Hydraulic Hole Clamp

Model SFA
Model SFC

Gripper expands and pulls workpiece down.

Gripper expands and pulls workpiece down.

Action Description

< Released State >
Load/Unload Workpiece

< Clamping State >
Gripper expands to hold workpiece hole.

< Clamping Completed >
Pulls and clamps in workpiece hole.
Advantages

- **To Workpiece**
  - Zero interference with 5 faces except clamping face.
  - Possible to use standard length tool which provides for better machining accuracy.
  - Possible to enhance cutting parameters which leads to shorter cycle times.
  - Elimination of multiple setups provides better machining process and zero setup time.

- **To Machining Equipment**
  - Fixture could be extremely downsized.
  - Turn-table could be downsized.
  - The movement of tool could be shorten.
  - For saving weight of fixture.
  - Machining equipment could be more simple.
  - Good design for easy flow of chips and reduction in coolant usage.

- **To Machining Line**
  - 5-face machining makes it possible to put process together.
  - Machining line is kept small and simple.
  - Possible to enhance cutting parameters which allows for shorter cycle times.

---

<table>
<thead>
<tr>
<th>Model</th>
<th>Features</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Model SFA</strong></td>
<td><img src="image" alt="Double Action Standard Model" /></td>
</tr>
<tr>
<td><strong>Model SFC</strong></td>
<td><img src="image" alt="Double Action Offset Model" /></td>
</tr>
</tbody>
</table>

- **Classification**
  - Double Action Standard Model
  - Double Action Offset Model

- **Increment of 5mm seating heights available**
- **Avoids interference with workpiece.**
Get more safety using New KOSMEK Hole Clamp

• Variable Mounting Dimensions to Suit the Process
  Select appropriate mounting dimension according to the plate thickness.

• Seating Surface Height to Suit Variety of Work
  Level the height in 5mm increments according to the phase of workpiece seating surface.

※ The number of ( ) is referred to SFA3000.
Hole Diameter to Suit Variety of Work

In order to suit different hole diameters and tolerances, hole diameters can be specified in 0.5mm increments.

More Powerful Clamping Force

Enables wider range of operating pressure by having more powerful clamping force.
Get more safety using **New KOSMEK Hole Clamp**

- Cap Structure Available in Any Condition
  ※ SFA/SFC1000 does not have the cap.

- Minimum clearance between cap and gripper prevents cutting chips from entering in.

- Small clearance leads to effective purging effect. Even using a little air flow prevent coolant from coming in.

- Workpiece does not have contact with gripper. It makes loading-unloading smooth.

- Not necessary for having rough guide on fixture.
  ※ It differs according to the loading speed.
Pursuing Good Design for Cutting Chips

Having smaller seating surface and wide sweep area on the flange enables easy flow of chips and reduction in coolant usage.

Secure Clamp Action Out of Sight

Built-in spring grips workpiece strongly and pulls it in. There is no effect by the temperature and/or amount of oil.
Get more safety using **New KOSMEK Hole Clamp**

- **Available for the Detection of Clamp Action**

  Lift-up function allows to check the movement of pulling and lifting off the workpiece. It can be used in automated line.

- **Abnormality Detection for Unpredictable Troubles**

  Anomaly detection for unpredictable trouble. It can be used in automated line.
Offset Model

Hydraulic Hole Clamp  Offset Model

Model SFC

The offset model allows for machining with no interference of workpieces, fixtures, tools, etc. when there is interference by using the standard SFA model.

Avoids interference with workpiece.

Avoids tool interference for backside machining.
Hydraulic Hole Clamp

Model SFA

Low Pressure (1.5～7MPa)
Many Varieties

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  • Notes on Handling  • Maintenance/Inspection  • Warranty
**Action Description**

### Released State

1. Hydraulic pressure is supplied to the release port.
2. The rod is lifted up and the gripper retracts.
   - (For workpiece lifting option, there is a gap between workpiece bottom surface and seating surface.)

<table>
<thead>
<tr>
<th>Hydraulic Pressure Switch</th>
<th>Seat Check Detection (Air Sensor)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Release Pressure</td>
<td>Lock Pressure</td>
</tr>
<tr>
<td>O</td>
<td>N</td>
</tr>
<tr>
<td>OFF</td>
<td>OFF</td>
</tr>
</tbody>
</table>

### Locked State

1. Hydraulic pressure is supplied to the lock port.
2. The rod descends and the gripper expands along the taper plane. (Since the gripper is lifted by spring force, it does not pull down.)
3. When pulling force exceeds the spring force for lift up, pulling force works after the gripper digs into workpiece. Then, it presses workpiece onto seating surface. (Clamping force = Pressing force onto seating surface.)

<table>
<thead>
<tr>
<th>Hydraulic Pressure Switch</th>
<th>Seat Check Detection (Air Sensor)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Release Pressure</td>
<td>Lock Pressure</td>
</tr>
<tr>
<td>OFF</td>
<td>O</td>
</tr>
<tr>
<td>N</td>
<td>N</td>
</tr>
</tbody>
</table>

### Abnormality Detected State (Clamping without Workpiece)

The built-in check valve function and seating confirmation air pressure detect abnormal condition as follows.

- When clamping workpiece which has larger workpiece hole diameter or clamping without workpiece (In this state the gripper expands but the lifting spring does not have pulling force so the workpiece lifting surface does not descend.)
- When rod or gripper is broken.
- If the piston is fully stroked when it has to stop at the bottom.
- In the case workpiece is floated more than 1mm when setting it.

<table>
<thead>
<tr>
<th>Hydraulic Pressure Switch</th>
<th>Seat Check Detection (Air Sensor)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Release Pressure</td>
<td>Lock Pressure</td>
</tr>
<tr>
<td>OFF</td>
<td>O</td>
</tr>
<tr>
<td>N</td>
<td>OFF</td>
</tr>
</tbody>
</table>
Hydraulic Hole Clamp

Model No. Indication

SFA 2000 0 - G0 N - 115 - 

1 Body Size  ※ Please refer to the specifications, performance curve and external dimension for details.

1 : Available in Diameters between φ 6 and φ 9mm (No Cap)
2 : Available in Diameters between φ 9 and φ 13mm (With Cap)
3 : Available in Diameters between φ 13 and φ 16mm (With Cap)

2 Design No.

0 : Revision Number

3 Mounting Methods

G0 : Mounting Length 0mm
M1 : Mounting Length 10mm
M2 : Mounting Length 20mm

4 Workpiece Lifting Option

A : With Lift Function (Lift Function Option)
N : With No Lift Function

Note:
1. When using with expansion locating pins (model VFL, VFM, VFJ, VFK, VWM, VWK, VX), please choose N : With no lift function.

5 Workpiece Hole Diameter (Workpiece Hole Code)

Workpiece Hole Code : Workpiece Diameter φ d 6.7 0.7 0.1

※ Workpiece hole diameter should be specified in 0.5mm increments from the allowable range in the table below.

