Large Size Vacuum Module:
Ejector System/Vacuum Pump System

- Large suction flow rate, suitable when used with large size pads or multiple pads.
- Nozzle dia. Ø 1.0, Ø 1.3, Ø 1.5, Ø 1.8, Ø 2.0
- Vacuum module suitable for handling workpieces of 0.5 to 5 kg.
Vacuum module suitable for handling workpieces of 0.5 to 5 kg.

- Modular design/Customised 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
- thin plates
- copper plates
- Automatic labeling machine
- Absorbing and transferring veneers
- Automatic screw fastening machine

Escorting printed matter
### Modular Components Introduction

#### Ejector System

<table>
<thead>
<tr>
<th>Nozzle dia. (mm)</th>
<th>Maximum suction flow rate (l/min [ANR])</th>
<th>Air consumption (l/min [ANR])</th>
<th>Maximum vacuum pressure</th>
<th>Exhaust release (Ejector exhaust)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.0</td>
<td>25</td>
<td>25</td>
<td>-53 kPa</td>
<td>Built-in silencer, Manifold exhaust</td>
</tr>
<tr>
<td>1.3</td>
<td>44</td>
<td>44</td>
<td>-53 kPa</td>
<td>Individual exhaust port</td>
</tr>
<tr>
<td>1.5</td>
<td>53</td>
<td>53</td>
<td>-53 kPa</td>
<td></td>
</tr>
<tr>
<td>1.8</td>
<td>63</td>
<td>63</td>
<td>-53 kPa</td>
<td></td>
</tr>
<tr>
<td>2.0</td>
<td>74</td>
<td>74</td>
<td>-53 kPa</td>
<td></td>
</tr>
</tbody>
</table>

#### Vacuum Pump System

<table>
<thead>
<tr>
<th>Supply valve (Pilot type)/Release valve (Pilot type)</th>
</tr>
</thead>
<tbody>
<tr>
<td>N.C./N.O.</td>
</tr>
<tr>
<td>Solenoid valve (Double, Single)/Air operated valve</td>
</tr>
<tr>
<td>3, 5, 6, 12, 24 VDC</td>
</tr>
</tbody>
</table>

### Refer to page 9 for further specifications of each unit.
Large Size Vacuum Module: Ejector System
ZR Series

How to Order

Take function plates into consideration. (Refer to page 6.)

Components

- **Components**
  - Ejector unit
  - Supply valve self-holding
  - Pressure switch for vacuum unit
  - Ejector unit
  - Supply valve N.C.
  - Pressure switch for vacuum unit
  - Ejector unit
  - Filter unit

**Ejector module**

<table>
<thead>
<tr>
<th>Nozzle diameter</th>
<th>10</th>
<th>18</th>
<th>1.8</th>
</tr>
</thead>
<tbody>
<tr>
<td>13</td>
<td>1.3</td>
<td>2.0</td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>1.5</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Maximum vacuum pressure**

- **Symbol**
  - S: Built-in silencer
  - L: Common exhaust

**Combination of supply valve and release valve**

Refer to “Table (1)” on page 4 for details.

**Lead wire specifications**

- **Digital pressure switch for vacuum (ZSE30A) specifications (D)**
  - Without lead wire
  - Lead wire with connector (Length 2 m)

Note 1) When the product is used for the manifold specification and common exhaust, the exhaust air of the operating ejector releases may enter the vacuum (V) port of the non-operating ejector and be released if there are an operating and non-operating ejector. Select either the built-in silencer or port exhaust for the ejector exhaust method.

**Solenoid valve rated voltage**

- **Air operated**
  - S: 24 VDC
  - R: 5 VDC

**Light/Surge voltage suppressor**

- **With light/surge voltage suppressor**

<table>
<thead>
<tr>
<th>-</th>
<th>None</th>
<th>Z: With light/surge voltage suppressor</th>
</tr>
</thead>
<tbody>
<tr>
<td>-</td>
<td></td>
<td>S: With surge voltage suppressor</td>
</tr>
</tbody>
</table>

**Manual override**

- **Non-locking push type**
  - B: Slotted locking type

**Combination of switch/filter**

- **None**
  - D: Digital pressure switch for vacuum (ZSE30A) + Filter
  - E: Pressure switch for vacuum (ZSE2) + Filter
  - F: Filter

**Release flow rate adjusting needle/Bracket A, B Note)**

**Note)** A bracket is applicable only when the product is to be shipped on its own. When a manifold is to be shipped, a bracket is not included with any of the models.

**Output specifications**

- **Digital pressure switch for vacuum (ZSE30A) specifications (D)**
  - N: NPN open collector 1 output
  - A: NPN open collector 2 outputs
  - B: PNP open collector 1 output + Analogue voltage output
  - C: NPN open collector 1 output + Analogue current output
  - D: NPN open collector 1 output + Analogue current output
  - E: PNP open collector 1 output + Analogue voltage output
  - F: PNP open collector 1 output + Analogue current output

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

- **Pressure switch for vacuum (ZSE2) specifications (E)**
  - 55: NPN open collector 1 output
  - 60: PNP open collector 1 output

Note 1) Fixed unit: kPa
Note 1) Fixed unit: psi
Note 2) Refer to “Table (2)” on page 4 for part no. of lead wire with connector.

**Filter specifications (F)**

Refer to “Table (3)” on page 4 for part no. of lead wire with connector.
Table (1) Combination of Supply Valve and Release Valve

<table>
<thead>
<tr>
<th>Operation</th>
<th>Vacuum</th>
<th>Valve unit components</th>
<th>Symbol</th>
<th>Supply valve</th>
<th>Release valve</th>
</tr>
</thead>
<tbody>
<tr>
<td>stop</td>
<td>ad.</td>
<td>Double SOL (SYJ3233-X126)</td>
<td>K1</td>
<td>N.C. (SYJ3133)</td>
<td>N.O. (SYJ3133)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>N.C. (SYJ3133)</td>
<td>K2</td>
<td>N.C. (SYJ3133)</td>
<td>N.O. (SYJ3133)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Air operated (SYJA3130)</td>
<td>K3</td>
<td>N.O. (SYJ3133)</td>
<td>N.O. (SYJ3133)</td>
</tr>
<tr>
<td>x</td>
<td></td>
<td>N.C. (SYJ3133)</td>
<td>C1</td>
<td>N.O. (SYJ3133)</td>
<td>N.O. (SYJ3133)</td>
</tr>
<tr>
<td>x</td>
<td></td>
<td>Air operated (SYJA3130)</td>
<td>C2</td>
<td>N.O. (SYJ3133)</td>
<td>N.O. (SYJ3133)</td>
</tr>
<tr>
<td>x</td>
<td></td>
<td></td>
<td>C3</td>
<td>N.O. (SYJ3133)</td>
<td>N.O. (SYJ3133)</td>
</tr>
</tbody>
</table>

Table (2) How to Order Valve Plug Connector Assembly

**DC**

SY100 - 30 - 4A

**ZS**

10 - 5A

**ZS**

38 - 3 L

**ZS**

10 - 5A - 30 - 50 - 0.6 m - 3 m - 5 m

**ZS**

38 - 3 L

How to order

When requiring a vacuum unit equipped with valves with lead wires of 600 mm or more, specify the vacuum module valves without the standard connectors and order the required connector ass’ys separately.

Example) ZR120S1-K15M/Z-EC-Q 1 pc.

ZS-10-5A-50 1 pc.

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

<table>
<thead>
<tr>
<th>Lead wire core</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 cores, 1 output, 2 m (Output specifications: N, P)</td>
</tr>
<tr>
<td>4 cores, 2 outputs, 2 m (Output specifications: A, B, C, D, E, F)</td>
</tr>
</tbody>
</table>
Ejector System/Combination of Supply Valve and Release Valve

**Combination Symbol: K1**
Feature: Double solenoid supply 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>OFF</td>
</tr>
<tr>
<td>2. Vacuum release</td>
<td>OFF</td>
<td>ON</td>
<td>ON</td>
</tr>
<tr>
<td>3. Operation stop</td>
<td>OFF</td>
<td>OFF</td>
<td>OFF</td>
</tr>
</tbody>
</table>

- **Combination Symbol: K2**
Feature: Single solenoid valve is provided for supply 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>OFF</td>
<td>OFF</td>
</tr>
<tr>
<td>2. Vacuum release</td>
<td>OFF</td>
<td>ON</td>
<td>ON</td>
</tr>
<tr>
<td>3. Operation stop</td>
<td>OFF</td>
<td>OFF</td>
<td>OFF</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>Air operated a</td>
<td>OFF</td>
<td>OFF</td>
</tr>
<tr>
<td>2. Vacuum release</td>
<td>OFF</td>
<td>ON</td>
<td>ON</td>
</tr>
<tr>
<td>3. Operation stop</td>
<td>OFF</td>
<td>OFF</td>
<td>OFF</td>
</tr>
</tbody>
</table>

**Combination Symbol: C1**
Feature: Adsorption of workpieces (when energised) and release of vacuum (when de-energised) 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>OFF</td>
<td>OFF</td>
</tr>
</tbody>
</table>

Caution
When pipe connection is made to one port connection (PV) port only, use a function plate (ZR1-RV1). Refer to page 6 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 – RV 1**

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Indication</th>
<th>PV port</th>
<th>PS port</th>
<th>PD port</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>PV PS PD</td>
<td>Common</td>
<td></td>
<td>Individual</td>
</tr>
</tbody>
</table>

How to order

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

Example) ZR120S1-K15MZ-EC-Q.................. 1 pc.

