Easy-to-use vacuum pressure switch

- Push button type provides easy operation.
- Vacuum pressure switch with LED display
  - NPN open collector 1 output + analog voltage
  - PNP open collector 1 output + analog voltage
  - NPN open collector 2 outputs
  - PNP open collector 2 outputs
- With One-touch fittings

Can copy to up to 10 switches simultaneously.
The settings of the master pressure switch (source of copy) can be copied to the slave pressure switches.
- Reduction in setting work
- Prevention of mistakes in setting
# Space Saving Vacuum Ejector

## ZQ Series

### How to Order

#### Ejector Unit

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ZQ1 05 1U K1 5 L - EA G</td>
<td>ZQ1 05 1U K1 5 L - EA G</td>
</tr>
</tbody>
</table>

#### Nozzle nominal size
- 05: ø0.5
- 07: ø0.7
- 10: ø1.0

#### Exhaust type
- 1U: With silencer for single unit
- 3M: With silencer for manifold

#### Solenoid valve combination
(Refer to Table (1).)

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Supply valve</th>
<th>Vacuum release valve</th>
</tr>
</thead>
<tbody>
<tr>
<td>K1</td>
<td>Normally closed</td>
<td>Normally closed</td>
</tr>
<tr>
<td>K2 (Note 1)</td>
<td>Normally open</td>
<td>Normally closed</td>
</tr>
<tr>
<td>J1</td>
<td>Normally closed</td>
<td>None</td>
</tr>
<tr>
<td>J2 (Note 1)</td>
<td>Normally open</td>
<td>None</td>
</tr>
<tr>
<td>Q1</td>
<td>Latching positive common</td>
<td>Normally closed</td>
</tr>
<tr>
<td>Q2</td>
<td>Latching positive common</td>
<td>None</td>
</tr>
<tr>
<td>N1</td>
<td>Latching negative common</td>
<td>Normally closed</td>
</tr>
<tr>
<td>N2</td>
<td>Latching negative common</td>
<td>None</td>
</tr>
</tbody>
</table>

Note 1: When using K2 or J2 (supply valve normally open), ensure that the energizing time does not become longer than the non-energizing time. If the energizing time becomes longer or if the valve is energized for 10 minutes or longer, select the DC low wattage type in “Made to Order”. (Refer to page 116.)

#### Pilot valve (Refer to Table (1).)

- Nil: Standard (DC: 1 W) Note 2)
- Y: DC low wattage type (0.5 W) Note 2)

Note 2: Avoid energizing the solenoid valve for long periods of time. (Refer to Design and Selection on Specific Product Precautions.)

#### Solenoid valve rated voltage
(Refer to Table (1).)

<table>
<thead>
<tr>
<th>Combination no.</th>
<th>Solenoid valve combination symbol</th>
<th>Applicable power supply voltage (V)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>K1</td>
<td>100 AC 200 AC 110 AC 220 AC 24 DC 12 DC</td>
</tr>
<tr>
<td>2</td>
<td>K1</td>
<td>100 AC 200 AC 110 AC 220 AC 24 DC 12 DC</td>
</tr>
<tr>
<td>3</td>
<td>K2</td>
<td>100 AC 200 AC 110 AC 220 AC 24 DC 12 DC</td>
</tr>
<tr>
<td>4</td>
<td>J1</td>
<td>100 AC 200 AC 110 AC 220 AC 24 DC 12 DC</td>
</tr>
<tr>
<td>5</td>
<td>J1</td>
<td>100 AC 200 AC 110 AC 220 AC 24 DC 12 DC</td>
</tr>
<tr>
<td>6</td>
<td>J2</td>
<td>100 AC 200 AC 110 AC 220 AC 24 DC 12 DC</td>
</tr>
<tr>
<td>7</td>
<td>Q1</td>
<td>100 AC 200 AC 110 AC 220 AC 24 DC 12 DC</td>
</tr>
<tr>
<td>8</td>
<td>Q2</td>
<td>100 AC 200 AC 110 AC 220 AC 24 DC 12 DC</td>
</tr>
<tr>
<td>9</td>
<td>N1</td>
<td>100 AC 200 AC 110 AC 220 AC 24 DC 12 DC</td>
</tr>
<tr>
<td>10</td>
<td>N2</td>
<td>100 AC 200 AC 110 AC 220 AC 24 DC 12 DC</td>
</tr>
</tbody>
</table>

* Combinations 1 to 10 in the above table are the only possible options.
### Electrical entry

- **L**: L-type plug connector, with 0.3 m lead wire, with light/surge voltage suppressor
- **LO**: L-type plug connector, without connector, with light/surge voltage suppressor
- **G**: Grommet, with 0.3 m lead wire (Latching/AC type: Not applicable)

### Manual override (Note 4)

<table>
<thead>
<tr>
<th>Nil</th>
<th>Non-locking push type</th>
</tr>
</thead>
<tbody>
<tr>
<td>B</td>
<td>Locking type (Q1/Q2/N1/N2: Not applicable)</td>
</tr>
</tbody>
</table>

Note 4) Latching type supply valve: Available in "Nil" only. In this case, the supply valve and release valve come with a push-locking type.

### Vacuum pressure switch suction filter (Note 5)

<table>
<thead>
<tr>
<th>EA</th>
<th>0 to −101 kPa/NPN open collector 2 outputs, with suction filter</th>
</tr>
</thead>
<tbody>
<tr>
<td>EB</td>
<td>0 to −101 kPa/PNP open collector 2 outputs, with suction filter</td>
</tr>
<tr>
<td>EC</td>
<td>0 to −101 kPa/NPN open collector 1 output + analog voltage, with suction filter</td>
</tr>
<tr>
<td>EE</td>
<td>0 to −101 kPa/PNP open collector 1 output + analog voltage, with suction filter</td>
</tr>
<tr>
<td>FA</td>
<td>100 to −100 kPa/NPN open collector 2 outputs, with suction filter</td>
</tr>
<tr>
<td>FB</td>
<td>100 to −100 kPa/PNP open collector 2 outputs, with suction filter</td>
</tr>
<tr>
<td>FC</td>
<td>100 to −100 kPa/NPN open collector 1 output + analog voltage, with suction filter</td>
</tr>
<tr>
<td>FE</td>
<td>100 to −100 kPa/PNP open collector 1 output + analog voltage, with suction filter</td>
</tr>
</tbody>
</table>

Note 5) The filter included in this product is of a simple type, and will become clogged quickly in environments with high quantities of dust or particulates. Please make additional use of an air suction filter of the ZFA, ZFB or ZFC series.

### Check valve (Note 8) (Note 9)

<table>
<thead>
<tr>
<th>Nil</th>
<th>None</th>
</tr>
</thead>
<tbody>
<tr>
<td>K</td>
<td>With check valve</td>
</tr>
</tbody>
</table>

Note 8) The check valve has a function to prevent the exhaust air from the silencer overflowing to the vacuum port side when a manifold is used, but it cannot prevent overflow of the exhaust air completely. During usage, please inspect thoroughly with actual machine. Also, in order to completely prevent the overflow of exhaust air, leave plenty of space between the check valve unit and adjacent ejector to avoid interference from the ejector's exhaust unit.

Note 9) Only applicable to the exhaust type 3M and cannot be selected for solenoid valve combinations of J1, J2, Q2 and N2.

### Warning

1. Cannot be used for vacuum retention.
2. Use a release valve. (Without a release valve, a workpiece may not be released.)

### Fitting (V port) (Note 10)

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Applicable tubing O.D.</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>Without fitting (M5 x 0.8)</td>
</tr>
<tr>
<td>1</td>
<td>ø3.2 (Straight)</td>
</tr>
<tr>
<td>2</td>
<td>ø4 (Straight)</td>
</tr>
<tr>
<td>3</td>
<td>ø6 (Straight)</td>
</tr>
<tr>
<td>4</td>
<td>ø3.2 (Elbow)</td>
</tr>
<tr>
<td>5</td>
<td>ø4 (Elbow)</td>
</tr>
</tbody>
</table>

### Fitting (P port) (Note 10)

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Applicable tubing O.D.</th>
<th>Object spec.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nil</td>
<td>Without fitting (M5 x 0.8)</td>
<td>Manifold</td>
</tr>
<tr>
<td>2</td>
<td>ø4 (Straight)</td>
<td>Single unit</td>
</tr>
<tr>
<td>3</td>
<td>ø6 (Straight)</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>ø4 (Elbow)</td>
<td></td>
</tr>
</tbody>
</table>

### Bracket A (Note 11)

<table>
<thead>
<tr>
<th>Nil</th>
<th>With bracket A</th>
</tr>
</thead>
<tbody>
<tr>
<td>N</td>
<td>Without bracket A</td>
</tr>
</tbody>
</table>

Note 11) Only applicable to the exhaust type 1U.

