Large Size Vacuum Module:  
Series ZR  
Ejector System/Vacuum Pump System

- Large suction flow rate, suitable when used with large size pads or multiple pads.
- Nozzle dia. ø1.0, ø1.3, ø1.5, ø1.8, ø2.0
- Vacuum module suitable for handling workpieces of 0.5 to 5 kg.
Large Size Vacuum Module: Ejector System/Vacuum Pump System

Series ZR

Vacuum module suitable for handling workpieces of 0.5 to 5 kg.
- Modular design/Customized application function through selection of modular components.
- Modules for use with external vacuum supply (from pump or mainline) or as an air driven ejector system.
- Safe — Vacuum self-holding function by means of double solenoid valves.
- Compact, Lightweight
- Manifolding possible

Vacuum ejector type complete unit

Application Example

Absorbing and transferring liquid crystal panels
Absorbing and transferring thin plates
Absorbing and transferring copper plates, Automatic labeling machine, Absorbing and transferring veneers, Automatic screw fastening machine

Courtesy of Steven Engineering, Inc.-230 Ryan Way, South San Francisco, CA 94080-6370-Main Office: (650) 588-9200-Outside Local Area: (800) 258-9200-www.stevenengineering.com
### Modular Components Introduction

#### Ejector System

<table>
<thead>
<tr>
<th>Component equipment</th>
<th>Characteristics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ejector unit (ZR1-W)</td>
<td>Ne: 32 (mm)</td>
</tr>
<tr>
<td></td>
<td>Maximum suction flow rate (l/min. (ANR))</td>
</tr>
<tr>
<td></td>
<td>Air consumption (l/min. (ANR))</td>
</tr>
<tr>
<td></td>
<td>Maximum vacuum pressure</td>
</tr>
<tr>
<td></td>
<td>Exhaust release (Ejector exhaust)</td>
</tr>
</tbody>
</table>

#### Vacuum Pump System

<table>
<thead>
<tr>
<th>Component equipment</th>
<th>Characteristics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vacuum Pump System</td>
<td>P. 968 to 983</td>
</tr>
</tbody>
</table>

#### Vacuum Pump System

<table>
<thead>
<tr>
<th>Symbol</th>
<th>PVF</th>
</tr>
</thead>
<tbody>
<tr>
<td>RV1</td>
<td></td>
</tr>
<tr>
<td>RV2</td>
<td></td>
</tr>
<tr>
<td>RV3</td>
<td></td>
</tr>
</tbody>
</table>

### Common specifications

- Air supply port
- Vacuum pad connection port
- Pilot valve connection port
- Release valve connection port
- Common exhaust port
- External vacuum supply port

Refer to pages 945 to 954 for further specifications of each unit.
Large Size Vacuum Module: Ejector System
Series ZR

How to Order

Components

<table>
<thead>
<tr>
<th>Ejector unit</th>
<th>Supply valve, self-holding</th>
<th>Pressure valve for vacuum unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>ZR1</td>
<td>20 S 1</td>
<td>K1, 5 M Z</td>
</tr>
<tr>
<td>ZR1</td>
<td>20 L 1</td>
<td>K2, 5 M Z</td>
</tr>
<tr>
<td>ZR1</td>
<td>20 L 1</td>
<td></td>
</tr>
</tbody>
</table>

Maximum vacuum pressure

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Type</th>
<th>Valve</th>
<th>Manifold</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Built-in silencer</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td>2</td>
<td>Common exhaust</td>
<td>•</td>
<td>•</td>
</tr>
</tbody>
</table>

Combination of supply valve and release valve

Note 1) When port exhaust is applied to the manifold, pilot exhaust should be open while operating.

Note 2) When the product is used for the manifold specification and pilot exhaust is done by common exhaust. Thus, the exhaust port on the manifold base should be open while operating.

Note) 110 VAC (20 Hz)

Solenoid valve rated voltage

- Nil: Air operated
- 5: 24 VDC
- 6: 12 VDC
- V: 6 VDC
- R: 6 VDC
- D1: 100 VAC (50 Hz)
- D2: 110 VAC (50 Hz)

Note) CE marked products are available only for "D1" and "DC."!

CAUTION

When using AC, the DC solenoids are operated via a rectifier. Therefore, make sure to combine the connector assembly equipped with a rectifier with the exclusive solenoids. Using other combinations could lead to burnt coils or other malfunctions.

Light/ Surge voltage suppressor

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

- It is not available for AC. DC voltage (with surge voltage suppressor) if the polarity is incorrect at DC surge voltage suppression. Diode or switching element may be damaged.

Combination of switch/filter

- Nil: None
- N: Non-locking push type
- B: Slotted locking type

Release flow rate adjusting needle

- Nil: Without lock nut
- L: With lock nut

Electronic entry

For 24, 12, 6.5, 3 VDC

- L: Lead wire length 0.3 m
- M: Without connector
- MN: Without lead wire (Applicable to only DC)
- MO: Without connector
- G: Grommet
- H: Horn
- D1: 100 VAC (50 Hz with rectifier)

Pressure switch for vacuum (ZSE2) specifications (B)

Note for model selection

Take function plates into consideration. (Refer to page 943.)

Unit specifications

Digital pressure switch for vacuum (ZSE3A) specifications (D)

- Nil: With unit switching function
- M: None
- P: With unit switching function (Initial value psi)

Note) 1) This is no longer sold for use in Japan due to the weight and measure law (implemented October, 1999).

2) Fixed unit: kPa

Output specifications

Digital pressure switch for vacuum (ZSE3A) specifications (D)

- N: NPN open collector 1 output
- P: PNP open collector 1 output
- A: NPN open collector 2 outputs
- B: PNP open collector 2 outputs
- C: NPN open collector 1 output + Analog voltage output
- D: NPN open collector 1 output + Analog current output
- E: PNP open collector 1 output + Analog voltage output
- F: PNP open collector 1 output + Analog current output

Pressure switch for vacuum (ZSE2) specifications (E)

- Nil: No setting

Filter specifications (F)

- Nil: No setting

Service

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Large Size Vacuum Module: Ejector System Series ZR

Table (1) Combination of Supply Valve and Release Valve

<table>
<thead>
<tr>
<th>Operation stop</th>
<th>Vacuum absorption</th>
<th>Supply valve</th>
<th>Release valve</th>
<th>Supply valve</th>
<th>Release valve</th>
</tr>
</thead>
<tbody>
<tr>
<td>K3</td>
<td>Air operated (VJ3133)</td>
<td>Air operated (VJ3133)</td>
<td>N.C. (VJ3133)</td>
<td>Air operated (VJ3133)</td>
<td>N.C. (VJ3133)</td>
</tr>
<tr>
<td>C1</td>
<td>Air operated (VJ3133)</td>
<td>Air operated (VJ3133)</td>
<td>N.C. (VJ3133)</td>
<td>Air operated (VJ3133)</td>
<td>N.C. (VJ3133)</td>
</tr>
<tr>
<td>C3</td>
<td>Air operated (VJ3133)</td>
<td>Air operated (VJ3133)</td>
<td>N.C. (VJ3133)</td>
<td>Air operated (VJ3133)</td>
<td>N.C. (VJ3133)</td>
</tr>
<tr>
<td>C4</td>
<td>Air operated (VJ3133)</td>
<td>Air operated (VJ3133)</td>
<td>N.C. (VJ3133)</td>
<td>Air operated (VJ3133)</td>
<td>N.C. (VJ3133)</td>
</tr>
<tr>
<td>Nil</td>
<td>Supply valve</td>
<td>Release valve</td>
<td>Supply valve</td>
<td>Release valve</td>
<td></td>
</tr>
</tbody>
</table>

Table (2) How to Order Valve Plug Connector Assembly

- **DC**
  - VJ10 - 20 - 4A
- **100 VAC (with rectifier)**
  - VJ10 - 36 - 1A
- **110 VAC (with rectifier)**
  - VJ10 - 36 - 3A

How to order
When requiring a vacuum switch with lead wire of 5 m, specify the part numbers of the vacuum module valves without the standard lead wire connectors and order the required connector ass'y separately. Example) ZR120S1-K15M/L50132/Z-EC(-Q) 1 pc.

Table (3) Pressure Switch for Vacuum/Lead Wire with Connector

- **ZS - 10 - 5A**
  - Lead wire length
    - Nil: 0.6 m
    - 30: 3 m
    - 50: 5 m

How to order
When requiring a vacuum switch with a lead wire of 5 m, specify the part numbers of the vacuum module valves without a lead wire connector and the 5 m lead wire connector separately. Example) ZR120S1-K15M/Z-EC(-Q) 1 pc.

Table (4) Digital Pressure Switch for Vacuum/Lead Wire with Connector

- **ZS - 38 - 3 L**
  - Lead wire core
    - 3: 3 cores, 1 output, 2 m (Output specifications: N, P)
    - 4: 4 cores, 2 outputs, 2 m (Output specifications: A, B, C, D, E, F)
Ejector System/Combination of Supply Valve and Release Valve

**Combination Symbol: K1**
Feature: Double solenoid supply valve allows for self-holding.
- Pilot pressure supply port (PS)
- Pilot pressure exhaust port (PE)
- Release pressure supply port (PD)
- Air pressure supply port (PV)
- Vacuum port (V)

**Combination Symbol: C1**
Feature: Adsorption of workpieces (when energized) and release of vacuum (when de-energized) are switched by single solenoid valve.

**Combination Symbol: K2**
Feature: Single solenoid valve is provided for supply valve.

**Combination Symbol: C2**
Feature: Adsorption of workpieces and release of vacuum are switched by external pilot valve.

**Combination Symbol: K3**
Feature: Operation can be controlled by an external pilot valve.

**Combination Symbol: C3**
Feature: Adsorption of workpieces (when de-energized) and release of vacuum (when energized) are switched by single solenoid valve.

**Combination Symbol: C4**
Feature: Adsorption of workpieces and release of vacuum are switched by double solenoid valve.

---

**Caution**
When pipe connection is made to one port connection (PV port) only, use a function plate (ZR1-RV1). Refer to page 943 for further information.
**Function Plate/ZR1-RV**

A function plate is used when each connecting port for the valve unit is common. If a function plate is not used (standard), make individual pipe connections to PV, PS, and PD ports respectively.

### Without Function Plate (Standard)

Applicable system: Ejector system
External vacuum supply system

**Pipe connection**

**With Function Plate/Applicable to Ejector System Only**

**When ZR1/RV1 (PV⇔PS⇔PD) is Selected**

Since PV, PS and PD ports are made common via the function plate, pipe only to the PV port.

**Pipe connection**

**When ZR1/RV2 (PV⇔PS/PD) is Selected**

Supply air for generating vacuum and releasing vacuum respectively.

**Pipe connection**

### How to Order Function Plate Unit (For Ejector System)

**ZR1-RV1**

<table>
<thead>
<tr>
<th>Piping specifications</th>
<th>PVC</th>
<th>PVC</th>
<th>PVC</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>PV</td>
<td>PS</td>
<td>PD</td>
</tr>
<tr>
<td>2</td>
<td>PV</td>
<td>PVC</td>
<td>PD</td>
</tr>
</tbody>
</table>

**How to order**

Indicate the model numbers of the vacuum module and the function plate.

Example) ZR120S1-K15MZ-EC.................. 1 pc.
ZR1-RV1 ..................................... 1 pc.

