FA Pneumatic Hole Clamp
Model WKH

Gripper expands and pulls workpiece in.
Clamps the workpiece by holding its holes, allowing for 5 faces accessible.
Light Weight, Smaller Footprint, and High-Power

Transfer • Assembly with Robots

Transfer Equipment

Gripper expands and pulls workpiece in.

Assembling Equipment
### Action Description

**Clearance**
- Less than 0.5mm

- **Gripper**
- **Large Clearance**

- **Workpiece**

- **< Released State >**
- Gripper expands to hold workpiece hole.

- **< Clamping State >**
- Pulls and clamps in workpiece hole.

- **< Clamping Completed >**

### Advantages

**Transfer • Light Weight**
- Compact and light weight loading/lifting hand part enables to downsize transfer equipment.

**Larger Space**
- Loading/Lifting Hand with Parallel Hand/Linear Cylinder

**Smaller Space**
- Compact Hole Clamp with Powerful Gripping Force

**No Interference**
- Able to access 5 faces of a workpiece and improves work efficiency.

**Interferes with the hand when holding a workpiece.**

**5 Faces Accessible with No Interference**

**High Power • Safety**
- Powerful gripping and clamping force with mechanical lock. The self-lock function with mechanical lock and internal spring will ensure safety even at 0MPa.

**The built-in spring maintains clamping state.**

- **Gripping Force**
  - Air 0.4MPa: **1600N**
  - Air 0MPa: **220N**
**Action Description** ♦ This is a simplified drawing. The actual part components may be different.

### When Loading / Unloading (Release)
1. Air is supplied to the release port.
2. Air pressure releases the internal mechanical lock and moves the clamp rod forward. The gripper will be retracted.

### When Gripping / Clamping (Lock)
1. Release air to the release port and supply air to the lock port.
2. The internal mechanical lock with self-locking spring force and air pressure powerfully pulls in the clamp rod. The gripper will be expanded.
3. After the gripper holds a workpiece, the pulling force pulls in the workpiece onto the seating surface. (Clamping Force = Pulling Force toward Seating Surface)

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**Caution**
This product has no function that prevents foreign substances. Do not use under environment with coolant and cutting chips.

For such environment, choose the high-power pneumatic hole clamp (model SWE).
**Auto Switch**

The lock and release action can be detected by an auto switch (preparatory by customer).

![Installation Sample 1](image1) ![Installation Sample 2](image2)

Auto Switch

Note:
1. Depending on difference of workpiece hole diameter, the detection range of an auto switch can be insufficient.
   If using an auto switch, workpiece hole diameter difference should be within ±0.1mm.

[**Applicable Auto Switch**](#) Refer to P.247-P.256 for detailed specifications. (When using an auto switch not made by Kosmek, check specifications of each manufacturer.)

<table>
<thead>
<tr>
<th>Auto Switch Model No.</th>
<th>JEP0000-A2</th>
<th>JEP0000-A2L</th>
<th>JEP0000-B2</th>
<th>JEP0000-B2L</th>
</tr>
</thead>
<tbody>
<tr>
<td>Switch Type</td>
<td>Reed Auto Switch</td>
<td>Solid State Auto Switch</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wiring Method</td>
<td>2-Wire</td>
<td>3-Wire</td>
<td>1m</td>
<td>3m</td>
</tr>
<tr>
<td>Cable Length</td>
<td>3m</td>
<td>1m</td>
<td>3m</td>
<td></td>
</tr>
<tr>
<td>Specifications</td>
<td>Refer to P.248</td>
<td>Refer to P.249</td>
<td></td>
<td></td>
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<tr>
<td>• Electric Circuit Diagram</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**External Dimensions**

- **M2.5×0.45 Mounting Bolt**
  - Tightening Torque: 0.25N·m
  - LED Indicator
  - Brown Cable (+)
  - Blue Cable (-)

- **M2.5×0.45 Mounting Bolt**
  - Tightening Torque: 0.25N·m
  - LED Indicator
  - Brown Cable (+)
  - Black Cable (Output)
  - Blue Cable (-)

