

Koyo®



Tapered Roller Bearings

for axle drive pinions



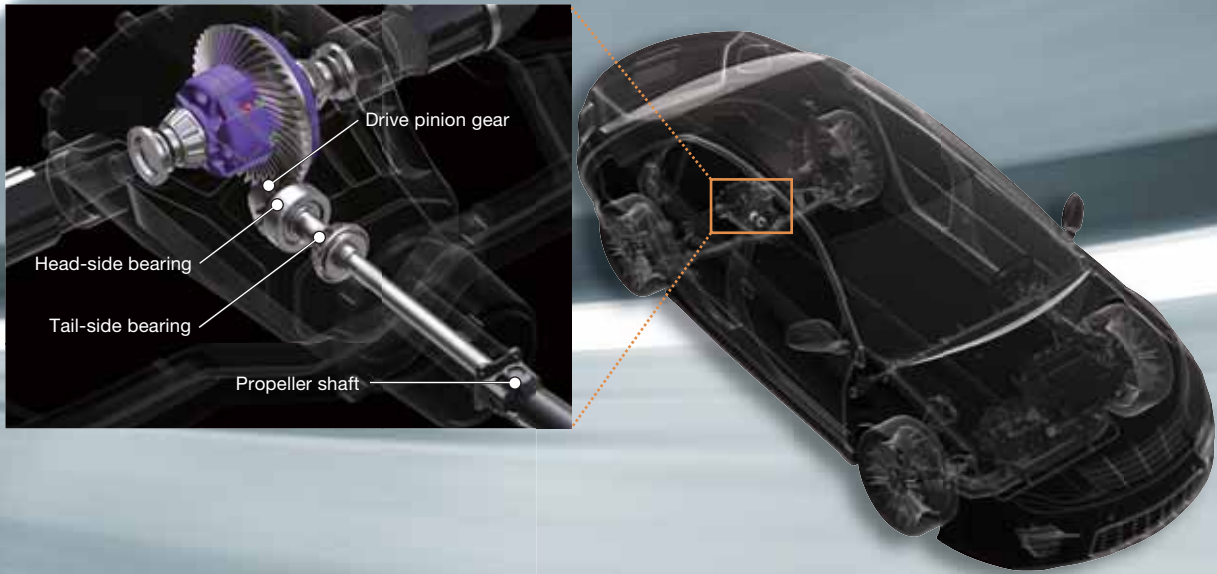
JTEKT
JTEKT CORPORATION

Compact & Lightweight, Low-torque,
High-capacity & High-durability. JTEKT's TRBs support
enhancement of vehicle's environmental performance.

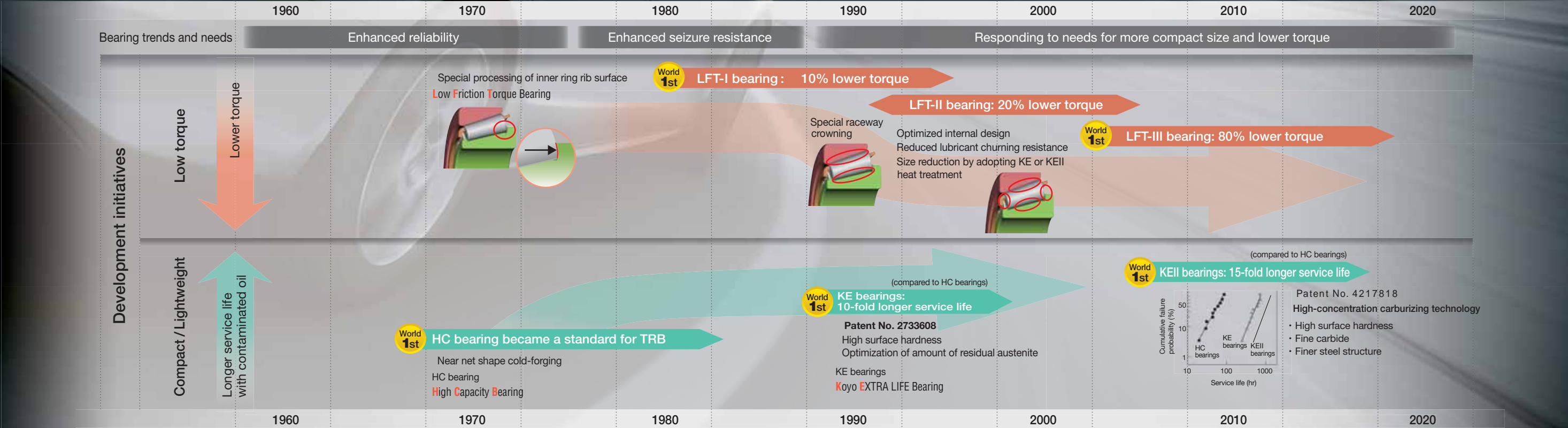
In automobile axles, various stresses are caused by acceleration, deceleration, and cornering forces in a complex manner from all directions. They're truly a key mechanical part of every vehicle. In response to the demand for ever more advanced bearings that support drive pinions, JTEKT goes one step beyond making proposals. Every elemental technology imaginable is rethought from scratch to ensure products with unequalled levels of low friction loss and high capacity.

