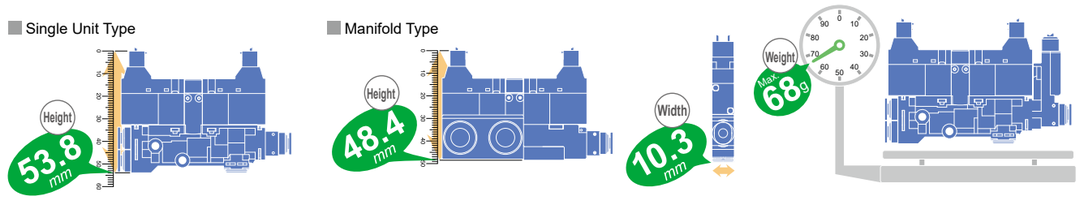
10.3 mm Width Compact Integrated Type Vacuum Switching Unit

VSNP Series

Integrated type vacuum switching unit achieving high-speed and stable response
Large flow rate during vacuum breaking, optimal for quick Pick & Place operations

Ideal for customers with limited installation space

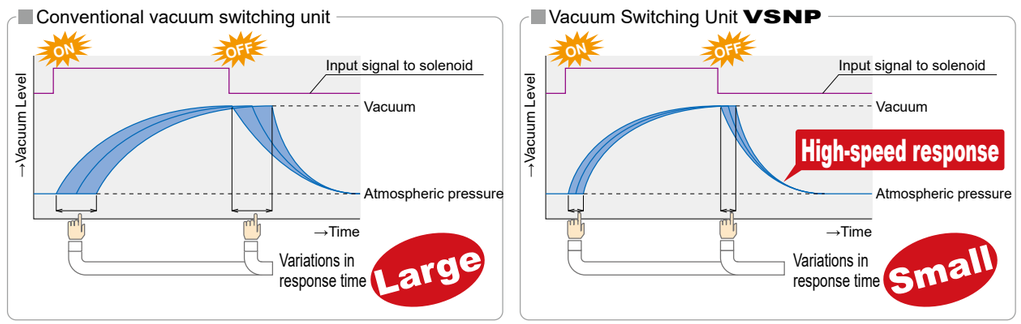
Compact and lightweight, especially with reduced product height.



*Excluding pressure sensor with LED display.

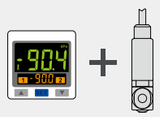
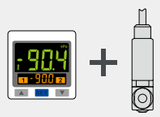
Achieves high-speed and stable responsE(ON/OFF ≤ 5 msec)

Direct acting valve adopted for main valve.



4 types of analog output pressure sensors available

- Analog Output Sensor for Negative Pressure
- Separate Digital Pressure Indicator + Analog Output Sensor for Negative Pressure
- Analog Output Sensor for Compound Pressure
- Separate Digital Pressure Indicator + Analog Output Sensor for Compound Pressure

	For Negative Pressure	For Compound Pressure
Analog Switch		
SeparatE-type Digital Pressure Indicator + Analog Switch		

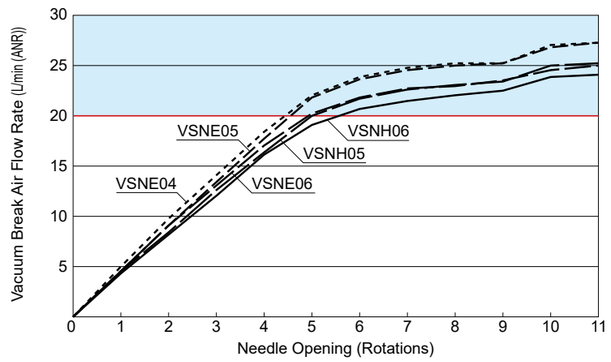
Pressure sensor lead wires are connectorized. Improved wiring work and maintainability
4 types of connector cable lengths available

Optimal length can be selected from 500, 1,000, 2,000, 3,000 mm according to the installation location.

*Only for pressure sensor with analog output for negative pressure, LED display pressure sensor. Pressure sensor with analog output for compound pressure is grommet type.

Vacuum break air flow rate ensures 20 L/min

Supply Pressure: At 0.5 MPa



Vacuum filter is external(purchased separately)

Eliminates inconvenience of filter replacement work due to product miniaturization

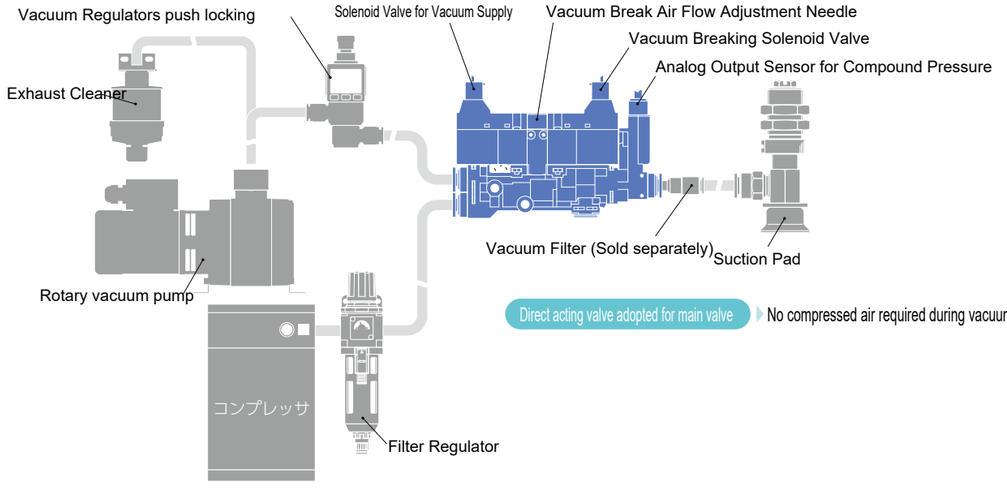
*This product does not have a built-in vacuum filter. To use the product longer, always use our vacuum filter (refer to the right) together with the vacuum piping.

