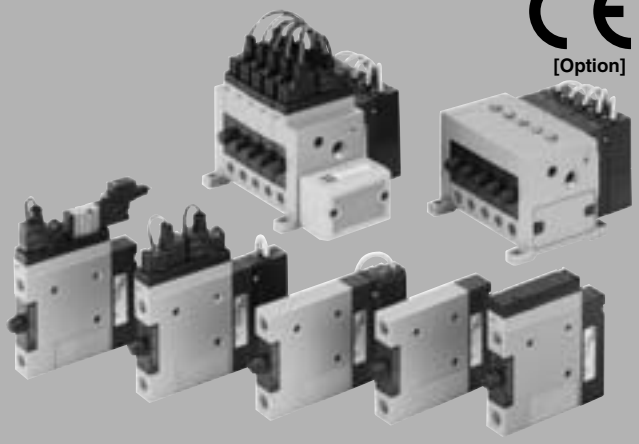
Vacuum Ejector

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

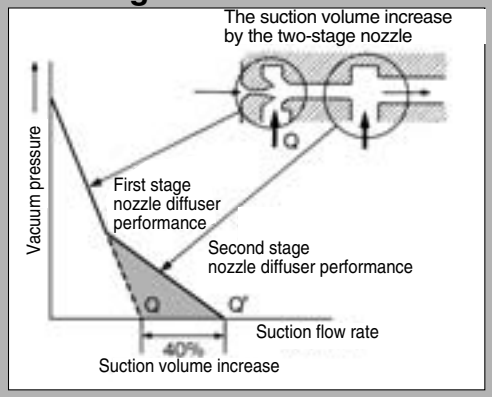
All tubing, wiring, indicators, and adjustment functions have been eliminated from the side surfaces, thus enabling assembly and maintenance while linked to a manifold.

- 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.

Two-stage nozzle construction



Compact and lightweight

15.5 mm width, 400 g (full system)

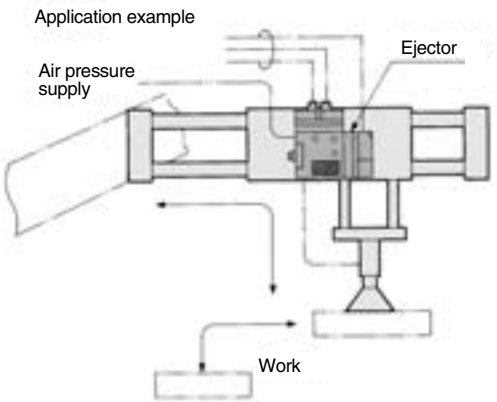
Air operated type

Series ZM Applications

Fields: Semiconductor and electrical, automobile assembly, food and medical equipment, and various types of manufacturing and assembly equipment

Machines: Robotic hand/material handling, automotive assembling machines, automatic transfer equipment, pick and place, printing machinery

Functions: Vacuum adsorption transfer, vacuum adsorption retention, vacuum generated air flow



Vacuum Ejector
With Valve and Switch
Series ZM

Note) CE compliant: For DC only. **[Option]**

How to Order

ZM □ □ □ □ □ – □ □ □ □ □ □ – □ □ – **L** – □ – □

Nozzle diameter

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

Vacuum port location

Nil	Side/Bottom entry
A	Side entry

Standard supply pressure

M	0.35 MPa
S	0.45 MPa
H	0.5 MPa

∗ Refer to table 1 for the selection of standard supply pressure and nozzle size.

Body style

1	Single unit: With valve + With standard silencer
1S	Single unit: With valve + With high noise reduction silencer
3 Note)	Manifold: With common SUP valve
5 Note)	Manifold: With individual SUP valve
2	Single unit: With standard silencer (Without valve)
2S	Single unit: With high noise reduction silencer (Without valve)
4 Note)	Manifold: Without common SUP valve
6 Note)	Manifold: Without individual SUP valve

Note) When the product is used for the manifold, the exhaust air of the operating ejector may enter the vacuum (V) port of the non-operating ejector and be released if there are an operating and non-operating ejector. If this becomes a problem, consider using a double check valve (-X107 on page 1004) or individual exhaust (-X111 on page 1005.)

