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.

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**

### How to Order

#### ZM

<table>
<thead>
<tr>
<th>Nozzle diameter</th>
<th>05</th>
<th>0.5</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>07</td>
<td>0.7</td>
</tr>
<tr>
<td></td>
<td>10</td>
<td>1.0</td>
</tr>
<tr>
<td></td>
<td>13</td>
<td>1.3</td>
</tr>
<tr>
<td></td>
<td>15</td>
<td>1.5</td>
</tr>
</tbody>
</table>

**Vacuum port location**

- Nil: Side/Bottom entry
- A: Side entry

#### Body style

- 1: Unit valve + with standard silencer
- 1S: Unit valve + with high noise reduction silencer
- 3: Manifold: with common SUP valve
- 5: Manifold: with individual SUP valve
- 2: Unit with standard silencer (without valve)
- 2S: Unit with high noise reduction silencer (without valve)
- 4: Manifold: without common SUP valve
- 6: Manifold: without individual SUP valve

**Standard supply pressure**

- M: 0.35 MPa
- S: 0.45 MPa
- H: 0.5 MPa

**Thread type**

- Nil: NC
- T: NPTF
- F: G (NC) (Option)

**Supply valve/Release valve combination**

- J: Supply valve (N.C.)
- K: Supply valve (N.O.), and release valve
- A: Supply valve (N.O.)
- B: Supply valve (N.O.), and release valve
- P5: Air operated valve (supply valve), Port size connection M5 x 0.8
- Q5: Air operated valve (supply/release valve), Port size connection M5 x 0.8

**Solenoid valve rated voltage**

<table>
<thead>
<tr>
<th>Nozzle diameter</th>
<th>CE-compliant</th>
<th>100 VAC 50/60Hz</th>
<th>110 VAC 50/60Hz</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 (Note)</td>
<td>Nil</td>
<td>24 VDC</td>
<td>12 VDC</td>
</tr>
<tr>
<td>2 (Note)</td>
<td>Nil</td>
<td>6 VDC</td>
<td>5 VDC</td>
</tr>
<tr>
<td>3 (Note)</td>
<td>Nil</td>
<td>3 VDC</td>
<td></td>
</tr>
<tr>
<td>4 (Note)</td>
<td>Nil</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**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)
- M19: 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 (100 VAC)(ZSM1)

**Manual override**

- Nil: Non-locking push type
- L: Locking slotted type

**Light/Surge voltage suppressor**

- Nil: None
- Z: With light/surge voltage suppressor
- S: With surge voltage suppressor

**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
- Nil: Air operated/Without valve

**Combination of Nozzle Diameter and Standard Supply Pressure**

<table>
<thead>
<tr>
<th>Nozzle diameter</th>
<th>Standard supply pressure MPa</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.5</td>
<td>0.35</td>
</tr>
<tr>
<td>0.7</td>
<td>0.45</td>
</tr>
<tr>
<td>1.0</td>
<td>0.5</td>
</tr>
<tr>
<td>1.3</td>
<td>0.6</td>
</tr>
<tr>
<td>1.5</td>
<td>0.7</td>
</tr>
</tbody>
</table>

*Note) CE-compliant products are not available for “1” and “3”.*
Table (1) How to Order Connector for Solid State Switch

- Without lead wire (A connector and 4 sockets) ........................................ ZS – 20 – A
- 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-8-1-1-E15CN ........................................ 1 pc.
  + ZS-20-5A-50 ........................................ 1 pc.

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

- How to Order Solenoid Valves (Refer to the table (3))
- How to order connector assembly

DC: SY100–30–4A–
100 VAC: SY100–30–1A–
110 VAC: SY100–30–3A–
SY100–30–A

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 – K1L0 (-Q) .............................. 1 pc.
SY100–30–1A–10 ......................... 2 pcs.

Warning
The pilot valve should be changed. When replacing the current model (black color) in which “1” or “3” is used for the solenoid valve rated voltage, replace the lead wire assembly with connector together.

Caution
The type of actuation cannot be changed just by changing the solenoid valve.