<table>
<thead>
<tr>
<th>Workpiece Hole Code</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>
<th>145</th>
<th>150</th>
<th>155</th>
<th>160</th>
</tr>
</thead>
<tbody>
<tr>
<td>Workpiece Hole Dia. (φ d) (mm)</td>
<td>6</td>
<td>6.5</td>
<td>7</td>
<td>7.5</td>
<td>8</td>
<td>8.5</td>
<td>9</td>
<td>9.5</td>
<td>10</td>
<td>10.5</td>
<td>11</td>
<td>11.5</td>
<td>12</td>
<td>12.5</td>
<td>13</td>
<td>13.5</td>
<td>14</td>
<td>14.5</td>
<td>15</td>
<td>15.5</td>
<td>16</td>
</tr>
<tr>
<td>SFA1000 No Cap</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>SFA2000 With Cap</td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
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<td>▲</td>
<td>▲</td>
<td>▲</td>
<td>▲</td>
<td></td>
</tr>
<tr>
<td>SFA3000 With Cap</td>
<td></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>
</tr>
</tbody>
</table>

※ Max. operating pressure is 4.0MPa regarding to ▲ workpiece hole diameter. Max. operating pressure is 6.0MPa regarding to ■ workpiece hole diameter.

6 Seating Height Dimension

Blank : Standard Height
H : Seating Height (In 5mm increments)

<table>
<thead>
<tr>
<th>Model</th>
<th>Mounting Methods</th>
<th>Seating Height H (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>20 25 30 35 40 45 50 55 60 65 70 75</td>
</tr>
<tr>
<td>SFA1000</td>
<td></td>
<td>40 45 50 55 60 65 70 75</td>
</tr>
<tr>
<td>SFA2000</td>
<td></td>
<td>40 45 50 55 60 65 70 75</td>
</tr>
<tr>
<td>SFA3000</td>
<td></td>
<td>35 40 45 50 55 60 65 70 75</td>
</tr>
</tbody>
</table>

※ ▲ is standard height and seating height dimension code is [Blank].
※ Entry example when specifying non-standard seating height. Seating Height 50mm : H50
7 Shape of Gripper (Workpiece Hole)

**Blank**
- With Serration

**F**
- Without Serration

**T**
- Taper Hole (With Serration) \(^\text{Contact us.}\)

---

**Specifications**

<table>
<thead>
<tr>
<th>Model No.</th>
<th>SFA1000</th>
<th>SFA2000</th>
<th>SFA3000</th>
</tr>
</thead>
<tbody>
<tr>
<td>Workpiece Hole Code</td>
<td>060</td>
<td>065</td>
<td>070</td>
</tr>
<tr>
<td>Workpiece Hole Dim.</td>
<td>6</td>
<td>6.5</td>
<td>7</td>
</tr>
<tr>
<td>Hole Pecking</td>
<td>0.060</td>
<td>0.065</td>
<td>0.070</td>
</tr>
<tr>
<td>Hardness</td>
<td>HB250 or less</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maximum Air Pressure</td>
<td>4.0</td>
<td>4.0</td>
<td>4.0</td>
</tr>
<tr>
<td>Minimum Air Pressure</td>
<td>1.5</td>
<td>1.5</td>
<td>1.5</td>
</tr>
<tr>
<td>Withstanding Pressure</td>
<td>6.0</td>
<td>6.0</td>
<td>6.0</td>
</tr>
<tr>
<td>Recommended Air Blow Pressure</td>
<td>0.4 ~ 0.5</td>
<td>0.2 ~ 0.3</td>
<td>0.2 ~ 0.3</td>
</tr>
<tr>
<td>Operating Temperature</td>
<td>0 ~ 70</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Notes:**
1. The clamping part is an adjusting structure and the clamping operation is done by locating the workpiece hole. The numerical value in the table shows the amount of tolerance value of single clamp. Please consider the center distance accuracy of each clamping installation part and each workpiece hole when used with another location clamp / location cylinder, or when using more than two of these products.
2. Workpiece lifting stroke and workpiece lifting force are functions only for lifting option.
3. Clamping force cannot be calculated from the cylinder inner diameter and rod diameter. Please refer to the clamping force curve.  
1. Please refer to External Dimensions for mass.

---
### Clamping Force Curve

**Applicable Model No.**

<table>
<thead>
<tr>
<th>Model No.</th>
<th>SFA 100</th>
<th>SFA 200</th>
<th>SFA 300</th>
</tr>
</thead>
<tbody>
<tr>
<td>190 00 00</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Clamping Force kN</th>
<th>SFA1000-□□□□□□□□</th>
<th>SFA2000-□□□□□□□□</th>
<th>SFA3000-□□□□□□□□</th>
</tr>
</thead>
<tbody>
<tr>
<td>Supply Hydraulic Pressure 7 MPa</td>
<td>-</td>
<td>2.7</td>
<td>-</td>
</tr>
<tr>
<td>Supply Hydraulic Pressure 6 MPa</td>
<td>-</td>
<td>2.3</td>
<td>-</td>
</tr>
<tr>
<td>Supply Hydraulic Pressure 5 MPa</td>
<td>-</td>
<td>1.9</td>
<td>-</td>
</tr>
<tr>
<td>Supply Hydraulic Pressure 4 MPa</td>
<td>1.5</td>
<td>2.5</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>3 MPa</td>
<td>1.1</td>
<td>1.9</td>
</tr>
<tr>
<td></td>
<td>2 MPa</td>
<td>0.7</td>
<td>1.2</td>
</tr>
<tr>
<td></td>
<td>1.5 MPa</td>
<td>0.5</td>
<td>0.9</td>
</tr>
</tbody>
</table>

**Clamping Force Calculation Formula**

<table>
<thead>
<tr>
<th>Model No.</th>
<th>SFA1000-□□□□□□□□</th>
<th>SFA2000-□□□□□□□□</th>
<th>SFA3000-□□□□□□□□</th>
</tr>
</thead>
<tbody>
<tr>
<td>Max. Operating Pressure</td>
<td>4.0</td>
<td>7.0</td>
<td>4.0</td>
</tr>
</tbody>
</table>

**Notes:**
1. This graph shows the relationship between clamping force (kN) and supply hydraulic pressure (MPa).
2. Clamping force shows pressing force against the seating surface.
3. Thin wall around the workpiece hole could be deformed by clamping action, and clamping force will not fill the specification.
4. Clamping force of F: Without Serration shows the calculated value when the friction coefficient of workpiece and gripper is μ = 0.1.

