Vacuum Module: Ejector System
Series ZX

How to Order

Components

Ejector unit	Valve unit N.C. type	Vacuum switch unit
Ejector unit	Valve unit N.O. type	Vacuum switch unit
Ejector unit		Vacuum switch unit
Ejector unit		Filter unit

	Ejector unit nozzle dia.	Ejector exhaust	Combination of supply valve and release valve	Pilot valve	Voltage	Electrical entry	Light/Surge voltage suppressor	Manual operation	Vacuum switch unit Filter unit	Vacuum switch Electrical entry	PV/V port size
ZX1	10	1	K1		5	L	Z		E	C	
ZX1	10	1	K3		5	L	Z		E	C	
ZX1	10	1							E	C	
ZX1	10	1							F		

Ejector unit nozzle dia.

05	0.5 mm
07	0.7 mm
10	1.0 mm

Ejector exhaust

1	With silencer
2	Port exhaust Rc 1/8
3	Common exhaust (Manifold only)

Valve unit/Combination of supply valve and release valve
Refer to "Table (1)" on page 13-2-7.

Pilot valve

Nil	DC: 1 W (With indicator light: 1.05 W)
	AC
Y *	DC: 0.45 W (With indicator light: 0.5 W)

* 24 VDC and 12 VDC are applicable to 0.45 W.

Voltage

1 *	100 VAC 50/60 Hz
3 *	110 VAC 50/60 Hz
5	24 VDC
6	12 VDC
V	6 VDC
S	5 VDC
R	3 VDC
Nil	Air operated (K6, K8, J3, J4, D3, D4)

* Applicable to plug connector. (Connector assembly with rectifier is attached.)

Electrical entry

L	Plug connector type	Lead wire length 0.3 m
LN		Without lead wire (Applicable to DC only)
LO		Without connector
M		Lead wire length 0.3 m
MN		Without lead wire (Applicable to DC only)
MO		Without connector
G	Grommet type	Lead wire length 0.3 m (Applicable to DC only)
H		Lead wire length 0.6 m (Applicable to DC only)
Nil	Air operated	

Note) In the case of "K1" or "J1" (combination of supply and release valves), M type plug connector can not be used.

- Refer to "Table (2)" on page 13-2-5 for part number of lead wire with connector.
- Refer to page 13-2-32 for ordering the manifold.
- Refer to page 13-2-62 to 13-2-63 for ordering a unit for replacement.

PV/V port size

Nil	M5 x 0.8
Y	M6 x 1 (Option)

Vacuum switch electrical entry

Nil	Grommet type	Lead wire length 0.6 m
L		Lead wire length 3 m
C	Connector type	Lead wire length 0.6 m
CL		Lead wire length 3 m
CN		Without connector (Without lead wire)

- Refer to "Table (3)" on page 13-2-5 for part number of lead wire with connector.

Vacuum switch unit/Filter unit

E	Vacuum switch (For general purpose)		With suction filter
PS	Adsorption confirmation switch	Nozzle dia. (ø0.3 to 0.7)	
PB		Nozzle dia. (ø0.5 to 1.2)	
F	Only suction filter		

Vacuum digital pressure switch unit

D	kPa	21	2 outputs/without analog output
		22	2 outputs/with analog output
DP		23	1 output (with trouble detection)/without analog
		24	1 output (with trouble detection)/with analog

Note) Analog output is available only on grommet type.

Manual operation

Nil	Non-locking push type
B	Locking slotted type

Light/Surge voltage suppressor

Nil	None
Z	With light/surge voltage suppressor
S *	With surge voltage suppressor

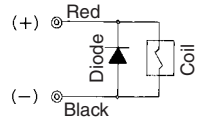
* In the case of AC, "S" is not available.

⚠ Caution

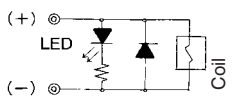
When using the AC type, the DC solenoids are operated via a rectifier. Therefore, when using this type, make sure to combine the connector assembly equipped with a rectifier with the exclusive solenoids. Using other combinations could lead to burned coils or other types of malfunctions.

⚠ Caution

Surge voltage suppressor



Light/Surge voltage suppressor



Using the DC type:
Match the polarity of the connectors according to the ⊕ and ⊖ marks on the connectors. Do not interchange the polarities to prevent the diodes or the switching elements from becoming burned.
If lead wires are pre-connected, the red wire is ⊕ and the black wire is ⊖.

Using the AC type:
The AC type is not equipped with a surge voltage suppressor because the rectifier assembly prevents the generation of surge voltage.

Table (1) Valve Unit/Combination of Supply Valve and Release Valve

(Refer to page 13-2-6 for detailed specifications.)

Components		Symbol	Supply valve					Release valve				
			Solenoid valve		Air operated		None	Solenoid valve		Air operated	External release	None
Supply valve	Release valve		N.C. (VJ114)	N.O. (VJ324)	N.C. (ZX1A)	N.O. (VJA324)		N.C. (VJ114)	N.C. (VJ314)	N.C. (VJA314)	ZX1A	
Solenoid (N.C.)	Solenoid (N.C.)	**K1**	●	—	—	—	—	●	—	—	—	—
Solenoid (N.O.)	Solenoid (N.C.)	**K3**	—	●	—	—	—	—	●	—	—	—
Air operated (N.C.)	External release	**K6**	—	—	●	—	—	—	—	—	●	—
Air operated (N.O.)	Air operated (N.C.)	**K8**	—	—	—	●	—	—	—	●	—	—
Solenoid (N.C.)	None	**J1**	●	—	—	—	—	—	—	—	—	●
Solenoid (N.O.)	None	**J2**	—	●	—	—	—	—	—	—	—	●
—		**Nil**	Without valve module									

• Air operated valve: Controlled by external 3 port valve.
• Weight (g)/K1: 82, K3: 132, K6: 58, K8: 132, J1: 77, J2: 100
• External release: Directly released by external 2 port valve.

Table (2) Valve Unit/Valve Plug Connector Assembly

Connector ass'y part no.

(For DC)
VJ10-20-4A-6

(For 100 VAC)
VJ10-36-1A-6

(For 110 VAC)
VJ10-36-3A-6

Lead wire length

Nil	0.3 m (Standard)
6	0.6 m
10	1 m
15	1.5 m
20	2 m
25	2.5 m
30	3 m

How to order
If ordering vacuum module with 600 m or the longer lead wire, specify both vacuum module and connector assembly part numbers.
Ordering example)
ZX1051-K15LOZ-EC ·····1 pc.
***VJ10-20-4A-6 ·····2 pcs.**

Table (3) Vacuum Switch/Plug Connector Assembly

ZS-10-5A-□

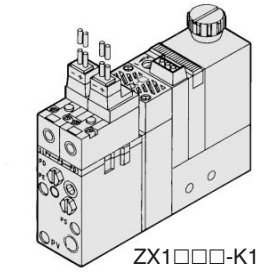
Lead wire length

Nil	0.6 m
30	3 m
50	5 m

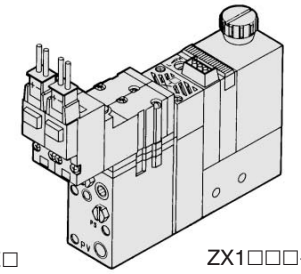
Note) If ordering a vacuum switch with 3 m lead wire, specify both the vacuum unit switch and the 3 m lead wire connector part numbers.
Ordering example)
ZX1051-K15LO- ECN ····· 1 pc.
***VJ10-20-4A-6 ····· 2 pcs.**
***ZS-10-5A-50 ····· 1 pc.**

Ejector System/Recommended Model (The models below will have shorter deliveries.)

Nozzle diameter (mm)	Model	Ejector unit exhaust type	Combination		Solenoid valve rated voltage	Lead wire electrical entry	Light/Surge voltage suppressor	Vacuum switch unit	Vacuum switch electrical entry
			Supply valve (Pilot valve)	Release valve (Direct operated)					
ø0.5	**ZX1051-K15LZ-EC**	With silencer	N.C. (VJ114)	N.C. (VJ114)	24 VDC	Plug connector type	With light/surge voltage supressor	General vacuum switch (ZSE)	Connector type
	ZX1051-K35MZ-EC		N.O. (VJ324)	N.C. (VJ314)					
ø0.7	**ZX1071-K15LZ-EC**		N.C. (VJ114)	N.C. (VJ114)					
	ZX1071-K35MZ-EC		N.O. (VJ324)	N.C. (VJ314)					
ø1.0	**ZX1101-K15LZ-EC**		N.C. (VJ114)	N.C. (VJ114)					
	ZX1101-K35MZ-EC		N.O. (VJ324)	N.C. (VJ314)					



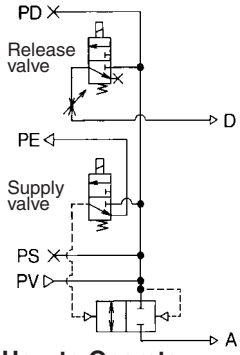
ZX1□□□-K15LZ-E□



ZX1□□□-K35MZ-E□

Ejector System/Combination of Supply Valve and Release Valve

Combination Symbol: K1



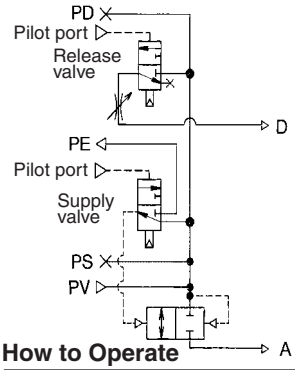
An N.C. solenoid valve is used for the supply valve. Also, an N.C. solenoid valve is used for the vacuum release valve.

Application: This combination is used for effecting control in accordance with electric signals.

How to Operate

Valve / Condition	Supply valve (N.C.)	Release valve (N.C.)
	Solenoid valve	Solenoid valve
1. Work adsorption	ON	OFF
2. Vacuum release	OFF	ON
3. Operation stop	OFF	OFF

Combination Symbol: K8



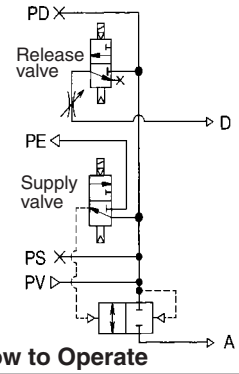
An air operated N.O. valve is used as the supply valve. An air operated N.C. valve is used for the vacuum release valve.

Application: This combination is used for effecting control in accordance with electric signals. Because the supply valve is N.O., the pressure that is supplied to the ejector is not interrupted during a power outage; as a result, the state of suction can be maintained. This combination is used for preventing the workpieces from dropping during power outages.

How to Operate

Valve / Condition	Supply valve (N.O.)	Release valve (N.C.)
	Air operated valve	Air operated valve
1. Work adsorption	OFF	OFF
2. Vacuum release	ON	ON
3. Operation stop	ON	OFF

Combination Symbol: K3



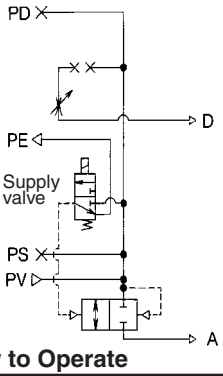
An N.O. solenoid valve is used for the supply valve. Also, an N.C. solenoid valve is used for the vacuum release valve.

Application: This combination is used for effecting control in accordance with electric signals. Because the supply valve is N.O., the pressure that is supplied to the ejector is not interrupted during a power outage; as a result, the state of suction can be maintained. This combination is used for preventing the workpieces from dropping during power outages.

How to Operate

Valve / Condition	Supply valve (N.O.)	Release valve (N.C.)
	Solenoid valve	Solenoid valve
1. Work adsorption	OFF	OFF
2. Vacuum release	ON	ON
3. Operation stop	ON	OFF

Combination Symbol: J1



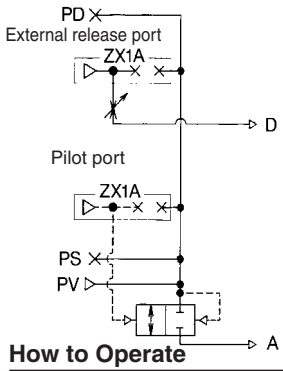
An N.C. solenoid valve is used as the supply valve. A vacuum release valve is not used.

Application: This combination is used for effecting control in accordance with electric signals. A vacuum release is effected by the intrusion of air between the silencer, pad, and the workpiece. This combination is used when there is no need to accelerate the vacuum release speed.

How to Operate

Valve / Condition	Supply valve (N.C.)	Release valve
	Solenoid valve	None
1. Work adsorption	ON	—
2. Vacuum release	OFF	—
3. Operation stop	OFF	—

Combination Symbol: K6



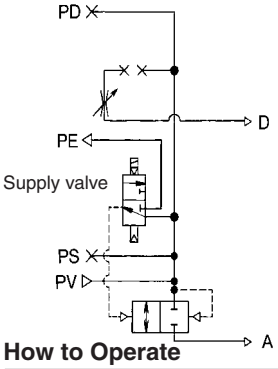
An external 3 port valve must be provided to serve as the supply valve. Also, an external 2 port valve (vacuum valve) must be provided to serve as the vacuum release valve.

Application: This combination is used for effecting control in accordance with electric signals.

How to Operate

Valve / Condition	Supply valve	Release valve
	External 3 port valve	External 2 port valve
1. Work adsorption	ON	OFF
2. Vacuum release	OFF	ON
3. Operation stop	OFF	OFF

Combination Symbol: J2



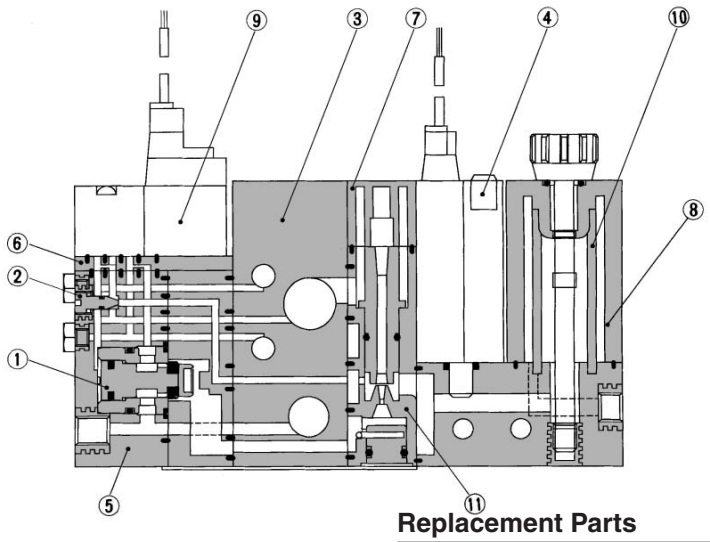
An N.O. solenoid valve is used as the supply valve. A vacuum release valve is not used.

Application: This combination is used for effecting control in accordance with electric signals. Because the supply valve is N.O., the pressure that is supplied to the ejector is not interrupted during a power outage; as a result, the state of suction can be maintained. This combination is used for preventing the workpieces from dropping during power outages. A vacuum release is effected by the intrusion of air between the silencer, pad, and the workpiece. This type is used when there is no need to accelerate the vacuum release speed.

How to Operate

Valve / Condition	Supply valve (N.O.)	Release valve
	Solenoid valve	None
1. Work adsorption	OFF	—
2. Vacuum release	ON	—
3. Operation stop	OFF	—

Ejector System/Construction



Component Parts

No.	Description	Material	Note
①	Poppet valve assembly	—	ZX1-PV-O
②	Release flow rate adjustment needle	Stainless steel	
③	Manifold	Aluminum	
④	Vacuum switch	—	ZSE2, ZSP1
⑤	Valve unit	—	ZX1-VA□□□□□□-D-□
⑥	Interface plate	—	(PV↔PS→PD)
⑦	Silencer case		
⑧ Note)	Filter case	Polycarbonate	

Replacement Parts

No.	Description	Material	Part no.
⑨	Pilot valve Air operated	—	Refer to "Table (1)","(2)","(3)".
⑩	Filter element	PVF	ZX1-FE
⑪	Ejector assembly	—	Refer to "Table (4)".

Note) Caution when handling filter case
1) The case is made of polycarbonate. Therefore, do not use with or expose it to the following chemicals: paint thinner, carbon tetrachloride, chloroform, acetic ester, aniline, cyclohexane, trichloroethylene, sulfuric acid, lactic acid, watersoluble cutting oil (alkalinic), etc.
2) Do not expose it to direct sunlight.

Table (1) How to Order Pilot Valves

No.	Components		Model	Combination of supply and release valve
	Supply valve	Release valve		
①	Solenoid valve N.C. (VJ114)	Solenoid valve N.C. (VJ114)	ZX1-VJ114-□□□□	K1, J1
②	Solenoid valve N.O. (VJ324)	Solenoid valve N.C. (VJ314)	ZX1-VJ3$\frac{1}{2}$4□-□□□□	K3, J2
③	Air operated N.O. (VJA324)	Air operated N.C. (VJA314)	ZX1-VJA3$\frac{1}{2}$4	K8
④	Air operated N.C. (ZX1A)		ZX1A-□	K6

Table (2) How to Order Solenoid Valves

ZX1—VJ114 □ 5 L Z □

ZX1—VJ3 2 4 □ □ 5 L Z □

Type of actuation

1	N.C. (Normally closed)
2	N.O. (Normally open)

Manual override

Nil	Non-locking push type
B	Locking slotted type

Body option

Nil	Pilot valve Individual exhaust
M	Common exhaust for main and pilot valves

Note) In the case of N.C. type, indicate no symbol. (Individual exhaust for Pilot valve)

Light/Surge voltage suppressor

Nil	Without light/surge voltage suppressor
S	With surge voltage suppressor
Z	With light/surge voltage suppressor

Pilot valve

Nil	DC: 1 W (With indicator light: 1.05 W)
	AC
Y*	DC: 0.45 W (With indicator light: 0.5 W)

* 24 VDC and 12 VDC are applicable to 0.45 W.
Note) Screw length of VJ100 and VJ300 for series ZX is different from that of the standard model.
<Screw length> VJ100–M1.7 x 15
VJ300–M1.7 x 22

Rated voltage

1 *	100 VAC
3 *	110 VAC
5	24 VDC
6	12 VDC
V	6 VDC
S	5 VDC
R	3 VDC

* Applicable to plug connector

Electrical entry

L	Connector (0.3 m)
LN	Connector (w/o lead wire)
LO	Without connector
M	Connector (0.3 m)
MN	Connector (w/o lead wire)
MO	Without connector
G	Grommet (0.3 m)
H	Grommet (0.6 m)

Note) In the case of "ZX1-VJ114", M, MN and MO cannot be used.