<table>
<thead>
<tr>
<th>Auto Switch Model No.</th>
<th>JEP0000-A2V</th>
<th>JEP0000-A2VL</th>
<th>JEP0000-B3</th>
<th>JEP0000-B3L</th>
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</thead>
<tbody>
<tr>
<td>Switch Type</td>
<td>Reed Auto Switch</td>
<td>Solid State Auto Switch</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wiring Method</td>
<td>2-Wire</td>
<td>3-Wire</td>
<td>1m</td>
<td>3m</td>
</tr>
<tr>
<td>Cable Length</td>
<td>3m</td>
<td>1m</td>
<td>3m</td>
<td></td>
</tr>
<tr>
<td>Specifications</td>
<td>Refer to P.248</td>
<td>Refer to P.250</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Electric Circuit Diagram</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**External Dimensions**

- **M2.3×0.4 Mounting Bolt**
  - Tightening Torque: 0.1N·m
  - LED Indicator
  - Blue Cable (-)

- **M2×0.4 (Left-Hand Thread)**
  - Tightening Torque: 0.1N·m
  - LED Indicator
  - Red Cable (Output)
  - Blue Cable (-)

- **High Sensitivity Position**
Model No. Indication

WKH 2 00 0 - 115 - D - - F B

1 Body Size
2 : Standard

2 Design No.
0 : Revision Number

3 Workpiece Hole Diameter (Workpiece Hole Code)

Workpiece Hole Diameter $d \pm 0.3$

* Indicate the workpiece hole diameter $d$ in 0.5 increments from the allowable range in the list below.
* When using with an auto switch, workpiece hole diameter difference should be within $\pm 0.1$ mm.

<table>
<thead>
<tr>
<th>Workpiece Hole Code</th>
<th>Hole Diameter $d$ $0.5$ (mm)</th>
<th>060</th>
<th>065</th>
<th>070</th>
<th>075</th>
<th>080</th>
<th>085</th>
<th>090</th>
<th>095</th>
<th>100</th>
<th>105</th>
<th>110</th>
<th>115</th>
<th>120</th>
<th>125</th>
<th>130</th>
<th>135</th>
<th>140</th>
</tr>
</thead>
<tbody>
<tr>
<td>Function D</td>
<td>Datum (For Reference Locating)</td>
<td>Not Available</td>
<td>Available No. of Gripper</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Function C</td>
<td>Available No. of Gripper: 2</td>
<td>Available No. of Gripper: 2</td>
<td></td>
<td></td>
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<td></td>
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<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Function M</td>
<td>Available No. of Gripper: 2</td>
<td>Available No. of Gripper: 2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
<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)
M : Floating of Expanding Area (No Locating Function)

* When using it with expansion locating pin (model WWM, WKK, WRA, VRU, VXU, etc.) please select Function M.

5 Seating Height Dimension

Blank : Standard Height
H Seating Height : Specifying Seating Height (In 10mm increments)

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Blank (Standard)</th>
<th>H10</th>
<th>H20</th>
<th>H30</th>
<th>H40</th>
<th>H50</th>
</tr>
</thead>
<tbody>
<tr>
<td>AA</td>
<td>50</td>
<td>60</td>
<td>70</td>
<td>80</td>
<td>90</td>
<td>100</td>
</tr>
<tr>
<td>AB</td>
<td>10</td>
<td>20</td>
<td>30</td>
<td>40</td>
<td>50</td>
<td>60</td>
</tr>
</tbody>
</table>

6 Shape of Gripper (Workpiece Hole)

F : No Serration (Standard)
S : With Serration
T : Taper Hole (With Serration) * Contact us for details.

7 Shape of Cap End

Blank : Standard (Low Head Model)
B : Cone Point Model

* When inserting the cap adjusting to a workpiece hole, it should be fixed within the floating range, or a workpiece should be light and not fixed.
Specifications

Model No.  

<table>
<thead>
<tr>
<th>Machine Part</th>
<th>Workpiece Diameter φ d</th>
<th>Workpiece Hole Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Part</td>
<td>φ d</td>
<td>Code</td>
</tr>
<tr>
<td></td>
<td>6.5</td>
<td>060</td>
</tr>
<tr>
<td></td>
<td>7</td>
<td>065</td>
</tr>
<tr>
<td></td>
<td>7.5</td>
<td>070</td>
</tr>
<tr>
<td></td>
<td>8</td>
<td>075</td>
</tr>
<tr>
<td></td>
<td>8.5</td>
<td>080</td>
</tr>
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<td></td>
<td>9</td>
<td>085</td>
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<tr>
<td></td>
<td>11.5</td>
<td>110</td>
</tr>
<tr>
<td></td>
<td>12</td>
<td>115</td>
</tr>
<tr>
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<td>12.5</td>
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<td>13.5</td>
<td>130</td>
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<tr>
<td></td>
<td>14</td>
<td>135</td>
</tr>
<tr>
<td></td>
<td>14.5</td>
<td>140</td>
</tr>
</tbody>
</table>

