outlet top
MB	Compact Fixed, Vacuum outlet side
MC	Compact Buffer, Vacuum outlet top
MD	Compact Buffer, Vacuum outlet side
Ⓑ Pad diameter	
Refer to Appendix 1 for pad diameter.	
Ⓒ Pad shape	
S	Sponge type
Ⓓ Pad material	
Blank	Chloroprene rubber
S	Silicone rubber
Ⓔ Frame	
Blank	Without frame
A	With frame
Ⓕ Port size/shape	
6	ø6 push-in fitting
6T	ø6 barbed fitting
6A	Rp1/8
Blank	(Holder shape: Selected with F)
Ⓖ Free holder (swinging) *1, *2, *3	**Page 550**
F1	With free holder swing angle 30°
F2	With free holder swing angle 15°
Blank	Without free holder
Ⓗ Position locking valve *1, *2, *3	**Page 556**
V	With position locking valve
Blank	None

Ⓐ Holder shape

Ⓑ Pad diameter

Ⓒ Pad shape

Ⓓ Pad material

Ⓔ Frame

Ⓕ Port size/shape

Ⓖ Free holder (swinging)

Ⓗ Position locking valve

⚠ Precautions for model No. selection

*1: When Ⓖ is "F1" or "F2", ⒶM□ (compact holder) cannot be selected.

*2: Ⓖ "F1", "F2" and Ⓗ "V" cannot be selected together.

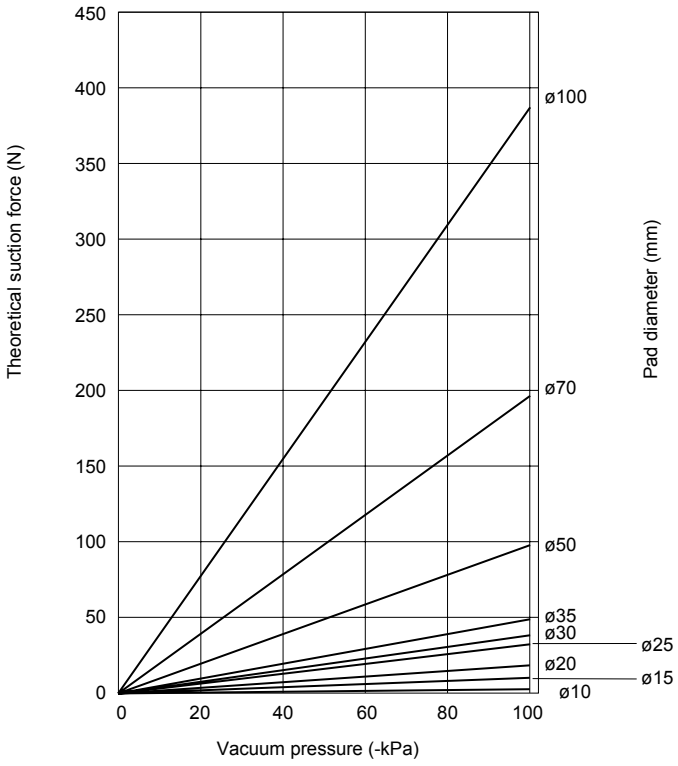
*3: Refer to page 550 for details on free holders (F1, F2) and page 556 for details on position locking valves (V).
In addition, refer to the target suction pad list (page 558) for applicable pad size shape.

Appendix 1

Pad diameter									
Code	10	15	20	25	30	35	50	70	100
Pad diameter (mm)	ø10	ø15	ø20	ø25	ø30	ø35	ø50	ø70	ø100

Theoretical suction force

● Pad diameter: ø10 mm to ø100 mm



Because the theoretical suction force is the value at static conditions, adopt a safety factor of 1/4 for horizontal lifting and 1/8 for vertical lifting in actual use. For the sponge type suction force, it may not be possible to secure the calculated suction force (theoretical suction force x safety factor) due to the effect of pad characteristics such as degree of vacuum/pad material/suctioned object.
When selecting with a suction force obtained by the “Selection method for suction pad” (page 288) as a guideline, confirm that there is no problem in the suction performance of the actual device.

Safety precautions

⚠ CAUTION

■ When replacing the suction pad, use a manual tightening torque for pad diameter: ø10 to ø30 mm and securely tighten by hand until it hits the end. For tightening torque of pad diameter: ø35 to ø100 mm, tighten using an appropriate tool according to the tightening torque in Common Precautions for suction pad (Intro Page 20) and confirm that there is no looseness.

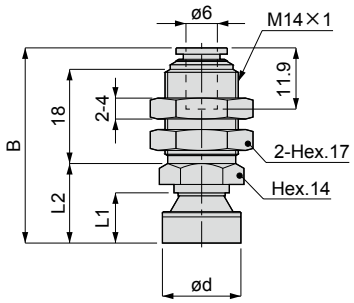
■ When installing the pad frame (pad diameter: ø10 to ø30 mm), tighten using an appropriate tool at tightening torque: 0.45 to 0.55 N·m and confirm that there is no looseness.

■ Suction force
For the sponge type suction force, it may not be possible to secure the calculated suction force (theoretical suction force x safety factor) due to the effect of pad characteristics such as degree of vacuum/pad material/ suctioned object.
When selecting with a suction force obtained by the “Selection method for suction pad” (page 288) as a guideline, confirm that there is no problem in the suction performance of the actual device.

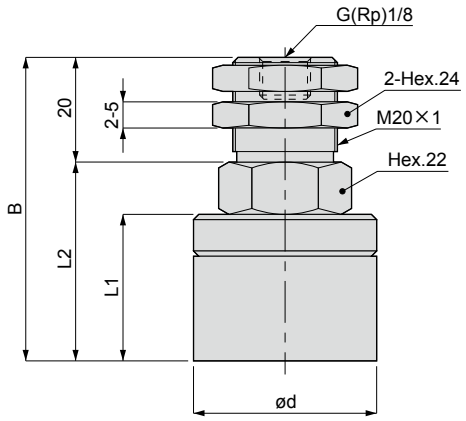
Dimensions (fixed, vacuum outlet top VSP-A)

● Push-in fitting

· VSP-A10 to 50S□-6



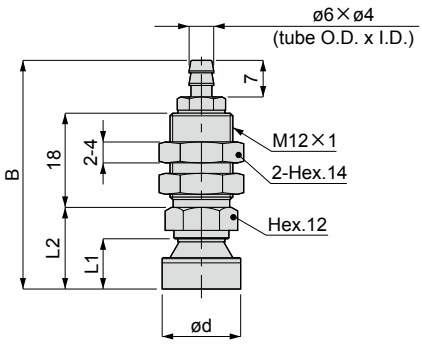
· VSP-A70, 100S□-6A



Unit: mm

Model No.	Pad diameter ød	B	L1	L2	Weight (g)
VSP-A 10S□-6	10	37.4	9.5	15.1	32
VSP-A 15S□-6	15	37.4	9.5	15.1	32
VSP-A 20S□-6	20	43.4	15.5	21.1	34
VSP-A 25S□-6	25	43.4	15.5	21.1	35
VSP-A 30S□-6	30	43.4	15.5	21.1	35
VSP-A 35S□-6	35	55.9	28	33.6	71
VSP-A 50S□-6	50	55.9	28	33.6	114
VSP-A 70S□-6A	70	60	30	40	244
VSP-A 100S□-6A	100	60	30	40	375

● Barbed fitting, VSP-A10 to 50S□-6T



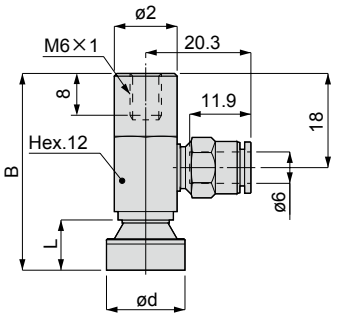
Unit: mm

Model No.	Pad diameter ød	B	L1	L2	Weight (g)
VSP-A 10S□-6T	10	43.5	9.5	15.5	25
VSP-A 15S□-6T	15	43.5	9.5	15.5	26
VSP-A 20S□-6T	20	49.5	15.5	21.5	27
VSP-A 25S□-6T	25	49.5	15.5	21.5	29
VSP-A 30S□-6T	30	49.5	15.5	21.5	29
VSP-A 35S□-6T	35	62	28	34	65
VSP-A 50S□-6T	50	62	28	34	108

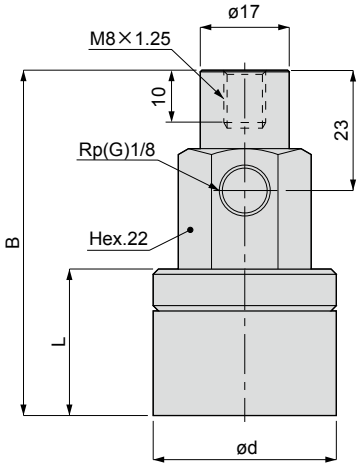
Dimensions (fixed. vacuum outlet side VSP-B)

● Push-in fitting

· VSP-B10 to 50S□-6



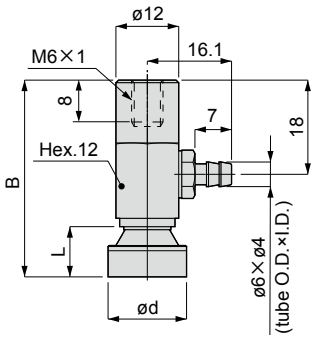
· VSP-B70, 100S□-6A



Unit: mm

Model No.	Pad diameter ød	B	L	Weight (g)
VSP-B 10S□-6	10	37.5	9.5	29
VSP-B 15S□-6	15	37.5	9.5	30
VSP-B 20S□-6	20	43.5	15.5	31
VSP-B 25S□-6	25	43.5	15.5	33
VSP-B 30S□-6	30	43.5	15.5	33
VSP-B 35S□-6	35	56	28	69
VSP-B 50S□-6	50	56	28	112
VSP-B 70S□-6A	70	68	30	251
VSP-B 100S□-6A	100	68	30	381

● Barbed fitting, VSP-B10 to 50S□-6T



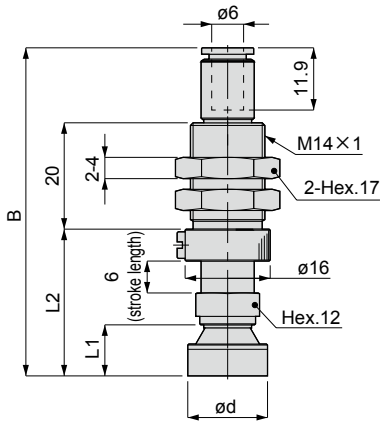
Unit: mm

Model No.	Pad diameter ød	B	L	Weight (g)
VSP-B 10S□-6T	10	37.5	9.5	27
VSP-B 15S□-6T	15	37.5	9.5	28
VSP-B 20S□-6T	20	43.5	15.5	29
VSP-B 25S□-6T	25	43.5	15.5	31
VSP-B 30S□-6T	30	43.5	15.5	31
VSP-B 35S□-6T	35	66	28	67
VSP-B 50S□-6T	50	66	28	110

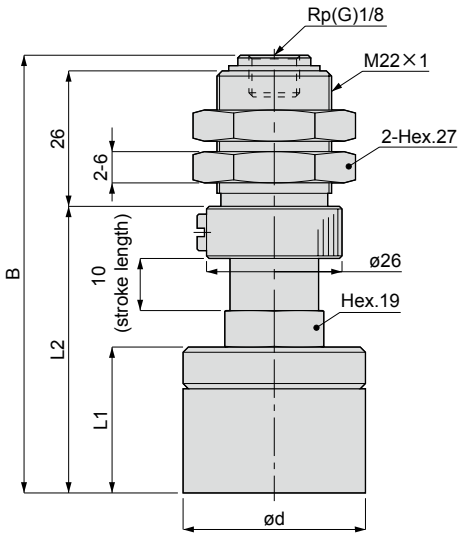
Dimensions (buffer, vacuum outlet top VSP-C)

● Push-in fitting

· VSP-C10 to 50S□-6



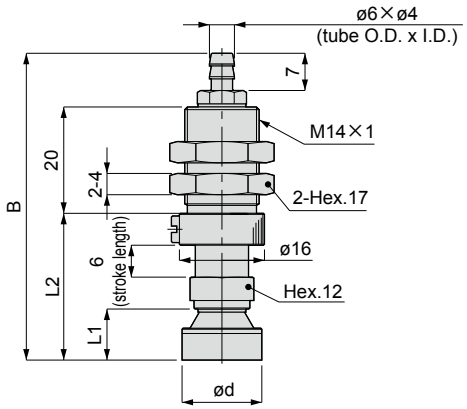
· VSP-C70, 100S□-6A



Unit: mm

Model No.	Pad diameter ød	B	L1	L2	Spring force (N)	Weight (g)
VSP-C 10S□-6	10	61.8	9.5	27.5	7 to 12.6	35
VSP-C 15S□-6	15	61.8	9.5	27.5	7 to 12.6	36
VSP-C 20S□-6	20	67.8	15.5	33.5	7 to 12.6	37
VSP-C 25S□-6	25	67.8	15.5	33.5	7 to 12.6	39
VSP-C 30S□-6	30	67.8	15.5	33.5	7 to 12.6	39
VSP-C 35S□-6	35	80.3	28	46	7 to 12.6	74
VSP-C 50S□-6	50	80.3	28	46	7 to 12.6	117
VSP-C 70S□-6A	70	86	30	57	10.1 to 15.8	272
VSP-C 100S□-6A	100	86	30	57	10.1 to 15.8	403

● Barbed fitting, VSP-C10 to 50S□-6T



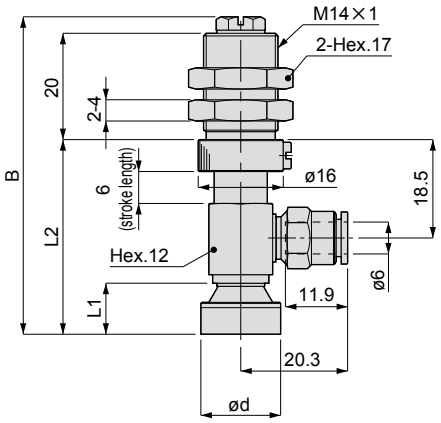
Unit: mm

Model No.	Pad diameter ød	B	L1	L2	Spring force (N)	Weight (g)
VSP-C 10S□-6T	10	57.6	9.5	27.5	7 to 12.6	33
VSP-C 15S□-6T	15	57.6	9.5	27.5	7 to 12.6	34
VSP-C 20S□-6T	20	63.6	15.5	33.5	7 to 12.6	35
VSP-C 25S□-6T	25	63.6	15.5	33.5	7 to 12.6	37
VSP-C 30S□-6T	30	63.6	15.5	33.5	7 to 12.6	37
VSP-C 35S□-6T	35	76.1	28	46	7 to 12.6	72
VSP-C 50S□-6T	50	76.1	28	46	7 to 12.6	115

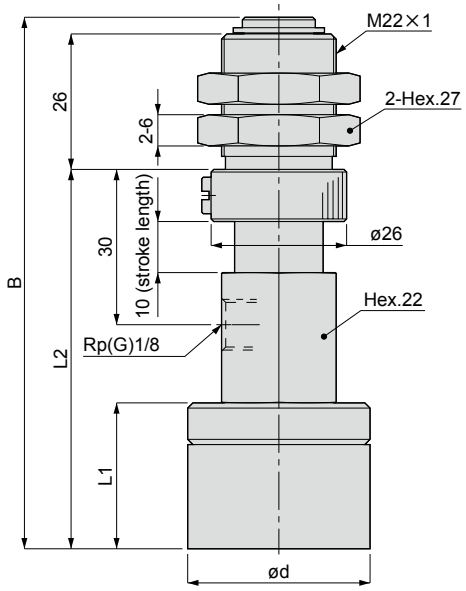
Dimensions (buffer, vacuum outlet side VSP-D)

● Push-in fitting

· VSP-D10 to 50S□-6



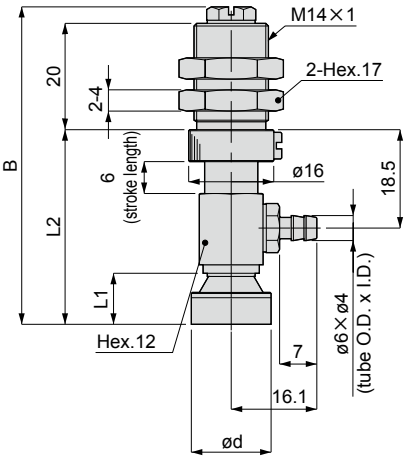
· VSP-D70, 100S□-6A



Unit: mm

Model No.	Pad diameter ød	B	L1	L2	Spring force (N)	Weight (g)
VSP-D 10S□-6	10	59.6	9.5	36.5	7 to 12.6	47
VSP-D 15S□-6	15	59.6	9.5	36.5	7 to 12.6	47
VSP-D 20S□-6	20	65.6	15.5	42.5	7 to 12.6	49
VSP-D 25S□-6	25	65.6	15.5	42.5	7 to 12.6	50
VSP-D 30S□-6	30	65.6	15.5	42.5	7 to 12.6	50
VSP-D 35S□-6	35	78.1	28	55	7 to 12.6	86
VSP-D 50S□-6	50	78.1	28	55	7 to 12.6	129
VSP-D 70S□-6A	70	104	30	75	10.1 to 15.8	355
VSP-D 100S□-6A	100	104	30	75	10.1 to 15.8	485

● Barbed fitting, VSP-D10 to 50S□-6T

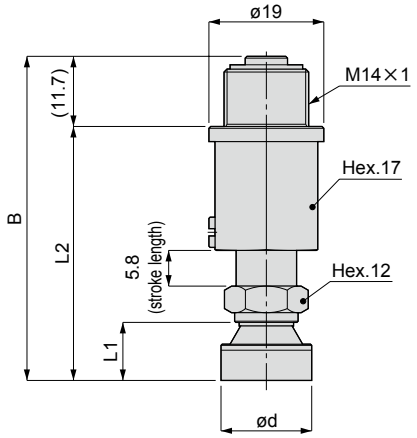


Unit: mm

Model No.	Pad diameter ød	B	L1	L2	Spring force (N)	Weight (g)
VSP-D 10S□-6T	10	59.6	9.5	36.5	7 to 12.6	45
VSP-D 15S□-6T	15	59.6	9.5	36.5	7 to 12.6	45
VSP-D 20S□-6T	20	65.6	15.5	42.5	7 to 12.6	47
VSP-D 25S□-6T	25	65.6	15.5	42.5	7 to 12.6	48
VSP-D 30S□-6T	30	65.6	15.5	42.5	7 to 12.6	48
VSP-D 35S□-6T	35	78.1	28	55	7 to 12.6	84
VSP-D 50S□-6T	50	78.1	28	55	7 to 12.6	127

Dimensions (direct mounting buffer, VSP-F)

● Metric thread
· VSP-F10 to 50S□

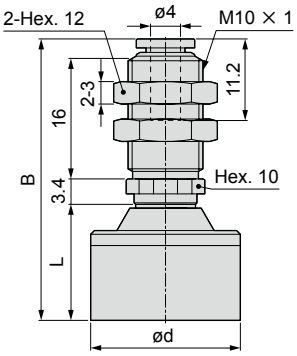


Unit: mm

Model No.	Pad diameter ød	B	L1	L2	Spring force (N)	Weight (g)
VSP-F 10S□	10	53.5	9.5	41.8	7.9 to 15	54
VSP-F 15S□	15	53.5	9.5	41.8	7.9 to 15	55
VSP-F 20S□	20	59.5	15.5	47.8	7.9 to 15	56
VSP-F 25S□	25	59.5	15.5	47.8	7.9 to 15	58
VSP-F 30S□	30	59.5	15.5	47.8	7.9 to 15	58
VSP-F 35S□	35	72	28	60.3	7.9 to 15	93
VSP-F 50S□	50	72	28	60.3	7.9 to 15	136

Dimensions (compact fixed, vacuum outlet top VSP-MA)

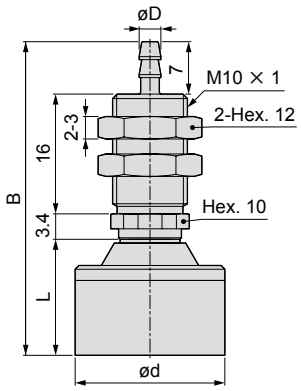
● Push-in fitting, VSP-MA10 to 30S□-4



Unit: mm

Model No.	Pad diameter ød	B	L	Weight (g)
VSP-MA10S□-4	10	31.9	9.5	7.6
VSP-MA15S□-4	15	31.9	9.5	7.9
VSP-MA20S□-4	20	37.9	15.5	9.5
VSP-MA25S□-4	25	37.9	15.5	11
VSP-MA30S□-4	30	37.9	15.5	11

● Barbed fitting, VSP-MA10 to 30S□-4T/6T

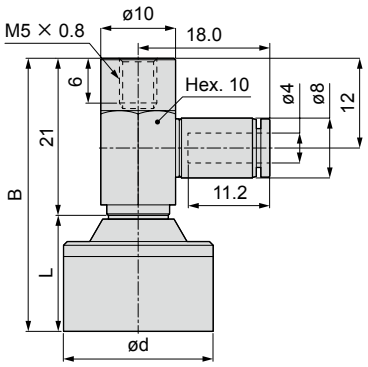


Unit: mm

Model No.	Tube O.D. x I.D. øD	Pad diameter ød	B	L	Weight (g)
VSP-MA10S□-4T	4×2.5	10	35.9	9.5	7.5
VSP-MA10S□-6T	6×4				7.6
VSP-MA15S□-4T	4×2.5	15	35.9	9.5	7.8
VSP-MA15S□-6T	6×4				7.9
VSP-MA20S□-4T	4×2.5	20	41.9	15.5	9.5
VSP-MA20S□-6T	6×4				
VSP-MA25S□-4T	4×2.5	25	41.9	15.5	11
VSP-MA25S□-6T	6×4				
VSP-MA30S□-4T	4×2.5	30	41.9	15.5	11
VSP-MA30S□-6T	6×4				

Dimensions (compact fixed, vacuum outlet side VSP-MB)

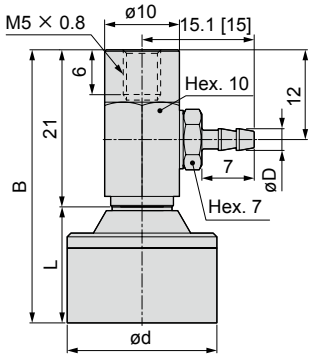
● Push-in fitting, VSP-MB10 to 30S□-4



Unit: mm

Model No.	Pad diameter ød	B	L	Weight (g)
VSP-MB10S□-4	10	30.5	9.5	8.5
VSP-MB15S□-4	15	30.5	9.5	8.8
VSP-MB20S□-4	20	36.5	15.5	11
VSP-MB25S□-4	25	36.5	15.5	12
VSP-MB30S□-4	30	36.5	15.5	12

● Barbed fitting, VSP-MB10 to 30S□-4T/6T

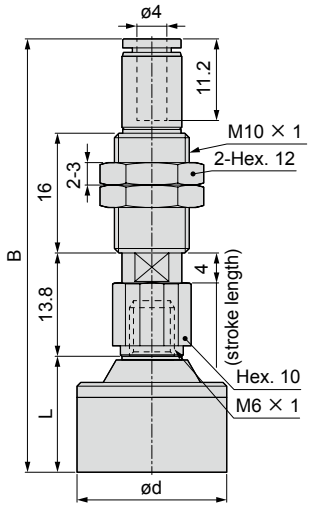


Unit: mm

Model No.	Tube O.D. x I.D. øD	Pad diameter ød	B	L	Weight (g)
VSP-MB10S□-4T	4×2.5	10	30.5	9.5	7
VSP-MB10S□-6T	6×4				7.3
VSP-MB15S□-4T	4×2.5	15	30.5	9.5	7.4
VSP-MB15S□-6T	6×4				7.6
VSP-MB20S□-4T	4×2.5	20	36.5	15.5	9
VSP-MB20S□-6T	6×4				9.3
VSP-MB25S□-4T	4×2.5	25	36.5	15.5	11
VSP-MB25S□-6T	6×4				
VSP-MB30S□-4T	4×2.5	30	36.5	15.5	11
VSP-MB30S□-6T	6×4				

Dimensions (compact buffer, vacuum outlet top VSP-MC)

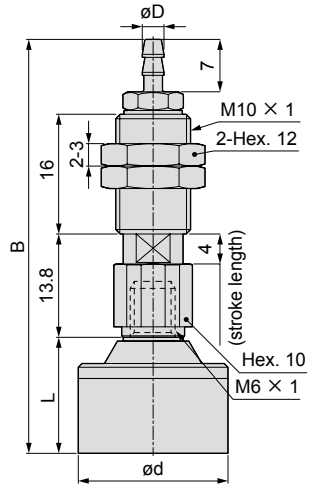
● Push-in fitting, VSP-MC10 to 30S□-4



Unit: mm

Model No.	Pad diameter ød	B	L	Spring force (N)	Weight (g)
VSP-MC10S□-4	10	52.3	9.5	1 to 1.3	20
VSP-MC15S□-4	15	52.3	9.5	1 to 1.3	20
VSP-MC20S□-4	20	58.3	15.5	1 to 1.3	22
VSP-MC25S□-4	25	58.3	15.5	1 to 1.3	23
VSP-MC30S□-4	30	58.3	15.5	1 to 1.3	23

● Barbed fitting, VSP-MC10 to 30S□-4T/6T

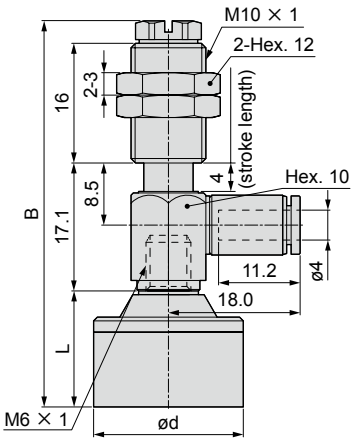


Unit: mm

Model No.	Tube O.D. x I.D. øD	Pad diameter ød	B	L	Spring force (N)	Weight (g)
VSP-MC10S□-4T	4×2.5	10	49.4	9.5	1 to 1.3	18
VSP-MC10S□-6T	6×4					19
VSP-MC15S□-4T	4×2.5	15	49.4	9.5	1 to 1.3	19
VSP-MC15S□-6T	6×4					
VSP-MC20S□-4T	4×2.5	20	55.4	15.5	1 to 1.3	20
VSP-MC20S□-6T	6×4					21
VSP-MC25S□-4T	4×2.5	25	55.4	15.5	1 to 1.3	22
VSP-MC25S□-6T	6×4					
VSP-MC30S□-4T	4×2.5	30	55.4	15.5	1 to 1.3	22
VSP-MC30S□-6T	6×4					

Dimensions (compact buffer, vacuum outlet side VSP-MD)

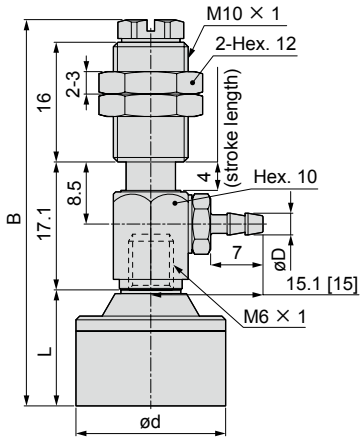
● Push-in fitting, VSP-MD10 to 30S□-4



Unit: mm

Model No.	Pad diameter ød	B	L	Spring force (N)	Weight (g)
VSP-MD10S□-4	10	45.6	9.5	1 to 1.3	23
VSP-MD15S□-4	15	45.6	9.5	1 to 1.3	24
VSP-MD20S□-4	20	51.6	15.5	1 to 1.3	25
VSP-MD25S□-4	25	51.6	15.5	1 to 1.3	27
VSP-MD30S□-4	30	51.6	15.5	1 to 1.3	27

● Barbed fitting, VSP-MC10 to 30S□-4T/6T

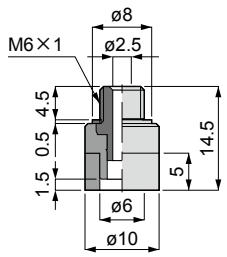


Unit: mm

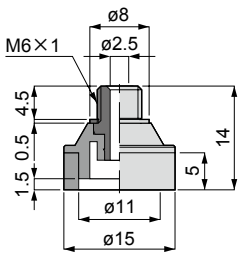
Model No.	Tube O.D. x I.D. øD	Pad diameter ød	B	L	Spring force (N)	Weight (g)
VSP-MD10S□-4T	4×2.5	10	45.6	9.5	1 to 1.3	22
VSP-MD10S□-6T	6×4					
VSP-MD15S□-4T	4×2.5	15	45.6	9.5	1 to 1.3	22
VSP-MD15S□-6T	6×4					23
VSP-MD20S□-4T	4×2.5	20	51.6	15.5	1 to 1.3	24
VSP-MD20S□-6T	6×4					
VSP-MD25S□-4T	4×2.5	25	51.6	15.5	1 to 1.3	25
VSP-MD25S□-6T	6×4					26
VSP-MD30S□-4T	4×2.5	30	51.6	15.5	1 to 1.3	25
VSP-MD30S□-6T	6×4					26

Dimensions: pad only

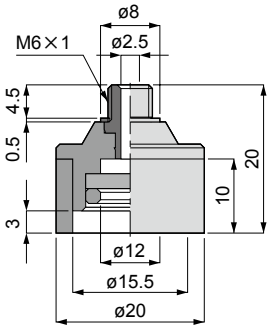
●VSPG-10S□A



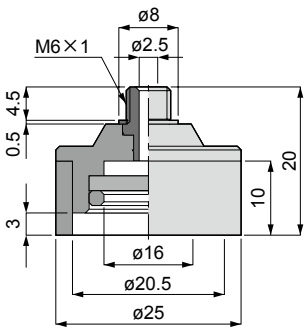
●VSPG-15S□A



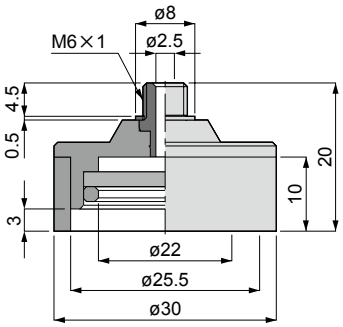
●VSPG-20S□A



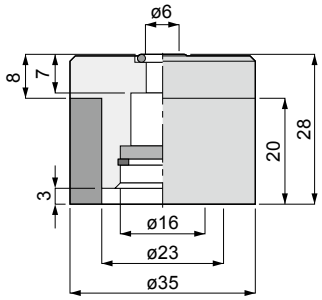
●VSPG-25S□A



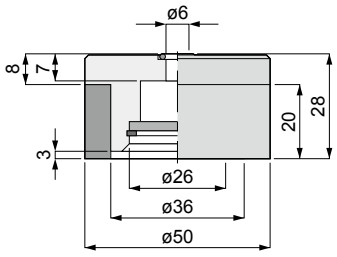
●VSPG-30S□A



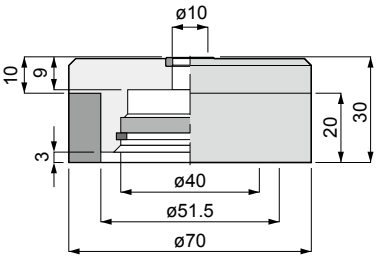
●VSPG-35S□A



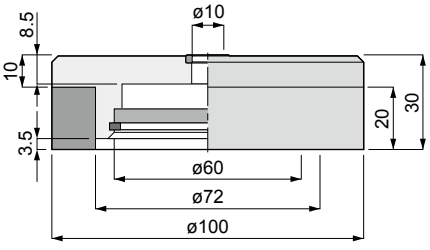
●VSPG-50S□A



●VSPG-70S□A

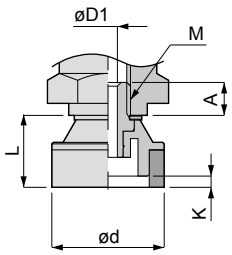


●VSPG-100S□A

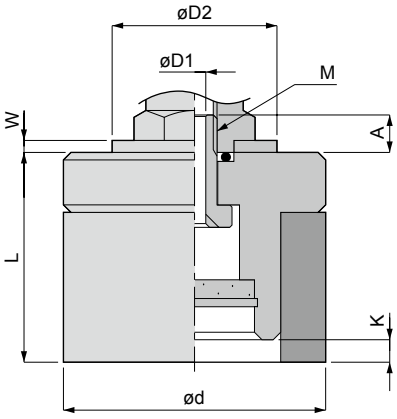


Detailed view of pad and holder fixing part

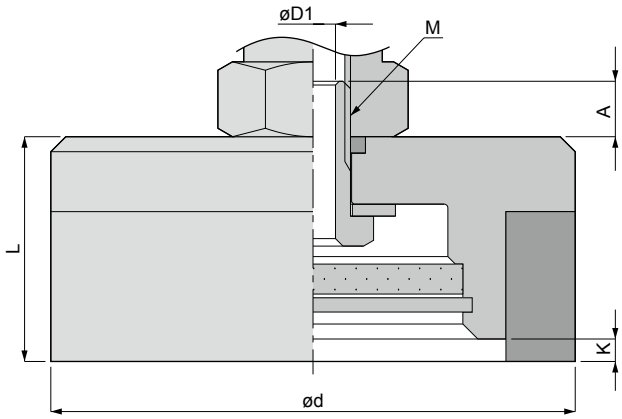
●VSPG-10 to 30S□A



● VSPG-35, 50S□A



● VSPG-70, 100S□A



Unit: mm

Model No.	Pad diameter ød	L	Lip internal height K	Fixing screw M	A	øD1	øD2	W
VSPG- 10S□A	10	9.6	1.5	M6×1	4.4	3	-	-
VSPG- 15S□A	15	9.6	1.5	M6×1	4.4	3	-	-
VSPG- 20S□A	20	15.6	3	M6×1	4.4	3	-	-
VSPG- 25S□A	25	15.6	3	M6×1	4.4	3	-	-
VSPG- 30S□A	30	15.6	3	M6×1	4.4	3	-	-
VSPG- 35S□A	35	28	3	M6×1	3	3	22	1.6
VSPG- 50S□A	50	28	3	M6×1	3	3	22	1.6
VSPG- 70S□A	70	30	3	M10×1.5	6	6	-	-
VSPG- 100S□A	100	30	3.5	M10×1.5	6	6	-	-

Suction pad for retort-pack
Suction pad, bellows

VSP-*B* Series

● Pad diameter: ø6 to ø100

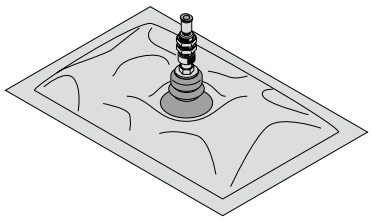
RoHS

Features

■ It can suction extremely soft workpieces such as paper and vinyl. It also includes swinging pad features.
■ Resin attachments ideal for applications susceptible to rubber pad suction marks are available.
- ● Pad diameter: 12 types (ø6, ø8, ø10, ø15, ø20, ø25, ø30, ø40, ø50, ø60, ø80, ø100)
- ● Pad diameter: 8 types(nitrile rubber, silicone rubber, urethane rubber, fluoro rubber, HNBR, EPDM, conductive silicone rubber, conductive NBR)
- ● Holder shape: 9 types (5 standard, 4 compact)
- ● Free holder (swinging): 2 types (30° angle, 10° angle) [Compatible pad diameter: ø10 to ø100]
- ● Position locking valve: Compatible pad diameter (all sizes)

Applications

● Retort-packs and bags containing food etc.



How to order

* Refer to model No. sections on dimensions pages 345 to 360 for combinations of model No.

● Suction pad/bellows

VSP - A 80 B N — 6A - ○ - V

● Pad rubber only/bellows

VSPG — 80 B N A

Code	Content
Ⓐ Holder shape *1	
A	Fixed, Vacuum outlet top
B	Fixed, Vacuum outlet side
C	Buffer, Vacuum outlet top
D	Buffer, Vacuum outlet side
F	Direct mounting, Buffer
MA	Compact Fixed, Vacuum outlet top
MB	Compact Fixed, Vacuum outlet side
MC	Compact Buffer, Vacuum outlet top
MD	Compact Buffer, Vacuum outlet side
Ⓑ Pad diameter *1	
Refer to Appendix 1 for pad diameter.	
Ⓒ Pad shape	
B	Bellows
Ⓓ Pad material	
N	Nitrile rubber
S	Silicone rubber
U	Urethane rubber
F	Fluoro rubber
HN	HNBR
EP	EPDM
SE	Conductive silicone rubber
NE	Conductive NBR (low resistance)
Ⓔ Frame	
Blank	Without frame
A	With frame (compatible pad diameter: ø80, ø100)
Ⓕ Port size/shape	
2	ø1.8 push-in fitting
4	ø4 push-in fitting
4T	ø4 barbed fitting
6	ø6 push-in fitting
6T	ø6 barbed fitting
6A	Rp1/8
Blank	(Holder shape: Selected with F)
Ⓖ Free holder (swinging) *1, *2, *3	**Page 550**
F1	With free holder swing angle 30°
F2	With free holder swing angle 15°
Blank	Without free holder
Ⓗ Position locking valve *1, *2, *3	**Page 556**
V	With position locking valve (compatible pad diameter: ø10 to ø100)
Blank	None

Ⓐ Holder shape
Ⓑ Pad diameter
Ⓒ Pad shape
Ⓓ Pad material
Ⓔ Frame
Ⓕ Port size/shape
Ⓖ Free holder (swinging)
Ⓗ Position locking valve

⚠ Precautions for model No. selection

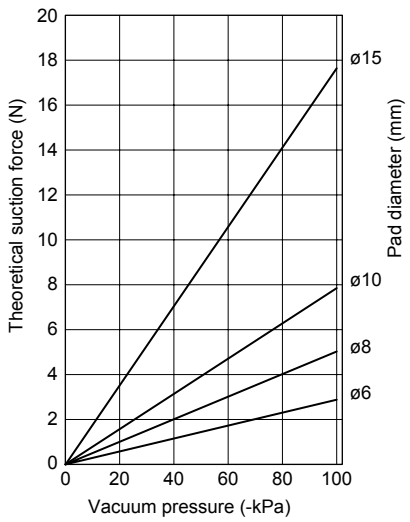
*1: When Ⓖ is "F1" or "F2", Ⓐ M□ (compact holder) cannot be selected.
*2: Ⓖ "F1", "F2" and Ⓗ "V" cannot be selected together.
*3: Refer to page 550 for details on free holders (F1, F2) and page 556 for details on position locking valves (V).
In addition, refer to the target suction pad list (page 558) for applicable pad size shape.

Appendix 1

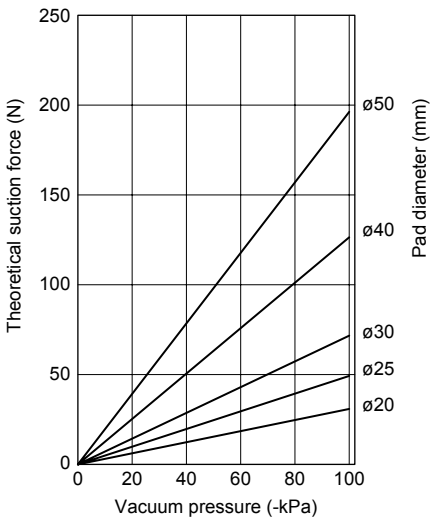
Pad diameter						
Code	**6**	**8**	**10**	**15**	**20**	**25**
Pad diameter (mm)	ø6	ø8	ø10	ø15	ø20	ø25
Code	**30**	**40**	**50**	**60**	**80**	**100**
Pad diameter (mm)	ø30	ø40	ø50	ø60	ø80	ø100

Theoretical suction force

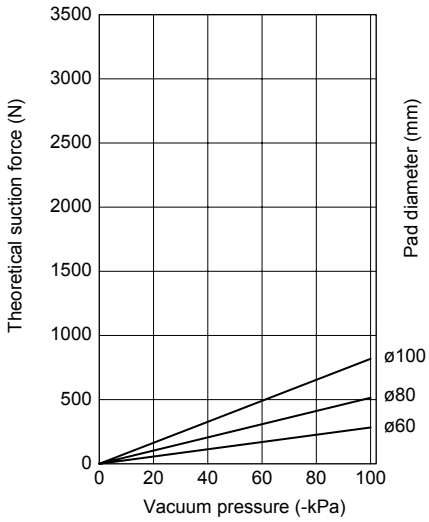
● Pad diameter: ø6 mm to ø15 mm



● Pad diameter: ø20 mm to ø50 mm



● Pad diameter: ø60mm to ø100mm



Because the theoretical suction force is the value at static conditions, adopt a safety factor of 1/4 for horizontal lifting and 1/8 for vertical lifting in actual use. For the bellows type suction force, it may not be possible to secure the calculated suction force (theoretical suction force x safety factor) due to the effect of pad characteristics such as degree of vacuum/pad material/suctioned object.
When selecting with a suction force obtained by the “Selection method for suction pad” (page 288) as a guideline, confirm that there is no problem in the suction performance of the actual device.

Safety precautions

WARNING

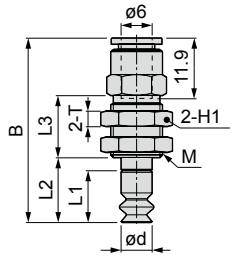
● Since bellows type pads may adhere together due to working conditions and material characteristics, confirm performance with an actual device.
In addition, since stickiness may increase due to operating environment and pad wear, review the pad shape, material, quantity, etc. as necessary.

CAUTION

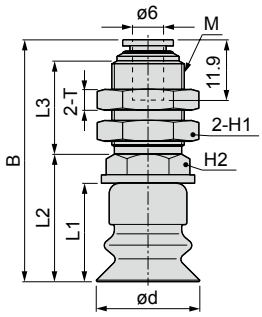
● Pad frames of pad O.D. ø80 mm or more have no conductivity. When using a vacuum pad of conductive material, take measures to let electricity pass directly from the pad rubber.

Dimensions (fixed, vacuum outlet top VSP-A, push-in fitting)

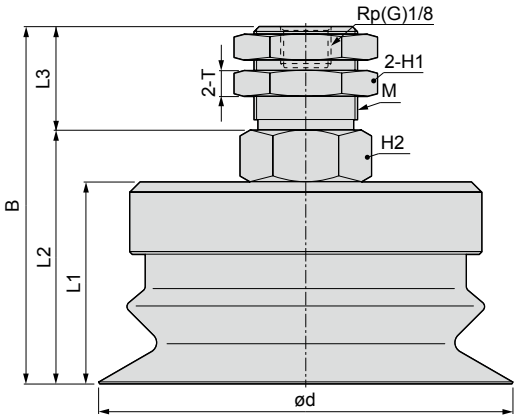
●VSP-A6, 8B□-6



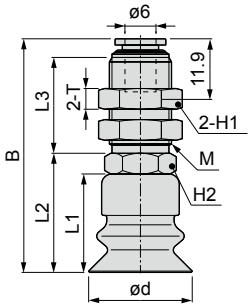
●VSP-A20 to 50B□-6



●VSP-A60 to 100B□-6A



●VSP-A10, 15B□-6

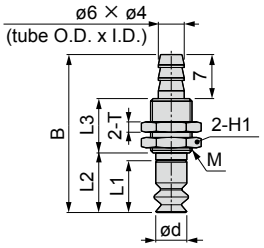


Unit: mm

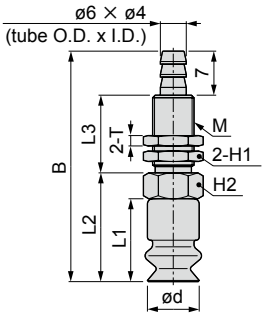
Model No.	Pad diameter ød	Mounting screw M	B	L1	L2	L3	Opposite side H1	Opposite side H2	T	Weight (g)
VSP-A6B□-6	6	M10×1	35.8	10	12.5	12	12	-	3	13
VSP-A8B□-6	8	M10×1	35.8	10	12.5	12	12	-	3	13
VSP-A10B□-6	10	M12×1	42.3	16	20	18.5	14	12	4	22
VSP-A15B□-6	15	M12×1	42.3	16	20	18.5	14	12	4	22
VSP-A20B□-6	20	M14×1	46.9	19	24.6	18	17	14	4	37
VSP-A25B□-6	25	M14×1	46.9	19	24.6	18	17	14	4	38
VSP-A30B□-6	30	M14×1	50.9	23	28.6	18	17	14	4	40
VSP-A40B□-6	40	M14×1	57.9	30	35.6	18	17	14	4	49
VSP-A50B□-6	50	M14×1	59.9	32	37.6	18	17	14	4	55
VSP-A60B□-6A	60	M20×1	69.6	39.6	49.6	20	24	22	5	141
VSP-A80B□-6A	80	M20×1	69	39	49	20	24	22	5	223
VSP-A100B□-6A	100	M20×1	75	45	55	20	24	22	5	322

Dimensions (fixed, vacuum outlet top VSP-A, barbed fitting)

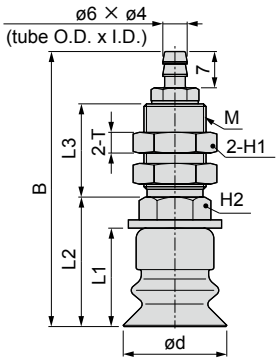
●VSP-A6, 8B□-6T



●VSP-A10, 15B□-6T



●VSP-A20 to 50B□-6T

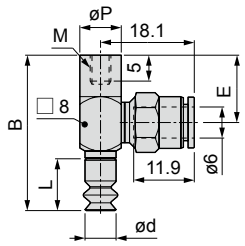


Unit: mm

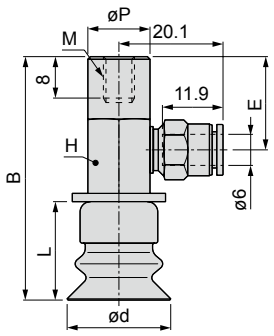
Model No.	Pad diameter ød	Mounting screw M	B	L1	L2	L3	Opposite side H1	Opposite side H2	T	Weight (g)
VSP-A6B□-6T	6	M8×0.75	29	10	11.5	10.5	10	-	2	8
VSP-A8B□-6T	8	M8×0.75	29	10	11.5	10.5	10	-	2	8
VSP-A10B□-6T	10	M8×0.75	43	16	21	15	10	10	2	12
VSP-A15B□-6T	15	M8×0.75	43	16	21	15	10	10	2	13
VSP-A20B□-6T	20	M12×1	53	19	25	18	14	12	4	30
VSP-A25B□-6T	25	M12×1	53	19	25	18	14	12	4	31
VSP-A30B□-6T	30	M12×1	57	23	29	18	14	12	4	34
VSP-A40B□-6T	40	M12×1	64	30	36	18	14	12	4	42
VSP-A50B□-6T	50	M12×1	66	32	38	18	14	12	4	48

Dimensions (fixed, vacuum outlet side VSP-B, push-in fitting)

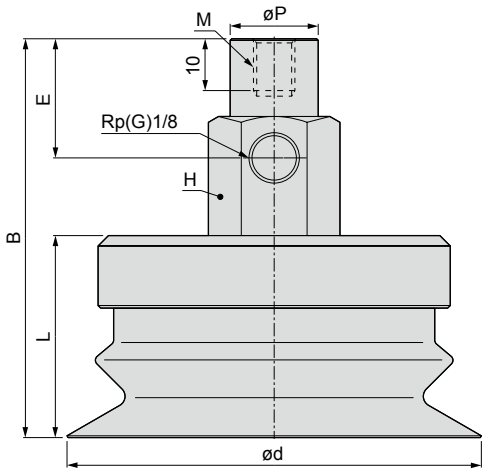
●VSP-B6, 8B□-6



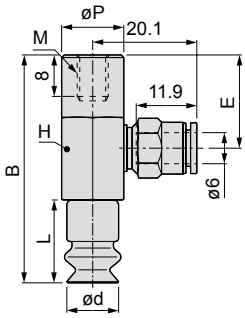
●VSP-B20 to 50B□-6



●VSP-B60 to 100B□-6A



●VSP-B10, 15B□-6

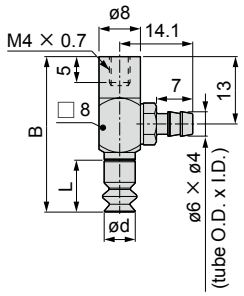


Unit: mm

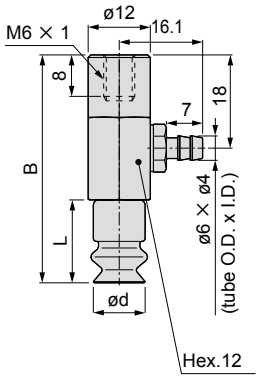
Model No.	Pad diameter ød	Mounting screw M	B	L	øP	E	Opposite side H	Weight (g)
VSP-B6B□-6	6	M4×0.7	30	10	8	13	-	14
VSP-B8B□-6	8	M4×0.7	30	10	8	13	-	14
VSP-B10B□-6	10	M6×1	44	16	12	18	12	31
VSP-B15B□-6	15	M6×1	44	16	12	18	12	31
VSP-B20B□-6	20	M6×1	47	19	12	18	12	34
VSP-B25B□-6	25	M6×1	47	19	12	18	12	35
VSP-B30B□-6	30	M6×1	51	23	12	18	12	38
VSP-B40B□-6	40	M6×1	58	30	12	18	12	46
VSP-B50B□-6	50	M6×1	60	32	12	18	12	52
VSP-B60B□-6A	60	M8×1.25	78.5	40.5	17	23	22	147
VSP-B80B□-6A	80	M8×1.25	77	39	17	23	22	230
VSP-B100B□-6A	100	M8×1.25	83	45	17	23	22	329

Dimensions (fixed. vacuum outlet side VSP-B, barbed fitting)

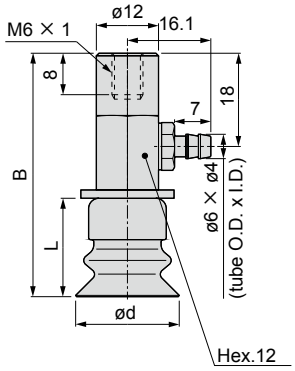
●VSP-B6, 8B□-6T



●VSP-B10, 15B□-6T



●VSP-B20 to 50B□-6T

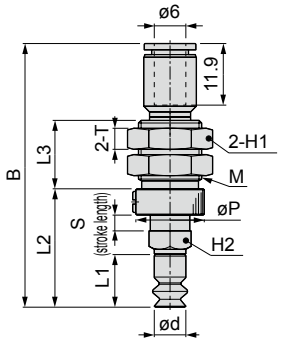


Unit: mm

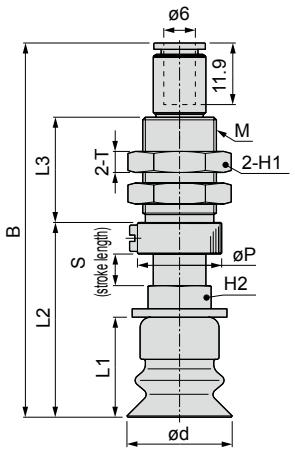
Model No.	Pad diameter ød	B	L	Weight (g)
VSP-B6B□-6T	6	30	10	12
VSP-B8B□-6T	8	30	10	12
VSP-B10B□-6T	10	44	16	29
VSP-B15B□-6T	15	44	16	30
VSP-B20B□-6T	20	47	19	32
VSP-B25B□-6T	25	47	19	33
VSP-B30B□-6T	30	51	23	36
VSP-B40B□-6T	40	58	30	44
VSP-B50B□-6T	50	60	32	50

Dimensions (buffer, vacuum outlet top VSP-C, push-in fitting)

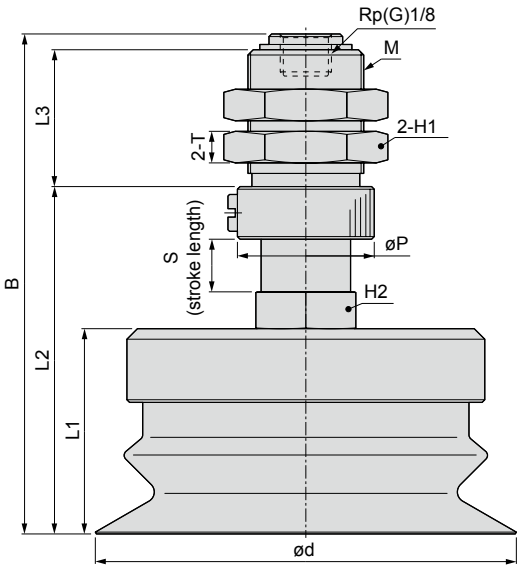
●VSP-C6, 8B□-6



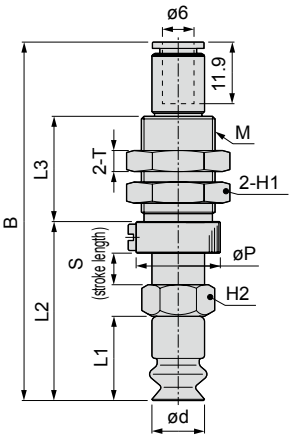
●VSP-C20 to 50B□-6



●VSP-C60 to 100B□-6A



●VSP-C10, 15B□-6

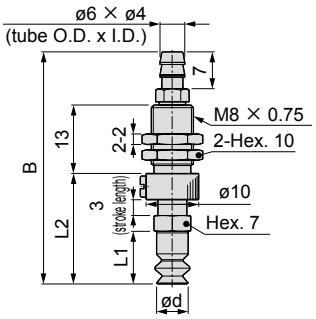


Unit: mm

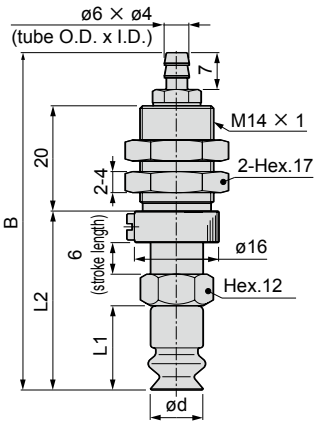
Model No.	Pad diameter ød	Mounting screw M	B	L1	L2	L3	øP	Stroke length S	Opposite side H1	Opposite side H2	T	Spring force (N)	Weight (g)
VSP-C6B□-6	6	M12×1	50.3	10	22.5	13	13	3	14	8	4	0.9 to 1.9	19
VSP-C8B□-6	8	M12×1	50.3	10	22.5	13	13	3	14	8	4	0.9 to 1.9	19
VSP-C10B□-6	10	M14×1	68.3	16	34	20	16	6	17	12	4	4 to 7.1	36
VSP-C15B□-6	15	M14×1	68.3	16	34	20	16	6	17	12	4	4 to 7.1	37
VSP-C20B□-6	20	M14×1	71.3	19	37	20	16	6	17	12	4	7 to 12.6	40
VSP-C25B□-6	25	M14×1	71.3	19	37	20	16	6	17	12	4	7 to 12.6	41
VSP-C30B□-6	30	M14×1	75.3	23	41	20	16	6	17	12	4	7 to 12.6	44
VSP-C40B□-6	40	M14×1	82.3	30	48	20	16	6	17	12	4	7 to 12.6	52
VSP-C50B□-6	50	M14×1	84.3	32	50	20	16	6	17	12	4	7 to 12.6	58
VSP-C60B□-6A	60	M22×1	96.5	40.5	70.1	26	26	10	27	19	6	10.1 to 15.8	169
VSP-C80B□-6A	80	M22×1	95	39	66	26	26	10	27	19	6	10.1 to 15.8	251
VSP-C100B□-6A	100	M22×1	101	45	72	26	26	10	27	19	6	10.1 to 15.8	350

Dimensions (buffer, vacuum outlet top VSP-C, barbed fitting)

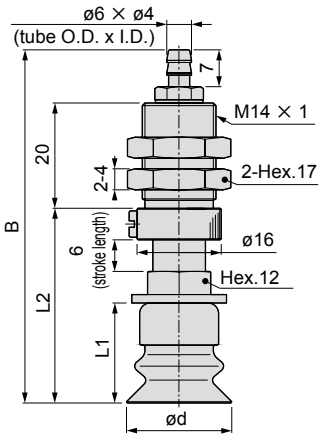
●VSP-C6, 8B□-6T



●VSP-C10, 15B□-6T



●VSP-C20 to 50B□-6T

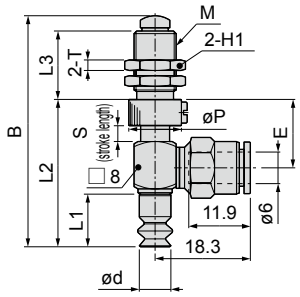


Unit: mm

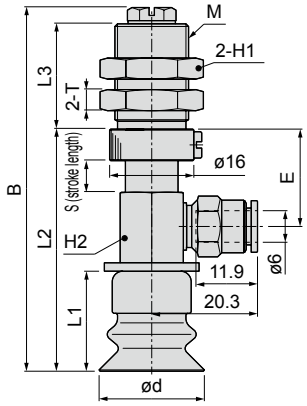
Model No.	Pad diameter ød	B	L1	L2	Spring force (N)	Weight (g)
VSP-C6B□-6T	6	44	10	21	0.9 to 1.9	9
VSP-C8B□-6T	8	44	10	21	0.9 to 1.9	9
VSP-C10B□-6T	10	64.1	16	34	4 to 7.1	34
VSP-C15B□-6T	15	64.1	16	34	4 to 7.1	35
VSP-C20B□-6T	20	67.1	19	37	7 to 12.6	38
VSP-C25B□-6T	25	67.1	19	37	7 to 12.6	39
VSP-C30B□-6T	30	71.1	23	41	7 to 12.6	41
VSP-C40B□-6T	40	78.1	30	48	7 to 12.6	50
VSP-C50B□-6T	50	80.1	32	50	7 to 12.6	56

Dimensions (buffer, vacuum outlet side VSP-D, push-in fitting)

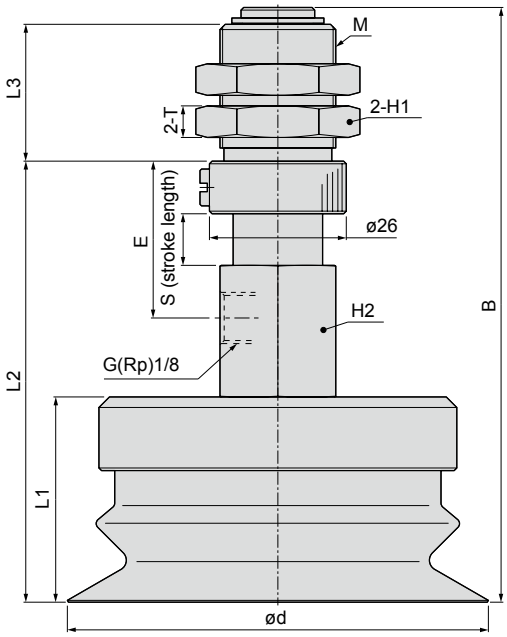
●VSP-D6, 8B□-6



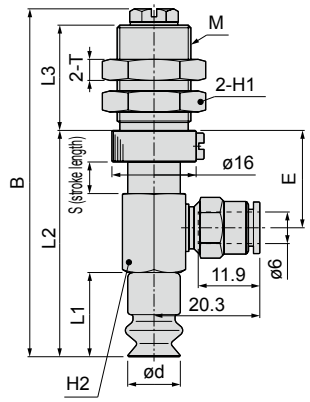
●VSP-D20 to 50B□-6



●VSP-D60 to 100B□-6A



●VSP-D10, 15B□-6

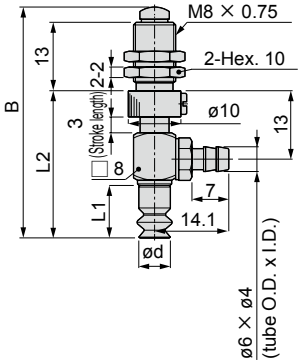


Unit: mm

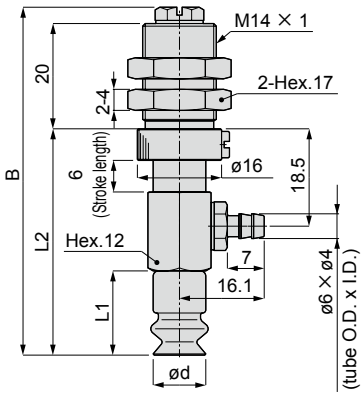
Model No.	Pad diameter ød	Mounting screw M	B	L1	L2	L3	Stroke length S	E	Opposite side H1	Opposite side H2	T	Spring force (N)	Weight (g)
VSP-D6B□-6	6	M8×0.75	44	10	28	13	3	13	10	-	2	0.9 to 1.9	16
VSP-D8B□-6	8	M8×0.75	44	10	28	13	3	13	10	-	2	0.9 to 1.9	16
VSP-D10B□-6	10	M14×1	66.1	16	43	20	6	18.5	17	12	4	4 to 7.1	48
VSP-D15B□-6	15	M14×1	66.1	16	43	20	6	18.5	17	12	4	4 to 7.1	49
VSP-D20B□-6	20	M14×1	69.1	19	46	20	6	18.5	17	12	4	7 to 12.6	52
VSP-D25B□-6	25	M14×1	69.1	19	46	20	6	18.5	17	12	4	7 to 12.6	53
VSP-D30B□-6	30	M14×1	73.1	23	50	20	6	18.5	17	12	4	7 to 12.6	55
VSP-D40B□-6	40	M14×1	80.1	30	57	20	6	18.5	17	12	4	7 to 12.6	64
VSP-D50B□-6	50	M14×1	82.1	32	59	20	6	18.5	17	12	4	7 to 12.6	70
VSP-D60B□-6A	60	M22×1	114.5	40.5	88.1	26	10	30	27	22	6	10.1 to 15.8	251
VSP-D80B□-6A	80	M22×1	113	39	84	26	10	30	27	22	6	10.1 to 15.8	334
VSP-D100B□-6A	100	M22×1	119	45	90	26	10	30	27	22	6	10.1 to 15.8	433

Dimensions (buffer, vacuum outlet side VSP-D, barbed fitting)

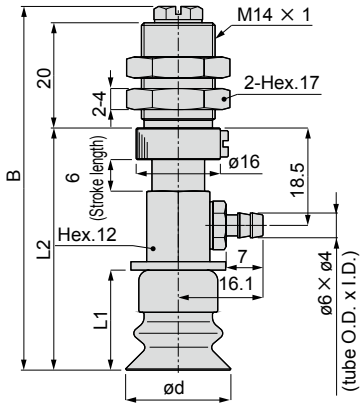
● VSP-D6, 8B□-6T



● VSP-D10, 15B□-6T



● VSP-D20 to 50B□-6T

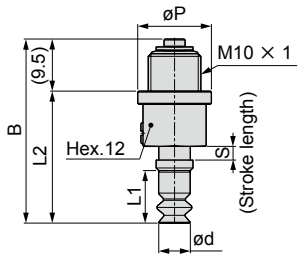


Unit: mm

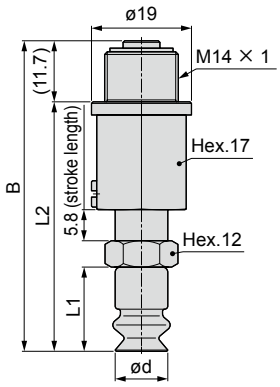
Model No.	Pad diameter ød	B	L1	L2	Spring force (N)	Weight (g)
VSP-D6B□-6T	6	44	10	28	0.9 to 1.9	13
VSP-D8B□-6T	8	44	10	28	0.9 to 1.9	13
VSP-D10B□-6T	10	66.1	16	43	4 to 7.1	48
VSP-D15B□-6T	15	66.1	16	43	4 to 7.1	49
VSP-D20B□-6T	20	69.1	19	46	7 to 12.6	52
VSP-D25B□-6T	25	69.1	19	46	7 to 12.6	53
VSP-D30B□-6T	30	73.1	23	50	7 to 12.6	55
VSP-D40B□-6T	40	80.1	30	57	7 to 12.6	64
VSP-D50B□-6T	50	82.1	32	59	7 to 12.6	70

Dimensions (direct mounting buffer)

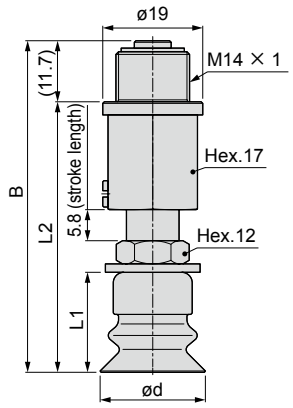
● VSP-F6, 8B□



● VSP-F10, 15B□



● VSP-F20 to 50B□



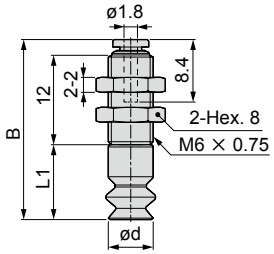
Unit: mm

Model No.	Pad diameter ød	B	L1	L2	Spring force (N)	Weight (g)
VSP-F6B□	6	35	10	25.5	2.3 to 3.9	15
VSP-F8B□	8	35	10	25.5	2.3 to 3.9	15
VSP-F10B□	10	59	16	47.3	7.9 to 15	56
VSP-F15B□	15	59	16	47.3	7.9 to 15	57
VSP-F20B□	20	63	19	51.3	7.9 to 15	59
VSP-F25B□	25	63	19	51.3	7.9 to 15	60
VSP-F30B□	30	67	23	55.3	7.9 to 15	62
VSP-F40B□	40	74	30	62.3	7.9 to 15	71
VSP-F50B□	50	76	32	64.3	7.9 to 15	77

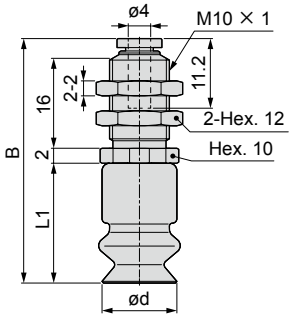
Dimensions (compact fixed, vacuum outlet top VSP-MA)

● Push-in fitting

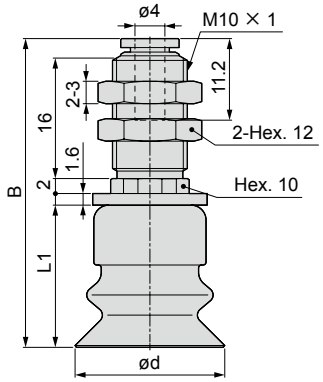
● VSP-MA6, 8B□-2



● VSP-MA10, 15B□-4



● VSP-MA20 to 30B□-4

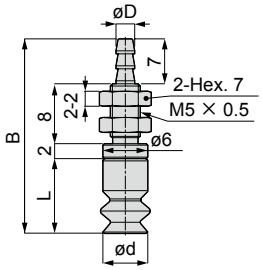


Unit: mm

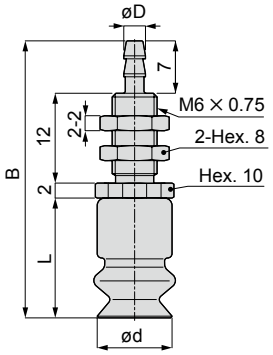
Model No.	Pad diameter ød	B	L1	Weight (g)
VSP-MA6B□-2	6	24.1	10	2.5
VSP-MA8B□-2	8	24.1	10	2.5
VSP-MA10B□-4	10	36.7	16	6.6
VSP-MA15B□-4	15	36.7	16	7.1
VSP-MA20B□-4	20	41.3	19	12
VSP-MA25B□-4	25	41.3	19	13
VSP-MA30B□-4	30	45.3	23	16

● Barbed fitting

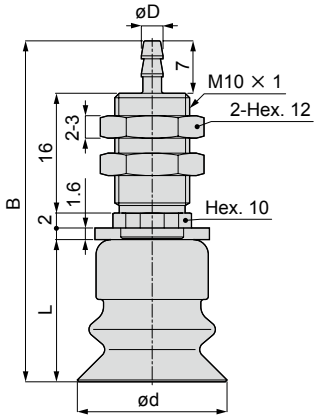
● VSP-MA6, 8B□-4T



● VSP-MA10, 15B□-4T



● VSP-MA20 to 30B□-4T/6T



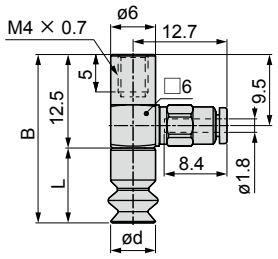
Unit: mm

Model No.	Tube O.D. x I.D. øD	Pad diameter ød	B	L	Weight (g)
VSP-MA6B□-4T	4×2.5	6	27	10	2.1
VSP-MA8B□-4T	4×2.5	8	27	10	2.1
VSP-MA10B□-4T	4×2.5	10	37	16	3.8
VSP-MA15B□-4T	4×2.5	15	37	16	4.3
VSP-MA20B□-4T	4×2.5	20	45.6	19	12
VSP-MA20B□-6T	6×4				
VSP-MA25B□-4T	4×2.5	25	45.6	19	13
VSP-MA25B□-6T	6×4				
VSP-MA30B□-4T	4×2.5	30	49.6	23	16
VSP-MA30B□-6T	6×4				

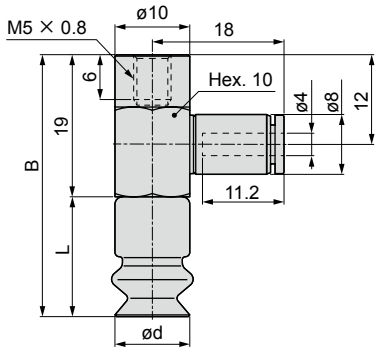
Dimensions (compact fixed, vacuum outlet side VSP-MB)

● Push-in fitting

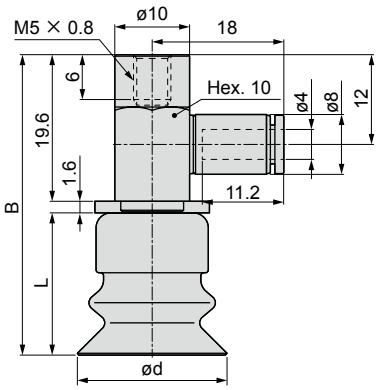
● VSP-MB6, 8B□-2



● VSP-MB10, 15B□-4



● VSP-MB20 to 30B□-4

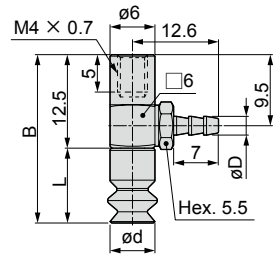


Unit: mm

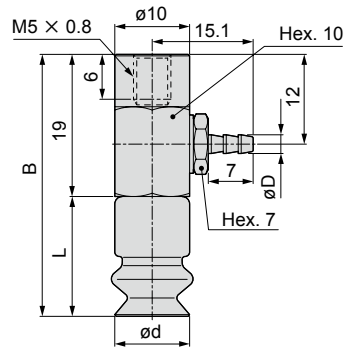
Model No.	Pad diameter ød	B	L	Weight (g)
VSP-MB6B□-2	6	22.5	10	2.5
VSP-MB8B□-2	8	22.5	10	2.5
VSP-MB10B□-4	10	35	16	8.4
VSP-MB15B□-4	15	35	16	8.9
VSP-MB20B□-4	20	40.2	19	13
VSP-MB25B□-4	25	40.2	19	14
VSP-MB30B□-4	30	44.2	23	17

● Barbed fitting

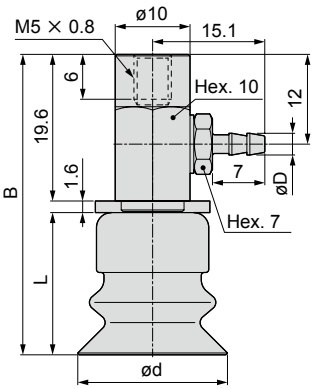
● VSP-MB6, 8B□-4T



● VSP-MB10, 15B□-4T



● VSP-MB20 to 30B□-4T/6T



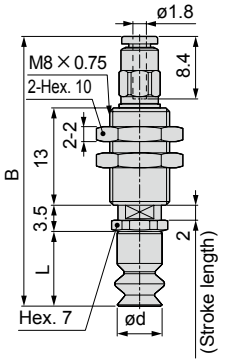
Unit: mm

Model No.	Tube O.D. x I.D. øD	Pad diameter ød	B	L	Weight (g)
VSP-MB6B□-4T	4×2.5	6	22.5	10	2.3
VSP-MB8B□-4T	4×2.5	8	22.5	10	2.3
VSP-MB10B□-4T	4×2.5	10	35	16	6.9
VSP-MB15B□-4T	4×2.5	15	35	16	7.4
VSP-MB20B□-4T	4×2.5	20	40.2	19	12
VSP-MB20B□-6T	6×4				
VSP-MB25B□-4T	4×2.5	25	40.2	19	13
VSP-MB25B□-6T	6×4				
VSP-MB30B□-4T	4×2.5	30	44.2	23	15
VSP-MB30B□-6T	6×4				

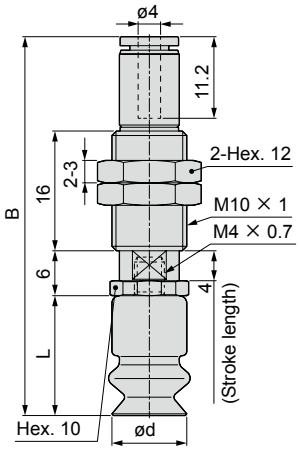
Dimensions (compact buffer, vacuum outlet top VSP-MC)

● Push-in fitting

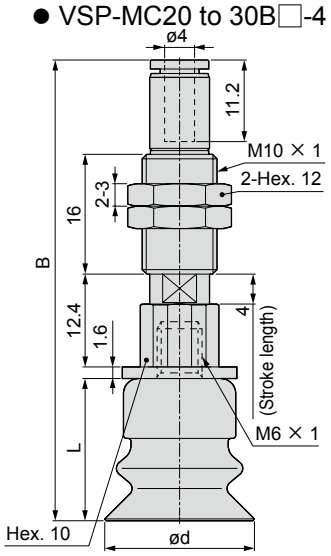
● VSP-MC6, 8B□-2



● VSP-MC10, 15B□-4



● VSP-MC20 to 30B□-4

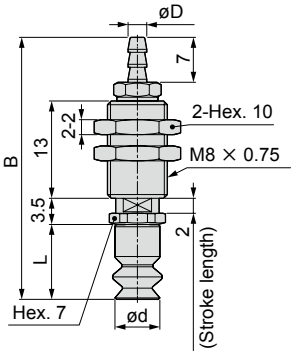


Unit: mm

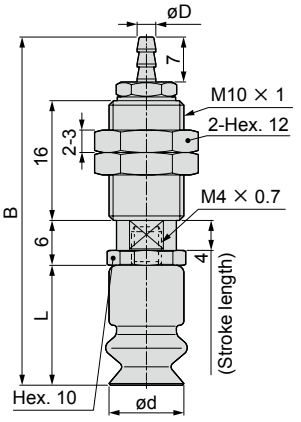
Model No.	Pad diameter ød	B	L	Spring force (N)	Weight (g)
VSP-MC6B□-2	6	36.2	10	0.5 to 0.6	7.3
VSP-MC8B□-2	8	36.2	10	0.5 to 0.6	7.3
VSP-MC10B□-4	10	50.7	16	1 to 1.3	16
VSP-MC15B□-4	15	50.7	16	1 to 1.3	17
VSP-MC20B□-4	20	61.7	19	1 to 1.3	24
VSP-MC25B□-4	25	61.7	19	1 to 1.3	25
VSP-MC30B□-4	30	65.7	23	1 to 1.3	28

● Barbed fitting

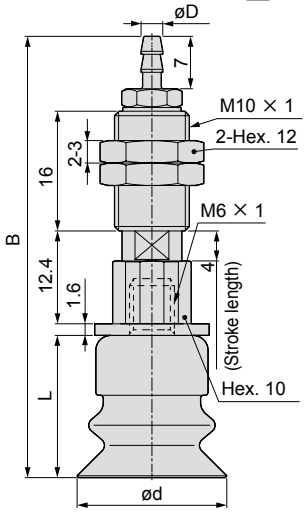
● VSP-MC6, 8B□-4T



● VSP-MC10, 15B□-4T



● VSP-MC20 to 30B□-4T/6T



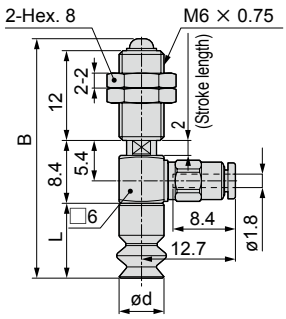
Unit: mm

Model No.	Tube O.D. x I.D. øD	Pad diameter ød	B	L	Spring force (N)	Weight (g)
VSP-MC6B□-4T	4×2.5	6	36.1	10	0.5 to 0.6	7.1
VSP-MC8B□-4T	4×2.5	8	36.1	10	0.5 to 0.6	7.1
VSP-MC10B□-4T	4×2.5	10	48.1	16	1 to 1.3	15
VSP-MC15B□-4T	4×2.5	15	48.1	16	1 to 1.3	16
VSP-MC20B□-4T	4×2.5	20	59.1	19	1 to 1.3	23
VSP-MC20B□-6T	6×4					
VSP-MC25B□-4T	4×2.5	25	59.1	19	1 to 1.3	24
VSP-MC25B□-6T	6×4					
VSP-MC30B□-4T	4×2.5	30	63.1	23	1 to 1.3	26
VSP-MC30B□-6T	6×4					

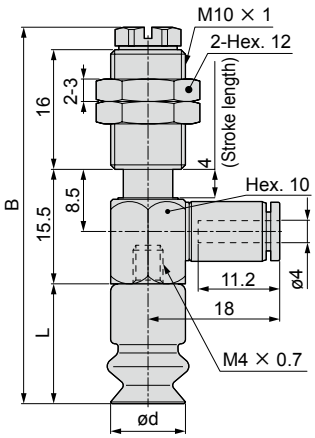
Dimensions (compact buffer, vacuum outlet side VSP-MD)

● Push-in fitting

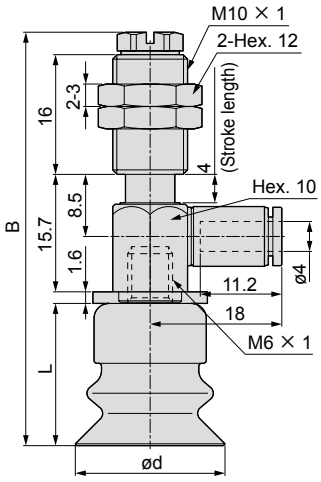
● VSP-MD6, 8B□-2



● VSP-MD10, 15B□-4



● VSP-MD20 to 30B□-4

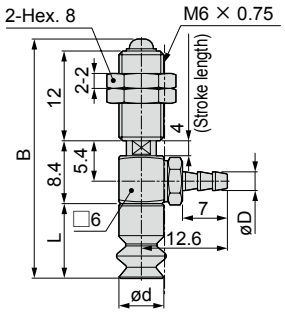


Unit: mm

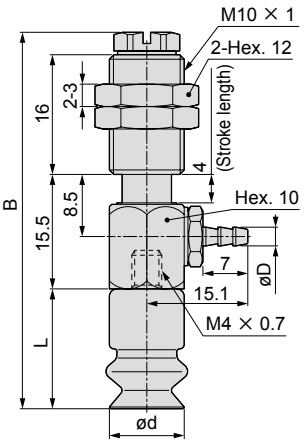
Model No.	Pad diameter ød	B	L	Spring force (N)	Weight (g)
VSP-MD6B□-2	6	32	10	0.5 to 0.6	6.6
VSP-MD8B□-2	8	32	10	0.5 to 0.6	6.6
VSP-MD10B□-4	10	50.5	16	1 to 1.3	24
VSP-MD15B□-4	15	50.5	16	1 to 1.3	25
VSP-MD20B□-4	20	55.3	19	1 to 1.3	28
VSP-MD25B□-4	25	55.3	19	1 to 1.3	29
VSP-MD30B□-4	30	59.3	23	1 to 1.3	31

● Barbed fitting

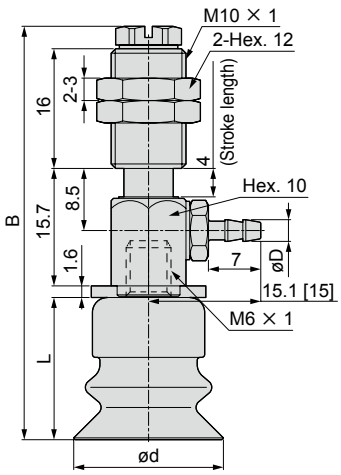
● VSP-MD6, 8B□-4T



● VSP-MD10, 15B□-4T



● VSP-MD20 to 30B□-4T/6T

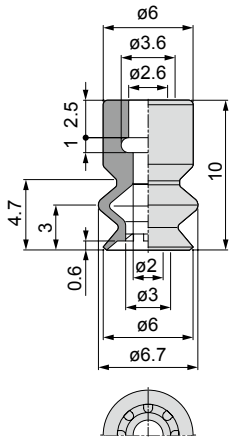


Unit: mm

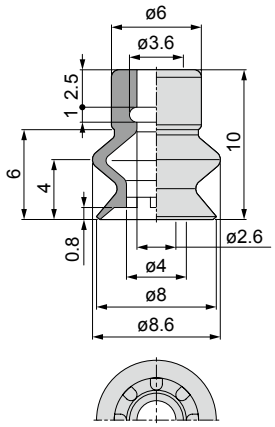
Model No.	Tube O.D. x I.D. øD	Pad diameter ød	B	L	Spring force (N)	Weight (g)
VSP-MD6B□-4T	4×2.5	6	32	10	0.5 to 0.6	6.4
VSP-MD8B□-4T	4×2.5	8	32	10	0.5 to 0.6	6.4
VSP-MD10B□-4T	4×2.5	10	50.5	16	1 to 1.3	22
VSP-MD15B□-4T	4×2.5	15	50.5	16	1 to 1.3	23
VSP-MD20B□-4T	4×2.5	20	55.3	19	1 to 1.3	26
VSP-MD20B□-6T	6×4					27
VSP-MD25B□-4T	4×2.5	25	55.3	19	1 to 1.3	27
VSP-MD25B□-6T	6×4					28
VSP-MD30B□-4T	4×2.5	30	59.3	23	1 to 1.3	30
VSP-MD30B□-6T	6×4					

Dimensions: pad only (without frame)

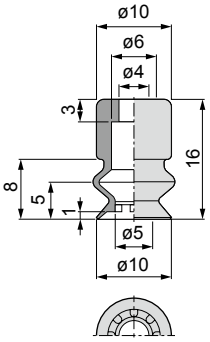
● VSPG-6B□



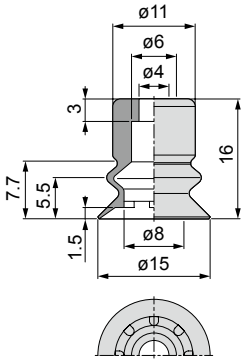
● VSPG-8B□



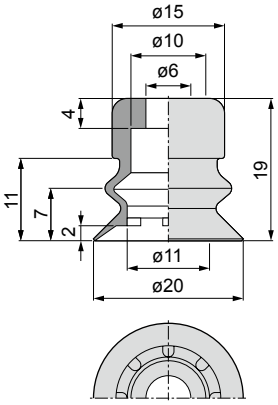
● VSPG-10B□



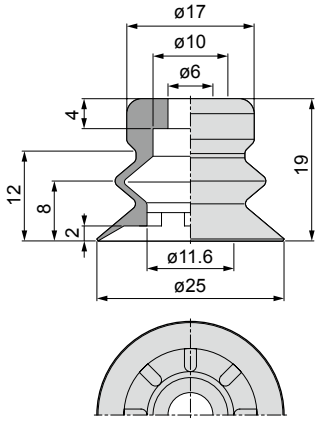
● VSPG-15B□



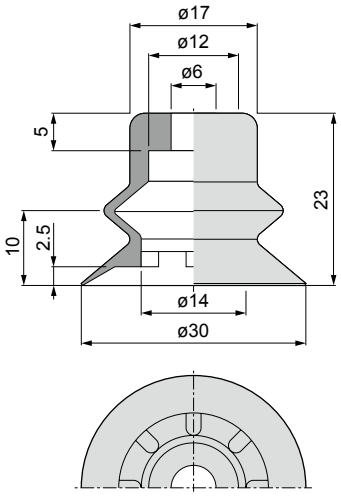
● VSPG-20B□



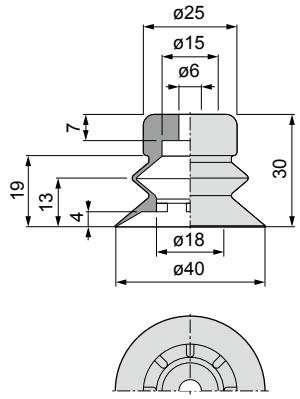
● VSPG-25B□



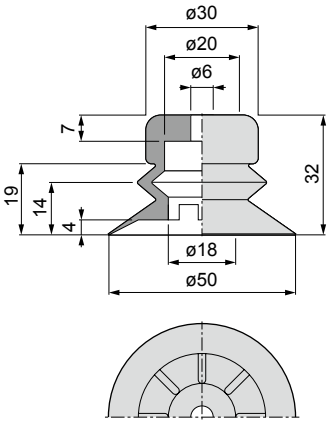
● VSPG-30B□



● VSPG-40B□

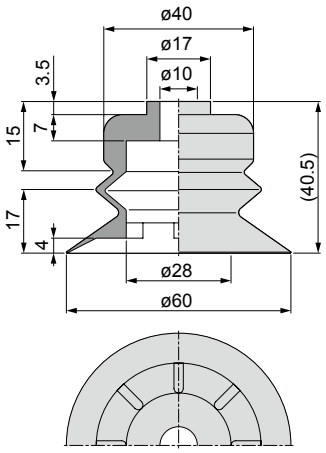


● VSPG-50B□

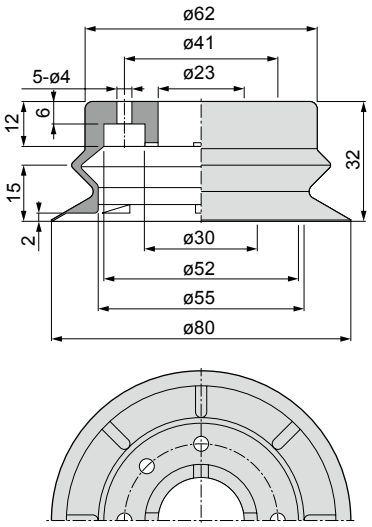


Dimensions: pad only (without frame)

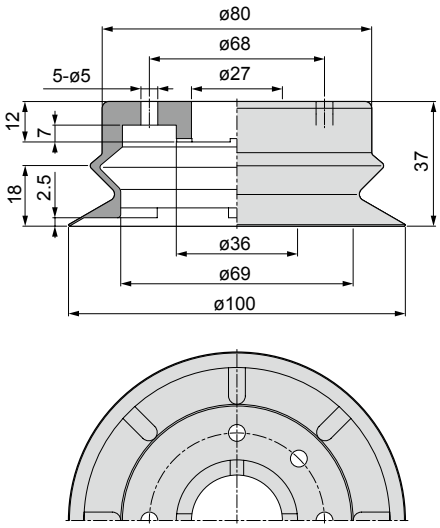
● VSPG-60B□



● VSPG-80B□

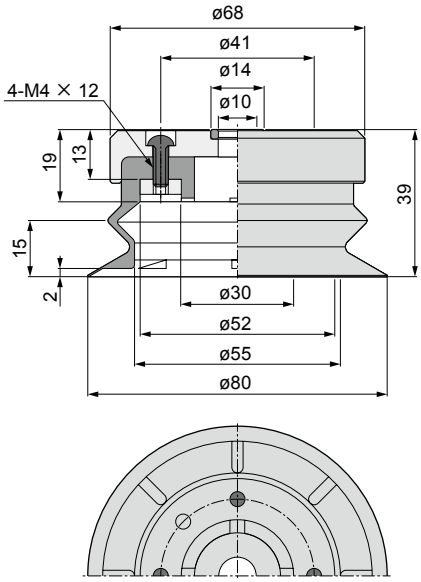


● VSPG-100B□

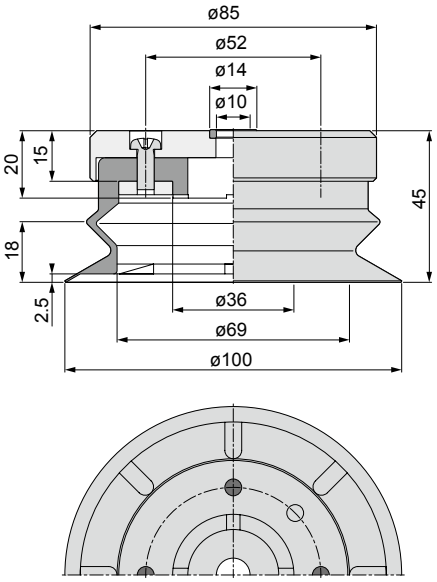


Dimensions: pad only (with frame)

● VSPG-80B□A

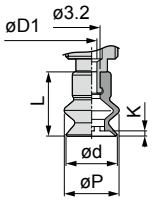


● VSPG-100B□A

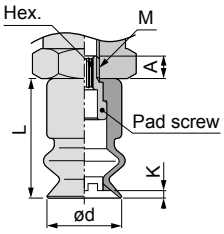


Detailed view of pad and holder fixing part

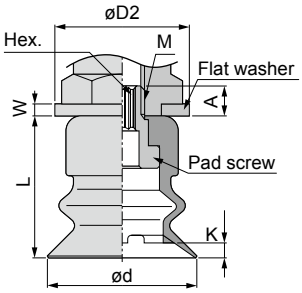
● VSPG-6, 8B□



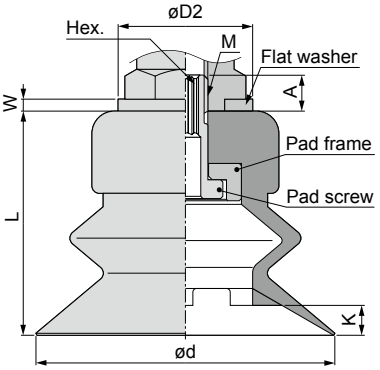
● VSPG-10, 15B□



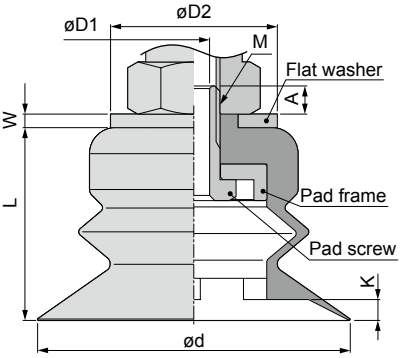
● VSPG-20, 25, 30B□



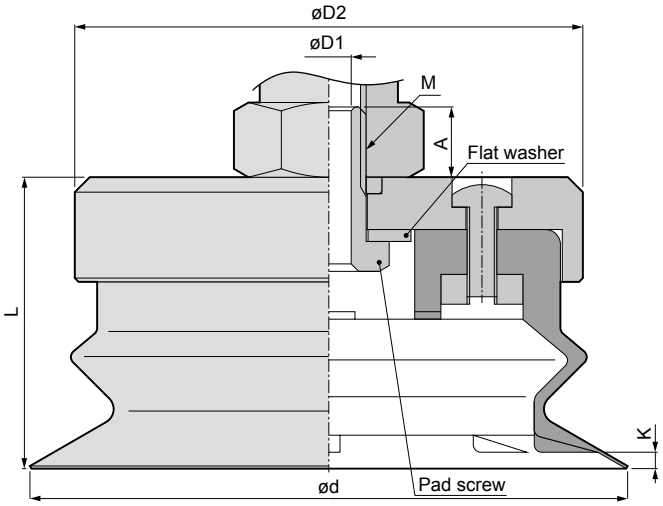
● VSPG-40, 50B□



● VSPG-60B□



● VSPG-80, 100B□A

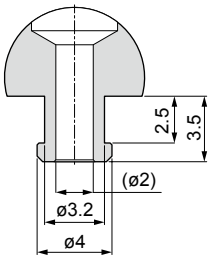


Unit: mm

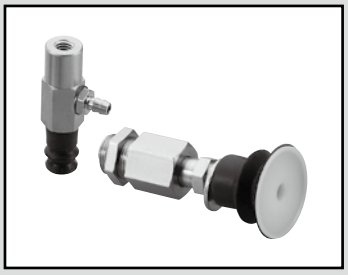
Model No.	Pad diameter ød	L	Lip internal height K	Fixing screw M	A	Opposite side Hex	øD1	øD2	øP	W
VSPG-6B□	6	10	0.6	-	-	-	2	-	6.7	-
VSPG-8B□	8	10	0.8	-	-	-	2	-	8.6	-
VSPG-10B□	10	16	1	M4×0.7	3	2	-	-	-	-
VSPG-15B□	15	16	1.5	M4×0.7	3	2	-	-	-	-
VSPG-20B□	20	19	2	M6×1	4	3	-	18	-	1.6
VSPG-25B□	25	19	2	M6×1	3.5	3	-	18	-	1.6
VSPG-30B□	30	23	2.5	M6×1	5	3	-	18	-	1.6
VSPG-40B□	40	30	4	M6×1	5.5	3	-	22	-	1.6
VSPG-50B□	50	32	4	M6×1	5.5	3	-	22	-	1.6
VSPG-60B□	60	40.5	4	M10×1.5	5.4	14	6	32	-	2.6
VSPG-80B□A	80	39	2	M10×1.5	9.4	14	6	68	-	-
VSPG-100B□A	100	45	2.5	M10×1.5	8.4	14	6	85	-	-

Pad fitting part dimensions

● VSPG-6 to 8B□



MEMO



Related parts for suction pad bellows

Features

● Resin attachment for suction mark prevention (for bellows)

■ Supports the suctioning of workpieces susceptible to rubber pad suction marks by simply attaching to bellows pads
- · Ideal for transporting glass, painting process, removal of molded products, etc.
- · 5 types of pad diameter are available: ø10, ø15, ø20, ø25, ø30
- · Materials can be selected from among 3 types: PEEK, POM and conductive PEEK, according to various working environments

How to order

● Resin attachment for suction mark prevention only/bellows

VSPG - 10 BQ KE

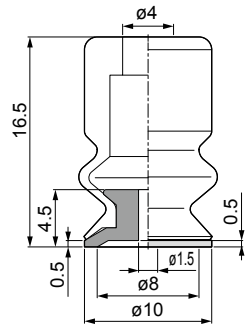
Ⓐ Pad diameter

Ⓐ Resin attachment material

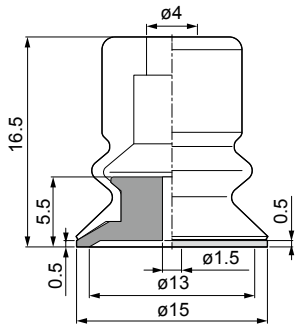
Code	Content
Ⓐ Pad diameter	
10	ø10
15	ø15
20	ø20
25	ø25
30	ø30
Ⓑ Resin attachment material	
K	PEEK
M	POM
KE	Conductive PEEK

Dimensions (outline drawing of resin attachment when attached to bellows pad)

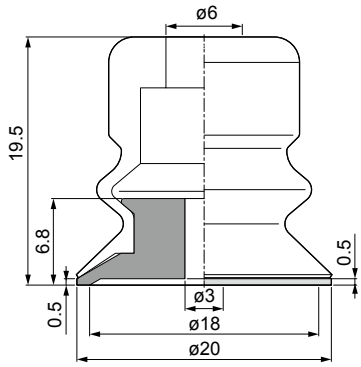
● VSPG-10BQ□



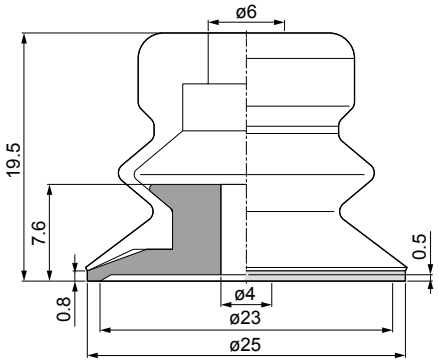
● VSPG-15BQ□



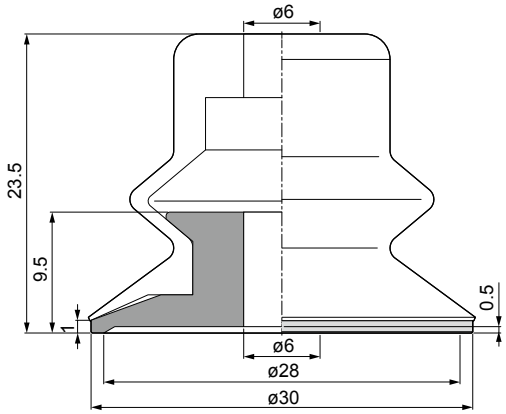
● VSPG-20BQ□



● VSPG-25BQ□



● VSPG-30BQ□



Related parts for suction pad bellows

Characteristics of resin attachment materials/Safety precautions

■ Characteristics of resin attachment materials

Descriptions	Pad material / Order code	PEEK K	POM M	Conductive PEEK KE
Applications		Semiconductor/LCD manufacturing equipment	Various manufacturing lines Food-related products Packaging machine	Semiconductor/LCD manufacturing equipment Electronic device parts
Pad color		Natural	White	Black
Charcteristics	High-temperature usage limits	250°C	95°C	250°C
	Low-temperature usage limits	-50°C	-60°C	-50°C
	Weather resistance	◎	○	◎
	Acid resistance	◎	×	◎
	Alkali resistance	◎	○	◎
	Self-lubrication	○	○	○
	Abrasion resistance	◎	○	◎
	Volume resistance ratio	-	-	10^5 to 10^6 Ω·cm

Reading the rating ➡ ◎: Ideal, ○: Suitable, △: Acceptable, ×: Unsuitable

*1 : Characteristics are those of pad resin material and do not include the suction mark prevention pad holder.
Select with consideration to the vacuum pad holder to be used and the specifications of the suction mark prevention pad holder.

*2 : Characteristics are general characteristics of each material and not guaranteed values. Confirm performance with an actual device.

*3 : The values for the high temperature usage limits are for very short periods of use. Therefore, careful consideration should be employed for usage extending for a constant period of time.

*4 : The volume resistance ratio is a representative value released by the material manufacturers and not a guaranteed value.

Safety precautions

⚠ WARNING

1 Use CKD's "suction pad bellows type" for the pad rubber for mounting the suction mark prevention resin attachment. If improperly shaped suction mark prevention resin attachments or pad rubber are used, dislocation of the resin attachment and large amounts of leakage will occur.

2 Since bellows type pads may adhere together due to working conditions and material characteristics, confirm performance with an actual device.

⚠ CAUTION

1 Compared to conventional rubber suction pads, the suction mark prevention resin attachment reduces suction marks by using resin for the lip portion; however, confirm before use that there is no effect of suction marks on the actual device.

2 The suction mark prevention resin attachment has a greater impact on leakage from the suction surface than conventional rubber suction pads. Note that vacuum hold is not possible. Also, minimize pressure drop due to leakage by keeping the vacuum flow rate as large as possible.

3 Clean the suction surface of the suction pad before use. Deposits may remain as suction marks. Be careful not to scratch the suction surface while cleaning, and do not use organic solvents.

4 Select a material that suits the working conditions for the pad rubber for mounting the suction mark prevention resin attachment.

Suction pad for retort-pack
Suction pad, multi-stage bellows

VSP-*W* Series

● Pad diameter: ø10 to ø50

RoHS

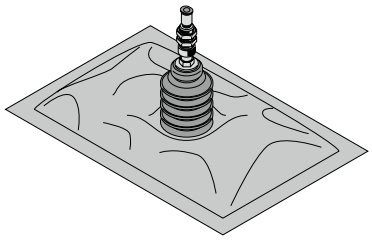
Features

■ It flexibly supports transporting tilted workpieces or plastic bag packaging products.

- ● Pad diameter : 5 types (ø10, ø20, ø30, ø40, ø50)
- ● Pad material : 8 types (nitrile rubber, silicone rubber, urethane rubber, fluoro rubber, HNBR, EPDM, conductive NBR, NBR compatible with Food Sanitation Act)
- ● Holder shape : 9 types (5 standard, 4 compact)
- ● Position locking valve : Compatible pad diameter (all sizes)

Applications

● Retort-packs and bags containing food etc.



