NSK Ball Screws for High-Load Drive
NSKTAC Series of Ball Screw Support Bearings for High-Load Applications
NSK Roller Guide RA Series

We have developed easy-to-use ball screws for high-load applications and now offer a wide variety of products suited for high-load drives. These ball screws enable the electric servo drive to operate under the most severe conditions.
Lineup of NSK Ball Screws for High-Load Drive

Best suited design for high-load applications
The best arrangement of the ball recirculation circuits and use of the largest possible ball have significantly contributed to the enhancement of high-load bearing characteristics. (Refer to pages 6 and 7 for details.)

As well as long shafts, a variety of shaft end configurations are available for high torque transmission.

Examples: Involute spline (JIS B 1603) Straight-sided spline (JIS B 1601) Keyways

There are high load capacity options available for the above ball screws for applications where a large load is applied with relatively short strokes.
Technical Description

1. Examples of Application

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</tr>
</tbody>
</table>

※ There are high load capacity options available for applications with large loads with relatively short strokes, such as press fitting machine. Please consult NSK.

2. Features

NSK high-load drive ball screws have maximized the ball diameter and increased the number of valid load balls for a design that can withstand a high load. They have achieved a high reliability through many different technologies including even load distribution. Technology for high-speed feeding and preserving the work environment have also been added to accommodate the needs of various devices requiring a large load and high reliability, such as hydraulic cylinder replacement.

- **High reliability**
  - In addition to high load design, all series are equipped with ball retaining piece S1 for preventing ball competition and helping even nut load distribution, and other original NSK technology to meet a high load bearing requirements.

- **High-speed feeding**
  - Feeding speed has been increased to improve efficiency of the machine and injection. Maximum speeds are 930 mm/s with a fine lead and 1,600 mm/s with a coarse lead.

- **High environmental properties**
  - With sophisticated seal technology, grease splattering has been reduced and less topping up is needed in response to ever increasing concerns for environment.

The chart below shows technologies used for each series to achieve high reliability, high-speed feeding and environmental consideration.

![Diagram showing technologies used for high load drive ball screws]
**Technical Description**

**2-1 High reliability**

**1 Design for high load**
NSK ball screws for high load drive have increased load capacity by maximizing the diameter of balls in relation to the lead, increasing the number of valid load balls and optimizing the shape of ball groove for a design that can withstand high load.

**2 Resin Retaining Piece NSK S1™**
A moment load caused by misalignment of a ball screw can hinder smooth motion of the balls, thus causing ball jamming in the ball recirculation circuits and adversely affecting the durability of the ball screw. By incorporating the resin retaining piece NSK S1™ between balls, NSK has greatly improved the durability of ball screws under a moment load.

**Durability test with continuous high load**

Test model: HTF10025-7.5
All load balls (without S1), and with S1

Test conditions:
- Load condition: Forward 200 kN, Back 20 kN
- Stroke: 70 mm, Cycle time: 9 sec
- Lubrication: Grease
- Temperature: Normal

Mounting error:
- Max. 0.03 mm
- 0.3 mm
- 0.3 mm

**3 Technology to evenly distribute nut load**
With ball screws that carry large loads, it is important to distribute the load evenly to each ball. NSK high-load drive ball screws have improved reliability with the load distribution technology described below.

**Theory of even load distribution 1 (applies to SRC and return tube types)**
Ball return tubes are located 180 degrees apart for equal load distribution to the balls.

**Minimum difference between upper and lower balls**

**Load distribution to balls**

[Diagram showing load distribution to balls with and without NSK S1™]
**Technical Description**

### Even load distribution [2]

With ball screws that carry a large load, the deformation of components (axis, nut) cannot be disregarded. Based on the load points adapted for screws and nuts in the illustration below (A) (recommended installation), the influence of contraction and expansion in the screw shaft and nut axial direction is offset and inner nut load is evenly distributed. To make these measures even more effective, axis and the cross section of nut are placed as close to each other as possible in HTF-SRC and HTF models.

### Options for high load capacity

#### Improving load bearing performance considerably

Load limits for high-load drive ball screws are

1. Allowable axial load (load limit beyond which stress on ball contact surface has extremely adverse effect on fatigue life)
2. Limit axial load (limit load of ball and axial groove contact surface reaching groove shoulder).

Through inner spec optimization, limit axial load can be up to 1.3 times greater than conventional high-load drive ball screws. These are suitable for applications where a large load is applied at relatively short strokes, such as sheet metal presses, press brakes, servo presses, mold presses, etc. Choices are made in consideration of balance between enhanced load bearing and service life. Please consult NSK.

#### A wide range of variations

Ball screws with this option are compatible with all types of high-load drive ball screws, such as HTF-SRC, HTF-SRD and grease-retaining A1 series in terms of size.

### High-speed feeding

#### 1 High d/n circulation route design

By smoothly picking up balls in the direction tangent to the screw groove, the impact of the balls colliding on other components will be reduced. d/n values (shaft diameter x number of rotations) for speed of circulation components is more than twice as fast as the conventional tube recirculation system.

#### 2 Ball groove shape for high speed

While rotating at a high speed, the ball collides with the axis at a high speed. With optimal-design ball grooves, pressure on the ball groove surface is minimized during ball collision, preventing shaft damage.

#### 3 Coarse lead setting

To achieve higher feeding, coarse lead setting is available (for example, shaft diameter 50 mm for a lead of 40 mm). This, along with high d/n values, enables a high speed feeding.
Technical Description

2-3 High environmental properties

1. Grease retaining A1 seal

Greatly improved grease retaining performance

Thanks to the special ball groove profile of the screw shaft together with the grease retaining A1 seal, the grease retaining characteristics have greatly improved compared with those of existing plastic seals.

Grease leakage at initial cycle operation
(Test piece: HTF-ASRC6316-10.5 with high-load grease with an extreme pressure additive [worked penetration: 300])

With conventional labyrinth seals
With grease retaining A1 seals

Suppresses grease scattering and preserves a clean environment

Use of the A1 seal greatly suppresses grease scattering, showing a significant improvement over the use of existing plastic seals. The A1 seal simplifies the design of your cover, helping to preserve a clean and healthy environment.

Grease splash after 100-cycle operation

Test conditions
Test piece: HTF-ASRC6316-10.5
Speed: 1 600 min⁻¹
Stroke: 500 mm
Lubrication: High-load grease with an extreme pressure additive

After initial run of 100 cycles at 200 min⁻¹, grease was wiped off from shaft OD, then photos were taken at the speed of 1600 min⁻¹.