Locating Repeatability 0.1 mm  

Allowable Offset (Floating Clearance of Expanding Area) ±0.2 mm  

Workpiece Pulling Stroke  

Cylinder Capacity  

Locating Repeatability 0.1 mm  

Verification: 0.03 (When Combining D/C)  

Allowable Offset (Floating Clearance of Expanding Area) ±0.2 (When Selecting M)  

Notes:  

1. Locating repeatability under the same condition (no load).  
2. The expanding part of option M is an adjusting structure and the clamping operation is done by locating a workpiece hole. The value in the table shows the amount of tolerance value of single clamp. Please consider the distance accuracy of each clamp mounting hole and each workpiece machining hole when using with another location clamp / location cylinder, or when using more than two of these products.

Gripping Force • Clamping Force Curve

<table>
<thead>
<tr>
<th>Model No.</th>
<th>Shape of Gripper</th>
<th>F: No Serration</th>
<th>S: With Serration</th>
</tr>
</thead>
<tbody>
<tr>
<td>WKH2000</td>
<td>Air Pressure</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>0.5 MPa</td>
<td>1950</td>
<td></td>
</tr>
<tr>
<td></td>
<td>0.4 MPa</td>
<td>1600</td>
<td></td>
</tr>
<tr>
<td></td>
<td>0.3 MPa</td>
<td>1260</td>
<td></td>
</tr>
<tr>
<td></td>
<td>0.2 MPa</td>
<td>910</td>
<td></td>
</tr>
<tr>
<td></td>
<td>0.1 MPa</td>
<td>220</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Calculation Formula</td>
<td>FH = 3460×P + 220</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Air Pressure</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>0.5 MPa</td>
<td>185</td>
<td>630</td>
</tr>
<tr>
<td></td>
<td>0.4 MPa</td>
<td>150</td>
<td>505</td>
</tr>
<tr>
<td></td>
<td>0.3 MPa</td>
<td>115</td>
<td>380</td>
</tr>
<tr>
<td></td>
<td>0.2 MPa</td>
<td>80</td>
<td>260</td>
</tr>
<tr>
<td></td>
<td>0.1 MPa</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>Calculation Formula</td>
<td>Fc = 350×P + 10</td>
<td>Fc = 1240×P + 10</td>
</tr>
</tbody>
</table>

Notes:  

1. This graph shows the relationship among supply air pressure, gripping force and clamping force.  
2. Gripping force shows the expanding force acting perpendicular to the clamp’s center axis. Clamping force shows the pressing force against the seating surface.  
3. Thin wall around the workpiece hole can be deformed by clamping action, gripping force and clamping force will not fill the specification.  
4. This graph shows the calculated value when the friction coefficient of expanding area is μ0.15.  
5. Clamping force of F: No Serration shows the calculated value when the friction coefficient of workpiece and gripper is μ0.1.  
**External Dimensions**

*The drawing shows the released state of WKH2000-[□]-D-F.

<table>
<thead>
<tr>
<th>4-MS × 0.8 Thread Depth 10</th>
</tr>
</thead>
<tbody>
<tr>
<td>19 ± 0.02</td>
</tr>
</tbody>
</table>

2- φ 3H8 [0.014]
Locating Hole Depth 4

**Seating Height: Standard**

- Air Lock Port [□] 2
- M5 × 0.8 Thread Depth 4
- Air Release Port [□] 2
- M5 × 0.8 Thread Depth 4

φ 36.5 ± 0.009
φ 4.3 ± 0.014
φ 4.3

**Workpiece (Pallet) Hole Dimensions**

- Workpiece Hole Diameter
  - φ d
  - Stop Hole
  - Through Hole
  - Taper Hole [□] 4

*Notes:

1. Mounting bolts are not provided. Please prepare them according to the mounting position. (Refer to "Mounting Hole Clamp" on P.198)

2. The workpiece must be resting on all seating surfaces when clamping. Otherwise the workpiece can be deformed by the clamping force.

