

Vacuum Ejector

Series ZM

All in One!

- Built-in suction filter silencer
- Air supply valve for generating a vacuum
- Vacuum release valve (equipped with a flow volume adjustment valve)
- Vacuum pressure switch (solid state, diaphragm)

Adaptable for a manifold application

All tubing, wiring, indicators, and adjustment functions have been eliminated from the side surfaces, thus enabling assembly and maintenance while linked to a manifold.

- EXH system — Common
- SUP system — Common, Individual

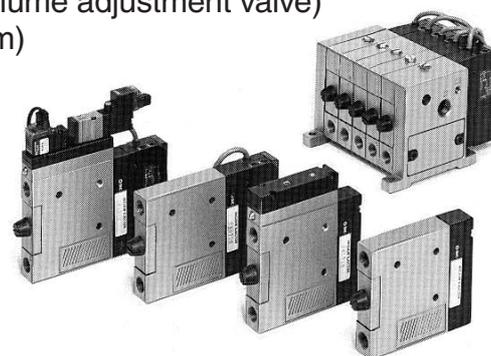
Maximum air suction volume increased by 40% Maximum vacuum pressure –84 kPa

The suction volume has been increased by 40% through the adoption of a two-stage nozzle construction.

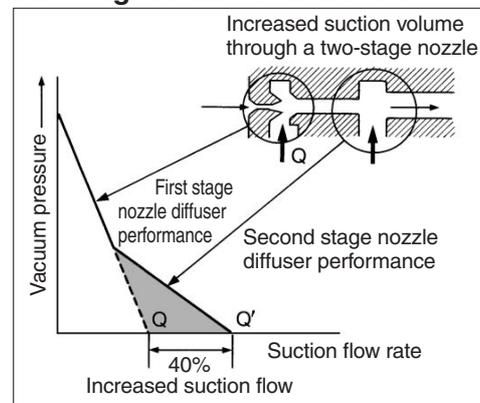
Compact and lightweight

15.5 mm width, 400 g (full system)

Air operated

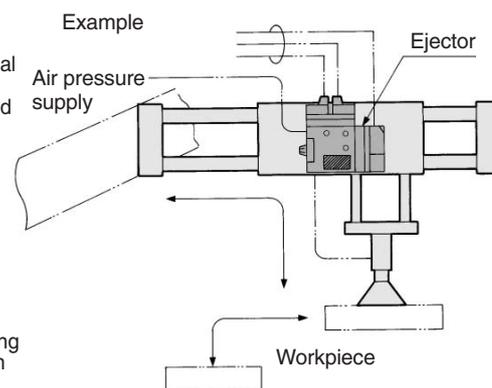


Two-stage Nozzle Construction



Series ZM Application

Field of application	Semiconductor and electrical, automobile assembly, food and medical equipment, and various types of manufacturing and assembly equipment
Type of machine	Robotics for material handling, automatic assembly equipment, automatic transfer equipment, pick & place, and printing equipment
Function	Vacuum picking and transferring, vacuum picking and securing, and vacuum air flow



- ZX
- ZR
- ZM**
- ZH
- ZU
- ZL
- ZY
- ZQ
- ZF
- ZP
- ZCU
- AMJ
- Misc.

Vacuum Ejector With Valve and Switch Series ZM

How to Order

Supply valve, Release valve

With valve

Without valve

ZM 07 1 S A H K 5 LZ E15 L

ZM 07 2 H K 5 LZ E15 L

Nozzle diameter

05	0.5 mm
07	0.7 mm
10	1.0 mm
13	1.3 mm

Body style

Valve	Symbol	Application
With valve	1	For single unit
With valve	3	For manifold, common SUP
With valve	5	For manifold, individual SUP
Without valve	2	For single unit
Without valve	4	For manifold, common SUP
Without valve	6	For manifold, individual SUP

Silencer*

Nil	Standard type
S	High noise reduction type

* Silencer is applicable to single unit style.

Vacuum port location

Nil	Side/Bottom entry
A	Side entry

Standard supply pressure

H	0.5 MPa
M	0.35 MPa (Except nozzle diameter "05" type)

Thread type

Nil	Rc
T	NPTF
F	G

Supply valve/Release valve combination

J	Supply valve
K	Supply valve and release valve
A	Supply valve (N.O.)
B	Supply valve (N.O.) and release valve

Pilot valve

Nil	DC: 1 W (With indicator light: 1.5 W)
Y*	AC DC: 0.45 W (With indicator light: 0.5 W)

Rated 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

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

Vacuum switch electrical entry

Nil	Grommet type, with 0.6 m lead wire	Solid state: ZSE1
L	Grommet type, with 3 m lead wire	
C	Connector type, with 0.6 m lead wire	
CL	Connector type, with 3 m lead wire	Diaphragm: ZSM1
CN	Connector type, without connector	
Nil	Grommet type, with 0.5 m lead wire	Diaphragm: ZSM1
L	Grommet type, with 3 m lead wire	

Vacuum switch model

Nil	Without switch	Solid state (12 to 24 VDC)
E14	1 point setting/without analog output/3 rotation setting	
E15	1 point setting/without analog output/200 degrees setting	
E16	2 point setting/without analog output/3 rotation setting	
E17	2 point setting/without analog output /200 degrees setting	
E18	1 point setting/analog output/3 rotation setting	
E19	1 point setting/analog output/200 degrees setting	
M15	1 point setting/without analog output/Diaphragm (18 rotation setting)/Solid state(10 to 26 VDC)	
M21	1 point setting/without analog output/Diaphragm (18 rotation setting)/Reed (100 VAC)	
Manual override		
Nil	Non-locking push type	
B	Locking slotted type	

Electrical entry

G	Grommet type, with 0.3 m lead wire (applicable to DC)
L	L plug connector, with 0.3 m lead wire
LZ	L plug connector, with 0.3 m lead wire, with light/surge voltage suppressor
LN	L plug connector, without lead wire (applicable to DC)
LO	L plug connector, without connector

* Refer to page 13-4-4 for air operated style.

Table (1) How to Order Connector for Solid State Switch

• Without lead wire (A connector and 4 sockets) **ZS - 20 - AA**

• With lead wire **ZS - 20 - 5A** 

Note) If ordering switch with 5 m lead wire, specify both switch and lead wire with connector part numbers.

Ex.) ZM□□□-E15CN 1 pc.
ZS-20-5A-50 1 pc.

Lead wire length	
Nil	0.6 m
30	3 m
50	5 m

Table (2) How to Order Connector for Supply Valve and Vacuum Release Valve

VJ10 - 36 - 1A  (Applicable to 100 VAC only)

VJ10 - 36 - 3A  (Applicable to 110 VAC only)

VJ10 - 20 - 4A  (Applicable to DC only)

Lead wire length	
Nil	300 mm
6	600 mm
10	1000 mm
15	1500 mm
20	2000 mm
25	2500 mm
30	3000 mm

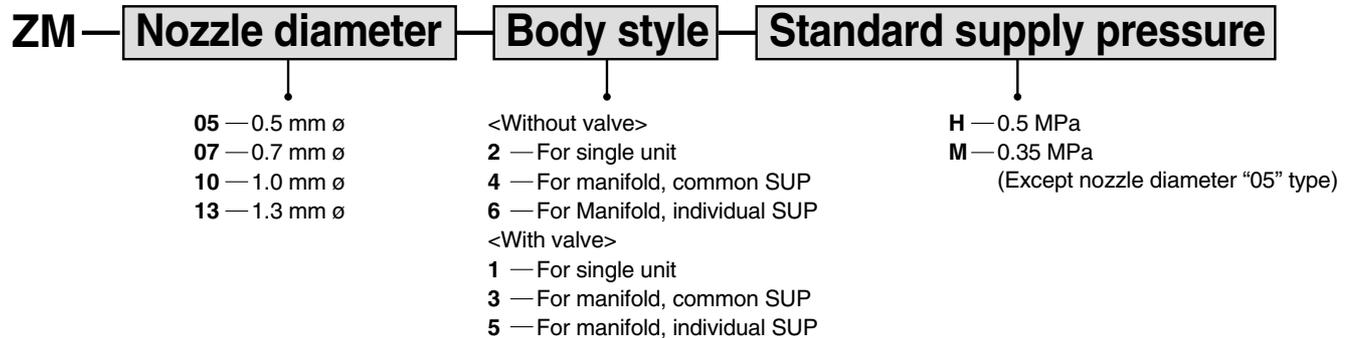
Note) If ordering a valve with 600 mm or longer lead wire, indicate the valve without connector and connector assembly.

Ex.) Lead wire length: 1000 mm
ZM□□□-K1LO 1 pc.
*VJ10-36-1A-10 2 pcs.

⚠ Caution

When using AC, 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.

How to Order



Quick Delivery/Model

<p><Without valve/Single unit></p> <ul style="list-style-type: none"> • ZM052H • ZM072H • ZM102H • ZM132H 	<p><With valve/Single unit></p> <ul style="list-style-type: none"> • ZM051H-K5LZ • ZM051H-K5LZ-E15 • ZM071H-K5LZ • ZM071H-K5LZ-E15 • ZM101H-K5LZ • ZM101H-K5LZ-E15 • ZM131H-K5LZ • ZM131H-K5LZ-E15 • ZM131M-K5LZ • ZM131M-K5LZ-E15
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- ZX
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Series ZM

All in One!

- Built-in suction filter and silencer
- Air supply valve for generating a vacuum
- Vacuum release valve (equipped with a flow volume adjustment valve)
- Vacuum pressure switch (solid state, diaphragm)

Adaptable for a manifold application

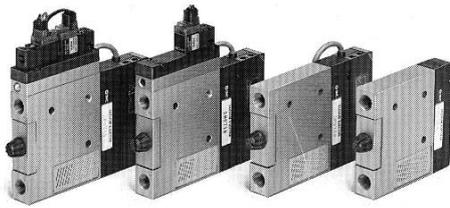
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- EXH system — Common
- SUP system — Common, Individual

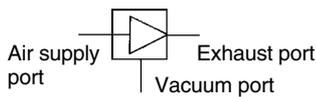
Maximum air suction volume increased by 40% Maximum vacuum pressure –84 kPa (–630 mmHg)

The suction volume has been increased by 40% through the adoption of a two-stage nozzle construction.

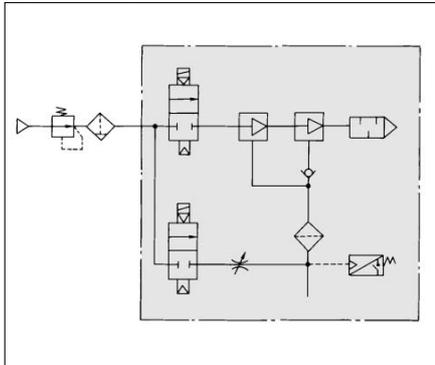
Compact and lightweight 15.5 mm width, 400 g (full system)



JIS Symbol



Ejector System Circuit



Made to Order P. 13-4-17 to 13-4-19

Model

Nozzle dia. ϕ (mm)	Model	Standard supply pressure		Maximum suction flow rate (ℓ /min (ANR))	Air consumption (ℓ /min (ANR))
		H	M		
0.5	ZM05□H	0.5 MPa	—	18	12
0.7	ZM07□H			24	23
1.0	ZM10□H			36	46
1.3	ZM13□H			40	95
0.7	ZM07□M	—	0.35 MPa	20	16
1.0	ZM10□M			26	32
1.3	ZM13□M			36	70

Vacuum Ejector Specifications

Fluid	Air	
Maximum operating pressure	0.7 MPa	
Maximum vacuum pressure	– 84 kPa	
Supply pressure range	Without valve	0.2 to 0.55 MPa
	With valve	0.25 to 0.55 MPa
Operating temperature range	Without valve	5 to 60 °C
	With valve	5 to 50 °C
Air supply valve	Main valve — Poppet	
Vacuum release valve	Pilot valve — VJ114, VJ324M	
Vacuum pressure switch	Electronic	ZSE1-00-□□□
	Diaphragm	ZSM1-0□□□
Suction filter	30 μ m PE (Polyethylene)	

Valve Specifications

How to operate	Pilot type
Main valve	NBR poppet
Effective area	3 mm ²
Cv factor	0.17
Operating pressure range	0.25 to 0.7 MPa
Electrical entry	Plug connector, Grommet (available on DC)
Max. operating frequency	5Hz
Voltage	24/12/6/5/3 VDC, 100/110 VAC (50/60 Hz)
Power consumption	DC: 1 W (With light: 1.2 W), 100 VAC: 1.4 W (1.45 W), 110 VAC: 1.45 W (1.5 W)

Air Operated Valve Specifications

Refer to page 13-4-11 for dimensions.



Specifications

Applicable nozzle size (mm)	ϕ 0.5, ϕ 0.7, ϕ 1.0, ϕ 1.3
Components	P Supply valve
	Q Supply valve and release valve
Port size	M3 x 0.5 M5 x 0.8
Main valve	N.C.

ZM 05¹³5 H-Q

Nozzle diameter

05	0.5 mm
07	0.7 mm
10	1.0 mm
13	1.3 mm

Port size connection

3	M3 x 0.5
5	M5 x 0.8

Supply pressure

H	0.5 MPa
M*	0.35 MPa

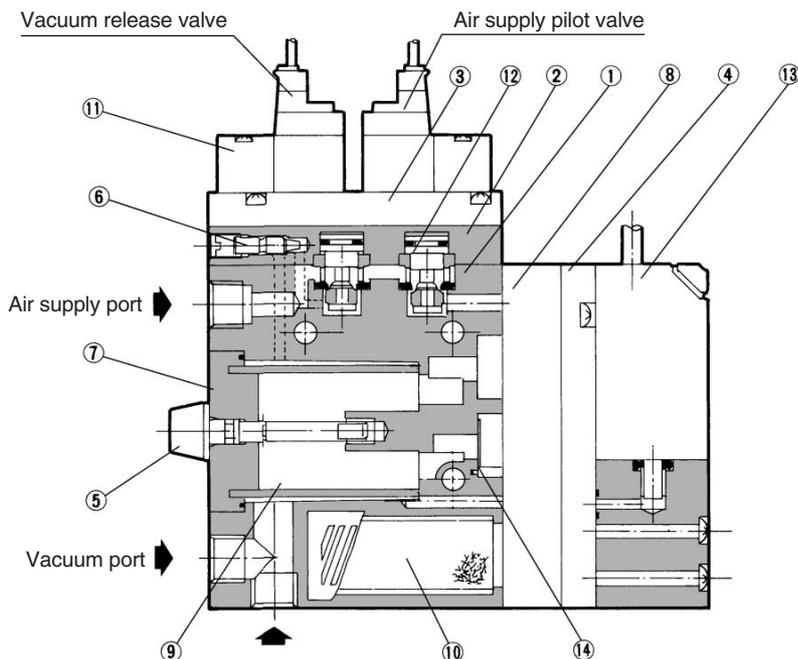
* Except nozzle diameter "05" type

Air operated valve

P	Supply valve
Q	Supply valve and release valve

Note) Switch mounted style is also available.

