

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

# VSK Series

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



## 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 ( $\phi 0.5$  mm), 07 ( $\phi 0.7$  mm), 10 ( $\phi 1.0$  mm) and 12 ( $\phi 1.2$  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...	0.7	0.5	67	11	11.5
VSK-□H07...		0.5	93	13	23
		0.35	73		17
VSK-□L07...		0.5	67	26	23
VSK-□E07...	1.0	0.35	91	10.5	17
VSK-□H10...		0.5	93	27	46
		0.35	73		34
VSK-□L10...		0.5	67	40	46
VSK-□E10...	1.2	0.35	91	21	34
VSK-□H12...		0.5	93	38	70
		0.35	73		47
VSK-□L12...		0.5	67	50	70
	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		Surge absorber	Bridge diode	Surge absorber	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
Effective cross-sectional area	mm <sup>2</sup>	3.5	3.5	3.5	3.5

## Lead wire color

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

## 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 <sup>2</sup>	1130
Replacement filter element model No.	VSG-E

## Vacuum holding function (Unit combination code: B, D, F, H, K, M, S, T, W)

Descriptions	Vacuum holding function
Vacuum leakage allowance	1.3 kPa/10 min or less

Note: When holding the vacuum for long periods, be sure to use upon full consideration of the above specifications.

## Weight table

Unit Combination code	Weight (g) for single unit				Weight (g) for manifold			
	VSK-A...	VSK-B...	VSKM...-S...	VSKM...-T...	VSKM...-S...	VSKM...-T...	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

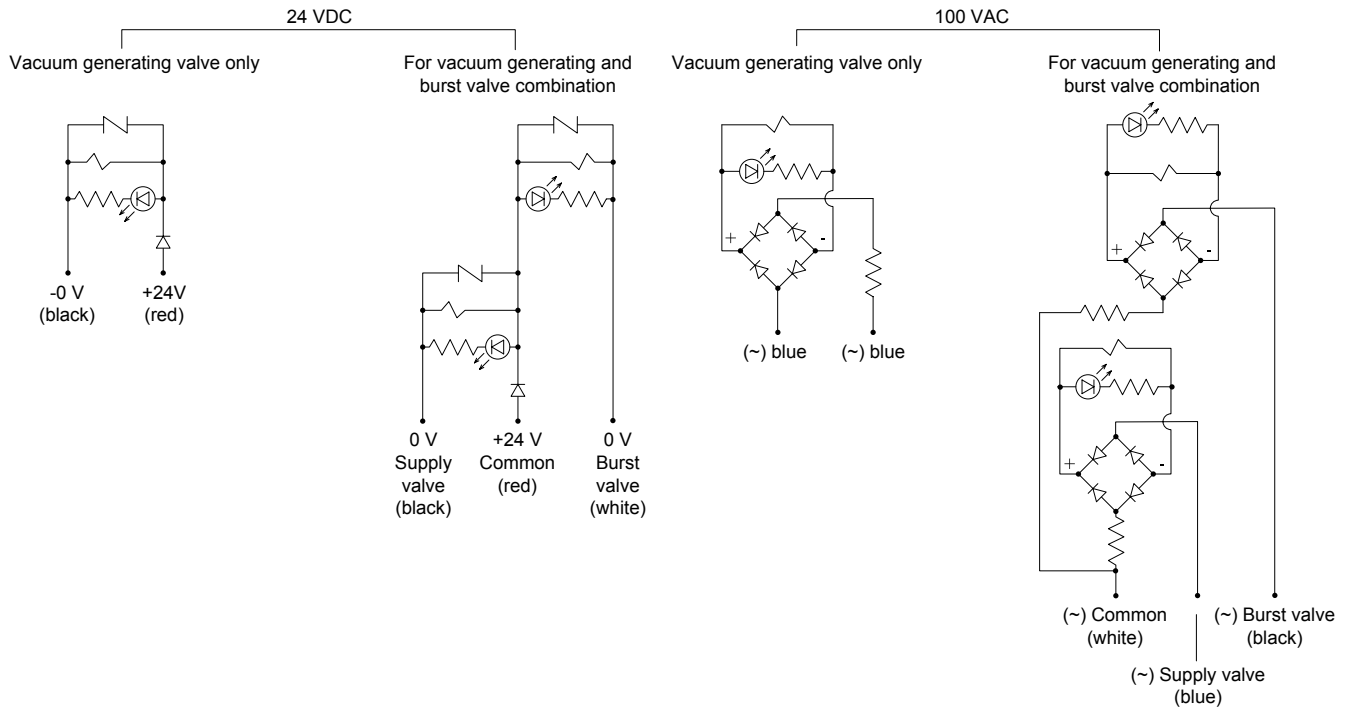
Block plate	Weight (g)
VSKM...-MB	6

Silencer	Weight (g)
Single unit atmospheric release	2

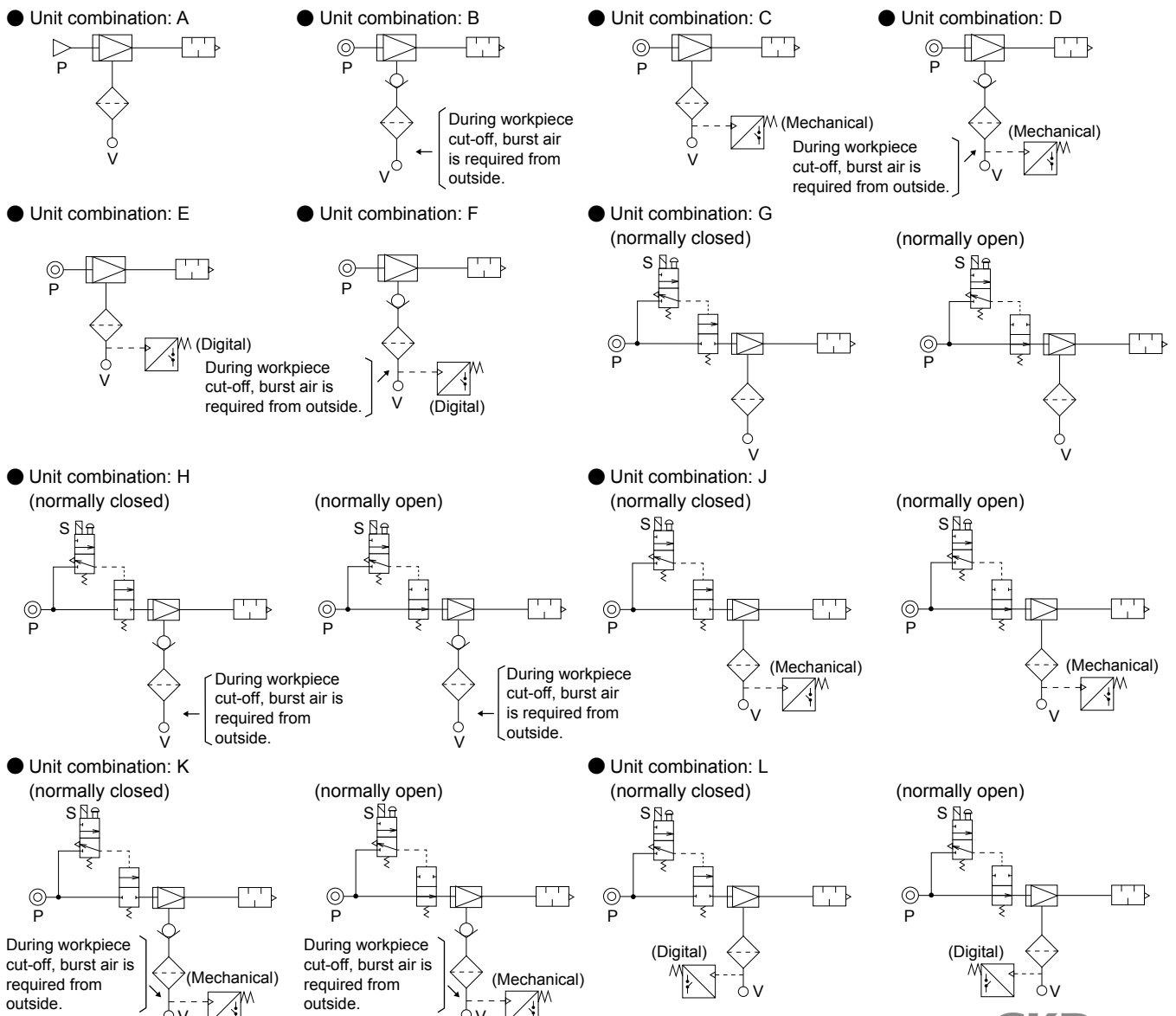
Cartridge for single unit	Weight (g)
φ4 push-in fitting	3.5
φ6 push-in fitting	3.5
φ8 push-in fitting	10
Plug cartridge	1.5