Table (3) Solenoid Valve Model

Supply valve N.C. Release valve (N.C.)  Z1-V114-HABCD
Supply valve N.O. V124-HABCD

Quick Delivery/Model
<Without valve/Single unit>
- ZM052H
- ZM072H
- ZM102H
- ZM132H

<With valve/Single unit>
- ZM051H-KSLZ-(Q)
- ZM051H-KSLZ-E15-(Q)
- ZM071H-KSLZ-(Q)
- ZM071H-KSLZ-E15-(Q)
- ZM101H-KSLZ-(Q)
- ZM101H-KSLZ-E15-(Q)
- ZM131H-KSLZ-(Q)
- ZM131H-KSLZ-E15-(Q)
- ZM131M-KSLZ-(Q)
- ZM131M-KSLZ-E15-(Q)
**Symbol**

- Air supply port
- Exhaust port
- Vacuum port

**Ejector System Circuit**

**Made to Order**
(Refer to pages 194 to 196 for details.)

**Model**

<table>
<thead>
<tr>
<th>Nozzle diameter (mm)</th>
<th>Model</th>
<th>Standard supply pressure (MPa)</th>
<th>Vacuum suction flow rate (L/min (ANR))</th>
<th>Air consumption (L/min (ANR))</th>
<th>Diffuser construction</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.5</td>
<td>ZM05</td>
<td>0.5</td>
<td>15</td>
<td>17</td>
<td>Double diffuser</td>
</tr>
<tr>
<td>0.7</td>
<td>ZM07</td>
<td>0.5</td>
<td>30</td>
<td>30</td>
<td>Double diffuser</td>
</tr>
<tr>
<td>1.0</td>
<td>ZM10</td>
<td>0.5</td>
<td>50</td>
<td>60</td>
<td>Double diffuser</td>
</tr>
<tr>
<td>1.3</td>
<td>ZM13</td>
<td>0.35</td>
<td>66</td>
<td>90</td>
<td>Double diffuser</td>
</tr>
<tr>
<td>0.7</td>
<td>ZM07</td>
<td>0.35</td>
<td>23</td>
<td>33</td>
<td>Single diffuser</td>
</tr>
<tr>
<td>0.7</td>
<td>ZM07</td>
<td>0.35</td>
<td>23</td>
<td>33</td>
<td>Single diffuser</td>
</tr>
<tr>
<td>1.3</td>
<td>ZM13</td>
<td>0.45</td>
<td>37</td>
<td>88</td>
<td>Single diffuser</td>
</tr>
<tr>
<td>1.3</td>
<td>ZM13</td>
<td>0.45</td>
<td>37</td>
<td>88</td>
<td>Single diffuser</td>
</tr>
<tr>
<td>1.5</td>
<td>ZM15</td>
<td>0.45</td>
<td>45</td>
<td>110</td>
<td>Single diffuser</td>
</tr>
</tbody>
</table>

**Vacuum Ejector Specifications**

<table>
<thead>
<tr>
<th>Fluid</th>
<th>Air pressure supply (P) port (Without valve)</th>
<th>Air pressure supply (P) port (With valve)</th>
<th>Pilot pressure supply (PA, PB) ports for supply and release</th>
<th>P port pressure to 0.55 MPa</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0.2 to 0.55 MPa</td>
<td>0.25 to 0.55 MPa</td>
<td>P port pressure to 0.55 MPa</td>
<td></td>
</tr>
</tbody>
</table>

**Operating range**

<table>
<thead>
<tr>
<th>Without valve</th>
<th>With valve</th>
</tr>
</thead>
<tbody>
<tr>
<td>5 to 60 °C</td>
<td>5 to 50 °C</td>
</tr>
</tbody>
</table>

**Air supply valve**

- Main valve: Poppet valve
- Pilot valve: V114, V124

**Vacuum release valve**

- Electronic: ZSE1-00
- Diaphragm: ZSM1-0

**Suction filter**

- Filtration degree: 30 μm, Material: PE (Polyethylene)

**Note**

- Combination of supply valve and release valve: P5, Q5
- The supply and release valves of this product have a structure which uses the pressure of the air pressure supply (P) port to operate them. Be sure to supply a pressure that is the pressure of the air pressure supply (P) port or more and 0.55 MPa or less to the pilot pressure supply (PA, PB) ports for supply and release.

