

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

VSX Series

- Nozzle diameter: $\phi 0.5$, $\phi 0.7$, $\phi 1.0$

RoHS

Features

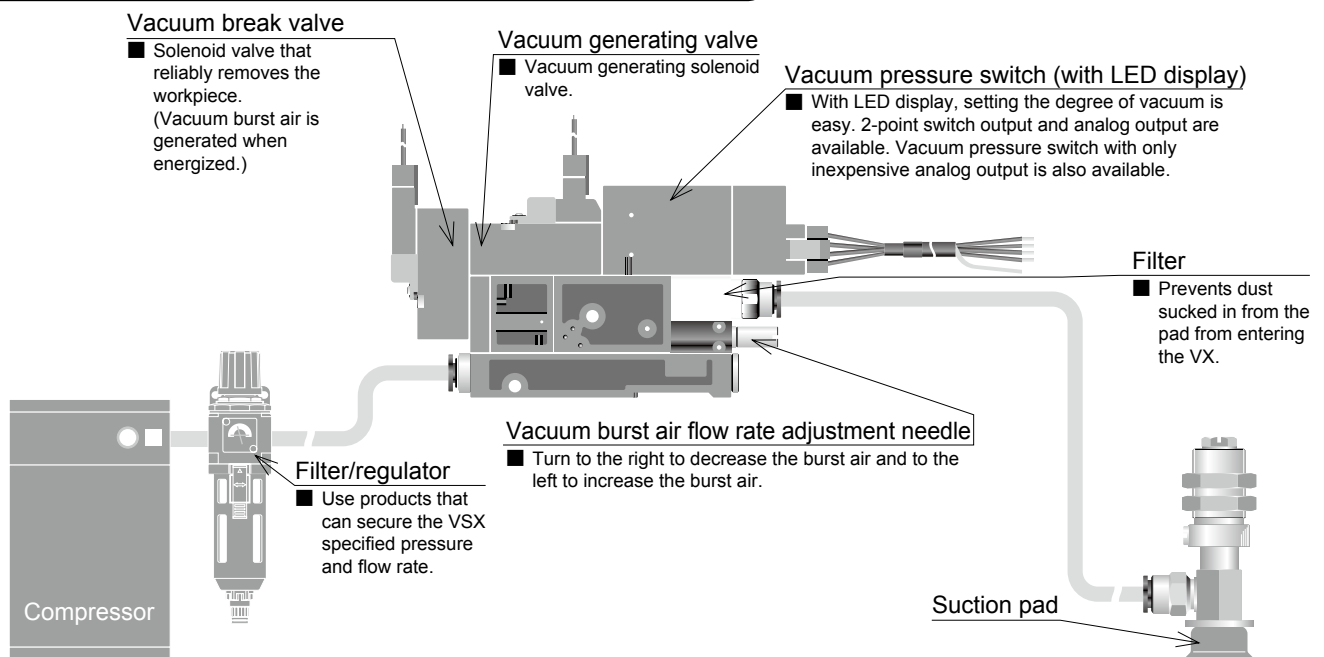
- A lightweight, compact vacuum unit that meets market needs.
- Vacuum generating valves available include normally closed and energy-saving self-hold types. Both valves attain the best possible response time, realizing high-cycle vacuum systems.
- Vacuum unit VSX fixing methods include direct mount, 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 ($\phi 0.5$), 07 ($\phi 0.7$) and 10 ($\phi 1.0$).



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	Surge absorber	Bridge diode	Surge absorber	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	VSZM
Proof pressure MPa	1.05	
Valve	Normally closed	VSQ
Lubrication	Not required	
Effective cross-sectional area mm ²	Air supply port size φ4: 3.5	VSQ
	Air supply port size φ6: 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 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)	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

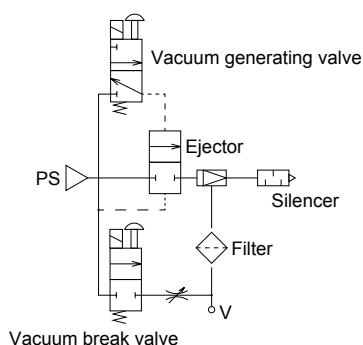
Model No.	Manifold mounting unit content	Weight (g)
VSXM-□□□-□□S-□□-D□-2	Vacuum ejector unit, atmospheric release, with vacuum pressure switch with LED display, 2-station manifold	310
VSXM-□□□-□□□-□□-D□-2	Vacuum ejector unit, common exhaust, with vacuum pressure switch with LED display, 2-station manifold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

*1 : 90 g heavier with each station increase.

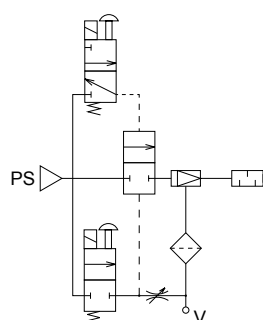
*2 : The above weight is for the type equipped with vacuum pressure switch with LED display. Vacuum pressure switch with analog output built in is lighter than the above weight by 3 g/station, while the type without vacuum pressure switch is lighter than the above weight by 10 g/station.

Circuit diagram

● Normally closed



● Self hold type



Ejector system

VSX

VSH/VSU
VSB/VSC

VSG

VSK
VSKM

VSJ
VSJM

VSN
VSNM

VSX
VSXM

VSQ

VSZM

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**

A Vacuum characteristics

B Nozzle diameter

C Valve

D Vacuum port (V)

E Air supply port (PS)

F Exhaust port (EX)

G Solenoid valve voltage

H Vacuum pressure switch specifications

I Mounting method

Code	Content
A Vacuum characteristics *1	
H	High vacuum/medium flow rate
L	Medium vacuum/large flow rate
E	High vacuum/low flow rate
B Nozzle diameter *1	
05	φ0.5
07	φ0.7
10	φ1.0
C Valve	
B	Normally closed
D	Self hold type
D Vacuum port (V)	
4	φ4 push-in fitting
6	φ6 push-in fitting
E Air supply port (PS)	
4	φ4 push-in fitting
6	φ6 push-in fitting
F Exhaust port (EX) *1	
S	Atmospheric release with silencer
J	φ6 push-in fitting common exhaust
G Solenoid valve voltage	
1	100 VAC
3	24 VDC
H 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
I Mounting method	
D	DIN rail mount
Blank	Direct mount

⚠ Precautions for model No. selection

*1 : With the combination of **A** and **B** for "L10", **F** "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**

F Exhaust port (EX)

A Vacuum characteristics

B Nozzle diameter

C Valve

D 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.

E Air supply port (PS)

G Solenoid valve voltage

H Manifold station No.

I 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 page 140 for details.
- *2 : When **A** is "Z", **B** is "00" only.
When **B** is "00", **A** is "Z" only.
- *3 : When common exhaust type (6, 8, 10) is selected for **F**, 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

		Type		
		Manifold	Single unit for manifold	Manifold only
Code	Content			
A 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.)	●		
B Nozzle diameter *1, *2				
05	φ0.5	●	●	
07	φ0.7	●	●	
10	φ1.0	●	●	
00	For mixed specs (indicate breakdown on specs sheet.)	●		
C Valve *1				
B	Normally closed	●	●	
D	Self hold type	●	●	
Z	For mixed specs (indicate breakdown on specs sheet.)	●		
D Vacuum port (V) *1				
4	φ4 push-in fitting	●	●	
6	φ6 push-in fitting	●	●	
CX	For mixed fittings (indicate breakdown on specs sheet.)	●		
E Air supply port (PS)				
4	φ4 push-in fitting	●		●
6	φ6 push-in fitting	●		●
8	φ8 push-in fitting	●		●
10	φ10 push-in fitting	●		●
F Exhaust port (EX) *3				
S	Atmospheric release with silencer	●		●
6	φ6 push-in fitting common exhaust	●		●
8	φ8 push-in fitting common exhaust	●		●
10	φ10 push-in fitting common exhaust	●		●
G Solenoid valve voltage				
1	100 VAC	●	●	
3	24 VDC	●	●	
H Manifold station No. *4				
2	2 stations	●		●
to	to			
10	10 stations			
I 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.)	●		

