Screw Locator

New Compact Model for Light Load

Model VXE
M3 Bolt Tightening / Compact Model for Light Load

Model VXF
New Compact Model for Light Load (Model VX) Added to the Line-up

M3 Bolt-Tightening Screw Locator (model VX) is newly added. Reduced minimum tightening force compared to model VXF, model VX is suitable for compact and/or thin pallets used in FA applications which require manual/automatic setups.
Screw Locator allows for Drastic Time Reduction for Locating and Setup

Before Pallet Setting

Set the pallet and tighten the bolts.

High Accuracy Locating Completed

Locating Bushing

Dual Surface Locating

Locating Pin

Locating Repeatability

Model VXE : 5 \( \mu \)m
Model VXF : 3 \( \mu \)m

Model VXF0100
M10 Bolt

Model VXF0120
M12 Bolt

Model VXF0160
M16 Bolt
Screw Locator

Compact Model for Light Load (Model VX) Newly Added
Model VX/VX

Simple High Accuracy Locating by Hand

VXF : Locating Repeatability 3 μm  VX : Locating Repeatability 5 μm

The "Screw Locator" performs high-precision locating by simply tightening the bolts.

General locating pin has a gap and poor locating repeatability.
Backlash • Low Accuracy • Space Required

Screw Locator with Dual Surface Tightening
Locating Repeatability 3 μm (5 μm for VX)
High accuracy allows for high quality and less defective parts. Compact body saves valuable space.
**Action Description**

Set the pallet.

Tighten 'PD': Datum first.

Fasten the pallet on the base plate with bolts. Tightening procedure is PD: Datum → PC: Cut. The pallet is fastened and located simultaneously.

Kosmek “Screw Locator” consists of
PD: Datum-Pin (Round Pin) and PC: Cut-Pin (Diamond Pin) like other manual locating pins.

**Reference Locating**

- **Locating Pin**
- **Locating Bushing**
- **Movable Taper Sleeve**
- **Taper Reference Surface**

**One Direction Locating**

- **Notch for Phase Confirmation**
- **Complete Tapered Surface**
- **Two Tapered Surfaces on Opposite Sides**
**Application Examples**

For Locating/Setup of Fixtures for Machining Applications

Connects both pallet and couplers simultaneously.

For Setup of Carrier Pallets ≫ Fixture Bases for Assembly / Press Fitting / Inspection Device of Compact Components

For Locating of Pallets for Robot Applications

For High-Accuracy Tightening of Components

※ If there is no need of diamond locating, the datum pin can be used in singular fashion.

**Auto Coupler**

Model JVA/JVB

Able to supply hydraulic or air pressure from the base plate to the pallet by using with the Auto Coupler.

※ Refer to the Complete Catalog or visit our website for detail.
### Lineup

<table>
<thead>
<tr>
<th></th>
<th>Model VXE → P. 9</th>
<th>Model VXF → P. 13</th>
</tr>
</thead>
<tbody>
<tr>
<td>Locating Repeatability</td>
<td>5 μm</td>
<td>3 μm</td>
</tr>
<tr>
<td>Tightening Bolt Size</td>
<td>M3</td>
<td>M4 / M5 / M6 / M8 / M10 / M12 / M16</td>
</tr>
<tr>
<td>Min. Tightening Force</td>
<td>50 N</td>
<td>1200 ~ 3000 N</td>
</tr>
<tr>
<td>Max. Loading Weight</td>
<td>Horizontal Mounting : 2 kg</td>
<td>Horizontal Mounting : 100 ~ 800 kg</td>
</tr>
<tr>
<td></td>
<td>Vertical Mounting : 0.4kg</td>
<td>Vertical Mounting : 20 ~ 160kg</td>
</tr>
</tbody>
</table>

**Applications • Features**

- **Model VXE**
  - With small min. tightening force (reaction force at connection), thin/compact pallets can hardly be deformed when locating. When locating with the use of auto clamps, the taper pin avoids interference and thus suitable for automation.
  - Low tightening force (reaction force) hardly deforms pallets.