Thread type

Nil	Rc
T	NPTF
F	G Note)

Note) G thread
The thread ridge shape is compatible with the G thread standard (JIS B0202), but other shapes are not conforming to ISO16030 and ISO1179.

Release flow rate adjusting needle

Nil	Without lock nut
L	With lock nut

Compatible with release valves only.

CE compliant

Nil	—
Q	CE compliant

Made to Order

Refer to pages 1004 to 1006 for details.

Vacuum switch electrical entry

Nil	Grommet type, with 0.6 m lead wire (ZSE1)
L	Grommet type, with 3 m lead wire (ZSE1)
C	Connector type, with 0.6 m lead wire (ZSE1)
CL	Connector type, with 3 m lead wire (ZSE1)
CN	Connector type, without connector assembly
Nil	Grommet type, with 0.5 m lead wire (ZSM1)
L	Grommet type, with 3 m lead wire (ZSM1)

Vacuum switch model

Nil	Without switch
E14	1 output, without analog output, 3 rotation setting (ZSE1)
E15	1 output, without analog output, 200° setting (ZSE1)
E16	2 outputs, without analog output, 3 rotation setting (ZSE1)
E17	2 outputs, without analog output, 200° setting (ZSE1)
E18	1 output, analog output, 3 rotation setting (ZSE1)
E19	1 output, analog output, 200° setting (ZSE1)
E55	1 output, without analog output, 200° setting, PNP output (ZSE1)
M15	1 output, without analog output, Diaphragm (18 rotation setting), Solid state(10 to 26 VDC) (ZSM1)
M21	1 output, without analog output, Diaphragm (18 rotation setting), Reed (AC/DC 100 VAC)(ZSM1)

Manual override

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

∗ S is not available for AC.
DC voltage (with surge voltage suppressor)
If the polarity is incorrect at DC (surge voltage suppressor), diode or switching element may be damaged.

Supply valve/Release valve combination

J	Supply valve (N.C.)
K	Supply valve (N.C.), and release valve
A	Supply valve (N.O.)
B	Supply valve (N.O.), and release valve
P3	Air operated valve (supply valve), Port size connection M3 x 0.5
P5	Air operated valve (supply valve), Port size connection M5 x 0.8
Q3	Air operated valve (supply/release valve), Port size connection M3 x 0.5
Q5	Air operated valve (supply/release valve), Port size connection M5 x 0.8
Nil	Without valve

∗ As the double solenoid specifications, -X126 and -X135 are available as a special order. (Refer to page 1006.)
When selecting air operated valves, there will be no symbol specified for "pilot valves", "solenoid valve rated voltage", "electrical entry", "light/surge voltage suppressor" and "manual override".

Pilot valve

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

∗ Only 24 VDC and 12 VDC are applicable to 0.45 W.

Solenoid valve rated voltage

		CE compliant
1 Note)	100 VAC 50/60 Hz	—
3 Note)	110 VAC 50/60 Hz	—
5	24 VDC	●
6	12 VDC	●
V	6 VDC	●
S	5 VDC	●
R	3 VDC	●
Nil	Air operated/Without valve	—

Note) CE compliant products are not available for "1" and "3".

