New Pneumatic/Hydraulic
Large Expansion Locating Pin

Model VWH-C

Model VWH-D

Model VFH-C

Model VFH-D
Large Expansion Locating Pin

Model VWH  Pneumatic Model
Model VFH  Hydraulic Model

Locating Repeatability: 10 μm
Zero Clearance between Reference Hole and Large Expansion Locating Pin

What is Expansion Locating Pin?
Air or Hydraulic Control High-Accuracy Locating Pin that locates a workpiece by expanding its pin diameter.

The general locating pin has some clearance between pin and workpiece hole.

Expansion locating pin has zero clearance!!
High Accuracy  Suitable for Automation
Setup Time Reduction  Cost Reduction

The World’s First Locating Mechanism
When expanded: Clearance between the pin and reference hole becomes zero to locate with high accuracy.
When released: Easy to load/unload workpieces with enough clearance.

Two types of locating pins (Cylindrical and Diamond shaped pins). Expansion Locating Pin consisting of Datum-D and Cut-C cylinder.

Reference Locating
Round Pin  Datum Cylinder
One Direction Locating
Diamond-Shaped Pin  Cut Cylinder
• **Large Expansion**

Expansion Stroke : 1.1mm

• **Suitable for Automation • Robot Application**

Current Models VWM/VFM have small clearance, but have high accuracy of 3 µm locating repeatability.

The New Models VWH/VFH have large clearance when released, suitable for automation such as transfer robot application. (Locating Repeatability : 10 µm)

• **Easy to Measure the Mounting Distance Accuracy**

Able to measure the distance accuracy with the same core part on the top.

• **Durability**

Air blow from the inside of the cylinder comes out from the gripper gap and prevents contaminants.
Suitable for Automation and Robot Application

<Knocking in from the Loader>

<Loading and Unloading with Robot>
### Pneumatic Line-up

**Model/ Locating Repeatability**
- **High Accuracy Model**
- **Multi-Purpose Model**
- **Casting Material Model**

**Control**
- Double Action (Air Pressure + Spring Lock / Air Release)
- Double Action (Air Lock / Air Release)

**Op. Pressure Range**
- 0.35 ~ 0.7 MPa

<table>
<thead>
<tr>
<th>Model</th>
<th>Feature</th>
<th>Application Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>VWM</td>
<td>Refer to the product catalog or Kosmek website.</td>
<td>Finishing Line / Dividing Operation Line</td>
</tr>
<tr>
<td>VWH</td>
<td>Refer to the product catalog or Kosmek website.</td>
<td>Locating Casting Holes / First Operation</td>
</tr>
<tr>
<td>VKW</td>
<td>Refer to the product catalog or Kosmek website.</td>
<td></td>
</tr>
</tbody>
</table>

### Hydraulic Line-up

**Model/ Locating Repeatability**
- **High Accuracy Model**
- **Multi-Purpose Model**
- **Casting Material Model**

**Control**
- Single Action (Hyd. Lock / Spring Release)
- Double Action (Hyd. Lock / Hyd. Release)

**Op. Pressure Range**
- 2.5 ~ 7 MPa

<table>
<thead>
<tr>
<th>Model</th>
<th>Feature</th>
<th>Application Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>VFL</td>
<td>Refer to the product catalog or Kosmek website.</td>
<td>Finishing Line / Dividing Operation Line</td>
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<tr>
<td>VFM</td>
<td>Refer to the product catalog or Kosmek website.</td>
<td>Locating Casting Holes / First Operation</td>
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<td>VFH</td>
<td>Refer to the product catalog or Kosmek website.</td>
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<tr>
<td>VFJ</td>
<td>Refer to the product catalog or Kosmek website.</td>
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</tr>
<tr>
<td>VFK</td>
<td>Refer to the product catalog or Kosmek website.</td>
<td></td>
</tr>
</tbody>
</table>

**Note:**
1. For the details of model VWM / VKW / VFL / VFH / VFJ / VFK, please refer to Kosmek Work Clamping System Main Catalog: CATALOG No. KWCS20-03-GB.
System References

- High Accuracy (10 μm) + One-Touch Locating Pin

Reduces Setup Time!