Tapered roller bearings for axle drive pinions

Drive pinion bearings support the drive pinion gear shaft of the hypoid gear, which facilitates a 90° directional change of the driving force transmitted from the propeller shaft. This bearing is used in pairs to simultaneously ensure smooth rotation and the rigidity of gear meshing points.

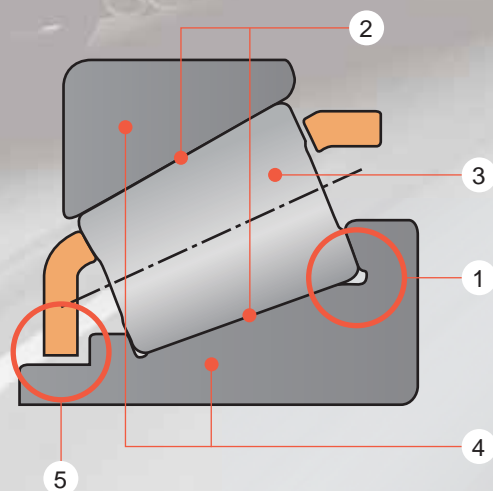


Tapered roller bearing development timeline (for automobile drivelines)



Tapered Roller Bearings Torque reduction technologies LFT

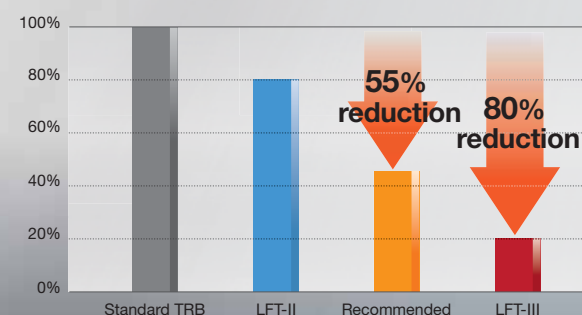
Target To reduce bearing rotational torque by focusing on friction loss caused by sliding, rolling and lubricant churning.



Applied technologies	LFT-II	Recommended	LFT-III
Optimized surface roughness and shape of sliding parts			
Optimized raceway crowning profile			
Optimized internal design			
Size reduction enabled by excellent heat-treatment technologies			
Control of lubricating oil flow			

Performance “Recommended” models significantly contribute to torque reduction compared to standard TRBs.

For axle drive pinion application, we are pleased to propose a model specially designed for that purpose as a recommended model. In addition, we can offer LFT-III as its option since LFT-III has a premium specification including the control of lubricating oil flow.



