**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
## How to Order

### ZM

**Nozzle diameter**

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

**Vacuum port location**

- Side/Bottom entry
- Side entry

**Body style**

- Unit: valve + with standard silencer
- Unit: valve + with high noise reduction silencer
- Manifold: with common SUP valve
- Manifold: with individual SUP valve
- Unit: with standard silencer (without valve)
- Unit: with high noise reduction silencer (without valve)
- Manifold: without common SUP valve
- Manifold: without individual SUP valve

**Standard supply pressure**

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

**Thread type**

- R: Rc
- T: NPTF
- F: G (honey)

**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
- PS: Air operated valve (supply valve), Port size connection M5 x 0.8
- QS: Air operated valve (supply/release valve), Port size connection M5 x 0.8

**Release flow rate adjusting needle**

- Without lock nut
- L: With lock nut

**Made to Order**

- Refer to pages 3.3-17 to 3.3-19 for details.

**Vacuum switch electrical entry**

- 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: Without lead wire assembly with connector (ZSE1)
- L: Grommet type, with 0.5 m lead wire (ZSM1)
- L: Grommet type, with 3 m lead wire (ZSM1)

**Vacuum switch model**

- Without switch
- E14: 1 output, without analogue output, 3 rotation setting (ZSE1)
- E15: 1 output, without analogue output, 200° setting (ZSE1)
- E16: 2 outputs, without analogue output, 3 rotation setting (ZSE1)
- E17: 2 outputs, without analogue output, 200° setting (ZSE1)
- E18: 1 output, analogue output, 3 rotation setting (ZSE1)
- E19: 1 output, analogue output, 200° setting (ZSE1)
- E55: 1 output, without analogue output, 200° setting, PNP output (ZSE1)
- M15: 1 output, without analogue output, UGF1 (0.6 rotation setting, Solid state 10 to 26 VDC) (ZSM1)

**Manual override**

- —: Non-locking push type
- B: Locking slotted type

**Light/Surge voltage suppressor**

- —: 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, with 0.3 m lead wire
- LO: L plug connector, with 0.6 m lead wire (applicable to DC)
- —: 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>M (0.35)</td>
</tr>
<tr>
<td>0.7</td>
<td>S (0.45)</td>
</tr>
<tr>
<td>1.0</td>
<td>H (0.5)</td>
</tr>
<tr>
<td>1.3</td>
<td></td>
</tr>
<tr>
<td>1.5</td>
<td></td>
</tr>
</tbody>
</table>

---

**Note**

- When the product is used for the manifold, the exhaust air of the operating ejector may enter the vacuum port (V) 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 3.3-17) or individual exhaust (-X111 on page 3.3-18.)

---

**Thread ridge shape**

The thread ridge shape is compatible with the G thread standard (JIS B0203), but other shapes are not conforming to ISO16030 and ISO1179.

---

**Solenoid valve rated voltage**

- 5: 24 VDC
- 6: 12 VDC
- V: 6 VDC
- S: 5 VDC
- R: 3 VDC

---

**Supply valve (N.C.)**

- As the solenoid valves, -X126 and -X135 are available as a special order. (Refer to page 3.3-19.)

**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"."
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.) ZM20ZS-E15CN ———— 1 pc.
+ ZS-20-5A-50 ———— 1 pc.

| Lead wire length | — | 0.6 m |
| | 30 | 3 m |
| | 50 | 5 m |

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

<table>
<thead>
<tr>
<th>How to Order Solenoid Valves (Refer to the table (3))</th>
<th>How to order connector assembly</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Z1 – V1 14 – 5 L Z</strong></td>
<td><strong>DC: SY100 – 30 – 4A –</strong></td>
</tr>
<tr>
<td><strong>V1 24 – 5 L Z</strong></td>
<td><strong>SY100 – 30 – A</strong></td>
</tr>
</tbody>
</table>

**Actuation**

- 1 Normally closed
- 2 Normally open

**Rated voltage**

- S 24 VDC
- 6 12 VDC
- V 6 VDC
- S 5 VDC
- R 3 VDC

**Light/Surge voltage suppressor**

- Without light/surge voltage suppressor
- With surge voltage suppressor
- With light/surge voltage suppressor