VSFU	VSFJ
Compact Union Type	Socket Type
	
Model No. / VSFU	Model No. / VSFJ
VSFU-2-44	VSFJ-44

Compliant with Global Standards

CE UKCA RoHS

Example Circuit Usage



Direct acting valve adopted for main valve ▶ No compressed air required during vacuum supply

Model No. Notation

●10.3mm width small vacuum unit(vacuum pump system compatible-type)
●Vacuum switching unit single unit

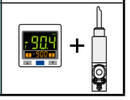
VSNP - 4 4 4 - 3 - V1C0

- VSNP: Model No.
- 4 (1st): ❶ Vacuum Port (V)
- 4 (2nd): Vacuum Supply Port (PV): ø4 Push-in straight fitting
- 4 (3rd): Air Supply Port for Vacuum Breaking: ø4 Push-in straight fitting
- 3: Solenoid Valve Voltage: 24 VDC
- V1C0: ❷ Vacuum Pressure Switch Specifications

❶ Vacuum Port (V)

Code	Content
4	*4 Push-in straight fitting
4L	*4 Push-in elbow fitting

❷ Vacuum Pressure Switch Specifications

Type	Lead Wire(mm)	Separate LED Indicator	Code	
Without Vacuum Pressure Switch			Blank	
Analog Output for Negative Pressure	500		V1C0	
	1,000		V1C1	
	2,000		V1C2	
	3,000		V1C3	
	500	●	V2C0	
	1,000	●	V2C1	
	2,000	●	V2C2	
	3,000	●	V2C3	
Analog Output for Compound Pressure Grommet Lead Wire	3,000		R1	
	3,000	●	R2	

Maintenance Part Model No.

For details of the *maintenance parts, Refer to P. 349 .

●Silencer Element

VSNP - E
Model No.

●Dedicated bracket (common to VSN and VSNP)

VSN - B
Model No.

●Separate Digital Indicator

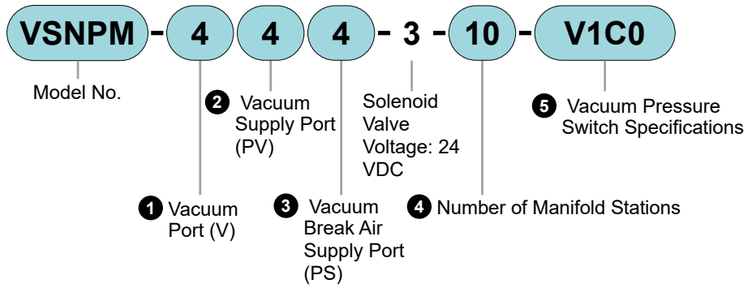
VSN - SED - 31N
Model No.

●Sensor connection connector (e-con)

VSN - EC
Model No.

Model No. Notation

●10.3mm width small vacuum unit(vacuum pump system compatible-type)
●Vacuum switching unit manifold



❶ Vacuum Port (V)

Code	Content
4	*4 Push-in straight fitting
4L	*4 Push-in elbow fitting
CX	For mixed specifications(Provide details in the specification sheet.)

*1: For mixed specifications, be sure to fill out the "Mixed Manifold Specification Sheet". For details, refer to P. 352, 353.

❷ Vacuum Supply Port (PV)

Shape	Size	Position	Code	
Straight Fitting	ø4	R Side Only	**4R**	
	ø6		**6R**	
	ø8		**8R**	
	ø4	Both Sides	**4**	
	ø6		**6**	
	ø8		**8**	
	ø4	L Side Only	**4H**	
	ø6		**6H**	
	ø8		**8H**	
Elbow Fitting	ø4	R Side Only	**4LR**	
	ø6		**6LR**	
	ø8		**8LR**	
	ø4	Both Sides	**4L**	
	ø6		**6L**	
	ø8		**8L**	
	ø4	L Side Only	**4LH**	
	ø6		**6LH**	
	ø8		**8LH**	

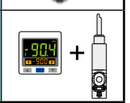
❸ Vacuum Break Air Supply Port (PS)

Shape	Size	Position	Code	
Straight Fitting	ø4	R Side Only	**4R**	
	ø6		**6R**	
	ø8		**8R**	
	ø4	Both Sides	**4**	
	ø6		**6**	
	ø8		**8**	
	ø4	L Side Only	**4H**	
	ø6		**6H**	
	ø8		**8H**	
Elbow Fitting	ø4	R Side Only	**4LR**	
	ø6		**6LR**	
	ø8		**8LR**	
	ø4	Both Sides	**4L**	
	ø6		**6L**	
	ø8		**8L**	
	ø4	L Side Only	**4LH**	
	ø6		**6LH**	
	ø8		**8LH**	
Common for Vacuum Generation / Vacuum Breaking			**N**	

❹ Number of Manifold Stations

Code	Content
2	2 stations
to	to
10	10 stations

❺ Vacuum Pressure Switch Specifications

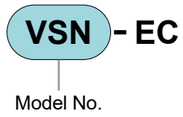
Type	Lead Wire(mm)	Separate LED Indicator	Code	
Without Vacuum Pressure Switch			**Blank**	
Analog Output for Negative Pressure	500		**V1C0**	
	1,000		**V1C1**	
	2,000		**V1C2**	
	3,000		**V1C3**	
	500	●	**V2C0**	
	1,000	●	**V2C1**	
	2,000	●	**V2C2**	
	3,000	●	**V2C3**	
Analog Output for Compound Pressure Grommet Lead Wire	3,000		**R1**	
	3,000	●	**R2**	

*: For mixed specifications, be sure to fill out the "Mixed Manifold Specification Sheet". For details, refer to P. 352, 353.

