High-Power Pneumatic Pallet Clamp

Model WVS

Clamping force which replaces hydraulic clamp
Development of high power pneumatic pallet clamp PAT.

Available in four body sizes cylinder output force is

4kN / 6kN / 10kN / 16kN

Stronger Holding Force with **Mechanical Lock**

With **Mechanical Lock Function**

Clamping force which replaces hydraulic clamp

*Clamping force varies depending on the operating pressure.
*This drawing is images. The parts constitution is different.
Elimination of Hydraulics
The hydraulic power pack and clamping systems can be eliminated by using pneumatic systems.

High Rigidity
Clamping force is suppressed to necessary minimum by the powerful holding force beyond clamping force.

Compact
WVS is size same as a hydraulic clamp (model VS). It withstands high cutting load.

Please contact us when you have concern with the transverse load data.

Shared Pallets
The block attached to the pallet side is common with WVS clamp and hydraulic clamp (VS/VT).

Energy Saving
Higher clamping force achieved by low operating pressure.
No need to use air booster.
**Function Description**

Refer to P.197 for detail.

![Diagram of Pallet Clamp](image)

**Block for Pallet Clamp**

There are two ways to mount the block.

**Repellative Locating with High Accuracy**

Locating Repeatability: 3 \( \mu \)m

Fixture alignment inspection is eliminated in the machining center.

![Diagram of Locating Accuracy](image)

**Self Lock (Safety) Function**

(Holding force when air pressure becomes zero)

The internal mechanical lock operates and clamping force and holding force achieved. When pneumatic pressure is at zero, it will stay locked due internal mechanical lock.

*It will stay locked with internal mechanical lock.*

![Diagram of Self Lock](image)

**Clamping Function**

Clamping force is ranged from 2.4kN ~ 15.7kN. Strong clamping force.

![Diagram of Clamping Force](image)

**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.

![Diagram of Air Blow and Seat Check](image)
Advantages

Setup Improvement Enhances Productivity

High-Power 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.
Installation Example 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 precision repetitive positioning of pallet clamp + one touch clamping.
- If common layouts are used, fixture count and required machines can be minimized saving cost and space.

![Diagram of Angle Plate Fixture, Clamp Fixture, Vise Fixture, and Chuck Fixture]

Installation Example 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 side by Auto Coupler with zero reaction force when setting a pallet (Refer to JVC/JVD and JVE/JVF).

![Diagram of Pneumatic Clamp Fixture, Air Chuck Fixture, and Auto Coupler]

Model JVC/JVD JVE/JVF
Coupler with the minimum connection stroke enhances automation. Compact and able to install in limited spaces.
Selectable from 3 pallet clamp models (WVS / VS / VT) according to application.

- The block attached to the pallet side is common with WVS clamp and hydraulic clamp (VS/VT). Hence, Spring of pallet with the WVS, VS or VT clamps attached becomes easy and compatible. Appropriate clamp can be selected depending on the application.

### 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

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

※ The detail form for combination is described at WVT(VS/VT)-VS8/VS8J block compatible table (P.201).

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**Features**

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<th>Performance Curve</th>
<th>External Dimensions</th>
<th>Cautions</th>
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</thead>
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---

**High-Power Series**

- Pneumatic Series
- Hydraulic Series
- Valve / Coupler
- Hydraulic Unit
- Manual Operation
- Accessories
- Cautions / Others

- High-Power Pneumatic Swing Clamp
- LHE
- High-Power Hydraulic Link Clamp
- LKE
- High-Power Pneumatic Swing Clamp
- WHE
- High-Power Pneumatic Link Clamp
- WCE
- High-Power Pneumatic Rail Support
- WNC
- Rodless Hollow
- Pneumatic Rail Support
- WNA

**High-Power Pneumatic Pallet Clamp**

- WVS

---

**Air Control Valve**

- model WVS
  - Air Lock
  - Air Release

- model VS
  - Spring Lock
  - Hydraulic Release
  - When using VS8250 and VS4000, it cannot use pallet in common.

