Hydraulic Pallet Clamp

Model VS
Model VT
Model VSB
Model VSJ

Instant Clamping and Locating
Locating Repeatability: 3 μm

- Repetitive Locating with High Accuracy
  Locating Repeatability: 3 μm
  Fixture alignment inspection is eliminated in the machining center.

- Clamping Function
  Clamping force is ranged from 2.5kN ~ 40kN.
  It is possible to select clamping force depending on purpose.

- Air-Blow and Seat Check
  Foreign substance is removed by air blow.
  Seating surface is provided with the air hole, seat check is possible if gap sensor is used.

Action Description

- Block
  There are two ways to mount the block.

- Clamps

- Released State

- Object for Locating

- Locked State

- Base Plate

- Pallet (Object for Locating)
Advantages

- **Higher Productivity by Setup Improvement**

  Pallet Clamp locates with high accuracy and clamps simultaneously. (Fixture alignment and inspection are eliminated.) Fixture change over is faster and easier, thus by eliminating alignment inspection for accuracy which is done in many different ways.

- **Efficient use of machine by eliminating non-productive time like fixture setting etc is done outside.**

  Since the fixture setting is outside, the machine idle time is reduced.

  Pallet sharing system is very efficient for many variants with small batch production requirements.

### Pallet Clamp

<table>
<thead>
<tr>
<th>Classification</th>
<th>Single Action</th>
<th>Double Action</th>
<th>Flange Shaped Block</th>
<th>Embedded Block</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating Pressure Range</td>
<td>Spring Lock / Hydraulic Release: 3.5～7MPa</td>
<td>1.5～7MPa</td>
<td>–</td>
<td>–</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Features</th>
<th>Model VS</th>
<th>Model VT</th>
<th>Model VSJ</th>
<th>Model VSB</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Able to detach from hydraulic source with spring lock.</td>
<td>→ P.921</td>
<td>→ P.925</td>
<td>→ P.931</td>
<td>→ P.929</td>
</tr>
<tr>
<td>• Clamping force varies depending on hydraulic pressure.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Accessories</td>
<td>VZ-VS1</td>
<td>–</td>
<td>–</td>
<td>VZ-VSC</td>
</tr>
<tr>
<td></td>
<td>→ P.923</td>
<td>–</td>
<td>–</td>
<td>→ P.929</td>
</tr>
</tbody>
</table>
Installation Sample on the Machining Center

- With combination of machining center and pallet clamp, multiple fixtures and works become easily interchangeable.
- Internal setup time can be reduced with high accuracy repetitive locating of pallet clamp + one touch clamping.
- If common layouts are used, fixture count and required machines can be minimized saving cost and space.

The pallet clamp is used at the machine table of the operating machine.

- With non-leak auto-couplers there is no need for live hydraulic connection during machining.
- Using datum clamps in combination with non-leak auto couplers simplifies setup and reduces changeover time.
Installation Sample on NC table

- With combination of NC table and pallet clamp, multiple fixtures and works become easily interchangeable.
- Hydraulic pressure, air pressure and coolant can be supplied to the fixture with the use of zero setting force type auto-couplers.

![Hydraulic Clamp Fixture](image1)
![Pneumatic Clamp Fixture](image2)
![Air Chuck Fixture](image3)

Auto-Coupler

Shared NC Table

Before Pallet Mounting

After Mounting Pneumatic Clamp

- The setup time during fixture changeover is greatly reduced.
- Thanks to high precision repetitive positioning (3 μm) of the pallet clamp, there is no need to check the fixture position precision within the machine.
© Installation Sample to the Chuck used for Lathe

• With combination of the lathe unit and chuck, the workpiece setting time and chuck replacement time is substantially!

© General Application Sample of Fixture

Optimization with Parent and Child Fixture

• The fixtures used for small size / large size work are divided into child fixture / large work used fixture, so that:
  → The setup operation is simplified and productivity is enhanced.
  → The fixture preparation cost is reduced as only the child.

Fixture needs to be prepared

• As the parent fixture / angle plate / child fixture can share one base plate
  → The fixture preparation cost is reduced.
  → The fixture stocking space is reduced.

Notes:

※1. In case the pallet (fixture) is in vertical position, the fixture may fall during releasing. It is recommended to set up the latching mechanism to prevent the fixture from failing.
1. Even for fixtures with different pallet size, VS/VT clamp and VSB/VSJ block can be combined for use. Installation samples when multiple pallet sizes are used.
Please choose WVS or VS (VT) according to the application.

- Since the blocks (VS/VSJ) attached to pallet side can be used for both VS/VT clamp and WVS high-power pneumatic pallet clamp, it is selectable from 3 type pallet clamps (VS / VT / WVS) according to application.

### Hydraulic Systems
- For the condition that is allowed to use oil
- For the manufacturing process that is operated by high cutting load

### All Pneumatic Systems
- For the condition that is not allowed to use oil
- For the manufacturing process that is operated by high cutting load
- For inspection and assembly line

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**model VS**
Lock with Spring Release with Hydraulic
※ VS0350 and VS0480 cannot be used in common.

