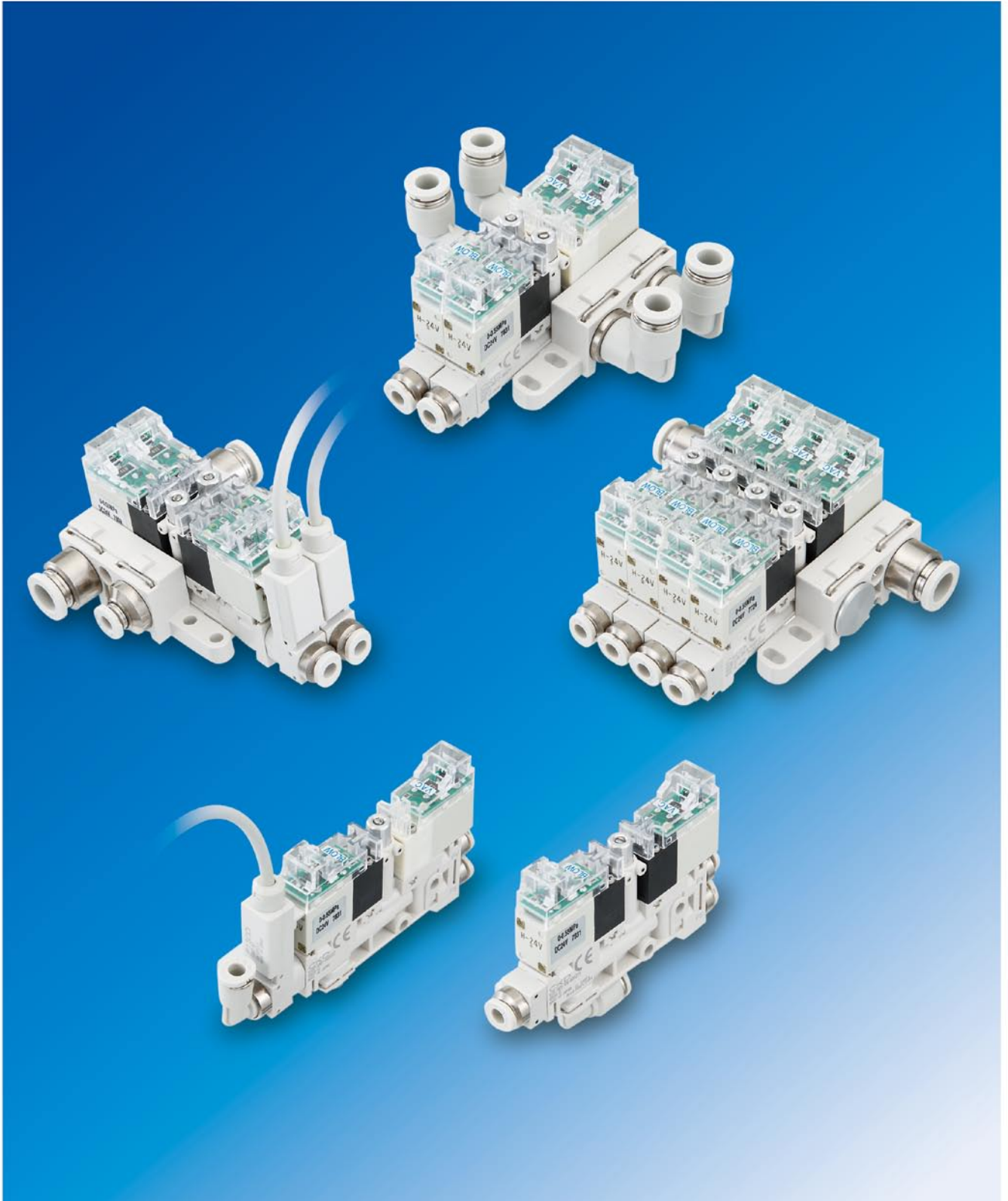


Vacuum system components VSN/VSNP Series

VACUUM SYSTEM COMPONENTS SELVACS VSN/VSNP SERIES

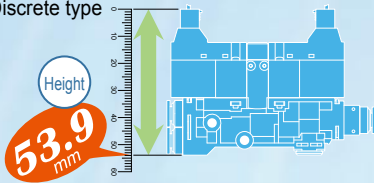


Appropriate for high speed transfer for such as electric parts, compact precision parts !!

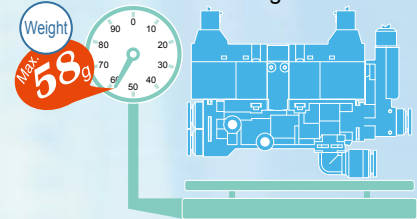
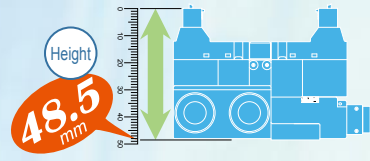
Perfect series where mounting space is restricted.

The product height has been suppressed for this compact and lightweight vacuum ejector unit and vacuum switching unit.

● Discrete type



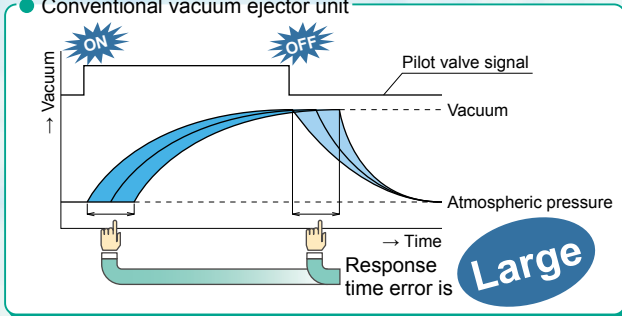
● Manifold type



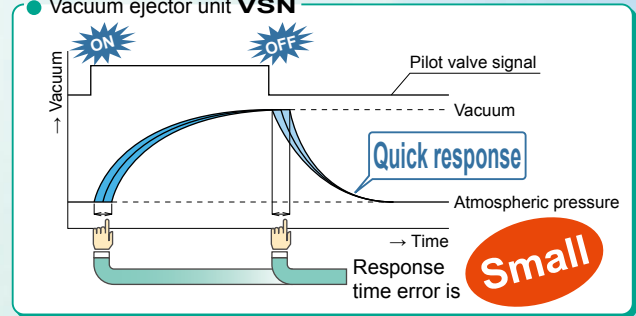
Realizing high-speed and stable responsiveness. (ON/OFF = 5msec or less)

A direct acting valve has been incorporated for the main valve.

● Conventional vacuum ejector unit

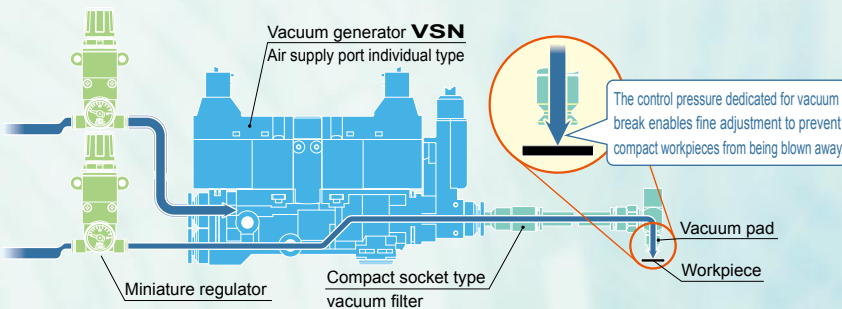


● Vacuum ejector unit VSN

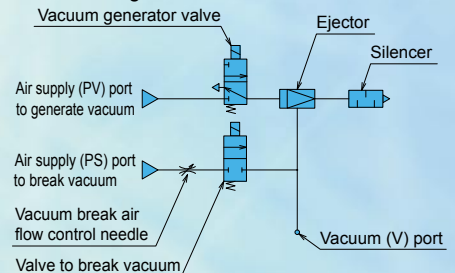


Compact workpieces are gently released during vacuum break.

The vacuum break air supply port has been isolated (option). In addition to the conventional flow adjustment, the vacuum break air can be finely adjusted by adjusting the pressure with the external regulator.



● Circuit diagram



Common supply ports added to lineup.

* Supply port: Common for air supply ports to generate vacuum and to break vacuum.

20ℓ/min ensured for vacuum break air flow.

4 analog output types for analog sensor are available.

Analog output sensor for negative pressure
 Separate type LED pressure indicator + Analog output sensor for negative pressure
 Analog output sensor for compound pressure
 Separated LED pressure indicator + analog output sensor for compound pressure

	Negative pressure	Compound pressure
Analog switch		
Separate type LED pressure indicator + Analog switch		

External (optional) vacuum filter.

Filter replacement work made cumbersome by the downsized product has been eliminated.

* Vacuum filter is not integrated with this product.
 Always use a CKD vacuum filter (shown below) on the vacuum piping to ensure long life of this product.

VSFU	VSFJ
Compact union type	Socket type
Type/VSFU	Type/VSFJ
VSFU-2-44	VSFJ-44

RoHS

RoHS directive complied
 All substances that can adversely affect the environment, including lead and hexavalent chrome, have been eliminated.

Vacuum system components
VSN·VSNP Series



Safety precautions

Always read this section before starting use.

When designing and manufacturing a device using CKD products, the manufacturer is obligated to check that device safety mechanism, pneumatic control circuit, or water control circuit and the system operated by electrical control that controls the devices is secured.

It is important to select, use, handle, and maintain the product appropriately to ensure that the CKD product is used safely.

Observe warnings and precautions to ensure device safety.

Check that device safety is ensured, and manufacture a safe device.

WARNING




- 1** This product is designed and manufactured as a general industrial machine part. It must be handled by an operator having sufficient knowledge and experience in handling.
- 2** Use this product in accordance of specifications.

This product must be used within its stated specifications. It must not be modified or machined. This product is intended for use as a general-purpose industrial device or part. It is not intended for use outdoors or for use under the following conditions or environment.
(Note that this product can be used when CKD is consulted prior to use and the customer consents to CKD product specifications. The customer must provide safety measures to avoid risks in the event of problems.)

 - ① Use for special applications including nuclear energy, railway, aircraft, marine vessel, vehicle, medicinal devices, devices or applications coming into contact with beverages or foodstuffs, amusement devices, emergency cutoff circuits, press machines, brake circuits, or safety devices or applications.
 - ② Use for applications where life or assets could be adversely affected, and special safety measures are required.
- 3** Observe corporate standards and regulations, etc., related to the safety of device design and control, etc.

ISO4414, JIS B8370 (pneumatic system rules)
JFPS2008 (principles for pneumatic cylinder selection and use)
Including High Pressure Gas Maintenance Law, Occupational Safety and Sanitation Laws, other safety rules, body standards and regulations, etc.
- 4** Do not handle, pipe, or remove devices before confirming safety.
 - ① Inspect and service the machine and devices after confirming safety of the entire system related to this product.
 - ② Note that there may be hot or charged sections even after operation is stopped.
 - ③ When inspecting or servicing the device, turn off the energy source (air supply or water supply), and turn off power to the facility. Discharge any compressed air from the system, and pay enough attention to possible water leakage and leakage of electricity.
 - ④ When starting or restarting a machine or device that incorporates pneumatic components, make sure that the system safety, such as pop-out prevention measures, is secured.
- 5** Observe warnings and cautions on the pages below to prevent accidents.

■ The precautions are ranked as "DANGER", "WARNING" and "CAUTION" in this section.

-  **DANGER:** When a dangerous situation may occur if handling is mistaken leading to fatal or serious injuries, or when there is a high degree of emergency to a warning.
-  **WARNING:** When a dangerous situation may occur if handling is mistaken leading to fatal or serious injuries.
-  **CAUTION:** When a dangerous situation may occur if handling is mistaken leading to minor injuries or physical damage.

Note that some items described as "CAUTION" may lead to serious results depending on the situation. In any case, important information that must be observed is explained.

Disclaimer

1. CKD cannot be held liable for any business interruption, loss of profit, personal injury, delay cost, or any other ancillary or indirect loss, cost, or damage resulting from the use of or faults in the use of CKD products.
2. CKD cannot be held responsible for the following damage.
 - ① Damage resulting from disaster or failure of CKD parts due to fire from reasons not attributable to CKD, or by intentional or negligence of a third party or customer.
 - ② When a CKD product is assembled into customer equipment, damage that could have been avoided if customer equipment were provided with functions and structure, etc., generally accepted in the industry.
 - ③ Damage resulting from use exceeding the scope of specifications provided in CKD catalogs or instruction manuals, etc., or from actions not following precautions for installation, adjustment, or maintenance, etc.
 - ④ Damage resulting from product modifications not approved by CKD, or from faults due to combination with other software or other connected devices.



Vacuum system components

Safety precautions

Always read this section before starting use.

Refer to "▲ Safety Precautions" in the text for each series' precautions.

General vacuum system components

Design & Selection

▲ WARNING

- If drop of workpiece could result in hazardous situations, take safety measures such as drop prevention.
- Avoid use where there are constant pressure of 0.1MPa or above in the vacuum circuit. Since the vacuum devices are not of explosion-proof structure, such use may cause damage to the devices bodies.
- Watch out for drop of vacuum due to faulty air supply or power supply. Reduced suction may cause the drop of work. Therefore, take an adequate protective measure.
- When more than one pad is piped to one ejector with the vacuum circuit, a suction fault with one pad may cause the other pad to separate due to a drop in vacuum pressure.

▲ CAUTION

- The specified pressure to the ejector is that during ejector operation. Secure the specified level in consideration of pressure drop. If the specified level is not met, then the ejector may emit an abnormal noise at certain supply pressures and become unstable, affecting the sensor and other parts adversely.
- In selecting the piping and equipment, take into account that the effective sectional area on the supply pressure side the ejector should be about three times the sectional area of the nozzle diameter. Inadequate supply flow may result in performance drop.

Installation & Adjustment

WARNING

- Install the piping by checking the ports of the ejector in the manual and by marking on the body. Mistake piping may cause damage to the device body.
- Use clean air free from drain or dust for ejector air supply. Do not lubricate by lubricator. Impurities and oil in compressed air could cause operation faults and a drop in performance.
- Confirm that leakage current is 1mA or less when operating the valve. Malfunctions could result from the leakage current and cause accidents.
- When continuously energizing the valve for a long time, heat generated by the coil could cause burns or adversely affect peripherals.
- Add a protective cover if the product is exposed to direct sunlight.

CAUTION

- Do not use a spiral hose.
If used on the vacuum side, the following types of faults could occur because of the piping resistance.
 - (1) Delay in vacuum attainment time
 - (2) Drop in vacuum at pickup end because of drop in flow rate
 - (3) Unstable operation of vacuum switch
- Provide the vacuum-side piping as short as possible and with the bore as large as possible. If piping is long or the bore is small, the response time at suction or release may become longer and the necessary suction flow may not be achieved.
- Connect the vacuum switch or the ejector with vacuum switch as close to the end of the vacuum piping as possible. With much distance between the vacuum switch and the end of vacuum piping, the piping resistance may become large and the vacuum at the sensor may be high even during the non-suction interval.

During Use & Maintenance

WARNING

- Avoid such usage as may stop up the exhaust port of the ejector or raise exhaust resistance. Such careless usage may cause the loss or drop of vacuum.
- Regularly maintain and inspect silencer element of ejector and filter element for vacuum filter. Clogging of element could lead to performance drop or troubles.
- Read the explanation of vacuum ejector replacement thoroughly before replacing it.
- Do not apply strong tension or excessively bend leads, or disconnection may result.
- If the product has a lock nut, securely tighten the nut by hand instead of using a tool. The lock nut or main unit could be damaged if the lock nut is tightened with a tool.
If the lock nut is not tightened precisely, it could loosen and change initial settings.
- If the product has a resin body which rotates, do not forcibly shake or rotate the product. The main unit could be damaged or leaks could result.



Vacuum system components

Safety precautions

Always read this section before starting use.

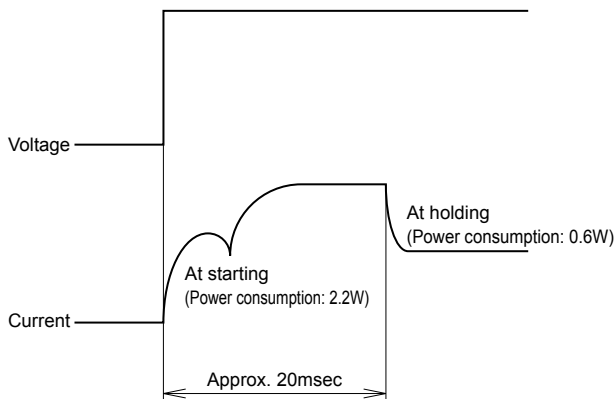
Refer to Intro 3 for the general vacuum system components.

Vacuum unit VSN/VSNP Series

Design & Selection

⚠ WARNING

- Confirm that leakage current is 1mA or less when operating the solenoid valve. Malfunctions could result from the leakage current and cause accidents.
- Do not apply vibration or impact exceeding the specifications on this product. Failure to observe this could lead to product damage or solenoid valve malfunction.
- Energizing the solenoid valve for a long time can cause the coils to heat up. The heat could cause burns or adversely affect the peripheral devices. Contact CKD when energizing the solenoid valve for a long time.
- This product's solenoid valve uses a current control circuit, and has a mechanism to lower the current value when holding the current in the energized state. Never use this product in an environment where vibration or impact exceeding the specifications. The valve could malfunction.



Current and voltage waveform during solenoid valve energizing

⚠ CAUTION

- Select the diameter and length for the pipe connected to the vacuum (V) port so that sufficient effective sectional area can be secured. If the effective sectional area is not sufficient, a suitable product performance, such as suction flow and vacuum break air flow may not be attained.
- Select the diameter and length for the pipe connected to the supply (PS, PV) ports so that sufficient effective sectional area can be secured. If the effective sectional area is not sufficient, the compressed air and vacuum supply rate will be insufficient, and a suitable product performance may not be attained.
- This product is provided no vacuum filter. Always use the CKD vacuum filter series for the vacuum filter. If a vacuum filter is not used, the dust and dirt sucked in could accumulate in the product and cause the vacuum performance to drop (ejector system compatible unit), or the solenoid valve to leak or malfunction (ejector system compatible unit, vacuum pump system compatible unit), etc. (Recommended vacuum filters: VSFU Series or VSFL Series)
- With the manifold type, the number of units which can be used simultaneously may be restricted by various conditions, including the air supply rate (supply port side, piping length, depressurizing valve processing flow rate, etc.), and by the ejector's air consumption rate (vacuum characteristics). Contact your CKD Sales Office if planning to use the manifold type in an application which operates the units simultaneously.
- With the vacuum ejector VSN Series manifold type, each unit is independently released to atmosphere. However, the ejector exhaust of the unit generating the vacuum may be led into (exhaust lead-in) to the units which are not generating a vacuum. Contact your CKD Sales Office if the exhaust lead-in causes a problem.