### CE-compliant

<table>
<thead>
<tr>
<th>Nil</th>
<th>—</th>
</tr>
</thead>
<tbody>
<tr>
<td>Q</td>
<td>CE-compliant</td>
</tr>
</tbody>
</table>

Note: CE-compliant: For DC only.

---

*Note 10) For filter only (Without vacuum pressure switch)

Single unit: When neither V port fitting nor P port fitting are needed, enter nothing or "00" in the dotted line "How to Order".

Manifold specifications: When the V port fitting is not needed, enter nothing or "0" in the dotted line "How to Order".*
Flow/Exhaust Characteristics

**ZQ Series**

### How to Order

**Manifold**

**ZZQ107**

- **Number of stations**
  - 01: 1 station
  - 02: 2 stations
  - 03: 4 stations
  - 08: 8 stations

- **Air pressure supply (P) port position**
  - B: Both sides

- **Exhaust**
  - S: With silencers (Both sides)

**Maximum Number of Stations in Simultaneous Operation**

<table>
<thead>
<tr>
<th>Nozzle nominal size</th>
<th>Maximum number of stations in simultaneous operation</th>
</tr>
</thead>
<tbody>
<tr>
<td>ø0.5</td>
<td>8 stations</td>
</tr>
<tr>
<td>ø0.7</td>
<td>6 stations</td>
</tr>
<tr>
<td>ø1.0</td>
<td>4 stations</td>
</tr>
</tbody>
</table>

### How to Read Flow Rate Characteristics

Flow rate 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.

1. When ejector suction port is covered and made airtight, suction flow becomes 0 and vacuum pressure is at maximum value (P<sub>max</sub>).
2. When suction port is opened gradually, air can flow through (air leakage), suction flow increases, but vacuum pressure decreases. (condition P<sub>1</sub> and Q<sub>1</sub>)
3. When suction port is opened further, suction flow moves to maximum value (Q<sub>max</sub>), 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 ventitative or leaky work must be adsorbed, please note that vacuum pressure will not be high.

### Precautions

Be sure to read this before handling the products. Refer to back page 60 for Safety Instructions and pages 49 to 51 for Vacuum Equipment Precautions.

### Caution

Refer to the vacuum equipment model selection on pages 25 to 48 for the selecting and sizing of ZQ series.

---

**Manifold Ordering Example**

ZZQ107-BSB → 1 pc.

- ZQ1053M-K15SL-EAG (-O) → 4 pcs. (Stations 1 to 4)
- ZQ1103M-K15SL-EAG (-O) → 4 pcs. (Stations 5 to 8)

Note: By viewing the front side of vacuum port (V), stations are counted starting from station 1 on the left side.
Specifications

### Ejector

<table>
<thead>
<tr>
<th>Model</th>
<th>ZQ105</th>
<th>ZQ107</th>
<th>ZQ110</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nozzle nominal diameter (mm)</td>
<td>0.5</td>
<td>0.7</td>
<td>1.0</td>
</tr>
<tr>
<td>Maximum suction flow (L/min (ANR))</td>
<td>5</td>
<td>10</td>
<td>22</td>
</tr>
<tr>
<td>Air consumption (L/min (ANR))</td>
<td>14</td>
<td>23</td>
<td>46</td>
</tr>
<tr>
<td>Maximum vacuum pressure</td>
<td>~80 kPa</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Weight

<table>
<thead>
<tr>
<th>Single unit</th>
<th>With suction filter Note 1)</th>
<th>95 g</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>With vacuum pressure switch and suction filter Note 2)</td>
<td>109 g</td>
</tr>
<tr>
<td></td>
<td>End plate assembly for manifold</td>
<td>122 g</td>
</tr>
</tbody>
</table>

Note 1) Including a 0.3 m connector for supply valve and vacuum release valve.
Note 2) Including a 0.3 m connector for supply valve and vacuum release valve and a 2 m connector for vacuum pressure switch.

Calculation of weight for the manifold type

(Single unit weight) x (Number of stations) + (Weight of end plate assembly for manifold)

Example) Vacuum pressure switch + 8 stations with suction filter

109 g x 8 + 122 g = 994 g

### Supply Valve / Vacuum Release Valve

<table>
<thead>
<tr>
<th>Type</th>
<th>Normally closed</th>
<th>Latching type</th>
<th>Normally open</th>
</tr>
</thead>
<tbody>
<tr>
<td>Model (Refer to “How to Order” for solenoid valves on page 107.)</td>
<td>VQ110-□</td>
<td>VQ110Y-□</td>
<td>ZQ1-VQ120-□</td>
</tr>
</tbody>
</table>

Manual override

Non-locking push type / Locking type (Tool type)

Push-locking type

Non-locking push type / Locking type (Tool type)

Rated coil voltage

<table>
<thead>
<tr>
<th>DC</th>
<th>12, 24 VDC, 100, 110, 200, 220 VAC</th>
<th>12, 24 VDC, 100, 110, 200, 220 VAC</th>
<th>12, 24 VDC</th>
</tr>
</thead>
<tbody>
<tr>
<td>100 VAC</td>
<td>0.5 VA (5 mA)</td>
<td>—</td>
<td>0.6 VA (6 mA)</td>
</tr>
<tr>
<td>110 VAC</td>
<td>0.55 VA (5 mA)</td>
<td>—</td>
<td>0.65 VA (5.9 mA)</td>
</tr>
<tr>
<td>200 VAC</td>
<td>1.0 VA (5 mA)</td>
<td>—</td>
<td>1.2 VA (6 mA)</td>
</tr>
<tr>
<td>220 VAC</td>
<td>1.1 VA (5 mA)</td>
<td>—</td>
<td>1.3 VA (5.9 mA)</td>
</tr>
</tbody>
</table>

Power consumption (current value)

<table>
<thead>
<tr>
<th>DC</th>
<th>0.5 W</th>
<th>1 W</th>
</tr>
</thead>
<tbody>
<tr>
<td>100 VAC</td>
<td>—</td>
<td>0.6 VA (6 mA)</td>
</tr>
<tr>
<td>110 VAC</td>
<td>—</td>
<td>0.65 VA (5.9 mA)</td>
</tr>
<tr>
<td>200 VAC</td>
<td>1.2 VA (6 mA)</td>
<td>—</td>
</tr>
<tr>
<td>220 VAC</td>
<td>1.3 VA (5.9 mA)</td>
<td>—</td>
</tr>
</tbody>
</table>

Electrical entry

Grommet L-type plug connector (with light/surge voltage suppressor)

L-type plug connector with light/surge voltage suppressor
Specifications

### Vacuum Pressure Switch

<table>
<thead>
<tr>
<th>Model</th>
<th>ZQ1-ZSE (ZSE10)</th>
<th>ZQ1-ZSF (ZSE10F)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rated pressure range</td>
<td>0 to –101 kPa</td>
<td>–100 to 100 kPa</td>
</tr>
<tr>
<td>Set pressure range/Display pressure range</td>
<td>10 to –105 kPa</td>
<td>–105 to 105 kPa</td>
</tr>
<tr>
<td>Withstand pressure</td>
<td>500 kPa</td>
<td></td>
</tr>
<tr>
<td>Minimum setting unit</td>
<td>0.1 kPa</td>
<td></td>
</tr>
<tr>
<td>Power supply voltage</td>
<td>12 to 24 VDC ±10%, Ripple (p-p) 10% or less (with power supply polarity protection)</td>
<td></td>
</tr>
<tr>
<td>Current consumption</td>
<td>40 mA or less</td>
<td></td>
</tr>
<tr>
<td>Switch output</td>
<td>NPN or PNP open collector; 2 outputs (selectable)</td>
<td></td>
</tr>
<tr>
<td>Maximum load current</td>
<td>80 mA</td>
<td></td>
</tr>
<tr>
<td>Maximum applied voltage</td>
<td>28 V (with NPN output)</td>
<td></td>
</tr>
<tr>
<td>Residual voltage</td>
<td>2 V or less (with load current of 80 mA)</td>
<td></td>
</tr>
<tr>
<td>Response time</td>
<td>2.5 ms or less (Response time selections with anti-chattering function: 20, 100, 500, 1000 and 2000 ms)</td>
<td></td>
</tr>
<tr>
<td>Short circuit protection</td>
<td>With short-circuit protection</td>
<td></td>
</tr>
<tr>
<td>Repeatability</td>
<td>±0.2% F.S. ±1 digit</td>
<td></td>
</tr>
<tr>
<td>Hysteresis</td>
<td>Hysteresis mode</td>
<td>Variable (0 or above) Note 1)</td>
</tr>
<tr>
<td>Window comparator mode</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Analog output</td>
<td>Voltage output</td>
<td>1 to 5 V ±2.5% F.S.</td>
</tr>
<tr>
<td>Output voltage (rated pressure range)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Linearity</td>
<td>±1% F.S. or less</td>
<td></td>
</tr>
<tr>
<td>Output impedance</td>
<td>Approx. 1 kΩ</td>
<td></td>
</tr>
<tr>
<td>Display system</td>
<td>3 1/2-digit, 7 segment LED, 1-color display (Red)</td>
<td></td>
</tr>
<tr>
<td>Display accuracy</td>
<td>±2% F.S. ±1 digit (at ambient temperature of 25 ±3°C)</td>
<td></td>
</tr>
<tr>
<td>Operation indicator light</td>
<td>Lights when ON, OUT1: Green, OUT2: Red</td>
<td></td>
</tr>
</tbody>
</table>

