Hydraulic Swing Clamp

Model LHA   Model LT/LG
Model LHC   Model TLA-2
Model LHS   Model TLA-1
Model LHW   Model TLB-2

High Rigidity • Long Life • High Accuracy
High Speed • High Rigidity • Swing Completion Position Repeatability ±0.5° (±0.75° only for LHS)

Action Description

Before Swing (Released State)  The lever descends as it swings. (For LHS, the lever swings parallel.)  After swing completion, it descends vertically.  Action completed (Clamped State)

Application Examples

Machining  For the applications which require clamp position repeatability  Deburring

Cleaning  Press Fitting
**Swing Clamp Quick Change Lever Type A**

**Model LHA-A**

Only one bolt is required for lever installation and removal. Allows for the fastest lever setup time.

**The Fastest Lever Change, with Only One Bolt**

**Remove the Lever with One Wrench**

**Secure Lever Tightening Even with Small Torque**

**Install the Lever, Wedge1 and 2**

- Set Wedge 1 to the slot of the rod.

**Tighten the Lever with Tightening Bolt**

- Pull the lever towards the wedge side and tighten the bolting bolt with the specified torque.
- When removing the lever, follow the installation procedure reverse to the above.

---

**Air Sensing Swing Clamp**

**Model LHW**

Clamp-unclamp confirmation with built-in air catch sensor for smaller footprint fixtures.
**Low Pressure Model**

**MAX. 7MPa**

<table>
<thead>
<tr>
<th>Classification</th>
<th>Double Action</th>
<th>Double Action Compact</th>
<th>Double Action Parallel Swing Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating Pressure Range</td>
<td>1.5〜7MPa</td>
<td>1.5〜7MPa</td>
<td>1.5〜7MPa</td>
</tr>
</tbody>
</table>

**Standard Model**

<table>
<thead>
<tr>
<th>Action Confirmation</th>
<th>Double End Rod Option for Dog</th>
<th>Air Sensing Manifold Option</th>
<th>Air Sensing Piping Option</th>
<th>Built-in Sensing Valve Model</th>
</tr>
</thead>
<tbody>
<tr>
<td>External Dimensions</td>
<td>→ P.387</td>
<td>→ P.389</td>
<td>→ P.391</td>
<td>→ P.393</td>
</tr>
</tbody>
</table>

**Option**

<table>
<thead>
<tr>
<th>Quick Change Lever Type A</th>
<th>Quick Change Lever Type F</th>
<th>Balance Lever Option</th>
<th>Long Stroke Option</th>
<th>Swing Angle Selectable Option</th>
</tr>
</thead>
<tbody>
<tr>
<td>External Dimensions</td>
<td>→ P.395</td>
<td>→ P.397</td>
<td>→ P.399</td>
<td>→ P.401</td>
</tr>
</tbody>
</table>

**Accessories**

<table>
<thead>
<tr>
<th>Lever</th>
<th>Manifold Block</th>
<th>Speed Control Valve Plug</th>
</tr>
</thead>
<tbody>
<tr>
<td>LZH-T, LZH-F, LZH-B</td>
<td>LZH-T-</td>
<td>LZY-MD</td>
</tr>
<tr>
<td>LZH-A, LZH-W</td>
<td>LZY-MD</td>
<td>BZL, BZX, JZG</td>
</tr>
<tr>
<td>→ P.411</td>
<td>→ P.1217</td>
<td>→ P.891</td>
</tr>
</tbody>
</table>

*Please contact us for detail dimension at ★ part.*

---

**High Pressure Model**

**MAX. 35MPa**

<table>
<thead>
<tr>
<th>Classification</th>
<th>Double Action Top Flange</th>
<th>Double Action Bottom Flange</th>
<th>Single Action (Spring Release) Top Flange</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating Pressure Range</td>
<td>7〜35MPa</td>
<td>7〜35MPa</td>
<td>7〜35MPa</td>
</tr>
</tbody>
</table>

**Standard Model**

<table>
<thead>
<tr>
<th>Balance Lever Option</th>
<th>Long Stroke Option</th>
<th>Swing Angle Selectable Option</th>
</tr>
</thead>
<tbody>
<tr>
<td>External Dimensions</td>
<td>→ P.503</td>
<td>→ P.503</td>
</tr>
</tbody>
</table>

**Option**

<table>
<thead>
<tr>
<th>Lever</th>
<th>Speed Control Valve Plug</th>
<th>G-Thread Fitting</th>
</tr>
</thead>
<tbody>
<tr>
<td>TLZ-L2, TLZ-LB</td>
<td>BZT, JZG</td>
<td>G-Thread Fitting (Made by Ihara Science)</td>
</tr>
<tr>
<td>→ P.519</td>
<td>→ P.519</td>
<td>→ P.1233</td>
</tr>
</tbody>
</table>
## Low Pressure Model

**MAX. 7MPa**

<table>
<thead>
<tr>
<th>Classification</th>
<th>Double Action Built-in Sensing Valve</th>
<th>Single Action (Spring Release)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating Pressure Range</td>
<td>1.5~7MPa</td>
<td>2.5~7MPa</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Standard Model</th>
<th>Double End Rod Option for Dog</th>
<th>Air Sensing Manifold Option</th>
<th>Air Sensing Piping Option</th>
<th>Built-in Sensing Valve Model</th>
</tr>
</thead>
<tbody>
<tr>
<td>External Dimensions</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>External Dimensions</td>
</tr>
</tbody>
</table>

### Action Confirmation

- **Quick Change Lever Type A**: ![Image](image1.png)  
  - External Dimensions: P.467
  - External Dimensions: P.483

- **Quick Change Lever Type F**: ★
  - External Dimensions: P.485

- **Balance Lever Option**: ★
  - External Dimensions: P.487

- **Long Stroke Option**: —
  - —

- **Swing Angle Selectable Option**: ![Image](image2.png)
  - ![Image](image3.png)
  - External Dimensions: P.489

### Option

- **Lever**: LZH-T, LZH-A, LZH-W → P.470  

- **Manifold Block**: —
  - LZ-MS → P.1218

- **Speed Control Valve Plug**: BZL, BZX, JZG → P.891

## High-Power Swing Clamp

**Hydraulic Double Action**

**Model LHE**

2 sizes smaller with equivalent clamping force. Mechanical lock and hydraulic pressure allow for strong clamping and holding force.  
Refer to P. 11 for further information.
Air Sensing Swing Clamp

Model LHW

Low Pressure (1.5～7MPa)

Ideal for automated equipment, with the built-in action confirmation valve.

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*Installation Notes  • Hydraulic Fluid List  • Notes on Hydraulic Cylinder Speed Control Circuit
• Notes on Handling  • Maintenance/Inspection  • Warranty
**Application Example**

For automated setup requiring action confirmation

**Cross Section**

※ This drawing shows clamp - unclamp confirmation model (LHW-C□E).

- Action confirmation allows for safe and secure loading and unloading of workpieces.
- Built-in sensing valves enable for thinner fixture designing.
  Zero air leakage when the valve is closed. Air sensor with limited flow rate is available.
- Simpler Internal Fitting Design

  Common air port height for action confirmation allows for simpler circuit designing as shown below.
  - When using different sizes of swing clamps (Model LHW-C□E).
  - When using swing clamp (Model LHW-C□E) in combination with link clamp (Model LKW-C□E). 

![Diagram of fixture showing clamp side, unclamp side, and fixture plate dimensions.](attachment:fixture-diagram.png)
**Action Description**

※ This drawing shows clamp–unclamp confirmation model (LHW-C□□E).

### Clamp

- **Clamp (Supplying hydraulic pressure to clamp port)**
  - The piston rod descends as it swings. 
  - After swing action is completed, the piston rod descends vertically and clamps the workpiece.

<table>
<thead>
<tr>
<th>Hydraulic Pressure</th>
<th>Air Catch Sensor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clamp Side</td>
<td>Unclamp Side</td>
</tr>
<tr>
<td>ON</td>
<td>OFF</td>
</tr>
<tr>
<td>Clamp Confirmation</td>
<td>Unclamp Confirmation</td>
</tr>
<tr>
<td>ON</td>
<td>OFF</td>
</tr>
</tbody>
</table>

### Unclamp

- **Unclamp (Supplying hydraulic pressure to unclamp port)**
  - The piston rod ascends vertically (Clamp Stroke Range).
  - After vertical action is completed, the piston rod ascends as it swings.

<table>
<thead>
<tr>
<th>Hydraulic Pressure</th>
<th>Air Catch Sensor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clamp Side</td>
<td>Unclamp Side</td>
</tr>
<tr>
<td>OFF</td>
<td>ON</td>
</tr>
<tr>
<td>Clamp Confirmation</td>
<td>Unclamp Confirmation</td>
</tr>
<tr>
<td>OFF</td>
<td>ON</td>
</tr>
</tbody>
</table>

**Air Catch Sensor**
(Circuit symbol differs depending on sensors.)

5μm

0.1–0.2MPa
(Recommended)
Clamp Confirmation Valve

Air Supply

The spool is pushed forward by the built-in spring. The valve is closed when stroking 1 mm after swing stroke.

Unclamp Confirmation Valve

Air Supply

The spool is pushed forward by the built-in spring, and the valve is opened.

Air Supply

The spool is pushed back by the piston rod, and the valve is opened.

Sensing Chart for Clamp Confirmation

Sensing Chart for Unclamp Confirmation

※1. The sensor pressure for opening the valve depends on the sensor.

With air sensor with large air flow, the sensor pressure for opening the valve is higher and the differential pressure for detection is lower.
**Action Description (Air Sensing Chart Explanation)**

Action confirmation can be conducted by detecting differential pressure with the built-in valve for air catch sensor.