**Quick Delivery/Model**

<table>
<thead>
<tr>
<th>Without valve/Single unit</th>
<th>With valve/Single unit</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>ZM052H</strong></td>
<td><strong>ZM05H-KSLZ-Q</strong></td>
</tr>
<tr>
<td><strong>ZM072H</strong></td>
<td><strong>ZM051H-KSLZ-E15-Q</strong></td>
</tr>
<tr>
<td><strong>ZM102H</strong></td>
<td><strong>ZM071H-KSLZ-Q</strong></td>
</tr>
<tr>
<td><strong>ZM101H</strong></td>
<td><strong>ZM071H-KSLZ-E15-Q</strong></td>
</tr>
</tbody>
</table>

**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.
### Ejector System Circuit

![Diagram of Ejector System Circuit](image)

- **Symbol**
  - Air supply port
  - Exhaust port
  - Vacuum port

### Symbol Specifications
- **Port**
  - Air supply
  - Vacuum

### Made to Order
- (Refer to pages 3.3-20 to 3.3-22 for details.)

### Model Specifications
- **Nozzle dia. ø (mm)**
  - 0.5
  - 0.7
  - 1.0
  - 1.3
  - 0.7
  - 1.0
  - 1.3
  - 1.3
  - 1.5
- **Model**
  - ZM05-1H
  - ZM07-1H
  - ZM10-1H
  - ZM13-1H
  - ZM07-1M
  - ZM10-1M
  - ZM13-1M
  - ZM13-1S
  - ZM15-1S

#### Vacuum Ejector Specifications
- **Deaths**
  - 3.3-20 to 3.3-22

#### 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: 0.35W (With light: 0.4 W), 100 VAC: 0.78 W (0.81 W), 110 VAC: 0.86 W (0.89 W)

#### Weight
- **Model**
  - ZM1-2-1
  - ZM1-4-1
  - ZM1-6
  - ZM1-6-J
  - ZM3-6-J
  - ZM3-6-K
  - ZM1-6-A
  - ZM3-6-J-A
  - ZM3-6-K-A
  - ZM1-6-B
  - ZM3-6-J-B
  - ZM3-6-K-B
  - ZM3-6-J-C

#### Weight (kg)

<table>
<thead>
<tr>
<th>Model</th>
<th>Without switch</th>
<th>-E-1</th>
<th>-E-1/0</th>
<th>-M-1</th>
<th>-M-1/0</th>
</tr>
</thead>
<tbody>
<tr>
<td>ZM1-2-1</td>
<td>0.13</td>
<td>0.17</td>
<td>0.22</td>
<td>0.25</td>
<td>0.29</td>
</tr>
<tr>
<td>ZM1-4-1</td>
<td>0.16</td>
<td>0.2</td>
<td>0.25</td>
<td>0.28</td>
<td>0.33</td>
</tr>
<tr>
<td>ZM1-6</td>
<td>0.18</td>
<td>0.22</td>
<td>0.27</td>
<td>0.29</td>
<td>0.34</td>
</tr>
<tr>
<td>ZM1-6-J</td>
<td>0.17</td>
<td>0.2</td>
<td>0.25</td>
<td>0.27</td>
<td>0.32</td>
</tr>
<tr>
<td>ZM3-6-J-B</td>
<td>0.18</td>
<td>0.21</td>
<td>0.26</td>
<td>0.29</td>
<td>0.34</td>
</tr>
<tr>
<td>ZM3-6-K-B</td>
<td>0.17</td>
<td>0.2</td>
<td>0.25</td>
<td>0.27</td>
<td>0.32</td>
</tr>
</tbody>
</table>

#### Made to Order
- (Refer to pages 3.3-20 to 3.3-22 for details.)

### Station Specifications
- **-04R/L**
  - 0.209
  - 0.214
  - 0.219
  - 0.224
  - 0.239
  - 0.244
  - 0.249
  - 0.254
  - 0.259
  - 0.264
- **-04B**
  - 0.219
  - 0.224
  - 0.229
  - 0.234
  - 0.239
  - 0.244
  - 0.249
  - 0.254
  - 0.259
  - 0.264
- **-06R/L**
  - 0.229
  - 0.234
  - 0.239
  - 0.244
  - 0.249
  - 0.254
  - 0.259
  - 0.264
  - 0.269
  - 0.274
- **-06B**
  - 0.239
  - 0.244
  - 0.249
  - 0.254
  - 0.259
  - 0.264
  - 0.269
  - 0.274
  - 0.279
  - 0.284
- **-SR/L**
  - 0.249
  - 0.254
  - 0.259
  - 0.264
  - 0.269
  - 0.274
  - 0.279
  - 0.284
  - 0.290
  - 0.296
- **-SB**
  - 0.254
  - 0.264
  - 0.269
  - 0.274
  - 0.279
  - 0.286
  - 0.291
  - 0.296
  - 0.301
  - 0.306
### 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, 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 plated</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-2</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-D)</td>
</tr>
<tr>
<td>11</td>
<td>Pilot valve</td>
<td>—</td>
<td>Z1-V114-□□□□□□□□□ (Refer to page 3.3-3)</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>14</td>
<td>Check valve</td>
<td>NBR</td>
<td>ZM-CV</td>
</tr>
</tbody>
</table>

