

Vacuum switching unit that achieves fast and stable response

VSNP Series

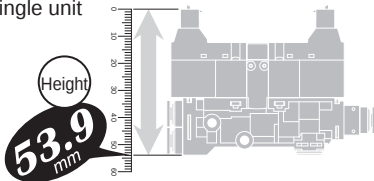
RoHS

Features

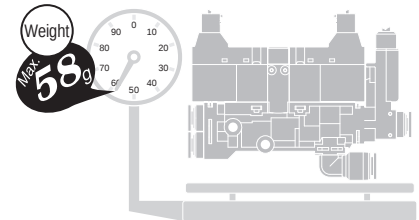
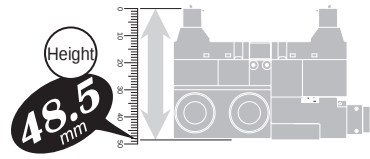
Ideal for restricted mounting space.

Compact and lightweight vacuum switching unit. The product height is notably reduced.

● Single unit



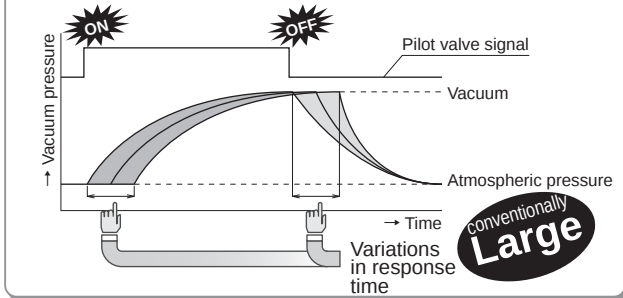
● Manifold



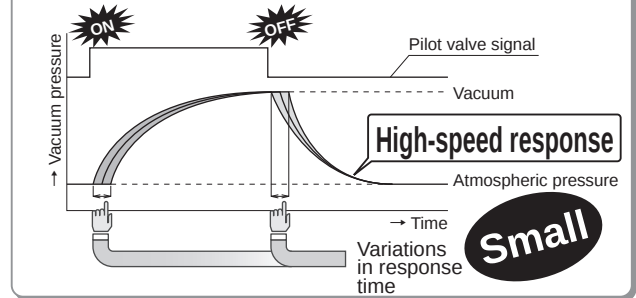
Achieves fast and stable response. (ON/OFF = 5 msec or less)

Direct acting valve is used for the main valve.

● Conventional vacuum ejector unit



● Vacuum ejector unit VSN



Vacuum burst air flow rate of 20ℓ/min is secured.

Four types of analog output are available for the pressure sensor.

Analog output sensor for negative pressure, Separated digital pressure display + Analog output sensor for negative pressure, Analog output sensor for compound pressure and Separated digital pressure display + Analog output sensor for compound pressure.

	For negative pressure	For compound pressure
Analog switch		
Separated digital pressure display + analog switch		

Vacuum filter is externally mounted (sold separately).

Miniaturization of the product does away with the inconvenience of replacing the filter.

* This product is not equipped with a vacuum filter. For longer product service life, be sure to use CKD's vacuum filter (see below) for vacuum piping.

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

Specifications

Descriptions	Vacuum switching unit VSNP
Working fluid	Air
Working pressure MPa	0 to 0.55
Ambient/fluid temperatures °C	5 to 50
Ambient humidity	35 to 85% RH (no condensation)
Degree of protection	IEC standards IP40 or equivalent
Vibration/impact resistance m/s ²	50 or less/150 or less
Vacuum pressure kPa	-100 to 0

Valve specifications

Descriptions	Unit	Vacuum switching unit VSNP	
		Vacuum supply valve	Vacuum break valve
Valve and operation		Direct acting poppet valve	
Rated voltage V		24 DC	
Voltage fluctuation range		±10%	
Surge suppressor		Surge suppressor built in	
Power consumption W		When starting: 2.2 When holding: 0.6 (energy-saving circuit built in)	
Operation indicator		Green LED	
Working pressure MPa		0 to 0.55	
Valve		Normally closed	
Response time (*1) ms		Both vacuum generation (OFF → ON) and vacuum stop (ON → OFF) are 5 or less	
Wire connections and lead wire length		Connector: 500 mm	
		Red lead wire: +24 VDC, black lead wire: -0 V	

*1 : Response time is the time until pressure change is detected at the vacuum port when rated pressure and rated voltage are supplied.
 Vacuum achievement time at the pipe end (workpiece) and vacuum burst time differ depending on conditions such as ejector characteristics, capacity (vacuum pipe length), vacuum burst flow rate, etc.