Cartridge for manifold	Weight (g)
φ6 push-in fitting	21
φ8 push-in fitting	20
φ10 push-in fitting	19
φ12 push-in fitting	26
φ8 elbow push-in fitting	25
φ10 elbow push-in fitting	32
φ12 elbow push-in fitting	38
Rc1/4 cartridge	44
Rc3/8 cartridge	35
Rc1/2 cartridge	38
Plug cartridge	6

### Electric circuit (solenoid valve)



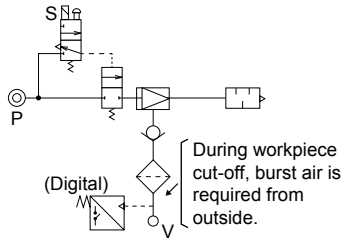
### Circuit diagram (unit combination)



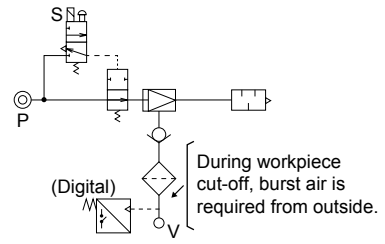
Ejector system  
VSY  
VSHVSU  
VSBVSC  
VSG  
VSK  
VSKM  
VSJ  
VSJM  
VSN  
VSNM  
VSK  
VSKM  
VSQ  
VSZM

## Circuit diagram (unit combination)

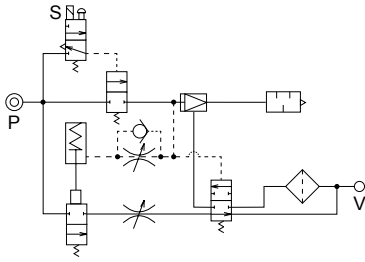
- Unit combination: M (normally closed)



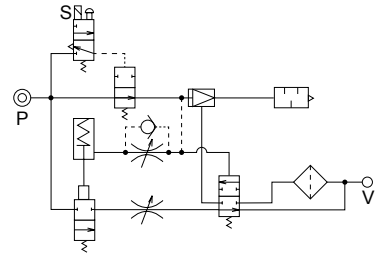
(normally open)



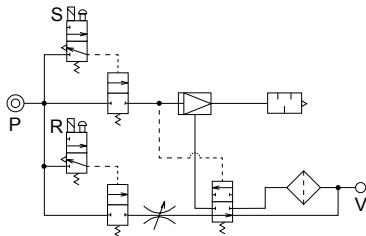
- Unit combination: P (normally closed)



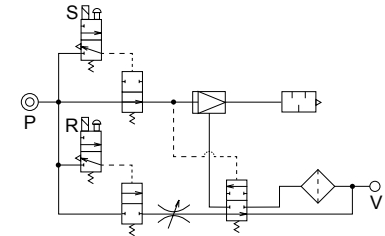
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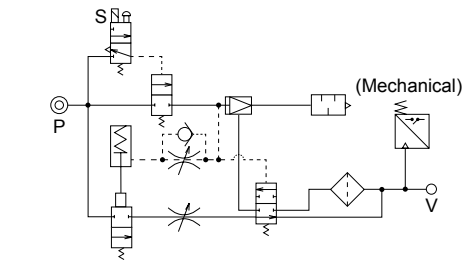
- Unit combination: S (normally closed)



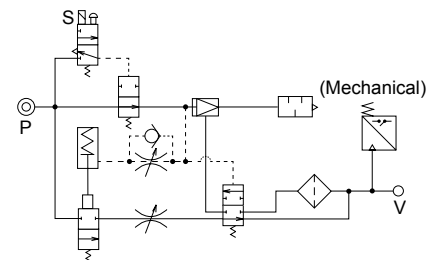
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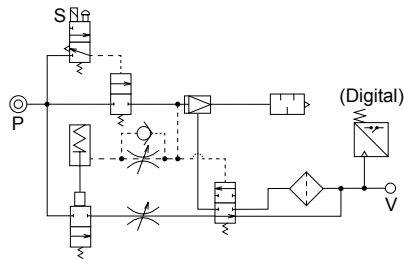
- Unit combination: Q (normally closed)



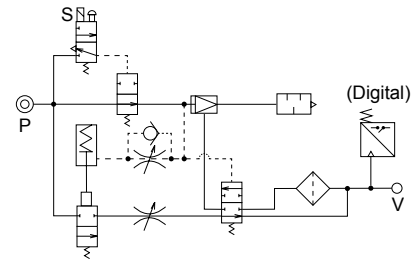
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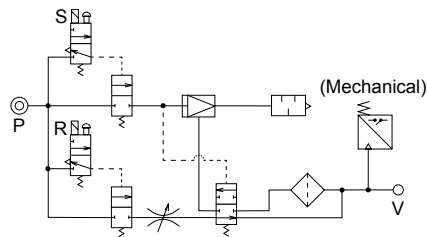
- Unit combination: R (normally closed)



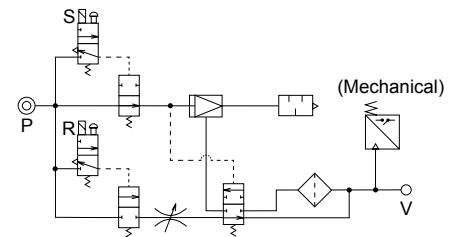
(normally open)



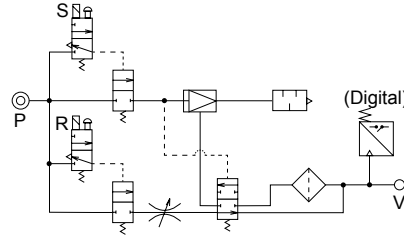
- Unit combination: T (normally closed)



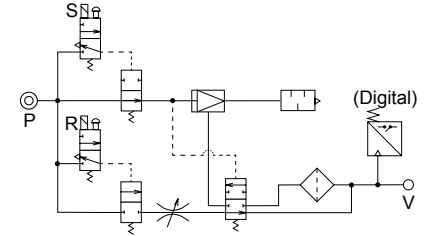
(normally open)



- Unit combination: W (normally closed)



(normally open)



Ejector system

VSJ

VSH/VSU  
VSB/VSC

VSG

VSK  
VSKM

VSJ  
VSJM

VSN  
VSNM

VSX  
VSXM

VSQ

VSZM

## How to order

● Single unit model No.

