Koyo®

The 3rd generation

# BALL HUB UNITS

JTEKT

JTEKT CORPORATION

CAT.NO.B1004E-1

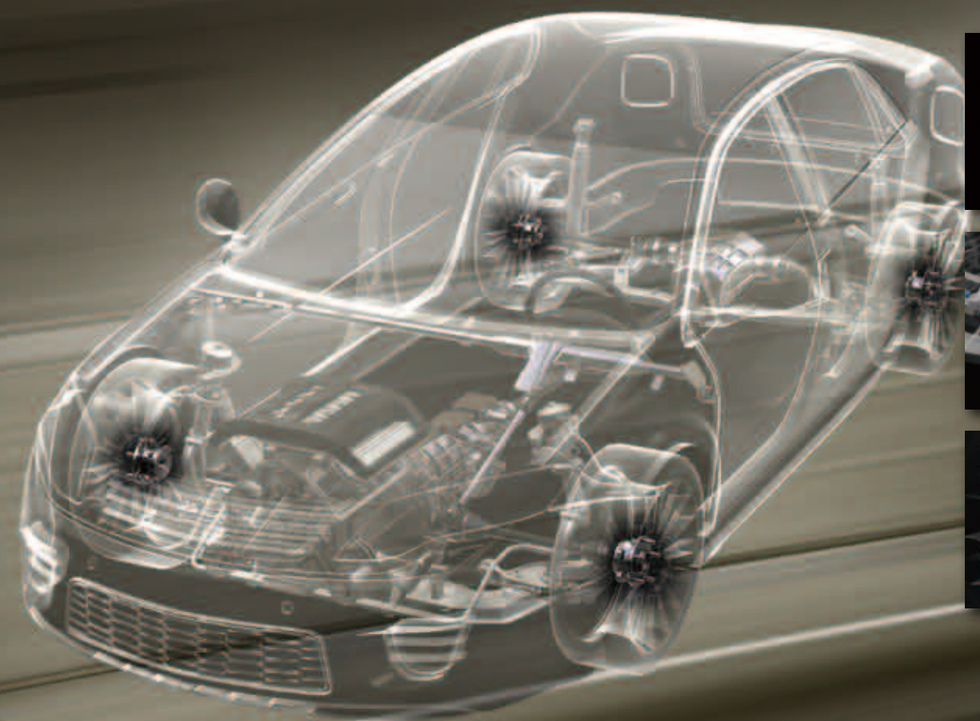
# Refined Technologies and Products for Roads Worldwide Market
# leading and environment-friendly hub units contributing to vehicle performance and safety on roads worldwide

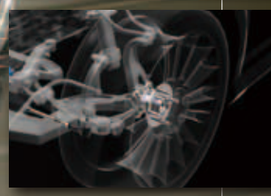
**Hub Units - What they are and how they work**

