

Koyo[®]



Tapered Roller Bearings

for axle drive pinions



JTEKT

JTEKT CORPORATION

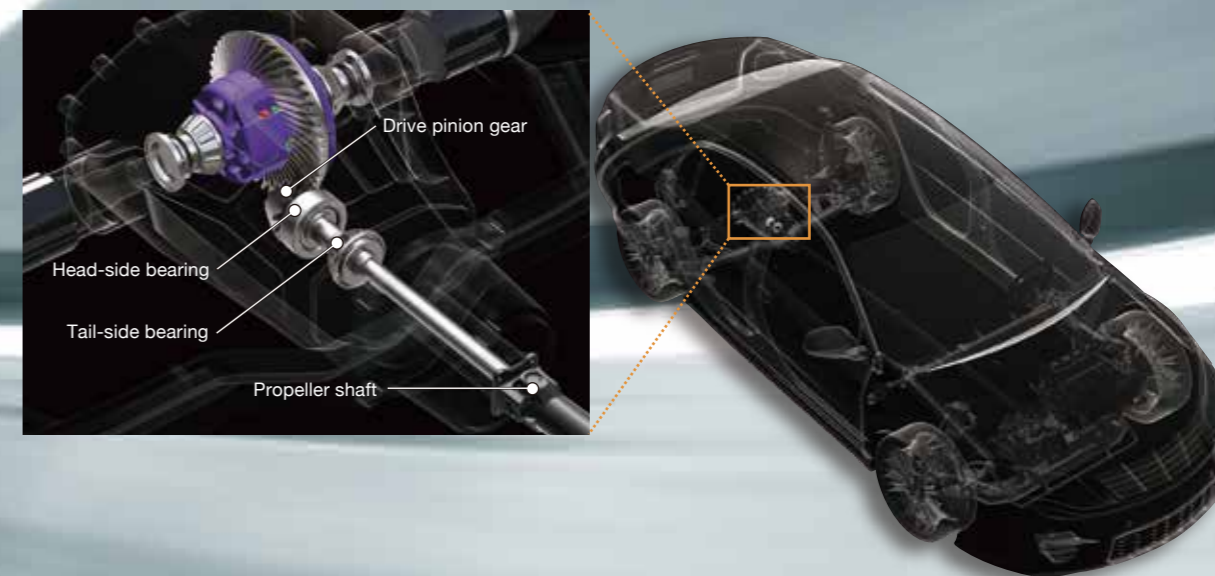
CAT.NO.B1006E-1

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

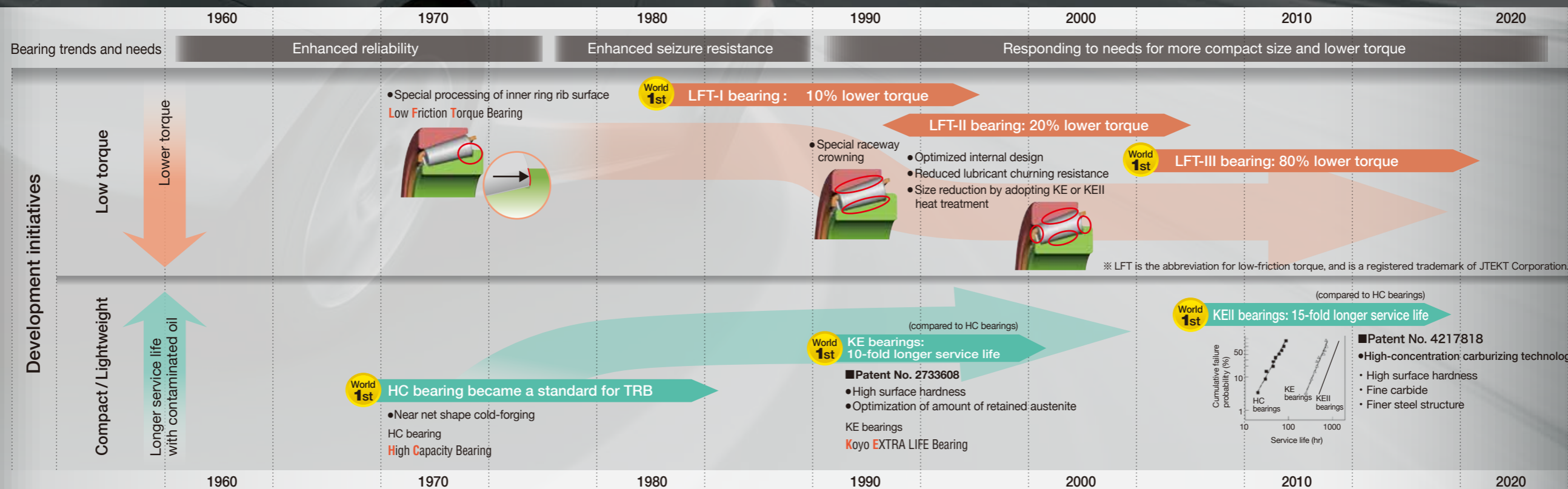
In automobile axles, various stresses are caused by acceleration, deceleration, and cornering forces in a complex manner from all directions. They're truly a key mechanical part of every vehicle. In response to the demand for ever more advanced bearings that support drive pinions, JTEKT goes one step 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.