Table (3) How to Order Air Operated Valves

ZX1A—M3

Port size

M3	M3 x 0.5	Pilot port/ External release port
M5	M5 x 0.8	

Table (4) How to Order Ejector Assembly

ZX1-W D 05 1

Assembly no.

Ejector unit nozzle dia.

05	0.5 mm
07	0.7 mm
10	1.0 mm

Ejector type (Exhaust type)

1	With silencer
2	Port exhaust
3	Common exhaust

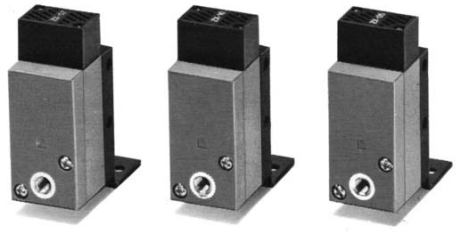
* An adapter should be attached to the assembly to be used as a unit. PV port and V port can be connected.

Ejector assembly
- Combination/ ZX-WD
- Used as a unit by attaching an adapter/ ZX-W-□

⚠ Caution

Turning the vacuum release flow volume adjustment needle clockwise reduces the vacuum release flow volume; the needle valve is fully closed when the needle stops turning. Turning the needle 2 full turns counterclockwise from the fully closed position renders the needle valve fully open. The needle will fall out if it is turned more than 4 full turns.

Ejector Unit



Specifications

Unit no.	ZX1-W05$^{1}_{2}$	ZX1-W07$^{1}_{2}$	ZX1-W10$^{1}_{2}$
Nozzle dia. ø (mm)	0.5	0.7	1.0
Max. suction flow (ℓ/min (ANR))	5	10	22
Air consumption (ℓ/min (ANR))	13	23	46
Maximum vacuum pressure	−84 kPa		
Maximum operating pressure	0.7 MPa		
Supply pressure range	0.2 to 0.55 MPa		
Standard supply pressure	0.45 MPa		
Operating temperature range	5 to 50°C		
Ejector exhaust type *	Code ①	Built-in silencer····· For single and manifold	
	Code ②	Individual exhaust····· For single and manifold	
Weight	Built-in silencer: 35 g/Port exhaust: 45 g		
Standard accessory	Bracket B		

* Codes ① and ② are corresponding to the suffixes in "How to Order" to indicate the exhaust method.

How to Order

ZX1 — W 05 1 ☐

Nozzle diameter

05	0.5 mm
07	0.7 mm
10	1.0 mm

PV, V port size

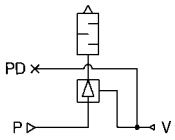
Nil	M5 x 0.8
Y	M6 x 1 (Option)

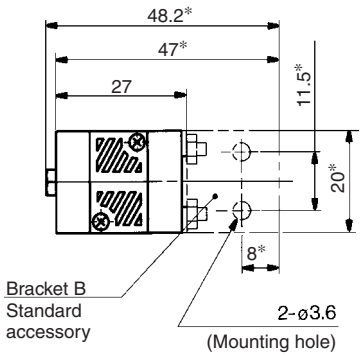
Ejector exhaust

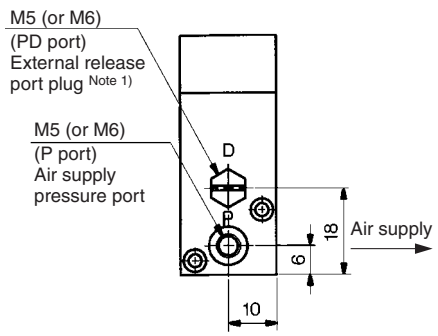
1	Silencer
2	Individual exhaust Rc 1/8

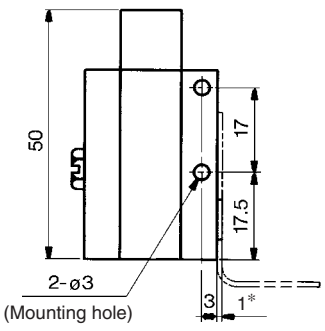
Dimensions: ZX1-W☐☐$^{1}_{2}$

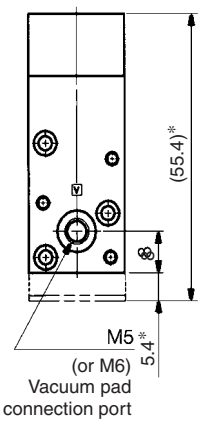
JIS Symbol











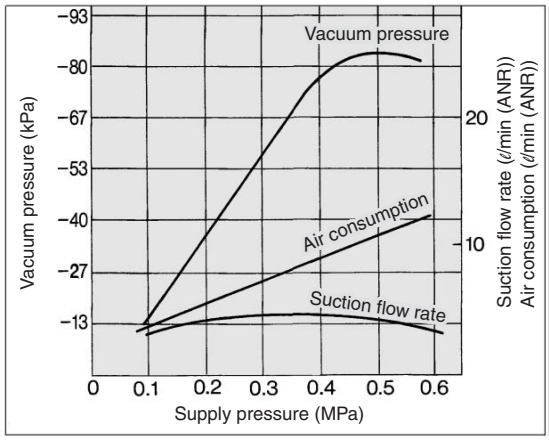
Note 1) Remove the plug at external release. Note 2) Dimensions *: For mounting bracket B.

Flow Characteristics/Exhaust Characteristics

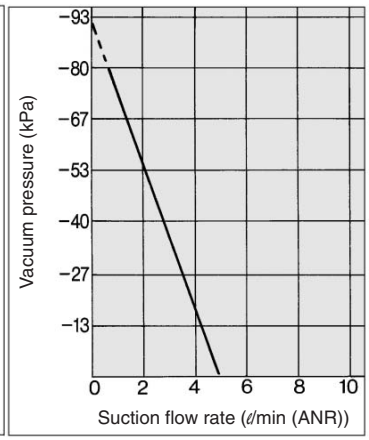
[At 0.45 MPa]

ZX1-W05

Exhaust Characteristics

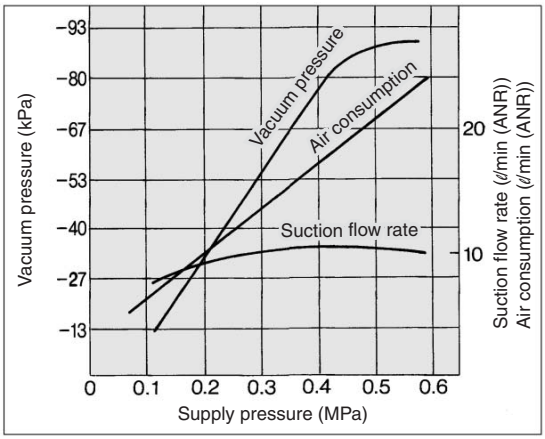


Flow Characteristics

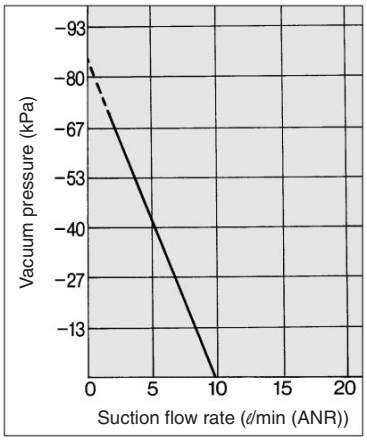


ZX1-W07

Exhaust Characteristics

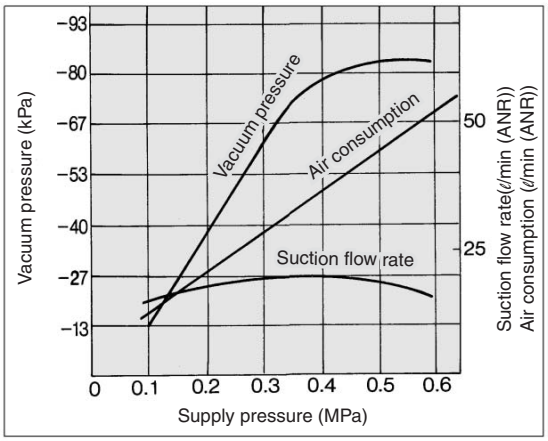


Flow Characteristics

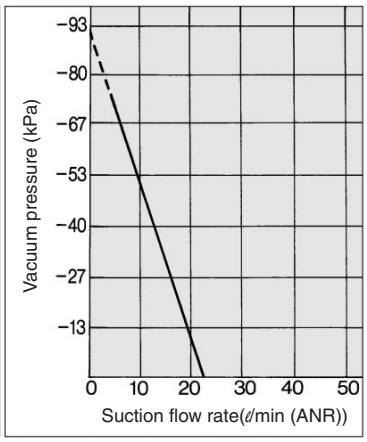


ZX1-W10

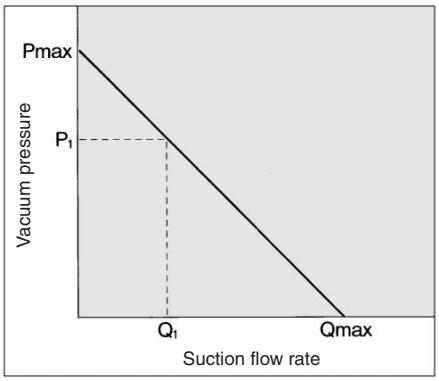
Exhaust Characteristics



Flow Characteristics



How to Read Flow Characteristics Graph



Flow characteristics are expressed in ejector vacuum pressure and suction flow. If suction flow rate changes, a change in vacuum pressure will also be expressed. Normally this relationship is expressed in ejector standard use.

In graph, Pmax. is max. vacuum pressure and Qmax is max. suction flow. The valves are specified according to catalog use. Changes in vacuum pressure are expressed in the below order.

1. When ejector suction port is covered and made airtight, suction flow becomes 0 and vacuum pressure is at maximum value (Pmax).
2. When suction port is opened gradually, air can flow through, (air leakage), suction flow increases, but vacuum pressure decreases. (condition P_1 and Q_1)
3. When suction port is opened further, suction flow moves to maximum value (Qmax), but vacuum pressure is near 0. (atmospheric pressure).
   When vacuum port (vacuum piping) has no leakage, vacuum pressure becomes maximum, and vacuum pressure decreases as leakage increases. When leakage value is the same as max. suction flow, vacuum pressure is near 0.
   When ventirative or leaky work must be adsorbed, please note that vacuum pressure will not be high.

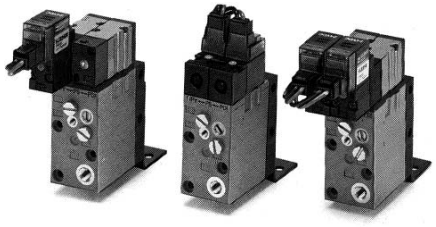
⚠ Precautions

Be sure to read before handling. Refer to pages 13-15-3 to 13-15-4 for Safety Instructions and Common Precautions on the products mentioned this catalog, and refer to page 13-1-5.

⚠ Caution

Refer to 13-1-10 to 13-1-19 for the product selection in series ZX and the sizing program.

Valve Unit: ZX1-VA



Specifications

Unit no.	ZX1-VA□□□□□							
Components	Vacuum supply valve				Vacuum release valve			
Operation	Pilot operated				Direct operated			
	Solenoid valve		Air operated		Solenoid valve		External release	Air operated
	N.C. (VJ314)	N.C. (VJ114)	N.O. (VJA324)	N.C. (ZX1A)	N.O. (VJA324)	N.C. (VJ114)	(ZX1A)	N.C. (VJA314)
Effective area (mm²) (Cv factor)	3 (0.17) Main valve				0.07 (0.004)	0.45 (0.025)	—	
Operating pressure range	0.3 to 0.6 MPa							
Max.operating frequency	5 Hz							
Operating temperature range	5 to 50°C							
Interface plate symbol	PV◄►PS◄►PD							
Standard accessory	Bracket C							

Solenoid Valve/Specifications

	VJ114	VJ314, VJ324
Rated voltage	24, 12, 6, 5, 3 VDC/100, 110 VAC* (50/60 Hz)	
Electrical entry	L plug connector, grommet	L plug connector, M plug connector, grommet
Light/Surge voltage suppressor	With or Without	
Manual operation	Non-locking push type/Locking slotted type	

* Applicable to plug connector; connector assembly with rectifier is attached.

Model/Solenoid Valve

Model		Supply valve			
		Solenoid valve N.C. (VJ114)	Solenoid valve N.O. (VJ324)	Air operated N.C. (ZX1A)	None
Release valve	Solenoid valve N.C. (VJ114)	● K1 [82]	—	● K5 [73]	● D1 [77]
	Solenoid valve N.C. (VJ314)	—	● K3 [132]	–	● D2 [100]
	External release (ZX1A)	● K2 [73]	—	● K6 [58]	● D3 [41]
	Air operated N.C. (VJA314)	—	● K4 [119]	–	● D2 [100]
	None	● J1 [77]	● J2 [100]	● J3 [41]	—

[ ]: Weight (g)

How to Order

Refer to page 13-2-4 for details.

ZX1 – V A K1 □ 5 L Z □ □

System

A	Ejector system
B	External vacuum supply

Combination of supply valve and release valve

Pilot valve

Rated voltage

Electrical entry

Light/Surge voltage suppressor

Manual override

PV/V port size

Connector Assembly for 100 VAC

Connector assembly with rectifier attached.

Connector Assembly with Rectifier Part No.

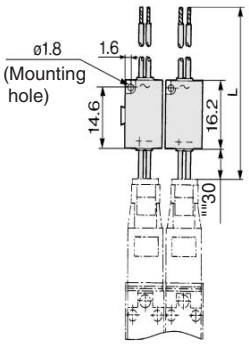
VJ10 — 36 — □ A — □

Rated voltage

Symbol	Rated voltage	Lead wire color
1	100 VAC 50/60 Hz	Blue (2 pcs.)
3	110 VAC 50/60 Hz (115 VAC 60 Hz)	Gray (2 pcs.)

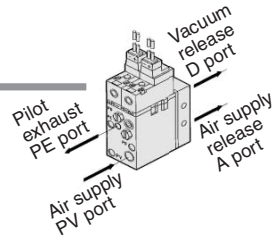
Lead wire length

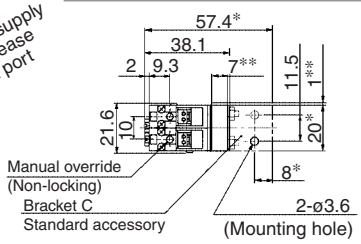
Symbol	L (mm)
Nil	300
6	600
10	1000
15	1500
20	2000
25	2500
30	3000

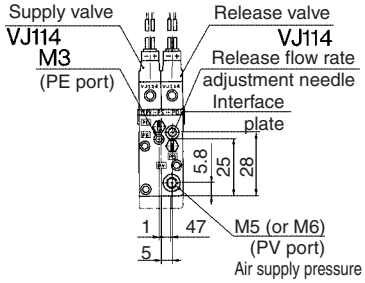


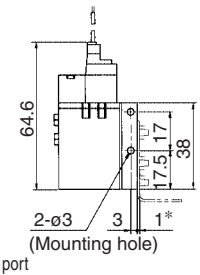
Valve Unit

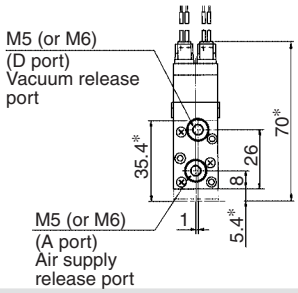
Normally closed

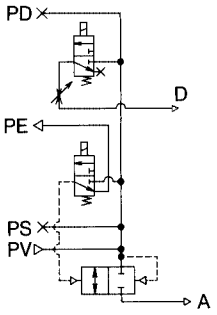






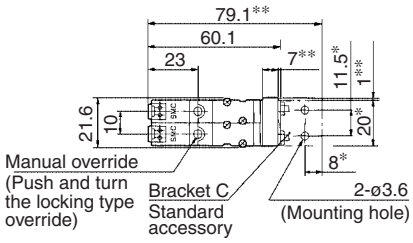


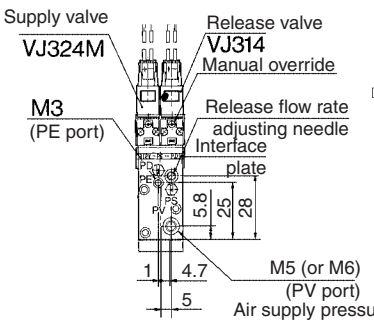


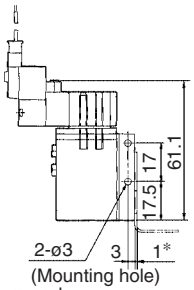


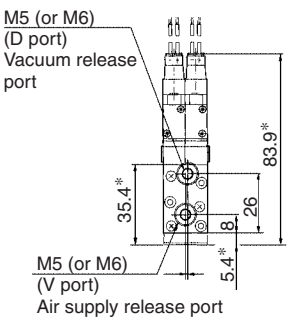
Circuit diagram

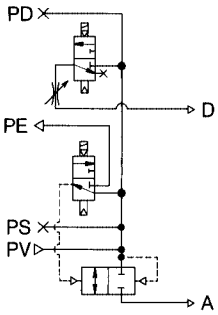
Normally open











Circuit diagram

Note) Dimensions ∗: For mounting bracket C ∗∗: For mounting spacer.

Suction Filter Unit: ZX1-F

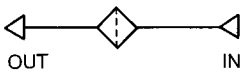
Specifications

Unit no.	ZX1-F
Operating pressure range	Vacuum to 0.5 MPa
Operating temperature range	5 to 50°C
Filtration efficiency	30 μm
Element	PVF
Weight	35 g

Note) If not operated within the specified range of pressure and temperature, trouble may result.

Filter

JIS Symbol



Note) Dimensions ∗: For A mounting bracket.

• Filter case

⚠Caution

1. The case is made of polycarbonate. Therefore, do not use it with or expose it to the following chemicals: paint thinner, carbon tetrachloride, chloroform, acetic ester, aniline, cyclohexane, trichloroethylene, sulfuric acid, lactic acid, water-soluble cutting oil (alkalinic), etc.
2. Do not expose it to direct sunlight.