**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: 24VDC/12VDC/6VDC/5/3VDC, 100/110 VAC (50/60 Hz)
- Power consumption: DC: 0.35W (With light: 0.4 W), 100 VAC: 0.78 W (0.81 W), 110 VAC: 0.86 W (0.89 W)

**Weight**

<table>
<thead>
<tr>
<th>Model</th>
<th>Without switch</th>
<th>-E-</th>
<th>-E- L</th>
<th>-M-</th>
<th>-M- L</th>
</tr>
</thead>
<tbody>
<tr>
<td>ZM</td>
<td>0.13</td>
<td>0.17</td>
<td>0.22</td>
<td>0.25</td>
<td>0.29</td>
</tr>
<tr>
<td>ZM</td>
<td>0.16</td>
<td>0.2</td>
<td>0.25</td>
<td>0.28</td>
<td>0.33</td>
</tr>
<tr>
<td>ZM</td>
<td>0.16</td>
<td>0.2</td>
<td>0.25</td>
<td>0.28</td>
<td>0.33</td>
</tr>
<tr>
<td>ZM</td>
<td>0.18</td>
<td>0.22</td>
<td>0.27</td>
<td>0.29</td>
<td>0.34</td>
</tr>
<tr>
<td>ZM</td>
<td>0.22</td>
<td>0.24</td>
<td>0.27</td>
<td>0.29</td>
<td>0.34</td>
</tr>
<tr>
<td>ZM</td>
<td>0.17</td>
<td>0.2</td>
<td>0.25</td>
<td>0.27</td>
<td>0.32</td>
</tr>
<tr>
<td>ZM</td>
<td>0.18</td>
<td>0.21</td>
<td>0.26</td>
<td>0.29</td>
<td>0.34</td>
</tr>
<tr>
<td>ZM</td>
<td>0.17</td>
<td>0.2</td>
<td>0.25</td>
<td>0.27</td>
<td>0.32</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Stations</th>
<th>-04/R/L</th>
<th>-04B</th>
<th>-06R/L</th>
<th>-06B</th>
<th>-SR/L</th>
<th>-SB</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0.209</td>
<td>0.219</td>
<td>0.219</td>
<td>0.229</td>
<td>0.239</td>
<td>0.269</td>
</tr>
<tr>
<td>2</td>
<td>0.214</td>
<td>0.224</td>
<td>0.224</td>
<td>0.244</td>
<td>0.244</td>
<td>0.274</td>
</tr>
<tr>
<td>3</td>
<td>0.219</td>
<td>0.229</td>
<td>0.229</td>
<td>0.239</td>
<td>0.249</td>
<td>0.279</td>
</tr>
<tr>
<td>4</td>
<td>0.224</td>
<td>0.234</td>
<td>0.234</td>
<td>0.244</td>
<td>0.254</td>
<td>0.284</td>
</tr>
<tr>
<td>5</td>
<td>0.229</td>
<td>0.239</td>
<td>0.239</td>
<td>0.249</td>
<td>0.259</td>
<td>0.289</td>
</tr>
<tr>
<td>6</td>
<td>0.234</td>
<td>0.244</td>
<td>0.244</td>
<td>0.254</td>
<td>0.264</td>
<td>0.294</td>
</tr>
<tr>
<td>7</td>
<td>0.239</td>
<td>0.249</td>
<td>0.249</td>
<td>0.259</td>
<td>0.269</td>
<td>0.299</td>
</tr>
<tr>
<td>8</td>
<td>0.244</td>
<td>0.254</td>
<td>0.254</td>
<td>0.264</td>
<td>0.274</td>
<td>0.304</td>
</tr>
<tr>
<td>9</td>
<td>0.249</td>
<td>0.259</td>
<td>0.259</td>
<td>0.269</td>
<td>0.279</td>
<td>0.309</td>
</tr>
<tr>
<td>10</td>
<td>0.254</td>
<td>0.264</td>
<td>0.264</td>
<td>0.274</td>
<td>0.284</td>
<td>0.314</td>
</tr>
</tbody>
</table>
Construction: ZM□1□-K□L-E□

Component Parts

<table>
<thead>
<tr>
<th>No.</th>
<th>Description</th>
<th>Material</th>
<th>Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Body</td>
<td>Aluminum die-casted</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Valve cover</td>
<td>Resin</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Adapter plate</td>
<td>Resin</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Cover</td>
<td>Zinc die-casted</td>
<td>Without switch: ZM-HCA,</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>With switch: ZM-HCB</td>
</tr>
<tr>
<td>5</td>
<td>Tension bolt</td>
<td>Stainless steel/Polyacetal</td>
<td></td>
</tr>
</tbody>
</table>