### Air Catch Sensor

- Air catch sensor is required in order to conduct the action confirmation. Sensing can be done by the air catch sensor with small air flow (recommended models are in the chart below).

**Recommended Operating Air Pressure:** 0.1~0.2MPa

**Recommended Air Catch Sensor**

<table>
<thead>
<tr>
<th>Maker</th>
<th>SMC</th>
<th>CKD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name</td>
<td>Air Catch Sensor</td>
<td>Gap Switch</td>
</tr>
<tr>
<td>Model No.</td>
<td>ISA3-F, ISA3-G, ISA2-G</td>
<td>GPS2-05-15</td>
</tr>
</tbody>
</table>

- Please refer to maker's catalog etc. for the detail of the air catch sensor.
- The air pressure to the air catch sensor should be 0.1~0.2MPa.
- Continuously supply air pressure to the clamps when in use.
- Refer to the drawing below for the pneumatic circuit construction.

### Notes for Design • Installation • Use

- Air vent port must be open to the atmosphere, and prevent coolant and chips from entering the air vent port. The air catch sensor can malfunction if the air vent port is blocked.
- Continuously supply air pressure to the air port when in use.
- Prevention of Foreign Substance to the Air Vent Port

Coolant and chips can be prevented by setting a check valve with low cracking pressure. (Recommended check valve: SMC-made series AKH, cracking pressure: 0.005MPa)

- The air vent port is open to the atmosphere.
- Coolant and chips enter from the air vent port.
**Air Sensing Chart**

Number Directly Connected to Clamp: 1, Air Catch Sensor ISA3-F, Supply Air Pressure 0.2MPa

Notes:
1. The sensing chart shows the relationship between the stroke and detection circuit air pressure.
2. The specifications may vary depending on the air circuit. The hose length should be as short as possible. (Less than 5m)
3. There is only clamp confirmation for sensing valve symbol [2] and only unclamp confirmation for sensing valve symbol [1].
   ※1. There is a certain tolerance with regard to the position where the pressure for closing the valve is reached depending on the sensor structure. (Refer to the sensing chart.)
   ※2. The position where the air catch sensor has ON signal output varies depending on the sensor setting.
   ※3. The sensor pressure for opening the valve depends on the sensor.

With air sensor with large air flow, the sensor pressure for opening the valve is higher and the differential pressure for detection is lower.


**Model No. Indication**

**LHW 048 1 - C R E -**

1 **Body Size**

- 040: \( \phi D = 40 \text{mm} \)
- 048: \( \phi D = 48 \text{mm} \)
- 055: \( \phi D = 55 \text{mm} \)
- 065: \( \phi D = 65 \text{mm} \)
- 075: \( \phi D = 75 \text{mm} \)

※ Outer diameter (\( \phi D \)) of the cylinder.

2 **Design No.**

1: Revision Number

3 **Piping Method**

- C: Gasket Option (With G Thread Plug)

※ Speed control valve (BZL) is sold separately. Please refer to P. 891.

4 **Swing Direction when Clamping**

- R: Clockwise
- L: Counter-Clockwise

5 **Sensing Valve**

- E: Clamp - Unclamp Confirmation (Both)
- H: Clamp Confirmation Only
- J: Unclamp Confirmation Only

6 **Option**

- Blank: None (Standard: Taper Lock Lever Option)
- A: Quick Change Lever Type A
### Specifications

<table>
<thead>
<tr>
<th>Model No.</th>
<th>LHW0401</th>
<th>LHW0481</th>
<th>LHW0551</th>
<th>LHW0651</th>
<th>LHW0751</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cylinder Area for Clamping cm²</td>
<td>5.00</td>
<td>6.95</td>
<td>10.3</td>
<td>13.4</td>
<td>20.3</td>
</tr>
<tr>
<td>Cylinder Inner Diameter mm</td>
<td>31</td>
<td>37</td>
<td>44</td>
<td>51</td>
<td>62</td>
</tr>
<tr>
<td>Rod Diameter mm</td>
<td>18</td>
<td>22</td>
<td>25</td>
<td>30</td>
<td>35.5</td>
</tr>
<tr>
<td>Clamping Force (Calculation Formula) kN</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cylinder Capacity cm³</td>
<td>Clamp</td>
<td>7.3</td>
<td>10.8</td>
<td>19.0</td>
<td>26.7</td>
</tr>
<tr>
<td></td>
<td>Unclamp</td>
<td>10.9</td>
<td>16.7</td>
<td>28.1</td>
<td>40.9</td>
</tr>
<tr>
<td>Full Stroke mm</td>
<td>14.5</td>
<td>15.5</td>
<td>18.5</td>
<td>20</td>
<td>24</td>
</tr>
<tr>
<td>Swing Stroke (90°) mm</td>
<td>6.5</td>
<td>7.5</td>
<td>8.5</td>
<td>10</td>
<td>12</td>
</tr>
<tr>
<td>Vertical Stroke mm</td>
<td>8</td>
<td>8</td>
<td>10</td>
<td>10</td>
<td>12</td>
</tr>
<tr>
<td>Swing Angle Accuracy</td>
<td>90° ±3°</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Swing Complete Position Repeatability</td>
<td>±0.5°</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hydraulic Pressure</td>
<td>Max. Operating Pressure MPa</td>
<td>7.0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Min. Operating Pressure MPa</td>
<td>1.5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Withstanding Pressure MPa</td>
<td>10.5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Recommended Operating Air Pressure MPa</td>
<td>0.1~0.2</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Recommended Air Catch Sensor</td>
<td>ISA3-F, ISA3-G, ISA2-G (SMC) / GPS2-05-15 (CKD)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Operating Temperature °C</td>
<td>0~70</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mass kg</td>
<td>Option Blank</td>
<td>0.9</td>
<td>1.4</td>
<td>2.0</td>
<td>2.9</td>
</tr>
<tr>
<td></td>
<td>Option A</td>
<td>0.9</td>
<td>1.3</td>
<td>1.9</td>
<td>2.8</td>
</tr>
</tbody>
</table>

Notes:

1. Clamping force cannot be calculated from the cylinder inner diameter and rod diameter. Please refer to the clamping force curve.
2. F: Clamping Force (MN), P: Supply Hydraulic Pressure (MPa), L: Distance between the piston center and the clamping point (mm).
3. Minimum pressure to operate the clamp without load.
4. Mass of single swing clamp including taper sleeve and nut.
5. Mass of single swing clamp without the tightening kit.
Clamping Force Curve

\[ F = P \cdot L \]
\[ P \text{ (kN)} = \frac{F}{L} \]
\[ L \text{ (m)} = \frac{F}{P} \]

Notes:
1. Tables and graphs shown are the relationships between the clamping force (kN) and supply hydraulic pressure (MPa).
2. Cylinder force (when \( L=0 \)) cannot be calculated from the calculation formula of clamping force.
3. There may be more lever swing action with large inertia depending on supply hydraulic pressure or lever mounting position.
4. Clamping force indicates the value when the lever locks a piecework in horizontal position.
5. The clamping force varies depending on the lever length. Set the supply hydraulic pressure suitable to the lever length.
6. Using in the non-usable range may damage the clamp and lead to fluid leakage.
7. The tables and graphs are only for reference. The exact results should be calculated based on the clamping force calculation formula.

\[ F = \begin{cases} 2000 \times L & \text{for } L \leq 3 \text{ (kN)} \\ 2000 \times L + 2000 \times (L - 3) & \text{for } L > 3 \text{ (kN)} \end{cases} \]

LHW0401
Cylinder Force Calculator formula: \( F = 1000 \times L \times (L + 1) \) (kN)

LHW0481
Cylinder Force Calculator formula: \( F = 1000 \times (L + 1) \times (L + 2) \) (kN)

LHW0551
Cylinder Force Calculator formula: \( F = 1000 \times (L + 1) \times (L + 2) \) (kN)

(Ex.) When using LHW0481,
Supply Hydraulic Pressure 5.0MPa, Lever Length L=50mm, Clamping force is about 3.1kN.

Applicable Model
LHW 1 - C R L E H Blank A

Body Size

Max. Operating Pressure (MPa): 7.0

Supply Hydraulic Pressure (MPa): 0, 2, 4, 6, 8, 10, 12, 14, 16, 18, 20

Non-Usable Range (B)

Cylinder Force

L=400\(=17.5\)
L=500\(=37.5\)
L=600\(=77.5\)
L=700\(=127.5\)
L=800\(=177.5\)

Non-Usable Range (B)

Cylinder Force

L=50\(=24.5\)
L=60\(=54.5\)
L=70\(=114.5\)
L=80\(=174.5\)

Non-Usable Range (B)

Cylinder Force

L=50\(=20\)
L=60\(=50\)
L=70\(=110\)
L=80\(=170\)

Non-Usable Range (B)
Allowable Swing Time Graph

Adjustment of Swing Time

The graph shows allowable swing time against lever inertia moment. Please make sure that an operation time is more than the operation time shown in the graph.

Excessive action speed can reduce stopping accuracy and damage internal components.

Notes:
1. It shows the inertia moment with material lever (LZH□-T).
2. For any lever inertia moment, minimum 90° swing time should be 0.2 sec for clamping and 0.1 sec for unclamping or more.
3. The graph shows the allowable action time in regard to the lever inertia moment when the piston rod operates at constant speed.
4. There may be no lever swing action with large inertia depending on supply hydraulic pressure, oil flow and lever mounting position.
5. For speed adjustment of clamp lever, please use meter-out flow control valve.
6. In case of meter-in control, the clamp lever may be accelerated by its own weight during swinging motion (clamp mounted horizontally) or the piston rod may be moving too fast. Please refer to P.1238 for speed control of the hydraulic cylinder.
7. Excessive swing speed can reduce stopping accuracy and damage the internal components.
8. Please contact us if operational conditions differ from those shown on the graphs.
(How to read the allowable swing time graph)
When using LHW0481
Lever Inertia Moment: 0.0068kg·m²
① 90° Swing Time when Clamping : About 0.44 sec or more
② 90° Swing Time when Unclamping : About 0.22 sec or more
③ Total Clamp Operation Time : About 0.9 sec or more
④ Total Unclamp Operation Time : About 0.45 sec or more
1. The total operation time on the graph represents the allowable operation time when fully stroked.