Vacuum Pressure Switch Unit/Vacuum Pressure Switch: ZSE2-0X

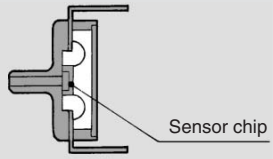
Quick response: 10 ms

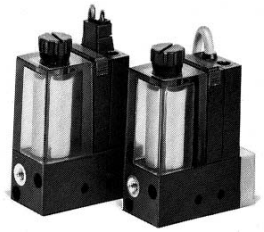
Compact size: 39H x 20W x 15D (except the connecting portion)

Improved wiring: connector type

Uses a carrier diffusion semiconductor pressure sensor

Pressure detector
(A carrier diffusion semiconductor pressure sensor is used.)





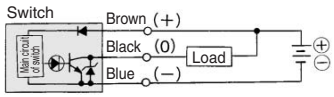
Vacuum Pressure Switch

Unit no.	ZSE2-0X
Fluid	Air
Set pressure range	0 to –101 kPa
Hysteresis	3% Full span or less
Accuracy	±3% Full span (5 to 40°C) ±5% Full span (0 to 60°C)
Voltage	12 to 24 VDC (Ripple ±10% or less)
Port size	M5 x 0.8

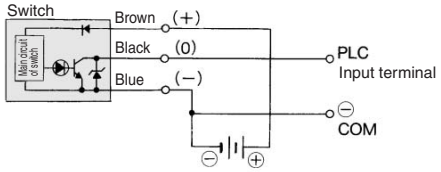
• **Weight** — 50 g • **Output** — Open collector 30 V/80 mA • **Indicator light** — Light at ON state
• **Current consumption** — 17 mA or less (24 VDC, at ON state)
• **Operating temperature range** — 0 to 60°C • **Max. operating pressure** — 0.2 MPa
* When using ejector system, instantaneous pressure up to 0.5 MPa will not damage the switch.
Note) If not operated within the specified range of pressure of temperature, trouble may be result.

Wiring

ZSE2 connection



Connection with PLC at negative COM terminal



How to Order

ZSE2 — 0X □ — 15 □

PV, V port size

Nil	M5 x 0.8
Y	M6 x 1 (Option)

Piping specifications

Nil	Grommet (0.6 m)
L	Grommet (3 m)
C	Connector (0.6 m)
CL	Connector (3 m)
CN	Without connector

• Filter case

⚠Caution

1. The case is made of polycarbonate. Therefore, do not use it with or expose it to the following chemicals: paint thinner, carbon tetrachloride, chloroform, acetic ester, aniline, cyclohexane, trichloroethylene, sulfuric acid, lactic acid, water-soluble cutting oil (alkalinic), etc.
2. Do not expose it to direct sunlight.

• Vacuum pressure setting

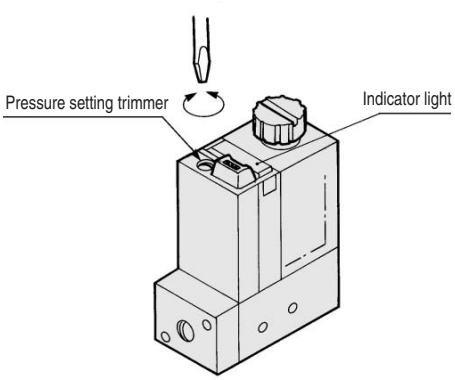
⚠Caution

Observe the following precautions when setting the vacuum pressure.
Lightly turn the screwdriver with your fingertips.
To prevent damage to the trimmer groove, do not use a screwdriver that has a large grip or a tip that does not fit in the trimmer groove.

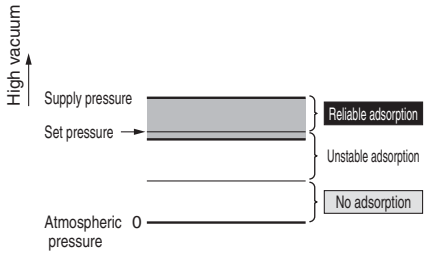
How to Set Vacuum Pressure

ZSE2

• Pressure setting trimmer selects the ON pressure. Clockwise rotation increases high vacuum set point.



• When using the switch to confirm correct adsorption, the set pressure should be as low as possible. But not so low that a false confirmation signal is given when adsorption is incomplete.

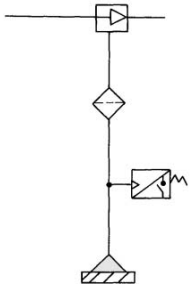


Vacuum Pressure Switch Unit/Vacuum Pressure Switch: ZSE2-0X

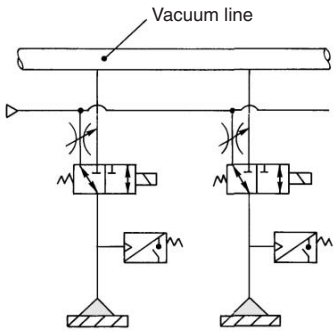
Guidelines for Use of Vacuum Pressure Switch Unit

System circuit for work adsorption

Ejector style



External vacuum supply style



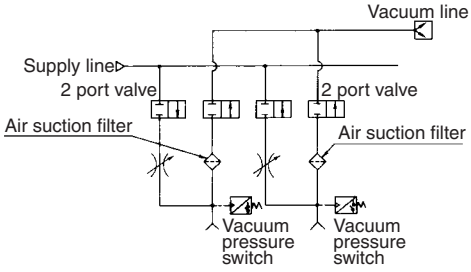
Set pressure

To use for picking verification, set a vacuum pressure that can pick the workpiece without fail. In some situations, the switch could turn ON even if the picking is not complete.

Using a small diameter picking nozzle

A nozzle that is used for picking electronic parts or small precision parts could be even smaller than ø2. If the nozzle diameter is approximately ø1, the pressure difference between ON and OFF becomes smaller, depending on the capacity of the ejector or the vacuum pump. In such a case, it is necessary to use **the picking verification switch ZSP1**, which provides a small hysteresis and high precision. On the other hand, an ejector with a large picking capacity will not be able to detect properly, so an ejector with an appropriate capacity must be used. Furthermore, it is necessary to stabilize the pressure of the ejector and the vacuum pump.

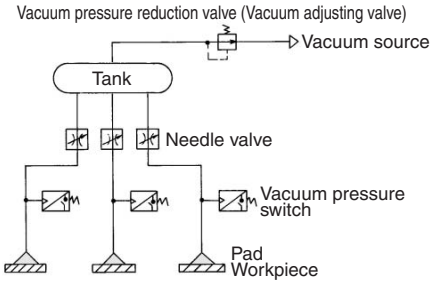
External vacuum supply system



Using multiple pressure switches with a single vacuum source

If a single vacuum source is divided so that vacuum switches can be used on individual lines, the vacuum pressure might not come within the values set with the switches because the pressure of the vacuum source fluctuates depending on the number of picks and non-picks.

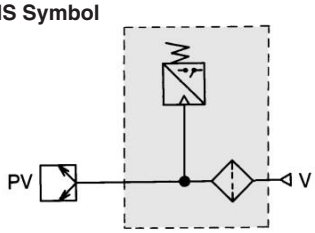
Especially, because pressure fluctuation exerts a great influence when picking with a small diameter nozzle, the countermeasures described below must be provided.

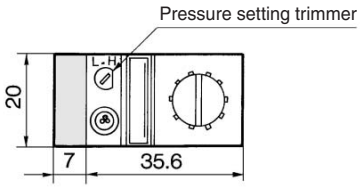


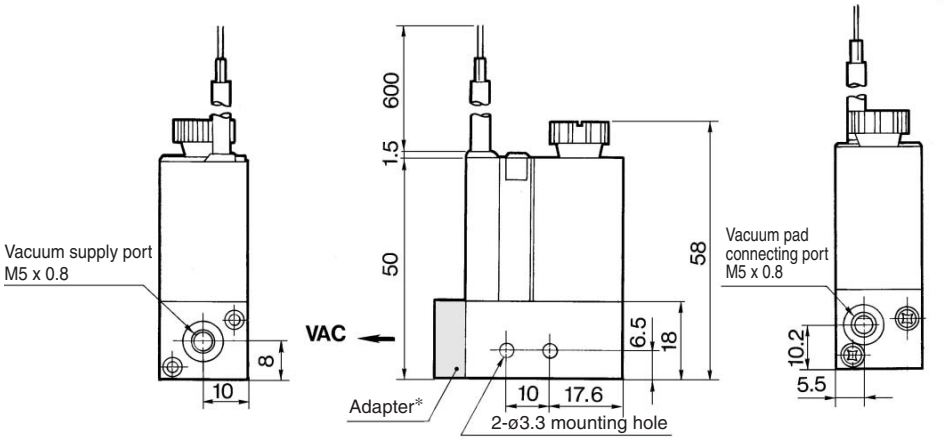
- Adjust the needle valve to reduce the pressure fluctuation between picking and non-picking.
- Stabilize the source pressure by providing a tank and a vacuum regulator.
- Provide a vacuum switch valve to individual lines. Thus, in case of an error, each valve can be turned OFF to minimize the influences on other pads.

Vacuum Pressure Switch: ZSE2-0X-15

JIS Symbol

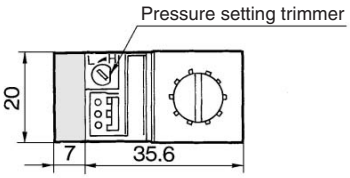


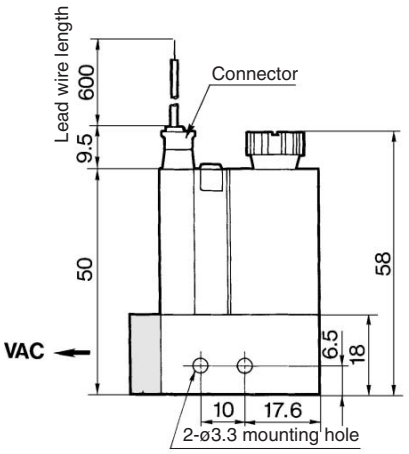




∗ Remove the adapter when mounted on the ejector.

Connector: ZSE2-0X-15C





Vacuum Pressure Switch Unit/Vacuum Pressure Switch: ZSE3-0X

Built-in failure prediction output function

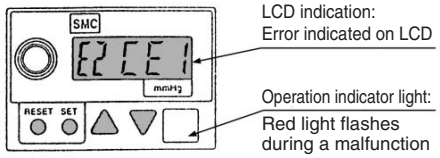
If the attainable amount of vacuum reduces due to a decrease in performance caused by clogging of the silencer of the vacuum system (ejectors), cracked pads, or the leakage of the vacuum pipes, this function quickly detects the abnormal condition and outputs a signal to halt the system.

Two independent pressure settings possible

This feature is well suited for applications that require 2 separate pressure outputs due to a change in the vacuum suction pad diameters, or for applications that require 2 pressure verifications to effect line changes in the positive pressure line.

Comprehensive self diagnosis function

- Overcurrent detection function
- Overvoltage detection function
- Data error



Data saving function

Even if the power is cut off, the settings are stored for 100,000 hours (approximately 11 years) in the exclusive IC (EEPROM).

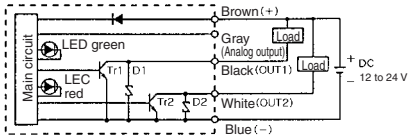
Vacuum Pressure Switch

Unit no.		ZSE3-0X
Fluid		Air, Non corrosive gas
Set pressure range		–101 to 0 kPa
Hysteresis	Hysteresis mode	Variable (3 digits or more)
	Window comparator mode	Fixed (3 digits)
Accuracy		±1% F.S. or less
Operating voltage		12 to 24 VDC (Ripple ±10% or less)
Port size		M5 x 0.8

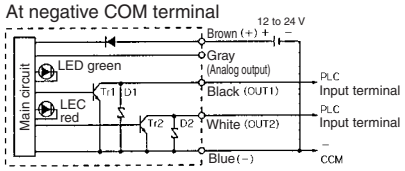
• **Weight** — 50 g • **Indicator light** — Light at ON state
• **Current consumption** — 25 mA or less • **Operating temperature range** — 0 to 60°C
• **Max. operating pressure** — 0.2 MPa

Wiring

Wiring example
General connection methed



Connection with PLC
At negative COM terminal



• Filter case

⚠Caution

1. The case is made of polycarbonate. Therefore, do not use it with or expose it to the following chemicals: paint thinner, carbon tetrachloride, chloroform, acetic ester, aniline, cyclohexane, trichloroethylene, sulfuric acid, lactic acid, water-soluble cutting oil (alkalinic), etc.
2. Do not expose it to direct sunlight.

How to Order

ZSE3 — 0X — 21 ☐

• Output specifications

21	NPN open collector, double output Without analog output
22	NPN open collector, double output With analog output
23	NPN open collector 1 output/Trouble detection/ Without analog output
24	NPN open collector 1 output/Trouble detection/ With analog output

• Wiring specifications

Nil	Grommet (0.6 m)
L	Grommet (3 m)
C	Connector (0.6 m)
CL	Connector (3 m)
CN	Without connector

Note) Analog output is available only for grommet type.

How to Set Vacuum Pressure

Refer to “Best Pneumatics Vol.16”.

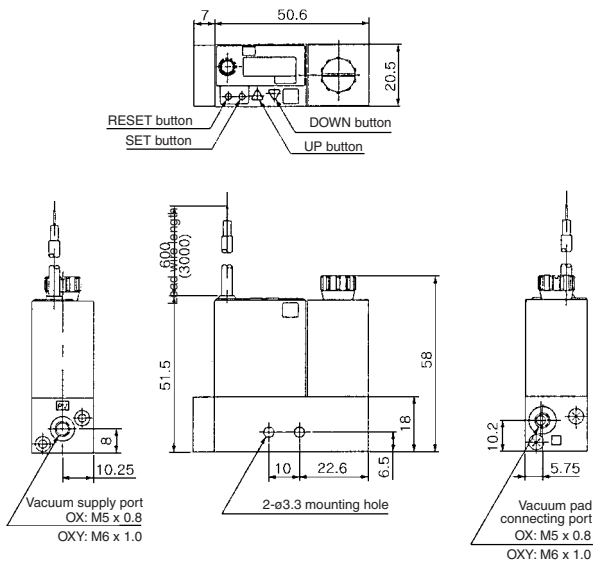
Guidelines for Use of Vacuum Pressure Switch Unit

Refer to page 13-2-14.

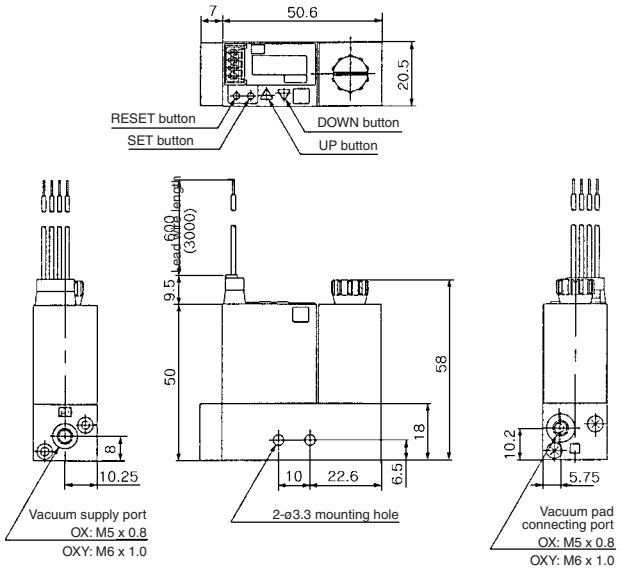
Vacuum Pressure Switch Unit/Vacuum Pressure Switch: ZSE3-0X

Vacuum Pressure Switch/ZSE3-0X-21, 22, 23, 24

Grommet: ZSE3-0X-□

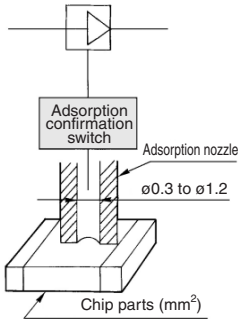


Connector: ZSE3-0X-□C



Vacuum Pressure Switch Unit/Adsorption Confirmation Switch: ZSP1-$^{S}_{B}$

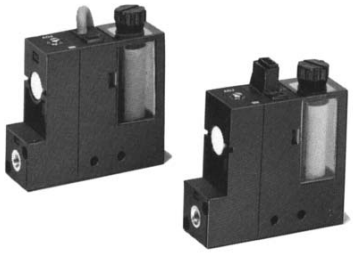
Small diameter nozzle/ø0.3 to ø1.2



With suction filter

Improved wiring: connector type

Uses a carrier diffusion semiconductor pressure sensor



• Filter case

⚠Caution

1. The case is made of polycarbonate. Therefore, do not use it with or expose it to the following chemicals: paint thinner, carbon tetrachloride, chloroform, acetic ester, aniline, cyclohexane, trichloroethylene, sulfuric acid, lactic acid, water-soluble cutting oil (alkalinic), etc.
2. Do not expose it to direct sunlight.

• Other caution

⚠Caution

It might not be possible to successfully pick a workpiece if a picking nozzle or a picking pad that is out of the applicable range is used.

Adsorption Confirmation Switch Specifications

Unit no.	ZSP1-S	ZSP1-B
Fluid	Air	
Operating pressure range	–20 kPa to 101 kPa	
Applicable adsorption nozzle dia.	ø0.3 to ø0.7 (Refer to Graph (1).)	ø0.5 to ø1.2 (Refer to Graph (2).)
Hysteresis	0.5 kPa	
Internal orifice	ø0.5	ø0.8

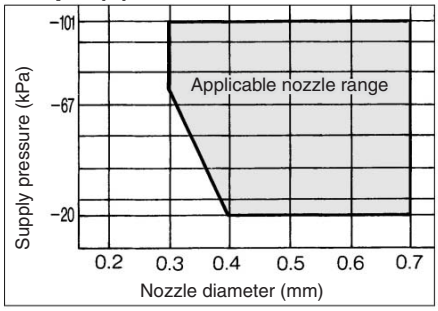
• **Weight**——62 g • **Voltage**——12 to 24 VDC (Ripple ±10% or less) • **Output**——Open collector 30 V/80 mA
• **Indicator light**——Light at ON state • **Current consumption**——17 mA (24 VDC, at ON state)
• **Operating temperature range**——0 to 60°C • **Port size**——M5 x 0.8

Note) If not operated within the specified range of pressure and temperature, trouble may result.