Vacuum flow rate

Descriptions	
Vacuum flow rate ℓ/min(ANR)	8 (with supply at -80 kPa)

Vacuum burst function

Descriptions	
Break air flow rate ℓ/min(ANR)	0 to 20 (Indicates the value when air is supplied at 0.5 MPa.)

Note: Variable with vacuum burst air flow rate adjustment needle.

Vacuum pump system

VSJP
VSJPM

VSNP
VSNPM

VSXP
VSXPM

VSQP

VSZPM

Vacuum pressure switch specifications

Descriptions		Negative pressure specifications (-V1□)	Compound pressure specifications (-R1)
Power supply voltage	V	10.8 to 30 DC (including ripple)	
Current consumption	mA	20 or less	
Pressure sensitive element		Diffused semiconductor pressure sensor	
Working 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)	
Degree of protection		IEC standards IP40 or equivalent	
Analog output	Output voltage	V	1 to 5
	Zero point voltage	V	1 ±0.04 (= at atmospheric pressure)
	Max pressure point voltage	V	4.6 ±0.04 (= -100 kPa)
	Linearity/hysteresis		±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	mA	0.195 or less (load resistance: 10 kΩ or less)
	Output impedance	kΩ	1 or less (load resistance: 5 kΩ or less)
			-

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

Descriptions		Separated digital display
Power supply voltage	V	10.8 to 26.4 DC
Current consumption	mA	40 max. (no load)
Repeatability		±0.1% F.S. ±1 digit or less
Hysteresis		Adjustment is possible
Responsivity	ms	2.5 or less (malfunction prevention function: select from 25, 100, 250, 500, 1000 or 1500)
Output short-circuit protection		Yes
Pressure display	Display unit	kPa
	Display magn resolution	0.1
	Display frequency	5 times/second
	Display accuracy	±1% F.S. ±1 digit or less
	Operational indicator lamp	Orange 1 & 2 indicator lamps
	Digital display	Main display: 2 colors (red, green), sub-display: orange
Sensor input specifications	Voltage input signal	V
	Input impedance	MΩ
Switch output	Output points	2-point output (OUT1, OUT2)
	Output method	NPN open collector
	Switch rating	30 VDC 125 mA max.
	Internal voltage drop	V
Analog output	Output voltage	V
	Linearity	±1% F.S. or less
	Output impedance	kΩ
Environmental resistance	Degree of protection	IEC standards IP40 or equivalent
	Storage temperature	°C
	Operating temperature	°C
	Operating humidity	35 to 85% RH (no freezing)
	Withstand voltage	1000 VAC 1 minute (between lead wire and case)
	Insulation resistance	50 MΩ or more (500 VDC) (between lead wire and case)
	Vibration resistance	Compound amplitude 1.5 mm or 100 m/s ² , 10 to 55 Hz, 2 hours each in X, Y, Z directions
	Shock resistance	100 m/s ² , 2 hours each in X, Y, Z directions
Temperature characteristics		±0.5% F.S. (0 to 50°C, base temperature: 25°C)

Weight table

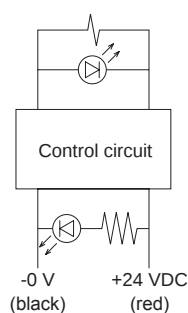
Model No.	Unit contents	Weight (g)
VSNP-□□□-3-□	Single unit, individual air/vacuum supply port, atmospheric release, with sensor	56
VSNP-□□□-3	Single unit, individual air/vacuum supply port, atmospheric release, without sensor	53
VSNPM-□□□-3-2-□	Manifold, individual air/vacuum supply port, with sensor	171
VSNPM-□□□-3-2	Manifold, individual air/vacuum supply port, without sensor	164

■ With each station increase, the manifold is heavier by 56 g for unit with sensor and 53 g for unit without sensor.

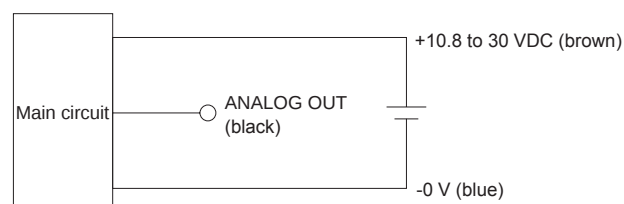
Example: The weight of vacuum switching unit, with sensor, quadruple manifold is $171 + (2 \times 56) = 283\text{g}$ → Weight of double manifold: 171 g with the weight of 2 units with sensor: 112g.

Electric circuit Fig.

