

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

VSJ Series

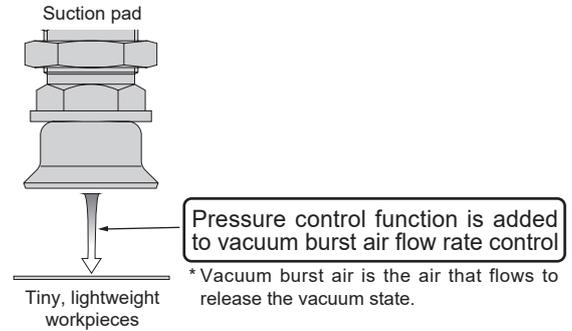
- Nozzle diameter: $\varnothing 0.5$, $\varnothing 0.7$, $\varnothing 1.0$, $\varnothing 1.2$



Features

Ejector system

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



VSJ

- 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.

VSH/VSU
VSB/VSC

- 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.

VSG

- 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.

VSK
VSKM

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

VSJ
VSJM

VSN
VSNM

VSX
VSXM

VSQ

VSZM

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

Item	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	
No. of 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	-
	Zero point voltage V	-
	Span voltage V	-
	Output current mA	-
	Linearity/hysteresis	-
Responsivity ms	2max.	
Display kPa	-99 to 0 (2-digit red LED display)	
Display frequency	Approx. 4 cycles/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

Item	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

Item	Vacuum filter
Element material	PVF (Polyvinyl formal)
Filtration rating μm	10
Filtration area mm ²	1130
Replacement filter element model No.	Vacuum
	Vacuum breaking

Weight table

① Single unit

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

② Manifold intermediate block

Weight (g)	Remarks
19	For 1 station

■ Calculate the manifold weight using the formula below.

$$\text{Manifold weight} = (\text{① VSJ single unit} + \text{② manifold intermediate block}) \times \text{station No.} + \text{③ manifold side block} + \text{④ cartridge} \times \text{No. used}$$

③ Manifold side block

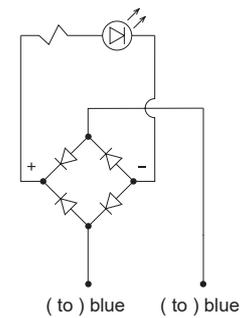
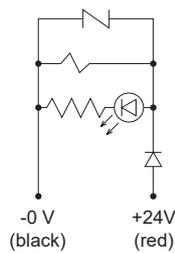
VSJ	Weight (g)	Remarks
Vacuum ejector unit (atmospheric release)	118	No. of cartridges used: 2 (PS port) Stopcock included with PV and EX ports
Vacuum ejector unit (common exhaust)	112	No. of cartridges used: 4 (PS, EX ports) Stopcock included with PV port

④ Cartridge (input/exhaust port)

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

Electric circuit (solenoid valve)

● 24 VDC specification Valve for vacuum generation and vacuum burst ● 100 VAC specification Valve for vacuum generation and vacuum burst

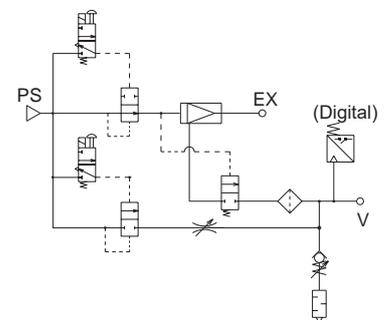
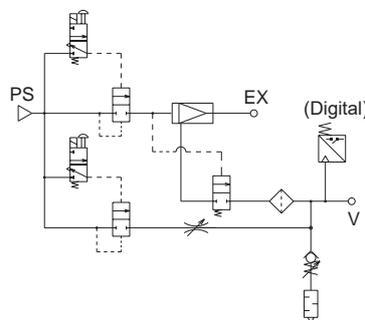
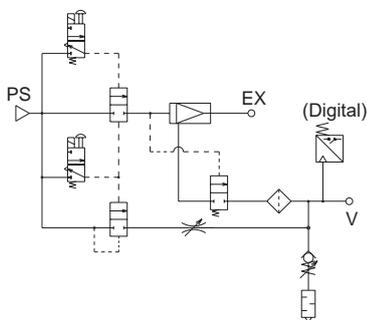


Circuit diagram

● 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

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

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	ø0.5
07	ø0.7
10	ø1.0
12	ø1.2
C Valve	
A	Normally open (NO)
B	Normally closed
D	Self hold type
D Vacuum port (V)	
4	ø4 push-in fitting
6	ø6 push-in fitting
8	ø8 push-in fitting
E Air supply port (PS)	
4	ø4 push-in fitting
6	ø6 push-in fitting
F Exhaust port (EX)	
S	Atmospheric release with silencer
8	ø8 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
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 **A** and **B**.

How to order (manifold)

● 20 mm width integrated vacuum ejector unit manifold

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

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 Manifold station No.