Option Single Item Model No.

●Separate Digital Indicator

●Sensor connection connector (e-con)



Specifications

Item	Vacuum Switching Unit VSNP
Operating Fluid	Air
Operating Pressure MPa	0 to 0.55
Ambient Temperature/Fluid Temperature (°C)	5 to 50
Operating Humidity	35 to 85% RH (No condensation)
Protection Structure	Equivalent to IEC Standard IP40
Vibration/Shock Resistance (m/s²)	≤ 50 / ≤ 150
Vacuum pressure kPa	-100 to 0

Valve Specifications

Item \ Unit	Vacuum Switching Unit VSNP	
	Vacuum Supply Valve	Vacuum Breaking Valve
ValvE-type and Operation Method	Direct acting poppet valve	
Rated Voltage V	24 VDC	
Voltage Fluctuation Range	±10%	
Surge Suppressor	Built-in Surge Suppressor	
Power consumption W	Startup: 2.2 Holding: 0.6 (Built-in power saving circuit)	
Operation Indicator	Green LED	
Operating Pressure MPa	0 to 0.55	
Valve Type	Normally Closed Type	
Response Time (*1) ms	Both Vacuum Generation (OFF→ON) / Vacuum Stop (ON→OFF) ≤ 5	
Wiring Method and Lead Wire Length	Connector type: 500 mm	
	Red Lead Wire: +24 VDC, Black Lead Wire: 0V	

*1: Response time is the time until pressure change is detected at the vacuum port when rated pressure and rated voltage are supplied. Vacuum reaching time at the piping end (workpiece) and vacuum breaking time vary depending on conditions such as ejector characteristics, volume (vacuum piping length), and vacuum breaking flow rate.

Vacuum Flow Rate

Item	
Vacuum Flow Rate L/min (ANR)	8 (at -80 kPa supply)

Vacuum Breaking Function

Item	
Break Air Flow Rate L/min (ANR)	0 to 20 (at 0.5 MPa supply)

*: Variable by vacuum break air flow adjustment needle.

Vacuum Pressure Switch Specifications

Item		Negative Pressure Specification(-V1□)	Compound Pressure Specification(-R1)
Power Supply Voltage V		DC 10.8 to 30 (incl. ripple)	
Current Consumption mA		≤ 20	
Pressure Sensing Element		Diffused Semiconductor Pressure Sensor	
Operating Pressure Range kPa		-100 to 0	-100 to 300
Proof pressure kPa		200	600
Storage Temperature Range °C		-20 to 70 (Atmospheric pressure, Humidity: 65% RH or less)	
Operating Temperature Range °C		-10 to 60 (No condensation)	
Operating Humidity Range		35 to 85% RH (No condensation)	
Protection Structure		Equivalent to IEC Standard IP40	
Analog Output	Output Voltage V	1 to 5	
	Zero Point Voltage V	1±0.04 (= at atmospheric pressure)	1±0.1 (= at -100 kPa)
	Maximum Pressure Point Voltage V	4.6±0.04 (= at -100 kPa)	5±0.1 (= at 300 kPa)
	Linearity/Hysteresis	≤ ±0.5% F.S.(at Ta = 25°C)	
	Temperature Characteristics	≤ ±2% F.S.(0 to 50°C, Ta = 25°C)	
	Output Current mA	0.195 or less (load resistance: 10 kΩ or less)	1 or less (load resistance: 5 kΩ or less)
	Output impedance kΩ	1	-

Separated digital display specifications (-V2□, -R2□)

Item		Separate Digital Indicator
Power Supply Voltage V		DC 10.8 to 26.4
Current Consumption mA		≤ 40 max.(No load)
Repeatability		≤ ±0.1% F.S. ±1 digit
Differential		Adjustable
Response time ms		2.5 or less (malfunction prevention function: 25, 100, 250, 500, 1000, 1500 selected)
Output Short-circuit Protection		Yes
Pressure Display	Display Unit	kPa
	Display Magnification Resolution	0.1
	Display Update Rate	5 times/sec
	Display Accuracy	≤ ±1% F.S. ±1 digit
	Operation Indicator Light	Orange 1 & 2 Indicator Light
	Digital Display	Main Display: 2 colors (red, green), sub-display: Orange
Sensor Input Specifications	Voltage input signal V	1 to 5
	Input impedance MΩ	1
Switch Output	Number of Output Points	2-point Output (OUT1, OUT2)
	Output Method	NPN Open Collector
	Switch Rating	30 VDC 125 mA max.
	Internal Voltage Drop V	≤ 1.5
Analog Output	Output Voltage V	≤ 1 to 5 ±2.5% F.S.
	Linearity	≤ ±1% F.S.
	Output impedance KΩ	1
Environmental Resistance	Protection Structure	Equivalent to IEC Standard IP40
	Storage Temperature °C	-10 to 60 (No condensation or freezing)
	Operating Temperature °C	0 to 50
	Operating Humidity	35 to 85% RH (No freezing)
	Dielectric Strength	1000 VAC 1 minute (Between lead wire and case)
	Insulation Resistance	≥ 50 MΩ (500 VDC)(Between lead wire and case)
	Vibration Resistance	Double amplitude 1.5 mm or 100 m/s², 10 to 55 Hz, 2 hours in each X, Y, Z direction
	Shock Resistance	100 m/s², 2 hours in each X, Y, Z direction
Temperature Characteristics		±0.5%F.S. (0 to 50°C, base temperature: 25°C)