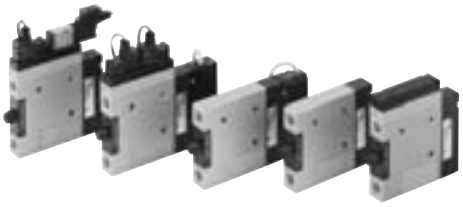
Electrical entry

G	Grommet type, with 0.3 m lead wire (applicable to DC)
H	Grommet type, with 0.6 m lead wire (applicable to DC)
L	L plug connector, with 0.3 m lead wire
LN	L plug connector, without lead wire (applicable to DC)
LO	L plug connector, without connector (applicable to DC)
Nil	Air operated/Without valve

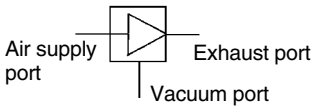
Combination of Nozzle Diameter and Standard Supply Pressure

Nozzle diameter	Standard supply pressure MPa		
	M (0.35)	**S** (0.45)	**H** (0.5)
0.5 mm	—	—	○
0.7 mm	○	—	○
1.0 mm	○	—	○
1.3 mm	○	○	○
1.5 mm	—	○	—

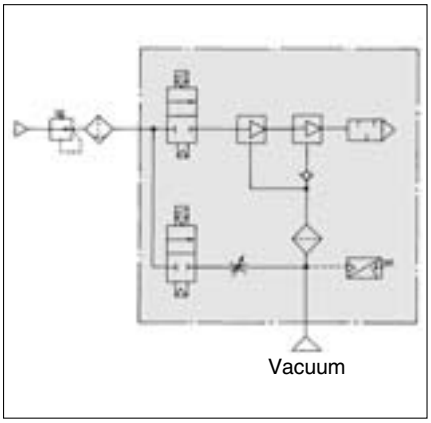
SMC



JIS Symbol



Ejector System Circuit



Made to Order
(Refer to pages 1004 to 1006 for details.)

Model

Nozzle dia. ø (mm)	Model	Standard supply pressure H	M	S	Maximum suction flow rate (ℓ/min (ANR))	Air consumption (ℓ/min (ANR))	Diffuser construction
0.5	**ZM05□H**	0.5 MPa	—	—	15	17	Double diffuser
0.7	**ZM07□H**				30	30	
1.0	**ZM10□H**				50	60	
1.3	**ZM13□H**				66	90	
0.7	**ZM07□M**	—	0.35 MPa	—	23	33	
1.0	**ZM10□M**				38	60	
1.3	**ZM13□M**				44	85	
1.3	**ZM13□S**	—	—	0.45 MPa	37	88	Single diffuser
1.5	**ZM15□S**				45	110	

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 **Vacuum release valve**		Main valve ——— Poppet Pilot valve ——— VJ114, VJ324M
Vacuum pressure switch		Electronic ——— ZSE1-00-□□ Diaphragm ——— ZSM1-0□□
Suction filter		Filteration degree: 30 μm, Material: PE (Polyethylene)

Valve Specifications

How to operate	Pilot type
Main valve	NBR poppet
Effective area	3 mm²
Cv factor	0.17
Operating pressure range	0.25 to 0.7 MPa
Electrical entry	Plug connector, Grommet (available on DC)
Max. operating frequency	5 Hz
Voltage	24/12/6/5/3 VDC, 100/110 VAC (50/60 Hz)
Power consumption	DC: 1 W (With light: 1.05 W), 100 VAC: 1.4 W (1.45 W), 110 VAC: 1.45 W (1.5 W)