I Common piping leadout direction

J Vacuum pressure switch specifications

Code	Content	
A 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.)	
B 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.)	
C Valve		*3
A	Normally open (NO)	
B	Normally closed	
D	Self hold type	
Z	For mixed specs (indicate breakdown on specs sheet.)	
D 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.)	
E Air supply port (PS)		
6	ø6 push-in fitting	
8	ø8 push-in fitting	
10	ø10 push-in fitting	
F Exhaust port (EX)		
S	Atmospheric release with silencer	
8	ø8 push-in fitting common exhaust	
10	ø10 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 Common piping leadout direction		
A	Vacuum port side	
B	Supply port side	
J 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 **A** and **E**.
- *2 : When **A** is "Z", **E** is "00" only.
When **E** is "00", only **A** "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

Ejector system

VSJ

VSH/VSU
VSB/VSC

VSG

VSK
VSKM

VSJ
VSJM

VSN
VSNM

VSX
VSXM

VSQ

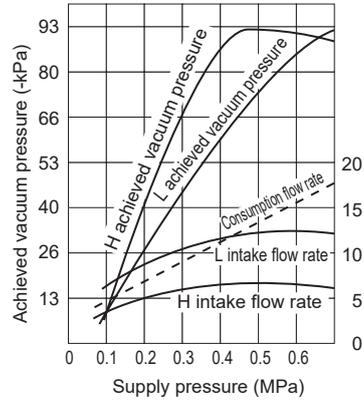
VSZM

Vacuum characteristics, flow characteristics

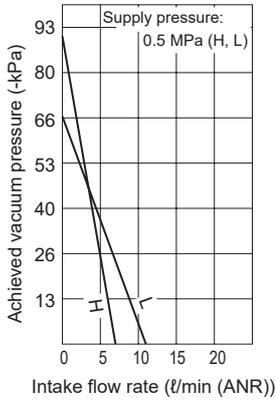
Supply pressure - achieved vacuum pressure, intake flow rate, air consumption rate

● VSJ-H 05, VSJ-L 05

Vacuum characteristics

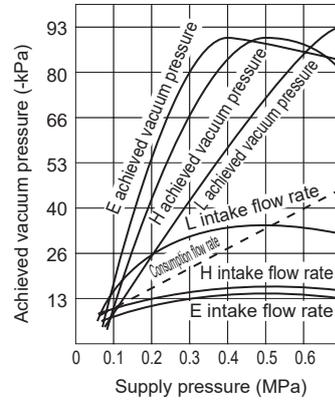


Flow characteristics

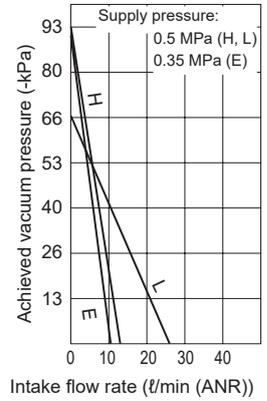


● VSJ-H 07, VSJ-L 07, VSJ-E 07

Vacuum characteristics

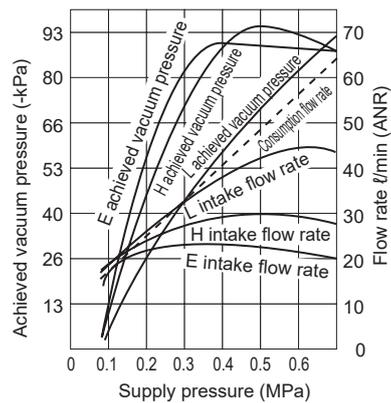


Flow characteristics

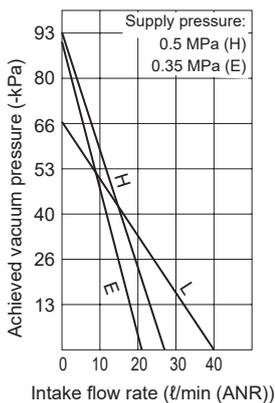


● VSJ-H 10, VSJ-L 10, VSJ-E 10

Vacuum characteristics

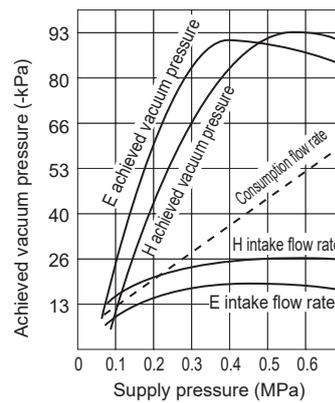


Flow characteristics

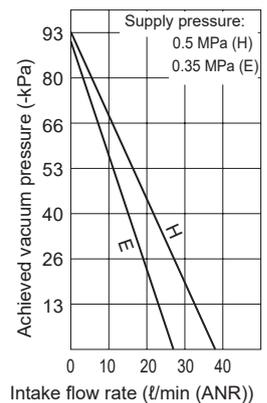


● VSJ-H 12, VSJ-E 12

Vacuum characteristics



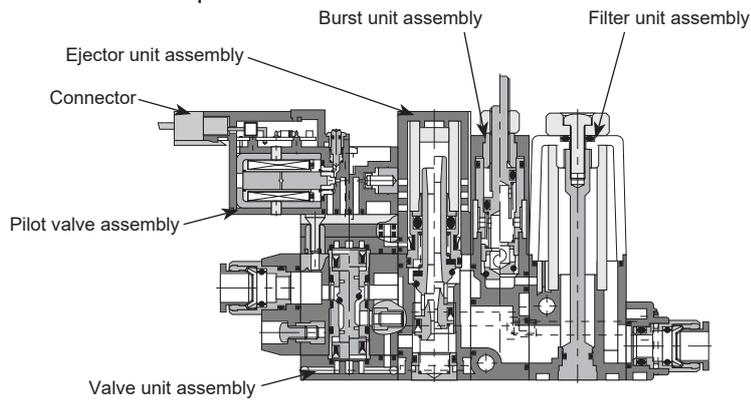
Flow characteristics



- Supply pressure with the characteristics described above occurs at vacuum generation.
- 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.
- 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 $0.5^2 \times \pi = 0.785 \text{ mm}^2 \times 3 = 2.35 \text{ mm}^2$. Therefore, carry out piping and equipment selection that ensures an effective cross-sectional area of 2.3 mm^2 or greater.

