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Технические характеристики

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General Information

HIGH PRECISION BEARINGS

PRODUCT DESCRIPTION

INA Combination Axial Ball And Radial Needle Bearings

- Radial precision ground needle bearing designed on ISO series NA4900 cross section.
- Various axial ball thrust bearings for light to heavy thrust loads adds length to bearing and may increase the outside diameter.
- Designed for applications where the thrust load is secondary to the radial load.

INA Combination Axial And Radial Needle Bearings

- Radial precision ground needle bearing designed on ISO series NA4900 cross section.
- Axial cylindrical thrust bearing for heavy thrust loads based on series 81100.
- Designed for applications where axial preload is required.

INA Combination Bearings For Ball Screw Support

- Matched axial cylindrical roller thrust cages with radial needle support.
- Made to P4 (ABEC 7) runout values for thrust.
- Extremely high rigidity with easily repeatable preloads.
- Available with predrilled integral mounting flange for ease of assembly without increased tolerance stack up.
- Available with seal mounting accessories.

INA 60° Contact Angle Angular Contact Ball Thrust Bearings For Ball Screw Support

- Individual bearings consist of 2 rows as a back to back arrangement with a single outer ring.
- Available as 2 matched bearings for 4 row applications.
- Available as 3 row design with one piece outer ring for stretched or vertical screws.
- Made to P4 (ABEC 7) axial runout values or available as PE version with P5(ABEC 5) runout.
- Available with integral shields or seals.
- Available with predrilled integral mounting flange for ease of assembly without increased tolerance stack up.
- Allows for economical arrangements since seals and mounting flanges included, reducing the need for associated parts.

INA Precision Locknuts

- Metric thread locknuts for high axial clamping forces.
- Designed with large axial and radial cross section for increased rigidity.
- Available with radial clamping plugs or axial deflection beams for doubling the back off torque.

INA Rotary Table Bearings

- Specialty bearing series for machine tool rotary tables and robots.
- Available in P4 precision for rotary tables with flange designs similar to Ball Screw Support Bearings.

INA YRT Series Bearings

- Large, double direction axial bearings with a radial guidance bearing.
- Support load combinations consisting of axial and radial forces as well as tilting moments.
- Holes are provided in the outer and inner rings which are suitable for flange mounting.
- The bearing consists of two axial needle roller and cage assemblies which are matched to the rings in such a way that a predetermined axial preload is achieved.
- Made to P4 (ABEC 7) tolerances.

INA ZKLDF Series Bearings

- Axial angular contact ball bearings of series ZKLDF are double row angular contact ball bearings with a 60° contact angle set in an "O" arrangement.
- They can support load combinations consisting of axial and radial forces as well as tilting moments.
- Bearings of this series have gap seals on both sides.
- The two-piece inner ring is matched to the two ball cages and the outer ring for a defined preload.
- The dimensional tolerances are class P5 (ABEC 5) and the geometrical tolerances are class P4 (ABEC 7) to DIN 620.

Part Number Identification

HIGH PRECISION BEARINGS

AXIAL ANGULAR CONTACT BALL BEARINGS AND NEEDLE ROLLER / AXIAL CYLINDRICAL ROLLER BEARINGS METRIC SERIES

ZKLN, ZKLF, ZARN, ZARF
DKLFA

ZKLN

ZKLN	Axial Angular Contact Ball Bearing, Double Direction
ZKLF	Axial Angular Contact Ball Bearing, Outer Ring Suitable for Flange Mounting
ZARN	Needle Roller / Axial Cylindrical Rollers Double Direction
ZARF	Needle Roller / Axial Cylindrical Rollers Double Direction, Outer Ring Suitable For Flange Mounting
DKLFA	Axial Angular Contact Ball Bearing, 3 Row, Double Direction, With Flange

4075

First Half – Shaft In mm
Second Half – OD In mm

TN

ZKL SUFFIXES	
2RS	Two Contact Seals
2Z	2 Gap Seals
2AP	Matched Pairs For 4 Ball Row
PE	Economy Version, P5 Runout

ZAR SUFFIXES	
TN	Plastic Cage
L	Stepped Extended Shaft Washer On 1 Side
PE	Economy Version, P5 Runout

ZARF COMBINATION SEALS METRIC SERIES

DRS

DRS

PREFIX	
DRS	Seal Ring Kit For Use With ZARF Series Bearings

40115

NUMBER	
	Shaft & OD, In Millimeters of mating ZARF Series Bearing

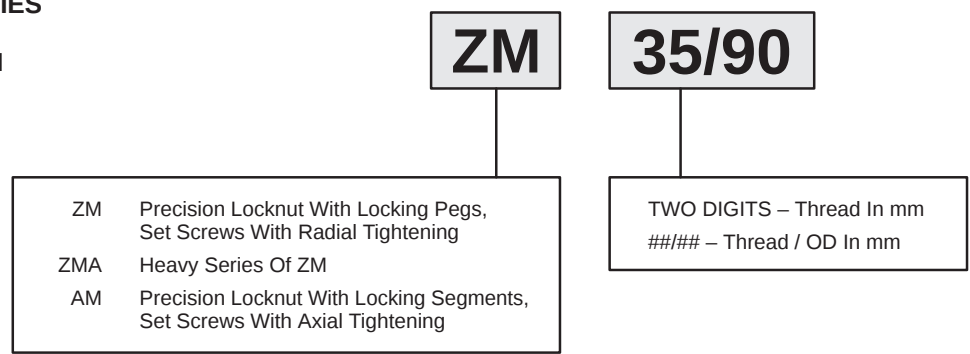


Part Number Identification

HIGH PRECISION BEARINGS

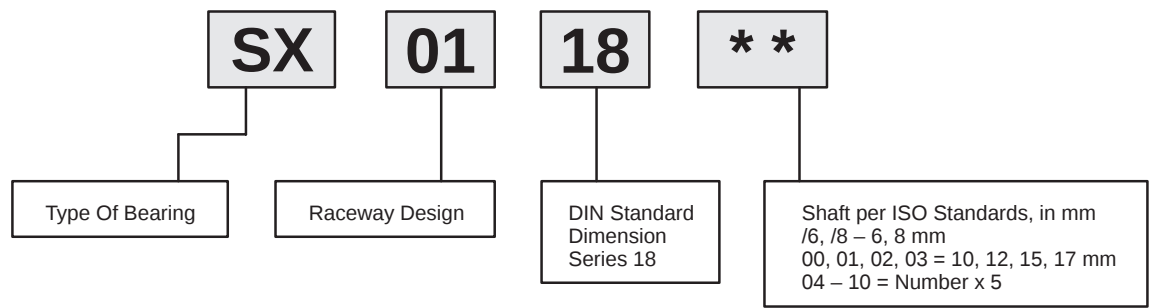
LOCKNUTS METRIC SERIES

ZM, ZMA, AM



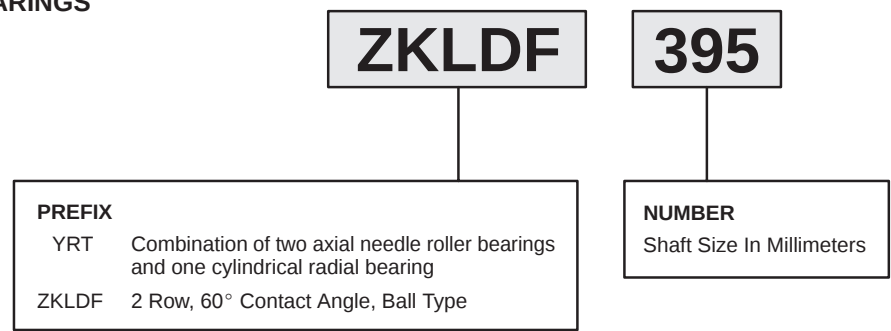
CROSSED ROLLER BEARINGS METRIC SERIES

SX



MACHINE TOOL TURNTABLE BEARINGS METRIC SERIES

YRT, ZKLDF

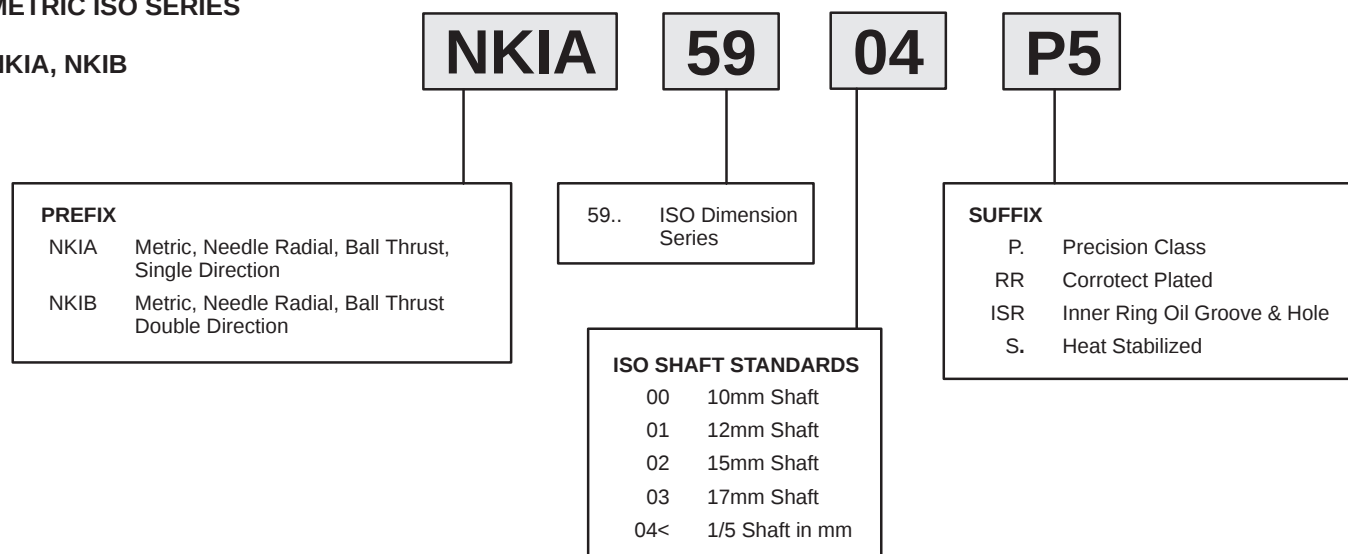


Part Number Identification

HIGH PRECISION BEARINGS

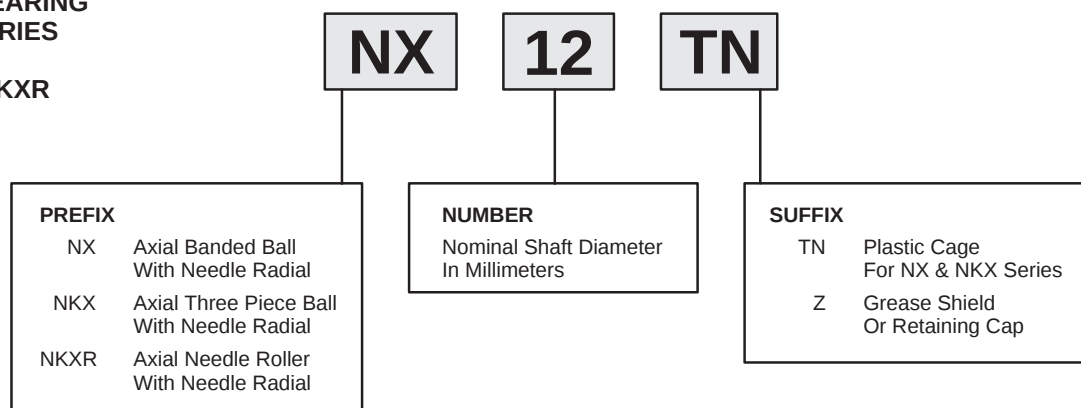
COMBINATION BEARINGS METRIC ISO SERIES

NKIA, NKIB



COMBINATION RADIAL NEEDLE BEARING METRIC SERIES

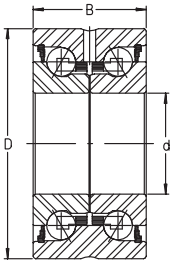
NX, NKX, NKXR



Angular Contact Thrust Ball Bearings

ZKLN..PE SERIES

- Double row, 60 degree contact angle
- Sealed
- For most ball screw support
- P5 runout with increased diameter tolerances



For details on part numbers, descriptive suffixes and various technical references, please refer to front of this section.
 For engineering or technical information contact your local sales representative or call Distributor Sales

PART NUMBER	SHAFT d inch	SHAFT d mm	OD D inch	OD D mm	WIDTH B inch	WIDTH B mm	WGT lbs	WGT kg	DYN. CAP. C lbf	DYN. CAP. C N	STAT. CAP. C ₀ lbf	STAT. CAP. C ₀ N
ZKLN 0624 2RS PE	0.236	6	0.945	24	0.591	15	0.066	0.03	1,550	6900	1,910	8500
ZKLN 1034 2RS PE	0.394	10	1.339	34	0.787	20	0.221	0.1	3,000	13400	4,250	18800
ZKLN 1242 2RS PE	0.472	12	1.654	42	0.984	25	0.441	0.2	3,800	17000	5,600	24700
ZKLN 1545 2RS PE	0.591	15	1.772	45	0.984	25	0.463	0.21	4,000	17900	6,300	28000
ZKLN 1747 2RS PE	0.669	17	1.850	47	0.984	25	0.485	0.22	4,250	18800	7,000	31000
F 822 17	0.669	17	1.850	47	1.181	30	0.617	0.28	5,800	26000	10,600	47000
F 822 20	0.787	20	1.850	47	1.181	30	0.573	0.26	5,800	26000	10,600	47000
ZKLN 2052 2RS PE	0.787	20	2.047	52	1.102	28	0.684	0.31	5,800	26000	10,600	47000
ZKLN 2557 2RS PE	0.984	25	2.244	57	1.102	28	0.75	0.34	6,200	27500	12,400	55000
F 822 25	0.984	25	2.441	62	1.181	30	1.014	0.46	6,500	29000	14,400	64000
ZKLN 3062 2RS PE	1.181	30	2.441	62	1.102	28	0.86	0.39	6,500	29000	14,400	64000
F 822 30	1.181	30	2.441	62	1.181	30	0.904	0.41	6,500	29000	14,400	64000
ZKLN 3572 2RS PE	1.378	35	2.835	72	1.339	34	1.125	0.51	9,200	41000	20,000	89000
ZKLN 4075 2RS PE	1.575	40	2.953	75	1.339	34	1.345	0.61	9,700	43000	22,700	101000
ZKLN 5090 2RS PE	1.969	50	3.543	90	1.339	34	1.94	0.88	10,500	46500	28,500	126000

CONTINUED FROM ABOVE

PART NUMBER	FRICTION in-lbf	FRICTION Nm	LOCKNUT	LOCKNUT TORQUE ft-lbf	LOCKNUT TORQUE Nm	SPEED LIMIT GREASE rpm
ZKLN 0624 2RS PE	0.35	0.04	ZM 06	1.48	2	6800
ZKLN 1034 2RS PE	1.06	0.12	ZM 10	4.43	6	4600
ZKLN 1242 2RS PE	1.42	0.16	ZM 12	5.9	8	3800
ZKLN 1545 2RS PE	1.77	0.2	ZM 15	7.38	10	3500
ZKLN 1747 2RS PE	2.12	0.24	ZM 17/AM 17	11.06	15	3300
F 822 17	2.66	0.3	ZM 17/AM 17	12.5	17	3000
F 822 20	2.66	0.3	ZM 20/AM 20	13.28	18	3000
ZKLN 2052 2RS PE	2.66	0.3	ZM 20/AM 20	13.28	18	3000
ZKLN 2557 2RS PE	3.54	0.4	ZM 25/AM 25	18.44	25	2600
F 822 25	4.43	0.5	ZM 25/AM 25	21.4	29	2200
ZKLN 3062 2RS PE	4.43	0.5	ZM 30/AM 30	23.6	32	2200
F 822 30	4.43	0.5	ZM 30/AM 30	23.6	32	2200
ZKLN 3572 2RS PE	5.31	0.6	ZM 35/AM 35	29.5	40	2000
ZKLN 4075 2RS PE	6.2	0.7	ZM 40/AM 40	40.6	55	1800
ZKLN 5090 2RS PE	7.97	0.9	ZM 50/AM 50	62.7	85	1500

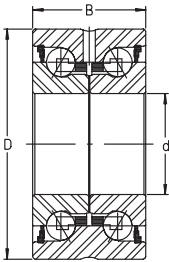
PE versions are relaxed tolerances for ball screw supports
 F 822 numbers match competitors paired bearings



Angular Contact Thrust Ball Bearings

ZKLN SERIES

- Double row, 60 degree contact angle
- Sealed versions (2RS), also available shielded (2Z)
- For ball screw support
- P4 runout for highest precision



For details on part numbers, descriptive suffixes and various technical references, please refer to front of this section.
 For engineering or technical information contact your local sales representative or call Distributor Sales

PART NUMBER	SHAFT d inch	SHAFT d mm	OD D inch	OD D mm	WIDTH B inch	WIDTH B mm	WGT lbs	WGT kg	DYN. CAP. C lbf	DYN. CAP. C N	STAT. CAP. C ₀ lbf	STAT. CAP. C ₀ N
ZKLN 0619 2Z	0.236	6	0.748	19	0.472	12	0.044	0.02	1,100	4900	1,400	6100
ZKLN 0624 2RS	0.236	6	0.945	24	0.591	15	0.066	0.03	1,550	6900	1,910	8500
ZKLN 0832 2RS	0.315	8	1.260	32	0.787	20	0.198	0.09	2,800	12500	3,650	16300
ZKLN 1034 2RS	0.394	10	1.339	34	0.787	20	0.221	0.1	3,000	13400	4,250	18800
ZKLN 1242 2RS	0.472	12	1.654	42	0.984	25	0.441	0.2	3,800	17000	5,600	24700
ZKLN 1545 2RS	0.591	15	1.772	45	0.984	25	0.463	0.21	4,000	17900	6,300	28000
ZKLN 1747 2RS	0.669	17	1.850	47	0.984	25	0.485	0.22	4,250	18800	7,000	31000
ZKLN 2052 2RS	0.787	20	2.047	52	1.102	28	0.684	0.31	5,800	26000	10,600	47000
ZKLN 2557 2RS	0.984	25	2.244	57	1.102	28	0.75	0.34	6,200	27500	12,400	55000
ZKLN 3062 2RS	1.181	30	2.441	62	1.102	28	0.86	0.39	6,500	29000	14,400	64000
ZKLN 3072 2RS	1.181	30	2.835	72	1.496	38	1.125	0.51	13,300	59000	24,300	108000
ZKLN 3572 2RS	1.378	35	2.835	72	1.339	34	1.125	0.51	9,200	41000	20,000	89000
ZKLN 4075 2RS	1.575	40	2.953	75	1.339	34	1.345	0.61	9,700	43000	22,700	101000
ZKLN 4090 2RS	1.575	40	3.543	90	1.811	46	2.095	0.95	16,200	72000	33,500	149000
ZKLN 5090 2RS	1.969	50	3.543	90	1.339	34	1.94	0.88	10,500	46500	28,500	126000
ZKLN 50110 2RS	1.969	50	4.331	110	2.126	54	5.513	2.5	25,500	113500	56,000	250000
ZKLN 60110 2Z	2.362	60	4.331	110	1.772	45	4.851	2.2	18,900	84000	48,000	214000
ZKLN 70120 2Z	2.756	70	4.724	120	1.772	45	5.292	2.4	19,800	88000	54,000	241000
ZKLN 80130 2Z	3.150	80	5.118	130	1.772	45	5.954	2.7	20,500	91000	60,000	265000
ZKLN 90150 2Z	3.543	90	5.906	150	2.165	55	9.923	4.5	30,500	135000	89,000	395000
ZKLN 100160 2Z	3.937	100	6.299	160	2.165	55	10.805	4.9	31,500	140000	98,000	435000

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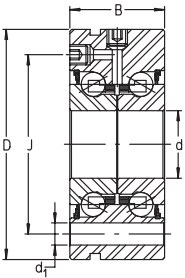
PART NUMBER	FRICTION in-lbf	FRICTION Nm	LOCKNUT	LOCKNUT TORQUE ft-lbf	LOCKNUT TORQUE Nm	SPEED LIMIT GREASE rpm
ZKLN 0619 2Z	0.09	0.01	ZM 06	1.48	2	14000
ZKLN 0624 2RS	0.35	0.04	ZM 06	1.48	2	6800
ZKLN 0832 2RS	0.71	0.08	ZM 08	2.95	4	5100
ZKLN 1034 2RS	1.06	0.12	ZM 10	4.43	6	4600
ZKLN 1242 2RS	1.42	0.16	ZM 12	5.9	8	3800
ZKLN 1545 2RS	1.77	0.2	ZM 15	7.38	10	3500
ZKLN 1747 2RS	2.12	0.24	ZM 17/AM 17	11.06	15	3300
ZKLN 2052 2RS	2.66	0.3	ZM 20/AM 20	13.28	18	3000
ZKLN 2557 2RS	3.54	0.4	ZM 25/AM 25	18.44	25	2600
ZKLN 3062 2RS	4.43	0.5	ZM 30/AM 30	23.6	32	2200
ZKLN 3072 2RS	7.08	0.8	ZM 30/52 AM 30	47.9	65	2100
ZKLN 3572 2RS	5.31	0.6	ZM 35/AM 35	29.5	40	2000
ZKLN 4075 2RS	6.2	0.7	ZM 40/AM 40	40.6	55	1800
ZKLN 4090 2RS	11.5	1.3	ZMA 40/62/AM 40	81.1	110	1600
ZKLN 5090 2RS	7.97	0.9	ZM 50/AM 50	62.7	85	1500
ZKLN 50110 2RS	23.01	2.6	ZM 50/75/AM 50	110.6	150	2500
ZKLN 60110 2Z	8.85	1	ZMA 60/98 AM 60	73.8	100	2400
ZKLN 70120 2Z	10.62	1.2	ZMA 70/110 AM 70	95.9	130	2200
ZKLN 80130 2Z	12.39	1.4	ZMA 80/120	118.0	160	2100
ZKLN 90150 2Z	20.36	2.3	ZMA 90/130 AM 90	147.5	200	1800
ZKLN 100160 2Z	23.01	2.6	ZMA 100/140	184.4	250	1700



Angular Contact Thrust Ball Bearings

ZKLF..PE SERIES

- Double row, 60 degree contact angle
- Sealed
- For most ball screw support
- With predrilled mounting flange
- P5 runout with increased diameter tolerances



For details on part numbers, descriptive suffixes and various technical references, please refer to front of this section.
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PART NUMBER	SHAFT d inch	SHAFT d mm	OD D inch	OD D mm	WIDTH B inch	WIDTH B mm	WGT lbs	WGT kg	DYN. CAP. C lbf	DYN. CAP. C N	STAT. CAP. C ₀ lbf	STAT. CAP. C ₀ N
ZKLF 1255 2RS PE	0.472	12	2.165	55	0.984	25	0.82	0.37	3,800	17000	5,600	24700
ZKLF 1560 2RS PE	0.591	15	2.362	60	0.984	25	0.95	0.43	4,000	17900	6,300	28000
ZKLF 1762 2RS PE	0.669	17	2.441	62	0.984	25	0.99	0.45	4,250	18800	7,000	31000
ZKLF 2068 2RS PE	0.787	20	2.677	68	1.102	28	1.35	0.61	5,800	26000	10,600	47000
ZKLF 2575 2RS PE	0.984	25	2.953	75	1.102	28	1.59	0.72	6,200	27500	12,400	55000
ZKLF 3080 2RS PE	1.181	30	3.150	80	1.102	28	1.72	0.78	6,500	29000	14,400	64000
ZKLF 3590 2RS PE	1.378	35	3.543	90	1.339	34	2.49	1.13	9,200	41000	20,000	89000
ZKLF 40100 2RS PE	1.575	40	3.937	100	1.339	34	3.22	1.46	9,700	43000	22,700	101000
ZKLF 50115 2RS PE	1.969	50	4.528	115	1.339	34	4.10	1.86	10,500	46500	28,500	126000

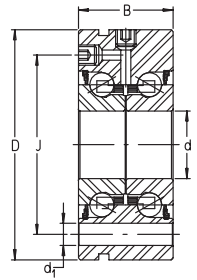
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PART NUMBER	J inch	J mm	d ₁ inch	d ₁ mm	FRICTION in-lbf	FRICTION Nm	BOLTS SIZE & GRADE	BOLTS QTY.	LOCKNUT	LOCKNUT TORQUE ft-lbf	LOCKNUT TORQUE Nm	SPEED LIMIT rpm
ZKLF 1255 2RS PE	1.654	42	0.256	6.5	1.42	0.16	M6–10.9	3	ZM 12	5.9	8	3800
ZKLF 1560 2RS PE	1.811	46	0.256	6.5	1.77	0.2	M6–10.9	3	ZM 15	7.4	10	3500
ZKLF 1762 2RS PE	1.890	48	0.256	6.5	2.12	0.24	M6–10.9	3	ZM 17/AM 17	11.1	15	3300
ZKLF 2068 2RS PE	2.087	53	0.256	6.5	2.66	0.3	M6–10.9	4	ZM 20/AM 20	13.3	18	3000
ZKLF 2575 2RS PE	2.284	58	0.256	6.5	3.54	0.4	M6–10.9	4	ZM 25/AM 25	18.4	25	2600
ZKLF 3080 2RS PE	2.480	63	0.256	6.5	4.43	0.5	M6–10.9	6	ZM 30/AM 30	23.6	32	2200
ZKLF 3590 2RS PE	2.953	75	0.256	8.5	5.31	0.6	M8–10.9	4	ZM 35/AM 35	29.5	40	2000
ZKLF 40100 2RS PE	3.150	80	0.335	8.5	6.2	0.7	M8–10.9	4	ZM 40/AM 40	40.6	55	1800
ZKLF 50115 2RS PE	3.701	94	0.335	8.5	7.97	0.9	M8–10.9	6	ZM 50/AM 50	62.7	85	1500



Angular Contact Thrust Ball Bearings ZKLF SERIES

- Double row, 60 degree contact angle
- Sealed version (2RS), also available shielded (2Z)
- With predrilled mounting flange
- For ball screw support
- P4 runout for highest precision



For details on part numbers, descriptive suffixes and various technical references, please refer to front of this section.

