Multi stage nozzle ejector ensuring high vacuum level of -27.8 inHg (-94kPa).

High suction flow of Max. 39.2 cfm (1,110 ℓ)/ min[ANR] with multi layer structure.
Securing high flow and high vacuum level

By adoption of multi-stage nozzle and multi layer structure, suction flow can be secured approx. 2.2 times (on average) larger than air consumption.

<table>
<thead>
<tr>
<th>Pressure Supply</th>
<th>72.5psi (0.5MPa)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Final vacuum</td>
<td>27.8 inHg (-94kPa)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Nozzle Code</th>
<th>Air Consumption (10.2cfm)</th>
<th>Suction Flow (26.8cfm)</th>
<th>(110ℓ)</th>
<th>19.4cfm (550ℓ)</th>
<th>7.8cfm (220ℓ)</th>
<th>11.7cfm (330ℓ)</th>
<th>26.8cfm (760ℓ)</th>
<th>51.4cfm (890ℓ)</th>
<th>15.5cfm (440ℓ)</th>
<th>36.0cfm (1,020ℓ)</th>
<th>19.4cfm (550ℓ)</th>
<th>39.2cfm (1,110ℓ)</th>
<th>23.3cfm (660ℓ)</th>
</tr>
</thead>
<tbody>
<tr>
<td>161</td>
<td></td>
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</tr>
<tr>
<td>162</td>
<td>3.9cfm (290ℓ)</td>
<td>19.4cfm (550ℓ)</td>
<td>7.8cfm (220ℓ)</td>
<td>11.7cfm (330ℓ)</td>
<td>26.8cfm (760ℓ)</td>
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<td>23.3cfm (660ℓ)</td>
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<td></td>
</tr>
<tr>
<td>163</td>
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</tr>
</tbody>
</table>

Nozzle Q’ ty:
- 1pc.
- 2pcs
- 3pcs
- 4pcs
- 5pcs
- 6pcs

Number of layers:
- Single layer
- Double layer
- Triple layer
Excellent in ozone resistance ▶ FKM for all sealing rubber.

Silencer installing direction is selectable.

- Selectable from Three directions: Side, Front(*1) and With rotary joint, depending on the installation space.

*1. Front installation is only for single layer type: 161, 162.

*2. Vacuum characteristic changes by silencer Q’ty and its installing direction.

Body can be fixed freely with two brackets.

Basic Venturi Principle of multi-stage nozzles
Suitable for applications in various industrial fields.

- Best suited for a various range of industries, as well as automobile, semiconductor, food and medicine industries.

**Suction Conveyance**

Best suited for large and heavy or porous work-piece in automobile industry and packaging industry, etc.

**Defoaming・Deaeration**

Bubble and air contained in adhesive, cosmetics (cream) and distilled water can be removed.

**Vacuum packing**

Can be used for vacuum packing of food or the like, removing air from the package.

**Vacuum Holding**

The processing accuracy can be stabilized because the distortion and thermal deformation of the work-piece hardly occurs. Also, the work-piece can be fixed easily.
### Model Designation (Example)

**VLM**

- **Code**: 161, 162 (Single layer), 163, 164 (Double layer), 165, 166 (Triple layer)

**Exhaust port**: Connection type: Taper pipe female thread, Size: Rc3/4
- **No Code**: No silencer, End cap 1pc.
- **S1**: Silencer 1pc, End cap 1pc.
- **S2**: Silencer 1pc, Rotate joint 1pc, End cap 2pcs

**Air supply port size**
- **Code**: 02: Rc1/4 (Taper pipe female thread)

**Vacuum port size**
- **Code**: 06, 08
  - Taper pipe female thread: Rc3/4, Rc1

**Nozzle specification**
- **Code**: 161, 162, 163, 164, 165, 166
  - **Layer**: Single layer, Double layer, Triple layer
  - **Nozzle quantity**: 1pc, 2pcs, 3pcs, 4pcs, 5pcs, 6pcs
  - **Suction/min[ANR]**: 10.2cf, (290 ℓ), 19.4cf, (550 ℓ), 26.8cf, (760 ℓ), 31.4cf, (890 ℓ)
  - **Consumption/min[ANR]**: 3.9cf, (110 ℓ), 7.8cf, (220 ℓ), 11.7cf, (330 ℓ), 15.5cf, (440 ℓ)