With existing plastic seals
(stroke center area)
With grease retaining A1 seals
(stroke center area)

2. Low noise

Low friction torque and low-heat generation

The increase of dynamic torque caused by the A1 seal is very small (30 to 50 Ncm in case of ball screw with 80-mm diameter). This level of increase has practically no impact on the driving torque.

The practical temperature rise caused by the A1 seal is merely 2 to 3 deg C higher than that of existing plastic seals.

Construction of ball screw equipped with grease retaining A1 seal

By opening the discharge holes for running-in after grease supplementation, etc., excess grease is discharged. By removing excess grease, grease splatter in high-speed operation is reduced.

Grease retaining A1 seal
Grease drain hole

Low noise

By smoothly picking up balls in the screw shaft tangent direction, impact of ball collision on other components can be reduced. Compared to conventional tube type, the noise is reduced by over 6dB (A).
Technical Description

In use

1 Life of Ball Screw

Computational life, which is estimated by calculation, is the flaking life caused by rolling contact fatigue. The fatigue life of a ball screw can be estimated by basic dynamic load rating (Ca).

Basic dynamic load rating (Ca)

Basic dynamic load rating (Ca) is the axial load that allows 90% of a group of the same ball screws to rotate one million times (10^6 rev) under the same conditions without flaking occurring due to rolling contact fatigue. Basic dynamic load ratings (Ca) are shown in the dimension tables.

How to calculate fatigue life

The fatigue life of a ball screw is obtained by the following formula.

\[
L = \left( \frac{Ca}{Fa \cdot fw} \right)^3 \cdot 10^6
\]

\[
Lt = \frac{L}{60n}
\]

\[
Ls = \frac{L \cdot l}{10^6}
\]

*The load factor is decided by operating conditions. Consult NSK when impact and/or vibrations occur during the operation.

2 Conditions for attaching ball screws

With design aimed at high loads and even inner nut load distribution, NSK high-load drive ball screws have achieved high-load performance. (See page 7) To make the most of these features, installation according to the illustration below is recommended. The bolt holes of the installation surface in this catalog have been set on an assumption that load is received on the surface of the nut flange.

If there is drag load on the bolt for mounting ball screw, the strength of bolts should be carefully considered. Also make sure to center the ball screw with guides.

3 Cautions regarding lubrication

When using ball screws, lubricant needs to be replenished. As time passes, lubricant and its functions deteriorate. Lubricant inside of nuts is gradually discharged by stroke motions. Also, operating environments results in impurities in lubricant. Therefore, lubricant needs to be supplemented regularly.

[If high load is applied, use of load withstanding grease containing extreme pressure additives is recommended.]

4 Operating temperature

As the temperature of ball screws rises during use, the strength of the oil film of the lubricant decreases and there is a risk of inadequate lubrication. Be sure to use them at temperatures below 70 deg C (temperature at nut diameter). Contact NSK to ask about environments and use conditions that can easily become too hot.

Other

For other information on general technology of ball screws, see the section of ball screw technical explanations in the precision product catalog (CAT. No. 3162).
HTF-SRC Type

1 Specifications

Recirculation system: Equipped with SRC (Smooth Return Coupling)
By smoothly picking up balls in the direction tangent to the screw groove, feeding speed is twice as fast as the conventional tube recirculation system while the noise is half or less.

Allowed d·n value and feed speed
Lead 14 and 16 mm: 160 000 or less
Lead 20 and 25 mm: 140 000 or less

d·n: Shaft diameter d (mm) × Rotational speed n (min⁻¹)

<table>
<thead>
<tr>
<th>Lead (mm)</th>
<th>14</th>
<th>16</th>
<th>20</th>
<th>25</th>
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<td>100</td>
<td>—</td>
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<td>470</td>
<td>590</td>
</tr>
<tr>
<td>120</td>
<td>—</td>
<td>—</td>
<td>390</td>
<td>490</td>
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</table>

Unit [mm/s]

2 Design Precautions

Accuracy grade
C7 of JIS B 1192 (1997) is applicable as the standard accuracy grade.

Axial play
Standard axial play: 0.020 mm or less, or 0.050 mm or less

Optional specs
- High load capacity option to increase limit axial load.
  See page 7 for details.
- Consult NSK if the number of circuits is to be changed for a higher load capacity or circulation routes are to be placed on a single side.

3 Selection of Ball Screw

- Please refer to pages 11 and 12 for details on the operating life of the ball screw and instructions on installation and lubrication.
- Please consult NSK in the case of a short stroke operation less than or equal to four times the length of the ball screw lead, capacity or circulation routes are to be placed on a single side.

4 Operating Temperature

- Use temperature: 70 deg C maximum (temperature at nut diameter).
  Use at or below 60 deg C is recommended.

High-speed performance two times greater than existing products

Noise reduced by 6 dB (A) or more compared with return tube type
## HTF-SRC Type

### HTF-SRC Type Specifications

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<tr>
<th>Model No.</th>
<th>Lead (i)</th>
<th>Shaft dia. (d)</th>
<th>Root dia. (d_r)</th>
<th>Effective ball turns</th>
<th>Nut model</th>
<th>Basic load rating (kN)</th>
<th>Ball nut dimensions</th>
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</table>

Remarks:
1. The ball nut length with no seals is shorter by \(M\) than that of a ball nut with seals.
2. Please consult NSK if load exceeds the allowable axial load \(Fa_{\text{max.}}\).
3. The right hand screw is the standard. For specifications on left hand screws, contact NSK.
4. The allowable axial load \(Fa_{\text{max.}}\) is determined in accordance with the mounting conditions of ball screws recommended by NSK. Refer to page 12 for the mounting conditions. If your mounting conditions differ from those provided, please consult NSK.
# HTF-SRD Type

## Specifications

### Recirculation system: Equipped with end deflector
By smoothly picking up balls in the direction tangent to the screw groove, feeding speed is twice as fast as the conventional tube recirculation system while the noise is half or less.

### Allowable d·n value and feed speed

d·n: 120,000 or less

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Unit [mm/s]

### Accuracy grade
C7 of JIS B 1192 (1997) is applicable as the standard accuracy grade.

### Axial play
Standard axial play: 0.020 mm or less, or 0.050 mm or less

### Seal
The ball nut length is shortened by the use of thin seals.

### Option
High load capacity option to increase limit axial load. See page 7 for details. Please consult NSK if you are considering nut rotation.