Installation & Adjustment

WARNING

- Do not place objects on this product. Failure to observe this could lead to accidents from falling, injuries from a tilting or dropping product, or malfunction from product damage.
- Never wash or paint this product with water or solvents. The resin parts could be damaged by the solvent, or the ports could be blocked by paint, resulting in malfunction.

CAUTION

- Do not apply strong tension or excessively bend the solenoid valve or sensor's lead wires. The wires or connector section could break.
- Compressed air contains large amounts of drainage (water, oxidized oil, tar, foreign matter, etc.) that may adversely affect the performance. Dehumidify air with an after cooler or dryer and improve air quality.

- Do not use a lubricator.
- Rust, etc., in piping may result in operation faults. Install a 5 μ m or smaller filter preceding the supply port. Always flush the pipes before use and at a suitable cycle.
- Avoid using this vacuum ejector in environment with corrosive or flammable gas. Do not use this unit for fluid. This product is not explosion proof, and it can cause fire and an explosion.
- Avoid using it where it could be subject to water, oil or dust. This product is provided neither drip proof nor dustproof structure. Use in such environment could lead to product damage or a drop in performance.
- The lead wires of this product's solenoid valve have a polarity. The solenoid valve will not operate if the polarity is incorrect.

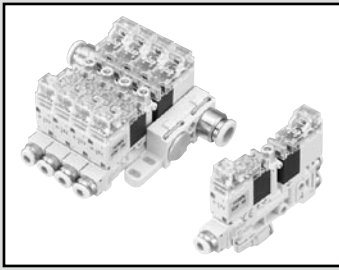
During Use & Maintenance

WARNING

- Always turn the power OFF, shut off the supply air, and confirm that there is no residual pressure before starting inspections or adjustments.
- Always turn the power OFF before starting wiring or piping. Always confirm that there is no incorrect wiring or incorrect piping before turning the power ON or supplying the air.
- Tighten the screws at each section with the appropriate torque. Refer to page 21 "Fixing the product" for the product's recommended tightening torque, and page 21 "Replacement the element" for the solenoid valve's recommended tightening torque. Improper tightening could lead to air leaks, dropping of the product, or damage of the product.

CAUTION

- When replacing the cartridge of the supply (PS, PV) or vacuum (V) ports, remove all matter stuck on the seal section, and securely insert the set pins.
- The product performance could drop if large amounts of dirt or dust are stuck on the silencer element of the ejector system compatible unit or vacuum pump system compatible unit's (isolated) filter element. The element should be cleaned and replaced periodically.



High speed, and the compact vacuum unit which achieved stable responsiveness
 Ejector system correspondence type vacuum ejector unit
 Vacuum pump system correspondence type vacuum switchover unit

VSN Series

VSNP Series



Specifications

Common

Descriptions	Vacuum ejector unit VSN	Vacuum switchover unit VSNP
Working fluid	Air	
Working pressure range MPa	0 to 0.55	
Ambient temperature range °C	5 to 50 (no dew condensation)	
Working humidity range	35 to 85%RH (no dew condensation)	
Protective structure	IEC standards IP40 or equivalent	
Vibration resistance/shock m/s ²	50 or less/150 or less	
Working vacuum pressure kPa	-	0 to -100

Ejector characteristics

Vacuum ejector unit

Model no.	Nozzle diameter (mm)	Rated supply pressure (MPa)	Ultimate vacuum (-kPa)	Suction flow (ℓ/min. (ANR))	Consumption flow (ℓ/min. (ANR))
VSN-E04	0.4	0.35	90.4	2	6
VSN-H05	0.5	0.5		7	11.5
VSN-E05		0.35		3	8
VSN-H06	0.6	0.5		9.5	16
VSN-E06		0.35		4.5	12

Solenoid valve specifications

Common

Descriptions	Vacuum ejector unit VSN		Vacuum switchover unit VSNP	
	Vacuum generator valve	Valve for vacuum break	Valve for vacuum supply	Valve for vacuum break
Actuation	Direct acting operation			
Valve structure	Rubber sealant, poppet valve			
Rated voltage	24 VDC			
Allowable voltage range	±10%			
Surge protective circuit	Surge suppressor integrated			
Power consumption	At starting: 2.2W at holding: 0.6W (power saving circuit integrated)			
Operating indication indicator	Green LED			
Working pressure range	0 to 0.55MPa	0 to 0.55MPa	-100 to 0kPa	0 to 0.55MPa
Valve type	Normally closed type			
Response time (Note 1)	Vacuum generation (OFF→ON) /vacuum stop (ON→OFF) both under 5msec			
Electric connection	Connector type (cable length: 500 mm)			
	Red lead wire: + 24 VDC , black lead wire: -0V			

Note 1: The response time is the time for the pressure changes to be detected at the vacuum port when the rated pressure and rated voltage are supplied. The vacuum attainment time at the pipe end (workpiece) and the vacuum break time will differ according to the conditions such as the ejector characteristics, volume (vacuum piping length) and vacuum break flow rate.

Vacuum break

Common

Descriptions	
Break air flow rate	0 to 20ℓ/min. [ANR] (at supply pressure: 0.5 MPa)

Note: Adjustable with vacuum break air flow adjusting needle.

Vacuum flow

Vacuum switchover unit

Descriptions	
Vacuum flow	8ℓ/min. (ANR) (at supply pressure: -80kPa)

Vacuum switch specifications

Common

Descriptions		Negative pressure specifications (-V1)	Compound pressure specifications (-R1)
Supply voltage		10.8 to 30 VDC (including ripple)	
Current consumption		20mA or less	
Pressure detection method		Diffused semiconductor pressure sensor, gauge pressure	
Working pressure range		-100 to 0kPa	-100 to 300kPa
Withstanding pressure		200kPa	600kPa
Storage temperature range		-20 to 70°C (atmospheric pressure, humidity: 65%RH or less)	
Operating temperature range		-10 to 60°C (no dew condensation)	
Operation humidity range		35 to 85%RH (no dew condensation)	
Protective structure		IEC standards IP40 or equivalent	
Analog output	Output voltage	1 to 5V	
	Zero point voltage	1±0.1V (= at atmospheric pressure)	1±0.1V (= at -100kPa)
	Max. pressure point voltage	5±0.1V (= at -100kPa)	5±0.1V (= at 300kPa)
	Linearity	±0.5%F.S. or less (at Ta = 25°C)	
	Temperature characteristics	±2%F.S. or less (0 to 50°C, Ta = 25°C)	
	Output current	1mA or less (load resistance: 5kΩ or less)	

Weight

Vacuum ejector unit

Model no.	Unit descriptions	Weight (g)
VSN-**-*** S-3-*	Discrete type, air supply ports individual, atmospheric release, with sensor	56
VSN-**-*** S-3	Discrete type, air supply ports individual, atmospheric release, without sensor	52.5
VSN-**-*** J-3-*	Discrete type, air supply ports individual, common exhaust, with sensor	58
VSN-**-*** J-3	Discrete type, air supply ports individual, common exhaust, without sensor	54.5
VSN-**-***NS-3-*	Discrete type, air supply ports common, atmospheric release, with sensor	54
VSN-**-***NS-3	Discrete type, air supply ports common, atmospheric release, without sensor	50.5
VSN-**-***NJ-3-*	Discrete type, air supply ports common, common exhaust, with sensor	56
VSN-**-***NJ-3	Discrete type, air supply ports common, common exhaust, without sensor	52.5
VSN-**-***NS-3-2-*	Manifold type, air supply ports individual/common, with sensor	171
VSN-**-***NS-3-2	Manifold type, air supply ports individual/common, without sensor	164

■ With the manifold type, the weight increases by 46.5g per additional station for the unit with sensor and 43g per additional station for unit without sensor. Example: The weight of the vacuum ejector unit, with sensor and four station manifold is 171 + (2x46.5) =264g → weight for two station manifold: 171g to which weight of two units with sensors 93g is added.

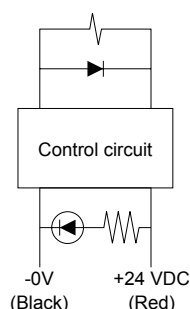
Vacuum switchover unit

Model no.	Unit descriptions	Weight (g)
VSNP-***-3-*	Discrete type, air supply ports individual, atmospheric release, with sensor	56
VSNP-***-3	Discrete type, air supply ports individual, atmospheric release, without sensor	52.5
VSNP-***-3-2-*	Manifold type, air supply ports individual/common, with sensor	171
VSNP-***-3-2	Manifold type, air supply ports individual/common, without sensor	164

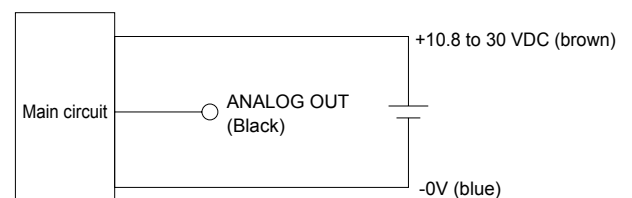
■ With the manifold type, the weight increases by 46.5g per additional station for the unit with sensor and 43g per additional station for unit without sensor. Example: The weight of the vacuum switchover unit, with sensor and four station manifold is 171 + (2x46.5) =264g → weight for two station manifold: 171g to which weight of two units with sensors 93g is added.

Electric circuit drawing

● Solenoid valve



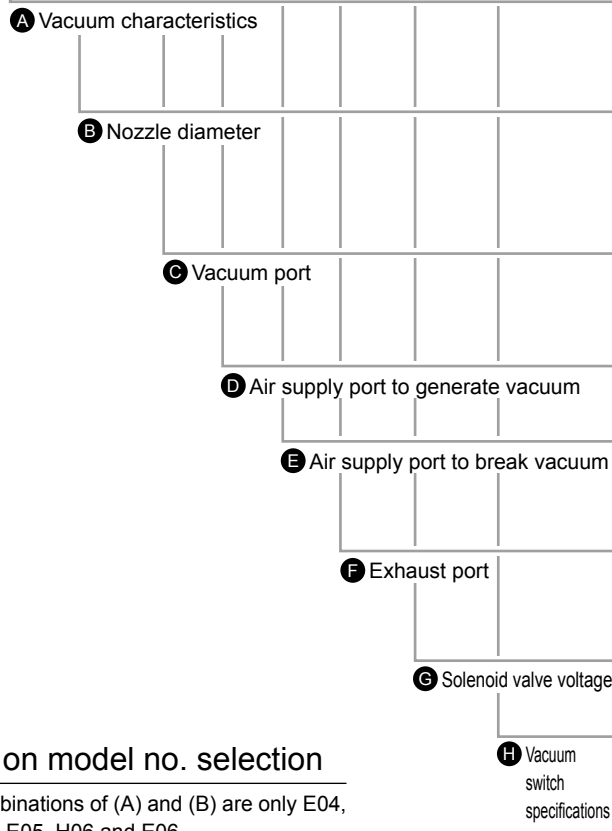
● Vacuum switch



How to order

- Compact 10.3mm depth vacuum unit (ejector system type)
- Discrete vacuum ejector unit type

VSN - **H** - **05** - **4** **4** **4** **S** - **3** - **V1**



Symbol	Descriptions
A Vacuum characteristics Note 1	
H	High vacuum/medium flow type
E	High vacuum/small flow rate type
B Nozzle diameter Note 1	
04	ø0.4
05	ø0.5
06	ø0.6
C Vacuum port (V)	
4	ø4 push-in straight joint
4L	ø4 push-in elbow joint
D Air supply port to generate vacuum (PV)	
4	ø4 push-in straight joint
E Air supply port to break vacuum (PS)	
4	ø4 push-in straight joint
N	Common for vacuum generator and vacuum break
F Exhaust port (EX) Note 1	
S	Atmospheric release with silencer
J	ø6 push-in joint common exhaust
G Solenoid valve voltage	
3	24 VDC
H Vacuum switch specifications	
Blank	Without vacuum switch
V1	Analog output for negative pressure
V2	Analog output for separate type LED indicator + negative pressure
R1	Analog output for compound pressure
R2	Analog output for separate type LED indicator + compound pressure

⚠ Note on model no. selection

Note 1: Combinations of (A) and (B) are only E04, H05, E05, H06 and E06.

● Maintenance part

- Silencer element for change

VSN-E

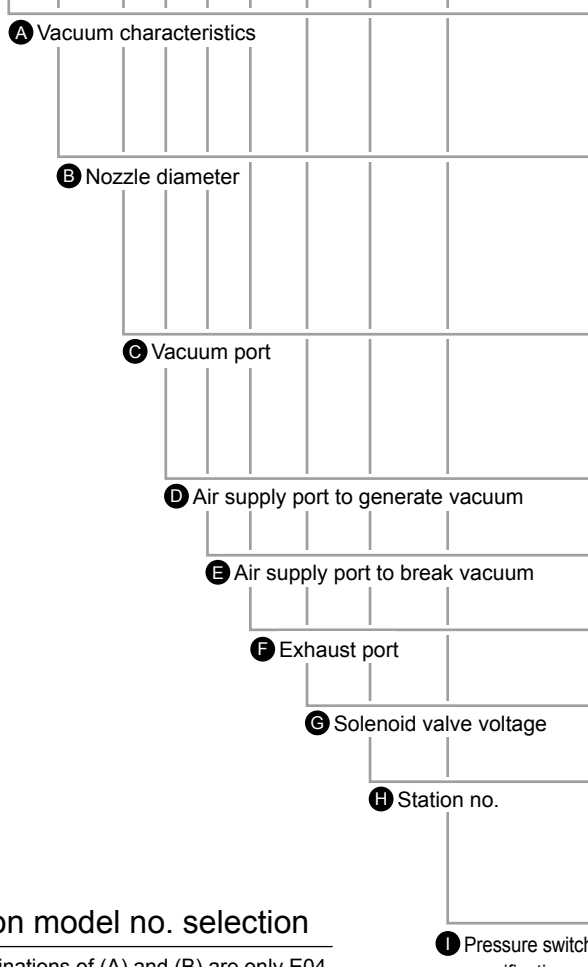
- Dedicated bracket (VSN, VSNP common)

VSN-B

How to order

- Compact 10.3mm depth vacuum unit (ejector system type)
- Vacuum ejector unit, manifold type

VSNM - H 05 - 4 4 4 S - 3 - 10 - V1



Symbol	Descriptions
A Vacuum characteristics Note 1, Note 2	
H	High vacuum/medium flow type
E	High vacuum/small flow rate type
Z	For mixed specifications (indicate details in specifications.)
B Nozzle diameter Note 1, Note 2	
04	ø0.4
05	ø0.5
06	ø0.6
00	For mixed specifications (indicate details in specifications.)
C Vacuum port (V) Note 2	
4	ø4 push-in straight joint
4L	ø4 push-in elbow joint
CX	For mixed specifications (indicate details in specifications.)
D Air supply port to generate vacuum (PV)	
Refer to a separate Table 1 for air supply port to generate vacuum.	
E Air supply port to break vacuum (PS)	
Refer to a separate Table 2 for air supply port to break vacuum.	
F Exhaust port (EX)	
S	Atmospheric release with silencer
G Solenoid valve voltage	
3	24 VDC
H Station no.	
2	2 station
to	to
10	10 station
I Vacuum switch specifications Note 2	
Blank	Without vacuum switch
V1	Analog output for negative pressure
V2	Analog output for separate type LED indicator + negative pressure
R1	Analog output for compound pressure
R2	Analog output for separate type LED indicator + compound pressure
Z	For mixed specifications (indicate details in specifications.)

⚠ Note on model no. selection

Note 1: Combinations of (A) and (B) are only E04, H05, E05, H06, E06 and Z00.

Note 2: Refer to "Mix manifold specifications" when mix specifications. Refer to Page 25 for details.