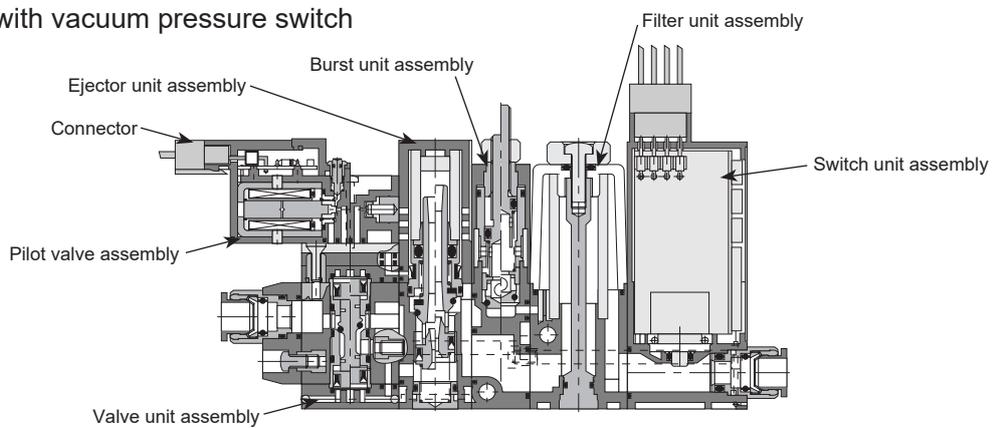
Internal structure

● Single unit VSJ, without vacuum pressure switch



Ejector system

● Single unit VSJ, with vacuum pressure switch

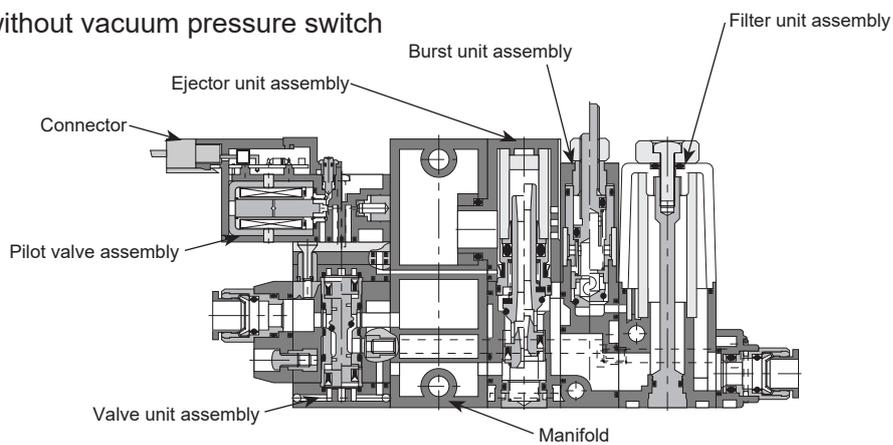


VSJ

VSH/VSU
VSB/VSC

VSG

● Manifold VSJM, without vacuum pressure switch



VSK
VSKM

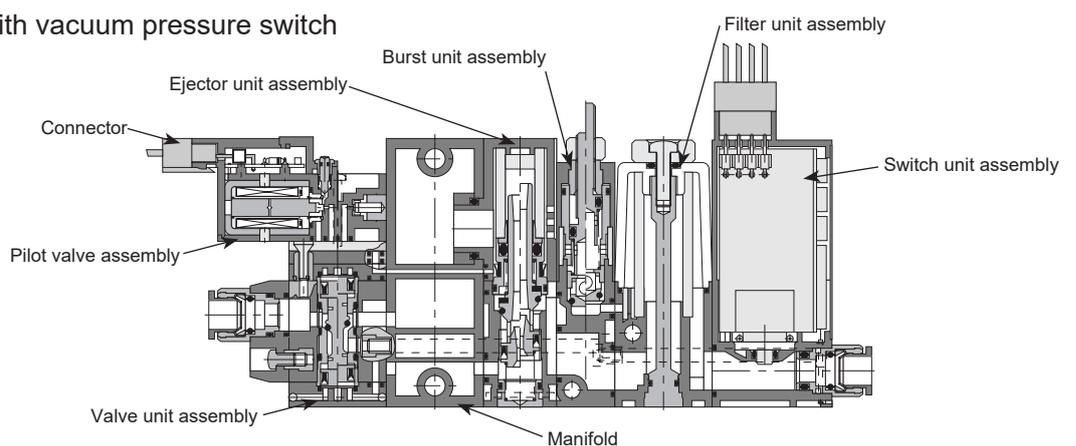
VSJ
VSJM

VSN
VSNM

VSX
VSXM

VSQ

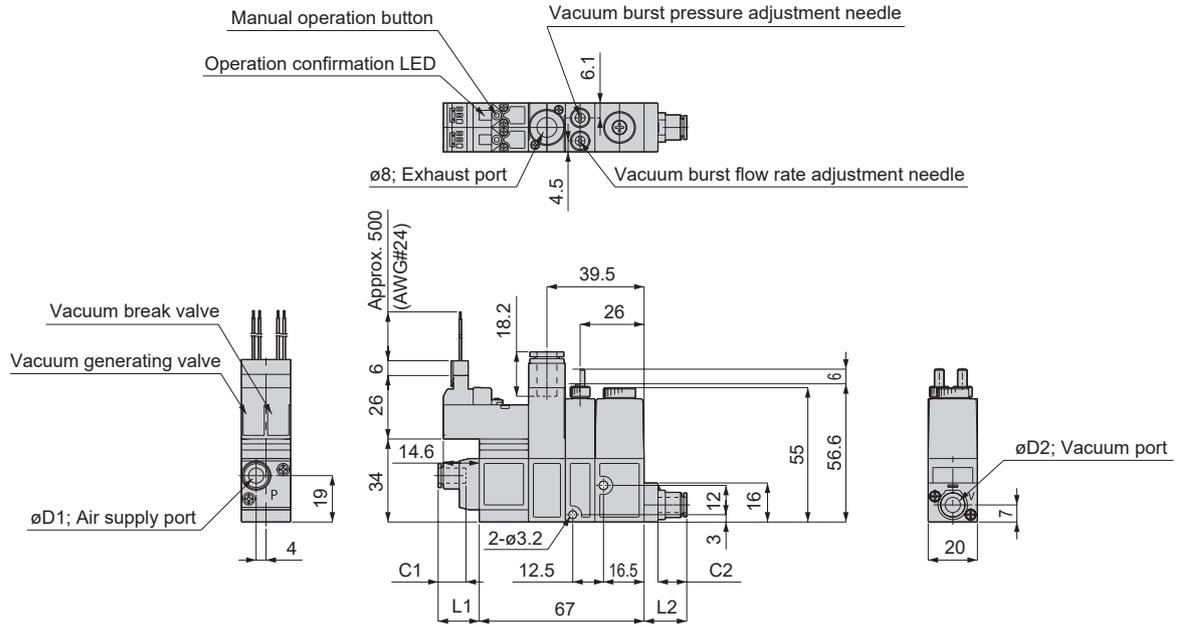
● Manifold VSJM, with vacuum pressure switch



VSZM

Dimensions (single unit VSJ)