- **Caution**

Length of assembling screw varies when adding function plate. Order from the mounting thread parts list for unit combination on page 982.
Order a plug (M-5P) separately in order to plug the PD and PS ports that are no longer used due to the addition of function plate.
Series ZR

Construction

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>Manifold base</td>
<td>Aluminum</td>
<td>Refer to page 962.</td>
</tr>
<tr>
<td>2</td>
<td>Release flow rate adjusting needle</td>
<td>Stainless steel</td>
<td>Refer to page 962.</td>
</tr>
<tr>
<td>3</td>
<td>Function plate</td>
<td>PBT</td>
<td>Refer to page 962.</td>
</tr>
<tr>
<td>4</td>
<td>Individual spacer</td>
<td>PBT</td>
<td>Refer to page 962.</td>
</tr>
<tr>
<td>5</td>
<td>Filter case</td>
<td>Polycarbonate</td>
<td>Refer to page 962</td>
</tr>
</tbody>
</table>

Note 1) Precautions on handling the filter case
1. The case is made of polycarbonate. Therefore, do not contact it or expose it to the following chemicals: paint thinner, carbon tetrachloride, chloroform, acetic ester, aniline, cyclohexane, trichloroethylene, sulfuric acid, lactic acid, water soluble cutting oil (alkalinic), etc.
2. Do not expose it to direct sunlight.

Note 2) Turning the release flow rate adjusting needle 2 full turns from the fully closed position renders the needle valve fully open. Do not turn more than two times since turning excessively may cause the needle to fall off.

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

Replacement Parts

<table>
<thead>
<tr>
<th>No.</th>
<th>Description</th>
<th>Material</th>
<th>Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td>Pilot valve assembly</td>
<td>—</td>
<td>Refer to (5)</td>
</tr>
<tr>
<td>7</td>
<td>Valve body assembly</td>
<td>—</td>
<td>Refer to (1)</td>
</tr>
<tr>
<td>8</td>
<td>Ejector assembly</td>
<td>—</td>
<td>Refer to (2)</td>
</tr>
<tr>
<td>9</td>
<td>Silencer element</td>
<td>PTF</td>
<td>Refer to (3)</td>
</tr>
<tr>
<td>10</td>
<td>Filter element</td>
<td>PTF</td>
<td>Refer to (3)</td>
</tr>
<tr>
<td>11</td>
<td>Pressure switch for vacuum</td>
<td>ZSE2-10</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>Filter switch unit for replacement</td>
<td>ZSE2-10</td>
<td></td>
</tr>
</tbody>
</table>

How to Order Solenoid Valves/Air Operated Valves

Air operated
ZR1–VJA3130

Solenoid valve
ZR1–VJ3233

Pilot valve
Solenoide valve rated voltage

Note: Pilot valve gasket is included. (ZR1-PVG-1 or ZR1-PVG-2)

(1) How to Order Valve Body Assembly

ZR1–VD K1 5 M Z L

Combination of supply valve and release valve
Pilot valve
Solenoid valve rated voltage
Manual operation
Release flow rate adjusting needle
With light/surge voltage suppressor

Refer to page 940 for detailed specifications of each code.

(2) How to Order Ejector Assembly

ZR1–WD 10 S 1

No. Description
10 Nozzle diameter
1 1.0 mm
13 1.3 mm
15 1.5 mm
18 1.8 mm
20 2.0 mm

Maximum vacuum pressure
S –84 kPa
L –53 kPa

(3) How to Order Silencer Element

ZR1–SZ 10

No. Description
10 Nozzle diameter
1 1.0 mm
13 1.3 mm
15 1.5 mm
18 1.8 mm
20 2.0 mm

(4) Pressure Switch for Vacuum + Suction Filter Unit

ZR1–F E L D

Option (Connector/lead wire specifications)
Unit specifications
Output specifications

Refer to page 953 for detailed specifications of each code.

(5) How to Order Pilot Valves

<table>
<thead>
<tr>
<th>Solenoid valve</th>
<th>Components</th>
<th>Release valve</th>
<th>Model</th>
</tr>
</thead>
<tbody>
<tr>
<td>ZR1–VJ3233</td>
<td>K1</td>
<td>Double solenoid valve N.C. (VJ3233)</td>
<td>ZR1-V JA3130</td>
</tr>
<tr>
<td>ZR1–VJ3133</td>
<td>C4</td>
<td>Double solenoid valve N.O. (VJ3233)</td>
<td>ZR1-V JA3130</td>
</tr>
<tr>
<td>ZR1–VJ3133</td>
<td>K3</td>
<td>Air operated N.C. (VJ3A3130)</td>
<td>ZR1-V JA3130</td>
</tr>
</tbody>
</table>

Refer to “How to Order” below.

Supply valve
Release valve

Refer to page 940 for detailed specifications of each code.

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### Ejector Unit/Series ZR1

#### Model/Max. Vacuum Pressure –84 kPa (S: Standard type)

<table>
<thead>
<tr>
<th>Model</th>
<th>Nozzle dia. (mm)</th>
<th>Maximum suction flow rate (l/min (ANR))</th>
<th>Air consumption (l/min (ANR))</th>
<th>Mass (With bracket) (kg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>ZR1-W10S</td>
<td>1.0</td>
<td>22</td>
<td>46</td>
<td>0.132</td>
</tr>
<tr>
<td>ZR1-W13S</td>
<td>1.3</td>
<td>38</td>
<td>78</td>
<td>0.134</td>
</tr>
<tr>
<td>ZR1-W15S</td>
<td>1.5</td>
<td>54</td>
<td>95</td>
<td>0.136</td>
</tr>
<tr>
<td>ZR1-W20S</td>
<td>2.0</td>
<td>84</td>
<td>185</td>
<td>0.156</td>
</tr>
</tbody>
</table>

#### Model/Max. Vacuum Pressure –53 kPa (L: Large flow type)

<table>
<thead>
<tr>
<th>Model</th>
<th>Nozzle dia. (mm)</th>
<th>Maximum suction flow rate (l/min (ANR))</th>
<th>Air consumption (l/min (ANR))</th>
<th>Mass (With bracket) (kg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>ZR1-W10L</td>
<td>1.0</td>
<td>42</td>
<td>46</td>
<td>0.133</td>
</tr>
<tr>
<td>ZR1-W13L</td>
<td>1.3</td>
<td>52</td>
<td>78</td>
<td>0.133</td>
</tr>
<tr>
<td>ZR1-W15L</td>
<td>1.5</td>
<td>74</td>
<td>95</td>
<td>0.135</td>
</tr>
<tr>
<td>ZR1-W18L</td>
<td>1.8</td>
<td>88</td>
<td>150</td>
<td>0.155</td>
</tr>
<tr>
<td>ZR1-W20L</td>
<td>2.0</td>
<td>105</td>
<td>185</td>
<td>0.154</td>
</tr>
</tbody>
</table>

#### Common Specifications

- Maximum operating pressure: 0.7 MPa
- Supply pressure range: 0.2 to 0.55 MPa
- Standard supply pressure: 0.45 MPa
- Operating temperature range: 5 to 50°C

*Model (Ejector exhaust method)*

| Code 1: Built-in silencer — For unit and manifold | Code 2: Individual exhaust — For unit and manifold |

**How to Order**

**ZR1-W 20 S 1**

- **Nozzle diameter**
  - 10: 1.0 mm
  - 13: 1.3 mm
  - 15: 1.5 mm
  - 18: 1.8 mm
  - 20: 2.0 mm

- **Ejector exhaust**
  - 1: Built-in silencer
  - 2: Individual exhaust

- **Maximum vacuum pressure**
  - S: –84 kPa
  - L: –53 kPa

*How to Order: Code 1 and 2 are the suffixes in the ordering number to indicate the exhaust method. Note: Operation outside of the specified supply pressure and operating temperature range may cause a serious accident or damage.*
Series ZR

Characteristics (Representative value)

Ejector Unit/Standard Type (S): Max. Vacuum Pressure –84 kPa

At 0.45 MPa

| ZR1-W10S1 Exhaust characteristics | Flow characteristics |
| ZR1-W13S1 Exhaust characteristics | Flow characteristics |
| ZR1-W15S1 Exhaust characteristics | Flow characteristics |
| ZR1-W18S1 Exhaust characteristics | Flow characteristics |
| ZR1-W20S1 Exhaust characteristics | Flow characteristics |

Vacuum pressure (kPa) vs. Suction flow (l/min (ANR))

Vacuum pressure (kPa) vs. Air consumption (l/min (ANR))

Supply pressure (MPa) vs. Suction flow (l/min (ANR))

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Vacuum pressure
Air consumption
Suction flow

Supply pressure (MPa) Suction flow (l/min (ANR))

Flow characteristics are expressed in ejector vacuum pressure and suction flow. If suction flow rate changes, the vacuum pressure will also be changed. Normally this relationship is expressed in ejector standard use. In graph, Pmax is max. vacuum pressure and Qmax is maximum suction flow. The values are specified according to catalog use. Changes in vacuum pressure are expressed in the below order.

1. When ejector suction port is covered and made airtight, suction flow becomes 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).

Based on the above, 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. In the case when ventilative or leaky work should be adsorbed, please note that vacuum pressure will not rise.

How to Read Flow Characteristics Graph

Flow characteristics are expressed in ejector vacuum pressure and suction flow. If suction flow rate changes, the vacuum pressure will also be changed. Normally this relationship is expressed in ejector standard use. In graph, Pmax is max. vacuum pressure and Qmax is maximum suction flow. The values are specified according to catalog use. Changes in vacuum pressure are expressed in the below order:

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Series ZR

Ejector Unit

Nozzle Dia./Ø1.0, Ø1.3, Ø1.5, Ø1.8, Ø2.0

Nozzle dia./Ø1.0, Ø1.3, Ø1.5 mm
ZR1-W

For port exhaust
Rc 1/8 exhaust port (EXH.)

Rc 1/8 Air pressure supply port (P)
M5 Release pressure supply port (PD)
Remove the plug from PD port at external release.

Bracket B
Bracket B

Nozzle dia./Ø1.8, Ø2.0 mm
ZR1-W

For port exhaust
Rc 1/4 exhaust port (EXH.)

Rc 1/8 Air pressure supply port (P)
M5 Release pressure supply port (PD)
Remove the plug from PD port at external release.

Bracket B
Bracket B

Circuit diagram

EXH. Silencer
Air pressure supply port (P)
Release pressure supply port (PD)

Ejector indication

2 x 4, 6 (Mounting hole)

Adapter B

2 x 3, 4 (Mounting hole)

Adapter E

2 x 4, 6 (Mounting hole)

Ejector

Silencer

EXH. Port exhaust

EXH. Port exhaust

Ejector

Circular diagram

Note) *1 Dimensions for mounting bracket B
*2 Dimensions for mounting spacer B
Spacer B is used to leave space for maintenance (for replacement of silencer etc.) on side mounting.
Bracket B part no.: P3270154#1 (Standard accessory)
Spacer B part no.: P3270157#1

Ejector exhaust
Air pressure supply P port
Vacuum V port

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Outside Local Area: (800) 258-9200
www.stevenengineering.com
Pressure Switch Unit for Vacuum/Pressure Switch for Vacuum: ZSE2-0R-□□

Specifications

<table>
<thead>
<tr>
<th>Specifications</th>
<th>ZSE2-0R-15</th>
<th>ZSE2-0R-55</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pressure switch for vacuum part no.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fluid</td>
<td>Act</td>
<td>Act</td>
</tr>
<tr>
<td>Setting pressure range</td>
<td>-101 to 0 kPa</td>
<td>-101 to 0 kPa</td>
</tr>
<tr>
<td>Hysteresis</td>
<td>±3% F.S. or less (Fixed)</td>
<td>±3% F.S. or less (Fixed)</td>
</tr>
<tr>
<td>Temperature characteristics (Based on 25°C)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Operating voltage</td>
<td>12 to 24 VDC (Ripple ±10% or less)</td>
<td>12 to 24 VDC (Ripple ±10% or less)</td>
</tr>
<tr>
<td>Output</td>
<td>NPN Open collector 30 V, 80 mA</td>
<td>PNP Open collector 80 mA</td>
</tr>
<tr>
<td>Indicator light</td>
<td>Lights up when ON</td>
<td>Lights up when ON</td>
</tr>
<tr>
<td>Current consumption</td>
<td>17 mA or less (when 24 VDC is ON)</td>
<td>17 mA or less (when 24 VDC is ON)</td>
</tr>
<tr>
<td>Proof pressure (Max. operating pressure)</td>
<td>0.5 MPa</td>
<td>0.5 MPa</td>
</tr>
<tr>
<td>Operating temperature range</td>
<td>5 to 50°C</td>
<td>5 to 50°C</td>
</tr>
</tbody>
</table>