For engineering or technical information contact your local sales representative or call Distributor Sales

PART NUMBER	SHAFT d inch	SHAFT d mm	OD D inch	OD D mm	WIDTH B inch	WIDTH B mm	WGT lbs	WGT kg	DYN. CAP. C lbf	DYN. CAP. C N	STAT. CAP. C ₀ lbf	STAT. CAP. C ₀ N	J inch	J mm
ZKLF 1255 2RS	0.472	12	2.165	55	0.984	25	0.82	0.37	3,800	17000	5,600	24700	1.654	42
ZKLF 1560 2RS	0.591	15	2.362	60	0.984	25	0.95	0.43	4,000	17900	6,300	28000	1.811	46
ZKLF 1762 2RS	0.669	17	2.441	62	0.984	25	0.99	0.45	4,250	18800	7,000	31000	1.89	48
ZKLF 2068 2RS	0.787	20	2.677	68	1.102	28	1.35	0.61	5,800	26000	10,600	47000	2.087	53
ZKLF 2575 2RS	0.984	25	2.953	75	1.102	28	1.59	0.72	6,200	27500	12,400	55000	2.284	58
ZKLF 3080 2RS	1.181	30	3.15	80	1.102	28	1.72	0.78	6,500	29000	14,400	64000	2.48	63
ZKLF 3590 2RS	1.378	35	3.543	90	1.339	34	2.49	1.13	9,200	41000	20,000	89000	2.953	75
ZKLF 40100 2RS	1.575	40	3.937	100	1.339	34	3.22	1.46	9,700	43000	22,700	101000	3.15	80
ZKLF 40115 2RS	1.575	40	4.528	115	1.811	46	5	2.2	16,200	72000	33,500	149000	3.701	94
ZKLF 50115 2RS	1.969	50	4.528	115	1.339	34	4.1	1.86	10,500	46500	28,500	126000	3.701	94
ZKLF 50140 2RS	1.969	50	5.512	140	2.126	54	10.36	4.7	25,500	113000	56,000	250000	4.449	113
ZKLF 60145 2Z	2.362	60	5.709	145	1.772	45	9.48	4.3	18,900	84000	48,000	214000	4.724	120
ZKLF 70155 2Z	2.756	70	6.102	155	1.772	45	10.81	4.9	19,800	88000	54,000	241000	5.118	130
ZKLF 80165 2Z	3.15	80	6.496	165	1.772	45	11.69	5.3	20,500	91000	60,000	265000	5.512	140
ZKLF 90190 2Z	3.543	90	7.48	190	2.165	55	19.18	8.7	30,500	135000	89,000	395000	6.496	165
ZKLF 100200 2Z	3.937	100	7.874	200	2.165	55	20.51	9.3	31,500	140000	98,000	435000	6.89	175

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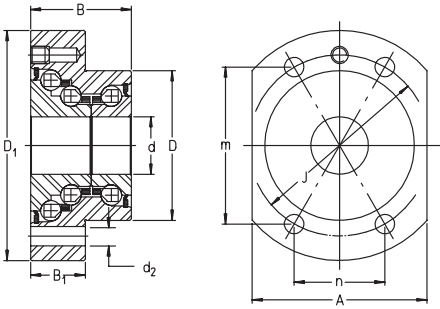
PART NUMBER	d ₁ inch	d ₁ mm	FRICTION in-lbf	FRICTION Nm	BOLTS SIZE & GRADE	BOLTS QTY.	LOCKNUT	LOCKNUT TORQUE ft-lbf	LOCKNUT TORQUE Nm	SPEED LIMIT rpm
ZKLF 1255 2RS	0.256	6.5	1.42	0.16	M6-10.9	3	ZM 12	5.9	8	3800
ZKLF 1560 2RS	0.256	6.5	1.77	0.2	M6-10.9	3	ZM 15	7.4	10	3500
ZKLF 1762 2RS	0.256	6.5	2.12	0.24	M6-10.9	3	ZM 17/AM 17	11.1	15	3300
ZKLF 2068 2RS	0.256	6.5	2.66	0.3	M6-10.9	4	ZM 20/AM 20	13.3	18	3000
ZKLF 2575 2RS	0.256	6.5	3.54	0.4	M6-10.9	4	ZM 25/AM 25	18.4	25	2600
ZKLF 3080 2RS	0.256	6.5	4.43	0.5	M6-10.9	6	ZM 30/AM 30	23.6	32	2200
ZKLF 3590 2RS	0.256	8.5	5.31	0.6	M8-10.9	4	ZM 35/AM 35	29.5	40	2000
ZKLF 40100 2RS	0.335	8.5	6.2	0.7	M8-10.9	4	ZM 40/AM 40	40.6	55	1800
ZKLF 40115 2RS	0.335	8.5	11.5	1.3	M8-10.9	12	ZMA 40/65/AM 40	81.1	110	1600
ZKLF 50115 2RS	0.335	8.5	7.97	0.9	M8-10.9	6	ZM 50/AM 50	62.7	85	1500
ZKLF 50140 2RS	0.413	10.5	23.01	2.6	M10-10.9	12	ZMA 50/75/AM 50	110.6	150	2500
ZKLF 60145 2Z	0.335	8.5	8.85	1	M 8-8.8	8	ZMA 60/98 /AM60	73.76	100	2400
ZKLF 70155 2Z	0.335	8.5	10.62	1.2	M 8-8.8	8	ZMA 70/110 /AM70	95.89	130	2200
ZKLF 80165 2Z	0.335	8.5	12.39	1.4	M 8-8.8	8	ZMA 80/120	118.02	160	2100
ZKLF 90190 2Z	0.413	10.5	20.36	2.3	M 10-8.8	8	ZMA 90/130/AM90	147.52	200	1800
ZKLF 100200 2Z	0.413	10.5	23.01	2.6	M 10-8.8	8	ZMA 100/140	184.4	250	1700



Angular Contact Thrust Ball Bearings

DKLFA SERIES

- 3 row design, 60 degree contact angle
- Ball screw support and stretching
- With predrilled mounting flange
- Sealed



For details on part numbers, descriptive suffixes and various technical references, please refer to front of this section.
For engineering or technical information contact your local sales representative or call Distributor Sales

PART NUMBER	SHAFT d	SHAFT d	OD D	OD D	WIDTH B	WIDTH B	WGT	WGT
	inch	mm	inch	mm	inch	mm	lbs	kg
DKLFA 1575 2RS	0.591	15	1.772	45	1.260	32	1.169	0.53
DKLFA 2080 2RS	0.787	20	2.047	52	1.378	35	1.544	0.7
DKLFA 2590 2RS	0.984	25	2.244	57	1.496	38	1.985	0.9
DKLFA 30100 2RS	1.181	30	2.441	62	1.496	38	2.205	1
DKLFA 40115 2RS	1.575	40	2.835	72	1.654	42	3.308	1.5

CONTINUED FROM ABOVE

PART NUMBER	INBOARD ROWS DYN. CAP. C	INBOARD ROWS DYN. CAP. C	INBOARD ROWS STAT. CAP. C ₀	INBOARD ROWS STAT. CAP. C ₀	OUTBOARD STRETCHING ROWS DYN. CAP. C	OUTBOARD STRETCHING ROWS DYN. CAP. C	OUTBOARD STRETCHING ROWS STAT. CAP. C ₀	OUTBOARD STRETCHING ROWS STAT. CAP. C ₀	SPEED LIMIT GREASE
	lbf	N	lbf	N	lbf	N	lbf	N	rpm
DKLFA 1575 2RS	4,000	17.9	6,300	28	8,300	37	18,700	83	2600
DKLFA 2080 2RS	5,800	26	10,600	47	10,000	44.5	24,700	110	2200
DKLFA 2590 2RS	6,200	27.5	12,400	55	11,700	52	32,500	144	2000
DKLFA 30100 2RS	6,500	29	14,400	64	12,400	55	37,000	165	1800
DKLFA 40115 2RS	9,700	43	22,700	101	16,400	73	51,000	227	1500

CONTINUED FROM ABOVE

PART NUMBER	D ₁	D ₁	B ₁	B ₁	J	J	d ₂	d ₂	m	m	n	n	A	A	THREAD	BOLT QTY.
	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm		
DKLFA 1575 2RS	2.953	75	0.709	18	2.284	58	0.268	6.8	1.976	50.2	1.142	29	2.165	55	M6	4
DKLFA 2080 2RS	3.150	80	0.748	19	2.480	63	0.268	6.8	2.150	54.6	1.240	31.5	2.441	62	M6	4
DKLFA 2590 2RS	3.543	90	0.866	22	2.953	75	0.347	8.8	2.087	53	2.087	53	2.756	70	M8	6
DKLFA 30100 2RS	3.937	100	0.866	22	3.150	80	0.347	8.8	2.228	56.6	2.228	56.6	2.835	72	M8	6
DKLFA 40115 2RS	4.528	115	0.906	23	3.701	94	0.347	8.8	2.618	66.5	2.618	66.5	3.543	90	M8	6

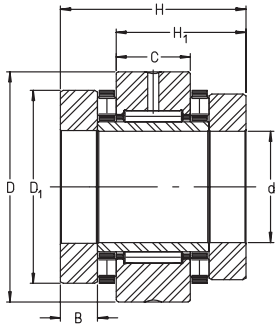
Independent capacity values are given for the ball rows depending on the load direction.



Ball Screw Support Bearings

ZARN SERIES

- Combination double direction axial cylindrical roller and radial needle roller bearings
- Metric series
- P4 axial precision



For details on part numbers, descriptive suffixes and various technical references, please refer to front of this section.
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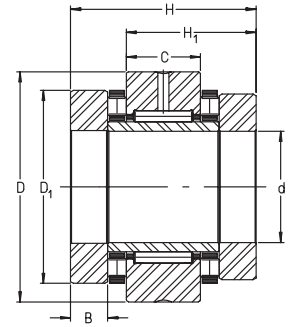
PART NUMBER	SHAFT d mm inch	OD D mm inch	WIDTH H mm inch	WEIGHT kg lbs	DYN. CAP. AXIAL N lbf	STAT. CAP. AXIAL N lbf	DYN. CAP. RADIAL N lbf	STAT. CAP. RADIAL N lbf
ZARN 1545 TN	15	45	40	0.34	24900	53000	13000	17500
ZARN 1545 TN	0.5906	1.7717	1.5748	0.7	5600	11900	2900	3900
ZARN 1747 TN	17	47	43	0.37	26000	57000	14000	19900
ZARN 1747 TN	0.6693	1.8504	1.6929	0.8	5800	12800	3100	4500
ZARN 2052 TN	20	52	46	0.41	33500	76000	14900	22400
ZARN 2052 TN	0.7874	2.0472	1.811	0.9	7500	17100	3300	5000
ZARN 2062 TN	20	62	60	0.87	64000	141000	22600	36000
ZARN 2062 TN	0.7874	2.4409	2.3622	1.9	14400	31700	5100	8100
ZARN 2572 TN	25	72	60	1.17	80000	199000	24300	41000
ZARN 2572 TN	0.9843	2.8346	2.3622	2.6	18000	44700	5500	9200
ZARN 2557 TN	25	57	50	0.53	35500	86000	22600	36000
ZARN 2557 TN	0.9843	2.2441	1.9685	1.2	8000	19300	5100	8100
ZARN 3080 TN	30	80	66	1.5	107000	265000	26000	47000
ZARN 3080 TN	1.1811	3.1496	2.5984	3.3	24100	59600	5800	10600
ZARN 3062 TN	30	62	50	0.6	39000	101000	24300	41500
ZARN 3062 TN	1.1811	2.4409	1.9685	1.3	8800	22700	5500	9300
ZARN 3585 TN	35	85	66	1.65	105000	265000	27500	53000
ZARN 3585 TN	1.378	3.3465	2.5984	3.6	23600	59600	6200	11900
ZARN 3570 TN	35	70	54	0.8	56000	148000	26000	47000
ZARN 3570 TN	1.378	2.7559	2.126	1.8	12600	33300	5800	10600
ZARN 4090 TN	40	90	75	2.09	117000	315000	38000	74000
ZARN 4090 TN	1.5748	3.5433	2.9528	4.6	26300	70800	8500	16600
ZARN 4075 TN	40	75	54	0.9	59000	163000	27500	53000
ZARN 4075 TN	1.5748	2.9528	2.126	2	13300	36600	6200	11900
ZARN 45105 TN	45	105	82	3.02	154000	405000	40000	82000
ZARN 45105 TN	1.7717	4.1339	3.2283	6.7	34600	91100	9000	18400
ZARN 4580 TN	45	80	60	1.12	61000	177000	38000	74000
ZARN 4580 TN	1.7717	3.1496	2.3622	2.5	13700	39800	8500	16600
ZARN 5090 TN	50	90	60	1.43	90000	300000	40000	82000
ZARN 5090 TN	1.9685	3.5433	2.3622	3.2	20200	67400	9000	18400
ZARN 50110 TN	50	110	82	3.3	172000	480000	42000	90000
ZARN 50110 TN	1.9685	4.3307	3.2283	7.3	38700	107900	9400	20200
ZARN 55115 TN	55	115	82	3.5	177000	500000	44000	98000
ZARN 55115 TN	2.1654	4.5276	3.2283	7.7	39800	112400	9900	22000
ZARN 60120 TN	60	120	82	3.7	187000	550000	44500	92000
ZARN 60120 TN	2.3622	4.7244	3.2283	8.2	42000	123700	10000	20700
ZARN 65125 TN	65	125	82	4	172000	500000	54000	104000
ZARN 65125 TN	2.5591	4.9213	3.2283	8.8	38700	112400	12100	23400
ZARN 70130 TN	70	130	82	4.1	201000	630000	56000	119000
ZARN 70130 TN	2.7559	5.1181	3.2283	9	45200	141600	12600	26800
ZARN 75155 TN	75	155	100	7.9	290000	890000	72000	132000
ZARN 75155 TN	2.9528	6.1024	3.937	17.4	65200	200100	16200	29700
ZARN 90180 TN	90	180	110	11.6	325000	1030000	98000	210000
ZARN 90180 TN	3.5433	7.0866	4.3307	25.6	73100	231600	22000	47200



Ball Screw Support Bearings

ZARN SERIES

- Combination double direction axial cylindrical roller and radial needle roller bearings
- Metric series
- P4 axial precision



For details on part numbers, descriptive suffixes and various technical references, please refer to front of this section.

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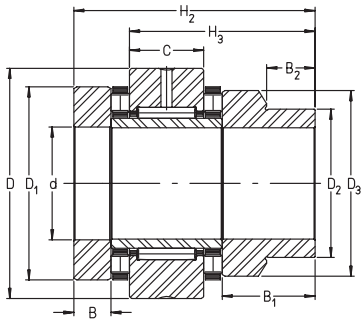
H ₁ mm inch	C mm inch	D ₁ mm inch	B mm inch	SPEED LIMIT OIL rpm	SPEED LIMIT GREASE rpm	BEARING FRICTION Nm in-lbf	LOCKNUT TORQUE Nm in-lbf	PART NUMBER
28	16	35	7.5	8500	2200	0.35	10	ZARN 1545 TN
1.1024	0.6299	1.378	0.2953	8500	2200	3.1	89	ZARN 1545 TN
29.5	16	38	9	7800	2100	0.4	12	ZARN 1747 TN
1.1614	0.6299	1.4961	0.3543	7800	2100	3.54	106	ZARN 1747 TN
31	16	42	10	7000	2000	0.5	18	ZARN 2052 TN
1.2205	0.6299	1.6535	0.3937	7000	2000	4.43	159	ZARN 2052 TN
40	20	52	12.5	6000	1500	1.3	38	ZARN 2062 TN
1.5748	0.7874	2.0472	0.4921	6000	1500	11.51	336	ZARN 2062 TN
40	20	62	12.5	4900	1400	1.6	55	ZARN 2572 TN
1.5748	0.7874	2.4409	0.4921	4900	1400	14.16	487	ZARN 2572 TN
35	20	47	10	6000	1900	0.55	25	ZARN 2557 TN
1.378	0.7874	1.8504	0.3937	6000	1900	4.87	221	ZARN 2557 TN
43	20	68	14	4400	1300	2.1	75	ZARN 3080 TN
1.6929	0.7874	2.6772	0.5512	4400	1300	18.59	664	ZARN 3080 TN
35	20	52	10	5500	1800	0.65	32	ZARN 3062 TN
1.378	0.7874	2.0472	0.3937	5500	1800	5.75	283	ZARN 3062 TN
43	20	73	14	4000	1250	2.3	100	ZARN 3585 TN
1.6929	0.7874	2.874	0.5512	4000	1250	20.36	885	ZARN 3585 TN
37	20	60	11	4800	1700	0.9	42	ZARN 3570 TN
1.4567	0.7874	2.3622	0.4331	4800	1700	7.97	372	ZARN 3570 TN
50	25	78	16	3700	1200	2.5	120	ZARN 4090 TN
1.9685	0.9843	3.0709	0.6299	3700	1200	22.13	1062	ZARN 4090 TN
37	20	65	11	4400	1600	1	55	ZARN 4075 TN
1.4567	0.7874	2.5591	0.4331	4400	1600	8.85	487	ZARN 4075 TN
53.5	25	90	17.5	3300	1150	3.5	150	ZARN 45105 TN
2.1063	0.9843	3.5433	0.689	3300	1150	30.98	1328	ZARN 45105 TN
42.5	25	70	11.5	4000	1500	1.2	65	ZARN 4580 TN
1.6732	0.9843	2.7559	0.4528	4000	1500	10.62	575	ZARN 4580 TN
42.5	25	78	11.5	3600	1200	2.2	85	ZARN 5090 TN
1.6732	0.9843	3.0709	0.4528	3600	1200	19.47	752	ZARN 5090 TN
53.5	25	95	17.5	3100	1100	3.8	180	ZARN 50110 TN
2.1063	0.9843	3.7402	0.689	3100	1100	33.63	1593	ZARN 50110 TN
53.5	25	100	17.5	2900	1000	4	220	ZARN 55115 TN
2.1063	0.9843	3.937	0.689	2900	1000	35.4	1947	ZARN 55115 TN
53.5	25	105	17.5	2700	950	4.2	250	ZARN 60120 TN
2.1063	0.9843	4.1339	0.689	2700	950	37.17	2213	ZARN 60120 TN
53.5	25	110	17.5	2600	900	3.9	270	ZARN 65125 TN
2.1063	0.9843	4.3307	0.689	2600	900	34.52	2390	ZARN 65125 TN
53.5	25	115	17.5	2400	800	4.8	330	ZARN 70130 TN
2.1063	0.9843	4.5276	0.689	2400	800	42.49	2921	ZARN 70130 TN
65	30	135	21	2100	700	8	580	ZARN 75155 TN
2.5591	1.1811	5.315	0.8268	2100	700	70.81	5134	ZARN 75155 TN
72.5	35	160	22.5	1800	700	10.5	960	ZARN 90180 TN
2.8543	1.378	6.2992	0.8858	1800	700	92.94	8497	ZARN 90180 TN



Ball Screw Support Bearings

ZARN..LTN SERIES

- Combination double direction axial cylindrical roller and radial needle roller bearings
- Extended shaft washer for DIN 3760 series metric seal
- Metric series
- P4 axial precision



For details on part numbers, descriptive suffixes and various technical references, please refer to front of this section.
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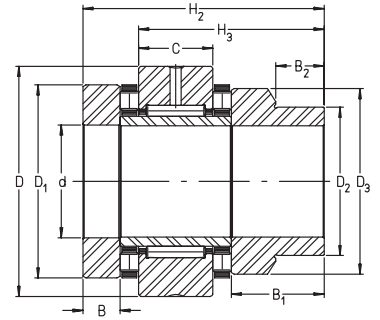
PART NUMBER	SHAFT d mm inch	OD D mm inch	WIDTH H ₂ mm inch	WEIGHT kg lbs	DYN. CAP. AXIAL N lbf	STAT. CAP. AXIAL N lbf	DYN. CAP. RADIAL N lbf	STAT. CAP. RADIAL N lbf	H ₃ mm inch	C mm inch
ZARN 1545 LTN	15	45	53	0.37	24900	53000	13000	17500	41	16
ZARN 1545 LTN	0.5906	1.7717	2.0866	0.82	5600	11900	2920	3930	1.6142	0.6299
ZARN 1747 LTN	17	47	57	0.41	26000	57000	14000	19900	43.5	16
ZARN 1747 LTN	0.6693	1.8504	2.2441	0.9	5850	12800	3150	4470	1.7126	0.6299
ZARN 2052 LTN	20	52	60	0.46	33500	76000	14900	22400	45	16
ZARN 2052 LTN	0.7874	2.0472	2.3622	1.01	7530	17100	3350	5040	1.7717	0.6299
ZARN 2062 LTN	20	62	75	0.99	64000	141000	22600	36000	55	20
ZARN 2062 LTN	0.7874	2.4409	2.9528	2.18	14400	32000	5080	8090	2.1654	0.7874
ZARN 2557 LTN	25	57	65	0.59	35500	86000	22600	36000	50	20
ZARN 2557 LTN	0.9843	2.2441	2.5591	1.3	8000	19000	5080	8090	1.9685	0.7874
ZARN 2572 LTN	25	72	75	1.32	80000	199000	24300	41000	55	20
ZARN 2572 LTN	0.9843	2.8346	2.9528	2.91	18000	45000	5460	9220	2.1654	0.7874
ZARN 3062 LTN	30	62	65	0.75	39000	101000	24300	41500	50	20
ZARN 3062 LTN	1.1811	2.4409	2.5591	1.65	8800	23000	5460	9330	1.9685	0.7874
ZARN 3080 LTN	30	80	82	1.7	107000	265000	26000	47000	59	20
ZARN 3080 LTN	1.1811	3.1496	3.2283	3.75	24100	60000	5850	10600	2.3228	0.7874
ZARN 3570 LTN	35	70	70	0.93	56000	148000	26000	47000	53	20
ZARN 3570 LTN	1.378	2.7559	2.7559	2.05	12600	33000	5850	10600	2.0866	0.7874
ZARN 3585 LTN	35	85	82	1.8	105000	265000	27500	53000	59	20
ZARN 3585 LTN	1.378	3.3465	3.2283	3.97	23600	60000	6180	11900	2.3228	0.7874
ZARN 4075 LTN	40	75	70	1	59000	163000	27500	53000	53	20
ZARN 4075 LTN	1.5748	2.9528	2.7559	2.21	13300	37000	6180	11900	2.0866	0.7874
ZARN 4090 LTN	40	90	93	2.39	117000	315000	38000	74000	68	25
ZARN 4090 LTN	1.5748	3.5433	3.6614	5.27	26300	71000	8540	16600	2.6772	0.9843
ZARN 4580 LTN	45	80	75	1.27	61000	177000	38000	74000	57.5	25
ZARN 4580 LTN	1.7717	3.1496	2.9528	2.8	13700	40000	8540	16600	2.2638	0.9843
ZARN 45105 LTN	45	105	103	3.42	154000	405000	40000	82000	74.5	25
ZARN 45105 LTN	1.7717	4.1339	4.0551	7.54	35000	91000	8990	18000	2.9331	0.9843
ZARN 5090 LTN	50	90	78	1.78	90000	300000	40000	82000	60.5	25
ZARN 5090 LTN	1.9685	3.5433	3.0709	3.92	20000	67000	8990	18000	2.3819	0.9843
ZARN 50110 LTN	50	110	103	3.75	172000	480000	42000	90000	74.5	25
ZARN 50110 LTN	1.9685	4.3307	4.0551	8.27	39000	108000	9440	20000	2.9331	0.9843
ZARN 55115 LTN	55	115	103	4	177000	500000	44000	98000	74.5	25
ZARN 55115 LTN	2.1654	4.5276	4.0551	8.82	40000	112000	9890	22000	2.9331	0.9843
ZARN 60120 LTN	60	120	103	4.85	187000	550000	44500	92000	74.5	25
ZARN 60120 LTN	2.3622	4.7244	4.0551	10.69	42000	124000	10000	21000	2.9331	0.9843
ZARN 65125 LTN	65	125	103	4.6	172000	500000	54000	104000	74.5	25
ZARN 65125 LTN	2.5591	4.9213	4.0551	10.14	39000	112000	12000	23000	2.9331	0.9843
ZARN 70130 LTN	70	130	103	4.85	201000	630000	56000	119000	74.5	25
ZARN 70130 LTN	2.7559	5.1181	4.0551	10.69	45000	142000	13000	27000	2.9331	0.9843
ZARN 75155 LTN	75	155	125	9.1	290000	890000	72000	132000	90	30
ZARN 75155 LTN	2.9528	6.1024	4.9213	20.07	65000	200000	16000	30000	3.5433	1.1811
ZARN 90180 LTN	90	180	135	13.05	325000	1030000	98000	210000	97.5	35
ZARN 90180 LTN	3.5433	7.0866	5.315	28.78	73000	232000	22000	47000	3.8386	1.378



Ball Screw Support Bearings

ZARN..LTN SERIES

- Combination double direction axial cylindrical roller and radial needle roller bearings
- Extended shaft washer for DIN 3760 series metric seal
- Metric series
- P4 axial precision



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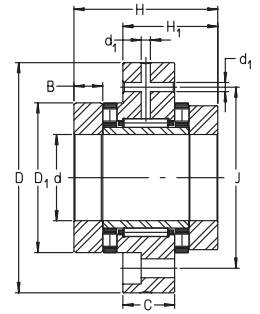
D ₁ mm inch	D ₂ mm inch	D ₃ mm inch	B mm inch	B ₁ mm inch	B ₂ mm inch	SPEED LIMIT OIL rpm	SPEED LIMIT GREASE rpm	BEARING FRICTION Nm in-lbf	LOCKNUT TORQUE Nm ft-lbf	SEAL SIZE PER DIN3760	PART NUMBER
35 1.378	24 0.9449	34 1.3386	7.5 0.2953	20.5 0.8071	11 0.4331	8500	2200	0.35 3.1	10 7	24x35x7	ZARN 1545 LTN
38 1.4961	28 1.1024	38 1.4961	9 0.3543	23 0.9055	11 0.4331	7800	2100	0.4 3.5	12 9	28x40x7	ZARN 1747 LTN
42 1.6535	30 1.1811	40 1.5748	10 0.3937	24 0.9449	11 0.4331	7000	2000	0.5 4.4	18 13	30x42x7	ZARN 2052 LTN
52 2.0472	40 1.5748	50 1.9685	12.5 0.4921	27.5 1.0827	11 0.4331	6000	1500	1.3 11.5	38 28	40x52x7	ZARN 2062 LTN
47 1.8504	36 1.4173	45 1.7717	10 0.3937	25 0.9843	11 0.4331	6000	1900	0.55 4.9	25 18	36x47x7	ZARN 2557 LTN
62 2.4409	48 1.8898	60 2.3622	12.5 0.4921	27.5 1.0827	11 0.4331	4900	1400	1.6 14.2	55 41	48x62x8	ZARN 2572 LTN
52 2.0472	40 1.5748	50 1.9685	10 0.3937	25 0.9843	11 0.4331	5500	1800	0.65 5.8	32 24	40x52x7	ZARN 3062 LTN
68 2.6772	52 2.0472	66 2.5984	14 0.5512	30 1.1811	12 0.4724	4400	1300	2.1 18.6	75 55	52x68x8	ZARN 3080 LTN
60 2.3622	45 1.7717	58 2.2835	11 0.4331	27 1.063	12 0.4724	4800	1700	0.9 8	42 31	45x60x8	ZARN 3570 LTN
73 2.874	60 2.3622	73 2.874	14 0.5512	30 1.1811	12 0.4724	4000	1250	2.3 20.4	100 74	60x75x8	ZARN 3585 LTN
65 2.5591	50 1.9685	63 2.4803	11 0.4331	27 1.063	12 0.4724	4400	1600	1 8.9	55 41	50x65x8	ZARN 4075 LTN
78 3.0709	60 2.3622	78 3.0709	16 0.6299	34 1.3386	12 0.4724	3700	1200	2.5 22.1	120 89	60x80x8	ZARN 4090 LTN
70 2.7559	56 2.2047	68 2.6772	11.5 0.4528	26.5 1.0433	12 0.4724	4000	1500	1.2 10.6	65 48	56x70x8	ZARN 4580 LTN
90 3.5433	70 2.7559	88 3.4646	17.5 0.689	38.5 1.5157	14 0.5512	3300	1150	3.5 31	150 111	70x90x10	ZARN 45105 LTN
78 3.0709	60 2.3622	78 3.0709	11.5 0.4528	29.5 1.1614	12 0.4724	3600	1200	2.2 19.5	85 63	60x80x8	ZARN 5090 LTN
95 3.7402	75 2.9528	93 3.6614	17.5 0.689	38.5 1.5157	14 0.5512	3100	1100	3.8 33.6	180 133	75x95x10	ZARN 50110 LTN
100 3.937	80 3.1496	98 3.8583	17.5 0.689	38.5 1.5157	14 0.5512	2900	1000	4 35.4	220 162	80x100x10	ZARN 55115 LTN
105 4.1339	90 3.5433	105 4.1339	17.5 0.689	38.5 1.5157	16 0.6299	2700	950	4.2 37.2	250 184	90x110x12	ZARN 60120 LTN
110 4.3307	90 3.5433	108 4.252	17.5 0.689	38.5 1.5157	16 0.6299	2600	900	3.9 34.5	270 199	90x110x12	ZARN 65125 LTN
115 4.5276	100 3.937	115 4.5276	17.5 0.689	38.5 1.5157	16 0.6299	2400	800	4.8 42.5	330 243	100x120x12	ZARN 70130 LTN
135 5.315	115 4.5276	135 5.315	21 0.8268	46 1.811	16 0.6299	2100	700	8 70.8	580 428	115x140x12	ZARN 75155 LTN
160 6.2992	130 5.1181	158 6.2205	22.5 0.8858	47.5 1.8701	16 0.6299	1800	700	10.5 92.9	960 708	130x160x12	ZARN 90180 LTN



Ball Screw Support Bearings

ZARF SERIES

- Combination double direction axial cylindrical roller and radial needle roller bearing
- Predrilled mounting flange
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- P4 axial precision



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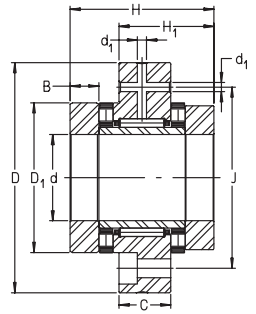
PART NUMBER	SHAFT d mm inch	OD D mm inch	WIDTH H mm inch	WEIGHT kg lbs	DYN. CAP. AXIAL N lbf	STAT. CAP. AXIAL N lbf	DYN. CAP. RADIAL N lbf	STAT. CAP. RADIAL N lbf	H ₁ mm inch	C mm inch	D ₁ mm inch
ZARF 1560 TN	15	60	40	0.42	24900	53000	13000	17500	26	14	35
ZARF 1560 TN	0.5906	2.3622	1.5748	0.926	5600	11900	2900	3900	1.0236	0.5512	1.378
ZARF 1762 TN	17	62	43	0.49	26000	57000	14000	19900	27.5	14	38
ZARF 1762 TN	0.6693	2.4409	1.6929	1.08	5800	12800	3100	4500	1.0827	0.5512	1.4961
ZARF 2068 TN	20	68	46	0.56	33500	76000	14900	22400	29	14	42
ZARF 2068 TN	0.7874	2.6772	1.811	1.235	7500	17100	3300	5000	1.1417	0.5512	1.6535
ZARF 2080 TN	20	80	60	1.1	64000	141000	22600	36000	38	18	52
ZARF 2080 TN	0.7874	3.1496	2.3622	2.426	14400	31700	5100	8100	1.4961	0.7087	2.0472
ZARF 2575 TN	25	75	50	0.78	35500	86000	22600	36000	33	18	47
ZARF 2575 TN	0.9843	2.9528	1.9685	1.72	8000	19300	5100	8100	1.2992	0.7087	1.8504
ZARF 2590 TN	25	90	60	1.6	80000	199000	24300	41500	38	18	62
ZARF 2590 TN	0.9843	3.5433	2.3622	3.528	18000	44700	5500	9300	1.4961	0.7087	2.4409
ZARF 3080 TN	30	80	50	0.85	39000	101000	24300	41500	33	18	52
ZARF 3080 TN	1.1811	3.1496	1.9685	1.874	8800	22700	5500	9300	1.2992	0.7087	2.0472
ZARF 3590 TN	35	90	54	1.12	56000	148000	26000	47000	35	18	60
ZARF 3590 TN	1.378	3.5433	2.126	2.47	12600	33300	5800	10600	1.378	0.7087	2.3622
ZARF 30105 TN	30	105	66	1.95	107000	265000	26000	47000	41	18	68
ZARF 30105 TN	1.1811	4.1339	2.5984	4.3	24100	59600	5800	10600	1.6142	0.7087	2.6772
ZARF 35110 TN	35	110	66	1.6	105000	265000	27500	53000	41	18	73
ZARF 35110 TN	1.378	4.3307	2.5984	3.528	23600	59600	6200	11900	1.6142	0.7087	2.874
ZARF 40100 TN	40	100	54	1.35	59000	163000	27500	53000	35	18	65
ZARF 40100 TN	1.5748	3.937	2.126	2.977	13300	36600	6200	11900	1.378	0.7087	2.5591
ZARF 40115 TN	40	115	75	2.7	117000	315000	38000	74000	47.5	22.5	78
ZARF 40115 TN	1.5748	4.5276	2.9528	5.954	26300	70800	8500	16600	1.8701	0.8858	3.0709
ZARF 45105 TN	45	105	60	1.7	61000	177000	38000	74000	40	22.5	70
ZARF 45105 TN	1.7717	4.1339	2.3622	3.749	13700	39800	8500	16600	1.5748	0.8858	2.7559
ZARF 45130 TN	45	130	82	3.9	154000	405000	40000	82000	51	22.5	90
ZARF 45130 TN	1.7717	5.1181	3.2283	8.6	34600	91100	9000	18400	2.0079	0.8858	3.5433
ZARF 50115 TN	50	115	60	2.1	90000	300000	40000	82000	40	22.5	78
ZARF 50115 TN	1.9685	4.5276	2.3622	4.631	20200	67400	9000	18400	1.5748	0.8858	3.0709
ZARF 50140 TN	50	140	82	4.2	172000	480000	42000	90000	51	22.5	95
ZARF 50140 TN	1.9685	5.5118	3.2283	9.261	38700	107900	9400	20200	2.0079	0.8858	3.7402
ZARF 55145 TN	55	145	82	4.5	177000	500000	44000	98000	51	22.5	100
ZARF 55145 TN	2.1654	5.7087	3.2283	9.923	39800	112400	9900	22000	2.0079	0.8858	3.937
ZARF 60150 TN	60	150	82	4.7	187000	550000	44500	92000	51	22.5	105
ZARF 60150 TN	2.3622	5.9055	3.2283	10.364	42000	123700	10000	20700	2.0079	0.8858	4.1339
ZARF 65155 TN	65	155	82	5.1	172000	500000	54000	104000	51	22.5	110
ZARF 65155 TN	2.5591	6.1024	3.2283	11.246	38700	112400	12100	23400	2.0079	0.8858	4.3307
ZARF 70160 TN	70	160	82	5.2	201000	630000	56000	119000	51	22.5	115
ZARF 70160 TN	2.7559	6.2992	3.2283	11.466	45200	141600	12600	26800	2.0079	0.8858	4.5276
ZARF 75185 TN	75	185	100	9.4	290000	890000	72000	132000	62	27	135
ZARF 75185 TN	2.9528	7.2835	3.937	20.727	65200	200100	16200	29700	2.4409	1.063	5.315
ZARF 90210 TN	90	210	110	13.7	300000	940000	98000	210000	69.5	32	160
ZARF 90210 TN	3.5433	8.2677	4.3307	30.209	67400	211300	22000	47200	2.7362	1.2598	6.2992