● Common exhaust, without vacuum pressure switch



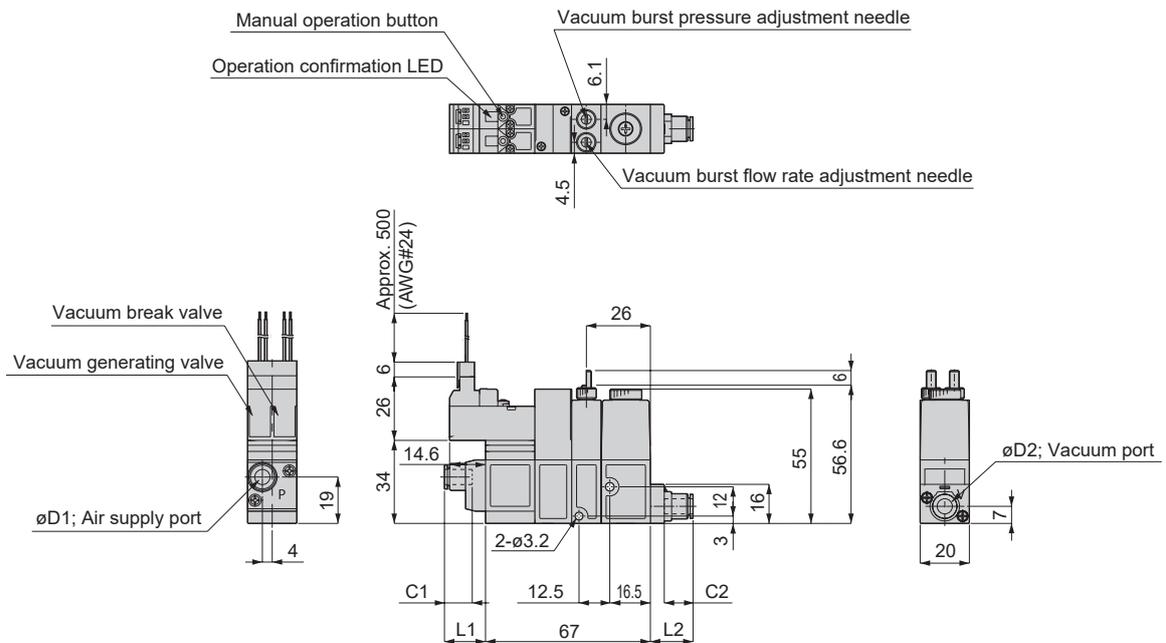
Unit: mm

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

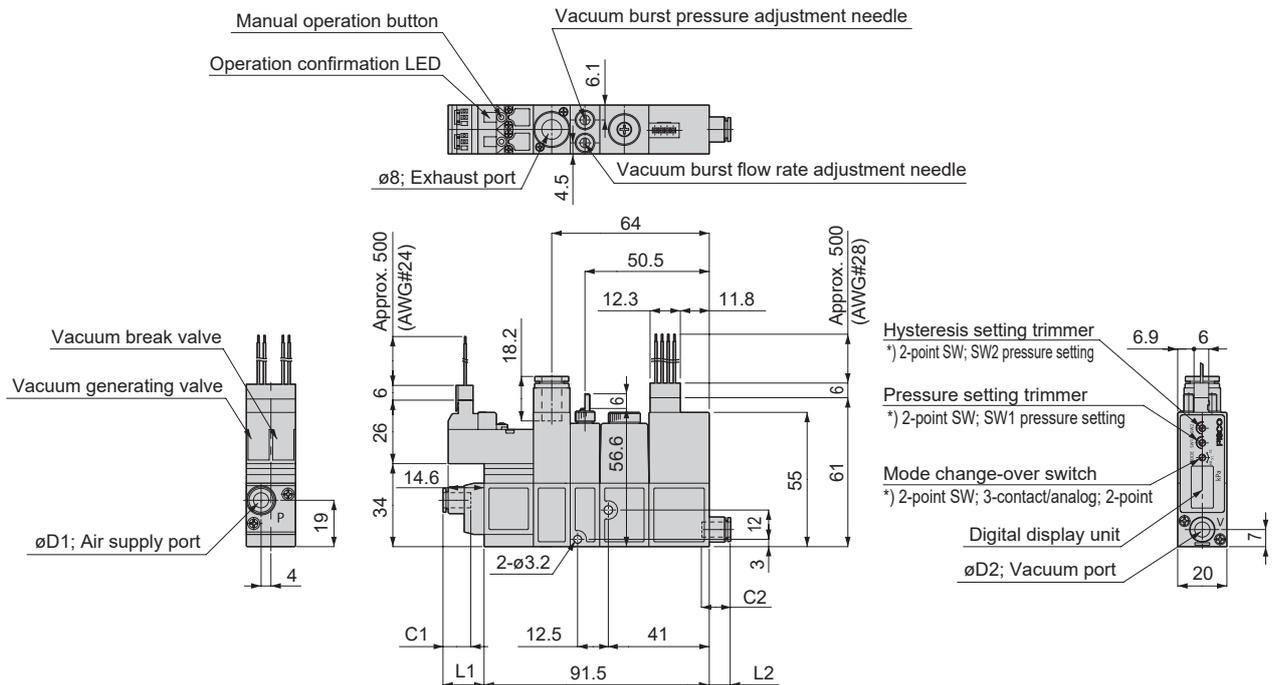
Air supply port Tube O.D. øD1	C1	L1
4	11.5	14.9
6	11.9	17.3