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

Wiring

ZSE2 connection

<table>
<thead>
<tr>
<th>Switch</th>
<th>Brown (+)</th>
<th>Blue (-)</th>
<th>Black (COM)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brown (+)</td>
<td>Blue (-)</td>
<td>Black (COM)</td>
<td></td>
</tr>
</tbody>
</table>

Connection with PLC at negative COM terminal

<table>
<thead>
<tr>
<th>Switch</th>
<th>Brown (+)</th>
<th>Blue (-)</th>
<th>Black (COM)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brown (+)</td>
<td>Blue (-)</td>
<td>Black (COM)</td>
<td></td>
</tr>
</tbody>
</table>

How to Order

ZSE2 - OR - 15 L

Output specifications

| 15 | NPN Open collector 30 V 80mA |
| 55 | PNP Open collector 80mA |

Piping specifications

<table>
<thead>
<tr>
<th>Grommet type</th>
<th>Lead wire length</th>
</tr>
</thead>
<tbody>
<tr>
<td>NI</td>
<td>0.6 m</td>
</tr>
<tr>
<td>L</td>
<td>3 m</td>
</tr>
<tr>
<td>C</td>
<td>5 m</td>
</tr>
</tbody>
</table>

Lead wire length

<table>
<thead>
<tr>
<th>Lead wire length</th>
<th>0.6 m</th>
<th>3 m</th>
<th>5 m</th>
</tr>
</thead>
</table>

With Connector/How to Order

Without lead wire (housing and 3 sockets) ................................ ZS-10-A
With lead wire ........................................................................ ZS-10-5A-

Note: When requiring a switch with lead wire of 5 m, indicate separately the model numbers of the connector type switch without lead wire and the connector assembly with 5 m lead wire.

Example) ZSE2-0R-15CN ...................................... 1 pc.
ZS-10-5A-50 .................................. 1 pc.

Refer to Best Pneumatics No. 6 for detailed specifications of pressure switches for vacuum.
Series ZR

Pressure Switch Unit for Vacuum/Pressure Switch for Vacuum: ZSE2-0R-

Guidelines for Use of Pressure Switch Unit for Vacuum

System circuit for work adsorption

Ejector style

Vacuum pump style

When pads and switches are common to one vacuum source, sometimes there is a possibility, depending on the number of adsorption and non-adsorption applications at each point in time, that the switches will not work within the range of set pressures due to pressure variations from the vacuum source. In particular, when small diameter nozzles are used for adsorption, the switches are greatly influenced by pressure variations. In order to remedy this situation, the following circuit is recommended.

- Adjust the throttle valve to reduce the pressure fluctuation between absorption and non-absorption.
- Stabilize the source pressure by providing a tank and a vacuum regulator.
- If a vacuum switch valve is inserted into individual lines and false absorption occurs, each valve should be turned OFF to minimize the influences on other pads.

Pressure Switch for Vacuum: ZSE2-0R-

ZSE2-0R-□

Pressure setting trimmer

Indicator light (Red)

2 x M2.5 x 41L Mounting thread

Vacuum supply port 3.3

ZSE2-0R-□C

ZSE2-0R-□CL

ZSE2-0R-□CN

Pressure setting trimmer

Indicator light (Red)

2 x M2.5 x 41L Mounting thread

Vacuum supply port 3.3

950

Courtesy of Steven Engineering, Inc.-230 Ryan Way, South San Francisco, CA 94080-6370-Main Office: (650) 588-9200-Outside Local Area: (800) 258-9200-www.stevenengineering.com
How to Set Vacuum Pressure

• Pressure trimmer selects the ON pressure. Clockwise rotation increases high vacuum set point.

• When using the switch to confirm correct absorption, the vacuum pressure is set to the minimum value to reliably absorb. 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 operate stably even though it may absorb correctly.

Hysteresis

Hysteresis is the actual pressure variance from set pressure occurring when the output signal turns from ON to OFF. The set pressure is the pressure selected to switch from OFF to ON mode.

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 at the end of the lead wires, insert the ends of core wires evenly into the sockets, and then crimp with a crimping tool. When this is done, take care that the coverings of the lead wires do not enter the core wire crimping area.

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 end. (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.
Refer to the separate catalog (CAT.ES100-70) for details.

### How to Order

#### Vacuum Pressure Switch Unit/Digital Pressure Switch for Vacuum: ZSE30A-00-N-M-X505

#### Output Specifications

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Output Type</th>
<th>Voltage</th>
<th>Current</th>
</tr>
</thead>
<tbody>
<tr>
<td>N</td>
<td>NPN</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>P</td>
<td>PNP</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>A</td>
<td>NPN</td>
<td>1</td>
<td>—</td>
</tr>
<tr>
<td>B</td>
<td>PNP</td>
<td>2</td>
<td>—</td>
</tr>
<tr>
<td>C</td>
<td>NPN</td>
<td>1</td>
<td>—</td>
</tr>
<tr>
<td>D</td>
<td>PNP</td>
<td>1</td>
<td>—</td>
</tr>
<tr>
<td>E</td>
<td>PNP</td>
<td>1</td>
<td>—</td>
</tr>
<tr>
<td>F</td>
<td>PNP</td>
<td>1</td>
<td>—</td>
</tr>
</tbody>
</table>

#### Specifications

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rated pressure range</td>
<td>0.0 to –101.0 kPa</td>
</tr>
<tr>
<td>Set pressure range</td>
<td>10.0 to –105.0 kPa</td>
</tr>
<tr>
<td>Withstand pressure</td>
<td>500 kPa</td>
</tr>
<tr>
<td>Minimum unit setting</td>
<td>0.1 kPa</td>
</tr>
<tr>
<td>Applicable fluid</td>
<td>Air, Non-corrosive gas, Non-flammable gas</td>
</tr>
<tr>
<td>Power supply voltage</td>
<td>12 to 24 VDC ±10% (with power supply polarity protection)</td>
</tr>
<tr>
<td>Current consumption</td>
<td>±10% (with power supply polarity protection)</td>
</tr>
<tr>
<td>Switch output</td>
<td>NPN or PNP open collector 1 output</td>
</tr>
<tr>
<td>Maximum load current</td>
<td>80 mA</td>
</tr>
<tr>
<td>Maximum applied voltage</td>
<td>28 V (at NPN output)</td>
</tr>
<tr>
<td>Residual voltage</td>
<td>1 V or less (with load current at 80 mA)</td>
</tr>
<tr>
<td>Response time</td>
<td>2.5 ms or less (with anti-chattering function: 20, 100, 500, 1000, 2000 ms)</td>
</tr>
<tr>
<td>Short circuit protection</td>
<td>±0.2% F.S., ±1 digit</td>
</tr>
<tr>
<td>Hysteresis mode</td>
<td>Variable (0 to variable)</td>
</tr>
<tr>
<td>Window comparator mode</td>
<td>1 to 5 V ±2.5% F.S.</td>
</tr>
<tr>
<td>Linearity</td>
<td>±1% F.S. or less</td>
</tr>
<tr>
<td>Output impedance</td>
<td>Approx. 1 kΩ</td>
</tr>
<tr>
<td>Load impedance</td>
<td>4 to 20 mA ±2.5% F.S.</td>
</tr>
<tr>
<td>Maximum load impedance</td>
<td>±1% F.S. or less</td>
</tr>
<tr>
<td>Display</td>
<td>4-digit, 7-segment, 2-color LCD (Red/Green) Sampling cycle: 5 times/sec.</td>
</tr>
<tr>
<td>Display accuracy</td>
<td>±2% F.S., ±1 digit (ambient temperature of 25°C)</td>
</tr>
<tr>
<td>Indicator light</td>
<td>Lights up when switch output is turned ON. (DUT: Green, OUT: Red)</td>
</tr>
<tr>
<td>Enclosure</td>
<td>IP40</td>
</tr>
<tr>
<td>Operating temperature range</td>
<td>Operating: 0 to 50°C, Stored: –10 to 60°C (No freezing or condensation)</td>
</tr>
<tr>
<td>Operating humidity range</td>
<td>Operating: Stored 35 to 85% RH (No condensation)</td>
</tr>
<tr>
<td>Withstand voltage</td>
<td>1000 VAC for 1 minute between live parts and case</td>
</tr>
<tr>
<td>Insulation resistance</td>
<td>50 MJ or more between live parts and case (at 500 VDC Mega)</td>
</tr>
<tr>
<td>Vibration resistance</td>
<td>10 to 150 Hz at whichever is smaller of 1.5 mm amplitude or 20 m/s² acceleration, in X, Y, Z directions, for 2 hours each</td>
</tr>
<tr>
<td>Impact resistance</td>
<td>100 m/s², in X, Y, Z directions, for 2 hours each</td>
</tr>
<tr>
<td>Temperature characteristics</td>
<td>±2% F.S. (Based on 25°C)</td>
</tr>
<tr>
<td>Lead wire</td>
<td>DIP proof heavy-duty vinyl cable: 3 cores ø3.5, 2 m</td>
</tr>
<tr>
<td></td>
<td>4 cores Conductor area: 0.15 mm² (AWG26)</td>
</tr>
<tr>
<td></td>
<td>Insulator OD: 1.0 mm</td>
</tr>
<tr>
<td>Standards</td>
<td>CE Marking, UL/CWA, RoHS compliance</td>
</tr>
</tbody>
</table>

Note 1) When analog voltage output is selected, analog current output cannot be used together.

Note 2) When analog current output is selected, analog voltage output cannot be used together.
**压力开关和吸尘过滤器组合单元：ZR1-F**

**组合单元**

- **真空压力开关**
  - 型号：ZR1-F
  - 通过压力开关和吸尘过滤器的组合保护真空压力开关和吸尘过滤器的真空压力检测。

**滤器盖**

- **警告**
  - 滤器盖是用聚碳酸酯制成的。因此，不要接触它或将其暴露在以下化学物质中：油漆稀释剂，丙酮，二氯甲烷，氯仿，乙酸乙酯，苯胺，环己烷，三氯乙烯，硫酸和乳酸，水，可溶性切削油（碱性），等。
  - 因此，不要接触它或将其暴露在以下化学物质中：油漆稀释剂，丙酮，二氯甲烷，氯仿，乙酸乙酯，苯胺，环己烷，三氯乙烯，硫酸和乳酸，水，可溶性切削油（碱性），等。

**使用说明**

- 当过滤元件堵塞时，应更换过滤元件。
  - (元件号 ZR1-FZ)。
  - 当过滤元件的性能下降时，应停止操作并更换元件。

**订购方法**

- **组合符号**
  - Suction filter for vacuum (ZSE2) specifications (E)
  - Pressure switch for vacuum (ZSE30A) specifications (D)
  - Digital pressure switch for vacuum (ZSE30A) + Filter

**注意**

- **组合符号**
  - ZF (pressure switch for vacuum unit for vacuum without a lead wire connector and the 5 m lead wire connector).
  - When requiring a switch with lead wire of 5 m, indicate separately the model numbers of a lead wire with connector.