Ejector system

VSJ

VSHVSV
VSBVSC

VSG

VSK
VSKM

VSJ
VSJM

VSN
VSNM

VSX
VSXM

VSQ

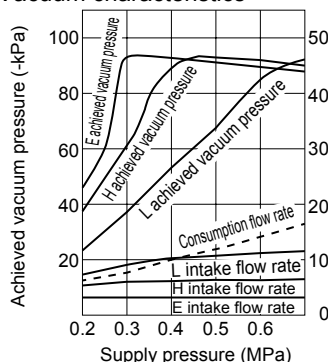
VSZM

Vacuum characteristics, flow characteristics

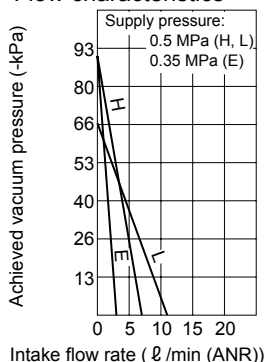
●VSX-H05, VSX-L05, VSX-E05

●VSX-H07, VSX-L07, VSX-E07

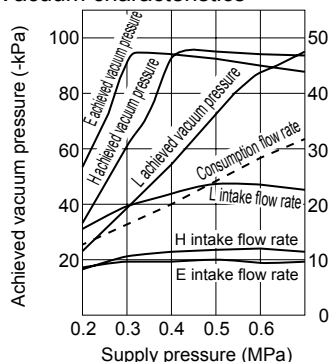
Vacuum characteristics



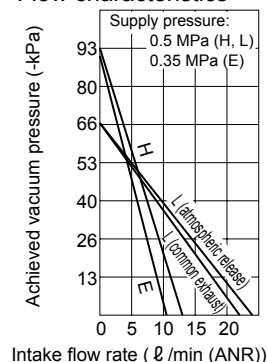
Flow characteristics



Vacuum characteristics



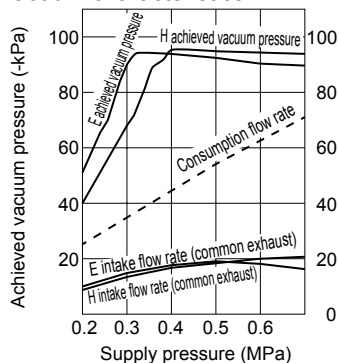
Flow characteristics



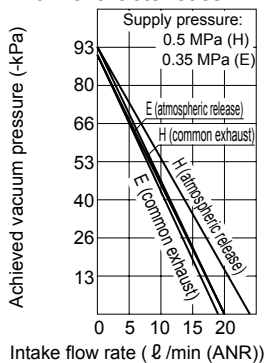
●VSX-H10□-□□J, VSX-L10□-□□J, VSX-E10□-□□J

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

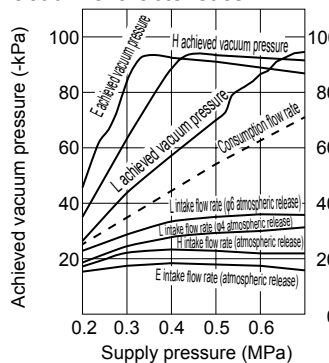
Vacuum characteristics



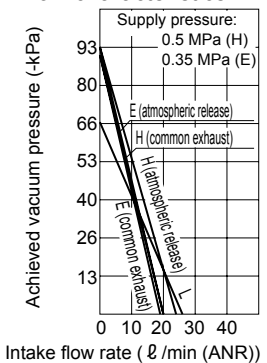
Flow characteristics



Vacuum characteristics



Flow characteristics

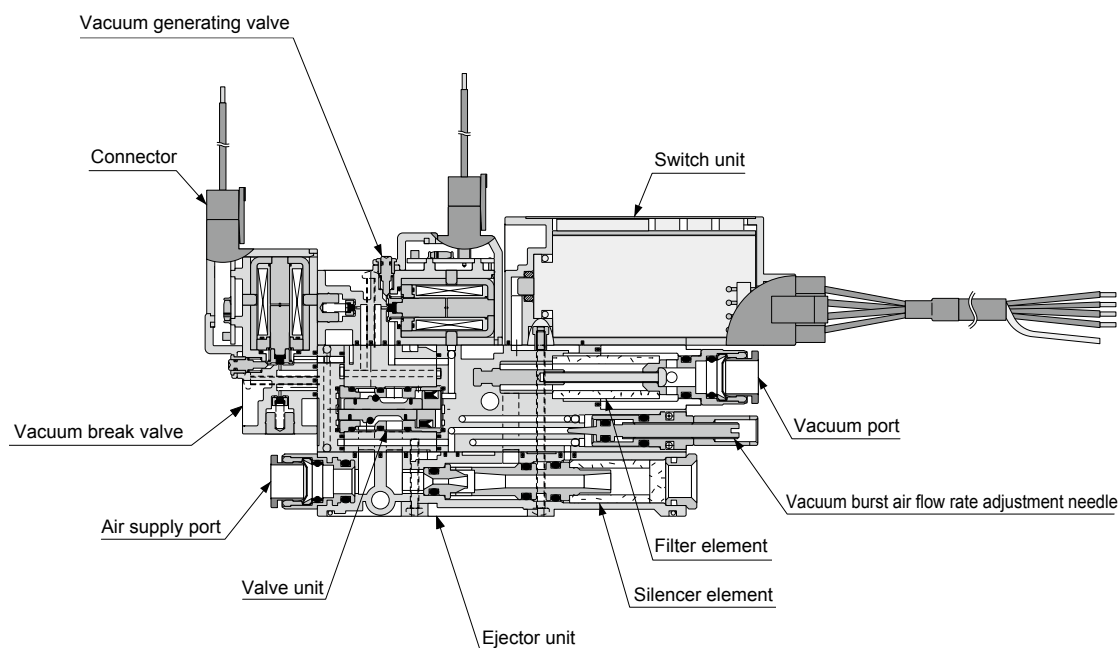


1. Supply pressure with the characteristics described above occurs at vacuum generation.
2. Achieved vacuum pressure with the characteristics described above produces abnormal noise (soft clicking sound) at supply pressure just before reaching the peak value. When this abnormal noise occurs, the characteristics 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 $0.5^2 \times \pi = 0.785 \text{ mm}^2 \times 3 = 2.35 \text{ mm}^2$. Therefore, carry out piping and equipment selection that ensures an effective cross-sectional area of 2.3 mm² or greater.

Internal structure (single unit)