● Solenoid valve



● Vacuum pressure switch



Vacuum pump system

VSJP
VSJPM

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VSXP
VSXPM

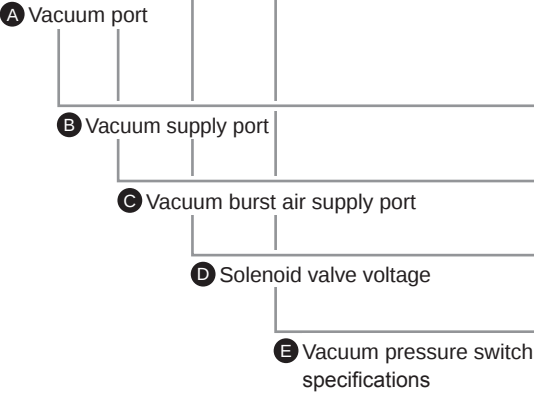
VSQP

VSZPM

How to order

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

VSNP - 4 4 4 - 3 - V1



● Maintenance parts

- Silencer element for replacement

VSNP-E

- Dedicated bracket (VSN, VSNP common)

VSN-B

- Separated digital display

VSN-SED-31N

- Sensor connection connector (e-con)

VSN-EC

Code	Content
A Vacuum port (V)	
4	ø4 straight push-in fitting
4L	ø4 elbow push-in fitting
B Vacuum supply port (PV)	
4	ø4 straight push-in fitting
C Vacuum burst air supply port (PS)	
4	ø4 straight push-in fitting
D Solenoid valve voltage	
3	24 VDC
E Vacuum pressure switch specifications	
Blank	Without vacuum pressure switch
V1C0	Negative pressure analog output/connector lead wire 500 mm
V1C1	Negative pressure analog output/connector lead wire 1,000 mm
V1C2	Negative pressure analog output/connector lead wire 2,000 mm
V1C3	Negative pressure analog output/connector lead wire 3,000 mm
V2C0	Separated LED display + (-ve) press analog output/connector lead wire 500 mm
V2C1	Separated LED display + (-ve) press analog output/connector lead wire 1,000 mm
V2C2	Separated LED display + (-ve) press analog output/connector lead wire 2,000 mm
V2C3	Separated LED display + (-ve) press analog output/connector lead wire 3,000 mm
R1	Compound pressure analog output/grommet lead wire 3,000 mm
R2	Separated LED display + Compound pressure analog output/grommet lead wire 3,000 mm

How to order

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

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

A Vacuum port

B Vacuum supply port

C Vacuum burst air supply port

D Solenoid valve voltage

E Manifold station No.

F Vacuum pressure switch specifications

⚠ Precautions for model No. selection

*1 : Be sure to fill in the "mix manifold specifications sheet" in the case of mixed specifications. Refer to pages 228 and 229 for details.

Code	Content
A Vacuum port (V) *1	
4	ø4 straight push-in fitting
4L	ø4 elbow push-in fitting
CX	For mixed specs (indicate the breakdown on the specs sheet)
B Vacuum supply port (PV)	
Refer to Appendix 1 for the vacuum supply port.	
C Vacuum burst air supply port (PS)	
Refer to Appendix 2 for vacuum burst air supply port.	
D Solenoid valve voltage	
3	24 VDC
E Manifold station No.	
2	2 stations
to	to
10	10 stations
F Vacuum pressure switch specifications *1	
Blank	Without vacuum pressure switch
V1C0	Negative pressure analog output/connector lead wire 500 mm
V1C1	Negative pressure analog output/connector lead wire 1,000 mm
V1C2	Negative pressure analog output/connector lead wire 2,000 mm
V1C3	Negative pressure analog output/connector lead wire 3,000 mm
V2C0	Separated LED display + (-ve) press analog output/connector lead wire 500 mm
V2C1	Separated LED display + (-ve) press analog output/connector lead wire 1,000 mm
V2C2	Separated LED display + (-ve) press analog output/connector lead wire 2,000 mm
V2C3	Separated LED display + (-ve) press analog output/connector lead wire 3,000 mm
R1	Compound pressure analog output/grommet lead wire 3,000 mm
R2	Separated LED display + Compound pressure analog output/grommet lead wire 3,000 mm
Z	For mixed specs (indicate the breakdown on the specs sheet)

Vacuum pump system

VSJP
VSJPM

VSNP
VSNPM

VXJP
VXJPM

VSQP

VSZPM

Appendix 1

B Vacuum supply port (PV)							
Port shape		Straight fitting			Elbow fitting		
Fitting size (mm)		ø4	ø6	ø8	ø4	ø6	ø8
Code	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

Appendix 2

C Vacuum burst air supply port (PS)							
Port shape		Straight fitting			Elbow fitting		
Fitting size (mm)		ø4	ø6	ø8	ø4	ø6	ø8
Code	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 generation/vacuum burst		N					