Ball Screw Support Bearings

ZARF SERIES

- Combination double direction axial cylindrical roller and radial needle roller bearing
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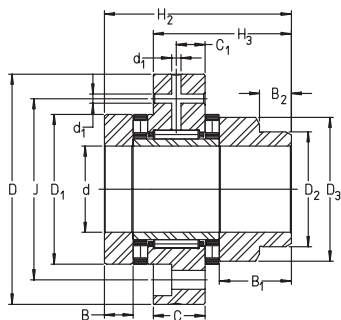
B	d ₁	J	SPEED LIMIT OIL rpm	SPEED LIMIT GREASE rpm	BEARING FRICTION Nm in-lbf	MTG. BOLT	BOLT HOLE QTY	LOCKNUT NUMBER	LOCKNUT TORQUE Nm ft-lbf	PART NUMBER
7.5	3.2	46	8500	2200	0.35	M6-10.9	6	ZMA 15/33	10	ZARF 1560 TN
0.2953	0.126	1.811	8500	2200	3.1	M6-10.9	6	ZMA 15/33	7	ZARF 1560 TN
9	3.2	48	7800	2100	0.4	M6-10.9	6	ZMA 17/38	12	ZARF 1762 TN
0.3543	0.126	1.8898	7800	2100	3.5	M6-10.9	6	ZMA 17/38	9	ZARF 1762 TN
10	3.2	53	7000	2000	0.5	M6-10.9	8	ZMA 20/38	18	ZARF 2068 TN
0.3937	0.126	2.0866	7000	2000	4.4	M6-10.9	8	ZMA 20/38	13	ZARF 2068 TN
12.5	3.2	63	6000	1500	1.3	M6-10.9	12	ZMA 20/52	38	ZARF 2080 TN
0.4921	0.126	2.4803	6000	1500	11.5	M6-10.9	12	ZMA 20/52	28	ZARF 2080 TN
10	3.2	58	6000	1900	0.55	M6-10.9	8	ZMA 25/45	25	ZARF 2575 TN
0.3937	0.126	2.2835	6000	1900	4.9	M6-10.9	8	ZMA 25/45	18	ZARF 2575 TN
12.5	3.2	73	4900	1400	1.6	M6-10.9	12	ZMA 25/58	55	ZARF 2590 TN
0.4921	0.126	2.874	4900	1400	14.2	M6-10.9	12	ZMA 25/58	41	ZARF 2590 TN
10	3.2	63	5500	1800	0.65	M6-10.9	12	ZMA 30/52	32	ZARF 3080 TN
0.3937	0.126	2.4803	5500	1800	5.8	M6-10.9	12	ZMA 30/52	24	ZARF 3080 TN
11	3.2	73	4800	1700	0.9	M6-10.9	12	ZMA 35/58	42	ZARF 3590 TN
0.4331	0.126	2.874	4800	1700	8	M6-10.9	12	ZMA 35/58	31	ZARF 3590 TN
14	3.2	85	4400	1300	2.1	M8-10.9	12	ZMA 30/65	75	ZARF 30105 TN
0.5512	0.126	3.3465	4400	1300	18.6	M8-10.9	12	ZMA 30/65	55	ZARF 30105 TN
14	3.2	88	4000	1250	2.3	M8-10.9	12	ZMA 35/70	100	ZARF 35110 TN
0.5512	0.126	3.4646	4000	1250	20.4	M8-10.9	12	ZMA 35/70	74	ZARF 35110 TN
11	3.2	80	4400	1600	1	M8-10.9	8	ZMA 40/62	55	ZARF 40100 TN
0.4331	0.126	3.1496	4400	1600	8.9	M8-10.9	8	ZMA 40/62	41	ZARF 40100 TN
16	6	94	3700	1200	2.5	M8-10.9	12	ZMA 40/75	120	ZARF 40115 TN
0.6299	0.2362	3.7008	3700	1200	22.1	M8-10.9	12	ZMA 40/75	89	ZARF 40115 TN
11.5	6	85	4000	1500	1.2	M8-10.9	8	ZMA 45/68	65	ZARF 45105 TN
0.4528	0.2362	3.3465	4000	1500	10.6	M8-10.9	8	ZMA 45/68	48	ZARF 45105 TN
17.5	6	105	3300	1150	3.5	M8-10.9	12	ZMA 45/85	150	ZARF 45130 TN
0.689	0.2362	4.1339	3300	1150	31	M8-10.9	12	ZMA 45/85	111	ZARF 45130 TN
11.5	6	94	3600	1200	2.2	M8-10.9	12	ZMA 50/75	85	ZARF 50115 TN
0.4528	0.2362	3.7008	3600	1200	19.5	M8-10.9	12	ZMA 50/75	63	ZARF 50115 TN
17.5	6	113	3100	1100	3.8	M10-10.9	12	ZMA 50/92	180	ZARF 50140 TN
0.689	0.2362	4.4488	3100	1100	33.6	M10-10.9	12	ZMA 50/92	133	ZARF 50140 TN
17.5	6	118	2900	1000	4	M10-10.9	12	ZMA 55/98	220	ZARF 55145 TN
0.689	0.2362	4.6457	2900	1000	35.4	M10-10.9	12	ZMA 55/98	162	ZARF 55145 TN
17.5	6	123	2700	950	4.2	M10-10.9	12	ZMA 60/98	250	ZARF 60150 TN
0.689	0.2362	4.8425	2700	950	37.2	M10-10.9	12	ZMA 60/98	184	ZARF 60150 TN
17.5	6	128	2600	900	3.9	M10-10.9	12	ZMA 65/105	270	ZARF 65155 TN
0.689	0.2362	5.0394	2600	900	34.5	M10-10.9	12	ZMA 65/105	199	ZARF 65155 TN
17.5	6	133	2400	800	4.8	M10-10.9	12	ZMA 70/110	330	ZARF 70160 TN
0.689	0.2362	5.2362	2400	800	42.5	M10-10.9	12	ZMA 70/110	243	ZARF 70160 TN
21	6	155	2100	700	8	M12-10.9	12	ZMA 75/125	580	ZARF 75185 TN
0.8268	0.2362	6.1024	2100	700	70.8	M12-10.9	12	ZMA 75/125	428	ZARF 75185 TN
22.5	8	180	1800	700	9.5	M12-10.9	16	ZMA 90/155	960	ZARF 90210 TN
0.8858	0.315	7.0866	1800	700	84.1	M12-10.9	16	ZMA 90/155	708	ZARF 90210 TN



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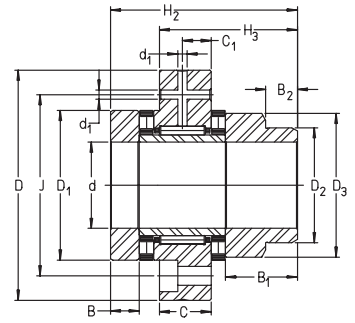
PART NUMBER	SHAFT d mm inch	OD D mm inch	WIDTH H ₂ mm inch	WEIGHT kg lbs	DYN. CAP. AXIAL N lbf	STAT. CAP. AXIAL N lbf	DYN. CAP. RADIAL N lbf	STAT. CAP. RADIAL N lbf	H ₃ mm inch	C mm inch	D ₁ mm inch	D ₂ mm inch	D ₃ mm inch
ZARF 1560 LTN	15	60	53	0.45	24900	53000	13000	17500	39	14	35	24	34
ZARF 1560 LTN	0.5906	2.3622	2.0866	0.99	5600	11900	2900	3900	1.5354	0.5512	1.378	0.9449	1.3386
ZARF 1762 LTN	17	62	57	0.52	26000	57000	14000	19900	41.5	14	38	28	38
ZARF 1762 LTN	0.6693	2.4409	2.2441	1.15	5800	12800	3100	4500	1.6339	0.5512	1.4961	1.1024	1.4961
ZARF 2068 LTN	20	68	60	0.61	33500	76000	14900	22400	43	14	42	30	40
ZARF 2068 LTN	0.7874	2.6772	2.3622	1.35	7500	17100	3300	5000	1.6929	0.5512	1.6535	1.1811	1.5748
ZARF 2080 LTN	20	80	75	1.22	64000	141000	22600	36000	53	18	52	40	50
ZARF 2080 LTN	0.7874	3.1496	2.9528	2.69	14400	31700	5100	8100	2.0866	0.7087	2.0472	1.5748	1.9685
ZARF 2575 LTN	25	75	65	0.84	35500	86000	22600	36000	48	18	47	36	45
ZARF 2575 LTN	0.9843	2.9528	2.5591	1.85	8000	19300	5100	8100	1.8898	0.7087	1.8504	1.4173	1.7717
ZARF 2590 LTN	25	90	75	1.75	80000	199000	24300	41500	53	18	62	48	60
ZARF 2590 LTN	0.9843	3.5433	2.9528	3.86	18000	44700	5500	9300	2.0866	0.7087	2.4409	1.8898	2.3622
ZARF 3080 LTN	30	80	65	0.9	39000	101000	24300	41500	48	18	52	40	50
ZARF 3080 LTN	1.1811	3.1496	2.5591	1.98	8800	22700	5500	9300	1.8898	0.7087	2.0472	1.5748	1.9685
ZARF 3590 LTN	35	90	70	1.25	56000	148000	26000	47000	51	18	60	45	58
ZARF 3590 LTN	1.378	3.5433	2.7559	2.76	12600	33300	5800	10600	2.0079	0.7087	2.3622	1.7717	2.2835
ZARF 30105 LTN	30	105	82	2.15	107000	265000	26000	47000	57	18	68	52	66
ZARF 30105 LTN	1.1811	4.1339	3.2283	4.74	24100	59600	5800	10600	2.2441	0.7087	2.6772	2.0472	2.5984
ZARF 35110 LTN	35	110	82	1.85	105000	265000	27500	53000	57	18	73	60	73
ZARF 35110 LTN	1.378	4.3307	3.2283	4.08	23600	59600	6200	11900	2.2441	0.7087	2.874	2.3622	2.874
ZARF 40100 LTN	40	100	70	1.45	59000	163000	27500	53000	51	18	65	50	63
ZARF 40100 LTN	1.5748	3.937	2.7559	3.2	13300	36600	6200	11900	2.0079	0.7087	2.5591	1.9685	2.4803
ZARF 40115 LTN	40	115	93	3	117000	315000	38000	74000	65.5	22.5	78	60	78
ZARF 40115 LTN	1.5748	4.5276	3.6614	6.62	26300	70800	8500	16600	2.5787	0.8858	3.0709	2.3622	3.0709
ZARF 45105 LTN	45	105	75	1.85	61000	177000	38000	74000	55	22.5	70	56	68
ZARF 45105 LTN	1.7717	4.1339	2.9528	4.08	13700	39800	8500	16600	2.1654	0.8858	2.7559	2.2047	2.6772
ZARF 45130 LTN	45	130	103	4.3	154000	405000	40000	82000	72	22.5	90	70	88
ZARF 45130 LTN	1.7717	5.1181	4.0551	9.48	34600	91100	9000	18400	2.8346	0.8858	3.5433	2.7559	3.4646
ZARF 50115 LTN	50	115	78	2.45	90000	300000	40000	82000	58	22.5	78	60	78
ZARF 50115 LTN	1.9685	4.5276	3.0709	5.4	20200	67400	9000	18400	2.2835	0.8858	3.0709	2.3622	3.0709
ZARF 50140 LTN	50	140	103	4.65	172000	480000	42000	90000	72	22.5	95	75	93
ZARF 50140 LTN	1.9685	5.5118	4.0551	10.25	38700	107900	9400	20200	2.8346	0.8858	3.7402	2.9528	3.6614
ZARF 55145 LTN	55	145	103	5	177000	500000	44000	98000	72	22.5	100	80	98
ZARF 55145 LTN	2.1654	5.7087	4.0551	11.03	39800	112400	9900	22000	2.8346	0.8858	3.937	3.1496	3.8583
ZARF 60150 LTN	60	150	103	5.35	187000	550000	44500	92000	72	22.5	105	90	105
ZARF 60150 LTN	2.3622	5.9055	4.0551	11.8	42000	123700	10000	20700	2.8346	0.8858	4.1339	3.5433	4.1339
ZARF 65155 LTN	65	155	103	5.7	172000	500000	54000	104000	72	22.5	110	90	108
ZARF 65155 LTN	2.5591	6.1024	4.0551	12.57	38700	112400	12100	23400	2.8346	0.8858	4.3307	3.5433	4.252
ZARF 70160 LTN	70	160	103	5.95	201000	630000	56000	119000	72	22.5	115	100	115
ZARF 70160 LTN	2.7559	6.2992	4.0551	13.12	45200	141600	12600	26800	2.8346	0.8858	4.5276	3.937	4.5276
ZARF 75185 LTN	75	185	125	10.6	290000	890000	72000	132000	87	27	135	115	135
ZARF 75185 LTN	2.9528	7.2835	4.9213	23.37	65200	200100	16200	29700	3.4252	1.063	5.315	4.5276	5.315
ZARF 90210 LTN	90	210	135	15.1	325000	103000	98000	210000	94.5	32	160	130	158
ZARF 90210 LTN	3.5433	8.2677	5.315	33.3	73100	23200	22000	47200	3.7205	1.2598	6.2992	5.1181	6.2205



Ball Screw Support Bearings

ZARF..LTN SERIES

- Combination double direction axial cylindrical roller and radial needle bearings
- Predrilled mounting flange
- Extended shaft washer for DIN 3760 metric series seal
- Metric series
- P4 axial precision



For details on part numbers, descriptive suffixes and various technical references, please refer to front of this section.

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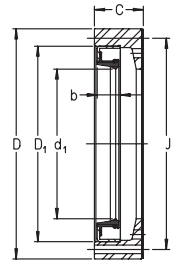
B	B ₁	B ₂	d ₁	J	SPEED LIMIT OIL rpm	SPEED LIMIT GREASE rpm	MTG. BOLT	BOLT QTY	LOCKNUT NUMBER	LOCKNUT TORQUE Nm ft-lbf	SEAL SIZE DIN3760	PART NUMBER
mm inch	mm inch	mm inch	mm inch	mm inch								
7.5	20.5	11	3.2	46	8500	2200	M6-10.9	6	ZMA 15/33	10	24x35x7	ZARF 1560 LTN
0.2953	0.8071	0.4331	0.126	1.811	8500	2200	M6-10.9	6	ZMA 15/33	7.4	24x35x7	ZARF 1560 LTN
9	23	11	3.2	48	8000	2100	M6-10.9	6	ZM 17	12	28x40x7	ZARF 1762 LTN
0.3543	0.9055	0.4331	0.126	1.8898	8000	2100	M6-10.9	6	ZM 17	8.9	28x40x7	ZARF 1762 LTN
10	24	11	3.2	53	7000	2000	M6-10.9	8	ZMA 20/38	18	30x42x7	ZARF 2068 LTN
0.3937	0.9449	0.4331	0.126	2.0866	7000	2000	M6-10.9	8	ZMA 20/38	13.3	30x42x7	ZARF 2068 LTN
12.5	27.5	11	3.2	63	6000	1500	M6-10.9	12	ZMA 20/52	38	40x52x7	ZARF 2080 LTN
0.4921	1.0827	0.4331	0.126	2.4803	6000	1500	M6-10.9	12	ZMA 20/52	28	40x52x7	ZARF 2080 LTN
10	25	11	3.2	58	6000	1900	M6-10.9	8	ZMA 25/45	25	36x47x7	ZARF 2575 LTN
0.3937	0.9843	0.4331	0.126	2.2835	6000	1900	M6-10.9	8	ZMA 25/45	18.4	36x47x7	ZARF 2575 LTN
12.5	27.5	11	3.2	73	4900	1400	M6-10.9	12	ZMA 25/58	55	48x62x8	ZARF 2590 LTN
0.4921	1.0827	0.4331	0.126	2.874	4900	1400	M6-10.9	12	ZMA 25/58	40.6	48x62x8	ZARF 2590 LTN
10	25	11	3.2	63	5500	1800	M6-10.9	12	ZMA 30/52	32	40x52x7	ZARF 3080 LTN
0.3937	0.9843	0.4331	0.126	2.4803	5500	1800	M6-10.9	12	ZMA 30/52	23.6	40x52x7	ZARF 3080 LTN
11	27	12	3.2	73	4800	1700	M6-10.9	12	ZMA 35/58	42	45x60x8	ZARF 3590 LTN
0.4331	1.063	0.4724	0.126	2.874	4800	1700	M6-10.9	12	ZMA 35/58	31	45x60x8	ZARF 3590 LTN
14	30	12	3.2	85	4400	1300	M8-10.9	12	ZMA 30/65	75	52x68x8	ZARF 30105 LTN
0.5512	1.1811	0.4724	0.126	3.3465	4400	1300	M8-10.9	12	ZMA 30/65	55.3	52x68x8	ZARF 30105 LTN
14	30	12	3.2	88	4000	1250	M8-10.9	12	ZMA 35/70	100	60x75x8	ZARF 35110 LTN
0.5512	1.1811	0.4724	0.126	3.4646	4000	1250	M8-10.9	12	ZMA 35/70	73.8	60x75x8	ZARF 35110 LTN
11	27	12	3.2	80	4400	1600	M8-10.9	8	ZMA 40/62	55	50x65x8	ZARF 40100 LTN
0.4331	1.063	0.4724	0.126	3.1496	4400	1600	M8-10.9	8	ZMA 40/62	40.6	50x65x8	ZARF 40100 LTN
16	34	12	6	94	3700	1200	M8-10.9	12	ZMA 40/75	120	60x80x8	ZARF 40115 LTN
0.6299	1.3386	0.4724	0.2362	3.7008	3700	1200	M8-10.9	12	ZMA 40/75	88.5	60x80x8	ZARF 40115 LTN
11.5	26.5	12	6	85	4000	1500	M8-10.9	8	ZMA 45/68	65	56x70x8	ZARF 45105 LTN
0.4528	1.0433	0.4724	0.2362	3.3465	4000	1500	M8-10.9	8	ZMA 45/68	47.9	56x70x8	ZARF 45105 LTN
17.5	38.5	14	6	105	3300	1150	M8-10.9	12	ZMA 45/85	150	70x90x10	ZARF 45130 LTN
0.689	1.5157	0.5512	0.2362	4.1339	3300	1150	M8-10.9	12	ZMA 45/85	110.6	70x90x10	ZARF 45130 LTN
11.5	29.5	12	6	94	3600	1200	M8-10.9	12	ZMA 50/75	85	60x80x8	ZARF 50115 LTN
0.4528	1.1614	0.4724	0.2362	3.7008	3600	1200	M8-10.9	12	ZMA 50/75	62.7	60x80x8	ZARF 50115 LTN
17.5	38.5	14	6	113	3100	1100	M10-10.9	12	ZMA 50/92	180	75x95x10	ZARF 50140 LTN
0.689	1.5157	0.5512	0.2362	4.4488	3100	1100	M10-10.9	12	ZMA 50/92	132.8	75x95x10	ZARF 50140 LTN
17.5	38.5	14	6	118	2900	1000	M10-10.9	12	ZMA 55/98	220	80x100x10	ZARF 55145 LTN
0.689	1.5157	0.5512	0.2362	4.6457	2900	1000	M10-10.9	12	ZMA 55/98	162.3	80x100x10	ZARF 55145 LTN
17.5	38.5	16	6	123	2700	950	M10-10.9	12	ZMA 60/98	250	90x110x12	ZARF 60150 LTN
0.689	1.5157	0.6299	0.2362	4.8425	2700	950	M10-10.9	12	ZMA 60/98	184.4	90x110x12	ZARF 60150 LTN
17.5	38.5	16	6	128	2600	900	M10-10.9	12	ZMA 65/105	270	90x110x12	ZARF 65155 LTN
0.689	1.5157	0.6299	0.2362	5.0394	2600	900	M10-10.9	12	ZMA 65/105	199.2	90x110x12	ZARF 65155 LTN
17.5	38.5	16	6	133	2400	800	M10-10.9	12	ZMA 70/110	330	100x120x12	ZARF 70160 LTN
0.689	1.5157	0.6299	0.2362	5.2362	2400	800	M10-10.9	12	ZMA 70/110	243.4	100x120x12	ZARF 70160 LTN
21	46	16	6	155	2100	700	M12-10.9	12	ZMA 75/125	580	115x140x12	ZARF 75185 LTN
0.8268	1.811	0.6299	0.2362	6.1024	2100	700	M12-10.9	12	ZMA 75/125	427.8	115x140x12	ZARF 75185 LTN
22.5	47.5	16	8	180	1800	700	M12-10.9	16	ZMA 90/155	960	130x160x12	ZARF 90210 LTN
0.8858	1.8701	0.6299	0.315	7.0866	1800	700	M12-10.9	16	ZMA 90/155	708.1	130x160x12	ZARF 90210 LTN



Seal Carriers & Seals

DRS SERIES

- Seal rings with mounting hardware for use with series ZARF..TN and ZARF..LTN ball screw support bearings



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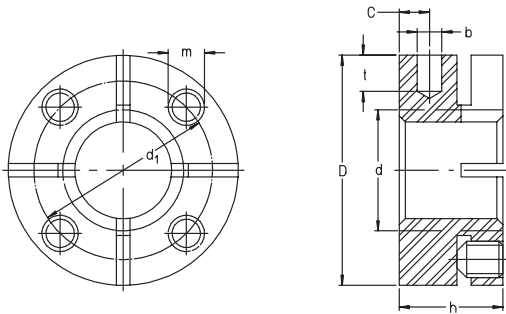
PART NUMBER	SHAFT d ₁ mm inch	WIDTH C mm inch	OD D mm inch	J mm inch	D ₁ mm inch	b mm inch	WEIGHT PER PIECE kg lbs	BOLT THREAD DIN 912	MATING BEARING
DRS 1560	35	14	60	52.4	45	7	0.16	M3x20	ZARF 1560 TN
DRS 1560	1.378	0.551	2.362	2.063	1.772	0.276	0.353	M3x20	ZARF 1560 TN
DRS 1762	38	15.5	62	54.4	45	7	0.18	M3x25	ZARF 1762 TN
DRS 1762	1.496	0.61	2.441	2.142	1.772	0.276	0.397	M3x25	ZARF 1762 TN
DRS 2068	42	17	68	60.4	55	8	0.11	M3x25	ZARF 2068 TN
DRS 2068	1.654	0.669	2.677	2.378	2.165	0.315	0.243	M3x25	ZARF 2068 TN
DRS 2080	52	22	80	73.4	68	8	0.2	M3x30	ZARF 2080 TN
DRS 2080	2.047	0.866	3.15	2.89	2.677	0.315	0.441	M3x30	ZARF 2080 TN
DRS 2575	47	17	75	67.4	62	6	0.16	M3x25	ZARF 2575 TN
DRS 2575	1.85	0.669	2.953	2.654	2.441	0.236	0.353	M3x25	ZARF 2575 TN
DRS 2590	62	22	90	81	75	10	0.3	M3x30	ZARF 2590 TN
DRS 2590	2.441	0.866	3.543	3.189	2.953	0.394	0.662	M3x30	ZARF 2590 TN
DRS 3080	52	17	80	73.4	68	8	0.15	M3x25	ZARF 3080 TN
DRS 3080	2.047	0.669	3.15	2.89	2.677	0.315	0.331	M3x25	ZARF 3080 TN
DRS 30105	68	25	105	95	85	10	0.35	M4x35	ZARF 30105 TN
DRS 30105	2.677	0.984	4.134	3.74	3.346	0.394	0.772	M4x35	ZARF 30105 TN
DRS 3590	60	19	90	80	72	8	0.15	M4x30	ZARF 3590 TN
DRS 3590	2.362	0.748	3.543	3.15	2.835	0.315	0.331	M4x30	ZARF 3590 TN
DRS 35110	73	25	110	101	95	10	0.3	M3x30	ZARF 35110 TN
DRS 35110	2.874	0.984	4.331	3.976	3.74	0.394	0.662	M3x30	ZARF 35110 TN
DRS 40100	65	19	100	90	80	8	0.25	M4x30	ZARF 40100 TN
DRS 40100	2.559	0.748	3.937	3.543	3.15	0.315	0.551	M4x30	ZARF 40100 TN
DRS 40115	78	27.5	115	106	100	10	0.5	M3x35	ZARF 40115 TN
DRS 40115	3.071	1.083	4.528	4.173	3.937	0.394	1.103	M3x35	ZARF 40115 TN
DRS 45105	70	20	105	95	85	8	0.3	M4x30	ZARF 45105 TN
DRS 45105	2.756	0.787	4.134	3.74	3.346	0.315	0.662	M4x30	ZARF 45105 TN
DRS 45130	90	31	130	120	110	12	0.7	M4x40	ZARF 45130 TN
DRS 45130	3.543	1.22	5.118	4.724	4.331	0.472	1.544	M4x40	ZARF 45130 TN
DRS 50115	78	20	115	106	100	10	0.2	M3x30	ZARF 50115 TN
DRS 50115	3.071	0.787	4.528	4.173	3.937	0.394	0.441	M3x30	ZARF 50115 TN
DRS 50140	95	30	140	127.5	115	13	0.8	M5x40	ZARF 50140 TN
DRS 50140	3.74	1.181	5.512	5.02	4.528	0.512	1.764	M5x40	ZARF 50140 TN
DRS 55145	100	30	145	132.5	120	12	0.9	M5x40	ZARF 55145 TN
DRS 55145	3.937	1.181	5.709	5.217	4.724	0.472	1.985	M5x40	ZARF 55145 TN
DRS 60150	105	30	150	137.5	125	12	0.9	M5x40	ZARF 60150 TN
DRS 60150	4.134	1.181	5.906	5.413	4.921	0.472	1.985	M5x40	ZARF 60150 TN
DRS 65155	110	30	155	142.5	130	12	1	M5x40	ZARF 65155 TN
DRS 65155	4.331	1.181	6.102	5.61	5.118	0.472	2.205	M5x40	ZARF 65155 TN
DRS 70160	115	30	160	147.5	135	13	1	M5x40	ZARF 70160 TN
DRS 70160	4.528	1.181	6.299	5.807	5.315	0.512	2.205	M5x40	ZARF 70160 TN
DRS 75185	135	36	185	172.5	160	15	1.8	M5x50	ZARF 75185 TN
DRS 75185	5.315	1.417	7.283	6.791	6.299	0.591	3.969	M5x50	ZARF 75185 TN
DRS 90210	160	38	210	194	180	15	2.7	M5x50	ZARF 90210
DRS 90210	6.299	1.496	8.268	7.638	7.087	0.591	5.954	M5x50	ZARF 90210



Locknuts

AM SERIES

- Axial set screws to prevent loss of preload
- Preloading axial bearings
- Metric series



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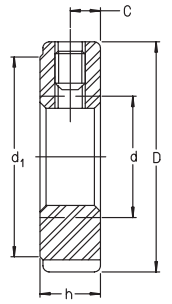
PART NUMBER	d inch	d mm	D inch	D mm	h inch	h mm	WGT lbs	WGT kg	b inch	b mm	t inch	t mm	d ₁ inch	d ₁ mm	c inch	c mm	m inch	m mm	FaB lbf	FaB kN
AM 15	0.591	M15 x 1	1.181	30	0.709	18	0.132	0.06	0.157	4	0.197	5	0.906	23	0.197	5	0.157	M4	22900	102
AM 17	0.669	M17 x 1	1.26	32	0.709	18	0.154	0.07	0.157	4	0.197	5	1.024	26	0.197	5	0.157	M4	27000	120
AM 20	0.787	M20 x 1	1.496	38	0.709	18	0.287	0.13	0.157	4	0.236	6	1.161	29.5	0.197	5	0.236	M6	32600	145
AM 25	0.984	M25 x 1.5	1.772	45	0.787	20	0.353	0.16	0.197	5	0.236	6	1.378	35	0.236	6	0.236	M6	46100	205
AM 30	1.181	M30 x 1.5	2.047	52	0.787	20	0.441	0.2	0.197	5	0.276	7	1.575	40	0.236	6	0.236	M6	55300	246
AM 35	1.378	M35 x 1.5	2.559	65	0.866	22	0.728	0.33	0.236	6	0.315	8	1.89	48	0.236	6	0.236	M6	74000	329
AM 40	1.575	M40 x 1.5	2.559	65	0.866	22	0.662	0.3	0.236	6	0.315	8	2.008	51	0.236	6	0.236	M6	78000	347
AM 45	1.772	M45 x 1.5	2.756	70	0.866	22	0.75	0.34	0.236	6	0.315	8	2.205	56	0.236	6	0.236	M6	80900	360
AM 50	1.969	M50 x 1.5	2.953	75	0.984	25	0.948	0.43	0.236	6	0.315	8	2.441	62	0.315	8	0.236	M6	101200	450
AM 60	2.362	M60 x 2	3.543	90	1.024	26	1.433	0.65	0.236	6	0.315	8	2.953	75	0.315	8	0.236	M6	123000	547



Locknuts

ZM SERIES

- Radial set screws to prevent loss of preload
- Preload for axial bearings
- Metric series



