Vacuum / Release Unit

VQD1000-V Series

- Response speed
  - 13 msec (at 500 mm*) / 18.5 msec (at 1000 mm*)
  - * Distance from the unit to the work area

- Adaptable to 0603 chip

- Smooth detachment of a work piece without over-blow
  - The work piece will not be blown away when the air is released.

- No need to adjust the timing when switching between vacuum and positive pressure. (single signal control)

- No need to design a restrictor circuit for release air.

- N.O. (Vacuum absorption type when de-energized) and N.C. (Vacuum shutoff type when de-energized) specifications are available.

---

**Diagram:**

- The work piece will not be blown away.
  - The work piece is detached as smoothly as possible by the subsonic release air. Even small electronic components such as a 0603 (0.6 mm x 0.3 mm) chip will not be blown away.

- Over-blow
  - A small and light work piece can be blown away.

- Condition:
  - Distance from the unit to the work area at 500 mm
  - Piping I.O.: ø2.5

---

**Diagram Components:**

- Connection port (M5 or Rc 1/8 plug)
- Work piece: A (Pad or Nozzle)
- Integral tank
- VQD1151W (For switching)
- 10-VQ110 (For charging release air)
- Atmospheric pressure
- Vacuum pressure (~80 kPa)
- Ordinary Circuit
- 13 msec (Constant)
- 60 msec or more (Vary depending on a condition.)

---

**Specifications:**

- Positive pressure (Release air): P
- Vacuum pressure (Suction air): V
- Work piece: A (Pad or Nozzle)

---

**Options:**

- VV061
- VV100
- V100
- S070
- VQD
- VQD-V
- VK
- VT
Vacuum / Release Unit

VQD1000-V Series

Compatible with an atmospheric release pressure circuit
Possible to make it an atmospheric release type by installing a check valve on the connecting port and by setting the release air pressure (P) lower. (When the release air is running low, the pressure inside the tank changes to vacuum from the positive pressure. In this case, the pressure is rapidly released to the atmosphere due to the check valve.)

Atmospheric pressure suction port
Recommended check valve AKH04B-M5

Suction filter can be cleaned.
If you energize the VQD1151W, you can clean the suction filter using positive-pressure air blowing.

Suction filter
Recommended:
ZFC050-M5X50
(Filtration rating 20 µm)

Additionally a tank can be installed.
Possible to add a tank for charging release air in accordance with the distance (volume) between the unit from the work piece.

[Example of tank addition]
Tube cap KQ2C series
One-touch fitting KQ2H series

Details → P.1408
When de-energized  Vacuum absorption

De-energizing 2 solenoid valves simultaneously
Charging release air during absorption of a work piece

- Suction vacuum pressure (P1): –90 kPa (–0.090 MPa)
- Piping tube size: ø4 (I.D. ø2.5)
- Suction filter: When mounting ZFC050-M5X50 (internal volume: 0.2 cm³)

P2: Release Air Guideline

1. Adjust P2 release pressure, using a regulator, in accordance with V1 volume. We recommend that you use our precision type, IR series.
2. When V1 volume differs in the same manifold, equalize it by adjusting the length or internal diameter of the piping. Even when the piping length is extended, a good response is ensured.
3. It is recommended for the electrical control of the valve that the release and switching valves are turned ON or OFF at the same time (single signal control). An overshoot of the release air pressure can also be generated by changing the electrical control.

<Conditions>
- Suction vacuum pressure (P1): –90 kPa (–0.090 MPa)
- Piping tube size: ø4 (I.D. ø2.5)
- Suction filter: When mounting ZFC050-M5X50 (internal volume: 0.2 cm³)

<Relationship between pressure and a release air tank>

\[ P2 = \frac{(P + 0.1) \times (V1 + V2) - (P1 + 0.1) \times V1}{V2} - 0.1 \]

P1: Suction vacuum pressure / Negative pressure (MPa)
P2: Release pressure / Positive pressure (MPa)
P: Detaching (Release) pressure (MPa)
* 0 MPa (atmospheric pressure) is normal.