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

● A Port position

● B Vacuum characteristics

● C Nozzle diameter

● D Unit combination

● E Vacuum port

● F Air supply port

● G Exhaust port

● H Solenoid valve voltage

● I Valve

● J Vacuum pressure switch specifications

Code	Content
<b>A Port position</b>	
A	Single unit connection port 2-surface
B	Single unit connection port 1-surface
<b>B Vacuum characteristics *1</b>	
H	High vacuum/medium flow rate
L	Medium vacuum/large flow rate
E	High vacuum/low flow rate
<b>C Nozzle diameter *1, *2</b>	
05	φ0.5
07	φ0.7
10	φ1.0
12	φ1.2
<b>D Unit combination *3, *4</b>	
Refer to Appendix 1 for unit combination.	
<b>E Vacuum port (V) *2</b>	
4	φ4 push-in fitting
6	φ6 push-in fitting
8	φ8 push-in fitting
<b>F Air supply port (P) *2</b>	
4	φ4 push-in fitting
6	φ6 push-in fitting
8	φ8 push-in fitting
<b>G Exhaust port (EX)</b>	
S	Atmospheric release with silencer
8	φ8 push-in fitting straight common exhaust
8L	φ8 push-in fitting elbow common exhaust
<b>H Solenoid valve voltage *3</b>	
1	100 VAC
3	24 VDC
<b>I Valve *3</b>	
A	Normally open (NO)
B	Normally closed
<b>J Vacuum pressure switch specifications *4</b>	
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 B E and C 05 cannot be selected.
- \*2 : When E or F is 4, C 10 or 12 cannot be selected.
- \*3 : When D Unit combination is "A, B, C, D, E or F", H Solenoid valve voltage and I Valve unit cannot be selected.
- \*4 : When D Unit combination is "E, F, L, M, R or W", select J Vacuum pressure switch specifications.

### Appendix 1 (common with manifold)

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.

① Vacuum pressure switch specifications

Type		
Manifold	Single unit for manifold	Manifold only
●	●	
●	●	
●	●	
●		●

Ejector system

VSJ

VSHVSV  
VSBVSC

VSG

VSK  
VSKM

VSJ  
VSJM

VSN  
VSNM

VSX  
VSXM

VSQ

VSZM

① Manifold station No.

Ⓐ Vacuum characteristics

Ⓑ Nozzle diameter

Ⓒ Unit combination

Ⓓ Vacuum port

Ⓔ Air supply port

Ⓕ Exhaust port

Ⓖ Solenoid valve voltage

Ⓗ Valve

### ⚠ 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 ① 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)		φ6	φ8	φ10	φ12	φ8	φ10	φ12	

### Appendix 3

Ⓕ Exhaust port											
		Atmospheric release silencer	Common exhaust								
Port shape			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)		-	φ8	φ10	φ12	φ8	φ10	φ12	Rc1/4	Rc3/8	Rc1/2

Code	Content	Manifold	Single unit for manifold	Manifold only
<b>Ⓐ Vacuum characteristics *1, *2, *5</b>				
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, *5, *9</b>				
05	φ0.5	●	●	
07	φ0.7	●	●	
10	φ1.0	●	●	
12	φ1.2	●	●	
00	For mixed specs (indicate breakdown on specs sheet.)	●		
<b>Ⓒ Unit combination *2, *3, *4, *8</b>				
Refer to Appendix 1 (common for single unit) for unit combination.				
<b>Ⓓ Vacuum port (V) *2, *6, *9</b>				
PP	Plug port position side	●		●
S4	φ4 push-in fitting port position side	●		●
S6	φ6 push-in fitting port position side	●		●
S8	φ8 push-in fitting port position side	●		●
T4	φ4 push-in fitting port position top	●	●	
T6	φ6 push-in fitting port position top	●	●	
T8	φ8 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.)	●		
<b>Ⓔ Air supply port (P)</b>				
Refer to Appendix 2 for the air supply port.				
<b>Ⓕ Exhaust port (EX)</b>				
Refer to Appendix 3 for the exhaust port.				
<b>Ⓖ Solenoid valve voltage *3</b>				
1	100 VAC	●	●	
3	24 VDC	●	●	
<b>Ⓗ Valve *2, *3</b>				
A	Normally open (NO)	●	●	
B	Normally closed	●	●	
Z	For mixed specs (indicate breakdown on specs sheet.)	●		
<b>① Manifold station No. *7</b>				
2	2 stations			
to	to	●		●
10	10 stations			
<b>① Vacuum pressure switch specifications *2, *4</b>				
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.)	●		

## Maintenance part model No.

- Nozzle kit

**VSK - H 07 - NK**

Ⓐ Vacuum characteristics

Ⓑ Nozzle diameter

Code	Content
<b>Ⓐ Vacuum characteristics *1</b>	
H	High vacuum/medium flow rate
L	Medium vacuum/large flow rate
E	High vacuum/low flow rate
<b>Ⓑ Nozzle diameter *1</b>	
05	φ0.5
07	φ0.7
10	φ1.0
12	φ1.2

### ⚠ 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**

Ejector system

VSY

VSHVSU  
VSBVSC

VSG

VSK  
VSKM

VSJ  
VSJM

VSN  
VSNM

VSX  
VSXM

VSQ

VSZM

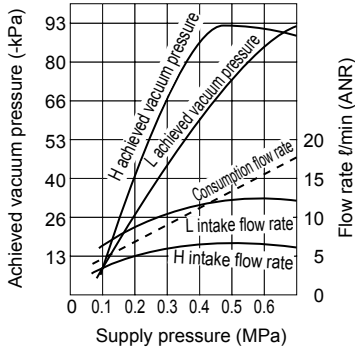


## Vacuum characteristics, flow characteristics

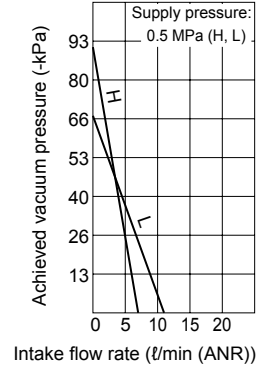
### Supply pressure - achieved vacuum pressure, intake flow rate, air consumption rate

