Koyo®

Needle Roller Bearings

JTEKT

JTEKT CORPORATION

JTEKT
Koyo TOYODA

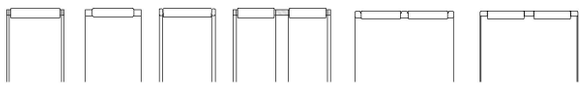
CAT. NO. B2020E-1

Bearing Size Chart

Radial Needle Roller and Cage Assemblies

Metric Series | **Inch Series**

Single-Row, Double-Row···B-1-8



K, RF, RFN | RS, R, RP | RV, V, VS | K ... ZW, WRF | WR, WRS | WRP

Single-Row···B-1-58

WJ, WJC

Drawn Cup Needle Roller Bearings

Metric Series (Caged)

Open Ends, Closed One End···B-2-14

BKM, BSM, HK | BK | BTM, BHTM

Sealed···B-2-24

HK RS | BK RS | BKM UU, BHKM UU, HK .2RS

(Full Complement)

Open Ends, Closed One End···B-2-38

BM, BHM, DL | DLF | YM

Inch Series (Caged)

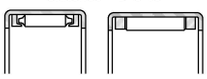
Open Ends, Closed One End···B-2-66

J,JH | MJ-1,MJH-1 | BT

Drawn Cup Roller Clutches

Metric Series | **Inch Series**

Clutches···B-3-10



FC | FCS FCL-K FC-K

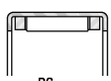
Clutch and Bearing Assemblies···B-3-12

FCB | FCBL-K FCBN-K

Miniature one-way clutches...B-3-20

1WC, EWC

Clutches···B-3-14



RC RC-FS

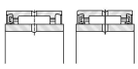
Heavy-Duty Needle Roller Bearings

Metric Series (Caged, With Inner Ring)

Unsealed···B-4-13

NKJ | NQI | NKJ,NKJS NA48,49,69 | NA69

Sealed···B-4-30



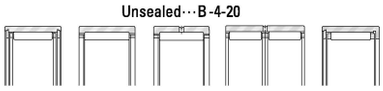
NA49RS | NA49.2RS

Without Flanges ···B-4-32

NAO | +SNSH

(Without Inner Ring)

Unsealed···B-4-20



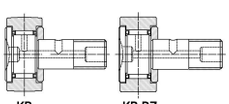
NK | NQ | NK.NKS RNA48,49,69 | RNA69 | NKTN

Track Rollers

Stud-Type

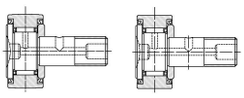
Metric Series (Caged)

Unsealed···B-5-16



KR | KR.DZ

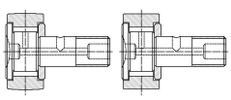
Sealed···B-5-18



KR .2RS | KR.DZ.2RS

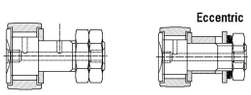
(Full Complement)

Unsealed···B-5-20



KRV | KRV.DZ

Standard Series···B-5-24,B-5-28



GC16-90/GCL16-90 | GCR, GCRL

Yoke-Type

Metric Series (Caged, Without End Washers)

Unsealed, Without Inner Ring···B-5-32

RSTO | RSTO.DZ

Unsealed, With Inner Ring···B-5-33

STO | STO.DZ

Sealed, Without Inner Ring···B-5-34

RNA22.2RS | RNA22.2RS.DZ

Sealed, With Inner Ring···B-5-35

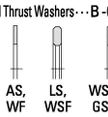
NA22.2RS | NA22.2RS.DZ

Thrust Bearings, Assemblies, Washers

Metric Series

Thrust Needle Roller and Cage Assemblies and Thrust Washers···B-6-12

FNT, AXK, TP



AS, WF | LS, WSF | WS.811, GS.811

Unitized Thrust Bearing Assemblies (Double-Washer) ···B-6-20

FNTKF, TPK JL, TVK JL

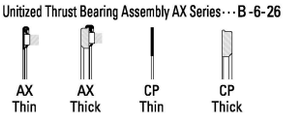
Unitized Thrust Bearing Assemblies (Single-Washer) ···B-6-22

FNTK, TPK J, TVK J

Unitized Thrust Bearing Assemblies (Single-Washer) ···B-6-24

FNTF, TPK L, TVK L

Unitized Thrust Bearing Assembly AX Series···B-6-26

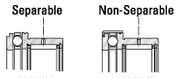


AX Thin | AX Thick | CP Thin | CP Thick

Combined Needle Roller Bearings

Metric Series (Heavy-Duty, Without Inner Ring)

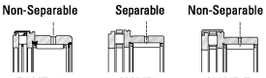
Ball Thrust Series···B-7-6



Separable | Non-Separable

NAXK | NAXK.Z

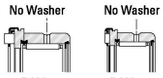
Cylindrical Roller Thrust Series···B-7-10