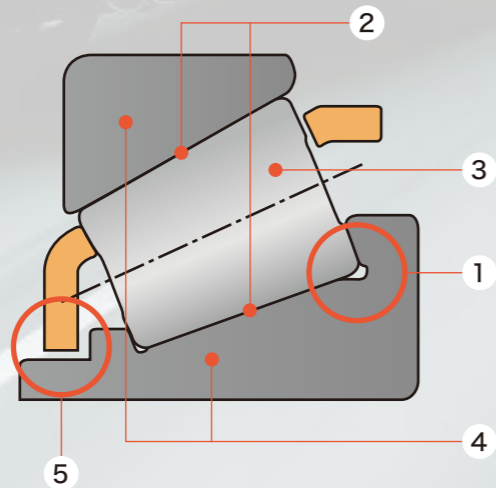


Tapered roller bearing development timeline (for automobile drivelines)



Tapered Roller Bearings Torque reduction technologies LFT

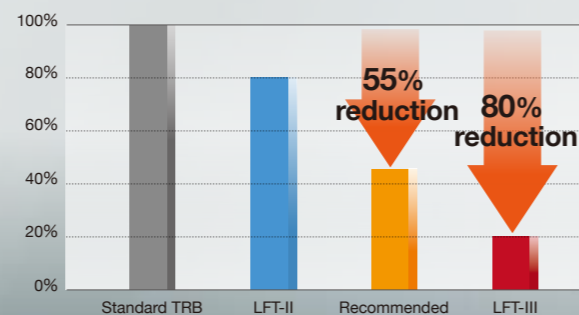
Target To reduce bearing rotational torque by focusing on friction loss caused by sliding, rolling and lubricant churning.



Applied technologies	LFT-II	Recommended	LFT-III
① Optimized surface roughness and shape of sliding parts	■	■	■
② Optimized raceway crowning profile	■	■	■
③ Optimized internal design	■	■	■
④ Size reduction enabled by excellent heat-treatment technologies	■	■	■
⑤ Control of lubricating oil flow	■	■	■

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

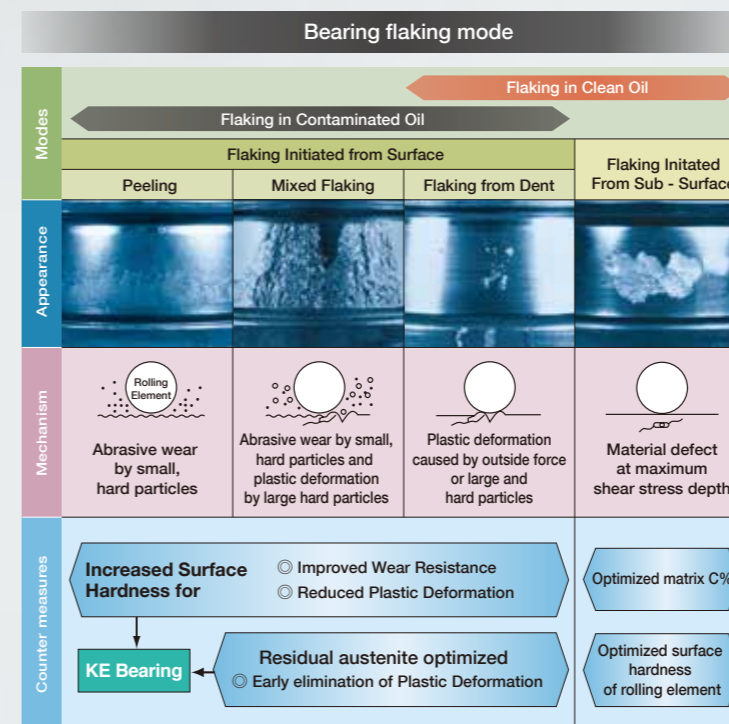
For axle drive pinion application, we are pleased to propose a model specially designed for that purpose as a recommended model. In addition, we can offer LFT-III as its option since LFT-III has a premium specification including the control of lubricating oil flow.