## Design Precautions

1. When designing the shaft ends, one end of the screw shaft must have ball groove cut through to the shaft end or the ball groove root diameter must be dr or less (see dimension chart), otherwise the ball nut cannot be installed on the screw shaft.
2. Please consult NSK with your special design requirements.

## Selection of Ball Screw

- Please refer to pages 11 and 12 for details on the operating life of the ball screw and instructions on installation and lubrication.
- Please consult NSK in the case of a short stroke operation less than or equal to four times the length of the ball screw lead. Capacity or circulation routes are to be placed on a single side.

## Operating Temperature

- Use temperature: 70 deg C maximum (temperature at nut diameter). Use at or below 60 deg C is recommended.
**Remarks:**
1. Please consult NSK if load exceeds the allowable axial load (Fa max.).
2. The right-hand screw is the standard. For specifications on left-hand screws, contact NSK.
3. The allowable axial load (Fa max.) is determined in accordance with the mounting conditions of ball screws recommended by NSK.
   Refer to page 12 for the mounting conditions. If your mounting conditions differ from those provided, please consult NSK.

**HTF-SRD Type Specifications**

<table>
<thead>
<tr>
<th>Model No.</th>
<th>Lead</th>
<th>Shaft dia.</th>
<th>Root dia.</th>
<th>Basic load rating (kN)</th>
<th>Ball nut dimensions</th>
<th>Allowable axial load (Fa max.) (kN)</th>
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<td></td>
<td>( \ell )</td>
<td>( d_f )</td>
<td>( d_r )</td>
<td>( C_s )</td>
<td>( C_{a s} )</td>
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<td>115</td>
</tr>
<tr>
<td>HTF-SRD5040-8E</td>
<td>40</td>
<td>50</td>
<td>39</td>
<td>319</td>
<td>679</td>
<td>115</td>
</tr>
<tr>
<td>HTF-SRD6340-6E</td>
<td>40</td>
<td>63</td>
<td>49</td>
<td>363</td>
<td>768</td>
<td>140</td>
</tr>
<tr>
<td>HTF-SRD6340-8E</td>
<td>40</td>
<td>63</td>
<td>49</td>
<td>476</td>
<td>1 060</td>
<td>140</td>
</tr>
<tr>
<td>HTF-SRD8050-6E</td>
<td>50</td>
<td>80</td>
<td>63</td>
<td>502</td>
<td>1 180</td>
<td>175</td>
</tr>
<tr>
<td>HTF-SRD8050-8E</td>
<td>50</td>
<td>80</td>
<td>63</td>
<td>658</td>
<td>1 630</td>
<td>175</td>
</tr>
<tr>
<td>HTF-SRD10060-6E</td>
<td>60</td>
<td>100</td>
<td>83</td>
<td>583</td>
<td>1 490</td>
<td>195</td>
</tr>
<tr>
<td>HTF-SRD10060-8E</td>
<td>60</td>
<td>100</td>
<td>83</td>
<td>765</td>
<td>2 060</td>
<td>195</td>
</tr>
<tr>
<td>HTF-SRD12070-6E</td>
<td>70</td>
<td>120</td>
<td>103</td>
<td>826</td>
<td>2 520</td>
<td>210</td>
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<tr>
<td>HTF-SRD12070-8E</td>
<td>70</td>
<td>120</td>
<td>103</td>
<td>826</td>
<td>2 520</td>
<td>210</td>
</tr>
</tbody>
</table>
# HTF-ASRC Type and HTF-ASRD Type

## Equipped with Grease Retaining A1 Seal

### Specifications

- **Equipped with grease retaining A1 seal**
  The optimum design of the A1 seal (patent applied for and pending) allows superior grease retaining performance.

- **Recirculation system: Equipped with SRC or end deflector**
  These ball screws are used with the SRC or the end deflector recirculation system, which pick up balls smoothly in the direction they are moving.

### Allowable d·n value and feed speed

<table>
<thead>
<tr>
<th>Lead (mm)</th>
<th>Shaft dia. (mm)</th>
<th>HTF-ASRC Type</th>
<th>HTF-ASRD Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>16</td>
<td>60</td>
<td>860</td>
<td>—</td>
</tr>
<tr>
<td>20</td>
<td>63</td>
<td>680</td>
<td>740</td>
</tr>
<tr>
<td>25</td>
<td>80</td>
<td>540</td>
<td>590</td>
</tr>
<tr>
<td>32</td>
<td>100</td>
<td>—</td>
<td>470</td>
</tr>
<tr>
<td>40</td>
<td>120</td>
<td>—</td>
<td>—</td>
</tr>
</tbody>
</table>

### Accuracy grade

C7 of JIS B 1192 (1997) is applicable as the standard accuracy grade.

### Axial play

Standard axial play: 0.020 mm or less, 0.050 mm or less

### Option

High load capacity option to increase limit axial load. See page 7 for details.

## Design Precautions

1. When designing the shaft ends, one end of the screw shaft must have ball groove cut through to the shaft end or the ball groove root diameter must be dr or less (see dimension chart), otherwise the ball nut cannot be installed on the screw shaft.
2. The table below shows the maximum length of screw shaft for the equipment of the A1 seal.
3. Please contact NSK with your special design requirements.

### Selection of Ball Screw

- Please refer to pages 11 and 12 for details on the operating life of the ball screw and instructions on installation and lubrication.
- Please consult NSK in the case of a short stroke operation less than or equal to four times the length of the ball screw lead.

### Environmental Conditions

- Use temperature: 70 deg C maximum (temperature at nut diameter). Use at or below 60 deg C is recommended.
- Never use in an environment where degreasing solvents are present.
- Examples: grease-removing organic solvent such as hexane or thinner, white kerosine, rust preventive oil (containing white kerosine)
**HTF-ASRC Type**

### HTF-ASRC Type Specifications

<table>
<thead>
<tr>
<th>Model No.</th>
<th>Lead ( \ell )</th>
<th>Shaft dia. ( d )</th>
<th>Root dia. ( d_r )</th>
<th>Effective ball turns per circuits</th>
<th>Nut model</th>
<th>Basic load rating ( [kN] )</th>
<th>Ball nut dimensions</th>
<th>Allowable axial load ( F_a ) max. ( [kN] )</th>
</tr>
</thead>
<tbody>
<tr>
<td>HTF-ASRC8020-7.5</td>
<td>25</td>
<td>80</td>
<td>69</td>
<td>35.3x</td>
<td>1</td>
<td>950</td>
<td>2 490</td>
<td>120</td>
</tr>
<tr>
<td>HTF-ASRC8025-7.5</td>
<td>25</td>
<td>80</td>
<td>69</td>
<td>35.3x</td>
<td>1</td>
<td>780</td>
<td>1 770</td>
<td>117</td>
</tr>
<tr>
<td>HTF-ASRC8025-10.5</td>
<td>25</td>
<td>100</td>
<td>86</td>
<td>35.3x</td>
<td>1</td>
<td>1 300</td>
<td>4 200</td>
<td>173</td>
</tr>
</tbody>
</table>