● VSK-□H05, VSK-□L05

#### Vacuum characteristics

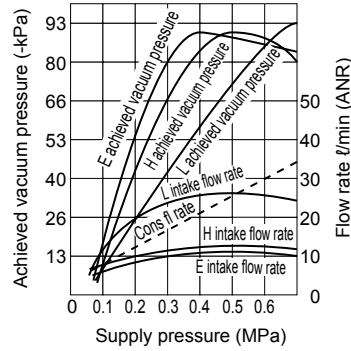


#### Flow characteristics

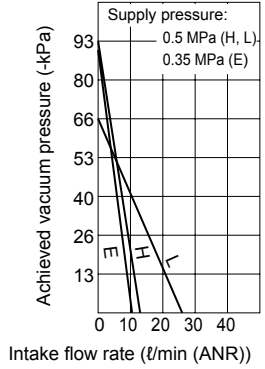


● VSK-□H07, VSK-□L07, VSK-□E07

#### Vacuum characteristics



#### Flow characteristics

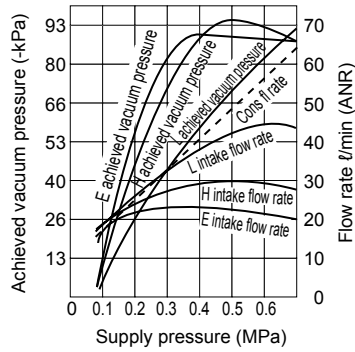


Ejector system

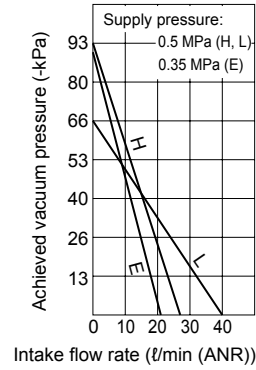
VSY

● VSK-□H10, VSK-□L10, VSK-□E10

#### Vacuum characteristics

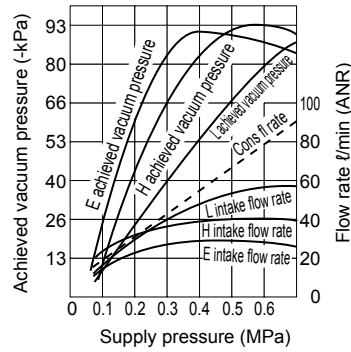


#### Flow characteristics

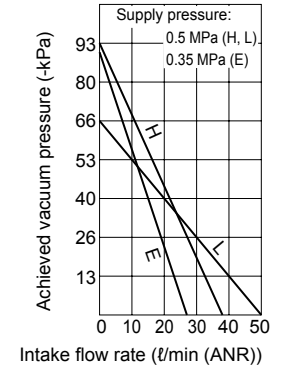


● VSK-□H12, VSK-□L12, VSK-□E12

#### Vacuum characteristics



#### Flow characteristics



VSK VSKM

VSN VSNM

VSK VSKM

VSK VSKM

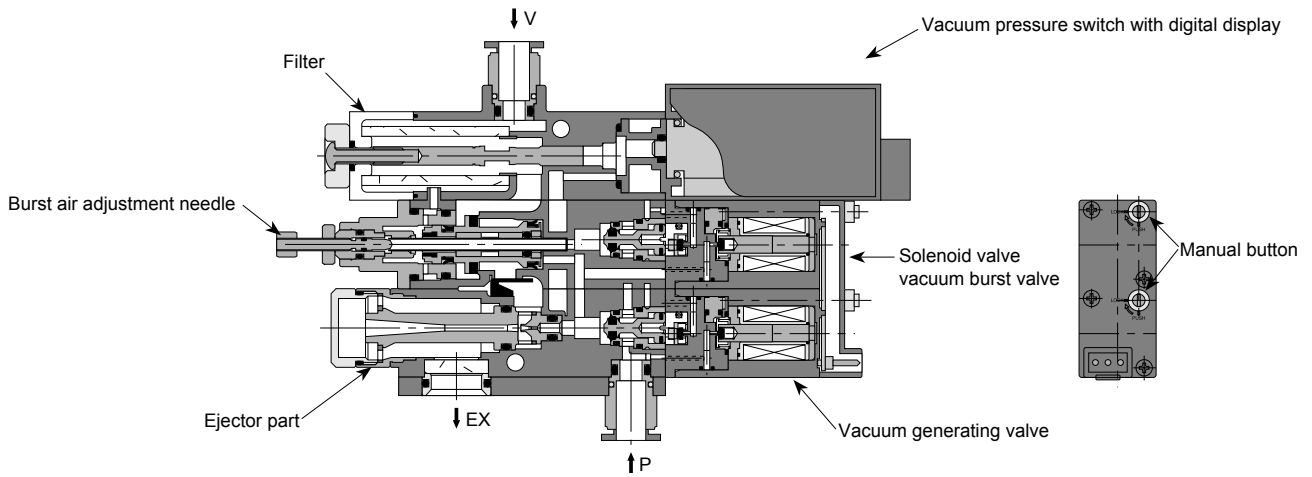
VSK VSKM

- 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 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.
- 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  $0.5^2 \times \pi = 0.785 \text{ mm}^2 \times 3 = 2.35 \text{ mm}^2$ . Therefore, carry out piping and equipment selection that ensures an effective cross-sectional area of 2.3 mm<sup>2</sup> or greater.