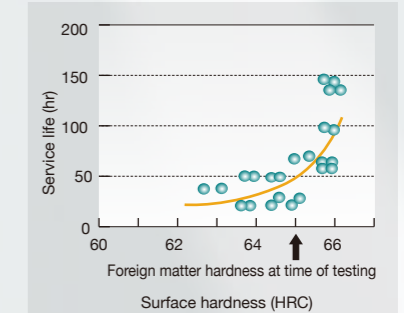
Tapered Roller Bearings KE Bearing—Embodiment of Size/Weight Reduction Technologies

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

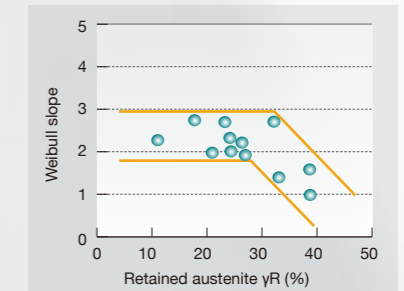
- 1. Increase bearing surface hardness
 - 2. Optimize the amount of retained austenite
- Effective to surface originated flaking which occurs when lubricated by contaminated oil



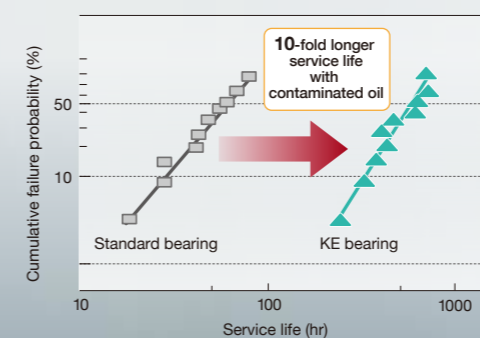
Relationship between bearing surface hardness and service life with contaminated oil



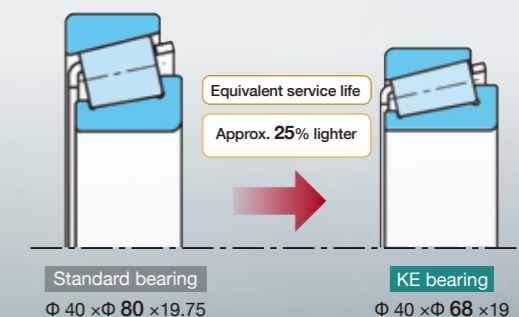
Relationship between the amount of retained austenite and Weibull slope with contaminated oil



Performance Longer service life with contaminated oil



Size/Weight reductions Contribution to fuel economy enhancement

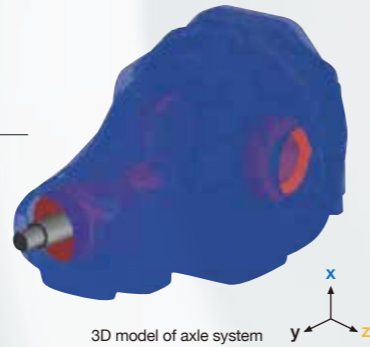


Example Technology Review

CAE analysis

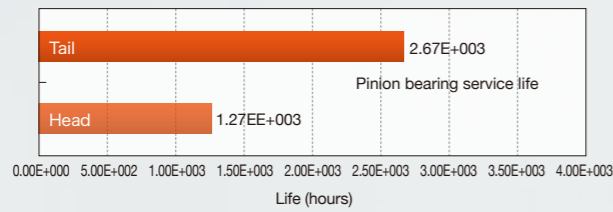
JTEKT's design and development are conducted utilizing the latest equipment in an advanced CAE environment.

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.

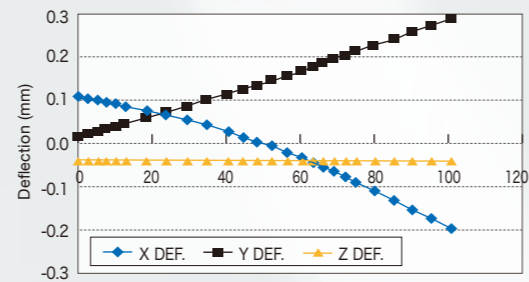


Calculation is possible as axle system.

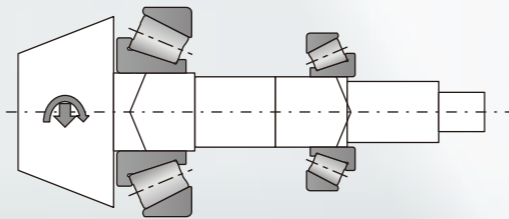
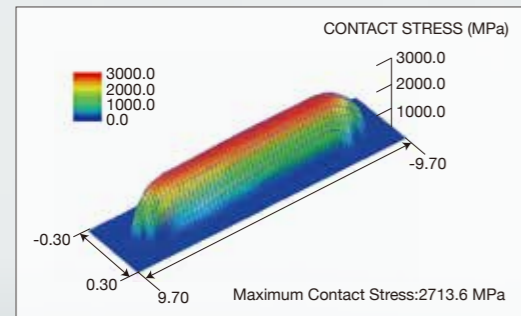
Service life calculation



Deflection of pinion gear's meshing point



Surface pressure calculation



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.