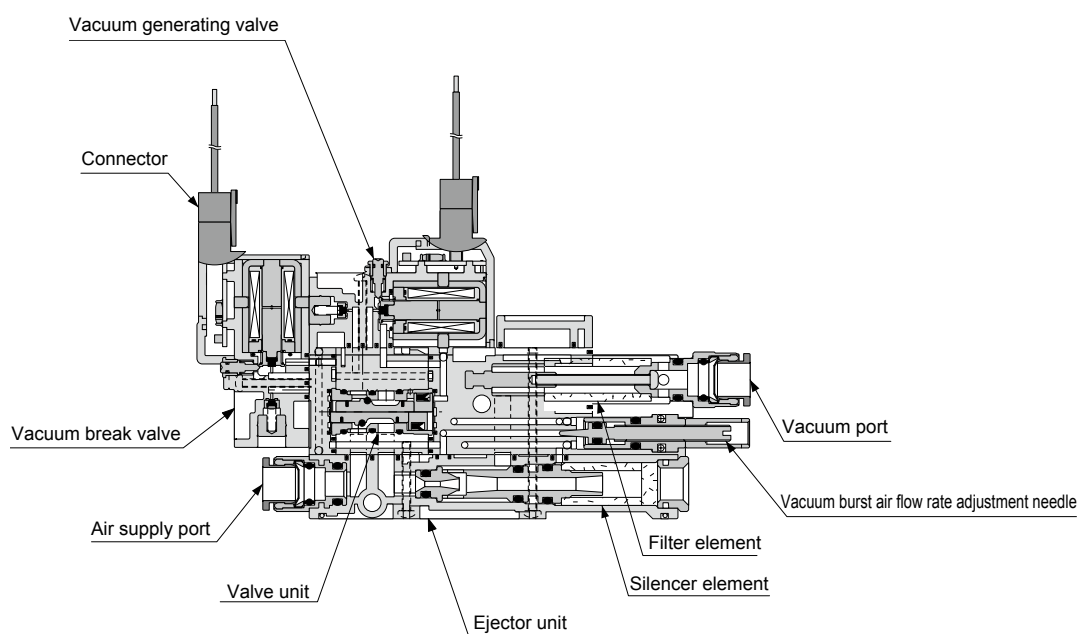
Example) VSX-□□□-□□S-□□

Type with vacuum pressure switch



Example) VSX-□□□-□□S-□□

Type without vacuum pressure switch



Ejector system

VSX

VSH/VSU
VSB/VSC

VSG

VSK
VSKM

VSJ
VSJM

VSN
VSNM

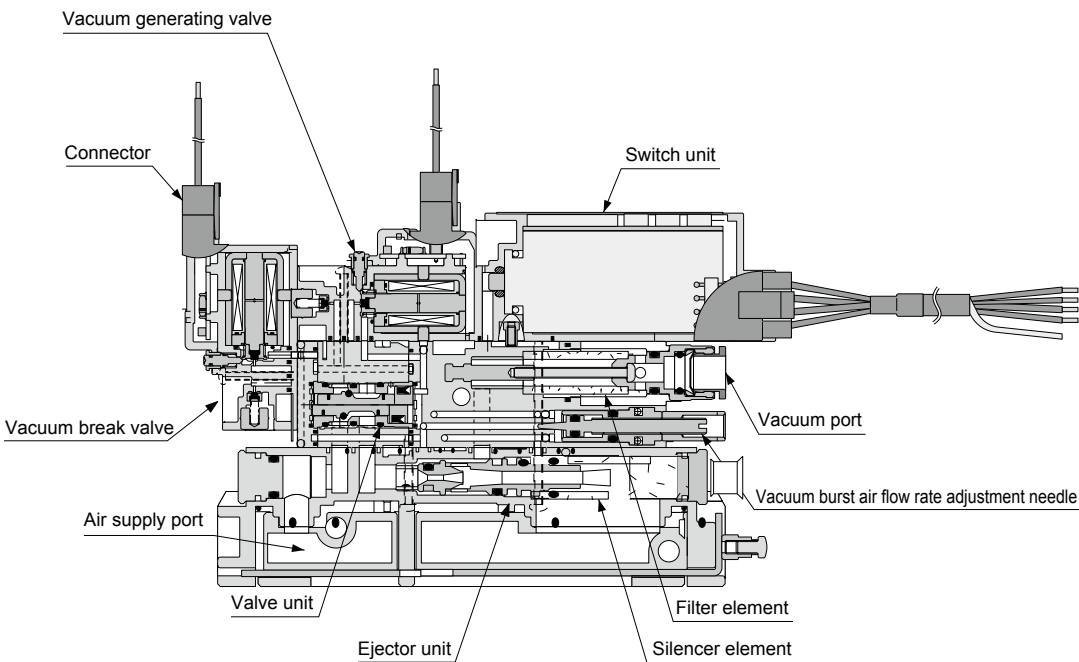
VSX
VSXM

VSQ

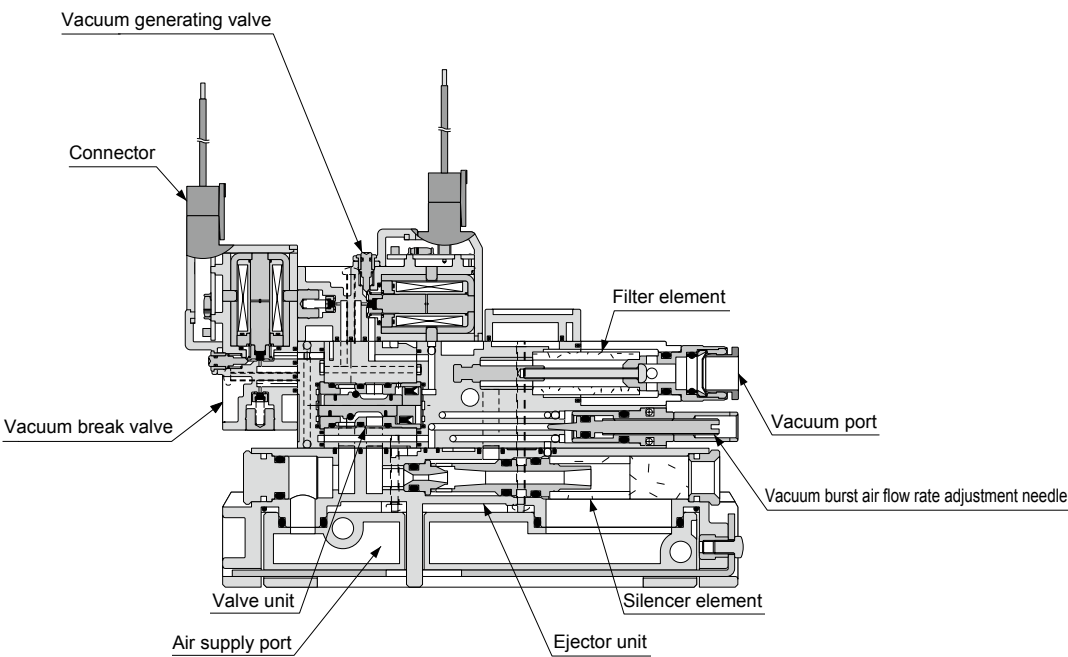
VSZM

Internal structure (manifold)

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

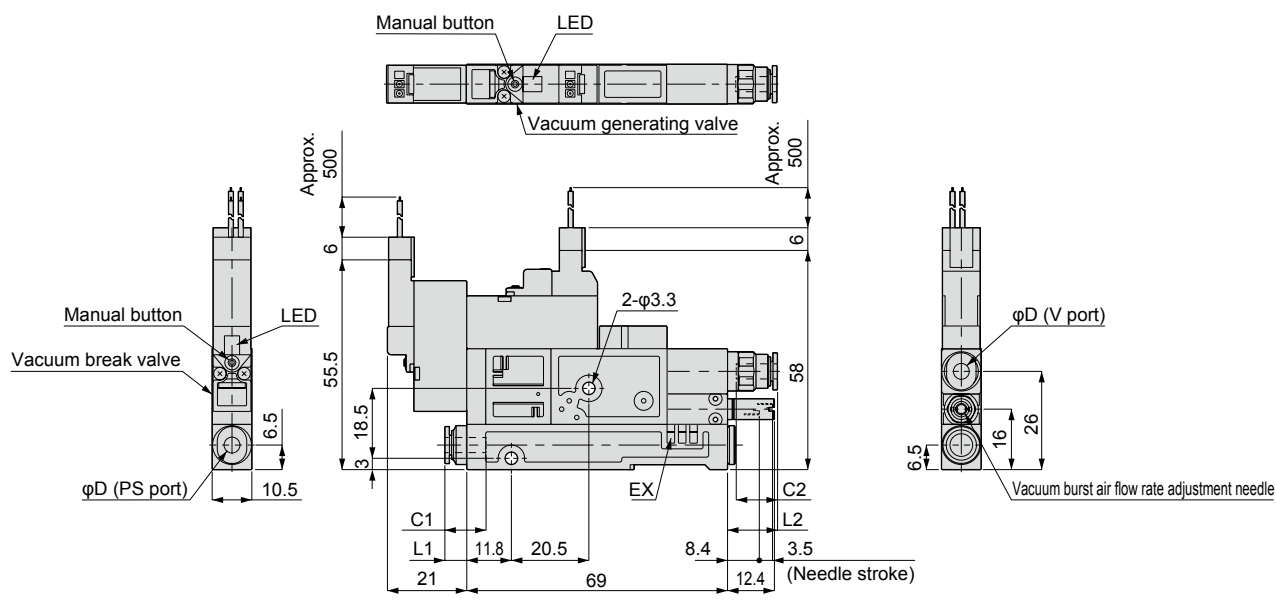


Example) VSXM-□□□-□□S-□-□-□
Type without vacuum pressure switch



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

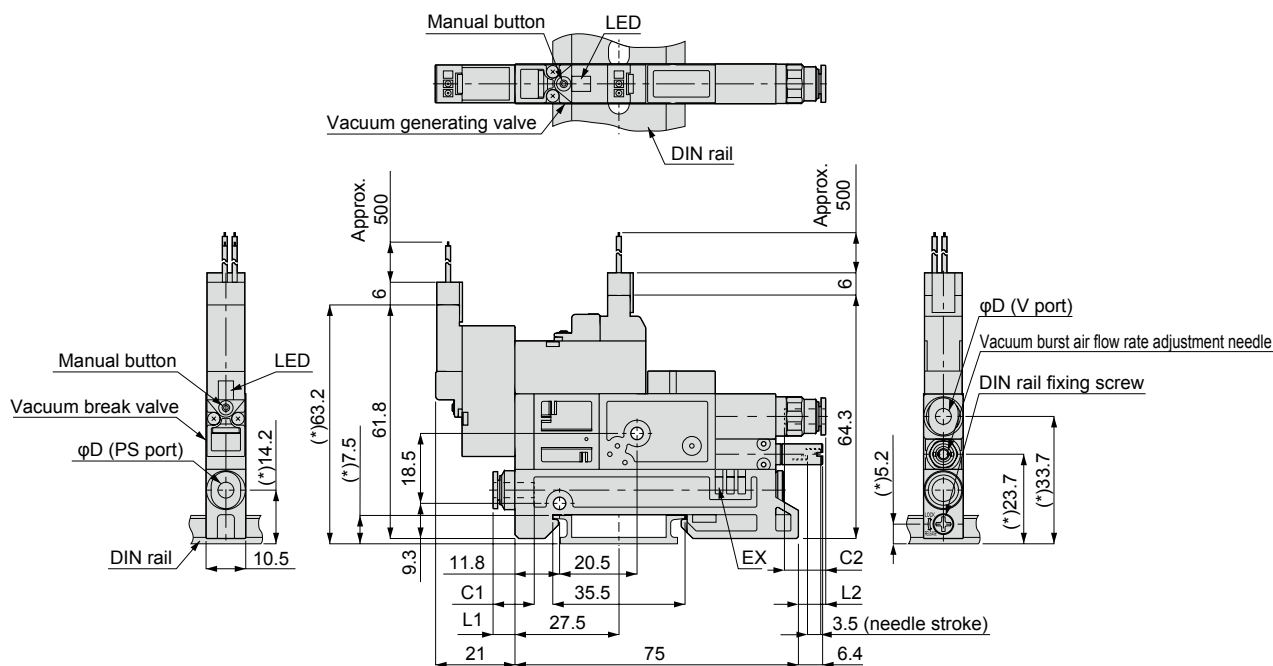
● Direct mounting



Unit: mm

Model No.	Tube O.D. (φD)	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

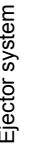


Note) Dimensions of the part with (*) mark are the values when DIN rail height is 7.5 mm.