Separate table 1

D Air supply port to generate vacuum (PV)							
Port shape		Straight joint			Elbow joint		
Joint size (mm)		ø4	ø6	ø8	ø4	ø6	ø8
Symbol	R side only	4R	6R	8R	4LR	6LR	8LR
	Both sides	4	6	8	4L	6L	8L
	L side only	4H	6H	8H	4LH	6LH	8LH

Separate table 2

E Air supply port to break vacuum (PS)							
Port shape		Straight joint			Elbow joint		
Joint size (mm)		ø4	ø6	ø8	ø4	ø6	ø8
Symbol	R side only	4R	6R	8R	4LR	6LR	8LR
	Both sides	4	6	8	4L	6L	8L
	L side only	4H	6H	8H	4LH	6LH	8LH
Common for vacuum generator/vacuum break		N					

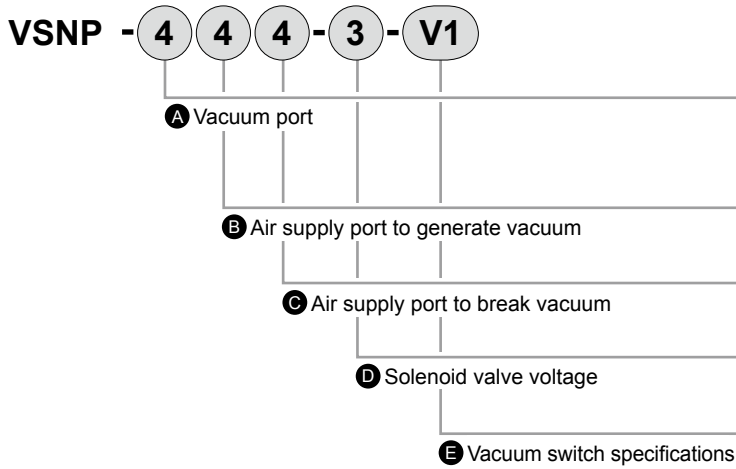
● Maintenance part

- Silencer element or change

VSNM-E

How to order

- Compact 10.3mm depth vacuum unit (vacuum pump system type)
- Discrete vacuum switchover unit type



Symbol	Descriptions
A Vacuum port (V)	
4	ø4 push-in straight joint
4L	ø4 push-in elbow joint
B Air supply port to generate vacuum (PV)	
4	ø4 push-in straight joint
C Air supply port to break vacuum (PS)	
4	ø4 push-in straight joint
D Solenoid valve voltage	
3	24 VDC
E Vacuum switch specifications	
Blank	Without vacuum switch
V1	Analog output for negative pressure
V2	Analog output for separate type LED indicator + negative pressure
R1	Analog output for compound pressure
R2	Analog output for separate type LED indicator + compound pressure

- Maintenance part
 - Silencer element for change

VSNP-E

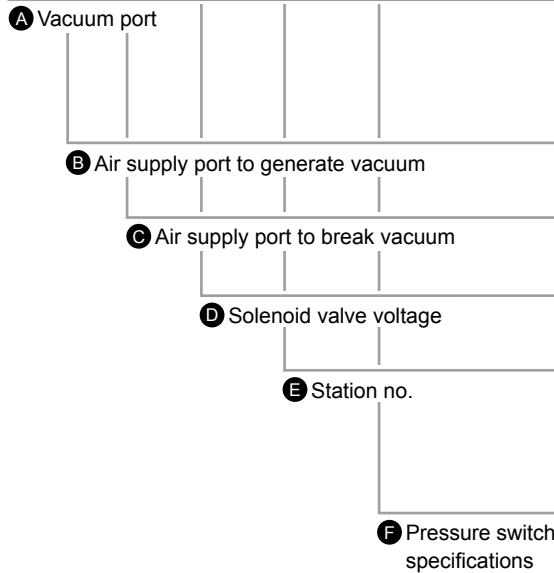
- Dedicated bracket (VSN, VSNP common)

VSN-B

How to order

- Compact 10.3mm depth vacuum unit (vacuum pump system type)
- Vacuum switchover unit, manifold type

VSNPM - 4 - 4 - 4 - 3 - 10 - V1



Symbol	Descriptions
A Vacuum port (V) Note 1	
4	ø4 push-in straight joint
4L	ø4 push-in elbow joint
CX	For mixed specifications (indicate details in specifications.)
B Air supply port to generate vacuum (PV)	
Refer to a separate Table 1 for air supply port to generate vacuum.	
C Air supply port to break vacuum (PS)	
Refer to a separate Table 2 for air supply port to break vacuum.	
D Solenoid valve voltage	
3	24 VDC
E Station no.	
2	2 station
to	to
10	10 station
F Vacuum switch specifications Note 1	
Blank	Without vacuum switch
V1	Analog output for negative pressure
V2	Analog output for separate type LED indicator + negative pressure
R1	Analog output for compound pressure
R2	Analog output for separate type LED indicator + compound pressure
Z	For mixed specifications (indicate details in specifications.)

⚠ Note on model no. selection

Note 1: Refer to "Mix manifold specifications" when mix specifications. Refer to page 27 for details.

Separate table 1

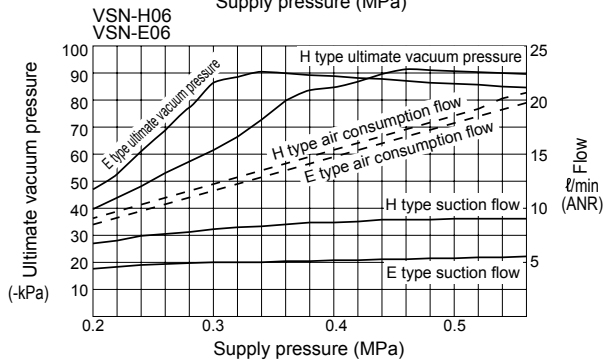
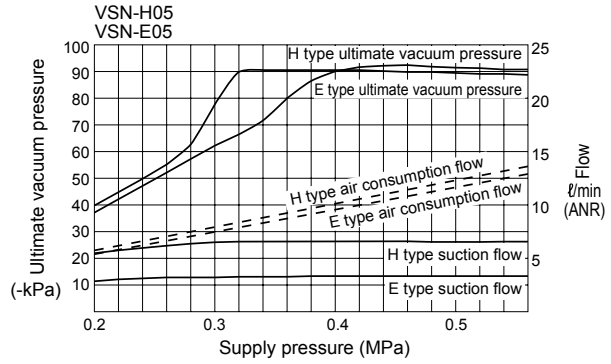
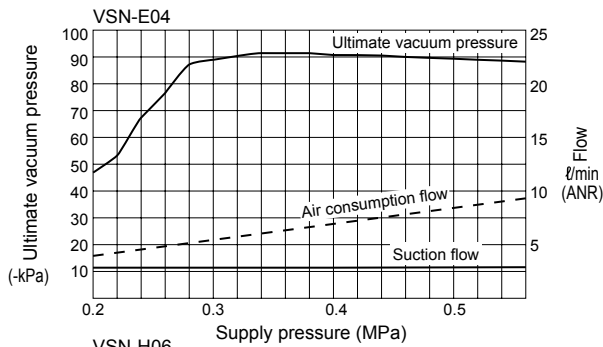
B Air supply port to generate vacuum (PV)							
Port shape		Straight joint			Elbow joint		
Joint size (mm)		ø4	ø6	ø8	ø4	ø6	ø8
Symbol	R side only	4R	6R	8R	4LR	6LR	8LR
	Both sides	4	6	8	4L	6L	8L
	L side only	4H	6H	8H	4LH	6LH	8LH

Separate table 2

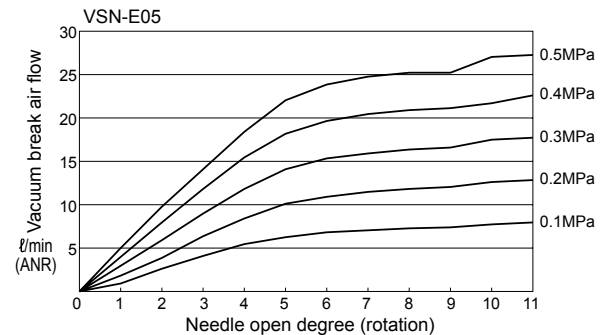
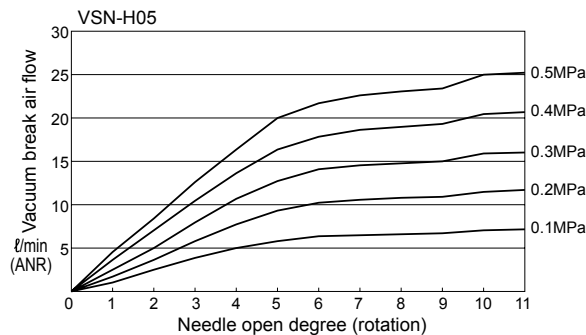
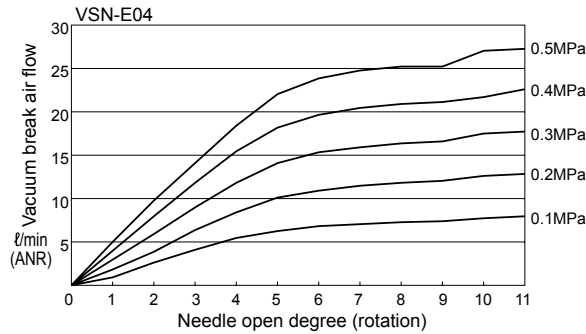
C Air supply port to break vacuum (PS)							
Port shape		Straight joint			Elbow joint		
Joint size (mm)		ø4	ø6	ø8	ø4	ø6	ø8
Symbol	R side only	4R	6R	8R	4LR	6LR	8LR
	Both sides	4	6	8	4L	6L	8L
	L side only	4H	6H	8H	4LH	6LH	8LH
Common for vacuum generator/vacuum break		N					

Vacuum characteristics

Supply pressure Ultimate vacuum pressure, suction flow, consumption flow



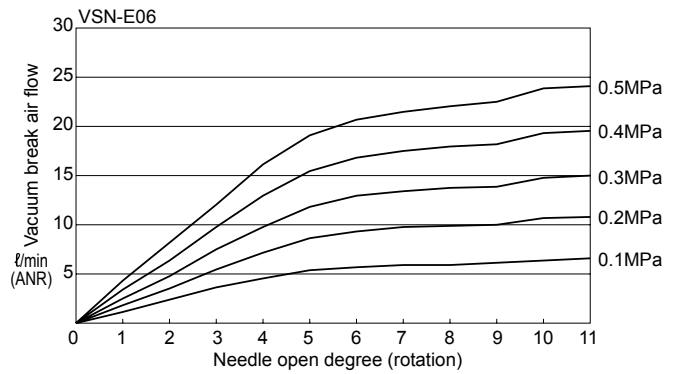
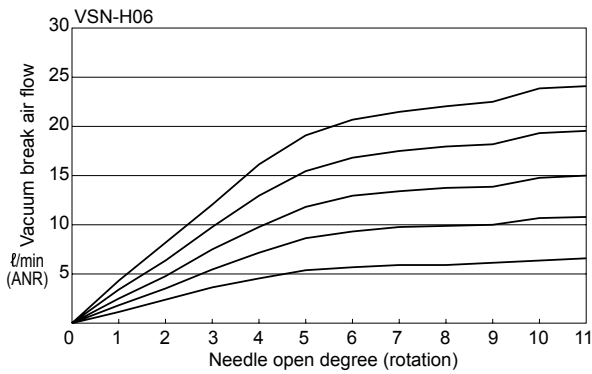
Vacuum break air flow characteristics



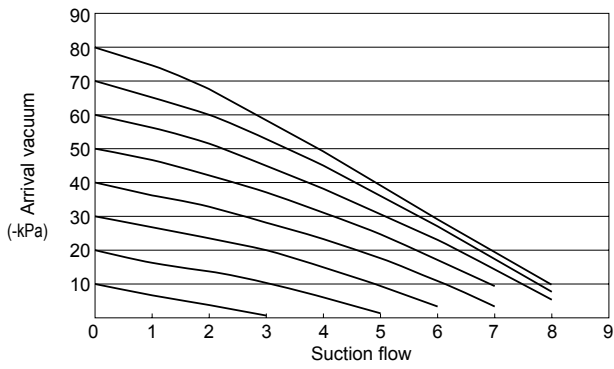
1. The supply pressure above applies at vacuum generation.
2. An abnormal popping may sound at the supply pressure (H type: 0.4 to 0.45MPa, E type: 0.29 to 0.32MPa) just before the ultimate vacuum peaks. This abnormal noise is because characteristics are unstable and increases with instability. This may adversely affect the sensor. Reset supply pressure.
(ex1. When the H type vacuum ejector operates with a base pressure of the H of 0.5MPa, an abnormal noise sounds when supply pressure drops to 0.43MPa due to a pressure drop. → Reset the supply pressure to 0.5MPa when the vacuum ejector operates.)
3. Select piping and components using a sectional area 3 times larger than the nozzle diameter. Satisfactory vacuum cannot be attained if a sufficient air flow cannot be ensured.
(Popping occurs at the set pressure if the intake flow is insufficient, the ultimate vacuum cannot be attained, etc.)
(ex2. Abnormal noise sounds even when using the H type vacuum ejector at a working pressure of 0.5MPa. → Supplied air flow is insufficient (The air flow is restricted preceding the vacuum ejector due to piping resistance, etc., keeping a satisfactory air flow from being attained. → Select piping components that provide the required effective section.)
(ex3. When using the vacuum ejector with a 0.6mm nozzle diameter, cross-sectional area is $0.3^2 \times \pi = 0.282\text{mm}^2 \times 3 = 0.84\text{mm}^2$. Select piping and devices that ensure an effective section of 0.9mm^2 or more.)

Vacuum characteristics

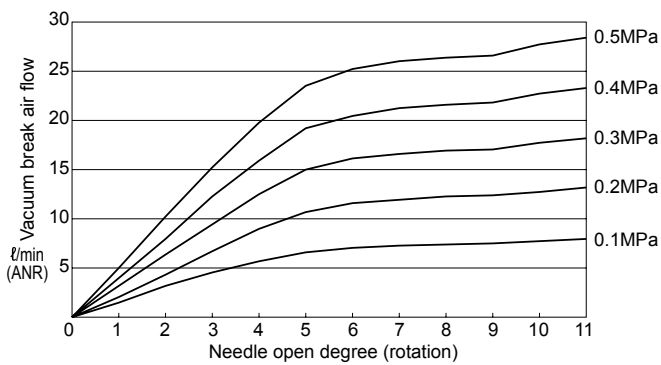
Vacuum break air flow characteristics



VSNP flow characteristics



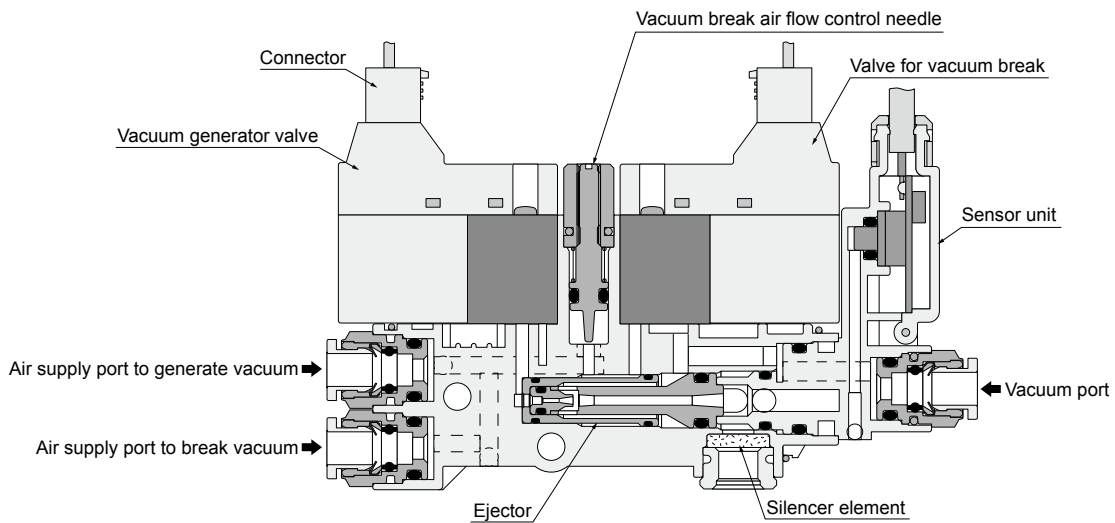
VSNP vacuum break air flow characteristics