**技术规格**

- **压力开关**
  - 型号：ZR1-F
  - 压力开关规格：PNP-open-collector 1 output + Analog voltage output

**如何更换过滤元件**

- 当一个元件堵塞时，应更换过滤元件。元件号为 ZR1-FZ。

**如何订购**

- **组合符号**
  - ZR1-F

**图示**

- **滤器盖**
  - O-ring
  - Filter case (ZR1-FC-PC)
  - Filter gasket (P3270144)

---

注意：如果未在规定的压力和温度范围内工作，可能造成故障。

**组合压力开关和吸尘过滤器**

- **组合符号**
  - Suction filter for vacuum (ZSE2) + Filter

**注意**

- **输出规格**
  - 数字压力开关规格：PNP-open-collector 1 output + Analog voltage output

**如何订购**

- **组合符号**
  - ZR1-F

**图示**

- **滤器盖**
  - O-ring
  - Filter case (ZR1-FC-PC)

---

注意：如果未在规定的压力和温度范围内工作，可能造成故障。

**组合压力开关和吸尘过滤器**

- **组合符号**
  - Suction filter for vacuum (ZSE2) + Filter

**注意**

- **输出规格**
  - 数字压力开关规格：PNP-open-collector 1 output + Analog voltage output

**如何订购**

- **组合符号**
  - ZR1-F
**Series ZR**

**Pressure Switch for Vacuum + Suction Filter Unit: ZR1-F**

**Dimensions: ZR1-F**

**Circuit diagram**

**ZR1-FE**

- Pressure switch for vacuum
- Vacuum pressure setting trimmer
- Vacuum port
- Suction filter
- Release pressure supply port (PD)
- Bracket A

**ZR1-FD**

- Digital pressure switch for vacuum
- Suction filter
- Attachment D
- Filter block D

---

**Note:**
1. Dimensions for mounting bracket A
2. Dimensions for mounting spacer A
3. Bracket A part no.: P3270153#1 (Standard accessory)
4. Spacer A part no.: P3270156#1

---

Courtesy of Steven Engineering, Inc.: 230 Ryan Way, South San Francisco, CA 94080
Main Office: (650) 588-9200
Outside Local Area: (800) 258-9200
www.stevenengineering.com
Suction Filter: ZR1-FX

ZR1-FX is to be used alone and cannot be combined with other units.

Filter case

⚠️ Caution
1. The case is made of polycarbonate. Therefore, do not use it with or expose it to the following chemicals: paint thinner, carbon tetrachloride, chloroform, acetic ester, aniline, cyclohexane, trichloroethylene, sulfuric acid, lactic acid, water soluble cutting oil (alkaline), etc.
2. Do not expose it to direct sunlight.

Dimensions: ZR1-FX

Circuit diagram

Note) If not operated within the specified range of pressure and temperature, trouble may be caused.

Specifications:
- Model: ZR1-FX
- Operating pressure range: Vacuum to 0.5 MPa
- Operating temperature range: 5 to 50°C
- Filtration efficiency: 30 µm
- Element: PVF
- Mass (With bracket): 2.1 kg

Note) Dimensions for mounting bracket C
Bracket C part no.: P3270155#1 (Standard accessory)
Series ZR

Ejector System Complete Unit

<Components>
Ejector + Valve + Pressure Switch for Vacuum + Filter

Circuit diagram

Nozzle dia./ø1.0, ø1.3, ø1.5
ZR1 - 1-K1 - M - E - D

For port exhaust
Rc 1/8 exhaust port (EXH.)
57.5

 Spacer A is used to leave space for maintenance (for replacement of filter element etc.) on side mounting.

ZR10 - 1-K1 - M - D

For port exhaust
Rc 1/8 PV port
Air pressure supply port (PV)

2 x ø4.2 (Mounting hole)

A: Release flow rate adjusting needle with lock nut

(Needle fully open)

7.2 mm

Digital pressure switch for vacuum

7.2 ±1

85 ±1

956

Approved

Approved

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Nozzle dia./ø1.8, ø2.0
ZR1\(\frac{1}{8}\)-K1-M-E

A: Release flow rate adjusting needle with lock nut
(Needle fully open)

Note:
1 Dimensions for mounting bracket A
2 Dimensions for mounting spacer A
Bracket A part no.: P327015341
(Standard accessory)
Spacer A part no.: P327015641

For port exhaust

Exhaust (EXH.) port
Re: 1/4 exhaust port (EXH.)

Dimensions not indicated are identical to the left drawing.

ZR1\(\frac{1}{8}\)-K1\(\frac{1}{4}\)-M-D

Compressed air
Digital pressure switch for vacuum

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Series ZR

Ejector System with Valve

Nozzle dia./ø1.0, ø1.3, ø1.5
ZR1\(\frac{1}{16}\)-K1|M|\(\frac{1}{16}\)-

For port exhaust
Rc 1/8 exhaust port (EXH.)

Nozzle dia./ø1.8, ø2.0
ZR1\(\frac{1}{8}\)-K1|M|\(\frac{1}{4}\)-

For port exhaust
Rc 1/4 exhaust port (EXH.)

Circuit diagram

- Pilot pressure supply port (PS)
- Pilot pressure exhaust port (PE)
- Release pressure supply port (PD)
- Air pressure supply port (PV)
- Supply tank
- Vacuum port (V)
- Ejector
- Vacuum port (V)
- Silencer
- Ejector indication
- Release flow adjusting needle

A: Release flow rate adjusting needle with lock nut

(Needle fully open)

Note:
1. Dimensions for mounting bracket B
2. Dimensions for mounting spacer B
Bracket B part no.: P3270154#1 (Standard accessory)
Spacer B part no.: P3270157#1

Dimensions not indicated are identical to the top drawing.
Series ZR

Ejector System without Valve

Nozzle dia./Ø1.0, Ø1.3, Ø1.5
ZR1\textsuperscript{10} 1-E\textsuperscript{2}

For port exhaust

- Rc 1/8 Exhaust port (EXH.)
- 57.5

- Indicator light (Red)
- 2 x Slotted holes
- (Mounting holes)

Spacer A

Spacer A is used to leave space for maintenance (for replacement of filter element etc.) on side mounting.

For port exhaust

- Rc 1/8 Exhaust port (EXH.)
- 79.3

- 7.2

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960

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Large Size Vacuum Module: Ejector System Series ZR

Nozzle dia./Ø1.8, Ø2.0

ZR18/1-E

For port exhaust
Rs: 1/4 Exhaust port (EXH.)

ZR18/1-D

For port exhaust
Exhaust (EXH.) port
Rs: 1/4

Note) (1) Dimensions for mounting bracket A
(2) Dimensions for mounting spacer A
Bracket A part no.: P3270153#1
Spacer A part no.: P3270156#1

Dimensions not indicated are identical to the top drawing.

 Courtesy of Steven Engineering, Inc.-230 Ryan Way, South San Francisco, CA 94080-6370-Main Office: (650) 588-9200-Outside Local Area: (800) 258-9200-www.stevenengineering.com
Ejector System/Manifold Specifications

### Specifications

<table>
<thead>
<tr>
<th>Max. number of units</th>
<th>Max. 6 stations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Port</td>
<td></td>
</tr>
<tr>
<td>Common air pressure supply port (PV)</td>
<td>1/4 (Rc, NPTF, G)</td>
</tr>
<tr>
<td>Common pilot pressure supply port (PS)</td>
<td>M5</td>
</tr>
<tr>
<td>Common release pressure supply port (PD)</td>
<td>M5</td>
</tr>
<tr>
<td>Common exhaust port (EXH)</td>
<td>1/2 (Rc, NPTF, G)</td>
</tr>
<tr>
<td>Mass</td>
<td></td>
</tr>
</tbody>
</table>

(1) When using 3 or more stations with ZR120 manifold, utilize PV port as supply port on both sides.
(2) When using 3 or more stations with ZR120 manifold, utilize EXH port as exhaust port on both sides.

### Manifold Air Supply

#### Piping Specifications

<table>
<thead>
<tr>
<th>Port</th>
<th>PV</th>
<th>PS</th>
<th>PD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Left</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Right</td>
<td>●</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>B</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
</tbody>
</table>

Air supply to ○ port
BLANK plug attached to ● port
Note: BLANK plug is attached on all ports of valve unit.

#### Individual Spacer

<table>
<thead>
<tr>
<th>Part no.</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>ZR1-R1</td>
<td></td>
</tr>
</tbody>
</table>

Individual spacer is used when the connecting port of each unit is not common for the manifold connecting port.
Mixed specifications of common and individual unit connecting ports for each unit is possible on manifolds with this individual spacer.

### How to Order Manifold

**<Manifold base>**

**<Function plate>**

**<Individual spacer>**

**<Blanking plate>**

### About individual spacers

- In the right table, ports with the symbol \( \downarrow \) mean that they are manifold supply, while others are individual supply from the valve unit.
- Symbols in the right table are printed on the surface of individual spacers.
When not using individual spacer

PV: Air pressure supply port
PS: Pilot pressure supply port
PD: Release pressure supply port
PE: Pilot pressure exhaust port
EXH: Common exhaust port
V: Vacuum Port

When using individual spacer

PV: Air pressure supply port
PS: Pilot pressure supply port
PD: Release pressure supply port
PE: Pilot pressure exhaust port
EXH: Common exhaust port
V: Vacuum Port

System circuit example

PV × PS × PE × PD × PV

Suction filter
Pressure switch for vacuum
Ejector
Release valve

Individual Spacer ZR1-R1-1
**Series ZR**

**Ejector System**

**Manifold Nozzle Dia./ø1.0, ø1.3, ø1.5**

4 stations manifold: Ordering number example

**ZZR104-□□□□** ....... 1pc. (Manifold base)
- **ZR1□□□□2** ........... 1pc. (Port exhaust type)
- **ZR1□□□□1-EC** .......... 1pc. (Single unit)
- **ZR1□□□□1-K1□□□□□□** ... 1pc. (Single unit)
- **ZR1-RV1-4** .............. 1pc. (Function plate)
- **ZR1-R1-4** .............. 1pc. (Individual spacer)

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

(Needle fully open)

---

* The common exhaust port (EXH) is also used as the pilot pressure exhaust (PE) port of the pilot valve. Use while the port is open to the atmosphere.
Large Size Vacuum Module:  
**Ejector System Series ZR**

Circuit diagram

- **PV**: Air pressure supply port
- **PS**: Pilot pressure supply port
- **PD**: Release pressure supply port
- **PE**: Pilot pressure exhaust port
- **EXH**: Exhaust port
- **V**: Vacuum Port

---

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**Series ZR**

4 stations manifold: Ordering number example

- **ZZR104-□□** - 1pc. (Manifold base)
- **ZR□□□2** - 1pc. (Port exhaust type)
- **ZR□□□-EC** - 1pc. (Single unit)
- **ZR□□□1-K1□□□** - 1pc. (Single unit)
- **ZR□□□1-K□□□-□D□□□** - 1pc. (Single unit)
- **ZR1-RV1-4** - 1pc. (Function plate)
- **ZR1-R1-4** - 1pc. (Individual spacer)

A: Release flow rate adjusting needle with lock nut

(Needle fully open)

---

**Diagram Description**

- **Function plate**
- **Digital pressure switch for vacuum**
- **Silencer case (Built-in silencer)**
- **Adaptor B**
- **Adaptor D**
- **Silencer case**
- **Silencer case**
- **Adaptor B**
- **Pressure switch for vacuum**
- **Pressure setting trimmer**
- **Exhaust (EXH) port**
- **Vacuum port (V)**

**Table**

<table>
<thead>
<tr>
<th>Station</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td>L1</td>
<td>52</td>
<td>85</td>
<td>118</td>
<td>151</td>
<td>184</td>
<td>217</td>
</tr>
<tr>
<td>L2</td>
<td>71</td>
<td>104</td>
<td>137</td>
<td>170</td>
<td>203</td>
<td>236</td>
</tr>
</tbody>
</table>

*1 The common exhaust port (EXH) is also used as the pilot pressure exhaust (PE) port of the pilot valve. Use while the port is open to the atmosphere.
Large Size Vacuum Module: Ejector System Series ZR

Circuit diagram

Individual spacer (ZR1-R1-4)
Function plate (ZR1-RV1-4)

Pressure switch for vacuum
Suction filter

PV: Air pressure supply port
PS: Pilot pressure supply port
PD: Release pressure supply port
PE: Pilot pressure exhaust port
EXH: Common exhaust port
V: Vacuum Port

Vacuum (V) port
Rc 1/8
Pitch P = 33
Pitch P = 33
35.5
12
16.5
70.5
105.5
110.5

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Large Size Vacuum Module: Vacuum Pump System

**Series ZR**

**How to Order**

**Components**

- **Valve unit**
- **Pressure switch for vacuum**
- **Suction filter**

**Combination of vacuum valve and release valve**
Refer to "Table (1)" in page 969 for details.

**Caution**
When using AC, the DC solenoids are operated via a rectifier. Therefore, make sure to combine the connector assembly equipped with a rectifier with the exclusive solenoids. Using other combinations could lead to burned coils or other malfunctions.