P2: Release Air Guideline

<table>
<thead>
<tr>
<th>Distance between the unit and the work area (mm)</th>
<th>300</th>
<th>500</th>
<th>1000</th>
<th>2000</th>
</tr>
</thead>
<tbody>
<tr>
<td>V1: Total volume from the unit to the work area (cm³)</td>
<td>1.67</td>
<td>2.65</td>
<td>5.10</td>
<td>10.01</td>
</tr>
<tr>
<td>V2: Volume of a release air tank (cm³)</td>
<td>VQD1000-V type: 0.8 cm³</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>P2: Release pressure (MPa)</td>
<td>VQD1000-V</td>
<td>0.19</td>
<td>0.30</td>
<td>0.58</td>
</tr>
<tr>
<td>VQD1000-VL</td>
<td>—</td>
<td>0.08</td>
<td>0.14</td>
<td>0.28</td>
</tr>
</tbody>
</table>

<Conditions>
- Suction vacuum pressure (P1): –90 kPa (–0.090 MPa)
- Piping tube size: ø4 (I.D. ø2.5)
- Suction filter: When mounting ZFC050-M5X50 (internal volume: 0.2 cm³)

[How to Adjust]
1. Adjust P2 release pressure, using a regulator, in accordance with V1 volume. We recommend that you use our precision type, IR series.
2. When V1 volume differs in the same manifold, equalize it by adjusting the length or internal diameter of the piping. Even when the piping length is extended, a good response is ensured.
3. It is recommended for the electrical control of the valve that the release and switching valves are turned ON or OFF at the same time (single signal control). An overshoot of the release air pressure can also be generated by changing the electrical control.

<Connections>
- Connection port (Plug)
- Work piece
- Suction
- Release
- Discharging release air
- Charging release air
- Atmospheric pressure
- smooth detachment
- Work piece
- Working principle

When energized  Release → Shut

Energizing 2 solenoid valves simultaneously
Release air is discharged and the pressure required for detaching / releasing a work piece turns to atmospheric pressure, resulting in smooth detachment.
Vacuum / Release Unit

VQD1000-V Series

How to Order

Vacuum / Release Unit VQD1000-V 05 5

10-VQ110-□-X46 (For charging release air)

VQD1151W-□ (For switching)

Valve type

Nil N.O. specifications
C N.C. specifications

Volume of release air tank

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Nil</th>
<th>L</th>
</tr>
</thead>
<tbody>
<tr>
<td>Volume of release air tank</td>
<td>0.8 cm³</td>
<td>3.2 cm³</td>
</tr>
</tbody>
</table>

Guideline: 1 m or shorter distance from a work piece
Guideline: 1 m or longer distance from a work piece

Note) Calculate and set the volume using the formula for the relationship between pressure and the release air tank on page 1403.

Stations

<table>
<thead>
<tr>
<th>Stations</th>
<th>01</th>
<th>02</th>
<th>10</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 unit (1 station)</td>
<td>2 units (2 stations)</td>
<td>10 units (10 stations)</td>
<td></td>
</tr>
</tbody>
</table>

Voltage

<table>
<thead>
<tr>
<th>Voltage</th>
<th>5</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td>24 VDC</td>
<td>12 VDC</td>
<td></td>
</tr>
</tbody>
</table>

Electrical entry

N.C.: M plug connector
L: Standard type
LO: Without L plug connector
MO: Without M plug connector

Blanking plate

<table>
<thead>
<tr>
<th>Nil</th>
<th>Without blanking plate</th>
</tr>
</thead>
<tbody>
<tr>
<td>B1</td>
<td>1 set</td>
</tr>
<tr>
<td>B2</td>
<td>2 sets</td>
</tr>
<tr>
<td>B9</td>
<td>9 sets</td>
</tr>
</tbody>
</table>

Note) The blanking plates are mounted in order starting on the U side of the vacuum/release unit.

Example: VQD1000-V-05-5-B1

Vacuum pressure: V (Suction air)
Positive pressure: P (Release air)
Connection port: (M5 or Rc 1/8 plug)
Work piece: A (Pad or Nozzle)
## Specifications