How to Calculate Inertia Moment (Estimated)

\[ I : \text{Inertia Moment (kg} \cdot \text{m}^2) \]
\[ L, L_1, L_2, k, b : \text{Length (m)} \]
\[ m, m_1, m_2, m_3 : \text{Mass (kg)} \]

① For a rectangular plate (cuboid), the rotating shaft is vertically on one side of the plate.

\[ I = m_1 \frac{4L_1^2 + b^2}{12} + m_2 \frac{4L_2^2 + b^2}{12} \]

② For a rectangular plate (cuboid), the rotating shaft is vertically on the gravity center of the plate.

\[ I = m \frac{L^2 + b^2}{12} \]

③ Load is applied on the lever front end.

\[ I = m_1 \frac{4L_1^2 + b^2}{12} + m_2 \frac{4L_2^2 + b^2}{12} + m_3K^2 + m_4 \frac{L_2^2 + b^2}{12} \]
**External Dimensions (Clamp - Unclamp Confirmation)**

※The drawing shows the unclamped state of LHW-CRE.

**Machining Dimensions of Mounting Area**

- **Unclamp Port:** G Thread \( \varphi 3 \)
  (Speed Control Valve Port)

- **Clamp Port:** G Thread \( \varphi 3 \)
  (Speed Control Valve Port)

- **2-G Thread Plug (Included)**

- **Nut (Included)**

- **X Screw**

- **Taper Sleeve (Included)**

**Notes:**

※1. The slot for lever phasing faces the port side when clamped.

※2. Mounting bolts are not provided. Please prepare them according to the mounting height referring to dimension ‘S’.

※3. Speed control valve is sold separately. Please refer to P.891.

※4. The valve of LHW0401 is protruded as shown in the drawing.

**Note:**

※5. EA tapping depth of the mounting bolt should be decided according to the mounting height referring to dimensions ‘S’.
### Model No. Indication

**LHW 048 1 - C**

![Diagram](image)

(Format Example: LHW0481-CRE, LHW0551-CLE)

1. **Body Size**
2. **Design No.**
3. **Piping Method**
4. **Swing Direction when Clamping**
5. **Sensing Valve**
   - E: Clamp - Unclamp Confirmation
6. **Option (Blank)**

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

<table>
<thead>
<tr>
<th>Model No.</th>
<th>LHW0401-C</th>
<th>LHW0401-C</th>
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### O-Ring

- **DA**: 1BP5, 1BP5, 1BP7, 1BP7
- **DB**: AS568-90D (90°)
- **DC**: AS568-0331(70°)
- **DD**: AS568-0331(70°)
**External Dimensions (Clamp Confirmation Only)**

*The drawing shows the unclamped state of LHW-CRH.*

Unclamp Port: G Thread \(^{1/3}\) (Speed Control Valve Port)

Clamp Port: G Thread \(^{1/3}\) (Speed Control Valve Port)

2-G Thread Plug (Included)

Hexagon Socket Y

Swing Direction when Clamping

\( \phi \text{ CC} \) \(^{0.05}\) Slot for Lever Phasing \(^{1/1}\)

R Type (L Type : 180° Reverse)

4-\( \phi \) R Spot Facing \( \phi \)

\( \phi \text{ AC} \)

\( \phi \text{ BB} \)

Taper Sleeve (Included)

\( \phi \text{ AC} \)

N, Screw

Nut (Included)

\( \phi \text{ DB} \)

\( \phi \text{ U} \)

Air Port for Clamp Confirmation

O-Ring (Included) DC

O-Ring (Included) DD

Notes:

*1. The slot for lever phasing faces the port side when clamped.*

*2. Mounting bolts are not provided. Please prepare them according to the mounting height referring to dimension ‘S’.*

*3. Speed control valve is sold separately. Please refer to P.891.*

*4. The valve of LHW0401 is protruded as shown in the drawing.*

---

**Machining Dimensions of Mounting Area**

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Notes:

*5. EA tapping depth of the mounting bolt should be decided according to the mounting height referring to dimensions ‘S’.*

*6. Provide the air port for clamp confirmation within the part ★.*
**Model No. Indication**

LHW 0481 - C  

(Format Example : LHW0481-CRH, LHW0551-CLH)

1. Body Size  
2. Design No.  
3. Piping Method  
4. Swing Direction when Clamping  
5. Sensing Valve  
   (H : Clamp Confirmation Only)  
6. Option (Blank)

**External Dimensions and Machining Dimensions of Mounting**  

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**Clamp Port**: G Thread  
**Unclamp Port**: G Thread

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**Air Sensing Swing Clamp**

**External Dimensions (Unclamp Confirmation Only)**

The drawing shows the unclamped state of LHW-CRU.

**Machining Dimensions of Mounting Area**

Unclamp Port: G Thread \( \text{R}^3 \)
(Speed Control Valve Port)

Clamp Port: G Thread \( \text{R}^3 \)
(Speed Control Valve Port)

2-G Thread Plug (Included)

4-G Screw

4- EA Screw \( \text{R}^5 \)

\( \phi \text{AC} \) Spot Facing \( \phi \text{Q} \)

\( \phi \text{CC} \) Slot for Lever Phasing \( \text{R}^1 \)

R Type (L type : 180° Reverse)

Swing Direction when Clamping

Nut (Included)

\( \phi \text{BB} \)

\( \phi \text{U} \)

Taper Sleeve (Included)

Air Port for Unclamp Confirmation

Air Port by Unclamp Confirmation

O-Ring (Included) DC

O-Ring (Included) DD

Clamp Port: O-Ring (Included) DA

Air Vent Port: O-Ring (Included) DB

Unclamp Port: O-Ring (Included) DA

Notes:

\( \text{R}^1 \). The slot for lever phasing faces the port side when clamped.

\( \text{R}^2 \). Mounting bolts are not provided. Please prepare them according to the mounting height referring to dimension ‘S’.

\( \text{R}^3 \). Speed control valve is sold separately. Please refer to P.891.

\( \text{R}^4 \). The valve of LHW0401 is protruded as shown in the drawing.

\( \text{R}^5 \). EA tapping depth of the mounting bolt should be decided according to the mounting height referring to dimensions ‘S’.

\( \text{R}^6 \). Provide the air port for unclamp confirmation within the part ∗
### Model No. Indication

**LHW 048 1 - C**

(Format Example: LHW0481-CRJ, LHW0551-CLJ)

1. **Body Size**
2. **Design No.**
3. **Piping Method**
4. **Swing Direction when Clamping**
5. **Sensing Valve (J : Unclamp Confirmation Only)**
6. **Option (Blank)**

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

<table>
<thead>
<tr>
<th>Model No.</th>
<th>LHW0401-C/J</th>
<th>LHW0481-C/J</th>
<th>LHW0551-C/J</th>
<th>LHW0651-C/J</th>
<th>LHW0751-C/J</th>
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<td>G1/8</td>
<td>G1/4</td>
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</table>

### O-Ring

- **DA**: 1BP5
- **DB**: A568-00790(90°)
- **DC**: 38×1.5 (internal diameter × wire diameter)
- **DD**: A568-0081070(70°)
- **DD**: 38×1.5 (internal diameter × wire diameter)
External Dimensions (Clamp - Unclamped Confirmation)

The drawing shows the unclamped state of LHW-CRE-A.

Machining Dimensions of Mounting Area

1. Slot for Lever Phasing

<table>
<thead>
<tr>
<th>Unclamped State</th>
<th>Clamped State</th>
<th>Common for R/L type</th>
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<tbody>
<tr>
<td>R type</td>
<td>L type</td>
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</table>

- 2-Slot for Lever Phasing
- 4-\( \phi \) R Spot Facing \( \phi \) Q
- Clamp Port \( \phi \) P
- Air Vent Port \( \phi \) P
- 4-\( \phi \)A Screw

Notes:

- 2. Mounting bolts are not provided. Please prepare them according to the mounting height referring to dimension 'S'.
- 3. Speed control valve is sold separately. Please refer to P891.
- 4. The valve of LHW0401 is protruded as shown in the drawing.
- 1. Please contact us if it has a combination with other detection methods.

Note:

- 5. EA tapping depth of the mounting bolt should be decided according to the mounting height referring to dimensions 'S'.