#### Notes
- **Note 1:** If the applied voltage fluctuates around the set-value, the hysteresis must be set to a value more than the fluctuating width, otherwise chattering will occur.
- **Note 2:** For others, refer to ejector specifications on page 105.

### Construction

#### Single unit

1. Poppet valve assembly
2. Nozzle
3. Diffuser
4. Vacuum release flow adjustment needle
5. Solenoid valve
6. Filter element
7. Sound absorbing material 1 (single unit)
8. Vacuum pressure switch
9. Fitting
10. Sound absorbing material 2 (manifold)

**Replacement Parts**

<table>
<thead>
<tr>
<th>No.</th>
<th>Description</th>
<th>Material</th>
<th>Part no.</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>Solenoid valve</td>
<td>Refer to page 107.</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Filter element</td>
<td>PVA sponge</td>
<td>XT534-5-001-AS</td>
</tr>
<tr>
<td>7</td>
<td>Sound absorbing material 1 (single unit)</td>
<td>PVA sponge</td>
<td>ZQ-SAE</td>
</tr>
<tr>
<td>8</td>
<td>Vacuum pressure switch</td>
<td>Refer to page 107.</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Fitting</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>10</td>
<td>Sound absorbing material 2 (manifold)</td>
<td>PVA sponge</td>
<td>ZZQ-SAE</td>
</tr>
</tbody>
</table>

---

**Component Parts**

<table>
<thead>
<tr>
<th>No.</th>
<th>Description</th>
<th>Material</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Poppet valve assembly</td>
<td>—</td>
</tr>
<tr>
<td>2</td>
<td>Nozzle</td>
<td>Resin</td>
</tr>
<tr>
<td>3</td>
<td>Diffuser</td>
<td>Resin</td>
</tr>
<tr>
<td>4</td>
<td>Vacuum release flow adjustment needle</td>
<td>Stainless steel</td>
</tr>
</tbody>
</table>
Vacuum pressure switch unit specifications

- **Actuation**
  - Normally closed: VQ1 1 0
  - Normally open: ZQ1-VQ1 2 0

- **Pilot valve**
  - Nil: Standard (DC: 1 W)
  - Y: Low wattage type (0.5 W)
  - L: Latching positive common
  - N: Latching negative common

- **Solenoid valve rated voltage**
  - 5: 24 VDC
  - 6: 12 VDC

- **Electrical entry**
  - L: L-type plug connector, with 0.3 m lead wire
  - LO: L-type plug connector, without connector
  - G: Grommet, with 0.3 m lead wire (Latching/AC type: Not applicable)

- **Connector assembly part no.**
  - A: Normal (Nil)

- **Manual override (Note)**
  - Nil: Non-locking push type
  - B: Latching type

- **Space Saving Vacuum Ejector**
  - ZQ1-ZS

- **Check valve** (Note 3)
  - Nil: None
  - K: With check valve

- **Warning**
  1. Cannot be used for vacuum retention.
  2. Use a vacuum release valve. (Without a vacuum release valve, the workpiece may not be released.)

- **Fitting (V port)**
  - Symbol
  - 0: Without fitting (M5 x 0.8)
  - 1: ø3.2 (Straight)
  - 2: ø4 (Straight)
  - 3: ø6 (Straight)
  - 4: ø3.2 (Elbow)
  - 5: ø4 (Elbow)

For details regarding vacuum pressure switches, refer to the ZSE10 series in the Best Pneumatics No.8.

For information on applicable tubing O.D.

- 0: Without fitting (M5 x 0.8)
- 1: ø3.2 (Straight)
- 2: ø4 (Straight)
- 3: ø6 (Straight)
- 4: ø3.2 (Elbow)
- 5: ø4 (Elbow)
**Dimensions**

**Type K1**

ZQ1 1U-K1

---

Pilot pressure exhaust (PE) port
M3, Atmospheric release (Note 4)

Air pressure supply (P) port
M5 (Note 4)

---

Supply valve

Vacuum pressure exhaust (PE) port
M3, Atmospheric release (Note 4)

Vacuum (V) port (M5) (Note 4)

---

Vacuum release flow adjusting needle

---

Exhaust part

Suction filter

Vacuum pressure switch

---

Bracket A (Standard)

---

**Circuit diagram**

---

**Type J1**

ZQ1 1U-J1

---

Pilot pressure exhaust (PE) port
M3, Atmospheric release (Note 4)

Air pressure supply (P) port
M5 (Note 4)

---

Supply valve

Vacuum pressure exhaust (PE) port
M3, Atmospheric release (Note 4)

Vacuum (V) port (M5) (Note 4)

---

Vacuum release flow adjusting needle

---

Exhaust part

Suction filter

Vacuum pressure switch

---

Bracket A (Standard)

---

**Circuit diagram**

---

**Note 1)** The above dimensions are for ZQ1 1U-K1 L-E 00. In case of ZQ1 1U-K1 F 00, the overall length is 87.2.

**Note 2)** The dimensions after bracket A is mounted are the same as those of the K1 type.

**Note 3)** When the body is mounted, tighten with a torque of 0.6 ± 0.06 N·m. Using excessive torque may cause damage to the body.

**Note 4)** The pitches of P, V and PE ports are determined assuming the use of One-touch fittings. If used with other fittings, these may cause interference, dependant on their type and size. Please refer to the catalog to confirm the sizes of the fittings to be used.
Note 1) The above dimensions are for ZQ1 1U-K2 L-F. In case of ZQ1 1U-K2 L-F, the overall length is 107.5.

Note 2) The dimensions after bracket A is mounted are the same as those of the K1 type.

Note 3) When the body is mounted, tighten with a torque of 0.6 ± 0.06 N·m. Using excessive torque may cause damage to the body.

Note 4) The pitches of P, V and PE ports are determined assuming the use of One-touch fittings. If used with other fittings, these may cause interference, dependant on their type and size. Please refer to the catalog to confirm the sizes of the fittings to be used.
ZQ Series

Dimensions

Type Q1, N1
ZQ1 1U-Q1
ZQ1 1U-N1

Circuit diagram

Type Q2, N2
ZQ1 1U-Q2
ZQ1 1U-N2

Note 1) The above dimensions are for ZQ1 1U-Q1 3. In case of ZQ1 1U-Q2 3, the overall length is 87.2.
Note 2) The dimensions after bracket A is mounted are the same as those of the K1 type.
Note 3) When the body is mounted, tighten with a torque of 0.6 ± 0.06 N·m. Using excessive torque may cause damage to the body.
Note 4) The pitches of P, V and PE ports are determined assuming the use of One-touch fittings. If used with other fittings, these may cause interference, dependant on their type and size. Please refer to the catalog to confirm the sizes of the fittings to be used.
**Dimensions**

**Manifold type (without PD port)**

ZZQ1□-BSB

*ZQ1□ 3M-□□□□□□□□□-

**Note 1)** The above dimensions are for ZZQ104-BSB.

- ZQ1□ 3M-K1□□□□□□□□□□
- ZQ1□ 3M-K2□□□□□□□□□□
- ZQ1□ 3M-J1□□□□□□□□□□
- ZQ1□ 3M-Q1□□□□□□□□□□

* In case of ZQ1□ 3M-□□□□□□□□□□, the overall length is 87.2.
* In case of ZQ1□ 3M-□□□□□□□□□□, the overall length is 90.7.
* In case of ZQ1□ 3M-□□□□□□□□□□, the overall length is 107.5.
* In case of ZQ1□ 3M-□□□□□□□□□□, the overall length is 111.