- model VT
  - Hydraulic Lock
  - Hydraulic Release
  - Dimension of corrected condition is different only for VT.

**Hydraulic Unit**

- Clamping Force

---

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System References

At the time of four use

Apparatus and Function

For Information about combination between clamps and blocks, please look at the P.201.

Datum Clamp

With Locating Function

Movable Taper Sleeve

Guide Clamp

No Locating Function

Guide Part (Straight)

Datum Block

For Reference Plane Direction Locating

The Taper Reference Surface (Whole Circumference)

Cut Block

For One Direction Locating

The Taper Reference Surface (part)

Guide Block

For Guide

Guide Part (Straight)

Note: 1. It is recommended to use air blow line with at least φ 6 in order to ensure effective air flow. Please supply clean filtered air.

Circuit Reference
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.

### Base Plate + Pallet 1–3

#### Pallet 1

#### Pallet 2

#### Pallet 3

#### Combination

**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:**

1. In case the clamp/block configuration is linear, it is recommended to provide additional supports for stability.
2. 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.)
**Action Description** ※ This is a simplified drawing. Actual components are different.

- Air blow prevents debris contamination.
- Dust seal prevents foreign objects from entering and keeps steel ball area clean.
- The flange top is designed as inclined surface so that cutting powder and cutting oil can flow easily.
- The slitting part of taper sleeve (one place) is protected with lever plate to prevent invasion of cutting powder.

When the pallet is transported in
- The pallet is set on the raised piston rod cap.
  At this time there is clearance between the datum surfaces allowing air flow to remove contaminants.
  This allows to effectively remove chips and cutting oil by the air blower.

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

- When release air pressured is OFF and lock pneumatic pressure is ON, the pneumatic pressure and the spring force, mechanical lock mechanism lowers the piston rod and the steel balls engage the block bringing it to the seating surface. (It holds the condition by mechanical lock function.)
- The pallet is positioned with high precision 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. Air pressure releases the clamp. Position of pallet while loading must be kept within the offset tolerance. Continuously supply air pressure to the air blow port.

The fixture pallet must be level when lowering or lifting from the pallet clamps. If necessary, provide guide pins (rough guide) to keep the pallet level during loading and unloading.

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

3. As the pallet is further lowered, it is positioned within 0.2mm of the reference axis by the guide sleeve and guide block. (Guide Function) The guide function prevents interference by allowing a gap between the datum clamp and taper reference surface.

4. Pallet setting is completed when the pallet rests on the piston rod. At this time, there is appropriate clearance between the taper reference surface and seating surface created by lift up function, which makes air blow more effective to remove cutting chips and fluid.

5. When release air pressure is OFF and lock air pressure is ON, the block is pressed onto the seating surface with air pressure, spring force and mechanical lock. As the block is pressed, the taper reference surface is contacted for locating.
**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
Almost zero clearance between the taper sleeve and the moving parts of the unit.

XYZ Locating
Absorbs errors by lowering the taper sleeve.

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 for pallet transfer and/or multiple fixture changeover.

Center Distance Inaccuracy
Center Distance Accuracy ±0.02 mm (max. ±0.0250)
Model No. Indication (Clamp)

**WVS 0 06 0 - M D**

1 Clamping Force

- **04**: Clamping Force 4.0kN (Pneumatic Pressure 0.5MPa)
- **06**: Clamping Force 6.3kN (Pneumatic Pressure 0.5MPa)
- **10**: Clamping Force 9.9kN (Pneumatic Pressure 0.5MPa)
- **16**: Clamping Force 15.7kN (Pneumatic Pressure 0.5MPa)

※ Refer to the clamping force shown on the right. Refer to the Performance Curve and Specification for detailed specifications.

2 Design No.

- **0**: Revision Number

3 Functions

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

Combination of Clamp and Block

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

Note:

1. Please refer to the following [WVS (VS/VT) - VSB/VSJ Block Compatible Lists] for the detailed form of the combination.