● Maintenance parts

- Separated digital display

VSN-SED-31N

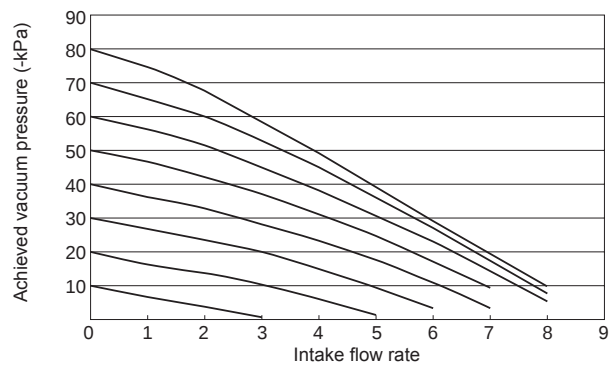
- Sensor connection connector (e-con)

VSN-EC

Vacuum characteristics

VSNP flow characteristics

Vacuum pump system



VSNP vacuum burst air flow rate characteristics

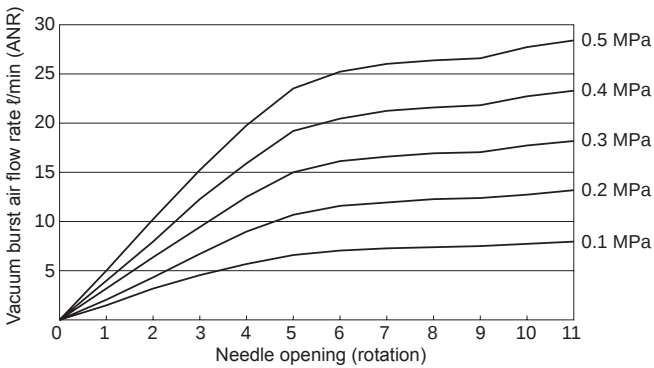
VSJP
VSJPM

VSNP
VSNPM

VSXP
VSXPM

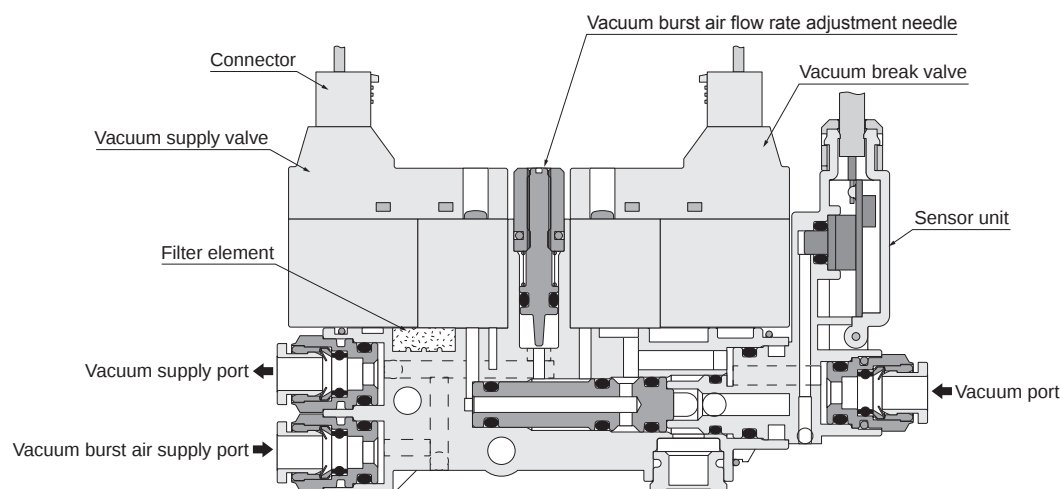