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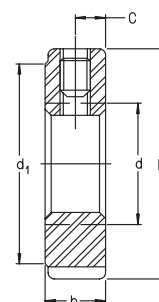
PART NUMBER	d inch	d mm	D inch	D mm	h inch	h mm	WGT lbs	WGT kg	d ₁ inch	d ₁ mm
ZM 06	0.2362	M 6 x 0.5	0.63	16	0.315	8	0.022	0.01	0.472	12
ZM 08	0.315	M 8 x 0.75	0.63	16	0.315	8	0.022	0.01	0.472	12
ZM 10	0.3937	M 10 x 1	0.709	18	0.315	8	0.022	0.01	0.551	14
ZM 12	0.4724	M 12 x 1	0.866	22	0.315	8	0.033	0.015	0.709	18
ZM 15	0.5906	M 15 x 1	0.984	25	0.315	8	0.04	0.018	0.827	21
ZMA 15/33	0.5906	M 15 x 1	1.299	33	0.63	16	0.176	0.08	1.102	28
ZM 17	0.6693	M 17 x 1	1.102	28	0.394	10	0.062	0.028	0.906	23
ZM 20	0.7874	M 20 x 1	1.26	32	0.394	10	0.077	0.035	1.063	27
ZMA 20/38	0.7874	M 20 x 1	1.496	38	0.787	20	0.265	0.12	1.299	33
ZM 25	0.9843	M 25 x 1.5	1.496	38	0.472	12	0.121	0.055	1.299	33
ZMA 25/45	0.9843	M 25 x 1.5	1.772	45	0.787	20	0.353	0.16	1.575	40
ZM 30	1.1811	M 30 x 1.5	1.772	45	0.472	12	0.165	0.075	1.575	40
ZMA 30/52	1.1811	M 30 x 1.5	2.047	52	0.866	22	0.485	0.22	1.85	47
ZM 35	1.378	M 35 x 1.5	2.047	52	0.472	12	0.218	0.099	1.85	47
ZMA 35/58	1.378	M 35 x 1.5	2.283	58	0.866	22	0.573	0.26	2.047	52
ZM 40	1.5748	M 40 x 1.5	2.283	58	0.551	14	0.309	0.14	2.047	52
ZMA 40/62	1.5748	M 40 x 1.5	2.441	62	0.866	22	0.595	0.27	2.205	56
ZM 45	1.7717	M 45 x 1.5	2.559	65	0.551	14	0.375	0.17	2.323	59
ZMA 45/68	1.7717	M 45 x 1.5	2.677	68	0.945	24	0.772	0.35	2.441	62
ZM 50	1.9685	M 50 x 1.5	2.756	70	0.551	14	0.419	0.19	2.52	64
ZMA 50/75	1.9685	M 50 x 1.5	2.953	75	0.984	25	0.948	0.43	2.677	68
ZM 55	2.1654	M 55 x 2	2.953	75	0.63	16	0.507	0.23	2.677	68
ZMA 55/98	2.1654	M 55 x 2	3.858	98	1.26	32	2.58	1.17	3.543	90
ZM 60	2.3622	M 60 x 2	3.15	80	0.63	16	0.551	0.25	2.874	73
ZMA 60/98	2.3622	M 60 x 2	3.858	98	1.26	32	2.359	1.07	3.543	90
ZM 65	2.5591	M 65 x 2	3.346	85	0.63	16	0.595	0.27	3.071	78
ZMA 65/105	2.5591	M 65 x 2	4.134	105	1.26	32	2.668	1.21	3.819	97
ZM 70	2.7559	M 70 x 2	3.622	92	0.709	18	0.794	0.36	3.346	85
ZMA 70/110	2.7559	M 70 x 2	4.331	110	1.378	35	3.087	1.4	4.016	102
ZM 75	2.9528	M 75 x 2	3.858	98	0.709	18	0.882	0.4	3.543	90
ZMA 75/125	2.9528	M 75 x 2	4.921	125	1.496	38	4.653	2.11	4.606	117
ZM 80	3.1496	M 80 x 2	4.134	105	0.709	18	1.014	0.46	3.74	95
ZM 85	3.3465	M 85 x 2	4.331	110	0.709	18	1.08	0.49	4.016	102
ZM 90	3.5433	M 90 x 2	4.724	120	0.787	20	1.544	0.7	4.252	108
ZMA 90/155	3.5433	M 90 x 2	6.102	155	1.496	38	7.409	3.36	5.748	146
ZM 100	3.937	M 100 x 2	5.118	130	0.787	20	1.698	0.77	4.724	120
ZM 105	4.1339	M 105 x 2	5.512	140	0.866	22	2.315	1.05	4.961	126
ZM 110	4.3307	M 110 x 2	5.709	145	0.866	22	2.403	1.09	5.236	133
ZM 115	4.5276	M 115 x 2	5.906	150	0.866	22	2.492	1.13	5.394	137
ZM 120	4.7244	M 120 x 2	6.102	155	0.945	24	2.822	1.28	5.433	138
ZM 125	4.9213	M 125 x 2	6.299	160	0.945	24	2.933	1.33	5.827	148
ZM 130	5.1181	M 130 x 2	6.496	165	0.945	24	2.999	1.36	5.866	149
ZM 140	5.5118	M 140 x 2	7.087	180	1.024	26	4.079	1.85	6.299	160
ZM 150	5.9055	M 150 x 2	7.677	195	1.024	26	4.939	2.24	6.732	171



Locknuts

ZM SERIES

- Radial set screws to prevent loss of preload
- Preload for axial bearings
- Metric series



For details on part numbers, descriptive suffixes and various technical references, please refer to front of this section.

For engineering or technical information contact your local sales representative or call Distributor Sales

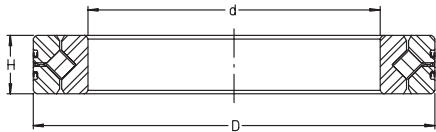
c inch	c mm	SET SCREW THREAD	GROOVE WIDTH inch	GROOVE WIDTH mm	GROOVE DEPTH inch	GROOVE DEPTH mm	FRACTURE LOAD lbf	FRACTURE LOAD kN	PART NUMBER
0.157	4	M4	0.118	3	0.079	2	3800	17	ZM 06
0.157	4	M4	0.118	3	0.079	2	5200	23	ZM 08
0.157	4	M4	0.118	3	0.079	2	7000	31	ZM 10
0.157	4	M4	0.118	3	0.079	2	8500	38	ZM 12
0.157	4	M4	0.118	3	0.079	2	11200	50	ZM 15
0.315	8	M5	0.157	4	0.079	2	23800	106	ZMA 15/33
0.197	5	M5	0.157	4	0.079	2	12800	57	ZM 17
0.197	5	M5	0.157	4	0.079	2	15500	69	ZM 20
0.394	10	M5	0.197	5	0.079	2	39100	174	ZMA 20/38
0.236	6	M6	0.197	5	0.079	2	20200	90	ZM 25
0.394	10	M6	0.197	5	0.079	2	47400	211	ZMA 25/45
0.236	6	M6	0.197	5	0.079	2	25200	112	ZM 30
0.433	11	M6	0.197	5	0.079	2	60700	270	ZMA 30/52
0.236	6	M6	0.197	5	0.079	2	30100	134	ZM 35
0.433	11	M6	0.236	6	0.098	2.5	67400	300	ZMA 35/58
0.276	7	M6	0.236	6	0.098	2.5	35300	157	ZM 40
0.433	11	M8	0.236	6	0.098	2.5	69700	310	ZMA 40/62
0.276	7	M6	0.236	6	0.098	2.5	40700	181	ZM 45
0.472	12	M8	0.236	6	0.098	2.5	80900	360	ZMA 45/68
0.276	7	M6	0.236	6	0.098	2.5	46100	205	ZM 50
0.492	12.5	M8	0.236	6	0.098	2.5	93300	415	ZMA 50/75
0.315	8	M6	0.276	7	0.118	3	51500	229	ZM 55
0.63	16	M8	0.315	8	0.138	3.5	139400	620	ZMA 55/98
0.315	8	M6	0.276	7	0.118	3	57300	255	ZM 60
0.63	16	M8	0.315	8	0.138	3.5	152900	680	ZMA 60/98
0.315	8	M6	0.276	7	0.118	3	62900	280	ZM 65
0.63	16	M8	0.315	8	0.138	3.5	168600	750	ZMA 65/105
0.354	9	M8	0.315	8	0.138	3.5	68600	305	ZM 70
0.689	17.5	M8	0.315	8	0.138	3.5	182100	810	ZMA 70/110
0.354	9	M8	0.315	8	0.138	3.5	74400	331	ZM 75
0.748	19	M8	0.315	8	0.138	3.5	197800	880	ZMA 75/125
0.354	9	M8	0.315	8	0.138	3.5	79800	355	ZM 80
0.354	9	M8	0.315	8	0.138	3.5	86600	385	ZM 85
0.394	10	M8	0.394	10	0.157	4	92200	410	ZM 90
0.748	19	M8	0.394	10	0.157	4	242800	1080	ZMA 90/155
0.394	10	M8	0.394	10	0.157	4	104500	465	ZM 100
0.433	11	M10	0.472	12	0.197	5	111300	495	ZM 105
0.433	11	M10	0.472	12	0.197	5	116900	520	ZM 110
0.433	11	M10	0.472	12	0.197	5	123700	550	ZM 115
0.472	12	M10	0.472	12	0.197	5	130400	580	ZM 120
0.472	12	M10	0.472	12	0.197	5	137100	610	ZM 125
0.472	12	M10	0.472	12	0.197	5	141600	630	ZM 130
0.512	13	M12	0.551	14	0.236	6	155100	690	ZM 140
0.512	13	M12	0.551	14	0.236	6	168600	750	ZM 150



Cross Roller Bearings

SX SERIES

- Cross roller bearings ISO series 18 (same envelope as 618 14 etc.)



For details on part numbers, descriptive suffixes and various technical references, please refer to front of this section.
For engineering or technical information contact your local sales representative or call Distributor Sales

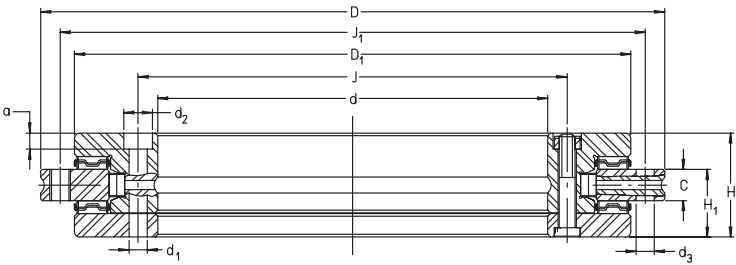
PART NUMBER	SHAFT d	SHAFT d	OD D	OD D	WIDTH H	WIDTH H	WGT	WGT	DYN. CAP. AXIAL	DYN. CAP. AXIAL	STAT. CAP. AXIAL	STAT. CAP. AXIAL	SPEED LIMIT
	inch	mm	inch	mm	inch	mm	lbs	kg	lbf	kN	lbf	kN	rpm
SX 01 18 14	2.756	70	3.543	90	0.394	10	0.662	0.3	4,050	18	13,500	60	955
SX 01 18 20	3.937	100	4.921	125	0.512	13	0.882	0.4	6,300	28	23,800	106	680
SX 01 18 24	4.724	120	5.906	150	0.630	16	1.764	0.8	9,200	41	34,500	153	565
SX 01 18 28	5.512	140	6.890	175	0.709	18	2.426	1.1	14,400	64	53,000	237	485
SX 01 18 32	6.299	160	7.874	200	0.787	20	3.749	1.7	15,500	69	61,000	272	425
SX 01 18 36	7.087	180	8.858	225	0.866	22	5.072	2.3	22,000	98	86,000	381	375
SX 01 18 40	7.874	200	9.843	250	0.945	24	6.836	3.1	23,800	106	96,000	425	340
SX 01 18 48	9.449	240	11.811	300	1.102	28	11.7	5.3	33,500	149	138,000	612	280
SX 01 18 60	11.811	300	14.961	380	1.496	38	26.5	12	55,000	245	231,000	1027	558
SX 01 18 68	13.386	340	16.535	420	1.496	38	29.8	13.5	60,000	265	260,000	1148	200
SX 01 18 80	15.748	400	19.685	500	1.811	46	52.9	24	87,000	385	380,000	1699	170
SX 01 18 /500	19.685	500	24.409	620	2.205	56	97.0	44	126,000	560	570,000	2538	135



Axial Radial Bearings for Rotary Tables

YRT SERIES

- Double direction
- Axially preloaded, radially preloaded
- Predrilled for flange mounting
- P4 precision



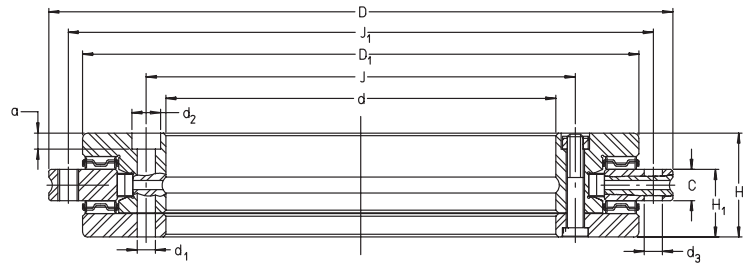
For details on part numbers, descriptive suffixes and various technical references, please refer to front of this section.
For engineering or technical information contact your local sales representative or call Distributor Sales

PART NUMBER	SHAFT d	OD D	WIDTH H	DYN. CAP AXIAL	STAT. CAP. AXIAL	DYN. CAP RADIAL	STAT. CAP. RADIAL	H ₁	C	D ₁	INNER BOLT CIRCLE J	OUTER BOLT CIRCLE J ₁	BOLT TORQUE
	mm inch	mm inch	mm inch	kN lbf	kN lbf	kN lbf	kN lbf	mm inch	mm inch	mm inch	mm inch	mm inch	Nm lbf-ft
YRT 80	80	146	35	38.5	158	36.5	47	23.35	12	130	92	138	8.5
YRT 80	3.15	5.748	1.378	8700	36000	8200	10600	0.919	0.472	5.118	3.622	5.433	6.3
YRT 100	100	185	38	72	370	54	115	25	12	160	112	170	8.5
YRT 100	3.937	7.283	1.496	16000	83000	12100	25900	0.984	0.472	6.299	4.409	6.693	6.3
YRT 120	120	210	40	79	430	70	148	26	12	184	135	195	14
YRT 120	4.724	8.268	1.575	18000	97000	15700	33000	1.024	0.472	7.244	5.315	7.677	10.3
YRT 150	150	240	40	85	510	77	179	26	12	214	165	225	14
YRT 150	5.906	9.449	1.575	19000	115000	17300	40000	1.024	0.472	8.425	6.496	8.858	10.3
YRT 180	180	280	43	92	580	83	208	29	15	244	194	260	14
YRT 180	7.087	11.024	1.693	21000	130000	18700	47000	1.142	0.591	9.606	7.638	10.236	10.3
YRT 200	200	300	45	98	650	88	235	30	15	274	215	285	14
YRT 200	7.874	11.811	1.772	22000	146000	20000	53000	1.181	0.591	10.787	8.465	11.22	10.3
YRT 260	260	385	55	109	810	101	305	36.5	18	345	280	365	34
YRT 260	10.236	15.157	2.165	25000	182000	23000	69000	1.437	0.709	13.583	11.024	14.37	25.1
YRT 325	325	450	60	186	1710	133	410	40	20	415	342	430	34
YRT 325	12.795	17.717	2.362	42000	384000	30000	92000	1.575	0.787	16.339	13.465	16.929	25.1
YRT 395	395	525	65	202	2010	146	495	42.5	20	486	415	505	34
YRT 395	15.551	20.669	2.559	45000	452000	33000	111000	1.673	0.787	19.134	16.339	19.882	25.1
YRT 460	460	600	70	217	2300	197	690	46	22	560	482	580	34
YRT 460	18.11	23.622	2.756	49000	517000	44000	155000	1.811	0.866	22.047	18.976	22.835	25.1
YRT 580	580	750	90	385	3550	215	830	60	30	700	610	720	68
YRT 580	22.835	29.528	3.543	87000	798000	48000	187000	2.362	1.181	27.559	24.016	28.346	50.2
YRT 650	650	870	122	495	5100	415	1520	78	34	800	680	830	116
YRT 650	25.591	34.252	4.803	111000	1147000	93000	342000	3.071	1.339	31.496	26.772	32.677	85.6
YRT 850	850	1095	124	560	6500	480	1990	80.5	37	1018	890	1055	284
YRT 850	33.465	43.11	4.882	126000	1461000	108000	447000	3.169	1.457	40.079	35.039	41.535	209.5
YRT 950	950	1200	132	1040	10300	600	2480	86	40	1130	990	1160	284
YRT 950	37.402	47.244	5.197	234000	2316000	135000	558000	3.386	1.575	44.488	38.976	45.669	209.5



Axial Radial Bearings for Rotary Tables YRT SERIES

- Double direction
- Axially preloaded, radially preloaded
- Predrilled for flange mounting
- P4 precision



For details on part numbers, descriptive suffixes and various technical references, please refer to front of this section.

For engineering or technical information contact your local sales representative or call Distributor Sales

a	d1	d2	QTY ★	HOLE SPACING	d3	QTY ★★	REMOVAL THREADS G	QTY	BEARING FRICTIONAL TORQUE	RIGIDITY AXIAL	RIGIDITY RADIAL	RIGIDITY MOMENT	WGT.	SPEED LIMIT GREASE	PART NUMBER
mm inch	mm inch	mm inch			mm inch				Nm lbf-ft	N/μm lbf°6/in	N/μm lbf°6/in	Nm/mrad ftlbf/deg	kg lbs	rpm	
4	5.6	10	10	30°	4.6	12	—	—	3	500	1800	2500	2.4	350	YRT 80
0.157	0.22	0.394	10	30°	0.181	12	—	—	2.2	2.86	10.28	32200	5.29	350	YRT 80
5.4	5.6	10	16	20°	5.6	15	M5	3	3	800	2000	5000	4.1	280	YRT 100
0.213	0.22	0.394	16	20°	0.22	15	M5	3	2.2	4.57	11.42	64400	9.04	280	YRT 100
6.2	7	11	22	15°	7	21	M8	3	7	1000	2200	7000	5.3	230	YRT 120
0.244	0.276	0.433	22	15°	0.276	21	M8	3	5.2	5.71	12.56	90100	11.69	230	YRT 120
6.2	7	11	34	10°	7	33	M8	3	10	1500	2600	11000	6.2	210	YRT 150
0.244	0.276	0.433	34	10°	0.276	33	M8	3	7.4	8.57	14.85	141600	13.67	210	YRT 150
6.2	7	11	46	7.5°	7	45	M8	3	12	2200	3000	17000	7.7	190	YRT 180
0.244	0.276	0.433	46	7.5°	0.276	45	M8	3	8.9	12.56	17.13	218800	16.98	190	YRT 180
6.2	7	11	46	7.5°	7	45	M8	3	14	3000	3500	23000	9.7	170	YRT 200
0.244	0.276	0.433	46	7.5°	0.276	45	M8	3	10.3	17.13	19.99	296100	21.39	170	YRT 200
8.2	9.3	15	34	10°	9.3	33	M12	3	20	5500	4500	45000	18.3	130	YRT 260
0.323	0.366	0.591	34	10°	0.366	33	M12	3	14.8	31.41	25.7	579300	40.35	130	YRT 260
8.2	9.3	15	34	10°	9.3	33	M12	3	40	8500	5000	80000	25	110	YRT 325
0.323	0.366	0.591	34	10°	0.366	33	M12	3	29.5	48.54	28.55	1029800	55.13	110	YRT 325
8.2	9.3	15	46	7.5°	9.3	45	M12	3	55	12500	6000	130000	33	90	YRT 395
0.323	0.366	0.591	46	7.5°	0.366	45	M12	3	40.6	71.38	34.26	1673400	72.77	90	YRT 395
8.2	9.3	15	46	7.5°	9.3	45	M12	3	70	18000	7000	200000	45	80	YRT 460
0.323	0.366	0.591	46	7.5°	0.366	45	M12	3	51.6	102.79	39.97	2574500	99.23	80	YRT 460
11	11.4	18	46	7.5°	11.4	42	M12	6	140	30000	9000	380000	89	60	YRT 580
0.433	0.449	0.709	46	7.5°	0.449	42	M12	6	103.3	171.31	51.39	4891600	196.25	60	YRT 580
13	14	20	46	7.5°	14	42	M12	6	200	45000	10000	550000	170	55	YRT 650
0.512	0.551	0.787	46	7.5°	0.551	42	M12	6	147.5	256.97	57.1	7079900	374.85	55	YRT 650
17	18	26	58	6°	18	54	M16	6	300	80000	13000	1100000	253	40	YRT 850
0.669	0.709	1.024	58	6°	0.709	54	M16	6	221.3	456.83	74.24	14159800	557.87	40	YRT 850
17	18	26	58	6°	18	54	M16	6	—	100000	14000	1500000	312	40	YRT 950
0.669	0.709	1.024	58	6°	0.709	54	M16	6	—	571.04	79.95	19308800	687.96	40	YRT 950

Equal hole spacing includes

★ quantity of mounting holes – spacing includes two holes with retaining bolts for shipping

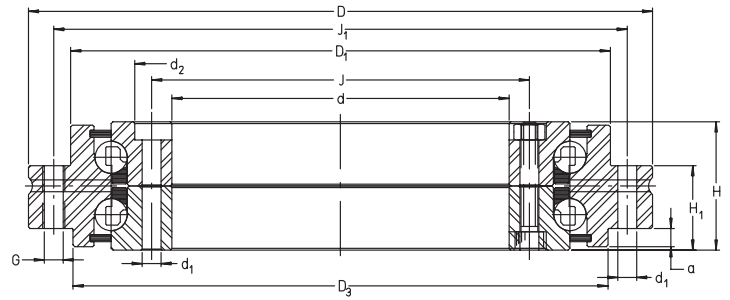
★★ equal hole spacing is sum of bolt holes and threaded removal holes



Rotary Table Bearings

ZKLDF SERIES

- Double direction axial angular contact ball bearings
- 60° contact angle with axial mounting bolt holes
- Bolt pattern matches YRT series
- Metric series



For details on part numbers, descriptive suffixes and various technical references, please refer to front of this section.

For engineering or technical information contact your local sales representative or call Distributor Sales

PART NUMBER	SHAFT d	OD D	WIDTH H	WEIGHT	DYN. CAP. AXIAL	STAT. CAP. AXIAL	H ₁	D ₁	D ₃	INNER BOLT CIRCLE DIA. J	OUTER BOLT CIRCLE DIA. J ₁	HOLE DIA. d ₁
	mm inch	mm inch	mm inch	Kg lbs	N lbf	N lbf	mm inch	mm inch	mm inch	mm inch	mm inch	mm inch
ZKLDF 100	100	185	38	4.5	51000	162000	25	160	158	112	170	5.6
ZKLDF 100	3.937	7.2835	1.496	9.9	11000	36000	0.984	6.299	6.22	4.409	6.693	0.22
ZKLDF 120	120	210	40	6	61000	207000	26	184	181	135	195	7
ZKLDF 120	4.7244	8.2677	1.575	13.2	14000	47000	1.024	7.244	7.126	5.315	7.677	0.276
ZKLDF 150	150	240	40	7.5	65000	247000	26	214	211	165	225	7
ZKLDF 150	5.9055	9.4488	1.575	16.5	15000	56000	1.024	8.425	8.307	6.496	8.858	0.276
ZKLDF 200	200	300	45	11	87000	365000	30	274	271	215	285	7
ZKLDF 200	7.874	11.811	1.772	24.3	20000	82000	1.181	10.787	10.669	8.465	11.22	0.276
ZKLDF 260	260	385	55	22	115000	540000	36.5	345	348	280	365	9.3
ZKLDF 260	10.2362	15.1575	2.165	48.5	26000	121000	1.437	13.583	13.701	11.024	14.37	0.366
ZKLDF 325	325	450	60	28	138000	720000	40	415	413	342	430	9.3
ZKLDF 325	12.7953	17.7165	2.362	61.7	31000	162000	1.575	16.339	16.26	13.465	16.929	0.366
ZKLDF 395	395	525	65	39	172000	960000	42.5	486	488	415	505	9.3
ZKLDF 395	15.5512	20.6693	2.559	86	39000	216000	1.673	19.134	19.213	16.339	19.882	0.366
ZKLDF 460	460	600	70	50	207000	1210000	46	560	563	482	580	9.3
ZKLDF 460	18.1102	23.622	2.756	110.3	47000	272000	1.811	22.047	22.165	18.976	22.835	0.366

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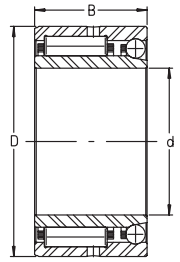
PART NUMBER	COUNTER BORE DIA. d ₂	a	HOLE SPACING	QTY. MOUNTING HOLES	QTY. SHIPPING SCREWS	THREADED HOLES G	QTY. THREADED HOLES G	BOLT TORQUE	SPEED LIMIT OIL	SPEED LIMIT GREASE	FRICTION TORQUE
	mm inch	mm inch						Nm inch-lbf	rpm	rpm	Nm inch-lbf
ZKLDF 100	10	5.4	18X20°	15	3	M5	3	8.5	2100	1400	1.6
ZKLDF 100	0.394	0.213	18X20°	15	3	M5	3	75.2	2100	1400	14.2
ZKLDF 120	11	6.2	24X15°	21	3	M8	3	14	1800	1200	2
ZKLDF 120	0.433	0.244	24X15°	21	3	M8	3	123.9	1800	1200	17.7
ZKLDF 150	11	6.2	36X10°	33	3	M8	3	14	1500	1000	3
ZKLDF 150	0.433	0.244	36X10°	33	3	M8	3	123.9	1500	1000	26.6
ZKLDF 200	11	6.2	48X7.5°	45	3	M8	3	14	1200	800	4.5
ZKLDF 200	0.433	0.244	48X7.5°	45	3	M8	3	123.9	1200	800	39.8
ZKLDF 260	15	8.2	36X10°	33	3	M12	3	34	900	600	7.5
ZKLDF 260	0.591	0.323	36X10°	33	3	M12	3	300.9	900	600	66.4
ZKLDF 325	15	8.2	36X10°	33	3	M12	3	34	750	500	11
ZKLDF 325	0.591	0.323	36X10°	33	3	M12	3	300.9	750	500	97.4
ZKLDF 395	15	8.2	48X7.5°	45	3	M12	3	34	600	400	16
ZKLDF 395	0.591	0.323	48X7.5°	45	3	M12	3	300.9	600	400	141.6
ZKLDF 460	15	8.2	48X7.5°	45	3	M12	3	34	525	350	21
ZKLDF 460	0.591	0.323	48X7.5°	45	3	M12	3	300.9	525	350	185.9



Combination Bearings

NKIA SERIES

- Radial needle roller and single direction axial angular contact ball bearings
- Metric series
- Removeable inner ring



For details on part numbers, descriptive suffixes and various technical references, please refer to front of this section.

For engineering or technical information contact your local sales representative or call Distributor Sales

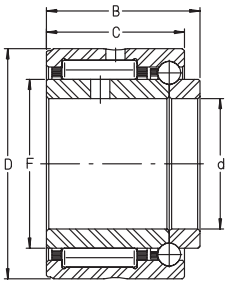
PART NUMBER	SHAFT d inch	SHAFT d mm	OD D inch	OD D mm	WIDTH B inch	WIDTH B mm	WGT. lbs	WGT. g	DYN. CAP. RADIAL lbf	DYN. CAP. RADIAL N	STAT. CAP. RADIAL lbf	STAT. CAP. RADIAL N	DYN. CAP. AXIAL lbf	DYN. CAP. AXIAL N	STAT. CAP. AXIAL lbf	STAT. CAP. AXIAL N	SPEED LIMIT rpm
NKIA 5901	0.472	12	0.945	24	0.630	16	0.088	40	1,710	7600	1,870	8300	485	2160	510	2250	24000
NKIA 5902	0.591	15	1.102	28	0.709	18	0.11	50	2,380	10600	3,050	13600	530	2340	620	2750	22000
NKIA 5903	0.669	17	1.181	30	0.709	18	0.123	56	2,470	11000	3,300	14600	560	2500	720	3200	21000
NKIA 5904	0.787	20	1.457	37	0.906	23	0.227	103	4,700	21000	5,700	25500	890	3950	1,090	4850	17000
NKIA 59/22	0.866	22	1.535	39	0.906	23	0.26	118	5,100	22800	6,600	29500	960	4250	1,260	5600	16000
NKIA 5905	0.984	25	1.654	42	0.906	23	0.287	130	5,300	23600	7,100	31500	980	4350	1,370	6100	15000
NKIA 5906	1.181	30	1.850	47	0.906	23	0.324	147	5,600	25000	8,000	35500	1,070	4750	1,640	7300	13000
NKIA 5907	1.378	35	2.165	55	1.063	27	0.536	243	7,100	31500	11,200	50000	1,350	6000	2,200	9800	11000
NKIA 5908	1.575	40	2.441	62	1.181	30	0.695	315	9,700	43000	15,100	67000	1,660	7400	2,850	12700	9500
NKIA 5909	1.772	45	2.677	68	1.181	30	0.827	375	10,100	45000	16,400	73000	1,730	7700	3,150	14000	8500
NKIA 5910	1.969	50	2.835	72	1.181	30	0.838	380	10,600	47000	18,000	80000	1,820	8100	3,600	15900	8000
NKIA 5911	2.165	55	3.150	80	1.339	34	1.213	550	13,000	58000	22,500	100000	2,180	9700	4,300	19200	7500
NKIA 5912	2.362	60	3.347	85	1.339	34	1.301	590	13,500	60000	24,300	108000	2,250	10000	4,700	20800	7000
NKIA 5913	2.559	65	3.543	90	1.339	34	1.4	635	13,700	61000	25,000	112000	2,320	10300	5,000	22300	6500
NKIA 5914	2.756	70	3.937	100	1.575	40	2.161	980	18,900	84000	35,000	156000	3,050	13500	6,500	29000	6000



Combination Bearings

NKIB SERIES

- Radial needle roller and double direction axial angular contact ball bearing
- Metric series
- Removeable inner rings



For details on part numbers, descriptive suffixes and various technical references, please refer to front of this section.
For engineering or technical information contact your local sales representative or call Distributor Sales

PART NUMBER	SHAFT d inch	SHAFT d mm	OD D inch	OD D mm	WIDTH B inch	WIDTH B mm	WIDTH C inch	WIDTH C mm	WGT. lbs	WGT. g
NKIB 5901	0.472	12	0.945	24	0.689	17.5	0.630	16	0.095	43
NKIB 5902	0.591	15	1.102	28	0.787	20	0.709	18	0.115	52
NKIB 5903	0.669	17	1.181	30	0.787	20	0.709	18	0.128	58
NKIB 5904	0.787	20	1.457	37	0.984	25	0.906	23	0.236	107
NKIB 59/22	0.866	22	1.535	39	0.984	25	0.906	23	0.269	122
NKIB 5905	0.984	25	1.654	42	0.984	25	0.906	23	0.295	134
NKIB 5906	1.181	30	1.850	47	0.984	25	0.906	23	0.333	151
NKIB 5907	1.378	35	2.165	55	1.181	30	1.063	27	0.545	247
NKIB 5908	1.575	40	2.441	62	1.339	34	1.181	30	0.706	320
NKIB 5909	1.772	45	2.677	68	1.339	34	1.181	30	0.838	380
NKIB 5910	1.969	50	2.835	72	1.339	34	1.181	30	0.849	385
NKIB 5911	2.165	55	3.150	80	1.496	38	1.339	34	1.224	555
NKIB 5912	2.362	60	3.347	85	1.496	38	1.339	34	1.312	595
NKIB 5913	2.559	65	3.543	90	1.496	38	1.339	34	1.411	640
NKIB 5914	2.756	70	3.937	100	1.772	45	1.575	40	2.172	985

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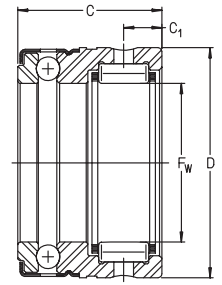
PART NUMBER	DYN. CAP. RADIAL lbf	DYN. CAP. RADIAL N	STAT. CAP. RADIAL lbf	STAT. CAP. RADIAL N	DYN. CAP. AXIAL lbf	DYN. CAP. AXIAL N	STAT. CAP. AXIAL lbf	STAT. CAP. AXIAL N	SPEED LIMIT rpm
NKIB 5901	1,710	7600	1,870	8300	485	2160	510	2250	24000
NKIB 5902	2,380	10600	3,050	13600	530	2340	620	2750	22000
NKIB 5903	2,470	11000	3,300	14600	560	2500	720	3200	21000
NKIB 5904	4,700	21000	5,700	25500	890	3950	1,090	4850	17000
NKIB 59/22	5,100	22800	6,600	29500	960	4250	1,260	5600	16000
NKIB 5905	5,300	23600	7,100	31500	980	4350	1,370	6100	15000
NKIB 5906	5,600	25000	8,000	35500	1,070	4750	1,640	7300	13000
NKIB 5907	7,100	31500	11,200	50000	1,350	6000	2,200	9800	11000
NKIB 5908	9,700	43000	15,100	67000	1,660	7400	2,850	12700	9500
NKIB 5909	10,100	45000	16,400	73000	1,730	7700	3,150	14000	8500
NKIB 5910	10,600	47000	18,000	80000	1,820	8100	3,600	15900	8000
NKIB 5911	13,000	58000	22,500	100000	2,180	9700	4,300	19200	7500
NKIB 5912	13,500	60000	24,300	108000	2,250	10000	4,700	20800	7000
NKIB 5913	13,700	61000	25,000	112000	2,320	10300	5,000	22300	6500
NKIB 5914	18,900	84000	35,000	156000	3,050	13500	6,500	29000	6000



Combination Bearings

NX SERIES

- Radial needle roller and axial banded ball bearing
- Metric series



For details on part numbers, descriptive suffixes and various technical references, please refer to front of this section.

