

# Vacuum Generators

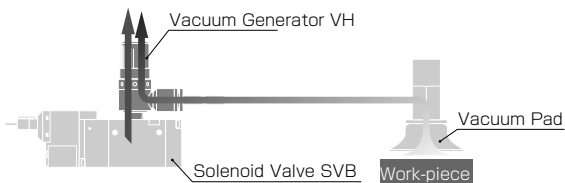
## Venturi Vacuum Generator VH, VS



### ❖ Valve Direct Mounting Type

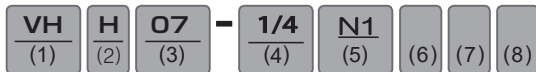


### ■ Piping example





## Model Designation (Example)



(1) Type

(2) Performance

**H:** High-vacuum type (Rated air supply pressure: 72.5psi (0.5MPa))

**L:** Large-flow type (Rated air supply pressure: 72.5psi (0.5MPa))

**E:** High-vacuum at Low air pressure supply type (Rated air supply pressure: 50.8psi (0.35MPa))

(3) Nozzle size

\* Air supply pressure is 72.5psi (0.5MPa) for H and L types or 50.8psi (0.35MPa) for E type.

\* The flow rate in SCFM is a reference value converted by multiplying  $l/min(ANR)$  by 0.035.

Code	Bore (mm)	H type	L type	E type
		Vacuum level and suction flow	Vacuum level and suction flow	Vacuum level and suction flow
<b>05</b>	ø0.5	-26.8in. Hg (-90kPa) 0.25SCFM (7 $l/min(ANR)$ )	-19.7in. Hg (-66kPa) 0.42SCFM (12 $l/min(ANR)$ )	-
<b>07</b>	ø0.7	-27.6in. Hg (-93kPa) 0.46SCFM (13 $l/min(ANR)$ )	-19.7in. Hg (-66kPa) 0.92SCFM (26 $l/min(ANR)$ )	-27.2in. Hg (-92kPa) 0.37SCFM (10.5 $l/min(ANR)$ )
<b>10</b>	ø1.0	-27.6in. Hg (-93kPa) 0.99SCFM (28 $l/min(ANR)$ )	-19.7in. Hg (-66kPa) 1.48SCFM (42 $l/min(ANR)$ )	-27.2in. Hg (-92kPa) 0.74SCFM (21 $l/min(ANR)$ )
<b>12</b>	ø1.2	-27.6in. Hg (-93kPa) 1.34SCFM (38 $l/min(ANR)$ )	-	-27.2in. Hg (-92kPa) 0.95SCFM (27 $l/min(ANR)$ )
<b>15</b>	ø1.5	-27.6in. Hg (-93kPa) 2.22SCFM (63 $l/min(ANR)$ )	-19.7in. Hg (-66kPa) 3.35SCFM (95 $l/min(ANR)$ )	-27.2in. Hg (-92kPa) 1.48SCFM (42 $l/min(ANR)$ )
<b>20</b>	ø2.0	-27.6in. Hg (-93kPa) 3.85SCFM (110 $l/min(ANR)$ )	-19.7in. Hg (-66kPa) 6.30SCFM (180 $l/min(ANR)$ )	-27.2in. Hg (-92kPa) 2.94SCFM (84 $l/min(ANR)$ )

\*The suction flow in the table is representing value and is varies by vacuum port size.

(4) Vacuum port size (V)

■ Tube dia.

Inch tube size (in.)					
Code	5/32	1/4	5/16	3/8	
Dia.	ø5/32	ø1/4	ø5/16	ø3/8	
Metric tube size (mm)					
Code	4	6	8	10	12
Dia.	ø4	ø6	ø8	ø10	ø12

(5) Air supply port (P)

■ Thread size

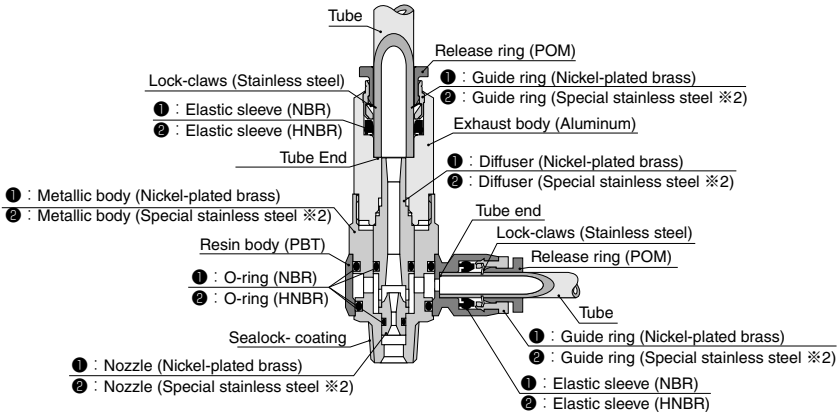
Code	Unified fine thread	American standard taper pipe thread		
	<b>U10</b>	<b>N1</b>	<b>N2</b>	
Size	10-32UNF	NPT1/8	NPT1/4	
Code	Metric thread	Taper pipe thread		
	<b>M5</b>	<b>O1</b>	<b>O2</b>	<b>O3</b>
Size	M5×0.8	R1/8	R1/4	R3/8

- (6) Exhaust port  
**J**: Tube exhaust type  
**No code**: Silencer vent
- (7) **U**: inch spec. (NPT, UNF)  
**No code**: mm spec. (M, R)
- (8) Material option  
**No code**: Standard spec.  
**-S3**: No Cu alloy spec. & HNBR seal for air passage.

## Specification

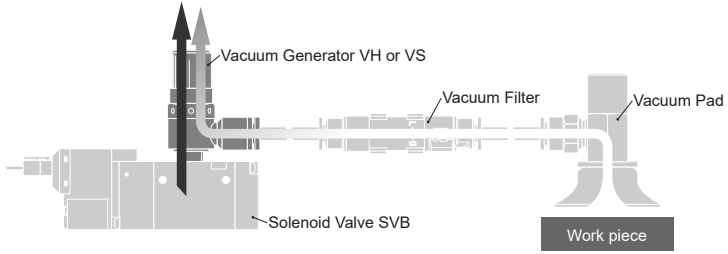
Fluid medium	Air
Operating pressure range	21.8 ~ 102psi (0.15 ~ 0.7MPa)
Rated pressure supply	H, L type : 72.5psi (0.5MPa), E type : 51psi (0.35MPa)
Operating temp. range	32 ~ 140°F (0 ~ 60°C) (No freezing)

## Construction (Valve Direct Mounting Type Elbow: VH)



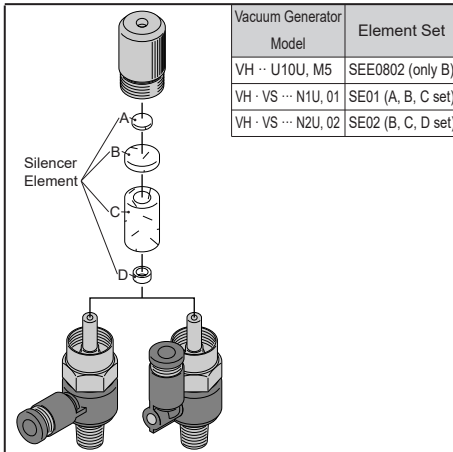
※ 1. The above ① material is for standard type. ② is for the type of copper alloy free material.  
 ※ 2. Performance of corrosion resistance is equal to SUS303.