WVS (VS/VT) - VSB/VSJ Block Compatible Lists

<table>
<thead>
<tr>
<th>Clamp Model</th>
<th>WVS0040</th>
<th>WVS0060</th>
<th>WVS0100</th>
<th>WVS0160</th>
</tr>
</thead>
<tbody>
<tr>
<td>Block Model (Material : SCM)</td>
<td>VS8020</td>
<td>VS8060</td>
<td>VS8100</td>
<td>VS8160</td>
</tr>
<tr>
<td>(Hydraulic Clamp Model No.)</td>
<td>VS0040</td>
<td>VS0060</td>
<td>VS0100</td>
<td>VS0160</td>
</tr>
<tr>
<td>(VT0040)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Notes:

1. The function is described at combination of clamp and block.

2. WVS and Block (VS8/VSJ) for Hydraulic clamp (VS/VT) are common.
Model No. Indication (Block)

VSB : Embedded Block

VSB 06 0 - D

1 2 3 4

1 Shape of Block

VSB : Embedded Block
VSJ : Flange Shaped Block

VSB

Pallet

Embedded Block

VSJ

Pallet

Flange Shaped Block

2 Accommodate WVS/VS/VT Clamp Model

02 : WVS0040 / VS0020 / VS0040 / VT0040
06 : WVS0060 / VS0060 / VT0060
10 : WVS0100 / VS0100 / VT0100
16 : WVS0160 / VS0160 / VT0160

Note :
1. VS/VT is hydraulic model.

3 Design No.

0 : Revision Number

4 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)

Model No. Indication (Level Adjustment Collar)

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

VZ 0 06 0 - VSC

1 Accommodate VSB Block Model No.

02 : VSB020-□
06 : VSB060-□
10 : VSB100-□
16 : VSB160-□

2 Design No.

0 : Revision Number

Other Mounting Examples (Reference)

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

VSJ Block : Bolt Mounting from the Upper Side

WVS

High-Power Series
Pneumatic Series
Hydraulic Series
Valve / Coupler
Hydraulic Unit
Manual Operation Accessories
Cautions / Others
High-Power Hydraulic Swing Clamp
LHE
High-Power Hydraulic Link Clamp
LKE
High-Power Pneumatic Swing Clamp
WE
High-Power Pneumatic Link Clamp
WCE
High-Power Pneumatic Stop Support
WNC
Rodless Hollow Pneumatic Stop Support
WNA
High-Power Pneumatic Pallet Clamp
WVS

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Clamping Force / Lift-Up Force

**WVS0040-M**

<table>
<thead>
<tr>
<th>Supply Air Pressure (MPa)</th>
<th>Clamping Force (kN)</th>
<th>Lift-Up Force (kN)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.5</td>
<td>4.0</td>
<td>0.33</td>
</tr>
<tr>
<td>0.45</td>
<td>3.6</td>
<td>0.28</td>
</tr>
<tr>
<td>0.4</td>
<td>3.3</td>
<td>0.23</td>
</tr>
<tr>
<td>0.35</td>
<td>3.0</td>
<td>0.19</td>
</tr>
<tr>
<td>0.3</td>
<td>2.7</td>
<td>0.14</td>
</tr>
<tr>
<td>0.25</td>
<td>2.4</td>
<td>0.09</td>
</tr>
</tbody>
</table>

Holding Force at 0 MPa ※1: 0.8 ~ –

Operating Pressure Range (MPa): 0.25 ~ 0.5

**WVS0060-M**

<table>
<thead>
<tr>
<th>Supply Air Pressure (MPa)</th>
<th>Clamping Force (kN)</th>
<th>Lift-Up Force (kN)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.5</td>
<td>6.3</td>
<td>0.49</td>
</tr>
<tr>
<td>0.45</td>
<td>5.8</td>
<td>0.42</td>
</tr>
<tr>
<td>0.4</td>
<td>5.3</td>
<td>0.34</td>
</tr>
<tr>
<td>0.35</td>
<td>4.8</td>
<td>0.27</td>
</tr>
<tr>
<td>0.3</td>
<td>4.4</td>
<td>0.20</td>
</tr>
<tr>
<td>0.25</td>
<td>3.9</td>
<td>0.12</td>
</tr>
</tbody>
</table>