- **Model VXF**
  - With a variety of body sizes, Screw Locator can be used in various environments.
  - High loading weight allows for locating heavy pallets and using in machining fixture.
  - Setup time of fixture pallet can be reduced.

Available for Heavy Fixture/Pallet

※ Maximum loading weight of VXE/VXF shows the maximum pallet weight that can be located.

About load applied after locating, vertical force is received by fixture seating surface, and horizontal force is received by clamping force with bolt tightening, etc.
**Description of Movable Taper Sleeve**

Locating Method : Dual Surface with Movable Taper Sleeve

![Diagram of Movable Taper Sleeve](image)

**The Benefits of Movable Taper Sleeve**

1. Absorbs tolerance variations in each locating pin and locating bushing.
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.

The advantage of the ‘Movable Taper Sleeve’ is to absorb dimension error by vertical movements. This is achieved by removing clearance between the locating pin, tapered sleeves and locating bushing. The dual surface fastening enables high precision with repeated accurate locating.
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 bushing is completely zero.

XYZ Locating
Absorbs errors by raising the taper sleeve. Seating surface touches and locates on two surfaces.

Movable taper sleeve absorbs distance error. (③/④)
Absorbs distance variations minimizing the wear of locating parts and prevents deformation of locating pin/locating bushing.
※ Accuracy becomes paramount when securing multiple sub plates.

Center Distance Inaccuracy
Datum Pin
Cut Pin

Distance Inaccuracy : Small
Absorbs variation errors by raising taper sleeve.

Distance Inaccuracy : Large

Center Distance Accuracy ±0.02 or better
**Model No. Indication (Locating Pin)**

**VXE 0030 - P**

1. **Mounting Bolt Size**
   - 03: Mounting Bolt Size M3

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

3. **Function Classification**
   - D: Datum Pin (For Reference Locating)
   - C: Cut Pin (For One Direction Locating)

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**Model No. Indication (Locating Bushing)**

**VXE 0030 - B**

1. **Accommodate VXE Locating Pin Model**
   - 03: VXE0030-PD / VXE0030-PC

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

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**Combination of Locating Pin and Locating Bushing**

<table>
<thead>
<tr>
<th>Mounting Bolt Size</th>
<th>Locating Pin Model No.</th>
<th>Locating Bushing Model No.</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>M3 Bolt</td>
<td>VXE0030-PD (Datum Pin)</td>
<td>VXE0030-B</td>
<td>Reference Locating</td>
</tr>
<tr>
<td></td>
<td>VXE0030-PC (Cut Pin)</td>
<td>VXE0030-B</td>
<td>One Direction Locating</td>
</tr>
</tbody>
</table>
### Specifications

<table>
<thead>
<tr>
<th>Model No.</th>
<th>VXE0030</th>
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<tbody>
<tr>
<td>Locating Repeatability</td>
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<tr>
<td>Stroke</td>
<td>mm</td>
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<tr>
<td>Max. Loading Weight</td>
<td>Horizontal Mounting</td>
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<td></td>
<td>Vertical Mounting</td>
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<tr>
<td>Min. Tightening Force</td>
<td>N</td>
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<tr>
<td>Tightening Procedure</td>
<td>VXE-PD → VXE-PC</td>
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<tr>
<td>Operating Temperature</td>
<td>°C</td>
</tr>
<tr>
<td>Mass</td>
<td>Locating Pin</td>
</tr>
<tr>
<td></td>
<td>Locating Bushing</td>
</tr>
</tbody>
</table>

**Notes:**

1. This product is made only for locating. It does not have clamping function. Tightening force is required when locating.

   ※1. Minimum tightening force indicates the required tightening force (pressing force) per locating unit. (It is the required axial force when tightening the center of VXE with a bolt.)

   Tighten the mounting bolt with appropriate tightening torque. (Refer to P.19 for reference data of bolt axial force and tightening torque.)