**Pilot valve**
- **Nil**
- **DC: 1 W**
- **DC: 0.45 W**
  - Only 24 VDC and 12 VDC are applicable to 0.45 W.

**Solenoid valve rated voltage**

<table>
<thead>
<tr>
<th>Nil</th>
<th>Air operated</th>
</tr>
</thead>
<tbody>
<tr>
<td>S</td>
<td>24 VDC</td>
</tr>
<tr>
<td>F</td>
<td>12 VDC</td>
</tr>
<tr>
<td>V</td>
<td>6 VDC</td>
</tr>
<tr>
<td>S</td>
<td>5 VDC</td>
</tr>
<tr>
<td>R</td>
<td>3 VDC</td>
</tr>
<tr>
<td>G</td>
<td>24 VDC</td>
</tr>
<tr>
<td>D1</td>
<td>100 VAC (50Hz)</td>
</tr>
<tr>
<td>D2</td>
<td>110 VAC (60Hz)</td>
</tr>
</tbody>
</table>

Note) Nil marked products are not available for "D1" and "D2".

**Electrical entry**

<table>
<thead>
<tr>
<th>Nil</th>
<th>Air operated</th>
</tr>
</thead>
<tbody>
<tr>
<td>L</td>
<td>Lead wire length 0.3 m</td>
</tr>
<tr>
<td>G</td>
<td>without lead wire (applicable to only DC)</td>
</tr>
<tr>
<td>H</td>
<td>Without connector</td>
</tr>
<tr>
<td>M</td>
<td>Lead wire length 0.3 m</td>
</tr>
<tr>
<td>MO</td>
<td>without lead wire (applicable to only DC)</td>
</tr>
</tbody>
</table>

Note) CE marked products are not available for "D1" and "D2".

**Lead wire specifications**

<table>
<thead>
<tr>
<th>Nil</th>
<th>No setting</th>
</tr>
</thead>
<tbody>
<tr>
<td>L</td>
<td>With lock nut</td>
</tr>
<tr>
<td>N</td>
<td>Without lock nut</td>
</tr>
</tbody>
</table>

**Digital pressure switch for vacuum (ZSE30A) specifications (D)**

<table>
<thead>
<tr>
<th>Nil</th>
<th>Without lead wire</th>
</tr>
</thead>
<tbody>
<tr>
<td>L</td>
<td>lead wire with connector (Length 2 m)</td>
</tr>
<tr>
<td>C</td>
<td>Lead wire with connector (Length 0.6 m)</td>
</tr>
<tr>
<td>CL</td>
<td>Lead wire with connector (Length 3 m)</td>
</tr>
<tr>
<td>CN</td>
<td>With connector/without lead wire</td>
</tr>
</tbody>
</table>

Note 1: This is no longer sold for use in Japan due to the Weight and Measure Act (implemented October, 1999).

Note 2: Fixed unit: kPa

**PNP open collector 1 output**

- N
- A
- B
- C
- D
- E
- F

**Digital pressure switch for vacuum (ZSE2) specifications (E)**

<table>
<thead>
<tr>
<th>Nil</th>
<th>No setting</th>
</tr>
</thead>
<tbody>
<tr>
<td>L</td>
<td>Without lock nut</td>
</tr>
<tr>
<td>N</td>
<td>With lock nut</td>
</tr>
</tbody>
</table>

**PNP open collector 2 outputs**

- P

**PNP open collector 1 output + Analog current output**

- D

**PNP open collector 1 output + Analog voltage output**

- E

**PNP open collector 1 output**

- F

**Pressure switch for vacuum (ZSE2) specifications (D)**

<table>
<thead>
<tr>
<th>Nil</th>
<th>No setting</th>
</tr>
</thead>
<tbody>
<tr>
<td>L</td>
<td>Without lock nut</td>
</tr>
<tr>
<td>N</td>
<td>With lock nut</td>
</tr>
</tbody>
</table>

**Pressure switch for vacuum (ZSE30A) specifications (D)**

- N
- A
- B
- C
- D
- E
- F

**PNP open collector 1 output**

- S

**Output specifications**

- N
- A
- B
- C
- D
- E
- F
- S
- F

**Pressure switch for vacuum (ZSE30A) specifications (E)**

- N
- A
- B
- C
- D
- E
- F

**Note for model selection**
Take function plates into consideration. (Refer to page 971.)
Table (1) Valve Unit/Combination of Vacuum Switch Valve and Release Valve

<table>
<thead>
<tr>
<th>Valve unit function</th>
<th>Valve unit components</th>
<th>Symbol</th>
<th>Supply valve</th>
<th>Release valve</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operation</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>stop</td>
<td>Double SOL</td>
<td>N.C.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vacuum adsorption</td>
<td>N.C.</td>
<td>N.C.</td>
<td></td>
<td>N.C.</td>
</tr>
<tr>
<td>Vacuum release</td>
<td>Air operated</td>
<td>Air operated</td>
<td></td>
<td>Air operated</td>
</tr>
<tr>
<td></td>
<td>N.C.</td>
<td>N.C.</td>
<td></td>
<td>N.C.</td>
</tr>
<tr>
<td></td>
<td>N.C.</td>
<td>N.C.</td>
<td></td>
<td>N.C.</td>
</tr>
<tr>
<td></td>
<td>N.C.</td>
<td>N.C.</td>
<td></td>
<td>N.C.</td>
</tr>
<tr>
<td></td>
<td>N.C.</td>
<td>N.C.</td>
<td></td>
<td>N.C.</td>
</tr>
</tbody>
</table>

Table (2) How to Order Valve Plug Connector Assembly

<table>
<thead>
<tr>
<th>Current</th>
<th>Valve Code</th>
<th>Lead wire length</th>
</tr>
</thead>
<tbody>
<tr>
<td>DC</td>
<td>VJ10 - 20 - 4A</td>
<td>0.6 m</td>
</tr>
<tr>
<td>100 VAC</td>
<td>VJ10 - 36 - 1A</td>
<td>5 m</td>
</tr>
<tr>
<td>110 VAC</td>
<td>VJ10 - 36 - 3A</td>
<td>3 m</td>
</tr>
</tbody>
</table>

Table (3) Pressure Switch for Vacuum/Lead Wire with Connector

<table>
<thead>
<tr>
<th>Valve Code</th>
<th>Lead wire length</th>
</tr>
</thead>
<tbody>
<tr>
<td>ZS - 10 - 5A</td>
<td>0.6 m</td>
</tr>
<tr>
<td>ZS - 10 - 5A</td>
<td>3 m</td>
</tr>
<tr>
<td>ZS - 10 - 5A</td>
<td>5 m</td>
</tr>
</tbody>
</table>

How to order
When requiring a vacuum switch with a lead wire of 5 m, indicate the part numbers of the vacuum unit switch without a lead wire with connector and the 5 m lead wire connector separately.
Example) ZR100-L50132/L50132/L50132/L50132/L50132/L50132-CN (-Q) ............... 1 pc.
* ZS-10-5A-50 .................. 1 pc.

Table (4) Digital Pressure Switch for Vacuum/Lead Wire with Connector

<table>
<thead>
<tr>
<th>Valve Code</th>
<th>Lead wire core</th>
</tr>
</thead>
<tbody>
<tr>
<td>ZS - 38 - 3 L</td>
<td>3 cores, 1 output, 2 m (Output specifications: N, P)</td>
</tr>
<tr>
<td>ZS - 38 - 4 L</td>
<td>4 cores, 2 outputs, 2 m (Output specifications: A, B, C, D, E, F)</td>
</tr>
</tbody>
</table>

Table (1) Valve Unit/Combination of Vacuum Switch Valve and Release Valve

<table>
<thead>
<tr>
<th>Valve unit function</th>
<th>Valve unit components</th>
<th>Symbol</th>
<th>Supply valve</th>
<th>Release valve</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operation</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>stop</td>
<td>Double SOL</td>
<td>N.C.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vacuum adsorption</td>
<td>N.C.</td>
<td>N.C.</td>
<td></td>
<td>N.C.</td>
</tr>
<tr>
<td>Vacuum release</td>
<td>N.C.</td>
<td>N.C.</td>
<td></td>
<td>N.C.</td>
</tr>
</tbody>
</table>

Table (2) How to Order Valve Plug Connector Assembly

<table>
<thead>
<tr>
<th>Current</th>
<th>Valve Code</th>
<th>Lead wire length</th>
</tr>
</thead>
<tbody>
<tr>
<td>DC</td>
<td>VJ10 - 20 - 4A</td>
<td>0.6 m</td>
</tr>
<tr>
<td>100 VAC</td>
<td>VJ10 - 36 - 1A</td>
<td>5 m</td>
</tr>
<tr>
<td>110 VAC</td>
<td>VJ10 - 36 - 3A</td>
<td>3 m</td>
</tr>
</tbody>
</table>

Table (3) Pressure Switch for Vacuum/Lead Wire with Connector

<table>
<thead>
<tr>
<th>Valve Code</th>
<th>Lead wire length</th>
</tr>
</thead>
<tbody>
<tr>
<td>ZS - 10 - 5A</td>
<td>0.6 m</td>
</tr>
<tr>
<td>ZS - 10 - 5A</td>
<td>3 m</td>
</tr>
<tr>
<td>ZS - 10 - 5A</td>
<td>5 m</td>
</tr>
</tbody>
</table>

How to order
When requiring a vacuum switch with a lead wire of 5 m, indicate the part numbers of the vacuum unit switch without a lead wire with connector and the 5 m lead wire connector separately.
Example) ZR100-L50132/L50132/L50132/L50132/L50132/L50132-CN (-Q) ............... 1 pc.
* ZS-10-5A-50 .................. 1 pc.

