

Double row axial angular contact ball bearings

Standard bearings and *Heavy series* ZKLF...2Z



**Heavy series
ZKLF 100 230.2Z**

Bearings of series ZKLF are double row axial angular contact ball bearings with an outer ring suitable for flange mounting and integral seals. These bearings are predominantly used for the bearing arrangements of screw drives and are an extremely economical solution for criteria such as a simple adjacent construction and low fitting costs. The larger sizes of these bearings – with a bore diameter of 60 mm to 100 mm – are particularly suitable for bearing arrangements of large threaded spindles or rotating threaded nuts, in other words screw drives with a static spindle.

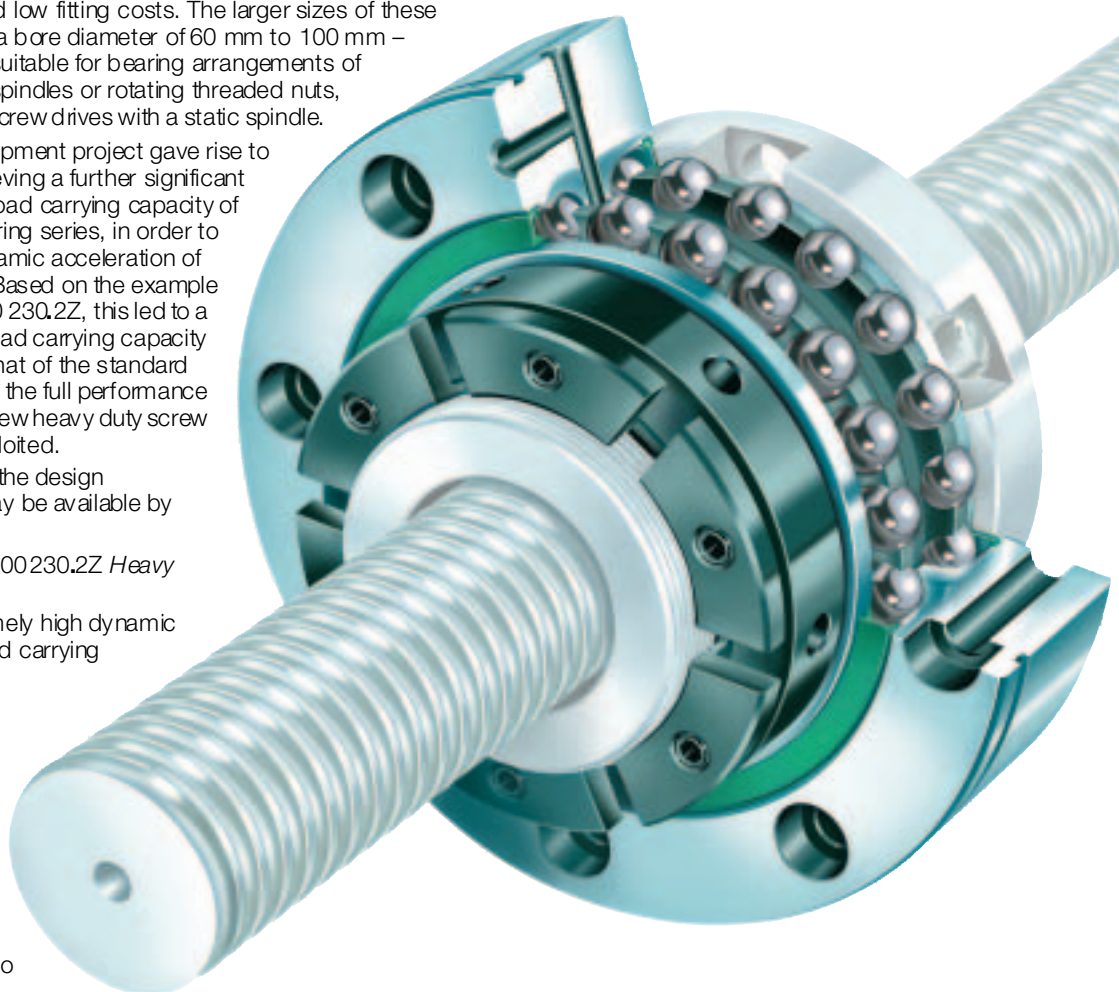
A special development project gave rise to the idea of achieving a further significant increase in the load carrying capacity of the existing bearing series, in order to allow highly dynamic acceleration of larger masses. Based on the example of size ZKLF 100 230.2Z, this led to a bearing with a load carrying capacity almost double that of the standard bearing allowing the full performance capacity of the new heavy duty screw drives to be exploited.