**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

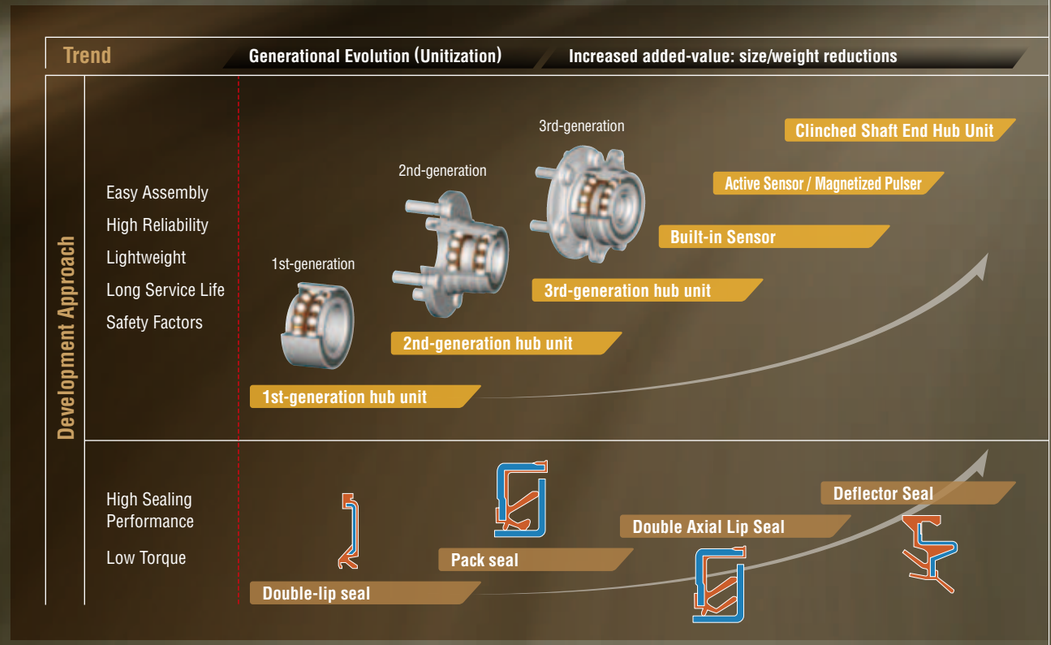
# BALL HUB UNITS





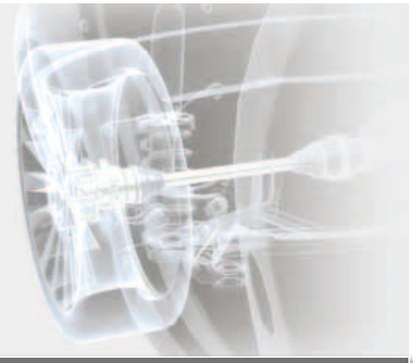
**JTEKT hub units have evolved from the conventional 1st-generation design to the current advanced 3rd-generation configuration, which we most recommend to customers, by integrating flanges that facilitate their installation to vehicles.**

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.**

# 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

| Axle load [kN] | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Driving wheel | ① 3DACF032D-1 | | ② 3DACF035D-4 | | ③ 3DACF038D-15 | | ④ 3DACF038D-33 | | ⑤ 3DACF041D-3 | ⑥ 3DACF044D-10 | |
| Driven wheel | ① 3DACF022F-1 | | ② 3DACF023F-2 | | ③ 3DACF026F-52 | | ④ 3DACF027F-12 | | ⑤ 3DACF031F-1 | ⑥ 3DACF033F-7 | |
| Vehicle class | UA / A | | B | | C | D | E | | F | SUV / P-UP | |

*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 *Example: Hub unit for driving wheel

**Grease**
Superior lubrication/fretting resistance

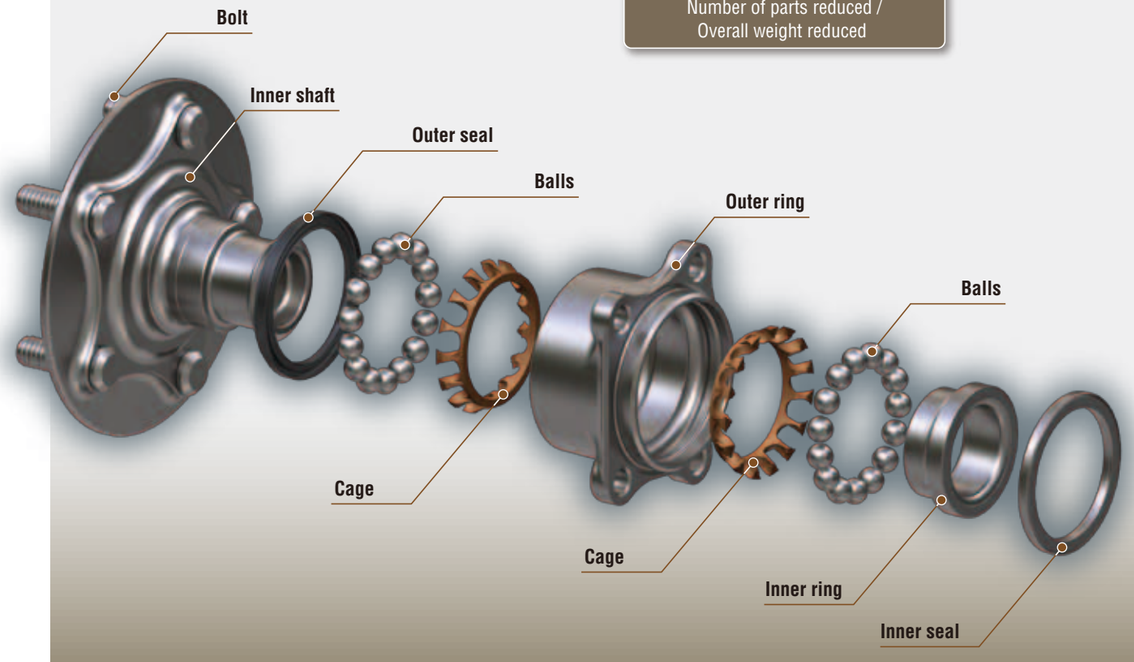
**Outer seal / Inner seal**
Superior muddy water resistance also in low friction torque