3. The name of each port is marked on the port. (LOCK: Air Lock Port, RELEASE: Air Release Port)

4. Please refer to Seating Height: Standard for dimensions that is not shown.

**Expanding Area Detail**

**Specified Seating Height: H [□] [□] 2**

**Notes:*

1. Thin wall around the workpiece hole can be deformed by clamping action, gripping force and clamping force will not fill the specification. Please make sure to test the clamping function before using and adjust to the appropriate supply of pressure.

2. When clamping a taper hole, please indicate the detailed dimensions of a clamp hole (including tolerance).
Functions and Gripper Direction

Number of Gripper: 3 (120° Interval)

Model No. Indication

WKH 2 00 0 - 115 - D - C - Blank - F - S - T

1 2 3 4 5 6

External Dimensions

<table>
<thead>
<tr>
<th>Model No.</th>
<th>WKH2000-□-□-□□-□□-□□□-□□□□</th>
<th>(mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Workpiece Hole Code</td>
<td>060 065 070 075 080 085 090 095 100 105 110 115 120 125 130 135 140</td>
<td></td>
</tr>
<tr>
<td>Workpiece Hole Diameter (\phi d)</td>
<td>6.1 6.5 6.9 7.3 7.7 8.1 8.6 9.0 9.4 9.8 10.2 10.6 11.0 11.4 11.8 12.2</td>
<td></td>
</tr>
<tr>
<td>Clamp Diameter At Release</td>
<td>5.5 6.0 6.5 7.0 7.5 8.0 8.5 9.0 9.5 10.0 10.5 11.0 11.5 12.0 12.5 13.0</td>
<td></td>
</tr>
<tr>
<td>At Idle</td>
<td>6.8 7.3 7.8 8.3 8.8 9.3 9.8 10.3 10.8 11.3 11.8 12.3 12.8 13.3 13.8 14.3</td>
<td></td>
</tr>
<tr>
<td>Workpiece Pulling Stroke</td>
<td>0.5</td>
<td></td>
</tr>
<tr>
<td>A</td>
<td>5.6 6.1 6.6 7.1 7.6 8.1 8.6 9.1 9.6 10.0 10.6 11.1 11.6 12.1 12.6 13.1</td>
<td></td>
</tr>
<tr>
<td>B</td>
<td>8 8 8 8 8 8 8 9.5 9.5 9.5 11 11 11 11 11</td>
<td></td>
</tr>
<tr>
<td>C</td>
<td>2 2 2.5 2.5 3 3 4.5 4.5 5 5 5.5 5.5 6 6 6 6.5 6.5 7.5</td>
<td></td>
</tr>
<tr>
<td>E</td>
<td>3.3 3.3 3.3 3.3 3.3 3.3 3.3 3.3 3.3 3.3 3.3 3.3 3.3 3.3 3.3</td>
<td></td>
</tr>
<tr>
<td>F</td>
<td>15 16 16 17 17 17 17 19 20 20 21 21 22 22 23 24 24</td>
<td></td>
</tr>
<tr>
<td>G</td>
<td>9.5 10.5 10.5 11.5 11.5 12 13.5 14.5 14.5 15.5 15.5 16.5 16.5 17.5 17.5 18.5</td>
<td></td>
</tr>
</tbody>
</table>

Function D
Locating Repeatability \(\pm 0.5\) Not Available 0.03

Function M
Allowable Offset (Floating Clearance of Expanding Area) \(\pm 0.2\)

Notes:
* 5. Locating repeatability under the same condition (no load).
* 6. The clamping part is an adjusting structure and the clamping operation is done by locating a workpiece hole. The value in the table shows the amount of tolerance value of single clamp. Please consider the distance accuracy of each clamp mounting hole and each workpiece machining hole when using with another location clamp / location cylinder, or when using more than two of these products.

Mounting Direction of WKH2000-□-□-□

When locating with workpiece hole code 090 ~ 140
- The expanding direction of WKH2000-□-□ must be vertical toward the line connecting the centers of WKH2000-□-□ and WKH2000-□-□.
- shows the expanding direction of the gripper.
**External Dimensions**

* The drawing shows the released state of WKH2000-□-D-F8.

Note: Mounting bolts are not provided.
Please prepare them according to the mounting position.
(Refer to “Mounting Hole Clamp” on P.198.)

*1. The workpiece must be resting on all seating surfaces when clamping. Otherwise the workpiece can be deformed by the clamping force.

*2. The name of each port is marked on the port.
(LOCK: Air Lock Port, RELEASE: Air Release Port)

*3. Please refer to Seating Height: Standard for dimensions that is not shown.