- When dividing operations into different fixtures, High Accuracy Locating Pin (10 μm)

Prevents Deterioration of Workpiece Accuracy!

- Using with Hole Clamps enables 5-face machining,

Integrated Operation and More Compact Fixture!
Essential Points

1. Workpiece Hole for Locating
   - Workpiece hole diameter is φ9 ~ φ15 (in 1mm increments).
   - Workpiece hole tolerance is ±0.3.

2. Workpiece Weight
   - Workpiece weight that expansion locating pin is able to locate with is calculated from expanding force.
   - Expanding force is the force with which the expansion locating pin pushes out (expands) against the workpiece.
   - Refer to the specification page for each model’s calculation method of expanding force and allowable workpiece weight for locating.

3. Mounting Phase of VWH / VFH-C (Cut: For One Direction Locating)
   - Reference position (origin) is determined by VWH / VFH-D (Datum: for reference locating).
   - VWH / VFH-C (Cut: for one direction locating) locates in one direction (Y-axis), so phasing is necessary.
   - When mounting, ensure the expanding direction of VWH / VFH-C (cut) is perpendicular to VWH/VFH-D (datum).

4. Seat Setting
   - This product has no seating surface (reference surface towards Z-axis).
   - Please prepare the seat separately.

5. Setting Additional Work Clamps
   - Expansion locating pin has no clamping function.
   - Additional clamps should be added to clamp workpieces.
Model No. Indication

VWH 2 00 0 - 090 - D - H20

1 Body Size

2 : Select from Workpiece Hole Diameter 9 / 10 / 11 / 12 / 13
3 : Select from Workpiece Hole Diameter 14 / 15

2 Design No.

0 : Revision Number

3 Workpiece Hole Diameter

Please contact us for unlisted workpiece hole diameters.

<table>
<thead>
<tr>
<th>Workpiece Hole Diam. Code</th>
<th>090</th>
<th>100</th>
<th>110</th>
<th>120</th>
<th>130</th>
<th>140</th>
<th>150</th>
</tr>
</thead>
<tbody>
<tr>
<td>Workpiece Hole Dia. WA</td>
<td>9</td>
<td>10</td>
<td>11</td>
<td>12</td>
<td>13</td>
<td>14</td>
<td>15</td>
</tr>
<tr>
<td>VWH2000</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
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<tr>
<td>VWH3000</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

4 Functions

D : Datum (for Reference Locating)
C : Cut (for One Direction Locating)

5 Seating Height

H15 : 15mm
H20 : 20mm
H25 : 25mm

Note: Please prepare a seat separately.
Specifications

<table>
<thead>
<tr>
<th>Model No.</th>
<th>VWH2000</th>
<th>VWH3000</th>
</tr>
</thead>
<tbody>
<tr>
<td>Workpiece Hole Diam. Code</td>
<td>090</td>
<td>110</td>
</tr>
<tr>
<td>Workpiece Hole DIam. (Straight Hole) mm</td>
<td>( \phi 9 \times 0.7 \times 0.5 )</td>
<td>( \phi 10 \times 0.7 \times 0.5 )</td>
</tr>
<tr>
<td>Locating Repeatability mm</td>
<td>0.01</td>
<td></td>
</tr>
<tr>
<td>Allowable Offset (C - Cut) mm</td>
<td>at Min. Hole Diam.</td>
<td>( \pm 0.05 )</td>
</tr>
<tr>
<td>Expanding Force (F) N</td>
<td>at 0.35MPa</td>
<td>70</td>
</tr>
<tr>
<td></td>
<td>at 0.5MPa</td>
<td>110</td>
</tr>
<tr>
<td></td>
<td>at 0.7MPa</td>
<td>160</td>
</tr>
<tr>
<td>Cylinder Capacity (Empty Action) cm³</td>
<td>Lock</td>
<td>0.46</td>
</tr>
<tr>
<td>Operating Pressure Range MPa</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Withstanding Pressure MPa</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Recommended Air Blow Pressure MPa</td>
<td>0.2 ~ 0.3</td>
<td></td>
</tr>
<tr>
<td>Operating Temperature Range °C</td>
<td>0 ~ 70</td>
<td></td>
</tr>
<tr>
<td>Usable Fluid</td>
<td>Dry Air</td>
<td></td>
</tr>
</tbody>
</table>