**model VT**
Lock with Hydraulic Release with Hydraulic
※ Dimension of connected condition is different only for VT

**model WVS**
Lock with Air Release with Air

※ Refer to WVT(VS/VT)-VSJ/VSS block compatible list (P.201) for the detail form of combination.
Pallet Clamp System References

Circuit Reference

<table>
<thead>
<tr>
<th>Spring Clamps model VS</th>
<th>Hydraulic Clamps model VT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Air for Seating Confirmation</td>
<td>Air for Seating Confirmation</td>
</tr>
<tr>
<td>Air Sensor for Seating Confirmation</td>
<td>Air Sensor for Seating Confirmation</td>
</tr>
<tr>
<td>VS Clamp</td>
<td>VT Clamp</td>
</tr>
<tr>
<td>Air Blow</td>
<td>Air Blow</td>
</tr>
<tr>
<td>Release Hydraulic Pressure</td>
<td>Release Hydraulic Pressure</td>
</tr>
</tbody>
</table>

Notes:
1. It is recommended to use air blow line with at least Ø6 in order to ensure effective air flow. Please supply clean filtered air.
2. It is recommended to use our non-leakage valve (model BK and BSP) in order to maintain long time release when hydraulic supply is stopped.
3. When clamping is not simultaneous and a pallet is tilted, adjust the speed with meter-out control for simultaneous clamping.
Configuration sample when multiple pallet sizes are used together

In case there are a variety of pallets with different sizes for the base plate, the clamp and block can be combined for use.

### Combination of Clamp and Block

<table>
<thead>
<tr>
<th>Equipment Installed on the Base Plate</th>
<th>Equipment Installed on the Pallet</th>
<th>Functions when they are combined</th>
</tr>
</thead>
<tbody>
<tr>
<td>Datum Clamp</td>
<td>Datum Block</td>
<td>Clamping Function + Locating Function (Reference Point)</td>
</tr>
<tr>
<td>Datum Clamp</td>
<td>Cut Block</td>
<td>Clamping Function + Locating Function (One Direction)</td>
</tr>
<tr>
<td>Guide Clamp</td>
<td>Guide Block</td>
<td>Clamping Function + Guide Function</td>
</tr>
<tr>
<td>Datum Clamp or Guide Clamp</td>
<td>Free Block</td>
<td>Clamping Function</td>
</tr>
</tbody>
</table>

*Notes:

2. In case the clamp/block configuration is linear, it is recommended to provide additional supports for stability.

3. The spring pin position is indicated. With the datum block as reference, unidirectional positioning is done via the cut block. The cut block positioning plane must be tangent to the datum block.

(The spring pin is positioned on the line connecting the centers of the datum block and cut block.)
Cross Section

The graph shows the locking status of VS.

Action Description

- **Before loading the pallet**
  - Air blow prevents debris contamination.
  - Dust seal prevents contaminants from above and keeps the steel ball area clean.
  - The flange top is designed as inclined surface so that cutting chips or fluid can flow easily.
  - The clamp spring chamber is totally shut from the external atmosphere with the rod packing and trap valve to ensure the clean environment.
  - The sliding part of taper sleeve (one place) is protected with rubber plate to prevent invasion of cutting chips.

- **When loading the pallet**
  - The pallet is set on the raised piston rod cap.
  - At this time there is clearance between the datum surfaces allowing air blow to remove contaminants effectively. Also, when loading the pallet, the clamp prevents damages caused by hitting/scratching and secures high accuracy.

- **When unloading the pallet**
  - The close contacting of taper seating surface is released with lift-up force.

- **When clamped**
  - When hydraulic pressured is OFF, the spring force lowers the piston rod and the steel balls engage the block bringing it to the seating surface.
  - The pallet is positioned with high accuracy via the taper sleeve as it contacts the taper surface of the block.
  - The seating surface includes an air vent for seating confirmation (via air catch sensor).
Action Description during Loading/Unloading

1. With hydraulic pressure released, load the pallet within the allowable offset. Air pressure must be continuously supplied to the air blow port.

2. When lowering the pallet, it should be positioned so the blocks contact the rod as shown A.

3. As the pallet is further lowered, it is positioned within 0.2mm of the reference axis via the guide sleeve and guide block. This provides clearance between datum clamp and taper surface.

4. Loading is finished when pallet is resting on piston rod. At this time, the appropriate clearance between seating surface and taper reference is created by lift up function, which makes it thus more effective that the cutting chips is removed by air blow.

5. When release hydraulic pressure is OFF, the block is pressed on the seating surface with clamp spring. When the block is pressed, the taper reference surface is contacted for positioning.
Description of Movable Taper Sleeve

Locating Method: Dual Surface with Movable Taper Sleeve

The Benefits of Movable Taper Sleeve

With marginal error absorbed by the moveable taper sleeve, the clearance between the clamp unit, taper sleeve and block is eliminated enabling the repetitive location accuracy and stabilized clamping force.

1. Absorbs tolerance variations in each location clamp and block.
2. Absorbs wear of locating part due to long time use.
3. Absorbs space variations of mounting holes.
4. Absorbs space variations due to temperature change.
Movement and Error Absorbed by the Movable Taper Sleeve (①/②)

Starting of Action for Locating

There is almost zero clearance as the moving parts come in contact with the taper reference surface.

XY Locating

Clearance between the taper sleeve and the moving parts of the unit is completely zero.

XYZ Locating

Absorbs errors by lowering the taper sleeve. Seating surface touches and locates on 2 surfaces.

Movable taper sleeve absorbs distance error. (③/④)

Absorbs distance variations minimizing the wear of locating parts and prevents deformation of clamp/block.

*The precision assurance function is absolutely necessary especially when plates are transported or multiple fixture changes are needed.