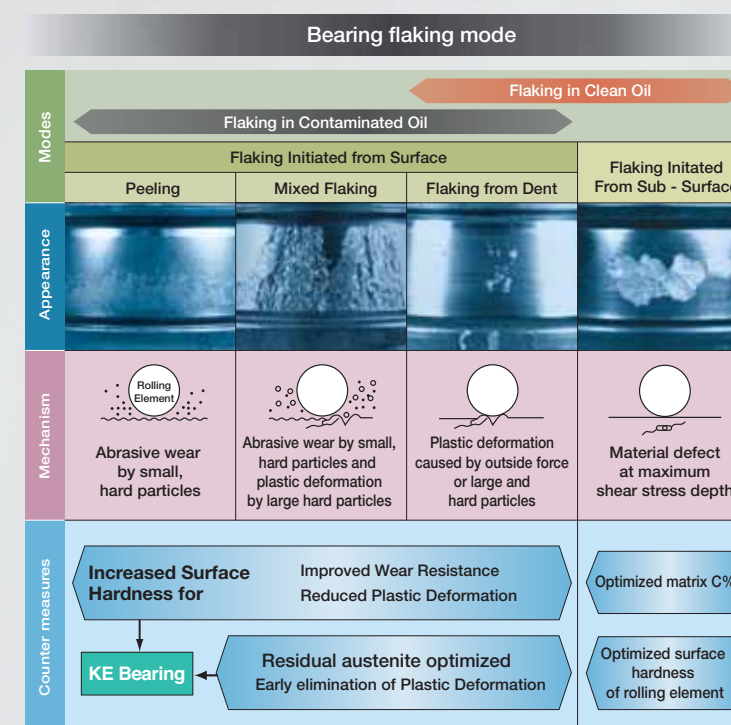
LFT is the abbreviation for low-friction torque, and is a registered trademark of JTEKT Corporation.

Tapered Roller Bearings KE Bearing - Embodiment of Size/Weight Reduction Technologies

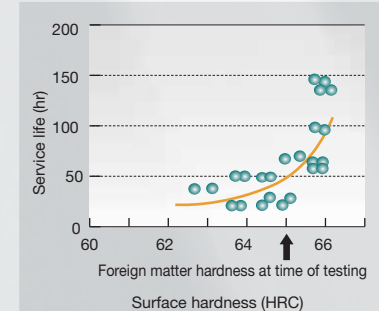
Target Significant extension of service life with contaminated oil by adopting JTEKT's own heat treatment technologies.

1. Increase bearing surface hardness
2. Optimize the amount of retained austenite

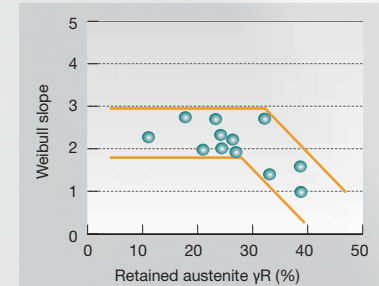
Effective to surface originated flaking which occurs when lubricated by contaminated oil



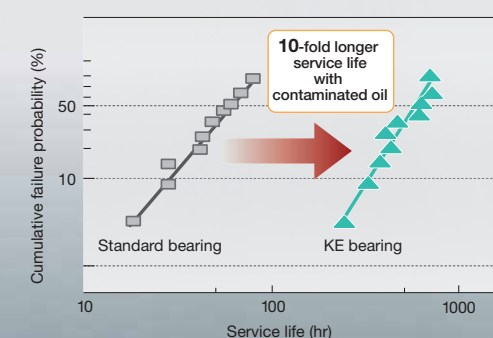
Relationship between bearing surface hardness and service life with contaminated oil



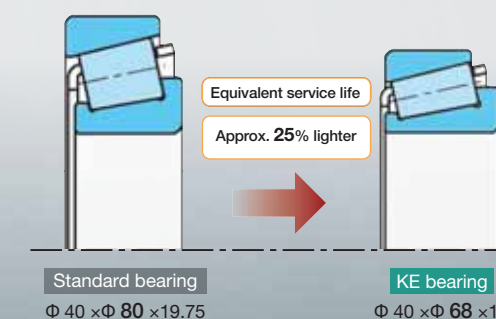
Relationship between the amount of retained austenite and Weibull slope with contaminated oil



Performance Longer service life with contaminated oil



Size/Weight reductions Contribution to fuel economy enhancement

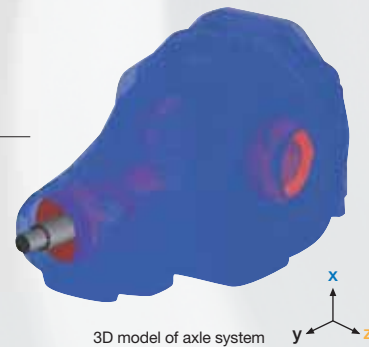


Example Technology Review

CAE analysis

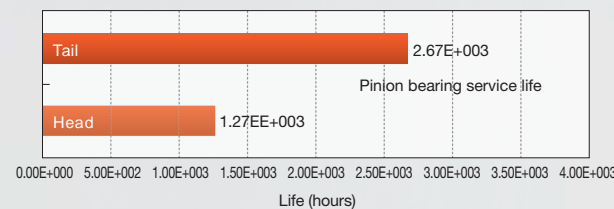
JTEKT's design and development are conducted utilizing the latest equipment in an advanced CAE environment.