For engineering or technical information contact your local sales representative or call Distributor Sales

PART NUMBER	SHAFT F _w	SHAFT F _w	OD D	OD D	WIDTH C	WIDTH C	WGT.	WGT.
	inch	mm	inch	mm	inch	mm	lbs	g
NX 7 TN	0.276	7	0.551	14	0.709	18	0.031	14
NX 10	0.394	10	0.748	19	0.709	18	0.055	25
NX 12	0.472	12	0.827	21	0.709	18	0.062	28
NX 15	0.591	15	0.945	24	1.102	28	0.106	48
NX 17	0.669	17	1.024	26	1.102	28	0.117	53
NX 20	0.787	20	1.181	30	1.102	28	0.15	68
NX 25	0.984	25	1.457	37	1.181	30	0.254	115
NX 30	1.181	30	1.654	42	1.181	30	0.287	130
NX 35	1.378	35	1.850	47	1.181	30	0.353	160

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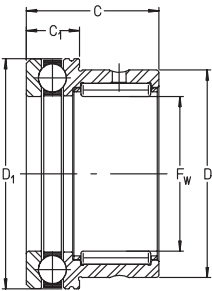
PART NUMBER	DYN. CAP. RADIAL	DYN. CAP. RADIAL	STAT. CAP. RADIAL	STAT. CAP. RADIAL	DYN. CAP. AXIAL	DYN. CAP. AXIAL	STAT. CAP. AXIAL	STAT. CAP. AXIAL	OIL GROOVE CENTER C ₁	OIL GROOVE CENTER C ₁	SPEED LIMIT	CORRECT SNAP RING
	lbf	N	lbf	N	lbf	N	lbf	N	inch	mm	rpm	
NX 7 TN	640	2850	600	2650	780	3450	1,030	4600	0.185	4.7	15000	WR 14
NX 10	1,000	4450	830	3700	1,150	5100	1,750	7800	0.185	4.7	11000	WR 19
NX 12	1,080	4800	970	4300	1,190	5300	2,000	8900	0.185	4.7	9500	WR 21
NX 15	2,410	10700	2,850	12700	1,370	6100	2,500	11200	0.315	8	8000	WR 24
NX 17	2,700	11900	3,350	15000	1,440	6400	2,800	12400	0.315	8	7500	WR 26
NX 20	2,900	13000	3,950	17500	1,730	7700	3,550	15800	0.315	8	6500	WR 30
NX 25	3,350	14900	5,000	22400	2,750	12200	5,800	26000	0.315	8	4900	WR 37
NX 30	5,100	22600	8,100	36000	2,900	12800	6,700	30000	0.394	10	4300	WR 42
NX 35	5,500	24300	9,300	41500	3,050	13600	7,900	35000	0.394	10	3700	WR 47



Combination Bearings

NKX SERIES

- Radial needle based on RNA49.. series
- Thrust ball based on 511.. series
- Per DIN 5429
- Available with grease retaining cap, suffix Z



For details on part numbers, descriptive suffixes and various technical references, please refer to front of this section.
For engineering or technical information contact your local sales representative or call Distributor Sales

PART NUMBER	DIN 5429 PART NUMBER	SHAFT Fw inch	SHAFT Fw mm	OD D inch	OD D mm	WIDTH C inch	WIDTH C mm	WGT. lbs	WGT. g	D1 max inch	D1 max mm	C1 inch	C1 mm
NKX 10 TN	NAXK 10 TN	0.394	10	0.748	19	0.906	23	0.075	34	0.949	24.1	0.354	9
NKX 12	NAXK 12	0.472	12	0.827	21	0.906	23	0.084	38	1.028	26.1	0.354	9
NKX 15	NAXK 15	0.591	15	0.945	24	0.906	23	0.097	44	1.106	28.1	0.354	9
NKX 17	NAXK 17	0.669	17	1.024	26	0.984	25	0.117	53	1.185	30.1	0.354	9
NKX 20	NAXK 20	0.787	20	1.181	30	1.181	30	0.183	83	1.382	35.1	0.394	10
NKX 25	NAXK 25	0.984	25	1.457	37	1.181	30	0.276	125	1.658	42.1	0.433	11
NKX 30	NAXK 30	1.181	30	1.654	42	1.181	30	0.311	141	1.854	47.1	0.433	11
NKX 35	NAXK 35	1.378	35	1.850	47	1.181	30	0.359	163	2.051	52.1	0.472	12
NKX 40	NAXK 40	1.575	40	2.047	52	1.260	32	0.441	200	2.366	60.1	0.512	13
NKX 45	NAXK 45	1.772	45	2.284	58	1.260	32	0.556	252	2.567	65.2	0.551	14
NKX 50	NAXK 50	1.969	50	2.441	62	1.378	35	0.617	280	2.764	70.2	0.551	14
NKX 60	NAXK 60	2.362	60	2.835	72	1.575	40	0.794	360	3.354	85.2	0.669	17
NKX 70	NAXK 70	2.756	70	3.347	85	1.575	40	1.103	500	3.748	95.2	0.709	18

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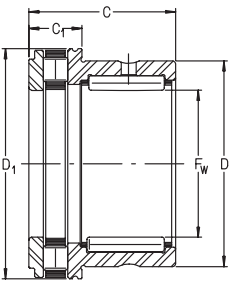
PART NUMBER	DIN 5429 PART NUMBER	DYN. CAP. RADIAL lbf	DYN. CAP. RADIAL N	STAT. CAP. RADIAL lbf	STAT. CAP. RADIAL N	DYN. CAP. AXIAL lbf	DYN. CAP. AXIAL N	STAT. CAP. AXIAL lbf	STAT. CAP. AXIAL N	SPEED LIMIT OIL rpm
NKX 10 TN	NAXK 10 TN	1,390	6200	1,750	7800	2,250	10000	3,150	14000	12000
NKX 12	NAXK 12	2,020	9000	2,470	11000	2,320	10300	3,450	15400	11000
NKX 15	NAXK 15	2,410	10700	2,850	12700	2,360	10500	3,800	16800	9500
NKX 17	NAXK 17	2,700	11900	3,350	15000	2,430	10800	4,100	18200	8500
NKX 20	NAXK 20	3,700	16400	5,400	23800	3,200	14300	5,600	24700	7500
NKX 25	NAXK 25	4,250	18800	6,900	30500	4,400	19600	8,400	37500	6000
NKX 30	NAXK 30	5,100	22600	8,100	36000	4,600	20400	9,400	42000	5000
NKX 35	NAXK 35	5,500	24300	9,300	41500	4,750	21200	10,600	47000	4600
NKX 40	NAXK 40	5,800	26000	10,600	47000	6,100	27000	14,200	63000	4000
NKX 45	NAXK 45	6,200	27500	11,900	53000	6,300	28000	15,500	69000	3600
NKX 50	NAXK 50	8,500	38000	16,600	74000	6,500	29000	16,900	75000	3300
NKX 60	NAXK 60	9,400	42000	20,200	90000	9,300	41500	25,500	113000	2800
NKX 70	NAXK 70	10,000	44500	20,700	92000	9,700	43000	28,500	127000	2400



Combination Bearings

NKXR SERIES

- Radial needle based on RNA49.. series
- Thrust roller based on 811.. series
- Per DIN 5429
- Available with grease retaining cap, suffix Z



For details on part numbers, descriptive suffixes and various technical references, please refer to front of this section.
 For engineering or technical information contact your local sales representative or call Distributor Sales

PART NUMBER	DIN 5429 PART NUMBER	SHAFT Fw inch	SHAFT Fw mm	OD D inch	OD D mm	WIDTH C inch	WIDTH C mm	WGT. lbs	WGT. g	D ₁ max inch	D ₁ max mm	C ₁ inch	C ₁ mm
NKXR 15	NAXR 15	0.591	15	0.945	24	0.906	23	0.093	42	1.106	28.1	0.354	9
NKXR 17	NAXR 17	0.669	17	1.024	26	0.984	25	0.11	50	1.185	30.1	0.354	9
NKXR 20	NAXR 20	0.787	20	1.181	30	1.181	30	0.176	80	1.382	35.1	0.394	10
NKXR 25	NAXR 25	0.984	25	1.457	37	1.181	30	0.265	120	1.658	42.1	0.433	11
NKXR 30	NAXR 30	1.181	30	1.654	42	1.181	30	0.298	135	1.854	47.1	0.433	11
NKXR 35	NAXR 35	1.378	35	1.850	47	1.181	30	0.346	157	2.051	52.1	0.472	12
NKXR 40	NAXR 40	1.575	40	2.047	52	1.260	32	0.45	204	2.366	60.1	0.512	13
NKXR 45	NAXR 45	1.772	45	2.284	58	1.260	32	0.538	244	2.567	65.2	0.551	14
NKXR 50	NAXR 50	1.969	50	2.441	62	1.378	35	0.591	268	2.764	70.2	0.551	14

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PART NUMBER	DIN 5429 PART NUMBER	DYN. CAP. RADIAL lbf	DYN. CAP. RADIAL N	STAT. CAP. RADIAL lbf	STAT. CAP. RADIAL N	DYN. CAP. AXIAL lbf	DYN. CAP. AXIAL N	STAT. CAP. AXIAL lbf	STAT. CAP. AXIAL N	SPEED LIMIT OIL rpm
NKXR 15	NAXR 15	2,410	10700	2,850	12700	3,250	14400	6,400	28500	13000
NKXR 17	NAXR 17	2,700	11900	3,350	15000	3,600	15900	7,500	33500	12000
NKXR 20	NAXR 20	3,700	16400	5,400	23800	5,600	24900	11,900	53000	10000
NKXR 25	NAXR 25	4,250	18800	6,900	30500	7,500	33500	17,100	76000	8500
NKXR 30	NAXR 30	5,100	22600	8,100	36000	8,000	35500	19,300	86000	7500
NKXR 35	NAXR 35	5,500	24300	9,300	41500	8,800	39000	22,700	101000	6500
NKXR 40	NAXR 40	5,800	26000	10,600	47000	12,600	56000	33,500	148000	6000
NKXR 45	NAXR 45	6,200	27500	11,900	53000	13,300	59000	36,500	163000	5000
NKXR 50	NAXR 50	8,500	38000	16,600	74000	13,700	61000	40,000	177000	4800

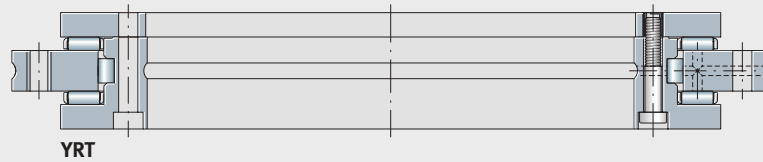




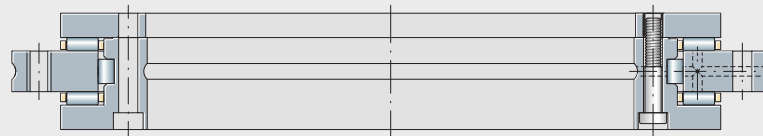
High precision bearings for combined loads



Axial/radial bearings
Axial angular contact ball bearings
Axial/radial bearings
with integral angular measuring system



YRT

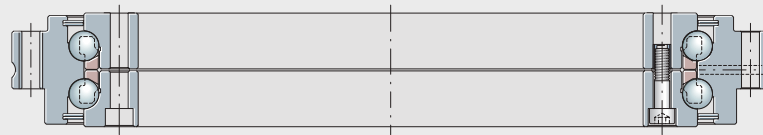


RTC



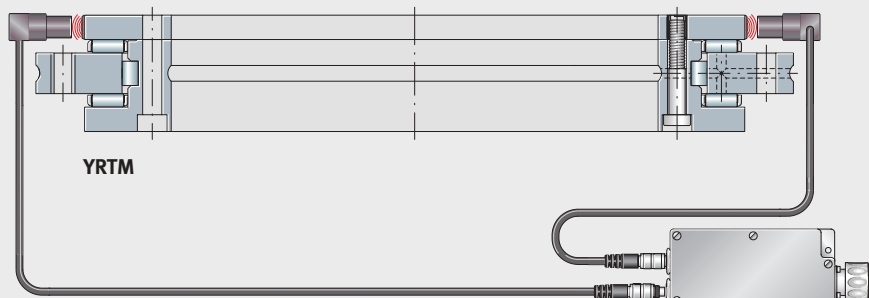
YRT Speed

107 584



ZKLDF

107 585

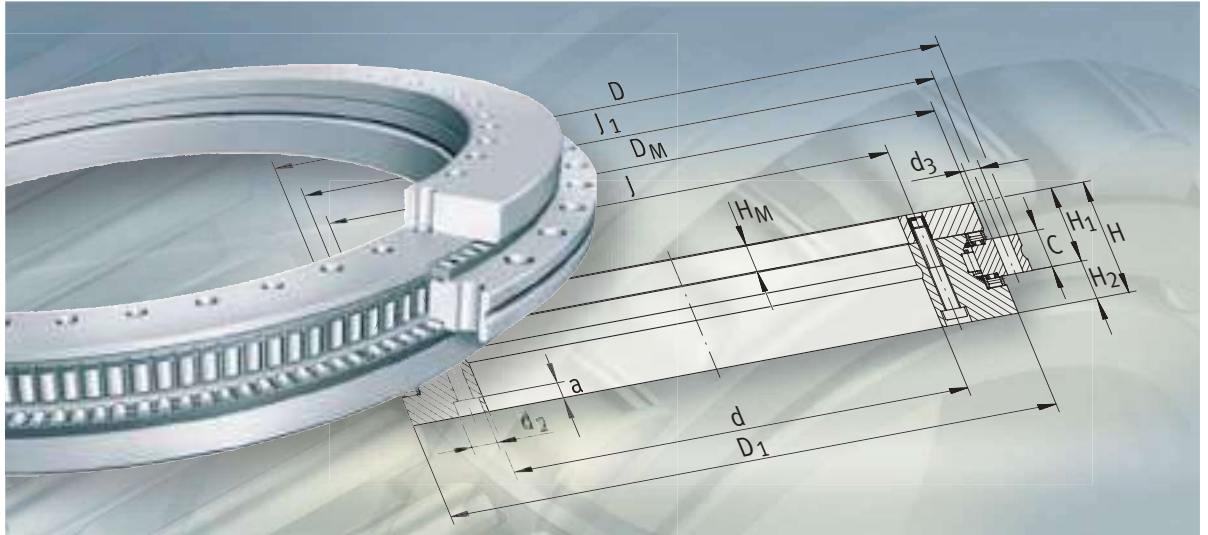


YRTM

MEKO/U

107 586





Axial/radial bearings
Axial angular contact ball bearings

Product overview

Axial/radial bearings

Axial angular contact ball bearings

Axial/radial bearings

YRT



RTC



For higher speeds

YRT_{Speed}



Axial angular contact ball bearings

ZKLDF



Axial/radial bearings

Axial angular contact ball bearings

Features

Axial/radial bearings YRT, RTC and YRT_{Speed} and axial angular contact ball bearings ZKLDF are ready-to-fit high precision bearings for high precision applications with combined loads. They can support radial loads, axial loads from both sides and tilting moments without clearance and are particularly suitable for bearing arrangements for running accuracy, such as rotary tables, face plates, milling heads and reversible clamps.

Due to the fixing holes in the bearing rings, the units are very easy to fit.

The bearings are radially and axially preloaded after fitting.

The mounting dimensions of all series are identical.

With angular measuring system

Axial/radial bearings are also available with an angular measuring system. The measuring system can measure angles to an accuracy of a few angular seconds by non-contact, magneto-resistive means, see page 1020.

Areas of application

For standard applications with low speeds and small operating durations – such as indexing tables and swivel type milling heads – series YRT is generally the most suitable, *Figure 1*. These bearings are available in two axial and radial runout accuracies.

Where comparatively lower friction and higher speeds are required, RTC bearings can be used, *Figure 1*. For higher requirements in accuracy, these bearings are also available with restricted axial runout accuracy.

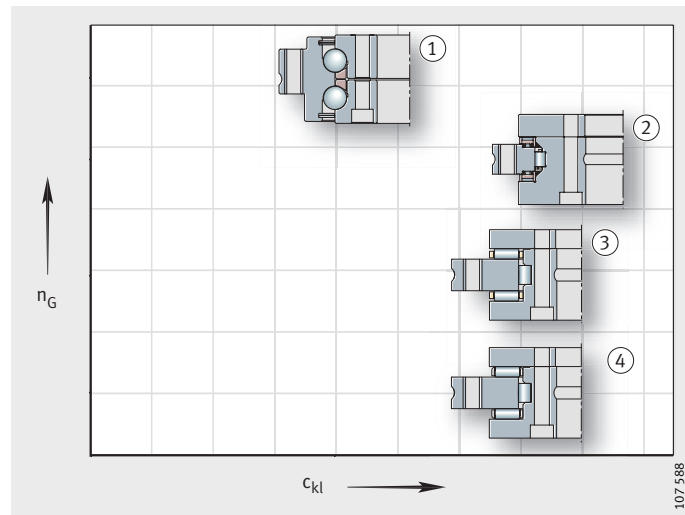
For the bearing arrangements of direct drive axes, there is the series YRT_{Speed}. Due to their high limiting speeds and very low, uniform frictional torque across the whole speed range, these bearings are particularly suitable for combination with torque motors, *Figure 1*.

Axial angular contact ball bearings ZKLDF are particularly suitable for high speed applications with long operating duration, *Figure 1*. They are characterised by high tilting rigidity, low friction and low lubricant consumption.



① ZKLDF
② YRT_{Speed}
③ RTC
④ YRT
 n_G = limiting speed
 c_{kl} = tilting rigidity

Figure 1
Speed and tilting rigidity – comparison



Axial/radial bearings

Axial angular contact ball bearings

Axial/radial bearings	Axial/radial bearings YRT, RTC and YRT_{Speed} have an axial component and a radial component. The axial component comprises an axial needle roller or cylindrical roller and cage assembly, an outer ring, L-section ring and shaft locating washer and is axially preloaded after fitting. The radial component is a full complement (YRT, RTC) or cage-guided, preloaded cylindrical roller set. The outer ring, L-section ring and shaft locating washer have fixing holes. The unit is located by means of retaining screws for transport and safe handling.
Sealing/lubricant	Axial/radial bearings are supplied without seals. Bearings of series YRT and YRT_{Speed} are greased using a lithium complex soap grease to GA08 and can be lubricated via the outer ring and L-section ring. Bearings of series RTC are greased with Arcanol MULTITOP.
Axial angular contact ball bearings	Axial angular contact ball bearings ZKLDF comprise a single-piece outer ring, a two-piece inner ring and two ball and cage assemblies with a contact angle of 60°. The outer ring and inner ring have fixing holes for screw mounting of the bearing on the adjacent construction. The unit is located by means of retaining screws for transport and safe handling.
Sealing/lubricant	Axial angular contact ball bearings have sealing shields on both sides. They are greased using a barium complex soap grease to DIN 51825–KPE2K–30 and can be lubricated via the outer ring.
Operating temperature	Axial/radial bearings and axial angular contact ball bearings are suitable for operating temperatures from –30 °C to +120 °C.
Suffixes	Suffixes and additional text for available designs: see table.

Available designs

Suffixes	Description	Design
H ₁ ...	Reduced tolerance on mounting dimension H ₁ (postscript: H ₁ with tolerance ± ...) Restricted tolerance value according to table, page 1010	Special design ¹⁾
H ₂ ...	Reduced tolerance on mounting dimension H ₂ (postscript: H ₂ with tolerance ± ...) Restricted tolerance value according to table, page 1010	Special design ¹⁾
–	Axial and radial runout tolerances restricted by 50% (additional text: axial/radial runout 50%)	Special design ¹⁾

¹⁾ Available by agreement.

Design and safety guidelines

Basic rating life

The load carrying capacity and life must be checked for the radial and axial bearing component.

Please contact us in relation to checking of the basic rating life. The speed, load and operating duration must be given.

Static load safety factor

The static load safety factor S_0 indicates the security against impermissible permanent deformations in the bearing.

It is determined as follows:

$$S_0 = \frac{C_{0r}}{F_{0r}} \text{ or } \frac{C_{0a}}{F_{0a}}$$

S_0 –
Static load safety factor

C_{0r}, C_{0a} N
Basic static load rating according to dimension tables

F_{0r}, F_{0a} N
Maximum static load on the radial or axial bearing.

Caution! In machine tools and similar areas of application, S_0 should be > 4 .

Static limiting load diagrams

The static limiting load diagrams can be used:

- for rapid checking of the selected bearing size under predominantly static load
- for calculation of the tilting moment M_k that can be supported by the bearing in addition to the axial load.

The limiting load diagrams are based on a rolling element set with a static load safety factor $S_0 \geq 4$, as well as the screw and bearing ring strength.

Caution! The static limiting load must not be exceeded when dimensioning the bearing arrangement. Example: see *Figure 2*.

Axial/radial bearings

The static limiting load diagrams for YRT, YRTS and RTC are shown in *Figure 3*, page 998 to *Figure 9*, page 1000.

Axial angular contact ball bearings

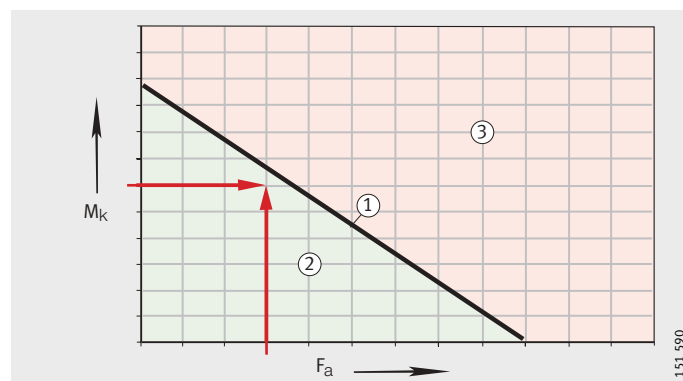
The static limiting load diagrams for the series ZKLDF are shown in *Figure 10* and *Figure 11*, page 1001.



- ① Bearing/size
 - ② Permissible range
 - ③ Impermissible range
- M_k = max. tilting moment
 F_a = axial load

Figure 2

Static limiting load diagram –
example

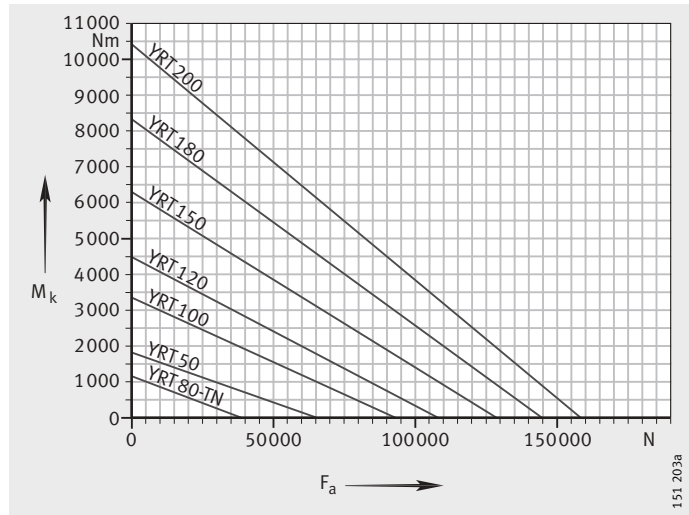


Axial/radial bearings

Axial angular contact ball bearings

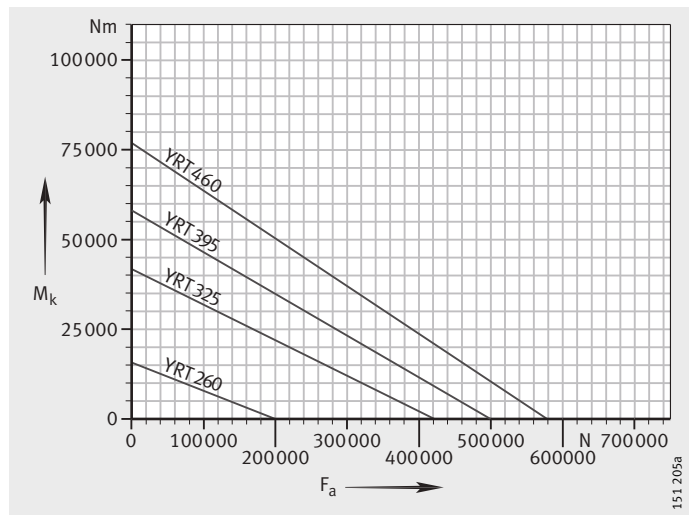
M_k = max. tilting moment
 F_a = axial load

Figure 3
 Static limiting load diagram –
 YRT50 to YRT200



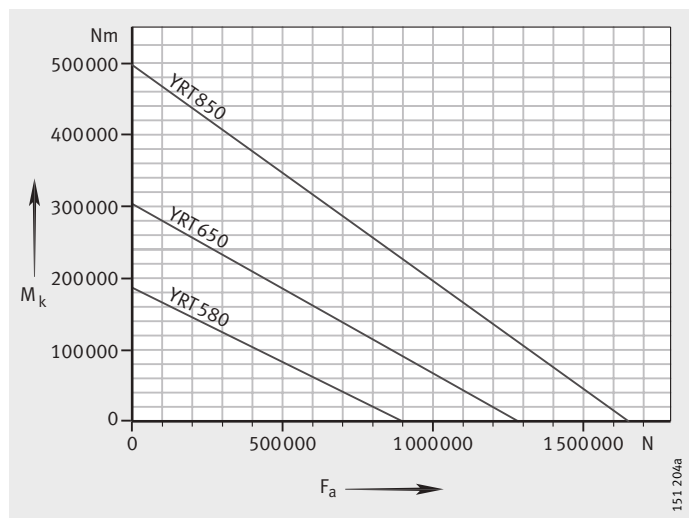
M_k = max. tilting moment
 F_a = axial load

Figure 4
 Static limiting load diagram –
 YRT260 to YRT460



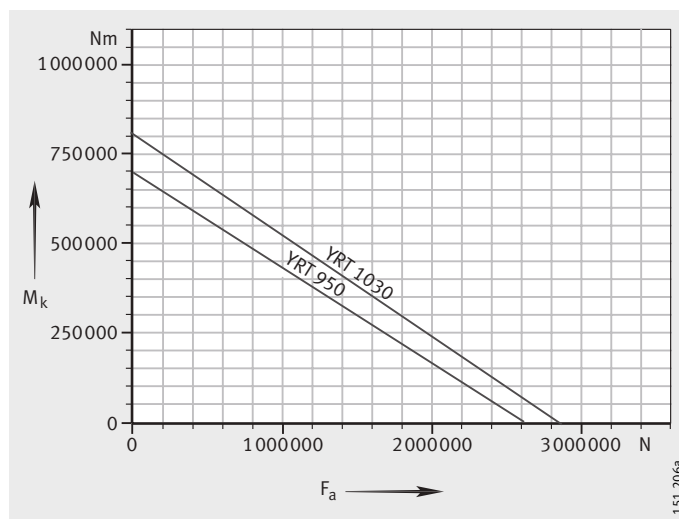
M_k = max. tilting moment
 F_a = axial load