**Inner Shaft / Outer ring / Flange shape**
Strength / Rigidity and Weight Reduction realized

**Shaft End Clinching**
Number of parts reduced / Overall weight reduced

Outer side (tire side)

Inner side (body side)



Answering bearing performance / reliability needs

## Materials Selection

### Properties required for bearing ring / ball materials

High Reliability | Excellent rolling fatigue life | High Abrasion Resistance

### JTEKT Hub Unit Materials

Use for hub unit bearings/structural parts ●: Yes ▪▪: No

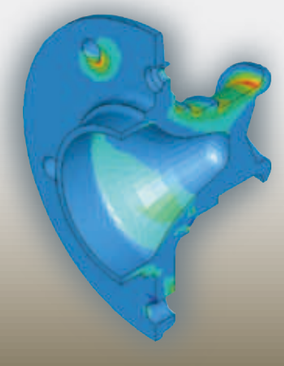
| | Outer ring | Inner ring | Inner shaft | Ball | |
|---|---|---|---|---|---|
| Carbon steels for machine structural use | ● | ▪▪ | ● | ▪▪ | Carbon steel with good forging performance and high-frequency quenching of races. High-quality material with low non-metallic inclusions and superior characteristics not only in rolling fatigue service life, but also rotation bend fatigue strength and impact resistance. |
| High carbon chromium bearing steels | 1st generation ● | ● | ▪▪ | ● | Most commonly used material for standard bearings; high quality with low non-metallic inclusions. |

Simultaneous achievement of strength / rigidity and weight reduction

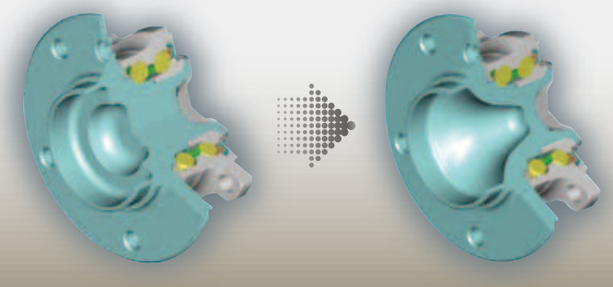
## Inner Shaft / Outer Ring / Flange Shape

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.

[Example of inner shaft analysis]



[Example of assembled unit weight reduction]



Superior Lubrication / Fretting Resistance

## 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.

| | Grease Service Life | Fretting Resistance | Seizure Resistance | Low friction torque | Operating Temperature Range |
|---|---|---|---|---|---|
| Conventional Product | ★ | ★ | ★ | ★ | 0～150℃ |
| Mineral-oil Urea Grease (standard) | ★★★ | ★★★ | ★★★ | ★★★ | -30～150℃ |

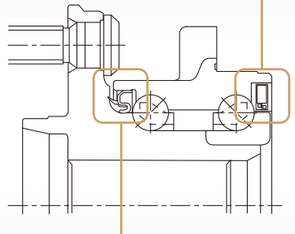
Superior muddy water resistance also in low friction torque

## Outer Seal / Inner Seal

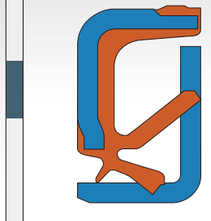
The seals are among the most important components supporting hub unit functions and their technical performance continues to increase in keeping with the evolution of the hub unit.
JTEKT seals ensure low friction torque and superior muddy water resistance.