Construction: LZM□1□-K□L-E□



⚠ 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 in this catalog**, and refer to page 13-1-5 for **Precautions on every series.**

⚠ Caution

Operation of an ejector equipped with a valve

When the air supply pilot valve is turned ON, air flows to the diffuser assembly, and a vacuum is created.

When the pilot valve for releasing the vacuum is turned ON, air flows to the vacuum port side, immediately causing a release in the vacuum. The release speed can be adjusted by regulating the flow volume adjustment screw.

When the supply valve is turned OFF, the atmospheric pressure causes the air to flow back from the silencer, thus releasing the vacuum. However, in order to properly release a vacuum, a vacuum release valve must be used.

Operating environment

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

Furthermore, avoid use in direct sunlight.

Matching of the ejector to the vacuum circuit

For precautions associated with matching of the ejector to the vacuum circuit, refer to the technical data on page 13-1-10 to 13-1-19.

Component Parts

No.	Description	Material	Note
①	Body	Aluminum die-casted	
②	Valve cover	Zinc die-casted	
③	Adapter plate	Zinc die-casted	
④	Cover	Zinc die-casted	Without switch: ZM-HCA, With switch: ZM-HCB
⑤	Tension bolt	Stainless steel/Polyacetal	
⑥	Flow adjustment screw	Brass	Electroless nickel plated

Replacement Parts

No.	Description	Material	Part no.
⑦	Filter cover assembly	—	ZM-FCB-0
⑧	Diffuser assembly	—	ZM□□0□-0
⑨	Suction filter	Polyethylene	ZM-SF
⑩	Silencer assembly	—	ZM-SA
⑪	Pilot valve	—	VJ114-□□□□
⑫	Poppet valve assembly	—	ZM-PV-0
⑬	Vacuum pressure switch	—	ZSE1-00-□□ ZSM1-015 ZSM1-021
⑭	Check valve	NBR	ZM-CV

ZX

ZR

ZM

ZH

ZU

ZL

ZY

ZQ

ZF

ZP

ZCU

AMJ

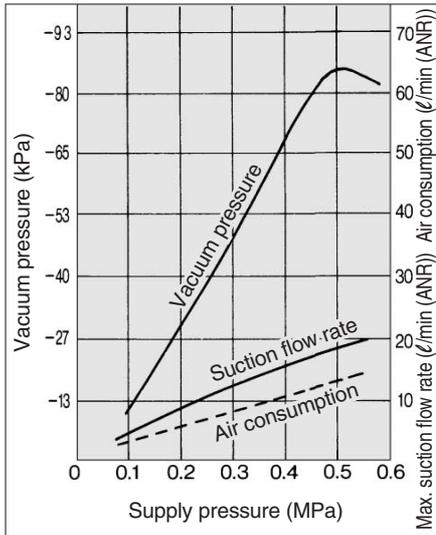
Misc.

Series ZM

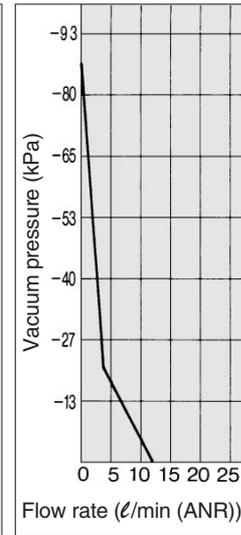
Exhaust Characteristics/Flow Characteristics, Standard Supply Pressure: H...0.5 MPa

ZM05□H

Exhaust Characteristics

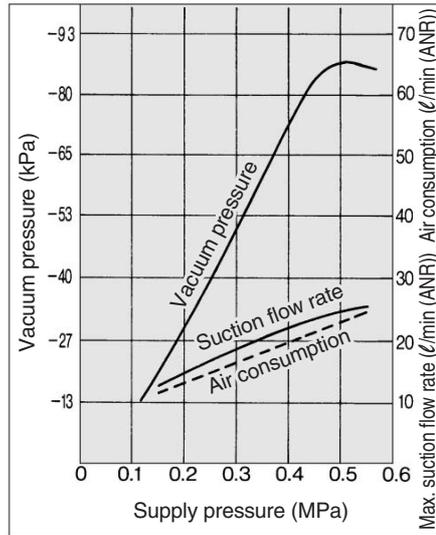


Flow Characteristics

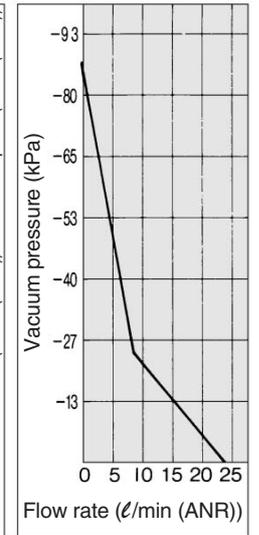


ZM07□H

Exhaust Characteristics

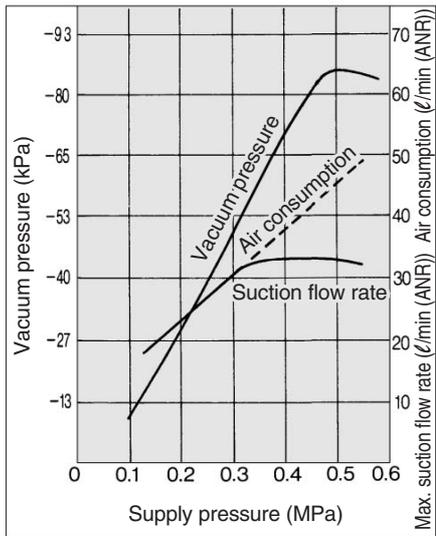


Flow Characteristics

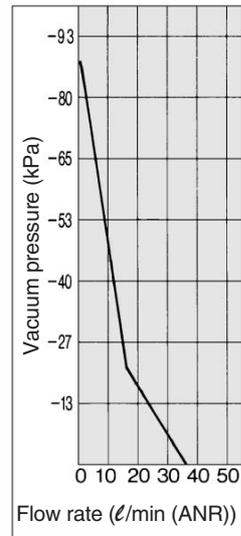


ZM10□H

Exhaust Characteristics

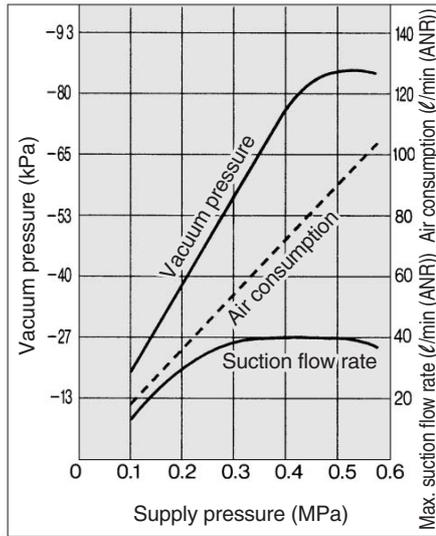


Flow Characteristics

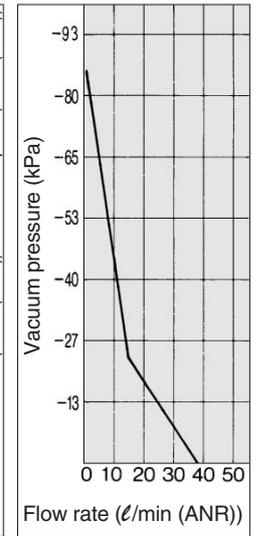


ZM13□H

Exhaust Characteristics

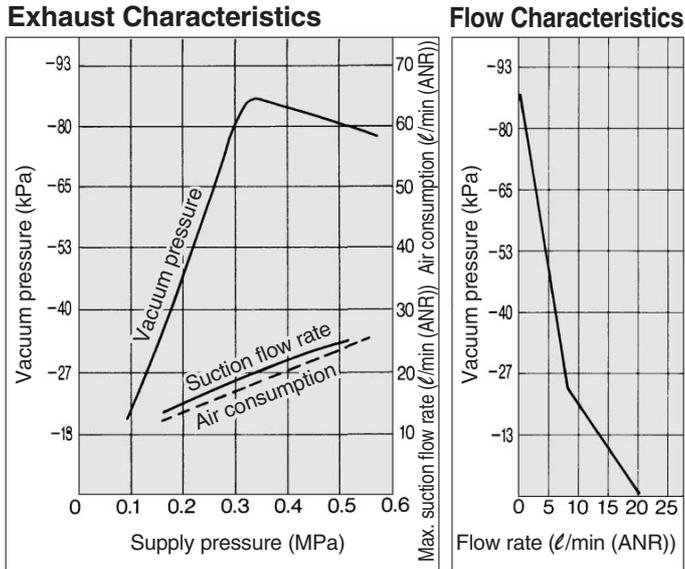


Flow Characteristics

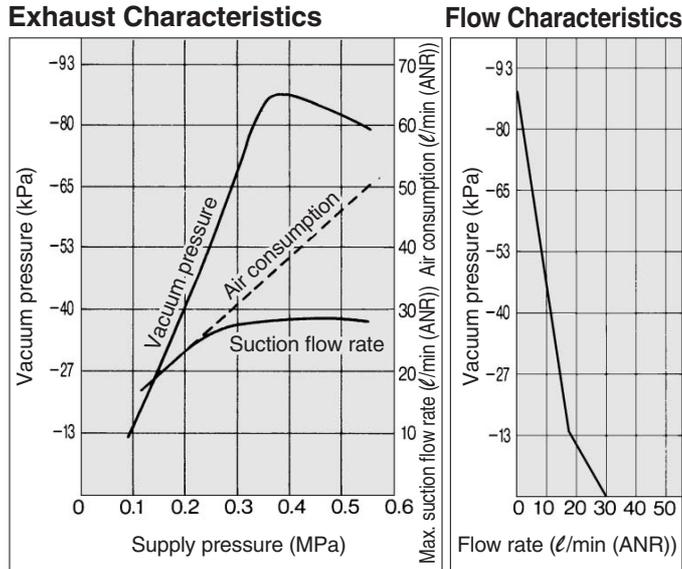


Exhaust Characteristics/Flow Characteristics, Standard Supply Pressure: M...0.35 MPa

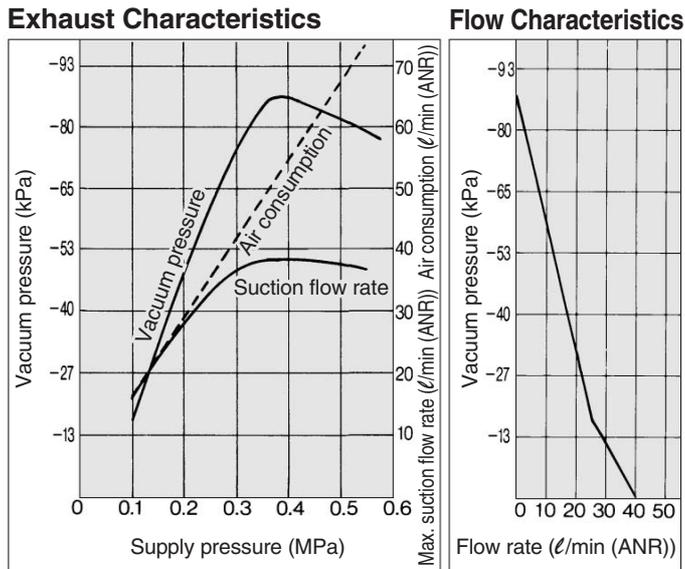
ZM07□M



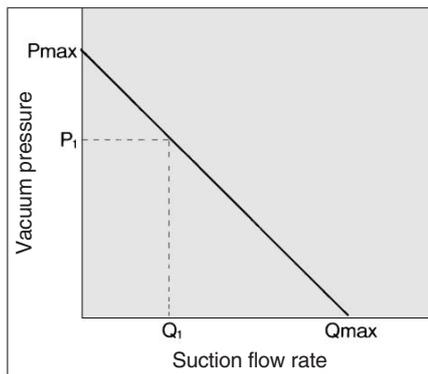
ZM10□M



ZM13□M



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 order below.

Changes in vacuum pressure are expressed in the order below.

1. When ejector suction port is covered and made airtight, suction flow is 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_i and Q_i)
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 ad-sorbed, please note that vacuum pressure will not be high.

- ZX
- ZR
- ZM**
- ZH
- ZU
- ZL
- ZY
- ZQ
- ZF
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- AMJ
- Misc.

Vacuum Pressure Switch/Solid State Switch (ZSE), Diaphragm Switch (ZSM)

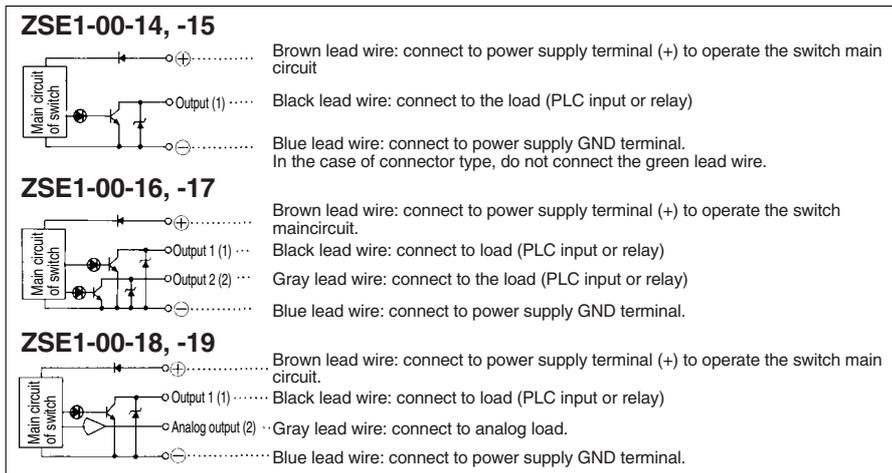
Vacuum Switch

Model	ZSE1-00-14	ZSE1-00-15	ZSE1-00-16	ZSE1-00-17	ZSE1-00-18	ZSE1-00-19	ZSM1-015	ZSM1-021
Sensor type	Solid state						Diaphragm	
Switch	Electronic circuit						Solid state	Reed
Set pressure range	0 to 101 kPa						-26.6 to -79.8 kPa	
Hysteresis	1 to 10% of the set pressure (Changeable)		3% full span or less (Fixed)		1 to 10% of the set pressure (Changeable)		17% full span	23% full span
Repeatability	±1% full span or less							
Temperature characteristics	±3% full span or less						±5% full span	
Operating voltage	12 to 24 VDC (Ripple ±10% or less)						DC10 to 26V	AC100V
ON-OFF output	Open collector 30 V Max. 80 mA						Open collector 30 V, Max. 100 mA	—
Setting points	1 point		2 points		1 point		1 point	
Operation indicator light	Lights up when ON		Lights ON (Output1: Red, Output2: Green)		Lights up when ON		Lights ON	
Setting trimmer	3 rotations	200 degrees	3 rotations	200 degrees	3 rotations	200 degrees	18 rotations	
Current consumption	17 mA or less (When 24 VDC is ON)		25 mA or less (When 24 VDC is ON)		17 mA or less (When 24 VDC is ON)		16 mA	—
Max. current	—						—	5 to 20 mA
Max. operating pressure	0.2 MPa						0.5 MPa	

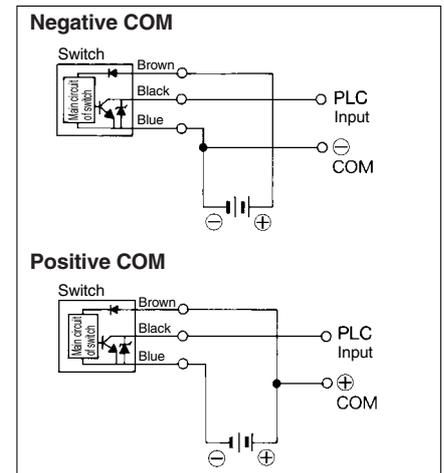
* When using ejector system, instantaneous pressure up to 0.5 MPa will not damage the switch.