VSQP

VSZPM

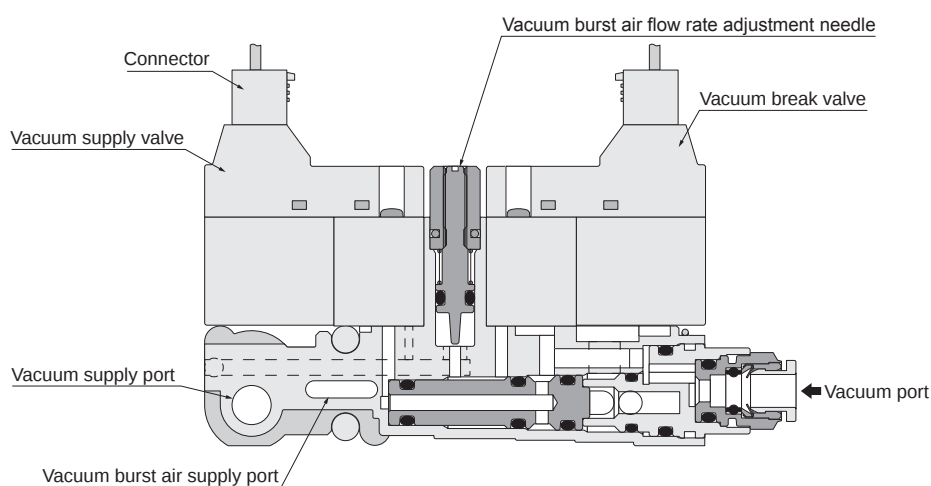


Internal structure

- Vacuum switching unit single unit
 - with pressure switch for vacuum



- Vacuum switching unit manifold
 - without pressure switch for vacuum



Vacuum pump system

VSJP
VSJPM

VSNP
VSNPM

VSXP
VSXPM

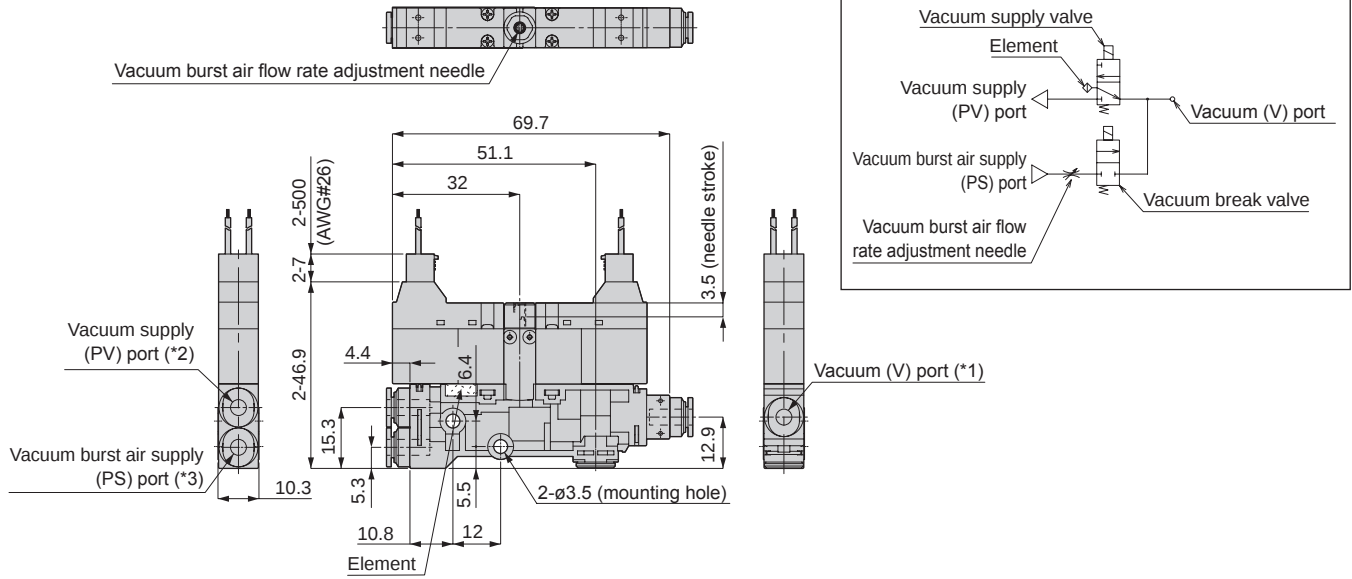
VSQP

VSZPM

Dimensions (single unit)

