Refined Technologies and Products for Roads Worldwide Market
leading and environment-friendly hub units contributing
to vehicle performance and safety on roads worldwide

Hub Units - What they are and how they work
Hub units are wheel bearings combined with various peripheral parts, which in a single component play a vital role in supporting vehicle motion. JTEKT produces two types, both of which feature high precision and durability: one supports vehicle weight while delivering smooth rotation, and the other does that as well as assisting in the transmission of the driving force from the engine to the wheel. Beginning with the consideration of the car’s overall construction to the environmental impact of our manufacturing techniques, JTEKT hub units are built to be lightweight with low rotating friction to enhance fuel efficiency, while maintaining the strength and rigidity that ensures optimal driving performance.

The 3rd generation
BALL HUB UNITS

JTEKT hub units have evolved from the conventional 1st-generation design to the current advanced 3rd-generation configuration, which we most recommend to customers, by integrating flanges that facilitate their installation to vehicles.

1st-generation: Two single rows integrated into a double-row unit
2nd-generation: Integrated one flange on outer ring
3rd-generation: Also inner ring integrated with flange

In parallel with the evolution of automobiles, JTEKT hub units have been widely adopted by not only automotive manufacturers in Japan, but manufacturers around the world.

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JTEKT Hub Units Support Vehicles on Every Road around the World

Eco-friendly measures taken at all stages — from initial design to manufacturing to daily driving

Hub Unit Recommendations

Features / Selection

- **Fuel Efficiency / Performance**: Simultaneous achievement of weight reduction (= fuel efficiency) and increased strength/rigidity (= driving performance) at a high level
- **High Reliability**: High reliability ensured, even in severe environments such as driving on muddy roads
- **High Capacity**: High-capacity bearing design enabled by maximizing the use of allowable space

Recommended set-up

Recommended specifications are set according to vehicle segment (axle load)

Recommended hub units according to axle load

<table>
<thead>
<tr>
<th>Axle load [kN]</th>
<th>Driving wheel</th>
<th>Driven wheel</th>
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<tbody>
<tr>
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<td>① 3DACF020D-7</td>
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<tr>
<th>Vehicle class</th>
<th>⑧ UA / A</th>
<th>⑨ B</th>
<th>⑩ C</th>
<th>⑪ D</th>
<th>⑫ E</th>
<th>⑬ F</th>
<th>⑭ SUV / P-UP</th>
</tr>
</thead>
</table>

*Please use this table together with “Recommended hub unit numbers” on pages 9 and 10.

Modifications

The flange design can be modified to suit installations to customer’s vehicles

3rd-generation evolution

Structure

- **Grease**: Superior lubrication/fretting resistance
- **Outer seal / Inner seal**: Superior muddy water resistance also in low friction torque
- **Inner Shaft / Outer ring / Flange shape**: Strength / Rigidity and Weight Reduction realized
- **Shaft End Clinching**: Number of parts reduced / Overall weight reduced

Superior lubrication/fretting resistance

Grease

Outer side (tire side)

Inner side (body side)

Outer seal / Inner seal

Superior muddy water resistance also in low friction torque

Inner Shaft / Outer ring / Flange shape

Strength / Rigidity and Weight Reduction realized

Shaft End Clinching

Number of parts reduced / Overall weight reduced

Bolt

Inner shaft

Outer seal

Cage

Balls

Outer ring

Inner ring

Inner seal

Cage
CAE analysis is used to obtain a design that achieves both of the seemingly contradictory goals of increased strength / rigidity and reduced weight. Theoretical results are then verified with actual use on an original and rigorous test course developed by JTEKT.

**Outer Shaft / Outer Ring / Flange Shape**

<table>
<thead>
<tr>
<th>Properties required for bearing ring / ball materials</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>High Reliability</strong></td>
</tr>
<tr>
<td><strong>Excellent rolling fatigue life</strong></td>
</tr>
<tr>
<td><strong>High Abrasion Resistance</strong></td>
</tr>
</tbody>
</table>

**JTEKT Hub Unit Materials**

<table>
<thead>
<tr>
<th>Outer ring</th>
<th>Inner ring</th>
<th>Ball</th>
<th>Carbon steels for machine structural use</th>
</tr>
</thead>
<tbody>
<tr>
<td>〇</td>
<td>〇</td>
<td>〇</td>
<td>Carbon steel with good forging performance and high-frequency quenching of races. High-quality material with low non-metallic inclusions and superior characteristics not only in rolling fatigue service life, but also in static and dynamic fatigue strength and impact resistance.</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Outer ring</th>
<th>Inner ring</th>
<th>Ball</th>
<th>High carbon chromium bearing steels</th>
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<tbody>
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<td>〇</td>
<td>〇</td>
<td>〇</td>
<td>Most commonly used material for standard bearings: high quality with low non-metallic inclusions.</td>
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</table>

**Grease**

Grease is injected into the hub unit as a lubricant to maintain bearing function. As standard, JTEKT uses grease with superior quick-acting lubricating performance and superior fretting resistance.

<table>
<thead>
<tr>
<th>Superior Lubrication / Fretting Resistance</th>
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<tbody>
<tr>
<td>Grease Service Life</td>
</tr>
<tr>
<td>Conventional Product</td>
</tr>
<tr>
<td>Mineral-oil Urea Grease (standard)</td>
</tr>
</tbody>
</table>

**Grease Service Life**

*Conventional Product*: Mineral-oil Urea Grease (standard)

---

**Materials Selection**

**Inner Shaft / Outer Ring / Flange Shape**

**Superior muddy water resistance also in low friction torque**

The seals are among the most important components supporting hub unit functions and their technical performance continues to increase in keeping with the evolution of the hub unit. JTEKT seals ensure low friction torque and superior muddy water resistance.

---

**Superior muddy water resistance also in low friction torque**

**Outer Seal / Inner Seal**

**Deflector Seal**

- Reduced 30% Muddy Water Resistance 1.4-fold
  - Compared to standard product

**Inner Side (Body Side)**

Inner seal used here

**Outer Side (Tire Side)**

Outer seal used here

---

**Outer Shaft / Outer Ring / Flange Shape**

**Grease**

**Grease Service Life**

*Conventional Product*: Mineral-oil Urea Grease (standard)

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**Outer Shaft / Outer Ring / Flange Shape**

**Grease**

**Grease Service Life**

*Conventional Product*: Mineral-oil Urea Grease (standard)
**Shaft End Clinching**

Fixed inner ring configuration proposed for 3rd-generation hub unit.

**Hub Unit for Non-Driven Wheel**
- Compared to the conventional nut fastening method, clinching the shaft end provides weight- and space-saving benefits.

**Hub Unit for Driven Wheel**
- In addition to weight- and space-saving benefits, the need for torque management (axial force) of nut fastening at the time of installing unit in the vehicle is eliminated, thereby simplifying assembly.

**Assembly work simplified**

**ABS Sensor (option)**

JTEKT 3rd-generation hub units with built-in ABS sensor and magnetized pulser provide the following benefits.

- **Space savings**
- **Controlled air gap for magnetized pulser and sensor**
- **Adhesion of foreign substances prevented; high ABS signal reliability**

**Magnetized pulser**

Changes in magnetic flux density accompanying wheel rotation are detected by a sensor and converted to wheel rpm.
## Recommended hub unit Numbers

### For Driving Wheel

#### Basic Installation Specifications

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### For Driven Wheel

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For dimensions not listed, please contact us.