Further sizes of the design *Heavy series* may be available by agreement.

The size ZKLF 100 230.2Z *Heavy series*:

- has an extremely high dynamic and static load carrying capacity
- is a compact, ready-to-fit bearing unit
- is suitable for high speeds – in terms of its diameter
- has an optimised ratio between load carrying capacity and design envelope.

The complete range of bearings for screw drives is described in detail in *INA publication "ZAE"*.



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Double row axial angular contact ball bearings of series ZKLF...2Z have two rows of balls with a contact angle of 60°.

The bearings are sealed on both sides with gap seals and are greased for life for the majority of applications. Additional seals in the adjacent construction are not required.

In most applications, the initial greasing is sufficient for the whole operating life. If necessary, relubrication can be carried out via a threaded connector for a central lubrication system on the flange side or by means of a lubrication groove and lubrication hole via the adjacent construction.

The axial runout tolerance corresponds approximately to P2 in accordance with DIN 620.

Figure 1 shows the basic load rating reserves of the new bearing ZKLF 100230.2Z in comparison with a heavy duty screw drive (ball screw drive KGT).

Figure 2 shows the dynamic and static load carrying capacity of the standard bearing in comparison with the new *Heavy series* ZKLF 100230.2Z.

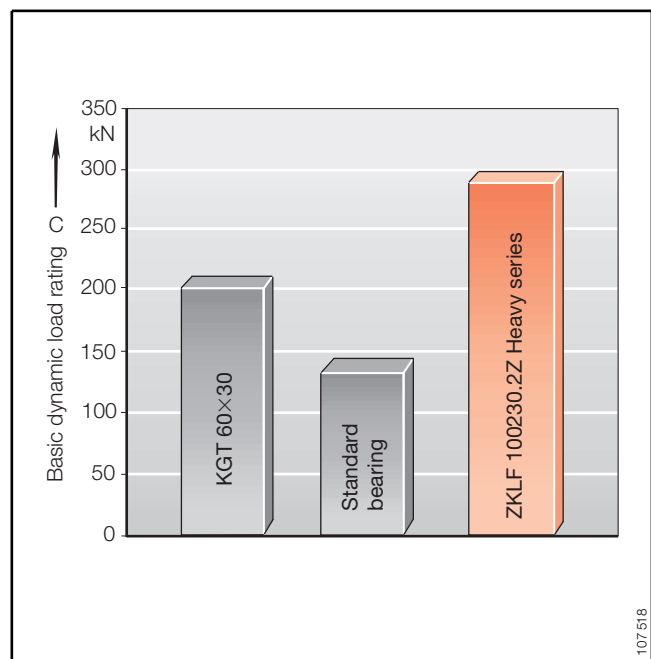


Figure 1 · Dynamic load carrying capacity, matched to the load carrying capacity of heavy duty screw drives

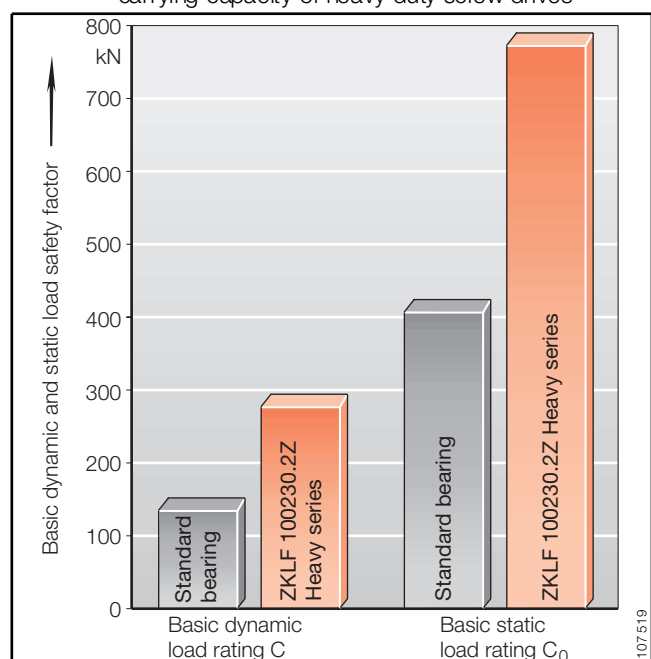


Figure 2 · Load carrying capacity – standard bearing/
Heavy series



Further information on bearings of series ZKLF: see INA publication "ZAE" and Fitting and maintenance manual "TPI 100".

Since the outer ring is suitable for screw mounting, the bearings can easily be flange mounted on the adjacent construction (Figure 3, Figure 4). This easy-to-fit solution gives savings on fitting costs and prevent fitting errors that could, for example, occur with assembled bearing packages.