**Remarks:**
1. Drain holes shall be plugged for shipping.
2. The right hand screw is the standard. For specifications on left hand screws, contact NSK.
3. The allowable axial load \( F_a \) max. is determined in accordance with the mounting conditions of ball screws recommended by NSK.
4. Refer to page 12 for the mounting conditions. If your mounting conditions differ from these provided, please consult NSK.
HTF-ASRD Type

Outline drawing

HTF-ASRD Type Specifications

<table>
<thead>
<tr>
<th>Model No.</th>
<th>Lead</th>
<th>Shaft dia.</th>
<th>Root dia.</th>
<th>Basic load rating (kN)</th>
<th>Ball nut dimensions</th>
<th>Allowable axial load Fa max. (kN)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>d</td>
<td>d_r</td>
<td>d_t</td>
<td>Dynamic C_d, Static C_0_d</td>
<td>D, A, B, L, H, W, X, Q, T_1, T_2, S, S_1, S_2</td>
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</tr>
<tr>
<td>HTF-ASRD6332-4E</td>
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<td>63</td>
<td>49</td>
<td>292, 590</td>
<td>140, 190, 36, 186, 85, 165, 14, Rc1/8, 85.1, —, Rc1/4, 23.5, 138, 72.6</td>
<td></td>
</tr>
<tr>
<td>HTF-ASRD5040-6E</td>
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<td>50</td>
<td>39</td>
<td>243, 491</td>
<td>115, 165, 34, 172, 72.5, 140, 14, Rc1/8, 75.7, 20, Rc1/4, 24, 123.5, 67.6</td>
<td></td>
</tr>
<tr>
<td>HTF-ASRD5040-8E</td>
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<td>50</td>
<td>39</td>
<td>319, 679</td>
<td>115, 165, 34, 212, 72.5, 140, 14, Rc1/8, 95.7, 20, Rc1/4, 24, 163.5, 92.0</td>
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</tr>
<tr>
<td>HTF-ASRD6340-6E</td>
<td>40</td>
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<td>49</td>
<td>363, 768</td>
<td>140, 200, 36, 176, 90, 170, 18, Rc1/8, 77.6, 20, Rc1/4, 24, 127.5, 108.3</td>
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<tr>
<td>HTF-ASRD6340-8E</td>
<td>40</td>
<td>63</td>
<td>49</td>
<td>476, 1 060</td>
<td>140, 200, 36, 216, 90, 170, 18, Rc1/8, 97.6, 20, Rc1/4, 24, 167.5, 144.7</td>
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</tr>
<tr>
<td>HTF-ASRD8050-6E</td>
<td>50</td>
<td>80</td>
<td>63</td>
<td>502, 1 180</td>
<td>175, 250, 40, 208, 110, 210, 22, Rc1/8, 91.1, 25, Rc1/4, 26, 156, 163.7</td>
<td></td>
</tr>
<tr>
<td>HTF-ASRD8050-8E</td>
<td>50</td>
<td>80</td>
<td>63</td>
<td>658, 1 630</td>
<td>175, 250, 40, 258, 110, 210, 22, Rc1/8, 116.1, 25, Rc1/4, 26, 206, 224.1</td>
<td></td>
</tr>
<tr>
<td>HTF-ASRD10060-6E</td>
<td>60</td>
<td>100</td>
<td>83</td>
<td>583, 1 490</td>
<td>195, 270, 40, 239, 122, 235, 22, Rc1/8, 104.5, 30, Rc1/4, 26, 187, 211.5</td>
<td></td>
</tr>
<tr>
<td>HTF-ASRD10060-8E</td>
<td>60</td>
<td>100</td>
<td>83</td>
<td>765, 2 060</td>
<td>195, 270, 40, 299, 122, 235, 22, Rc1/8, 134.5, 30, Rc1/4, 26, 247, 288</td>
<td></td>
</tr>
</tbody>
</table>

Remarks:
1. Drain holes shall be plugged for shipping.
2. The right hand screw is the standard. For specifications on left hand screws, contact NSK.
3. The allowable axial load Fa max. is determined in accordance with the mounting conditions of ball screws recommended by NSK.

Refer to page 12 for the mounting conditions. If your mounting conditions differ from those provided, please consult NSK.

Unit [mm]
HTF-SRE Type

1 Specifications

<table>
<thead>
<tr>
<th>Recirculation system: picking up balls in the direction tangent to deflector</th>
</tr>
</thead>
<tbody>
<tr>
<td>By smoothly picking up balls in the direction of the screw groove tangent, feeding speed is 1.4 to 2 times as fast as the conventional tube recirculation system.</td>
</tr>
</tbody>
</table>

![Diagram of recirculation system](image)

<table>
<thead>
<tr>
<th>Allowable d-n value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Allowable d-n value 100,000</td>
</tr>
<tr>
<td>d-n value: shaft diameter d [mm] × rotations n [min⁻¹]</td>
</tr>
</tbody>
</table>

| Allowable feed speed of combinations of shaft diameter and lead | Unit [mm] |
|---|---|---|---|---|---|
| Shaft dia. | Lead | 25 | 30 | 70 | 80 |
| 140 | 25 | | | | |
| 160 | 25 | | | | |
| 200 | 25 | | | | |
| | | | | | |
| | | | | | |

- Please consult NSK about ball nut shape and dimensions.
- A double-screw can be used for leads of 90mm and more.

2 Design Precautions

- Accuracy grade
  - Cl7 of JIS B 1192 (1997) is applicable as the standard accuracy grade.

- Axial play
  - Standard axial play: 0.050 mm or less

- Option
  - High load capacity option to increase limit axial load. See page 7 for details.
  - Consult NSK if the number of circuits is to be changed for a higher load capacity or circulation routes are to be placed on a single side.