**Shape of Gripper (Workpiece Hole):**

- **Blank / T (With Serration)**
- **F (Without Serration)**

---

**SFA Model Specifications**

- **Model SFA**
- **Hydraulic Hole Clamp**
- **Clamping Force Curve**
- **Applicable Model No.**
- **Clamping Force kN**
- **Clamping Force Calculation Formula**
- **Max. Operating Pressure**
- **Notes:**
  1. This graph shows the relationship between clamping force (kN) and supply hydraulic pressure (MPa).
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**Clamping Force Curve**

**Applicable Model No.**

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<th>SFA3000-□□□□□□□□</th>
</tr>
</thead>
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<td>2.7</td>
<td>-</td>
</tr>
<tr>
<td>Supply Hydraulic Pressure 6 MPa</td>
<td>-</td>
<td>2.3</td>
<td>-</td>
</tr>
<tr>
<td>Supply Hydraulic Pressure 5 MPa</td>
<td>-</td>
<td>1.9</td>
<td>-</td>
</tr>
<tr>
<td>Supply Hydraulic Pressure 4 MPa</td>
<td>1.5</td>
<td>2.5</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>3 MPa</td>
<td>1.1</td>
<td>1.9</td>
</tr>
<tr>
<td></td>
<td>2 MPa</td>
<td>0.7</td>
<td>1.2</td>
</tr>
<tr>
<td></td>
<td>1.5 MPa</td>
<td>0.5</td>
<td>0.9</td>
</tr>
</tbody>
</table>

**Clamping Force Calculation Formula**

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<tr>
<th>Model No.</th>
<th>SFA1000-□□□□□□□□</th>
<th>SFA2000-□□□□□□□□</th>
<th>SFA3000-□□□□□□□□</th>
</tr>
</thead>
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<td>7.0</td>
<td>4.0</td>
</tr>
</tbody>
</table>

**Notes:**
1. This graph shows the relationship between clamping force (kN) and supply hydraulic pressure (MPa).
2. Clamping force shows pressing force against the seating surface.
3. Thin wall around the workpiece hole could be deformed by clamping action, and clamping force will not fill the specification.
4. Clamping force of F: Without Serration shows the calculated value when the friction coefficient of workpiece and gripper is μ = 0.1.

---

**SFA Model Specifications**

- **Model SFA**
- **Hydraulic Hole Clamp**
- **Clamping Force Curve**
- **Applicable Model No.**
- **Clamping Force kN**
- **Clamping Force Calculation Formula**
- **Max. Operating Pressure**
- **Notes:**
  1. This graph shows the relationship between clamping force (kN) and supply hydraulic pressure (MPa).
  2. Clamping force shows pressing force against the seating surface.
  3. Thin wall around the workpiece hole could be deformed by clamping action, and clamping force will not fill the specification.
  4. Clamping force of F: Without Serration shows the calculated value when the friction coefficient of workpiece and gripper is μ = 0.1.
Hydraulic Hole Clamp  

**External Dimensions**

- The drawing shows the released state of SFA1000-G0A-□.

**Expanding Area Detail**

- Workpiece Lifting Stroke ③
  - Clearance from Seating Surface when Releasing

- Clamp Diameter

**Specifying Seating Height ④**

Notes:

- ① The workpiece must be resting on all seating surfaces when clamping. If this is not done the workpiece can be deformed by the clamping force.
- ② The port name is marked on the product surface. (HYD: Hydraulic Port, FC: Seat Confirmation Port, BLOW: Air Blow Port) Continuously supply air pressure to the air blow port and the seating confirmation port.
- ③ The numerical value is only for the workpiece lifting option.
- ④ Please refer to Seating Height: Standard for dimensions that is not shown.

**Workpiece (Pallet) Hole Dimensions**

Notes:

- 1. Thin wall around the workpiece hole could be deformed by clamping action, 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.
- ⑤ When the clamp head is sticking above the Y surface of the workpiece, please make sure there is no interference with the clamp cylinders during machining.
Machining Dimensions of Mounting Area

Notes:
1. There should be no burrs at the hole contact surface.
   ※6. Please make a hydraulic release port within the range of 

Model No. Indication

SFA 1 00 0 - G0 A N - 080 - Blank H - Blank T F

1 2 3 4 5 6 7

External Dimensions and Machining Dimensions for Mounting (mm)

<table>
<thead>
<tr>
<th>Model No.</th>
<th>SFA1000-G0</th>
<th>1 2 3 4 5 6 7</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Workpiece Diameter</th>
<th>Workpiece Hole Diameter</th>
<th>Clamp Diameter</th>
<th>Released State</th>
<th>Empty Action</th>
<th>Allowable Offset</th>
<th>Pulling Stroke</th>
<th>Workpiece Lifting Stroke</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.06</td>
<td>6.0 ≤ 0.05</td>
<td>6.00 6.01</td>
<td>5.5 6.5 7.5 8.5</td>
<td>7.7 8.2 8.7 9.2 9.7 10.2</td>
<td>±0.5</td>
<td>4.2</td>
<td>1.0</td>
<td>8.</td>
</tr>
<tr>
<td>0.065</td>
<td>6.5 ≤ 0.05</td>
<td>6.50 6.51</td>
<td>5.5 6.5 7.5 8.5</td>
<td>7.7 8.2 8.7 9.2 9.7 10.2</td>
<td>±0.5</td>
<td>4.2</td>
<td>1.0</td>
<td>8.</td>
</tr>
<tr>
<td>0.07</td>
<td>7.0 ≤ 0.05</td>
<td>7.00 7.01</td>
<td>5.5 6.5 7.5 8.5</td>
<td>7.7 8.2 8.7 9.2 9.7 10.2</td>
<td>±0.5</td>
<td>4.2</td>
<td>1.0</td>
<td>8.</td>
</tr>
<tr>
<td>0.075</td>
<td>7.5 ≤ 0.05</td>
<td>7.50 7.51</td>
<td>5.5 6.5 7.5 8.5</td>
<td>7.7 8.2 8.7 9.2 9.7 10.2</td>
<td>±0.5</td>
<td>4.2</td>
<td>1.0</td>
<td>8.</td>
</tr>
<tr>
<td>0.080</td>
<td>8.0 ≤ 0.05</td>
<td>8.00 8.01</td>
<td>5.5 6.5 7.5 8.5</td>
<td>7.7 8.2 8.7 9.2 9.7 10.2</td>
<td>±0.5</td>
<td>4.2</td>
<td>1.0</td>
<td>8.</td>
</tr>
<tr>
<td>0.085</td>
<td>8.5 ≤ 0.05</td>
<td>8.50 8.51</td>
<td>5.5 6.5 7.5 8.5</td>
<td>7.7 8.2 8.7 9.2 9.7 10.2</td>
<td>±0.5</td>
<td>4.2</td>
<td>1.0</td>
<td>8.</td>
</tr>
<tr>
<td>0.090</td>
<td>9.0 ≤ 0.05</td>
<td>9.00 9.01</td>
<td>5.5 6.5 7.5 8.5</td>
<td>7.7 8.2 8.7 9.2 9.7 10.2</td>
<td>±0.5</td>
<td>4.2</td>
<td>1.0</td>
<td>8.</td>
</tr>
</tbody>
</table>

Notes:
※7. The clamping part is an adjusting structure and the clamping operation is done by locating the workpiece hole.
   The numerical value in the table shows the amount of tolerance value of one clamp. Please consider the center distance accuracy of each clamping installation part and each workpiece hole when used with another location clamp / location cylinder, or when using more than two of these products.

※8. Workpiece lifting stroke is the function only for lifting option.