Center Distance Inaccuracy

Datum Block

Cut Block

Taper Sleeve

Spring

Center Distance Accuracy ±0.02 (max. ±0.025)

Distance Inaccuracy : Small

Distance Inaccuracy : Large

Absorbs variation errors by lowering taper sleeve.
Model No. Indication (Clamp)

VS : Spring Clamps

**VS 0 06 0 - M D**

1 Clamping Force
- 02 : Clamping Force 2.5kN
- 04 : Clamping Force 4.0kN
- 06 : Clamping Force 6.0kN
- 10 : Clamping Force 10.0kN
- 16 : Clamping Force 16.0kN

2 Design No.
- 0 : Revision Number

3 Functions
- D : Datum Clamp (Especially Used for Locating)
- G : Guide Clamp (Especially Used for Guide)

4 Flange Shape
- A : Cylindrical
- B : Prismatic

Model No. Indication (Level Adjustment Collar for VS)

This product is only for VS Clamp.

**VZ 0 06 0 - VS 1**

1 Accommodate VS Clamp Model
- 02 : VS0020
- 04 : VS0040
- 06 : VS0060
- 10 : VS0100
- 16 : VS0160
- 25 : VS0250
- 40 : VS0400

2 Design No.
- 0 : Revision Number

Model No. Indication (Clamp)

VT : Hydraulic Clamps

**VT 0 06 0 - M D - A**

1 Clamping Force
- 04 : Clamping Force (at 7MPa) 4.0kN
- 06 : Clamping Force (at 7MPa) 6.2kN
- 10 : Clamping Force (at 7MPa) 9.9kN
- 16 : Clamping Force (at 7MPa) 16.0kN

2 Design No.
- 0 : Revision Number

3 Functions
- D : Datum Clamp (Especially Used for Locating)
- G : Guide Clamp (Especially Used for Guide)

4 Flange Shape
- A : Cylindrical
- B : Prismatic
Model No. Indication (Block)

VSB: Embedded Block

VSB 06 0 - D

1 2 3 4

Shape of Block

VSB: Embedded Block

VSB

Pallet

Embedded Block

VSJ: Flange Shaped Block

VSJ

Pallet

Flange Shaped Block

Accommodate WVT/VS/VT Clamp Model

02 : VSO020 / VSO040 / VTO040 / WVS0040
06 : VSO060 / VTO060 / WVS0060
10 : VSO100 / VTO100 / WVS0100
16 : VSO160 / VTO160 / WVS0160
25 : VSO250
40 : VSO400

Note: 1. WVS is the pallet clamps operated by air.

Design No.

0 : Revision Number

Functions

D : Datum Block (Especially Used for Reference Locating)
C : Cut Block (Especially Used for One Direction Locating)
G : Guide Block (Especially Used for Guide)
F : Free Block (Shared by Multiple Pallets with Different Sizes)

Combination of Clamp and Block

<table>
<thead>
<tr>
<th>Clamp Model</th>
<th>Block Model</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>VS/VT-MD</td>
<td>VSB-D / VSJ-D (Datum Block)</td>
<td>Clamping + Locating at a Reference Point</td>
</tr>
<tr>
<td>VS/VT-MD</td>
<td>VSB-C / VSJ-C (Cut Block)</td>
<td>Clamping + One Direction Locating</td>
</tr>
<tr>
<td>VS/VT-MG</td>
<td>VSB-G / VSJ-G (Guide Block)</td>
<td>Clamping + Guide</td>
</tr>
<tr>
<td>VS/VT-MG</td>
<td>VSB-F / VSJ-F (Free Block)</td>
<td>Clamping</td>
</tr>
</tbody>
</table>

Model No. Indication (Level Adjustment Collar for VSJ)

※This product is only for VSB’s embedded block.

VZ 0 06 0 - VSC

1 Accommodate VSB Block Model

02 : VSB020
06 : VSB060
10 : VSB100
16 : VSB160
25 : VSB250
40 : VSB400

2 Design No.

0 : Revision Number

Other Mounting Examples (Reference)

※Please contact us for mounting methods as shown in the drawings below.

VSB Block: Bolt Mounting from the Upper Side

VSJ Block: Bolt Mounting from the Upper Side
### Clamping Force / Lift-up Force (Spring Clamp Model VS)

<table>
<thead>
<tr>
<th>Model No.</th>
<th>V50020</th>
<th>V50040</th>
<th>V50060</th>
<th>V50100</th>
<th>V50160</th>
<th>V50250</th>
<th>V50400</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clamping Force</td>
<td>kN</td>
<td>At 7 MPa</td>
<td>2.5</td>
<td>4.0</td>
<td>6.0</td>
<td>10.0</td>
<td>16.0</td>
</tr>
<tr>
<td>Lift-Up Force</td>
<td>kN</td>
<td>At 5 MPa</td>
<td>4.0</td>
<td>4.4</td>
<td>5.0</td>
<td>9.1</td>
<td>13.3</td>
</tr>
<tr>
<td></td>
<td>kN</td>
<td>At 3.5 MPa</td>
<td>2.2</td>
<td>2.3</td>
<td>2.3</td>
<td>4.7</td>
<td>6.7</td>
</tr>
</tbody>
</table>

- **Clamping Force**
  - Clamping force is stable because VS clamps with spring.

- **Lift-Up Force**
  - Lift up force varies according to the supply hydraulic pressure.