Unit: mm

Model No.	Tube O.D. (φD)	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

- Direct mounting



VS

VSG

VSKM

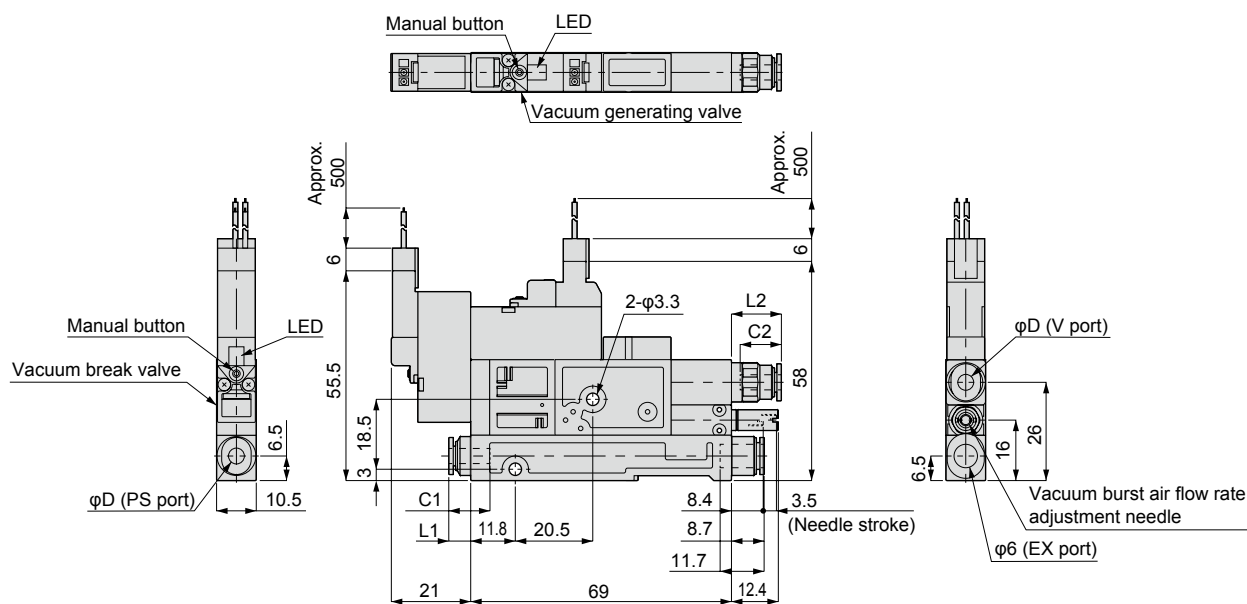


Q

WZM

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

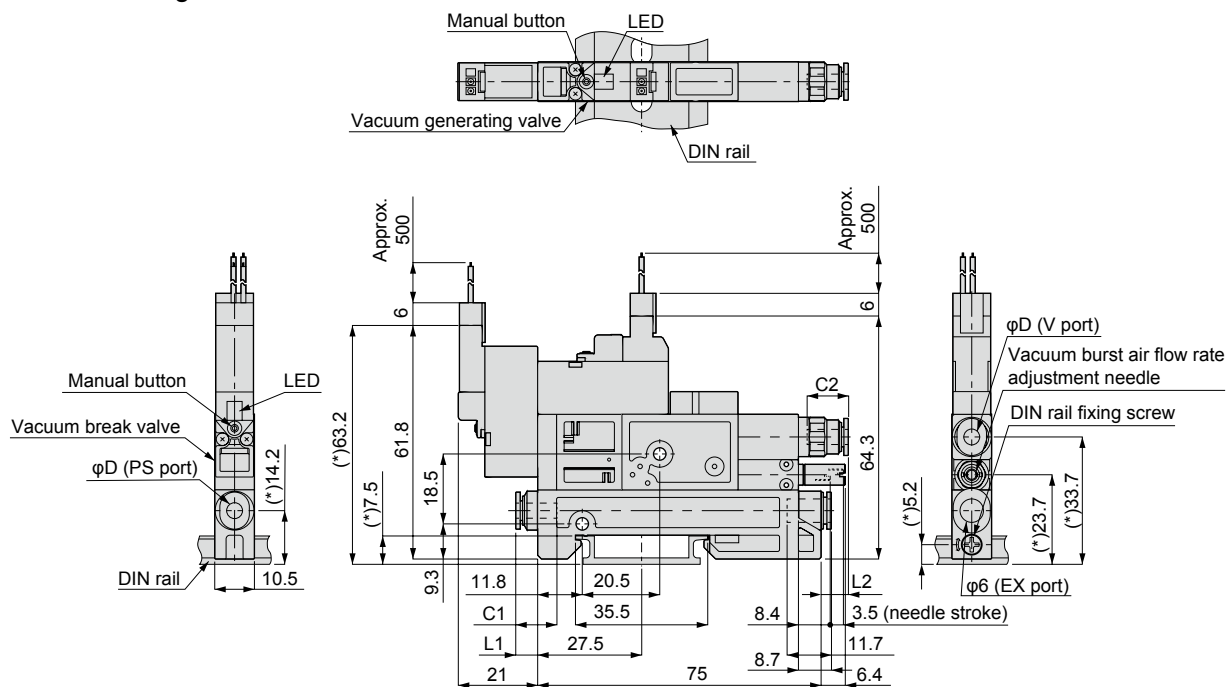
● Direct mounting



Unit: mm

Model No.	Tube O.D. (φD)	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



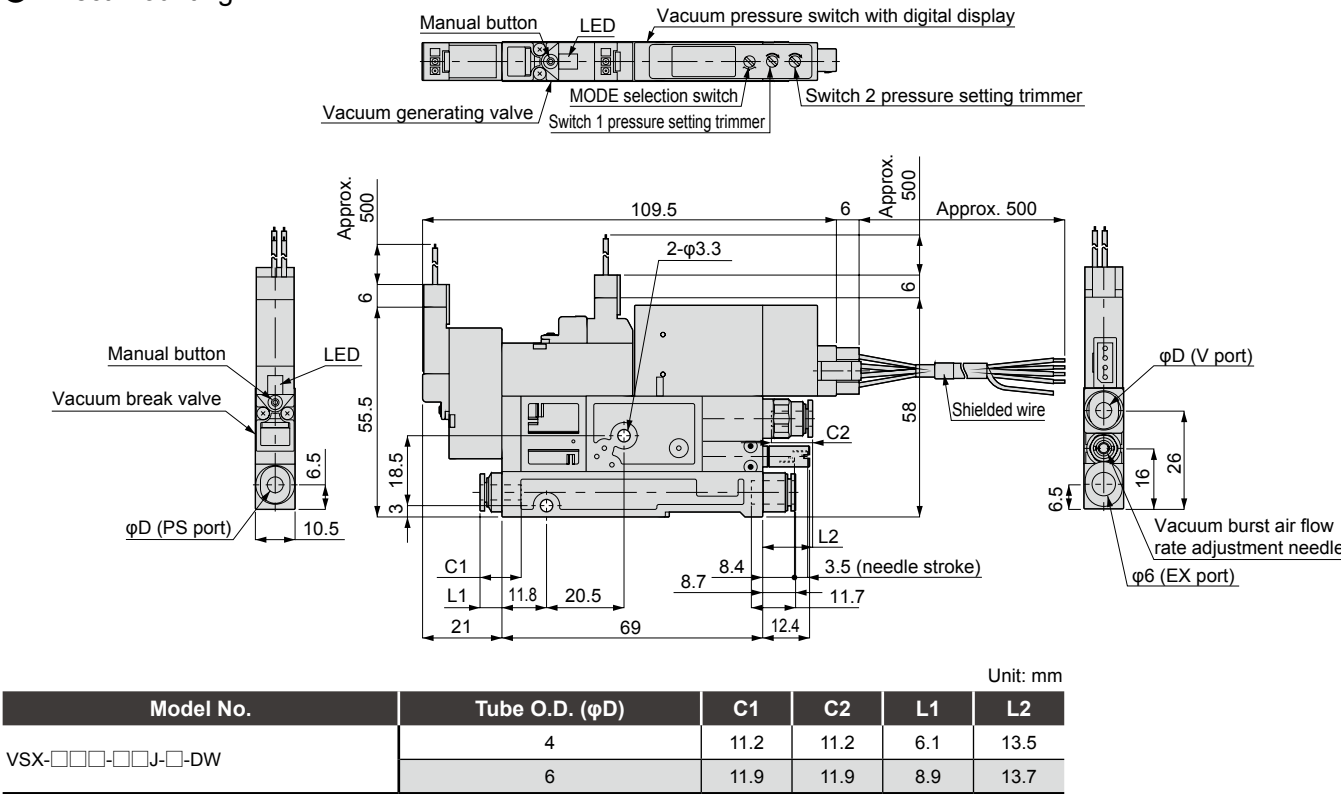
Note) Dimensions of the part with (*) mark are the values when DIN rail height is 7.5 mm.