Structural map of assembly | Standard product | Low-torque spec. product

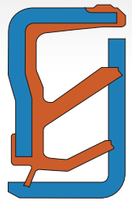
Inner Side (Body Side)
Inner seal used here



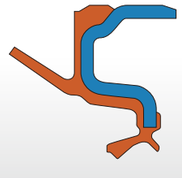
Outer Side (Tire Side)
Outer seal used here



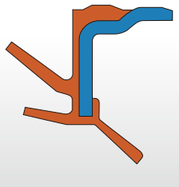
Reduce torque : Reduced 30%
Muddy Water Resistance : 1.4-fold
※Compared to standard product



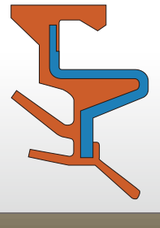
**Deflector Seal**
Simultaneous low friction torque and highly reliability, with excellent resistance to muddy water, environmental conditions (CaCl) and extremely low temperatures



Reduce torque : Reduced 30%
Muddy Water Resistance : 1.4-fold
※Compared to standard product



Reduce torque : Reduced 50%
Muddy Water Resistance : 5-fold
※Compared to standard product



Number of Parts Reduced / Weight Reduced

## Shaft End Clinching

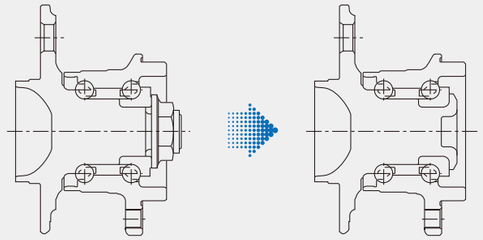
**Fixed inner ring configuration proposed for 3rd-generation hub unit.**

### 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.



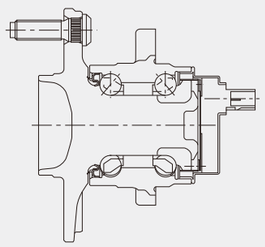
[Nut fastening] [Shaft End Clinching]

Assembly work simplified

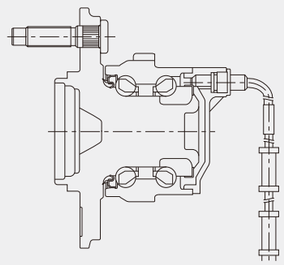
## ABS Sensor (option)

**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



[Integrated sensor cover]

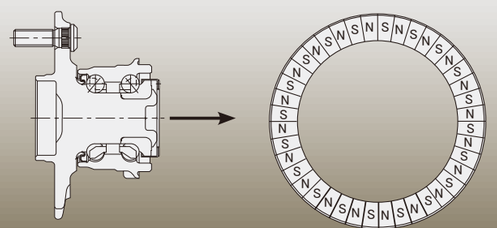


[Built-in stick-type sensor]

### Magnetized pulser

Changes in magnetic flux density accompanying wheel rotation are detected by a sensor and converted to wheel rpm.

The magnetized pulser is a multipolar magnet applied to a pulser ring: a rubber composite is filled with magnetic material and then segments are alternately magnetized with North and South poles, taking the bearing rotation shaft as the point of origin. Using the magnetized pulser enables more reliable detection of wheel speed.



## Global Technical Support (Bearing Development Bases)

Europe (5 bases)

Japan (4 bases)


America (2 bases)


China / Southeast Asia (2 bases)



## Iga Proving Ground Enables Testing / Evaluations Simulating Roads Worldwide

Fully utilizing our knowledge as a world-leading systems supplier, JTEKT conducts driving evaluations and analyses of products installed in vehicles. We exhaustively pursue the highest standards in product safety and operation on a test course capable of simulating various road and weather conditions around the world. As a total systems supplier, our highest value is to provide our customers with products that deliver outstanding performance and the best quality that help to make automobiles that are more than just fun to drive.

A Straight-line Course

B Winding Course

■ JTEKT Iga Proving Ground

- Site area: 500,000m²
- Course area: 170,000m²
- Combined circuit length: 2,200m
- Dynamics pad area: 54,000m²