Internal structure

Piping direction 2-surface VSK-A

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



Ejector system

VSY

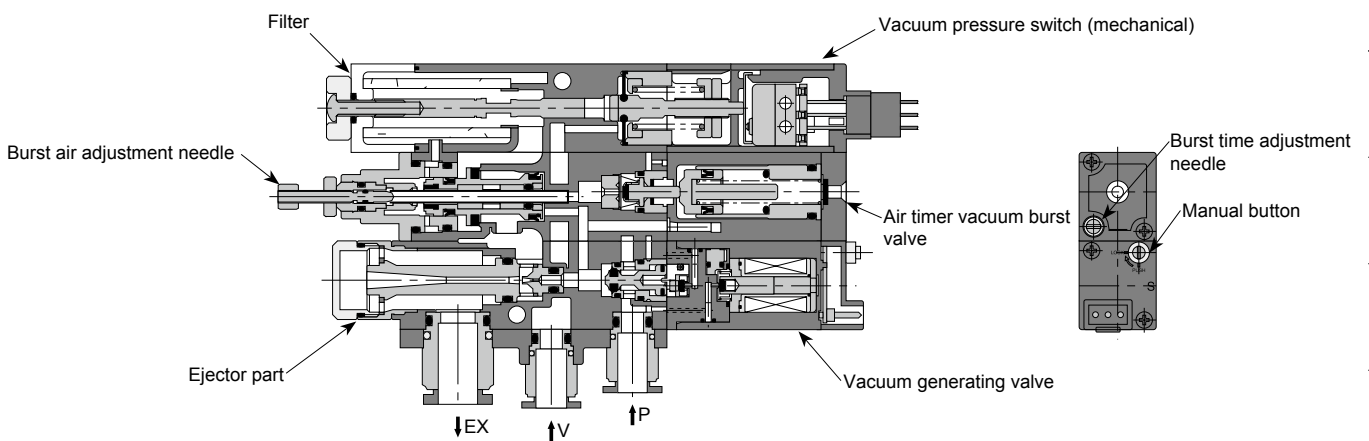
VSHVSV  
VSBVSC

VSG

VSK  
VSKM

Piping direction 1-surface VSK-B

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



VSJ  
VSJM

VSN  
VSNM

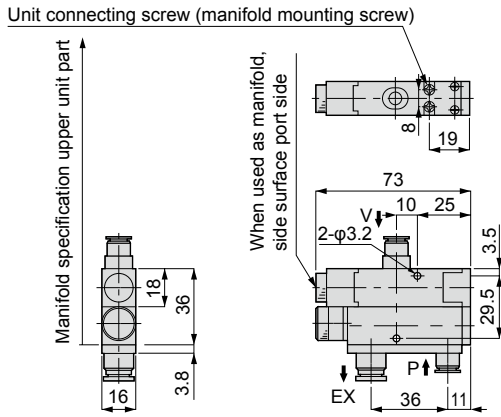
VSX  
VSXM

VSQ

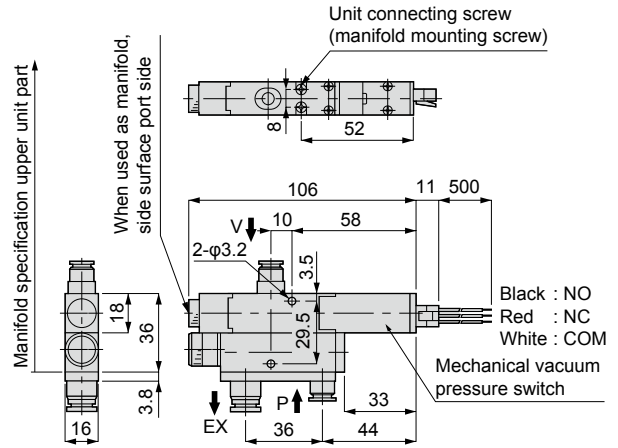
VSZM

## Dimensions (piping method 2-surface VSK-A)

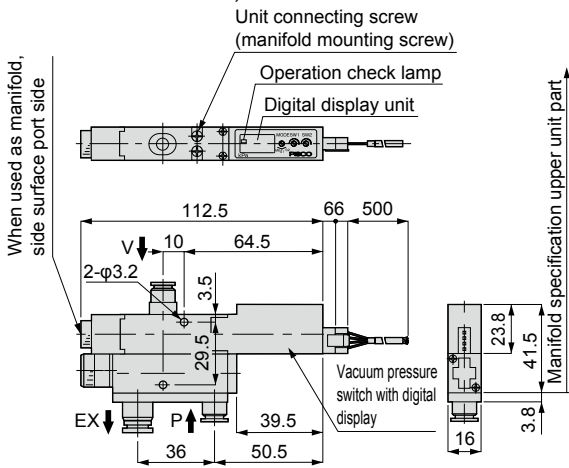
### ● Unit combination: A, B



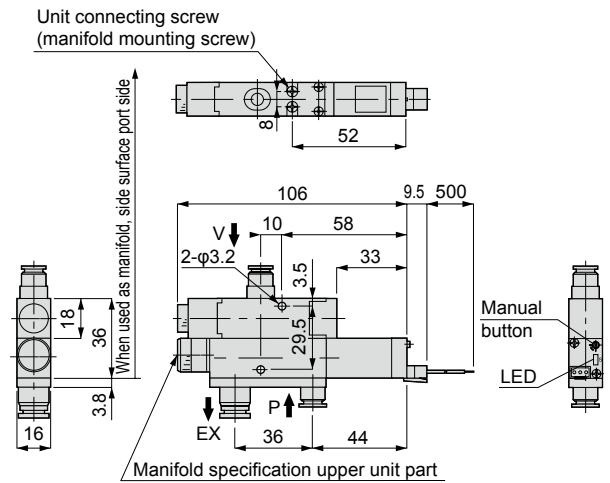
### ● Unit combination: C, D



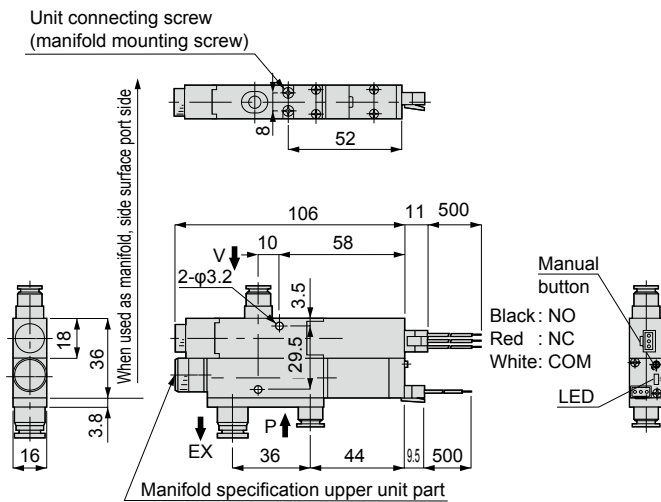
### ● Unit combination: E, F



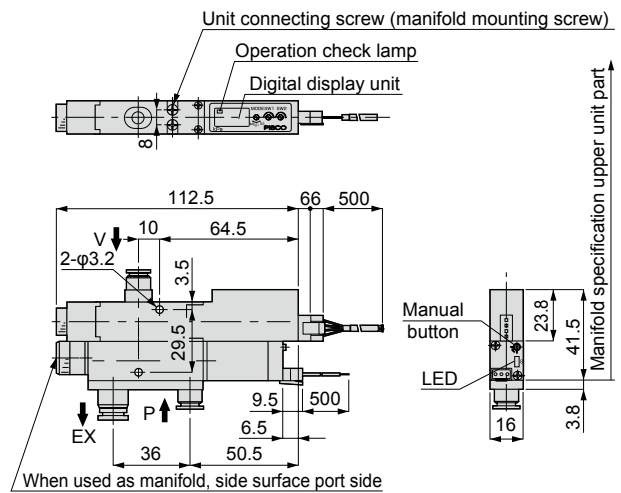
### ● Unit combination: G, H



### ● Unit combination: J, K

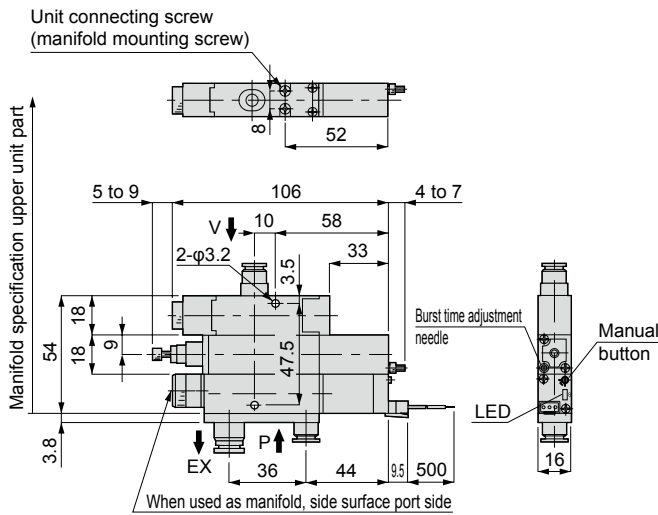


