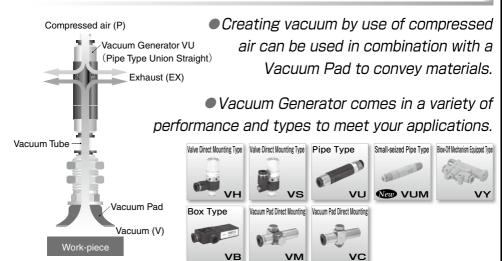


Ejector for Various Piping Conditions Vacuum Generators



For the applications requiring copper alloy free material and countermeasures against low ozone concentration, VH, VS, VU, and VC are selectable.

Metal parts material is copper alloy free. HNBR is used for seal rubber material.

52

·VS

/UM

VY

VB

RL

VK

...

VQ

VZ

VN

VH

VUM

VB

VM · VC

■ Characteristicss

VY Type (With Blow-Off Mechanism)

• Ejector and Blow-Off Mechanism are integrated.

VY Type provides a high cost performance, compared to a normal solenoid valve equipped type.

 Small and lightweight body makes it possible to place on the terminal part of the vacuum piping. High speed cycle of suction and Blow-Off Mechanism is achieved by diffuser spool.

WVUM Type (Super small pipe type)

■ Super small and lightweight ejector.
Outer diameter: Ø8.5mm, Weight: Max. 7.7g

Nozzle bore selection : Ø0.3, Ø0.4 and Ø0.5mm

VUM Type meets the demands of low air consumption.

Vacuum	Nozzle bore	Rated supply pressure	Vacuum level	Suction flow	Air consumption
characteristics	(ømm)	(MPa)	(-kPa)	(ℓ/min[ANR])	(l/min[ANR])
H03		0.5	90	2	4.5
L03	0.3	0.5	66	3	4.5
E03		0.35	88	1	3.5
H04		0.5	90	4	8
L04	0.4	0.5	66	7	0
E04		0.35	90	2	6.5
H05		0.5	90	7	11.5
L05	0.5	0.5	66	12	11.5
E05		0.35	90	3	8

^{**} The above "Vacuum characteristics" codes mean as follows. "H: High-vacuum type", "L: Large-flow type" and "E: High-vacuum at low air pressure supply type".

- Connectable to small Vacuum pad holder VPMB directly.
- Easy detachment by optional fixing holder (VUKO4).

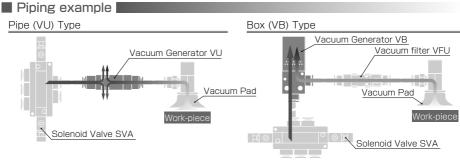
WVC, VM Type (Vacuum pad Direct Mounting)

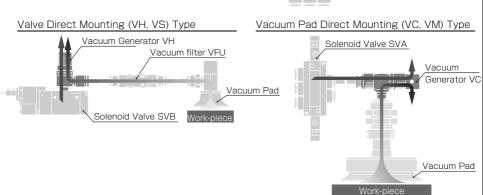
Nozzle bore : Ø0.3 and Ø0.4mm are available in the series (VC and VM).

VC and VM Type meet the demands of low air consumption flow.

Vacuum	Nozzle bore	Rated supply pressure	Vacuum level	Suction flow	Air consumption
characteristics	(ømm)	(MPa)	(-kPa)	(l/min[ANR])	(l/min[ANR])
H03	0.3	0.5	90	2	4.5
L03	0.3	0.5	66	4	4.5
H04	0.4	0.5	90	4	0
L04	0.4	0.5	66	7.5	0

^{**} The above "Vacuum Characteristics" codes mean as follows. "H: High-vacuum type", and "L: Large-flow type".





Blow-Off Mechanism Equipped (VY) Type

■ Example 1 ■ Example 2. Usage with Twin 3-way valve (SVA21). HO . Solenoid Valve SVA Solenoid Valve SVB Tube Fitting Regulator PY Type RVU Check Valve Vacuum CVPU Type GeneratorV\ Vacuum GeneratorVY Vacuum Pad Work-piece Vacuum Pad

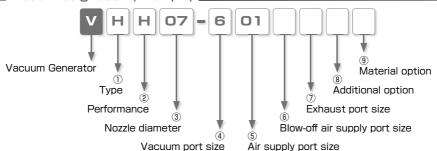
Connect P Port and PD Port with Check Valve (Purchase separately). The residual pressure between Check Valve and PD Port turns into a blowoff air. The flow rate of the blow-off air is adjusted by a release needle. Blow-off time can be controlled by the tube length between Check Valve and PD Port.

Work-piece can be released instantly by adjusting a blow-off pressure and a flow rate. But it is necessary to pay attention not to blow away the work-piece. The above figure shows an example to arrange the different pressure supplies to vacuum generation side and Blow-Off Mechanism side when a blow-off pressure needs to be controlled low (Pressure to vacuum generation side ≥ Pressure to Blow-Off Mechanism side). A blowoff air is adjusted by the release needle. Blow-off time is controlled by the solenoid valve (SVA21 series).

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Work-piece

■ Model Designation (Example)



① Type

Code	Туре	Code	Туре	Code	Туре
Н	Valve Direct Mounting Type Elbow	U	Pipe Type	UM	Small-seized Pipe Type
M	Vacuum Pad Direct Mounting Type Elbow	S	Valve Direct Mounting Type Straight	В	Box Type
С	Vacuum Pad Direct Mounting Type Straight	Υ	Blow-Off Mechanism Equipped Type		

2 Performance

Code	Performance	Code	Performance	Code	Performance
ш	High-vacuum type	1	Large-flow type	E	High-vacuum at low air pressure supply type
"	(Rated supply pressure : 0.5MPa)	J	(Rated supply pressure : 0.5MPa)		(Rated supply pressure : 0.5MPa)

3 Nozzle bore

Codo	Nozzle bore	H type	L type	E type	
Code	NOZZIE DOIE	Vacuum level, Suction flow	Vacuum level, Suction flow	Vacuum level, Suction flow	
03	ø0.3mm	-90kPa、2l/min[ANR]*1	-66kPa、4l/min[ANR]*1	-88kPa、1ℓ/min[ANR]*1	2
04	ø0.4mm	00kDo 44/min[AND]*1	VUM type: -66kPa, 7t/min[ANR]*1	-90kPa、2t/min[ANR]*1	1.
04	00.4111111	-90kPa、4l/min[ANR]*1	VC, VM type : -66kPa、7.5t/min[ANR]*1	-90kPa、20min[ANH]	⋚⋰∥
05	ø0.5mm	-90kPa、7ℓ/min[ANR]	-66kPa、12t/min[ANR]	-90kPa、3t/min[ANR]*2	751
07	ø0.7mm	-92 ~ -93kPa、 12.5 ~ 13t/min[ANR]	-66kPa、22 ~ 26t/min[ANR]	-90 ~ 92kPa、 10 ~ 10.5t/min[ANR]	∀ 8 >
10	ø1.0mm	-93kPa、28ℓ/min[ANR]	-66kPa、42l/min[ANR]	-92kPa、21ℓ/min[ANR]	1.
12	ø1.2mm	-93kPa、38ℓ/min[ANR]	-	-92kPa、27t/min[ANR]	-
15	ø1.5mm	-93kPa、63ℓ/min[ANR]	-66kPa、95t/min[ANR]	-92kPa、42t/min[ANR]	
20	ø2.0mm	-93kPa、104t/min[ANR]	-66kPa、174t/min[ANR]	-92kPa、82t/min[ANR]	

- \divideontimes 1. Nozzle bore Ø0.3 and 0.4mm of H, L and E type are only for VUM, VC and VM .
- № 2. Nozzle bore ø0.3 and 0.4mm of E type with is only for VUM.
- ※ 3. Supply pressure of H and L type is 0.5MPa and that of E type is 0.35MPa.

■ VY type

Code	Nozzle bore H type		L type	E type	
Code	NOZZIE DOIE	Vacuum level, Suction flow	Vacuum level, Suction flow	Vacuum level, Suction flow	
05	ø0.5mm	-90kPa、7ℓ/min[ANR]	-66kPa、12l/min[ANR]	-90kPa、3l/min[ANR]	
07	ø0.7mm	-92kPa、12.5l/min[ANR]	Tube O.D. ø4mm: -66kPa、184/min[ANR]	-90kPa、9l/min[ANR]	
07	טט.וווווו	-92KFa, 12.34MM[ANK]	Tube O.D. ø6mm: -66kPa、214/min[ANR]	-90KFA、90MIN[ANK]	

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VU

VUM

VB VM·VC 4 Vacuum port size

J	oint typ	е		Pus	sh-In Fit	ting			Metric	thread	(mm)	Tape	r pipe th	read
	Code	180	3	4	6	8	10	12	МЗ	M5	M6	01	02	03
	Size	ø1.8mm	ø3mm	ø4mm	ø6mm	ø8mm	ø10mm	ø12mm	M3×0.5	M5×0.8	M6×1	R1/8	R1/4	R3/8
	VH, V	S		0	0	0	0	0						
	VB, V	Υ		0	0									
_	- VU	ı		0	0					0	0	0		
7	NUN	И О	0	0					0	0				
	VC	;								0	0	0	0	0
	VIV	1								0	0			

5 Air supply port size

Joint type			Pι	ısh-In Fitti	ng		Metric thread (mm)		Taper pipe thread		
С	ode	3	4	6	8	10	M5	M6	01	02	03
S	ize	ø3mm	ø4mm	ø6mm	ø8mm	ø10mm	M5×0.8	M6×1	R1/8	R1/4	R3/8
	VH, VS						0	0	0	0	0
	VB, VY		0	0							
7	VU		0	0							
уре	VUM	0	0								
	VC	0	0	6C, 6L	8C, 8L	10C, 10L					
	VM	0	0								

6 Blow-off air supply port size (VY only)

Code	4	6
Tube dia.	ø4mm	ø6mm

① Exhaust port (VH, VS, VU, VC and VY only)

Code	No code	J
Port type	Silencer vent	Tube exhaust

Additional option (VU, VB and VY only)

Code	Α	Р	S	F
Additional option	Separable type (VU only)	Resin type (VB only)	With mechanical vacuum switch (VB only)	With vacuum filter (VY only)

Material option

Code	No code	-S3
Material	Standard	Copper alloy free material
Applicable types	All types	VH (Tube exhaust) VS (Tube exhaust) VU (Tube exhaust) VC (Tube exhaust)

■ Model Designation of Mechanical Vacuum Switch



Mechanical Vacuum Switch

Pressure port (Negative pressure)

① Pressure port (Negative pressure)

Code	4	6
Tube dia.	ø4mm	ø6mm

■ Specification (Excluding VY))

Fluid medium	Air
Operating pressure range	0.15 ~ 0.7MPa
Rated pressure supply	H, L type:0.5MPa(E type:0.35MPa)
Operating temp. range	0 ~ 60°C (No freezing)

■ Specification of Box Union Switch Type VB and Mechanical Vacuum Switch Type VUSM

Pressure detection	Diaphragm to Micro switch
Fluid medium	Air
Operating temp. range	0 ~ 60°C (No freezing)
Micro switch rating	3A 250V
Pressure setting range	-20 ~ -66kPa
Accuracy	±5kPa
Differential response	22kPa
Factory default pressure	-53kPa
Lead wire	Length: About 300mm (White: Common, Red: Normally closed, Black: Normally open)

■ Specification of Blow-off Mechanism Equipped VY

Fluid medium	Air
Operating pressure range	0.3 ~ 0.7MPa
Rated pressure supply	H, L type: 0.5MPa (E type: 0.35MPa)
Operating temp. range	5 ~ 50°C
Lubrication	Not required

■ Specification of Vacuum Filter for VY

Fluid medium	Air
Operating pressure range	-100 ~ 0kPa
Filtering capacity	10µm
Operating temp. range	0 ~ 60°C (No freezing)
Filter area	Joint size 44 : 0.8cm ²
riitei aiea	Joint size 66 : 1.1cm ²
Material	PVF (Polyvinyl formal)

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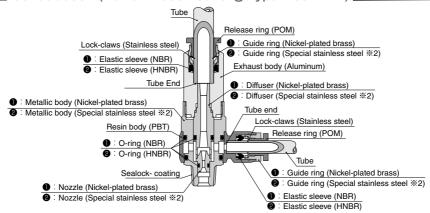
VH·VS VU

VU

٠.

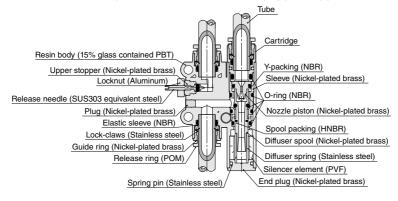
VM - VC

■ 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.

Construction (Blow-Off Mechanism Equipped Type: VY)



Vacuum Generator VH.VS.VU.VUM.VB.VM.VC.VY

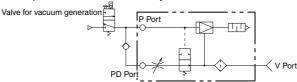
Before using PISCO products, be sure to read "Safety Instructions" and "Safety Instruction Manual" on page 35-39, "Common Safety Instructions for Vacuum Series" on page 47-49 and "Common Safety Instructions for Mechanical Vacuum Switch" on page 50.

Warning

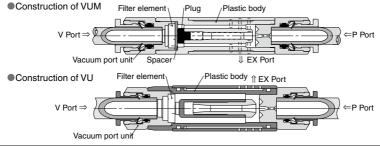
- 1. For the VC type with M5×0.8, piping direction cannot be changed after installation of the body.
- 2. Before installing VY type, thoroughly read this instruction for piping method of VY Vacuum Generator. Wrong piping may cause injuries to human bodies and damage to equipments.
- 3. Resin body of 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.



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VII

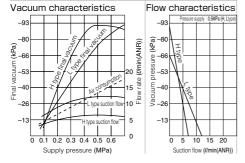
VUM

VM - VC

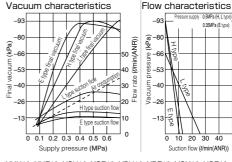
Characteristics

Supply pressure - Final vacuum / Suction Flow / Air Consumption

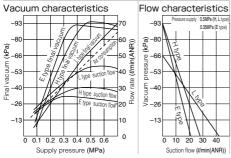
VHH05, VHL05, VSH05, VSL05, VBH05, VBL05



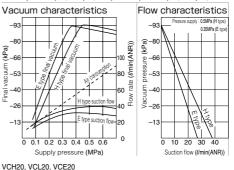
VHH07, VHL07, VHE07, VSH07, VSL07, VSE07, VBH07, VBL07, VBE07, VCH07, VCL07, VCE07



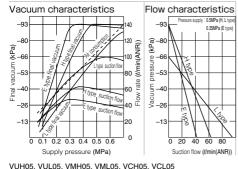
VHH10, VHL10, VHE10, VSH10, VSL10, VSE10, VBH10, VBL10, VBE10, VCH10, VCL10, VCE10

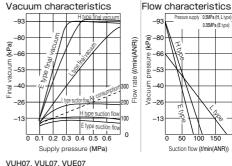


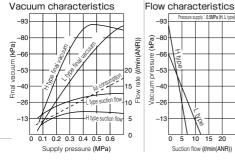
VHH12, VHE12, VSH12, VSE12, VBH12, VBE12, VCH12, VCE12



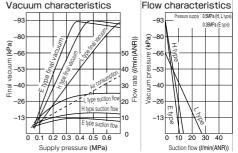
VHH15, VHL15, VHE15, VSH15, VSL15, VSE15, VCH15, VCL15, VCE15











VU

VUM

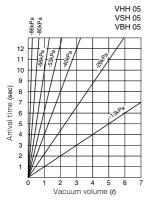
VΒ

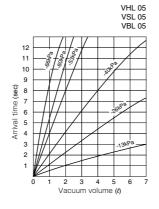
 $VM \cdot VC$

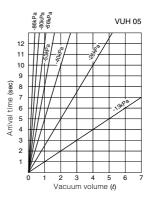
■ Characteristics

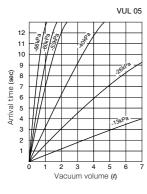
Vacuum arrival time (Supply pressure H and L types: 0.5MPa, E type: 0.3 to 0.5Mpa)

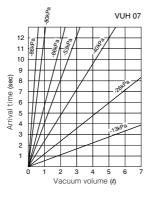
* The following graphs is for reference only since the values vary according to the piping arrangement.

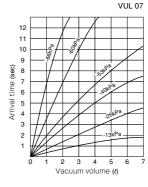


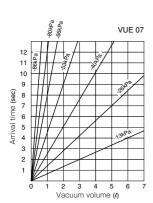


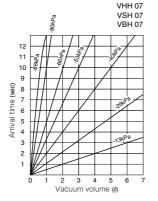


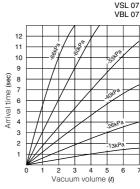




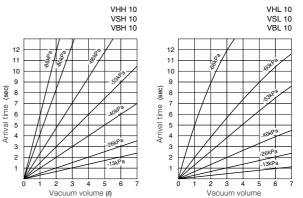




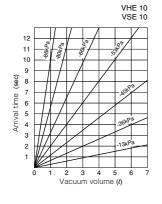




VHL 07



VHH 12



3

Vacuum volume (t)

VHE 07

VSE 07

VBE 07

6

-80kPa 86kPa

12

11

10

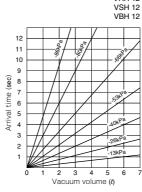
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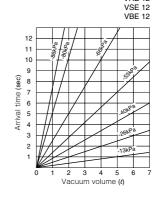
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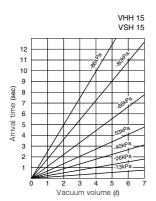
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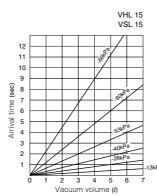
2

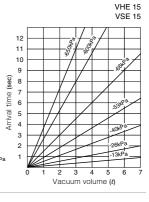
Arrival time (sec)











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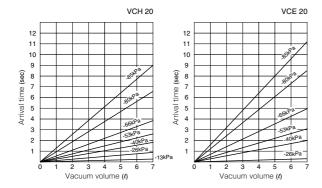
VHE 12

♣ Vacuum Generator Series

Vacuum Generator VH,VS,VU,VUM,VB,VM,VC,VY

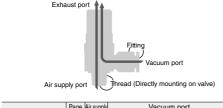
■ Characteristics

Vacuum arrival time (Supply pressure H and L types: 0.5MPa, E type: 0.3 to 0.5Mpa) ** The following graphs is for reference only since the values vary according to the piping arrangement.

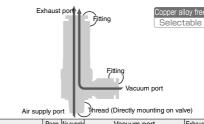


■ Standard Size List |

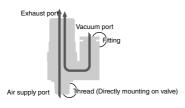
Valve Direct Mounting Type (Nozzle bore: ø0.5 / 0.7 / 1.0 / 1.2 / 1.5 / 2.0mm)



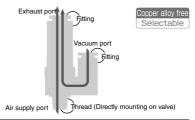
4mm	6mm	0mm	40	
		OHIIII	10mm	12mm
•				
	•	•		
		•	•	•
				•
		•	• •	• • •



Type	Page	Air supply		Vac	cuum p	oort		Exhaust
туре	to refer	port	4mm	6mm	8mm	10mm	12mm	port
VH Valve		M5×0.8	•					6mm
Direct Mounting	69	R1/8		•	•			8mm
Type Elbow Tube	69	R1/4			•	•	•	12mm
Exhaust		R3/8					•	12111111



Time	Page	Air supply		Vacuu	m port	
Type	to refer	port	6mm	8mm	10mm	12mm
VS Valve Direct		R1/8	•	•		
Mounting Type Straight	70	R1/4		•	•	•
(Silencer vent)		R3/8				•



Type	Page	Air supply		Vacuu	m port		Exhaust
туре	to refer	port	6mm	8mm	10mm	12mm	port
VS Valve Direct		R1/8	•	•			8mm
Mounting Type	71	R1/4		•	•	•	12mm
Straight Tube Exhaust		R3/8				•	12111111

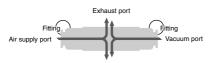
VACUUM

VU

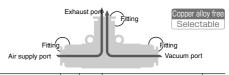
VUM

VB VM·VC

Pipe Type (Nozzle bore: Ø0.3 / 0.4 / 0.5 / 0.7mm) / Box Type (Nozzle bore: Ø0.5 / 0.7 / 1.0 / 1.2mm) Union Type



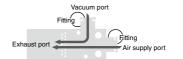




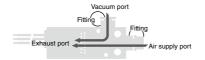
Time	Page	Air supply	Vacuu	m port	Exhaust
Type	to refer	port	4mm	6mm	port
VU Pipe Type Union	75	4mm	•	•	6mm
Straight Tube Exhaust	75	6mm	•	•	6mm



Type	Page	Air supply	Vacuum port				
туре	to refer	port	1.8mm	3mm	4mm		
VUM Pipe Type	77	3mm	•	•	•		
Union Straight(vent)		4mm	•	•	•		

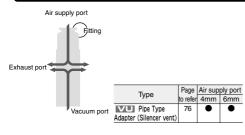


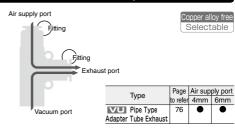
Time	Page	Air supply	Vacuum port		
Туре	to refer	port	4mm	6mm	
VE Box Type	86	4mm	•		
Union	00	6mm		•	



Time	Page	Air supply	Vacuu	m port
Туре	to refer	port	4mm	6mm
VE Box Type	86	4mm	•	
Union Vacuum Switch	00	6mm		•

Pipe Type Adaptor (Nozzle bore: Ø0.5 / 0.7mm)

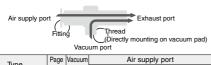




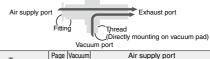
Vacuum Generator VH.VS.VU.VUM.VB.VM.VC.VY

Standard Size List

Vacuum Pad Direct Mounting Type (Nozzle bore: $\emptyset 0.3 / 0.4 / 0.5 / 0.7 / 1.0 / 1.2 / 1.5 / 2.0mm)$



Type	Page	Vacuum	Air supply port
туре	to refer	port	4mm
VIVI Pad Direct	00	M5×0.8	•
Mounting Elbow (Silencer vent)	88	M6×1	•



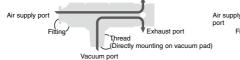
Type	Page	Vacuum	Air supply port
Type	to refer	port	4mm
VC Pad Direct Mounting	88	M5×0.8	•
Straight (Silencer vent)	88	M6×1	•

Copper alloy free Selectable

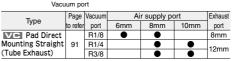
Exhaust

port

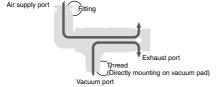
(Directly mounting on vacuum pad)



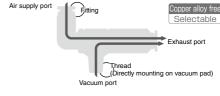
			-							
Type	Page	Vacuum	Air supply port							
туре	to refer	port	6mm	8mm	10mm					
VC Pad Direct		R1/8	•	•						
Mounting Straight	90	R1/4		•	•					
(Silencer vent)		R3/8		•	•					



[hread

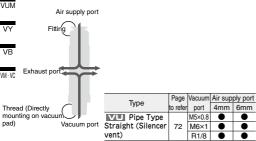


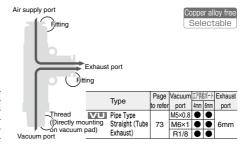


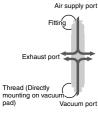


Type	Page	Page Vacuum Air supply port						
Type	to refer	port	6mm	8mm	10mm			
VC Pad Direct		R1/8	•	•				
Mounting Elbow	92	R1/4		•	•			
(Silencer vent)		R3/8		•	•			

Type	Page	Vacuum	Ai	r supply po	ort	Exhaust
Type	to refer	port	6mm	8mm	10mm	port
VC Pad Direct		R1/8	•	•		8mm
Mounting Elbow	93	R1/4		•	•	12mm
(Tube Exhaust)		R3/8		•	•	12mm







VU

VB

Time	Page	Vacuum	Air sup	ply port
Type	to refer	port	3mm	4mm
VUM Pipe Type Union	78	M3×0.5	•	•
Straight (Silencer vent)	/ 0	M5×0.8	•	•

Exhaust port : 6mm

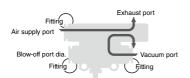
Fitting

Vacuum port

Tube Connecting Type with Blow-Off Mechanism (Nozzle bore: ø0.5 / 0.7mm)

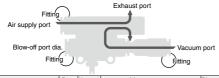
Air supply port

Blow-off port dia



Type	Page	Air supply	Vacuu	m port	Blow-of
туре	to refer	port	4mm	6mm	port dia
Blow-Off Mechanism	83	4mm	•		4mm
incorporated (Silencer vent)	03	6mm		•	6mm





Type	Page	Air supply	Vacuu	m port	Blow-off
туре	to refe	port	4mm	6mm	port dia.
Blow-Off Mechanism ar	83	4mm	•		4mm
Vacuum Filter incorporated (Silencer ve	t) 03	6mm		•	6mm



Time	Page	Air supply	Vacuu	m port	Blow-off
Туре	to refer	port	4mm	6mm	port dia.
Blow-Off Mechanism and	85	4mm	•		4mm
Vacuum Filter incorporated (Tube Exhaust)	65	6mm		•	6mm

Vacuum Generator VH.VS.VU.VUM.VB.VM.VC.VY

■ 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.

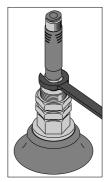


2. How to tighten thread

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.



Applicable Tube and Related Products |

Vacuum Tube (Piping products catalog Vacuum Pads

P.612)

Ultra-soft tube is suitable for vacuum products or actuators.

Vacuum Pad Sponge Series · · · P.468

■ Vacuum Pad Bellows Series · · · P.488

Vacuum Pad Multi-Bellows Series P.508Vacuum Pad Oval Series · · · · P.526

Vacuum au Ovar Series 1.520

Vacuum Pad Soft Series · · · · P.550

Vacuum Pad Soft Bellows Series · P.578

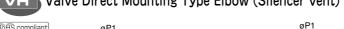
Vacuum Pad Skidproof Series · · P.604

Vacuum Pad Ultrathin Series · · · P.624

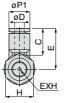
Vacuum Pad Mark-free Series · · P.642

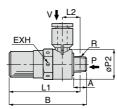
Vacuum Pad Long Stroke Series · P.658

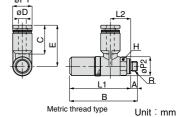
Valve Direct Mounting Type Elbow (Silencer vent)











															,,		Ullit			
Model code	Tube O.D ø D	R		В	L1	L2	øP1	øP2	С	Е	Hex. H	Nozzle bore (mm)	Operating pressure (MPa)	Final vacuum (-kPa)	Suction flow (Amin(ANR))	Air consumption (&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						13	VH_05-4M5		
VHH05-601												0.5		90	7	11.5	36.5			
VHH07-601												0.7			13	23	37			
VHH10-601	6					11.4	12.4		17	25.5		1			28	46		VH601		
VHH12-601		R1/8	8	48	44			18.4			17	1.2	1		38	70	36.5			
VHH10-801												1	1		28	46	38			
VHH12-801	8					12.4	14.4		18.1	28.4		1.2	0.5		38	70	37.5	VH801		
VHH15-802						13.5				28.9				93			77	VH 15-802		
VHH15-1002		R1/4	11	71.5	65.5	14.8		22		31.2	22	1.5			63	100	79.5	VH_15-1002		
VHH20-1002	10			99.6	93.5	15.1	17.6		20.2								116	VH_20-1002		
VHH20-1003		R3/8	12	100.6	94.2	15.8		28		33.6	24				101	200	126	VH_20-1003		
VHH20-1202	12	R1/4	11	99.6	93.5	16.8	21	28	22.4	26.4	24	2			104	200	116	VH_20-1202		
VHH20-1203	12	R3/8	12	100.6	94.2	17.5	21		23.4	36.4							126	VH_20-1203		
VHL05-4M5	4	M5 × 0.8	3.5	35	31.5	10.5	10	9.8	14.9	21.2	8	0.5			12	11.5	13	VH_05-4M5		
VHL05-601												0.5			12	1.5	36.5			
VHL07-601	6					11.4	12.4		17	25.5		0.7			26	23	37	VH601		
VHL10-601		R1/8	8	48	44			18.4			17	1			42	46	36			
VHL07-801						12.4				28.4		0.7			26	23	38.5	VH -801		
VHL10-801	8					12.4	14.4		18.1	20.4		1			42	46	37.5	VII001		
VHL15-802	10					13.5				28.9			0.5	66			75	VH_15-802		
VHL15-1002			R1/4	D1 //	11	71.5	65.5	14.8	17.6	22	20.2	31.2	22	1.5			95	100	77.5	VH_15-1002
VHL15-1202		K1/4		- 1 1			16.5 21		23.4 36.	36.9							81.5	VHL15-1202		
VHL20-1002	10			99.6	93.5	15.1	17.6		20.2	33.6							116	VH_20-1002		
VHL20-1003	10	R3/8	12	100.6	94.2	15.8	17.0	28	20.2	33.0	24	2			174	200	126	VH_20-1003		
VHL20-1202	12	R1/4	11	99.6	93.5	16.8	21	20	23.4	36.4	27	_			174	200	116	VH_20-1202		
VHL20-1203	12	R3/8	12	100.6	94.2	17.5	21		20.4	30.4							126	VH_20-1203		
VHE07-601												0.7			10.5	17	36.5			
VHE10-601	6					11.4	12.4		17	25.5		1			21	34	37	VH601		
VHE12-601		R1/8	8	48	44			18.4			17	1.2			27	47	36.5			
VHE10-801						12.4				28.4		1			21	34	38.5	VH -801		
VHE12-801	8					12.7	14.4		18.1	20.4		1.2			27	47	38	VII_ 001		
VHE15-802				71.5	65.5	13.5		22		28.9	22	1.5	0.35	92	42	70	78	VH_15-802		
VHE15-1002		R1/4	11	71.5	55.5	14.8				31.2		1.5			74	70	80	VH_15-1002		
VHE20-1002	10			99.6	93.5	15.1	17.6		20.2	33.6							116	VH_20-1002		
VHE20-1003		R3/8	12	100.6	94.2	15.8		28		55.0	24	2			82	150	126	VH_20-1003		
VHE20-1202	12	R1/4	11	99.6	93.5	16.8	21		23.4	36.4		_			02	100	116	VH_20-1202		
VHE20-1203		R3/8	12	100.6	94.2	17.5			20.4	50.т							126	VH_20-1203		

^{* &}quot;L1" and "L2" are reference dimensions after tightening the taper thread.

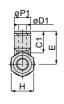
VH Valve Direct Mounting Type Elbow (Tube Exhaust)

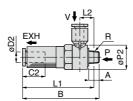


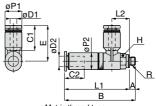


VU

VB VM·VC







Metric thread type		
31	Unit :	mm

Model code
VHH05-601J VHH07-601J VHH10-601J VHH12-601J VHH10-801J 8 R1/8 8 58.4 54.4 11.4 12.4 17 25.5 17 1 10.7 13 23 45.5 18.0 18.2 17 1.2
VHH05-601J VHH07-601J VHH10-601J VHH12-601J VHH10-801J 6 8 R1/8 8 58.4 54.4 11.4 12.4 17 18.2 25.5 17 1 12.2 28.4 44.5 17 1.2 28.4 46.4 44.5 18.0 18.2 17 1.2 1.2 28.4 46.4 45.5 18.0 18.2 1.2 <t< th=""></t<>
VHH10-601J VHH12-601J VHH10-801J 8 R1/8 8 58.4 54.4 11.4 12.4 17 18.2 17 1 1 28 46 44.5 10.5
VHH10-601J VHH12-601J VHH10-801J 8 R1/8 8 58.4 54.4 18.4 18.2 17 1 1.2 1 1 28 46 44.5 38 70 44 VHH10-801J 12.4 12.4 28.4 1 28.4 1 28.4 46.45.5 10.3
VHH12-601J 1.2 38 70 44 VHH10-801J 12 4 28 4 1 28 46 45.5
112 4 128 4 1 1 1 1 1 1 1 1 1
VHH12-801J 8
VHH15-802J 76.9 70.9 13.5 22 28.9 22 1.5 93 63 100 92 11.5
VHH15-1002J R1/4 11 70.9 70.9 14.8 22 31.2 22 1.3 03 100 94.5 MISHID
VHH20-1002J 10 12 89.4 83.3 15.1 17.6 20.2 23.3 33.6
VHH20-1003J 12 90.4 84 15.8 28 28.5 55.5 55.6 104 200 138 MAHIB
VHH20-1202J 12 R1/4 11 89.4 83.3 16.8 21 23.4 36.4 24 2 1 23.4 36.4 27 2 1 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2
VHH20-1203J R3/8 12 90.4 84 17.5 138 MJ/MIN
VHL05-4M5J 4 6 M6×08 3.5 42.1 38.6 10.5 10 10 14.9 11.7 21.2 8 0.5
VHL05-601J 44.5
VHL07-601J 6 11.4 12.4 17 25.5 0.7 26 23 45 IH-60J
VHL10-601J 8 R1/8 8 58.4 54.4 18.4 18.2 17 1 42 46 44
VHL07-801J 12.4 28.4 0.7 26 23 46 WH-901J
VHL10-801J 8 12.7 14.4 18.1 1 42 46 45 10.00
VHL15-802J 13.5 28.9 0.5 66 89.5 限場級
VHL15-1002J 10 R1/4 11 76.9 70.9 14.8 17.6 22 20.2 31.2 22 1.5 95 100 93 Mb/mill
VHL15-1202J 12 16.5 21 23.4 36.9 96.5 HE SUIZ
VHL20-1002J 10 12 89.4 83.3 15.1 17.6 20.2 23.3 33.6
VHL20-1003J R3/8 12 90.4 84 15.8 28 24 2 174 200 138 KB/M
VHL20-1202J 12 R1/4 11 89.4 83.3 16.8 21 23.4 36.4 11 128 順和
VHL20-1203J R3/8 12 90.4 84 17.5 138 順級
VHE07-601J 0.7 10.5 17 45
VHE10-601J 6 11.4 12.4 17 25.5 1 21 34 44.5 IM-600
VHE12-601J 8 R1/8 8 58.4 54.4 18.4 18.2 17 1.2 27 47
VHE10-801J 1 21 34 46.5 映歌
VHE12-801J 8 14.4 18.1 1.2 27 47 45.5
VHE15-802J 76.9 70.9 13.5 22 28.9 22 1.5 0.35 92 42 70 92 11.500
VHE15-1002J R1/4 11 14.8 31.2 95.5 MENDE
VHE20-1002J 10 12 89.4 83.3 15.1 17.6 20.2 23.3 33.6 128 128 128 128 128 128 128 128 128 128
VHE20-1003J R3/8 12 90.4 84 15.8 28 24 2 82 150 138 marks
VHE20-1202J 12 R1/4 11 89.4 83.3 16.8 21 23.4 36.4 128 開始間
VHE20-1203J R3/8 12 90.4 84 17.5 2

^{* &}quot;L1" and "L2" are reference dimensions after tightening the taper thread.

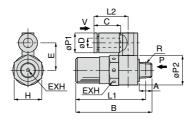
 $[\]ensuremath{\text{\%}}$ Add "-S3" at the end of model code for "Copper alloy free" .

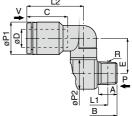




Valve Direct Mounting Type Straight (Silencer vent)





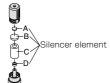


VS[]20-[

														VS∐	20-∐		Unit	: mm
Model	Tube O.D	R	Α	В	L1	L2	øΡ1	øP2	С	Е	Нех.	Nozzle bore	Operating pressure	Final vacuum	Suction flow	Air consumption	Weight	CAD
code	øD					LE	ווש	012			Н	(mm)	(MPa)	(-kPa)	(Umin(ANR))	(¢min(ANR))	(g)	file name
VSH05-601												0.5		90	7	11.5	38	
VSH07-601	6					20.2	12.6		17	17.2		0.7			13	23	38.5	VS -601
VSH10-601	U	R1/8	8	48	44	20.2	12.0	18.4	17	17.2	17	1			28	46	38	VO001
VSH12-601		N1/0	0	40	44			10.4			17	1.2			38	70	37.5	
VSH10-801						21.6				18.2		1	0.5		28	46	40	VS -801
VSH12-801	8					21.0	14.6		18.1	10.2		1.2	0.5	93	38	70	39.5	V3001
VSH15-802				71.5	65.5	22.4		22		19.2	22	1.5			63	100	79	VS_15-802
VSH15-1002	10	R1/4	11	71.5	03.3	24.7	17.8	22	20.2	20.8	22	1.0			00	100	82	VS_15-1002
VSH20-1202	12			99.6	93.5	35.2	21	28	23.4	25	24	2			104	200	121	VS_20-1202
VSH20-1203	12	R3/8	12	100.6	94.2	00.2	21	20	20.4	20	27						129	VS_20-1203
VSL05-601												0.5			12	11.5	37.5	
VSL07-601	6					20.2	12.6		17	17.2		0.7			26	23	38	VS601
VSL10-601		R1/8	8	48	44			18.4			17	1			42	46	37.5	
VSL07-801						21.6				18.2		0.7			26	23	39.5	VS801
VSL10-801	8					21.0	14.6		18.1	10.2		1	0.5	66	42	46	39	VO_ 001
VSL15-802						22.4				19.2			0.5	00			76.5	VS_15-802
VSL15-1002	10	R1/4	11	71.5	65.5	24.7	17.8	22	20.2	20.8	22	1.5			95	100	80.5	VS_15-1002
VSL15-1202		1(1/4	- 1 1			27.4	21.2		23.4	22.5							84.5	VSL15-1202
VSL20-1202	12			99.6		35.2	21	28	23.4	25	24	2			174	200	121	VS_20-1202
VSL20-1203		R3/8	12	100.6	94.2	00.2			20.4	20							129	VS_20-1203
VSE07-601												0.7			10.5	17		
VSE10-601	6					20.2	12.6		17	17.2		1			21	34	38	VS601
VSE12-601		R1/8	8	48	44			18.4			17	1.2			27	47		
VSE10-801						21.6				18.2		1			21	34	40	VS -801
VSE12-801	8						14.6		18.1			1.2	0.35	92	27	47	39.5	_
VSE15-802				71.5	65.5	22.4		22		19.2	22	1.5			42	70		VS_15-802
VSE15-1002	10	R1/4	11			24.7	17.8		20.2	20.8					,,,	. 0	83	VS_15-1002
VSE20-1202	12			99.6		35.2	21	28	23.4	25	24	2			82	150	121	VS_20-1202
VSE20-1203		R3/8	12	100.6	94.2	55.2					2-7	_			02	100	129	VS_20-1203

 $\ensuremath{\,\%\,}$ "L1" is reference dimension after tightening the taper thread.

■ Replacement Element of VH Type |



Element model code	Element parts	Vacuum generator VH model
SEE0802	В	VH □□-□ M5
SE01	A, B, C	VH□□-□01
SE02	B, C, D	VH□□-□02

^{*} Filter element of nozzle bore Ø2.0mm is the same as that of VC type (VCSE20). Refer to page 94.

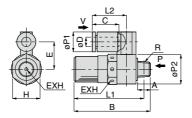
Valve Direct Mounting Type Straight (Tube Exhaust)

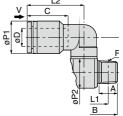










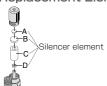


VS∏20-[

															V	الا	20		Unit :	mm
Model	Tube O.D.	Tube O.D.	R	Α	В	L1	12	øP1	øP2	C1	C2	Е	Нех.	Nozzle bore		Final vacuum	Suction flow	Air	Weight	CAD
code	øD1	øD2		A			LZ	ואפן	WF2		02	-	Н	(mm)	pressure (MPa)	(-kPa)	(Imin(ANR))	(Jmin(ANR))	(g)	file name
VSH05-601J														0.5		90	7	11.5	46	
VSH07-601J	6						20.2	12.6		17		17.2		0.7			13	23	46.5	VS -601J
VSH10-601J		8	R1/8	8	58 A	54.4		12.0	18.4	17	18.2	17.2	17	1			28	46	46	VO_70010
VSH12-601J		0	1(1/0	0	50.4	54.4			10.4		10.2		17	1.2			38	70	45	
VSH10-801J							21.6					18.2		1	0.5		28	46	47.5	VS -801J
VSH12-801J	8						21.0	14.6		18.1		10.2		1.2	0.5	93	38	70	47	10_0010
VSH15-802J					76.9	70.9	22.4		22			19.2	22	1.5			63	100	94	VS_15-802J
VSH15-1002J	10	12	R1/4	11			24.7	17.8		20.2	23.3	20.8	-	1.0			- 00	100	97.5	VS_15-1002J
VSH20-1202J	12					83.3	35.2	21	28	23.4	20.0	25	24	2			104	200	133	VS_20-1202J
VSH20-1203J			R3/8	12	90.4	84	00.2			20.1									141	VS_20-1203J
VSL05-601J														0.5			12	11.5	46.5	ĺ
VSL07-601J	6						20.2	12.6		17		17.2		0.7			26	23		VS601J
VSL10-601J		8	R1/8	8	58.4	54.4			18.4		18.2		17	1			42	46	45.5	
VSL07-801J							21.6					18.2		0.7			26	23	48	VS -801J
VSL10-801J	8							14.6		18.1				1	0.5	66	42	46	47	_
VSL15-802J							22.4					19.2							91.5	VS_15-802J
VSL15-1002J	10		R1/4	11	76.9	70.9	24.7		22	20.2		20.8	22	1.5			95	100	96	VS_15-1002J
VSL15-1202J		12					27.4	21.2		23.4	23.3	22.5							99	VSL15-1202J
VSL20-1202J	12				89.4		35.2	21	28	23.4		25	24	2			174	200	133	VS_20-1202J
VSL20-1203J			R3/8	12	90.4	84													141	VS_20-1203J
VSE07-601J														0.7			10.5	17	46	
VSE10-601J	6		D4 10				20.2	12.6		17		17.2		1			21	34		VS601J
VSE12-601J		8	R1/8	8	58.4	54.4			18.4	-	18.2		17	1.2			27	47	46	<u> </u>
VSE10-801J							21.6	440		40.4		18.2		1	0.05	00	21	34	47.5	VS801J
VSE12-801J	8						00.4	14.6		18.1				1.2	0.35	92	27	47	47	110.45.000.1
VSE15-802J	10	ļ	D4 /4		76.9	70.9	22.4	40.0	22	00.0	-	19.2	22	1.5			42	70	94.5	
VSE15-1002J	10	12	R1/4	11	00.4	00.0	24.7	17.8		20.2	23.3	20.8							98	VS_15-1002J
VSE20-1202J	12		D2 /2	10	89.4		35.2	21	28	23.4		25	24	2			82	150	133	VS_20-1202J
VSE20-1203J		12	R3/8	12	90.4	84													141	VS_20-1203J

^{* &}quot;L1" is reference dimension after tightening the taper thread.

■ Replacement Element of VS Type



Element model code	Element parts	Vacuum generator VS model
SE01	A, B, C	VS □□-□01
SE02	B, C, D	VS □ □ - □ 02

^{*} Filter element of nozzle bore Ø2.0mm is the same as that of VC type (VCSE20). Refer to page 94.

VU VUM

VΒ

VM · VC

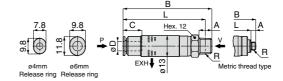
^{*} Add "-S3" at the end of model code for "Copper alloy free" .

Pipe Type Straight (Silencer vent)









											U	nit: mm
Model	Tube O.D	R	А	В	L	С	Nozzle	Final	Suction	Air	Weight	CAD
code	øD	l R	A				bore (mm)	vacuum (-kPa)	flow (Umin(ANR))	consumption (t/min(ANR))	(g)	file name
VUH05-M54A	4	M5 × 0.8	3	50	47	10.9					17.5	VU_05-M54A
VUH05-M56A	6	0.0	3	51.1	48.1	11.7					17	VU_05-M56A
VUH05-M64A	4	M6 × 1	3.4	50.5	47.1	10.9	0.5	90	7	11.5	18	VU_05-M64A
VUH05-M66A	6	1010 × 1	3.4	51.6	48.2	11.7	0.5	90	,	11.5	16.5	VU_05-M66A
VUH05-014A	4	R1/8	8	54	50	10.9					20	VU_05-014A
VUH05-016A	6	K1/0	0	55.1	51.1	11.7					19.5	VU_05-016A
VUH07-M54A	4	M5 × 0.8	3	56.8	53.8	10.9					19	VU_07-M54A
VUH07-M56A	6	0.0	3	57.6	54.6	11.7					18	VU_07-M56A
VUH07-M64A	4	M6 × 1	3.4	57.3	53.9	10.9	0.7	92	12.5	23	19	VU_07-M64A
VUH07-M66A	6	IVIO ^ I	3.4	58.1	54.7	11.7	0.7	92	12.0	23	18.5	VU_07-M66A
VUH07-014A	4	R1/8	8	60.8	56.8	10.9					21	VU_07-014A
VUH07-016A	6	1770	0	61.6	57.6	11.7					20.5	VU_07-016A
VUL05-M54A	4	M5 × 0.8	3	50	47	10.9					17.5	VU_05-M54A
VUL05-M56A	6	1VIO ~ 0.0	3	51.1	48.1	11.7					17	VU_05-M56A
VUL05-M64A	4	M6 × 1	2.1	50.5	47.1	10.9	0.5		12	11.5	17.5	VU_05-M64A
VUL05-M66A	6	1010 ^ 1	3.4	51.6	48.2	11.7	0.5		12	11.5	17	VU_05-M66A
VUL05-014A	4	R1/8	8	54	50	10.9					20	VU_05-014A
VUL05-016A	6	1770	0	55.1	51.1	11.7		66			19.5	VU_05-016A
VUL07-M54A	4	M5 × 0.8	3	56.8	53.8	10.9		00	20		19	VU_07-M54A
VUL07-M56A	6	0.0	3	57.6	54.6	11.7			20		18	VU_07-M56A
VUL07-M64A	4	M6 × 1	3.4	57.3	53.9	10.9	0.7			23	19	VU_07-M64A
VUL07-M66A	6	1010 ^ 1	3.4	58.1	54.7	11.7	0.7		22	23	18	VU_07-M66A
VUL07-014A	4	R1/8	8	60.8	56.8	10.9			22		21	VU_07-014A
VUL07-016A	6	K1/0	0	61.6	57.6	11.7					20.5	VU_07-016A
VUE07-M54A	4	M5 × 0.8	3	56.8	53.8	10.9						VU_07-M54A
VUE07-M56A	6	0.0	3	57.6	54.6	11.7					19	VU_07-M56A
VUE07-M64A	4	M6 × 1	3.4	57.3	53.9	10.9	0.7	90	10	17		VU_07-M64A
VUE07-M66A	6	IVIO X I	3.4	58.1	54.7	11.7	0.7	90	10	17	18.5	VU_07-M66A
VUE07-014A	4	R1/8	8	60.8	56.8	10.9	9				21.5	VU_07-014A
VUE07-016A	6	KI/8	Ö	61.6	57.6	11.7					20.5	VU_07-016A

 $[\]ensuremath{\,\%\,}$ "L1" is reference dimension after tightening the taper thread.

^{*} A knurling knob is used on M5 and M6 thread instead of a hexagonal-column. Hex.12 is used only for 01(R1/8).

Pipe Type Straight Tube Exhaust (Tube exhaust) RoHS compliant Copper alloy free Selectable Release ring Release ring В Unit: mm

									В			Uı	nit : mm						
Model code	Tube O.D. øD	R	А	В	L	С	Е	Nozzle bore	Final vacuum	Suction flow_	Air consumption	Weight							
VUH05-M54J	4			50	47	10.9	22	(mm)	(-kPa)	(Umin(ANR))	(t/min(ANR))	(g) 20	file name VU 05-M54J						
VUH05-M56J	6	M5 × 0.8	3	51.1	48.1	11.7	23.1					19.5	VU 05-M56J						
VUH05-M64J	4			50.5	47.1	10.9	22					20	VU 05-M64J						
VUH05-M66J	6	M6 × 1	3.4	51.6	48.2	11.7	23.1	0.5	90	7	11.5	19.5	VU_05-M66J						
VUH05-014J	4			54	50	10.9	22					22.5	VU 05-014J						
VUH05-016J	6	R1/8	8	55.1	51.1	11.7	23.1					22	VU 05-016J						
VUH07-M54J	4			56.8	53.8	10.9	28.8					21	VU 07-M54J						
VUH07-M56J	6	M5 × 0.8	3	57.6	54.6	11.7	29.6					20.5	VU 07-M56J						
VUH07-M64J	4			57.3	53.9	10.9	28.8					21	VU 07-M64J						
VUH07-M66J	6	M6 × 1	3.4	58.1	54.7	11.7	29.6	0.7	92	12.5	23	20.5	VU 07-M66J						
VUH07-014J	4	04.0		60.8	56.8	10.9	28.8	-				23.5	VU_07-014J						
VUH07-016J	6	R1/8	8	61.6	57.6	11.7	29.6					23	VU_07-016J						
VUL05-M54J	4	ME V 0 0	0	50	47	10.9	22						VU_05-M54J						
VUL05-M56J	6	M5 × 0.8	3	51.1	48.1	11.7	23.1					19.5	VU_05-M56J						
VUL05-M64J	4	M6 × 1	3.4	50.5	47.1	10.9	22	0.5		12	115		VU_05-M64J						
VUL05-M66J	6	1010 ^ 1	3.4	51.6	48.2	11.7	23.1	0.5		12	11.5	19	VU_05-M66J						
VUL05-014J	4	R1/8	8	54	50	10.9	22					22	VU_05-014J						
VUL05-016J	6	K1/0	0	55.1	51.1	11.7	23.1		66			21.5	VU_05-016J						
VUL07-M54J	4	M5 × 0.8	3	56.8	53.8	10.9	28.8		00	20		20	VU_07-M54J						
VUL07-M56J	6	IVIO A 0.0	3	57.6	54.6	11.7	29.6			20		20	VU_07-M56J						
VUL07-M64J	4	M6 × 1	3.4	57.3	53.9	10.9	28.8	0.7			23	21	VU_07-M64J						
VUL07-M66J	6	1010 / 1	5.1	58.1	54.7	11.7	29.6	0.7		22	20	20.5	VU_07-M66J						
VUL07-014J	4	R1/8	8	60.8	56.8	10.9	28.8					23	VU_07-014J						
VUL07-016J	6	1(1/0	0	61.6	57.6	11.7	29.6					22.5	VU_07-016J						
VUE07-M54J	4	M5 × 0.8	3	56.8	53.8	10.9	28.8					21.5	VU_07-M54J						
VUE07-M56J	6	1410 0.0	0	57.6	54.6	11.7	29.6					20.5	VU_07-M56J						
VUE07-M64J	4	M6 × 1	3.4	57.3	53.9	10.9	28.8	0.7	90	10	17	21	VU_07-M64J						
VUE07-M66J	6	IVI6 × 1	IVIb × 1	IVI6 × 1	0. 1	58.1	54.7	11.7	29.6	0.,					VU_07-M66J				
VUE07-014J	4	R1/8	8	60.8	56.8	10.9	28.8					23.5	VU_07-014J						
VUE07-016J	6	R1/8	R1/8	R1/8	R1/8	R1/8	R1/8	R1/8	,	61.6	57.6	11.7	29.6					23	VU_07-016J

^{* &}quot;L1" is reference dimension after tightening the taper thread.

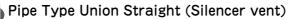
۷U VUM

VM · VC

^{*} A knurling knob is used on M5 and M6 thread instead of a hexagonal-column. Hex.12 is used only for 01 (R1/8).

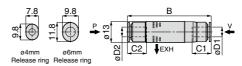
^{*} Add "-S3" at the end of model code for "Copper alloy free" .

CAD





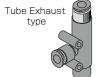




Unit: mm

										,	Jint . 111111
Model	Tube O.D.	Tube O.D.	В	C1	C2	Nozzle bore	Final vacuum	Suction flow	Air consumption	Weight	CAD
code	øD1	øD2			02	(mm)	(-kPa)	(t/min(ANR))	(t/min(ANR))	(g)	file name
VUH05-44A	4	4	49.3	10.9	10.9					18.5	VU_05-44A
VUH05-46A	-	6	50.4	10.5	11.7	0.5	90	7	11.5	10.5	VU_05-46A
VUH05-64A	6	4	50.1	11.7	10.9	0.5	90	,	11.5	18	VU_05-64A
VUH05-66A	0	6	51.2	11.7	11.7					17.5	VU_05-66A
VUH07-44A	4	4	56.1	10.9	10.9					20	VU_07-44A
VUH07-46A	4	6	56.9	10.9	11.7	0.7	92	12.5	23	19.5	VU_07-46A
VUH07-64A	6	4	50.9	11.7	10.9	0.7	92	12.5	23	19	VU_07-64A
VUH07-66A	O	6	57.7	11.7	11.7					18.5	VU_07-66A
VUL05-44A	4	4	49.3	10.9	10.9					18.5	VU_05-44A
VUL05-46A	4	6	50.4	10.9	11.7	0.5		12	11.5	10.0	VU_05-46A
VUL05-64A	6	4	50.1	11.7	10.9	0.5		12		17.5	VU_05-64A
VUL05-66A	0	6	51.2	11.7	11.7		66			2.5	VU_05-66A
VUL07-44A	4	4	56.1	10.9	10.9		00	20		20	VU_07-44A
VUL07-46A	4	6	56.9	10.9	11.7	0.7		20	23	19	VU_07-46A
VUL07-64A	6	4	50.9	11.7	10.9	0.7		22	23	18.5	VU_07-64A
VUL07-66A	U	6	57.7	11.7	11.7			22		17.5	VU_07-66A
VUE07-44A	4	4	56.1	10.9	10.9					20.5	VU_07-44A
VUE07-46A	4	6	56.9	10.9	11.7	0.7	00	10	17	19.5	VU_07-46A
VUE07-64A	6	4	50.9	11 🗆	10.9	0.7	90	10	17	18.5	VU_07-64A
VUE07-66A	0	6	57.7	11.7	11.7					19	VU_07-66A

■ Replacement Element







-Filter element

Element model code	Remarks
FEE8.2×2	A : Disassembly type
FEE10×2	Adapter type only

Pipe Type Union Straight (Silencer vent)



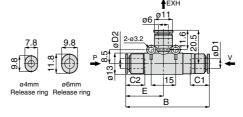


RoHS compliant

Copper alloy free

Selectable





Unit: mm

Model	Tube O.D.	Tube O.D.	В	C1	C2	Е	Nozzle bore	Final vacuum	Suction flow	Air consumption	Weight	CAD
code	øD1	øD2	ь		02		(mm)	(-kPa)	(Umin(ANR))		(g)	file name
VUH05-44J	4	4	49.3	10.9	10.9	22					21	VU_05-44J
VUH05-46J	4	6	50.4	10.9	11.7	23.1	0.5	90	7	11.5	20.5	VU_05-46J
VUH05-64J	6	4	50.1	11.7	10.9	22	0.5	90	/	11.5	20	VU_05-64J
VUH05-66J	0	6	51.2	11.7	11.7	23.1					19.5	VU_05-66J
VUH07-44J	4	4	56.1	10.9	10.9	28.8					22.5	VU_07-44J
VUH07-46J	4	6	56.9	10.9	11.7	29.6	0.7	92	12.5	23	21.5	VU_07-46J
VUH07-64J	6	4	50.9	11.7	10.9	28.8	0.7	92	12.5	23	21.5	VU_07-64J
VUH07-66J	0	6	57.7	11.7	11.7	29.6					20.5	VU_07-66J
VUL05-44J	4	4	49.3	10.9	10.9	22					21	VU_05-44J
VUL05-46J	4	6	50.4	10.9	11.7	23.1	0.5		12	11.5	20.5	VU_05-46J
VUL05-64J	6	4	50.1	11.7	10.9	22	0.5		12	11.5	20	VU_05-64J
VUL05-66J	0	6	51.2	11.7	11.7	23.1		66			19.5	VU_05-66J
VUL07-44J	4	4	56.1	10.9	10.9	28.8		00	20		22	VU_07-44J
VUL07-46J	4	6	56.9	10.9	11.7	29.6	0.7		20	23	21.5	VU_07-46J
VUL07-64J	6	4	50.9	11.7	10.9	28.8	0.7		22	23	21	VU_07-64J
VUL07-66J	U	6	57.7	11.7	11.7	29.6			22		20.5	VU_07-66J
VUE07-44J	4	4	56.1	10.9	10.9	28.8					22	VU_07-44J
VUE07-46J	4	6	56.9	10.9	11.7	29.6	0.7	90	10	17		VU_07-46J
VUE07-64J	6	4	50.8	11.7	10.9	28.8	- 07	90	10	17	21.5	VU_07-64J
VUE07-66J	0	6	57.7	11.7	11.7	29.6					20.5	VU_07-66J

 $\ensuremath{\ensuremath{\%}}$ Add "-S3" at the end of model code for "Copper alloy free" .

VUK VU Holder





Unit: mm

Model code	В	F	J	Weight (g)	CAD file name
VUK05	33.2	9	15	2	VVU-005
VUK07	39.2	10	20	2	V V U-005

^{*} VUK05 is for nozzle bore Ø0.5mm and VUK07 is for nozzle bore Ø0.7mm.

75

VH·VS VU

VY

VM · V

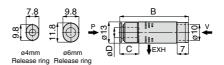
 $[\]ensuremath{\%}$ This product can be applicable only for the vacuum generator ending with the model code "J" or "A" $\,$.