● Without vacuum pressure switch

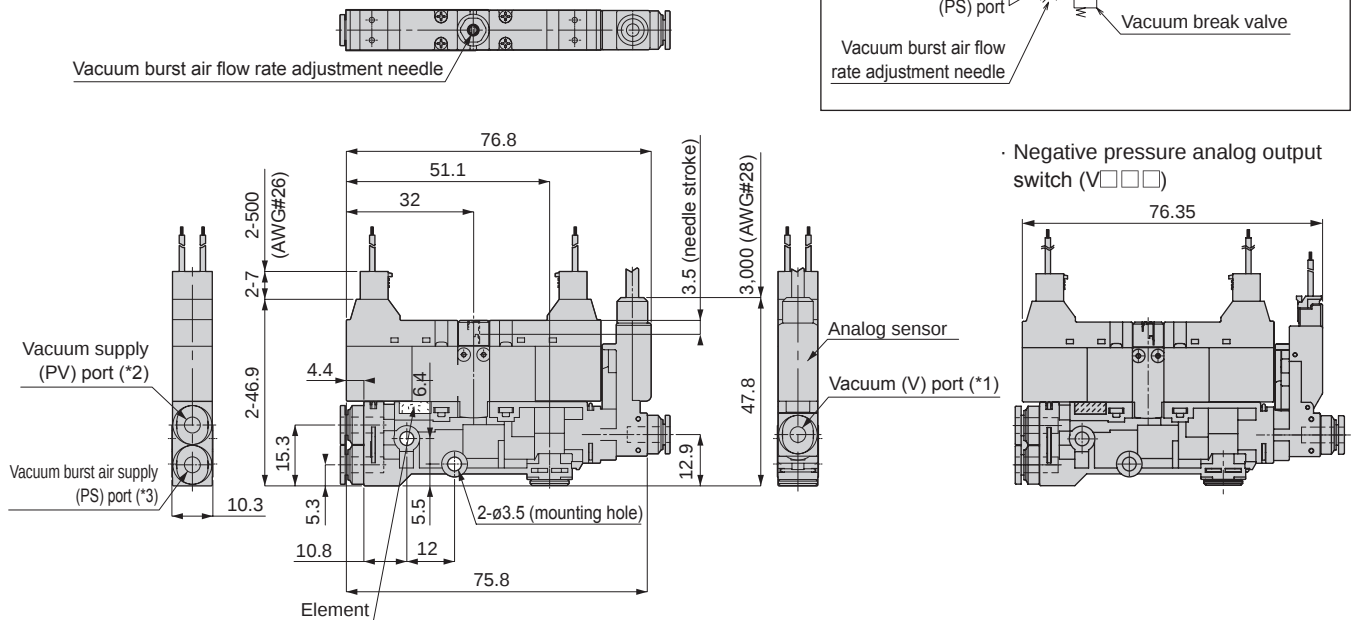
· VSNP-□□□-3



● With vacuum pressure switch

· VSNP-□□□-3-V□□□/R□

· Compound pressure analog output switch (R□)



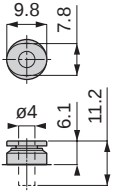
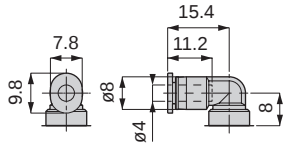
*1 : For vacuum (V) port dimensions, refer to Table 1 on page 219.

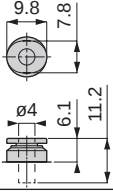
*2 : For vacuum supply (PV) port dimensions, refer to Table 2 on page 219.

*3 : For vacuum burst air supply (PS) port dimensions, refer to Table 2 on page 219.

Dimensions

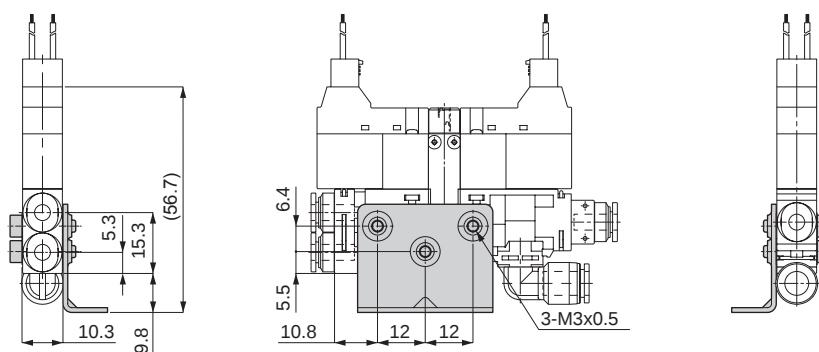
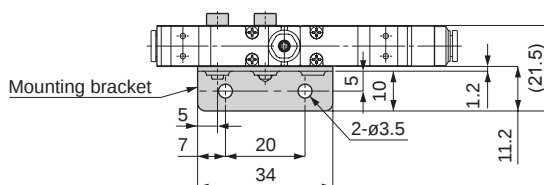
● Single unit fitting dimensions

	
ø4 straight push-in fitting	ø4 elbow push-in 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