- ZR1-RV1 .....................................  1 pc.

Length of assembling mounting threads varies when adding function plate. Order from the mounting thread parts list for unit combination on page 47.

Order a plug (ZX1-MP1) separately in order to plug the PD and PS ports that are no longer used due to the addition of function plate.

**Caution**
Construction

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 (alkaline), etc.
2. Do not expose it to direct sunlight.

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.

How to Order Solenoid Valves/Air Operated Valves

Air operated
SYJA3130

Solenoid valve
ZR1 – SYJ3233 – [ ] [ ] X126 – Q

SYJ3133 – [ ] [ ] – Q

rated voltage

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

Manual override
— Non-locking push type
D Slotted locking type

Light/Surge voltage suppressor
— None
Z With light and surge voltage suppressor
S With surge voltage suppressor

Component Parts

<table>
<thead>
<tr>
<th>No.</th>
<th>Description</th>
<th>Material</th>
<th>Part Model</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Manifold base</td>
<td>Aluminium alloy</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Release flow rate adjusting needle</td>
<td>Stainless steel</td>
<td>ZR1-NA†2</td>
</tr>
<tr>
<td>3</td>
<td>Function plate</td>
<td>PBT</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Individual spacer</td>
<td>PBT</td>
<td></td>
</tr>
<tr>
<td>5†1</td>
<td>Filter case</td>
<td>Polycarbonate</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Pilot valve assembly</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Valve body assembly</td>
<td></td>
<td></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 (alkaline), 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 (ZR1-ND-L) lock nut is also available.

Note) Mounting screw and pilot valve gasket are included.
Construction

(1) How to Order Valve Body Assembly

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

- Combination of supply valve and release valve
- Solenoid valve rated voltage
- Manual operation
- Release flow rate adjusting needle
  - Without lock nut
  - With lock nut
- Electrical entry
- With light/surge voltage suppressor

* Refer to page 3 for detailed specifications of each code.

(2) How to Order Ejector Assembly

**ZR1-WD** 10 S 1

- Nozzle diameter
  - 10: 1.0
  - 13: 1.3
  - 15: 1.5
  - 18: 1.8
  - 20: 2.0
- Ejector exhaust
  - 1: Built-in silencer
  - 2: Port exhaust
  - 3: Common exhaust
- Maximum vacuum pressure
  - S: ~84 kPa
  - L: ~53 kPa

(3) How to Order Silencer

**ZR1-SE** 1

- Applicable ejector
  - 1 For ZR110S1
  - 1 For ZR110L1
  - 1 For ZR113S1
  - 1 For ZR113L1
  - 2 For ZR115S1
  - 2 For ZR115L1
  - 3 For ZR118S1
  - 3 For ZR118L1

Silencer assembly (Case, Element, Mounting screw)

**ZR1-SA** 1 A

- Applicable ejector
  - 1 For ZR110S1
  - 1 For ZR110L1
  - 1 For ZR113S1
  - 1 For ZR113L1
  - 2 For ZR115S1
  - 2 For ZR115L1
  - 3 For ZR118S1
  - 3 For ZR118L1

Silencer case assembly for port exhaust (Case, Mounting screw)

**ZR1-SA** 4 A

- Applicable ejector
  - 4 For ZR110S2
  - 4 For ZR110L2
  - 4 For ZR113S2
  - 4 For ZR113L2
  - 5 For ZR115S2
  - 5 For ZR115L2
  - 6 For ZR118S2
  - 6 For ZR118L2

Silencer case assembly for centralised exhaust (Case, Mounting screw)

**ZR1-SA** 6 A

- Applicable ejector
  - 6 For ZR110S3
  - 6 For ZR110L3
  - 6 For ZR113S3
  - 6 For ZR113L3
  - 7 For ZR115S3
  - 7 For ZR115L3
  - 7 For ZR118S3
  - 7 For ZR118L3
  - 7 For ZR120S3
  - 7 For ZR120L3

(4) Pressure Switch for Vacuum + Suction Filter Unit

**ZR1-F** E L D

- Combination of switch/filter
- Output specifications
- Option (Connector/lead wire specifications)

(5) How to Order Pilot Valves

<table>
<thead>
<tr>
<th>Combination Symbol</th>
<th>Components</th>
<th>Model</th>
</tr>
</thead>
<tbody>
<tr>
<td>K3</td>
<td>Air operated N.C (SYJA3130)</td>
<td>SYJA3130</td>
</tr>
</tbody>
</table>

* Refer to page 18 for detailed specifications of each code.
Specifications

<table>
<thead>
<tr>
<th>Valve unit part no.</th>
<th>ZR1-V/L50132/L50132/L50132/L50132/L50132</th>
</tr>
</thead>
<tbody>
<tr>
<td>Components</td>
<td>Supply valve</td>
</tr>
<tr>
<td></td>
<td>Release valve</td>
</tr>
<tr>
<td>Operating method</td>
<td>Pilot operated</td>
</tr>
<tr>
<td></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>
</tr>
<tr>
<td>PV port supply pressure</td>
<td>-0.1 to 0.6 MPa (PS port pressure or less)</td>
</tr>
<tr>
<td>PD port supply pressure</td>
<td>0.05 to 0.6 MPa (PS port pressure or less)</td>
</tr>
<tr>
<td>PS port supply pressure</td>
<td>0.25 to 0.6 MPa</td>
</tr>
<tr>
<td>Supply pressure range of pilot pressure supply (PA, PB) ports for supply and release</td>
<td>PS port pressure to 0.6 MPa</td>
</tr>
<tr>
<td>Main valve effective area (mm²)</td>
<td>8.2</td>
</tr>
<tr>
<td>Main valve effective area (Cv)</td>
<td>0.96</td>
</tr>
<tr>
<td>Maximum operating frequency</td>
<td>5 Hz</td>
</tr>
<tr>
<td>Operating temperature range</td>
<td>5 to 50 °C</td>
</tr>
<tr>
<td>Standard accessory</td>
<td>Bracket B (ZR1-OB)</td>
</tr>
</tbody>
</table>

Note) Combination of supply valve and release valve: K3, C2
The supply and release valves of this product have a structure which uses the pressure of the pilot pressure supply (PS) port to operate them. Be sure to supply a pressure that is the pressure of the pilot pressure supply (PS) port or more and 0.6 MPa or less to the pilot pressure supply (PA, PB) ports for supply and release.

Solenoid Valve/Specifications

<table>
<thead>
<tr>
<th>Solenoid</th>
<th>SYJ3133-L, SYJ3233-L, SYJ333-L-X126</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rated voltage</td>
<td>24, 12, 6, 5, 3 VDC</td>
</tr>
<tr>
<td>Electrical entry</td>
<td>LM plug connector, Grommet</td>
</tr>
<tr>
<td>Light/Surge voltage suppressor</td>
<td>Available, Not available (at grommet)</td>
</tr>
<tr>
<td>Manual operation</td>
<td>Non-locking push type, Locking slotted type</td>
</tr>
</tbody>
</table>

Combination of Supply Valve and Release Valve

<table>
<thead>
<tr>
<th>Combination symbol</th>
<th>Vacuum switch valve</th>
<th>Release valve</th>
<th>Weight (kg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>K1</td>
<td>Double SOL (SYJ3233-X126)</td>
<td>N.C. (SYJ3133)</td>
<td>0.34</td>
</tr>
<tr>
<td>K2</td>
<td>N.C. (SYJ3133)</td>
<td>N.C. (SYJ3133)</td>
<td>0.27</td>
</tr>
<tr>
<td>K3</td>
<td>Air operated (SYJA3130)</td>
<td>Air operated (SYJA3130)</td>
<td>0.194</td>
</tr>
<tr>
<td>C1</td>
<td>N.C. (SYJ3133)</td>
<td>Air operated (SYJA3130)</td>
<td>0.22</td>
</tr>
<tr>
<td>C2</td>
<td>N.C. (SYJ3133)</td>
<td>Air operated (SYJA3130)</td>
<td>0.174</td>
</tr>
<tr>
<td>C3</td>
<td>N.C. (SYJ3133)</td>
<td>Air operated (SYJA3130)</td>
<td>0.21</td>
</tr>
</tbody>
</table>

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

How to Order

Refer to page 3 for further part no. information.