### Piping example





## Replacement Element

### VH, VS Type



## Valve Direct Mounting Type



<b>VH</b> Valve Direct Mounting Type Elbow 	Model		<b>VH</b> Valve Direct Mounting Type Elbow Tube Exhaust 	Standard		"-S3" spec.
	VH②③-V-P	VH②③-V-PU		Model	Model	Model
	VHH05- <sup>5</sup> / <sub>32</sub> U10U	VHH05-4M5		VH②③-V-PJ	VH②③-V-PJU	VH②③-V-PJ-S3
	VHH05- <sup>1</sup> / <sub>4</sub> N1U	VHH05-601		VHH05- <sup>5</sup> / <sub>32</sub> U10JU	VHH05-4M5J	VHH05-4M5J-S3
	VHH07- <sup>1</sup> / <sub>4</sub> N1U	VHH07-601		VHH05- <sup>1</sup> / <sub>4</sub> N1JU	VHH05-601J	VHH05-601J-S3
	VHH10- <sup>1</sup> / <sub>4</sub> N1U	VHH10-601		VHH07- <sup>1</sup> / <sub>4</sub> N1JU	VHH07-601J	VHH07-601J-S3
	VHH10- <sup>5</sup> / <sub>16</sub> N1U	VHH10-801		VHH10- <sup>1</sup> / <sub>4</sub> N1JU	VHH10-601J	VHH10-601J-S3
	VHH12- <sup>1</sup> / <sub>4</sub> N1U	VHH12-601		VHH10- <sup>5</sup> / <sub>16</sub> N1JU	VHH10-801J	VHH10-801J-S3
	VHH12- <sup>5</sup> / <sub>16</sub> N1U	VHH12-801		VHH12- <sup>1</sup> / <sub>4</sub> N1JU	VHH12-601J	VHH12-601J-S3
	VHH15- <sup>5</sup> / <sub>16</sub> N2U	VHH15-802		VHH12- <sup>5</sup> / <sub>16</sub> N1JU	VHH12-801J	VHH12-801J-S3
	VHH15- <sup>3</sup> / <sub>8</sub> N2U	VHH15-1002		VHH15- <sup>5</sup> / <sub>16</sub> N2JU	VHH15-802J	VHH15-802J-S3
	VHL05- <sup>5</sup> / <sub>32</sub> U10U	VHH20-1002		VHH15- <sup>3</sup> / <sub>8</sub> N2JU	VHH15-1002J	VHH15-1002J-S3
	VHL05- <sup>1</sup> / <sub>4</sub> N1U	VHH20-1003		VHL05- <sup>5</sup> / <sub>32</sub> U10JU	VHH20-1002J	VHH20-1002J-S3
	VHL07- <sup>1</sup> / <sub>4</sub> N1U	VHH20-1202		VHL05- <sup>1</sup> / <sub>4</sub> N1JU	VHH20-1003J	VHH20-1003J-S3
	VHL07- <sup>5</sup> / <sub>16</sub> N1U	VHH20-1203		VHL07- <sup>1</sup> / <sub>4</sub> N1JU	VHH20-1202J	VHH20-1202J-S3
	VHL10- <sup>1</sup> / <sub>4</sub> N1U	VHL05-4M5		VHL07- <sup>5</sup> / <sub>16</sub> N1JU	VHH20-1203J	VHH20-1203J-S3
	VHL10- <sup>5</sup> / <sub>16</sub> N1U	VHL05-601		VHL10- <sup>1</sup> / <sub>4</sub> N1JU	VHL05-4M5J	VHL05-4M5J-S3
	VHL15- <sup>5</sup> / <sub>16</sub> N2U	VHL07-601		VHL10- <sup>5</sup> / <sub>16</sub> N1JU	VHL05-601J	VHL05-601J-S3
	VHL15- <sup>3</sup> / <sub>8</sub> N2U	VHL07-801		VHL15- <sup>5</sup> / <sub>16</sub> N2JU	VHL07-601J	VHL07-601J-S3
	VHL15- <sup>1</sup> / <sub>2</sub> N2U	VHL10-601		VHL15- <sup>3</sup> / <sub>8</sub> N2JU	VHL07-801J	VHL07-801J-S3
	VHE07- <sup>1</sup> / <sub>4</sub> N1U	VHL10-801		VHL15- <sup>1</sup> / <sub>2</sub> N2JU	VHL10-601J	VHL10-601J-S3
	VHE10- <sup>1</sup> / <sub>4</sub> N1U	VHL15-802		VHE07- <sup>1</sup> / <sub>4</sub> N1JU	VHL10-801J	VHL10-801J-S3
	VHE10- <sup>5</sup> / <sub>16</sub> N1U	VHL15-1002		VHE10- <sup>1</sup> / <sub>4</sub> N1JU	VHL15-802J	VHL15-802J-S3
	VHE12- <sup>1</sup> / <sub>4</sub> N1U	VHL15-1202		VHE10- <sup>5</sup> / <sub>16</sub> N1JU	VHL15-1002J	VHL15-1002J-S3
	VHE12- <sup>5</sup> / <sub>16</sub> N1U	VHL20-1002		VHE12- <sup>1</sup> / <sub>4</sub> N1JU	VHL15-1202J	VHL15-1202J-S3
	VHE15- <sup>5</sup> / <sub>16</sub> N2U	VHL20-1003		VHE12- <sup>5</sup> / <sub>16</sub> N1JU	VHL20-1002J	VHL20-1002J-S3
	VHE15- <sup>3</sup> / <sub>8</sub> N2U	VHL20-1202		VHE15- <sup>5</sup> / <sub>16</sub> N2JU	VHL20-1003J	VHL20-1003J-S3
		VHL20-1203		VHE15- <sup>3</sup> / <sub>8</sub> N2JU	VHL20-1202J	VHL20-1202J-S3
		VHE07-601			VHL20-1203J	VHL20-1203J-S3
		VHE10-601			VHE07-601J	VHE07-601J-S3
		VHE10-801			VHE10-601J	VHE10-601J-S3
		VHE12-601			VHE10-801J	VHE10-801J-S3
		VHE12-801			VHE12-601J	VHE12-601J-S3
		VHE15-802			VHE12-801J	VHE12-801J-S3
		VHE15-1002			VHE15-802J	VHE15-802J-S3
		VHE20-1002			VHE15-1002J	VHE15-1002J-S3
		VHE20-1003			VHE20-1002J	VHE20-1002J-S3
		VHE20-1202			VHE20-1003J	VHE20-1003J-S3
		VHE20-1203			VHE20-1202J	VHE20-1202J-S3
					VHE20-1203J	VHE20-1203J-S3

\* Air supply port → Exhaust port

U10	→	ø1/4in.
N1	→	ø5/16in.
N2	→	ø1/2in.
M5	→	ø6mm
01	→	ø8mm
02, 03	→	ø12mm

# Vacuum Generator Series

## Vacuum Generator VH,VS

VS Valve Direct Mounting Type Straight	Model		VS Valve Direct Mounting Type Straight Tube Exhaust	Standard Model		"-S3" spec. Model
	VS2[3]-V-P	VS2[3]-V-PU		VS2[3]-V-PJ	VS2[3]-V-PJU	VS2[3]-V-PJ-S3
	VSH05-1/4N1U	VSH05-601		VSH05-1/4N1JU	VSH05-601J	VSH05-601J-S3
	VSH07-1/4N1U	VSH07-601		VSH07-1/4N1JU	VSH07-601J	VSH07-601J-S3
	VSH10-1/4N1U	VSH10-601		VSH10-1/4N1JU	VSH10-601J	VSH10-601J-S3
	VSH10-5/16N1U	VSH10-801		VSH10-5/16N1JU	VSH10-801J	VSH10-801J-S3
	VSH12-1/4N1U	VSH12-601		VSH12-1/4N1JU	VSH12-601J	VSH12-601J-S3
	VSH12-5/16N1U	VSH12-801		VSH12-5/16N1JU	VSH12-801J	VSH12-801J-S3
	VSH15-5/16N2U	VSH15-802		VSH15-5/16N2JU	VSH15-802J	VSH15-802J-S3
	VSH15-3/8N2U	VSH15-1002		VSH15-3/8N2JU	VSH15-1002J	VSH15-1002J-S3
	VSL05-1/4N1U	VSH20-1202		VSL05-1/4N1JU	VSH20-1202J	VSH20-1202J-S3
	VSL07-1/4N1U	VSH20-1203		VSL07-1/4N1JU	VSH20-1203J	VSH20-1203J-S3
	VSL07-5/16N1U	VSL05-601		VSL07-5/16N1JU	VSL05-601J	VSL05-601J-S3
	VSL10-1/4N1U	VSL07-601		VSL10-1/4N1JU	VSL07-601J	VSL07-601J-S3
	VSL10-5/16N1U	VSL07-801		VSL10-5/16N1JU	VSL07-801J	VSL07-801J-S3
	VSL15-5/16N2U	VSL10-601		VSL15-5/16N2JU	VSL10-601J	VSL10-601J-S3
	VSL15-3/8N2U	VSL10-801		VSL15-3/8N2JU	VSL10-801J	VSL10-801J-S3
	VSL15-1/2N2U	VSL15-802		VSL15-1/2N2JU	VSL15-802J	VSL15-802J-S3
	VSE07-1/4N1U	VSL15-1002		VSE07-1/4N1JU	VSL15-1002J	VSL15-1002J-S3
	VSE10-1/4N1U	VSL15-1202		VSE10-1/4N1JU	VSL15-1202J	VSL15-1202J-S3
	VSE10-5/16N1U	VSL20-1202		VSE10-5/16N1JU	VSL20-1202J	VSL20-1202J-S3
	VSE12-1/4N1U	VSL20-1203		VSE12-1/4N1JU	VSL20-1203J	VSL20-1203J-S3
	VSE12-5/16N1U	VSE07-601		VSE12-5/16N1JU	VSE07-601J	VSE07-601J-S3
	VSE15-5/16N2U	VSE10-601		VSE15-5/16N2JU	VSE10-601J	VSE10-601J-S3
	VSE15-3/8N2U	VSE10-801		VSE15-3/8N2JU	VSE10-801J	VSE10-801J-S3
		VSE12-601			VSE12-601J	VSE12-601J-S3
		VSE12-801			VSE12-801J	VSE12-801J-S3
		VSE15-802			VSE15-802J	VSE15-802J-S3
	VSE15-1002		VSE15-1002J	VSE15-1002J-S3		
	VSE20-1202		VSE20-1202J	VSE20-1202J-S3		
	VSE20-1203		VSE20-1203J	VSE20-1203J-S3		

\* Air supply port → Exhaust port

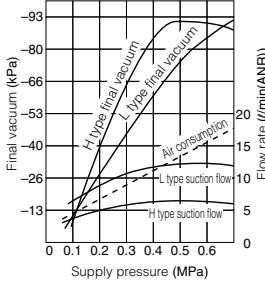
U10 → ø1/4in.  
 N1 → ø5/16in.  
 N2 → ø1/2in.  
 M5 → ø6mm  
 01 → ø8mm  
 02, 03 → ø12mm

# Characteristics

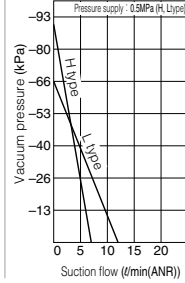
## Supply pressure - Final vacuum / Suction Flow / Air Consumption