As JTEKT developed its own high-precision tapered roller bearing's torque calculation formula based on accumulated data, research and analysis, rotational torque can be easily obtained and used for examination. JTEKT considers the rigidity of whole axle system, which supports the axle, bearing service life, contact stress, etc. and propose the best TRBs for your applications.

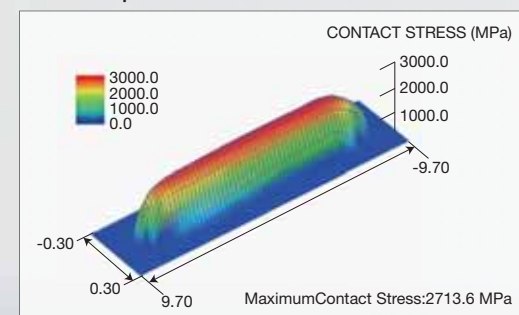


Calculation is possible as axle system.

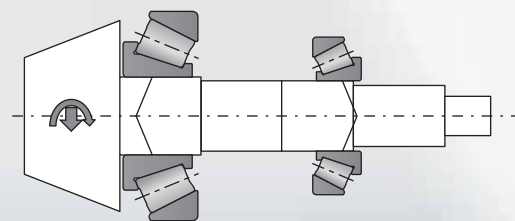
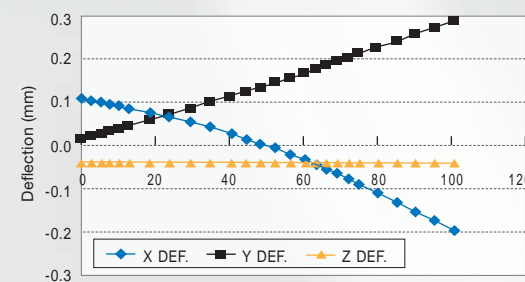
Service life calculation



Surface pressure calculation



Deflection of pinion gear's meshing point



Simulation test equipment

In response to customers' requests, we conduct evaluations utilizing various vehicle driving conditions.

At JTEKT, prior to evaluations in actual vehicles, evaluations simulating various driving conditions are possible (such as oil flow check and torque loss measurement), which enables the reduction of development and evaluation periods.

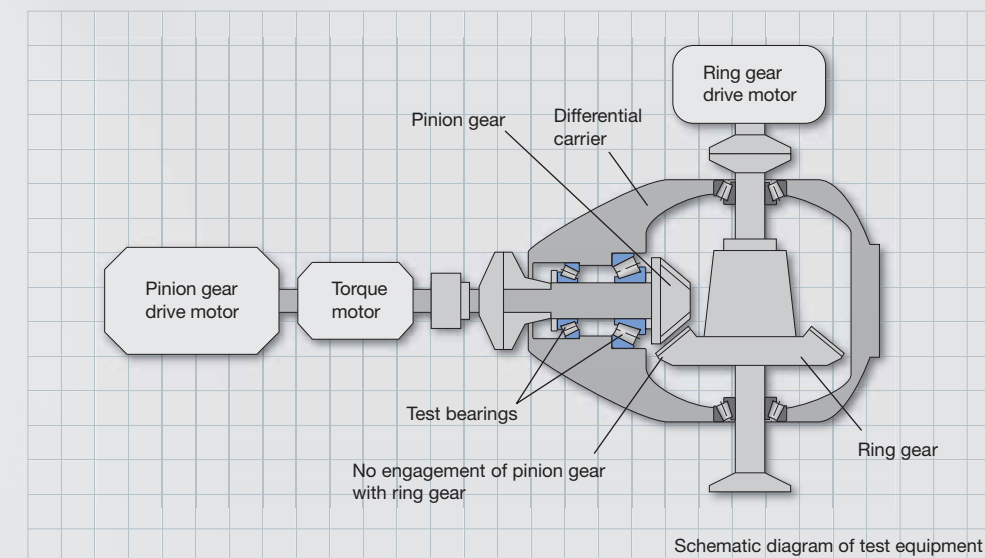
Simulation of mountain road driving, high-speed cornering, driving in urban areas, etc.