Holding Force at 0 MPa ※1: 1.4 ~ –

Operating Pressure Range (MPa): 0.25 ~ 0.5

**WVS0100-M**

<table>
<thead>
<tr>
<th>Supply Air Pressure (MPa)</th>
<th>Clamping Force (kN)</th>
<th>Lift-Up Force (kN)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.5</td>
<td>9.9</td>
<td>0.87</td>
</tr>
<tr>
<td>0.45</td>
<td>9.1</td>
<td>0.75</td>
</tr>
<tr>
<td>0.4</td>
<td>8.3</td>
<td>0.64</td>
</tr>
<tr>
<td>0.35</td>
<td>7.5</td>
<td>0.52</td>
</tr>
<tr>
<td>0.3</td>
<td>6.6</td>
<td>0.40</td>
</tr>
<tr>
<td>0.25</td>
<td>5.8</td>
<td>0.28</td>
</tr>
</tbody>
</table>

Holding Force at 0 MPa ※1: 1.8 ~ –

Operating Pressure Range (MPa): 0.25 ~ 0.5

**WVS0160-M**

<table>
<thead>
<tr>
<th>Supply Air Pressure (MPa)</th>
<th>Clamping Force (kN)</th>
<th>Lift-up force (kN)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.5</td>
<td>15.7</td>
<td>1.52</td>
</tr>
<tr>
<td>0.45</td>
<td>14.4</td>
<td>1.33</td>
</tr>
<tr>
<td>0.4</td>
<td>13.0</td>
<td>1.14</td>
</tr>
<tr>
<td>0.35</td>
<td>11.7</td>
<td>0.94</td>
</tr>
<tr>
<td>0.3</td>
<td>10.3</td>
<td>0.75</td>
</tr>
<tr>
<td>0.25</td>
<td>9.0</td>
<td>0.56</td>
</tr>
</tbody>
</table>

Holding Force at 0 MPa ※1: 2.2 ~ –

Operating Pressure Range (MPa): 0.25 ~ 0.5

Notes:
1. This graph shows the value for single clamp.
2. This graph shows the relationship between Supply Air Pressure and Clamping Force (solid line) / Lift-Up Force (dotted line).
※1. It shows holding force at 0MPa air pressure and does not satisfy specifications.

(Example)
When using WVS0060-M:
Supply Air Pressure 0.4MPa
Clamping force is about 5.3kN
Lift-up force is about 0.3kN.
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<th>Model No.</th>
<th>Indication</th>
<th>Performance Curve</th>
<th>External Dimensions</th>
<th>Cautions</th>
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### MEMO

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<td>Hydraulic Series</td>
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<tr>
<td>Valve / Coupler</td>
</tr>
<tr>
<td>Hydraulic Unit</td>
</tr>
<tr>
<td>Manual Operation</td>
</tr>
<tr>
<td>Accessories</td>
</tr>
<tr>
<td>Cautions / Others</td>
</tr>
</tbody>
</table>

- High-Power Hydraulic Swing Clamp
  - LHE
- High-Power Hydraulic Link Clamp
  - LIKE
- High-Power Pneumatic Hole Clamp
  - 5WE
- High-Power Pneumatic Swing Clamp
  - WHE
- High-Power Pneumatic Link Clamp
  - WCE
- High-Power Pneumatic Risk Support
  - WNC
- Rodless Hollow Pneumatic Risk Support
  - WNA
- High-Power Pneumatic Plate Clamp
  - WVS
**Displacement against Transverse Load**

- The displacement is the predicted reference value based on the test data under the conditions shown below.
- Displacement may vary according to conditions of fixtures. The displayed values are reference based on the test data.