Solid State Switch (ZSE)

Circuit/Connection

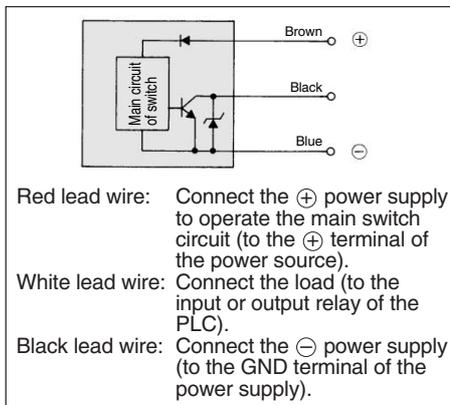


Connection with PLC

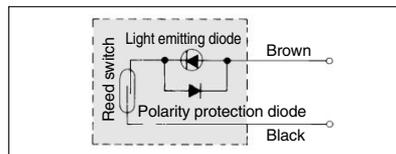


Diaphragm Switch (ZSM)

Solid State Switch: ZSM1-015



Reed Switch: ZSM1-021

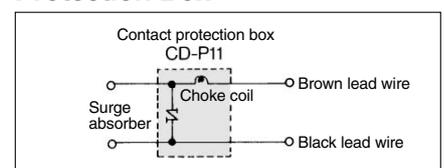


Contact protection box

The switch does not have a built-in contact protection circuit. Use this box if an induction load is applied or if the lead wire is longer than 5 meters.

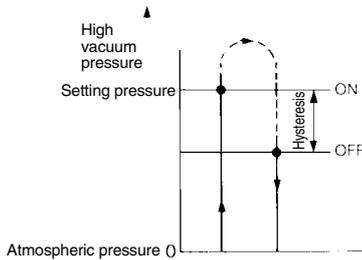


Internal Circuit of Contact Protection Box

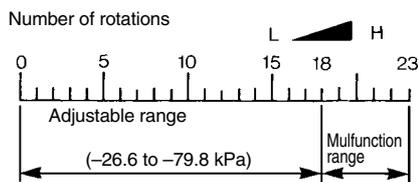


Hysteresis

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



Number of Rotations/Pressure Adjustment Screw



Set the pressure adjustment screw to be within 18 turns from its minimum setting.

Silencer

A hole is provided in one side of the window of the silencer's exhaust port. Therefore, if the silencer is to be attached against a wall or a board, make sure that the window of the exhaust port is not covered by the wall or the board.

To reverse the position, apply your finger to the side without a hole to forcefully push and remove the silencer. Then, turn the silencer around and push it into place.

At this time, make sure that the window of the silencer is located away from the diffuser.

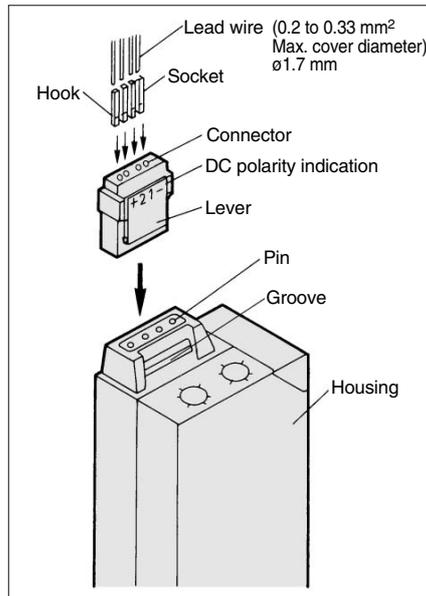
Mounting Direction of Silencer

Noise reduction		
Noise reduction impossible		

How to Use Connector

1. Attaching and detaching connectors

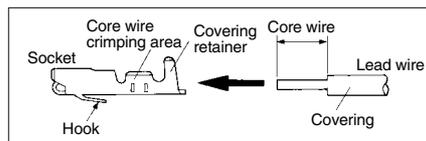
- When assembling the connector to the switch housing, push the connector straight onto the pins until the level locks into the housing slot.
- When removing the connector from the switch housing, push the lever down to unlock it from the slot and then withdraw the connector straight off of the pins.



2. Crimping of lead wires and sockets

Strip 3.2 to 3.7 mm of the lead wire ends, insert each stripped wire into a socket and crimp contact it using special crimping tool. Be careful that the outer insulation of the lead wires does not interfere with the socket contact part.

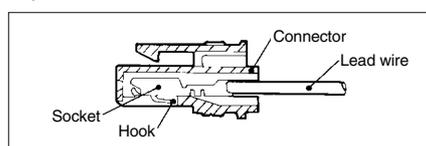
(Crimping tool: DXT170-75-1)



3. Attaching and detaching of socket to connector with lead wire

- Attaching**
Insert the sockets into the square holes of the connector (with +, 1, 2, - indication), and continue to push the sockets all the way in until they lock by hooking into the seats in the connector. (When they are pushed in their hooks open and they are locked automatically.) Then confirm that they are locked by pulling lightly on the lead wires.

- Detaching**
To detach a socket from a connector, pull out the lead wire while pressing the socket's hook with a stick having a thin tip (about 1 mm). If the socket will be used again, first spread the hook outward.



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 in this catalog, and refer to page 13-1-5 for Precautions on every series.

Mounting

Warning

1. Do not drop or bump.

When handling the switch, do not apply an excessive impact (1000 m/s²) by dropping or striking the switch. Even if the switch case itself does not become damaged, it could damage the internal switch and cause it to malfunction.

2. Hold the product from the body side when handling.

To handle the product, hold it by its body. The tensile strength of the power supply cord is 49 N (5 kgf). If the cord is pulled with a greater force, it could lead to a malfunction. When handling the product, make sure to hold it by its body.

3. Never move the switch assembly or loosen the switch assembly mounting screws.

Wiring

Warning

1. Do not repeatedly bend or pull the lead wires.

If the lead wires are routed in such a way that repetitive bending stress or tensile strength is applied, it could cause broken wires. If the lead wires become damaged, the product must be replaced (the lead wires cannot be replaced due to the grommet type wiring.).

Power Supply

Warning

1. Vacuum pressure switch:

The performance is not affected even if a momentary pressure of approximately 0.5 MPa is applied (during a vacuum break). However, make sure that a constant pressure that is higher than 0.2 MPa is not applied.

Operating Environment

Warning

1. It cannot be used in a magnetic region.

In the case of ZSM1-021

Warning

- Operate the product within the specified operating amperage range. If the product is used below the specified operating amperage, the indicator light will not turn ON. If the product is used above the specified operating amperage, the indicator light will become damaged.

- A parallel connection of the switches does not cause any problem. However, be careful with a series connection because the voltage drop will increase due to the internal resistance of the light-emitting diodes (approximately 2 V per switch).

In the case of ZSM1-015

Warning

- Make sure to connect the 3 lead wires correctly. If they are interchanged, they could lead to a malfunction or damage.

- Although an output signal is emitted immediately after the power is turned ON, this is not a malfunction.

ZX

ZR

ZM

ZH

ZU

ZL

ZY

ZQ

ZF

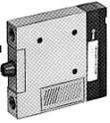
ZP

ZCU

AMJ

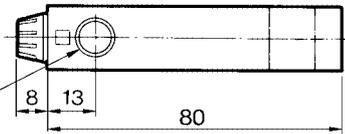
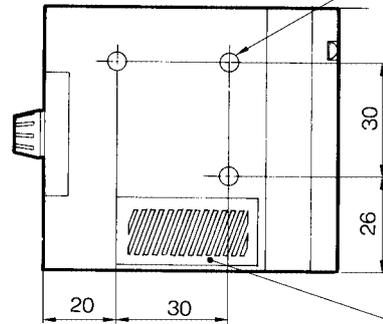
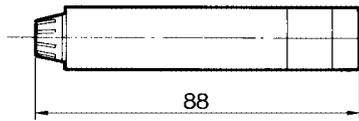
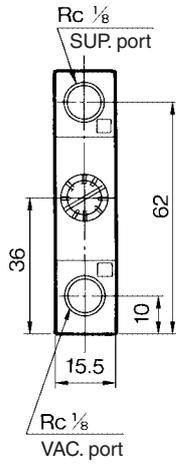
Misc.

Series ZM



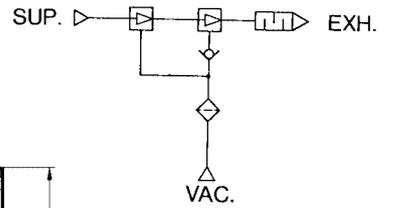
For Single Unit/Without Valve Basic Type

ZM□2H_M

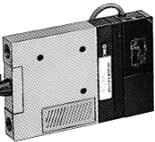


3-φ4.5
Mounting hole

Silencer assembly
Dimensions of model
with high noise
reduction silencer
assembly is the same
as standard.



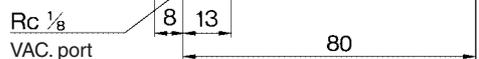
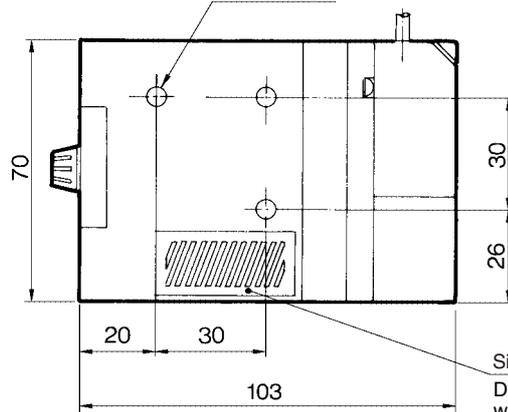
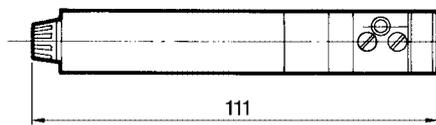
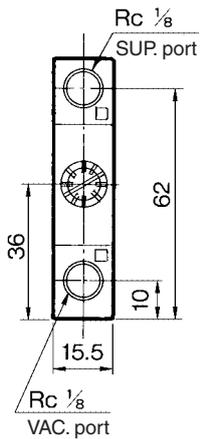
(Side entry style is equipped with plugs.)



<Components>

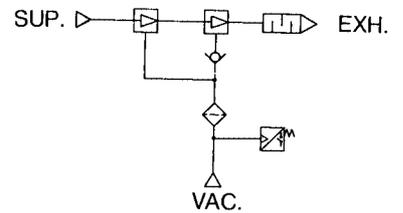
For Single Unit/Without Valve Basic Type with Switch

ZM□2H_M□□



3-φ4.5
Mounting hole

Silencer assembly
Dimensions of model
with high noise
reduction silencer
assembly is the same
as standard.



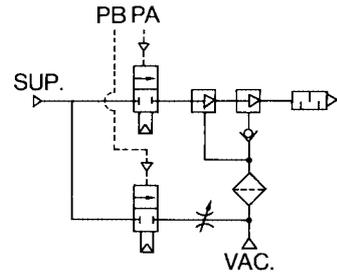
(Side entry style is equipped with plugs.)

Vacuum Ejector: With Valve and Switch Series ZM



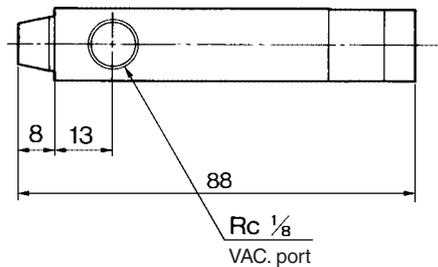
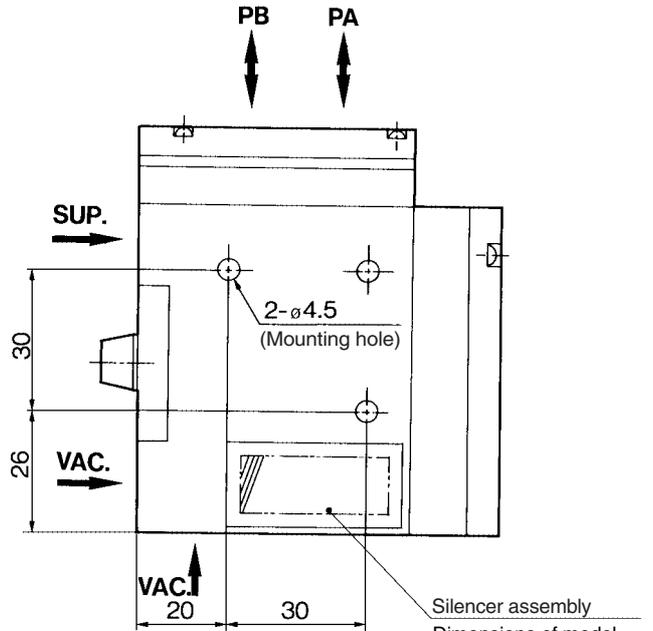
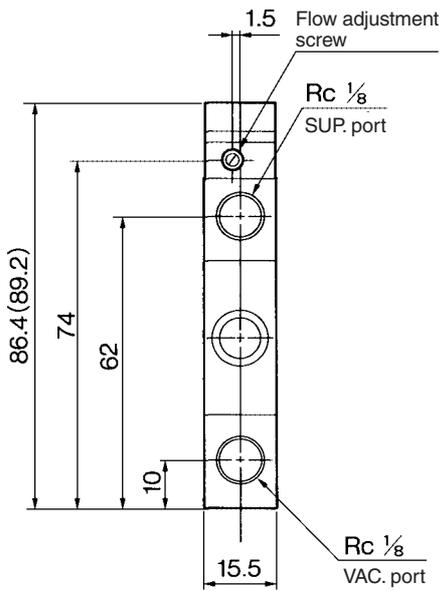
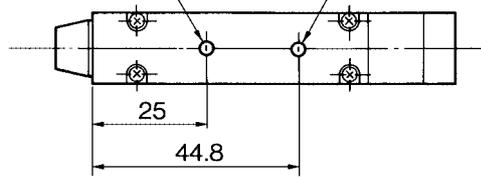
Air Operated Type

ZM□1^H_M-Q□



Pilot port for release valve
M3 x 0.5 (M5 x 0.8)

Pilot port for supply valve
M3 x 0.5 (M5 x 0.8)

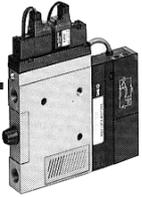


(Side entry style is equipped with plugs.)