Nose angle Turning angle Longitudinal G force Lateral G force Load
Rotational speed Temp



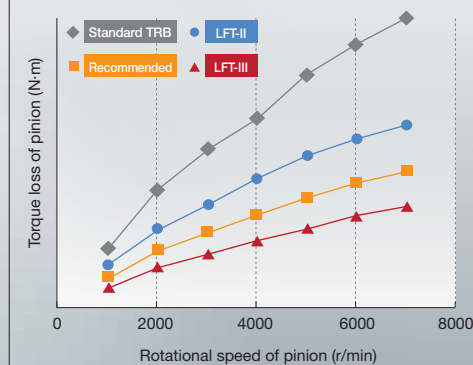
Example Evaluation

CAE analysis result is verified by using an actual final reduction gear unit with an actual drive pinion.



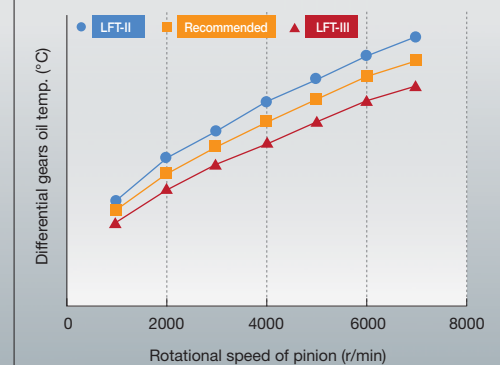
Pinion bearing torque measurement results

Recommended Max. 55% torque reduction
LFT-III Max. 80% torque reduction
* Compared to Standard TRB



Oil temperature measurement results of differential gears

Recommended Max. temp. rise controlled to 11°C
LFT-III Max. temp. rise controlled to 20°C
* Compared to LFT-II



Testing methods:
"Pinion bearing torque measurement results" for torque reduction and
"Oil temperature measurement results of differential gears" for temperature rise.

Global Technical Support (Bearing Development Bases)

Technical centers located around the world ensure quick response and technical support for customers' needs.



Iga Proving Ground Enables Testing / Evaluations Simulating Roads Worldwide

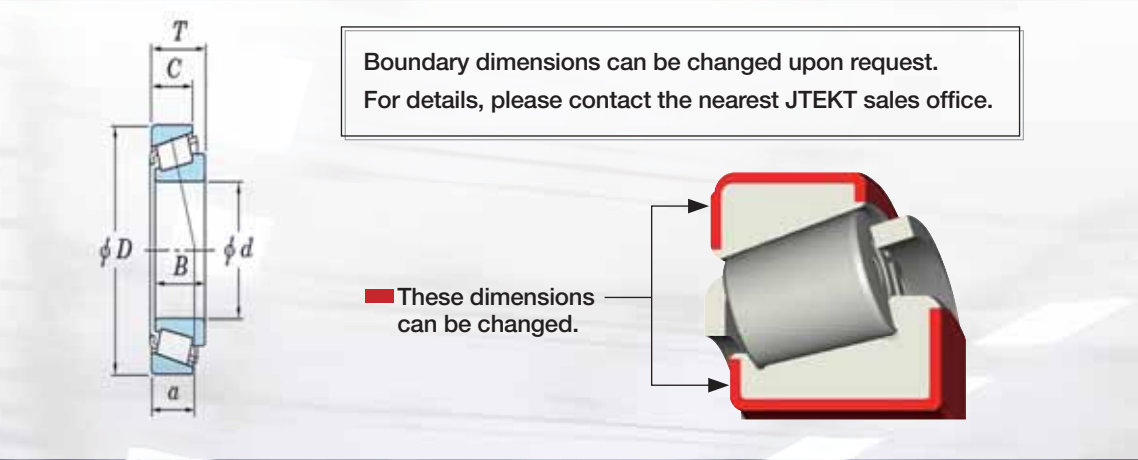
Fully utilizing our knowledge as a world-leading systems supplier, JTEKT conducts driving evaluations and analyses of products installed in vehicles. We exhaustively pursue the highest standards in product safety and operation on a test course capable of simulating various road and weather conditions 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.