### Precautions

**Be sure to read before handling.**

### 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, chlorofrom, acetic ester, aniline, cyclohexane, trichlo-roethylene, 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.
Exhaust Characteristics/Flow Characteristics, Standard Supply Pressure: H ... 0.5 MPa

### ZM05\(\text{H}\)

**Exhaust Characteristics**

**Flow Characteristics**

### ZM07\(\text{H}\)

**Exhaust Characteristics**

**Flow Characteristics**

### ZM10\(\text{H}\)

**Exhaust Characteristics**

**Flow Characteristics**
Exhaust Characteristics/Flow Characteristics, Standard Supply Pressure: H \( \cdots 0.5 \) MPa

**ZM13\( \square \)H**

**Exhaust Characteristics**

- Vacuum pressure (kPa)
- Suction flow rate (l/min (ANR))
- Air consumption (l/min (ANR))

**Flow Characteristics**

- Vacuum pressure (kPa)
- Flow rate (l/min (ANR))

---

Exhaust Characteristics/Flow Characteristics, Standard Supply Pressure: S \( \cdots 0.45 \) MPa

**ZM13\( \square \)S**

**Exhaust Characteristics**

- Vacuum pressure (kPa)
- Suction flow rate (l/min (ANR))
- Air consumption (l/min (ANR))

**Flow Characteristics**

- Vacuum pressure (kPa)
- Flow rate (l/min (ANR))

---

**ZM15\( \square \)S**

**Exhaust Characteristics**

- Vacuum pressure (kPa)
- Suction flow rate (l/min (ANR))
- Air consumption (l/min (ANR))

**Flow Characteristics**

- Vacuum pressure (kPa)
- Flow rate (l/min (ANR))
Exhaust Characteristics/Flow Characteristics, Standard Supply Pressure: M ··· 0.35 MPa

Exhaust Characteristics Flow Characteristics

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

#### 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>Solid state</td>
<td>Solid state</td>
<td>Solid state</td>
<td>Solid state</td>
<td>Solid state</td>
<td>Solid state</td>
</tr>
<tr>
<td>Switch</td>
<td>Electronic circuit</td>
<td>Solid state</td>
<td>Reed</td>
<td>Electronic circuit</td>
<td>Solid state</td>
<td>Reed</td>
<td>Electronic circuit</td>
<td>Solid state</td>
<td>Reed</td>
</tr>
<tr>
<td>Set pressure range</td>
<td>0 to –101 kPa</td>
<td>–27 to –80 kPa</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></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></td>
<td></td>
<td></td>
<td></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>Max. ±10% or less</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Temperature characteristics</td>
<td>±3% full span or less</td>
<td>±3% full span or less</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></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></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></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></td>
<td></td>
<td></td>
<td></td>
<td></td>
<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>1 point</td>
<td>1 point</td>
<td>1 point</td>
</tr>
<tr>
<td>Operation indicator light</td>
<td>Lights up when ON</td>
<td>Lights up when ON (Red, Output 2: Green)</td>
<td>Lights up when ON</td>
<td>Lights up when ON (Red)</td>
<td>Lights up when ON</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Setting trimmer</td>
<td>3 rotations</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>18 rotations</td>
<td></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>10 mA or less (24 VDC)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Max. current</td>
<td>24 V or less, 80 mA</td>
<td>30 V, 40 mA</td>
<td></td>
<td></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></td>
<td></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.*

#### Diaphragm Switch (ZSM)

**Solid State Switch: ZSM1-015**

![Solid State Switch Diagram]

- 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**

![Reed Switch Diagram]

**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**

![Internal Circuit Diagram]

- Contact protection box
- CD-P1
- Surge absorber
- Choke coil
- Black lead wire
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.

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.

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).

When using the switch to confirm correct adsorption, the vacuum pressure is set to the minimum value to reliably adsorb. If the value is set below the minimum, the switch will be turned ON even when adsorption has failed or is insufficient. If the pressure is set too high, the switch may not turn ON even though it may adsorb correctly.

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.