   Tightening torque may differ according to bolt tensile strength grade / plate material. For further information, please refer to JIS B 1083, JIS B 1084 or catalogs of bolt makers.

   ※2. When tightening/clamping a point other than the VXE center using external clamps, clamping force has to be greater than the minimum tightening force. Refer to P.21 “For tightening (clamping) a point other than the VXE/VXF center,” and calculate required tightening force.
**External Dimensions**

Locating Bushing: VXE0030—B

Locating Pin
VXE0030—PC

VXE0030-PD (Datum)  
VXE0030-PC (Cut)

**Machining Dimensions of Mounting Area**

Locating Bushing (VXE0030—B) Side

Locating Pin (VXE0030—PC) Side

Notes:

1. Prepare this hole for phase confirmation. The overlap of the notch and hole will confirm phase. Phasing becomes easier with a phase confirmation hole when using a parallel pin for mounting VXE-PC. (When using parallel pin, please take into account for the removal of the pin after phase alignment.)

2. When preparing M4 × 0.7 screw for mounting/jacking, use the plain washer for the mounting bolt as shown in the drawing on the right.

1. Special tool (Model: ZZV0010-030) or equivalent is required when inserting VXE0030-B. Special tool (Model: ZZV0010-030) is not included with VXE0030-B. Please order separately (refer to P.17).

2. Mounting bolts are not included in this product.
### Mounting Distance Accuracy

Mounting Distance Accuracy ±0.02 or better

- **Pallet**
- **Base Plate**

### VXE-PC Phase

Notch for Phase Confirmation

- **VXE0030-PC**
- **VXE0030-PD**

**Note:**

- Please align the notch of VXE-PC perpendicular to the center of VXE-PD.

### Mounting and Removing

**When Mounting**

- Special Tool for Inserting Locate Bushing **ZZV0010-030**
- Washer or Equivalent
- Parallel Pin
- (Fixture)

**When Removing**

- Three Bolts (120° Pitch)
- Plate Cover

**Notes:**

- **Note:** Please align the notch of VXE-PC perpendicular to the center of VXE-PD.

- **Special Tool:** (Model: ZZV0010-030) or equivalent is required when inserting VXE0030-B.
- Special tool (Model: ZZV0010-030) is not included with VXE0030-B. Please order separately.
1. **Model No. Indication (Locating Pin)**

   **VXF 0080 - P D**

   1. **Mounting Bolt Size**
      - 04: Mounting Bolt Size M4
      - 05: Mounting Bolt Size M5
      - 06: Mounting Bolt Size M6
      - 08: Mounting Bolt Size M8
      - 10: Mounting Bolt Size M10
      - 12: Mounting Bolt Size M12
      - 16: Mounting Bolt Size M16

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

   3. **Function Classification**
      - D: Datum Pin (For Reference Locating)
      - C: Cut Pin (For One Direction Locating)

2. **Combination of Locating Pin and Locating Bushing**

<table>
<thead>
<tr>
<th>Mounting Bolt Size</th>
<th>Locating Pin Model No.</th>
<th>Locating Bushing Model No.</th>
<th>Function</th>
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<td>M4 Bolt</td>
<td>VXF0040-PD (Datum Pin)</td>
<td>VXF0040-B</td>
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<td>VXF0040-PC (Cut Pin)</td>
<td>VXF0040-B</td>
<td>One Direction Locating</td>
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<tr>
<td>M5 Bolt</td>
<td>VXF0050-PD (Datum Pin)</td>
<td>VXF0050-B</td>
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<td>VXF0050-PC (Cut Pin)</td>
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<td>One Direction Locating</td>
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<tr>
<td>M6 Bolt</td>
<td>VXF0060-PD (Datum Pin)</td>
<td>VXF0060-B</td>
<td>Reference Locating</td>
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<td></td>
<td>VXF0060-PC (Cut Pin)</td>
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<tr>
<td>M8 Bolt</td>
<td>VXF0080-PD (Datum Pin)</td>
<td>VXF0080-B</td>
<td>Reference Locating</td>
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<tr>
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<td>VXF0080-PC (Cut Pin)</td>
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<td>One Direction Locating</td>
</tr>
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<td>M10 Bolt</td>
<td>VXF0100-PD (Datum Pin)</td>
<td>VXF0100-B</td>
<td>Reference Locating</td>
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<tr>
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<td>VXF0100-PC (Cut Pin)</td>
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</tr>
<tr>
<td>M12 Bolt</td>
<td>VXF0120-PD (Datum Pin)</td>
<td>VXF0120-B</td>
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<td>M16 Bolt</td>
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<td>VXF0160-PC (Cut Pin)</td>
<td>VXF0160-B</td>
<td>One Direction Locating</td>
</tr>
</tbody>
</table>
Model No. Indication (Locating Bushing)