Seating Height Dimension (mm)

<table>
<thead>
<tr>
<th>Mounting Method</th>
<th>Standard Height</th>
<th>Specifying Seating Height</th>
</tr>
</thead>
<tbody>
<tr>
<td>When G0 is chosen (Mounting Length 0mm)</td>
<td>Blank</td>
<td>H45</td>
</tr>
<tr>
<td>H</td>
<td>40</td>
<td>45</td>
</tr>
<tr>
<td>AA</td>
<td>–</td>
<td>5,5</td>
</tr>
<tr>
<td>Mass kg</td>
<td>0.6</td>
<td>0.6</td>
</tr>
</tbody>
</table>
External Dimensions

-The drawing shows the released state of SFA1000-M1A.-

Expanding Area Detail

Workpiece Lifting Stroke
(Clearance from Seating Surface when Releasing)

Workpiece Lifting Surface

Specifying Seating Height

Notes:

1. The workpiece must be resting on all seating surfaces when clamping. If this is not done the workpiece can be deformed by the clamping force.

2. Screw jack is used when removing hole clamp. Remove with torque wrench in a parallel fashion when detaching.

3. The port name is marked on the product surface. (HYD: Hydraulic Lock Port, FC: Seat Confirmation Port, BLOW: Air Blow Port) Continuously supply air pressure to the air blow port and the seating confirmation port.

4. The numerical value is only for the workpiece lifting option.

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

Workpiece (Pallet) Hole Dimensions

Notes:

1. Thin wall around the workpiece hole could be deformed by clamping action, and clamping force will not fill the specification.

2. Please make sure to test the clamping function before using and adjust to the appropriate supply of pressure.

3. When the clamp head is sticking above the Y surface of the workpiece, please make sure there is no interference with the clamp cylinders during machining.
Machining Dimensions of Mounting Area

Air Blow Port φ3
Seating Confirmation Air Port φ3
Hydraulic Lock Port φ3
Hydraulic Release Port φ7

4-M4 × 0.7 Thread Depth 7 or more

Notes:
1. There should be no burrs at the hole contact surface.
2. Release hydraulic pressure can be supplied from the side or bottom surface.
   Please make a hydraulic release port within ◆ area in the case supplied from the side.
   Please make a hydraulic release port within ◆ area in the case supplied from the bottom.
3. Base thickness and remaining depth of the lower hole machining (2.5mm) is for when the material is SSOC.

Model No. Indication

SFA 100 0 - M1 M2 A N - 080 - Blank - Blank T F

External Dimensions and Machining Dimensions for Mounting (mm)

<table>
<thead>
<tr>
<th>Model No.</th>
<th>Workpiece Hole Code</th>
<th>SFA1000-M (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Workpiece Hole Diameter φ d</td>
<td>060</td>
<td>065</td>
</tr>
<tr>
<td>Clamp Diameter</td>
<td>Released State</td>
<td>5.5</td>
</tr>
<tr>
<td></td>
<td>Empty Action</td>
<td>7.2</td>
</tr>
<tr>
<td>Allowable Offsetting/Clearance of Expanding Area</td>
<td>±0.5</td>
<td></td>
</tr>
<tr>
<td>Full Stroke</td>
<td>4.2</td>
<td></td>
</tr>
<tr>
<td>Pulling Stroke</td>
<td>1.0</td>
<td></td>
</tr>
<tr>
<td>Workpiece Lifting Stroke</td>
<td>0.2</td>
<td></td>
</tr>
<tr>
<td>G</td>
<td>9</td>
<td>9</td>
</tr>
<tr>
<td>S</td>
<td>5.5</td>
<td>5.5</td>
</tr>
<tr>
<td>U</td>
<td>5.55</td>
<td>6.05</td>
</tr>
<tr>
<td>V</td>
<td>8.5</td>
<td>9</td>
</tr>
<tr>
<td>W</td>
<td>12</td>
<td>13</td>
</tr>
</tbody>
</table>

Notes:
9. The clamping part is an adjusting structure and the clamping operation is done by locating the workpiece hole.
The numerical value in the table shows the amount of tolerance value of one clamp. Please consider the center distance accuracy of each clamping installation part and each workpiece hole when used with another location clamp / location cylinder, or when using more than two of these products.
10. Workpiece lifting stroke is the function only for lifting option.

Seating Height Dimension (mm)

<table>
<thead>
<tr>
<th>Mounting Method</th>
<th>Standard Height</th>
<th>Specifying Seating Height</th>
</tr>
</thead>
<tbody>
<tr>
<td>When M1 is chosen (Mounting Length 10mm)</td>
<td>H</td>
<td>30</td>
</tr>
<tr>
<td></td>
<td>E</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>AA</td>
<td>–</td>
</tr>
<tr>
<td></td>
<td>Mass kg</td>
<td>0.5</td>
</tr>
<tr>
<td>When M2 is chosen (Mounting Length 20mm)</td>
<td>H</td>
<td>20</td>
</tr>
<tr>
<td></td>
<td>E</td>
<td>20</td>
</tr>
<tr>
<td></td>
<td>AA</td>
<td>–</td>
</tr>
<tr>
<td></td>
<td>Mass kg</td>
<td>0.5</td>
</tr>
</tbody>
</table>
**External Dimensions**

*The drawing shows the released state of SFA2000-G0A-□.*

**Grippers (3 Grippers 120° Distance)
(The direction of gripper is as indicated in this drawing.)*

**Seating Height: Standard**

**Specifying Seating Height**

**Workpiece Lifting Stroke***

(Clearance from seating surface when releasing)

**Notes:**

1. The workpiece must be resting on all seating surfaces when clamping. If this is not done the workpiece can be deformed by the clamping force.
2. The port name is marked on the product surface. (HYD: Hydraulic Lock Port, FC: Seat Confirmation Port, BLOW: Air Blow Port) Continuously supply air pressure to the air blow port and the seating confirmation port.
3. The numerical value is only for the workpiece lifting option.
4. Please refer to Seating Height: Standard for dimensions that is not shown.

**Workpiece (Pallet) Hole Dimensions**

**Notes:**

1. Thin wall around the workpiece hole could be deformed by clamping action, 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 the clamp head is sticking above the Y surface of the workpiece, please make sure there is no interference with the clamp cylinders during machining.
**Machining Dimensions of Mounting Area**

![Diagram of Machining Dimensions of Mounting Area](image)

Notes:
1. There should be no burrs at the hole contact surface.
2. Please make a hydraulic release port within the range of [ ]

**Model No. Indication**

![Model No. Indication](image)

- B: Body Size (when selecting 2)
- D: Design No.
- M: Mounting Methods (when selecting G0)
- L: Lifting Methods
- K: Workpiece Hole Diameter (Workpiece Hole Code)
- H: Seating Height Dimension
- F: Shape of Gripper (Workpiece Hole)

**External Dimensions and Machining Dimensions for Mounting**

<table>
<thead>
<tr>
<th>Model No.</th>
<th>Workpiece Hole Code</th>
<th>SFA2000-G0</th>
</tr>
</thead>
<tbody>
<tr>
<td>090</td>
<td>095</td>
<td>100</td>
</tr>
<tr>
<td>105</td>
<td>110</td>
<td>120</td>
</tr>
<tr>
<td>125</td>
<td>130</td>
<td></td>
</tr>
</tbody>
</table>