Internal structure

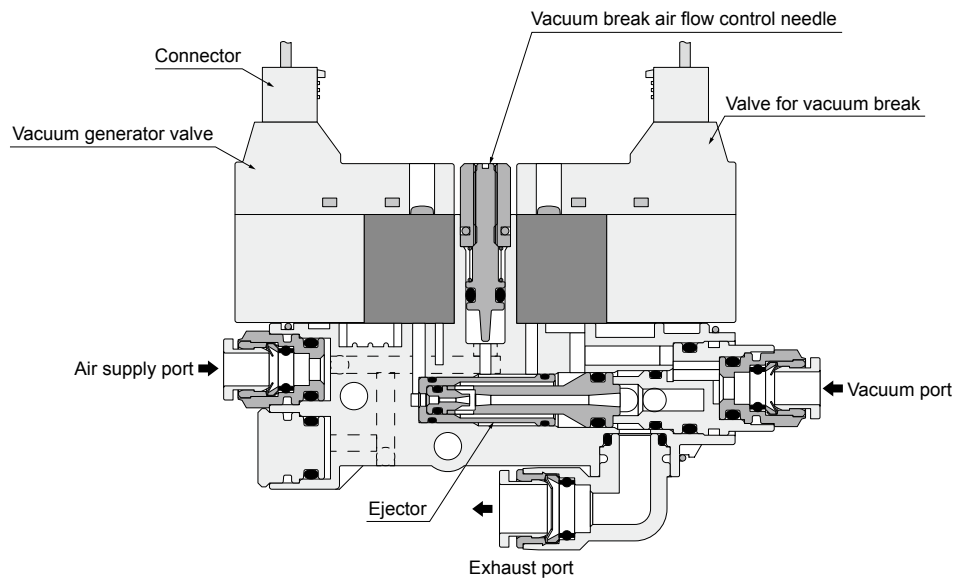
● Vacuum ejector unit discrete type

- Air supply port individual type, atmospheric release, with vacuum switch



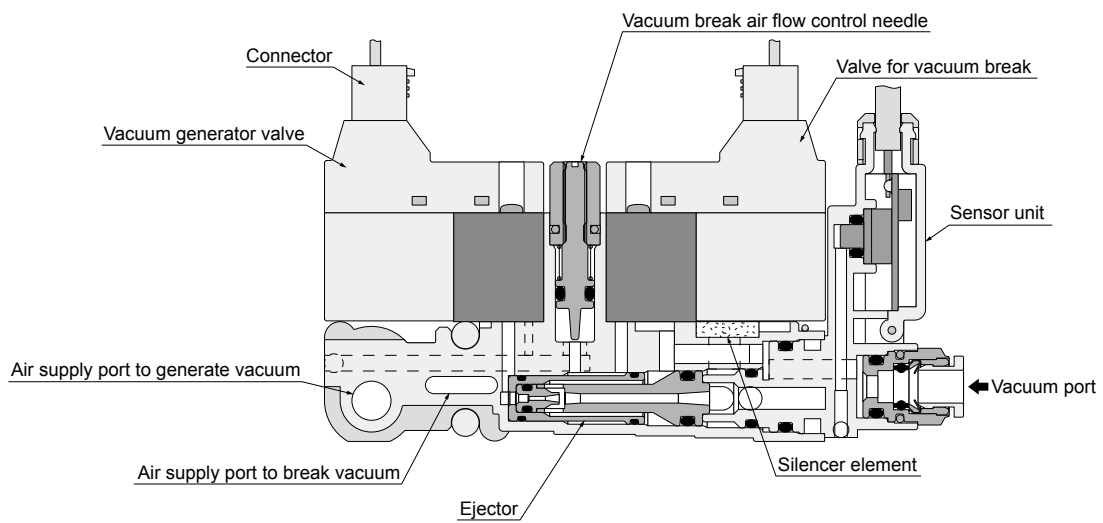
● Vacuum ejector unit discrete type

- Air supply port common type, common exhaust, without vacuum switch

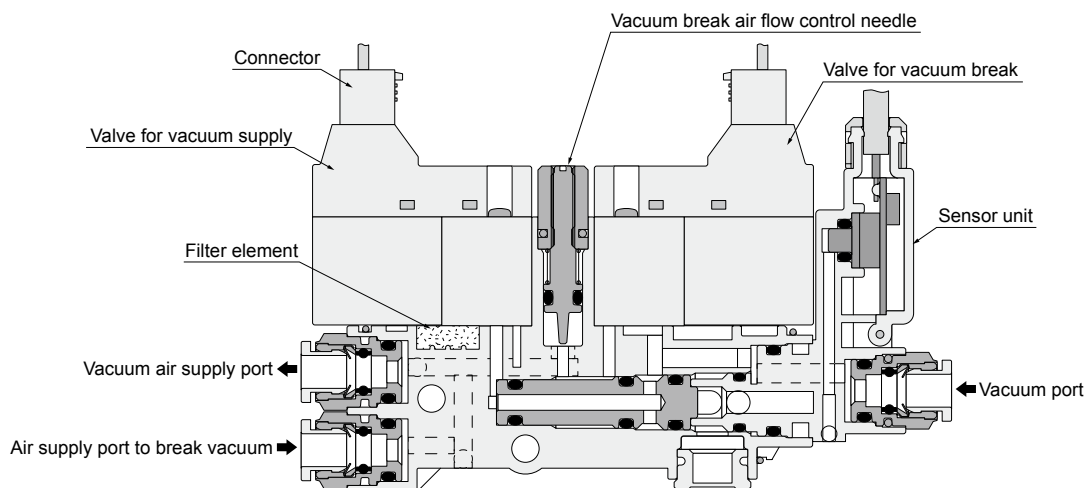


Internal structure

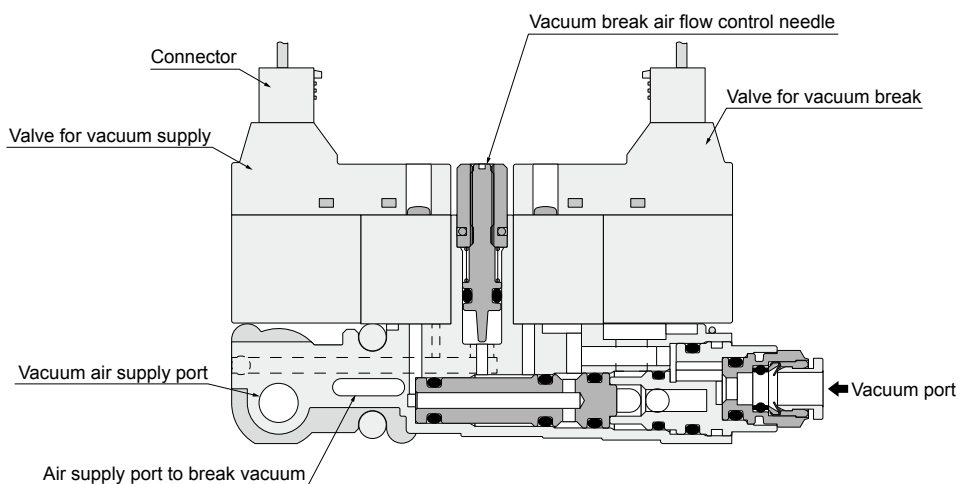
- Vacuum ejector unit manifold type
 - With vacuum switch



- Vacuum switchover unit discreet type
 - With vacuum switch

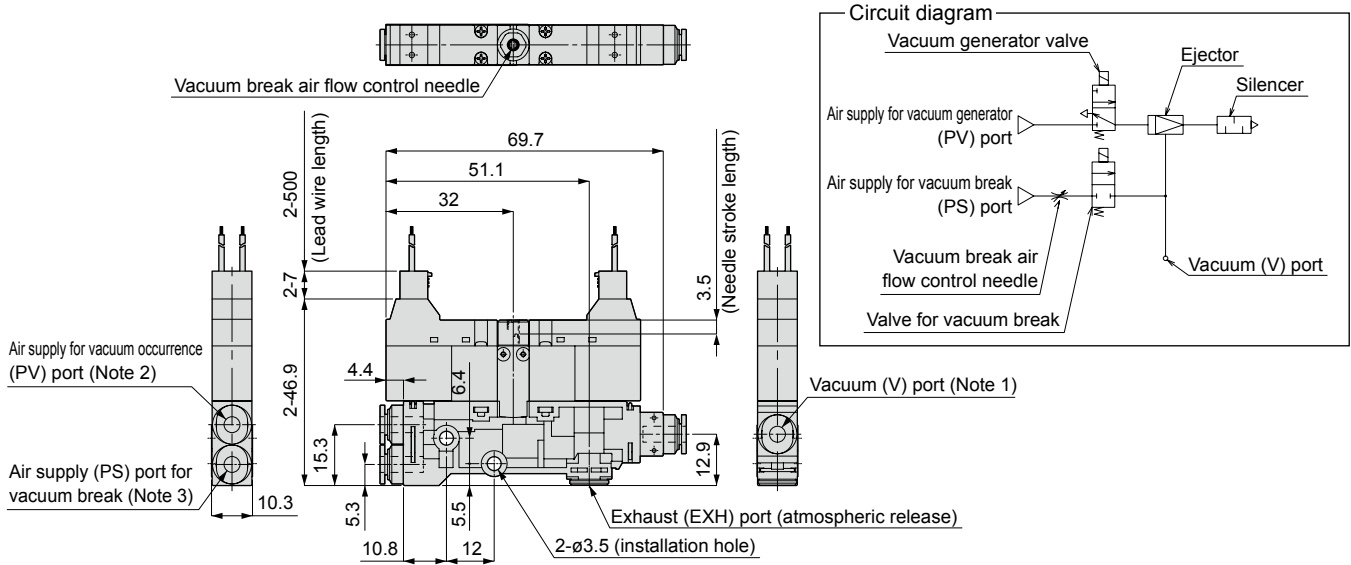


- Vacuum switchover unit manifold type
 - Without vacuum switch



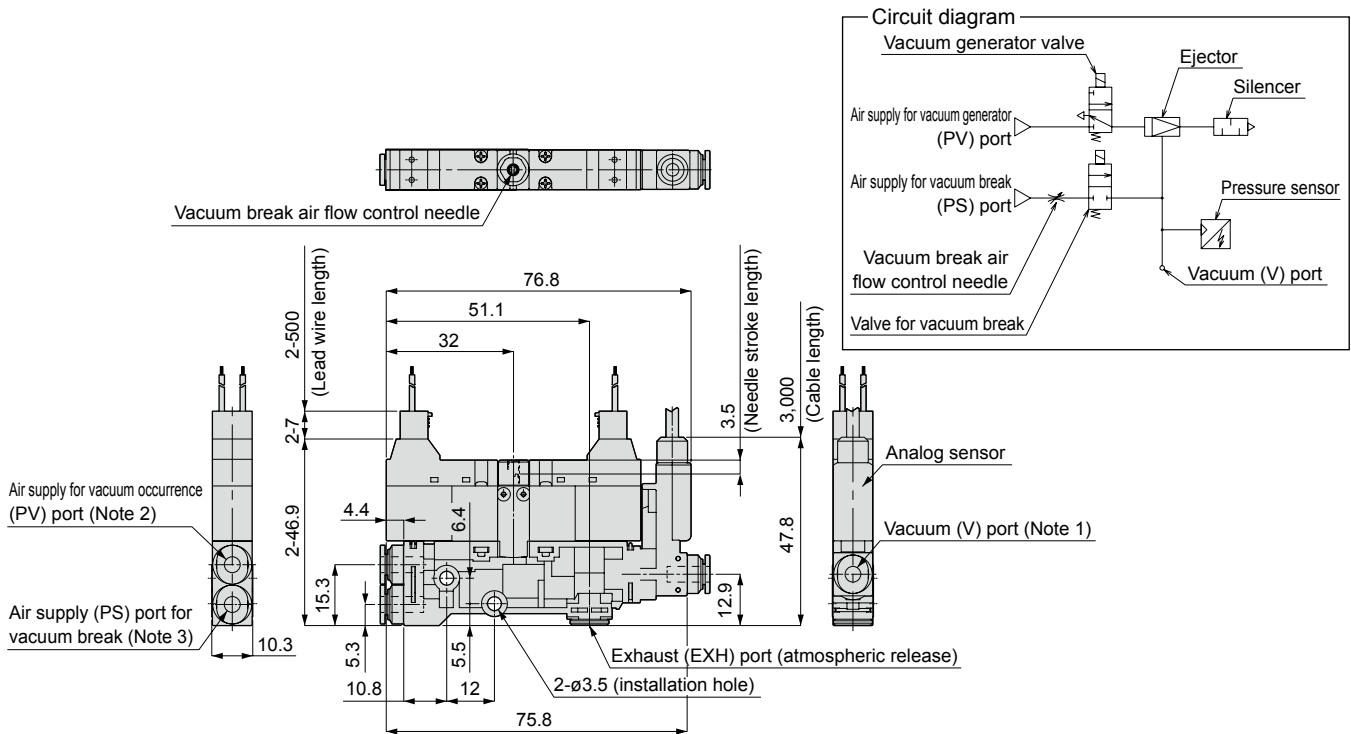
Dimensions (discrete vacuum ejector unit type)

- Air supply port individual type, atmospheric release, without vacuum switch
 - VSN-**-*** S-3



- Note 1: Refer to Table 1 on page 16 for the dimension of the vacuum (V) port.
- Note 2: Refer to Table 2 on page 16 for the dimension of the air supply (PV) port for vacuum generator.
- Note 3: Refer to Table 2 on page 16 for the dimension of the air supply (PS) port for vacuum break.

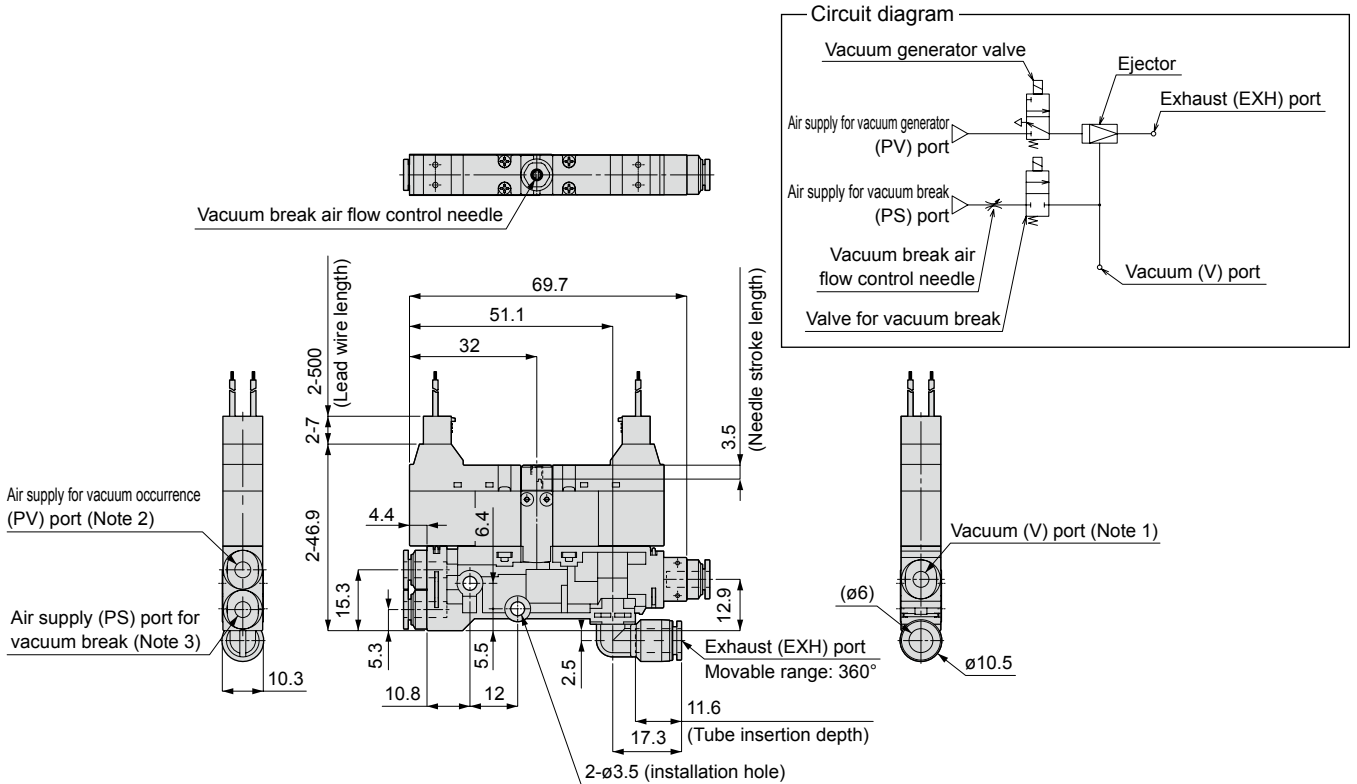
- Air supply port individual type, atmospheric release, with vacuum switch
 - VSN-**-*** S-3-*



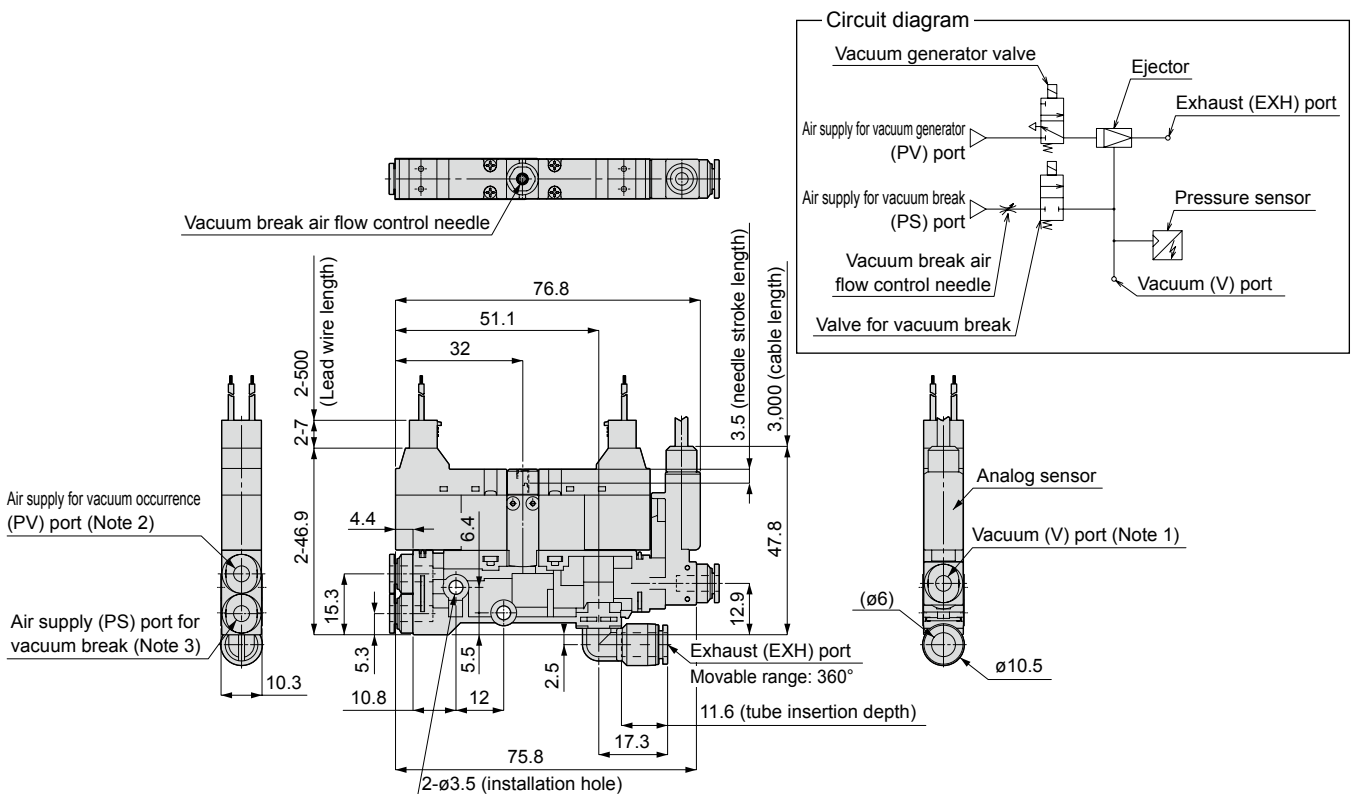
- Note 1: Refer to Table 1 on page 16 for the dimension of the vacuum (V) port.
- Note 2: Refer to Table 2 on page 16 for the dimension of the air supply (PV) port for vacuum generator.
- Note 3: Refer to Table 2 on page 16 for the dimension of the air supply (PS) port for vacuum break.