Notes:

※1. It shows the locating repeatability under specific condition (when no load is applied).
※2. Expanding force shows the calculated value when coefficient friction is \( \mu = 0.2 \). Refer to the following chart for the relative equation of expanding force and allowable workpiece weight for locating.
※3. Exceeding allowable thrust load leads to accuracy failure and/or damages on the product.
1. This product locates and releases with air pressure. (Air Pressure Double Acting Model)
2. This cylinder is used only for locating and does not have a clamping function.

Relative Equation of Expanding Force and Allowable Workpiece Weight for Locating

Horizontal Attitude

\[ W \leq \frac{F \times \mu}{0.25} \]

Vertical Attitude

\[ W \leq \frac{F \times \mu}{0.25} \]

Thrust Load/Displacement Curve

This graph shows the relationship between thrust load and displacement. Thrust load is the static load applied perpendicular to the center axis of the VWH (Pneumatic Expansion Locating Pin).

Note:

This graph shows the thrust load (static load) applied to a single datum cylinder (VWH-D) that is not used with any other cylinders, etc.
### External Dimensions

*The drawing shows the released state of VWH.*

![Diagram](image)

#### VWH-D

(Datum : Reference Locating)

#### VFH-C

(Cut : One Direction Locating)

---

### Expanding Area Detail

- **When Releasing**
- **When Locking (At Full Stroke)**

![Diagram](image)

---

### Workpiece Hole Dimensions

- **Blind Hole**
- **Through Hole**

![Diagram](image)

---

### Notes:

1. The mounting direction of VWH-C (Cut) should be confirmed by the direction of the gripper.
2. Do not use spring washer or toothed lock washer.
3. The tip of the product can be used to check the mounting distance accuracy after installed. However, it is different from the center accuracy of the gripper part (locating part), so make sure to determine the origin with an actual workpiece before machining.
4. When mounting the product, use two mounting bolts (Strength Grade 12.9) and tighten them evenly. Use two jack bolts to remove the product, keeping it parallel to the mounting surface.
5. This product has no seat. Please prepare another seat if necessary.
### Machining Dimensions for Mounting

![Machining Dimensions for Mounting Diagram](image)

**Notes:**
1. Prepare an air blow port choosing one port from four ★ parts.
2. There might be foam near the flange bottom depending on roughness of mounting surface, but this is not a malfunction.
3. Prepare the air lock port within ★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★
Cautions

Notes for Design

1) Check Specifications
   ● Please use each product according to the specifications.
     **VWH** locates and releases with air pressure.
     **VFH** locates and releases with hydraulic pressure.

2) Notes for Circuit Design
   ● Please read "Circuit Reference" to assist with proper hydraulic/pneumatic circuit design.
   Carry out sufficient advance review as the wrong circuit design may lead to product malfunctioning and damage.

3) Air Supply
   ● Continuously supply air pressure to the air blow port.
     If air supply is shut off during operation, contaminants enter into the cylinder leading to malfunctions.

4) Setting Up the Clamps
   ● The expansion locating pin is a positioning cylinder and has no clamping mechanism. A clamp must be provided separately.

5) Mounting Direction (Phase)
   ● C : Cut (V.H.C) locates a workpiece in the direction of rotation, based on D : Datum (V.H.D). Therefore, it is required to determine the phase of C : Cut when mounting.

When mounting the product, make sure that expanding direction of C (Cut) is perpendicular to D (Datum).

6) Reference Surface towards Z-axis
   ● This product has no seating. Please prepare a seat separately.

7) Adjusting Height of Expansion Locating Pin
   ● Seating height can be selected from 15mm / 20mm / 25mm.
   ● For slight adjustment of seating height and expanding part height, install a spacer (3mm or less) under the flange.