Replacement Parts

<table>
<thead>
<tr>
<th>No.</th>
<th>Description</th>
<th>Material</th>
<th>Part no.</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td>Release flow rate adjusting needle</td>
<td>Brass/Electroless nickel plating</td>
<td>ZM-NA (With lock nut: ZM-ND-L)</td>
</tr>
<tr>
<td>7</td>
<td>Filter cover assembly</td>
<td></td>
<td>ZM-FCB-0</td>
</tr>
<tr>
<td>8</td>
<td>Diffuser assembly</td>
<td></td>
<td>ZM-10-0 (Refer to page 176)</td>
</tr>
<tr>
<td>9</td>
<td>Suction filter</td>
<td>Polyethylene</td>
<td>ZM-SF</td>
</tr>
<tr>
<td>10</td>
<td>Silencer assembly</td>
<td></td>
<td>ZM-SA (High noise reduction: ZM-SA-B)</td>
</tr>
<tr>
<td>11</td>
<td>Pilot valve</td>
<td></td>
<td>Z1-V114-□□□□ (Refer to page 177)</td>
</tr>
<tr>
<td>12</td>
<td>Poppet valve assembly</td>
<td></td>
<td>ZMA-PV2-0</td>
</tr>
<tr>
<td>13</td>
<td>Vacuum pressure switch</td>
<td></td>
<td>ZSE1-00-□□□□</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>ZSM1-015</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>ZSM1-021</td>
</tr>
<tr>
<td>14</td>
<td>Check valve</td>
<td>NBR</td>
<td>ZM-CV</td>
</tr>
</tbody>
</table>

Precautions

Be sure to read before handling. Refer to back page 1 for Safety Instructions and back page 2 to 4 for Vacuum Equipment Precautions.

Caution

Selection and sizing of Series ZM
Refer to the Vacuum Equipment Model Selection on front mater 18 to 39.

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 the following chemicals: paint thinner, carbon tetrachloride, chloroform, acetic esters, aniline, cyclohexane, trichloroethylene, sulfuric acid, lactic acid, water-soluble cutting oil (alkaline), 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.
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**
Exhaust Characteristics/Flow Characteristics, Standard Supply Pressure: H ••• 0.5 MPa

**ZM13□H**

**Exhaust Characteristics**

![Graph showing Exhaust Characteristics for ZM13□H]

**Flow Characteristics**

![Graph showing Flow Characteristics for ZM13□H]

Exhaust Characteristics/Flow Characteristics, Standard Supply Pressure: S ••• 0.45 MPa

**ZM13□S**

**Exhaust Characteristics**

![Graph showing Exhaust Characteristics for ZM13□S]

**Flow Characteristics**

![Graph showing Flow Characteristics for ZM13□S]

**ZM15□S**

**Exhaust Characteristics**

![Graph showing Exhaust Characteristics for ZM15□S]

**Flow Characteristics**

![Graph showing Flow Characteristics for ZM15□S]
Exhaust Characteristics/Flow Characteristics, Standard Supply Pressure: M ··· 0.35 MPa

**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 supply pressure.

In graph, Pmax is max. vacuum pressure and Qmax is max. suction flow. The values are specified according to catalog use.

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 ventilative or leaky work must be adsorbed, please note that vacuum pressure will not be high.
**Vacuum Switch**