How to order

* Refer to model No. sections on dimensions pages 367 to 377 for combinations of model No.

● Suction pad/multi-stage bellows

VSP - A 50 W N — 6T - V

● Pad rubber only/multi-stage bellows

VSPG — 50 W N ( )

Ⓐ Holder shape

Code	Content
Ⓐ Holder shape	
A	Fixed, Vacuum outlet top
B	Fixed, Vacuum outlet side
C	Buffer, Vacuum outlet top
D	Buffer, Vacuum outlet side
F	Direct mounting, Buffer
MA	Compact Fixed, Vacuum outlet top
MB	Compact Fixed, Vacuum outlet side
MC	Compact Buffer, Vacuum outlet top
MD	Compact Buffer, Vacuum outlet side

Ⓑ Pad diameter

Ⓑ Pad diameter
Refer to Appendix 1 for pad diameter.

Ⓒ Pad shape

Ⓒ Pad shape	
W	Multi-stage bellows

Ⓓ Pad material

Ⓓ Pad material *1	
N	Nitrile rubber
S	Silicone rubber
U	Urethane rubber
F	Fluoro rubber
HN	HNBR
EP	EPDM
NE	Conductive NBR (low resistance)
G	NBR compatible with Food Sanitation Act

Ⓔ Frame

Ⓔ Frame	
Blank	Without frame

Ⓕ Port size/shape

Ⓕ Port size/shape	
4	ø4 push-in fitting
4T	ø4 barbed fitting
6	ø6 push-in fitting
6T	ø6 barbed fitting
Blank	(Holder shape: Selected with F)

Ⓖ Position locking valve

Ⓖ Position locking valve *1 Page 556	
V	With position locking valve
Blank	None

⚠ Precautions for model No. selection

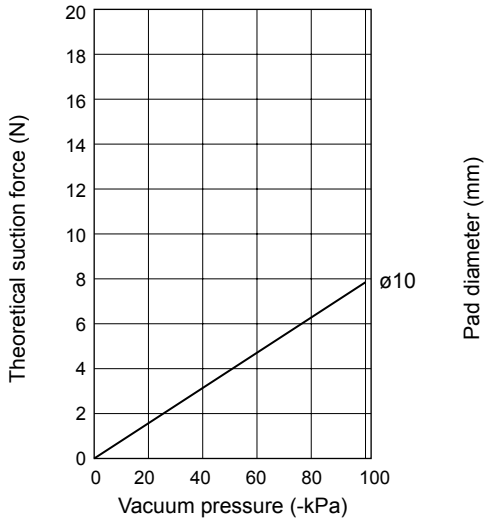
*1 : Refer to page 556 for details on position locking valves (V).
Refer to the target suction pad list (page 558) for applicable pad size shape.

Appendix 1

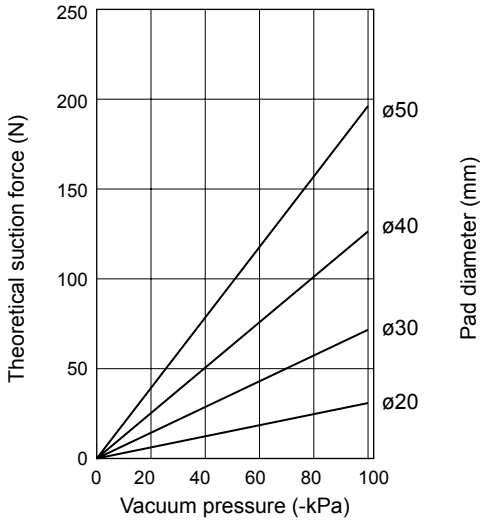
Pad diameter					
Code	10	20	30	40	50
Pad diameter (mm)	ø10	ø20	ø30	ø40	ø50

Theoretical suction force

● Pad diameter: ø10 mm



● Pad diameter: ø20 mm to ø50 mm



For multi-stage bellows type suction force, it may not be possible to secure the calculated suction force (theoretical suction force x safety factor) due to the effect of pad characteristics such as degree of vacuum/pad material/suctioned object.
When selecting with a suction force obtained by the “Selection method for suction pad” (page 288) as a guideline, confirm that there is no problem in the suction performance of the actual device. In addition, the multi-stage bellows type is not suitable for vertical lifting. If this product is to be used for such purposes, do so at your own risk.

Safety precautions

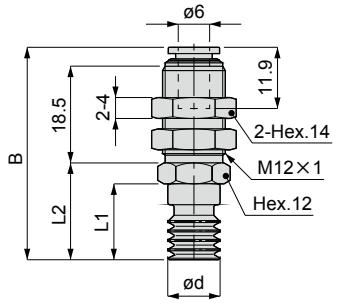
⚠ WARNING

● Since the multi-stage bellows type pads may adhere together due to working conditions and material characteristics, confirm performance with an actual device.
In addition, since stickiness may increase due to operating environment and pad wear, review the pad shape, material, quantity, etc. as necessary.

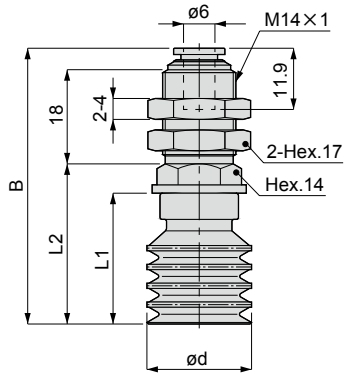
Dimensions (fixed, vacuum outlet top VSP-A)

● Push-in fitting

· VSP-A10W□-6



· VSP-A20 to 50W□-6

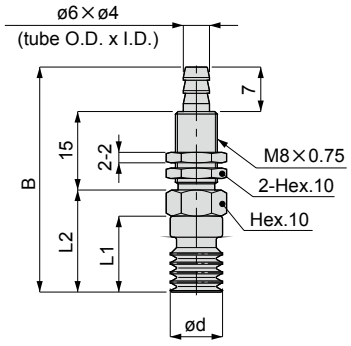


Unit: mm

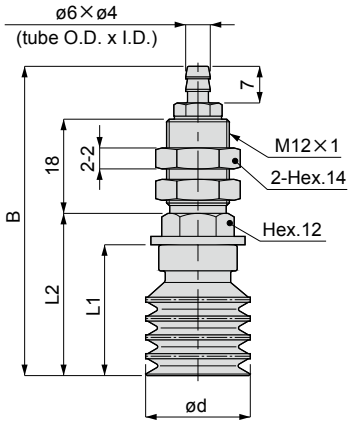
Model No.	Pad diameter ød	B	L1	L2	Weight (g)
VSP-A 10W□-6	10	40.8	14.5	18.5	22
VSP-A 20W□-6	20	52.9	25	30.6	37
VSP-A 30W□-6	30	66.4	38.5	44.1	43
VSP-A 40W□-6	40	72.9	45	50.6	53
VSP-A 50W□-6	50	83.9	56	61.6	64

● Barbed fitting

· VSP-A10W□-6T



· VSP-A20 to 50W□-6T



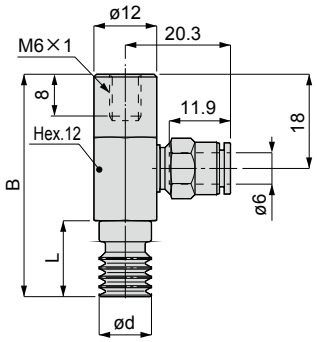
Unit: mm

Model No.	Pad diameter ød	B	L1	L2	Weight (g)
VSP-A 10W□-6T	10	43	14.5	19.5	12
VSP-A 20W□-6T	20	59	25	31	31
VSP-A 30W□-6T	30	72.5	38.5	44.5	37
VSP-A 40W□-6T	40	79	45	51	46
VSP-A 50W□-6T	50	90	56	62	58

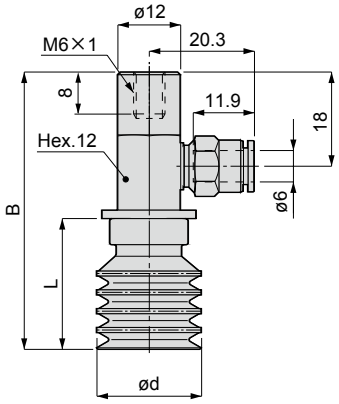
Dimensions (fixed. vacuum outlet side VSP-B)

● Push-in fitting

· VSP-B10W□-6



· VSP-B20 to 50W□-6

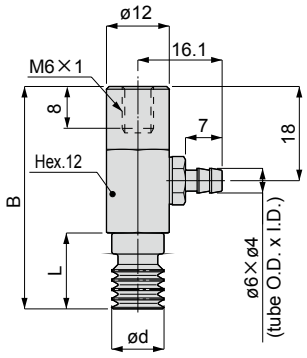


Unit: mm

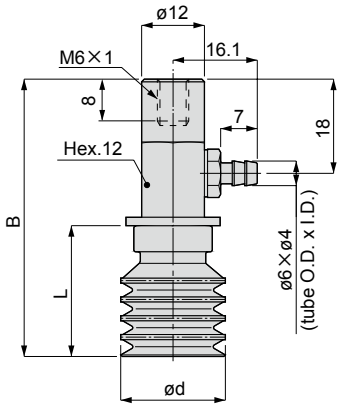
Model No.	Pad diameter ød	B	L	Weight (g)
VSP-B 10W□-6	10	42.5	14.5	31
VSP-B 20W□-6	20	53	25	35
VSP-B 30W□-6	30	66.5	38.5	41
VSP-B 40W□-6	40	73	45	50
VSP-B 50W□-6	50	84	56	62

● Barbed fitting

· VSP-B10W□-6T



· VSP-B20 to 50W□-6T



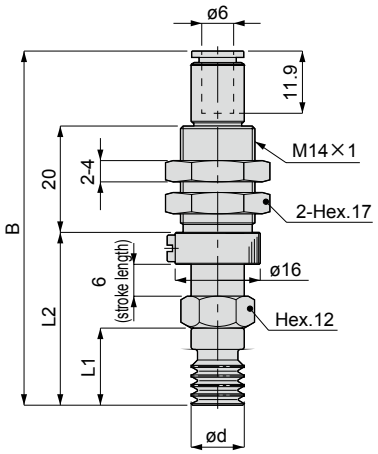
Unit: mm

Model No.	Pad diameter ød	B	L	Weight (g)
VSP-B 10W□-6T	10	42.5	14.5	29
VSP-B 20W□-6T	20	53	25	33
VSP-B 30W□-6T	30	66.5	38.5	39
VSP-B 40W□-6T	40	73	45	48
VSP-B 50W□-6T	50	84	56	60

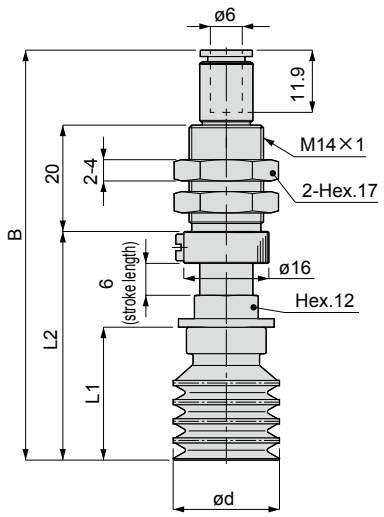
Dimensions (buffer, vacuum outlet top VSP-C)

● Push-in fitting

· VSP-C10W□-6



· VSP-C20 to 50W□-6

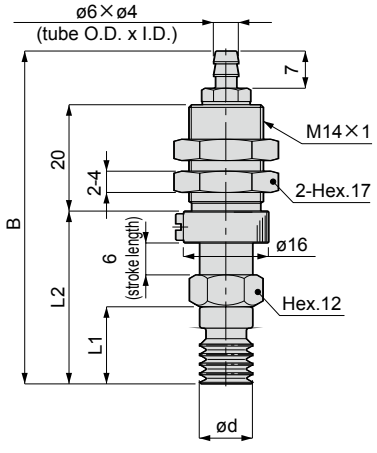


Unit: mm

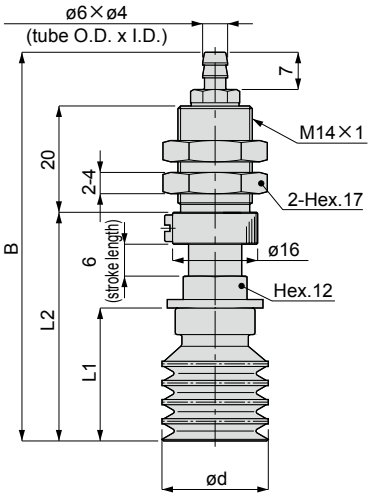
Model No.	Pad diameter ød	B	L1	L2	Spring force (N)	Weight (g)
VSP-C 10W□-6	10	66.8	14.5	32.5	4 to 7.1	36
VSP-C 20W□-6	20	77.3	25	43	7 to 12.6	40
VSP-C 30W□-6	30	90.8	38.5	56.5	7 to 12.6	47
VSP-C 40W□-6	40	97.3	45	63	7 to 12.6	56
VSP-C 50W□-6	50	108.3	56	74	7 to 12.6	67

● Barbed fitting

· VSP-C10W□-6T



· VSP-C20 to 50W□-6T



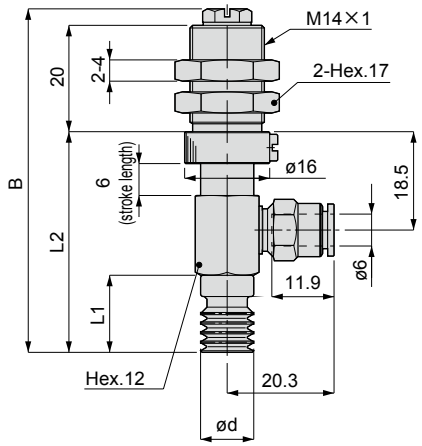
Unit: mm

Model No.	Pad diameter ød	B	L1	L2	Spring force (N)	Weight (g)
VSP-C 10W□-6T	10	62.6	14.5	32.5	4 to 7.1	34
VSP-C 20W□-6T	20	73.1	25	43	7 to 12.6	38
VSP-C 30W□-6T	30	86.6	38.5	56.5	7 to 12.6	44
VSP-C 40W□-6T	40	93.1	45	63	7 to 12.6	54
VSP-C 50W□-6T	50	104.1	56	74	7 to 12.6	65

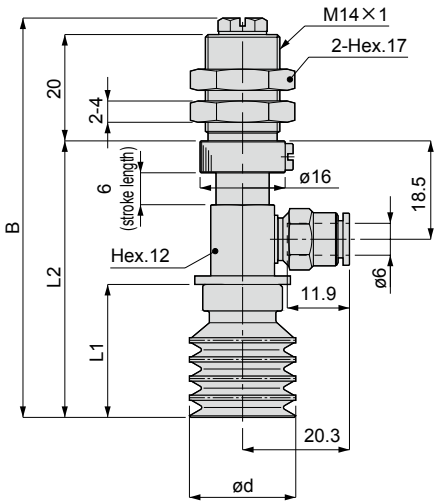
Dimensions (buffer, vacuum outlet side VSP-D)

● Push-in fitting

· VSP-D10W□-6



· VSP-D20 to 50W□-6

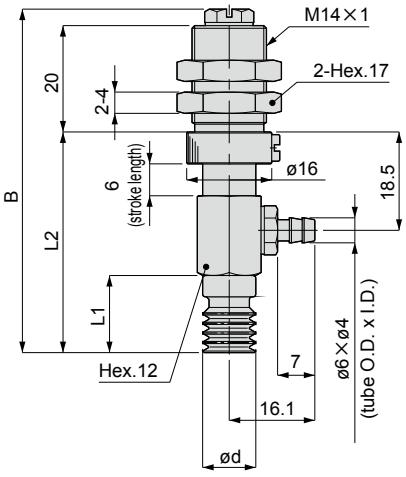


Unit: mm

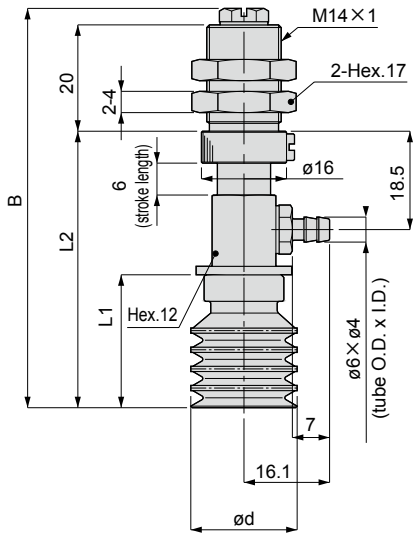
Model No.	Pad diameter ød	B	L1	L2	Spring force (N)	Weight (g)
VSP-D 10W□-6	10	64.6	14.5	41.5	4 to 7.1	48
VSP-D 20W□-6	20	75.1	25	52	7 to 12.6	52
VSP-D 30W□-6	30	88.6	38.5	65.5	7 to 12.6	58
VSP-D 40W□-6	40	95.1	45	72	7 to 12.6	68
VSP-D 50W□-6	50	106.1	56	83	7 to 12.6	79

● Barbed fitting

· VSP-D10W□-6T



· VSP-D20 to 50W□-6T

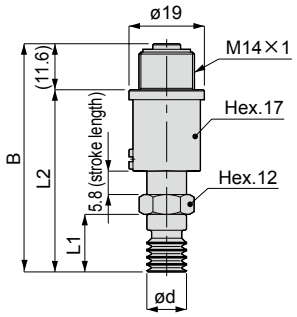


Unit: mm

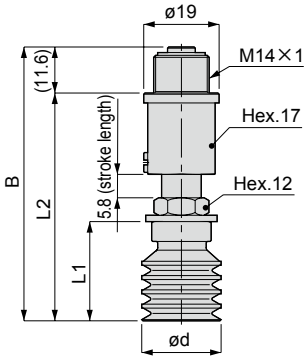
Model No.	Pad diameter ød	B	L1	L2	Spring force (N)	Weight (g)
VSP-D 10W□-6T	10	64.6	14.5	41.5	4 to 7.1	48
VSP-D 20W□-6T	20	75.1	25	52	7 to 12.6	52
VSP-D 30W□-6T	30	88.6	38.5	65.5	7 to 12.6	58
VSP-D 40W□-6T	40	95.1	45	72	7 to 12.6	68
VSP-D 50W□-6T	50	106.1	56	83	7 to 12.6	79

Dimensions (direct mounting buffer)

● VSP-F10W□



● VSP-F20 to 50W□



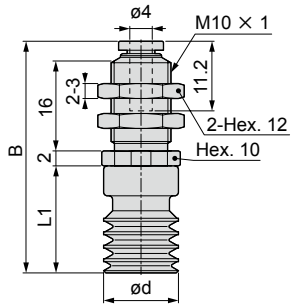
Unit: mm

Model No.	Pad diameter ød	B	L1	L2	Spring force (N)	Weight (g)
VSP-F 10W□	10	57.5	14.5	45.8	7.9 to 15	57
VSP-F 20W□	20	69	25	57.3	7.9 to 15	60
VSP-F 30W□	30	82.5	38.5	70.8	7.9 to 15	66
VSP-F 40W□	40	89	45	77.3	7.9 to 15	76
VSP-F 50W□	50	100	56	88.3	7.9 to 15	87

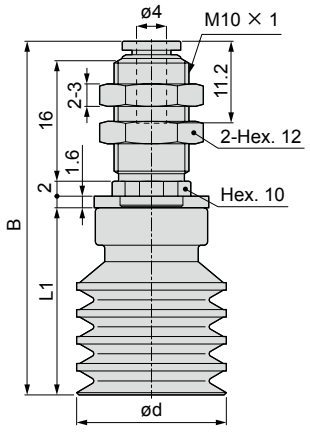
Dimensions (compact fixed, vacuum outlet top VSP-MA)

● Push-in fitting

● VSP-MA10W□-4



● VSP-MA20, 30W□-4

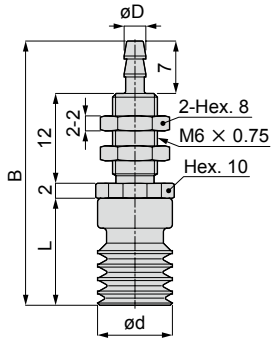


Unit: mm

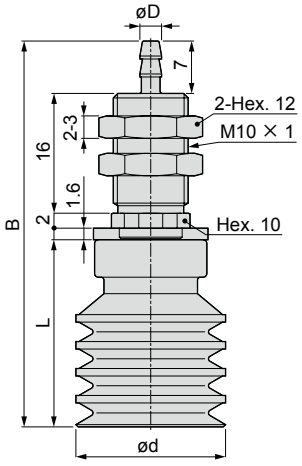
Model No.	Pad diameter ød	B	L1	Weight (g)
VSP-MA10W□-4	10	35.2	14.5	6.5
VSP-MA20W□-4	20	47.3	25	13
VSP-MA30W□-4	30	60.8	38.5	19

● Barbed fitting

● VSP-MA10W□-4T



● VSP-MA20, 30W□-4T/6T



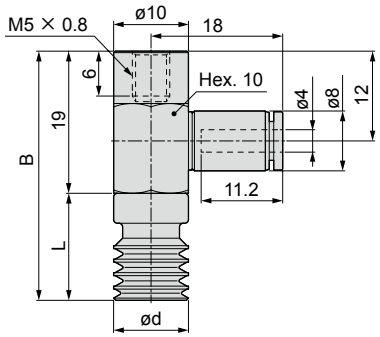
Unit: mm

Model No.	Tube O.D. x I.D. øD	Pad diameter ød	B	L	Weight (g)
VSP-MA10W□-4T	4×2.5	10	35.5	14.5	3.7
VSP-MA20W□-4T	4×2.5	20	51.6	25	13
VSP-MA20W□-6T	6×4				
VSP-MA30W□-4T	4×2.5	30	65.1	38.5	19
VSP-MA30W□-6T	6×4				

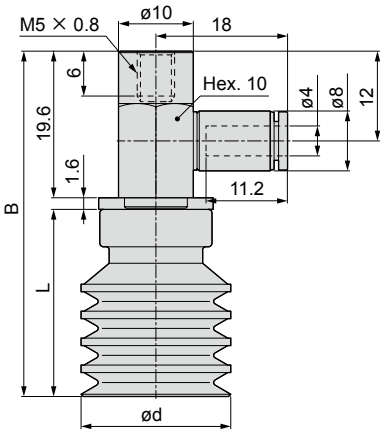
Dimensions (compact fixed, vacuum outlet side VSP-MB)

● Push-in fitting

● VSP-MB10W□-6



● VSP-MB20, 30W□-6

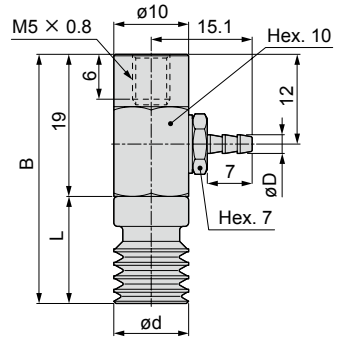


Unit: mm

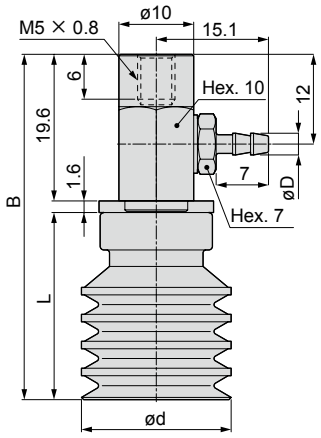
Model No.	Pad diameter ød	B	L	Weight (g)
VSP-MB10W□-6	10	33.5	14.5	8.2
VSP-MB20W□-6	20	46.2	25	14
VSP-MB30W□-6	30	59.7	38.5	20

● Barbed fitting

● VSP-MB10W□-4T



● VSP-MB20, 30W□-4T/6T



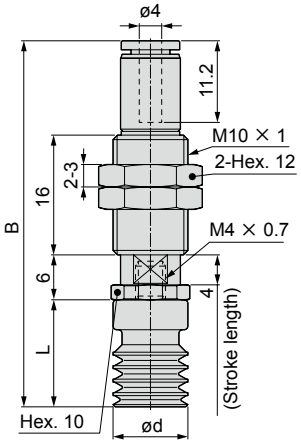
Unit: mm

Model No.	Tube O.D. x I.D. øD	Pad diameter ød	B	L	Weight (g)
VSP-MB10W□-4T	4×2.5	10	33.5	14.5	6.8
VSP-MB20W□-4T	4×2.5	20	46.2	25	12
VSP-MB20W□-6T	6×4				13
VSP-MB30W□-4T	4×2.5	30	59.7	38.5	18
VSP-MB30W□-6T	6×4				

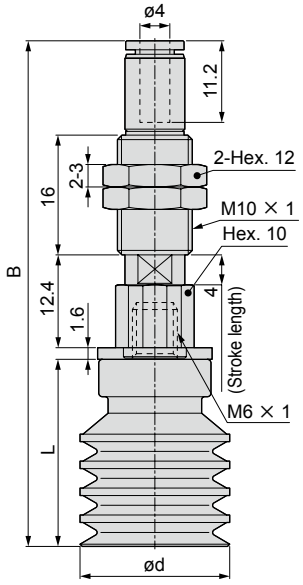
Dimensions (compact buffer, vacuum outlet top VSP-MC)

● Push-in fitting

● VSP-MC10W□-4



● VSP-MC20, 30W□-4

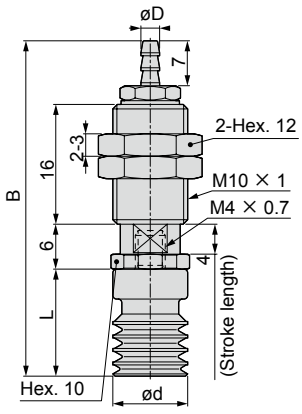


Unit: mm

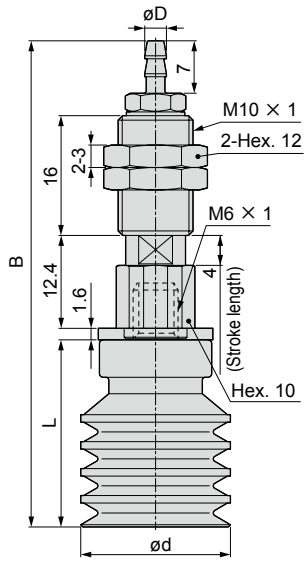
Model No.	Pad diameter ød	B	L	Spring force (N)	Weight (g)
VSP-MC10W□-4	10	49.5	14.5	1 to 1.3	16
VSP-MC20W□-4	20	68	25	1 to 1.3	25
VSP-MC30W□-4	30	81.5	38.5	1 to 1.3	31

● Barbed fitting

● VSP-MC10W□-4T



● VSP-MC20, 30W□-4T/6T



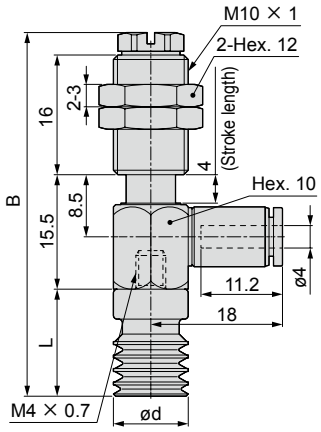
Unit: mm

Model No.	Tube O.D. x I.D. øD	Pad diameter ød	B	L	Spring force (N)	Weight (g)
VSP-MC10W□-4T	4×2.5	10	46.6	14.5	1 to 1.3	15
VSP-MC20W□-4T	4×2.5	20	65.1	25	1 to 1.3	23
VSP-MC20W□-6T	6×4					24
VSP-MC30W□-4T	4×2.5	30	78.6	38.5	1 to 1.3	29
VSP-MC30W□-6T	6×4					

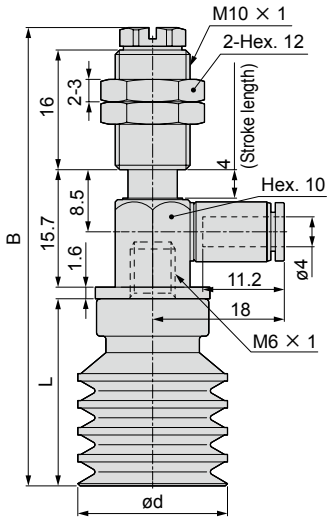
Dimensions (compact buffer, vacuum outlet side VSP-MD)

● Push-in fitting

● VSP-MD10W□-4



● VSP-MD20, 30W□-4

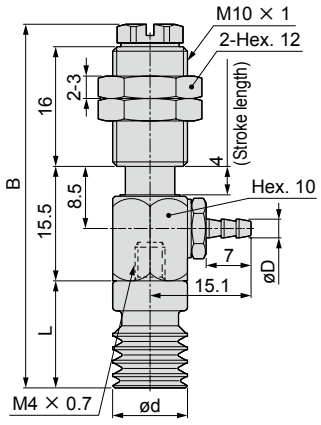


Unit: mm

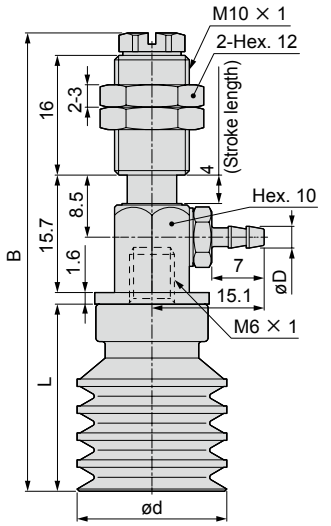
Model No.	Pad diameter ød	B	L	Spring force (N)	Weight (g)
VSP-MD10W□-4	10	49	14.5	1 to 1.3	24
VSP-MD20W□-4	20	61.3	25	1 to 1.3	28
VSP-MD30W□-4	30	74.8	38.5	1 to 1.3	34

● Barbed fitting

● VSP-MD10W□-6T



● VSP-MD20, 30W□-4T/6T

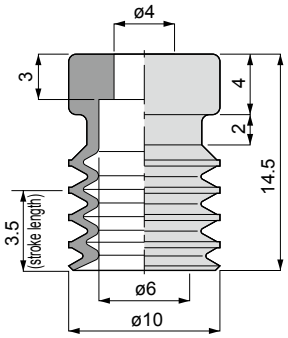


Unit: mm

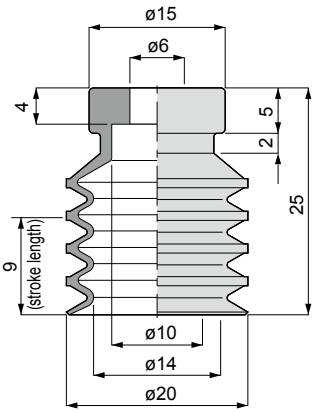
Model No.	Tube O.D. x I.D. øD	Pad diameter ød	B	L	Spring force (N)	Weight (g)
VSP-MD10W□-6T	4×2.5	10	49	14.5	1 to 1.3	22
VSP-MD20W-4T	4×2.5	20	61.3	25	1 to 1.3	27
VSP-MD20W□-6T	6×4					
VSP-MD30W-4T	4×2.5	30	74.8	38.5	1 to 1.3	33
VSP-MD30W□-6T	6×4					

Dimensions: pad only

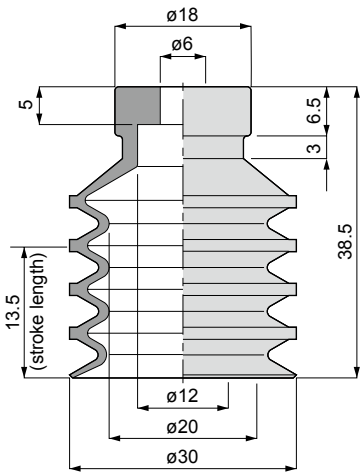
● VSPG-10W□



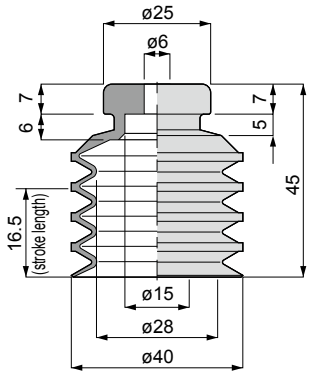
● VSPG-20W□



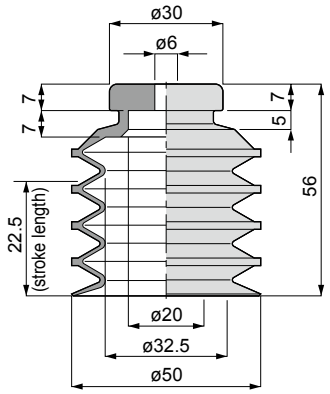
● VSPG-30W□



● VSPG-40W□

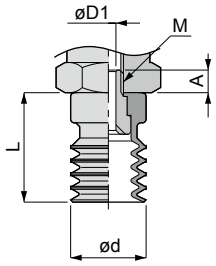


● VSPG-50W□

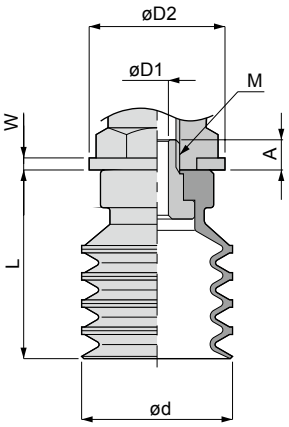


Detailed view of pad and holder fixing part

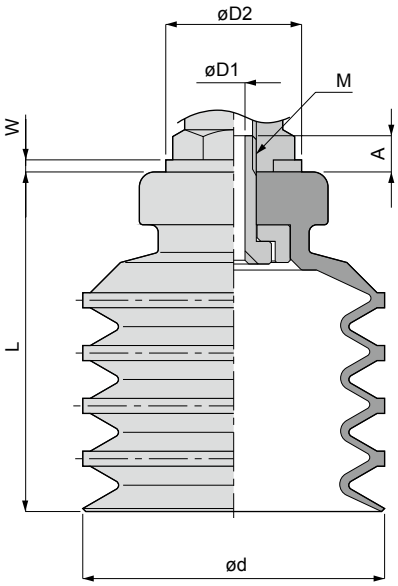
● VSPG-10W□



● VSPG-20, 30W□

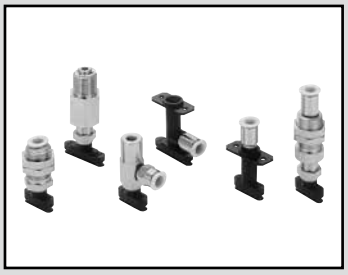


● VSPG-40, 50W□



Unit: mm

Model No.	Pad diameter ød	L	Fixing screw M	A	øD1	øD2	W
VSPG-10W□	10	14.5	M4×0.7	3.5	2	-	-
VSPG-20W□	20	25	M6×1	4.5	3	18	1.6
VSPG-30W□	30	38.5	M6×1	5.5	3	18	1.6
VSPG-40W□	40	45	M6×1	5.3	3	22	1.6
VSPG-50W□	50	56	M6×1	5.3	3	22	1.6



Suction pad for substrates and semiconductors
Suction pad, oval

VSP-*E* Series

● Pad diameter: 2 mm x 4 mm to 8 mm x 30 mm

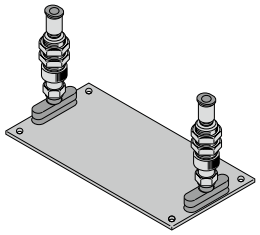
RoHS

Features

■ Ideal for workpieces that require multiple small pads, such as round rods.
■ Small size that supports workpieces with small suction surface is available
- ● Pad diameter: 13 types (2 x 4, 3.5 x 7, 4 x 10, 4 x 20, 4 x 30, 5 x 10, 5 x 20, 5 x 30, 6 x 10, 6 x 20, 6 x 30, 8 x 20, 8 x 30)
- ● Pad material: 7 types (nitrile rubber, silicone rubber, urethane rubber, fluoro rubber, conductive silicone rubber, antistatic butadiene rubber, conductive NBR)
- ● Holder shape: 11 types (7 standard, 4 compact)
- ● Free holder (swinging): 2 types (30° angle, 10° angle) [Compatible pad diameter: all sizes]
- ● Position locking valve: Compatible pad diameter (all sizes)

Applications

● Long workpieces such as substrates and semiconductors



How to order

* Refer to model No. sections on dimensions pages 381 to 395 for combinations of model No.

● Suction pad/oval

VSP - A 5×30 E N — 6T - ○ - V

● Pad rubber only/oval

VSPG — 5×30 E N A

Ⓐ Holder shape

Code	Content
Ⓐ Holder shape *1, *2	
A	Fixed, Vacuum outlet top
B	Fixed, Vacuum outlet side
C	Buffer, Vacuum outlet top
D	Buffer, Vacuum outlet side
F	Direct mounting, Buffer
AE	Screw-in, Vacuum outlet top
BE	Screw-in, Vacuum outlet side
MA	Compact Fixed, Vacuum outlet top
MB	Compact Fixed, Vacuum outlet side
MC	Compact Buffer, Vacuum outlet top
MD	Compact Buffer, Vacuum outlet side

Ⓑ Pad size

Ⓑ Pad size *4
Refer to Appendix 1 for pad size.

Ⓒ Pad shape

Ⓒ Pad shape	
E	Oval

Ⓓ Pad material

Ⓓ Pad material *4	
N	Nitrile rubber
S	Silicone rubber
U	Urethane rubber
F	Fluoro rubber
SE	Conductive silicone rubber
E	Antistatic butadiene rubber (low resistance)
NE	Conductive NBR (low resistance)

Ⓔ Frame

Ⓔ Frame	
Blank	Without frame
A	With frame

Ⓕ Port size/shape

Ⓕ Port size/shape	
4	ø4 push-in fitting
4T	ø4 barbed fitting
6	ø6 push-in fitting
6T	ø6 barbed fitting
Blank	(Holder shape: Selected with F)

Ⓖ Free holder (swinging)

Ⓖ Free holder (swinging) *1, *3, *5	Page 550
F1	With free holder swing angle 30°
F2	With free holder swing angle 15°
Blank	Without free holder

Ⓗ Position locking valve

Ⓗ Position locking valve *2, *3, *5	Page 556
V	With position locking valve
Blank	None

⚠ Precautions for model No. selection

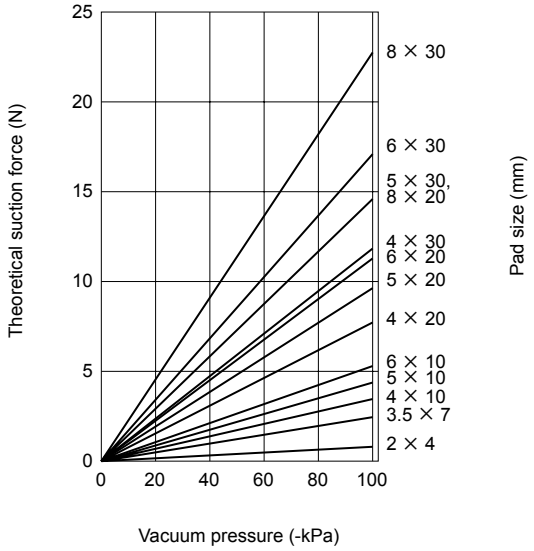
*1 : When Ⓐ is “A”, “B”, “C”, “D”, or “F”, Ⓖ “F1” or “F2” can be selected.
*2 : When Ⓐ is “AE” or “BE”, Ⓗ “V” cannot be selected.
*3 : Ⓖ “F1”, “F2” and Ⓗ “V” cannot be selected together.
*4 : When Ⓓ is “U” or “F”, Ⓑ“4 x 30” cannot be selected.
When Ⓓis “E”, Ⓑ“2 x 4” and “3.5 x 7” cannot be selected.
*5 : Refer to page 550 for details on free holders (F1, F2) and page 556 for details on position locking valves (V).
In addition, refer to the target suction pad list (page 558) for applicable pad size shape.

Appendix 1

Pad size					
	4 mm	7 mm	10 mm	20 mm	30 mm
2 mm	2×4	-	-	-	-
3.5 mm	-	3.5×7	-	-	-
4 mm	-	-	4×10	4×20	4×30
5 mm	-	-	5×10	5×20	5×30
6 mm	-	-	6×10	6×20	6×30
8 mm	-	-	-	8×20	8×30

Theoretical suction force

● Pad size: 2 x 4 mm, 3.5 x 7 mm,
□ x 10 mm, □ x 20 mm, □ x 30 mm



Because the theoretical suction force is the value at static conditions, adopt a safety factor of 1/4 for horizontal lifting and 1/8 for vertical lifting in actual use.

Safety precautions

WARNING

■ Use appropriate torque to tighten and fix the oval pad rubber holder.

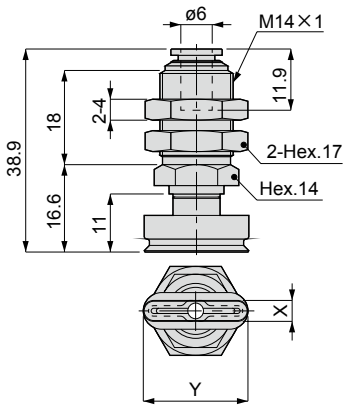
Model	Fixing screw size	Tightening torque
All models with oval pad	M6×1	0.27 to 0.33 N·m

CAUTION

■ The oval pad fixing holder has no conductivity. When using a vacuum pad of conductive material, take measures to let electricity pass directly from the pad rubber.

Dimensions (fixed, vacuum outlet top VSP-A)

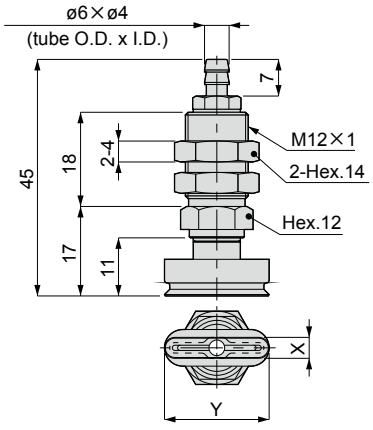
● Push-in fitting, VSP-A□□E□-6



Unit: mm

Model No.	Pad size		Weight (g)
	X	Y	
VSP-A2×4E□-6	2	4	32
VSP-A3.5×7E□-6	3.5	7	32
VSP-A4×10E□-6	4	10	32
VSP-A4×20E□-6		20	32
VSP-A4×30E□-6		30	33
VSP-A5×10E□-6	5	10	32
VSP-A5×20E□-6		20	32
VSP-A5×30E□-6		30	33
VSP-A6×10E□-6	6	10	32
VSP-A6×20E□-6		20	32
VSP-A6×30E□-6		30	33
VSP-A8×20E□-6	8	20	32
VSP-A8×30E□-6		30	33

● Barbed fitting, VSP-A□□E□-6T

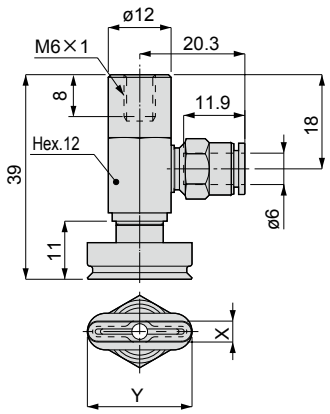


Unit: mm

Model No.	Pad size		Weight (g)
	X	Y	
VSP-A2×4E□-6T	2	4	25
VSP-A3.5×7E□-6T	3.5	7	25
VSP-A4×10E□-6T	4	10	25
VSP-A4×20E□-6T		20	26
VSP-A4×30E□-6T		30	26
VSP-A5×10E□-6T	5	10	25
VSP-A5×20E□-6T		20	26
VSP-A5×30E□-6T		30	26
VSP-A6×10E□-6T	6	10	25
VSP-A6×20E□-6T		20	26
VSP-A6×30E□-6T		30	26
VSP-A8×20E□-6T	8	20	26
VSP-A8×30E□-6T		30	26

Dimensions (fixed, vacuum outlet side VSP-B)

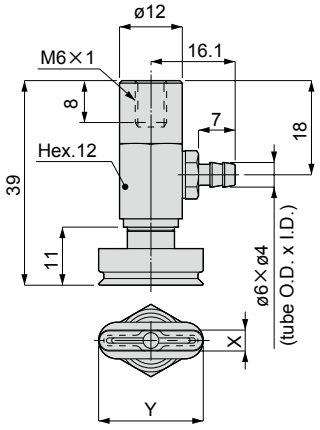
● Push-in fitting, VSP-B□□E□-6



Unit: mm

Model No.	Pad size		Weight
	X	Y	(g)
VSP-B2×4E□-6	2	4	29
VSP-B3.5×7E□-6	3.5	7	29
VSP-B4×10E□-6	4	10	29
VSP-B4×20E□-6		20	30
VSP-B4×30E□-6		30	30
VSP-B5×10E□-6	5	10	29
VSP-B5×20E□-6		20	30
VSP-B5×30E□-6		30	30
VSP-B6×10E□-6	6	10	29
VSP-B6×20E□-6		20	30
VSP-B6×30E□-6		30	30
VSP-B8×20E□-6	8	20	30
VSP-B8×30E□-6		30	30

● Barbed fitting, VSP-B□□E□-6T

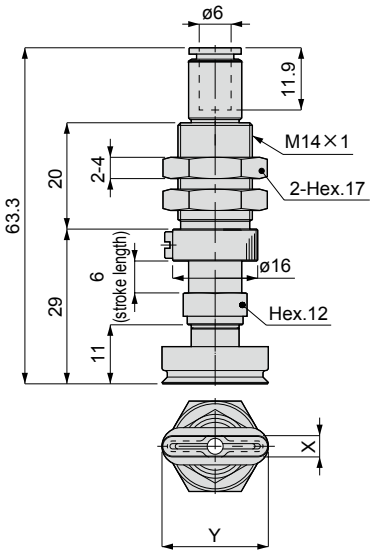


Unit: mm

Model No.	Pad size		Weight
	X	Y	(g)
VSP-B2×4E□-6T	2	4	27
VSP-B3.5×7E□-6T	3.5	7	27
VSP-B4×10E□-6T	4	10	27
VSP-B4×20E□-6T		20	28
VSP-B4×30E□-6T		30	28
VSP-B5×10E□-6T	5	10	27
VSP-B5×20E□-6T		20	28
VSP-B5×30E□-6T		30	28
VSP-B6×10E□-6T	6	10	27
VSP-B6×20E□-6T		20	28
VSP-B6×30E□-6T		30	28
VSP-B8×20E□-6T	8	20	28
VSP-B8×30E□-6T		30	28

Dimensions (buffer, vacuum outlet top VSP-C)

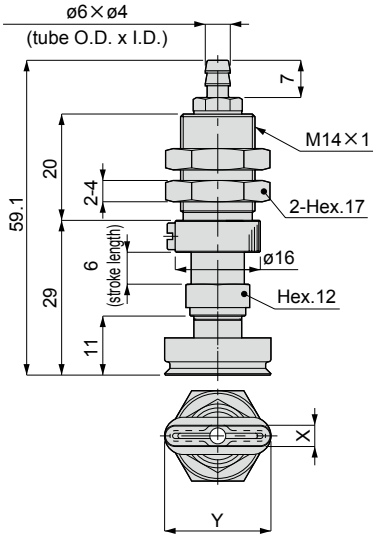
● Push-in fitting, VSP-C□□E□-6



Unit: mm

Model No.	Pad size		Spring force	Weight
	X	Y	(N)	(g)
VSP-C2×4E□-6	2	4	7 to 12.6	35
VSP-C3.5×7E□-6	3.5	7	7 to 12.6	35
VSP-C4×10E□-6	4	10	7 to 12.6	35
VSP-C4×20E□-6		20		36
VSP-C4×30E□-6		30		36
VSP-C5×10E□-6	5	10	7 to 12.6	35
VSP-C5×20E□-6		20		36
VSP-C5×30E□-6		30		36
VSP-C6×10E□-6	6	10	7 to 12.6	35
VSP-C6×20E□-6		20		36
VSP-C6×30E□-6		30		36
VSP-C8×20E□-6	8	20	7 to 12.6	36
VSP-C8×30E□-6		30		36

● Barbed fitting, VSP-C□□E□-6T

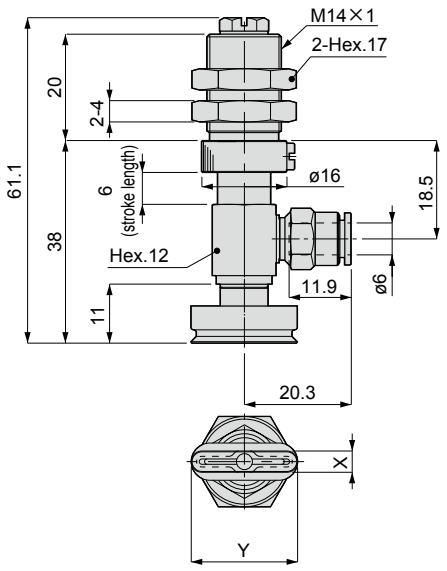


Unit: mm

Model No.	Pad size		Spring force	Weight
	X	Y	(N)	(g)
VSP-C2×4E□-6T	2	4	7 to 12.6	33
VSP-C3.5×7E□-6T	3.5	7	7 to 12.6	33
VSP-C4×10E□-6T	4	10	7 to 12.6	33
VSP-C4×20E□-6T		20		34
VSP-C4×30E□-6T		30		34
VSP-C5×10E□-6T	5	10	7 to 12.6	33
VSP-C5×20E□-6T		20		34
VSP-C5×30E□-6T		30		34
VSP-C6×10E□-6T	6	10	7 to 12.6	33
VSP-C6×20E□-6T		20		34
VSP-C6×30E□-6T		30		34
VSP-C8×20E□-6T	8	20	7 to 12.6	34
VSP-C8×30E□-6T		30		34

Dimensions (buffer, vacuum outlet side VSP-D)

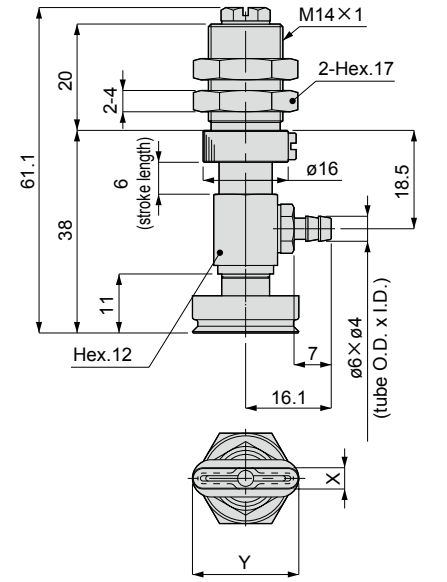
● Push-in fitting, VSP-D□□E□



Unit: mm

Model No.	Pad size		Spring force	Weight
	X	Y	(N)	(g)
VSP-D2×4E□-6	2	4	7 to 12.6	47
VSP-D3.5×7E□-6	3.5	7	7 to 12.6	47
VSP-D4×10E□-6	4	10	7 to 12.6	47
VSP-D4×20E□-6		20		47
VSP-D4×30E□-6		30		48
VSP-D5×10E□-6	5	10	7 to 12.6	47
VSP-D5×20E□-6		20		47
VSP-D5×30E□-6		30		48
VSP-D6×10E□-6	6	10	7 to 12.6	47
VSP-D6×20E□-6		20		47
VSP-D6×30E□-6		30		48
VSP-D8×20E□-6	8	20	7 to 12.6	47
VSP-D8×30E□-6		30		48

● Barbed fitting, VSP-D□□E□

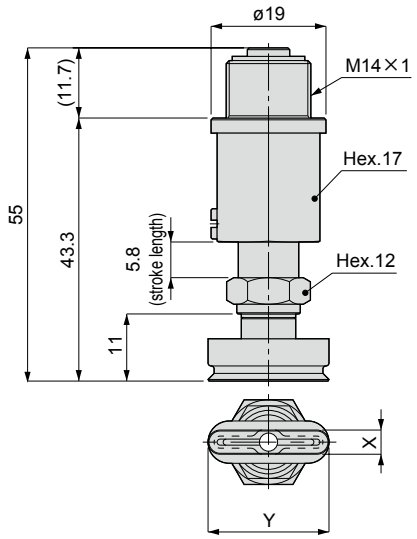


Unit: mm

Model No.	Pad size		Spring force	Weight
	X	Y	(N)	(g)
VSP-D2×4E□-6T	2	4	7 to 12.6	45
VSP-D3.5×7E□-6T	3.5	7	7 to 12.6	45
VSP-D4×10E□-6T	4	10	7 to 12.6	45
VSP-D4×20E□-6T		20		45
VSP-D4×30E□-6T		30		46
VSP-D5×10E□-6T	5	10	7 to 12.6	45
VSP-D5×20E□-6T		20		45
VSP-D5×30E□-6T		30		46
VSP-D6×10E□-6T	6	10	7 to 12.6	45
VSP-D6×20E□-6T		20		45
VSP-D6×30E□-6T		30		46
VSP-D8×20E□-6T	8	20	7 to 12.6	45
VSP-D8×30E□-6T		30		46

Dimensions (direct mounting buffer, VSP-F)

● VSP-F□□E□



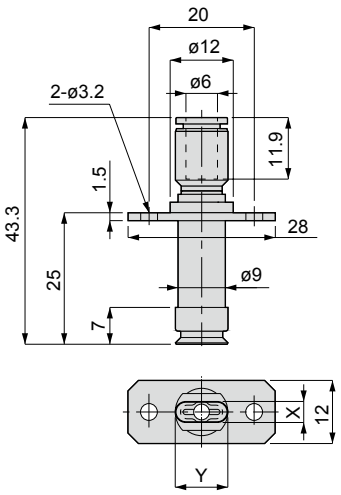
Unit: mm

Model No.	Pad size		Spring force	Weight
	X	Y	(N)	(g)
VSP-F2×4E□	2	4	7.9 to 15	54
VSP-F3.5×7E□	3.5	7	7.9 to 15	54
VSP-F4×10E□	4	10	7.9 to 15	54
VSP-F4×20E□		20		55
VSP-F4×30E□		30		
VSP-F5×10E□	5	10	7.9 to 15	54
VSP-F5×20E□		20		55
VSP-F5×30E□		30		
VSP-F6×10E□	6	10	7.9 to 15	54
VSP-F6×20E□		20		55
VSP-F6×30E□		30		
VSP-F8×20E□	8	20	7.9 to 15	55
VSP-F8×30E□		30		

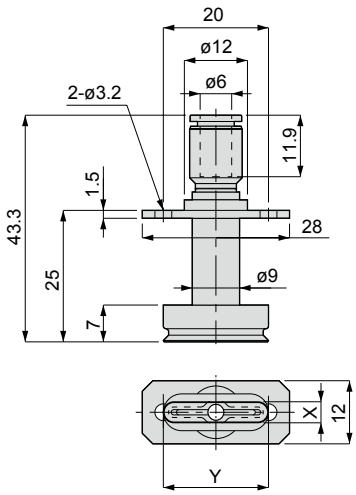
Dimensions (screw-in, vacuum outlet top VSP-AE)

● Push-in fitting

· VSP-AE□ x 10E□



· VSP-AE□ x 20, 30E□

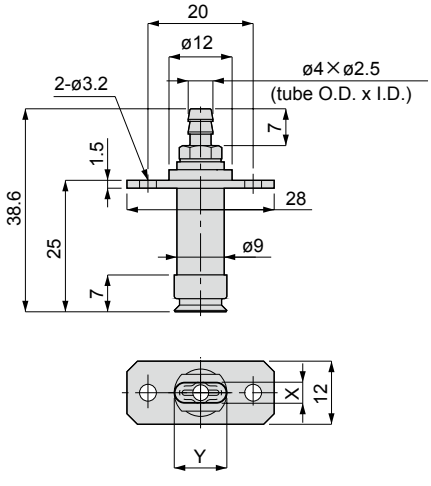


Unit: mm

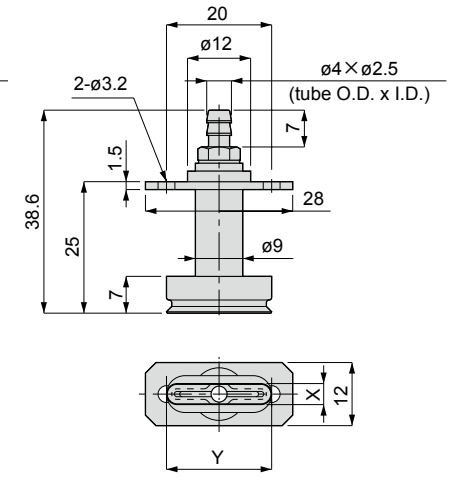
Model No.	Pad size		Weight
	X	Y	(g)
VSP-AE2×4E□-6	2	4	7
VSP-AE3.5×7E□-6	3.5	7	7
VSP-AE4×10E□-6	4	10	7
VSP-AE4×20E□-6		20	7.5
VSP-AE4×30E□-6		30	8
VSP-AE5×10E□-6	5	10	7
VSP-AE5×20E□-6		20	7.5
VSP-AE5×30E□-6		30	8
VSP-AE6×10E□-6	6	10	7
VSP-AE6×20E□-6		20	7.5
VSP-AE6×30E□-6		30	8
VSP-AE8×20E□-6	8	20	7.5
VSP-AE8×30E□-6		30	8

● Barbed fitting

· VSP-AE□ x 10E□



· VSP-AE□ x 20, 30E□



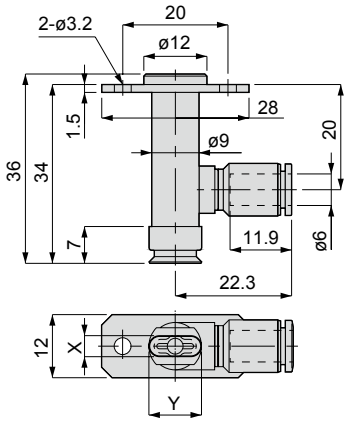
Unit: mm

Model No.	Pad size		Weight
	X	Y	(g)
VSP-AE2×4E□-6T	2	4	5
VSP-AE3.5×7E□-6T	3.5	7	5
VSP-AE4×10E□-6T	4	10	5
VSP-AE4×20E□-6T		20	5.5
VSP-AE4×30E□-6T		30	6
VSP-AE5×10E□-6T	5	10	5
VSP-AE5×20E□-6T		20	5.5
VSP-AE5×30E□-6T		30	6
VSP-AE6×10E□-6T	6	10	5
VSP-AE6×20E□-6T		20	5.5
VSP-AE6×30E□-6T		30	6
VSP-AE8×20E□-6T	8	20	5.5
VSP-AE8×30E□-6T		30	6

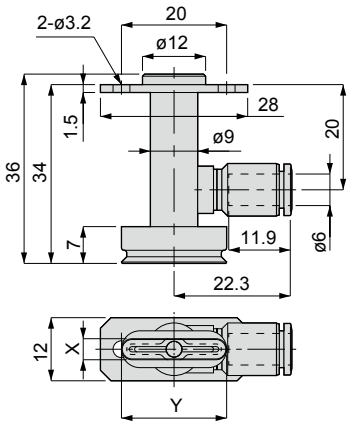
Dimensions (screw-in, vacuum outlet side VSP-BE)

● Push-in fitting

· VSP-BE□ x 10E□-6



· VSP-BE□ x 20, 30E□-6

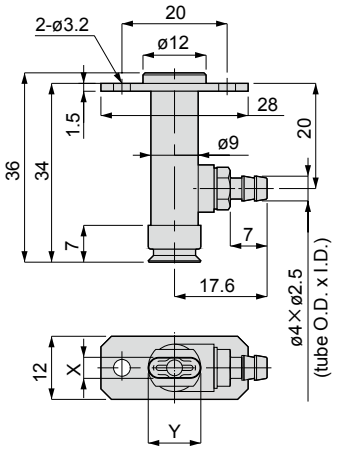


Unit: mm

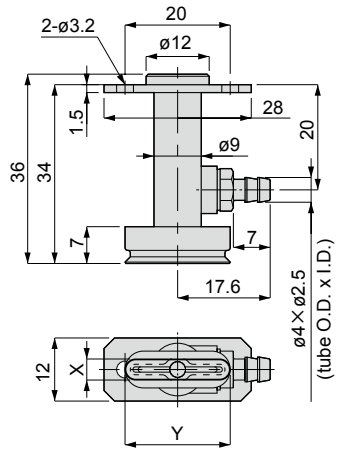
Model No.	Pad size		Weight
	X	Y	(g)
VSP-BE2×4E□-6	2	4	8
VSP-BE3.5×7E□-6	3.5	7	8
VSP-BE4×10E□-6	4	10	8
VSP-BE4×20E□-6		20	
VSP-BE4×30E□-6		30	8.5
VSP-BE5×10E□-6	5	10	8
VSP-BE5×20E□-6		20	
VSP-BE5×30E□-6		30	8.5
VSP-BE6×10E□-6	6	10	8
VSP-BE6×20E□-6		20	
VSP-BE6×30E□-6		30	8.5
VSP-BE8×20E□-6	8	20	8
VSP-BE8×30E□-6		30	8.5

● Barbed fitting

· VSP-BE□ x 10E□-6T



· VSP-BE□ x 20, 30E□-6T

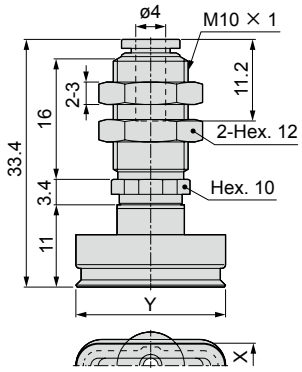


Unit: mm

Model No.	Pad size		Weight
	X	Y	(g)
VSP-BE2×4E□-6T	2	4	6
VSP-BE3.5×7E□-6T	3.5	7	6
VSP-BE4×10E□-6T	4	10	6
VSP-BE4×20E□-6T		20	
VSP-BE4×30E□-6T		30	6.5
VSP-BE5×10E□-6T	5	10	6
VSP-BE5×20E□-6T		20	
VSP-BE5×30E□-6T		30	6.5
VSP-BE6×10E□-6T	6	10	6
VSP-BE6×20E□-6T		20	
VSP-BE6×30E□-6T		30	6.5
VSP-BE8×20E□-6T	8	20	6
VSP-BE8×30E□-6T		30	6.5

Dimensions (compact fixed, vacuum outlet top VSP-MA)

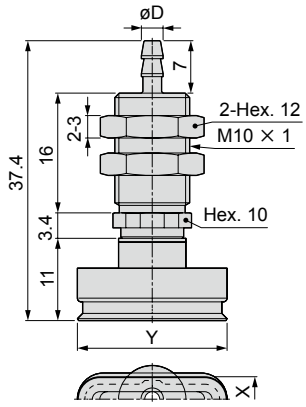
● Push-in fitting, VSP-MA□□E□-4



Unit: mm

Model No.	Pad size		Weight
	X	Y	(g)
VSP-MA2×4E□-4	2	4	6
VSP-MA3.5×7E□-4	3.5	7	6
VSP-MA4×10E□-4	4	10	6
VSP-MA4×20E□-4		20	6.3
VSP-MA4×30E□-4		30	6.7
VSP-MA5×10E□-4	5	10	6
VSP-MA5×20E□-4		20	6.3
VSP-MA5×30E□-4		30	6.6
VSP-MA6×10E□-4	6	10	6
VSP-MA6×20E□-4		20	6.3
VSP-MA6×30E□-4		30	6.7
VSP-MA8×20E□-4	8	20	6.3
VSP-MA8×30E□-4		30	6.8

● Barbed fitting, VSP-MA□□E□-4T/6T

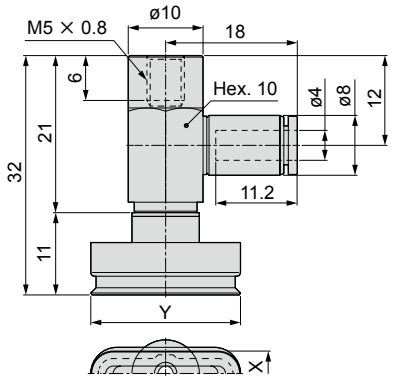


Unit: mm

Model No.	Pad size		Tube O.D. x I.D.	Weight
	X	Y	øD	(g)
VSP-MA2×4E□-4T	2	4	4×2.5	5.9
VSP-MA2×4E□-6T			6×4	6
VSP-MA3.5×7E□-4T	3.5	7	4×2.5	5.9
VSP-MA3.5×7E□-6T			6×4	6
VSP-MA4×10E□-4T	4	10	4×2.5	5.9
VSP-MA4×10E□-6T			6×4	6
VSP-MA4×20E□-4T		20	4×2.5	6.2
VSP-MA4×20E□-6T			6×4	6.3
VSP-MA4×30E□-4T		30	4×2.5	6.6
VSP-MA4×30E□-6T			6×4	6.7
VSP-MA5×10E□-4T	5	10	4×2.5	5.9
VSP-MA5×10E□-6T			6×4	6
VSP-MA5×20E□-4T		20	4×2.5	6.3
VSP-MA5×20E□-6T			6×4	6.3
VSP-MA5×30E□-4T		30	4×2.5	6.6
VSP-MA5×30E□-6T			6×4	6.7
VSP-MA6×10E□-4T	6	10	4×2.5	6
VSP-MA6×10E□-6T			6×4	6
VSP-MA6×20E□-4T		20	4×2.5	6.3
VSP-MA6×20E□-6T			6×4	6.3
VSP-MA6×30E□-4T		30	4×2.5	6.7
VSP-MA6×30E□-6T			6×4	6.7
VSP-MA8×20E□-4T	8	20	4×2.5	6.3
VSP-MA8×20E□-6T			6×4	6.4
VSP-MA8×30E□-4T		30	4×2.5	6.8
VSP-MA8×30E□-6T			6×4	6.9

Dimensions (compact fixed, vacuum outlet side VSP-MB)

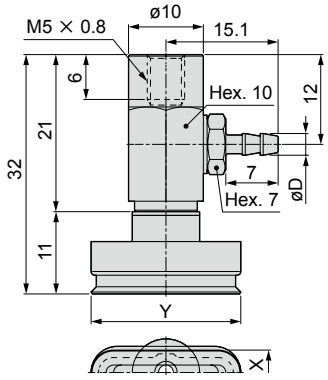
● Push-in fitting, VSP-MB□□E□-4



Unit: mm

Model No.	Pad size		Weight
	X	Y	(g)
VSP-MB2×4E□-4	2	4	6.9
VSP-MB3.5×7E□-4	3.5	7	6.9
VSP-MB4×10E□-4	4	10	6.9
VSP-MB4×20E□-4		20	7.2
VSP-MB4×30E□-4		30	7.6
VSP-MB5×10E□-4	5	10	6.9
VSP-MB5×20E□-4		20	7.2
VSP-MB5×30E□-4		30	7.6
VSP-MB6×10E□-4	6	10	6.9
VSP-MB6×20E□-4		20	7.2
VSP-MB6×30E□-4		30	7.6
VSP-MB8×20E□-4	8	20	7.3
VSP-MB8×30E□-4		30	7.7

● Barbed fitting, VSP-MB□□E□-4T/6T

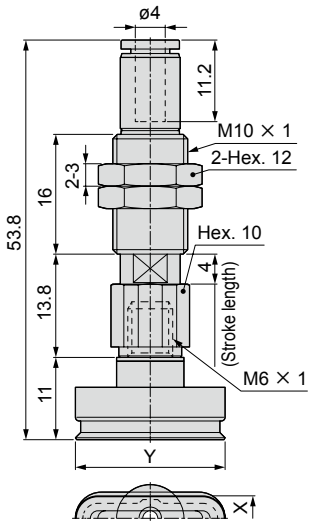


Unit: mm

Model No.	Pad size		Tube O.D. x I.D.	Weight
	X	Y	øD	(g)
VSP-MB2×4E□-4T	2	4	4×2.5	5.5
VSP-MB2×4E□-6T			6×4	5.7
VSP-MB3.5×7E□-4T	3.5	7	4×2.5	5.5
VSP-MB3.5×7E□-6T			6×4	5.7
VSP-MB4×10E□-4T	4	10	4×2.5	5.5
VSP-MB4×10E□-6T			6×4	5.7
VSP-MB4×20E□-4T		20	4×2.5	5.8
VSP-MB4×20E□-6T			6×4	6.0
VSP-MB4×30E□-4T		30	4×2.5	6.2
VSP-MB4×30E□-6T			6×4	6.4
VSP-MB5×10E□-4T	5	10	4×2.5	5.5
VSP-MB5×10E□-6T			6×4	5.7
VSP-MB5×20E□-4T		20	4×2.5	5.8
VSP-MB5×20E□-6T			6×4	6.1
VSP-MB5×30E□-4T		30	4×2.5	6.1
VSP-MB5×30E□-6T			6×4	6.4
VSP-MB6×10E□-4T	6	10	4×2.5	5.5
VSP-MB6×10E□-6T			6×4	5.8
VSP-MB6×20E□-4T		20	4×2.5	5.8
VSP-MB6×20E□-6T			6×4	6.1
VSP-MB6×30E□-4T		30	4×2.5	6.2
VSP-MB6×30E□-6T			6×4	6.5
VSP-MB8×20E□-4T	8	20	4×2.5	5.8
VSP-MB8×20E□-6T			6×4	6.1
VSP-MB8×30E□-4T		30	4×2.5	6.3
VSP-MB8×30E□-6T			6×4	6.6

Dimensions (buffer, vacuum outlet top VSP-MC)

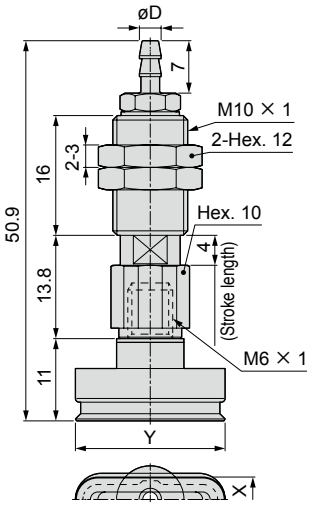
● Push-in fitting, VSP-MC□□E□-4



Unit: mm

Model No.	Pad size		Spring force (N)	Weight (g)
	X	Y		
VSP-MC2×4E□-4	2	4	1 to 1.3	18
VSP-MC3.5×7E□-4	3.5	7	1 to 1.3	18
VSP-MC4×10E□-4	4	10	1 to 1.3	18
VSP-MC4×20E□-4		20		19
VSP-MC4×30E□-4		30		19
VSP-MC5×10E□-4	5	10	1 to 1.3	18
VSP-MC5×20E□-4		20		19
VSP-MC5×30E□-4		30		19
VSP-MC6×10E□-4	6	10	1 to 1.3	18
VSP-MC6×20E□-4		20		19
VSP-MC6×30E□-4		30		19
VSP-MC8×20E□-4	8	20	1 to 1.3	19
VSP-MC8×30E□-4		30		19

● Barbed fitting, VSP-MC□□E□-4T/6T

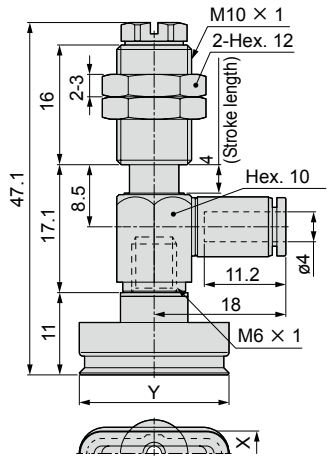


Unit: mm

Model No.	Pad size		Tube O.D. x I.D. øD	Spring force (N)	Weight (g)
	X	Y			
VSP-MC2×4E□-4T	2	4	4×2.5	1 to 1.3	17
VSP-MC2×4E□-6T			6×4		17
VSP-MC3.5×7E□-4T	3.5	7	4×2.5	1 to 1.3	17
VSP-MC3.5×7E□-6T			6×4		17
VSP-MC4×10E□-4T	4	10	4×2.5	1 to 1.3	17
VSP-MC4×10E□-6T			6×4		17
VSP-MC4×20E□-4T		20	4×2.5		17
VSP-MC4×20E□-6T			6×4		17
VSP-MC4×30E□-4T		30	4×2.5		18
VSP-MC4×30E□-6T			6×4		18
VSP-MC5×10E□-4T	5	10	4×2.5	1 to 1.3	17
VSP-MC5×10E□-6T			6×4		17
VSP-MC5×20E□-4T		20	4×2.5		17
VSP-MC5×20E□-6T			6×4		17
VSP-MC5×30E□-4T		30	4×2.5		18
VSP-MC5×30E□-6T			6×4		18
VSP-MC6×10E□-4T	6	10	4×2.5	1 to 1.3	17
VSP-MC6×10E□-6T			6×4		17
VSP-MC6×20E□-4T		20	4×2.5		17
VSP-MC6×20E□-6T			6×4		17
VSP-MC6×30E□-4T		30	4×2.5		18
VSP-MC6×30E□-6T			6×4		18
VSP-MC8×20E□-4T	8	20	4×2.5	1 to 1.3	18
VSP-MC8×20E□-6T			6×4		18
VSP-MC8×30E□-4T		30	4×2.5		18
VSP-MC8×30E□-6T			6×4		18

Dimensions (buffer, vacuum outlet side VSP-MD)

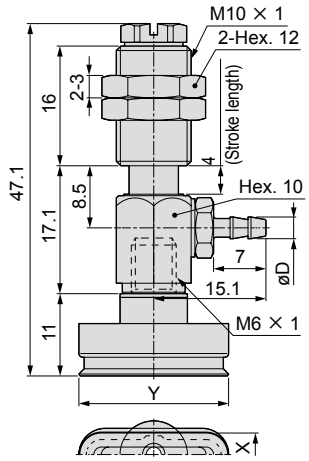
● Push-in fitting, VSP-MD□□E□-4



Unit: mm

Model No.	Pad size X	Pad size Y	Spring force (N)	Weight (g)
VSP-MD2×4E□-4	2	4	1 to 1.3	22
VSP-MD3.5×7E□-4	3.5	7	1 to 1.3	22
VSP-MD4×10E□-4	4	10	1 to 1.3	22
VSP-MD4×20E□-4		20		22
VSP-MD4×30E□-4		30		23
VSP-MD5×10E□-4	5	10	1 to 1.3	22
VSP-MD5×20E□-4		20		22
VSP-MD5×30E□-4		30		23
VSP-MD6×10E□-4	6	10	1 to 1.3	22
VSP-MD6×20E□-4		20		22
VSP-MD6×30E□-4		30		23
VSP-MD8×20E□-4	8	20	1 to 1.3	22
VSP-MD8×30E□-4		30		23

● Barbed fitting, VSP-MD□□E□-4T/6T

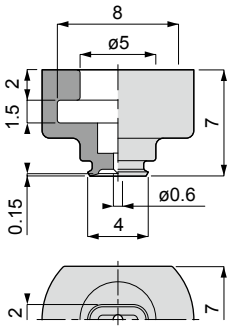


Unit: mm

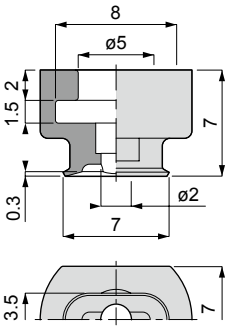
Model No.	Pad size X	Pad size Y	Tube O.D. x I.D. øD	Spring force (N)	Weight (g)
VSP-MD2×4E□-4T	2	4	4×2.5	1 to 1.3	20
VSP-MD2×4E□-6T			6×4		21
VSP-MD3.5×7E□-4T	3.5	7	4×2.5	1 to 1.3	20
VSP-MD3.5×7E□-6T			6×4		21
VSP-MD4×10E□-4T	4	10	4×2.5	1 to 1.3	20
VSP-MD4×10E□-6T			6×4		21
VSP-MD4×20E□-4T		20	4×2.5		21
VSP-MD4×20E□-6T			6×4		21
VSP-MD4×30E□-4T		30	4×2.5		21
VSP-MD4×30E□-6T			6×4		21
VSP-MD5×10E□-4T	5	10	4×2.5	1 to 1.3	20
VSP-MD5×10E□-6T			6×4		21
VSP-MD5×20E□-4T		20	4×2.5		21
VSP-MD5×20E□-6T			6×4		21
VSP-MD5×30E□-4T		30	4×2.5		21
VSP-MD5×30E□-6T			6×4		21
VSP-MD6×10E□-4T	6	10	4×2.5	1 to 1.3	20
VSP-MD6×10E□-6T			6×4		21
VSP-MD6×20E□-4T		20	4×2.5		21
VSP-MD6×20E□-6T			6×4		21
VSP-MD6×30E□-4T		30	4×2.5		21
VSP-MD6×30E□-6T			6×4		21
VSP-MD8×20E□-4T	8	20	4×2.5	1 to 1.3	21
VSP-MD8×20E□-6T			6×4		21
VSP-MD8×30E□-4T		30	4×2.5		21
VSP-MD8×30E□-6T			6×4		21

Dimensions: pad only (without frame)

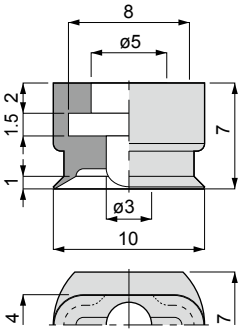
●VSPG-2×4E□



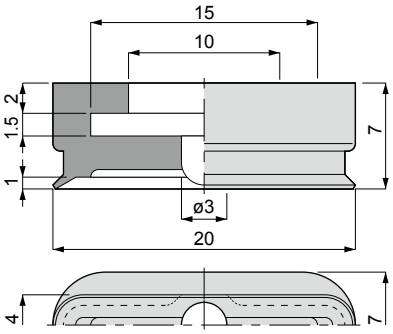
●VSPG-3.5×7E□



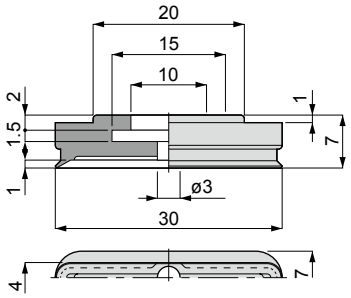
●VSPG-4×10E□



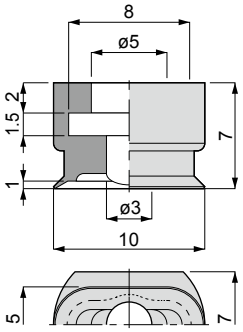
●VSPG-4×20E□



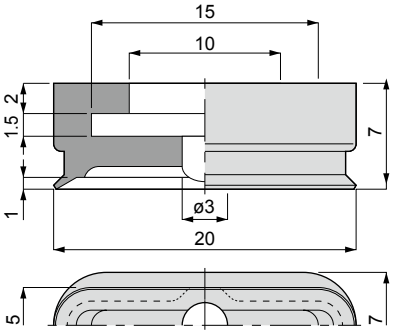
●VSPG-4×30E□



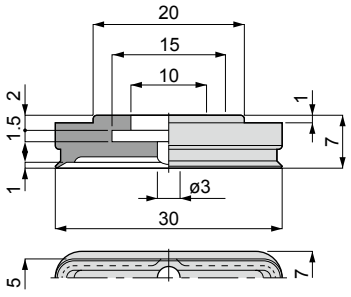
●VSPG-5×10E□



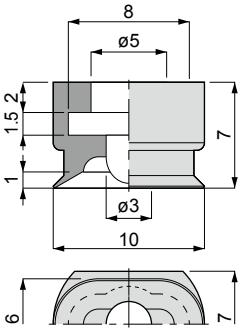
●VSPG-5×20E□



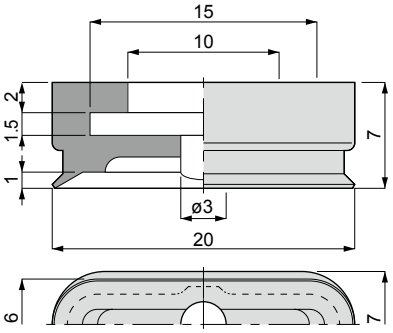
●VSPG-5×30E□



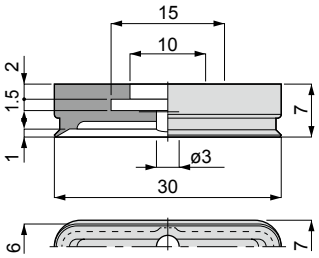
●VSPG-6×10E□



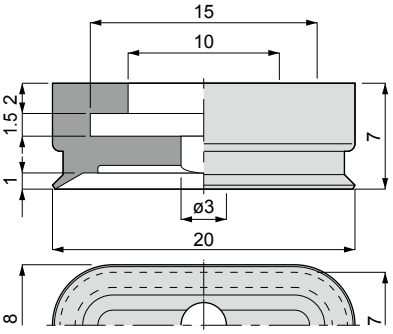
●VSPG-6×20E□



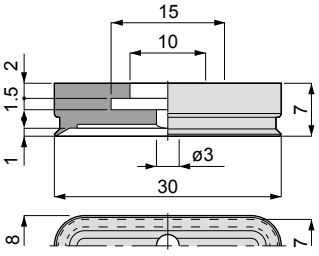
●VSPG-6×30E□



●VSPG-8×20E□

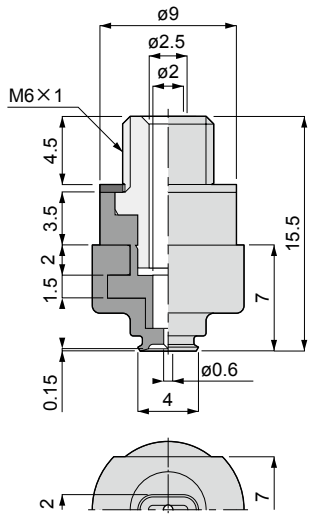


●VSPG-8×30E□

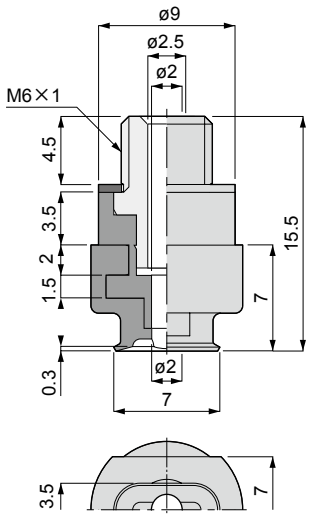


Dimensions: pad only (with frame)

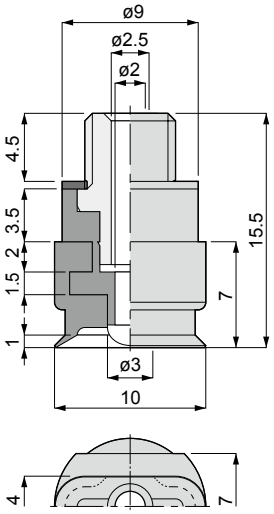
●VSPG-2×4E□A



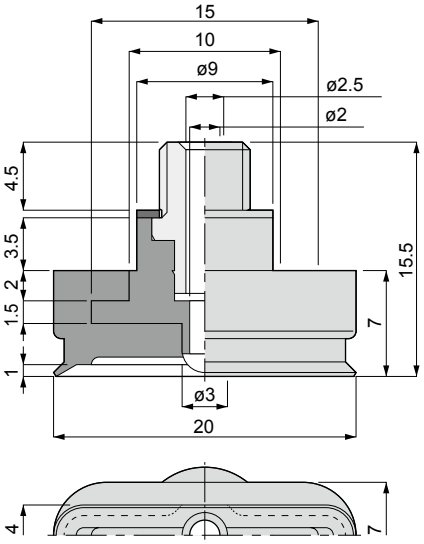
●VSPG-3.5×7E□A



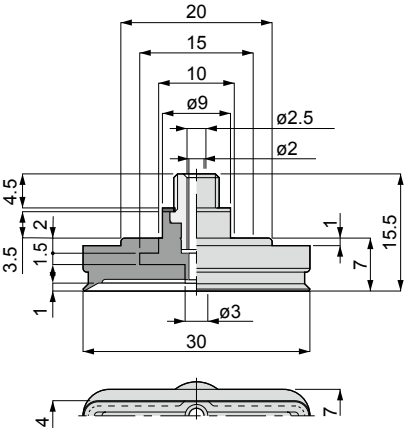
●VSPG-4×10E□A



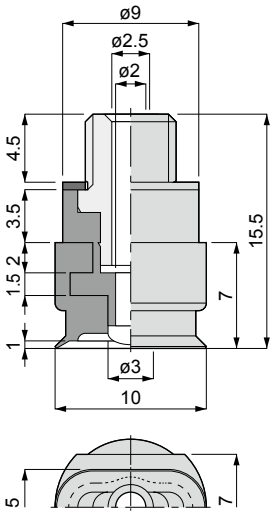
●VSPG-4×20E□A



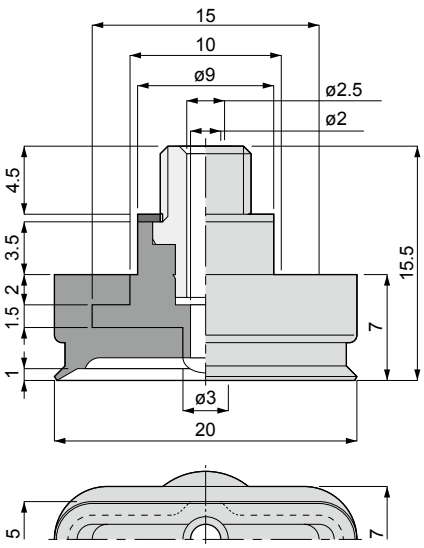
●VSPG-4×30E□A



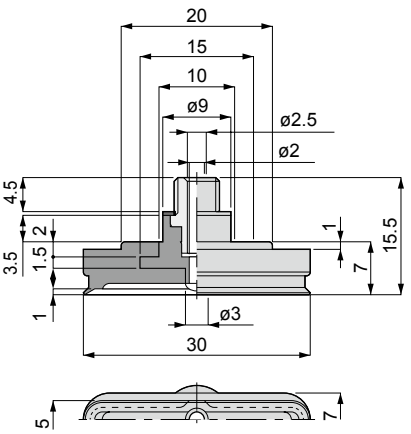
●VSPG-5×10E□A



●VSPG-5×20E□A

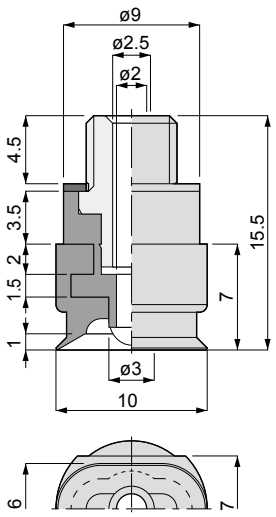


●VSPG-5×30E□A

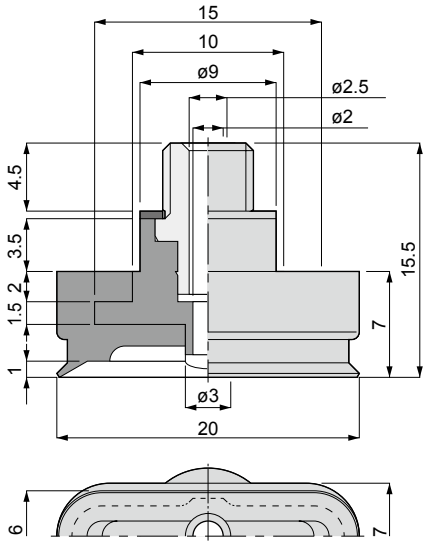


Dimensions: pad only (with frame)

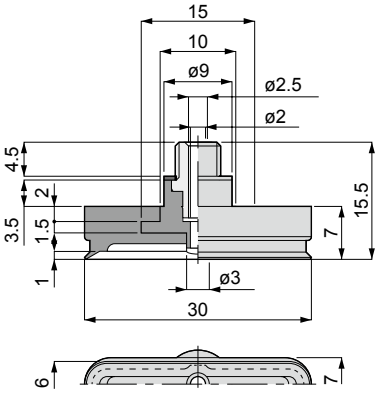
●VSPG-6×10E□A



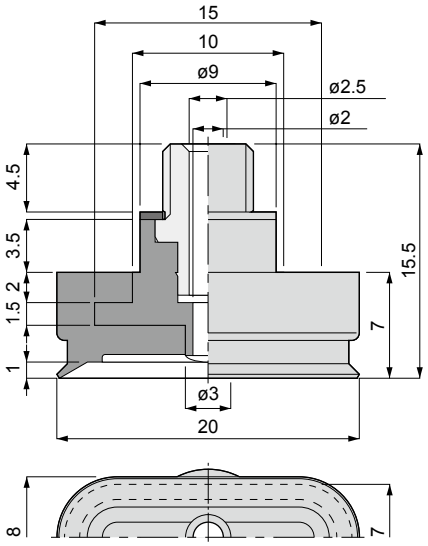
●VSPG-6×20E□A



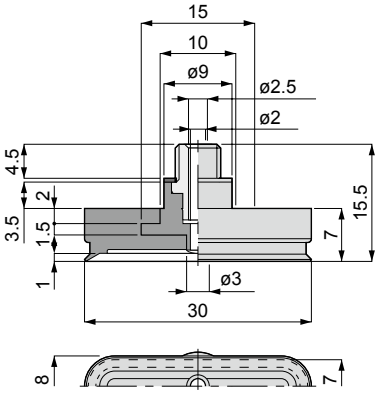
●VSPG-6×30E□A



●VSPG-8×20E□A

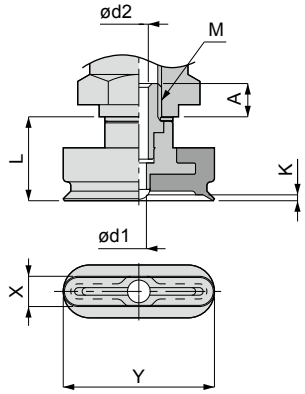


●VSPG-8×30E□A



Detailed view of pad and holder fixing part

●VSPG-□□E□A

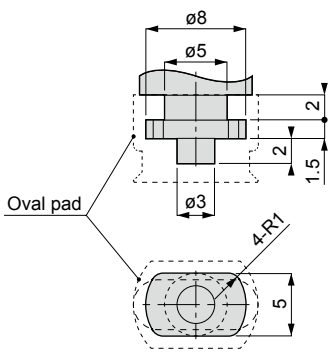


Unit: mm

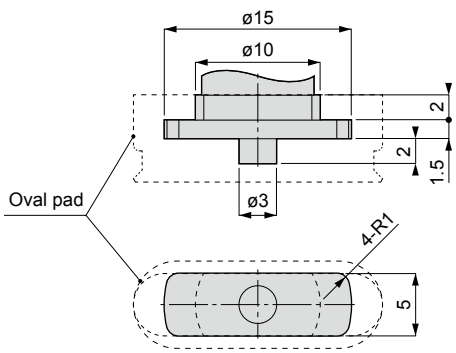
Model No.	Pad size		Fixing screw	A	Lip internal height	L	ød1	ød2
	X	Y	M		K			
VSPG-2×4E□	2	4	-	-	0.15	-	-	-
VSPG-3.5×7E□	3.5	7	-	-	0.3	-	-	-
VSPG-4×10E□	4	10	-	-	0.8	-	-	-
VSPG-4×20E□		20	-	-	0.8	-	-	-
VSPG-4×30E□		30	-	-	0.8	-	-	-
VSPG-5×10E□	5	10	-	-	0.8	-	-	-
VSPG-5×20E□		20	-	-	0.8	-	-	-
VSPG-5×30E□		30	-	-	0.8	-	-	-
VSPG-6×10E□	6	10	-	-	1	-	-	-
VSPG-6×20E□		20	-	-	1	-	-	-
VSPG-6×30E□		30	-	-	1	-	-	-
VSPG-8×20E□	8	20	-	-	1	-	-	-
VSPG-8×30E□		30	-	-	1	-	-	-
VSPG-2×4E□A	2	4	M6×1	3.4	0.15	11	2	2.5
VSPG-3.5×7E□A	3.5	7	M6×1	3.4	0.3	11	2	2.5
VSPG-4×10E□A	4	10	M6×1	3.4	0.8	11	2	2.5
VSPG-4×20E□A		20	M6×1	3.4	0.8	11	2	2.5
VSPG-4×30E□A		30	M6×1	3.4	0.8	11	2	2.5
VSPG-5×10E□A	5	10	M6×1	3.4	0.8	11	2	2.5
VSPG-5×20E□A		20	M6×1	3.4	0.8	11	2	2.5
VSPG-5×30E□A		30	M6×1	3.4	0.8	11	2	2.5
VSPG-6×10E□A	6	10	M6×1	3.4	1	11	2	2.5
VSPG-6×20E□A		20	M6×1	3.4	1	11	2	2.5
VSPG-6×30E□A		30	M6×1	3.4	1	11	2	2.5
VSPG-8×20E□A	8	20	M6×1	3.4	1	11	2	2.5
VSPG-8×30E□A		30	M6×1	3.4	1	11	2	2.5

Pad fitting part dimensions

●VSPG-2×4E□
3.5×7E□
□×10E□



●VSPG-□×20E□
□×30E□



Suction pad for molded products
Suction pad, soft

VSP-*L* Series

● Pad diameter: ø4 to ø40

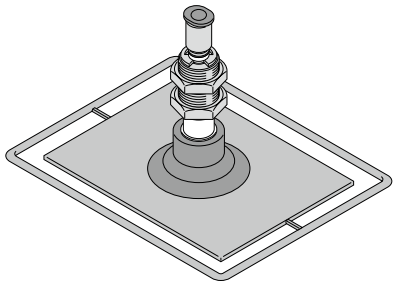
RoHS

Features

■ Pad rubber is excellent in flexibility, allowing suction of plastic molded products with relatively few marks.
■ Holder with vacuum outlet on both sides can be selected for use with crossover wiring of multiple suction pads.
- ● Pad diameter: 8 types (ø4, ø6, ø8, ø10, ø15, ø20, ø30, ø40)
- ● Pad diameter: 5 types (nitrile rubber, silicone rubber, fluorosilicone rubber, conductive silicone rubber, conductive NBR)
- ● Holder shape: 14 types (10 standard, 4 compact)
- ● Free holder (swinging): 2 types (30° angle, 10° angle) [Compatible pad diameter: all sizes]
- ● Position locking valve: Compatible pad diameter (all sizes)

Applications

● Taking out molded products and easily damaged workpieces



How to order * Refer to model No. sections on dimensions pages 399 to 414 for combinations of model No.

● Suction pad/soft

VSP - A 30 L N — 6A - ○ - V

● Pad rubber only/soft

VSPG — 30 L N ○

Code	Content
Ⓐ Holder shape *1, *2	
A	Fixed, Vacuum outlet top
B	Fixed, Vacuum outlet side
C	Buffer, Vacuum outlet top
D	Buffer, Vacuum outlet side
F	Direct mounting, Buffer
HC	With buffer (without rotation-stop) Vacuum outlet top
HD	With buffer (without rotation-stop) Vacuum outlet side
HDW	With buffer (without rotation-stop) Vacuum outlet on both sides
HE	Direct mounting, Fixed, Vacuum outlet side
HEW	Direct mounting, Fixed, Vacuum outlet on both sides
MA	Compact Fixed, Vacuum outlet top
MB	Compact Fixed, Vacuum outlet side
MC	Compact Buffer, Vacuum outlet top
MD	Compact Buffer, Vacuum outlet side

Ⓐ Holder shape

Ⓑ Pad diameter
Refer to Appendix 1 for pad diameter.

Ⓑ Pad diameter

Ⓒ Pad shape	
L	Soft type

Ⓒ Pad shape

Ⓓ Pad material	
N	Nitrile rubber
S	Silicone rubber
FS	Fluorosilicone rubber
SE	Conductive silicone rubber
NE	Conductive NBR (low resistance)

Ⓓ Pad material

Ⓔ Frame	
Blank	Without frame

Ⓔ Frame

Ⓕ Port size/shape	
4	ø4 push-in fitting
4T	ø4 barbed fitting
6	ø6 push-in fitting
6T	ø6 barbed fitting
Blank	(Holder shape: Selected with F)

Ⓕ Port size/shape

Ⓖ Free holder (swinging) *1, *3, *4	Page 550
F1	With free holder swing angle 30°
F2	With free holder swing angle 15°
Blank	Without free holder

Ⓖ Free holder (swinging)

Ⓗ Position locking valve *2, *3, *4	Page 556
V	With position locking valve
Blank	None

Ⓗ Position locking valve

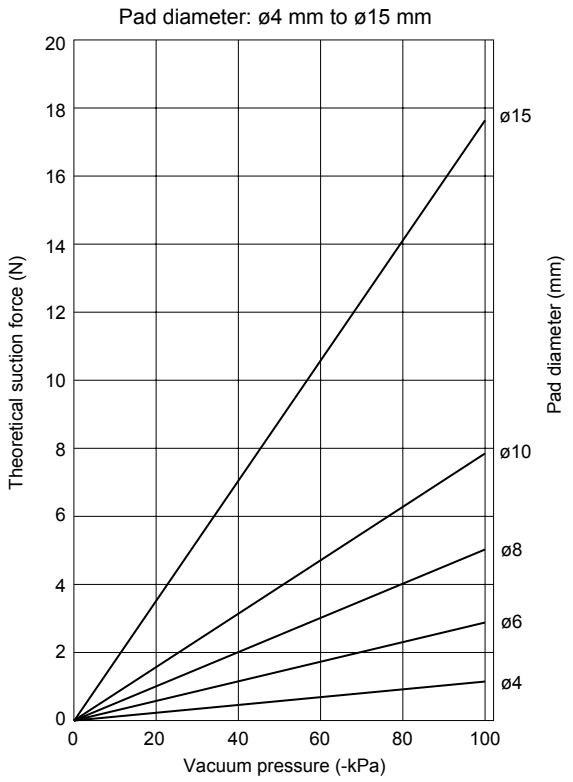
⚠ Precautions for model No. selection

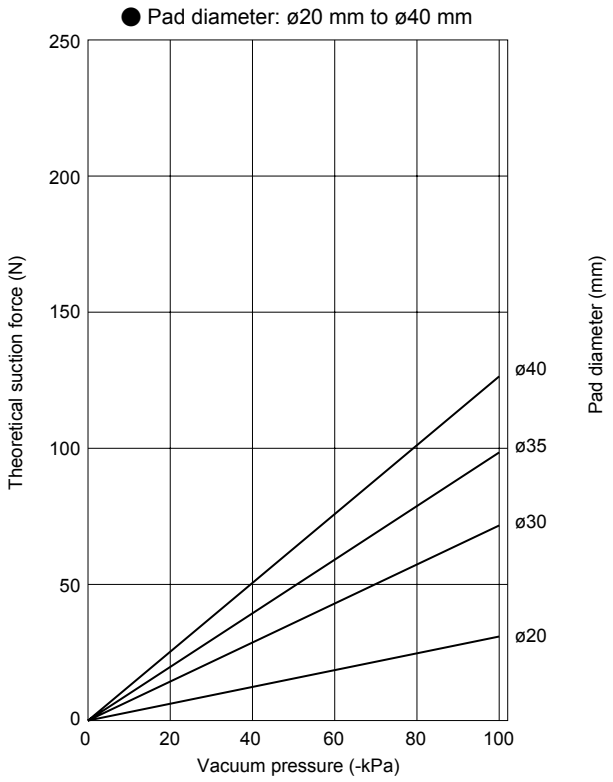
*1: When Ⓐ is "A", "B", "C", "D", or "F", Ⓖ "F1" or "F2" can be selected.
*2: When Ⓐ is "HC", "HD", "HDW", "HE", or "HEW", Ⓗ "V" cannot be selected.
*3: Ⓖ "F1", "F2" and Ⓗ "V" cannot be selected together.
*4: Refer to page 550 for details on free holders (F1, F2) and page 556 for details on position locking valves (V).
In addition, refer to the target suction pad list (page 558) for applicable pad size shape.

Appendix 1

Pad diameter								
Code	4	6	8	10	15	20	30	40
Pad diameter (mm)	ø4	ø6	ø8	ø10	ø15	ø20	ø30	ø40

Theoretical suction force





For soft type suction force, it may not be possible to secure the calculated suction force (theoretical suction force x safety factor) due to the effect of pad characteristics such as degree of vacuum/pad material/suctioned object. When selecting with suction force obtained by the “Selection method for suction pad” (page 288) as a guideline, confirm that there is no problem in the suction performance of the actual device.