**Note 2)** The above dimensions are for ZQ1□ 3M-□□□□□□□□□□□-

**Note 3)** Dimensions marked with "∗" are those after the attached square bracket is mounted.

**Note 4)** When the body is mounted, tighten with a torque of 0.6 ± 0.06 N·m.

Using excessive torque may cause damage to the body.

**Note 5)** The pitches of V ports are determined assuming the use of One-touch fittings. If used with other fittings, these may cause interference, dependant on their type and size. Please refer to the catalog to confirm the sizes of the fittings to be used.

**Note 6)** When the release valve is not used, design the circuit for vacuum release separately in order to release a workpiece.

---

**Circuit diagram**

- ZQ1□ 3M-K1□□□□□□□□□-
- ZQ1□ 3M-K2□□□□□□□□□-
- ZQ1□ 3M-J1□□□□□□□□□-
- ZQ1□ 3M-Q1□□□□□□□□□-

---

Space Saving Vacuum Ejector **ZQ Series**
**Dimensions**

Manifold type (with PD port)

**ZZQ1-BSC**

*ZQ1 3M-*

- Common air pressure supply (P) port (One-touch fitting: Applicable tubing O.D. ø8)
- Common release pressure supply (PD) port (One-touch fitting: Applicable tubing O.D. ø4)
- Atmospheric release.
- Supply valve
- Release valve
- Vacuum release flow adjusting needle
- Exhaust port
- Vacuum pressure switch
- Suction filter

**Circuit diagram**

- PE
- P
- PD
- EXH

**Notes:**

1. The above dimensions are for ZZQ104-BSC.
2. In case of ZQ1 3M- F-0, the overall length is 91.7.
3. When the body is mounted, tighten with a torque of 0.6 ± 0.06 N·m. Using excessive torque may cause damage to the body.
4. The pitches of V ports are determined assuming the use of One-touch fittings. If used with other fittings, these may cause interference, dependant on their type and size. Please refer to the catalog to confirm the sizes of the fittings to be used.
5. When the release valve is not used, design the circuit for vacuum release separately in order to release a workpiece.
**Dimensions**

**Fittings / Fitting type filter dimensions after installation**

**V port**

*<With vacuum pressure switch>*

- Applicable thread size: M5
- Vacuum (V) port

- Applicable tubing O.D.: ø3.2
  - Vacuum (V) port
  - VVQ1000-50A-C3
  - VVQ1000-F1-LC3

- Applicable tubing O.D.: ø4
  - Vacuum (V) port
  - VVQ1000-50A-C4
  - VVQ1000-F1-LC4

**V port**

*<Suction filter only>*

- Release button dimensions
  - KQ2S23-MSN1
  - 9.5
  - 11.3
  - 14.5

- Release button dimensions
  - KQ2S23-MSN1
  - ø7.1
  - 14.5

**P port**

- Release button dimensions
  - KQ2S04-MSN1
  - ø8
  - 14.6

- Release button dimensions
  - KQ2L04-MSN1
  - ø8.2
  - 15.4
Manifold Exploded View

Component Parts

<table>
<thead>
<tr>
<th>No.</th>
<th>Description</th>
<th>Part no.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Hexagon socket head cap screw</td>
<td>Refer to “How to Order” below.</td>
</tr>
<tr>
<td>2</td>
<td>End block L</td>
<td>Refer to “Table (1)” (including 1 pc. of 6).</td>
</tr>
<tr>
<td>3</td>
<td>End block R</td>
<td>Refer to “Table (1)” (including 1 pc. of 5).</td>
</tr>
<tr>
<td>4</td>
<td>Ejector assembly</td>
<td>ZQ1L-1-BSB-AS</td>
</tr>
<tr>
<td>5</td>
<td>Ejector body gasket for manifold</td>
<td>ZQ-3-005-10AS</td>
</tr>
<tr>
<td>6</td>
<td>Exhaust block gasket</td>
<td>ZQ-3-009-10AS</td>
</tr>
</tbody>
</table>

Table (1)

<table>
<thead>
<tr>
<th>Description</th>
<th>With PD port</th>
<th>Without PD port</th>
</tr>
</thead>
<tbody>
<tr>
<td>End block L</td>
<td>ZQ1L-2-BSB-AS</td>
<td>ZQ1L-1-BSB-AS</td>
</tr>
<tr>
<td>End block R</td>
<td>ZQ1R-2-BSB-AS</td>
<td>ZQ1R-1-BSB-AS</td>
</tr>
</tbody>
</table>

Note 1) Refer to pages 102 and 103 for detailed description of “How to Order”. Note 2) 10 pcs. are included in one set.

Working Procedure

Disassembly
Loosen and remove the clamp rod ①.

Assembly
1. Install the ejector body gasket for manifold ⑤ into the gasket groove of each ejector assembly ④. Install the exhaust block gasket ⑥ around the projected part.
2. Install the exhaust block gasket ⑥ around the projected part of the end block L ②.
3. Install the ejector body gasket for manifold ⑤ into the gasket groove of the end block R ③.
4. Align the ejector assemblies ④, end block (L) ②, and end block (R) ③ using positioning pins (at the two "a" positions) and fasten with clamp rods ① (2 pcs.) (with a tightening torque of 0.6 N·m ± 0.06 N·m).

How to Order Hexagon Socket Head Cap Screw

ZQ—STB05

<table>
<thead>
<tr>
<th>Number of stations</th>
<th>01</th>
<th>02</th>
<th>08</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 station</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2 stations</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8 stations</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note) 2 pcs. are included in one set.

Replacement of V Port Fittings (With vacuum pressure switch)

V port fittings are cassette style for easy replacement. The fittings are blocked by a clip. Remove the clip with a flat blade screwdriver, etc. to replace the fittings.
When mounting the fittings, after inserting the fitting assembly until it stops, then put the clip into the prescribed position completely.
**ZQ Series**

**Made to Order Specifications**

Please contact SMC for detailed dimensions, specifications and lead times.

---

1. **Port Exhaust Specifications**

Manifold: ZZQ1
Stations: -B2- -X125

Port exhaust specifications

Exhaust port is changed for “Port Exhaust Specifications.”

**Dimensions**

Manifold type (without PD port)

ZZQ1-B2B-X125

*ZQ1-B3M-{-}{-}{-}{-}{-}(-Q)*

---

**Note:**

- The diagram shows the port exhaust specifications and dimensions for the ZZQ1 manifold with stations -B2- -X125.
- The exhaust port is changed as specified.
- Please consult the Made to Order Specifications for detailed dimensions, specifications, and lead times.

---

**SMC**
ZQ Series
Made to Order Specifications

Please contact SMC for detailed dimensions, specifications and lead times.

2 Pilot Valve for Supply: Normally Open DC Low Wattage Specification

Power consumption (W): 0.3 [Inrush 1.5, Holding 0.3]

- Normally open supply valve with low wattage type pilot valve mounted
- When the normally open specification is selected as a countermeasure for power failure, the temperature increase of the solenoid valve can be suppressed in the operation cycle where the vacuum suspension state (supply valve energizing) is longer than the vacuum generation state.

Dimensions: Same as standard type.
**Vacuum Pump Unit**

**ZQ1000**

1. **Body type**
   - U: For single unit
   - M: For manifold

2. **Solenoid valve combination**
   (Refer to Table (1).)

3. **Pilot valve** (Refer to Table (1).)

4. **Solenoid valve rated voltage**
   (Refer to Table (1).)

---

### How to Order

**Vacuum Pump Unit**

**ZQ1000 U-K1 5 L-EA G-3 3**

**Table (1) Combination of Solenoid Valve, Pilot Valve and Rated Voltage**

<table>
<thead>
<tr>
<th>Combination no.</th>
<th>Solenoid valve combination symbol</th>
<th>Pilot valve symbol</th>
<th>Applicable power supply voltage (V)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>100 AC</td>
</tr>
<tr>
<td>1</td>
<td>K1</td>
<td>Nil</td>
<td>—</td>
</tr>
<tr>
<td>2</td>
<td>K1</td>
<td>Y</td>
<td>—</td>
</tr>
<tr>
<td>3</td>
<td>K2 (Note 1)</td>
<td>Nil</td>
<td>—</td>
</tr>
<tr>
<td>4</td>
<td>J1</td>
<td>Nil</td>
<td>•</td>
</tr>
<tr>
<td>5</td>
<td>J1</td>
<td>Y</td>
<td>—</td>
</tr>
<tr>
<td>6</td>
<td>J2 (Note 1)</td>
<td>Nil</td>
<td>—</td>
</tr>
<tr>
<td>7</td>
<td>Q1</td>
<td>Nil</td>
<td>—</td>
</tr>
<tr>
<td>8</td>
<td>Q2</td>
<td>Nil</td>
<td>•</td>
</tr>
<tr>
<td>9</td>
<td>N1</td>
<td>Nil</td>
<td>—</td>
</tr>
<tr>
<td>10</td>
<td>N2</td>
<td>Nil</td>
<td>—</td>
</tr>
</tbody>
</table>

* Combinations 1 to 10 in the above table are the only possible options.