Recommended Series Bearing Numbers

Please select from the recommended bearing numbers when considering axle drive pinion bearings.

Boundary dimensions (mm)						Basic load rating (kN)		Fatigue load limit (kN)	Representative bearing number	ABMA bearing number	Load center position (mm)	Constant	Axial load factor		(Reference) Mass (kg)
No.	d	D	T	B	C	C _r	C _{0r}	C _u			a	e	Y1	Y0	
1	30	72	20.750	19	14	71.2	55.6	8.10	KEST3072CLFT	---	18.6	0.55	1.10	0.60	0.381
2	33.338	68.263	22.225	22.225	15.25	66.1	62.2	8.70	KESTD3368LTF	M88048/10	21.8	0.70	0.86	0.47	0.361
3	34.925	72.233	23.579	23.106	15.463	78.8	75.0	10.6	KESTR3572LFTYR1	HM88649/10	22.0	0.70	0.86	0.47	0.428
4	35	80	29.000	27.2	20	100	96.4	13.8	KESTN3580LFT	---	24.8	0.50	1.20	0.66	0.694
5	36.513	79.375	29.370	27.2	20.4	100	96.4	13.8	KESTA3779LFT	HM89249/10	25.6	0.67	0.90	0.49	0.664
6	40	90	26.500	26	18.5	110	106	15.7	KESTJ4090LFT	---	25.4	0.62	0.97	0.53	0.806
7	41.275	82.550	26.543	25.654	18	85.8	75.3	11.0	KEST4183YR1LFT	M802048/11	27.3	0.72	0.84	0.46	0.601
8	41.275	90.000	30.006	30.006	21	112	112	16.2	KEST4190LFTUR4	HM803146/10	29.0	0.70	0.86	0.47	0.866
9	45	100	38.000	36.5	27.5	164	183	25.6	KETRD091004UR4	---	34.5	0.76	0.79	0.43	1.46
10	47.625	95.250	30.162	29.37	20.5	127	133	19.4	KESTA4895-1LFTUR4	HM804846/10	29.2	0.70	0.86	0.47	0.945
11	50.800	104.775	36.512	34	25.5	171	177	26.1	KETRD101004UR4	HM807046/10	33.1	0.67	0.90	0.49	1.41



OFFICES

KOYO CANADA INC.

5324 South Service Road, Burlington, Ontario L7L 5H5, CANADA
TEL : 1-905-681-1121
FAX : 1-905-681-1392

JTEKT NORTH AMERICA CORPORATION

-Main Office-

47771 Halyard Drive, Plymouth, MI 48170, U.S.A.
TEL : 1-734-454-1500
FAX : 1-734-454-4076

-Cleveland Office-

29570 Clemens Road, P.O.Box 45028, Westlake,
OH 44145, U.S.A.
TEL : 1-440-835-1000
FAX : 1-440-835-9347

KOYO MEXICANA, S.A. DE C.V.

Av. Insurgentes Sur 2376-505, Col. Chimalistac, Del. Álvaro
Obregón, C.P. 01070, México, D.F.
TEL : 52-55-5207-3860
FAX : 52-55-5207-3873

KOYO LATIN AMERICA, S.A.

Edificio Banco del Pacifico Planta Baja, Calle Aquilino de la
Guardia y Calle 52, Panama, REPUBLICA DE PANAMA
TEL : 507-208-5900
FAX : 507-264-2782/507-269-7578

KOYO ROLAMENTOS DO BRASIL LTDA.

Avenida Reboucas, 2472 Jardim America, CEP 05402-300 São
Paulo, BRAZIL
TEL : 55-11-3372-7500
FAX : 55-11-3887-3039

KOYO BEARINGS INDIA PVT. LTD.

C/o Stylus Commercial Services PVT LTD, Ground Floor, The
Beech, E-1, Manyata Embassy Business Park, Outer Ring Road,
Bengaluru-560045, INDIA
TEL : 91-80-4276-4567 (Reception Desk of Service Office)
FAX : 91-80-4276-4568

JTEKT (THAILAND) CO., LTD.