VXF 008 0 - B

1 Accommodate VXF Locating Pin Model

- 04: VXF0040-PD / VXF0040-PC
- 05: VXF0050-PD / VXF0050-PC
- 06: VXF0060-PD / VXF0060-PC
- 08: VXF0080-PD / VXF0080-PC
- 10: VXF0100-PD / VXF0100-PC
- 12: VXF0120-PD / VXF0120-PC
- 16: VXF0160-PD / VXF0160-PC

2 Design No.

- 0: Revision Number

Specifications

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<th>Model No.</th>
<th>VXF0040</th>
<th>VXF0050</th>
<th>VXF0060</th>
<th>VXF0080</th>
<th>VXF0100</th>
<th>VXF0120</th>
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<td>Locating Repeatability mm</td>
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<td>Stroke mm</td>
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<td></td>
<td>0.3</td>
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<tr>
<td>Max. Loading Weight kg</td>
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<td>40</td>
<td>60</td>
<td>80</td>
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<td>120</td>
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<tr>
<td>Horizontal Mounting</td>
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<td>200</td>
<td>300</td>
<td>400</td>
<td>500</td>
<td>600</td>
<td>800</td>
</tr>
<tr>
<td>Vertical Mounting</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Min. Tightening Force kN</td>
<td>1.2</td>
<td>1.4</td>
<td>1.5</td>
<td>1.8</td>
<td>2.0</td>
<td>2.5</td>
<td>3.0</td>
</tr>
<tr>
<td>Tightening Procedure</td>
<td>VXF-PD → VXF-PC</td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Operating Temperature °C</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0~70</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mass g</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Locating Pin</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>10</td>
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<td>25</td>
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<tr>
<td>Locating Bushing</td>
<td>4</td>
<td>7</td>
<td>10</td>
<td>11</td>
<td>22</td>
<td>36</td>
<td>50</td>
</tr>
</tbody>
</table>

Notes:
1. This product is made only for locating. It does not have clamping function. Tightening force is required when locating.
2. Minimum tightening force indicates the required tightening force (pressing force) per locating unit. (It is the required axial force when tightening the center of VXF with a bolt.)
   Tighten the mounting bolt with appropriate tightening torque. (Refer to P.19 for reference data of bolt axial force and tightening torque.)
   Tightening torque may differ according to bolt tensile strength grade / plate material. For further information, please refer to JIS B 1083, JIS B 1084 or catalogs of bolt makers.
**External Dimensions**

Locating Bushing: VXFD-B

**Machining Dimensions of Mounting Area**

Locating Bushing (VXFD-B) Side

Locating Pin (VXFD-P) Side

**Mounting Distance Accuracy**

Mounting Distance Accuracy ±0.02 or better

**VXF-PC Phase**

Notch for Phase Confirmation

Note:
1. If material of a base plate and pallet is different, BC machining tolerance should be ±0.02.
2. Prepare this hole for phase confirmation.
   The overlap of the notch and hole will confirm phase. Phasing becomes easier with a phase confirmation hole when using a parallel pin for mounting VXF-PC. (When using parallel pin, please take into account for the removal of the pin after phase alignment.)