<table>
<thead>
<tr>
<th>Model</th>
<th>ZSE1-00-14</th>
<th>ZSE1-00-15</th>
<th>ZSE1-00-16</th>
<th>ZSE1-00-17</th>
<th>ZSE1-00-18</th>
<th>ZSE1-00-19</th>
<th>ZSE1-00-55</th>
<th>ZSM1-015</th>
<th>ZSM1-021</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sensor type</td>
<td>Solid state</td>
<td>Solid state</td>
<td>Solid state</td>
<td>Reed</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Set pressure range</td>
<td>0 to –101 kPa</td>
<td>–27 to –80 kPa</td>
<td>0 to –101 kPa</td>
<td>–27 to –80 kPa</td>
<td>0 to –101 kPa</td>
<td>–27 to –80 kPa</td>
<td>0 to –101 kPa</td>
<td>–27 to –80 kPa</td>
<td>0 to –101 kPa</td>
</tr>
<tr>
<td>Hysteresis</td>
<td>1 to 10% of the set pressure (Changeable)</td>
<td>3% full span or less (Fixed)</td>
<td>1 to 10% of the set pressure (Changeable)</td>
<td>Max. 15 kPa</td>
<td>Max. 20 kPa</td>
<td>Max. 15 kPa</td>
<td>Max. 20 kPa</td>
<td>Max. 15 kPa</td>
<td>Max. 20 kPa</td>
</tr>
<tr>
<td>Repeatability</td>
<td>±1% full span or less</td>
<td>±1% full span or less</td>
<td>±1% full span or less</td>
<td>±10% or less</td>
<td>±1% full span or less</td>
<td>±1% full span or less</td>
<td>±1% full span or less</td>
<td>±1% full span or less</td>
<td>±1% full span or less</td>
</tr>
<tr>
<td>Temperature characteristics</td>
<td>±3% full span or less</td>
<td>±3% full span or less</td>
<td>±3% full span or less</td>
<td>±5% full span</td>
<td>±3% full span or less</td>
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<td>±3% full span or less</td>
<td>±5% full span</td>
<td></td>
</tr>
<tr>
<td>Operating voltage</td>
<td>12 to 24 VDC (Ripple ±10% or less )</td>
<td>4.5 to 28 VDC</td>
<td>AC/DC 100 V</td>
<td>12 to 24 VDC (Ripple ±10% or less )</td>
<td>4.5 to 28 VDC</td>
<td>AC/DC 100 V</td>
<td>12 to 24 VDC (Ripple ±10% or less )</td>
<td>4.5 to 28 VDC</td>
<td>AC/DC 100 V</td>
</tr>
<tr>
<td>ON-OFF output</td>
<td>NPN open collector 30 V, Max. 80 mA</td>
<td>PNP open collector 80 mA</td>
<td>Open collector 28 V, Max. 40 mA</td>
<td>NPN open collector 30 V, Max. 80 mA</td>
<td>PNP open collector 80 mA</td>
<td>Open collector 28 V, Max. 40 mA</td>
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<td></td>
</tr>
<tr>
<td>Setting points</td>
<td>1 point</td>
<td>2 points</td>
<td>1 point</td>
<td>1 point</td>
<td>1 point</td>
<td>1 point</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Operation indicator light</td>
<td>Lights up when ON</td>
<td>Lights ON (Output 1: Red, Output 2: Green)</td>
<td>Lights up when ON</td>
<td>Lights up when ON</td>
<td>Lights up when ON</td>
<td></td>
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</tr>
<tr>
<td>Setting trimmer</td>
<td>3 rotations</td>
<td>200 degrees</td>
<td>3 rotations</td>
<td>200 degrees</td>
<td>3 rotations</td>
<td>200 degrees</td>
<td>3 rotations</td>
<td>200 degrees</td>
<td>3 rotations</td>
</tr>
<tr>
<td>Current consumption</td>
<td>17 mA or less (When 24 VDC is ON)</td>
<td>25 mA or less (When 24 VDC is ON)</td>
<td>17 mA or less (When 24 VDC is ON)</td>
<td>17 mA or less (When 24 VDC is ON)</td>
<td>17 mA or less (When 24 VDC is ON)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Max. current</td>
<td>34 mA or less 34 mA</td>
<td>40 mA 40 mA</td>
<td>34 mA or less 34 mA</td>
<td>40 mA 40 mA</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Max. operating pressure</td>
<td>0.2 MPa</td>
<td>0.5 MPa</td>
<td>0.2 MPa</td>
<td>0.5 MPa</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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

Note: For details about wiring, refer to the Operation Manual that can be downloaded from our website (http://www.smcworld.com).

### Diaphragm Switch (ZSM)

**Solid State Switch: ZSM1-015**

- **Brown lead wire:** Connect the ☀️ power supply to operate the main switch circuit (to the ☀️ terminal of the power source).
- **Black lead wire:** Connect the load (to the input or output relay of the PLC).
- **Blue lead wire:** Connect the ☽ power supply (to the GND terminal of the power supply).