Figure 5
 Static limiting load diagram –
 YRT580 to YRT850



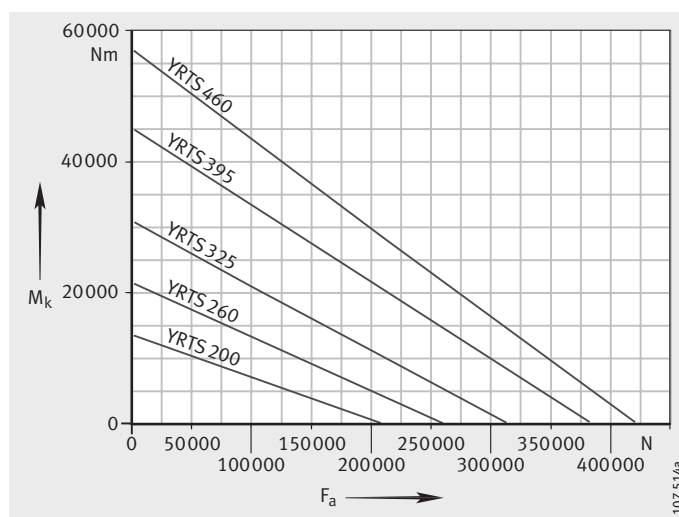
M_k = max. tilting moment
 F_a = axial load

Figure 6
 Static limiting load diagram –
 YRT950 and YRT1030



M_k = max. tilting moment
 F_a = axial load

Figure 7
 Static limiting load diagram –
 YRT_{Speed}200 to YRT_{Speed}460

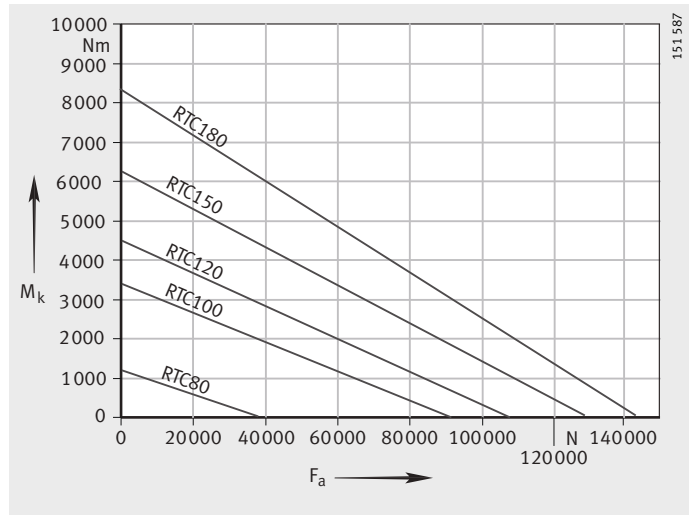


Axial/radial bearings

Axial angular contact ball bearings

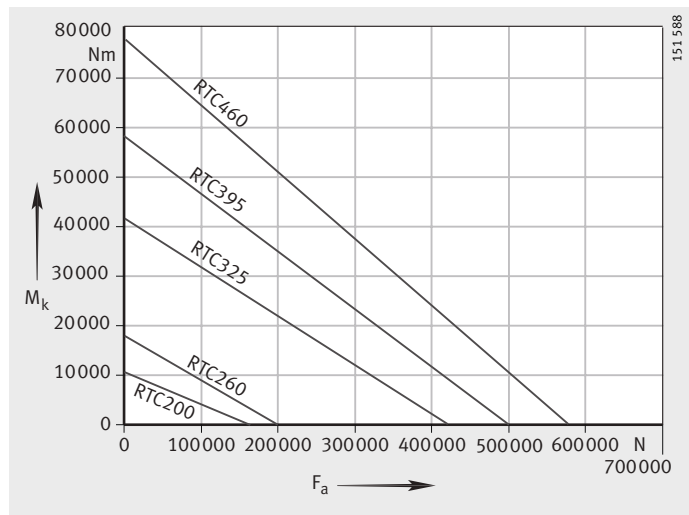
M_k = max. tilting moment
 F_a = axial load

Figure 8
 Static limiting load diagram –
 RTC80 to RTC180



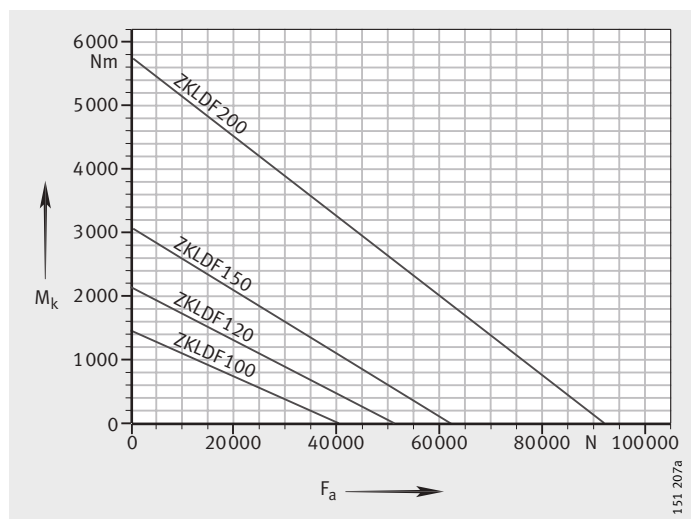
M_k = max. tilting moment
 F_a = axial load

Figure 9
 Static limiting load diagram –
 RTC200 to RTC460



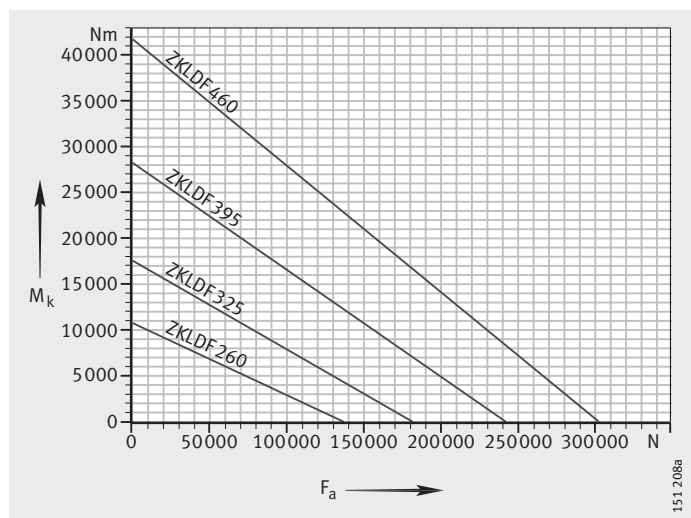
M_k = max. tilting moment
 F_a = axial load

Figure 10
 Static limiting load diagram –
 ZKLDF100 to ZKLDF200



M_k = max. tilting moment
 F_a = axial load

Figure 11
 Static limiting load diagram –
 ZKLDF260 to ZKLDF460



Axial/radial bearings

Axial angular contact ball bearings

Limiting speeds

The bearings allow the limiting speeds n_G given in the dimension tables. The operating temperatures occurring are heavily dependent on the environmental conditions. Calculation is possible by means of a thermal balance analysis based on frictional torque data.

Caution! If the environmental conditions deviate from the specifications in relation to, for example, adjacent construction tolerances, lubrication, ambient temperature/heat dissipation or differ from the operating conditions normal for machine tools, checking must be carried out again. Please contact us.

Bearing preload

Once the bearings have been fitted and fully screw mounted, they are radially and axially clearance-free and preloaded.

Temperature differences

Temperature differences between the shaft and housing influence the radial bearing preload and thus the operating behaviour of the bearing arrangement.

If the shaft temperature is higher than the housing temperature, the radial preload will increase proportionally, so there will be an increase in the rolling element load, bearing friction and bearing temperature.

If the shaft temperature is lower than the housing temperature, the radial preload will decrease proportionally, so the rigidity will decrease to bearing clearance and wear will increase.

Frictional torque

The bearing frictional torque M_{RL} is influenced primarily by the viscosity and quantity of the lubricant and the bearing preload:

- The lubricant viscosity and quantity are dependent on the lubricant grade and operating temperature.
- The bearing preload is dependent on the mounting fits, the geometrical accuracy of the adjacent parts, the temperature difference between the inner and outer ring, the screw tightening torque and the mounting situation (bearing inner ring axially supported on one or both sides).

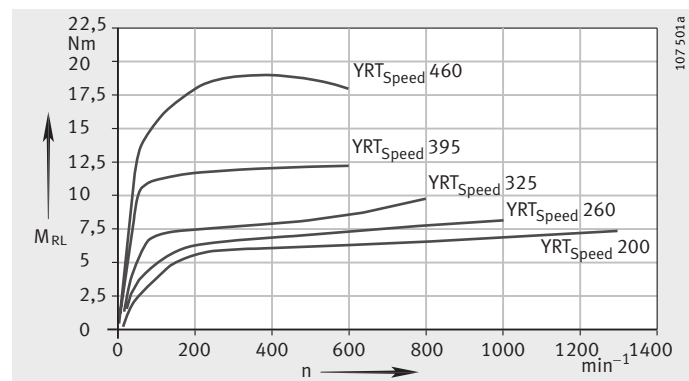
The frictional torques M_{RL} in the dimension tables are statistically determined guide values for bearings with grease lubrication (measurement speed $n_{const} = 5 \text{ min}^{-1}$). Figure 12 shows measured frictional torques for mounting with an unsupported L-section ring for YRT_{Speed} .

Caution! Any deviations in the tightening torque of the fixing screws will have a detrimental effect on the preload and the frictional torque.

M_{RL} = frictional torque
n = speed

Figure 12

Frictional torques as guide values
for YRT_{Speed} –
statistically determined values
from series of measurements



Frictional torque and dimensioning of the drive

Caution!

For YRT and RTC bearings, it must be taken into consideration that the frictional torque can increase by a factor of 2 to 2,5 with increasing speed.

For ZKLDF bearings, it must be taken into consideration that the starting frictional torque can be 1,5 times as high as the values M_{RL} in the dimension tables.

Lubrication

Axial/radial bearings YRT, RTC and YRT_{Speed} can be relubricated via the L-section ring and outer ring.

Axial angular contact ball bearings ZKLDF can be relubricated via the outer ring.

The initial greasing is compatible with lubricating oils having a mineral oil base.

For calculation of the relubrication quantities and intervals based on a stated load spectrum (speed, load, operating duration) and the environmental conditions, please contact us.

Overluberation

If the bearing is inadvertently overlubricated, the bearing frictional torque and temperature will increase.

In order to achieve the original frictional torque again, a running-in cycle in accordance with *Figure 13* should be applied.

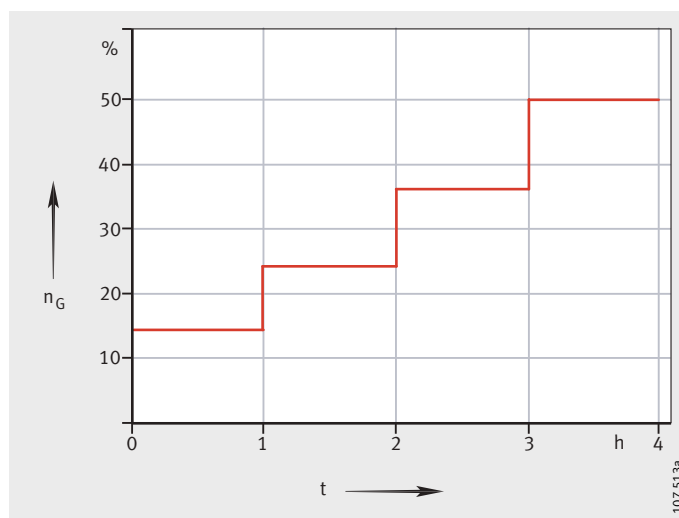
Caution!

Please note the further information on lubrication in Technical Principles, Lubrication.

n_G = limiting speed according to dimension tables
t = time

Figure 13

Running-in cycle after overlubrication



Axial/radial bearings Axial angular contact ball bearings

Design of adjacent construction

Caution!

YRT, RTC, YRT_{Speed} and ZKLDF have the same mounting dimensions.

Geometrical defects in the screw mounting surfaces and fits will influence the running accuracy, preload and running characteristics of the bearing arrangement. The accuracy of the adjacent surfaces must therefore be matched to the overall accuracy requirement of the subassembly.

The adjacent construction should be produced in accordance with *Figure 14* and the tolerances must be in accordance with the tables from page 1006. Any deviations will influence the bearing frictional torque, running accuracy and running characteristics.

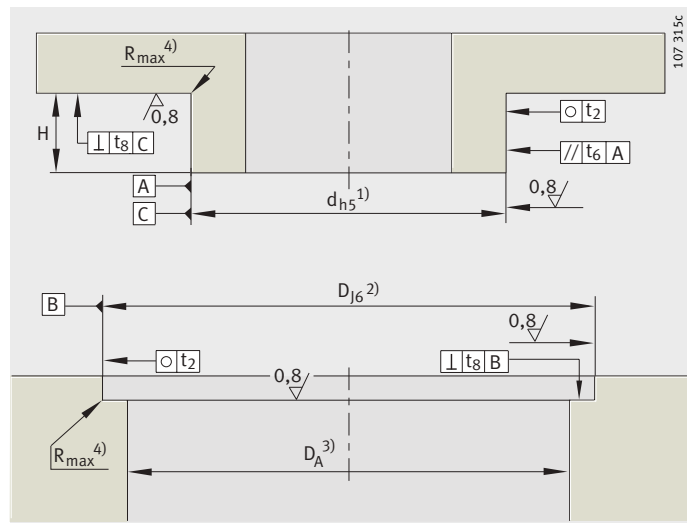


Figure 14
Requirements for
the adjacent construction –
YRT, RTC, YRT_{Speed}, ZKLDF

Legend to *Figure 14*

- 1) Support over whole bearing height. It must be ensured that the means of support has adequate rigidity.
- 2) A precise fit is only necessary if radial support due to the load or a precise bearing position is required.
- 3) Note the bearing diameter D_1 according to the dimension tables. Ensure that there is sufficient distance between the rotating bearing rings and the adjacent construction.
- 4) For values, see table Maximum corner radii of fit surfaces, page 1007.

Fits

The selection of fits leads to transition fits, i.e. depending on the actual dimensional position of the bearing diameter and mounting dimensions, clearance fits or interference fits can arise.

Caution!

The fit influences, for example, the running accuracy of the bearing and its dynamic characteristics.

An excessively tight fit will increase the radial bearing preload. This means that:

- there is an increase in bearing friction and heat generation in the bearing as well as the load on the raceway system and wear
- there will be a decrease in the achievable speed and the bearing operating life.

In order to achieve very high running accuracy, the fit clearance should be as close as possible to zero.

For easier matching of the adjacent construction to the actual bearing dimensions, each bearing of series RTC and YRT_{Speed} is supplied with a measurement record (this is supplied by agreement for other series).

Recommended fits for shafts

The shaft should be produced to tolerance zone h5 and for series YRT_{Speed} in accordance with the table, page 1007.

If there are special requirements, the fit clearance must be further restricted within the tolerance zone h5:

■ Requirements for running accuracy:

For maximum running accuracy and a rotating bearing inner ring, the fit clearance should be as close as possible to zero.

The fit clearance may otherwise increase the bearing runout.

With normal requirements for running accuracy or a static bearing inner ring, the shaft should be produced to h5.

■ Requirements for dynamic characteristics:

– For swivel type operation ($n \times d < 35\,000$, operating duration $ED < 10\%$) the shaft should be produced to h5.

– For higher speeds and longer operating durations, the fit clearance must not exceed 0,01 mm. For series YRT_{Speed}, the fit clearance must not exceed 0,005 mm.

For series ZKLDF, the fit clearance should be based on the inner ring with the smallest bore dimension.

Recommended fits for housings

The housing should be produced to tolerance zone J6, for series YRT_{Speed} in accordance with the table Recommended fits, page 1007.

If there are special requirements, the fit clearance must be further restricted within the tolerance zone J6:

■ Requirements for running accuracy:

For maximum running accuracy and a rotating bearing outer ring, the fit clearance should be as close as possible to zero.

With a static bearing outer ring, a clearance fit or a design without radial centring should be selected.

■ Requirements for dynamic characteristics:

– For predominantly swivel type operation ($n \times d < 35\,000$, operating duration $ED < 10\%$) and a rotating bearing outer ring, the housing fit should be produced to J6.

– For higher speeds and longer operating duration, the bearing outer ring should not be radially centred or the housing fit should be produced as a clearance fit with at least 0,02 mm clearance. This reduces the increase in preload when heat is generated in the bearing position.



Fit selection depending on the screw connection of the bearing rings

If the bearing outer ring is screw mounted on the static component, a fit seating is not required or a fit seating in accordance with the table Recommended fits for adjacent construction, page 1007, can be produced. If the values in the table are used, this will give a transition fit with a tendency towards clearance fit. This generally allows easy fitting.

If the bearing inner ring is screw mounted on the static component, it should nevertheless for functional reasons be supported by the shaft over the whole bearing height. The shaft dimensions should then be selected in accordance with the tables from page 1006. If these values in the table are used, this will give a transition fit with a tendency towards clearance fit.

Axial/radial bearings

Axial angular contact ball bearings

Geometrical and positional accuracy of the adjacent construction

Caution!

The values given in the following tables for the geometrical and positional accuracy of the adjacent construction have proved effective in practice and are adequate for the majority of applications.

The geometrical tolerances influence the axial and radial runout accuracy of the subassembly as well as the bearing frictional torque and the running characteristics.

Geometrical and positional accuracy for shafts – YRT, RTC, ZKLDF

Nominal shaft diameter d mm		Deviation d for tolerance zone h5 μm		Roundness Parallelism Perpendicularity t ₂ , t ₆ , t ₈ μm
over	incl.			
50	80	0	-13	3
80	120	0	-15	4
120	150	0	-18	5
150	180	0	-18	5
180	250	0	-20	7
250	315	0	-23	8
315	400	0	-25	9
400	500	0	-27	10
500	630	0	-28	11
630	800	0	-32	12
800	1000	0	-36	14

Geometrical and positional accuracy for housings – YRT, RTC, ZKLDF

Nominal housing bore diameter D mm		Deviation D for tolerance zone J6 μm		Roundness Perpendicularity t ₂ , t ₈ μm
over	incl.			
120	150	+18	-7	5
150	180	+18	-7	5
180	250	+22	-7	7
250	315	+25	-7	8
315	400	+29	-7	9
400	500	+33	-7	10
500	630	+34	-7	11
630	800	+38	-8	12
800	1000	+44	-12	14
1000	1250	+52	-14	16

Recommended fits for shaft and housing bore – YRT_{Speed}

Axial/radial bearing	Shaft diameter d mm	Housing bore D mm
YRT _{Speed} 200	200 ^{-0,01} _{-0,024}	300 ^{+0,011} _{-0,005}
YRT _{Speed} 260	260 ^{-0,013} _{-0,029}	385 ^{+0,013} _{-0,005}
YRT _{Speed} 325	325 ^{-0,018} _{-0,036}	450 ^{+0,015} _{-0,005}
YRT _{Speed} 395	395 ^{-0,018} _{-0,036}	525 ^{+0,017} _{-0,005}
YRT _{Speed} 460	460 ^{-0,018} _{-0,038}	600 ^{+0,017} _{-0,005}

Geometrical and positional accuracy for shafts – YRT_{Speed}

Axial/radial bearing	Roundness t ₂ μm	Parallelism t ₆ μm	Perpendicularity t ₈ μm
YRT _{Speed} 200	6	5	5
YRT _{Speed} 260 to YRT _{Speed} 460	8	5	7

Geometrical and positional accuracy for housings – YRT_{Speed}

Axial/radial bearing	Roundness t ₂ μm	Perpendicularity t ₈ μm
YRT _{Speed} 200 to YRT _{Speed} 460	6	8

Maximum corner radii of fit surfaces – YRT, RTC, YRT_{Speed}, ZKLDF

Bore diameter d mm	Max. corner radius R _{max} mm
50 incl. 150	0,1
over 150 incl. 460	0,3
over 460 incl. 950	1



Mounting dimensions H₁, H₂

Caution!

If the height variation must be as small as possible, the H₁ dimensional tolerance must conform to the tables, page 1010, page 1011 and *Figure 15*.

The mounting dimension H₂ defines the position of any worm wheel used, *Figure 15*, see also *Figure 16*, L-section ring with support ring.

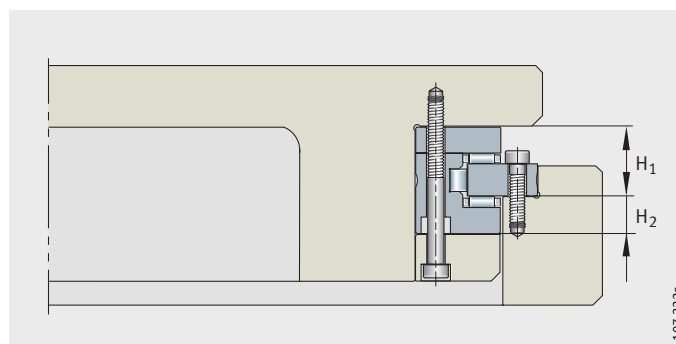


Figure 15
Mounting dimension H₁, H₂

Axial/radial bearings

Axial angular contact ball bearings

L-section ring without support ring / with support ring

The L-section ring of bearings YRT and RTC can be mounted unsupported or supported over its whole surface, *Figure 16*. If the L-section ring is supported, the tilting rigidity is higher. The support ring (e.g. worm wheel) must be ordered separately.

Depending on the application, series YRT and RTC require bearings with a different preload match in order to achieve the same preload forces in the axial bearing.

For series YRT_{Speed} and ZKLDF, there is only one preload match. The increase in rigidity and friction in YRT_{Speed} bearings is small and can normally be ignored.

In bearings of series ZKLDF, the rigidity and frictional torque are not influenced by the support ring.

L-section ring without support ring

For an arrangement “L-section ring without support ring”, the bearing designation is:

- YRT <bore diameter> or
- RTC <bore diameter>.

L-section ring with support ring

For an arrangement “L-section ring with support ring”, the bearing designation is:

- YRT <bore diameter> **VSP**
- RTC <bore diameter> **EB**.

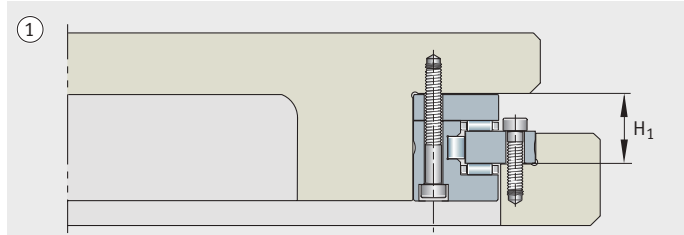
For RTC with an additionally restricted axial and radial runout, the bearing designation is:

- RTC <bore diameter> **T52EA**.

Caution!

For bearing arrangements with a supported L-section ring, only bearings with the suffix VSP, EB or T52EA can be ordered. If the normal design is mounted with a supported L-section ring, there will be a considerable increase in the bearing frictional torque. The support ring should be at least twice as high as the shaft locating washer of the bearing.

YRT
RTC



YRT..VSP
RTC..EB
RTC..T52EA

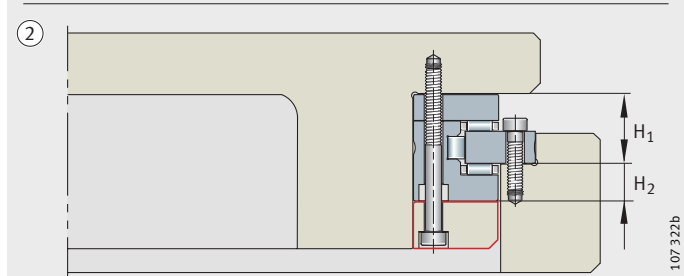


Figure 16

- ① L-section ring without support ring,
- ② L-section ring with support ring/ for YRT, RTC

107 322b

Fitting Retaining screws secure the bearing components during transport. For easier centring of the bearing, the screws should be loosened before fitting and either secured again or removed after fitting. Tighten the fixing screws in crosswise sequence using a torque wrench in three stages to the specified tightening torque M_A , while rotating the bearing ZKLDF, *Figure 17*:

- Stage 1 40% of M_A
- Stage 2 70% of M_A
- Stage 3 100% of M_A .

Observe the correct grade of the fixing screws.

Caution! Mounting forces must only be applied to the bearing ring to be fitted, never through the rolling elements.

Bearing components must not be separated or interchanged during fitting and dismantling.

If the bearing is unusually difficult to move, loosen the fixing screws and tighten them again in steps in a crosswise sequence. This will eliminate any distortion.

Bearings should only be fitted in accordance with TPI 103, Fitting and Maintenance Manual.

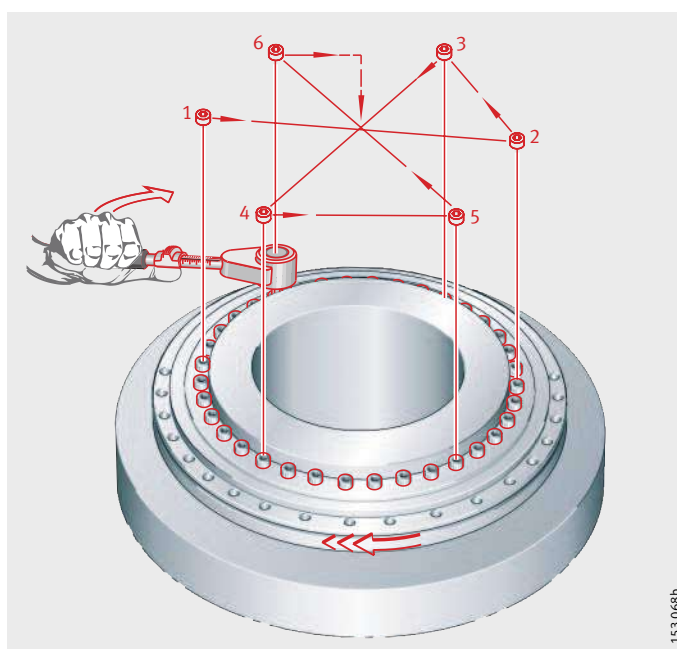


Figure 17
Tightening of fixing screws

Axial/radial bearings

Axial angular contact ball bearings

Accuracy

The dimensional tolerances are derived from tolerance class P5.

The running tolerances correspond to P4 in accordance with DIN 620, see table Dimensional tolerances, mounting dimensions, axial and radial runout.

The axial and radial runout accuracy is influenced by:

- the running accuracy of the bearing
- the geometrical accuracy of the adjacent surfaces
- the fit between the rotating bearing ring and the adjacent component.

Caution!

In order to achieve very high running accuracy, the fit clearance should be as close as possible to zero.

The bearing bore in the series YRT, RTC and YRT_{Speed} may be slightly conical when delivered. This is typical of the bearing design and is a result of the radial bearing preload forces. The bearing will regain its ideal geometry when fitted.

Dimensional tolerances,
mounting dimensions,
axial and radial runout –
YRT, ZKLDF

Dimensional tolerances				Mounting dimensions						Axial and radial runout ¹⁾	
Bore		Outside diameter		H ₁ mm	Δ _{H1s} mm	Re-strict-ed ²⁾ Δ _{H1s} mm	H ₂ mm	Δ _{H2s} mm	Re-strict-ed ²⁾	Nor-mal μm	Re-strict-ed ²⁾ μm
d mm	Δ _{ds} mm	D mm	Δ _{Ds} mm								
50	-0,008	126	-0,011	20	±0,125	±0,025	10	±0,02		2	1
80	-0,009	146	-0,011	23,35	±0,15	±0,025	11,7	±0,02		3	1,5
100	-0,01	185	-0,015	25	±0,175	±0,025	13	±0,02		3	1,5
120	-0,01	210	-0,015	26	±0,175	±0,025	14	±0,02		3	1,5
150	-0,013	240	-0,015	26	±0,175	±0,03	14	±0,02		3	1,5
180	-0,013	280	-0,018	29	±0,175	±0,03	14	±0,025		4	2
200	-0,015	300	-0,018	30	±0,175	±0,03	15	±0,025		4	2
260	-0,018	385	-0,02	36,5	±0,2	±0,04	18,5	±0,025		6	3
325	-0,023	450	-0,023	40	±0,2	±0,05	20	±0,025		6	3
395	-0,023	525	-0,028	42,5	±0,2	±0,05	22,5	±0,025		6	3
460	-0,023	600	-0,028	46	±0,225	±0,06	24	±0,03		6	3
580	-0,025	750	-0,035	60	±0,25	±0,075	30	±0,03		10	5 ³⁾
650	-0,038	870	-0,05	78	±0,25	±0,1	44	±0,03		10	5 ³⁾
850	-0,05	1095	-0,063	80,5	±0,3	±0,12	43,5	±0,03		12	6 ³⁾
950	-0,05	1200	-0,063	86	±0,3	±0,12	46	±0,03		12	6 ³⁾
1030	-0,063	1300	-0,08	92,5	±0,3	±0,15	52,5	±0,03		12	6 ³⁾

¹⁾ For rotating inner and outer ring, measured on fitted bearing, with ideal adjacent construction.

²⁾ Special design, YRT only.

³⁾ By agreement only for rotating outer ring.

**Dimensional tolerances,
mounting dimensions,
axial and radial runout –
RTC**

Dimensional tolerances						Mounting dimensions		Axial and radial runout ¹⁾	Axial run-out ¹⁾
Bore		Outside diameter		Bearing height					
d	Δ _{ds}	D	Δ _{Ds}	H	Δ _{Hs}	H ₁	Δ _{H1s}		
mm	mm	mm	mm	mm	mm	mm	mm	μm	μm
80	−0,009	146	−0,011	35	+0,025 −0,15	23,35	±0,025	3	1,5
100	−0,01	185	−0,015	38	+0,025 −0,15	25	±0,025	3	1,5
120	−0,01	210	−0,015	40	+0,03 −0,175	26	±0,025	3	1,5
150	−0,013	240	−0,015	40	+0,03 −0,175	26	±0,03	3	1,5
180	−0,013	280	−0,018	43	+0,03 −0,175	29	±0,03	4	2
200	−0,015	300	−0,018	45	+0,03 −0,175	30	±0,03	4	2
260	−0,018	385	−0,020	55	+0,04 −0,25	36	±0,04	5	3
325	−0,023	450	−0,023	60	+0,05 −0,3	40	±0,05	5	3
395	−0,023	525	−0,028	65	+0,05 −0,3	42,5	±0,05	5	3
460	−0,027	600	−0,028	70	+0,06 −0,35	46	±0,06	6	3

¹⁾ For rotating inner and outer ring, measured on fitted bearing, with ideal adjacent construction.