Vacuum pump system

VSJP
VSJPM

VSNP
VSNPM

VSXP
VSXPM

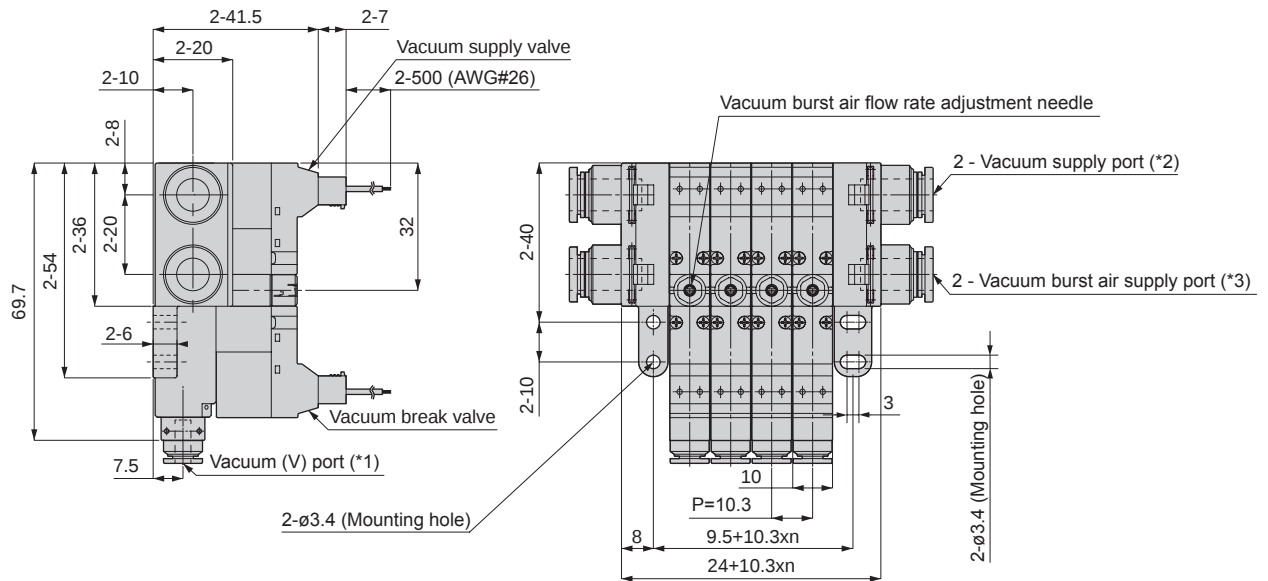
VSQP

VSZPM

Dimensions (manifold)

● Without vacuum pressure switch

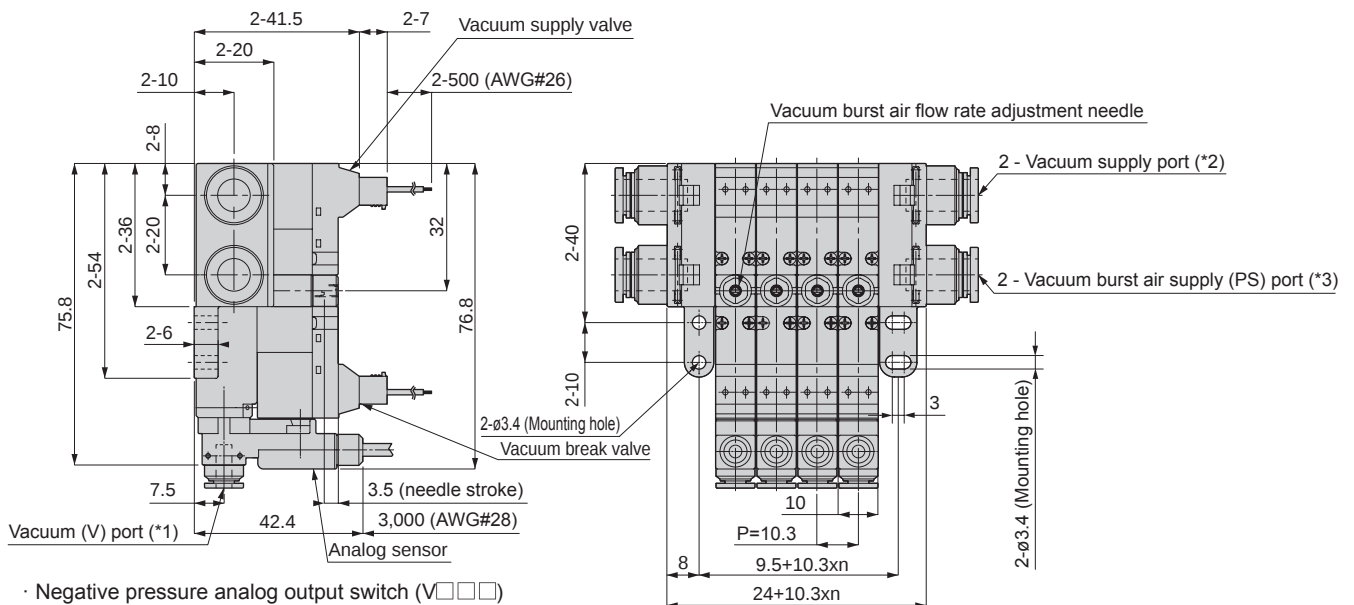
· VSNPM-□□□-3-□



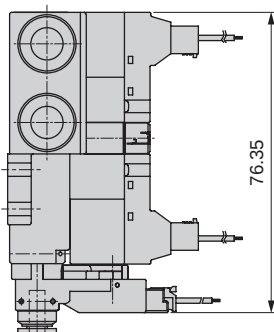
● With vacuum pressure switch

· VSNPM-□□□-3-□-V□□□/R□

· Compound pressure analog output switch (R□)



· Negative pressure analog output switch (V□□□)



*1 : For vacuum port dimensions, refer to Table 1 on page 221.