Safety precautions

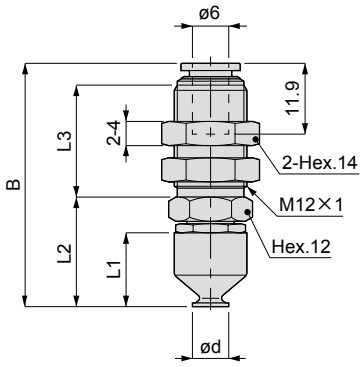
CAUTION

■ The VPHC type holder has no conductivity. When using a suction pad of conductive material, take measures to let electricity pass directly from the pad rubber.

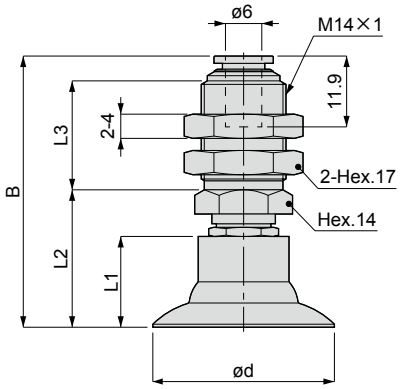
Dimensions (fixed, vacuum outlet top VSP-A)

● Push-in fitting

· VSP-A4 to 15L□-6



· VSP-A20 to 40L□-6

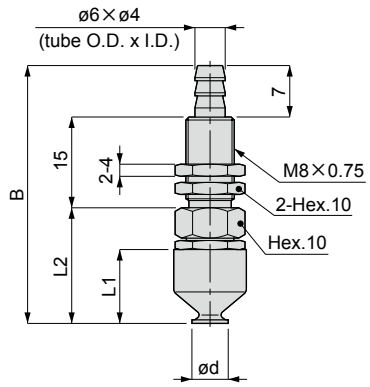


Unit: mm

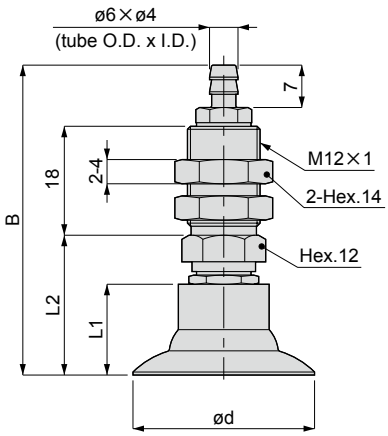
Model No.	Pad diameter ød	Mounting screw M	B	L1	L2	L3	Opposite side H1	Opposite side H2	Weight (g)
VSP-A4L□-6	4	M12×1	40.6	12.2	18.3	18.5	14	12	9.5
VSP-A6L□-6	6	M12×1	40.6	12.2	18.3	18.5	14	12	16
VSP-A8L□-6	8	M12×1	40.6	12.2	18.3	18.5	14	12	16
VSP-A10L□-6	10	M12×1	42.4	14	20.1	18.5	14	12	25
VSP-A15L□-6	15	M12×1	42.4	14	20.1	18.5	14	12	25
VSP-A20L□-6	20	M14×1	45	15	22.7	18	17	14	41
VSP-A30L□-6	30	M14×1	45	15	22.7	18	17	14	44
VSP-A40L□-6	40	M14×1	45	15	22.7	18	17	14	50

● Barbed fitting

· VSP-A4 to 15L□-6T



· VSP-A20 to 40L□-6T



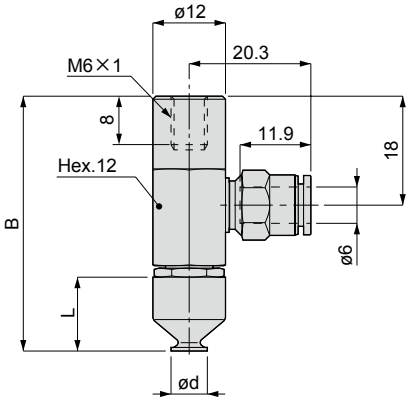
Unit: mm

Model No.	Pad diameter ød	B	L1	L2	Weight (g)
VSP-A4L□-6T	4	41.3	12.2	19.3	6.5
VSP-A6L□-6T	6	41.3	12.2	19.3	11
VSP-A8L□-6T	8	41.3	12.2	19.3	11
VSP-A10L□-6T	10	43.1	14	21.1	15
VSP-A15L□-6T	15	43.1	14	21.1	15
VSP-A20L□-6T	20	51.1	15	23.1	34
VSP-A30L□-6T	30	51.1	15	23.1	37
VSP-A40L□-6T	40	51.1	15	23.1	44

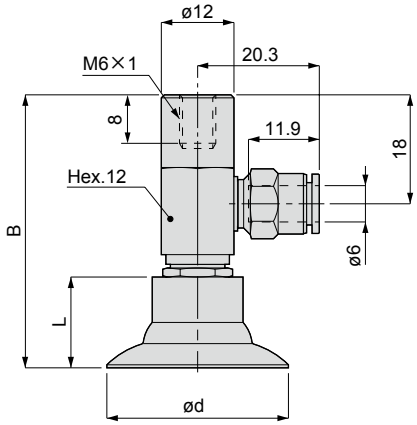
Dimensions (fixed, vacuum outlet side VSP-B)

● Push-in fitting

· VSP-B4 to 15L□-6



· VSP-B20 to 40L□-6

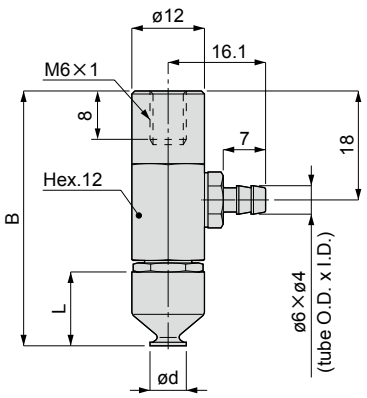


Unit: mm

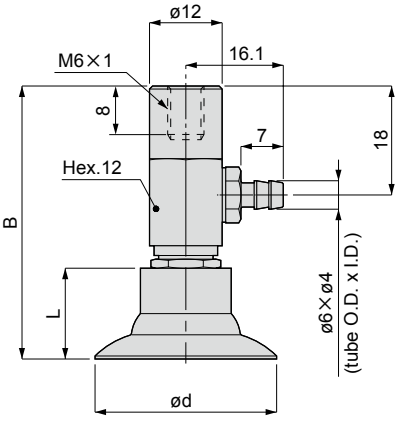
Model No.	Pad diameter ød	B	L	Weight (g)
VSP-B4L□-6	4	42.3	12.2	9
VSP-B6L□-6	6	42.3	12.2	17
VSP-B8L□-6	8	42.3	12.2	17
VSP-B10L□-6	10	44.1	14	34
VSP-B15L□-6	15	44.1	14	34
VSP-B20L□-6	20	45.1	15	38
VSP-B30L□-6	30	45.1	15	41
VSP-B40L□-6	40	45.1	15	48

● Barbed fitting

· VSP-B4 to 15L□-6T



· VSP-B20 to 40L□-6T



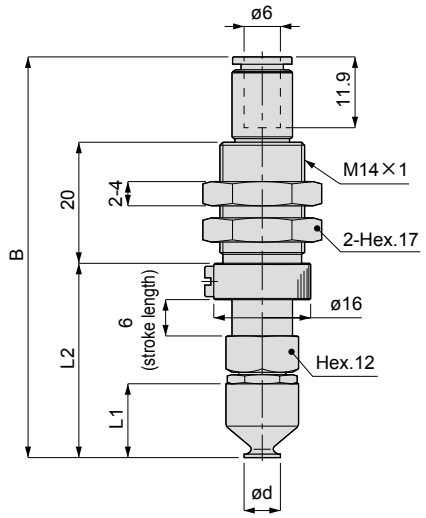
Unit: mm

Model No.	Pad diameter ød	B	L	Weight (g)
VSP-B4L□-6T	4	42.3	12.2	7.5
VSP-B6L□-6T	6	42.3	12.2	15
VSP-B8L□-6T	8	42.3	12.2	15
VSP-B10L□-6T	10	44.1	14	32
VSP-B15L□-6T	15	44.1	14	32
VSP-B20L□-6T	20	45.1	15	36
VSP-B30L□-6T	30	45.1	15	39
VSP-B40L□-6T	40	45.1	15	46

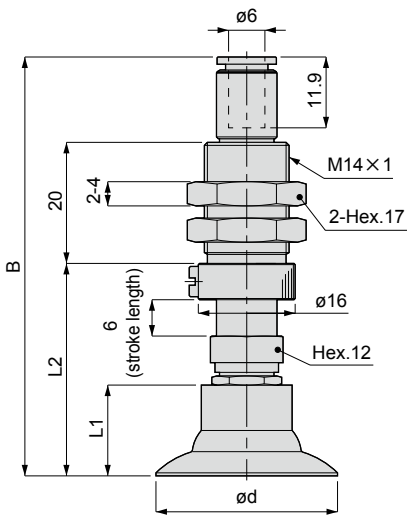
Dimensions (buffer, vacuum outlet top VSP-C)

● Push-in fitting

· VSP-C4 to 15L□-6



· VSP-C20 to 40L□-6

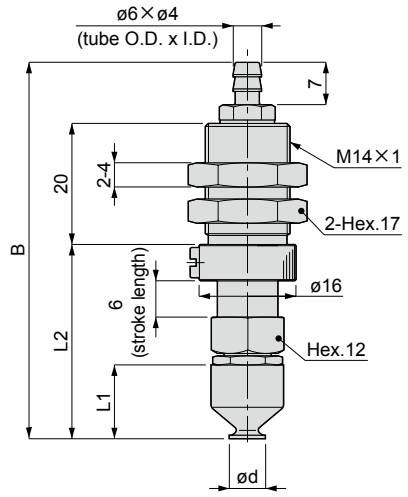


Unit: mm

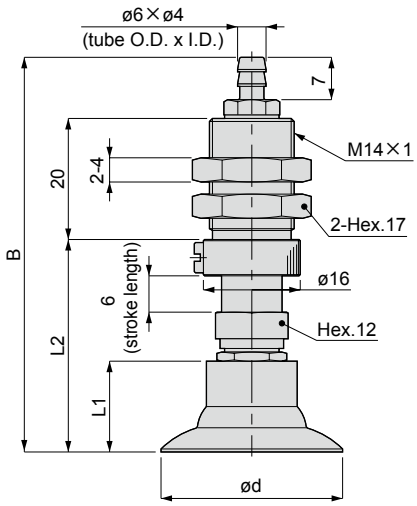
Model No.	Pad diameter ød	B	L1	L2	Spring force (N)	Weight (g)
VSP-C4L□-6	4	66.6	12.2	32.3	4 to 7.1	21
VSP-C6L□-6	6	66.6	12.2	32.3	4 to 7.1	22
VSP-C8L□-6	8	66.6	12.2	32.3	4 to 7.1	22
VSP-C10L□-6	10	68.4	14	34.1	4 to 7.1	39
VSP-C15L□-6	15	68.4	14	34.1	4 to 7.1	39
VSP-C20L□-6	20	69.4	15	35.1	7 to 12.6	44
VSP-C30L□-6	30	69.4	15	35.1	7 to 12.6	47
VSP-C40L□-6	40	69.4	15	35.1	7 to 12.6	54

● Barbed fitting

· VSP-C4 to 15L□-6T



· VSP-C20 to 40L□-6T



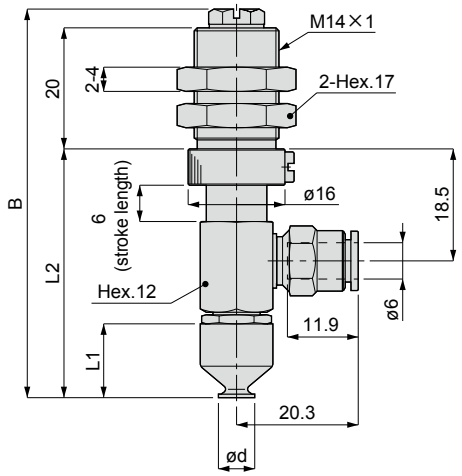
Unit: mm

Model No.	Pad diameter ød	B	L1	L2	Spring force (N)	Weight (g)
VSP-C4L□-6T	4	62.4	12.2	32.3	4 to 7.1	12
VSP-C6L□-6T	6	62.4	12.2	32.3	4 to 7.1	12
VSP-C8L□-6T	8	62.4	12.2	32.3	4 to 7.1	12
VSP-C10L□-6T	10	64.2	14	34.1	4 to 7.1	37
VSP-C15L□-6T	15	64.2	14	34.1	4 to 7.1	37
VSP-C20L□-6T	20	65.2	15	35.1	7 to 12.6	42
VSP-C30L□-6T	30	65.2	15	35.1	7 to 12.6	45
VSP-C40L□-6T	40	65.2	15	35.1	7 to 12.6	51

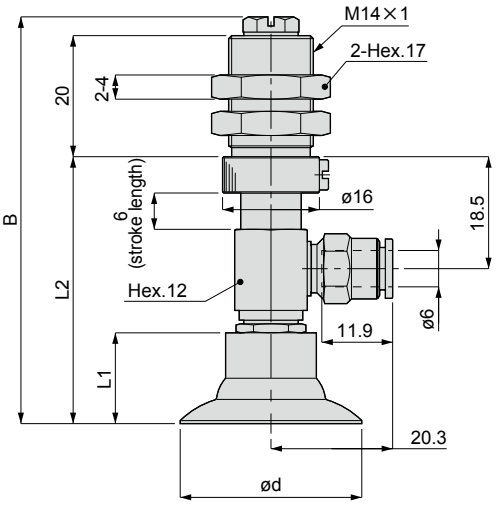
Dimensions (buffer, vacuum outlet side VSP-D)

● Push-in fitting

· VSP-D4 to 15L□-6



· VSP-D20 to 40L□-6

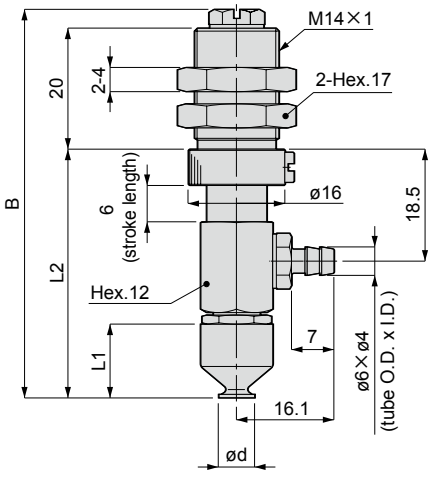


Unit: mm

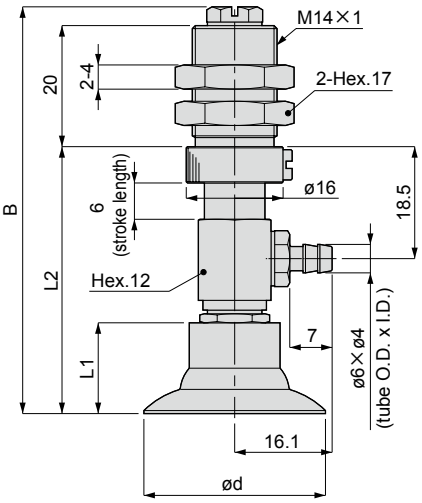
Model No.	Pad diameter ød	B	L1	L2	Spring force (N)	Weight (g)
VSP-D4L□-6	4	64.4	12.2	41.3	4 to 7.1	17
VSP-D6L□-6	6	64.4	12.2	41.3	4 to 7.1	19
VSP-D8L□-6	8	64.4	12.2	41.3	4 to 7.1	19
VSP-D10L□-6	10	66.2	14	43.1	4 to 7.1	51
VSP-D15L□-6	15	66.2	14	43.1	4 to 7.1	51
VSP-D20L□-6	20	67.2	15	44.1	7 to 12.6	56
VSP-D30L□-6	30	67.2	15	44.1	7 to 12.6	59
VSP-D40L□-6	40	67.2	15	44.1	7 to 12.6	65

● Barbed fitting

· VSP-D4 to 15L□-6T



· VSP-D20 to 40L□-6T

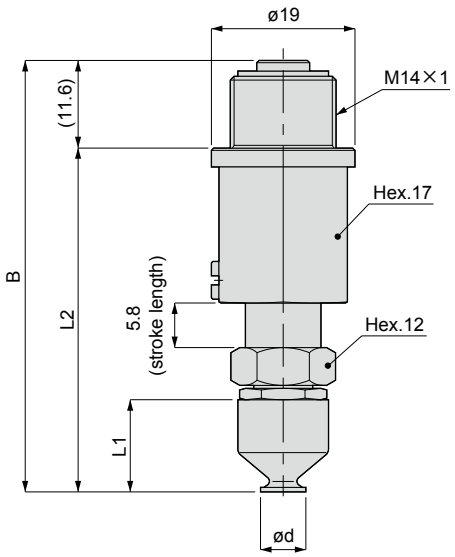


Unit: mm

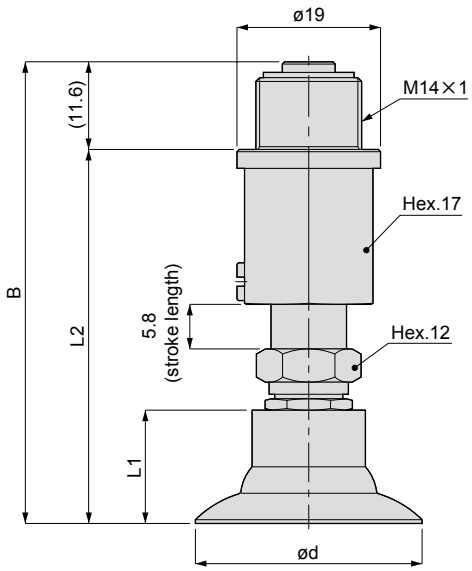
Model No.	Pad diameter ød	B	L1	L2	Spring force (N)	Weight (g)
VSP-D4L□-6T	4	64.4	12.2	41.3	4 to 7.1	16
VSP-D6L□-6T	6	64.4	12.2	41.3	4 to 7.1	16
VSP-D8L□-6T	8	64.4	12.2	41.3	4 to 7.1	16
VSP-D10L□-6T	10	66.2	14	43.1	4 to 7.1	49
VSP-D15L□-6T	15	66.2	14	43.1	4 to 7.1	49
VSP-D20L□-6T	20	67.2	15	44.1	7 to 12.6	53
VSP-D30L□-6T	30	67.2	15	44.1	7 to 12.6	56
VSP-D40L□-6T	40	67.2	15	44.1	7 to 12.6	63

Dimensions (direct mounting buffer, VSP-F)

●VSP-F4 to 15L□



●VSP-F20 to 40L□



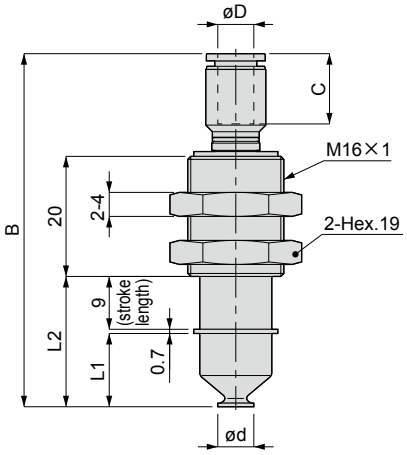
Unit: mm

Model No.	Pad diameter ød	B	L1	L2	Spring force (N)	Weight (g)
VSP-F4L□	4	57.3	12	45.6	7.9 to 15	18
VSP-F6L□	6	57.3	12	45.6	7.9 to 15	18
VSP-F8L□	8	57.3	12	45.6	7.9 to 15	18
VSP-F10L□	10	59.1	14	47.4	7.9 to 15	59
VSP-F15L□	15	59.1	14	47.4	7.9 to 15	59
VSP-F20L□	20	61.1	15	49.5	7.9 to 15	63
VSP-F30L□	30	61.1	15	49.5	7.9 to 15	66
VSP-F40L□	40	61.1	15	49.5	7.9 to 15	72

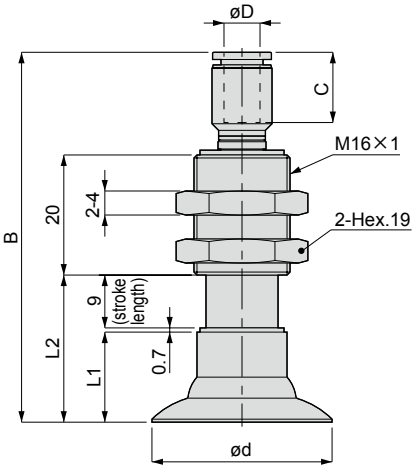
Dimensions (buffer [without rotation-stop], vacuum outlet top VSP-HC)

● Push-in fitting

· VSP-HC4 to 15L□-4/6



· VSP-HC20 to 40L□-6

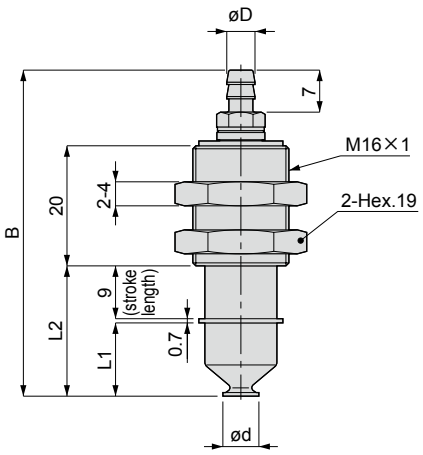


Unit: mm

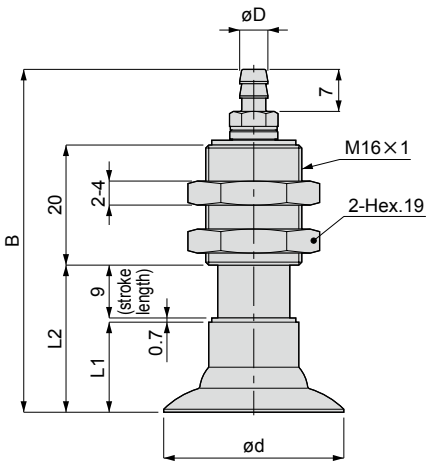
Model No.	Tube O.D. øD	Pad diameter ød	B	L1	L2	C	Spring force (N)	Weight (g)
VSP-HC4L□-4	4	4	57.2	12.2	21.9	11.2	0.9 to 2.7	20
VSP-HC6L□-6	6	6	59	12.2	21.9	11.9	0.9 to 2.7	22
VSP-HC8L□-6	6	8	59	12.2	21.9	11.9	0.9 to 2.7	22
VSP-HC10L□-6	6	10	60.8	14	23.7	11.9	0.9 to 2.7	22
VSP-HC15L□-6	6	15	60.8	14	23.7	11.9	0.9 to 2.7	22
VSP-HC20L□-6	6	20	61.8	15	24.5	11.9	0.9 to 2.7	23
VSP-HC30L□-6	6	30	61.8	15	24.5	11.9	0.9 to 2.7	24
VSP-HC40L□-6	6	40	61.8	15	24.5	11.9	0.9 to 2.7	28

● Barbed fitting

· VSP-HC4 to 15L□-4T/6T



· VSP-HC20 to 40L□-6T



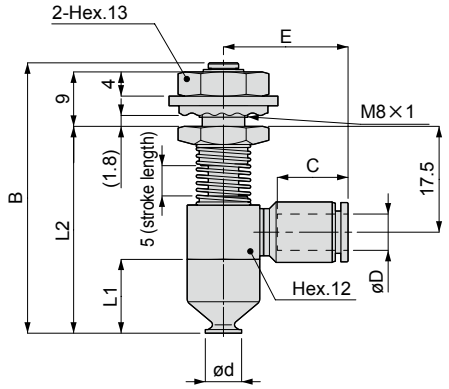
Unit: mm

Model No.	Tube O.D. x I.D. øD	Pad diameter ød	B	L1	L2	Spring force (N)	Weight (g)
VSP-HC4L□-4T	4×2.5	4	54.3	12.2	21.9	0.9 to 2.7	18
VSP-HC6L□-6T	6×4	6	54.3	12.2	21.9	0.9 to 2.7	20
VSP-HC8L□-6T	6×4	8	54.3	12.2	21.9	0.9 to 2.7	20
VSP-HC10L□-6T	6×4	10	56.1	14	23.7	0.9 to 2.7	20
VSP-HC15L□-6T	6×4	15	56.1	14	23.7	0.9 to 2.7	20
VSP-HC20L□-6T	6×4	20	57.1	15	24.7	0.9 to 2.7	21
VSP-HC30L□-6T	6×4	30	57.1	15	24.7	0.9 to 2.7	23
VSP-HC40L□-6T	6×4	40	57.1	15	24.7	0.9 to 2.7	27

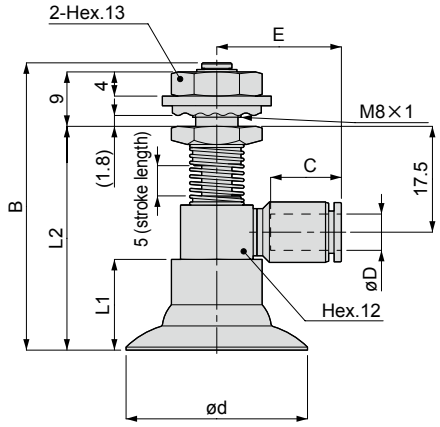
Dimensions (buffer [without rotation-stop], vacuum outlet side VSP-HD)

● Push-in fitting

· VSP-HD4 to 15L□-4/6



· VSP-HD20 to 40L□-6

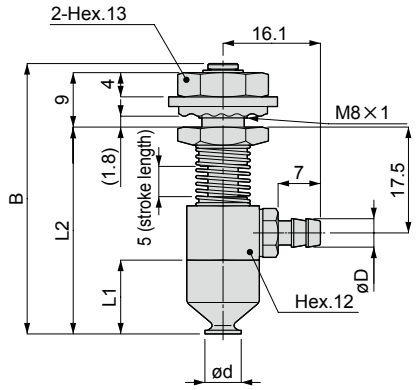


Unit: mm

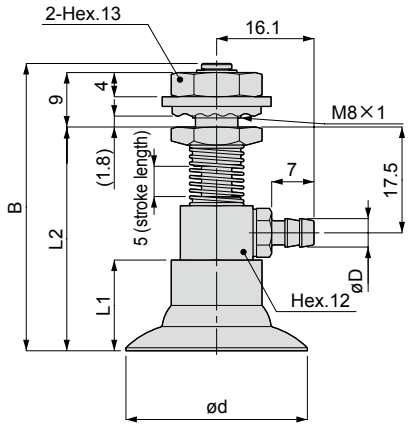
Model No.	Tube O.D. øD	Pad diameter ød	B	L1	L2	C	E	Spring force (N)	Weight (g)
VSP-HD4L□-4	4	4	44.5	12.2	34.2	11.2	19	1.6 to 2.9	30
VSP-HD6L□-6	6	6	44.5	12.2	34.2	11.9	20.8	1.6 to 2.9	31
VSP-HD8L□-6	6	8	44.5	12.2	34.2	11.9	20.8	1.6 to 2.9	31
VSP-HD10L□-6	6	10	46.5	14	36	11.9	20.8	1.6 to 2.9	31
VSP-HD15L□-6	6	15	46.5	14	36	11.9	20.8	1.6 to 2.9	31
VSP-HD20L□-6	6	20	47.5	15	37	11.9	20.8	1.6 to 2.9	33
VSP-HD30L□-6	6	30	47.5	15	37	11.9	20.8	1.6 to 2.9	35
VSP-HD40L□-6	6	40	47.5	15	37	11.9	20.8	1.6 to 2.9	39

● Barbed fitting

· VSP-HD4 to 15L□-4T/6T



· VSP-HD20 to 40L□-6T



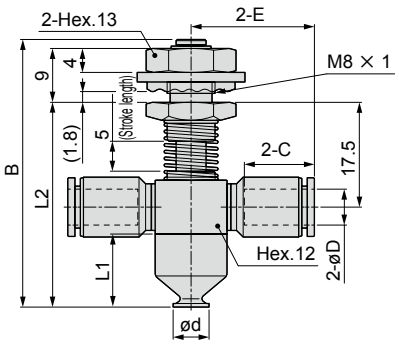
Unit: mm

Model No.	Tube O.D. x I.D. øD	Pad diameter ød	B	L1	L2	Spring force (N)	Weight (g)
VSP-HD4L□-4T	4×2.5	4	44.5	12.2	34.2	1.6 to 2.9	27
VSP-HD6L□-6T	6×4	6	44.5	12.2	34.2	1.6 to 2.9	30
VSP-HD8L□-6T	6×4	8	44.5	12.2	34.2	1.6 to 2.9	30
VSP-HD10L□-6T	6×4	10	46.5	14	36	1.6 to 2.9	30
VSP-HD15L□-6T	6×4	15	46.5	14	36	1.6 to 2.9	30
VSP-HD20L□-6T	6×4	20	47.5	15	37	1.6 to 2.9	32
VSP-HD30L□-6T	6×4	30	47.5	15	37	1.6 to 2.9	33
VSP-HD40L□-6T	6×4	40	47.5	15	37	1.6 to 2.9	37

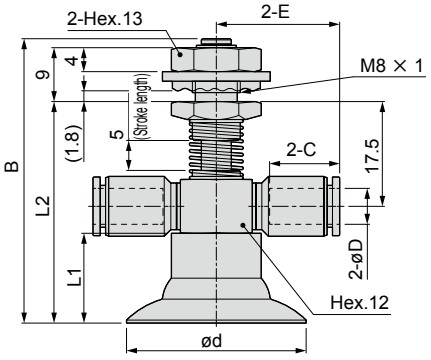
Dimensions (fixed vacuum outlet on both sides VSP-HDW)

● Push-in fitting

● VSP-HDW4 to 15L□-4/6



● VSP-HDW20 to 40L□-6

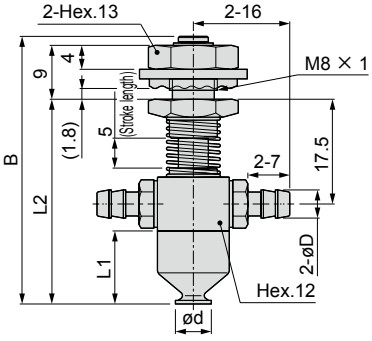


Unit: mm

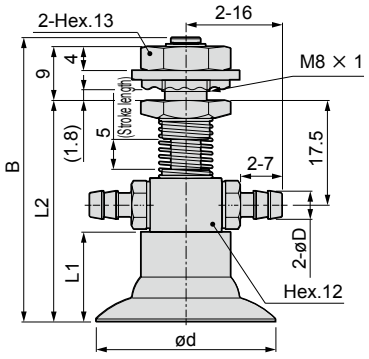
Model No.	Tube O.D. øD	Pad diameter ød	B	L1	L2	C	E	Spring force (N)	Weight (g)
VSP-HDW4L□-4	4	4	44.5	12.2	34.2	11.2	18.9	1.6 to 2.9	30
VSP-HDW6L□-6	6	6	44.5	12.2	34.2	11.9	20.7	1.6 to 2.9	31
VSP-HDW8L□-6	6	8	44.5	12.2	34.2	11.9	20.7	1.6 to 2.9	31
VSP-HDW10L□-6	6	10	46.5	14	36	11.9	20.7	1.6 to 2.9	31
VSP-HDW15L□-6	6	15	46.5	14	36	11.9	20.7	1.6 to 2.9	31
VSP-HDW20L□-6	6	20	47.5	15	37	11.9	20.7	1.6 to 2.9	33
VSP-HDW30L□-6	6	30	47.5	15	37	11.9	20.7	1.6 to 2.9	35
VSP-HDW40L□-6	6	40	47.5	15	37	11.9	20.7	1.6 to 2.9	39

● Barbed fitting

● VSP-HDW4 to 15L□-4T/6T



● VSP-HDW20 to 40L□-6T



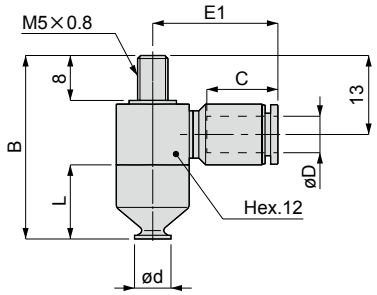
Unit: mm

Model No.	Tube O.D. x I.D. øD	Pad diameter ød	B	L1	L2	Spring force (N)	Weight (g)
VSP-HDW4L□-4T	4×2.5	4	44.5	12.2	34.2	1.6 to 2.9	27
VSP-HDW6L□-6T	6×4	6	44.5	12.2	34.2	1.6 to 2.9	30
VSP-HDW8L□-6T	6×4	8	44.5	12.2	34.2	1.6 to 2.9	30
VSP-HDW10L□-6T	6×4	10	46.5	14	36	1.6 to 2.9	30
VSP-HDW15L□-6T	6×4	15	46.5	14	36	1.6 to 2.9	30
VSP-HDW20L□-6T	6×4	20	47.5	15	37	1.6 to 2.9	32
VSP-HDW30L□-6T	6×4	30	47.5	15	37	1.6 to 2.9	33
VSP-HDW40L□-6T	6×4	40	47.5	15	37	1.6 to 2.9	37

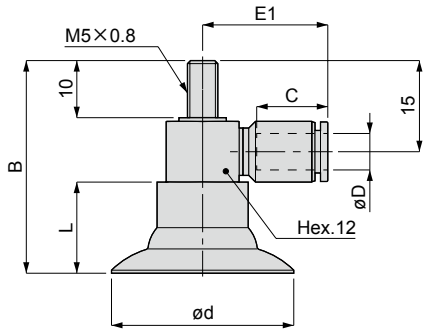
Dimensions (direct mounting, fixed vacuum outlet side VSP-HE)

● Push-in fitting

· VSP-HE4 to 15L□-4/6



· VSP-HE20 to 40L□-6

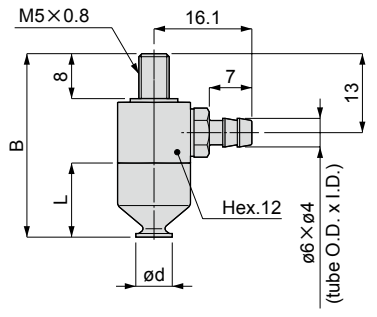


Unit: mm

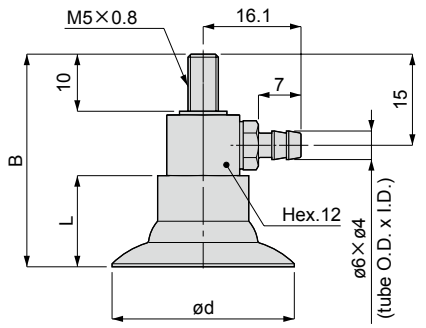
Model No.	Tube O.D. øD	Pad diameter ød	B	L	C	E1	Weight (g)
VSP-HE4L□-4	4	4	30.2	12.2	11.2	19	15
VSP-HE6L□-6	6	6	30.2	12.2	11.9	20.8	17
VSP-HE8L□-6	6	8	30.2	12.2	11.9	20.8	17
VSP-HE10L□-6	6	10	32	14	11.9	20.8	17
VSP-HE15L□-6	6	15	32	14	11.9	20.8	17
VSP-HE20L□-6	6	20	35	15	11.9	20.8	19
VSP-HE30L□-6	6	30	35	15	11.9	20.8	21
VSP-HE40L□-6	6	40	35	15	11.9	20.8	25

● Barbed fitting

· VSP-HE4 to 15L□-4T/6T



· VSP-HE20 to 40L□-6T



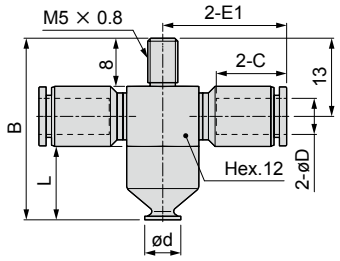
Unit: mm

Model No.	Tube O.D. x I.D. øD	Pad diameter ød	B	L	Weight (g)
VSP-HE4L□-4T	4×2.5	4	30.2	12.2	13
VSP-HE6L□-6T	6×4	6	30.2	12.2	15
VSP-HE8L□-6T	6×4	8	30.2	12.2	15
VSP-HE10L□-6T	6×4	10	32	14	15
VSP-HE15L□-6T	6×4	15	32	14	15
VSP-HE20L□-6T	6×4	20	35	15	18
VSP-HE30L□-6T	6×4	30	35	15	19
VSP-HE40L□-6T	6×4	40	35	15	23

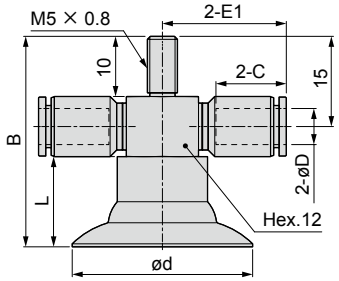
Dimensions (direct mounting vacuum outlet on both sides VSP-HEW)

● Push-in fitting

● VSP-HEW4 to 15L□-4/6



● VSP-HEW20 to 40L□-6

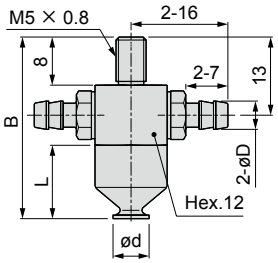


Unit: mm

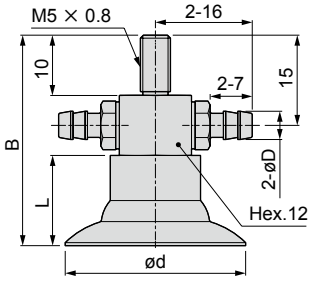
Model No.	Tube O.D. øD	Pad diameter ød	B	L	C	E1	Weight (g)
VSP-HEW4L□-4	4	4	30.2	12.2	10.9	18.6	15
VSP-HEW6L□-6	6	6	30.2	12.2	11.7	20.5	17
VSP-HEW8L□-6	6	8	30.2	12.2	11.7	20.5	17
VSP-HEW10L□-6	6	10	32	14	11.7	20.5	17
VSP-HEW15L□-6	6	15	32	14	11.7	20.5	17
VSP-HEW20L□-6	6	20	35	15	11.7	20.5	19
VSP-HEW30L□-6	6	30	35	15	11.7	20.5	21
VSP-HEW40L□-6	6	40	35	15	11.7	20.5	25

● Barbed fitting

● VSP-HEW4 to 15L□-4T/6T



● VSP-HEW20 to 40L□-6T



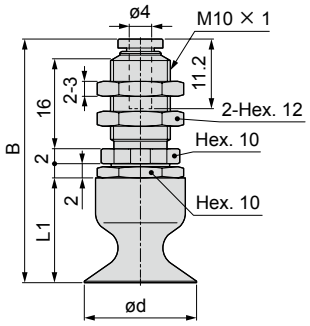
Unit: mm

Model No.	Tube O.D. x I.D. øD	Pad diameter ød	B	L	Weight (g)
VSP-HEW4L□-4T	4×2.5	4	30.2	12.2	13
VSP-HEW6L□-6T	6×4	6	30.2	12.2	15
VSP-HEW8L□-6T	6×4	8	30.2	12.2	15
VSP-HEW10L□-6T	6×4	10	32	14	15
VSP-HEW15L□-6T	6×4	15	32	14	15
VSP-HEW20L□-6T	6×4	20	35	15	18
VSP-HEW30L□-6T	6×4	30	35	15	19
VSP-HEW40L□-6T	6×4	40	35	15	23

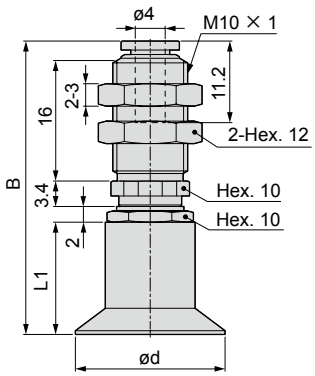
Dimensions (compact fixed, vacuum outlet top VSP-MA)

● Push-in fitting

● VSP-MA4 to 15L□-4



● VSP-MA20, 30L□-4

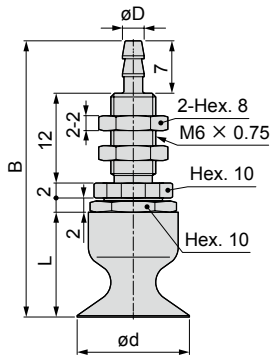


Unit: mm

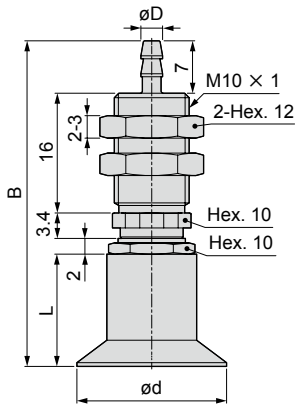
Model No.	Pad diameter ød	B	L1	Weight (g)
VSP-MA4L□-4	4	35.2	12.2	8.7
VSP-MA6L□-4	6	35.2	12.2	8.6
VSP-MA8L□-4	8	35.2	12.2	8.5
VSP-MA10L□-4	10	37	14	8.6
VSP-MA15L□-4	15	37	14	8.6
VSP-MA20L□-4	20	39.4	15	11
VSP-MA30L□-4	30	39.4	15	13

● Barbed fitting

● VSP-MA4 to 15L□-4T



● VSP-MA20, 30L□-4T/6T



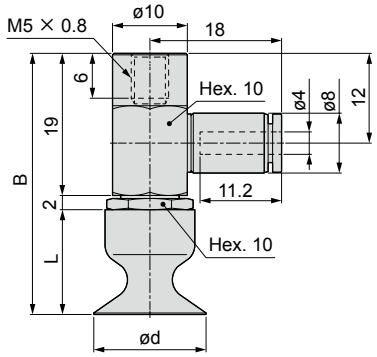
Unit: mm

Model No.	Tube O.D. x I.D. øD	Pad diameter ød	B	L	Weight (g)
VSP-MA4L□-4T	4×2.5	4	35.2	12.2	5.9
VSP-MA6L□-4T	4×2.5	6	35.2	12.2	5.8
VSP-MA8L□-4T	4×2.5	8	35.2	12.2	5.7
VSP-MA10L□-4T	4×2.5	10	37	14	5.8
VSP-MA15L□-4T	4×2.5	15	37	14	5.8
VSP-MA20L□-4T	4×2.5	20	43.4	15	11
VSP-MA20L□-6T	6×4				
VSP-MA30L□-4T	4×2.5	30	43.4	15	13
VSP-MA30L□-6T	6×4				

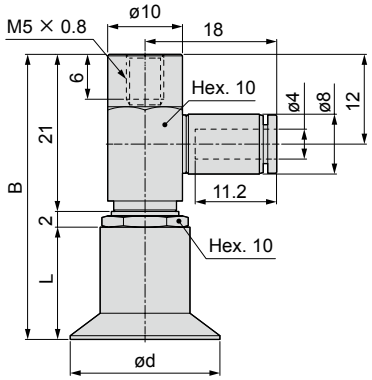
Dimensions (compact fixed, vacuum outlet side VSP-MB)

● Push-in fitting

● VSP-MB4 to 15L□-4



● VSP-MB20, 30L□-4

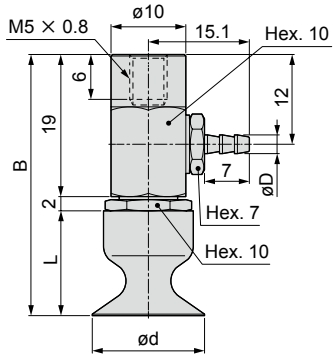


Unit: mm

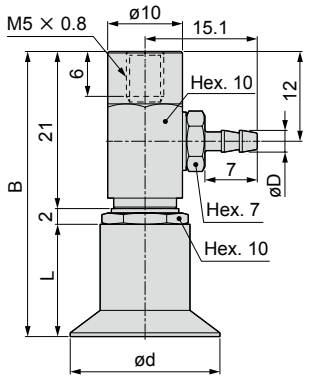
Model No.	Pad diameter ød	B	L	Weight (g)
VSP-MB4L□-4	4	33.2	12.2	11
VSP-MB6L□-4	6	33.2	12.2	11
VSP-MB8L□-4	8	33.2	12.2	11
VSP-MB10L□-4	10	35	14	11
VSP-MB15L□-4	15	35	14	11
VSP-MB20L□-4	20	38	15	12
VSP-MB30L□-4	30	38	15	14

● Barbed fitting

● VSP-MB4 to 15L□-4T



● VSP-MB20, 30L□-4T/6T



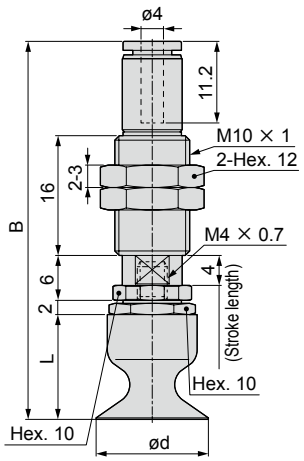
Unit: mm

Model No.	Tube O.D. x I.D. øD	Pad diameter ød	B	L	Weight (g)
VSP-MB4L□-4T	4×2.5	4	33.2	12.2	9
VSP-MB6L□-4T	4×2.5	6	33.2	12.2	8.9
VSP-MB8L□-4T	4×2.5	8	33.2	12.2	8.8
VSP-MB10L□-4T	4×2.5	10	35	14	8.9
VSP-MB15L□-4T	4×2.5	15	35	14	8.9
VSP-MB20L□-4T	4×2.5	20	38	15	11
VSP-MB20L□-6T	6×4				
VSP-MB30L□-4T	4×2.5	30	38	15	13
VSP-MB30L□-6T	6×4				

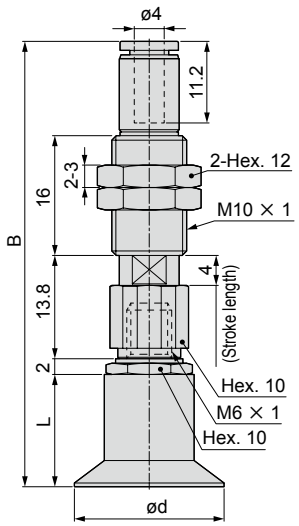
Dimensions (compact buffer, vacuum outlet top VSP-MC)

● Push-in fitting

● VSP-MC4 to 15L□-4



● VSP-MC20, 30L□-4

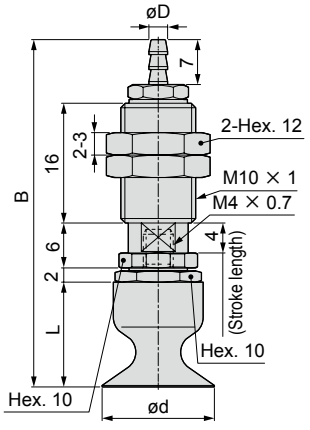


Unit: mm

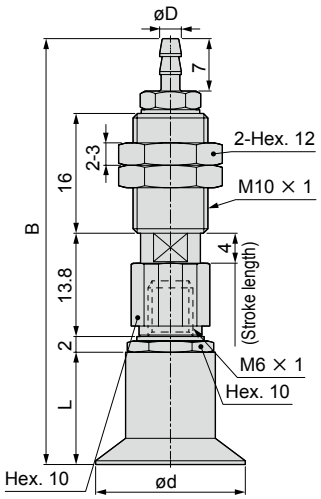
Model No.	Pad diameter ød	B	L	Spring force (N)	Weight (g)
VSP-MC4L□-4	4	49.2	12.2	1 to 1.3	18
VSP-MC6L□-4	6	49.2	12.2	1 to 1.3	18
VSP-MC8L□-4	8	49.2	12.2	1 to 1.3	18
VSP-MC10L□-4	10	51	14	1 to 1.3	18
VSP-MC15L□-4	15	51	14	1 to 1.3	18
VSP-MC20L□-4	20	59.7	15	1 to 1.3	23
VSP-MC30L□-4	30	59.7	15	1 to 1.3	25

● Barbed fitting

● VSP-MC4 to 15L□-4T



● VSP-MC20, 30L□-4T/6T



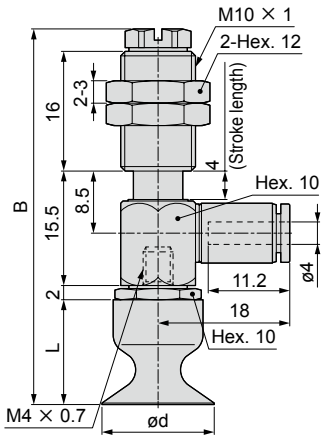
Unit: mm

Model No.	Tube O.D. x I.D. øD	Pad diameter ød	B	L	Spring force (N)	Weight (g)
VSP-MC4L□-4T	4×2.5	4	46.3	12.2	1 to 1.3	17
VSP-MC6L□-4T	4×2.5	6	46.3	12.2	1 to 1.3	17
VSP-MC8L□-4T	4×2.5	8	46.3	12.2	1 to 1.3	17
VSP-MC10L□-4T	4×2.5	10	48.1	14	1 to 1.3	17
VSP-MC15L□-4T	4×2.5	15	48.1	14	1 to 1.3	17
VSP-MC20L□-4T	4×2.5	20	56.9	15	1 to 1.3	22
VSP-MC20L□-6T	6×4					
VSP-MC30L□-4T	4×2.5	30	56.9	15	1 to 1.3	24
VSP-MC30L□-6T	6×4					

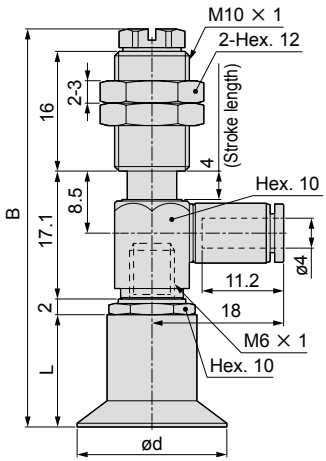
Dimensions (compact buffer, vacuum outlet side VSP-MD)

● Push-in fitting

● VSP-MD4 to 15L□-4



● VSP-MD20, 30L□-4

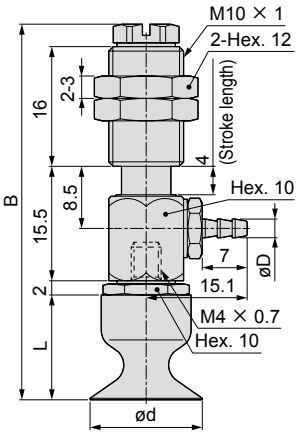


Unit: mm

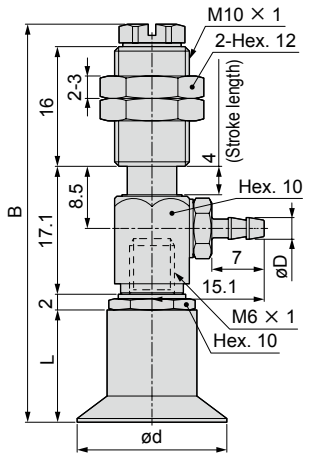
Model No.	Pad diameter ød	B	L	Spring force (N)	Weight (g)
VSP-MD4L□-4	4	48.7	12.2	1 to 1.3	26
VSP-MD6L□-4	6	48.7	12.2	1 to 1.3	26
VSP-MD8L□-4	8	48.7	12.2	1 to 1.3	26
VSP-MD10L□-4	10	50.5	14	1 to 1.3	26
VSP-MD15L□-4	15	50.5	14	1 to 1.3	26
VSP-MD20L□-4	20	53.1	15	1 to 1.3	27
VSP-MD30L□-4	30	53.1	15	1 to 1.3	28

● Barbed fitting

● VSP-MD4 to 15L□-4T



● VSP-MD20, 30L□-4T/6T

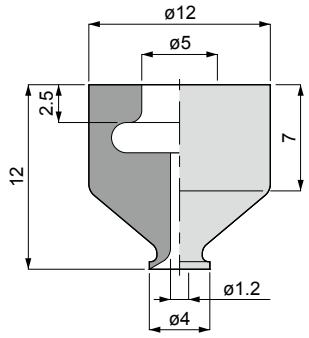


Unit: mm

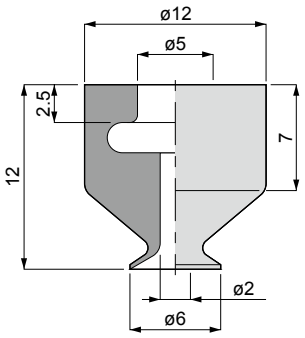
Model No.	Tube O.D. x I.D. øD	Pad diameter ød	B	L	Spring force (N)	Weight (g)
VSP-MD4L□-4T	4×2.5	4	48.7	12.2	1 to 1.3	24
VSP-MD6L□-4T	4×2.5	6	48.7	12.2	1 to 1.3	24
VSP-MD8L□-4T	4×2.5	8	48.7	12.2	1 to 1.3	24
VSP-MD10L□-4T	4×2.5	10	50.5	14	1 to 1.3	24
VSP-MD15L□-4T	4×2.5	15	50.5	14	1 to 1.3	24
VSP-MD20L□-4T	4×2.5	20	53.1	15	1 to 1.3	26
VSP-MD20L□-6T	6×4				1 to 1.3	
VSP-MD30L□-4T	4×2.5	30	53.1	15	1 to 1.3	27
VSP-MD30L□-6T	6×4					

Dimensions: pad only

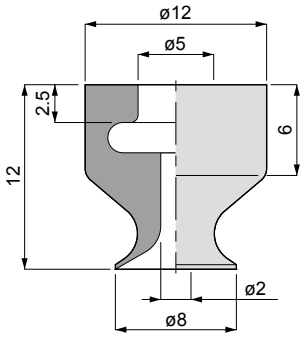
●VSPG-4L□



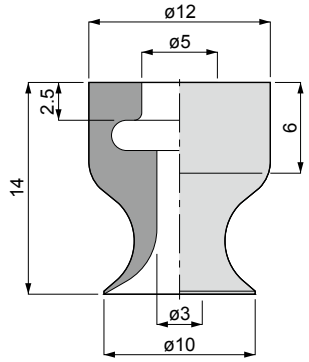
●VSPG-6L□



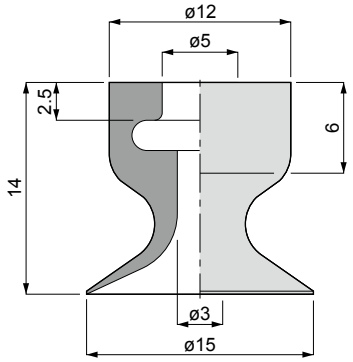
●VSPG-8L□



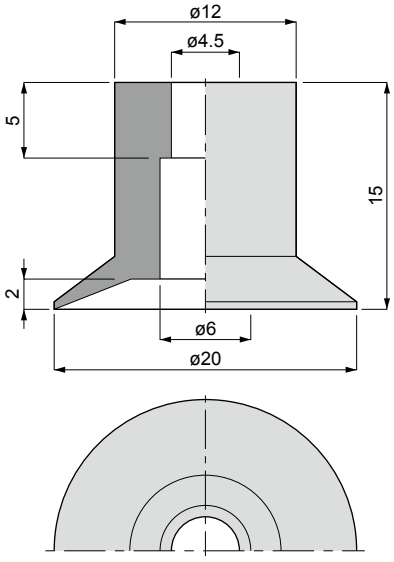
●VSPG-10L□



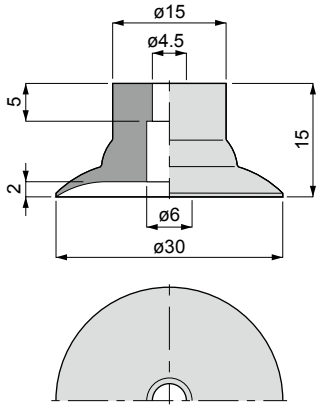
●VSPG-15L□



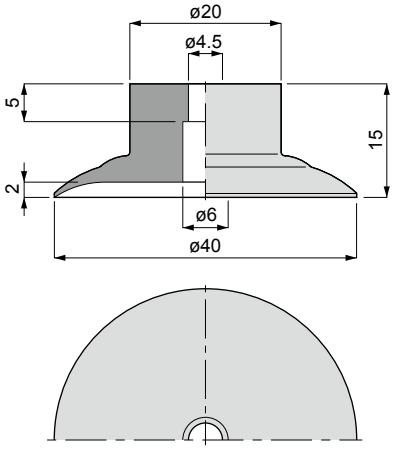
●VSPG-20L□



●VSPG-30L□

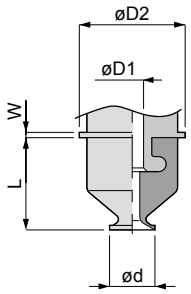


●VSPG-40L□

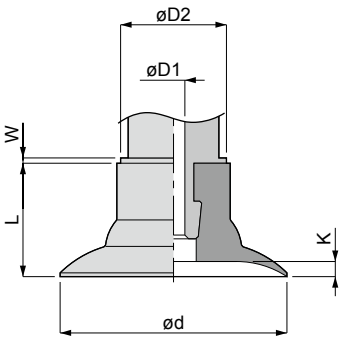


Detailed view of pad and holder fixing part

●VSPG-4 to 15L□



●VSPG-20 to 40L□



Unit: mm

Model No.	Pad diameter ød	L	Lip internal height K	øD1	øD2	W
VSPG-4L□	4	12.2	-	3	14	0.7
VSPG-6L□	6	12.2	-	3	14	0.7
VSPG-8L□	8	12.2	-	3	14	0.7
VSPG-10L□	10	14	-	3	14	0.7
VSPG-15L□	15	14	-	3	14	0.7
VSPG-20L□	20	15	2	3	14	0.7
VSPG-30L□	30	15	2	3	14	0.7
VSPG-40L□	40	15	2	3	14	0.7

*1 : øD2 and W dimensions in the dimensions table are only for VSP-HC type.

MEMO

Suction pad for molded products
Suction pad, soft bellows

VSP-*LB* Series

● Pad diameter: ø6 to ø20

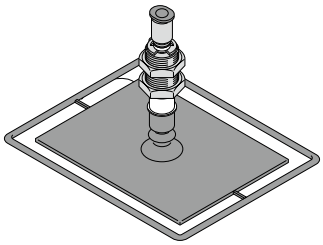
RoHS

Features

■ Pad rubber is excellent in flexibility, allowing suction of paper, etc. In addition, suction of plastic molded products is possible with relatively few marks.
- ● Pad material: 6 types (nitrile rubber, silicone rubber, urethane rubber, HNBR, EPDM, conductive NBR)
- ● Holder shape: 14 types (10 standard, 4 compact)
- ● Free holder (swinging): 2 types (30° angle, 10° angle) [Compatible pad diameter: all sizes]
- ● Position locking valve: Compatible pad diameter (all sizes)

Applications

● Taking out molded products and easily damaged workpieces



How to order

* Refer to model No. sections on dimensions pages 419 to 434 for combinations of model No.

● Suction pad/soft bellows

VSP - B 20 LB EP — 6 - ○ - V

● Pad rubber only/soft bellows

VSPG — 20 LB EP ○

Code	Content
Ⓐ Holder shape *1, *2	
A	Fixed, Vacuum outlet top
B	Fixed, Vacuum outlet side
C	Buffer, Vacuum outlet top
D	Buffer, Vacuum outlet side
F	Direct mounting, Buffer
HC	Buffer (without rotation-stop) Vacuum outlet top
HD	Buffer (without rotation-stop) Vacuum outlet side
HDW	Buffer (without rotation-stop) Vacuum outlet on both sides
HE	Direct mounting fixed Vacuum outlet side
HEW	Direct mounting fixed Vacuum outlet on both sides
MA	Compact Fixed, Vacuum outlet top
MB	Compact Fixed, Vacuum outlet side
MC	Compact Buffer Vacuum outlet top
MD	Compact Buffer Vacuum outlet side

Ⓐ Holder shape

Ⓑ Pad diameter
Refer to Appendix 1 for pad diameter.

Ⓑ Pad diameter

Ⓒ Pad shape	
LB	Soft bellows

Ⓒ Pad shape

Ⓓ Pad material	
N	Nitrile rubber
S	Silicone rubber
U	Urethane rubber
HN	HNBR
EP	EPDM
NE	Conductive NBR (low resistance)

Ⓓ Pad material

Ⓔ Frame	
Blank	Without frame

Ⓔ Frame

Ⓕ Port size/shape	
4	ø4 push-in fitting
4T	ø4 barbed fitting
6	ø6 push-in fitting
6T	ø6 barbed fitting
Blank	(Holder shape: Selected with F)

Ⓕ Port size/shape

Ⓖ Free holder (swinging) *1, *3	**Page 550**
F1	With free holder swing angle 30°
F2	With free holder swing angle 15°
Blank	Without free holder

Ⓖ Free holder

Ⓗ Position locking valve *2, *3	**Page 556**
V	With position locking valve
Blank	None

Ⓗ Position locking valve

⚠ Precautions for model No. selection

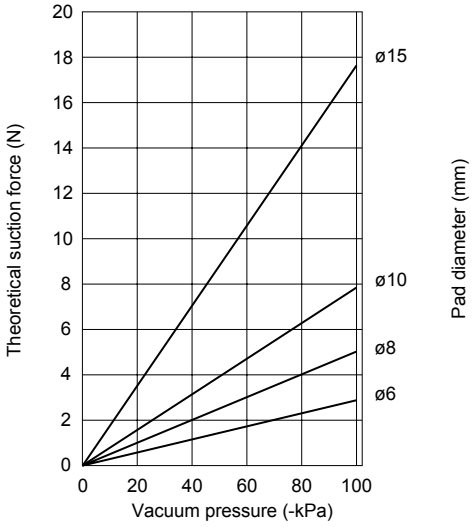
*1 : When Ⓐ is "A", "B", "C", "D", or "F", Ⓖ"F1" or "F2" can be selected.
*2 : For other than Ⓐ "HC", "HD", "HDW", "HE" and "HEW", Ⓗ "V" can be selected.
*3 : Ⓖ "F1", "F2" and Ⓗ "V" cannot be selected together.
*4 : Refer to page 550 for details on free holders (F1, F2) and page 556 for details on position locking valves (V). In addition, refer to the target suction pad list (page 558) for applicable pad size shape.

Appendix 1

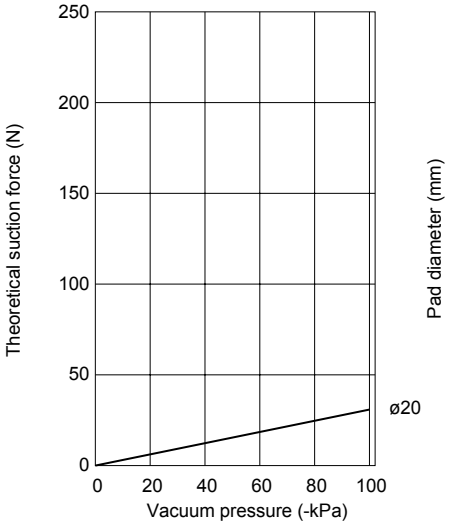
Pad diameter					
Code	6	8	10	15	20
Pad diameter (mm)	ø6	ø8	ø10	ø15	ø20

Theoretical suction force

· Pad diameter: ø6 mm to ø15 mm



· Pad diameter: ø20 mm



For soft bellows type suction force, it may not be possible to secure the calculated suction force (theoretical suction force x safety factor) due to the effect of pad characteristics such as degree of vacuum/pad material/suctioned object.
When selecting with suction force obtained by the "Selection method for suction pad" (page 288) as a guideline, confirm that there is no problem in the suction performance of the actual device. In addition, the soft bellows type is not suitable for vertical lifting. If this product is to be used for such purposes, do so at your own risk.

Safety precautions

WARNING

■ Since soft bellows type pads may adhere together due to working conditions and material characteristics, confirm with an actual device.
In addition, since stickiness may increase due to operating environment and pad wear, review the pad shape, material, quantity, etc. as necessary.

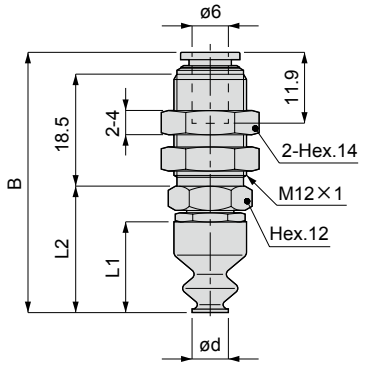
CAUTION

■ The VPHC type holder has no conductivity. When using a vacuum pad of conductive material, take measures to let electricity pass directly from the pad rubber.

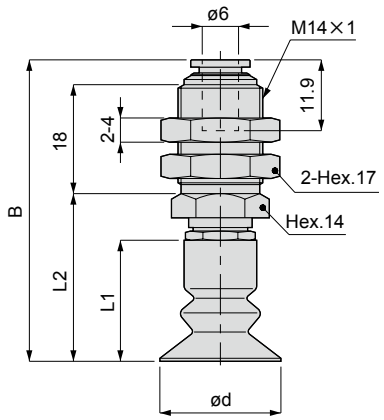
Dimensions (fixed, vacuum outlet top VSP-A)

● Push-in fitting

· VSP-A6 to 15LB□-6



· VSP-A20LB□-6

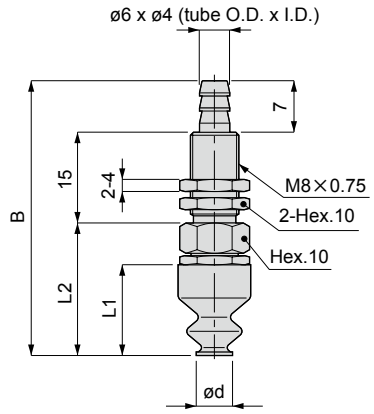


Unit: mm

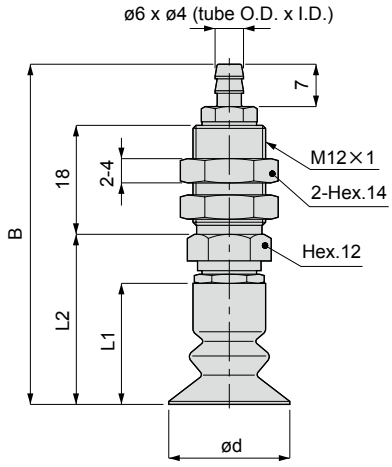
Model No.	Pad diameter ød	B	L1	L2	Weight (g)
VSP-A6LB□-6	6	43.4	15	21.1	16
VSP-A8LB□-6	8	43.4	15	21.1	16
VSP-A10LB□-6	10	43.9	15.5	21.6	25
VSP-A15LB□-6	15	45.9	17.5	23.6	25
VSP-A20LB□-6	20	50	20	27.7	41

● Barbed fitting

· VSP-A6 to 15LB□-6T



· VSP-A20LB□-6T



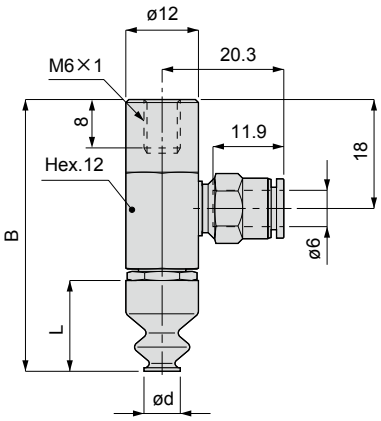
Unit: mm

Model No.	Pad diameter ød	B	L1	L2	Weight (g)
VSP-A6LB□-6T	6	44.1	15	22.1	11
VSP-A8LB□-6T	8	44.1	15	22.1	11
VSP-A10LB□-6T	10	44.6	15.5	22.6	15
VSP-A15LB□-6T	15	46.6	17.5	24.6	16
VSP-A20LB□-6T	20	56.2	20	28.1	34

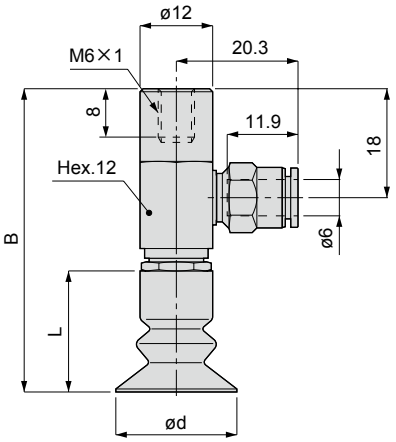
Dimensions (fixed, vacuum outlet side VSP-B)

● Push-in fitting

· VSP-B6 to 15LB□-6



· VSP-B20LB□-6

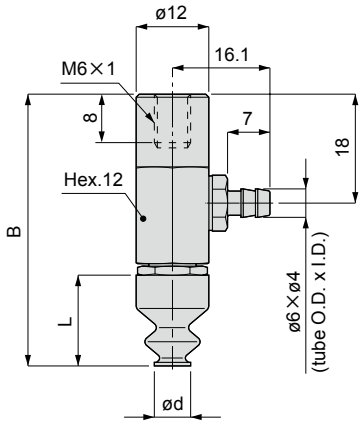


Unit: mm

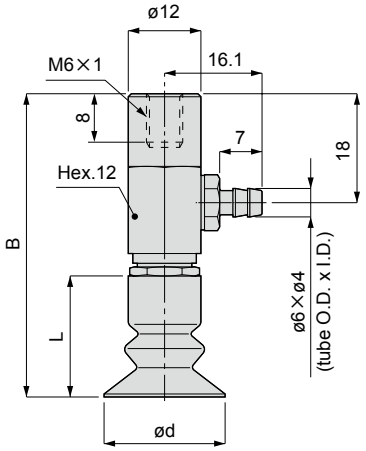
Model No.	Pad diameter ød	B	L1	Weight (g)
VSP-B6LB□-6	6	45.1	15	17
VSP-B8LB□-6	8	45.1	15	17
VSP-B10LB□-6	10	45.6	15.5	34
VSP-B15LB□-6	15	47.6	17.5	34
VSP-B20LB□-6	20	50.1	20	38

● Barbed fitting

· VSP-B6 to 15LB□-6T



· VSP-B20LB□-6T



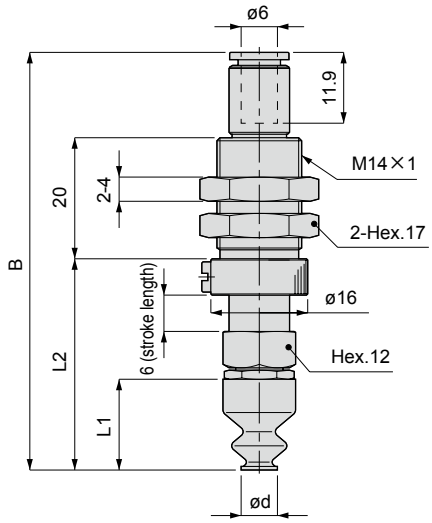
Unit: mm

Model No.	Pad diameter ød	B	L1	Weight (g)
VSP-B6LB□-6T	6	45.1	15	15
VSP-B8LB□-6T	8	45.1	15	15
VSP-B10LB□-6T	10	45.6	15.5	32
VSP-B15LB□-6T	15	47.6	17.5	33
VSP-B20LB□-6T	20	50.1	20	36

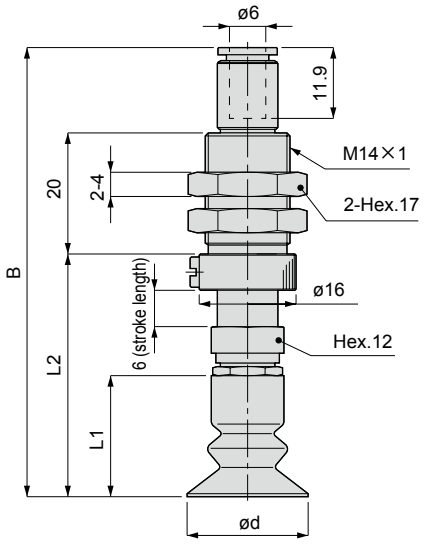
Dimensions (buffer, vacuum outlet top VSP-C)

● Push-in fitting

· VSP-C6 to 15LB□-6



· VSP-C20LB□-6

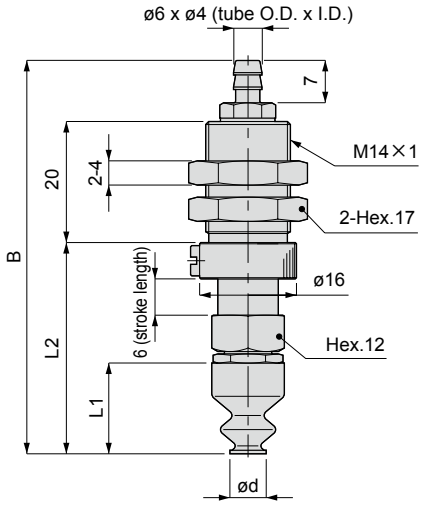


Unit: mm

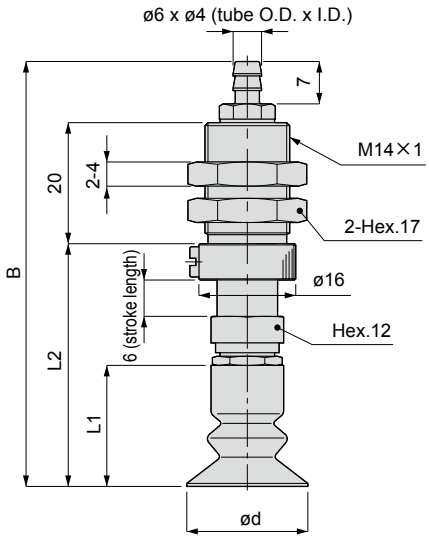
Model No.	Pad diameter ød	B	L1	L2	Spring force (N)	Weight (g)
VSP-C6LB□-6	6	69.4	15	35.1	4 to 7.1	22
VSP-C8LB□-6	8	69.4	15	35.1	4 to 7.1	22
VSP-C10LB□-6	10	69.9	15.5	35.6	4 to 7.1	39
VSP-C15LB□-6	15	71.9	17.5	37.6	4 to 7.1	40
VSP-C20LB□-6	20	74.4	20	40.1	7 to 12.6	44

● Barbed fitting

· VSP-C6 to 15LB□-6T



· VSP-C20LB□-6T



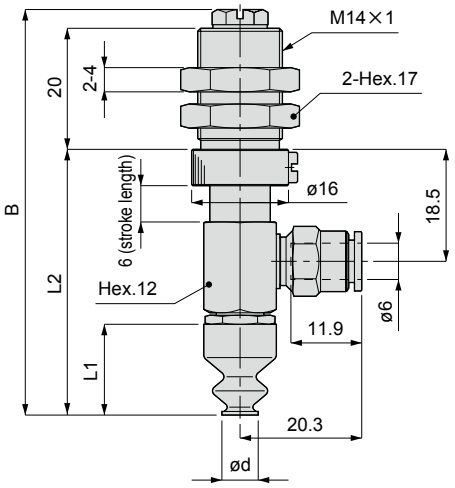
Unit: mm

Model No.	Pad diameter ød	B	L1	L2	Spring force (N)	Weight (g)
VSP-C6LB□-6T	6	65.2	15	35.1	4 to 7.1	12
VSP-C8LB□-6T	8	65.2	15	35.1	4 to 7.1	12
VSP-C10LB□-6T	10	65.7	15.5	35.6	4 to 7.1	37
VSP-C15LB□-6T	15	67.7	17.5	37.6	4 to 7.1	38
VSP-C20LB□-6T	20	70.2	20	40.1	7 to 12.6	42

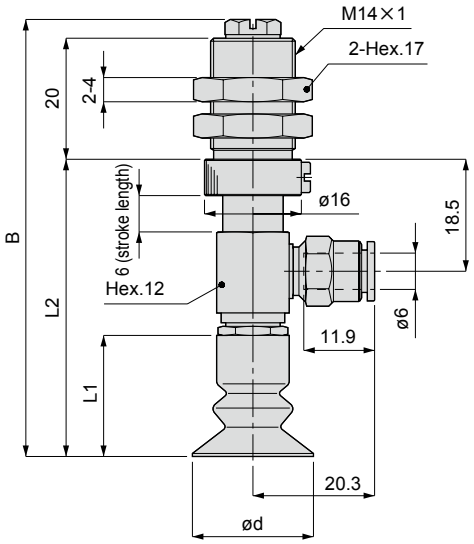
Dimensions (buffer, vacuum outlet side VSP-D)

● Push-in fitting

· VSP-D6 to 15LB□-6



· VSP-D20LB□-6

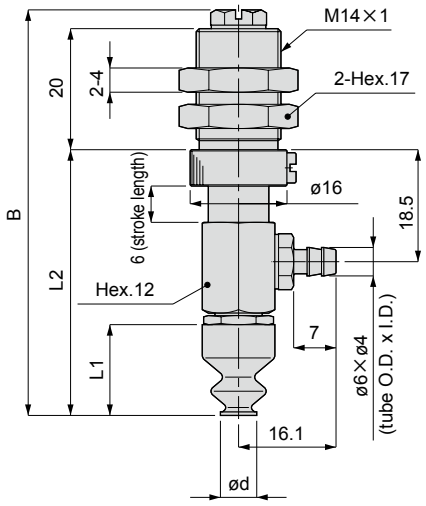


Unit: mm

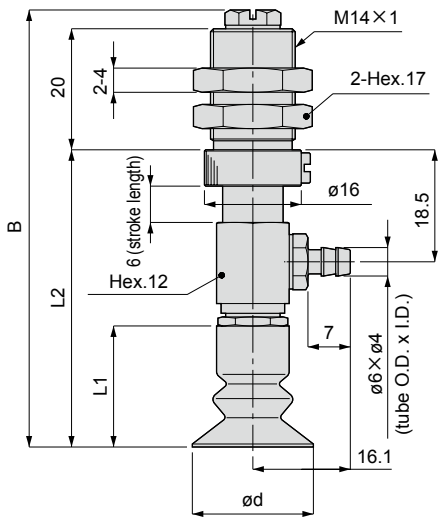
Model No.	Pad diameter ød	B	L1	L2	Spring force (N)	Weight (g)
VSP-D6LB□-6	6	67.2	15	44.1	4 to 7.1	19
VSP-D8LB□-6	8	67.2	15	44.1	4 to 7.1	19
VSP-D10LB□-6	10	67.7	15.5	44.6	4 to 7.1	51
VSP-D15LB□-6	15	69.7	17.5	46.6	4 to 7.1	52
VSP-D20LB□-6	20	72.2	20	49.1	7 to 12.6	56

● Barbed fitting

· VSP-D6 to 15LB□-6T



· VSP-D20LB□-6T

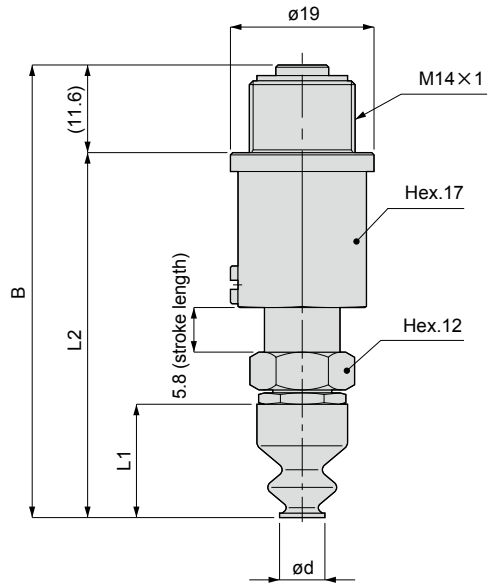


Unit: mm

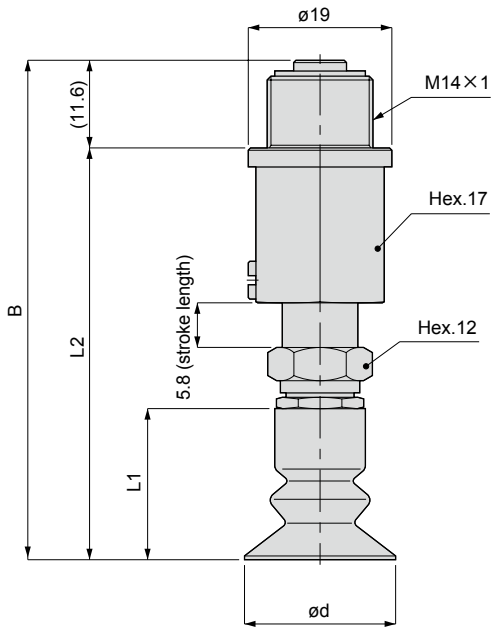
Model No.	Pad diameter ød	B	L1	L2	Spring force (N)	Weight (g)
VSP-D6LB□-6T	6	67.2	15	44.1	4 to 7.1	16
VSP-D8LB□-6T	8	67.2	15	44.1	4 to 7.1	16
VSP-D10LB□-6T	10	67.7	15.5	44.6	4 to 7.1	49
VSP-D15LB□-6T	15	69.7	17.5	46.6	4 to 7.1	50
VSP-D20LB□-6T	20	72.2	20	49.1	7 to 12.6	53

Dimensions (direct mounting buffer, VSP-F)

● VSP-F6 to 15LB□



● VSP-F20LB□



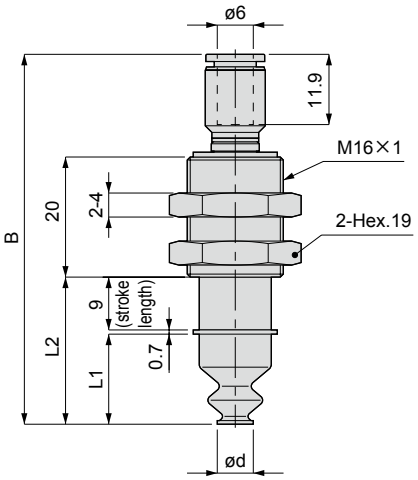
Unit: mm

Model No.	Pad diameter ød	B	L1	L2	Spring force (N)	Weight (g)
VSP-F6LB□	6	60.1	15	48.4	8.8 to 12.7	18
VSP-F8LB□	8	60.1	15	48.4	8.8 to 12.7	18
VSP-F10LB□	10	60.6	15.5	48.9	8.8 to 12.7	59
VSP-F15LB□	15	62.6	17.5	50.9	8.8 to 12.7	60
VSP-F20LB□	20	66.1	20	54.4	8.8 to 12.7	63

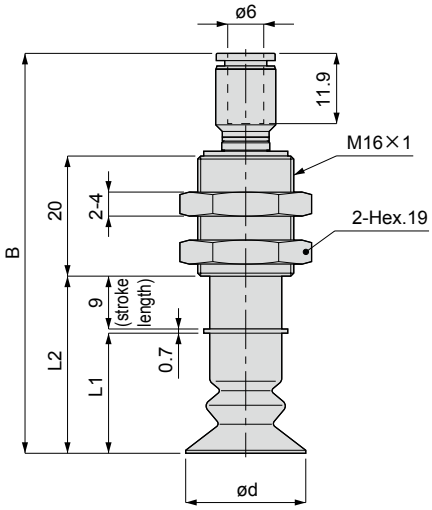
Dimensions (buffer [without rotation-stop], vacuum outlet top VSP-HC)

● Push-in fitting

· VSP-HC6 to 15LB□-6



· VSP-HC20LB□-6

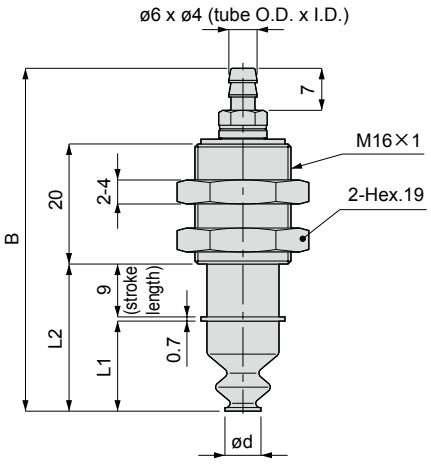


Unit: mm

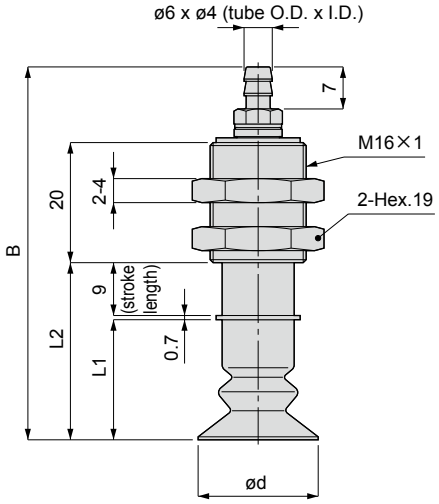
Model No.	Pad diameter ød	B	L1	L2	Spring force (N)	Weight (g)
VSP-HC 6LB□-6	6	61.8	15	24.7	0.9 to 2.7	22
VSP-HC 8LB□-6	8	61.8	15	24.7	0.9 to 2.7	22
VSP-HC 10LB□-6	10	62.3	15.5	25.2	0.9 to 2.7	22
VSP-HC 15LB□-6	15	64.3	17.5	27.2	0.9 to 2.7	22
VSP-HC 20LB□-6	20	66.8	20	29.7	0.9 to 2.7	23

● Barbed fitting

· VSP-HC6 to 15LB□-6T



· VSP-HC20LB□-6T



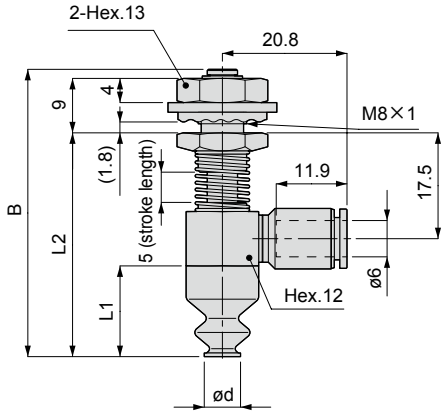
Unit: mm

Model No.	Pad diameter ød	B	L1	L2	Spring force (N)	Weight (g)
VSP-HC6LB□-6T	6	57.1	15	24.7	0.9 to 2.7	20
VSP-HC8LB□-6T	8	57.1	15	24.7	0.9 to 2.7	20
VSP-HC10LB□-6T	10	57.6	15.5	25.2	0.9 to 2.7	20
VSP-HC15LB□-6T	15	59.6	17.5	27.2	0.9 to 2.7	21
VSP-HC20LB□-6T	20	62.1	20	29.7	0.9 to 2.7	21

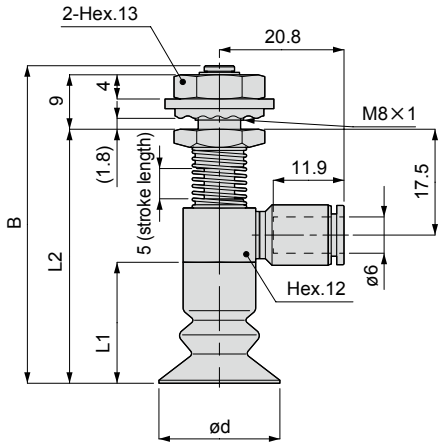
Dimensions (buffer [without rotation-stop], vacuum outlet side VSP-HD)

● Push-in fitting

· VSP-HD6 to 15LB□-6



· VSP-HD20LB□-6

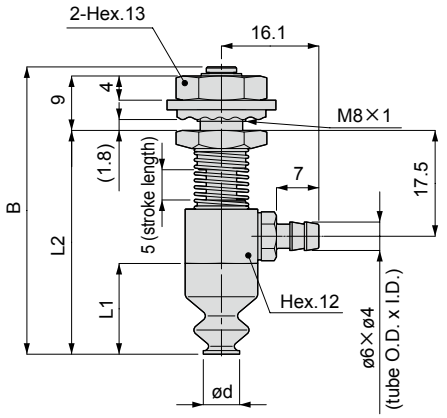


Unit: mm

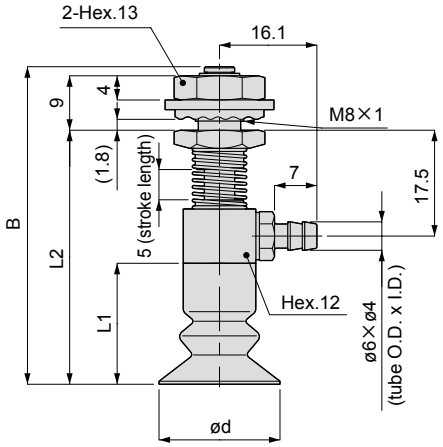
Model No.	Pad diameter ød	B	L1	L2	Spring force (N)	Weight (g)
VSP-HD6LB□-6	6	47.3	15	37	1.6 to 2.9	31
VSP-HD8LB□-6	8	47.3	15	37	1.6 to 2.9	31
VSP-HD10LB□-6	10	47.8	15.5	37.5	1.6 to 2.9	31
VSP-HD15LB□-6	15	49.8	17.5	39.5	1.6 to 2.9	32
VSP-HD20LB□-6	20	52.3	20	42	1.6 to 2.9	33

● Barbed fitting

· VSP-HD6 to 15LB□-6T



· VSP-HD20LB□-6T



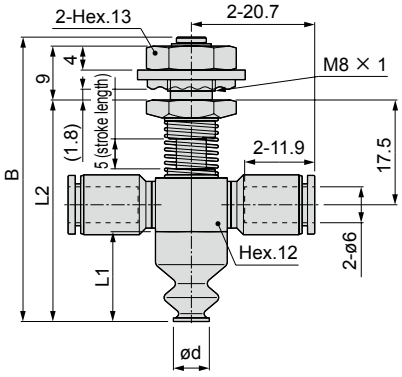
Unit: mm

Model No.	Pad diameter ød	B	L1	L2	Spring force (N)	Weight (g)
VSP-HD6LB□-6T	6	47.3	15	37	1.6 to 2.9	30
VSP-HD8LB□-6T	8	47.3	15	37	1.6 to 2.9	30
VSP-HD10LB□-6T	10	47.8	15.5	37.5	1.6 to 2.9	30
VSP-HD15LB□-6T	15	49.8	17.5	39.5	1.6 to 2.9	30
VSP-HD20LB□-6T	20	52.3	20	42	1.6 to 2.9	32

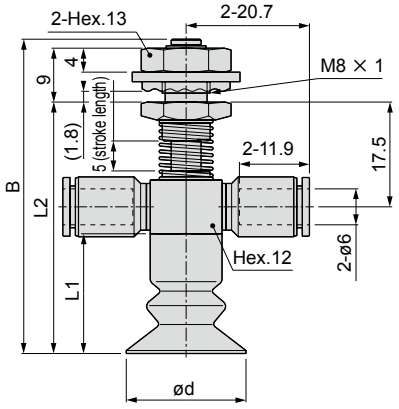
Dimensions (fixed vacuum outlet on both sides VSP-HDW)

● Push-in fitting

● VSP-HDW6 to 15LB□-6



● VSP-HDW20LB□-6

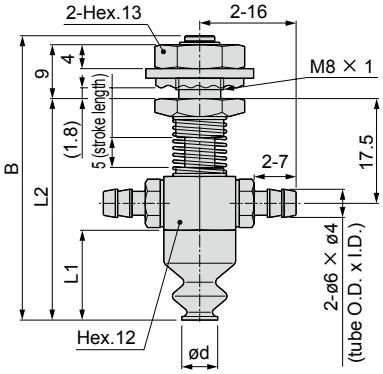


Unit: mm

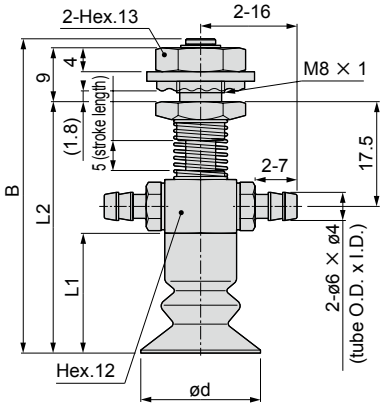
Model No.	Pad diameter ød	B	L1	L2	Spring force (N)	Weight (g)
VSP-HDW6LB□-6	6	47.3	15	37	1.6 to 2.9	31
VSP-HDW8LB□-6	8	47.3	15	37	1.6 to 2.9	31
VSP-HDW10LB□-6	10	47.8	15.5	37.5	1.6 to 2.9	31
VSP-HDW15LB□-6	15	49.8	17.5	39.5	1.6 to 2.9	32
VSP-HDW20LB□-6	20	52.3	20	42	1.6 to 2.9	33

● Barbed fitting

● VSP-HDW6 to 15LB□-6T



● VSP-HDW20LB□-6T



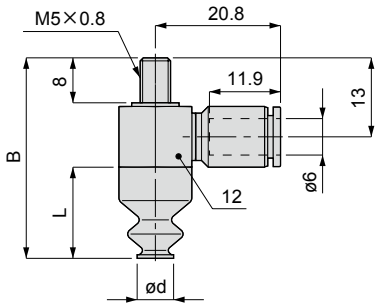
Unit: mm

Model No.	Pad diameter ød	B	L1	L2	Spring force (N)	Weight (g)
VSP-HDW6LB□-6T	6	47.3	15	37	1.6 to 2.9	30
VSP-HDW8LB□-6T	8	47.3	15	37	1.6 to 2.9	30
VSP-HDW10LB□-6T	10	47.8	15.5	37.5	1.6 to 2.9	30
VSP-HDW15LB□-6T	15	49.8	17.5	39.5	1.6 to 2.9	30
VSP-HDW20LB□-6T	20	52.3	20	42	1.6 to 2.9	32

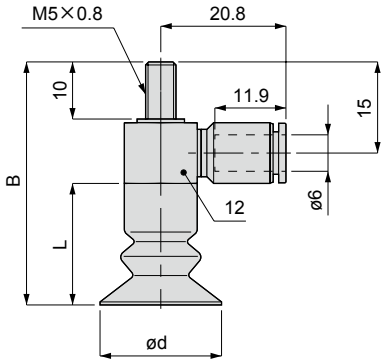
Dimensions (direct mounting, fixed vacuum outlet side VSP-HE)

● Push-in fitting

· VSP-HE6 to 15LB□-6



· VSP-HE20LB□-6

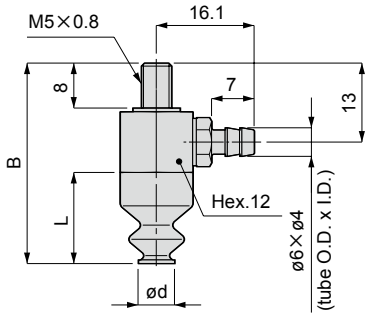


Unit: mm

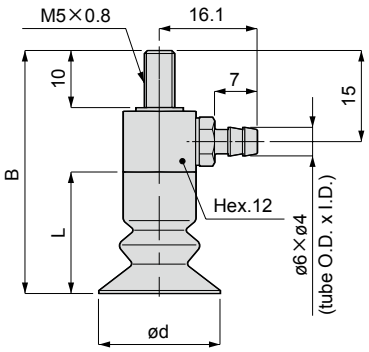
Model No.	Pad diameter ød	B	L	Weight (g)
VSP-HE6LB□-6	6	33	15	17
VSP-HE8LB□-6	8	33	15	17
VSP-HE10LB□-6	10	33.5	15.5	17
VSP-HE15LB□-6	15	35.5	17.5	17
VSP-HE20LB□-6	20	40	20	19

● Barbed fitting

· VSP-HE6 to 15LB□-6T



· VSP-HE20LB□-6T



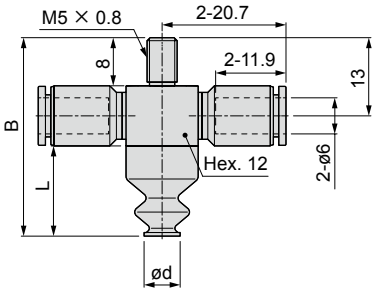
Unit: mm

Model No.	Pad diameter ød	B	L	Weight (g)
VSP-HE6LB□-6T	6	33	15	15
VSP-HE8LB□-6T	8	33	15	15
VSP-HE10LB□-6T	10	33.5	15.5	15
VSP-HE15LB□-6T	15	35.5	17.5	16
VSP-HE20LB□-6T	20	40	20	18

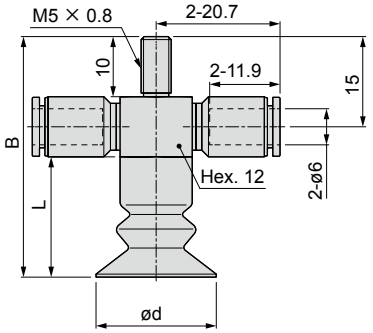
Dimensions (direct mounting, vacuum outlet on both sides VSP-HEW)

● Push-in fitting

● VSP-HEW6 to 15LB□-6



● VSP-HEW20LB□-6

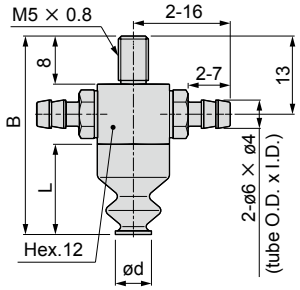


Unit: mm

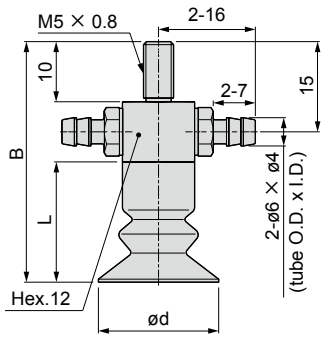
Model No.	Pad diameter ød	B	L	Weight (g)
VSP-HEW6LB□-6	6	33	15	17
VSP-HEW8LB□-6	8	33	15	17
VSP-HEW10LB□-6	10	33.5	15.5	17
VSP-HEW15LB□-6	15	35.5	17.5	17
VSP-HEW20LB□-6	20	40	20	19

● Barbed fitting

● VSP-HEW6 to 15LB□-6T



● VSP-HEW20LB□-6T



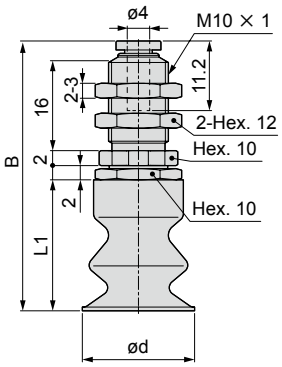
Unit: mm

Model No.	Pad diameter ød	B	L	Weight (g)
VSP-HEW6LB□-6T	6	33	15	15
VSP-HEW8LB□-6T	8	33	15	15
VSP-HEW10LB□-6T	10	33.5	15.5	15
VSP-HEW15LB□-6T	15	35.5	17.5	16
VSP-HEW20LB□-6T	20	40	20	18

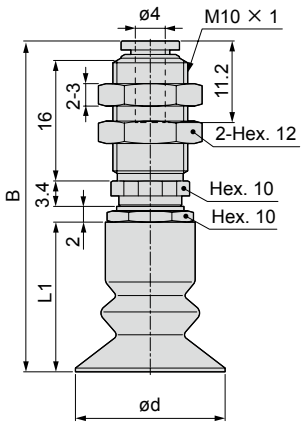
Dimensions (compact fixed, vacuum outlet top VSP-MA)

● Push-in fitting

● VSP-MA6 to 15LB□-4



● VSP-MA20LB□-4

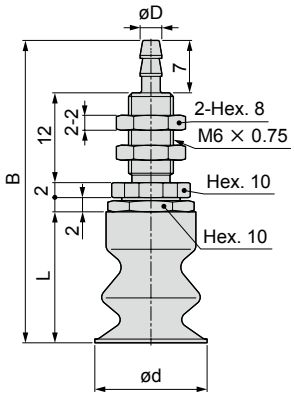


Unit: mm

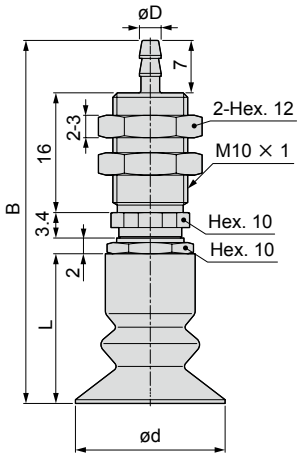
Model No.	Pad diameter ød	B	L1	Weight (g)
VSP-MA6LB□-4	6	38	15	8.6
VSP-MA8LB□-4	8	38	15	8.6
VSP-MA10LB□-4	10	38.5	15.5	8.6
VSP-MA15LB□-4	15	40.5	17.5	8.8
VSP-MA20LB□-4	20	44.4	20	12

● Barbed fitting

● VSP-MA6 to 15LB□-4T



● VSP-MA20LB□-6T



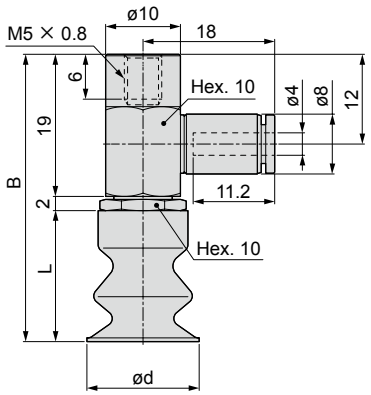
Unit: mm

Model No.	Tube O.D. x I.D. øD	Pad diameter ød	B	L	Weight (g)
VSP-MA6LB□-4T	4×2.5	6	38	15	5.8
VSP-MA8LB□-4T	4×2.5	8	38	15	5.8
VSP-MA10LB□-4T	4×2.5	10	38.5	15.5	5.8
VSP-MA15LB□-4T	4×2.5	15	40.5	17.5	6
VSP-MA20LB□-4T	4×2.5	20	48.4	20	12
VSP-MA20LB□-6T	6×4				

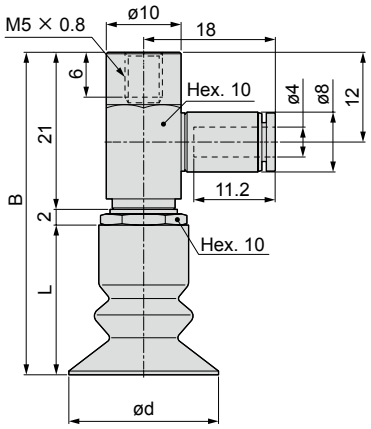
Dimensions (compact fixed, vacuum outlet side VSP-MB)

● Push-in fitting

● VSP-MB6 to 15LB□-4



● VSP-MB20LB□-4

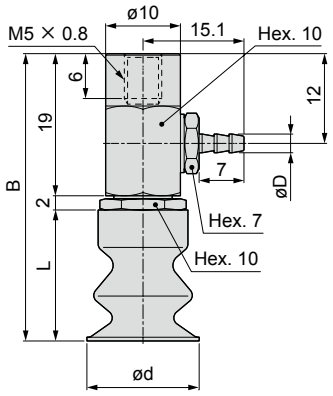


Unit: mm

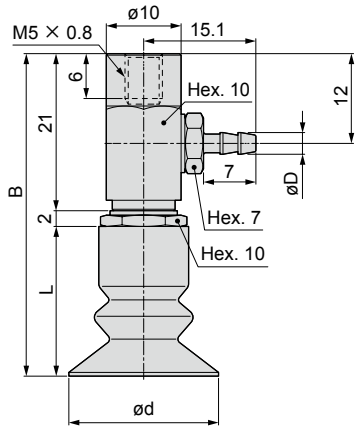
Model No.	Pad diameter ød	B	L	Weight (g)
VSP-MB6LB□-4	6	36	15	11
VSP-MB8LB□-4	8	36	15	11
VSP-MB10LB□-4	10	36.5	15.5	11
VSP-MB15LB□-4	15	38.5	17.5	11
VSP-MB20LB□-4	20	43	20	13

● Barbed fitting

● VSP-MB6 to 15LB□-4T



● VSP-MB20LB□-6T



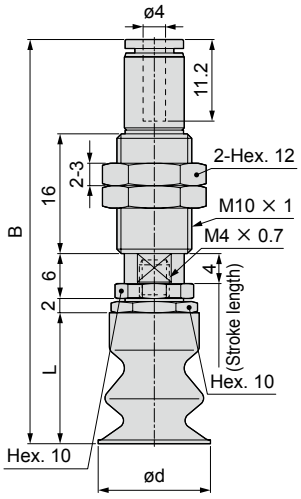
Unit: mm

Model No.	Tube O.D. x I.D. øD	Pad diameter ød	B	L	Weight (g)
VSP-MB6LB□-4T	4×2.5	6	36	15	8.9
VSP-MB8LB□-4T	4×2.5	8	36	15	8.9
VSP-MB10LB□-4T	4×2.5	10	36.5	15.5	9
VSP-MB15LB□-4T	4×2.5	15	38.5	17.5	9.1
VSP-MB20LB□-4T	4×2.5	20	43	20	11
VSP-MB20LB□-6T	6×4				

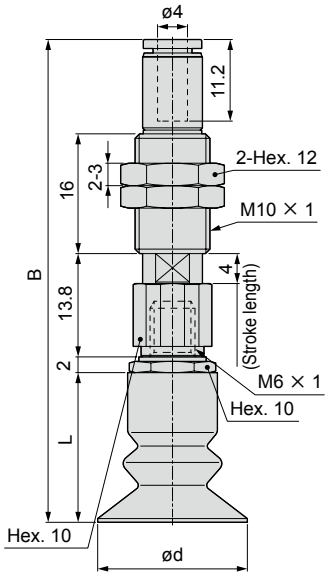
Dimensions (compact buffer, vacuum outlet top VSP-MC)

● Push-in fitting

● VSP-MC6 to 15LB□-4



● VSP-MC20LB□-4

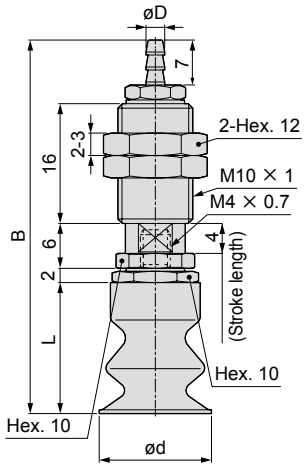


Unit: mm

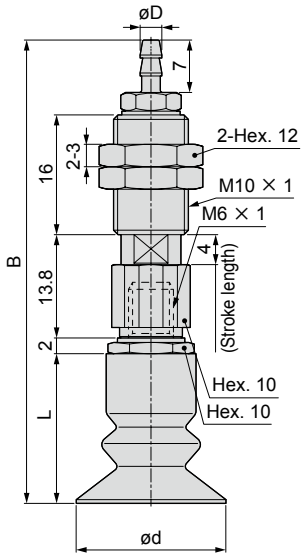
Model No.	Pad diameter ød	B	L	Spring force (N)	Weight (g)
VSP-MC6LB□-4	6	52	15	1 to 1.3	18
VSP-MC8LB□-4	8	52	15	1 to 1.3	18
VSP-MC10LB□-4	10	52.5	15.5	1 to 1.3	18
VSP-MC15LB□-4	15	54.5	17.5	1 to 1.3	18
VSP-MC20LB□-4	20	64.8	20	1 to 1.3	23

● Barbed fitting

● VSP-MC6 to 15LB□-4T



● VSP-MC20LB□-6T



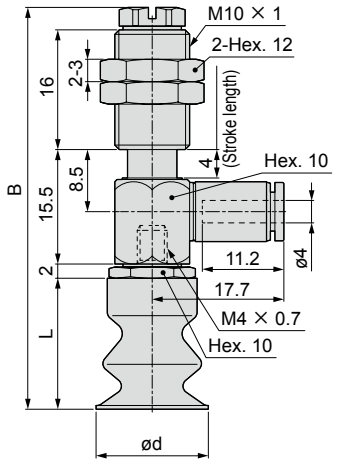
Unit: mm

Model No.	Tube O.D. x I.D. øD	Pad diameter ød	B	L	Spring force (N)	Weight (g)
VSP-MC6LB□-4T	4×2.5	6	49.1	15	1 to 1.3	17
VSP-MC8LB□-4T	4×2.5	8	49.1	15	1 to 1.3	17
VSP-MC10LB□-4T	4×2.5	10	49.6	15.5	1 to 1.3	17
VSP-MC15LB□-4T	4×2.5	15	51.6	17.5	1 to 1.3	17
VSP-MC20LB□-4T	4×2.5	20	61.9	20	1 to 1.3	22
VSP-MC20LB□-6T	6×4					

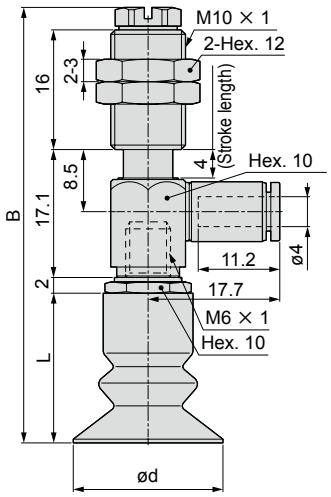
Dimensions (compact buffer, vacuum outlet side VSP-MD)

● Push-in fitting

● VSP-MD6 to 15LB□-4



● VSP-MD20LB□-4

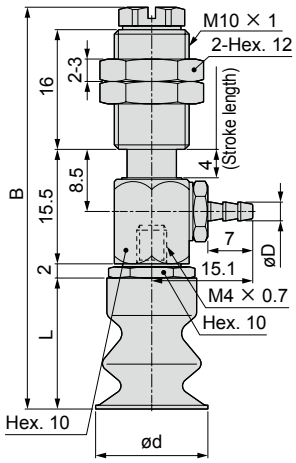


Unit: mm

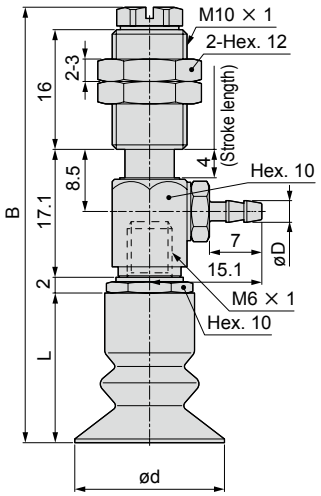
Model No.	Pad diameter ød	B	L	Spring force (N)	Weight (g)
VSP-MD6LB□-4	6	51.5	15	1 to 1.3	26
VSP-MD8LB□-4	8	51.5	15	1 to 1.3	26
VSP-MD10LB□-4	10	52	15.5	1 to 1.3	26
VSP-MD15LB□-4	15	54	17.5	1 to 1.3	26
VSP-MD20LB□-4	20	58.1	20	1 to 1.3	27

● Barbed fitting

● VSP-MD6 to 15LB□-4T



● VSP-MD20LB□-6T

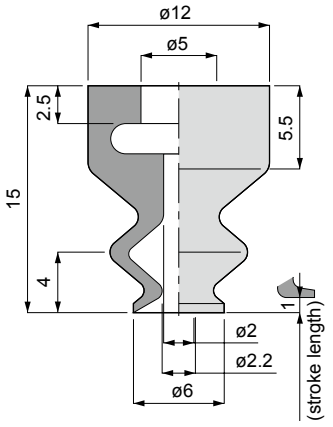


Unit: mm

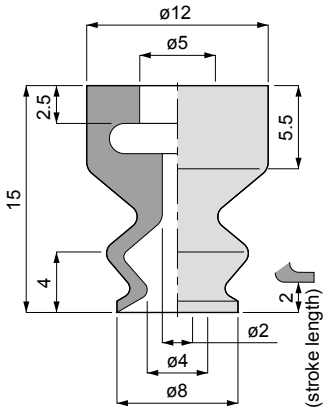
Model No.	Tube O.D. x I.D. øD	Pad diameter ød	B	L	Spring force (N)	Weight (g)
VSP-MD6LB□-4T	4×2.5	6	51.5	15	1 to 1.3	24
VSP-MD8LB□-4T	4×2.5	8	51.5	15	1 to 1.3	24
VSP-MD10LB□-4T	4×2.5	10	52	15.5	1 to 1.3	24
VSP-MD15LB□-4T	4×2.5	15	54	17.5	1 to 1.3	24
VSP-MD20LB□-4T	4×2.5	20	58.1	20	1 to 1.3	26
VSP-MD20LB□-6T	6×4					

Dimensions: pad only

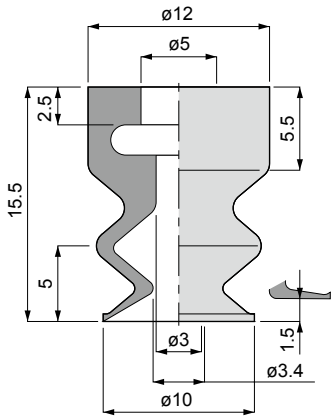
● VSPG-6LB□



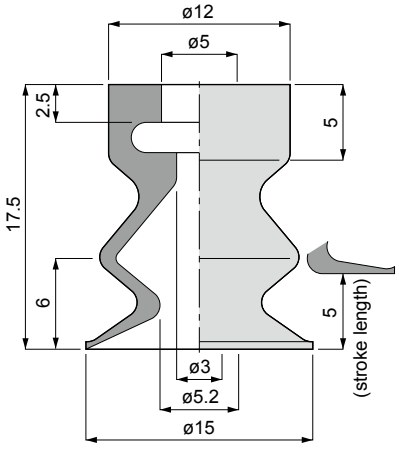
● VSPG-8LB□



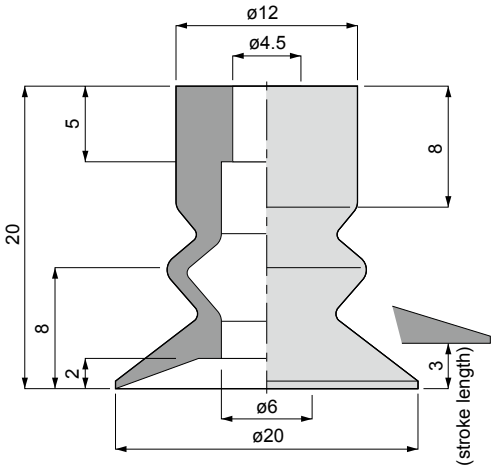
● VSPG-10LB□



● VSPG-15LB□

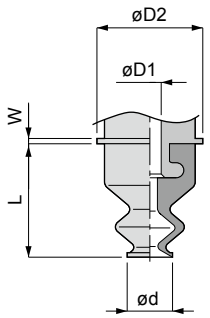


● VSPG-20LB□

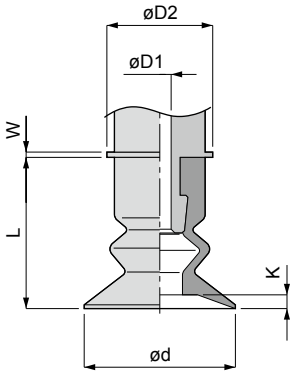


Detailed view of pad and holder fixing part

● VSPG-6 to 15LB□



● VSPG-20LB□



Unit: mm

Model No.	Pad diameter ød	L	øD1	øD2	W
VSPG-6LB□	6	15	3	14	0.7
VSPG-8LB□	8	15	3	14	0.7
VSPG-10LB□	10	15.5	3	14	0.7
VSPG-15LB□	15	17.5	3	14	0.7
VSPG-20LB□	20	20	3	14	0.7

Note: øD2 and W dimensions in the dimensions table are only for the VPHC type.