### Clamping Force / Lift-Up Force (Hydraulic Clamp Model VT)

<table>
<thead>
<tr>
<th>Model No.</th>
<th>VT0040</th>
<th>VT0060</th>
<th>VT0100</th>
<th>VT0160</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clamping Force</td>
<td>kN</td>
<td>At 7 MPa</td>
<td>4.0</td>
<td>6.2</td>
</tr>
<tr>
<td></td>
<td>kN</td>
<td>At 5 MPa</td>
<td>2.9</td>
<td>4.5</td>
</tr>
<tr>
<td></td>
<td>kN</td>
<td>At 3.5 MPa</td>
<td>1.7</td>
<td>2.7</td>
</tr>
<tr>
<td>Lift-Up Force</td>
<td>kN</td>
<td>At 7 MPa</td>
<td>2.5</td>
<td>4.0</td>
</tr>
<tr>
<td></td>
<td>kN</td>
<td>At 5 MPa</td>
<td>1.8</td>
<td>2.9</td>
</tr>
<tr>
<td></td>
<td>kN</td>
<td>At 3.5 MPa</td>
<td>1.1</td>
<td>1.7</td>
</tr>
</tbody>
</table>

### VT0040
- **Clamping Force**
- **Lift-Up Force**

### VT0060
- **Clamping Force**
- **Lift-Up Force**

### VT0100
- **Clamping Force**
- **Lift-Up Force**

### VT0160
- **Clamping Force**
- **Lift-Up Force**

**Notes:**
1. This graph shows one clamp.
2. This graph shows the relationship between the supply hydraulic pressure and the clamping force (solid line)/Lift-up force (dotted line).

- **Clamping Force**
- **Lift-Up Force**

- **Clamping force of VT depends on supply hydraulic pressure because VT is designed to be operated by hydraulic double action.**

- **Lift-up force varies according to the supply hydraulic pressure.**
Displacement against Transverse Load

The displacement is the predicted reference value on the basis of test data under the conditions shown below.

1. **Clamp / Block Layout**

   ![Diagram of Clamp / Block Layout](image)

   - Datum Clamp Cut Block
   - Guide Clamp Guide Block
   - Transverse Load F
   - Mounting Distance P
   - Workpiece
   - Load Position L
   - Base

2. **Test Device**

   - Displacement Dial Gauge at the Direction of X-axis
   - X-axis Displacement

   - Displacement Dial Gauge at the Direction of Y-axis

   ![Diagram of Test Device](image)

   - Workpiece
   - Load Cell
   - Push Cylinder
   - Transverse Load F
   - Y-axis Displacement

3. **How to Read the Displacement**

   ![Graph of Displacement](image)

   - Components
     - VS0020-MD × 2 Units
     - VS0020-MG × 2 Units
     - VS0J020-D × 1 Unit
     - VS0J020-C × 1 Unit
     - VS0J020-G × 2 Units
   - Requirements
     - Mounting Distance P = 200mm
     - Load Position L = 135mm
     - Transverse Load F = 4kN
   - Displacement
     - X-axis displacement is about 4.3 μm.
     - Y-axis displacement is about 9.5 μm.

   **Note:**
   1. Please contact us in case the conditions are different.
**Displacement against Transverse Load**

- The displacement is the predicted reference value on the basis of test data under the conditions as shown on P.918.

**VS0020**
- **Components**
  - [Clamp]
  - VS0020-MD x 2 Units
  - VS0020-MG x 2 Units
  - VS0020-D x 1 Unit
  - VS0020-C x 1 Unit
  - VS0020-G x 2 Units
- **Requirements**
  - Mounting Distance P=200mm
  - Load Position L=30~240mm
- **Clamping Force**
  - Total 168N (2.5KN x 4)

**VS0040**
- **Components**
  - [Clamp]
  - VS0040-MD x 2 Units
  - VS0040-MG x 2 Units
  - VS0020-D x 1 Unit
  - VS0020-C x 1 Unit
  - VS0020-G x 2 Units
- **Requirements**
  - Mounting Distance P=200mm
  - Load Position L=30~240mm
- **Clamping Force**
  - Total 168N (4KN x 4)

**VS0060**
- **Components**
  - [Clamp]
  - VS0060-MD x 2 Units
  - VS0060-MG x 2 Units
  - VS0060-D x 1 Unit
  - VS0060-C x 1 Unit
  - VS0060-G x 2 Units
- **Requirements**
  - Mounting Distance P=200mm
  - Load Position L=30~240mm
- **Clamping Force**
  - Total 244N (6KN x 4)

**VS0100**
- **Components**
  - [Clamp]
  - VS0100-MD x 2 Units
  - VS0100-MG x 2 Units
  - VS0100-D x 1 Unit
  - VS0100-G x 2 Units
- **Requirements**
  - Mounting Distance P=300mm
  - Load Position L=70~550mm
- **Clamping Force**
  - Total 40KN (10KN x 4)
VS0160
- Components
  [Clamp]
  VS0160-MD×2 Units
  VS0160-MG×2 Units
- [Block]
  VS160-D×1 Unit
  VS160-C×1 Unit
  VS160-G×2 Units
- Requirements
  Mounting Distance P=300mm
  Load Position L=150~550mm
- Clamping Force
  Total 64KN (16KN×4)

VS0250
- Components
  [Clamp]
  VS0250-MD×2 Units
  VS0250-MG×2 Units
- [Block]
  VS250-D×1 Unit
  VS250-C×1 Unit
  VS250-G×2 Units
- Requirements
  Mounting Distance P=375mm
  Load Position L=150~550mm
- Clamping Force
  Total 100KN (25KN×4)

VS0400
- Components
  [Clamp]
  VS0400-MD×2 Units
  VS0400-MG×2 Units
- [Block]
  VS400-D×1 Unit
  VS400-C×1 Unit
  VS400-G×2 Units
- Requirements
  Mounting Distance P=375mm
  Load Position L=150~550mm
- Clamping Force
  Total 160KN (40KN×4)

Note:
1. The displacement may vary as per the fixture condition. The displayed values are just for reference based on the test data.
**External Dimensions**

※ This drawing shows the released state of VS.
(When supplying release hydraulic pressure)

**Machining Dimensions of Mounting Area**

1. Make sure no burrs are on or around the hole intersection.
2. Release hydraulic port should be machined within the range.
3. The base thickness (AG) and remaining depth after boring (AJ) are reference values when the base material is SS0C.