**Workpiece (Pallet) Hole Dimensions**

Notes:

1. Thin wall around the workpiece hole can be deformed by clamping action, gripping force and clamping force will not fill the specification.
Please make sure to test the clamping function before using and adjust to the appropriate supply of pressure.

*4. When clamping a taper hole, please indicate the detailed dimensions of a clamp hole (including tolerance).
Functions and Gripper Direction

![Diagram of gripper directions with labels and numbers]

- Shows the expanding direction of the gripper.

Model No. Indication

- WKH 2 00 0 - □□□□ - □□□□ - □□□□ - □□□□ - □□□□ - □□□□ - □□□□ - □□□□ - □□□□ - □□□□

- 1: Body Size
- 2: Design No.
- 3: Workpiece Hole Diam. (Code)
- 4: Functions
- 5: Seat Height Dimension
- 6: Shape of Gripper (Workpiece Hole)
- 7: Shape of Cap End (When selecting B)

External Dimensions

<table>
<thead>
<tr>
<th>Model No.</th>
<th>Workpiece Hole Code</th>
<th>WKH2000-□□□□-□□□□-□□□□-□□□□-□□□□-□□□□-□□□□-□□□□-□□□□-□□□□</th>
<th>(mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Workpiece Hole Diameter ø d</td>
<td>060</td>
<td>065</td>
<td>070</td>
</tr>
<tr>
<td>Clamp Diameter At Release</td>
<td>5.5</td>
<td>6</td>
<td>6.5</td>
</tr>
<tr>
<td>At Idle</td>
<td>6.8</td>
<td>7.3</td>
<td>7.8</td>
</tr>
<tr>
<td>Workpiece Pulling Stroke 0.5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A</td>
<td>5.6</td>
<td>6.1</td>
<td>6.6</td>
</tr>
<tr>
<td>B</td>
<td>9</td>
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</tr>
<tr>
<td>C</td>
<td>2</td>
<td>2</td>
<td>2.5</td>
</tr>
<tr>
<td>D</td>
<td>3.5</td>
<td>4</td>
<td>4.5</td>
</tr>
<tr>
<td>E</td>
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<td>3.3</td>
<td>3.3</td>
</tr>
<tr>
<td>F</td>
<td>15</td>
<td>16</td>
<td>16</td>
</tr>
<tr>
<td>G</td>
<td>9.5</td>
<td>10.5</td>
<td>10.5</td>
</tr>
</tbody>
</table>

- Function D: Locating Repeatability ≥5
- Function M: Allowable Offset (Floating Clearance of Expanding Area) ≥6
- Notes: ≥5. Locating repeatability under the same condition (no load).
- ≥6. The clamping part is an adjusting structure and the clamping operation is done by locating a workpiece hole. The value in the table shows the amount of tolerance value of single clamp. Please consider the distance accuracy of each clamp mounting hole and each workpiece machining hole when using with another location clamp / location cylinder, or when using more than two of these products.

Mounting Direction of WKH2000-□□□□-□□□□

- When locating with workpiece hole code 090 ~ 140
- The expanding direction of WKH2000-□□□□ must be vertical toward the line connecting the centers of WKH2000-□□□□ and WKH2000-□□□□.

- Shows the expanding direction of the gripper.

5 Seating Height Dimension

<table>
<thead>
<tr>
<th>Standard Seating Height</th>
<th>Specified Seating Height</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blank</td>
<td>H10</td>
</tr>
<tr>
<td>AA</td>
<td>50</td>
</tr>
<tr>
<td>AB</td>
<td>10</td>
</tr>
<tr>
<td>Mass</td>
<td>kg</td>
</tr>
</tbody>
</table>
Sample 1 (Layout and Circuit)

Combination Use with Pneumatic Expansion Locating Pin (model VWM) for High Accuracy Locating (Repeatability: 3 μm)
※ This drawing shows a layout sample of WKH-M (FA Pneumatic Hole Clamp) and VWM (Pneumatic Expansion Locating Pin).

Notes:
1. When loading/unloading a workpiece, install two or more rough guides in order to prevent damage to a clamping part.
2. When using with VWM (Pneumatic Expansion Locating Pin), choose Function:M Floating of Expanding Area for FA Pneumatic Hole Clamp.