Dimensions (discrete vacuum ejector unit type)

- Air supply port individual type, common exhaust, without vacuum switch
 - VSN-**-*** J-3



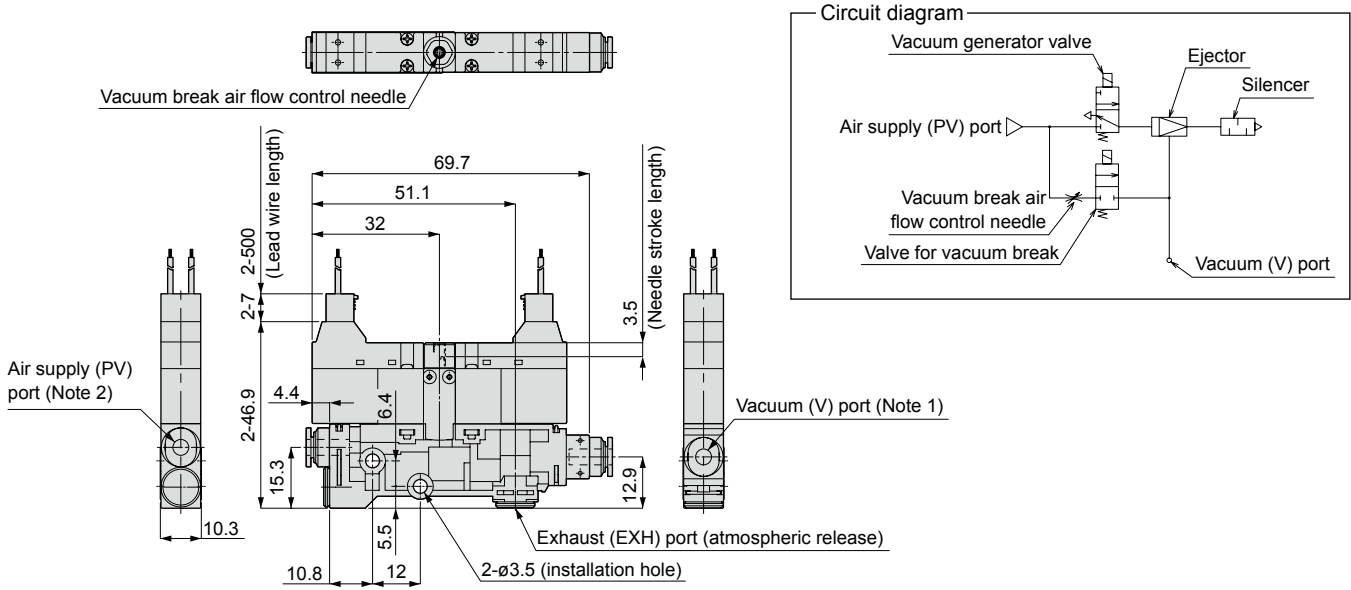
- Air supply port individual type, common exhaust, with vacuum switch
 - VSN-**-*** J-3-*



Note 1: Refer to Table 1 on page 16 for the dimension of the vacuum (V) port.
 Note 2: Refer to Table 2 on page 16 for the dimension of the air supply (PV) port for vacuum generator.
 Note 3: Refer to Table 2 on page 16 for the dimension of the air supply (PS) port for vacuum break.

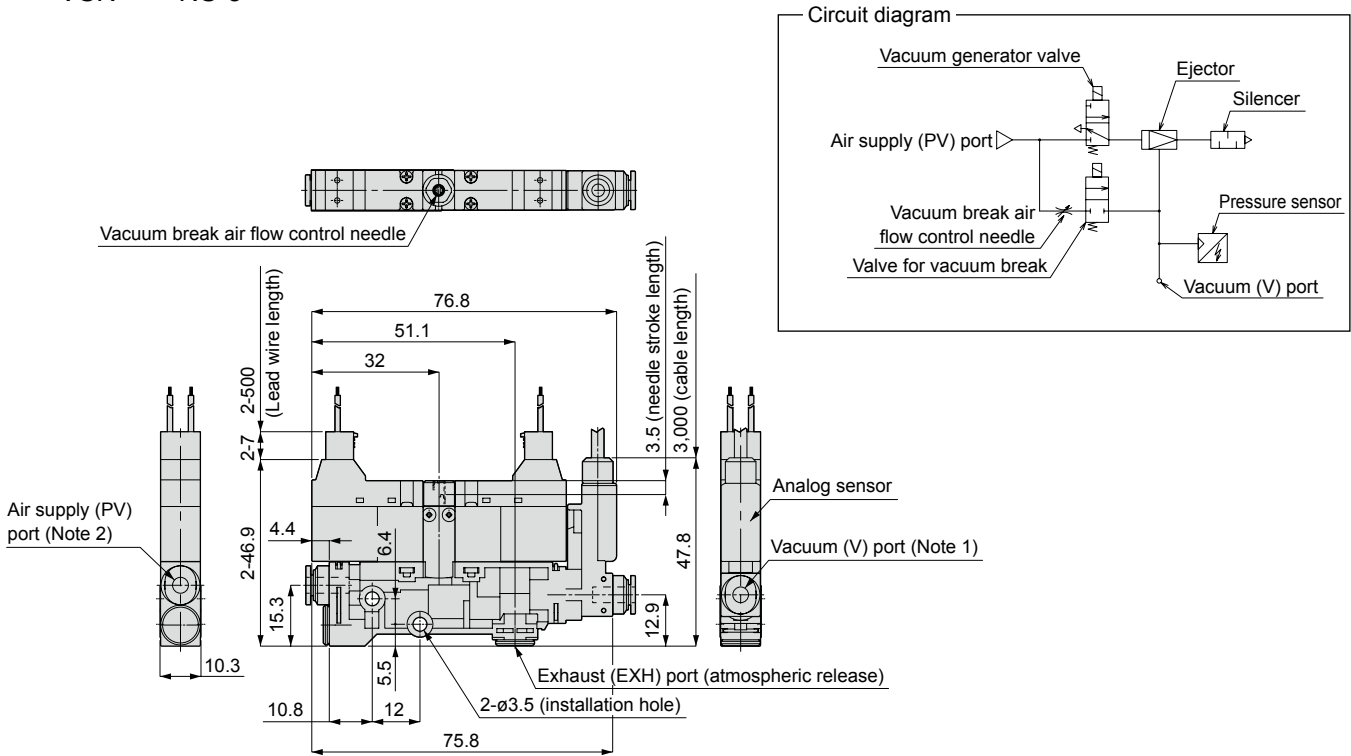
Dimensions (discrete vacuum ejector unit type)

- Air supply port individual type, atmospheric exhaust, without vacuum switch
 - VSN-**-**NS-3



Note 1: Refer to Table 1 on page 16 for the dimension of the vacuum (V) port.
 Note 2: Refer to Table 2 on page 16 for the dimension of air supply (PV) port.

- Air supply port individual type, atmospheric exhaust, with vacuum switch
 - VSN-**-**NS-3-*

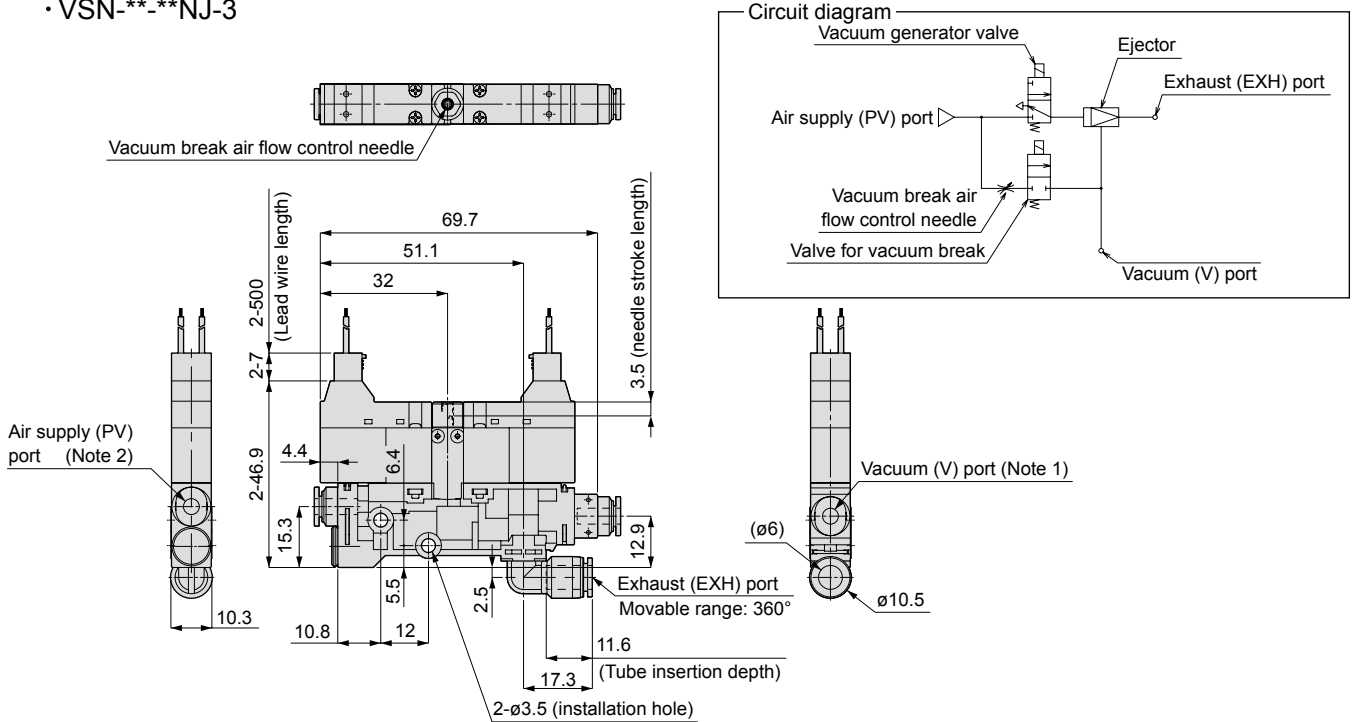


Note 1: Refer to Table 1 on page 16 for the dimension of the vacuum (V) port.
 Note 2: Refer to Table 2 on page 16 for the dimension of air supply (PV) port.

Dimensions (discrete vacuum ejector unit type)

● Air supply port common type, common exhaust, without vacuum switch

• VSN-**-**NJ-3

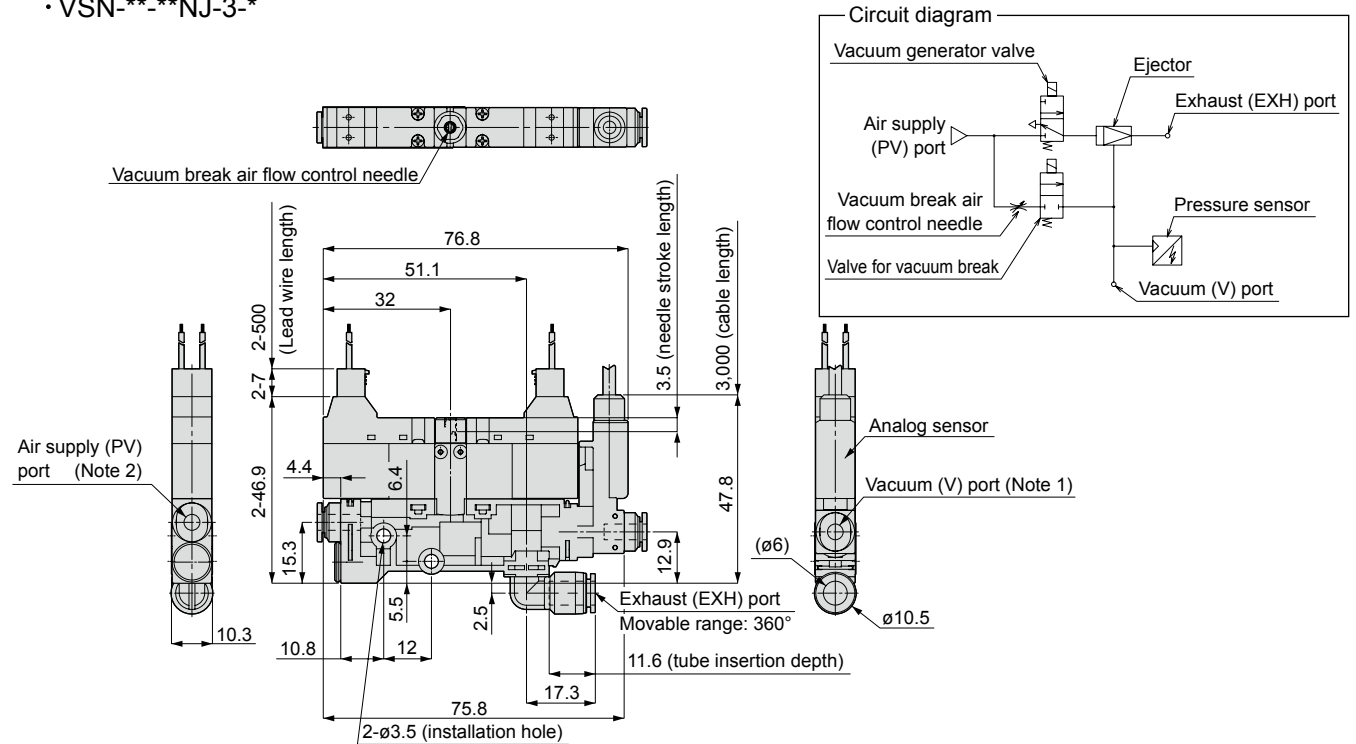


Note 1: Refer to Table 1 on page 16 for the dimension of the vacuum (V) port.

Note 2: Refer to Table 2 on page 16 for the dimension of air supply (PV) port.

● Air supply port common type, common exhaust, with vacuum switch

• VSN-**-**NJ-3-*



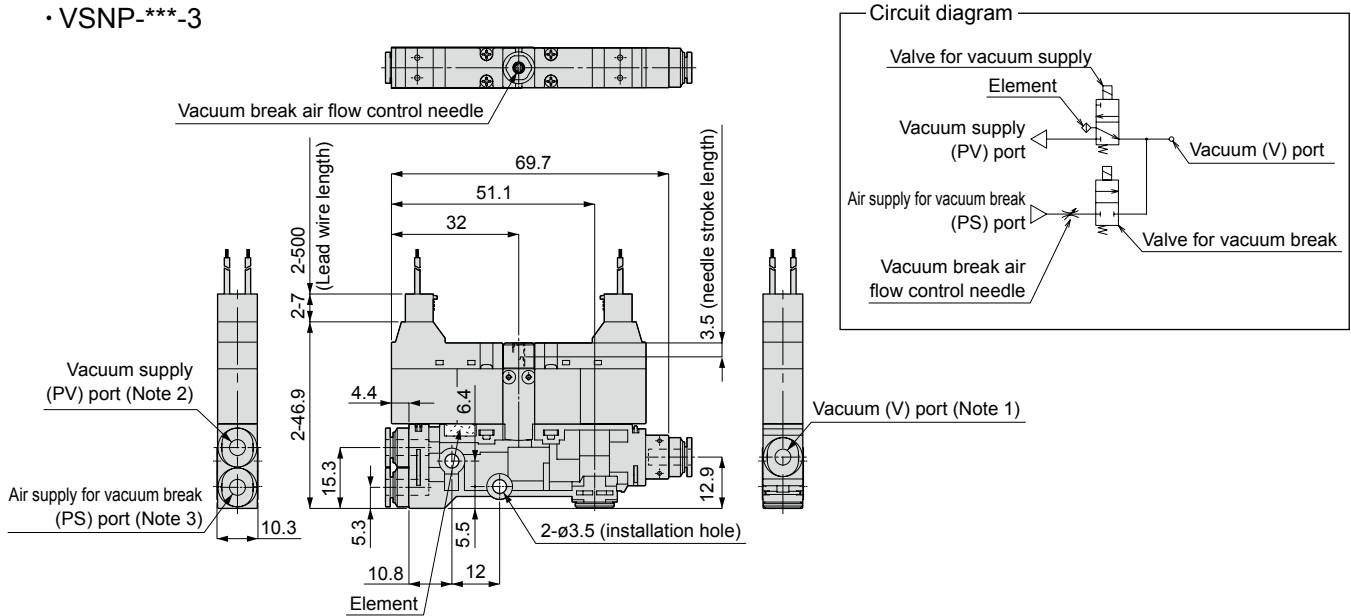
Note 1: Refer to Table 1 on page 16 for the dimension of the vacuum (V) port.

Note 2: Refer to Table 2 on page 16 for the dimension of air supply (PV) port.

Dimensions (discrete vacuum switchover unit type)

● Without vacuum switch

· VSNP-***-3



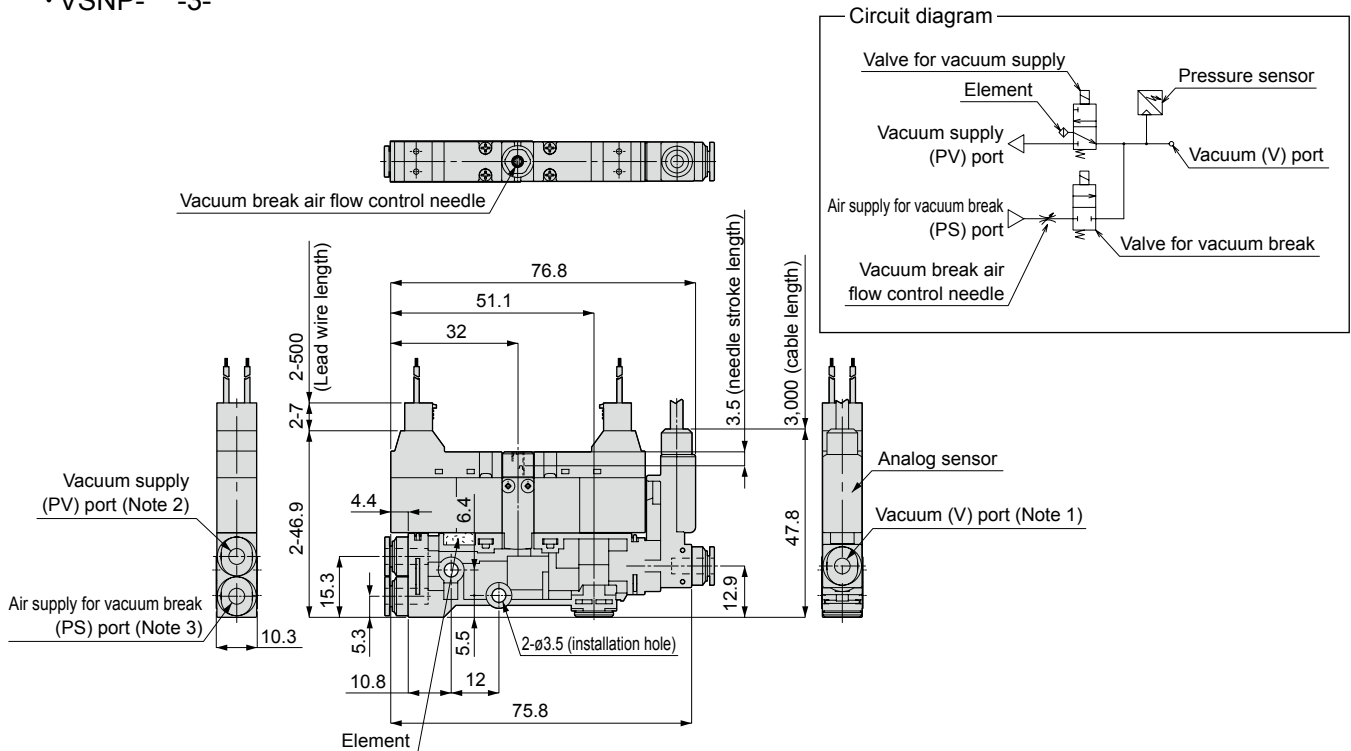
Note 1: Refer to Table 1 on page 16 for the dimension of the vacuum (V) port.