Pipe Type Adapter









Unit: mm

Model code	Tube O.D. øD		С	Nozzle bore (mm)	Final vacuum (-kPa)	Suction flow (!/min(ANR))	Air consumption (t/min(ANR))	Weight (g)	CAD file name
VUH05-4A	4	41	10.9		00	7			VU_05-4A
VUH05-6A	6	42.1	11.7	0.5	90	/	11.5	11.5	VU_05-6A
VUH07-4A	4	47.8	10.9	0.7	92	12.5	23	13	VU_07-4A
VUH07-6A	6	48.6	11.7	0.7	92	12.0	23	12.5	VU_07-6A
VUL05-4A	4	41	10.9	0.5		12	11.5	11.5	VU_05-4A
VUL05-6A	6	42.1	11.7	0.5	66	12	11.5	11.5	VU_05-6A
VUL07-4A	4	47.8	10.9	0.7	00	20	23	12.5	VU_07-4A
VUL07-6A	6	48.6	11.7	0.7		22	23	12	VU_07-6A
VUE07-4A	4	47.8	10.9	0.7	90	10	17	13	VU_07-4A
VUE07-6A	6	48.6	11.7	0.7	90	10	17	12.5	VU_07-6A

Pipe Type Adapter Tube Exhaust

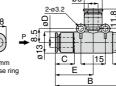












₽EXH

- 11	nit	mr
U	HIL	mr

							4	-		OTHE - ITHIT
Model code	Tube O.D. øD	В	С	Е	Nozzle bore (mm)	Final vacuum (-kPa)	Suction flow (!/min(ANR))	Air consumption (t/min(ANR))	Weight (g)	CAD file name
VUH05-4J	4	41	10.9	22	0.5	90	7	11.5	13.5	VU_05-4J
VUH05-6J	6	42.1	11.7	23.1	0.5	90	′	11.5	13	VU_05-6J
VUH07-4J	4	47.8	10.9	28.8	0.7	92	12.5	23	15	VU_07-4J
VUH07-6J	6	48.6	11.7	29.6	0.7	92	12.0	23	14.5	VU_07-6J
VUL05-4J	4	41	10.9	22	0.5		12	11.5	13.5	VU_05-4J
VUL05-6J	6	42.1	11.7	23.1	0.5	66	12	11.5	13	VU_05-6J
VUL07-4J	4	47.8	10.9	28.8	0.7	00	22	23	15	VU_07-4J
VUL07-6J	6	48.6	11.7	29.6	0.7		22	23	14	VU_07-6J
VUE07-4J	4	47.8	10.9	28.8	0.7	90	10	17	14.5	VU_07-4J
VUE07-6J	6	48.6	11.7	29.6	0.7	30	10	17	14.5	VU_07-6J

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

Pipe Type Unio

Pipe Type Union Straight (Silencer vent)

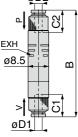








Release ring size of tube O.D. ø1.8 / 4mm





Release ring size of tube O.D. ø3mm



Release ring size of tube O.D. ø1.8 / 4mm

VH,VS,VU	,VU	M,V	B,V	'M,√	C,V	Υ						Unit	: mn
Model code	Tube O.D.	Tube O.D.	C1	C2	В	øΡ	Nozzle bore	Operating pressure	Final	Suction		Weight	CAE
Model Code	øD1	øD2	Ci	02	D		(ø)	(MPa)	vacuum (-kPa)	flow (Ømin(ANR))	consumption (/min(ANR))	(g)	file nam
VUMH03-1803	1.8	3	8.4	9.3	43.1	4.8						6.4	
VUMH03-1804	1.0	4	0.4	10.9	44.7	4.0						6 5	
VUMH03-33	•	3	0.0	9.3	44	-				0	4 -	6.5	
VUMH03-34	3	4	9.3	10.9	45.6	-	0.3			2	4.5		
VUMH03-43		3	100	9.3	45.6	0						6.6	
VUMH03-44	4	4	10.9	10.9	47.2	7.8						6.8	ĺ
VUMH04-1803	,	3	0.4	9.3	43.1	4.0						6.4	ĺ
VUMH04-1804	1.8	4	8.4	10.9	44.7	4.8						٥٦	
VUMH04-33	0	3	0.2	9.3	44	-	0.4	0.5	00	4	0	6.5	
VUMH04-34	3	4	9.3	10.9	45.6	1	0.4	0.5	90	4	8	0	_
VUMH04-43		3	100	9.3	45.6	0						6.6	
VUMH04-44	4	4	10.9	10.9	47.2	7.8						6.8	ĺ
VUMH05-1803	10	3	0.4	9.3	43.1	4.0						6.4	
VUMH05-1804	1.8	4	8.4	10.9	44.7	4.8						۲	ĺ
VUMH05-33	(3	0.2	9.3	44	1	0.5				11 5	6.5	
VUMH05-34	3	4	9.3	10.9	45.6	1	0.5			7	11.5	0	ĺ
VUMH05-43		3	100	9.3	45.6	0						6.6	
VUMH05-44	4	4	10.9	10.9	47.2	7.8						6.8	
VUML03-1803	1	3	0.05	9.3	43.1	4.0						6.4	
VUML03-1804	1.8	4	8.35	10.9	44.7	4.8						6	
VUML03-33	_	3	0.0	9.3	44	-				0	4.5	6.5	
VUML03-34	3	4	9.3	10.9	45.6	-	0.3			3	4.5	6	
VUML03-43		3	100	9.3	45.6							6.6	
VUML03-44	4	4	10.9	10.9	47.2	7.8						6.8	
VUML04-1803	1	3	0.4	9.3	43.1	4.0						6.4	
VUML04-1804	1.8	4	8.4	10.9	44.7	4.8		0.5	66			6.5	
VUML04-33	0	3	0.2	9.3	44	-	0.4	0.5	66	7	8	6.5	_
VUML04-34	3	4	9.3	10.9	45.6	-	0.4			/	0	6.6	
VUML04-43	4	3	10.9	9.3	45.6	7.8						0.0	
VUML04-44	4	4	10.9	10.9	47.2	2.0						6.8	
VUML05-33	3	3	9.3	9.3	44	-						6.5	
VUML05-34	3	4	9.3	10.9	45.6	-	0.5			12	11.5	6.6	
VUML05-43	4	3	10.9	9.3	45.6	7.8	0.5			12	11.5	0.0	
VUML05-44	4	4	10.5	10.9	47.2	7.0						6.8	
VUME03-1803	1.8	3	8.4	9.3	43.1	4.8						6.4	
VUME03-1804	1.0	4	0.4	10.9	44.7	1.0						6.5	
VUME03-33	3	3	9.3	9.3	44	-	0.3		88	1	3.5	0.0	
VUME03-34	Ü	4	0.0	10.9	45.6	-	0.0		00		0.0	6.6	
VUME03-43	4	3	10.9	9.3	45.6	7.8						0.0	
VUME03-44	•	4	10.0	10.9	47.2	7.0						6.8	
VUME04-1803	1.8	3	8.4	9.3	43.1	4.8						6.4	
VUME04-1804	1.0	4	0.1	10.9	44.7	1.0						6.5	
VUME04-33	3	3	9.3	9.3	44	-	0.4	0.35		2	6.5	0.0	_
VUME04-34	Ů	4	0.0	10.9	45.6	-	0.1	0.00		_	0.0	6.6	
VUME04-43	4	3	10.9	9.3	45.6	7.8						0.0	
VUME04-44	т	4	. 5.5	10.9	47.2	, .0		1	90			6.8	
VUME05-1803	1.8	3	8.4	9.3	43.1	4.8						6.4	
VUME05-1804		4		10.9	44.7							6.5	
VUME05-33	3	3	9.3	9.3	44	-	0.5			3	8	0	5
VUME05-34		4	- 1 9.3 - -	10.9		-	0.5)		3 8	6.6	;	
VUME05-43	4	3	10.9	9.3	45.6	7.8							
VUME05-44	•	4		10.9	47.2		1					6.8	l

VACUU

VU

VUM

VΒ

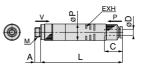
 $VM \cdot VC$

Pipe Type Straight (Silencer vent)











Release ring size of tube O.D. ø3mm



Release ring size of tube O.D. ø4mm

OHIIII	O.D. ØTIIIII	
	Unit ∶ ı	mm

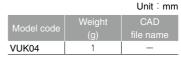
												111L - 111111
形式	Tube O.D. øD	М		С	L	Nozzle bore (ø)	Operating pressure (MPa)	Final vacuum (-kPa)	Suction flow (I/min(ANR))	Air consumption (t/min(ANR))	Weight (g)	CAD file name
VUMH03-M33	3	1400.5	0.5	9.3	42.2						6.7	
VUMH03-M34	4	M3 × 0.5	2.5	10.9	43.8					4.5	6.8	
VUMH03-M53	3	M5×0.8	3	9.3	42.2	0.3			2	4.5	7.5	
VUMH03-M54	4	8.U × CIVI	3	10.9	43.8						7.7	
VUMH04-M33	3	M3×0.5	2.5	9.3	42.2						6.7	
VUMH04-M34	4	IVI3 ^ U.5	2.5	10.9	43.8	0.4	0.5	90	4	8	6.8	_
VUMH04-M53	3	M5×0.8	3	9.3	42.2	0.4	0.5	90	4	0	7.5	
VUMH04-M54	4	IVI3 × 0.0	3	10.9	43.8						7.7	
VUMH05-M33	3	M3×0.5	2.5	9.3	42.2						6.7	
VUMH05-M34	4	1010 × 0.5	2.0	10.9	43.8	0.5			7	11.5	6.8	
VUMH05-M53	3	M5×0.8	3	9.3	42.2	- 0.0			,	11.5	7.5	
VUMH05-M54	4	1013 × 0.0		10.9	43.8						7.7	
VUML03-M33	3	M3×0.5	2.5	9.3	42.2						6.7	
VUML03-M34	4	1010 0.0	2.0	10.9	43.8	0.3			3	4.5	6.8	
VUML03-M53	3	M5×0.8	3	9.3	42.2	0.0				4.0	7.5	
VUML03-M54	4	1110 0.0		10.9	43.8						7.7	
VUML04-M33	3	M3×0.5	2.5	9.3	42.2						6.7	
VUML04-M34	4			10.9	43.8	0.4	0.5	66	7	8	6.8	_
VUML04-M53	3		M5×0.8	3	9.3	42.2						7.5
VUML04-M54	4			10.9	43.8						7.7	
VUML05-M33	3	M3×0.5	2.5	9.3	42.2						6.7	
VUML05-M34	4			10.9	43.8	0.5			12	11.5	6.8	
VUML05-M53	3	M5×0.8	3	9.3	42.2						7.5	
VUML05-M54	4			10.9	43.8						7.7	
VUME03-M33	3	M3 × 0.5	2.5	9.3	42.2	-					6.7	
VUME03-M34	4			10.9	43.8	0.3		88	1	3.5	6.8	
VUME03-M53	3	M5×0.8	3	9.3	42.2						7.5	
VUME03-M54	4			10.9	43.8						7.7	
VUME04-M33	3	M3×0.5	2.5	9.3	42.2						6.7	
VUME04-M34	4			10.9	43.8	0.4	0.35		2	6.5	6.8	_
VUME04-M53	3	M5×0.8	3	9.3	42.2						7.5	
VUME04-M54	4			10.9	43.8			90			7.7	
VUME05-M33	3	M3×0.5	2.5	9.3	42.2						6.7	
VUME05-M34	4			10.9	43.8	0.5			3	8	6.8	_
VUME05-M53	3	M5×0.8	3	9.3	42.2	2			3		7.5 7.7	
VUME05-M54	4			10.9	43.8							



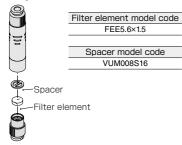
VUK VUM Type Fixing Holder







■ Replacement Element |



79

VU

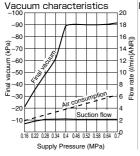
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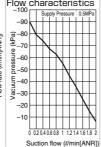
VB

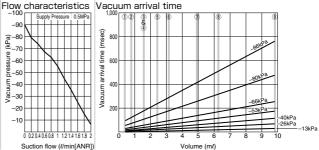
VM · VC

Characteristics

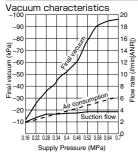
VUMH03

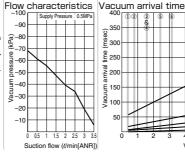


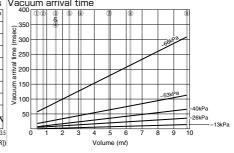




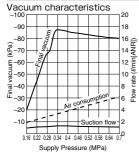
VUML03

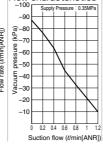


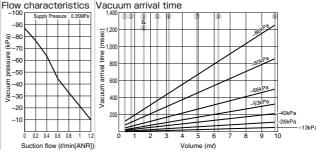




VUME03







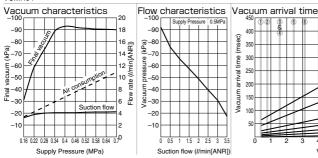
- * Shaded ① to ③ line in the graph of "Vacuum arrival time" represents the code and length (mm) of the following tubes. Please refer the below for the details.
- ① UB01810 (L: 500)
- ② UB01810 (L: 1,000) ⑥ UB0320 (L: 1,000)
- ③ UB0320 (L: 500) ⑦ UB0425 (L: 1,000)
- 4 UB01810 (L: 2,000) ® UB0320 (L: 2,000)

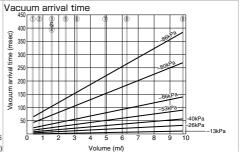
⑤ UB0425 (L: 500) 9 UB0425 (L: 2,000)

VACUUM

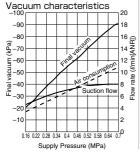
Characteristics

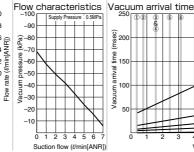


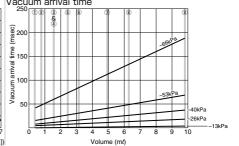




VUML04







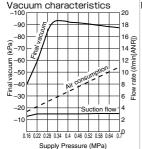
VUME04

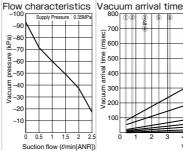
VU

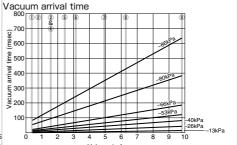
VUM

VΒ

VM · VC







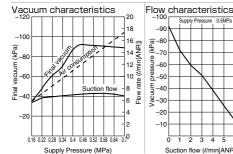
- ** Shaded ① to ③ line in the graph of "Vacuum arrival time" represents the code and length (mm) of the following tubes.
 Please refer the below for the details.
- ① UB01810 (L: 500)
- ② UB01810 (L: 1,000) ⑥ UB0320 (L: 1,000)
- ③ UB0320 (L: 500) ⑦ UB0425 (L: 1,000)
- ④ UB01810 (L: 2,000) ⑧ UB0320 (L: 2,000)

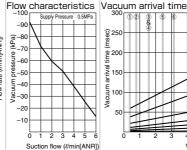
(5) UB0425 (L: 500) (9) UB0425 (L: 2,000)

_53kPa

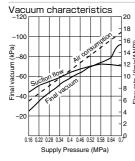
-26kPa 13kPa

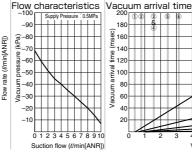


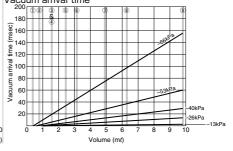




VUML05

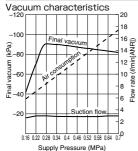


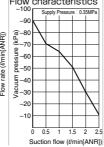


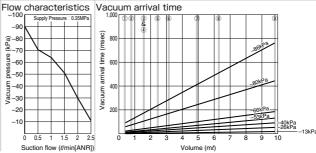


Volume (mt)

VUME05







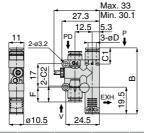
- * Shaded ① to ③ line in the graph of "Vacuum arrival time" represents the code and length (mm) of the following tubes. Please refer the below for the details.
- ① UB01810 (L: 500)
- ② UB01810 (L: 1,000) ⑥ UB0320 (L: 1,000)
- ③ UB0320 (L: 500) ⑦ UB0425 (L: 1,000)
- ④ UB01810 (L: 2,000) ® UB0320 (L: 2,000)

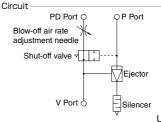
⑤ UB0425 (L: 500) 9 UB0425 (L: 2,000)

Blow-Off Mechanism with Silencer vents









11.	: 4	
Un	ш	mm

Model	Tube U.D.	В		C1	C2	Nozzle	pressure	vacuum	flow	AII consumption	Weight
code	ØD				02	bore	(MPa)	(-kPa)	(∉min(ANR))	(t/min(ANR))	(g)
VYH05-444	4	45.1	10.4	10.9	11	0.5		90	7	11.5	19
VYH05-666	6	48	10.8	11.7	11.6	0.5	0.5	90	,	11.5	19.5
VYH07-444	4	45.1	10.4	10.9	11	0.7	0.5	92	12.5	23	19.5
VYH07-666	6	48	10.8	11.7	11.6	0.7		92	12.5	23	19.5
VYL05-444	4	45.1	10.4	10.9	11	0.5			12	11.5	19
VYL05-666	6	48	10.8	11.7	11.6	0.5	0.5	66	12	11.5	19.5
VYL07-444	4	45.1	10.4	10.9	11	0.7	0.5		18	23	19
VYL07-666	6	48	10.8	11.7	11.6	0.7			21	23	19.5
VYE05-444	4	45.1	10.4	10.9	11	0.5			3	8	19
VYE05-666	6	48	10.8	11.7	11.6	0.5	0.05	90	3	0	19.5
VYE07-444	4	45.1	10.4	10.9	11	0.7	0.35	90	0	17	19.5
VYE07-666	6	48	10.8	11.7	11.6	0.7			9	17	20



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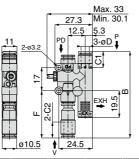
VU

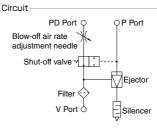
VUM

Blow-Off Mechanism with Silencer vent & Vacuum Filter









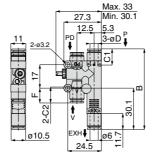
Unit: mm

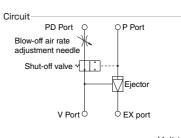
Model	Tube O.D.	В	F	C1	C2	Nozzle	Operating pressure	Final vacuum	Suction flow	Air consumption	Weight
code	ØD					bore	(MPa)	(-kPa)	(#min(ANR))	(t/min(ANR))	(g)
VYH05-444F	4	59.7	34.1	10.9	11	0.5		90	7	11.5	20.5
VYH05-666F	6	62.9	34.4	11.7	11.6	0.5	0.5	90	1	11.5	21.5
VYH07-444F	4	59.7	34.1	10.9	11	0.7	0.5	92	12.5	23	20.5
VYH07-666F	6	62.9	34.4	11.7	11.6	0.7		92	12.5	23	21.5
VYL05-444F	4	59.7	34.1	10.9	11	0.5			12	11.5	20.5
VYL05-666F	6	62.9	34.4	11.7	11.6	0.5	0.5	66	12	11.5	21.5
VYL07-444F	4	59.7	34.1	10.9	11	0.7	0.5	00	18	23	20.5
VYL07-666F	6	62.9	34.4	11.7	11.6	0.7			21	23	21.5
VYE05-444F	4	59.7	34.1	10.9	11	0.5			3	8	20.5
VYE05-666F	6	62.9	34.4	11.7	11.6	0.5	0.35	90	3	O	21.5
VYE07-444F	4	59.7	34.1	10.9	11	0.7		90	9	17	21
VYE07-666F	6	62.9	34.4	11.7	11.6	0.7			9	17	22

Blow-Off Mechanism with Tube Exhaust







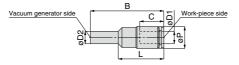


 $\mathsf{Unit} \; \vdots \; \mathsf{mm}$

Model code	Tube 0.D. øD	В	F	C1	C2	Nozzle bore	Operating pressure (MPa)	Final vacuum (-kPa)	Suction flow (Umin(ANR))	Air consumption (&min(ANR))	Weight (g)
VYH05-444J	4	55.7	10.4	10.9	11	0.5		90	7	11.5	23
VYH05-666J	6	58.6	10.8	11.7	11.6	0.5	0.5	90	′	11.5	23
VYH07-444J	4	55.7	10.4	10.9	11	0.7	0.5	92	12.5	23	23
VYH07-666J	6	58.6	10.8	11.7	11.6	0.7		92	12.5	23	23
VYL05-444J	4	55.7	10.4	10.9	11	0.5		Į.	12	11.5	22.5
VYL05-666J	6	58.6	10.8	11.7	11.6	0.5	0.5	66	12	11.5	23
VYL07-444J	4	55.7	10.4	10.9	11	0.7	0.5	00	18	23	22.5
VYL07-666J	6	58.6	10.8	11.7	11.6	0.7			21	23	23
VYE05-444J	4	55.7	10.4	10.9	11	0.5			3	8	23
VYE05-666J	6	58.6	10.8	11.7	11.6	0.5	0.35	90	3	0	23
VYE07-444J	4	55.7	10.4	10.9	11	0.7	0.35	90	9	17	23
VYE07-666J	6	58.6	10.8	11.7	11.6	0.7			9	17	23.5

VYF Vacuum Filter for VY





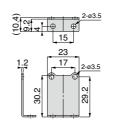
Unit: mm

Model code	Tube O.D. ØD1	Applicable fitting dia. ØD2			С	øР	Weight (g)	Filter area (cm²)
VYF44M	4	4	34.7	21.5	11	8	1.5	0.8
VYF66M	6	6	35.2	21.8	11.6	10.5	2.5	1.1

VYB Bracket for VY







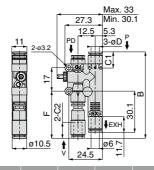
	Unit: mm
Model code	Weight
VYB11	8

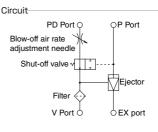
RoHS compliant

Blow-Off Mechanism with Tube Exhaust & Vacuum Filter









Unit: mm

VYH05-444JF 4 5	59.7	34.1				(MPa)	(-kPa)	(#min(ANR))	(t/min(ANR))	(g)
111100 111101		0 1.1	10.9	11	0.5		90	7	11.5	24
VYH05-666JF 6 6	52.9	34.4	11.7	11.6	0.5	0.5	90	,	11.5	25
VYH07-444JF 4 5	9.7	34.1	10.9	11	0.7	0.5	92	12.5	23	24
VYH07-666JF 6 6	32.9	34.4	11.7	11.6	0.7		32	12.5	2.3	25
VYL05-444JF 4 5	9.7	34.1	10.9	11	0.5			12	11.5	24
VYL05-666JF 6 6	32.9	34.4	11.7	11.6	0.5	0.5	66	12	11.5	25
VYL07-444JF 4 5	9.7	34.1	10.9	11	0.7	0.5	00	18	23	24
VYL07-666JF 6 6	32.9	34.4	11.7	11.6	0.7			21	23	25
VYE05-444JF 4 5	9.7	34.1	10.9	11	0.5			3	8	24
VYE05-666JF 6 6	32.9	34.4	11.7	11.6	0.5	0.25	90	3	O	25
VYE07-444JF 4 5	9.7	34.1	10.9	11	0.7	- 0.35	90	9	17	24.5
VYE07-666JF 6 6	62.9	34.4	11.7	11.6	0.7			9	17	25.5

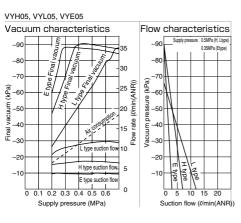
Characteristics

Supply pressure - Final vacuum / Suction Flow / Air Consumption



VU

VUM



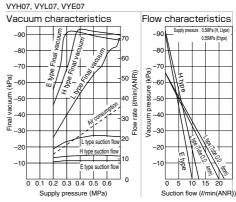


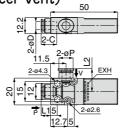
Chart Characteristic chart page

CAD

Box Type Union (Silencer vent)







Unit: mm

Model code	Tube 0.D. ØD	øΡ	С		L2	Nozzle bore (mm)	Operating pressure (MPa)	vacuum	Suction flow (/min(ANR))	Air consumption (t/min(ANR))	Weight (g)	CAD file name
VBH05-44P	4	9	11	6.6	16.6	0.5		90	7	11.5	18	VB_05-44P
VBH07-66P						0.7	0.5		13	23	18.5	
VBH10-66P	6	10.5	11.6	7	17	1	0.5	93	28	46	10.5	VB66P
VBH12-66P						1.2			38	70	18	
VBL05-44P	4	9	11	6.6	16.6	0.5			12	11.5	18	VB_05-44P
VBL07-66P	6	10.5	11.6	7	17	0.7	0.45	66	26	23	18.5	VB -66P
VBL10-66P	0	10.5	11.0	′	17	1			42	46	17.5	
VBE07-66P						0.7			10.5	17	18.5	
VBE10-66P	6	10.5	11.6	7	17	1	0.4	92	21	34	10.5	VB66P
VBE12-66P						1.2			27	47	18	

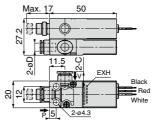
Box Type Union Vacuum Switch





RoHS compliant





Unit: mm

Model	Tube O.D.	С	Nozzle bore	Operating pressure	Final vacuum	Suction flow	Air consumption	Weight	CAD
code	ØD		(mm)	(MPa)	(-kPa)	(ℓ/min(ANR))	(t/min(ANR))	(g)	file name
VBH05-44S	4	11	0.5		90	7	11.5	46.5	VB_05-44S
VBH07-66S		11.6	0.7	0.5	93	13	23	46	VB66S
VBH10-66S	6		1			28	46	47	
VBH12-66S			1.2			38	70	47.5	
VBL05-44S	4	11	0.5			12	11.5	46.5	VB_05-44S
VBL07-66S	6	11.6	0.7	0.45	66	26	23	48	VB -66S
VBL10-66S	U		1			42	46	46.5	V D003
VBE07-66S		· · · · · · · · · · · · · · · · · · ·	0.7	0.4	92	10.5	17	48.5 47.5	VB66S
VBE10-66S	6	11.6	1			21	34		
VBE12-66S			1.2			27	47		

* Lead wire White: Common

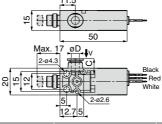
Red: Normally closed Black: Normally open

VUSM Mechanical Vacuum Switch









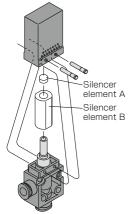
Unit: mm

Model code	Tube O.D. øD	С	Weight (g)	CAD file name
VUSM10-4	4	11	29	VUSM10-4
VUSM10-6	6	11.6	29	VUSM10-6

* Lead wire White: Common

Red: Normally closed Black: Normally open

Replacement



Element A model code	Element B model code
SEE0602	VGED-G

VU

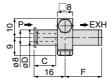
VUM

Pad Direct Mounting Elbow(Silencer vent)









Unit: mm

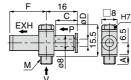
Model	Tube O.D.	М	Α	В		С		Nozzle bore	Final vacuum	Suction	Air consumption	Weight	CAD
code	ØD							(mm)	(-kPa)		(Umin(ANR))		file name
VMH03-M53	3	M5 × 0.8	3.5	14.5	11	9.4	15	0.3		2	4.5	15.5	
VMH03-M54	4	0.0 × CIVI	3.5	14.5	- 11	10.9	15	0.3			4.5	15.5	_
VMH04-M53	3	M5 × 0.8	3.5	14.5	11	9.4	17	0.4	90	4	8	16.5	
VMH04-M54	4	0.0 × CIVI	3.5	14.5	- ' '	10.9	17	0.4	90	4	O	10.5	
VMH05-M54	4	$\mathrm{M5}\times0.8$	3.5	14.5	11	10.9	19	0.5		7	11.5	17	VM_05-M54
VMH05-M64	4	M6 × 1	5.5	15.5	10	10.9	19	0.5		,	11.5	17.5	VM_05-M64
VML03-M53	3	M5 × 0.8	3.5	14.5	11	9.4	18.2	0.3		4	4.5	17	
VML03-M54	4	0.0 × CIVI	3.5	14.5	- ' '	10.9	10.2	0.5		4	4.5	17	
VML04-M53	3	M5 × 0.8	3.5	14.5	11	9.4	19	0.4	66	7.5	8	17	_
VML04-M54	4	0.0 × CIVI	3.5	14.5	- ' '	10.9	19	0.4	00	7.5	O	17	
VML05-M54	4	$M5 \times 0.8$	3.5	14.5	11	100	10	0.5		11	11.5	17	VM_05-M54
VML05-M64	4	$M6 \times 1$	5.5	15.5	10	10.9	19 0.5			11	11.5	17	VM_05-M64

Pad Direct Mounting Straight(Silencer vent)









Unit: mm

Model		М	А	С		Nozzle bore	Final vacuum	Suction	Air consumption	Weight	CAD
code	ØD					(mm)	(-kPa)	(Umin(ANR))	(t/min(ANR))		file name
VCH03-M53	3	M5 × 0.8	3.5	9.4	15	0.3		2	4.5	12.5	_
VCH03-M54	4	1VIO X 0.0	5.5	10.9	13	5.		٦	7.	12.5	
VCH04-M53	3	M5 × 0.8	3.5	9.4	17	0.4	90	4	8	13.5	_
VCH04-M54	4	1VIO X 0.0	5.5	10.9	1 7	5.	30	Ť	0	5.5	
VCH05-M54	4	$M5 \times 0.8$	3	10.9	19	0.5		7	11.5	14.5	VC_05-M54
VCH05-M64	4	M6 × 1	3.5	10.9	19	0.0		,	1.5	4.5	VC_05-M64
VCL03-M53	3	M5 × 0.8	3.5	9.4	18.2	0.3		4	4.5	14	_
VCL03-M54	4	0.0 ^ CIVI	3.5	10.9	10.2	0.5		4	2.2	14	
VCL04-M53	3	M5 × 0.8	3.5	9.4	19	0.4	66	7.5	8	14	
VCL04-M54	4	0.0 ^ 0.0	3.0	10.9	19	0.4	00	7.5	0	14	
VCL05-M54	4	$M5 \times 0.8$	3	10.9	19	0.5		11	11.5	17	VC_05-M54
VCL05-M64	4	M6 × 1	3.5	10.9	19	0.5		11	11.5	17	VC_05-M64

■ Replacement Element





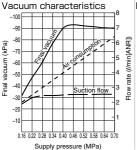
VC

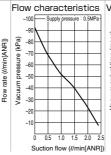


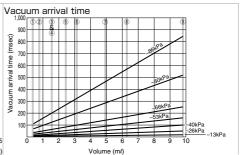
Vacuum Generator VH.VS.VU.VUM.VB.VM.VC.VY

Characteristics |

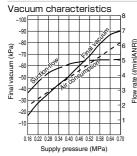


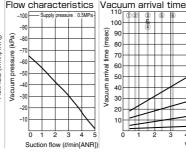


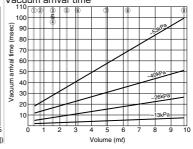




VCL03, VML03







VCH04, VMH04

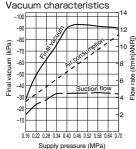
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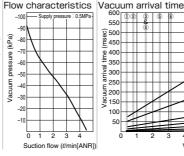
VU

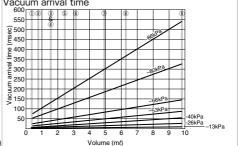
VUM

VΒ

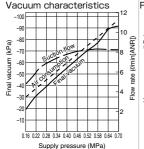
VM · VC

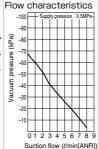


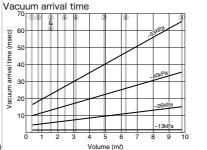




VCL04, VML04







- Shaded ① to ③ line in the graph of "Vacuum arrival time" represents the code and length (mm) of the following tubes.

 Please refer the below for the details.

 Output

 Description:

 Please refer the below for the details.

 Please refer the below for the details.

 Output

 Description:

 Please refer the below for the details.

 Output

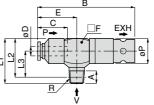
 Description:

 Description:
- ① UB01810 (L: 500) ⑤ UB0425 (L: 500)
- ② UB01810 (L: 1,000) ⑥ UB0320 (L: 1,000)
- ③ UB0320 (L: 500) ⑦ UB0425 (L: 1,000)
- ④ UB01810 (L: 2,000) ⑧ UB0320 (L: 2,000)
 - 9 UB0425 (L: 2,000)

Pad Direct Mounting Straight(Silencer vent)



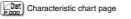




Unit: mm

										٧						Unit	: mm
Model code	Tube 0.D. øD1	R	А	L1	L2	L3	øΡ	В	Е	С	□F	Nozzle bore (mm)	Final vacuum (-kPa)	Suction flow (Umin(ANR))	Air consumption (4/min(ANR))	Weight (g)	CAD file name
VCH07-016C	6							62.5	24.5	17		0.0		10	00		VC016C
VCH07-018C	8	Ť						65.2	27.2	18.2		0.7		13	23		VC018C
VCH10-016C	6	D4 /0	0	00	0.4	4.0	10	62.5	24.5	17	10	4		00	10	04.5	VC016C
VCH10-018C	8	R1/8	8	28	24	16	16	65.2	27.2	18.2	16	1		28	46	31.5	VC018C
VCH12-016C	6	Ī						62.5	24.5	17		10		20	ПО		VC016C
VCH12-018C		Ī						65.2	27.2	18.2		1.2		38	70		VC018C
VCH15-028C	8	R1/4	11		33	21		4040	00.0	400			00			87	VC028C
VCH15-038C		R3/8	12		32.7	20.7		104.2	29.2	18.2		4.5	93	00	100	00	VC038C
VCH15-0210C	10	R1/4	11		33	21		105.0	20.0	00.0		1.5		63	100	88	VC0210C
VCH15-0310C	10	R3/8	12	39	32.7	20.7	24	105.9	30.9	20.7	20					89	VC0310C
VCH20-028C	- 8	R1/4	11	39	33	21	24	104.2	29.2	18.2	22					91	VC028C
VCH20-038C	0	R3/8	12	Ī	32.7	20.7		104.2	29.2	18.2		2		110	200	92	VC038C
VCH20-0210C	10	R1/4	11		33	21		105.0	20.0	20.0				110	200	92.5	VC0210C
VCH20-0310C	10	R3/8	12		32.7	20.7		105.9	30.9	20.7						93.5	VC0310C
VCL07-016C	6							62.5	24.5	17		0.7		26	23		VC016C
VCL07-018C	8	R1/8	8	28	24	16	16	65.2	27.2	18.2	16	0.7		20	23	31.5	VC018C
VCL10-016C	6	K1/0	0	20	24	10	10	62.5	24.5	17	10	1		42	46	31.3	VC016C
VCL10-018C								65.2	27.2	18.2				42	40		VC018C
VCL15-028C	8	R1/4	11		33	21		104.2	29.2	18.2						85	VC028C
VCL15-038C		R3/8	12		32.7	20.7		104.2	29.2	10.2		1.5	66	95	100	86	VC038C
VCL15-0210C	10	R1/4	11		33	21		105.9	30.9	20.7		1.5	00	33	100	86.5	VC0210C
VCL15-0310C	10	R3/8	12	39	32.7	20.7	24	100.5	50.5	20.7	22					87.5	VC0310C
VCL20-028C	8	R1/4	11	33	33	21	24	104.2	29.2	18.2	22					87	VC028C
VCL20-038C	Ü	R3/8	12		32.7	20.7		104.2	23.2	10.2		2		180	200	88	VC038C
VCL20-0210C	10	R1/4	11		33	21		105.9	30.9	20.7				100	200	0	VC0210C
VCL20-0310C	10	R3/8	12		32.7	20.7		105.5	30.3	20.7						89	VC0310C
VCE07-016C	6							62.5	24.5	17		0.7		10.5	17		VC016C
VCE07-018C	8							65.2	27.2	18.2		0.7		10.5	1 7		VC018C
VCE10-016C	6	R1/8	8	28	24	16	16	62.5	24.5	17	16	1		21	34	31.5	VC016C
VCE10-018C	8	11170	O			10	10	65.2	27.2	18.2	10			į.	0 1	01.0	VC018C
VCE12-016C	6							62.5	24.5	17		1.2		27	47		VC016C
VCE12-018C								65.2	27.2	18.2		1.2			77		VC018C
VCE15-028C	8	R1/4	11		33	21		104.2	29.2	18.2			92			87.5	VC028C
VCE15-038C		R3/8	12		32.7	20.7		104.2	20.2	10.2		1.5	JL	42	70	88.5	VC038C
VCE15-0210C	10	R1/4	11		33	21		105.9	30.9	20.7		1.5		42	70	00.5	VC0210C
VCE15-0310C	10	R3/8	12	39	32.7	20.7	24	100.0	50.9	20.7	22					89.5	VC0310C
VCE20-028C	8	R1/4	11		33	21	<u>_</u>	104.2	29.2	18.2						92.5	VC028C
VCE20-038C	J	R3/8	12		32.7	20.7		107.2	20.2	10.2		2		84	150	93.5	VC038C
VCE20-0210C	10	R1/4	11		33	21		105.9	30.9	20.7		_		0 1	100	94	VC0210C
VCE20-0310C		R3/8	12		32.7	20.7		. 00.0	30.0	_0.7						95	VC0310C

* "L2" and "L3" are reference dimensions after tightening the thread.



Vacuum Generator VH,VS,VU,VUM,VB,VM,VC,VY

VU VUM

VM · VC

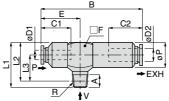
Pad Direct Mounting Straight (Tube Exhaust)











								-		R								Unit	: mm
Model	Tube O.D.	. Tube O.D												Nozzle	Final	Suction	Air	Weight	
code	øD1	øD2	R			L2	L3	øΡ			C1	C2		bore (mm)	vacuum (-kPa)	flow (/min(ANR))	consumption (I/min(ANR))	(g)	file name
VCH07-016CJ	6								64.6	24.5	17							(0)	VC016CJ
VCH07-018CJ	8	Ì							67.3	27.2	18.2			0.7		13	23		VC018CJ
VCH10-016CJ	6	8	R1/8	8	28	24	16	16	64.6	24.5	17	18.2	16	1		28	46	36.5	VC016CJ
VCH10-018CJ	8	l °	KI/8	0	28	24	10	10	67.3	27.2	18.2	18.2	10	ı		28	40	30.5	VC018CJ
VCH12-016CJ	6								64.6	24.5	17			1.2		38	70		VC016CJ
VCH12-018CJ									67.3	27.2	18.2			1.4		30	70		VC018CJ
VCH15-028CJ	8		R1/4	11		32	21		94	29.2	18.2				93			98.5	VC028CJ
VCH15-038CJ		_	R3/8	12		31.7	20.7		0 1	20.2	10.2			1.5	00	63	100	99.5	VC038CJ
VCH15-0210CJ	10		R1/4	11		32	21		95.7	30.9	20.7			1.0		00			VC0210CJ
VCH15-0310CJ		12	R3/8	12	38	31.7	20.7	22				23.3	22					100.5	_
VCH20-028CJ	8		R1/4	11		32	21		94	29.2	18.2							103	VC028CJ
VCH20-038CJ		-	R3/8	12		31.7	20.7							2		110	200	104	VC038CJ
VCH20-0210CJ	10		R1/4	11	<u> </u>	32	21		95.7	30.9	20.7							405	VC0210CJ
VCH20-0310CJ	_		R3/8	12		31.7	20.7		040	045	40							105	VC0310CJ
VCL07-016CJ VCL07-018CJ	6 8	+							64.6 67.3	24.5	17 18.2			0.7		26	23		VC016CJ VC -018CJ
VCL07-018CJ	6	8	R1/8	8	28	24	16	16	64.6	27.2	17	18.2	16					36.5	VC016CJ
VCL10-018CJ	0	+							67.3	27.2	18.2			1		42	46		VC018CJ
VCL15-018CJ	8		R1/4	11		32	21		07.5	21.2	10.2							97	VC -028CJ
VCL15-038CJ	1		R3/8	12		31.7	20.7		94	29.2	18.2							01	VC038CJ
VCL15-0210CJ		1	R1/4	11		32	21							1.5	66	95	100	98	VC -0210CJ
VCL15-0310CJ	10		R3/8	12		31.7	20.7		95.7	30.9	20.7							99	VC -0310CJ
VCL20-028CJ		12	R1/4	11	38	32	21	22				23.3	22					98.5	VC -028CJ
VCL20-038CJ	8		R3/8	12		31.7	20.7		94	29.2	18.2			_				99.5	VC -038CJ
VCL20-0210CJ		Ì	R1/4	11		32	21		05.0	00.0	00.5			2		180	200	100	VC0210CJ
VCL20-0310CJ	10		R3/8	12	İ	31.7	20.7		95.7	30.9	20.7							100.5	VC0310CJ
VCE07-016CJ	6								64.6	24.5	17			0.7		10.5	17		VC016CJ
VCE07-018CJ	8								67.3	27.2	18.2			0.7		10.5	17		VC018CJ
VCE10-016CJ	6	8	R1/8	8	28	24	16	16	64.6	24.5	17	18.2	16	1		21	34	36.5	VC016CJ
VCE10-018CJ	8	՝	111/0	J	20	-4	10	10	67.3	27.2	18.2	10.2	10	-		<u>- 1</u>	54	50.5	VC018CJ
VCE12-016CJ	6								64.6		17			1.2		27	47		VC016CJ
VCE12-018CJ	1								67.3	27.2	18.2						.,		VC018CJ
VCE15-028CJ	8		R1/4	11		32	21		94	29.2	18.2				92			99.5	VC028CJ
VCE15-038CJ			R3/8	12		31.7	20.7							1.5		42	70	100.5	VC038CJ
VCE15-0210CJ	10		R1/4	11		32	21		95.7	30.9	20.7								VC0210CJ
VCE15-0310CJ		12	R3/8	12	38	31.7	20.7	22				23.3	22					101.5	
VCE20-028CJ	8		R1/4	11		32	21		94	29.2	18.2							104.5	
VCE20-038CJ		1	R3/8	12		31.7	20.7							2		84	150	105.5	VC038CJ
VCE20-0210CJ	10		R1/4	11		32	21		95.7	30.9	20.7							100.5	VC0210CJ
VCE20-0310CJ			R3/8	12		31.7	20.7											106.5	VC0310CJ

^{* &}quot;L2" and "L3" are reference dimensions after tightening the thread.

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

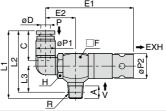




Pad Direct Mounting Elbow (Silencer Vent)







Unit: mm

										<u>H</u>								Onit . mm
Model code	Tube O.D. øD	R	А	L1	L2	L3	E1	E2	øP1	øP2	С	Hex. H	□F	Nozzle bore (mm)	Final vacuum (-kPa)	Suction flow (Umin(ANR))	Air consumption (&min(ANR))	Weight CAD (g) file name
VCH07-016L	6			42.8	38.8		57.3	19.3	12.5		17							31.5 VC016L
VCH07-018L	8			45.7	41.7		58.3	20.3	14.5		18.2			0.7		13	23	34 VC018L
VCH10-016L	6			42.8	38.8		57.3	19.3	12.5		17							31.5 VC016L
VCH10-018L	8	R1/8	8	45.7	41.7	16	58.3	20.3	14.5	16	18.2	14	16	1		28	46	34 VC -018L
VCH12-016L	6			42.8	38.8		57.3	19.3	12.5		17							31.5 VC -016L
VCH12-018L	-			45.7	41.7		58.3	20.3	14.5		18.2			1.2		38	70	34 VC018L
VCH15-028L	8	R1/4	11		46.7	21												85.5 VC -028L
VCH15-038L		R3/8	12	52.7	46.4	20.7	99.3	24.3	14.5		18.2				93			86.5 VC038L
VCH15-0210L		R1/4	11		50.5	21		05.0						1.5		63	100	90.5 VC0210L
VCH15-0310L	10	R3/8	12	56.5	50.2	20.7	100.8	25.8	17.5	0.4	20.2	10	00					91.5 VC0310L
VCH20-028L	0	R1/4	11	E 2 E	46.7	21	00.2	242	115	24	10.0	19	22					90 VC028L
VCH20-038L	8	R3/8	12	52.7	46.4	20.7	99.3	24.3	14.5		18.2			2		110	200	91 VC038L
VCH20-0210L	10	R1/4	11	56.5	50.5	21	100.0	25.8	17.5		20.2					110	200	95 VC0210L
VCH20-0310L	10	R3/8	12	50.5	50.2	20.7	100.0	20.0	17.5		20.2							96 VC0310L
VCL07-016L	6			42.8	38.8		57.3	19.3	12.5		17			0.7		26	23	31.5 VC016L
VCL07-018L	8	R1/8	8	45.7	41.7	16	58.3	20.3	14.5	16	18.2	14	16	0.7		2	2	34 VC018L
VCL10-016L	6	1(1/0	O	42.8	38.8	10	57.3	19.3	12.5	10	17	14	10	1		42	46	31.5 VC016L
VCL10-018L				45.7	41.7		58.3	20.3	14.5		18.2			'		42	40	34 VC018L
VCL15-028L	8	R1/4	11	52.7	46.7	21	99.3	24.3	14.5		18.2							84 VC028L
VCL15-038L		R3/8	12	52.7	46.4	20.7	33.3	24.5	14.5		10.2			1.5	66	95	100	85 VC038L
VCL15-0210L	10	R1/4	11	56.5	50.5	21	100.8	25.8	17.5		20.2			1.5	00	55	100	89 VC0210L
VCL15-0310L	10	R3/8	12	50.5	50.2	20.7	100.0	20.0	17.5	24	20.2	19	22					90 VC0310L
VCL20-028L	8	R1/4	11	52.7	46.7	21	99.3	24.3	14.5	27	18.2	13						85.5 VC028L
VCL20-038L	Ů	R3/8	12	02.7	46.4	20.7	00.0	24.0	14.0		10.2			2		180	200	86.5 VC038L
VCL20-0210L	10	R1/4	11	56.5	50.5	21	100.8	25.8	17.5		20.2			_		100	200	90.5 \(\text{VC}0210L \)
VCL20-0310L	.0	R3/8	12	00.0	50.2	20.7	100.0	20.0	17.0		20.2							91.5 \(\text{VC}0310L \)
VCE07-016L	6			42.8	38.8		57.3	19.3	12.5		17			0.7		10.5	17	31.5 VC016L
VCE07-018L	8			45.7	41.7		58.3	20.3	14.5		18.2			0.,		10.0		34 VC018L
VCE10-016L	6	R1/8	8	42.8	38.8	16	57.3	19.3	12.5	16	17	14	16	1		21	34	31.5 VC016L
VCE10-018L	8	11170		45.7	41.7		58.3	20.3	14.5		18.2						0.	34 VC018L
VCE12-016L	6			42.8	38.8		57.3	19.3	12.5		17			1.2		27	47	31.5 VC016L
VCE12-018L				45.7	41.7		58.3	20.3	14.5		18.2							34 VC018L
VCE15-028L	8	R1/4	11	52.7	46.7	21	99.3	24.3	14.5		18.2				92			86.5 VC028L
VCE15-038L		R3/8	12	32.7	46.4	20.7	30.0							1.5	0_	42	70	87.5 VC038L
VCE15-0210L	10	R1/4	11	56.5	50.5	21	100.8	25.8	17.5		20.2			1.0			, ,	91.5 \(\text{VC}0210L \)
VCE15-0310L		R3/8	12	30.0	50.2	20.7		_0.0		24		19	22					92.5 \(\mathbb{V}\text{\te}\text{\texi}\text{\text{\text{\text{\text{\text{\text{\text{\text{\texite\text{\tet{\text{\text{\text{\text{\text{\text{\text{\text{\text{\texit{\
VCE20-028L	8	R1/4	11	52.7	46.7	21	99.3	24.3	14.5		18.2							91.5 VC028L
VCE20-038L	_	R3/8	12		46.4	20.7	23.0				. 5			2		84	150	92.5 VC038L
VCE20-0210L	10	R1/4	11	56.5	50.5	21	100.8	25.8	17.5		20.2			_		-		96.5 \(\mathbb{V}\text{\te}\text{\texi}\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\texit{\text{\tetx{\texi}\text{\text{\text{\text{\text{\text{\text{\text{\
VCE20-0310L		R3/8	12	30.0	50.2	20.7	. 00.0	_0.0			0							97.5 VC0310L

* "L2" and "L3" are reference dimensions after tightening the thread.





Vacuum Generator VH,VS,VU,VUM,VB,VM,VC,VY

VU VUM

VM · VC

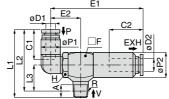
Pad Direct Mounting Elbow (Tube Exhaust)











											<u> </u>	⋖,		₽₩V						ı	Jnit:	mm
	Model code	Tube O.D. ø D 1	Tube O.D øD2	R	А	L1	L2	L3	E1	E2	øP1	øP2	C1	C2	Hex. H	□F	Nozzle bore (mm)	Final vacuum (-kPa)	Suction flow ((min(ANR))	Air consumption (4min(ANR))	(g)	CAD file name
	VCH07-016LJ VCH07-018LJ	8				42.8 45.7	38.8 41.7		59.4 60.4	19.3	12.5 14.5		17 18.2				0.7		13	23	35.5 38	VC016LJ VC018LJ
	VCH10-016LJ VCH10-018LJ	6	8	R1/8	8	42.8 45.7	38.8 41.7	16	59.4 60.4	19.3 20.3	12.5 14.5	16	17 18.2	18.2	14	16	1		28	46	35.5 38	VC016LJ VC -018LJ
	VCH10-018L3	6				42.8	38.8		59.4	19.3	12.5		17								35.5	
	VCH12-018LJ	Ů				45.7	41.7		60.4	20.3	14.5		18.2				1.2		38	70		VC018LJ
	VCH15-028LJ	8		R1/4	11	52.7	46.7	21	OO 1	24.3	14.5		18.2					93			97.5	VC028LJ
	VCH15-038LJ			R3/8	12	52.7	46.4	20.7	89.1	24.3	14.5		18.2				1.5	93	63	100	98.5	VC038LJ
	VCH15-0210LJ	10		R1/4	11	56.5	50.5	21	വ ഒ	25.8	17.5		20.2				1.5		03	100	102	VC0210LJ
	VCH15-0310LJ	10	12	R3/8	12	30.3	50.2	20.7	30.0	25.0	17.5	22	20.2	23.3	19	22					103	VC_0310LJ
	VCH20-028LJ	8		R1/4	11	52.7	46.7	21	89.1	24.3	14.5		18.2	20.0	10						101.5	VC028LJ
	VCH20-038LJ			R3/8	12		46.4	20.7									2		110	200	102.5	VC038LJ
	VCH20-0210LJ	10		R1/4	11	56.5	50.5	21	90.6	25.8	17.5		20.2									VC_0210LJ
١	VCH20-0310LJ VCL07-016LJ	6		R3/8	12	42.8	50.2 38.8	20.7	59.4	19.3	12.5		17								107.5 35.5	VC0310LJ VC016LJ
'	VCL07-018LJ	8				45.7	41.7		60.4	20.3	14.5		18.2				0.7		26	23	38	VC018LJ
	VCL10-016LJ	6	8	R1/8	8	42.8	38.8	16	59.4	19.3	12.5	16	17	18.2	14	16					35.5	
	VCL10-018LJ	•				45.7	41.7		60.4	20.3	14.5		18.2				1		42	46	38	VC018LJ
	VCL15-028LJ	8		R1/4	11		46.7	21													95.5	VC028LJ
	VCL15-038LJ			R3/8	12	52.7	46.4	20.7	89.1	24.3	14.5		18.2				4 -	00	٥٢	100	96.5	VC038LJ
	VCL15-0210LJ	10		R1/4	11	56.5	50.5	21	00.6	25.8	10 6		20.2				1.5	66	95	100	100.5	VC0210LJ
	VCL15-0310LJ	10	12	R3/8	12	50.5	50.2	20.7	90.0	25.0	17.5	22	20.2	23.3	19	22					101.5	VC0310LJ
	VCL20-028LJ	8	12	R1/4	11	52.7	46.7	21	89.1	24.3	1/15	22	18.2	23.3	19	22					97	VC028LJ
	VCL20-038LJ	•		R3/8	12	02.7	46.4	20.7	00.1	27.0	17.0		10.2				2		180	200	98	VCCBBLJ
	VCL20-0210LJ	10		R1/4	11	56.5	50.5	21	90.6	25.8	17.5		20.2				_		100		102	VC0210LJ
	VCL20-0310LJ			R3/8	12		50.2	20.7													103	VC0310LJ
	VCE07-016LJ	6				42.8	38.8		59.4	19.3	12.5		17				0.7		10.5	17		VC016LJ VC -018LJ
	VCE07-018LJ VCE10-016LJ	8				45.7 42.8	41.7 38.8			20.3 19.3	14.5 12.5		18.2 17								38 35.5	
	VCE10-018LJ	8	8	R1/8	8	45.7	41.7	16	59.4 60.4	20.3	14.5	16	18.2	18.2	14	16	1		21	34	38	VC -018LJ
	VCE12-016LJ	6				42.8	38.8		59.4	19.3	12.5		17									VC016LJ
	VCE12-018LJ	•				45.7	41.7		60.4	20.3	14.5		18.2				1.2		27	47	38	VC018LJ
	VCE15-028LJ	8		R1/4	11		46.7	21													98	VC028LJ
	VCE15-038LJ			R3/8	12	52.7	46.4	20.7	89.1	24.3	14.5		18.2					92	40		99	VC03BLJ
	VCE15-0210LJ	10		R1/4	11	EC E	50.5	21	00.6	25.0	10.5		20.2				1.5		42	70	103	VC_40210LJ
	VCE15-0310LJ	10	12	R3/8	12	56.5	50.2	20.7	90.0	25.8	17.5	22	20.2	23.3	19	22					104	VC_0310LJ
	VCE20-028LJ	8	12	R1/4	11	52.7	46.7	21	80 1	24.3	1/15	22	18.2	20.0	19	22					103	VC028LJ
	VCE20-038LJ	U		R3/8	12	JE.1	46.4	20.7	03.1	۷.٠	14.5		10.2				2		84	150	104	VC038LJ
	VCE20-0210LJ	10		R1/4	11	56.5	50.5	21	90.6	25.8	17.5		20.2				-		0 1	100	108	VC0210LJ
	VCE20-0310LJ			R3/8	12		50.2	20.7													109	VC0310LJ

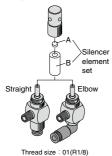
^{* &}quot;L2" and "L3" are reference dimensions after tightening the thread.

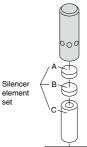
^{*} Add "-S3" at the end of model code for "Copper alloy free"



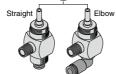


■ Replacement Element





Element set model code	Vacuum generator mode
	VC □ 07-01 □ C(L)
VCSE12	VC ☐ 10-01 ☐ C(L)
	VC ☐ 12-01 ☐ C(L)
	VC ☐ 15-028 ☐ C(L)
VCSE15	VC ☐ 15-038 ☐ C(L)
VCSE15	VC □ 15-0210 □ C(L)
	VC ☐ 15-0310 ☐ C(L)
	VC □ 20-028 □ C(L)
VCSE20	VC □ 20-038 □ C(L)
VC3E20	VC □ 20-0210 □ C(L)
	VC □ 20-0310 □ C(L)



Thread size : 02(R1/4), 03(R3/8)

VU

VUM

VR

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...Recomendations 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.

Products can cause personal injury or damages to properties.

↑ Warning I

- 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.

X. This safety instructions are subject to change without notice.



Disclaimer

- 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.
- 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.
- 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.

- 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 I

- 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 Antispatter 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.
 - $\ensuremath{\bigcirc}$ 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.



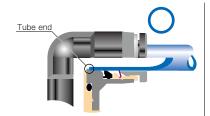
 \pm 0.15mm \pm 0.15mm \pm 0.15mm \pm 0.15mm \pm 0.15mm \pm 0.15mm \pm 0.15mm

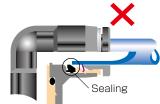
 \pm 0.15mm

- 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
Ø1.8mm	_	\pm 0.05mm	Ø1/8	± 0.1mm
Ø3mm	_	± 0.15mm	Ø5/32	\pm 0.1mm
Ø4mm	± 0.1mm	± 0.15mm	Ø3/16	\pm 0.1mm
Ø6mm	± 0.1mm	± 0.15mm	Ø1/4	± 0.1mm
Ø8mm	± 0.1mm	± 0.15mm	Ø5/16	\pm 0.1mm
Ø10mm	± 0.1mm	± 0.15mm	Ø3/8	± 0.1mm
Ø12mm	± 0.1mm	± 0.15mm	Ø1/2	± 0.1mm
Ø16mm	± 0.1mm	± 0.15mm	Ø5/8	± 0.1mm

- 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 pushin 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.





Tube is not fully inserted up to tube end.

- 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
 - ②The 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 releasering, 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
	$M3 \times 0.5$	0.7N·m		0110004
	M5 × 0.8	1.0 ~ 1.5N·m		SUS304 NBR
	M6 × 1	2 ~ 2.7N·m		NDN
Metric thread	M3 × 0.5	0.7N·m	_	
	$M5 \times 0.8$	1 ~ 1.5N·m		POM
	$M6 \times 0.75$	0.8 ~ 1N·m		POW
	$M8 \times 0.75$	1 ~ 2N·m		
	R1/8	4.5 ~ 6.5N·m		
Taper pipe thread	R1/4	7 ~ 9N·m	White	_
Taper pipe trireau	R3/8	12.5 ~ 14.5N·m	vviille	
	R1/2	20 ~ 22N·m		
Unified thread	No.10-32UNF	1.0 ~ 1.5N·m	_	SUS304、NBR
	1/16-27NPT	4.5 ~ 6.5N·m		
Nietienel nine	1/8-27NPT	4.5 ~ 6.5N·m		
National pipe thread taper	1/4-18NPT	7 ~ 9N·m	White	_
illieau lapei	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.



Vacuum Generator

Common Safety Instructions for Vacuum Series

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

↑ Warning I

- 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
- 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.

VN

- 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.

- 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 Series

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

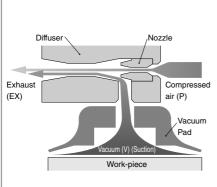
^{*} There are more chemicals which should be avoided. Contact us for the use under chemical circumstance.

Common Safety Instructions for Mechanical Vacuum Switch

↑ Warning I

- 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

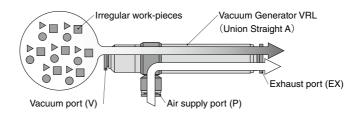


- An ejector (Vacuum generator) can generate the vacuum suction force by applying a compressed air to it. Its mechanism is explained in the left figure.
- Compressed air is squeezed and released to diffuser with high speed. The vacuum force is generated by a drop of pressure level due to a high-speed jet flow, and enables to convey a workpiece.
- 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.



Ejector for Conveying particles, powder and fibers Vacuum Generator L

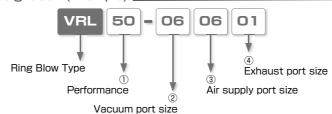
- To convey small, irregular materials, such as particles, powder and fibers in the air current.
- The vacuum port and the exhaust port are located in a straight line. The works sucked in from the vacuum port pass through the inside of the vacuum generator and go out of the exhaust port. Thus the vacuum generator enables conveyance of works through a tube.



Select the proper type according to work-piece size and the amount.

VRL

■ Model Designation (Example) |



(1) Performance

Code	Suction flow	Final vacuum	Min. dia. of flow channel
Code	(\ell/min(ANR))	(-kPa)	(mm)
50	50	53	ø2.8
100	100	53	ø4.1
200	200	53	ø6
300	300	53	ø7.5

^{*} The performance is based on the value at an air supply pressure 0.5MPa.

② Vacuum port size

Joint type	Push-In Fitting					Taper pipe thread			
Code	06	08	10	12	16	01	02	03	04
Size	ø6mm	ø8mm	ø10mm	ø12mm	ø16mm	R1/8	R1/4	R3/8	R1/2

3 Air supply port size

Joint type		Push-In Fitting	Taper pipe thread		
Code	06	08	10	01	02
Size	ø6mm	ø8mm	ø10mm	R1/8	R1/4

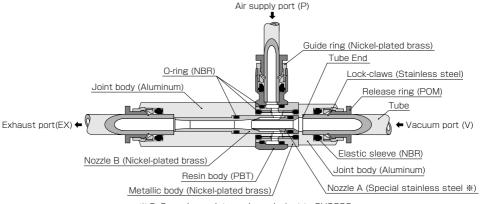
4 Exhaust port size

Joint type		Push-In Fitting		Taper pipe thread			
Code	08	10	12	01	02	04	
Size	ø8mm	ø10mm	ø12mm	R1/8	R1/4	R1/2	

Specification

Fluid medium	Air / Inert gas
Operating pressure range	0 ~ 0.9MPa
Rated supply pressure	0.5MPa
Operating temp. range	0-60℃ (No freezing)

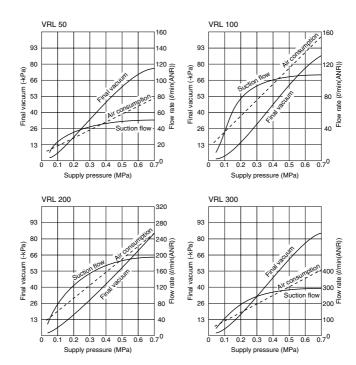
■ Construction (Union Straight A) |



※ 2. Corrosion resistance is equivalent to SUS303.

Characteristics

Supply pressure - Final vacuum / Suction Flow / Air Consumption



^{**} The above data is a measured value, not a guaranteed value. Measurement condition is with no pipe resistance. When there is any resistance on exhaust port side, the performance drops slightly.

Vacuum Generator VRL

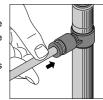
How to insert and disconnect

How to insert and disconnect tubes

① Tube insertion

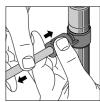
Insert a tube into Push-In Fitting of the vacuum generator VRL up to the tube end. Lock-claws bite the tube to fix it and the elastic sleeve seals around the

Refer to "2. Instructions for Tube Insertion" under "Common Safety Instructions for Fittings".



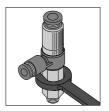
② Tube disconnection

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 fix the product

Tighten a hexagonal-column by a proper spanner to fix vacuum generator VRL. Refer to the outer dimensional drawing in the catalog for hex size and recommended tightening torque on page 39.



♠ Detailed Safety Instructions

Before using PISCO products, be sure to read "Safety Instructions" and "Safety Instruction Manual" on page 35-39 and "Common Safety Instructions for Vacuum Series" on page 47-49.

Warning

- 1. In some conditions, particles, powder and fibers may not be conveyed by Vacuum Generator VRL. Contact us for further information.
- 2. Use tube with inner diameter over Ø12mm for the exhaust port of Push-in fitting with diameter Ø16mm.

Applicable Tube and Related Products |

Polyurethane Tube

(Piping products catalog P.596)

■ Polyurethane Tube is for the general ■ Nylon Tube is for the general pneumatic pneumatic piping and suitable for a compact piping.

Nylon Tube

(Piping products catalog P.608)

piping and suitable for a high-pressure fluid up to 1.5MPa (NB tube: 1.0MPa).

Vacuum Tube

(Piping products catalog P.612)

■ Vacuum Tube is a ultra-soft tube and suitable for piping of vacuum generators or actuators.

99

VRL

Exhaust

port 8mm

8mm

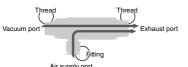
12mm 12mm

16mm

R1/2

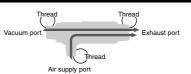
■ Standard Size List

Nipple type



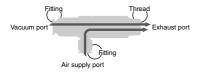


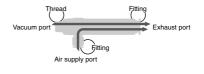
	Туре	Page	Air supply		Vacuum port					
	туре	to refer	port	R1/8	R1/4	R3/8	R1/2	port		
VRL	Nipple type A		6mm	•				R1/8		
		101	8mm	•				R1/8		
		101	OIIIIII		•			R1/4		
			10mm		•	•	•	R1/2		



Time	Page	Air supply		Vacuum port					
Туре	to refer	port	R1/8	R1/4	R3/8	R1/2	port		
VEL Nipple type B		R1/8	•				R1/8		
	101	R1/4		•			R1/4		
		N 1/4			•	•	R1/2		

Straight





R1/8

Vacuum port

R1/4 R3/8

Page Air supply

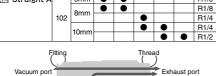
port

6mm

8mm 102

10mm

Time	Page	Air supply	ir supply Vacuum port						
Type	to refer	port	6mm	8mm	10mm	12mm	16mm	port	
VRL Straight A		6mm	•	•				R1/8	
		8mm	•	•				R1/8	
	102				•			R1/4	
		40			•	•		R1/4	
		10mm				•	•	R1/2	
				•	•				





Type

VRL Straight B

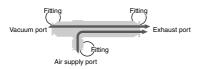
Thread	Fitting
Vacuum port	Exhaust port
Tihread	
Air supply port	

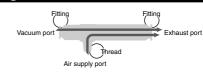
Type	Page	Air supply		Vacuum port					
Type	to refer	port	6mm	8mm	10mm	12mm	16mm	port	
VRL Straight C		R1/8	•	•				R1/8	
	101	101 R1/4			•	•		R1/4	
						•	•	R1/2	

Air supply port

Type	Page	Air supply		Vacuum port					
Type	to refer	port	R1/8	R1/4	R3/8	R1/2	port		
VRL Straight D		R1/8	•				8mm		
	103	R1/4		•			12mm		
		H 1/4			•	•	16mm		

Union Straight





Type	raye	MII SUPPIY		vacuum port					
Type	to refer	port	6mm	8mm	10mm	12mm	16mm	port	
VRL Union Straight A		6mm	•	•				8mm	
		8mm	•	•				8mm	
	103				•	•		12mm	
		10mm			•	•		12mm	
		IOIIIII				•	•	16mm	

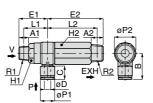
Type	Page	Air supply		vacuum port					
Type	to refer	port	6mm	8mm	10mm	12mm	16mm	port	
VRL Union Straight B		R1/8	•	•				8mm	
	104	R1/4			•	•		12mm	
		H 1/4				•	•	16mm	

Vacuum Generator VRL

VRL Nipple type A

RoHS compliant









Unit: mm

Model code	Tube O.D. øD	R1	R2	A1	A2	В	E1	E2	L1	L2	øP1	øP2	С	Hex. H1	Hex. H2	Min. dia. of flow charnel (ømm)	Final vacuum (-kPa)	Suction flow ((min(ANR))	Air consumption (4min(ANR))	Weight (g)	CAD file name
VRL50-010601	6	D1 /0	R1/8	8	8	25.5	23.4	35.6	19.4	31.6	12.4	18.4	17	14	14	2.8	53	50	50	41	
VRL50-010801	8	K1/0	K1/0	0	0	28.4	24.4	34.6	20.4	30.6	14.4	10.4	18.1	14	14	2.0	55	50	50	43	
VRL100-020802	8	D1 //	R1/4	11	11	28.9	29	53	23	47	14.4	22	18.1	17	17	4.1	53	100	100	81	0.7
VRL100-021002	10	N1/4	N1/4	11	11	31.2	30.3	51.7	24.3	45.7	17.6	22	20.2	17	17	4.1	55	100	100	84	Refer
VRL200-031004	10	R3/8	R1/2	12	15	33.6	35.1	69.4	28.8	61.2	17.6	28	20.2	22	24	6	53	200	200	190	to page 104
VRL200-041004	10	R1/2	NI/Z	15	15	33.0	38.1	09.4	29.9	01.2	17.0	20	20.2	24	24	0	55	200	200	204	101
VRL300-031004	10	R3/8	R1/2	12	15	33.6	35.1	69.4	28.8	61.2	17.6	28	20.2	22	16	7.5	53	300	300	179	
VRL300-041004	10	R1/2	N1/2	15	13	55.0	38.1	09.4	29.9	01.2	17.0	20	20.2	24	10	7.5	55	300	300	193	

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

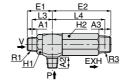


101

VRL

Nipple type B









Unit: mm

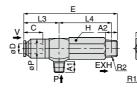
Model code	R1	R2	R3	A1	A2	АЗ	В	L1	L2	L3	L4	E1	E2	Hex. H1	Hex. H2	□F	Nin.da.of fowdranel (ømm)	Final vacuum (-kPa)	Suction flow (min(ANR))	Air consumption (dmin(ANR))	Weight (g)	CAD file name
VRL50-010101	R1/8	R1/8	R1/8	8	8	8	28	24	16	17	34	21	38	14	14	16	2.8	53	50	50	37	
VRL100-020202	R1/4	R1/4	R1/4	11	11	11	35	29	19	21	49	27	55	17	17	20	4.1	53	100	100	79	0 /
VRL200-030204	R3/8	R1/4	D1 /2	12	11	15	12 E	36.5	24	25.2	64.8	31.5	73	22	24	25	6	53	200	200	180	Refer
VRL200-040204	R1/2	K1/4	KI/Z	15	111	10	42.5	30.5	24	26.3	04.0	34.5	73	24	24	20	O	55	200	200	194	to page 104
VRL300-030204	R3/8	R1/4	D1 /2	12	11	15	12.5	36.5	24	25.2	64.8	31.5	73	22	16	25	7.5	53	300	300	170	101
VRL300-040204	R1/2	IX1/4	N1/Z	15	11	10	42.0	30.5	24	26.3	04.0	34.5	13	24	10	20	7.5	55	300	300	184	

 $\mbox{\%}$ "L1" , "L2" , "L3" and "L4" are referential dimensions after tightening thread.













Unit: mm

Model code	Tube O.D. øD	R1	R2	A1	A2	В	L1	L2	L3	L4	Е	øΡ	С	Hex. H1	□F	Min. dia. of flow channel (ømm)	Final vacuum (-kPa)	Suction flow ((min(ANR))	Air consumption (4min(ANR))	Weight (g)	CAD file name
VRL50-060101	6	R1/8	R1/8	8	8	28	24	16	27.6	34	65.6	16	17	14	16	2.8	53	50	50	34	
VRL50-080101	8	K1/0	K1/0	0	0	20	20	10	27.9	34	65.9	10	18.2	14	10	2.0	55	50	50	34	
VRL100-100202	10	D1 //	R1/4	11	11	35	25	19	32.8	49	87.8	20	20.7	17	20	4.1	53	100	100	75	D-4
VRL100-120202	12	N1/4	N1/4	- 11	11	30	20	19	35.4	49	90.4	20	23.3	17	20	4.1	55	100	100	76	Refer
VRL200-120204	12	D1 //	R1/2	11	15	42.5	30	24	39.9	64.8	112.9	25	23.3	24	25	6	53	200	200	172	to page 104
VRL200-160204	16	IX 1/4	KI/Z	11	10	42.0	30	24	41.3	04.0	114.3	20	24.8	24	20	6	55	200	200	174	101
VRL300-120204	12	D1 //	R1/2	11	15	42.5	30	24	39.9	64.8	112.9	25	23.3	24	25	7.5	53	300	300	162	
VRL300-160204	16	K1/4	KI/Z	11	10	42.0	30	24	41.3	04.0	114.3	20	24.8	24	20	7.0	00	300	300	163	

* "L1", "L2" and "L4" are reference dimensions after tightening thread.