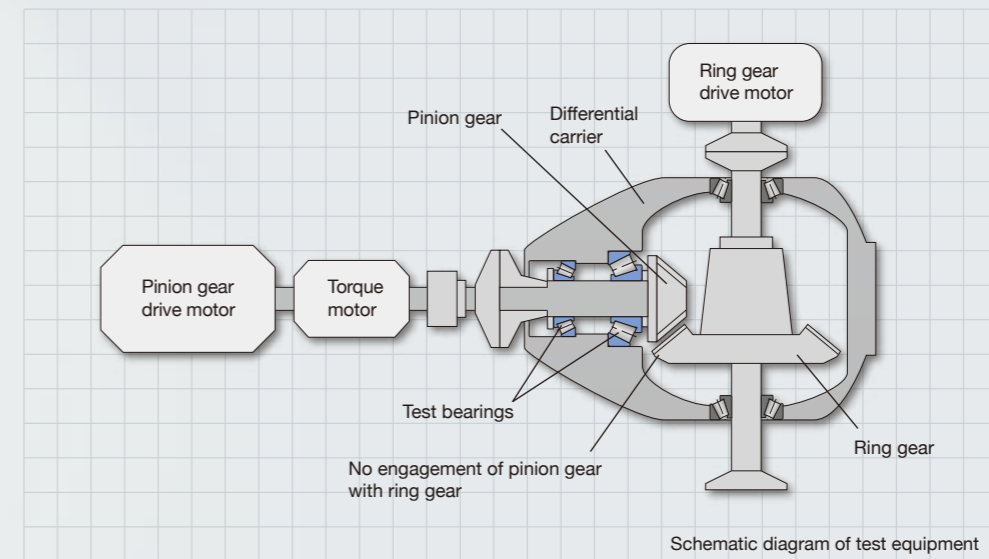
Simulation of mountain road driving, high-speed cornering, driving in urban areas, etc.

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



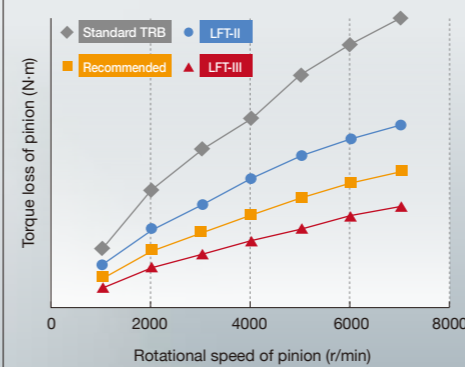
Example Evaluation

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



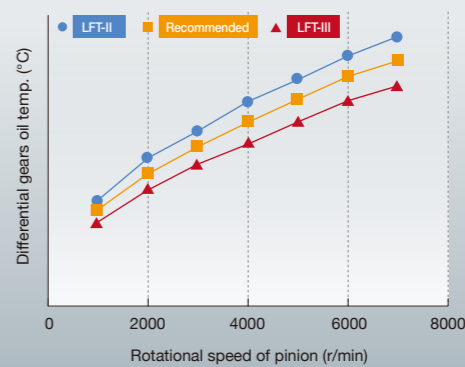
Pinion bearing torque measurement results

- 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

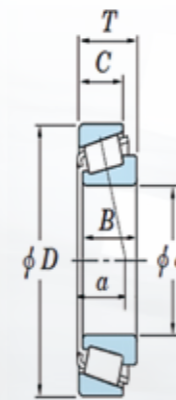
Fully utilizing our knowledge as a world-leading systems supplier, JTEKT conducts driving evaluations and analyses of products installed in vehicles. We exhaustively pursue the highest standards in product safety and operation on a test course capable of simulating various road and weather conditions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

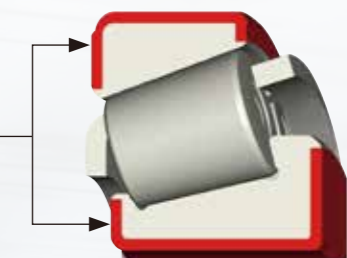
Please select from the recommended bearing numbers when considering axle drive pinion bearings.

No.	Boundary dimensions (mm)					Basic load rating (kN)		Fatigue load limit (kN)	bearing number	ABMA bearing number	Load center position (mm)	Constant		Axial load factor		(Reference) Mass (kg)
	d	D	T	B	C	C _r	C _{or}	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	KESTD3368LFT	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	



Boundary dimensions can be changed upon request.
For details, please contact the nearest JTEKT sales office.

These dimensions can be changed.



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Value & Technology