MEMO

Suction pad for workpieces with oil adhered
Suction pad, anti-slip

VSP-*K* Series

● Pad diameter: ø10 to ø50

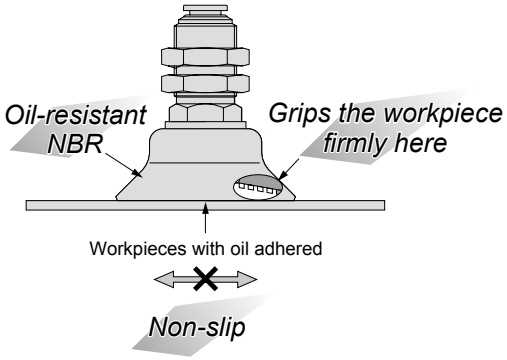
RoHS

Features

■ Ideal for transporting workpieces covered with an oil film such as press parts.

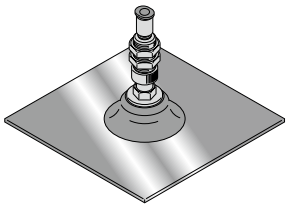
■ Improved pad shape prevents slipping of workpieces during transportation.

■ The adoption of oil-resistant NBR improves pad durability in environments containing oil.
- ● Pad diameter: 5 types (ø10, ø20, ø30, ø40, ø50)
- ● Pad material: 5 types (silicone rubber, urethane rubber, fluoro rubber, conductive NBR, oil-resistant NBR)
- ● Holder shape: 9 types (5 standard, 4 compact)
- ● Free holder (swinging): 2 types (30° angle, 10° angle) [Compatible pad diameter: all sizes]
- ● Position locking valve: Compatible pad diameter (all sizes)



Applications

● Slippery workpieces with oil adhered



How to order

* Refer to model No. sections on dimensions pages 439 to 448 for combinations of model No.

● Suction pad/anti-slip

VSP - MA 30 K NH — 6T - ○ - V

● Pad rubber only/anti-slip

VSPG — 30 K NH ○

Ⓐ Holder shape

Code	Content
Ⓐ Holder shape	
A	Fixed, Vacuum outlet top
B	Fixed, Vacuum outlet side
C	Buffer, Vacuum outlet top
D	Buffer, Vacuum outlet side
F	Direct mounting, Buffer
MA	Compact Fixed, Vacuum outlet top
MB	Compact Fixed, Vacuum outlet side
MC	Compact Buffer, Vacuum outlet top
MD	Compact Buffer, Vacuum outlet side

Ⓑ Pad diameter

Ⓑ Pad diameter
Refer to Appendix 1 for pad diameter.

Ⓒ Pad shape

Ⓒ Pad shape	
K	Anti-slip

Ⓓ Pad material

Ⓓ Pad material	
S	Silicone rubber
U	Urethane rubber
F	Fluoro rubber
NE	Conductive NBR (low resistance)
NH	Oil-resistant NBR

Ⓔ Frame

Ⓔ Frame	
Blank	Without frame

Ⓕ Port size/shape

Ⓕ Port size/shape	
4	ø4 push-in fitting
4T	ø4 barbed fitting
6	ø6 push-in fitting
6T	ø6 barbed fitting
Blank	(Holder shape: Selected with F)

Ⓖ Free holder (swinging)

Ⓖ Free holder (swinging) *1	Page 550
F1	With free holder swing angle 30°
F2	With free holder swing angle 15°
Blank	Without free holder

Ⓗ Position locking valve

Ⓗ Position locking valve *1	Page 556
V	With position locking valve
Blank	None

Appendix 1

Pad diameter					
Code	10	20	30	40	50
Pad diameter (mm)	ø10	ø20	ø30	ø40	ø50

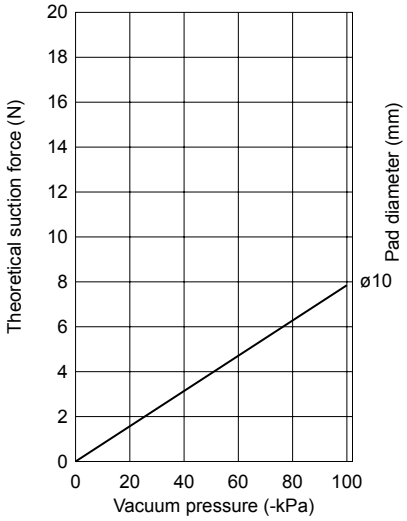
⚠ Precautions for model No. selection

*1 : Ⓖ"F1", "F2" and Ⓗ"V" cannot be selected together.

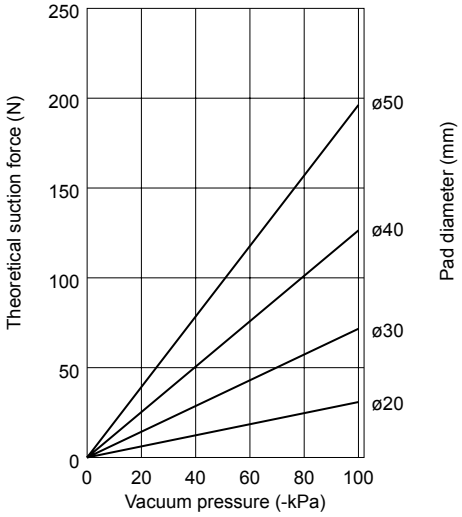
*2 : Refer to page 550 for details on free holders (F1, F2) and page 556 for details on position locking valves (V). In addition, refer to the target suction pad list (page 558) for applicable pad size shape.

Theoretical suction force

● Pad diameter: ø10 mm



● Pad diameter: ø20 mm to ø50 mm

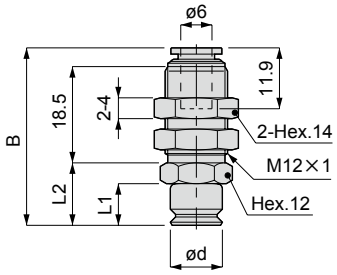


Because the theoretical suction force is the value at static conditions, adopt a safety factor of 1/4 for horizontal lifting and 1/8 for vertical lifting in actual use.

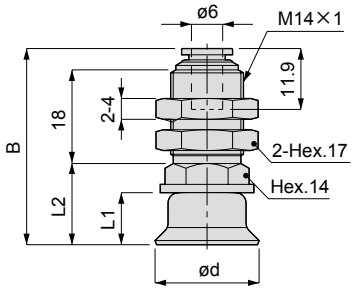
Dimensions (fixed, vacuum outlet top VSP-A)

● Push-in fitting

· VSP-A10K□-6



· VSP-A20 to 50K□-6

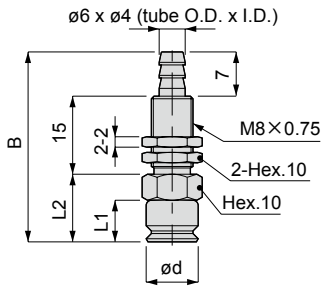


Unit: mm

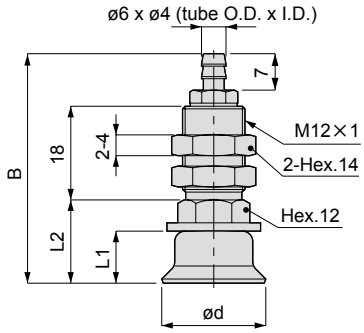
Model No.	Pad diameter ød	B	L1	L2	Weight (g)
VSP-A10K□-6	10	34.3	8	12	22
VSP-A20K□-6	20	37.9	10	15.6	36
VSP-A30K□-6	30	39.9	12	17.6	40
VSP-A40K□6	40	43.9	16	21.6	49
VSP-A50K□-6	50	44.9	17	22.6	55

● Barbed fitting

· VSP-A10K□-6T



· VSP-A20 to 50K□-6T



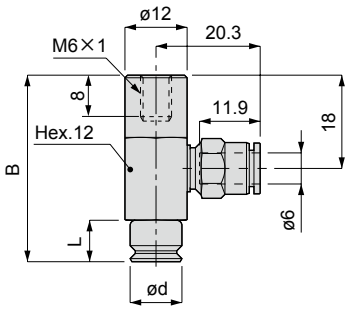
Unit: mm

Model No.	Pad diameter ød	B	L1	L2	Weight (g)
VSP-A10K□-6T	10	35	8	13	12
VSP-A20K□-6T	20	44	10	16	30
VSP-A30K□-6T	30	46	12	18	34
VSP-A40K□-6T	40	50	16	22	43
VSP-A50K□-6T	50	51	17	23	49

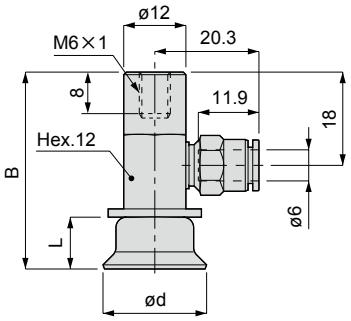
Dimensions (fixed, vacuum outlet side VSP-B)

● Push-in fitting

· VSP-B10K□-6



· VSP-B20 to 50K□-6

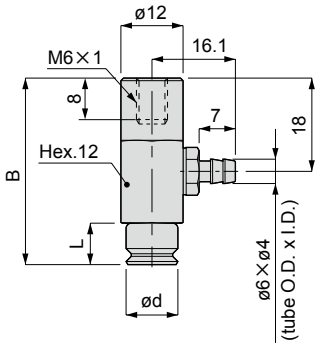


Unit: mm

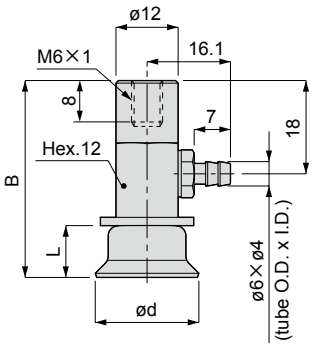
Model No.	Pad diameter ød	B	L	Weight (g)
VSP-B10K□-6	10	36	8	31
VSP-B20K□-6	20	38	10	34
VSP-B30K□-6	30	40	12	38
VSP-B40K□-6	40	44	16	47
VSP-B50K□-6	50	45	17	53

● Barbed fitting

· VSP-B10K□-6T



· VSP-B20 to 50K□-6T



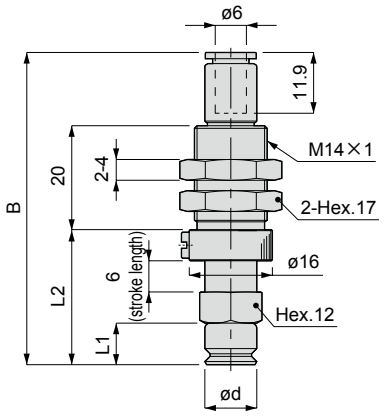
Unit: mm

Model No.	Pad diameter ød	B	L	Weight (g)
VSP-B10K□-6T	10	36	8	29
VSP-B20K□-6T	20	38	10	32
VSP-B30K□-6T	30	40	12	36
VSP-B40K□-6T	40	44	16	45
VSP-B50K□-6T	50	45	17	51

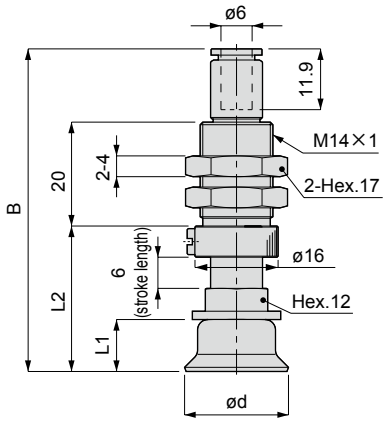
Dimensions (buffer, vacuum outlet top VSP-C)

● Push-in fitting

· VSP-C10K□-6



· VSP-C20 to 50K□-6

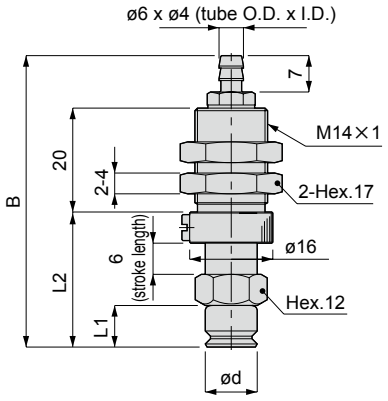


Unit: mm

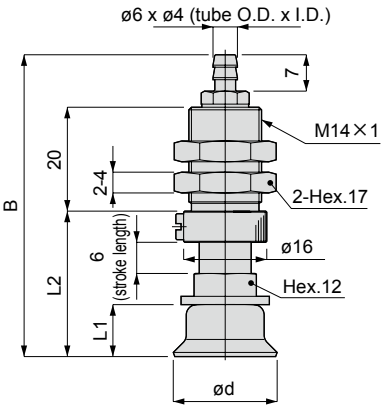
Model No.	Pad diameter ød	B	L1	L2	Spring force (N)	Weight (g)
VSP-C10K□-6	10	60.3	8	26	4 to 7.1	36
VSP-C20K□-6	20	62.3	10	28	7 to 12.6	40
VSP-C30K□-6	30	64.3	12	30	7 to 12.6	44
VSP-C40K□-6	40	68.3	16	34	7 to 12.6	52
VSP-C50K□-6	50	69.3	17	35	7 to 12.6	59

● Barbed fitting

· VSP-C10K□-6T



· VSP-C20 to 50K□-6T



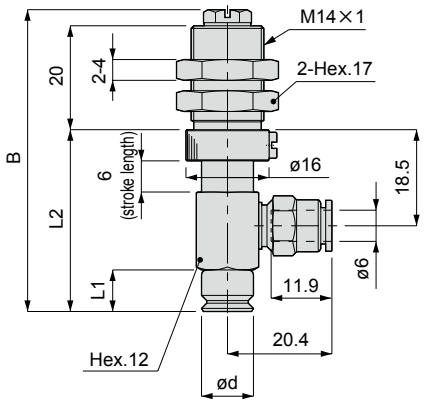
Unit: mm

Model No.	Pad diameter ød	B	L1	L2	Spring force (N)	Weight (g)
VSP-C10K□-6T	10	56.1	8	26	4 to 7.1	34
VSP-C20K□-6T	20	58.1	10	28	7 to 12.6	38
VSP-C30K□-6T	30	60.1	12	30	7 to 12.6	42
VSP-C40K□-6T	40	64.1	16	34	7 to 12.6	50
VSP-C50K□-6T	50	65.1	17	35	7 to 12.6	57

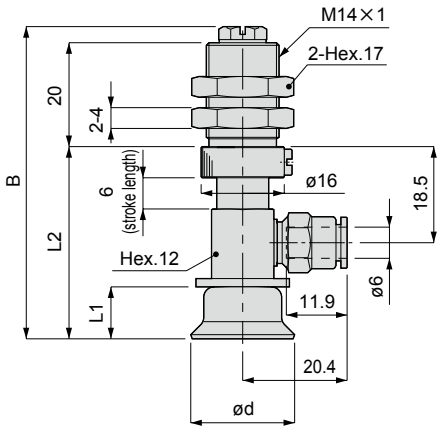
Dimensions (buffer, vacuum outlet side VSP-D)

● Push-in fitting

· VSP-D10K□-6



· VSP-D20 to 50K□-6

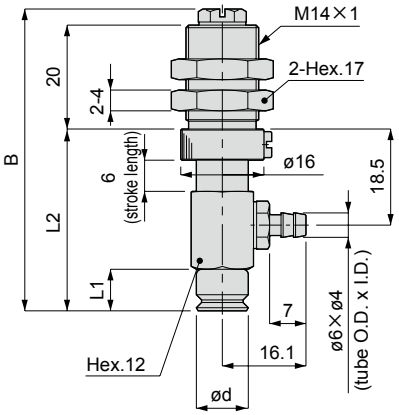


Unit: mm

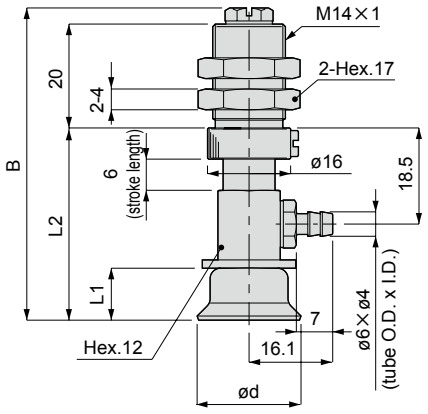
Model No.	Pad diameter ød	B	L1	L2	Spring force (N)	Weight (g)
VSP-D10K□-6	10	58.1	8	35	4 to 7.1	48
VSP-D20K□-6	20	60.1	10	37	7 to 12.6	51
VSP-D30K□-6	30	62.1	12	39	7 to 12.6	55
VSP-D40K□-6	40	66.1	16	43	7 to 12.6	64
VSP-D50K□-6	50	67.1	17	44	7 to 12.6	70

● Barbed fitting

· VSP-D10K□-6T



· VSP-D20 to 50K□-6T

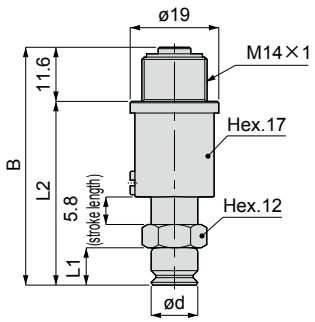


Unit: mm

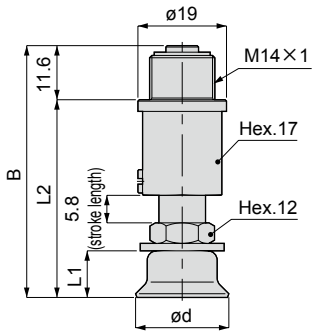
Model No.	Pad diameter ød	B	L1	L2	Spring force (N)	Weight (g)
VSP-D10K□-6T	10	58.1	8	35	4 to 7.1	46
VSP-D20K□-6T	20	60.1	10	37	7 to 12.6	49
VSP-D30K□-6T	30	62.1	12	39	7 to 12.6	53
VSP-D40K□-6T	40	66.1	16	43	7 to 12.6	62
VSP-D50K□-6T	50	67.1	17	44	7 to 12.6	68

Dimensions (direct mounting buffer, VSP-F)

● VSP-F10K□



● VSP-F20 to 50K□



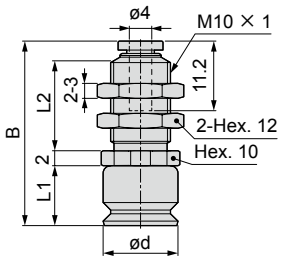
Unit: mm

Model No.	Pad diameter ød	B	L1	L2	Spring force (N)	Weight (g)
VSP-F10K□	10	51	8	39.3	7.9 to 15	56
VSP-F20K□	20	54	10	42.3	7.9 to 15	59
VSP-F30K□	30	56	12	44.3	7.9 to 15	63
VSP-F40K□	40	60	16	48.3	7.9 to 15	71
VSP-F50K□	50	61	17	49.3	7.9 to 15	78

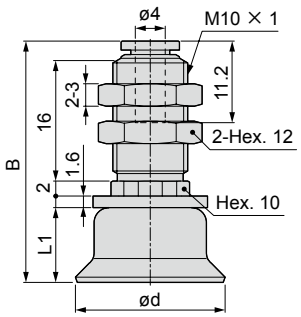
Dimensions (compact fixed, vacuum outlet top VSP-MA)

● Push-in fitting

● VSP-MA10K□-4



● VSP-MA20, 30K□-4

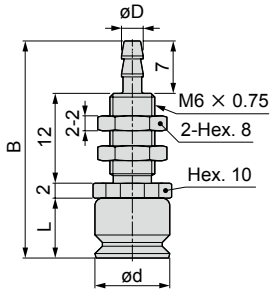


Unit: mm

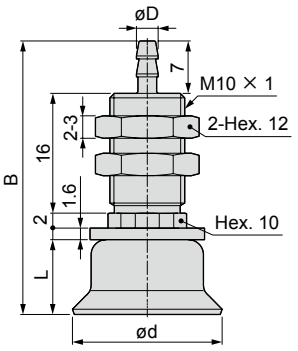
Model No.	Pad diameter ød	B	L1	Weight (g)
VSP-MA10K□-4	10	29	8	6.4
VSP-MA20K□-4	20	32.6	10	12
VSP-MA30K□-4	30	34.6	12	16

● Barbed fitting

● VSP-MA10K□-4T



● VSP-MA20K□-4T/6T



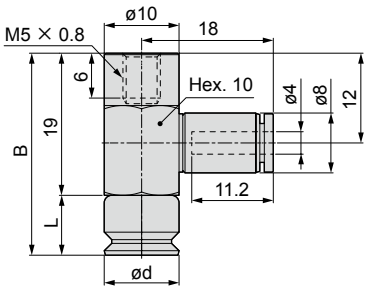
Unit: mm

Model No.	Tube O.D. x I.D. øD	Pad diameter ød	B	L	Weight (g)
VSP-MA10K□-4T	4×2.5	10	27	8	3.6
VSP-MA20K□-4T	4×2.5	20	36.6	10	12
VSP-MA20K□-6T	6×4				
VSP-MA30K□-4T	4×2.5	30	38.6	12	16
VSP-MA30K□-6T	6×4				

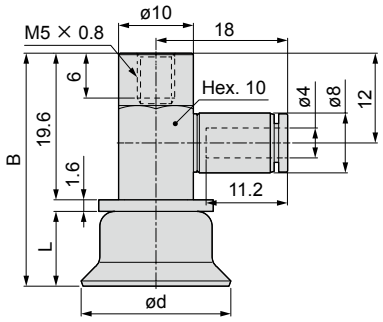
Dimensions (compact fixed, vacuum outlet side VSP-MB)

● Push-in fitting

● VSP-MB10K□-4



● VSP-MB20, 30K□-4

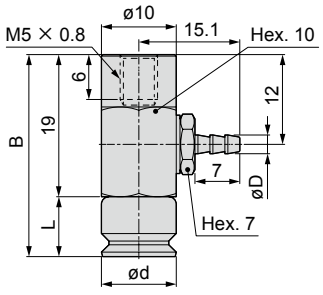


Unit: mm

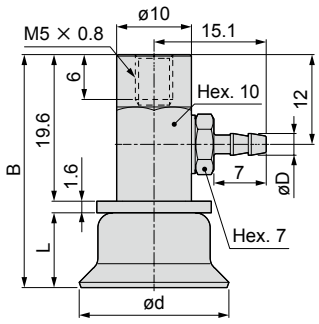
Model No.	Pad diameter ød	B	L	Weight (g)
VSP-MB10K□-4	10	27	8	8.1
VSP-MB20K□-4	20	31.2	10	13
VSP-MB30K□-4	30	33.2	12	17

● Barbed fitting

● VSP-MB10K□-4T



● VSP-MB20, 30K□-4T/6T



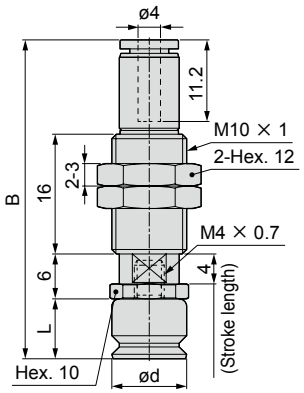
Unit: mm

Model No.	Tube O.D. x I.D. øD	Pad diameter ød	B	L	Weight (g)
VSP-MB10K□-4T	4×2.5	10	27	8	6.7
VSP-MB20K□-4T	4×2.5	20	31.2	10	11
VSP-MB20K□-6T	6×4				12
VSP-MB30K□-4T	4×2.5	30	33.2	12	15
VSP-MB30K□-6T	6×4				16

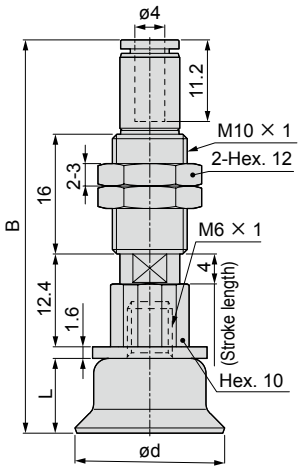
Dimensions (compact buffer, vacuum outlet top VSP-MC)

● Push-in fitting

● VSP-MC10K□-4



● VSP-MC20, 30K□-4

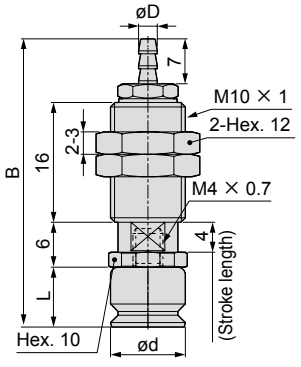


Unit: mm

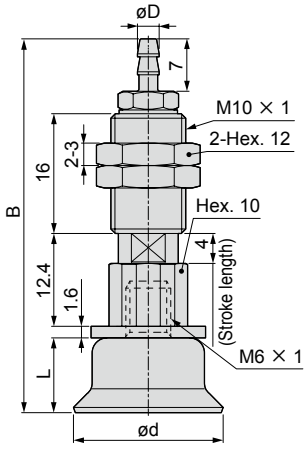
Model No.	Pad diameter ød	B	L	Spring force (N)	Weight (g)
VSP-MA10K□-4	10	43	8	1 to 1.3	16
VSP-MA20K□-4	20	53	10	1 to 1.3	24
VSP-MA30K□-4	30	55	12	1 to 1.3	28

● Barbed fitting

● VSP-MC10K□-4T



● VSP-MC20, 30K□-4T/6T



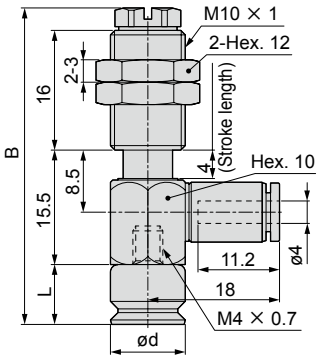
Unit: mm

Model No.	Tube O.D. x I.D. øD	Pad diameter ød	B	L	Spring force (N)	Weight (g)
VSP-MA10K□-4T	4×2.5	10	40.1	8	1 to 1.3	15
VSP-MA20K□-4T	4×2.5	20	50.1	10	1 to 1.3	22
VSP-MA20K□-6T	6×4					23
VSP-MA30K□-4T	4×2.5	30	52.1	12	1 to 1.3	26
VSP-MA30K□-6T	6×4					27

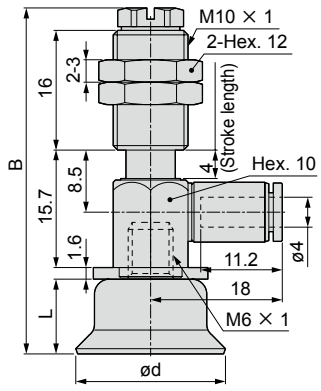
Dimensions (compact buffer, vacuum outlet side VSP-MD)

● Push-in fitting

● VSP-MD10K□-4



● VSP-MD20, 30K□-4

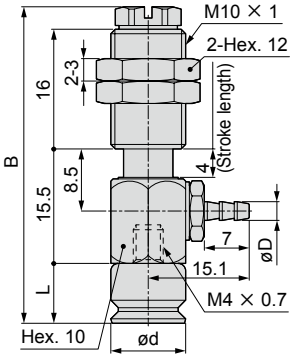


Unit: mm

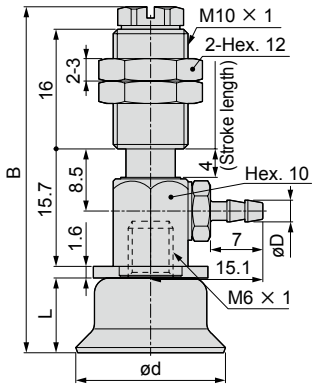
Model No.	Pad diameter ød	B	L	Spring force (N)	Weight (g)
VSP-MD10K□-4	10	42.5	8	1 to 1.3	23
VSP-MD20K□-4	20	46.3	10	1 to 1.3	27
VSP-MD30K□-4	30	48.3	12	1 to 1.3	31

● Barbed fitting

● VSP-MD10K□-4T



● VSP-MD20, 30K□-4T/6T

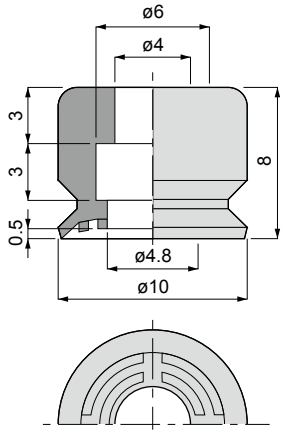


Unit: mm

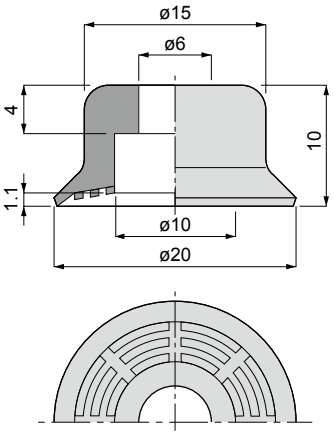
Model No.	Tube O.D. x I.D. øD	Pad diameter ød	B	L	Spring force (N)	Weight (g)
VSP-MD10K□-4T	4×2.5	10	42.5	8	1 to 1.3	22
VSP-MD20K□-4T	4×2.5	20	46.3	10	1 to 1.3	26
VSP-MD20K□-6T	6×4					
VSP-MD30K□-4T	4×2.5	30	48.3	12	1 to 1.3	30
VSP-MD30K□-6T	6×4					

Dimensions: pad only

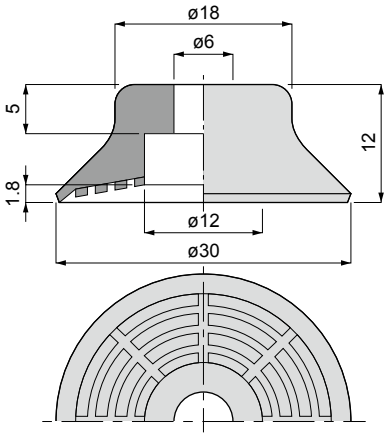
● VSPG-10K□



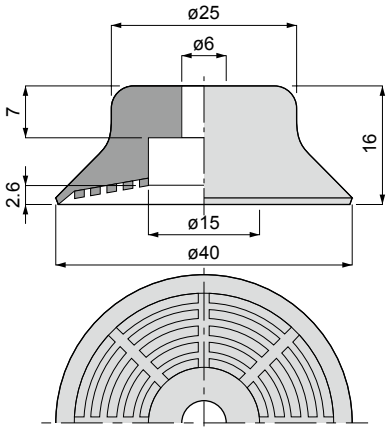
● VSPG-20K□



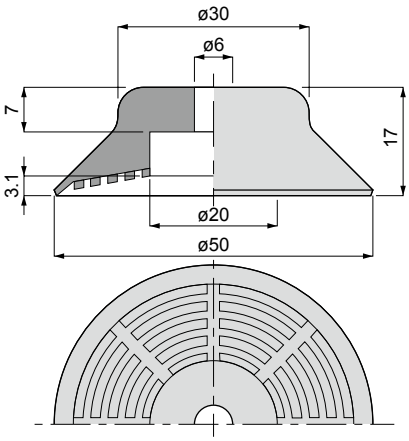
● VSPG-30K□



● VSPG-40K□

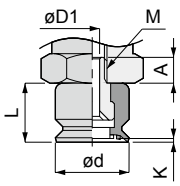


● VSPG-50K□

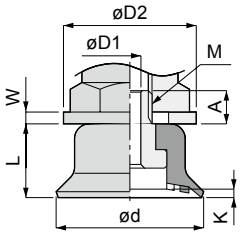


Detailed view of pad and holder fixing part

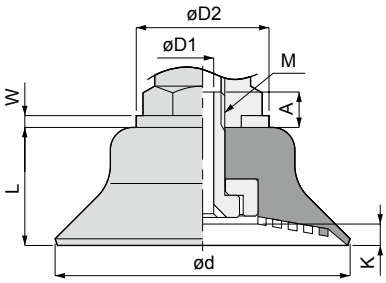
● VSPG-10K□



● VSPG-20, 30K□



● VSPG-40, 50K□



Unit: mm

Model No.	Pad diameter ød	L	Lip internal height K	Fixing screw M	A	øD1	øD2	W
VSPG-10K□	10	8	0.5	M4×0.7	3.5	2	-	-
VSPG-20K□	20	10	1.1	M6×1	4.5	3	18	1.6
VSPG-30K□	30	12	1.8	M6×1	5.5	3	18	1.6
VSPG-40K□	40	16	2.6	M6×1	5.3	3	22	1.6
VSPG-50K□	50	17	3.1	M6×1	5.3	3	22	1.6

MEMO

Suction pad for copy paper & plastic bags
Suction pad, thin object

VSP-*P* Series

● Pad diameter: ø8 to ø20

RoHS

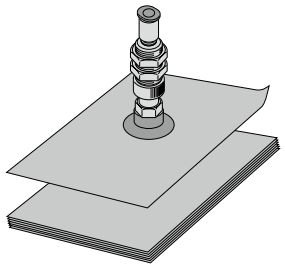
Features

■ Ideal for transporting thin workpieces such as copy paper, vinyl, etc.

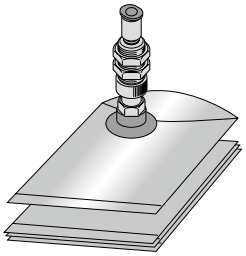
■ By making the lip part thinner and improving the adhesion to the workpiece, suction is improved and suction overlap is reduced.
- ● Pad diameter: 4 types (ø8, ø10, ø15, ø20)
- ● Pad diameter: 6 types (nitrile rubber, silicone rubber, urethane rubber, fluoro rubber, fluoro silicone rubber, conductive NBR)
- ● Holder shape: 9 types (5 standard, 4 compact)

Applications

● Copy paper, etc.



● Vinyl, etc.



How to order

* Refer to model No. sections on dimensions pages 453 to 463 for combinations of model No.

Suction pad/thin object

VSP - MC 20 P NE — 4T

● Pad rubber only/thin object

VSPG — 20 P NE

Ⓐ Holder shape

Code	Content
Ⓐ Holder shape	
A	Fixed, Vacuum outlet top
B	Fixed, Vacuum outlet side
C	Buffer, Vacuum outlet top
D	Buffer, Vacuum outlet side
E	Direct mounting, Fixed
F	Direct mounting, Buffer
MA	Compact Fixed, Vacuum outlet top
MB	Compact Fixed, Vacuum outlet side
MC	Compact Buffer, Vacuum outlet top
MD	Compact Buffer, Vacuum outlet side
ME	Compact Direct mounting, Fixed

Ⓑ Pad diameter

Ⓑ Pad diameter
Refer to Appendix 1 for pad diameter.

Ⓒ Pad shape

Ⓒ Pad shape	
P	Thin object type

Ⓓ Pad material

Ⓓ Pad material	
N	Nitrile rubber
S	Silicone rubber
U	Urethane rubber
F	Fluoro rubber
FS	Fluorosilicone rubber
NE	Conductive NBR (low resistance)

Ⓔ Frame

Ⓔ Frame	
Blank	Without frame

Ⓕ Port size/shape

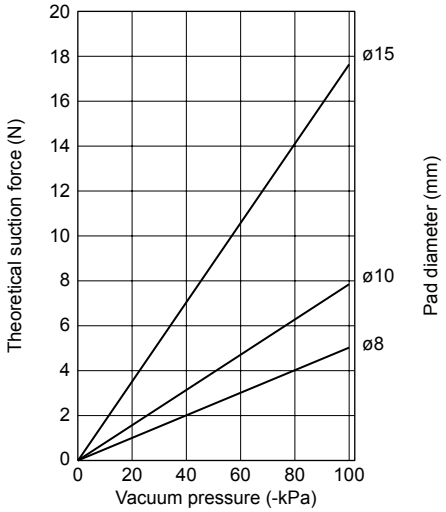
Ⓕ Port size/shape	
2	ø1.8 push-in fitting
4	ø4 push-in fitting
4T	ø4 barbed fitting
M5	M5 x 0.5 (compact holder shape: ME only)
Blank	(Holder shape: Selected with E)

Appendix 1

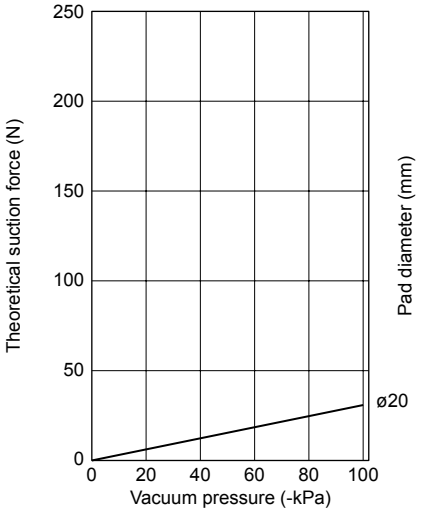
Pad diameter				
Code	8	10	15	20
Pad diameter (mm)	ø8	ø10	ø15	ø20

Theoretical suction force

● Pad diameter: ø8 mm to 15 mm



● Pad diameter: ø20 mm



For thin object type suction force, it may not be possible to secure the calculated suction force (theoretical suction force x safety factor) due to the effect of pad characteristics such as degree of vacuum/pad material/suctioned object.
When selecting with suction force obtained by the “Selection method for suction pad” (page 288) as a guideline, confirm that there is no problem in the suction performance of the actual device.

Safety precautions

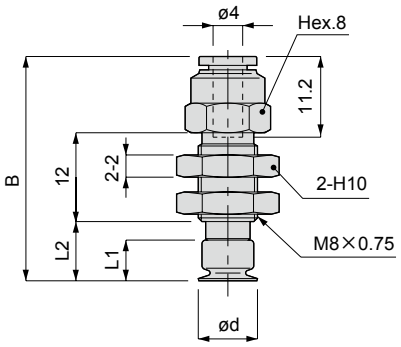
⚠ WARNING

Since thin object type pads may adhere together due to working conditions and material characteristics, confirm with the actual device.

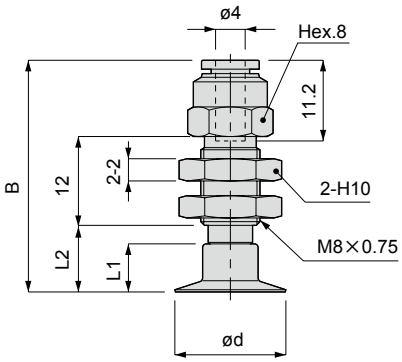
Dimensions (fixed, vacuum outlet top VSP-A)

● Push-in fitting

· VSP-A8, 10P□-4



· VSP-A15, 20P□-4

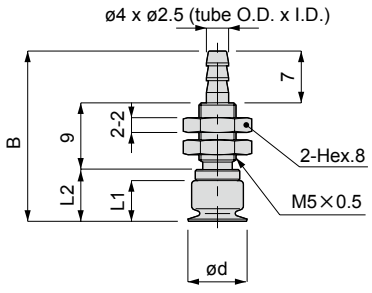


Unit: mm

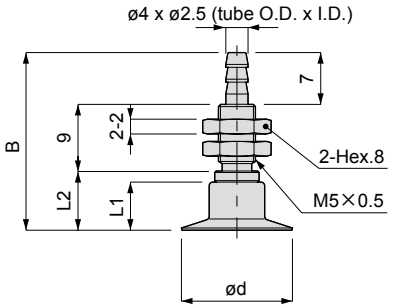
Model No.	Pad diameter ød	B	L1	L2	Weight (g)
VSP-A8P□-4	8	30.6	5.5	8	10.2
VSP-A10P□-4	10	30.9	5.8	8.3	10.3
VSP-A15P□-4	15	31.6	6.5	9	10.4
VSP-A20P□-4	20	32.4	7.3	9.8	10.5

● Barbed fitting

· VSP-A8, 10P□-4T



· VSP-A15, 20P□-4T



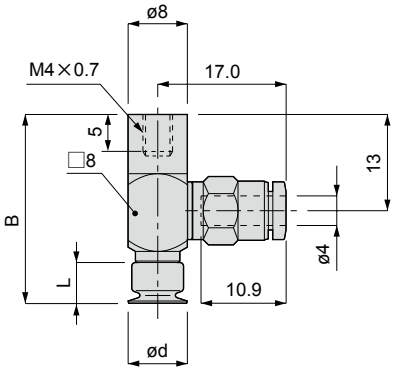
Unit: mm

Model No.	Pad diameter ød	B	L1	L2	Weight (g)
VSP-A8P□-4T	8	23	5.5	7	3.2
VSP-A10P□-4T	10	23.3	5.8	7.3	3.2
VSP-A15P□-4T	15	24	6.5	8	3.3
VSP-A20P□-4T	20	24.8	7.3	8.8	3.4

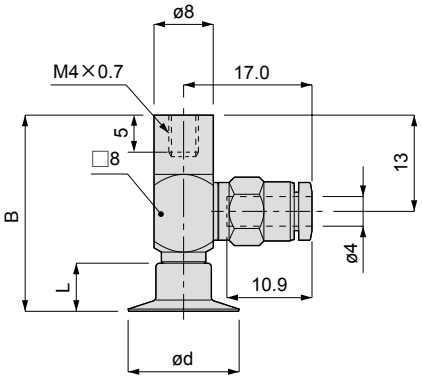
Dimensions (fixed, vacuum outlet side VSP-B)

● Push-in fitting

· VSP-B8, 10P□-4



· VSP-B15, 20P□-4

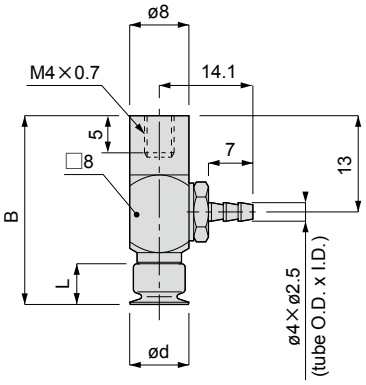


Unit: mm

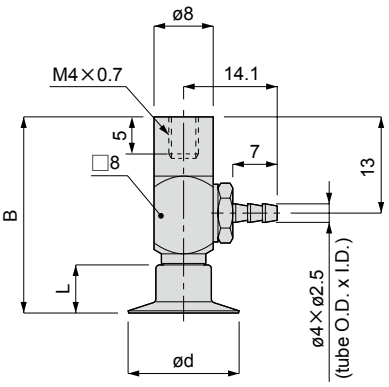
Model No.	Pad diameter ød	B	L	Weight (g)
VSP-B8P□-4	8	25.5	5.5	10.7
VSP-B10P□-4	10	25.8	5.8	10.8
VSP-B15P□-4	15	26.5	6.5	10.9
VSP-B20P□-4	20	27.3	7.3	11

● Barbed fitting

· VSP-B8, 10P□-4T



· VSP-B15, 20P□-4T



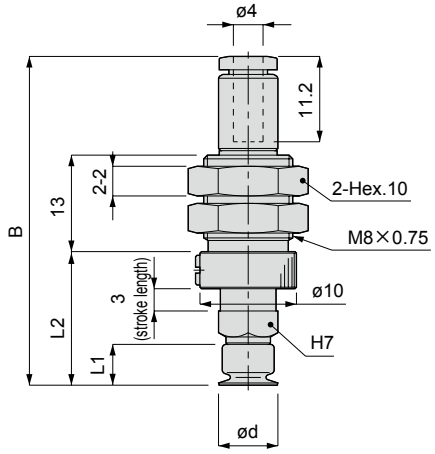
Unit: mm

Model No.	Pad diameter ød	B	L	Weight (g)
VSP-B8P□-4T	8	25.5	5.5	9.2
VSP-B10P□-4T	10	25.8	5.8	9.3
VSP-B15P□-4T	15	26.5	6.5	9.4
VSP-B20P□-4T	20	27.3	7.3	9.5

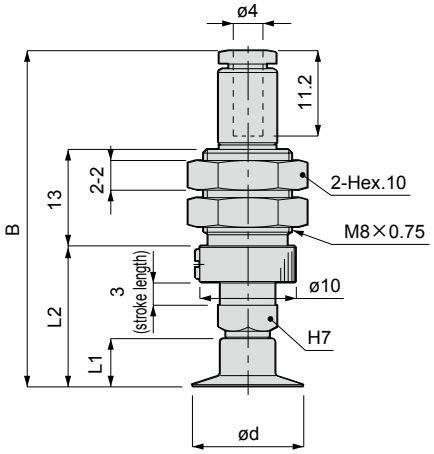
Dimensions (buffer, vacuum outlet top VSP-C)

● Push-in fitting

· VSP-C8, 10P□-4



· VSP-C15, 20P□-4

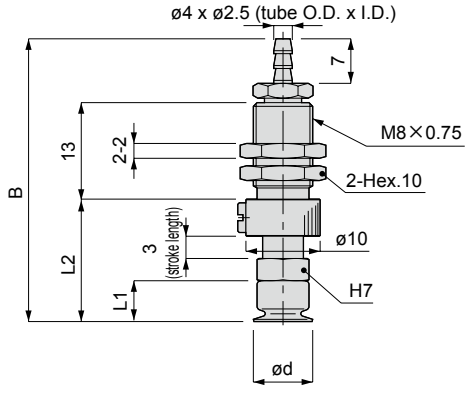


Unit: mm

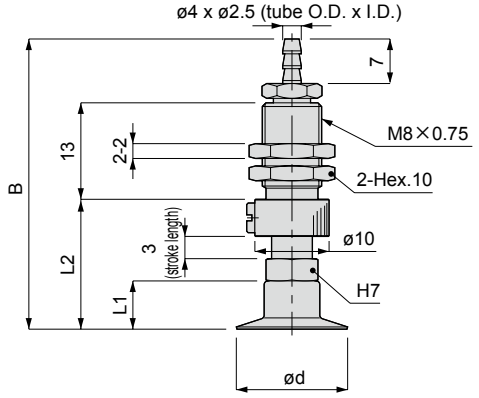
Model No.	Pad diameter ød	B	L1	L2	Spring force (N)	Weight (g)
VSP-C8P□-4	8	42.5	5.5	16.5	1 to 1.9	8.9
VSP-C10P□-4	10	42.8	5.8	16.8	1 to 1.9	9
VSP-C15P□-4	15	43.5	6.5	17.5	1 to 1.9	9.1
VSP-C20P□-4	20	44.3	7.3	18.3	1 to 1.9	9.2

● Barbed fitting

· VSP-C8, 10P□-4T



· VSP-C15, 20P□-4T



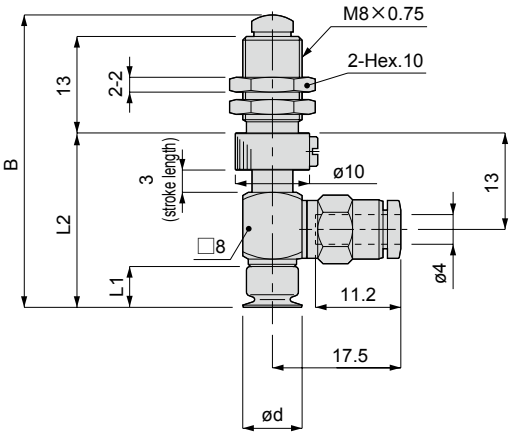
Unit: mm

Model No.	Pad diameter ød	B	L1	L2	Spring force (N)	Weight (g)
VSP-C8P□-4T	8	39.1	5.5	16.5	1 to 1.9	7.7
VSP-C10P□-4T	10	39.4	5.8	16.8	1 to 1.9	7.8
VSP-C15P□-4T	15	40.1	6.5	17.5	1 to 1.9	7.9
VSP-C20P□-4T	20	40.9	7.3	18.3	1 to 1.9	8

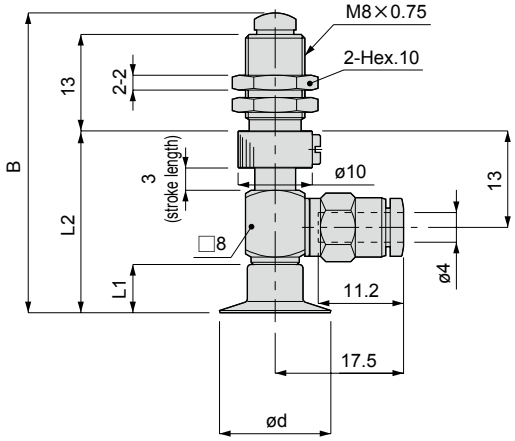
Dimensions (buffer, vacuum outlet side VSP-D)

● Push-in fitting

· VSP-D8, 10P□-4



· VSP-D15, 20P□-4

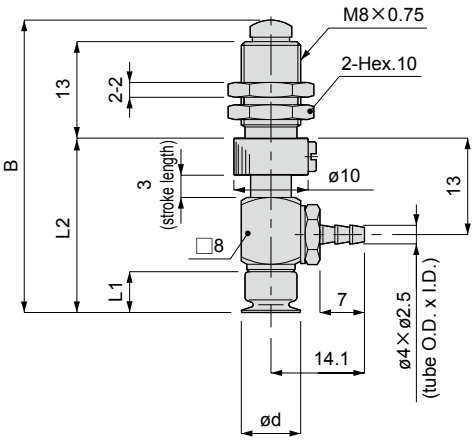


Unit: mm

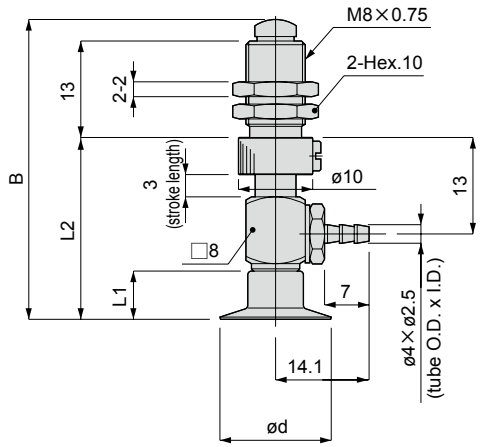
Model No.	Pad diameter ød	B	L1	L2	Spring force (N)	Weight (g)
VSP-D8P□-4	8	39.5	5.5	23.5	1 to 1.9	14.2
VSP-D10P□-4	10	39.8	5.8	23.8	1 to 1.9	14.3
VSP-D15P□-4	15	40.5	6.5	24.5	1 to 1.9	14.4
VSP-D20P□-4	20	41.3	7.3	25.3	1 to 1.9	14.5

● Barbed fitting

· VSP-D8, 10P□-4T



· VSP-D15, 20P□-4T

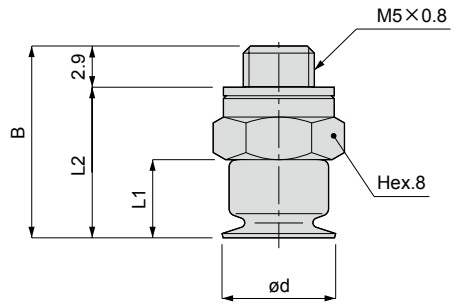


Unit: mm

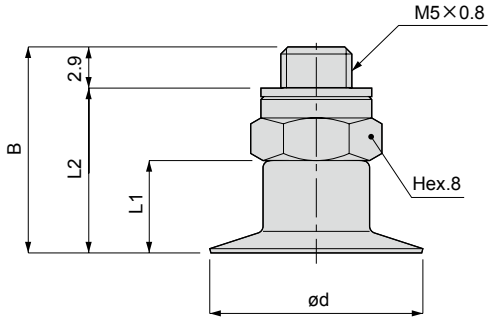
Model No.	Pad diameter ød	B	L1	L2	Spring force (N)	Weight (g)
VSP-D8P□-4T	8	39.5	5.5	23.5	1 to 1.9	12.2
VSP-D10P□-4T	10	39.8	5.8	23.8	1 to 1.9	12.3
VSP-D15P□-4T	15	40.5	6.5	24.5	1 to 1.9	12.4
VSP-D20P□-4T	20	41.3	7.3	25.3	1 to 1.9	12.5

Dimensions (direct mounting fixed VSP-E)

● VSP-E8, 10P□



● VSP-E15, 20P□

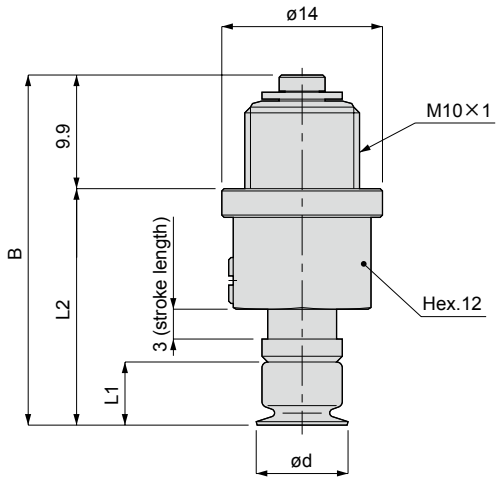


Unit: mm

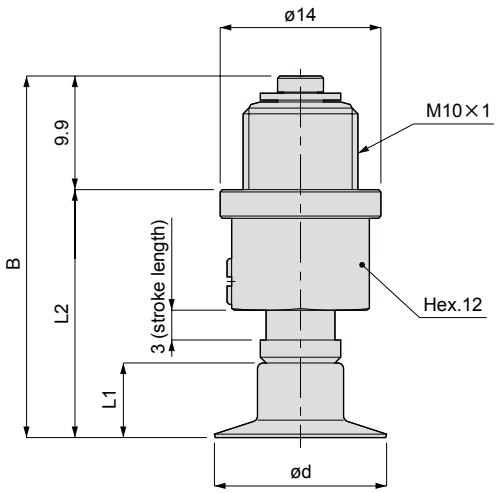
Model No.	Pad diameter ød	B	L1	L2	Weight (g)
VSP-E8P□	8	13.5	5.5	10.6	2.7
VSP-E10P□	10	13.8	5.8	10.9	2.8
VSP-E15P□	15	14.5	6.5	11.6	2.9
VSP-E20P□	20	15.3	7.3	12.4	3

Dimensions (direct mounting buffer, VSP-F)

● VSP-F8, 10P□



● VSP-F15, 20P□

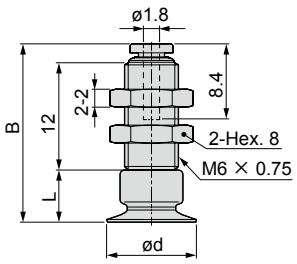


Unit: mm

Model No.	Pad diameter ød	B	L1	L2	Spring force (N)	Weight (g)
VSP-F8P□	8	30.5	5.5	21	2.3 to 3.9	14.2
VSP-F10P□	10	30.8	5.8	21.3	2.3 to 3.9	14.3
VSP-F15P□	15	31.5	6.5	22	2.3 to 3.9	14.4
VSP-F20P□	20	32.3	7.3	22.8	2.3 to 3.9	14.5

Dimensions (compact fixed, vacuum outlet top VSP-MA)

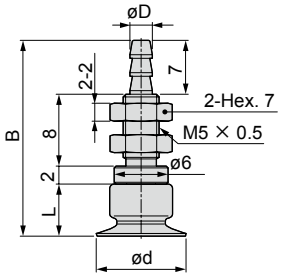
● Push-in fitting, VSP-MA8 to 20P□-2



Unit: mm

Model No.	Pad diameter ød	B	L	Weight (g)
VSP-MA8P□-2	8	19.6	5.5	2.1
VSP-MA10P□-2	10	19.9	5.8	2.1
VSP-MA15P□-2	15	20.6	6.5	2.2
VSP-MA20P□-2	20	21.4	7.3	2.2

● Barbed fitting, VSP-MA8 to 20P□-4T

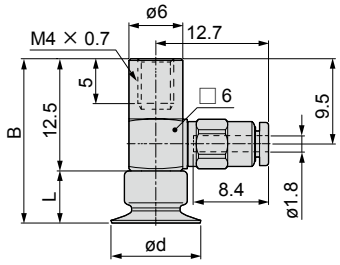


Unit: mm

Model No.	Tube O.D. x I.D. øD	Pad diameter ød	B	L	Weight (g)
VSP-MA8P□-4T	4×2.5	8	22.5	5.5	1.6
VSP-MA10P□-4T	4×2.5	10	22.8	5.8	1.6
VSP-MA15P□-4T	4×2.5	15	23.5	6.5	1.7
VSP-MA20P□-4T	4×2.5	20	24.3	7.3	1.7

Dimensions (compact fixed, vacuum outlet side VSP-MB)

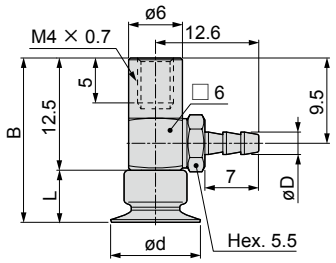
● Push-in fitting, VSP-MB8 to 20P□-2



Unit: mm

Model No.	Pad diameter ød	B	L	Weight (g)
VSP-MB8P□-2	8	18	5.5	2.1
VSP-MB10P□-2	10	18.3	5.8	2.1
VSP-MB15P□-2	15	19	6.5	2.2
VSP-MB20P□-2	20	19.8	7.3	2.2

● Barbed fitting, VSP-MB8 to 20P□-4T

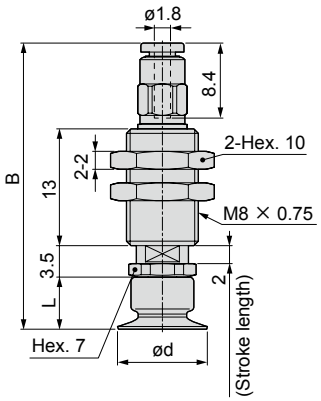


Unit: mm

Model No.	Tube O.D. x I.D. øD	Pad diameter ød	B	L	Weight (g)
VSP-MB8P□-4T	4×2.5	8	18	5.5	1.9
VSP-MB10P□-4T	4×2.5	10	18.3	5.8	1.9
VSP-MB15P□-4T	4×2.5	15	19	6.5	2
VSP-MB20P□-4T	4×2.5	20	19.8	7.3	2

Dimensions (compact buffer, vacuum outlet top VSP-MC)

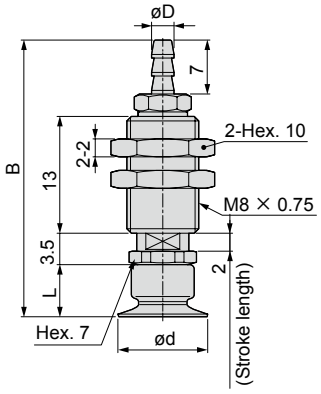
● Push-in fitting, VSP-MC8 to 20P□-2



Unit: mm

Model No.	Tube O.D. øD	Pad diameter ød	B	L	Spring force (N)	Weight (g)
VSP-MC8P□-2	1.8	8	31.7	5.5	0.5 to 0.6	1.8
VSP-MC10P□-2	1.8	10	32	5.8	0.5 to 0.6	1.8
VSP-MC15P□-2	1.8	15	32.7	6.5	0.5 to 0.6	1.8
VSP-MC20P□-2	1.8	20	33.5	7.3	0.5 to 0.6	1.8

● Barbed fitting, VSP-MC8 to 20P□-4T

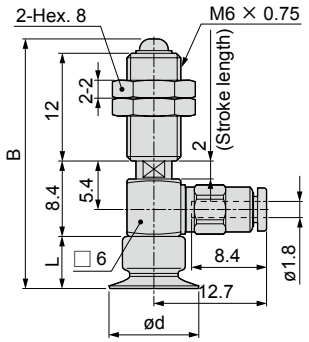


Unit: mm

Model No.	Tube O.D. x I.D. øD	Pad diameter ød	B	L	Spring force (N)	Weight (g)
VSP-MC8P□-4T	4×2.5	8	31.6	5.5	0.5 to 0.6	6.7
VSP-MC10P□-4T	4×2.5	10	31.9	5.8	0.5 to 0.6	6.7
VSP-MC15P□-4T	4×2.5	15	32.6	6.5	0.5 to 0.6	6.8
VSP-MC20P□-4T	4×2.5	20	33.4	7.3	0.5 to 0.6	6.8

Dimensions (compact buffer, vacuum outlet side VSP-MD)

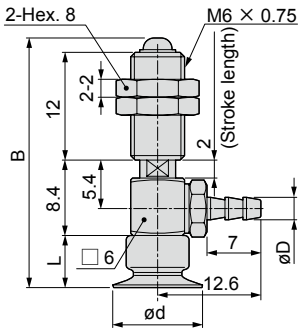
● Push-in fitting, VSP-MD8 to 20P□-2



Unit: mm

Model No.	Pad diameter ød	B	L	Spring force (N)	Weight (g)
VSP-MD8P□-2	8	27.5	5.5	0.5 to 0.6	6.1
VSP-MD10P□-2	10	27.8	5.8	0.5 to 0.6	6.2
VSP-MD15P□-2	15	28.5	6.5	0.5 to 0.6	6.2
VSP-MD20P□-2	20	29.3	7.3	0.5 to 0.6	6.3

● Barbed fitting, VSP-MD8 to 20P□-4T

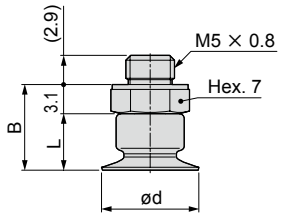


Unit: mm

Model No.	Tube O.D. x I.D. øD	Pad diameter ød	B	L	Spring force (N)	Weight (g)
VSP-MD8P□-4T	4×2.5	8	27.5	5.5	0.5 to 0.6	6
VSP-MD10P□-4T	4×2.5	10	27.8	5.8	0.5 to 0.6	6
VSP-MD15P□-4T	4×2.5	15	28.5	6.5	0.5 to 0.6	6.1
VSP-MD20P□-4T	4×2.5	20	29.3	7.3	0.5 to 0.6	6.1

Dimensions (compact direct mounting fixed VSP-ME)

● VSP-ME8 to 20□-M5

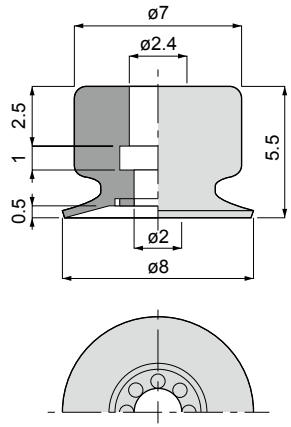


Unit: mm

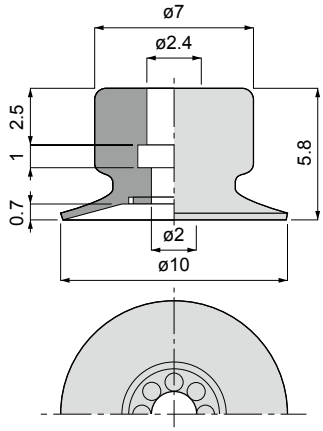
Model No.	Pad diameter ød	B	L	Weight (g)
VSP-ME8P□-M5	8	8.6	5.5	8
VSP-ME10P□-M5	10	8.9	5.8	10
VSP-ME15P□-M5	15	9.6	6.5	15
VSP-ME20P□-M5	20	10.4	7.3	20

Dimensions: pad only

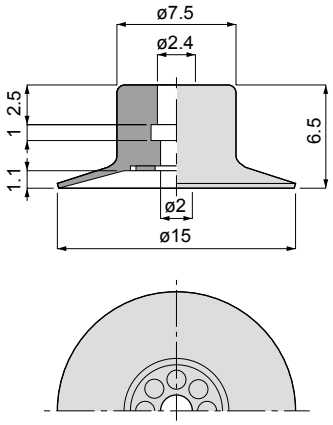
●VSPG-8P□



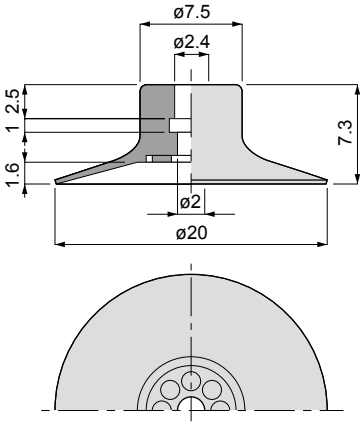
●VSPG-10P□



●VSPG-15P□

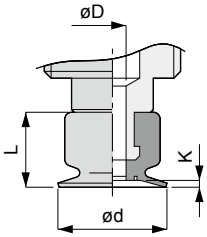


●VSPG-20P□

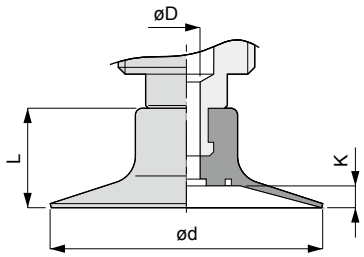


Detailed view of pad and holder fixing part

●VSPG-8, 10P□



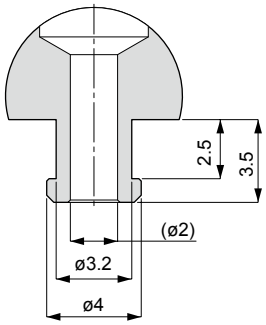
●VSPG-15, 20P□



Unit: mm

Model No.	Pad diameter ød	L	Lip internal height K	øD
VSPG-8P□	8	5.5	0.5	2
VSPG-10P□	10	5.8	0.7	2
VSPG-15P□	15	6.5	1.1	2
VSPG-20P□	20	7.3	1.6	2

Pad fitting part dimensions



Suction pad for sheets & vinyl which tend to deform/crease
Suction pad, flat

VSP-*F* Series

● Pad diameter: ø10 to ø30

RoHS

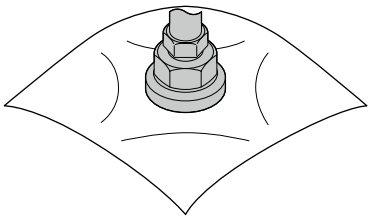
Features

■ Deformation of workpiece during suction is controlled and creases reduced by the flat suction surface with grooves

- ● Pad diameter: 5 types (ø10, ø15, ø20, ø25, ø30)
- ● Pad diameter: 6 types (nitrile rubber, silicone rubber, urethane rubber, fluoro rubber, conductive silicone rubber, conductive NBR)
- ● Holder shape: 9 types (5 standard, 4 compact)
- ● Free holder (swinging): 2 types (30° angle, 10° angle) [Compatible pad diameter: all sizes]
- ● Position locking valve: Compatible pad diameter (all sizes)

Applications

Thin workpieces such as sheets and vinyl



How to order

* Refer to model No. sections on dimensions pages 467 to 476 for combinations of model No.

● Suction pad/flat

VSP - C 10 F N — 6 - ○ - V

● Pad rubber only/flat

VSPG — 10 F N ○

Code	Content
Ⓐ Holder shape	
A	Fixed, Vacuum outlet top
B	Fixed, Vacuum outlet side
C	Buffer, Vacuum outlet top
D	Buffer, Vacuum outlet side
F	Direct mounting, Buffer
MA	Compact Fixed, Vacuum outlet top
MB	Compact Fixed, Vacuum outlet side
MC	Compact Buffer, Vacuum outlet top
MD	Compact Buffer, Vacuum outlet side
Ⓑ Pad diameter	***1**
Refer to Appendix 1 for pad diameter.	
Ⓒ Pad shape	
F	Flat
Ⓓ Pad material	
N	Nitrile rubber
S	Silicone rubber
U	Urethane rubber
F	Fluoro rubber
SE	Conductive silicone rubber
NE	Conductive NBR (low resistance)
Ⓔ Frame	
Blank	Without frame
Ⓕ Port size/shape	
4	ø4 push-in fitting
4T	ø4 barbed fitting
6	ø6 push-in fitting
6T	ø6 barbed fitting
Blank	(Holder shape: Selected with F)
Ⓖ Free holder (swinging) *1, *2, *3	**Page 550**
F1	With free holder swing angle 30°
F2	With free holder swing angle 15°
Blank	Without free holder
Ⓗ Position locking valve *2, *3	**Page 556**
V	With position locking valve
Blank	None

Ⓐ Holder shape
Ⓑ Pad diameter
Ⓒ Pad shape
Ⓓ Pad material
Ⓔ Frame
Ⓕ Port size/shape
Ⓖ Free holder (swinging)
Ⓗ Position locking valve

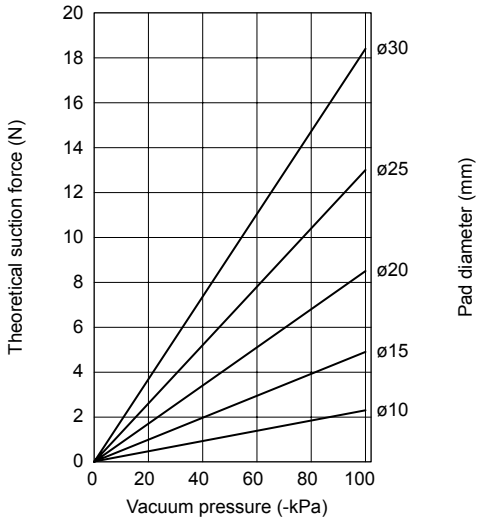
⚠ Precautions for model No. selection

*1 : When Ⓐ is "A", "B", "C", "D", or "F", Ⓖ "F1" or "F2" can be selected.
*2 : Ⓖ F1, F2 and Ⓗ Ⓥ cannot be selected together.
*3 : Refer to page 550 for details on free holders (F1, F2) and page 556 for details on position locking valves (V). In addition, refer to the target suction pad list (page 558) for applicable pad size shape.

Appendix 1

Pad diameter					
Code	10	15	20	25	30
Pad diameter (mm)	ø10	ø15	ø20	ø25	ø30

Theoretical suction force



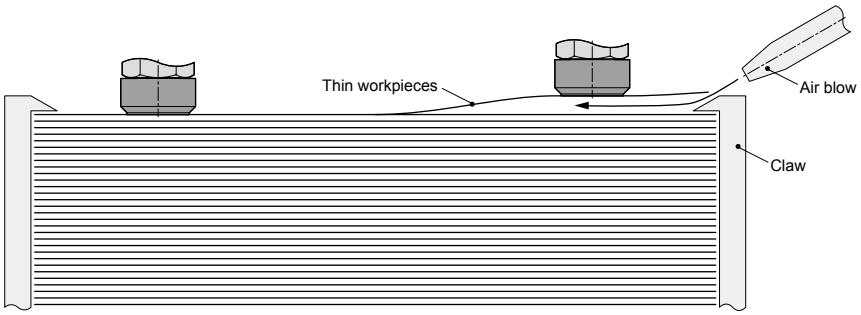
Because the theoretical suction force is the value at static conditions, adopt a safety factor of 1/4 for horizontal lifting and 1/8 for vertical lifting in actual use.

■ Reference materials for use

■ When suctioning multiple thinly stacked workpieces

Since multiple workpieces may be suctioned at once, it is necessary to use a small-diameter pad and further lower the vacuum pressure.

Moreover, one way to prevent suction of multiple workpieces is to use air blow and claw as shown in the figure below.



Safety precautions

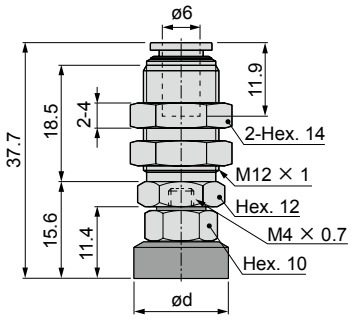
⚠ CAUTION

With the flat type, suction of ventilated workpieces may be difficult. Be sure to conduct actual testing of suction on workpieces before making a selection.

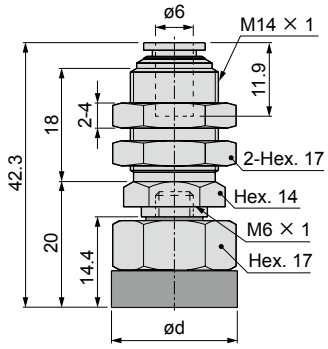
Dimensions (fixed, vacuum outlet top VSP-A)

● Push-in fitting

● VSP-A10, 15F□-6



● VSP-A20 to 30F□-6

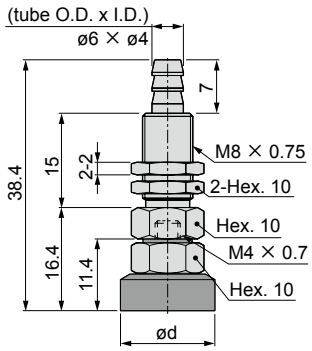


Unit: mm

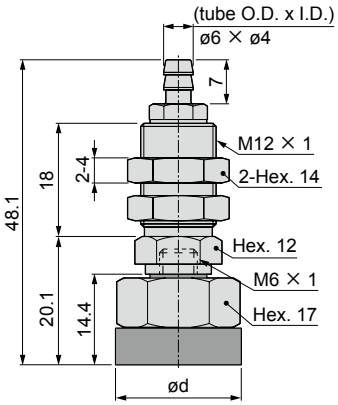
Model No.	Pad diameter ød	Weight (g)
VSP-A10F□-6	10	25
VSP-A15F□-6	15	25
VSP-A20F□-6	20	54
VSP-A25F□-6	25	55
VSP-A30F□-6	30	55

● Barbed fitting

● VSP-A10, 15F□-6T



● VSP-A20 to 30F□-6T



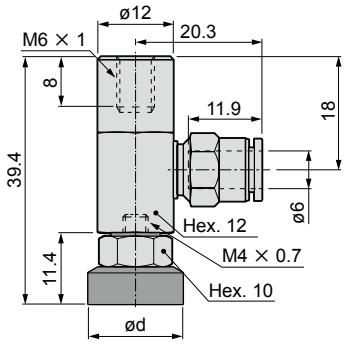
Unit: mm

Model No.	Pad diameter ød	Weight (g)
VSP-A10F□-6T	10	15
VSP-A15F□-6T	15	16
VSP-A20F□-6T	20	47
VSP-A25F□-6T	25	48
VSP-A30F□-6T	30	49

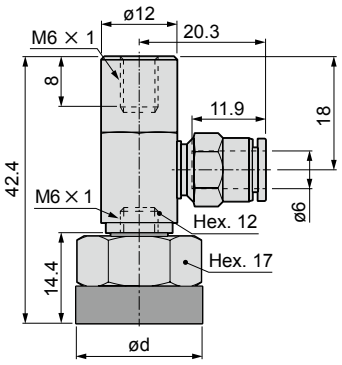
Dimensions (fixed, vacuum outlet side VSP-B)

● Push-in fitting

● VSP-B10, 15F□-6



● VSP-B20 to 30F□-6

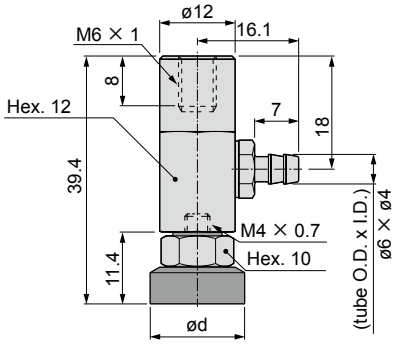


Unit: mm

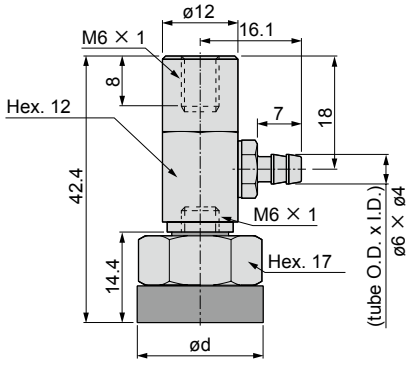
Model No.	Pad diameter ød	Weight (g)
VSP-B10F□-6	10	34
VSP-B15F□-6	15	34
VSP-B20F□-6	20	51
VSP-B25F□-6	25	52
VSP-B30F□-6	30	53

● Barbed fitting

● VSP-B10, 15F□-6T



● VSP-B20 to 30F□-6T



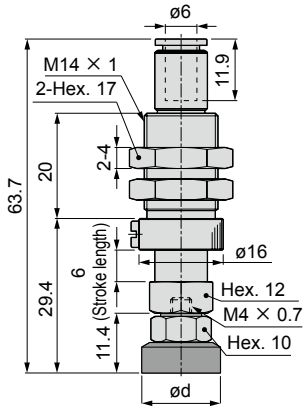
Unit: mm

Model No.	Pad diameter ød	Weight (g)
VSP-B10F□-6T	10	32
VSP-B15F□-6T	15	33
VSP-B20F□-6T	20	49
VSP-B25F□-6T	25	50
VSP-B30F□-6T	30	51

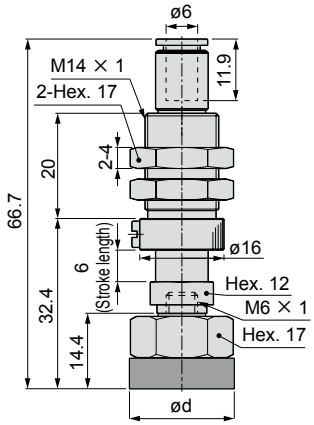
Dimensions (buffer, vacuum outlet top VSP-C)

● Push-in fitting

● VSP-C10, 15F□-6



● VSP-C20 to 30F□-6

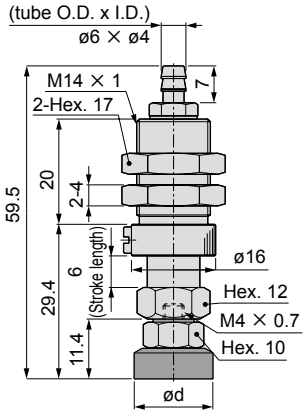


Unit: mm

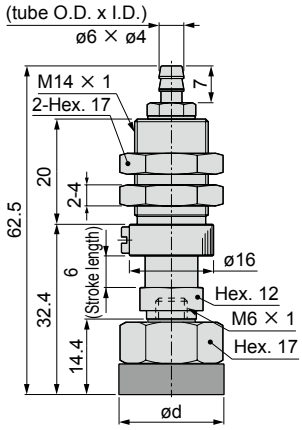
Model No.	Pad diameter ød	Spring force (N)	Weight (g)
VSP-C10F□-6	10	4 to 7.1	39
VSP-C15F□-6	15	4 to 7.1	40
VSP-C20F□-6	20	7 to 12.6	57
VSP-C25F□-6	25	7 to 12.6	58
VSP-C30F□-6	30	7 to 12.6	59

● Barbed fitting

● VSP-C10, 15F□-6T



● VSP-C20 to 30F□-6T



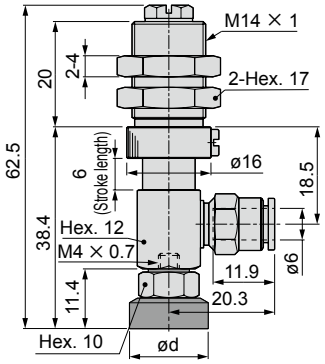
Unit: mm

Model No.	Pad diameter ød	Spring force (N)	Weight (g)
VSP-C10F□-6T	10	4 to 7.1	37
VSP-C15F□-6T	15	4 to 7.1	38
VSP-C20F□-6T	20	7 to 12.6	55
VSP-C25F□-6T	25	7 to 12.6	56
VSP-C30F□-6T	30	7 to 12.6	56

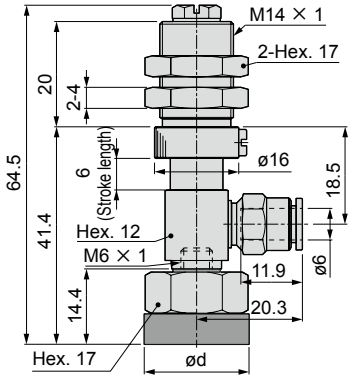
Dimensions (buffer, vacuum outlet side VSP-D)

● Push-in fitting

● VSP-D10, 15F□-6



● VSP-D20 to 30F□-6

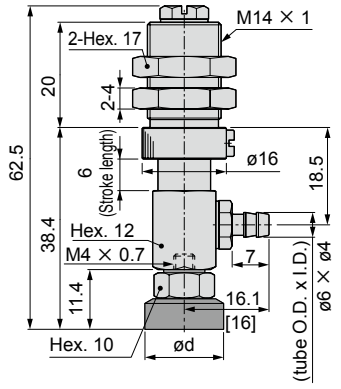


Unit: mm

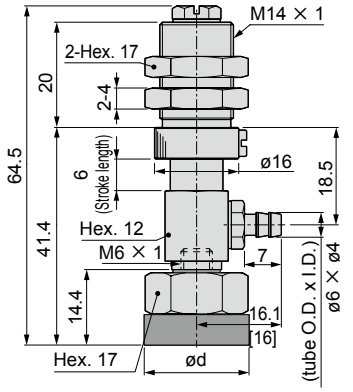
Model No.	Pad diameter ød	Spring force (N)	Weight (g)
VSP-D10F□-6	10	4 to 7.1	51
VSP-D15F□-6	15	4 to 7.1	52
VSP-D20F□-6	20	7 to 12.6	69
VSP-D25F□-6	25	7 to 12.6	70
VSP-D30F□-6	30	7 to 12.6	70

● Barbed fitting

● VSP-D10, 15F□-6T



● VSP-D20 to 30F□-6T

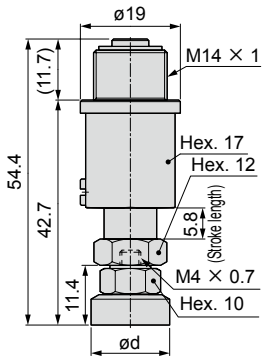


Unit: mm

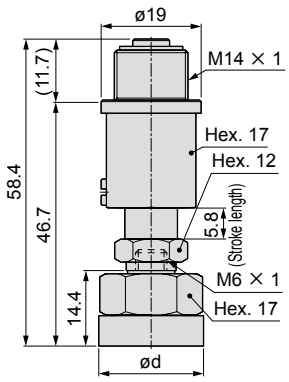
Model No.	Pad diameter ød	Spring force (N)	Weight (g)
VSP-D10F□-6T	10	4 to 7.1	49
VSP-D15F□-6T	15	4 to 7.1	50
VSP-D20F□-6T	20	7 to 12.6	66
VSP-D25F□-6T	25	7 to 12.6	67
VSP-D30F□-6T	30	7 to 12.6	68

Dimensions (direct mounting fixed VSP-F)

●VSP-F10, 15F□



●VSP-F20 to 30F□



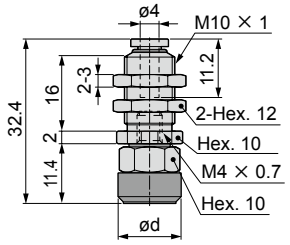
Unit: mm

Model No.	Pad diameter ød	Spring force (N)	Weight (g)
VSP-F10F□	10	7.9 to 15	59
VSP-F15F□	15	7.9 to 15	60
VSP-F20F□	20	7.9 to 15	76
VSP-F25F□	25	7.9 to 15	77
VSP-F30F□	30	7.9 to 15	77

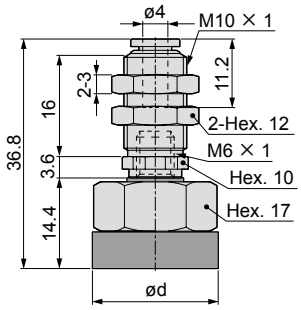
Dimensions (compact fixed, vacuum outlet top VSP-MA)

● Push-in fitting

● VSP-MA10, 15F□-4



● VSP-MA20 to 30F□-4

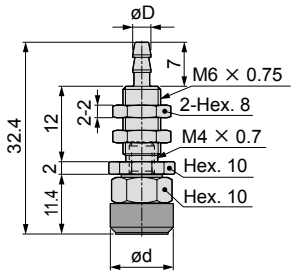


Unit: mm

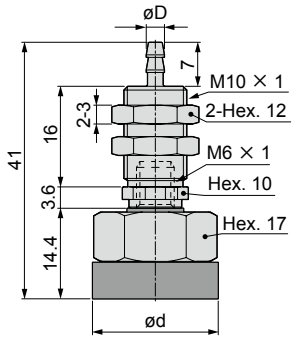
Model No.	Pad diameter ød	Weight (g)
VSP-MA10F□-4	10	10
VSP-MA15F□-4	15	10
VSP-MA20F□-4	20	29
VSP-MA25F□-4	25	31
VSP-MA30F□-4	30	31

● Barbed fitting

● VSP-MA10, 15F□-4T



● VSP-MA20 to 30F□-4T/6T



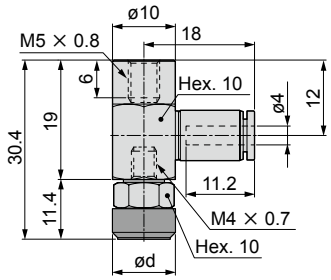
Unit: mm

Model No.	Tube O.D. x I.D. øD	Pad diameter ød	Weight (g)
VSP-MA10P□-4T	4×2.5	10	7
VSP-MA15P□-4T	4×2.5	15	8
VSP-MA20P□-4T	4×2.5	20	29
VSP-MA20P□-6T	6×4		
VSP-MA25P□-4T	4×2.5	25	31
VSP-MA25P□-6T	6×4		
VSP-MA30P□-4T	4×2.5	30	31
VSP-MA30P□-6T	6×4		

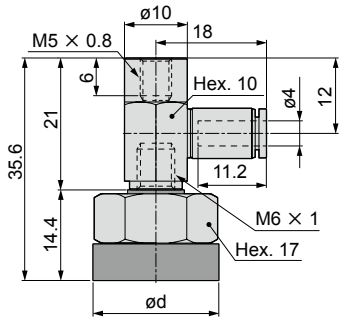
Dimensions (compact fixed, vacuum outlet side VSP-MB)

● Push-in fitting

● VSP-MB10, 15F□-4



● VSP-MB20 to 25F□-4

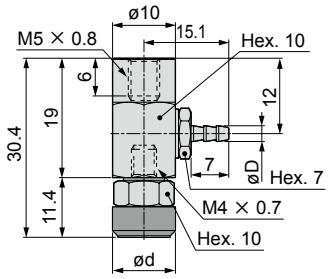


Unit: mm

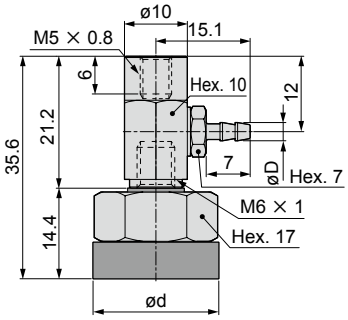
Model No.	Pad diameter ød	Weight (g)
VSP-MB10F□-4	10	12
VSP-MB15F□-4	15	12
VSP-MB20F□-4	20	30
VSP-MB25F□-4	25	32
VSP-MB30F□-4	30	33

● Barbed fitting

● VSP-MB10, 15F□-4T



● VSP-MB20 to 25F□-4T/6T



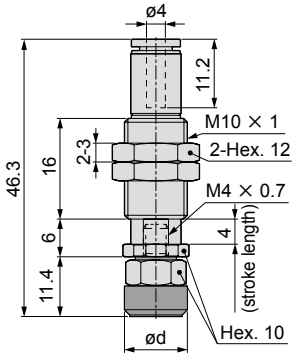
Unit: mm

Model No.	Tube O.D. x I.D. øD	Pad diameter ød	Weight (g)
VSP-MB10F□-4T	4×2.5	10	10
VSP-MB15F□-4T	4×2.5	15	11
VSP-MB20F□-4T	4×2.5	20	29
VSP-MB20F□-6T	6×4		
VSP-MB25F□-4T	4×2.5	25	30
VSP-MB25F□-6T	6×4		31
VSP-MB30F□-4T	4×2.5	30	30
VSP-MB30F□-6T	6×4		31

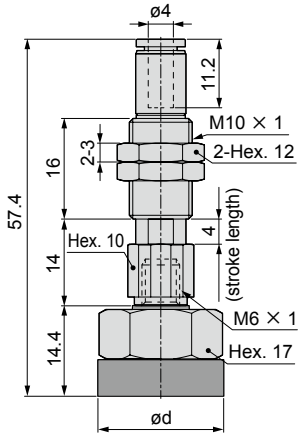
Dimensions (compact buffer, vacuum outlet top VSP-MC)

● Push-in fitting

● VSP-MC10, 15F□-4



● VSP-MC20 to 30F□-4

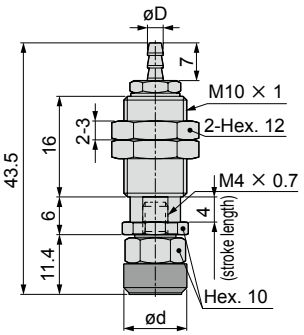


Unit: mm

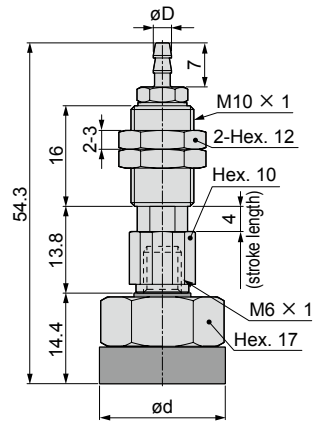
Model No.	Pad diameter ød	Spring force (N)	Weight (g)
VSP-MC10F□-4	10	1 to 1.3	20
VSP-MC15F□-4	15	1 to 1.3	20
VSP-MC20F□-4	20	1 to 1.3	41
VSP-MC25F□-4	25	1 to 1.3	43
VSP-MC30F□-4	30	1 to 1.3	43

● Barbed fitting

● VSP-MC10, 15F□-4T



● VSP-MC20 to 30F□-4T/6T



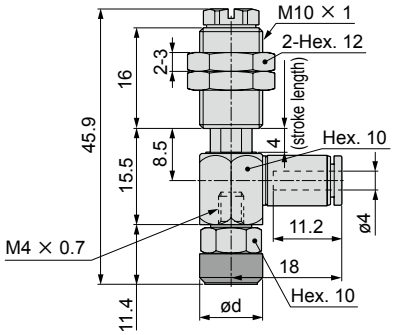
Unit: mm

Model No.	Tube O.D. x I.D. øD	Pad diameter ød	Spring force (N)	Weight (g)
VSP-MC10F□-4T	4×2.5	10	1 to 1.3	18
VSP-MC15F□-4T	4×2.5	15	1 to 1.3	19
VSP-MC20F□-4T	4×2.5	20	1 to 1.3	40
VSP-MC20F□-6T	6×4			
VSP-MC25F□-4T	4×2.5	25	1 to 1.3	41
VSP-MC25F□-6T	6×4			42
VSP-MC30F□-4T	4×2.5	30	1 to 1.3	41
VSP-MC30F□-6T	6×4			42

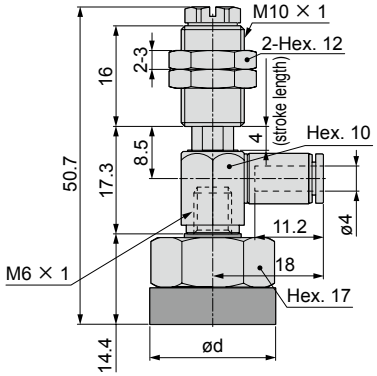
Dimensions (compact buffer, vacuum outlet side VSP-MD)

● Push-in fitting

● VSP-MD10, 15F□-4



● VSP-MD20 to 25F□-4

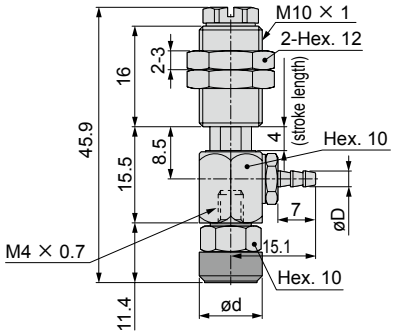


Unit: mm

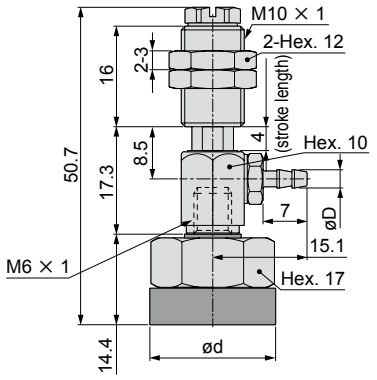
Model No.	Pad diameter ød	Spring force (N)	Weight (g)
VSP-MD10F□-4	10	1 to 1.3	27
VSP-MD15F□-4	15	1 to 1.3	28
VSP-MD20F□-4	20	1 to 1.3	45
VSP-MD25F□-4	25	1 to 1.3	46
VSP-MD30F□-4	30	1 to 1.3	46

● Barbed fitting

● VSP-MD10, 15F□-4T



● VSP-MD20 to 25F□-4T/6T

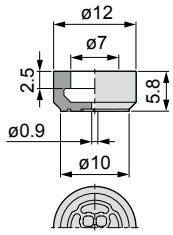


Unit: mm

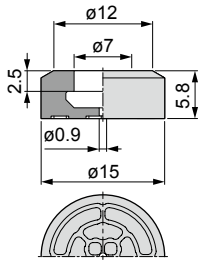
Model No.	Tube O.D. x I.D. øD	Pad diameter ød	Spring force (N)	Weight (g)
VSP-MD10F□-4T	4×2.5	10	1 to 1.3	26
VSP-MD15F□-4T	4×2.5	15	1 to 1.3	26
VSP-MD20F□-4T	4×2.5	20	1 to 1.3	43
VSP-MD20F□-6T	6×4			
VSP-MD25F□-4T	4×2.5	25	1 to 1.3	45
VSP-MD25F□-6T	6×4			
VSP-MD30F□-4T	4×2.5	30	1 to 1.3	45
VSP-MD30F□-6T	6×4			

Dimensions: pad only

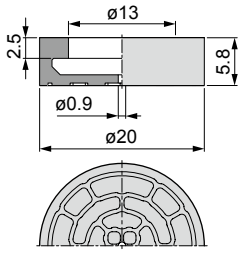
●VSPG-10F□



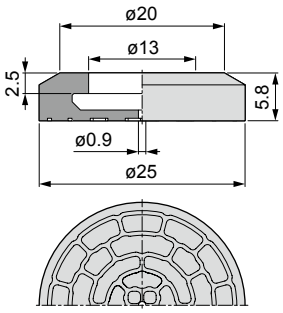
●VSPG-15F□



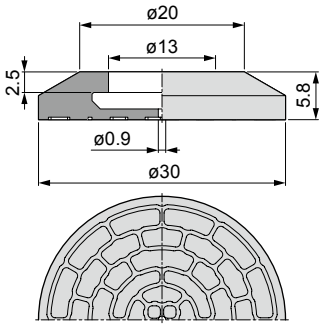
●VSPG-20F□



●VSPG-25F□

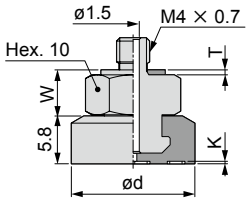


●VSPG-30F□

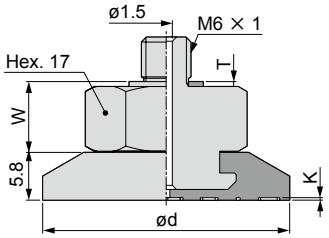


Detailed view of pad and holder fixing part

●VSPG-10, 15F□



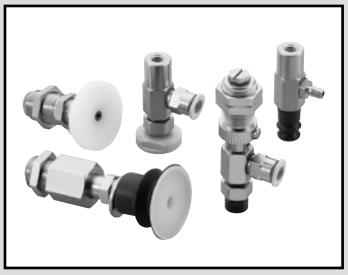
●VSPG-20 to 30F□



Unit: mm

Model No.	Pad diameter ød	Slot depth K	W	Gasket thickness T
VSPG-10F□	10	0.3	5.6	0.6
VSPG-15F□	15	0.3	5.6	0.6
VSPG-20F□	20	0.3	8.6	0.6
VSPG-25F□	25	0.3	8.6	0.6
VSPG-30F□	30	0.3	8.6	0.6

MEMO



Suction pad that prevents suction marks with adverse effect on the product
Suction pad, suction mark prevention

VSP-*Q* Series

● Pad diameter: ø10 to ø30

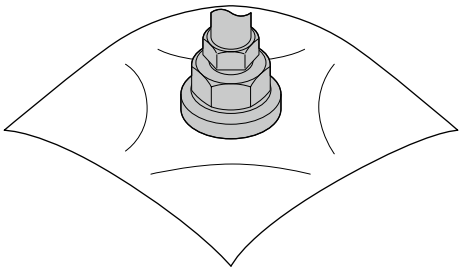
RoHS

Features

■ Uses resin pads, making it ideal for workpieces that are susceptible to rubber pad suction marks
■ Suction of workpiece with flexible holder and resin material
■ Releasability of workpiece during vacuum burst is also improved
■ The resin pad can be easily replaced using a spanner and Allen wrench, without removing the body
- ● Pad diameter: 3 types (ø10, ø20, ø30)
- ● Pad material: 3 types (PEEK, POM, conductive PEEK)
- ● Holder shape: 9 types (5 standard, 4 compact)
- ● Position locking valve: Compatible pad diameter (all sizes)

Applications

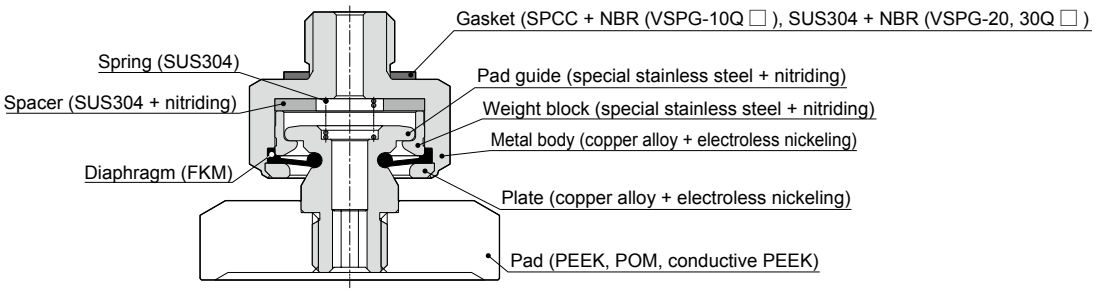
Liquid crystal glass, painting process, semiconductor manufacturing facilities, etc.



