New Models! ZL212 large flow rate type and ZL112 with valve.
Multistage Ejector

Series ZL112/212

Energy saving, large flow rate, 3 stage diffuser construction

Suction flow rate increased 250% and air consumption reduced 20% with 3 stage diffuser construction

(Versus ø1.3, one stage model)

<table>
<thead>
<tr>
<th>Series</th>
<th>Maximum suction flow rate Q1 (l/min)</th>
<th>Air consumption Q1 (l/min)</th>
</tr>
</thead>
<tbody>
<tr>
<td>ZL112</td>
<td>100</td>
<td>63</td>
</tr>
<tr>
<td>ZL212</td>
<td>200</td>
<td>126</td>
</tr>
</tbody>
</table>

Series ZL12

Diffusers stacked and integrated
Compact size and large flow rate
(twice the flow rate of the ZL112)

Series ZL112 valve option now available (ZL112 only)

Vacuum pressure sensor

- With adaptor for vacuum
- With vacuum pressure gauge

Digital vacuum pressure switch

Rated pressure range: 0.0 to –101.0 kPa
3-step setting

1. Push
2. [Set-value] with buttons.
3. Push

Power-saving function
Power consumption is reduced by turning off the monitor. (Reduce power consumption by up to 20%.)

* For series ZSE30A, refer to the separate catalogue for details.

Features
How to Order

**Without valve**

| ZL1 | 12 |   |   |   |   | Q |

**With valve**

| ZL1 | 12 | K1 | 5 | M | Z | D | P | Q |

**Nozzle diameter**

12 ø1.2mm

**Exhaust specifications**

- Built-in silencer
- Port exhaust

**Exhaust port thread specifications**

(port exhaust only)

- Rc1/2
- G1/2
- N 1/2-14NPT
- T 1/2-14NPTF

**Supply valve/Release valve combination**

- K1 With supply and release valves
- K2 With supply valve

**Lead wire specifications**

- None
- 2 m

**Output specifications**

- 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 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

**Vacuum pressure sensor**

- None
- GN Vacuum adapter Rc1/8
- G With vacuum pressure gauge
- D With digital vacuum pressure switch ZSE30A

**Manual override**

- None
- Non-locking push type
- D Slotted locking type

**Light/Surge voltage suppressor**

- None
- Without light/surge voltage suppressor
- S With surge voltage suppressor
- Z With light/surge voltage suppressor
- U With light/surge voltage suppressor (non-polar type)

**Electrical entry**

- G Grommet
- H Lead wire length 0.3m
- L Lead wire length 0.6m
- LN Without lead wires
- LO Without connector
- M Lead wire length 0.3m
- MN Without lead wires
- MO Without connector

**Tensión nominal**

DC specifications

- 1 100VAC
- 2 200VAC
- 3 110VAC (115V)
- 4 220VAC (230V)

**Exhaust specifications**

- Built-in silencer
- Port exhaust

**Exhaust port thread specifications**

(port exhaust only)

- Rc1/2
- G1/2
- N 1/2-14NPT
- T 1/2-14NPTF

**Supply valve/Release valve combination**

- K1 With supply and release valves
- K2 With supply valve

**Lead wire specifications**

- None
- 2 m

**Output specifications**

- 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 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

**Vacuum pressure sensor**

- None
- GN Vacuum adapter Rc1/8
- G With vacuum pressure gauge
- D With digital vacuum pressure switch ZSE30A

**Manual override**

- None
- Non-locking push type
- D Slotted locking type

**Light/Surge voltage suppressor**

- None
- Without light/surge voltage suppressor
- S With surge voltage suppressor
- Z With light/surge voltage suppressor
- U With light/surge voltage suppressor (non-polar type)

**Electrical entry**

- G Grommet
- H Lead wire length 0.3m
- L Lead wire length 0.6m
- LN Without lead wires
- LO Without connector
- M Lead wire length 0.3m
- MN Without lead wires
- MO Without connector

Note 1) Type U is 24 or 12VDC only.
Note 2) Since surge voltage is prevented by a rectifier in the case of AC, there is no “S” type.
Series ZL