Unit: mm

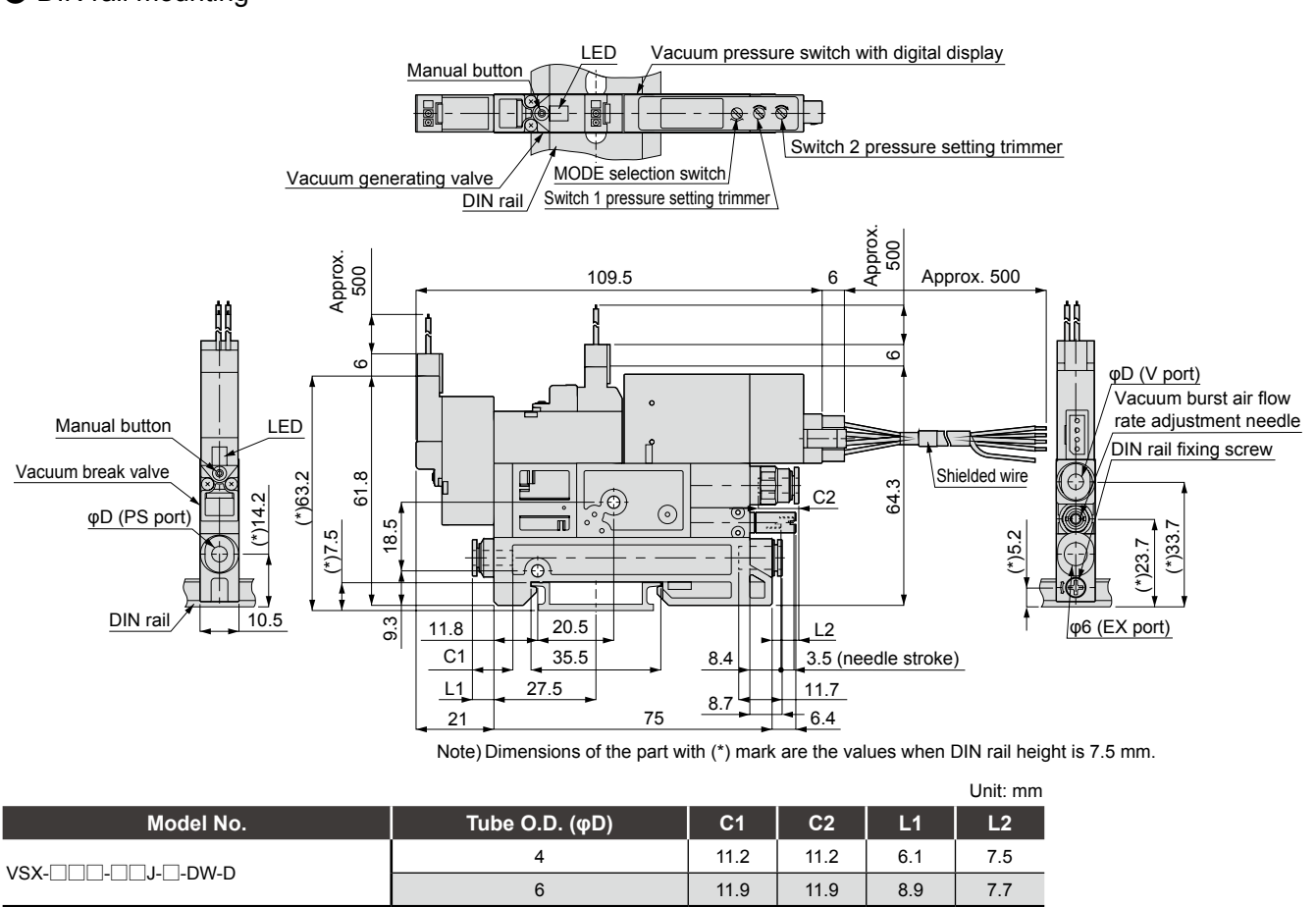
Model No.	Tube O.D. (φD)	C1	C2	L1	L2
VSX-□□□-□□J-□-D	4	11.2	11.2	6.1	7.5
	6	11.9	11.9	8.9	7.7

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

● Direct mounting

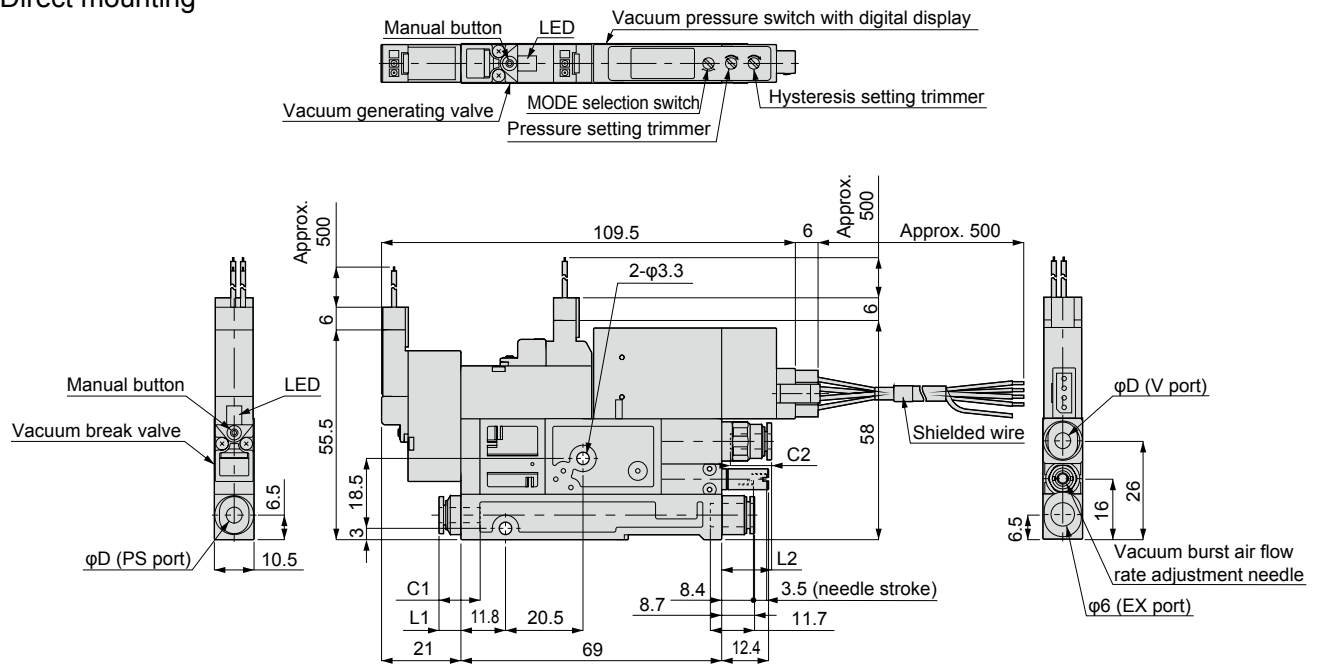


● DIN rail mounting



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

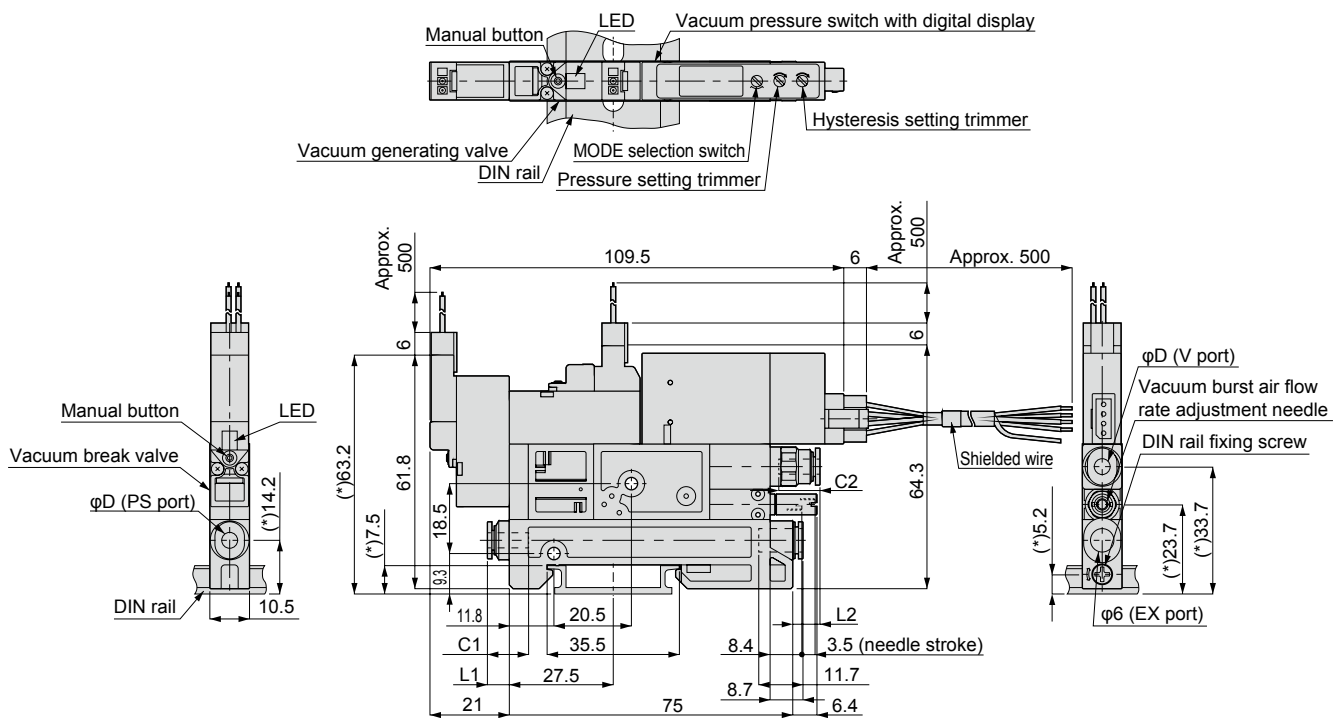
- Direct mounting



Unit: mm

Model No.	Tube O.D. (φD)	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. (φD)	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