**Distance Accuracy of Each Clamp**

※6. Please make sure the distance accuracy of each datum clamp is below ±0.025mm between the clamps with the longest distance.
### Specifications

<table>
<thead>
<tr>
<th>Model No.</th>
<th>VS0020-M</th>
<th>VS0040-M</th>
<th>VS0060-M</th>
<th>VS0100-M</th>
<th>VS0160-M</th>
<th>VS0250-M</th>
<th>VS0400-M</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clamping Force $^{\text{a},\text{b}}$ kN</td>
<td>2.5</td>
<td>4.0</td>
<td>6.0</td>
<td>10.0</td>
<td>16.0</td>
<td>25.0</td>
<td>40.0</td>
</tr>
<tr>
<td>Locating Repeatability mm</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.003</td>
</tr>
<tr>
<td>Full Stroke mm</td>
<td>3.4</td>
<td>3.4</td>
<td>3.4</td>
<td>3.4</td>
<td>4.0</td>
<td>4.5</td>
<td>5.8</td>
</tr>
<tr>
<td>Lift Up Stroke</td>
<td>1.0</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Allowable Offset when fixture pallet is set mm</td>
<td>1.5</td>
<td>1.5</td>
<td>1.5</td>
<td>2.0</td>
<td>2.0</td>
<td>2.5</td>
<td>2.5</td>
</tr>
<tr>
<td>Lift Up Force $^{\text{a},\text{b}}$ kN</td>
<td>4.0</td>
<td>4.4</td>
<td>5.0</td>
<td>9.1</td>
<td>13.3</td>
<td>20.0</td>
<td>33.5</td>
</tr>
<tr>
<td>at 7.0MPa</td>
<td>2.2</td>
<td>2.3</td>
<td>2.3</td>
<td>4.7</td>
<td>6.7</td>
<td>10.0</td>
<td>15.5</td>
</tr>
<tr>
<td>at 5.0MPa</td>
<td>0.9</td>
<td>0.7</td>
<td>0.4</td>
<td>1.3</td>
<td>1.8</td>
<td>0.5</td>
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Notes:
- $^{\text{a}}$7. The specification indicates the value of one device.
- $^{\text{b}}$8. It indicates the maximum weight of pallet in horizontal position (placed flat) when using four clamps.
- $^{\text{c}}$Release hydraulic pressure is determined with the loading weight (fixture).
- (Lifting load weight should be less than 80% of the lift-up force (Number of Clamps × Lift-Up Force)).
- When using pallet in vertical direction, please refer to P.935.

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

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### External Dimensions

**VZ0-0-VS1**

- **B**
- **H**
- **K**
- **W**

**Notes:**
1. When using VZ-VS1, the mounting bolts included in VS Clamp cannot be used due to insufficient strength. Please use mounting bolts prepared by customer.
2. These are only the dimensions for VZ0250-VS1 and VZ0400-VS1.
3. Please grind Z surface when adjusting the thickness.

### Machining Dimensions of Mounting Area

(VZ-VS1 when using the level adjustment collar)

- **4-AL Screw**
- **Seat Check Air Port**
  - **φ N**
- **Air Blow Port**
  - **φ N**
- **Remove all burrs**
- **Release Hydraulic Port**
  - **φ AH or less**

**Notes:**
1. When using VZ-VS1, please machine the mounting hole as shown in the drawing above.
2. Make sure no burrs are on or around the hole intersection.
3. Release hydraulic port should be machined within range.
4. The base thickness (AG) and remaining depth after boring (AJ) are reference values when the base material is S50C.

### Distance Accuracy of Each Clamp

- **VS-MG**
- **VS-MD**

**Note:**
6. Please make sure the distance accuracy of each datum clamp is below ±0.025mm between the clamps with the longest distance.
Connection Dimensions

External Dimensions and Machining Dimensions for Mounting

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<th>Model No.</th>
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<th>VZ0100-VS1</th>
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Mounting Bolt<sup>1</sup>
- M5 x 0.8 x 9
- M5 x 0.8 x 9
- M6 x 1 x 10
- M8 x 1.25 x 13
- M10 x 1.5 x 17
- M12 x 1.75 x 24
- M16 x 2 x 26

O-ring
- 1AP5
- 1AP5
- 1AP5
- 1AP5
- 1AP7
- 1AP7
- 1AP8

When using VSB, BA
- 13.5
- 15.5
- 18.5
- 22.5
- 29
- 35.5

When using VSL, BB
- 22
- 22
- 26
- 29
- 35
- 44.5
- 54
### External Dimensions

This drawing shows the released state of VT-A.

![Diagram of External Dimensions]

### Machining Dimensions of Mounting Area

Notes:
1. Make sure no burrs are on or around the hole intersection.
2. Release hydraulic port should be machined within range.
3. The base thickness (AG) and remaining depth after boring (AJ) are reference values when the base material is SS40C.

![Diagram of Machining Dimensions]

### Distance Accuracy of Each Clamp

Notes:
1. $\phi$ Q shows the dimensions of sleeve (taper) of datum clamp (VT-MD).
2. $\phi$ R shows the dimensions of sleeve (straight) of guide clamp (VT-MG).
3. The screw for jack is used when removing the clamp. (See P936 for operation method.)