Ejector Specifications

<table>
<thead>
<tr>
<th>Model</th>
<th>ZL112</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nozzle diameter</td>
<td>ø1.2mm</td>
</tr>
<tr>
<td>Maximum suction flow rate</td>
<td>100ℓ/min (ANR)</td>
</tr>
<tr>
<td>Air consumption</td>
<td>63ℓ/min (ANR)</td>
</tr>
<tr>
<td>Maximum vacuum pressure</td>
<td>–84kPa</td>
</tr>
<tr>
<td>Maximum operating pressure</td>
<td>0.7MPa</td>
</tr>
<tr>
<td>Supply pressure range</td>
<td>0.2 to 0.5MPa</td>
</tr>
<tr>
<td>Standard supply pressure</td>
<td>0.4MPa</td>
</tr>
<tr>
<td>Operating temperature range</td>
<td>5 to 50°C</td>
</tr>
</tbody>
</table>

Supply/Release Valve Specifications

<table>
<thead>
<tr>
<th>Part Number</th>
<th>SYJ514-□□□□□</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type of valve actuation</td>
<td>N.C.</td>
</tr>
<tr>
<td>Fluid</td>
<td>Air</td>
</tr>
<tr>
<td>Operating pressure range</td>
<td>0.15 to 0.7MPa</td>
</tr>
<tr>
<td>Ambienet and fluid temperature</td>
<td>-10 to 50°C (No freezing)</td>
</tr>
<tr>
<td>Response time (for 0.5MPa) Note 1)</td>
<td>25ms or less</td>
</tr>
<tr>
<td>Maximum operating frequency</td>
<td>5Hz</td>
</tr>
<tr>
<td>Manual operation</td>
<td>Non-locking push type, Slotted locking type</td>
</tr>
<tr>
<td>Pilot exhaust type</td>
<td>Pilot valve individual exhaust type, Main valve/Pilot valve common exhaust</td>
</tr>
<tr>
<td>Lubrication</td>
<td>Not required</td>
</tr>
<tr>
<td>Mounting position</td>
<td>Unrestricted</td>
</tr>
<tr>
<td>Impact/Vibration resistance Note 2)</td>
<td>150/30m/s²</td>
</tr>
<tr>
<td>Enclosure</td>
<td>Dust proof</td>
</tr>
</tbody>
</table>

Note 1) Based on JIS B8374-1981 dynamic performance test. (coil temperature 20°C, at rated voltage, without surge voltage suppressor)

Note 2) Impact resistance: No malfunction when tested with a drop tester in the axial direction and at a right angle to the main valve and armature, one time each in both energized and deenergized states. (initial value)

Vibration resistance: No malfunction when tested with one sweep of 45 to 2000Hz in the axial direction and at a right angle to the main valve and armature, one time each in both energized and deenergized states. (initial value)

Note 3) Refer to SYJ300/500/700 catalogue for details on valves.

Option Specifications

Vacuum pressure gauge specifications

<table>
<thead>
<tr>
<th>Part number</th>
<th>GZ30S</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fluid</td>
<td>Air</td>
</tr>
<tr>
<td>Pressure range</td>
<td>-100 to 100kPa</td>
</tr>
<tr>
<td>Scale range (angular)</td>
<td>230</td>
</tr>
<tr>
<td>Accuracy</td>
<td>± 3% F.S. (full span)</td>
</tr>
<tr>
<td>Class</td>
<td>Class 3</td>
</tr>
<tr>
<td>Operating temperature range</td>
<td>0 to 50°C</td>
</tr>
<tr>
<td>Material</td>
<td>Housing: Polycarbonate/ABS resin</td>
</tr>
</tbody>
</table>

Weight

<table>
<thead>
<tr>
<th>Weight</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>ZL112 (Basic)</td>
<td>450 g</td>
</tr>
<tr>
<td>Port exhaust</td>
<td>+110 g</td>
</tr>
<tr>
<td>Digital pressure switch for vacuum (Excluding lead wire)</td>
<td>+43 g</td>
</tr>
<tr>
<td>Digital pressure switch for vacuum (Including 3 cores lead wire)</td>
<td>+81 g</td>
</tr>
<tr>
<td>Digital pressure switch for vacuum (Including 4 cores lead wire)</td>
<td>+85 g</td>
</tr>
<tr>
<td>Valve (per 1 pc.)</td>
<td>+45 g</td>
</tr>
</tbody>
</table>
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, 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
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)
Window comparator mode | Output voltage (Rated pressure range): 1 to 5 V ±2.5% F.S.
Linearly | ±1% F.S. or less
Output impedance | Approx. 1 kΩ
Load current (Rated pressure range): 4 to 20 mA ±2.5% F.S.
Linearly | ±1% F.S. or less
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-color 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)
Enclosure | IP40
Operating temperature range | Operating: 0 to 50°C, Stored: –10 to 60°C (No freezing or condensation)
Operating humidity range | Operating/Storage: 30 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
Temperature characteristics | ±2% F.S. (Based on 25°C)
Lead wire | Oilproof heavy-duty vinyl cable, 3 cores ø3.5, 2 m
| 4 cores Conductor area: 0.15 mm² (AWG26)
| Insulator O.D.: 1.0 mm
Standards | CE Marking, UL/CSA, RoHS compliance