When Controlled with One Solenoid Valve

When Controlled with Two Solenoid Valves

Note:
※1. Please use solenoid valve to make a sequence operation that WKH (Hole Clamp) starts working after VWM (Pneumatic Expansion Locating Pin) completes the movement. When unable to use solenoid valve, please prepare flow control valve with check valve at ★1 part to adjust sequencing speed. If WKH operates before VWM, there is a possibility for the equipment to be damaged due to a thrust load on WKH.
Sample 2 (Layout and Circuit)

Combination Use with High-Power Pneumatic Work Support (model WNC) for Workpiece Inclination Prevention During Transfer

When the gravity center of a workpiece is unbalanced, it could damage a clamp or drop a workpiece affected by inertia moment due to high-speed transfer (sudden stop). Use work supports, etc. when designing a system.

※ This drawing shows a layout sample of WKH-D/C (FA Pneumatic Hole Clamp), WNC (High-Power Pneumatic Work Support) and BWD (Air Sequence Valve).

Note:

※1. Please use solenoid valve or BWD (Air Sequence Valve) to make a sequence operation that WKH (Hole Clamp) starts working after WNC (High-Power Pneumatic Work Support) completes the movement. If WKH operates before WNC, there is a possibility for the equipment to be damaged due to a thrust load on WKH.
Notes for Design

1) Check Specifications
- Please use each product according to its specifications.
- This product is air double action clamp which locks with air pressure and spring force (gripping and clamping) / releases with air pressure. Even when air is not supplied to either lock or release port, the built-in spring maintains clamped state (clamp diameter is expanded).

1) Gripping and clamping force at zero pressure is lower than those when air is supplied. For using at zero pressure, please refer to P.192 Gripping • Clamping Force Curve : Air Pressure 0 MPa.
2) Supply the release air when loading/unloading a workpiece. Otherwise the workpiece contacts the grippers leading to damage to workpiece or clamp.

2) Working Reference Plate (Seating Surface) Z Axis
- The upper surface of the flange of this product is the seating surface of workpiece and locates in Z direction.

A workpiece must be resting on all seating surfaces when clamping. If not, calculate contacting pressure with clamping force and seating area not to deform a workpiece.

3) Wall Thickness around Workpiece Hole
- Thin wall around the workpiece hole can be deformed by clamping action, gripping and clamping force does not fill the specification. Please conduct clamping test and adjust to proper air pressure before use. If clamping force is insufficient, workpiece may fall out.

4) Clamp Installation
- When Using Functions -D/C
  -C : Cut locates the orientation using -D : Datum as a reference. Therefore, it is required to determine the phase of -C : Cut when mounting.

When locating with workpiece hole code 090 ~ 140
(When using Function -D and -C together)
The expanding direction of WKH2000□-C must be vertical toward the line connecting the centers of WKH2000□-D and WKH2000□-C.

When roughly locating with workpiece hole code 060 ~ 085
(When using Function -C and -C together)
Rotate 90° of the expanding direction of two clamps toward the line connecting the centers of two WKH2000□-C.
(Accuracy is not guaranteed since there is no reference locating.)

5) Clamping Force
- Clamping force shows pressing force against the seating surface. Please conduct clamping test and adjust to proper air pressure before use.
  When using in a state that the clamping force is insufficient, the workpiece may fall out.

6) Workpiece hole size, slope angle and workpiece hardness should be within the range of the specification.

<table>
<thead>
<tr>
<th>Condition</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>When workpiece hole diameter is larger than specification.</td>
<td>Expansion stroke is insufficient and the gripping force - clamping force will not fill the specifications.</td>
</tr>
<tr>
<td>When using it with insufficient gripping (clamping) force.</td>
<td>Leads to failing of the workpiece.</td>
</tr>
<tr>
<td>When workpiece hole diameter is smaller than specification.</td>
<td>Difficult to attach/detach the workpiece leading to damage.</td>
</tr>
<tr>
<td>When workpiece hole depth is shallow.</td>
<td>Could lead to abnormal seating and damage.</td>
</tr>
<tr>
<td>When workpiece hole taper is larger than standard.</td>
<td>The load concentrates on the gripper point when clamping and could lead to damage.</td>
</tr>
<tr>
<td>When workpiece hole is harder than specified.</td>
<td>Gripper does not dig into work enough and it cannot clamp securely.</td>
</tr>
</tbody>
</table>
7) Horizontal Locating
- When a workpiece is set, please make sure there is no lifting or slope of the workpiece. If the clamping operation is done with lifting or slope of the workpiece, it will lead to possible damage of a clamp and deformation of the workpiece hole.