8) When the workpiece is in vertical position.
   ● When setting a workpiece, make sure it is in proper proximity and square to the expansion locating pins.
     If it is locked out of position, the products may be damaged.
   ● As the workpiece may fall down during releasing, it is recommended to set up the latching mechanism to prevent it from falling down.
   ● When the workpiece is used in vertical position (hanging on the wall), the internal moving parts tend to wear out. Check the locating accuracy regularly, and if exceeding the allowable range, replace the product.

---

Example of Latching Mechanism

Expanding direction of standard model is the same as the direction of mounting bolt. Please contact us if needing to change the expanding direction of C : Cut.
9) Inclination in the Z-axis direction.
   - If a workpiece is tilted when loading/unloading, expanded part of expansion locating pin and workpiece hole will get stuck and the cylinder and workpiece will be damaged. Workpiece should be loaded and unloaded with less than 4/100 ~ 5/100 (approx. 2 ~ 3°) of tilt between workpiece and expansion locating pin plane.
   - The product will be damaged when a workpiece is tilted during loading/unloading (especially when unloaded). Prepare guide pins (rough guides) to keep the workpiece level during loading/unloading.

10) Thickness around the Workpiece Hole
    - Thin wall around the workpiece hole could be deformed by expanding force, and locating accuracy would not fill the specification. Please conduct trial testing before use.

11) Distance Accuracy of VWH / VFH
    - Distance accuracy between VWH / VFH mounting holes and between workpiece holes has to be machined corresponding with the allowable offset (VWH/VFH-C : Cut).

12) Depth of Mounting Hole
    - When the depth of mounting hole is not properly machined, it may lead to insufficient expansion or damages on the product.
Cautions

Installation Notes

1) Usable Fluid
   - Use the appropriate fluid by referring to the Hydraulic Fluid List (for VFH).

2) Procedure before Piping
   - The pipeline, piping connector and fixture circuits should be cleaned and flushed thoroughly. The dust and cutting chips in the circuit may lead to fluid leakage and malfunction.

3) Applying Sealing Tape
   - Wrap with tape 1 to 2 times following the screwing direction. Wrapping in the wrong direction will cause leaks and malfunction.
   - Pieces of the sealing tape can lead to air leaks and malfunction.
   - When piping, be careful that contaminant such as sealing tape does not enter in products.

4) Mounting / Removing Expansion Locating Pin
   - Use all bolts with hex holes (Strength Grade 12.9) and tighten them with torque as shown in the table below. Tighten them evenly to prevent twisting or jamming.

<table>
<thead>
<tr>
<th>Model No.</th>
<th>Thread Size</th>
<th>Tightening Torque (N-m)</th>
</tr>
</thead>
<tbody>
<tr>
<td>VWH2000</td>
<td>M5 x 0.8</td>
<td>6.3</td>
</tr>
<tr>
<td>VWH3000</td>
<td>M5 x 0.8</td>
<td>6.3</td>
</tr>
</tbody>
</table>

- Do not use spring washer or toothed lock washer.
- There might be foam near the flange bottom depending on roughness of mounting surface, but this is not a malfunction.
- When removing the product, use two jack bolts (two mounting bolt holes) in order not to damage the installation tap.

The below picture shows the case in which the parallel pin (hollow set) is set in the tapped hole so that the installation tap will not be damaged.

5) Installation of O-ring (Included)
   - For VFH, set the O-ring to the mounting hole side (fixture side) before mounting the body.

<table>
<thead>
<tr>
<th>Hydraulic Fluid List</th>
</tr>
</thead>
<tbody>
<tr>
<td>ISO Viscosity Grade ISO VG 32</td>
</tr>
<tr>
<td>Maker</td>
</tr>
<tr>
<td>Showa Shell Sekiyu</td>
</tr>
<tr>
<td>Idemitsu Kosan</td>
</tr>
<tr>
<td>JXT Nippon Oil &amp; Energy</td>
</tr>
<tr>
<td>Cosmo Oil</td>
</tr>
<tr>
<td>ExxonMobil</td>
</tr>
<tr>
<td>Matsumura Oil</td>
</tr>
<tr>
<td>Castrol</td>
</tr>
</tbody>
</table>

Note: As it may be difficult to purchase the products as shown in the table from overseas, please contact the respective manufacturer.