<table>
<thead>
<tr>
<th>Valve specifications</th>
<th>Direct operated poppet valve</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fluid</td>
<td>Air</td>
</tr>
<tr>
<td>Operating pressure range</td>
<td>Suction (negative pressure): 0 to –100 kPa</td>
</tr>
<tr>
<td></td>
<td>Release (positive pressure): 0 to 0.7 MPa</td>
</tr>
<tr>
<td>Response time</td>
<td>N.O. specifications: Suction (OFF): 2 ± 1 msec</td>
</tr>
<tr>
<td></td>
<td>N.C. specifications: Suction (ON): 4 ± 1 msec</td>
</tr>
<tr>
<td></td>
<td>Release (OFF): 2 ± 1 msec</td>
</tr>
<tr>
<td>Suction flow rate/Sonic conductance</td>
<td>16 L/min/0.27 dm³/(s·bar)</td>
</tr>
<tr>
<td>Manual override</td>
<td>Non-locking push type</td>
</tr>
<tr>
<td>Impact/Vibration resistance</td>
<td>Unrestricted</td>
</tr>
<tr>
<td>Mounting position</td>
<td>Dusttight</td>
</tr>
<tr>
<td>Enclosure</td>
<td></td>
</tr>
<tr>
<td>Coil rated voltage</td>
<td>24 VDC, 12 VDC</td>
</tr>
<tr>
<td>Allowable rated voltage</td>
<td>±10% of rated voltage</td>
</tr>
<tr>
<td>Coil insulation type</td>
<td>Class B or equivalent</td>
</tr>
<tr>
<td>Power consumption</td>
<td>VQD1151W (for switching): 3.2 W energy saving type (Onrush: 3.2 W, Holding: 2.4 W)</td>
</tr>
<tr>
<td></td>
<td>10-VQ110 (for release supply): 1 W</td>
</tr>
<tr>
<td>Electrical entry</td>
<td>L/M plug connector (with light/surge voltage suppressor)</td>
</tr>
</tbody>
</table>

### Valve specifications

1. **Solenoid valve for switching**
   - **Model**: VQD1151W - 5L -
   - **Voltage**: 24 VDC, 12 VDC
   - **Connector assembly**: nil, nil, CE-compliant
   - **Electrical entry**: L plug connector, nil, nil

2. **Solenoid valve for charging release air**
   - **Model**: 10-VQ110 - 5L - X46 -
   - **Voltage**: 24 VDC, 12 VDC
   - **Connector assembly**: nil, nil, CE-compliant
   - **Electrical entry**: L plug connector, nil, nil

3. **Manifold base unit**
   - **Model**: VVQD1000-1A-01-V
   - **Stations**: 01 - 1 unit (1 station)
   - **Valve type**: N.O. specifications
   - **Volume of release air tank**: L: 3.2 cm³
   - **Guideline**: 1 m or longer distance from a work piece

4. **Blanking plate assembly**
   - **Model**: VVQD1000-10A-V
   - **Guideline**: 1 m or longer distance from a work piece

---

### Replacement Parts

**Product Weight (Formula)**
- **VQD1000-V(C)**: \( W = 80n + 31 \)
- **VQD1000-V(C)L**: \( W = 84n + 49 \)

**Connecter assembly**
- **AXT661 - 14A -**
- **Lead wire length**
  - Nil: 300 mm
  - 6: 600 mm
  - 10: 1000 mm
  - 20: 2000 mm
  - 30: 3000 mm

*For the product with the lead wire, the lead wire length is 300 mm. To extend the lead wire length to 600 mm or more, select the valve without connector and order the connector assembly separately.*
## Dimensions

### L: Dimensions (VQD1000-V(C)-□□ / Standard type: Tank volume 0.8 cm³)

<table>
<thead>
<tr>
<th>L</th>
<th>n</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
</tr>
</thead>
<tbody>
<tr>
<td>L1</td>
<td></td>
<td>23</td>
<td>34</td>
<td>45</td>
<td>56</td>
<td>67</td>
<td>78</td>
<td>89</td>
<td>100</td>
<td>111</td>
<td>122</td>
</tr>
<tr>
<td>L2</td>
<td></td>
<td>17</td>
<td>28</td>
<td>39</td>
<td>50</td>
<td>61</td>
<td>72</td>
<td>83</td>
<td>94</td>
<td>105</td>
<td>116</td>
</tr>
</tbody>
</table>

Formula: L1 = 11n + 12, L2 = 11n + 6 (Max. 10 stations)

### L: Dimensions (VQD1000-V(C)L-□□ / Tank volume 3.2 cm³)

<table>
<thead>
<tr>
<th>L</th>
<th>n</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
</tr>
</thead>
<tbody>
<tr>
<td>L1</td>
<td></td>
<td>25</td>
<td>36</td>
<td>47</td>
<td>58</td>
<td>69</td>
<td>80</td>
<td>91</td>
<td>102</td>
<td>113</td>
<td>124</td>
</tr>
<tr>
<td>L2</td>
<td></td>
<td>19</td>
<td>30</td>
<td>41</td>
<td>52</td>
<td>63</td>
<td>74</td>
<td>85</td>
<td>96</td>
<td>107</td>
<td>118</td>
</tr>
</tbody>
</table>