### ● Unit combination: L, M

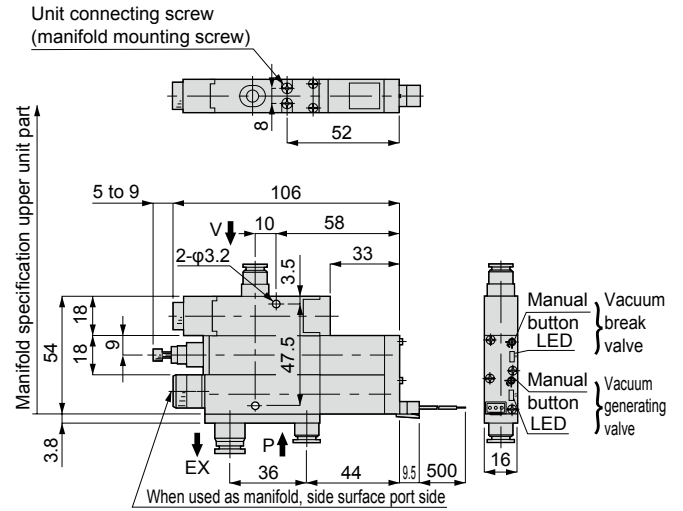


## Dimensions (piping method 2-surface VSK-A)

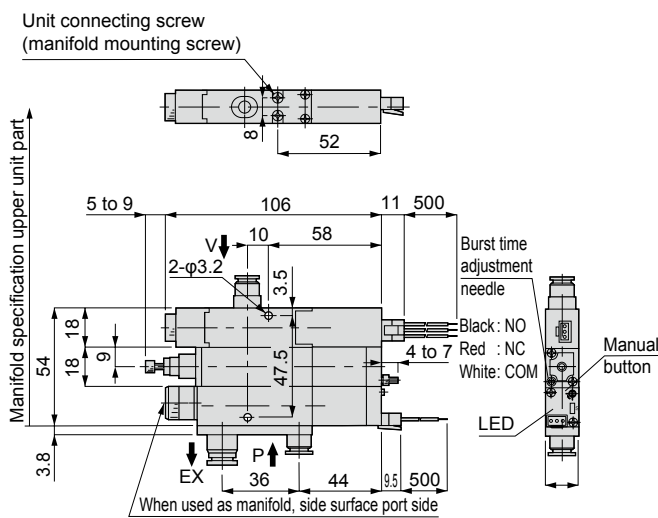
### ● Unit combination: P



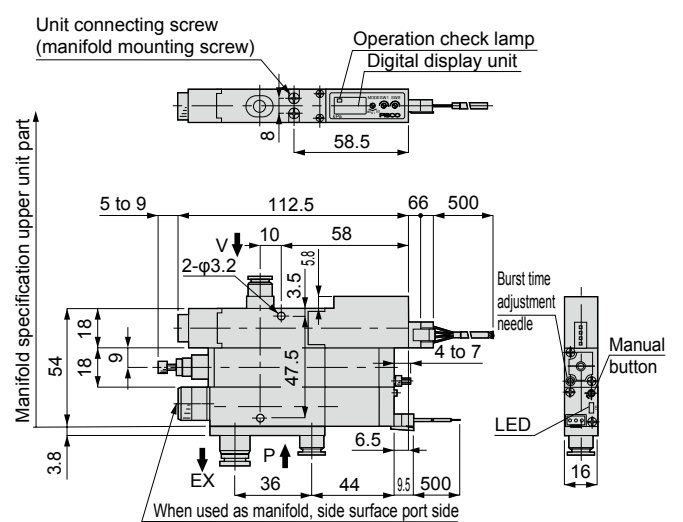
### ● Unit combination: S



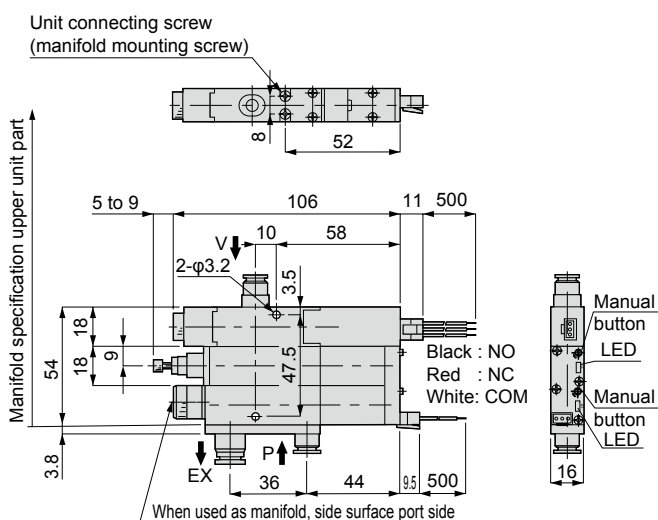
### ● Unit combination: Q



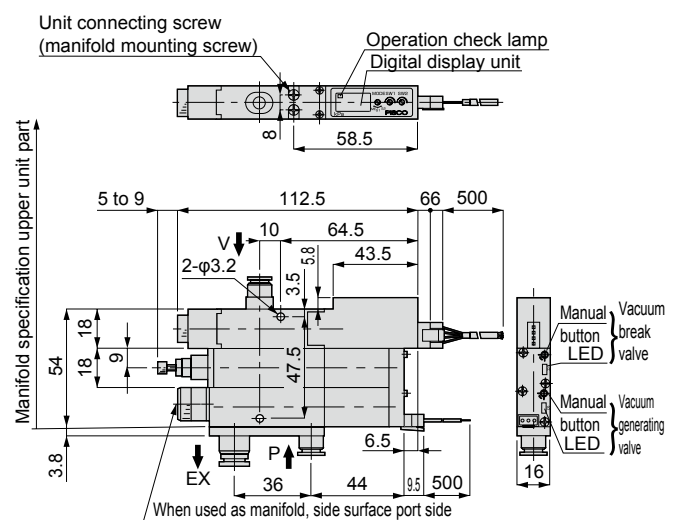
### ● Unit combination: R



### ● Unit combination: T



### ● Unit combination: W



Ejector system

VSY

VSHVSU  
VSBVSC

VSG

VSK  
VSKM

VSJ  
VSJM

VSN  
VSNM

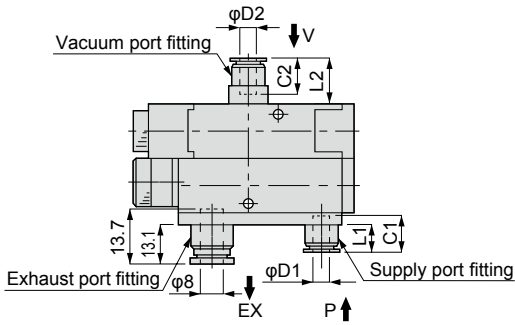
VSX  
VSXM

VSQ

VSZM

## Dimensions (piping method 2-surface VSK-A)

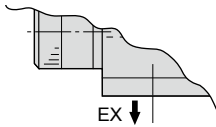
### ● Fitting dimensions



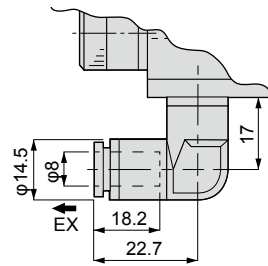
Unit: mm

	Tube O.D. $\phi D1$	Tube O.D. $\phi D2$	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)