Note 2: Refer to Table 2 on page 16 for the dimension of vacuum supply (PV) port.

Note 3: Refer to Table 2 on page 16 for the dimension of the air supply (PS) port for vacuum break.

● With vacuum switch

· VSNP-***-3-*



Note 1: Refer to Table 1 on page 16 for the dimension of the vacuum (V) port.

Note 2: Refer to Table 2 on page 16 for the dimension of vacuum supply (PV) port.

Note 3: Refer to Table 2 on page 16 for the dimension of the air supply (PS) port for vacuum break.

Dimensions

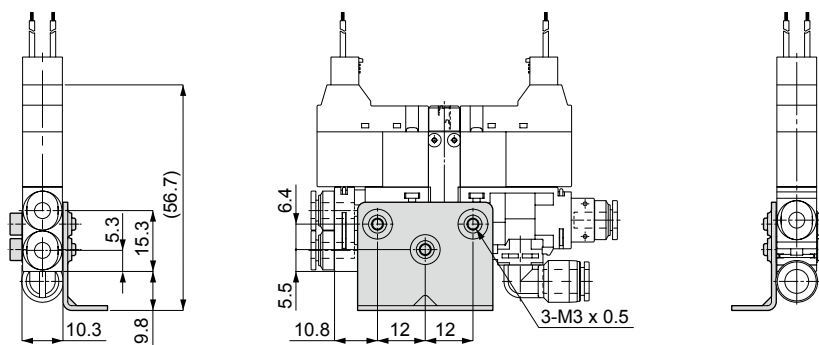
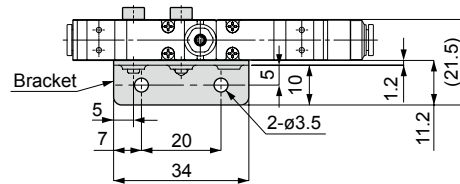
● Joint dimension of discrete type

ø4 push-in straight joint	ø4 push-in elbow joint
Table 1: Vacuum port push-in joint shape	

4 (ø4 straight)
Table 2: Supply port push-in joint shape

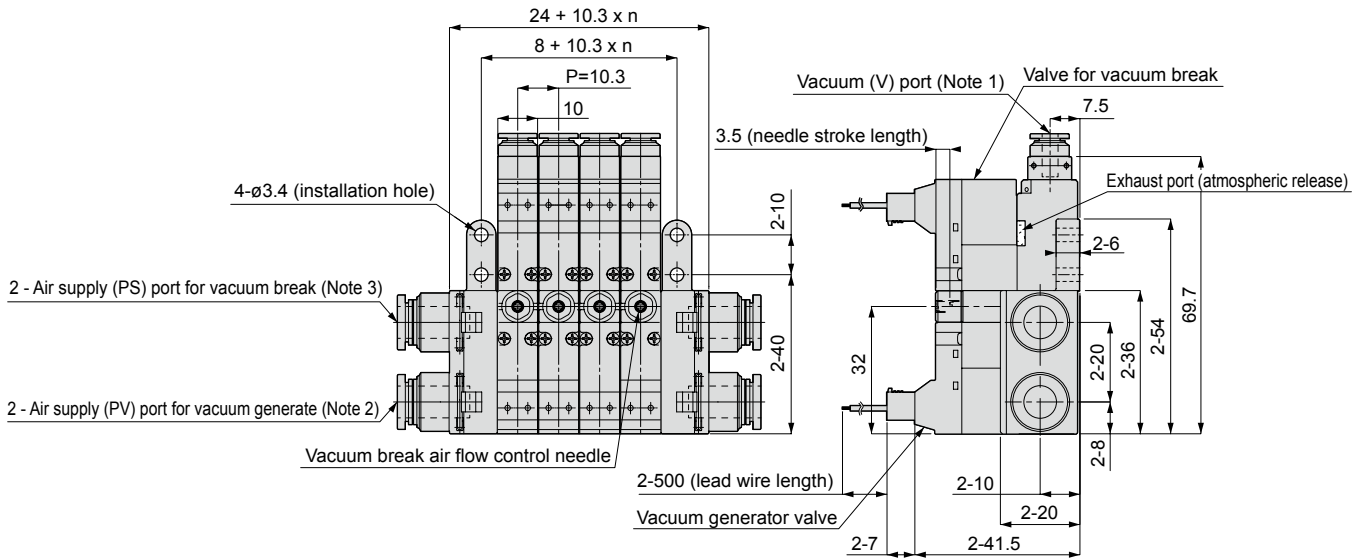
● Discrete bracket

· VSN-B



Dimensions (vacuum ejector unit, manifold type)

- Air supply port individual type, without vacuum switch
 - VSNM-**-*** S-3-*

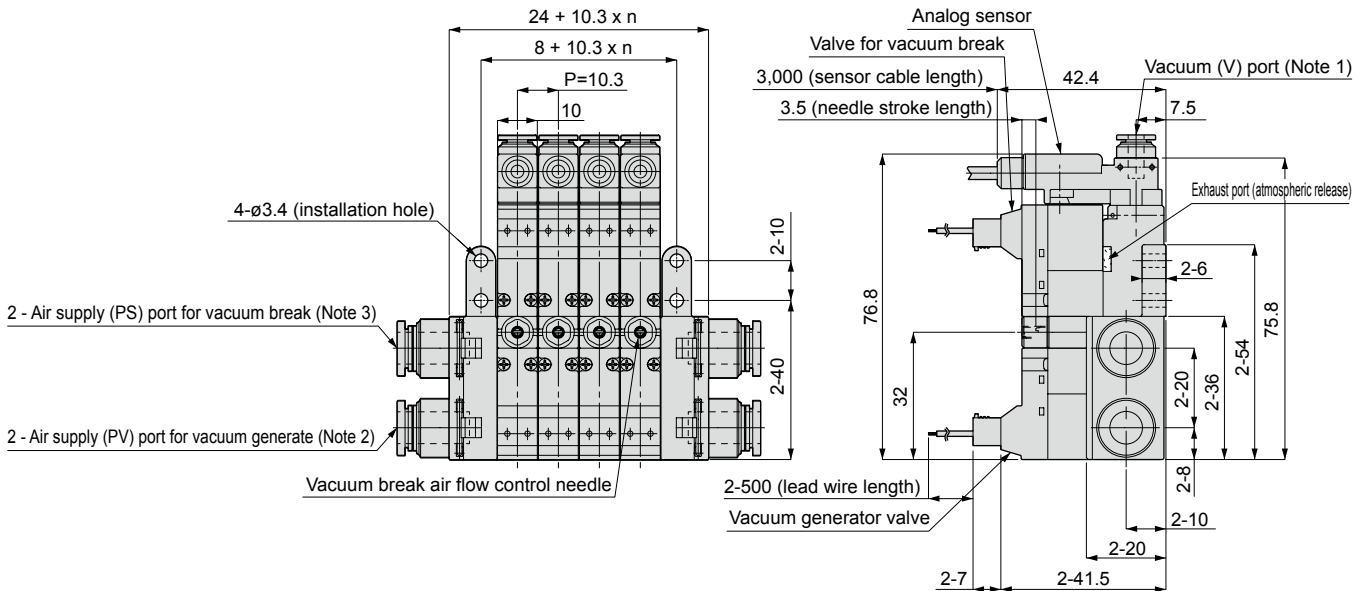


Note 1: Refer to Table 1 on page 20 for the dimensions of vacuum port.

Note 2: Refer to Table 2 on page 20 for the dimension of air supply port to generate vacuum.

Note 3: Refer to Table 2 on page 20 for the dimension of the air supply (PS) port to break vacuum.

- Air supply port individual type, with vacuum switch
 - VSNM-**-*** S-3-*_*



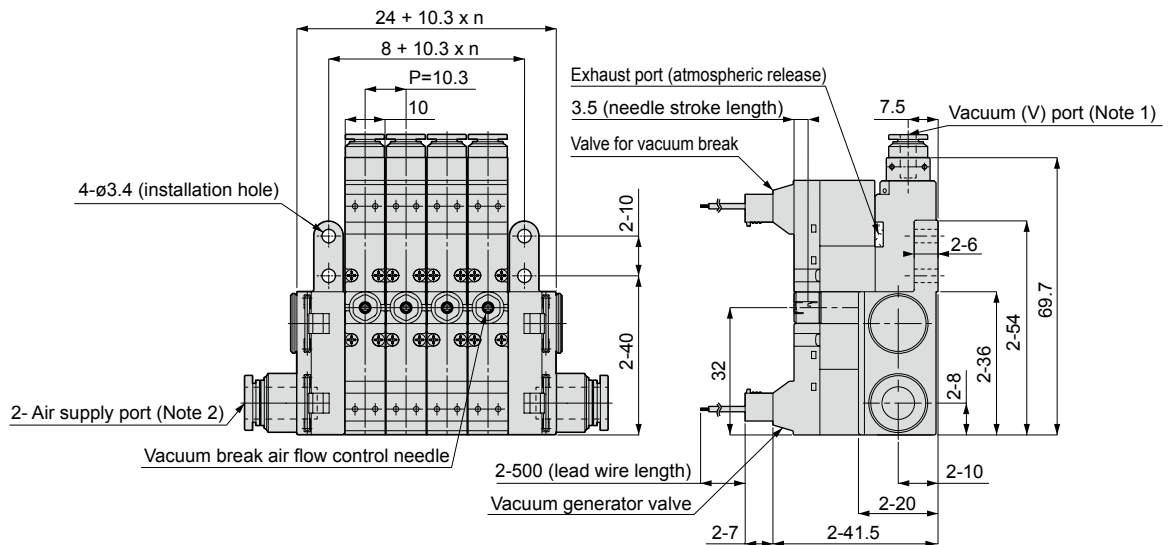
Note 1: Refer to Table 1 on page 20 for the dimensions of vacuum port.

Note 2: Refer to Table 2 on page 20 for the dimension of air supply port to generate vacuum.

Note 3: Refer to Table 2 on page 20 for the dimension of the air supply (PS) port to break vacuum.

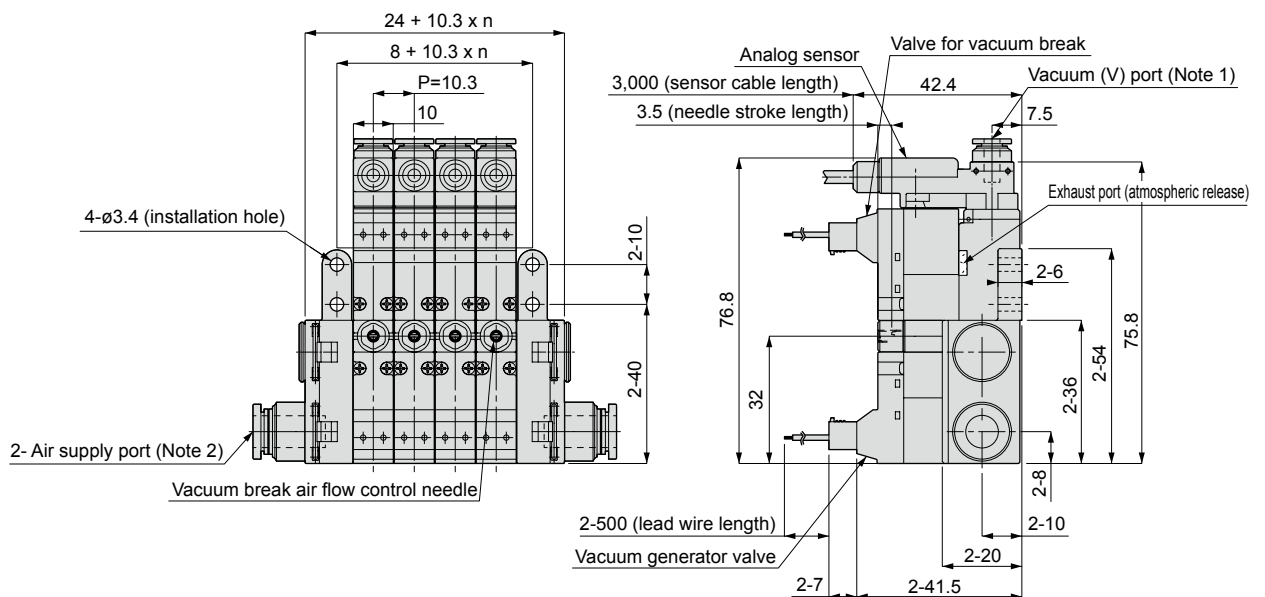
Dimensions (vacuum ejector unit, manifold type)

- Air supply port common type, without vacuum switch
 - VSNM-**-*** S-3-*



Note 1: Refer to Table 1 on page 20 for the dimensions of vacuum port.
 Note 2: Refer to Table 2 on page 20 for the dimension of the air supply port.

- Air supply port common type, with vacuum switch
 - VSNM-**-***NS-3-*

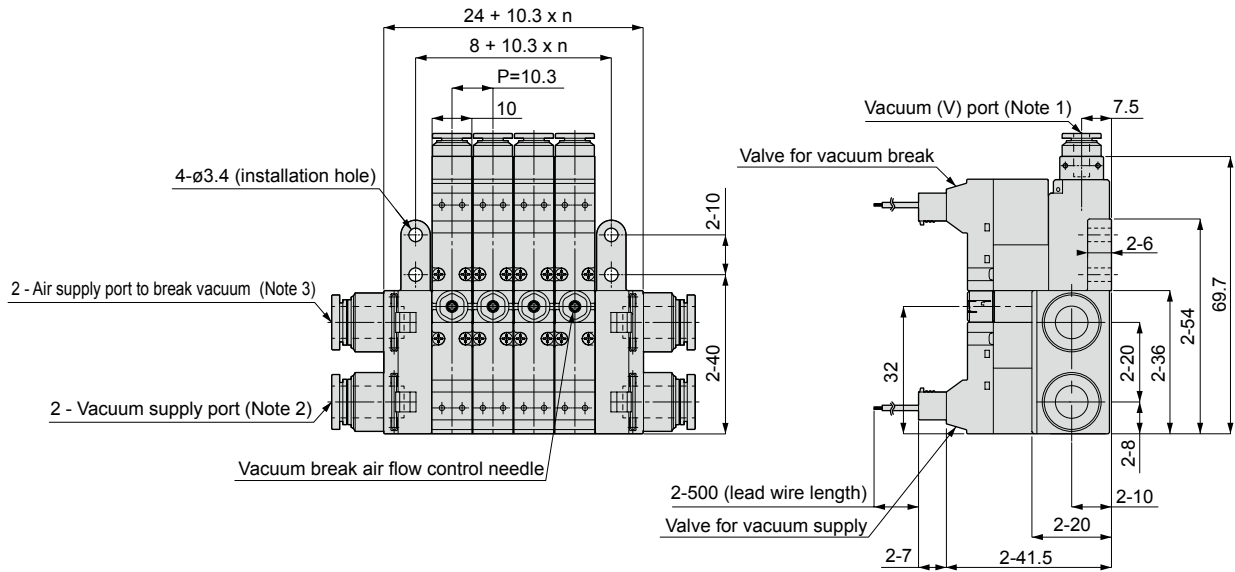


Note 1: Refer to Table 1 on page 20 for the dimensions of vacuum port.
 Note 2: Refer to Table 2 on page 20 for the dimension of the air supply port.

Dimensions (vacuum switchover unit, manifold type)

● Without vacuum switch

• VSNPM-***-3-*



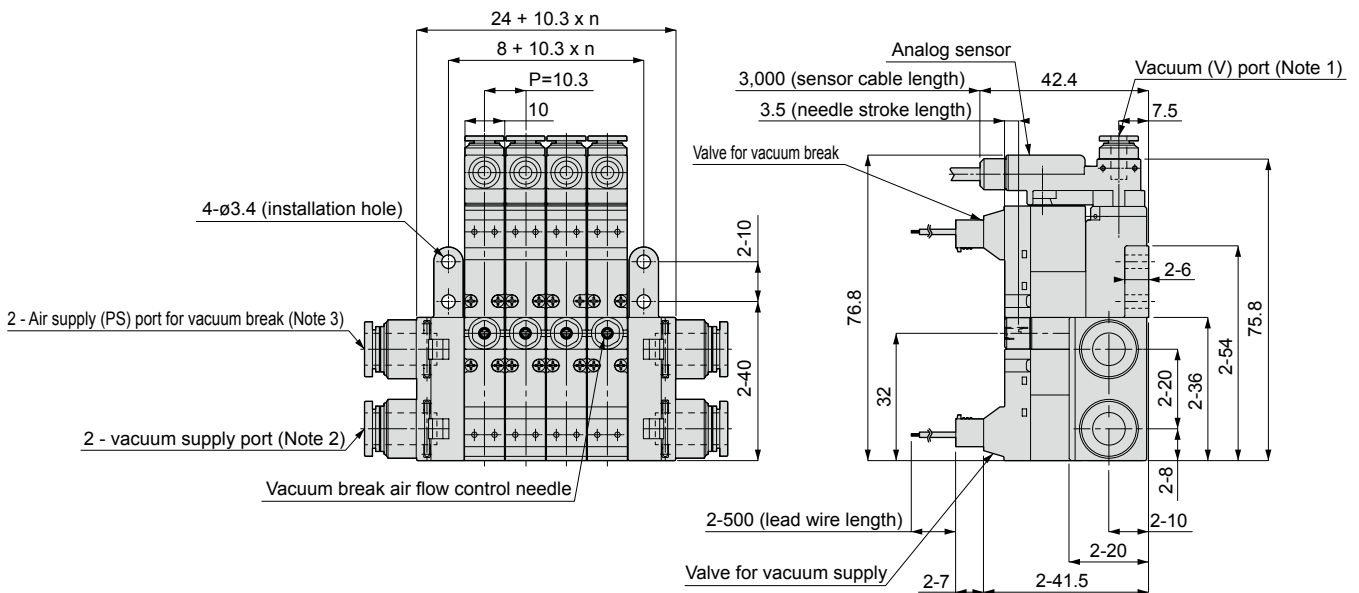
Note 1: Refer to Table 1 on page 20 for the dimensions of vacuum port.