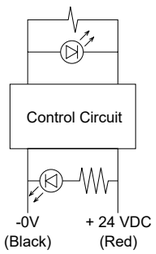
Weight Table

Model No.	Unit Contents	Weight (g)
VSNP-□□□-3-□	Single Unit Type, Air/Vacuum Supply Port Individual, Atmospheric Release, With Sensor	56
VSNP-□□□-3	Single Unit Type, Air/Vacuum Supply Port Individual, Atmospheric Release, Without Sensor	53
VSNPM-□□□-3-2-□	Manifold Type, Air/Vacuum Supply Port Individual, With Sensor	171
VSNPM-□□□-3-2	Manifold Type, Air/Vacuum Supply Port Individual, Without Sensor	164

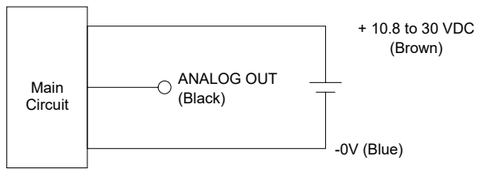
■ For the manifold, with each station increase, a sensor equipped unit can be used for each station increase: 56 g, per station for unit without sensor: 53 g heavier. Example: The weight of vacuum switching unit, with sensor, quadruple manifold is 171 +(2 x 56) = 283 g→2: Weight of 2 units with sensor for 171 g: Add 112 g.

Electrical Circuit Diagram

● Solenoid valve

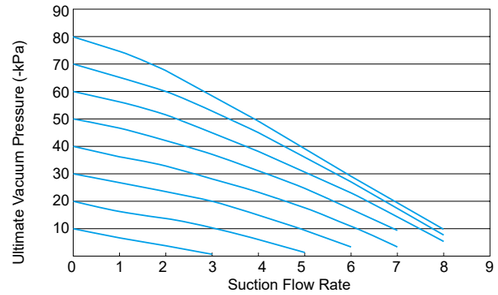


● Vacuum Pressure Switch

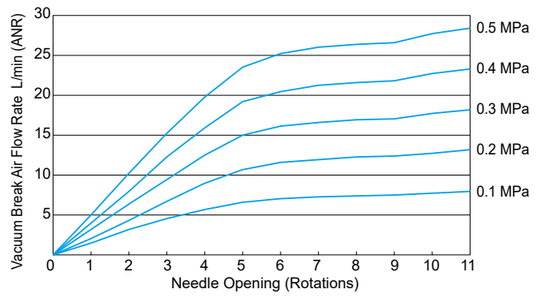


Vacuum Characteristics

VSNP Flow Characteristics



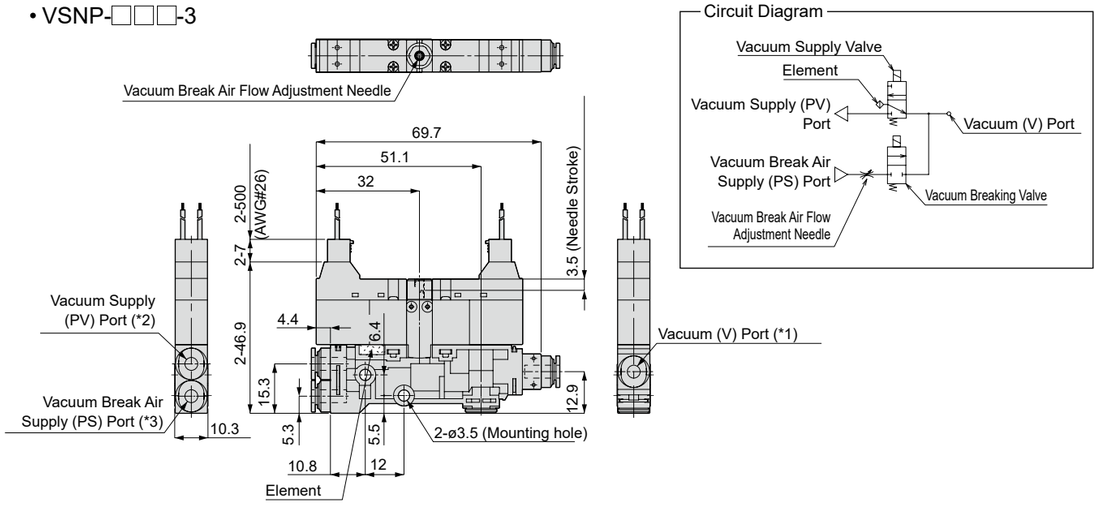
VSNP Vacuum Break Air Flow Characteristics



External Dimensions Diagram (Single Unit Type)