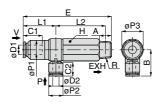














Unit: mm

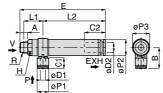
Model code	Tube O.D. øD1	Tube O.D. øD2	R		В			L2	øP1	øP2	øP3	C1	C2	対辺 H	Min. dia. of flow channel (ømm)	Final vacuum (-kPa)	Suction flow (Umin(ANR))	Air consumption (4min(ANR))	Weight (g)	CAD file name
VRL50-060601	6	6			25.5	65.6	30	31.6		12.4		17	17						38	
VRL50-080601	8	U	R1/8	8 -	20.0	65.9	30.3	31.0	16	12.4	18.4	18.2	17	14	2.8	53	50	50	30	
VRL50-060801	6	8	1(1/0	U	28.4	65.6	31	30.6	10	14.4	10.4	17	18.1	14	2.0	55	30	30	40	
VRL50-080801	8	0			20.4	65.9	31.3	30.0		4.4		18.2	0.1						39	
VRL100-100802	10	8			28.9	87.8	34.8	47		14.4		20.7	18.1						77	0.7
VRL100-120802	12	0	R1/4	11	20.9	90.4	37.4	47	20	4.4	22	23.3	0.1	17	4.1	53	100	100	79	Refer to page
VRL100-101002	10	10	1(1/4	- 11	31.2	87.8	36.1	45.7	20	17.6	22	20.7	20.2	17	4.1	55	100	100	80	104
VRL100-121002	12	10			31.2	90.4	38.7	40.7		17.0		23.3	20.2						82	101
VRL200-121004	12	10	R1/2	15	33.6	112.9	43.5	61.2	26	17.6	28	23.3	20.2	24	6	53	200	200	182	
VRL200-161004	16	10	NI/Z	10	33.0	114.3	44.9	01.2	20	17.0	20	24.8	20.2	24	0	55	200	200	183	
VRL300-121004	12	10	R1/2	15	33.6	112.9	43.5	61.2	26	17.6	28	23.3	20.2	24	7.5	53	300	300	172	
VRL300-161004	16	10	NI/Z	10	55.0	114.3	44.9	01.2	20	17.0	20	24.8	20.2	24	7.0	55	300	300	173	

 $[\]ensuremath{\,\%\,}$ "L2" is reference dimensions after tightening thread.









Unit: mm

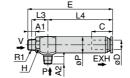
Model code	Tube O.D. ø D 1	Tube 0.D. øD2	R					L2	øP1	øP2	øP3	C1	C2	対辺 H	Min. dia. of flow channel (ømm)	Final vacuum (-kPa)	Suction flow (4min(ANR))	Air consumption (4min(ANR))		CAD file name
VRL50-010608	6	8	R1/8	8	25.5	77.9	19.4	54.5	12.4	16	18.4	17	18.2	14	2.8	53	50	50	52	
VRL50-010808	8	0	N1/0	0	28.4	11.9	20.4	53.5	14.4	10	10.4	18.1	10.2	14	2.0	55	50	30	54	
VRL100-020812	8	12	R1/4	11	28.9	105.4	23	76.4	14.4	20	22	18.1	23.3	17	4.1	53	100	100	105	٥,
VRL100-021012	10	12	N1/4	- 11	31.2	100.4	24.3	75.1	17.6	20	22	20.2	23.3	17	4.1	55	100	100	108	Refer to page
VRL200-031016	10	16	R3/8	12	33.6	109.3	28.8	74.2	17.6	25	28	20.2	24.8	22	6	53	200	200	194	104
VRL200-041016	10	10	R1/2	15	33.0	112.3	29.9	74.2	17.0	20	20	20.2	24.0	24	0	55	200	200	208	
VRL300-031016	10	16	R3/8	12	33.6	109.3	28.8	74.2	17.6	25	28	20.2	24.8	22	7.5	53	300	300	184	
VRL300-041016	10	10	R1/2	15	55.0	112.3	29.9	14.2	17.0	20	20	20.2	24.0	24	7.0	55	300	300	198	

* "L1" is reference dimension after tightening thread.



Vacuum Generator VRL

VRL Straight D RoHS compliant







Unit	•	mn
UIIII		mn

Model code	Tube O.D ø D	R1	R2	A1	A2	В	L1	L2	L3	L4	Е	С	øΡ	対辺 H1	□F	Min. dia. of flow charnel (ømm)		Suction flow ((min(ANR))	Air consumption (4min(ANR))		CAD file name
VRL50-010108	8	R1/8	R1/8	8	8	28	20	16	17	56.9	77.9	18.2	16	14	16	2.8	53	50	50	49	
VRL100-020212	12	R1/4	R1/4	11	11	35	25	19	21	78.4	105.4	23.3	20	17	20	4.1	53	100	100	103	0./
VRL200-030216	16	R3/8	R1/4	12	11	42.5	30	24	25.2	77.8	109.3	24.8	25	22	25	6	53	200	200	185	Refer to page
VRL200-040216	10	R1/2	N1/4	15		42.0	50	24	26.3	77.0	112.3	24.0	23	24	2	U	5	200	200	199	104
VRL300-030216	16	R3/8	R1/4	12	11	42.5	30	24	25.2	77.8	109.3	24.8	25	22	25	7.5	53	300	300	174	101
VRL300-040216	10	R1/2	111/4	15		42.0	50	24	26.3	17.0	112.3	24.0	20	24	20	7.0	55	300	300	188	

^{* &}quot;L2" and "L3" are reference dimension after tightening thread.

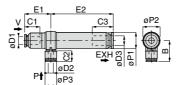
VRL Union Straight A



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VRL









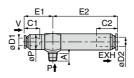
Unit: mm

Model code	Tube O.D. ø D 1		Tube O.D. øD3		øP1	øP2	øP3	C1	C2	C3	E1	E2	Min. dia. of flow channel (ømm)	Final vacuum (-kPa)	Suction flow (Imin(ANR))	Air consumption (I/min(ANR))	Weight (g)	CAD file name
VRL50-060608	6	6		25.5			12.4	17	17		30	54.5					49	
VRL50-060808	0	8	8	28.4	16	18.4	14.4	17	18.1	18.2	31	53.5	2.8	53	50	50	51	
VRL50-080608	8	6	0	25.5	10	10.4	12.4	18.2	17	10.2	30.3	54.5	2.0	55	50	50	49	
VRL50-080808	0	8		28.4			14.4	10.2	18.1		31.3	53.5					51	
VRL100-100812	10	8		28.9			14.4	20.7	18.1		34.8	76.4					102	D. 6
VRL100-120812	12	0	12	20.9	20	22	14.4	23.3	0.1	23.3	37.4	70.4	4.1	53	100	100	103	Refer to page
VRL100-101012	10	10	12	31.2	20	22	17.6	20.7	20.2	23.3	36.1	75.1	4.1	55	100	100	105	104
VRL100-121012	12	10		51.2			7.0	23.3	20.2		38.7	75.1					106	101
VRL200-121016	12	10	16	33.6	25	28	17.6	23.3	20.2	24.8	43.5	74.2	6	53	200	200	186	
VRL200-161016	16	10	10	55.0	3	20	17.0	24.8	20.2	24.0	44.9	74.2	0	55	200	20	187	
VRL300-121016	12	10	16	33.6	25	28	17.6	23.3	20.2	24.8	43.5	74.2	7.5	53	300	300	176	
VRL300-161016	16	10	10	55.0	2	20	17.0	24.8	20.2	24.0	44.9	14.2	7.5	55	300	500	177	

/RL Union Straight B









Unit: mm

Model code	Tube 0.D. øD1		R				L2	øΡ	C1	C2	E1	E2	□F	Min. dia. of flow channel (ømm)	Final vacuum (-kPa)	Suction flow (Umin(ANR))	Air consumption (#min(ANR))	Weight (g)	CAD file name
VRL50-060108	6	8	R1/8	8	28	23.4	35.6	16	17	18.2	27.6	56.9	16	2.8	53	50	50	45	
VRL50-080108	8	0	N1/0	O	20	24.4	34.6	10	18.2	10.2	27.9	50.9	10	2.0	55	50	50	45	
VRL100-100212	10	12	R1/4	11	35	29	53	20	20.7	23.3	32.8	78.4	20	4.1	53	100	100	99	D./
VRL100-120212	12	12	N1/4	11	33	30.3	51.7	20	23.3	23.3	35.4	70.4	20	4.1	55	100	100	106	Refer to page
VRL200-120216	12	16	R1/4	11	42.5	35.1	69.4	25	23.3	24.8	39.9	77.8	25	6	53	200	200	177	104
VRL200-160216	16	10	N1/4	11	42.5	38.1	09.4	20	24.8	24.0	41.3	77.0	20	O	55	200	200	178	101
VRL300-120216	12	16	R1/4	11	42.5	35.1	69.4	25	23.3	24.8	39.9	77.8	25	7.5	53	300	300	166	
VRL300-160216	16	10	N1/4	11	42.5	38.1	09.4	25	24.8	24.0	41.3	77.0	2	7.5	5	300	300	167	

 $[\]ensuremath{\text{\%}}$ "L2" is reference dimension after tightening thread.

CAD file list

Nipp

CAD
file name
VRL50-010601
VRL50-010801
VRL100-020802
VRL100-021002
VRL200-031004
VRL200-041004
VRL300-031004
VRL300-041004

ı	Model	CAD
ı	code	file name
	VRL50-010101	VRL50-010101
_	VRL100-020202	VRL100-020202
	VRL200-030204	VRL200-030204
Ī	VRL200-040204	VRL200-040204
	VRL300-030204	VRL300-030204
	VRL300-040204	VRL300-040204
Ī		

Union Straight A Union Straight B

Model	CAD	ı
code	file name	ı
VRL50-060608	VRL50-060608	١
VRL50-060808	VRL50-060808	١
VRL50-080608	VRL50-080608	١
VRL50-080808	VRL50-080808	١
VRL100-100812	VRL100-100812	١
VRL100-120812	VRL100-120812	١
VRL100-101012	VRL100-101012	١
VRL100-121012	VRL100-121012	١
VRL200-121016	VRL200-121016	
VRL200-161016	VRL200-161016	
VRL300-121016	VRL300-121016	
VRL300-161016	VRL300-161016	

Model	CAD
code	file name
VRL50-060108	VRL50-060108
VRL50-080108	VRL50-080108
VRL100-100212	VRL100-100212
VRL100-120212	VRL100-120212
VRL200-120216	VRL200-120216
VRL200-160216	VRL200-160216
VRL300-120216	VRL300-120216
VRL300-160216	VRL300-160216

Straight D

Straight A

Model CAD

Straight B

	Straight	C
П	Model	

_		_	
Model	CAD	Model	CAD
code	file name	code	file name
L50-060101	VRL50-060101	VRL50-010108	VRL50-010108
L50-080101	VRL50-080101	VRL100-020212	VRL100-020212
100-100202	VRL100-100202	VRL200-030216	VRL200-030216
100-120202	VRL100-120202	VRL200-040216	VRL200-040216
200-120204	VRL200-120204	VRL300-030216	VRL300-030216
200-160204	VRL200-160204	VRL300-040216	VRL300-040216
300-120204	VRL300-120204		
300-160204	VRL300-160204		

0, 15	н
file name	ı
VRL50-060601	١
VRL50-080601	١
VRL50-060801	١
VRL50-080801	١
VRL100-100802	١
VRL100-120802	١
VRL100-101002	١
VRL100-121002	١
VRL200-121004	
VRL200-161004	
VRL300-121004	
	VRL50-060601 VRL50-080601 VRL50-060801 VRL50-080801 VRL100-100802 VRL100-120802 VRL100-101002 VRL100-121002 VRL200-121004 VRL200-161004

VRL300-161004 VRL300-161004

Model	CAD	Model	CAD
code	file name	code	file name
VRL50-010608	VRL50-010608	VRL50-060101	VRL50-060101
VRL50-010808	VRL50-010808	VRL50-080101	VRL50-080101
VRL100-020812	VRL100-020812	VRL100-100202	VRL100-100202
VRL100-021012	VRL100-021012	VRL100-120202	VRL100-120202
VRL200-031016	VRL200-031016	VRL200-120204	VRL200-120204
VRL200-041016	VRL200-041016	VRL200-160204	VRL200-160204
VRL300-031016	VRL300-031016	VRL300-120204	VRL300-120204
VRL300-041016	VRL300-041016	VRL300-160204	VRL300-160204

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...Recomendations 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.

Products can cause personal injury or damages to properties.

↑ Warning I

- 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.

X. This safety instructions are subject to change without notice.



Disclaimer

- 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.
- 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.
- 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.

- 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 I

- 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 Antispatter 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.
 - $\ensuremath{\bigcirc}$ 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.



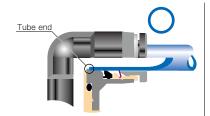
 \pm 0.15mm \pm 0.15mm \pm 0.15mm \pm 0.15mm \pm 0.15mm \pm 0.15mm \pm 0.15mm

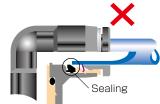
 \pm 0.15mm

- 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
Ø1.8mm	_	\pm 0.05mm	Ø1/8	± 0.1mm
Ø3mm	_	± 0.15mm	Ø5/32	\pm 0.1mm
Ø4mm	± 0.1mm	± 0.15mm	Ø3/16	\pm 0.1mm
Ø6mm	± 0.1mm	± 0.15mm	Ø1/4	± 0.1mm
Ø8mm	± 0.1mm	± 0.15mm	Ø5/16	\pm 0.1mm
Ø10mm	± 0.1mm	± 0.15mm	Ø3/8	± 0.1mm
Ø12mm	± 0.1mm	± 0.15mm	Ø1/2	± 0.1mm
Ø16mm	± 0.1mm	± 0.15mm	Ø5/8	± 0.1mm

- 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 pushin 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.





Tube is not fully inserted up to tube end.

- 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
 - ②The 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 releasering, 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
	$M3 \times 0.5$	0.7N·m		0110004
	M5 × 0.8	1.0 ~ 1.5N·m		SUS304 NBR
	M6 × 1	2 ~ 2.7N·m		ואטרו
Metric thread	M3 × 0.5	0.7N·m	_	
	$M5 \times 0.8$	1 ~ 1.5N·m		POM
	$M6 \times 0.75$	0.8 ~ 1N·m		POW
	$M8 \times 0.75$	1 ~ 2N·m		
	R1/8	4.5 ~ 6.5N·m		
Taper pipe thread	R1/4	7 ~ 9N·m White	_	
Taper pipe trireau	R3/8	12.5 ~ 14.5N·m	vviille	_
	R1/2	20 ~ 22N·m		
Unified thread	No.10-32UNF	1.0 ~ 1.5N·m	_	SUS304、NBR
	1/16-27NPT	4.5 ~ 6.5N·m		
Nietienel nine	1/8-27NPT	4.5 ~ 6.5N·m		
National pipe thread taper	1/4-18NPT	7 ~ 9N·m	White	_
	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.

Common Safety Instructions for Vacuum Series

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

↑ Warning I

- 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
- 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.

- 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.

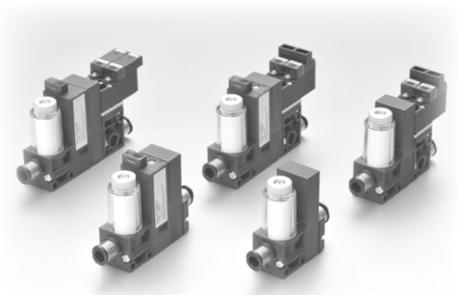
* Vacuum Generator Series

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

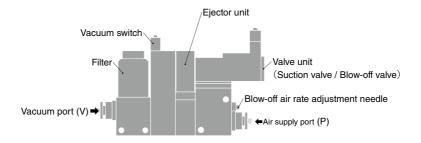
Chemical Name
Methanol
Ethanol
Nitric acid
Sulfuric acid
Hydrochloric acid
Lactic acid
Acetone
Chloroform
Aniline
Trichloroethylene
Hydrogen peroxide

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

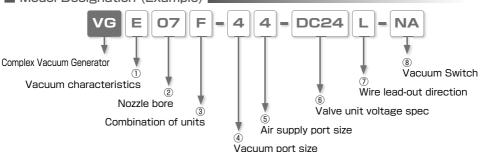


Complex Ejector focusing on basic performance Vacuum Generator VG Series

- Vacuum switch and blow-off valve are united. Select the best combination in accordance with applications.
- There are 3 output types: 1 switch output and 1 analog output type, 2-point switch output type, and cost saving 1 analog output type.



■ Model Designation (Example)



1) Vacuum characteristics

Code	Performance	Code	Performance	Code	Performance
Н	High-vacuum type	L	Large-flow type	Ε	High-vacuum at low air supply pressure type

② Nozzle bore

Cada	Nozzle	H type	L type	E type	Air concumuntion
Code	bore	Vacuum level, Suction flow	Vacuum level, Suction flow	Vacuum level, Suction flow	Air consumption
05	0.5mm	-90kPa	-66kPa		11.5t/min(ANR)
05	0.511111	7ℓ/min(ANR)	12t/min(ANR)	_	H.Schiil(ANA)
07	0.7	-93kPa	-66kPa	-90kPa	23t/min(ANR)
07	0.7mm	13t/min(ANR)	26t/min(ANR)	10.5t/min(ANR)	(17t/min(ANR))
10	1 0	-93kPa	-66kPa	-90kPa	46t/min(ANR)
	1.0mm	27ℓ/min(ANR)	40ℓ/min(ANR)	21/min(ANR)	(34t/min(ANR))

^{*} Supply pressure is 0.5MPa for H and L type and 0.35MPa for E type.

③ Combination of units

Code	Filter	Vacuum switch	Suction valve	Blow-off valve
Α	0	_	_	_
В	0	0	_	_

4 Vacuum port size

Joint type	Push-In Fitting		
Code	4	6	
Size	ø4mm	ø6mm	

(5) Air supply port size

6 Valve unit voltage spec

Joint type	Push-In Fitting		
Code	4	6	
Size	ø4mm	ø6mm	

Code	DC24	AC100
Voltage	DC24V	AC100V

(7) Wire lead-out direction

Code	S	L
lead-out direction	Side	Тор

(8) Vacuum Switch (For Unit combination of B and F only)

	, , , , , , , , , , , , , , , , , , , ,			
Code	NW	NA	Α	
Sensor	2 Switch outputs	1 analog output and 1 switch output	1 analog output	

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VU

VY

VM · VC

VG

^{*} The values of air consumption in () are for E type.

^{*} The values in the table are representative values. Suction flow can vary by vacuum port dia. or tube length.

VG

VN

■ Specification

Fluid medium	Air
Operating pressure range	0.25 ~ 0.7MPa
Operating temp. range	5 ~ 50°C
Lubrication	Not required

■ Suction Valve Specification

Valve type	Pilot operated poppet valve
Rated voltage	DC24V ±10% · AC100V ±10%
Power consumption	1.2W (with LED) · 1.5VA (with LED)
Effective sectional area	5 mm²
Manual operation	Push button (non-lock)

■ Blow-off Valve Specification

Valve type	Direct operating poppet
Rated voltage	DC24V ±10% · AC100V ±10%
Power consumption	1.2W (with LED) · 1.5VA (with LED)
Manual operation	Push button (non-lock)

■ Vacuum Switch Specification

Mandal and		1/0 1/4	VO 104	1/0 1			
Model code		VG······NA	VG·····-NW	VG·····-A			
Output Specification		1 switch output	2 switch output				
Output Open	modelon	1 analog output		1 analog output			
Power requir	ements	DC12 ~ 24V	\pm 10% 24VDC \pm Ripple (P-	P) Max. 10%			
Current consumption (wh	en 24VDC supplied)	Max. 17mA (1 switch: ON)	Max. 25mA (2 switches: ON)	Max. 15mA (Output current: 0mA)			
Fluid medium	า		Air / Inert gas				
Operating pres	sure range		0 ~ -100kPa				
Proof pressu	ıre		200kPa				
Operating te	mp. range		0 ~ 50°C (No freezing)				
Operating hum	idity range	35 ~ 85%RH (No dew condensation)					
Durability (%	€)	10 m	sure)				
	No. of pressure setting	1	2				
	Switch output	NPN open co					
	Pressure setting range	0 ~ -10					
Switch output	Operating accuracy	±3%F.S.	(at 25°C)				
	Differential response	Variable (about 1-15% of set value)	2% F.S.Max				
	Switch capacity	30V DC 8	0mA Max.				
	Residual voltage	Max.					
	Output voltage	1 ~ 5V		1 ~ 5V			
	Zero point voltage	1 ±0.1V		1 ±0.2V			
Analog output	Span voltage	4 ±0.1V		4 ±0.2V			
	Lin / HYS	±0.5%F.S.以下		±0.5%F.S.以下			

 $^{^{\}star}$ Allowable range: \pm 3%F.S. of zero point voltage, Span voltage for analog output, or of switch output accuracy.

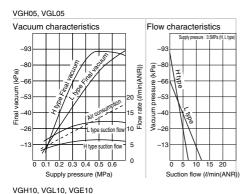
Vacuum Generator VG

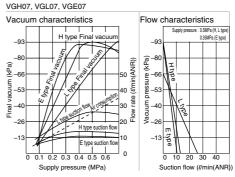
Filter Specification

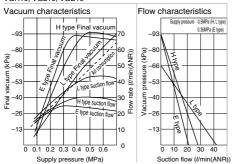
Element material	PVF (Polyvinyl formal)
Filtering capacity	10μm
Element model code	VGFE10

■ Characteristics

Supply pressure - Final vacuum / Suction Flow / Air Consumption







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VL

VY

VRI

VG

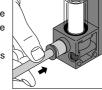
How to insert and disconnect

1. How to insert and disconnect tubes

① Tube insertion

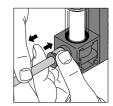
Insert a tube into Push-In Fitting of the vacuum generator VG up to the tube end. Lock-claws bite the tube to fix it and the elastic sleeve seals around the

Refer to "2. Instructions for Tube Insertion" under "Common Safety Instructions for Fittings".



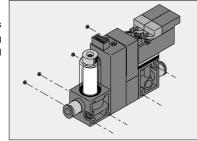
2 Tube disconnection

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 fix the product

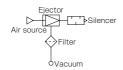
In order to fix the vacuum generator VG, tighten M3 threads through the fixing holes on the resin body with tightening torque 0.3 to 0.35Nm. Refer to the outer dimensional drawings for the hole pitch.

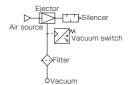


VG

Standard Size List

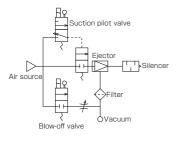
Unit combination : Built-in Filter Type



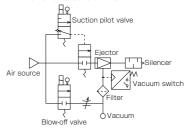


Type	Page	Air supply	Vacuu	m port
Type	to refer	port	4mm	6mm
Vc A Type	112	4mm	•	
	112	6mm		•

Unit combination: Suction Valve / Blow-off Valve / Built-in Filter Type



Unit combination: \	/acuum Switch	(digital type) /	Suction Valve
/	Blow-off Valve	/ Built-in Filter	



Type	Page	Air supply	Vacuu	m port	
туре	to refer	port	4mm	6mm	
VC E Type	113	4mm	•		
	1113	6mm		•	

Type	Page	Air supply	Vacuum port				
туре	to refer	port	4mm	6mm			
VC F Type	114	4mm	•				
	114	6mm		•			

Applicable Tubes and Related Products

Polyurethane Tube

(Piping products catalog P.596)

Polyurethane Tube is for the general pneumatic piping and suitable for a compact piping.

Nylon Tube

(Piping products catalog P.608)

■ Nylon Tube is for the general pneumatic piping and suitable for a high-pressure fluid up to 1.5MPa (NB tube: 1.0MPa).

Vacuum Tube

(Piping products catalog P.612)

Vacuum Tube is a ultra-soft tube and suitable for piping of vacuum generators or actuators.

Vacuum Pads

- Vacuum Pad Standard Series · · P.428
- Vacuum Pad Sponge Series · · · P.468
- Vacuum Pad Bellows Series · · · P.488
- Vacuum Pad Multi-Bellows Series P.508
- Vacuum Pad Oval Series · · · · · P.526
- Vacuum Pad Soft Series · · · · · P.550
- Vacuum Pad Soft Bellows Series · P.578
- Vacuum Pad Skidproof Series · · P.604
- Vacuum Pad Ultrathin Series · · · P.624
- Vacuum Pad Mark-free Series · · P.642
- Vacuum Pad Long Stroke Series · P.658

CAD P.109 CAD

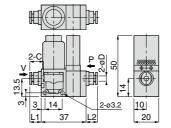
112

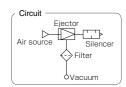


A Type Built-in Filer Type









Unit: mm

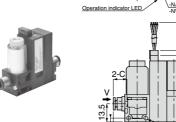
Model	Tube O.D.	L1	L2	С	Nozzle Bore	Final vacuum	Suction flow	Air consumption	Weight	CAD
code	øD		LZ			(-kPa)	(t/min(ANR))		(g)	file name
VGH05A-44	4	9.6	9.1	10.9	0.5	90	7	11.5	47	
VGH07A-66	6	12.1	11.6	11.7	0.7	93	13	23	49	
VGH10A-66	0	12.1	11.0	11.7	1	93	27	46	48	
VGL05A-44	4	9.6	9.1	10.9	0.5		12	11.5	46	VVG-001
VGL07A-66	6	12.1	11.6	11.7	0.7	66	26	23	48	V V G-00 I
VGL10A-66	0	12.1	11.0	11.7	1		40	46	47	
VGE07A-66	6	6 12.1	11.6	11.7	0.7	90	10.5	17	48	
VGE10A-66	U	12.1	11.0	11.7	1	90	21	34	4	

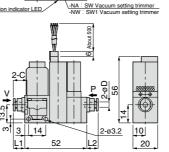
Vacuum Sensor (digital type) / Built-in Filter Type CAD

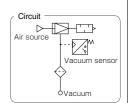




RoHS compliant







* 1 analog output type does not have Operation indicator LED and Vacuum Setting Trimmer.

Unit: mm

Model	Tube O.D.	L1	L2	С	Nozzle Bore	Final vacuum	Suction flow	Air consumption	Weight	CAD	
code	øD		LZ			(-kPa)	(t/min(ANR))		(g)	file name	
VGH05B-44-□	4	9.6	7.6	10.9	0.5	90	7	11.5	74		
VGH07B-66- □	6	12.1	10.1	11.7	0.7	93	13	23	75		
VGH10B-66-□	0	O	12.1	10.1	11.7	1	93	27	46	13	
VGL05B-44-□	4	9.6	7.6	10.9	0.5		12	11.5	73	VVG-001	
VGL07B-66-□	6	12.1	10.1	11.7	0.7	66	26	23	75	V V O - 00 I	
VGL10B-66-□	0	12.1	10.1	11.7	1		40	46	74		
VGE07B-66- □	6	12.1	10.1	11.7	0.7	90	10.5	17	75		
VGE10B-66-□	0	12.1	10.1	11.7	1	90	21	34	74		

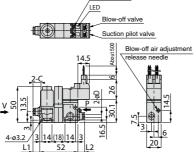
Vacuum Generator VG

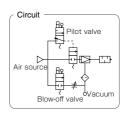
Suction Pilot Valve / Blow-off Valve / Built-in Filter Type Cable lead-out direction: Top Manual button











Unit: mm

Model	Tube O.D.	L1	L2	С	Nozzle Bore	Final vacuum	Suction flow	Air consumption	Weight	CAD
code	øD		LE	O .		(-kPa)	(t/min(ANR))		(g)	file name
VGH05E-44-□L	4	9.6	7.6	10.9	0.5	90	7	11.5	99	
VGH07E-66-□L	6	12.1	10.1	11.7	0.7	93	13	23	100	
VGH10E-66-□L	0	12.1	10.1	11.7	1	93	27	46	101	
VGL05E-44-□L	4	9.6	7.6	10.9	0.5		12	11.5	99	VVG-001
VGL07E-66-□L	6	12.1	10.1	11.7	0.7	66	26	23	101	V V O-001
VGL10E-66-□L	0	12.1	10.1	11.7	1		40	46	100	
VGE07E-66-□L	6	12.1	10.1	11.7	0.7	90	10.5	17	101	
VGE10E-66-□L	U	14.1	10.1	11.7	1	90	21	34	100	

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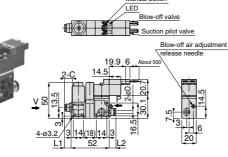
VG

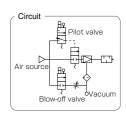
Suction Pilot Valve / Blow-off Valve / Built-in Filter Type Cable lead-out direction: Side Manual button











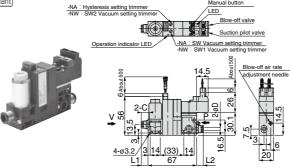
Unit: mm

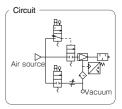
Model code	Tube O.D. øD	L1	L2	С	Nozzle Bore (mm)	Final vacuum (-kPa)	Suction flow (Umin(ANR))	Air consumption (t/min(ANR))		CAD file name
VGH05E-44-□S	4	9.6	7.6	10.9	0.5	90	7	11.5	99	
VGH07E-66- ☐ S	6	12.1	10.1	11.7	0.7	93	13	23	100	
VGH10E-66-□S	0	12.1	10.1	11.7	1	93	27	46	101	
VGL05E-44-□S	4	9.6	7.6	10.9	0.5		12	11.5	99	VVG-001
VGL07E-66-□S	6	12.1	10.1	11.7	0.7	66	26	23	101	V V O-00 I
VGL10E-66-□S	0	12.1	10.1	11.7	1		40	46	100	
VGE07E-66-□S	6	12.1	10.1	11.7	0.7	90	10.5	17	101	
VGE10E-66-□S	0	12.1	10.1	11.7	1	90	21	34	100	

Vacuum Sensor (digital type) / Suction Pilot Valve / Blow-off Valve / Built-in Filter TypeCable lead-out direction: Top









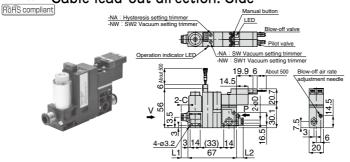
* 1 analog output type does not have Operation indicator LED and Vacuum Setting Trimmer.

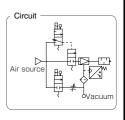
Unit: mm

Model	Tube O.D.	L1	L2	С	Nozzle Bore	Final vacuum	Suction flow	Air consumption	Weight	CAD
code	øD		LZ			(-kPa)	(t/min(ANR))		(g)	file name
VGH05F-44-□L-□	4	9.6	7.6	10.9	0.5	90	7	11.5	125	
VGH07F-66-□L-□	6	12.1	10.1	11.7	0.7	93	13	23	128	
VGH10F-66-□L-□	0	12.1	10.1	11.7	1	93	27	46	127	
VGL05F-44-□L-□	4	9.6	7.6	10.9	0.5		12	11.5		VVG-001
VGL07F-66-□L-□	6	12.1	10.1	11.7	0.7	66	26	23	127	V V G - 00 I
VGL10F-66-□L-□	0	12.1	10.1	11.7	1		40	46		
VGE07F-66-□L-□	6	12.1	10.1	11.7	0.7	90	10.5	17	128	
VGE10F-66-□L-□	U	12.1	10.1	11.7	1	90	21	34	120	

, Vacuum Sensor (digital type) / Suction Pilot Valve / Blow-off Valve / Built-in Filter Type Cable lead-out direction: Side







¾ 1 analog output type does not have Operation indicator LED and Vacuum Setting Trimmer.

Unit: mm

Model	Tube O.D.	L1	L2	С	Nozzle Bore	Final vacuum	Suction flow	Air consumption	Weight	CAD
code	øD		LZ			(-kPa)	(t/min(ANR))	(Umin(ANR))	(g)	file name
VGH05F-44-□S-□	4	9.6	7.6	10.9	0.5	90	7	11.5	125	
VGH07F-66-□S-□	6	12.1	10.1	11.7	0.7	93	13	23	128	
VGH10F-66-□S-□	0	12.1	10.1	11.7	1	93	27	46	127	
VGL05F-44-□S-□	4	9.6	7.6	10.9	0.5		12	11.5		VVG-001
VGL07F-66-□S-□	6	12.1	10.1	11.7	0.7	66	26	23	127	V V G-00 I
VGL10F-66-□S-□	0	12.1	10.1	11.7	1		40	46		
VGE07F-66-□S-□	6	12.1	10.1	11.7	0.7	90	10.5	17	128	
VGE10F-66-□S-□	0	12.1	10.1	11.7	1	90	21	34	120	

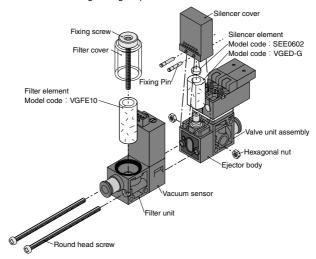
Before using PISCO products, be sure to read "Safety Instructions" and "Safety Instruction Manual" on page 35-39, "Common Safety Instructions for Vacuum Series" on page 47-49 and "Common Safety Instructions for Vacuum Generator VG & VK" on page 105.

Warning

- Attentions should be paid when pipe resistance is large or a large amount of blow-off air rate is required.
 Insufficient blow-off air may cause troubles. Make sure to evaluate PISCO products by actual system.
- 2. The coil in a pilot valve generates heat under the following ① ③ conditions. Heating may be a cause of dropping life cycle, malfunctions and burn or may affect negatively on peripheral machines due to the heat. Contact us when the power is applied to the vacuum generator under the following conditions:
 - 1) The power is continuously ON for over 2 hours.
 - ② High-cycle operation.
 - ③ Even when intermittent running of the generator is carried out, the total operation time per day is longer than non-operation time.

■ Replacement Element |

■ Remove the fixing screws to replace filter elements. Make sure not to lose the filter seal ring after the replacement and tighten the screws with tightening torque 0.18-0.22Nm.



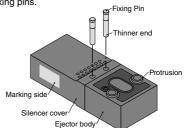
■ Replacement of Silencer Elements

Replace elements after removing 2 round head screws and 2 fixing pins.

Make sure not to lose 2 hexagonal nuts.

Procedures After Replacing Silencer Element

As the right figure shows, attach the silencer cover to the ejector body and insert thinner end of 2 fixing pins into the holes from the side with protrusion of the ejector body. Make sure all seal materials of each unit are fit before assembling the units. Use a screwdriver to appropriately tighten the round head screw and the hexagonal nut with 0.35-0.4Nm of the tightening torque.



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VL

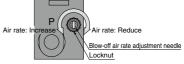
V

VM - V

VRL

Adjusting Method of Blow-off Air

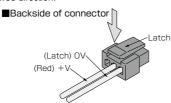
- Adjusting Method of Blow-off Air
 - Turn the release needle in the clockwise direction to reduce blow-off air and counter-clockwise to increase.
 - * After adjustment of the blow-off air rate, make sure to tighten the locknut to prevent the setting from changing with attentions to the following (1) and (2).

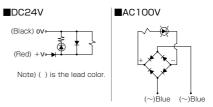


- ① Without turning the needle, finger-tighten the lock nut clockwise until it touches needle-guide. Then tighten the nut by turning 20 ~ 30° more by using proper tool.
- 2 Be careful not to damage the thread by over tightening.

Attaching / Detaching Individual Plug-in Connector

- Attaching / Detaching Individual Plug-in Connector
 - Insert the connector into the socket until it stops.
- Connector Detaching Method
 - Pull out the connector while pushing the latch to the arrowed direction.





Manual of Vacuum Sensor

1. Pressure Adjustment

- ① Turn on the power (Apply DC power to the vacuum sensor after making sure the correct wiring).
- ② Fully turn the hysteresis setting trimmer (HYS) in the counter-clockwise direction in order to minimize the hysteresis setting. (Vacuum sensor with analog output (Code: -NA) only)

Note) When vacuum level is not stable, minimized hysteresis make the output unstable.

- 3 Adjust the vacuum setting trimmer (S1 / S2 and SW) to meet the required value.
- Note) Use a vacuum gauge or check in the actual system for setting pressure.

4 Apply the air pressure and check the operation.

(In case of Vacuum sensor with analog output (Code: -NA))

Switch output (SW): Operation indicator (Red LED) turns ON more than the set pressure.

(Vacuum sensor with 2 switch output (Code: -NW))

Switch output 1 (S1): Operation indicator (Red LED) turns ON more than the set pressure.

Switch output 2 (S2): Operation indicator (Green LED) turns ON more than the set pressure.

2. Differential response setting (Vacuum sensor with analog output (Code: -NA) only)

- ① Differential response setting can be adjusted by the hysteresis setting trimmer (HYS).
- ② Differential response setting range is regulated within about 0-15% of the set value. Differential response setting becomes large when the trimmer is turned in the clockwise direction.
- ③ Confirmation of Hysteresis

Gradually increase and decrease the supply pressure around the set pressure value and read the value from a vacuum gauge when operation indicator lamp turns ON/OFF. The difference in the displayed values is taken as differential response.

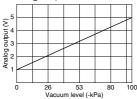
- 4 Hysteresis adjustment is useful for the following cases:
 - · Increase differential response when pressure pulsates with output repeatedly showing small on/off movements.
 - · When an allowable range is to be set for the lowering of pressure.

VG

Vacuum Generator VG

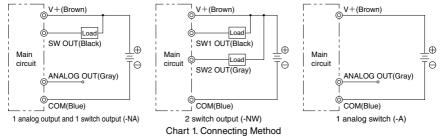
3. Output Characteristics of 1 analog switch (Code: -A).

■Analog output characteristics



4. Wiring / Piping

- (1) Be sure to shut off the power supply before wiring.
- (2) In conducting the wiring, distinguish the wire colors and confirm the terminal output.
- (3) Refer to Chart 1. Connecting Method for wiring.
- (4) Do not give excessive tension or bending to the drawer cable.
- (5) The cable can be connected or disconnected from connector. In case of disconnection, please hold connector and pull out the cable while pushing stop bar. Avoid connection and disconnection unless it is absolutely necessary, for it will put burdens on the sensor board.



Safety Instructions

- ① Do not use the vacuum generator in location where it may be exposed to water, oil drop or dust, since it is not the drip/dust proof.
- ② Do not use the vacuum generator in location where it may be exposed to inflammable or explosive gas, liquid or atmosphere, since it is not an explosive-proof.
- ③ Do not use the sensor in atmosphere exceeding the range of application temperature or causing heat as the vacuum generator malfunction may result.
- When the positive pressure such as blow-off air is applied to the sensor, do not apply the pressure more than 0.2MPa constantly.
- ⑤ Do not use it in an ambience of gas containing a corrosive substance.
- (6) Compressed air contains many kinds of drains such as water, oxidized oil, tar and other foreign substances. Dehumidify the compressed air by using an after-cooler or a dryer and improve the air quality, since those drains seriously impair the performance of the vacuum generator.
- Supply a stable DC power to the product.
- ® Add a surge absorption circuit to relays or solenoid valves, etc. which are to be connected with output terminal and source terminal. Avoid any use which involves over 80mA in current.
- Ground FG terminal when using a unit power source such as switching current.
- (i) Output terminals (lead wire color: black and gray) and other terminals should not be short circuited.
- 1 Do not apply excessive external impact on the sensor.
- (2) Wiring or ways by which noise is caused may cause troubles.
- (ii) When adjusting pressure and the hysteresis setting, use the accompaied flathead screwdriver. Do not apply an excessive force on the trimmer and slowly turn it within its rotation limits.

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...Recomendations 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.

Products can cause personal injury or damages to properties.

↑ Warning I

- 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.

X. This safety instructions are subject to change without notice.



Disclaimer

- 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.
- 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.
- 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.

- 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.

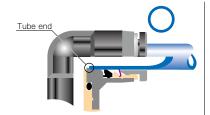
- 1. Do not use PISCO products under the following conditions.
 - ① Beyond the specifications or conditions stated in the catalog, or the instructions.
 - ② Under the direct sunlight or outdoors.
 - ③ Excessive vibrations and impacts.
 - 4 Exposure / adhere to corrosive gas, inflammable gas, chemicals, 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 Antispatter 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.
 - $\ensuremath{\bigcirc}$ 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.

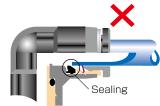


- 1. Remove dusts or drain before piping. They may get into the peripheral machine / facilities and cause malfunction.
- 2. When inserting an ultra-soft tube into push-in fitting, make sure to place an Insert Ring into the tube edge. There is a risk of causing the escape of tube and a fluid leakage without 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	_	\pm 0.05mm	Ø1/8	\pm 0.1mm	\pm 0.15mm
Ø3mm	_	± 0.15mm	Ø5/32	\pm 0.1mm	± 0.15mm
Ø4mm	\pm 0.1mm	± 0.15mm	Ø3/16	\pm 0.1mm	± 0.15mm
Ø6mm	\pm 0.1mm	± 0.15mm	Ø1/4	\pm 0.1mm	± 0.15mm
Ø8mm	\pm 0.1mm	± 0.15mm	Ø5/16	\pm 0.1mm	± 0.15mm
Ø10mm	\pm 0.1mm	± 0.15mm	Ø3/8	\pm 0.1mm	± 0.15mm
Ø12mm	\pm 0.1mm	± 0.15mm	Ø1/2	\pm 0.1mm	± 0.15mm
Ø16mm	\pm 0.1mm	± 0.15mm	Ø5/8	\pm 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 pushin 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.





Tube is not fully inserted up to tube end.

- 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
 - ②The 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 releasering, 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	
	$M3 \times 0.5$	0.7N·m		0110004	
	M5 × 0.8	1.0 ~ 1.5N·m		SUS304 NBR	
	M6 × 1	2 ~ 2.7N·m		ואטרו	
Metric thread	M3 × 0.5	0.7N·m	_		
	$M5 \times 0.8$	1 ~ 1.5N·m		DOM	
	$M6 \times 0.75$	0.8 ~ 1N·m		POM	
	$M8 \times 0.75$	1 ~ 2N·m			
	R1/8	4.5 ~ 6.5N·m			
Taper pipe thread	R1/4	R1/4 7 ~ 9N·m White		_	
Taper pipe trireau	R3/8	12.5 ~ 14.5N·m	vviille	_	
	R1/2	20 ~ 22N·m			
Unified thread	No.10-32UNF	1.0 ~ 1.5N·m	_	SUS304、NBR	
	1/16-27NPT	4.5 ~ 6.5N·m			
Nietienel nine	1/8-27NPT	4.5 ~ 6.5N·m			
National pipe thread taper	1/4-18NPT	7 ~ 9N·m	White	_	
illieau lapei	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.

Common Safety Instructions for Vacuum Series

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

↑ Warning I

- 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
- 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.

- 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 Series

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.

Vacuum Generator VG. VK

VACUUM

Common Safety Instructions for Vacuum Generator VG and VK Series

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

- 1. For the operation of the valve, make sure that the leakage current is less than 1mA. Leakage current larger than that may cause malfunction.
- 2. The Vacuum Generator with retention function or check valve function permits some vacuum leakage, so provide an appropriate safety measure when vacuum retention for long period of time is required.
- 3. Long continuous power supply to the valve may raise the temperature of the coil. Heat may cause damaging product life, malfunction, and burns or may adversely affect the peripherical machines. Consult PISCO about such applications.

- 1. Do not give an excessive tensile strength and bending on a lead wire. Otherwise, breaking wire or damage on connector may be caused.
- When manifold type is selected, dropping the performance or having an effect to other vacuum ports can be caused depending on number of stations or a combination of mounting units. Contact us for any unclear points.
- 3. Compressed air contains many kinds of drains such as water, oxidized oil, tar and other foreign substances. Dehumidify the compressed air by using an after-cooler or a dryer and improve the air quality, since those drains seriously impair the performance of the vacuum generator.
- 4. Do not use lubricators.
- 5. Since pipe rust cause malfunctions, a filter finer than $5\mu m$ should be placed right before the air supply port.
- 6. Do not use the vacuum generator under the condition of corrosive and/or flammable gases. Also do not use these gasses as a fluid medium.
- 7. Do not operate blow-off solenoid valve during vacuum generating.
- 8. When replacing vacuum port cartridge, first remove any foreign matter clinging to them and the surrounding areas, then firmly insert pins into cartridges.
- 9. For handling and setting of vacuum switch, please read instruction manual carefully.
- 10. For adjustment of vacuum blow-off air flow or blow-off time of air-timer operated blow-off valve on VK Series, read the instructions carefully.

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VH-

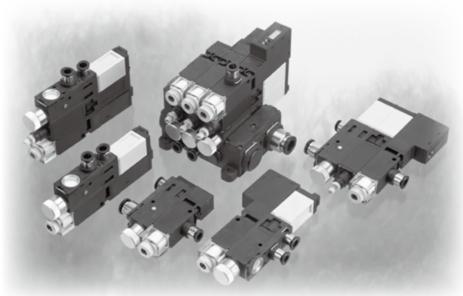
VUI

VE

VM - V

VC

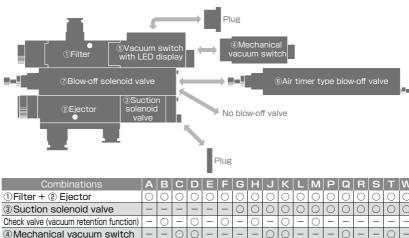
VK



Complex Vacuum Generator with Variety of Mounting Units for Different Applications

Vacuum Generator VK Series

 Selection of the most suitable module for your application is possible by the modularized each unit and rich combination of units.



S Vacuum switch with LED display
 Air timer type blow-off valve
 Blow-off solenoid valve

VX

VZ

۷N

- Characteristics
- Blow-Off Mechanism can be selectable from solenoid valve type and air timer type. The built-in switching valve realizes fine tuning of quick blow-off air and fine adjustment of air rate.
- Easy maintenance by a lock-on manual button.
- 2 vacuum sensor selections: LED display Type and Mechanical Type which is reasonable and user-friendly.
- An LED display is used for LED digital pressure sensor to enhance visibility.
- Two types of vacuum switch : 2 switch output, 1 switch output with 1 analog output are available depending on the desired application.
- 4 Standard nozzle bores are 05(ø0.5mm), 07(ø0.7mm), 10(ø10mm) and 12(ø1.2mm).

VI

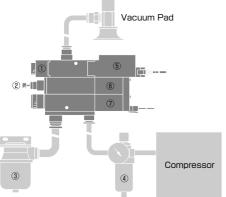
VUI

VE

VM - V

VG

■ Piping Example



① Filter

Dusts sucked up from a vacuum pad are filtered and blocked from entering inside the vacuum generator.

②Blow-off air rate adjustment needle

Turning the release needle to right (clockwise direction) reduces blowoff air and turning it to left (counterclockwise) increases blow-off air.

③ Vacuum Filter

Dusts and water drops exhausted from the vacuum generator are filtered.

4 Filter / Regulator

Select a filter and a regulator which ensure an adequate flow pressure and rate of VK.

5 Vacuum Sensor with LED display

Easy adjustment of vacuum level by the LED display. 2 types of output are available; ①2 switch output and ②1 switch output with analog output.

® Blow-off Solenoid Valve (R)

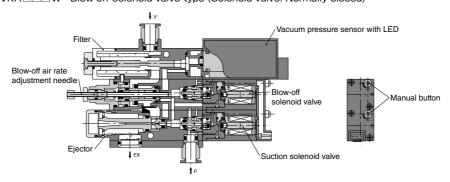
The solenoid valve functions to release a work-piece from a vacuum nad

(Blow-off air is generated during the electric power supply)

③ Suction Solenoid Valve (S) The solenoid valve generates vacuum.

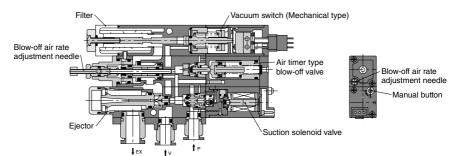
■ Construction (Stand-alone type with double side port : VKA)

VKA _ _ W...Blow-off solenoid valve type (Solenoid valve: Normally closed)

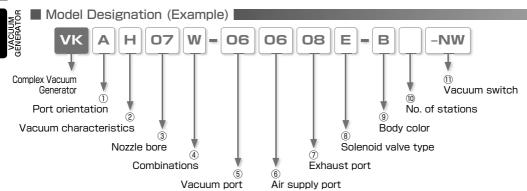


■ Construction (VKB: Stand-alone type with single side port)

VKB QQ...Air timer type (Solenoid valve: Normally closed)



Vacuum Generator VK



1) Port orientation

Code		Code		Code	
Α	Stand-alone type with double side port	В	Stand-alone type with single side port	М	Manifold type

② Vacuum characteristics

Code	Performance	Code	Performance	Code	Performance
ш	High-vacuum type		Large-flow type	_	High-vacuum at low air supply pressure type
	(Rated supply pressure : 0.5MPa)		(Rated supply pressure : 0.5MPa)	_	(Rated supply pressure : 0.35MPa)
No code	Manifold-base alone				

3 Nozzle bore. (Combinations: A, C, E, G, J, L, P, Q, R, S, T and W)

Code	Nozzle	H type	L type	E type	Air consumption			
Code	bore	Vacuum level and Suction flow	Vacuum level and Suction flow	Vacuum level and Suction flow	All consumption			
05	0.5mm	-91kPa、7l/min[ANR]	-67kPa、11t/min[ANR]	-	11.5t/min[ANR]			
07	0.7mm	-93kPa、13l/min[ANR]	-67kPa、26t/min[ANR]	-91kPa、10.5t/min[ANR]	23t/min[ANR](17t/min[ANR])			
10	1.0mm	-93kPa、27t/min[ANR]	-67kPa、40t/min[ANR]	-91kPa、21t/min[ANR]	46t/min[ANR](34t/min[ANR])			
12	1.2mm	-93kPa、38l/min[ANR]	-67kPa、50t/min[ANR]	-91kPa、27t/min[ANR]	70t/min[ANR](47t/min[ANR])			
No code	Manifold-base alone							

Nozzle bore. (Combinations: B. D. F. H. K and M)

0-4-	Nozzle	H type	L type	E type	A:
Code	bore	Vacuum level and Suction flow	Vacuum level and Suction flow	Vacuum level and Suction flow	Air consumption
05	0.5mm	-86.5kPa、5.4t/min[ANR]	-66.5kPa、10t/min[ANR]	-	11.54/min[ANR]
07	0.7mm	-90.5kPa、114/min[ANR]	-66.5kPa、19t/min[ANR]	-86.5kPa、8.4l/min[ANR]	23t/min[ANR](17t/min[ANR])
10	1.0mm	-90.5kPa、19t/min[ANR]	-66.5kPa、24t/min[ANR]	-86.5kPa、15.4t/min[ANR]	46t/min[ANR](34t/min[ANR])
12	1.2mm	-90.5kPa、24l/min[ANR]	-66.5kPa、27t/min[ANR]	-86.5kPa、19t/min[ANR]	70t/min[ANR](47t/min[ANR])
No codo		•	Manifold base	olono	•

* Supply pressure is 0.5MPa for H and L type and 0.35MPa for E type.

Air consumption values in () represents that of E type.

* The values in the table are reference values only. Suction flow varies according to the vacuum system conditions; vacuum port dia. or tube length.

4 Combinations (18 types)

Code	Α	В	С	D	Е	F	G	Н	J	K	L	М	Р	Q	R	S	Т	W
Filter	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Suction solenoid valve	_	_	_	_	_	_	0	0	0	0	0	0	0	0	0	0	0	0
Check valve (vacuum retention feature)	_	0	_	0	_	0	_	0	_	0	_	0	_	_	_	_	_	_
Mechanical vacuum switch	_	_	0	0	_	_	_	_	0	0	_	_	_	0	_	_	0	_
Vacuum switch with LED display	_	_	_	_	0	0	_	_	_	_	0	0	_	_	0	_	_	0
Air timer type blow-off valve	_	_	_	_	_	_	_	_	_	_	_	_	0	0	0	_	_	_
Solenoid valve type blow-off pilot valve	1	_	_	1	_	-	_	_	1	-	1	-	1	1	_	0	0	0

No code Manifold-base alone

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VLI

VY

VM - V

VRL

VK

5 Vacuum port (tube dia.)

■Stand-alone type

	ı	mm size	Э	inch size				
Code	04	06	08	5/32	1/4	5/16		
Tube dia.(mm)	ø4	ø6	ø8	ø3.97	ø6.35	ø7.94		

※. ø4mm (code: 04) is selectable for Nozzle Bore 0.5mm and 0.7mm only.

■ Manifold type (VKM)

Port position		Side (S	traight	t)	Top (Straight)			
Code	S4	S6	S8	PP	T4	T6	T8	
Tube dia.(mm)	ø4	ø6	ø8	Plug	ø4	ø6	ø8	
Port position	5	Side (S	traight	t)	Тор	(Strai	ght)	
Code	S5/32	S1/4	S5/16	PP	T5/32	T1/4	T5/16	
Tube dia.(mm)	ø3.97	ø6.35	ø7.94	Plua	ø3.97	ø6.35	ø7.94	

- 00 : Applicable to a manifold installation top-mounting unit alone, with the port to be installed on the side and to model code for manifold-base alone with different vacuum port size.
- *1. Ø4mm (code: 04) is selectable for Nozzle Bore 0.5mm and 0.7mm only.
- ※2. Refer to the Manifold Type reference picture to select the port position (page 127).

7 Exhaust port (tube dia.)

■ Stand-alone type

Code	S	08	L8
Tubo dia (mm)	Silencer vent	ø8mm Straight type	ø8mm Elbow type
Tube dia.(IIIII)	Silericer verit	(tube exhaust)	(tube exhaust)

■ Manifold type (VKM)

	maine type (truin)												
		Silencer		Tube exhaust									
Port type vent S					Straight			Elbow			Female taper thread		
С	R side only	S1	18	10	12	13	48	40	42	72	73	74	6
b 0	Both sides	S2	28	20	22	23	58	50	52	82	83	84	Ú
ě	L side only	S3	38	30	32	33	68	60	62	92	93	94	
Tube	dia.(mm)	_	ø8	ø10	ø12	ø16	ø8	ø10	ø12	Rc1/4	Rc3/8	Rc1/2	

		Silencer		Tube exhaust								
Port type			Straight							Female taper thread		
	R side only											
9	Both sides	S2	25/16	23/8	21/2	25/8	55/16	53/8	51/2	82N	83N	84N
ě	L side only	S3	35/16	33/8	31/2	35/8	65/16	63/8	61/2	92N	93N	94N
Tube dia.(mm)		_	ø7.94	ø9.53	ø12.7	ø15.88	ø7.94	ø9.53	ø12.7	1/4NPT	3/8NPT	1/2NPT

00 : Applicable to a manifold installation top-mounting unit alone.

6 Air supply port (tube dia.)

■Stand-alone type

	- 1	nm size	9	inch size				
Code	04	06	08	5/32	1/4	5/16		
Tube dia.(mm)	ø4	ø6	ø8	ø3.97	ø6.35	ø7.94		

 . ø4mm (code: 04) is selectable for Nozzle Bore 0.5mm and 0.7mm only.

Manifold type (VKM)

Po	rt type		Stra	iight		Elbow		
С	R side only	16	18	10	12	48	40	42
d	Both sides	26	28	20	22	58	50	52
	L side only	36	38	30	32	68	60	62
Tube	e dia.(mm)	ø6	ø8	ø10	ø12	ø8	ø10	ø12
Po	rt type		Stra	ight			Elbow	,

Po	rt type		Stra	ight		Elbow		
С	R side only	11/4	15/16	13/8	11/2	45/16	43/8	41/2
d	Both sides	21/4	26/16	23/8	21/2	55/16	53/8	51/2
ĕ	L side only	31/4	35/16	33/8	31/2	65/16	63/8	61/2
Tube dia.(mm)		ø6.35	ø7.94	ø9.53	ø12.7	ø7.94	ø9.53	ø12.7

 $00\ \ \tilde{}$. Applicable to a manifold installation top-mounting unit alone.

8 Solenoid valve type

Voltage	DC24V	AC100V
Normally closed (N.C.)	E	F
Normally open (N.O.)	G	Н

No code : Manifold-base alone

* The above codes are selectable when a suction solenoid valve or/and a blow-off solenoid valve are selected.

Color

Code	W	В
Color	Light-gray	Black

10 No. of stations (Manifold type only)

Code	02	03	04	05	06	07	08	09	10
No. of stations	2	3	4	5	6	7	8	9	10

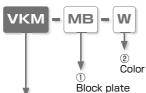
* Special-order for those with 11 or more stations.

① Vaccum switch (* Selectable only when ④ Combinations is one of E, F, L, M, R and W)

Code	-NW	-NA	–PW	-PA
Switch N	NPN open collector output	NPN open collector switch	PNP open collector output	PNP open collector switch
output	with 2 switch outputs	output and analog output	with 2 switch outputs	output with analog output

Vacuum Generator VK

lacksquare Model Designation of Block Plate (Example) lacksquare



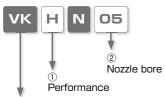
Manifold for complex vacuum generator

1) Block plate: MB

2 Color

Code	W	В			
Color	Light-gray	Black			

■ Model Designation of Nozzle Set (Example)



Complex vacuum generator

Complex vacuum generator

Cod	Vacuum characteristics	Code	Vacuum characteristics	Code	Vacuum characteristics
ы	High-vacuum type	High-vacuum type Large-flow type		_	High-vacuum at low air supply pressure type
П	(Rated supply pressure : 0.5MPa)	_	(Rated supply pressure : 0.5MPa)	Ц	(Rated supply pressure : 0.35MPa)

* E type does not have Nozzle Bore 0.5mm.

② Nozzle bore

Code	05	07	10	12
Nozzle hore	0.5mm	0.7mm	1.0mm	1.2mm

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VL

VUN

VY

VM - V

1/0

VK

Order Example

■ Manifold type (VKM)

Example . When all stations have common specifications.

VK M H 10 W - T6 20 S2 E - B 04 - NW

- ① Port orientation : M → Manifold
- ② Vacuum characteristics : H → High-vacuum type
- ③ Nozzle bore : $10 \rightarrow Ø1.0$ mm
- ④ Combinations : W → Filter, Suction solenoid valve, Vacuum switch with LED display and Blow-off solenoid valve
- ⑤ Vacuum port: T6 → Ø6mm Push-In Fitting on top
- ⑥ Air supply port : 20 → Ø10mm Push-In Fittings on both sides of manifold
- ⑦ Exhaust port : S2 → Silencers on both sides of manifold
- ® Solenoid valve type : E → Normally closed (N.C) type 24VDC
- (9) Color : B → Black
- 10 No. of stations \vdots **04** \rightarrow 4 stations
- ① Switch output : NW → NPN open collector output with 2 switch output
- Manifold installation top-mounting unit alone

Example 2. When vacuum port is installed on the side of the manifold-base.

VK M H OZ G - OO OO E - W

- Port orientation : M → Manifold type
- ② Vacuum characteristics : H → High-vacuum type
- ③ Nozzle bore : $07 \rightarrow Ø0.7mm$
- 4 Combinations : $\textbf{G} \rightarrow \textbf{Filter}$ and Suction solenoid valve
- ⑥ Air supply port $: 00 \rightarrow$ Applicable to a manifold installation top-mounting unit alone ⑦ Exhaust port $: 00 \rightarrow$ Applicable to a manifold installation top-mounting unit alone
- Solenoid valve type : E → "Normally Closed" (N.C.) type 24VDC (for both suction and blow-off)

Example 3. When vacuum port is installed on the upper plane of the station

VK <u>M H 12 R - T6 00 00 E - W - NA</u> ① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨

- ① Port orientation : M → Manifold
- ② Vacuum characteristics : H → High-vacuum type
- ③ Nozzle bore : $12 \rightarrow Ø1.2mm$
- ④ Combinations : R → Filter, Suction solenoid valve, Vacuum switch with LED display and Air timer type blow-off valve
- ⑤ Vacuum port: T6 → ø6mm Push-In Fitting on top
- ⑥ Air supply port : 00 → Applicable to a manifold installation top-mounting unit alone
- ⑦ Exhaust port : 00 → Applicable to a manifold installation top-mounting unit alone
- (8) Solenoid valve type : E → "Normally closed" (N.C.) type 24VDC (for both suction and blow-off)
- ① Vacuum switch : $NA \rightarrow NPN$ open collector switch output and analog output

Note) For manifold installation top-mounting unit, vacuum ports are provided with a seal packing and two threads. (Seals are not provided for exhaust port and supply port. → Instead, they are attached to manifolds)

VΖ

Vacuum Generator VK

Order Example

■ Manifold-base only (Block plate not attaching to the top unit)

Example 4. When all vacuum ports are common specifications

VK<u>M</u> - <u>S6 48 62 -W 08</u>

① Port orientation : M → Manifold type

⑤ Vacuum port : S6 → ø6mm Push-In Fitting for each of 8 stations

⑥ Air supply port : 48 → R side only, ø8mm Push-In Fitting (Elbow)
 ⑦ Exhaust port : 62 → L side only, ø12mm Push-In Fitting (Elbow)

 \bigcirc No. of stations \bigcirc 08 \rightarrow 8 stations

Example 5. When the vacuum ports differ even by one (Fill out the Specification Order Form on page 128)

VK M - 00 48 62 -W 08

① Port orientation : M → Manifold type

⑤ Vacuum port : 00 → When a vacuum port at any station differs in a manifolds (Specification Order Form is required separately)

6 Air supply port : 48 \rightarrow R side only, ø8mm Push-In Fitting (Elbow)

⑦ Exhaust port : 62 → L side only, Ø12mm Push-In Fitting (Elbow)

10 No. of stations \vdots 08 \rightarrow 8 stations

Example of entry in specification form when vacuum port differ even by one

			Config. (Port pos.)	Vacuum characteristics	Nozzle bore.	Combinations (4)	Vacuum port 5	Air supply port	Exhaust port	Solenoid valve	Color ⁽⁹⁾	No. of stations	Vacuum switch with LED display
Manifold model code			VKM		_		00	48	62	_	W	08	
Top-	L	St.1					56						
Mounting	1	St.2					56						
unit	ş	St.3					56						
model	l t	St.4					56						
	ţ	St.5					58						
		St.6					58						
	n.	St.7					58						
	no.	St.8					PP						
	#	St.9											
	R	St.10											

Note1) Enter the column of Manifold model code. For entries into the vacuum port column (5), use only side port codes (S4, S6, S8, or PP)

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VL

VY

VM - V

VG

PISCO

■ Example of model code when manifold installation top-mounting units and vacuum port vary in type, while stations of the manifold type (VKM) are aligned

(in and it are examples of model designation. Also fill in it (Specification Order Form) which indicates station arrangements for manifold installation top-mounting unit and vacuum port.)

Model code and number of units when ordering manifold

VK M - 00 48 62 - W 08 · · · · · · only 1 unit

* See the Specification Order Form Example 3 for manifold only

- 2 Model code and number of units of manifold installation top-mounting units
- 1)···VK M H O 7 G OO OO OO E W · · · · · 3 units
- 2)···**VK M E 10 W 00 00 00 G NW** · · · 1 unit
- 3)···VK M H 12 R T6 00 00 E NA · · · 3 units
- 4)...**VK M MB W** 1 uni
- *1. See the specification order form Examples 3 and 4 for manifold installation top-mounting units only.
- *2. See the specification order form Example for block plates only.
- Specification order form (example) (Shows station arrangements for manifold installation topmounting unit and vacuum port.)