VHH05, VHL05, VSH05, VSL05

Vacuum characteristics

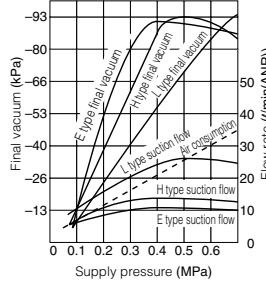


Flow characteristics

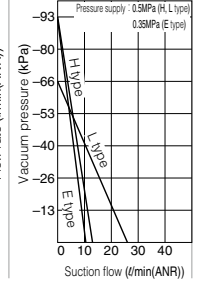


VHH07, VHL07, VHE07, VSH07, VSL07, VSE07

Vacuum characteristics

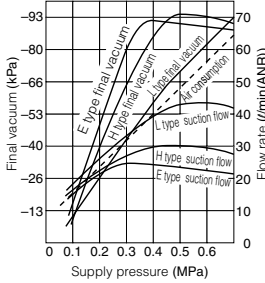


Flow characteristics

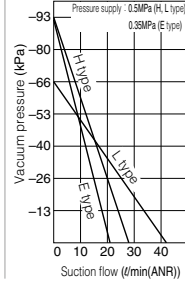


VHH10, VHL10, VHE10, VSH10, VSL10, VSE10

Vacuum characteristics

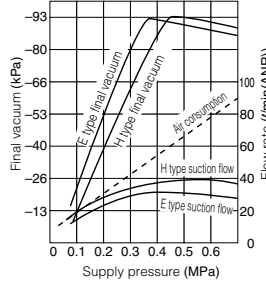


Flow characteristics

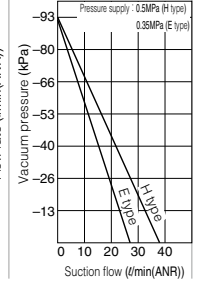


VHH12, VHE12, VSH12, VSE12

Vacuum characteristics

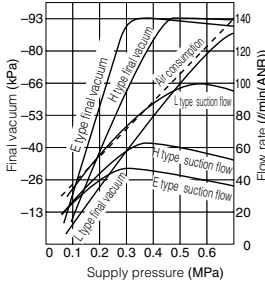


Flow characteristics

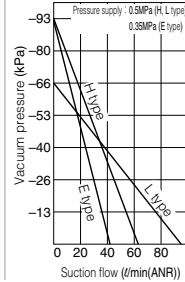


VHH15, VHL15, VHE15, VSH15, VSL15, VSE15

Vacuum characteristics

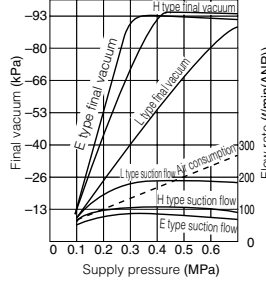


Flow characteristics

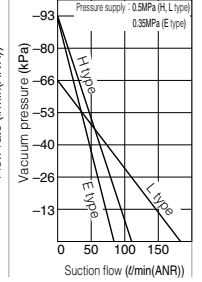


VHH20, VHL20, VHE20

Vacuum characteristics



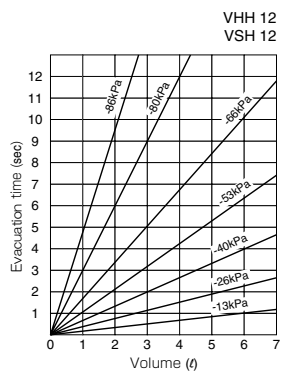
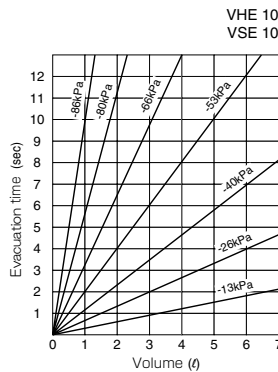
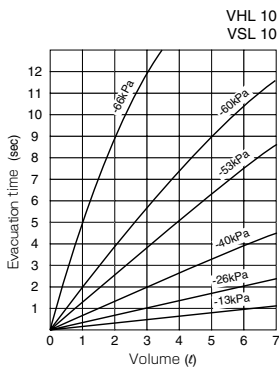
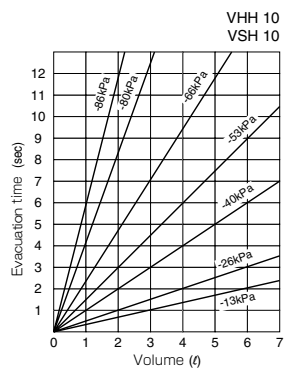
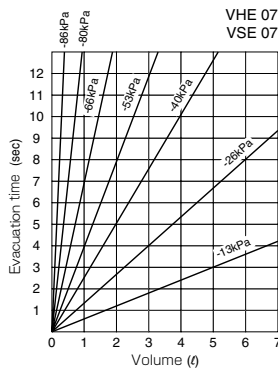
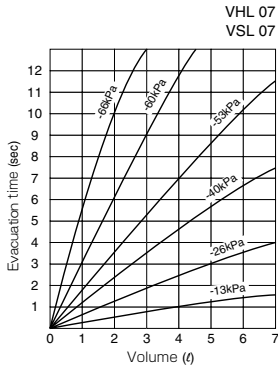
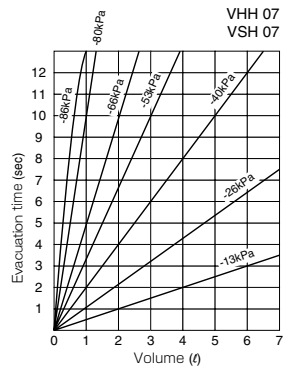
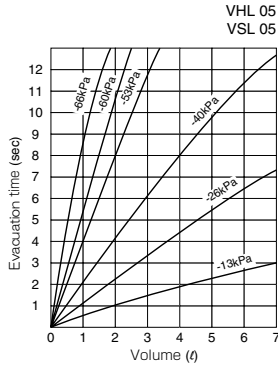
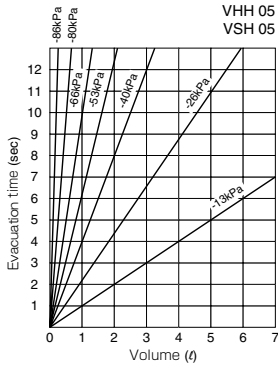
Flow characteristics



# Characteristics

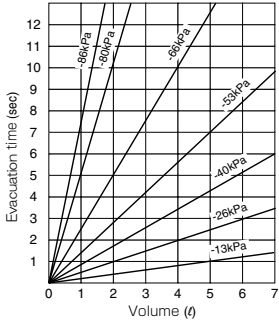
Evacuation time (Supply pressure H and L types: 0.5MPa (72.5psi), E type: 0.3 (43.5psi) to 0.5MPa (72.5psi))

※ The following charts are for reference only since the values vary according to the piping arrangement.

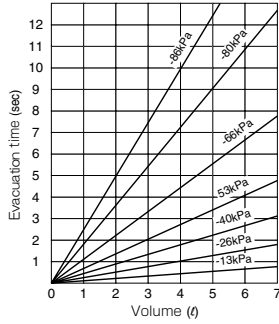




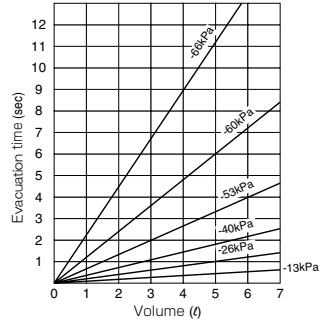
VHE 12  
VSE 12



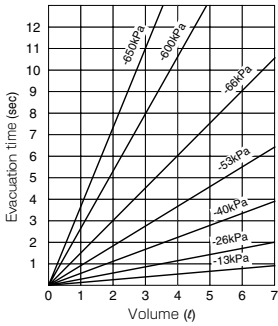
VHH 15  
VSH 15



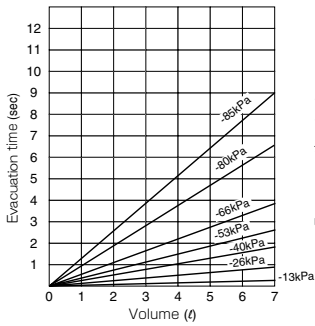
VHL 15  
VSL 15



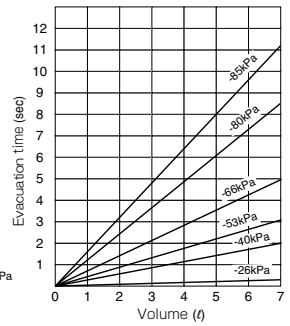
VHE 15  
VSE 15



VHH 20  
VSH 20



VHE 20  
VSE 20

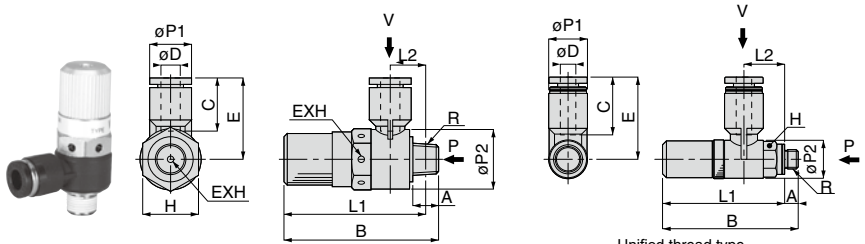




## Valve Direct Mounting Type Elbow (Silencer vent)

RoHS compliant

NPT thread



Unified thread type Unit : inch

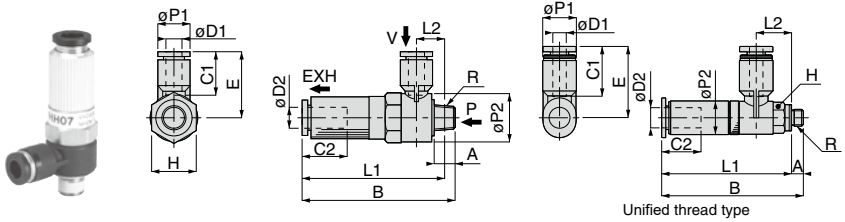
Model code	Tube O.D. øD	R	A	B	L1	L2	øP1	øP2	C	E	Hex. H	Nozzle bore (mm)	Operating pressure (psi)	Final vacuum (-inHg)	Suction flow (scfm)	Air consumption (scfm)
VHH05-5/32 U10U	5/32	10-32 UNF	0.12	1.36	1.24	0.41	0.39	0.39	0.59	0.83	5/16	0.5	72.5	26.6	0.25	0.41
VHH05-1/4 N1U	1/4	1/8NPT	0.31	1.89	1.73	0.45	0.49	0.72	0.67	0.98	11/16	0.7				
VHH07-1/4 N1U						1	1.34					2.47				
VHH10-1/4 N1U						1.2										
VHH12-1/4 N1U						1										
VHH10-5/16 N1U	5/16	1/4NPT	0.43	2.83	2.60	0.49	0.59	0.87	0.71	1.10	7/8	1.2	19.5	0.99	1.62	
VHH12-5/16 N1U						0.45										
VHH15-5/16 N2U	3/8	1/4NPT	0.43	2.83	2.60	0.59	0.71	0.87	0.79	1.14	7/8	1.5	27.2	1.34	1.62	
VHH15-3/8 N2U						0.59										
VHH15-5/8 N2U						0.71										
VHL05-5/32 U10U	5/32	10-32 UNF	3.5	35	31.5	10.5	10	9.8	14.9	21.2	8	0.5	72.5	19.5	0.42	0.41
VHL05-1/4 N1U	1/4	1/8NPT	0.31	1.89	1.73	0.45	0.49	0.72	0.67	0.98	11/16	0.7				
VHL07-1/4 N1U												1				
VHL10-1/4 N1U												0.7				
VHL07-5/16 N1U												1				
VHL10-5/16 N1U	5/16	1/4NPT	0.43	2.83	2.60	0.49	0.59	0.87	0.71	1.10	7/8	1.5	19.5	1.48	1.62	
VHL15-5/16 N2U						0.45										
VHL15-3/8 N2U	3/8	1/4NPT	0.43	2.83	2.60	0.59	0.71	0.87	0.79	1.22	7/8	1.5	27.2	3.35	3.53	
VHL15-1/2 N2U						0.65										
VHL15-1/2 N2U	1/2					0.85			0.93	1.44		1.5				
VHE07-1/4 N1U	1/4	1/8NPT	0.31	1.89	1.73	0.45	0.49	0.72	0.67	0.98	11/16	0.7	50.8	27.2	0.37	0.60
VHE10-1/4 N1U												1				
VHE12-1/4 N1U												1.2				
VHE10-5/16 N1U												1				
VHE12-5/16 N1U	5/16	1/4NPT	0.43	2.83	2.60	0.49	0.59	0.87	0.71	1.10	7/8	1.2	27.2	0.74	1.20	
VHE15-5/16 N2U						1.2										
VHE15-5/16 N2U	3/8	1/4NPT	0.43	2.83	2.60	0.45	0.71	0.87	0.79	1.14	7/8	1.5	27.2	0.95	1.66	
VHE15-3/8 N2U						0.59										

\* "L1" and "L2" are reference dimensions after tightening the taper thread.