**Clamp/Block Layout**

![Diagram of Clamp/Block Layout]

- **Datum Clamp**
- **Guide Clamp**
- **Cut Block**
- **Guide Block**
- **Mounting Distance P**

**Test Device**

![Diagram of Test Device]

- **Load Cell**
- **Push Cylinder**
- **Workpiece**
- **Y-axis Displacement**
- **Load Position L**

**How to Read Displacement**

(Ex.) When using W50040

- **Components**
  - [Clamp]
  - W50040-MD X 2 Units
  - W50040-MG X 2 Units
  - [Block]
  - V5,020-D X 1 Unit
  - V5,020-C X 1 Unit
  - V5,020-G X 2 Units

- **Conditions**
  - Mounting Distance P=200mm
  - Load Position L=175mm
  - Supply Air Pressure 0.5MPa
  - Transverse Load F=4kN

- **Displacement**
  1. X-axis displacement is about 7.4 μm.
  2. Y-axis displacement is about 2.8 μm.

**Note:**

1. Please contact us in case the conditions are different.
### WVS0040

**Components**
- [Clamp] WVS0040-MD × 2 Units
- [Block] VS1020-D × 1 Unit
- VS1020-C × 1 Unit
- VS1020-G × 2 Units

**Conditions**
- Mounting Distance P = 200mm
- Load Position L = 50~250mm
- Supply Air Pressure 0.3MPa

**Clamping Force**
- Total 164N (4.0kN × 4)

---

### WVS0060

**Components**
- [Clamp] WVS0060-MD × 2 Units
- [Block] VS1060-D × 1 Unit
- VS1060-C × 1 Unit
- VS1060-G × 2 Units

**Conditions**
- Mounting Distance P = 200mm
- Load Position L = 50~250mm
- Supply Air Pressure 0.3MPa

**Clamping Force**
- Total 25.2kN (6.3kN × 4)

---

### WVS0100

**Components**
- [Clamp] WVS0100-MD × 2 Units
- [Block] VS1010-D × 1 Unit
- VS1010-C × 1 Unit
- VS1010-G × 2 Units

**Conditions**
- Mounting Distance P = 300mm
- Load Position L = 50~450mm
- Supply Air Pressure 0.3MPa

**Clamping Force**
- Total 39.6kN (9.9kN × 4)

---

### WVS0160

**Components**
- [Clamp] WVS0160-MD × 2 Units
- [Block] VS1160-D × 1 Unit
- VS1160-C × 1 Unit
- VS1160-G × 2 Units

**Conditions**
- Mounting Distance P = 300mm
- Load Position L = 50~450mm
- Supply Air Pressure 0.3MPa

**Clamping Force**
- Total 62.8kN (15.7kN × 4)
**External Dimensions**

- This drawing shows the release state of WVS.

**Machining Dimensions of Mounting Area**

1. Lock Air Port: \(\phi N \text{ or less}\)
2. Seat Check Air Port: \(\phi N \text{ or less}\)
3. 4-Screw: \(\phi AB \leq 0.1\)
4. Air Blow Port: \(\phi N \text{ or less}\)

**Distance Accuracy of Each Clamp**

1. WVS-MG: \((\pm 0.02)\)
2. WVS-MD: \((\pm 0.02)\)

**Notes:**

1. \(\phi Q\) shows the dimensions of sleeve (taper) of datum clamp (WVS-MD).
2. \(\phi R\) shows the dimensions of sleeve (straight) of guide clamp (WVS-MG).
3. The screw for jack is used when removing the clamp. (See P.213 for usage.)
4. Please make sure the distance accuracy of each datum clamp is below \(\pm 0.025\)mm between the clamps with the longest distance.
Specifications

<table>
<thead>
<tr>
<th>Model</th>
<th>WVS0040-M</th>
<th>WVS0060-M</th>
<th>WVS0100-M</th>
<th>WVS0160-M</th>
</tr>
</thead>
<tbody>
<tr>
<td>Locating Repeatability mm</td>
<td>0.003</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Full Stroke mm</td>
<td>3.4</td>
<td>3.4</td>
<td>4.0</td>
<td>4.5</td>
</tr>
<tr>
<td>Lift Up Stroke mm</td>
<td></td>
<td></td>
<td>1.0</td>
<td></td>
</tr>
<tr>
<td>Allowable Offset when fixture pallet is set mm</td>
<td>1.0</td>
<td>1.5</td>
<td>1.5</td>
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<td>1000</td>
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Notes:

※ 7. The specification indicates the value of one device.
※ 8. It indicates the weight of pallet in horizontal position (placed flat) that WVS can locate regardless of number of clamps. Release air 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 contact us.
※ 9. It indicates holding force when air pressure is at 0MPa and may not satisfy the specifications.