**Dimensional tolerances, mounting
dimensions, axial and radial runout
– YRT_{Speed}**

Dimensional tolerances				Mounting dimensions			Axial and radial runout ¹⁾
Bore		Outside diameter		H ₁	ΔH _{1s}	H ₂	
d	Δ _{ds}	D	Δ _{Ds}				mm
200	−0,015	300	−0,018	30	+0,04 −0,06	15	4
260	−0,018	385	−0,02	36,5	+0,05 −0,07	18,5	6
325	−0,023	450	−0,023	40	+0,06 −0,07	20	6
395	−0,023	525	−0,028	42,5	+0,06 −0,07	22,5	6
460	−0,023	600	−0,028	46	+0,07 −0,08	24	6

¹⁾ For rotating inner and outer ring, measured on fitted bearing, with ideal adjacent construction.



Special designs

Available by agreement:

For YRT, axial and radial runout tolerance restricted by 50%.

Additional text: axial/radial runout 50%.

For RTC, axial runout tolerance restricted by 50%.

Additional text: axial runout 50%.

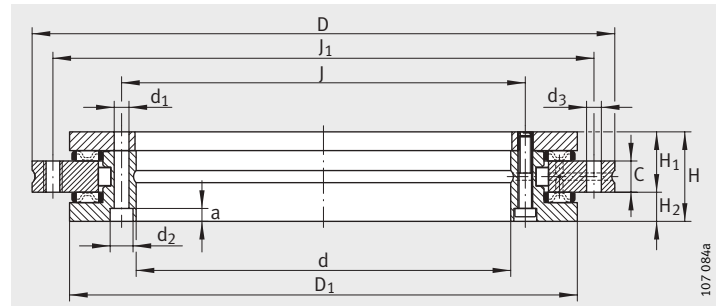
For YRT, closer tolerance on mounting dimension H₁ and H₂.

Additional text: H₁ with tolerance ± ..., H₂ with tolerance ± ...

For restricted tolerance value, see table, page 1010.

Axial/radial bearings

Double direction



YRT

Dimension table · Dimensions in mm

Designation	Mass m ≈ kg	Dimensions									Fixing holes					
		d	D	H	H ₁	H ₂	C	D ₁	J	J ₁	Inner ring				Outer ring	
								max.			d ₁	d ₂	a	Quantity ⁴⁾	d ₃	Quantity ⁴⁾
YRT50	1,6	50	126	30	20	10	10	105	63	116	5,6	–	–	10	5,6	12
YRT80-TV⁵⁾	2,4	80	146	35	23,35	11,65	12	130	92	138	5,6	10	4	10	4,6	12
YRT100⁵⁾	4,1	100	185	38	25	13	12	160	112	170	5,6	10	5,4	16	5,6	15
YRT120	5,3	120	210	40	26	14	12	184	135	195	7	11	6,2	22	7	21
YRT150	6,2	150	240	40	26	14	12	214	165	225	7	11	6,2	34	7	33
YRT180	7,7	180	280	43	29	14	15	244	194	260	7	11	6,2	46	7	45
YRT200	9,7	200	300	45	30	15	15	274	215	285	7	11	6,2	46	7	45
YRT260	18,3	260	385	55	36,5	18,5	18	345	280	365	9,3	15	8,2	34	9,3	33
YRT325⁵⁾	25	325	450	60	40	20	20	415	342	430	9,3	15	8,2	34	9,3	33
YRT395	33	395	525	65	42,5	22,5	20	486	415	505	9,3	15	8,2	46	9,3	45
YRT460	45	460	600	70	46	24	22	560	482	580	9,3	15	8,2	46	9,3	45
YRT580	89	580	750	90	60	30	30	700	610	720	11,4	18	11	46	11,4	42
YRT650	170	650	870	122	78	44	34	800	680	830	14	20	13	46	14	42
YRT850	253	850	1095	124	80,5	43,5	37	1018	890	1055	18	26	17	58	18	54
YRT950 ⁷⁾	312	950	1200	132	86	46	40	1130	990	1160	18	26	17	58	18	54
YRT1030	375	1 030	1300	145	92,5	–	40	1215	1 075	1255	18	26	17	60	18	66

1) Including retaining screws and threaded extraction holes.

2) Tightening torque for screws to DIN 912, grade 10.9.

3) Rigidity values taking account of the rolling element set, deformation of the bearing rings and the screw connections.

4) Caution!

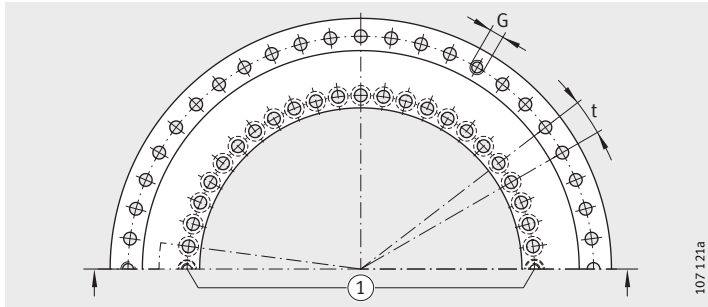
For fixing holes in the adjacent construction.

Pay attention to the pitch of the bearing holes.

5) Screw counterbores in the L-section ring open to the bearing bore (see figure, page 1013). Bearing inside diameter is unsupported in this area ②.

6) For high operating durations or continuous operation, please contact us.

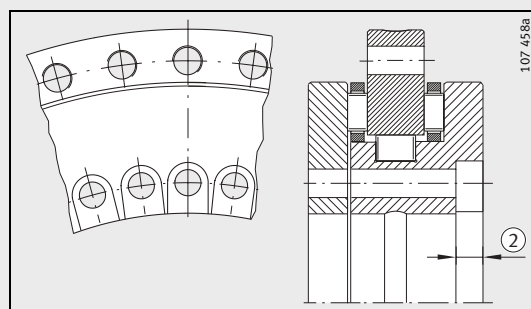
7) Available by agreement only.



Hole pattern

① Two retaining screws per size

Pitch t ¹⁾	Threaded extraction hole		Screw tightening torque M _A ²⁾ Nm	Basic load ratings				Limiting speed ⁶⁾ n _G min ⁻¹	Bearing frictional torque M _{RL} Nm	Axial rigidity ³⁾ c _{aL} kN/μm	Radial rigidity ³⁾ c _{rL} kN/μm	Tilting rigidity ³⁾ c _{kL} kNm/mrad
	G	Quantity		axial		radial						
				dyn. C _a	stat. C _{0a}	dyn. C _r	stat. C _{0r}					
				N	N	N	N					
12X30°	—	—	8,5	56 000	280 000	28 500	49 500	440	2,5	1,3	1,1	1,25
12X30°	—	—	8,5/4,5	38 000	158 000	44 000	98 000	350	3	1,6	1,8	2,5
18X20°	M5	3	8,5	73 000	370 000	52 000	108 000	280	3	2	2	5
24X15°	M8	3	14	80 000	445 000	70 000	148 000	230	7	2,1	2,2	7
36X10°	M8	3	14	85 000	510 000	77 000	179 000	210	13	2,3	2,6	11
48X 7,5°	M8	3	14	92 000	580 000	83 000	209 000	190	14	2,6	3	17
48X 7,5°	M8	3	14	98 000	650 000	89 000	236 000	170	15	3	3,5	23
36X10°	M12	3	34	109 000	810 000	102 000	310 000	130	25	3,5	4,5	45
36X10°	M12	3	34	186 000	1 710 000	134 000	415 000	110	48	4,3	5	80
48X 7,5°	M12	3	34	202 000	2 010 000	133 000	435 000	90	55	4,9	6	130
48X 7,5°	M12	3	34	217 000	2 300 000	187 000	650 000	80	70	5,7	7	200
48X 7,5°	M12	6	68	390 000	3 600 000	211 000	820 000	60	140	6,9	9	380
48X 7,5°	M12	6	116	495 000	5 200 000	415 000	1 500 000	55	200	7,6	10	550
60X 6°	M12	6	284	560 000	6 600 000	475 000	1 970 000	40	300	9,3	13	1 100
60X 6°	M12	6	284	1 040 000	10 300 000	600 000	2 450 000	40	600	10,4	14	1 500
72X 5°	M16	6	284	1 080 000	11 000 000	620 000	2 650 000	35	800	11,2	16	1 900

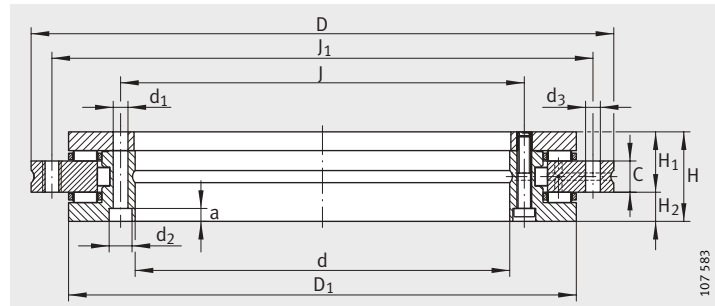


Screw counterbore open

Bearing inside diameter unsupported in area ②

Axial/radial bearings

Double direction



RTC

Dimension table · Dimensions in mm

Designation	Mass m ≈ kg	Dimensions ⁷⁾								Fixing holes					
		d	D	H	H ₁	C	D ₁	J	J ₁	Inner ring				Outer ring	
							max.			d ₁	d ₂	a	Quantity ⁴⁾	d ₃	Quantity ⁴⁾
RTC80⁵⁾	2	80	146	35	23,35	12	130	92	138	5,6	10	5,7	12	4,6	12
RTC100⁵⁾	4	100	185	38	25	12	160	112	170	5,6	10	5,7	15	5,6	18
RTC120	5	120	210	40	26	12	184	135	195	7	11	7	21	7	24
RTC150	5,8	150	240	40	26	12	212	165	225	7	11	7	33	7	36
RTC180	8	180	280	43	29	15	242	194	260	7	11	7	45	7	48
RTC200	9,3	200	300	45	30	15	272	215	285	7	11	7	45	4	48
RTC260	18	260	385	55	36,5	18	343	280	365	9,3	15	9,3	33	9,3	36
RTC325⁵⁾	25	325	450	60	40	20	413	342	430	9,3	15	9,3	33	9,3	36
RTC395	33	395	525	65	42,5	20	484	415	505	9,3	15	9,3	45	9,3	48
RTC460	48	460	600	70	46	22	558	482	580	9,3	15	9,3	45	9,3	48

¹⁾ Including retaining screws and threaded extraction holes.

²⁾ Tightening torque for screws to DIN 912, grade 10.9.

³⁾ Rigidity values taking account of the rolling element set, deformation of the bearing rings and the screw connections.

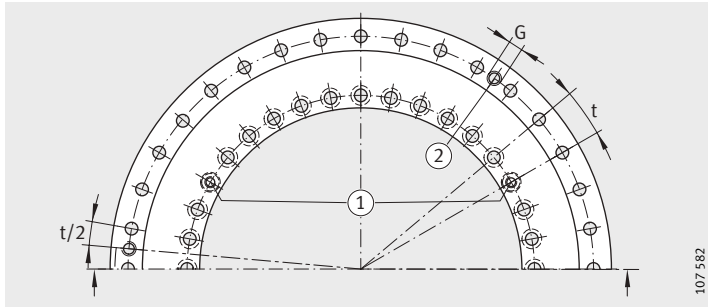
⁴⁾ Caution!

For fixing holes in the adjacent construction.
Pay attention to the pitch of the bearing holes.

⁵⁾ Screw counterbores in the L-section ring open to the bearing bore (see figure, page 1015).
Bearing inside diameter is unsupported in this area ③.

⁶⁾ For high operating durations or continuous operation, please contact us.

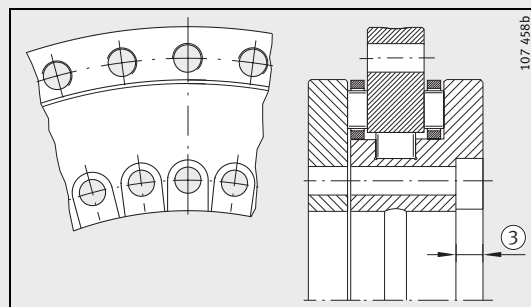
⁷⁾ Sizes d > 460 mm available by agreement.



Hole pattern

- ① Retaining screws 3×120°
- ② Threaded extraction holes

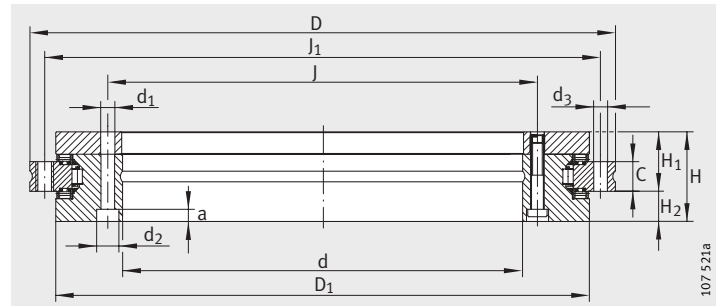
Pitch t ¹⁾	Retain- ing screws	Threaded extraction hole		Screw tightening torque	Basic load ratings				Limiting speed ⁶⁾	Bearing fric- tional torque	Axial rigid- ity ³⁾	Radial rigid- ity ³⁾	Tilting rigid- ity ³⁾
Quan- tityXt	Quan- tity	G	Quan- tity	M _A ²⁾	axial		radial						
					dyn. C _a	stat. C _{0a}	dyn. C _r	stat. C _{0r}					
				Nm	N	N	N	N	min ⁻¹	Nm	kN/ μm	kN/ μm	kNm/ mrad
12X30°	3	–	–	8,5	56 000	255 000	42 500	100 000	530	1	0,71	1,8	1,6
18X20°	3	M5	3	8,5	76 500	415 000	47 500	120 000	430	4	1,2	2	5
24X15°	3	M6	3	14	102 000	540 000	52 000	143 000	340	5	1,3	2,2	7
36X10°	3	M6	3	14	112 000	630 000	56 000	170 000	320	7	1,5	2,6	11
48X 7,5°	3	M6	3	14	118 000	710 000	69 500	200 000	280	9	1,7	3	17
48X 7,5°	3	M6	3	14	120 000	765 000	81 500	220 000	260	11	1,8	3,5	23
36X10°	3	M8	3	34	160 000	1 060 000	93 000	290 000	200	16	2,1	4,5	45
36X10°	3	M8	3	34	275 000	1 930 000	120 000	345 000	170	27	2,8	5	80
48X 7,5°	3	M8	3	34	300 000	2 280 000	186 000	655 000	140	42	3,4	6	130
48X 7,5°	3	M8	3	34	355 000	2 800 000	200 000	765 000	120	55	3,9	7	200



Screw counterbore open
Bearing inside diameter unsupported in area ③

Axial/radial bearings

Double direction



YRT_{Speed}

Dimension table · Dimensions in mm

Designation	Mass	Dimensions										Fixing holes						Retain- ing screws
	m	d	D	H	H ₁	H ₂	C	D ₁	J	J ₁	Inner ring				Outer ring		Quantity	
											d ₁	d ₂	a	Quantity ³⁾	d ₃	Quantity ³⁾		
≈kg																		
YRTS200	9,7	200 _{-0,015}	300 _{-0,018}	45	30	15	15	274	215	285	7	11	6,2	46	7	45	2	
YRTS260	18,3	260 _{-0,018}	385 _{-0,02}	55	36,5	18,5	18	345	280	365	9,3	15	8,2	34	9,3	33	2	
YRTS325 ⁵⁾	25	325 _{-0,023}	450 _{-0,023}	60	40	20	20	415	342	430	9,3	15	8,2	34	9,3	33	2	
YRTS395	33	395 _{-0,023}	525 _{-0,028}	65	42,5	22,5	20	486	415	505	9,3	15	8,2	46	9,3	45	2	
YRTS460	45	460 _{-0,023}	600 _{-0,023}	70	46	24	22	560	482	580	9,3	15	8,2	46	9,3	45	2	

1) Including retaining screws and threaded extraction holes.

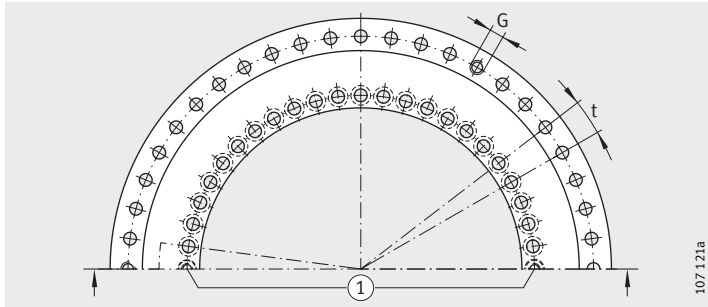
2) For screws to DIN 912, grade 10.9.

3) Caution!

For fixing holes in the adjacent construction.
Pay attention to the pitch of the bearing holes.

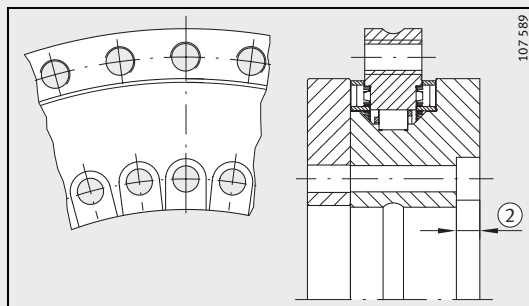
4) Rigidity values taking account of the rolling element set, deformation of the bearing rings and the screw connections.

5) Screw counterbores in the L-section ring open to the bearing bore, see figure, page 1017.
Bearing inside diameter is unsupported in this area ②.



Hole pattern
① Retaining screws

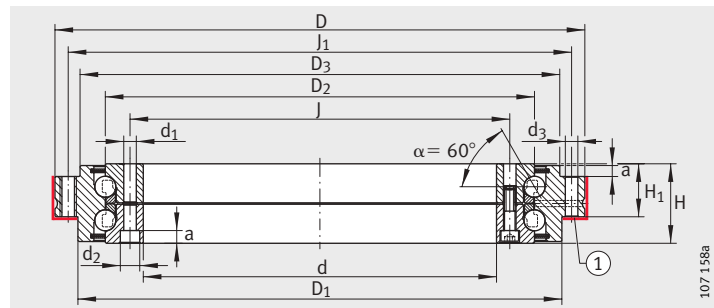
Pitch t ¹⁾	Threaded extraction hole		Screw tightening torque	Basic load ratings				Limiting speed	Axial rigid-ity ⁴⁾	Radial rigid-ity ⁴⁾	Tilting rigid-ity ⁴⁾	Mass moment of inertia for rotating			
Quan-tityXt	G	Quan-tity		axial		radial						Inner ring IR	Outer ring AU		
				dyn. C _a	stat. C _{0a}	dyn. C _r	stat. C _{0r}							M _M	
			Nm	N	N	N	N	min ⁻¹	kN/μm	kN/μm	kNm/mrad	kg · cm ²	kg · cm ²		
48X 7,5°	M8	3	14	155 000	840 000	94 000	226 000	1 160	4	1,2	29	667	435		
36X10°	M12	3	34	173 000	1 050 000	110 000	305 000	910	5,4	1,6	67	2 074	1 422		
36X10°	M12	3	34	191 000	1 260 000	109 000	320 000	760	6,6	1,8	115	4 506	2 489		
48X 7,5°	M12	3	34	214 000	1 540 000	121 000	390 000	650	7,8	2	195	8 352	4 254		
48X 7,5°	M12	3	34	221 000	1 690 000	168 000	570 000	560	8,9	1,8	280	15 738	7 379		



Screw counterbore open
Bearing inside diameter unsupported in area ②

Axial angular contact ball bearings

Double direction



ZKLDF

① Contact surface/centring diameter

Dimension table · Dimensions in mm															
Designation	Mass	Dimensions										Inner ring			
	m	d	D	H	H ₁	D ₁	D ₂	D ₃	J	J ₁	a	Fixing holes			Retain- ing screws
												d ₁	d ₂	Quan- tity ⁴⁾	Quan- tity
≈kg															
ZKLDF100 ⁵⁾	4,5	100	185	38	25	160	136	158	112	170	5,4	5,6	10	16	2
ZKLDF120	6	120	210	40	26	184	159	181	135	195	6,2	7	11	22	2
ZKLDF150	7,5	150	240	40	26	214	188	211	165	225	6,2	7	11	34	2
ZKLDF200	11	200	300	45	30	274	243	271	215	285	6,2	7	11	46	2
ZKLDF260	22	260	385	55	36,5	345	313	348	280	365	8,2	9,3	15	34	2
ZKLDF325 ⁵⁾	28	325	450	60	40	415	380	413	342	430	8,2	9,3	15	34	2
ZKLDF395	39	395	525	65	42,5	486	450	488	415	505	8,2	9,3	15	46	2
ZKLDF460 ⁶⁾	50	460	600	70	46	560	520	563	482	580	8,2	9,3	15	46	2

1) Including retaining screws and threaded extraction holes.

2) Tightening torque for screws to DIN 912, grade 10.9.

3) Rigidity values taking account of the rolling element set, deformation of the bearing rings and the screw connections.

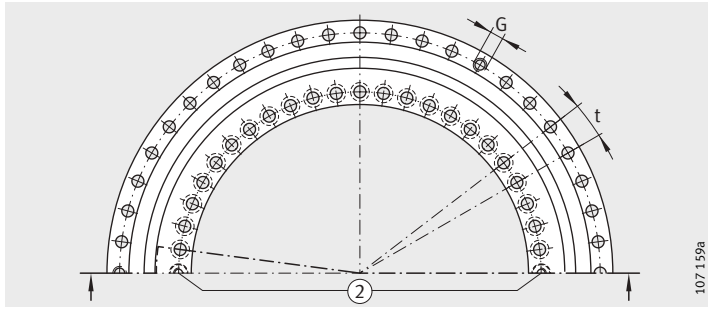
4) Caution!

For fixing holes in the adjacent construction.
Pay attention to the pitch of the bearing holes.

5) Screw counterbores in the L-section ring open to the bearing bore, see figure, page 1019.
Bearing inside diameter is unsupported in this area ③.

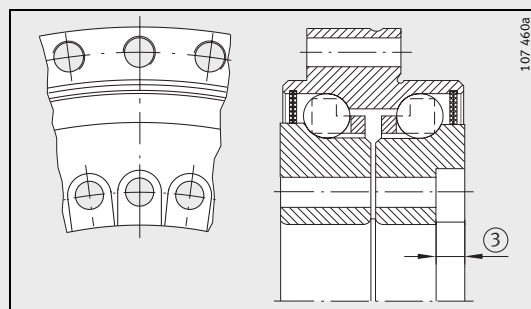
6) Sizes d > 460 mm available by agreement.

7) Valid for adapted adjacent construction.

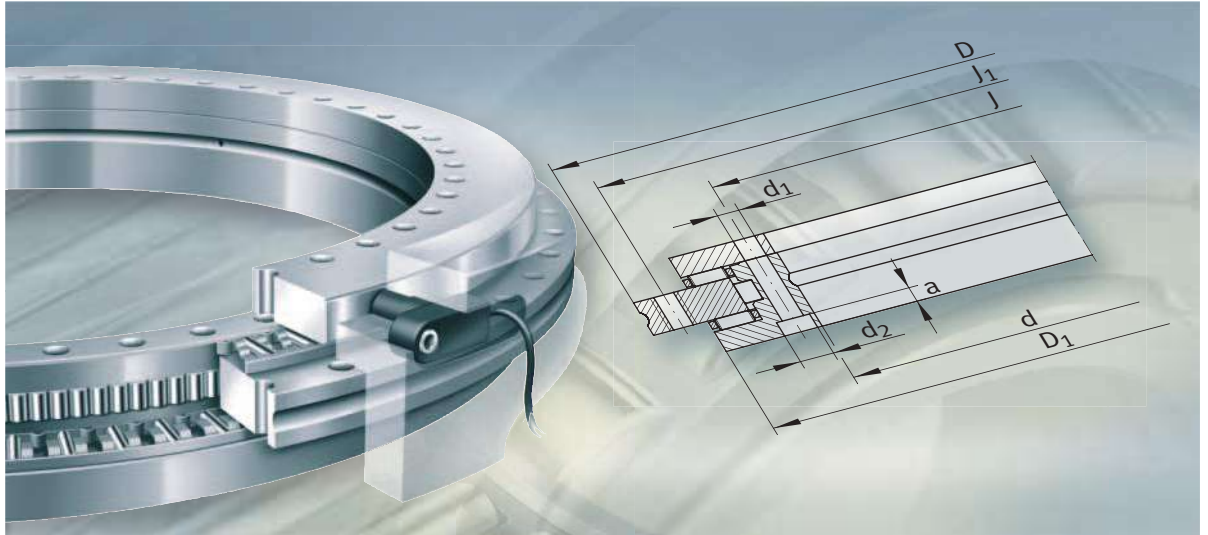


Hole pattern
① Retaining screws

Outer ring				Pitch t ¹⁾	Screw tightening torque	Basic load ratings		Limiting speed ⁷⁾	Bearing frictional torque	Axial rigidity ³⁾	Radial rigidity ³⁾	Tilting rigidity ³⁾
Fixing holes		Threaded extraction hole				axial						
d ₃	Quan- tity ⁴⁾	G	Quan- tity			Quan- tityXt	M _A ²⁾					
					Nm	N	N	min ⁻¹	Nm	kN/μm	kN/μm	kNm/ mrad
5,6	15	M5	3	18X20°	8,5	71 000	265 000	2 800	1,6	1,2	0,35	3,6
7	21	M8	3	24X15°	14	76 000	315 000	2 400	2	1,5	0,4	5,5
7	33	M8	3	36X10°	14	81 000	380 000	2 000	3	1,7	0,5	7,8
7	45	M8	3	48X 7,5°	14	121 000	610 000	1 600	4,5	2,5	0,7	17,5
9,3	33	M12	3	36X10°	34	162 000	920 000	1 200	7,5	3,2	0,9	40
9,3	33	M12	3	36X10°	34	172 000	1 110 000	1 000	11	4	1	60
9,3	45	M12	3	48X 7,5°	34	241 000	1 580 000	800	16	4,5	1,3	100
9,3	45	M12	3	48X 7,5°	34	255 000	1 860 000	700	21	5,3	1,6	175



Screw counterbore open
Bearing inside diameter unsupported in area ③



**Axial/radial bearings
with integral measuring system**

Product overview **Axial/radial bearings with integral measuring system**

Axial/radial bearings
With magnetic dimensional scale

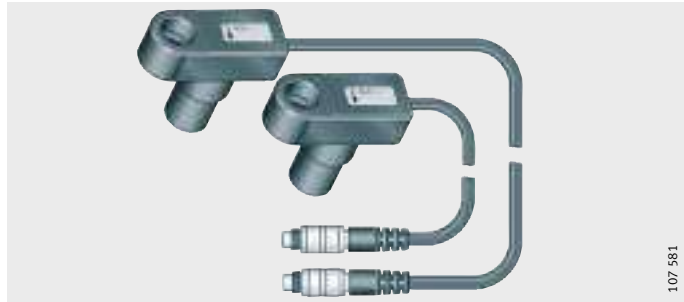
YRTM



107 577a

MEKO/U
electronic measuring system
Measuring heads

MEKO/U



107 581

Electronic evaluation system



107 506a

Axial/radial bearings with integral measuring system

Features

Axial/radial bearings with integral measuring system comprise:

- an axial/radial bearing YRTM with a dimensional scale and a MEKO/U electronic measuring system. The electronic measuring system consists of two measuring heads, a set of shims and an electronic evaluation system.

Bearings of series YRTM correspond in mechanical terms to axial bearings YRT but are additionally fitted with a magnetic dimensional scale. The measuring system can measure angles to an accuracy of a few angular seconds by non-contact, magneto-resistive means.

For the mechanical part of axial/radial bearings YRTM, please refer to the information from page 995 to page 1011.

Advantages of the angular measuring system

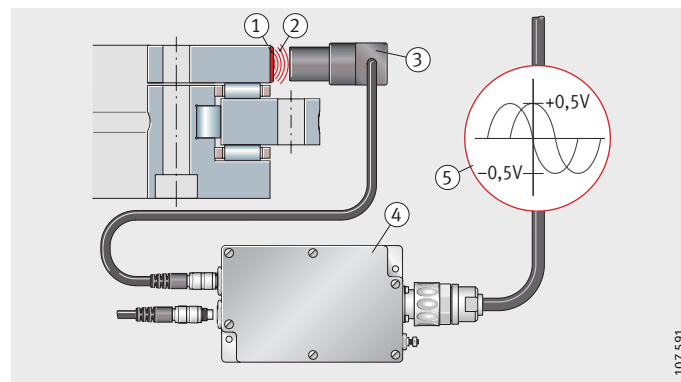
The measuring system, *Figure 1*:

- operates by non-contact means and is therefore not subject to wear
- carries out measurement irrespective of tilting and position
- has automatically self-adjusting electronics
- has a self-centring function
- is unaffected by lubricants
- is easy to fit, the measuring heads are easily adjustable, there is no need for alignment of the bearing and a separate measuring system
- requires no additional parts
 - the dimensional scale and measuring heads are integrated in the bearing and adjacent construction respectively
 - the resulting space saved can be used for the machining area of the machine
- does not give any problems relating to supply cables. The cables can be laid within the adjacent construction directly through the large bearing bore
- gives savings on design envelope size and costs due to the compact, integrated design requiring fewer components.



- ① Magnetic scale
- ② Magnetic field lines
- ③ Measuring head with magneto-resistive sensor
- ④ Electronic evaluation system
- ⑤ Analogue signals at output

Figure 1
Measurement principle



Axial/radial bearings with integral measuring system

Axial/radial bearings with integral measuring system

Dimensional scale

The dimensional scale is applied without seams or joins to the outside diameter of the shaft locating washer. Magnetic poles are present as angle references, *Figure 2* on the magnetisable, electroplated coating at a pitch of 250 µm.

The angular position is measured incrementally, i.e. by counting the individual increments. For a fixed datum point for the angular position after the machine is switched on, an additional reference mark is therefore also required.

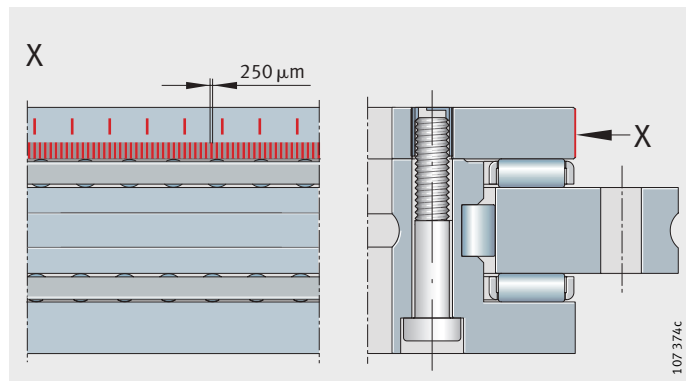


Figure 2

Dimensional scale

Reference marks

The system has pitch-coded reference marks in order to quickly create the absolute datum point. Every 15°, reference marks are applied with defined different pitches, so that the absolute datum point is achieved by passing over two adjacent reference marks (maximum 30°).