Note 1) When analogue voltage output is selected, analogue current output cannot be used together.
Note 2) When analogue current output is selected, analogue voltage output cannot be used together.

How to Order Suction Filter Assembly

It is impossible to replace only the vacuum pressure switch. Please replace the suction filter assembly.

ZL 12 – SC –

Ejector size
Vacuum pressure sensor
Lead wire specifications

Output specifications

(Applicable only when the vacuum pressure sensor specification is “D” for digital pressure switch for vacuum)

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 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

Note

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

For details about vacuum pressure switch functions, refer to the Operation Manual for Series ZSE30A that can be downloaded from our website (http://www.smceu.com).

Digital pressure switch
Series ZSE30A

ZSE30A – 00 –

Digital pressure switch
Series ZL

ZL 12 – SC – D

Output specifications

Lead wire specifications

(Applicable only when the vacuum pressure sensor specification is “D” for digital pressure switch for vacuum)

L Lead wire with connector

Note 1) When analogue voltage output is selected, analogue current output cannot be used together.
Note 2) When analogue current output is selected, analogue voltage output cannot be used together.
### Component Parts

<table>
<thead>
<tr>
<th>No.</th>
<th>Description</th>
<th>Part no.</th>
<th>Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Suction cover</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Front cover</td>
<td></td>
<td>Without valve</td>
</tr>
<tr>
<td>3</td>
<td>End cover</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Body</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Vacuum sensor unit</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Nozzle</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Diffuser</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Detent plug</td>
<td></td>
<td>Other than vacuum switch</td>
</tr>
<tr>
<td>9</td>
<td>Lead wire cover</td>
<td></td>
<td>Vacuum switch specifications</td>
</tr>
<tr>
<td>12</td>
<td>Front cover B</td>
<td>SYJ514-□□□</td>
<td>With valve</td>
</tr>
<tr>
<td>13</td>
<td>Valve plate</td>
<td>SYJ514-□□□</td>
<td>With valve</td>
</tr>
<tr>
<td>14</td>
<td>Needle</td>
<td>SYJ514-□□□</td>
<td>With valve</td>
</tr>
<tr>
<td>15</td>
<td>Supply valve (N.C.)</td>
<td>SYJ514-□□□</td>
<td>With valve</td>
</tr>
<tr>
<td>16</td>
<td>Release valve (N.C.)</td>
<td>SYJ514-□□□</td>
<td>With valve</td>
</tr>
<tr>
<td>17</td>
<td>Connector assembly</td>
<td>SYJ100-30-□□□</td>
<td>With valve (Table1.)</td>
</tr>
</tbody>
</table>

### Replacement Parts

<table>
<thead>
<tr>
<th>No.</th>
<th>Description</th>
<th>Material</th>
<th>Part no.</th>
</tr>
</thead>
<tbody>
<tr>
<td>9</td>
<td>Sound absorbing material B</td>
<td>PVF</td>
<td>ZL112-SP01 (Set no. for 9, 10 &amp; 11)</td>
</tr>
<tr>
<td>10</td>
<td>Sound absorbing material A</td>
<td>PVF</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>Suction filter</td>
<td>PE</td>
<td></td>
</tr>
</tbody>
</table>

### Table 1. How to order connector assembly

- For DC: SY100-30-4A
- For 100 VAC: SY100-30-1A
- For other AC: SY100-30-3A

#### Lead wire length

- Nil: 3000mm (Standard)
- 6: 600mm
- 10: 1000mm
- 15: 1500mm
- 20: 2000mm
- 25: 2500mm
- 30: 3000mm
- 50: 5000mm
Multistage Ejector  
Series ZL