3 Selection of Ball Screw

- Please refer to pages 11 and 12 for details on the operating life of the ball screw and instructions on installation and lubrication.
- Please consult NSK in the case of a short stroke operation less than or equal to four times the length of the ball screw lead capacity or circulation routes are to be placed on a single side.

4 Operating Temperature

- Use temperature: 70 deg C maximum (temperature at nut diameter).
HTF Type

1 Specifications

Allowable d·n value and feed speed

<table>
<thead>
<tr>
<th>Lead</th>
<th>20 mm or less</th>
<th>25 mm</th>
<th>30 to 32 mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standard</td>
<td>≥70 000</td>
<td>≥70 000</td>
<td>≥50 000</td>
</tr>
<tr>
<td>High-speed</td>
<td>≥100 000</td>
<td>—</td>
<td>—</td>
</tr>
</tbody>
</table>

*d·n: Shaft diameter d (mm) x Rotational speed (min⁻¹)

For even faster specs, HTF-SRC is recommended (See pages 13-16 for details).

2 Design Precautions

1) When designing the shaft ends, one end of the screw shaft must have a ball groove cut through to the shaft end or the ball groove root diameter must be d or less (see dimension chart), otherwise the ball nut cannot be installed on the screw shaft.

2) Please consult NSK with your special design requirements.

3 Selection of Ball Screw

- Please refer to pages 11 and 12 for details on the operating life of the ball screw and instructions on installation and lubrication.
- Please consult NSK in the case of a short stroke operation less than or equal to four times the length of the ball screw lead.

4 Operating Temperature

- Use temperature: 70 deg C maximum (temperature at nut diameter)

Accuracy grade

C7 of JIS B 1192 (1997) is applicable as the standard accuracy grade.

Axial play

Standard axial play: 0.020 mm or less, or 0.050 mm or less

Optional specs

- High load capacity option to increase limit axial load.
  See page 7 for details.
- Consult NSK if the number of circuits is to be changed for a higher load capacity or circulation routes are to be placed on a single side.
**HTF Type**

**HTF Type Specifications**

<table>
<thead>
<tr>
<th>Model No.</th>
<th>Lead ( \ell )</th>
<th>Shaft dia. ( d )</th>
<th>Root dia. ( d_r )</th>
<th>Effective ball turns ( T ) × Circuits</th>
<th>Nut model</th>
<th>Basic load rating ( [kN] )</th>
<th>Ball nut dimensions</th>
<th>Allowable axial load ( F_a ) max. ( [kN] )</th>
</tr>
</thead>
<tbody>
<tr>
<td>HTF3210-5</td>
<td>10</td>
<td>32</td>
<td>25.6</td>
<td>2.5×2</td>
<td>I</td>
<td>88.7 169 58 92 18 103 7 75 9 40.5 42 82 M6×1 36.5 30 20.3</td>
<td></td>
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<tr>
<td>HTF3610-5</td>
<td>10</td>
<td>36</td>
<td>29.6</td>
<td>2.5×2</td>
<td>I</td>
<td>96.1 191 62 96 18 103 7 79 9 43 45 87 M6×1 36.5 30 23.4</td>
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<tr>
<td>HTF4010-7.5</td>
<td>10</td>
<td>40</td>
<td>33.6</td>
<td>2.5×3</td>
<td>II</td>
<td>149 344 66 100 18 143 7 83 9 45 48 91 M6×1 46.5 30 39.6</td>
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</tr>
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<td>HTF4510-7.5</td>
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<td>45</td>
<td>38.6</td>
<td>2.5×3</td>
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<td>158 386 70 104 18 143 7 87 9 47 52 95 M6×1 48.5 30 45.3</td>
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<tr>
<td>HTF5010-7.5</td>
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<td>43.6</td>
<td>2.5×3</td>
<td>II</td>
<td>166 435 75 109 18 143 7 92 9 49 57 99 M6×1 48.5 30 60.4</td>
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<tr>
<td>HTF5010-10</td>
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<td>43.6</td>
<td>2.5×4</td>
<td>II</td>
<td>213 580 75 109 18 173 7 92 9 49 57 99 M6×1 48.5 30 61.0</td>
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</tr>
<tr>
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<td>173 477 80 114 18 143 7 97 9 51.5 62 104 M6×1 46.5 30 60.7</td>
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<td>HTF5510-10</td>
<td>10</td>
<td>55</td>
<td>48.6</td>
<td>2.5×4</td>
<td>II</td>
<td>222 636 80 114 18 173 7 97 9 51.5 62 104 M6×1 46.5 30 74.2</td>
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<td>36</td>
<td>29</td>
<td>2.5×2</td>
<td>I</td>
<td>112 228 66 100 22 123 8 83 9 46.5 46 94 M6×1 44 36 28.3</td>
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</tr>
<tr>
<td>HTF6012-7.5</td>
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<td>40</td>
<td>33</td>
<td>2.5×3</td>
<td>II</td>
<td>184 422 70 104 22 171 8 87 9 47.5 50 96 M6×1 56 36 48.0</td>
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<tr>
<td>HTF6012-10</td>
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<td>45</td>
<td>38</td>
<td>2.5×3</td>
<td>II</td>
<td>195 473 72 106 22 171 8 89 9 49.5 54 100 M6×1 56 36 55.0</td>
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<tr>
<td>HTF6512-7.5</td>
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<td>50</td>
<td>43</td>
<td>2.5×3</td>
<td>II</td>
<td>205 525 77 111 22 171 8 94 9 52 59 105 M6×1 56 36 62.0</td>
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<td>2.5×4</td>
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<td>263 700 77 111 22 207 8 94 9 52 59 105 M6×1 56 36 82.7</td>
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<tr>
<td>HTF6512-10</td>
<td>12</td>
<td>55</td>
<td>48</td>
<td>2.5×3</td>
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<td>214 586 82 116 22 171 8 99 9 54.5 63 110 M6×1 56 36 69.1</td>
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<tr>
<td>HTF6512-10</td>
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<td>55</td>
<td>48</td>
<td>2.5×4</td>
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<td>274 781 82 116 22 207 8 99 9 54.5 63 110 M6×1 56 36 82.1</td>
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</tr>
<tr>
<td>HTF6312-7.5</td>
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<td>63</td>
<td>56</td>
<td>2.5×3</td>
<td>II</td>
<td>227 688 92 126 22 171 8 109 9 58.5 70 118 M6×1 56 36 80.3</td>
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</tr>
<tr>
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<td>63</td>
<td>56</td>
<td>2.5×4</td>
<td>II</td>
<td>290 891 92 126 22 207 8 109 9 58.5 70 118 M6×1 56 36 107.1</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Remarks:
1. The ball nut length with no seals is shorter by \( M \) than that of a ball nut with seals.
2. Please consult NSK if load exceeds the allowable axial load \( F_a \) max.
3. The allowable axial load \( F_a \) max. is determined in accordance with the mounting conditions of ball screws recommended by NSK. Refer to page 12 for the mounting conditions. If your mounting conditions differ from those provided, please consult NSK.