D Fording Course

E Dynamics Pad

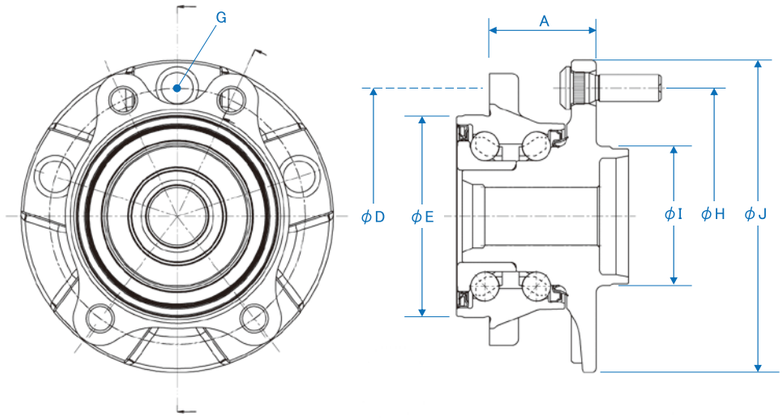
F Noise Evaluation Course

C Administration / Maintenance Building

# Recommended hub unit Numbers

## Hub Unit List

### For Driving Wheel



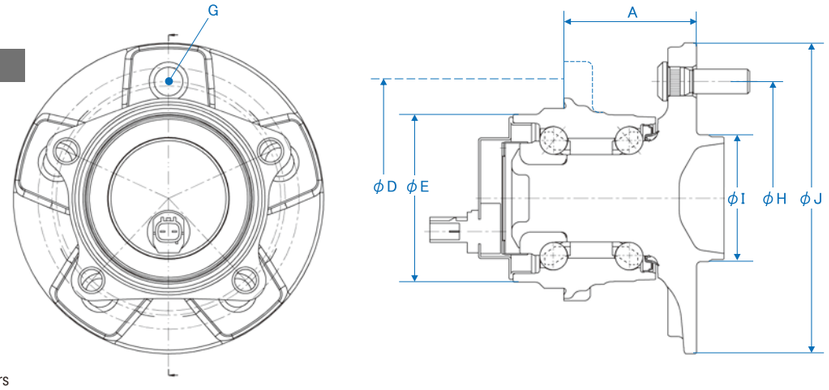

Recommended hub unit Numbers

| Type | JTEKT Recommended model | Basic hub unit No. | Basic Installation Specifications | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | A: Unit Width | Vehicle-side Installation Dimensions | | Wheel-side Installation Dimensions | | | |
| | | | | D: Installation Hole P.C.D. | E: Spigot Outer Diameter | G: No. of bolts | H: Hub Bolt P.C.D. | I: Spigot Outer Diameter | J: Flange Outer Diameter |
| Driving Wheel | ① | 3DACF032D-1 | 59.4 | 92 | 63 | 4 | 100 | 61 | 136 |
| | ② | 3DACF035D-4 | 38.4 | 93 | 70 | 4 | 100 | 60 | 120 |
| | | 3DACF037D-14 | 60 | 95 | 74 | 5 | 100 | 55 | 135 |
| | | 3DACF037D-2 | 72 | 110 | 84 | 5 | 114.3 | 62 | 152 |
| | | 3DACF037D-4 | 60 | 95 | 74 | 4 | 100 | 55 | 135 |
| | | 3DACF037D-8 | 69 | 110 | 84 | 5 | 114.3 | 62 | 152 |
| | | 3DACF037D-9 | 66 | 95 | 74 | 5 | 100 | 55 | 135 |
| | | 3DACF038D-1 | 69 | 106 | 84 | 5 | 114.3 | 62 | 152 |
| | ③ | 3DACF038D-15 | 47 | 109 | 84 | 5 | 100 | 55 | 125 |
| | ④ | 3DACF038D-33 | 43.2 | 115.5 | 79.4 | 5 | 100 | 55 | 125 |
| | | 3DACF038DB-2 | 42 | 103 | 78 | 5 | 100 | 55 | 125 |
| | ⑤ | 3DACF041D-3 | 47.5 | 114 | 90 | 5 | 114.3 | 62 | 139 |
| | | 3DACF041D-6 | 65 | 110 | 87 | 5 | 114.3 | 62 | 152 |
| | ⑥ | 3DACF044D-10 | 47.5 | 114 | 90 | 5 | 114.3 | 62 | 139 |
| | | 3DACF044D-14 | 68.9 | 112.5 | 87.4 | 5 | 120 | 62 | 158 |
| | | 3DACF044D-16 | 67.5 | 109.8 | 84 | 5 | 114.3 | 62 | 154 |
| | | 3DACF044D-9 | 67.5 | 109.8 | 84 | 5 | 114.3 | 62 | 154 |
| | | 3DACF044DC | 67.5 | 112 | 84 | 5 | 114.3 | 62 | 154 |

※ For dimensions not listed, please contact us.