Dimensions/Series ZL112 (without Valve)

Standard ZL112

Port exhaust ZL112P

With vacuum pressure gauge ZL112-G

With vacuum adapter ZL112-GN

With digital vacuum pressure switch ZL112-D

Section A with digital vacuum pressure switch

ZL112-D (ZSE30A)

Scale: 40%
### Dimensions/Series ZL112 (with Valve)

#### With supply valve and release valve

**ZL112-K1□□□□-D□□□**

**Circuit diagram**

- **Release flow adjusting needle**
- **Vacuum port (V)**
- **Applicable tubing O.D. 12**
- **2 x ø5.4 Mounting hole**
- **Air pressure supply port (P)**
- **Applicable tubing O.D. 6**

**Name plate**

- **4 x M4 x 0.7**
- **Thread depth 8 (For mounting)**

**Supply valve**

- **Digital vacuum pressure switch**
- **Exhaust port**
- **2 x ø5.4 Mounting hole**

**Blanking plate assembly (SYJ500-10-3A)**

**Digital pressure switch for vacuum**

- **2 x ø5.4**
- **Mounting hole**

**Scale: 40%**

#### With supply valve

**ZL112-K2□□□□-D□□□**

**Circuit diagram**

- **Supply valve**
- **Release valve**
- **50**
- **166**
- **117**
- **4.5**

**Exhaust port**

- **Digital vacuum pressure switch**

**Blanking plate assembly (SYJ500-10-3A)**

**Supply valve**
Multistage Ejector
Series ZL212

How to Order

ZL2 12 [-] [-] [-Q]

Nozzle diameter
12 ø1.2mm

Lead wire specifications
L 2 m

Note) Applicable only when the vacuum pressure sensor specification is “D” for digital pressure switch for vacuum.

Exhaust specifications
- Built-in silencer
- Port exhaust

Output specifications

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Specifications/Contents</th>
</tr>
</thead>
<tbody>
<tr>
<td>GN</td>
<td>Adaptor Rc1/8</td>
</tr>
<tr>
<td>G</td>
<td>With vacuum pressure gauge</td>
</tr>
<tr>
<td>D</td>
<td>With digital vacuum pressure switch ZSE30A</td>
</tr>
</tbody>
</table>

Made to Order
(Refer to page 17 for details.)

Symbol | Specifications/Contents
X132   | Supply valve/Vacuum release valve

Ejector Specifications

<table>
<thead>
<tr>
<th>Model</th>
<th>ZL212</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nozzle diameter</td>
<td>ø1.2mm x 2</td>
</tr>
<tr>
<td>Maximum suction flow rate</td>
<td>200l/min (ANR)</td>
</tr>
<tr>
<td>Air consumption</td>
<td>126l/min (ANR)</td>
</tr>
<tr>
<td>Maximum vacuum pressure</td>
<td>-84kPa</td>
</tr>
<tr>
<td>Maximum operating pressure</td>
<td>0.7MPa</td>
</tr>
<tr>
<td>Supply pressure range</td>
<td>0.2 to 0.5MPa</td>
</tr>
<tr>
<td>Standard supply pressure</td>
<td>0.4MPa</td>
</tr>
<tr>
<td>Operating temperature range</td>
<td>5 to 50°C</td>
</tr>
</tbody>
</table>

Weight

<table>
<thead>
<tr>
<th>Model</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>ZL212</td>
<td>700 g</td>
</tr>
<tr>
<td>Port exhaust</td>
<td>+300 g</td>
</tr>
<tr>
<td>Digital pressure switch for vacuum (Excluding lead wire)</td>
<td>+43 g</td>
</tr>
<tr>
<td>Digital pressure switch for vacuum (Including 3 cores lead wire)</td>
<td>+81 g</td>
</tr>
<tr>
<td>Digital pressure switch for vacuum (Including 4 cores lead wire)</td>
<td>+85 g</td>
</tr>
<tr>
<td>Valve (per 1 pc.)</td>
<td>+45 g</td>
</tr>
</tbody>
</table>
### Parts list

<table>
<thead>
<tr>
<th>No.</th>
<th>Description</th>
<th>Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Suction cover</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Front cover A</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>End plate</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Body</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Vacuum sensor unit</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Nozzle</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Diffuser</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Detent plug</td>
<td>Other than vacuum switch</td>
</tr>
<tr>
<td></td>
<td>Lead wire cover</td>
<td>Vacuum switch specifications</td>
</tr>
</tbody>
</table>