- ZX
- ZR
- ZM**
- ZH
- ZU
- ZL
- ZY
- ZQ
- ZF
- ZP
- ZCU
- AMJ
- Misc.

This dimension shows Q3 (M3 x 0.5). Dimension in parentheses shows Q5 (M5 x 0.8).

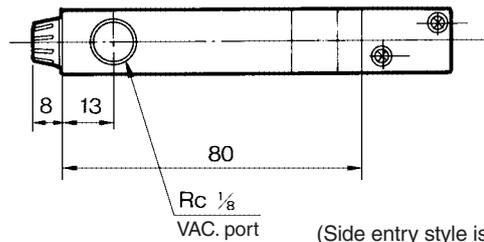
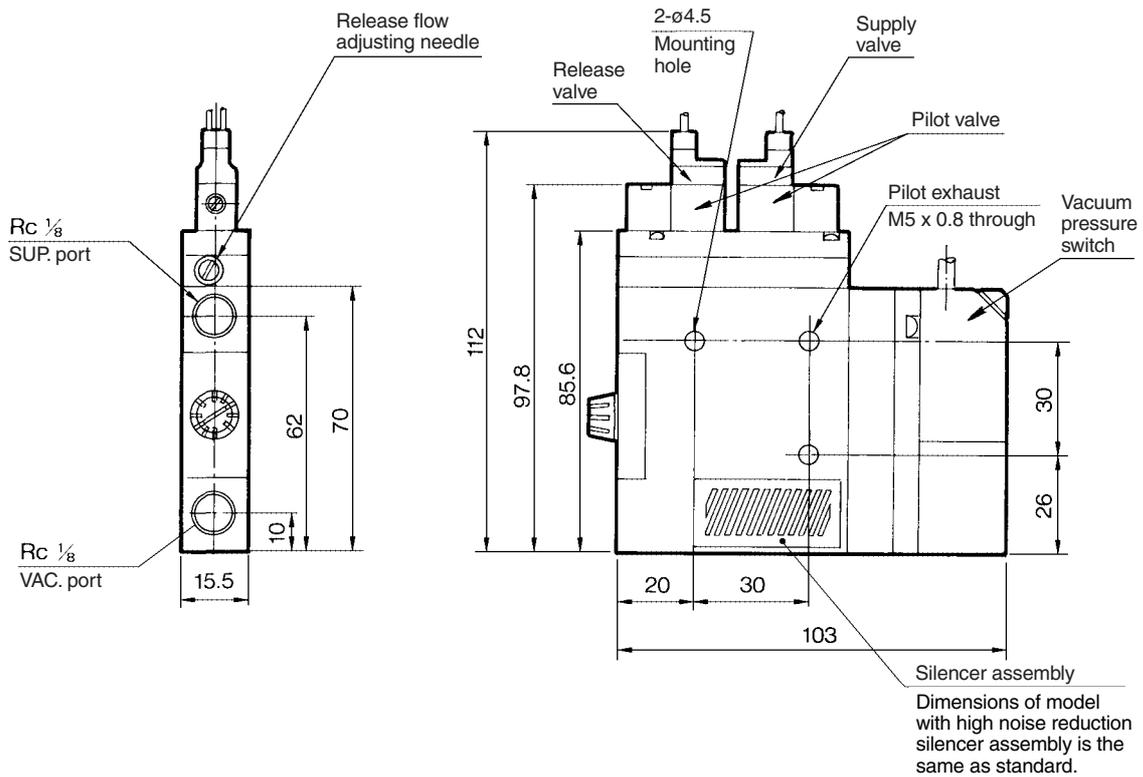
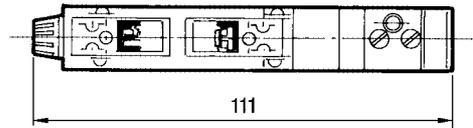
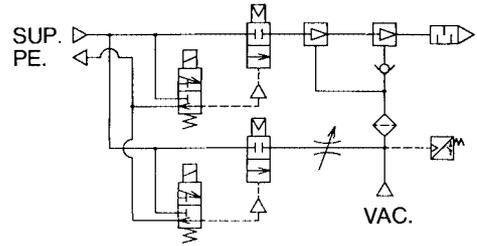
Series ZM



<Components>

For Single Unit/With Valve Basic Type with Switch and Valve

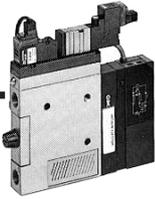
ZM□1^H_M-K□□□-E□



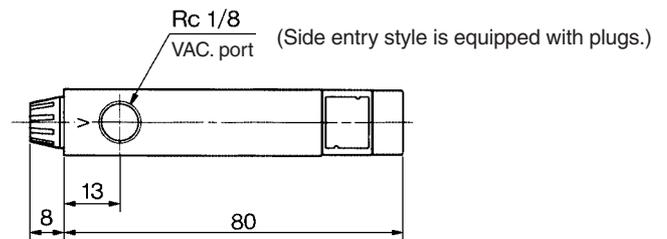
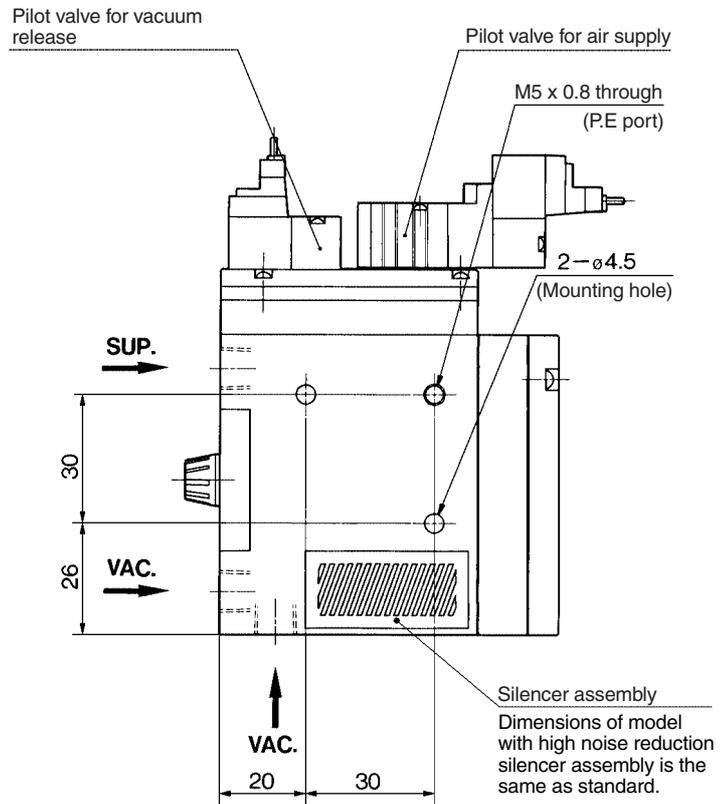
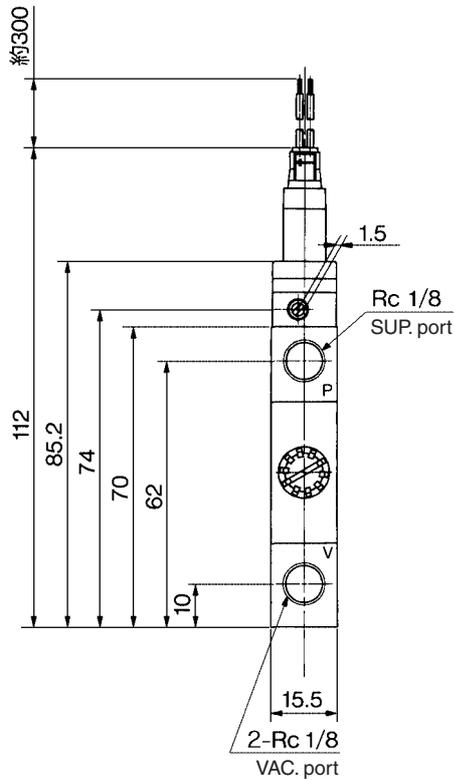
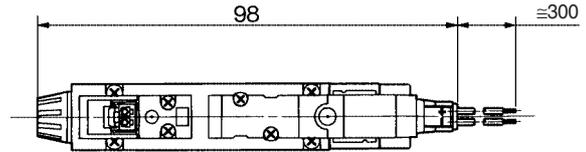
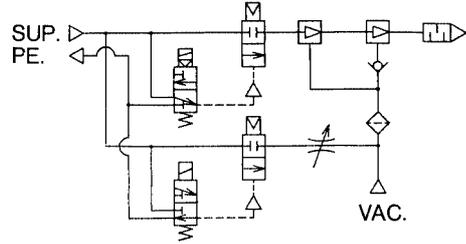
Vacuum Ejector: With Valve and Switch **Series ZM**

<Components>

Single/With Air Supply Valve (N.O.) and Vacuum Release Valve Basic Type with Valve



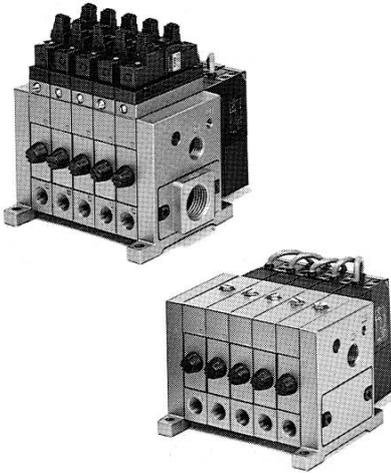
ZM□1^H_M-B□□



- ZX
- ZR
- ZM**
- ZH
- ZU
- ZL
- ZY
- ZQ
- ZF
- ZP
- ZCU
- AMJ
- Misc.

Series ZM

Manifold Specifications: Series ZM



Manifold Specifications

Manifold style	Stacking
Common SUP port*	Rc 1/4
Individual SUP port*	Rc 1/8
Common EXH port	Rc 1/2, 3/4
EXH port location	Right side/Left side/Both sides**
Max. number of stations	Max. 10 stations
Silencer	ZM-SA (With bolts)

* Mixed mounting of common SUP and individual SUP types possible.

** Right or left to the VAC port.

Maximum Ejector Stations (Max. operable nos. simultaneously)

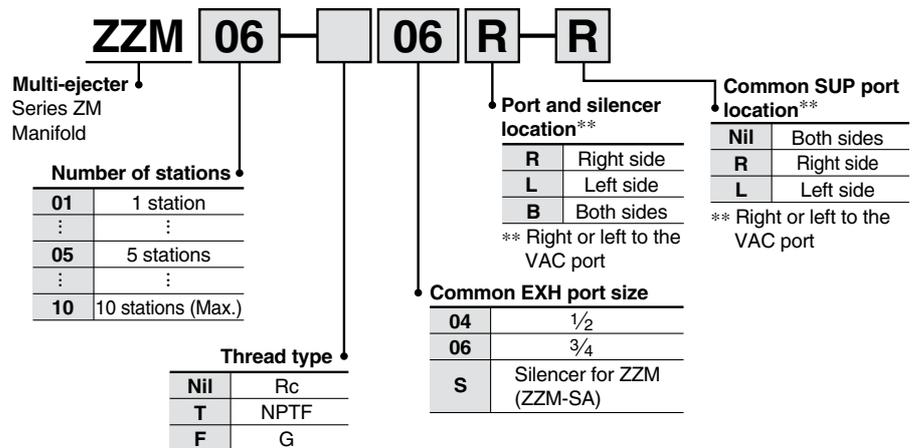
Manifold model	Ejector model	ZM053	ZM073	ZM103	ZM133
		ZM054	ZM074	ZM104	ZM134
ZM [Stations] — 06 ^R / _L		10	8	5	4
ZM [Stations] — 06B		10	10	8	6
ZM [Stations] — 04 ^R / _L		10	8	5	4
ZM [Stations] — 04B		10	10	8	6

* Effective area of external silencer is 160 mm².

Manifold Specification Sheet

Fill in the manifold specification sheet on page 13-14-20 when specifying the manifold style.

How to Order Ejector Manifold



* Indicate the ejector model no. below the manifold base no.

Example)

Manifold: ZM06-06R (1 pc.)