ZR1-V [K1 5 M Z] L Q

Combination of vacuum valve and release valve
Solenoid valve rated voltage
Electrical entry
Release flow rate adjusting needle/Bracket B
Manual override
With light/surge voltage suppressor
Ejector Unit/ZR1 Series

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>Weight (With bracket) (kg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>ZR1-W10S</td>
<td>1.0</td>
<td>25</td>
<td>53</td>
<td>0.132</td>
</tr>
<tr>
<td>ZR1-W13S</td>
<td>1.3</td>
<td>42</td>
<td>86</td>
<td>0.134</td>
</tr>
<tr>
<td>ZR1-W15S</td>
<td>1.5</td>
<td>63</td>
<td>102</td>
<td>0.136</td>
</tr>
<tr>
<td>ZR1-W18S</td>
<td>1.8</td>
<td>74</td>
<td>155</td>
<td>0.154</td>
</tr>
<tr>
<td>ZR1-W20S</td>
<td>2.0</td>
<td>95</td>
<td>194</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>Weight (With bracket) (kg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>ZR1-W10L</td>
<td>1.0</td>
<td>44</td>
<td>53</td>
<td>0.133</td>
</tr>
<tr>
<td>ZR1-W13L</td>
<td>1.3</td>
<td>55</td>
<td>86</td>
<td>0.133</td>
</tr>
<tr>
<td>ZR1-W15L</td>
<td>1.5</td>
<td>88</td>
<td>102</td>
<td>0.135</td>
</tr>
<tr>
<td>ZR1-W18L</td>
<td>1.8</td>
<td>105</td>
<td>155</td>
<td>0.155</td>
</tr>
<tr>
<td>ZR1-W20L</td>
<td>2.0</td>
<td>132</td>
<td>194</td>
<td>0.154</td>
</tr>
</tbody>
</table>

Common Specifications

- 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
- Standard accessory: Bracket (ZR1-OBB)

*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.

How to Order

ZR1-W 20 S 1 -

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

- Bracket B
  - With Bracket B
  - N: Without Bracket B

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

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

* Port size:
  - Rc1/4 (Nozzle dia. 1.0 to 1.5)
  - Rc3/8 (Nozzle dia. 1.8, 2.0)
Ejector Unit/Standard Type (S): Max. Vacuum Pressure –84 kPa

At 0.45 MPa

**Characteristics (Representative value)**

### ZR1-W10S1
- **Exhaust characteristics**
- **Flow rate characteristics**

### ZR1-W13S1
- **Exhaust characteristics**
- **Flow rate characteristics**

### ZR1-W15S1
- **Exhaust characteristics**
- **Flow rate characteristics**

### ZR1-W18S1
- **Exhaust characteristics**
- **Flow rate characteristics**

### ZR1-W20S1
- **Exhaust characteristics**
- **Flow rate characteristics**
Ejector Unit/Large Flow Type (L): Max. Vacuum Pressure –53 kPa

At 0.45 MPa

Flow rate 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, \(P_{\text{max}}\) is max. vacuum pressure and \(Q_{\text{max}}\) is maximum suction flow. The values are specified according to catalogue 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 \(P_{\text{max}}\).
2. When suction port is opened gradually, air can flow through, (air leakage), suction flow increases, but vacuum pressure decreases. (condition \(P_1\) and \(Q_1\))
3. When suction port is opened further, suction flow moves to maximum value \(Q_{\text{max}}\), 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 Rate Characteristics Graph**

Flow rate 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, \(P_{\text{max}}\) is max. vacuum pressure and \(Q_{\text{max}}\) is maximum suction flow. The values are specified according to catalogue use. Changes in vacuum pressure are expressed in the below order.

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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.
Nozzle dia./Ø 1.0, Ø 1.3, Ø 1.5 mm
ZR1-W10

Nozzle dia./Ø 1.8, Ø 2.0 mm
ZR1-W18

Note) *1 Dimensions : For mounting bracket B
Bracket B part number: ZR1-0BB
(Standard accessory)

For port exhaust

Circuit diagram

Ejector Unit

Nozzle Dia./Ø 1.0, Ø 1.3, Ø 1.5, Ø 1.8, Ø 2.0
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>Fluid</td>
<td>Air</td>
<td></td>
</tr>
<tr>
<td>Rated pressure range/Set pressure range</td>
<td>0 to -101 kPa</td>
<td></td>
</tr>
<tr>
<td>Proof pressure</td>
<td>500 kPa</td>
<td></td>
</tr>
<tr>
<td>Hysteresis</td>
<td>±3 % F.S. or less (Fixed)</td>
<td>±3 % F.S. or less</td>
</tr>
<tr>
<td>Temperature characteristics (Based on 25°C)</td>
<td>12 to 24 VDC (Ripple ±10 % or less)</td>
<td></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></td>
</tr>
<tr>
<td>Current consumption</td>
<td>17 mA or less (when 24 VDC is ON)</td>
<td></td>
</tr>
<tr>
<td>Proof pressure (Max. operating pressure)</td>
<td>0.5 MPa^*</td>
<td></td>
</tr>
<tr>
<td>Operating temperature range</td>
<td>5 to 50 °C</td>
<td></td>
</tr>
<tr>
<td>Operating voltage</td>
<td>12 to 24 VDC (Ripple ±10 % or less)</td>
<td></td>
</tr>
</tbody>
</table>

*Refer to web catalogue for detailed specifications of pressure switches for vacuum.

**How to Order**

**With Connector/How to Order**

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

**Lead wire length**

<table>
<thead>
<tr>
<th>—</th>
<th>0.6 m</th>
</tr>
</thead>
<tbody>
<tr>
<td>30</td>
<td>3 m</td>
</tr>
<tr>
<td>50</td>
<td>5 m</td>
</tr>
</tbody>
</table>

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.

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

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

Quick response: 10 mS
Compact size: 39H x 20W x 15D (except the connecting portion)
Improved wiring: Connector style
Uses a carrier diffusion semiconductor pressure sensor

---

**How to Order**

**With Connector/How to Order**

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

**Lead wire length**

<table>
<thead>
<tr>
<th>—</th>
<th>0.6 m</th>
</tr>
</thead>
<tbody>
<tr>
<td>30</td>
<td>3 m</td>
</tr>
<tr>
<td>50</td>
<td>5 m</td>
</tr>
</tbody>
</table>

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.
Guidelines for Use of Pressure Switch Unit for Vacuum

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-adsorption.
- Stabilise 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 minimise the influences on other pads.

System circuit for work adsorption

Ejector style

Vacuum pump style

Pressure Switch for Vacuum: ZSE2-0R-□□

<table>
<thead>
<tr>
<th>ZSE2-0R-□□</th>
<th>ZSE2-0R-□□C</th>
<th>ZSE2-0R-□□L</th>
<th>ZSE2-0R-□□CL</th>
<th>ZSE2-0R-□□CN</th>
</tr>
</thead>
<tbody>
<tr>
<td>20</td>
<td>18</td>
<td>16</td>
<td>20</td>
<td>18</td>
</tr>
<tr>
<td>16</td>
<td>18</td>
<td>16</td>
<td>16</td>
<td>18</td>
</tr>
<tr>
<td>16</td>
<td>18</td>
<td>16</td>
<td>16</td>
<td>18</td>
</tr>
</tbody>
</table>

Vacuum supply port 3.3

Pressure setting trimmer

Indicator light (Red)

2 x M2.5 x 41L Mounting thread
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.

(Crimping tool: model no. DXT170-75-1)

3. Attaching and detaching of socket to connector with lead wire
   - Attaching
     Insert the sockets into the square holes of the connector (with +, 1, 2, – indication), and continue to push the sockets all the way 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.

Precautions

Be sure to read before handling.
Refer to back page for Safety Instructions.

Warning

1. Do not give an excessive impact load.
   Do not drop, bump or apply excessive impact (1000 m/s²) when handling. Even if the switch body is not damaged, the switch may suffer internal damage that will lead to malfunction.

2. Hold the product from the body side when handling.
   When raising and moving the product, do not raise it by holding the lead wire only, but hold the body. It may cause malfunction due to broken contacts.
Vacuum Pressure Switch Unit/Digital Pressure Switch for Vacuum: ZR1-ZSE30A-00-

How to Order

ZR1 - ZSE30A - 00

Output specifications

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Output Type</th>
<th>Point</th>
<th>Analogue output Voltage</th>
<th>Current</th>
</tr>
</thead>
<tbody>
<tr>
<td>N</td>
<td>NPN</td>
<td>1</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>P</td>
<td>NPN</td>
<td>1</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>A</td>
<td>NPN</td>
<td>2</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>B</td>
<td>PNP</td>
<td>2</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>C</td>
<td>NPN</td>
<td>1</td>
<td>○</td>
<td>〇</td>
</tr>
<tr>
<td>D</td>
<td>NPN</td>
<td>1</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>E</td>
<td>PNP</td>
<td>1</td>
<td>〇</td>
<td>〇</td>
</tr>
<tr>
<td>F</td>
<td>PNP</td>
<td>1</td>
<td>—</td>
<td>—</td>
</tr>
</tbody>
</table>

Option 1 (Connector/Lead wire specifications)
- Without lead wire
- Lead wire with connector (Length 2 m)

Display unit
- Without unit display switching function
- Fixed SI unit
- With unit display switching function (Initial value psi)

Note 1) Fixed unit: kPa

Specifications

- Rated pressure range: 0.0 to –101.0 kPa
- Set pressure range: 10.0 to –105.0 kPa
- Withstand pressure: 500 kPa
- Minimum unit setting: 0.1 kPa
- Applicable fluid: Air
- 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
- NPN or PNP open collector 2 outputs (selectable)
- Maximum load current: 80 mA
- Maximum applied voltage: 28 V (at NPN output)
- Residual voltage: 1 V or less (with load current of 80 mA)
- Response time: 2.5 ms or less (with anti-chattering function: 20, 100, 500, 1000, 2000 ms)
- Short circuit protection: Yes