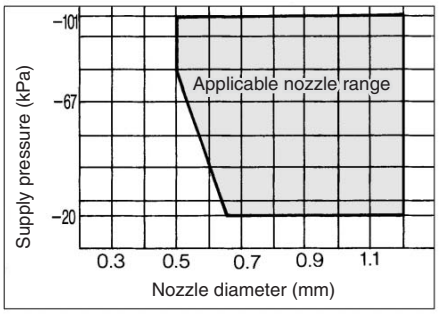
Applicable Adsorption Nozzle

Supply pressure and nozzle diameter are expressed in the graphs below.

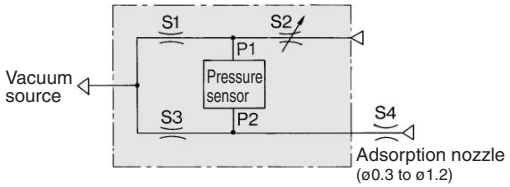
Graph (1)/ZSP1-S



Graph (2)/ZSP1-B



Pneumatic Circuit and Principle



Comprised of a pneumatically operated bridge circuit, this function puts the S4 picking nozzle into the non-picking state, and uses the S2 adjustment needle to balance (P1 ≅ P2) the pressure that is applied to the pressure sensor. The small pressure difference (P2 – P1) that is created when a part is picked by the (S4) picking nozzle and is detected by the pressure sensor.

∗ Wiring is the same as ZSE2.

How to Order

ZSP1 — S 0X □ — 15 □

Model

Symbol	Applicable model
S	Applicable nozzle dia. ø0.3 to ø0.7
B	Applicable nozzle dia. ø0.5 to ø1.2

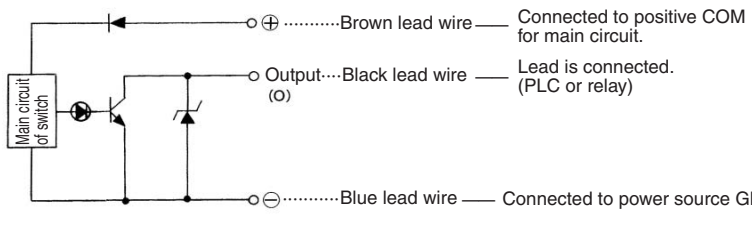
PV, V port size

Nil	M5 x 0.8
Y	M6 x 1 (Option)

Piping specifications

Nil	Grommet (0.6 m)
L	Grommet (3 m)
C	Connector (0.6 m)
CL	Connector (3 m)

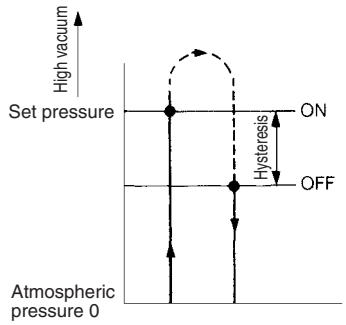
Circuit and Wiring



Vacuum Pressure Switch Unit/Adsorption Confirmation Switch: ZSP1-$^{S}_{B}$

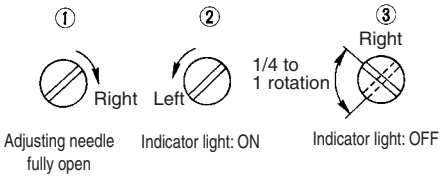
Hysteresis

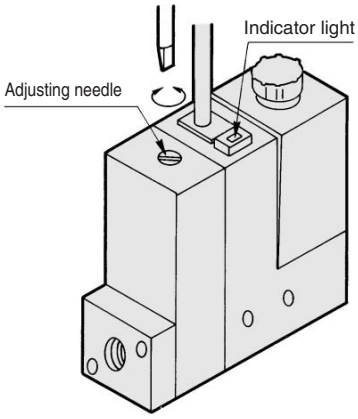
Hysteresis is the difference in pressure when the output signal is ON and OFF. The pressure to be set is the ON pressure.



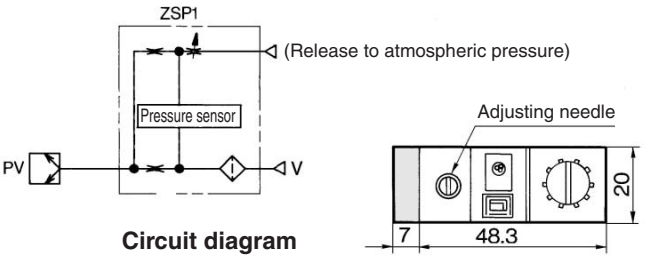
How to Set Adsorption Confirmation Needle

1. Apply a vacuum and current. Turn the adjusting needle clockwise until it stops, thus fully closing the needle valve.
2. Without attaching a workpiece to the picking nozzle, turn the adjusting needle counterclockwise and verify the position in which the indicator light turns ON.
3. From the state described in step w, turn back the adjusting needle clockwise 1/4 turn to 1 full turn.
4. Pick a workpiece with the nozzle and readjust the adjusting needle so that the indicator light turns ON when the nozzle has picked the workpiece successfully.

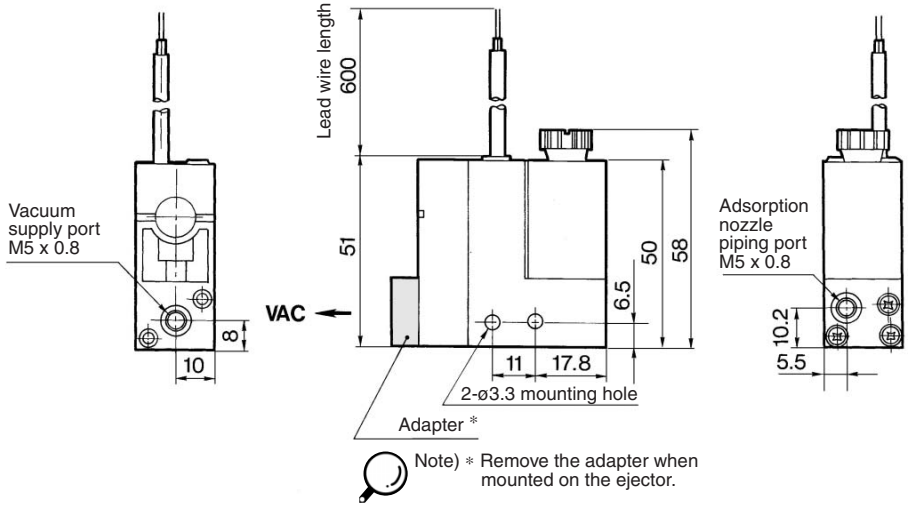




Adsorption Confirmation Switch: ZSP1-□0X-15

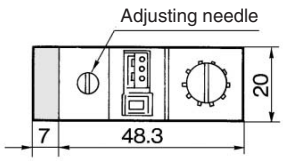


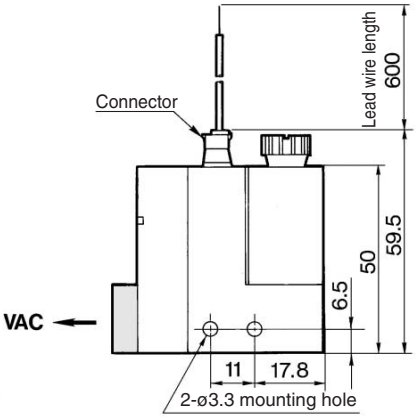
Circuit diagram



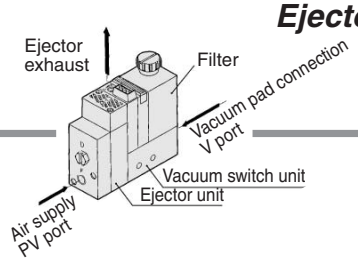
Note) * Remove the adapter when mounted on the ejector.

Connector: ZSP1-□0X-15





Without Valve Unit



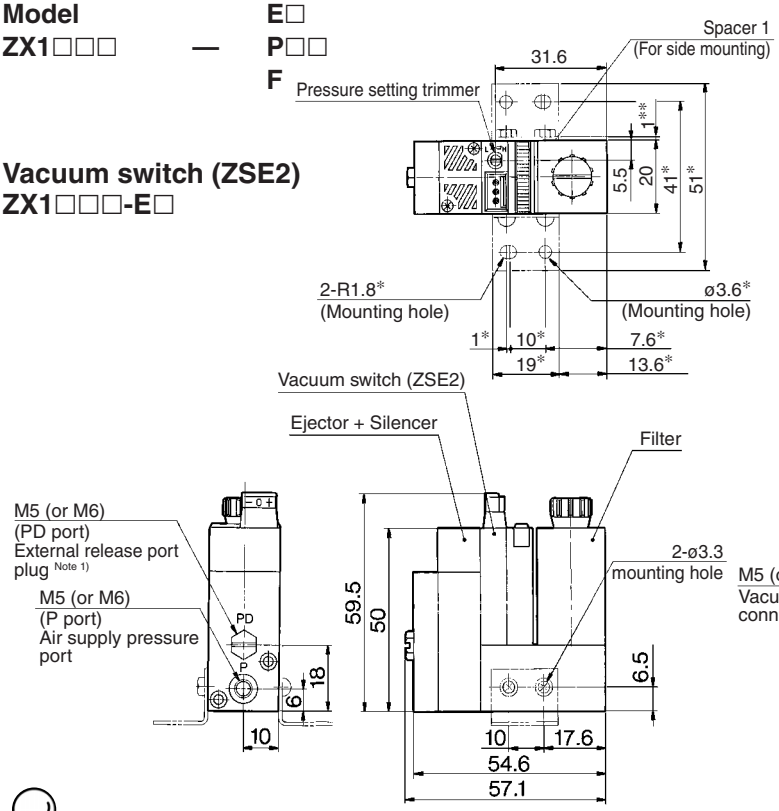
Configuration and combination

Ejector unit	+	Vacuum switch (ZSE2)
		Adsorption confirmation switch (ZSP1)
		Filter unit (F)

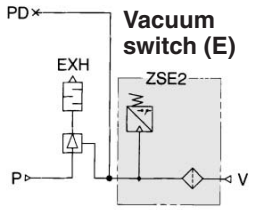
Model

ZX1□□□ — **E□** **P□□** **F**

Vacuum switch (ZSE2) ZX1□□□-E□

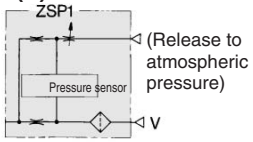


Circuit diagram
(Circuits other than those with vacuum switch are shown as below.)

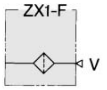


Vacuum switch (E)

Adsorption confirmation switch (P)



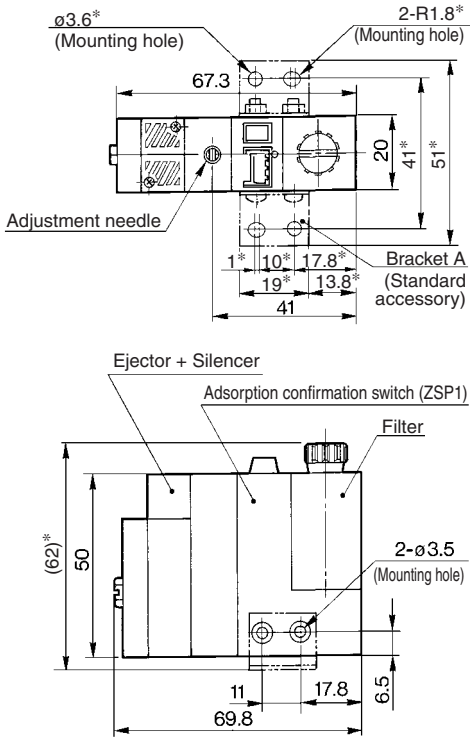
Filter unit (F)



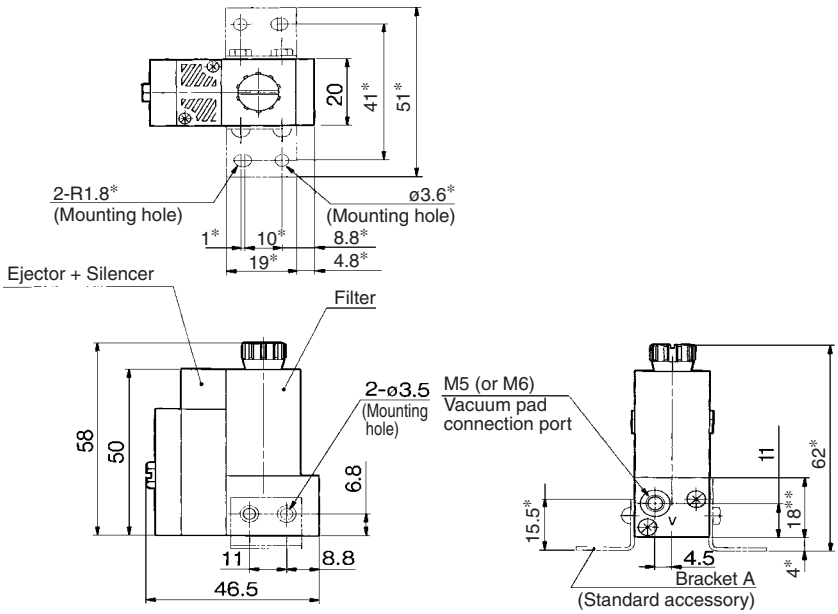
Note 1) Remove the plug at external release.

Note 2) Dimensions ∗: For mounting bracket A ∗∗: For mounting spacer 1.

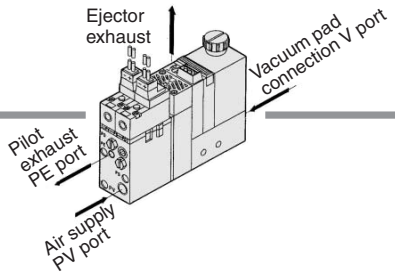
Adsorption confirmation switch (ZSP1) ZX1□□□-P□□



Filter unit (F) ZX1□□□-F



Valve Unit: Type K1



Configuration and combination

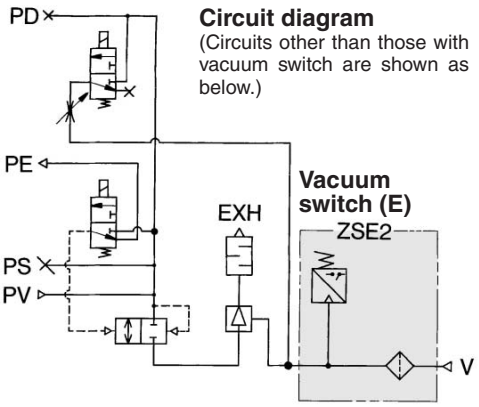
Ejector unit + Valve unit (K1) +

- Vacuum switch (ZSE2)
- Vacuum switch (ZSE3)
- Adsorption confirmation switch (ZSP1)
- Filter unit (F)
- Without switch and filter

Model

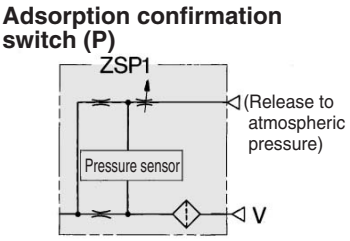
ZX1□□□□ — K1□□□□ —

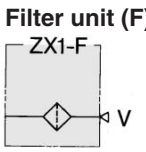
- E□
- D□
- P□□
- F□
- Nil

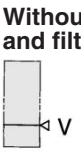


Circuit diagram
(Circuits other than those with vacuum switch are shown as below.)

Vacuum switch (ZSE2)
ZX1□□□-K1□□□□-E□

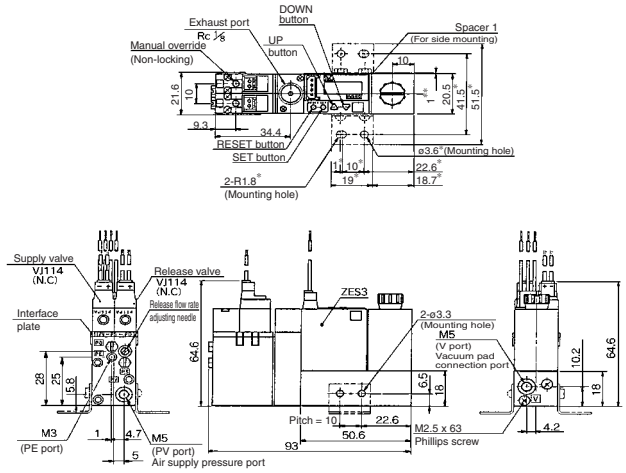






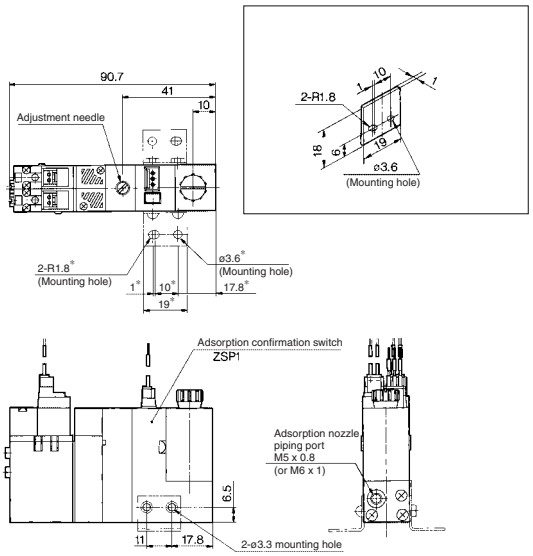
Note) Dimensions ∗: For mounting bracket A ∗∗: For mounting spacer 1.