3. Please align the notch of VXF-PC perpendicular to the center of VXF-PD.
**External Dimensions and Machining Dimensions for Mounting**

<table>
<thead>
<tr>
<th>Model No.</th>
<th>VXF0040</th>
<th>VXF0050</th>
<th>VXF0060</th>
<th>VXF0080</th>
<th>VXF0100</th>
<th>VXF0120</th>
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<tbody>
<tr>
<td>A</td>
<td>13.00</td>
<td>16.00</td>
<td>18.00</td>
<td>20.00</td>
<td>25.00</td>
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<td>8.3</td>
<td>8.8</td>
<td>10.8</td>
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<td>C</td>
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<td>H</td>
<td>M6 × 1</td>
<td>M8 × 1.25</td>
<td>M10 × 1.5</td>
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<td>13H6 ×</td>
<td>16H6 ×</td>
<td>18H6 ×</td>
<td>20H6 ×</td>
<td>25H6 ×</td>
<td>30H6 ×</td>
<td>35H6 ×</td>
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<td>13.00</td>
<td>16.00</td>
<td>18.00</td>
<td>20.00</td>
<td>25.00</td>
<td>30.00</td>
<td>35.00</td>
</tr>
<tr>
<td>BC</td>
<td>7</td>
<td>8</td>
<td>8.5</td>
<td>9</td>
<td>11</td>
<td>13</td>
<td>14</td>
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<tr>
<td>BD</td>
<td>0.5</td>
<td>0.8</td>
<td>0.8</td>
<td>1</td>
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<td>BE</td>
<td>4.2</td>
<td>4.5</td>
<td>5</td>
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<td>6.5</td>
<td>7.5</td>
<td>8.5</td>
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<tr>
<td>BF</td>
<td>4.3</td>
<td>5.3</td>
<td>6.8</td>
<td>9</td>
<td>11</td>
<td>14</td>
<td>18</td>
</tr>
<tr>
<td>BG</td>
<td>M5 × 0.8</td>
<td>M6 × 1</td>
<td>M8 × 1.25</td>
<td>M10 × 1.5</td>
<td>M12 × 1.75</td>
<td>M14 × 2</td>
<td>M20 × 2.5</td>
</tr>
<tr>
<td>CA</td>
<td>6.5H6 ×</td>
<td>8H6 ×</td>
<td>10H6 ×</td>
<td>12H6 ×</td>
<td>15H6 ×</td>
<td>18H6 ×</td>
<td>23H6 ×</td>
</tr>
<tr>
<td>CB</td>
<td>6.5 ×</td>
<td>8 ×</td>
<td>10 ×</td>
<td>12 ×</td>
<td>15 ×</td>
<td>18 ×</td>
<td>23 ×</td>
</tr>
<tr>
<td>CC</td>
<td>4.5</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>6</td>
<td>7</td>
<td>7</td>
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<td>3.5</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>5</td>
<td>5.5</td>
<td>5.5</td>
</tr>
<tr>
<td>CE</td>
<td>M4 × 0.7</td>
<td>M5 × 0.8</td>
<td>M6 × 1</td>
<td>M8 × 1.25</td>
<td>M10 × 1.5</td>
<td>M12 × 1.75</td>
<td>M16 × 2</td>
</tr>
</tbody>
</table>

Notes:
1. Special tool (Model: ZZV0010-□) or equivalent is required when inserting VXF□-□.
2. Mounting bolts are not included in this product.

### Mounting and Removing

**When Mounting**

- Special Tool for Inserting Locating Bushing (φ4)
- Washer or Equivalent
- Parallel Pin
- (Fixture)

**When Removing**

- Three Bolts (1/2" Pitch)
- Plate Cover

Note:

※4. Special tool (Model: ZZV0010-□) or equivalent is required when inserting VXF□-□.