■ Specifications of flexible holder

Working fluid	Air
Operating vacuum pressure	-100 to 0 kPa
Operating ambient temperature range	0 to 60°C (no freezing)

■ Structure drawing



How to order

* Refer to model No. sections on dimensions pages 481 to 490 for combinations of model No.

Suction pad/suction mark prevention

VSP - MD 10 Q KE — 4 - V

● Pad resin only/suction mark prevention

VSPG — 10 Q KE - RP

Ⓐ Holder shape

Code	Content
Ⓐ Holder shape	
A	Fixed, Vacuum outlet top
B	Fixed, Vacuum outlet side
C	Buffer, Vacuum outlet top
D	Buffer, Vacuum outlet side
F	Direct mounting, Buffer
MA	Compact Fixed, Vacuum outlet top
MB	Compact Fixed, Vacuum outlet side
MC	Compact Buffer, Vacuum outlet top
MD	Compact Buffer, Vacuum outlet side

Ⓑ Pad diameter

Ⓑ Pad diameter *1
Refer to Appendix 1 for pad diameter.

Ⓒ Pad shape

Ⓒ Pad shape	
Q	Suction mark prevention

Ⓓ Pad material

Ⓓ Pad material	
K	PEEK
M	POM
KE	Conductive PEEK

Ⓔ Flexible holder

Ⓔ Flexible holder	
RP	Without flexible holder
Blank	With flexible holder

Ⓕ Port size/shape

Ⓕ Port size/shape	
4	ø4 push-in fitting
4T	ø4 barbed fitting
6	ø6 push-in fitting
6T	ø6 barbed fitting
Blank	(Holder shape: Selected with F)

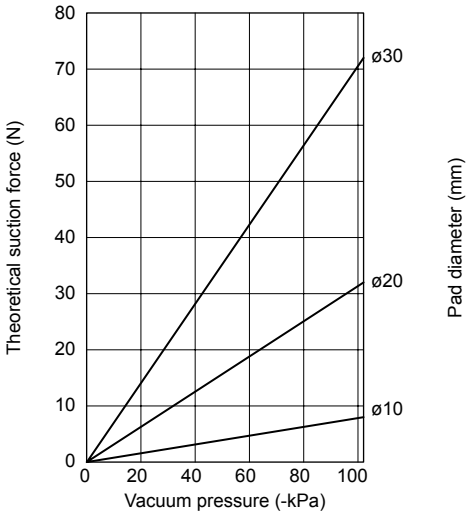
Ⓖ Position locking valve

Ⓖ Position locking valve Page 556	
V	With position locking valve
Blank	None

Appendix 1

Pad diameter			
Code	10	20	30
Pad diameter (mm)	ø10	ø20	ø30

Theoretical suction force

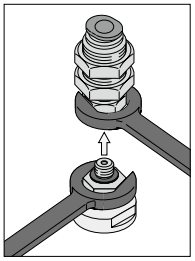


Because the theoretical suction force is the value at static conditions, adopt a safety factor of 1/4 for horizontal lifting and 1/8 for vertical lifting in actual use.

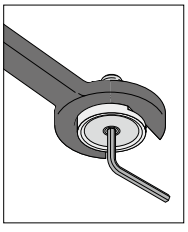
Safety precautions

⚠ CAUTION

1. Compared to conventional suction pads, the suction mark prevention suction pad reduces suction marks by using resin for the lip portion; however, confirm with an actual device that the effects of suction marks on the workpieces are acceptable.
2. The interior of the flexible holder for the suction mark prevention suction pad may wear depending on its structure and usage. Before use, check that there is no effect of dust generation due to wear, when using in clean environments.
3. This product has a 1 mm stroke length on the flexible holder, allowing it to follow even subtle workpiece inclinations precisely. If buffer function is required, use together with a spring type holder. When using a spring type holder, minimize the lateral force applied to the sliding part. It may lead to malfunction and dust generation due to holder wear.
4. There is no rotation-stop structure between the suction mark prevention suction pad flexible holder and the resin pad. Note that it is not suitable for rotary transport.
5. Suction mark prevention suction pads generate more vacuum pressure leakage from the lip than rubber pads. Note that vacuum hold is not possible. Also, minimize pressure drop due to leakage by keeping the vacuum flow rate as large as possible.
6. Clean the suction surface of the suction pad before use. Deposits may remain as suction marks. Be careful not to scratch the suction surface while cleaning, and do not use organic solvents.
7. Special stainless steel is used for this product, but it is not intended to prevent rust. Rust may occur depending on the working environment.
8. When attaching the flexible holder to the actual device or the pad holder, tighten using an appropriate tool with reference to the following tightening torque and confirm that there is no looseness.



Thread size	Tightening torque
M4×0.7	0.7 to 0.8 N·m
M6×1	1.5 to 2.0 N·m



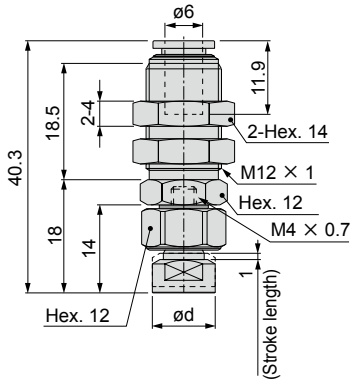
9. The resin pad mounting screws on the flexible holder may loosen due to creep. Regularly check for loosening and if found, refer to the following tightening torque and periodically tighten or replace the suction pad when necessary.

Vacuum pad material	Thread size	Tightening torque
PEEK	M5×0.8	1.4 to 2.1 N·m
Conductive PEEK	M5×0.8	2.0 to 2.3 N·m
POM	M5×0.8	0.6 to 0.7 N·m

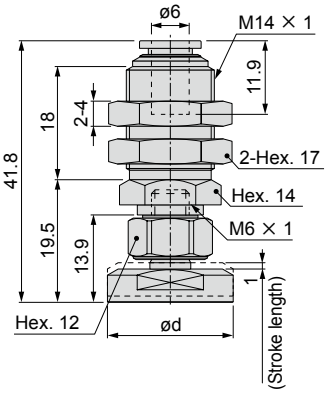
Dimensions (fixed, vacuum outlet top VSP-A)

● Push-in fitting

● VSP-A10Q□-6



● VSP-A20, 30Q□-6

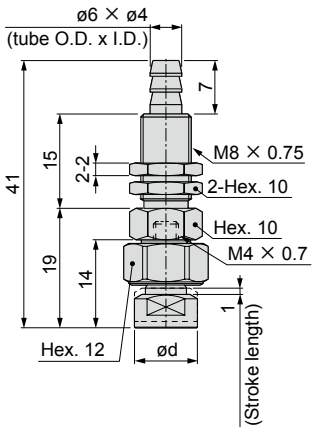


Unit: mm

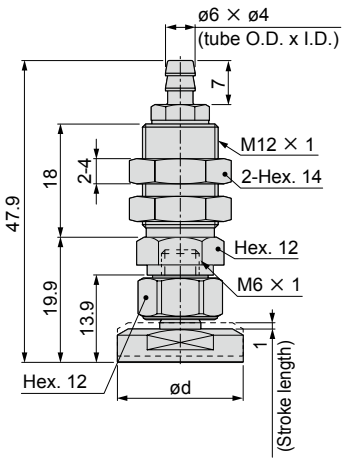
Model No.	Pad diameter ød	Weight (g)
VSP-A10Q□-6	10	27
VSP-A20Q□-6	20	41
VSP-A30Q□-6	30	45

● Barbed fitting

● VSP-A10Q□-6T



● VSP-A20, 30Q□-6T



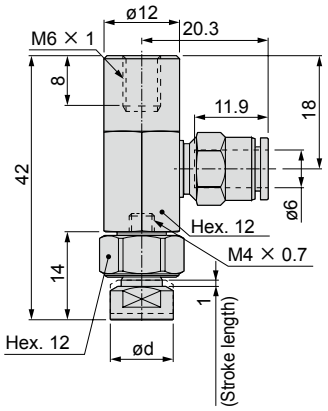
Unit: mm

Model No.	Pad diameter ød	Weight (g)
VSP-A10Q□-6T	10	17
VSP-A20Q□-6T	20	34
VSP-A30Q□-6T	30	38

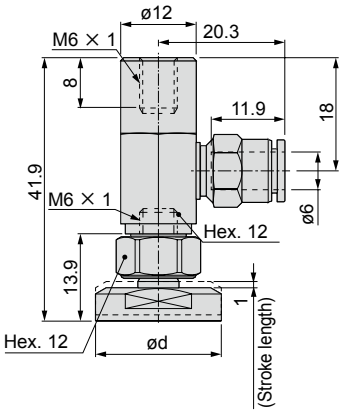
Dimensions (fixed, vacuum outlet side VSP-B)

● Push-in fitting

● VSP-B10Q□-6



● VSP-B20, 30Q□-6

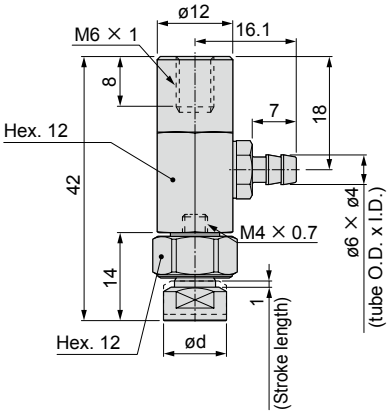


Unit: mm

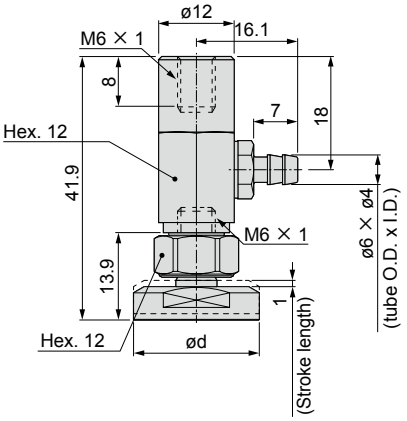
Model No.	Pad diameter ød	Weight (g)
VSP-B10Q□-6	10	36
VSP-B20Q□-6	20	38
VSP-B30Q□-6	30	42

● Barbed fitting

● VSP-B10Q□-6T



● VSP-B20, 30Q□-6T



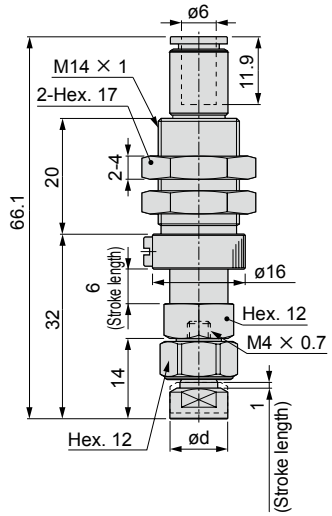
Unit: mm

Model No.	Pad diameter ød	Weight (g)
VSP-B10Q□-6T	10	34
VSP-B20Q□-6T	20	36
VSP-B30Q□-6T	30	38

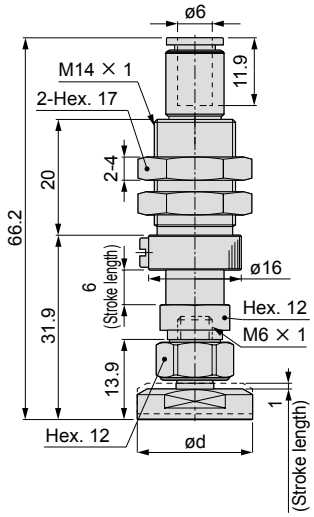
Dimensions (buffer, vacuum outlet top VSP-C)

● Push-in fitting

● VSP-C10Q□-6



● VSP-C20, 30Q□-6

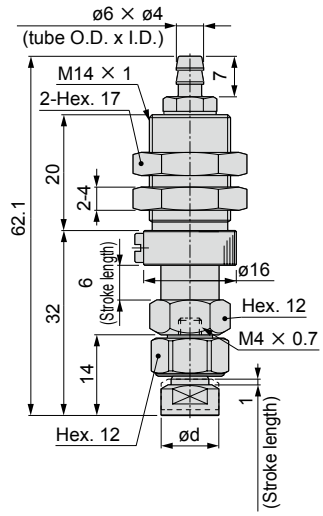


Unit: mm

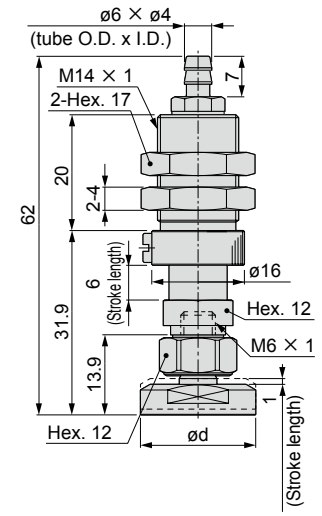
Model No.	Pad diameter ød	Spring force (N)	Weight (g)
VSP-C10Q□-6	10	4 to 7.1	41
VSP-C20Q□-6	20	7 to 12.6	44
VSP-C30Q□-6	30	7 to 12.6	48

● Barbed fitting

● VSP-C10Q□-6T



● VSP-C20, 30Q□-6T



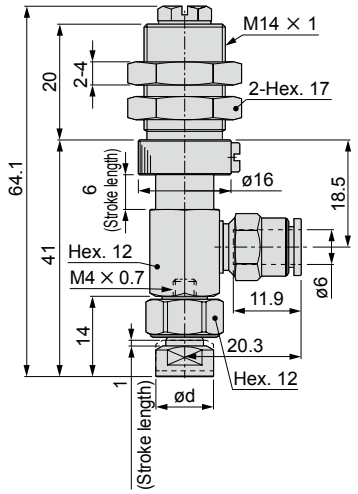
Unit: mm

Model No.	Pad diameter ød	Spring force (N)	Weight (g)
VSP-C10Q□-6T	10	4 to 7.1	39
VSP-C20Q□-6T	20	7 to 12.6	42
VSP-C30Q□-6T	30	7 to 12.6	46

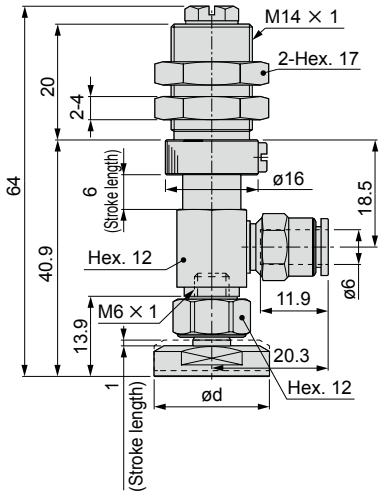
Dimensions (buffer, vacuum outlet side VSP-D)

● Push-in fitting

● VSP-D10Q□-6



● VSP-D20, 30Q□-6

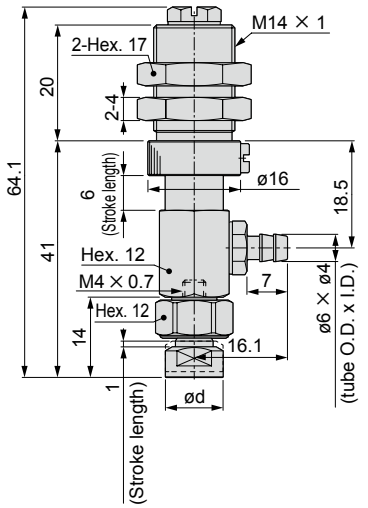


Unit: mm

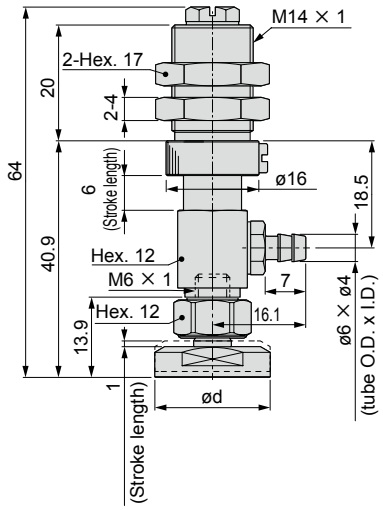
Model No.	Pad diameter ød	Spring force (N)	Weight (g)
VSP-D10Q□-6	10	4 to 7.1	53
VSP-D20Q□-6	20	7 to 12.6	56
VSP-D30Q□-6	30	7 to 12.6	60

● Barbed fitting

● VSP-D10Q□-6T



● VSP-D20, 30Q□-6T

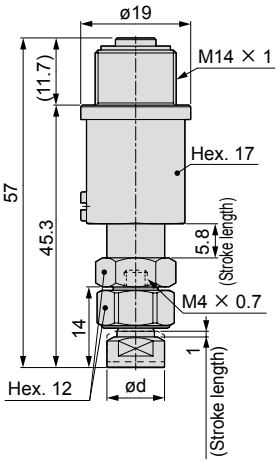


Unit: mm

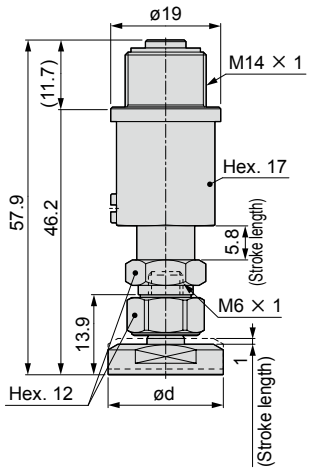
Model No.	Pad diameter ød	Spring force (N)	Weight (g)
VSP-D10Q□-6T	10	4 to 7.1	51
VSP-D20Q□-6T	20	7 to 12.6	53
VSP-D30Q□-6T	30	7 to 12.6	57

Dimensions (direct mounting fixed VSP-F)

●VSP-F10Q□



●VSP-F20, 30Q□



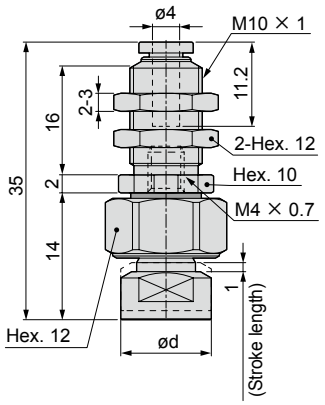
Unit: mm

Model No.	Pad diameter ød	Spring force (N)	Weight (g)
VSP-F10Q□	10	7.9 to 15	61
VSP-F20Q□	20	7.9 to 15	63
VSP-F30Q□	30	7.9 to 15	67

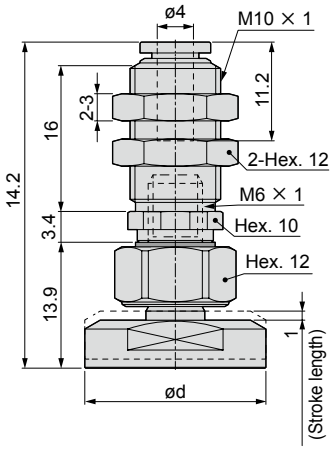
Dimensions (compact fixed, vacuum outlet top VSP-MA)

● Push-in fitting

● VSP-MA10Q□-4



● VSP-MA20, 30Q□-4

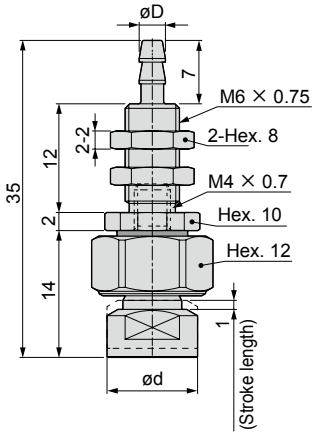


Unit: mm

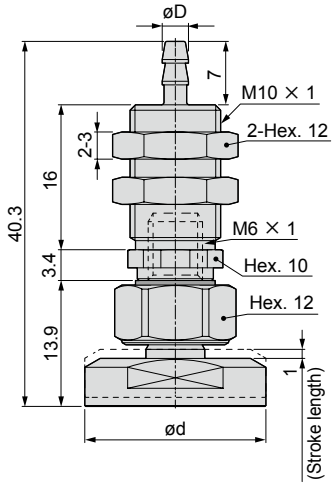
Model No.	Pad diameter ød	Weight (g)
VSP-MA10Q□-4	10	12
VSP-MA20Q□-4	20	16
VSP-MA30Q□-4	30	20

● Barbed fitting

● VSP-MA10Q□-4T



● VSP-MA20, 30Q□-4T/6T



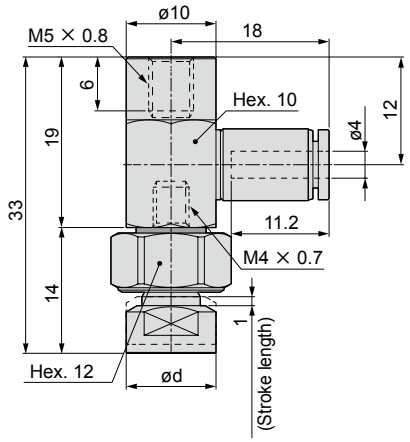
Unit: mm

Model No.	Tube O.D. x I.D. øD	Pad diameter ød	Weight (g)
VSP-MA10Q□-4T	4×2.5	10	9.1
VSP-MA20Q□-4T	4×2.5	20	16
VSP-MA20Q□-6T	6×4		
VSP-MA30Q□-4T	4×2.5	30	20
VSP-MA30Q□-6T	6×4		

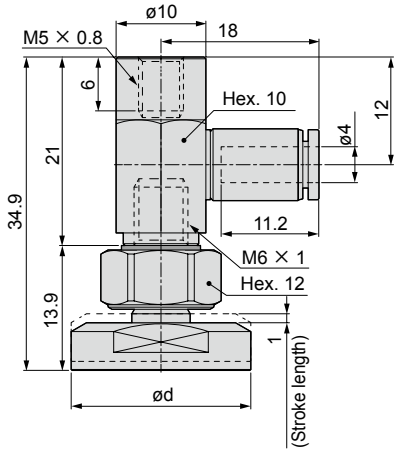
Dimensions (compact fixed, vacuum outlet side VSP-MB)

● Push-in fitting

● VSP-MB10Q□-4



● VSP-MB20, 30Q□-4

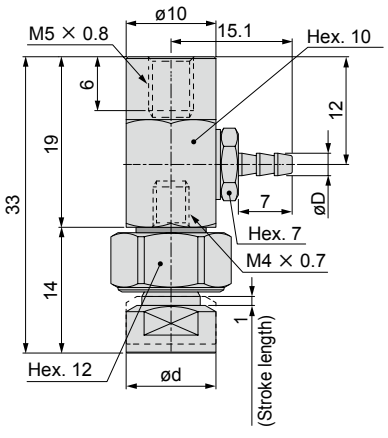


Unit: mm

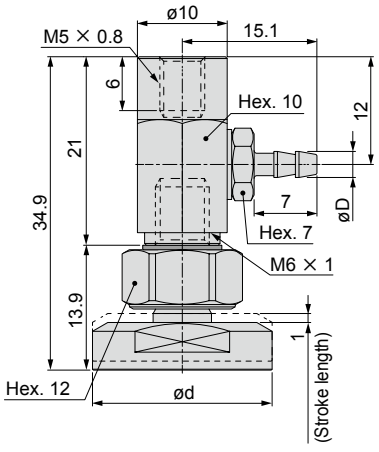
Model No.	Pad diameter ød	Weight (g)
VSP-MB10Q□-4	10	14
VSP-MB20Q□-4	20	17
VSP-MB30Q□-4	30	21

● Barbed fitting

● VSP-MB10Q□-4T



● VSP-MB20, 30Q□-4T/6T



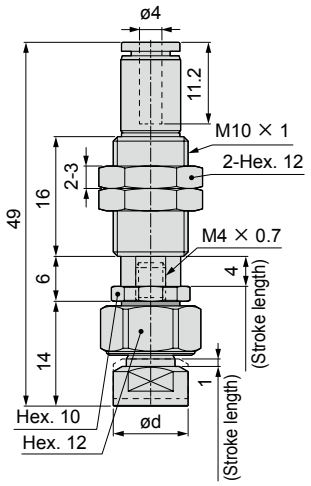
Unit: mm

Model No.	Tube O.D. x I.D. øD	Pad diameter ød	Weight (g)
VSP-MB10Q□-4T	4×2.5	10	13
VSP-MB20Q□-4T	4×2.5	20	16
VSP-MB20Q□-6T	6×4		
VSP-MB30Q□-4T	4×2.5	30	20
VSP-MB30Q□-6T	6×4		

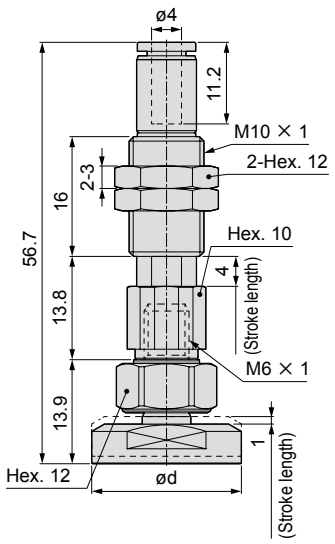
Dimensions (compact buffer, vacuum outlet top VSP-MC)

● Push-in fitting type

● VSP-MC10Q□-4



● VSP-MC20, 30Q□-4

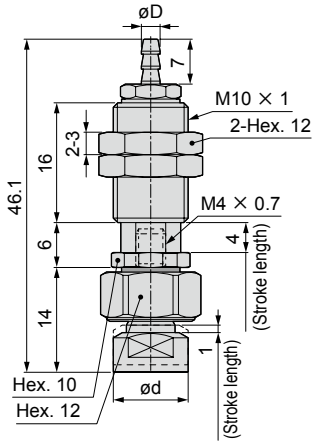


Unit: mm

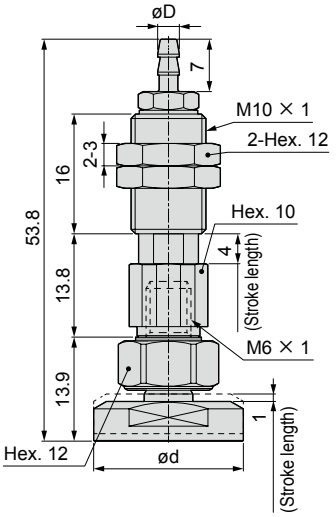
Model No.	Pad diameter ød	B	L	Spring force (N)	Weight (g)
VSP-MC10Q□-4	10	48.7	14	1 to 1.3	22
VSP-MC20Q□-4	20	56.4	13.9	1 to 1.3	28
VSP-MC30Q□-4	30	56.4	13.9	1 to 1.3	32

● Barbed fitting type

● VSP-MC10Q□-4T



● VSP-MC20, 30Q□-4T/6T



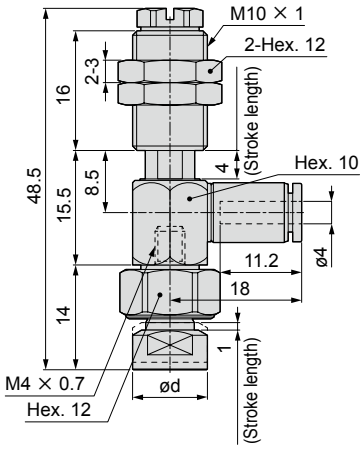
Unit: mm

Model No.	Tube O.D. x I.D. øD	Pad diameter ød	Spring force (N)	Weight (g)
VSP-MC10Q□-4T	4×2.5	10	1 to 1.3	20
VSP-MC20Q□-4T	4×2.5	20	1 to 1.3	27
VSP-MC20Q□-6T	6×4			
VSP-MC30Q□-4T	4×2.5	30	1 to 1.3	31
VSP-MC30Q□-6T	6×4			

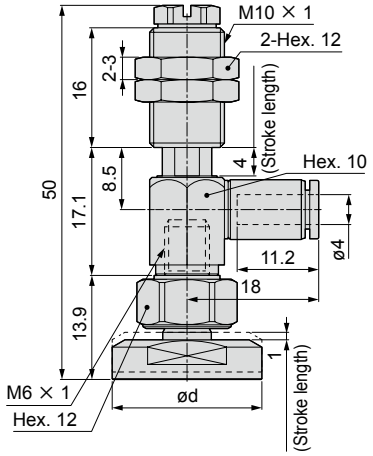
Dimensions (compact buffer, vacuum outlet side VSP-MD)

● Push-in fitting type

● VSP-MD10Q□-4



● VSP-MD20, 30Q□-4

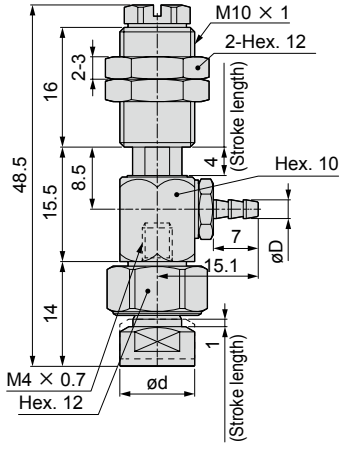


Unit: mm

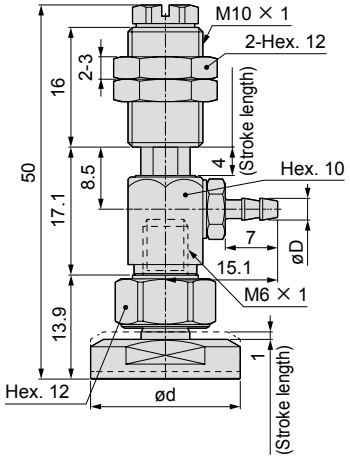
Model No.	Pad diameter ød	B	L	Spring force (N)	Weight (g)
VSP-MD10Q□-4	10	48.5	14	1 to 1.3	29
VSP-MD20Q□-4	20	50	13.9	1 to 1.3	32
VSP-MD30Q□-4	30	50	13.9	1 to 1.3	36

● Barbed fitting type

● VSP-MD10Q□-4T



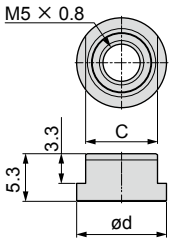
● VSP-MD20, 30Q□-4T/6T



Unit: mm

Model No.	Tube O.D. x I.D. øD	Pad diameter ød	Spring force N)	Weight (g)
VSP-MD10Q□-4T	4×2.5	10	1 to 1.3	28
VSP-MD20Q□-4T	4×2.5	20	1 to 1.3	30
VSP-MD20Q□-6T	6×4			
VSP-MD30Q□-4T	4×2.5	30	1 to 1.3	34
VSP-MD30Q□-6T	6×4			

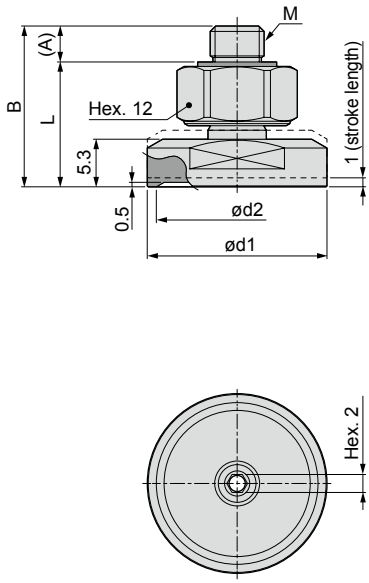
Dimensions: Resin pad only



Unit: mm

Resin pad single unit model No.	Pad diameter ød	C	Weight (g)	Applicable pad model No.
VSPG-10Q□-RP	10	8	0.4	VSP-□10Q□
VSPG-20Q□-RP	20	17	2	VSP-□20Q□
VSPG-30Q□-RP	30	21	4.6	VSP-□30Q□

Dimensions: pad with flexible holder



Unit: mm

Model No.	Pad diameter ød1	Effective diameter ød2	M	A	B	L	C	Weight (g)
VSPG-10Q□	10	8	M4×0.7	2.9	16.9	14	8	7
VSPG-20Q□	20	18	M6×1	4	17.9	13.9	17	10
VSPG-30Q□	30	28	M6×1	4	17.9	13.9	27	14

MEMO

- Suction pad with long stroke holder
- Suction pad, long stroke

VSP-* Series

- Pad diameter: ø4 to ø50, 2 mm x 4 mm to 8 mm x 30 mm

RoHS

Features

■ Suction is possible even when the distance from the pad to the workpiece is irregular.

■ Wide variations in pad shape, pad diameter and pad material.

- Pad shape: 8 types [Standard (standard, deep), sponge, bellows, oval, anti-slip, flat, suction mark prevention]
- Pad diameter: Standard → 10 types (ø4, ø6, ø8, ø10, ø15, ø20, ø25, ø30, ø40, ø50)
  Standard (deep) → 6 types (ø15, ø20, ø25, ø30, ø40, ø50)
  Sponge → 7 types (ø10, ø15, ø20, ø25, ø30, ø35, ø50)
  Bellows → 9 types (ø6, ø8, ø10, ø15, ø20, ø25, ø30, ø40, ø50)
  Oval → 13 types (2 x 4, 3.5 x 7, 4 x 10, 4 x 20, 4 x 30, 5 x 10, 5 x 20, 5 x 30, 6 x 10, 6 x 20, 6 x 30, 8 x 20, 8 x 30)
  Anti-slip → 5 types (ø10, ø20, ø30, ø40, ø50)
  Flat → 5 types (ø10, ø15, ø20, ø25, ø30)
  Suction mark prevention → 3 types (ø10, ø20, ø30)
- Pad material: 15 types (nitrile rubber, silicone rubber, urethane rubber, fluoro rubber, HNBR, chloroprene rubber, HNBR, EPDM, conductive silicone rubber, antistatic butadiene rubber, conductive NBR, NBR compatible with the Food Sanitation Act, PEEK, POM, conductive PEEK)
- Holder shape: 2 types (each with cover, without cover)
- Free holder (swinging): 2 types (30° angle, 10° angle) [Compatible pad diameter: ø10 to ø50 and oval all sizes]
- Position locking valve: Compatible pad diameter (all sizes)

Pad shape - pad material combinations and applications

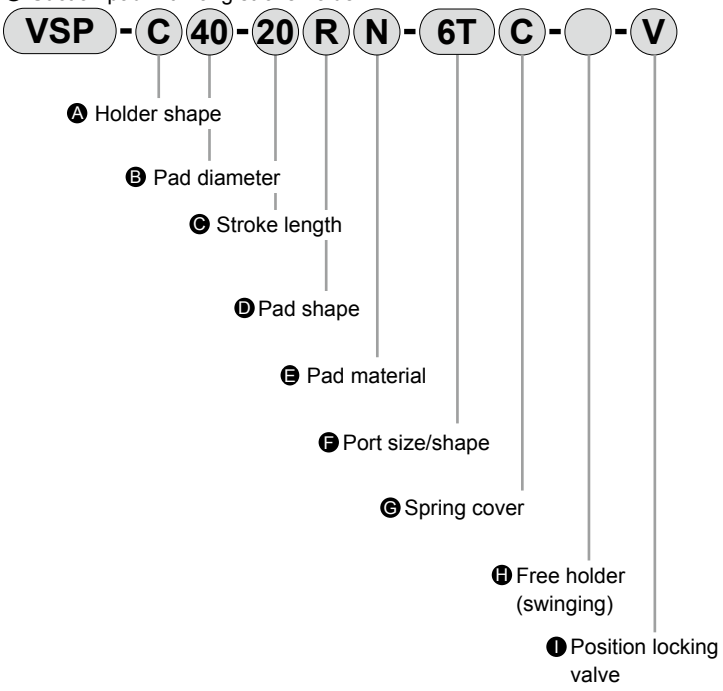
Pad material		N	S	U	F	NH	Blank	HN	EP
		Nitrile rubber	Silicone rubber	Urethane rubber	Fluoro rubber	Oil-resistant NBR	Chloroprene rubber	HNBR	EPDM
Pad shape	R Standard, general	●	●	●	●	-	-	-	-
	A Standard, deep	●	●	●	●	-	-	-	-
	S Sponge	-	●	-	-	-	●	-	-
	B Bellows	●	●	●	●	-	-	●	●
	E Oval	●	●	●	●	-	-	-	-
	K Anti-slip	-	●	●	●	●	-	-	-
	F Flat	●	●	●	●	-	-	-	-
	Q Suction mark prevention	-	-	-	-	-	-	-	-
Applications		Cardboard, plywood, iron plate, food-related, and other general workpieces	Removal of semiconductor molded products Thin workpieces Food-related	Cardboard, iron plates, plywood	Chemical atmospheres, hot workpieces	Cardboard, plywood, iron plate, food-related, and other general workpieces	Workpieces with uneven surface	For cardboard, plywood, iron plates, food-related, general items and low-conc ozone specs	Used in applications requiring light resistance and ozone resistance, wet atmospheres

Pad material		SE	E	NE	G	K	M	KE
		Conductive silicone rubber	Antistatic butadiene rubber (low resistance)	Conductive NBR (low resistance)	NBR compatible with Food Sanitation Act	PEEK	POM	Conductive PEEK
Pad shape	R Standard, general	●	●	●	●	-	-	-
	A Standard, deep	-	-	●	●	-	-	-
	S Sponge	-	-	-	-	-	-	-
	B Bellows	●	-	●	-	-	-	-
	E Oval	●	●	●	-	-	-	-
	K Anti-slip	-	-	●	-	-	-	-
	F Flat	●	-	●	-	-	-	-
	Q Suction mark prevention	-	-	-	-	●	●	●
Applications		Semiconductor Removal of molded products Thin workpieces Food-related	General semiconductor workpieces (antistatic measures)	Semiconductor	Cardboard, plywood, iron plate, food-related, and other general workpieces	Semiconductor/ LCD manufacturing equipment	Various manufacturing lines, food-related products, packaging machines	Semiconductor/LCD manufacturing equipment Electronic device parts

How to order

* Refer to model No. sections on dimensions pages 494 to 549 for combinations of model No.

● Suction pad/with long stroke holder



Code	Content
Ⓐ Holder shape	
C	With buffer, Vacuum outlet top
D	With buffer, Vacuum outlet side
Ⓑ Pad diameter *1, *2, *4, *5	
Refer to "Pad diameter - pad shape combinations" in Appendix 1 for pad diameter.	
Ⓒ Stroke length	
10	10 mm
15	15 mm
20	20 mm
30	30 mm
40	40 mm
50	50 mm
Ⓓ Pad shape	
R	Standard, general
A	Standard, deep
S	Sponge
B	Bellows
E	Oval
K	Anti-slip
F	Flat
Q	Suction mark prevention
Ⓔ Pad material *4, *5	
N	Nitrile rubber
S	Silicone rubber
U	Urethane rubber
F	Fluoro rubber
SE	Anticonductive silicone rubber
E	Antistatic butadiene rubber (low resistance)
NE	Conductive NBR (low resistance)
NH	Oil-resistant NBR
G	NBR compatible with Food Sanitation Act
HN	HNBR
EP	EPDM
Blank	Chloroprene rubber
K	PEEK
M	POM
KE	Conductive PEEK
Ⓕ Port size/shape	
4	ø4 push-in fitting
4T	ø4 barbed fitting
6	ø6 push-in fitting
6T	ø6 barbed fitting
Ⓖ Spring cover	
Blank	With spring cover
C	Without spring cover
Ⓗ Free holder (swinging) *1, *3	**Page 550**
F1	With free holder swing angle 30°
F2	With free holder swing angle 15°
Blank	Without free holder
Ⓘ Position locking valve *2, *3	**Page 556**
V	With position locking valve
Blank	None

⚠ Precautions for model No. selection

*1 : Ⓗ "F1", "F2" cannot be selected for Ⓑ 4 to 8.
*2 : Ⓘ "V" cannot be selected for Ⓑ 4 to 8.
*3 : Ⓗ "F1", "F2" and Ⓘ "V" cannot be selected together.
*4 : When Ⓑ is "2 x 4" or "3.5 x 7", Ⓔ "E" cannot be selected.
*5 : When Ⓑ is "4 x 30", Ⓔ "U" and "F" cannot be selected.
*6 : Refer to page 550 for details on free holders (F1, F2) and page 556 for details on position locking valves (V). In addition, refer to the target suction pad list (page 558) for applicable pad size shape.

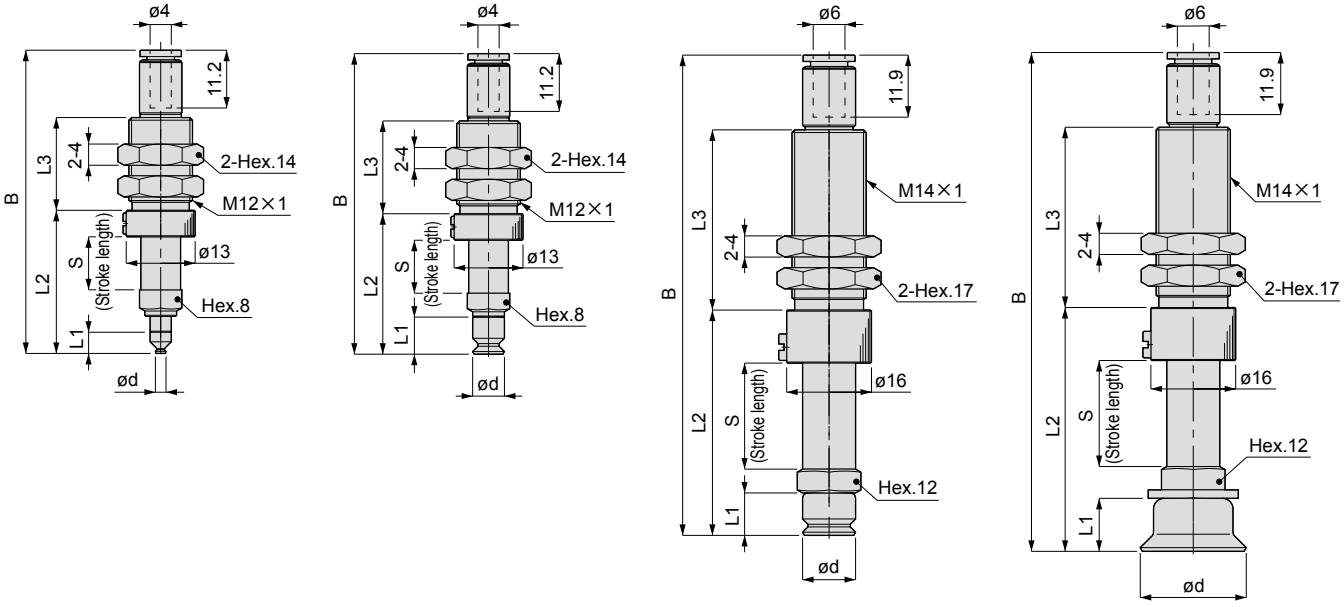
Appendix 1 Pad diameter - pad shape combinations

	Pad shape		R	A	S	B	E	K	F	Q
Pad diameter	4	ø4	●							
	6	ø6	●			●				
	8	ø8	●			●				
	10	ø10	●		●	●		●	●	●
	15	ø15	●	●	●	●			●	
	20	ø20	●	●	●	●		●	●	●
	25	ø25	●	●	●	●			●	
	30	ø30	●	●	●	●		●	●	●
	35	ø35			●					
	40	ø40	●	●		●		●		
	50	ø50	●	●	●	●		●		
	2×4	2×4					●			
	3.5×7	3.5×7					●			
	4×10	4×10					●			
	4×20	4×20					●			
	4×30	4×30					●			
	5×10	5×10					●			
	5×20	5×20					●			
	5×30	5×30					●			
	6×10	6×10					●			
	6×20	6×20					●			
	6×30	6×30					●			
	8×20	8×20					●			
	8×30	8×30					●			

Dimensions (standard, buffer, vacuum outlet top VSP-C□-□)

● Type with spring cover, push-in fitting

· VSP-C4-□R□-4 · VSP-C6, 8-□R□-4 · VSP-C10-□R□-6 · VSP-C15 to 50-□R(A)□-6



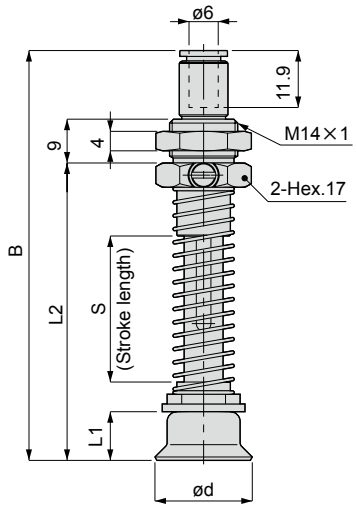
Unit: mm

Model No.	Pad diameter ød	B	L1	L2	L3	Stroke length S	Spring force (N)	Weight (g)
VSP-C4-10R□-4	4	57.5	4	27	17.5	10	0.6 to 1.7	21
VSP-C4-15R□-4		68.5		32	23.5	15	0.4 to 1.7	24
VSP-C4-20R□-4		78.5		37	28.5	20	0.3 to 1.8	27
VSP-C6-10R□-4	6	57	7	26.5	17.5	10	0.8 to 2.7	20
VSP-C6-15R□-4		68		31.5	23.5	15	0.7 to 3	24
VSP-C6-20R□-4		78		36.5	28.5	20	0.9 to 3.4	26
VSP-C8-10R□-4	8	55.5	5.5	25	17.5	10	0.8 to 2.7	20
VSP-C8-15R□-4		66.5		30	23.5	15	0.7 to 3	24
VSP-C8-20R□-4		76.5		35	28.5	20	0.9 to 3.4	26
VSP-C10-10R□-6	10	64.8	8	30.5	20	10	2 to 5.2	37
VSP-C10-15R□-6		74.8		35.5	25	15	2 to 5.9	42
VSP-C10-20R□-6		90.8		42.5	34	20	1.1 to 4.8	49
VSP-C15-10R(A)□-6	15	65.8(66.8)	9(10)	31.5(32.5)	20	10	2 to 5.2	37
VSP-C15-15R(A)□-6		75.8(76.8)		36.5(37.5)	25	15	2 to 5.9	42
VSP-C15-20R(A)□-6		91.8(92.8)		43.5(44.5)	34	20	1.1 to 4.8	50
VSP-C20-10R(A)□-6	20	68.3(69.3)	10(11)	34(35)	20	10	3.3 to 10	42
VSP-C20-15R(A)□-6		78.3(79.3)		39(40)	25	15	3.3 to 10.4	47
VSP-C20-20R(A)□-6		94.3(95.3)		46(47)	34	20	2 to 8.7	54
VSP-C25-10R(A)□-6	25	69.3(70.3)	11(12)	35(36)	20	10	3.3 to 10	43
VSP-C25-15R(A)□-6		79.3(80.3)		40(41)	25	15	3.3 to 10.4	48
VSP-C25-20R(A)□-6		95.3(96.3)		47(48)	34	20	2 to 8.7	54
VSP-C30-10R(A)□-6	30	69.3(72.3)	11(14)	35(38)	20	10	3.3 to 10	45
VSP-C30-15R(A)□-6		79.3(82.3)		40(43)	25	15	3.3 to 10.4	50
VSP-C30-20R(A)□-6		95.3(98.3)		47(50)	34	20	2 to 8.7	57
VSP-C40-10R(A)□-6	40	72.3(75.8)	14(17.5)	38(41.5)	20	10	3.3 to 10	52(53)
VSP-C40-15R(A)□-6		82.3(85.8)		43(46.5)	25	15	3.3 to 10.4	57(58)
VSP-C40-20R(A)□-6		98.3(101.8)		50(53.5)	34	20	2 to 8.7	64(65)
VSP-C50-10R(A)□-6	50	73.3(76.3)	15(18)	39(42)	20	10	3.3 to 10	58(59)
VSP-C50-15R(A)□-6		83.3(86.3)		44(47)	25	15	3.3 to 10.4	63(64)
VSP-C50-20R(A)□-6		99.3(102.3)		51(54)	34	20	2 to 8.7	69(71)

* Dimensions in ( ) are dimensions of the deep pad.

Dimensions (standard, buffer, vacuum outlet top VSP-C□-□)

● Type without spring cover, with push-in fitting
· VSP-C20 to 50-□R (A) □-6C



Unit: mm

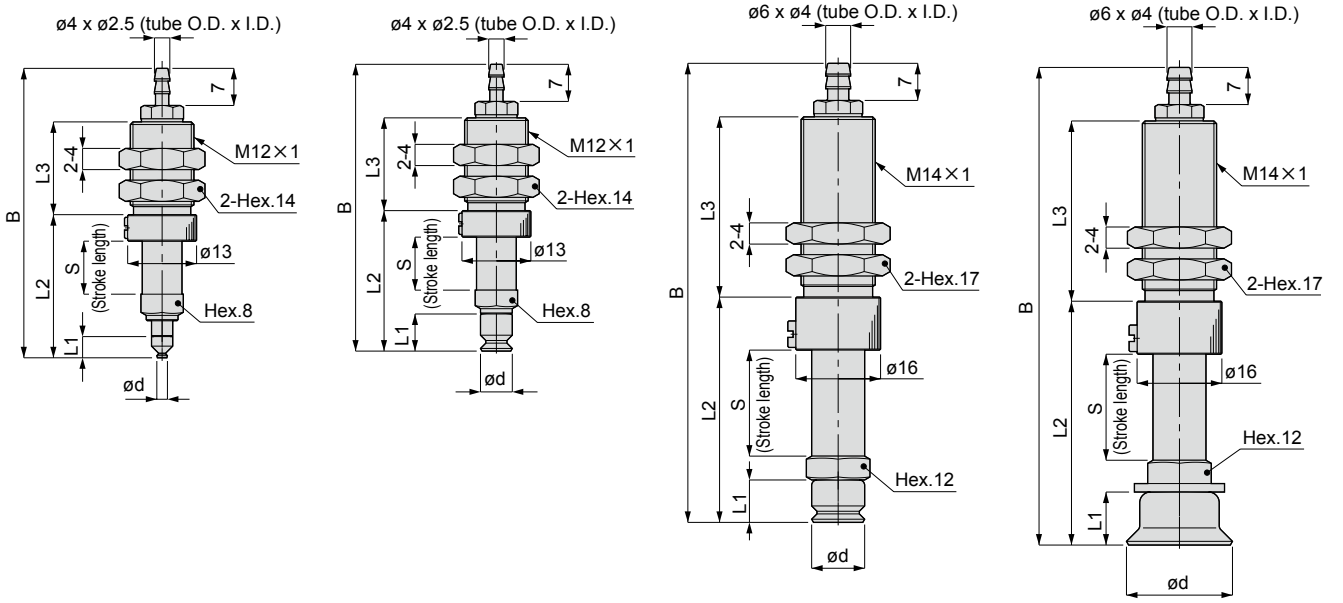
Model No.	Pad diameter ød	B	L1	L2	Stroke length S	Spring force (N)	Weight (g)
VSP-C20-20R(A)□-6C	20	71.4(72.3)	10(11)	48.1(49.1)	20	1.5 to 4.9	50
VSP-C20-30R(A)□-6C		84.4(85.3)		61.1(62.1)	30	1.1 to 4.8	55
VSP-C20-40R(A)□-6C		97.4(98.3)		74.1(75.1)	40	1 to 4.5	60
VSP-C20-50R(A)□-6C		110.4(111.3)		87.1(88.1)	50	0.9 to 4.5	65
VSP-C25-20R(A)□-6C	25	72.4(73.3)	11(12)	49.1(50.1)	20	1.5 to 4.9	50
VSP-C25-30R(A)□-6C		85.4(86.3)		62.1(63.1)	30	1.1 to 4.8	55
VSP-C25-40R(A)□-6C		98.4(99.3)		75.1(76.1)	40	1 to 4.5	61
VSP-C25-50R(A)□-6C		111.4(112.3)		88.1(89.1)	50	0.9 to 4.5	66
VSP-C30-20R(A)□-6C	30	72.4(75.3)	11(14)	49.1(52.1)	20	1.5 to 4.9	52
VSP-C30-30R(A)□-6C		85.4(88.3)		62.1(65.1)	30	1.1 to 4.8	57
VSP-C30-40R(A)□-6C		98.4(101.3)		75.1(78.1)	40	1 to 4.5	63
VSP-C30-50R(A)□-6C		111.4(114.3)		88.1(91.1)	50	0.9 to 4.5	68
VSP-C40-20R(A)□-6C	40	75.4(78.9)	14(17.5)	52.1(55.6)	20	1.5 to 4.9	59(60)
VSP-C40-30R(A)□-6C		88.4(91.9)		65.1(68.6)	30	1.1 to 4.8	65(66)
VSP-C40-40R(A)□-6C		101.4(104.9)		78.1(81.6)	40	1 to 4.5	70(71)
VSP-C40-50R(A)□-6C		114.4(117.9)		91.1(94.6)	50	0.9 to 4.5	75(76)
VSP-C50-20R(A)□-6C	50	76.4(79.4)	15(18)	53.1(56.1)	20	1.5 to 4.9	65(67)
VSP-C50-30R(A)□-6C		89.4(92.4)		66.1(69.1)	30	1.1 to 4.8	70(72)
VSP-C50-40R(A)□-6C		102.4(105.4)		79.1(82.1)	40	1 to 4.5	76(77)
VSP-C50-50R(A)□-6C		115.4(118.4)		92.1(95.1)	50	0.9 to 4.5	81(82)

* Dimensions in ( ) are dimensions of the deep pad.

Dimensions (standard, buffer, vacuum outlet top VSP-C□-□)

● Type with spring cover, barbed fitting

· VSP-C4-□R□-4T · VSP-C6, 8-□R□-4T · VSP-C10-□R□-6T · VSP-C15 to 50-□R(A)□-6T



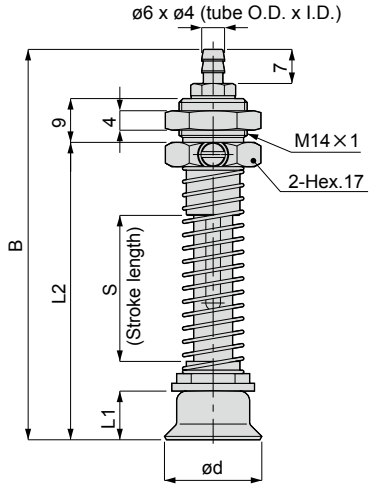
Unit: mm

Model No.	Pad diameter ød	B	L1	L2	L3	Stroke length S	Spring force (N)	Weight (g)
VSP-C4-10R□-4T	4	54.6	4	27	17.5	10	0.6 to 1.7	19
VSP-C4-15R□-4T		65.6		32	23.5	15	0.4 to 1.7	22
VSP-C4-20R□-4T		75.6		37	28.5	20	0.3 to 1.8	25
VSP-C6-10R□-4T	6	54.1	7	26.5	17.5	10	0.8 to 2.7	18
VSP-C6-15R□-4T		65.1		31.5	23.5	15	0.7 to 3	22
VSP-C6-20R□-4T		75.1		36.5	28.5	20	0.9 to 3.4	24
VSP-C8-10R□-4T	8	52.6	5.5	25	17.5	10	0.8 to 2.7	18
VSP-C8-15R□-4T		63.6		30	23.5	15	0.7 to 3	22
VSP-C8-20R□-4T		73.6		35	28.5	20	0.9 to 3.4	24
VSP-C10-10R□-6T	10	60.6	8	30.5	20	10	2 to 5.2	35
VSP-C10-15R□-6T		70.6		35.5	25	15	2 to 5.9	40
VSP-C10-20R□-6T		86.6		42.5	34	20	1.1 to 4.8	47
VSP-C15-10R(A)□-6T	15	61.6(62.6)	9(10)	31.5(32.5)	20	10	2 to 5.2	35
VSP-C15-15R(A)□-6T		71.6(72.6)		36.5(37.5)	25	15	2 to 5.9	40
VSP-C15-20R(A)□-6T		87.6(88.6)		43.5(44.5)	34	20	1.1 to 4.8	48
VSP-C20-10R(A)□-6T	20	64.1(65.1)	10(11)	34(35)	20	10	3.3 to 10	40
VSP-C20-15R(A)□-6T		74.1(75.1)		39(40)	25	15	3.3 to 10.4	45
VSP-C20-20R(A)□-6T		90.1(91.1)		46(47)	34	20	2 to 8.7	52
VSP-C25-10R(A)□-6T	25	65.1(66.1)	11(12)	35(36)	20	10	3.3 to 10	41
VSP-C25-15R(A)□-6T		75.1(76.1)		40(41)	25	15	3.3 to 10.4	46
VSP-C25-20R(A)□-6T		91.1(92.1)		47(48)	34	20	2 to 8.7	52
VSP-C30-10R(A)□-6T	30	65.1(68.1)	11(14)	35(38)	20	10	3.3 to 10	43
VSP-C30-15R(A)□-6T		75.1(78.1)		40(43)	25	15	3.3 to 10.4	48
VSP-C30-20R(A)□-6T		91.1(94.1)		47(50)	34	20	2 to 8.7	54
VSP-C40-10R(A)□-6T	40	68.1(71.6)	14(17.5)	38(41.5)	20	10	3.3 to 10	50(51)
VSP-C40-15R(A)□-6T		78.1(81.6)		43(46.5)	25	15	3.3 to 10.4	55(56)
VSP-C40-20R(A)□-6T		94.1(97.6)		50(53.5)	34	20	2 to 8.7	61(62)
VSP-C50-10R(A)□-6T	50	69.1(72.1)	15(18)	39(42)	20	10	3.3 to 10	56(57)
VSP-C50-15R(A)□-6T		79.1(82.1)		44(47)	25	15	3.3 to 10.4	61(62)
VSP-C50-20R(A)□-6T		95.1(98.1)		51(54)	34	20	2 to 8.7	67(69)

* Dimensions in ( ) are dimensions of the deep pad.

Dimensions (standard, buffer, vacuum outlet top VSP-C□-□)

● Type without spring cover, with barbed fitting
· VSP-C20 to 50-□R (A) □-6TC



Unit: mm

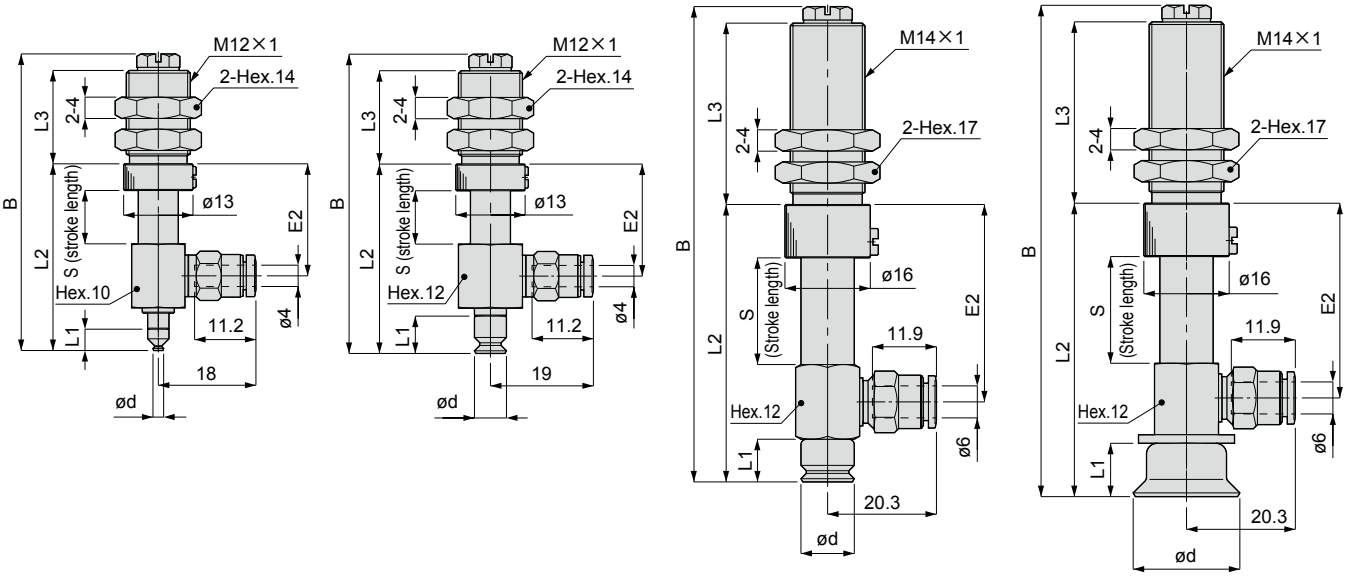
Model No.	Pad diameter ød	B	L1	L2	Stroke length S	Spring force (N)	Weight (g)
VSP-C20-20R(A)□-6TC	20	67.2(68.2)	10(11)	48.1(49.1)	20	1.5 to 4.9	48
VSP-C20-30R(A)□-6TC		80.2(81.2)		61.1(62.1)	30	1.1 to 4.8	53
VSP-C20-40R(A)□-6TC		93.2(94.2)		74.1(75.1)	40	1 to 4.5	58
VSP-C20-50R(A)□-6TC		106.2(107.2)		87.1(88.1)	50	0.9 to 4.5	63
VSP-C25-20R(A)□-6TC	25	68.2(69.2)	11(12)	49.1(50.1)	20	1.5 to 4.9	48
VSP-C25-30R(A)□-6TC		81.2(82.2)		62.1(63.1)	30	1.1 to 4.8	53
VSP-C25-40R(A)□-6TC		94.2(95.2)		75.1(76.1)	40	1 to 4.5	58
VSP-C25-50R(A)□-6TC		107.2(108.2)		88.1(89.1)	50	0.9 to 4.5	64
VSP-C30-20R(A)□-6TC	30	68.2(71.2)	11(14)	49.1(52.1)	20	1.5 to 4.9	49
VSP-C30-30R(A)□-6TC		81.2(84.2)		62.1(65.1)	30	1.1 to 4.8	54
VSP-C30-40R(A)□-6TC		94.2(97.2)		75.1(78.1)	40	1 to 4.5	59
VSP-C30-50R(A)□-6TC		107.2(110.2)		88.1(91.1)	50	0.9 to 4.5	64
VSP-C40-20R(A)□-6TC	40	71.2(74.7)	14(17.5)	52.1(55.6)	20	1.5 to 4.9	57(58)
VSP-C40-30R(A)□-6TC		84.2(87.7)		65.1(68.6)	30	1.1 to 4.8	62(63)
VSP-C40-40R(A)□-6TC		97.2(100.7)		78.1(81.6)	40	1 to 4.5	68(69)
VSP-C40-50R(A)□-6TC		110.2(113.7)		91.1(94.6)	50	0.9 to 4.5	73(74)
VSP-C50-20R(A)□-6TC	50	72.2(75.7)	15(18)	53.1(56.1)	20	1.5 to 4.9	63(65)
VSP-C50-30R(A)□-6TC		85.2(88.7)		66.1(69.1)	30	1.1 to 4.8	68(70)
VSP-C50-40R(A)□-6TC		98.2(101.7)		79.1(82.1)	40	1 to 4.5	73(75)
VSP-C50-50R(A)□-6TC		111.2(114.7)		92.1(95.1)	50	0.9 to 4.5	79(80)

* Dimensions in ( ) are dimensions of the deep pad.

Dimensions (standard, buffer, vacuum outlet side VSP-D□-□)

● Type with spring cover, push-in fitting

· VSP-D4-□R□-4 · VSP-D6, 8-□R□-4 · VSP-D10-□R□-6 · VSP-D15 to 50-□R(A)□-6



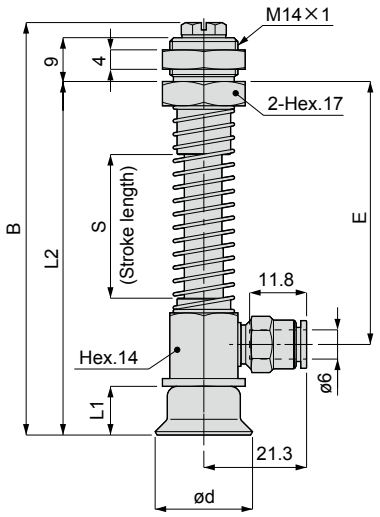
Unit: mm

Model No.	Pad diameter ød	B	L1	L2	L3	Stroke length S	E2	Spring force (N)	Weight (g)
VSP-D4-10R□-4	4	55.6	4	35	17.5	10	21	0.6 to 1.7	30
VSP-D4-15R□-4		66.6		40	23.5	15	26	0.4 to 1.7	34
VSP-D4-20R□-4		76.6		45	28.5	20	31	0.3 to 1.8	37
VSP-D6-10R□-4	6	56.1	7	35.5	17.5	10	21	0.8 to 2.7	34
VSP-D6-15R□-4		67.1		40.5	23.5	15	26	0.7 to 3	38
VSP-D6-20R□-4		77.1		45.5	28.5	20	31	0.9 to 3.4	41
VSP-D8-10R□-4	8	54.6	5.5	34	17.5	10	21	0.8 to 2.7	34
VSP-D8-15R□-4		65.6		39	23.5	15	26	0.7 to 3	38
VSP-D8-20R□-4		75.6		44	28.5	20	31	0.9 to 3.4	41
VSP-D10-10R□-6	10	63.1	8	40	20	10	25	2 to 5.2	51
VSP-D10-15R□-6		73.1		45	25	15	30	2 to 5.9	56
VSP-D10-20R□-6		89.1		52	34	20	37	1.1 to 4.8	67
VSP-D15-10R(A)□-6	15	64.1(65.1)	9(10)	41(42)	20	10	25	2 to 5.2	51
VSP-D15-15R(A)□-6		74.1(75.1)		46(47)	25	15	30	2 to 5.9	57
VSP-D15-20R(A)□-6		90.1(91.1)		53(54)	34	20	37	1.1 to 4.8	67
VSP-D20-10R(A)□-6	20	66.1(67.1)	10(11)	43(44)	20	10	24.5	3.3 to 10	55
VSP-D20-15R(A)□-6		76.1(77.1)		48(49)	25	15	29.5	3.3 to 10.4	62
VSP-D20-20R(A)□-6		92.1(93.1)		55(56)	34	20	36.5	2 to 8.7	72
VSP-D25-10R(A)□-6	25	67.1(68.1)	11(12)	44(45)	20	10	24.5	3.3 to 10	56
VSP-D25-15R(A)□-6		77.1(78.1)		49(50)	25	15	29.5	3.3 to 10.4	62
VSP-D25-20R(A)□-6		93.1(94.1)		56(57)	34	20	36.5	2 to 8.7	72
VSP-D30-10R(A)□-6	30	67.1(70.1)	11(14)	44(47)	20	10	24.5	3.3 to 10	58
VSP-D30-15R(A)□-6		77.1(80.1)		49(52)	25	15	29.5	3.3 to 10.4	64
VSP-D30-20R(A)□-6		93.1(96.1)		56(59)	34	20	36.5	2 to 8.7	74
VSP-D40-10R(A)□-6	40	70.1(73.6)	14(17.5)	47(50.5)	20	10	24.5	3.3 to 10	65(66)
VSP-D40-15R(A)□-6		80.1(83.6)		52(55.5)	25	15	29.5	3.3 to 10.4	71(72)
VSP-D40-20R(A)□-6		96.1(99.6)		59(62.5)	34	20	36.5	2 to 8.7	81(82)
VSP-D50-10R(A)□-6	50	71.1(74.1)	15(18)	48(51)	20	10	24.5	3.3 to 10	71(72)
VSP-D50-15R(A)□-6		81.1(84.1)		53(56)	25	15	29.5	3.3 to 10.4	77(79)
VSP-D50-20R(A)□-6		97.1(100.1)		60(63)	34	20	36.5	2 to 8.7	87(89)

* Dimensions in ( ) are dimensions of the deep pad.

Dimensions (standard, buffer, vacuum outlet side VSP-D□-□)

● Type without spring cover, with push-in fitting
· VSP-D20 to 50-□R (A) □-6C



Unit: mm

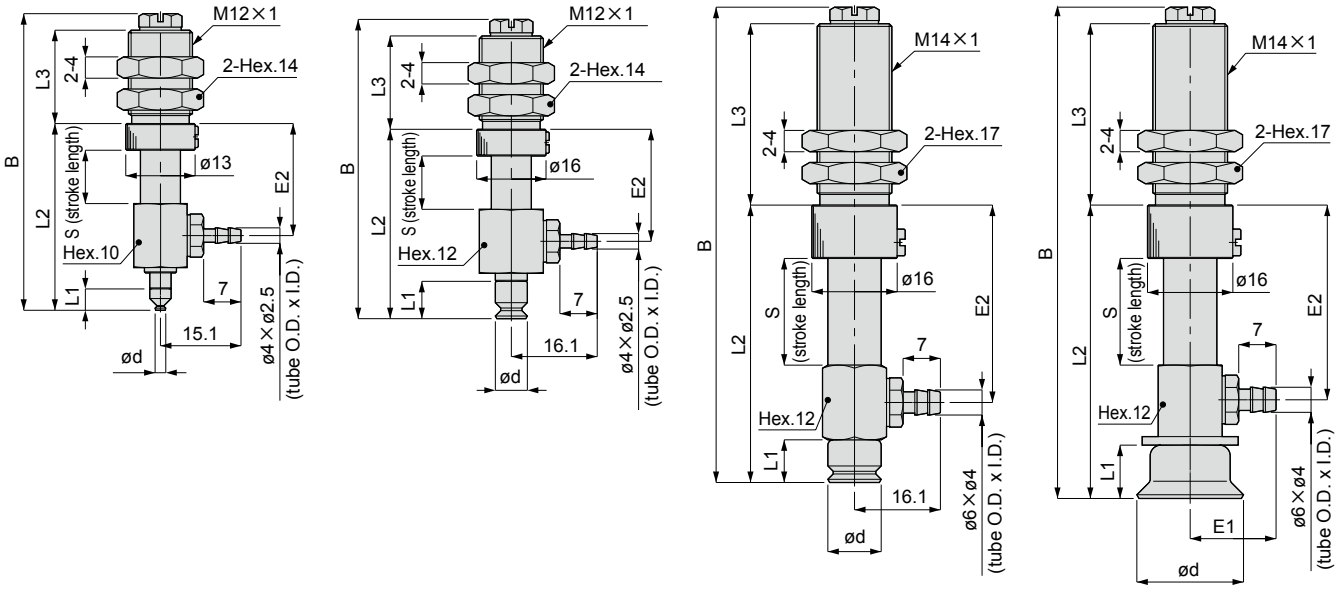
Model No.	Pad diameter ød	B	L1	L2	Stroke length S	E	Spring force (N)	Weight (g)
VSP-D20-20R(A)□-6C	20	71.7(72.7)	10(11)	59.6(60.7)	20	41	1.5 to 4.9	70
VSP-D20-30R(A)□-6C		84.7(85.7)		72.6(73.7)	30	54	1.1 to 4.8	77
VSP-D20-40R(A)□-6C		97.7(98.7)		85.6(86.7)	40	67	1 to 4.5	83
VSP-D20-50R(A)□-6C		110.7(111.7)		98.6(99.7)	50	80	0.9 to 4.5	90
VSP-D25-20R(A)□-6C	25	72.7(73.7)	11(12)	60.6(61.7)	20	41	1.5 to 4.9	70
VSP-D25-30R(A)□-6C		85.7(86.7)		73.6(74.7)	30	54	1.1 to 4.8	77
VSP-D25-40R(A)□-6C		98.7(99.7)		86.6(87.7)	40	67	1 to 4.5	84
VSP-D25-50R(A)□-6C		111.7(112.7)		99.6(100.7)	50	80	0.9 to 4.5	91
VSP-D30-20R(A)□-6C	30	72.7(75.7)	11(14)	60.6(63.7)	20	41	1.5 to 4.9	72(71)
VSP-D30-30R(A)□-6C		85.7(88.7)		73.6(76.7)	30	54	1.1 to 4.8	79(78)
VSP-D30-40R(A)□-6C		98.7(101.7)		86.6(89.7)	40	67	1 to 4.5	86(84)
VSP-D30-50R(A)□-6C		111.7(114.7)		99.6(102.7)	50	80	0.9 to 4.5	93(91)
VSP-D40-20R(A)□-6C	40	75.7(79.2)	14(17.5)	63.6(67.2)	20	41	1.5 to 4.9	79(76)
VSP-D40-30R(A)□-6C		88.7(92.2)		76.6(80.2)	30	54	1.1 to 4.8	86(83)
VSP-D40-40R(A)□-6C		101.7(105.2)		89.6(93.2)	40	67	1 to 4.5	93(90)
VSP-D40-50R(A)□-6C		114.7(118.2)		102.6(106.2)	50	80	0.9 to 4.5	100(97)
VSP-D50-20R(A)□-6C	50	76.7(79.7)	15(18)	64.6(67.7)	20	41	1.5 to 4.9	85(81)
VSP-D50-30R(A)□-6C		89.7(92.7)		77.6(80.7)	30	54	1.1 to 4.8	92(88)
VSP-D50-40R(A)□-6C		102.7(105.7)		90.6(93.7)	40	67	1 to 4.5	99(94)
VSP-D50-50R(A)□-6C		115.7(118.7)		103.6(106.7)	50	80	0.9 to 4.5	106(101)

* Dimensions in ( ) are dimensions of the deep pad.

Dimensions (standard, buffer, vacuum outlet side VSP-D□-□)

● Type with spring cover, barbed fitting

· VSP-D4-□R□-4T · VSP-D6, 8-□R□-4T · VSP-D10-□R□-6T · VSP-D15 to 50-□R (A) □-6T



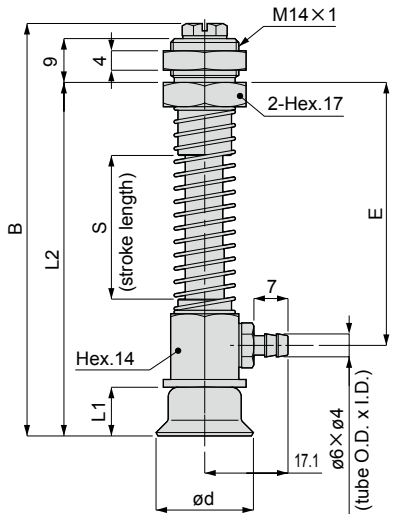
Unit: mm

Model No.	Pad diameter ød	B	L1	L2	L3	Stroke length S	E2	Spring force (N)	Weight (g)
VSP-D4-10R□-4T	4	55.6	4	35	17.5	10	21	0.6 to 1.7	27
VSP-D4-15R□-4T		66.6		40	23.5	15	26	0.4 to 1.7	32
VSP-D4-20R□-4T		76.6		45	28.5	20	31	0.3 to 1.8	35
VSP-D6-10R□-4T	6	56.1	7	35.5	17.5	10	21	0.8 to 2.7	32
VSP-D6-15R□-4T		67.1		40.5	23.5	15	26	0.7 to 3	36
VSP-D6-20R□-4T		77.1		45.5	28.5	20	31	0.9 to 3.4	39
VSP-D8-10R□-4T	8	54.6	5.5	34	17.5	10	21	0.8 to 2.7	32
VSP-D8-15R□-4T		65.6		39	23.5	15	26	0.7 to 3	36
VSP-D8-20R□-4T		75.6		44	28.5	20	31	0.9 to 3.4	39
VSP-D10-10R□-6T	10	63.1	8	40	20	10	25	2 to 5.2	49
VSP-D10-15R□-6T		73.1		45	25	15	30	2 to 5.9	54
VSP-D10-20R□-6T		89.1		52	34	20	35	1.1 to 4.8	65
VSP-D15-10R(A)□-6T	15	64.1(65.1)	9(10)	41(42)	20	10	25	2 to 5.2	49
VSP-D15-15R(A)□-6T		74.1(75.1)		46(47)	25	15	30	2 to 5.9	55
VSP-D15-20R(A)□-6T		90.1(91.1)		53(54)	34	20	37	1.1 to 4.8	65
VSP-D20-10R(A)□-6T	20	66.1(67.1)	10(11)	43(44)	20	10	24.5	3.3 to 10	53
VSP-D20-15R(A)□-6T		76.1(77.1)		48(49)	25	15	29.5	3.3 to 10.4	60
VSP-D20-20R(A)□-6T		92.1(93.1)		55(56)	34	20	36.5	2 to 8.7	70
VSP-D25-10R(A)□-6T	25	67.1(68.1)	11(12)	44(45)	20	10	24.5	3.3 to 10	54
VSP-D25-15R(A)□-6T		77.1(78.1)		49(50)	25	15	29.5	3.3 to 10.4	60
VSP-D25-20R(A)□-6T		93.1(94.1)		56(57)	34	20	36.5	2 to 8.7	70
VSP-D30-10R(A)□-6T	30	67.1(70.1)	11(14)	44(47)	20	10	24.5	3.3 to 10	54
VSP-D30-15R(A)□-6T		77.1(80.1)		49(52)	25	15	29.5	3.3 to 10.4	61
VSP-D30-20R(A)□-6T		93.1(96.1)		56(59)	34	20	36.5	2 to 8.7	71
VSP-D40-10R(A)□-6T	40	70.1(73.6)	14(17.5)	47(50.5)	20	10	24.5	3.3 to 10	63(64)
VSP-D40-15R(A)□-6T		80.1(83.6)		52(55.5)	25	15	29.5	3.3 to 10.4	69(70)
VSP-D40-20R(A)□-6T		96.1(99.6)		59(62.5)	34	20	36.5	2 to 8.7	79(80)
VSP-D50-10R(A)□-6T	50	71.1(74.1)	15(18)	48(51)	20	10	24.5	3.3 to 10	69(70)
VSP-D50-15R(A)□-6T		81.1(84.1)		53(56)	25	15	29.5	3.3 to 10.4	75(77)
VSP-D50-20R(A)□-6T		97.1(100.1)		60(63)	34	20	36.5	2 to 8.7	85(87)

* Dimensions in ( ) are dimensions of the deep pad.

Dimensions (standard, buffer, vacuum outlet side VSP-D□-□)

● Type without spring cover, with barbed fitting
· VSP-D20 to 50-□R (A) □-6TC



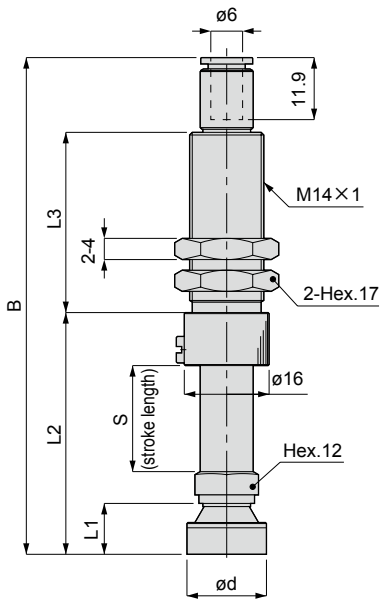
Unit: mm

Model No.	Pad diameter ød	B	L1	L2	Stroke length S	E	Spring force (N)	Weight (g)
VSP-D20-20R(A)□-6TC	20	71.7(72.7)	10(11)	59.6(60.7)	20	41	1.5 to 4.9	68
VSP-D20-30R(A)□-6TC		84.7(85.7)		72.6(73.7)	30	54	1.1 to 4.8	75
VSP-D20-40R(A)□-6TC		97.7(98.7)		85.6(86.7)	40	67	1 to 4.5	81
VSP-D20-50R(A)□-6TC		110.7(111.7)		98.6(99.7)	50	80	0.9 to 4.5	88
VSP-D25-20R(A)□-6TC	25	72.7(73.7)	11(12)	60.6(61.7)	20	41	1.5 to 4.9	68
VSP-D25-30R(A)□-6TC		85.7(86.7)		73.6(74.7)	30	54	1.1 to 4.8	75
VSP-D25-40R(A)□-6TC		98.7(99.7)		86.6(87.7)	40	67	1 to 4.5	82
VSP-D25-50R(A)□-6TC		111.7(112.7)		99.6(100.7)	50	80	0.9 to 4.5	89
VSP-D30-20R(A)□-6TC	30	72.7(75.7)	11(14)	60.6(63.7)	20	41	1.5 to 4.9	69
VSP-D30-30R(A)□-6TC		85.7(88.7)		73.6(76.7)	30	54	1.1 to 4.8	76
VSP-D30-40R(A)□-6TC		98.7(101.7)		86.6(89.7)	40	67	1 to 4.5	82
VSP-D30-50R(A)□-6TC		111.7(114.7)		99.6(102.7)	50	80	0.9 to 4.5	89
VSP-D40-20R(A)□-6TC	40	75.7(79.2)	14(17.5)	63.6(67.2)	20	41	1.5 to 4.9	77(78)
VSP-D40-30R(A)□-6TC		88.7(92.2)		76.6(80.2)	30	54	1.1 to 4.8	84(85)
VSP-D40-40R(A)□-6TC		101.7(105.2)		89.6(93.2)	40	67	1 to 4.5	91(92)
VSP-D40-50R(A)□-6TC		114.7(118.2)		102.6(106.2)	50	80	0.9 to 4.5	98(99)
VSP-D50-20R(A)□-6TC	50	76.7(79.7)	15(18)	64.6(67.7)	20	41	1.5 to 4.9	83(85)
VSP-D50-30R(A)□-6TC		89.7(92.7)		77.6(80.7)	30	54	1.1 to 4.8	90(92)
VSP-D50-40R(A)□-6TC		102.7(105.7)		90.6(93.7)	40	67	1 to 4.5	97(98)
VSP-D50-50R(A)□-6TC		115.7(118.7)		103.6(106.7)	50	80	0.9 to 4.5	104(105)

* Dimensions in ( ) are dimensions of the deep pad.