![Diagram of Distance Accuracy]

Note:
6. Please make sure the distance accuracy of each datum clamp is below $\pm 0.025\text{mm}$ between the clamps with the longest distance.
### Specifications

<table>
<thead>
<tr>
<th>Model No.</th>
<th>VT0040-M -A</th>
<th>VT0060-M -A</th>
<th>VT0100-M -A</th>
<th>VT0160-M -A</th>
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<tbody>
<tr>
<td>Locating Repeatability (mm)</td>
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<tr>
<td>Clamping Force (Calculation Formula) (kN)</td>
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<td>Lift Up Force (Calculation Formula) (kN)</td>
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**Notes:**
- P indicates the hydraulic pressure (MPa).
- The specification indicates the value of one device.
- It indicates the maximum weight of pallet in horizontal position (placed flat) when using four clamps.
- Release hydraulic pressure is determined with the loading fixture.
- Loading weight should be less than 80% of the lift-up force (Number of Clamps × Lift-Up Force).
- When using pallet in vertical direction, please refer to P.935.

### External Dimensions and Machining Dimensions for Mounting

<table>
<thead>
<tr>
<th>Model No.</th>
<th>VT0040-M -A</th>
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<tr>
<td>AJ (Nominal Pitch x Depth)</td>
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<td>M5 × 0.8 × 10</td>
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<tr>
<td>O-ring BA</td>
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<td>AS568-027 (90°)</td>
<td>AS568-030 (90°)</td>
<td>AS568-033 (90°)</td>
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<tr>
<td>O-ring BB</td>
<td>AS568-007 (90°)</td>
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<td>1B5</td>
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<tr>
<td>Mounting Bolt</td>
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<td>M5 × 0.8 × 14</td>
<td>M6 × 1 × 14</td>
<td>M8 × 1.25 × 20</td>
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<td>Hole for Jack Bolt</td>
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<td>M8 × 1.25</td>
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</table>
**External Dimensions**

This drawing shows the released state of VT-B.

**Machining Dimensions of Mounting Area**

Notes:
1. Make sure no burrs are on or around the hole intersection.
2. Release hydraulic port should be machined within range.
3. The base thickness (AG) and remaining depth after boring (AJ) are reference values when the base material is SS4C.

**Distance Accuracy of Each Clamp**

Notes:
1. φQ shows the dimensions of sleeve (taper) of datum clamp (VT-MD).
2. φR shows the dimensions of sleeve (straight) of guide clamp (VT-MG).
3. The screw for jack is used when removing the clamp. (See P936 for operation method.)

Note:
6. Please make sure the distance accuracy of each datum clamp is below ±0.025mm between the clamps with the longest distance.
### Specifications

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<th>Model No.</th>
<th>VT0040-M□-B</th>
<th>VT0060-M□-B</th>
<th>VT1000-M□-B</th>
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<td>Locating Repeatability</td>
<td>mm</td>
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<td>Clamping force (Calculation Formula) kN</td>
<td>0.57×P</td>
<td>0.89×P</td>
<td>1.42×P</td>
<td>2.28×P</td>
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<tr>
<td>Lift Up Force (Calculation Formula) kN</td>
<td>0.36×P</td>
<td>0.57×P</td>
<td>0.93×P</td>
<td>1.45×P</td>
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<td>Full Stroke</td>
<td>mm</td>
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<td>Lift Up Stroke</td>
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<td>Allowable Offset when fixture pallet is set</td>
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<td>Mass kg</td>
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Notes:
- *P* indicates the hydraulic pressure (MPa).
- *k* indicates the specification indicates the value of one device.
- *M* indicates the maximum weight of pallet in horizontal position (placed flat) when using four clamps.
- Release hydraulic pressure is determined with the loading weight (fixture).
- Loading weight should be less than 80% of the lift-up force (Number of Clamps × Lift-Up Force).
- When using pallet in vertical direction, please refer to P.935.

### External Dimensions and Machining Dimensions for Mounting

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<td>M6×1</td>
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</tbody>
</table>
External Dimensions

VSB020/060/100/160/250-D

VSB020/060/100/160/250-C

VSB020/060/100/160/250-G/F

Notes:
1. The screw for jack bolt is used when removing VSB block.
2. The spring pin is used for phasing of VSB-C locating direction.

Dimensions of Level Adjustment Collar

VZ020/060/100/160/250-VSC

VZ0400-VSC

Notes:
1. Please refer to the drawing above when preparing level adjustment collar by yourself.
2. (3 parts) are for jack bolt. Align them with the phase of jack screw of VSB block.
3. Clearance between the seating surface of VSB Block and the bottom surface of the pallet.
**Mounting Distance Accuracy and VSB-C Phase**

![Diagram of Mounting Distance Accuracy and VSB-C Phase](image)

**Connection Dimensions**

![Diagram of Connection Dimensions](image)

**External Dimensions and Machining Dimensions for Mounting**

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<th>VSB100-G</th>
<th>VSB160-D</th>
<th>VSB160-G</th>
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</table>

**Notes:**

- **A:** The dimensions in ( ) display that of VSB-F.
- **B:** The spring pin is included in VSB-C.
- **C:** The guide block (VSB-G) is used only for guide clamp (VSB/VT-G) and the free block (VSB-F) can be used for both datum clamp (VSB/VT-D) and guide clamp (VSB/VT-G).
- **D:** Pallet with low rigidity (thin pallet or pallet made of aluminum etc.) may be deformed when mounting VSB block.