Table (4) Digital Pressure Switch for Vacuum/Lead Wire with Connector

<table>
<thead>
<tr>
<th>Valve Code</th>
<th>Lead wire core</th>
</tr>
</thead>
<tbody>
<tr>
<td>ZS - 38 - 3 L</td>
<td>3 cores, 1 output, 2 m (Output specifications: N, P)</td>
</tr>
<tr>
<td>ZS - 38 - 4 L</td>
<td>4 cores, 2 outputs, 2 m (Output specifications: A, B, C, D, E, F)</td>
</tr>
</tbody>
</table>

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Vacuum Pump System / Combination of supply valve and release valve

### Combination Symbol: K1
Feature: Double solenoid vacuum valve allows for self-holding.

#### How to Operate

<table>
<thead>
<tr>
<th>Operation</th>
<th>Supply valve</th>
<th>Release valve</th>
<th>Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Adsorption</td>
<td>ON</td>
<td>OFF</td>
<td></td>
</tr>
<tr>
<td>2. Vacuum release</td>
<td>OFF</td>
<td>ON</td>
<td></td>
</tr>
<tr>
<td>3. Operation stop</td>
<td>OFF</td>
<td>OFF</td>
<td>When power supply is cut off while the supply valve is ON, the operational state is held.</td>
</tr>
</tbody>
</table>

### Combination Symbol: C1
Feature: Adsorption of workpieces (when energized) and release of vacuum (when de-energized) are switched by single solenoid valve.

#### How to Operate

<table>
<thead>
<tr>
<th>Operation</th>
<th>Supply valve</th>
<th>Release valve</th>
<th>Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Adsorption</td>
<td>ON</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Vacuum release</td>
<td>OFF</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Combination Symbol: C2
Feature: Adsorption of workpieces and release of vacuum are switched by an external pilot valve.

#### How to Operate

<table>
<thead>
<tr>
<th>Operation</th>
<th>Supply valve</th>
<th>Release valve</th>
<th>Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Adsorption</td>
<td>ON</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Vacuum release</td>
<td>OFF</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Combination Symbol: K2
Feature: Single solenoid valve is provided for vacuum valve.

#### How to Operate

<table>
<thead>
<tr>
<th>Operation</th>
<th>Supply valve</th>
<th>Release valve</th>
<th>Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Adsorption</td>
<td>ON</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Vacuum release</td>
<td>OFF</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Operation stop</td>
<td>OFF</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Combination Symbol: K3
Feature: Operation can be controlled by an external pilot valve.

#### How to Operate

<table>
<thead>
<tr>
<th>Operation</th>
<th>Supply valve</th>
<th>Release valve</th>
<th>Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Adsorption</td>
<td>ON</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Vacuum release</td>
<td>OFF</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Operation stop</td>
<td>OFF</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Combination Symbol: C3
Feature: Adsorption of workpieces (when de-energized) and release of vacuum (when energized) are switched by the single solenoid valve.

#### How to Operate

<table>
<thead>
<tr>
<th>Operation</th>
<th>Supply valve</th>
<th>Release valve</th>
<th>Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Adsorption</td>
<td>OFF</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Vacuum release</td>
<td>ON</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Combination Symbol: C4
Feature: Adsorption of workpieces and release of vacuum are switched by double solenoid valve.

#### How to Operate

<table>
<thead>
<tr>
<th>Operation</th>
<th>Supply valve</th>
<th>Release valve</th>
<th>Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Adsorption</td>
<td>OFF</td>
<td>ON</td>
<td></td>
</tr>
<tr>
<td>2. Vacuum release</td>
<td>OFF</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

---

**Caution**

When pipe connection is made to two port connections (PV port, PD port) only, use a function plate (ZR1-RV3). Refer to page 971 for further information.
Function Plate: ZR1-RV3
A function plate is used when each connecting port for the valve unit is common. If a function plate is not used (standard), make individual pipe connections to PV, PS, and PD ports respectively.

Without Function Plate (Standard)
Applicable system: Ejector system
External vacuum supply system

With Function Plate/Applicable to Vacuum Pump System Only
When ZR1-RV3 (PV/PS⇔PD) is Selected
Since compressed air is necessary to operate pilot valve in vacuum pump system, supply air to PD port (or PS port).

How to Order Function Plate Unit (For Pump System)
ZR1 – RV 3

Example of circuit diagram

Caution
Length of assembling screw varies when adding function plate. Order from the mounting thread parts list for unit combination on page 983.
Order a plug (M-5P) separately in order to plug the PD and PS ports that are no longer used due to the addition of function plate.
Series ZR

Valve Unit : ZR1-V

Specifications

<table>
<thead>
<tr>
<th>Components</th>
<th>Supply valve</th>
<th>Release valve</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating method</td>
<td>Pilot operated</td>
<td>Pilot operated</td>
</tr>
<tr>
<td>Combination of supply valve and release valve</td>
<td>Refer to the combination of supply valve and release valve below</td>
<td></td>
</tr>
<tr>
<td>PV port supply pressure</td>
<td>~0.1 to 0.6 MPa</td>
<td></td>
</tr>
<tr>
<td>PS port supply pressure</td>
<td>0.25 to 0.6 MPa</td>
<td></td>
</tr>
<tr>
<td>Main valve effective area (mm²)</td>
<td>8.2</td>
<td></td>
</tr>
<tr>
<td>Main valve effective area (Cv)</td>
<td>0.45</td>
<td></td>
</tr>
<tr>
<td>Maximum operating frequency</td>
<td>5 Hz</td>
<td></td>
</tr>
<tr>
<td>Operating temperature range</td>
<td>5 to 50°C</td>
<td></td>
</tr>
</tbody>
</table>

Valve unit part no. ZR1-V

Solenoid Valve Specifications

<table>
<thead>
<tr>
<th>Solenoid</th>
<th>VJ3123-X17</th>
<th>VJ3223-X17</th>
<th>VJ3223-X17</th>
<th>X17</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rated voltage</td>
<td>24, 12, 6, 5, 3 VDC</td>
<td>100, 110 VAC</td>
<td>L/M plug connector (with rectifier)</td>
<td></td>
</tr>
<tr>
<td>Electrical entry</td>
<td>3, 5, 6, 12, 24 VDC</td>
<td>L/M plug connector, Grommet</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Light/Surge voltage suppressor</td>
<td>Available</td>
<td>Not available (at grommet)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

| Manual operation | Non-locking push type, Locking slotted type |

Combination of Supply Valve and Release Valve

<table>
<thead>
<tr>
<th>Combination symbol</th>
<th>Vacuum switch valve</th>
<th>Release valve</th>
<th>Mass (kg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>K1</td>
<td>Double SOL. (VJ3233-X17)</td>
<td>N.C. (VJ3133)</td>
<td>0.245</td>
</tr>
<tr>
<td>K2</td>
<td>N.C. (VJ3133)</td>
<td>N.C. (VJ3133)</td>
<td>0.213</td>
</tr>
<tr>
<td>K3</td>
<td>Air operated VJA3130</td>
<td>Air operated VJA3130</td>
<td>0.194</td>
</tr>
<tr>
<td>C1</td>
<td>N.C. (VJ3133)</td>
<td></td>
<td>0.187</td>
</tr>
<tr>
<td>C2</td>
<td>Air operated VJA3130</td>
<td></td>
<td>0.174</td>
</tr>
<tr>
<td>C3</td>
<td>N.C. (VJ3133)</td>
<td></td>
<td>0.184</td>
</tr>
<tr>
<td>C4</td>
<td>Double SOL. (VJ3233-X18)</td>
<td></td>
<td>0.214</td>
</tr>
</tbody>
</table>

* Weight includes Bracket B. (Solenoid valve: 24 VDC, M plug connector type)

How to Order

ZR1-V K1 5 M Z L

Release flow rate adjusting needle

Combination of vacuum valve and release valve

Manual override

With light/surge voltage suppressor

Vacuum Pressure Switch Unit/Digital Pressure Switch for Vacuum : ZSE30A-00-   -          -X505

Specifications

| Rated pressure range | 0.0 to –101.0 kPa |
| Set pressure range | 10.0 to –105.0 kPa |
| Withstand pressure | 500 kPa |
| Applicable fluid | Air, Non-corrosive gas, Non-flammable gas |
| Power supply voltage | 12 to 24 VDC +10% (with power supply polarity protection) |
| Current consumption | 40 mA (at no load) |
| Switch output | NPN or PNP open collector 1 output |
| Hysteresis mode | Variable (0 to variable) |
| Display | 4-digit, 7-segment, 2-color LCD (Red/Green) Sampling cycle: 5 times/sec. |
| Display accuracy | ±1% F.S. ±1 digit (Ambient temperature of 25°C) |
| Enclosure | IP40 |
| Operating temperature range | Operating 0 to 50°C, Stored: –10 to 60°C (No freezing or condensation) |
| Operating humidity range | Operating/Store: 35 to 85% RH (No condensation) |
| Withstand voltage | 1000 VAC for 1 minute between live parts and case |

Note 1) When analog voltage output is selected, analog current output cannot be used together.

Note 2) When analog current output is selected, analog voltage output cannot be used together.

Refer to page 962 for further specifications.
Vacuum Pressure Switch : ZSE2-0R-

Specifications

<table>
<thead>
<tr>
<th>Fluid</th>
<th>ZSE2-0R-15</th>
<th>ZSE2-0R-5S</th>
</tr>
</thead>
<tbody>
<tr>
<td>Setting pressure range</td>
<td>0 to –101 kPa</td>
<td>0 to –101 kPa</td>
</tr>
<tr>
<td>Hysteresis</td>
<td>3% F.S. or less</td>
<td>3% F.S. or less</td>
</tr>
<tr>
<td>Temperature characteristics (25˚C standard)</td>
<td>15% F.S. or less</td>
<td>15% F.S. or less</td>
</tr>
<tr>
<td>Operating voltage</td>
<td>12 to 24 VDC (Hazele x10% or less)</td>
<td>12 to 24 VDC (Hazele x10% or less)</td>
</tr>
<tr>
<td>Output</td>
<td>NPN Open collector 30 V, 80 mA</td>
<td>PNP Open collector 80 mA</td>
</tr>
<tr>
<td>Indicator light</td>
<td>Lights up when ON</td>
<td>Lights up when ON</td>
</tr>
<tr>
<td>Current consumption</td>
<td>17 mA or less when 24 VDC is ON</td>
<td>17 mA or less when 24 VDC is ON</td>
</tr>
<tr>
<td>Proof pressure (Max. operating pressure)</td>
<td>0.5 MPa</td>
<td>0.5 MPa</td>
</tr>
<tr>
<td>Operating temperature range</td>
<td>5 to 50˚C</td>
<td>5 to 50˚C</td>
</tr>
</tbody>
</table>

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

Note: Operation outside of the maximum operating pressure and operating temperature range may cause a serious accident or damage.

Pressure Switch for Vacuum/Suction Filter Unit : ZR1-F

Specifications

<table>
<thead>
<tr>
<th>Suction filter</th>
<th>Unit no.</th>
<th>ZR1-F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating pressure range</td>
<td>Vacuum to 0.5 MPa</td>
<td></td>
</tr>
<tr>
<td>Operating temperature range</td>
<td>5 to 50˚C</td>
<td></td>
</tr>
<tr>
<td>Filtration efficiency</td>
<td>30 μm</td>
<td></td>
</tr>
<tr>
<td>Filter media</td>
<td>PVF</td>
<td></td>
</tr>
<tr>
<td>Pressure switch for vacuum</td>
<td>Refer to pages 949 and 952 regarding pressure switch for vacuum</td>
<td></td>
</tr>
<tr>
<td>Standard option</td>
<td>Bracket A</td>
<td></td>
</tr>
</tbody>
</table>

Filter case

Caution

1. The case is made of polycarbonate. Therefore, do not use it with or expose it to the following chemicals: paint thinner, carbon tetrachloride, chloroform, acetic ester, aniline, cyclohexane, trichloroethylene, sulfuric acid, lactic acid, watersoluble cutting oil (alkaline), etc.
2. Do not expose it to direct sunlight.