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



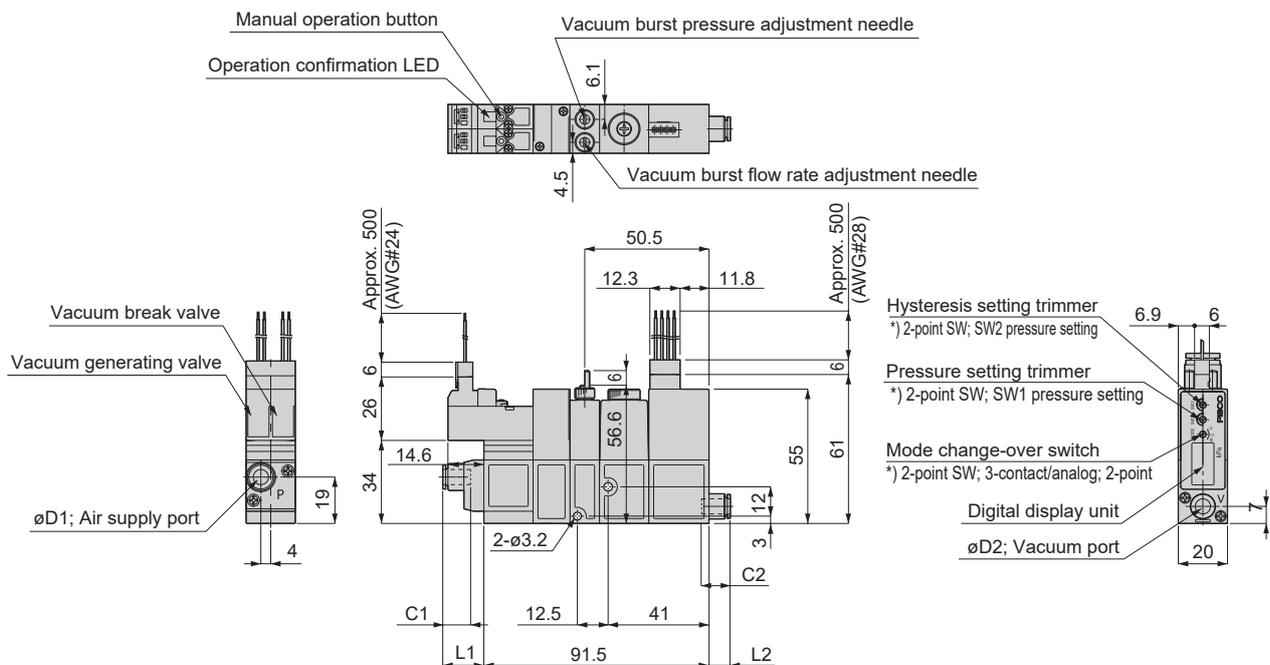
Unit: mm

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

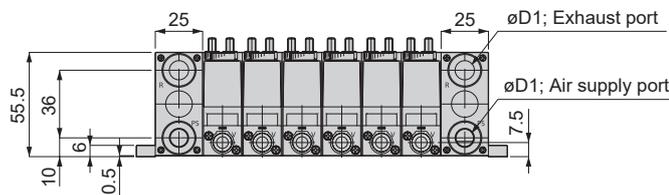
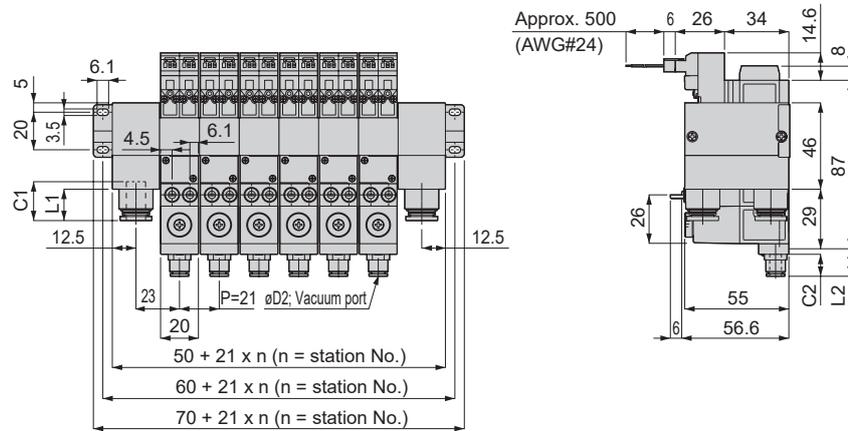
Unit: mm

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

- Ejector system
- VSJ
- VSH/SU
VSB/VSC
- VSG
- VSK
VSKM
- VSJ
VSJM
- VSN
VSNM
- VSX
VSXM
- VSQ
- VSZM

Dimensions (manifold, VSJM)