Frictional power and limiting speed

The limiting speeds n_G in the *dimension table* are guide values proven in practice; depending on the specific application, the actual values may be higher or lower. The values are based on the following conditions:

- bearing prebaded, no external operating load
- 25% operating duration
- max. equilibrium temperature +50 °C.

For size ZKLF 100 230.2Z *Heavy series*, the precise limiting speed can be determined using the frictional power by means of a thermal balance calculation (Figure 5, Frictional power as a function of speed).

For thermal balance calculation, see *INA Catalogue "307", Speeds*.

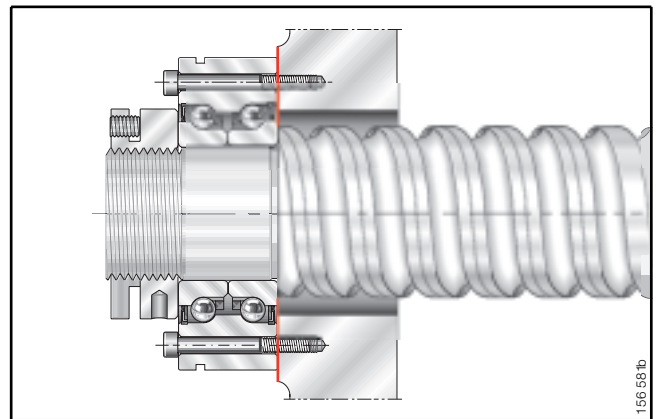


Figure 3 · Bearing screw mounted on flat surface

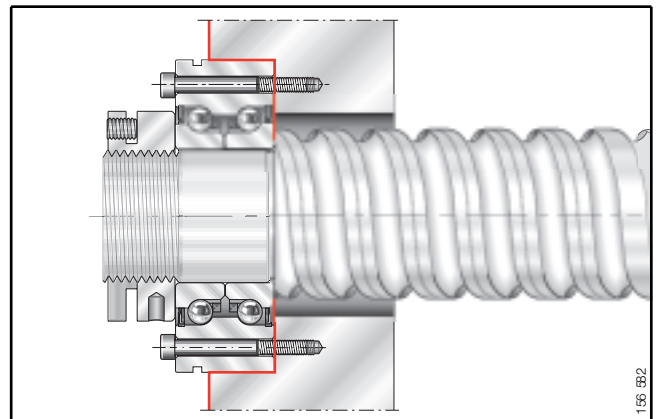


Figure 4 · Bearing in centring bore

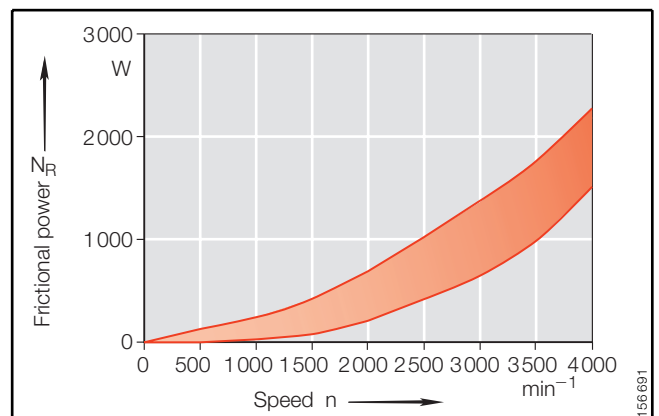
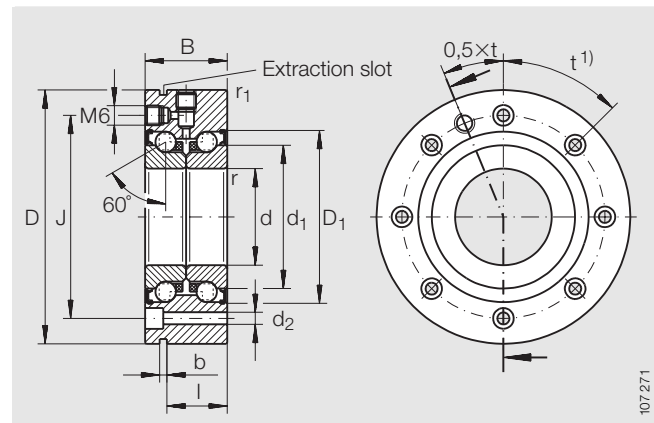


Figure 5 · Frictional power as a function of speed

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Series ZKLF...2Z



ZKLF...2Z (60 mm ≤ d ≤ 100 mm)