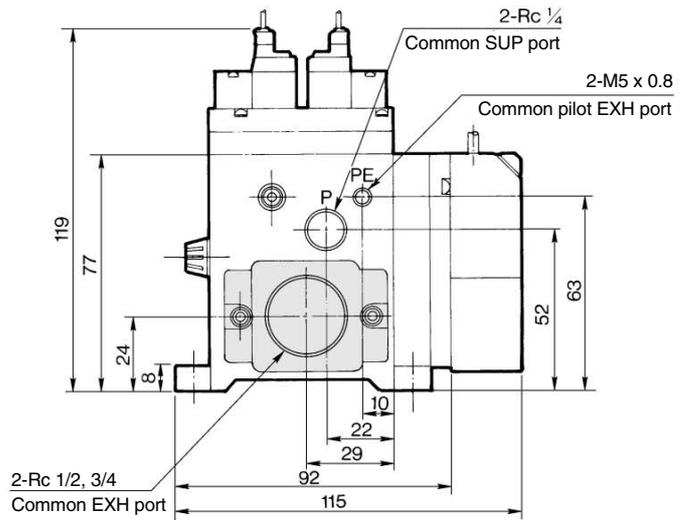
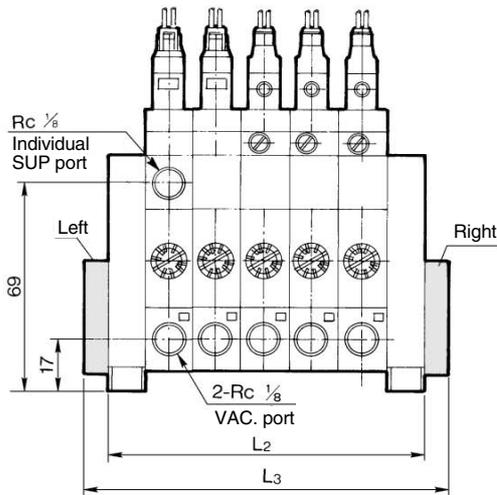
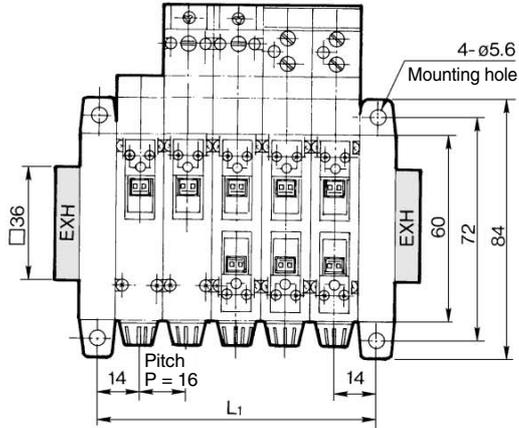
Ejector: { ZM103H-J5LZ (3 pcs.)
ZM133H-J5LZ (3 pcs.)

Vacuum Ejector: With Valve and Switch **Series ZM**



Manifold

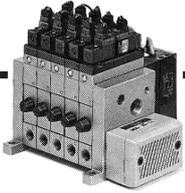
ZM Number of ejectors — Common EXH port Port location



- ZX
- ZR
- ZM**
- ZH
- ZU
- ZL
- ZY
- ZQ
- ZF
- ZP
- ZCU
- AMJ
- Misc.

(mm)										
L \ Stations	1	2	3	4	5	6	7	8	9	10
L1	28 ± 1.5	44 ± 1.5	60 ± 1.5	76 ± 1.5	92 ± 1.5	108 ± 2.0	124 ± 2.0	140 ± 2.0	156 ± 2.0	172 ± 2.0
L2	40 ± 1.5	56 ± 1.5	72 ± 1.5	88 ± 1.5	104 ± 1.5	120 ± 2.0	136 ± 2.0	152 ± 2.0	168 ± 2.0	184 ± 2.0
L3	56 ± 1.5	72 ± 1.5	88 ± 1.5	104 ± 1.5	120 ± 1.5	136 ± 2.0	152 ± 2.0	168 ± 2.0	184 ± 2.0	200 ± 2.0

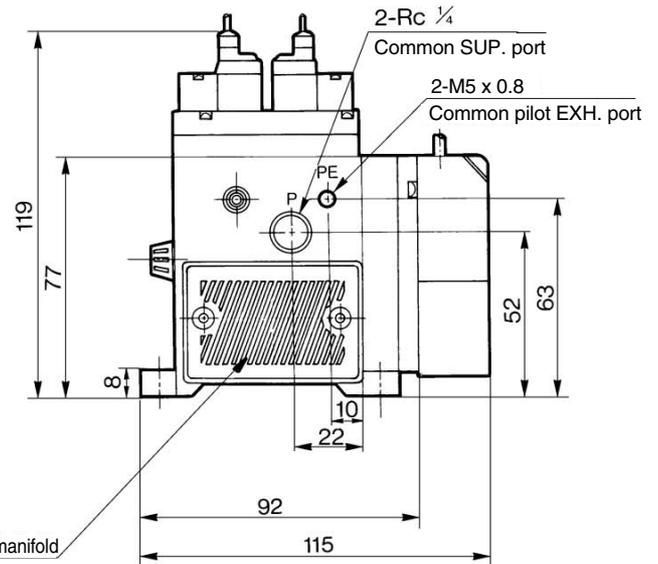
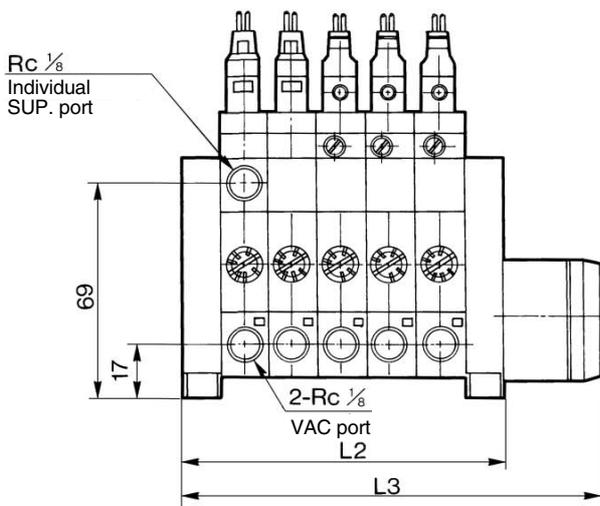
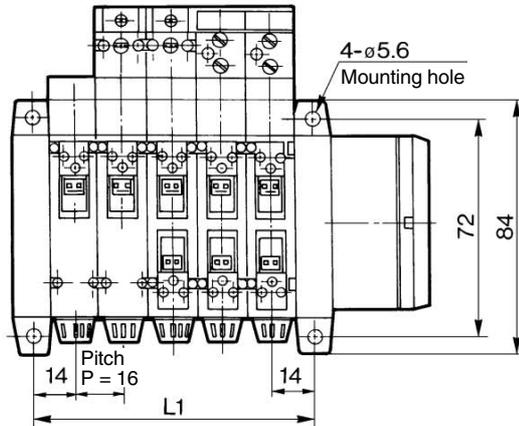
Series ZM



<Components>

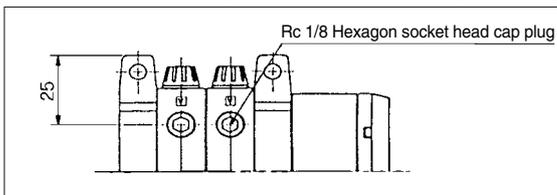
Manifold/With Silencer Manifold with Silencer Dedicated for Manifold

ZM Number of ejectors — S Silencer location



Silencer dedicated for manifold
(ZM-SA)

VAC. port electrical entry (In the case of side entry/With plug at the bottom)



(mm)

L	Stations	1	2	3	4	5	6	7	8	9	10
	L1	28 ± 1.5	44 ± 1.5	60 ± 1.5	76 ± 1.5	92 ± 1.5	108 ± 2.0	124 ± 2.0	140 ± 2.0	156 ± 2.0	172 ± 2.0
	L2	40 ± 1.5	56 ± 1.5	72 ± 1.5	88 ± 1.5	104 ± 1.5	120 ± 2.0	136 ± 2.0	152 ± 2.0	168 ± 2.0	184 ± 2.0
	L3	72 ± 1.5	88 ± 1.5	104 ± 1.5	120 ± 1.5	136 ± 1.5	152 ± 2.0	168 ± 2.0	184 ± 2.0	200 ± 2.0	216 ± 2.0

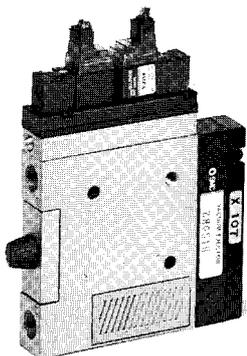
Made to Order Specifications:

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

1. Double Check Valve/For Manifold

Single: ZM Nozzle diameter Body Supply pressure Valve Voltage Electrical entry X107
↓ Double check valve

When a manifold is used, the exhaust that is discharged to the silencer could flow out to the vacuum port side. To prevent this from occurring, a check valve is used.

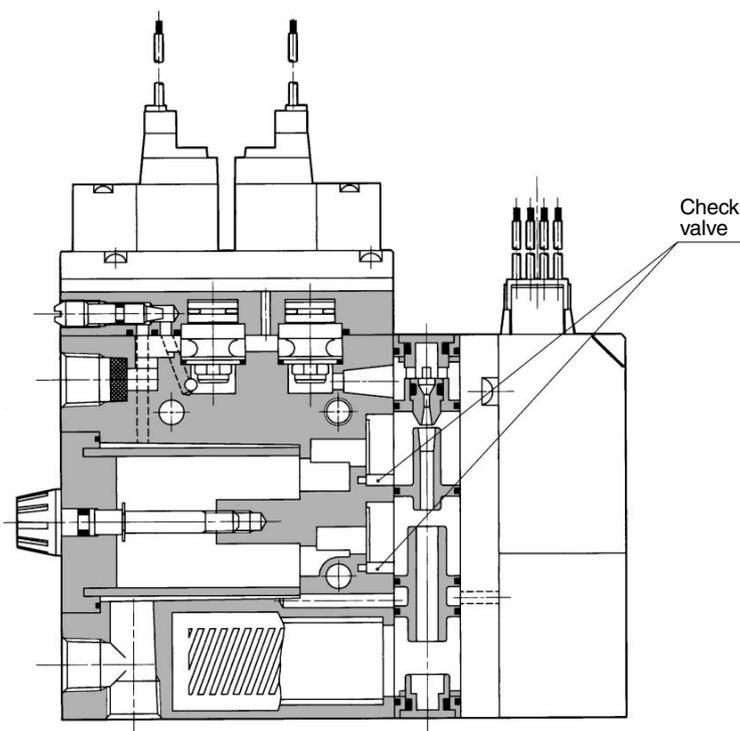


⚠ Warning

1. It cannot be used for maintaining a vacuum.
2. Use a vacuum release valve (the workpiece cannot be released without a vacuum release valve.)

- ZX
- ZR
- ZM
- ZH
- ZU
- ZL
- ZY
- ZQ
- ZF
- ZP
- ZCU
- AMJ
- Misc.

Construction



Series ZM

Made to Order Specifications:

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

2. With Individual Exhaust Spacer

Single: ZM Nozzle diameter Body Supply pressure X111

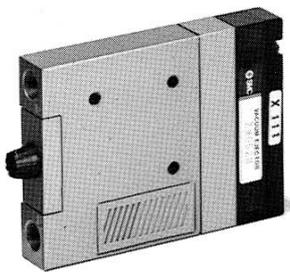
↓ Individual exhaust spacer

When using an individual ejector in a clean room, the exhaust can be discharged outside of the clean room by attaching an individual exhaust spacer. (The spacer can also be installed when using a manifold. Please contact SMC for mounting dimensions.)

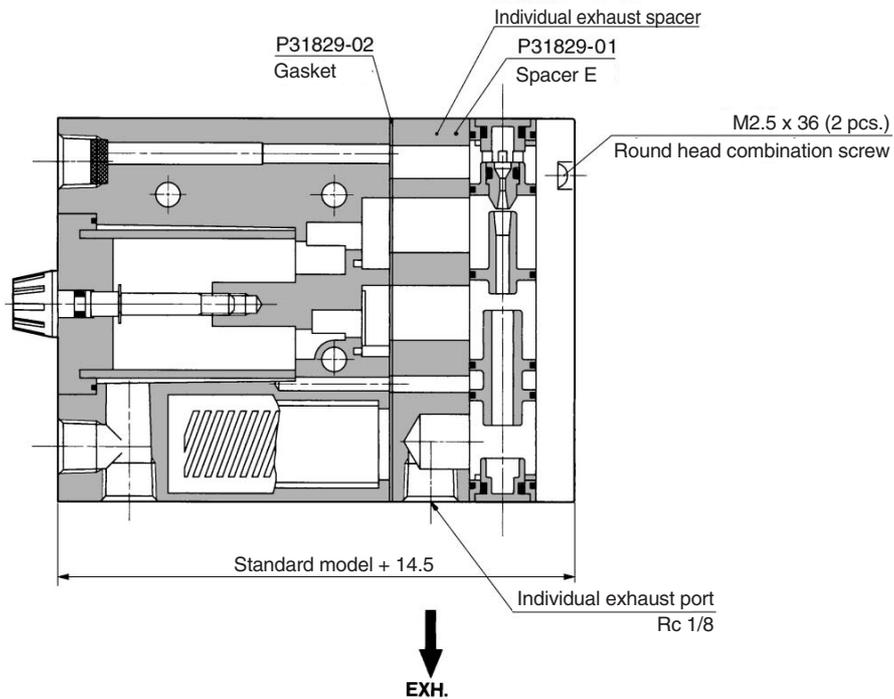
* It is possible to manufacture it with a switch.

⚠ Warning

To connect a pipe to the exhaust port, do not use an elbow joint because it creates resistance and prevents the system from attaining a sufficient vacuum.



Construction



Series ZM

Made to Order Specifications:

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

3. Double Solenoid Supply Valve

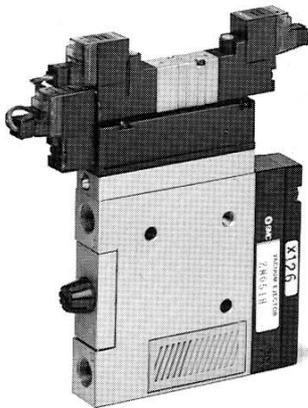
Single: ZM Nozzle diameter Body Supply pressure Valve Voltage Electrical entry X126

Double solenoid valve

-X126	With release valve
-X135	Without release valve

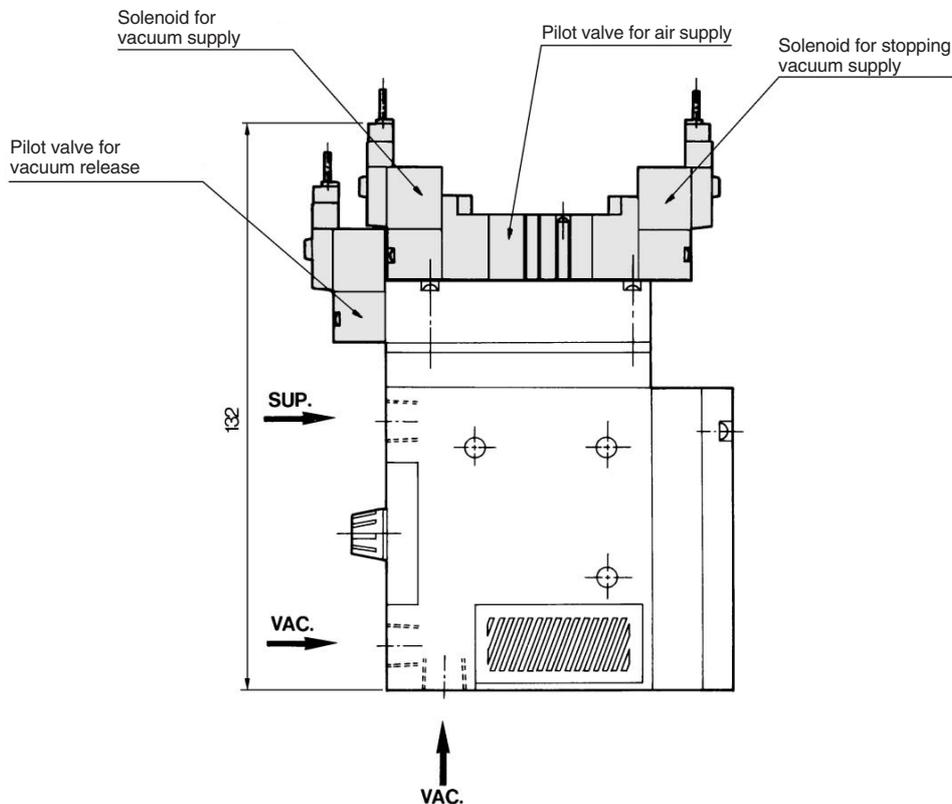
This is an air supply pilot valve that is made with double solenoids.
* It is possible to manufacture it with a switch.