Ejector system

VSV

VSB/VSC

VSG

VSKM

VSJM

VSNM

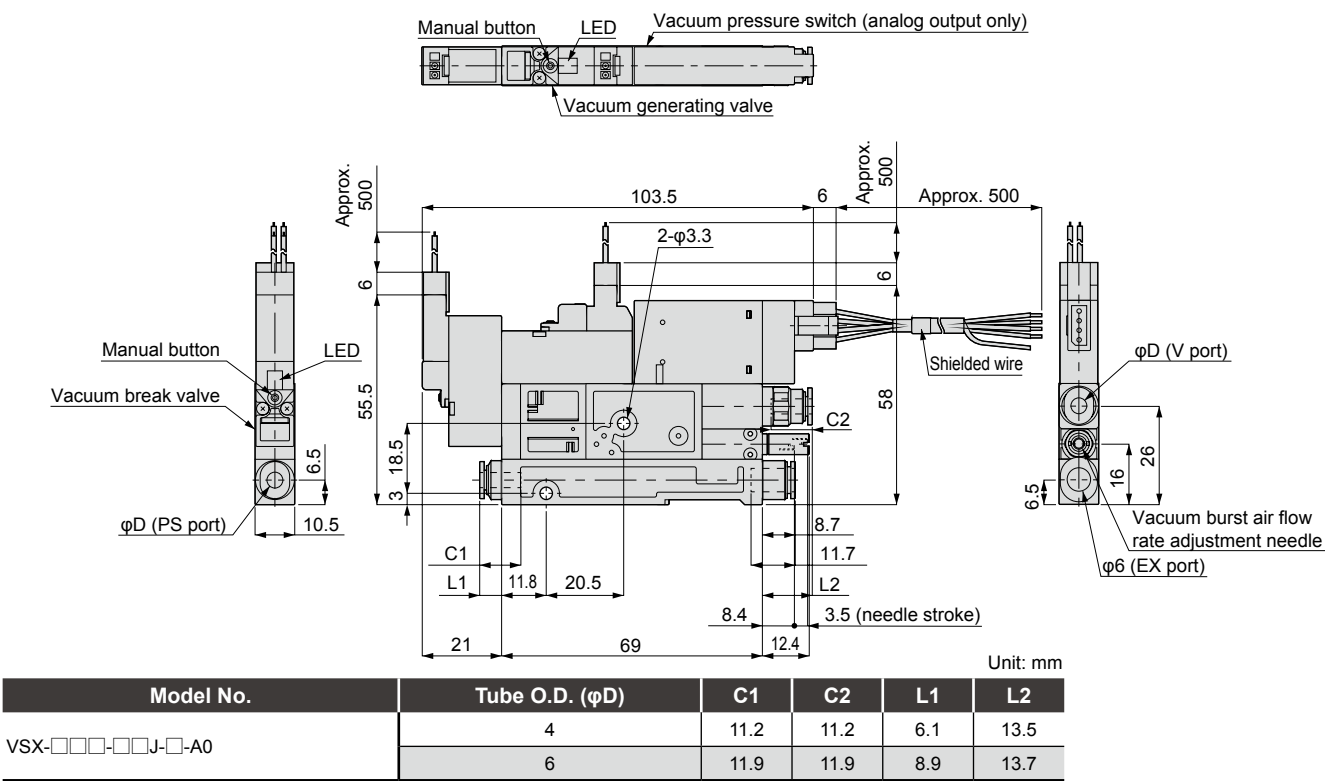
VSXM

VSQ

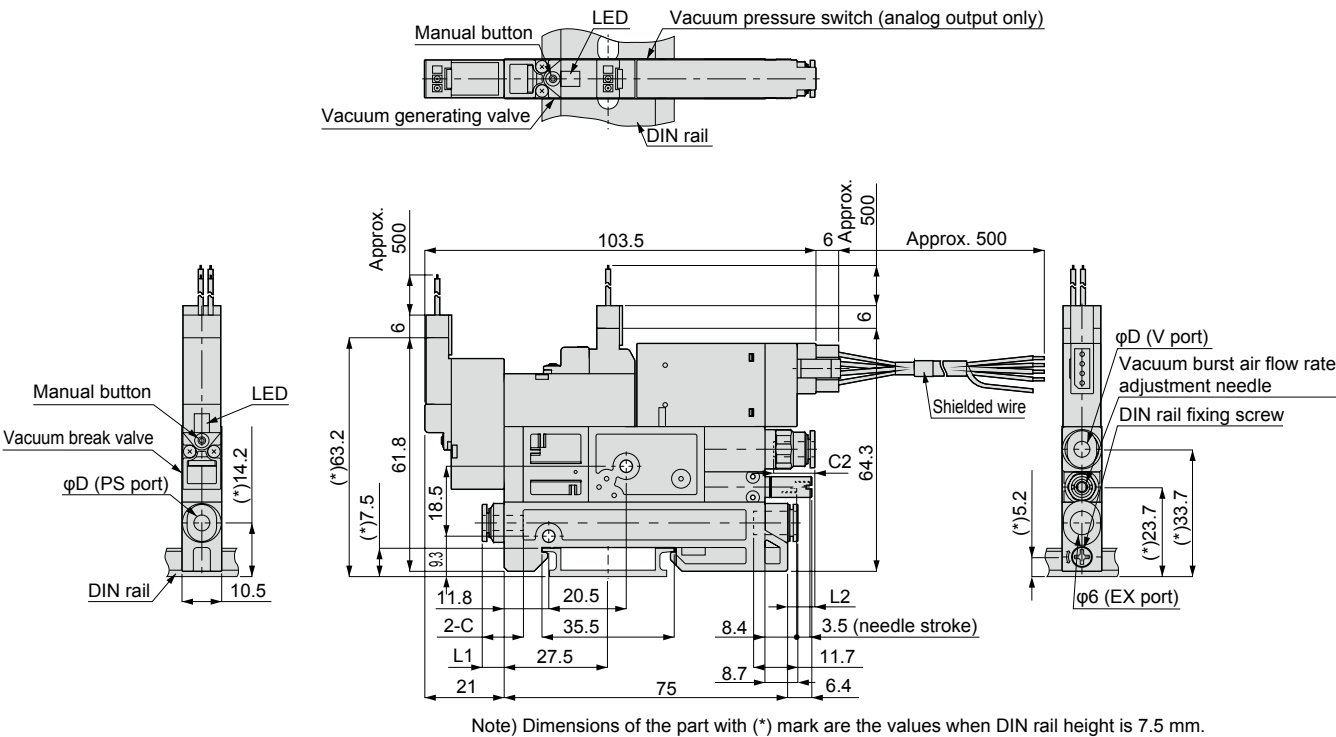
VSZ

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

● Direct mounting



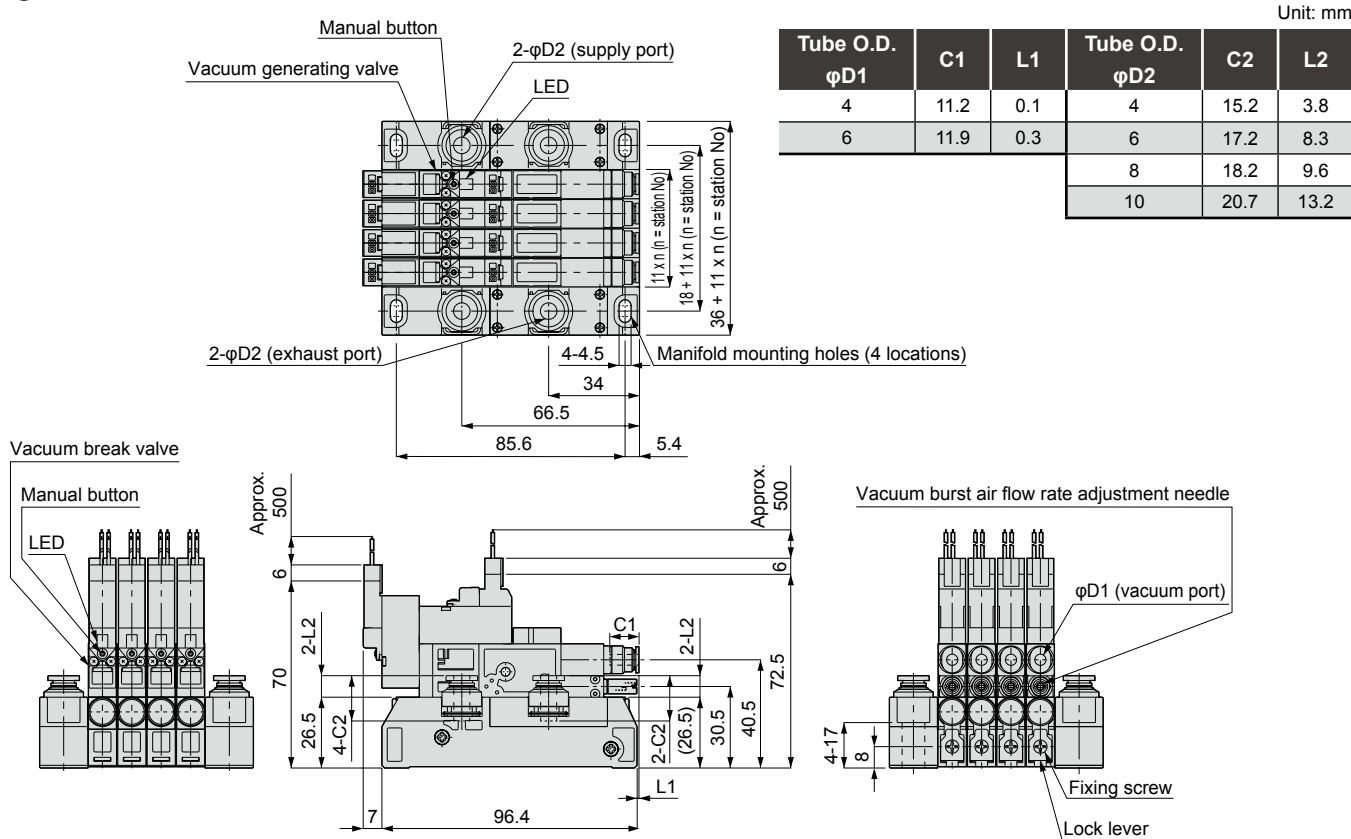
● DIN rail mounting



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

Dimensions (manifold, VSXM, without vacuum pressure switch)