172/1 Moo 12 Tambol Bangwua, Amphur Bangpakong,
Chachoengsao 24180, THAILAND
TEL : 66-38-830-571/578
FAX : 66-38-830-579

PT. JTEKT INDONESIA

d/a. MM2100 Industrial Town Block DD-3, Cikarang Barat, Bekasi
17520, INDONESIA
TEL : 62-21-8998-3273
FAX : 62-21-8998-3274

KOYO SINGAPORE BEARING (PTE.) LTD.

27, Penjuru Lane, #09-01 C&P Logistics Hub 2, SINGAPORE
609195
TEL : 65-6274-2200
FAX : 65-6862-1623

KOYO MIDDLE EAST FZCO

6EA 601, Dubai Airport Free Zone, P.O. Box 54816, Dubai,
U.A.E.
TEL : 97-1-4299-3600
FAX : 97-1-4299-3700

PHILIPPINE KOYO BEARING CORPORATION

6th Floor, One World Square Building, #10 Upper McKinley
Road, McKinley Town Center Fort Bonifacio, 1634 Taguig City,
PHILIPPINES
TEL : 63-2-856-5046/5047
FAX : 63-2-856-5045

JTEKT KOREA CO., LTD.

Inwoo Building 6F, 539-11, Shinsa-dong, Gangnam-Gu, Seoul,
KOREA
TEL : 82-2-549-7922
FAX : 82-2-549-7923

JTEKT (CHINA) CO., LTD.

Room.25A2, V-CAPITAL Building, 333 Xianxia Road, Changning
District, Shanghai 200336, CHINA
TEL : 86-21-5178-1000
FAX : 86-21-5178-1008

KOYO AUSTRALIA PTY. LTD.

Unit 2, 8 Hill Road, Homebush Bay, NSW 2127, AUSTRALIA
TEL : 61-2-8719-5300
FAX : 61-2-8719-5333

JTEKT EUROPE BEARINGS B.V.

Markerkant 13-01, 1314 AL Almere, THE NETHERLANDS
TEL : 31-36-5383333
FAX : 31-36-5347212

-Benelux Branch Office-

Energieweg 10a, 2964 LE, Groot-Ammers, THE NETHERLANDS
TEL : 31-184606800
FAX : 31-184606857

KOYO KULLAGER SCANDINAVIA A.B.

Johanneslundsvägen 4, 194 61 Upplands Väsby, SWEDEN
TEL : 46-8-594-212-10
FAX : 46-8-594-212-29

KOYO (U.K.) LIMITED

Whitehall Avenue, Kingston, Milton Keynes MK10 0AX,
UNITED KINGDOM
TEL : 44-1908-289300
FAX : 44-1908-289333

KOYO DEUTSCHLAND GMBH

Bargkoppelweg 4, D-22145 Hamburg, GERMANY
TEL : 49-40-67-9090-0
FAX : 49-40-67-9203-0

KOYO FRANCE S.A.

6 avenue du Marais, BP20189, 95105 Argenteuil, FRANCE
TEL : 33-1-3998-4202
FAX : 33-1-3998-4244/4249

KOYO IBERICA, S.L.

Avda.de la Industria, 52-2 izda 28820 Coslada Madrid, SPAIN
TEL : 34-91-329-0818
FAX : 34-91-747-1194

KOYO ITALIA S.R.L.

Via Stephenson 43/a 20157 Milano, ITALY
TEL : 39-02-2951-0844
FAX : 39-02-2951-0954

-Romanian Representative Office-

24, Lister Street, ap. 1, sector 5, Bucharest, ROMANIA
TEL : 40-21-410-4182
FAX : 40-21-410-1178

PUBLISHER

JTEKT CORPORATION NAGOYA HEAD OFFICE

No.7-1, Meieki 4-chome, Nakamura-ku, Nagoya, Aichi 450-8515, JAPAN TEL:81-52-527-1900 FAX:81-52-527-1911

JTEKT CORPORATION OSAKA HEAD OFFICE

No.5-8, Minamisemba 3-chome, Chuo-ku, Osaka 542-8502, JAPAN TEL:81-6-6271-8451 FAX:81-6-6245-3712

Sales & Marketing Headquarters

No.5-8, Minamisemba 3-chome, Chuo-ku, Osaka 542-8502, JAPAN TEL:81-6-6245-6087 FAX:81-6-6244-9007

Value & Technology



CAT.NO.B1006E
Printed in japan'14.04-1CCH