Note) The -X126 model cannot be manufactured with an L plug connector for electrical entry. Therefore, use a grommet type or an M plug connector.



- ZX
- ZR
- ZM
- ZH
- ZU
- ZL
- ZY
- ZQ
- ZF
- ZP
- ZCU
- AMJ
- Misc.

Construction

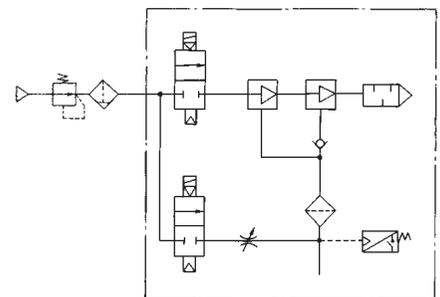


Предназначен для создания вакуума посредством сжатого воздуха.

Компактный, легкий, двухступенчатый, может содержать в себе: эжекторный блок, реле вакуума, фильтр, глушитель, распределители (один или два), дроссель.

Технические характеристики

Тип	EZM051HF	EZM101HF	EZM131HF
Диаметр сопла (мм)	0,5	1,0	1,3
Конструктивное исполнение	Двухступенчатое эжектирование		
Рабочая среда	Очищенный сжатый воздух без содержания масла		
Максимальный вакуум (кПа)	-84		
Вакуумный расход (норм. л/мин)	18	36	40
Потребление сж. воздуха (норм. л/мин)	12	46	95
Диапазон раб. давлений на входе (МПа)	0,2 - 0,55		
Рабочая температура (°C)	5 ~ 50		
Присоединительная резьба	G1/8		
Вакуумный фильтр	Стандарт, 30 микрон		
Глушитель	Стандарт		
Распределители			
Напряжение питания	24 VDC		
Допуск по напряжению	±10%		
Класс изоляции	A		
Потребляемая мощность (Вт)	1,0		
Индикатор рабочего состояния	Стандарт		
Искрогашение	Стандарт		
Реле вакуума			
Выход	Открытый коллектор PNP (NPN под заказ)		
Рабочий диапазон (кПа)	-100 ~ 10,6		
Гистерезис	1 ~ 10% от рабочего диапазона, регулируемый		
Погрешность температурная	±3% от рабочего диапазона		
Напряжение	12 - 24 VDC		
Выход	30В / 80 мА		
Обозначение	Стандарт		
Длина кабеля (м)	3		
Вес (г)	380		



Номер для заказа

Тип	Диаметр сопла	Выход реле вакуума	Номер для заказа
Вакуумный эжектор + два распределителя	0,5	—	EZM051HF-K5LOZ-Q
	1,0	—	EZM101HF-K5LOZ-Q
	1,3	—	EZM131HF-K5LOZ-Q
Вакуумный эжектор + два распределителя + Реле вакуума	0,5	PNP	EZM051HF-K5LOZ-E55L-Q
	1,0	PNP	EZM101HF-K5LOZ-E55L-Q
	1,3	PNP	EZM131HF-K5LOZ-E55L-Q

Принадлежности (заказываются отдельно)

Длина кабеля (м)	Номер для заказа штекера с кабелем для распределителя
0,6	SY100-68-A-6
3,0	SY100-68-A-30

Блочная конструкция (опции)

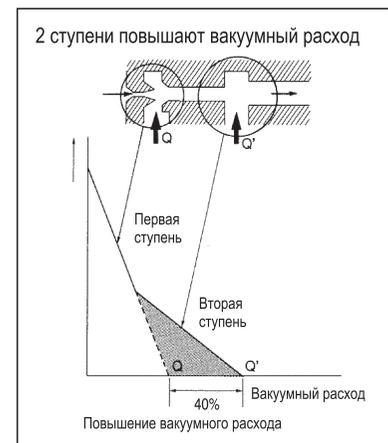
Тип	EZM053HF	EZM103HF	EZM133HF
Подвод сжатого воздуха	G1/4		
Выхлоп	G3/4 (общий)		
Количество вакуумных эжекторов в блоке	Макс 10		

Пример:

Вакуумный эжектор с распределителями вакуумирования и сброса вакуума (PNP), с расходом вакуума 40 л/мин, с подсоединением G1/8:

EZM131HF-K5LOZ-E55L

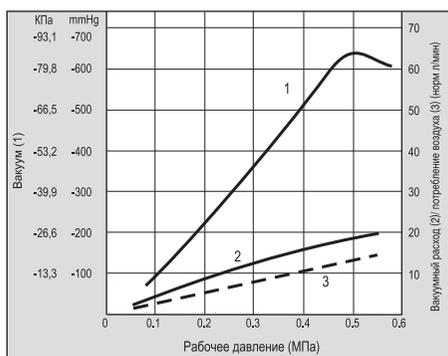
Двухступенчатый эжектор



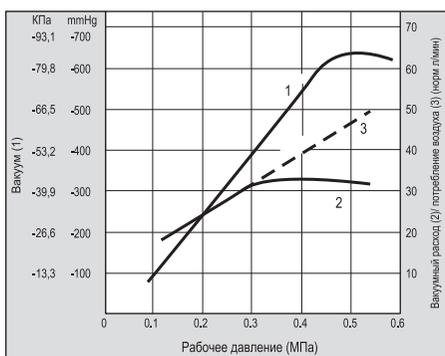
Вакуумный эжектор EZM

Характеристики

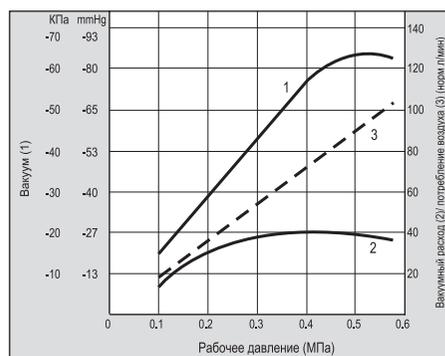
EZM051HF



EZM101HF



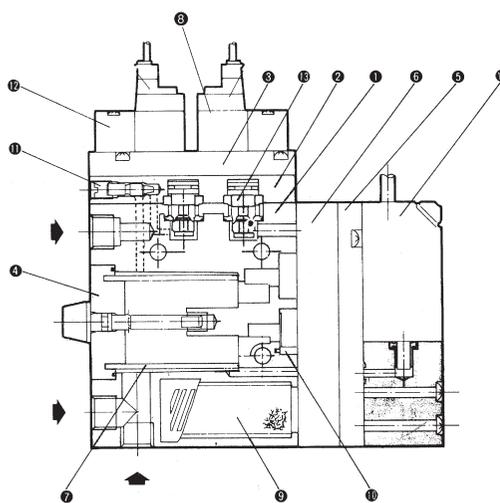
EZM131HF



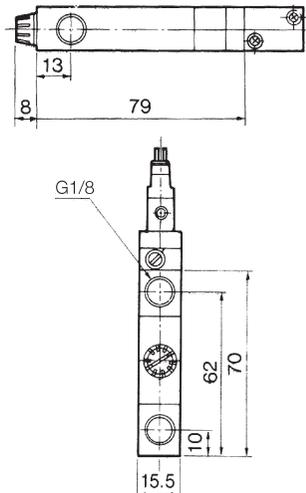
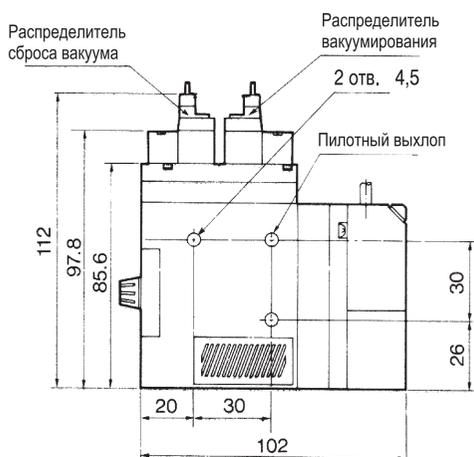
Конструкция

Спецификация

Поз.	Наименование	Номер для заказа
1	Корпус	—
2	Крышка	—
3	Переходная пластина	—
4	Крышка фильтра	ZM-FCA-0
5	Крышка	P31806-02
6	Эжекторный блок	—
7	Фильтр	ZM-SF
8	Распределитель вакуумирования	SY114-5LOZ-Q
9	Глушитель	EZM-SA-0
10	Обратный клапан	ZM-CV
11	Дроссель линии сброса вакуума	—
12	Распределитель сброса вакуума	SY114-5LOZ-Q
13	Тарельчатый клапан	ZM-PV-0
14	Реле вакуума (PNP)	ZSE1-00-55L



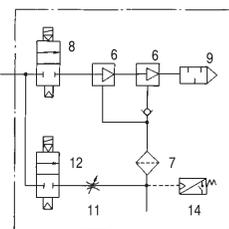
Размеры



Описание работы

Вакуумный эжектор с распределителями управления

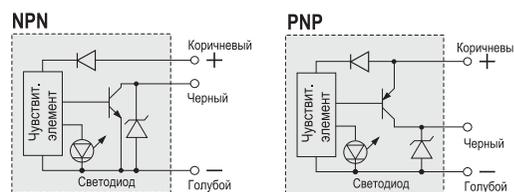
При включении Распределителя вакуумирования (8) сжатый воздух подается на вход эжектора (6) и происходит отсос воздуха. Из линии вакуума через вакуумный фильтр (7).

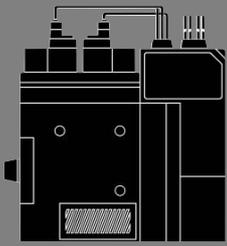


При включении распределителя сброса вакуума (12) сжатый воздух подается в линию вакуума, вследствие чего в ней происходит повышение давления. Скорость нарастания давления в линии вакуума регулируется дросселем (11).

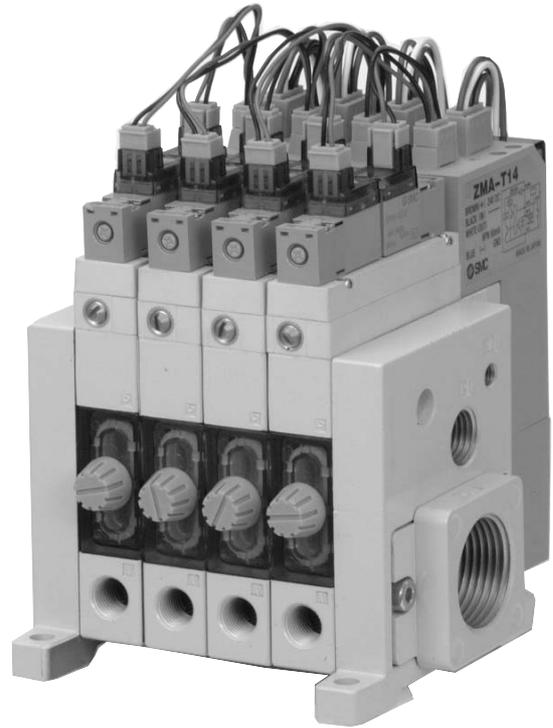
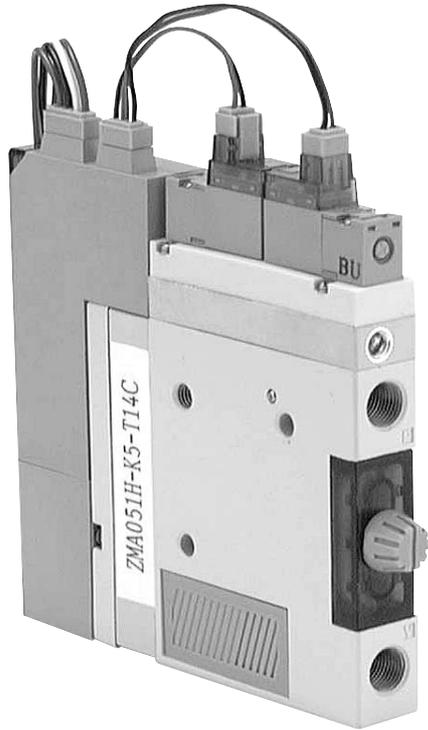
Примечание: при выключении распределителя вакуумирования (8) воздух из атмосферы через глушитель (9) попадает в линию вакуума и в ней возрастает давление, но для надежного и быстрого повышения давления в линии вакуума, тем не менее, должен использоваться распределитель сброса вакуума.

Подключение реле вакуума





Vacuum Ejector With Solid State Timer *Series ZMA*



ZX

ZR

ZM

ZH

ZU

ZL

ZY

ZQ

ZF

ZP

ZCU

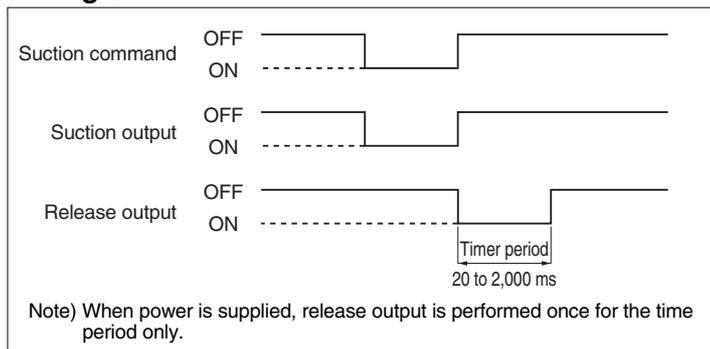
AMJ

Misc.