# VH Valve Direct Mounting Type Elbow (Tube Exhaust)

RoHS compliant

NPT thread



Unit : inch

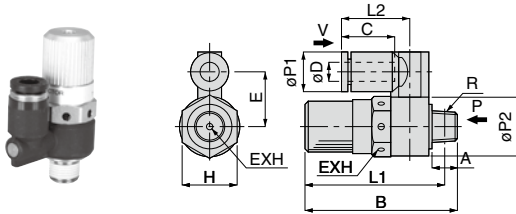
Model code	Tube O.D. øD1	Tube O.D. øD2	R	A	B	L1	L2	øP1	øP2	C1	C2	E	Hex. H	Nozzle bore (mm)	Operating pressure (psi)	Final vacuum (-inHg)	Suction flow (sfcm)	Air consumption (sfcm)	
VHH05-5/32U10JU	5/32	1/4	10-32UNF	0.12	1.85	1.73	0.41	0.39	0.47	0.59	0.67	0.83	5/16	0.5		26.6	0.25	0.41	
VHH05-1/4 N1JU	1/4	5/16	1/8NPT	0.31	1.89	1.73	0.45	0.49	0.72	0.67	0.69	0.98	0.7	72.5		27.5	0.46	0.81	
VHH07-1/4 N1JU							0.99	1.62											
VHH10-1/4 N1JU	1/4	5/16	1/8NPT	0.31	1.89	1.73	0.45	0.49	0.72	0.67	0.69	0.98	1	72.5		27.5	1.34	2.47	
VHH12-1/4 N1JU							0.99	1.62											
VHH10-5/16 N1JU	5/16	1/2	1/4NPT	0.43	2.83	2.60	0.49	0.59	0.71	0.85	1.14	1.22	7/8	1.5			2.22	3.53	
VHH12-5/16 N1JU							0.53	0.59					0.87						0.79
VHH15-5/16-N2JU	5/16	1/2	1/4NPT	0.43	2.83	2.60	0.53	0.59	0.87	0.79	0.85	1.14	1.22	7/8	1.5		2.22	3.53	
VHL05-5/32U10JU	5/32	6	10-32UNF	3.5	42.1	38.6	10.5	10	10	14.9	11.7	21.2	5/16	0.5					
VHL05-1/4-N1JU	1/4	5/16	1/8NPT	0.31	1.89	1.73	0.45	0.49	0.72	0.67	0.69	0.98	0.7	72.5		19.5	0.42	0.41	
VHL07-1/4-N1JU							0.92	0.81											
VHL10-1/4-N1JU	1/4	5/16	1/8NPT	0.31	1.89	1.73	0.45	0.49	0.72	0.67	0.69	0.98	1	72.5		19.5	1.48	1.62	
VHL07-5/16 N1JU							0.49	0.59					0.71				1.10	0.7	0.92
VHL10-5/16 N1JU	5/16	1/2	1/4NPT	0.43	2.83	2.60	0.49	0.59	0.71	0.85	1.14	1.22	7/8	1.5			3.35	3.53	
VHL15-5/16 N2JU							0.53	0.59					0.71						0.87
VHL15-3/8 N2JU	3/8	1/2	1/4NPT	0.43	2.83	2.60	0.53	0.59	0.71	0.87	0.79	0.85	1.14	1.22	7/8	1.5		3.35	3.53
VHL15-1/2 N2JU	1/2	1/2	1/4NPT	0.43	2.83	2.60	0.65	0.85	0.87	0.79	0.93	1.44	7/8	1.5					
VHE07-1/4 N1JU	1/4	5/16	1/8NPT	0.31	1.89	1.73	0.45	0.49	0.72	0.67	0.69	0.98	0.7	50.8		27.2	0.37	0.60	
VHE10-1/4 N1JU							0.92	1.20											
VHE12-1/4 N1JU	1/4	5/16	1/8NPT	0.31	1.89	1.73	0.45	0.49	0.72	0.67	0.69	0.98	1	50.8		27.2	0.74	1.20	
VHE10-5/16 N1JU							0.95	1.66											
VHE12-5/16 N1JU	5/16	1/2	1/4NPT	0.43	2.83	2.60	0.49	0.59	0.71	0.85	1.14	1.22	7/8	1.5			0.74	1.20	
VHE10-10/16 N1JU							0.53	0.59					0.71						0.87
VHE15-5/16 N2JU	5/16	1/2	1/4NPT	0.43	2.83	2.60	0.53	0.71	0.87	0.79	0.85	1.14	1.22	7/8	1.5		1.48	2.47	
VHE15-15/16 N2JU							0.59	0.71											0.87
VHE15-3/8 N2JU	3/8	1/2	1/4NPT	0.43	2.83	2.60	0.59	0.71	0.87	0.79	0.85	1.14	1.22	7/8	1.5		1.48	2.47	

※ "L1" and "L2" are reference dimensions after tightening the taper thread.

**VS** Valve Direct Mounting Type Straight (Silencer vent)

RoHS compliant

NPT thread



Unit : Inch

Model code	Tube O.D. øD	R	A	B	L1	L2	øP1	øP2	C	E	Hex. H	Nozzle bore (mm)	Operating pressure (psi)	Final vacuum (-inHg)	Suction flow (scfm)	Air consumption (scfm)
VSH05-1/4 N1U	1/4	1/8NPT	0.31	1.89	1.73	1.26	0.49	0.72	0.67	0.98	11/16	0.5	72.5	26.6	0.25	0.41
VSH07-1/4 N1U						0.7						0.46			0.81	
VSH10-1/4 N1U						1						0.99			1.62	
VSH12-1/4 N1U						1.2						1.34			2.47	
VSH10-5/16 N1U	5/16	1/8NPT	0.31	1.89	1.73	1.30	0.59	0.87	0.71	1.10	7/8	1	72.5	27.5	0.99	1.62
VSH12-5/16 N1U						1.2						1.34			1.62	
VSH15-5/16 N2U	3/8	1/4NPT	0.43	2.83	2.60	1.48	0.71	0.87	0.79	1.22	7/8	1.5	72.5	27.5	2.22	3.53
VSH15-3/8 N2U						1.57						0.79			1.22	
VSL05-1/4 N1U						1/4						1/8NPT			0.31	1.89
VSL07-1/4 N1U	0.7	0.92	0.81													
VSL10-1/4 N1U	1	1.48	1.62													
VSL07-5/16 N1U	0.7	0.92	0.81													
VSL10-5/16 N1U	5/16	1/8NPT	0.31	1.89	1.73	1.30	0.59	0.87	0.71	1.10	7/8	1	72.5	19.5	1.48	1.62
VSL15-5/16 N2U						1.48						0.79			1.22	
VSL15-3/8 N2U	3/8	1/4NPT	0.43	2.83	2.60	1.57	0.71	0.87	0.79	1.22	7/8	1.5	72.5	19.5	3.35	3.53
VSL15-1/2 N2U	1/2	1/2				1.67	0.85		0.93	1.44						
VSE07-1/4 N1U	1/4	1/8NPT	0.31	1.89	1.73	1.26	0.49	0.72	0.67	0.98	11/16	0.7	50.8	27.2	0.37	0.60
VSE10-1/4 N1U						1						0.74			1.20	
VSE12-1/4 N1U						1.2						0.95			1.66	
VSE10-5/16 N1U						1						0.74			1.20	
VSE12-5/16 N1U	5/16	1/8NPT	0.31	1.89	1.73	1.30	0.59	0.87	0.71	1.10	7/8	1.2	50.8	27.2	0.95	1.66
VSE15-5/16 N2U						1.48						0.79			1.22	
VSE15-3/8 N2U	3/8	1/4NPT	0.43	2.83	2.60	1.57	0.71	0.87	0.79	1.22	7/8	1.5	50.8	27.2	1.48	2.47

\* "L1" is reference dimension after tightening the taper thread.