**External Dimensions and Machining Dimensions for Mounting**

<table>
<thead>
<tr>
<th>Workpiece Diameter d (mm)</th>
<th>9.7 ± 0.3</th>
<th>9.5 ± 0.3</th>
<th>10.0 ± 0.3</th>
<th>10.5 ± 0.3</th>
<th>11.0 ± 0.3</th>
<th>11.5 ± 0.3</th>
<th>12.0 ± 0.3</th>
<th>12.5 ± 0.3</th>
<th>13.0 ± 0.3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clamp Diameter</td>
<td>8.5</td>
<td>9.0</td>
<td>9.5</td>
<td>10.0</td>
<td>10.5</td>
<td>11.0</td>
<td>11.5</td>
<td>12.0</td>
<td>12.5</td>
</tr>
<tr>
<td>Empty Action</td>
<td>10.2</td>
<td>10.7</td>
<td>11.2</td>
<td>11.7</td>
<td>12.2</td>
<td>12.7</td>
<td>13.2</td>
<td>13.7</td>
<td>14.2</td>
</tr>
<tr>
<td>Axial Tolerances in Holes</td>
<td>±0.5</td>
<td>±0.5</td>
<td>±0.5</td>
<td>±0.5</td>
<td>±0.5</td>
<td>±0.5</td>
<td>±0.5</td>
<td>±0.5</td>
<td>±0.5</td>
</tr>
<tr>
<td>Pulling Stroke</td>
<td>4.2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Workpiece Lifting Stroke</td>
<td>1.0</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Notes:
1. The clamping part is an adjusting structure and the clamping operation is done by locating the workpiece hole.
2. The numerical value in the table shows the amount of tolerance value of one clamp. Please consider the distance accuracy of each clamping installation part and each workpiece hole used when used with another location clamp / location cylinder, or when using more than two of these products.
3. Workpiece lifting stroke is the function only for lifting option.

**Seating Height Dimension**

<table>
<thead>
<tr>
<th>Mounting Method</th>
<th>Standard Height</th>
<th>Specifying Seating Height</th>
</tr>
</thead>
<tbody>
<tr>
<td>When G0 is chosen (Mounting Length 0mm)</td>
<td>Blank</td>
<td>H45</td>
</tr>
<tr>
<td>H</td>
<td>40</td>
<td>45</td>
</tr>
<tr>
<td>AA</td>
<td>-</td>
<td>5.5</td>
</tr>
<tr>
<td>Mass kg</td>
<td>0.8</td>
<td>0.8</td>
</tr>
</tbody>
</table>
**External Dimensions**

The drawing shows the released state of SFA2000-M1A-□.

**Workpiece (Pallet) Hole Dimensions**

Notes:
1. Thin wall around the workpiece hole could be deformed by clamping action, 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 the clamp head is sticking above the Y surface of the workpiece, please make sure there is no interference with the clamp cylinders during machining.

---

**Expanding Area Detail**

**Workpiece Lifting Stroke**

(Shaft clearance from seating surface when releasing)

**Expaned State**

**Clamp Diameter**

(Empty Action)

**Specifying Seating Height**

Notes:
1. The workpiece must be resting on all seating surfaces when clamping. If this is not done the workpiece can be deformed by the clamping force.
2. Screw jack is used when removing hole clamp. Remove with torque wrench in a parallel fashion when detaching.
3. The port name is marked on the product surface.
   (HYD: Hydraulic Lock Port, FC: Seat Confirmation Port, BLOW: Air Blow Port) Continuously supply air pressure to the air blow port and the seating confirmation port.
4. The numerical value is only for the workpiece lifting option.
5. Please refer to Seating Height: Standard for dimensions that is not shown.
Machining Dimensions of Mounting Area

Air Blow Port φ3
Seating Confirmation Air Port φ3
Hydraulic Lock Port φ3

Release Hydraulic Port φ7

4-R5 × 0.8 Thread Depth 7 or more

Notes:
1. There should be no burrs at the hole contact surface.
2. Release hydraulic pressure can be supplied from the side or bottom surface.
   Please make a hydraulic release port within ◆ area in the case supplied from the side.
   Please make a hydraulic release port within ◇ area in the case supplied from the bottom.
3. Base thickness and remaining depth of the lower hole machining (2.5mm) is for when the material is SSOC.

Model No. Indication

SFA 2 0 0 0 - M1 M2 A N - 115 - Blank H - Blank T

External Dimensions and Machining Dimensions for Mounting (mm)

Model No. Workpiece Hole Code SFA2000-M Workpiece Hole Diameter φ d Clamp Diameter Released State Empty Action

Workpiece Diameter φ d Clamp Released State Empty Action

Allowable Offset (flaxing Clearance of Cutting Area) ±0.5

Full Stroke 4.2

Pulling Stroke 1.0

Workpiece Lifting Stroke = 10

G 10 10 10 11.5 11.5 11.5 11.5 11.5 11.5
Mx 8 8 8 8 8 8 8 8 9 9
S 4.3 4.3 4.3 5.8 5.8 5.8 5.8 5.8 5.8 5.8
U 8.6 9.1 9.6 10.1 10.6 11.1 11.6 12.1 12.6
V 11.3 12.5 13 13.5 14 14.5 15 15.5
W 15 16 16 17 17 18 18 19 19
X 24 24 24 24 24 25 25 26 26
Y 25 25 25 25 25 26 26 27 27

Notes:
9. The clamping part is an adjusting structure and the clamping operation is done by locating the workpiece hole.
   The numerical value in the table shows the amount of tolerance value of one clamp. Please consider the exact distance accuracy
   of each clamping installation part and each workpiece hole when used with another location clamp / location cylinder,
   or when using more than two of these products.
10. Workpiece lifting stroke is the function only for lifting option.

Seating Height Dimension (mm)

Mounting Method Standard Height Specifying Seating Height

When M1 is chosen (Mounting Length 10mm) H 30 – – 35 40 45 50 55 60
E 10 – – 10 10 10 10 10 10
AA – – – 5.5 10.5 15.5 20.5 25.5 30.5
Mass kg 0.7 – – 0.7 0.8 0.8 0.8 0.8 0.8

When M2 is chosen (Mounting Length 20mm) H 20 25 30 35 40 45 50 – –
E 20 20 20 20 20 20 20 20 20
AA – – – 5.5 10.5 15.5 20.5 25.5 30.5
Mass kg 0.6 0.7 0.7 0.7 0.7 0.7 0.8 – –
Hydraulic Hole Clamp

**External Dimensions**

The drawing shows the released state of SFA3000-G0A-□.

**Workpiece (Pallet) Hole Dimensions**

Notes:

1. The workpiece must be resting on all seating surfaces when clamping. If this is not done the workpiece can be deformed by the clamping force.
2. The port name is marked on the product surface. (HYD: Hydraulic Lock Port, FC: Seat Confirmation Port, BLOW: Air Blow Port) Continuously supply air pressure to the air blow port and the seating confirmation port.
3. The numerical value is only for the workpiece lifting option.
4. Please refer to Seating Height: Standard for dimensions that is not shown.

Notes:

1. Thin wall around the workpiece hole could be deformed by clamping action, 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 the clamp head is sticking above the Y surface of the workpiece, please make sure there is no interference with the clamp cylinders during machining.
Machining Dimensions of Mounting Area

![Diagram of Machining Dimensions of Mounting Area]

Notes:
1. There should be no burrs at the hole contact surface.