Ejector system

VSJ

VSH/VSU  
VSB/VSC

VSG

VSK  
VSKM

VSJ  
VSJM

VSN  
VSNM

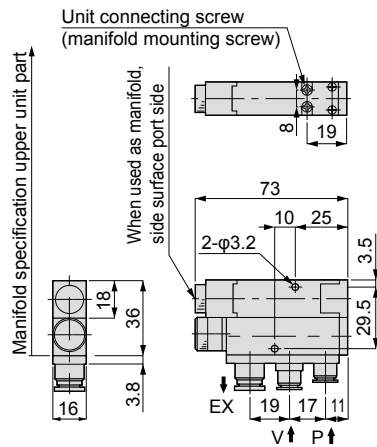
VSX  
VSXM

VSQ

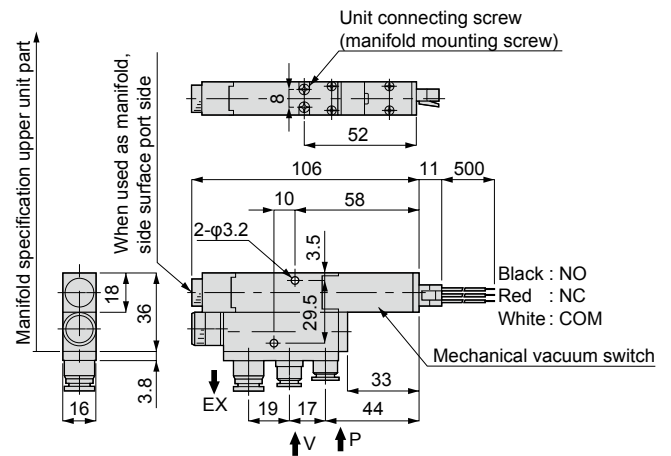
VSZM

## Dimensions (piping method 1-surface VSK-B)

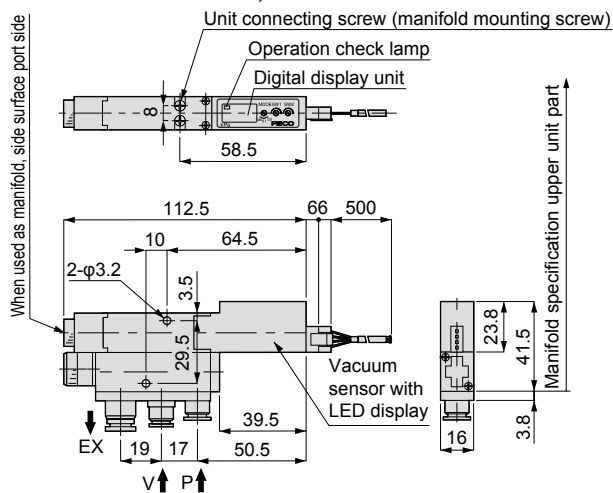
### ● Unit combination: A, B



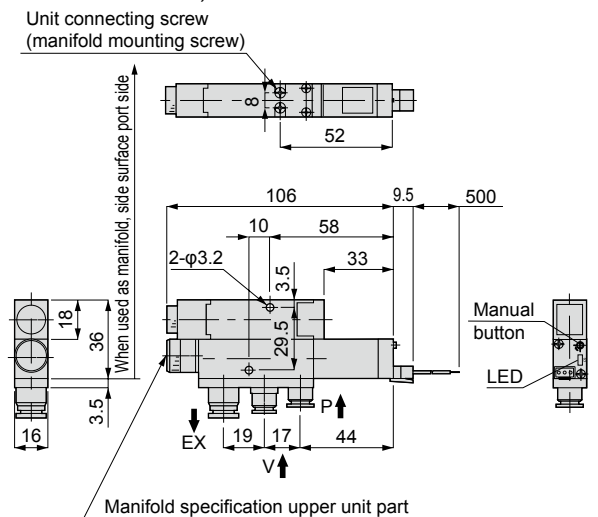
### ● Unit combination: C, D



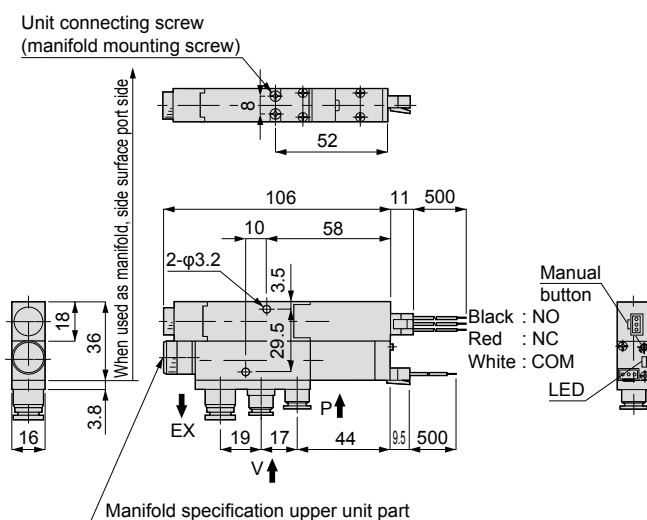
### ● Unit combination: E, F



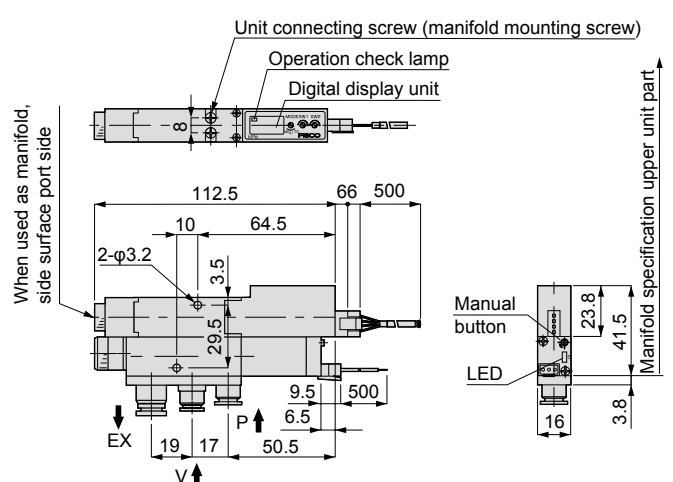
### ● Unit combination: G, H



### ● Unit combination: J, K



### ● Unit combination: L, M



Ejector system

VSY

VSHVSV  
VSBVSC

VSG

VSK  
VSKM

VSJ  
VSJM

VSN  
VSNM

VSX  
VSXM

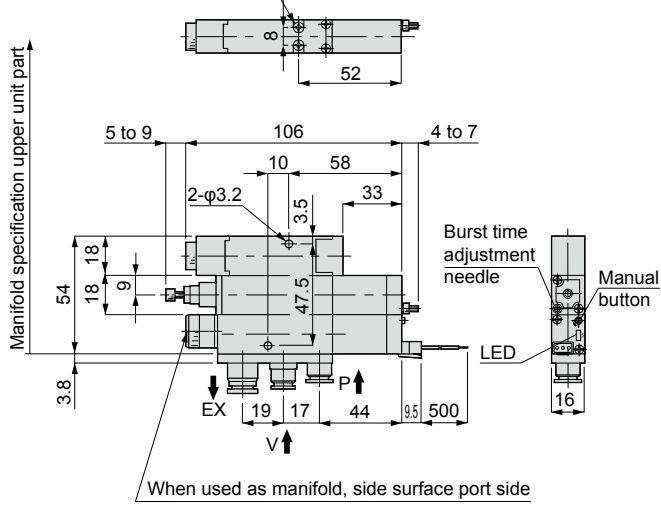
VSQ

VSZM

## Dimensions (piping method 1-surface VSK-B)

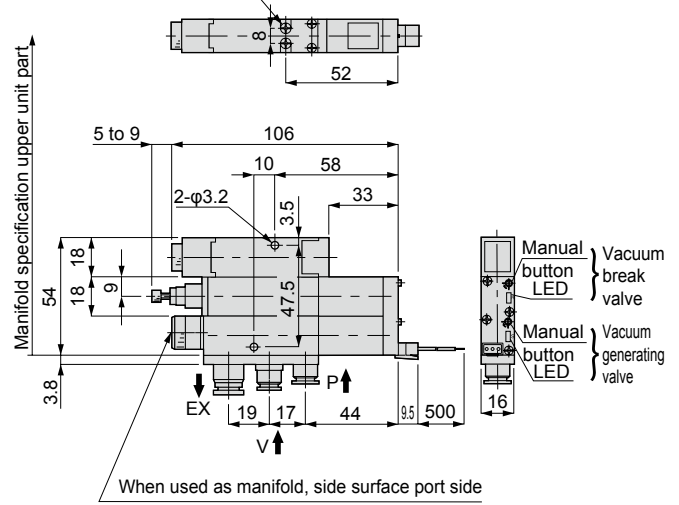
### ● Unit combination: P

Unit connecting screw  
(manifold mounting screw)



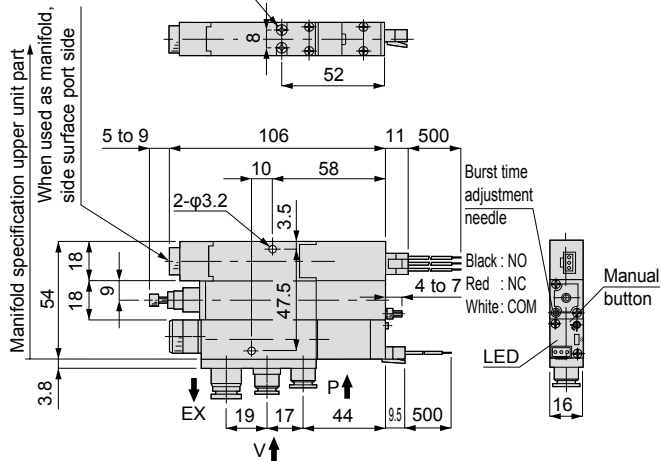
### ● Unit combination: S

Unit connecting screw  
(manifold mounting screw)



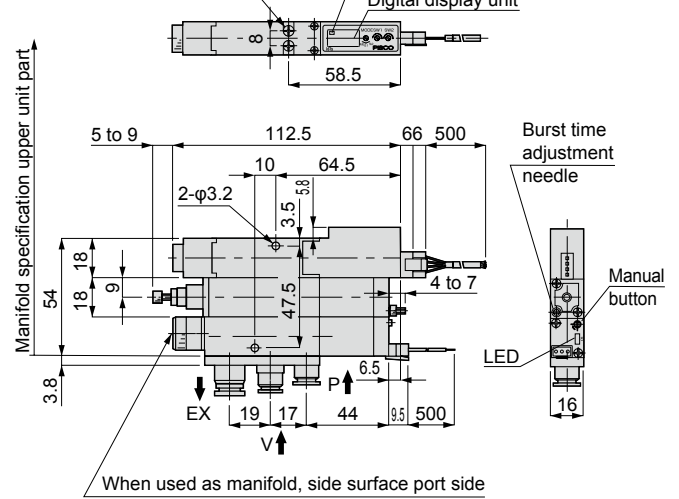
### ● Unit combination: Q

Unit connecting screw  
(manifold mounting screw)



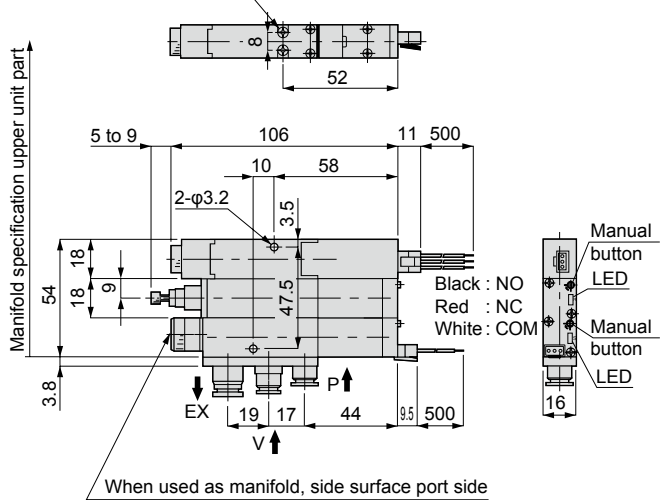
### ● Unit combination: R

Unit connecting screw  
(manifold mounting screw)