Vacuum switch (ZSE3)
ZX1□□□-K1□□□□-D□

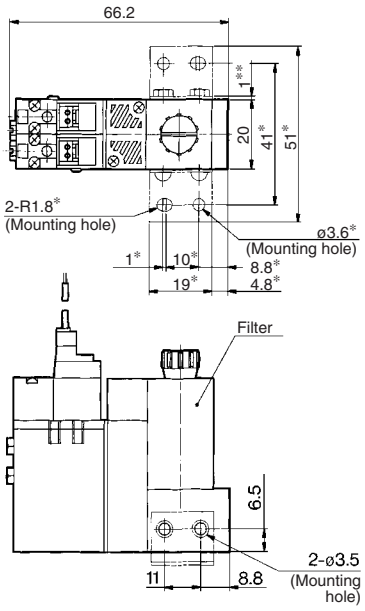


Adsorption confirmation switch (ZSP1)
ZX1□□□-K1□□□□-P□□

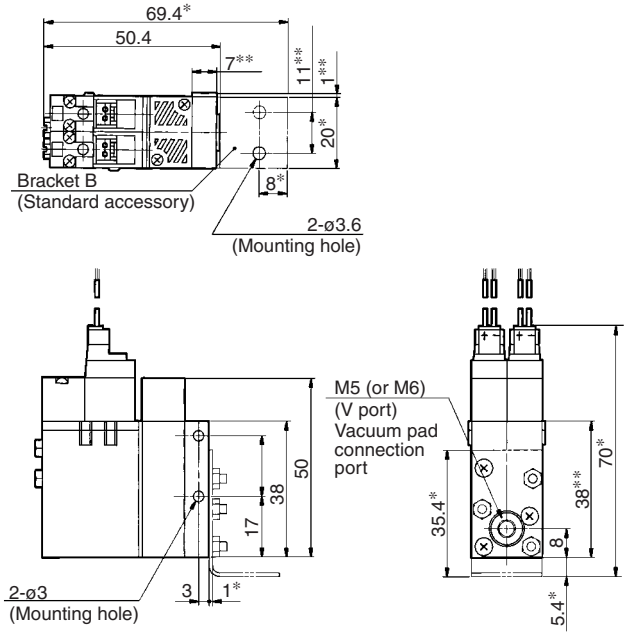
Spacer 1: ZX1-S1



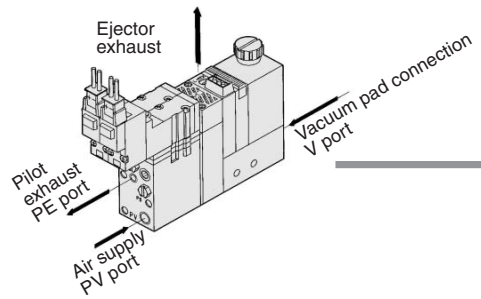
Filter unit
ZX1□□□-K1□□□□-F



Without switch and filter
ZX1□□□-K1□□□□



Valve Unit: Type K3



Configuration and combination

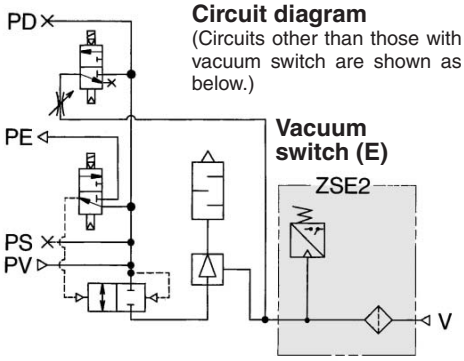
Ejector unit + Valve unit (K3) +

- Vacuum switch (ZSE2)
- Adsorption confirmation switch (ZSP1)
- Filter unit (F)
- Without switch and filter

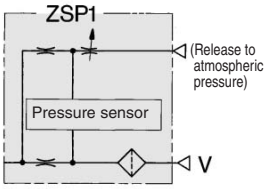
Model
ZX1□□□ — K3□□□□ — P□□

- E□
- F
- Nil

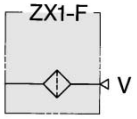
Circuit diagram
(Circuits other than those with vacuum switch are shown as below.)



Adsorption confirmation switch (P)

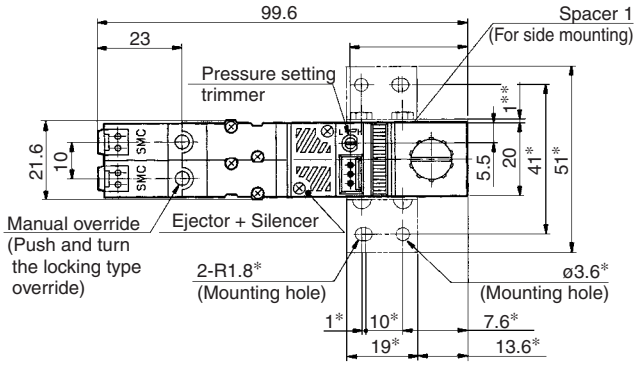


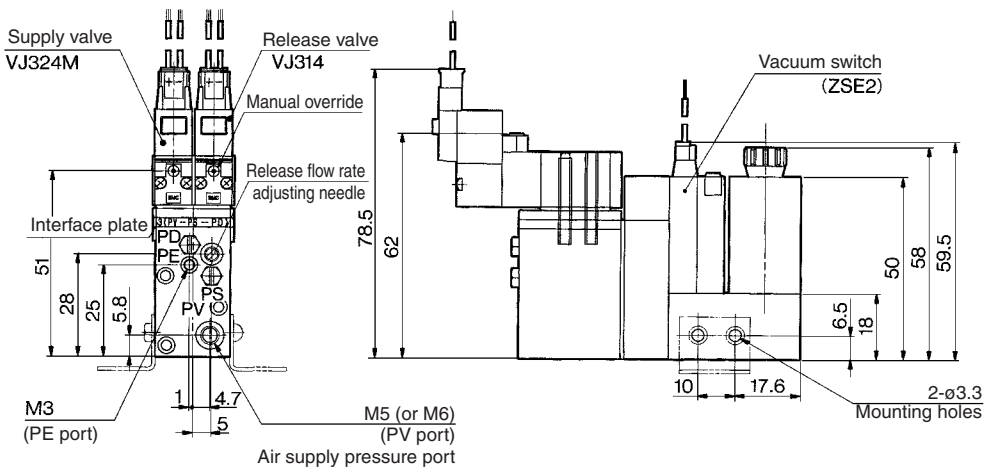
Filter unit (F)

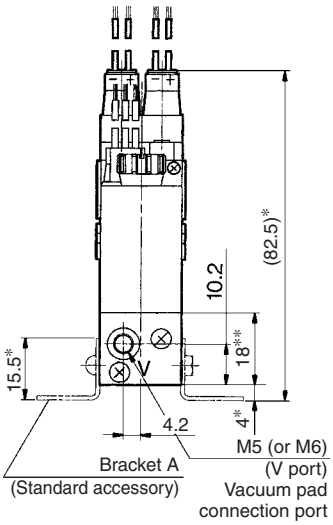


Without switch and filter

Vacuum switch (ZSE2)
ZX1□□□-K3□□□-E□

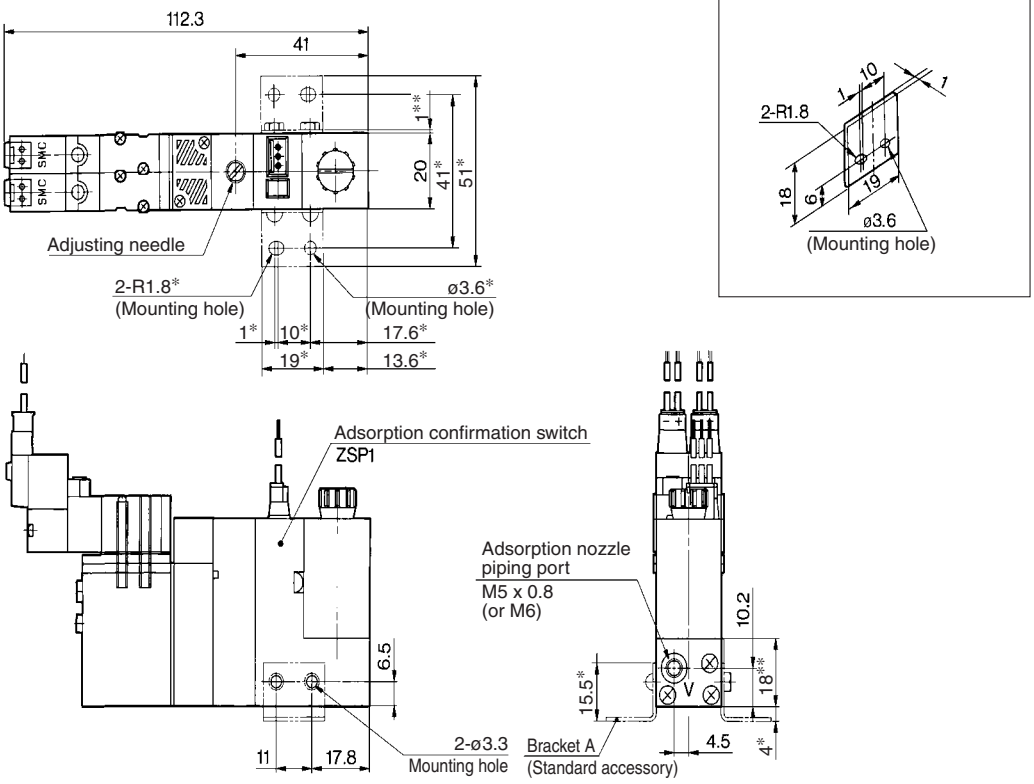




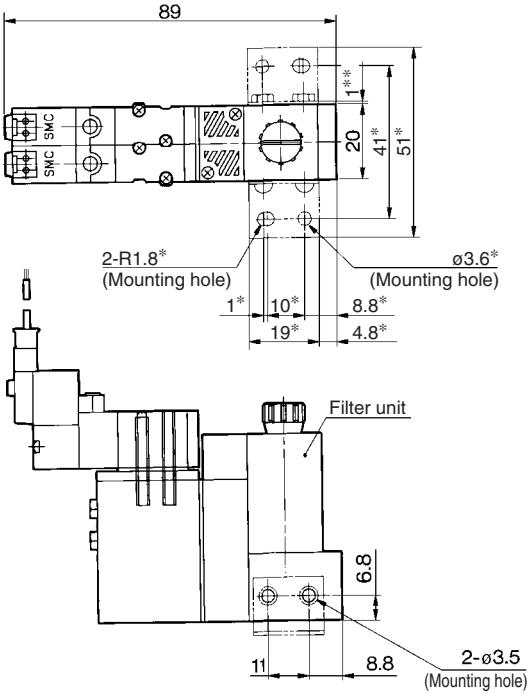


Note) Dimensions ∗: For mounting bracket A ∗∗: For mounting spacer 1.

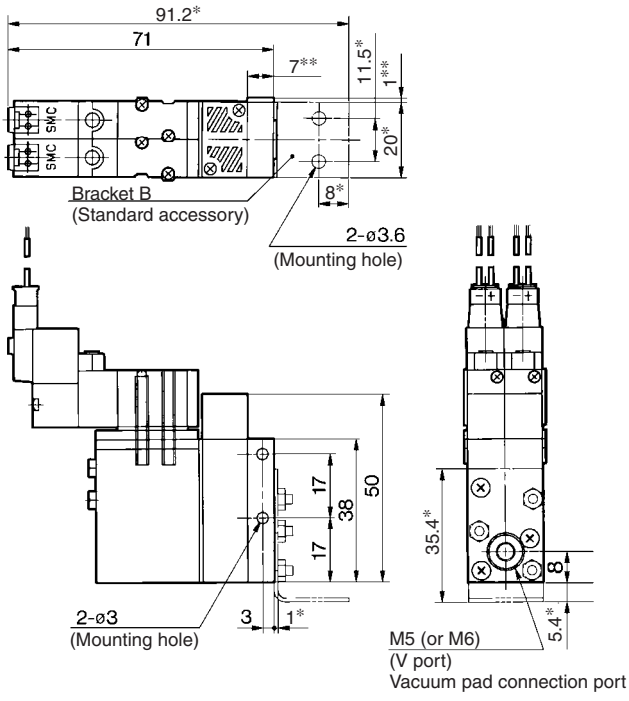
Adsorption confirmation switch (ZSP1)
ZX1□□□-K3□□□□-P□□



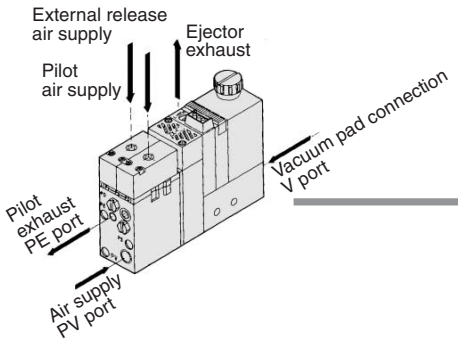
Filter unit (F)
ZX□□□-K3□□□□-F



Without switch and filter
ZX1□□□-K3□□□□



Valve Unit: Type K6



Configuration and combination

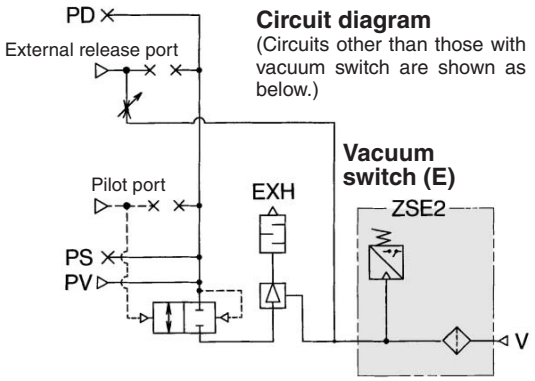
Ejector unit + Valve unit (K6) +

- Vacuum switch (ZSE2)
- Adsorption confirmation switch (ZSP1)
- Filter unit (F)
- Without switch and filter

Model

ZX1□□□ — K6 —

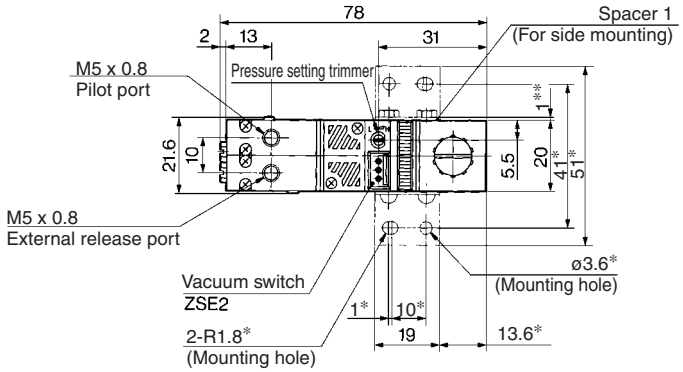
- **E□**
- **P□□**
- **F**
- **Nil**



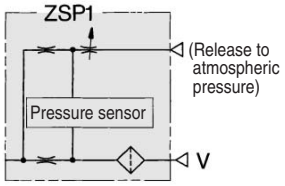
Circuit diagram
(Circuits other than those with vacuum switch are shown as below.)

Vacuum switch (E)

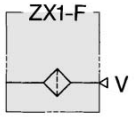
Vacuum switch (ZSE2)
ZX1□□□ - K6- E□



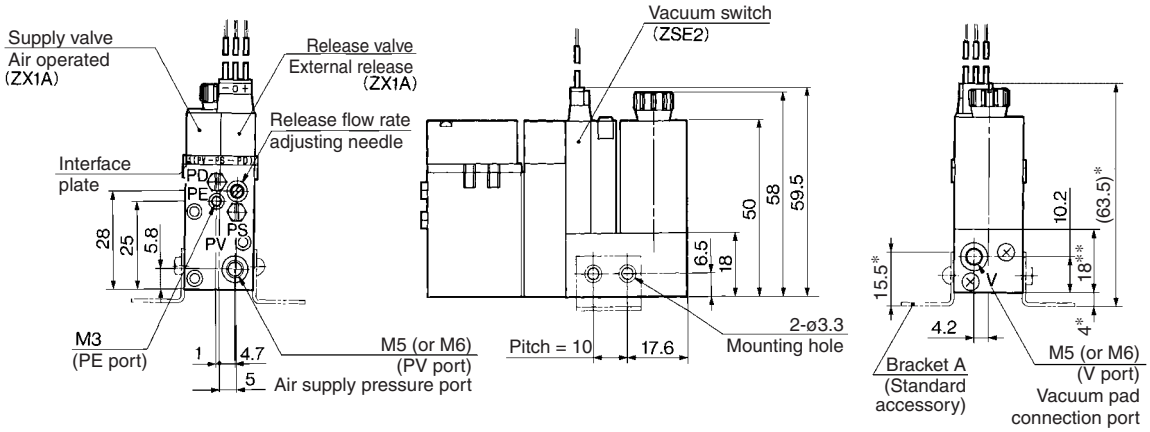
Adsorption confirmation switch (P)



Filter unit (F)

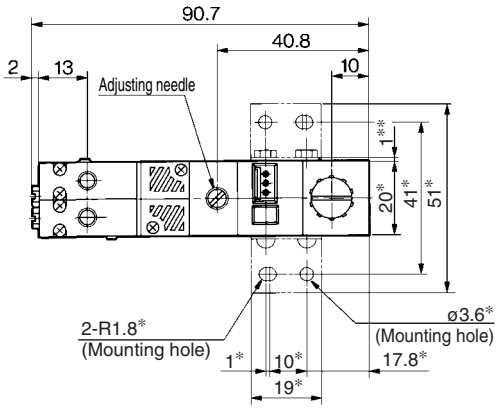


Without switch and filter

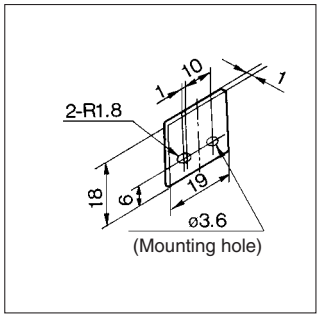


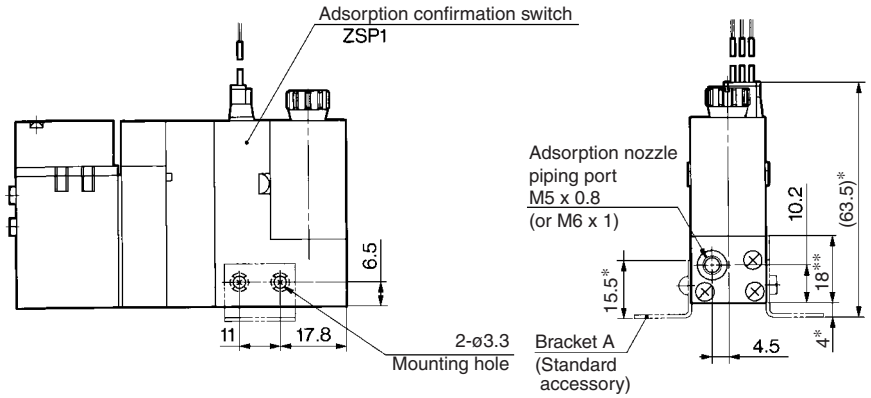
Note) Dimensions ∗: For mounting bracket B ∗∗: For mounting spacer 2.