In this case, tolerance of mounting hole machining dimension AA±0.010 should be close to ±0.010 (the upper limit of the tolerance).
**External Dimensions**

VSJ020/060-D

![Diagram](image1)

VSJ100/160/250/400-D

![Diagram](image2)

Notes:

1. The screw for jack is used when removing VSJ block.
2. The spring pin is used for phasing of VSJ-C locating direction.

**Machining Dimensions of Mounting Area**

VSJ020/060

![Diagram](image3)

VSJ100/160/250/400

![Diagram](image4)

Notes:

3. \( \phi \) AK hole is used for phasing of VSJ-C locating direction.

Please make sure \( \phi \) AK hole is at the line connecting the centers of VSJ-D and VSJ-C.

This machining is only necessary for VSJ-C.
Mounting Distance Accuracy and VSJ-C Phase

Note:
1. Distance accuracy of the block should be within ±0.025mm between the blocks with the longest distance.

Connection Dimensions

When using VS

<table>
<thead>
<tr>
<th>Clamp Model No.</th>
<th>V50020</th>
<th>V50040</th>
<th>V50060</th>
<th>V50100</th>
<th>V50160</th>
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<th>V50400</th>
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When using VT

<table>
<thead>
<tr>
<th>Clamp Model No.</th>
<th>VT0040</th>
<th>VT0060</th>
<th>VT1000</th>
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<td>21</td>
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<td>25</td>
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Notes:
1. If using V2-V5, please refer to P.923.

External Dimensions and Machining Dimensions for Mounting

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<th>VS020D</th>
<th>VS020G</th>
<th>VS060D</th>
<th>VS060F</th>
<th>VS100D</th>
<th>VS100F</th>
<th>VS160D</th>
<th>VS160F</th>
<th>VS250D</th>
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<td>M5×0.8×9</td>
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</table>

Notes:
1. The dimensions in ( ) display that of VSJ-F.
2. The spring pin is included only in VSJ-C.
3. The guide block (VS-G) is used only for guide clamp (VS/VT-G) and the free block (VS-F) can be used for both datum clamp (VS/VT-D) and guide clamp (VS/VT-G).
4. Pallet with low rigidity (thin pallet or pallet made of aluminum etc.) may be deformed when mounting VSJ block.
5. In this case, tolerance of mounting hole machining dimension 4A±0.010 should be close to 0.010 (the upper limit of the tolerance).
Introduction of Related Products

Helpydraulic pressure is generated with factory air pressure. Ability of single circuit control (hydraulic pressure ON/OFF) with air ON/OFF. Easy to set up with compact size.

Please take a look at P.1171 for Specification details.

<table>
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<tr>
<th>Model</th>
<th>CV2B30-0-0</th>
<th>CV2B40-0-0</th>
<th>CV2B50-0-0</th>
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<tr>
<td>Pump Model No.</td>
<td>AB3000-V</td>
<td>AB4000-V</td>
<td>AB5000-V</td>
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<tr>
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<td>3.9~7.0</td>
<td>6.0~11.0</td>
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<tr>
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</table>

Notes: 1. It shows discharge hydraulic pressure when set air pressure is 0.3~0.5MPa.

Circuit Reference

Reference Images for Use
Non-Leak Coupler (Hydraulic Pressure)  model BGC/BDG

Even if the coupler is separated after adding pressure and supplying fluid, it can hold the pressure of the coupler at the side that receive fluid supply from the other.
You can cut off unwanted circuit facilities and hydraulic pressure is allowed to be off even when the coupler is separated.

Images for Use

Auto Coupler (Hydraulic Pressure / Air / Coolant) model JVC/JVD, JVE/JVF

Coupler with the minimum connection stroke enhances automation. Compact and able to install in limited spaces.

Images for Use
Cautions

Notes for Design

1) Check Specifications
   • Please use each product according to the specifications.

2) Notes for Circuit Design
   • Please read "Notes on Hydraulic Cylinder Speed Control Circuit" on P. 1238 to assist with proper hydraulic circuit designing. Improper circuit design will lead to malfunction and damages of products.
   • It is recommended to use the air flow path over φ6 mm.

3) When the pallet is in vertical position.
   • When the workpiece fixture plate is being set, make sure it is in proper proximity and square to the clamps.
     If it is locked out of position, the machine or clamps may be damaged.

   When VS block is used
   Allowed Dimension P

   When VSJ block is used
   Allowed Dimension P

   Allowed Dimension P (VS Spring Clamp) (mm)
<table>
<thead>
<tr>
<th>Model No.</th>
<th>VS0020</th>
<th>VS0040</th>
<th>VS0060</th>
<th>VS0100</th>
<th>VS0160</th>
<th>VS0250</th>
<th>VS0400</th>
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</thead>
<tbody>
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<td>14.5</td>
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<td>27.5</td>
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<td>42.5</td>
<td>51.5</td>
</tr>
</tbody>
</table>

   Allowed Dimension P (VT Hydraulic Clamp) (mm)
<table>
<thead>
<tr>
<th>Model No.</th>
<th>VT0040</th>
<th>VT0060</th>
<th>VT0100</th>
<th>VT0160</th>
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<tr>
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<td>VSJ block</td>
<td>21.5</td>
<td>24</td>
<td>25.5</td>
<td>31.5</td>
</tr>
</tbody>
</table>

   As the workpiece fixture plate may fall down during releasing, it is recommended to set up the latching mechanism to prevent it from falling down.