6. Please make a hydraulic release port within the range of

Model No. Indication

![Model No. Indication]

External Dimensions and Machining Dimensions for Mounting (mm)

<table>
<thead>
<tr>
<th>Model No.</th>
<th>Workpiece Hole Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>SFA3000-G0</td>
<td>150</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Workpiece Hole Diameter</th>
<th>130</th>
<th>135</th>
<th>140</th>
<th>145</th>
<th>150</th>
<th>155</th>
<th>160</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.7</td>
<td>13.0</td>
<td>13.5</td>
<td>14.0</td>
<td>14.5</td>
<td>15.0</td>
<td>15.5</td>
<td>16.0</td>
</tr>
</tbody>
</table>

- Released State: 12.5
- Empty Action: 14.2

Available Offset / Floating Clearance of Expanding Area: ±0.5

- Full Stroke: 4.2
- Pulling Stroke: 1.0
- Workpiece Lifting Stroke: 0.2

Notes:
7. The clamping part is an adjusting structure and the clamping operation is done by locating the workpiece hole.
8. The numerical value in the table shows the amount of tolerance of one value. Please consider the center distance accuracy of each clamping installation part and each workpiece hole when used with another location clamp / location cylinder, or when using more than two of these products.

Workpiece Lifting Stroke: 0.2

Seating Height Dimension (mm)

- Mass kg: 1.3
- When G0 is chosen (Mounting Length 0mm)

Specifications

<table>
<thead>
<tr>
<th>Mounting Method</th>
<th>Standard Height</th>
<th>Specifying Seating Height</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blank</td>
<td>H</td>
<td>H50</td>
</tr>
<tr>
<td>H</td>
<td>45</td>
<td>50</td>
</tr>
<tr>
<td>AA</td>
<td>–</td>
<td>5.5</td>
</tr>
<tr>
<td>Mass kg</td>
<td>1.3</td>
<td>1.3</td>
</tr>
</tbody>
</table>
Hydraulic Hole Clamp

**External Dimensions**

- The drawing shows the released state of SFA3000-M1A-

![Diagram of hydraulic hole clamp](image)

**Workpiece (Pallet) Hole Dimensions**

- Blind Hole: 12 or more C0.5 or less
- Through Hole: 5.8 or more C0.5 or less
- Taper Hole: Slope Angle (3° or less)

**Notes:**

- Thin wall around the workpiece hole could be deformed by clamping action, 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.
- When the clamp head is sticking above the Y surface of the workpiece, please make sure there is no interference with the clamp cylinders during machining.
### Machining Dimensions of Mounting Area

![Diagram of machining dimensions](image)

**Notes:**
1. There should be no burrs at the hole contact surface.
2. 4-M6 x 1 Thread Depth 7 or more
3. Base thickness and remaining depth of the lower hole machining (2.5mm) is for when the material is SSOC.

### Model No. Indication

<table>
<thead>
<tr>
<th>Model No.</th>
<th>SFA 3 00 0</th>
<th>M1</th>
<th>M2</th>
<th>A</th>
<th>150</th>
<th>Blank</th>
<th>T</th>
<th>F</th>
</tr>
</thead>
</table>

### External Dimensions and Machining Dimensions for Mounting (mm)

<table>
<thead>
<tr>
<th>Model No.</th>
<th>SFA300–M1 /M2 /A / 150 / Blank / Blank</th>
</tr>
</thead>
<tbody>
<tr>
<td>Workpiece Hole Code</td>
<td>130</td>
</tr>
<tr>
<td>Workpiece Hole Diameter d</td>
<td>13.0</td>
</tr>
<tr>
<td>Clamp Diameter</td>
<td>Released State</td>
</tr>
<tr>
<td>Empty Action</td>
<td>14.2</td>
</tr>
</tbody>
</table>

| Axial Offset / Floating Clearance of Expanding Area (mm) | ±0.5 |
| Full Stroke | 4.2 |
| Pulling Stroke | 1.0 |
| Workpiece Lifting Stroke | 0.2 |
| Mx | 8.8 | 8.8 | 8.8 | 8.8 | 8.8 | 9.6 | 9.6 |
| U | 12.6 | 13.1 | 13.6 | 14.1 | 14.6 | 15.1 | 15.6 |
| V | 15.5 | 16.0 | 16.5 | 17.0 | 17.5 | 18.0 | 18.5 |
| W | 19.0 | 20.0 | 20.0 | 21.0 | 21.0 | 22.0 | 22.0 |
| X | 28.0 | 28.0 | 28.0 | 28.0 | 28.0 | 29.0 | 29.0 |
| Y | 29.0 | 29.0 | 29.0 | 29.0 | 29.0 | 30.0 | 30.0 |

Notes:
- 9. The clamping part is an adjusting structure and the clamping operation is done by locating the workpiece hole.
- 10. The numerical value in the table shows the amount of tolerance value of one clamp. Please consider the center distance accuracy of each clamping installation part and each workpiece hole when used with another location clamp / location cylinder, or when using more than two of these products.
- 11. Workpiece lifting stroke is the function only for lifting option.

### Seating Height Dimension (mm)

<table>
<thead>
<tr>
<th>Mounting Method</th>
<th>Standard Height</th>
<th>Specifying Seating Height</th>
</tr>
</thead>
<tbody>
<tr>
<td>H</td>
<td>35</td>
<td>H30</td>
</tr>
<tr>
<td>Mx</td>
<td>8.8</td>
<td>8.8</td>
</tr>
<tr>
<td>E</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>U</td>
<td>12.6</td>
<td>13.1</td>
</tr>
<tr>
<td>X</td>
<td>28.0</td>
<td>28.0</td>
</tr>
<tr>
<td>Y</td>
<td>29.0</td>
<td>29.0</td>
</tr>
<tr>
<td>AA</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>Mass kg</td>
<td>1.2</td>
<td>1.2</td>
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</table>

When M1 is chosen (Mounting length 10mm)

When M2 is chosen (Mounting length 20mm)
Layout Sample

This drawing shows a combination layout sample of SFA (Hole Clamp) and VFM (Expansion Locating Pin).

Notes:
1. When detaching a workpiece, in order to prevent the clamping part from damage, please set up rough guide of 2 or more. Please refer to the above drawing about the length of rough guide and the diameter gap. (Use of rough guides depends on the loading/unloading condition of the workpiece.)
2. When using a combination of VFM (Expansion Locating Pin) and SFA (Hole Clamp), please choose N with lift function.
Hydraulic and Pneumatic Circuit Reference

This drawing shows a combination circuit reference of SFA (Hole Clamp) and VFM (Expansion Locating Pin).

When controlled with one solenoid valve

When controlled with two solenoid valves

Notes:

1. Please use solenoid valve to make a sequence operation that SFA (Hole Clamp) starts working after VFM (Expansion Locating Pin) completes the movement. When unable to use solenoid valve, please prepare flow control valve with check valve at ★ (1 piece) to adjust sequencing speed. If SFA operates before VFM, there is a possibility for the equipment to be damaged due to a thrust load on SFA.