*2 : For vacuum supply port dimensions, refer to Table 2 on page 221.

*3 : For vacuum burst air supply port dimensions, refer to Table 2 on page 221.

Dimensions

● Manifold fitting dimensions

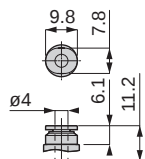
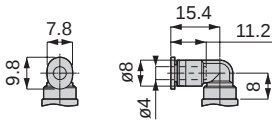
	
ø4 straight push-in fitting	ø4 elbow push-in fitting

Table 1: Vacuum port push-in fitting shape

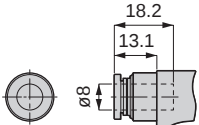
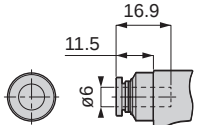
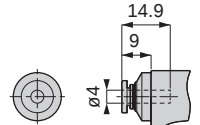
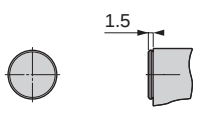
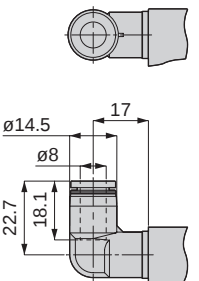
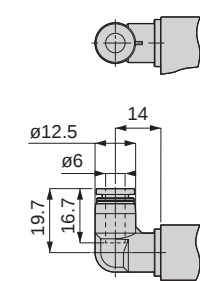
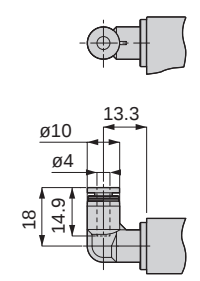
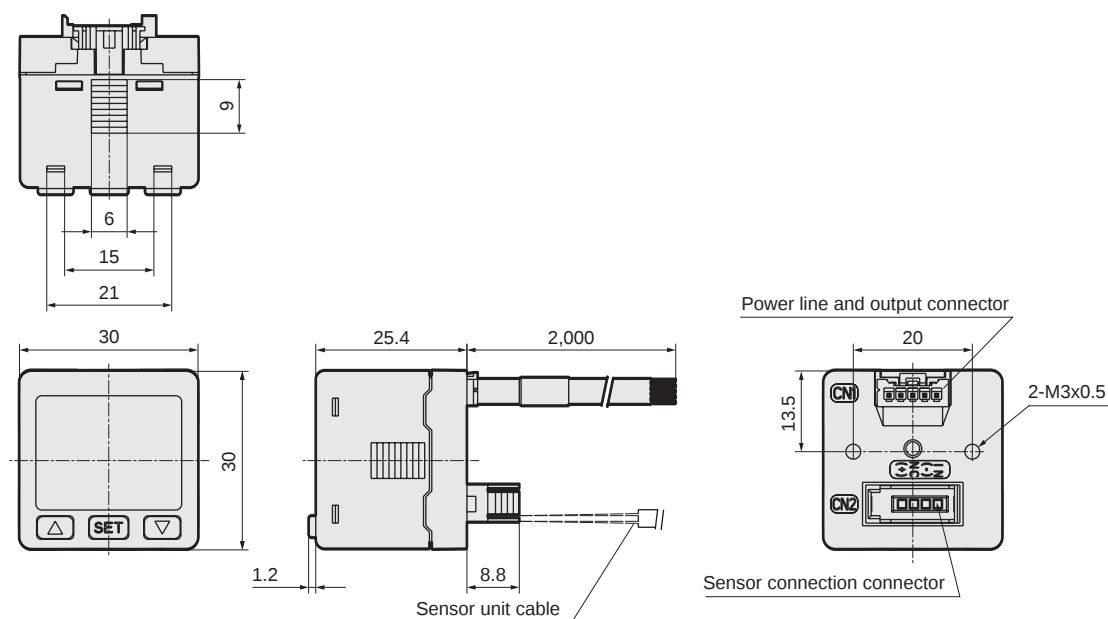
			
ø8 straight push-in fitting	ø6 straight push-in fitting	ø4 straight push-in fitting	Plug
			
ø8 elbow push-in fitting	ø6 elbow push-in fitting	ø4 elbow push-in fitting	

Table 2: Supply port push-in fitting shape

● Separated digital display



· Power line and output wiring specifications

Line 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

Line color	Content
Brown	DC+
Blue	DC-
Black	IN

* Refer to page 226 for the wiring method of the sensor connector.