			Config. (Port pos.)	Vacuum characteristics	Nozzle bore.	Combinations (4)	Vacuum port	Air supply port	Exhaust port	Solenoid valve	Color ⁹	No. of stations	Vacuum switch with LED display
1	Manifold model code		VKM		_		00	48	62	_	w	08	
Top-	L	St.1	VKM	Н	07	G	58	00	00	Е	W	3	
Mounting	1	St.2	St 1				^ Ø8	mm Push	In Fitting	on side po	rt		
unit	ş	St.3	S† 1				¥ ø€	mm Push	In Fitting	on side po	rt		
model	l t	St.4	VKM	E	10	W	56	00	00	G	W	1	-NW
	Ť	St.5	VKM	Н	12	R	T6	00	00	Е	W	1	-NA
	o	St.6	St 5				^ ؀	mm Push	In Fitting	on top port			
	n.	St.7	St 5				∡ Eı	nter side p	ort				
	no.	St.8	VKM			MB	56				W	1	
	#	St.9											
	R	St.10											

Vacuum Generator VK

■ Instructions for Specification order form

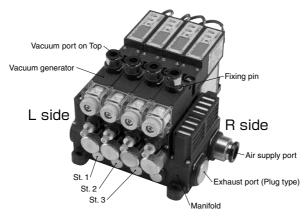
- (1) In case of manifold installation top-mounting unit example 1) and 2) of Model code and number of units of manifold installation top-mounting unit", (§) "Vacuum port" is "00" which indicates ports on sides, but does not show the tube dia. of fittings. Tube dia. of the fitting should be designated by (§) "Specification Order Form". Therefore, there may be a difference in format style between the model code in (§) and (§) "Specification order form" as to the Vacuum port space (§).
- (2) Station numbers are arranged in serial order as St 1, St 2, St 10 form the L side toward R side. To confirm the positions of the L and R sides, see the Manifold Type reference picture below.
- (3) If the manifold installation top-mounting units for St 1, St 2 and St 3 are of the same specifications as in the above example of specification order form, fill up the "St 1" space (uppermost) only, while entering St 1 in each of the St 2 and St 3 grids on the Config. (port pos.) column ①. (For example, if the manifold installation top-mounting unit for St 6 happens to be the same model as that of St 1, enter "St 1" in St 6's grid on the Config. (port pos.) column ①).

On the right-hand edge column are grids to enter the number of common units for respective St numbers. Remember to fill in these grids as a verification of the number of common units per manifold.

With respect to solenoid valves, we have, in principle, unified working voltage.

Therefore, different working voltage can not be selected in one manifold order. However, we can provide either N.O. or N.C. type if the two types are of the same working voltage, so it is possible to choose one as with the case of solenoid valve type 8.

Example of Manifold Type



127

VH · V

VUI

VM · V

1/0

VK

Vacuum Generator VK Series Specification Order Form

Name :		
Order No. :		
Date :		
Requested EX-W PISCO Date :	Quantity :	

			Config. (Port pos.)	Vacuum characteristics	Nozzle bore.	Combinations	Vacuum port	Air supply port	Exhaust port	Solenoid valve	Color	No. of stations	Vacuum switch with LED display	For PISCO use only
			1	2	3	4	(5)	6	7	8	9	10	11)	
Man mode			VKM		_					_				
Тор-	L	St.1												/
Mounting	1	St.2												/
unit model		St.3												1 / 1
code	S t	St.4												1 / 1
	a t	St.5												1 / 1
	o n	St.6												1 / 1
	no.	St.7												/
	110.	St.8												1 /
	1	St.9												1/
	R	St.10												V

^{*} Make a copy of this page and fill in the code referring to model designation example on the page 125 and 126.

To: NIHON PISCO CO., Ltd.

^{*} Enter the quantity of common units in ® No. of stations.

■ Specification (Supply pressure)

Fluid medium	Air
Operating pressure range	0.25 ~ 0.7 MPa
Rated supply pressure	H and L type∶ 0.5 MPa、E type∶ 0.35 MPa
Operating temp. range	5 ~ 50°C
Lubrication	Not required

■ Ejector characteristics

	Nozzle bore	Supply pressure	Final vacuum	Suction flow	Air consumption	Replacement Nozzle	
Model code						'	
	(mm)	(MPa)	(-kPa)	(t/min(ANR))	(∉min(ANR))	set model code	
VK□H05···		0.5	91	7	11.5	VK HN05	
VK HUS	0.5	0.35	73	,	9	VICTINOS	
VK□L05···		0.5	67	11	11.5	VK LN05	
VK□H07···		0.5	93	13	23	VK HN07	
VK_HU/···	0.7	0.35	73	13	17	VK HNU7	
VK□L07···	0.7	0.5	67	26	23	VK LN07	
VK□E07···		0.35	91	10.5	17	VK EN07	
VK□H10···		0.5	93	27	46	VK HN10	
VK□⊓10	1.0	0.35	73	21	34	VKHINIU	
VK□L10···	1.0	0.5	67	40	46	VK LN10	
VK□E10···		0.35	91	21	34	VK EN10	
VK□H12···		0.5	93	38	70	VK HN12	
VN□□1Z···	1.2	0.35	73	36	47	VIXIINIZ	
VK□L12···	1.2	0.5	67	50	70	VK LN12	
VK□E12···		0.35	91	27	47	VK EN12	

^{* 1.} Secure supply pressure as listed when the vacuum generator is in operation. (Take pressure drop into account.)

■ Solenoid valve (Suction solenoid valve / Blow-off solenoid valve)

Structure	Suction	n solenoid	d valve (Co	de: S)	Blow-off solenoid valve (Code: R)		
Rated voltage	DC	24V	AC1	00V	DC24V	AC100V	
Allowable voltage range	DC21.6	~ 26.4V	AC90	~ 110V	DC21.6 ~ 26.4V	AC90 ~ 110V	
Allowable voltage range	(DC24\	/ ±10%)	(AC100)	√ ±10%)	(DC24V ±10%)	(AC100V ±10%)	
Surge protection circuit	Surge a	bsorber	Diode	bridge	Surge absorber	Diode bridge	
Power consumption	0.0	3W	1\	/A	0.8W	1VA	
Valve type	Pilot valve						
Insulation system				Equal to	class B		
Manual operation				Push-loc	ck button		
Operation indicator			Coil	excitation	: Red LED ON		
Wire connection method and lead wire length				Connector	r: 500mm		
Proof pressure	1.05MPa						
Conduction	N.C.	N.O.	N.C.	N.O.	N.	C.	
Effective sectional area	3.5 mm ² 0.6 mm ²					mm²	

^{* 2.} The values in the table are reference values only. Suction flow varies according to the vacuum system conditions; vacuum port dia. or tube length.

^{* 3.} The values in the dark highlight show the characteristics at the rated supply pressure.

■ Filter specification

Element material	PVF (Polyvinyl formal)
Filtering capacity	10μm
Filter area	1,130mm²
Replacement element model code	VGFE 10

■ Air timer type blow-off valve

Structure	Delay style by air timer cylinder, Poppet valve, Two-way valve
Release time	Approx. 0.3 to 3sec after closing of suction solenoid
Blow-off air rate	0 ~ 40t/min(ANR) (For supply pressure : 0.5MPa)
Timer setting method	Control by the speed controller of air timer cylinder

■ Lead Wire Color

With suction solenoid valve only		With combination of suction & blow-off solenoid valve	
DC24V	AC100V	DC24V	AC100V
Red (+) Black (-)		Black (- : Suction solenoid valve)	White (Common)
	Blue	Red (+ : Common)	Blue (Suction solenoid valve)
		White (- : Blow-off solenoid valve)	Black (Blow-off solenoid valve)

■ Vacuum Retention Function (Combinations: B, D, F, H, K, M, S, T and W)

Allowable vacuum	eakage	1.3kPa/10min. or less
------------------	--------	-----------------------

Note) In case of applying vacuum retention for long period, take above specification into consideration.

■ Mechanical-type Vacuum Switch Specification

Pressure detection	Diaphragm - Micro switch	
Pressure setting range	-20 ~ -80kPa	
Setting mode	Nut rotation (stepless adjustment)	
Switch terminal	Common, N.O., N.C.	
Accuracy	±4kPa	
Differential response	16kPa or less	
Micro switch	QJ (AM8100) Matsushita Electric or J-7 OMRON	
Micro switch rating	7A 250V AC	

Vacuum Generator VK

■ Vacuum switch with LED display

■ NPN open collector				
Output	2 switch output (-NW) 1 switch output and 1 analog output (-NA			
Current consumption	40mA	or less		
Pressure detection	Diffused metaloxide semiconductive pressure transducer			
Operating pressure range	0 ~ -1	00kPa		
Pressure setting range	0 ~ -9	9kPa		
Proof pressure	0.2MPa			
Operating temp. range	0 ~ 50°C (N	lo freezing)		
Operating humidity range	35 ~ 85%RH (No dew condensation)			
Power requirements	12 ~ 24VDC \pm 10% Ripple (P-P) 10% max.			
Protective structure	IEC standard IP40 equiv.			
No. of pressure setting	2	1		
Operating accuracy	±3%F.S. max. (at Ta=25°C)			
Differential response	Fixed (2%F.S. max.)	Variable (about 0 ~ 15% of set value)	
Switch output	NPN open collector output: 30V 80r	NPN open collector output: 30V 80mA max. Residual voltage 0.8V max.		
		Output voltage	1 ~ 5V	
		Zero-point voltage	1±0.1V	
Analog output		Span voltage	4±0.1V	
		Output current	Output current: 1mA max. (load resistance 50k Ω max.)	
		LIN/HYS	±0.5%F.S. max.	
Differential response	approx. 2m-sec max.			
Indication	0 ~ -99kPa (2-digit red LED display)			
Display frequency	About 4 times / sec.			
Indication accuracy	±3%F.S. ±2 digit			
Sensor resolution	1 digit			
Operational indication	SW1: Red LED turns ON, when pressure is above the setting	Red LED turns ON, when pressure is above the setting		
	SW2: Green LED turns ON, when pressure is above the setting			
	1. MODE selector switch (ME / S1 / S2)	1. MODE se	1. MODE selector switch (ME / SW)	
Function	2. S1 setting trimmer (2/3-turn trimmer)	2. SW setting trimmer (2/3- turn trimmer)		
	3. S2 setting trimmer (2/3- turn trimmer)	3. HYS setting trimmer (About 0-15% of setting value)		

I S I

VU

VUN

VM - VC

VHL

VK

,	1	
1	ĸ	

Output 2 switch output (-PW) 1 switch and 1 analog output (-PA) Current consumption 40mA or less Pressure detection Diffused metaloxide semiconductive pressure transducer Operating pressure range 0 ~ -100kPa Pressure setting range 0 ~ -99kPa Proof pressure 0.2MPa 0 ~ 50°C (No freezing) Operating temp. range 35 ~ 85%RH (No dew condensation) Operating humidity range Power requirements 12 ~ 24VDC \pm 10% Ripple (P-P) 10% max. Protective structure IEC standard IP40 equiv. No. of pressure setting 2 1 Operating accuracy ±3%F.S. max. (at Ta=25°C) Differential response Fixed (2%F.S. max.) Variable (about 0 ~ 15% of set value) Switch output PNP open collector output: Supply voltage 80mA max. Residual Output voltage 1 ~ 5V Zero-point voltage 1±0.1V Analog output Span voltage 4±0.1V Output current Output current: 1mA max. (load resistance 50kΩ max.) LIN/HYS ±0.5%F.S. max. approx. 2m·sec max. Differential response

SW1: Red LED turns ON, when pressure is above the setting

SW2: Green LED turns ON, when pressure is above the setting

2. S1 setting trimmer (2/3-turn trimmer)

0 ~ -99kPa (2-digit red LED display)

About 4 times / sec.

±3%F.S. ±2 digit

1 diait

3. S2 setting trimmer (2/3- turn trimmer) 3. HYS setting trimmer (About 0-15% of setting value)

1. MODE selector switch (ME / S1 / S2) 1. MODE selector switch (ME / SW)

Red LED turns ON, when pressure is above the setting

2. SW setting trimmer (2/3- turn trimmer)

PNP open collector

Indication

Function

Display frequency

Sensor resolution

Indication accuracy

Operational indication

* Vacuum Generator Series

Vacuum Generator VK

■ Mechanism of VKA |

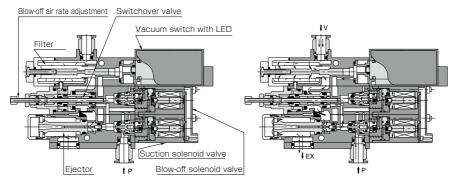
Example) VKA

Www.E

Solenoid valve type (Normally closed) / Blow-off solenoid valve / Filter / Vacuum switch with LED

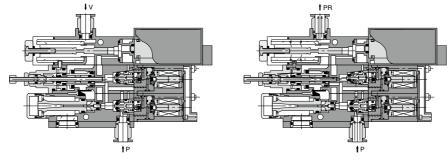
①At vacuum generation suspended

②At vacuum generating

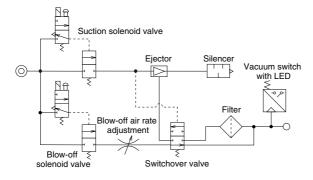


3At vacuum retention

4At blowing-off



■ VKA circuit diagram



J-

133

Vl

V

VM · V

VG

VK

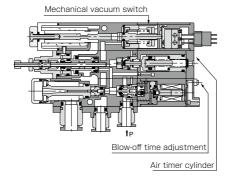
■ Mechanism of VKB I

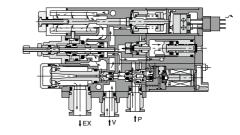
Example) VKB Q.....E

Solenoid valve type (Normally closed) / Air timer type blow-off valve / Filter / Mechanical vacuum switch

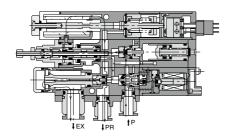
①At vacuum generation suspended

②At vacuum generating



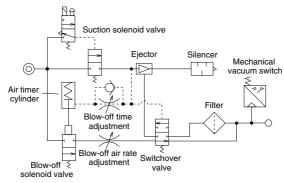


③Blow-off (Immediately after turning off Suction solenoid valve)



■ VKB circuit diagram

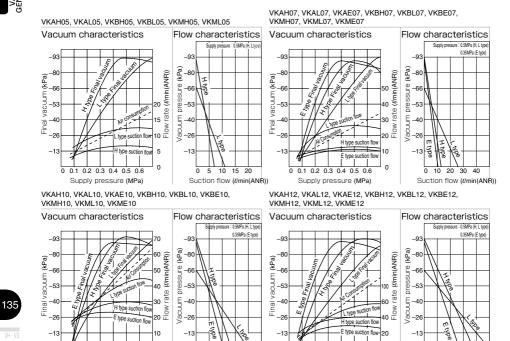
Example) VKB $\square\square\square$ Q \cdots E



VK

Characteristics

Supply pressure - Final vacuum, Suction Flow, Air Consumption



1. In the characteristics shown above, supply pressures refer to those when vacuum is generated.

Suction flow (t/min(ANR))

10 20 30

0

0 0.1 0.2 0.3 0.4 0.5 0.6

Supply pressure (MPa)

2.In the characteristics shown above, an odd noise may be heard when supply pressures are immediately before the peak of vacuum levels (H (High vacuum) type: 0.4~0.45MPa, and E (High-vacuum at low air supply pressure type) type: 0.29~0.32MPa). The sounding of this odd noise means the characteristics are unstable. If nothing is done, the sound may become even noisier. This situation can also adversely affect the sensor, resulting in a malfunction or trouble. So reset the supply pressure.

0

10 20

Suction flow (//min(ANR))

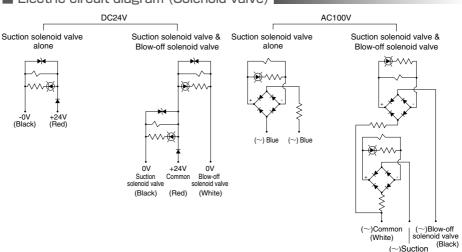
30 40 50

0 0.1 0.2 0.3 0.4 0.5 0.6

Supply pressure (MPa)

- (Ex. 1: When the vacuum generator H type is in operation with the original pressure of 0.5MPa, the odd noise began to be heard due to a drop in supply pressure to 0.43MPa. Reset the supply pressure for the vacuum generator in operation at 0.5MPa.)
- 3. Piping design and equipment selection should be made with an effective sectional area being 3 times as large as the nozzle diameter as a standard. Satisfactory vacuum characteristics are not obtained unless sufficient supply air flow is secured. (For example, the odd noise is heard even when pressure is at the set value, suction flow is insufficient, the final vacuum does not satisfy the required level, etc.)
 - (Example2. There is the odd noise from the vacuum generator H type, though the supply pressure is 0.5MPa. → Insufficient supplied air rate is the cause. The supplied air rate is reduced before the vacuum generator by a pipe resistance, and a proper air rate is not obtained. Select tubes and pneumatic apparatuses with the target effective cross-section areas obtaining the necessary air flow rate.)
 - (Example3. When \emptyset 1.0mm of nozzle bore is selected, the effective cross-section size should be more than 2.35mm².(cross-section 0.52 \times π =0.785 mm² \times 3=2.35 mm²). Select tubes and pneumatic apparatuses with the effective cross-section area more than 2.3 mm².)

■ Electric circuit diagram (Solenoid valve)

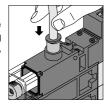


How to insert and disconnect

1. How to insert and disconnect tubes

① Tube insertion

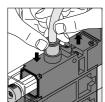
Insert a tube into Push-In Fitting of the vacuum generator VK up to the tube end. Lock-claws bite the tube to fix it and the elastic sleeve seals around the tube. Refer to "2. Instructions for Tube Insertion" under "Common Safety Instructions for Fittings" .



solenoid valve (Blue)

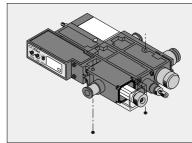
2 Tube disconnection

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 fix the product

In order to fix the vacuum generator VK, tighten M3 threads through the fixing holes on the resin body with tightening torque 0.4 to 0.5Nm. Refer to the outer dimensional drawings for the hole pitch.



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VK

VK Series Weight List

		_		
Combination	Stand-alone	e weight (g)	Manifold	weight (g)
code	VKA	VKB	VKMS	VKMT
Α	60	60	75.5	77.5
В	60	60	75.5	77.5
С	78.5	78.5	94	96
D	78.5	78.5	94	96
Е	84.5	84.5	100	102
F	84.5	84.5	100	102
G	81	81	96.5	98.5
Н	81	81	96.5	98.5
J	99.5	99.5	115	117
K	99.5	99.5	115	117
L	105.5	105.5	121	123
М	105.5	105.5	121	123
Р	134	134	149.5	151.5
Q	152.5	152.5	168	170
R	158.5	158.5	174	176
S	128.5	128.5	144	146
Т	147	147	162.5	164.5
W	153	153	168.5	170.5

N	/lanifold type	Weight (g)					
	VKMS1	72.5					
Side	VKMS2	84					
block	VKMS3	72.5					
	VKM	61					
Manifold	VKM-M(Without Plug)	20.5					
intermediate block	VKM-MP(With Plug)	22					

Block plate	Weight (g)
VKM····MB···	6
Silencer	Weight (g)
Silencer for stand-alone type	2
Cartridge for stand-alone type	Weight (g)
CJC09-04	3.5
CJC09-06	3.5
CJC09-08	10
CJC14-08	10
CJP09	1.5

Cartridge for manifold type	Weight (g)
Cartriage for marillola type	weight (g)
CJC18-06	20.5
CJC18-08	20
CJC18-10	19
CJC18-12	26
CJC18-16	36.5
CJL18-08	25
CJL18-10	31.5
CJL18-12	37.5
CJF18-02	43.5
CJF18-03	34.5
CJF18-04	38
CJP18	6
	•

■ Total weight can be calculated by the following calculation formula.

(Stand-alone/Manifold; combination x No. of stations) + (Vacuum port cartridge x qty) + (Supply port cartridge x qty) + (Exhaust port cartridge x qty) + Manifold type

Example 1. VKA H 10 W





E - W - NA

153 + 3.5 + 10 + 2 = 168.5q

- ① Stand-alone weight: VKA / Combination (W): 153g
- ② Vacuum port cartridge (CJC09-06): 3.5g
- ③ Supply port cartridge (CJC09-08): 10g
- 4 Exhaust port cartridge (Silencer for stand-alone type): 2g

Example2.VKM H 07 P

299 + 7 + 40 + 49.5 + 61 = 456.5g

① Manifold weight: VKM···-S···

Combination code: P.

No. of stations: 2 stations: 149.5 x 2 stations

- ② Cartridge for vacuum port (CJC09-06): 3.5g x 2 pcs
- ③ Cartridge for supply port (CJC18-08): 20g x 2 pcs
- 4 Cartridge for exhaust port (CJF18-02 + CJP18): 43.5g +
- ⑤ Manifold type (VKM···-··): 61g

Example3. Complicated combination of manifold type

VKM - 00 10 S2 - B 03 (Manifold type) · · · ①

VKM H 12 M - T6 00 00 E - B - NW (St.1) ··· ②

VKM L 07 Q - \$8 00 00 G - B (St.2) · · · ③

VKM - MB PP - B (St.3) · · · ④

109 + 126.5 + 178 + 28 = 441.5a

- ① Manifold type ("VKM···-S···" + "Cartridge for supply port (CJC18-10)" + " Plug for supply port (CJP18)"): 84g + 19g + 6g
- @ Manifold type ("VKM···-T···" , "Combination code (M)" + "Cartridge for vacuum port (CJC09-06)"): 123g + 3.5g
- ③ Manifold type ("VKM···-S···" , "Combination code (Q)" + "Cartridge for vacuum port (CJC09-08)"): 168g + 10g
- 4 Manifold intermediate block with plug ("VKM-MP- " + "Block plate (VKM-MB)"): 22g + 6g

■ Applicable Tube and Related Products

Polyurethane Tube

(Piping products catalog P.596)

Polyurethane Tube is for the general pneumatic piping and suitable for a compact piping.

Nylon Tube

(Piping products catalog P.608)

■ Nylon Tube is for the general pneumatic piping and suitable for a high-pressure fluid up to 1.5MPa (NB tube: 1.0MPa).

Vacuum Tube

(Piping products catalog P.612)

Vacuum Tube is a ultra-soft tube and suitable for piping of vacuum generators or actuators.

Vacuum Pads

Vacuum Pad Standard Series · P.428
Vacuum Pad Sponge Series · P.468
Vacuum Pad Bellows Series · P.488
Vacuum Pad Multi-Bellows Series P.508
Vacuum Pad Oval Series · · · P.526
Vacuum Pad Soft Series · · · P.550
Vacuum Pad Soft Bellows Series · P.578
Vacuum Pad Skidproof Series · P.604
Vacuum Pad Ultrathin Series · P.624
Vacuum Pad Mark-free Series · P.642

Vacuum Pad Long Stroke Series · P.658

■ Standard Size List |

Unit combinations: Built-in filter



Unit combinations: Built-in filter and check valve



Type	Page to	Vacuum				ply po			Exhaust
Type	refer	port	4mm	6mm	8mm	5/32in.	1/4in.	5/16in.	port
VKA VKB		4,000	•	•	•	_	_	_	8mm
A Type		4mm		•	•	_	_	_	With silencer
		6mm	•	•	•	_	_	_	8mm
			•	•	•	_	_	_	With silencer
		8mm	•	•	•	_	-	_	8mm
	VKA: 144		•	•	•	_	-	_	With silencer
	VKB: 150	F/00:	_	_	_	•	•	•	8mm
		5/32in.	_	_	_	•	•	•	With silencer
		1/4in.	_	_	_	•	•	•	8mm
		1/4In.	_	_	-	•	•	•	With silencer
		-40	-	_	-	•	•	•	8mm
		5/16in.	_	_	_	•	•	•	With silencer

Type	Page to	Vacuum		Ai		Exhaust			
Type	refer	port	4mm	6mm	8mm	5/32in.	1/4in.	5/16in.	port
VKA VKB		4mm	•	•	•	_	_	_	8mm
B Type				•	•	_	_	_	With silencer
		6mm		•	•	-	_	_	8mm
	VKA: 144 VKB: 150			•	•	-	-	-	With silencer
		8mm	•	•	•	_	_	-	8mm
			•	•	•	_	_	_	With silencer
		5/32in.	_	_	_	•	•	•	8mm
			_	_	_	•	•	•	With silencer
		1/4in.	_	_	_	•	•	•	8mm
		1/4111.	_	_	_	•	•	•	With silencer
		5/16in.	_	_	-	•	•	•	8mm
		3/ 10111.	_	_	_	•	•	•	With silencer

Unit combinations: Built-in filter and Mechanical vacuum switch



Unit combinations: Built-in filter, Check valve and Mechanical vacuum switch



Type	Page to	Vacuum		Ai	r sup	ply po	ort		Exhaust
туре	refer	port	4mm	6mm	8mm	5/32in.	1/4in.	5/16in.	port
VKA VKB		4,000	•	•	•	_	-	-	8mm
C Type		4mm	•	•	•	_	_	_	With silencer
		6mm	•	•	•	_	_	_	8mm
			•	•	•	_	_	_	With silencer
		8mm	•	•	•	_	_	_	8mm
	VKA: 144 VKB: 150		•	•	•	_	_	_	With silencer
		5/32in.	_	_	-	•	•	•	8mm
			_	_	-	•	•	•	With silencer
		4/4:	-	_	-	•	•	•	8mm
		1/4in.	_	-	_	•	•	•	With silencer
		E (40)	-	-	-	•	•	•	8mm
		5/16in.	_	-	-	•	•	•	With silencer

Type	Page to	Vacuum		Ai	r sup	ply po	ort		Exhaust
Type	refer	port	4mm	6mm	8mm	5/32in.	1/4in.	5/16in.	port
VKA VKB		4mm		•	•	-	_	_	8mm
D Type				•	•	-	-	-	With silencer
	VKA: 144 VKB: 150	6mm		•	•	-	-	-	8mm
			•	•	•	_	_	_	With silencer
		8mm	•	•	•	_	_	_	8mm
			•	•	•	_	_	_	With silencer
		5/32in.	_	_	_	•	•	•	8mm
			_	_	_	•	•	•	With silencer
		1/4in.	-	-	_	•	•	•	8mm
		1/4In.	_	_	-	•	•	•	With silencer
		5/16in.	_	_	_	•	•	•	8mm
			_	-	-	•	•	•	With silencer

Unit combinations: Built-in filter and Digital vacuum switch with LED display



Unit combinations: Built-in filter, Check valve and Digital vacuum switch with LED display

O display	
	\(\)
	(Digital type)
	} -

Type	Page to	Vacuum		Air supply port					
туре	refer	port	4mm	6mm	8mm	5/32in.	1/4in.	5/16in.	port
VKA VKB		4mm	•	•	•	-	-	_	8mm
E Type		4mm	•	•	•	-	-	_	With silencer
			•	•	•	_	-	_	8mm
		6mm	•	•	•	_	-	-	With silencer
		0	•	•	•	_	_	_	8mm
	VKA: 144	8mm	•	•	•	_	_	_	With silencer
	VKB: 150	5/32in.	_	_	_	•	•	•	8mm
			_	_	-	•	•	•	With silencer
		1/4in.	-	-	_	•	•	•	8mm
		1/4In.	_	-	_	•	•	•	With silencer
			_	_	_	•	•	•	8mm
		5/16in.	_	_	_	•	•	•	With silencer

Type	refer	port	4mm	6mm	8mm	5/32in.	1/4in.	5/16in.	port
VKA VKB		4mm	•	•	•	-	-	_	8mm
F Type	VKA: 144	4111111	•	•	•	_	-	_	With silencer
		6mm	•	•	•	_	_	_	8mm
				•	•	-	-	-	With silencer
		8mm	•	•	•	_	-	_	8mm
				•	•	-	-	-	With silencer
	VKB: 150	5/32in.	_	_	_	•	•	•	8mm
			_	-	_	•	•	•	With silencer
		1/4in.	-	-	_		•	•	8mm
		1/4In.		-	_	•	•	•	With silencer
		5/16in.	_	-	-	•	•	•	8mm
		5/16111.	_	-	-		•	•	With silencer

Page to Vacuum Air supply port Exhaust

VI

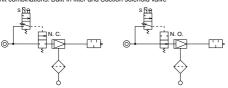
V

VM - V

VRL

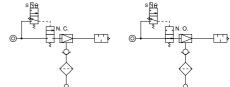
VK

Unit combinations: Built-in filter and Suction solenoid valve



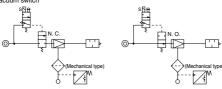
Type	Page to	Vacuum		Air supply port						
Type	refer	port	4mm	6mm	8mm	5/32in.	1/4in.	5/16in.	port	
VKA VKB		4,000	•	•		_	_	-	8mm	
G Type		4mm	•	•		-	-	-	With silencer	
			•	•	•	_	_	_	8mm	
		6mm	•	•	•	_	_	_	With silencer	
		8mm	•	•	•	_	_	_	8mm	
	VKA: 145		•	•	•	_	_	_	With silencer	
	VKB: 151	5/32in.	_	_	_	•	•	•	8mm	
			_	_	_	•	•	•	With silencer	
		1/4in.	_	_	_	•	•	•	8mm	
		1/4111.	_	_	_	•	•	•	With silencer	
		-40	-	_	-	•	•	•	8mm	
		5/16in.	-	-	-	•	•	•	With silencer	

Unit combinations: Built-in filter, Check valve and Suction solenoid valve



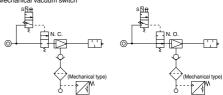
Type	Page to	Vacuum		Ai	r sup	ply po	ort		Exhaust
туре	refer	port	4mm	6mm	8mm	5/32in.	1/4in.	5/16in.	port
VKA VKB		4	•	•	•	_	_	_	8mm
H Type		4mm	•	•	•	_	_	_	With silencer
		C	•	•	•	_	_	_	8mm
		6mm	•	•	•	_	_	_	With silencer
		8mm	•	•	•	_	_	_	8mm
	VKA: 145		•	•	•	_	_	_	With silencer
	VKB: 151	E (00°	_	_	_	•	•	•	8mm
		5/32in.	_	_	_		•	•	With silencer
		1/4in.	_	—	_		•	•	8mm
		1/4111.	_	—	_		•	•	With silencer
		E/1Cin	_	-	_	•	•	•	8mm
		5/16in.	_	_	_		•	•	With silencer

Unit combinations: Built-in filter, Suction solenoid valve and Mechanical vacuum switch



Type	Page to	Vacuum		Ai		Exhaust			
туре	refer	port	4mm	6mm	8mm	5/32in.	1/4in.	5/16in.	port
VKA VKB		4mm	•	•	•	_	_	_	8mm
J Type		4111111	•	•	•	_	_	_	With silencer
		6mm	•	•	•	_	_	-	8mm
		OIIIIII		•		_	_	_	With silencer
		8mm	•	•	•	_	_	_	8mm
	VKA: 145		•	•	•	_	_	_	With silencer
	VKB: 151	E (00)	_	_	_	•	•	•	8mm
		5/32in.	_	_	_	•	•	•	With silencer
		1/4in.	_	_	_	•	•	•	8mm
	-	1/4In.	_	_	_	•	•	•	With silencer
		F/40:-	-	_	_	•	•	•	8mm
		5/16in.	_	_	_	•	•	•	With silencer

Unit combinations: Built-in filter, Check valve, Suction solenoid valve and Mechanical vacuum switch



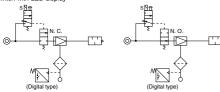
Type	Page to	vacuum		Air supply port					
Type	refer	port	4mm	6mm	8mm	5/32in.	1/4in.	5/16in.	port
VKA VKB		4mm	•	•	•	-	-	-	8mm
K Type		4111111	•	•	•	_	_	_	With silencer
		6mm	•	•	•	_	_	_	8mm
		GIIIIII	•	•	•	_	-	_	With silencer
	VKA: 145	8mm	•	•	•	_	-	_	8mm
			•	•	•	-	-	-	With silencer
	VKB: 151	5/32in.	-	-	-		•	•	8mm
		5/32IN.	_	_	_	•	•	•	With silencer
		1/4in.	-	-	_		•	•	8mm
		1/4111.	-	-	-		•	•	With silencer
		5/16in.	_	-	_	•	•	•	8mm
		J/ 10111.	_	_	_			•	With silencer

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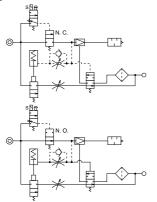
■ Standard Size List

Unit combinations: Built-in filter, Suction solenoid valve and Digital vacuum switch with LED display



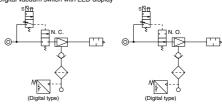
Time	Page to	Vacuum		Ai	r sup	ply po	ort		Exhaust
Type	refer	port	4mm	6mm	8mm	5/32in.	1/4in.	5/16in.	port
VKA VKB		4,000	•	•	•	_	-	-	8mm
L Type		4mm	•	•	•	_	_	_	With silencer
		6mm	•	•	•	_	_	_	8mm
		OIIIIII	•	•	•	_	_	_	With silencer
	VKA: 146	0,000	•	•	•	_	_	-	8mm
		8mm	•	•	•	_	_	-	With silencer
	VKB: 152	E (00:	_	_	-	•		•	8mm
		5/32in.	_	_	-	•		•	With silencer
		1/4in.	_	-	_	•	•	•	8mm
	-	1/4In.	_	_	_	•	•	•	With silencer
		5/16in.	_	_	_	•	•	•	8mm
		D/ 16IN.	_	_	-	•	•	•	With silencer

Unit combinations: Built-in filter, Suction solenoid valve and Air timer type blow-off valve



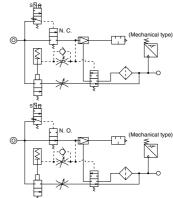
Type	Page to	Vacuum		Ai	r sup	ply po	ort		Exhaust
Type	refer	port	4mm	6mm	8mm	5/32in.	1/4in.	5/16in.	port
VKA VKB		4	•	•		_	-	_	8mm
P Type		4mm	•	•	•	_	_	_	With silencer
		C	•	•	•	_	_	_	8mm
		6mm	•	•	•	_	_	_	With silencer
	VKA: 146	8mm	•	•	•	_	_	_	8mm
			•	•	•	_	_	_	With silencer
	VKB: 152	5/32in.	_	_	_	•	•	•	8mm
		5/32111.	_	_	-	•	•	•	With silencer
		1/4in.	-	_	-	•	•	•	8mm
		1/4In.	_	-	_	•	•	•	With silencer
	ļ	F/40:	-	-	_	•	•	•	8mm
		5/16in.	_	-	-	•	•	•	With silencer

Unit combinations: Built-in filter, Check valve, Suction solenoid valve and Digital vacuum switch with LED display



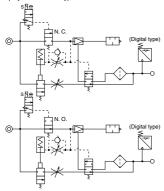
Time	Page to	Vacuum		Ai	r sup	ply po	ort		Exhaust
Type	refer	port	4mm	6mm	8mm	5/32in.	1/4in.	5/16in.	port
VKA VKB		4mm		•	•	-	-	_	8mm
M Type		4111111		•	•	-	-	-	With silencer
		6mm	•	•	•	_	_	_	8mm
		OIIIIII	•	•	•	_	_	_	With silencer
		8mm	•	•	•	_	_	_	8mm
	VKA: 146	0111111	•	•	•	_	_	_	With silencer
	VKB: 152	5/32in.	_	-	_	•	•		8mm
		5/32111.		-	_	•	•		With silencer
		1/4in.	_	-	_	•	•		8mm
		1/4111.	_	-	-	•	•		With silencer
		5/16in.	_	_	_	•	•	•	8mm
	5	5/1611.	_	_	_		•		With silencer

Unit combinations: Built-in filter, Suction solenoid valve, Mechanical vacuum switch and Air timer type blow-off valve



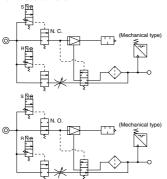
Type	Page to	Vacuum		Ai		Exhaust			
Type	refer	port	4mm	6mm	8mm	5/32in.	1/4in.	5/16in.	port
VKA VKB		4mm	•	•	•	-	_	_	8mm
Type		4111111		•	•	-	-	-	With silencer
		0		•	•	-	-	-	8mm
		6mm	•	•	•	_	-	-	With silencer
		0	•	•	•	_	_	_	8mm
	VKA: 147	8mm	•	•	•	_	_	_	With silencer
	VKB: 153	5/32in.	_	_	_	•	•	•	8mm
		5/32111.	_	_	_	•	•	•	With silencer
		1/4in.	_	_	_	•	•		8mm
		1/4111.	_	_	_	•	•		With silencer
		5/16in.	-	-	_	•	•	•	8mm
		5/ 16IN.	_	_	_	•	•		With silencer

Unit combinations: Built-in filter, Suction solenoid valve, Digital vacuum switch Unit combinations: Built-in filter, Suction solenoid valve and Blow-off solenoid with LED display and Air timer type blow-off valve



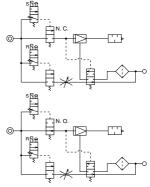
Type	Page to	Vacuum								
туре	refer	port	4mm	6mm	8mm	5/32in.	1/4in.	5/16in.	port	
VKA VKB		4mm	•	•	•	-	_	_	8mm	
R Type		4111111	•	•		_	_	_	With silencer	
		6mm	•	•	•	_	_	_	8mm	
		OIIIIII	•	•	•	_	_	_	With silencer	
		8mm	•	•	•	_	_	_	8mm	
	VKA: 148		•	•	•	_	_	_	With silencer	
	VKB: 154	5/32in.	_	_	_	•	•	•	8mm	
		5/32111.	_	_	-	•	•	•	With silencer	
		1/4in.	-	_	-	•	•	•	8mm	
		1/4111.	-	-	-	•	•	•	With silencer	
		F (4 C)	-	-	_	•	•	•	8mm	
		5/16in.	_	_	_	•			With silencer	

Unit combinations: Built-in filter, Suction solenoid valve, Mechanical vacuum switch and Blow-off solenoid valve



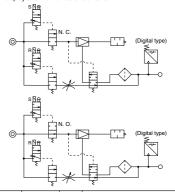
Type	Page to	Vacuum				ply po			Exhaust
Type	refer	port	4mm	6mm	8mm	5/32in.	1/4in.	5/16in.	port
VKA VKB		4mm	•	•	•	_	_	_	8mm
T Type		4111111	•	•	•	_	_	-	With silencer
		6mm	•	•	•	_	_	-	8mm
		OIIIIII	•	•	•	_	_	-	With silencer
	VKA: 148	0,000	•	•	•	_	_	-	8mm
		8mm	•	•		_	-	-	With silencer
	VKB: 154	5/32in.	_	_	_	•	•	•	8mm
		5/32111.	_	_	-	•	•	•	With silencer
		1/4in.	-	-	-	•	•	•	8mm
	-	1/4111.	_	_	_	•	•	•	With silencer
		5/16in.	_	_	_	•	•	•	8mm
		5/ 10111.	_	_	_	•	•	•	With silencer

valve



_	Page to	Vacuum		Ai	ir sup	ply po	ort		Exhaust
Type	refer	port	4mm	6mm	8mm	5/32in.	1/4in.	5/16in.	port
VKA VKB		1mm	•	•	•	_	-	-	8mm
S Type		4mm	•		•	_	_	_	With silencer
		6mm	•		•	_	_	_	8mm
			•		•	_	_	_	With silencer
	VKA: 147	8mm	•	•	•	-	_	_	8mm
			•	•	•	-	_	-	With silencer
	VKB: 153	5/32in.	-	-	_		•	•	8mm
		5/32111.	_	-	_	•	•	•	With silencer
		1/4in.	_	-	_	•	•	•	8mm
		1/4111.	_	-	_	•	•	•	With silencer
		5/16in.	_	_	_	•	•	•	8mm
		D/ 16IN.	_	-	_	•	•	•	With silencer

Unit combinations: Built-in filter, Suction solenoid valve, Digital vacuum switch with LED display and Blow-off solenoid valve



Type	Page to	Vacuum		Ai	r sup	ply po	ort		Exhaust
Type	refer	port	4mm	6mm	8mm	5/32in.	1/4in.	5/16in.	port
VKA VKB		4mm	•	•	•	_	_	_	8mm
W Type		4111111	•	•	•	_	_	_	With silencer
		Cmm	•	•	•	_	_	_	8mm
		6mm	•	•	•	-	_	_	With silencer
		Omm	•	•	•	_	-	_	8mm
	VKA: 149	8mm	•	•	•	-	-	-	With silencer
	VKB: 155	5/32in.	_	_	_	•	•	•	8mm
		5/32IN.	_	_	_	•	•	•	With silencer
	1/4in.	_	_	_	•	•	•	8mm	
		1/4111.	_	_	_	•	•	•	With silencer
		5/16in.	_	_	_	•	•	•	8mm
		D/ 10111.							MOL 3

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VU

VUN

VM - VC

VHL

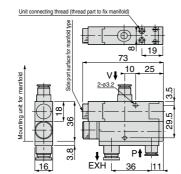
___Chart P.135

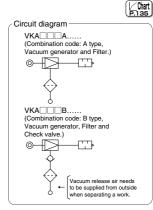








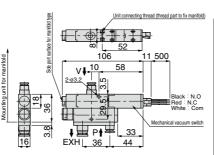


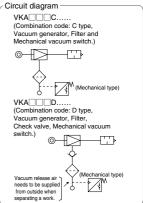








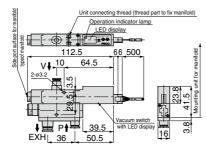


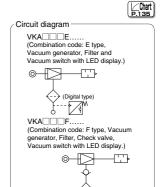












Vacuum release air needs to be supplied from outside when separating a work.

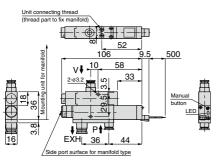
(Digital type)

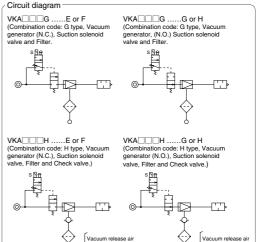












needs to be supplied from outside when

separating a work.





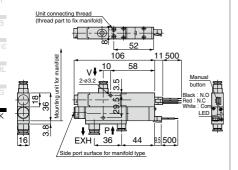


needs to be supplied from outside when

separating a work.

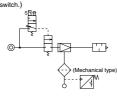




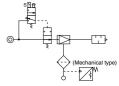




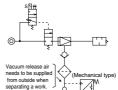
VKAE or F (Combination code: J type, Vacuum generator (N.C.), Suction solenoid valve, Filter and Mechanical vacuum switch.)

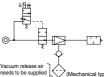


VKAG or H (Combination code: J type, Vacuum generator (N.O.), Suction solenoid valve, Filter and Mechanical vacuum switch.)



VKA□□□K.....E or F VKA R K.....G or H (Combination code: K type, Vacuum (Combination code: K type, Vacuum generator (N.C.), Suction solenoid generator (N.O.), Suction solenoid valve, Filter, Check valve and valve, Filter, Check valve and Mechanical vacuum switch.) Mechanical vacuum switch.)





needs to be supplied al type) separating a work.

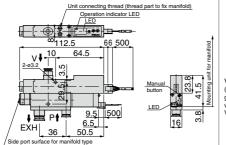
needs to be supplied

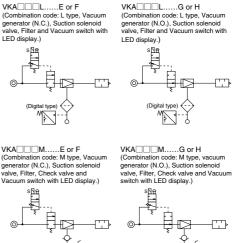
Chart P.135

separating a work.









needs to be supplied

from outside when separating a work.

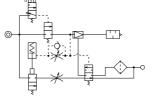
(Digital type)



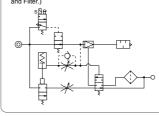


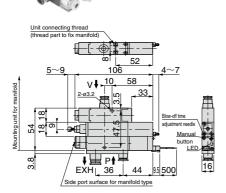
Circuit diagram

VKA□□□P.....E or F (Combination code: P type, Vacuum generator (N.C.), Suction solenoid valve, Air timer type blow-off valve and Filter.)



VKADDDP.....G or H (Combination code: P type, Vacuum generator (N.O.), Suction solenoid valve, Air timer type blow-off valve and Filter.)

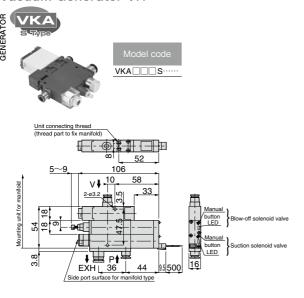


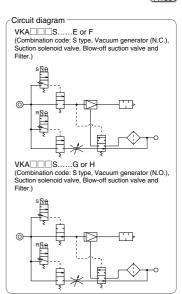


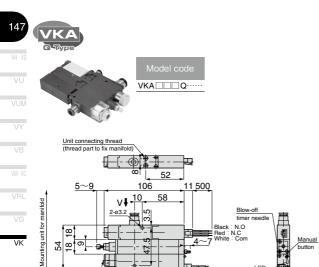
VKA □ □ □ P · · · · · ·

* Vacuum Generator Series

Vacuum Generator VK







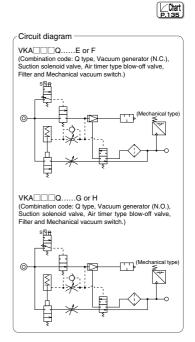
₽ŧ 36

Side port surface for manifold type

ω,

∞

3.8



LED

Black : N.O Red : N.C 4~7 White : Com

9.5 500

44

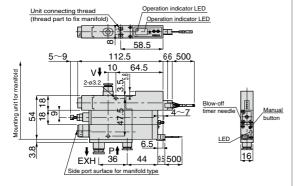
Manual

hutton

Chart P.135



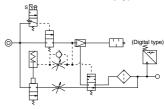




Circuit diagram

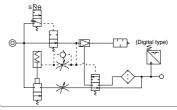
VKA□□□R.....E or F

(Combination code: R type, Vacuum generator (N.C.), Suction solenoid valve, Air timer type blow-off valve, Filter and vacuum switch with LED display.)



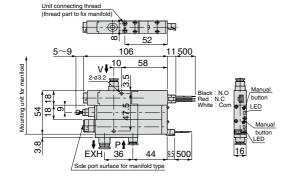
VKA□□□R.....G or H

(Combination code: R type, Vacuum generator (N.O.), Suction solenoid valve, Air timer type blow-off valve, Filter and Vacuum switch with LED display.)





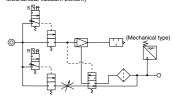




Circuit diagram

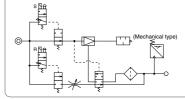
VKA TT.....E or F (Combination code: T type, Vacuum generator (N.C.),

Suction solenoid valve, Blow-off suction valve, Filter and Mechanical vacuum switch.)



VKA G or H

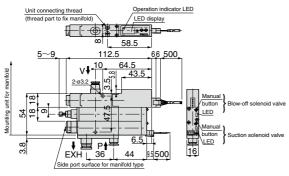
(Combination code T, vacuum generator (N.O.), Suction solenoid valve, Blow-off suction valve, Filter and Mechanical vacuum switch.)

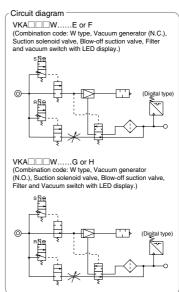








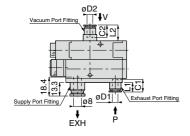




■ Dimension of Fitting Part

149

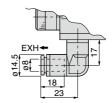
٧K



					Un	it: mm
	Tube O.D. øD1	Tube O.D. øD2		L2	C1	C2
	4(5/32)	-	6	-	11	-
P Port	6(1/4)	-	9	-	12	-
	8(5/16)	-	17.5	-	18.5	-
	-	4(5/32)	-	11.5	-	11
V Port	-	6(1/4)	-	14.5	-	12
	-	8(5/16)	-	23	-	18.5

■ VKA / VKB common silencer (Exhaust) ■ VKA / VKB common Exhaust Fitting (Elbow)





___Chart P.135

___Chart P.135

VJ

VX

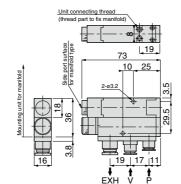
VZ

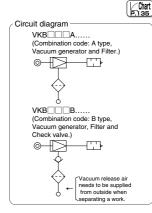
۷N

VKB





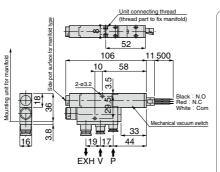






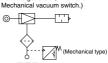


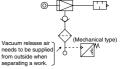






VKB C.....
(Combination code: C type,
Vacuum generator, Filter and
Mechanical vacuum switch.)

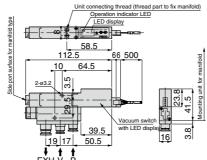




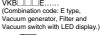






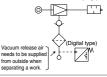


Circuit diagram -





(Combination code: F type, Vacuum generator, Filter, Check valve, Vacuum switch with LED display.)

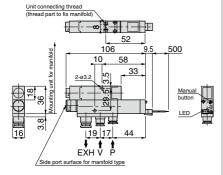






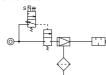




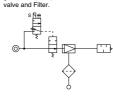




VKB $\square\square\square$ GE or F (Combination code: G type, Vacuum generator (N.C.), Suction solenoid valve and Filter.



VKB□□□HE or F (Combination code: H type, Vacuum generator (N.C.), Suction solenoid valve, Filter and Check valve.)

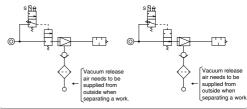


VKB□□□GG or H

(Combination code: G type, Vacuum

generator, (N.O.) Suction solenoid

VKB□□□HG or H (Combination code: H type, Vacuum generator (N.O.), Suction solenoid valve, Filter and Check valve.)



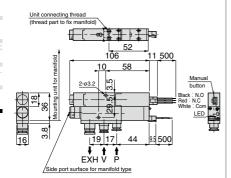
151





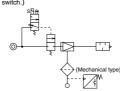




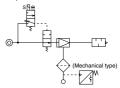


Circuit diagram

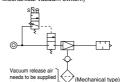
VKB□□□J.....E or F (Combination code: J type, Vacuum generator (N.C.), Suction solenoid valve, Filter and Mechanical vacuum switch.)



VKB JJ.....G or H (Combination code: J type, Vacuum generator (N.O.), Suction solenoid valve, Filter and Mechanical vacuum switch.)



VKB□□□K.....E or F (Combination code: K type, Vacuum generator (N.C.), Suction solenoid valve, Filter, Check valve and Mechanical vacuum switch.)



separating a work.

generator (N.O.), Suction solenoid valve, Filter, Check valve and Mechanical vacuum switch.)

(Combination code: K type, Vacuum

VKB□□□K......G or H

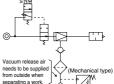
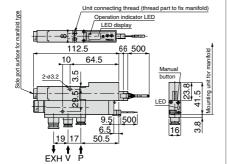


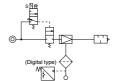
Chart P.135



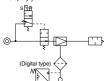




VKB□□□L.....E or F (Combination code: L type, Vacuum generator (N.C.), Suction solenoid valve, Filter and Vacuum switch with LED display.)

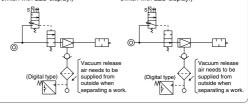


VKB□□□L.....G or H (Combination code: L type, Vacuum generator (N.O.), Suction solenoid valve, Filter and Vacuum switch with LED display.)



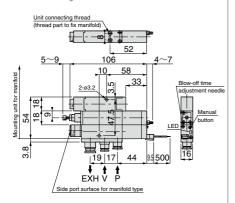
VKB□□□M.....E or F (Combination code: M type, Vacuum generator (N.C.), Suction solenoid valve, Filter, Check valve and Vacuum switch with LED display.)

VKB□□□M......G or H (Combination code: M type, Vacuum generator (N.O.), Suction solenoid valve, Filter, Check valve and Vacuum switch with LED display.)





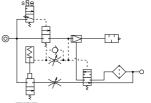




Circuit diagram

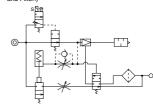
VKB□□□P.....E or F (Combination code: P type, Vacuum generator (N.C.), Suction solenoid valve, Air timer type blow-off valve

and Filter.)



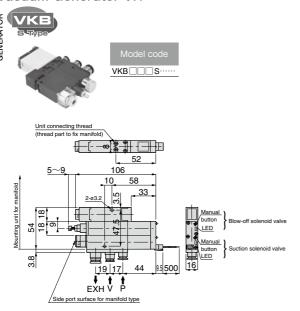
VKB□□□P......G or H

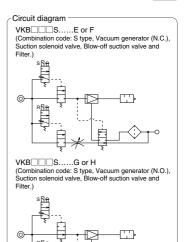
(Combination code: P type, Vacuum generator (N.O.), Suction solenoid valve, Air timer type blow-off valve and Filter.)



* Vacuum Generator Series

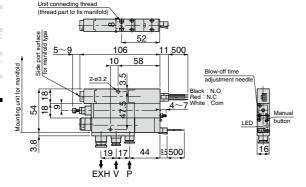
Vacuum Generator VK



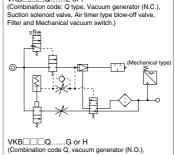


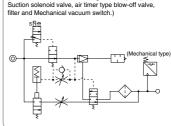








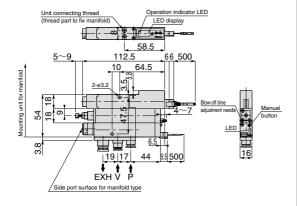




___Chart P.135



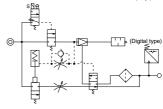






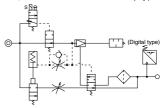
VKB□□□R.....E or F

(Combination code: R type, Vacuum generator (N.C.), Suction solenoid valve, Air timer type blow-off valve, Filter and Vacuum switch with LED display.)



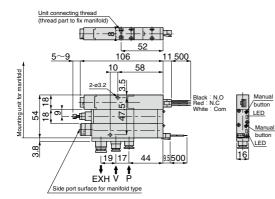
VKB□□□R.....G or H

(Combination code: R type, Vacuum generator (N.O.), Suction solenoid valve, Air timer type blow-off valve, Filter and Vacuum switch with LED display.)





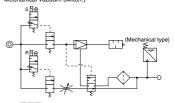




Circuit diagram

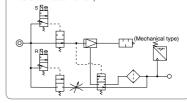
VKB□□□T.....E or F (Combination code: T type, Vacuum generator (N.C.), Suction solenoid valve, Blow-off suction valve, Filter and

Mechanical vacuum switch.)



VKBG or H

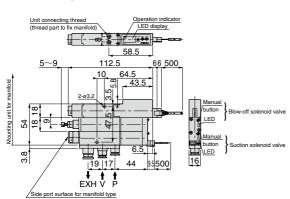
(Combination code: T type, Vacuum generator (N.O.), Suction solenoid valve, Blow-off suction valve, Filter and Mechanical vacuum switch.)

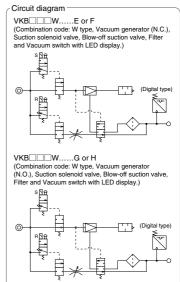








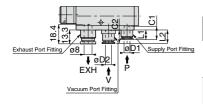




■ Dimension of Fitting Part

155

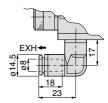
٧K



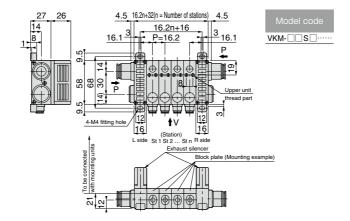
					Un	it: mm
	Tube O.D. øD1	Tube O.D. øD2		L2	C1	C2
	4(5/32)	-	6	-	11	-
P Port	6(1/4)	-	9	-	12	-
	8(5/16)	-	17.5	-	18.5	-
	-	4(5/32)	-	9.5	-	11
V Port	-	6(1/4)	1	12.5	ı	12
	-	8(5/16)	-	21	-	18.5

■ VKA / VKB common silencer (Exhaust) ■ VKA / VKB common Exhaust Fitting (Elbow)

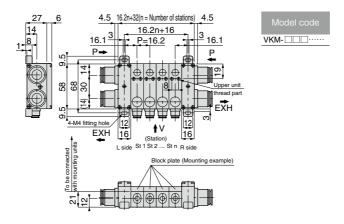




Manifold type (Silencer vent)



VKM Manifold type (Tube exhaust)



■ Dimension of Supply Port Fitting Part

Straight type		
ØD	Tube O.D. øD	
	6(1/4)	1
	8(5/16)	1
	10(3/8)	1
	12(1/2)	1

	Unit: mm				
Tube O.D. øD		С			
6(1/4)	11	17			
8(5/16)	12	18			
10(3/8)	14	20			
12(1/2)	19	23.5			



			Un	it: mm
Tube O.D. øD		С		L2
8(5/16)	14.5	18	17	23
10(3/8)	17.5	20	21	26.5
12(1/2)	21	23.5	23	29.5



Plug cap

Dimension of Vacuum Port Fitting Part

Straight type

Plug cap type
Unit: mm



Tube O.D. øD		С
4(5/32)	6	11
6(1/4)	9(16)	12(17)
8(5/16)	17.5	18.5



■ Dimension of Exhaust Port Fitting Part

Unit: mm

Straight



Tube O.D. øD	L	С
8(5/16)	12	18
10(3/8)	14	20
12(1/2)	19	23.5
16(5/8)	23.5	24.5

Elbow



Tube O.D. øD	øΡ	С	L1	L2
8(5/16)	14.5	18	17	23
10(3/8)	17.5	20	21	26.5
12(1/2)	21	23.5	23	29.5

Unit: mm

Unit: mm

Plug cap type



Female thread

Rc - N	Rc	Hex. H		L2
	Rc1/4(1/4NPT)	22	10	14
	Rc3/8(3/8NPT)	22	10	14
	Rc1/2(1/2NPT)	24	13	17

Before using PISCO products, be sure to read "Safety Instructions" and "Safety Instruction Manual" on page 35-39, "Common Safety Instructions for Vacuum Series" on page 47-49 and "Common Safety Instructions for Vacuum Generator VG & VK" on page 105.

Warning

- A cartridge fitting and a silencer element are detachable for maintenance by pulling a lock pin. Make sure that the pin is properly inserted after the maintenance.
- 2. The coil in a pilot solenoid valve generates heat under the following ① to ③ conditions. The heat may cause dropping life cycle, malfunctions, getting burnt or damaging peripheral machines.

Contact us when the power is applied to the vacuum generator under the following conditions:

- 1) The power is continuously ON for over 2 hours.
- ② High-cycle operation.
- ③ Even when intermittent running of the generator is carried out, the total operation time per day is longer than non-operation time.
- 3. When the electricity is applied to valves for a long time, the coils generate a heat. The heat may cause dropping life cycle, malfunctions, getting burnt or damaging peripheral machines.

Caution

 In case that not all units generate vacuum at same time, the exhaust air of operating unit flows into the vacuum port of non-operating unit. If such exhaust air causes the problem, please consult with PISCO.

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VK

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- Operating temperature range is 5-50°C. Do not operate the product out of the temperature range.
- Compressed air contains many kinds of drains such as water, oxidized oil, tar and other foreign substances. Dehumidify and improve the quality of air by using an after-cooler or a dryer, since those drains seriously impair the performance of the vacuum generator.
- Do not use lubricators.
- Rusts in the pipes may cause malfunction. Place a filter with finer than 5µm ahead of the air supply port.
- Avoid using the vacuum generator under the condition of corrosive gas or inflammable gas. Also do not use these gasses as a fluid.
- Avoid sucking dusts, salt and iron powder as much as possible.
- Do not operate Blow-off solenoid valve during a vacuum generation.
- After adjusting the air rate and turn the locknut until it stops at the needle guide, additionally tighten the locknut at 20-30° with a proper tool such as a pair of long-nose pliers. When this additional tightening is not done, the locknut maybe loosened and result in damaging the needle and the thread part of the locknut. Too much tightening may cause damage such as scraping off the knurling surface or a deformation of female thread.

1. Safety Rules for Manifold Type I

- There is a possibility of a performance drop or a trouble by increasing mounting unit numbers on manifold type due to the following reasons. Consult us for the solutions.
 - 1. A drop of the vacuum performance due to insufficient supply air.

Countermeasures: 1) Check the supplied air volume.

- ② Arrange the piping length as short as possible.
- ③ Use Fittings with larger size.
- 4 Use both R and L side ports for the supply pressure when the supply is from one side only.
- 2. When there is a drop of the vacuum performance due to insufficient volume of exhaust port, or is an exhaust air leaking out through the vacuum port.
 - → Consult us for the solutions. There is a limit of station numbers to maintain the manifold performance by a nozzle size or a vacuum performance of each mounting unit.

Reason (Silencer vent): A drop of the vacuum performance due to a large exhaust resistance caused by insufficient volume of silencer exhaust.

- Countermeasures: ① Use silencers on both exhaust ports when a silencer is on one side.
 - 2 Set an external silencer (Special order)
 - 3 Exhaust individually from each mounting unit. (Special order)
 - 4 Avoid any obstacles around the exhaust ports.
 - (5) Reduce number of mounting units.

Reason (Tube exhaust): A drop of the vacuum performance is caused by large pipe resistance.

Countermeasures: ① Use both exhaust ports when exhaust ports is on one side.

- 2 Arrange the piping length as short as possible.
- ③ Use Fittings with larger size.
- 4 Exhaust individually from each mounting unit. (Special order)
- ⑤ Reduce number of mounting units.

2. LED Digital Vacuum Pressure Sensor (Vacuum Switch)

- (1) Pressure Setting Method
 - ①Turn on the power (Make sure the correct wiring and apply DC power to the vacuum pressure sensor).
 - ②-1 Set the indicator switch at Pressure Setting Mode (ME→S1 / S2 and SW)
 - 2 -2 (Vacuum switch with analog output)
 - Fully turn the hysteresis setting trimmer (HYS) in the counterclockwise direction in order to minimize the hysteresis adjustment in advance.
 - 3 Adjust the pressure adjusting trimmer (S1 / S2 and SW) with a flathead screwdriver to set at the desired value.
 - (4) Set the indicator switch at ME and apply pressure and check the actual operation.

(Vacuum switch with 2 switch output)

Switch output 1 (S1): Red LED turns ON at the pressure with more than the setting.

Switch output 2 (S2): Green LED turns ON at the pressure with more than the setting.

(Vacuum switch with analog output)

Switch output (SW): Red LED turns ON at the pressure with more than the setting.

(2) Differential response setting

- ① Differential response setting can be adjusted by the hysteresis setting trimmer (HYS).
- ② Differential response setting range is regulated within about 0-15% of the set value. Differential response setting becomes large when the trimmer is turned in the clockwise direction.
- ③ Differential response setting adjustment Set the indicator switch at ME (pressure indication mode). Increase or decrease the supply pressure gradually

APressure setting trimmer
BSW1 Pressure setting trimmer
AMode Change Switch 2 positions
BMode Change Switch 3 positions
LED display
A: Vacuum switch with analog output
B: Vacuum switch with 2-point switch output

AHysteresis setting trimmer

BSW2 Pressure setting trimmer

- displayed values are taken as differential response.

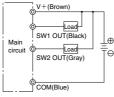
 ① Hysteresis adjustment is useful for the following cases:
 - · Increase differential response when pressure pulsates with output repeatedly showing small on/off movements.

around the set pressure value and read the value at ON/OFF of the switch LED. Differences in

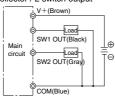
· When an allowable range is to be set for the lowering of pressure.

(3) Wire Connecting Method

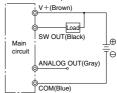
NPN open collector / 2 switch output



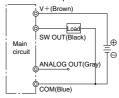
PNP open collector / 2 switch output



NPN open collector / 1 switch output and 1 analog output



PNP open collector / 1 switch output and 1 analog output



■ 3. Safety Instructions for LED Digital Vacuum Pressure Sensor

- ① Do not use the vacuum switch in the environment or gasses containing corrosive substance. It may cause a sensor trouble.
- ② Wiring or ways by which noise or other disturbance is caused may cause a sensor trouble.
- ③ Since the sensors are not explosive-proof, do not use them in an inflammable or explosive gas, fluid or atmosphere.
- 4 Since the sensors are not drip / dust proof, do not use them in locations where they may be exposed to water or oil drops or dust.
- ⑤ Do not use the sensor in an atmosphere exceeding the range of application temperature or causing heat as sensor malfunction may result.
- ® Make sure to turn off the power before wiring. Check the wire colors, and do not short-circuit output terminals, power supply terminals and COM terminals when wiring. Short-circuits may cause a sensor trouble.
- ① Do not give an excessive tensile strength and bending on a lead wire. Otherwise, breaking wire or damage on connector may be caused.
- ® Do not keep applying 0.2MPa or more of positive pressure to the vacuum pressure sensor constantly during a blow-off air supply. Otherwise, damaging to the sensor may be caused.
- When adjusting pressure and differential response, use a flathead screwdriver (accessory). Do not apply an excessive force on the trimmer and slowly turn it within its rotation limits. Otherwise, there is a risk of damaging the trimmer and the circuit board.
- 10 Supply a stable DC power to the product.

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VI

VB

VM - V

VG

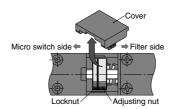
VK

VN

- ① Add a surge absorption circuit to relays or solenoid valves, etc. which are to be connected with output terminal and source terminal. Avoid any use which involves over 80mA in current.
- (2) Ground the FG terminal when using a unit power source such as switching current.
- (3) Output terminals (black with a gray lead wire) and other terminals should not be short-circuited.
- (4) Avoid strong external impacts and excessive force to the sensor body.