Non-Separable | Separable | Non-Separable

RAXZ500 | NAXR | NAXR.Z

Needle Roller and Cylindrical Roller Thrust Series···B-7-14

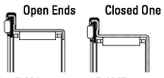


No Washer | No Washer

RAX500 | RAX400

(Drawn Cup, Without Inner Ring)

Needle Roller Thrust Series···B-7-18



Open Ends | Closed One End

RAX700 | RAXF700

Needle Rollers, Accessories

Inner Rings (Caged)

<Metric Series>

For Drawn Cup Needle Roller Bearings, Heavy-Duty···B-8-22

JR,IM..P | JR.JS1 | JRZ.JS1

(Full Complement)

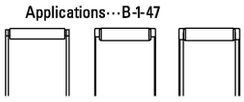
For Drawn Cup Needle Roller Bearings···B-8-32

IM | IMC | IM...R6

For Machine-Tool Quality Precision-Combined Bearings ···B-8-35

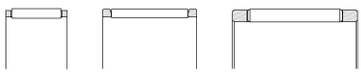
IM | IMC | IM...R6

Assemblies for Crank Pin End Applications···B-1-47



K.BE BE, GS VE, VS P

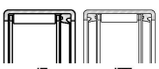
Assemblies for Wrist Pin End Applications···B-1-52



K.SE R P RE, UR P

(Full Complement)

Sealed···B-2-72



JT JTT

Open Ends, Closed One End···B-2-54

B,BH M-1, MH-1 Y

Extra-Precision ···B-2-65

GB,GBH

Inner Rings

Metric Series···B-2-28

JR,IM..P JR.JS1, JRZ.JS1

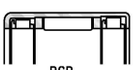
Metric Series (Full Complement)···B-2-43

IM, IM...R6 IMC

Inch Series ···B-2-74

IRA, IR (4 digit or less)

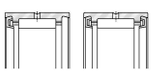
Clutch and Bearing Assemblies···B-3-16



RCB RCB-FS

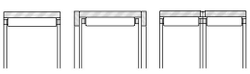
(Full Complement)

Sealed···B-4-31



RNA49RS RNA49.2RS

Without Flanges···B-4-35



RNAO +SNSH RNAO

With Inner Ring ···B-4-42

NA

Without Inner Ring ···B-4-38

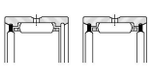
RNA

Inch Series(Without Inner Ring)

Unsealed ···B-4-48

HJ

Sealed···B-4-52



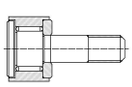
HJ-RS HJ-.2RS

Inner Rings

Inch Series ···B-4-54

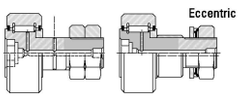
IR

Small Series···B-5-22



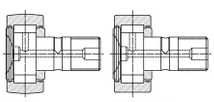
GC10-15/GCL10-15

Light Series···B-5-26,B-5-30



GCU,GCUL GCUR,GCURL

Cylindrical Rollers···B-5-20



NUKR NUKR.DZ

(Caged, With End Washers)

With Inner Ring···B-5-36

NATR NATR.DZ STO.ZZ STO.ZZ.DZ

(Full Complement, With End Washers)

Small Series ···B-5-38

FP,FPL

Non-Separable ···B-5-39

FG,FGL

Without Inner Ring Unsealed ···B-5-44

RNA...B6 RNAB RNAL

With Inner Ring, Cylindrical Rollers···B-5-37

NUTR NUTR.DZ

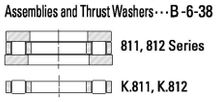
(Full Complement, With Metal Seals)

Non-Separable, Light Series, Heavy Series···B-5-41

FGU,FGUL

Inch Series

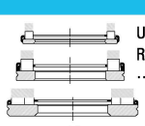
Thrust Cylindrical Roller and Cage Assemblies and Thrust Washers···B-6-38



811, 812 Series K.811, K.812

Needle Rollers, Cylindrical Rollers···B-6-42

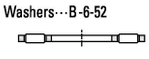
AXZ, ARZ



AR

Unitized Cylindrical Rollers ···B-6-44

Thrust Needle Roller and Cage Assemblies and Thrust Washers···B-6-52



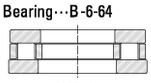
NTA

TRA, TRB, TRC, TRD, TRE, TRF

Thrust Cylindrical Roller and Cage Assembly ···B-6-62

NTH

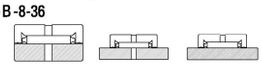
Cylindrical Roller Thrust Bearing···B-6-64



NTHA

End Washer

For RNA Bearings (With Oil Holes, Extra Wide) ···B-8-36



BIC BICG BIG,BIK,BIP

For Metric Series NAO and RNAO Bearings···B-8-39

SNSH

★The contents of this catalog are subject to change without prior notice. Every possible effort has been made to ensure that the data herein is correct; however, JTEKT cannot assume responsibility for any errors or omissions.