## Hub Unit List

### For Driven Wheel




Recommended hub unit Numbers

| Type | JTEKT Recommended model | Basic hub unit No. | Basic Installation Specifications | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | A: Unit Width | Vehicle-side Installation Dimensions | | Wheel-side Installation Dimensions | | | |
| | | | | D: Installation Hole P.C.D. | E: Spigot Outer Diameter | G: No. of bolts | H: Hub Bolt P.C.D. | I: Spigot Outer Diameter | J: Flange Outer Diameter |
| Driven Wheel | ① | 3 DACF 022 F-1 | 52.5 | 82 | 56 | 4 | 100 | 55 | 133 |
| | ② | 3 DACF 023 F-2 | 55.5 | 92 | 67 | 4 | 100 | 55 | 135 |
| | | 3 DACF 026 F-15 | 74.5 | 99 | 74 | 5 | 114.3 | 62 | 152 |
| | | 3 DACF 026 F-16 | 74.5 | 99 | 74 | 5 | 114.3 | 62 | 152 |
| | | 3 DACF 026 F-17 | 69 | 106 | 84 | 5 | 114.3 | 62 | 152 |
| | | 3 DACF 026 F-20 | 54.5 | 93 | 74 | 4 | 100 | 55 | 135 |
| | | 3 DACF 026 F-23 | 54.5 | 92 | 67 | 4 | 100 | 55 | 135 |
| | | 3 DACF 026 F-23 | 54.5 | 92 | 67 | 4 | 100 | 55 | 135 |
| | | 3 DACF 026 F-24 | 60 | 95 | 74 | 4 | 100 | 55 | 135 |
| | | 3 DACF 026 F-37 | 60 | 95 | 74 | 5 | 100 | 55 | 135 |
| | | 3 DACF 026 F-39 | 60 | 95 | 74 | 4 | 100 | 55 | 135 |
| | | 3 DACF 026 F-47 | 60 | 95 | 74 | 5 | 100 | 55 | 135 |
| | ③ | 3 DACF 026 F-52 | 60 | 95 | 74 | 4 | 100 | 55 | 135 |
| | | 3 DACF 026 F-6 | 55.5 | 92 | 67 | 4 | 100 | 55 | 125 |
| | | 3 DACF 026 F-7 | 54.5 | 93 | 74 | 4 | 100 | 55 | 135 |
| | | 3 DACF 027 F-10 | 54.5 | 93 | 74 | 5 | 100 | 55 | 135 |
| | | 3 DACF 027 F-11 | 60 | 95 | 74 | 5 | 114.3 | 62 | 152 |
| | ④ | 3 DACF 027 F-12 | 60 | 97 | 76 | 5 | 114.3 | 62 | 152 |
| | | 3 DACF 027 F-13 | 60 | 99 | 74 | 5 | 100 | 55 | 135 |
| | | 3 DACF 027 F-14 | 65 | 112 | 74 | 5 | 114.3 | 62 | 150 |
| | | 3 DACF 027 F-15 | 65 | 112 | 74 | 5 | 114.3 | 62 | 150 |
| | | 3 DACF 027 F-19 | 64 | 95 | 74 | 5 | 114.3 | 62 | 152 |
| | | 3 DACF 027 F-26 | 57 | 102 | 74 | 5 | 114.3 | 62 | 140 |
| | | 3 DACF 027 F-28 | 60 | 97 | 76 | 5 | 100 | 55 | 135 |
| | | 3 DACF 027 F-29 | 74.5 | 99 | 74 | 5 | 114.3 | 62 | 152 |
| | | 3 DACF 027 F-30 | 67.5 | 99 | 74 | 5 | 114.3 | 62 | 152 |
| | | 3 DACF 027 F-8 | 55 | 112 | 74 | 5 | 114.3 | 62 | 140 |
| | ⑤ | 3 DACF 031 F-1 | 42 | 110 | 78 | 5 | 120 | 62 | 158 |
| | ⑥ | 3 DACF 033 F-7 | 65 | 110 | 87 | 5 | 114.3 | 62 | 152 |

※ For dimensions not listed, please contact us.

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**BALL HUB UNITS**

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