Shaft Collars Guide
-Keyless Bushing Mechanism / Wedge Mechanism / Clamping Force Data-

Keyless Bushing Mechanism Features
- Clamping force increased up to 2.2 times (D35 is used for comparison).
- Easy installation in limited spaces
- 8 components are reduced by using the Sensor-less System.

Installation
(1) Clean (wipe off) shaft surface.
(2) Clean (wipe off) contact surface of the body and ring (nut) as well.
(4) After positioning the collar, tighten the locking screws with a torque wrench in a diagonal order, start tightly (approx. 1/4 of the specified tightening torque).
(5) Tighten the screws further to an increased torque (approximately 1.5x specified torque).

Wall Mechanism Features
- The screws pull a wedge and the shaft is clamped; this structure requires less force for tightening.

Cautions for Installation
- For Keyless Bushing Type, tighten the screws after the shaft is inserted.
- Insert sensor rail to a shaft centerhole in order to insert sensor rail to a shaft centerhole.
- Adjust tightening torque of Slit Type, Wedge Type and Keyless Bushing Type shaft collars.

Removal
- Be sure the system is completely shut down and stopped before beginning the work.
- Do not use lock screws other than those included.

Proposals for Parts Reduction
*Shaft collar is used as an origin of position.
*Reducer with an absolute encoder is used for this example.
*The Shaft collar is used as an origin of position.

Clamping Force Data
- Reduced parts count (in the case above)
- 3 Photo Sensors + (2) 1 Sensor Rail
- 3 Rail Mounting Screws + (4) 1 Sensor Flag
- Reduced parts count (in the case above)
- No breakdown by sensor disconnection
- Troubles from sensor errors can be reduced.
- Adjustments and maintenance can be reduced.

Table: Clamping Force Data

<table>
<thead>
<tr>
<th>Diameter</th>
<th>Nominal Tightening Torque (Nm)</th>
<th>IP Standard Type</th>
<th>SCML Type</th>
<th>Keyless Bushing Type - Nut Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>M3</td>
<td>1.6</td>
<td>2.0</td>
<td>1.1</td>
<td></td>
</tr>
<tr>
<td>M4</td>
<td>3.7</td>
<td>4.8</td>
<td>2.9</td>
<td></td>
</tr>
<tr>
<td>M5</td>
<td>4.1</td>
<td>5.3</td>
<td>3.5</td>
<td></td>
</tr>
<tr>
<td>M6</td>
<td>6.7</td>
<td>8.0</td>
<td>5.0</td>
<td></td>
</tr>
<tr>
<td>M8</td>
<td>13.1</td>
<td>14.3</td>
<td>8.0</td>
<td></td>
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<td>M10</td>
<td>25.5</td>
<td>27.4</td>
<td>11.5</td>
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<tr>
<td>M12</td>
<td>49</td>
<td>53</td>
<td>14.0</td>
<td></td>
</tr>
</tbody>
</table>

Keyless Bushing Type in Use

Advantages of sensor-less systems
- Reduced parts count (in the case above)
- 3 Photo Sensors + (2) 1 Sensor Rail
- 3 Rail Mounting Screws + (4) 1 Sensor Flag
- Reduced parts count (in the case above)
- No breakdown by sensor disconnection
- Troubles from sensor errors can be reduced.
- Adjustments and maintenance can be reduced.

Testing Condition
- Shaft: M20 (cadaver) Shaft, D28, Page P236
- Testing Instrument: Universal Tester
- Testing Conditions
- Tightening Torque (Nm)
- SCSA / SCSJ
- Specific Gravity 2017  Aluminum Alloy: 2.8, 1045 Carbon Steel: 7.9, 304 Stainless Steel: 8.0

Note 1. * marked are Compact Types only. (SCSJ, SSCSJ)