Special tool (Model: ZZV0010-□) is not included with VXF□-□. Please order separately.
Accessory : Special Tool for Inserting Locating Bushing

Model No. Indication

**ZZV0010 - 060**

Size (See the table below)

Design No. (Revision Number)

External Dimensions (mm)

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
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<tr>
<td>DA</td>
<td>11.51618.5</td>
<td>20.325</td>
<td>30.535</td>
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<td>3 3 3 3 3 4 7</td>
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<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>DE</td>
<td>4 4.3 4.5 4.5 6 7 8</td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DZ (Chamfer)</td>
<td>C0.2 C0.4 C0.4 C0.4 C0.4 C0.4 C0.4</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note:

1. Special tool (Model: ZZV0010-□□□) or equivalent is required when inserting VXE0030-B / VXF■■-B. Please determine the number of tools required when ordering.
Reference Data: Mounting Jig

Sample jig design for mounting and phasing VXE0030-PC, VXF-PC with parallel pins.

External Dimensions (mm)

<table>
<thead>
<tr>
<th>Product Model</th>
<th>External Dimension</th>
</tr>
</thead>
<tbody>
<tr>
<td>VXE0030-PC</td>
<td>A (12 or more)</td>
</tr>
<tr>
<td>VXF0040-PC</td>
<td>B (12 or more)</td>
</tr>
<tr>
<td>VXF0050-PC</td>
<td>C (12 or more)</td>
</tr>
<tr>
<td>VXF0060-PC</td>
<td>D (12 or more)</td>
</tr>
<tr>
<td>VXF0070-PC</td>
<td>E (12 or more)</td>
</tr>
<tr>
<td>VXF0100-PC</td>
<td>F (12 or more)</td>
</tr>
<tr>
<td>VXF0120-PC</td>
<td>G (12 or more)</td>
</tr>
</tbody>
</table>

Mounting Bolt

- M3 (4.0)
- M4 (7.0)
- M5 (8.0)
- M6 (10.0)
- M8 (12.5)
- M10 (15.0)
- M12 (17.5)
- M16 (22.0)

Parallel Pin

- Ø 1 (8)
- Ø 1.5 (8)
- Ø 2 (8)
- Ø 2.5 (8)
- Ø 3 (8)
- Ø 4.0 (8)

Notes:
1. Determine the mounting bolt length according to screw length of base plate.
2. Determine the parallel pin length according to G dimension.

Reference Data: Removing Jig

Sample jig design for removing VXE0030-PD/PC, VXF-PC/PD/PC.

External Dimensions (mm)

<table>
<thead>
<tr>
<th>Product Model</th>
<th>External Dimension</th>
</tr>
</thead>
<tbody>
<tr>
<td>VXE0030-PD</td>
<td>A (40 or more)</td>
</tr>
<tr>
<td>VXF0040-PD</td>
<td>B (40 or more)</td>
</tr>
<tr>
<td>VXF0050-PD</td>
<td>C (40 or more)</td>
</tr>
<tr>
<td>VXF0060-PD</td>
<td>D (40 or more)</td>
</tr>
<tr>
<td>VXF0070-PD</td>
<td>E (40 or more)</td>
</tr>
<tr>
<td>VXF0100-PD</td>
<td>F (40 or more)</td>
</tr>
<tr>
<td>VXF0120-PD</td>
<td>G (40 or more)</td>
</tr>
</tbody>
</table>

AF Bolt

- M6 x 10 x 15 mm
- M8 x 10 x 16 mm
- M10 x 12 x 16 mm
- M12 x 17 x 20 mm
- M16 x 17 x 25 mm
- M20 x 22 x 30 mm

AG Bolt

- M6 x 1 x 10 mm
- M8 x 1 x 10 mm
- M10 x 1 x 10 mm
- M12 x 1 x 10 mm
- M16 x 1 x 10 mm

Screw Locator

- For Jack Up
- For Fastening Screw Locator and Jig

Removing Method

1. Use jack up bolt and remove the product parallel.
2. Able to prevent damage on the jig by using shims.

Other Removing Method

Turn the flat part of the jig with a spanner for jack up.
Reference Data: Bolt Axial Force and Tightening Torque (Torque Method)

Reference Calculation of Tightening Force (Axial Force). (Not a guaranteed value.)
This is extracted and edited from catalogs of Kyokuto MFG Co., Ltd. and Gosho Works Ltd.