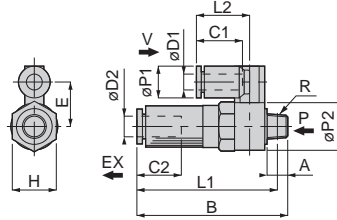
# Vacuum Generator Series

## Vacuum Generator VH,VS

### VS Valve Direct Mounting Type Straight (Tube Exhaust)

RoHS compliant

NPT thread



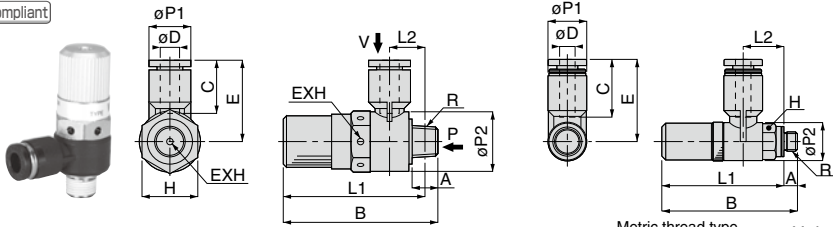
Unit : inch

Model code	Tube O.D. øD1	Tube O.D. øD2	R	A	B	L1	L2	øP1	øP2	C1	C2	E	Hex. H	Nozzle bore (mm)	Operating pressure (MPa)	Final vacuum (-kPa)	Suction flow (l/min/ANR)	Air consumption (l/min/ANR)
VSH05-1/4 N1JU	1/4	5/16	1/8NPT	0.31	1.89	1.73	1.26	0.49	0.72	0.67	0.69	17.2	11/16	0.5	72.5	26.6	0.25	0.41
VSH07-1/4 N1JU							0.7							0.46			0.81	
VSH10-1/4 N1JU							1							0.99			1.62	
VSH12-1/4 N1JU							1.2							1.34			2.47	
VSH10-5/16 N1JU	5/16	1/2	1/4NPT	0.43	2.83	2.60	1.30	0.59	0.87	0.71	0.85	18.2	7/8	1	72.5	27.5	0.99	1.62
VSH12-5/16 N1JU							1.2							1.34			1.62	
VSH15-5/16 N2JU							19.2							2.22			3.53	
VSH15-3/8-N2JU							20.8							2.22			3.53	
VSL05-1/4 N1JU	1/4	5/16	1/8NPT	0.31	1.89	1.73	1.26	0.49	0.72	0.67	0.69	17.2	11/16	0.5	72.5	19.5	0.42	0.41
VSL07-1/4 N1JU							0.7							0.92			0.81	
VSL10-1/4 N1JU							1							1.48			1.62	
VSL07-5/16 N1JU							0.7							0.92			0.81	
VSL10-5/16 N1JU	5/16	1/2	1/4NPT	0.43	2.83	2.60	1.30	0.59	0.87	0.71	0.85	18.2	7/8	1	72.5	27.2	1.48	1.62
VSL15-5/16 N2JU							19.2							3.35			3.53	
VSL15-3/8 N2JU							20.8							3.35			3.53	
VSL15-1/2 N2JU							22.5							3.35			3.53	
VSE07-1/4 N1JU	1/4	5/16	1/8NPT	0.31	1.89	1.73	1.26	0.49	0.72	0.67	0.69	17.2	11/16	0.7	50.8	27.2	0.37	0.60
VSE10-1/4 N1JU							1							0.74			1.20	
VSE12-1/4 N1JU							1.2							0.95			1.66	
VSE10-5/16 N1JU							1							0.74			1.20	
VSE12-5/16 N1JU	5/16	1/2	1/4NPT	0.43	2.83	2.60	1.30	0.59	0.87	0.71	0.85	18.2	7/8	1.2	50.8	27.2	0.95	1.66
VSE15-5/16 N2JU							19.2							1.48			2.47	
VSE15-3/8 N2JU							20.8							1.48			2.47	
VSE15-3/8 N2JU							20.8							1.48			2.47	

\* "L1" is reference dimension after tightening the taper thread.

**VH** Valve Direct Mounting Type Elbow (Silencer vent)

RoHS compliant



Metric thread type Unit : mm

Model code	Tube O.D. øD	R	A	B	L1	L2	øP1	øP2	C	E	Hex. H	Nozzle bore (mm)	Operating pressure (MPa)	Final vacuum (-kPa)	Suction flow (l/min/ANR)	Air consumption (l/min/ANR)	Weight (g)	CAD file name														
VHH05-4M5	4	M5×0.8	3.5	35	31.5	10.5	10	9.8	14.9	21.2	8	0.5	0.5	90	7	11.5	13	VH_05-4M5														
VHH05-601	6	R1/8	8	48	44	11.4	12.4	18.4	17	25.5	17	0.7					13	23	37	36.5	VH_601											
VHH10-601												1																				
VHH12-601												1.2																				
VHH10-801												1																				
VHH12-801	8	R1/4	11	71.5	65.5	13.5	14.4	22	18.1	28.4	22	1.2					28	46	38	37.5	VH_801											
VHH15-802	1.5																															
VHH15-1002	2																															
VHH20-1002	2																															
VHH20-1003	10	R3/8	12	100.6	93.5	15.8	17.6	28	20.2	33.6	24	2					104	200	116	126	VH_20-1003											
VHH20-1202	12																					R1/4	11	99.6	93.5	16.8	21	23.4	36.4	116	126	VH_20-1203
VHH20-1203																																
VHL05-4M5	4												M5×0.8	3.5	35	31.5						10.5	10	9.8	14.9	21.2	8	0.5	0.5	66	12	11.5
VHL05-601	6	R1/8	8	48	44	11.4	12.4	18.4	17	25.5	17	0.7	26	23	37	36.5	VH_601															
VHL07-601												1																				
VHL10-601												0.7																				
VHL07-801												1																				
VHL10-801	8	R1/4	11	71.5	65.5	13.5	14.4	22	18.1	28.4	22	1.5	26	23	38.5	37.5	VH_801															
VHL15-802	1.5																															
VHL15-1002	2																															
VHL15-1202	2																															
VHL20-1002	10	R3/8	12	100.6	94.2	15.8	17.6	28	20.2	33.6	24	2	174	200	116	126	VH_20-1003															
VHL20-1003	12																	R1/4	11	99.6	93.5	16.8	21	23.4	36.4	116	126	VH_20-1202				
VHL20-1202																																
VHL20-1203	R3/8																	12	100.6	94.2	17.5	126										
VHE07-601	6	R1/8	8	48	44	11.4	12.4	18.4	17	25.5	17	0.7	10.5	17	36.5	37	VH_601															
VHE10-601												1																				
VHE12-601												1.2																				
VHE10-801												1																				
VHE12-801	8	R1/4	11	71.5	65.5	13.5	14.4	22	18.1	28.4	22	1.2	21	34	38.5	38	VH_801															
VHE15-802	1.2																															
VHE15-1002	1.5																															
VHE20-1002	1.5																															
VHE20-1003	10	R3/8	12	100.6	94.2	15.8	17.6	28	20.2	33.6	24	2	82	150	116	126	VH_20-1003															
VHE20-1202	12																	R1/4	11	99.6	93.5	16.8	21	23.4	36.4	116	126	VH_20-1202				
VHE20-1203																													R3/8	12	100.6	94.2

※ "L1" and "L2" are reference dimensions after tightening the taper thread.

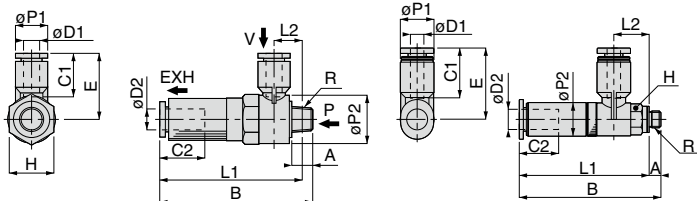
# Vacuum Generator Series

## Vacuum Generator VH,VS

### VH Valve Direct Mounting Type Elbow (Tube Exhaust)

RoHS compliant

Copper alloy free  
Selectable



Metric thread type

Unit : mm

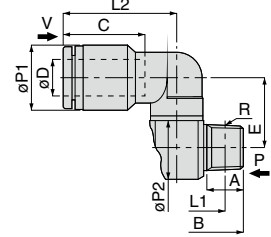
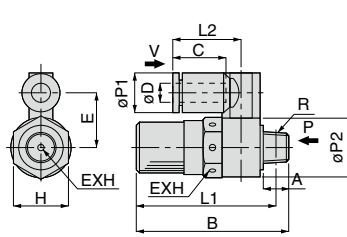
Model code	Tube OD øD1	Tube OD øD2	R	A	B	L1	L2	øP1	øP2	C1	C2	E	Hex. H	Nozzle bore (mm)	Operating pressure (MPa)	Final vacuum (kPa)	Suction flow (l/min/ANR)	Air consumption (l/min/ANR)	Weight (g)	CAD file name								
VHH05-4M5J	4	6	M5×0.8	3.5	42.1	38.6	10.5	10	10	14.9	11.7	21.2	8	0.5	0.5	90	7	11.5	18	VH_15-4M5J								
VHH05-601J	6	8	R1/8	8	58.4	54.4	11.4	12.4	18.4	17	25.5	17	0.7	13					23	44.5	28	46	45.5	VH_601J				
VHH10-601J													1												38	70	44	
VHH12-601J													1.2												28	46	45.5	
VHH10-801J	8	12	R1/4	11	76.9	70.9	13.5	14.4	18.1	18.2	28.4	22	1	28					46	46	28	46	45.5	VH_801J				
VHH12-801J													1.2												38	70	46	
VHH15-802J													1.5												63	100	92	
VHH15-1002J	10	12	R1/4	11	76.9	70.9	14.8	17.6	22	20.2	23.3	33.6	24	2					104	200	128	138	94.5	VH_15-802J				
VHH20-1002J																									1.5	63	100	92
VHH20-1202J																									2	104	200	128
VHH20-1203J	12	12	R3/8	12	90.4	84	15.8	17.6	28	23.4	36.4	24	2	104					200	128	138	94.5	VH_20-1002J					
VHH20-1202J																								1.5	63	100	92	
VHH20-1203J															2	104	200	128										
VHL05-4M5J	4	6	M5×0.8	3.5	42.1	38.6	10.5	10	10	14.9	11.7	21.2	8	0.5	0.5	90	7	11.5	18	VH_15-4M5J								
VHL05-601J	6	8	R1/8	8	58.4	54.4	11.4	12.4	18.4	17	25.5	17	0.7	26					23	45	21	34	44.5	VH_601J				
VHL10-601J													1												42	46	44	
VHL07-801J													0.7												26	23	46	
VHL10-801J	8	12	R1/4	11	76.9	70.9	13.5	14.4	18.1	18.2	28.4	22	1	28					46	46	28	46	45	VH_801J				
VHL15-802J													1.5												63	100	89.5	
VHL15-1002J													1.5												95	100	93	
VHL15-1202J	10	12	R1/4	11	76.9	70.9	14.8	17.6	22	20.2	23.4	36.9	22	1.5					95	100	96.5	96.5	96.5	VH_15-802J				
VHL20-1002J																									1.5	63	100	93
VHL20-1003J																									2	104	200	128
VHL20-1202J	10	12	R3/8	12	90.4	84	15.8	17.6	28	20.2	23.3	33.6	24	2					174	200	128	138	96.5	VH_20-1002J				
VHL20-1202J																									1.5	63	100	92
VHL20-1203J															2	104	200	128										
VHE07-601J	6	8	R1/8	8	58.4	54.4	11.4	12.4	18.4	17	25.5	17	0.7	10.5	17	45	21	34	44.5	VH_601J								
VHE10-601J													1								27	47	44.5					
VHE12-601J													1.2								21	34	46.5					
VHE10-801J	8	12	R1/4	11	76.9	70.9	13.5	14.4	18.1	18.2	28.4	22	1	21	34	46.5	27	47	45.5	VH_801J								
VHE12-801J													1.2								21	34	46.5					
VHE15-802J													1.5								42	70	92					
VHE15-1002J	10	12	R1/4	11	76.9	70.9	14.8	17.6	22	20.2	23.4	36.9	22	1.5	95	100	96.5	96.5	96.5	VH_15-802J								
VHE20-1002J																					1.5	63	100	92				
VHE20-1003J																					2	104	200	128				
VHE20-1202J	10	12	R3/8	12	90.4	84	15.8	17.6	28	20.2	23.3	33.6	24	2	82	150	128	138	96.5	VH_20-1002J								
VHE20-1202J																					1.5	63	100	92				
VHE20-1203J																					2	104	200	128				

※ "L1" and "L2" are reference dimensions after tightening the taper thread.