Suction Filter : ZR1-FX

Specifications

<table>
<thead>
<tr>
<th>Model</th>
<th>ZR1-FX</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating pressure range</td>
<td>Vacuum to 0.5 MPa</td>
</tr>
<tr>
<td>Operating temperature range</td>
<td>5 to 50˚C</td>
</tr>
<tr>
<td>Filtration efficiency</td>
<td>30 μm</td>
</tr>
<tr>
<td>Filter media</td>
<td>PVF</td>
</tr>
<tr>
<td>Mass (with bracket)</td>
<td>0.1 kg</td>
</tr>
</tbody>
</table>

Filter case

Caution

1. The case is made of polycarbonate. Therefore, do not contact it or expose it to the following chemicals: paint thinner, carbon tetrachloride, chloroform, acetic ester, aniline, cyclohexane, trichloroethylene, sulfuric acid, lactic acid, watersoluble cutting oil (alkaline), etc.
2. Do not expose it to direct sunlight.
## Series ZR

### Construction

#### Components Parts

<table>
<thead>
<tr>
<th>No.</th>
<th>Description</th>
<th>Material</th>
<th>Part No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Manifold base</td>
<td>Aluminum</td>
<td>ZR1-FC</td>
</tr>
<tr>
<td>2</td>
<td>Release flow rate adjusting needle</td>
<td>Stainless steel (Refer to Note 2)</td>
<td>ZR1-FC-PC-AS</td>
</tr>
<tr>
<td>3</td>
<td>Function plate</td>
<td>PBT</td>
<td>ZR1-FZ</td>
</tr>
<tr>
<td>4</td>
<td>Individual spacer</td>
<td>PBT</td>
<td>ZR1-FZ</td>
</tr>
<tr>
<td>5</td>
<td>Filter case</td>
<td>Polycarbonate</td>
<td>ZR1-FPC-PC-AS</td>
</tr>
</tbody>
</table>

**Note 1)** Precautions on handling the filter case
- The case is made of polycarbonate. Therefore, do not contact it or expose it to the following chemicals: paint thinner, carbon tetrachloride, chloroform, acetic ester, aliphatic, cyclohexane, trichloroethylene, sulfuric acid, lactic acid, water soluble cutting oil (alkaline), etc.
- Do not expose it to direct sunlight.

**Note 2)** Turning the release flow rate adjusting needle 4 full turns from the fully closed position renders the needle valve fully open. Do not turn more than four times since turning excessively may cause the needle to fall off. In order to prevent the needle from loosening and falling out, a release flow rate adjusting needle with lock nut is available.

#### 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>Pilot valve assembly</td>
<td></td>
<td>ZR1-PV</td>
</tr>
<tr>
<td>7</td>
<td>Valve body assembly</td>
<td></td>
<td>ZR1-VJ</td>
</tr>
<tr>
<td>8</td>
<td>Pressure switch for vacuum</td>
<td></td>
<td>ZSE2-ZR</td>
</tr>
<tr>
<td>9</td>
<td>Filter element</td>
<td>PBT</td>
<td>ZR1-F</td>
</tr>
<tr>
<td>10</td>
<td>Filter switch unit for replacement</td>
<td></td>
<td>ZR1-FC-PC-AS</td>
</tr>
</tbody>
</table>

### How to Order Solenoid Valves/Air Operated Valves

**Air operated**

**ZR1-VJA3130**

- **Solenoid valve**
  - **ZR1-VJ3233**
  - **ZR1-VJ3313**

**ZR1-VJA3130**

- **Option**: (Connector/lead wire specifications)
- **Unit specifications**
- **Output specifications**

*Refer to page 968 for further symbol specifications.

**Note)** Pilot valve gasket is included. (ZR1-PVG-1 or ZR1-PVG-2)

---

### Table (1) How to Order Pilot Valves

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Components</th>
<th>Model</th>
</tr>
</thead>
<tbody>
<tr>
<td>K1</td>
<td>Supply valve N.C. (VJ3233)</td>
<td>ZR1-VJ3233</td>
</tr>
<tr>
<td>C4</td>
<td>Supply valve N.O. (VJ3233)</td>
<td>ZR1-VJ3233</td>
</tr>
<tr>
<td>K3</td>
<td>Air operated N.C. (VJA3130)</td>
<td>ZR1-VJA3130</td>
</tr>
</tbody>
</table>

Refer to “How to Order” below.

### Table (2) How to Order Valve Body Assembly

**ZR1-VD K1 5 M Z L**

- Combination of supply valve and release valve
- Pilot valve
- Solenoid valve rated voltage
- Electrical entry
- With light/surge voltage suppressor
- Release flow rate adjusting needle

**ZR1-F D**

- Combination of switch/filter
- Option
- Unit specifications
- Output specifications

Refer to page 953 for further symbol specifications.

---

**Note**

- Refer to page 968 for further symbol specifications.
- Refer to page 978 for further symbol specifications.

---

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Type K1
Vacuum valve: Double SOL.
Release valve: Single SOL. (N.C.)

Complete Unit
Valve + Pressure Switch for Vacuum + Filter Unit

Circuit diagram

Type K1
Vacuum valve: Double SOL.
Release valve: Single SOL. (N.C.)

ZR100-K1 M D E

Supply valve
Release valve
Pilot pressure exhaust port (PE)
Pilot pressure supply port (PS)
Vacuum pressure supply port (PV)
Release pressure supply port (PD)
Vacuum port (V)

A : Release flow rate adjusting needle with lock nut
(Noodle fully open)

ZR100-K1 M D E

Digital pressure switch for vacuum

Bracket A
Adapter G

Note) 1 Dimensions for mounting bracket A
2 Dimensions for mounting spacer A
Bracket A part no.: P3270153#1 (Standard accessory) Spacer A part no.: P3270156#1

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**Series ZR**

**Vacuum Pump System**

**Valve Unit**

**Type K1**  
**ZR1-VK1**

**Circuit diagram**

- Pilot pressure supply port (PS)
- Pilot pressure exhaust port (PE)
- Release pressure supply port (PD)
- Air pressure supply port (PV)
- Supply valve
- Release valve
- Manual override
- Adapter B
- Bracket B

**Type K2**  
**ZR1-VK2**

**Circuit diagram**

- Pilot pressure supply port (PS)
- Pilot pressure exhaust port (PE)
- Release pressure supply port (PD)
- Supply valve
- Release valve
- Manual override
- Adapter B
- Bracket B

**Type K3**  
**ZR1-VK3**

**Circuit diagram**

- Pilot pressure supply port (PS)
- Pilot pressure exhaust port (PE)
- Air pressure supply port (PV)
- Supply valve
- Release valve
- Manual override

---

**Note**

- Dimensions for mounting bracket B
- Dimensions for mounting spacer B
- Spacer B is used to leave space for maintenance (for replacement of solenoid valve etc.) on side mounting of used on surface mounting.

- Bracket B part no.: P3270154#1  (Standard accessory)
- Spacer B part no.: P3270157#1

**Dimensions not indicated are identical to type K2.**

**976**

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www.stevenengineering.com
Large Size Vacuum Module:
Vacuum Pump System  **Series ZR**

Vacuum Pump System

Valve Unit

**Type C1**
ZR1-VC1□□□M□□□□

Circuit diagram

- Manual override
- Pilot valve
- Dimensions not indicated are identical to drawings above.

**Type C2**
ZR1-VC2□□

Circuit diagram

- (Needle fully open)
- "A" : Release flow rate adjusting needle with lock nut

**Type C3**
ZR1-VC3□□□M□□□□

Circuit diagram

- Note) 1 Dimensions for mounting bracket B
- 2 Dimensions for mounting spacer B

**Type C4**
ZR1-VC4□□□M□□□□

Circuit diagram

- Bracket B
- Blanking plate
- Adapter C

Dimensions not indicated are identical to drawings above.

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**Manifold Specifications/Vacuum Pump System**

**Specifications**

<table>
<thead>
<tr>
<th>Max. number of units</th>
<th>6 stations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Port</td>
<td></td>
</tr>
<tr>
<td>Common vacuum pressure supply port (PV)</td>
<td>⅝ (Rc, NPTF, G)</td>
</tr>
<tr>
<td>Common pilot pressure supply port (PS)</td>
<td>M5</td>
</tr>
<tr>
<td>Common release pressure supply port (PD)</td>
<td>M5</td>
</tr>
<tr>
<td>Common exhaust port (EXH)</td>
<td>⅝ (Rc, NPTF, G)</td>
</tr>
</tbody>
</table>

**Note:** When using 3 or more stations with ZR100 manifold, utilize PV port as suction on both sides.

**Manifold Vacuum/Air Supply**

<table>
<thead>
<tr>
<th>Supply port location</th>
<th>PV</th>
<th>PS</th>
<th>PD</th>
<th>PV</th>
<th>PS</th>
<th>PD</th>
</tr>
</thead>
<tbody>
<tr>
<td>L (Left side)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>R (Right side)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B (Both sides)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Vacuum supply to PV port.
Air supply to PS port.
BLANK plug attached to PD port.

**Individual Spacer**

<table>
<thead>
<tr>
<th>Part no.</th>
<th>Port</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>ZR1-R1</td>
<td>PV</td>
<td>Possible to set the external vacuum pressure individually</td>
</tr>
<tr>
<td></td>
<td>PS</td>
<td>Possible to set the pilot valve air supply pressure individually</td>
</tr>
<tr>
<td></td>
<td>PD</td>
<td>Possible to set the release valve supply pressure individually</td>
</tr>
<tr>
<td></td>
<td>PE</td>
<td>Possible to set the pilot valve exhaust individually</td>
</tr>
</tbody>
</table>

**Arrangement**

- Right valve station which is looked from valve side is first station.
- Viewed from the front side of valve unit, confirm the port location on the right and/or left side.

**Note:** The thread ridge shape is compatible with the G thread standard (JIS B 0203), but other shapes are not conforming to ISO26030 and ISO1179.

---

**Example 1)**

ZZR106-R .... 1 pc. (Manifold base only)
ZR100-K15M2-EC .... 5 pcs. (Unit)
ZR1-1BM1 .... 1 pc. (Blank plate)
ZR1-R1-3 .... 1 pc. (Individual spacer)

With reference from valve side, the third station from right side

---

**Example 2)**

Attached to the first and third stations

ZR1-RV3-1
ZR1-RV3-3
ZR1-R1-1
ZR1-R1-3

---

**Example 3)**

Attached to the first and third stations

ZR1-R1-1
ZR1-R1-3

With reference from valve side, the third station from right side

---

---

**About individual spacers**

- Manifold supply or valve unit supply can be selectable for each port. In the right table, ports with the symbol ( ) mean that they are manifold supply, while others are individual supply from the valve unit.
- Symbols in the right table are printed on the surface of individual spacers.

<table>
<thead>
<tr>
<th>Part no.</th>
<th>Symbol</th>
<th>Part no.</th>
<th>Symbol</th>
</tr>
</thead>
<tbody>
<tr>
<td>ZR1-R1</td>
<td>R1</td>
<td>ZR1-R9</td>
<td>R9</td>
</tr>
<tr>
<td></td>
<td></td>
<td>ZR1-R11</td>
<td>R11</td>
</tr>
<tr>
<td></td>
<td></td>
<td>ZR1-R13</td>
<td>R13</td>
</tr>
<tr>
<td></td>
<td></td>
<td>ZR1-R15</td>
<td>R15</td>
</tr>
<tr>
<td></td>
<td></td>
<td>ZR1-R16</td>
<td>R16</td>
</tr>
<tr>
<td>-R2</td>
<td>R2</td>
<td>-R10</td>
<td>R10</td>
</tr>
<tr>
<td>-R3</td>
<td>R3</td>
<td>-R11</td>
<td>R11</td>
</tr>
<tr>
<td>-R4</td>
<td>R4</td>
<td>-R12</td>
<td>R12</td>
</tr>
<tr>
<td>-R5</td>
<td>R5</td>
<td>-R13</td>
<td>R13</td>
</tr>
<tr>
<td>-R6</td>
<td>R6</td>
<td>-R14</td>
<td>R14</td>
</tr>
<tr>
<td>-R7</td>
<td>R7</td>
<td>-R15</td>
<td>R15</td>
</tr>
<tr>
<td>-R8</td>
<td>R8</td>
<td>-R16</td>
<td>R16</td>
</tr>
<tr>
<td></td>
<td></td>
<td>PD</td>
<td>PD</td>
</tr>
<tr>
<td></td>
<td></td>
<td>PV</td>
<td>PV</td>
</tr>
<tr>
<td></td>
<td></td>
<td>PE</td>
<td>PE</td>
</tr>
</tbody>
</table>

---

**Caution when ordering manifold**

- The asterisk denotes the symbol for assembly. Prefix it to the ejector part numbers to be mounted.
- When it is not added, the manifold base and ejector are shipped separately.