**Allowable Max. Axial Force Calculation Formula**

\[
F_{f_{\text{max}}} = 0.7 \times \sigma y \times A_s
\]

**Appropriate Tightening Torque Calculation Formula**

\[
T_{FA} = \frac{0.35 \times K \times (1+1/Q) \times \sigma y \times A_s \times d}{1000}
\]


\[
F_{f} = \frac{Tr}{K \times d}
\]

*Note:* Tightening Torque [N·m]

<table>
<thead>
<tr>
<th>Nominal x Pitch</th>
<th>Bolt Effective Cross Section Area ( A_s ) [mm²]</th>
<th>Strength Grade 12.9</th>
<th>Yield Load [kN]</th>
<th>Allowable Max. Axial Force ( F_{f_{\text{max}}} ) [kN]</th>
<th>Appropriate Tightening Torque [kN]</th>
<th>Yield Load [kN]</th>
<th>Allowable Max. Axial Force ( F_{f_{\text{max}}} ) [kN]</th>
<th>Appropriate Tightening Torque [kN]</th>
</tr>
</thead>
<tbody>
<tr>
<td>M3 \times 0.5</td>
<td>5.03</td>
<td>5.5</td>
<td>3.8</td>
<td>1.7</td>
<td>(3.3)</td>
<td>4.7</td>
<td>3.3</td>
<td>1.4</td>
</tr>
<tr>
<td>M4 \times 0.7</td>
<td>8.78</td>
<td>9.6</td>
<td>6.7</td>
<td>3.9</td>
<td>(5.8)</td>
<td>8.3</td>
<td>5.8</td>
<td>3.3</td>
</tr>
<tr>
<td>M5 \times 0.8</td>
<td>14.2</td>
<td>15.6</td>
<td>10.9</td>
<td>7.9</td>
<td>(9.3)</td>
<td>13.4</td>
<td>9.3</td>
<td>6.8</td>
</tr>
<tr>
<td>M6 \times 1</td>
<td>20.1</td>
<td>22.1</td>
<td>15.5</td>
<td>13.5</td>
<td>(13.3)</td>
<td>18.9</td>
<td>13.2</td>
<td>11.6</td>
</tr>
<tr>
<td>M8 \times 1.25</td>
<td>36.6</td>
<td>40.2</td>
<td>28.1</td>
<td>32.8</td>
<td>(24.1)</td>
<td>34.4</td>
<td>24.1</td>
<td>28.0</td>
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<tr>
<td>M10 \times 1.5</td>
<td>58.0</td>
<td>63.7</td>
<td>44.6</td>
<td>65.0</td>
<td>(38.2)</td>
<td>54.5</td>
<td>38.2</td>
<td>55.6</td>
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<tr>
<td>M12 \times 1.75</td>
<td>84.3</td>
<td>92.6</td>
<td>64.8</td>
<td>114</td>
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<td>M16 \times 2</td>
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<td>121</td>
<td>281</td>
<td>(103)</td>
<td>148</td>
<td>103</td>
<td>241</td>
</tr>
</tbody>
</table>

Notes:
1. Tightening Condition: Tightened by torque wrench. Surface Oil Lubrication. Torque Coefficient \( K = 0.17 \), Tightening Coefficient \( Q = 1.4 \)
2. Torque coefficient and tightening coefficient may vary depending on the conditions of use. Use this table as a reference.
3. For further information, please refer to JIS B 1083, JIS B 1084 or catalogs of bolt makers.
4. This table is extracted and edited from the catalog of Kyokuto MFG Co., Ltd.
5. Tightening force [Reference] \( F_f \) is a reference value of tightening force (axial force) when tightening with appropriate tightening torque \( T_{FA} \).
6. Tightening force should be calculated from the actual tightening torque.
7. Consider the tightening torque and calculate the strength as the bolt seating surface must not depress tightened part.
Cautions

Cautions for Use

1) Bolt Tightening Procedure (Locating Action)
   Tighten the Screw Locator in order of Datum Pin (VXE/VXF-PD) → Cut Pin (VXE/VXF-PC).
   When using other bolt(s), tighten them in order of Datum Pin (VXE/VXF-PD) → Cut Pin (VXE/VXF-PC) → other bolt(s).