NEEDLE ROLLER BEARINGS

1866 **1900** **1930**

Corporate History

- •1866 Torrington is founded
- •1867 Dürkopp-Werke Bielefeld is founded
- •1921 Koyo Seiko Co., Ltd. is founded
- •1930 Nadella is founded

Bearing Trends and Market Needs

Smaller → Improvement in seizure resistance

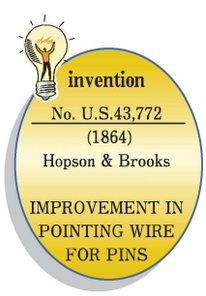
Transition of Products

1866
Foundation of Torrington

Founded as manufacturer of sewing machine needles and machinery to produce same

Early model of the swaging machine, designed to produce straight and uniform needle blanks.

Early model swaging machine for uniform needle blanks



This invention is the origin of the extra-precision rollers now produced by JTEKT.

1920
80% market share of automobile wire wheel parts

Cadillac put out its entire line on dressy wire wheels. Packard and a few other major producers followed suit, as eventually did most manufacturers (except Chevrolet). At the height of the trend, over 60% of U.S. passenger cars had wire wheels, and 80% of the spokes and nipples to build them were supplied by The Torrington Company. Effectively, every other passenger car made in America had Torrington spokes and nipples in the wheels.

More than 60% of automobiles, including those made by Cadillac, adopt wire wheels. Torrington acquires 80% market share of wire wheel spokes and nipples.

As a result, one in every two U.S.-manufactured automobiles use Torrington spokes and nipples.

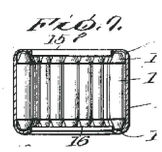
Radial Needle Bearings

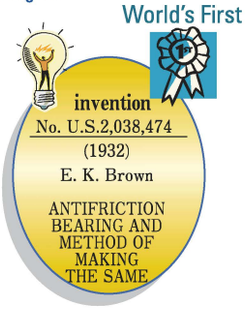
1932

Development of the world's first drawn cup needle bearing

< Space-saving and lightweight >

World's First





1960 **1990** **2010** **2013**

- •1962 FAG purchases Dürkopp-Werke AG
- •1963 New needle bearing plant is built in Tokyo
- •1962 Utsunomiya Kiki Co., Ltd. joins the group
- •1984 SNR (Nadella business partner) and Torrington commence joint venture
- •1993 Torrington purchases needle bearing business from FAG
- •2001 Torrington purchases Nadella business from SNR
- •2003 The Timken Company purchases Torrington
- •2006 JTEKT Corporation is born
- •2010 JTEKT purchases needle bearing business from The Timken Company
- •2013 JTEKT is integrated into the **Koyo** brand

Longer life » Reduced torque and noise, compact and lightweight, usability with less diluted lubricant

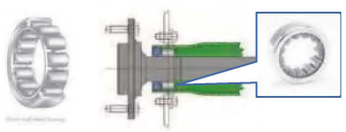
Thrust Needle Bearings

1957
Development of caged drawn cup needle bearing
< Improved lubrication and support for higher speeds >

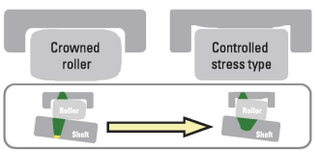
Increased lubricant retention capability

Separated rollers using cages

1968
Development of thick-wall drawn cup bearing
< High capacity >
Applications in axles, transmissions, pumps and motors

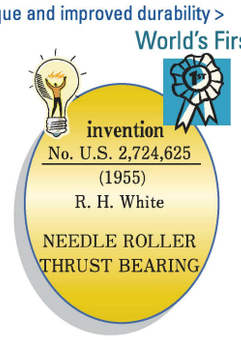


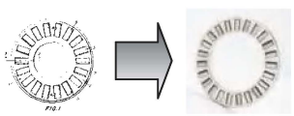
1996
Development of controlled stress thick-wall drawn cup needle bearing < Longer life > Cup bore is profiled.



Reduced contact pressure on cup and shaft

1955
Development of the world's first thrust needle bearing: contribution to the progress of AT development
< Lower torque and improved durability >





Development of the thrust needle bearing solved problems in early automatic transmissions.

2008
Development of thrust needle bearing for high-speed applications
< Higher speed, lower torque, and supports thin film lubricant >
Optimization of washer and cage shapes

Improved lubricity
Reduced roller end wear

2011
Development of noise-reduced thrust needle bearing
< Noise reduction >

Vibration-resistant
Custom-shaped resin is installed on the back side of the thrust washer.