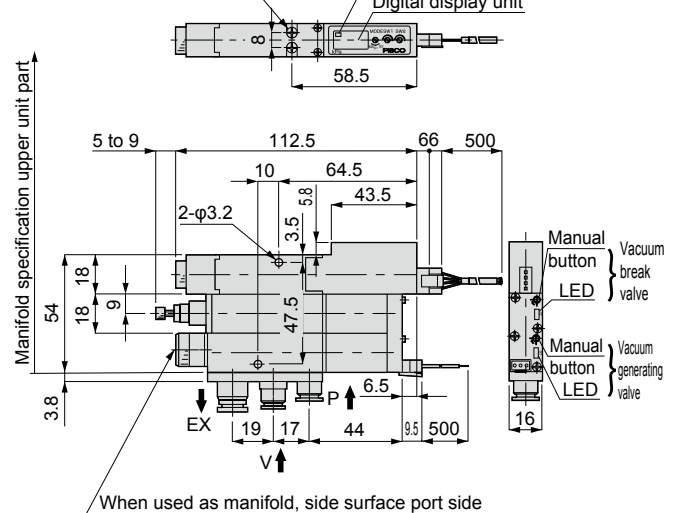
### ● Unit combination: T

Unit connecting screw  
(manifold mounting screw)



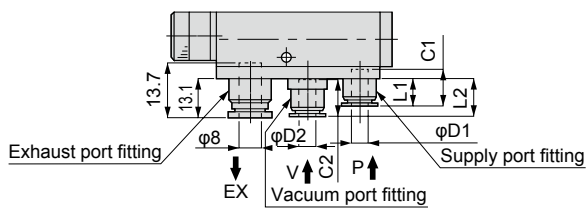
### ● Unit combination: W

Unit connecting screw  
(manifold mounting screw)



## Dimensions (piping method 1-surface VSK-B)

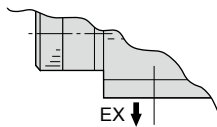
### ● Fitting dimensions



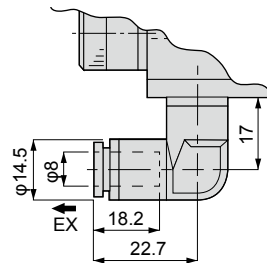
Unit: mm

	Tube O.D. φD1	Tube O.D. φD2	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)



Ejector system

VS Y

VSHV SU  
VSBV SC

VSG

VSK  
VSKM

VSJ  
VSJM

VSN  
VSNM

VSX  
VSXM

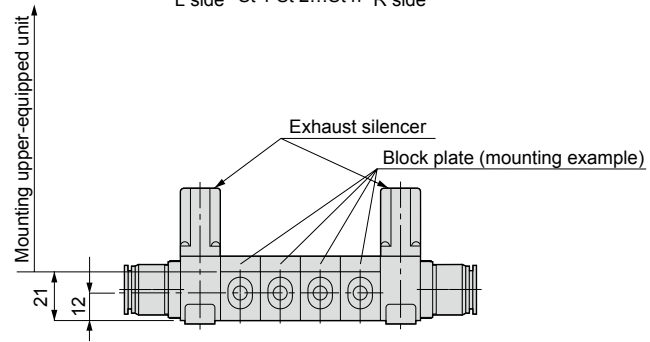
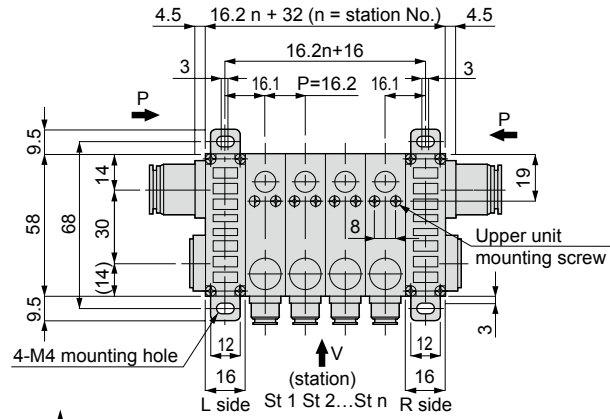
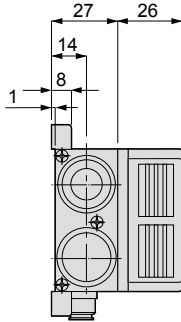
VSQ

VSZM

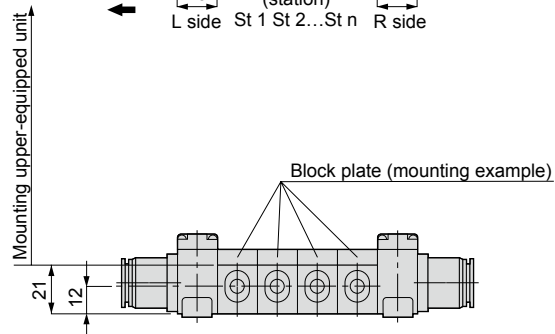
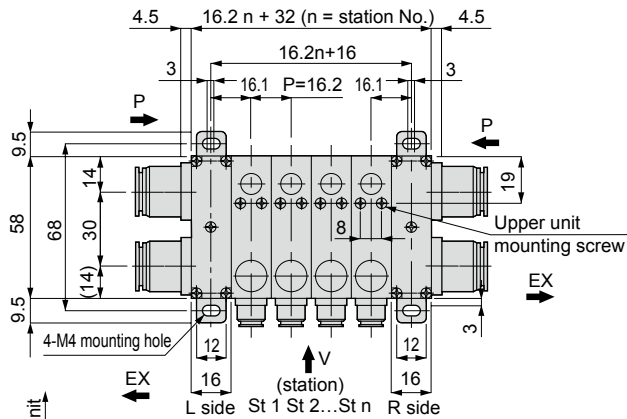
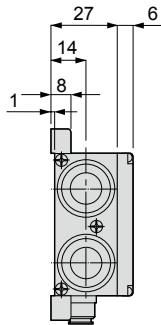


## Dimensions (manifold, VSKM)

### ● Manifold (atmosphere release)



### ● Manifold (common exhaust)



Ejector system

VSY

VSH/VSU  
VSB/VSC

VSG

VSK  
VSKM

VSJ  
VSJM

VSN  
VSNM

VSX  
VSXM

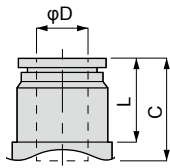
VSQ

VSZM

## Dimensions (manifold, VSKM)

### ● Supply port fitting dimensions

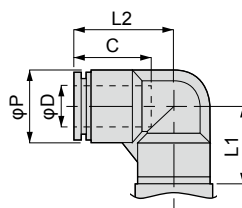
· Straight



Unit: mm

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

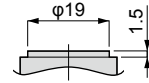
· Elbow



Unit: mm

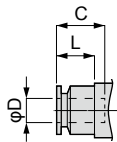
Tube O.D. φD	φP	C	L1	L2
8	14.5	18.2	17	22.7
10	17.7	20.2	21	26.2
12	21	23.4	23	29.4

· Plug



### ● Vacuum port fitting dimensions

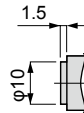
· Straight



Unit: mm

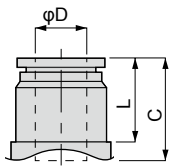
Tube O.D. φD	L	C
4	6.1	11.2
6	8.9	11.9
8	17.3	18.2

· Plug



### ● Exhaust port fitting dimensions

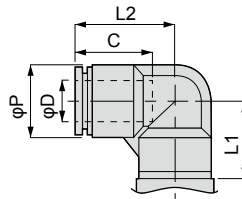
· Straight



Unit: mm

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

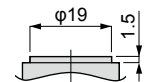
· Elbow



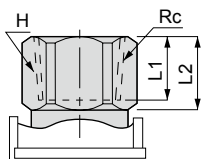
Unit: mm

Tube O.D. φD	φP	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

Ejector system

VSJ

VSHVSU  
VSBVSC

VSG

VSK  
VSKM

VSJ  
VSJM

VSN  
VSNM

VSX  
VSXM

VSQ

VSZM