**Vacuum characteristic**: H: High-vacuum large flow (Rated supply pressure: 72.5psi (0.5MPa), Final vacuum: -27.8 inHg (-94kPa))

### Model Designation of Attachment parts (Example)

**VLM**

- **Code**: R3/4

**Parts name**
- **R**: Rotate joint
- **E**: End cap
- **B**: Bracket (2pcs/set)
- **D**: Dummy plug (2pcs/set)※

**Silencer**
- For direct mounting to body or attaching to rotate joint
  - R3/4

**Bush**
- For connecting Push-in fitting (Thread size: R1/2) to vacuum port (Rc3/4)
  - R3/4

※ Dummy plug is needed to plug unnecessary nozzles.
Specifications

<table>
<thead>
<tr>
<th>Nozzle type</th>
<th>161</th>
<th>162</th>
<th>163</th>
<th>164</th>
<th>165</th>
<th>166</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nozzle quantity</td>
<td>1pc</td>
<td>2pcs</td>
<td>3pcs</td>
<td>4pcs</td>
<td>5pcs</td>
<td>6pcs</td>
</tr>
<tr>
<td>Suction flow rate (/min ANR)</td>
<td>10.2cf (290L)</td>
<td>19.4cf (550L)</td>
<td>26.8cf (760L)</td>
<td>31.4cf (890L)</td>
<td>36.0cf (1020L)</td>
<td>39.2cf (1110L)</td>
</tr>
<tr>
<td>Air consumption (/min ANR)</td>
<td>3.9cf (110L)</td>
<td>7.8cf (220L)</td>
<td>11.7cf (330L)</td>
<td>15.9cf (440L)</td>
<td>19.4cf (550L)</td>
<td>23.3cf (660L)</td>
</tr>
</tbody>
</table>

Construction (VLMH163 or 164)

<table>
<thead>
<tr>
<th>No.</th>
<th>Parts</th>
<th>Material</th>
</tr>
</thead>
<tbody>
<tr>
<td>①</td>
<td>Top case</td>
<td>Brass, PA, Aluminum</td>
</tr>
<tr>
<td>②</td>
<td>Middle case</td>
<td>PA, Aluminum</td>
</tr>
<tr>
<td>③</td>
<td>Bottom case</td>
<td>PA, Aluminum</td>
</tr>
<tr>
<td>④</td>
<td>Nozzle Assy</td>
<td>PA, FKM</td>
</tr>
<tr>
<td>⑤</td>
<td>Nozzle clip</td>
<td>Iron (Electroless nickel plated)</td>
</tr>
<tr>
<td>⑥</td>
<td>End cap</td>
<td>PBT</td>
</tr>
<tr>
<td>⑦</td>
<td>Rotate joint</td>
<td>Aluminum, PBT</td>
</tr>
<tr>
<td>⑧</td>
<td>Silencer</td>
<td>PBT, PVF</td>
</tr>
<tr>
<td>⑨</td>
<td>Hexagon socket head bolt</td>
<td>Iron (Electroless nickel plated)</td>
</tr>
<tr>
<td>⑩</td>
<td>Case packing</td>
<td>FKM</td>
</tr>
<tr>
<td>⑪</td>
<td>Bracket</td>
<td>Iron (Electroless nickel plated)</td>
</tr>
<tr>
<td>⑫</td>
<td>Plug for pressure gauge port</td>
<td>Iron (Electroless nickel plated)</td>
</tr>
</tbody>
</table>

Safety instruction manual

**Warnings**

1. Maintenance of Large Flow Vacuum Generator VLM Series should be conducted by a person with the understanding about the construction of this product and enough knowledge about pneumatic equipment.

**Cautions**

1. When selecting an exhaust piping, or use without silencer with dust existing in air or pipe, dust may enter from the exhaust port by back-flow at operation stop, and it may cause malfunction and performance drop.
2. Vacuum characteristics may be changed upon plumbing conditions and other variants.
3. Do not use the generator in corrosive gas, flammable gas, chemicals, sea water, water or steam. As the generator may be damaged and lead to leakage.
4. Do not use the generator in places where they can be exposed to water drops, oil drops, duct, etc. The generator is neither drip-proof nor dust-proof, so that trouble may result.
5. Diameter of tube connected to vacuum port to be as large as possible and length as long as possible, to ensure the generator performance.
6. Falling or shock may cause damage or leakage to the generator.
7. Install silencer to every layer of the generator, otherwise performance may be deteriorated.
8. Do not supply positive pressure more than 0.3MPa such as blow-off air to vacuum circuit. It causes check packing damage.
9. Use of vacuum filter is recommended to prevent possible entering of foreign substances from vacuum port (V).
Characteristics