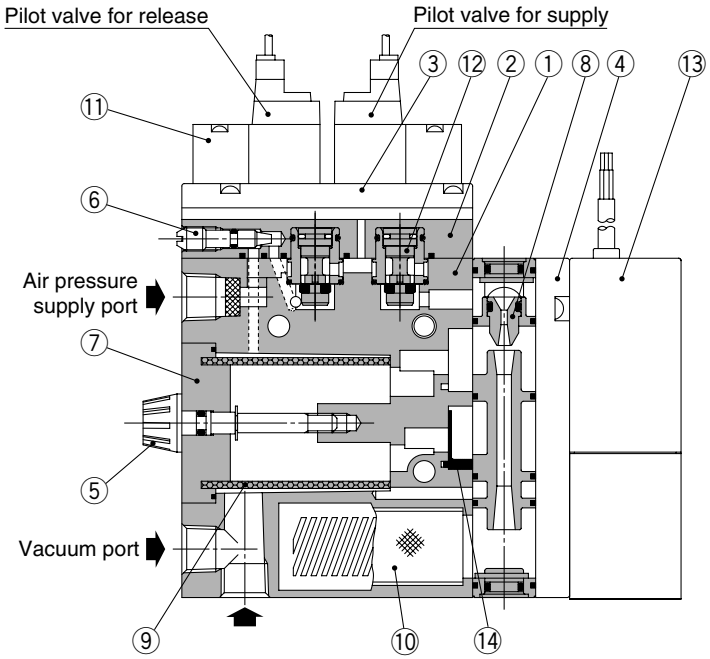
Mass

(kg)

Model	Without switch	-E□□	-E□□L	-M□□	-M□□L
ZM□□2□	0.17	0.21	0.26	0.27	0.32
ZM□□4□	0.17	0.21	0.26	0.27	0.32
ZM□□6□	0.17	0.21	0.26	0.27	0.32
ZM□□1□-J□□ **ZM□□3□-J□□** **ZM□□5□-J□□**	0.24	0.28	0.33	0.34	0.39
ZM□□1□-K□□ **ZM□□3□-K□□** **ZM□□5□-K□□**	0.25	0.29	0.34	0.35	0.4
ZM□□1□-A□□ **ZM□□3□-A□□** **ZM□□5□-A□□**	0.25	0.29	0.34	0.35	0.4
ZM□□1□-B□□ **ZM□□3□-B□□** **ZM□□5□-B□□**	0.26	0.3	0.35	0.36	0.41
ZM□□□□-$^{P}_{Q}$□	0.24	0.28	0.33	0.34	0.39

Stations	-04R/L	-04B	-06R/L	-06B	-SR/L	-SB
1	0.209	0.219	0.219	0.229	0.239	0.269
2	0.214	0.224	0.224	0.234	0.244	0.274
3	0.219	0.229	0.229	0.239	0.249	0.279
4	0.224	0.234	0.234	0.244	0.254	0.284
5	0.229	0.239	0.239	0.249	0.259	0.289
6	0.234	0.244	0.244	0.254	0.264	0.294
7	0.239	0.249	0.249	0.259	0.269	0.299
8	0.244	0.254	0.254	0.264	0.274	0.304
9	0.249	0.259	0.259	0.269	0.279	0.309
10	0.254	0.264	0.264	0.274	0.284	0.314

Construction: ZM□1□-K□L-E□



Component Parts

No.	Description	Material	Note
1	**Body**	Aluminum die-casted	
2	**Valve cover**	Zinc die-casted or resin	
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	

Replacement Parts

No.	Description	Material	Part no.
6	**Release flow rate adjusting needle**	Brass/Electroless nickel plated	ZM-NA (With lock nut: ZM-ND-L)
7	**Filter cover assembly**	—	ZM-FCB-0
8	**Diffuser assembly**	—	ZM□□0□-0
9	**Suction filter**	Polyethylene	ZM-SF
10	**Silencer assembly**	—	ZM-SA (High noise reduction: ZM-SA-D)
11	**Pilot valve**	—	VJ114-□□□□
12	**Poppet valve assembly**	—	ZMA-PV2-0
13	**Vacuum pressure switch**	—	ZSE1-00-□□ ZSM1-015 ZSM1-021
14	**Check valve**	NBR	ZM-CV

⚠ Precautions

Be sure to read before handling. Refer to front matters 38 and 39 for Safety Instructions and pages 844 to 846 for Vacuum Equipment Precautions.

⚠ Caution

Selection and sizing of Series ZM

Refer to the Vacuum Equipment Model Selection on pages 825 to 843.

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, chlorofrom, 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.

Release flow rate adjusting screw

Turning the vacuum release flow rate adjusting screw 4 full turns from the fully closed position renders the valve fully open. Do not turn more than four times since turning excessively may cause the screw fall off.

In order to prevent the screw from loosening and falling out, the release flow rate adjusting needle with lock nut is also available.