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



Ejector system

VSY

VSH/VSU
VSB/VSC

VSG

VSK
VSKMV SJ
V SJMVSN
VSNMVSX
VSXM

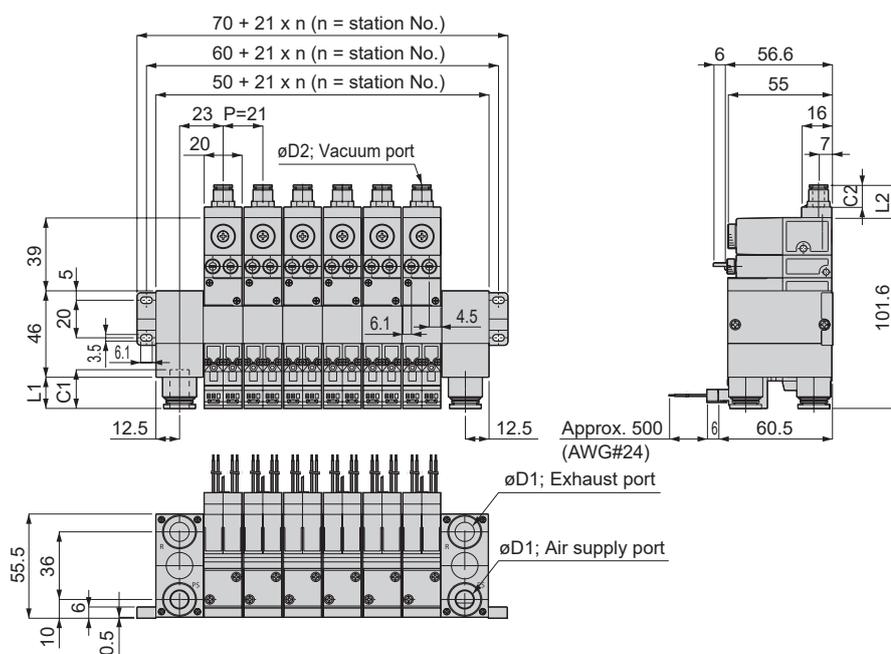
VSQ

VSZM

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

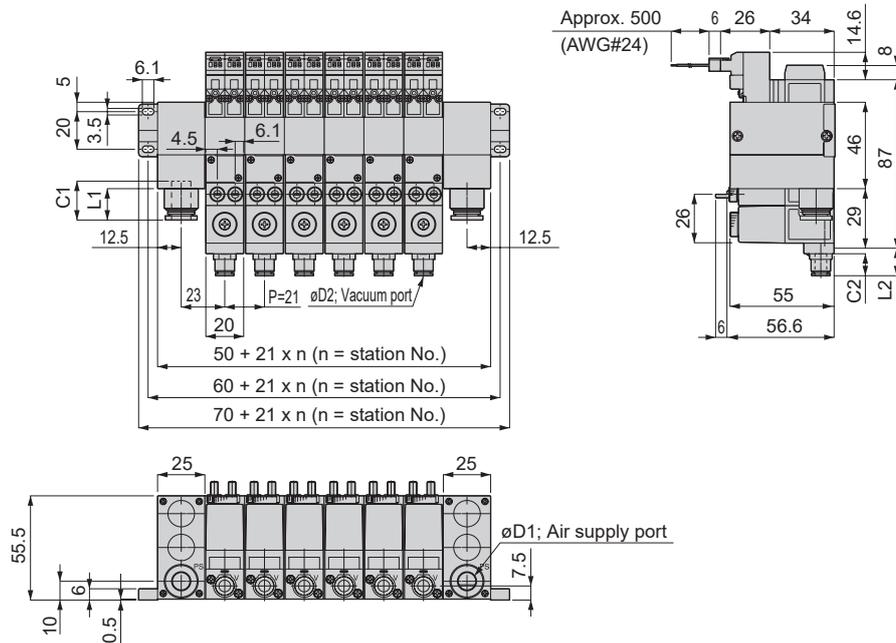


Unit: mm		
Air supply port Tube O.D. øD1	C1	L1
6	17	11.6
8	18.2	13.1
10	20.7	16.7

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)