### Replacement parts

<table>
<thead>
<tr>
<th>No.</th>
<th>Description</th>
<th>Material</th>
<th>Part No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>9</td>
<td>Sound absorbing material A</td>
<td>PVF</td>
<td>ZL212-SP01 (Set no. for 9 &amp; 10)</td>
</tr>
<tr>
<td>10</td>
<td>Sound absorbing material</td>
<td>PVF</td>
<td></td>
</tr>
</tbody>
</table>
These safety instructions are intended to prevent a hazardous situation and/or equipment damage. These instructions indicate the level of potential hazard by labels of "Caution", "Warning" or "Danger". To ensure safety, be sure to observe ISO 4414 Note 1), JIS B 8370 Note 2) and other safety practices.

⚠️ **Caution**: Operator error could result in injury or equipment damage.

⚠️ **Warning**: Operator error could result in serious injury or loss of life.

⚠️ **Danger**: In extreme conditions, there is a possible result of serious injury or loss of life.

### Note 1)
ISO 4414: Pneumatic fluid power – Recommendations for the application of equipment to transmission and control systems.

### Note 2)
JIS B 8370: General Rules for Pneumatic Systems

---

### Warning

1. **The compatibility of pneumatic equipment is the responsibility of the person who designs the pneumatic system or decides its specifications.**
   
   Since the products specified here are used in various operating conditions, their compatibility for the specific pneumatic system must be based on specifications or after analysis and/or tests to meet your specific requirements.

2. **Only trained personnel should operate pneumatically operated machinery and equipment.**
   
   Compressed air can be dangerous if an operator is unfamiliar with it. Assembly, handling or repair of pneumatic systems should be performed by trained and experienced operators.

3. **Do not service machinery/equipment or attempt to remove components until safety is confirmed.**
   
   1. Inspection and maintenance of machinery/equipment should only be performed after confirmation of safe locked-out control positions.
   2. When equipment is to be removed, confirm the safety process as mentioned above. Cut the supply pressure for this equipment and exhaust all residual compressed air in the system.
   3. Before machinery/equipment is restarted, take measures to prevent shooting-out of cylinder piston rod, etc. (Bleed air into the system gradually to create back pressure.)

4. **Contact SMC if the product is to be used in any of the following conditions:**
   
   1. Conditions and environments beyond the given specifications, or if product is used outdoors.
   2. Installation on equipment in conjunction with atomic energy, railway, air navigation, vehicles, medical equipment, food and beverages, recreation equipment, emergency stop circuits, press applications, or safety equipment.
   3. An application which has the possibility of having negative effects on people, property, or animals, requiring special safety analysis.
1. Confirm the specifications.

The products appearing in this catalog are designed for use only in compressed air systems (including vacuum).
Do not use outside the specified ranges of pressure, temperature, etc., as this may cause damage or faulty operation. (Refer to specifications.)
Consult with SMC if fluids other than compressed air (including vacuum) are to be used.

2. Selection

Air Supply

1. Types of air

Do not use compressed air containing chemicals, synthetic oil which includes organic solvents, salt, corrosive gases, etc., as this may cause damage or malfunction.

Operating Environment

1. Do not operate in locations having an atmosphere of corrosive gases, chemicals, sea water, fresh water or water vapor, or where there will be contact with the same.
2. In locations which receive direct sunlight, the sunlight should be blocked.
3. Do not operate in locations where vibration or impact occurs.
4. Do not operate in locations near heat sources where radiated heat will be received.

3. Drain management

If the air filter drains are not flushed regularly, the drainage will flow downstream from the drains and this may lead to the malfunction of pneumatic equipment.
In cases where the management of drain flushing will be difficult, the use of filters with automatic drains is recommended.
For details on the qualities of compressed air, refer to SMC’s “Air Cleaning Equipment” catalog.