Note 2: Refer to Table 2 on page 20 for the dimension of the vacuum supply port.

Note 3: Refer to Table 2 on page 20 for the dimension of the air supply (PS) port to break vacuum.

● With vacuum switch

• VSNPM-***-3-_*



Note 1: Refer to Table 1 on page 20 for the dimensions of vacuum port.

Note 2: Refer to Table 2 on page 20 for the dimension of the vacuum supply port.

Note 3: Refer to Table 2 on page 20 for the dimension of the air supply (PS) port to break vacuum.

Dimensions

Joint dimension of manifold type

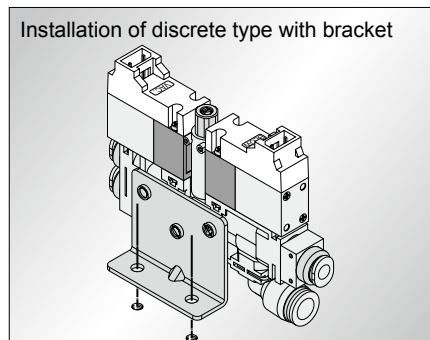
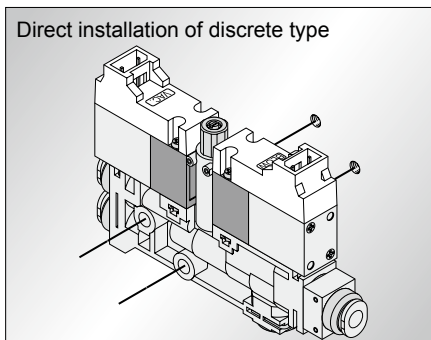
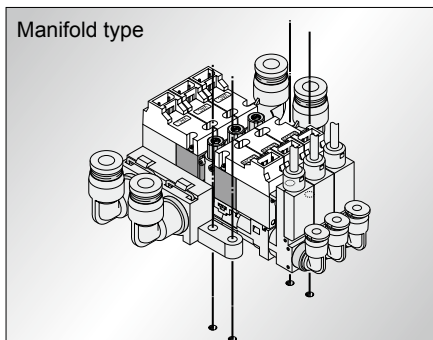
<p>ø4 push-in straight joint</p>	<p>ø4 push-in elbow joint</p>
<p>Table 1: Vacuum port push-in joint shape</p>	

<p>ø8 push-in straight joint</p>	<p>ø6 push-in straight joint</p>	<p>ø4 push-in straight joint</p>	<p>Plug type</p>
<p>ø8 push-in elbow joint</p>	<p>ø6 push-in elbow joint</p>	<p>ø4 push-in elbow joint</p>	
<p>Table 2: Supply port push-in joint shape</p>			

How to use

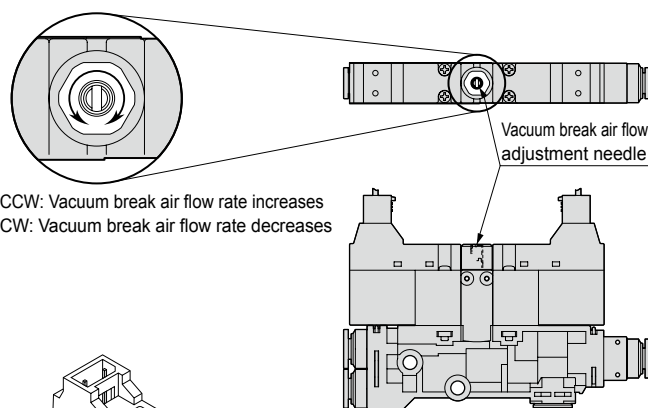
1. Fixing method

Fix with M3 screws using the fixing holes (2 holes) on the resin body. The recommended tightening torque is 0.3 to 0.5N·m. The product could fall off or be damaged if tightened with a torque exceeding the recommended tightening torque range. (Refer to dimensions for a pitch of a installation hole.)



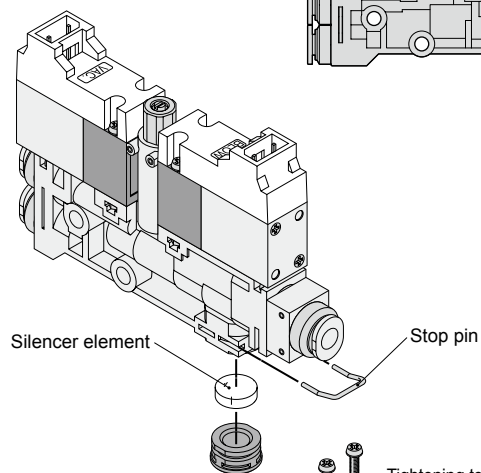
2. Adjustment method with vacuum break air flow

- Turning the release air adjustment needle to the right (CW) decreases the release air flow and turning it left (CCW) increases it.
- * Always use a suitable flat-tip screwdriver to adjust the vacuum break air flow rate.
- * No lock nut is used as this product has a spring inside to stop the needle rotation. Do not turn the hexagon section with a spanner, etc. The product could break.



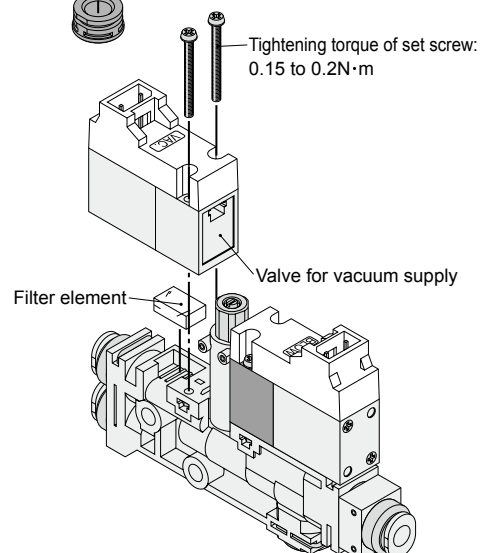
3. Replacing the silencer element

- To replace the silencer element (model: VSN-E) for the isolated type vacuum ejector unit, use a flat-tip screwdriver to remove the set pin, and then replace. Securely insert the set pin after replacing the silencer element.
- * Pay attention to the set pin's orientation. If the set pin is inserted in reverse, it could drop off because of vibration, etc., during use.



4. Replacing the filter element

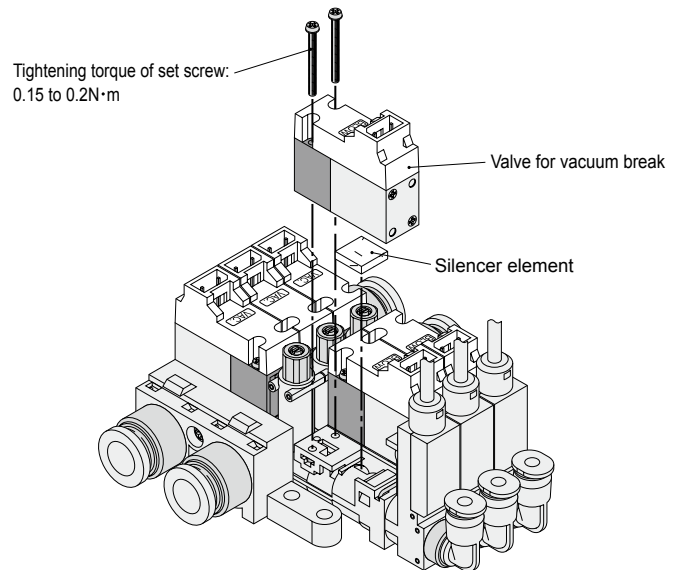
- To replace the filter element (model: VSNP-E) for the isolated type vacuum switch unit, use a suitable Phillips screwdriver to remove the vacuum supply valve's set screw, and then replace the element. After replacing the filter element, make sure that the vacuum supply valve's packing has not dropped off, and then tighten the set screw with a tightening torque of 0.15 to 0.2N·m, and securely tighten.



How to use

5. Replacing the silencer element

- To replace the silencer element (model: VSNM-E) for the manifold type vacuum ejector unit, remove the vacuum break valve with a suitable cross-point screwdriver. After replacing the silencer element, securely insert the set pin, make sure that the packing for the vacuum supply valve has not dropped off, and then securely mount by tightening the set screws with a 0.15 to 0.2N·m tightening torque.



6. Removing and cleaning the ejector type nozzle and diffuser

- Remove the vacuum break valve, remove the vacuum port set pin, sensor unit or vacuum port block, and then pull out the diffuser with pliers, etc. To prevent the nozzle from popping out, cover the exhaust port with a piece of cushioning material (i.e., sponge), then supply the vacuum generating air (Note 1) and energize the vacuum generating valve. The air will force the nozzle out, so remove the cushioning material and then remove the nozzle. Remove all matter adhered on the inner side of the nozzle and diffuser as well as the seal section with compressed air or by wiping it off (Note 2).

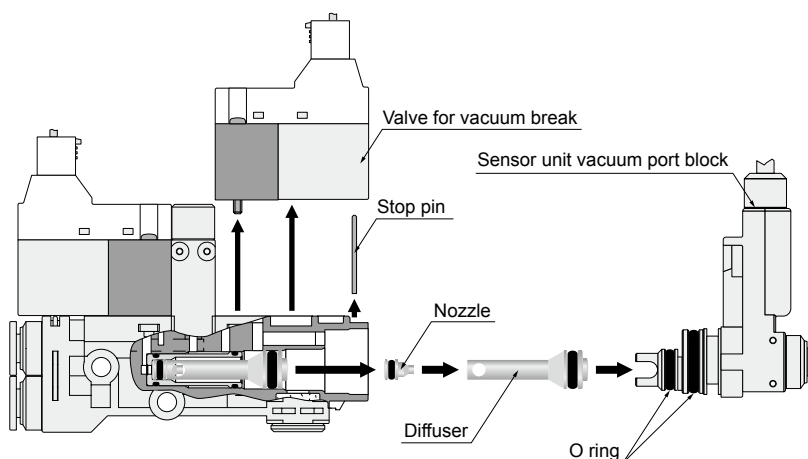
Assemble the nozzle onto the diffuser, and then carefully set it onto the body so that the nozzle does not drop off. Press the diffuser in so that the end of the diffuser is not damaged, and then assemble the sensor unit or vacuum port. Accurately insert the set pins for fixing the vacuum port, and tighten the vacuum break solenoid valve fixing screws with a tightening torque of 0.15 to 0.2N·m. Refer to "Replacing the silencer element" for details on mounting the silencer element.

(Note 1) <Warning> Do not face the nozzle outlet toward personnel while air is supplied to the product. The nozzle could pop out and cause injury.

(Note 2) <Warning> If air is supplied with the vacuum break valve removed, the break air will be blown out from the valve's square hole. Fully close the vacuum break air flow adjusting needle when supplying air with the vacuum break valve removed.

(Note 3) When mounting the vacuum port block onto the main unit, confirm that there is no dirt or lint, etc., adhered on the O ring.

(Note 4) Take care not to damage the nozzle, inner side of the diffuser, seal section, seal parts (O ring) or inner side of the main unit. The performance could drop.



How to use

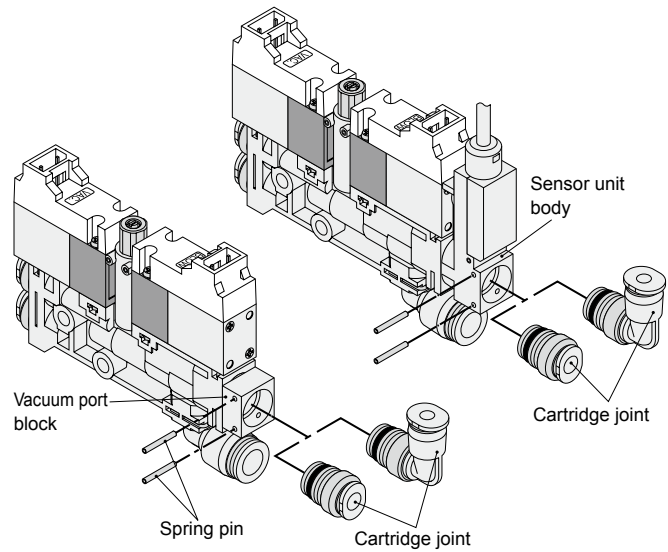
7. How to replace cartridge joint

<Vacuum port>

■ Discrete type

To replace the cartridge joint for the vacuum port, remove the two spring pins inserted from the side of the sensor unit body or vacuum port block with a jig such as a $\varnothing 1\text{mm}$ pin, and then replace the cartridge joint.

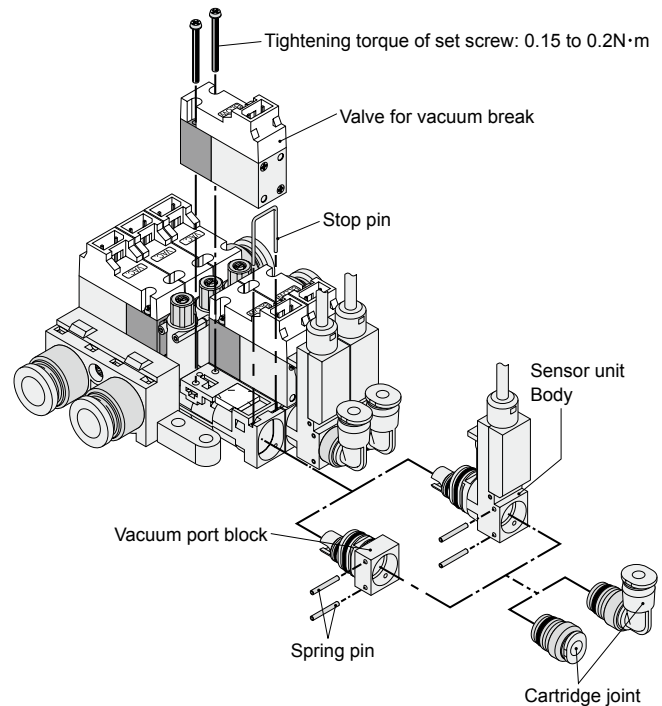
- * Always confirm that there is no dirt or lint, etc., stuck on the O ring before mounting the cartridge joints onto the main body. Take care not to damage the O ring or the inner side of the main unit. The performance could drop because of leaks in the vacuum circuit.



■ Manifold type

Remove the vacuum break valve with a suitable cross-pinted screwdriver. Remove the set pins for fixing the vacuum port block or sensor unit body with a flat-tip screwdriver, etc. To replace the cartridge joint for the vacuum port, remove the two spring pins inserted from the side of the sensor unit body or vacuum port block with a jig such as a $\varnothing 1\text{mm}$ pin, and then replace the cartridge joint. After replacing the cartridge joint, make sure that the packing for the vacuum supply valve has not dropped off, and then securely mount by tightening the set screws with a 0.15 to 0.2N·m tightening torque.

- * Always confirm that there is no dirt or lint, etc., stuck on the O ring before mounting the cartridge joints onto the main body. Take care not to damage the O ring or the inner side of the main unit. The performance could drop because of leaks in the vacuum circuit.

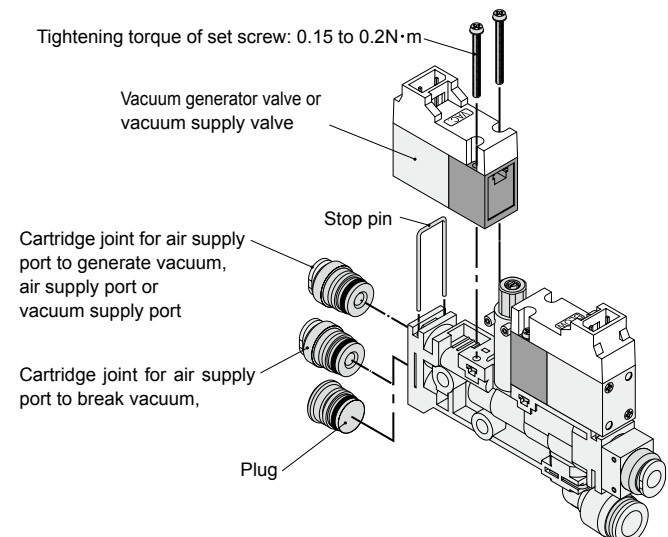


<Supply port>

■ Discrete type

Remove the vacuum generation valve or vacuum supply valve with a suitable cross-pinted screwdriver. Remove the vacuum generation air supply port and vacuum break air supply port or air supply port set pins with a flat-tip screwdriver, etc. After replacing the cartridge joint, make sure that the packing for the vacuum supply valve has not dropped off, and then securely mount by tightening the set screws with a 0.15 to 0.2N·m tightening torque.

- * Always confirm that there is no dirt or lint, etc., stuck on the O ring before mounting the cartridge joints onto the main body. Take care not to damage the O ring or the inner side of the main unit. Air leakage may occurred.