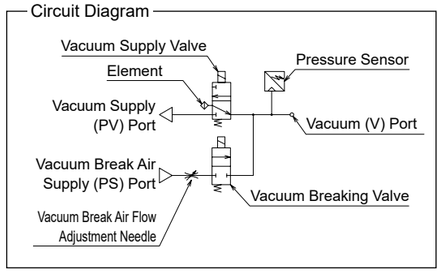
● Without Vacuum Pressure Switch

• VSNP-□□□-3

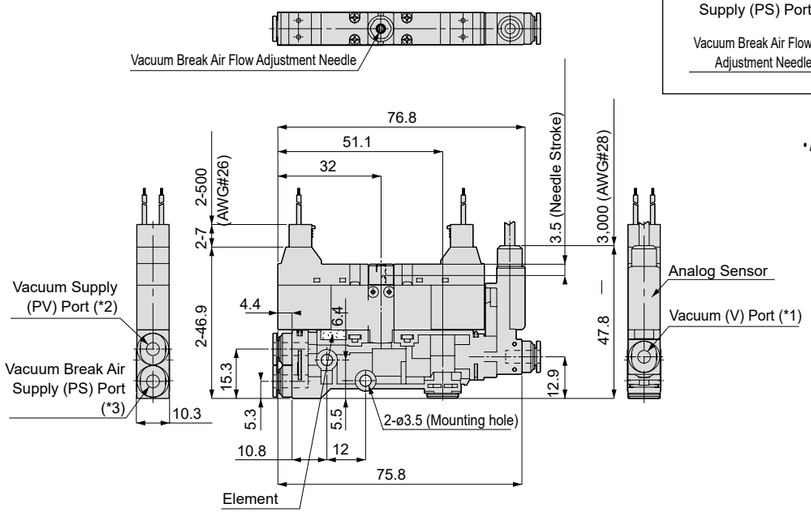


● With vacuum pressure switch

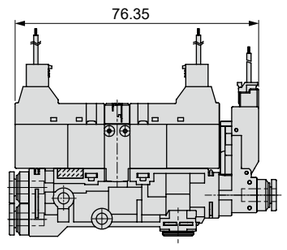
• VSNP-□□□-3-V□□□/R□



• Analog Output Switch for Compound Pressure (R□)



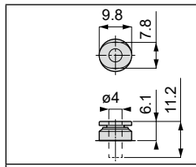
• Analog Output Switch for Negative Pressure (V□□□)



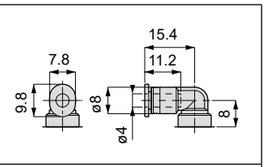
*1: For vacuum (V) port dimensions, Refer to P. 345 Table 1 on .
*2: For vacuum supply (PV) port dimensions Refer to P. 345 Table 2 on the .
*3: For vacuum burst air supply (PS) port dimensions, P. 345 Refer to Table 2 on the .

External Dimension Drawings

● Single unit fitting dimensions

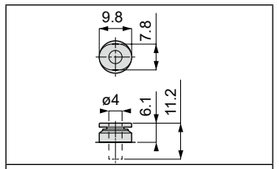


ø4 Push-in straight fitting



ø4 Push-in elbow fitting

Table 1: Vacuum Port Push-in Fitting Shape

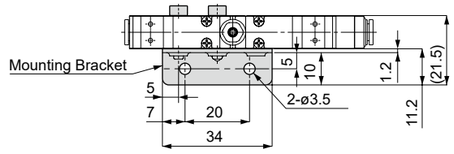


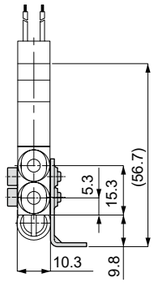
4 (ø4 Straight)

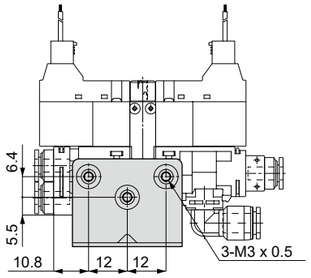
Table 2: Supply Port Push-in Fitting Shape

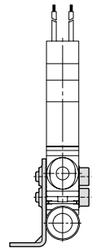
● Dedicated bracket for single unit

• VSN-B





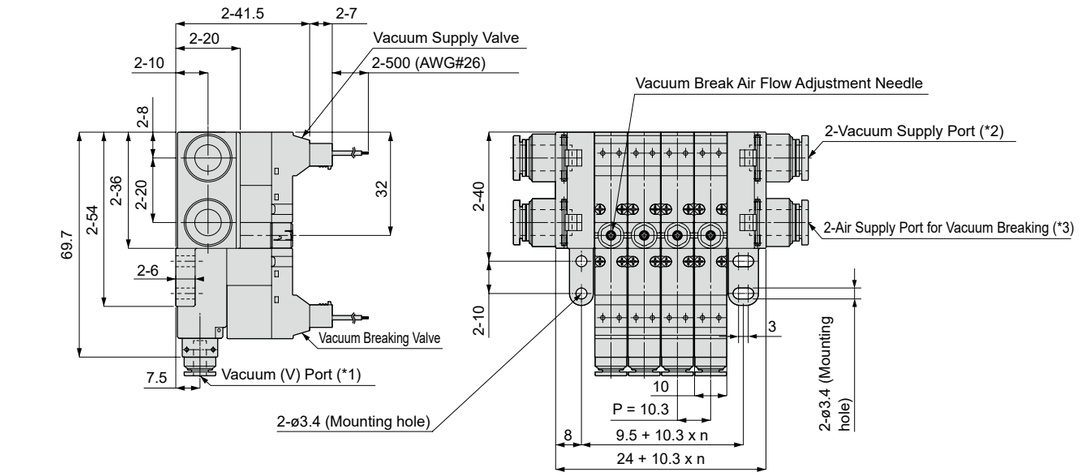




External Dimensions Diagram (Manifold Type)