4. Maintenance

1. Maintenance should be performed in accordance with procedures in the instruction manual.
Improper handling may cause damage or malfunction of equipment or machinery.
2. Maintenance work
Improper handling of compressed air is dangerous. Therefore, in addition to observing the product specifications, replacement of elements and other maintenance activities should be performed by personnel having sufficient knowledge and experience pertaining to pneumatic equipment.
3. Drain flushing
Drainage should be flushed from air filter and other drains on a regular basis. (Refer to specifications.)
4. Pre-maintenance inspection
When removing this product, turn off the electric power and be certain to shut off the supply pressure and exhaust the compressed air in the system. Proceed only after confirming that all pressure has been released to the atmosphere.
5. Post maintenance inspection
After installation, repair or reconstruction, reconnect pressurized air and electric power, and then perform inspections for proper operation and air leakage. If the sound of air leakage can be heard, or if the equipment does not operate properly, stop operation and confirm that it is mounted correctly.
6. Disassembly and alteration prohibited.
Do not disassemble the unit or make any alterations to it.

4. Piping

1. Preparation before piping
Before piping is connected, it should be thoroughly blown out with air (flushing) or washed to remove chips, cutting oil and other debris from inside the pipe.
2. Wrapping of pipe tape
When screwing together pipes and fittings, etc., be certain that chips from the pipe threads and sealing material do not get inside the piping.
Further, when pipe tape is used, leave 1.5 to 2 thread ridges exposed at the end of the threads.

Maintenance

1. Types of fluid
This product is designed for use with pressurized air. Consult with SMC if a different fluid is to be used.
Consult SMC regarding products to be used with general purpose fluids, to confirm which fluids may be used.

2. When there is a large amount of drainage
Pressurized air containing a large amount of drainage can cause the malfunction of pneumatic equipment. An air dryer or Drain Catch should be installed upstream from filters.

3. Drainage

Drainage should be flushed from air filter and other drains on a regular basis. (Refer to specifications.)

4. Pre-maintenance inspection
When removing this product, turn off the electric power and be certain to shut off the supply pressure and exhaust the compressed air in the system. Proceed only after confirming that all pressure has been released to the atmosphere.

5. Post maintenance inspection
After installation, repair or reconstruction, reconnect pressurized air and electric power, and then perform inspections for proper operation and air leakage. If the sound of air leakage can be heard, or if the equipment does not operate properly, stop operation and confirm that it is mounted correctly.

6. Disassembly and alteration prohibited.
Do not disassemble the unit or make any alterations to it.

4. Warning

1. Confirm the specifications.

The products appearing in this catalog are designed for use only in compressed air systems (including vacuum).
Do not use outside the specified ranges of pressure, temperature, etc., as this may cause damage or faulty operation. (Refer to specifications.)
Consult with SMC if fluids other than compressed air (including vacuum) are to be used.

2. Warning

1. Read the instruction manual carefully.
The product should be mounted and operated with a good understanding of its contents. Also, keep the manual where it can be easily referred to at any time.

2. Ensure space for maintenance.
Ensure the necessary space for maintenance activities.

3. Be sure to tighten screws with the proper torque.
When mounting, tighten screws with the recommended torque.
1. Create a safe design, which addresses the possibility of accidents resulting from a drop in vacuum pressure due to power failure or trouble with the air supply, etc. If vacuum pressure drops and there is a loss of vacuum pad adsorption force, work pieces being carried may fall, causing a danger of human injury and/or damage to machinery. Safety measures should be implemented, such as the installation of drop prevention guides.

2. Use vacuum specifications for vacuum switching valves and vacuum breakers. If valves which do not meet vacuum specifications are installed in vacuum piping, vacuum leakage will occur. Be certain to use vacuum specification valves.

3. Select ejectors which have a suitable suction flow rate.
   - When there is a vacuum leak from the work piece or the piping:
     If the ejector’s suction flow rate is too low, this will cause poor adsorption.
   - When piping is long or of large diameter:
     The adsorption response time will increase due to the increased volume of the piping.
     Select ejectors with a suitable suction flow rate by referring to their technical data.

4. If the suction flow rate is too high, setting of vacuum switches will become difficult.
   In the case of adsorption on a small work piece of only a few millimeters, if an ejector is selected which has a high suction flow rate, the pressure difference when adsorbing and releasing the work piece is small. Since setting of the vacuum switch may become difficult, an appropriate ejector should be selected.

5. When two or more pads are piped to one ejector, if one pad releases its work piece, the other pads will also release.
   When one pad is removed from its work piece, there is a drop in vacuum pressure which causes the other pads to release their work pieces also.