**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**

For details on the ZSM1 series, click here.

For details on the ZSE1 series, click here.
How to Set the Pressure

• The ON pressure is set with the pressure setting trimmer. The high pressure/high vacuum pressure can be set turning it clockwise.
• When setting, use a flat head screw driver which fits the groove in the trimmer, and turn it gently with your fingertips.

ZSE1(L)-14/-15/-18/-19
• Hysteresis can be set using the hysteresis setting trimmer. The setting is increased by turning it clockwise, and the range is 1 to 10% of the set pressure range.
• When the hysteresis setting trimmer is moved after setting the ON pressure, it must be set again.

• OUT1 (black lead wire, red LED) can be set with the pressure setting trimmer 1 (SET1).
• OUT2 (white lead wire, green LED) can be set with the pressure setting trimmer 2 (SET2).

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.

Caution
Observe the following precautions for setting the vacuum pressure. Use your fingertips to gently turn the screwdriver. Do not use a screwdriver with a large grip or with a tip that does not fit into the trimmer groove because this could damage the groove.
Series ZM

For Single Unit/Without Valve  Basic Type

ZM[H][M][S]

For Single Unit/Without Valve  Basic Type with Switch

ZM[H][M][S]

1/8 (Rc, NPTF, G)  Vacuum (V) port
Side entry style is equipped with plugs.

1/8 (Rc, NPTF, G)  Air pressure supply (P) port

1/8 (Rc, NPTF, G)  Vacuum (V) port

1/8 (Rc, NPTF, G)  Air pressure supply (P) port

1/8 (Rc, NPTF, G)  Vacuum (V) port
Side entry style is equipped with plugs.

<Components>

Exhaust

Vacuum

Exhaust

Vacuum

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

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

Supply
Air Operated Type

ZM□□□□H□□□□5

A: Release flow rate adjusting needle with lock nut

Note 1) This is a hole for using the manifold and single unit bodies in common, and it is not used for the single unit.

Note 2) The supply and release valves of this product have a structure which uses the pressure of the air pressure supply (P) port to operate them. Be sure to supply a pressure that is the pressure of the air pressure supply (P) port or more and 0.55 MPa or less to the pilot pressure supply (PA, PB) ports for supply and release.
Series ZM

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

<Components>

A: Release flow rate adjusting needle with lock nut

Note 1) This is a hole for using the manifold and single unit bodies in common, and it is not used for the single unit.

Note 2) [ ]: AC

Dimensions of model with high noise reduction silencer assembly is the same as standard.
Single/With Air Supply Valve (N.O.) and Vacuum Release Valve  
Basic Type with Valve

<Components>

A: Release flow rate adjusting needle with lock nut

(Note 1) This is a hole for using the manifold and single unit bodies in common, and it is not used for the single unit.

Note 2) [ ]: AC
The asterisk (*) indicates the ejector model no. below the manifold base no. Prefix it to the vacuum ejector part numbers to be mounted. When it is not added, products are shipped separately.

Example)

ZZM06-06R ····················· 1 pc.
* ZM103H-J5LZ(-Q) ··········· 3 pcs.
* ZM133H-J5LZ(-Q) ··········· 3 pcs.
### Vacuum Ejector

**Series ZM**

**Manifold**

**ZZM**

<table>
<thead>
<tr>
<th>Number of ejectors</th>
<th>Common EXH port</th>
<th>Port location</th>
</tr>
</thead>
<tbody>
<tr>
<td>L1</td>
<td>28±1.5</td>
<td>60±1.5</td>
</tr>
<tr>
<td></td>
<td>44±1.5</td>
<td>76±1.5</td>
</tr>
<tr>
<td></td>
<td>92±1.5</td>
<td>108±2.0</td>
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<tr>
<td></td>
<td>124±2.0</td>
<td>140±2.0</td>
</tr>
<tr>
<td></td>
<td>156±2.0</td>
<td>172±2.0</td>
</tr>
</tbody>
</table>