■ 4. Mechanical vacuum switch

- Vacuum switch of VK Series is a connector (detachable) type. Refer to the following figure for connecting method.
- When adjusting the pressure setting, open the cover with a flathead screwdriver. Hold the cover with fingers to prevent the cover jumping out. Turn the adjusting nut in the clockwise direction to increase the vacuum pressure. The adjusting nut is fixed to the locknut, thus loosen the locknut first then adjust the pressure setting with the adjusting nut. After adjusting the pressure setting, hold the adjusting nut with fingers to fix it and tighten the locknut.
 - * In case of a breakdown, contact us for repairing.

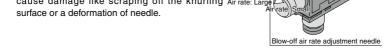


Lead wire color	
White	Common
Red	N.C.
Black	N.O.

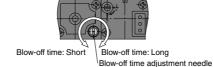
- 5. Safety Rules for Mechanical vacuum switch & Vacuum Switch with LED display
 - When VK Series with vacuum switch is used, arrange tubes as short as possible.
 - ■When a piping is long, it creates large piping resistance which can cause malfunction such as the vacuum level around the sensor remains high even in no suction state. When a piping needs to be long unavoidably, place a sensor unit close to the vacuum end such as a vacuum pad.

■ 6. Adjusting Method of Blow-off Air

- Blow-off air (Blow-off solenoid valve / Air timer type blow-off valve)
 - Turn the blow-off air rate adjustment needle to the right (clockwise) to reduce blow-off air and to the left (counterclockwise) to increase.
 When finishing adjusting an air rate, make sure to tighten the locknut in order to avoid deviation from the setting. Read closely the following ① and ② for the tightening method
 - ① After adjusting the air rate and turn the locknut until it touches the needle guide, tighten the locknut additionally at 20-30° with a pair of longnose pliers.
 - ② Please be aware that too much tightening may cause damage like scraping off the knurling Air rate: I



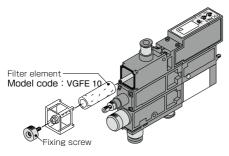
- Time adjustment of air timer type blow-off valve
 - · Turn the blow-off timer needle to the right for a longer blow-off time and to the left for a shorter one.

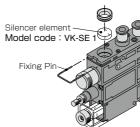


■ How to replace silencer elements of Stand-alone Type

Remove the fixing screw to replace the filter Use a flathead screwdriver to pull out the fixing pin element. Make sure to place the filter seal rubber properly and tighten the screw to fix the filter cover with 0.3-0.5Nm of the tightening torque after the replacement.

in order to replace silencer elements. Make sure to insert the pin properly after the replacement. The fixing pin is bent for fall-proof. Insert the pin in the direction that the bent side of pin faces inward (filter side) as shown in the picture.





■ How to replace silencer elements of Manifold Type

■ How to replace silencer elements of Manifold Type

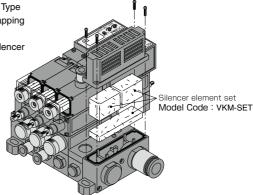
· Use a proper screwdriver to remove four tapping screws.

· Remove the element cover and replace silencer elements (Model Code: VKM-SET).

How to mount the silencer element

· Use a screwdriver to tighten the four tapping screws with 0.3-0.4Nm of the tightening torque after the replacement.

* .Silencer element of manifold type consists of VKM-SE1(2pcs) and VKM-SE2(1pce).



■ How to attach / detach and clean the nozzle and diffuser

How to attach / detach the nozzle and diffuser

Pull out the diffuser with a pair of long-nose pliers after remove the cover and the diffuser retainer. Use a cushion material such as a sponge to cover the nozzle port to prevent the nozzle from jumping out. Apply the air to the vacuum generator and the nozzle comes out by the air pressure. Take out the cushion material and then take out the nozzle.

* During applying the air to the generator, do not point the nozzle port toward anyone. There is a risk of injury by the nozzle jumping out.

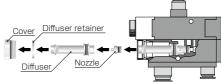
How to clean the nozzle and diffuser

Remove the substances adhered to the nozzle, diffuser bores and the seal rubber by air blow or wiping.

*Do not damage nozzle, diffuser bore, seal rubber and the seal part of the body. It may cause performance

How to attach the nozzle and diffuser

Combine the nozzle with the diffuser and push them back into the body with the attention not to drop the nozzle. Place the diffuser retainer on the diffuser and tighten the cover with 0.2-0.25Nm of the tightening torque.



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VK

⚠ 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...Recomendations 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.

Products can cause personal injury or damages to properties.

↑ Warning I

- 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

- 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.
- 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.
- 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 I

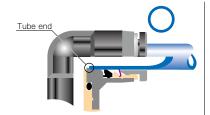
- 1. Do not use PISCO products under the following conditions.
 - ① Beyond the specifications or conditions stated in the catalog, or the instructions.
 - ② Under the direct sunlight or outdoors.
 - ③ Excessive vibrations and impacts.
 - 4 Exposure / adhere to corrosive gas, inflammable gas, chemicals, 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 Antispatter 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.
 - $\ensuremath{\bigcirc}$ 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.

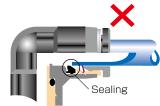


- 1. Remove dusts or drain before piping. They may get into the peripheral machine / facilities and cause malfunction.
- 2. When inserting an ultra-soft tube into push-in fitting, make sure to place an Insert Ring into the tube edge. There is a risk of causing the escape of tube and a fluid leakage without 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	_	\pm 0.05mm	Ø1/8	\pm 0.1mm	\pm 0.15mm
Ø3mm	_	± 0.15mm	Ø5/32	\pm 0.1mm	± 0.15mm
Ø4mm	\pm 0.1mm	± 0.15mm	Ø3/16	\pm 0.1mm	± 0.15mm
Ø6mm	\pm 0.1mm	± 0.15mm	Ø1/4	\pm 0.1mm	± 0.15mm
Ø8mm	\pm 0.1mm	± 0.15mm	Ø5/16	\pm 0.1mm	± 0.15mm
Ø10mm	\pm 0.1mm	± 0.15mm	Ø3/8	\pm 0.1mm	± 0.15mm
Ø12mm	\pm 0.1mm	± 0.15mm	Ø1/2	\pm 0.1mm	± 0.15mm
Ø16mm	\pm 0.1mm	± 0.15mm	Ø5/8	\pm 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 pushin 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.





Tube is not fully inserted up to tube end.

- 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
 - ②The 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 releasering, 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	
	$M3 \times 0.5$	0.7N·m		0110004	
	M5 × 0.8	1.0 ~ 1.5N·m		SUS304 NBR	
	M6 × 1	2 ~ 2.7N·m		NDN	
Metric thread	M3 × 0.5	0.7N·m	_		
	$M5 \times 0.8$	1 ~ 1.5N·m		BO14	
	$M6 \times 0.75$	0.8 ~ 1N·m		POM	
	$M8 \times 0.75$	1 ~ 2N·m			
	R1/8	4.5 ~ 6.5N·m			
Taper pipe thread	R1/4	7 ~ 9N·m	White	_	
Taper pipe trireau	R3/8	12.5 ~ 14.5N·m	vviille		
	R1/2	20 ~ 22N·m			
Unified thread	No.10-32UNF	1.0 ~ 1.5N·m	_	SUS304、NBR	
	1/16-27NPT	4.5 ~ 6.5N·m			
Nietienel nine	1/8-27NPT	4.5 ~ 6.5N·m			
National pipe thread taper	1/4-18NPT	7 ~ 9N·m	White	_	
illieau lapei	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.

Common Safety Instructions for Vacuum Series

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

↑ Warning I

- 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
- 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.

- 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 Series

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.

VACUUM

Common Safety Instructions for Vacuum Generator VG and VK Series

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

- 1. For the operation of the valve, make sure that the leakage current is less than 1mA. Leakage current larger than that may cause malfunction.
- 2. The Vacuum Generator with retention function or check valve function permits some vacuum leakage, so provide an appropriate safety measure when vacuum retention for long period of time is required.
- 3. Long continuous power supply to the valve may raise the temperature of the coil. Heat may cause damaging product life, malfunction, and burns or may adversely affect the peripherical machines. Consult PISCO about such applications.

- 1. Do not give an excessive tensile strength and bending on a lead wire. Otherwise, breaking wire or damage on connector may be caused.
- When manifold type is selected, dropping the performance or having an effect to other vacuum ports can be caused depending on number of stations or a combination of mounting units. Contact us for any unclear points.
- 3. Compressed air contains many kinds of drains such as water, oxidized oil, tar and other foreign substances. Dehumidify the compressed air by using an after-cooler or a dryer and improve the air quality, since those drains seriously impair the performance of the vacuum generator.
- 4. Do not use lubricators.
- 5. Since pipe rust cause malfunctions, a filter finer than 5µm should be placed right before the air supply port.
- 6. Do not use the vacuum generator under the condition of corrosive and/or flammable gases. Also do not use these gasses as a fluid medium.
- 7. Do not operate blow-off solenoid valve during vacuum generating.
- 8. When replacing vacuum port cartridge, first remove any foreign matter clinging to them and the surrounding areas, then firmly insert pins into cartridges.
- 9. For handling and setting of vacuum switch, please read instruction manual carefully.
- For adjustment of vacuum blow-off air flow or blow-off time of air-timer operated blow-off valve on VK Series, read the instructions carefully.

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VH-

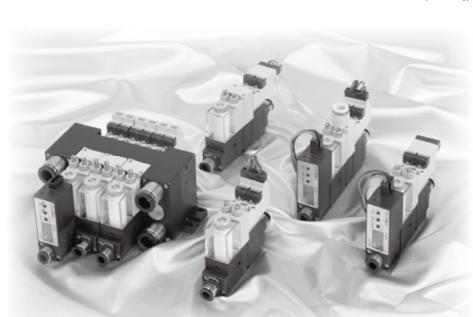
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VM - V

VRL

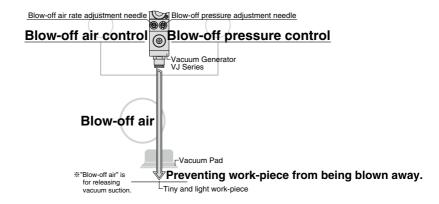
VK



Complex Vacuum Generator with Blow-off Air and Relief Pressure Adjustment

Vacuum Generator VJ Series

- Pressure adjusting function is added to the conventional blow-off air control function to prevent work-pieces from being blown away.
- A relief mechanism built into the blow-off circuit which breaks the vacuum (extra pressure is relieved) realizes shorter blow-off time.



VJ

VO

VZ

- Characteristics
- Wide variety of combinations can cope with various needs.
 External Vacuum Controller for Vacuum Pump Series is for available (P.318). Less wiring is achieved.
- For the pipe lead-out direction of concentrated piping of manifold-type, two types are available; front lead-out type and rear lead-out type.
- 3 types for supply valve
 - Double solenoid type (Vacuum retention type, selectable for saving energy)
 - · Normally closed type
 - · Normally open type
- Improved visibility by vacuum switch with LED display. 2 types of vacuum switch with LED display: ①2 switch output, ②1 switch output and 1 analog output.
- Standard nozzle bore: 05(Ø0.5mm), 07(Ø0.7mm), 10(Ø10mm) and 12(Ø1.2mm).

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VLI

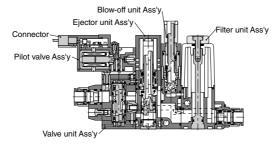
VY

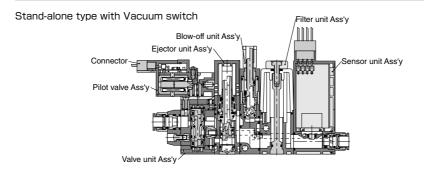
VM · V

VK

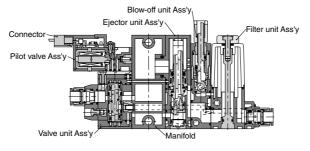
■ Construction

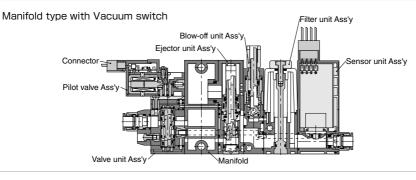
Stand-alone type without Vacuum switch

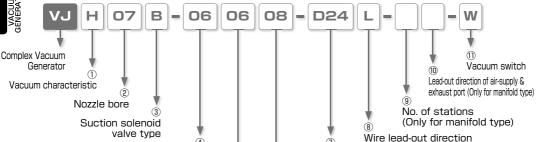




Manifold type without Vacuum switch







Exhaust port

Solenoid valve voltage

① Vacuum characteristics

Code	Performance	Code	Performance	Code	Performance					
Н	High-vacuum type	1	Large-flow type	_	High-vacuum at low air pressure type					
	(Rated supply pressure : 0.5MPa)	_	(Rated supply pressure : 0.5MPa)	_	(Rated supply pressure: 0.35MPa)					
K	Combination of different vacuum characteristics on mounting units on a manifold (Details should be described on Specification Order Form separate									

② Nozzle bore

Ī	Code	Nozzlo boro	Htype	Ltype	Etype	Air concumption							
	Code	NOZZIE DOTE	Vacuum level, Suction flow	Vacuum level, Suction flow	Vacuum level, Suction flow	All consumption							
	05	0.5mm	-90.4kPa	-66.5kPa									
	05	0.511111	7ℓ/min(ANR)	11/min(ANR)	Vacuum level, Suction flow	H.S/MIN(ANA)							
07		0.7	-93.1kPa	-93.1kPa -66.5kPa		23t/min(ANR)							
	07	0.7mm	13t/min(ANR)	26t/min(ANR)	10.5ℓ/min(ANR)	(17t/min(ANR))							
ĺ	10	1.0mm			-90.4kPa	46t/min(ANR)							
	10	1.0111111	27t/min(ANR)	40ℓ/min(ANR)	- 11.5t/min(ANR) -90.4kPa 23t/min(ANR) 10.5t/min(ANR) (17t/min(ANR)) -90.4kPa 46t/min(ANR) 21t/min(ANR) (34t/min(ANR)) -90.4kPa 70t/min(ANR) 27t/min(ANR) (47t/min(ANR))	(34t/min(ANR))							
ĺ	12	1.2mm	-93.1kPa		-90.4kPa	70t/min(ANR)							
	12	1.2111111	38t/min(ANR)	ı	27t/min(ANR)	(47t/min(ANR))							
	00	Combination	of different nozzle on mounting	Combination of different nozzle on mounting units on a manifold (Details should be described on Specification Order Form separately)									

Supply pressure is 0.5MPa for H and L type and 0.35MPa for E type.

Vacuum port

Air supply port

3 Suction solenoid valve type

Code	Code Valve unit		Valve unit	Code	Valve unit
Α	Double solenoid type (Vacuum retention type)	В	Normally closed type	С	Normally open type
K	Combination of different vacuum characte	eristics on mo	ounting units on a manifold (Details should	be described	on Specification Order Form separately)

4 Vacuum port (Applicable tube size)

Code	04	06	08
Tube dia.(mm)	ø4	ø6	ø8

00 : With manifold types, when port size differs with each station. (Details should be described in Specification order form.)

(5) Air supply port (Applicable tube size)

Code	04	06	08	10
Tube dia.(mm)	ø4(※ 1)	ø6	ø8(※ 2)	ø10(※ 2)

^{* 1.} Stand-alone type only

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V L

VY

VE

VR

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VK

VJ

^{*} Air consumption values in () represents that of E type.

^{**} The values in the table are reference values only. Suction flow varies according to the vacuum system conditions; vacuum port dia. or tube length. are reference values only. Suction flow changes according to the vacuum system conditions; vacuum port dia. or tube length.

^{※ 2.} Manifold type only.

6 Exhaust port (Applicable tube size)

	Open to air (Silencer vent)	Tube exhaust (Push-in fitting)					
Code	S	08 10					
Tube dia.(mm)	_	ø8	ø10(※ 1)				

^{※ 1.} Manifold type only

Solenoid valve type

Code	D24	A100
Working voltage	DC24V	AC100V

(8) Wire lead-out direction

Code	L	S	K
lead-out direction	Тор	Side	Different directions on mounting units (Specification Order Form required)

9 No. of stations (Only for manifold type)

╸.			- (,					
	Code	02	03	04	05	06	07	08	09	10	Ī
Ī	No. of manifolds	2	3	4	5	6	7	8	9	10	_

(Only for manifold type)

Code	Α	В
lead-out direction	Vacuum port side	Solenoid valve side

(1) Vacuum switch

Code	W	Α	K	No code		
Switch	O auditab autaut	1 switch output and	Different vacuum switches on mounting units	Without vacuum switch		
type	2 switch output	1 analog output	(Specification Order Form required)	williout vacuum switch		

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Order Example

☐ Vacuum Generator Stand-alone type

VJ <u>H 05 A</u> - <u>04 06 S - <u>D24 L - W</u></u>

- ① Vacuum characteristics : H → High-vacuum type
- ② Nozzle bore : 05 → Ø0.5mm
- ③ Suction solenoid valve type : A → Double solenoid type (Vacuum retention type)
- ④ Vacuum port : 04 → ø4mm Push-In Fitting
- (5) Air supply port : 06 → Ø6mm Push-In Fitting
- ⑥ Exhaust port : S → Open to air (Silencer vent)
- ⑦ Solenoid valve type : D24 → DC24VDC
- Wire lead-out direction : L → Top
- ① Vacuum switch : W → 2 switch output
- 2 Vacuum Generator Manifold type



- ① Vacuum characteristics : H → High-vacuum type
- ② Nozzle bore : 05 → ø0.5mm
- ③ Suction solenoid valve type: A → Double solenoid type (Vacuum retention type)
- ④ Vacuum port : 04 → Ø4mm Push-In Fitting
- ⑤ Air supply port : 10 → ø10mm Push-In Fitting
- 6 Exhaust port : 10 → \varnothing 10mm Push-In Fitting
- ⑦ Solenoid valve type : D24 → 24VDC
- ® Wire lead-out direction : L → Top \bigcirc No. of stations : \bigcirc 04 → 4 stations
- Wacuum switch : W → 2 switch output
- 3 Vacuum Generator Manifold type (Different mounting units on a manifold)

VJ <u>K 00 K - 00 10 10 - 024 L - 05 A - K</u>

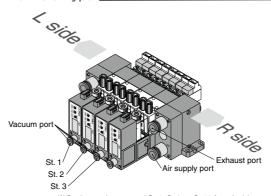
- ① Vacuum characteristics: K → St.1, St.2, St.3: H type
 - St.4 : E type St.5 : H type
- ② Nozzle bore : 00 → St.1, St.2, St.3 : Ø0.7mm
 - St.4: Ø1.0mm
 - St.5: Ø1.2mm
- ③ Suction solenoid valve type ∶ $K \rightarrow St.1$ 、St.2、St.3 ∶ Double solenoid type
- St.4、St.5: Normally closed type
- ④ Vacuum port : 00 → St.1、St.2、St.3 : Ø6mm Push-In Fitting
 - St.4、St.5: Ø8mm Push-In Fitting
- ⑤ Air supply port : 10 → ø10mm Push-In Fitting
- ⑥ Exhaust port : 10 → ø10mm Push-In Fitting
- ⑦ Solenoid valve type : D24 → 24VDC
- Wire lead-out direction : L → Top
- Lead-out direction of air-supply & exhaust port : A → Vacuum port side
- ① Vacuum switch : K → St.1、St.2、St.3 : 2 switch output
 - St.4: Without vacuum switch
 - St.5: 1 switch output and 1 analog output

Specification Order Form (example of 3: Vacuum Generator Manifold type in the left page.)

			Vacuum	Nozzle	Suction solenoid	Vacuum	Air supply	Exhaust	Solenoid	Wire lead-out	No. of	Lead-out direction	Vacuum
			characteristics	bore	valve type	port	port	port	valve type	direction	stations	of air-supply & exhaust port	switch
			1	2	3	4	(5)	6	7	8	9	10	11)
Manifold model code	>	J	K	00	К -	- 00	10	10 -	- D24	L -	- 05	Α -	- к
	L	St.1	Н	07	Α	06							W
	1	St.2	St.1										
		St.3	St.1									/	
	St.	St.4	Е	10	В	08							
Mounting unit	no.	St.5	Н	12	В	08							Α
model code	110.	St.6											
		St.7											
		St.8											
	1	St.9											
	R	St.10											

When the top-mounting units for St. 1, St. 2 and St. 3 are of the same specifications as in the above example of specification order form, fill up the St. 1 space (uppermost) only, while entering "St. 1" in each of the St. 2 and St. 3 grids on the Vacuum characteristics column (1).

■ Example of Manifold Type



 $\mbox{\%}$ Station no. is arranged St.1, St.2 \cdots St.10 from L side.

Vacuum Generator VJ Series Specification Order Form

Γο: NIHON PISCO CO., Ltd.		
Name :		
Order No. :		
Date :		
Requested EX-W PISCO Date :	Quantity:	

			Vacuum characteristics	Suction solenoid valve type		Air supply port			Wire lead-out direction ®		Lead-out direction of air-supply & exhaust port	Vacuum switch
Manifold model code	>	'J		_	_		_	_	_	_	-	_
	L	St.1										
	1	St.2										
		St.3										
	St.	St.4										
Mounting unit	no.	St.5										
model code	110.	St.6										
		St.7										
		St.8										
	1	St.9										
	R	St.10										

^{*} Refer to the example in the previous page to fill in the form.

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VUI

VY

VD

VW-V

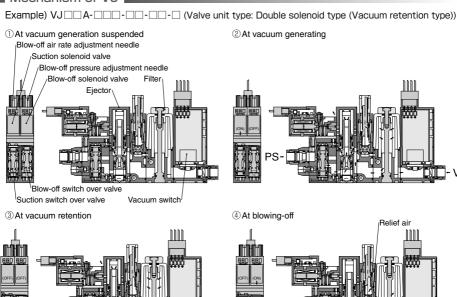
\/(-

VK

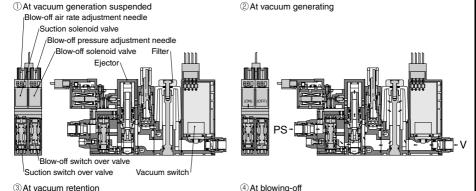
٧J

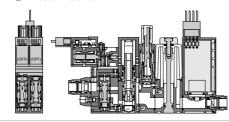
^{*} When the combination of mounting unit spec. is different, a separate Specification Order Form is required.

■ Mechanism of VJ

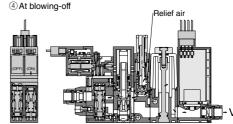








Retention of suction switchover valve



■ Specification (Supply pressure)

Fluid medium	Air
Operating pressure range	0.3 ~ 0.7 MPa
Rated supply pressure	H and L type∶ 0.5 MPa、E type∶ 0.35 MPa
Operating temp. range	5 ~ 50°C

■ Ejector characteristics

Model code	Nozzle bore (mm)	Final vacuum (–kPa)	Suction flow (t/min(ANR))	Air consumption (#min(ANR))
VJH05···	0.5	90.4	7	11.5
VJL05···	0.5	66.5	11	11.5
VJH07···		93.1	13	23
VJL07···	0.7	66.5	26	23
VJE07···		90.4	10.5	17
VJH10···		93.1	27	46
VJL10···	1.0	66.5	40	40
VJE10···		90.4	21	34
VJH12···	1.2	93.1	38	70
VJE12···	1.2	90.4	27	47

^{*} Secure supply pressure as listed when the vacuum generator is in operation. (Take pressure drop into account.)

Solenoid valve (Suction solenoid valve / Blow-off solenoid valve)

D:	-	va	l. 10

Item	Suction sol	enoid valve	Blow-off sol	enoid valve	
Operating system		Direct o	peration		
Valve construction		Elastic seal,	Poppet valve		
Rated voltage	DC24V	AC100V	DC24V	AC100V	
Allowable voltage range	DC24V ±10%	AC100V ±10%	DC24V ±10%	AC100V ±10%	
Surge protection circuit	Diode	Diode bridge	Diode	Diode bridge	
Power consumption	1.2W (with LED)	1.5VA (with LED)	1.2W (with LED)	1.5VA (with LED)	
Manual operation	Non-lock push button				
Operation indicator	During coil excitation, Red LED is on				
	Connector wire (cable length: 500mm)				
Wiring type	Red : DC24V	Plus	Red: DC24V	Blue	
	Black : COM	Blue	Black : COM	blue	

Switchover valve						
Item	Suction n	nain valve	Blow-off main valve			
Operating system		Pneumatic opera	tion by pilot valve			
Valve construction		Elastic seal, Poppet valve				
Proof pressure	1.05MPa					
Valve type	Double solenoid (retention type)	/ Normally closed / Normally open	Normally closed			
Min. excitation time	50msec (Double s	solenoid type only)	_			
Lubrication	Not required					
Effective sectional	Air supply port	Air supply port Ø4mm : 3.5mm²				
area	diameter	ø6mm : 5mm²	1mm²			

^{*} The values in the table are reference values only. Suction flow varies according to the vacuum system conditions; vacuum port dia. or tube length.

^{*} The above characteristics are the values measured at the rated supply pressure which is 0.5MPa for H and L type and 0.35MPa for E type.

■ Vacuum switch with LED display

Specification	2 switch output (-NW)	1 switch output and 1 analog output (-NA)		
Current consumption	40mA	or less		
Pressure detection	Diffused metaloxide semicor	nductive pressure transducer		
Operating pressure range	0 ~ -1	00kPa		
Pressure setting range	0 ~ -9	99kPa		
Proof pressure	0.21	MPa		
Operating temp. range	0 ~ 50°C (N	No freezing)		
Operating humidity range	35 ~ 85%RH (No	dew condensation)		
Power requirement	12 ~ 24VDC ± 10%,	ripple P-P: 10% or less		
Protective structure	IEC stan	dard IP40		
No. of pressure setting	2	1		
Operating accuracy	±3%F.S. max. (at Ta=25°C)			
Differential response	Fixed (2%F.S. max.) Variable (About 0-15% of setting			
Switch output	NPN open collector output / 30V 80mA	or less / Residual voltage: 0.8V or less		
		Output voltage 1 ~ 5V		
		Zero-point voltage 1±0.1V		
Analog output		Span voltage 4±0.1V		
		Output current Output current: 1mA max. (load resistance 50kΩmax		
		LIN / HYS ±0.5%F.S. max.		
Response time	About ma	x. 2m·sec.		
Indication	2-digit red l	LED display		
Display frequency	About 4 t	imes/sec.		
Indication accuracy	±3%F.S	. ±2 digit		
Sensor resolution	1 digit			
Operation indication	SW1: Red LED turns ON, when pressure is above the setting.	Red LED turns ON, when pressure is		
	SW2: Green LED turns ON, when pressure is above the setting.	above the setting.		
	1. MODE selector switch (ME / S1 / S2)	1. MODE selector switch (ME / SW)		
Function	2. S1 setting trimmer (2/3-turn trimmer)	2. SW setting trimmer (2/3- turn trimmer		
	3. S2 setting trimmer (2/3- turn trimmer)	3. HYS setting trimmer (About 0-15% of setting value		

■ Filter specification ■

Element material		PVF (Polyvinyl formal)			
Filtering capacity		10μm			
Filter area		1,130mm²			
Replacement filter	Vacuum filter	ilter VGFE 10			
Model code	Blow-off filter	ter VJFF			

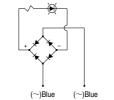
■ Blow-off function

Blow-off air rate	$0 \sim 50t/min(ANR)$ (Supply pressure: 0.5Mpa)			
Blow-off Release Valve structure	Elastic seal, Poppet valve			
Relief pressure setting range	0.005 ~ 0.05MPa			

■ Circuit diagram (Solenoid valve)



24VDC Suction & Blow-off solenoid valve



(~)Blue (~)Blue
AC100V Suction & Blow-off solenoid valve

■ VJ Series Weight List

(1) Stand-alone type

Type	Model code	Weight(g)	Remarks
Silencer vent with	VJ 🗆 🗆 - 🗆 S- 🗆 🗆 - 🗆	164.5	Vacuum port : ø4, ø6
vacuum switch	VJ 🗆 🗆 - 🗆 8S - 🗆 - 🗆	171.0	Vacuum port : ø8
Silencer vent without	VJ 🗆 🗆 - 🗆 S- 🗆 🗆	156.0	Vacuum port : ø4, ø6
vacuum switch	VJ8S	162.5	Vacuum port : ø8
Tube exhaust with	VJ 🗆 🗆 - 🗆 8- 🗆 - 🗆	169.0	Vacuum port : ø4, ø6
vacuum switch	VJ 🗆 🗆 -8 🗆 8- 🗆 - 🗆	175.5	Vacuum port : ø8
Tube exhaust without	VJ 🗆 🗆 - 🗆 8- 🗆 🗆	160.5	Vacuum port : ø4, ø6
vacuum switch	VJ 🗆 🗆 -8 🗆 8- 🗆 🗆	167.0	Vacuum port : ø8

2 Manifold intermediate block

	Weight(g)	Remarks
Manifold intermediate block	18.5	Per station

3 Manifold side block

Weight(g)	Remarks
110 0	Cartridge qty: 2pcs (PS port) PV and EX ports have plugs.
110.0	PV and EX ports have plugs.
110.0	Cartridge qty: 4pcs (PS and EX ports)
112.0	PV port has a plug.
	118.0

(4) Cartridge (Supply and Exhaust ports)

© 04. 1. 1480 (04pp.) 4. 14 = 1. 1440 t po. 10)				
Model code	Weight(g)	Remarks		
CJC14-06	11.5	For ø6mm		
CJC14-08	10.0	For ø8mm		
CJC14-10	13.0	For ø10mm		

■Total weight can be calculated by the following calculation formula.

Total weight of manifold type = (① Stand-alone type + ② Manifold intermediate block) x station qty + ③ Manifold Side block + ④ Cartridge x qty

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VU

VUI

VR

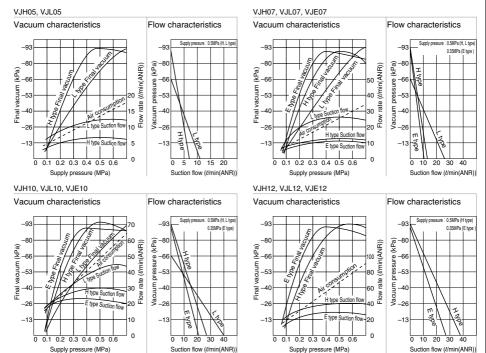
V/K

VJ

VN

Characteristics

Supply pressure - Final vacuum, Suction Flow, Air Consumption



- 1. In the characteristics shown above, supply pressures refer to those when vacuum is generated.
- 2. In the characteristics shown above, an odd noise may be heard when supply pressures are immediately before the peak of vacuum levels (H (High vacuum) type: 0.4~0.45MPa, and E (High-vacuum at low air supply pressure type) type: 0.29~0.32MPa). The sounding of this odd noise means the characteristics are unstable. If nothing is done, the sound may become even noisier. This situation can also adversely affect the sensor, resulting in a malfunction or trouble. So reset the supply pressure.
 - (Ex. 1: When the vacuum generator H type is in operation with the original pressure of 0.5MPa, the odd noise began to be heard due to a drop in supply pressure to 0.43MPa. Reset the supply pressure for the vacuum generator in operation at 0.5MPa.)
- 3. Piping design and equipment selection should be made with an effective sectional area being 3 times as large as the nozzle diameter as a standard. Satisfactory vacuum characteristics are not obtained unless sufficient supply air flow is secured.(For example, the odd noise is heard even when pressure is at the set value, suction flow is insufficient, the final vacuum does not satisfy the required level, etc.)
 - (Example2. There is the odd noise from the vacuum generator H type, though the supply pressure is 0.5MPa. → Insufficient supplied air rate is the cause. The supplied air rate is reduced before the vacuum generator by a pipe resistance, and a proper air rate is not obtained. Select tubes and pneumatic apparatuses with the target effective cross-section areas obtaining the necessary air flow rate.)
 - (Example3. When \emptyset 1.0mm of nozzle bore is selected, the effective cross-section size should be more than 2.35mm2.(cross-section $0.5^2x\pi=0.785$ mm²x3=2.35mm²). Select tubes and pneumatic apparatuses with the effective cross-section area more than 2.3 mm².)

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■ How to insert and disconnect

1. How to insert and disconnect tubes

① Tube insertion

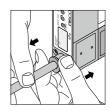
Insert a tube into Push-In Fitting of the vacuum generator VK up to the tube end. Lock-claws bite the tube to fix it and the elastic sleeve seals around the tube

Refer to "2. Instructions for Tube Insertion" under "Common Safety Instructions for Fittings" .



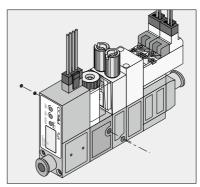
2 Tube disconnection

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 fix the product

In order to fix the vacuum generator VK, tighten M3 threads through the fixing holes on the resin body with tightening torque 0.3 to 0.35Nm. Refer to the outer dimensional drawings for the hole pitch.



Applicable Tube and Related Products

Polyurethane Tube

(Piping products catalog P.596)

Polyurethane Tube is for the general pneumatic piping and suitable for a compact piping.

Nylon Tube

(Piping products catalog P.608)

■ Nylon Tube is for the general pneumatic piping and suitable for a high-pressure fluid up to 1.5MPa (NB tube: 1.0MPa).

Vacuum Tube

(Piping products catalog P.612)

Vacuum Tube is a ultra-soft tube and suitable for piping of vacuum generators or actuators.

Vacuum Pads

Vacuum rau opunge senes · · · r.400
● Vacuum Pad Bellows Series · · · P.488
Vacuum Pad Multi-Bellows Series P.508
Vacuum Pad Oval Series · · · · · P.526
Vacuum Pad Soft Series · · · · · P.550
Vacuum Pad Soft Bellows Series · P.578
Vacuum Pad Skidproof Series · · P.604
■ Vacuum Pad Ultrathin Series · · · P 624

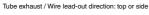
Vacuum Pad Standard Series · · P.428

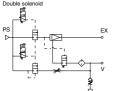
Naguum Dad Changa Carion

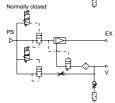
Vacuum Pad Long Stroke Series · P.658

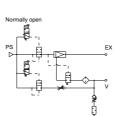
PISCO:

■ Standard Size List



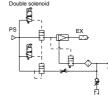


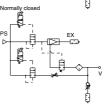


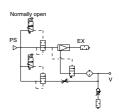


Type	Page to	Vacuum	Air sup	ply port	Exhaust
Type	refer	port	4mm	6mm	port
LV		1mm	•	•	8mm
		4mm	•	•	With Silencer
	177	Cmm	•	•	8mm
	1//	6mm	•	•	With Silencer
		8mm	•	•	8mm
		OHIIII	•	•	With Silencer

Silencer vent / Wire lead-out direction: top or side

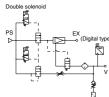


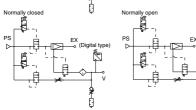




Type		Vacuum	Air supply port		Exhaust
туре	refer	port	4mm	6mm	port
LV		40000	•	•	8mm
		4mm	•	•	With Silencer
	470	C	•	•	8mm
	178	6mm	•	•	With Silencer
		8mm	•	•	8mm
		OIIIIII	•	•	With Silencer

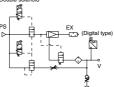
Tube exhaust with vacuum switch, Wire lead-out direction: top or side





Type	Page to	Vacuum	Air sup	ply port	Exhaust
Type	refer	port	4mm	6mm	port
LV		1mm	•	•	8mm
		4mm	•	•	With Silencer
	470	C	•	•	8mm
	179	6mm	•	•	With Silencer
		8mm	•	•	8mm
		OHIIII	•	•	With Silencer

Silencer vent with vacuum switch, Wire lead-out direction: top or side Double solenoid



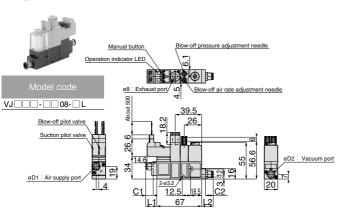
	¥*		
lormally closed	Ų	Normally open	
	EX (Digital type)		EX (I
	ģ		

Type	Page to	Vacuum	Air supply port		Exhaust
туре	refer	port	4mm	6mm	port
LV		4	•	•	8mm
		4mm	•	•	With Silencer
	180		•	•	8mm
	180	6mm	•	•	With Silencer
		0	•	•	8mm
		8mm	•	•	With Silencer

_

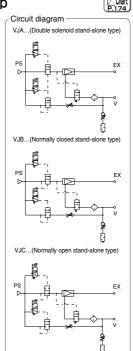
VN

Tube exhaust, Wire lead-out direction: Top



	Unit	: mm
Air supply port applicable tube O.D.: øD1	C1	L1
4	11.2	14.6
6	11.7	17.1

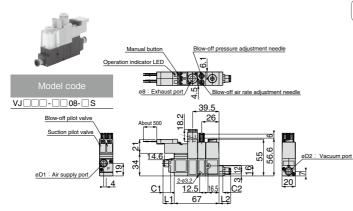
	Unit	: mm
Vacuum port applicable tube O.D. : øD2	C2	L2
4	10.9	14.3
6	11.7	17.2
8	21.7	25.8





Tube exhaust, Wire lead-out direction: Side

Circuit diagram Please refer to the above circuit.



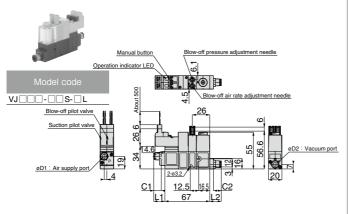
	Unit	mm
Air supply port applicable tube O.D. : øD1	C1	L1
4	11.2	14.6
6	11.7	17.1

	Unit	. mm
Vacuum port applicable tube O.D. : øD2	C2	L2
4	10.9	14.3
6	11.7	17.2
8	21.7	25.8

___Chart P.174



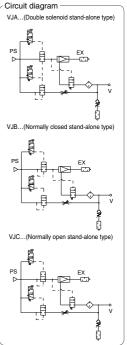
Silencer vent, Wire lead-out direction: Top



	Unit	: mm
Air supply port applicable tube O.D. : øD1	C1	L1
4	11.2	14.6
6	11.7	17.1

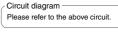
	OHIL	
Vacuum port applicable tube O.D.: øD2	C2	L2
4	10.9	14.3
6	11.7	17.2
8	21.7	25.8

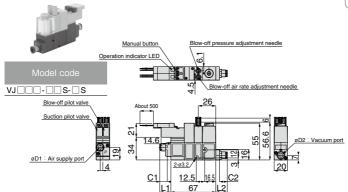
I Init : mm



Silencer vent, Wire lead-out direction: Side

____Chart P.174



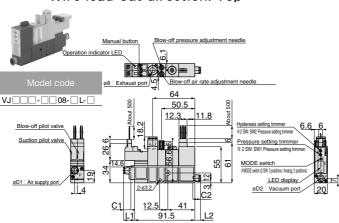


	Unit	: mm
Air supply port applicable tube O.D.: øD1	C1	L1
4	11.2	14.6
6	11.7	17.1

	Unit	: mm
Vacuum port applicable tube O.D.: øD2	C2	L2
4	10.9	14.3
6		17.2
8	21.7	25.8

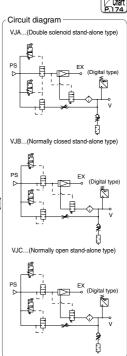


Tube exhaust with vacuum switch, Wire lead-out direction: Top



	Unit	mm
Air supply port applicable tube O.D.: øD1	C1	L1
4	11.2	14.6
6	11.7	17.1

	Unit	: mm
Vacuum port applicable tube O.D. : øD2	C2	L2
4	10.9	5.8
6	11.7	8.7
8	18.2	17.3

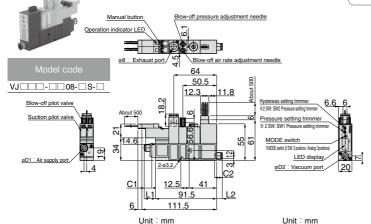




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Tube exhaust with vacuum switch. Wire lead-out direction: Side

_Chart P.174 Circuit diagram Please refer to the above circuit.

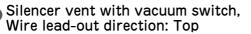


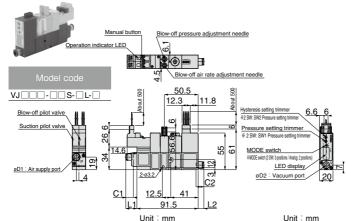
Air supply port applicable tube O.D. : øD1	C1	L1
4	11.2	14.6
6	11.7	17.1

Vacuum port applicable tube O.D.: øD2	C2	L2
4	10.9	5.8
6	11.7	8.7
8	18.2	17.3

Circuit diagram

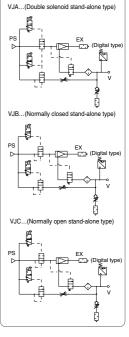
___Chart P.174





C1	LI
11.2	14.6
11.7	17.1
	11.2 11.7

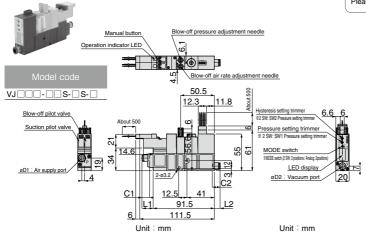
	OTIIL	
Vacuum port applicable tube O.D. : øD2	C2	L2
4	10.9	5.8
6	11.7	8.7
8	18.2	17.3



Silencer vent with vacuum switch, Wire lead-out direction: Side

Circuit diagram

Please refer to the above circuit.

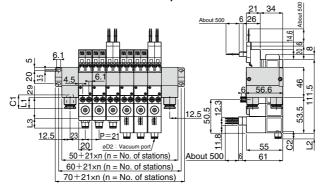


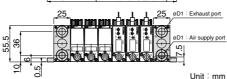
	Unit	· mm
Air supply port applicable tube O.D.: øD1	C1	L1
4	11.2	14.6
6	11.7	17.1

Vacuum port applicable tube O.D.: øD2	C2	L2
4	10.9	5.8
6		8.7
8	18.2	17.3

Vacuum Generator VJ

Manifold type, Tube exhaust, Concentrated wire lead-out direction: Vacuum port side





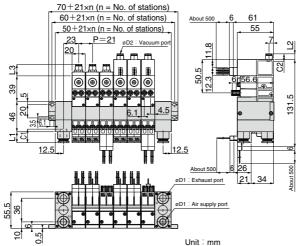
Model code	
VJ A	

	0	
Air supply and exhaust ports applicable tube O.D. : øD1	C1	L1
6	16.95	11.55
8	18.2	13.1
10	20.7	16.7

		Unit	: mm
Vacuum port applicable tube O.D.: øD2	C2	L2	L3
4	10.9	5.8	14.3
6	11.7		17.2
8	18.2	17.3	23

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Manifold type, Tube exhaust, Concentrated wire lead-out direction: Supply port side



Model code
VJ B

	Othic	
Air supply and exhaust ports applicable tube O.D.: øD1	C1	L1
6		11.55
8	18.2	13.1
10	20.7	16.7

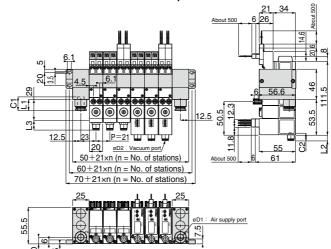
Vacuum port applicable tube O.D.: øD2	C2	L2	L3
4		5.8	
6	11.7	8.7	17.2
8	18.2	17.3	23

Unit: mm

Chart Characteristic chart page



Manifold type, Silencer vent, Concentrated wire lead-out direction: Vacuum port side

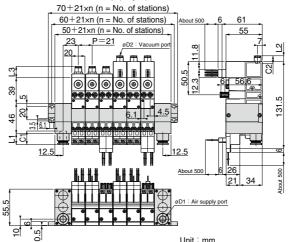


Model code
VJ S A

	Unit	: mm
Air supply port applicable tube O.D. : øD1	C1	L1
6	16.95	11.55
8	18.2	13.1
10	20.7	16.7

		Unit	: mm
Vacuum port pplicable tube O.D.: øD2	C2	L2	L3
4	10.9	5.8	14.3
6	11.7	8.7	17.2
8	18.2	17.3	23

Manifold type, Silencer vent, Concentrated wire lead-out direction: Supply port side



Model code	
VJ S B	

	0	
Air supply port applicable tube O.D. : øD1	C1	L1
6	16.95	11.55
8	18.2	13.1
10	20.7	16.7

Vacuum port oplicable tube O.D. : øD2	C2	L2	L3
4	10.9	5.8	14.3
6	11.7	8.7	17.2
8	18.2	17.3	23

Unit: mm

Vacuum Generator VJ

Before using PISCO products, be sure to read "Safety Instruction" and "Safety Instruction Manual" on page 35-39 and "Common Safety Instructions for Vacuum Series" on page 47-49.

Warning

- Make sure that the leakage current is less than 1mA, when operating a valve unit. Leakage current larger than that may cause malfunction.
- Vacuum generator with vacuum retention function permits some vacuum leakage. Provide an appropriate safety measure when vacuum retention for long period of time is required.
- 3. The coil in a pilot solenoid valve generates heat under the following ① ③ conditions. The heat may cause dropping life cycle, malfunctions and burn or may affect negatively on peripheral machines.

Contact us when the power is applied to the vacuum generator under the following conditions:

- ① The power is continuously ON for over 2 hours.
- 2 High-cycle operation.
- ③ Even when intermittent running of the generator is carried out, the total operation time per day is longer than non-operation time.
- 4. Regarding double-solenoid types (VJ □□ A···), the switchover valve (main valve) is placed in neutral after the supply of pilot air has been suspended (the same is true when the valve is being operated for the first time after shipment). When resuming the supply of pilot air, be sure to send a signal to the pilot valve, or conduct switchover operations manually as required.

Caution

- Do not give an excessive tensile strength and bending on a lead wire. Otherwise, breaking wire or damage on connector may be caused.
- 2. When manifold type is selected, dropping the performance or having an effect to other vacuum ports can be caused depending on number of stations or a combination of mounting units. Contact us for any unclear points.
- 3. Compressed air contains many kinds of drains such as water, oxidized oil, tar and other foreign substances. Dehumidify the compressed air by using an after-cooler or a dryer and improve the air quality, since those drains seriously impair the performance of the vacuum generator.
- 4. Do not use lubricators.
- Since pipe rust cause malfunctions, a filter finer than 5µm should be placed right before the air supply port.
- Do not use the vacuum generator under the condition of corrosive and / or inflammable gas. Also do not use these gasses as fluid medium.
- 7. Do not operate a blow-off valve during vacuum generating.
- When replacing vacuum port cartridge, first remove any foreign substances clinging to them and the surrounding areas, then firmly insert pins into cartridges.
- When replacing a supply port block, make sure not to lose the seal rubber and remove the foreign substances stuck around the block. Tighten the screw to fix the block with 0.27-0.3Nm of the tightening torque.

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↑ Safety Rules for Use

1. Safety Rules for Manifold Type

The increase of manifold station may cause troubles such as performance drop by a shortage of air supply and insufficient capability to exhaust, and exhaust air leak to the vacuum port. Allowable station numbers of simultaneous operation differs by nozzle size, vacuum performance, and other conditions. Please contact us for details.

2. LED Digital Vacuum Pressure Sensor (Vacuum Switch)

- (1) Pressure Setting Method
 - ①Turn on the power (Make sure the correct wiring and apply DC power to the vacuum pressure sensor).
 - ②-1 Set the indicator switch at Pressure Setting Mode (ME → S1 / S2 and SW)
 - 2 -2 (Vacuum switch with analog output)
 - Fully turn the hysteresis setting trimmer (HYS) in the counterclockwise direction in order to minimize the hysteresis adjustment in advance.
 - 3 Adjust the pressure adjusting trimmer (S1 / S2 and SW) with a flathead screwdriver to set at the desired value.
 - (4) Set the indicator switch at ME and apply pressure and check the actual operation.

(Vacuum switch with 2 switch output)

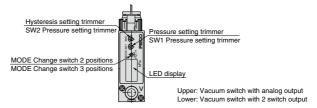
Switch output 1 (S1): Red LED turns ON at the pressure with more than the setting.

Switch output 2 (S2): Green LED turns ON at the pressure with more than the setting.

(Vacuum switch with analog output)

Switch output (SW): Red LED turns ON at the pressure with more than the setting.

- (2) Differential response setting
 - ① Differential response setting can be adjusted by the hysteresis setting trimmer (HYS).
 - ② Differential response setting range is regulated within about 0-15% of the set value. Differential response setting becomes large when the trimmer is turned in the clockwise direction.
 - 3 Differential response setting adjustment
 - Set the indicator switch at ME (pressure indication mode). Increase or decrease the supply pressure gradually around the set pressure value and read the value at ON/OFF of the switch LED. Differences in displayed values are taken as differential response.
 - 4 Hysteresis adjustment is useful for the following cases:
 - Increase differential response when pressure pulsates with output repeatedly showing small on/off movements.
 - · When an allowable range is to be set for the lowering of pressure.

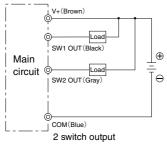


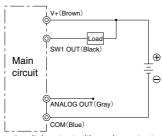
Safety Instructions for LED Digital Vacuum Pressure Sensor

- ① Do not use the vacuum switch in the environment or gasses containing corrosive substance. It may cause a sensor trouble.
- ② Wiring or ways by which noise or other disturbance is caused may cause a sensor trouble.
- 3 Since the sensors are not explosive-proof, do not use them in an inflammable or explosive gas, fluid or
- (4) Since the sensors are not drip / dust proof, do not use them in locations where they may be exposed to water or oil drops or dust.

- ⑤ Do not use the sensor in an atmosphere exceeding the range of application temperature or causing heat as sensor malfunction may result.
- (6) Make sure to turn off the power before wiring. Check the wire colors, and do not short-circuit output terminals, power supply terminals and COM terminals when wiring. Short-circuits may cause a sensor
- Do not give an excessive tensile strength and bending on a lead wire. Otherwise, breaking wire or damage on connector may be caused.
- ® Do not keep applying 0.2MPa or more of positive pressure to the vacuum pressure sensor constantly during a blow-off air supply. Otherwise, damaging to the sensor may be caused.
- (9) When adjusting pressure and differential response, use a flathead screwdriver (accessory). Do not apply an excessive force on the trimmer and slowly turn it within its rotation limits. Otherwise, there is a risk of damaging the trimmer and the circuit board.
- 10 Supply a stable DC power to the product.
- (1) Add a surge absorption circuit to relays or solenoid valves, etc. which are to be connected with output terminal and source terminal. Do not apply a current exceeding 80mA.
- @Ground the FG terminal when using a unit power source such as switching current.
- (3) Output terminals (lead wire color: black and gray) and other terminals should not be short-circuited.
- (4) Avoid strong external impacts and excessive force to the sensor body.

(3) Wire connecting method

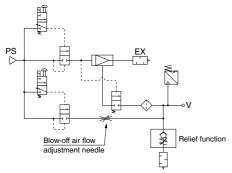


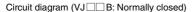


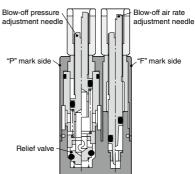
1 switch output with analog output

3. Adjusting Method of Relief Valve

(1) Circuit diagram / Construction







Construction of blow-off unit

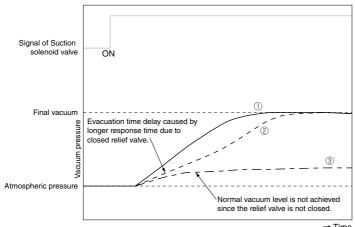
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(2) Adjust and set the amount of pressure by referring to the following "Table 1. Open limit of the blow-off pressure relief needle".

Table 1. Open limit of the blow-off pressure adjustment needle

Vacuum characteristics	H: High-vacuum type			L: Large-flow type		E: High-vacuum at low air supply pressure type				
Nozzle bore (mm)	0.5	0.7	1.0	1.2	0.5	0.7	1.0	0.7	1.0	1.2
Max. open limit (rotations)	6.5	7.5	8.5	9.0	7.5	8.0	9.0	7.5	8.0	8.5

- ※ In case of External Vacuum Controller "VJP Series" (VJP□), open limit of of the blow-off pressure needle differs according to the performance of a vacuum pump. Adjust the needle within the condition under which the startup time and vacuum level are not affected.
- Table 1 represents the referential values at rated supply pressure. Open limit of the blow-off pressure needle can change
 by factors such as supply pressure, vacuum characteristics and volume of piping at vacuum side. Values in table 1 are only
 reference valves.
- (3) Reconfirm if the vacuum characteristics and the evacuation time are not influenced and abnormal after setting the blow-off pressure.
 - **Be noted that the evacuation time may become longer or normal final vacuum level may not be obtained when the pressure adjustment needle opening exceeds the limit indicated in Table 1. (Please refer to the following (5) Others.)
- (4) Adjust the desired blow-off air rate by blow-off air rate adjustment needle.
 - * Increase the amount of blow-off air if shorter blow-off air time is required.
 - * Decrease the amount of blow-off air flow in order to avoid a work from being blown away.
- (5) Others
 - 1) When the pressure adjustment needle opening is adequate, a vacuum rising becomes like ① in the below graph.
 - 2) If the pressure adjustment needle opening exceeds the limit, a vacuum rising becomes like ② in the below graph and evacuation time becomes longer.
 - 3) If the pressure adjustment needle is opened more from ② of below graph, a vacuum rising becomes like ③ in the below graph and proper vacuum level cannot be obtained.



→ Time

Vacuum Generator VJ

Replacement Element

Remove the fixing screw to replace the filter element. Make sure to place the filter seal rubber properly and tighten the screw to fix the filter cover with 0.3-0.5Nm of the tightening torque after the replacement.

Vacuum filter element
Model code: VJFF

■ How to detach silencer element

- Remove 2 fixing screws by a proper screwdriver.
- · Detach the element cover and replace silencer elements (Model code: SEE0602 & VJEF).

Silencer element

-Model code : SEE0602 -Model code : VJEF

How attach silencer elements

· Tighten 2 fixing screws firmly with 0.18-0.2Nm of the ttightening torque by a proper screwdriver.

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⚠ 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...Recomendations 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.

Products can cause personal injury or damages to properties.

↑ Warning I

- 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

- 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.
- 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.
- 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.

- 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.

- 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 Antispatter 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.
 - $\ensuremath{\bigcirc}$ 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.

0.15mm 0.15mm 0.15mm 0.15mm 0.15mm 0.15mm

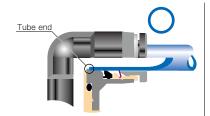
0.15mm

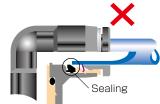


- 1. Remove dusts or drain before piping. They may get into the peripheral machine / facilities and cause malfunction.
- 2. When inserting an ultra-soft tube into push-in fitting, make sure to place an Insert Ring into the tube edge. There is a risk of causing the escape of tube and a fluid leakage without 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	Polyu
Ø1.8mm	_	\pm 0.05mm	Ø1/8	± 0.1mm	±
Ø3mm	_	± 0.15mm	Ø5/32	± 0.1mm	±
Ø4mm	± 0.1mm	± 0.15mm	Ø3/16	± 0.1mm	±
Ø6mm	\pm 0.1mm	± 0.15mm	Ø1/4	\pm 0.1mm	±
Ø8mm	\pm 0.1mm	± 0.15mm	Ø5/16	± 0.1mm	±
Ø10mm	\pm 0.1mm	± 0.15mm	Ø3/8	± 0.1mm	±
Ø12mm	\pm 0.1mm	± 0.15mm	Ø1/2	\pm 0.1mm	±
Ø16mm	± 0.1mm	± 0.15mm	Ø5/8	± 0.1mm	±

- 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 pushin 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.





Tube is not fully inserted up to tube end.

- 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
 - ②The 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 releasering, 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		
	$M3 \times 0.5$	0.7N·m		SUS304 NBR		
	M5 × 0.8	1.0 ~ 1.5N·m				
	M6 × 1	2 ~ 2.7N·m				
Metric thread	M3 × 0.5	5 × 0.8 1 ~ 1.5N·m				
	$M5 \times 0.8$			POM		
	$M6 \times 0.75$					
	$M8 \times 0.75$	1 ~ 2N·m				
Taper pipe thread	R1/8	4.5 ~ 6.5N·m		_		
	R1/4	7 ~ 9N·m	White			
	R3/8	R3/8 12.5 ~ 14.5N·m				
	R1/2	20 ~ 22N·m				
Unified thread	No.10-32UNF	1.0 ~ 1.5N·m	_	SUS304、NBR		
National pipe thread taper	1/16-27NPT	4.5 ~ 6.5N·m		_		
	1/8-27NPT	4.5 ~ 6.5N·m				
	1/4-18NPT	7 ~ 9N·m	White			
illieau lapei	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.

Common Safety Instructions for Vacuum Series

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

↑ Warning I

- 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
- 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.

- 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.

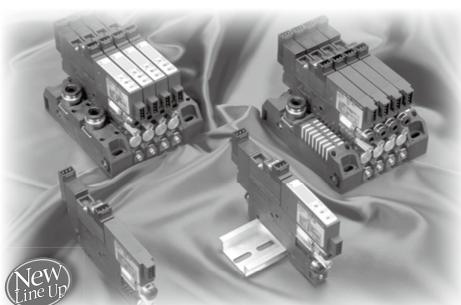
* Vacuum Generator Series

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.



Complex Vacuum Generator with Lightweight, Compact Body and High Vacuum Cycle

Vacuum Generator VX Series

Lightweight and compact body meeting market needs.



* The above is the weight of a tube exhaust type with LED vacuum pressure sensor.



Pursue of faster responsiveness of suction solenoid valve to the extreme realized the high cycle of vacuum system.

> Two types of valves, Normally closed type and Double solenoid type (vacuum retention type) which is suitable to save energy, are selectable.

- Characteristics
- Wide variety of combinations enables to meet various applications. External Vacuum Controller for vacuum pump is also available. (P.338).
- 2 installation methods are selectable. Direct-installation type is to fix the product from side using threads. The other DIN rail type is to install the product on DIN rail. Selection according to the application is possible.



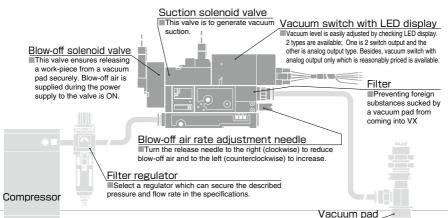
 Vacuum switch with visibility improved LED display, and one with analog output with reasonable price are selectable.

There are 2 kinds in vacuum switch with LED display. One is 2 switch output and the other is analog output type. Connector wire is adopted which makes wiring layout easy.

- Max. 10 mounting units in a manifold type.
- Standard nozzle bore: 05(Ø0.5mm), 07(v0.7mm) and 10(Ø10mm).
- "Copper alloy free" and "Low level ozone proof" types are available in VX.

No copper alloy on airflow path. HMBR material for seal rubber. Krytox grease is a measure against low ozone concentration and dry air.

■ Piping Example



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VU

VY

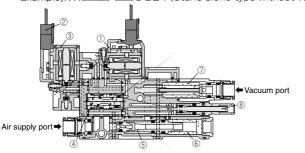
VG

VJ

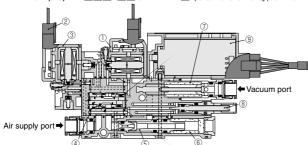
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■ Construction

Example).VX DD-DS-D24 (Stand-alone type without vacuum switch)

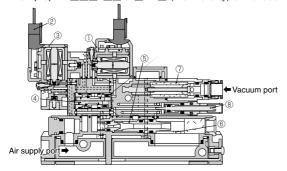


No.	Part name
1	Pilot valve for vacuum generation
2	Connector
3	Blow-off pilot valve
4	Valve unit
(5)	Ejector unit
6	Silencer element
7	Filter element
8	Blow-off air rate adjustment needle

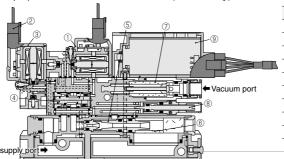
Example).VX \(\subseteq


No.	Part name
1	Pilot valve for vacuum generation
2	Connector
3	Blow-off pilot valve
4	Valve unit
(5)	Ejector unit
6	Silencer element
7	Filter element
8	Blow-off air rate adjustment needle
9	Vacuum sensor unit

Example).VX \square \square - \square S- \square -M \square (Manifold type without vacuum switch)



No.	Part name		
1)	Pilot valve for vacuum generation		
2	Connector		
3	Blow-off pilot valve		
4	Valve unit		
(5)	Ejector unit		
6	Silencer element		
7	Filter element		
8	Blow-off air rate adjustment needle		

Example).VX \(\subseteq


1	Pilot valve for vacuum generation
2	Connector
3	Blow-off pilot valve
4	Valve unit
(5)	Ejector unit
6	Silencer element
7	Filter element
8	Blow-off air rate adjustment needle
9	Vacuum sensor unit

Part name

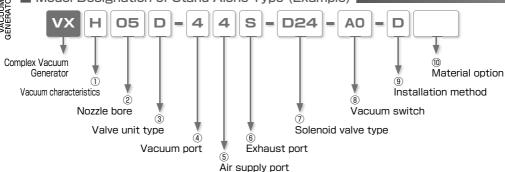
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VX

* Vacuum Generator Series

Vacuum Generator VX

■ Model Designation of Stand-Alone Type (Example)



Vacuum characteristics

Code	Performance	Code	Performance	Code	Performance
ш	High-vacuum type		Large-flow type	_	High-vacuum at low air supply pressure type
Н	(Rated supply pressure : 0.5MPa)	L	(Rated supply pressure : 0.5MPa)	E	(Rated supply pressure : 0.35MPa)

② Nozzle bore

Code	Nozzle	H type	L type	E type	Air concumption
Code	bore	Vacuum level, Suction flow	Vacuum level, Suction flow	Vacuum level, Suction flow	Air consumption
05	0.5mm	-90.4kPa	-66.5kPa	-90.4kPa	11.54/min(ANR)
05	0.511111	7ℓ/min(ANR)	12t/min(ANR)	3ℓ/min(ANR)	(8t/min(ANR))
07	0.7mm	-93.1kPa	-66.5kPa	-90.4kPa	23t/min(ANR)
07		13t/min(ANR)	24[22]//min(ANR)	10.5t/min(ANR)	(17t/min(ANR))
10	1.0mm	-93.1kPa	-66.5kPa	-90.4kPa	46t/min(ANR)
10		24[20]#/min(ANR)	26t/min(ANR)	20[19] //min(ANR)	(34l/min(ANR))

^{* 1.} Supply pressure is 0.5MPa for H and L type and 0.35MPa for E type.

* 3. Air consumption values in () are for E type.

3 Valve unit type

Code	Valve unit type	Code	Valve unit type
D	Double solenoid type (Vacuum retention type)	No code	Normally closed

4 Vacuum (V) port (Applicable tube O.D.)

Code	3	4	6
Tube dia.(mm)	ø3 (Push-In Fitting)	ø4 (Push-In Fitting)	ø6 (Push-In Fitting)

5 Air supply (PS) port (Applicable tube O.D.)

Code	4	6
Tube dia.(mm)	ø4 (Push-In Fitting)	ø6 (Push-In Fitting)

6 Exhaust (EX) port

Code	S	J
Exhaust method	Silencer vent	Tube exhaust (ø6mm Push-In Fitting)

^{* .} Tube exhaust is not selectable for nozzle bore ø1mm of L (Large-flow type).

^{※ 2.} The values in [] are for suction flow of tube exhaust type.

^{* 4.} The values in the table are reference values only. Suction flow varies according to the vacuum system conditions; vacuum port dia. or tube length. are reference values only. Suction flow changes according to the vacuum system conditions; vacuum port dia. or tube length.

Solenoid valve type

Code	D24	A100		
Voltage	DC24V	AC100V		

® Vacuum switch

Code	Switch	Code	Switch	Code	Switch
DW	Pressure sensor with LED display (2 switch outputs)	DA	Pressure sensor with LED display (Analog and switch output)	A0	Analog output pressure sensor (No LED)
No code	Without vacuum switch				_

9 Installation method

Code	Installation method	Code	Installation method
D	DIN rail type	No code	Direct-installation type

10 Material option

Code	No code	-S3
Material	Standard	No copper alloy & HNBR seal
Exhaust method	Silencer vent & Tube exhaust	Tube exhaust

^{**. -}S3 specification is only for where air flow through but not corresponding to electrical parts, wires or vacuum port size with ø3mm.