2. Expanded VFM cylinder sometimes releases (unclamps) due to a back pressure of tank-port. Please prepare check valve (recommend cracking pressure: less than 0.04MPa).

3. To reach required accuracy in setting air sensor, please install air sensor for individual clamp.
Cautions

Notes for Design

1) Check Specifications
- Please use each product according to the specifications.
- This product is hydraulic double action model which locks and releases with hydraulic pressure.

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.

![Diagram of Workpiece, Seating Surface, and Base Plate]

When clamping, make sure all seating surfaces touch workpiece. When the workpiece is not touching the seating surface area, please refer to external dimension chart and calculate contacting pressure with clamping force and seating area not to deform the workpiece.

3) Seat Confirmation Mechanism
- It will be detected when workpiece is pressed against the seating surface by lock (clamp) action.

![Diagram of Workpiece, Bottom of Workpiece, and Seated State]

With lifting function, when workpiece is set (before supplying lock hydraulic pressure), the workpiece is lifted up by built-in spring, and there will be a clearance of 0.2mm between workpiece bottom surface and seating surface.

4) Clamp Installation
- The clamping part of this product has floating structure (±0.5mm). Please consider the center distance accuracy of each clamping installation part and each workpiece hole when used with another location clamp / location cylinder, or when using more than two of these products.

5) Clamping Force
- Clamping force shows the pressing force against the seating surface.
- Make sure to conduct test clamping and adjust supply pressure accordingly. Insufficient clamping force and/or expanding force leads to workpiece detachment.

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

<table>
<thead>
<tr>
<th>Condition</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>When workpiece hole diameter is larger than specification.</td>
<td>Expansion stroke is insufficient and the clamping force will not fill the specifications.</td>
</tr>
<tr>
<td>When using it with insufficient clamping force.</td>
<td>Leads to falling 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 slope angle is larger than specification.</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 the workpiece enough and it cannot clamp securely.</td>
</tr>
</tbody>
</table>

7) Wall Thickness around Workpiece Hole
- Thin wall around the workpiece hole could be deformed by clamping action, and clamping force does not fill the specification. Make sure to conduct test clamping and adjust supply pressure accordingly. Insufficient clamping force leads to workpiece detachment.

8) Air Blow Port and Seating Confirmation Port
- Continuously supply air pressure to the air blow port and the seating confirmation port.
- If air supply is shut off during operation, contaminants enter into the clamp leading to malfunctions.
9) Release Condition
- When releasing, it lifts up the workpiece which is normal. When using in a horizontal application, it is recommended to install work fallout prevention and other temporary stop mechanisms.

Example of Latching Mechanism

10) 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.

11) Please detach workpiece with all clamps released completely.
- When a workpiece is detached during lock or release operation, it will lead to damage of clamp or fall of workpiece.

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

When using the product with other location clamps / cylinders, please set rough guides considering the center distance accuracy of each mounting hole and workpiece hole of location clamp / cylinders.
Cautions

- **Installation Notes**

1) Check the Usable Fluid
   - Please use the appropriate fluid by referring to the Hydraulic Fluid List (P. 1237).

2) Installation / Removal of Hole Clamp
   - Use four bolts with hex holes (grade 12.9) and tighten the body with a torque wrench as shown in the table below.
   - Tighten them evenly to prevent twisting or jamming.
   - When removing hole clamp with mounting length 10mm/20mm option, use screw for jack (SFA: 4 mounting bolt holes, SFC: 2 mounting bolt holes), and remove without damage to the screw.
   - The right drawing shows the case in which the parallel pin (hollow set) is put in the screw hole without damage to the screw.

<table>
<thead>
<tr>
<th>Model No.</th>
<th>Thread Size</th>
<th>Tightening Torque (N/ml)</th>
</tr>
</thead>
<tbody>
<tr>
<td>SFA/SFC1000</td>
<td>M4 x 0.7</td>
<td>3.2</td>
</tr>
<tr>
<td>SFA/SFC2000</td>
<td>M5 x 0.8</td>
<td>6.3</td>
</tr>
<tr>
<td>SFA/SFC3000</td>
<td>M6 x 1</td>
<td>10.0</td>
</tr>
</tbody>
</table>

3) Port Position of the Hole Clamp
   - The port name is marked on the product surface.
   - Be careful of installation direction.
     - (HYD: Hydraulic Lock Port, FC: Seat Confirmation Port, BLOW: Air Blow Port)
   - Release pressure is supplied from the bottom of cylinder.

4) Use air piping with outer diameter φ 6 (inner diameter φ 4) or larger for air blow.

5) Restarting at Hydraulic Pressure OFF (Neutral) State.
   - It is recommended to supply hydraulic pressure from the release side at the first hydraulic supply after installing a clamp, or when restarting at both lock and release hydraulic pressure OFF (neutral) state.
   - When supplying hydraulic pressure from the lock side, a small amount of oil may leak from the clamping part for a moment, but this is not a functional problem.

- **Maintenance and Inspection**
  - [SFA Model]

1) Please refer to P.1239 for general maintenance.

2) Please clean the clamping part regularly.

3) Continuous use will result in wear of the gripper and creating less clamping force.
   - Whenever the wear is found replacement of the gripper is needed. Depending on operating pressure, workpiece material and hole shape etc., the timing of replacement will differ due to those dependent conditions.
   - Please contact us.

※ Please refer to P.1237 for common cautions.
Cautions

Installation Notes (For Hydraulic Series)

1) Check the Usable Fluid
   ● Please use the appropriate fluid by referring to the Hydraulic Fluid List.

2) Procedure before Piping
   ● The pipeline, piping connector and fixture circuits should be cleaned by thorough flushing.
   ● The dust and cutting chips in the circuit may lead to fluid leakage and malfunction.
   ● There is no filter provided with Kosmek’s product except for a part of valves which prevents foreign materials and contaminants from getting into the circuit.

3) Applying Sealing Tape
   ● Wrap with tape 1 to 2 times following the screw direction.
   ● Pieces of the sealing tape can lead to oil leakage 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) Air Bleeding of the Hydraulic Circuit
   ● If the hydraulic circuit has excessive air, the action time may become very long. If air enters the circuit after connecting the hydraulic port or under the condition of no air in the oil tank, please perform the following steps.

   ① Reduce hydraulic pressure to less than 2MPa.
   ② Loosen the cap nut of pipe fitting closest to the clamp by one full turn.
   ③ Wiggle the pipeline to loosen the outlet of pipe fitting.
      Hydraulic fluid mixed with air comes out.

   ④ Tighten the cap nut after bleeding.
   ⑤ It is more effective to bleed air at the highest point inside the circuit or at the end of the circuit.
      (Set an air bleeding valve at the highest point inside the circuit.)

5) Checking Looseness and Retightening
   ● At the beginning of the machine installation, the bolt and nut may be tightened lightly. Check the looseness and re-tighten as required.