---

**Disclaimer**

- The content of this document is for informational purposes only and should not be considered as official or authoritative. Always consult the manufacturer’s specifications and guidelines for the most accurate and up-to-date information.

---

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**Manifold/System Circuit Example**

**When not using individual spacer**

- PV: Vacuum pressure supply port
- PS: Pilot pressure supply port
- PD: Release pressure supply port
- PE: Pilot pressure exhaust port
- EXH: Common exhaust port
- V: Vacuum Port

**When using individual spacer**

- PV: Vacuum pressure supply port
- PS: Pilot pressure supply port
- PD: Release pressure supply port
- PE: Pilot pressure exhaust port
- EXH: Common exhaust port
- V: Vacuum Port

---

**Vacuum Pump System Series ZR**

---

**Related Equipment**

- ZA
- ZX
- ZR
- ZM
- ZMA
- ZQ
- ZH
- ZU
- ZL
- ZY
- ZF
- ZP
- ZCUK
- AMJ
- AMV
- AEP
- HEP

---

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**Series ZR**

Vacuum Pump System

<table>
<thead>
<tr>
<th>Symbol</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td>L1</td>
<td>52</td>
<td>85</td>
<td>118</td>
<td>151</td>
<td>184</td>
<td>217</td>
</tr>
<tr>
<td>L2</td>
<td>71</td>
<td>104</td>
<td>137</td>
<td>170</td>
<td>203</td>
<td>236</td>
</tr>
</tbody>
</table>

---

A: Release flow rate adjusting needle with lock nut

*1 The common exhaust port (EXH) is also used as the pilot pressure exhaust (PE) port of the pilot valve. Use while the port is open to the atmosphere.
Large Size Vacuum Module: Vacuum Pump System Series ZR

Circuit diagram

- PV: Vacuum pressure supply port
- PS: Common pilot pressure supply port
- PD: Common release pressure supply port
- PE: Pilot valve exhaust port
- EXH: Common exhaust port
- V: Vacuum Port

Vacuum switch valve
Release valve
Vacuum (V) port
Rc 1/8
35.5
Pitch P = 33
12
16.5
70.5
981

Series ZR
Large Size Vacuum Module:
Vacuum Pump System
ZA
ZX
ZR
ZM
ZMA
ZQ
ZH
ZU
ZL
ZY
ZF
ZP
SP
ZCUK
AMJ
AMV
AEP
HEP

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Approved

Courtesy of Steven Engineering, Inc.-230 Ryan Way, South San Francisco, CA 94080-6370-
Main Office: (650) 588-9200-Outside Local Area: (800) 258-9200-www.stevenengineering.com
### Series ZR

#### Ejector System

**Mounting Thread Parts List for Unit Combination**

<table>
<thead>
<tr>
<th>Components</th>
<th>Valve unit + Ejector unit + Pressure switch for vacuum/Filter unit</th>
</tr>
</thead>
</table>

#### Mounting Thread Parts List for Unit Combination

<table>
<thead>
<tr>
<th>No.</th>
<th>Combination specifications</th>
<th>Mounting thread</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Standard (without options)</td>
<td>M2.5 x 0.45 x 33</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>With individual spacer</td>
<td>M2.5 x 0.45 x 37</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>With function plate</td>
<td>M2.5 x 0.45 x 38</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>With individual plate + with function plate</td>
<td>M2.5 x 0.45 x 41</td>
<td>6</td>
</tr>
<tr>
<td>2</td>
<td>Individual exhaust style for nozzle size 15</td>
<td>M2 x 0.4 x 13</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Common and port exhaust style for nozzle size 15</td>
<td>M1 x 0.4 x 23</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Individual exhaust style for nozzle size 18, 20</td>
<td>M0 x 0.4 x 53</td>
<td>2</td>
</tr>
</tbody>
</table>

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<table>
<thead>
<tr>
<th>No.</th>
<th>Combination specifications</th>
<th>Mounting thread</th>
<th>Quantity</th>
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</thead>
<tbody>
<tr>
<td>3</td>
<td>For vacuum switch and adapter A</td>
<td>M2.5 x 0.45 x 41</td>
<td>2</td>
</tr>
<tr>
<td>4</td>
<td>For nozzle size 10, 13, 15</td>
<td>M2 x 0.45 x 7</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>For nozzle size 18, 20</td>
<td>M2.5 x 0.45 x 7</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>For nozzle size 10, 13, 15 + with function plate</td>
<td>M2.5 x 0.45 x 7</td>
<td>2</td>
</tr>
<tr>
<td>5</td>
<td>For nozzle size 18, 20</td>
<td>M2 x 0.45 x 70</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>For nozzle size 10, 13, 15</td>
<td>M2 x 0.45 x 70</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>For nozzle size 18, 20</td>
<td>M2.5 x 0.45 x 70</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>For nozzle size 10, 13, 15 + with function plate</td>
<td>M2.5 x 0.45 x 70</td>
<td>4</td>
</tr>
<tr>
<td>6</td>
<td>For nozzle size 18, 20</td>
<td>M2 x 0.45 x 86</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>For nozzle size 10, 13, 15</td>
<td>M2 x 0.45 x 86</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>For nozzle size 18, 20</td>
<td>M2.5 x 0.45 x 86</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>For nozzle size 10, 13, 15 + with function plate</td>
<td>M2.5 x 0.45 x 86</td>
<td>4</td>
</tr>
<tr>
<td>7</td>
<td>Standard (without options)</td>
<td>M2.5 x 0.45 x 5</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>With individual spacer</td>
<td>M2 x 0.45 x 8</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>For nozzle size 18, 20</td>
<td>M2 x 0.35 x 23</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>For nozzle size 10, 13, 15 + with function plate</td>
<td>M3 x 0.35 x 24</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>For nozzle size 18, 20 + with function plate</td>
<td>M3 x 0.35 x 24</td>
<td>2</td>
</tr>
<tr>
<td>8</td>
<td>For nozzle size 10, 13, 15</td>
<td>M3 x 0.35 x 68</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>For nozzle size 18, 20</td>
<td>M2 x 0.35 x 72</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>For nozzle size 10, 13, 15 + with function plate</td>
<td>M3 x 0.35 x 73</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>For nozzle size 18, 20 + with function plate</td>
<td>M3 x 0.35 x 73</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>For nozzle size 10, 13, 15</td>
<td>M3 x 0.35 x 84</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>For nozzle size 18, 20</td>
<td>M2 x 0.35 x 84</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>For nozzle size 10, 13, 15 + with function plate</td>
<td>M3 x 0.35 x 88</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>For nozzle size 18, 20 + with function plate</td>
<td>M3 x 0.35 x 88</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>For nozzle size 10, 13, 15</td>
<td>M3 x 0.35 x 93</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>For nozzle size 18, 20</td>
<td>M2 x 0.35 x 93</td>
<td>4</td>
</tr>
<tr>
<td>9</td>
<td>For nozzle size 10, 13, 15</td>
<td>M3 x 0.35 x 37</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>For nozzle size 18, 20</td>
<td>M3 x 0.35 x 37</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>For nozzle size 10, 13, 15 + with function plate</td>
<td>M3 x 0.35 x 42</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>For nozzle size 18, 20 + with function plate</td>
<td>M3 x 0.35 x 42</td>
<td>6</td>
</tr>
</tbody>
</table>

#### Note 1

- Screw M12 x 12 screws (Hexagon socket head set screws) in until the head aligns with the manifold base surface.
- The manifold base not assembled with the unit does not include M12 x 12 screws (Hexagon socket head set screws). Please order them separately.

#### Note 2

When the valve unit is assembled from a single unit function to a manifold function, 3 pcs. of M-5P for PS, PD, PE ports and 1 pc. of R1/8 for PV port are required.

#### Precautions

1. Refer to the Vacuum Equipment Model Selection on page 825 for precautions on matching with vacuum circuit.

#### Caution

Refer to the Vacuum Equipment Model Selection on page 825 for precautions on matching with vacuum circuit.
Vacuum Pump System
Mounting Thread Parts List for Unit Combination

<table>
<thead>
<tr>
<th>Manifold Specifications</th>
<th>Without Manifold</th>
</tr>
</thead>
<tbody>
<tr>
<td>Components</td>
<td>Valve unit + Pressure switch for vacuum / Filter unit</td>
</tr>
</tbody>
</table>

### Components
- Valve unit
- Pressure switch for vacuum / Filter unit

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<tr>
<th>No.</th>
<th>Combination specifications</th>
<th>Mounting thread</th>
<th>Quantity</th>
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<tbody>
<tr>
<td>1</td>
<td>Standard (Without options)</td>
<td>M2.5 x 0.45 x 33</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>With individual spacer</td>
<td>M2.5 x 0.45 x 37</td>
<td>6</td>
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<td></td>
<td>With function plate</td>
<td>M2.5 x 0.45 x 38</td>
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<tr>
<td></td>
<td>With individual spacer + with function plate</td>
<td>M2.5 x 0.45 x 41</td>
<td>6</td>
</tr>
<tr>
<td>3</td>
<td>For vacuum switch and adapter A</td>
<td>M2.5 x 0.45 x 41</td>
<td>2</td>
</tr>
<tr>
<td>7</td>
<td>Standard (Without options)</td>
<td>M2.5 x 0.45 x 5</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>With individual spacer</td>
<td>M2.5 x 0.45 x 8</td>
<td>6</td>
</tr>
<tr>
<td>11</td>
<td>Standard (Without options)</td>
<td>M2.5 x 0.45 x 49</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>Standard (Without options)</td>
<td>M2.5 x 0.45 x 85</td>
<td>4</td>
</tr>
<tr>
<td>12</td>
<td>Standard (Without options)</td>
<td>M2.5 x 0.45 x 18</td>
<td>6</td>
</tr>
<tr>
<td>13</td>
<td>Standard (Without options)</td>
<td>M2.5 x 0.45 x 33</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>With function plate</td>
<td>M2.5 x 0.45 x 38</td>
<td>2</td>
</tr>
<tr>
<td>14</td>
<td>Standard (Without options)</td>
<td>M3 x 0.35 x 54</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>With function plate</td>
<td>M3 x 0.35 x 93</td>
<td>4</td>
</tr>
<tr>
<td>15</td>
<td>Standard (Without options)</td>
<td>M3 x 0.35 x 70</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>With function plate</td>
<td>M3 x 0.35 x 75</td>
<td>4</td>
</tr>
<tr>
<td>16</td>
<td>Standard</td>
<td>M12 x 12</td>
<td>1</td>
</tr>
</tbody>
</table>

**Note 1)** Screw M12 x 12 screws (Hexagon socket head set screws) in until the head aligns with the manifold base surface.

**Note 2)** When the valve unit is assembled from a single unit function to a manifold function, 3 pcs. of M-5P for PS, PD, PE ports and 1 pc. of R1/8 for PV port are required.