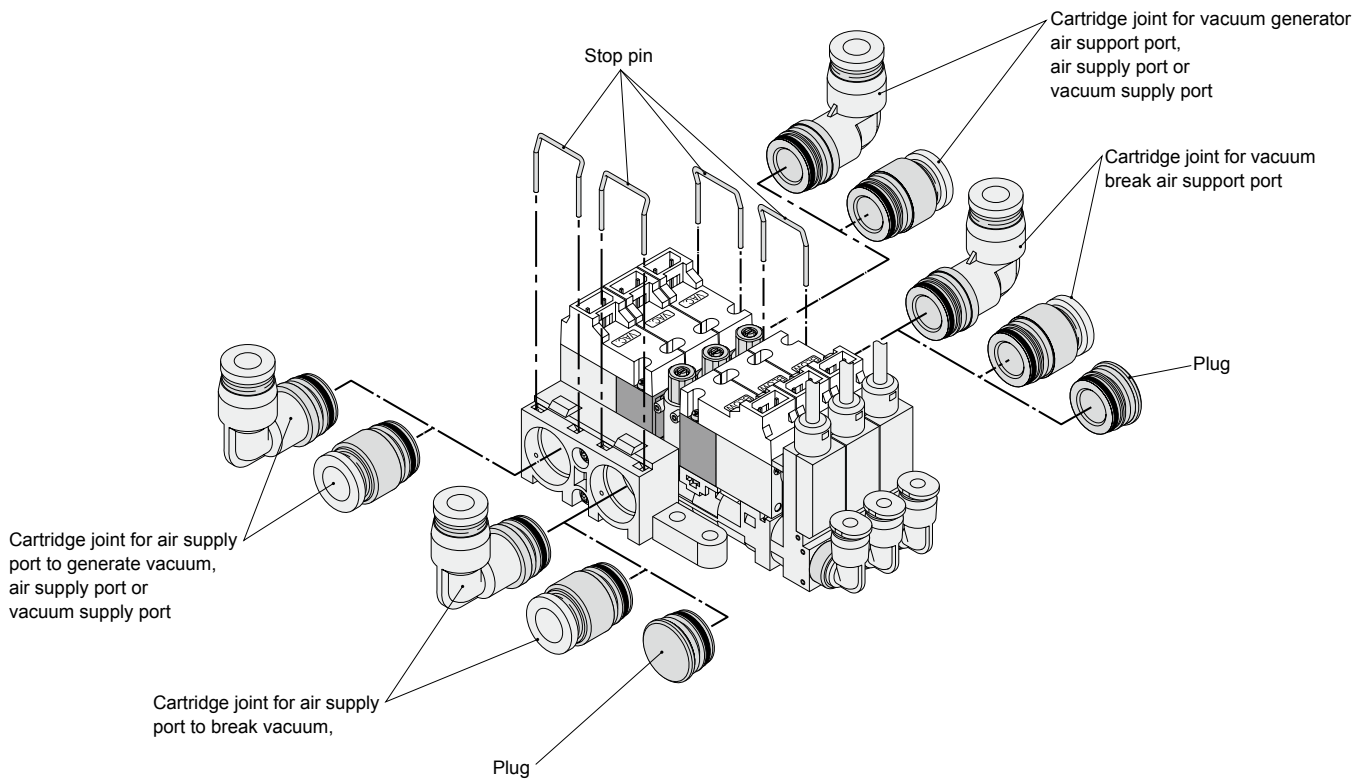
How to use

■ Manifold type

Remove the set pin with a flat-tip screwdriver, etc., and replace the cartridge joint.

* Always confirm that there is no dirt or lint, etc., stuck on the O ring before mounting the cartridge joints onto the main body. Take care not to damage the O ring or the inner side of the main unit. Air leakage may occurred.

* Pay attention to the set pin's orientation. If the set pin is inserted in reverse, it could drop off because of vibration, etc., during use.



How to complete VSNM mix manifold specification

● Mix manifold model no. (example)

VSNM - ^AZ - ^B00 - ^CCX - ^D4R - ^EN - ^FS - ^G3 - ^H5 - ^IZ

● Mix manifold specifications

Vacuum ejector unit model no. ^A ^B ^C ^I	Layout										Quantity
	1	2	3	4	5	6	7	8	9	10	
VSNM - ^A H - ^B 05 - ^C 4 - ^I R1	○	○									2
VSNM - ^A E - ^B 05 - ^C 4 - ^I R2			○	○							2
VSNM - ^A E - ^B 05 - ^C 4L - ^I R2					○						1
VSNM - ^A - ^B - ^C - ^I											
VSNM - ^A - ^B - ^C - ^I											

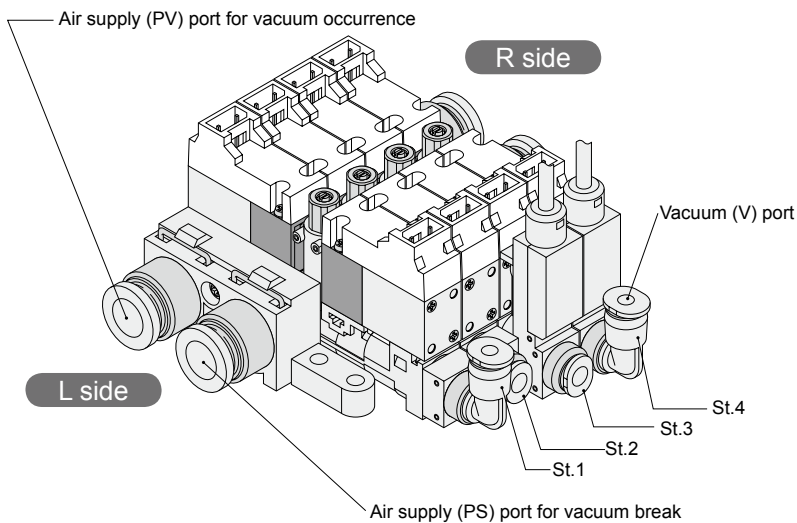
<Only vacuum port size mix joint specifications>

● Mix manifold model no. (example)

VSNM - ^AH - ^B05 - ^CCX - ^D4R - ^EN - ^FS - ^G3 - ^H5 - ^IV1

● Mix manifold specifications

Vacuum ejector unit model no. ^A ^B ^C ^I	Layout										Quantity
	1	2	3	4	5	6	7	8	9	10	
VSNM - ^A H - ^B 05 - ^C 4 - ^I V1	○	○									2
VSNM - ^A H - ^B 05 - ^C 4L - ^I V1			○	○	○						3
VSNM - ^A - ^B - ^C - ^I											
VSNM - ^A - ^B - ^C - ^I											
VSNM - ^A - ^B - ^C - ^I											



<Completing the form>

- Piping locations start from the vacuum port, and are set in order from the left.
- Indicate the total number of designated product models required at the far right in the table.

VSNM mix manifold specifications

Issue / /

Company name

Contact messrs.

Purchase order No.

Contact _____ Quantity _____ Set _____ Request date _____ Month _____ Day _____

Slip No. _____ Order No. _____

● Mix manifold model no.

VSNM - ^A - ^B - ^C ^D ^E ^F - ^G - ^H - ^I

A Vacuum characteristics Note 1, 2	
H	High vacuum/medium flow type
E	High vacuum/small flow rate type
Z	For mix specifications (describe in the specification.)

B Nozzle diameter Note 1, 2	
04	ø0.4
05	ø0.5
06	ø0.6
00	For mix specifications (describe in the specification.)

C Vacuum port (V)	
4	ø4 push-in straight joint
4L	ø6 push-in elbow joint
CX	For mix joint (describe in the specification.)

D Air supply port to generate vacuum (PV)	
Refer to a separate Table 1 of P***.	

E Air supply port to break vacuum (PS)	
Refer to a separate Table 2 of P***.	

F Exhaust port (EX)	
S	Atmospheric release with silencer

G Solenoid valve voltage	
3	24 VDC

H Station no.	
2	2 station
to	to
10	10 station

I Vacuum sensor specifications	
Blank	Without vacuum sensor
V1	Analog output for negative pressure
V2	Analog output for separate type LED indicator + negative pressure
R1	Analog output for compound pressure
R2	Analog output for separate type LED indicator + compound pressure
Z	For mix specifications (describe in the specification.)

⚠ Note on model no. selection

Note 1: Combinations of (A) and (B) are only E04, H05, E05, H06, E06 and Z00.

● Mix manifold specifications

Vacuum ejector unit model no. ^A ^B ^C ^I	Layout										Quantity
	1	2	3	4	5	6	7	8	9	10	
VSNM - ^A ^B - ^C ^I											
VSNM - ^A ^B - ^C ^I											
VSNM - ^A ^B - ^C ^I											
VSNM - ^A ^B - ^C ^I											
VSNM - ^A ^B - ^C ^I											

How to complete VSNPM mix manifold specification

● Mix manifold model no. (example)

VSNPM - ^A**CX** - ^B**4R** - ^C**4** - ^D**3** - ^E**5** - ^F**Z**

● Mix manifold specifications

Vacuum switchover unit model no. ^A ^F	Layout										Quantity
	1	2	3	4	5	6	7	8	9	10	
VSNPM - 4 - V2	○	○			○						3
VSNPM - 4L - V2			○								1
VSNPM - 4L - V1				○							1
VSNPM - <input type="text"/> - <input type="text"/>											
VSNPM - <input type="text"/> - <input type="text"/>											

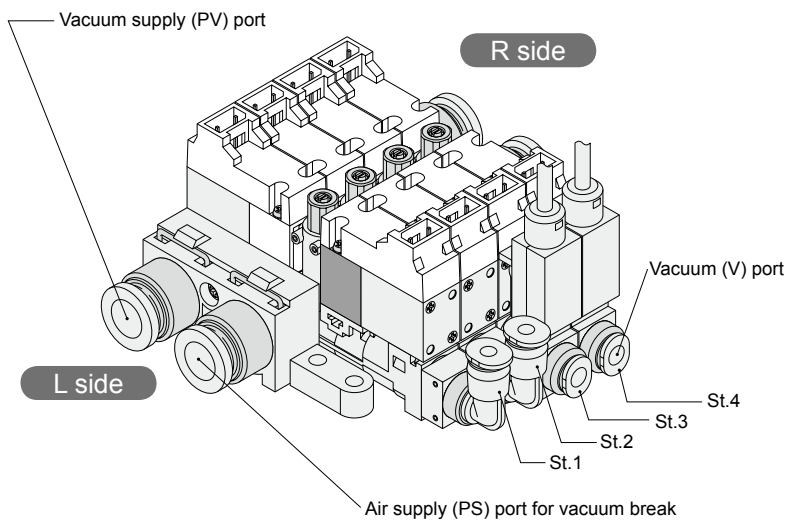
<Only vacuum port size mix joint specifications>

● Mix manifold model no. (example)

VSNPM - ^A**CX** - ^B**4** - ^C**4** - ^D**3** - ^F**5** - ^G**V2**

● Mix manifold specifications

Vacuum switchover unit model no. ^A ^F	Layout										Quantity
	1	2	3	4	5	6	7	8	9	10	
VSNPM - 4 - V2	○	○		○	○						4
VSNPM - 4L - V2			○								1
VSNPM - <input type="text"/> - <input type="text"/>											
VSNPM - <input type="text"/> - <input type="text"/>											
VSNPM - <input type="text"/> - <input type="text"/>											



<Completing the form>

- Piping locations start from the vacuum port, and are set in order from the left.
- Indicate the total number of designated product models required at the far right in the table.

VSNPM mix manifold specifications

Issue / /

Company name

Contact messrs.

Purchase order No.

Contact _____ Quantity _____ Set _____ Request date _____ Month _____ Day _____

Slip No. _____ Order No. _____

● Mix manifold model no.

VSNPM - - - -

A Vacuum port (V)	
4	ø4 push-in straight joint
4L	ø4 push-in elbow joint
CX	For mix joint (describe in the specification.)

B Air supply port to generate vacuum (PV)	
Refer to a separate Table 1 of P***.	

C Air supply port to break vacuum (PS)	
Refer to a separate Table 2 of P***.	

D Solenoid valve voltage	
3	24 VDC

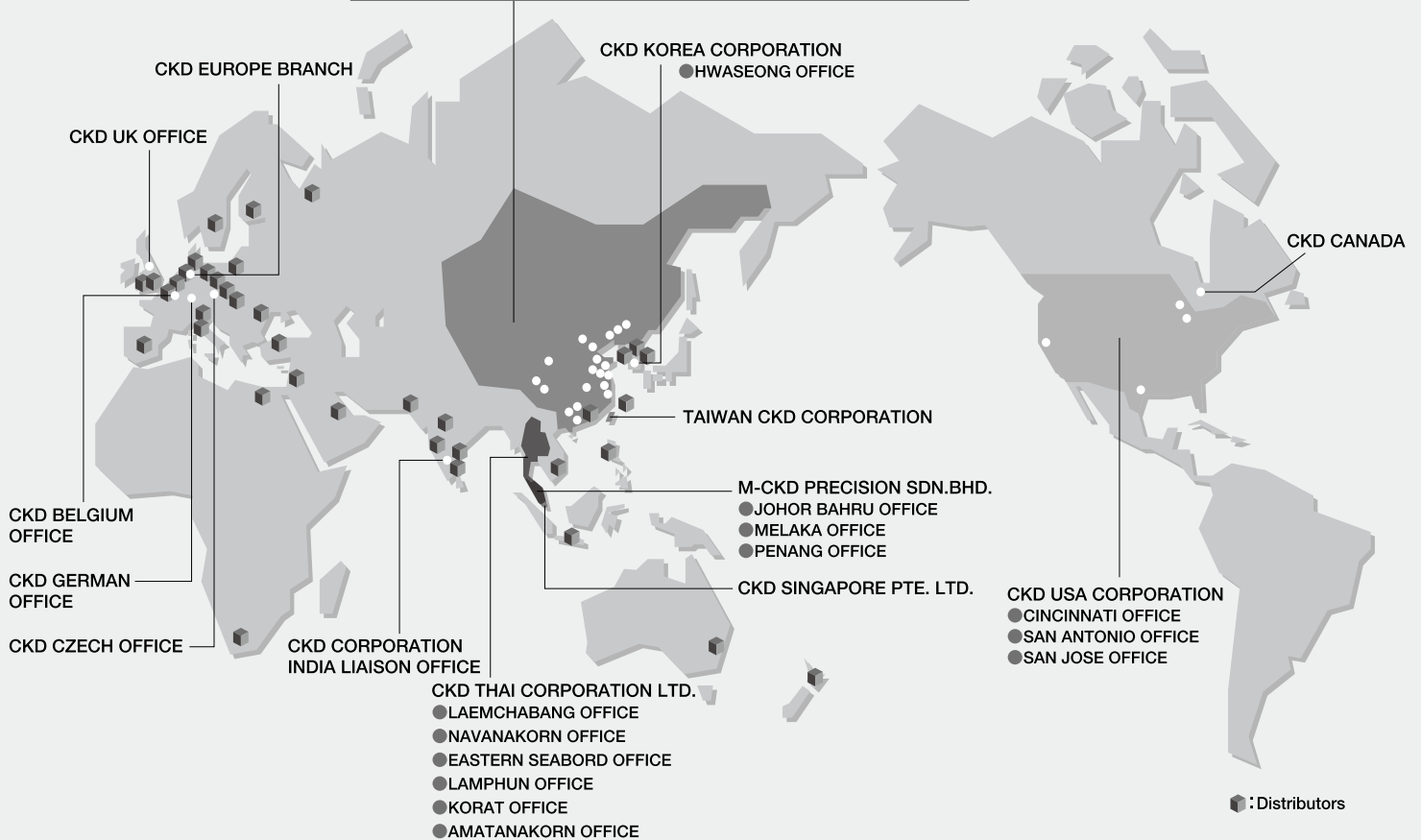
E Station no.	
2	2 station
to	to
10	10 station

F Vacuum sensor specifications	
Blank	Without vacuum sensor
V1	Analog output for negative pressure
V2	Analog output for separate type LED indicator + negative pressure
R1	Analog output for compound pressure
R2	Analog output for separate type LED indicator + compound pressure
Z	For mix specifications (describe in the specification.)

● Mix manifold specifications

Vacuum switchover unit model no. A F	Layout										Quantity
	1	2	3	4	5	6	7	8	9	10	
VSNPM - <input type="text"/> - <input type="text"/>											
VSNPM - <input type="text"/> - <input type="text"/>											
VSNPM - <input type="text"/> - <input type="text"/>											
VSNPM - <input type="text"/> - <input type="text"/>											
VSNPM - <input type="text"/> - <input type="text"/>											

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CKD Corporation

Website <http://www.ckd.co.jp/>

□ OVERSEAS DPT. SALES DIV. 2-250 Uji Komaki, Aichi 485-8551, Japan
 □ PHONE +81-(0)568-74-1338 FAX +81-(0)568-77-3461

U.S.A

CKD USA CORPORATION

● HEADQUARTERS

4080 Winnetka Avenue, Rolling Meadows, IL 60008 USA
 PHONE +1-847-368-0539 FAX +1-847-788-0575

EUROPE

CKD EUROPE BRANCH

De Fruittuinen 28 Hoofddorp 2132NZ The Netherlands
 PHONE +31-(0)23-5541490 FAX +31-(0)23-5541491

Malaysia

M-CKD PRECISION SDN.BHD.

● HEADQUARTERS

Lot No.6, Jalan Modal 23/2, Seksyen 23, Kawasan, MIEL,
 Fasa 8, 40300 Shah Alam, Selangor Darul Ehsan, Malaysia
 PHONE +60-(0)3-5541-1468 FAX +60-(0)3-5541-1533

Thailand

CKD THAI CORPORATION LTD.

● SALES HEADQUARTERS-BANGKOK OFFICE

Suwan Tower, 14/1 Soi Saladaeng 1, North Sathorn Rd., Bangrak,
 Bangkok 10500 Thailand
 PHONE +66-(0)2-267-6300 FAX +66-(0)2-267-6305

Singapore

CKD SINGAPORE PTE LTD.

705 Sims Drive #03-01/02, Shun Li Industrial Complex,
 387384 Singapore
 PHONE +65-6744-2623 FAX +65-6744-2486

Taiwan

TAIWAN CKD CORPORATION

1F., No.16, Wucyuan 5th Rd., Wugu Township, Taipei Country 248,
 Taiwan (R.O.C)
 PHONE +886-(0)2-2298-2866 FAX +886-(0)2-2298-0322

China

CKD (SHANGHAI) CORPORATION

● SALES HEADQUARTERS / SHANGHAI OFFICE

Room 1903, 333 Jiujiang Road, Shanghai, 200001, China
 PHONE +86-(0)21-63602277 FAX +86-(0)21-63511661

Korea

CKD KOREA CORPORATION

3rd FL, Sam Young B/D, 371-20
 Sinsu-Dong, Mapo-Gu, Seoul, 121-110, Korea
 PHONE +82-(0)2-783-5201~5203 FAX +82-(0)2-783-5204

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