※ Add "-S3" at the end of model code for "Copper alloy free".

**VS** Valve Direct Mounting Type Straight (Silencer vent)

RoHS compliant



VS□20-□□ Unit : mm

Model code	Tube O.D. øD	R	A	B	L1	L2	øP1	øP2	C	E	Hex. H	Nozzle bore (mm)	Operating pressure (MPa)	Final vacuum (-kPa)	Suction flow (l/min/AVR)	Air consumption (l/min/AVR)	Weight (g)	CAD file name			
VSH05-601	6	R1/8	8	48	44	20.2	12.6	18.4	17	17.2	17	0.5	0.5	90	7	11.5	38	VS_601			
VSH07-601												0.7			13	23	38.5				
VSH10-601												1			28	46	38				
VSH12-601												1.2			38	70	37.5				
VSH10-801	8					21.6	14.6	18.1	18.2					93	1	28	46	40	VS_801		
VSH12-801															1.2	38	70	39.5			
VSH15-802															19.2	19.2	20.8	22		1.5	63
VSH15-1002	10	R1/4	11	71.5	65.5	24.7	17.8	22	20.2	20.8	22	1.5	0.5	93	104	200	121	129	VS_15-1002		
VSH20-1202	12	R3/8	12	99.6	93.5	35.2	21	28	23.4	25	24	2			121	129	VS_20-1202				
VSH20-1203				100.6	94.2	35.2	21	28	23.4	25	24	2			129	VS_20-1203					
VSL05-601	6	R1/8	8	48	44	20.2	12.6	18.4	17	17.2	17	0.5	0.5	66	12	11.5	37.5	VS_601			
VSL07-601												0.7			26	23	38				
VSL10-601												1			42	46	37.5				
VSL07-801												0.7			26	23	39.5				
VSL10-801	8					21.6	14.6	18.1	18.2						1	42	46	39	VS_801		
VSL15-802	19.2														19.2	20.8	22	1.5		76.5	VS_15-802
VSL15-1002	10														R1/4	11	71.5	65.5		24.7	17.8
VSL15-1202	12	R3/8	12	99.6	93.5	27.4	21.2	23.4	22.5	84.5	VS_15-1202										
VSL20-1202				35.2	21	28	23.4	25	24	2	174	200	121	129	VS_20-1202						
VSL20-1203				100.6	94.2	35.2	21	28	23.4	25	24	2	129	VS_20-1203							
VSE07-601	6	R1/8	8	48	44	20.2	12.6	18.4	17	17.2	17	0.7	0.35	92	10.5	17	38	VS_601			
VSE10-601												1			21	34			38		
VSE12-601												1.2			27	47			37		
VSE10-801												1			21	34			40		
VSE12-801	8					21.6	14.6	18.1	18.2						1.2	27	47	39.5	VS_801		
VSE15-802	19.2														79.5	VS_15-802					
VSE15-1002	10														R1/4	11	71.5	65.5		24.7	17.8
VSE20-1202	12	R3/8	12	99.6	93.5	35.2	21	28	23.4	25	24	2	82	150	121	129	VS_20-1202				
VSE20-1203				100.6	94.2	35.2	21	28	23.4	25	24	2	129	VS_20-1203							

※ "L1" is reference dimension after tightening the taper thread.



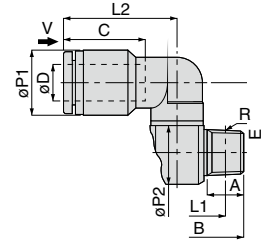
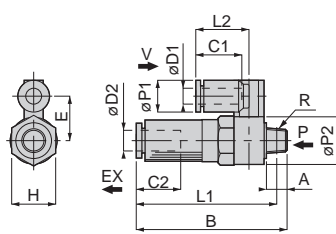
# Vacuum Generator Series

## Vacuum Generator VH,VS

### VS Valve Direct Mounting Type Straight (Tube Exhaust)

oHS compliant

Copper alloy free  
Selectable



VS□20-□□ Unit : mm

Model code	Tube O.D. øD1	Tube O.D. øD2	R	A	B	L1	L2	øP1	øP2	C1	C2	E	Hex. H	Nozzle bore (mm)	Operating pressure (MPa)	Final vacuum (kPa)	Suction flow (mm <sup>3</sup> /s)	Air consumption (mm <sup>3</sup> /s)	Weight (g)	CAD file name																	
VSH05-601J	6	8	R1/8	8	58.4	54.4	20.2	12.6	18.4	17	18.2	17.2	17	0.5	0.5	90	7	11.5	46	VS_601J																	
VSH07-601J														0.7			13	23	46.5																		
VSH10-601J														1			28	46	46																		
VSH12-601J														1.2			38	70	45																		
VSH10-801J	8	8	R1/8	8	58.4	54.4	20.2	12.6	18.4	17	18.2	17.2	17	0.5	0.5	93	28	46	47.5	VS_801J																	
VSH12-801J														1			28	46	47																		
VSH15-802J														1.2			38	70	47																		
VSH15-1002J														1.2			38	70	47																		
VSH15-1002J	10	12	R1/4	11	76.9	70.9	22.4	17.8	22	20.2	23.3	19.2	22	1.5	0.5	93	63	100	94	VS_15-802J																	
VSH15-1202J																	97.5	100	97.5																		
VSH20-1202J																	133	104	200		133																
VSH20-1203J																	141	104	200		141																
VSH20-1203J	12	12	R3/8	12	90.4	84	35.2	21	28	23.4	25	24	2	0.5	0.5	93	104	200	133	VS_20-1202J																	
VSH20-1203J																	141	104	200		141																
VSL05-601J																	6	8	R1/8		8	58.4	54.4	20.2	12.6	18.4	17	18.2	17.2	17	0.5	0.5	66	12	11.5	46.5	VS_601J
VSL07-601J																															0.7			26	23	46.5	
VSL10-601J	1	42	46	45.5																																	
VSL07-801J	0.7	26	23	48																																	
VSL10-801J	8	8	R1/8	8	58.4	54.4	20.2	12.6	18.4	17	18.2	17.2	17	0.5	0.5	66	42	46	47	VS_801J																	
VSL15-802J														1			42	46	47																		
VSL15-1002J														1.5			95	100	91.5																		
VSL15-1002J														1.5			95	100	96																		
VSL15-1202J	10	12	R1/4	11	76.9	70.9	22.4	17.8	22	20.2	23.3	20.8	22	1.5	0.5	66	95	100	99	VS_15-1002J																	
VSL15-1202J																	99	100	99																		
VSL20-1202J																	133	104	200		133																
VSL20-1202J																	141	104	200		141																
VSL20-1203J	12	12	R3/8	12	90.4	84	35.2	21	28	23.4	25	24	2	0.5	0.5	66	174	200	141	VS_20-1202J																	
VSL20-1203J																	141	174	200		141																
VSE07-601J																	6	8	R1/8		8	58.4	54.4	20.2	12.6	18.4	17	18.2	17.2	17	0.7	0.35	92	10.5	17	46	VS_601J
VSE10-601J																															1			21	34	44.5	
VSE12-601J	1.2	27	47	46																																	
VSE10-801J	1	21	34	47.5																																	
VSE12-801J	8	8	R1/8	8	58.4	54.4	20.2	12.6	18.4	17	18.2	17.2	17	0.35	0.35	92	27	47	47	VS_801J																	
VSE15-802J														1.2			27	47	47																		
VSE15-1002J														1.5			42	70	94.5																		
VSE15-1002J														1.5			42	70	98																		
VSE20-1202J	10	12	R1/4	11	76.9	70.9	22.4	17.8	22	20.2	23.3	20.8	22	1.5	0.35	92	82	150	133	VS_15-1002J																	
VSE20-1202J																	133	82	150		133																
VSE20-1202J																	141	82	150		141																
VSE20-1203J																	141	82	150		141																
VSE20-1203J	12	12	R3/8	12	90.4	84	35.2	21	28	23.4	25	24	2	0.35	0.35	92	82	150	141	VS_20-1202J																	
VSE20-1203J																	141	82	150		141																
VSE20-1203J																	141	82	150		141																
VSE20-1203J																	141	82	150		141																

\* "L1" is reference dimension after tightening the taper thread.

\* Add "-S3" at the end of model code for "Copper alloy free".



# SAFETY Instructions

This safety instructions aim to prevent personal injury and damage to properties by requiring proper use of PISCO products.

Be certain to follow ISO 4414 and JIS B 8370

ISO 4414 : Pneumatic fluid power...Recommendations for the application of equipment to transmission and control systems.

JIS B 8370 : General rules and safety requirements for systems and their components.

This safety instructions is classified into "Danger", "Warning" and "Caution" depending on the degree of danger or damages caused by improper use of PISCO products.



## Danger

Hazardous conditions. It can cause death or serious personal injury.



## Warning

Hazardous conditions depending on usages. Improper use of PISCO products can cause death or serious personal injury.



## Caution

Hazardous conditions depending on usages. Improper use of PISCO products can cause personal injury or damages to properties.



## Warning

### 1. Selection of pneumatic products

- ① A user who is a pneumatic system designer or has sufficient experience and technical expertise should select PISCO products.
- ② Due to wide variety of operating conditions and applications for PISCO products, carry out the analysis and evaluation on PISCO products. The pneumatic system designer is solely responsible for assuring that the user's requirements are met and that the application presents no health or safety hazards. All designers are required to fully understand the specifications of PISCO products and constitute all systems based on the latest catalog or information, considering any malfunctions.