Do not cover the 30° taper area of the air supply ports.
### Model No. Indication

<table>
<thead>
<tr>
<th>Model No.</th>
<th>LHW0401-C</th>
<th>LHW0481-C</th>
<th>LHW0551-C</th>
<th>LHW0631-C</th>
<th>LHW0751-C</th>
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<td>Vertical Stroke</td>
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### External Dimensions and Machining Dimensions of Mounting (mm)

- **Model No.**
  - LHW0401-C: A
  - LHW0481-C: B
  - LHW0551-C: C
  - LHW0631-C: D
  - LHW0751-C: E

- **Full Stroke**
  - 14.5
- **Swing Stroke (90°)**
  - 6.5
- **Vertical Stroke**
  - 8
- **A**
  - 115
- **B**
  - 54
- **C**
  - 45
- **D**
  - 40
- **Da**
  - 40.8
- **E**
  - 71.5
- **F**
  - 46.5
- **Fu**
  - 68.5
- **G**
  - 25
- **H**
  - 31.5
- **J**
  - 22.5
- **K**
  - 34
- **L**
  - 73
- **M**
  - 11
- **Nx**
  - 26
- **Ny**
  - 9
- **P**
  - 3
- **Q**
  - 9
- **R**
  - 5.5
- **S**
  - 15
- **U**
  - 18
- **Z (Chamfer)**
  - C3
- **CA (Feed)**
  - 5.8
- **CB**
  - 15
- **CC**
  - 4
- **EA (Nominal × Pitch)**
  - M5×0.8
- **SA (Hole)**
  - 27
- **SB (Hole)**
  - 16.5
- **SC (Nominal × Pitch × Depth)**
  - M5×0.8×8
- **FA**
  - 40.8
- **FB**
  - 41.4
- **FC**
  - 40.5
- **FD**
  - 1.2
- **FE**
  - 47
- **JA**
  - 3.5
- **JB**
  - 14
- **Clamp Port: G Thread**
  - G1/8
- **Unclamp Port: G Thread**
  - G1/8
- **O-Ring**
  - DA: 1BPS
  - DB: 1BPS
  - DC: 38×1.5
  - DD: 38×1.5

### Notes:
- **Note**: It shows different dimensions than **Blank**: Standard.
- Also, the dimensions of **6** are the same when selecting **A** for **H/J**.
**Taper Lock Lever Design Dimensions**

- Reference for designing taper lock swing lever.

**Quick Change Lever Type A Design Dimensions**

- Reference for designing Quick Change Swing Lever Type A.

---

### Taper Lock Lever Design Dimensions

**Corresponding Model No.**

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**Pin Hole for Lever Phasing**

- \( \phi H_{PH} \)

**Corresponding Model No.**

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<th>LHW0551</th>
<th>LHW0651</th>
<th>LHW0751</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>19</td>
<td>23</td>
<td>26</td>
<td>29</td>
<td>35</td>
</tr>
<tr>
<td>B</td>
<td>16</td>
<td>19</td>
<td>22</td>
<td>25</td>
<td>31</td>
</tr>
<tr>
<td>C</td>
<td>3</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>D</td>
<td>10.5</td>
<td>12.5</td>
<td>14.5</td>
<td>16.5</td>
<td>17.5</td>
</tr>
<tr>
<td>E</td>
<td>20.(\frac{3}{8})</td>
<td>25.(\frac{3}{8})</td>
<td>28.(\frac{3}{8})</td>
<td>34.(\frac{3}{8})</td>
<td>40.(\frac{3}{8})</td>
</tr>
<tr>
<td>F</td>
<td>17</td>
<td>21</td>
<td>23.5</td>
<td>29</td>
<td>33</td>
</tr>
<tr>
<td>G</td>
<td>9</td>
<td>11.5</td>
<td>13</td>
<td>15.5</td>
<td>18</td>
</tr>
<tr>
<td>H</td>
<td>4.(\frac{3}{8})</td>
<td>5.(\frac{3}{8})</td>
<td>6.(\frac{3}{8})</td>
<td>6.(\frac{3}{8})</td>
<td>8.(\frac{3}{8})</td>
</tr>
</tbody>
</table>

**Phasing Pin (Referenced)**

- \( \phi H_{PH} \times 10 \)

**Notes:**

1. Swing lever should be designed with its length according to performance curve.
2. If the swing lever is not in accordance with the dimension shown above, performance may be degraded and damage can occur.
3. Refer to Design Dimensions of Quick Change Lever Type A for -A (Quick Change Lever Type A).

### Quick Change Lever Type A Design Dimensions

**Corresponding Model No.**

<table>
<thead>
<tr>
<th>Model No.</th>
<th>LHW0401</th>
<th>LHW0481</th>
<th>LHW0551</th>
<th>LHW0651</th>
<th>LHW0751</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>18.(\frac{1}{4})</td>
<td>22.(\frac{1}{4})</td>
<td>25.(\frac{1}{4})</td>
<td>30.(\frac{3}{4})</td>
<td>35.5.(\frac{3}{4})</td>
</tr>
<tr>
<td>B</td>
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<td>C</td>
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<tr>
<td>D</td>
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<tr>
<td>E</td>
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<tr>
<td>F</td>
<td>15</td>
<td>16.5</td>
<td>18.5</td>
<td>20.5</td>
<td>25</td>
</tr>
<tr>
<td>G</td>
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<td>4</td>
<td>4.5</td>
<td>6.5</td>
<td>6.5</td>
</tr>
<tr>
<td>H</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>J</td>
<td>4.(\frac{3}{8})</td>
<td>4.(\frac{3}{8})</td>
<td>4.(\frac{3}{8})</td>
<td>6.(\frac{3}{8})</td>
<td>6.(\frac{3}{8})</td>
</tr>
<tr>
<td>K</td>
<td>M5×0.8</td>
<td>M5×0.8</td>
<td>M6×1</td>
<td>M6×1</td>
<td>M8×1.25</td>
</tr>
</tbody>
</table>

**Pin for Stopper**

- \( \phi 4(\frac{m6}{m6}) \times 10 \)

**Notes:**

1. Swing lever should be designed with its length according to performance curve.
2. If the swing lever is not in accordance with the dimension shown above, performance may be degraded and damage can occur.
3. Tightening Kit (LZH-□-W) for Quick Change Lever Type A is sold separately.
4. The pin hole for stopper and phasing (\( \phi J \)) should be appropriately machined according to the slot for lever phasing on the clamp body.

Pin for stopper and phasing (prepared by customer) is used as phasing when mounting the lever and as stopper when removing the lever. If you are not using a pin for stopper and phasing, a stopper is required to remove the lever.
**Accessories : Material Swing Lever for Taper Lock Option**

**Model No. Indication**

**LZH 048 0 – T**

<table>
<thead>
<tr>
<th>Model No.</th>
<th>LZH0400</th>
<th>LZH0480</th>
<th>LZH0550</th>
<th>LZH0650</th>
<th>LZH0750</th>
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<tbody>
<tr>
<td>-T</td>
<td>LZH0401</td>
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<td>LZH0551</td>
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<td>LZH0751</td>
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</table>

<table>
<thead>
<tr>
<th>Corresponding Model No.</th>
<th>LHW0401</th>
<th>LHW0481</th>
<th>LHW0551</th>
<th>LHW0651</th>
<th>LHW0751</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
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<td>160</td>
<td>170</td>
<td>175</td>
<td>185</td>
</tr>
<tr>
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<td>D</td>
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<td>H</td>
<td>16</td>
<td>20</td>
<td>22.5</td>
<td>25</td>
<td>29</td>
</tr>
</tbody>
</table>

Notes:
1. Material: SSOCH
2. If necessary, the front end should be additionally machined.
3. When determining the phase, refer to taper lock lever design dimensions for each model for the additional machining.

**Accessories : Material Swing Lever for Quick Change Lever Type A**

**Model No. Indication**

**LZH 048 0 – A**

<table>
<thead>
<tr>
<th>Model No.</th>
<th>LZH0400</th>
<th>LZH0480</th>
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<th>LZH0650</th>
<th>LZH0750</th>
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</thead>
<tbody>
<tr>
<td>-A</td>
<td>LZH0401</td>
<td>LZH0481</td>
<td>LZH0551</td>
<td>LZH0651</td>
<td>LZH0751</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Corresponding Model No.</th>
<th>LHW0401</th>
<th>LHW0481</th>
<th>LHW0551</th>
<th>LHW0651</th>
<th>LHW0751</th>
</tr>
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<tr>
<td>A</td>
<td>145</td>
<td>160</td>
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<td>C</td>
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<tr>
<td>G</td>
<td>17</td>
<td>21</td>
<td>23.5</td>
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<tr>
<td>H</td>
<td>16</td>
<td>20</td>
<td>22.5</td>
<td>25</td>
<td>29</td>
</tr>
</tbody>
</table>

Notes:
1. Material: SSOCH
2. If necessary, the front end should be additionally machined.
3. The pin hole for stopper and lever phasing should be additionally machined by referring to Quick Change Lever Type A Design Dimensions.
4. Tightening Kit (LZH048-W) for Quick Change Lever Type A is sold separately.

**Accessories : Tightening Kit for Quick Change Lever Type A**

**Model No. Indication**

**LZH 048 0 – W**

<table>
<thead>
<tr>
<th>Model No.</th>
<th>LZH0400</th>
<th>LZH0480</th>
<th>LZH0550</th>
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</thead>
<tbody>
<tr>
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<td>LZH0481</td>
<td>LZH0551</td>
<td>LZH0651</td>
<td>LZH0751</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Corresponding Model No.</th>
<th>LHW0401</th>
<th>LHW0481</th>
<th>LHW0551</th>
<th>LHW0651</th>
<th>LHW0751</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>145</td>
<td>160</td>
<td>170</td>
<td>175</td>
<td>185</td>
</tr>
<tr>
<td>B</td>
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<td>C</td>
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<td>D</td>
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<td>E</td>
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<td>19</td>
<td>22</td>
<td>25</td>
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</tr>
<tr>
<td>G</td>
<td>17</td>
<td>21</td>
<td>23.5</td>
<td>29</td>
<td>33</td>
</tr>
<tr>
<td>H</td>
<td>16</td>
<td>20</td>
<td>22.5</td>
<td>25</td>
<td>29</td>
</tr>
</tbody>
</table>

Notes:
1. Material: SSOCH
2. If necessary, the front end should be additionally machined.
3. The pin hole for stopper and lever phasing should be additionally machined by referring to Quick Change Lever Type A Design Dimensions.
4. Tightening Kit (LZH048-W) for Quick Change Lever Type A is sold separately.