- Repeatability: ±0.2 % F.S. ±1 digit
- Hysteresis mode: Variable (0 to variable)
- Linearity: ±1% F.S. or less
- Output impedance: Approx. 1 kΩ
- Load impedance: Maximum load impedance: Power supply voltage 12 V: 300 Ω, Power supply voltage 24 V: 600 Ω
- Minimum load impedance: 50 Ω
- Display: 4-digit, 7-segment, 2-colour LCD (Red/Green) Sampling cycle: 5 times/sec.
- Display accuracy: ±2 % F.S. ±1 digit (Ambient temperature of 25 °C)
- Indicator light: Lights up when switch output is turned ON. (OUT1: Green, OUT2: Red)

Environment
- Temperature characteristics: ±2 % F.S. (Based on 25 °C)
- Lead wire: Oilproof heavy-duty vinyl cable, 3 cores Ø 3.5, 2 m
- Insulation resistance: 50 MΩ or more (500 VDC measured via megohmmeter) between terminals and housing
- Temperature range:
  - Operating: 0 to 50 °C, Stored: -10 to 60 °C (No freezing or condensation)
  - Operating/Storage: 35 to 85 % RH (No condensation)
- Withstand voltage: 1000 VAC for 1 minute between terminals and housing
- Insulation resistance: 50 MΩ or more (500 VDC measured via megohmmeter) between terminals and housing
- Enclosure: IP40

• The vacuum pressure switch mounted on this product is equivalent to our SMC product, the ZSE30A series compact digital pressure switch.
• Pressure switch correspondence table

For details about vacuum pressure switch functions, refer to the Operation Manual for Series ZSE30A that can be downloaded from our website (http://www.smc.eu).
Combination unit of vacuum pressure switch for vacuum pressure detection and suction filter to protect the unit from dust and contamination.

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, water soluble cutting oil (alkaline), etc.

2. Do not expose it to direct sunlight.

How to Replace Elements

When an element becomes clogged, adsorption performance and response times are degraded. Stop operation and replace element. (Element no. ZR1-FZ). Please ensure that gasket is in slot before re-installation.

### Specification

<table>
<thead>
<tr>
<th>Suction filter</th>
<th>Rated pressure range/Min pressure range</th>
<th>Proof pressure</th>
<th>Operating temperature range</th>
<th>Filtration degree</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>-100 to 100 kPa</td>
<td>500 kPa</td>
<td>5 to 50 °C</td>
<td>30 μm</td>
</tr>
<tr>
<td>Filtration material</td>
<td>PVF</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pressure switch for vacuum</td>
<td>Refer to pages 14 and 17 regarding pressure switch for vacuum.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### How to Order

**ZR1 - F**

**Combination of pressure switch/filter**

- D: Digital pressure switch for vacuum (ZSE30A) + Filter
- E: Pressure switch for vacuum (ZSE2) + Filter
- F: Pressure switch for vacuum

**Output specifications**

- Digital pressure switch for vacuum (ZSE30A) 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 + Analogue voltage output
  - D: PNP open collector 1 output + Analogue current output
  - E: NPN open collector 1 output + Analogue voltage output
  - F: PNP open collector 1 output + Analogue current output

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

- N: NPN open collector 1 output
- P: PNP open collector 1 output
- F: No setting

**Filter specifications (F)**

- No setting

**How to order**

When requiring a switch with lead wire of 5 m, indicate separately the model numbers of a pressure switch unit for vacuum without a lead wire connector and the 5 m lead wire connector. (Ex.) ZR1-F-G-A-CN ....... 1 pc.

- ZS-10-SA-30 ................. 2 pcs.

**Lead wire specifications**

- **Lead wire core**
  - 3 cores, 1 output, 2 m (Output specifications: N, P)
  - 4 cores, 2 outputs, 2 m (Output specifications: A, B, C, D, E, F)

**Lead wire length**

- 0.6 m
- 3 m
- 5 m

---

*Note) If not operated within the specified range of pressure and temperature, trouble may be caused.*
Pressure Switch for Vacuum + Suction Filter Unit: ZR1-F

Dimensions: ZR1-F

**ZR1-FE**

- Vacuum (V) port
- Release pressure supply (PD) port
- Vacuum pressure supply (PV) port

**ZR1-FD**

- Suction filter
- Digital pressure switch for vacuum

**Circuit diagram**

Note: Dimensions: For mounting bracket A
Bracket A part number: ZR1-OBA (standard)
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 (alkalinic), etc.
2. Do not expose it to direct sunlight.

Specification

<table>
<thead>
<tr>
<th>Model</th>
<th>ZR1-FX-□</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating pressure range</td>
<td>-0.1 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>Element</td>
<td>PVF</td>
</tr>
<tr>
<td>Weight (With bracket)</td>
<td>0.1 kg</td>
</tr>
<tr>
<td>Standard</td>
<td>Bracket C (ZR1-OBC)</td>
</tr>
</tbody>
</table>

How to Order

ZR1-FX-

 Bracket C

- With Bracket C
N Without Bracket C

Dimensions: ZR1-FX-

Note) *1 Dimensions for mounting bracket C
Bracket C part no.: ZR1-OBC (Standard accessory)

Circuit diagram
**ZR Series**

**Ejector System**

**Complete Unit**

Exhaust (EXH) port

Vacuum (V) port

Release pressure supply (PV) port

Pilot pressure supply (PS) port

Air pressure supply (PD) port

**Nozzle dia./Ø 1.0, Ø 1.3, Ø 1.5**

ZR113-1-K1-M-D-E-

**Circuit diagram**

**Pressure switch for vacuum (E)**

- **PS**
- **PE**
- **PD**
- **PV**

**Silencer**

**Port exhaust**

**For port exhaust**

**Digital pressure switch for vacuum**

A: Release flow adjusting needle with lock nut

**Components**

ZR113-1-K1-M-D-E-

ZR Series

Complete Unit Ejector + Valve + Pressure Switch for Vacuum + Filter

ZR113-1-K1-M-D-E-

For port exhaust

Digital pressure switch for vacuum (D)

A: Release flow adjusting needle with lock nut

2 x long hole (Mounting hole)\(^1\)

2 x 4.6 (Mounting hole)\(^1\)

2 x 4.2 (Mounting hole)\(^1\)

Vacuum pressure setting trimmer

Indicator light (Red)

Vacuum pressure switch

Silencer

Suction filter

Valve Unit

Adaptor C

Ejector System Complete Unit

ZR113-1-K1-M-D-E-

Exhaust (EXH) port

Vacuum (V) port

Bracket A

Rc1/8

Vacuum (V) port

Adaptor C

ZSE30A

(With analogue output)

ZSE2

Nozzle dia./Ø 1.0, Ø 1.3, Ø 1.5

ZR113-1-K1-M-D-E-

For port exhaust

Digital pressure switch for vacuum

A: Release flow adjusting needle with lock nut

V

ZSE30A

Without analogue output

ZSE2

ZR Series

Complete Unit Ejector + Valve + Pressure Switch for Vacuum + Filter

ZR113-1-K1-M-D-E-

**Circuit diagram**

**Pressure switch for vacuum (E)**

- **PS**
- **PE**
- **PD**
- **PV**

**Silencer**

**Port exhaust**

**For port exhaust**

**Digital pressure switch for vacuum**

A: Release flow adjusting needle with lock nut

**Components**

ZR113-1-K1-M-D-E-

ZR Series

Complete Unit Ejector + Valve + Pressure Switch for Vacuum + Filter

ZR113-1-K1-M-D-E-

For port exhaust

Digital pressure switch for vacuum

A: Release flow adjusting needle with lock nut

V

ZSE30A

Without analogue output

ZSE2
ZR Series

Ejector System with Valve

Nozzle dia./Ø 1.0, Ø 1.3, Ø 1.5
ZR10

Nozzle dia./Ø 1.8, Ø 2.0
ZR118

Note) 1 Dimensions for mounting bracket B
Bracket B part no.: ZR1-OB8B
(Standard accessory)

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

Dimensions not indicated are identical to the top drawing.


Nozzle dia./Ø 1.0, Ø 1.3, Ø 1.5

ZR10

ZR10 D-1

Digital pressure switch for vacuum (D)

Digital pressure switch for vacuum (D)

Silencer

Vacuum pressure switch

Suction filter

Attachment D

Digital pressure switch for vacuum (D)

Vacuum (V) port

Exhaust (EXH) port

2 x 4.2 (Mounting hole)

2 x long hole (Mounting hole)

2 x 4.2 (Mounting hole)

2 x 4.6 (Mounting hole)

80 (in case of nozzle diameter 1.5)

70 (in case of nozzle diameter 1.0, 1.3 port exhaust)

84 (in case of nozzle diameter 1.5)

74 (in case of nozzle diameter 1.0, 1.3 port exhaust)

Vacuum pressure setting trimmer

Indicator light (Red)

Vacuum pressure supply (PV) port

Vacuum (V) port

Exhaust (EXH) port

Port exhaust

Port exhaust

Release pressure supply (PD) port

Remove the plug from PD port at external release.
Nozzle dia./Ø 1.8, Ø 2.0
ZR1²⁰Ⅰ-E

Dimensions not indicated are identical to the top drawing.