   When the pallet is used in vertical position (hanging on the wall), the internal moving parts tend to wear out. Confirm the positioning precision in a regular manner. In case the allowed range is exceeded, change the machine.

   Example of Latching Mechanism

4) Seat Setting
   • In case the clamp/block configuration is linear, it is recommended to provide additional supports for stability.

5) Setting of Rough Guide
   • If the position of the pallet during loading is outside the clamp allowable tolerance, the clamp may prematurely contact the block taper surface causing damage affecting locating precision.
     It is recommended to use rough guides to contain the pallet within the allowable tolerance.

   The pallet must be level with the base plate during loading and unloading, otherwise the clamps and blocks will be damaged.
     Provide guide pins to keep the pallet level during loading and unloading.

   When the pallet is in horizontal position (levied), make sure the weight of the workpiece fixture is less than the lift force of the clamps and maximum load of the machine.

   When the pallet is in vertical position, make sure the weight of workpiece fixture pallet is 10% of the clamping force.

   Please contact us in case the pallet is in other positions.
6) It is necessary to have a guide in case the guide block (VSB/VSJ-G) is not used.
   - The combination of guide clamp (VS/VT-G) and guide block (VSB/VSJ-G) ensures the protective function of datum clamp.
   The guide should be set up in case the guide block is not used in the applications below.

   When only the combination of datum clamps (2) and datum block (VSB/VSJ-D) cut block (VSB/VSJ-C) is used.

   When only the combination of datum clamp and free block (VSB/VSJ-F) is used to rotate the fixture plate.

   ![Diagram of guide clamp setup](image-url)

   **Installation Notes**

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

   2) Mounting the Product
   - Use four bolts with hex. hole (Strength Grade 12.9) and tighten the product with torque as shown in the table below.
   - Tighten them evenly to prevent twisting or jamming.

<table>
<thead>
<tr>
<th>Clamp Model</th>
<th>Block Model</th>
<th>Thread size</th>
<th>Tightening Torque (N·m)</th>
</tr>
</thead>
<tbody>
<tr>
<td>VS</td>
<td>VT</td>
<td>VSJ</td>
<td>VSBJ</td>
</tr>
<tr>
<td>-</td>
<td>-</td>
<td>VSB020</td>
<td>VST020</td>
</tr>
<tr>
<td>VS020</td>
<td>VTO040</td>
<td>VSB060</td>
<td>VSJ060</td>
</tr>
<tr>
<td>VS060</td>
<td>VT0100</td>
<td>VSB100</td>
<td>VSJ160</td>
</tr>
<tr>
<td>VS100</td>
<td>VT1600</td>
<td>VSB160</td>
<td>VSJ250</td>
</tr>
<tr>
<td>VS160</td>
<td>-</td>
<td>VSB250</td>
<td>VSJ400</td>
</tr>
<tr>
<td>VS250</td>
<td>-</td>
<td>-</td>
<td>M12 x 1.75</td>
</tr>
<tr>
<td>VS400</td>
<td>-</td>
<td>-</td>
<td>M16 x 2</td>
</tr>
</tbody>
</table>

   - Please set up the U-shape packing to the mounting hole as shown in the drawing below.

   ![Diagram of U-shape packing](image-url)

   **Attention to the Direction**

   **Delivery Ring [Important] (Only VS Clamp)**

   - The delivery ring prevents detachment of parts of individual clamp.
   - The clamp will be equipped with a delivery ring for shipment.
   - After mounting the pallet clamp on the fixture, remove the delivery ring before use.
   - (When removing the delivery ring, supply release hydraulic pressure.)
   - Please keep the delivery ring with great care as it is necessary to remove the clamp.

   When removing the pallet clamp from the fixture, mount the delivery ring in advance. Otherwise the internal parts may be detached from the spring, and they cannot be recovered.

   ![Diagram of delivery ring](image-url)

   **Level Adjustment of VSB Block Seating Surface**

   - When installing each block in the fixture plate, adjust the level of block seating surface as described below.
   - (Recommended Level Adjustment : within ±0.003mm)
   - Install in order of the level adjustment collar and the block to the fixture and tighten them with the specified torque.
   - Measure the level of the seating surface of each block.
   - In case the levels are not even, remove the blocks, and grind the level adjustment collar so that the level range is within ±0.003mm.
   - Once again, install the block and level adjustment collar into the fixture plate, and check the levels.

   ![Diagram of level adjustment](image-url)

   ※ 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.

   ![Air Bleeding Diagram](image)

   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.)

   ![Air Bleeding Diagram](image)

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>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></td>
<td>Showa Shell Sekiyu</td>
<td>Tellus S2 M 32</td>
<td>Morina S2 B 32</td>
</tr>
<tr>
<td></td>
<td>Idemitsu Kosan</td>
<td>Daphne Hydraulic Fluid 32</td>
<td>Daphne Super Multi Oil 32</td>
</tr>
<tr>
<td></td>
<td>JX Nippon Oil &amp; Energy</td>
<td>Super Hyrando 32</td>
<td>Super Mulpus DX 32</td>
</tr>
<tr>
<td></td>
<td>Cosmo Oil</td>
<td>Cosmo Hydro AW32</td>
<td>Cosmo New Mighty Super 32</td>
</tr>
<tr>
<td></td>
<td>ExxonMobil</td>
<td>Mobil DYE 24</td>
<td>Mobil DYE 24 Light</td>
</tr>
<tr>
<td></td>
<td>Matsumura Oil</td>
<td>Hydol AW-32</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Castrol</td>
<td>Hyspin AWS 32</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.

[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.

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 an 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.
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