Hydraulic Fluid List

<table>
<thead>
<tr>
<th>Maker</th>
<th>Anti-Wear Hydraulic Oil</th>
<th>Multi-Purpose Hydraulic Oil</th>
</tr>
</thead>
<tbody>
<tr>
<td>Showa Shell Sekiyu</td>
<td>Tellus S2 M 32</td>
<td>Morlina S2 B 32</td>
</tr>
<tr>
<td>Idemitsu Kosan</td>
<td>Daphne Hydraulic Fluid 32</td>
<td>Daphne Super Multi Oil 32</td>
</tr>
<tr>
<td>JX Nippon Oil &amp; Energy</td>
<td>Super Hyrando 32</td>
<td>Super Mulpus DX 32</td>
</tr>
<tr>
<td>Cosmo Oil</td>
<td>Cosmo Hydro AW32</td>
<td>Cosmo New Mighty Super 32</td>
</tr>
<tr>
<td>ExxonMobil</td>
<td>Mobil DYE 24</td>
<td>Mobil DYE 24 Light</td>
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<tr>
<td>Matsumura Oil</td>
<td>Hydol AW-32</td>
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<tr>
<td>Castrol</td>
<td>Hyspin AWS 32</td>
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</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 Hydraulic Cylinder Speed Control Unit**

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

1. **Flow Control Circuit for Single Acting Cylinder**
   - For spring return single acting cylinders, restricting flow during release can extremely slow down or disrupt release action. The preferred method is to control the flow during the lock action using a valve that has free-flow in the release direction. It is also preferred to provide a flow control valve at each actuator.
   - Flow Control at the Release Side
   - Accelerated clamping speed by excessive hydraulic flow to the cylinder may sustain damage. In this case add flow control to regulate flow. (Please add flow control to release flow if the lever weight is put on at the time of release action when using swing clamps.)

2. **Flow Control Circuit for Double Acting Cylinder**
   - Flow control circuit for double acting cylinder should have meter-out circuits for both the lock and release sides. Meter-in control can have adverse effect by presence of air in the system.
   - However, in the case of controlling LKE, TMA, TLA, both lock side and release side should be meter-in circuit.
   - Refer to P.75 for speed adjustment of LKE.
   - For TMA and TLA, if meter-out circuit is used, abnormal high pressure is created, which causes oil leakage and damage.

   - [Meter-out Circuit] (Except LKE/TMA/TLA)

   - [Meter-in Circuit] (LKE/TMA/TLA must be controlled with meter-in.)

   - In the case of meter-out circuit, the hydraulic circuit should be designed with the following points.
     1. Single acting components should not be used in the same flow control circuit as the double acting components. The release action of the single acting cylinders may become erratic or very slow.

   - Reference to the following circuit when both the single acting cylinder and double acting cylinder are used together.
     1. Separate the control circuit.

     - Reduce the influence of double acting cylinder control unit. However, due to the back pressure in tank line, single action cylinder is activated after double action cylinder works.

   - In the case of meter-out circuit, the inner circuit pressure may increase during the cylinder action because of the fluid supply. The increase of the inner circuit pressure can be prevented by reducing the supplied fluid beforehand via the flow control valve. Especially when using sequence valve or pressure switches for clamping detection. If the back pressure is more than the set pressure then the system will not work as it is designed to.

     - Sequence Valve
     - Flow Control Valve (Any location is OK)
Cautions

Notes on Handling

1) It should be handled by qualified personnel.
2) Do not handle or remove the machine unless the safety protocols are ensured.
3) Do not touch clamp (cylinder) while clamp (cylinder) 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 Machine and Shut-off of Pressure Source
2) Regularly clean the area around the piston rod and plunger.
3) Please clean out the reference surface regularly (taper reference surface and seating surface) of locating machine. (VS/VT/VFL/VFM/VFJ/VFK/VWS/VWM/VWK/VX/VXF)
4) If disconnecting by couplers on a regular basis, air bleeding should be carried out daily to avoid air mixed in the circuit.
5) Regularly tighten nuts, bolts, pins, cylinders and pipe line to ensure proper use.
6) Make sure the hydraulic fluid has not deteriorated.
7) 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 correctly.
8) The products should be stored in the cool and dark place without direct sunshine or moisture.
9) 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.

   a) If the stipulated maintenance and inspection are not carried out.
   b) If the product is used while it is not suitable for use based on the operator’s judgment, resulting in defect.
   c) If it is used or handled in inappropriate way by the operator.
      (Including damage caused by the misconduct of the third party.)
   d) If the defect is caused by reasons other than our responsibility.
   e) If repair or modifications are carried out by anyone other than Kosmek, or without our approval and confirmation, it will void warranty.
   f) Other caused by natural disasters or calamities not attributable to our company.
   g) 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.
# Sales Offices

## Sales Offices across the World

<table>
<thead>
<tr>
<th>Country</th>
<th>TEL.</th>
<th>FAX.</th>
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<tbody>
<tr>
<td>Japan</td>
<td>+81-78-991-5162</td>
<td>+81-78-991-8787</td>
</tr>
<tr>
<td>Overseas Sales</td>
<td></td>
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<tr>
<td>USA</td>
<td>+1-630-620-7650</td>
<td>+1-630-620-9015</td>
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<td>KOSMEK (USA) LTD.</td>
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<tr>
<td>Mexico</td>
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<tr>
<td>KOSMEK USA Mexico Office</td>
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<tr>
<td>EUROPE</td>
<td>+43-463-287587</td>
<td>+43-463-287587-20</td>
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<tr>
<td>KOSMEK EUROPE GmbH</td>
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<tr>
<td>China</td>
<td>+86-21-54253000</td>
<td>+86-21-54253709</td>
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<td>KOSMEK (CHINA) LTD.</td>
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<tr>
<td>India</td>
<td>+91-9880561695</td>
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<td>KOSMEK LTD. - INDIA</td>
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<tr>
<td>Thailand</td>
<td>+66-2-300-5132</td>
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<td>Thailand Representative Office</td>
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<tr>
<td>Taiwan</td>
<td>+886-2-82261860</td>
<td>+886-2-82261890</td>
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<tr>
<td>Full Life Trading Co., Ltd.</td>
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<td>Philippines</td>
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<td>G.E.T. Inc, Phil.</td>
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<tr>
<td>Indonesia</td>
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<td>+62-21-5814857</td>
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<tr>
<td>P.T PANDU HYDRO PNEUMATICS</td>
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## Sales Offices in Japan

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<th>Office</th>
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<th>FAX.</th>
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<tbody>
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<td>Head Office</td>
<td>078-991-5115</td>
<td>078-991-8787</td>
</tr>
<tr>
<td>Osaka Sales Office</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Overseas Sales</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tokyo Sales Office</td>
<td>048-652-8839</td>
<td>048-652-8828</td>
</tr>
<tr>
<td>Nagoya Sales Office</td>
<td>0566-74-8778</td>
<td>0566-74-8808</td>
</tr>
<tr>
<td>Fukuoka Sales Office</td>
<td>092-433-0424</td>
<td>092-433-0426</td>
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Global Network

Overseas Affiliates and Sales Offices
Distributors

Canada
U.S.A.

Europe

Asia

Brazil

Australia

Mexico

Japan

China

Taiwan

Philippines

Thailand

India

Singapore

Malaysia

Indonesia

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