Adsorption confirmation switch (ZSP1)
ZX1□□□-K6-P□□

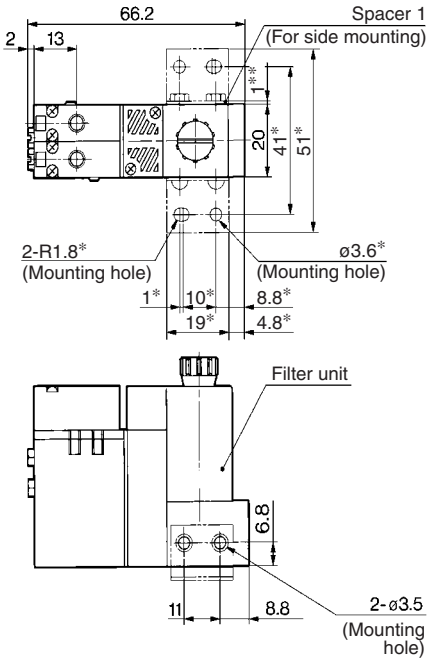


Spacer 1: ZX1-S1

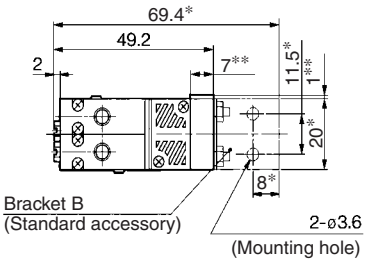


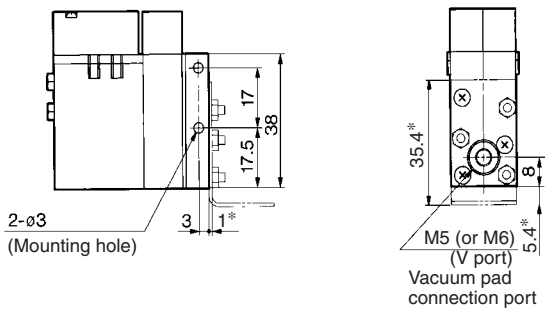


Filter unit (F)
ZX1-□□□-K6-F

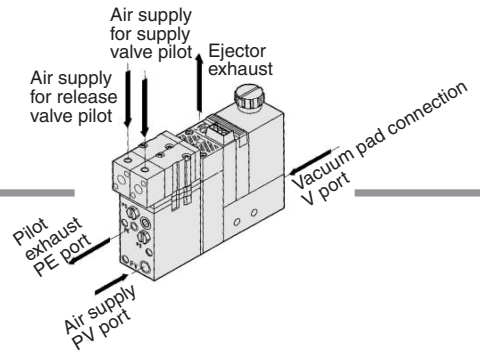


Without switch and filter
ZX1□□□-K6





Valve Unit: Type K8



Configuration and combination

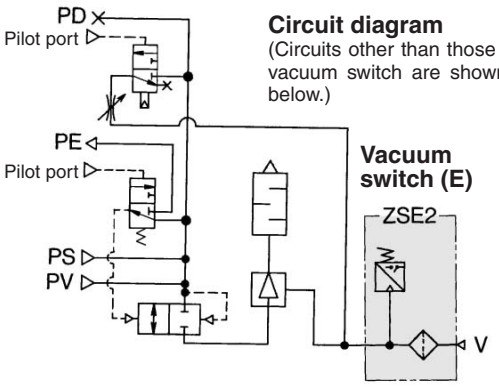
Ejector unit + Valve unit (K8) +

- **Vacuum switch (ZSE2)**
- **Adsorption confirmation switch (ZSP1)**
- **Filter unit (F)**
- **Without switch and filter**

Model

ZX1□□□ — K8 —

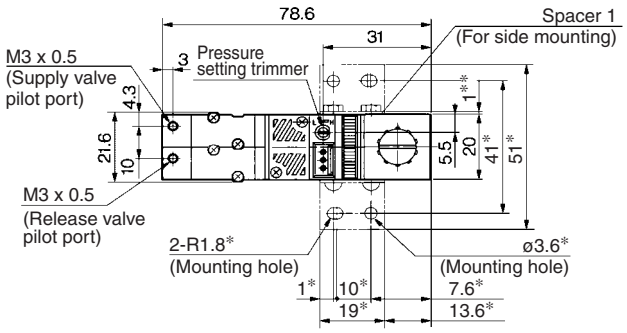
- **E□**
- **P□□**
- **F**
- **Nil**



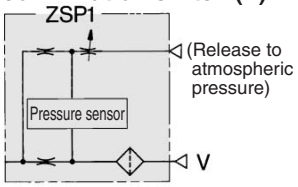
Circuit diagram
(Circuits other than those with vacuum switch are shown as below.)

Vacuum switch (E)

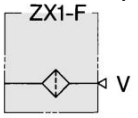
Vacuum switch (ZSE2)
ZX1□□□-K8-E□



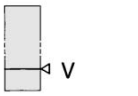
Adsorption confirmation switch (P)

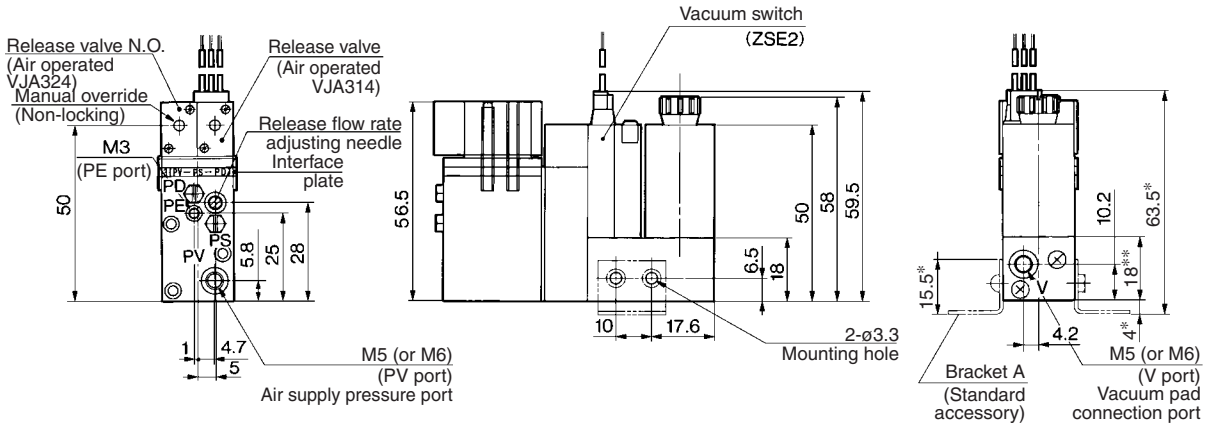


Filter unit (F)



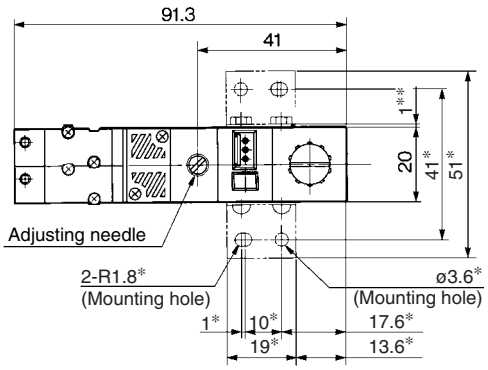
Without switch and filter



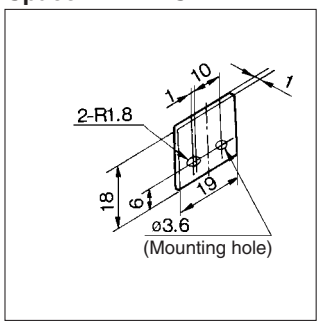


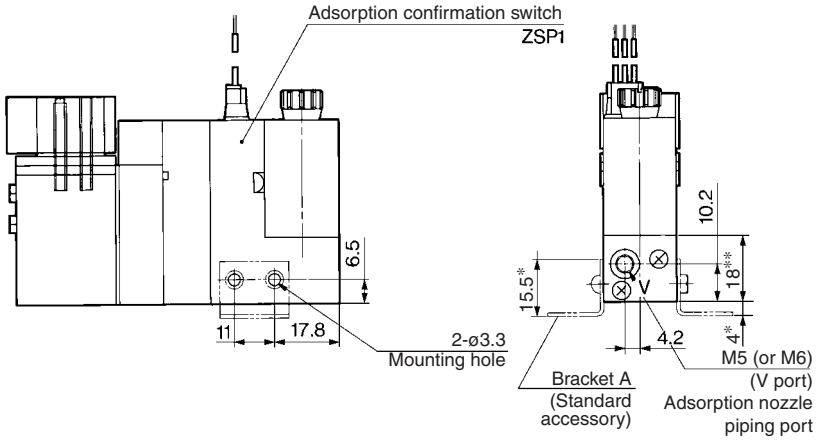
Note) Dimensions ∗: For mounting bracket A ∗∗: For mounting spacer 1.

Adsorption confirmation switch (ZSP1)
ZX1□□□-K8-P□□

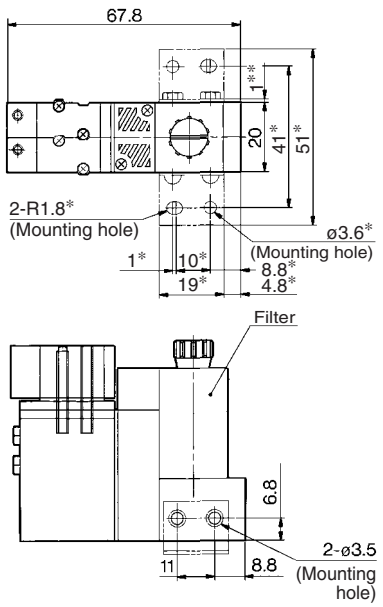


Spacer 1: ZX1-S1

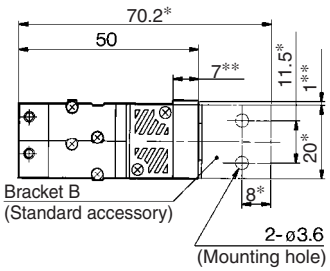


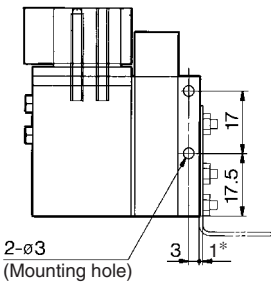


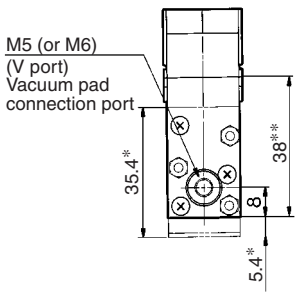
Filter unit (F)
ZX1□□□-K8-F

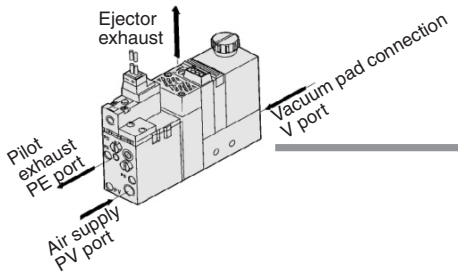


Without switch and filter
ZX1□□□-K8









Valve Unit: Type J1

Configuration and combination

Ejector unit + Valve unit (J1) +

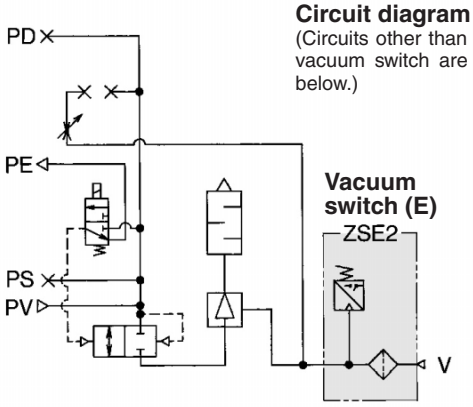
- Vacuum switch (ZSE2)
- Adsorption confirmation switch (ZSP1)
- Filter unit (F)
- Without switch and filter

Model

ZX1□□□ — J1□□□□ —

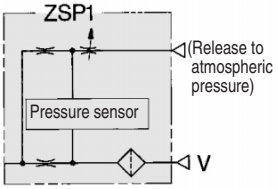
- E□
- P□□
- F
- Nil

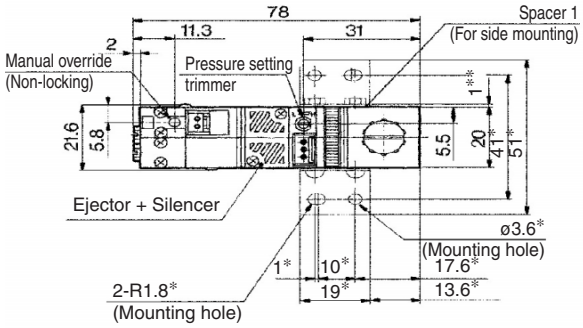
Circuit diagram
(Circuits other than those with vacuum switch are shown as below.)



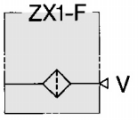
Vacuum switch (ZSE2)
ZX1□□□-J1□□□□-E□

Adsorption confirmation switch (P)

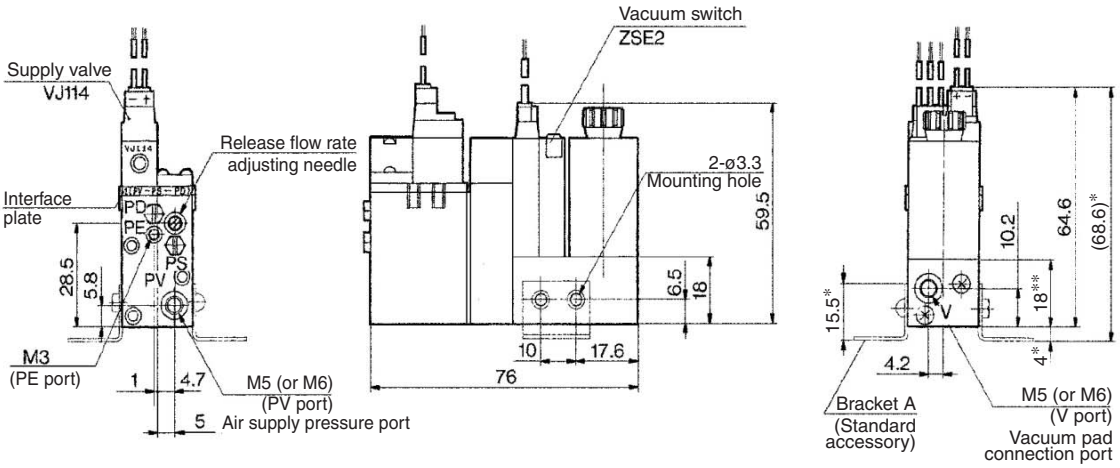




Filter unit (F)



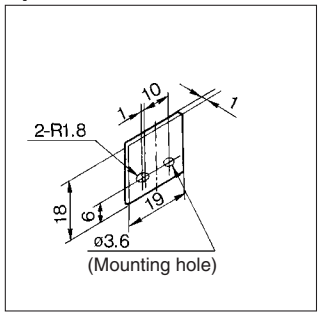
Without switch and filter

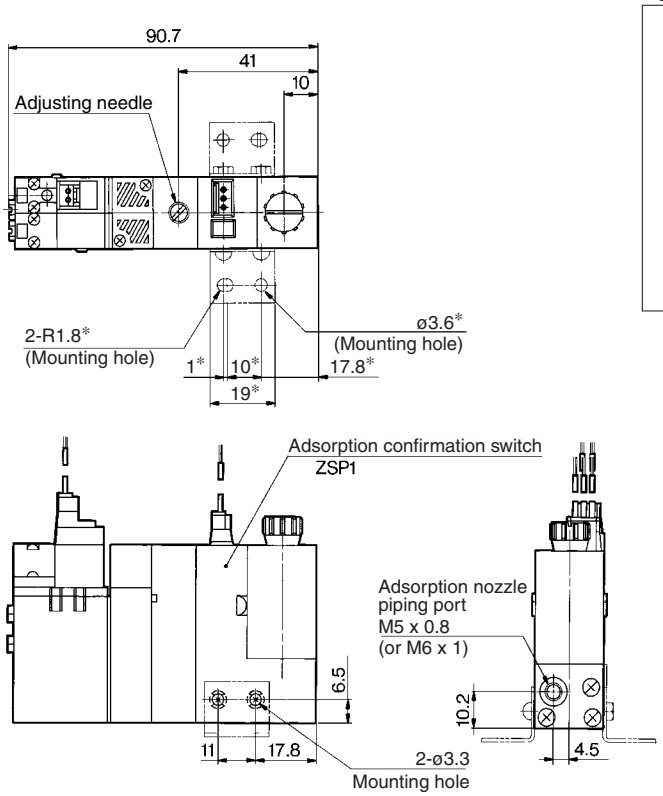


Note) Dimensions ∗: For mounting bracket A ∗∗: For mounting spacer 1.