External Dimensions and Machining Dimensions for Mounting (mm)

<table>
<thead>
<tr>
<th>Model</th>
<th>WVS0040-M</th>
<th>WVS0060-M</th>
<th>WVS0100-M</th>
<th>WVS0160-M</th>
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<td>M6×1 Thread Depth 10</td>
<td>M8×1.25 Thread Depth 14</td>
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<td>AS568-033(70°)</td>
<td>AS568-037(70°)</td>
<td>AS568-042(70°)</td>
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<td>AS568-007(70°)</td>
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<td>M5×0.8×12</td>
<td>M6×1×14</td>
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<td>Screw for Jack</td>
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<td>M8×1.25</td>
<td>M10×1.5</td>
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### External Dimensions

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<tr>
<th>Model</th>
<th>VS8020/060/100/160-D</th>
<th>VS8020/060/100/160-C</th>
<th>VS8020/060/100/160-G/F</th>
</tr>
</thead>
</table>

#### Notes:
1. The screw for jack is used when removing VS8 block.
2. The spring pin is used for phasing of VS8-C locating direction.

### Dimensions of Collar for Level Adjustment

#### Notes:
1. Please refer to the drawing above when preparing level adjustment collar by yourself.
2. (3 parts) are for jack screw. Align them with the phase of jack screw of VS8 block.

### Machining Dimensions of Mounting Area

#### Notes:
1. This graph shows when the clearance between the seating surface of VS8 block and the bottom surface of the pallet is 0.5mm by using the level adjustment collar.
2. vs. 3. (4 parts) hole is used for phasing of VS8-C locating direction. Please make sure the AK hole is at the line connecting the centers of VS8-D and VS8-C.
3. This machining is only necessary for VS8-C.

---

※1. Clearance between the seating surface of VS8 block and the bottom surface of the pallet.
Mounting Distance Accuracy and VSB-C Phase

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

External Dimensions and Machining Dimensions for Mounting

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<th>VSB020-D</th>
<th>VSB020-C</th>
<th>VSB020-G</th>
<th>VSB020-F</th>
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<th>VSB060-C</th>
<th>VSB060-G</th>
<th>VSB060-F</th>
<th>VSB100-D</th>
<th>VSB100-C</th>
<th>VSB100-G</th>
<th>VSB100-F</th>
<th>VSB160-D</th>
<th>VSB160-C</th>
<th>VSB160-G</th>
<th>VSB160-F</th>
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<td>50g7</td>
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<td>0.010</td>
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<td>38.5 (42.5)</td>
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(AH) 28.28 32.53 39.6 46.67
AJ M4×0.7 Thread Depth 7 M5×0.8 Thread Depth 8 M6×1 Thread Depth 10 M8×1.25 Thread Depth 14.5
AK φ3.4 Depth 5 – φ4.5 Depth 5 – φ4.5 Depth 5 – φ4.5 Depth 5 –
Mounting Bolt M4×0.7×16 M5×0.8×16 M6×1×20 M8×1.25×25
Screw for Jack M4×0.7 M5×0.8 M6×1 M8×1.25
Spring Pin ⑩ φ3×10 – φ4×10 – φ4×10 – φ4×10 –
Mass 0.15kg 0.2kg 0.35kg 0.5kg

Appropriate Clamp

| WV50090-MD | WV50090-MG | WV50090-MD | WV50090-MG | WV50090-MD | WV50090-MG | WV50090-MD | WV50090-MG | WV50090-MD | WV50090-MG | WV50090-MD | WV50090-MG | WV50090-MD | WV50090-MG |
|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|