**Incorporates solid state timer
function for release valve control
(Timer setting with PLC is unnecessary)**

**Allows sharing of switch/valve
power supply, and single line for
suction signal
(Valve wiring is unnecessary)**

Timing Chart



**Timer can be easily adjusted
without programming
(Reduction of the load of PLC)**

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 in this catalog, and refer to page 13-1-5 for Precautions on every series.

Mounting

Warning

1. Do not drop or bump.
Do not drop, bump or apply excessive impact (1,000 m/s²) when handling. Even if the switch body is not damaged, the switch may suffer internal damage that will lead to malfunction.
2. Hold the product from the body side when handling.
The tensile strength of the power cord is 49 N, and pulling it with a greater force can cause failure.
3. When handling the product, never move or loosen the switch assembly or the switch assembly mounting screws.

Wiring

Warning

1. Do not allow repeated bending or stretching forces to be applied to lead wires.
Wiring arrangements in which repeated bending stress or stretching force is applied to the lead wires can cause broken wires.

Pressure Source

Warning

1. Vacuum pressure switches
There will be no change in performance if a pressure of approximately 0.5 MPa is applied momentarily (when releasing vacuum), but care should be taken that pressures of 0.2 MPa or more are not applied on a regular basis.

Operating Environment

Warning

1. The product cannot be used in a strong magnetic field.

Vacuum Ejector With Solid State Timer Series ZMA

How to Order

ZMA 07 1 H — K 5 — T14 C

Nozzle diameter

05	0.5 mm
07	0.7 mm
10	1.0 mm
13	1.3 mm
15	1.5 mm

Body type

1	For single unit
3	Common SUP for manifold
5	Individual SUP for manifold

Standard supply pressure

H	0.5 MPa
M	0.35 MPa
S	0.45 MPa

* Refer to "Table (1)" for selection of standard supply pressure and nozzle diameter.

Thread type

Nil	Rc
T	NPTF
F	G

Electrical entry of vacuum switch (Connector type)

C	Lead wire length 0.6 m
C	Lead wire length 3 m
CN	No lead wire

* Refer to "Table (2)" for lead wire with 4-wire connector.

Switch model

T14	1 point setting, No analog output available 3 turns, NPN output
T54	1 point setting, No analog output available 3 turns, PNP output

Rated voltage

5	24 VDC
---	--------

Valve

K	With air supply valve, Vacuum release valve
---	---

ZX

ZR

ZM

ZH

ZU

ZL

ZY

ZQ

ZF

ZP

ZCU

AMJ

Misc.

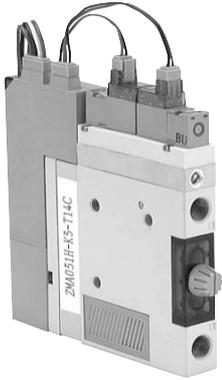
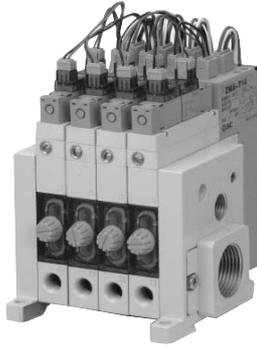
Table (1)
Combination of Nozzle Diameter and Standard Supply Pressure

Nozzle diameter	Standard supply pressure (MPa)		
	M (0.35)	S (0.45)	H (0.5)
ø0.5	—	—	●
ø0.7	●	—	●
ø1.0	●	—	●
ø1.3	●	●	●
ø1.5	—	●	—

Table (2)

Lead wire with 4-wire connector	P5022-6-1 (0.6 m)
	P5022-6-2 (3 m)

Series ZMA



Model

Nozzle diameter (mm)	Model	Standard supply pressure			Maximum suction flow rate (ℓ/min (ANR))	Air consumption (ℓ/min (ANR))	Diffuser construction
		H	M	S			
0.5	ZMA05□H	0.5 MPa	—	—	18	12	2nd stage diffuser
0.7	ZMA07□H				24	23	
1.0	ZMA10□H				36	46	
1.3	ZMA13□H				40	95	
0.7	ZMA07□M	—	0.35 MPa	—	20	16	
1.0	ZMA10□M				26	32	
1.3	ZMA13□M				36	70	
1.3	ZMA13□S	—	—	0.45 MPa	38	75	1st stage diffuser
1.5	ZMA15□S				45	90	

Vacuum Ejector Specifications

Fluid	Air
Max. operating pressure	0.7 MPa
Max. vacuum pressure	-84 kPa
Supply pressure range	0.25 to 0.55 MPa
Operating temperature range	5 to 50°C
Suction filter	Polyethylene sintered metal (30 μm)

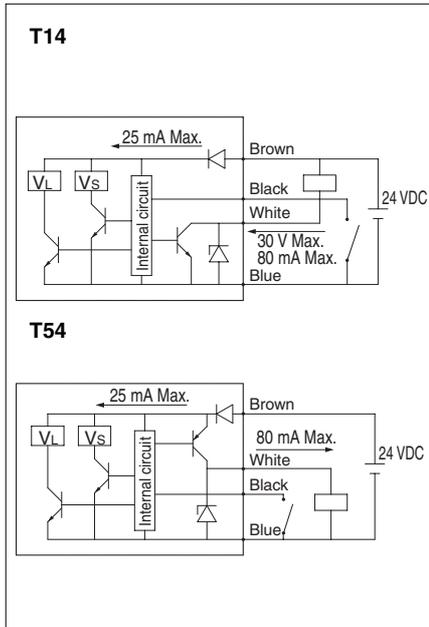
Valve Specifications

How to operate	Pilot type
Main valve	Poppet
Effective area (Cv factor)	3 mm ² (0.17)
Operating pressure range	0.25 to 0.6 MPa
Electrical entry	Plug connector
Max. operating frequency	5 Hz
Voltage	24 VDC

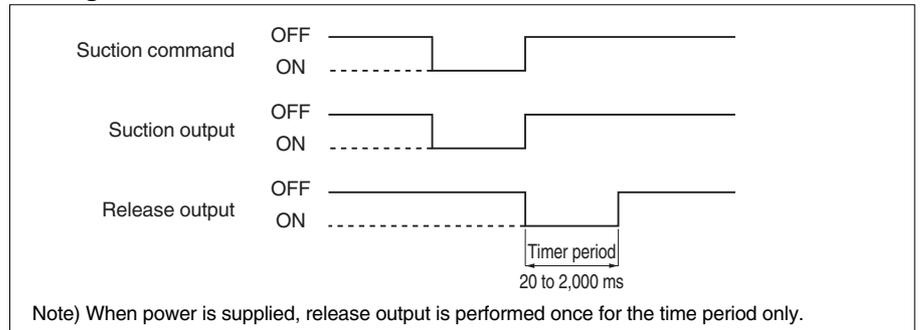
Vacuum Switch with Timer Specifications (for controlling solenoid valve)

Power source	Operating voltage	24 VDC ± 10%
	Consumption current per one unit	1.1 W (at switch output OFF)
Sensor switch output	Number of output	1
	Output	NPN/PNP open collector
	Setting trimmer	3 turns
	Operation indicator light	Red LED lighting
	Temperature characteristics	±3% FS or less
Part of timer	Hysteresis	3% FS or less (fixed)
	Timer period	20 to 2,000 ms
	Setting trimmer	3 turns
	Temperature characteristics	±3% FS or less

Connection Example



Timing Chart



Wiring

Brown	DC (+)
Black	Suction command
White	Switch output
Blue	DC (-)

Construction: ZMA□1□-K□L-E□

Pilot valve for air supply

Pilot valve for vacuum release

Air supply port

Vacuum port

- ZX
- ZR
- ZM**
- ZH
- ZU
- ZL
- ZY
- ZQ
- ZF
- ZP
- ZCU
- AMJ
- Misc.

Component Parts

No.	Description	Material	Note
①	Body	Aluminum die-casted	
②	Valve cover	Zinc die-casted	
③	Adapter plate	Zinc die-casted	
④	Cover	Zinc die-casted	ZMA-HCB
⑤	Tension bolt	Stainless steel/Polyacetal	
⑥	Flow adjustment screw	Brass	Electroless nickel plated

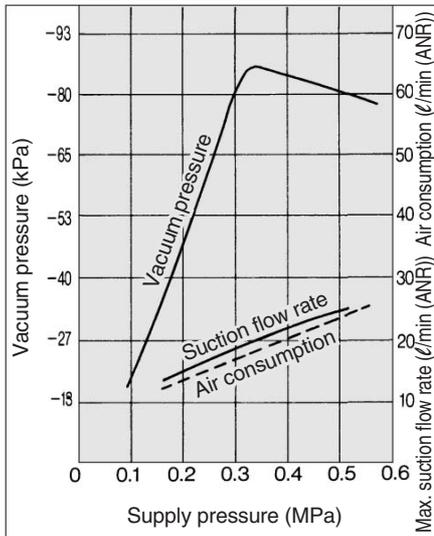
Replacement Parts

No.	Description	Material	Part no.
⑦	Filter cover assembly	—	ZMA-FCB-0
⑧	Diffuser assembly	—	ZMA□□0□-0
⑨	Suction filter	Polyethylene	ZM-SF
⑩	Silencer assembly	—	ZM-SA
⑪	Pilot valve	—	SY114-5LOZ
⑫	Poppet valve assembly	—	ZM-PV-0
⑬	Vacuum switch with timer	—	ZMA-T14CN (NPN) ZMA-T54CN (PNP)
⑭	Check valve	NBR	ZM-CV
⑮	Connector assembly	—	ZMA-VC-1A

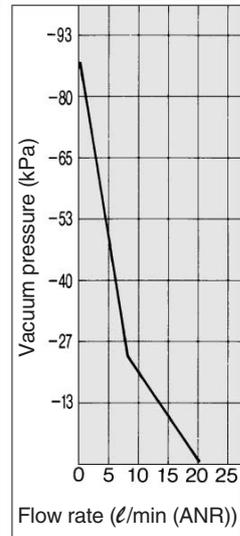
Exhaust Characteristics/Flow Characteristics, Standard Supply Pressure: M...0.35 MPa

ZM07□M

Exhaust Characteristics

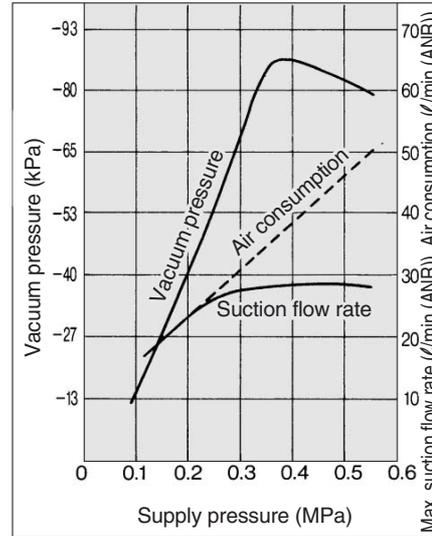


Flow Characteristics

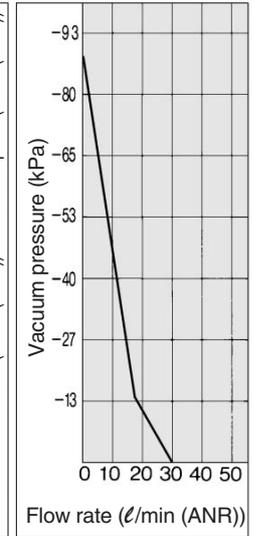


ZM10□M

Exhaust Characteristics

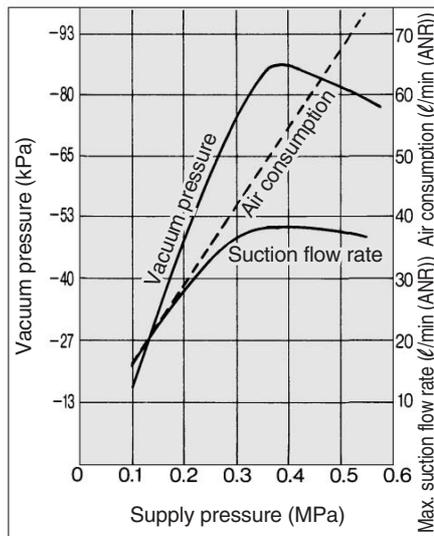


Flow Characteristics

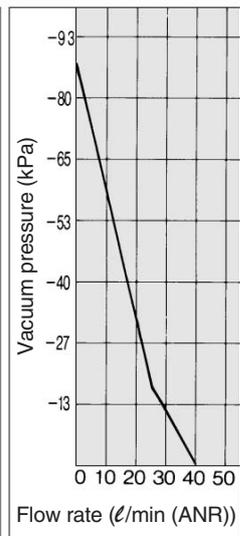


ZM13□M

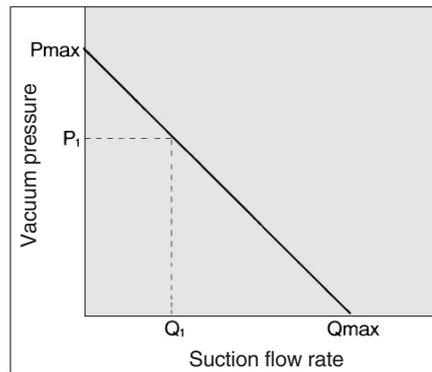
Exhaust Characteristics



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.

Changes in vacuum pressure are expressed in the order below.

1. When ejector suction port is covered and made airtight, suction flow is 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 P₁ and Q₁)
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 ad-sorbed, please note that vacuum pressure will not be high.