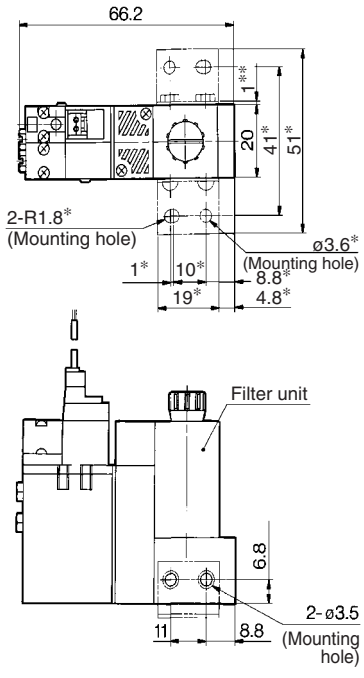
Adsorption confirmation switch (ZSP1)
ZX1□□-J1□□□□-P□□

Spacer 1: ZX1-S1

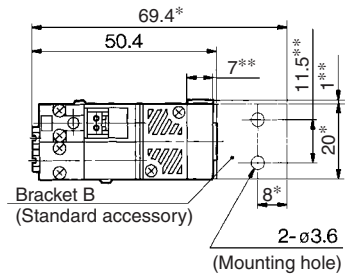


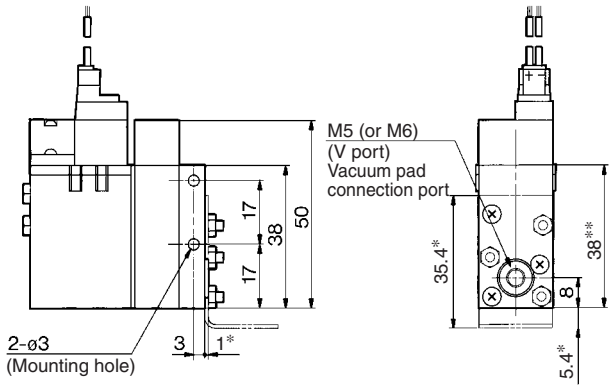


Filter unit (F)
ZX1□□□-J1□□□□-F

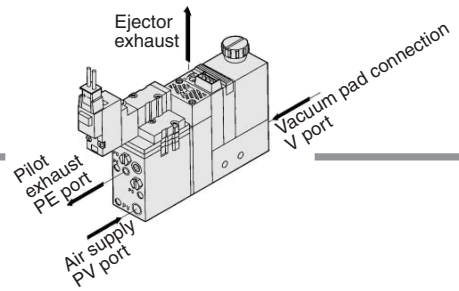


Without switch and filter
ZX1□□□-J1□□□□





Valve Unit: Type J2



Configuration and combination

Ejector unit + Valve unit (J2) +

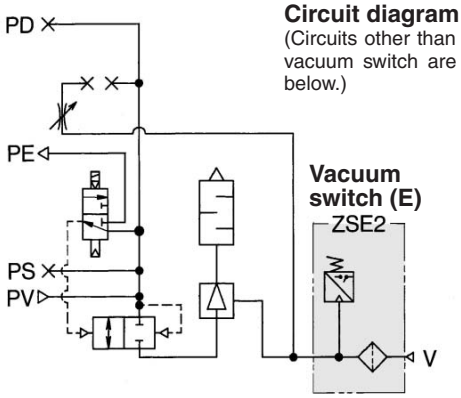
- Vacuum switch (ZSE2)
- Adsorption confirmation switch (ZSP1)
- Filter unit (F)
- Without switch and filter

Model

ZX1□□□ — J2□□□□ —

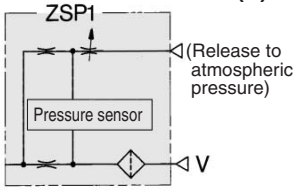
- E□
- P□□
- F
- Nil

Circuit diagram
(Circuits other than those with vacuum switch are shown as below.)

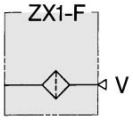


Vacuum switch (ZSE2)
ZX1□□□-J2□□□□-E□

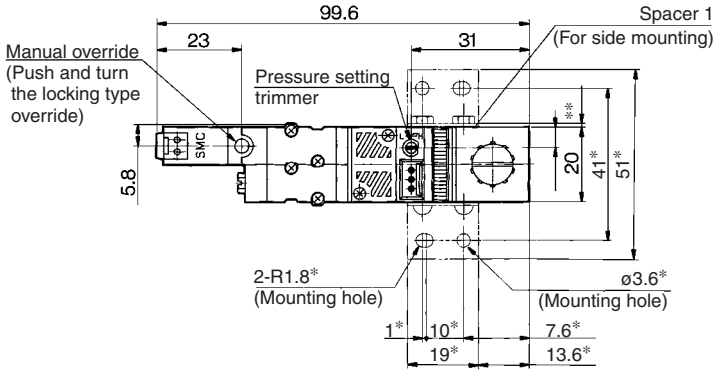
Adsorption confirmation switch (P)

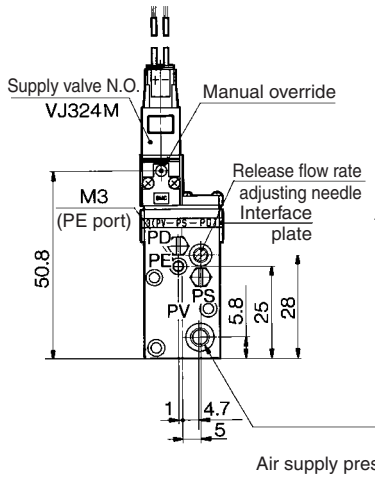


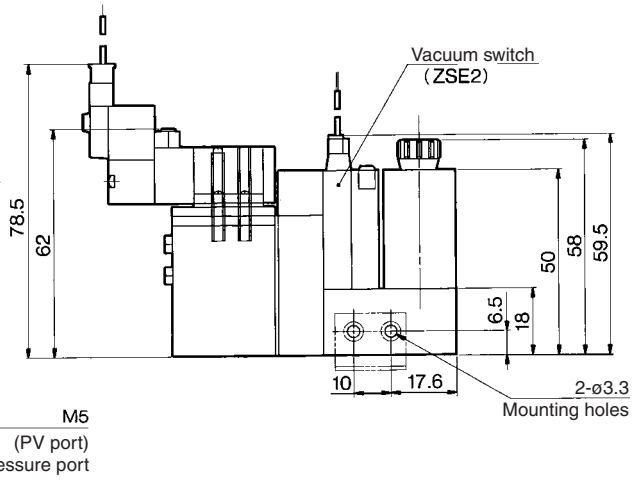
Filter unit (F)

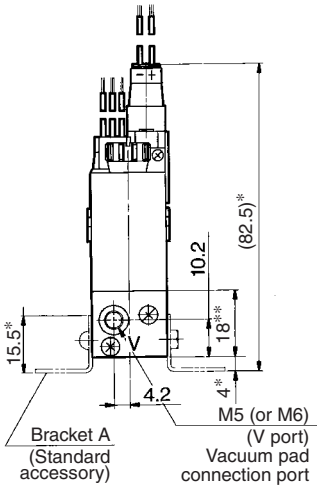


Without switch and filter



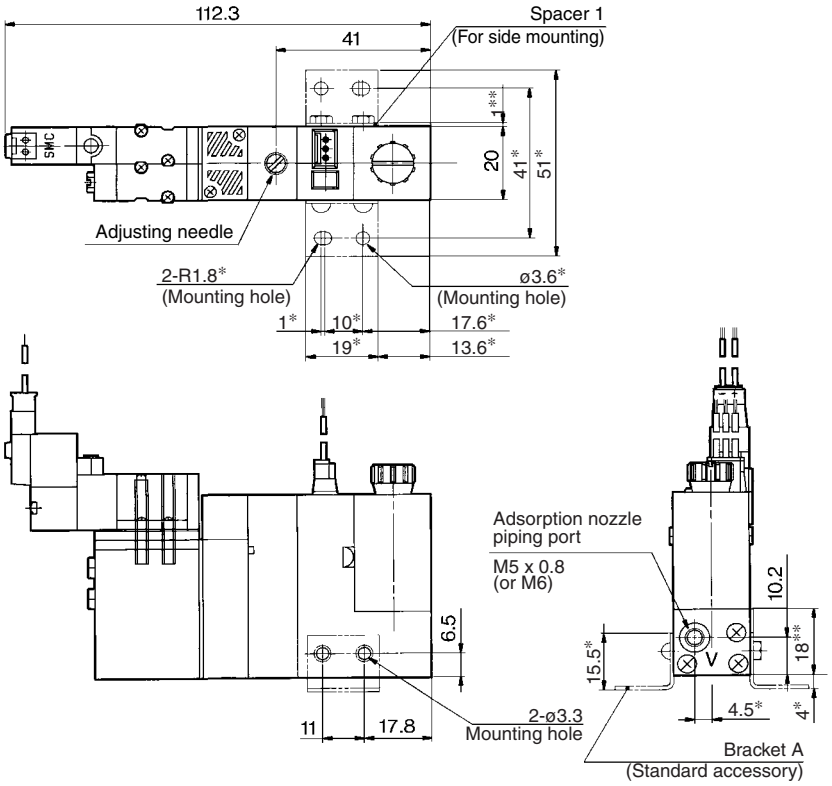




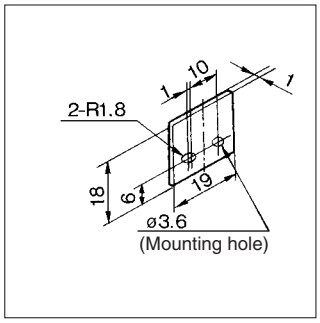


Note) Dimensions ∗: For mounting bracket A ∗∗: For mounting spacer 1.

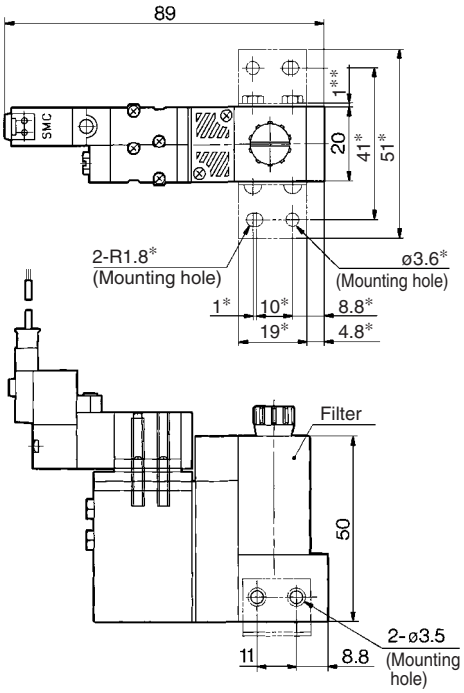
Adsorption confirmation switch (ZSP1)
ZX1□□□-J2□□□□-P□□



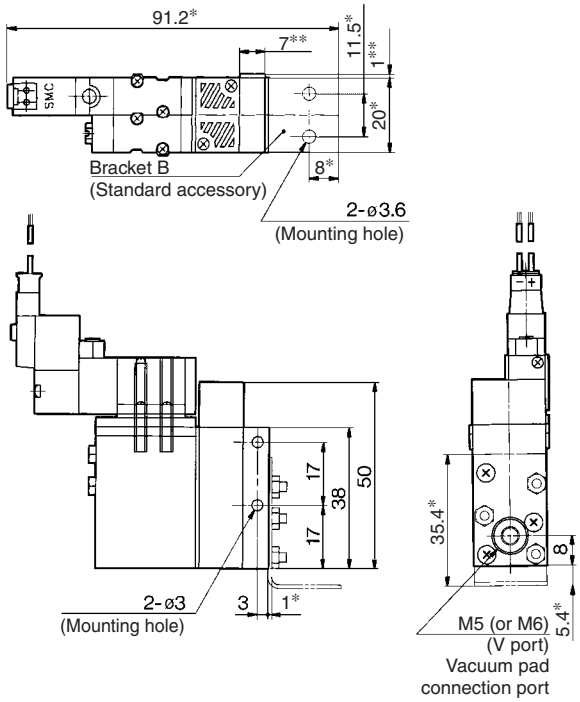
Spacer 1: ZX1-S1



Filter unit (F)
ZX1□□□-J2□□□□-F



Without switch and filter
ZX1□□□-J2□□□□



Made to Order Specifications:

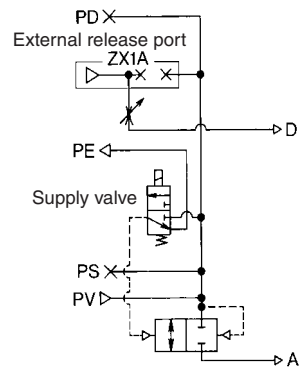
Please consult with SMC for detailed specifications, size and delivery.

1. Valve Unit/Other Combinations of Supply Valve and Release Valve (Ejector unit)

Ejector Unit

If those other than the standard combination of supply valves and release valves (Refer to page 13-2-5.) are required, select from the following combinations. (Refer to page 13-2-4 for "How to Order".)

Combination Symbol: K2



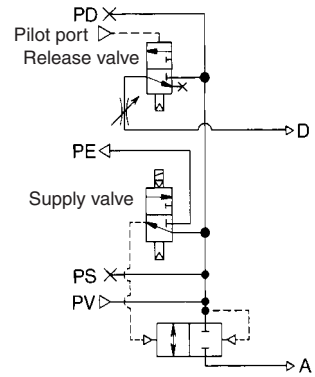
An N.C. solenoid valve is used as the supply valve. Also, an external 2 port valve (vacuum valve) must be provided to serve as the vacuum release valve.

Application: The supply pressure is controlled by electric signals and a vacuum release is effected by external air.

How to Operate

Valve / Condition	Supply valve	Release valve
	Solenoid valve	External 2 port valve
1. Work adsorption	ON	OFF
2. Vacuum release	OFF	ON
3. Operation stop	OFF	OFF

Combination Symbol: K4



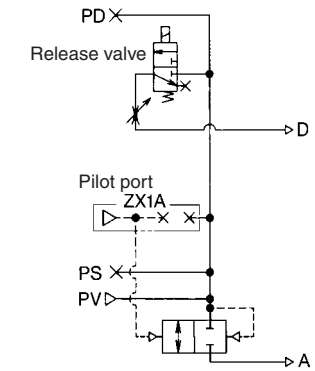
An N.O. solenoid valve is used as the supply valve. An air operated N.C. valve is used for the vacuum release valve.

Application: The supply pressure is restricted by electric signals and a vacuum release is effected by air signals. Because the supply valve is N.O., the pressure that is supplied to the ejector is not interrupted during a power outage; as a result, the state of suction can be maintained. This combination is used for preventing the workpieces from dropping during power outages.

How to Operate

Valve / Condition	Supply valve	Release valve
	Solenoid valve	Air operated valve
1. Work adsorption	OFF	OFF
2. Vacuum release	ON	ON
3. Operation stop	ON	OFF

Combination Symbol: K5



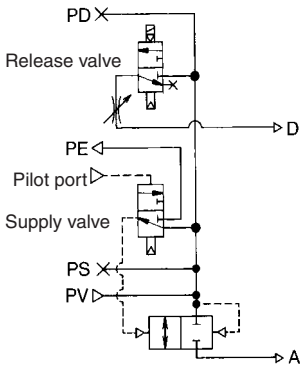
An external 3 port valve must be provided to serve as the supply valve. Also, an N.C. solenoid valve is used for the vacuum release valve.

Application: The supply pressure is controlled by external air signals and a vacuum release is effected by the solenoid valve.

How to Operate

Valve / Condition	Supply valve	Release valve
	External 3 port valve	Solenoid valve
1. Work adsorption	ON	OFF
2. Vacuum release	OFF	ON
3. Operation stop	OFF	OFF

Combination Symbol: K7



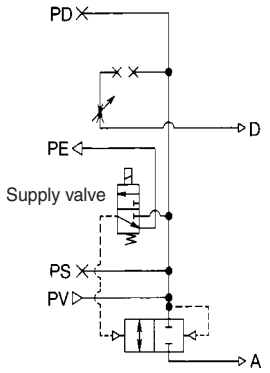
An air operated N.O. valve is used as the supply valve. An N.C. solenoid valve is used for the vacuum release valve.

Application: The supply pressure is controlled by external air signals and a vacuum release is effected by the solenoid valve. Because the supply valve is N.O., the pressure that is supplied to the ejector is not interrupted during a power outage; as a result, the state of suction can be maintained. This combination is used for preventing the workpieces from dropping during power outages.

How to Operate

Valve / Condition	Supply valve	Release valve
	Air operated valve	Solenoid valve
1. Work adsorption	OFF	OFF
2. Vacuum release	ON	ON
3. Operation stop	ON	OFF

Combination Symbol: J1



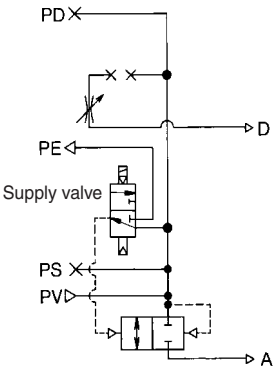
An N.C. solenoid valve is used as the supply valve. A vacuum release valve is not used.

Application: This combination is used for effecting control in accordance with electric signals. A vacuum release is effected by the intrusion of air between the silencer, pad, and the workpiece. This combination is used when there is no need to accelerate the vacuum release speed.

How to Operate

Valve / Condition	Supply valve	Release valve
	Solenoid valve	—
1. Work adsorption	ON	—
2. Vacuum release	OFF	—
3. Operation stop	OFF	—

Combination Symbol: J2



An N.O. solenoid valve is used as the supply valve. A vacuum release valve is not used.

Application: It is used for controlling the supply pressure through electric signals. Because the supply valve is N.O., the pressure that is supplied to the ejector is not interrupted during a power outage; as a result, the state of suction can be maintained. This is used for preventing the workpieces from dropping during power outages. A vacuum release is effected by the intrusion of air between the silencer, pad, and the workpiece. This combination is used when there is no need to accelerate the vacuum release speed.

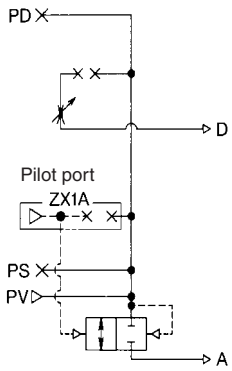
How to Operate

Valve / Condition	Supply valve	Release valve
	Solenoid valve	—
1. Work adsorption	OFF	—
2. Vacuum release	ON	—
3. Operation stop	ON	—

Made to Order Specifications:

Please consult with SMC for detailed specifications, size and delivery.

Combination Symbol: J3



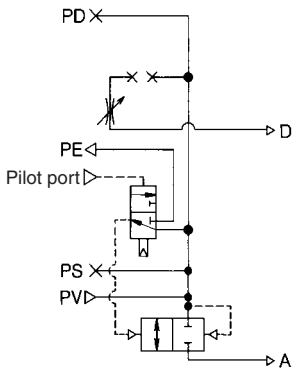
An N.C. solenoid valve is used as the supply valve. A vacuum release valve is not used.