Dimensions (sponge, buffer, vacuum outlet top VSP-C□-□)

● Type with spring cover, push-in fitting
· VSP-C10 to 50-□S□-6

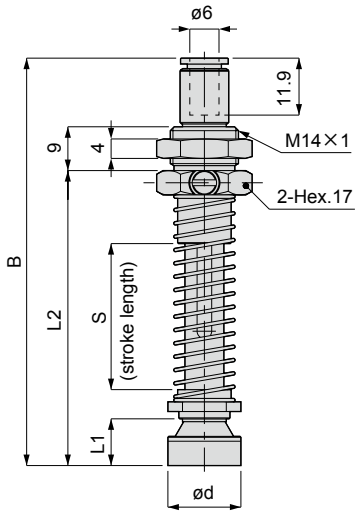


Unit: mm

Model No.	Pad diameter ød	B	L1	L2	L3	Stroke length S	Spring force (N)	Weight (g)
VSP-C10-10S□-6	10	67.8	9.5	33.5	20	10	3.3 to 10	38
VSP-C10-15S□-6		77.8		38.5	25	15	3.3 to 10.4	42
VSP-C10-20S□-6		93.8		45.5	34	20	2 to 8.7	49
VSP-C15-10S□-6	15	67.8	9.5	33.5	20	10	3.3 to 10	38
VSP-C15-15S□-6		77.8		38.5	25	15	3.3 to 10.4	43
VSP-C15-20S□-6		93.8		45.5	34	20	2 to 8.7	50
VSP-C20-10S□-6	20	73.8	15.5	39.5	20	10	3.3 to 10	40
VSP-C20-15S□-6		83.8		44.5	25	15	3.3 to 10.4	44
VSP-C20-20S□-6		99.8		51.5	34	20	2 to 8.7	51
VSP-C25-10S□-6	25	73.8	15.5	39.5	20	10	3.3 to 10	41
VSP-C25-15S□-6		83.8		44.5	25	15	3.3 to 10.4	46
VSP-C25-20S□-6		99.8		51.5	34	20	2 to 8.7	53
VSP-C30-10S□-6	30	73.8	15.5	39.5	20	10	3.3 to 10	41
VSP-C30-15S□-6		83.8		44.5	25	15	3.3 to 10.4	46
VSP-C30-20S□-6		99.8		51.5	34	20	2 to 8.7	53
VSP-C35-10S□-6	35	86.3	28	52	20	10	3.3 to 10	77
VSP-C35-15S□-6		96.3		57	25	15	3.3 to 10.4	82
VSP-C35-20S□-6		112.3		64	34	20	2 to 8.7	88
VSP-C50-10S□-6	50	86.3	28	52	20	10	3.3 to 10	120
VSP-C50-15S□-6		96.3		57	25	15	3.3 to 10.4	125
VSP-C50-20S□-6		112.3		64	34	20	2 to 8.7	131

Dimensions (sponge, buffer, vacuum outlet top VSP-C□-□)

● Type without spring cover, with push-in fitting
· VSP-C10 to 50-□S□-6C

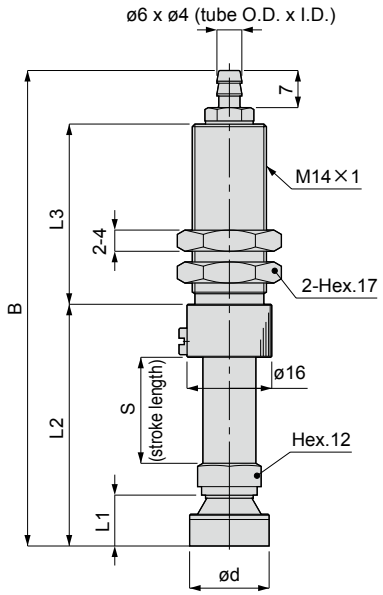


Unit: mm

Model No.	Pad diameter ød	B	L1	L2	Stroke length S	Spring force (N)	Weight (g)
VSP-C10-20S□-6C	10	70.8	9.5	47.5	20	1.5 to 4.9	45
VSP-C10-30S□-6C		83.8		60.5	30	1.1 to 4.8	50
VSP-C10-40S□-6C		96.8		73.5	40	1 to 4.5	55
VSP-C10-50S□-6C		109.8		86.5	50	0.9 to 4.5	61
VSP-C15-20S□-6C	15	70.8	9.5	47.5	20	1.5 to 4.9	45
VSP-C15-30S□-6C		83.8		60.5	30	1.1 to 4.8	51
VSP-C15-40S□-6C		96.8		73.5	40	1 to 4.5	56
VSP-C15-50S□-6C		109.8		86.5	50	0.9 to 4.5	61
VSP-C20-20S□-6C	20	76.8	15.5	53.5	20	1.5 to 4.9	47
VSP-C20-30S□-6C		89.8		66.5	30	1.1 to 4.8	52
VSP-C20-40S□-6C		102.8		79.5	40	1 to 4.5	57
VSP-C20-50S□-6C		115.8		92.5	50	0.9 to 4.5	63
VSP-C25-20S□-6C	25	76.8	15.5	53.5	20	1.5 to 4.9	48
VSP-C25-30S□-6C		89.8		66.5	30	1.1 to 4.8	54
VSP-C25-40S□-6C		102.8		79.5	40	1 to 4.5	59
VSP-C25-50S□-6C		115.8		92.5	50	0.9 to 4.5	64
VSP-C30-20S□-6C	30	76.8	15.5	53.5	20	1.5 to 4.9	48
VSP-C30-30S□-6C		89.8		66.5	30	1.1 to 4.8	54
VSP-C30-40S□-6C		102.8		79.5	40	1 to 4.5	59
VSP-C30-50S□-6C		115.8		92.5	50	0.9 to 4.5	64
VSP-C35-20S□-6C	40	89.4	28	66.1	20	1.5 to 4.9	84
VSP-C35-30S□-6C		102.4		79.1	30	1.1 to 4.8	89
VSP-C35-40S□-6C		115.4		92.1	40	1 to 4.5	95
VSP-C35-50S□-6C		128.4		105.1	50	0.9 to 4.5	100
VSP-C50-20S□-6C	50	89.4	28	66.1	20	1.5 to 4.9	127
VSP-C50-30S□-6C		102.4		79.1	30	1.1 to 4.8	132
VSP-C50-40S□-6C		115.4		92.1	40	1 to 4.5	138
VSP-C50-50S□-6C		128.4		105.1	50	0.9 to 4.5	143

Dimensions (sponge, buffer, vacuum outlet top VSP-C□-□)

● Type with spring cover, barbed fitting
· VSP-C10 to 50-□S□-6T

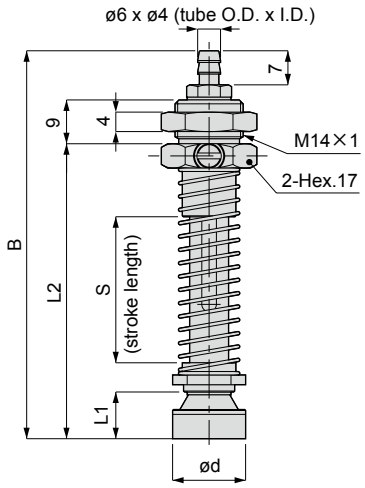


Unit: mm

Model No.	Pad diameter ød	B	L1	L2	L3	Stroke length S	Spring force (N)	Weight (g)
VSP-C10-10S□-6T	10	63.6	9.5	33.5	20	10	3.3 to 10	36
VSP-C10-15S□-6T		73.6		38.5	25	15	3.3 to 10.4	40
VSP-C10-20S□-6T		89.6		45.5	34	20	2 to 8.7	47
VSP-C15-10S□-6T	15	63.6	9.5	33.5	20	10	3.3 to 10	36
VSP-C15-15S□-6T		73.6		38.5	25	15	3.3 to 10.4	41
VSP-C15-20S□-6T		89.6		45.5	34	20	2 to 8.7	48
VSP-C20-10S□-6T	20	69.6	15.5	39.5	20	10	3.3 to 10	38
VSP-C20-15S□-6T		79.6		44.5	25	15	3.3 to 10.4	42
VSP-C20-20S□-6T		95.6		51.5	34	20	2 to 8.7	49
VSP-C25-10S□-6T	25	69.6	15.5	39.5	20	10	3.3 to 10	39
VSP-C25-15S□-6T		79.6		44.5	25	15	3.3 to 10.4	44
VSP-C25-20S□-6T		95.6		51.5	34	20	2 to 8.7	51
VSP-C30-10S□-6T	30	69.6	15.5	39.5	20	10	3.3 to 10	39
VSP-C30-15S□-6T		79.6		44.5	25	15	3.3 to 10.4	44
VSP-C30-20S□-6T		95.6		51.5	34	20	2 to 8.7	51
VSP-C35-10S□-6T	35	82.1	28	52	20	10	3.3 to 10	75
VSP-C35-15S□-6T		92.1		57	25	15	3.3 to 10.4	80
VSP-C35-20S□-6T		108.1		64	34	20	2 to 8.7	86
VSP-C50-10S□-6T	50	82.1	28	52	20	10	3.3 to 10	118
VSP-C50-15S□-6T		92.1		57	25	15	3.3 to 10.4	123
VSP-C50-20S□-6T		108.1		64	34	20	2 to 8.7	129

Dimensions (sponge, buffer, vacuum outlet top VSP-C□-□)

● Type without spring cover, with barbed fitting
· VSP-C10 to 50-□S□-6TC

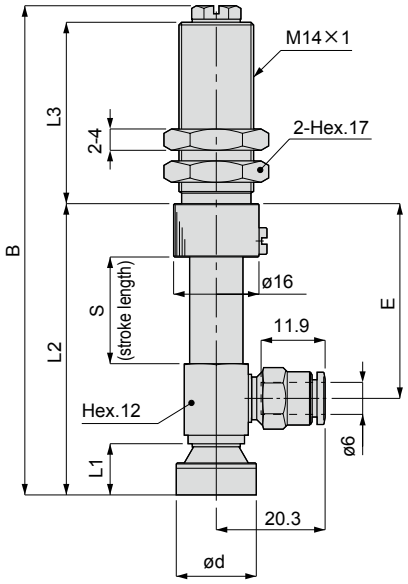


Unit: mm

Model No.	Pad diameter ød	B	L1	L2	Stroke length S	Spring force (N)	Weight (g)
VSP-C10-20S□-6TC	10	66.6	9.5	47.5	20	1.5 to 4.9	43
VSP-C10-30S□-6TC		79.6		60.5	30	1.1 to 4.8	48
VSP-C10-40S□-6TC		92.6		73.5	40	1 to 4.5	53
VSP-C10-50S□-6TC		105.6		86.5	50	0.9 to 4.5	59
VSP-C15-20S□-6TC	15	66.6	9.5	47.5	20	1.5 to 4.9	43
VSP-C15-30S□-6TC		79.6		60.5	30	1.1 to 4.8	49
VSP-C15-40S□-6TC		92.6		73.5	40	1 to 4.5	54
VSP-C15-50S□-6TC		105.6		86.5	50	0.9 to 4.5	59
VSP-C20-20S□-6TC	20	72.6	15.5	53.5	20	1.5 to 4.9	45
VSP-C20-30S□-6TC		85.6		66.5	30	1.1 to 4.8	50
VSP-C20-40S□-6TC		98.6		79.5	40	1 to 4.5	55
VSP-C20-50S□-6TC		111.6		92.5	50	0.9 to 4.5	61
VSP-C25-20S□-6TC	25	72.6	15.5	53.5	20	1.5 to 4.9	46
VSP-C25-30S□-6TC		85.6		66.5	30	1.1 to 4.8	52
VSP-C25-40S□-6TC		98.6		79.5	40	1 to 4.5	57
VSP-C25-50S□-6TC		111.6		92.5	50	0.9 to 4.5	62
VSP-C30-20S□-6TC	30	72.6	15.5	53.5	20	1.5 to 4.9	46
VSP-C30-30S□-6TC		85.6		66.5	30	1.1 to 4.8	52
VSP-C30-40S□-6TC		98.6		79.5	40	1 to 4.5	57
VSP-C30-50S□-6TC		111.6		92.5	50	0.9 to 4.5	62
VSP-C35-20S□-6TC	35	85.2	28	66.1	20	1.5 to 4.9	82
VSP-C35-30S□-6TC		98.2		79.1	30	1.1 to 4.8	87
VSP-C35-40S□-6TC		111.2		92.1	40	1 to 4.5	92
VSP-C35-50S□-6TC		124.2		105.1	50	0.9 to 4.5	90
VSP-C50-20S□-6TC	50	85.2	28	66.1	20	1.5 to 4.9	125
VSP-C50-30S□-6TC		98.2		79.1	30	1.1 to 4.8	130
VSP-C50-40S□-6TC		111.2		92.1	40	1 to 4.5	135
VSP-C50-50S□-6TC		124.2		105.1	50	0.9 to 4.5	133

Dimensions (sponge, buffer, vacuum outlet side VSP-D□-□)

● Type with spring cover, push-in fitting
· VSP-D10 to 50-□S□-6

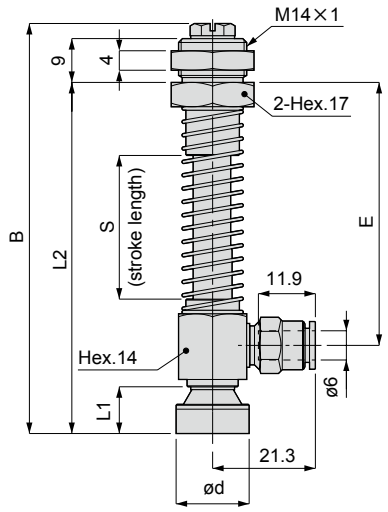


Unit: mm

Model No.	Pad diameter ød	B	L1	L2	L3	Stroke length S	E	Spring force (N)	Weight (g)
VSP-D10-10S□-6	10	65.6	9.5	42.5	20	10	24.5	3.3 to 10	51
VSP-D10-15S□-6		75.6		47.5	25	15	29.5	3.3 to 10.4	57
VSP-D10-20S□-6		91.6		54.5	34	20	36.5	2 to 8.7	67
VSP-D15-10S□-6	15	65.6	9.5	42.5	20	10	24.5	3.3 to 10	51
VSP-D15-15S□-6		75.6		47.5	25	15	29.5	3.3 to 10.4	57
VSP-D15-20S□-6		91.6		54.5	34	20	36.5	2 to 8.7	67
VSP-D20-10S□-6	20	71.6	15.5	48.5	20	10	24.5	3.3 to 10	53
VSP-D20-15S□-6		81.6		53.5	25	15	29.5	3.3 to 10.4	59
VSP-D20-20S□-6		97.6		60.5	34	20	36.5	2 to 8.7	69
VSP-D25-10S□-6	25	71.6	15.5	48.5	20	10	24.5	3.3 to 10	54
VSP-D25-15S□-6		81.6		53.5	25	15	29.5	3.3 to 10.4	60
VSP-D25-20S□-6		97.6		60.5	34	20	36.5	2 to 8.7	70
VSP-D30-10S□-6	30	71.6	15.5	48.5	20	10	24.5	3.3 to 10	54
VSP-D30-15S□-6		81.6		53.5	25	15	29.5	3.3 to 10.4	60
VSP-D30-20S□-6		97.6		60.5	34	20	36.5	2 to 8.7	70
VSP-D35-10S□-6	35	84.1	28	61	20	10	24.5	3.3 to 10	90
VSP-D35-15S□-6		94.1		66	25	15	29.5	3.3 to 10.4	96
VSP-D35-20S□-6		110.1		73	34	20	36.5	2 to 8.7	106
VSP-D50-10S□-6	50	84.1	28	61	20	10	24.5	3.3 to 10	133
VSP-D50-15S□-6		94.1		66	25	15	29.5	3.3 to 10.4	139
VSP-D50-20S□-6		110.1		73	34	20	36.5	2 to 8.7	149

Dimensions (sponge, buffer, vacuum outlet side VSP-D□-□)

● Type without spring cover, with push-in fitting
· VSP-D10 to 50-□S□-6C

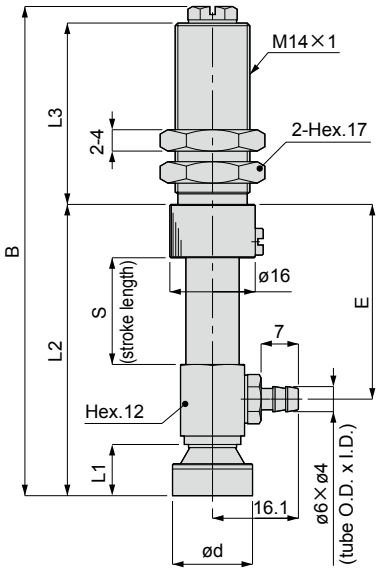


Unit: mm

Model No.	Pad diameter ød	B	L1	L2	Stroke length S	E	Spring force (N)	Weight (g)
VSP-D10-20S□-6C	10	71.1	9.5	59	20	41	1.5 to 4.9	65
VSP-D10-30S□-6C		84.1		72	30	54	1.1 to 4.8	72
VSP-D10-40S□-6C		97.1		85	40	67	1 to 4.5	79
VSP-D10-50S□-6C		110.1		98	50	80	0.9 to 4.5	85
VSP-D15-20S□-6C	15	71.1	9.5	59	20	41	1.5 to 4.9	66
VSP-D15-30S□-6C		84.1		72	30	54	1.1 to 4.8	72
VSP-D15-40S□-6C		97.1		85	40	67	1 to 4.5	79
VSP-D15-50S□-6C		110.1		98	50	80	0.9 to 4.5	86
VSP-D20-20S□-6C	20	77.1	15.5	65	20	41	1.5 to 4.9	67
VSP-D20-30S□-6C		90.1		78	30	54	1.1 to 4.8	74
VSP-D20-40S□-6C		103.1		91	40	67	1 to 4.5	81
VSP-D20-50S□-6C		116.1		104	50	80	0.9 to 4.5	87
VSP-D25-20S□-6C	25	77.1	15.5	65	20	41	1.5 to 4.9	69
VSP-D25-30S□-6C		90.1		78	30	54	1.1 to 4.8	75
VSP-D25-40S□-6C		103.1		91	40	67	1 to 4.5	82
VSP-D25-50S□-6C		116.1		104	50	80	0.9 to 4.5	89
VSP-D30-20S□-6C	30	77.1	15.5	65	20	41	1.5 to 4.9	69
VSP-D30-30S□-6C		90.1		78	30	54	1.1 to 4.8	75
VSP-D30-40S□-6C		103.1		91	40	67	1 to 4.5	82
VSP-D30-50S□-6C		116.1		104	50	80	0.9 to 4.5	89
VSP-D35-20S□-6C	35	89.7	28	77.6	20	41	1.5 to 4.9	104
VSP-D35-30S□-6C		102.7		90.6	30	54	1.1 to 4.8	111
VSP-D35-40S□-6C		115.7		103.6	40	67	1 to 4.5	118
VSP-D35-50S□-6C		128.7		116.6	50	80	0.9 to 4.5	125
VSP-D50-20S□-6C	50	89.7	28	77.6	20	41	1.5 to 4.9	147
VSP-D50-30S□-6C		102.7		90.6	30	54	1.1 to 4.8	154
VSP-D50-40S□-6C		115.7		103.6	40	67	1 to 4.5	161
VSP-D50-50S□-6C		128.7		116.6	50	80	0.9 to 4.5	168

Dimensions (sponge, buffer, vacuum outlet side VSP-D□-□)

● Type with spring cover, barbed fitting
· VSP-D10 to 50-□S□-6T

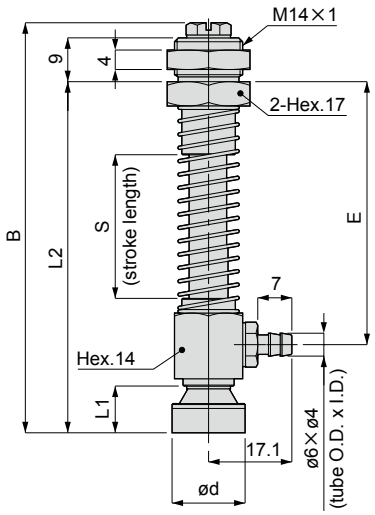


Unit: mm

Model No.	Pad diameter ød	B	L1	L2	L3	Stroke length S	E	Spring force (N)	Weight (g)
VSP-D10-10S□-6T	10	65.6	9.5	42.5	20	10	24.5	3.3 to 10	49
VSP-D10-15S□-6T		75.6		47.5	25	15	29.5	3.3 to 10.4	55
VSP-D10-20S□-6T		91.6		54.5	34	20	36.5	2 to 8.7	65
VSP-D15-10S□-6T	15	65.6	9.5	42.5	20	10	24.5	3.3 to 10	49
VSP-D15-15S□-6T		75.6		47.5	25	15	29.5	3.3 to 10.4	55
VSP-D15-20S□-6T		91.6		54.5	34	20	36.5	2 to 8.7	65
VSP-D20-10S□-6T	20	71.6	15.5	48.5	20	10	24.5	3.3 to 10	51
VSP-D20-15S□-6T		81.6		53.5	25	15	29.5	3.3 to 10.4	57
VSP-D20-20S□-6T		97.6		60.5	34	20	36.5	2 to 8.7	67
VSP-D25-10S□-6T	25	71.6	15.5	48.5	20	10	24.5	3.3 to 10	52
VSP-D25-15S□-6T		81.6		53.5	25	15	29.5	3.3 to 10.4	58
VSP-D25-20S□-6T		97.6		60.5	34	20	36.5	2 to 8.7	68
VSP-D30-10S□-6T	30	71.6	15.5	48.5	20	10	24.5	3.3 to 10	52
VSP-D30-15S□-6T		81.6		53.5	25	15	29.5	3.3 to 10.4	58
VSP-D30-20S□-6T		97.6		60.5	34	20	36.5	2 to 8.7	68
VSP-D35-10S□-6T	35	84.1	28	61	20	10	24.5	3.3 to 10	88
VSP-D35-15S□-6T		94.1		66	25	15	29.5	3.3 to 10.4	94
VSP-D35-20S□-6T		110.1		73	34	20	36.5	2 to 8.7	96
VSP-D50-10S□-6T	50	84.1	28	61	20	10	24.5	3.3 to 10	131
VSP-D50-15S□-6T		94.1		66	25	15	29.5	3.3 to 10.4	137
VSP-D50-20S□-6T		110.1		73	34	20	36.5	2 to 8.7	139

Dimensions (sponge, buffer, vacuum outlet side VSP-D□-□)

● Type without spring cover, with barbed fitting
· VSP-D10 to 50-□S□-6TC



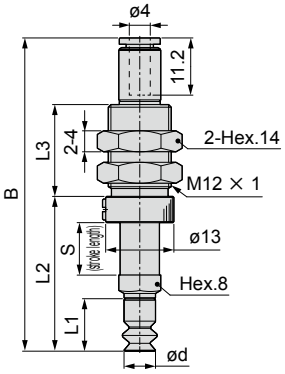
Unit: mm

Model No.	Pad diameter ød	B	L1	L2	Stroke length S	E	Spring force (N)	Weight (g)
VSP-D10-20S□-6TC	10	71.1	9.5	59	20	41	1.5 to 4.9	63
VSP-D10-30S□-6TC		84.1		72	30	54	1.1 to 4.8	70
VSP-D10-40S□-6TC		97.1		85	40	67	1 to 4.5	77
VSP-D10-50S□-6TC		110.1		98	50	80	0.9 to 4.5	83
VSP-D15-20S□-6TC	15	71.1	9.5	59	20	41	1.5 to 4.9	64
VSP-D15-30S□-6TC		84.1		72	30	54	1.1 to 4.8	70
VSP-D15-40S□-6TC		97.1		85	40	67	1 to 4.5	77
VSP-D15-50S□-6TC		110.1		98	50	80	0.9 to 4.5	84
VSP-D20-20S□-6TC	20	77.1	15.5	65	20	41	1.5 to 4.9	65
VSP-D20-30S□-6TC		90.1		78	30	54	1.1 to 4.8	72
VSP-D20-40S□-6TC		103.1		91	40	67	1 to 4.5	79
VSP-D20-50S□-6TC		116.1		104	50	80	0.9 to 4.5	85
VSP-D25-20S□-6TC	25	77.1	15.5	65	20	41	1.5 to 4.9	67
VSP-D25-30S□-6TC		90.1		78	30	54	1.1 to 4.8	73
VSP-D25-40S□-6TC		103.1		91	40	67	1 to 4.5	80
VSP-D25-50S□-6TC		116.1		104	50	80	0.9 to 4.5	87
VSP-D30-20S□-6TC	30	77.1	15.5	65	20	41	1.5 to 4.9	67
VSP-D30-30S□-6TC		90.1		78	30	54	1.1 to 4.8	73
VSP-D30-40S□-6TC		103.1		91	40	67	1 to 4.5	80
VSP-D30-50S□-6TC		116.1		104	50	80	0.9 to 4.5	87
VSP-D35-20S□-6TC	35	89.7	28	77.6	20	41	1.5 to 4.9	102
VSP-D35-30S□-6TC		102.7		90.6	30	54	1.1 to 4.8	109
VSP-D35-40S□-6TC		115.7		103.6	40	67	1 to 4.5	116
VSP-D35-50S□-6TC		128.7		116.6	50	80	0.9 to 4.5	123
VSP-D50-20S□-6TC	50	89.7	28	77.6	20	41	1.5 to 4.9	145
VSP-D50-30S□-6TC		102.7		90.6	30	54	1.1 to 4.8	152
VSP-D50-40S□-6TC		115.7		103.6	40	67	1 to 4.5	159
VSP-D50-50S□-6TC		128.7		116.6	50	80	0.9 to 4.5	167

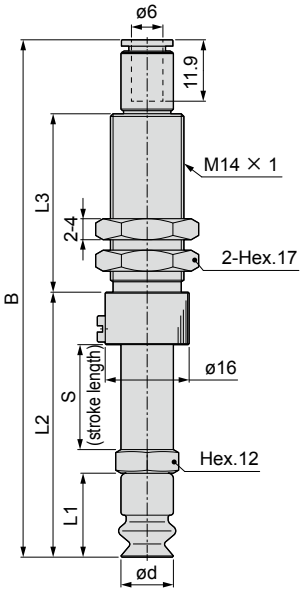
Dimensions (bellows, buffer, vacuum outlet top VSP-C□-□)

● Type with spring cover, push-in fitting

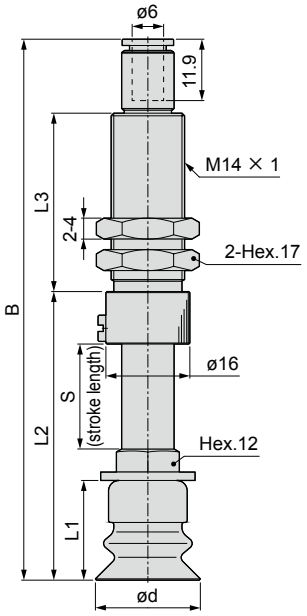
● VSP-C6, 8-□B□-4



● VSP-C10, 15-□B□-6



● VSP-C20 to 50-□B□-6



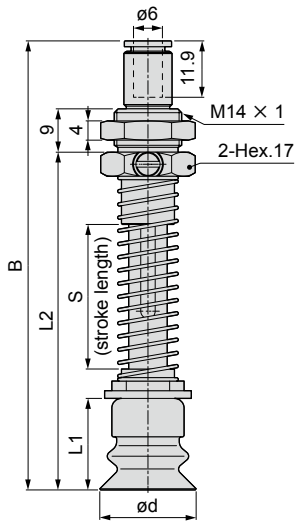
Unit: mm

Model No.	Pad diameter ød	B	L1	L2	L3	Stroke length S	Spring force (N)	Weight (g)
VSP-C6-10B□-4	6	60	10	29.5	20	10	0.8 to 2.7	20
VSP-C6-15B□-4		71		34.5	25	15	0.7 to 3	24
VSP-C6-20B□-4		81		39.5	34	20	0.9 to 3.4	26
VSP-C8-10B□-4	8	60	10	29.5	20	10	0.8 to 2.7	20
VSP-C8-15B□-4		71		34.5	25	15	0.7 to 3	24
VSP-C8-20B□-4		81		39.5	34	20	0.9 to 3.4	26
VSP-C10-10B□-6	10	72.8	16	38.5	20	10	2 to 5.2	37
VSP-C10-15B□-6		82.8		43.5	25	15	2 to 5.9	42
VSP-C10-20B□-6		98.8		50.5	34	20	1.1 to 4.8	50
VSP-C15-10B□-6	15	72.8	16	38.5	20	10	2 to 5.2	38
VSP-C15-15B□-6		82.8		43.5	25	15	2 to 5.9	43
VSP-C15-20B□-6		98.8		50.5	34	20	1.1 to 4.8	50
VSP-C20-10B□-6	20	77.3	19	43	20	10	3.3 to 10	42
VSP-C20-15B□-6		87.3		48	25	15	3.3 to 10.4	47
VSP-C20-20B□-6		103.3		55	34	20	2 to 8.7	54
VSP-C25-10B□-6	25	77.3	19	43	20	10	3.3 to 10	43
VSP-C25-15B□-6		87.3		48	25	15	3.3 to 10.4	48
VSP-C25-20B□-6		103.3		55	34	20	2 to 8.7	55
VSP-C30-10B□-6	30	81.3	23	47	20	10	3.3 to 10	46
VSP-C30-15B□-6		91.3		52	25	15	3.3 to 10.4	51
VSP-C30-20B□-6		107.3		59	34	20	2 to 8.7	58
VSP-C40-10B□-6	40	88.3	30	54	20	10	3.3 to 10	55
VSP-C40-15B□-6		98.3		59	25	15	3.3 to 10.4	59
VSP-C40-20B□-6		114.3		66	34	20	2 to 8.7	66
VSP-C50-10B□-6	50	90.3	32	56	20	10	3.3 to 10	60
VSP-C50-15B□-6		100.3		61	25	15	3.3 to 10.4	65
VSP-C50-20B□-6		116.3		68	34	20	2 to 8.7	72

Dimensions (bellows, buffer, vacuum outlet top VSP-C□-□)

● Type without spring cover, with push-in fitting

● VSP-C20 to 50-□B□-6C



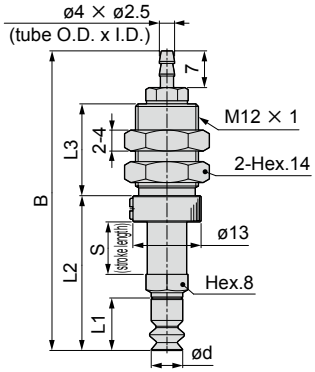
Unit: mm

Model No.	Pad diameter ød	B	L1	L2	Stroke length S	Spring force (N)	Weight (g)
VSP-C20-20B□-6C	20	80.4	19	57.1	20	1.5 to 4.9	50
VSP-C20-30B□-6C		93.4		70.1	30	1.1 to 4.8	55
VSP-C20-40B□-6C		106.4		83.1	40	1 to 4.5	60
VSP-C20-50B□-6C		119.4		96.1	50	0.9 to 4.5	65
VSP-C25-20B□-6C	25	80.4	19	57.1	20	1.5 to 4.9	51
VSP-C25-30B□-6C		93.4		70.1	30	1.1 to 4.8	56
VSP-C25-40B□-6C		106.4		83.1	40	1 to 4.5	61
VSP-C25-50B□-6C		119.4		96.1	50	0.9 to 4.5	66
VSP-C30-20B□-6C	30	84.4	23	61.1	20	1.5 to 4.9	53
VSP-C30-30B□-6C		97.4		74.1	30	1.1 to 4.8	58
VSP-C30-40B□-6C		110.4		87.1	40	1 to 4.5	64
VSP-C30-50B□-6C		123.4		100.1	50	0.9 to 4.5	69
VSP-C40-20B□-6C	40	91.4	30	68.1	20	1.5 to 4.9	62
VSP-C40-30B□-6C		104.4		81.1	30	1.1 to 4.8	67
VSP-C40-40B□-6C		117.4		94.1	40	1 to 4.5	72
VSP-C40-50B□-6C		130.4		107.1	50	0.9 to 4.5	78
VSP-C50-20B□-6C	50	93.4	32	70.1	20	1.5 to 4.9	68
VSP-C50-30B□-6C		106.4		83.1	30	1.1 to 4.8	73
VSP-C50-40B□-6C		119.4		96.1	40	1 to 4.5	78
VSP-C50-50B□-6C		132.4		109.1	50	0.9 to 4.5	83

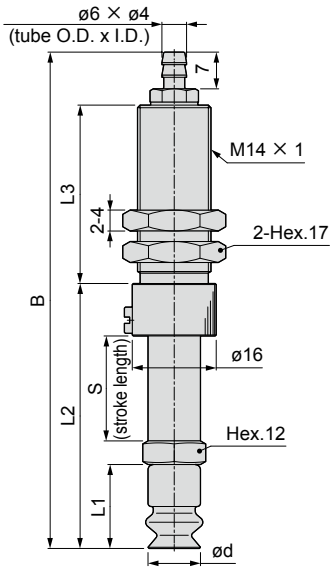
Dimensions (bellows, buffer, vacuum outlet top VSP-C□-□)

● Type with spring cover, barbed fitting

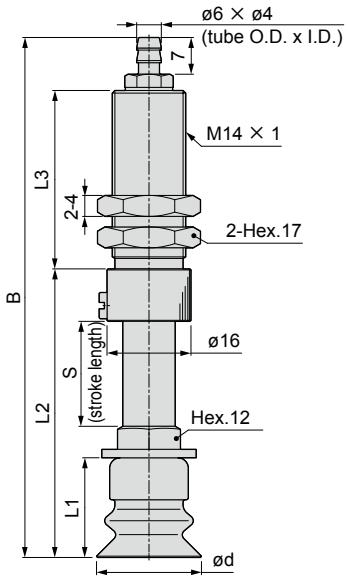
● VSP-C6, 8-□B□-4T



● VSP-C10, 15-□B□-6T



● VSP-C20 to 50-□B□-6T



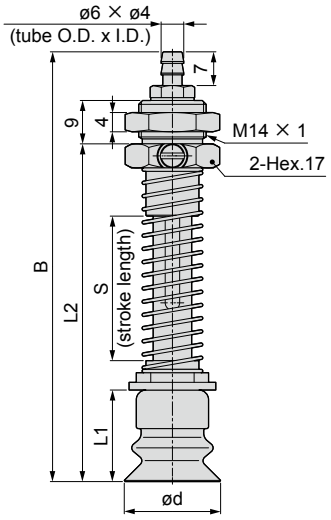
Unit: mm

Model No.	Pad diameter ød	B	L1	L2	L3	Stroke length S	Spring force (N)	Weight (g)
VSP-C6-10B□-4T	6	57.1	10	29.5	17.5	10	0.8 to 2.7	18
VSP-C6-15B□-4T		68.1		34.5	23.5	15	0.7 to 3	22
VSP-C6-20B□-4T		78.1		39.5	28.5	20	0.9 to 3.4	24
VSP-C8-10B□-4T	8	57.1	10	29.5	17.5	10	0.8 to 2.7	18
VSP-C8-15B□-4T		68.1		34.5	23.5	15	0.7 to 3	22
VSP-C8-20B□-4T		78.1		39.5	28.5	20	0.9 to 3.4	24
VSP-C10-10B□-6T	10	68.6	16	38.5	20	10	2 to 5.2	35
VSP-C10-15B□-6T		78.6		43.5	25	15	2 to 5.9	40
VSP-C10-20B□-6T		94.6		50.5	34	20	1.1 to 4.8	48
VSP-C15-10B□-6T	15	68.6	16	38.5	20	10	2 to 5.2	36
VSP-C15-15B□-6T		78.6		43.5	25	15	2 to 5.9	41
VSP-C15-20B□-6T		94.6		38.5	34	20	1.1 to 4.8	48
VSP-C20-10B□-6T	20	73.1	19	43	20	10	3.3 to 10	40
VSP-C20-15B□-6T		83.1		48	25	15	3.3 to 10.4	45
VSP-C20-20B□-6T		99.1		55	34	20	2 to 8.7	52
VSP-C25-10B□-6T	25	73.1	19	43	20	10	3.3 to 10	41
VSP-C25-15B□-6T		83.1		48	25	15	3.3 to 10.4	46
VSP-C25-20B□-6T		99.1		55	34	20	2 to 8.7	53
VSP-C30-10B□-6T	30	77.1	23	47	20	10	3.3 to 10	44
VSP-C30-15B□-6T		87.1		52	25	15	3.3 to 10.4	49
VSP-C30-20B□-6T		103.1		59	34	20	2 to 8.7	55
VSP-C40-10B□-6T	40	84.1	30	54	20	10	3.3 to 10	52
VSP-C40-15B□-6T		94.1		59	25	15	3.3 to 10.4	57
VSP-C40-20B□-6T		110.1		66	34	20	2 to 8.7	64
VSP-C50-10B□-6T	50	86.1	32	56	20	10	3.3 to 10	58
VSP-C50-15B□-6T		96.1		61	25	15	3.3 to 10.4	63
VSP-C50-20B□-6T		112.1		68	34	20	2 to 8.7	70

Dimensions (bellows, buffer, vacuum outlet top VSP-C□-□)

● Type without spring cover, with barbed fitting

● VSP-C20 to 50B□-6TC



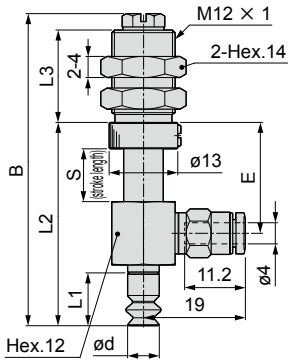
Unit: mm

Model No.	Pad diameter ød	B	L1	L2	Stroke length S	Spring force (N)	Weight (g)
VSP-C20-20B□-6TC	20	76.2	19	57.1	20	1.5 to 4.9	48
VSP-C20-30B□-6TC		89.2		70.1	30	1.1 to 4.8	53
VSP-C20-40B□-6TC		102.2		83.1	40	1 to 4.5	58
VSP-C20-50B□-6TC		115.2		96.1	50	0.9 to 4.5	63
VSP-C25-20B□-6TC	25	76.2	19	57.1	20	1.5 to 4.9	49
VSP-C25-30B□-6TC		89.2		70.1	30	1.1 to 4.8	54
VSP-C25-40B□-6TC		102.2		83.1	40	1 to 4.5	59
VSP-C25-50B□-6TC		115.2		96.1	50	0.9 to 4.5	64
VSP-C30-20B□-6TC	30	80.2	23	61.1	20	1.5 to 4.9	50
VSP-C30-30B□-6TC		93.2		74.1	30	1.1 to 4.8	55
VSP-C30-40B□-6TC		106.2		87.1	40	1 to 4.5	60
VSP-C30-50B□-6TC		119.2		100.1	50	0.9 to 4.5	65
VSP-C40-20B□-6TC	40	87.2	30	68.1	20	1.5 to 4.9	60
VSP-C40-30B□-6TC		100.2		81.1	30	1.1 to 4.8	65
VSP-C40-40B□-6TC		113.2		94.1	40	1 to 4.5	70
VSP-C40-50B□-6TC		126.2		107.1	50	0.9 to 4.5	75
VSP-C50-20B□-6TC	50	89.2	32	70.1	20	1.5 to 4.9	66
VSP-C50-30B□-6TC		102.2		83.1	30	1.1 to 4.8	71
VSP-C50-40B□-6TC		115.2		96.1	40	1 to 4.5	76
VSP-C50-50B□-6TC		128.2		109.1	50	0.9 to 4.5	81

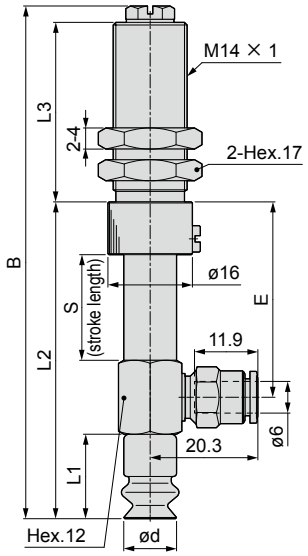
Dimensions (bellows, buffer, vacuum outlet side VSP-D□-□)

● Type with spring cover, push-in fitting

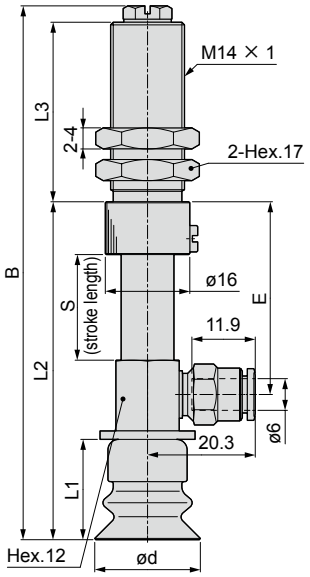
● VSP-D6, 8-□B□-4



● VSP-D10, 15-□B□-6



● VSP-D20 to 50-□B□-6



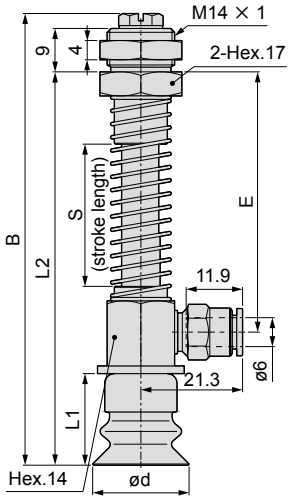
Unit: mm

Model No.	Pad diameter ød	B	L1	L2	L3	E	Stroke length S	Spring force (N)	Weight (g)
VSP-D6-10B□-4	6	59.1	10	38.5	17.5	21	10	0.8 to 2.7	34
VSP-D6-15B□-4		70.1		43.5	23.5	26	15	0.7 to 3	38
VSP-D6-20B□-4		80.1		48.5	28.5	31	20	0.9 to 3.4	41
VSP-D8-10B□-4	8	59.1	10	38.5	17.5	21	10	0.8 to 2.7	34
VSP-D8-15B□-4		70.1		43.5	23.5	26	15	0.7 to 3	38
VSP-D8-20B□-4		80.1		48.5	28.5	31	20	0.9 to 3.4	41
VSP-D10-10B□-6	10	71.1	16	48	20	25	10	2 to 5.2	51
VSP-D10-15B□-6		81.1		53	25	30	15	2 to 5.9	57
VSP-D10-20B□-6		97.1		60	34	37	20	1.1 to 4.8	67
VSP-D15-10B□-6	15	71.1	16	48	20	25	10	2 to 5.2	52
VSP-D15-15B□-6		81.1		53	25	30	15	2 to 5.9	57
VSP-D15-20B□-6		97.1		60	34	37	20	1.1 to 4.8	68
VSP-D20-10B□-6	20	75.1	19	52	20	24.5	10	3.3 to 10	55
VSP-D20-15B□-6		85.1		57	25	29.5	15	3.3 to 10.4	62
VSP-D20-20B□-6		101.1		64	34	36.5	20	2 to 8.7	72
VSP-D25-10B□-6	25	75.1	19	52	20	24.5	10	3.3 to 10	56
VSP-D25-15B□-6		85.1		57	25	29.5	15	3.3 to 10.4	62
VSP-D25-20B□-6		101.1		64	34	36.5	20	2 to 8.7	73
VSP-D30-10B□-6	30	79.1	23	56	20	24.5	10	3.3 to 10	59
VSP-D30-15B□-6		89.1		61	25	29.5	15	3.3 to 10.4	65
VSP-D30-20B□-6		105.1		68	34	36.5	20	2 to 8.7	75
VSP-D40-10B□-6	40	86.1	30	63	20	24.5	10	3.3 to 10	68
VSP-D40-15B□-6		96.1		68	25	29.5	15	3.3 to 10.4	74
VSP-D40-20B□-6		112.1		75	34	36.5	20	2 to 8.7	84
VSP-D50-10B□-6	50	88.1	32	65	20	24.5	10	3.3 to 10	73
VSP-D50-15B□-6		98.1		70	25	29.5	15	3.3 to 10.4	80
VSP-D50-20B□-6		114.1		77	34	36.5	20	2 to 8.7	90

Dimensions (bellows, buffer, vacuum outlet side VSP-D□-□)

● Type without spring cover, with push-in fitting

● VSP-D20 to 50-□B□-6C



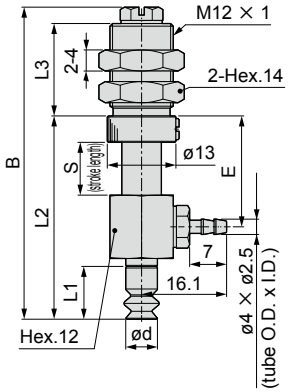
Unit: mm

Model No.	Pad diameter ød	B	L1	L2	E	Stroke length S	Spring force (N)	Weight (g)
VSP-D20-20B□-6C	20	80.7	19	68.6	41	20	1.5 to 4.9	70
VSP-D20-30B□-6C		93.7		81.6	54	30	1.1 to 4.8	77
VSP-D20-40B□-6C		106.7		94.6	67	40	1 to 4.5	83
VSP-D20-50B□-6C		119.7		107.6	80	50	0.9 to 4.5	90
VSP-D25-20B□-6C	25	80.7	19	68.6	41	20	1.5 to 4.9	71
VSP-D25-30B□-6C		93.7		81.6	54	30	1.1 to 4.8	78
VSP-D25-40B□-6C		106.7		94.6	67	40	1 to 4.5	84
VSP-D25-50B□-6C		119.7		107.6	80	50	0.9 to 4.5	91
VSP-D30-20B□-6C	30	84.7	23	72.6	41	20	1.5 to 4.9	72
VSP-D30-30B□-6C		97.7		85.6	54	30	1.1 to 4.8	79
VSP-D30-40B□-6C		110.7		98.6	67	40	1 to 4.5	85
VSP-D30-50B□-6C		123.7		111.6	80	50	0.9 to 4.5	92
VSP-D40-20B□-6C	40	91.7	30	79.6	41	20	1.5 to 4.9	78
VSP-D40-30B□-6C		104.7		92.6	54	30	1.1 to 4.8	85
VSP-D40-40B□-6C		117.7		105.6	67	40	1 to 4.5	91
VSP-D40-50B□-6C		130.7		118.6	80	50	0.9 to 4.5	98
VSP-D50-20B□-6C	50	93.7	32	81.6	41	20	1.5 to 4.9	82
VSP-D50-30B□-6C		106.7		94.6	54	30	1.1 to 4.8	89
VSP-D50-40B□-6C		119.7		107.6	67	40	1 to 4.5	95
VSP-D50-50B□-6C		132.7		120.6	80	50	0.9 to 4.5	102

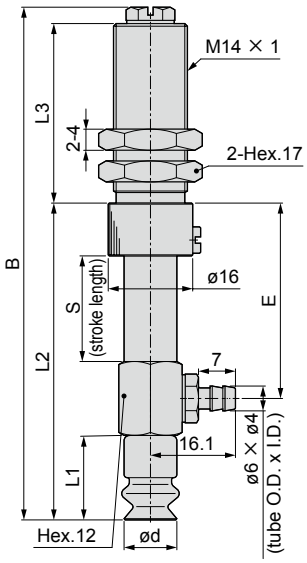
Dimensions (bellows, buffer, vacuum outlet side VSP-D□-□)

● Type with spring cover, barbed fitting

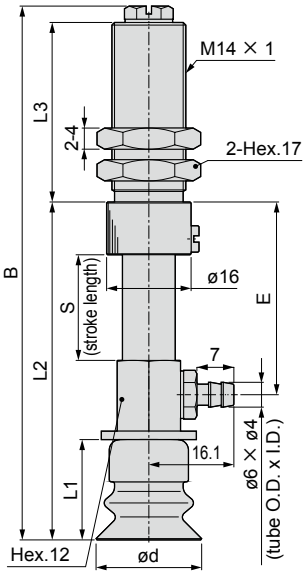
● VSP-D6, 8-□B□-4T



● VSP-D10, 15-□B□-6T



● VSP-D20 to 50-□B□-6T



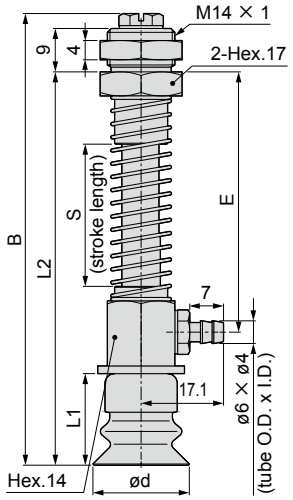
Unit: mm

Model No.	Pad diameter ød	B	L1	L2	L3	E	Stroke length S	Spring force (N)	Weight (g)
VSP-D6-10B□-4T	6	59.1	10	38.5	17.5	21	10	0.8 to 2.7	32
VSP-D6-15B□-4T		70.1		43.5	23.5	26	15	0.7 to 3	36
VSP-D6-20B□-4T		80.1		48.5	28.5	31	20	0.9 to 3.4	39
VSP-D8-10B□-4T	8	59.1	10	38.5	17.5	21	10	0.8 to 2.7	32
VSP-D8-15B□-4T		70.1		43.5	23.5	26	15	0.7 to 3	36
VSP-D8-20B□-4T		80.1		48.5	28.5	31	20	0.9 to 3.4	39
VSP-D10-10B□-6T	10	71.1	16	48	20	25	10	2 to 5.2	49
VSP-D10-15B□-6T		81.1		53	25	30	15	2 to 5.9	55
VSP-D10-20B□-6T		97.1		60	34	37	20	1.1 to 4.8	65
VSP-D15-10B□-6T	15	71.1	16	48	20	25	10	2 to 5.2	50
VSP-D15-15B□-6T		81.1		53	25	30	15	2 to 5.9	55
VSP-D15-20B□-6T		97.1		60	34	37	20	1.1 to 4.8	66
VSP-D20-10B□-6T	20	75.1	19	52	20	24.5	10	3.3 to 10	53
VSP-D20-15B□-6T		85.1		57	25	29.5	15	3.3 to 10.4	60
VSP-D20-20B□-6T		101.1		64	34	36.5	20	2 to 8.7	70
VSP-D25-10B□-6T	25	75.1	19	52	20	24.5	10	3.3 to 10	54
VSP-D25-15B□-6T		85.1		57	25	29.5	15	3.3 to 10.4	61
VSP-D25-20B□-6T		101.1		64	34	36.5	20	2 to 8.7	71
VSP-D30-10B□-6T	30	79.1	23	56	20	24.5	10	3.3 to 10	55
VSP-D30-15B□-6T		89.1		61	25	29.5	15	3.3 to 10.4	62
VSP-D30-20B□-6T		105.1		68	34	36.5	20	2 to 8.7	72
VSP-D40-10B□-6T	40	86.1	30	63	20	24.5	10	3.3 to 10	66
VSP-D40-15B□-6T		96.1		68	25	29.5	15	3.3 to 10.4	72
VSP-D40-20B□-6T		112.1		75	34	36.5	20	2 to 8.7	82
VSP-D50-10B□-6T	50	88.1	32	65	20	24.5	10	3.3 to 10	71
VSP-D50-15B□-6T		98.1		70	25	29.5	15	3.3 to 10.4	78
VSP-D50-20B□-6T		114.1		77	34	36.5	20	2 to 8.7	88

Dimensions (bellows, buffer, vacuum outlet side VSP-D□-□)

● Type without spring cover, with barbed fitting

● VSP-D20 to 50-□B□-6TC

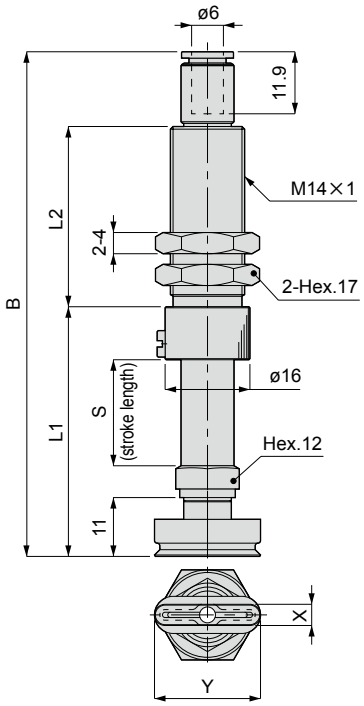


Unit: mm

Model No.	Pad diameter ød	B	L1	L2	E	Stroke length S	Spring force (N)	Weight (g)
VSP-D20-20B□-6TC	20	80.7	19	68.6	41	20	1.5 to 4.9	68
VSP-D20-30B□-6TC		93.7		81.6	54	30	1.1 to 4.8	75
VSP-D20-40B□-6TC		106.7		94.6	67	40	1 to 4.5	81
VSP-D20-50B□-6TC		119.7		107.6	80	50	0.9 to 4.5	88
VSP-D25-20B□-6TC	25	80.7	19	68.6	41	20	1.5 to 4.9	68
VSP-D25-30B□-6TC		93.7		81.6	54	30	1.1 to 4.8	75
VSP-D25-40B□-6TC		106.7		94.6	67	40	1 to 4.5	82
VSP-D25-50B□-6TC		119.7		107.6	80	50	0.9 to 4.5	89
VSP-D30-20B□-6TC	30	84.7	23	72.6	41	20	1.5 to 4.9	70
VSP-D30-30B□-6TC		97.7		85.6	54	30	1.1 to 4.8	77
VSP-D30-40B□-6TC		110.7		98.6	67	40	1 to 4.5	83
VSP-D30-50B□-6TC		123.7		111.6	80	50	0.9 to 4.5	90
VSP-D40-20B□-6TC	40	91.7	30	79.6	41	20	1.5 to 4.9	80
VSP-D40-30B□-6TC		104.7		92.6	54	30	1.1 to 4.8	87
VSP-D40-40B□-6TC		117.7		105.6	67	40	1 to 4.5	94
VSP-D40-50B□-6TC		130.7		118.6	80	50	0.9 to 4.5	100
VSP-D50-20B□-6TC	50	93.7	32	81.6	41	20	1.5 to 4.9	86
VSP-D50-30B□-6TC		106.7		94.6	54	30	1.1 to 4.8	93
VSP-D50-40B□-6TC		119.7		107.6	67	40	1 to 4.5	99
VSP-D50-50B□-6TC		132.7		120.6	80	50	0.9 to 4.5	106

Dimensions (oval, buffer, vacuum outlet top VSP-C□-□)

● Type with spring cover, push-in fitting
· VSP-C□-□E□-6

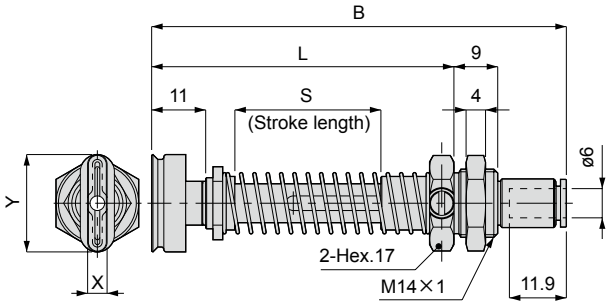


Unit: mm

Model No.	Pad size X	Pad size Y	B	L1	L2	Stroke length S	Spring force (N)	Weight (g)
VSP-C2×4-10E□-6	2	4	69.3	35	20	10	3.3 to 10	38
VSP-C2×4-15E□-6			79.3	40	25	15	3.3 to 10.4	42
VSP-C2×4-20E□-6			95.3	47	34	20	2 to 8.7	47
VSP-C3.5×7-10E□-6	3.5	7	69.3	35	20	10	3.3 to 10	38
VSP-C3.5×7-15E□-6			79.3	40	25	15	3.3 to 10.4	42
VSP-C3.5×7-20E□-6			95.3	47	34	20	2 to 8.7	49
VSP-C4×10-10E□-6	4	10	69.3	35	20	10	3.3 to 10	38
VSP-C4×10-15E□-6			79.3	40	25	15	3.3 to 10.4	42
VSP-C4×10-20E□-6			95.3	47	34	20	2 to 8.7	49
VSP-C4×20-10E□-6	4	20	69.3	35	20	10	3.3 to 10	38
VSP-C4×20-15E□-6			79.3	40	25	15	3.3 to 10.4	43
VSP-C4×20-20E□-6			95.3	47	34	20	2 to 8.7	50
VSP-C4×30-10E□-6	4	30	69.3	35	20	10	3.3 to 10	39
VSP-C4×30-15E□-6			79.3	40	25	15	3.3 to 10.4	43
VSP-C4×30-20E□-6			95.3	47	34	20	2 to 8.7	50
VSP-C5×10-10E□-6	5	10	69.3	35	20	10	3.3 to 10	38
VSP-C5×10-15E□-6			79.3	40	25	15	3.3 to 10.4	42
VSP-C5×10-20E□-6			95.3	47	34	20	2 to 8.7	49
VSP-C5×20-10E□-6	5	20	69.3	35	20	10	3.3 to 10	38
VSP-C5×20-15E□-6			79.3	40	25	15	3.3 to 10.4	43
VSP-C5×20-20E□-6			95.3	47	34	20	2 to 8.7	50
VSP-C5×30-10E□-6	5	30	69.3	35	20	10	3.3 to 10	39
VSP-C5×30-15E□-6			79.3	40	25	15	3.3 to 10.4	43
VSP-C5×30-20E□-6			95.3	47	34	20	2 to 8.7	50
VSP-C6×10-10E□-6	6	10	69.3	35	20	10	3.3 to 10	38
VSP-C6×10-15E□-6			79.3	40	25	15	3.3 to 10.4	42
VSP-C6×10-20E□-6			95.3	47	34	20	2 to 8.7	49
VSP-C6×20-10E□-6	6	20	69.3	35	20	10	3.3 to 10	38
VSP-C6×20-15E□-6			79.3	40	25	15	3.3 to 10.4	43
VSP-C6×20-20E□-6			95.3	47	34	20	2 to 8.7	50
VSP-C6×30-10E□-6	6	30	69.3	35	20	10	3.3 to 10	39
VSP-C6×30-15E□-6			79.3	40	25	15	3.3 to 10.4	43
VSP-C6×30-20E□-6			95.3	47	34	20	2 to 8.7	50
VSP-C8×20-10E□-6	8	20	69.3	35	20	10	3.3 to 10	38
VSP-C8×20-15E□-6			79.3	40	25	15	3.3 to 10.4	43
VSP-C8×20-20E□-6			95.3	47	34	20	2 to 8.7	50
VSP-C8×30-10E□-6	8	30	69.3	35	20	10	3.3 to 10	39
VSP-C8×30-15E□-6			79.3	40	25	15	3.3 to 10.4	43
VSP-C8×30-20E□-6			95.3	47	34	20	2 to 8.7	50

Dimensions (oval, buffer, vacuum outlet top VSP-C□-□)

● Type without spring cover, with push-in fitting
· VSP-C□-□E□-6C

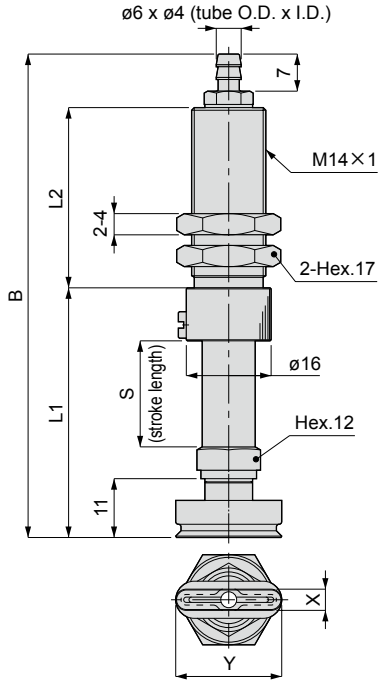


Unit: mm

Model No.	Pad size		B	L	Stroke length	Spring force	Weight
	X	Y			S	(N)	(g)
VSP-C2×4-20E□-6C	2	4	72.4	49.1	20	1.5 to 4.9	45
VSP-C2×4-30E□-6C			85.4	62.1	30	1.1 to 4.8	50
VSP-C2×4-40E□-6C			98.4	75.1	40	1 to 4.5	55
VSP-C2×4-50E□-6C			111.4	88.1	50	0.9 to 4.5	61
VSP-C3.5×7-20E□-6C	3.5	7	72.4	49.1	20	1.5 to 4.9	45
VSP-C3.5×7-30E□-6C			85.4	62.1	30	1.1 to 4.8	50
VSP-C3.5×7-40E□-6C			98.4	75.1	40	1 to 4.5	55
VSP-C3.5×7-50E□-6C			111.4	88.1	50	0.9 to 4.5	61
VSP-C4×10-20E□-6C	4	10	72.4	49.1	20	1.5 to 4.9	45
VSP-C4×10-30E□-6C			85.4	62.1	30	1.1 to 4.8	50
VSP-C4×10-40E□-6C			98.4	75.1	40	1 to 4.5	55
VSP-C4×10-50E□-6C			111.4	88.1	50	0.9 to 4.5	61
VSP-C4×20-20E□-6C	4	20	72.4	49.1	20	1.5 to 4.9	45
VSP-C4×20-30E□-6C			85.4	62.1	30	1.1 to 4.8	51
VSP-C4×20-40E□-6C			98.4	75.1	40	1 to 4.5	56
VSP-C4×20-50E□-6C			111.4	88.1	50	0.9 to 4.5	61
VSP-C4×30-20E□-6C	4	30	72.4	49.1	20	1.5 to 4.9	46
VSP-C4×30-30E□-6C			85.4	62.1	30	1.1 to 4.8	51
VSP-C4×30-40E□-6C			98.4	75.1	40	1 to 4.5	56
VSP-C4×30-50E□-6C			111.4	88.1	50	0.9 to 4.5	62
VSP-C5×10-20E□-6C	5	10	72.4	49.1	20	1.5 to 4.9	45
VSP-C5×10-30E□-6C			85.4	62.1	30	1.1 to 4.8	50
VSP-C5×10-40E□-6C			98.4	75.1	40	1 to 4.5	55
VSP-C5×10-50E□-6C			111.4	88.1	50	0.9 to 4.5	61
VSP-C5×20-20E□-6C	5	20	72.4	49.1	20	1.5 to 4.9	45
VSP-C5×20-30E□-6C			85.4	62.1	30	1.1 to 4.8	51
VSP-C5×20-40E□-6C			98.4	75.1	40	1 to 4.5	56
VSP-C5×20-50E□-6C			111.4	88.1	50	0.9 to 4.5	61
VSP-C5×30-20E□-6C	5	30	72.4	49.1	20	1.5 to 4.9	46
VSP-C5×30-30E□-6C			85.4	62.1	30	1.1 to 4.8	51
VSP-C5×30-40E□-6C			98.4	75.1	40	1 to 4.5	56
VSP-C5×30-50E□-6C			111.4	88.1	50	0.9 to 4.5	62
VSP-C6×10-20E□-6C	6	10	72.4	49.1	20	1.5 to 4.9	45
VSP-C6×10-30E□-6C			85.4	62.1	30	1.1 to 4.8	50
VSP-C6×10-40E□-6C			98.4	75.1	40	1 to 4.5	55
VSP-C6×10-50E□-6C			111.4	88.1	50	0.9 to 4.5	61
VSP-C6×20-20E□-6C	6	20	72.4	49.1	20	1.5 to 4.9	45
VSP-C6×20-30E□-6C			85.4	62.1	30	1.1 to 4.8	51
VSP-C6×20-40E□-6C			98.4	75.1	40	1 to 4.5	56
VSP-C6×20-50E□-6C			111.4	88.1	50	0.9 to 4.5	61
VSP-C6×30-20E□-6C	6	30	72.4	49.1	20	1.5 to 4.9	46
VSP-C6×30-30E□-6C			85.4	62.1	30	1.1 to 4.8	51
VSP-C6×30-40E□-6C			98.4	75.1	40	1 to 4.5	56
VSP-C6×30-50E□-6C			111.4	88.1	50	0.9 to 4.5	62
VSP-C8×20-20E□-6C	8	20	72.4	49.1	20	1.5 to 4.9	45
VSP-C8×20-30E□-6C			85.4	62.1	30	1.1 to 4.8	51
VSP-C8×20-40E□-6C			98.4	75.1	40	1 to 4.5	56
VSP-C8×20-50E□-6C			111.4	88.1	50	0.9 to 4.5	61
VSP-C8×30-20E□-6C	8	30	72.4	49.1	20	1.5 to 4.9	46
VSP-C8×30-30E□-6C			85.4	62.1	30	1.1 to 4.8	51
VSP-C8×30-40E□-6C			98.4	75.1	40	1 to 4.5	56
VSP-C8×30-50E□-6C			111.4	88.1	50	0.9 to 4.5	62

Dimensions (oval, buffer, vacuum outlet top VSP-C□-□)

● Type with spring cover, barbed fitting
· VSP-C□-□E□-6T

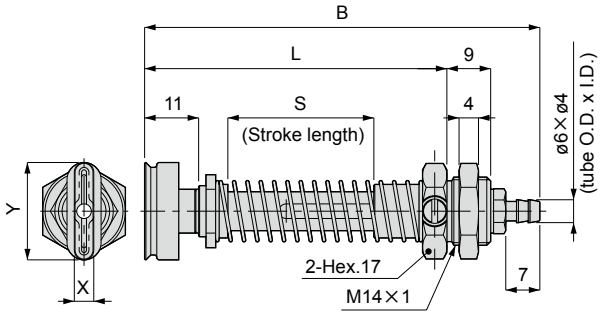


Unit: mm

Model No.	Pad size X	Pad size Y	B	L1	L2	Stroke length S	Spring force (N)	Weight (g)
VSP-C2×4-10E□-6T	2	4	65.1	35	20	10	3.3 to 10	36
VSP-C2×4-15E□-6T			75.1	40	25	15	3.3 to 10.4	40
VSP-C2×4-20E□-6T			91.1	47	34	20	2 to 8.7	47
VSP-C3.5×7-10E□-6T	3.5	7	65.1	35	20	10	3.3 to 10	36
VSP-C3.5×7-15E□-6T			75.1	40	25	15	3.3 to 10.4	40
VSP-C3.5×7-20E□-6T			91.1	47	34	20	2 to 8.7	47
VSP-C4×10-10E□-6T	4	10	65.1	35	20	10	3.3 to 10	36
VSP-C4×10-15E□-6T			75.1	40	25	15	3.3 to 10.4	40
VSP-C4×10-20E□-6T			91.1	47	34	20	2 to 8.7	47
VSP-C4×20-10E□-6T	4	20	65.1	35	20	10	3.3 to 10	36
VSP-C4×20-15E□-6T			75.1	40	25	15	3.3 to 10.4	41
VSP-C4×20-20E□-6T			91.1	47	34	20	2 to 8.7	48
VSP-C4×30-10E□-6T	4	30	65.1	35	20	10	3.3 to 10	37
VSP-C4×30-15E□-6T			75.1	42	25	15	3.3 to 10.4	41
VSP-C4×30-20E□-6T			91.1	47	34	20	2 to 8.7	48
VSP-C5×10-10E□-6T	5	10	65.1	35	20	10	3.3 to 10	36
VSP-C5×10-15E□-6T			75.1	40	25	15	3.3 to 10.4	40
VSP-C5×10-20E□-6T			91.1	47	34	20	2 to 8.7	47
VSP-C5×20-10E□-6T	5	20	65.1	35	20	10	3.3 to 10	36
VSP-C5×20-15E□-6T			75.1	40	25	15	3.3 to 10.4	41
VSP-C5×20-20E□-6T			91.1	47	34	20	2 to 8.7	48
VSP-C5×30-10E□-6T	5	30	65.1	35	20	10	3.3 to 10	37
VSP-C5×30-15E□-6T			75.1	40	25	15	3.3 to 10.4	41
VSP-C5×30-20E□-6T			91.1	47	34	20	2 to 8.7	48
VSP-C6×10-10E□-6T	6	10	65.1	35	20	10	3.3 to 10	36
VSP-C6×10-15E□-6T			75.1	40	25	15	3.3 to 10.4	40
VSP-C6×10-20E□-6T			91.1	47	34	20	2 to 8.7	47
VSP-C6×20-10E□-6T	6	20	65.1	35	20	10	3.3 to 10	36
VSP-C6×20-15E□-6T			75.1	40	25	15	3.3 to 10.4	41
VSP-C6×20-20E□-6T			91.1	47	34	20	2 to 8.7	48
VSP-C6×30-10E□-6T	6	30	65.1	35	20	10	3.3 to 10	37
VSP-C6×30-15E□-6T			75.1	40	25	15	3.3 to 10.4	41
VSP-C6×30-20E□-6T			91.1	47	34	20	2 to 8.7	48
VSP-C8×20-10E□-6T	8	20	65.1	35	20	10	3.3 to 10	36
VSP-C8×20-15E□-6T			75.1	40	25	15	3.3 to 10.4	41
VSP-C8×20-20E□-6T			91.1	47	34	20	2 to 8.7	48
VSP-C8×30-10E□-6T	8	30	65.1	35	20	10	3.3 to 10	37
VSP-C8×30-15E□-6T			75.1	40	25	15	3.3 to 10.4	41
VSP-C8×30-20E□-6T			91.1	47	34	20	2 to 8.7	48

Dimensions (oval, buffer, vacuum outlet top VSP-C□-□)

● Type without spring cover, with barbed fitting
· VSP-C□-□E□-6TC

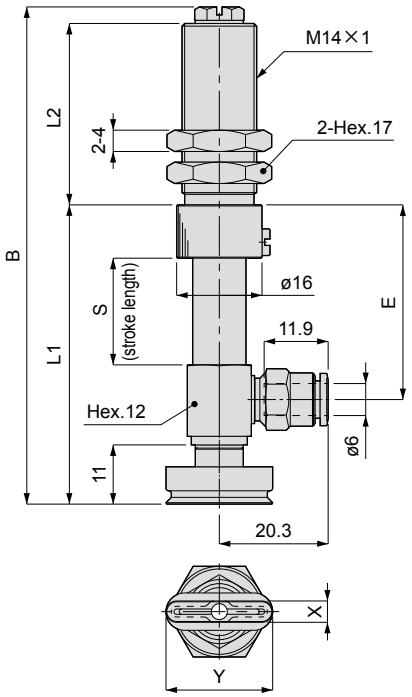


Unit: mm

Model No.	Pad size		B	L	Stroke length	Spring force	Weight
	X	Y			S	(N)	(g)
VSP-C2×4-20E□-6TC	2	4	68.2	49	20	1.5 to 4.9	43
VSP-C2×4-30E□-6TC			81.2	62	30	1.1 to 4.8	48
VSP-C2×4-40E□-6TC			94.2	75	40	1 to 4.5	53
VSP-C2×4-50E□-6TC			107.2	88	50	0.9 to 4.5	59
VSP-C3.5×7-20E□-6TC	3.5	7	68.2	49	20	1.5 to 4.9	43
VSP-C3.5×7-30E□-6TC			81.2	62	30	1.1 to 4.8	48
VSP-C3.5×7-40E□-6TC			94.2	75	40	1 to 4.5	53
VSP-C3.5×7-50E□-6TC			107.2	88	50	0.9 to 4.5	59
VSP-C4×10-20E□-6TC	4	10	68.2	49	20	1.5 to 4.9	43
VSP-C4×10-30E□-6TC			81.2	62	30	1.1 to 4.8	48
VSP-C4×10-40E□-6TC			94.2	75	40	1 to 4.5	53
VSP-C4×10-50E□-6TC			107.2	88	50	0.9 to 4.5	59
VSP-C4×20-20E□-6TC	4	20	68.2	49	20	1.5 to 4.9	43
VSP-C4×20-30E□-6TC			81.2	62	30	1.1 to 4.8	49
VSP-C4×20-40E□-6TC			94.2	75	40	1 to 4.5	54
VSP-C4×20-50E□-6TC			107.2	88	50	0.9 to 4.5	59
VSP-C4×30-20E□-6TC	4	30	68.2	49	20	1.5 to 4.9	44
VSP-C4×30-30E□-6TC			81.2	62	30	1.1 to 4.8	49
VSP-C4×30-40E□-6TC			94.2	75	40	1 to 4.5	54
VSP-C4×30-50E□-6TC			107.2	88	50	0.9 to 4.5	60
VSP-C5×10-20E□-6TC	5	10	68.2	49	20	1.5 to 4.9	43
VSP-C5×10-30E□-6TC			81.2	62	30	1.1 to 4.8	48
VSP-C5×10-40E□-6TC			94.2	75	40	1 to 4.5	53
VSP-C5×10-50E□-6TC			107.2	88	50	0.9 to 4.5	59
VSP-C5×20-20E□-6TC	5	20	68.2	49	20	1.5 to 4.9	43
VSP-C5×20-30E□-6TC			81.2	62	30	1.1 to 4.8	49
VSP-C5×20-40E□-6TC			94.2	75	40	1 to 4.5	54
VSP-C5×20-50E□-6TC			107.2	88	50	0.9 to 4.5	59
VSP-C5×30-20E□-6TC	5	30	68.2	49	20	1.5 to 4.9	44
VSP-C5×30-30E□-6TC			81.2	62	30	1.1 to 4.8	49
VSP-C5×30-40E□-6TC			94.2	75	40	1 to 4.5	54
VSP-C5×30-50E□-6TC			107.2	88	50	0.9 to 4.5	60
VSP-C6×10-20E□-6TC	6	10	68.2	49	20	1.5 to 4.9	43
VSP-C6×10-30E□-6TC			81.2	62	30	1.1 to 4.8	48
VSP-C6×10-40E□-6TC			94.2	75	40	1 to 4.5	53
VSP-C6×10-50E□-6TC			107.2	88	50	0.9 to 4.5	59
VSP-C6×20-20E□-6TC	6	20	68.2	49	20	1.5 to 4.9	43
VSP-C6×20-30E□-6TC			81.2	62	30	1.1 to 4.8	49
VSP-C6×20-40E□-6TC			94.2	75	40	1 to 4.5	54
VSP-C6×20-50E□-6TC			107.2	88	50	0.9 to 4.5	59
VSP-C6×30-20E□-6TC	6	30	68.2	49	20	1.5 to 4.9	44
VSP-C6×30-30E□-6TC			81.2	62	30	1.1 to 4.8	49
VSP-C6×30-40E□-6TC			94.2	75	40	1 to 4.5	54
VSP-C6×30-50E□-6TC			107.2	88	50	0.9 to 4.5	60
VSP-C8×20-20E□-6TC	8	20	68.2	49	20	1.5 to 4.9	43
VSP-C8×20-30E□-6TC			81.2	62	30	1.1 to 4.8	49
VSP-C8×20-40E□-6TC			94.2	75	40	1 to 4.5	54
VSP-C8×20-50E□-6TC			107.2	88	50	0.9 to 4.5	59
VSP-C8×30-20E□-6TC	8	30	68.2	49	20	1.5 to 4.9	44
VSP-C8×30-30E□-6TC			81.2	62	30	1.1 to 4.8	49
VSP-C8×30-40E□-6TC			94.2	75	40	1 to 4.5	54
VSP-C8×30-50E□-6TC			107.2	88	50	0.9 to 4.5	60

Dimensions (oval, buffer, vacuum outlet side VSP-D□-□)

● Type with spring cover, push-in fitting
· VSP-D□-□E□-6

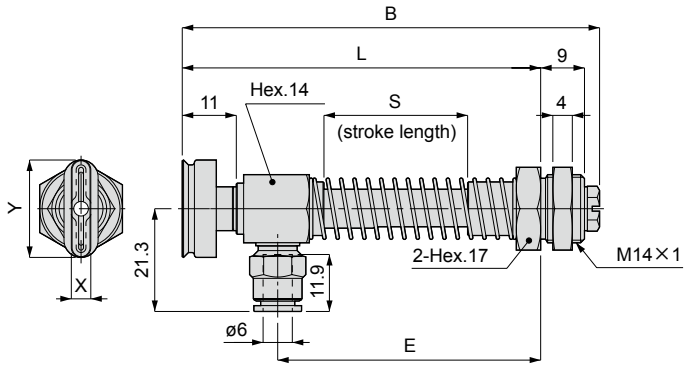


Unit: mm

Model No.	Pad size X	Pad size Y	B	L1	L2	Stroke length S	E	Spring force (N)	Weight (g)
VSP-D2×4-10E□-6	2	4	67.1	44	20	10	24.5	3.3 to 10	51
VSP-D2×4-15E□-6			77.1	49	25	15	29.5	3.3 to 10.4	57
VSP-D2×4-20E□-6			93.1	56	34	20	36.5	2 to 8.7	67
VSP-D3.5×7-10E□-6	3.5	7	67.1	44	20	10	24.5	3.3 to 10	51
VSP-D3.5×7-15E□-6			77.1	49	25	15	29.5	3.3 to 10.4	57
VSP-D3.5×7-20E□-6			93.1	56	34	20	36.5	2 to 8.7	67
VSP-D4×10-10E□-6	4	10	67.1	44	20	10	24.5	3.3 to 10	51
VSP-D4×10-15E□-6			77.1	49	25	15	29.5	3.3 to 10.4	57
VSP-D4×10-20E□-6			93.1	56	34	20	36.5	2 to 8.7	67
VSP-D4×20-10E□-6	4	20	67.1	44	20	10	24.5	3.3 to 10	51
VSP-D4×20-15E□-6			77.1	49	25	15	29.5	3.3 to 10.4	57
VSP-D4×20-20E□-6			93.1	56	34	20	36.5	2 to 8.7	67
VSP-D4×30-10E□-6	4	30	67.1	44	20	10	24.5	3.3 to 10	52
VSP-D4×30-15E□-6			77.1	49	25	15	29.5	3.3 to 10.4	58
VSP-D4×30-20E□-6			93.1	56	34	20	36.5	2 to 8.7	68
VSP-D5×10-10E□-6	5	10	67.1	44	20	10	24.5	3.3 to 10	51
VSP-D5×10-15E□-6			77.1	49	25	15	29.5	3.3 to 10.4	57
VSP-D5×10-20E□-6			93.1	56	34	20	36.5	2 to 8.7	67
VSP-D5×20-10E□-6	5	20	67.1	44	20	10	24.5	3.3 to 10	51
VSP-D5×20-15E□-6			77.1	49	25	15	29.5	3.3 to 10.4	57
VSP-D5×20-20E□-6			93.1	56	34	20	36.5	2 to 8.7	67
VSP-D5×30-10E□-6	5	30	67.1	44	20	10	24.5	3.3 to 10	52
VSP-D5×30-15E□-6			77.1	49	25	15	29.5	3.3 to 10.4	58
VSP-D5×30-20E□-6			93.1	56	34	20	36.5	2 to 8.7	68
VSP-D6×10-10E□-6	6	10	67.1	44	20	10	24.5	3.3 to 10	51
VSP-D6×10-15E□-6			77.1	49	25	15	29.5	3.3 to 10.4	57
VSP-D6×10-20E□-6			93.1	56	34	20	36.5	2 to 8.7	67
VSP-D6×20-10E□-6	6	20	67.1	44	20	10	24.5	3.3 to 10	51
VSP-D6×20-15E□-6			77.1	49	25	15	29.5	3.3 to 10.4	57
VSP-D6×20-20E□-6			93.1	56	34	20	36.5	2 to 8.7	67
VSP-D6×30-10E□-6	6	30	67.1	44	20	10	24.5	3.3 to 10	52
VSP-D6×30-15E□-6			77.1	49	25	15	29.5	3.3 to 10.4	58
VSP-D6×30-20E□-6			93.1	56	34	20	36.5	2 to 8.7	68
VSP-D8×20-10E□-6	8	20	67.1	44	20	10	24.5	3.3 to 10	51
VSP-D8×20-15E□-6			77.1	49	25	15	29.5	3.3 to 10.4	57
VSP-D8×20-20E□-6			93.1	56	34	20	36.5	2 to 8.7	67
VSP-D8×30-10E□-6	8	30	67.1	44	20	10	24.5	3.3 to 10	52
VSP-D8×30-15E□-6			77.1	49	25	15	29.5	3.3 to 10.4	58
VSP-D8×30-20E□-6			93.1	56	34	20	36.5	2 to 8.7	68

Dimensions (oval, buffer, vacuum outlet side VSP-D□-□)

● Type without spring cover, with push-in fitting
· VSP-D□-□E□-6C

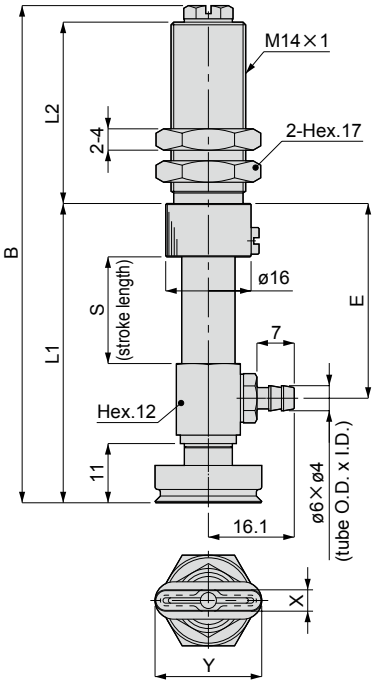


Unit: mm

Model No.	Pad size		B	L	Stroke length	E	Spring force	Weight
	X	Y			S		(N)	(g)
VSP-D2×4-20E□-6C	2	4	72.6	60.5	20	41	1.5 to 4.9	65
VSP-D2×4-30E□-6C			85.6	73.5	30	54	1.1 to 4.8	72
VSP-D2×4-40E□-6C			98.6	86.5	40	67	1 to 4.5	79
VSP-D2×4-50E□-6C			111.6	99.5	50	80	0.9 to 4.5	85
VSP-D3.5×7-20E□-6C	3.5	7	72.6	60.5	20	41	1.5 to 4.9	65
VSP-D3.5×7-30E□-6C			85.6	73.5	30	54	1.1 to 4.8	72
VSP-D3.5×7-40E□-6C			98.6	86.5	40	67	1 to 4.5	79
VSP-D3.5×7-50E□-6C			111.6	99.5	50	80	0.9 to 4.5	85
VSP-D4×10-20E□-6C	4	10	72.6	60.5	20	41	1.5 to 4.9	65
VSP-D4×10-30E□-6C			85.6	73.5	30	54	1.1 to 4.8	72
VSP-D4×10-40E□-6C			98.6	86.5	40	67	1 to 4.5	79
VSP-D4×10-50E□-6C			111.6	99.5	50	80	0.9 to 4.5	85
VSP-D4×20-20E□-6C	4	20	72.6	60.5	20	41	1.5 to 4.9	66
VSP-D4×20-30E□-6C			85.6	73.5	30	54	1.1 to 4.8	72
VSP-D4×20-40E□-6C			98.6	86.5	40	67	1 to 4.5	79
VSP-D4×20-50E□-6C			111.6	99.5	50	80	0.9 to 4.5	86
VSP-D4×30-20E□-6C	4	30	72.6	60.5	20	41	1.5 to 4.9	66
VSP-D4×30-30E□-6C			85.6	73.5	30	54	1.1 to 4.8	73
VSP-D4×30-40E□-6C			98.6	86.5	40	67	1 to 4.5	80
VSP-D4×30-50E□-6C			111.6	99.5	50	80	0.9 to 4.5	86
VSP-D5×10-20E□-6C	5	10	72.6	60.5	20	41	1.5 to 4.9	65
VSP-D5×10-30E□-6C			85.6	73.5	30	54	1.1 to 4.8	72
VSP-D5×10-40E□-6C			98.6	86.5	40	67	1 to 4.5	79
VSP-D5×10-50E□-6C			111.6	99.5	50	80	0.9 to 4.5	85
VSP-D5×20-20E□-6C	5	20	72.6	60.5	20	41	1.5 to 4.9	66
VSP-D5×20-30E□-6C			85.6	73.5	30	54	1.1 to 4.8	72
VSP-D5×20-40E□-6C			98.6	86.5	40	67	1 to 4.5	79
VSP-D5×20-50E□-6C			111.6	99.5	50	80	0.9 to 4.5	86
VSP-D5×30-20E□-6C	5	30	72.6	60.5	20	41	1.5 to 4.9	66
VSP-D5×30-30E□-6C			85.6	73.5	30	54	1.1 to 4.8	73
VSP-D5×30-40E□-6C			98.6	86.5	40	67	1 to 4.5	80
VSP-D5×30-50E□-6C			111.6	99.5	50	80	0.9 to 4.5	86
VSP-D6×10-20E□-6C	6	10	72.6	60.5	20	41	1.5 to 4.9	65
VSP-D6×10-30E□-6C			85.6	73.5	30	54	1.1 to 4.8	72
VSP-D6×10-40E□-6C			98.6	86.5	40	67	1 to 4.5	79
VSP-D6×10-50E□-6C			111.6	99.5	50	80	0.9 to 4.5	85
VSP-D6×20-20E□-6C	6	20	72.6	60.5	20	41	1.5 to 4.9	66
VSP-D6×20-30E□-6C			85.6	73.5	30	54	1.1 to 4.8	72
VSP-D6×20-40E□-6C			98.6	86.5	40	67	1 to 4.5	79
VSP-D6×20-50E□-6C			111.6	99.5	50	80	0.9 to 4.5	86
VSP-D6×30-20E□-6C	6	30	72.6	60.5	20	41	1.5 to 4.9	66
VSP-D6×30-30E□-6C			85.6	73.5	30	54	1.1 to 4.8	73
VSP-D6×30-40E□-6C			98.6	86.5	40	67	1 to 4.5	80
VSP-D6×30-50E□-6C			111.6	99.5	50	80	0.9 to 4.5	86
VSP-D8×20-20E□-6C	8	20	72.6	60.5	20	41	1.5 to 4.9	66
VSP-D8×20-30E□-6C			85.6	73.5	30	54	1.1 to 4.8	72
VSP-D8×20-40E□-6C			98.6	86.5	40	67	1 to 4.5	79
VSP-D8×20-50E□-6C			111.6	99.5	50	80	0.9 to 4.5	86
VSP-D8×30-20E□-6C	8	30	72.6	60.5	20	41	1.5 to 4.9	66
VSP-D8×30-30E□-6C			85.6	73.5	30	54	1.1 to 4.8	73
VSP-D8×30-40E□-6C			98.6	86.5	40	67	1 to 4.5	80
VSP-D8×30-50E□-6C			111.6	99.5	50	80	0.9 to 4.5	86

Dimensions (oval, buffer, vacuum outlet side VSP-D□-□)

● Type with spring cover, barbed fitting
· VSP-D□-□E□-6T

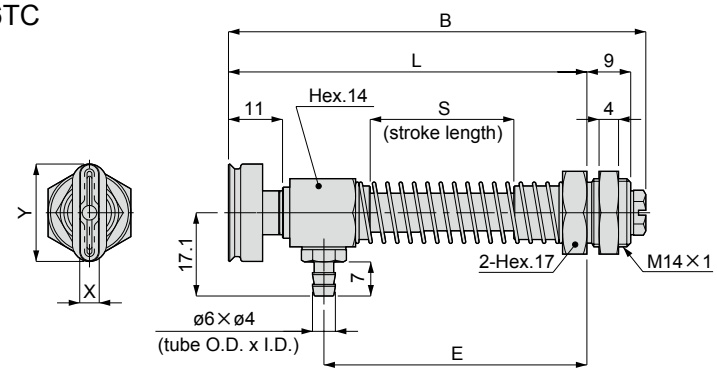


Unit: mm

Model No.	Pad size X	Pad size Y	B	L1	L2	Stroke length S	E	Spring force (N)	Weight (g)
VSP-D2×4-10E□-6T	2	4	67.1	44	20	10	24.5	3.3 to 10	49
VSP-D2×4-15E□-6T			77.1	49	25	15	29.5	3.3 to 10.4	55
VSP-D2×4-20E□-6T			93.1	56	34	20	36.5	2 to 8.7	65
VSP-D3.5×7-10E□-6T	3.5	7	67.1	44	20	10	24.5	3.3 to 10	49
VSP-D3.5×7-15E□-6T			77.1	49	25	15	29.5	3.3 to 10.4	55
VSP-D3.5×7-20E□-6T			93.1	56	34	20	36.5	2 to 8.7	65
VSP-D4×10-10E□-6T	4	10	67.1	44	20	10	24.5	3.3 to 10	49
VSP-D4×10-15E□-6T			77.1	49	25	15	29.5	3.3 to 10.4	55
VSP-D4×10-20E□-6T			93.1	56	34	20	36.5	2 to 8.7	65
VSP-D4×20-10E□-6T	4	20	67.1	44	20	10	24.5	3.3 to 10	49
VSP-D4×20-15E□-6T			77.1	49	25	15	29.5	3.3 to 10.4	55
VSP-D4×20-20E□-6T			93.1	56	34	20	36.5	2 to 8.7	65
VSP-D4×30-10E□-6T	4	30	67.1	44	20	10	24.5	3.3 to 10	50
VSP-D4×30-15E□-6T			77.1	49	25	15	29.5	3.3 to 10.4	56
VSP-D4×30-20E□-6T			93.1	56	34	20	36.5	2 to 8.7	66
VSP-D5×10-10E□-6T	5	10	67.1	44	20	10	24.5	3.3 to 10	49
VSP-D5×10-15E□-6T			77.1	49	25	15	29.5	3.3 to 10.4	55
VSP-D5×10-20E□-6T			93.1	56	34	20	36.5	2 to 8.7	65
VSP-D5×20-10E□-6T	5	20	67.1	44	20	10	24.5	3.3 to 10	49
VSP-D5×20-15E□-6T			77.1	49	25	15	29.5	3.3 to 10.4	55
VSP-D5×20-20E□-6T			93.1	56	34	20	36.5	2 to 8.7	65
VSP-D5×30-10E□-6T	5	30	67.1	44	20	10	24.5	3.3 to 10	50
VSP-D5×30-15E□-6T			77.1	49	25	15	29.5	3.3 to 10.4	56
VSP-D5×30-20E□-6T			93.1	56	34	20	36.5	2 to 8.7	66
VSP-D6×10-10E□-6T	6	10	67.1	44	20	10	24.5	3.3 to 10	49
VSP-D6×10-15E□-6T			77.1	49	25	15	29.5	3.3 to 10.4	55
VSP-D6×10-20E□-6T			93.1	56	34	20	36.5	2 to 8.7	65
VSP-D6×20-10E□-6T	6	20	67.1	44	20	10	24.5	3.3 to 10	49
VSP-D6×20-15E□-6T			77.1	49	25	15	29.5	3.3 to 10.4	55
VSP-D6×20-20E□-6T			93.1	56	34	20	36.5	2 to 8.7	65
VSP-D6×30-10E□-6T	6	30	67.1	44	20	10	24.5	3.3 to 10	50
VSP-D6×30-15E□-6T			77.1	49	25	15	29.5	3.3 to 10.4	56
VSP-D6×30-20E□-6T			93.1	56	34	20	36.5	2 to 8.7	66
VSP-D8×20-10E□-6T	8	20	67.1	44	20	10	24.5	3.3 to 10	49
VSP-D8×20-15E□-6T			77.1	49	25	15	29.5	3.3 to 10.4	55
VSP-D8×20-20E□-6T			93.1	56	34	20	36.5	2 to 8.7	65
VSP-D8×30-10E□-6T	8	30	67.1	44	20	10	24.5	3.3 to 10	50
VSP-D8×30-15E□-6T			77.1	49	25	15	29.5	3.3 to 10.4	56
VSP-D8×30-20E□-6T			93.1	56	34	20	36.5	2 to 8.7	66

Dimensions (oval, buffer, vacuum outlet side VSP-D□-□)

● Type without spring cover, with barbed fitting
· VSP-D□-□E□-6TC



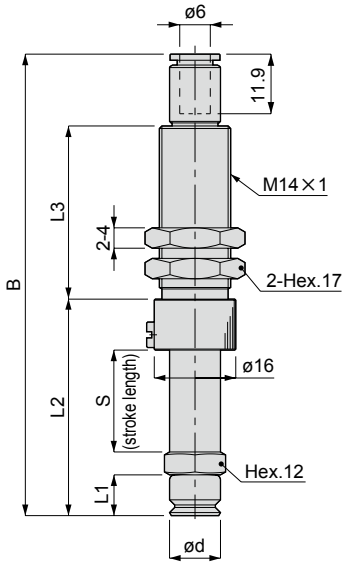
Unit: mm

Model No.	Pad size X	Pad size Y	B	L	Stroke length S	E	Spring force (N)	Weight (g)
VSP-D2×4-20E□-6TC	2	4	72.6	60.5	20	41	1.5 to 4.9	63
VSP-D2×4-30E□-6TC			85.6	73.5	30	54	1.1 to 4.8	70
VSP-D2×4-40E□-6TC			98.6	86.5	40	67	1 to 4.5	77
VSP-D2×4-50E□-6TC			111.6	99.5	50	80	0.9 to 4.5	83
VSP-D3.5×7-20E□-6TC	3.5	7	72.6	60.5	20	41	1.5 to 4.9	63
VSP-D3.5×7-30E□-6TC			85.6	73.5	30	54	1.1 to 4.8	70
VSP-D3.5×7-40E□-6TC			98.6	86.5	40	67	1 to 4.5	77
VSP-D3.5×7-50E□-6TC			111.6	99.5	50	80	0.9 to 4.5	83
VSP-D4×10-20E□-6TC	4	10	72.6	60.5	20	41	1.5 to 4.9	63
VSP-D4×10-30E□-6TC			85.6	73.5	30	54	1.1 to 4.8	70
VSP-D4×10-40E□-6TC			98.6	86.5	40	67	1 to 4.5	77
VSP-D4×10-50E□-6TC			111.6	99.5	50	80	0.9 to 4.5	83
VSP-D4×20-20E□-6TC	4	20	72.6	60.5	20	41	1.5 to 4.9	64
VSP-D4×20-30E□-6TC			85.6	73.5	30	54	1.1 to 4.8	70
VSP-D4×20-40E□-6TC			98.6	86.5	40	67	1 to 4.5	77
VSP-D4×20-50E□-6TC			111.6	99.5	50	80	0.9 to 4.5	84
VSP-D4×30-20E□-6TC	4	30	72.6	60.5	20	41	1.5 to 4.9	64
VSP-D4×30-30E□-6TC			85.6	73.5	30	54	1.1 to 4.8	71
VSP-D4×30-40E□-6TC			98.6	86.5	40	67	1 to 4.5	78
VSP-D4×30-50E□-6TC			111.6	99.5	50	80	0.9 to 4.5	84
VSP-D5×10-20E□-6TC	5	10	72.6	60.5	20	41	1.5 to 4.9	63
VSP-D5×10-30E□-6TC			85.6	73.5	30	54	1.1 to 4.8	70
VSP-D5×10-40E□-6TC			98.6	86.5	40	67	1 to 4.5	77
VSP-D5×10-50E□-6TC			111.6	99.5	50	80	0.9 to 4.5	83
VSP-D5×20-20E□-6TC	5	20	72.6	60.5	20	41	1.5 to 4.9	64
VSP-D5×20-30E□-6TC			85.6	73.5	30	54	1.1 to 4.8	70
VSP-D5×20-40E□-6TC			98.6	86.5	40	67	1 to 4.5	77
VSP-D5×20-50E□-6TC			111.6	99.5	50	80	0.9 to 4.5	84
VSP-D5×30-20E□-6TC	5	30	72.6	60.5	20	41	1.5 to 4.9	64
VSP-D5×30-30E□-6TC			85.6	73.5	30	54	1.1 to 4.8	71
VSP-D5×30-40E□-6TC			98.6	86.5	40	67	1 to 4.5	78
VSP-D5×30-50E□-6TC			111.6	99.5	50	80	0.9 to 4.5	84
VSP-D6×10-20E□-6TC	6	10	72.6	60.5	20	41	1.5 to 4.9	63
VSP-D6×10-30E□-6TC			85.6	73.5	30	54	1.1 to 4.8	70
VSP-D6×10-40E□-6TC			98.6	86.5	40	67	1 to 4.5	77
VSP-D6×10-50E□-6TC			111.6	99.5	50	80	0.9 to 4.5	83
VSP-D6×20-20E□-6TC	6	20	72.6	60.5	20	41	1.5 to 4.9	64
VSP-D6×20-30E□-6TC			85.6	73.5	30	54	1.1 to 4.8	70
VSP-D6×20-40E□-6TC			98.6	86.5	40	67	1 to 4.5	77
VSP-D6×20-50E□-6TC			111.6	99.5	50	80	0.9 to 4.5	84
VSP-D6×30-20E□-6TC	6	30	72.6	60.5	20	41	1.5 to 4.9	64
VSP-D6×30-30E□-6TC			85.6	73.5	30	54	1.1 to 4.8	71
VSP-D6×30-40E□-6TC			98.6	86.5	40	67	1 to 4.5	78
VSP-D6×30-50E□-6TC			111.6	99.5	50	80	0.9 to 4.5	84
VSP-D8×20-20E□-6TC	8	20	72.6	60.5	20	41	1.5 to 4.9	64
VSP-D8×20-30E□-6TC			85.6	73.5	30	54	1.1 to 4.8	70
VSP-D8×20-40E□-6TC			98.6	86.5	40	67	1 to 4.5	77
VSP-D8×20-50E□-6TC			111.6	99.5	50	80	0.9 to 4.5	84
VSP-D8×30-20E□-6TC	8	30	72.6	60.5	20	41	1.5 to 4.9	64
VSP-D8×30-30E□-6TC			85.6	73.5	30	54	1.1 to 4.8	71
VSP-D8×30-40E□-6TC			98.6	86.5	40	67	1 to 4.5	78
VSP-D8×30-50E□-6TC			111.6	99.5	50	80	0.9 to 4.5	84

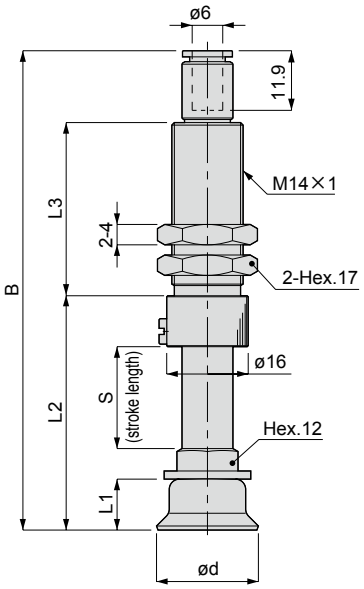
Dimensions (anti-slip, buffer, vacuum outlet top VSP-C□-□)

● Type with spring cover, push-in fitting

· VSP-C10-□K□-6



· VSP-C20 to 50-□K□-6

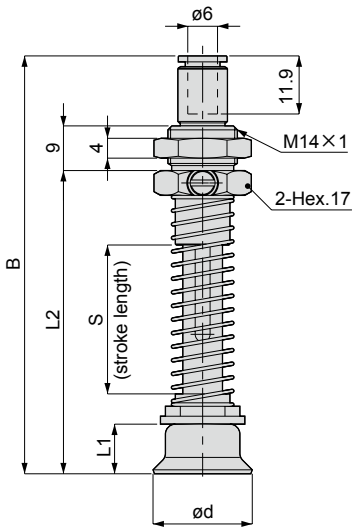


Unit: mm

Model No.	Pad diameter ød	B	L1	L2	L3	Stroke length S	Spring force (N)	Weight (g)
VSP-C10-10K□-6	10	64.8	8	30.5	20	10	2 to 5.2	37
VSP-C10-15K□-6		74.8		35.5	25	15	2 to 5.9	43
VSP-C10-20K□-6		90.8		42.5	34	20	1.1 to 4.8	50
VSP-C20-10K□-6	20	68.3	10	34	20	10	3.3 to 10	42
VSP-C20-15K□-6		78.3		39	25	15	3.3 to 10.4	47
VSP-C20-20K□-6		94.3		46	34	20	2 to 8.7	54
VSP-C30-10K□-6	30	70.3	12	36	20	10	3.3 to 10	46
VSP-C30-15K□-6		80.3		41	25	15	3.3 to 10.4	51
VSP-C30-20K□-6		96.3		48	34	20	2 to 8.7	58
VSP-C40-10K□-6	40	74.3	16	40	20	10	3.3 to 10	55
VSP-C40-15K□-6		84.3		45	25	15	3.3 to 10.4	60
VSP-C40-20K□-6		100.3		52	34	20	2 to 8.7	66
VSP-C50-10K□-6	50	75.3	17	41	20	10	3.3 to 10	61
VSP-C50-15K□-6		85.3		46	25	15	3.3 to 10.4	66
VSP-C50-20K□-6		101.3		53	34	20	2 to 8.7	73

Dimensions (anti-slip, buffer, vacuum outlet top VSP-C□-□)

● Type without spring cover, with push-in fitting
· VSP-C20 to 50-□K□-6C



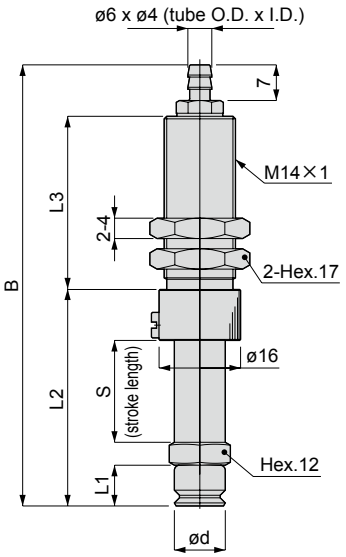
Unit: mm

Model No.	Pad diameter ød	B	L1	L2	Stroke length S	Spring force (N)	Weight (g)
VSP-C20-20K□-6C	20	71.4	10	48.1	20	1.5 to 4.9	50
VSP-C20-30K□-6C		84.4		61.1	30	1.1 to 4.8	55
VSP-C20-40K□-6C		97.4		74.1	40	1 to 4.5	60
VSP-C20-50K□-6C		110.4		87.1	50	0.9 to 4.5	65
VSP-C30-20K□-6C	30	73.4	12	50.1	20	1.5 to 4.9	54
VSP-C30-30K□-6C		86.4		63.1	30	1.1 to 4.8	59
VSP-C30-40K□-6C		99.4		76.1	40	1 to 4.5	64
VSP-C30-50K□-6C		112.4		89.1	50	0.9 to 4.5	69
VSP-C40-20K□-6C	40	77.4	16	54.1	20	1.5 to 4.9	62
VSP-C40-30K□-6C		90.4		67.1	30	1.1 to 4.8	67
VSP-C40-40K□-6C		103.4		80.1	40	1 to 4.5	72
VSP-C40-50K□-6C		116.4		93.1	50	0.9 to 4.5	78
VSP-C50-20K□-6C	50	78.4	17	55.1	20	1.5 to 4.9	69
VSP-C50-30K□-6C		91.4		68.1	30	1.1 to 4.8	74
VSP-C50-40K□-6C		104.4		81.1	40	1 to 4.5	79
VSP-C50-50K□-6C		117.4		94.1	50	0.9 to 4.5	84

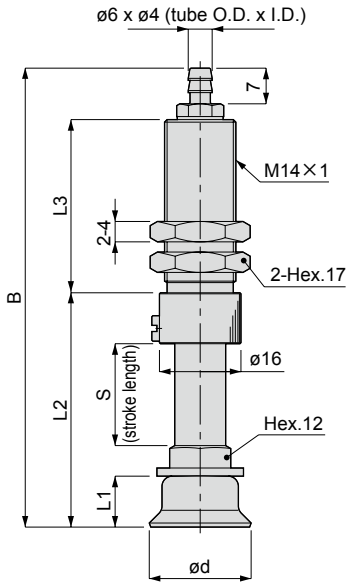
Dimensions (anti-slip, buffer, vacuum outlet top VSP-C□-□)

● Type with spring cover, barbed fitting

· VSP-C10-□K□-6T



· VSP-C20 to 50-□K□-6T

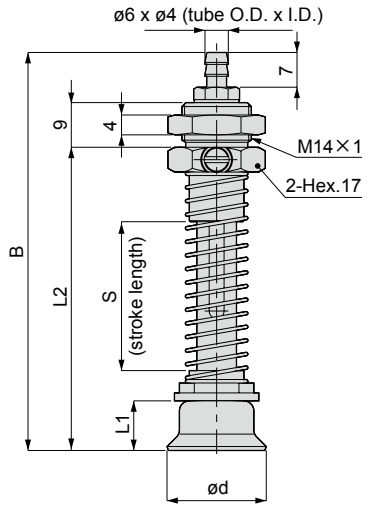


Unit: mm

Model No.	Pad diameter ød	B	L1	L2	L3	Stroke length S	Spring force (N)	Weight (g)
VSP-C10-10K□-6T	10	60.6	8	30.5	20	10	2 to 5.2	35
VSP-C10-15K□-6T		70.6		35.5	25	15	2 to 5.9	41
VSP-C10-20K□-6T		86.6		42.5	34	20	1.1 to 4.8	48
VSP-C20-10K□-6T	20	64.1	10	34	20	10	3.3 to 10	40
VSP-C20-15K□-6T		74.1		39	25	15	3.3 to 10.4	45
VSP-C20-20K□-6T		90.1		46	34	20	2 to 8.7	52
VSP-C30-10K□-6T	30	66.1	12	36	20	10	3.3 to 10	44
VSP-C30-15K□-6T		76.1		41	25	15	3.3 to 10.4	49
VSP-C30-20K□-6T		92.1		48	34	20	2 to 8.7	56
VSP-C40-10K□-6T	40	70.1	16	40	20	10	3.3 to 10	53
VSP-C40-15K□-6T		80.1		45	25	15	3.3 to 10.4	58
VSP-C40-20K□-6T		96.1		52	34	20	2 to 8.7	64
VSP-C50-10K□-6T	50	71.1	17	41	20	10	3.3 to 10	59
VSP-C50-15K□-6T		81.1		46	25	15	3.3 to 10.4	64
VSP-C50-20K□-6T		97.1		53	34	20	2 to 8.7	71

Dimensions (anti-slip, buffer, vacuum outlet top VSP-C□-□)

● Type without spring cover, with barbed fitting
· VSP-C20 to 50-□K□-6TC



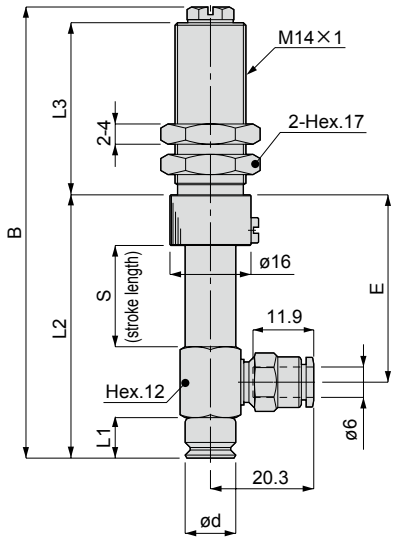
Unit: mm

Model No.	Pad diameter ød	B	L1	L2	Stroke length S	Spring force (N)	Weight (g)
VSP-C20-20K□-6TC	20	67.2	10	48.1	20	1.5 to 4.9	48
VSP-C20-30K□-6TC		80.2		61.1	30	1.1 to 4.8	53
VSP-C20-40K□-6TC		93.2		74.1	40	1 to 4.5	58
VSP-C20-50K□-6TC		106.2		87.1	50	0.9 to 4.5	63
VSP-C30-20K□-6TC	30	69.2	12	50.1	20	1.5 to 4.9	52
VSP-C30-30K□-6TC		82.2		63.1	30	1.1 to 4.8	57
VSP-C30-40K□-6TC		95.2		76.1	40	1 to 4.5	62
VSP-C30-50K□-6TC		108.2		89.1	50	0.9 to 4.5	67
VSP-C40-20K□-6TC	40	73.2	16	54.1	20	1.5 to 4.9	60
VSP-C40-30K□-6TC		86.2		67.1	30	1.1 to 4.8	65
VSP-C40-40K□-6TC		99.2		80.1	40	1 to 4.5	70
VSP-C40-50K□-6TC		112.2		93.1	50	0.9 to 4.5	76
VSP-C50-20K□-6TC	50	74.2	17	55.1	20	1.5 to 4.9	67
VSP-C50-30K□-6TC		87.2		68.1	30	1.1 to 4.8	72
VSP-C50-40K□-6TC		100.2		81.1	40	1 to 4.5	77
VSP-C50-50K□-6TC		113.2		94.1	50	0.9 to 4.5	82