**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.

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 it using a 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.
For Single Unit/Without Valve  Basic Type

For Single Unit/Without Valve  Basic Type with Switch

<Components>

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

(Side entry style is equipped with plugs.)
Air Operated Type

ZM1□□□□□□□□□□M5

A: Release flow rate adjusting needle with lock nut

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

(Side entry style is equipped with plugs.)

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.
A: Release flow rate adjusting needle with lock nut

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

(Side entry style is equipped with plugs.)

Pilot valve for release
Pilot valve for supply
Pilot pressure exhaust (PE) port
Pilot pressure exhaust (PE) port /M5 x 0.8 through

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

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

<Components>

- Pilot pressure exhaust port (PE)
- Supply
- Vacuum

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
Manifold Specifications: Series ZM

**Manifold Specifications**

<table>
<thead>
<tr>
<th>Manifold style</th>
<th>Stacking</th>
</tr>
</thead>
<tbody>
<tr>
<td>Common air pressure supply port (P)*</td>
<td>½ (Rc, NPTF, G)</td>
</tr>
<tr>
<td>Individual air pressure supply port (P)*</td>
<td>½ (Rc, NPTF, G)</td>
</tr>
<tr>
<td>Common exhaust port (EXH)</td>
<td>½, ¾ (Rc, NPTF, G)</td>
</tr>
<tr>
<td>Common exhaust port (EXH) location</td>
<td>Right side/Left side/Both sides**</td>
</tr>
<tr>
<td>Max. number of stations</td>
<td>Max. 10 stations</td>
</tr>
<tr>
<td>Silencer</td>
<td>ZZM-SA (With bolts)</td>
</tr>
</tbody>
</table>

* The common air pressure supply port (P) and individual air pressure supply port (P) can be mounted together.
** Right and left sides are viewed from the front side of vacuum port (V).

**Maximum Ejector Stations (Max. operable nos. simultaneously)**

<table>
<thead>
<tr>
<th>Manifold model</th>
<th>Ejector model</th>
<th>ZM053</th>
<th>ZM054</th>
<th>ZM073</th>
<th>ZM074</th>
<th>ZM103</th>
<th>ZM104</th>
<th>ZM113</th>
<th>ZM114</th>
<th>ZM115</th>
<th>ZM116</th>
</tr>
</thead>
<tbody>
<tr>
<td>ZZM [Stations]</td>
<td>R L</td>
<td>10</td>
<td>8</td>
<td>5</td>
<td>4</td>
<td>3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ZZM [Stations]</td>
<td>B</td>
<td>10</td>
<td>10</td>
<td>8</td>
<td>6</td>
<td>5</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* Effective area of external silencer is 160 mm².

**How to Order Ejector Manifold**

**ZZM 06 - 06 R - R**

- **Multi-ejector**
  - Series ZM Manifold

- **Number of stations**
  - 01: 1 station
  - 05: 5 stations
  - 10: 10 stations (Max.)

- **Thread type**
  - Nil
  - Rc
  - T NPTF
  - F G (Note)

Note: G thread
The thread ridge shape is compatible with the G thread standard (JIS B2203), but other shapes are not conforming to ISO16030 and ISO 1179.

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

- **Common exhaust port (EXH) and silencer location**
  - R Right side
  - L Left side
  - B Both sides

- **Common exhaust (EXH) port size**
  - 04 ½
  - 06 ¾
  - S Silencer for ZZM (ZZM-SA)
  - 00 Without exhaust port (Compatible with X111)

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.
### Manifold

**ZZM**
- **Number of ejectors**
- **Common EXH port**
- **Port location**

#### A: Release flow rate adjusting needle with lock nut

(Needle fully open)

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

Rc1/8 Hexagon socket head cap plug

---

### Table: ZZM Number of ejectors Common EXH port Port location

<table>
<thead>
<tr>
<th>ZZM</th>
<th>L1</th>
<th>L2</th>
<th>L3</th>
</tr>
</thead>
<tbody>
<tr>
<td>SB</td>
<td>28±1.5</td>
<td>40±1.5</td>
<td>48±1.5</td>
</tr>
<tr>
<td>S</td>
<td>56±1.5</td>
<td>104±1.5</td>
<td>64±1.5</td>
</tr>
<tr>
<td>04B</td>
<td>104±1.5</td>
<td>136±1.5</td>
<td>80±1.5</td>
</tr>
<tr>
<td>06B</td>
<td>136±1.5</td>
<td>168±1.5</td>
<td>90±1.5</td>
</tr>
</tbody>
</table>