Common exhaust



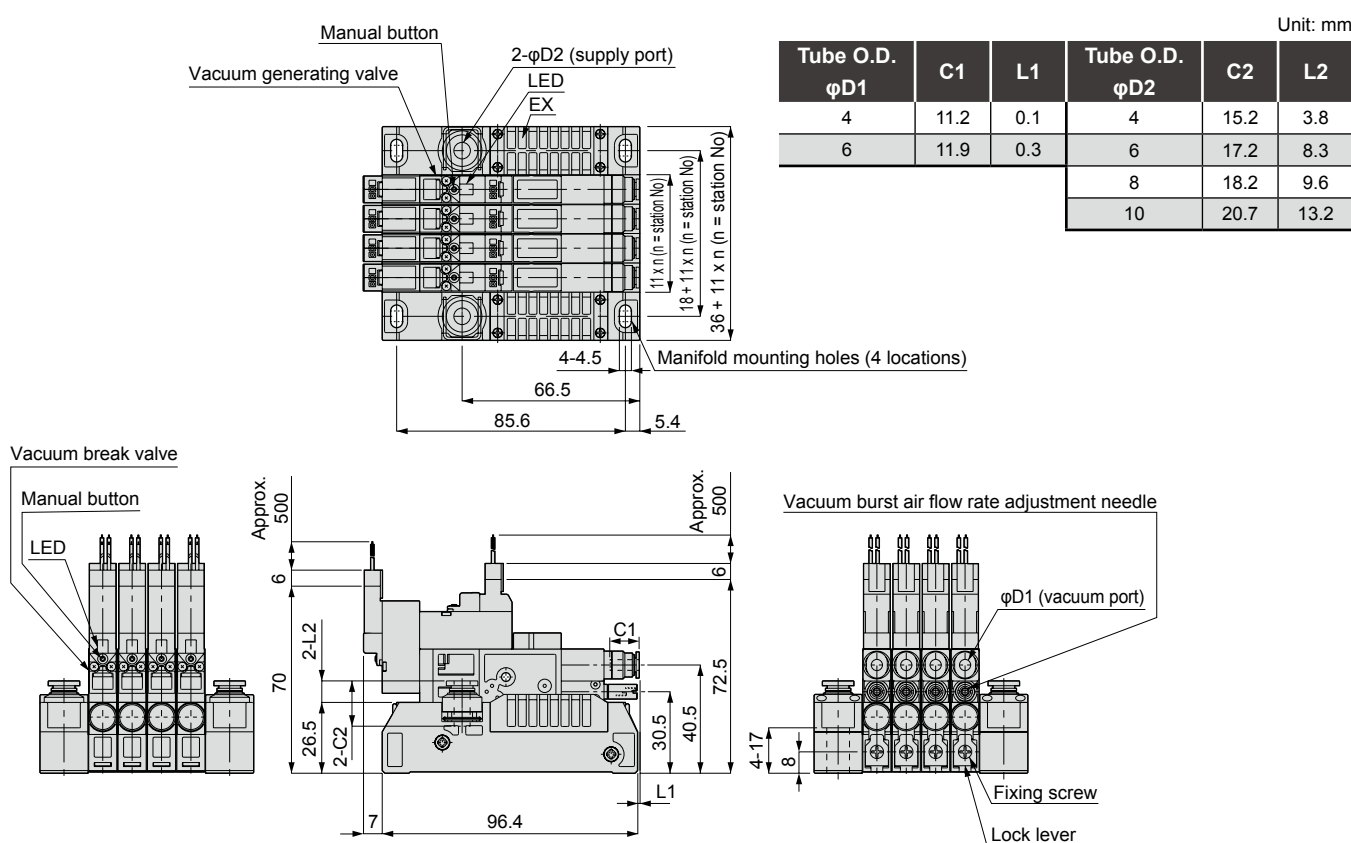
Ejector system

VSX

VSH/VSU
VSB/VSC

VSG

Atmosphere release



VSK
VSKM

VSJ
VSJM

VSN
VSNM

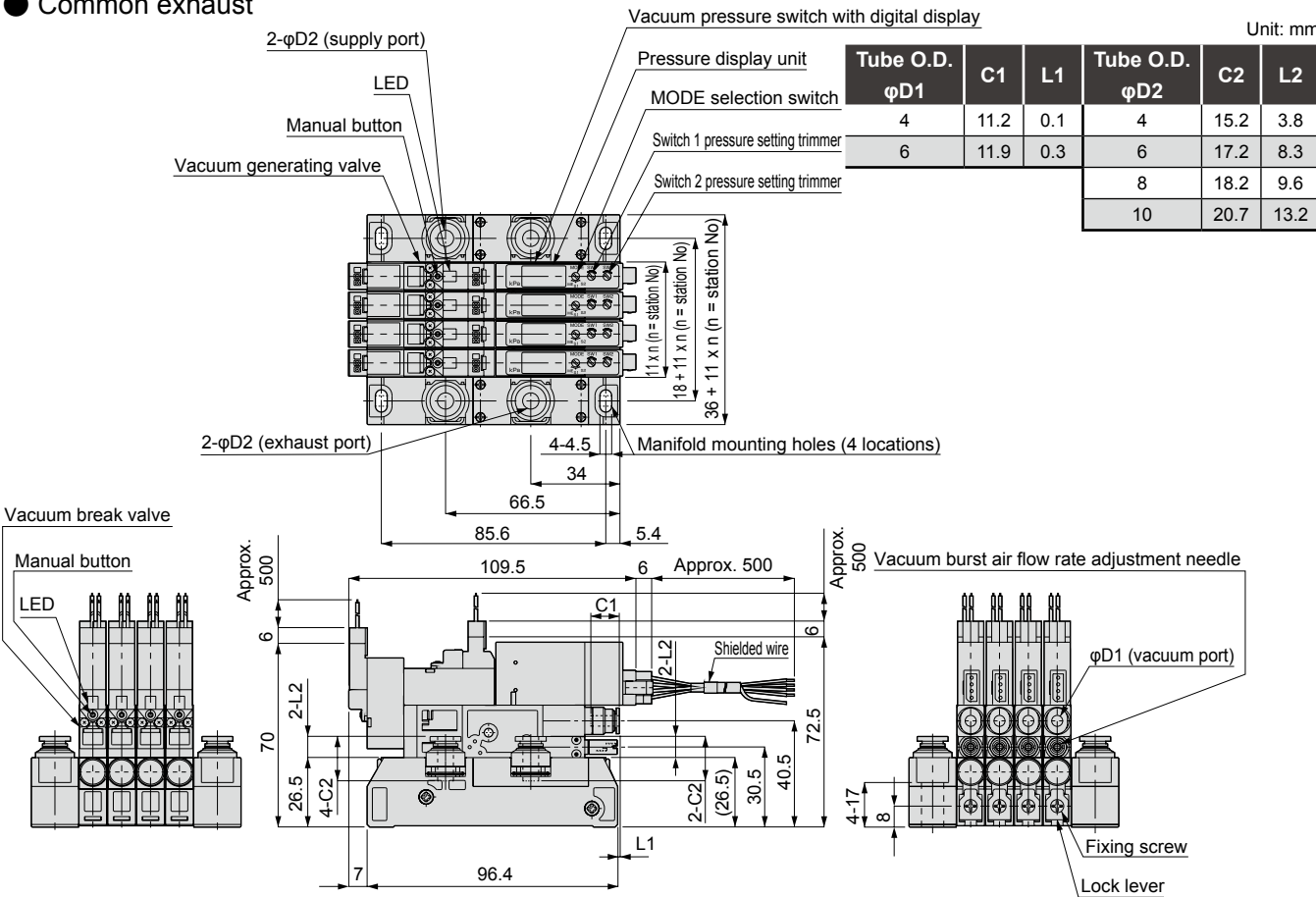
VSX
VSXM

VSQ

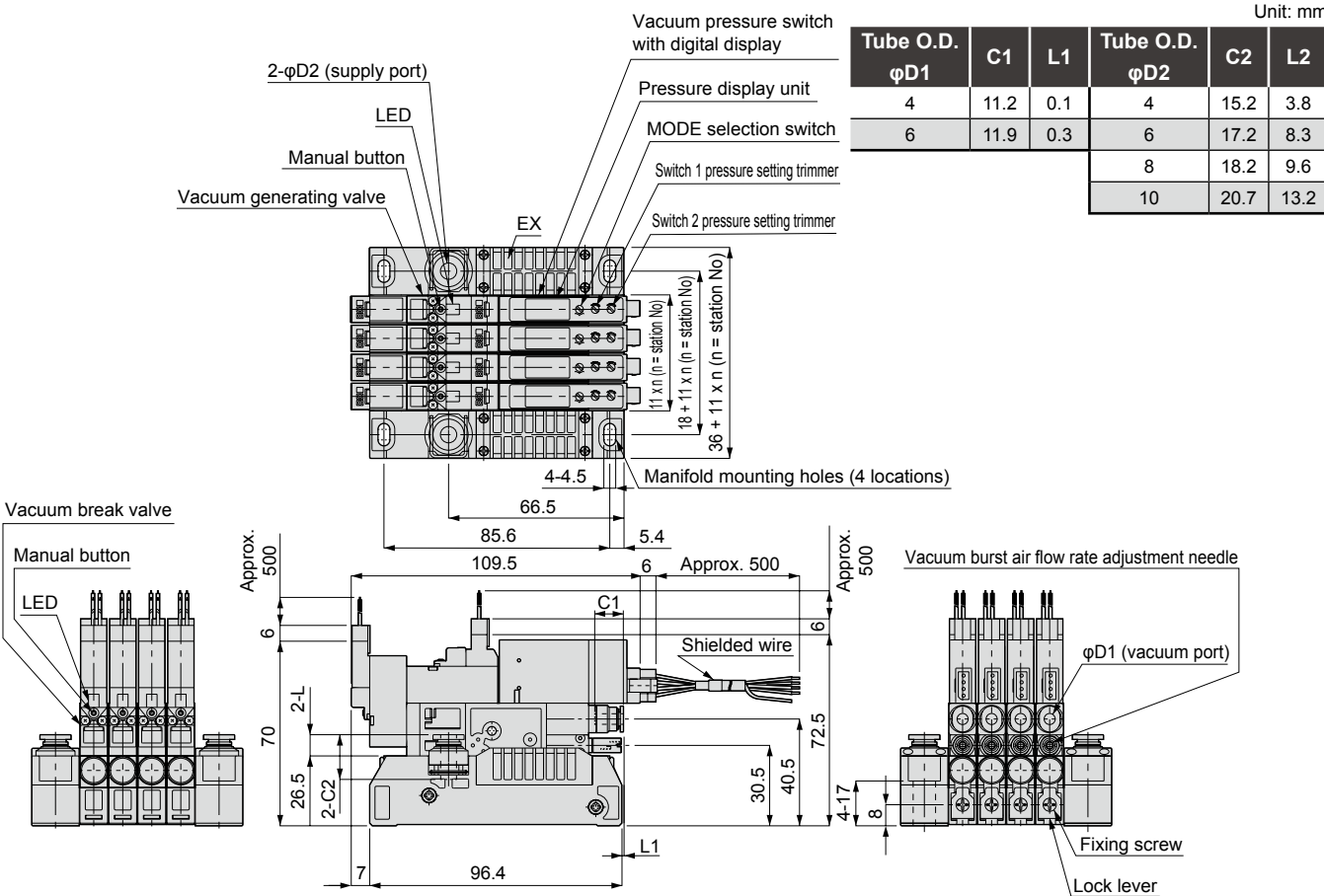
VSZM

Dimensions (manifold VSXM, with 2-point switch output with digital display, with vacuum pressure switch)

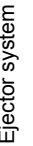
Common exhaust



Atmosphere release