VLMH 161, 162 (Single layer)

VLMH 163, 164 (Double layer)

VLMH 165, 166 (Triple layer)

VLMH 161, 162 (Single layer)
Appearance drawing

Model code: VLM H161-202-3
VLM H162-202-3

Single layer, nozzle 1pc.
Single layer, nozzle 2pcs

No silencer ⇒③: No code
Silencer: Side installation ⇒③: S1
Silencer with rotate joint ⇒③: S2
Silencer: Front installation ⇒③: S1

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http://www.pisco.com

Silencer: Side installation
Silencer: Front installation
Silencer with rotate joint

Exhaust port (EX): Rc3/4
Vacuum port (V): Rc3/4 or Rc1

Sensor port: Rc1/8
Air supply port (P): Rc1/4

Unit: mm

<table>
<thead>
<tr>
<th>Model code</th>
<th>weight (g)</th>
</tr>
</thead>
<tbody>
<tr>
<td>VLM H161-202</td>
<td>848</td>
</tr>
<tr>
<td>VLM H162-202</td>
<td>909</td>
</tr>
<tr>
<td>VLM H161-202-S1</td>
<td>882</td>
</tr>
<tr>
<td>VLM H162-202-S1</td>
<td>943</td>
</tr>
<tr>
<td>VLM H161-202-S2</td>
<td>952</td>
</tr>
<tr>
<td>VLM H162-202-S2</td>
<td>1,013</td>
</tr>
</tbody>
</table>

※1) Reference dimension when silencer installed. ※2) Reference dimension when end cap installed.
※3) Reference dimension when silencer and rotate joint installed.
※4) Replaced with vacuum port size code from the model designation (example) in page 4.
※5) The installation method of bracket in this dimensional drawing is only one example. Refer page 2 for other bracket installation method.
Model code: VLM H163-202-3  VLM H164-202-3

Double layer, nozzle 3pcs
Double layer, nozzle 4pcs

No silencer ⇒③: No code
Silencer: Side installation ⇒③: S1
Silencer with rotate joint ⇒③: S2

Air supply port (P): Rc1/4
Sensor port: Rc1/8
Vacuum port (V): Rc3/4 or Rc1
Exhaust port (EX): Rc3/4

Unit: mm

Silencer: Side installation

Exhaust port (EX): 2-Rc3/4

Silencer with rotate joint

Exhaust port (EX): 2-Rc3/4

Model code weight (g)

<table>
<thead>
<tr>
<th>Model code</th>
<th>weight (g)</th>
</tr>
</thead>
<tbody>
<tr>
<td>VLM H163-202</td>
<td>1,358</td>
</tr>
<tr>
<td>VLM H164-202</td>
<td>1,393</td>
</tr>
<tr>
<td>VLM H163-202-S1</td>
<td>1,426</td>
</tr>
<tr>
<td>VLM H164-202-S1</td>
<td>1,461</td>
</tr>
<tr>
<td>VLM H163-202-S2</td>
<td>1,566</td>
</tr>
<tr>
<td>VLM H164-202-S2</td>
<td>1,601</td>
</tr>
</tbody>
</table>

※1) Reference dimension when silencer installed.
※2) Reference dimension when end cap installed.
※3) Reference dimension when silencer and rotate joint installed.
※4) ② Replaced with vacuum port size code from the model designation (example) in page 4.
※5) The installation method of bracket in this dimensional drawing is only one example. Refer page 2 for other bracket installation method.
Model code: **VLM H165-202-3**  
**VLM H166-202-3**

No silencer ⇒③: No code  
Silencer: Side installation ⇒③: S1  
Silencer with rotate joint ⇒③: S2

- **Air supply port (P):** Rc1/4  
- **Sensor port:** Rc1/8  
- **Vacuum port (V):** Rc3/4 or Rc1  
- **Exhaust port (EX):** Rc3/4