Note 1) [ ] for N.C., AC type
Note 2) < > for N.O., AC type
<Components>

Manifold/With Silencer

Manifold with Silencer Dedicated for Manifold

ZZM | Number of ejectors | S | Silencer location

A: Release flow rate adjusting needle with lock nut

1/4 (Rc,NPTF,G) Common air supply (P) port
2 x M5 x 0.8

Common pilot pressure exhaust (PE) port

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

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

1/8 Hexagon socket head cap plug

<table>
<thead>
<tr>
<th>L1</th>
<th>L2</th>
<th>L3</th>
</tr>
</thead>
<tbody>
<tr>
<td>L1</td>
<td>28±1.5</td>
<td>44±1.5</td>
</tr>
<tr>
<td>L2</td>
<td>40±1.5</td>
<td>56±1.5</td>
</tr>
<tr>
<td>L3</td>
<td>104±1.5</td>
<td>120±1.5</td>
</tr>
</tbody>
</table>

Note 1) [ ] for N.C., AC type
Note 2) < > for N.O., AC type

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

Rc1/8 Hexagon socket head cap plug

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

Note 1) [ ] for N.C., AC type
Note 2) < > for N.O., AC type

Manifold/With Silencer

Manifold with Silencer Dedicated for Manifold

ZZM | Number of ejectors | S | Silencer location
### Component Parts for Manifold

#### stations

<table>
<thead>
<tr>
<th>Stations</th>
<th>Manifold part no.</th>
<th>Clamp rod part no.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>ZM01</td>
<td>ZM-01</td>
</tr>
<tr>
<td>2</td>
<td>ZM02</td>
<td>ZM-02</td>
</tr>
<tr>
<td>3</td>
<td>ZM03</td>
<td>ZM-03</td>
</tr>
<tr>
<td>4</td>
<td>ZM04</td>
<td>ZM-04</td>
</tr>
<tr>
<td>5</td>
<td>ZM05</td>
<td>ZM-05</td>
</tr>
<tr>
<td>6</td>
<td>ZM06</td>
<td>ZM-06</td>
</tr>
<tr>
<td>7</td>
<td>ZM07</td>
<td>ZM-07</td>
</tr>
<tr>
<td>8</td>
<td>ZM08</td>
<td>ZM-08</td>
</tr>
<tr>
<td>9</td>
<td>ZM09</td>
<td>ZM-09</td>
</tr>
<tr>
<td>10</td>
<td>ZM10</td>
<td>ZM-10</td>
</tr>
</tbody>
</table>

#### Adapter A

<table>
<thead>
<tr>
<th>Adapter A</th>
<th>Left</th>
<th>Right</th>
</tr>
</thead>
<tbody>
<tr>
<td>ZM01-04R</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>ZM02-04L</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>ZM03-04B</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>ZM04-04L</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>ZM05-06B</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>ZM06-06L</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>ZM07-06L</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>ZM08-00</td>
<td>○</td>
<td>○</td>
</tr>
</tbody>
</table>

#### Adapter B

<table>
<thead>
<tr>
<th>Adapter B</th>
<th>Left</th>
<th>Right</th>
</tr>
</thead>
<tbody>
<tr>
<td>ZM01-04R</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>ZM02-04L</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>ZM03-04B</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>ZM04-04L</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>ZM05-06B</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>ZM06-06L</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>ZM07-06L</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>ZM08-00</td>
<td>○</td>
<td>○</td>
</tr>
</tbody>
</table>

### Notes

1. The used quantity varies depending on the part number.
2. Clamp rods consist of a set of 2 pcs.
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 and B types only.) (The workpiece cannot be released without a vacuum release valve.)
3. Compatible with the manifold specifications only.

### Construction
With Individual Exhaust Spacer

Single: ZM Nozzle diameter Body Supply pressure — X111 — Q

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>Rc</th>
<th>T</th>
<th>NPTF</th>
<th>F</th>
<th>G</th>
</tr>
</thead>
</table>

Construction

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
Stations
Without exhaust ports on both sides

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

Round head combination screw

Gasket

Spacer E

Standard model + 14.5

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

Exhaust
Series ZM
Made to Order Specifications 2
Please contact SMC for detailed specifications, dimensions, and delivery.

3 Double Solenoid Supply Valve

<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)

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

Construction

- Solenoid for vacuum generating
- Pilot valve for vacuum release V114-
- Solenoid for vacuum stopping
- Pilot valve for air supply SYJ3233-