For port exhaust
Rc 3/8
Exhaust (EXH) port

Note) *1 Dimensions for mounting bracket A
Bracket A part no.: ZR1-OBA
(Standard accessory)

ZR1²⁰Ⅰ-D

Digital pressure switch for vacuum

For port exhaust
Rc 3/8
Exhaust (EXH) port

★ Dimensions not indicated are identical to the top drawing.
Ejector System/Manifold Specifications

### Specifications

<table>
<thead>
<tr>
<th>Port Location</th>
<th>Port Size</th>
<th>Max. number of units</th>
<th>Max. 6 stations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Common air pressure supply (PV) port</td>
<td>1/8 (Rc, NPTF, G)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Common pilot pressure supply (PS) port</td>
<td>M5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Common release pressure supply (PD) port</td>
<td>M5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Common exhaust (EXH.) port</td>
<td>1/2 (Rc, NPTF, G)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### How to Order Manifold

**Port size**

<table>
<thead>
<tr>
<th>Port size</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>M5</td>
<td></td>
</tr>
<tr>
<td>M5</td>
<td></td>
</tr>
</tbody>
</table>

**Weight (Manifold bases only)**

Basic mass for one station is 0.28 kg. Additional mass per one station is 0.12 kg.

**Supply port location**

- **Manifold**
  - PV
  - PS
  - PD
- **Port**
  - Left
  - Right
- **Common**
  - PV
  - PS
  - PD
- **Individual**
  - PV
  - PS
  - PD

**Individual Spacer**

- **Part no.**
  - ZR1-R1 to R16
- **Function**
  - PV: Possible to set the air supply pressure individually
  - PS: Possible to set the release valve supply pressure individually
  - PD: Possible to set the pilot valve exhaust individually
  - PE: Possible to set the pilot valve exhaust individually

**Manifold Air Supply**

- Air supply to **○** port
- BLANK plug attached to **●** port

**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.

**Piping specifications**

<table>
<thead>
<tr>
<th>Symbo</th>
<th>PV port</th>
<th>PS port</th>
<th>PD port</th>
</tr>
</thead>
<tbody>
<tr>
<td>Symbol 1</td>
<td>PV→PS→PD</td>
<td>Common</td>
<td></td>
</tr>
<tr>
<td>Symbol 2</td>
<td>PV→PS→PD</td>
<td>Common</td>
<td>Individual</td>
</tr>
</tbody>
</table>

**Arrangement**

- Right valve station which is looked from valve side is first station.

<table>
<thead>
<tr>
<th>Arrangement</th>
<th>Station</th>
<th>Symbol</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 station only</td>
<td>ZR1-RV1-1</td>
<td>R1</td>
</tr>
<tr>
<td>6 stations only</td>
<td>ZR1-RV1-3</td>
<td>R1</td>
</tr>
<tr>
<td>All stations</td>
<td>ZR1-RV1-A-3</td>
<td>R1</td>
</tr>
</tbody>
</table>

**About individual spacers**

- 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.

**Example 1**

- ZZR106-R: 1 pc. (Manifold base only)
- ZR120S1-K15MZ-EC: 5 pcs. (Unit)
- ZR1-BM1: 1 pc. (Blank plate)
- ZR1-R1-3: 1 pc. (Individual spacer)

**Example 2**

- Attached to the first and third stations
  - ZR1-RV1-1
  - ZR1-RV1-3

**Example 3**

- Attached to all stations.
  - ZR1-RV1-A-3

**Example 4**

- Attached to the first and third stations
  - ZR1-R1-1
  - ZR1-R1-3

**Blanking plate**

ZR1-BM1

Refer to Example 1.
Manifold/System Circuit Example

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>

<System circuit example>
A: Release flow adjusting needle with lock nut

(Needle fully open)

*1 The common exhaust (EXH.) port 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 ZR Series

Circuit diagram

Function plate ZR1-RV1-4

Body ported individual spacer ZR1-R1-4

Body ported individual spacer ZR1-R1-2

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
The common exhaust (EXH.) port is also used as the pilot pressure exhaust (PE) port of the pilot valve. Use while the port is open to the atmosphere.

* The common exhaust (EXH.) port is also used as the pilot pressure exhaust (PE) port of the pilot valve. Use while the port is open to the atmosphere.
**Circuit Diagram**

- **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
## Components

### Valve unit
- ZR100

### Pressure switch for vacuum
- K1

### Suction filter
- 5

### Combination of vacuum valve and release valve
Refer to “Table (1)” in page 34 for details.

### Solenoid valve rated voltage

| — | 5 | 24 VDC |
| — | 6 | 12 VDC |
| — | V | 6 VDC |
| — | S | 5 VDC |
| — | R | 3 VDC |

### Electrical entry

| — | L plug connector type | Lead wire length 0.3 m |
| — | LN | Without lead wire |
| — | LO | Without connector |
| — | M plug connector type | Lead wire length 0.3 m |
| — | MO | Without lead wire |
| — | G grommet type | Lead wire length 0.3 m |
| — | H lead wire length 0.6 m |

### Manual override
- K
- 5
- M
- D
- Z

### Light/Surge voltage suppressor
- None
- Z
- S

### Note for model selection
Take function plates into consideration.
(Refer to page 36.)

### How to Order

#### Large Size Vacuum Module:
Vacuum Pump System

**ZR Series**

#### Note for model selection

- Manual override
  - B: Non-locking push type
  - Slotted locking type

- Note 1) A bracket is applicable only when the product is to be shipped on its own. When a manifold is to be shipped, a bracket is not included with any of the models.

### Lead wire specifications

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

| — | L | Lead wire with connector (Length 2 m) |
| — | M | Z DQ |

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

| — | L | Without lead wire |
| — | C | CL |
| — | CN | Lead wire with connector (Length 0.6 m) |

#### Filter specifications (F)

- No setting

#### Pressure switch for vacuum (ZSE2) specifications (E)

| — | M | With unit switching function |
| — | P | SI unit only |

#### Filter specifications (F)

| — | No setting |

#### Output specifications

**Digital pressure switch for vacuum (ZSE30A) 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 + Analogue voltage output |
| — | D | PNP open collector 1 output + Analogue current output |
| — | E | FPN open collector 1 output + Analogue voltage output |
| — | F | FPN open collector 1 output + Analogue current output |

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

| — | No setting |

**Filter specifications (F)**

| — | No setting |

#### Solenoid valve rated voltage

- Air operated

#### Pressure switch for vacuum (ZSE2) specifications (E)

- SI unit only

#### Electrical entry

| — | L plug connector type | Lead wire length 0.3 m |
| — | LN | Without lead wire |
| — | LO | Without connector |
| — | M plug connector type | Lead wire length 0.3 m |
| — | MO | Without lead wire |
| — | G grommet type | Lead wire length 0.3 m |
| — | H lead wire length 0.6 m |

### Lead wire specifications

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

| — | L | Lead wire with connector (Length 2 m) |
| — | M | Z DQ |

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

| — | L | Without lead wire |
| — | C | CL |
| — | CN | Lead wire with connector (Length 0.6 m) |

#### Filter specifications (F)

- No setting

#### Pressure switch for vacuum (ZSE2) specifications (E)

| — | M | With unit switching function |
| — | P | SI unit only |

#### Filter specifications (F)

| — | No setting |

#### Output specifications

**Digital pressure switch for vacuum (ZSE30A) 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 + Analogue voltage output |
| — | D | PNP open collector 1 output + Analogue current output |
| — | E | FPN open collector 1 output + Analogue voltage output |
| — | F | FPN open collector 1 output + Analogue current output |

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

| — | No setting |

**Filter specifications (F)**

| — | No setting |
Table (1) Valve Unit/Combination of Vacuum Switch Valve and Release Valve

<table>
<thead>
<tr>
<th>Operation</th>
<th>Vacuum adsorption</th>
<th>Vacuum release</th>
<th>Supply valve</th>
<th>Release valve</th>
</tr>
</thead>
<tbody>
<tr>
<td>stop</td>
<td></td>
<td></td>
<td>Double SOL. (SYJ3233-X126)</td>
<td>N.C. (SYJ3133)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>N.C. (SYJ3133)</td>
<td>N.C. (SYJ3133)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Air operated (SYJA3130)</td>
<td>Air operated (SYJA3130)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table (2) How to Order Valve Plug Connector Assembly

DC

SY100-30-4A

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

ZS - 10 - 5A

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

ZS - 38 - 3 L

Example) ZR100-K15M-CN-Q - 1 pc.
SY100-30-4A-6 - 3 pcs.
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>Pilot valve 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>OFF</td>
<td>When power supply is cut off while the supply valve is ON, the operational state is held.</td>
</tr>
<tr>
<td>2. Vacuum release</td>
<td>OFF</td>
<td>ON</td>
<td>ON</td>
<td></td>
</tr>
<tr>
<td>3. Operation stop</td>
<td>OFF</td>
<td>OFF</td>
<td>ON</td>
<td></td>
</tr>
</tbody>
</table>