Planetary Gear Shafts

1971
Development of induction-hardened planetary gear shaft

2001
Cold forging hole processing of planetary gear shaft
< Improved installation capability >

< Weight savings, material waste reduction, and cost effective >

Regarding the Publishing of this Needle Roller Bearing Catalog

Thank you very much for your patronage of **Koyo** brand products.

In terms of environmental friendliness, there has been a rapidly increasing demand for smaller, lighter products, as well as lower friction, higher reliability, and higher functionality in many different industrial fields.

Our needle roller bearings are the optimal solution to all such requirements.

In 2010, as part of JTEKT's continual process for improvement in the needle roller bearing business, we integrated the technology of Torrington, a company with a long history in the United States and Europe, into the Koyo brand of traditional needle roller bearings.
In 2013, the Koyo brand will take the next step in this line of business to pursue stronger distribution and production structures and further technological development with the aim to accommodate our customers' needs on a global scale.

On this occasion, JTEKT has fully renewed its needle roller bearing catalog, which we present here.

We believe that this new catalog will prove useful in your selection and use of our needle roller bearings.

We look forward to your continued patronage.

NEEDLE ROLLER BEARINGS

PRODUCT BREADTH

DRAWN CUP NEEDLE ROLLER BEARINGS, available in 3 mm to 139.7 mm bore (1/8 to 5 1/2 in), are designed to support radial loads and reduce friction between rotating components. The low cross section of the drawn cup bearing provides maximum load-carrying capability with minimum space required.

DRAWN CUP ROLLER CLUTCHES AND BEARING ASSEMBLIES, available in 3 to 35 mm bore (1/8 to 1 3/8 in), are designed to transmit torque between the shaft and housing in one direction and allow free overrun in the opposite direction. When transmitting torque, either the shaft or the housing can be the input member.

RADIAL NEEDLE ROLLER AND CAGE ASSEMBLIES, available in 3 mm to 165 mm bore (1/8 to 6 1/2 in), consist of a complement of needle rollers held in place by a cage. With no inner or outer ring, the low cross section provides maximum load-carrying capability within the smallest envelope. The mating shaft and housing are normally used as inner and outer raceways.

NEEDLE ROLLER THRUST BEALINGS, available in 5 mm to 160 mm (3/16 to 6 1/4 in) bore, consist of a complement of needle rollers held in place by a cage.

Needle roller thrust bealings are complements of small diameter needle rollers arranged in a spoke-like configuration. Needle rollers are equally spaced by means of a cage whose web section separates the rollers and provides guidance to keep them tracking in an orbital path. The purpose of these assemblies is to transmit a thrust load between two relatively rotating objects while greatly reducing friction.

Needle roller thrust bealings also can be unitized with lipped washers which service as raceway surfaces for the needle rollers. Washers can be supplied separately or can be mechanically unitized to the needle roller thrust assemblies for ease of handling.

HEAVY-DUTY NEEDLE ROLLER BEARINGS, available in 5 mm to 335 mm bore (3/16 to 13 3/16 in), consist of a machined and ground channel-shaped outer ring with a complement of needle rollers retained and guided by a cage. The thick outer ring provides maximum load capacity and shock resistance with a relatively small radial cross section.

TRACK ROLLERS/CAM FOLLOWERS, available in 10 mm to 300 mm O.D. (3/8 to 11 13/16 in), are characterized by their thick-walled outer rings that run directly on a track. The thick outer rings permit high load-carrying capability while minimizing distortion and bending stresses.

ENGINE BEARINGS include a full line of advanced bearing assemblies for automotive engine valve trains. These assemblies help reduce friction and optimize performance in both overhead valve and overhead cam engines. They include roller rocker arms for overhead valve (pushrod) engines, roller finger followers for overhead cam engines, valve lifter rollers for overhead valve and overhead cam engines.

PRECISION NEEDLE ROLLERS have multiple uses in a variety of industries including automotive, truck, farm and construction equipment, two-cycle engines, outboard engines and consumer durables. Needle rollers are mainly used as bearing rolling elements to transmit torque and reduce friction. They also can serve as precision shafts or as precision locating pins.

PLANETARY GEAR SHAFTS have multiple uses in a variety of industries including automotive, truck and farm and construction equipment. The shafts are used in planetary gear sets, differentials and engine valve trains.

PRECISION PINS AND SHAFTS are crafted from the highest quality steel within a TS16949/ISO9000/AS9100-certified manufacturing facility. Pins and shafts come in a larger variety of configurations and materials and flexible product volumes. These pins and shafts are found in applications such as gasoline fuel systems components, diesel systems components, aerospace rollers and precision rollers (DFAR-compliant), planet pins, racing applications, rollers for bearing assemblies, gear shafts and steering column pins.