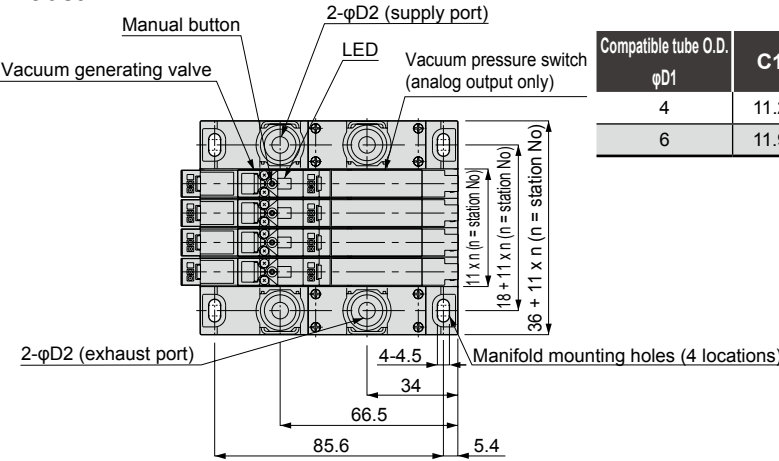


- Common exhaust



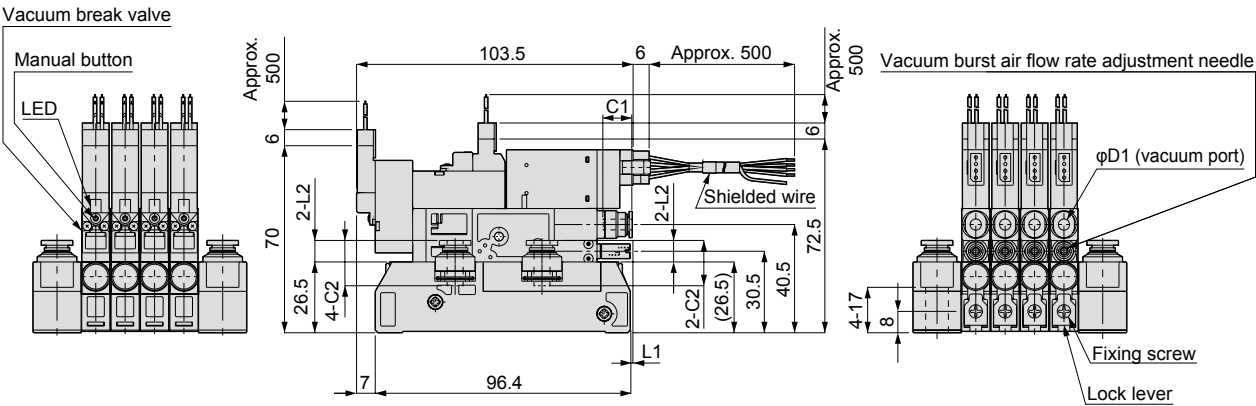
Dimensions (manifold VSXM, with vacuum pressure switch with analog output)

● Common exhaust

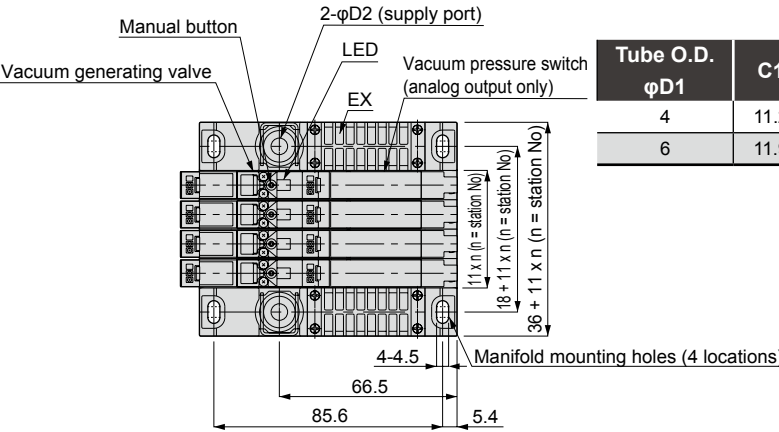


Unit: mm

Compatible tube O.D. φD1	C1	L1	Compatible tube O.D. φD2	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. φD1	C1	L1	Tube O.D. φD2	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