● Without Vacuum Pressure Switch

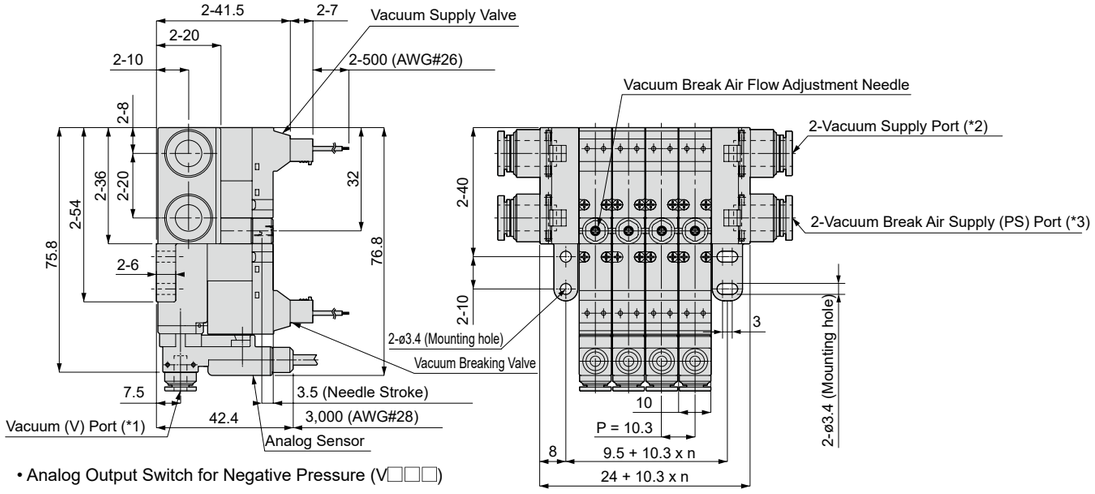
• VSNPM-□□□-3-□



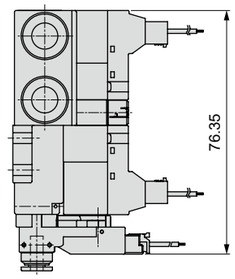
● With vacuum pressure switch

• VSNPM-□□□-3-□-V□□□/R□

• Analog Output Switch for Compound Pressure (R□)



• Analog Output Switch for Negative Pressure (V□□□)



*1: For vacuum port dimensions, Refer to P. 347 Table 1 on.
*2: For vacuum port dimensions, Refer to P. 347Table 2 on the.
*3: For vacuum burst air supply port dimensions, Refer to P. 347 Table 2 on the.

External Dimension Drawings

● Manifold fitting dimensions

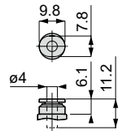
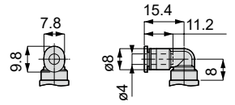
	
ø4 Push-in straight fitting	ø4 Push-in elbow fitting

Table 1: Vacuum Port Push-in Fitting Shape

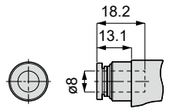
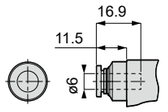
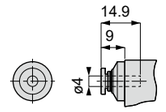
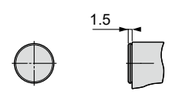
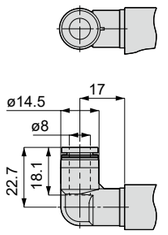
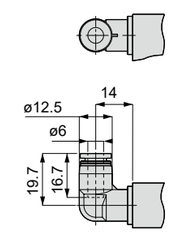
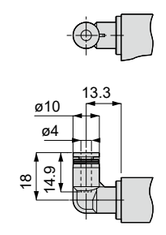
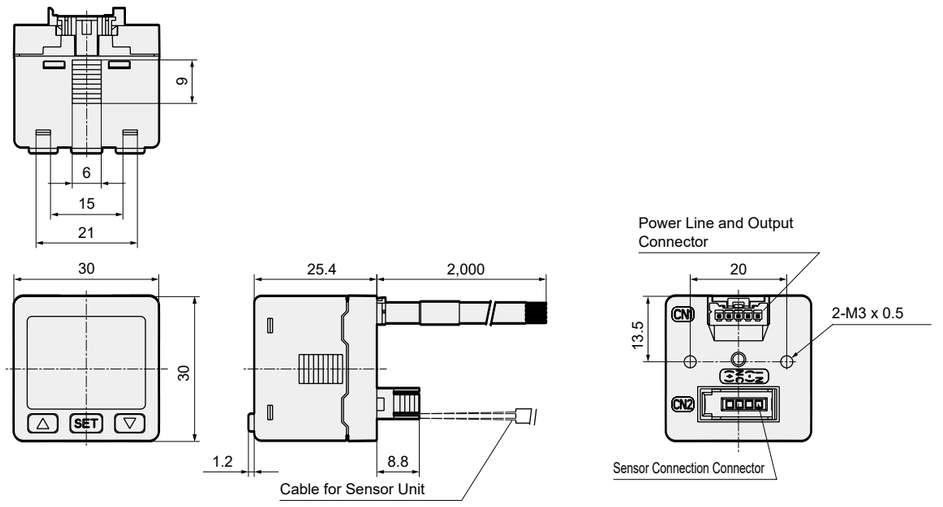
			
ø8 Push-in straight fitting	ø6 Push-in straight fitting	ø4 Push-in straight fitting	Plug Type
			
ø8 Push-in elbow fitting	ø6 Push-in elbow fitting	ø4 Push-in elbow fitting	

Table 2: Supply Port Push-in Fitting Shape

● Separate Digital Indicator



* Power Line and Output Wiring Specifications

Wire Color	Content
Brown	Power Supply (10.8 to 26.4 VDC)
Orange	Analog Output (1 to 5 V)
White	OUT2 Output
Black	OUT1 Output
Blue	COMMON

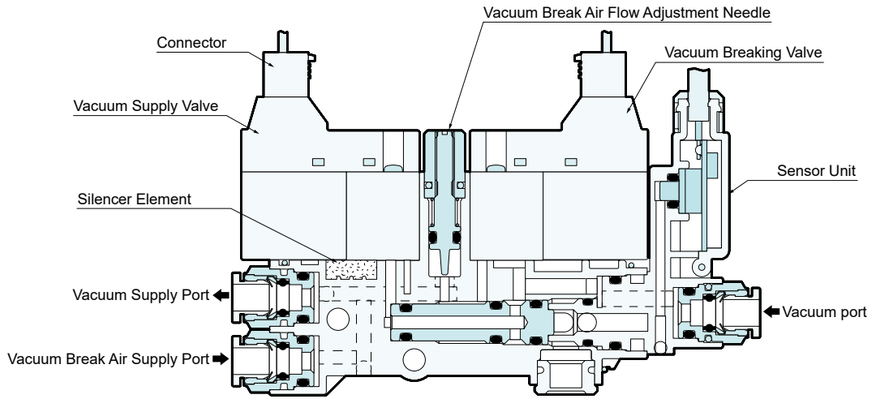
* Sensor Unit Connection Wiring Specifications