Unit \([\text{mm}]\)

<table>
<thead>
<tr>
<th>( D )</th>
<th>( A )</th>
<th>( B )</th>
<th>( L )</th>
<th>( M )</th>
<th>( W )</th>
<th>( X )</th>
<th>( U )</th>
<th>( V )</th>
<th>( Dh )</th>
<th>( Q )</th>
<th>( T_1 )</th>
<th>( T_2 )</th>
</tr>
</thead>
<tbody>
<tr>
<td>891</td>
<td>92</td>
<td>126</td>
<td>22</td>
<td>171</td>
<td>8</td>
<td>109</td>
<td>9</td>
<td>58.5</td>
<td>70</td>
<td>118</td>
<td>56</td>
<td>36</td>
</tr>
</tbody>
</table>

NSK Ball Screws for High-Load Drive

HTF Type
## HTF Type

### Outline drawing

![HTF Type Diagram](image)

### HTF Type Specifications

<table>
<thead>
<tr>
<th>Model No.</th>
<th>Lead</th>
<th>Shaft dia.</th>
<th>Root dia.</th>
<th>Effective ball turns × Circuits</th>
<th>Nut model</th>
<th>Basic load rating (kN)</th>
<th>Ball nut dimensions</th>
<th>Allowable axial load Fa max. (kN)</th>
</tr>
</thead>
<tbody>
<tr>
<td>HTF5514-7.5</td>
<td>14</td>
<td>55</td>
<td>46.7</td>
<td>2.5x3</td>
<td>Ⅲ</td>
<td>270 696 85 119 28 200 10 102 9 57.5 65 116 M6x1 66.5 42 81.2</td>
<td></td>
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<tr>
<td>HTF6314-7.5</td>
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<td>63</td>
<td>54.7</td>
<td>2.5x3</td>
<td>Ⅲ</td>
<td>291 800 94 128 28 200 10 111 9 61.5 72 124 M6x1 66.5 42 93.5</td>
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</tr>
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<td>63</td>
<td>54.7</td>
<td>2.5x4</td>
<td>Ⅲ</td>
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<td>Ⅲ</td>
<td>327 1 020 116 150 28 200 10 133 9 72 87 146 M6x1 66.5 42 121.9</td>
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</tr>
<tr>
<td>HTF8014-10</td>
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<td>80</td>
<td>71.7</td>
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<td>732 2 730 173 213 32 275 10 193 11 104 126 210 Rc1/8 77 48 331.9</td>
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</table>

Remarks:
1. The ball nut length with no seals is shorter by M than that of a ball nut with seals.
2. Please consult NSK if load exceeds the allowable axial load Fa max.
3. The allowable axial load Fa max is determined in accordance with the mounting conditions of ball screws recommended by NSK.
4. Refer to page 12 for the mounting conditions. If your mounting conditions differ from those provided, please consult NSK.

Unit [mm]
HTF Type

Refer to page 12 for the mounting conditions. If your mounting conditions differ from those provided, please consult NSK.

HTF Type Specifications

<table>
<thead>
<tr>
<th>Model No.</th>
<th>Lead ( \ell )</th>
<th>Shaft dia. ( d )</th>
<th>Root dia. ( d_r )</th>
<th>Effective ball turns ( N \times ) Circuits</th>
<th>Nut model</th>
<th>Basic load rating ( [kN] )</th>
<th>Ball nut dimensions</th>
<th>Allowable axial load ( Fa_{max.} ) ( [kN] )</th>
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Remarks:
1. The ball nut length with no seals is shorter by \( \ell \) than that of a ball nut with seals.
2. Please consult NSK if load exceeds the allowable axial load \( Fa_{max.} \).
3. The allowable axial load \( Fa_{max.} \) is determined in accordance with the mounting conditions of ball screws recommended by NSK.
4. Refer to page 12 for the mounting conditions. If your mounting conditions differ from those provided, please consult NSK.
### HTF Type Specifications

<table>
<thead>
<tr>
<th>Model No.</th>
<th>Lead</th>
<th>Shaft dia.</th>
<th>Root dia.</th>
<th>Effective ball turns</th>
<th>Nut model</th>
<th>Basic load rating (kN)</th>
<th>Ball nut dimensions</th>
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<td>Fa max. 1 079.2</td>
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Remarks:
1. The ball nut length with no seals is shorter by 1° than that of a ball nut with seals.
2. Please consult NSK if load exceeds the allowable axial load (Fa max.).
3. The allowable axial load (Fa max.) is determined in accordance with the mounting conditions of ball screws recommended by NSK.

Refer to page 12 for the mounting conditions. If your mounting conditions differ from those provided, please consult NSK.
High-load ball screws for injection molding machine ejectors

Ball screws exclusively designed for ejector mechanism contribute to the compact design of the device.

More compact, high-load volume

Compared with conventional ball screws (generally used with ejectors), these have achieved a higher load capacity. This means smaller ball screws, contributing to the compact design of the device.

Grease splatter reduction

An exclusive design for seal and ball groove has reduced grease leakage and splattering.

Specifications

Accuracy grade

Ct7 of JIS B 1192 (1197) is applicable as the standard accuracy grade.

Axial play

Standard axial play: 0.050 mm or less

Optional specs

The nut shape can be adapted for tube push-out specs. Please consult NSK.

Design Precautions

When designing the shaft ends, one end of the screw shaft must have ball groove cut through to the shaft end or the ball groove root diameter must be dr or less (see dimension chart), otherwise the ball nut cannot be installed on the screw shaft.