Note: CE-compliant products are not available for “1”, “2”, “3” and “4”.

---

The air in the adsorption section of this product is not released to the atmosphere at the vacuum suspension state.

As for K1, K2, Q1 and N1, use the vacuum release valve when a workpiece is detached.

Concerning J1, J2, Q2 and N2, devise the circuit for the vacuum release additionally when a workpiece is detached.

Note 1) In cases when K2 or J2 (supply valve normally open) is selected for the solenoid valve combination, when vacuum is stopped for long periods of time (10 minutes or more), do not continue to energize the supply valve, and shut off the air supply.

Note 2) Avoid energizing the solenoid valve for long periods of time. (Refer to Specific Product Precautions 1; Caution on Design and Selection.)

Note 3) CE-compliant products are not available for “1”, “2”, “3” and “4”.

---

**Table (1) Combination of Solenoid Valve, Pilot Valve and Rated Voltage**

<table>
<thead>
<tr>
<th>Combination no.</th>
<th>Solenoid valve combination symbol</th>
<th>Pilot valve symbol</th>
<th>Applicable power supply voltage (V)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>100 AC</td>
</tr>
<tr>
<td>1</td>
<td>K1</td>
<td>Nil</td>
<td>—</td>
</tr>
<tr>
<td>2</td>
<td>K1</td>
<td>Y</td>
<td>—</td>
</tr>
<tr>
<td>3</td>
<td>K2 (Note 1)</td>
<td>Nil</td>
<td>—</td>
</tr>
<tr>
<td>4</td>
<td>J1</td>
<td>Nil</td>
<td>•</td>
</tr>
<tr>
<td>5</td>
<td>J1</td>
<td>Y</td>
<td>—</td>
</tr>
<tr>
<td>6</td>
<td>J2 (Note 1)</td>
<td>Nil</td>
<td>—</td>
</tr>
<tr>
<td>7</td>
<td>Q1</td>
<td>Nil</td>
<td>—</td>
</tr>
<tr>
<td>8</td>
<td>Q2</td>
<td>Nil</td>
<td>•</td>
</tr>
<tr>
<td>9</td>
<td>N1</td>
<td>Nil</td>
<td>—</td>
</tr>
<tr>
<td>10</td>
<td>N2</td>
<td>Nil</td>
<td>—</td>
</tr>
</tbody>
</table>

* Combinations 1 to 10 in the above table are the only possible options.
## 5 Electrical entry

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Applicable tubing O.D.</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>Without fitting (M5 x 0.8)</td>
</tr>
<tr>
<td>1</td>
<td>ø3.2 (Straight)</td>
</tr>
<tr>
<td>2</td>
<td>ø4 (Straight)</td>
</tr>
<tr>
<td>3</td>
<td>ø6 (Straight)</td>
</tr>
<tr>
<td>4</td>
<td>ø3.2 (Elbow)</td>
</tr>
<tr>
<td>5</td>
<td>ø4 (Elbow)</td>
</tr>
</tbody>
</table>

## 6 Manual override (Note 4)

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Non-locking push type</th>
<th>Locking type (O1/O2/N1/N2: Not applicable)</th>
</tr>
</thead>
<tbody>
<tr>
<td>nil</td>
<td>nil</td>
<td>nil</td>
</tr>
<tr>
<td>B</td>
<td>Locking type</td>
<td></td>
</tr>
</tbody>
</table>

Note 4) Latching type supply valve: Available in "Nil" only. In this case, the supply valve and release valve come with a push-locking type.

## 7 Vacuum pressure switch suction filter (Note 5)

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>EA</td>
<td>0 to –101 kPa/NPN open collector 2 outputs, with suction filter</td>
</tr>
<tr>
<td>EB</td>
<td>0 to –101 kPa/PNP open collector 2 outputs, with suction filter</td>
</tr>
<tr>
<td>EC</td>
<td>0 to –101 kPa/NPN open collector 1 output + analog voltage, with suction filter</td>
</tr>
<tr>
<td>EE</td>
<td>0 to –101 kPa/PNP open collector 1 output + analog voltage, with suction filter</td>
</tr>
<tr>
<td>FA</td>
<td>100 to –100 kPa/NPN open collector 2 outputs, with suction filter</td>
</tr>
<tr>
<td>FB</td>
<td>100 to –100 kPa/PNP open collector 2 outputs, with suction filter</td>
</tr>
<tr>
<td>FC</td>
<td>100 to –100 kPa/PNP open collector 1 output + analog voltage, with suction filter</td>
</tr>
<tr>
<td>FE</td>
<td>100 to –100 kPa/PNP open collector 1 output + analog voltage, with suction filter</td>
</tr>
</tbody>
</table>

Note 5) The filter included in this product is of a simple type, and will become clogged quickly in environments with high quantities of dust or particulates. Please make additional use of an air suction filter of the ZFA, ZFB or ZFC series.

### Warning

The filter case of this suction filter is made of nylon. Contact with alcohol or similar chemicals may cause it to be damaged. Also, do not use the filter when these chemicals are present in the atmosphere.

## 8 Vacuum pressure switch unit specifications

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>nil</td>
<td>With unit switching function (Note 6)</td>
</tr>
<tr>
<td>M</td>
<td>With fixed SI unit (Note 7)</td>
</tr>
<tr>
<td>P</td>
<td>With unit switching function (Note 6)</td>
</tr>
</tbody>
</table>

Note 6) Under the New Measurement Law, sales of switches with the unit switching function are not allowed for use in Japan.

Note 7) Fixed unit: kPa

## 9 Vacuum pressure switch lead wire specifications

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>nil</td>
<td>Without connector</td>
</tr>
<tr>
<td>G</td>
<td>Lead wire with connector (Lead wire length 2 m)</td>
</tr>
</tbody>
</table>

## 10 Fitting (P port) (Note 8)

Note 8) For filter only (Without vacuum pressure switch)

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Applicable tubing O.D.</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>Without fitting (M5 x 0.8)</td>
</tr>
<tr>
<td>1</td>
<td>ø3.2 (Straight)</td>
</tr>
<tr>
<td>2</td>
<td>ø4 (Straight)</td>
</tr>
<tr>
<td>3</td>
<td>ø6 (Straight)</td>
</tr>
<tr>
<td>4</td>
<td>ø3.2 (Elbow)</td>
</tr>
<tr>
<td>5</td>
<td>ø4 (Elbow)</td>
</tr>
</tbody>
</table>

## 11 Fitting (PS / PV port) (Note 8)

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Applicable tubing O.D.</th>
</tr>
</thead>
<tbody>
<tr>
<td>nil</td>
<td>Without port</td>
</tr>
<tr>
<td>0</td>
<td>Without fitting (M5 x 0.8)</td>
</tr>
<tr>
<td>2</td>
<td>ø4 (Straight)</td>
</tr>
<tr>
<td>3</td>
<td>ø6 (Straight)</td>
</tr>
<tr>
<td>5</td>
<td>ø4 (Elbow)</td>
</tr>
</tbody>
</table>

### Object spec.

<table>
<thead>
<tr>
<th>nil</th>
<th>Single unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>Manifold</td>
</tr>
<tr>
<td>2</td>
<td>Single unit</td>
</tr>
</tbody>
</table>

## 12 Bracket A

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>nil</td>
<td>With bracket A</td>
</tr>
<tr>
<td>N</td>
<td>Without bracket A (Note 9)</td>
</tr>
</tbody>
</table>

## 13 CE-compliant

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>nil</td>
<td>—</td>
</tr>
<tr>
<td>Q</td>
<td>CE-compliant</td>
</tr>
</tbody>
</table>

Note) CE-compliant: For DC only.
ZQ Series

How to Order

**Manifold**

 ZZQ108-ROB → 1 pc.
*ZQ1000M-K15L-EAG (-Q) → 4 pcs. (Stations 1 to 4)
*ZQ1000M-K1Y5L-EAG (-Q) → 4 pcs. (Stations 5 to 8)

Note) By viewing the front side of vacuum port (V), stations are counted starting from station 1 on the left side.