**Tightening Kit for mounting Quick Change Lever Type A. Sold separately from clamp body.**

**Contents of Tightening Kit**

- Wedge 1
- Wedge 2
- Tightening Bolt

<table>
<thead>
<tr>
<th>Model No.</th>
<th>LZH0400</th>
<th>LZH0480</th>
<th>LZH0550</th>
<th>LZH0650</th>
<th>LZH0750</th>
</tr>
</thead>
<tbody>
<tr>
<td>-W</td>
<td>LZH0401</td>
<td>LZH0481</td>
<td>LZH0551</td>
<td>LZH0651</td>
<td>LZH0751</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Corresponding Model No.</th>
<th>LHW0401</th>
<th>LHW0481</th>
<th>LHW0551</th>
<th>LHW0651</th>
<th>LHW0751</th>
</tr>
</thead>
<tbody>
<tr>
<td>MS x 0.8</td>
<td>4</td>
<td>4</td>
<td>5</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>Tightening Torque N-m</td>
<td>5.0</td>
<td>5.0</td>
<td>8.0</td>
<td>8.0</td>
<td>20</td>
</tr>
</tbody>
</table>

**Hole Clamp**
- SFA
- SFC

**Swing Clamp**
- LHA
- LHC
- LHS
- LTV/G
- TLA-2
- TLR-2
- TLA-1

**Link Clamp**
- LEA
- LKC
- LKW
- LM/LJ
- TMA-2
- TMA-1

**Work Support**
- LD
- LC
- TNC
- TC

**Air Sensing Lift Cylinder**
- LHW

**Compact Cylinder**
- LLR
- LLO
- DP
- DR
- DS
- DT

**Block Cylinder**
- DBA
- DBC

**Centering Vise**
- FVA
- FVD
- FVC

**Control Valve**
- BZL
- BZT
- BZX/ZG

**Pallet Clamp**
- V5
- VT

**Expansion Locating Pin**
- VFL
- VFM
- VFI
- VFK

**Pull Stud Clamp**
- FP
- FD

**Customized Spring Cylinder**
- DWA/DWB
Cautions

- **Notes for Design**
  1) Check Specifications
  - Please use each product according to the specifications.

- **Notes for Circuit Design**
  1) Please read "Notes on Hydraulic Cylinder Speed Control Circuit" on P. 1237 to assist with proper hydraulic circuit designing.
  2) Ensure there is no possibility of supplying hydraulic pressure to the lock and release ports simultaneously.

- **Swing lever should be designed so that the inertia moment is small.**
  - Large moment of inertia will degrade the lever's stopping accuracy and cause undue wear to the clamp.
  - Additionally, the clamp may not function, depending on supplied hydraulic pressure and lever mounting position.
  - Set the allowable operation time after the inertia moment is calculated. Refer to "Allowable Swing Time Graph" and make sure to operate clamps within the allowable operation time.

- **When using on a welding fixture, the exposed area of piston rod should be protected.**
  - If spatter gets onto the sliding surface it could lead to malfunction and fluid leakage.

- **When clamping on a sloped surface of the workpiece**
  - Make sure the clamp surface and mounting surface of the clamp are parallel.

- **Notes for LHA/M/N, LHW**
  1) When using air sensing swing clamp (LHA-M/N, LHW), make sure to check the Notes for Design • Installation • Use (Pages shown below).
  - Swing clamp with air sensing option LHA-M/N: Refer to P.407.
  - Swing clamp with air sensing valve LHW: Refer to P.453.

- **When using an offset lever for Quick Change Lever Type A.**
  - Clamp point should be in the range of 90° towards lever tightening part.

### Installation Notes

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

2) **Mounting the clamp**
   - When mounting the clamp, use hexagon socket bolts as multiple bolt holes for mounting (with tensile strength of 12.9) 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>LHA0360 / LHC0360</td>
<td>M4×0.7</td>
<td>4.0</td>
</tr>
<tr>
<td>LHA0400 / LHC0400</td>
<td>M5×0.8</td>
<td>8.0</td>
</tr>
<tr>
<td>LHS0400 / LHWW0401</td>
<td>M5×0.8</td>
<td>8.0</td>
</tr>
<tr>
<td>LHA0480 / LHC0480</td>
<td>M5×0.8</td>
<td>8.0</td>
</tr>
<tr>
<td>LHS0480 / LHWW0481</td>
<td>M6×1</td>
<td>14</td>
</tr>
<tr>
<td>LHA0550 / LHC0550</td>
<td>M6×1</td>
<td>14</td>
</tr>
<tr>
<td>LHS0550 / LHWW0551</td>
<td>M6×1</td>
<td>14</td>
</tr>
<tr>
<td>LHA0750 / LHS0750</td>
<td>M6×1.25</td>
<td>33</td>
</tr>
<tr>
<td>LHA0900</td>
<td>M10×1.5</td>
<td>65</td>
</tr>
<tr>
<td>LHA1050</td>
<td>M12×1.75</td>
<td>114</td>
</tr>
<tr>
<td>LT0301 / LG0301</td>
<td>M4×0.7</td>
<td>3.2</td>
</tr>
<tr>
<td>LT0361 / LG0361</td>
<td>M4×0.7</td>
<td>3.2</td>
</tr>
<tr>
<td>LT0401 / LG0401</td>
<td>M5×0.8</td>
<td>6.3</td>
</tr>
<tr>
<td>LT0481 / LG0481</td>
<td>M5×0.8</td>
<td>6.3</td>
</tr>
<tr>
<td>LT0551 / LG0551</td>
<td>M6×1</td>
<td>10</td>
</tr>
<tr>
<td>LT0651 / LG0651</td>
<td>M6×1</td>
<td>10</td>
</tr>
<tr>
<td>LT0751 / LG0751</td>
<td>M6×1.25</td>
<td>25</td>
</tr>
<tr>
<td>LG0901</td>
<td>M10×1.5</td>
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</tr>
<tr>
<td>LG1051</td>
<td>M12×1.75</td>
<td>98</td>
</tr>
<tr>
<td>TLA0401-2 / TLB0401-2</td>
<td>M5×0.8</td>
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<td>TLA0402-1</td>
<td>M5×0.8</td>
<td>6.9</td>
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<td>TLA0601-2 / TLB0601-2</td>
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<td>TLA0602-1</td>
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<td>TLA1002-1 / TLB1001-2</td>
<td>M8×1.25</td>
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<td>TLA1002-1</td>
<td>M8×1.25</td>
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</tr>
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<td>58.8</td>
</tr>
<tr>
<td>TLA4001-2 / TLB4001-2</td>
<td>M12×1.75</td>
<td>98</td>
</tr>
</tbody>
</table>
3) Installation / Removal of the Swing Lever

- Oil or debris on the mating surfaces of the lever, taper sleeve or piston rod may cause the rod to loosen. Please clean them thoroughly before assembly.
- Tighten the tightening bolt of swing lever with the torque shown below. Tightening with greater torque than recommended can damage the bolt and lever tightening function.

<table>
<thead>
<tr>
<th>LHA/LHC/LH-A/LHN/LTL/G Standard</th>
<th>Taper Lock Lever</th>
</tr>
</thead>
<tbody>
<tr>
<td>Model No.</td>
<td>Thread Size</td>
</tr>
<tr>
<td>LHA0360 / LH0360 LHS0360</td>
<td>M14 × 1.5</td>
</tr>
<tr>
<td>LHA0400 / LH0400 LHS0400</td>
<td>M16 × 1.5</td>
</tr>
<tr>
<td>LHA0480 / LH0480 LHS0480</td>
<td>M20 × 1.5</td>
</tr>
<tr>
<td>LHA0550 / LH0550 LHS0550</td>
<td>M22 × 1.5</td>
</tr>
<tr>
<td>LHA0650 / LH0650 LHS0650</td>
<td>M27 × 1.5</td>
</tr>
<tr>
<td>LHA0750 / LH0750 LHS0750</td>
<td>M30 × 1.5</td>
</tr>
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<td>LHA0900 / LH0900 LHS0900</td>
<td>M39 × 1.5</td>
</tr>
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<td>LHA1050 / LH1050</td>
<td>M48 × 1.5</td>
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</table>

<table>
<thead>
<tr>
<th></th>
<th></th>
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</thead>
<tbody>
<tr>
<td>Model No.</td>
<td>Thread Size</td>
<td>Tightening Torque (N·m)</td>
</tr>
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<td>LT0301-F / LGO301-F</td>
<td>M5 × 0.8</td>
<td>7.5</td>
</tr>
<tr>
<td>LHA0360-F / LH0360-F</td>
<td>M6 × 1</td>
<td>14</td>
</tr>
<tr>
<td>LHA0400-F / LH0400-F</td>
<td>M8 × 1</td>
<td>33</td>
</tr>
<tr>
<td>LHA0480-F / LH0480-F</td>
<td>M10 × 1.25</td>
<td>65</td>
</tr>
<tr>
<td>LHA0550-F / LH0550-F / LGO551-F</td>
<td>M12 × 1.5</td>
<td>100 ~ 114</td>
</tr>
<tr>
<td>LHA0650-F / LH0650-F / LGO651-F</td>
<td>M14 × 1.5</td>
<td>160 ~ 180</td>
</tr>
<tr>
<td>LHA0750-F / LH0750-F / LGO751-F</td>
<td>M16 × 1.5</td>
<td>250 ~ 280</td>
</tr>
<tr>
<td>LHA0900-F / LH0900-F / LG0901-F</td>
<td>M20 × 2</td>
<td>500 ~ 540</td>
</tr>
<tr>
<td>LHA1050-F / LH1050-F / LG1051-F</td>
<td>M24 × 2</td>
<td>760 ~ 810</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>TLA-2</th>
<th>TKB-2/TLB-2/TLA-1</th>
<th>Standard</th>
</tr>
</thead>
<tbody>
<tr>
<td>Model No.</td>
<td>Thread Size</td>
<td>Tightening Torque (N·m)</td>
</tr>
<tr>
<td>TLA0401-2 / TKB0401-2</td>
<td>M6 × 1</td>
<td>13</td>
</tr>
<tr>
<td>TLA0601-2 / TKB0601-2</td>
<td>M8 × 1</td>
<td>32</td>
</tr>
<tr>
<td>TLA0801-2 / TKB0801-2</td>
<td>M8 × 1</td>
<td>32</td>
</tr>
<tr>
<td>TLA1001-2 / TKB1001-2</td>
<td>M10 × 1.25</td>
<td>63</td>
</tr>
<tr>
<td>TLA1601-2 / TKB1601-2</td>
<td>M12 × 1.5</td>
<td>100</td>
</tr>
<tr>
<td>TLA2001-2 / TKB2001-2</td>
<td>M14 × 1.5</td>
<td>160</td>
</tr>
<tr>
<td>TLA2501-2 / TKB2501-2</td>
<td>M16 × 1.5</td>
<td>250</td>
</tr>
<tr>
<td>TLA4001-2 / TKB4001-2</td>
<td>M20 × 2</td>
<td>500</td>
</tr>
</tbody>
</table>
Cautions

Installation Notes

- When Using Taper Lock Lever
  If the piston rod is subjected to excessive torque or shock, the rod or the internal mechanism may be damaged. Observe the following points to prevent such shock.

