Hub bearing equipped with high resolution rotational sensor

Contributing to better vehicle safety control

**Features**

1. High resolution rotational signal (40 times higher relative to conventional types; magnetic encoder is the same as conventional types)
2. A & B phase pulse output allows detection of rotational direction
3. External dimensions are the same as conventional hub bearings and can be applied to both driven and non-driven wheels

**Construction**

- Magnetized encoder
- SNR made high resolution rotational sensor

**Applications**

- Hub bearings for passenger vehicle use
Using biodegradable materials to make the cage, seal and grease, the new roller bearing reduces environmental loading after being discarded.

**Environment-friendly roller bearing**

Features

(1) The biodegradability of the cage and seal is over 60%.
   [A product eligible for a Green Pla Mark]

(2) The biodegradability of the grease is over 60%.
   [A product eligible for an Eco Mark]

(3) Working temperature limits: –30 to 70°C

(4) Allowable number of revolutions: dmnn value: 350,000
   (about the same as that of existing general-purpose products)

Construction

- The cage and seal are made up of a polyester-based biodegradable resin having improved strength and heat resistance.
- The grease is made up of a base oil composed of an ester-based synthetic oil having a 60% biodegradability.

※ Green Pla Mark: An official certification mark given to a biodegradable plastic product.
※ Eco Mark: An official certification mark given to a biodegradable material (other than plastics) or a commodity using such material.
World’s smallest tapered roller bearing

A tapered roller bearing with a bearing inside diameter of five mm achieves a longer life and higher rigidity than similar ball bearings.

Features

(1) Tapered roller bearing with the world’s smallest diameter
   Five-mm inside diameter \( \phi 17 \)-mm outside diameter \( \phi 10 \)-mm width

(2) Longer life
   Fourteen-time longer life than that of similar ball bearings

(3) Higher rigidity
   Five-time greater axial rigidity than that of similar ball bearings

Applications

- Reducers, medical equipment, robot joints, and the like
MQCJ lubrication angular contact ball bearing

The world’s highest speed angular contact ball bearing has been realized through the adoption of a new jet lubrication scheme equipped with inner ring cooling and a mechanism for best minimum quantity lubrication for the raceway

**Features**

1. **High-speed operation at the world’s highest speed**
   - Constant pressure pre-load: 
     \[ d_{\text{min}} \text{ value: 5 million} \] (90% increase in the conventional air/oil lubrication ratio)
   - Constant position pre-load: 
     \[ d_{\text{min}} \text{ value: 3.6 million} \] (40% increase in the conventional air/oil lubrication ratio)

2. **Power loss: on the same level as that of air/oil lubrication**

3. **Simplification of the oil supply / discharge system**
   The outer cylinder cooling oil serves also as the bearing lubrication oil.

**Applications**

- Ultra-high-speed main spindle for machine tools (machining centers for die machining and aluminum machining)

*MQCJ stands for Minimum Quantity and Cooling Jet*

**Construction (means of realization)**

1. The adoption of inner ring cooling scoop grooves and special nozzle spacers has realized inner ring cooling and best lubrication.
2. Optimization of the bearing interior design has realized ultra-high speed and high rigidity.
3. Special inner/outer ring materials excel in durability under high-speed, high-contact-pressure operation.

[Diagram showing lubrication system and application areas]
Angular contact ball bearing with ultra-high-speed seal

The new grease SE-1 and optimization of internal design have realized ultra-high-speed operation at the world’s highest level

Features

(1) Angular contact ball bearing with seal having high-speed rotation performance at the world’s highest level

- \( d_{\text{min}} \) value: 1.7 million; 20% improvement compared to the performance of conventional similar products

(2) The bearing washing process before mounting and the grease filling process are not necessary.

(3) External lubricant feeders are not necessary.

Applications

- Machining tool main spindle (machining centers and tapping machines)

Construction

1. Optimization of internal design
   ⇒ High speed and low heat generation

2. Adoption of the newly developed grease SE-1
   ⇒ High speed and long life

3. Adoption of a specially developed material for the race
   ⇒ Improved seizure resistance

Cross-section of an angular contact ball bearing with ultra-high-speed seal
New high-speed specification bearing unit for rolling stocks (New RCT bearing)

The bearing maintenance interval is lengthened more than twice

Features

(1) **Special-resin-made cage**
   Longer lubrication life as a result of the adoption of a special, anti-shock resin and the suppression of abrasion loss

(2) **Spacer with rubber lip**
   Suppression of fretting between the inner ring and the back cover due to dynamic deflection of a shaft

(3) **New shape seal**
   Longer lubrication life as a result of reduced temperature rise

Applications

- Shaft support bearings for rolling stock use

Construction

- Resin-made cage
- Brass plate
- Rubber lip
- New shape seal
- Spacer with rubber lip
Office equipment paper-reversing unit

Smooth paper feed without a reversing motor in the double-side printing mechanism for printing and copying machines

Features

(1) The output gear can be rotated both clockwise and counterclockwise at the same speed with that of the input gear.
(2) A dedicated reversing motor is not needed.

Applications

- Paper feed direction switchover mechanisms for copying machines and printers capable of both side printing

Construction

- The unit consists of three gears, namely, an input gear, an output gear, and a control gear, with the input gear always rotating in one (normal) direction.
- When the control gear is not braked (free), both the control and the output gear rotate in the normal direction (the same direction as that of the input gear).
- On the other hand, when the control gear is braked to a halt (locked), the output gear rotates in the direction opposite to that of the input gear.
Color filter automatic repair machine

Automatic repairing of defects in color filters for flat panel displays improves labor efficiency, saving labor

Features

(1) NTN’s unique image processing technology is used to locate a defect, automatically remove (laser-cutting) the defect and coat it according to its type and color.

(2) Automatic repairing improves labor efficiency, saving labor.

Defect repair methods

Clear defect repairing
(The circle denotes the result of the automatic coating location calculation.)

Opaque defect repairing
(The square denotes the result of the laser cutting location calculation.)

Applications

• Color filter defect repair
  (Opaque defects, clear defects, mixed colors)