**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       |
|                   | 200±2.0         | 216±2.0       |

**L3**

|                   | 52±1.5          | 68±1.5        |
|                   | 84±1.5          | 100±1.5       |
|                   | 116±1.5         | 132±2.0       |
|                   | 148±2.0         | 164±2.0       |
|                   | 180±2.0         | 196±2.0       |

|                   | 46±1.5          | 62±1.5        |
|                   | 78±1.5          | 94±1.5        |
|                   | 110±1.5         | 126±2.0       |
|                   | 142±2.0         | 158±2.0       |
|                   | 174±2.0         | 190±2.0       |

|                   | 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       |

|                   | 48±1.5          | 64±1.5        |
|                   | 80±1.5          | 96±1.5        |
|                   | 112±1.5         | 128±2.0       |
|                   | 144±2.0         | 160±2.0       |
|                   | 176±2.0         | 192±2.0       |

**Diagram:**

- Vacuum port electrical entry (in the case of side entry/With plug at the bottom)
- 2 x ø5.5 (Mounting hole)
- 2 x 1/8 (Rc, NPTF, G) VAC port
- 1/2, 3/4 (Rc, NPTF, G) Common exhaust (EXH.) port
- Right
- Left
- Vacuum port electrical entry (In the case of side entry/With plug at the bottom)

**Notes:**

1) [ ] for N.C., AC type
2) <> for N.O., AC type
3) For individual supply specifications

---

**Legend:**

- Rc1/8 Hexagon socket head cap plug
- Vacuum port electrical entry (In the case of side entry/With plug at the bottom)
- Individual air pressure supply (P) port
- Common air supply (P) port
- Common exhaust (EXH.) port
- Common pilot pressure exhaust (PE) port
- 2 x M5 x 0.8

**Dimensions:**

<table>
<thead>
<tr>
<th>Stations</th>
<th>L1</th>
<th>L2</th>
<th>L3</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>28±1.5</td>
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<td>60±1.5</td>
<td>76±1.5</td>
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<tr>
<td></td>
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<tr>
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<td>172±2.0</td>
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<td>216±2.0</td>
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<tr>
<td></td>
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<td></td>
<td>248±2.0</td>
<td>264±2.0</td>
<td>216±2.0</td>
</tr>
</tbody>
</table>
### Components

#### Vacuum port electrical entry (in the case of side entry/With plug at the bottom)

- **Rc1/8 Hexagon socket head cap plug**
- **Silencer dedicated for manifold (ZZM-SA)**

#### Manifold/With Silencer

**Manifold with Silencer Dedicated for Manifold**

**ZZM** Number of ejectors - **S** Silencer location

---

#### Table: Stations

<table>
<thead>
<tr>
<th>L1</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
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<tr>
<td>L1</td>
<td>28±1.5</td>
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<td>60±1.5</td>
<td>76±1.5</td>
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<td>140±2.0</td>
<td>156±2.0</td>
<td>172±2.0</td>
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<tr>
<td>L2</td>
<td>40±1.5</td>
<td>56±1.5</td>
<td>72±1.5</td>
<td>88±1.5</td>
<td>104±1.5</td>
<td>120±2.0</td>
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<td>152±2.0</td>
<td>168±2.0</td>
<td>184±2.0</td>
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<tr>
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<td>100±1.5</td>
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<td>132±2.0</td>
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<td>164±2.0</td>
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<td>46±1.5</td>
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<td>94±1.5</td>
<td>110±1.5</td>
<td>126±2.0</td>
<td>142±2.0</td>
<td>158±2.0</td>
<td>174±2.0</td>
<td>190±2.0</td>
</tr>
<tr>
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<td>82±1.5</td>
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<td>160±2.0</td>
<td>176±2.0</td>
<td>192±2.0</td>
</tr>
</tbody>
</table>

**Note 1)** [ ] for N.C., AC type  
**Note 2)** < > for N.O., AC type  
**Note 3)** For individual supply specifications
Component Parts for Manifold

(1) Stations | Manifold part no. | Clamp rod part no.
---|---|---
1 | ZZM01- | ZZM-CR-01
2 | ZZM02- | ZZM-CR-02
3 | ZZM03- | ZZM-CR-03
4 | ZZM04- | ZZM-CR-04
5 | ZZM05- | ZZM-CR-05
6 | ZZM06- | ZZM-CR-06
7 | ZZM07- | ZZM-CR-07
8 | ZZM08- | ZZM-CR-08
9 | ZZM09- | ZZM-CR-09
10 | ZZM10- | ZZM-CR-10