Installation Procedure
1. With the clamp is positioned to the fixture, determine the lever position, and temporarily tighten the nut for fixing the lever.
2. Remove the clamp from a fixture, fix the lever by machine vise etc., and tighten the nut.
3. If tightening the nut with the clamp positioned to the fixture, please use a wrench to the hexagon part of piston rod, or fix the lever with a spanner. It is best to bring the lever to the middle of the swing stroke before tightening the nut.

Removal Procedure
1. While the clamp is in the fixture or vise, use a hex wrench to bring the lever to the middle of the swing stroke and then loosen the nut.
2. Loosen the nut after securing the lever two or three turns then remove the lever with a puller without any rotational torque applied on the piston rod.

- When Using Quick Change Lever Type A
  Pin for stopper and phasing (prepared by customer) is used as phasing when mounting the lever and as stopper when removing the lever. If you are not using a pin for stopper and phasing, a stopper is required to remove the lever.

Installation Procedure
1. Install in order of swing lever, wedge 1, wedge 2 to the rod.
2. Pull the lever towards the wedge side and tighten the tightening bolt with the specified torque.

Removal Procedure
1. By loosening tightening bolt, wedge function is released and the lever can be removed.
4) Swing Speed Adjustment
   • Adjust the speed following "Allowable Swing Time Graph".
   If the clamp operates too fast the parts will wear out leading to premature damage and ultimately complete equipment failure.
   • Please make sure to release air from the circuit before adjusting speed. It will be difficult to adjust the speed accurately with air mixed in the circuit.
   • Turn the speed control valve gradually from the low-speed side (small flow) to the high-speed side (large flow) to adjust the speed.

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

6) Notes on dual rod option (-D) for dog application.
   • When attaching dog, set up the piston so that it will not turn around. Please secure the dog or cam and prevent any rotation or torque on the piston rod.

   Torque values for the mounting screw are shown in the table below.

<table>
<thead>
<tr>
<th>Model No.</th>
<th>Thread Size</th>
<th>Tightening Torque (N·m)</th>
</tr>
</thead>
<tbody>
<tr>
<td>LMA0360-OD</td>
<td>M4×0.7</td>
<td>3.2</td>
</tr>
<tr>
<td>LMA0400-OD</td>
<td>M6×1</td>
<td>10</td>
</tr>
<tr>
<td>LMA0490-OD</td>
<td>M8×1.25</td>
<td>25</td>
</tr>
<tr>
<td>LMA0550-OD</td>
<td>M8×1.25</td>
<td>25</td>
</tr>
<tr>
<td>LMA0650-OD</td>
<td>M8×1.25</td>
<td>25</td>
</tr>
<tr>
<td>LMA0750-OD</td>
<td>M10×1.5</td>
<td>50</td>
</tr>
<tr>
<td>LMA0900-OD</td>
<td>M10×1.5</td>
<td>50</td>
</tr>
<tr>
<td>LMA1050-OD</td>
<td>M10×1.5</td>
<td>50</td>
</tr>
</tbody>
</table>

※ Please refer to P.1237 for common cautions. • Installation Notes  • Notes on Handling  • Hydraulic Fluid List  • Notes on Hydraulic Cylinder Speed Control Circuit  • Maintenance/Inspection  • Warranty
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.)

   ⑥ 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>ISO Viscosity Grade ISO VG 32</th>
<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>Morina S2 B 32</td>
<td></td>
</tr>
<tr>
<td>Idemitsu Kosan</td>
<td>Daphne Hydraulic Fluid 32</td>
<td>Daphne Super Multi Oil 32</td>
<td></td>
</tr>
<tr>
<td>JX Nippon Oil &amp; Energy</td>
<td>Super Hyrando 32</td>
<td>Super Mulpus DX 32</td>
<td></td>
</tr>
<tr>
<td>Cosmo Oil</td>
<td>Cosmo Hydro AW32</td>
<td>Cosmo New Mighty Super 32</td>
<td></td>
</tr>
<tr>
<td>Exxon Mobil</td>
<td>Mobil DYE 24</td>
<td>Mobil DYE 24 Light</td>
<td></td>
</tr>
<tr>
<td>Matsumura Oil</td>
<td>Hydol AW-32</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Castrol</td>
<td>Hyspin AWS 32</td>
<td></td>
<td></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 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.

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.

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.)

Flow Control at the Release Side

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.

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

2. [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.

- 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.

Refer to the following circuit when both the single acting cylinder and double acting cylinder are used together.

- 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.
Cautions

- 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 machine 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 machine 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 machine, 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 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

- Before the machine 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.

- Make sure there is no abnormality in the bolts and respective parts before restarting.

2) Regularly clean the area around the piston rod and plunger.
- If it is used when the surface is contaminated with dirt, it may lead to packing seal damage, malfunctioning, fluid leakage and air leaks.

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)

- Location products, except VX/VXF model, can remove contaminants with cleaning functions.

- When installing pallets makes sure there is no thick sludge like substances on pallets.

- Continuous use with dirt on components will lead to locating functions not work properly, leaking and malfunction.

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.

   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.
Control Valve

Model BZL
Model BZT
Model BZX
Model JZG

Directly mounted to clamps, flow control valve • Air bleeding • plug

- Directly mounted to clamps
  Flow control valve, air bleeding valve, G-thread plug for G-thread (-C option) directly mounted.

Adjusting Screw
Lock Nut

Speed Control Valve

Speed Control Valve
Model BZL
Model BZT

Air Bleed Valve
Model BZX

G Thread Plug
Model JZG
<table>
<thead>
<tr>
<th>Speed Control Valve (For Low Pressure)</th>
<th>Operating Pressure Range</th>
<th>Action Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Model BZL</strong> → P.893</td>
<td>7MPa or less</td>
<td>Adjust the flow by wrench. It can adjust the clamping action speed individually.</td>
</tr>
</tbody>
</table>

| Speed Control Valve (For High Pressure) | Model BZT → P.897        | 35MPa or less       | Air bleeding in the circuit is possible by loosening flow control valve. |

| Air Bleed Valve | Model BZX → P.899        | 25MPa or less       | Air bleeding in the circuit is possible by wrench. |

| G Thread Plug | Model JZG → P.901        | 35MPa or less       | Air bleeding in the circuit is possible by loosening G thread plug. |
**Model No. Indication (Speed Control Valve for Low Pressure)**

**BZL 0101 - B**

1. **G Thread Size**
   - 10 : Thread Part G1/8A Thread
   - 20 : Thread Part G1/4A Thread
   - 30 : Thread Part G3/8A Thread

2. **Design No.**
   - 1 : Revision Number

3. **Control Method**
   - **A** : Meter-in
   - **B** : Meter-out

4. **Specifications**

<table>
<thead>
<tr>
<th>Model No.</th>
<th>BZL0101-A</th>
<th>BZL0201-A</th>
<th>BZL0301-A</th>
<th>BZL0101-B</th>
<th>BZL0201-B</th>
<th>BZL0301-B</th>
</tr>
</thead>
<tbody>
<tr>
<td>Max. Operating Pressure MPa</td>
<td>7</td>
<td></td>
<td></td>
<td>10.5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Control Method</td>
<td>Meter-in</td>
<td></td>
<td></td>
<td>Meter-out</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cracking Pressure MPa</td>
<td>0.04</td>
<td>0.04</td>
<td>11.6</td>
<td>0.04</td>
<td>0.04</td>
<td>0.12</td>
</tr>
<tr>
<td>Max. Passage Area mm²</td>
<td>2.6</td>
<td>5.0</td>
<td>11.6</td>
<td>2.6</td>
<td>5.0</td>
<td>10.2</td>
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<tr>
<td>Usable Fluid</td>
<td>General Hydraulic Oil Equivalent to ISO-VG-32</td>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Operating Temperature °C</td>
<td>0 ~ 70</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tightening Torque for Main Body N·m</td>
<td>10</td>
<td>25</td>
<td>35</td>
<td>10</td>
<td>25</td>
<td>35</td>
</tr>
<tr>
<td>Weight g</td>
<td>12</td>
<td>26</td>
<td>48</td>
<td>12</td>
<td>26</td>
<td>48</td>
</tr>
</tbody>
</table>

**Notes:**
1. It must be mounted with recommended torque. Because of the structure of the metal seal, if mounting torque is insufficient, the flow control valve may not be able to adjust the flow rate.
2. Don't use ZBL to other clamps. Flow control will not be made because the bottom depth difference of G thread makes metal seal insufficient.
Applicable Products