Wire Color	Content
Brown	DC+
Blue	DC-
Black	IN

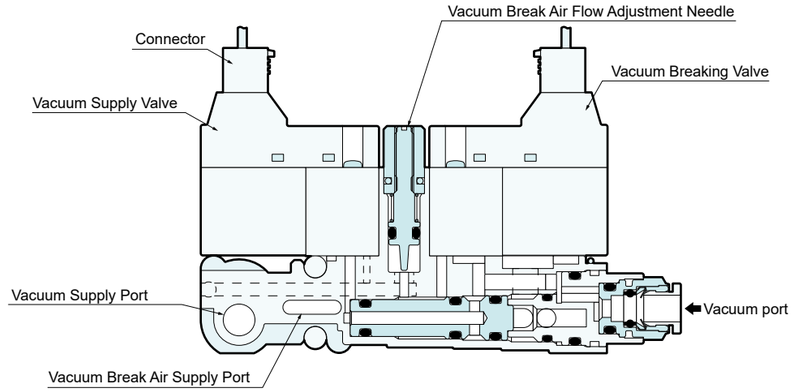
*For how to wire the sensor connection connector, P. 351.

Internal Structure Diagram

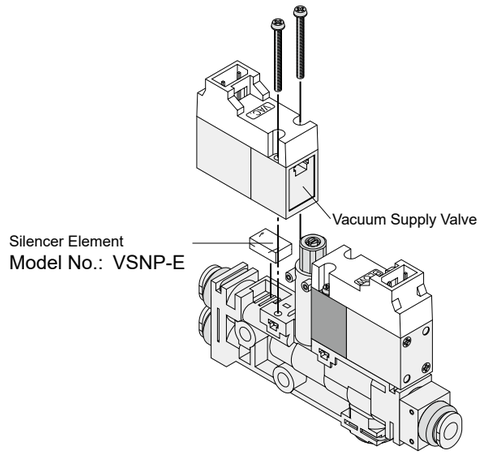
● Vacuum switching unit single unit
• With Vacuum Pressure Switch



● Vacuum switching unit manifold
• Without Vacuum Pressure Switch



Maintenance Parts



Pneumatic Components

To Use This Product Safely

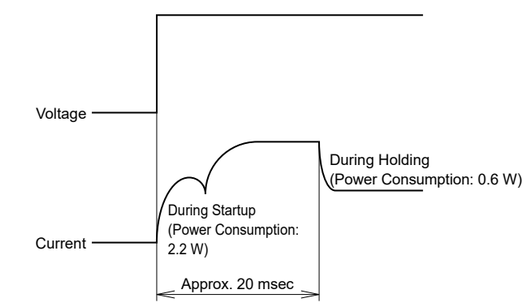
Be sure to read this before use.
For general pneumatic components precautions, Intro Page 15 for details.

Individual Precautions: 10.3 mm Width Integrated Type VSNP Series

Design / Selection

Warning

■ The solenoid valve of this product employs a current control circuit, featuring a mechanism that lowers the current value during coil energization holding. Absolutely avoid use in environments subject to vibration/shock outside of specifications. This can lead to valve malfunction.



Current/Voltage Waveform During Solenoid Valve Energization

Caution

■ The solenoid valve lead wire of this product has polarity. If the polarity is incorrect, the solenoid valve will not operate.

■ This product does not have a Vacuum Filters. Always use our company's vacuum filter series together with this product. If a vacuum filter is not used, sucked-in dust, dirt, etc., will accumulate inside the product, causing degradation of vacuum performance (ejector system compatible unit) or solenoid valve leakage/ malfunction(ejector system compatible unit, vacuum pump system compatible unit), etc.
(Recommended Vacuum Filters: VSFU Series, VSFJ Series

■ The solenoid valve of this product essentially operates continuously. If performing continuous energization exceeding 15 minutes, limit it to 10 times/day or less. Also, return to normal operation after continuous energization.

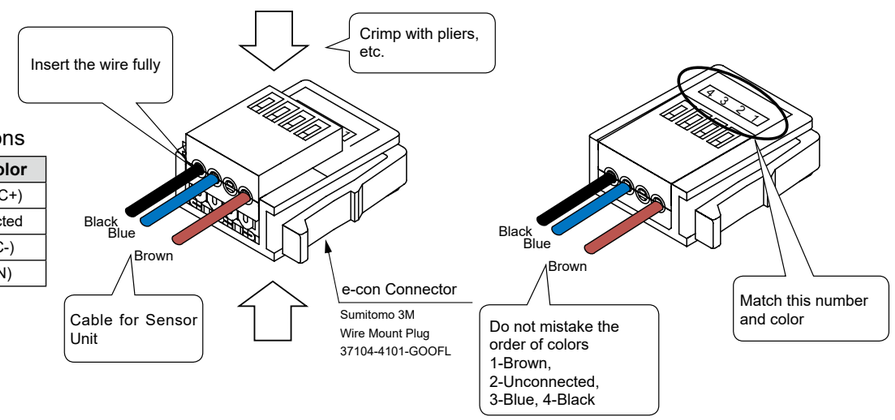
■ When leaving the product for 24 h or more with pressure 0 to 0.1MPa/OFF, perform a conditioning operation of the solenoid valve (one second or more and x5 times or more before starting operation).