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

**How to Operate**

<table>
<thead>
<tr>
<th>Operation</th>
<th>Pilot valve operation</th>
<th>Supply valve/Release valve</th>
<th>Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Adsorption</td>
<td>ON</td>
<td>ON</td>
<td>Be careful for blowing off of workpieces or displacement of adsorption position in case of small and/or lightweight workpieces.</td>
</tr>
<tr>
<td>2. Vacuum release</td>
<td>OFF</td>
<td>OFF</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>Pilot valve 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>OFF</td>
<td>When power supply is stopped, all operations will be stopped.</td>
</tr>
<tr>
<td>2. Vacuum release</td>
<td>OFF</td>
<td>ON</td>
<td>ON</td>
<td></td>
</tr>
<tr>
<td>3. Operation stop</td>
<td>OFF</td>
<td>OFF</td>
<td>ON</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>Pilot valve operation</th>
<th>Supply valve/Release valve</th>
<th>Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Adsorption</td>
<td>ON</td>
<td>ON</td>
<td>Be careful for blowing off of workpieces or displacement of adsorption position in case of small and/or lightweight workpieces.</td>
</tr>
<tr>
<td>2. Vacuum release</td>
<td>OFF</td>
<td>OFF</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>Pilot valve operation</th>
<th>Supply valve</th>
<th>Release valve</th>
<th>Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Adsorption</td>
<td>Air operated a</td>
<td>ON</td>
<td>OFF</td>
<td>The product is used under the environment in which solenoid valves cannot be used or when the centralised control is applied using external pilot air.</td>
</tr>
<tr>
<td>2. Vacuum release</td>
<td>OFF</td>
<td>OFF</td>
<td>ON</td>
<td></td>
</tr>
<tr>
<td>3. Operation stop</td>
<td>OFF</td>
<td>OFF</td>
<td>OFF</td>
<td></td>
</tr>
</tbody>
</table>

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

**How to Operate**

<table>
<thead>
<tr>
<th>Operation</th>
<th>Pilot valve operation</th>
<th>Supply valve/Release valve</th>
<th>Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Adsorption</td>
<td>OFF</td>
<td>OFF</td>
<td>Be careful for blowing off of workpieces or displacement of adsorption position in case of small and/or lightweight workpieces.</td>
</tr>
<tr>
<td>2. Vacuum release</td>
<td>ON</td>
<td>ON</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 36 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**

![Pipe connection diagram]

### 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).

![Pipe connection diagram]

### Example of circuit diagram

**Example of circuit diagram**

---

**How to Order Function Plate Unit (For Pump System)**

**ZR1 – RV 3**

**Piping specifications**

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Symbol</th>
<th>PV port</th>
<th>PS/PD port</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>PV/PS</td>
<td>Individual</td>
</tr>
</tbody>
</table>

**How to order**

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

Example) ZR100-K15MZ-E-Q………1

* ZR1-RV3 ……………………1

---

**Caution**

Length of assembling mounting threads varies when adding function plate.

Order from the mounting thread parts list for unit combination on page 48.

Order a plug (ZXl-MP1) separately in order to plug the PD and PS ports that are no longer used due to the addition of function plate.
## Valve Unit: ZR1-V

### Specifications

<table>
<thead>
<tr>
<th>Valve unit part no.</th>
<th>ZR1-V-5MZ-LQ</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Components</th>
<th></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>
<td></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>
<td></td>
</tr>
</tbody>
</table>

- **PV port supply pressure**: -0.1 to 0.6 MPa (PS port pressure or less)
- **PD port supply pressure**: 0.05 to 0.6 MPa (PS port pressure or less)
- **PS port supply pressure**: 0.25 to 0.6 MPa
- **Supply pressure range of pilot pressure supply (PA, PB) ports for supply and release**
  - PS port pressure to 0.6 MPa
- **Main valve effective area (mm²)**
  - K1: 0.34 m²
  - K2: 0.27 m²
  - K3: 0.194 m²
- **Main valve effective area (Cv)**
  - C1: 0.22
  - C2: 0.174
  - C3: 0.21
- **Maximum operating frequency**: 5 Hz
- **Operating temperature range**: 5 to 50 °C
- **Standard Bracket B**

#### Note
- Combination of supply valve and release valve: K3, C2
- The supply and release valves of this product have a structure which uses the pressure of the pilot pressure supply (PS) port to operate them. Be sure to supply a pressure that is the pressure of the pilot pressure supply (PS) port or more and 0.6 MPa or less to the pilot pressure supply (PA, PB) ports for supply and release.

### Solenoid Valve/Specifications

| Solenoid | SYJ3133-, SYJ3233-,
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Rated voltage</td>
<td>24, 12, 6, 5, 3 VDC</td>
</tr>
<tr>
<td>Electrical entry</td>
<td>VDC-L/M plug connector, Grommet</td>
</tr>
<tr>
<td>Light/Surge voltage suppressor</td>
<td>Available, Not available (at grommet)</td>
</tr>
</tbody>
</table>

### Combination of Supply Valve and Release Valve

<table>
<thead>
<tr>
<th>Combination symbol</th>
<th>Vacuum switch valve</th>
<th>Release valve</th>
<th>Weight (kg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>K1</td>
<td>Double SOL. (SYJ3233-X126)</td>
<td>N.C. (SYJ3133)</td>
<td>0.34</td>
</tr>
<tr>
<td>K2</td>
<td>N.C. (SYJ3133)</td>
<td>N.C. (SYJ3133)</td>
<td>0.27</td>
</tr>
<tr>
<td>K3</td>
<td>Air operated (SYJA3130)</td>
<td>Air operated (SYJA3130)</td>
<td>0.194</td>
</tr>
<tr>
<td>C1</td>
<td>N.C. (SYJ3133)</td>
<td>Air operated (SYJA3130)</td>
<td>0.22</td>
</tr>
<tr>
<td>C2</td>
<td>Air operated (SYJA3130)</td>
<td></td>
<td>0.174</td>
</tr>
<tr>
<td>C3</td>
<td>N.C. (SYJ3133)</td>
<td>N.C. (SYJ3133)</td>
<td>0.21</td>
</tr>
</tbody>
</table>

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

### How to Order

**Refer to page 33 for further part no. information.**

#### ZR1 - V

- **Combination of vacuum valve and release valve**
- **Solenoid valve rated voltage**
- **Release flow rate adjusting needle/Bracket B**
- **Manual override**
- **With light/surge voltage suppressor**

#### 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
- **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 LCD (Red/Green), Sampling cycle: 5 times/sec.
- **Display accuracy**: ±0.1 % F.S. ±1 digit (Ambient temperature of 25 °C)

### Environment

- **Enclosure**: IP40
- **Operating temperature range**: Operating: 0 to 50 °C, Stored: –10 to 60 °C (No freezing or condensation)
- **Operating humidity range**: Operating/Stored: 35 to 85 % RH (No condensation)
- **Withstand voltage**: 1000 VAC for 1 minute between terminals and housing

#### Note

- **Temperature characteristics**: ±2 % F.S. (Based on 25 °C)

**Refer to page 17 for further specifications.**
Vacuum Pressure Switch : ZSE2-0R-

Specifications

<table>
<thead>
<tr>
<th>Fluid</th>
<th>Air</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rated pressure range/Set pressure range</td>
<td>-100 to 0.5 MPa</td>
</tr>
<tr>
<td>Proof pressure</td>
<td>600 kPa</td>
</tr>
<tr>
<td>Hysteresis</td>
<td>3 % F.S. or less (Fixed)</td>
</tr>
<tr>
<td>Temperature characteristics (Based on 25°C)</td>
<td>± 3 % F.S. or less</td>
</tr>
<tr>
<td>Operating voltage</td>
<td>12 to 24 VDC (Ripple ±10 % or less)</td>
</tr>
<tr>
<td>Output</td>
<td>NPN Open collector 30 V, 80 mA PNP Open collector 80 mA</td>
</tr>
<tr>
<td>Indicator light</td>
<td>Lights up when ON</td>
</tr>
<tr>
<td>Current consumption</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>
</tr>
<tr>
<td>Operating temperature range</td>
<td>5 to 50 °C</td>
</tr>
</tbody>
</table>

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

Refer to page 14 for further specifications.

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

Specifications

| Unit no. | ZR1-F-
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Rated pressure range/Set pressure range</td>
<td>-100 to 0.5 MPa</td>
</tr>
<tr>
<td>Operating temperature range</td>
<td>5 to 50 °C</td>
</tr>
<tr>
<td>Filtration degree</td>
<td>30 μm</td>
</tr>
<tr>
<td>Filtration material</td>
<td>PVF</td>
</tr>
<tr>
<td>Pressure switch for vacuum</td>
<td>Refer to pages 14 and 17 regarding pressure switch for vacuum.</td>
</tr>
<tr>
<td>Standard option</td>
<td>Bracket A (ZR1-OBA)</td>
</tr>
</tbody>
</table>

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

Refer to page 18 for further specifications.

Suction Filter : ZR1-FX-

Specifications

| Model | ZR1-FX-
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating pressure range</td>
<td>-0.1 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>Weight (with bracket)</td>
<td>0.1 kg</td>
</tr>
<tr>
<td>Standard option</td>
<td>Bracket C (ZR1-IBC)</td>
</tr>
</tbody>
</table>

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

Refer to page 20 for further specifications.

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.