(1)

Nozzle bore

Complex Vacuum Generator

Vacuum characteristics

Valve unit type Vacuum (V) port (Applicable tube O.D.)

Air supply (PS) port (Applicable tube O.D.)

Solenoid valve type

Vacuum switch

Material option

No. of stations

(1) Vacuum characteristics

Code	Performance	Code	Performance	Code	Performance
ы	High-vacuum type		Large-flow type	_	High-vacuum at low air supply pressure type
П	(Rated supply pressure : 0.5MPa)	L	(Rated supply pressure : 0.5MPa)		(Rated supply pressure : 0.35MPa)
K	When different vacuum characteristics are mixed (Fill in the details on Specification order form)				

Exhaust (EX) port

(2) Nozzle bore

Code	Nozzle	H type	L type	E type	Air consumption	
Code	bore	Vacuum level, Suction flow	Vacuum level, Suction flow	Vacuum level, Suction flow	All consumption	
05	0.5mm	-90.4kPa	-66.5kPa	-90.4kPa	11.5t/min(ANR)	
05	0.511111	7ℓ/min(ANR)	12t/min(ANR)	3ℓ/min(ANR)	(8t/min(ANR))	
07	0.7	-93.1kPa	-66.5kPa	-90.4kPa	23t/min(ANR)	
07	0.7mm	13t/min(ANR)	24[22]//min(ANR)	10.5t/min(ANR)	(17t/min(ANR))	
10	1 0 000 000	-93.1kPa	-66.5kPa	-90.4kPa	46t/min(ANR)	
10	1.0mm 24[20]//min(ANR) 26//min(ANR) 20[19]//min(ANR) (34//min(ANR))					
00	When different vacuum characteristics are mixed (Fill in the details on Specification order form)					

^{* 1.} Supply pressure is 0.5MPa for H and L type and 0.35MPa for E type.

% 3. Air consumption values in () are for E type.

3 Valve unit type

Code	Valve unit type	Code	Valve unit type			
D	Double solenoid type (Vacuum retention type)	No code	Normally closed			
K	When different valves are mixed on a manifold (Fill in the details on Specification order form)					

4 Vacuum (V) port (Applicable tube O.D.)

Code	3	4	6	0
Tube dia.(mm)	ø3 (Push-In Fitting)	ø4 (Push-In Fitting)	ø6 (Push-In Fitting)	When different ports are mixed on a manifold
rube dia.(mm)	Ø3 (Fusii-iii Filling)	Ø4 (Fusii-iii Filling)	Ø6 (Fusii-iii Filling)	(Fill in the details on Specification order form)

5 Air supply (PS) port (Applicable tube O.D.)

Code	4	6	8	1
Tube dia.(mm)	ø4 (Push-In Fitting)	ø6 (Push-In Fitting)	ø8 (Push-In Fitting)	ø10 (Push-In Fitting)

6 Exhaust (EX) port (Applicable tube O.D.)

Code	S	6	8	1
Exhaust	Silencer vent	Tube exhaust	Tube exhaust	Tube exhaust
method	Silencer vent	(ø6mm Push-In Fitting)	(ø8mm Push-In Fitting)	(ø10mm Push-In Fitting)

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VX

^{※ 2.} The values in [] are for suction flow of tube exhaust type.

^{* 4.} The values in the table are reference values only. Suction flow varies according to the vacuum system conditions; vacuum port dia. or tube length. are reference values only. Suction flow changes according to the vacuum system conditions; vacuum port dia. or tube length.

Solenoid valve type

Code	D24	A100
Voltage	DC24V	AC100V

® Vacuum switch

Code	Switch	Code	Switch	Code	Switch
DW	Pressure sensor with LED display (two switch outputs)	DA	Pressure sensor with LED display (analog and switch output)	A0	Analog output pressure sensor (no LED)
No code	Without vacuum switch				_

9 No. of stations

Code	02	03	04	05	06	07	80	09	10
No. of manifold	2	3	4	5	6	7	8	9	10

10 Material option

Code	No code	-S3
Material	Standard	Copper alloy free
Exhaust method	Silencer vent & Tube exhaust	Tube exhaust

- **. -S3 specification is only for where air flow through but not corresponding to electrical parts, wires or vacuum port size with ø3mm.
- $\ensuremath{\,\%\,}$ 1. When simultaneous operation of all mounting units is required, contact us in advance.
- ※ 2. When 10 or more stations on a unit are required, contact PISCO in advance.

■ Model Designation of Manifold-base only (Example)

Manifold-base for High-cycle type vacuum generator

Air supply (PS) port (Applicable tube 0.D.)

With the company of the compa

(Exhaust (EX) port (Applicable tube O.D.)

1) Air supply port

Code	4	6	8	1
Tube dia.(mm)	ø4 (Push-In Fitting)	ø6 (Push-In Fitting)	ø8 (Push-In Fitting)	ø10 (Push-In Fitting)

② Exhaust port

Code	S	6	8	1
Exhaust	Silencer vent	Tube exhaust	Tube exhaust	Tube exhaust
method	Silericer verit	(ø6mm Push-In Fitting)	(ø8mm Push-In Fitting)	(ø10mm Push-In Fitting)

③ No. of stations

Code	02	03	04	05	06	07	08	09	10
No. of manifold	2	3	4	5	6	7	8	9	10

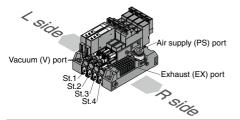
4 Material option

Code	No code	-S3		
Material	Standard	Copper alloy free & HNBR seal		
Exhaust method	Silencer vent & Tube exhaust	Tube exhaust		

■ Specification Order Form Example of Manifold type |

	cuum ator type	Vacuum characteristics	Nozzle bore	Valve unit type		(V) port	(PS)port	(EX) port)		valve type		Vacuum switch		No. of stations	Material option
\overline{v}	(X	K	00	K	-	0	8	S	-	D24	-	K	-	04	
L	St. 1	Е	07	Q	-	6			-		-	DW	-		
\Rightarrow	St. 2	Е	07	Q	-	6			-	/	-	DW	-		
	St. 3	Н	05		-	4			-		-		-		
St.	St. 4	Н	05		-	4			-		-		-		
no.	St. 5				-				-	/	-		-		
	St. 6				-				-		-		-		
	St. 7				-				-	/	-		-		
	St. 8				-				-		-		-		
—	St. 9				-				-		-		-		
R	St. 10				ı				ı		ı		ı		

■ Manifold Type Example



* Station no. is arranged St.1, St.2 ··· St.10 from L side.

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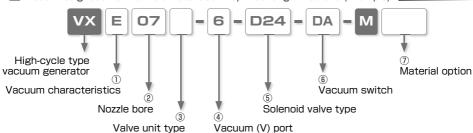
VB VM · W

VRL

VJ







1) Vacuum characteristics

Code	Performance	Code	Performance	Code	Performance
ш	High-vacuum type	_	Large-flow type	_	High-vacuum at low air supply pressure type
П	(Rated supply pressure : 0.5MPa)	١	(Rated supply pressure : 0.5MPa)	J	(Rated supply pressure : 0.35MPa)

② Nozzle bore

Code	Nozzle	H type	H type L type E type		Air consumption	
Code	bore	Vacuum level, Suction flow	flow Vacuum level, Suction flow Vacuum level, Suction flow		All consumption	
05	0.5mm	-90.4kPa	-66.5kPa	-90.4kPa	11.5t/min(ANR)	
05	0.511111	7[7]#/min(ANR)	12[12]//min(ANR)	3[3]//min(ANR)	(8t/min(ANR))	
07	0.7mm	-93.1kPa	-66.5kPa	-90.4kPa	23l/min(ANR)	
07	0.7111111	13[13]//min(ANR)	24[22]//min(ANR)	10.5[10.5] //min(ANR)	(17ℓ/min(ANR))	
10	1.00000	-93.1kPa	-66.5kPa	-90.4kPa	46ℓ/min(ANR)	
10	1.0mm	27[20]//min(ANR)	26ℓ/min(ANR)	20[19]t/min(ANR)	(34ℓ/min(ANR))	

- * 1. Supply pressure is 0.5MPa for H and L type and 0.35MPa for E type.
- * 2. The values in [] are for suction flow of tube exhaust type.
- * 3. Air consumption values in () are for E type.

3 Valve unit type

Code	Valve unit type	Code	Valve unit type
D	Double solenoid type (Vacuum retention type)	No code	Normally closed

4 Vacuum (V) port

Code	3	4	6
Tube dia.(mm)	ø3 (Push-In Fitting)	ø4 (Push-In Fitting)	ø6 (Push-In Fitting)

Solenoid valve type

Code	D24	A100
Voltage	DC24V	AC100V

6 Vacuum switch

Code	Switch	Code	Switch	Code	Switch
DW	Pressure sensor with LED display (two switch outputs)	DA	Pressure sensor with LED display (analog and switch output)	A0	Analog output pressure sensor (no LED)
No code	Without vacuum switchvacuum switch				

Material option

Code	No code	-S3
Material	Standard	Copper alloy free & HNBR seal

^{* .-} S3 specification is only for where air flow through but not corresponding to electrical parts, wires or vacuum port size with ø3mm.

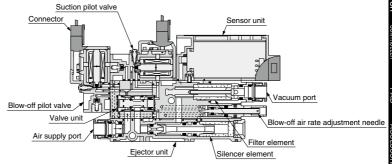
Vacuum Generator VX Series Specification Order Form

To: NIHON PISCO CO., Ltd.		
Name :		
Order No. :		
Date :		
Regulasted EX-W PISCO Date:	Quantity:	

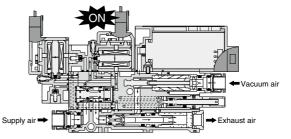
	uum tor type	Vacuum characteristics	Nozzle bore	Valve unit type		Vacuum (V) port	Air supply (PS)port	Exhaust (EX) port)		Solenoid valve type		Vacuum switch		No. of stations	Material option
V	X	K	00	K	-	0	8	5	-	D24	-	K	-	04	
L	St. 1	Е	07	D	-	6			-		-	DW	-		
1	St. 2	Е	07	D	-	6			-		-	DW	-		
	St. 3	Н	05		-	4			-		-		-		
	St. 4	Н	05		-	4			-		-		-		
St.	St. 5				-				-		-		-		
no.	St. 6				-				ı		-		-		
	St. 7				-				-		-		-		
	St. 8				-				-		-		-		
1	St. 9				-				-		-		-		
R	St. 10				-				-		-		-		

- * 1. Refer to the example on page 195 to fill in the form.
- * 2. Copy this page and use.
- $\ensuremath{\%}$ 3. Use this specification order form for different specifications of mounting units.
- * 4. -S3 specification is not selectable for silencer exhaust type and a type with vacuum port size with ø3mm.

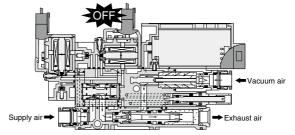
① When suction pilot valve is OFF (At vacuum generation suspended)



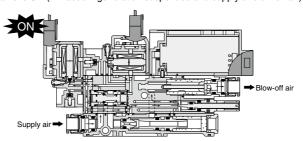
② When suction pilot valve is ON (At vacuum generating)



3 When suction pilot valve is OFF (At vacuum retention)



4 When blow-off pilot valve is ON (At vacuum generation suspended and supply of blow-off air)



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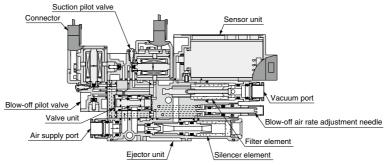
VX

V W

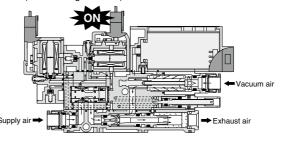
VN

■ How normally closed type works

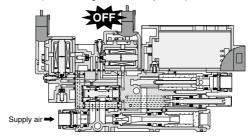
① When suction pilot valve is OFF (At vacuum generation suspended)



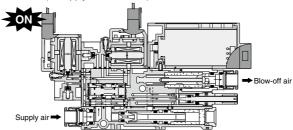
2 When suction pilot valve is ON (At vacuum generation)



③ When suction pilot valve is OFF (At vacuum generation suspended)



4 When blow-off pilot valve is ON (At supply of blow-off air)



199

VU

VUN

VB

/M·VC

1/0

. . . .

VX

Specification (Supply pressure)

Fluid medium	Air
Operating pressure range	0.3 ~ 0.7 MPa
Operating temp. range	5 ~ 50°C
Protective structure	IEC standard IP40 equiv.

■ Ejector characteristics |

M = -1-	Madalaada		Rated supply pressure	Final vacuum	Suction flow	Air consumption	
Model code		(mm)	(MPa)	(-kPa)	(∉min(ANR))	(∉min(ANR))	
VXH05	Silencer vent & Tube exhaust		0.5	90.4	7	11.5	
VXL05···	Silencer vent & Tube exhaust	0.5	0.5	66.5	12	11.5	
VXE05	Silencer vent & Tube exhaust		0.35	90.4	3	8	
VXH07	Silencer vent & Tube exhaust			93.1	13		
VXL07···S	Silencer vent	0.7	0.5	66.5	24 (※)	23	
VXL07···J	Tube exhaust			00.5	22 (※)		
VXE07	Silencer vent & Tube exhaust		0.35	90.4	10.5	17	
VXH10···S	Silencer vent			93.1	24 (※)		
VXH10···J	Tube exhaust		0.5	93.1	20 (※)	46	
VXL10···S	Silencer vent	1.0		66.5	26 (※)		
VXE10···S	Silencer vent		0.35	90.4	20 (※)	- 34	
VXE10···J	Tube exhaust		0.35	90.4	19 (※)	34	

^{*} The specifications are different from those of other conventional PISCO vacuum generator series.

Solenoid valve specification (Suction pilot valve / Blow-off solenoid valve)

■ Pilot valves

Item	Suction sol	enoid valve	Blow-off solenoid valve				
Operation system	Pilot valve						
Valve construction		Elastic seal,	Poppet valve				
Rated voltage	DC24V	AC100V	DC24V	AC100V			
Allowable voltage range	DC24V ±10%	AC100V ±10%	DC24V ±10%	AC100V ±10%			
Surge protection circuit	Surge absorber	Diode bridge	Surge absorber	Diode bridge			
Power consumption	1.2W (With LED)	1.5VA (With LED)	1.2W (With LED)	1.5VA (With LED)			
Manual operation	Push button (Non-lock)						
Operation indicator	Coil excitation: Red LED ON						
Wire connection method	Connector type (Cable length : 500mm)						
Wire connection method	Red: DC24V Black: COM	Blue	Red: DC24V Black: COM	Blue			

Changeover valve

Changeover valve	Changeover valve						
Item	Suction solenoid valve						
Operation system	Pneumatic operation by pilot valve						
Valve construction	Elastic seal, Poppet valve						
Proof pressure	1.05MPa						
Valve type	Normally closed / Double solenoid						
Lubrication	Not required						
Effective sectional area	Air supply port (PS) size ø4mm : 3.5mm²、Air supply port (PS) size ø6mm : 4.5mm²						
Decrease time (*)	Normally closed / Vacuum generation(OFF → ON): 7m·sec, Vacuum operation stop (ON → OFF): 16m·sec						
Response time (*)	Double solenoid / Vacuum generation(OFF → ON): 7m·sec, Vacuum operation stop (ON → OFF): 9m·sec						

^{**} Response time is the time length until pressure change at vacuum port is detected under rated supply pressure and rated voltage. Vacuum arrival time and blow-off time at the piping end (work-piece) vary according to ejector characteristics, volume (tube length), blow-off air rate and others.

^{**} The values in the table are reference values only. Suction flow changes according to the vacuum system conditions; vacuum port dia. or tube length. are reference values only. Suction flow changes according to the vacuum system conditions; vacuum port dia. or tube length.

■ Vacuum switch

Vacuum Switch					
Specification	Vacuum switch	with LED displ	ay	Vacuum switch without LED display	
Specification	2 switch output (-DW)	Analog output & 1	switch output (-DA)	Analog output only (-A0)	
Factory default pressure	-50kPa(SW1)、-10kPa(SW2)	-501	kPa		
Current consumption	40mA	or less		15mA or less	
Pressure detection	Diffuse	ed semiconduc	ction pressure	switch	
Operating pressure range		-100 ~	0kPa		
Pressure setting range	-99 ~	0kPa			
Proof pressure		0.21	ИРа		
Operating temp. range		0 ~ 50°C (N	lo freezing)		
Operating humidity range	35 ~	85%RH (No c	dew condensa	ation)	
Power requirements	12 ~ 24	12 ~ 24VDC ± 10% Ripple (P-P) 10			
Protective structure	IEC standard IP40 equiv				
No. of pressure setting	2 1				
Operating accuracy	±3%F.S. max. (at Ta=25°C)				
Differential response	Fixed (2%F.S. max.)	Variable (About 0-1	5% of setting value)		
Switch output	NPN open collector output: 30V 80r	nA max. Residual v	voltage 0.8V max.		
		Output voltage		1 ~ 5V	
		Zero-point voltage		1±0.1V	
Analog output		Span voltage		4±0.1V	
		Output current	1mA max. (L	oad resistance: $5k\Omega$ max.)	
		LIN/HYS	±	±0.5%F.S. max.	
Display	0 ~ -99kPa (2-digi	t red LED disp	olay)		
Display frequency	About 4 ti	mes / sec			
Indication accuracy	±3%F.S	. ±2 digit			
Sensor resolution	1 digit				
Operation indicator	SW1: Red LED turns ON when pressure is above setting. Red LED turns ON when				
Operation indicator	SW2: Green LED turns ON when pressure is above setting.	pressure is at			
	1. MODE switch (ME / S1 / S2)	1. MODE swit	ch (ME / SW)		
Function	2. S1 setting trimmer (2/3-rotation trimmer)	2. SW setting trimmer	(2/3-rotation trimmer)		
	3. S2 setting trimmer (2/3-rotation trimmer)	3. HYS setting trimmer (Ab	out 0-15% of setting value)		

■ Blow-off air rate

Vacuum characteristics	Stand-alone type & DIN rail type	Manifold type		
VXH05	0 ~ 9.5t/min[ANR]	0 ~ 8.0t/min[ANR]		
VXH07	0 ~ 8.5t/min[ANR]	0 ~ 6.0t/min[ANR]		
VXH10	0 ~ 6.5t/min[ANR]	0 ~ 5.0t/min[ANR]		
VXL05	0 ~ 9.0t/min[ANR]	0 ~ 7.0t/min[ANR]		
VXL07	0 ~ 7.0t/min[ANR]	0 ~ 5.5t/min[ANR]		
VXL10	0 ~ 6.5t/min[ANR]	0 ~ 4.5t/min[ANR]		
VXE05	0 ~ 9.5t/min[ANR]	0 ~ 8.0t/min[ANR]		
VXE07	0 ~ 9.0t/min[ANR]	0 ~ 7.0t/min[ANR]		
VXE10	0 ~ 7.5t/min[ANR]	0 ~ 5.5t/min[ANR]		
VX□□D(Double solenoid)	0.2 ~ 2t/min[ANR]			

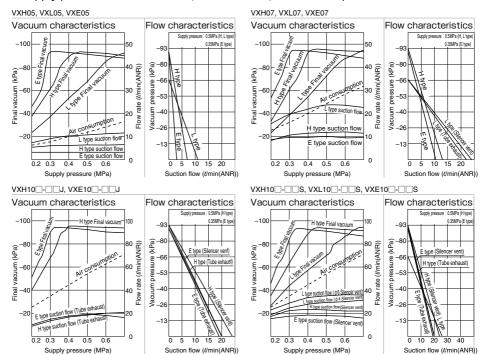
 $[\]frak{\%}$.The above value is 0.5Mpa of supply pressure.

Filter Specification

Element material	PVF (Polyvinyl formal)
Filtering capacity	10µm
Filter area	502mm²
Replacement element model code	VXV010B30

Characteristics

Supply pressure - Final vacuum, Suction Flow, Air Consumption



Stand-Alone Type Weight List |

Model code	Unit combinations	Weight(g)
VX □□□-□□S-□-D□	Silencer vent & Vacuum pressure sensor with LED display	81
VX	Tube exhaust & Vacuum pressure sensor with LED display	84
VX	Silencer vent & analog output pressure sensor	78
VX 🗆 🗆 - 🗆 🗆 J- 🗆 - A0	Tube exhaust & analog output pressure sensor	81
VX 🗆 🗆 - 🗆 S- 🗆	Silencer vent without vacuum pressure sensor	71
VX 🗆 🗆 - 🗆 🗆 J - 🗆	Tube exhaust without vacuum pressure sensor	74

^{¾1. Add 5g for DIN rail type to the above weights.}

Manifold Type Weight List

Model code	Mounting unit combinations	Weight(g)
VX	Silencer vent & Vacuum pressure sensor with LED display & 2 manifolds	310
VXDM02	Tube exhaust & Vacuum pressure sensor with LED display & 2 manifolds	330

^{* 1.} Add 90g / station

^{*2.} The above table represents the weight of pressure sensor with LED display type. Pressure sensor with analog output type (no indicator) is 3g/station lighter than the above weights and no vacuum pressure sensor type is 10g/station lighter than the above weights.

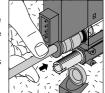
How to insert and disconnect

How to insert and disconnect tubes

Tube insertion

Insert a tube into Push-In Fitting of the vacuum generator VX up to the tube end. Lock-claws bite the tube to fix it and the elastic sleeve seals around the

Refer to "2. Instructions for Tube Insertion" under "Common Safety Instructions for Fittings".



2 Tube disconnection

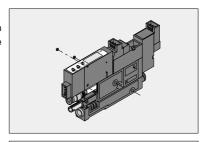
The tube is disconnected by pushing release-ring to release Lock-claws. Make sure to stop air supply before the tube disconnection.



2. How to fix the product

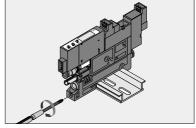
(1) Direct-installation type

Tighten M3 threads through the fixing holes on the resin body with tightening torque 0.3 to 0.35Nm. Refer to the outer dimensional drawings for the hole pitch.



2 DIN rail type

Mount the product on a DIN rail and tighten DIN rail fixing screw with tightening torque 0.1-0.15Nm using a proper Phillips screwdriver. When shaking or physical impact on DIN rail is expected, attach commercialized metal stoppers on both sides to fix Din rail.



Applicable Tube and Related Products

Polyurethane Tube (Piping products catalog P.596) Vacuum Pads

■ Polyurethane Tube is for the general pneumatic piping and suitable for a compact piping.

Nylon Tube (Piping products catalog P.608)

■ Nylon Tube is for the general pneumatic piping and suitable for a high-pressure fluid up to 1.5MPa (NB tube: 1.0MPa).

Vacuum Tube (Piping products catalog P.612)

■ Vacuum Tube is a ultra-soft tube and suitable for piping of vacuum generators or actuators.

- Vacuum Pad Standard Series · · P.428
- Vacuum Pad Sponge Series · · · P.468
- Vacuum Pad Bellows Series · · · P.488
- Vacuum Pad Multi-Bellows Series P.508
- Vacuum Pad Oval Series · · · · · P.526
- Vacuum Pad Soft Series · · · · P.550
- Vacuum Pad Soft Bellows Series · P.578
- Vacuum Pad Skidproof Series · · P.604
- Vacuum Pad Ultrathin Series · · · P.624
- Vacuum Pad Mark-free Series · · P.642
- Vacuum Pad Long Stroke Series · P.658



■ Standard Size List |

Silencer vent, Direct-installation type or DIN rail type without Vacuum pressure sensor

Normally closed type

Air supply port (P)s

Air supply port (P)s

Filter

Filter

Vacuum port (V)

Double solenoid

Air supply port (P)s

Blow-off pilot valve

Tild Suction pilot valve

Ejector

Silencer

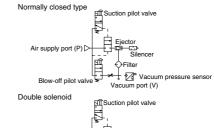
Filter

Vacuum port (V)

Blow-off pilot valve

Type	Page to	Vacuum	Air sup	ply port	Exhaust
Type	refer	port	4mm	6mm	port
VX		3mm	•	•	With
	206	4mm	•	•	silencer
		6mm	•	•	Silericer

Silencer vent, Direct-installation type or DIN rail type with 2 switch output with LED display

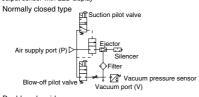


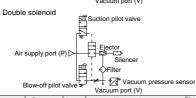
Air supply port (P)

"Vacuum pressure sensor Blow-off pilot valve Vacuum port (V) Page to Vacuum Air supply port Exhaust Type refer port 4mm 6mm port VX 3mm With 207 4mm silencer 6mm

Silencer Filter

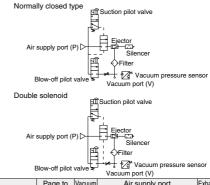
Silencer vent, Direct-installation type or DIN rail type with switch output and analog output sensor with LED display





Type	Page to	Vacuum	Air sup	ply port	Exhaust
Type	refer	port	4mm	6mm	port
VX		3mm	•	•	With
	208	4mm	•	•	silencer
		6mm	•	•	Silericer

Silencer vent, Direct-installation type or DIN rail type with analog output sensor



			Vacaaiii poit (• /	
Type	Page to	Vacuum	Air sup	ply port	Exhaust
Type	refer	port	4mm	6mm	port
VX		3mm	•	•	With
	209	4mm	•	•	silencer
		6mm	•	•	Silericer

/X

VZ

VN

Tube exhaust, Direct-installation type or DIN rail type without vacuum pressure sensor

Normally closed

Suction pilot valve

Copper all

Selector

Exhaust port (EX port)

Blow-off pilot valve

Vacuum port (V)

Double solenoid

Suction pilot valve

Ejector

Exhaust port (EX port)

Blow-off pilot valve

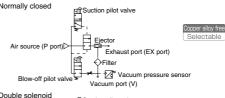
Vacuum port (V)

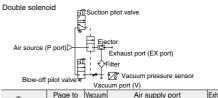
Type	Page to	Vacuum	Air sup	ply port	Exhaust
туре	refer	port	4mm	6mm	port
VX		3mm	•	•	
	210	4mm	•	•	6mm
		6mm	•		

Tube exhaust, Direct-installation type or DIN rail type with 2 switch output with LED display

Normally closed

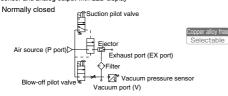
\$\sin^2\text{Suction pilot valve}\$

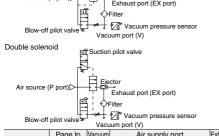




Type	Page to	Vacuum	Air sup	Exhaust	
туре	refer	port	4mm	6mm	port
VX		3mm	•	•	
	211	4mm	•	•	6mm
		6mm	•	•	

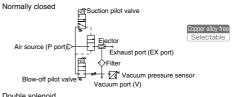
Tube exhaust, Direct-installation type or DIN rail type with switch output sensor and analog output with LED display





		• 400	iaiii poit (+)					
Type		Vacuum	Air sup	Air supply port				
туре	refer	port	4mm	6mm	port			
VX		3mm	•	•				
	212	4mm	•	•	6mm			
		6mm	•	•				

Tube exhaust, Direct-installation type or DIN rail type with analog output sensor



Blow-off pilot valve ♥ Vacuum port (V)
Double solenoid
<u></u>
Air source (P port) Ejector Exhaust port (EX port)
Filter
Vacuum prassura sansor
Blow-off pilot valve Vacuum port (V)

Type	Page to	Vacuum	Air sup	ply port	Exhaust
Type	refer	port	4mm	6mm	port
VX		3mm	•	•	
	213	4mm	•	•	6mm
		6mm	•	•	1

205

VL

V 1

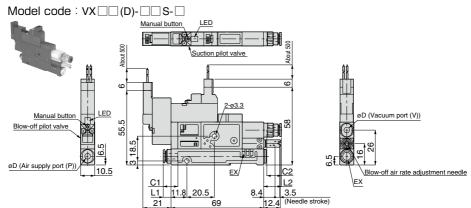
VRL

VK

VX



Silencer vent, Direct-installation type

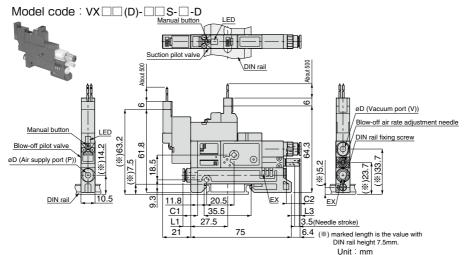




Silencer vent, DIN rail type

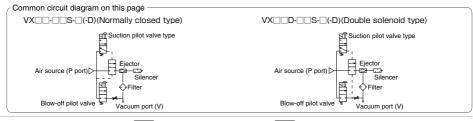






Common dimension list on this page

Applicable tube O.D.(øD)	C1	C2	L1	L2	L3	CAD file name	
3	-	10.4	-	13.2	7.2	-	
4	10.9	10.9	5.8	13.2	7.2	VVX-001	
6	11.7	11.7	8.7	13.5	7.5	V V X-00 I	

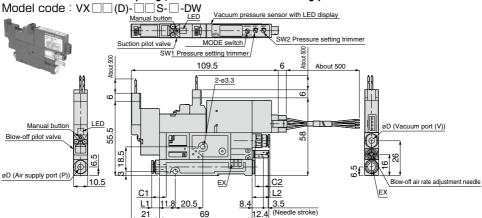




Vacuum Generator VX

Silencer vent, pressure sensor of 2 switch output CAD with LED display, Direct-installation type

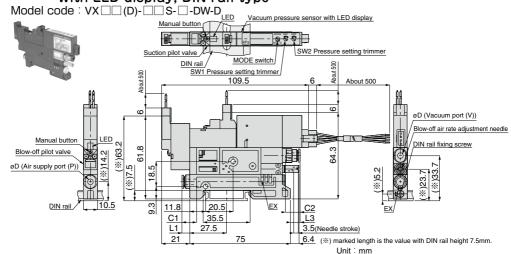




Silencer vent, pressure sensor of 2 switch output with LED display, DIN rail type



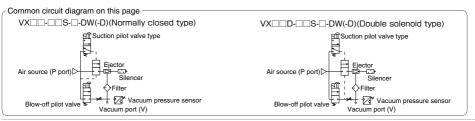




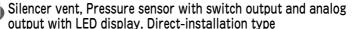
Common dimension list on this page

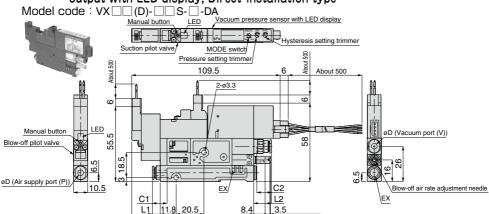
207

Applicable tube O.D.(øD)	C1	C2		L2		CAD file name	
3	-	10.4	-	13.2	7.2	-	
4	10.9	10.9	5.8	13.2	7.2	VVX-002	
6	11.7	11.7	8.7	13.5	7.5	VVX-002	







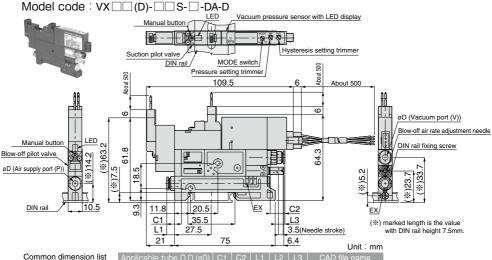


12.4 (Needle stroke)

Silencer vent, Pressure sensor with switch output and analog output with LED display, DIN rail type

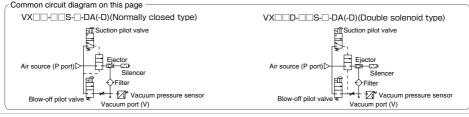








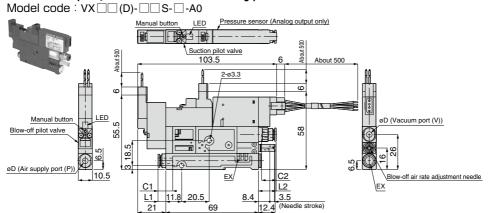
3 - 10.4 - 13.2 7.2 - 4 10.9 10.9 5.8 13.2 7.2 VVX-003	Applicable tube O.D.(øD)	C1	C2		L2	L3	CAD file name	
///X_()[1]	3	-	10.4	-	13.2	7.2	-	
	4	10.9	10.9	5.8	13.2	7.2	///V 003	
6 11.7 11.7 8.7 13.5 7.5	6	11.7	11.7	8.7	13.5	7.5	V V X-003	



Vacuum Generator VX

Silencer vent, Pressure sensor with analog output, Direct-installation type

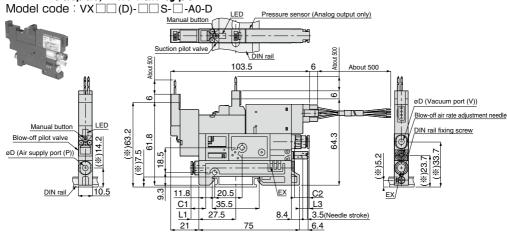




Silencer vent, Pressure sensor with analog output, DIN rail type

Chart C



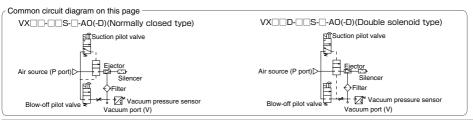


(*) marked length is the value with DIN rail height 7.5mm.

Common dimension list on this page

209

Applicable tube O.D.(øD)	C1	C2	L1	L2	L3	CAD file name	
3	-	10.4	-	13.2	7.2	-	
4	10.9	10.9	5.8	13.2	7.2	VVX-004	
6	11.7	11.7	8.7	13.5	7.5	V V X-004	



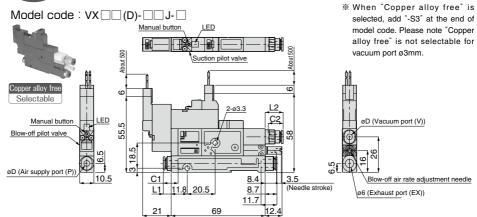
Unit mm



Tube exhaust, Direct-installation type









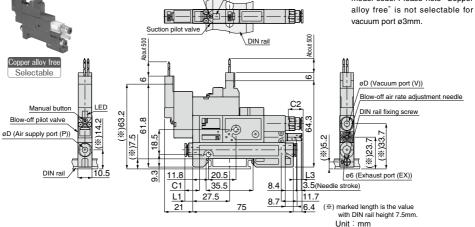
Tube exhaust, DIN rail type

Manual button

Model code : VX □ □ (D)- □ □ J- □ -D



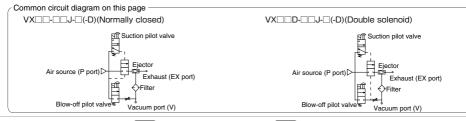
* When "Copper alloy free" is selected, add "-S3" at the end of model code. Please note "Copper



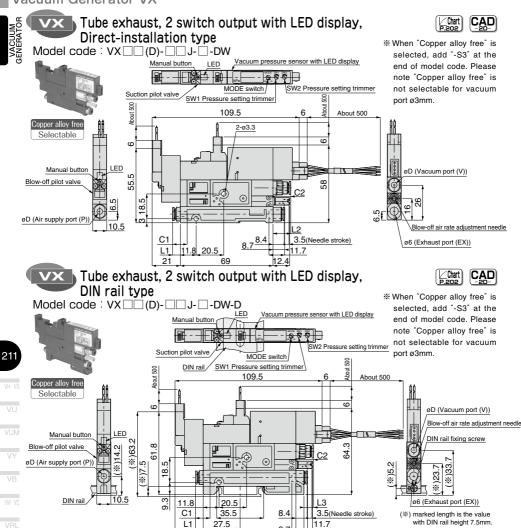
LED

Common dimension list on this page

Applicable tube O.D.(øD)	C1	C2	L1	L2	L3	CAD file name	
3	-	10.4	-	13.2	7.2	-	
4	10.9	10.9	5.8	13.2	7.2	\/\/Y_005	
6	11.7	11.7	8.7	13.5	7.5	VVX-005	







Common dimension list on this page

Applicable tube O.D.(øD)	C1	C2		L2		CAD file name
3	-	10.4	-	13.2	7.2	=
4	10.9	10.9	5.8	13.2	7.2	VVX-006
6	11.7	11.7	8.7	13.5	7.5	V V A-000

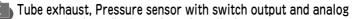
75

Common circuit diagram on this page VX __-_-DW(-D)(Normally closed type) VX D-D-J-DW(-D)(Double solenoid) Suction pilot valve Suction pilot valve Air source (P port) Air source (P port) Exhaust (EX port) Exhaust (EX port) →Filter Filter Vacuum pressure sensor Vacuum pressure sensor Blow-off pilot valve Blow-off pilot valve ₹ Vacuum port (V) Vacuum port (V)

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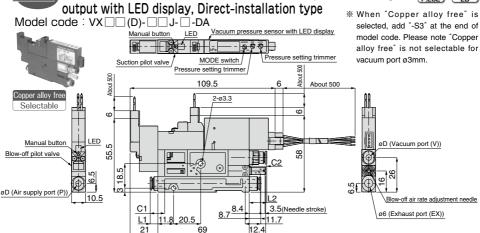
Unit: mm





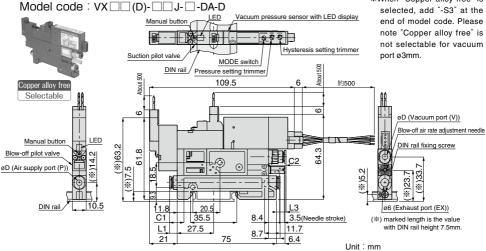






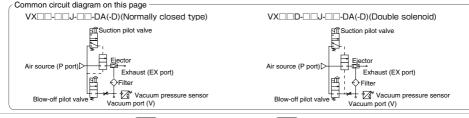
Tube exhaust, Pressure sensor with switch output and analog output with LED display, DIN rail type *When "Copper alloy free" is





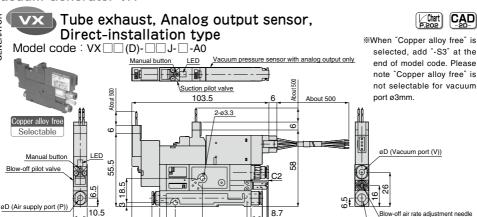
Common dimension list on this page

Applicable tube O.D.(øD)	C1	C2		L2	L3	CAD file name
3	-	10.4	-	13.2	7.2	=
4	10.9	10.9	5.8	13.2	7.2	VVX-007
6	11.7	11.7	8.7	13.5	7.5	v v ∧-007





Vacuum Generator VX



Tube exhaust, Analog output sensor, DIN rail type

11.8 20.5

69

C1

21

*When "Copper alloy free" is

selected, add "-S3" at the

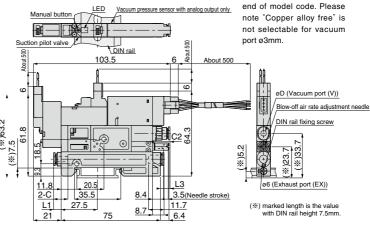
ø6 (Exhaust port (EX))

Model code : VX □ □ (D)- □ □ J- □ -A0-D

 $\widehat{\mathbb{X}}$

Copper alloy free Selectable LED Manual button Blow-off pilot valve øD (Air supply port (P))

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11.7

L2 3.5(Needle stroke)

Common dimension list on this page

DIN rail

Applicable tube O.D.(øD)	C1	C2		L2		CAD file name
3	-	10.4	-	13.2	7.2	-
4	10.9	10.9	5.8	13.2	7.2	VVX-008
6	11.7	11.7	8.7	13.5	7.5	V V ∧-UUO

Common circuit diagram on this page VX __-_- J-_-AO(-D)(Normally closed type) VX D-D-J-AO(-D)(Double solenoid) Suction pilot valve Suction pilot valve Eiector Ejector Air source (P port) Air source (P port) Exhaust (EX port) Exhaust (EX port) ÒFilter Filter Vacuum pressure sensor Blow-off pilot valve Blow-off pilot valve Vacuum nort (V) Vacuum port (V)

Unit: mm

3

4

CAD

Unit: mm 10.4 0.2

10.9 0.2

øD1(Vacuum port)

Fixing screw

Lock lever

X-M Tube exhaust, Manifold type

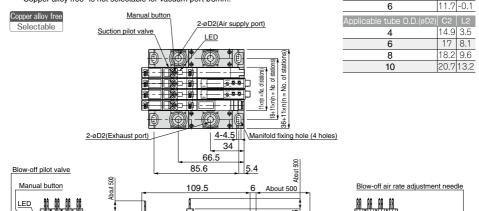
Model code	CAD file name			
VX	VVX-021, 022, 023, 024			

26.5 2-C2

7

96.4

**.When "Copper alloy free" is selected, add "-S3" at the end of model code. Please note "Copper alloy free" is not selectable for vacuum port ø3mm.



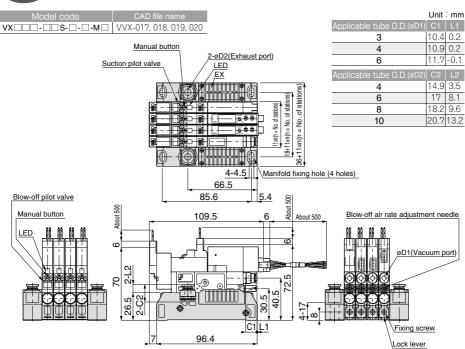
2-C2 (26.5) 30.5

C1_L1

40.

VX-M Silencer vent, Manifold type





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VX

Before using PISCO products, be sure to read "Safety Instructions" and "Safety Instruction Manual" on page 35-39 and "Common Safety Instructions for Vacuum Series" on page 47-49.

Warning

- 1. The compressed air is dangerous if mishandled. It is recommended that a person having enough knowledge and experience carry out the assembling or maintenance of a machine or a device using pneumatic equipments.
- 2. At maintenance check of the product, shut electrical power supply and the air supply, and make sure to vent the residual pressure in the air circuit in advance. When installing or removing of a unit to/from a manifold, make sure to shut off air supply and to exhaust the residual pressure in the air circuit first.
- 3. The product is not explosive-proof. Do not use it in the environments containing flammable or explosive gases or liquid. Please avoid using in conditions that pressure of 0.1MPa or higher is continuously supplied to vacuum circuit.
- 4. The coil in a pilot solenoid valve generates heat under the following ① to ③ conditions. The heat may cause dropping life cycle, malfunctions, getting burnt or damaging peripheral machines.
- Contact us when the power is applied to the vacuum generator under the following conditions:
- 1) The power is continuously ON for over 2 hours.
- (2) High-cycle operation.
- 3 Even when intermittent running of the generator is carried out, the total operation time per day is longer than non-operation time.
- 5. When the electricity is applied to valves continuously for a long time, the coils generate heat. It may cause dropping life cycle, malfunctions, getting burnt or damaging peripheral machines.

Caution

- 1. The product shall be used within the operating pressure range. Otherwise, there are risks of damage or deformation.
- 2. Regarding double-solenoid types (VX \subseteq D-\cdots), the switchover valve (main valve) is placed in neutral after the supply of pilot air has been suspended (the same is true when the valve is being operated for the first time after shipment). When resuming the supply of pilot air, be sure to send a signal to the pilot valve, or conduct switchover operations manually as required.
- 3. The increase of of manifold station may cause troubles such as performance drop by a shortage of air supply and insufficient capability to exhaust, and exhaust air leak to the vacuum port. Allowable station numbers of simultaneous operation differs by nozzle size, vacuum performance, and other conditions. Please contact us for details.
- 4. Although the exhaust of the model with a manifold type is silencer vent by each individual unit, the exhaust air of operating unit or blow-off air flows into the vacuum port of non-operating unit. If such exhaust air causes the problem, please contact PISCO.

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Vacuum Switch with LED display

- (1) Pressure Setting Method
 - ① Turn on the power (Make sure the correct wiring and apply DC power to the vacuum switch).
 - ②-1 Set the indicator switch at Pressure Setting Mode (ME→S1 / S2 and SW)
 - 2 -2 (Vacuum switch with analog output)

Fully turn the hysteresis setting trimmer (HYS) in the counterclockwise direction in order to minimize the hysteresis adjustment in advance.

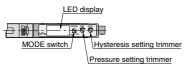
- 3 Adjust the pressure adjusting trimmer (S1 / S2 and SW) with a flathead screwdriver to set at the desired value.
- (4) Set the indicator switch at ME and apply pressure and check the actual operation.
 - (Vacuum switch with 2 switch output)
 - Switch output 1 (S1): Red LED turns ON at the pressure with more than the setting.
 - Switch output 2 (S2): Green LED turns ON at the pressure with more than the setting.
 - (Vacuum switch with analog output)
 - Switch output (SW): Red LED turns ON at the pressure with more than the setting.

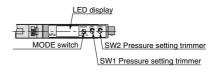
(2) Differential response setting

- ① Differential response setting can be adjusted by the hysteresis setting trimmer (HYS).
- ② Differential response setting range is regulated within about 0-15% of the set value. Differential response setting becomes large when the trimmer is turned in the clockwise direction.
- ③ Confirmation of Hysteresis

Gradually increase and decrease the supply pressure around the set pressure value and read the value by a vacuum gauge when operation indicator lamp turns ON/OFF. The difference in the displayed values is taken as differential response.

- 4 Hysteresis adjustment is useful for the following cases:
 - · Increase differential response when pressure pulsates with output repeatedly showing small on/off movements.
 - \cdot When an allowable range is to be set for the lowering of pressure.

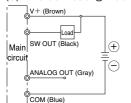


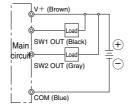


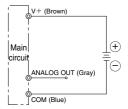
Vacuum pressure sensor with LED display (Analog output and 1 switch output)

Vacuum pressure sensor with LED display (2 switch output)

(3) Wire Connecting Method







Vacuum pressure sensor with LED display Vacuum pressure sensor with LED display (Analog output and 1 switch output) (2 switch output)

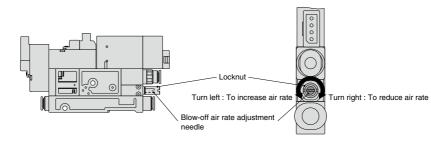
Analog output sensor

■ Safety Instructions for Vacuum Switch with LED display

- ① Do not use the vacuum switch in the environment or gasses containing corrosive substance. It may cause a sensor trouble.
- ② Wiring or ways by which noise or other disturbance is caused may cause a sensor trouble.
- ③ Since the sensors are not explosive-proof, do not use them in an inflammable or explosive gas, fluid or atmosphere.
- 4 Since the sensors are not drip / dust proof, do not use them in locations where they may be exposed to water or oil drops or dust.
- ⑤ Do not use the sensor in an atmosphere exceeding the range of application temperature or causing heat as sensor malfunction may result.
- ® Make sure to turn off the power before wiring. Check the wire colors, and do not short-circuit output terminals, power supply terminals and COM terminals when wiring. Short-circuits may cause a sensor trouble.
- ⑦ Do not give an excessive tensile strength and bending on a lead wire. Otherwise, breaking wire or damage on connector may be caused.
- ® Instant application of pressure about 0.5MPa does not affect the sensor performance, but do not keep applying 0.2MPa or more constantly during blow-off air supply. It may be a cause of damaging the sensor.
- When adjusting pressure and differential response, use a flathead screwdriver (accessory). Do not apply
 an excessive force on the trimmer and slowly turn it within its rotation limits. Otherwise, there is a risk of
 damaging the trimmer and the circuit board.
- (1) Supply a stable DC power to the product.
- ① Add a surge absorption circuit to relays or solenoid valves, etc. which are to be connected with output terminal and source terminal. Do not apply a current exceeding 80mA.
- (2) Ground the FG terminal when using a unit power source such as switching current.
- (i) Output terminals (lead wire color: black and gray) and other terminals should not be short-circuited.
- (4) Avoid strong external impacts and excessive fore to on the sensor body.

■ Blow-off air adjustment method

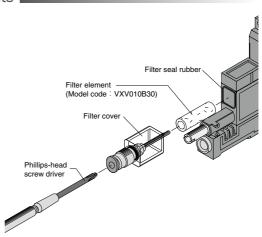
- Turn the blow-off air rate adjustment needle to the right (clockwise) to reduce blow-off air and to the left (counterclockwise) to increase. After the adjustment, tighten the locknut firmly with 0.1 to 0.2Nm of the tightening torque.
 - * . Make sure to use a proper flathead screwdriver for the needle adjustment.



Vacuum Generator VX

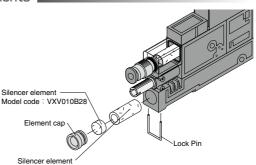
■ How to replace Filter Elements

- When replacing the filter element, remove the vacuum port piping. Then, loosen the screw inside the joint (at the end of the tube insertion hole) using a Philips type screwdriver(※) with an outside diameter of Ø2.5mm or less, and remove the vacuum port. After replacing the filter element, make sure that the filter packing has not been detached, then install the filter element and filter window on the vacuum port, and fasten the port to the main body. For fastening, apply the tightening torque of 0.1 ~ 0.15N·m.
 - **.Do not let the screw driver touch the Lock-claws. Damage or deformation of the Lock-claws may result in the degradation of the tensile strengh.



■ Replacement of Silencer Elements

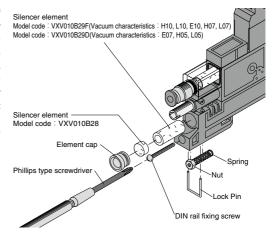
■ When replacing the silencer element of a direct mount type unit, pull out the lock pin using a flat-tip screwdriver and replace the elements. After replacing the element, insert the lock pin correctly. The lock pin is bent for fall-proof. Therefore, please insert the pin in the direction as shown in the right picture.



Model code: VXV010B29F(Vacuum characteristics: H10, L10, E10, H07, L07) Model code: VXV010B29D(Vacuum characteristics: E07, H05, L05)

■ When replacing the silencer element of a DIN rail type unit, remove the screw for fixing the DIN rail, using an appropriate Phillips type screwdriver. Then, remove the fixing pin using a flat-tip screwdriver. After replacing the elements, insert the lock pin correctly to install the screw for fixing the DIN rail. The lock pin is bent for fall-proof.

Therefore, please insert the pin in the direction as shown in the right picture.



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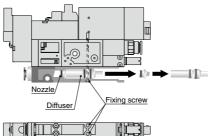
■ How to attach / detach and clean the nozzle and diffuser

■ Pull out the diffuser with a pair of long-nose pliers after removing the cover and the diffuser retainer. Use a cushion material such as a sponge to cover the nozzle port to prevent the nozzle from jumping out. Apply the air to the vacuum generator (*5)and the nozzle comes out by the air pressure. Take out the cushion material and then take out the nozzle.

Remove any foreign substance from nozzle, inside of diffuser by air blowing or wiping(*6). Combine the nozzle with the diffuser and push them back into the body with the attention not to drop the nozzle. Place the diffuser retainer on the diffuser and tighten the cover with 0.2-0.25Nm of the tightening torque.

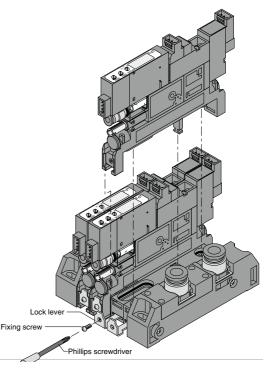
For installation of the silencer element, refer to the section "How to replace the silencer elements."

- (*5) <Warning> *During applying the air to the generator, do not point the nozzle port toward anyone. There is a risk of injury by the nozzle jumping out.
- (*6) Do not damage nozzle, diffuser bore, seal rubber and the seal part of the body. It may cause performance drop.



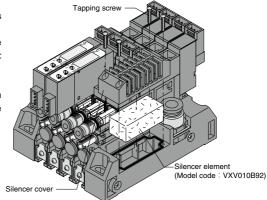
■ How to replace Mounting units of Manifold type

- How to detach a mounting unit
 - · Shut off the air supply and exhaust the residual pressure.
 - · Turn off the power supply and detach the wiring.
 - · Use a proper-sized Phillips screwdriver to remove the fixing screw.
 - · Pull out lock lever completely by using a flathead screwdriver and detach the mounting unit.
- How to install a mounting unit
 - · Make sure not to lose O-rings of air supply and exhaust ports.
 - · Fully pull out the lock lever and install a mounting unit.
 - · While pushing down the mounting units, push the lock lever back to the original position and tighten the fixing screw with 0.15-0.2Nm of the tightening torque to fix the lock lever.



■ How to replace Silencer Elements of Manifold Type

- How to detach a silencer element
 - · Remove 4 tapping screws by a Phillips screwdriver.
 - Detach the element cover and replace the silencer elements (Model code: VXV010B92).
- How to install silencer element
 - Tighten 4 tapping screws firmly with 0.3-0.4Nm of the tightening torque with a proper screwdriver.



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⚠ 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...Recomendations 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.

Products can cause personal injury or damages to properties.

↑ Warning I

- 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

- 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.
- 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.
- 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 I

- 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 Antispatter 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.
 - $\ensuremath{\bigcirc}$ 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.

0.15mm 0.15mm 0.15mm 0.15mm 0.15mm 0.15mm

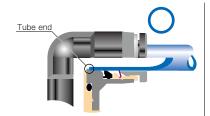
0.15mm

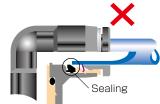


- 1. Remove dusts or drain before piping. They may get into the peripheral machine / facilities and cause malfunction.
- 2. When inserting an ultra-soft tube into push-in fitting, make sure to place an Insert Ring into the tube edge. There is a risk of causing the escape of tube and a fluid leakage without 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	Polyu
Ø1.8mm	_	\pm 0.05mm	Ø1/8	\pm 0.1mm	±
Ø3mm	_	± 0.15mm	Ø5/32	± 0.1mm	±
Ø4mm	± 0.1mm	± 0.15mm	Ø3/16	± 0.1mm	±
Ø6mm	\pm 0.1mm	± 0.15mm	Ø1/4	\pm 0.1mm	±
Ø8mm	\pm 0.1mm	± 0.15mm	Ø5/16	± 0.1mm	±
Ø10mm	\pm 0.1mm	± 0.15mm	Ø3/8	± 0.1mm	±
Ø12mm	\pm 0.1mm	± 0.15mm	Ø1/2	\pm 0.1mm	±
Ø16mm	± 0.1mm	± 0.15mm	Ø5/8	± 0.1mm	±

- 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 pushin 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.





Tube is not fully inserted up to tube end.

- 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
 - ②The 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 releasering, 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	
	M3 × 0.5	0.7N·m		SUS304 NBR	
	M5 × 0.8	1.0 ~ 1.5N·m			
	M6 × 1	2 ~ 2.7N·m		INDI	
Metric thread	M3 × 0.5	0.7N·m	_		
	M5 × 0.8	1 ~ 1.5N·m		POM	
	M6 × 0.75	0.8 ~ 1N·m		POW	
	M8 × 0.75	1 ~ 2N·m			
	R1/8	4.5 ~ 6.5N·m			
Tanar pipe thread	R1/4	R1/4 7 ~ 9N·m			
Taper pipe thread	R3/8	12.5 ~ 14.5N·m	White	_	
	R1/2	20 ~ 22N·m			
Unified thread	No.10-32UNF	1.0 ~ 1.5N·m	_	SUS304、NBR	
	1/16-27NPT	4.5 ~ 6.5N·m			
National pipe thread taper	1/8-27NPT	4.5 ~ 6.5N·m			
	1/4-18NPT	PT 7 ~ 9N·m Whi		_	
	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.

Common Safety Instructions for Vacuum Series

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

↑ Warning I

- 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
- 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.

VN

- 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.

- 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 Series

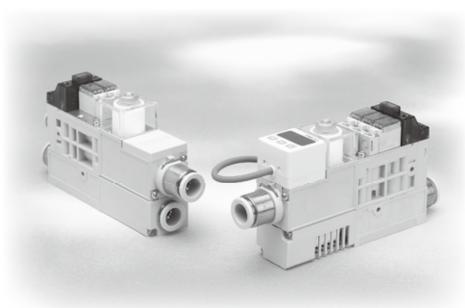
Vacuum Generator

- 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.

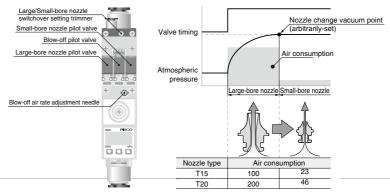




Complex vacuum generator best suitable for control large flow Vacuum Generator Vacuum Series

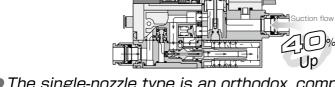
- Best suitable to control large flow with width of 31.5mm.
- 3 types of standardized nozzle; Single nozzle, Two-stage nozzle and Twin nozzle.
- The twin-nozzle type is the most durable unit for applications with longer suctioning or transportation time.

The large-bore nozzle controls vacuum generation from start up to a prescribed reference preset pressure level, after which the small-bore nozzle takes over for maintaining a vacuum level. This combination makes possible substantial reductions in air consumption. Only one signal is used for vacuum generation as with previous models.

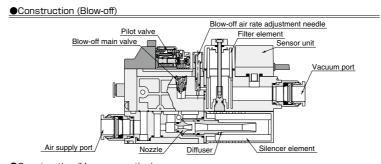


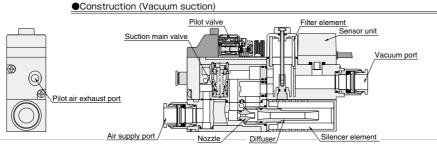
Characteristics

- Wide variety of combinations enables to meet various applications. External Vacuum Controller for a vacuum pump, VQP Series, is also available. (P.366).
- The two-stage nozzle type's vacuum suction rate has been increased by approximately 40% compared to conventional types.



- The single-nozzle type is an orthodox, complex vacuum generator designed to produce large vacuum flows.
- A wide variety of valve type is standardized.
 - Single-nozzle type: Normally open, Normally closed, Double solenoid (retention) type
 - Two-stage nozzle type: Normally open, Normally closed type
 - Twin-nozzle type : Normally closed type
- Visibility improvement by vacuum pressure sensor with 31mm size LED display.
- Construction (Single nozzle type)



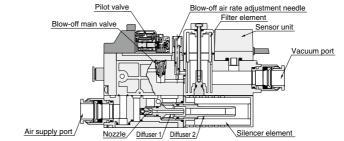


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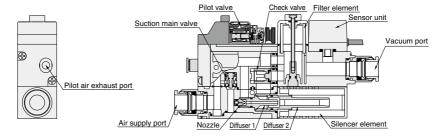


■ Construction (Two-stage nozzle type)

●Construction (Blow-off)

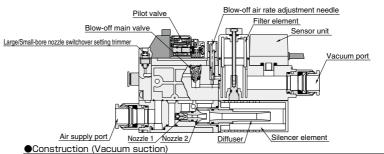


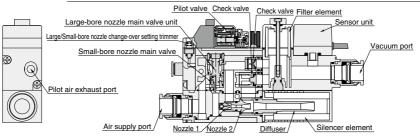
●Construction (Vacuum suction)



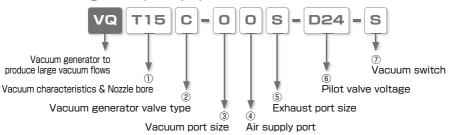
■ Construction (Twin nozzle type)

Construction (Blow-off)





■ Model Designation (Example)



1) Vacuum characteristics & Nozzle bore

Code		Nozzle diameter		Rated supply pressure	Final vacuum	Suction flow	Air consumption
		(mm)		(MPa)	(-kPa)	(l/min(ANR))	(ℓ/min(ANR))
	H15	ø1.5	1	0.5	93	63	100
	L15	ø1.5	I		66	95	
Single nozzle	E15	ø1.5	-	0.35	92	42	70
type	H20	ø2.0	-	0.5	93	110	200
	L20	ø2.0	1	0.5	66	180	
	E20	ø2.0	1	0.35	92	84	150
	T20	ø0.7	ø1.5		93 (93)	40 (24)	100 (23)
Twin nozzle		(Small-bore)	(Large-bore)	0.5			
type		ø1.0	ø2.0	0.5		70 (26)	000 (46)
		(Small-bore)	(Large-bore)			70 (36)	200 (46)
Two stores	D07	ø0.7	-			24	23
Two-stage nozzle type	D10	ø1.0	-	0.5	93	36	46
	D12	ø1.2	ī			40	70

^{*} The vacuum characteristics in () value for Twin-nozzle type is the value when small-bore nozzle is operated.

② Vacuum generator valve type

Code	Valve type	Code	Valve type	Code	Valve type
С	Normally closed type	0	Normally open type	D	Double solenoid type (Vacuum retention)

^{*1. &}quot;Normally-close (code: C)" only when a twin-nozzle type is selected in (1).

3 Vacuum port size (Applicable tube O.D.)

Code	8	0
Tube dia.(mm)	ø8 (Push-In Fitting)	ø10 (Push-In Fitting)

4 Air supply port (Applicable tube O.D.)

Code	6 (%)	8	0
Tube dia.(mm)	ø6 (Push-In Fitting)	ø8 (Push-In Fitting)	ø10 (Push-In Fitting)
14/ - 1			

(5) Exhaust port

Code	S	J
Exhaust method	Silencer vent	Tube exhaust (ø12mm Push-In Fitting)

22

VU

VY

VM - VC

VM·VC

VK

VJ

^{**} The values in the table are reference values only. Suction flow changes according to the vacuum system conditions; vacuum port dia. or tube length. are reference values only. Suction flow changes according to the vacuum system conditions; vacuum port dia. or tube length.

^{*2. &}quot;Normally-close (code: C)" or "normally-open (code: O)" only when a 2-stage nozzle type is selected in (1).

6 Pilot valve voltage

Code	D24	A100
Voltage	DC24V	AC100V

* For twin nozzle type, only 24VDC (code: D24) is selectable.

7 Vacuum switch

Code	Sensor	Code	Sensor
S	2 switch output with 31mm LED display	No code	Without vacuum switch

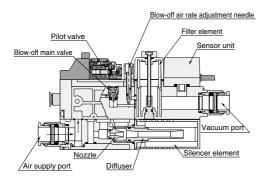
* Vacuum Generator Series

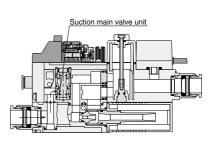
Vacuum Generator VQ

How single nozzle with normally closed type works

At vacuum generation suspended

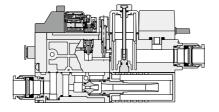
●Blow-off ●Vacuum suction

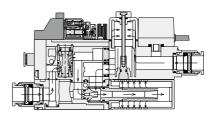




At vacuum generating

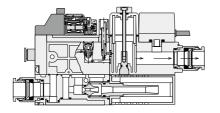
●Blow-off ●Vacuum suction

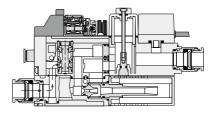




At blow-off air supply

●Blow-off ●Vacuum suction





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V

VY

VD

VR

VK

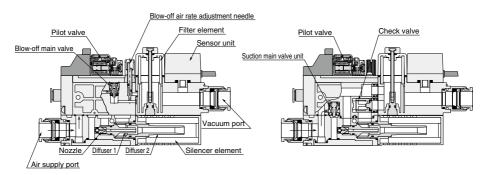
VX

■ How two-stage nozzle with normally closed type works

At vacuum generation suspended

●Blow-off

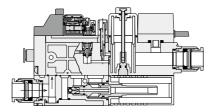
■Vacuum suction

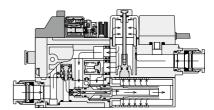


At vacuum generating

●Blow-off

Vacuum suction

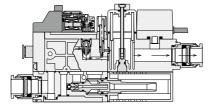


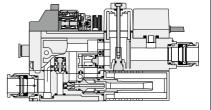


At blow-off air supply

●Blow-off

●Vacuum suction





How twin nozzle type works

At vacuum generation suspended

●Blow-off

Blow-off air rate adjustment needle

Filter element

Sensor unit

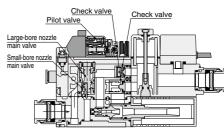
Sensor unit

Vacuum port

Nozzle 1 Nozzle 2 Diffuser

Silencer element

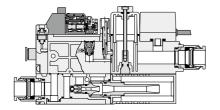
Vacuum suction

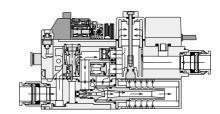


At vacuum generating (Large-bore nozzle: from set up to switchover vacuum pressure point)

Blow-off

●Vacuum suction

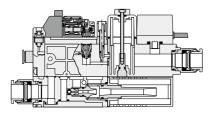


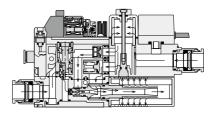


At vacuum generating (Small-bore nozzle: more than switchover vacuum pressure point)

Blow-off

Vacuum suction

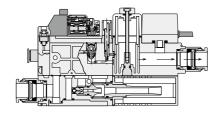


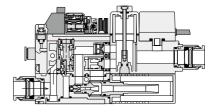


At blow-off air supply

●Blow-off

Vacuum suction





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VL

\/\

VB

\/DI

VG

VJ

■ Specification (Supply pressure)

Fluid medium	Air
Operating pressure range	0.3 ~ 0.7 MPa
Rated supply pressure	H and L type∶ 0.5 MPa、E type∶ 0.35 MPa
Operating temp, range	5 ~ 50°C

■ Ejector characteristics

Nozzle type		Nozzle bore		Rated supply pressure	Final vacuum	Suction flow	Air consumption
		(mm)		(MPa)	(-kPa)	(∉min(ANR))	(/min(ANR))
	H15			0.5	93	63	100
	L15	1.5	-	0.5	66	95	
Cinale nearle	E15			0.35	92	42	70
Single nozzle	H20			0.5	93	110	200
	L20	2.0	_	0.5	66	180	200
	E20			0.35	92	84	150
	T15	0.7	1.5	0.5	93(93)	40(24)	100(23)
Twin nozzle		(Small-bore)	(Large-bore)			40(24)	100(23)
TWITT HOZZIE	T20	1.0	2.0			70(36)	200(46)
		(Small-bore)	(Large-bore)			70(30)	200(40)
Two-stage nozzle	D07	0.7	-			24	23
	D10	1.0	-	0.5	93	36	46
	D12	1.2	_			40	70

^{*} The vacuum characteristics in () value for Twin-nozzle type is the value when small-bore nozzle is operated.