<table>
<thead>
<tr>
<th>Model No.</th>
<th>DBA (Double Action) Block Cylinder</th>
<th>DBC (Double Action) Block Cylinder</th>
<th>FVA (Double Action Centering Vise)</th>
<th>FVC (Double Action Centering Vise)</th>
<th>FVD (Double Action Centering Vise)</th>
<th>LC (Single Action Work Support)</th>
<th>LHA (Double Action Swing Clamp)</th>
<th>LHC (Double Action Swing Clamp)</th>
</tr>
</thead>
<tbody>
<tr>
<td>BZL0101-A</td>
<td>DBA0250-C (D8B0120-C) DBC0250-C</td>
<td>DBC0120-C (D8B0320-C) DBC0120-C</td>
<td>(FVA0401) (FVA0631) (FVA01001)</td>
<td>(FVC0630)</td>
<td>(FVD1600)</td>
<td>LC0262-C (LC0261-1)</td>
<td>LHA0360-C (LHA0380-C)</td>
<td>LHC0360-C (LHC0362-C)</td>
</tr>
<tr>
<td>BZL0101-B</td>
<td>DBC0250-C (D8B0120-C) DBC0320-C</td>
<td>DBC0250-C (D8B0320-C) DBC0320-C</td>
<td>FVA0401</td>
<td>FVC0630</td>
<td>FVD1600</td>
<td>LC0262-C (LC0261-1)</td>
<td>LHC0360-C (LHC0380-C)</td>
<td>LHC0362-C (LHC0368-C)</td>
</tr>
<tr>
<td>BZL0201-A</td>
<td>DBC0400-C (D8B0150-C) DBC0500-C</td>
<td>DBC0400-C (D8B0150-C) DBC0500-C</td>
<td>(FVC1000)</td>
<td>FVD4000</td>
<td>LC0752-C (LC0702-C)</td>
<td>LC0400-C (LC0360-C)</td>
<td>LHC0400-C (LHC0480-C)</td>
<td>LHC0480-C (LHC0550-C)</td>
</tr>
<tr>
<td>BZL0201-B</td>
<td>DBC0400-C (D8B0150-C) DBC0500-C</td>
<td>DBC0400-C (D8B0150-C) DBC0500-C</td>
<td>FVC1000</td>
<td>FVD4000</td>
<td>LC0752-C (LC0702-C)</td>
<td>LC0400-C (LC0360-C)</td>
<td>LHC0400-C (LHC0480-C)</td>
<td>LHC0480-C (LHC0550-C)</td>
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<tr>
<td>BZL0301-A</td>
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<tr>
<td>BZL0301-B</td>
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<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Model No.</th>
<th>LHE (Double Action High-Power Swing Clamp)</th>
<th>LHS (Double Action Swing Clamp)</th>
<th>LHW (Double Action Swing Clamp)</th>
<th>LT (Single Action Swing Clamp)</th>
<th>LG (Single Action Swing Clamp)</th>
<th>LKA (Double Action Link Clamp)</th>
<th>LKC (Double Action High-Power Swing Clamp)</th>
</tr>
</thead>
<tbody>
<tr>
<td>BZL0101-A</td>
<td>LHE0360-C (LHE0340-C) LHE0480-C (LHE0550-C)</td>
<td>LHS0360-C (LHS0400-C) LHS0480-C (LHS0550-C)</td>
<td>LH040-C (LHW048-C) (LHW055-C)</td>
<td>LT0351-C (LT0340-C)</td>
<td>LG0361-C (LG0300-C)</td>
<td>LKA0360-C (LAK0400-C)</td>
<td>LK0350-C (LKO360-C)</td>
</tr>
<tr>
<td>BZL0101-B</td>
<td>LHE0360-C (LHE0340-C) LHE0480-C (LHE0550-C)</td>
<td>LHS0360-C (LHS0400-C) LHS0480-C (LHS0550-C)</td>
<td>LHW04-R (LHW055-C)</td>
<td>LT0651-C (LT075-C)</td>
<td>LG0651-C (LG075-C)</td>
<td>LKO650-C (LKO75-C)</td>
<td>LC0650-C (LC075-C)</td>
</tr>
<tr>
<td>BZL0201-A</td>
<td>LHS0590-C (LHS1050-C)</td>
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<td>LT0651-C (LT075-C)</td>
<td>LG0651-C (LG075-C)</td>
<td>LKO650-C (LKO75-C)</td>
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<td>BZL0201-B</td>
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<td>LT0651-C (LT075-C)</td>
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<td></td>
</tr>
<tr>
<td>BZL0301-B</td>
<td>LHS0590-C (LHS1050-C)</td>
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<td></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Model No.</th>
<th>LKW (Double Action Link Clamp)</th>
<th>LM (Single Action Link Clamp)</th>
<th>LJ (Single Action Link Clamp)</th>
<th>LL (Double Action Linear Cylinder)</th>
<th>LLR (Double Action Linear Cylinder)</th>
<th>LLW (Double Action Lift Cylinder)</th>
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<tbody>
<tr>
<td>BZL0101-A</td>
<td>LKW040-C (LKW055-C) LKW040-C</td>
<td>LM0300-C</td>
<td>LJ0302-C</td>
<td>(LL0360-C) (LL0400-C) (LL0550-C)</td>
<td>(LLW0360-C) (LLW0400-C) (LLW0550-C)</td>
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<td>BZL0101-B</td>
<td>LKW040-C (LKW055-C) LKW040-C</td>
<td>LM0400-C</td>
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<td>(LL0400-C) (LL0480-C) (LL0550-C)</td>
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<tr>
<td>BZL0201-A</td>
<td>LKW065-C (LKW0751-C)</td>
<td>LM0650-C</td>
<td>LJ0652-C</td>
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Note: 1. Flow control circuit for double action cylinder should have meter-out circuits for both the lock and release sides (except model LKE/TLA/TMA). Meter-in circuits can be adversely affected by any air in the system.
Flow Rate Graph < Hydraulic Fluids ISO-VG32 (25~35°C) >
### External Dimensions

![Diagram of hydraulic cylinder](image)

### Machining Dimensions of Mounting Area

![Diagram of machining dimensions](image)

**Notes:**
1. Since the \( \text{flat} \) area is sealing part, be careful not to damage it.
2. Since the \( \text{flat} \) area is the metal sealing part of BZL, be careful not to damage it. (Especially when deburring)
3. No cutting chips or burr should be at the tolerance part of machining hole.
4. As shown in the drawing, P1 port is used as the hydraulic supply and P2 port as the clamp side.
5. If mounting plugs or fittings with G thread specification available in the market, the dimension \( '1' \) should be 12.5.

### Notes

1. Please read "Notes on Hydraulic Cylinder Speed Control Circuit" to assist with proper hydraulic circuit design.
2. If there is something wrong with the circuit design, it leads to the applications malfunction and damage. (Refer to P.1238)
3. It is dangerous to air bleed during operation under high pressure. It must be done under lower pressure.

(For reference: the minimum operating range of the product within the circuit.)

### Table: External Dimensions

<table>
<thead>
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<td>12</td>
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</tr>
<tr>
<td>F</td>
<td>(11.6)</td>
<td>(15.1)</td>
<td>(17.6)</td>
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<td>G</td>
<td>G1/8</td>
<td>G1/4</td>
<td>G3/8</td>
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<tr>
<td>H</td>
<td>3</td>
<td>3</td>
<td>3</td>
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<tr>
<td>J</td>
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<td>4</td>
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<tr>
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<td>11.5</td>
<td>15</td>
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<tr>
<td>O</td>
<td>8.5</td>
<td>11 1/3</td>
<td>13</td>
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<tr>
<td>Q</td>
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<td>R (Flat Surface Area)</td>
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<td>S</td>
<td>10</td>
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<td>T</td>
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<td>15</td>
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<td>U</td>
<td>G1/8</td>
<td>G1/4</td>
<td>G3/8</td>
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<tr>
<td>V</td>
<td>2 ~ 3</td>
<td>3 ~ 4</td>
<td>4 ~ 5</td>
</tr>
<tr>
<td>W</td>
<td>2.5 ~ 5</td>
<td>3.5 ~ 7</td>
<td>4.5 ~ 9</td>
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</table>

**Attention:**
- \( \text{min.} \) \( \text{R} \) \( \text{min.} \) \( \text{R} \)
- \( \text{max.} \) \( \phi \text{R} \) \( \text{max.} \) \( \phi \text{R} \)
- \( \text{max.} \) \( \phi \text{T} \) \( \text{max.} \) \( \phi \text{T} \)
- \( \text{max.} \) \( \phi \text{V} \) \( \text{max.} \) \( \phi \text{V} \)
- \( \text{max.} \) \( \phi \text{V} \) \( \text{max.} \) \( \phi \text{V} \)

**M (Nominal × Pitch):**
- M6 × 0.75
- M6 × 0.75
- M8 × 0.75

**Notes:**
- Since the \( \text{flat} \) area is sealing part, be careful not to damage it.
- Since the \( \text{flat} \) area is the metal sealing part of BZL, be careful not to damage it. (Especially when deburring)
- No cutting chips or burr should be at the tolerance part of machining hole.
- As shown in the drawing, P1 port is used as the hydraulic supply and P2 port as the clamp side.
- If mounting plugs or fittings with G thread specification available in the market, the dimension \( '1' \) should be 12.5.

### Notes

1. Please read "Notes on Hydraulic Cylinder Speed Control Circuit" to assist with proper hydraulic circuit design.
2. If there is something wrong with the circuit design, it leads to the applications malfunction and damage. (Refer to P.1238)
3. It is dangerous to air bleed during operation under high pressure. It must be done under lower pressure.