Dimension table · Dimensions in mm

Shaft diameter	Designation	Mass m	Dimensions										Mounting dimensions		Fixing screws ³⁾ DIN 912-10.9	
			d	D	B	d ₁	D ₁	r, r ₁	J	d ₂	b	l	D _a ²⁾	d _a ²⁾	Size	Quantity
d		≈ kg	-0,008	-0,015	-0,25			min.								
60	ZKLF 60145.2Z	4,3	60	145	45	85	100	0,6	120	8,8	3	35	100	82	M 8	8
70	ZKLF 70155.2Z	4,9	70	155	45	85	110	0,6	130	8,8	3	35	110	92	M 8	8
80	ZKLF 80165.2Z	5,3	80	165	45	105	120	0,6	140	8,8	3	35	120	102	M 8	8
90	ZKLF 90190.2Z	8,7	90	190	55	120	138	0,6	165	11	3	45	138	116	M10	8
100	ZKLF 100200.2Z	9,3	100	200	55	132	150	0,6	175	11	3	45	150	128	M10	8
	ZKLF 100230.2Z⁷⁾	17,6	100	230	85	146	174,6	0,6	200	14	3	73	175	130	M12	12

Permissible operating temperature: +120 °C (continuous operation).

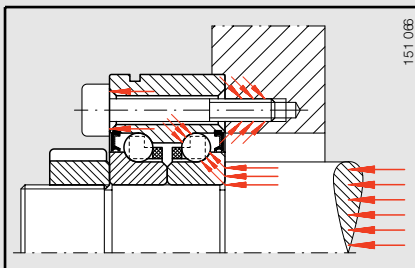
¹⁾ For quantity of screws and pitch, see *dimension table*.

²⁾  Recommended minimum abutment diameter.
If these values are not used, rib diameters d₁ and D₁ must be observed.

³⁾ Tightening torque of fixing screws according to manufacturer's data.
Screws are not included in the delivery.

$$^4) P_{0zul} \leq \frac{C_0}{2}$$

Permissible static axial load in the direction of the screw connection.

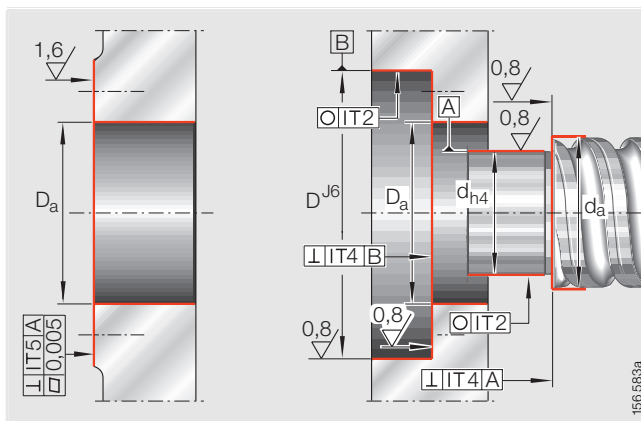


⁵⁾ Mass moment of inertia for rotating inner ring.

⁶⁾ Locknuts are not included in the delivery; these must be ordered separately (see *INA publication ZAE* and *Market Information MAI 76*).
The tightening torques stated are only valid in conjunction with INA precision locknuts.

⁷⁾ Heavy series.

⁸⁾ See page 3, Figure 5.



Tolerance grades for shaft and housing

Pitch t Quantity×t	Basic load ratings axial ⁴⁾		Limiting speed n _{G grease} min ⁻¹	Bearing frictional torque M _{RL} Nm	Rigidity axial c _{aL} N/μ.m	Tilting rigidity axial c _{kL} Nm/mrad	Mass moment of inertia ⁵⁾ M _m kg · cm ²	Recommended INA locknut ⁶⁾		Shaft diameter d	
	dyn. C _a	stat. C _{0a}						Designation	Tightening torque M _A Nm		
	kN	kN									
8×45°	84	214	3 000	1	1300	1650	13,7	ZMA 60/ 98 AM 60	100	60	
8×45°	88	241	2 800	1,2	1450	2250	19,8	ZMA 70/110 AM 70	130	70	
8×45°	91	265	2 700	1,4	1600	3000	27,6	ZMA 80/120 AM 80	160	80	
8×45°	135	395	2 300	2,3	1700	4400	59,9	ZMA 90/130 AM 90	200	90	
8×45°	140	435	2 150	2,6	1900	5800	85,3	– AM 100	250	100	
12×30°	295	790	– ⁸⁾	3	2450	8200	185	– AM 100	500		



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