Cautions for Design

1) X-axis/Y-axis Locating
   ● The reference position (origin) is determined by Datum Pin (VXE/VXF-PD: for reference locating).
   ● Cut Pin (VXE/VXF-PC : for one direction locating) only locates in one direction (Y-axis direction).
   ● Please follow the illustration below for phase alignment of Cut Pin (VXE/VXF-PC).

VXE / VXF-PC Phase

- Please align the notch of VXE/VXF-PC perpendicular to the center of VXE/VXF-PC.

2) When the pallet is in vertical position.
   ● Please prepare and secure precautionary measures to prevent injury from fixture plate falling off.
   ● 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.
   ● Refer to the vertical mounting fixture specification of Max. allowable loading weight.

3) Reference Surface towards Z-axis
   ● Z-axis direction datum surface is determined by customer’s base plate and pallet specifications. Consider the accuracy when designing them, since it will affect accuracy of Z-axis direction.

4) Rough Guide Installation
   ● When setting up the fixture plate, prepare rough guides to prevent damaging taper surfaces on “Screw Locator”. Otherwise locating accuracy will be affected.

5) Check Specifications
   ● Locating is operated by hand.
   ● This product is made only for locating. It does not have clamping function.

6) Special Tool for Mounting VXE/VXF□-B.
   ● Special tool (Model : ZZV0010□) or equivalent is required when inserting VXE/VXF□-B (refer to P.17). Special tool (Model : ZZV0010□) is not included with VXE/VXF□-B. Please order separately.

7) Use Plain Washer
   ● When tightening a mounting bolt, use a plain washer to avoid damage on the seating surface.
Cautions

● Notes for Design (Continued)
8) For tightening (clamping) a point other than the VXE/VXF center.
● When tightening (clamping) a point other than the VXE/VXF center using external clamps, clamping force has to be greater than the minimum tightening force. Calculate required tightening force with the calculation formula below.

\[
\text{Required Tightening Force} \geq \frac{\text{Minimum Tightening Force} \times L_2 \times \text{Safety Factor (2 or more)}}{L_1}
\]

● If tightening (clamping) a point other than the VXE/VXF center when pallet or plate has low rigidity, it will deform the pallet or plate.

Notes on Handling
1) It should be handled by qualified personnel.
● The hydraulic and pneumatic equipment should be handled and maintained by qualified personnel.
2) Do not handle or remove the product unless the safety is ensured.
① The machine and equipment can only be inspected or prepared when it is confirmed that the preventative devices are in place.
② Please remove the product after the preventative devices are in place, the pressure source and power source are shut off, and no pressure exists in the hydraulic and air circuit.
③ After stopping the product, do not remove until it 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 the base plate or plate during bolt tightening. Otherwise, your hands may be injured due to clinching.

4) Do not disassemble or modify.
● If the product is taken apart or modified, the warranty will be voided even within the warranty period.
1) Maintenance • Inspection

- Removal of equipment and shutdown of pressure source
- Please remove the equipment after the preventative devices are in place. Ensure the pressure sources and power sources are shut off, and no pressure exists in the air circuits.
- Make sure there is no abnormality in the bolts and respective parts before restarting.

2) Clean out the Locating Pin/Locating Bushing regularly.
- Continuous use with dirt on components will lead to locating function failure.

3) Make sure Screw Locator is securely inserted.

4) Make sure there is smooth action and no abnormal noise.
- Especially when it is restarted after being left unused for a long period, make sure it can be operated properly.

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

6) Please contact us for overhaul and repair.

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.