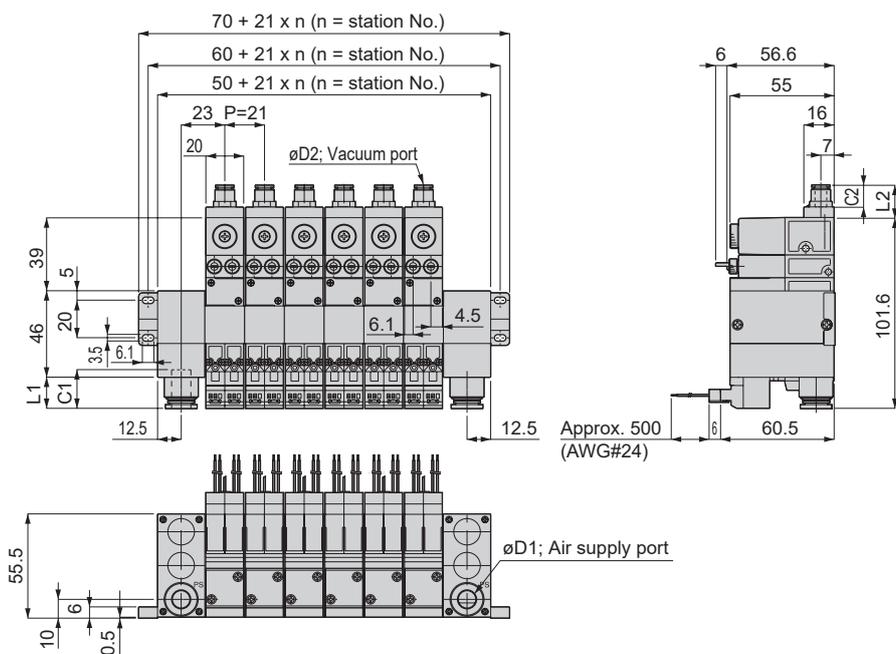
- Atmospheric release, common piping leadout direction on vacuum port side, without vacuum pressure switch



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

Ejector system

VSJ

VSH/VSU
VSB/VSC

VSG

VSK
VSKM

VSJ
VSJM

VSN
VSNM

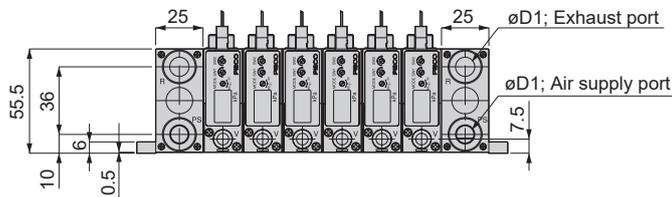
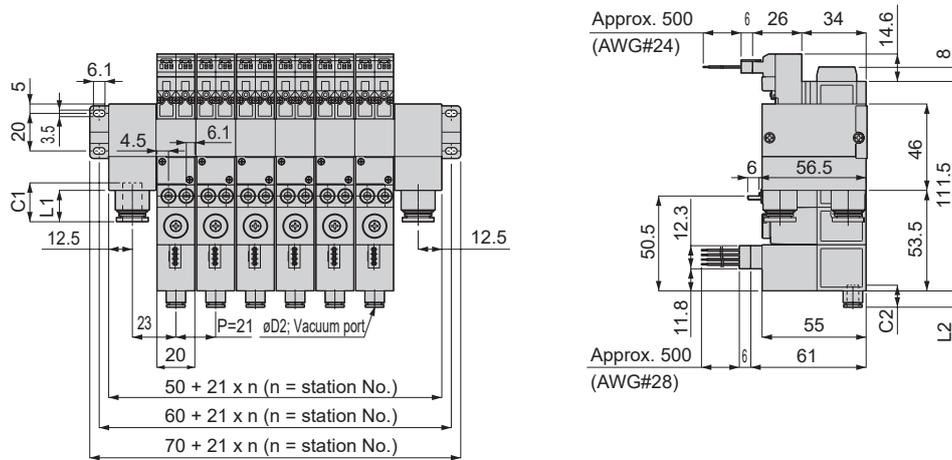
VSX
VSXM

VSQ

VSZM

Dimensions (manifold, VSJM)

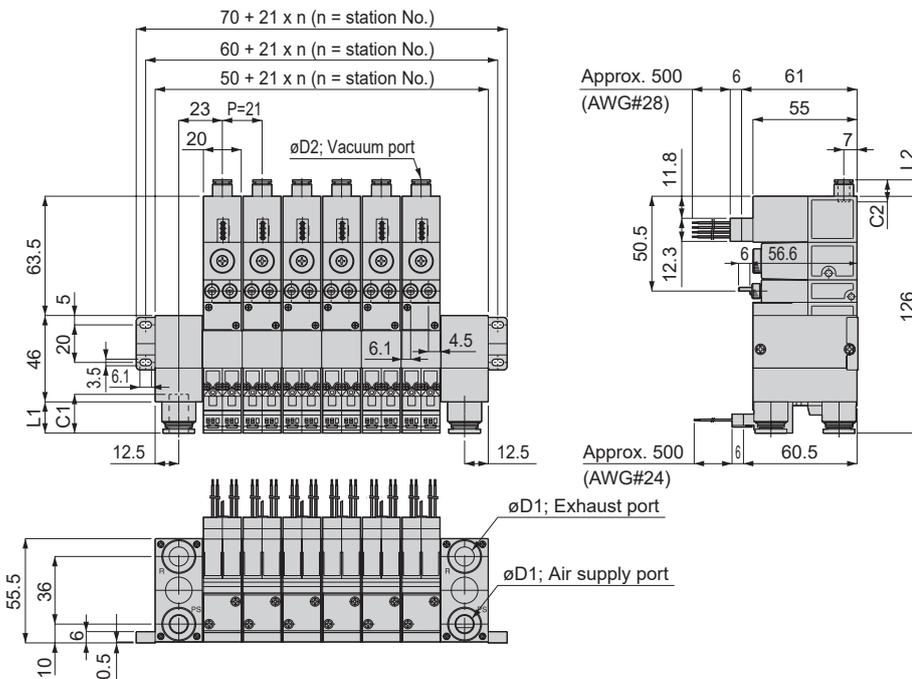
- Common exhaust, common piping leadout direction on vacuum port side, with vacuum pressure switch