8) Please detach a workpiece with all clamps fully released.
- When detaching a workpiece during lock or release operation, it may cause damage to the clamp or cause the workpiece to fall.

9) Please set up rough guides.
- When detaching a workpiece with slope it may cause the damage to the clamp or cause the workpiece to fall.

Please set up rough guides considering the pitch accuracy of location clamp / location cylinder mounting hole and each workpiece machining hole when using with another location clamp / location cylinder, etc.

10) For Use of Auto Switch
- Depending on difference of workpiece hole diameter, the detection range of an auto switch can be insufficient.

If using an auto switch, workpiece hole diameter difference should be within ±0.1mm.

11) Fall Prevention Measures
- In case of accident such as detachment of a workpiece, please prepare fall prevention measures for safety.

12) Operating Environment
This product has no function that prevents foreign substances. Do not use under environment with coolant and cutting chips. For such environment, choose the high-power pneumatic hole clamp (model SWE).

13) Damage Prevention during Robot Handling, etc.
- When inserting the Hole Clamp tip into/taking it out of a workpiece hole, the Hole Clamp tip has to be vertical to the workpiece hole.

Especially after releasing a workpiece, the Hole Clamp tip must be fully taken out from the workpiece hole before moving to a next coordinate.

If the Hole Clamp tip touches a workpiece when inserting, control the insertion speed to avoid damage on the workpiece and Hole Clamp tip.

When the Hole Clamp is mounting/removing a workpiece, make sure that a robot operates only after the Clamp completes clamping/releasing action by using a sensor or timer. If the robot starts operating in the middle of clamping/releasing action, the workpiece may be fallen off.

When mounting/removing a workpiece, it may be tilted due to a gap between the workpiece and the stand. This causes damage of the Hole Clamp. The gap has to be minimized as much as possible when mounting/removing.

Large Gap between the Workpiece and Stand

Minimal Gap between the Workpiece and Stand
Cautions

• Installation Notes
  1) Check the fluid to use.
     • Please supply filtered clean dry air.
     • Oil supply with a lubricator etc. is unnecessary.
  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.
     • There is no filter provided with this product for prevention of
       contaminants in the air circuit.
  3) Applying Sealing Tape
     • Wrap with tape 1 to 2 times following the screwing direction.
     • Pieces of the sealing tape may lead to air leaks and malfunction.
     • In order to prevent a foreign substance from going into the product
       during the piping work, it should be carefully cleaned before working.
  4) Mounting Hole Clamp
     • When mounting the product use four hexagon socket bolts
       (with tensile strength of A2-70 or more) and tighten them
       with the torque shown in the chart below.
       Tightening with greater torque than recommended can
       depress the seating surface or break the bolt.

<table>
<thead>
<tr>
<th>Model No.</th>
<th>Thread Size</th>
<th>Tightening Torque (N·m)</th>
</tr>
</thead>
<tbody>
<tr>
<td>WKH2000</td>
<td>M4×0.7</td>
<td>2.5</td>
</tr>
<tr>
<td></td>
<td>M5×0.8</td>
<td>5.0</td>
</tr>
</tbody>
</table>

4-M4×0.7
Prepared by Customer

4-M5×0.8
Prepared by Customer

5) Port Position of Hole Clamp
• The name of each port is marked on the flange surface.
  Be careful with the mounting direction of piping.
  (LOCK : Air Lock Port, RELEASE : Air Release Port)

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.
     ① The machine and equipment can only be inspected or prepared
       when it is confirmed that the preventive devices are in place.
     ② Before the product is removed, make sure that the above-mentioned
       safety measures are in place. Shut off the air of hydraulic source
       and make sure no pressure exists in the hydraulic and air circuit.
     ③ After stopping the product, do not remove until the temperature
       cools down.
     ④ Make sure there is no abnormality in the bolts and respective parts
       before restarting the machine or equipment.
  3) Do not touch workpieces (pallets) or clamps while they are working.
     Otherwise, your hands may be injured due to clinching.

4) When transferring a workpiece, make sure the safety of environment
   in case of a workpiece detachment.