Notes on Handling

1) It should be handled by qualified personnel.
   - The hydraulic machine and air compressor should be handled and maintained by qualified personnel.

2) Do not handle or remove the product unless the safety protocols are ensured.
   - The machine and equipment can only be inspected or prepared when it is confirmed that the preventive devices are in place.
   - Before the product is removed, make sure that the above-mentioned safety measures are in place. Shut off the pressure and power source, and make sure no pressure exists in the air and hydraulic circuits.

3) After stopping the product, do not remove until the temperature cools down.
   - Make sure there is no abnormality in the bolts and respective parts before restarting the machine or equipment.

4) Do not touch the Expansion Locating Pin while it is working. Otherwise, your hands may be injured due to clinching.

4) Do not disassemble or modify.
   - If the equipment is taken apart or modified, the warranty will be voided even within the warranty period.
● **Maintenance and Inspection**

1) **Removal of the Product and Shut-off of Pressure Source**
   - Before the product is removed, make sure that safety measures and preventive devices are in place. Shut off the pressure and power source, and make sure no pressure exists in the air and hydraulic circuits.
   - Make sure there is no abnormality in the bolts and respective parts before restarting.

2) Please clean the locating product regularly.
   - Locating products (VWH/VFH) can remove contaminants with cleaning functions (air blow function). However, hardened cutting chips, adhesive coolant, etc. may not be removed. Make sure there is no contaminant before installing a workpiece/pallet.
   - Continuous use with contaminant on components will lead to locating accuracy failure, malfunction and fluid leakage.

3) If disconnecting by couplers, air bleeding should be carried out on a regular basis to avoid air mixed in the circuit.

4) Regularly tighten piping, mounting bolts, nuts, snap rings and cylinders, etc. to ensure proper use.

5) Make sure the hydraulic fluid has not deteriorated.

6) Make sure there is smooth action and no abnormal noise.
   - Especially when it is restarted after left unused for a long period, make sure it can be operated properly.

7) The products should be stored in the cool and dark place without direct sunshine or moisture.

8) Please contact us for overhaul and repair.

● **Warranty**

1) **Warranty Period**
   - The product warranty period is 18 months from shipment from our factory or 12 months from initial use, whichever is earlier.

2) **Warranty Scope**
   - If the product is damaged or malfunctions during the warranty period due to faulty design, materials or workmanship, we will replace or repair the defective part at our expense.
   - Defects or failures caused by the following are not covered.
      1. If the stipulated maintenance and inspection are not carried out.
      2. If the product is used while it is not suitable for use based on the operator’s judgment, resulting in defect.
      3. If it is used or handled in inappropriate way by the operator.
         (Including damage caused by the misconduct of the third party.)
      4. If the defect is caused by reasons other than our responsibility.
      5. If repair or modifications are carried out by anyone other than Kosmek, or without our approval and confirmation, it will void warranty.
      6. Other caused by natural disasters or calamities not attributable to our company.
      7. Parts or replacement expenses due to parts consumption and deterioration.
         (Such as rubber, plastic, seal material and some electric components.)

   Damages excluding from direct result of a product defect shall be excluded from the warranty.
Notes on Cylinder Speed Control Circuit

Please pay attention to the cautions below. Design the circuit for controlling the action speed of cylinder. Improper circuit design may lead to malfunctions and damages. Please review the circuit design in advance.

Circuit Reference

Double Action model VWH

Expansion Locating Pin and other actuators on different circuits.

Double Action model VFH

Expansion Locating Pin and other actuators on the same circuit.

Notes:
1. The procedure for lock operation should be "VWH (Expansion Locating Pin)" → "other actuators". Otherwise there might be accuracy failure and/or damages on the product.
2. Use the check valve (Recommended cracking pressure : 0.04MPa or less) if there is back pressure in the tank port.
3. Adjust the flow rate so that there is no surge pressure.
4. This circuit reference is one example. It should be prepared depending on the fixture structure.