Connection Dimensions

| When lock | 11.5 | 13 | 15.3 | 19.5 |
| When release | 12.5 | 14 | 16.5 | 20.5 |

Model

<table>
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<th>VZ0020-VSC</th>
<th>VZ0060-VSC</th>
<th>VZ0100-VSC</th>
<th>VZ0160-VSC</th>
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</table>

Notes:
⑦ The dimensions in () display that of VSB-F.
⑧ The spring pin is used only on VSB-C.
⑨ The guide block (VSB-G) is used only for guide clamp (WVS□-MG) and the free block (VSB-F) can be used for both datum clamp (WVS□-MD) and guide clamp (WVS□-MG).
⑩ 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**

**VSJ020/060-C**

**VSJ020/060-G**

**VSJ020/060-F**

4-Mounting Bolt (Included)

3-Screw for Jack

3-Screw for Jack

3-Screw for Jack

Notes:

※1. The screw for jack is used when VSJ block is removed.

※2. The spring pin is used for phasing of VSJ-C locating direction.

### Mounting Distance Accuracy and VSJ-C Phase

VSJ-D

VSJ-C

VSJ-G/F

Spring Pin

Locating Direction

Note:

※3. Distance accuracy of the block should be within ±0.025mm between the blocks with the longest distance.

### Connection Dimensions
**Machining Dimensions of Mounting Area**

**VSJ020/060**

- **φ AB**
- **φ AE or less**
- **φ AA ≥ 0.010 in (φ)**
- **4-AJ Thread**
- **Locating Direction N2**

**VSJ100/160**

- **φ AB**
- **φ AE or less**
- **φ AA ≥ 0.010 in (φ)**
- **6-AJ Thread**
- **Locating Direction N2**

**Note:**

*4. φ AK hole is used for phasing of VSJ-C locating direction.
Please make sure φ AK hole is at the line connecting the centers of VS8-D and VS8-C. This machining is only necessary for VS8-C.*

**External Dimensions and Machining Dimensions for Mounting**

<table>
<thead>
<tr>
<th>Model No.</th>
<th>VSJ020-D</th>
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<th>VSJ060-D</th>
<th>VSJ060-G</th>
<th>VSJ100-D</th>
<th>VSJ100-G</th>
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<td>28.5</td>
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<td>36</td>
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<td>φ 4 × 10</td>
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**Appropriate Clamp**

- VS50040-MD
- VS50040-MS
- VS50060-MD
- VS50060-MS
- VS51000-MD
- VS51000-MS
- VS51600-MD
- VS51600-MS
- VS5100-MS
- VS5100-MS
- VS5160-MS
- VS5160-MS

**Connection Dimensions**

- **WVS/VS**
- **When lock**
  - 20
  - 23.5
  - 26
  - 32
- **When release**
  - 21
  - 24.5
  - 27
  - 33

**Notes:**

*5. The dimensions in ( ) display that of VSJ-F.
6. The spring pin is used only on VSJ-C.
7. The guide block (VSJ-G) is used only for guide clamp (WVS□-MG) and the free block (VSJ-F) can be used for both datum clamp (WVS□-MD) and guide clamp (WVS□-G).
8. Pallet with low rigidity (thin pallet or pallet made of aluminum etc.) may be deformed when mounting VS8 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).
Cautions

Notes for Design

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

2) Notes for Circuit Design
   - Ensure there is no possibility of supplying air pressure to the lock and release ports simultaneously. Improper circuit design may lead to malfunctions and damages.
   - Air blow passage should be \( \phi 6 \) mm or more.

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.