Formula: L1 = 11n + 14, L2 = 11n + 8 (Max. 10 stations)

The dimensions shown in brackets indicate the VQD1000-V(C)L-□□ / tank volume 3.2 cm³.
**VQD1000-V Series**

**Specific Product Precautions**

Be sure to read this before handling the products. Refer to back page 50 for Safety Instructions and pages 3 to 9 for 3/4/5 Port Solenoid Valve Precautions.

---

### Manual Override Operation

**Warning**

Connected actuator is started by manual operation. Use the manual override after confirming that there is no danger.

- Non-locking push type (Tool required)

![Manual Override Operation Diagram]

- In order to turn it ON, push down the manual override button in the direction the arrow (→) indicates until it stops (approx. 0.5 mm), and release it to turn it OFF.

### Continuous Energization

**Warning**

Coil temperature may get high due to ambient temperature or energizing duration. Do not touch the valve by hand directly. When there is such a dangerous case to be touched by hand directly, install a protective cover.

**Caution**

When simultaneously energizing 3 stations or more, make sure to place an energized and non-energized valve alternatively. However, if 3 stations or more need to be energized simultaneously at the time of installing or adjusting, the energizing time should be less than 30 minutes to achieve an energized status not exceeding 50%.

### Wiring Specifications

**Caution**

For the VQD1151W specifications (energy saving type), power consumption at holding is reduced with the above circuit. Refer to electrical power waveform as shown below.

<Energy saving type's electrical power waveform>
(Rated voltage: at 24 VDC)

<table>
<thead>
<tr>
<th>Applied voltage</th>
</tr>
</thead>
<tbody>
<tr>
<td>24 V</td>
</tr>
<tr>
<td>0 V</td>
</tr>
<tr>
<td>3.2 W</td>
</tr>
<tr>
<td>2.4 W</td>
</tr>
<tr>
<td>0 W</td>
</tr>
<tr>
<td>15 to 25 ms</td>
</tr>
</tbody>
</table>

### Valve Mounting

**Caution**

After confirming the gasket is correctly placed under the valve, securely tighten the bolts with the proper torque shown in the table below.

<table>
<thead>
<tr>
<th>Proper tightening torque (N·m)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.18 to 0.25</td>
</tr>
</tbody>
</table>

### How to Use Plug Connector

**Caution**

Attaching and detaching connectors
- To attach a connector, hold the lever and connector unit between your fingers and insert straight onto the pins of the solenoid valve so that the lever’s pawl is pushed into the groove and locks.
- To detach a connector, remove the pawl from the groove by pushing the lever downward with your thumb, and pull the connector straight out.

Note) Gently pull the lead wire, otherwise it may cause contact failure or disconnection.

### When Piping to a Product

**Caution**

When piping to a product, check the supply port, etc.

Also, when tightening the piping tube, clamp the base unit to avoid any undue force from being applied to the valve. If a force of 120 N or more is applied to the coil especially, the connecting pin may be deformed, resulting in malfunction.
Related Products

Suction Filter

ZFC050-M5X50

Width across flats 7

Section diagram A-A

Example of mounting to the manifold base (A port) of the vacuum/release unit VQD1000-V series

Specifications

<table>
<thead>
<tr>
<th>Specifications</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Filtration degree</td>
<td>20 Mm (Nominal)</td>
</tr>
<tr>
<td>Fluid</td>
<td>Air</td>
</tr>
<tr>
<td>Operating pressure range</td>
<td>–100 to 700 kPa</td>
</tr>
<tr>
<td>Ambient temperature</td>
<td>0 to 60°C (No freezing)</td>
</tr>
</tbody>
</table>

Replacement element part no. ⋯ ZFC-EL050-X50

Caution

1. To screw in OUT side port (M5 male thread), tighten by hand before giving it an additional 1/4 turn with a tightening tool.
2. When replacing the element, remove the IN side body using the hexagon surface on the IN side, then replace the element. After replacing the element, tighten the IN side body with the tightening torque 0.5 to 0.7 N·m.
3. As a rule, replace the element when the pressure drops by 20 kPa.