Manifold Ordering Example

**Table (1) Air Pressure Supply Port Location on the Manifold**

<table>
<thead>
<tr>
<th>PD port</th>
<th>Port location</th>
<th>Left</th>
<th>Right</th>
</tr>
</thead>
<tbody>
<tr>
<td>B</td>
<td>L (Left side)</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>R (Right side)</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>C</td>
<td>L (Left side)</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>R (Right side)</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

Note) The position of each port is shown as right and left sides viewed from the front side of the vacuum port.
Release pressure is commonly supplied from the PS port.
- PS: Pilot pressure supply port, PV: Vacuum pressure supply port, PD: Release pressure supply port

**Specifications**

**Common**

- Switching method for vacuum/release valve: Piloted
- Cv factor: 0.11
- Supply pressure range:
  - Vacuum pressure supply port (PV): 0 to –101.3 kPa
  - Pilot/Pressure port (PS): 0.3 to 0.5 MPa (Normally open: 0.3 to 0.45 MPa)
  - Supply pressure port for vacuum release (PD): 0.3 to 0.5 MPa (Normally open: 0.3 to 0.45 MPa), and also PD pressure
- Operating temperature range: 5 to 50°C
- Fluid: Air

**Supply Valve / Vacuum Release Valve**

<table>
<thead>
<tr>
<th>Item</th>
<th>Type</th>
<th>Normally closed</th>
<th>Latching type</th>
<th>Normally open</th>
</tr>
</thead>
<tbody>
<tr>
<td>Model (Refer to “How to Order” for solenoid valves on page 122.)</td>
<td>VQ110</td>
<td>VQ110Y</td>
<td>VQ110Y</td>
<td>VQ110Y</td>
</tr>
<tr>
<td>Manual override</td>
<td>Non-locking push type / Locking type (Tool type)</td>
<td></td>
<td>Push-locking type</td>
<td>Non-locking push type / Locking type (Tool type)</td>
</tr>
<tr>
<td>Rated coil voltage</td>
<td>12, 24 VDC, 100, 110, 200, 220 VAC</td>
<td>12, 24 VDC, 100, 110, 200, 220 VAC</td>
<td>12, 24 VDC, 100, 110, 200, 220 VAC</td>
<td>12, 24 VDC, 100, 110, 200, 220 VAC</td>
</tr>
<tr>
<td>Power consumption (current value)</td>
<td>DC</td>
<td>1 W</td>
<td>0.5 W</td>
<td>1 W</td>
</tr>
<tr>
<td></td>
<td>100 VAC</td>
<td>0.5 VA (5 mA)</td>
<td>—</td>
<td>0.6 VA (6 mA)</td>
</tr>
<tr>
<td></td>
<td>110 VAC</td>
<td>0.55 VA (5 mA)</td>
<td>—</td>
<td>0.65 VA (5.9 mA)</td>
</tr>
<tr>
<td></td>
<td>200 VAC</td>
<td>1.0 VA (5 mA)</td>
<td>—</td>
<td>1.2 VA (6 mA)</td>
</tr>
<tr>
<td></td>
<td>220 VAC</td>
<td>1.1 VA (5 mA)</td>
<td>—</td>
<td>1.3 VA (5.9 mA)</td>
</tr>
<tr>
<td>Electrical entry</td>
<td>Grommet</td>
<td>L plug connector</td>
<td>L plug connector (with light/surge voltage suppressor)</td>
<td>Grommet</td>
</tr>
</tbody>
</table>

**Weight**

- Single unit: With suction filter (Note 1) 95 g
- With vacuum pressure switch and suction filter (Note 2) 109 g
- End plate assembly for manifold 122 g

Note 1) Including a 0.3 m connector for supply valve and vacuum release valve.
Note 2) Including a 0.3 m connector for supply valve and vacuum release valve and a 2 m connector for vacuum pressure switch.

Calculating weight for the manifold type
(Single unit weight) x (Number of stations) + (Weight of end plate assembly for manifold)

Example) Vacuum pressure switch + 8 stations with suction filter
109 g x 8 + 122 g = 994 g

(Refer to “How to Order” for solenoid valves on page 122.)
Specifications

Vacuum Pressure Switch

<table>
<thead>
<tr>
<th>Model</th>
<th>ZQ1-ZSE (ZSE10)</th>
<th>ZQ1-ZSF (ZSE10F)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rated pressure range</td>
<td>0 to –101 kPa</td>
<td>–100 to 100 kPa</td>
</tr>
<tr>
<td>Set pressure range/Display pressure range</td>
<td>10 to –105 kPa</td>
<td>–105 to 105 kPa</td>
</tr>
<tr>
<td>Withstand pressure</td>
<td>500 kPa</td>
<td></td>
</tr>
<tr>
<td>Minimum setting unit</td>
<td>0.1 kPa</td>
<td></td>
</tr>
<tr>
<td>Power supply voltage</td>
<td>12 to 24 VDC ±10%</td>
<td>(with power supply polarity protection)</td>
</tr>
<tr>
<td>Current consumption</td>
<td>40 mA or less</td>
<td></td>
</tr>
</tbody>
</table>

Switch output

- Maximum load current: 80 mA
- Maximum applied voltage: 28 V (with NPN output)
- Residual voltage: 2 V or less (with load current of 80 mA)
- Response time: 2.5 ms or less (Response time selections with anti-chattering function: 20, 100, 500, 1000 and 2000 ms)

Repeatable

- ±0.2% F.S. ±1 digit

Hysteresis

- Hysteresis mode: Variable (0 or above) (Note 1)
- Window comparator mode: With short-circuit protection

Analog output

- Output voltage (rated pressure range): 1 to 5 V ±2.5% F.S.
- Linearity: ±1% F.S. or less
- Output impedance: Approx. 1 kΩ

Display system

- 3 1/2-digit, 7 segment LED: 1-color display (Red)

Display accuracy

- ±2% F.S. ±1 digit (at ambient temperature of 25 ±3°C)

Operation indicator light

- Lights when ON, OUT1: Green, OUT2: Red

Environmental resistance

- Enclosure: IP40
- Ambient humidity range: Operating/Stored: 35 to 85% RH (with no condensation)
- Withstand voltage: 1000 VAC for 1 min. between terminals and housing
- Insulation resistance: 50 MΩ or more (500 VDC measured via megohmmeter) between terminals and housing

Temperature characteristics

- ±2% F.S. (at 25°C of ambient temperature range between –5 and 50°C)

Lead wires

- Oil-resistant cabtire cord
  - Cross section: 0.15 mm² (AWG26), 5 cores, Conductor O.D.: 1.0 mm

Note 1) If the applied voltage fluctuates around the set-value, the hysteresis must be set to a value more than the fluctuating width, otherwise chattering will occur.

Note 2) For others, refer to ejector specifications on page 120.

Construction

Component Parts

<table>
<thead>
<tr>
<th>No.</th>
<th>Description</th>
<th>Material</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Poppet valve assembly for supply valve</td>
<td>—</td>
</tr>
<tr>
<td>2</td>
<td>Poppet valve assembly for vacuum release valve</td>
<td>—</td>
</tr>
<tr>
<td>3</td>
<td>Vacuum release flow adjusting needle</td>
<td>Stainless steel</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>4</td>
<td>Solenoid valve</td>
<td>—</td>
<td>Refer to page 122.</td>
</tr>
<tr>
<td>5</td>
<td>Filter element</td>
<td>PVA sponge XT534-5-001-AS</td>
<td>—</td>
</tr>
<tr>
<td>6</td>
<td>Vacuum pressure switch</td>
<td>—</td>
<td>Refer to page 122.</td>
</tr>
<tr>
<td>7</td>
<td>Fitting</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>8</td>
<td>Fitting</td>
<td>—</td>
<td>—</td>
</tr>
</tbody>
</table>
**Solenoid Valve**

- **Actuation**
  - Normally closed
  - Normally open

**Pilot valve**

- Nil
- Standard (DC: 1 W)
- Latching positive common
- Latching negative common
- Low wattage type (0.5 W)
- AC type: Not applicable

**How to Order**

- **Connector assembly part no.**
  - Latching negative common
  - Latching positive common

**Solenoid valve rated voltage**

- 100 VAC (50/60 Hz)
- 200 VAC (50/60 Hz)
- 110 VAC (50/60 Hz)
- 220 VAC (50/60 Hz)
- 24 VDC
- 12 VDC

**Electrical entry**

- L-type plug connector, with 0.3 m lead wire
- L-type plug connector, without connector

**Check valve**

- Nil
- None
- With check valve

**Check valve (Note 3)**

- The check valve has a function to prevent the exhaust air from the silencer overflowing to the vacuum port side when a manifold is used, but it is incapable of completely preventing overflow. During usage, please inspect thoroughly with actual machine.