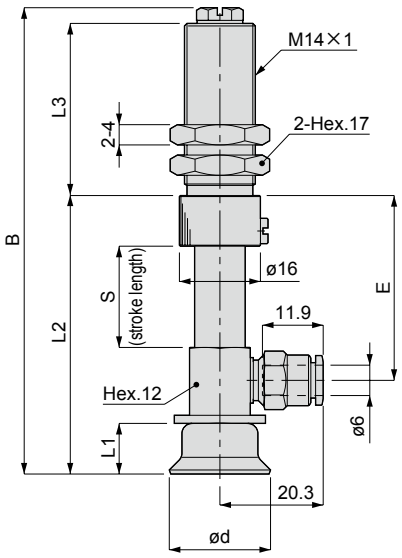
Dimensions (anti-slip, buffer, vacuum outlet side VSP-D□-□)

● Type with spring cover, push-in fitting

· VSP-D10-□K□-6



· VSP-D20 to 50-□K□-6

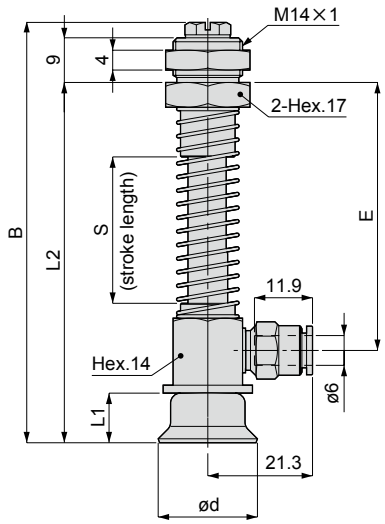


Unit: mm

Model No.	Pad diameter ød	B	L1	L2	L3	Stroke length S	E	Spring force (N)	Weight (g)
VSP-D10-10K□-6	10	63.1	8	40	20	10	25	2 to 5.2	52
VSP-D10-15K□-6		73.1		45	25	15	30	2 to 5.9	57
VSP-D10-20K□-6		89.1		52	34	20	37	1.1 to 4.8	67
VSP-D20-10K□-6	20	66.1	10	43	20	10	24.5	3.3 to 10	55
VSP-D20-15K□-6		76.1		48	25	15	29.5	3.3 to 10.4	62
VSP-D20-20K□-6		92.1		55	34	20	36.5	2 to 8.7	72
VSP-D30-10K□-6	30	68.1	12	45	20	10	24.5	3.3 to 10	59
VSP-D30-15K□-6		78.1		50	25	15	29.5	3.3 to 10.4	66
VSP-D30-20K□-6		94.1		57	34	20	36.5	2 to 8.7	76
VSP-D40-10K□-6	40	72.1	16	49	20	10	24.5	3.3 to 10	68
VSP-D40-15K□-6		82.1		54	25	15	29.5	3.3 to 10.4	74
VSP-D40-20K□-6		98.1		61	34	20	36.5	2 to 8.7	84
VSP-D50-10K□-6	50	73.1	17	50	20	10	24.5	3.3 to 10	74
VSP-D50-15K□-6		83.1		55	25	15	29.5	3.3 to 10.4	81
VSP-D50-20K□-6		99.1		62	34	20	36.5	2 to 8.7	91

Dimensions (anti-slip, buffer, vacuum outlet side VSP-D□-□)

● Type without spring cover, with push-in fitting
· VSP-D20 to 50-□K□-6C



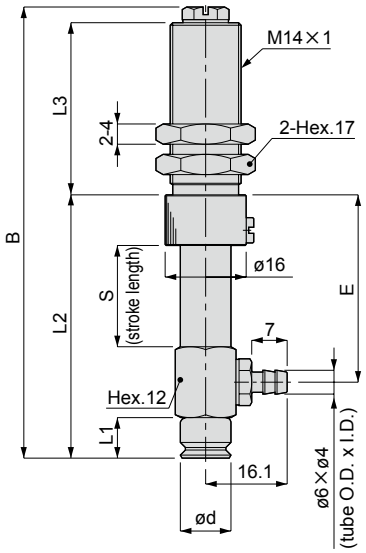
Unit: mm

Model No.	Pad diameter ød	B	L1	L2	Stroke length S	E	Spring force (N)	Weight (g)
VSP-D20-20K□-6C	20	71.7	10	59.6	20	41	1.5 to 4.9	70
VSP-D20-30K□-6C		84.7		72.6	30	54	1.1 to 4.8	77
VSP-D20-40K□-6C		97.7		85.6	40	67	1 to 4.5	83
VSP-D20-50K□-6C		110.7		98.6	50	80	0.9 to 4.5	90
VSP-D30-20K□-6C	30	73.7	12	61.6	20	41	1.5 to 4.9	74
VSP-D30-30K□-6C		86.7		74.6	30	54	1.1 to 4.8	81
VSP-D30-40K□-6C		99.7		87.6	40	67	1 to 4.5	87
VSP-D30-50K□-6C		112.7		100.6	50	80	0.9 to 4.5	94
VSP-D40-20K□-6C	40	77.7	16	65.6	20	41	1.5 to 4.9	82
VSP-D40-30K□-6C		90.7		78.6	30	54	1.1 to 4.8	89
VSP-D40-40K□-6C		103.7		91.6	40	67	1 to 4.5	96
VSP-D40-50K□-6C		116.7		104.6	50	80	0.9 to 4.5	103
VSP-D50-20K□-6C	50	78.7	17	66.6	20	41	1.5 to 4.9	89
VSP-D50-30K□-6C		91.7		79.6	30	54	1.1 to 4.8	96
VSP-D50-40K□-6C		104.7		92.6	40	67	1 to 4.5	102
VSP-D50-50K□-6C		117.7		105.6	50	80	0.9 to 4.5	109

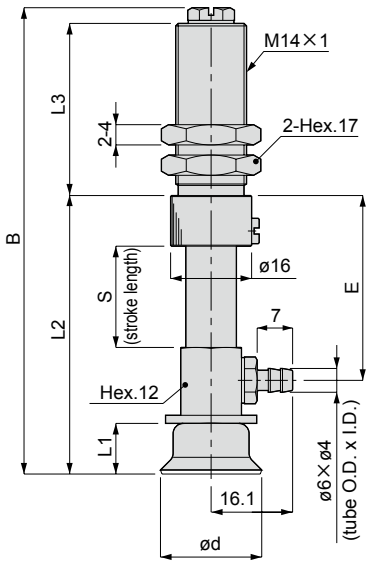
Dimensions (anti-slip, buffer, vacuum outlet side VSP-D□-□)

● Type with spring cover, barbed fitting

· VSP-D10-□K□-6T



· VSP-D20 to 50-□K□-6T

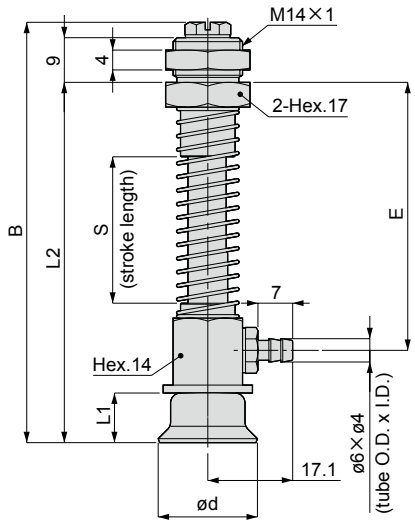


Unit: mm

Model No.	Pad diameter ød	B	L1	L2	L3	Stroke length S	E	Spring force (N)	Weight (g)
VSP-D10-10K□-6T	10	63.1	8	40	20	10	25	2 to 5.2	50
VSP-D10-15K□-6T		73.1		45	25	15	30	2 to 5.9	55
VSP-D10-20K□-6T		89.1		52	34	20	37	1.1 to 4.8	65
VSP-D20-10K□-6T	20	66.1	10	43	20	10	24.5	3.3 to 10	53
VSP-D20-15K□-6T		76.1		48	25	15	29.5	3.3 to 10.4	60
VSP-D20-20K□-6T		92.1		55	34	20	36.5	2 to 8.7	70
VSP-D30-10K□-6T	30	68.1	12	45	20	10	24.5	3.3 to 10	57
VSP-D30-15K□-6T		78.1		50	25	15	29.5	3.3 to 10.4	64
VSP-D30-20K□-6T		94.1		57	34	20	36.5	2 to 8.7	74
VSP-D40-10K□-6T	40	72.1	16	49	20	10	24.5	3.3 to 10	66
VSP-D40-15K□-6T		82.1		54	25	15	29.5	3.3 to 10.4	72
VSP-D40-20K□-6T		98.1		61	34	20	36.5	2 to 8.7	82
VSP-D50-10K□-6T	50	73.1	17	50	20	10	24.5	3.3 to 10	72
VSP-D50-15K□-6T		83.1		55	25	15	29.5	3.3 to 10.4	79
VSP-D50-20K□-6T		99.1		62	34	20	36.5	2 to 8.7	89

Dimensions (anti-slip, buffer, vacuum outlet side VSP-D□-□)

● Type without spring cover, with barbed fitting
· VSP-D20 to 50-□K□-6TC



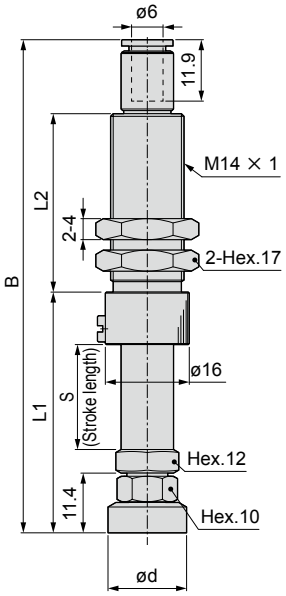
Unit: mm

Model No.	Pad diameter ød	B	L1	L2	Stroke length S	E	Spring force (N)	Weight (g)
VSP-D20-20K□-6TC	20	71.7	10	59.6	20	41	1.5 to 4.9	68
VSP-D20-30K□-6TC		84.7		72.6	30	54	1.1 to 4.8	75
VSP-D20-40K□-6TC		97.7		85.6	40	67	1 to 4.5	81
VSP-D20-50K□-6TC		110.7		98.6	50	80	0.9 to 4.5	88
VSP-D30-20K□-6TC	30	73.7	12	61.6	20	41	1.5 to 4.9	72
VSP-D30-30K□-6TC		86.7		74.6	30	54	1.1 to 4.8	79
VSP-D30-40K□-6TC		99.7		87.6	40	67	1 to 4.5	85
VSP-D30-50K□-6TC		112.7		100.6	50	80	0.9 to 4.5	92
VSP-D40-20K□-6TC	40	77.7	16	65.6	20	41	1.5 to 4.9	80
VSP-D40-30K□-6TC		90.7		78.6	30	54	1.1 to 4.8	87
VSP-D40-40K□-6TC		103.7		91.6	40	67	1 to 4.5	94
VSP-D40-50K□-6TC		116.7		104.6	50	80	0.9 to 4.5	101
VSP-D50-20K□-6TC	50	78.7	17	66.6	20	41	1.5 to 4.9	87
VSP-D50-30K□-6TC		91.7		79.6	30	54	1.1 to 4.8	94
VSP-D50-40K□-6TC		104.7		92.6	40	67	1 to 4.5	100
VSP-D50-50K□-6TC		117.7		105.6	50	80	0.9 to 4.5	107

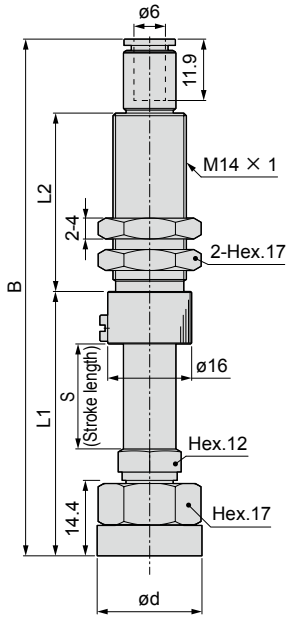
Dimensions (flat, buffer, vacuum outlet top VSP-C□-□)

● Type with spring cover, push-in fitting

● VSP-C10, 15-□F□-6



● VSP-C20 to 30-□F□-6



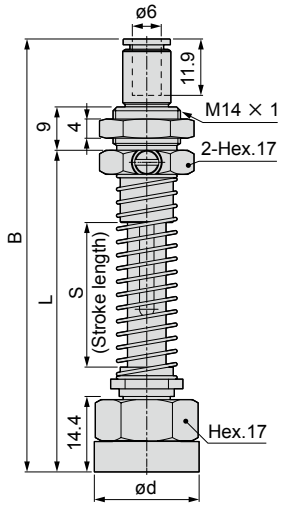
Unit: mm

Model No.	Pad diameter ød	B	L1	L2	Stroke length S	Spring force (N)	Weight (g)
VSP-C10-10F□-6	10	68.2	33.9	20	10	2 to 5.2	41
VSP-C10-15F□-6		78.2	38.9	25	15	2 to 5.9	46
VSP-C10-20F□-6		94.2	45.9	34	20	1.1 to 4.8	53
VSP-C15-10F□-6	15	68.2	33.9	20	10	2 to 5.2	41
VSP-C15-15F□-6		78.2	38.9	25	15	2 to 5.9	46
VSP-C15-20F□-6		94.2	45.9	34	20	1.1 to 4.8	53
VSP-C20-10F□-6	20	72.7	38.4	20	10	3.3 to 10	60
VSP-C20-15F□-6		82.7	43.4	25	15	3.3 to 10.4	65
VSP-C20-20F□-6		98.7	50.4	34	20	2 to 8.7	71
VSP-C25-10F□-6	25	72.7	38.4	20	10	3.3 to 10	61
VSP-C25-15F□-6		82.7	43.4	25	15	3.3 to 10.4	66
VSP-C25-20F□-6		98.7	50.4	34	20	2 to 8.7	72
VSP-C30-10F□-6	30	72.7	38.4	20	10	3.3 to 10	61
VSP-C30-15F□-6		82.7	43.4	25	15	3.3 to 10.4	66
VSP-C30-20F□-6		98.7	50.4	34	20	2 to 8.7	72

Dimensions (flat, buffer, vacuum outlet top VSP-C□-□)

● Type without spring cover, with push-in fitting

● VSP-C20 to 30-□F□-6C



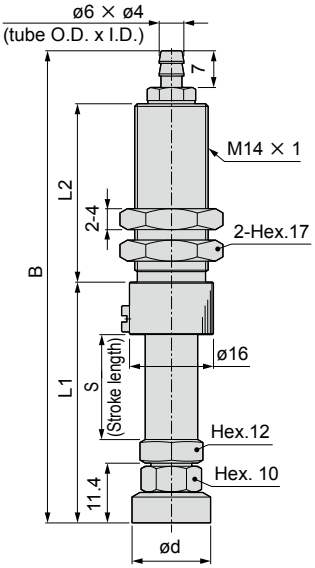
Unit: mm

Model No.	Pad diameter ød	B	L	Stroke length S	Spring force (N)	Weight (g)
VSP-C20-20F□-6C	20	75.8	52.5	20	1.5 to 4.9	67
VSP-C20-30F□-6C		88.8	65.5	30	1.1 to 4.8	72
VSP-C20-40F□-6C		101.8	78.5	40	1 to 4.5	78
VSP-C20-50F□-6C		114.8	91.5	50	0.9 to 4.5	83
VSP-C25-20F□-6C	25	75.8	52.5	20	1.5 to 4.9	68
VSP-C25-30F□-6C		88.8	65.5	30	1.1 to 4.8	73
VSP-C25-40F□-6C		101.8	78.5	40	1 to 4.5	79
VSP-C25-50F□-6C		114.8	91.5	50	0.9 to 4.5	84
VSP-C30-20F□-6C	30	75.8	52.5	20	1.5 to 4.9	68
VSP-C30-30F□-6C		88.8	65.5	30	1.1 to 4.8	73
VSP-C30-40F□-6C		101.8	78.5	40	1 to 4.5	79
VSP-C30-50F□-6C		114.8	91.5	50	0.9 to 4.5	84

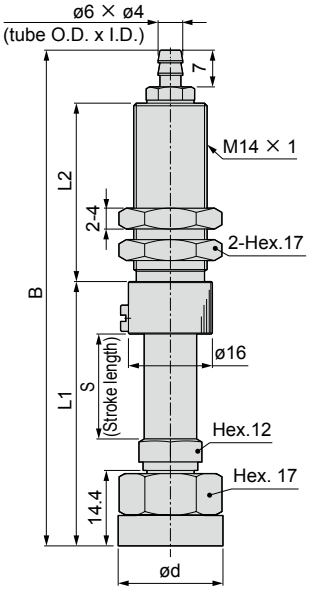
Dimensions (flat, buffer, vacuum outlet top VSP-C□-□)

● Type with spring cover, barbed fitting

● VSP-C10, 15-□F□-6T



● VSP-C20 to 30-□F□-6T



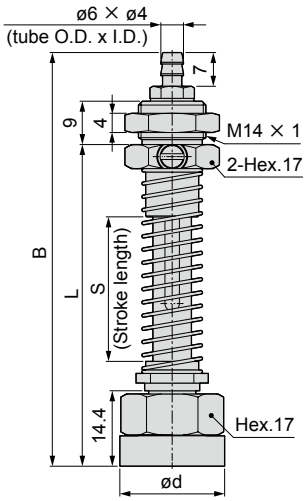
Unit: mm

Model No.	Pad diameter ød	B	L1	L2	Stroke length S	Spring force (N)	Weight (g)
VSP-C10-10F□-6T	10	64	33.9	20	10	2 to 5.2	39
VSP-C10-15F□-6T		74	38.9	25	15	2 to 5.9	44
VSP-C10-20F□-6T		90	45.9	34	20	1.1 to 4.8	51
VSP-C15-10F□-6T	15	64	33.9	20	10	2 to 5.2	39
VSP-C15-15F□-6T		74	38.9	25	15	2 to 5.9	44
VSP-C15-20F□-6T		90	45.9	34	20	1.1 to 4.8	51
VSP-C20-10F□-6T	20	68.5	38.4	20	10	3.3 to 10	58
VSP-C20-15F□-6T		78.5	43.4	25	15	3.3 to 10.4	63
VSP-C20-20F□-6T		94.5	50.4	34	20	2 to 8.7	69
VSP-C25-10F□-6T	25	68.5	38.4	20	10	3.3 to 10	59
VSP-C25-15F□-6T		78.5	43.4	25	15	3.3 to 10.4	64
VSP-C25-20F□-6T		94.5	50.4	34	20	2 to 8.7	70
VSP-C30-10F□-6T	30	68.5	38.4	20	10	3.3 to 10	59
VSP-C30-15F□-6T		78.5	43.4	25	15	3.3 to 10.4	64
VSP-C30-20F□-6T		94.5	50.4	34	20	2 to 8.7	70

Dimensions (flat, buffer, vacuum outlet top VSP-C□-□)

● Type without spring cover, with barbed fitting

● VSP-C20 to 30-□F□-6TC



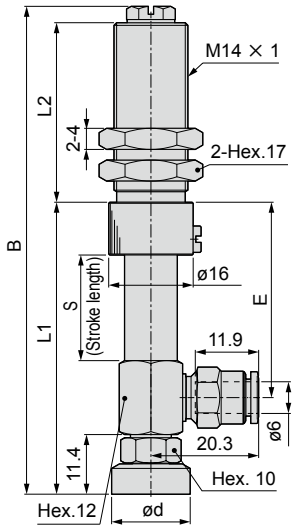
Unit: mm

Model No.	Pad diameter ød	B	L	Stroke length S	Spring force (N)	Weight (g)
VSP-C20-20F□-6TC	20	71.6	52.5	20	1.5 to 4.9	65
VSP-C20-30F□-6TC		84.6	65.5	30	1.1 to 4.8	70
VSP-C20-40F□-6TC		97.6	78.5	40	1 to 4.5	75
VSP-C20-50F□-6TC		110.6	91.5	50	0.9 to 4.5	81
VSP-C25-20F□-6TC	25	71.6	52.5	20	1.5 to 4.9	66
VSP-C25-30F□-6TC		84.6	65.5	30	1.1 to 4.8	71
VSP-C25-40F□-6TC		97.6	78.5	40	1 to 4.5	76
VSP-C25-50F□-6TC		110.6	91.5	50	0.9 to 4.5	82
VSP-C30-20F□-6TC	30	71.6	52.5	20	1.5 to 4.9	66
VSP-C30-30F□-6TC		84.6	65.5	30	1.1 to 4.8	71
VSP-C30-40F□-6TC		97.6	78.5	40	1 to 4.5	76
VSP-C30-50F□-6TC		110.6	91.5	50	0.9 to 4.5	82

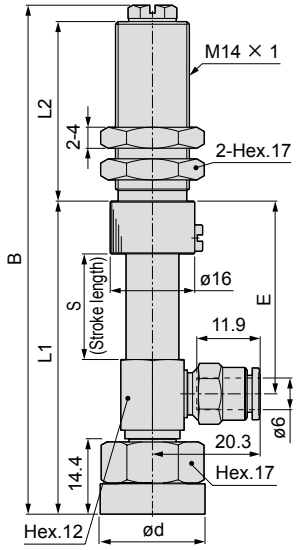
Dimensions (flat, buffer, vacuum outlet side VSP-D□-□)

● Type with spring cover, push-in fitting

● VSP-D10, 15-□F□-6



● VSP-D20 to 30-□F□-6



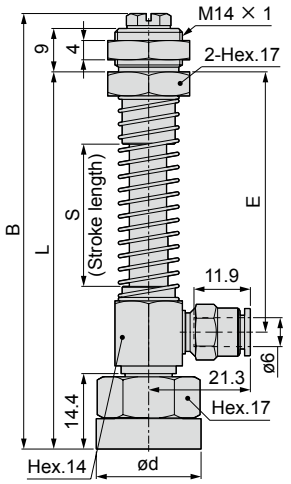
Unit: mm

Model No.	Pad diameter ød	B	L1	L2	E	Stroke length S	Spring force (N)	Weight (g)
VSP-D10-10F□-6	10	66.5	43.4	20	25	10	2 to 5.2	55
VSP-D10-15F□-6		76.5	48.4	25	30	15	2 to 5.9	60
VSP-D10-20F□-6		92.5	55.4	34	37	20	1.1 to 4.8	71
VSP-D15-10F□-6	15	66.5	43.4	20	25	10	2 to 5.2	55
VSP-D15-15F□-6		76.5	48.4	25	30	15	2 to 5.9	60
VSP-D15-20F□-6		92.5	55.4	34	37	20	1.1 to 4.8	71
VSP-D20-10F□-6	20	70.5	47.4	20	24.5	10	3.3 to 10	73
VSP-D20-15F□-6		80.5	52.4	25	29.5	15	3.3 to 10.4	79
VSP-D20-20F□-6		96.5	59.4	34	36.5	20	2 to 8.7	89
VSP-D25-10F□-6	25	70.5	47.4	20	24.5	10	3.3 to 10	74
VSP-D25-15F□-6		80.5	52.4	25	29.5	15	3.3 to 10.4	80
VSP-D25-20F□-6		96.5	59.4	34	36.5	20	2 to 8.7	90
VSP-D30-10F□-6	30	70.5	47.4	20	24.5	10	3.3 to 10	74
VSP-D30-15F□-6		80.5	52.4	25	29.5	15	3.3 to 10.4	80
VSP-D30-20F□-6		96.5	59.4	34	36.5	20	2 to 8.7	90

Dimensions (flat, buffer, vacuum outlet side VSP-D□-□)

● Type without spring cover, with push-in fitting

● VSP-D20 to 30-□F□-6C



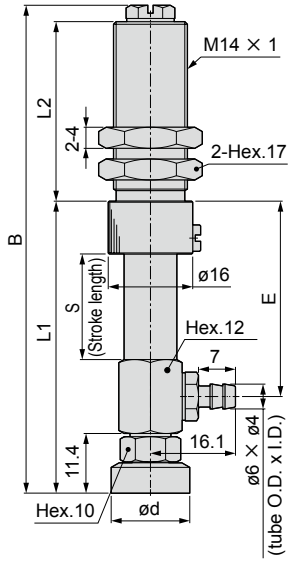
Unit: mm

Model No.	Pad diameter ød	B	L	E	Stroke length S	Spring force (N)	Weight (g)
VSP-D20-20F□-6C	20	76.1	64	41	20	1.5 to 4.9	77
VSP-D20-30F□-6C		89.1	77	54	30	1.1 to 4.8	84
VSP-D20-40F□-6C		102.1	90	67	40	1 to 4.5	101
VSP-D20-50F□-6C		115.1	103	80	50	0.9 to 4.5	108
VSP-D25-20F□-6C	25	76.1	64	41	20	1.5 to 4.9	78
VSP-D25-30F□-6C		89.1	77	54	30	1.1 to 4.8	85
VSP-D25-40F□-6C		102.1	90	67	40	1 to 4.5	102
VSP-D25-50F□-6C		115.1	103	80	50	0.9 to 4.5	109
VSP-D30-20F□-6C	30	76.1	64	41	20	1.5 to 4.9	78
VSP-D30-30F□-6C		89.1	77	54	30	1.1 to 4.8	85
VSP-D30-40F□-6C		102.1	90	67	40	1 to 4.5	102
VSP-D30-50F□-6C		115.1	103	80	50	0.9 to 4.5	109

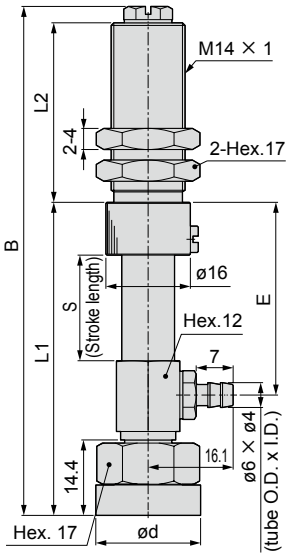
Dimensions (flat, buffer, vacuum outlet side VSP-D□-□)

● Type with spring cover, barbed fitting

● VSP-D10, 15-□F□-6T



● VSP-D20 to 30-□F□-6T



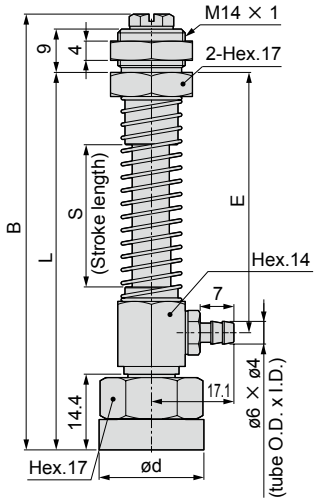
Unit: mm

Model No.	Pad diameter ød	B	L1	L2	E	Stroke length S	Spring force (N)	Weight (g)
VSP-D10-10F□-6T	10	66.5	43.4	20	25	10	2 to 5.2	53
VSP-D10-15F□-6T		76.5	48.4	25	30	15	2 to 5.9	58
VSP-D10-20F□-6T		92.5	55.4	34	37	20	1.1 to 4.8	69
VSP-D15-10F□-6T	15	66.5	43.4	20	24.5	10	2 to 5.2	53
VSP-D15-15F□-6T		76.5	48.4	25	29.5	15	2 to 5.9	58
VSP-D15-20F□-6T		92.5	55.4	34	36.5	20	1.1 to 4.8	69
VSP-D20-10F□-6T	20	70.5	47.4	20	24.5	10	3.3 to 10	71
VSP-D20-15F□-6T		80.5	52.4	25	29.5	15	3.3 to 10.4	77
VSP-D20-20F□-6T		96.5	59.4	34	36.5	20	2 to 8.7	87
VSP-D25-10F□-6T	25	70.5	47.4	20	24.5	10	3.3 to 10	72
VSP-D25-15F□-6T		80.5	52.4	25	29.5	15	3.3 to 10.4	78
VSP-D25-20F□-6T		96.5	59.4	34	36.5	20	2 to 8.7	88
VSP-D30-10F□-6T	30	70.5	47.4	20	24.5	10	3.3 to 10	72
VSP-D30-15F□-6T		80.5	52.4	25	29.5	15	3.3 to 10.4	78
VSP-D30-20F□-6T		96.5	59.4	34	36.5	20	2 to 8.7	88

Dimensions (flat, buffer, vacuum outlet side VSP-D□-□)

● Type without spring cover, with barbed fitting

● VSP-D20 to 30-□F□-6TC



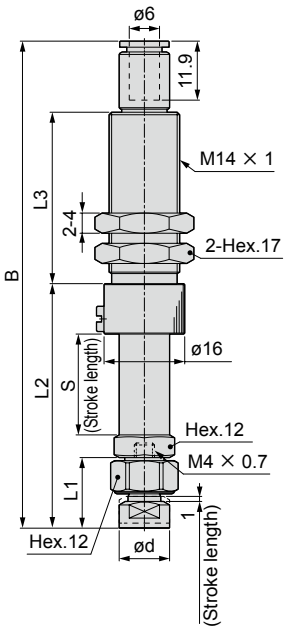
Unit: mm

Model No.	Pad diameter ød	B	L	E	Stroke length S	Spring force (N)	Weight (g)
VSP-D20-20F□-6TC	20	46.1	64	41	20	1.5 to 4.9	85
VSP-D20-30F□-6TC		89.1	77	54	30	1.1 to 4.8	92
VSP-D20-40F□-6TC		102.1	90	67	40	1 to 4.5	99
VSP-D20-50F□-6TC		115.1	103	80	50	0.9 to 4.5	106
VSP-D25-20F□-6TC	25	46.1	64	41	20	1.5 to 4.9	86
VSP-D25-30F□-6TC		89.1	77	54	30	1.1 to 4.8	93
VSP-D25-40F□-6TC		102.1	90	67	40	1 to 4.5	100
VSP-D25-50F□-6TC		115.1	103	80	50	0.9 to 4.5	107
VSP-D30-20F□-6TC	30	46.1	64	41	20	1.5 to 4.9	86
VSP-D30-30F□-6TC		89.1	77	54	30	1.1 to 4.8	93
VSP-D30-40F□-6TC		102.1	90	67	40	1 to 4.5	100
VSP-D30-50F□-6TC		115.1	103	80	50	0.9 to 4.5	107

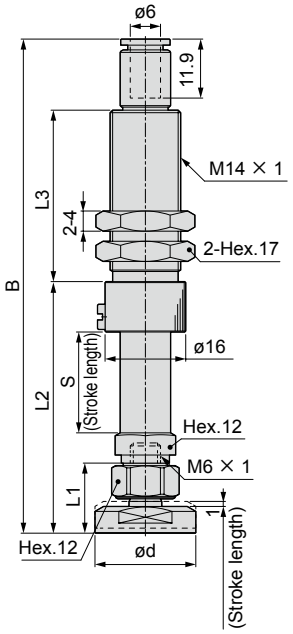
Dimensions (suction mark prevention, buffer, vacuum outlet top VSP-C□-□)

● Type with spring cover, push-in fitting

● VSP-C10-□Q□-6



● VSP-C20, 30-□Q□-6



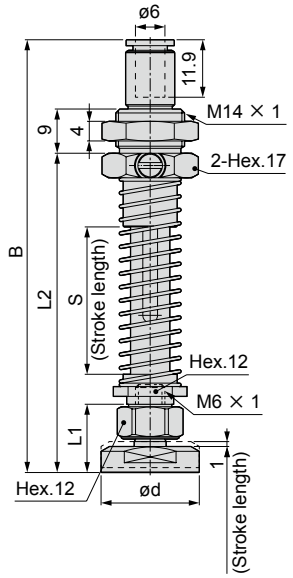
Unit: mm

Model No.	Pad diameter ød	B	L1	L2	L3	Stroke length S	Spring force (N)	Weight (g)
VSP-C10-10Q□-6	10	70.8	14	36.5	20	10	2 to 5.2	42
VSP-C10-15Q□-6		80.8		41.5	25	15	2 to 5.9	47
VSP-C10-20Q□-6		96.8		48.5	34	20	1.1 to 4.8	55
VSP-C20-10Q□-6	20	72.2	13.9	37.9	20	10	3.3 to 10	46
VSP-C20-15Q□-6		82.2		42.9	25	15	3.3 to 10.4	51
VSP-C20-20Q□-6		98.2		49.9	34	20	2 to 8.7	58
VSP-C30-10Q□-6	30	72.2	13.9	37.9	20	10	3.3 to 10	50
VSP-C30-15Q□-6		82.2		42.9	25	15	3.3 to 10.4	55
VSP-C30-20Q□-6		98.2		49.9	34	20	2 to 8.7	62

Dimensions (suction mark prevention, buffer, vacuum outlet top VSP-C□-□)

● Type without spring cover, with push-in fitting

● VSP-C20, 30-□Q□-6C



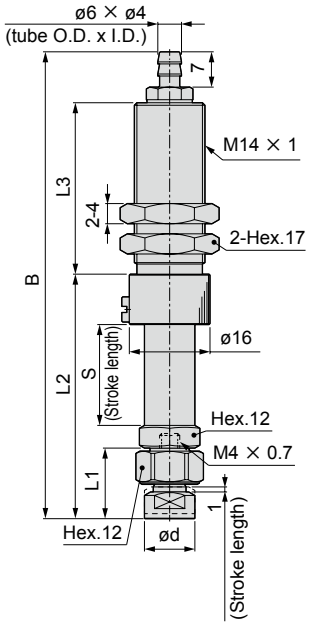
Unit: mm

Model No.	Pad diameter ød	B	L1	L2	Stroke length S	Spring force (N)	Weight (g)
VSP-C20-20Q□-6C	20	75.3	13.9	52	20	1.5 to 4.9	54
VSP-C20-30Q□-6C		88.3		65	30	1.1 to 4.8	59
VSP-C20-40Q□-6C		101.3		78	40	1 to 4.5	64
VSP-C20-50Q□-6C		114.3		91	50	0.9 to 4.5	69
VSP-C30-20Q□-6C	30	75.3	13.9	52	20	1.5 to 4.9	58
VSP-C30-30Q□-6C		88.3		65	30	1.1 to 4.8	63
VSP-C30-40Q□-6C		101.3		78	40	1 to 4.5	68
VSP-C30-50Q□-6C		114.3		91	50	0.9 to 4.5	73

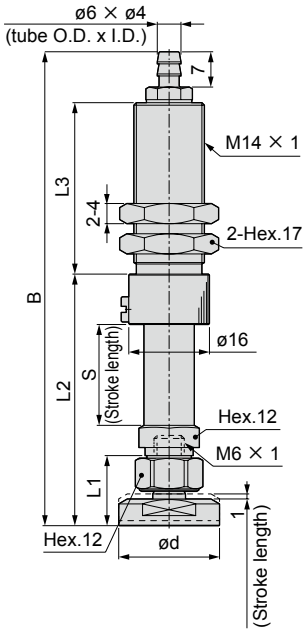
Dimensions (suction mark prevention, buffer, vacuum outlet top VSP-C□-□)

● Type with spring cover, barbed fitting

● VSP-C10-□Q□-6T



● VSP-C20, 30-□Q□-6T



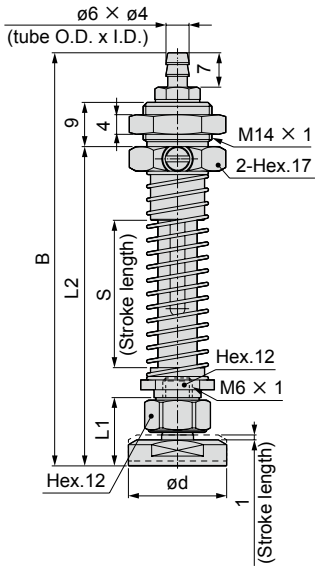
Unit: mm

Model No.	Pad diameter ød	B	L1	L2	L3	Stroke length S	Spring force (N)	Weight (g)
VSP-C10-10Q□-6T	10	66.6	14	36.5	20	10	2 to 5.2	40
VSP-C10-15Q□-6T		76.6		41.5	25	15	2 to 5.9	45
VSP-C10-20Q□-6T		92.6		48.5	34	20	1.1 to 4.8	53
VSP-C20-10Q□-6T	20	68	13.9	37.9	20	10	3.3 to 10	44
VSP-C20-15Q□-6T		78		42.9	25	15	3.3 to 10.4	49
VSP-C20-20Q□-6T		94		49.9	34	20	2 to 8.7	56
VSP-C30-10Q□-6T	30	68	13.9	37.9	20	10	3.3 to 10	48
VSP-C30-15Q□-6T		78		42.9	25	15	3.3 to 10.4	53
VSP-C30-20Q□-6T		94		49.9	34	20	2 to 8.7	60

Dimensions (suction mark prevention, buffer, vacuum outlet top VSP-C□-□)

● Type without spring cover, with barbed fitting

● VSP-C20, 30-□Q□-6TC



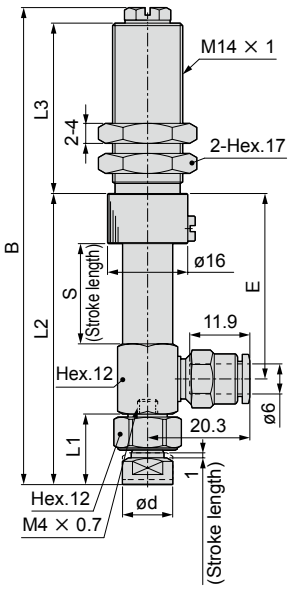
Unit: mm

Model No.	Pad diameter ød	B	L1	L2	Stroke length S	Spring force (N)	Weight (g)
VSP-C20-20Q□-6TC	20	71.1	13.9	52	20	1.5 to 4.9	52
VSP-C20-30Q□-6TC		84.1		65	30	1.1 to 4.8	57
VSP-C20-40Q□-6TC		97.1		78	40	1 to 4.5	62
VSP-C20-50Q□-6TC		110.1		91	50	0.9 to 4.5	67
VSP-C30-20Q□-6TC	30	71.1	13.9	52	20	1.5 to 4.9	56
VSP-C30-30Q□-6TC		84.1		65	30	1.1 to 4.8	61
VSP-C30-40Q□-6TC		97.1		78	40	1 to 4.5	66
VSP-C30-50Q□-6TC		110.1		91	50	0.9 to 4.5	71

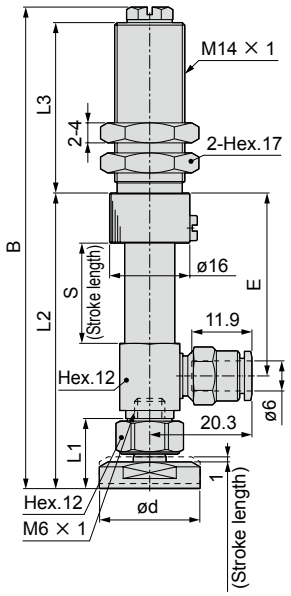
Dimensions (suction mark prevention, buffer, vacuum outlet side VSP-D□-□)

● Type with spring cover, push-in fitting

●VSP-D10-□Q□-6



●VSP-D20, 30-□Q□-6



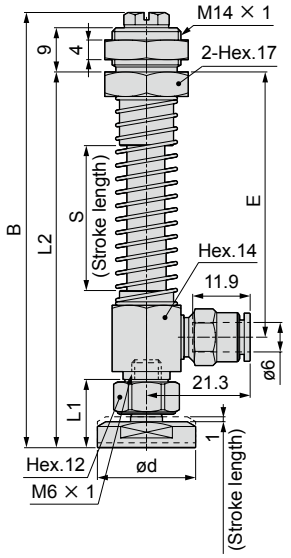
Unit: mm

Model No.	Pad diameter ød	B	L1	L2	L3	E	Stroke length S	Spring force (N)	Weight (g)
VSP-D10-10Q□-6	10	69.1	14	46	20	25	10	2 to 5.2	56
VSP-D10-15Q□-6		79.1		51	25	30	15	2 to 5.9	62
VSP-D10-20Q□-6		95.1		58	34	37	20	1.1 to 4.8	72
VSP-D20-10Q□-6	20	70	13.9	46.9	20	24.5	10	3.3 to 10	59
VSP-D20-15Q□-6		80		51.9	25	29.5	15	3.3 to 10.4	66
VSP-D20-20Q□-6		96		58.9	34	36.5	20	2 to 8.7	76
VSP-D30-10Q□-6	30	70	13.9	46.9	20	24.5	10	3.3 to 10	63
VSP-D30-15Q□-6		80		51.9	25	29.5	15	3.3 to 10.4	70
VSP-D30-20Q□-6		96		58.9	34	36.5	20	2 to 8.7	80

Dimensions (suction mark prevention, buffer, vacuum outlet side VSP-D□-□)

● Type without spring cover, with push-in fitting

● VSP-D20, 30-□Q□-6C



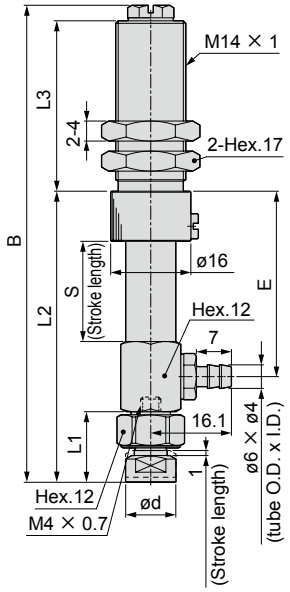
Unit: mm

Model No.	Pad diameter ød	B	L1	L2	E	Stroke length S	Spring force (N)	Weight (g)
VSP-D20-20Q□-6C	20	75.6	13.9	63.5	41	20	1.5 to 4.9	74
VSP-D20-30Q□-6C		88.6		76.5	54	30	1.1 to 4.8	81
VSP-D20-40Q□-6C		101.6		89.5	67	40	1 to 4.5	87
VSP-D20-50Q□-6C		114.6		102.5	80	50	0.9 to 4.5	94
VSP-D30-20Q□-6C	30	75.6	13.9	63.5	41	20	1.5 to 4.9	78
VSP-D30-30Q□-6C		88.6		76.5	54	30	1.1 to 4.8	85
VSP-D30-40Q□-6C		101.6		89.5	67	40	1 to 4.5	91
VSP-D30-50Q□-6C		114.6		102.5	80	50	0.9 to 4.5	98

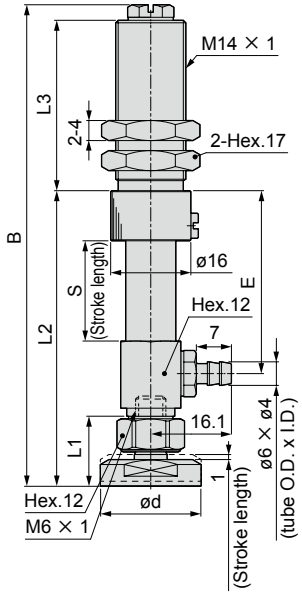
Dimensions (flat, buffer, vacuum outlet side VSP-D□-□)

● Type with spring cover, barbed fitting

● VSP-D10-□Q□-6T



● VSP-D20 to 30-□Q□-6T



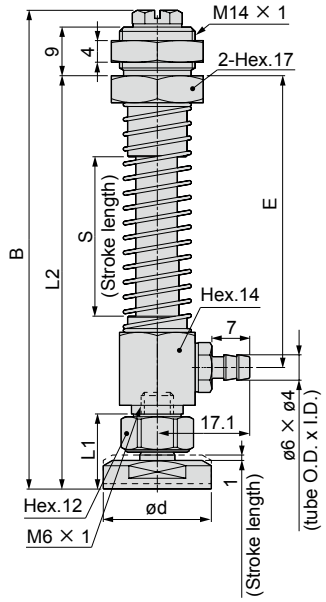
Unit: mm

Model No.	Pad diameter ød	B	L1	L2	L3	E	Stroke length S	Spring force (N)	Weight (g)
VSP-D10-10Q□-6T	10	69.1	14	46	20	25	10	2 to 5.2	54
VSP-D10-15Q□-6T		79.1		51	25	30	15	2 to 5.9	60
VSP-D10-20Q□-6T		95.1		58	34	37	20	1.1 to 4.8	70
VSP-D20-10Q□-6T	20	70	13.9	46.9	20	24.5	10	3.3 to 10	57
VSP-D20-15Q□-6T		80		51.9	25	29.5	15	3.3 to 10.4	64
VSP-D20-20Q□-6T		96		58.9	34	36.5	20	2 to 8.7	74
VSP-D30-10Q□-6T	30	70	13.9	46.9	20	24.5	10	3.3 to 10	61
VSP-D30-15Q□-6T		80		51.9	25	29.5	15	3.3 to 10.4	68
VSP-D30-20Q□-6T		96		58.9	34	36.5	20	2 to 8.7	78

Dimensions (suction mark prevention, buffer, vacuum outlet side VSP-D□-□)

● Type without spring cover, with barbed fitting

● VSP-D20, 30-□Q□-6TC



Unit: mm

Model No.	Pad diameter ød	B	L1	L2	E	Stroke length S	Spring force (N)	Weight (g)
VSP-D20-20Q□-6TC	20	75.6	13.9	63.5	41	20	1.5 to 4.9	72
VSP-D20-30Q□-6TC		88.6		76.5	54	30	1.1 to 4.8	79
VSP-D20-40Q□-6TC		101.6		89.5	67	40	1 to 4.5	85
VSP-D20-50Q□-6TC		114.6		102.5	80	50	0.9 to 4.5	92
VSP-D30-20Q□-6TC	30	75.6	13.9	63.5	41	20	1.5 to 4.9	76
VSP-D30-30Q□-6TC		88.6		76.5	54	30	1.1 to 4.8	83
VSP-D30-40Q□-6TC		101.6		89.5	67	40	1 to 4.5	89
VSP-D30-50Q□-6TC		114.6		102.5	80	50	0.9 to 4.5	96

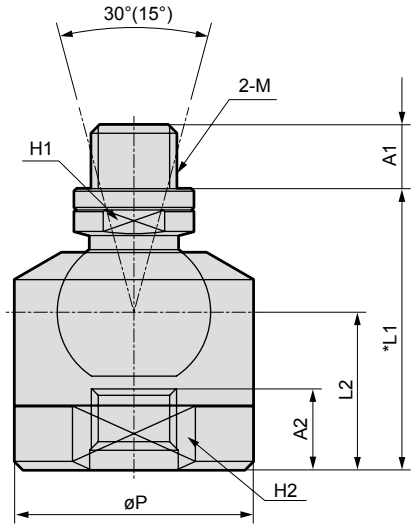
Suction pad option/free holder (swinging) [Code; F1, F2]

Applicable pad list

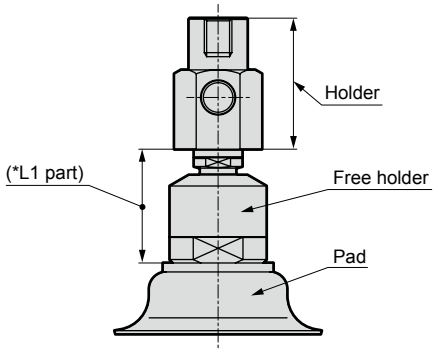
Pad shape	Free holder part model No. (custom order) *1		
	VSP-FH10-F*	VSP-FH20-F*	VSP-FH60-F*
Standard general: R	ø10, ø15	ø20 to ø50	ø60 to ø100
Standard deep: A	ø15	ø20 to ø50	ø60 to ø100
Sponge: S	-	ø10 to ø50	ø70, ø100
Bellows: B	ø10, ø15	ø20 to ø50	ø60, ø80, ø100
Oval: E	-	2×4 to 8×30	-
Soft: L	ø4 to ø15	ø20 to ø40	-
Soft bellows: LB	ø6 to ø15	ø20	-
Anti-slip: K	ø10	ø20 to ø50	-
Flat: F	ø10, ø15	ø20 to ø30	-

*1 : For the * mark, select the following codes.
1: Swing angle 30°
2: Swing angle 15°

Dimensions



Free holder mounting example



Note : When free holder option is selected in the suction pad product model No. , the total length of the pad is the size obtained by adding * L1 in the following dimensional table.

Part model No.	M	A1	A2	*L1	L2	øP	Opposite side H1	Opposite side H2	Weight (g)
VSP-FH10-F*	M4×0.7	3.4	7	19.7	11.1	15	4	-	10
VSP-FH20-F*	M6×1	5.5	6.6	22.9	12.4	20	7	-	20
VSP-FH60-F*	M10×1.5	7.5	9.5	33	18.5	28	12	24	60

Safety precautions

WARNING

- Do not use the free holder in combination with other than CKD suction pads or for other than the intended use since it is designed for CKD suction pads. Doing so may damage the body of the product depending on the use.
- When transporting by the free holder, consider the acceleration, impact and wind pressure. The suctioned object may detach during transportation and damage the body of the product.
- Do not apply excessive force to the free holder. It could damage the body of the product.

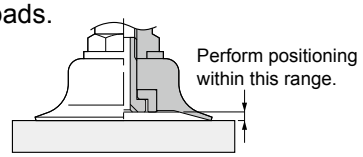
CAUTION

- Note the orientation of the free holder during suction. The orientation changes according to the weight after suction, the acceleration or shock during transport.

Reference material for using suction pads

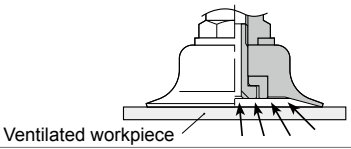
Shock to the pad

When pressing the pad against the workpiece, do not apply impact or great force. The pad may deform, crack and wear out faster. Therefore, use it within the deformation range of the pad skirt or until it touches the rib part lightly. In particular, position accurately for small diameter pads.



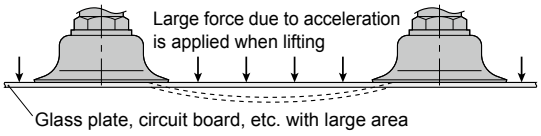
For ventilated workpieces or those with holes

For suction of ventilated workpieces, the suction force decreases due to the amount of air leakage. Measures such as increasing the capacity of the ejector and vacuum pump or increasing the cross-sectional area of the piping path are necessary. Selecting a pad with a small diameter is one way to reduce the amount of air leakage.



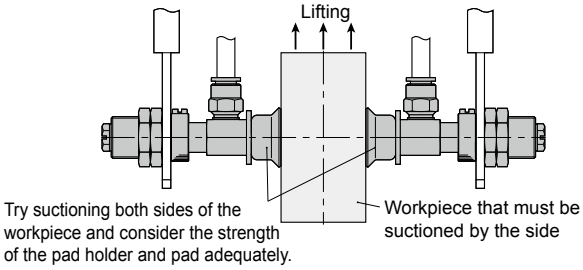
For flat workpieces with large area

When lifting a glass plate or circuit board with a large area, it may be subject to large force due to acceleration or undulation due to its own weight, so it is necessary to allow sufficient margin in consideration of the pad layout and size.



When lifting workpiece sides with suction

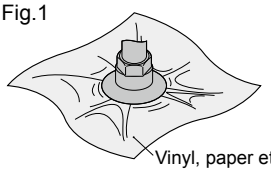
Since all the pad holders are designed for horizontal lifting, when suctioning workpiece sides for lifting, give sufficient consideration to the strength of the pad holder and pad.



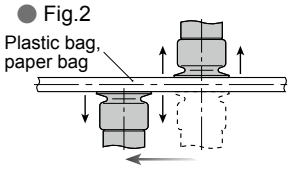
When workpiece is soft

When suctioning soft workpieces such as vinyl, paper, thin plates, etc., the workpiece deforms due to the vacuum pressure and creases, so it is necessary to use a small pad and further reduce the vacuum pressure (see Fig.1). The small diameter pad is appropriate when opening plastic bags, paper bags, etc.; when installed in a position slightly off-center to the opposite side pad, opening is easier (see Fig.2).

● Fig.1

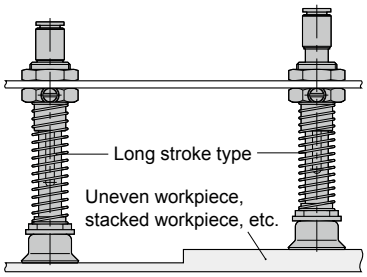


● Fig.2



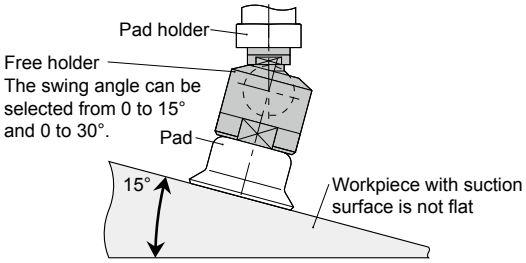
When the pad to workpiece distance is irregular

Use a long stroke type when the position of the pad and workpiece cannot be determined, such as for the suctioning of uneven or stacked workpieces. Even if the distance between the pad and the workpiece changes, it can be suctioned by the stroke.



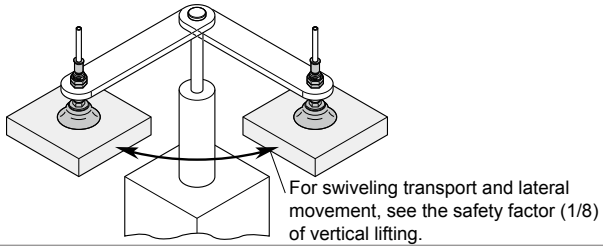
When the work surface is not flat

When the work surface to be suctioned is not flat, use a free holder.



For swiveling transport

If swiveling transport is carried out with a pad fixed with screws, the screws may loosen and the pad may come off, so design with sufficient margin. Also, special attention is required when the suction position and the center of gravity of the workpiece are misaligned.



MEMO

Vacuum-related products

■ Vacuum components

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Series variation

Vacuum-related products

[Position locking valve]

Series	Model No.	Port size		Remarks	Page
		Vacuum generator side	Workpiece side		
VSECV Series · Even if the workpiece comes off, vacuum is maintained for workpieces in other circuits. · Compatible with SELVACS suction pad series.	VSECV-M3	M3			556
	VSECV-M4	M4			
	VSECV-M5	M5			
	VSECV-M6	M6			
	VSECV-M10	M10			
	VSECV-6A	R1/8			

[Compact vacuum regulator]

Series	Model No.	Port size		Remarks	Page
		ø6	ø8		
VSRVV Series · Both source pressure and terminals can be controlled. · Vacuum pressure switch with digital display or pressure gauge for vacuum can also be selected.	VSRVV-*A*	○	○	Elbow (output: male thread)	560
	VSRVV-*B*	○	○	Elbow (supply: male thread)	
	VSRVV-*U*	○	○	Union	

[Vacuum burst unit]

Series	Model No.	Port size		Remarks	Page
		Vacuum generator side	Workpiece side		
VSLF Series · Controls the vacuum burst air while maintaining the vacuum characteristics of the vacuum ejector. · Vacuum burst circuit relief function realizes shortening of vacuum burst time.	VSLF-44	ø4	ø4		570
	VSLF-66	ø6	ø6		
	VSLF-46A	ø4	R1/8		
	VSLF-66A	ø6	R1/8		

[Vacuum filter]

●: Standard equipment ○: Optional selection

Series	Model No.	Port size						Remarks	Page
		M5	ø4	ø6	ø8	ø10	ø12		
VSFB Series Large capacity union · Dust and water droplets are removed by cyclone effect and element. · Dust scattering is prevented because the entire dust case can be detached with one touch.	VSFB-66			●				Filtration area: 20cm^2	574
	VSFB-88				●			Filtration area: 20cm^2	
	VSFB-1010					●		Filtration area: 20cm^2	
	VSFB-1212						●	Filtration area: 20cm^2	
VSFU Series Compact union · Replacement and cleaning of element requires no tools. · Inline that can be easily installed in the middle of piping.	VSFU-1S	○	○	○				Filtration area: 2.8cm^2	
	VSFU-1L	○	○	○				Filtration area: 4.7cm^2	
	VSFU-2	○	○	○				Filtration area: 7.5cm^2	
	VSFU-3			○	○	○		Filtration area: 12.5cm^2	
VSFJ Series Compact socket · Ideal for single ejector without built-in vacuum filter.	VSFJ-44		●					Filtration area: 0.8cm^2	
	VSFJ-66			●				Filtration area: 1.1cm^2	
FSL Series Inline · Compact, lightweight and space saving inline · Use either positive or negative pressure	FSL100		●	●				Filtration area: 4.7cm^2	582
	FSL200		●	●				Filtration area: 7.5cm^2	
	FSL500			●	●	●		Filtration area: 12.7cm^2	

[Vacuum pressure switch]

Series	Model No.	Port size					Remarks	Page
		M5	ø4	ø6	ø8	Direct mount		
VSUS Series · 2-point output and analog output are available. · Three types of pipe connection are available: push-in fitting, M5 female thread and direct mount.	VSUS-NW	○	○	○	○	○	NPN: 2-point output	586
	VSUS-NA	○	○	○	○	○	NPN: Analog output	
	VSUS-PW	○	○	○	○	○	PNP: 2-point output	
	VSUS-PA	○	○	○	○	○	PNP: Analog output	

[Air tweezers]

Series	Model No.	Pad diameter				Pad rubber material	Holder shape	Page
		ø2	ø4	ø6	ø8			
VST Series · Built-in suction pad and ejector in pen body. · Ideal for assembling small parts. · Package type is also available.	VST-A*N	○	○	○	○	Nitrile rubber	Without valve	592
	VST-A*S	○	○	○	○	Silicone rubber	Without valve	
	VST-B*N	○	○	○	○	Nitrile rubber	Integrated valve	
	VST-B*S	○	○	○	○	Silicone rubber	Integrated valve	

Even if the workpiece comes off, vacuum is maintained for workpieces in other circuits.
Position locking valve

VSECV Series

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

RoHS

Features

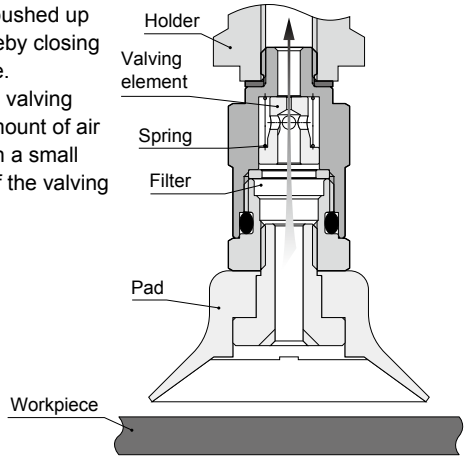
■ When two or more pads are used, pads that suction normally reduce the vacuum pressure decline even if other pads are not suctioning. Thus, preventing the workpiece from falling.

Specifications

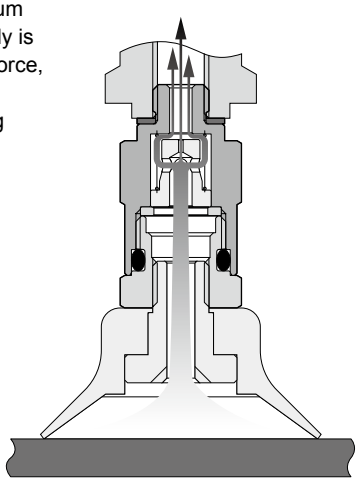
Descriptions		VSECV
Working fluid		Air
Working pressure	Positive pressure MPa	0 to 0.7
	Negative pressure kPa	-100 to 0
Operating ambient temperature °C		0 to 60

Position locking valve operational explanation

● Position locking valve operational status
If the workpiece is detached from the suction pad, the valving element is pushed up by the air flow, thereby closing the suction passage.
When operating the valving element, a small amount of air is suctioned through a small hole at the center of the valving element.

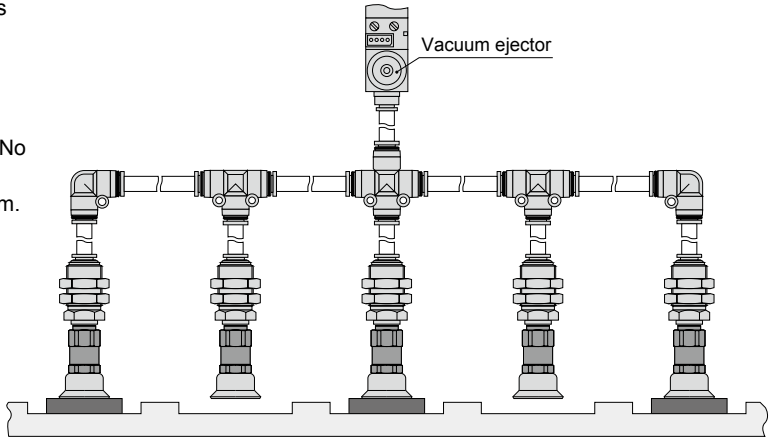


● Workpiece suction status
When the workpiece comes into close contact with the suction pad, the suction flow rate of vacuum decreases and the valve body is pushed down by the spring force, thereby opening the suction passage between the valving element and the main body.



Piping example

■ When using multiple vacuum pads with a single vacuum ejector or vacuum pump, if pads separate from the workpiece but the minimum graspable quantity of pads are still adhering to the workpiece, the suction at the separated pads are automatically reduced, whereby lowering the vacuum loss of the entire system. Thus, stoppages of handling workpieces and other problems can be prevented.
When adopting this system, be sure to be aware of the minimum number of pads required for the conveyance of workpieces.
Also, if the minimum number of pads are not met, an NG “No Good” judgment of the situation needs to be realized and appropriate safety measures need to be put into the system.



How to order

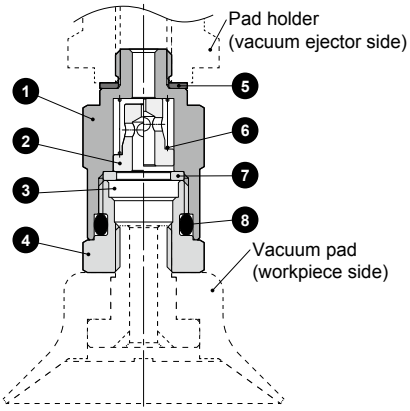
● Position locking valve

VSECV - M4

Ⓐ Port thread size

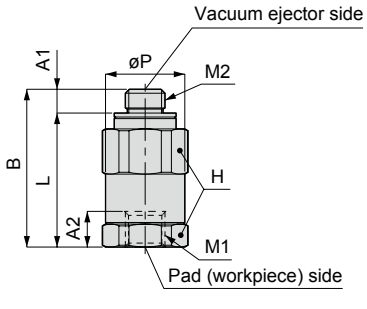
Code	Content
Ⓐ Port thread size	
M3	M3×0.5
M4	M4×0.7
M5	M5×0.8
M6	M6×1
M10	M10×1.5
6A	R1/8, Rc1/8

Internal structure

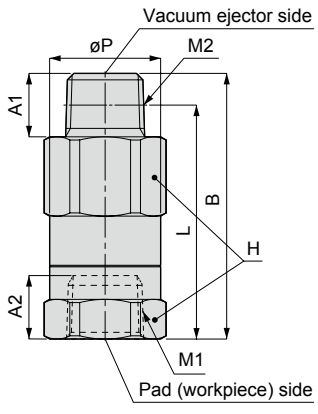


No.	Part name	Material				
		VSECV-M3	VSECV-M4	VSECV-M5	VSECV-M6	VSECV-M10 VSECV-6A
1	Metal body A	Stainless steel		Copper alloy, electroless nickeling		Aluminum, electroless nickeling
2	Valving element	Aluminum				
3	Filter	PVF				
4	Metal body B	Copper alloy, electroless nickeling			Aluminum, electroless nickeling	
5	Gasket	SUS304+NBR				
6	Spring	SUS304				
7	Stopper	Copper alloy, electroless nickeling				
8	O-ring	NBR				

Dimensions



Metric thread



For pipe taper threads

Model No.	M1	M2	A1	A2	B	L	øP	Opposite side H	Valving element min. working intake flow rate (ℓ/min (ANR))	Valving element post-operation intake flow rate (ℓ/min (ANR))	Effective cross-sectional area Free flow	Weight (g)
VSECV-M3	M3×0.5	M3×0.5	2.5	4.5	18.4	15.9	8	8	2	1.3	0.7	4.9
VSECV-M4	M4×0.7	M4×0.7	2.9	4.5	19.9	17	10	10	5	1.3	1.6	7.9
VSECV-M5	M5×0.8	M5×0.8	3	4.5	19.9	16.9	10	10	5	1.3	1.6	6.6
VSECV-M6	M6×1	M6×1	4	5	28.1	24.1	12	12	13	1.3	4.0	13
VSECV-M10	M10×1.5	M10×1.5	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

Target suction pad list

Model No.	Pad shape	Pad size (mm)	Holder shape (including long stroke length)					
			VSP-A	VSP-B	VSP-C	VSP-D	VSP-E	VSP-F
			VSP-MA	VSP-MB	VSP-MC	VSP-MD	VSP-ME	-
VSECV-M3	Standard	ø1.5, ø2, ø3, ø4	-				○	-
VSECV-M4	Standard	ø10, ø15	○				-	○
	Bellows	ø10, ø15	○				-	○
	Multi-stage bellows	ø10	○				-	○
	Soft	ø4, ø6, ø8, ø10, ø15	○				-	○
	Soft bellows	ø6, ø8, ø10, ø15	○				-	○
	Anti-slip	ø10	○				-	○
	Flat	ø10, ø15	○				-	○
	Suction mark prevention	ø10	○				-	○
VSECV-M5	Standard	ø6, ø8	-				○	-
	Bellows	ø6, ø8	-				○	-
	Thin object	ø8, ø10, ø15, ø20	-				○	-
VSECV-M6	Standard	ø20, ø25, ø30, ø40, ø50	○				-	○
	Sponge	ø10, ø15, ø20, ø25, ø30, ø35, ø50	○				-	○
	Bellows	ø20, ø25, ø30, ø40, ø50	○				-	○
	Multi-stage bellows	ø20, ø30, ø40, ø50	○				-	○
	Oval	2×4 to 8×30	○				-	○
	Soft	ø20, ø30, ø40	○				-	○
	Soft bellows	ø20	○				-	○
	Anti-slip	ø20, ø30, ø40, ø50	○				-	○
	Flat	ø20, ø25, ø30	○				-	○
	Suction mark prevention	ø20, ø30	○				-	○
VSECV-M10	Standard	ø60, ø80, ø100	○				-	-
	Bellows	ø70, ø100	○				-	-
	Thin object	ø80	○				-	-

[How to order]

[Example] Holder shape: B/pad size: ø30 mm/pad shape: bellows/pad material: position locking valve mounted on nitrile rubber.

VSP-B30BN-6A-V

Code V : With position locking valve

⚠ Precautions for model No. selection (Items common to all models)

*1 : When selecting free holder (code F1, F2), position locking valve (code V) cannot be selected.

*2 : The suction pad shape/pad size and holder shape to which this option selection applies will be within the range of “Target suction pad list” in the above table.

Safety precautions

⚠ WARNING

- Since it is not a check valve, vacuum is not held unless there is a hold function on the vacuum source side. Do not use for vacuum holding.
- The design allows multiple suction pads to be mounted on a single ejector, but before using the product, confirm the performance with the 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
  (1)Use an appropriate tool to mount/remove the product.
  (2)When mounting, refer to the recommended tightening torque of each thread size (see the following table).

Table. Recommended tightening torque

Thread size	Tightening torque
M3×0.5	0.5 N·m
M4×0.7	1.0 to 1.2 N·m
M5×0.8	1.0 to 1.5 N·m
M6×1	1.5 to 2.0 N·m
M10×1	5.0 to 7.0 N·m
R1/8, Rc1/8	4.5 to 6.5 N·m

■ Precautions for body screw tightening position

(1)When attaching the male thread side of the position locking valve to the device or holder, tighten using the opposite side hexagon of the male thread side and confirm that there is no looseness. Refer to the recommended tightening torque in the table above for tightening.

(2)When attaching the female thread side of the position locking valve to the device or pad, tighten using the opposite side hexagon of the female thread side and confirm that there is no looseness. Refer to the recommended tightening torque in the table above for tightening.

(3)Refer to the recommended tightening torque in the table above for tightening the body screws during element replacement.

■ 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 check thoroughly with the actual device before use. If the filter element clogs, the pressure fall when the workpiece is not suctioned becomes even smaller so take additional care when setting the pressure sensor, etc.

■ Check the structure diagram of the product when replacing the element. Also, be careful not to lose the position locking valve components during replacement.

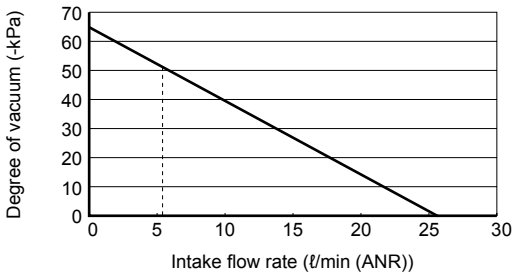
Selection method

Based on the valving element operating minimum intake flow rate in the table below and the sample graph, find how many position locking valves can be installed in one vacuum generator.

Descriptions		VSECV-M3	VSECV-M4	VSECV-M5	VSECV-M6	VSECV-M10	VSECV-6A
Valving element working minimum intake flow rate	ℓ/min(ANR)	2.0	5.0	5.0	13.0	13.0	13.0
Vacuum drop rate when not suctioned	kPa	2.0	2.0	2.0	2.0	2.0	2.0

Example 1. VSJ-L07… (catalog data)

Achieved vacuum level (-kPa)	Intake flow rate (ℓ/min(ANR))
66.5	26



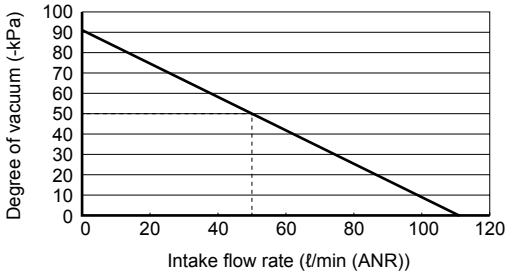
Based on the catalog data, with reference to the completed figure on the right and the valving element working minimum intake flow rate table above, the type and maximum quantity of the operable position locking valves than can be used is calculated.

■ 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, VSECV-M5 can be obtained.
No. of valves used and non-suctioned locations for VSECV-M3: 3,
No. of valves used and non-suctioned locations for VSECV-M4, VSECV-M5: to allow up to 1 valve.

Example 2 VSQ-H2O… (catalog data)

Achieved vacuum level (-kPa)	Intake flow rate (ℓ/min(ANR))
93	110



Based on the catalog data, with reference to the completed figure on the right and the valving element working minimum intake flow rate table above, the type and maximum use quantity of the operable position locking valves can be obtained.

■ 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, VSECV-6A can be obtained.
No. of valves used and non-suctioned locations for VSECV-M3: 21 (*1),
for VSECV-M4, VSECV-M5: 10,
for VSECV-M6, VSECV-M10, VSECV-6A: to allow up to 4 valves.

*1 : VSECV-M3 can theoretically support up to 25 valves upon calculation by suction flow alone, but since the reduction in degree of vacuum per valve is -2 kPa as described above, with all 25 valves in the suctioning state, the degree of vacuum: -93 + (2 × 25) = -43 kPa. Therefore, when used at -50 kPa: -93 + (2×x) ≤ -50 x ≤ 21.5 ∴ Max. non-suctioned locations: 21 valves.

Source pressure as well as terminals can be controlled.
Compact vacuum regulator

VSRVV Series

● Port size: ø6, ø8

JIS symbol

RoHS

Features

■ Suitable for source pressure control of small vacuum pump.

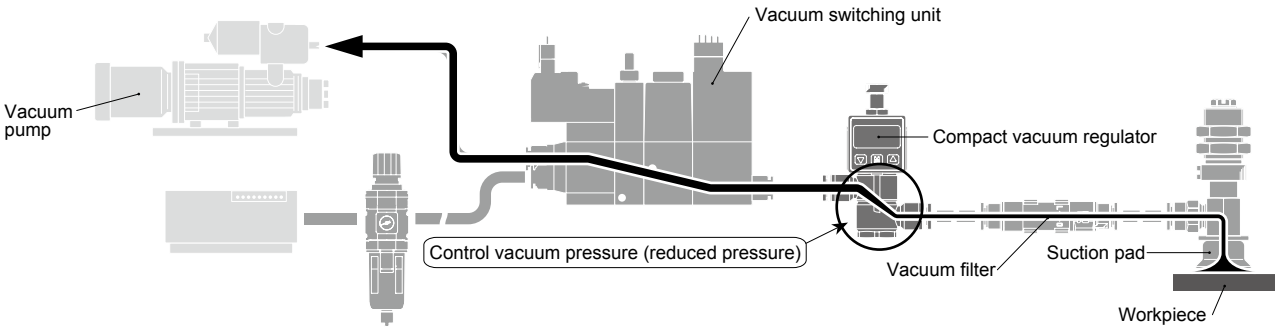
■ Pressure control of individual pads inserted between vacuum valve and suction pad is also possible.

■ Female thread (A) directly connectable to the vacuum port of the vacuum pump is available.

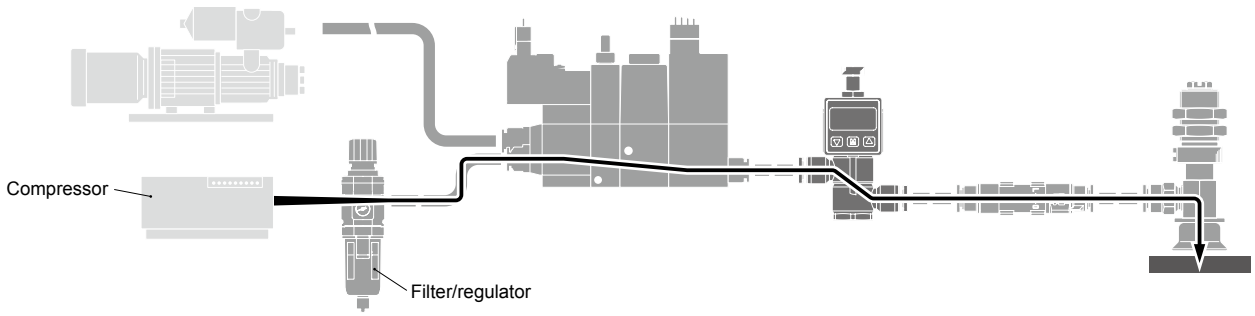
■ Male thread (B) can be mounted directly to the holder for pad diameters ø150, ø200 mm, enabling pressure control.

Piping example

● At vacuum supply



● At vacuum burst



Regulator specifications

Descriptions	VSRVV		
Pressure display	Without pressure gauge	Vacuum pressure switch with large digital display	ø30 vacuum pressure gauge
Working fluid	Air		
Working pressure kPa	-100 to 100		-100 to 0
Set pressure kPa	-100 to -1.3		
Intake flow rate ℓ/min(ANR)	30		
Operating ambient temperature ℃	0 to 50 (no freezing)		0 to 40 (no freezing)

Specifications of vacuum pressure switch with large digital display

Descriptions		Pressure switch
Working pressure		-100 to 100 kPa
Proof pressure		300 kPa
Environmental resistance	Degree of protection	IEC standards IP40 or equivalent
	Ambient temperature (in storage)	-10 to 60°C (no condensation, freezing)
	Ambient temperature (in use)	0 to 50°C (no condensation, freezing)
	Ambient humidity (in storage / in use)	35 to 85% RH (no condensation)
Power supply voltage		12 to 24 VDC ±10% Ripple (P-P) ±10% or less
Current consumption		40 mA or less (no load)
Pressure display	Display frequency	5 cycles/second
	Display accuracy	±2% F.S. ±1 digit
	Digital display	Main display: 2 colors (red, green) Sub-display: Orange
Switch output	No. of I/O points	2 points
	Output method	NPN open collector
	Switch rating	30 VDC, 125 mA or less
	Internal voltage drop	1.5 V or less
Analog output	Output voltage	1 to 5 V ±2.5% F.S. or less Linearity: ±1% F.S. or less Output impedance: Approx. 1 kΩ
Temperature characteristics		±2.5% F.S. or less (0 to 50°C, at 25°C)
Repeatability		±0.2%F.S. ±1digit
Hysteresis		Adjustment is possible
Responsivity		Available (2.5 or less/25/100/250/500/1,000/1,500 msec)

Display magnification (unit)	Pressure range (rated display range)
×1(kPa)	-100 to 100
×1(MPa)	-
×0.75(cmHg)	-75 to 75
×0.01(bar)	-1.00 to 1.00
×0.145(psi)	-14.5 to 14.5

Vacuum pressure gauge specifications

Descriptions	Vacuum pressure gauge
Pressure display kPa	-100 to 0
Pressure display accuracy	5% F.S (at 25°C)

How to order

● Compact vacuum regulator

VSRVV - 6 U RA - B

Ⓐ Connection size

Ⓑ Shape (flow direction)

Ⓒ Pressure display

Ⓓ Bracket

Code	Content
Ⓐ Connection size	
6	ø6 push-in fitting
8	ø8 push-in fitting
Ⓑ Shape (flow direction) *1, *2	
A	Elbow A: Vacuum pump direct type
B	Elbow B: Vacuum pad (ø150 to ø200) direct type
U	Union
Ⓒ Pressure display	
G	With pressure display (ø30 vacuum pressure gauge)
RA	With pressure display (vacuum pressure switch with large digital display analog)
M	None (M5 x 0.8 male thread)
Ⓓ Bracket *1	
Blank	None
B	With bracket

⚠ Precautions for model No. selection

*1 : When Ⓑ is "U", only Blank can be selected for Ⓓ. (Bracket is equipped as standard with U)

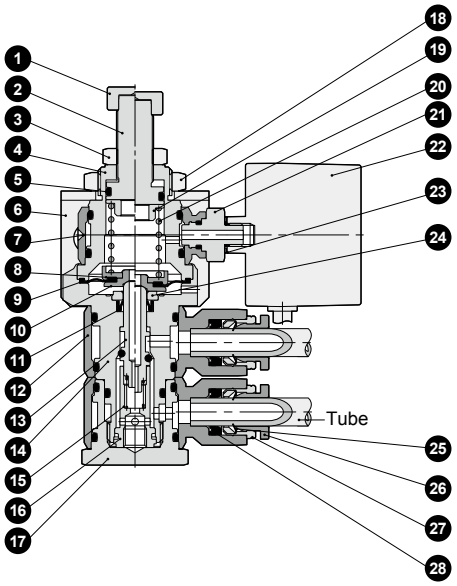
*2 : Elbow A type and elbow B type have the same dimensions, but cannot be changed later.

● Dedicated part model No.

· Dedicated bracket

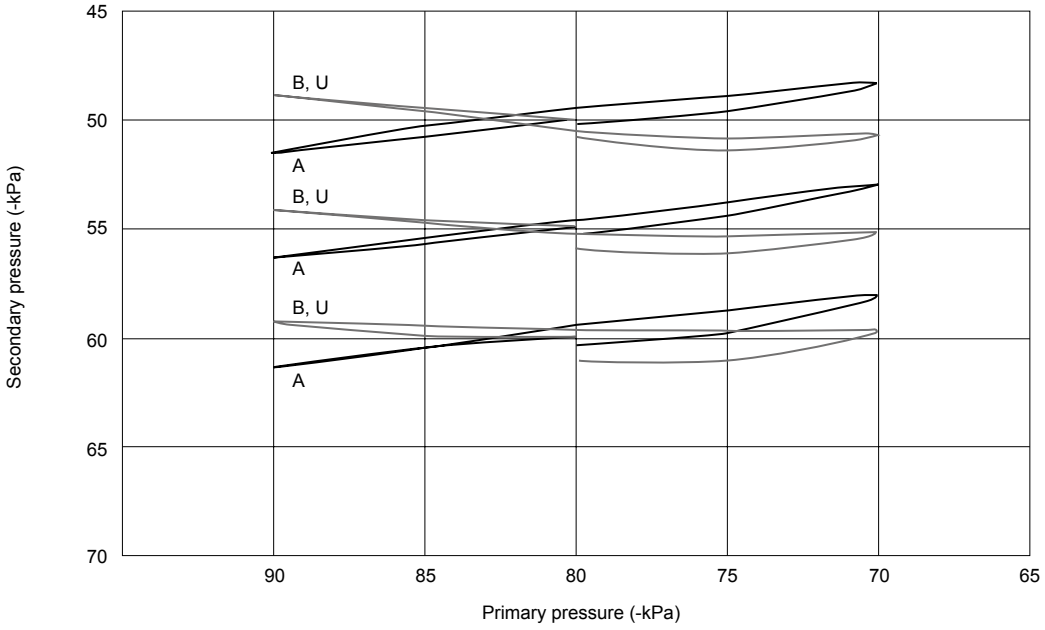
VSRVV-B

Internal structure and parts list

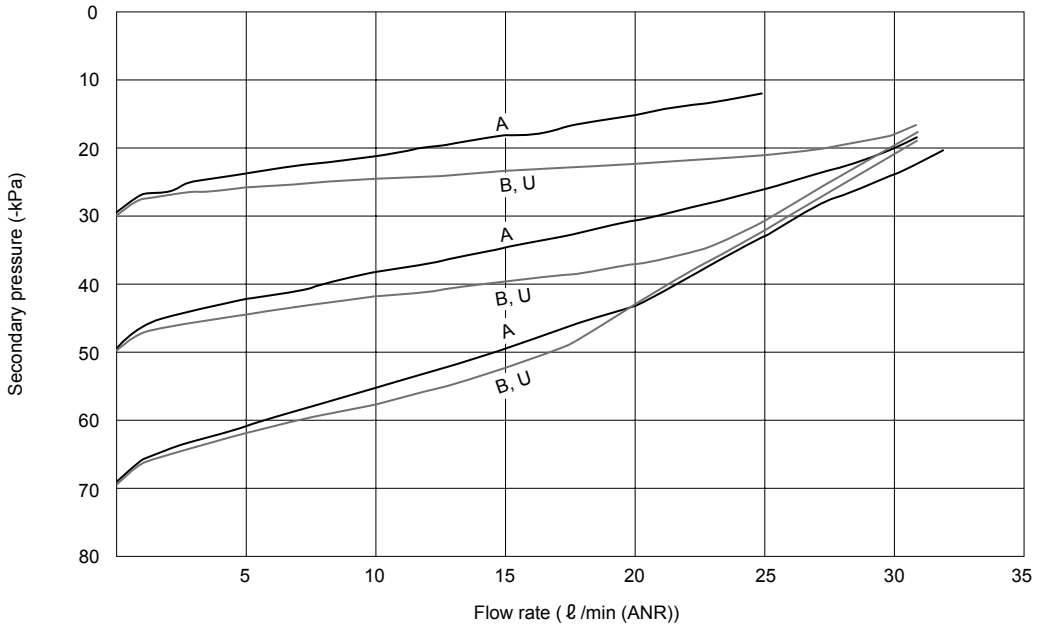


No.	Part name	Material
1	Knob	Copper alloy, electroless nickeling
2	Pressure adjustment screw	Copper alloy, electroless nickeling
3	Lock nut	Copper alloy, electroless nickeling
4	Bonnet	Copper alloy, electroless nickeling
5	O-ring	NBR
6	Bracket	Copper alloy, electroless nickeling
7	Bleed port	PBT
8	Center disc A	Aluminum
9	Diaphragm	NBR
10	Center disc B	Aluminum
11	Rod packing	NBR
12	Resin body	PBT
13	Valve	Copper alloy, electroless nickeling
14	Metal body	Copper alloy, electroless nickeling
15	Valve spring	Stainless steel
16	Sleeve	Copper alloy, electroless nickeling
17	Plug	Copper alloy, electroless nickeling
18	Lock nut	Steel, trivalent chromate treatment
19	Spring guide	Copper alloy, electroless nickeling
20	Pressure adjustment spring	Piano wire
21	Gauge port	Copper alloy, electroless nickeling
22	Pressure sensor	-
23	Gasket	SUS304, NBR
24	Seal bush	Copper alloy, electroless nickeling
25	Lock claw	Stainless steel
26	Release ring	POM
27	Guide ring	Copper alloy, electroless nickeling
28	Elastic sleeve	NBR

Pressure characteristics graph

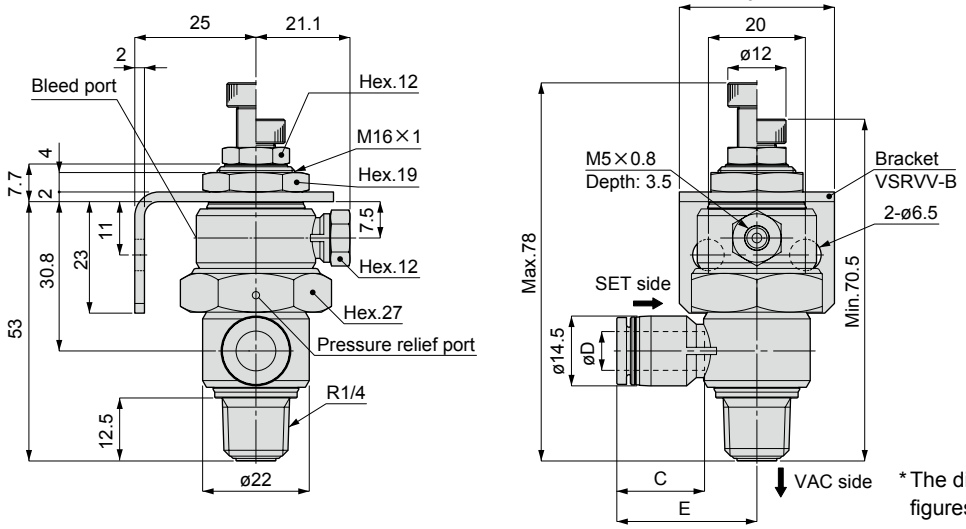


Flow characteristics graph



Dimensions

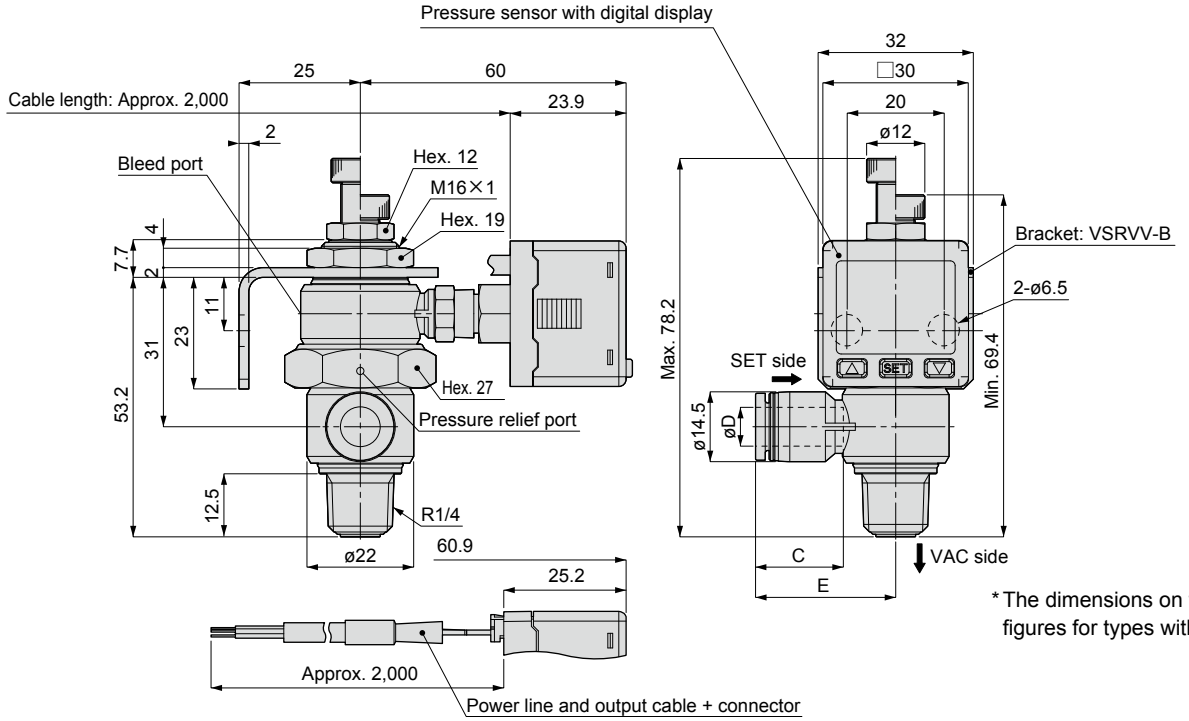
● Vacuum pump direct, without pressure display VSRVV-□AM



*The dimensions on the left are the figures for types with bracket.

Model No.	Tube O.D. øD	C	E	Weight (g)
VSRVV-6AM-□	6	17	29	127
VSRVV-8AM-□	8	18.1	28.9	128

● Vacuum pump direct, with pressure display VSRVV-□AV

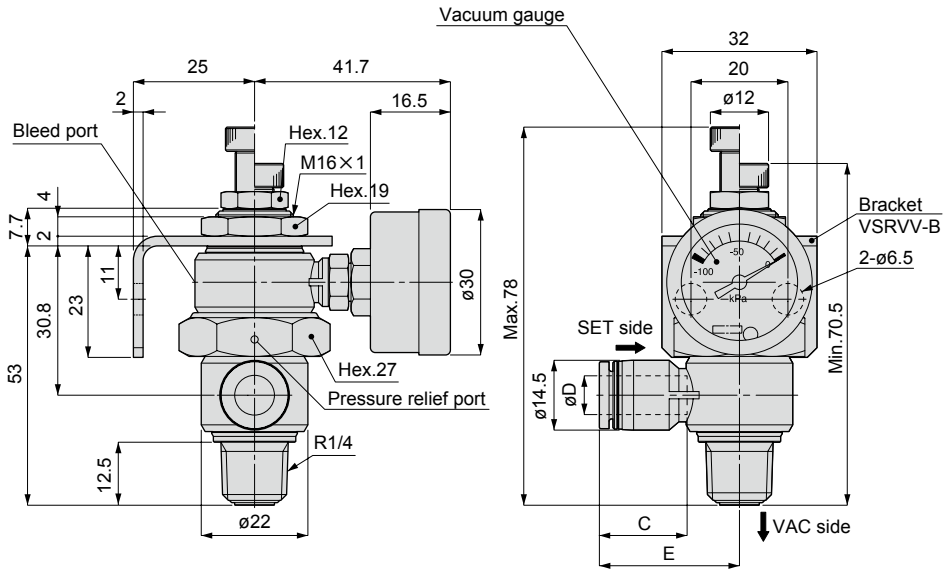


*The dimensions on the left are the figures for types with bracket.

Model No.	Tube O.D. øD	C	E	Weight (g)
VSRVV-6AV-□	6	17	29	214
VSRVV-8AV-□	8	18.1	28.9	214

Dimensions

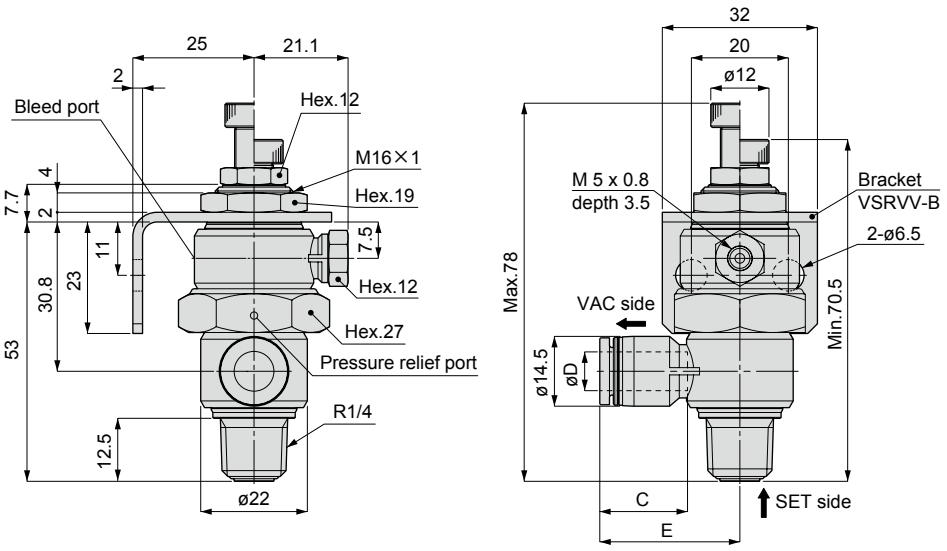
● Vacuum pump direct, with pressure display (ø30) VSRVV-□AG



* The dimensions on the left are the figures for types with bracket.

Model No.	Tube O.D. øD	C	E	Weight (g)
VSRVV-6AG-□	6	17	29	156
VSRVV-8AG-□	8	18.1	28.9	156

● Suction pad direct, without pressure display VSRVV- □ BM

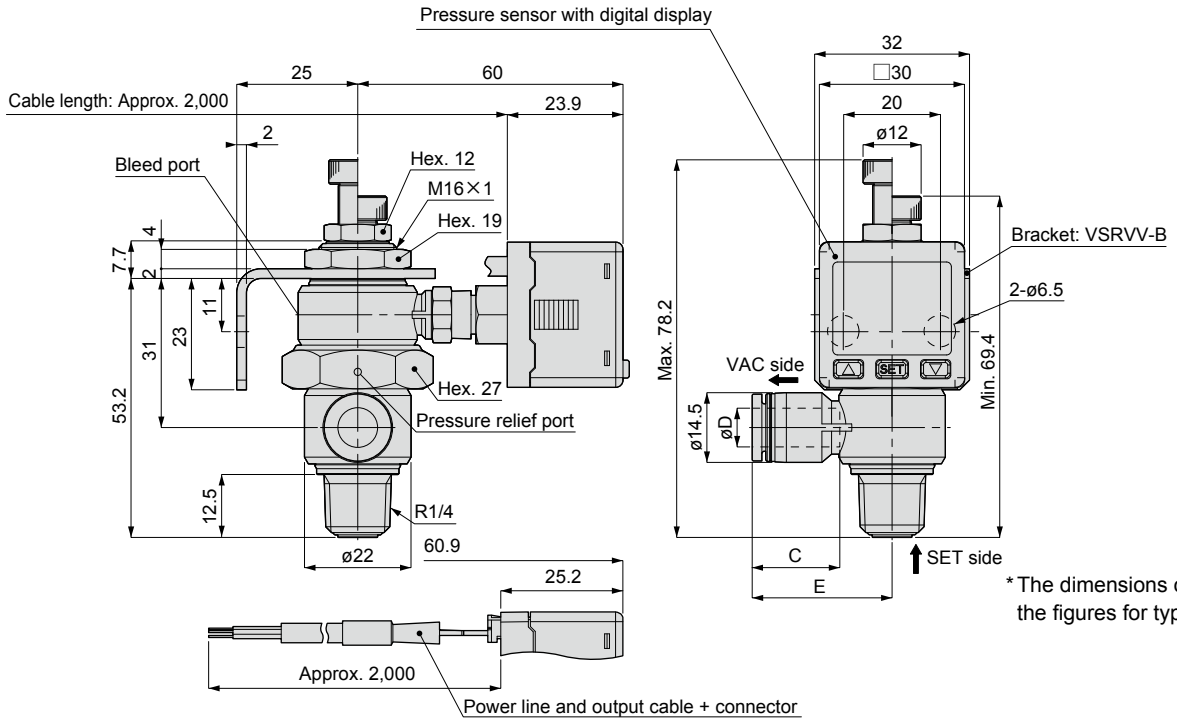


* The dimensions on the left are the figures for types with bracket.

Model No.	Tube O.D. øD	C	E	Weight (g)
VSRVV-6BM-□	6	17	29	127
VSRVV-8BM-□	8	18.1	28.9	128

Dimensions

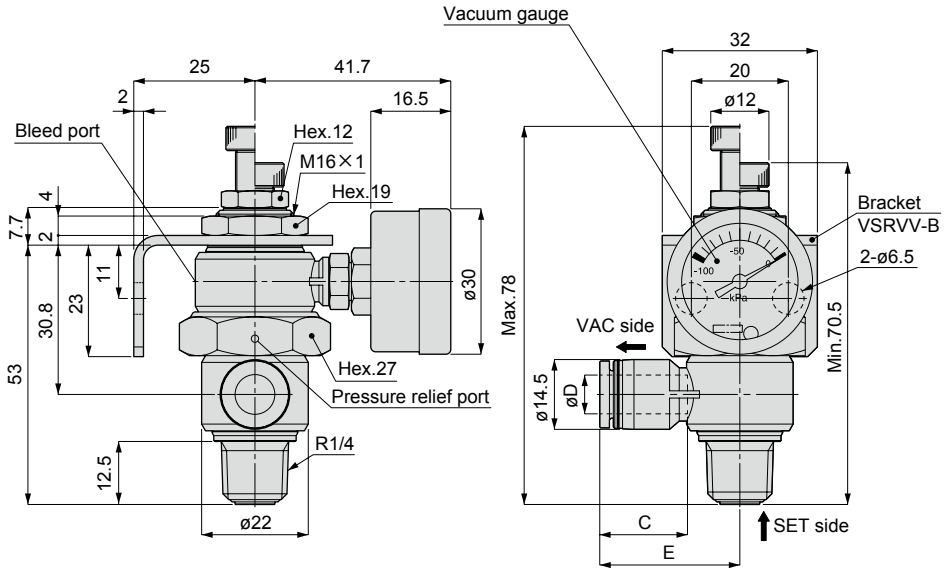
● Vacuum pad direct, with pressure display VSRVV-□BV



*The dimensions on the left are the figures for types with bracket.

Model No.	Tube O.D. øD	C	E	Weight (g)
VSRVV-6BV-□	6	17	29	214
VSRVV-8BV-□	8	18.1	28.9	214

● Vacuum pad direct, with pressure display (ø30) VSRVV-□BG

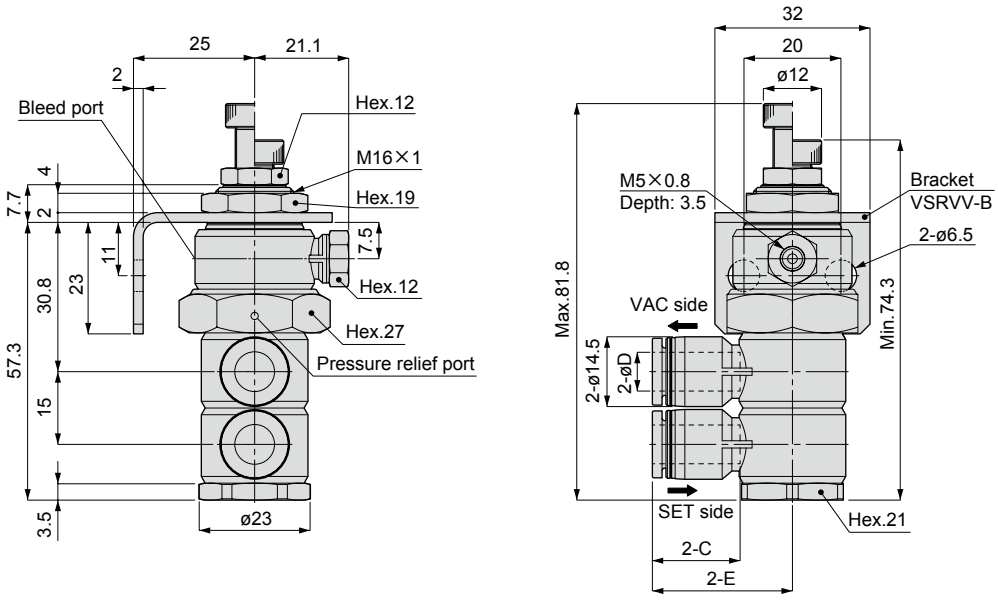


*The dimensions on the left are the figures for types with bracket.