(2) Manifold part no. | Adapter A Left | Right | Adapter B Left | Right | Silencer Left | Right | Blanking plate Left | Right
---|---|---|---|---|---|---|---|---
ZZM-*04L- | | | | | | | | |
ZZM-*04B- | | | | | | | | |
ZZM-*06L- | | | | | | | | |
ZZM-*06B- | | | | | | | | |
ZZM-*159- | | | | | | | | |
ZZM-*15R- | | | | | | | | |
ZZM-*15L- | | | | | | | | |
ZZM-*15B- | | | | | | | | |
ZZM-*000- | | | | | | | | |

(3) No. | Model | Description | Quantity | Note
---|---|---|---|---
1 | ZZM-SA | Silencer assembly | * | Note 1) | *
2 | ZZM-BP | Blanking plate assembly | * | Note 2) Clamp rods consist of a set of 2 pcs.
3 | ZZM-ADA- | Adapter A assembly | * | Common exhaust (EXH.) port Size: (4 mm)
4 | ZZM-ADB- | Adapter B assembly | * | Common exhaust (EXH.) port Size: (6 mm)
5 | ZZM-GE | Gasket E | 2 |
6 | ZZM-EPL- | End plate L | 1 | Note 1) | 1
7 | ZZM-GBL | Gasket BL | 1 |
8 | ZZM-GBB | Gasket BB | Station: 1 |
9 | ZZM-GBR | Gasket BR | 1 |
10 | ZZM-EPR- | End plate R | 1 |
11 | ZZM-CR- | Clamp rod | 1 | Refer to Table (1), Note 2 |

* The used quantity varies depending on the part number.
Note 1) □ Symbol corresponding to the port thread type.
Note 2) Clamp rods consist of a set of 2 pcs.
### Double Check Valve/For Manifold

<table>
<thead>
<tr>
<th>Single: ZM</th>
<th>Nozzle diameter</th>
<th>Body</th>
<th>Supply pressure</th>
<th>Valve voltage</th>
<th>Electrical entry</th>
<th>X107</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Double check valve</td>
</tr>
</tbody>
</table>

When a manifold is used, the exhaust that is discharged to the silencer could flow out to the vacuum (V) port side. To reduce this, a check valve is used.

⚠️ **Warning**

1. It cannot be used for maintaining a vacuum.
2. Use a vacuum release valve. (Compatible with valve K, B and Q5 types only.) (The workpiece cannot be released without a vacuum release valve.)
3. Compatible with the manifold specifications only.

### Construction

![Diagram of Double Check Valve/For Manifold]
2 With Individual Exhaust Spacer

Single: ZM [Nozzle diameter] [Body] [Supply pressure] X111 [CE-compliant] → 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 valve and a switch.

Exhaust spacer assembly: ZM — SP —

<table>
<thead>
<tr>
<th>Thread Type</th>
<th>Nil</th>
<th>T</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Rc</td>
<td>NPTF</td>
<td>G</td>
</tr>
</tbody>
</table>

Caution
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.
When the product is used to prevent the manifold exhaust intrusion, exhaust intrusion may occur if exhaust pipes are put together.
When this special product is used for all manifold stations, the following part number can be used.

ZZM 00 —

Exhaust: Individual exhaust (EXH) port 1/8 (Rc, NPTF, G)

Construction

- Gasket
- Spacer E
- Round head combination screw
- Individual exhaust (EXH) port 1/8 (Rc, NPTF, G)

Stations
Without exhaust ports on both sides

Common air pressure supply (P) port location
- Nil, Both sides
- R, Right side
- L, Left side

* To the left or right when the vacuum (V) port is viewed from the front
Double Solenoid Supply Valve

This is an air supply pilot valve that is made with double solenoids.

* It is possible to manufacture it with a switch.

Construction

<table>
<thead>
<tr>
<th>Single: ZM</th>
<th>Nozzle diameter</th>
<th>Body</th>
<th>Supply pressure</th>
<th>Valve voltage</th>
<th>Electrical entry</th>
<th>X126</th>
</tr>
</thead>
</table>

Double solenoid supply valve

- X126 With release valve (Valve K type only)
- X135 Without release valve (Valve J type only)

Please contact SMC for detailed specifications, dimensions, and delivery.