Outline view

<table>
<thead>
<tr>
<th>Model No.</th>
<th>Lead (mm)</th>
<th>Nut dia. (mm)</th>
<th>Circuits</th>
<th>Basic load rating</th>
<th>Ball nut dimensions</th>
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<tbody>
<tr>
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<td>2.5×2</td>
<td>66.2 [kN]</td>
<td>L: 169, W: 86</td>
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</table>

Note: All are right-hand screws.
NSKTAC Series of Ball Screw Support Bearings for High-Load Applications

Standard Series and Special Bore Diameter Series of Ball Screw Support Bearings for High-Load Applications

NSKHPS™ Angular Contact Thrust Ball Bearings of Ball Screw Support Bearings for High-Load Drive Applications

Extended bearing life and higher axial-load capacity
- Limiting axial load has increased by 1.5 times compared with that of conventional bearings.
- Bearing life has increased by 1.3 times compared with that of conventional bearings.

Special bore diameter series facilitates downscaling of screw shaft end
Extended bearing life and higher axial-load capacity

Extended bearing life and higher axial-load capacity

Longer bearing life and higher axial load capacity have been achieved by optimization of the bearing’s internal design, thus enabling the reduction in number of combined rows.

Comparison of limiting axial load

Comparison of basic dynamic load ratings

Axial load capacity has increased by 1.5 times compared with that of conventional bearings.

The DBD arrangement can be used instead of a DBT arrangement.

Special bore diameter series facilitates downscaling of screw shaft end

The special bore diameter series is designed with an outer ring outside diameter and width that are the same as those of the standard series, but with a bore diameter that is smaller. Therefore, the dimension of the shaft end of the screw can be shortened while maintaining the same basic load rating.

Example: Reduced number of combined rows

Example: Mounting of special bore diameter series

Formulation of Bearing Numbers

Standard series

Example:

T85: Angular contact thrust ball bearing

Special bore diameter series

Example:

TAC: Angular contact thrust ball bearing

Legend:

Bearing type symbol
Dimension symbol
Accuracy symbol
Arrangement symbol
Cage symbol
Bore diameter (mm)
Basic dynamic load rating (kN)
Internal design symbol
Preload symbol
Contact angle 55°
Angular contact thrust ball bearing
SU: Universal matching for single row
M: Medium preload
PN5D: Standard accuracy (ISO class 5 equivalent)
M: Standard preload
SU: SU-Universal matching for single row
contact angle 55°
T85: T85-Polyamide resin cage
T85: Polyamide resin cage
NSK Ball Screws for High-Load Drive

### NSK Ball Screws for High-Load Drive

#### NSK TAC Series of Ball Screw Support Bearings for High-Load Applications

> Dynamic equivalent load
> Angular contact thrust ball bearings for equipment such as electric injection molding machines are subjected to extremely large axial loads (Fz) in comparison to radial loads (Fy).

Therefore, the dynamic equivalent load P of the support bearing is obtained by the following formula regardless of the number of rows:

\[
P = 0.8F \times F_z
\]

### Standard series

<table>
<thead>
<tr>
<th>Bearing numbers</th>
<th>Boundary dimensions (mm)</th>
<th>Dimensions (mm)</th>
<th>Numerical amount invested of Imperial (piece)</th>
<th>Contact angle</th>
<th>Limiting load (Fz) (kN)</th>
<th>Preload (in lb)</th>
<th>ANGLE (deg)</th>
<th>Basic load rating of contact angle (Cdb) (kN)</th>
<th>Limiting axial load by number of rows sustaining Fz</th>
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<td>10TAC20D</td>
<td>15 x 35 x 11.0 x 0.6</td>
<td>19.1 x 24.5</td>
<td>25.8 x 31.9</td>
<td>15 x 5.5</td>
<td>0.4 x 0.047</td>
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<td>200</td>
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#### Special bore diameter series

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<thead>
<tr>
<th>Bearing numbers</th>
<th>Boundary dimensions (mm)</th>
<th>Dimensions (mm)</th>
<th>Numerical amount invested of Imperial (piece)</th>
<th>Contact angle</th>
<th>Limiting load (Fz) (kN)</th>
<th>Preload (in lb)</th>
<th>ANGLE (deg)</th>
<th>Basic load rating of contact angle (Cdb) (kN)</th>
<th>Limiting axial load by number of rows sustaining Fz</th>
</tr>
</thead>
<tbody>
<tr>
<td>TAC202D</td>
<td>20 x 52 x 15.1 x 1.1</td>
<td>27.2 x 35.3</td>
<td>37.5 x 46.1</td>
<td>20.7 x 5.5</td>
<td>0.8 x 8.300</td>
<td>630</td>
<td>430</td>
<td>6.5 x 7700</td>
<td>0.026</td>
</tr>
<tr>
<td>TAC302D</td>
<td>30 x 62 x 17.1 x 1.1</td>
<td>32.4 x 40.6</td>
<td>48.5 x 58.0</td>
<td>30.4 x 5.5</td>
<td>1.3 x 137.7</td>
<td>690</td>
<td>430</td>
<td>7.5 x 7700</td>
<td>0.036</td>
</tr>
<tr>
<td>TAC402D</td>
<td>40 x 90 x 23.1 x 1.5</td>
<td>50.4 x 64.2</td>
<td>67.1 x 81.7</td>
<td>40.4 x 5.5</td>
<td>1.8 x 4600</td>
<td>2500</td>
<td>750</td>
<td>9.0 x 16300</td>
<td>0.26</td>
</tr>
<tr>
<td>TAC502D</td>
<td>50 x 110 x 27.2 x 2.1</td>
<td>62.7 x 79.1</td>
<td>82.4 x 100.6</td>
<td>50.7 x 5.5</td>
<td>2.1 x 4100</td>
<td>2800</td>
<td>830</td>
<td>1.0 x 11000</td>
<td>0.31</td>
</tr>
</tbody>
</table>

#### Ball Screw Shaft Diameters and Recommended NSK TAC Series

<table>
<thead>
<tr>
<th>Shaft diameter (mm)</th>
<th>Standard series</th>
<th>Special bore diameter series</th>
</tr>
</thead>
<tbody>
<tr>
<td>40, 45</td>
<td>TAC202D</td>
<td>TAC35-3</td>
</tr>
<tr>
<td>50</td>
<td>40TAC20D</td>
<td>TAC40-3</td>
</tr>
<tr>
<td>63</td>
<td>50TAC20D</td>
<td>TAC50-3</td>
</tr>
<tr>
<td>80</td>
<td>60TAC20D</td>
<td>TAC60-3</td>
</tr>
<tr>
<td>100</td>
<td>80TAC20D</td>
<td>TAC80-3</td>
</tr>
<tr>
<td>120</td>
<td>100TAC20D</td>
<td>TAC100-3</td>
</tr>
<tr>
<td>140</td>
<td>120TAC20D</td>
<td>TAC120-3</td>
</tr>
</tbody>
</table>

Remarks:
1. Limiting speeds are based on the standard preload of each bearing.
2. Also, the figures are free of the influence arrangement type.
3. Bearing bore of 100mm or more and TAC20D-2 indicates a figure of IL preload.
4. The starting torque figures indicate grease lubrication.
5. Permissible axial load equals 0.7 times of limiting axial load.
NSK Roller Guides RA Series

The RA series’ roller guides feature high-load capacity and high rigidity and help to preserve the working environment. This series is the culmination of NSK’s analysis technology and tribology.