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

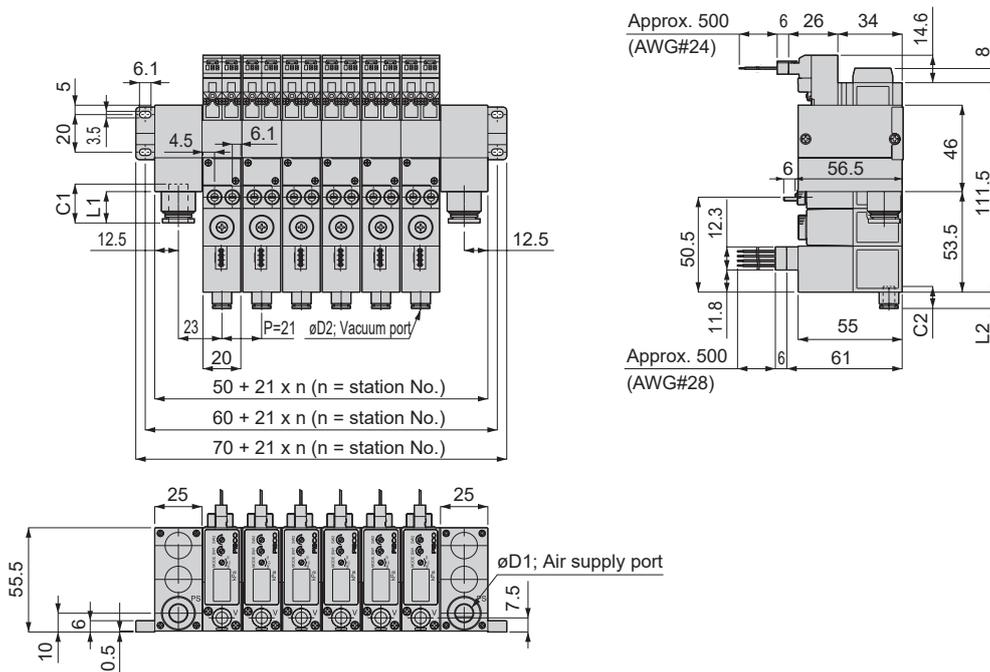


Unit: mm		
Air supply port Tube O.D. øD1	C1	L1
6	17	11.6
8	18.2	13.1
10	20.7	16.7

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)

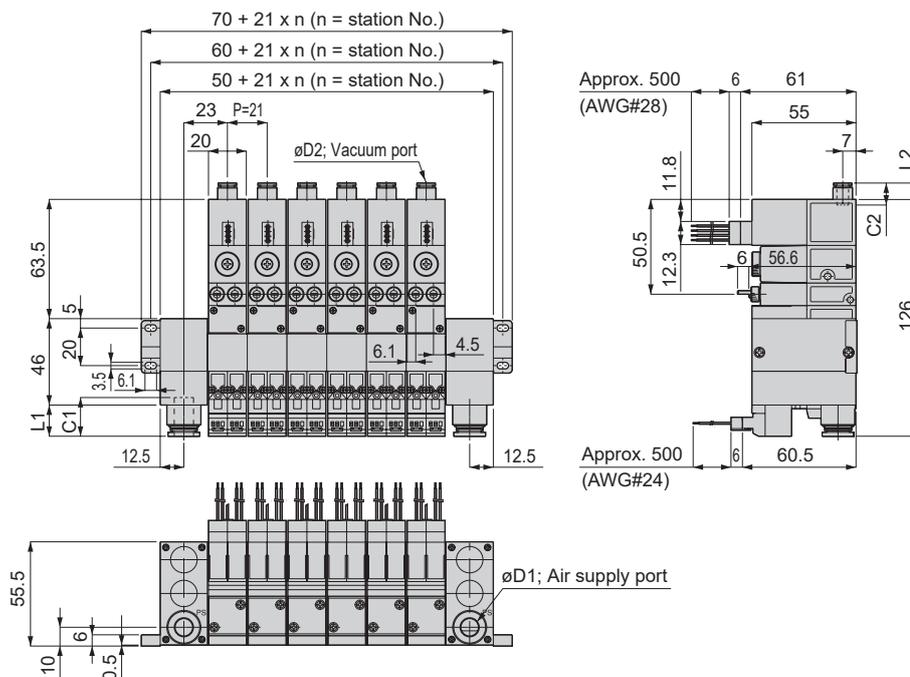
- Atmospheric release, common piping leadout direction on vacuum port side, with vacuum pressure switch



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

Ejector system

VSJ

VSH/VSU
VSB/VSC

VSG

VSK
VSKM

VSJ
VSJM

VSN
VSNM

VSX
VSXM

VSQ

VSZM