   ![Allowed Dimension Chart](chart.png)

<table>
<thead>
<tr>
<th>Model No</th>
<th>WV50040</th>
<th>WV50060</th>
<th>WV50100</th>
<th>WV50160</th>
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<tr>
<td>V5B Block</td>
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<tr>
<td>V5J Block</td>
<td>21.5</td>
<td>25</td>
<td>27.5</td>
<td>33.5</td>
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</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](mechanism.png)

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

   ![Datum Clamp and Cut Block](datum.png)

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

   ![Rough Guides](rough.png)

   - The fixture pallet must be level when lowering or lifting from the pallet clamps. If necessary, provide guide pins (rough guide) to keep the pallet level during loading and unloading.

   ![Guide Pin](pin.png)

- When the pallet is in horizontal position (leveled), 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 (WVS-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.

6) Delivery Ring (Important)
   • 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 air 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.

7) 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)
   ① Install in order of the level adjustment collar and the block to the fixture and tighten them with the specified torque.
   ② Measure the level of the seating surface of each block.
   ③ 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.
   ④ Once again, install the block and level adjustment collar into the fixture plate, and check the levels.

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<tr>
<th>Clamp Model</th>
<th>Block Model</th>
<th>Thread Size</th>
<th>Tightening Torque (N·m)</th>
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<td>VSB020</td>
<td>VSJ020</td>
<td>M4 × 0.7</td>
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<td>WVS05040</td>
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<td>M6 × 1</td>
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<td>M8 × 1.25</td>
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<td>WVS05160</td>
<td>VSB160</td>
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<td></td>
</tr>
</tbody>
</table>

※ Please refer to P.1239 for common cautions. • Notes on Handling • Maintenance/Inspection • Warranty
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.
   - The machine and equipment can only be inspected or prepared when it is confirmed that the preventive devices are in place.
3) 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.
4) After stopping the machine, do not remove until the temperature cools down.
5) 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/VFL/VFK/WVS/VWM/VW/K/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.
### Sales Offices

#### Sales Offices across the World

<table>
<thead>
<tr>
<th>Country</th>
<th>Address/Office Name</th>
<th>TEL.</th>
<th>FAX.</th>
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<tbody>
<tr>
<td>Japan</td>
<td>KOSMEK LTD. 1-5, 2-chome, Murotani, Nishi-ku, Kobe-city, Hyogo, Japan</td>
<td>+81-78-991-5162</td>
<td>+81-78-991-8787</td>
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<td>Overseas Sales</td>
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<td>USA</td>
<td>KOSMEK (USA) LTD. 650 Springer Drive, Lombard, IL 60148 USA</td>
<td>+1-630-620-7650</td>
<td>+1-630-620-9015</td>
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<tr>
<td>Mexico</td>
<td>KOSMEK USA Mexico Office Blv Jurica la Campana 1040, B Colonia Punta Juriquilla Queretaro, QRO 76230 Mexico</td>
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<tr>
<td>Europe</td>
<td>KOSMEK EUROPE GmbH Schleepenplatz 2 9020 Klagenfurt am Wörthersee Austria</td>
<td>+43-463-287587</td>
<td>+43-463-287587-20</td>
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<tr>
<td>Asia</td>
<td>KOSMEK (CHINA) LTD. Room601, RIVERSIDE PYRAMID No.55, Lane21, Pusan Rd, Pudong Shanghai 200125, China</td>
<td>+86-21-54253000</td>
<td>+86-21-54253709</td>
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<tr>
<td>Indeia</td>
<td>KOSMEK LTD. - INDIA F 203, Level-2, First Floor, Prestige Center Point, Cunningham Road, Bangalore -560052 India</td>
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<td>Taiwan</td>
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<td>+886-2-82261860</td>
<td>+886-2-82261890</td>
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<tr>
<td>Full Life Trading Co., Ltd.</td>
<td>益生貿易有限公司</td>
<td>TEL. +63-2-310-7286</td>
<td>FAX. +63-2-310-7286</td>
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<td>Philippines</td>
<td>Victoria Wave Special Economic Zone Mt. Apo Building, Brgy. 186, North Caloocan City, Metro Manila, Philippines 1427</td>
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<td>Indonesia</td>
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#### Sales Offices in Japan

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<td>+81-78-991-8787</td>
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