Caution

⚠️ 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.
**Construction**

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

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Components</th>
<th>Model</th>
</tr>
</thead>
<tbody>
<tr>
<td>ZR1-VD</td>
<td>K1</td>
<td>5 M Z L Q</td>
</tr>
</tbody>
</table>

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

Refer to page 33 for further symbol specifications.

**Table (3) Pressure Switch for Vacuum + Suction Filter Unit**

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Components</th>
<th>Model</th>
</tr>
</thead>
<tbody>
<tr>
<td>ZR1-F</td>
<td>D</td>
<td></td>
</tr>
</tbody>
</table>

- Option (Connector/lead wire specifications)
- Unit specifications
- Combination of switch/filter

Refer to page 18 for further symbol specifications.

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

**Air operated**

**SYJA3130**

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Components</th>
<th>Model</th>
</tr>
</thead>
<tbody>
<tr>
<td>ZR1-SYJ3233</td>
<td></td>
<td>X126 - Q</td>
</tr>
</tbody>
</table>

- Solenoid valve
- Air operated N.C (SYJA3130)
- Refer to "How to Order" below.
- Supply: ZR1-SYJ3233-
- Release: ZR1-SYJ3133-

**SYJ3233**

- Rated voltage
- 5 VDC
- 6 VDC
- 12 VDC
- 24 VDC

**SYJ3133**

- Manual override
- Non-locking push type
- Slotted locking type
- Light/Surge voltage suppressor

Refer to page 33 for further symbol specifications.

**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>Double solenoid valve N.C. (SYJ3233)</td>
<td>SYJ3233</td>
</tr>
<tr>
<td></td>
<td>Single solenoid valve N.C. (SYJ3133)</td>
<td>SYJ3133</td>
</tr>
<tr>
<td></td>
<td>Refer to &quot;How to Order&quot; below. Supply: ZR1-SYJ3233-</td>
<td>X126</td>
</tr>
<tr>
<td></td>
<td>Release: ZR1-SYJ3133-</td>
<td></td>
</tr>
<tr>
<td>K3</td>
<td>Air operated N.C (SYJA3130)</td>
<td>SYJA3130</td>
</tr>
<tr>
<td></td>
<td>Air operated N.O (SYJA3130)</td>
<td>SYJA3130</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, a-knee, cyclohexane, trichloroethylene, sulfuric acid, lactic acid, water soluble cutting oil (alkaline), etc.

2. 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 (ZR1-ND-L) with lock nut is available.
Type K1
Vacuum valve: Double SOL.
Release valve: Single SOL. (N.C.)
ZR100-K1 □ M □ □ □ □ □ □ □ □

Note) + 1 Dimensions for mounting bracket A
Bracket A part no.: ZR1-0BA (Standard accessory)
**Type K1**
**ZR1-VK1**

**Circuit diagram**

A: Release flow adjusting needle with lock nut

(Note) *1: Dimensions for mounting bracket B
Bracket B part no.: ZR1-OBB
(Standard accessory)

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

**Circuit diagram**

A: Release flow adjusting needle with lock nut

★ Dimensions not indicated are identical to type K2.
Vacuum Pump System

Valve Unit

Type C1
ZR1-VC1□M□□-□

Circuit diagram

A: Release flow adjusting needle with lock nut

(Needle fully open)

Bracket B part number: ZR1-0BB
(Standard accessory)

Note) Dimensions ∗: For mounting bracket B

Type C2
ZR1-VC2-□

Circuit diagram

A: Release flow adjusting needle with lock nut

(Needle fully open)

Type C3
ZR1-VC3□M□□-□

Circuit diagram

Type C4
ZR1-VC4□M□□-□

Circuit diagram

DIMENSIONS NOT INDICATED ARE IDENTICAL TO DRAWINGS ABOVE.
Manifold Specifications/Vacuum Pump System

How to Order Manifold

**<Manifold base>**

**ZZR1 06**

- **Stations**: 01, 06
- **Thread type**: Rc, NPTF

**<Function plate>**

**ZR1 – RV3 – 1**

Arrangement

(Right valve station which is looked from valve side is first station.)

- 1 station only
- 6 stations only
- All stations

* When the spacers are attached to the specified locations, specify all spacers.

Example 2) Attached to the first and third stations.

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

Example 3) Attached to all stations.

- ZR1-RV3-A – 2

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

**<Individual spacer>**

**ZR1 – R1 – 1**

Arrangement

(Right valve station which is looked from valve side is first station.)

- 1 station only
- 6 stations only
- All stations

* When the spacers are attached to the specified locations, specify all spacers.

Example 4) Attached to the first and third stations.

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

**<Blanking plate>**

Example 4) Attached to the first and third stations.

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

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

### Individual Spacer

<table>
<thead>
<tr>
<th>Part no.</th>
<th>Port</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>ZR1-R1 to R16</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>

* 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.

### Note

- 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.

---

### 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.

### Weight (Manifold bases only)

Basic mass for one station is 0.28kg. Additional mass per one station is 0.12 kg.
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

<System circuit example>

<System circuit example>

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

<System circuit example>

<System circuit example>
**Vacuum Pump System**

<table>
<thead>
<tr>
<th>Symbol</th>
<th>L1</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>

**Stations (mm)**

- L1: 52, 71, 1
- L2: 31, 50, 80

**Manifold**

- Vacuum (V) port
- Common Exhaust (EXH) port
- Common Vacuum pressure supply (PV) port
- Common Release pressure supply (PD) port
- Common Pilot pressure supply (PS) port

**Vacuum Switch**

- Pressure setting trimmer

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

(Needle fully open)

*The common exhaust (EXH) port is also used as the pilot pressure exhaust (PE) port of the pilot valve. Use while the port is open to the atmosphere.*
Mounting Thread Parts List for Unit Combination

### Manifold Specifications

<table>
<thead>
<tr>
<th>Components</th>
<th>Valve unit + Ejector unit + Pressure switch for vacuum/Filter unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>No.</td>
<td>Combination specifications</td>
</tr>
<tr>
<td>1</td>
<td>Standard (without options)</td>
</tr>
<tr>
<td>1</td>
<td>With individual spacer</td>
</tr>
<tr>
<td>1</td>
<td>With function plate</td>
</tr>
<tr>
<td>1</td>
<td>With individual spacer + with function plate</td>
</tr>
<tr>
<td>2</td>
<td>Individual, common and port exhaust style for nozzle size 10, 13</td>
</tr>
<tr>
<td>2</td>
<td>Common and port exhaust style for nozzle size 15</td>
</tr>
<tr>
<td>2</td>
<td>Individual exhaust style for nozzle size 15</td>
</tr>
<tr>
<td>2</td>
<td>Individual exhaust style for nozzle size 18, 20</td>
</tr>
<tr>
<td>3</td>
<td>For vacuum switch and adapter A</td>
</tr>
<tr>
<td>4</td>
<td>For nozzle size 10, 13, 15</td>
</tr>
<tr>
<td>4</td>
<td>For nozzle size 18, 20</td>
</tr>
<tr>
<td>5</td>
<td>For nozzle size 10, 13, 15</td>
</tr>
<tr>
<td>5</td>
<td>For nozzle size 18, 20</td>
</tr>
<tr>
<td>5</td>
<td>For nozzle size 10, 13, 15 (For ZSE30A spec.)</td>
</tr>
<tr>
<td>5</td>
<td>For nozzle size 18, 20 (For ZSE30A spec.)</td>
</tr>
<tr>
<td>6</td>
<td>For nozzle size 10, 13, 15</td>
</tr>
<tr>
<td>6</td>
<td>For nozzle size 18, 20</td>
</tr>
<tr>
<td>7</td>
<td>Standard (without options)</td>
</tr>
<tr>
<td>7</td>
<td>With individual spacer</td>
</tr>
<tr>
<td>8</td>
<td>For nozzle size 10, 13, 15</td>
</tr>
<tr>
<td>8</td>
<td>For nozzle size 18, 20</td>
</tr>
<tr>
<td>8</td>
<td>For nozzle size 10, 13, 15 (For ZSE30A spec.)</td>
</tr>
<tr>
<td>8</td>
<td>For nozzle size 18, 20 (For ZSE30A spec.)</td>
</tr>
<tr>
<td>9</td>
<td>For nozzle size 10, 13, 15</td>
</tr>
<tr>
<td>9</td>
<td>For nozzle size 18, 20</td>
</tr>
<tr>
<td>9</td>
<td>For nozzle size 18, 20 + with function plate</td>
</tr>
<tr>
<td>9</td>
<td>For nozzle size 10, 13, 15 + with function plate</td>
</tr>
<tr>
<td>9</td>
<td>For nozzle size 18, 20 + with function plate</td>
</tr>
<tr>
<td>10</td>
<td>For nozzle size 10, 13, 15</td>
</tr>
<tr>
<td>10</td>
<td>For nozzle size 18, 20</td>
</tr>
<tr>
<td>10</td>
<td>For nozzle size 10, 13, 15 + with function plate</td>
</tr>
<tr>
<td>10</td>
<td>For nozzle size 18, 20 + with function plate</td>
</tr>
</tbody>
</table>

### Without Manifold

<table>
<thead>
<tr>
<th>Components</th>
<th>Ejector unit + Pressure switch for vacuum/Filter unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>No.</td>
<td>Combination specifications</td>
</tr>
<tr>
<td>11</td>
<td>Standard (without options)</td>
</tr>
<tr>
<td>11</td>
<td>With individual spacer</td>
</tr>
<tr>
<td>11</td>
<td>With function plate</td>
</tr>
<tr>
<td>11</td>
<td>With individual spacer + with function plate</td>
</tr>
</tbody>
</table>

### Notes

1. BA00601 (M12 x 12 screws/Hexagon socket head set screws) in until the head aligns with the manifold base surface.
2. The manifold base not assembled with the unit does not include BA00601. Please order them separately.