### 2. Handle the pneumatic equipment with enough knowledge and experience

- ① Improper use of compressed air is dangerous. Assembly, operation and maintenance of machines using pneumatic equipment should be conducted by a person with enough knowledge and experience.

### 3. Do not operate machine / equipment or remove pneumatic equipment until safety is confirmed.

- ① Make sure that preventive measures against falling work-pieces or sudden movements of machine are completed before inspection or maintenance of these machine.
- ② Make sure the above preventive measures are completed. A compressed air supply and the power supply to the machine must be off, and also the compressed air in the systems must be exhausted.
- ③ Restart the machines with care after ensuring to take all preventive measures against sudden movements.

## Disclaimer

1. PISCO does not take any responsibility for any incidental or indirect loss, such as production line stop, interruption of business, loss of benefits, personal injury, etc., caused by any failure on use or application of PISCO products.
  2. PISCO does not take any responsibility for any loss caused by natural disasters, fires not related to PISCO products, acts by third parties, and intentional or accidental damages of PISCO products due to incorrect usage.
  3. PISCO does not take any responsibility for any loss caused by improper usage of PISCO products such as exceeding the specification limit or not following the usage the published instructions and catalog allow.
  4. PISCO does not take any responsibility for any loss caused by remodeling of PISCO products, or by combinational use with non-PISCO products and other software systems.
  5. The damages caused by the defect of Pisco products shall be covered but limited to the full amount of the PISCO products paid by the customer.
-



# SAFETY INSTRUCTION MANUAL

PISCO products are designed and manufactured for use in general industrial machines. Be sure to read and follow the instructions below.

## Danger

1. Do not use PISCO products for the following applications.
  - ① Equipment used for maintaining / handling human life and body.
  - ② Equipment used for moving / transporting human.
  - ③ Equipment specifically used for safety purposes.

## Warning

1. Do not use PISCO products under the following conditions.
  - ① Beyond the specifications or conditions stated in the catalog, or the instructions.
  - ② Under the direct sunlight or outdoors.
  - ③ Excessive vibrations and impacts.
  - ④ Exposure / adhere to corrosive gas, inflammable gas, chemicals, seawater, water and vapor. \*  
\* Some products can be used under the condition above(④), refer to the details of specification and condition of each product.
2. Do not disassemble or modify PISCO products, which affect the performance, function, and basic structure of the product.
3. Turn off the power supply, stop the air supply to PISCO products, and make sure there is no residual air pressure in the pipes before maintenance and inspection.
4. Do not touch the release-ring of push-in fitting when there is a working pressure. The lock may be released by the physical contact, and tube may fly out or slip out.
5. Frequent switchover of compressed air may generate heat, and there is a risk of causing burn injury.
6. Avoid any load on PISCO products, such as a tensile strength, twisting and bending. Otherwise, there is a risk of causing damage to the products.
7. As for applications where threads or tubes swing / rotate, use Rotary Joints, High Rotary Joints or Multi-Circuit Rotary Block only. The other PISCO products can be damaged in these applications.
8. Use only Die Temperature Control Fitting Series, Tube Fitting Stainless SUS316 Series, Tube Fitting Stainless SUS316 Compression Fitting Series or Tube Fitting Brass Series under the condition of over 60°C (140° F) water or thermal oil. Other PISCO products can be damaged by heat and hydrolysis under the condition above.
9. As for the condition required to dissipate static electricity or provide an antistatic performance, use EG series fitting and antistatic products only, and do not use other PISCO products. There is a risk that static electricity can cause system defects or failures.
10. Use only Fittings with a characteristic of spatter-proof such as Anti-spatter or Brass series in a place where flame and weld spatter is produced. There is a risk of causing fire by sparks.
11. Turn off the power supply to PISCO products, and make sure there is no residual air pressure in the pipes and equipment before maintenance. Follow the instructions below in order to ensure safety.
  - ① Make sure the safety of all systems related to PISCO products before maintenance.
  - ② Restart of operation after maintenance shall be proceeded with care after ensuring safety of the system by preventive measures against unexpected movements of machines and devices where pneumatic equipment is used.
  - ③ Keep enough space for maintenance when designing a circuit.
12. Take safety measures such as providing a protection cover if there is a risk of causing damages or fires on machine / facilities by a fluid leakage.

## ⚠ Caution

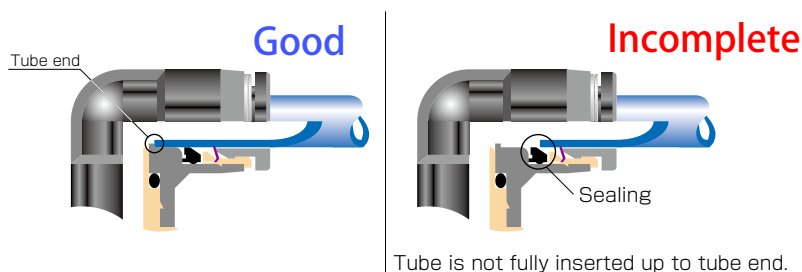
1. Remove dusts or drain before piping. They may get into the peripheral machine / facilities and cause malfunction.
2. When inserting an ultra-soft tube into push-in fitting, make sure to place an Insert Ring into the tube edge. There is a risk of causing the escape of tube and a fluid leakage without using an Insert Ring.
3. The product incorporating NBR as seal rubber material has a risk of malfunction caused by ozone crack. Ozone exists in high concentrations in static elimination air, clean-room, and near the high-voltage motors, etc. As a countermeasure, material change from NBR to HNBR or FKM is necessary. Consult with PISCO for more information.
4. Special option "Oil-free" products may cause a very small amount of a fluid leakage. When a fluid medium is liquid or the products are required to be used in harsh environments, contact us for further information.
5. In case of using non-PISCO brand tubes, make sure the tolerance of the outer tube diameter is within the limits of Table 1.

● Table 1. Tube O.D. Tolerance

mm size	Nylon tube	Polyurethane tube	inch size	Nylon tube	Polyurethane tube
ø1.8mm	—	± 0.05mm	ø1/8	± 0.1mm	± 0.15mm
ø3mm	—	± 0.15mm	ø5/32	± 0.1mm	± 0.15mm
ø4mm	± 0.1mm	± 0.15mm	ø3/16	± 0.1mm	± 0.15mm
ø6mm	± 0.1mm	± 0.15mm	ø1/4	± 0.1mm	± 0.15mm
ø8mm	± 0.1mm	± 0.15mm	ø5/16	± 0.1mm	± 0.15mm
ø10mm	± 0.1mm	± 0.15mm	ø3/8	± 0.1mm	± 0.15mm
ø12mm	± 0.1mm	± 0.15mm	ø1/2	± 0.1mm	± 0.15mm
ø16mm	± 0.1mm	± 0.15mm	ø5/8	± 0.1mm	± 0.15mm

## 6. Instructions for Tube Insertion

- ① Make sure that the cut end surface of the tube is at right angle without a scratch on the surface and deformations.
- ② When inserting a tube, the tube needs to be inserted fully into the push-in fitting until the tubing edge touches the tube end of the fitting as shown in the figure below. Otherwise, there is a risk of leakage.



- ③ After inserting the tube, make sure it is inserted properly and not to be disconnected by pulling it moderately.
- ※ When inserting tubes, Lock-claws may be hardly visible in the hole, observed from the front face of the release-ring. But it does not mean the tube will surely escape. Major causes of the tube escape are the followings;
- ① Shear drop of the lock-claws edge
  - ② The problem of tube diameter (usually small)
- Therefore, follow the above instructions from ① to ③, even lock-claws is hardly visible.

7. Instructions for Tube Disconnection

- ① Make sure there is no air pressure inside of the tube, before disconnecting it.
- ② Push the release-ring of the push-in fitting evenly and deeply enough to pull out the tube toward oneself. By insufficient pushing of the release-ring, the tube may not be pulled out or damaged by scratch, and tube shavings may remain inside of the fitting, which may cause the leakage later.

8. Instructions for Installing a fitting

- ① When installing a fitting, use proper tools to tighten a hexagonal-column or an inner hexagonal socket. When inserting a hex key into the inner hexagonal socket of the fitting, be careful so that the tool does not touch lock-claws. The deformation of lock-claws may result in a poor performance of systems or an escape of the tube.
- ② Refer to Table 2 which shows the recommended tightening torque. Do not exceed these limits to tighten a thread. Excessive tightening may break the thread part or deform the gasket and cause a fluid leakage. Tightening thread with tightening torque lower than these limits may cause a loosened thread or a fluid leakage.
- ③ Adjust the tube direction while tightening thread within these limits, since some PISCO products are not rotatable after the installation.

● Table 2: Recommended tightening torque / Sealock color / Gasket materials

Thread type	Thread size	Tightening torque	Sealock color	Gasket materials
Metric thread	M3 × 0.5	0.7N·m	—	SUS304 NBR
	M5 × 0.8	1.0 ~ 1.5N·m		
	M6 × 1	2 ~ 2.7N·m		
	M3 × 0.5	0.7N·m		POM
	M5 × 0.8	1 ~ 1.5N·m		
	M6 × 0.75	0.8 ~ 1N·m		
Taper pipe thread	M8 × 0.75	1 ~ 2N·m	White	—
	R1/8	4.5 ~ 6.5N·m		
	R1/4	7 ~ 9N·m		
	R3/8	12.5 ~ 14.5N·m		
Unified thread	R1/2	20 ~ 22N·m	—	SUS304, NBR
	No.10-32UNF	1.0 ~ 1.5N·m		
National pipe thread taper	1/16-27NPT	4.5 ~ 6.5N·m	White	—
	1/8-27NPT	4.5 ~ 6.5N·m		
	1/4-18NPT	7 ~ 9N·m		
	3/8-18NPT	12.5 ~ 14.5N·m		
	1/2-14NPT	20 ~ 22N·m		

※ These values may differ for some products. Refer to each specification as well.

9. Instructions for removing a fitting

- ① When removing a fitting, use proper tools to loosen a hexagonal-column or an inner hex bolt.
- ② Remove the sealant stuck on the mating equipment. The remained sealant may get into the peripheral equipment and cause malfunctions.

10. Arrange piping avoiding any load on fittings and tubes such as twist, tensile, moment load, shaking and physical impact. These may cause damages to fittings, tube deformations, bursting and the escape of tubes.