Model No.	Tube O.D. øD	C	E	Weight (g)
VSRVV-6BG-□	6	17	29	156
VSRVV-8BG-□	8	18.1	28.9	156

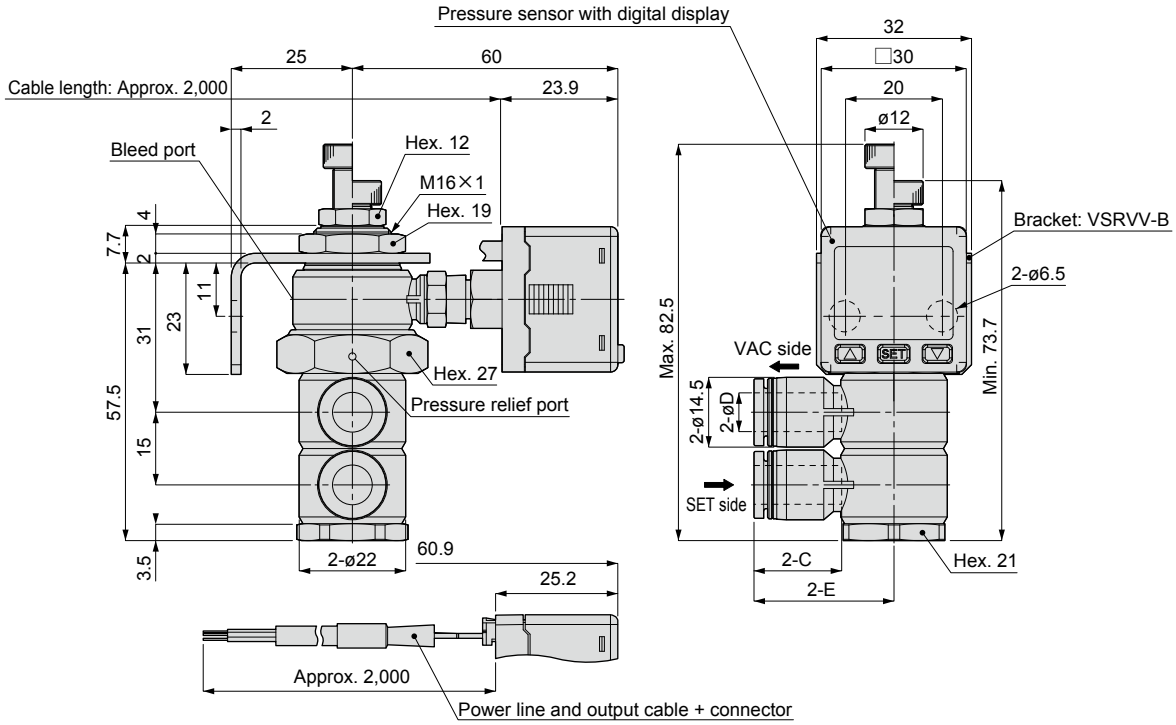
Dimensions

● Union, without pressure display VSRVV-□UM



Model No.	Tube O.D. øD	C	E	Weight (g)
VSRVV-6UM	6	17	29	180
VSRVV-8UM	8	18.1	28.9	181

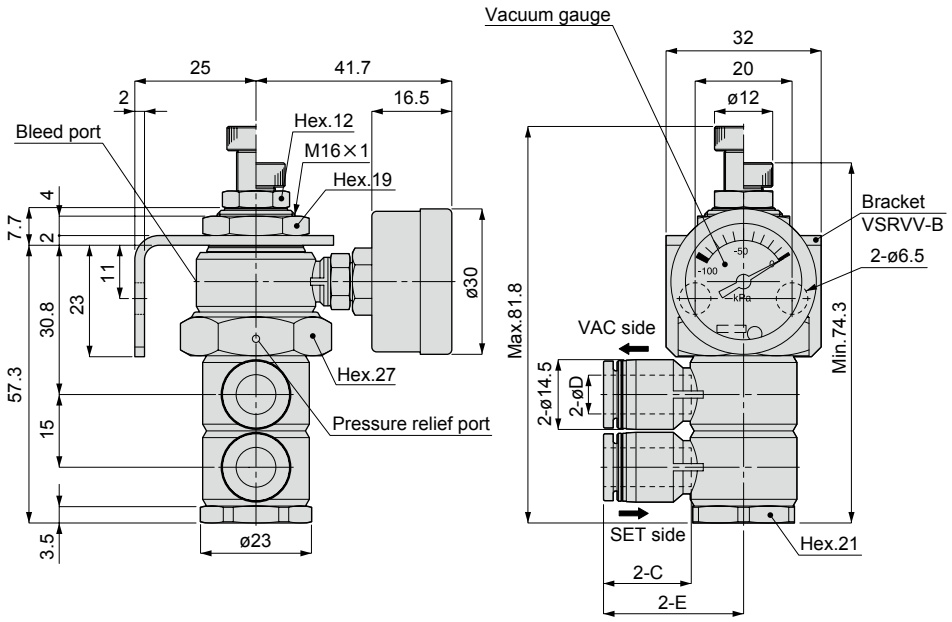
● Union, with pressure display VSRVV-□UV



Model No.	Tube O.D. øD	C	E	Weight (g)
VSRVV-6UV	6	17	29	214
VSRVV-8UV	8	18.1	28.9	214

Dimensions

● Union, with pressure display VSRVV-□UG



Model No.	Tube O.D. øD	C	E	Weight (g)
VSRVV-6UG	6	17	29	209
VSRVV-8UG	8	18.1	28.9	210

Safety precautions

WARNING

■ When applying positive pressure to the regulator, do not use a ø30 vacuum pressure gauge. When using with positive pressure, use the vacuum pressure switch with a large digital display. The application of excessive positive pressure risks damaging the device.

■ Before use, carefully read the instruction manual of the vacuum source to be connected and perform sufficient tests before operating.

CAUTION

■ Do not apply excessive load or shock to pressure gauge, pressure switch, or gauge port. It risks causing damage to the equipment or deterioration of display accuracy.

■ When mounting the product, be sure to hold and fix it securely. When using a screw type, tighten by applying a wrench, etc. to the body hexagonal part (opposite side: 27 mm). If tightened at other parts, the body may be damaged.

■ When installing gauges and piping etc. on the gauge port, tighten by applying a wrench, etc. to the gauge port hexagonal part (opposite side: 12 mm). For tightening to the M5 × 0.8 port, refer to the recommended tightening torque in the table below. It risks causing damage to the equipment, leakage, or deterioration of display accuracy due thereto.

Table. Recommended tightening torque

Thread size	Tightening torque
M5×0.8 mm	1.0 to 1.5 N·m

■ When there is a possibility of suctioning dust or particles, be sure to install a vacuum filter on the pressure adjustment side (workpiece side) of the vacuum regulator. Suction of foreign matter could cause operation faults.

■ Since the secondary pressure is unstable, do not block the bleed port and the pressure relief port.

■ When applying positive pressure to the regulator, air is discharged from the bleed port. Be careful when using in a clean room etc.

■ When applying burst air, set with attention to the amount of leakage from the bleed port.

■ Do not use the pressure gauge in places where pressure fluctuation is high (high cycle).

Burst air flow rate & vacuum burst control valve
with relief pressure adjustment needle
Vacuum burst unit

VSLF Series

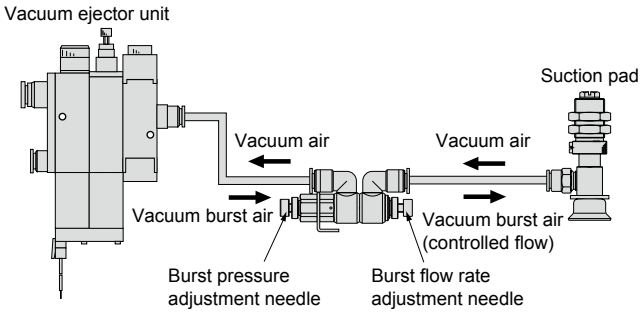
● Port size: ø4, ø6

RoHS

Features

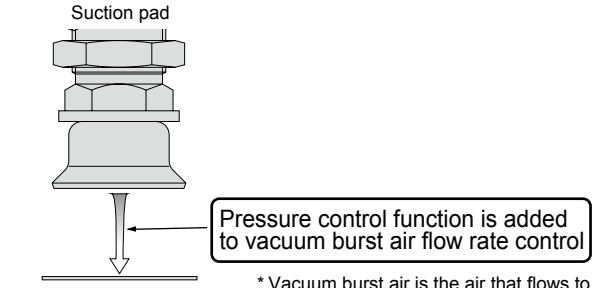
■ Vacuum burst unit for vacuum ejector with vacuum burst mechanism.

■ Controls vacuum burst air while maintaining the vacuum characteristics of the vacuum ejector.



■ Pressure control is added to vacuum burst air flow rate control to prevent workpieces from being blown away.

■ Shortening of vacuum burst time is realized by providing a relief function in the vacuum burst circuit (function to relieve extra pressure).



* Vacuum burst air is the air that flows to release the vacuum state.

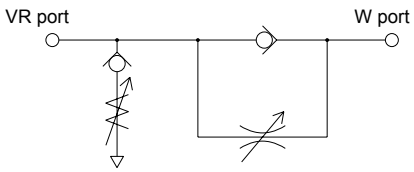
■ Burst time can be shortened by mounting to the end of the vacuum burst circuit.

■ Tube removal direction is free, due to the rotation of resin body and fitting part.

Specifications

Descriptions	VSLF
Working fluid	Air
Working pressure MPa	0 to 0.7
Relief valve operating press setting range MPa	-0.015 to 0.015
Vacuum pressure kPa	-101 to 0
Operating ambient temperature °C	0 to 60 (no freezing)

Circuit diagram



How to order

● Burst unit assembly

VSLF - 6 6A

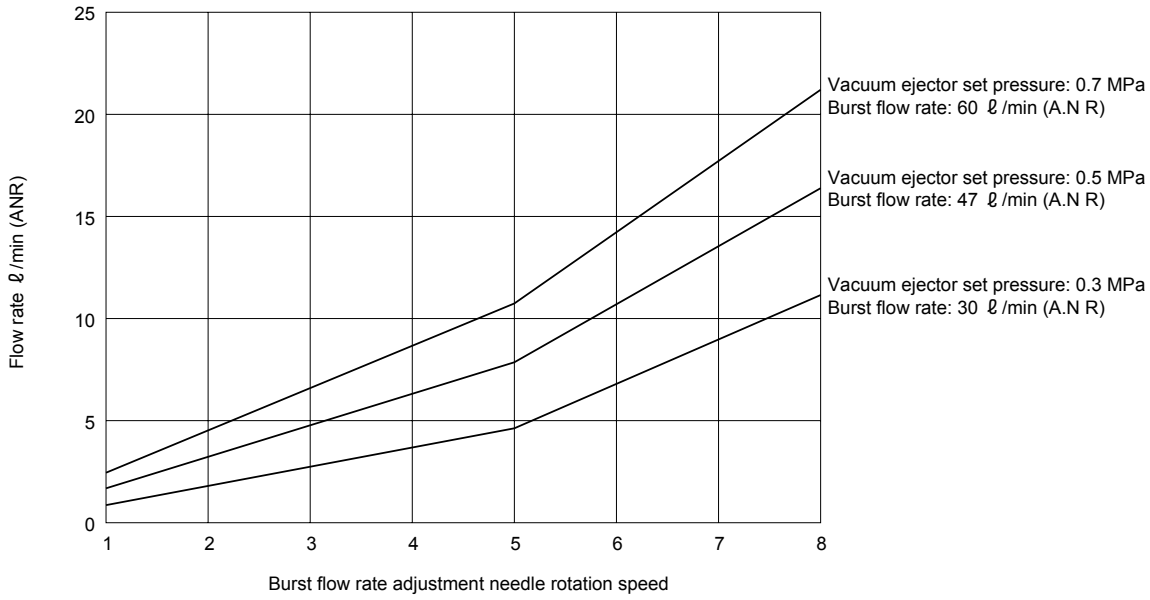
Ⓐ Vacuum side port size

Ⓑ Pad side port size

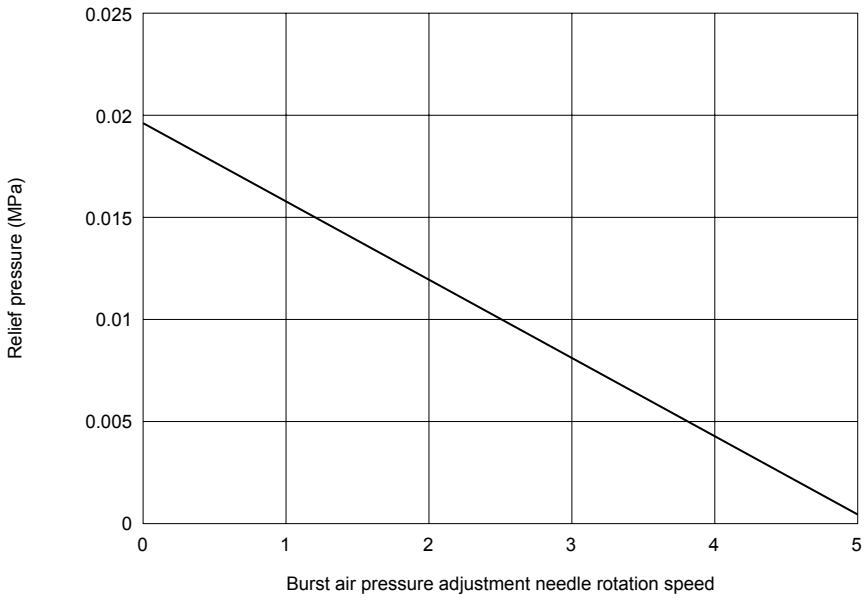
Code	Content	Vacuum generator side port size	
	Ⓐ Vacuum side port size		
4	ø4 push-in fitting		
6	ø6 push-in fitting		
	Ⓑ Pad side port size		
		4	6
4	ø4 push-in fitting	●	
6	ø6 push-in fitting		●
6A	R1/8	●	●

is not available.

Vacuum burst air discharge flow characteristics

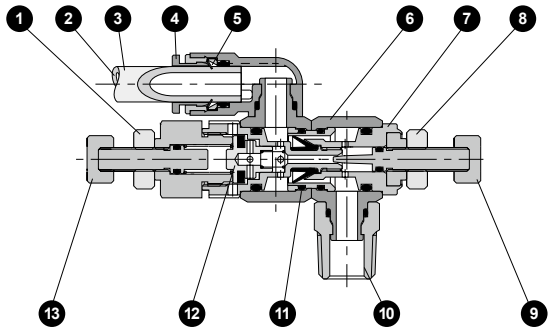


Vacuum burst air pressure characteristics



Internal structure and parts list

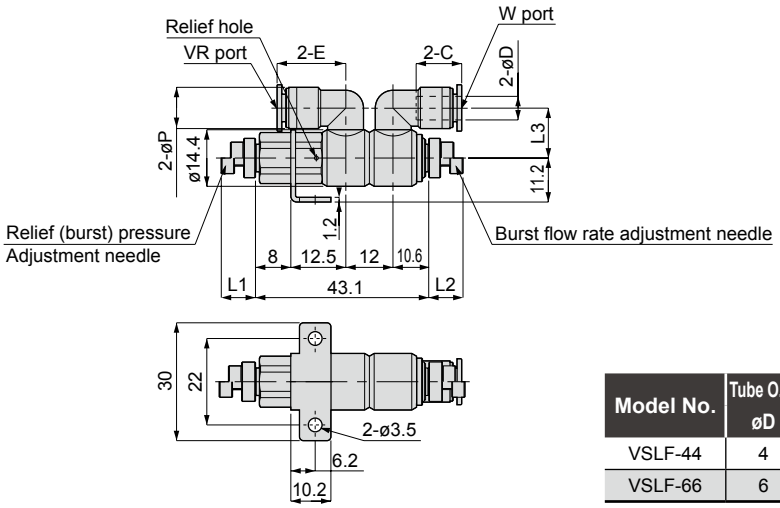
● VR port: push-in fitting, W port: taper thread



No.	Part name	Material	Remarks	No.	Part name	Material	Remarks
1	Lock nut	Aluminum		8	Lock nut	Aluminum	
2	Vacuum port (VR)			9	Vacuum burst flow rate adjustment needle	Copper alloy, nickeling	
3	Tube			10	Pad side port (W)		
4	Release ring	Polyacetal		11	Check packing	Nitrile rubber	
5	Lock claw	Stainless steel		12	Valving element	Aluminum	
6	Resin body	Polybutylene terephthalate		13	Vacuum burst relief pressure adjustment needle	Copper alloy, nickeling	
7	Metal body	Copper alloy, nickeling					

Dimensions

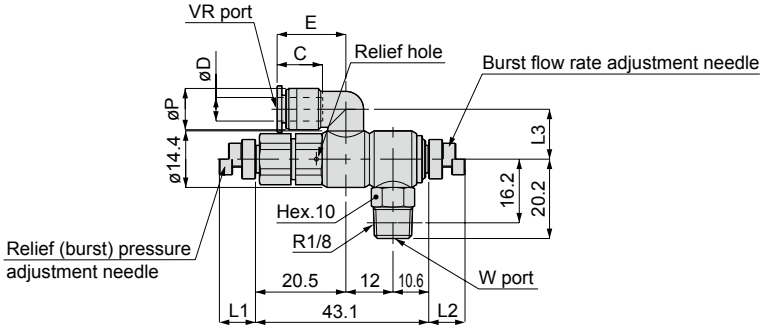
● Vacuum side (VR) port: push-in fitting, pad side (W) port: push-in fitting



Unit: mm

Model No.	Tube O.D. øD	C	E	L1		L2		L3	øP	Weight (g)
				max.	min.	max.	min.			
VSLF-44	4	11.3	16.4	11.8	8	13.4	9.7	12.2	8	36
VSLF-66	6	11.8	17.7	11.8	8	13.4	9.7	12.7	10.5	37

● Vacuum side (VR) port: push-in fitting, pad side (W) port: taper thread



Unit: mm

Model No.	Tube O.D. øD	C	E	L1		L2		L3	øP	Weight (g)
				max.	min.	max.	min.			
VSLF-46A	4	11.3	16.4	11.8	8	13.4	9.7	12.2	8	36
VSLF-66A	6	11.8	17.7	11.8	8	13.4	9.7	12.7	10.5	37

Safety precautions

⚠ WARNING

- Since the vacuum burst unit has air control direction, read the catalog carefully before use. Incorrect control directions may cause bodily injury or damage to the equipment.
- Do not use with fluids other than air. Contact CKD for use of fluids other than air.
- Do not apply tensile, torsion, or bending loads to the body. Do not drop or apply excessive impact. It risks damaging the product body.
- Tighten the lock nut securely by hand without using tools. Tightening with a tool may cause damage to the lock nut or the body. Also, if not tightened securely, the lock nut may loosen and cause errors in the initial setting.
- Do not use so that the internal pressure between the vacuum ejector and the vacuum burst unit is usually 0.2 MPa or more. It may cause damage to the vacuum ejector.

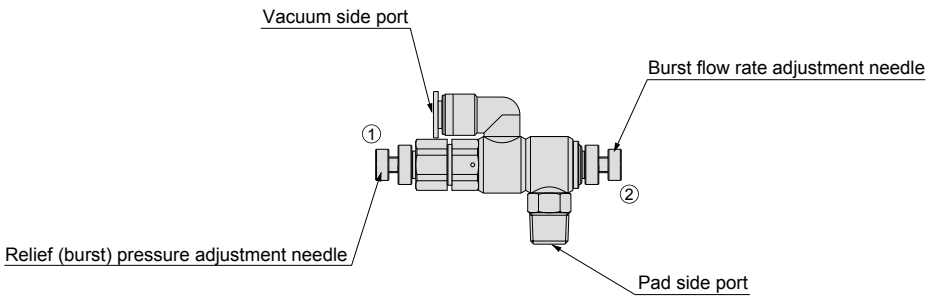
⚠ CAUTION

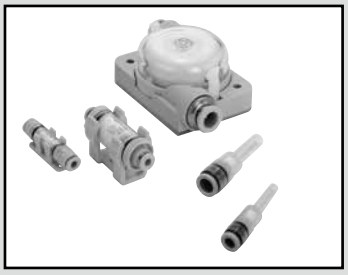
- Read the catalog carefully regarding flow rate adjustment and vacuum burst relief pressure adjustment for vacuum burst air.
- Be careful when the piping resistance or required flow rate is large. It may cause malfunction due to insufficient burst flow rate. Be sure to check the specifications thoroughly.
- Be sure to install a vacuum filter on the pad side port (limited to filters usable with positive pressure for vacuum burst). Without a filter, avoid as far as possible the suction of dust, salt, iron powder, etc., and periodically wash the inside.

Usage methods

Vacuum burst unit adjustment method

1. First, install the VR port (vacuum side port) to the vacuum ejector side and the W port (pad side port) to the pad side, fully open the relief pressure adjustment needle ① in the figure and fully close the burst air flow rate adjustment needle ②.
2. Generate vacuum in the vacuum ejector, gradually tighten the needle in Fig.① so that the degree of vacuum rises, and check whether the rise time of the vacuum is delayed. After that, generate repeated vacuum and if there seems to be no problem, go to 3.
3. Generate burst air for the vacuum ejector, gradually open the needle in Fig.② and set the appropriate burst air to the workpiece.





Vacuum filter compatible with various vacuum pipes
Vacuum filter

VSFB/VSFU/VSFJ Series

● Port size: M5, ø4, ø6, ø8, ø10, ø12

RoHS

Features

Union type VSFB/VSFU

■ Dust and water droplets suctioned by the vacuum ejector are removed by cyclone effect and element. (Large capacity union: VSFB)

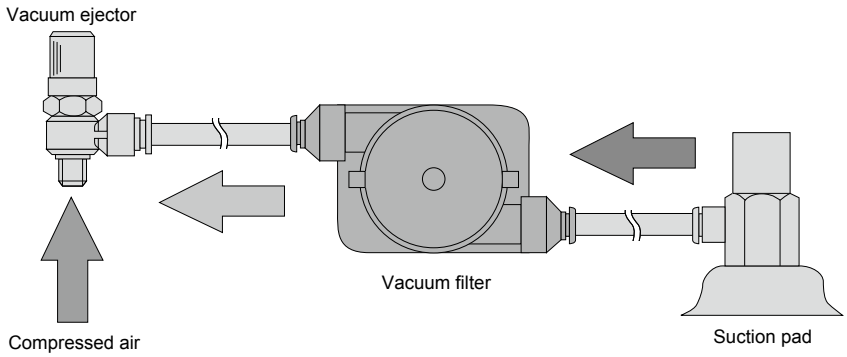
■ Since the dust case is large, maintenance frequency is reduced.

■ Dust scattering is prevented because the entire dust case can be detached with one touch. (Large capacity union: VSFB)

■ The small vacuum filter is ideal for applications where a high cycle vacuum system is required. (Compact union: VSFU)

Piping example

■ Lay piping between the vacuum ejector and the suction pad to remove dust and dirt from the pad and prevent the vacuum ejector from malfunctioning.



Socket type VSFJ

■ Since body and nipple are integrated and resin material is used, small size and light weight are realized.

■ Now with filter function inside the socket.

■ Ideal for single vacuum ejectors such as VSH that do not have a built-in filter.

Specifications

Descriptions	VSFB/VSFU/VSFJ
Working fluid	Air
Working pressure kPa	-100 to 0
Filtration rating μm	10
Operating ambient temperature ℃	0 to 60 (no freezing)

How to order

● Large capacity union

VSFB - 1010

Ⓐ Vacuum side port size - Pad side port size

Code	Content
Ⓐ Vacuum side port size - Pad side port size	
66	Push-in fitting ø6 - Push-in fitting ø6
88	Push-in fitting ø8 - Push-in fitting ø8
1010	Push-in fitting ø10 - Push-in fitting ø10
1212	Push-in fitting ø12 - Push-in fitting ø12

● Maintenance part model No.

· Filter element

VSFB-E

● Compact union

VSFU - 3 - 1010

Ⓐ Filter size

Ⓑ Vacuum side port size - Pad side port size

Code	Content
Ⓐ Filter size	
1S	Filtration area 2.8 cm^2 (element length: 15 mm)
1L	Filtration area 4.7cm^2 (element length: 25mm)
2	Filtration area 7.5 cm^2
3	Filtration area 12.5cm^2
Ⓑ Vacuum side port size - Pad side port size	
44	Push-in fitting ø4 - Push-in fitting ø4
66	Push-in fitting ø6 - Push-in fitting ø6
88	Push-in fitting ø8 - Push-in fitting ø8
1010	Push-in fitting ø10 - Push-in fitting ø10
M55	M5×0.8-M5×0.8

● Filter size - port size combination table

Port size / Model No.	44	66	88	1010	M55
VSFU-1S	●	●			●
VSFU-1L	●	●			●
VSFU-2	●	●			
VSFU-3		●	●	●	

● Maintenance part model No.

· Bracket

VSFU - 3 - B

Ⓐ Size

Code	Content
Ⓐ Size	
1	Filter size 1S, 1L common
2	For filter size 2
3	For filter size 3

· Filter element

VSFU - 3 - E

Ⓐ Filter size

Code	Content
Ⓐ Filter size	
1S	Filtration area 2.8 cm^2 (element length: 15 mm)
1L	Filtration area 4.7 cm^2 (element length: 25 mm)
2	Filtration area 7.5 cm^2
3	Filtration area 12.5cm^2

● Socket

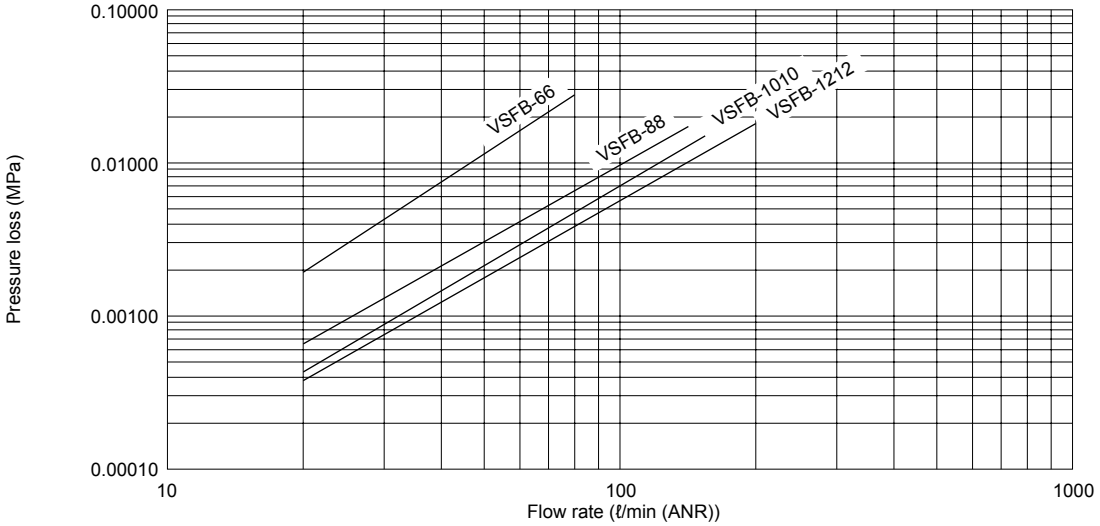
VSFJ - 44

Ⓐ Port size

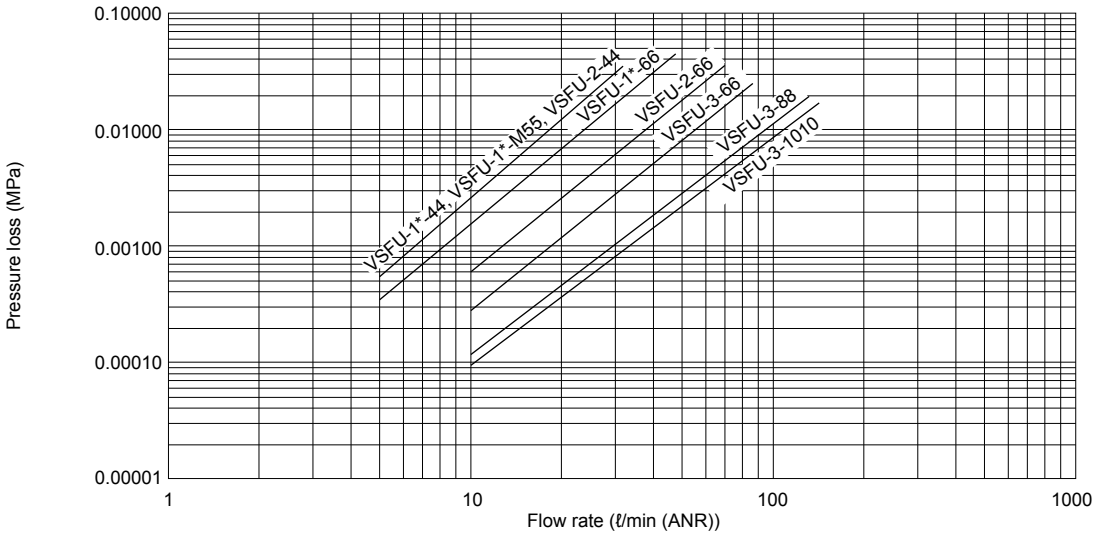
Code	Content
Ⓐ Port size	
44	ø4 push-in fitting
66	ø6 push-in fitting

Pressure loss

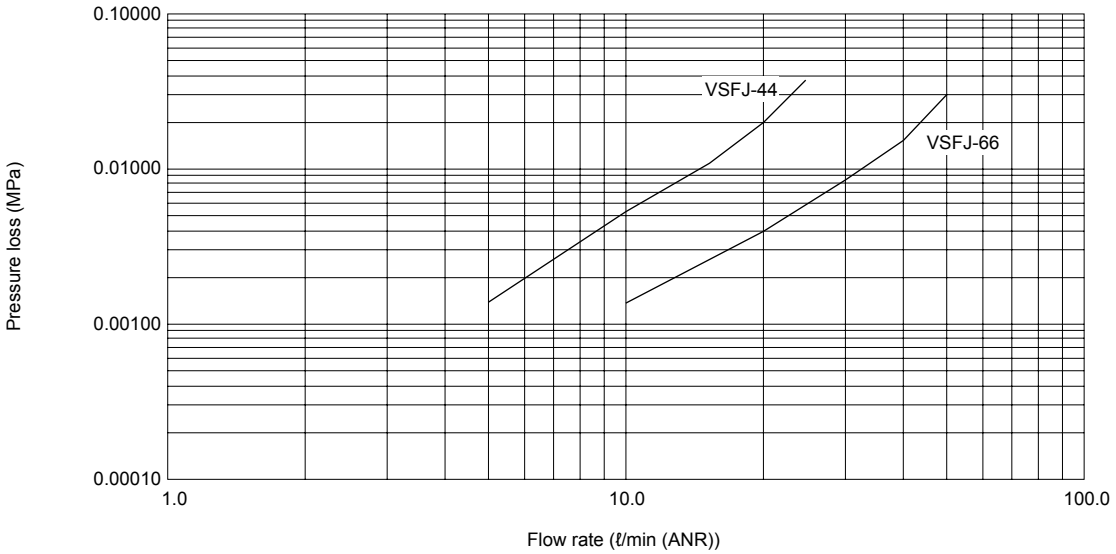
● Large capacity union VSFB



● Compact union VSFU



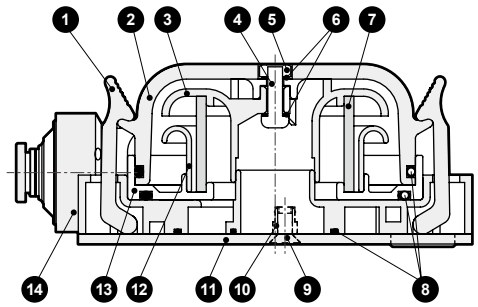
● Socket VSFJ



* This data is actual measured values and not guaranteed values.

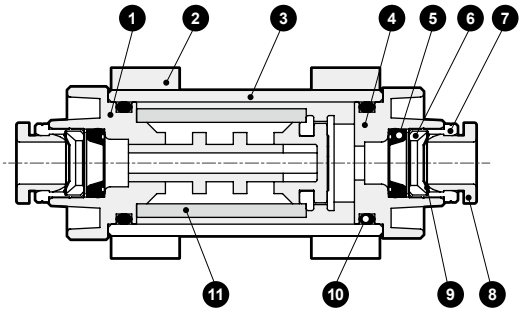
Internal structure and parts list

● Large capacity union VSFB



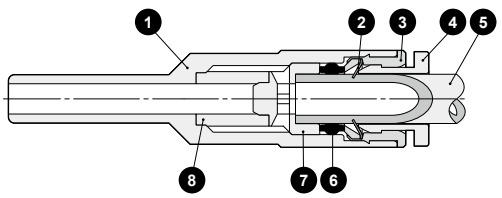
Model No.	Part name	Material	Remarks
1	Fastener	Acetal resin	
2	Case	Polycarbonate	
3	Air guide	Acetal resin	
4	Pan head machine screw		
5	Hexagon nut		
6	Gasket	Stainless steel + nitrile rubber	
7	Filter element	PVF resin	
8	O-ring	Nitrile rubber	
9	Flat head machine screw		
10	Socket	Copper alloy	Electroless nickel plating
11	Base plate	Copper alloy	Electroless nickel plating
12	Dust guide	Acetal resin	
13	Case cover	ABS resin	
14	Resin body		

● Compact union VSFU



Model No.	Part name	Material	Remarks
1	Resin body A	PBT resin	
2	Holder	Acetal resin	
3	Cover	Polyamide resin	
4	Resin body B	PBT resin	
5	Elastic sleeve	Nitrile rubber	
6	Lock ring	Copper alloy	Electroless nickel plating
7	Guide ring	Copper alloy	Electroless nickel plating
8	Release ring	Acetal resin	
9	Lock claw	Stainless steel	
10	O-ring	Nitrile rubber	
11	Filter element	PVF resin	

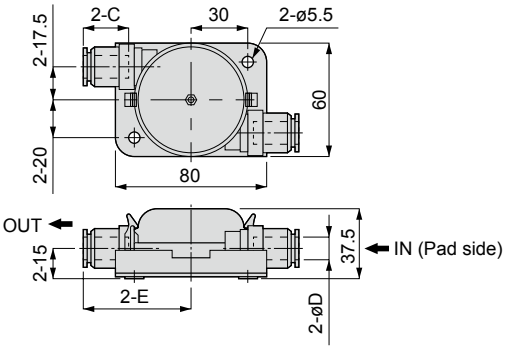
● Socket VSFJ



Model No.	Part name	Material
1	Resin body	Polypropylene
2	Lock claw	Stainless steel
3	Guide ring	Copper alloy, electroless nickeling
4	Release ring	Acetal resin
5	Tube	Urethane or nylon
6	Elastic sleeve	Nitrile rubber
7	Element holder	Acetal resin
8	Filter element	PVF

Dimensions

● Large capacity union VSFB



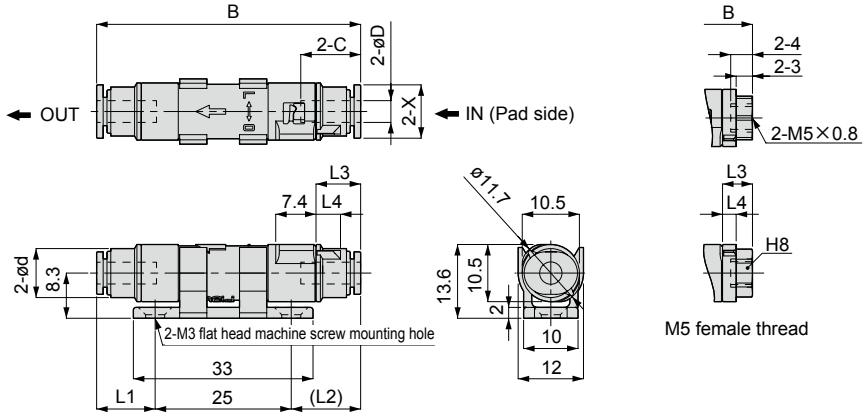
Unit: mm

Model No.	Tube O.D. øD	C	E	Filtration area (cm^2)	Weight (g)
VSFB-66	6	17	52.6	20	208
VSFB-88	8	18.2	53.9		207
VSFB-1010	10	20.7	54.8		201
VSFB-1212	12	23.3	57.4		198

* Replacement element: VSFB-E

● Compact union

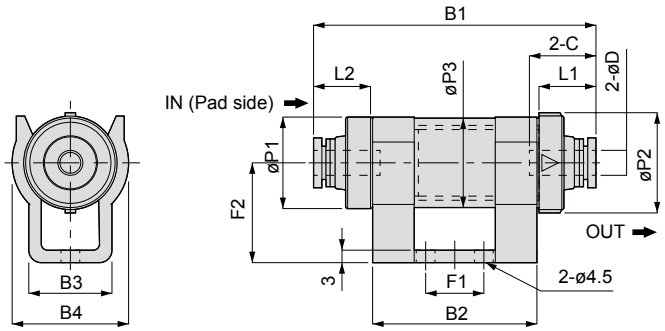
· VSFU-1*



Unit: mm

Model No.	Tube O.D. øD	B	C	L1	(L2)	L3	L4	ød	X	Element length	Filtration area (cm^2)	Weight (g)
VSFU-1S-44	4	49.1	11.3	11.1	13.0	8.5	4	10.5	9.8	15	2.8	5.1
VSFU-1L-44		59.1		17.1	17.0					25	4.7	5.4
VSFU-1S-66	6	53.8	11.8	13.4	15.4	10.8	4.5	10.5	11.8	15	2.8	6
VSFU-1L-66		63.8		19.4	19.4					25	4.7	6.4
VSFU-1S-M55	-	40.6	-	5.6	10	5.5	2.5	10.5	-	15	2.8	7.6
VSFU-1L-M55		50.6		11.6	14					25	4.7	8

· VSFU-$\frac{2}{3}$

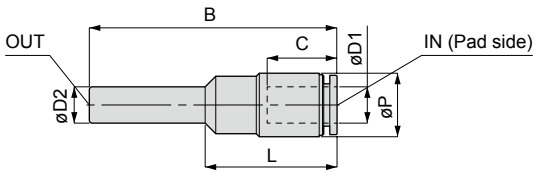


Unit: mm

Model No.	Tube O.D. øD	B1	B2	B3	B4	L1	L2	øP1	øP2	øP3	C	F1	F2	Filtration area (cm^2)	Weight (g)
VSFU-2-44	4	57.8	33	18	24	11.9	11.9	18.2	20	17.5	14.9	10	20	7.5	18
VSFU-2-66	6	59.9				13	13				16				19
VSFU-3-66	6	67.7	39.5	20	28	13.5	13.8	22.1	24	21.5	16.5	14	24	12.5	27
VSFU-3-88	8	70.1				14.9	14.7				18				29
VSFU-3-1010	10	72.7				16.2	16.0				19.2				32

Dimensions

● Socket VSFJ



Model No.	Tube O.D. øD1	Tube O.D. øD2	B	L	C	øP	Weight (g)	Filtration area (cm^2)
VSFJ-44	4	4	38.9	21.8	11.3	8	1.5	0.8
VSFJ-66	6	6	41.2	22	11.8	10.5	2.5	1.1

Safety precautions

Union type VSFB/VSFU

⚠ WARNING

■ Large capacity union type: Never apply positive pressure for vacuum burst to the VSFB vacuum filter. It is not an explosion-proof structure. Due to low pressure resistance, damage to the product body may cause injuries.

■ Compact union type, union type: VSFU is a vacuum filter. Avoid use in locations where pressure is continuously applied. Since it is not an explosion-proof structure, damage to the product body may cause injuries.

■ Regularly perform maintenance and inspection for the filter element of the vacuum filter. A clogged element could decrease performance and cause other problems. Before replacing the element, read and understand the section on dust removal method and vacuum filter replacement element, change the internal pressure of the filter to the atmospheric pressure state and check the safety.

⚠ CAUTION

■ Check the ⚠ safety precautions on Intro Page 17 for more information on the operating environment of the vacuum filter.

■ Connect piping after checking the catalog or the IN or OUT on the body. The filter functions will not be satisfied if the pipes are connected in reverse.

■ After removing the dust and replacing the element, securely fix the case and confirm that there is no vacuum leak.

Socket type VSFJ

⚠ WARNING

■ Compact socket type: VSFJ is a vacuum filter. Avoid use in locations where pressure is continuously applied. Since it is not an explosion-proof structure, damage to the product body may cause injuries.

■ Compact socket type: Periodically check the filter element. A clogged element could decrease performance and cause other problems. When replacing, the element cannot be replaced as a single unit, so replace the vacuum filter with a new one.

■ Since the filter body material is PP, the resin may deteriorate due to direct sunlight or ultraviolet rays. When using in an atmosphere containing chemicals or in a place where chemicals could make contact, refer to CKD's chemical resistance data and check whether there is any impact on the material before use.

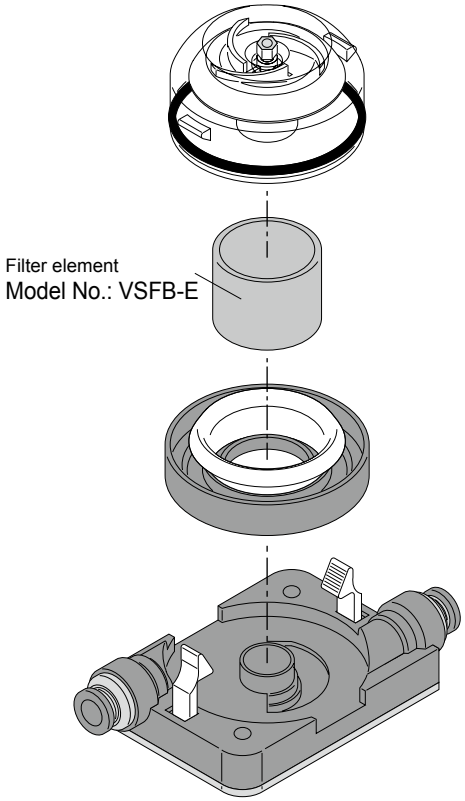
⚠ CAUTION

■ Compact socket type: For piping connection, the nipple side is the vacuum ejector side port, and the fitting side is the workpiece side port. Reverse connection can be used, but the filter surface area will decrease. As well, element clogging will not be confirmable.

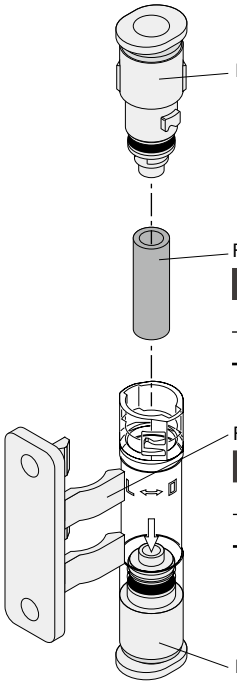
Usage methods

Vacuum filter replacement element

● Large capacity union type VSFB



● Compact union type VSFU-1*

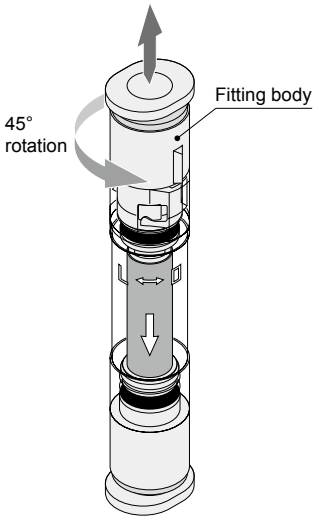


Model No.	Filter element
VSFU-1S-□□	VSFU-1S-E
VSFU-1L-□□	VSFU-1L-E

Model No.	Fixing brackets
VSFU-1S-□□	VSFU-1-B
VSFU-1L-□□	

How to replace compact union type element

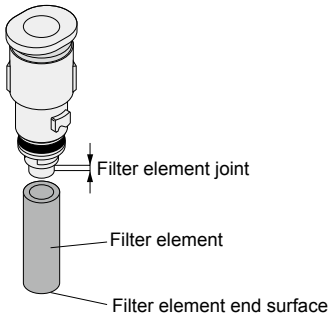
(1) Turn the fitting body 45° in the direction of “0”. (After replacing, turn the fitting body until it locks in “L” direction.)



(2) Remove the turned fitting body from the filter cover and replace the filter element. When replacing, insert the filter element halfway into the filter element fitting and insert into the fitting body A so as not to crush the filter element end surface.

*1: There are two types of replacement elements, 15 mm and 25 mm, so be sure to check before replacing.

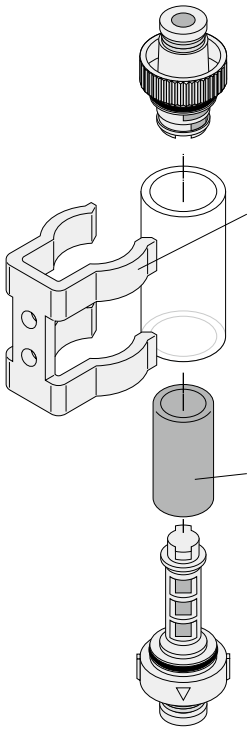
*2: After replacement is completed, install in the reverse order to above and securely lock the fitting body.



Usage methods

Vacuum filter replacement element

● Union type VSFU-$\frac{2}{3}$



Fixing bracket single unit

Model No.	Fixing holder
VSFU-2-□□	VSFU-2-B
VSFU-3-□□	VSFU-3-B

Filter element

Model No.	Filter element
VSFU-2-□□	VSFU-2-E
VSFU-3-□□	VSFU-3-E

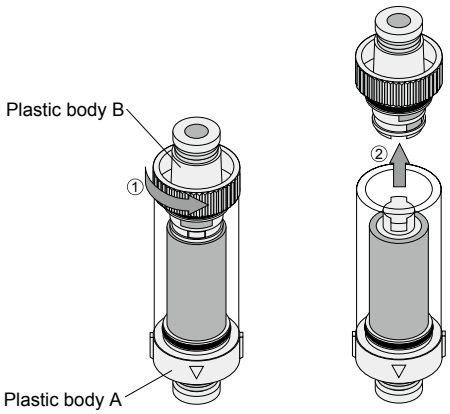
Body removal and locking method for union type element replacement

■ How to remove

(1)Turn the plastic body B clockwise by 45 degrees *.

(2)Pull out the plastic body B.

* When turning the plastic body B, never turn by more than 45 degrees. There is a risk of damage to the body of the product.



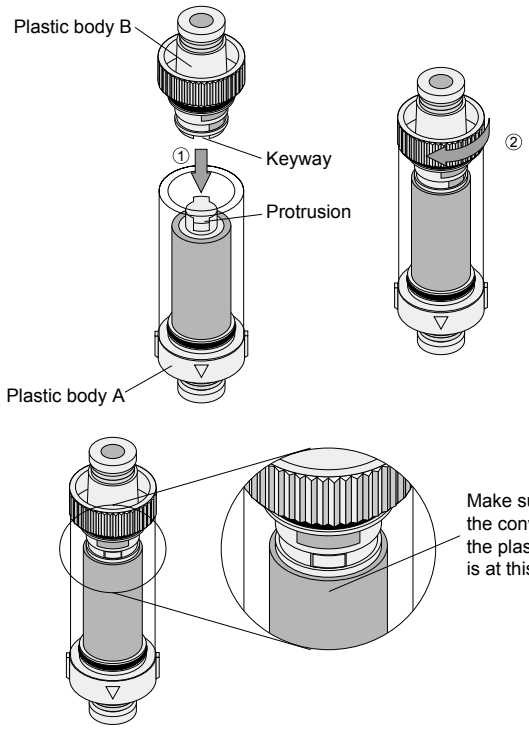
■ Locking method

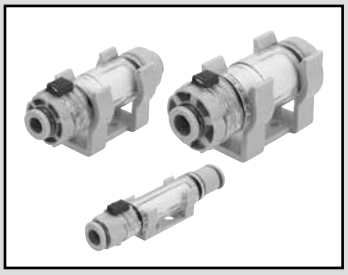
(1)Push in the convex part of the plastic body A aligned to the key groove of the plastic body B until it hits the end.

(2)Turn the plastic body B clockwise by 45 degrees *1 and lock.

*1. When turning the plastic body B, never turn by more than 45 degrees. There is a risk of damage to the body of the product.

*2. When locking, make sure that the convex part of the plastic body A comes to the center part of the hole of the plastic body B as shown in the figure below.





Inline filter

FSL Series

● Port size: ø4 to ø10

RoHS

Features

■ Compact/lightweight/space saving inline
Uses a lightweight, compact resin body

■ Diverse range of model variations
Select the flow rate from 100, 200 or 500, and the port size from ø4, ø6, ø8 or ø10.

■ Use either positive or negative pressure
Positive pressure can also be used in the same way as a conventional vacuum inline filter

■ Easy maintenance
Replacing the element is easy as the main body can be removed and attached without tools.

Specifications

Model No. / Descriptions		FSL100		FSL200		FSL500		
Port size	mm	ø4	ø6	ø4	ø6	ø6	ø8	ø10
Working fluid		Air						
Operating ambient temperature	°C	0 to 50 (no freezing)						
Max. working pressure	MPa	0.8 (*1)						
Vacuum working pressure	kPa	-100						
Proof pressure	MPa	1.2						
Nominal filtration rating	µm	10 (Collection efficiency 95%)						
Filtration area	cm^2	4.7		7.5		12.7		
Recommended processing flow rate (*2)	ℓ/min(ANR)	10		15	20	25	50	60
Weight	g	8	8.5	21	22	35	34	39

*1: The max. working pressure is the value at 20°C.
When using in other temperature ranges, refer to the “Relation of working temperature and max. working pressure” on page 584.
*2: Initial flow rate at initial pressure loss 3 kPa or less under negative pressure. When using with positive pressure, refer to the “Flow characteristics” on page 583.

How to order

● Inline filter

FSL [500] - [1010] - [B]

Ⓐ Series
Ⓑ Vacuum side port size - Pad side port size
Ⓒ Attachment options

Code	Content
Ⓐ Series	
100	FSL100 Series
200	FSL 200 Series
500	FSL 500 Series
Ⓑ Vacuum side port size - Pad side port size	
44	Push-in fitting ø4 - Push-in fitting ø4
66	Push-in fitting ø6 - Push-in fitting ø6
88	Push-in fitting ø8 - Push-in fitting ø8
1010	Push-in fitting ø10 - Push-in fitting ø10
Ⓒ Attachment options	
Blank	None
B	Bracket

◆ Series - port size combination table

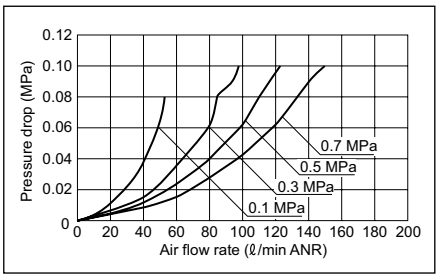
Port size / Model No.	44	66	88	1010
FSL100	●	●		
FSL200	●	●		
FSL500		●	●	●

is not available.

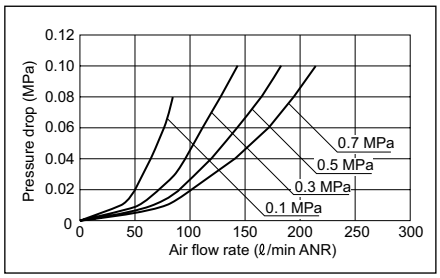
Flow characteristics

*The flow characteristics graph gives reference values, and does not guarantee the values.

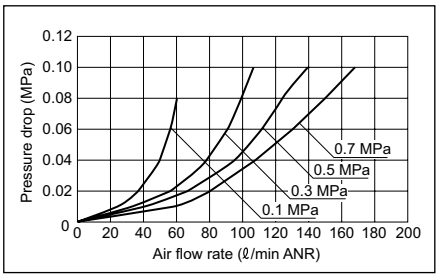
● FSL100-44



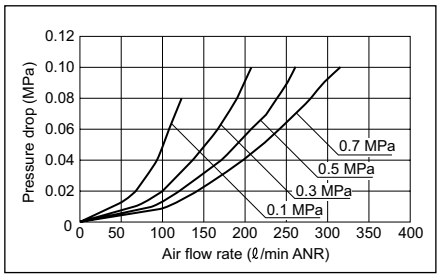
● FSL100-66



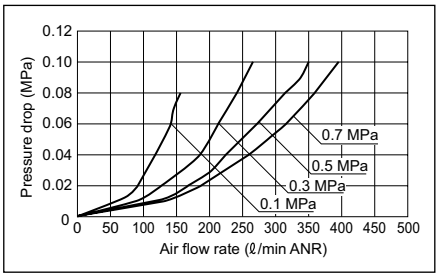
● FSL200-44



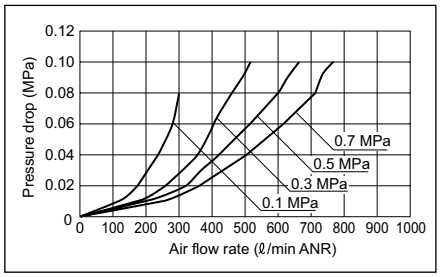
● FSL200-66



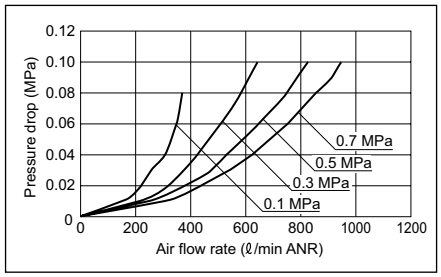
● FSL500-66



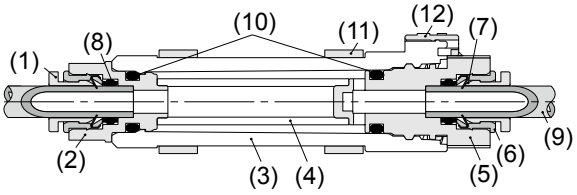
● FSL500-88



● FSL500-1010



Internal structure and parts list



No.	Part name	Material
(1)	Release ring	Acetal resin
(2)	Resin body A	Polybutylene terephthalate resin
(3)	Cover	Polyester resin
(4)	Filter element	Polyvinyl formal resin
(5)	Resin body B	Polybutylene terephthalate
(6)	Guide ring	Copper alloy, electroless nickeling
(7)	Lock claw	Stainless steel
(8)	Elastic sleeve	Nitrile rubber
(9)	Tube	-
(10)	O-ring	Nitrile rubber
(11)	Bracket	Acetal resin
(12)	Slide lock	Acetal resin

● Maintenance parts

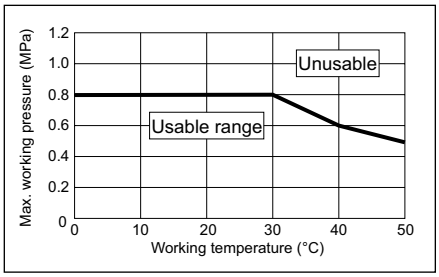
· Filter element (No. (4))

Filter element model No.	Compatible model No.	Element size
VSFU-1L-E	FSL100	ø6 × ø4 × L25
FSL200-E	FSL200	ø11 × ø7 × L22
FSL500-E	FSL500	ø15 × ø11 × L27

· Bracket (No. (11))

Bracket model No.	Compatible model No.
FSL100-B	FSL100
VSFU-2-B	FSL200
VSFU-3-B	FSL500

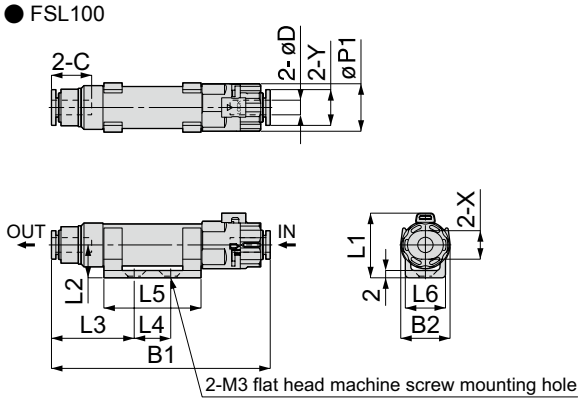
Relation of working temperature and max. working pressure



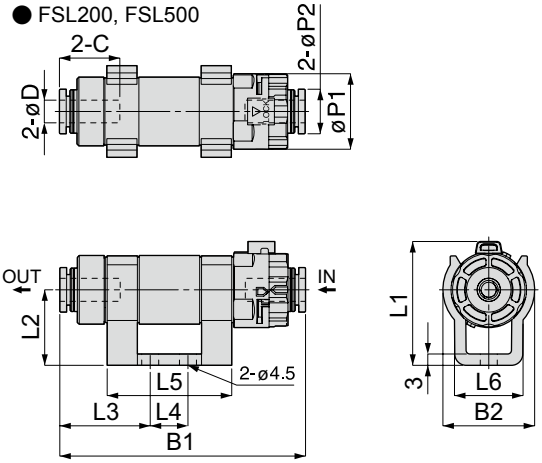
Dimensions

* The following dimensions show the state with the attached optional bracket mounted.

● FSL100



● FSL200, FSL500



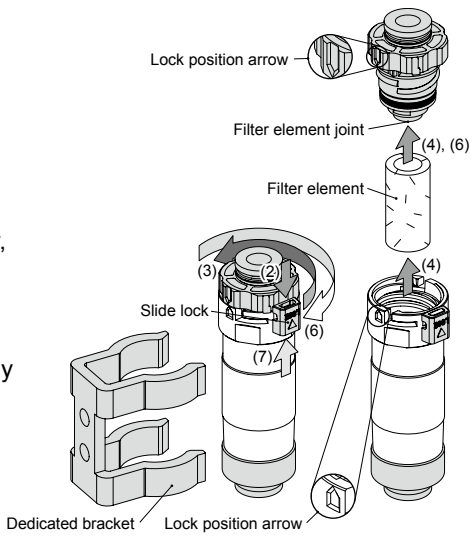
Unit: mm

Type	Tube O.D. øD	C	B1	B2	L1	L2	L3	L4	L5	L6	øP1	øP2	X	Y
FSL100-44- □	4	11.3	60.7	13.5	18	9	23	10	26.6	11	13	-	7.8	9.8
FSL100-66- □	6	11.8	64.8	13.5	18	9	25.3	10	26.6	11	13	-	9.8	11.8
FSL200-44- □	4	14.9	61.1	24.3	33	20	20.3	10	33	18.2	20	9.9	-	-
FSL200-66- □	6	16	65.5	24.3	33	20	24.2	10	33	18.2	20	11.8	-	-
FSL500-66- □	6	17	72	28.3	39.6	24	19.6	14	39.5	20.2	25	11.8	-	-
FSL500-88- □	8	18.1	71.2	28.3	39.6	24	20.9	14	39.5	20.2	25	13.8	-	-
FSL500-1010- □	10	19.2	77.4	28.3	39.6	24	26.8	14	39.5	20.2	25	16.8	-	-

Usage methods

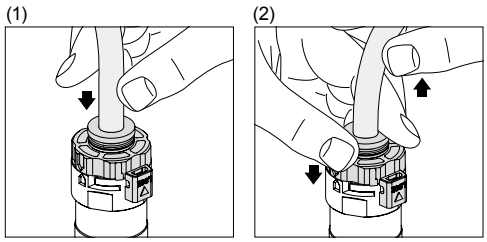
1. Replacing the filter element

(1) Release the filter's inner pressure to the atmosphere.
(2) Release the red slide lock. (In opposite direction from LOCK arrow)
(3) Turn the fitting body 180° counterclockwise.
(4) Remove the turned fitting body from the filter cover, and replace the filter element.
(5) If necessary, remove the dust accumulated in the filter cover using air blow, etc.
(6) Mount the element into the filter element fitting, insert into the main body, and turn the fitting body clockwise until it stops.
(7) In the tightened state, confirm that the lock position arrow on the fitting body and the lock position arrow on the filter cover are aligned, and then lift the slide lock up (toward the LOCK arrow). Confirm that it is properly locked.



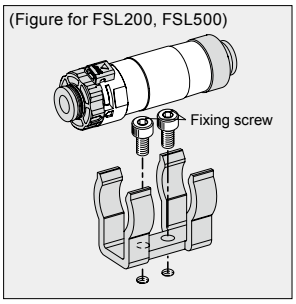
Usage methods

2. Removing and attaching the connection



1. Removing and attaching the tube
   (1) Attaching the tube
   With the inline filter FSL (filter with push-in fitting), the locking hook is fixed and the elastic sleeve seals the outer periphery of the tube when the tube is inserted to the end.
   (2) Removing the tube
   To remove the tube, press the release ring. The locking hook will open and the tube can be pulled off.
   Always stop the air before removing the tube.

2. Tightening the screw
   (1) Tightening the screw
   Use the fixing hole on the dedicated bracket, and fix with the following screws.
   (Refer to the dimensions for the fixing hole pitch.)
   Fixing screw ▶ FSL100: M3 flat head machine screw,
   FSL200, FSL500: M4 screw



Safety precautions

⚠ WARNING

■ Design/selection
- The filter's clear cover is made of special polyester resin. Avoid using in an atmosphere containing chemicals (see text at right) or in a place where these chemicals could come in contact as there is a risk of damage.

■ Mounting, installation and adjustment
- Do not apply tensile, torsion, or bending loads to the body. Do not drop or apply excessive impact. The body could break or come apart.

■ Use/maintenance
- Always lock the slide lock during use.

● Table. Chemical names

Chemical name
All alcohols
Paint thinner
Carbon tetrachloride
Chloroform
Acetic ester
Aniline
Cyclohexane
Trichloroethylene
Sulfuric acid
Lactic acid
Water-soluble cutting oil (alkaline)

* There are other chemicals which cannot be used. Contact CKD regarding details.

⚠ CAUTION

■ Design/selection
- Avoid installing this product where it is subject to direct ultraviolet.
- Note that when using in a circuit where vacuum and vacuum burst air are alternately applied, the dust removed by the element could be discharged by the burst air.

■ Mounting, installation and adjustment
- Check the arrow indicating the air flow on the body before connecting the pipes. The filter functions will not be satisfied if the pipes are connected in reverse.
- After removing the dust and replacing the element, securely fix the case and confirm that there are no leaks.

■ Use/maintenance
- Periodically perform maintenance and inspection. A clogged element could decrease performance and cause other problems.
- When disassembling or assembling for maintenance, make sure that the O-ring is not damaged. Use of a damaged O-ring could result in problems such as leaks.
- When rotating the fitting body for disassembly or assembly, make sure not to apply excessive force with the tools, etc. The body could break.

Digital display is used for vacuum pressure switch display to improve visibility
Vacuum pressure switch with digital display

VSUS Series

● Port size: M5, ø4, ø6, ø8

RoHS

Features

■ Digital display of set pressure and applied pressure.

■ 2-point output and analog output are available for the vacuum pressure switch, selectable according to the application. In addition, wiring layout can be done easily using a connector system.

■ Three types of pipe connection are available: push-in fitting, M5 metric thread (female thread), and direct mount. Select according to the application.

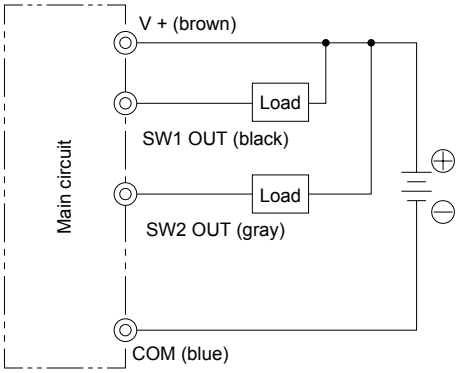
■ Accuracy is stable due to pressure detection by electronic switch.

Specifications

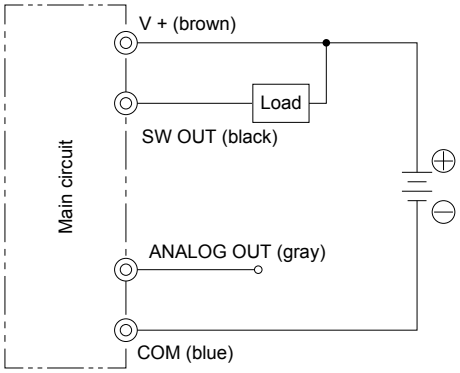
Descriptions		2-point output (NW)	With analog output (NA)	2-point output (PW)	With analog output (PA)
Factory default pressure kPa		-50(SW1), -10(SW2)	-50	-50(SW1), -10(SW2)	-50
Current consumption mA		40 or less			
Pressure sensitive element		Diffused semiconductor pressure switch			
Working pressure kPa		-100 to 0			
Set pressure kPa		-99 to 0			
Proof pressure MPa		0.2			
Storage temperature °C		-20 to 70 (atmospheric pressure, humidity 60% RH or less)			
Operating temperature °C		0 to 50 (no freezing or condensation)			
Operating humidity		35 to 85% RH (no condensation)			
Power supply voltage V		12 to 24 DC ±10% ripple (P-P) 10% or less			
Degree of protection		IEC standards IP40 or equivalent			
Output points		2	1	2	1
Repeatability		±3%F.S. max(at Ta=25°C)			
Hysteresis		Fixed (2% F.S. or less)	Variable (Approx. 0 to 15% F.S.)	Fixed (2% F.S. or less)	Variable (Approx. 0 to 15% F.S.)
Switch output		NPN transistor/open collector output 30 V 80 mA or less Residual voltage 0.8 V or less		PNP transistor/open collector output Power supply voltage 80 mA or less Residual voltage 0.8 V or less	
Analog output	Output voltage V	-	1 to 5	-	1 to 5
	Zero point voltage V	-	1±0.1	-	1±0.1
	Span voltage V	-	4±0.1	-	4±0.1
	Output current mA	-	1 or less (load resistance 5 kΩ or more)	-	1 or less (load resistance 5 kΩ or more)
	Linearity/hysteresis	-	±0.5% F.S. or less	-	±0.5% F.S. or less
Responsivity ms		Approx. 2 or less			
Display kPa		-99 to 0 (2-digit red LED display)			
Display frequency		Approx. 4 times/sec			
Display accuracy		±3%F.S. ±2digit			
Resolution		1digit			
Operation display		SW1: Red LED lights at set pressure and over SW2: Green LED lights at set pressure and over	Red LED lights at set pressure and over	SW1: Red LED lights at set pressure and over SW2: Green LED lights at set pressure and over	Red LED lights at set pressure and over
Function		1. MODE change-over switch (ME or S1 or S2) 2. S1 set trimmer (2/3 rotation trimmer) 3. S2 set trimmer (2/3 rotation trimmer)	1. MODE change-over switch (ME or SW) 2. SW set trimmer (2/3 rotation trimmer) 3. HYS setting trimmer (approx. 0 to 15% of set value)	1. MODE change-over switch (ME or S1 or S2) 2. S1 set trimmer (2/3 rotation trimmer) 3. S2 set trimmer (2/3 rotation trimmer)	1. MODE change-over switch (ME or SW) 2. SW set trimmer (2/3 rotation trimmer) 3. HYS setting trimmer (approx. 0 to 15% of set value)

Electric circuit

● Vacuum pressure switch with 2-point switch output



● Vacuum pressure switch with analog output



How to order

● Vacuum pressure switch

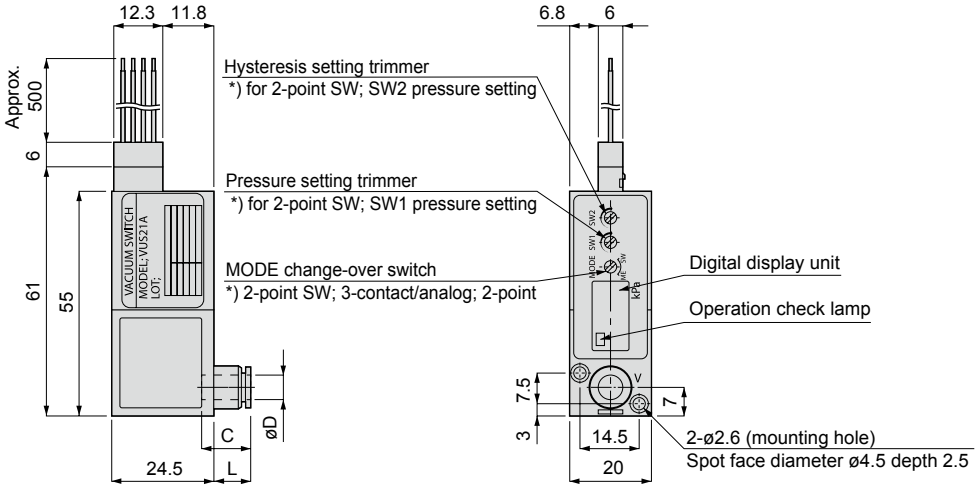
VSUS - P W - M5

Ⓐ Switch output models
Ⓑ Switch specifications
Ⓒ Port size

Code	Content
Ⓐ Switch output models	
N	NPN output
P	PNP output
Ⓑ Switch specifications	
W	2-output points
A	1-point output + analog output
Ⓒ Port size	
4	ø4 push-in fitting
6	ø6 push-in fitting
8	ø8 push-in fitting
M5	M5×0.8
F	Direct mount

Dimensions

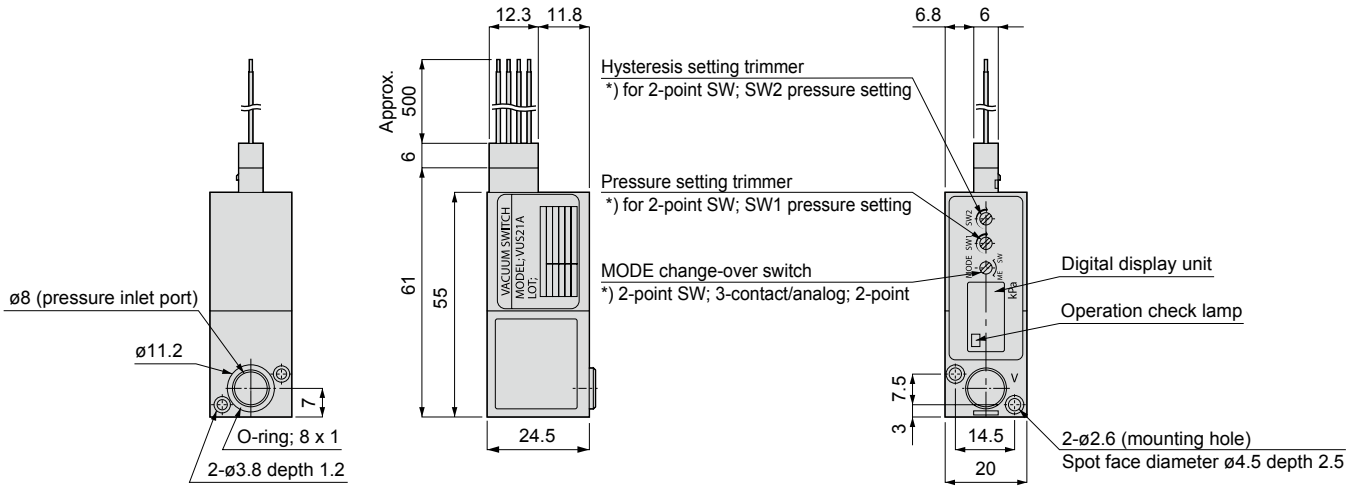
● Push-in fitting



Unit: mm

Model No.	Tube O.D. øD	L	C	Weight (g)
VSUS-□□-4	4	6.1	11.2	28
VSUS-□□-6	6	8.9	11.9	28
VSUS-□□-8	8	17.3	18.2	35

● Direct mount

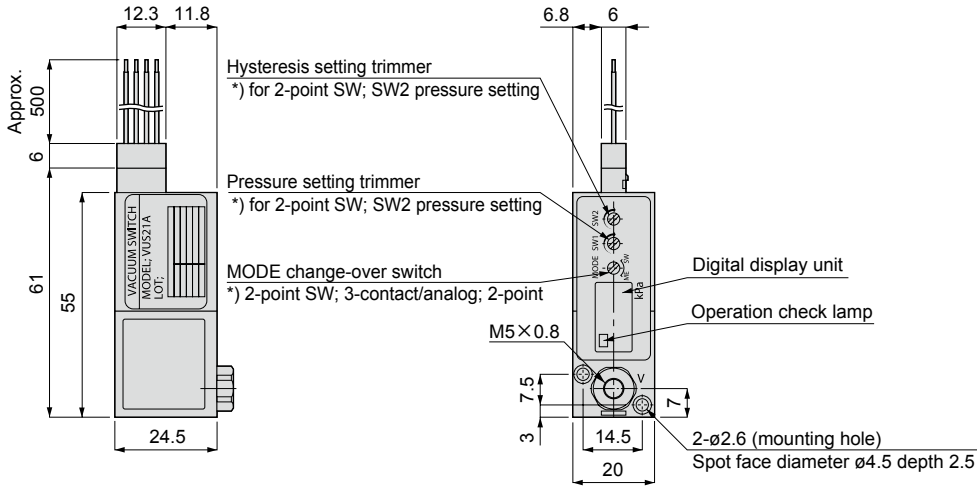


Unit: mm

Model No.	Weight (g)
VSUS-□□-F	19

Dimensions

● Female thread



Unit: mm

Model No.	Weight (g)
VSUS- □□-M5	29

Safety precautions

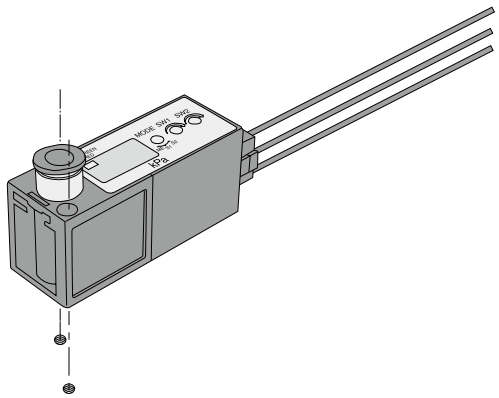
⚠ CAUTION

- Do not use in atmospheres or gases containing corrosive substances. It risks damaging the switch.
- Do not perform wiring or usage that would introduce noise (surge), etc. It risks damaging the switch.
- Do not use in flammable or explosive gases, liquids, or atmospheres. This may cause fire or explosion, as the product does not have an explosion-proof structure.
- Avoid using in places where the product is exposed to dripping water, oil, dust, etc. This may cause malfunction, as the product does not have a drip-proof structure.
- Do not use where the heat generated exceeds the operating temperature range. It risks damaging the switch.
- Make sure to turn the power OFF before wiring. During wiring, check the lead wire color and do not short-circuit the output terminal and power supply terminal or COM terminal. Short-circuiting could cause switch malfunction.
- Do not apply high tensile force or bending force to the connector cable. It could cause disconnection or damage to the connector unit.
- At vacuum burst, do not constantly apply pressure of 0.2 MPa or more. If constantly applied, it could damage the sensor.
- When setting the pressure and hysteresis, use a small screwdriver and gently turn within the rotation range of the trimmer, without applying excessive force. If excessive force is applied during adjustment, it could damage the trimmer and base.
- Use a stable DC power supply.
- To connect to an output terminal or power supply terminal (relay, solenoid valve, etc.), install a surge voltage absorption circuit. Avoid usage where current exceeds 80 mA.
- When using a unit power supply such as switching power supply, ground the F.G. (frame ground).
- Do not short-circuit the output terminal (black/gray lead wire) with other terminals.
- Do not apply strong external impact or excessive force to the switch body.
- Since mounting holes for M2.5 screws are available for mounting the switch body, tighten with the recommended tightening torque when mounting.
- Keep the working fluid as clean as possible.

Usage methods

Vacuum pressure switch with digital display VSUS fixing method

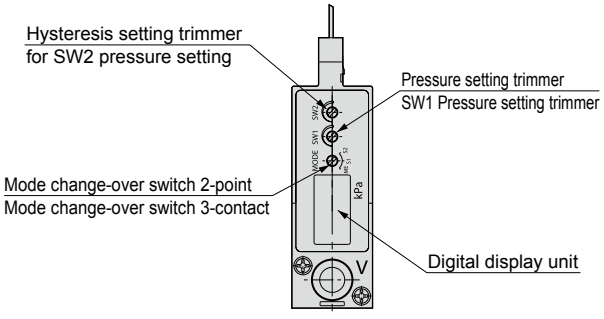
(1) Vacuum pressure switch with LED display VSUS fixing
Use the mounting holes of vacuum pressure switch with LED display VSUS body and fix with M2.5 screws. (Refer to the catalog dimensions for the mounting hole pitch.)



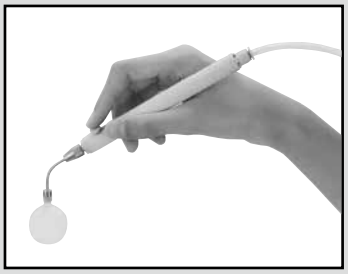
How to use vacuum pressure switch

1. Pressure setting procedure
   (1) Energization (supply DC power after confirming the wiring.)
   (2) Set the display change-over switch to pressure setting mode (ME → S1 or S2, SW).
   (2)-2 (vacuum pressure switch with analog output only)
   Turn the hysteresis setting trimmer (HYS) fully counterclockwise to set hysteresis to minimum.
   (3) Align to the desired setting value by turning the pressure setting trimmer (S1 or S2, SW) with a small screwdriver, etc.
   (4) Set the display change-over switch to ME, apply pressure and confirm actual operation.
   (For vacuum sensor with 2-point switch output)
   Switch output 1 (S1): Operation indicator lamp (red LED) turns ON at set pressure or greater.
   Switch output 2 (S2): Operation indicator lamp (green LED) turns ON at set pressure or greater.
   (For vacuum sensor with analog output)
   Switch output (SW): Operation indicator lamp (red LED) turns ON at set pressure or greater.

2. Hysteresis setting
   (1) Hysteresis can be adjusted by the hysteresis setting trimmer (HYS).
   (2) Hysteresis adjusting range is approx. 0 to 15% of the set value. Hysteresis increases when the trimmer is rotated clockwise.
   (3) Hysteresis confirmation
   Set the display change-over switch to pressure display mode (ME), and gradually increase/decrease the pressure so that it will be over and under the set pressure.
   Then, read the values displayed when the operation indicator lamp turns ON and OFF. The display value difference is the hysteresis.
   (4) Hysteresis adjustment application examples
   ·When the pressure is pulsating and the output cuts out at fine intervals, increase the hysteresis.
   ·When setting the allowable range of pressure drop.



* Top: Vacuum pressure switch with analog output
Bottom: Vacuum pressure switch with 2-point switch output



Suction pad with built-in vacuum ejector
Air tweezers

VST Series

RoHS

Features

■ Air tweezers with built-in suction pad and vacuum ejector in pen-shaped body. Ideal for assembling small parts.

■ Integrated valve: VST-B has less noise and saves energy as air flows only when used.

Specifications

Descriptions	VST
Working fluid	Air
Working pressure MPa	0.15 to 0.7
Rated supply pressure MPa	0.5
Achieved vacuum pressure kPa	-85(VST-B:-80)
Intake flow rate ℓ/min(ANR)	2
Operating ambient temperature ℃	0 to 60 (no freezing)

How to order

● Air tweezers package set model No.

VST - A - SET

● Model No. of air tweezers only

VST - A - 6RS

Ⓐ Holder shape

Ⓑ Pad size, shape and material

Code	Content
Ⓐ Holder shape	
A	Without valve
B	Integrated valve
Ⓑ Pad size, shape and material	
Refer to Appendix 1 for pad size, shape and material.	

Appendix 1

Pad size, shape and material					
Code	**Nitrile rubber**	2RN	4RN	6RN	8RN
	Silicone rubber	2RS	4RS	6RS	8RS
Pad size (mm)		ø2 mm	ø4 mm	ø6 mm	ø8 mm

* Air tweezers package set contents

[Air tweezers: 1, pad rubber: 4 (material: silicone), pad O.D: ø2 mm, ø4 mm, ø6 mm, ø8 mm, pad adaptor: 2 (for ø2/4 mm, for ø6/8mm) coiling tube: 1]

● Maintenance part model No.

· Filter element

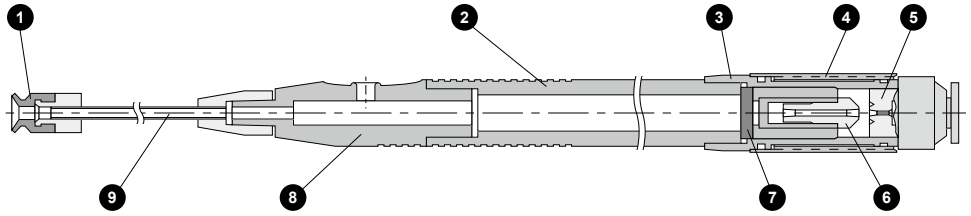
VST - A - E

Ⓐ Holder shape

Code	Content
Ⓐ Holder shape	
A	Without valve
B	Integrated valve

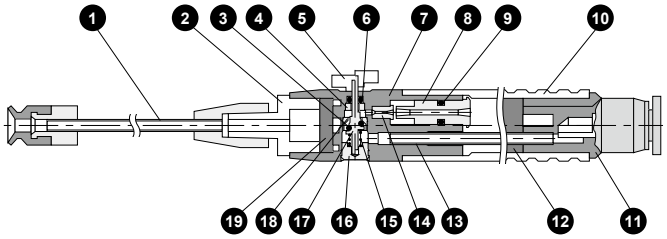
Internal structure and parts list

● Without valve VST-A



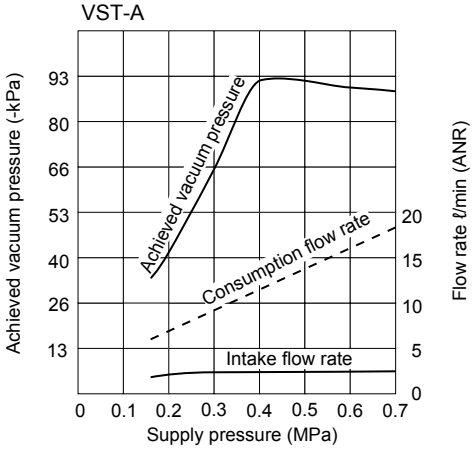
No.	Part name	Material	Remarks	No.	Part name	Material	Remarks
1	Standard pad			6	Diffuser	Copper alloy, nickeling	
2	Resin body B	Nylon		7	Filter element		
3	Resin body C	Polyacetal		8	Resin body A	ABS resin	
4	Cover	ABS resin		9	Pad holder	Copper alloy, nickeling	
5	Nozzle assembly						

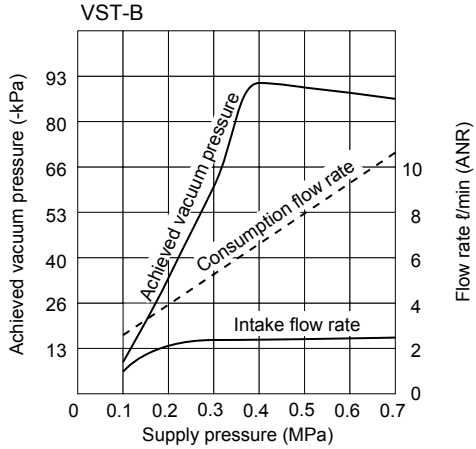
● Integrated valve VST-B



No.	Part name	Material	Remarks	No.	Part name	Material	Remarks
1	Pad holder B	Copper alloy, nickeling		11	Fitting body	Polybutylene terephthalate	
2	Pad holder A	ABS resin		12	Silencer element		
3	O-ring	Nitrile rubber		13	Pipe	Copper alloy, nickeling	
4	O-ring holder	Copper alloy, nickeling		14	Nozzle	Copper alloy, nickeling	
5	Push button	ABS resin		15	Spring	Stainless steel	
6	O-ring	Nitrile rubber		16	Valving element guide	Copper alloy, nickeling	
7	Resin body A	Polybutylene terephthalate		17	Valving element	Copper alloy, nickeling	
8	Diffuser	Copper alloy, nickeling		18	Valving element ring	Copper alloy, nickeling	
9	O-ring	Nitrile rubber		19	Filter element		
10	Resin body B	Nylon					

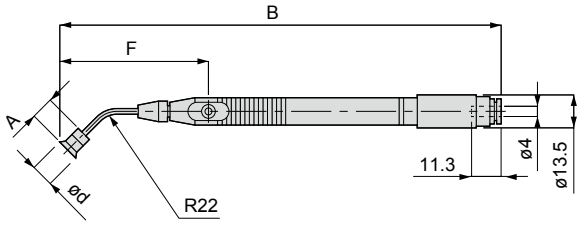
Vacuum characteristics





Dimensions

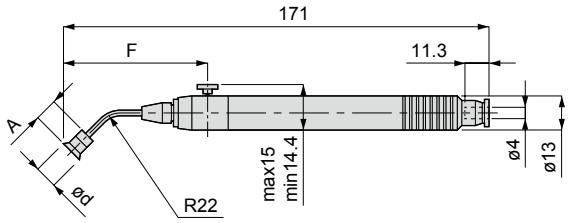
● Without valve VST-A



Unit: mm

Model No.	Pad diameter ød	A	B	F	Weight (g)
VST-A-2R□	2	8	182.7	62.4	21.5
VST-A-4R□	4	8	182.7	62.4	21.5
VST-A-6R□	6	11	188.7	68.4	22.5
VST-A-8R□	8	9.5	187.2	66.9	22.5

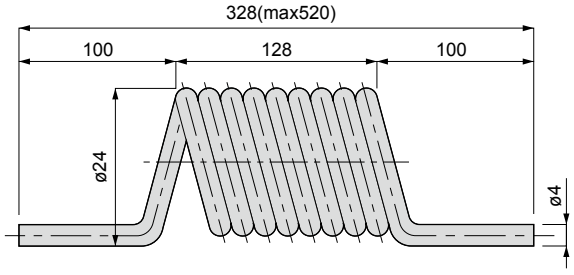
● Integrated valve VST-B



Unit: mm

Model No.	Pad diameter ød	A	F	Weight (g)
VST-B-2R□	2	8	59.9	16
VST-B-4R□	4	8	59.9	16
VST-B-6R□	6	11	65.9	17
VST-B-8R□	8	9.5	64.4	17

● Coiling tube for air tweezers



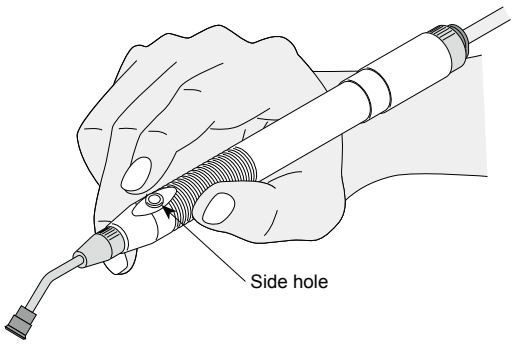
Safety precautions

⚠ CAUTION

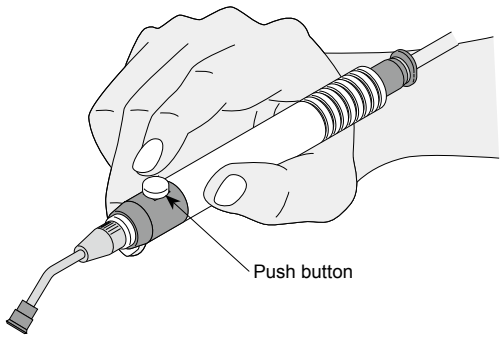
- Do not carry out pushbutton operation of the integrated valve type mechanically. It could damage the button.
- Since the filter element can be replaced by removing the ejector (without valve: VST-A) or the pad holder (integrated valve: VST-B), carry out periodic maintenance and inspection. Clogging could decrease performance.
- Note that the silencer element of integrated valve cannot be replaced.
- For piping to air tweezers, use a coiling tube and minimize the load on the fitting.

How to use

● For type without valve VST-A
When the side hole is pressed while discharging compressed air (0.5 MPa) to the air tweezers, the workpiece is suctioned. Release the side hole when separating the workpiece.

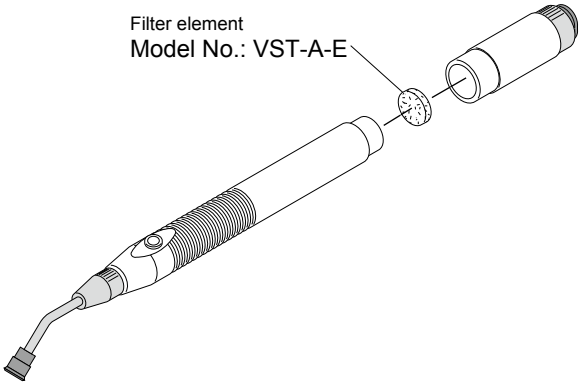


● For integrated valve VST-B
When the push button is pressed while discharging compressed air (0.5 MPa) to the air tweezers, the workpiece is suctioned. Release the push button when separating the workpiece.

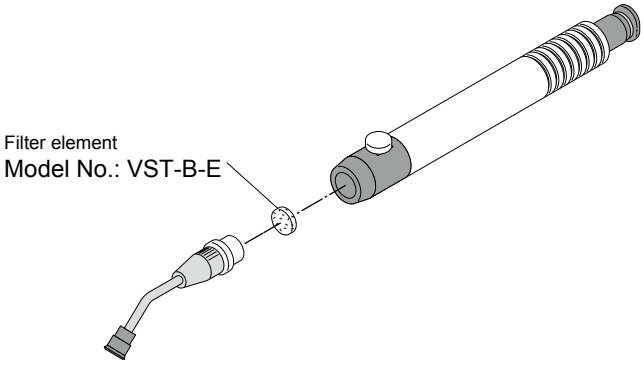


Replacement element for air tweezers

● Without valve VST-A



● Integrated valve VST-B



Guide to custom order products

The model No. of standard products can be changed by changing the “inch specification” of the connection tube size and “NPT specification” of the port thread with the standard port size as reference.
In addition, products with special specifications are also supported.
Contact CKD for details.

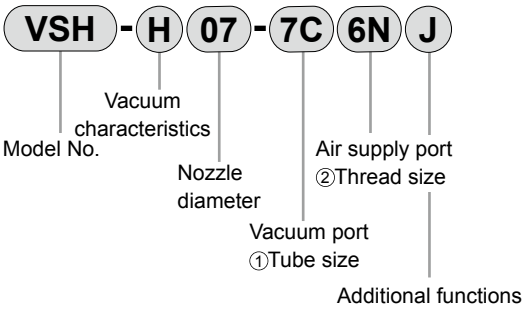
Guide to custom order products

Inch size specifications/NPT specifications

Features

■ Metric size fittings are available as inch size fittings and R threads as NPT threads.

Model No. (example)



①Tube size

Tube size		Inch size				
Code		3C	7C	9C	11C	13C
Size	(inch)	5/32	1/4	5/16	3/8	1/2
	(mm)	ø3.97	ø6.35	ø7.94	ø9.53	ø12.7

②Thread size

Thread size	Unified thread	NPT thread	
Code	32U	6N	8N
Size	10-32UNF	NPT1/8	NPT1/4

Compatible models

- Vacuum ejector: VSH/VSU/VSC/VSB/VSG/VSK/VSKM
- Suction pad: VSP
- Vacuum filter: VSFU

* May not be available depending on the product. Contact CKD for details.

MEMO

Related products

Related products

Quick valve 2QV/3QV Series

Straight flow path and large effective sectional area.
Ideal for shutting off source pressure.

(Catalog No. CB-024SA)

Vacuum filter VFA Series

Effectively removes dust and moisture suctioned up by vacuum pump or ejector.

(Catalog No. CB-024SA)

Vacuum regulator VRA2000 Series

Ideal for precise pressure adjustment such as fine workpiece suction or inspection systems.

(Catalog No. CB-024SA)

Electro pneumatic regulator EV2100 V Series

Feedback control with semiconductor pressure sensor and electronic control circuit is used and vacuum pressure is controlled in a step-less and precise manner by electrical signals.

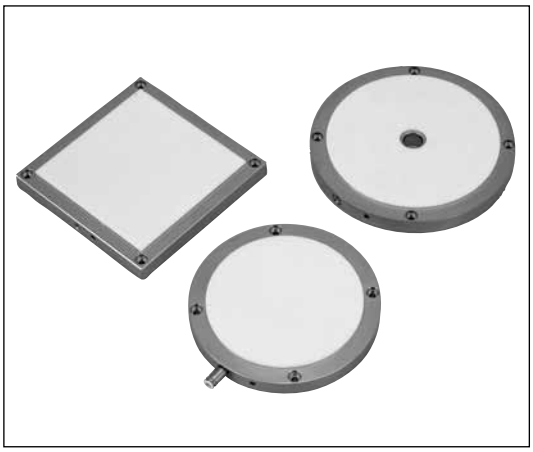
(Catalog No. CB-024SA)

Related products

Precise suction plate PVP Series

Adopts fluoro resin on the suction surface and gently suctions the workpiece without damaging it.

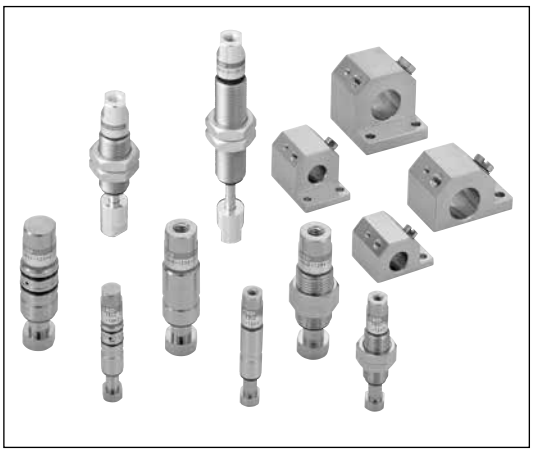
(Catalog No. CB-024SA)



Fine buffer FBU 2 Series

By adopting a CKD original magnetic spring in the buffer part, the load is always kept constant.
Damage-free buffer that does not damage the workpiece.

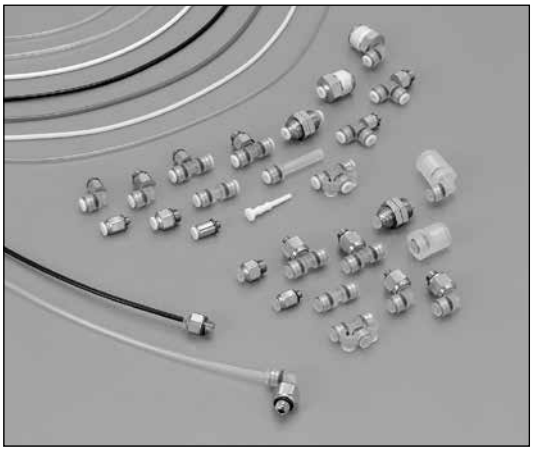
(Catalog No. CB-024SA)



Fiber tube UP Series

Extremely fine tube of O.D. ø1.8.
Stress when piping is also greatly reduced!

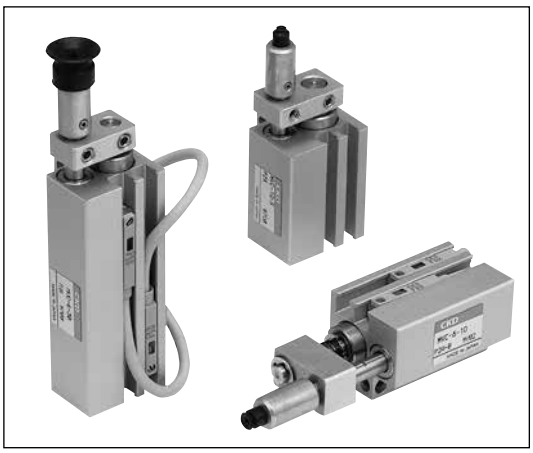
(Catalog No. CB-024SA)



Small cylinder with suction pad MVC Series

A vacuum flow path is provided in the cylinder body. Select according to usage, including types with pad rubber or buffer.

(Catalog No. CB-029SA)



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2nd edition 3rd printing Changed content
· Correction of external dimension values

3rd edition Changed content
· VSN/VSNP Series added
· FSL Series added
· Clerical corrections

3rd edition 2nd printing Changed content
· Clerical corrections

3rd edition 3rd printing Changed content
· Clerical corrections

3rd edition 4th printing Changed content
· Clerical corrections

4th edition Changed content
· Correction of external dimensions
· Clerical corrections

5th edition Changed content
· Suction pad variations added

5th edition 2nd printing Changed content
· Correction of external dimensions
· Clerical corrections

5th edition 3rd printing Changed content
· Correction of external dimensions
· Clerical corrections

Vacuum System Components SELVACS

Catalog No.CC-796A-5

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CKD WARRANTY

Subject to the conditions below, CKD Corporation ("CKD") warrants the first end user (the "Buyer") that CKD's products are free from defects in material and workmanship.

"Warranty Period" is one (1) year from the first delivery to the customer.

CKD will, at CKD's option, either repair or replace a defective product, including lowest transportation costs but not including installation or any other similar charges, provided that (1) the buyer notifies CKD in writing of the claimed defect within one year from the date Buyer received the product, (2) provides a complete explanation of the defect, the application of the product, and such other information concerning use of the product as CKD may request, and (3) returns the product to CKD in accordance with CKD's specific written instructions and authorization obtained from CKD prior to return of the product, and CKD's inspection confirms that the product was defective.

This warranty applies only if the product was used and applied correctly under normal operating conditions and good engineering practice; was installed, operated and maintained in accordance with all instructions issued or published by CKD; was used within stated pressure, media and operating limitations published by CKD and in effect on the date of shipment; and was not subject to abuse, misuse or unauthorized modification.

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CKD MAINTAINS A POLICY OF ONGOING PRODUCT DEVELOPMENT AND INPROVEMENT. WE THEREFORE RESERVE THE RIGHT TO CHANGE DIMENSIONS, SPECIFICATIONS AND DESIGN WITHOUT NOTICE.

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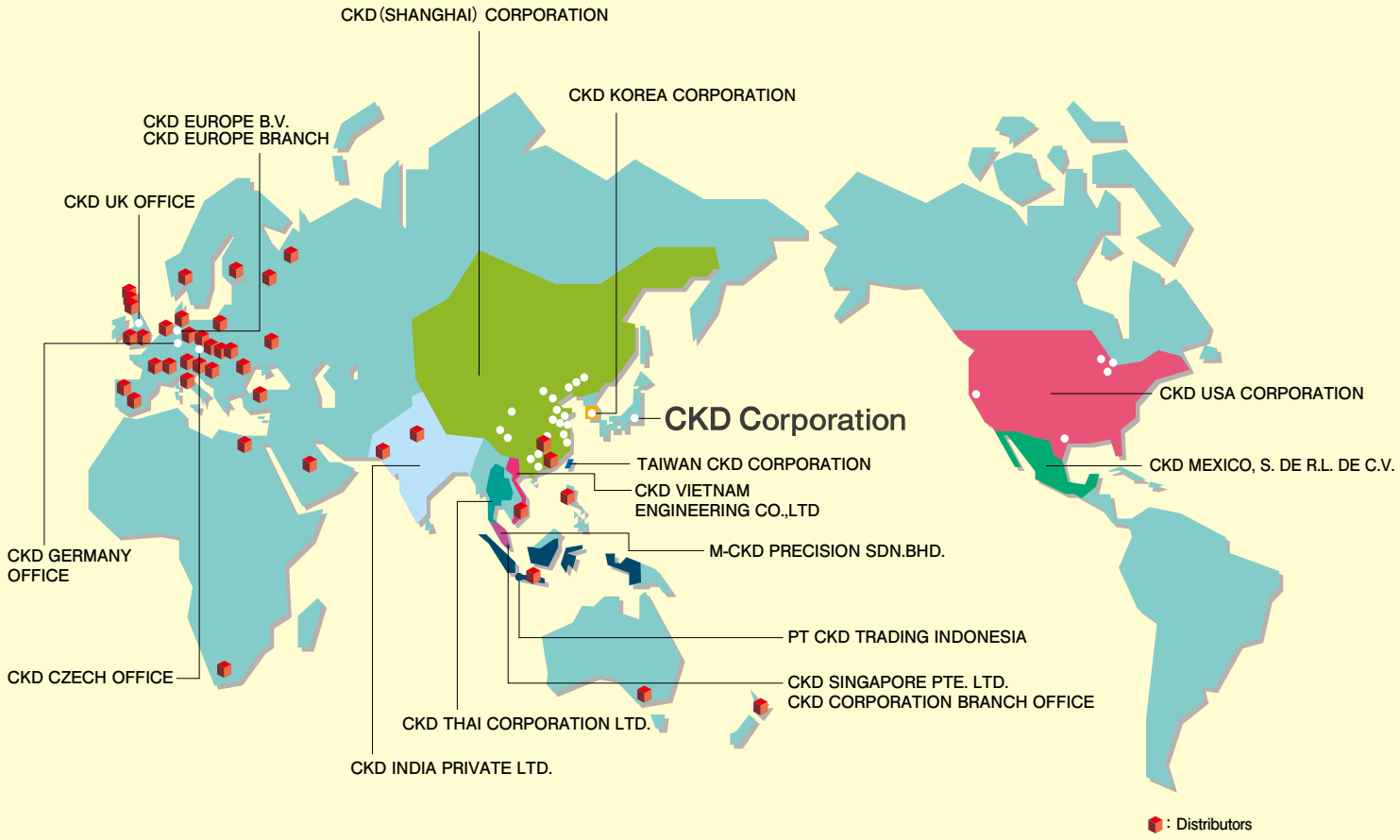

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