### Precautions

- Be sure to read before handling.
- Refer to back page for Safety Instructions.
Vacuum Pump System

Mounting Thread Parts List for Unit Combination

### Components

| Valve unit + Pressure switch for vacuum / Filter unit |

### Mounting Thread Parts List for Unit Combination

<table>
<thead>
<tr>
<th>No.</th>
<th>Combination specifications</th>
<th>Assembly part number</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Standard (Without options)</td>
<td>ZR1-SR2-33-A (a set of six threads)</td>
</tr>
<tr>
<td>2</td>
<td>With individual spacer</td>
<td>ZR1-SR2-37-A (a set of six threads)</td>
</tr>
<tr>
<td>3</td>
<td>With function plate</td>
<td>ZR1-SR2-39-A (a set of six threads)</td>
</tr>
<tr>
<td>4</td>
<td>With individual spacer + with function plate</td>
<td>ZR1-SR2-41-A (a set of six threads)</td>
</tr>
<tr>
<td>5</td>
<td>For vacuum switch and adapter A</td>
<td>ZR1-SR2-41-A (a set of two threads)</td>
</tr>
<tr>
<td>6</td>
<td>Standard (Without options)</td>
<td>ZR1-SR2-5-A (a set of six threads)</td>
</tr>
<tr>
<td>7</td>
<td>With individual spacer</td>
<td>ZR1-SR2-8-A (a set of six threads)</td>
</tr>
<tr>
<td>8</td>
<td>Standard (Without options)</td>
<td>ZR1-SR2-49-A (a set of four threads)</td>
</tr>
<tr>
<td>9</td>
<td>Standard (Without options) [For ZSE30A spec.]</td>
<td>ZR1-SR2-66-A (a set of four threads)</td>
</tr>
<tr>
<td>10</td>
<td>Standard (Without options)</td>
<td>ZR1-SR2-33-1A (a set of two threads)</td>
</tr>
<tr>
<td>11</td>
<td>With function plate</td>
<td>ZR1-SR2-35-A (a set of two threads)</td>
</tr>
<tr>
<td>12</td>
<td>Standard (Without options)</td>
<td>ZR1-SR2-18-A (a set of six threads)</td>
</tr>
<tr>
<td>13</td>
<td>Standard (Without options)</td>
<td>ZR1-SR2-35-1A (a set of two threads)</td>
</tr>
<tr>
<td>14</td>
<td>With function plate</td>
<td>ZR1-SR2-35-A (a set of four threads)</td>
</tr>
<tr>
<td>15</td>
<td>Standard (Without options) [For ZSE30A spec.]</td>
<td>ZR1-SR2-35-1A (a set of four threads)</td>
</tr>
<tr>
<td>16</td>
<td>With function plate</td>
<td>ZR1-SR2-35-A (a set of four threads)</td>
</tr>
<tr>
<td>16™</td>
<td>Standard</td>
<td>BA00601 (M12 x 12)</td>
</tr>
</tbody>
</table>

**Note 1)** BA00601 (M12 x 12 screws/Hexagon socket head set screws) in until the head aligns with the manifold base surface.

**Note 2)** The manifold base not assembled with the unit does not include BA00601. Please order them separately.

Note 2): When the valve unit is assembled from a single unit function to a manifold function, 3 pcs. of ZX1-MP1 for PS, PD, PE ports and 1 pc. of TB00148 for PV port are required.
**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.

For Vacuum pressure switch (ZSE2)

**NPN open collector (1 output)**

For Digital pressure switch for vacuum (ZSE30A)

**PNP open collector (1 output)**

- **For Vacuum pressure switch (ZSE2)**
  - NPN open collector (1 output)
  - PNP open collector (1 output)

- **For Digital pressure switch for vacuum (ZSE30A)**
  - NPN open collector (1 output)
  - PNP open collector (1 output)

- **A NPN open collector (2 outputs)**

- **B PNP open collector (2 outputs)**

- **C NPN open collector (1 output) + Analogue voltage output**

- **D NPN open collector (1 output) + Analogue current output**

- **E PNP open collector (1 output) + Analogue voltage output**

- **F PNP open collector (1 output) + Analogue current output**

* The FUNC terminal is connected when using the copy function. (Refer to the operation manual of the ZSE30A series.)
Safety Instructions

These safety instructions are intended to prevent hazardous situations and/or equipment damage. These instructions indicate the level of potential hazard with the labels of “Caution,” “Warning,” or “Danger.” They are all important notes for safety and must be followed in addition to International Standards (ISO/IEC)\(^1\), and other safety regulations.

1) ISO 4414: Pneumatic fluid power – General rules relating to systems.
ISO 4413: Hydraulic fluid power – General rules relating to systems.
IEC 60204-1: Safety of machinery – Electrical equipment of machines.
(Part 1: General requirements)
ISO 10218-1: Manipulating industrial robots - Safety.

Caution:
Caution indicates a hazard with a low level of risk which, if not avoided, could result in minor or moderate injury.

Warning:
Warning indicates a hazard with a medium level of risk which, if not avoided, could result in death or serious injury.

Danger:
Danger indicates a hazard with a high level of risk which, if not avoided, will result in death or serious injury.

Warning

1. The compatibility of the product is the responsibility of the person who designs the equipment or decides its specifications.
   Since the product specified here is used under various operating conditions, its compatibility with specific equipment must be decided by the person who designs the equipment or decides its specifications based on necessary analysis and test results.
   The expected performance and safety assurance of the equipment will be the responsibility of the person who has determined its compatibility with the product. This person should also continuously review all specifications of the product referring to its latest catalogue information, with a view to giving due consideration to any possibility of equipment failure when configuring the equipment.

2. Only personnel with appropriate training should operate machinery and equipment.
   The product specified here may become unsafe if handled incorrectly. The assembly, operation and maintenance of machines or equipment including our products must be performed by an operator who is appropriately trained and experienced.

3. Do not service or attempt to remove product and machinery/equipment until safety is confirmed.
   1. The inspection and maintenance of machinery/equipment should only be performed after measures to prevent falling or runaway of the driven objects have been confirmed.
   2. When the product is to be removed, confirm that the safety measures as mentioned above are implemented and the power from any appropriate source is cut, and read and understand the specific product precautions of all relevant products carefully.
   3. Before machinery/equipment is restarted, take measures to prevent unexpected operation and malfunction.

4. Contact SMC beforehand and take special consideration of safety measures if the product is to be used in any of the following conditions.
   1. Conditions and environments outside of the given specifications, or use outdoors or in a place exposed to direct sunlight.
   2. Installation on equipment in conjunction with atomic energy, railways, air navigation, space, shipping, vehicles, military, medical treatment, combustion and recreation, or equipment in contact with food and beverages, emergency stop circuits, clutch and brake circuits in press applications, safety equipment or other applications unsuitable for the standard specifications described in the product catalogue.
   3. An application which could have negative effects on people, property, or animals requiring special safety analysis.
   4. Use in an interlock circuit, which requires the provision of double interlock for possible failure by using a mechanical protective function, and periodical checks to confirm proper operation.

Caution

1. The product is provided for use in manufacturing industries.
   The product herein described is basically provided for peaceful use in manufacturing industries. If considering the product in other industries, consult SMC beforehand and exchange specifications or a contract if necessary.
   If anything is unclear, contact your nearest sales branch.

Limited warranty and Warranty/Compliance Requirements

The product used is subject to the following “Limited warranty and Disclaimer” and “Compliance Requirements.” Read and accept them before using the product.

Limited warranty and Disclaimer

1. The warranty period of the product is 1 year in service or 1.5 years after the product is delivered, whichever is first.\(^2\)
   Also, the product may have specified durability, running distance or replacement parts. Please consult your nearest sales branch.

   2. For any failure or damage reported within the warranty period which is clearly our responsibility, a replacement product or necessary parts will be provided. This limited warranty applies only to our product independently, and not to any other damage incurred due to the failure of the product.

   3. Prior to using SMC products, please read and understand the warranty terms and disclaimers noted in the specified catalogue for the particular products.

   \(^2\) Vacuum pads are excluded from this 1 year warranty.
   A vacuum pad is a consumable part, so it is warranted for a year after it is delivered. Also, even within the warranty period, the wear of a product due to the use of the vacuum pad or failure due to the deterioration of rubber material are not covered by the limited warranty.

Compliance Requirements

1. The use of SMC products with production equipment for the manufacture of weapons of mass destruction (WMD) or any other weapon is strictly prohibited.

   2. The exports of SMC products or technology from one country to another are governed by the relevant security laws and regulations of the countries involved in the transaction. Prior to the shipment of a SMC product to another country, assure that all local rules governing that export are known and followed.

Safety Instructions | Be sure to read “Handling Precautions for SMC Products” (M-E03-3) before using.

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