**Warning**

- Cannot be used for vacuum retention.
- Use a vacuum release valve. (Without a vacuum release valve, the workpiece may not be released.)

**Fitting (V port)**

- Symbol
- Applicable tubing O.D.
  - 0: Without fitting (MS: 0.8)
  - 1: ø3.2 (Straight)
  - 2: ø4 (Straight)
  - 3: ø6 (Straight)
  - 4: ø3.2 (Elbow)
  - 5: ø4 (Elbow)

**Vacuum Pump System ZQ series**

**Digital Pressure Switch ZSE10 series**

**Rated pressure range/diaphragm specifications table**

<table>
<thead>
<tr>
<th>Vacuum Pump System ZQ series</th>
<th>Digital Pressure Switch ZSE10 series</th>
</tr>
</thead>
<tbody>
<tr>
<td>ZQ1-ZS E-□□□□□□□□□□□□□□□□□</td>
<td>ZQ1-ZS E-□□□□□□□□□□□□□□□□□</td>
</tr>
<tr>
<td>ZE1□□□□□□□□□□□□□□□□□□□□□</td>
<td>ZSE1□□□□□□□□□□□□□□□□□□□□□</td>
</tr>
</tbody>
</table>

**Rated pressure range/output specifications correspondence table**

<table>
<thead>
<tr>
<th>Vacuum pump system for ZQ</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>ZQ1-ZSE□□□□□□□□□□□□□□□</td>
<td>0 to –101 kPa/NPN open collector 2 outputs</td>
</tr>
<tr>
<td>ZQ1-ZSE□□□□□□□□□□□□□□□</td>
<td>0 to –101 kPa/PNP open collector 2 outputs</td>
</tr>
<tr>
<td>ZQ1-ZSE□□□□□□□□□□□□□□□</td>
<td>0 to –101 kPa/NPN open collector 1 output + analog voltage</td>
</tr>
<tr>
<td>ZQ1-ZSE□□□□□□□□□□□□□□□</td>
<td>0 to –101 kPa/PNP open collector 1 output + analog voltage</td>
</tr>
<tr>
<td>ZQ1-ZSF□□□□□□□□□□□□□□□</td>
<td>100 to –100 kPa/NPN open collector 2 outputs</td>
</tr>
<tr>
<td>ZQ1-ZSF□□□□□□□□□□□□□□□</td>
<td>100 to –100 kPa/PNP open collector 2 outputs</td>
</tr>
<tr>
<td>ZQ1-ZSF□□□□□□□□□□□□□□□</td>
<td>100 to –100 kPa/NPN open collector 1 output + analog voltage</td>
</tr>
<tr>
<td>ZQ1-ZSF□□□□□□□□□□□□□□□</td>
<td>100 to –100 kPa/PNP open collector 1 output + analog voltage</td>
</tr>
</tbody>
</table>
Space Saving Vacuum Pump System  ZQ Series

Dimensions

Type K1  
ZQ1000U-K1

Type J1  
ZQ1000U-J1

Circuit diagram

Note 1) The above dimensions are for ZQ1000U-K1  L-E  G-00. In case of ZQ1000U-K  L-E  G-00, the overall length is 87.2.
Note 2) Dimensions marked with "∗" are those after bracket A is mounted.
Note 3) When the body is mounted, tighten with a torque of 0.6 ± 0.06 N·m.
Using excessive torque may cause damage to the body.
Note 4) The pitches of PS, PV, V and PE ports are determined assuming the use of One-touch fittings. If used with other fittings, these may cause interference, dependant on their type and size. Please refer to the catalog to confirm the sizes of the fittings to be used.

Note 5) In order to release a workpiece, design the circuit for vacuum release separately.
### Dimensions

#### Type K2

**ZQ1000U-K2**

- Pilot pressure exhaust (PE) port
- M3, Atmospheric release
- Pilot pressure supply (PS) port
- M5
- Vacuum pressure supply (PV) port
- M5

---

#### Type J2

**ZQ1000U-J2**

- Pilot pressure exhaust (PE) port
- M3, Atmospheric release
- Pilot pressure supply (PS) port
- M5
- Vacuum pressure supply (PV) port
- M5

---

**Circuit diagram**

**ZQ1000U-K2**

**ZQ1000U-J2**

---

**Note 1)** The above dimensions are for ZQ1000U-J1F00

**Note 2)** In case of ZQ1000U-K1F00, the overall length is 113.3.

**Note 3)** When the body is mounted, tighten with a torque of 0.6 ± 0.06 N·m. Using excessive torque may cause damage to the body.

**Note 4)** The pitches of PS, PE, PV and V ports are determined assuming the use of One-touch fittings. If used with other fittings, these may cause interference, dependent on their type and size. Please refer to the catalog to confirm the sizes of the fittings to be used.

---

**Circuit diagram**

**ZQ1000U-K2**

**ZQ1000U-J2**

---

**Note 5)** In order to release a workpiece, design the circuit for vacuum release separately.
Dimensions

Type Q1, N1
ZQ1000U-Q1
ZQ1000U-N1

Type Q2, N2
ZQ1000U-Q2
ZQ1000U-N2

Circuit diagram

Note 1) The above dimensions are for ZQ1000U-Q1-L-E-G-00. In case of ZQ1000U-Q1-F, the overall length is 93.
Note 2) The dimensions after bracket A is mounted are the same as those of the K1 type.
Note 3) When the body is mounted, tighten with a torque of 0.6 ± 0.06 N·m. Using excessive torque may cause damage to the body.
Note 4) The pitches of PS, PV, V and PE ports are determined assuming the use of One-touch fittings. If used with other fittings, these may cause interference, dependant on their type and size. Please refer to the catalog to confirm the sizes of the fittings to be used.

Note 5) In order to release a workpiece, design the circuit for vacuum release separately.
Manifold type (without PD port)

**ZQ1000M-OB**

---

**Dimensions**

**Manifold type (without PD port)**

**ZQ1000M-OB**

---

**Circuit diagram**

---

Note 1) The above dimensions are for ZQ1000M-OB.

Note 2) The above dimensions are for ZQ1000M-J1 and ZQ1000M-K1.

Note 3) Dimensions marked with "∗" are those after the attached washer is mounted.

Note 4) When the body is mounted, tighten with a torque of 0.6 ± 0.06 N·m. Using excessive torque may cause damage to the body.

Note 5) The pitches of V ports are determined assuming the use of One-touch fittings. If used with other fittings, these may cause interference, dependant on their type and size. Please refer to the catalog to confirm the sizes of the fittings to be used.

Note 6) When the release valve is not used, design the circuit for vacuum release separately in order to release a workpiece.
Dimensions

Manifold type (with PD port)

ZZQ1□□□□□□□□OC
*ZQ1000M□□□□□□□□□□

Supply valve
Common vacuum pressure exhaust (PE) port
(One-touch fitting: Applicable tubing O.D. ø4)
Atmospheric release.

Release valve
Common release pressure supply (PD) port
(One-touch fitting: Applicable tubing O.D. ø4)

Vacuum release flow adjusting needle

Common vacuum pressure supply (PV) port
(One-touch fitting: Applicable tubing O.D. ø8)

Circuit diagram

Note 1) The above dimensions are for ZZQ104-ROC.
* ZQ1000M-K1□□□□□□□□□□
* ZQ1000M-K2□□□□□□□□□□
* ZQ1000M-J1□□□□□□□□□□
* ZQ1000M-Q1□□□□□□□□□□
* In case of ZQ1000M□□□□□□□□□□□□□□-F-0, the overall length is 91.7.
* In case of ZQ1000M□□□□□□□□□□□□□□□□□□-G-0, the overall length is 112.

Note 2) The above dimensions are for ZQ1000M□□□□□□□□□□□□□□□□□□□□□□□□□□
Using excessive torque may cause damage to the body.

Note 3) When the body is mounted, tighten with a torque of 0.6 ± 0.06 N·m.
Using excessive torque may cause damage to the body.