<table>
<thead>
<tr>
<th>Model code</th>
<th>weight (g)</th>
</tr>
</thead>
<tbody>
<tr>
<td>VLM H165-202</td>
<td>1,828</td>
</tr>
<tr>
<td>VLM H166-202</td>
<td>1,848</td>
</tr>
<tr>
<td>VLM H165-202-S1</td>
<td>1,930</td>
</tr>
<tr>
<td>VLM H166-202-S1</td>
<td>1,950</td>
</tr>
<tr>
<td>VLM H165-202-S2</td>
<td>2,140</td>
</tr>
<tr>
<td>VLM H166-202-S2</td>
<td>2,160</td>
</tr>
</tbody>
</table>

- ※1) Reference dimension when silencer installed.  
- ※2) Reference dimension when end cap installed.  
- ※3) Reference dimension when silencer and rotate joint installed.  
- ※4) (2) Replaced with vacuum port size code from the model designation (example) in page 4.  
- ※5) The installation method of bracket in this dimensional drawing is only one example. Refer page 2 for other bracket installation method.
Maintenance

Follow below procedures for cleaning the nozzle and the diffuser:

① Loosen all screws on the bottom of the generator and remove top case and nozzle clip.
② Remove diffuser from the generator body.
③ Remove nozzle 3 and nozzle 1 & 2 ass’y in this order. (Do not disassemble nozzle 1 & 2 ass’y.)
④ Remove deposits by air blow or wiping with soft cloth from the diffuser, nozzle, packing and seal.
⑤ Assemble the body with the nozzle 1 &2, nozzle 3 and the diffuser in reverse order of disassembling and install the nozzle clip. Fasten the screws with the tightening torque 1N·m~1.2N·m. Make sure the packing is in the proper position.
### Parts

<table>
<thead>
<tr>
<th>Bracket</th>
<th>Rotate joint</th>
<th>End cap</th>
<th>Dummy plug</th>
<th>Silencer (without elbow block)</th>
<th>Bush</th>
</tr>
</thead>
<tbody>
<tr>
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</tbody>
</table>

*Model code*  
- VLM-B  
- VLM-R  
- VLM-E  
- VLM-D  
- VVSR06  
- PF06-04

### Related products

#### Push-in fittings for air supply port
- Air supply port size: Rc1/4.  
- Tubing OD: 3/8", 1/2", 10, 12

<table>
<thead>
<tr>
<th>PC</th>
<th>Straight</th>
<th>PL</th>
<th>Elbow</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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</tbody>
</table>

*Model code*  
- PC3/8-02, PC10-02  
- PC12-02

<table>
<thead>
<tr>
<th>Model code</th>
<th>PCøD-R</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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</tbody>
</table>

#### Push-in fittings for vacuum port
- These push-in fittings can be used only when the vacuum port size is Rc3/4 and installing a bush listed above (PF06-04).  
- Tubing OD: 3/8", 1/2", 5/8", 10, 12, 16

<table>
<thead>
<tr>
<th>PC</th>
<th>Straight</th>
<th>PL</th>
<th>Elbow</th>
</tr>
</thead>
<tbody>
<tr>
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</tbody>
</table>

*Model code*  
- PC1/2-04, PC12-04  
- PC5/8-04, PC16-04

<table>
<thead>
<tr>
<th>Model code</th>
<th>PLoD-R</th>
</tr>
</thead>
<tbody>
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</table>

#### Large digital pressure sensor (vacuum switch)
- VUS32
- Compound pressure type
- Rated pressure range: -100〜100kPa

<table>
<thead>
<tr>
<th>Model code</th>
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</table>

- Easily viewable LCD dual displays. High level visibility with 3-color display.  
- Improved wiring workability and maintenance by lead wire with connector.  
- Copy function enables to copy various settings to slave-side sensor.

#### Digital pressure gauge
- GPD-V
- Negative pressure type
- Rated pressure range: -101〜-0kPa

*Model code*  
- GPD-V-01

- Pressure is clearly digital displayed by a single push of a button.  
- Display with only 1 battery; no need of wiring.  
- A power saving mode is adapted. Battery life is about 3 years (at 5times indication/ day).

#### Air Tank
- ATS
- Tank capacity: 0.4 〜 20L

*Model code*  
- ATS-0.4  
- ATS-0.75  
- ATS-2  
- ATS-5  
- ATS-10  
- ATS-20

- Reducing the vacuum pressure fluctuations and pulsations.  
- Tank capacity is selectable from 6 variations.  
- Tank is made of stainless steel.

For more detail information on those products, please check our web site (http://en.pisco.co.jp/).