■ Solenoid valve specification

■ Pilot valve

Operating system	Direct operation				
Valve construction	Elastic seal, Poppet valve				
Rated voltage	DC24V AC100V				
Allowable voltage range	DC24V ±10%	AC100V ±10%			
Surge protection circuit	Surge absorber Diode bridge				
Power consumption	0.55W	1VA			
Manual operation	Push-lock button				
Operation indicator	Coil excitation: Red LED ON				

■ Switchover valve Twin nozzle type

Item	Valve for small-bore nozzle	Blow-off solenoid valve			
Operating system	Pneumatic operation by pilot valve				
Valve construction	Elastic seal , Poppet valve				
Valve type	Normally closed				
Lubrication	Not required				
Effective sectional area (Cv)	3.5mm² (0.19)	16.5mm² (0.89)	3.5mm² (0.19)		

^{*} The values in the table are reference values only. Suction flow varies according to the vacuum system conditions; vacuum port dia. or tube length.

* Vacuum Generator Series

Vacuum Generator VQ

Two-stage	nozzlo	typo
I WU-Stage	HUZZIE	Lype

Item	Suction solenoid valve	Blow-off solenoid valve		
Operating system	Pneumatic operation by pilot valve			
Valve construction	Elastic seal , Poppet valve			
Valve type	N.C. (Normally closed)、N.O. (Normally open)	N.C. (Normally closed)		
Lubrication	Not required			
Effective sectional area (Cv)	3.5mm² (0.19)			

Single nozzle type

Item	Suction solenoid valve	Blow-off solenoid valve			
Operating system	Pneumatic operation by pilot valve				
Valve construction	Elastic seal , Poppet valve				
Valve type	N.C. (Normally closed)、N.O. (Normally open)、Double solenoid	N.C. (Normally closed)			
Lubrication	Not required				
Effective sectional area (Cv)	16.5mm² (0.89)	3.5mm² (0.19)			
Min. excitation time	50 m·sec or more				

■ Vacuum switch specification

Operating pressure range	-100 ~ 100kPa
Proof pressure	200kPa
Operating temp. range	-10 ~ 50°C (No freezing)
Operating humidity range	35 ~ 85%RH (No dew condensation)
Power requirement	12-24V DC±10%, Ripple (P-P) 10% or less
Protective structure	IEC specification IP40-equivalent
No. of pressure setting	2
Switch output	NPN Open collector output / DC30V 100mA or less / Residual voltage : 1.2V or less (Load current : 100mA)
Differential response	0 ~ 30 digit (Variable)
Accuracy of response	Within the range of ±3%F.S.
Response time	5m-sec max.
Display	2-1/2 digit-7-segmented LED display
Display frequency	About 4 times/sec.
Indication accuracy	±1%F.S. ±1digit
Temperature characteristics	±0.3%F.S. max. (0 ~ 50°C、Standard: 25°C)

■ Filter specification

Element material	PVF (Polyvinyl formal)		
Filtering capacity	10μm		
Filter surface area	1,507mm²		
Replacement element model code	VQ030B61		

■ Blow-off function

Blow-oil fullction	
Blow-off air rate	0 ~ 50t/min(ANR) (Supply pressure: at 0.5Mpa)

PISCO:

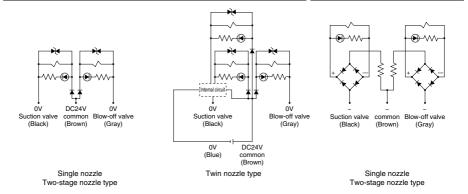
■ Valve lead wire color ■

	DC24V type	Black	Gray	Blue	Brown
Twin nozzle type		Vacuum suction(-)	Blow-off(-)	Minus (-)	DC24V (+ common)
	Two-stage nozzle type	Vacuum suction(-)	Blow-off(-)		DC24V (+ common)
Single nozzle type		Vacuum suction(-)	Blow-off(-)		DC24V (+ common)
100V AC type Two-stage nozzle type Single nozzle type					
		Black	Gray	Blue	Brown
		Vacuum suction(-)	Blow-off(-)		common
		Vacuum suction(-)	Blow-off(-)		common

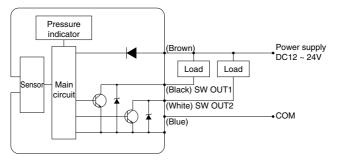
AC100V

■ Circuit diagram (Solenoid valve)

DC24V

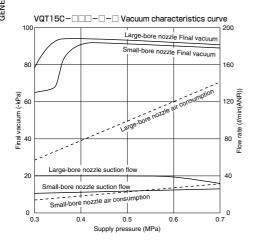


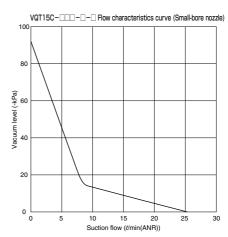
■ Vacuum switch circuit

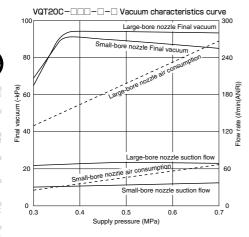


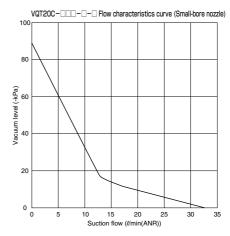
Vacuum Generator VQ

■ Characteristics of twin nozzle type |









V

VY

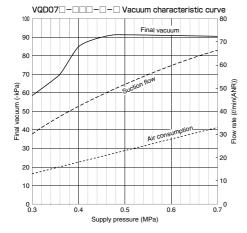
VM · V

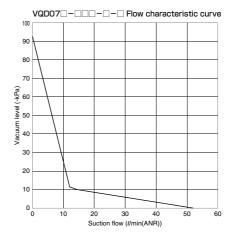
V

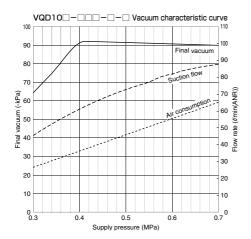
VJ

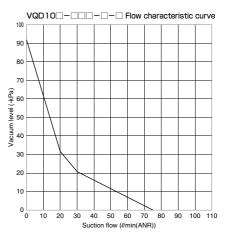


■ Characteristics of two-stage nozzle type



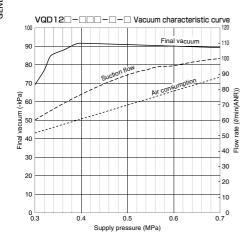


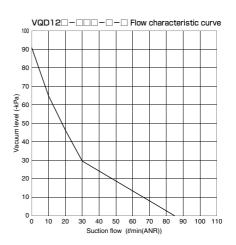




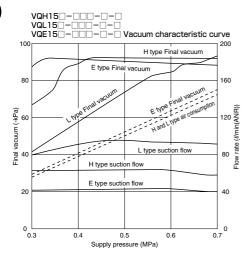
Vacuum Generator VQ

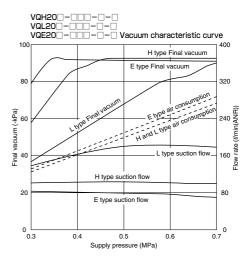
■ Characteristics of two-stage nozzle type





■ Characteristics of single nozzle type





235

VUN

VY

VM·VC VRL

VK

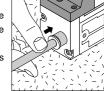
How to insert and disconnect

1. How to insert and disconnect tubes

1) Tube insertion

Insert a tube into Push-In Fitting of the vacuum generator VQ up to the tube end. Lock-claws bite the tube to fix it and the elastic sleeve seals around the

Refer to "2. Instructions for Tube Insertion" under "Common Safety Instructions for Fittings".



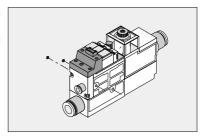
2 Tube disconnection

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 fix body

In order to fix the vacuum generator VQ, tighten M3 threads through the fixing holes on the resin body with tightening torque 0.3 to 0.35Nm. Refer to the outer dimensional drawings for the hole pitch.



Applicable Tube and Related Products I

Polyurethane Tube

(Piping products catalog P.596)

■ Polyurethane Tube is for the general pneumatic piping and suitable for a compact piping.

Nylon Tube

(Piping products catalog P.608)

■ Nylon Tube is for the general pneumatic piping and suitable for a high-pressure fluid up to 1.5MPa (NB tube: 1.0MPa).

Vacuum Tube

(Piping products catalog P.612)

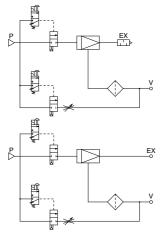
■ Vacuum Tube is a ultra-soft tube and suitable for piping of vacuum generators or actuators.

Vacuum Pads

Vacuum Pad Standard Series · · P.428
● Vacuum Pad Sponge Series · · · P.468
● Vacuum Pad Bellows Series · · · P.488
Vacuum Pad Multi-Bellows Series P.508
● Vacuum Pad Oval Series · · · · · P.526
● Vacuum Pad Soft Series · · · · · P.550
Vacuum Pad Soft Bellows Series · P.578
● Vacuum Pad Skidproof Series · · P.604
• Vacuum Pad Ultrathin Series · · · P.624
● Vacuum Pad Mark-free Series · · P.642
 Vacuum Pad Long Stroke Series · P.658

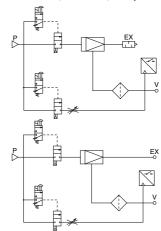
■ Size List of single nozzle type

Silencer vent or Tube exhaust, Without vacuum switch, Normally closed



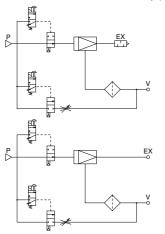
Time	Page to Vacuur		Air supply port		Exhaust
Type	refer	port	8mm	10mm	port
241		8mm	•	•	12mm
	0111111	•	•	With silencer	
		10mm	•	•	12mm
		TOMM	•	•	With silencer

Silencer vent or Tube exhaust, Vacuum switch, Normally closed



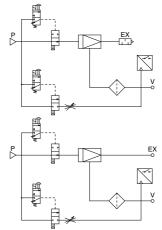
Time		Vacuum	Air supply port		Exhaust
Type	refer	port	8mm	10mm	port
VQ	241 -	8mm	•	•	12mm
			•	•	With silencer
		10mm	•	•	12mm
			•	•	With silencer

Silencer vent or Tube exhaust, Without vacuum switch, Normally open



Type	Page to	Vacuum	Air sup	Air supply port		
туре	refer	port	8mm	10mm	port	
VQ		0	•	•	12mm	
	241	8mm	•	•	With silencer	
	241	10mm	•	•	12mm	
			•	•	With silencer	

Silencer vent or Tube exhaust, Vacuum switch, Normally open



Type	Page to	Vacuum	Air supply port		Exhaust
Type	refer	port	8mm	10mm	port
VQ		8mm	•	•	12mm
	241		•	•	With silencer
	241	10mm	•	•	12mm
			•	•	With silencer

237

VU

VB

VRL

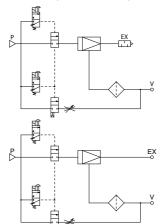
VK

VX

238

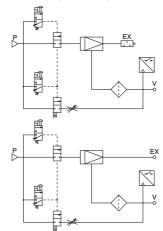
PISCO:

Silencer vent or Tube exhaust, Without vacuum switch, Double solenoid



Type	Page to Vacu		Air sup	ply port	Exhaust
туре	refer	port	8mm	10mm	port
VQ		8mm	•	•	12mm
	241	0111111	•	•	With silencer
		10mm	•	•	12mm
			•	•	With silencer

Silencer vent or Tube exhaust, Vacuum switch, Double solenoid

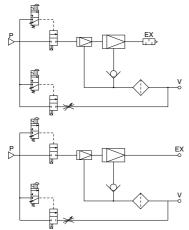


Type	Page to	Vacuum	Air sup	ply port	Exhaust
туре	refer	port	8mm	10mm	port
Vo	241	8mm	•	•	12mm
			•	•	With silencer
		10mm	•	•	12mm
			•	•	With silencer

Vacuum Generator VQ

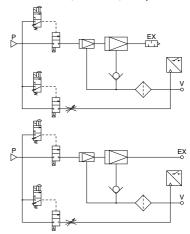
■ Size List of two-stage nozzle type

Silencer vent or Tube exhaust, Without vacuum switch, Normally closed



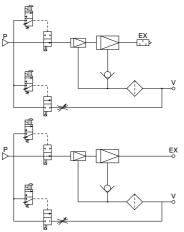
Time	Page to	Vacuum	Air supply port		Exhaust
Type	refer	port	8mm	10mm	port
VQD		8mm	•	•	12mm
	244		•	•	With silencer
	244	10mm	•	•	12mm
			•	•	With silencer

Silencer vent or Tube exhaust, Vacuum switch, Normally closed



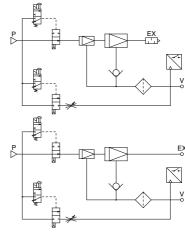
Time		Vacuum	Air supply port		Exhaust
Type	refer	port	8mm	10mm	port
VQD		8mm	•	•	12mm
	244		•	•	With silencer
	244	10mm	•	•	12mm
			•	•	With silencer

Silencer vent or Tube exhaust, Without vacuum switch, Normally open



Type	Page to	vacuum	All Sup	Exmausi	
Type	refer	port	8mm	10mm	port
VQD	244	8mm	•	•	12mm
		OIIIIII	•	•	With silencer
		10mm	•	•	12mm
			•	•	With silencer

Silencer vent or Tube exhaust, Vacuum switch, Normally open



Type	Page to	Vacuum	Air supply port		Exhaust
Type	refer	port	8mm	10mm	port
VQD		8mm	•	•	12mm
	244		•	•	With silencer
	244	10mm	•	•	12mm
			•	•	With silencer

VU

VB

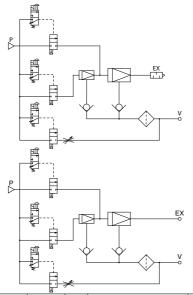
VRL

VK

VX

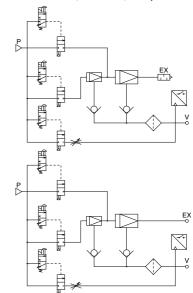
■ Size List of twin nozzle type

Silencer vent or Tube exhaust, Without vacuum switch, Normally closed



Type		Page to	Vacuum	Air sup	Exhaust	
	Type	refer	port	8mm	10mm	port
	VQT		0	•	•	12mm
		0.45	8mm	•	•	With silencer
		245	245 10mm	•	•	12mm
				•	•	With silencer
		2-43	10mm	•	•	

Silencer vent or Tube exhaust, Vacuum switch, Normally closed



Type	Page to Vacuur		Air sup	ply port	Exhaust
Type	refer	port	8mm	10mm	port
VQT		8mm	•	•	12mm
	245	8mm	•	•	With silencer
	245	10mm	•	•	12mm
			•	•	With silencer
		•			

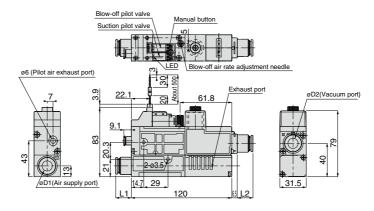
Vacuum Generator VQ

Silencer vent, Single nozzle type, Without vacuum switch



Refer to page 237~238 for circuit.





Silencer vent, Single nozzle type, 2 switch output

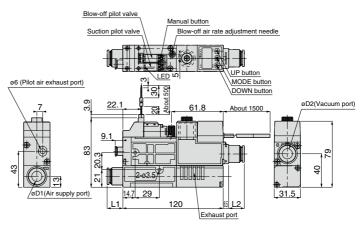
_Chart

Model code: VQ -- S-S

Refer to page 237~238 for circuit.



241



Common dimension list or	Unit: mm			
	Applicable tube O.D. øD1		Applicable tube O.D. øD2	L2
Air armahr mant	8	12.2	-	-
Air supply port	10	14.7	-	-
Vacuum port	-	-	8	12.2
vacuum port	_	-	10	14.7

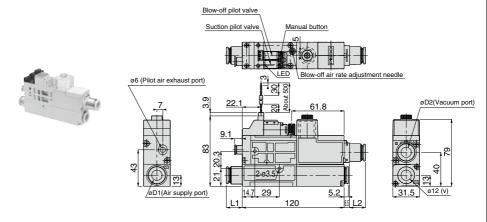


Tube exhaust, Single nozzle type, Without vacuum switch



Model code : VQ ___-__J__

Refer to page 237~238 for circuit.

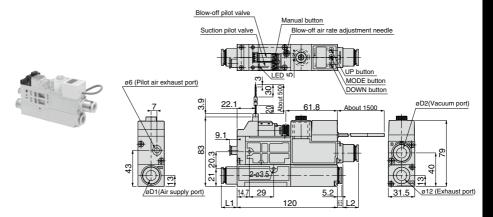


Tube exhaust, Single nozzle type, 2 switch output

_Chart p.235

Model code: VQ - - J-S

Refer to page 237~238 for circuit.



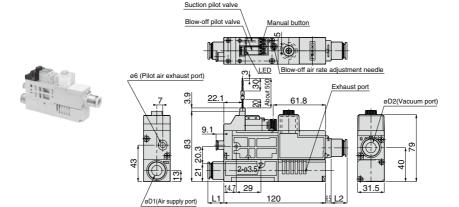
Common dimension list or	Unit . mm			
	Applicable tube	L1	Applicable tube	L2
_	O.D. øD1		O.D. øD2	
Air armah, mark	8	12.2	-	-
Air supply port	10	14.7	-	-
Vacuum port	-	-	8	12.2
vacuum port	_	ı	10	14.7

Vacuum Generator VQ

Silencer vent, Two-stage nozzle type, Without vacuum switch

Model code : VQD □ - □ □ S- □

Refer to page 239 for circuit.

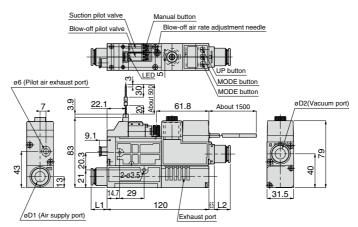


Silencer vent, Two-stage nozzle type, 2 switch output

__Chart P.234

Model code : VQD □-□□S-□S

Refer to page 239 for circuit.



Common dimension list on this page Unit : mn					
	Applicable tube	L1	Applicable tube	L2	
	O.D. øD1		O.D. øD2	LE	
Air armahr mant	8	12.2	-	-	
Air supply port	10	14.7	-	-	
Vocuum nort	-	-	8	12.2	
Vacuum port	_	-	10	14.7	

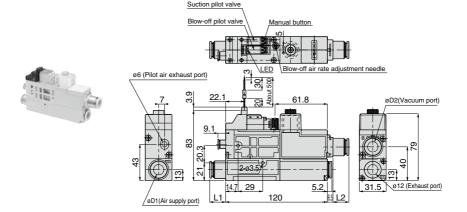
243

Tube exhaust, Two-stage nozzle type, Without vacuum switch



Model code : VQD □ - □□ J-□

Refer to page 239 for circuit.

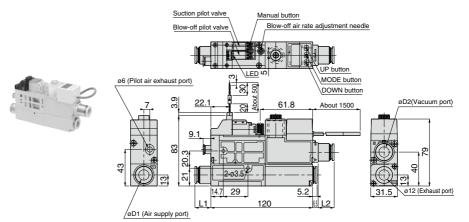


Tube exhaust, Two-stage nozzle type, 2 switch output

__Chart P.234

Model code : VQD □-□□J-□S

Refer to page 239 for circuit.



Common dimension list on this page Unit . If					
	Applicable tube	L1	Applicable tube	L2	
	O.D. øD1		O.D. øD2	LE	
Air armah, mark	8	12.2	-	-	
Air supply port	10	14.7	-	-	
Vacuum port	-	-	8	12.2	
vacuum port	-	-	10	14.7	

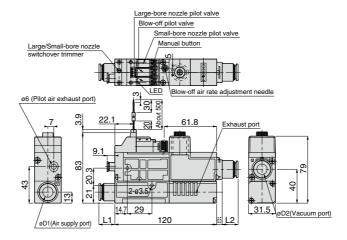
Vacuum Generator VQ

Silencer vent, Twin nozzle type, Without vacuum switch Model code : VQT ☐ C- ☐ ☐ S- ☐



Refer to page 240 for circuit.





Silencer vent, Twin nozzle type, 2 switch output

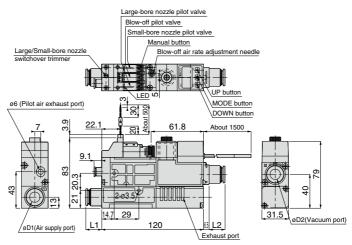
_ Chart

Model code : VQT □ C- □ □ S- □ S

Refer to page 240 for circuit.



245

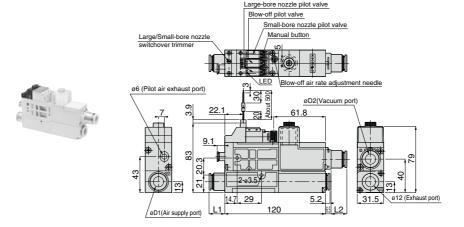


Common dimension list on this page					
	Applicable tube O.D. øD1		Applicable tube O.D. øD2	12	
Air armahr mark	8	12.2	-	-	
Air supply port	10	14.7	-	-	
Vocuum nort	-	-	8	12.2	
Vacuum port	_	-	10	14.7	



Without vacuum switch Model code: VQT C- TJ-

Refer to page 240 for circuit.



Tube exhaust, Twin nozzle, 2 switch output

_Chart P.233

Refer to page 240 for circuit.

Model code: VQT C- DJ- S

Large-bore nozzle pilot valve Blow-off pilot valve Small-bore nozzle pilot valve Manual button Blow-off air rate adjustment needle Large/Small-bore nozzle switchover trimmer UP button ø6 (Pilot air exhaust port) MODE button DOWN button 22.1 61.8 About 1500 29 14.7 5.2 120 /øD1(Air supply port)

-000/(
øD2(Vacuum port)
13 40 79
31.5 ø12 (Exhaust port)

Unit: mm

Common	dimension	list on	this	page
--------	-----------	---------	------	------

	Applicable tube O.D. øD1		Applicable tube O.D. øD2	L2		
Air armah raart	8	12.2	-	-		
Air supply port	10	14.7	-	-		
Vacuum nort	-	-	8	12.2		
Vacuum port	-	-	10	14.7		

Vacuum Generator VQ

Before using PISCO products, be sure to read "Safety Instructions" and "Safety Instruction Manual" on page 35-39 and "Common Safety Instructions for Vacuum Series" on page 47-49.

Warning

- 1. Operating temp. range of this series is 5-50°C. Do not operate the product out this range.
- 2. The coil in a pilot solenoid valve generates heat under the following ① to ③ conditions. The heat may cause dropping life cycle, malfunctions, getting burnt or damaging peripheral machines.

Contact us when the power is applied to the vacuum generator under the following conditions:

- ① The power is continuously ON for over 2 hours.
- ② High-cycle operation.
- 3 Even when intermittent running of the generator is carried out, the total operation time per day is longer than non-operation time.
- 3. When the electricity is applied to valves continuously for a long time, the coils generate heat. It may cause dropping life cycle, malfunctions, getting burnt or damaging peripheral machines due to the heat.
- 4. Switchover valve of double-solenoid types is placed in neutral after the supply of pilot air has been suspended (the same is true when the valve is being operated for the first time after shipment). When resuming the supply of pilot air, be sure to send a signal to the pilot valve, or conduct switchover operations manually as required.
- 5. For the operation of the valve, make sure that the leakage current is less than 1mA. Leakage current larger than that may cause malfunction.
- 6. Do not use the product in the environment including a corrosive gas.
- 7. The product is not explosive-proof. Do not use it in the environments containing flammable or explosive gases or liquid. It may cause a fire or an explosion under these environments.
- 8. Do not use the product out of the operation temperature range. It may cause a malfunction of the sensor by the heat.
- 9. When wiring, be sure to 1) switch OFF the power, and 2) confirm the color of each lead wire, terminal numbers, etc. in order to prevent the output terminal from being inadvertently short-circuited with the power source and COM terminals. Short-circuits can cause sensor problems.

Caution

- 1. Compressed air contains many kinds of drains such as water, oxidized oil, tar and other foreign substances. Dehumidify the compressed air by using an after-cooler or a dryer and improve the air quality, since those drains seriously impair the performance of the vacuum generator.
- 2. Do not use lubricators.
- 3. Rusts in the pipes may cause malfunction. Place a filter finer than 5µm ahead of the air supply port. It is recommended to carry out pipe flushing before operation and on a proper regular basis.
- 4. Do not give an excessive tensile strength and bending on a lead wire. Otherwise, breaking wire or damage on connector may be caused.
- 5. Avoid using the vacuum generator under the condition of corrosive and / or inflammable gas. Also do not use these gasses as a fluid medium.
- 6. The product is not drip/dust proof. Do not use the vacuum generator in location where it may be exposed to water, oil drop or dust.
- 7. Avoid sucking dust, salt and / or iron powders.
- 8. Do not operate Blow-off solenoid valves during vacuum generation.
- 9. When replacing supply ports and vacuum ports cartridges, be sure to remove foreign substances sticking to cartridge seals; make sure cartridge fixing pins are properly inserted into the appropriate ports.
- 10. Use the shortest pipes as much as possible when piping vacuum components (concentrated exhaust, pilot air exhaust and supply units). Using long pipes can prevent vacuum units from performing properly.
- 11. Supply a stable DC power to the product.
- 12. Add a surge absorption circuit to relays or solenoid valves, etc. which are to be connected with output terminal and source terminal. Avoid any use which involves over 80mA in current.
- 13. Ground the FG terminal when using a unit power source such as switching current.
- 14. Output terminals and other terminals should not be short-circuited.
- 15. Do not apply excessive loads to vacuum generators. Subjecting them to excessive loads can damage the equipment.
- 16. Do not wire nozzles and other components in a way that will subject them to applied pressure. Do not use them in an arbitrary manner, either. It can cause malfunctions.
- 17. In case of using twin-nozzle type, please set pressure allowance between the vacuum level at work suction time and the setting value of Large/Small nozzle switchover pressure sensor. If these values are similar, the Large/Small caliber pilot valve might actuate simultaneously.

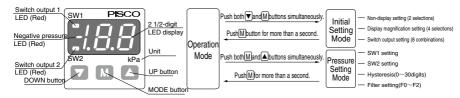
■ 1. Valve Operation Usage

- · Power ON. Turn on the power supply after making sure the correct wiring.
- · Provide power to lead wires which are to be used (Black: Suction valve / Gray: Blow-off valve) to start a valve.

■ 2. Valve Operation of Twin Nozzle type

- · Keep applying consistent voltage to brown and blue lead wires when to operate twin nozzle type.
- · Use large/small-bore nozzle switchover trimmer to adjust the switchover vacuum pressure point.
- *Switchover of large and small nozzles is controlled by the internal circuit after applying a voltage to suction pilot valve of large nozzle.

■ 3. Parts Names of Vacuum Switch Display and Operation Method



■ 4. Initial Setting Mode of Vacuum Switch

■ Starting Initial Setting Mode



Push both ▼and M buttons simultaneously in Operation Mode.

The third digit starts flashing when Initial Setting Mode starts.

-00 is displayed at the first use.

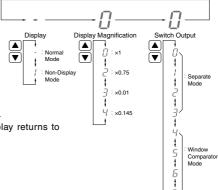
■ Setting Initial Conditions



Push M button to move to the next digit. The flashing digit is to be set. Pushing ▼or button can change the condition of setting.



Operation Mode.



Flashing digit moves to the next by pushing M button



249

VU

VB

VRL

VK

VX



■ 5. Pressure Setting Mode of Vacuum Switch

■ Starting Pressure Setting Mode



Push both M and buttons simultaneously in Operation Mode.

Once Pressure Setting Mode starts, SW1 starts flashing and Setting Value 1 is indicated. 50 is displayed at the first use.

■ Setting Pressure Values



Push M button.

[Setting Value 1 (P1)]

SW1 LED starts flashing.

Setting Value 1 (P1) is set by pushing ▼or ▲ button.

(50 is displayed at the first use)

Note1) Setting values are available within operating pressure range.

Note2) Available setting values in window comparator mode are range of "P1 ≦ P2-2H".



[Setting Value 2 (P2)]

SW2 LED starts flashing.

Setting Value 2 (P2) can be set by pushing ▼or ▲button.

(50 is displayed at the first use)

Note1) Setting values are available within operating pressure range.

Note2) Available setting values in window comparator mode are range of "P1 ≦ P2-2H" . Push M button.



[Hysteresis (H) Setting]

SW1 and SW2 start flashing.

Hysteresis (H) can be set by pushing ▼or ▲ button.

(00 is displayed at the first use)

Note1) Setting digits should be less than 30.

Push M button.

Note2) Available setting values in window comparator mode are range of "P1 ≦ P2-2H".



[Digital Filter Setting]

Digital Filter can be set by pushing ▼ or ▲ button.

F0: No filter F1: 25ms filter F2: 250ms filter

(F0 is displayed at the first use)



■ Exiting Pressure Setting Mode



Push M for more than a second.

Pressure conditions are set and the display returns to Operation Mode.

■ 6. Vacuum Switch Functions

■ Non-Display Mode

When any button is not touched for about 10 seconds, the system automatically select non-display mode and LED indication function will sleep. Pushing any button while sleeping, LED indication will come back.

Note1) The decimal point in the below figure flashes while Non-Display Mode.

Note2) Switch output and switch output indicator are active during Non-Display Mode.

Note3) No error message will appear during Non-Display Mode.

* Refer to "Initial Setting Mode (P.249)" for Non-Display Mode.



■ Display Magnification

Select Display Magnification from the right table.

※ Refer to "Initial Setting Mode (P.249)" for Display magnification.

Code	Pressure range				
Code	Display magnification	Display range			
0	×1 (kPa)	-100 ~ 100			
2	×0.75 (cmHg)	-75 ~ 75			
3	×0.01 (bar)	-1.00 ~ 1.00			
4	×0.145 (psi)	-14.5 ~ 14.5			

■ Switch Output

Switch output is selectable from the following table.

Note1) Under separate mode, SW1 & Setting Value1 and SW2 & Setting Value2 work respectively.

Note2) Under window comparator mode, SW1 and SW2 operate at their common lower limit (Setting Value 1) and their upper limit (Setting Value 2).

* Refer to "Initial Setting Mode (P.249)" for Switch Output.

Out	tput	SW1		SW2					
Mo	de	Separate Window Comparator		Separate Window Comp			Comparator		
Oper	ation	HI	LO	Α	В	HI	LO	Α	В
	0	0				0			
	1	0					0		
	2		0			0			
Code	3		0				0		
Code	4			0				0	
	5			0					0
	6				0			0	
	7				0				0
			Lower limit :				Lower	limit :	
		Set	ting	Setting	Value 1	Set	ting	Setting	Value 1
		Value 1 Upper limit :		Valu	ue 2	Upper	limit:		
		Setting Value 2				Setting	Value 2		
		No	te 1	No	te 2	No	te 1	No	te 2

Separate	Window Comparator
OFF P1:SW1 P2:SW2 Pr	ON OFF ON ON OFF P1 P2 Pr
ON (LO) P1:SW1 P2:SW2 OFF Pr H H Pr	(B) OFF P1 P2 OFF
P1 ≦ P2 or P1 ≥ P2	P1 ≦ P2-2H
D4. O-Hi 1/-1 4 / D0. O-Hi-	- M-I O

P1: Setting Value 1 / P2: Setting Value 2 H: Hysteresis

■ Digital Filter

There are two selections (25ms or 250ms) of Digital Filter.

Use the digital filter function when the pressure fluctuates rapidly.

Note1) Selected digital filter (25ms or 250ms) is reflected on pressure indication and switch output.

* Refer to "Pressure Setting Mode of Vacuum Switch (P.250)" for the digital filter setting.

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■ 7. Zero Point Adjustment and Error Message of Vacuum Switch

■ Starting Zero point adjustment



Release the applied pressure in pressure port to have the atmospheric pressure condition. (i.e., No pressure is applied.)

Push both ▼and ▲ buttons simultaneously in Operation Mode.

Once Zero Point Adjustment starts, OA starts flashing.

■ Exiting Zero Point Adjustment



PISCO Release and buttons during OA flashing.

Zero point adjustment is completed after a second and the display returns to Operation Mode.



Error message [2] is displayed when any pressure is supplied to the sensor during the zero adjustment. Escape [2] by pressing [M] button for more than a second.

Release the pressure in the pressure port and operate Zero Point Adjustment again.

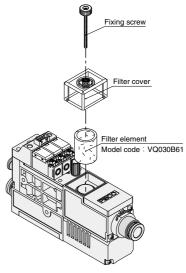
■ Actions for Error

Error message	Error details	Countermeasures
EI	An overload current is supplied. (SW1 or SW2 LED which detects the overload current starts flashing)	Turn off the power and check the overload condition.
[[2]	Pressure is supplied to the sensor during the zero adjustment.	Release © by pressing M button. Release the pressure in the pressure port and operate Zero Point Adjustment again.
-	Vacuum pressure is exceeding 110% or more of the rated supply pressure. (Example indication of 111kPa)	Check the supply pressure.
-[-H-[-	Supply pressure is higher than the range of pressure display.	Check the supply pressure.
<u>-[- </u>	Supply pressure is lower than the range of pressure display.	Check the supply pressure.

 $[\]divideontimes$ Error message is not displayed during Non-Display Mode.

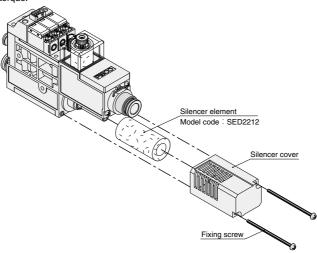
■ 8. How to replace Filter Elements

■ Remove the fixing screw to replace filter elements. Make sure to place the filter seal rubber properly and tighten the screw to fix the filter cover with 0.3-0.5Nm of the tightening torque after the replacement.



■ 9. Replacement of Silencer Element

- Replace silencer elements following the instructions below.
 - ① Remove 2 fixing screws of silencer cover.
 - ② Take out the silencer element
 - ③ Replace with a new element and tighten the screws to fix the filter cover with 0.4-0.5Nm of the tightening torque.



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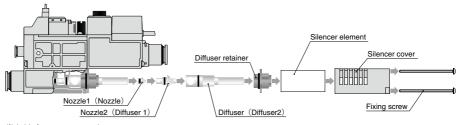
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■ 10. How to replace and clean Nozzles and Diffusers

- Replace and clean nozzles and diffusers following the instructions below.
 - ① Remove 2 fixing screws with a Phillips screwdriver to take out silencer cover.
 - ②-1 Single nozzle type: Pull out diffuser retainer, diffuser and nozzle in this order.
 - ②-2 Twin nozzle type: Pull out diffuser retainer, diffuser, nozzle2 and nozzle1 in this order.
 - $\textcircled{2-3} \ \mathsf{Two\text{-}stage} \ \mathsf{nozzle} \ \mathsf{type} \\ \vdots \\ \mathsf{Pull} \ \mathsf{out} \ \mathsf{diffuser} \\ \mathsf{retainer}, \ \mathsf{diffuser2}, \ \mathsf{diffuser1} \ \mathsf{and} \ \mathsf{nozzle} \ \mathsf{in} \ \mathsf{this} \ \mathsf{order}.$
 - 3-1 Single nozzle type: Remove foreign substances adhered to nozzle1, diffuser inside and seal rubbers by air blowing or wiping.
 - 3-2 Twin nozzle type: Remove the substances adhered to nozzle1 & 2, diffuser2 inside and seal rubbers by air blowing or wiping.
 - 3-3 Two-stage nozzle type: Remove the substances adhered to nozzle, inside of diffuser1 & 2 and seal rubbers by air blowing or wiping.
 - (Note) Pay special attention not to damage inside of nozzle & diffuser and seal rubbers.

4 - 2 Twin nozzle type: Place back nozzle1, nozzle2, diffuser and diffuser retainer in this order.

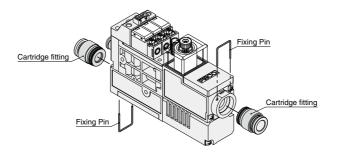
- 4-1 Single nozzle type: Place back nozzle1, diffuser and diffuser retainer in this order.
- 4)-3 Two-stage nozzle type: Place back nozzle. diffuser1, diffuser2 and diffuser retainer in this order.
- ⑤ Tighten the screws to fix the silencer cover with 0.4-0.5Nm of the tightening torque.



 $\ensuremath{\mathbb{X}}$ () is for two-stage nozzle.

■ 11. How to replace Cartridge Fittings

- Replace cartridge fittings following the instructions below.
 - ① Use a flathead screwdriver to pull out a fixing pin.
 - ② Pull out a cartridge fitting.
 (Note) When a new cartridge fitting is attached, check if there are no dusts or fluffs stuck on O-ring.



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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...Recomendations 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.

Products can cause personal injury or damages to properties.

↑ Warning I

- 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.

X. This safety instructions are subject to change without notice.



Disclaimer

- 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.
- 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.
- 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.

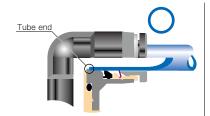
- 1. Do not use PISCO products under the following conditions.
 - ① Beyond the specifications or conditions stated in the catalog, or the instructions.
 - ② Under the direct sunlight or outdoors.
 - ③ Excessive vibrations and impacts.
 - 4 Exposure / adhere to corrosive gas, inflammable gas, chemicals, 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 Antispatter 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.

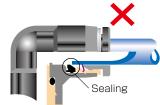


- 1. Remove dusts or drain before piping. They may get into the peripheral machine / facilities and cause malfunction.
- 2. When inserting an ultra-soft tube into push-in fitting, make sure to place an Insert Ring into the tube edge. There is a risk of causing the escape of tube and a fluid leakage without 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	_	\pm 0.05mm	Ø1/8	\pm 0.1mm	\pm 0.15mm	
Ø3mm	_	± 0.15mm	Ø5/32	\pm 0.1mm	± 0.15mm	
Ø4mm	\pm 0.1mm	± 0.15mm	Ø3/16	\pm 0.1mm	± 0.15mm	
Ø6mm	\pm 0.1mm	± 0.15mm	Ø1/4	\pm 0.1mm	± 0.15mm	
Ø8mm	\pm 0.1mm	± 0.15mm	Ø5/16	\pm 0.1mm	± 0.15mm	
Ø10mm	\pm 0.1mm	± 0.15mm	Ø3/8	\pm 0.1mm	± 0.15mm	
Ø12mm	\pm 0.1mm	± 0.15mm	Ø1/2	\pm 0.1mm	± 0.15mm	
Ø16mm	\pm 0.1mm	± 0.15mm	Ø5/8	\pm 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 pushin 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.





Tube is not fully inserted up to tube end.

- 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
 - ②The 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 releasering, 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		
	M3 × 0.5	0.7N·m		0110004		
	M5 × 0.8	1.0 ~ 1.5N·m		SUS304 NBR		
	M6 × 1	2 ~ 2.7N·m		INDI		
Metric thread	M3 × 0.5	0.7N·m	_			
	M5 × 0.8	1 ~ 1.5N·m		РОМ		
	M6 × 0.75	0.8 ~ 1N·m				
	M8 × 0.75	1 ~ 2N·m				
	R1/8	4.5 ~ 6.5N·m				
Tanar pipe thread	R1/4	7 ~ 9N·m	White	_		
Taper pipe thread	R3/8	12.5 ~ 14.5N·m	vvnite			
	R1/2	20 ~ 22N·m				
Unified thread	No.10-32UNF	1.0 ~ 1.5N·m	_	SUS304、NBR		
	1/16-27NPT	4.5 ~ 6.5N·m				
Nietienel nine	1/8-27NPT	4.5 ~ 6.5N·m				
National pipe thread taper	1/4-18NPT	7 ~ 9N·m	White	_		
illieau lapei	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.

Common Safety Instructions for Vacuum Series

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

↑ Warning I

- 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
- 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.

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- 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.

- 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 Series

Vacuum Generator

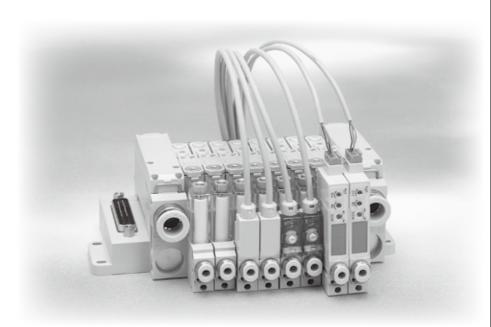
- 9. The material of plastic filter cover for VQ and VFU series is PA. Avoid the adherence of chemicals below to the products, and do not use them under those chemical environments.
- Table Chemical Name

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.



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Complex Vacuum Generator with compact and lightweight body, achieving shorter blow-off time to a large extent.

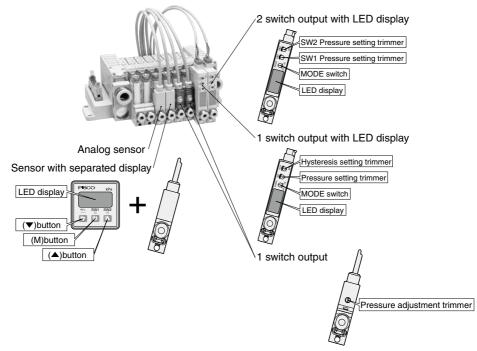
Vacuum Generator VZ Series

- Compact manifold type with lightweight body.
- Large volume of blow-off air by air pressure release valve which have achieved to reduce blow-off time.
 - Bundled wiring of the suction and blow-off solenoid valves.





- Characteristic
- Wide variety of combinations enables to meet various applications. External Vacuum Controller for a vacuum pump, VZP Series, is also available. (P.378).
- 2 types of suction valves; Single solenoid type and Double solenoid type
- Energy saving. Current consumption of valve is saved at 0.55W
- Various kinds of vacuum sensors for wide range of applications



- User-friendly structure considering easy maintenance
- Push-In Fitting and Female thread are standardized on vacuum port.
- 3 kinds of nozzle bore; ø0.5mm, ø0.7mm and ø10mm

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VU

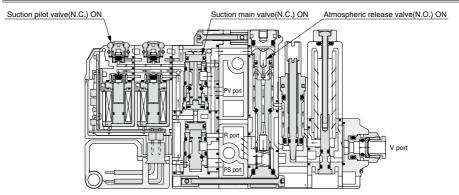
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VR

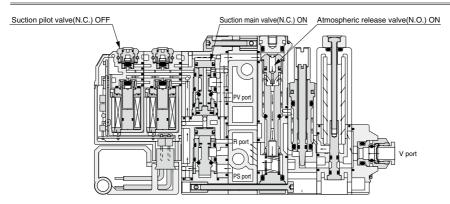
VK V.I

■ How double solenoid type works

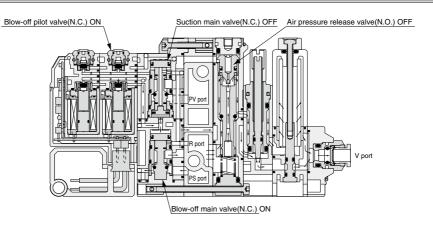
At vacuum generation suspended

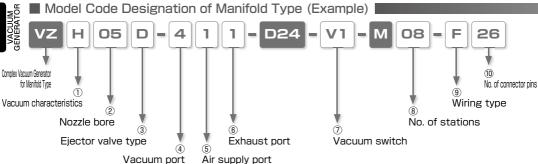


Vacuum retention



Blow-off





1) Vacuum characteristics

Code	Performance	Code	Performance	Code	Performance	
Н	High-vacuum type (Rated supply pressure : 0.5MPa)	L	Large-flow type (Rated supply pressure : 0.5MPa)	E .	High-vacuum at low air supply pressure type (Rated supply pressure: 0.35MPa)	
K	When different vacuum characteristics are mixed on a manifold (Fill in the details on Specification Order Form)					

2 Nozzle bore

Code	Nozzle bore	Code Nozzle bore		Code	Nozzle bore		
05	0.5mm	07	0.7mm	10	1.0mm		
00	When different nozzle bores are mixed on a manifold (Fill in the details on Specification Order For						

** Some combinations of vacuum characteristics ① and nozzle bore ② are not possible. Refer to page 267 for the ejector characteristics.

③ Ejector valve type

Code	Valve type	Code	Valve type	Code	Valve type
No Code	Normally closed type	D	Double solenoid type (Vacuum retention type)	K	Different types on a manifold (specification Order Form Required)

4 Vacuum port

Code	4	Code	6	Code	5		
Tube dia.(mm)	ø4 (Push-In Fitting)	Tube dia.(mm)	ø6 (Push-In Fitting)	Thread size.(mm)	M5×0.8 (Female thread)		
Code	0						
Tube dia.(mm)	When different ports are mixed on a manifold (Fill in the details on Specification Order Form)						

⑤ Air supply port

Code	4	6	8	1
Tube dia.(mm)	ø4 (Push-In Fitting)	ø6 (Push-In Fitting)	ø8 (Push-In Fitting)	ø10 (Push-In Fitting)

(6) Exhaust port

	-			
Code	S	6	8	1
Exhaust method	Silencer vent	Tube exhaust (ø6mm Push-In Fitting)	Tube exhaust (ø6mm Push-In Fitting)	Tube exhaust (ø10mm Push-In Fitting)

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7 Vacuum switch

Code	No code	DW
Switch	Without vacuum switch	2 switch output with LED display
Code	DA	S
Switch	Pressure sensor with LED display (Analog output and 1 switch output)	1 switch output without display
Code	V1	V2
Switch	Analog output for negative pressure	Separated type LED pressure display + negative pressure analog sensor
Code	R1	R2
Switch	Compound pressure analog sensor	Separated type LED pressure display + compound pressure analog sensor
Code	K	
Switch	When different switches are mixed on a manifold (Fill in the details on Specification Order Form)	-

® No. of stations

_			_										
	Code	02	03	04	05	06	07	08	09	10	11	12	Ī
	No. of stations	2	3	4	5	6	7	8	9	10	11	12	

^{**} Allowable station numbers of simultaneous operation differs by nozzle size, vacuum performance, and other conditions. Please contact us for details.

9 Wiring type

Code	F	D
Connector	Flat cable connector	Sub-D connector

10 No. of connector pins

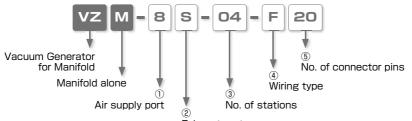
Code	20	26	25	
No. of	20-pin flat cable connector	26-pin Flat cable connector	25-pin Sub-D connector	
pins.	(Max. 9 stations)	(Max. 12 stations)	(Max. 12 stations)	
Code	No code			

No. of pins. Not specified (The suitable connector comes according to wiring type and No. of stations. See below.) (※)

- * In case of a flat cable connector
 - 2 to 4 stations: 10-pin flat cable connector
 - 5 to 9 stations: 20-pin flat cable connector
 - 10 to 12 stations: 26-pin flat cable connector
 - In case of a sub-D connector
 - 2 to 4 stations: 9-pin Sub-D connector
 - 5 to 12 stations: 25-pin Sub-D connector

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■ Model Designation of Manifold-base Only (Example)



Exhaust port

1) Air supply port (Applicable tube size)

Code	4	6	8	1
Tube dia.(mm)	ø4 (Push-In Fitting)	ø6 (Push-In Fitting)	ø8 (Push-In Fitting)	ø10 (Push-In Fitting)

② Exhaust port

Code	S	6	8	1
Exhaust method	Silencer vent	Tube exhaust (ø6mm Push-In Fitting)	Tube exhaust (ø6mm Push-In Fitting)	Tube exhaust (ø10mm Push-In Fitting)

3 No. of stations

Code	02	03	04	05	06	07	08	09	10	11	12
No. of stations	2	3	4	5	6	7	8	9	10	11	12

4 Wiring type

Code	F	D
Connector	Flat cable connector	Sub-D connector

5 No. of connector pins

Code	20	26	25	
No. of	20-pin Flat cable connector	26-pin Flat cable connector	25-pin Sub-D connector	
pin.	(Max. 9 stations)	(Max. 12 stations)	(Max. 12 stations)	
Code	No code			

No. of pin. Not specified (The suitable connector comes according to wiring type and No. of stations. See below.) (※)

* In case of a flat cable connector

2 to 4 stations: 10-pin Flat cable connector

5 to 9 stations: 20-pin Flat cable connector

10 to 12 stations: 26-pin Flat cable connector

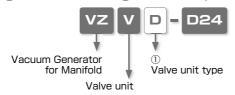
In case of a sub-D connector

2 to 4 stations: 9-pin Sub-D connector

5 to 12 stations: 25-pin Sub-D connector



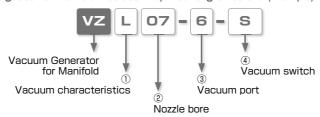
■ Model Designation of Mounting Valve Unit (Example)



1 Valve unit type

Code	No Code	D		
Valve unit type	Normally closed type	Double solenoid type (Vacuum retention type)		

■ Model Designation of Manifold Instllation Top-Mounting Unit alone (Example)



1) Vacuum characteristics

Code	Performance	Code	Performance	Code	Performance
ш	High-vacuum type		Large-flow type	_	High-vacuum at low air supply pressure type
П	(Rated supply pressure : 0.5MPa)		(Rated supply pressure : 0.5MPa)	_	(Rated supply pressure: 0.35MPa)

2 Nozzle bore

Code	Nozzle bore	Code	Nozzle bore	Code	Nozzle bore
05	0.5mm	07	0.7mm	10	1.0mm

3 Vacuum port

Code	4	Code	6	Code	5
Tube dia.(mm)	ø4 (Push-In Fitting)	Tube dia.(mm)	ø6 (Push-In Fitting)	Thread size(mm)	M5×0.8 (Female thread)

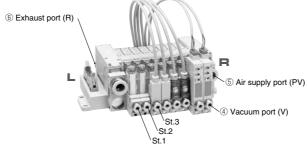
4 Vacuum switch

Code	No code	DW
Sensor	Without vacuum switch	2 switch output with LED display
Code	DA	S
Sensor	Pressure sensor with LED display (Analog and 1 switch output)	1 switch output without display
Code	V1	V2
Sensor	Analog output for negative pressure	Separated type LED pressure display + negative pressure analog sensor
Code	R1	R2
Sensor	Compound pressure analog sensor	Separated type LED pressure display + compound pressure analog sensor

Vacuum Generator VZ

■ Specification Order Form (example)

		Vacuum	Nozzle	Ejector		Vacuum	Air supply	Exhaust				Vacuum		No. of	Wiring	No. of
		characteristics	bore	valve	_	port	port	port	_	Voltage		switch	_	stations	type	connector
				type	-	(V)	(PV)	(R)	_	(V)	_					pins
		1	2	3		4	(5)	6				7		8	9	10
V	Z	K	00	K	-	0	1	1	ı	D24	ı	K	ı	08	F	20
L	St.1	Н	05		-	4			ı		ı		ı			
1	St.2	Н	05		_	4			ı		ı		ı			
	St.3	Н	05		-	4		/	_		_	V1	_			
	St.4	L	07	D	-	4		/	-		-	V1	-			
	St.5	L	07	D	-	4			-		-	5	-			
St. no.	St.6	L	07	D	-	4			-		-	5	-			
Ot. 110.	St.7	E	10		-	4			-		-	DA	-			
	St.8	E	10		-	4			-		-	DA	_			
	St.9				_			/	_		-		_			
	St.10				-				-		-		-			
1	St.11				_				-		-		-			
Ř	St.12				_				_		_		_			



 $\ensuremath{\text{\%}}$ Station no. is arranged St.1, St.2 \cdots St.12 from L side.



Vacuum Generator VZ Series Specification Order Form

To: NIHON PISCO CO., Ltd.		
Name :		
Order No.:		
Date :		
Requested EX-W PISCO Date :	Quantity :	

		Vacuum characteristics		Ejector valve type ③	_	Vacuum port (V) 4	Air supply port (PV)	Exhaust port (R) ⑤	_	Voltage (V)	_	Vacuum switch	-	No. of stations	Wiring type	No. of connector pins
	z		0		_				-	D24	_		_			
L	St.1				-				-		-		-			
1	St.2				_				-		_		-			
	St.3				_				-		_		-			
	St.4				-				-		-		-			
	St.5				_				-		_		-			
St. no.	St.6				_				-		-		-			
St. 110.	St.7				-				-		-		-			
	St.8				-				-		-		-			
	St.9				ı				_		ı		-			
	St.10				ı				_		ı		-			
1	St.11				ı				_		ı		-			
Ř	St.12				-				-		-		-			

 $[\]divideontimes$ 1. Refer to the previous page to fill in the form.

 $[\]frak{\%}$ 2. Copy this page and use.

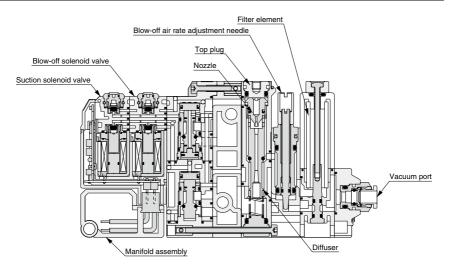
^{* 3.} Use this specification order form when ordering different specifications of mounting units on a manifold.

* Vacuum Generator Series

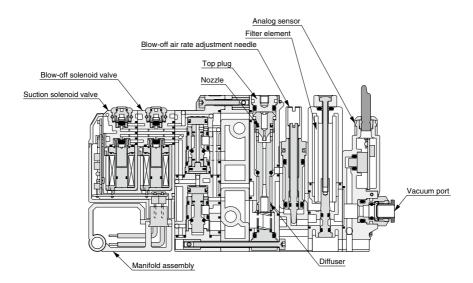
Vacuum Generator VZ

■ Construction

Without vacuum pressure sensor type



Analog sensor type



265

VI

VU

VE

VM - V

V

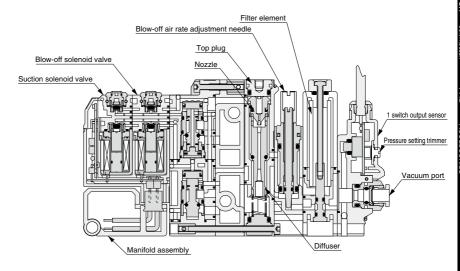
VJ

VX

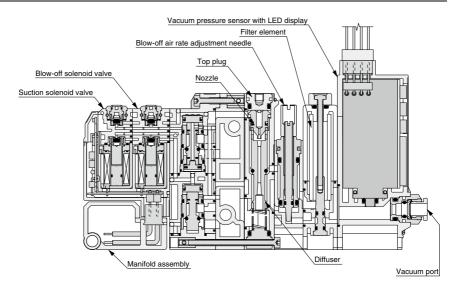
V7

PISCO: http://www.**pisco.co.jp**

1 switch output sensor type



Vacuum pressure sensor with LED display type



267

■ Specification (Supply pressure)

Fluid medium	Air
Operating pressure range	0.3 ~ 0.7 MPa
Rated supply pressure	H and L type∶0.5 MPa、E type∶0.5 MPa
Operating temp. range	5 ~ 50°C

■ Ejector specification

Model code	Nozzle bore (mm)	Rated supply pressure (MPa)	Final vacuum (–kPa)	Suction flow	Air consumption	
VZH05	2.5	0.5	90.4	7	44.5	
VZL05	0.5	0.5	66.5	12	11.5	
VZH07		0.5	93.1	13	23	
VZL07	0.7	0.5	66.5	24		
VZE07		0.35	90.4	10	17	
VZH10	1.0	0.5	93.1	24	46	
VZE10	1.0	0.35	90.4	20	34	

■ Solenoid valve (Suction solenoid valve / Blow-off solenoid valve)

■ Pilot valve

Item	Suction solenoid valve	Blow-off solenoid valve				
Operating system	Direct operation					
Valve construction	Elastic seal, Poppet valve					
Rated voltage	DC	DC24V				
Allowable voltage range	DC21.6 ~ DC26.4V					
Surge protection circuit	Surge absorber					
Power consumption	0.55W (V	Vith LED)				
Operation indicator	Coil excitation: Red LED ON	Coil excitation: Yellow-green LED ON				
Manual operation	Push & lock type					
Wiring method	Sub-D connector / Flat cable connector					

■ Switchover valve

Item		Suction sol	enoid valve	Blow-off solenoid valve			
Operating s	system		Pilot valve-activated indirect action				
Valve cons	truction		Elastic seal, Poppet valve				
Valve funct	tion	Single solenoid	Double solenoid	Single solenoid			
Valve unit t	type	N.C. (Normally closed)					
Proof press	sure	1.05MPa					
Lubrication		Not required					
Effective secti	ional area (Cv)	4.5mm	² (0.24)	3.5mm² (0.19)			
Response time	OFF → ON	10msec	10msec	10msec			
	ON → OFF	15msec	10msec	15msec			

■ Vacuum switch

_	Specification		O display	No display	Separated display with analog	Analog
Item		· ·	1 switch output	· ·	· ·	
Current cor	nsumption	40	mA	20mA	50mA	20mA
Pressure d	etection	Diffused ser	niconduction pre	ssure switch		Diffused semiconduction pressure switch
Operating pro	essure range		-100 ~ 0kPa			-100 ~ 0kPa
Pressure se	etting range		-99 ~ 0kPa		-999 ~ 999counts	
Proof press	sure		0.2MPa			0.2MPa
Operating t	emp. range	0 ~ 50°C (N	lo freezing)	-10 ~ 60°C (No freezing)	-10 ~ 50°C (No freezing)	-10 ~ 60°C (No freezing)
Operating hu	midity range		35 ~ 85%l	RH (No dew con	densation)	
Rated voltage	ge	12 ~ 24VDC ±10% R	ipple (P-P) 10% max.	DC10.8 ~ 3	0V (Ripple voltaç	ge included)
Protective	structure		quiv.			
No. of switch output		2 1			2	
Switching ac	tion accuracy		±3%F.S. max			
Differential a	ccuracy	Fixed	Variable	Fixed	Variable	
Switch out	put		NPN oper	n collector		
	Output voltage		1 ~ 5V	N	1 ~	5 V
	Zero-point voltage		1±0.1V		1±0	.1 V
Analog output	Span voltage		4±0.1V		4±0	.1 V
	Output current		1mA max.		0.5mA max.	1mA max.
	LIN/HYS		±0.5%F.S. max.		±0.5%F	S. max.
Indication		0 ~ -99kPa (2-digi	t red LED display)		3-digit red LED display	
Display frequency		About 4 t	imes/sec.		About 4 times/sec.	
Indication accuracy		±3%F.S.	. ±2 digit		±1%F.S.	
Sensor resolution		1 d	ligit	\	1 digit	
Operations	Lindination	SW1: Red LED turi	ns ON, when pressu	ure is above setting.	SW1: Green LED turns ON, when pressure is above setting.	
Operational indication		SW2: Green LED turns ON,		SW2: Red LED turns ON,		

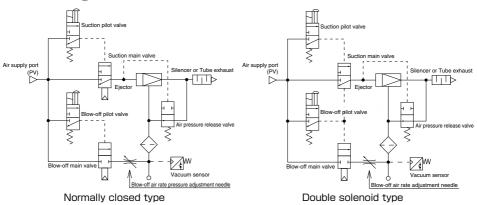
■ Filter specification ■

Element material	PVF (Polyvinyl formal)
Filtering capacity	10μm
Filter surface area	660mm²

■ Blow-off function

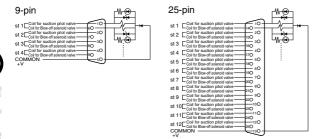
Item		Blow-off valve
Blow-off air rate		0 ~ 50t/min(ANR) (Supply pressure: 0.5MPa)
	Operating system	Pilot valve-activated indirect action
Air pressure	Valve construction	Elastic seal, Poppet valve
release valve	Valve type	N.O. (Normally open)
release valve	Lubrication	Not required
	Orifice bore	Equivalent to 35mm

■ Circuit diagram

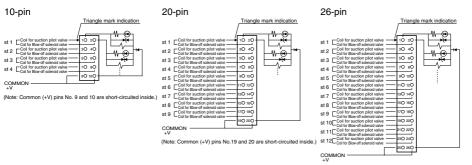


■ Circuit diagram(Solenoid valve)

Sub-D connector



Flat cable connector



(Note: Common (+V) pins No.25 and 26 are short-circuited inside.)Z

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VU

VUN

VB

VM · VC

VG

1/1

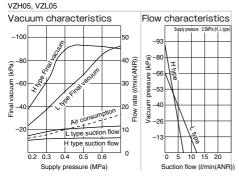
VX

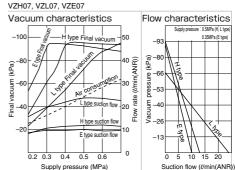
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http://www.**pisco.co.jp**

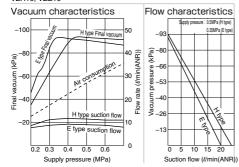
Characteristics

Supply pressure - Final vacuum, Suction Flow, Air Consumption





VZH10, VZE10



- 1. In the characteristics shown above, supply pressures refer to those when vacuum is generated.
- 2. In the characteristics shown above, an odd noise may be heard when supply pressures are immediately before the peak of vacuum levels (H (High vacuum) type: 0.4~0.45MPa, and E (High-vacuum at low air supply pressure type) type: 0.29~0.32MPa). The sounding of this odd noise means the characteristics are unstable. If nothing is done, the sound may become even noisier. This situation can also adversely affect the sensor, resulting in a malfunction or trouble. So reset the supply pressure.
 - (Ex. 1: When the vacuum generator H type is in operation with the original pressure of 0.5MPa, the odd noise began to be heard due to a drop in supply pressure to 0.43MPa. Reset the supply pressure for the vacuum generator in operation at 0.5MPa.)
- 3. Piping design and equipment selection should be made with an effective sectional area being 3 times as large as the nozzle diameter as a standard. Satisfactory vacuum characteristics are not obtained unless sufficient supply air flow is secured.(For example, the odd noise is heard even when pressure is at the set value, suction flow is insufficient, the final vacuum does not satisfy the required level, etc.)
 - (Example2. There is the odd noise from the vacuum generator H type, though the supply pressure is 0.5MPa. → Insufficient supplied air rate is the cause. The supplied air rate is reduced before the vacuum generator by a pipe resistance, and a proper air rate is not obtained. Select tubes and pneumatic apparatuses with the target effective cross-section areas obtaining the necessary air flow rate.)
 - (Example3. When Ø 1.0mm of nozzle bore is selected, the effective cross-section size should be more than 2.35mm².(cross-section 0.5²xπ=0.785mm²x3=2.35mm²). Select tubes and pneumatic apparatuses with the effective cross-section area more than 2.3 mm2.)