Note 4) The pitches of V ports are determined assuming the use of One-touch fittings. If used with other fittings, these may cause interference, dependant on their type and size. Please refer to the catalog to confirm the sizes of the fittings to be used.

Note 5) When the vacuum release valve is not used, design the circuit for vacuum release separately in order to release a workpiece.
Dimensions

Fittings / Fitting type filter dimensions after installation

V port

<With vacuum pressure switch>

V port

<Suction filter only>

PS/PV port
Manifold Exploded View

Component Parts

<table>
<thead>
<tr>
<th>No.</th>
<th>Description</th>
<th>Part no.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Hexagon socket head cap screw</td>
<td>Hexagon socket head cap screw</td>
</tr>
<tr>
<td>2</td>
<td>End block L</td>
<td>End block L</td>
</tr>
<tr>
<td>3</td>
<td>End block R</td>
<td>End block R</td>
</tr>
<tr>
<td>4</td>
<td>Vacuum pump system assembly</td>
<td>Vacuum pump system assembly</td>
</tr>
<tr>
<td>5</td>
<td>Ejector body gasket for manifold</td>
<td>Ejector body gasket for manifold</td>
</tr>
</tbody>
</table>

Table (1)

<table>
<thead>
<tr>
<th>PD port specification</th>
<th>Without PD port</th>
<th>With PD port</th>
</tr>
</thead>
<tbody>
<tr>
<td>Right side</td>
<td>ZQ1L-0-S0B</td>
<td>ZQ1L-0-S0C</td>
</tr>
<tr>
<td>Left side</td>
<td>ZQ1L-0-V0B</td>
<td>ZQ1L-0-V0C</td>
</tr>
</tbody>
</table>

Table (2)

<table>
<thead>
<tr>
<th>PD port specification</th>
<th>Without PD port</th>
<th>With PD port</th>
</tr>
</thead>
<tbody>
<tr>
<td>Right side</td>
<td>ZQ1R-0-S0B</td>
<td>ZQ1R-0-S0C</td>
</tr>
<tr>
<td>Left side</td>
<td>ZQ1R-0-V0B</td>
<td>ZQ1R-0-V0C</td>
</tr>
</tbody>
</table>

Working Procedure

**Disassembly**

Loosen and remove the clamp rod ①.

**Assembly**

1. Install the ejector body gasket for manifold ⑤ into the gasket groove of each vacuum pump system assembly ④.
2. Install the ejector body gasket for manifold ③ into the gasket groove of the end block R ②.
3. Align the ejector assemblies ④, end block (L) ②, and end block (R) ③ using positioning pins (at the two “a” positions) and fasten with clamp rods ① (2 pcs.) (with a tightening torque of 0.6 N·m ± 0.06 N·m).

How to Order Hexagon Socket Head Cap Screw

**ZQ—STB 05**

<table>
<thead>
<tr>
<th>Number of stations</th>
<th>01</th>
<th>1 station</th>
</tr>
</thead>
<tbody>
<tr>
<td>02</td>
<td>2 stations</td>
<td></td>
</tr>
<tr>
<td>08</td>
<td>8 stations</td>
<td></td>
</tr>
</tbody>
</table>

Replacement of V Port Fittings (With vacuum pressure switch)

V port fittings are cassette style for easy replacement. The fittings are blocked by a clip. Remove the clip with a flat blade screwdriver, etc. to replace the fittings.

When mounting the fittings, after inserting the fitting assembly until it stops, then put the clip into the prescribed position completely.
## Warning

1. Avoid energizing the solenoid valve for long periods of time.

If a solenoid valve is energized for a long period of time, the coil will get hot and the performance may be reduced. Additionally, the peripheral equipment in close proximity may also be badly affected. Use a low wattage solenoid valve when the solenoid valve is energized continuously or when the duration of the energization is longer than the non-energized period each day. Periods of energization can be shortened by using a normally opened or latching type solenoid valve. Do not energize the coil on both A and B sides simultaneously when using the latching type.

Continuous energization of the solenoid valve should be less than 10 minutes in duration and the energization period should be shorter than the non-energized period. Take measures for any heat radiation so that the temperature is within the range of solenoid valve specifications when the solenoid valve is mounted on the control panel. Please pay special attention to any temperature increases when a manifold type with 3 stations or more is energized continuously or when three individual units are placed in close proximity.

2. Use the vacuum equipment within the operating supply pressure range.

When the operating with a lower supply pressure, the vacuum performance will be reduced and the poppet valve will cause malfunction. Never use the vacuum equipment more than the operating supply pressure range as this may cause damage to the product resulting in potentially dangerous operation.

3. Suspension of operation for long periods of time

Please use caution — as detailed below — when the vacuum equipment is turned off for periods in excess of 6 hours.

- Be sure to turn off the pressure supply to the vacuum equipment.

Please observe this precautions as the supply pressure will be applied for a extra period of time due to the line pressure increase and may result in damage to the vacuum equipment.

- Be sure to turn off the power supply to the solenoid valve and the pressure switch.

Please observe this precautions as any heat generated due to the length of energization time may seriously affect the vacuum equipment and peripheral equipment resulting in potentially dangerous operation.

4. Check valve

The check valve has a function to prevent the exhaust air from the silencer overflowing to the vacuum port side when a manifold is used. However, depending on usage conditions, it does not always suppress air overflow to the desired extent. During usage, please inspect thoroughly with actual machine. Also, no guarantee is therefore provided when used for any other purposes. It is especially dangerous if used for the purpose of workpiece drop prevention in the case of operator blackout. Therefore, please take additional measures for providing drop prevention, such as providing a guide.

5. Exhaust port (EXH port) on the vacuum ejector

Please check the exhaust port (EXH port) on the vacuum ejector, so that any exhaust resistance will not be increased due to insulating materials or restrictions in the piping. The exhaust resistance may reduce the ejector’s performance. Additionally, never use this product in an application where the exhaust port is blocked when detaching a workpiece. This misuse may result in possible damage to the product.

## Warning

6. Vacuum release flow adjustment needle

Adjust the vacuum release flow adjustment needle from the fully closed to the open state by 1/8 to 1/4 turns to detach a workpiece completely during the ON time of a release valve. Do not supply compressed air while the vacuum release flow adjustment needle is adjusted. Securely lock it with a lock nut after adjustment.

7. How to use the latching type solenoid valve

Our Latching type solenoid are fitted with a self-detaining mechanism. Its construction features an armature inside the solenoid which is set or reset using spontaneous energization. (20 ms or greater) Therefore, continuous energization is not required.

### How to Use the Latching Type Plug Connector

#### Wiring specifications

- Wiring should be connected as shown below. Connect with the power supply respectively.

#### DC positive common

- 

#### DC negative common

- 

#### AC type

<table>
<thead>
<tr>
<th>Lead wire colors</th>
<th>AC type</th>
</tr>
</thead>
<tbody>
<tr>
<td>100 VAC, 200 VAC</td>
<td>Yellow</td>
</tr>
<tr>
<td>Yellow</td>
<td>Blue</td>
</tr>
<tr>
<td>Yellow</td>
<td>Gray</td>
</tr>
</tbody>
</table>

Special care must be taken for the latching type.

1. Avoid using this product with a circuit which electrifies both the set and reset signals simultaneously.

2. The minimum energization time required for self-detaining is 20 ms.

3. Please contact us when using this product in locations where there are vibration levels of 30 m/s² or above or highly magnetic fields. No problems arise in normal usage or locations.

4. This valve retains the reset position (Flow path: A → R) at the time of shipment. However, it may alter to the set position during transporation or due to vibration when mounting the valve. Therefore, confirm the home position either manually or with power supply prior to use.

## Warning

## Mounting

1. Screw tightening torque for mounting the body should be performed with 0.6 ± 0.06 N-m.

Excessive torque may damage the product.
**Warning**

1. The following diagram shows the internal circuits of the vacuum switch as well as wiring examples. Incorrect wiring could cause malfunction or failure, leading to an electric shock or fire.

**Internal Circuits and Wiring Examples**

**EA, FA**  
NPN open collector (2 outputs)

**EB, FB**  
PNP open collector (2 outputs)

**EC, FC**  
NPN open collector (1 output) + Analog voltage output

---

* The FUNC terminal is connected when using the copy function. (Refer to the operation manual of the ZSE10 series.)

---

**EE, FE**  
PNP open collector (1 output) + Analog voltage output

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Be sure to read this before handling the products. Refer to back page 50 for Safety Instructions and pages 49 to 51 for Vacuum Equipment Precautions.