5) Do not disassemble or modify.
• If the equipment is taken apart or modified, the warranty will be
  voided even within the warranty period.
• Powerful spring is built in inside which is very dangerous.
• Maintenance and Inspection

1) Removal of the Machine and Shut-off of Air Source
• Before the product is removed, make sure that the above-mentioned safety measures are in place. Shut off the pressure source and power source and make sure no pressure exists in the hydraulic • air circuit.
• Make sure there is no abnormality in the bolts and respective parts before restarting.

2) Regularly clean the clamping part and seating surface.
• If operating with dirt adhering to the clamping part, it will lead to damage to a product and workpiece detachment due to gripping force and clamping force shortage, defective operation, and air leaks, etc.

3) Regularly tighten pipe line and mounting bolt to ensure proper use.

4) Clamping force will be decreased due to friction of a gripper surface caused by repeated operation.
Replacement period differs depending on operating pressure, workpiece material, and shape of hole. When you find friction on gripper surface, the gripper needs to be required.
Please contact us for replacement.

5) 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.

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

7) Please contact us for overhaul and repair.

**Powerful spring is built in inside which is very dangerous.**

※ Please refer to P.461 for common cautions. • Warranty
# Sales Offices

## Sales Offices across the World

<table>
<thead>
<tr>
<th>Country</th>
<th>Office Name</th>
<th>TEL.</th>
<th>FAX.</th>
</tr>
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<tbody>
<tr>
<td>Japan</td>
<td>KOSMEK LTD.</td>
<td>TEL. +81-78-991-5162</td>
<td>FAX. +81-78-991-8787</td>
</tr>
<tr>
<td></td>
<td>Overseas Sales</td>
<td></td>
<td></td>
</tr>
<tr>
<td>USA</td>
<td>KOSMEK (USA) LTD.</td>
<td>TEL. +1-630-620-7650</td>
<td>FAX. +1-630-620-9015</td>
</tr>
<tr>
<td>Mexico</td>
<td>KOSMEK USA Mexico Office</td>
<td>TEL. +52-442-161-2347</td>
<td></td>
</tr>
<tr>
<td>Europe</td>
<td>KOSMEK EUROPE GmbH</td>
<td>TEL. +43-463-287587</td>
<td>FAX. +43-463-287587-20</td>
</tr>
<tr>
<td>China</td>
<td>KOSMEK (CHINA) LTD.</td>
<td>TEL. +86-21-54253000</td>
<td>FAX. +86-21-54253709</td>
</tr>
<tr>
<td></td>
<td>考世美(上海)貿易有限公司</td>
<td></td>
<td></td>
</tr>
<tr>
<td>India</td>
<td>KOSMEK LTD - INDIA</td>
<td>TEL. +91-9880561695</td>
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<tr>
<td>Thailand</td>
<td>Thailand Representative Office</td>
<td>TEL. +66-2-300-5132</td>
<td>FAX. +66-2-300-5133</td>
</tr>
<tr>
<td>Taiwan</td>
<td>Full Life Trading Co., Ltd.</td>
<td>TEL. +886-2-82261860</td>
<td>FAX. +886-2-82261890</td>
</tr>
<tr>
<td></td>
<td>(Taiwan Exclusive Distributor)</td>
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<tr>
<td>Philippines</td>
<td>G.E.T. Inc, Phil.</td>
<td>TEL. +63-2-310-7286</td>
<td>FAX. +63-2-310-7286</td>
</tr>
<tr>
<td>Indonesia</td>
<td>(Indonesia Exclusive Distributor)</td>
<td>TEL. +62-21-29628607</td>
<td>FAX. +62-21-29628608</td>
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<tr>
<td></td>
<td>PT. Yamata Machinery</td>
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## Sales Offices in Japan

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<th>Location</th>
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<th>FAX.</th>
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<tbody>
<tr>
<td>Head Office</td>
<td>078-991-5162</td>
<td>078-991-8787</td>
</tr>
<tr>
<td>Osaka Sales Office</td>
<td></td>
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<tr>
<td>Overseas Sales</td>
<td>048-652-8839</td>
<td>048-652-8828</td>
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<tr>
<td>Tokyo Sales Office</td>
<td>0566-74-8778</td>
<td>0566-74-8808</td>
</tr>
<tr>
<td>Nagoya Sales Office</td>
<td>092-433-0424</td>
<td>092-433-0426</td>
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<tr>
<td>Fukuoka Sales Office</td>
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Overseas Affiliates and Sales Offices

Distributors

Asia Detailed Map

For further information on unlisted specifications and sizes, please call us.

Specifications in this catalog are subject to change without notice.