6. Use piping with an adequate effective sectional area.
   Select piping for the vacuum side which has an adequate effective sectional area, so that the ejector’s maximum suction flow rate can be accommodated by the piping. Also, make sure that there are no unnecessary restrictions or leaks, etc., along the course of the piping. The piping on the air supply side must be designed so that it corresponds to each ejector’s air consumption. The effective sectional area of tubing, fittings and valves, etc., should be sufficiently large, and the pressure drop reaching the ejector should be kept to a minimum.
   Further, design of the air supply should be performed while taking into consideration the ejector’s maximum air consumption and the air consumption of other pneumatic circuits.

Caution
1. For information on related items, such as directional control equipment and drive equipment, refer to the caution sections in each respective catalog.

Warning
1. Do not obstruct the exhaust port of the ejector. If the exhaust port is obstructed when mounted, a vacuum will not be generated.

Caution
1. Avoid disorganized piping.
   Piping which is direct and of the shortest possible length should be used for both the vacuum and supply sides, and disorganized piping should be avoided. Unnecessary length increases the piping volume, and this increases the response time.

Operating Environment
1. Do not operate in locations having an atmosphere of corrosive gases, chemicals, sea water, water or steam, or where there will be contact with the same.
2. Do not operate in locations having an explosive atmosphere.
3. Do not operate in locations where vibration or impact occurs.
   Confirm the specifications for each series.
4. In locations which receive direct sunlight, provide a protective cover, etc.
5. In locations near heat sources, block off any radiated heat.
6. In locations where there is contact with water, oil or welding spatter, etc., implement suitable protective measures.
7. In cases where the vacuum unit is surrounded by other equipment or it is energized for an extended time etc., implement measures to radiate excess heat so that temperatures remain within the range of specifications.

Maintenance
1. Clean suction filters and silencers on a regular basis.
   The performance of ejectors will deteriorate due to clogging in filters and silencers. Large capacity filters should be used, especially in dusty locations.
**Design & Selection**

**Warning**

1. Use with the specified voltage.
   Use with voltage outside of the specifications can cause malfunction or switch damage, as well as electrocution and fire hazard, etc.

2. Never use a load which exceeds the maximum load capacity.
   This may damage a switch or reduce its service life.

3. Do not use a load that generates surge voltage.
   Although surge protection is provided at the output side of a switch, damage may still occur if the surge is applied repeatedly. When a load, such as a relay or solenoid, which generates surge is directly driven, use a type of switch having a built-in surge absorbing element.

4. Be sure to confirm the fluid specifications.
   Since switches do not have explosion-proof construction, do not use flammable gases or fluids. This may cause a fire or explosion.

5. Be certain to observe the regulating pressure range and maximum operating pressure.
   Operation at a pressure outside of this range can cause failure. In addition, the switch will be broken if operated above the maximum operating pressure.

**Mounting**

**Warning**

1. Do not use if equipment does not operate properly.
   Verify correct mounting by suitable function and leakage inspections after air and power are connected following mounting, maintenance or conversions.

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

3. Hold the product from the body side when handling.
   The tensile strength of the power cord is 49N, and pulling it with a force greater than this can cause failure. Hold by the body when handling.

4. Turn the setting trimmer gently using a watchmakers screw driver.
   Turn the setting trimmer gently using a watchmakers screw driver. Do not turn beyond the stoppers located at both ends. If the trimmer is broken, adjustment will be impossible.

5. Pressure port
   Do not insert wire, etc., from the pressure port. This will damage the pressure sensor, making it impossible to obtain normal operation.

**Wiring**

**Warning**

1. Confirm wire colors and terminal numbers when wiring is performed.
   Since incorrect wiring can lead to breakage or failure of the switch as well as malfunction, perform wiring after confirming wiring colors and terminal numbers with the instruction manual.

2. Avoid repeatedly bending or stretching lead wires.
   Broken lead wires will result from applying bending stress or stretching force to the lead wires. In the event that lead wires are damaged creating a possibility of malfunction, replace the entire product. (For cases in which the lead wires cannot be replaced through grommets.)

3. Confirm proper insulation of wiring.
   Be certain that there is no faulty wiring insulation (contact with other circuits, ground fault, improper insulation between terminals, etc.). Damage may occur due to excess current flow into a switch.