Demand for preloaded rolling linear guides for high-load drive is now increasing. The RA series with high rigidity and a function for preserving a clean environment is one of the most suitable linear guides for high-load applications.

### High-load capacity
The world’s highest-load capacity, taking full advantage of NSK’s analysis technology, ensures a long operating life.

### High rigidity
The optimum size of the roller ensures high rigidity and supports more compact machinery.

### Highly dust-resistant design
The high performance seals as standard equipment completely block the entry of foreign matter and maintain primary performance over the long time.

### Interchangeable series
The interchangeable series of the guide rails and the roller slides are independently available in stock.

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**Specifications**

#### Roller Slide Types and Shapes
- Two types of roller slides are available in this series: a flange type and a square type.
- A compact, low-profile square type is now available.
- On the mounting hole of the flange type, the tapped part is used to fix the roller slide from the top surface, and the minor diameter can be used as a bolt hole from the bottom. This provides mounting from both directions, top and bottom.
- Roller slide length can be specified by the standard high-load type or special long, super-high load type.

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**Fig. 1 Square type (RA15, 20, 25, 30, 35, 45, 55, and 65)**

- AN (High load)
- BN (Super-high load)

**Fig. 2 Low-profile type (RA15, 25, 30, 35, 45, and 55)**

- AL (High load)
- BL (Super-high load)

**Fig. 3 Flange type (RA15, 20, 25, 30, 35, 45, 55, and 65)**

- EM (High load)
- GM (Super-high load)

Please refer to Cat. No. E3328 for more details.
Technical Data sheet

NSK Technical Data Sheet for NSK High-Load Drive Ball Screw

Custom-made ball screw

Company name: NSK sales office

Date: 

Section: 

Person in charge: 

Address: 

Name of machine*: Electric injection molding machine, 30-ton capacity. Application*: Clamping axis

Drawing/rough sketch attached?: Yes [ ] No [ ]

* Please specify capacity of the machine in case of injection molding machine or press.

1. Use conditions

<table>
<thead>
<tr>
<th>Operating conditions</th>
<th>Shaft rotation−Moving nut</th>
<th>Normal operation</th>
<th>Degree of abrasion / impact</th>
<th>Smooth operation without impact</th>
<th>Normal operation</th>
<th>Operation associated with impact of vibration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Direction of load*</td>
<td>C−C [ ]</td>
<td>C−T [ ]</td>
<td>T−C [ ]</td>
<td>C−T [ ]</td>
<td>Other [ ]</td>
<td>Mounting orientation: Horizontal [ ] Vertical (Indicate the direction of gravity): [ ]</td>
</tr>
</tbody>
</table>

* Please specify loading direction code on the figures below. (Shaft fixed: [ ], Main load: [ ])

Lubricant

Grease [ ] (Brand name: [ ], Maker: [ ]) How to replenish lubricant

Grease gun [ ] Automatic

(avg. cm³ / cycles)

Request for oil hole

NSK recommended [ ] Your request [ ]

Necessity of seals

Yes [ ] No [ ] NSK S1 necessary?: Yes [ ] NSK recommended [ ] No [ ]

Environment

Temperature [ deg]: [ ] Particles / No particle

Surface treatment

Not required [ ] Low-temperature chrome plating [ ] Fluoride low-temperature chrome plating [ ] Other [ ]

Quantity in mass-production

Quantity used per machine: f pcs./machine

2. Specifications

<table>
<thead>
<tr>
<th>Shaft diameter</th>
<th>≤ 145 mm</th>
<th>Load</th>
<th>32 mm</th>
<th>Accuracy grade</th>
<th>C17</th>
<th>Axis play</th>
<th>0.055 or less</th>
<th>mm/max</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nut model No.</td>
<td>140507-3.5-1</td>
<td>Effective nuts of balls</td>
<td>2.5×3</td>
<td>Direction of turn:</td>
<td>right</td>
<td>Thread length / Overall shaft length</td>
<td>1000 / 1000</td>
<td></td>
</tr>
</tbody>
</table>

* Please specify loading direction code on the figures below. (Shaft fixed: [ ], Main load: [ ])

Special note/Remarks

Please calculate the life as a continuous operation based on “3. Load chart”.

3. Load chart (If using multiple ball screws in an axis, fill out the axial load per ball screw.)

4. Plan to conduct the endurance test of the ball screw?

Actual data on the machine

Planning to check endurance? [ ] Yes [ ] No (Reason: [ ])

Endurance of the ball screw

(1) Mounting accuracy, load conditions, and lubricating conditions are the main factors affecting the ball screw fatigue life. Therefore, we recommend evaluating the influence of those factors on actual use of your machines.

(2) A temperature rise caused by operational and environmental conditions may reduce the effectiveness of lubricant.
Technical Data Sheet for NSK High-Load Drive Ball Screw

1. Use conditions

Operating conditions
- Shaft rotation−Moving nut
- Nut rotation−Moving nut
- Nut rotation−Moving shaft
- Nut rotation−Moving shaft

Degree of vibration / impact
- Normal operation
- Normal operation
- Normal operation
- Normal operation

Direction of load
- C-C
- T-T
- T-C
- C-T

Mounting orientation
- Vertical (Indicate the direction of gravity.)

Lubricant
- Grease
- Oil

How to replenish lubricant
- Grease gun
- Automatic

Environment
- Temperature (deg)
- Particles

Surface treatment
- Low-temperature chrome plating
- Fluoride low-temperature chrome plating

Quantity in mass-production
- Month
- Year
- Lot

2. Specifications

Shaft diameter
- mm

Accuray grade
- Accuracy grade

Axial play
- mm max.

3. Load chart (If using multiple ball screws in an axis, fill out the axial load per ball screw.)

4. Plan to conduct the endurance test of the ball screw?

Actual data on the machine
- Yes
- N/A

Planning to check endurance (Date)
- (Reason: )