Vacuum Generator VZ

Applicable Tube and Related Products |

Polyurethane Tube

(Piping products catalog P.596)

Polyurethane Tube is for the general pneumatic piping and suitable for a compact piping.

Nylon Tube

(Piping products catalog P.608)

■ Nylon Tube is for the general pneumatic piping and suitable for a high-pressure fluid up to 1.5MPa (NB tube: 1.0MPa).

Vacuum Tube

(Piping products catalog P.612)

Vacuum Tube is a ultra-soft tube and suitable for piping of vacuum generators or actuators.

Vacuum Pads

 Vacuum Pad Standard Series · · 	P.428
Vacuum Pad Sponge Series · · ·	P.468
Vacuum Pad Bellows Series· · ·	P.488
Vacuum Pad Multi-Bellows Series	P.508
■ Vacuum Pad Oval Series · · · · · ·	P.526
Vacuum Pad Soft Series· · · · · ·	P.550
Vacuum Pad Soft Bellows Series ·	P.578
Vacuum Pad Skidproof Series · · ·	P.604
■ Vacuum Pad Ultrathin Series · · ·	P.624
■ Vacuum Pad Mark-free Series · · ·	P.642

Vacuum Pad Long Stroke Series · P.658

__Chart P.270

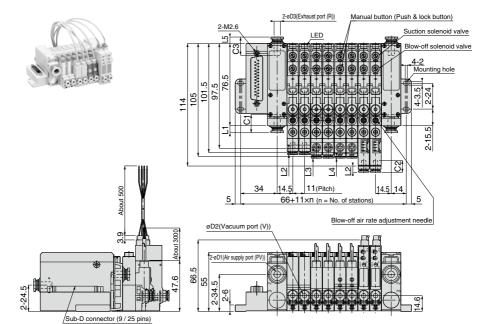
Tube exhaust, Sub-D connector type

Model code : $VZ \square \square - \square \square - D24 - \square - M \square - D \square$

10

20.7

11.7



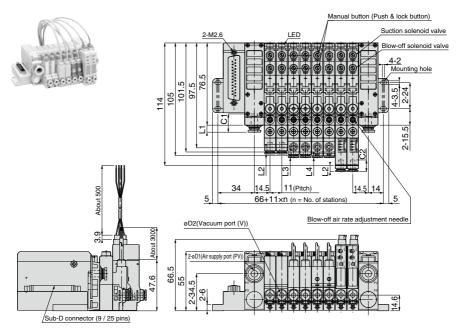
Dimension of Fitting										
Air supply port (PV) øD1	C1		Vacuum port (V) øD2	C2	L2	L3		Exhaust port (R) øD3	C3	L5
4	14.9	2	4	10.9	5.8	5.1	1.6	6	17	6.1
6	17	6.6	6	8.8	8.7	8	4.5	8	18.2	7.6
8	18.2	8.1	M5 (Female thread)	-	4	3.3	-0.2	10	20.7	11.2

Vacuum Generator VZ

VZ | Silencer vent, Sub-D connector type



Model code : $VZ \square \square - \square \square S-D24-\square -M\square -D\square$



14.9

17

18.2

2

6.6

8.1

4

6

M5 (Female thread

10.9

8.8

5.8

8.7

4

6

8

10

	Unit: mm
L3	L4
5.1	1.6
8	4.5

-0.2

3.3

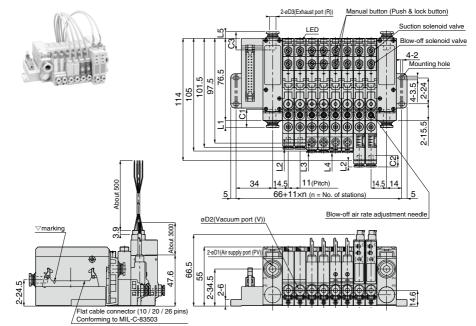
V		

Unit mm

Tube exhaust, Flat cable connector type







Dimension of Fitting

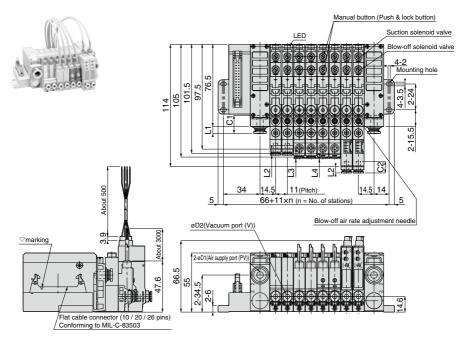
3								OTHE THIRD			
	Air supply port (PV) øD1	C1	L1	Vacuum port (V) øD2	C2	L2	L3	L4	Exhaust port (R) øD3	C3	L5
	4	14.9	2	4	10.9	5.8	5.1	1.6	6	17	6.1
	6	17	6.6	6	8.8	8.7	8	4.5	8	18.2	7.6
	8	18.2	8.1	M5 (Female thread)	-	4	3.3	-0.2	10	20.7	11.2
	10	20.7	11.7								

Vacuum Generator VZ

VZ | Silencer vent, Flat cable connector type



Model code: VZ ... - ... S-D24- ... - M ... - F ...



Dimension of Fitting U							
Air supply port (PV) ØD1	C1		Vacuum port (V) øD2	C2	L2	L3	L4
4	14.9	2	4	10.9	5.8	5.1	1.6
6	17	6.6	6	8.8	8.7	8	4.5
8	18.2	8.1	M5 (Female thread)	-	4	3.3	-0.2
10	20.7	11.7					

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♠ Detailed Safety Instructions

Before using PISCO products, be sure to read "Safety Instructions" and "Safety Instruction Manual" on page 35-39 and "Common Safety Instructions for Vacuum Series" on page 47-49.

Warning

- 1. For the operation of the valve, make sure that the leakage current is less than 1mA. Leakage current larger than that may cause malfunction.
- 2. The coil in a pilot solenoid valve generates heat under the following ① to ③ conditions. The heat may cause dropping life cycle, malfunctions, getting burnt or damaging peripheral machines.

Contact us when the power is applied to the vacuum generator under the following conditions:

- 1 The power is continuously ON for over 2 hours.
- ② High-cycle operation.
- 3 Even when intermittent running of the generator is carried out, the total operation time per day is longer than non-operation time.
- 3. When the electricity is applied to valves continuously for a long time, the coils generate heat. It may cause dropping life cycle, malfunctions, getting burnt or damaging peripheral machines due to the heat.
- 4. Switchover valve of double-solenoid types (VZ \square D···) is placed in neutral after the supply of pilot air has been suspended (the same is true when the valve is being operated for the first time after shipment). When resuming the supply of pilot air, be sure to send a signal to the pilot valve, or conduct switchover operations manually as required.
- 5. When a mounting unit is removed from a manifold-base, make sure the residual air is exhausted completely.
- 6. Avoid excessive vibration and impact on the vacuum generator. Otherwise, it may cause malfunctions or damaging. (Operate the product with acceleration less than 49m/s²)
- 7. When double solenoid type (VZ \square D \cdots) is operated under vibrating condition, set the main valves at right angles to vibrating direction.

Caution

- 1. Do not give an excessive tensile strength and bending on a lead wire. Otherwise, breaking wire or damage on connector may be caused.
- 2. Compressed air contains many kinds of drains such as water, oxidized oil, tar and other foreign substances. Dehumidify the compressed air by using an after-cooler or a dryer and improve the air quality, since those drains seriously impair the performance of the vacuum generator.
- 3. Do not use lubricators.
- 4. Foreign substances such as rusts or dust in the pipes may cause malfunction. Place a filter finer than 5µm ahead of the air supply port. It is recommended to carry out pipe flushing before operation and on a proper regular basis.
- 5. Avoid using the vacuum generator under the condition of corrosive and / or inflammable gas. Also do not use these gasses as a fluid medium.
- 6. When replacing supply ports and vacuum ports cartridges, be sure to remove foreign substances sticking to cartridge seals; make sure cartridge fixing pins are properly inserted into the appropriate ports. Read "Safety Rules for Use" before replacement.
- 7. Carry out the maintenance of the clogging of silencer element on manifold base periodically. It may cause dropping the performance or troubles by the clogging.
- 8. When installing each mounting unit on a manifold, be sure to remove any foreign substances sticking to seals; make sure cartridge fixing pins are properly inserted into the appropriate ports. Read "Safety Rules for Use" before replacement.
- 9. Arrange connector wiring of Sub-D or Flat cable correctly, after understanding the circuit well.
- 10. Read and understand "Safety Rules for Manifold Type" before operation, since manifold type may have a performance drop or some troubles by use condition.
- 11. Although the exhaust of the model with a manifold type is silencer vent by each individual unit, the exhaust air of operating unit or blow-off air flows into the vacuum port of non-operating unit. If such exhaust air causes the problem, please contact PISCO.

1. Safety Rules for Manifold Type

The increase of manifold station may cause troubles such as performance drop by a shortage of air supply and insufficient capability to exhaust, and exhaust air leak to the vacuum port. Allowable manifold numbers of simultaneous operation differs by nozzle size, vacuum performance, and other conditions. Please contact us for details.

1. Drop in the vacuum performance due to the supplied air shortage.

Countermeasures : ① Check the supplied air volume.

② Arrange the piping length as short as possible.

③ Use fittings with large size.

Drop in the vacuum performance due to insufficient exhaust volume, or exhaust air leaking out through the vacuum port.

Cause: Insufficient volume of the silencer or piping makes exhaust resistance large and it results in impairing the vacuum performance.

Countermeasures : ① In case of silencer vent type, set an external silencer.

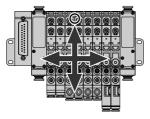
② In case of tube exhaust type, use wider and shorter pipes for exhaustion.

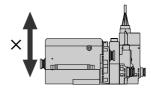
3 Avoid any obstacles around the exhaust ports.

 $\ensuremath{\textcircled{4}}$ Reduce the number of mounting units which operate simultaneously.

2. How to install the product

When a vacuum generator is operated under a vibration condition, install the vacuum generator so that the main valves are at right angle to vibrating direction of application.





3. Handling Method of Vacuum Switch I

- · Refer to page 825 (Small Pressure Sensor) for handling of vacuum sensor "V1", "V2", "R1" and "R2".
- Refer to page 815 (LED Digital Pressure Sensor) for handling of vacuum sensor "DW" and "DA".

4. How to adjust Blow-off Air

Turn the blow-off air rate adjustment needle to the right (clockwise) to reduce blow-off air and to the left (counterclockwise) to increase. After adjusting the needle, tighten the locknut firmly with 0.1-0.3Nm of the tightening torque.

Turn left: To increase air rate





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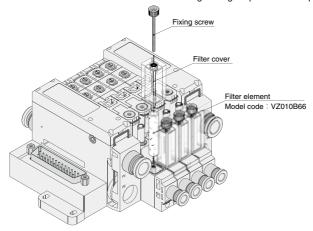
VK

VX

VZ

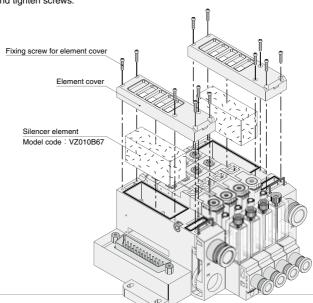
■ 5. How to replace Filter Elements

■ Remove the fixing screw to replace filter elements. Make sure to place the filter seal rubber properly and tighten the screw to fix the filter cover with 0.3-0.5Nm of the tightening torque after the replacement.



■ 6. How to replace Silencer Elements

- Replace silencer elements by the following method.
 - ① Remove 6 fixing screws to take out the silencer cover.
 - ② Take out a silencer element.
 - ③ Install a new element and place the cover to the original position. Tighten the screws with 0.4-0.5Nm of the tightening torque.
 - (Note) The fixing screws are tapping screws for resin. Use a precision driver to check the initial mesh and tighten screws.



■ 7. How to replace and clean Nozzles and Diffusers ■

- Clean the nozzle and the diffuser following the instructions below.
 - ① Remove the fixing pin on the ejector body with a flathead screwdriver.
 - 2 Pull out top plug, nozzle and diffuser.
 - ③ Remove the foreign substances adhered to nozzle and diffuser inside and seal rubbers by air blowing or wiping.

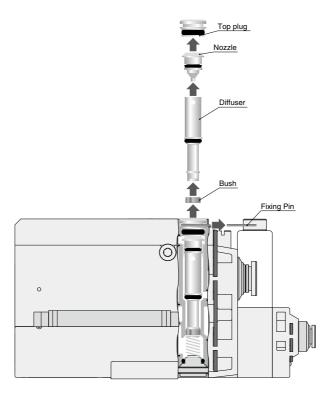
(Note) Pay special attention not to damage inside of nozzle & diffuser and seal rubbers.

- 4 Apply grease on piston packing of nozzle and diffuser if necessary.
 - (Note1) If grease on the packing is found scattered around seal rubbers, apply a thin layer of grease on the entire circumference of the packing. Select the grease which does not damage rubber and resin.

(NOK KLUBER CO., LTD. "ISOFLEX TOPAS NB52" is recommended.)

(Note2) Apply grease with care since it will cause dust and/or fluff to adhering to the packing section.

- ⑤ Place back diffuser, nozzle and top plug into the unit in this order.
- 6 Insert the fixing pin to fix the top plug.



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8. How to install and uninstall Mounting Unit |

[How to uninstall] Uninstall mounting units from the manifold by the following instructions.

①Stop the air supply and release all pressure in piping.

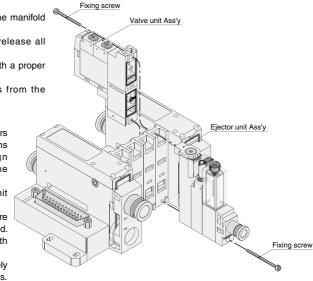
② Remove 2 fixing screws with a proper

3 Uninstall mounting units from the manifold.

[How to install]

- (1) Make sure that seal rubbers are in the proper positions and there is no foreign substance adhered to the connecting parts.
- ② Install each mounting unit on the manifold.
- 3 Make sure that the units are properly fit into the manifold.
- 4 Tighten 2 fixing screws with a proper tool.

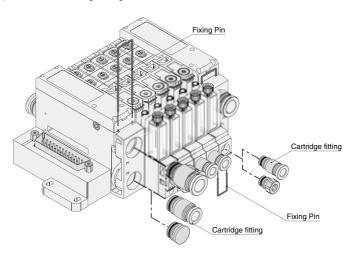
(Note) Slowly and alternately tighten 2 fixing screws. Recommended tightening torque: 0.4-0.5Nm~0.5N·m



9. How to replace Cartridge Fittings

- Replace cartridge fittings following the instructions below.
 - ① Use a flathead screwdriver to pull out a fixing pin.
 - 2 Pull out a cartridge fitting.

(Note) When a new cartridge fitting is attached, check if there are no dusts or fluffs stuck on O-ring.



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VΖ

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...Recomendations 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.

Products can cause personal injury or damages to properties.

↑ Warning I

- 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.

X. This safety instructions are subject to change without notice.



Disclaimer

- 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.
- 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.
- 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.

- 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 I

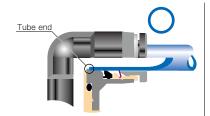
- 1. Do not use PISCO products under the following conditions.
 - ① Beyond the specifications or conditions stated in the catalog, or the instructions.
 - ② Under the direct sunlight or outdoors.
 - ③ Excessive vibrations and impacts.
 - 4 Exposure / adhere to corrosive gas, inflammable gas, chemicals, 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 Antispatter 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.
 - $\ensuremath{\bigcirc}$ 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.

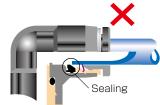


- 1. Remove dusts or drain before piping. They may get into the peripheral machine / facilities and cause malfunction.
- 2. When inserting an ultra-soft tube into push-in fitting, make sure to place an Insert Ring into the tube edge. There is a risk of causing the escape of tube and a fluid leakage without 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	_	\pm 0.05mm	Ø1/8	\pm 0.1mm	\pm 0.15mm
Ø3mm	_	± 0.15mm	Ø5/32	\pm 0.1mm	± 0.15mm
Ø4mm	\pm 0.1mm	± 0.15mm	Ø3/16	\pm 0.1mm	± 0.15mm
Ø6mm	\pm 0.1mm	± 0.15mm	Ø1/4	\pm 0.1mm	± 0.15mm
Ø8mm	\pm 0.1mm	± 0.15mm	Ø5/16	\pm 0.1mm	± 0.15mm
Ø10mm	\pm 0.1mm	± 0.15mm	Ø3/8	\pm 0.1mm	± 0.15mm
Ø12mm	\pm 0.1mm	± 0.15mm	Ø1/2	\pm 0.1mm	± 0.15mm
Ø16mm	\pm 0.1mm	± 0.15mm	Ø5/8	\pm 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 pushin 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.





Tube is not fully inserted up to tube end.

- 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
 - ②The 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 releasering, 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	
	M3 × 0.5	0.7N·m		SUS304 NBR	
	M5 × 0.8	1.0 ~ 1.5N·m			
	M6 × 1	2 ~ 2.7N·m			
Metric thread	M3 × 0.5	0.7N·m	_	РОМ	
	M5 × 0.8	1 ~ 1.5N·m			
	M6 × 0.75	0.8 ~ 1N·m			
	M8 × 0.75	1 ~ 2N·m			
	R1/8	4.5 ~ 6.5N·m			
Tanar pipe thread	R1/4	7 ~ 9N·m	White	_	
Taper pipe thread	R3/8	12.5 ~ 14.5N·m	vvnite		
	R1/2	20 ~ 22N·m			
Unified thread	No.10-32UNF	1.0 ~ 1.5N·m	_	SUS304、NBR	
	1/16-27NPT	4.5 ~ 6.5N·m			
Nietienel nine	1/8-27NPT	4.5 ~ 6.5N·m			
National pipe thread taper	1/4-18NPT	7 ~ 9N·m	White	_	
illieau lapei	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.

Common Safety Instructions for Vacuum Series

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

↑ Warning I

- 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
- 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.

VN

- 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.

- 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 Series

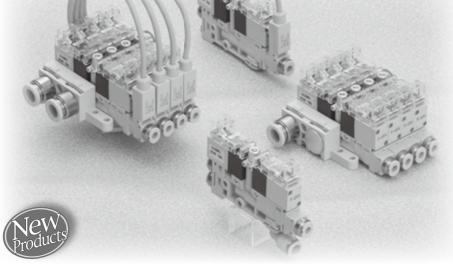
Vacuum Generator

- 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.



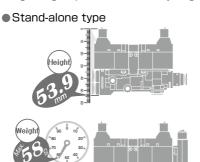


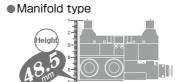
Complex Vacuum Generator realizing Stable and High-Speed Response

Vacuum Generator VN Series

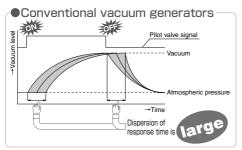
- Suitable for semiconductor industry such as IC chip loader or IC handler.
 - Suitable for the application requiring a limited space.

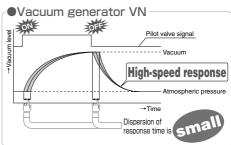
Compact and lightweight ejector unit. The body height is lowered in particular for small space use.





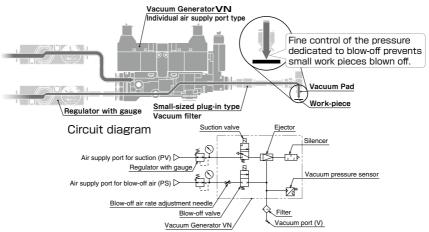
- Characteristics
- Wide variety of combinations enables to meet various applications. External Vacuum Controller for a vacuum pump, VNP Series, is also available. (P.394).
- High-speed response time. (ON / OFF = 5msec or less)
 Direct operated solenoid valve is used for the main valve.





Gently release a tiny work-piece by blow-off air.

Air supply port for blow-off is independent. In addition to conventional adjustment of blow-off air rate, control by an external regulator make the fine adjustment of blow-off air easy.



Supply port in common type is also available.

* Supply port in common: Air supply port for suction and for blow-off air is in common.

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VU

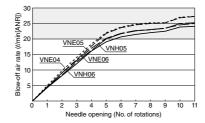
VB

VRL

VK

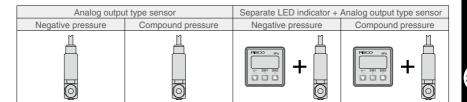
VZ

Securing 20l/min for blow-off air rate. (Supply pressure: 0.5Mpa)



4 types of analog output sensors are selectable.

Analog output type vacuum pressure sensor for negative pressure, Separate LED indicator + Analog output type vacuum pressure sensor for negative pressure, Analog output type sensor for compound pressure, Separate LED indicator + Analog output type sensor for compound pressure



External vacuum filter (option) is prepared.

Inconvenience from filter replacement due to the downsizing of this vacuum generator is resolved.

* Vacuum Generator VN series is not equipped with vacuum filter. Please make sure to order PISCO vacuum filter separately for long-term use.

Vacuum characteristics

Vacuum port Air supply port for suction

■ Model Designation of Stand-Alone Type (Example)

Voltage specification Exhaust type

Vacuum sensor

Air supply port for blow-off air

1) Vacuum characteristics

Vacuum	Nozzle bore	Rated supply pressure	Final vacuum	Suction flow	Air consumption
characteristics	(mm)	(MPa)	(-kPa)	(t/min[ANR])	(t/min[ANR])
E04	ø0.4	0.35		2	6
H05	ø0.5	0.5	90.4	7	11.5
E05		0.35		3	8
H06	~0.6	0.5		9.5	16
E06	ø0.6	0.35		5	12

^{*} The values in the table are reference values only. Suction flow varies according to the vacuum system conditions; vacuum port dia. or tube length.

2 Vacuum port (Applicable tube size)

Code	3	4	3L	4L
Tube dia. (mm)	ø3 (Straight push-in fitting)	ø4 (Straight push-in fitting)	ø3 (Elbow push-in fitting)	ø4 (Elbow push-in fitting)

3 Air supply port for suction (Applicable tube size)

Code	3	4
Tube dia. (mm)	ø3 (Straight push-in fitting)	ø4 (Straight push-in fitting)

4 Air supply port for blow-off air (Applicable tube size)

Code	3	4	N		
Tube dia. (mm)	ø3 (Straight push-in fitting)	ø4 (Straight push-in fitting)	Common air supply port for suction and blow-off		
* When 3 or 4 is selected, suction air and blow-off air are senarately supplied					

⑤ Exhaust type

Code	S	J*
Exhaust type	Silencer vent	Tube exhaust

Onlyø6mm Push-In Fitting is available for Tube exhaust.

6 Valve specification

Code	D24
Voltage	24VDC

7 Vacuum sensor

Code	No code	
Sensor	Without vacuum sensor	
Code	V1	V2
Sensor	Analog output type vacuum sensor for negative pressure	Separate LED indicator + Analog output type vacuum sensor for negative pressure
Code	R1	R2
Sensor	Analog output type sensor for compound pressure	Separate LED indicator + Analog output type sensor for compound pressure

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■ Model code of Bracket for Stand-Alone Type (Option) |

VNB

* Including 2 hexagonal socket head screw (M3 x 12)

■ Model code of Silencer Element for Stand-Alone Type (Maintenance parts)

VN012B33

■ Model Designation of Manifold Type (Example)

No. of stations Vacuum sensor Voltage specification Exhaust type

Air supply port for blow-off air

1) Vacuum characteristics

Air supply port for suction

Vacuum	Nozzle bore	Rated supply pressure	Final vacuum	Suction flow	Air consumption
characteristics	(mm)	(MPa)	(-kPa)	(t/min[ANR])	(t/min[ANR])
E04	ø0.4	0.35	90.4	2	6
H05	ø0.5	0.5		7	11.5
E05		0.35		3	8
H06		0.5		9.5	16
E06	ø0.6	0.35		5	12
K	When different vacuum characteristics are mixed on a manifold (Fill in the details on Specification Order Form)				

^{*} Mixing of E and H on the same manifold is not possible. Mixing of different nozzle sizes with same characteristic is possible.

② Vacuum port (Applicable tube size)

Code	3	4	3L	4L	K
Tube dia.(mm)	ø3 (Straight push-in fitting)	ø4 (Straight push-in fitting)	ø8 (Elbow push-in fitting)	ø10 (Elbow push-in fitting)	When different vacuum ports are mixed on a manifold (Fill in the details on Specification Order Form)

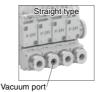
(3) Air supply port for suction (Applicable tube size)

	Code		Tube dia. (mm) and Fitting type			
Both sides	R side only	L side only	rube dia. (mm) and Filling type			
4	4R	4H	ø4 (Straight push-in fitting)			
6	6R 6H		ø6 (Straight push-in fitting)			
8	8R 8H		ø8 (Straight push-in fitting)			
4L	4LR	4LH	ø4 (Elbow push-in fitting)			
6L	6LR	6LH	ø6 (Elbow push-in fitting)			
8L	8LR	8LH	ø8 (Elbow push-in fitting)			

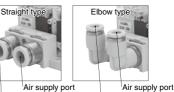


	Code		Tube dia. (mm) and Fitting type				
Both sides	R side only	L side only	rube dia. (min) and Filling type				
4	4 4R		ø4 (Straight push-in fitting)				
6	6R	6H	ø6 (Straight push-in fitting)				
8	8R	8H	ø8 (Straight push-in fitting)				
4L	4L 4LR		ø4 (Elbow push-in fitting)				
6L	6L 6LR 6L		ø6 (Elbow push-in fitting)				
8L 8LR 8LH			ø8 (Elbow push-in fitting)				
	N		Common air supply port for suction and blow-off				

^{*} When 4, 6, 8, 4L, 6L or 8L is selected for blow-off air supply port, suction air and blow-off air are separately supplied.







for blow-off air Air supply port for suction

for blow-off air Air supply port for suction

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^{*} The values in the table are reference values only. Suction flow varies according to the vacuum system conditions; vacuum port dia. or tube length.

PISCO:

⑤ Exhaust type

Code	S
Exhaust type	Silencer vent

- * Tube exhaust is not available for Manifold type.
- 6 Valve voltage

Code	D24
Voltage	24VDC

7 Vacuum sensor

Code	No code	
Switch	Without vacuum switch	
Code	V1	V2
Switch	Analog output type vacuum sensor for negative pressure	Separate LED indicator + Analog output type vacuum sensor for negative pressure
Code	R1	R2
Switch	Analog output type sensor for compound pressure	Separate LED indicator + Analog output type sensor for compound pressure
Code	I	<
Switch	When different vacuum sensors are mixed on a mar	nifold (Fill in the details on Specification Order Form)

® No. of stations

Code	02	03	04	05	06	07	08	09	10
No of stations	2	3	4	5	6	7	8	9	10

■ Model Code of Silencer Element for manifold type (Maintenance part)

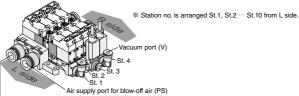


Vacuum Generator VN

ACUUM NERATOR

■ Specification Order Form (example)

Va	cuum	Vacuum		Vacuum port	Air supply port	Air supply port	Exhaust		Voltage	Vacuum		No. of
ger	nerator	characteristics			for suction (PV)	for blow-off air (PS)	type		specification	sensor		stations
	type	1		2	3	4	(5)		6	7		8
	VN	K	_	K	8	8	5	_	D24	K	_	M04
L	St. 1	H04	_	4				_				
	St. 2	H05	-	4				-				
1	St. 3	H06	_	3L				-		V1	1	
	St. 4	H04	_	3L				_		V1		
St.	St. 5		_					<u> </u>				
no.	St. 6		_					-			1	
	St. 7		_					-				
1	St. 8		_					-				
	St. 9		_					_			1	
R	St. 10		_					_]	



Air supply port for suction (PV)

VH - VS

VUN

VY

VB

VRL

VG

V1C

VX

1/7

Vacuum Generator VN Series Specification Order Form

Го: NIHON PISCO CO., Ltd.		
Name:		
Order No. :		
Date :		
Requested EX-W PISCO Date :	Quantity :	

N
No. of
station
8
-

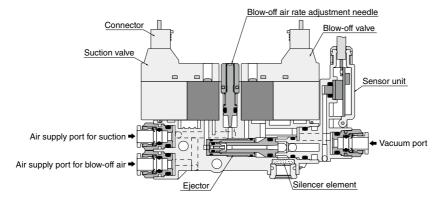
 $[\]ensuremath{\%}$ 1. Refer to the previous page to fill in the form.

^{※2.} Copy this page and use.

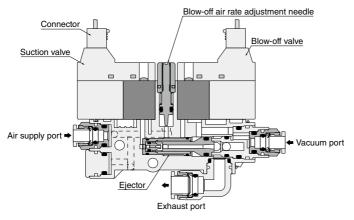
^{*3.} Use this specification order form when ordering different specifications of mounting units.

Vacuum Generator VN

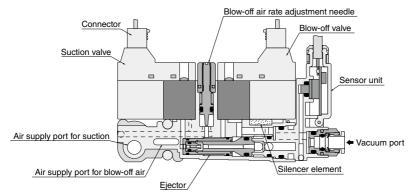
Construction of Individual air supply port, Silencer vent, Vacuum sensor



Construction of common air supply port, Tube exhaust, Without vacuum sensor



■ Construction of Manifold type, Vacuum sensor |



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VL

VY

VM · V

VK

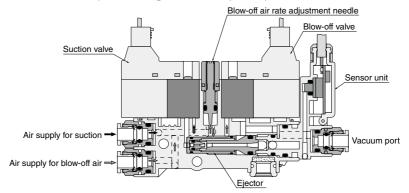
VJ

VZ

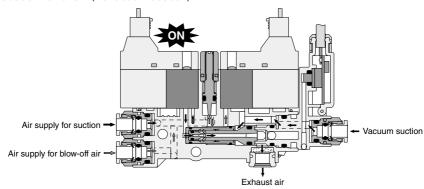


■ How Individual air supply port, silencer vent type works |

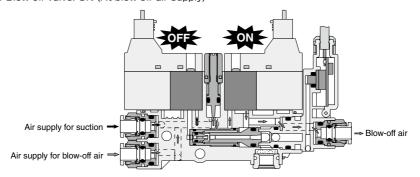
① Suction valve: OFF (At vacuum generation suspended)



2 Suction valve: ON (At vacuum suction)



3 Blow-off valve: ON (At blow-off air supply)



Vacuum Generator VN

Specification

Fluid medium	Air
Operating pressure range	0 ~ 0.55MPa
Operating temp. range	5 ~ 50°C (No freezing)
Operating humidity range	35 ~ 85%RH (No dew condensation)
Protective structure	IEC standard IP40 equiv.
Vibration resistance / shock resistance	Less than 50m/s ² / Less than 150m/s ²

■ Ejector Characteristics

Model code	Nozzle bore	Rated supply pressure	Final vacuum	Suction flow	Air consumption	
woder code	(mm)	(MPa)	(-kPa)	(ℓ/min[ANR])	(t/min[ANR])	
VNE04	0.4	0.35		2	6	
VNH05	0.5	0.5		7	11.5	
VNE05	0.5	0.35	90.4	3	8	
VNH06	0.6	0.5		9.5	16	
VNE06	0.6	0.35		5	12	

^{**} The values in the table are reference values only. Suction flow varies according to the vacuum system conditions; vacuum port dia. or tube length.

■ Solenoid Valve

Item	Suction valve	Blow-off valve				
Operating system	Direct operation					
Valve construction	Elastic seal, Poppet valve					
Rated voltage	24VDC					
Allowable voltage range	±10%					
Surge protection circuit	Surge absorber					
Power consumption	Startup: 2.2W Retention: 0.6W (Power saving circuit)					
Operation indicator LED	Green LED					
Operating pressure range	0 ~ 0.55MPa	0 ~ 0.55MPa				
Valve type	Normally closed					
Response time (*)	Vacuum suction (OFF → ON) / Vacuum stop (ON → OFF): 5 msec or less for each					
Wiring method	Connector (Cable length: 500mm)					
wining method	Red lead wire: +24VDC, Black lead wire: -0V					

^(**)Response time is the time length until pressure change at vacuum port is detected under rated supply pressure and rated voltage. Vacuum arrival time and blow-off time at the piping end (work-piece) vary according to ejector characteristics, volume (tube length), blow-off air rate and others.

■ Blow-Off Function

Blow-off air rate	0 ~ 204/min[ANR] (Supply pressure is at 0.5MPa)

^{*} Air rate is adjustable with the blow-off air rate adjustment needle.

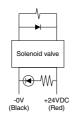
PISCO: http://www.pisco.co.jp

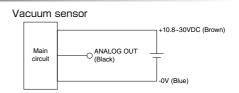
■ Vacuum Sensor

Item		Negative pressure (-V1) Compound pressure		
Rated vo	Itage	10.8 ~ 30VDC (Ripple included)		
Current co	onsumption	Less than 20mA (2	24VDC at no-load)	
Pressure	detection	Proliferated semiconductor pre	ssure sensor, gauge pressure	
Operating p	ressure range	-100 ~ 0kPa	-100 ~ 300kPa	
Proof pre	ssure	200kPa	600kPa	
Storage tem	perature range	-20 ~ 70°C (Atmospheric pressure / Humidity: 65% RH or less)		
Operating	temp. range	-10 ~ 60°C (No freezing)		
Operating h	umanity range	35 ~ 85%RH (No dew condensation)		
Protectiv	e structure	IEC standard IP40 equiv.		
	Output voltage	1 ~ 5V		
	Zero-point voltage	1±0.1V (=Atmospheric pressure)	1±0.1V (=At 100kPa)	
Analog	Max. pressure voltage	5±0.1V (=At 100kPa)	5±0.1V (=At 300kPa)	
output	Linearity	±0.5% F.S. or less		
	Temperature characteristics	±2% F.S. or less (0 ~ 50°C、Ta=25°C)		
	Output current	Output current: 1mA max. (load resistance 50kΩmax.)		

■ Circuit diagram |

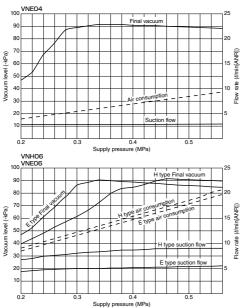
Solenoid valve

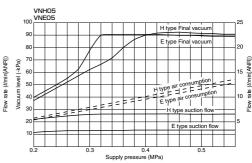




Characteristics

■Vacuum characteristics chart





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VU

VY

VM · VO

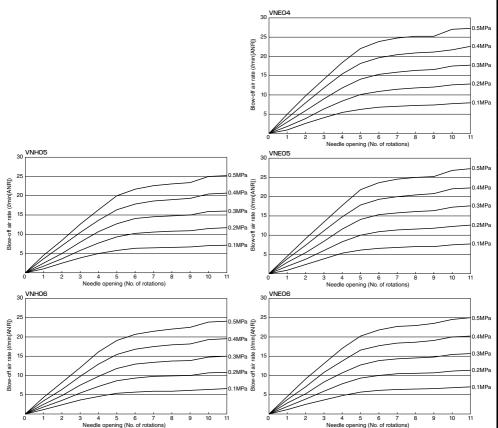
VRL

VK

....

VQ

■Flow characteristics chart of blow-off air



■ Applicable Tube and Related Products

Polyurethane Tube (Piping products catalog P.596)

Polyurethane Tube is for the general pneumatic piping and suitable for a compact piping.

Nylon Tube (Piping products catalog P.608)

■ Nylon Tube is for the general pneumatic piping and suitable for a high-pressure fluid up to 1.5MPa (NB tube: 1.0MPa).

Vacuum Tube (Piping products catalog P.612)

Vacuum Tube is a ultra-soft tube and suitable for piping of vacuum generators or actuators.

Vacuum Pads

Vacuum Pad Standard Series

Vacuum Pad Oval Series · · · ·	P.526
Vacuum Pad Soft Series · · · ·	P.550
Vacuum Pad Soft Bellows Series	P.578
Vacuum Pad Skidproof Series	P.604
■ Vacuum Pad Ultrathin Series · · ·	P.624
■ Vacuum Pad Mark-free Series	P.642
Vacuum Pad Long Stroke Series	P.658

Vacuum Pad Sponge Series · · · P.468

Vacuum Pad Bellows Series · · · P.488
Vacuum Pad Multi-Bellows Series P.508

Vacuum Generator VN

■ 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 VN 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

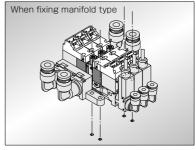
The tube is disconnected by pushing release-ring to release Lock-claws. Make sure to stop air supply before the tube disconnection.



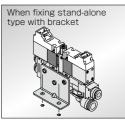
2. How to fix Stand-alone/Manifold type

In order to fix the vacuum generator, use the fixing holes on the body to tighten with M3 thread with tightening torque 0.3-0.35Nm. Tightening with the torque out of the recommended range may result in falling of the product or damaging the products.

Refer to the outer dimensional drawings of the mounting hole pitch.







■ Weight List

Model code	Unit combinations	Weight (g)
VN□□-□□□S-D24-□	Individual air supply port, Silencer vent, Stand-alone with Vacuum sensor	56
VN□□-□□□S-D24	Individual air supply port, Silencer vent, Stand-alone without Vacuum sensor	52.5
VN□□-□□□J-D24-□	Individual air supply port, Tube exhaust, Stand-alone with Vacuum sensor	58
VN□□-□□□J-D24	Individual air supply port, Tube exhaust, Stand-alone without Vacuum sensor	54.5
VN□□-□□NS-D24-□	Common air supply port, Silencer vent, Stand-alone with Vacuum sensor	54
VN□□-□□NS-D24	Common air supply port, Silencer vent, Stand-alone without Vacuum sensor	50.5
VN□□-□□NJ-D24-□	Common air supply port, Tube exhaust, Stand-alone with Vacuum sensor	56
VN□□-□□NJ-D24	Common air supply port, Tube exhaust, Stand-alone without Vacuum sensor	52.5
VN-□S-M	Individual air supply port, Manifold side block	171
VN-NS-M	Common air supply port, Manifold side block	164

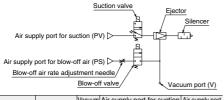
For manifold type, weight of mounting unit increases by 46.5g/ mounting unit with a sensor, and 43g/mounting unit without a sensor.

Example) Individual air supply port, Silencer vent, 4 stations with Vacuum sensor

¹⁷¹⁺⁽⁴x46.5)=357g → Manifold weight (171g) + 4 mounting units with vacuum sensor (186g)

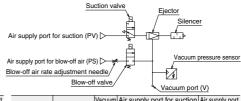
Standard Size List

Individual air supply port, Silencer vent, Without vacuum pressure sensor



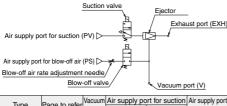
Туре	Page to refer	Vacuum	Air supply po	rt for suction	Air supply port
		port	3mm	4mm	for blow-off air
VN	200	3mm	•	•	3mm
	299	4mm	•	•	4mm

Individual air supply port, Silencer vent, With pressure vacuum sensor



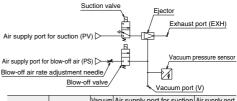
Type Page to refer		Vacuum	Air supply po	rt for suction	Air supply port
Type	rage to relei	port	3mm	4mm	for blow-off air
VN	200	3mm	•	•	3mm
	299	4mm	•	•	4mm

Individual air supply port, Tube exhaust, Without vacuum pressure sensor Individual air supply port, Tube exhaust, With vacuum pressure sensor



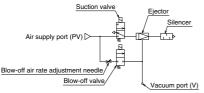
			it ioi suction	Air supply port
Type Page to re	port	3mm	4mm	for blow-off air
VN 300	3mm	•	•	3mm
300	4mm	•	•	4mm

^{*} Exhaust port size is 6mm only.



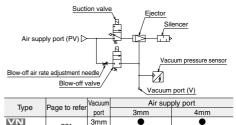
Type	Page to refer	Vacuum	Air supply po	Air supply port	
Type		port	3mm	4mm	for blow-off air
VN	300	3mm	•	•	3mm
	300	4mm	•	•	4mm

^{*} Exhaust port size is 6mm only.

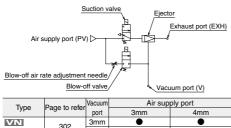


Type	Page to refer	Vacuum	Air supply port		
Type		port	3mm	4mm	
VN	301	3mm	•	•	
	301	4mm	•	•	

Common air supply port, Silencer vent, Without vacuum pressure sensor Common air supply port, Silencer vent, With vacuum pressure sensor



Common air supply port, Tube exhaust,	, Without vacuum pressure senso
---------------------------------------	---------------------------------

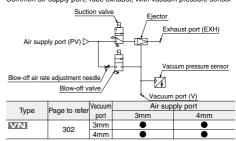


4mm

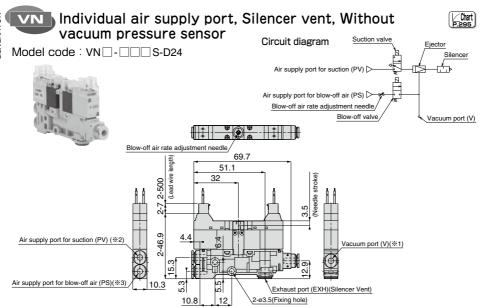
*	Exhaust	port	size	is	6mm	only.
---	---------	------	------	----	-----	-------

Common air supply port, Tube exhaust, With vacuum pressure sensor

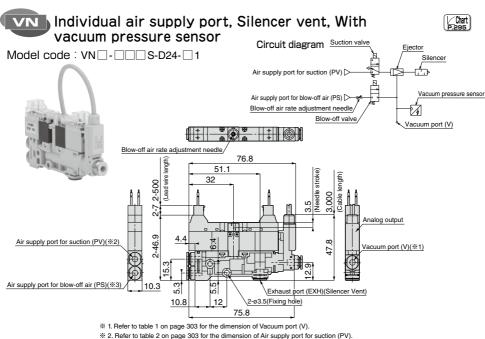
4mm



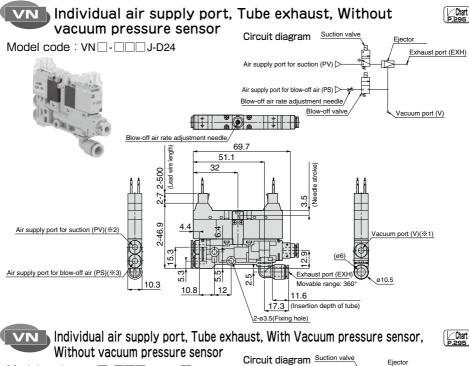
^{*} Exhaust port size is 6mm only

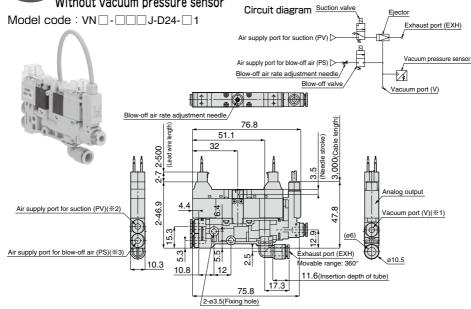


- * 1. Refer to table 1 on page 303 for the dimension of Vacuum port (V).
- * 2. Refer to table 2 on page 303 for the dimension of Air supply port for suction (PV).
- * 3. Refer to table 2 on page 303 for the dimension of Air supply port for blow-off air (PS).



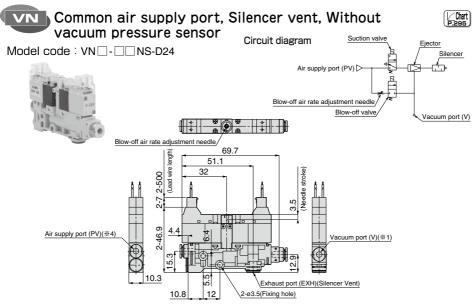
3. Refer to table 2 on page 303 for the dimension of Air supply port for blow-off air (PS).



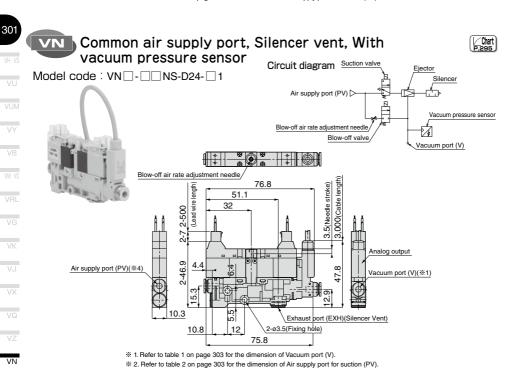


- * 1. Refer to table 1 on page 303 for the dimension of Vacuum port (V).
- * 2. Refer to table 2 on page 303 for the dimension of Air supply port for suction (PV).
- $\frak{\%}$ 3. Refer to table 2 on page 303 for the dimension of Air supply port for blow-off air (PS).

Vacuum Generator VN

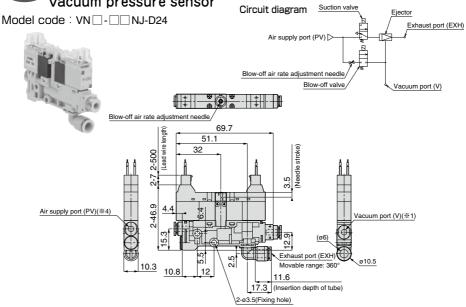


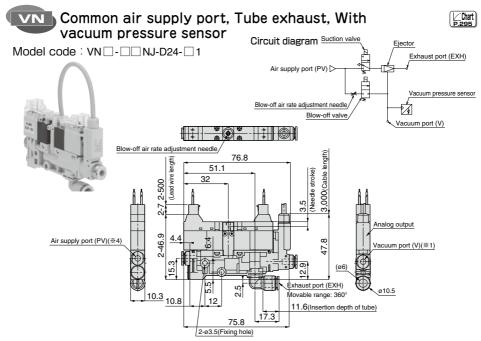
- * 1. Refer to table 1 on page 303 for the dimension of Vacuum port (V).
- * 2. Refer to table 2 on page 303 for the dimension of Air supply port for suction (PV).











- * 1. Refer to table 1 on page 303 for the dimension of Vacuum port (V).
- * 2. Refer to table 2 on page 303 for the dimension of Air supply port for suction (PV).

Vacuum Generator VN

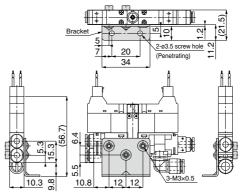
■ Fitting Dimension of Stand-Alone type

Fitting dimension of Stand-Alone type				
10.9 10.9	10.9	7.8 15.1	7.8	
4(ø4 Straight type)	3(ø3 Straight type)	4L(ø4 Elbow type)	3L(ø3 Elbow type)	
Table 1 ∶ Push-In Fitting type of Vacuum port				

9.8 2.8 8.9 9.10 9.0	9.8 8.2 8.9 9.0 9.0 9.0 9.0 9.0 9.0 9.0 9.0 9.0 9	
4(ø4 Straight type)	3(ø3 Straight type)	
Table 2 Push-In Fitting type of Air supply port		

NE Bracket for Stand-Alone type (Option)





303

VI

VUI

VE

VM - V

V

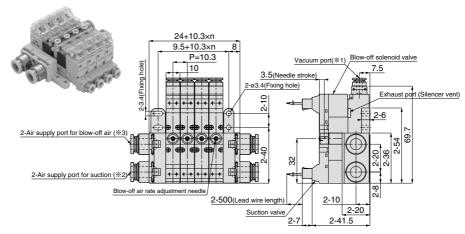
VJ

7 0



Individual air supply port, Silencer vent, Without vacuum pressure sensor

Model code: VN - - S-D24-M



- * 1. Refer to table 1 on page 306 for the dimension of Vacuum port.
- * 2. Refer to table 2 on page 306 for the dimension of Air supply port for suction.
- * 3. Refer to table 2 on page 306 for the dimension of Air supply port for blow-off air.

Individual air supply port, Silencer vent, With vacuum pressure sensor

Model code: VN . - . S-D24- 1-M

Blow-off air rate adjustment needle

24+10.3×n Analog output 9.5+10.3×n Blow-off solenoid valve Vacuum port(**1) 3,000(Sensor cable length) P=10.3 7.5 10 3.5(Needle stroke) 2-ø3.4(Fixing hole) Exhaust port (Silencer vent) 2-6 76.8 2-Air supply port for blow-off air(3) 38 2-Air supply port for suction(%2)

- \frak{W} 1. Refer to table 1 on page 306 for the dimension of Vacuum port.
- * 2. Refer to table 2 on page 306 for the dimension of Air supply port for suction.
- * 3. Refer to table 2 on page 306 for the dimension of Air supply port for blow-off air.

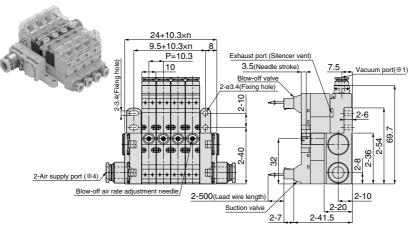
2-500(v) Suction valve စု ၃ 2-10

2-20 2-41.5

Vacuum Generator VN

Common air supply port, Silencer vent, Without vacuum pressure sensor

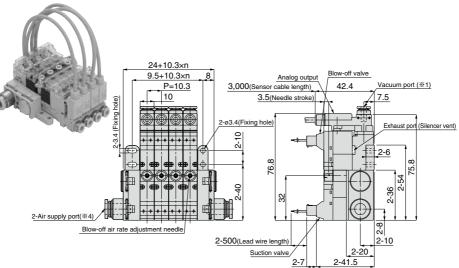
Model code : VN □ - □ □ NS-D24-M □



- * 1. Refer to table 1 on page 306 for the dimension of Vacuum port.
- * 4. Refer to table 2 on page 306 for the dimension of Air supply port.

Common air supply port, Silencer vent, With Vacuum pressure sensor

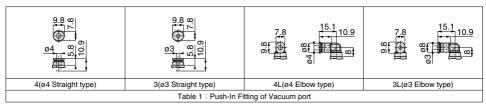
Model code : VN □ - □ □ NS-D24- □ 1-M □

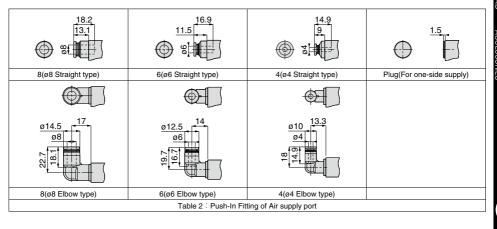


- * 1. Refer to table 1 on page 306 for the dimension of Vacuum port.
- * 4. Refer to table 2 on page 306 for the dimension of Air supply port.

305

■ Fitting Dimension of Manifold type |





Before using PISCO products, be sure to read "Safety Instructions" and "Safety Instruction Manual" on page 35-39 and "Common Safety Instructions for Vacuum Series" on page 47-49.

Warning

[Products Handling]

- Do not step onto or place objects on the devices. These may cause falling accident, fall of devices, injuries from falling and malfunctions from device breakage.
- 2. Do not wash or paint the devices with solvent or water. Solvent use may cause breakage of resin parts and malfunction by port clogs.

[Products maintenance]

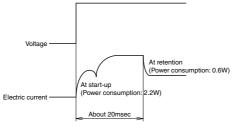
- 1. Carry out maintenance and checks of equipment only after turning power off, shutting air off and making sure that the residual pressure in the piping has dropped to zero.
- When installing wiring and piping, be sure to switch off the power and make sure there is no wrong wiring and wrong piping before applying power and air.
- 3. Tighten screws with recommended tightening torque. The recommended tightening torque for fixing device is specified on "How to fix Stand alone / Manifold type" of page 297. The recommended tightening torque is written on "How to replace silencer elements" of page 309. Improper tightening may cause air leakage, dropout or breakage of the products.

[Products application]

- For the operation of the solenoid valve, make sure that the leakage current is less than 1mA. Leakage current larger than that may cause malfunction.
- Avoid applying excessive vibration or shocks to the devises. (Check the specification on page 293.) It may damage devises and lead to malfunction of solenoid valve.
- 3. The coil in a pilot solenoid valve generates heat under the following ① to ③ conditions. The heat may cause dropping life cycle, malfunctions, getting burnt or damaging peripheral machines.

Contact us when the power is applied to the vacuum generator under the following conditions:

- ① The power is continuously ON for over 2 hours.
- ② High-cycle operation.
- ③ Even when intermittent running of the generator is carried out, the total operation time per day is longer than non-operation time.
- 4. When the electricity is applied to valves continuously for a long time, the coils generate heat. It may cause dropping life cycle, malfunctions, getting burnt or damaging peripheral machines due to the heat.
- 5. Current limit circuit is adopted for the solenoid valve. It features the current drop when the coil is energized and retains current. Therefore, the use under the vibration or shock greater than the specification must be avoided. It may cause valve malfunction.



Electric current and voltage waveform at valve excitation

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VU

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VB

VW-VC

VG

VJ

VQ

Caution

[Products Handling]

- 1. Do not give an excessive tensile strength and bending on a lead wire. Otherwise, breaking wire or damage on connector may be caused.
- 2. Compressed air contains many kinds of drains such as water, oxidized oil, tar and other foreign substances. Dehumidify the compressed air by using an after-cooler or a dryer and improve the air quality, since those drains seriously impair the performance of the vacuum generator.
- 3. Do not use lubricators.
- 4. Foreign substances such as rusts or dust in the pipes may cause malfunction. Place a filter finer than 5µm ahead of the air supply port. It is recommended to carry out pipe flushing before operation and on a proper regular basis.
- 5. Avoid using the vacuum generator under the condition of corrosive and / or inflammable gas. Also do not use these gasses as a fluid medium.
- 6. The product is not drip/dust proof. Do not use the vacuum generator in location where it may be exposed to water, oil drop or dust.
- 7. The lead wire of solenoid valve is polarized. Therefore, wrong polarity does not activate the solenoid

[Products maintenance]

- 1. When replacing cartridge fittings for air supply (PS, PV) or vacuum (V) port, be sure to remove foreign substance from the seal and fix the fastening pin firmly in place.
- 2. The performance of silencer may deteriorate due to when much dust is stuck on the elements. Periodical cleaning and replacing of the elements are recommended.

[Products application]

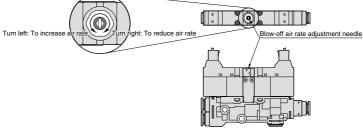
- 1. In selecting the piping to the vacuum (V) port, secure piping bore and length for enough effective sectional area. Insufficient effective sectional area may cause performance drop in characteristics such as suction flow and vacuum release airflow.
- 2. In selecting the piping to the supply (PS,PV) port, select piping bore and length to secure enough effective sectional area. Insufficient effective sectional area may cause performance drop due to short supply of compressed air and vacuum flow.
- 3. This product is not equipped with a vacuum filter. Make sure to select and use PISCO vacuum filter. If the filter is not used, dust or other particles are accumulated inside the product and cause vacuum performance drop and solenoid valve malfunction such as air leakage. (Recommended filter: VFU series and VFJ series)
- 4. As for manifold types, allowable station numbers for the simultaneous operation depends on the condition of the air supply (supply port size, piping length, regulator processing flow rate and etc.) and/or air consumption (vacuum characteristics) of ejector. If simultaneous operation of mounting units on a manifold is required, contact PISCO before the use.
- 5. Although the exhaust of the model with a manifold type is silencer vent by each individual unit, the exhaust air of operating unit or blow-off air flows into the vacuum port of non-operating unit. If such exhaust air causes the problem, please contact PISCO.

■ How to adjust blow-off air flow

■ Turn the blow-off air rate adjustment needle to the right (clockwise) to reduce blow-off air and to the left (counterclockwise) to increase.

* Make sure to use a proper size of a flathead screwdriver for the needle adjustment of blow-off air flow.

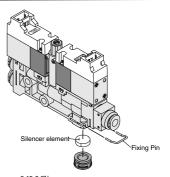
※ A spring is installed under the needle in order to avoid an unexpected needle rotation, so there is no locknut. Do not use a spanner or other tools for the hexagonal-colum. Otherwise, it may cause damage to the product.



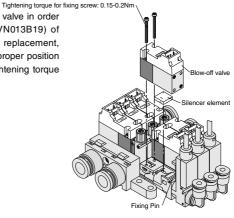
■ How to replace silencer elements

Use a flathead screwdriver to pull out the fixing pin in order to replace silencer elements (Model code: VN012B33) of stand-alone type. Make sure to insert the pin properly after the replacement.

※ Pay attentions to the direction of the fixing pin when inserting. In case it is inserted with a wrong direction, the pin can be fallen out by vibration during the operation.



Use a Phillips screwdriver to remove a blow-off valve in order to replace silencer elements (Model code: VN013B19) of manifold type. Insert the pin properly after the replacement, make sure the seal rubbers of the valve in the proper position and tighten the fixing screws firmly with the tightening torque 0.15-0.2Nm.



309

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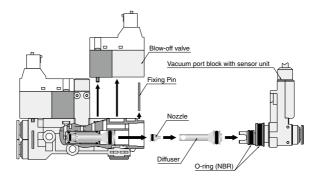
■ How to replace and clean nozzles and diffusers

■ To remove the diffuser, firstly remove the blow-off valve, lock pin for vacuum port block with or without sensor unit. Then, pull out the diffuser using needle-nose pliers etc. To prevent the nozzle from jumping out, cover the main body with a cushioning material (sponge etc.), and supply vacuum generating air (*1,*2) and energize vacuum generating solenoid valve. After the nozzle is pushed out by supplied air, remove the cushioning material and take out the nozzle.

Remove any foreign substance adhered to the nozzle, diffuser interior and seal using air blowing or wiping (*3).

Install the nozzle on the diffuser, and insert to the main body, taking care that the nozzle is not detached from the diffuser. Push in the diffuser by taking care not to damage the tip and install the vacuum port block with or without sensor unit. After inserting the lock pin to fix the vacuum port, tighten the blow-off valve by the fixing screws with a tightening torque of 0.15-0.2N.m. For installation of the silencer element, refer to "How to replace the silencer elements".

- ** 1 <Warning> When the air is applied to the generator, do not point the nozzle port toward anyone.
 There is a possibility that the nozzle jumps out and cause injury.
- ※ 2 <Warning> By supplying air without having installed the blow-off valve, the air blows out from the square hole of main unit. In such case, close blow-off air rate adjustment needle completely before supplying air.
- * 3 Nozzle, diffuser, seal rubbers and inside of the body shall not be damaged, since there is a possibility of a performance drop.
- ¾ 4 When attaching the vacuum port block, make sure to remove dusts or fluffs stuck on O-ring.



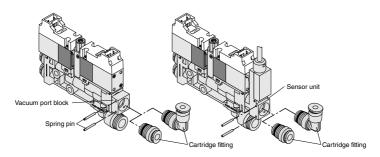
How to replace cartridge fittings

<Vacuum port>

Stand-Alone Type

Pull out the spring pins (2 pieces) inserted from the side of vacuum port block with or without sensor unit with the jig like ø1mm pin and replace the cartridge fitting.

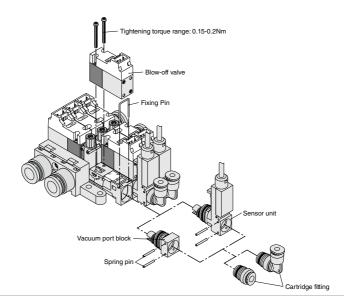
* When attaching a new cartridge fitting, make sure to remove dusts or fluffs stuck on O-ring. O-ring and inside of the body shall not be damaged, since it may cause a performance drop.



Manifold Type

Using a suitable Philips screwdriver to remove the vacuum blow-off valve. Pull out the fixing pin using a flat-blade screwdriver and remove the vacuum port block with or without sensor unit. Pull out the spring pins (2 pieces) inserted from the side of the vacuum port block with the jig like ø1mm pin and replace the cartridge fittings. After checking the rubber gasket for the solenoid valve is not missing, securely tighten the two fixing screws with a tightening torque of 0.15-0.2N.m.

When attaching a new cartridge fitting, make sure to remove dusts or fluffs stuck on O-ring. O-ring and inside of the body shall not be damaged, since it may cause a performance drop.



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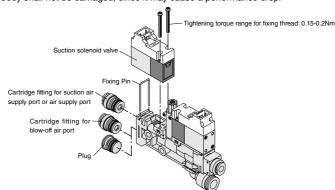


<Supply port>

Stand-Alone Type

Using a suitable Philips screwdriver to remove suction solenoid valve. Pull out a fixing pin on suction air supply port, blow-off air supply port or air supply port with a flathead screwdriver. After checking the packing for the solenoid valve is not missing, securely tighten the two fixing screws with tightening torque of 0.15-0.2N.m.

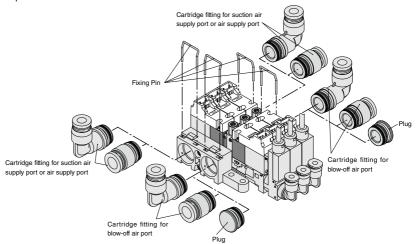
** When attaching a new cartridge fitting, make sure to remove dusts or fluffs stuck on O-ring. O-ring and inside of the body shall not be damaged, since it may cause a performance drop.



Manifold Type

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

- ** When attaching a new cartridge fitting, make sure to remove dusts or fluffs stuck on O-ring. O-ring and inside of the body shall not be damaged, since it may cause a performance drop.
- Be careful of the direction of fixing pin. If the fixing pin is inserted with a wrong direction, the pin may
 drop off due to vibration.



VACUUM

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VUN

VY

VM - VI

VRL

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VA

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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...Recomendations 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.

Products can cause personal injury or damages to properties.

↑ Warning I

- 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.

X. This safety instructions are subject to change without notice.



Disclaimer

- 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.
- 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.
- 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.

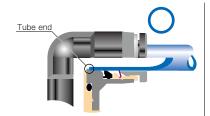
- 1. Do not use PISCO products under the following conditions.
 - ① Beyond the specifications or conditions stated in the catalog, or the instructions.
 - ② Under the direct sunlight or outdoors.
 - ③ Excessive vibrations and impacts.
 - 4 Exposure / adhere to corrosive gas, inflammable gas, chemicals, 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 Antispatter 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.

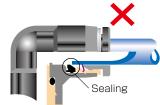


- 1. Remove dusts or drain before piping. They may get into the peripheral machine / facilities and cause malfunction.
- 2. When inserting an ultra-soft tube into push-in fitting, make sure to place an Insert Ring into the tube edge. There is a risk of causing the escape of tube and a fluid leakage without 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	_	\pm 0.05mm	Ø1/8	\pm 0.1mm	\pm 0.15mm
Ø3mm	_	± 0.15mm	Ø5/32	\pm 0.1mm	± 0.15mm
Ø4mm	\pm 0.1mm	± 0.15mm	Ø3/16	\pm 0.1mm	± 0.15mm
Ø6mm	\pm 0.1mm	± 0.15mm	Ø1/4	\pm 0.1mm	± 0.15mm
Ø8mm	\pm 0.1mm	± 0.15mm	Ø5/16	\pm 0.1mm	± 0.15mm
Ø10mm	\pm 0.1mm	± 0.15mm	Ø3/8	\pm 0.1mm	± 0.15mm
Ø12mm	\pm 0.1mm	± 0.15mm	Ø1/2	\pm 0.1mm	± 0.15mm
Ø16mm	\pm 0.1mm	± 0.15mm	Ø5/8	\pm 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 pushin 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.





Tube is not fully inserted up to tube end.

- 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
 - ②The 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 releasering, 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
	$M3 \times 0.5$			SUS304 NBR
	$M5 \times 0.8$			
	$M6 \times 1$			
Metric thread	$M3 \times 0.5$		_	
	$M5 \times 0.8$			РОМ
	$M6 \times 0.75$			
	$M8 \times 0.75$			
	R1/8			_
Tanar nine thread	R1/4		White	
Taper pipe thread	R3/8		vviille	
	R1/2			
Unified thread	No.10-32UNF		_	SUS304、NBR
	1/16-27NPT			_
NI-4iIi	1/8-27NPT			
National pipe thread taper	1/4-18NPT		White	
	3/8-18NPT			
	1/2-14NPT			

- * 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.

Common Safety Instructions for Vacuum Series

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

↑ Warning I

- 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
- 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.

VN

- 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.

- 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 Series

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.