4. Do not wire with power lines or high voltage lines.
   Wire separately from power lines or high voltage lines, avoiding parallel wiring or wiring in the same conduit with these lines. Control circuits containing switches may malfunction due to noise from these other lines.

5. Do not allow short circuiting of loads.
   Use caution, as switches will be damaged instantly if a load is short circuited. Be especially careful not to reverse the power supply line (Brown) and the output line (Black).

**Pressure Source**

**Warning**

1. Observe the fluid and ambient temperature ranges.
   The fluid and ambient temperatures are 0 to 60°C. Since moisture in circuits can freeze at 5°C or below, causing damage to O-rings and malfunction, take measures to prevent freezing. The installation of an air dryer is recommended to remove drainage and moisture from circuits. Furthermore, even though the ambient temperature range remains within specifications, do not operate in locations where there are abrupt temperature changes.

2. Vacuum pressure switches
   There will be no change in performance if a pressure of 0.5MPa or less is applied for 1 second or less (when releasing a vacuum), but care should be taken that pressures of 0.2MPa or more are not applied on a regular basis.
### Operating Environment

⚠️ **Warning**

1. **Never use in an atmosphere of explosive gases.**
   The structure of pressure switches is not intended to prevent explosion. Never use in an atmosphere with an explosive gas since this may cause a serious explosion.

2. **Do not use in locations with sources of surge generation.**
   When equipment that generates a large amount of surge (solenoid type lifters, high frequency induction furnaces, motors, etc.) is located in the area around a pressure switch, there is a danger of deterioration or damage to the switch's internal circuit elements. Therefore, implement surge countermeasures at the sources, and avoid the mixing and touching of lines.

3. **Operating environment**
   Since the electronic pressure switch is basically an open type, avoid use in locations where there is splashing of water or oil, etc.

### Maintenance

⚠️ **Warning**

1. **Perform maintenance regularly and confirm normal operation.**
   It may otherwise not be possible to assure safety due to unexpected malfunction or misoperation, etc.

2. **When used in an interlock circuit**
   When used in an interlock circuit, provide multiple interlock circuits as a precaution against failure, and also perform regular inspections to confirm normal operation.

3. **Cleaning the case**
   Use a soft cloth to clean the case. In case of heavy soiling, first soak the cloth in a neutral detergent diluted with water and wring it out thoroughly. Finish up by wiping with a dry cloth.
**Piping**

⚠️ **Caution**

1. Connect the compressed air supply piping separately to the solenoid valves and ejector valves. Also, connect piping to the ejector valve stations.

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**Operation of Ejector Valves**

⚠️ **Caution**

1. When the pilot valve for air supply is turned ON, the main valve switches, and vacuum is generated by the flow of compressed air from the nozzle to the diffuser. When the pilot valve for vacuum release is turned ON, the main valve switches, and the vacuum is quickly released as air passes through the release flow adjustment needle and flows to the vacuum port.

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**Environment**

⚠️ **Caution**

1. Operate away from direct sunlight.

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**Solenoid Valves (Series ZL112/ZL212)**

⚠️ **Caution**

1. For specific product precautions on solenoid valves (Series ZL112), refer to the solenoid valve (Series SYJ500) catalogue.
### Exhaust Characteristics

**Vacuum pressure**

- Supply pressure: 0.4MPa

**Suction flow rate**

- 0.1 to 0.6 MPa

**Air consumption**

- 0 to 150 l/min (ANR)

### Flow Rate Characteristics

**Supply pressure: 0.4MPa**

- 10 to 120 l/min (ANR)

### Time to Reach Vacuum

**Measurement conditions**

- Tank capacity: 1l
- Supply pressure: 0.4MPa

**Vacuum pressure reached**

- 89.3kPa

### Viewing the Graphs

The graphics indicate the time required to reach a vacuum pressure determined by adsorption conditions for work pieces, etc., starting from atmospheric pressure in a 1l sealed tank. Approximately 8.8 seconds are necessary to attain a vacuum pressure of 89.3kPa.

When adsorbing work pieces which are permeable or subject to leakage, etc., caution is required as the vacuum pressure will not be very high.
1 With Supply and Release Valves

ZL212 valve | Voltage | Electrical entry | Vacuum pressure switch | Electrical entry | X132

With supply and release valves

ZL212 type with supply and release valves

Dimensions

![Dimensions Diagram]
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Specifications are subject to change without prior notice and any obligation on the part of the manufacturer.