## ⚠ Detailed Safety Instructions

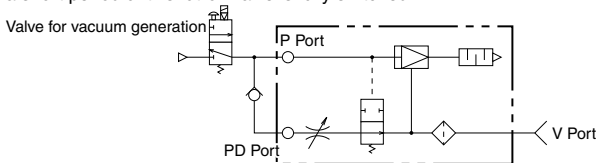
Before using PISCO products, be sure to read "Safety Instructions" and "Safety Instruction Manual", "Common Safety Instructions for Vacuum Series" and "Common Safety Instructions for Mechanical Vacuum Switch".

### Warning

1. For the VC type with  $M5 \times 0.8$ , piping direction cannot be changed after installation of the body.
2. Before installing VY type, thoroughly read this instruction for piping method of VY Vacuum Generator. Wrong piping may cause injuries to human bodies and damage to equipments.
3. Resin body of VY vacuum filter is made of PP. Material deterioration may be caused by exposure to direct sunlight or ultra-violet rays.
4. Please do not apply load in a pulling direction to the generator VU and VUM. The tension loading may cause breakup of the generator.
5. Please avoid increasing unnecessary inner pressure for VU and VUM. Metal part may come away from resin unit.

### Caution

1. In order to adjust blow-off air and blow-off time of VY Vacuum Generator, thoroughly read the catalog and understand the method.
2. The filter element of VY type is not replacable. When the replacement is necessary, replace the whole vacuum filter unit.
3. When applying different pressure level for vacuum generation and blow-off for VY, keep the blow-off pressure level under the level of vacuum generation. If the blow-off pressure level is higher than the level of vacuum generation, it may cause air leakage.
4. When the unit is used as following piping diagram, the blow-off air from check valve is exhausted from V port for a short period until shut-off valve is fully switched.



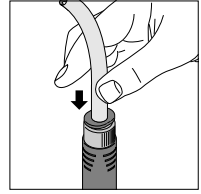
5. When connecting a tube for VY Vacuum Filter, please do not apply excessive force. It may break the inside of filter.
6. In the assembly after the maintenance of filter of VUM, confirm the plug is installed in the right position as shown in the below construction first, and then install the spacer and filter element. It is unnecessary to take out the plug at the maintenance.
7. In case of VU and VUM type, make sure to place the right part in the correct position with right method (There must not be space between the resin body and the vacuum port unit) at the filter element maintenance. Otherwise, the satisfactory product performance cannot be obtained.

## How to insert and disconnect

### 1. How to insert and disconnect tubes

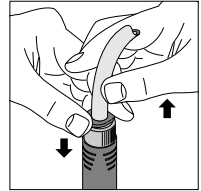
#### ① Tube insertion

Insert a tube into Push-In Fitting of the vacuum generator up to the tube end. Lock-claws bite the tube to fix it and the elastic sleeve seals around the tube. Refer to "2. Instructions for Tube Insertion" under "Common Safety Instructions for Fittings" .



#### ② Tube disconnection

The tube is disconnected by pushing release-ring to release Lock-claws. Make sure to stop air supply before the tube disconnection.

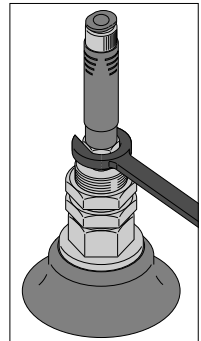


### 2. How to tighten thread

#### ① Tightening thread

There are two ways to fix vacuum generators. One is tightening a hexagonal-column by a proper spanner, and the other is fixing with M4 thread at the fixing holes which is adopted to VB and VUSM.

Refer to the outer dimensional drawings of the hole pitch.







## Common Safety Instructions for Vacuum Series

Before selecting or using PISCO products, read the following instructions. Read the detailed instructions for individual series.

### Warning

1. If there is a risk of dropping work-pieces during vacuum suction, take a safety measure against the falling of them.
2. Avoid supplying more than 0.1MPa pressure constantly in a vacuum circuit. Since vacuum generators are not explosive-proof, there is a risk of damaging the products.
3. Pay attention to drop of vacuum pressure caused by problems of the supplied air or the power supply. Decrease of suction force may lead to a danger of falling work-piece so that safety measure against the falling of them is necessary.
4. When more than 2 vacuum pads are plumbed on a single ejector and one of them has a suction problem such as vacuum leak, there is a risk of releasing work-pieces from the other pad due to the drop of the vacuum pressure.
5. Do not use in the way by which exhaust port is blocked or exhaust resistance is increased. Otherwise, there is a risk of no vacuum generation or a drop of the vacuum pressure.
6. Do not use the product in the circumstance of corrosive gas, inflammable gas, explosive gas, chemicals, seawater and vapor or do not expose the product to those. Never allow the product to suck those things.
7. Provide a protective cover on the products when it is exposed to sunlight.
8. Carry out clogging check for silencer element in an ejector and a vacuum filter periodically. Clogged element will be a cause to impair the performance or a cause of troubles.
9. Before replacing the element, thoroughly read and understand the method of filter replacement in the catalog.
10. Make sure the correct port of the vacuum generator by this catalog or marking on the products when plumbing. Wrong plumbing can be a risk to damage the product.
11. Supply clean air without sludge or dusts to an ejector. Do not lubricate by a lubricator. There is a risk of malfunction or performance impairing by impurities and oil contained in the compressed air.
12. Do not apply extreme tension, twist or bending forces on a lead wire. Otherwise, it may cause a wire breaking.
13. Locknut needs to be tightened firmly by hand. Do not use any tool to tighten. In case of using tools to tighten the locknut, it may damage the locknut or the product. Inadequate tightening may loosen the locknut and the initial setting can be changed.
14. Do not force the product to rotate or swing even its resin body is rotatable. It may cause damage to the product and a fluid leakage.
15. Do not supply an air pressure or a dry air to the products over the necessary amount. There is a risk of deteriorating rubber materials and malfunction due to oil.
16. Keep the product away from water, oil drops or dusts. These may cause malfunction. Take a proper measure to protect the product before the operation.

17. Do not use the product in the environment of inflammable or explosive gas / fluid. It can cause a fire or an explosion hazard.
18. Do not use the product in the circumstance of corrosive gas, inflammable gas, explosive gas, chemicals, seawater and vapor or do not expose the product to those. Otherwise, it may be a cause of malfunction.
19. Do not clean or paint the products by water or a solvent.

## **Caution**

1. Operating pressure range in the catalog is the values during ejector operation. Secure the described value of the supplied air, taking a drop of the pressure into consideration. Insufficient pressure, which does not satisfy the spec, may cause abnormal noise, unstable performance and may negatively affect sensors, bringing troubles at last.
2. Effective cross-section area of the air supply side needs to be three times as large as effective cross-section area of the nozzle bore. When arranging piping or selecting PISCO products, secure required effective cross-section area. Insufficient supply pressure may be a cause to impair performance.
3. A Shorter distance of plumbing with a wider bore is preferable at vacuum system side. A long plumbing with a small bore may result in slow response time at the time of releasing work-piece as well as in failure to secure adequate suction flow rate.
4. Plumb a vacuum switch and an ejector with vacuum switch at the end of vacuum system as much as possible. A long distance between a vacuum switch and a vacuum system end may increase plumbing resistance which may lead to a high vacuum level at the sensor even when no suctioning and a malfunction of vacuum switch. Make sure to evaluate the products in an actual system.
5. Refer to "4. Instructions for Installing a fitting" and "5. Instructions for Removing a fitting" under "Common Safety Instructions for Fittings" , when installing or removing Fittings.
6. Refer to "Common Safety Instructions for Pressure Sensors" and "Detailed Safety Instructions" for the handling of digital vacuum switch sensor.
7. Refer to "Common Safety Instructions for Mechanical Vacuum Sensor" for the handling of mechanical vacuum switch.
8. The material of plastic filter cover for VG, VK, VJ, VZ and VX series is PCTG. Avoid the adherence of Chemicals below to the products, and do not use them under those chemical environments.

### ● Table Chemical Name

Chemical Name
Thinner
Carbon tetrachloride
Chloroform
Acetate
Aniline
Cyclohexane
Trichloroethylene
Sulfuric acid
Lactic acid
Water soluble cutting oil (alkaline)

\* There are more chemicals which should be avoided. Contact us for the use under chemical circumstance.

## Vacuum Generator

9. The material of plastic filter cover for VQ and VFU series is PA. Avoid the adherence of chemicals below to the products, and do not use them under those chemical environments.

● Table Chemical Name

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

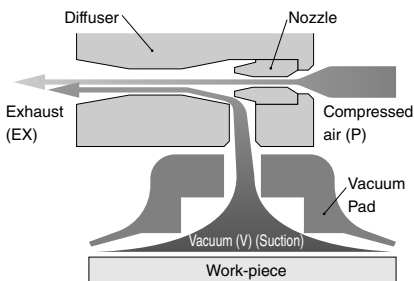
\* There are more chemicals which should be avoided. Contact us for the use under chemical circumstance.

## ⚠ Common Safety Instructions for Mechanical Vacuum Switch

### ⚠ Warning

1. Do not use mechanical vacuum switch in the environment of inflammable or explosive gas / fluid. Since the products are not explosive-proof structure, use in such environment may cause a fire or an explosion.
2. Keep a mechanical vacuum switch away from water, oil drops or dusts which may cause malfunction. The product is not drip / dust proof structure.
3. Applying 0.5 MPa instantaneously to a mechanical vacuum switch does not affect on its performance, but do not apply more than 0.2 MPa constantly. It may cause damage to the switch.
4. Use a vacuum switch within the described pressure setting range in the specifications. There is a risk of malfunction by a hysteresis when the products are operated with the pressure beyond the range.
5. Make sure to turn off the power supply before plumbing mechanical vacuum switch. Pay special attention to lead wire colors to prevent a wrong wiring.

## Mechanism of Vacuum Generator



- An ejector (Vacuum generator) can generate the vacuum suction force by applying a compressed air to it. Its mechanism is explained in the left figure.
- Compressed air is squeezed and released to diffuser with high speed. The vacuum force is generated by a drop of pressure level due to a high-speed jet flow, and enables to convey a work-piece.
- An ejector consists of a nozzle and a diffuser in order to obtain a high degree of vacuum level by a high-speed jet flow. Final vacuum, exhaust airflow (suction flow) and air consumption are determined by the shapes and dimensions of these components.