For precautions regarding mounting, installation, adjustment, operation, and maintenance, please refer to the CKD Equipment Product Site(https: //www.ckd.co.jp/kiki/en/) → 'model No.' → Instruction Manual.

How to Use

■ How to connect sensor connection connector(e-con)
For connection of the sensor connection connector, cut the half-strip part at the tip of the cable lead wire before use. Insert the lead wire fully into the connector and securely crimp it with a tool such as pliers.

- Removal of lead wire insulation is not required.
- Incorrect wiring can lead to destruction, failure, or malfunction of the sensor and indicator. During pressure welding, check the pin number and wire color carefully to avoid mistakes.
- Once the sensor connection connector is crimped, it cannot be reused. If a wiring mistake or lead wire insertion failure occurs, use a new sensor connection connector.



• Wiring Specifications

Pin No.	Cable Color
1	Brown (DC+)
2	Unconnected
3	Blue (DC-)
4	Black (IN)

How to Create VSNPM Mixed Manifold Specification Sheet

● Mix manifold model No.(example)

VSNPM- ❶ **CX** ❷ **4R** ❸ **4** - ❹ **3** - ❺ **5** - ❻ **Z**

● Mix manifold specifications sheet

Vacuum Switching Unit Model No. ❶ ❻	Arrangement Position 1	2	3	4	5	6	7	8	9	10	Quantity
VSNPM- 4 - V2	○	○			○						3
VSNPM- 4L - V2			○								1
VSNPM- 4L - V1				○							1
VSNPM- -											
VSNPM- -											

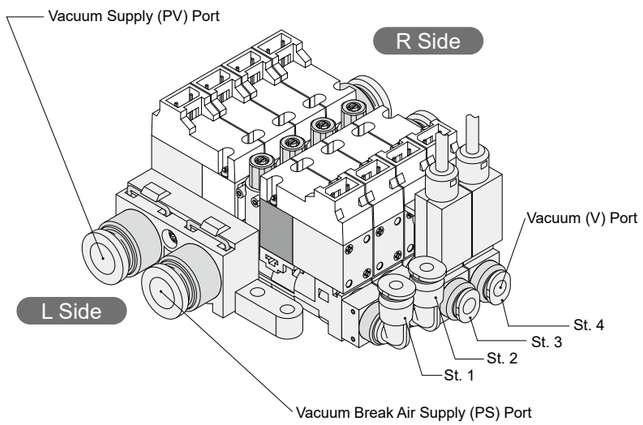
[For Fitting Mix Specification with Vacuum Port Size Only]

● Mix manifold model No.(example)

VSNPM- ❶ **CX** ❷ **4** ❸ **4** - ❹ **3** - ❺ **5** - ❻ **V2**

● Mix manifold specifications sheet

Vacuum Switching Unit Model No. ❶ ❻	Arrangement Position 1	2	3	4	5	6	7	8	9	10	Quantity
VSNPM- 4 - V2	○	○		○	○						4
VSNPM- 4L - V2			○								1
VSNPM- -											
VSNPM- -											
VSNPM- -											
VSNPM- -											



[Notes for Filling Out]
- For piping position, place the vacuum port at the front and install sequentially from the left.
- In the Required Quantity column at the right end of the table, enter the total quantity of the specified product model No.s.

VSNPM Mixed Manifold Specification Sheet

Date of Issue
Company
Contact Person Quantity Set Delivery (Month/Day)
Attn:
Voucher No. Order Received No.
Order No.

● Mix manifold model No.

VSNPM- ❶ ❷ ❸ - ❹ - ❺ - ❻

❶ Vacuum Port (V)

Code	Content
4	ø4 Push-in straight fitting
4L	ø4 Push-in elbow fitting
CX	For fitting mix(Provide details in the specification sheet)

❷ Air Supply Port for Vacuum Generation (PV)

Content
Refer to ❷ on page 338 for unit combination

❸ Air Supply Port for Vacuum Breaking (PS)

Content
Refer to ❸ on page 338 for unit combination

❹ Solenoid Valve Voltage

Code	Content
3	24 VDC

❺ Number of Manifold Stations

Code	Content
2	2 stations
to	to
10	10 stations

❻ Vacuum Sensor Specification

Code	Content
Blank	Without Vacuum Pressure Switch
V1C0	Analog Output for Negative Pressure / Connector Lead Wire 500 mm
V1C1	Analog Output for Negative Pressure / Connector Lead Wire 1000 mm
V1C2	Analog Output for Negative Pressure / Connector Lead Wire 2000 mm
V1C3	Analog Output for Negative Pressure / Connector Lead Wire 3000 mm
V2C0	Separate LED Indicator + Analog Output for Negative Pressure / Connector Lead Wire 500 mm
V2C1	Separate LED Indicator + Analog Output for Negative Pressure / Connector Lead Wire 1000 mm
V2C2	Separate LED Indicator + Analog Output for Negative Pressure / Connector Lead Wire 2000 mm
V2C3	Separate LED Indicator + Analog Output for Negative Pressure / Connector Lead Wire 3000 mm
R1	Analog Output for Compound Pressure / Grommet Lead Wire 3000 mm
R2	Separate LED Indicator + Analog Output for Compound Pressure / Grommet Lead Wire 3000 mm
Z	For mixed specifications (Provide details in the specification sheet.)

● Mix manifold specifications sheet

Vacuum Switching Unit Model No. ❶ ❻	Arrangement Position 1	2	3	4	5	6	7	8	9	10	Quantity
VSNPM- -											
VSNPM- -											
VSNPM- -											
VSNPM- -											
VSNPM- -											