(For reference: the minimum operating range of the product within the circuit.)
Model No. Indication (Air Bleed Valve)

**BZX010**

1. **G Thread Size**
   1 : Thread Part G1/8A Thread
   2 : Thread Part G1/4A Thread
   3 : Thread Part G3/8A Thread

2. **Design No.**
   0 : Revision Number

### Specifications

<table>
<thead>
<tr>
<th>Model No.</th>
<th>BZX010</th>
<th>BZX020</th>
<th>BZX030</th>
</tr>
</thead>
<tbody>
<tr>
<td>Max. Operating Pressure MPa</td>
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<td></td>
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<tr>
<td>Withstanding Pressure MPa</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>G Thread Size</td>
<td>G1/8A</td>
<td>G1/4A</td>
<td>G3/8A</td>
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<tr>
<td>Usable Fluid</td>
<td>General Hydraulic Oil Equivalent to ISO-VG-32</td>
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<tr>
<td>Operating Temperature °C</td>
<td>0 ~ 70</td>
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<td></td>
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<tr>
<td>Tightening Torque for Main Body N·m</td>
<td>10</td>
<td>25</td>
<td>35</td>
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</tbody>
</table>

Notes:
1. Do not over loosen the plug during air venting. (Do not loosen for more than 2 turns from the fully closed position.)
2. It is dangerous to have air venting operation under high pressure. It must be done under lower pressure. (For reference: the minimum operation pressure range of the product within the circuit)
3. Refer to the machining dimensions for BZL mounting area.

### Circuit Symbol
### Applicable Products

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<thead>
<tr>
<th></th>
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<th></th>
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<tbody>
<tr>
<td><strong>BZX010</strong></td>
<td>DBA0250-C</td>
<td>DBA0250-C</td>
<td>FVA0401</td>
<td>FVA0631</td>
<td>FVA1001</td>
<td>FVC0630</td>
<td>FVD1600</td>
<td>FVD2500</td>
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<tr>
<td><strong>BZX020</strong></td>
<td>DBA0400-C</td>
<td>DBA0500-C</td>
<td>FVC1000</td>
<td>FVC1600</td>
<td>LC0275-C</td>
<td>LC0302-C</td>
<td>LC0362-C</td>
<td>LC0402-C</td>
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<td><strong>BZX030</strong></td>
<td>LC0482-C</td>
<td>LC0552-C</td>
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</tbody>
</table>

### External Dimensions

**Lock Nut M6 (3 types)**

**Plug M6×T**

**Body G Thread**

**Exclusive Packing (Included)**

(Exclusive Packing / Cylinder)

<table>
<thead>
<tr>
<th>Model No.</th>
<th>BZX010</th>
<th>BZX020</th>
<th>BZX030</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
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<td>B</td>
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<td>20</td>
<td>24</td>
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<td>C</td>
<td>19.8</td>
<td>20.6</td>
<td>20.6</td>
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<tr>
<td>D</td>
<td>9.5</td>
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<tr>
<td>E</td>
<td>5.5</td>
<td>6.3</td>
<td>6.3</td>
</tr>
<tr>
<td>G</td>
<td>G1/8</td>
<td>G1/4</td>
<td>G3/8</td>
</tr>
</tbody>
</table>

**Centering Vise**

| FVA | FVD | FVC |

**Control Valve**

| BZL | BZT | BZX/ZG |

**Pallet Clamp**

| VS | VT |

**Expansion Locating Pin**

| VFL | VFM | VFI | VFK |

**Pull Stud Clamp**

| FP | FQ |

**Customized Spring Cylinder**

| DWA/DWB |
Control Valve  G Thread Plug  

Model No. Indication (G Thread Plug with Air Bleeding Function)

**J ZG0 10**

1 **G Thread Size**

1 : Thread Part G1/8A Thread
2 : Thread Part G1/4A Thread
3 : Thread Part G3/8A Thread

2 **Design No.**

0 : Revision Number

### Specifications

<table>
<thead>
<tr>
<th>Model No.</th>
<th>JZG010</th>
<th>JZG020</th>
<th>JZG030</th>
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</thead>
<tbody>
<tr>
<td>Max. Operating Pressure</td>
<td>MPa</td>
<td>35</td>
<td>42</td>
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<tr>
<td>Withstanding Pressure</td>
<td>MPa</td>
<td>42</td>
<td>42</td>
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<tr>
<td>G Thread Size</td>
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<td>G1/8A</td>
<td>G1/4A</td>
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<tr>
<td>Usable Fluid</td>
<td></td>
<td>General Hydraulic Oil Equivalent to ISO-VG-32</td>
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</tr>
<tr>
<td>Operating Temperature</td>
<td>°C</td>
<td>0  ～  70</td>
<td></td>
</tr>
<tr>
<td>Tightening Torque</td>
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<td>N·m</td>
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<tr>
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<td>for Female Thread Side Material : Steel</td>
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<tr>
<td></td>
<td>for Female Thread Side Material : Aluminum [For LT/LM*1]</td>
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</table>

**Notes:**
1. It is dangerous to have air venting operation under high pressure. It must be done under lower pressure.
   (For reference: the minimum operation pressure range of the product within the circuit)
2. Refer to the machining dimensions for B2L mounting area.

*1. Body material of LT/LM is aluminum alloy, so install it with the tightening torque for aluminum.
## Applicable Products

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<tr>
<th>Model No.</th>
<th>DBA (Double Action) Block Cylinder</th>
<th>DBC (Double Action) Block Cylinder</th>
<th>FVA (Double Action) Centering Vise</th>
<th>FVC (Double Action) Centering Vise</th>
<th>FVD (Double Action) Centering Vise</th>
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<td>JZG010</td>
<td>DBA0250-C</td>
<td>DBA0320-C</td>
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<td>FVC0630</td>
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<td>JZG020</td>
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<td>FVD4000</td>
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<tr>
<th>Model No.</th>
<th>LC (Single Action) Work Support</th>
<th>LHA (Double Action) Swing Clamp</th>
<th>LHC (Double Action) Swing Clamp</th>
<th>LHE (Double Action) High-Power Swing Clamp</th>
<th>LHS (Double Action) Swing Clamp</th>
<th>LW (Single Action) Swing Clamp</th>
<th>LL (Double Action) Linear Cylinder</th>
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<td>JZG010</td>
<td>LC0262-C</td>
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<tr>
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<th>LM (Single Action) Link Clamp</th>
<th>LL (Double Action) Linear Cylinder</th>
<th>LLR (Double Action) Linear Cylinder</th>
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### External Dimensions

![External Dimensions Diagram]

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<td>G</td>
<td>G1/8A</td>
<td>G1/4A</td>
<td>G3/8A</td>
</tr>
</tbody>
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Sales Offices

Sales Offices across the World

<table>
<thead>
<tr>
<th>Country</th>
<th>Address/Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Japan</td>
<td>TEL. +81-78-991-5162 FAX. +81-78-991-8787 KOSMEK LTD. 1-5, 2-chome, Murotani, Nishi-ku, Kobe-city, Hyogo, Japan 651-2241</td>
</tr>
<tr>
<td>Overseas Sales</td>
<td></td>
</tr>
<tr>
<td>USA</td>
<td>TEL. +1-630-620-7650 FAX. +1-630-620-9015 KOSMEK (USA) LTD. 650 Springer Drive, Lombard, IL 60148 USA</td>
</tr>
<tr>
<td>Mexico</td>
<td>TEL. +52-442-161-2347 KOSMEK USA Mexico Office Blvd Jurica la Campana 1040, B Colonia Punta Juriquilla Queretaro, QRO 76230 Mexico</td>
</tr>
<tr>
<td>Europe</td>
<td>TEL. +43-463-287587 FAX. +43-463-287587-20 KOSMEK EUROPE GmbH Schleppeplatz 2 9020 Klagenfurt am Wörthersee Austria</td>
</tr>
<tr>
<td>China</td>
<td>TEL.+86-21-54253000 FAX.+86-21-54253709 KOSMEK (CHINA) LTD. Room601, RIVERSIDE PYRAMID No.55, Lane21, Pusan Rd, Pudong Shanghai 200125, China</td>
</tr>
<tr>
<td>India</td>
<td>TEL.+91-9880561695 KOSMEK LTD.-INDIA F 203, Level-2, First Floor, Prestige Center Point, Cunningham Road, Bangalore -560052 India</td>
</tr>
<tr>
<td>Thailand</td>
<td>TEL. +66-2-300-5132 FAX. +66-2-300-5133</td>
</tr>
<tr>
<td>Thailand Rep. Off</td>
<td></td>
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<tr>
<td>Taiwan</td>
<td>TEL. +886-2-82261860 FAX. +886-2-82261890 Full Life Trading Co., Ltd. 16F-4, No.2, Jian Ba Rd, Zhonghe District, New Taipei City Taiwan 23511</td>
</tr>
<tr>
<td>Philippines</td>
<td>TEL.+63-2-310-7286 FAX. +63-2-310-7286 G.E.T. Inc, Phil. Victoria Wave Special Economic Zone Mt. Apo Building, Brgy. 186, North Caloocan City, Metro Manila, Philippines 1427</td>
</tr>
<tr>
<td>Indonesia</td>
<td>TEL.+62-21-5818632 FAX.+62-21-5814857</td>
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<td>P.T PANDU HYDRO PNEUMATICS</td>
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Sales Offices in Japan

<table>
<thead>
<tr>
<th>Office Type</th>
<th>Address/Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Head Office</td>
<td>TEL.078-991-5115 FAX.078-991-8787</td>
</tr>
<tr>
<td>Osaka Sales Office</td>
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</tr>
<tr>
<td>Tokyo Sales Office</td>
<td>TEL.048-652-8839 FAX.048-652-8828</td>
</tr>
<tr>
<td>Nagoya Sales Office</td>
<td>TEL.0566-74-8778 FAX.0566-74-8808</td>
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<tr>
<td>Fukuoka Sales Office</td>
<td>TEL.092-433-0424 FAX.092-433-0426</td>
</tr>
</tbody>
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