Application: The supply pressure is controlled by external air signals. A vacuum release is effected by the intrusion of air between the silencer, pad, and the workpiece. This is used when there is no need to accelerate the vacuum release speed.

How to Operate

Valve / Condition	Supply valve	Release valve
	External 3 port valve	—
1. Work adsorption	ON	—
2. Vacuum release	OFF	—
3. Operation stop	OFF	—

Combination Symbol: J4



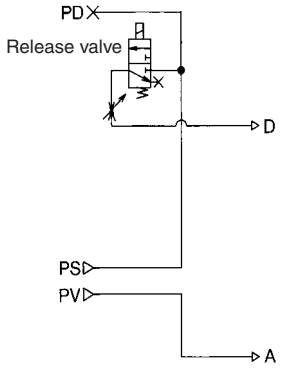
An air operated N.O. valve is used as the supply valve. A vacuum release valve is not used.

Application: The supply pressure is controlled by external air signals. Because the supply valve is N.O., the pressure that is supplied to the ejector is not interrupted during a power outage; as a result, the state of suction can be maintained. This is used for preventing the workpieces from dropping during power outages. A vacuum release is effected by the intrusion of air between the silencer, pad, and the workpiece. This type is used when there is no need to accelerate the vacuum release speed.

How to Operate

Valve / Condition	Supply valve	Release valve
	Air operated valve	—
1. Work adsorption	OFF	—
2. Vacuum release	ON	—
3. Operation stop	OFF	—

Combination Symbol: D1



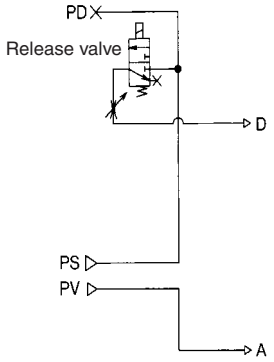
An N.C. solenoid valve is used for the vacuum release valve. An external supply valve must be provided.

Application: The supply pressure is controlled by the external valve and a vacuum release is effected by the solenoid valve.

How to Operate

Valve / Condition	Supply valve	Release valve
	External valve	Solenoid valve
1. Work adsorption	ON	OFF
2. Vacuum release	OFF	ON
3. Operation stop	OFF	OFF

Combination Symbol: D2



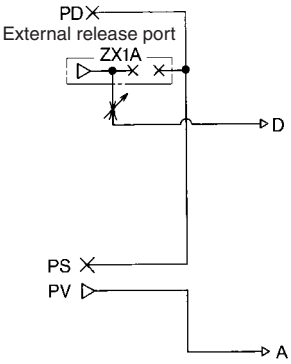
An N.C. solenoid valve is used for the vacuum release valve. An external supply valve must be provided.

Application: The supply pressure is controlled by the external valve and a vacuum release is effected by the solenoid valve.

How to Operate

Valve / Condition	Supply valve	Release valve
	External valve	Solenoid valve
1. Work adsorption	ON	OFF
2. Vacuum release	OFF	ON
3. Operation stop	OFF	OFF

Combination Symbol: D3



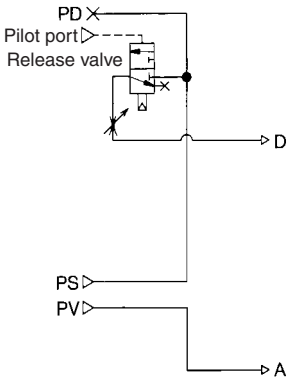
An external valve must be provided to serve as the supply valve. Also, an external 2 port valve (vacuum valve) must be provided to serve as the vacuum release valve.

Application: The supply pressure is controlled by the external valve and a vacuum release is effected by the external 2 port valve (vacuum valve).

How to Operate

Valve / Condition	Supply valve	Release valve
	External valve	Solenoid valve
1. Work adsorption	ON	OFF
2. Vacuum release	OFF	ON
3. Operation stop	OFF	OFF

Combination Symbol: D4



An external valve must be provided to serve as the supply valve. An air operated N.C. valve is used for the vacuum release valve.

Application: The supply pressure is controlled by the external valve and a vacuum release is effected by external air signals.

How to Operate

Valve / Condition	Supply valve	Release valve
	External valve	Air operated valve
1. Work adsorption	ON	OFF
2. Vacuum release	OFF	ON
3. Operation stop	OFF	OFF

Made to Order Specifications:

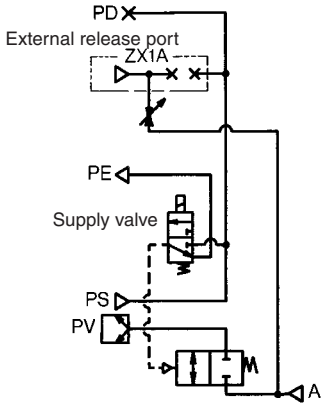
Please consult with SMC for detailed specifications, size and delivery.

1. Valve Unit/Other Combinations of Supply Valve and Release Valve (Vacuum pump system)

Vacuum Pump System

If those other than the standard combination of supply valves (Refer to page 13-2-41.) and release valves are required, select from the following combinations. (Refer to page 13-2-40 for "How to Order".)

Combination Symbol: K2



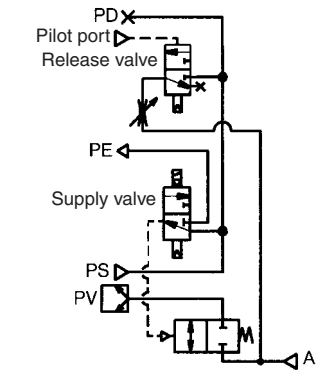
An N.C. solenoid valve is used as the supply valve. Also, an external 2 port valve (vacuum valve) must be provided to serve as the vacuum release valve.

Application: The supply pressure is controlled by electric signals and a vacuum release is effected by external air.

How to Operate

Valve / Condition	Supply valve	Release valve
	Solenoid valve	External 2 port valve
1. Work adsorption	ON	OFF
2. Vacuum release	OFF	ON
3. Operation stop	OFF	OFF

Combination Symbol: K4



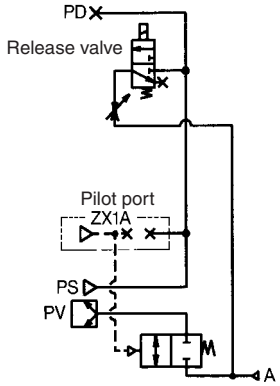
An N.O. solenoid valve is used as the supply valve. An air operated N.C. valve is used for the vacuum release valve.

Application: The supply pressure is controlled by electric signals and a vacuum release is effected by air signals. Because the supply valve is N.O., the pressure that is supplied to the ejector is not interrupted during a power outage; as a result, the state of suction can be maintained. This combination is used for preventing the workpieces from dropping during power outages.

How to Operate

Valve / Condition	Supply valve	Release valve
	Solenoid valve	Solenoid valve
1. Work adsorption	OFF	OFF
2. Vacuum release	ON	ON
3. Operation stop	ON	ON

Combination Symbol: K5



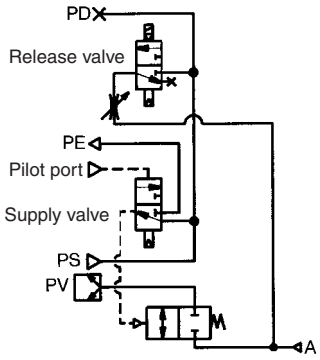
An external 3 port valve must be provided to serve as the supply valve. Also, an N.C. solenoid valve is used for the vacuum release valve.

Application: The supply pressure is controlled by external air signals and a vacuum release is effected by the solenoid valve.

How to Operate

Valve / Condition	Supply valve	Release valve
	External 3 port valve	Solenoid valve
1. Work adsorption	ON	OFF
2. Vacuum release	OFF	ON
3. Operation stop	OFF	OFF

Combination Symbol: K7



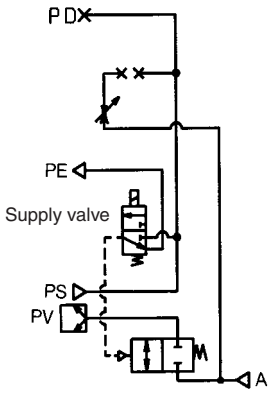
An air operated N.O. valve is used as the supply valve. An N.C. solenoid valve is used for the vacuum release valve.

Application: The supply pressure is controlled by external air signals and a vacuum release is effected by the solenoid valve. Because the supply valve is the N.O., the pressure that is supplied to the ejector is not interrupted during a power outage; as a result, the state of suction can be maintained. This combination is used for preventing the workpieces from dropping during power outages.

How to Operate

Valve / Condition	Supply valve	Release valve
	Air operated valve	Solenoid valve
1. Work adsorption	OFF	OFF
2. Vacuum release	ON	ON
3. Operation stop	ON	OFF

Combination Symbol: J1



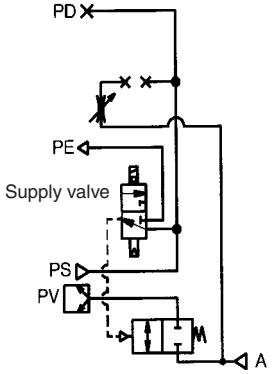
An N.C. solenoid valve is used as the supply valve. A vacuum release valve is not used.

Application: This combination is used for controlling the pressure by electric signals. Normally, the workpiece is released due to the air leakage that occurs between the pad and the workpiece. However, if there is no air leakage, the workpiece will not become detached because the vacuum state is maintained even when the supply valve is turned OFF. To effect releasing, an external 2 port valve (vacuum valve) must be provided.

How to Operate

Valve / Condition	Supply valve	Release valve
	Solenoid valve	———
1. Work adsorption	ON	———
2. Vacuum release	OFF	———
3. Operation stop	OFF	———

Combination Symbol: J2



An N.O. solenoid valve is used as the supply valve. A vacuum release valve is not used.

Application: Used for controlling with electric signals. Because the supply N.O., the pressure is not interrupted during a power outage. This prevents the workpieces from dropping. Normally, the workpiece is released due to leakage. However, if no air leakage, the workpiece will not detach because the vacuum state is maintained even when the supply valve is turned ON. To release, an external 2 port valve (vacuum valve) must be used.

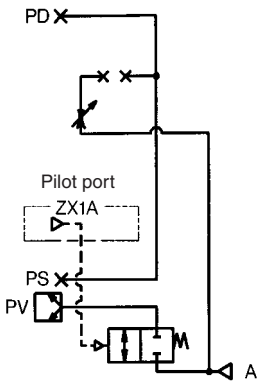
How to Operate

Valve / Condition	Supply valve	Release valve
	Solenoid valve	———
1. Work adsorption	OFF	———
2. Vacuum release	ON	———
3. Operation stop	ON	———

Made to Order Specifications:

Please consult with SMC for detailed specifications, size and delivery.

Combination Symbol: J3



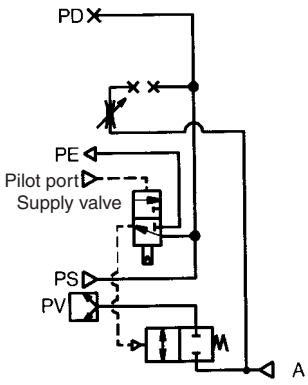
An N.C. solenoid valve is used as the supply valve. A vacuum release valve is not used.

Application: The supply pressure is controlled by external air signals. Normally, the workpiece is released due to the air leakage that occurs between the pad and the workpiece. However, if there is no air leakage, the workpiece will not become detached because the vacuum state is maintained even when the supply valve is turned OFF. To effect releasing, an external 2 port valve (vacuum valve) must be provided.

How to Operate

Valve / Condition	Supply valve	Release valve
	External 3 port valve	———
1. Work adsorption	ON	———
2. Vacuum release	OFF	———
3. Operation stop	OFF	———

Combination Symbol: J4



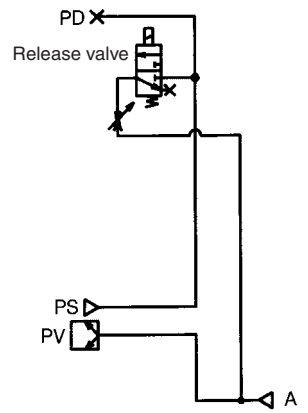
An air operated N.O. valve is used as the supply valve. A vacuum release valve is not used.

Application: Supply is controlled by external air signals. Because the valve is N.O., the pressure is not interrupted during a power outage. This prevents the workpieces from dropping. Normally, the workpiece is released due to leakage. However, if no leakage, the workpiece will not detach because the vacuum state is maintained even when the valve is turned ON. To release, an external 2 port valve (vacuum valve) must be provided.

How to Operate

Valve / Condition	Supply valve	Release valve
	Air operated valve	———
1. Work adsorption	OFF	———
2. Vacuum release	ON	———
3. Operation stop	ON	———

Combination Symbol: D1



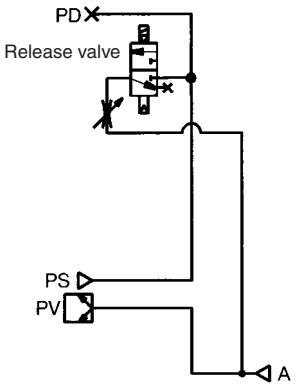
An N.C. solenoid valve is used as the vacuum release valve. A supply valve is not used.

Application: The supply pressure is controlled by an external 2 port valve (vacuum valve) and a vacuum release is effected by the solenoid.

How to Operate

Valve / Condition	Supply valve	Release valve
	External 2 port valve	Solenoid valve
1. Work adsorption	ON	OFF
2. Vacuum release	OFF	ON
3. Operation stop	OFF	OFF

Combination Symbol: D2



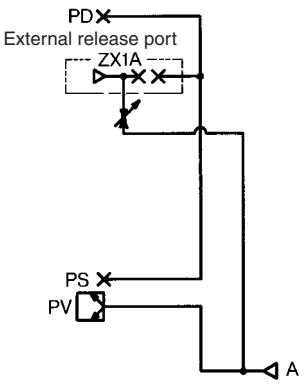
An N.C. solenoid valve is used as the vacuum release valve. A supply valve is not used.

Application: The supply pressure is controlled by an external 2 port valve (vacuum valve) and a vacuum release is effected by the solenoid.

How to Operate

Valve / Condition	Supply valve	Release valve
	External 2 port valve	Solenoid valve
1. Work adsorption	ON	OFF
2. Vacuum release	OFF	ON
3. Operation stop	OFF	OFF

Combination Symbol: D3



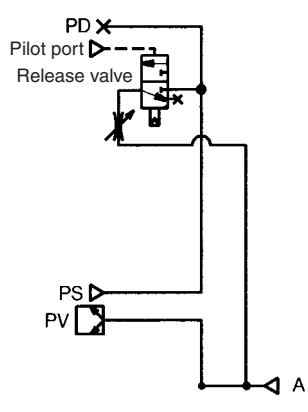
An external 2 port valve (vacuum valve) must be provided to serve as the supply valve and the vacuum release valve.

Application: The supply pressure is controlled by the external 2 port valve (vacuum valve) and releasing is also effected by the external 2 port valve.

How to Operate

Valve / Condition	Supply valve	Release valve
	External 2 port valve	Solenoid valve
1. Work adsorption	ON	OFF
2. Vacuum release	OFF	ON
3. Operation stop	OFF	OFF

Combination Symbol: D4



An external 2 port valve (vacuum valve) must be provided to serve as the supply valve. An air operated N.C. valve is used for the vacuum release valve.

Application: The supply pressure is controlled by the external 2 port valve (vacuum valve) and vacuum release is effected by external air signals.

How to Operate

Valve / Condition	Supply valve	Release valve
	External 2 port valve	Solenoid valve
1. Work adsorption	ON	OFF
2. Vacuum release	OFF	ON
3. Operation stop	OFF	OFF

Made to Order Specifications:

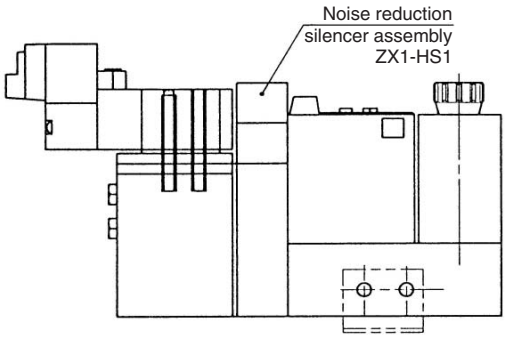
Please consult SMC for detailed specifications, size and delivery.

1. Noise Reduction Silencer Assembly/The ejector exhaust style is applicable to the silencer equipped specifications.

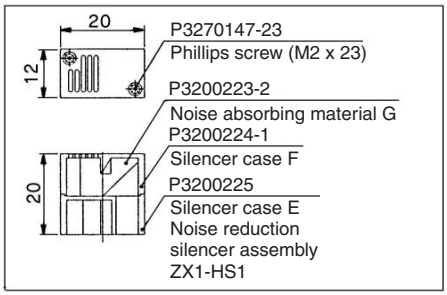
ZX1	Nozzle diameter	Exhaust style	—	Valve	Voltage	Electrical entry	–X121

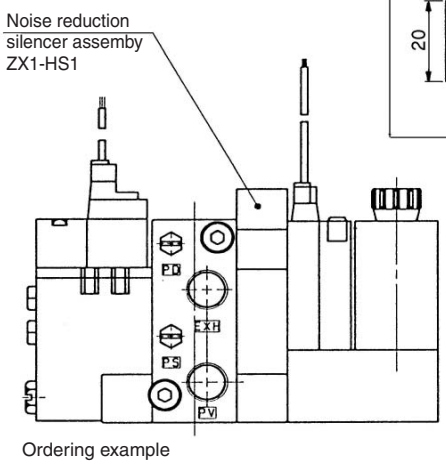
Noise reduction silencer assembly

Reduction in the exhaust noise from the ejector (Silencing effect 8 dB (A) Standard silencer assembly comparison)



Ordering example
ZX1101-K35LZ-D23C-X121





Ordering example

* ZZX102-R		1 pc.
ZX1101-K35LZ-EC-X121		2 pcs.