ZX

ZR

ZM

ZH

ZU

ZL

ZY

ZQ

ZF

ZP

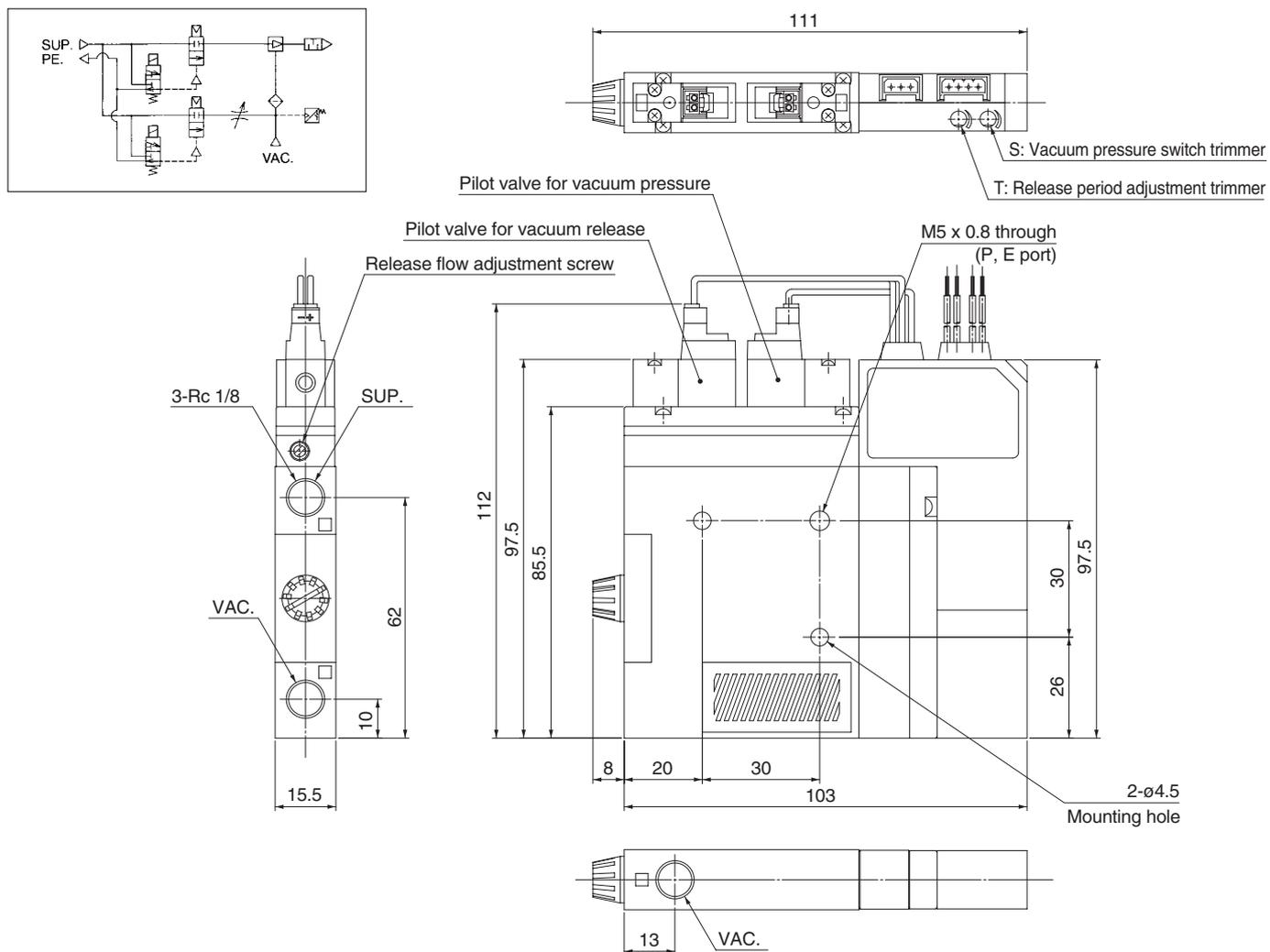
ZCU

AMJ

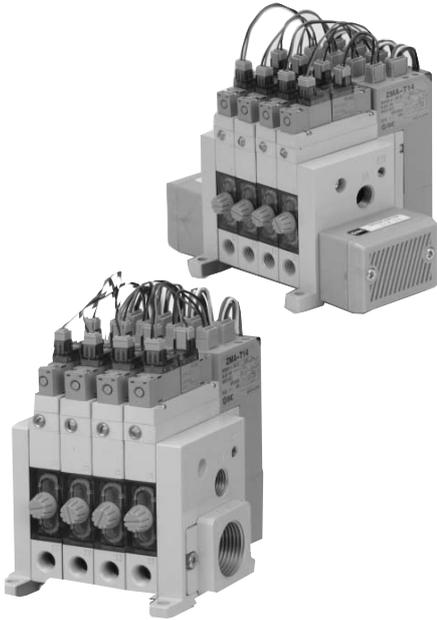
Misc.

Series ZMA

Dimensions



Manifold Specifications: Series ZZMA



Manifold Specifications

Manifold style	Stacking
Common SUP port*	Rc 1/4
Individual SUP port*	Rc 1/8
Common EXH port	Rc 1/2, 3/4
EXH port location	Right side/Left side/Both sides**
Max. number of stations	Max. 10 stations
Silencer	ZZM-SA (With bolts)

* Mixed mounting of common SUP and individual SUP types possible.
** Right or left to the VAC port.

Maximum Ejector Stations (Max. operable nos. simultaneously)

Manifold model	Ejector model			
	ZM053 ZM054	ZM073 ZM074	ZM103 ZM104	ZM133 ZM134
ZZMA [Stations] — 06 ^R _L	10	8	5	4
ZZMA [Stations] — 06B	10	10	8	6
ZZMA [Stations] — 04 ^R _L	10	8	5	4
ZZMA [Stations] — 04B	10	10	8	6

* Effective area of external silencer is 160 mm².

ZX

ZR

ZM

ZH

ZU

ZL

ZY

ZQ

ZF

ZP

ZCU

AMJ

Misc.

How to Order Ejector Manifold

ZZMA **06** — **06** **R**

Number of stations

01	1 station
⋮	⋮
10	10 stations (max.)

Port and silencer location

R	Right side
L	Left side
B	Both sides

Note) Right and left side are viewed from the front side of VAC port.

Thread type

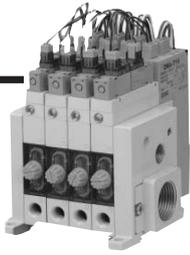
Nil	Rc
T	NPTF
F	G

Common EXH port size

04	1/2
06	3/4
S	Silencer dedicated for ZZMA (ZZM-SA)

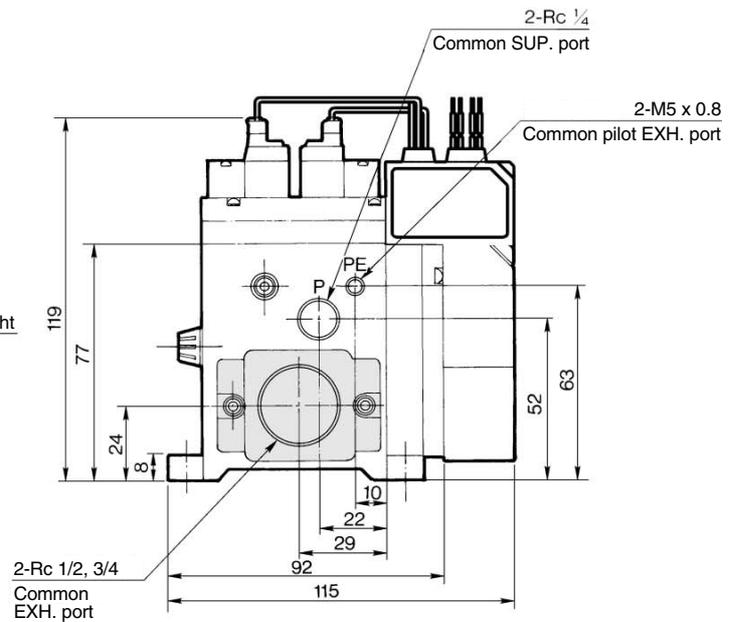
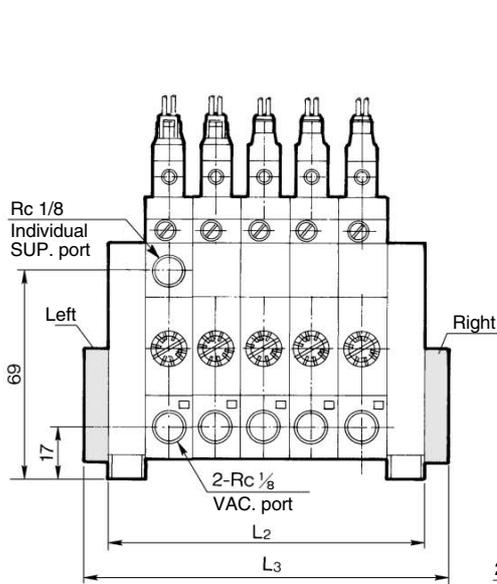
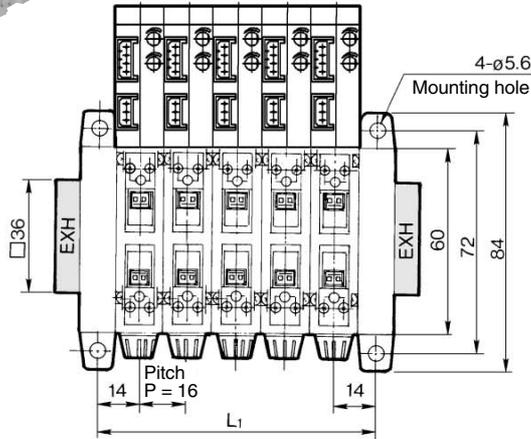
* Indicate the ejector model no. below the manifold base no.
Example) Manifold model no.: ZZMA04-SR (1 pc.)
Ejector model no. : *ZMA073H-K5-T14C (4 pcs.)

Series ZMA



Manifold

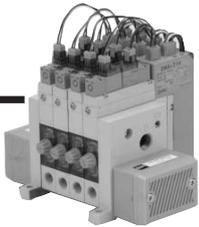
ZZMA Number of ejectors — Common EXH port Port position



(mm)

L \ Stations	1	2	3	4	5	6	7	8	9	10
L1	28 ± 1.5	44 ± 1.5	60 ± 1.5	76 ± 1.5	92 ± 1.5	108 ± 2.0	124 ± 2.0	140 ± 2.0	156 ± 2.0	172 ± 2.0
L2	40 ± 1.5	56 ± 1.5	72 ± 1.5	88 ± 1.5	104 ± 1.5	120 ± 2.0	136 ± 2.0	152 ± 2.0	168 ± 2.0	184 ± 2.0
L3	56 ± 1.5	72 ± 1.5	88 ± 1.5	104 ± 1.5	120 ± 1.5	136 ± 2.0	152 ± 2.0	168 ± 2.0	184 ± 2.0	200 ± 2.0

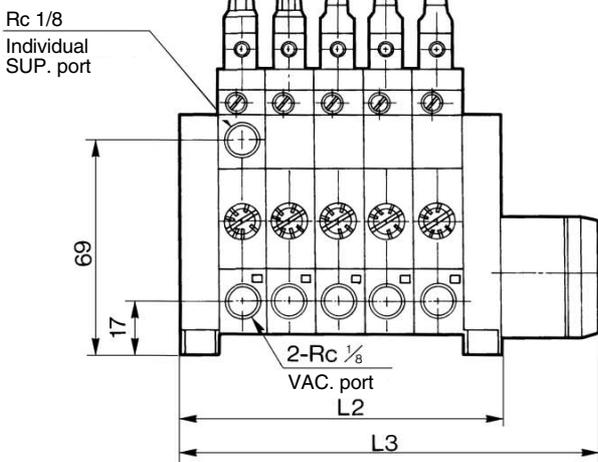
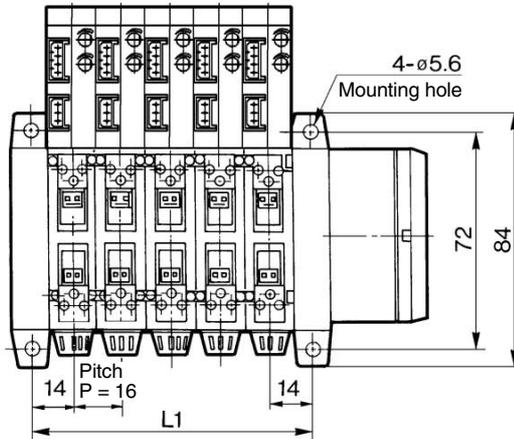
Vacuum Ejector: With Solid State Timer **Series ZM**



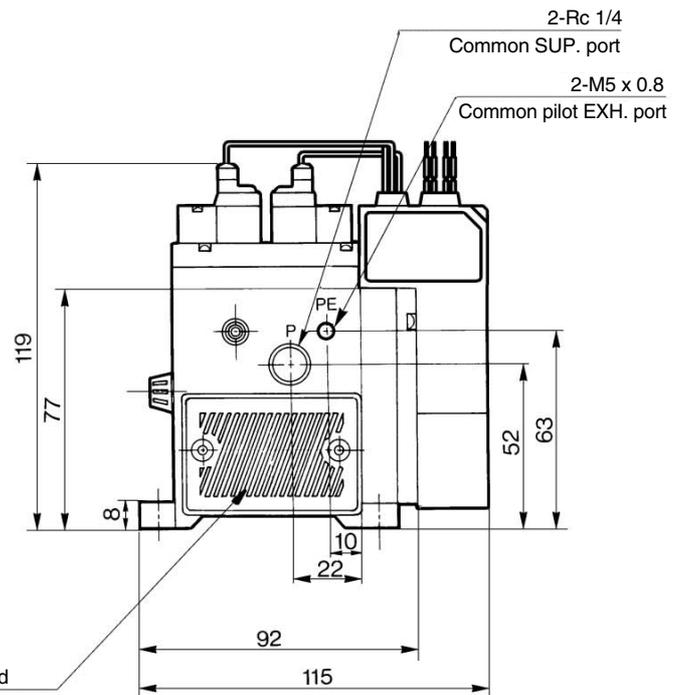
<Components>

Manifold/With Silencer **Manifold with Silencer Dedicated for Manifold**

ZZMA Number of ejectors — **S** Position of silencer



Silencer dedicated for manifold
(ZM-SA)



ZX

ZR

ZM

ZH

ZU

ZL

ZY

ZQ

ZF

ZP

ZCU

AMJ

Misc.

		(mm)									
L	Stations	1	2	3	4	5	6	7	8	9	10
	L1	28 ± 1.5	44 ± 1.5	60 ± 1.5	76 ± 1.5	92 ± 1.5	108 ± 2.0	124 ± 2.0	140 ± 2.0	156 ± 2.0	172 ± 2.0
	L2	40 ± 1.5	56 ± 1.5	72 ± 1.5	88 ± 1.5	104 ± 1.5	120 ± 2.0	136 ± 2.0	152 ± 2.0	168 ± 2.0	184 ± 2.0
	L3	72 ± 1.5	88 ± 1.5	104 ± 1.5	120 ± 1.5	136 ± 1.5	152 ± 2.0	168 ± 2.0	184 ± 2.0	200 ± 2.0	216 ± 2.0