MEKO/U electronic measuring system

Measuring heads with magneto-resistive sensors

The two measuring heads are designed for optimum use of space. They are fixed in a slot in the adjacent construction by means of a fixing screw.

The small magnetic fields are detected as a result of the magneto-resistive effect (MR effect). Compared with magnetic heads, the MR sensors allow static measurement of magnetic fields, i.e. electrical signals are derived without movement, in contrast to magnetic heads.

The resistance layer of the MR sensors is designed such that the resistance changes when a magnetic field is perpendicular to the current flow.

When the magnetic pitch moves past the MR sensor, two sine wave signals with a phase offset of 90° are generated with a period length of 500 µm.

Electronic evaluation system	The electronic evaluation system operates with the aid of a digital signal processor (DSP). The input signals are digitised by an analogue/digital converter. The high performance processor (DSP) automatically compares the sensor signals and calculates the effective angular value from the sensor signals by means of vector addition. Correction is carried out, for example, on the offset of the analogue signals. A digital/analogue converter generates synthetic analogue signals as a 1 V_{SS} value. The electronic evaluation system can be positioned at any location or within the adjacent construction. It is connected to the controller by means of a conventional 12-pin extension cable. The connections for transmitting the voltage signals from the electronic evaluation system to the electronic post-processor can be up to 100 m long.
Cable for signal transmission	Each measuring head is fitted with a 2 m, 2,5 m or 3 m long cable with a plug. The shielded cables of the measuring system components are made from polyurethane (PUR) and, in accordance with VDO 0672, resistant to oil, hydrolysis and microbes. The cables are suitable for fixed laying free from forces or torsion. The minimum bending radius $R \geq 40$ mm must be observed. For other requirements, please contact us.
Plug connectors	INA plug connectors are robust and designed for use in industrial environments. When connected, they conform to protection grade IP 65 (EN 60 529). The large sheathed areas of the plugs ensure effective shielding.
Measurement accuracy	The more accurate the angular measurement, the more accurately a rotary axis can be positioned. The accuracy of angular measurement is essentially determined by: ① the quality of the dimensional scale ② the quality of scanning ③ the quality of the electronic evaluation system ④ the eccentricity of the dimensional scale to the bearing raceway system ⑤ the runout deviation of the bearing arrangement ⑥ the elasticity of the measurement system shaft and its linkage to the shaft to be measured ⑦ the elasticity of the stator shaft and shaft coupling. For the measuring system YRTM, only points ① to ③ are relevant. The eccentricity in point ④ is completely eliminated by the diametrically opposed arrangement of the MR sensors. Points ⑤ to ⑦ play only a very minor role in the INA measuring system.



Axial/radial bearings with integral measuring system

Positional deviations

Positional deviations within a revolution are the absolute measurement errors over one revolution of the system (measured at +20 °C ambient temperature)

■ YRTM150 $\leq \pm 6''$

■ YRTM180 $\leq \pm 5''$

■ YRTM200, YRTM260, YRTM325, YRTM395, YRTM460 $\leq \pm 3''$.

Since the dimensional scale is directly connected, i.e. without any compensation elements, to the rolling bearing, deflections in the bearing raceway system due to machining forces can affect the measurement result. This effect is eliminated by the diametrically opposed arrangement of the measuring heads in the electronic evaluation system.

Measurement record

Each INA measuring system is supplied with an accuracy measurement record, *Figure 3*.

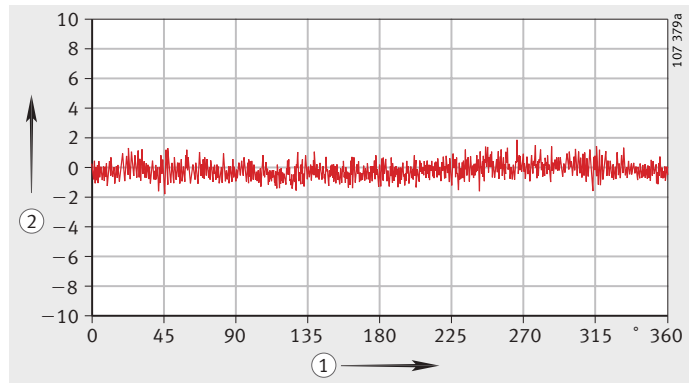
The accuracy is measured on the coded washer of the YRTM bearing when the coding is applied and is documented.

The measurement trace shows the pitch error of the coding.

- ① Measurement travel in degrees
- ② Deviation in angular seconds

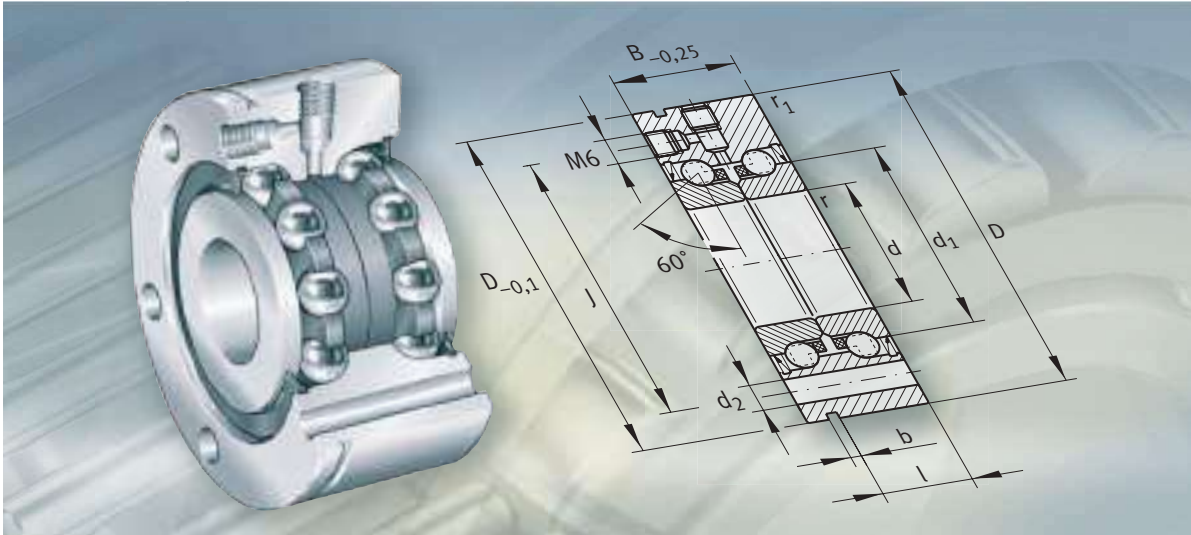
Figure 3

Excerpt from a measurement trace –
example
YRTM 395 – S.Nr. 03/09/004



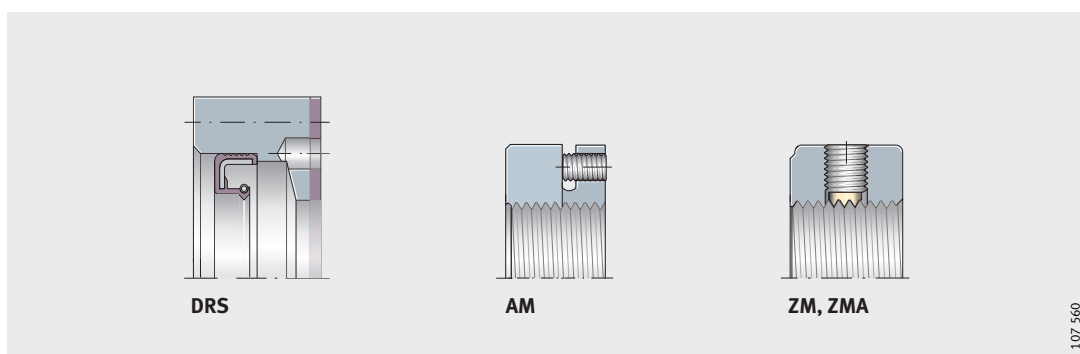
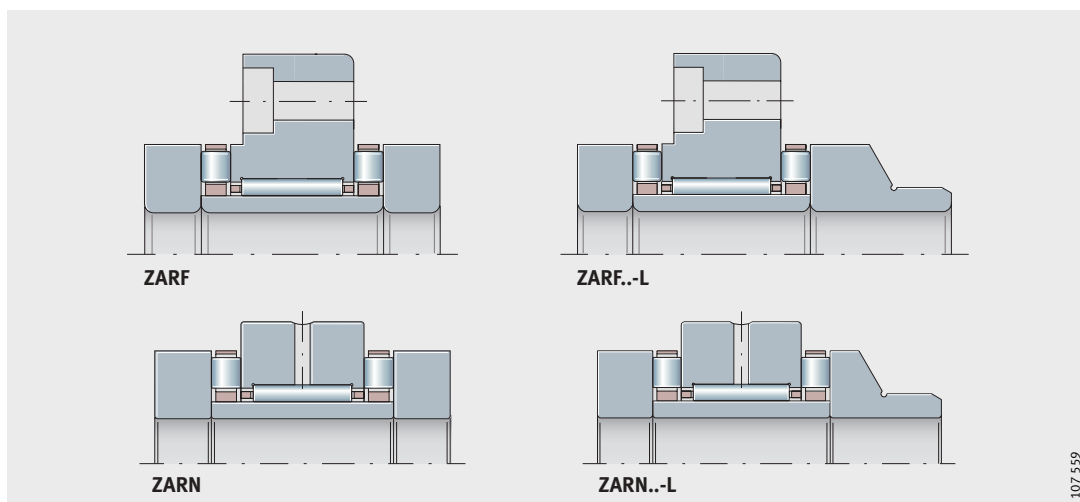
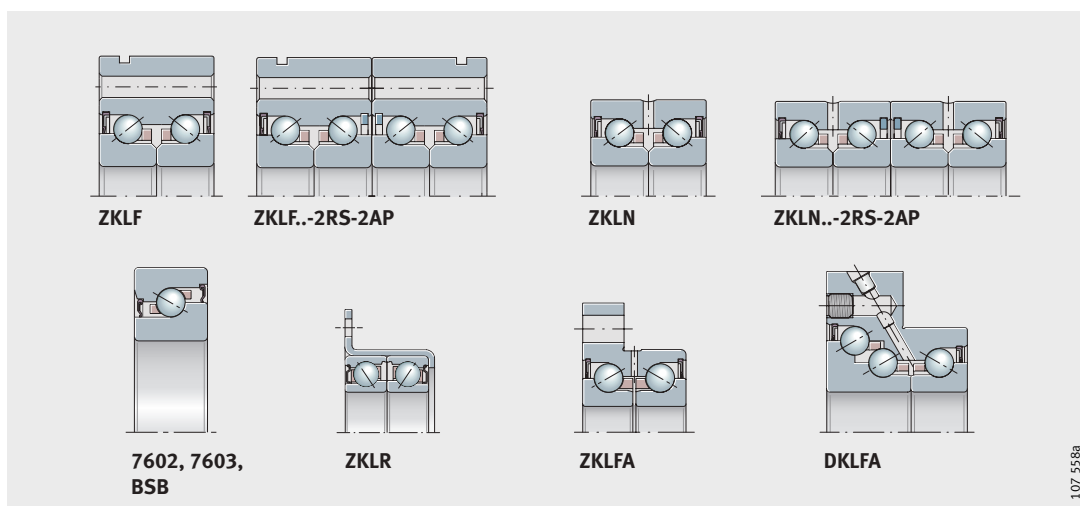
Technical Product Information on axial/radial bearings with integral measuring system

Comprehensive information on axial/radial bearings with an integral measuring system is given in TPI 120, High precision bearings for combined loads. This publication is available on request.

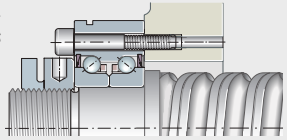
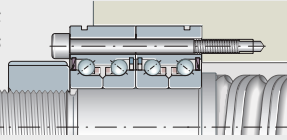
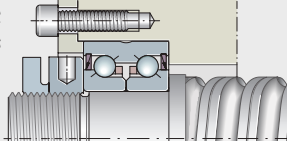
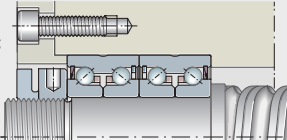
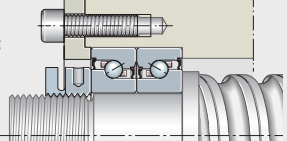
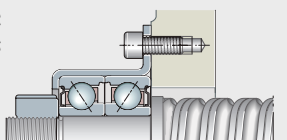
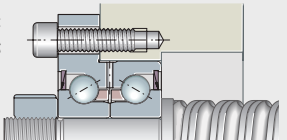
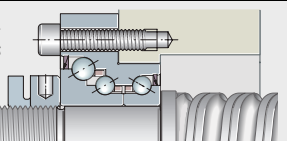
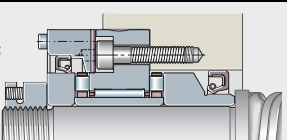
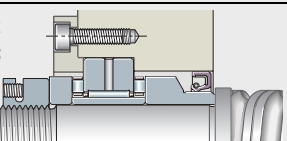


Bearings for screw drives

Axial angular contact ball bearings
 Needle roller/axial cylindrical roller bearings
 Seal carrier assemblies
 Precision locknuts



Matrix for preselection of bearings

Application	Series	
For standard applications	159 078c 	ZKLF...-2Z ZKLF...-2RS ZKLF...-2RS-PE
	159 079b 	ZKLF...-2RS-2AP
	159 075b 	ZKLN...-2Z ZKLN...-2RS ZKLN...-2RS-PE
	159 081b 	ZKLN...-2RS-2AP
	159 062c 	7602 7602-2RS 7603 7603-2RS BSB BSB-2RS
For special applications	159 095a 	ZKLR...-2Z ZKLR...-2RS
	159 077a 	ZKLFA...-2Z ZKLFA...-2RS
	159 076a 	DKLFA...-2RS
For applications requiring very high accuracy and rigidity	159 080c 	ZARF (L)
	159 074b 	ZARN (L)

Definition of symbols

- +++ very good
- ++ good
- + satisfactory
- sufficient

Caution!

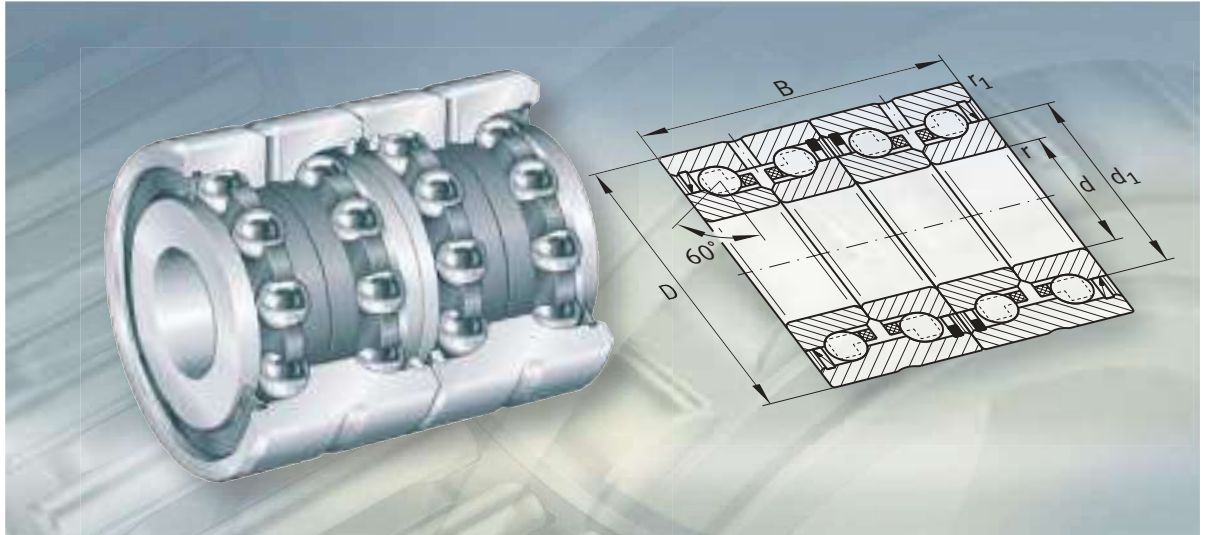
This selection matrix is a general overview for preliminary assessment of whether bearings can be considered for the required purpose. For the specific application, the data in the product sections and the technical principles must always be taken into consideration.

Features	Characteristics					
	High runout accuracy	High speeds and low friction	High rigidity and load carrying capacity	Work on adjacent construction and mounting	Low lubricant consumption	For description, see page
– Outer ring for flange mounting – Gap seals or contact seals on both sides – Greased, with relubrication facility – Most economical type of screw drive bearing arrangement	++ ++ +	+++ ++ ++	+ + +	+++ +++ +++	++ ++ ++	902
– As ZKLF, but in matched pair – Significantly higher load carrying capacity and rigidity than ZKLF	++	++	++	++	++	903
– Gap seals or contact seals on both sides – Greased, with relubrication facility – Easier to fit than single row bearings, e.g. for plummer block housings	++ ++ +	+++ ++ ++	+ + +	+ + +	++ ++ ++	904
– As ZKLN, but in matched pair – Significantly higher load carrying capacity and rigidity than ZKLN	++	++	++	+	++	904
– Open or sealed on both sides – Highly suitable for mounting in pairs to form wide range of contact angle combinations	++ ++ ++ ++ ++ ++	+++ ++ +++ ++ +++ ++	+ + + + + +	– – – – – –	++ ++ ++ ++ ++ ++	906
– Particularly economical alternative to solutions with individual ball bearings – Gap seals or contact seals on both sides – Simple to fit – For applications with comparatively low loads, but high positional accuracy	+ +	+++ ++	– –	+++ +++	++ ++	907
– Outer ring for flange mounting – Stepped outer ring with flattened areas on both sides – Gap seals or contact seals on both sides	++ ++	+++ ++	+ +	+++ +++	++ ++	908
– Higher load capacity on one side – Outer ring for flange mounting – Sealed on both sides – For vertical axes – For locating/locating bearing arrangements	+	++	++	+++	++	908
– Outer ring for flange mounting – Very high accuracy, rigidity and load carrying capacity – Bearing prepared for sealing	+++	+	+++	+	–	953
– Very high accuracy, rigidity and load carrying capacity – Bearing prepared for sealing	+++	+	+++	–	–	954





FAG

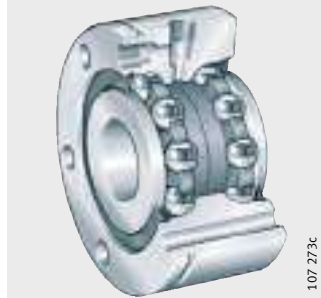


Axial angular contact ball bearings

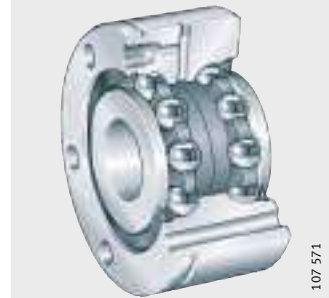
Product overview Axial angular contact ball bearings

**Double row,
for screw mounting**
Lip seals or gap seals

ZKLF...-2RS, ZKLF...-2Z

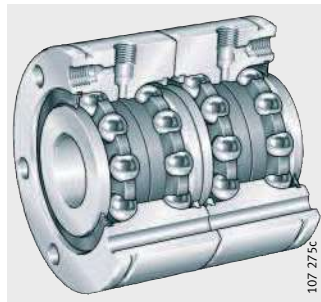


ZKLF...-2RS-PE



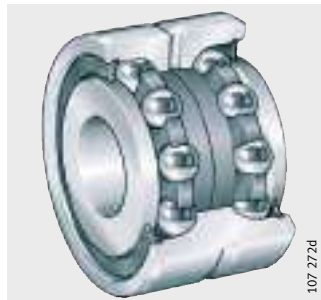
Matched pair

ZKLF...-2RS-2AP



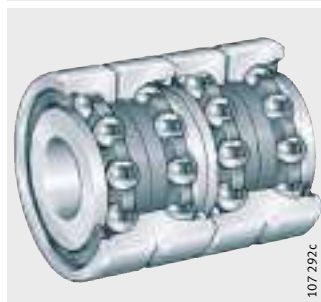
**Double row,
not for screw mounting**
Lip seals or gap seals

**ZKLN...-2RS, ZKLN...-2Z
ZKLN...-2RS-PE**



Matched pair

ZKLN...-2RS-2AP



**Single row,
for matching in pairs**
Without/with lip seals

7602, 7603, BSB



135 268a

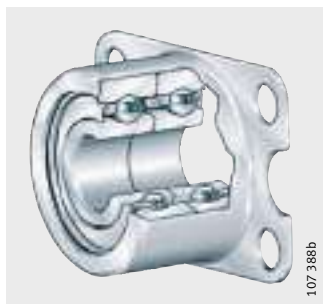
**7602..-2RS, 7603..-2RS,
BSB..-2RS**



135 323

**Double row angular
contact ball bearing unit,
for screw mounting**
Lip seals or gap seals

**ZKLR..-2RS
ZKLR..-2Z**

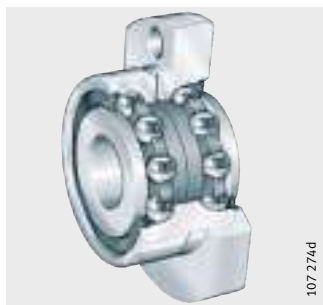


107 388b

**Double or triple row,
flange with flattened areas,
for screw mounting**

Double row
Lip seals or gap seals

**ZKLFA..-2RS
ZKLFA..-2Z**



107 274d

Triple row
Lip seals

DKLFA..-2RS



107 279d



Axial angular contact ball bearings

Features

Screw drive bearing arrangements are subjected to requirements that often cannot be optimally fulfilled by the design construction of conventional bearings. For the design of bearing arrangements for the highly dynamic operating conditions in screw drives that have high accuracy, high load carrying capacity, high rigidity, low friction, are easy to fit and maintenance-free or low-maintenance, there is a wide range of INA/FAG axial angular contact ball bearings. With this well thought-out product range, ideal application-specific solutions can be found to all the technical and economic demands placed on the bearing arrangements of screw drives.

Single row and multi-row designs

Axial angular contact ball bearings are available as single, double or triple row ready-to-fit units. They are self-retaining and comprise thick-walled, geometrically stable outer rings, ball and cage assemblies and one-piece or two-piece inner rings. In several series, the outer ring has through holes for simple flange mounting to the adjacent construction.

The bearing rings are matched to each other such that a defined preload is achieved when the rings are clamped in place using a precision locknut.

Radial and axial load carrying capacity

Due to the contact angle of 60° , the bearings can support not only radial forces but high axial forces as well.

Double row axial angular contact ball bearings, for screw mounting

Axial angular contact ball bearings ZKLF are screw mounted directly on the adjacent construction or in a radial locating bore, *Figure 1* and *Figure 2*. The cover that would otherwise be required and the associated matching work can therefore be dispensed with.

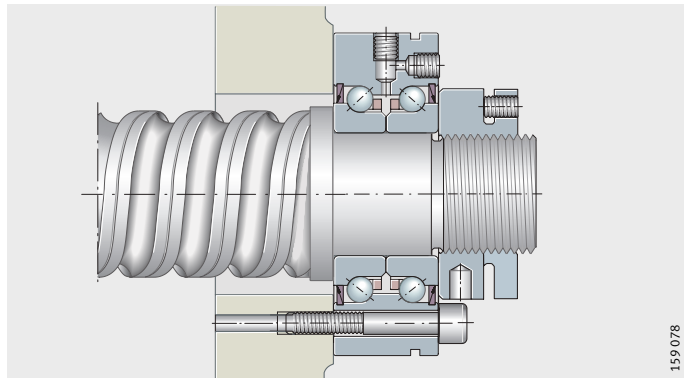
In order to aid removal of the bearings from a locating bore, the outer ring has a circumferential extraction slot.

Relubrication is facilitated by radial and axial threaded connectors with detachable grub screws.

ZKLF..-2RS
ZKLF..-2Z

Figure 1

Outer ring screw mounted on flat adjacent construction, preloaded using locknut



With less stringent tolerances

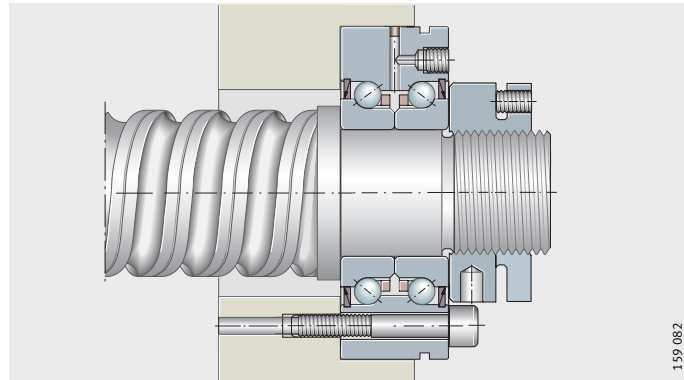
Axial angular contact ball bearings ZKLF..-2RS-PE correspond to series ZKLF but have a runout tolerance within P5 to DIN 620, less stringent diameter tolerances and the suffix PE. They are used where a lower positional accuracy is acceptable. As a result, the adjacent construction does not need to be as accurate with these bearings.

Relubrication is facilitated by an axial threaded connector.
The radial lubrication duct is firmly closed off.

ZKLF..-2RS-PE

Figure 2

Outer ring screw mounted in bore,
preloaded using locknut



Heavy series

Axial angular contact ball bearings ZKLF..-2RS and ZKLF..-2Z are also available in a heavy series. For the same shaft diameter, they have a larger cross-section and thus higher basic load ratings.

Matched pairs

Bearings of series ZKLF..-2RS-2AP comprise a matched pair of bearings ZKLF..-2RS, *Figure 3*. The individual bearings are matched to each other.

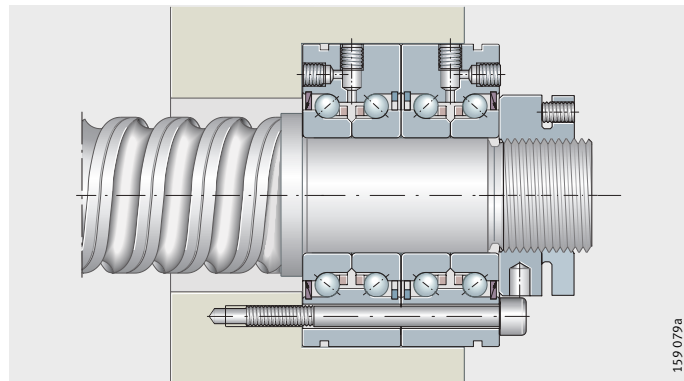
Matched bearings have an arrow marking on the outside surface of the outer rings. When the bearings are arranged correctly, the lip seals face outwards. During fitting, the hole pattern of the two bearings must match, not the marking.



ZKLF..-2RS-2AP

Figure 3

Matched pair,
outer ring screw mounted in bore,
preloaded using locknut



Sealing/lubricant

Bearings with the suffix 2RS have lip seals and highly effective sealing.

Bearings with the suffix 2Z are sealed using gap seals and are suitable for higher speeds.

The bearings are greased using a lithium soap grease to GA28 and can be lubricated via the lubrication connectors in the outer ring. For the majority of applications, the initial greasing is sufficient for the whole bearing operating life.

Axial angular contact ball bearings

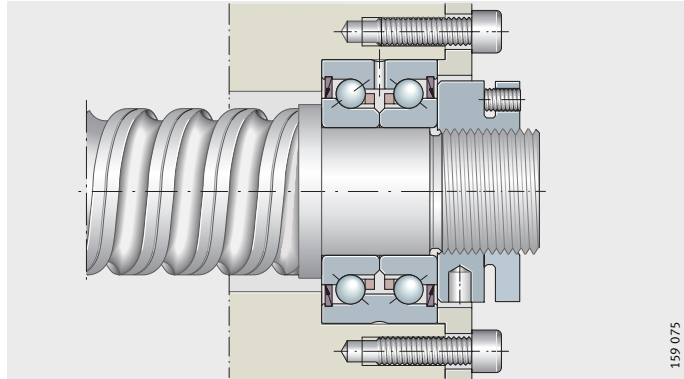
Double row axial angular contact ball bearings, not for screw mounting

ZKLN...-2RS
ZKLN...-2Z

Figure 4

Outer ring located using cover, preloaded using locknut

Axial angular contact ball bearings ZKLN are mounted in a housing bore, *Figure 4*. The bearing outer ring is axially located by a cover.



With less stringent tolerances

Axial angular contact ball bearings ZKLN...-2RS-PE correspond to series ZKLN but have a runout tolerance within P5 to DIN 620, less stringent diameter tolerances and the suffix PE. They are used where a lower positional accuracy is acceptable. As a result, the adjacent construction does not need to be as accurate with these bearings.

Heavy series

Axial angular contact ball bearings ZKLN...-2RS and ZKLN...-2Z are also available in a heavy series. For the same shaft diameter, they have a larger cross-section and thus higher basic load ratings.

Matched pairs

Bearings of series ZKLN...-2RS-2AP comprise a matched pair of bearings ZKLN...-2RS, *Figure 5*. The individual bearings are matched to each other.

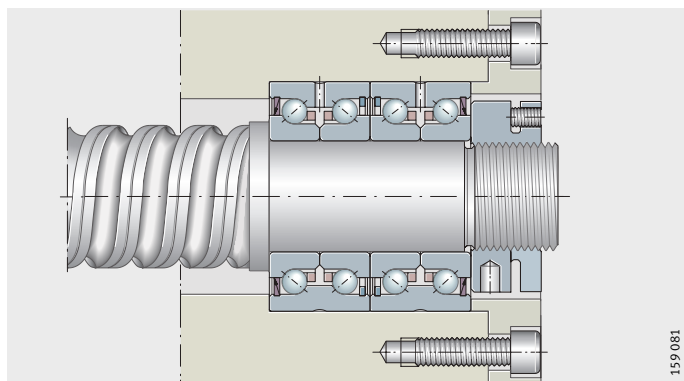
Matched bearings have an arrow marking on the outside surface of the outer rings. When the bearings are arranged correctly, the lip seals face outwards.

The bearing outer rings are axially clamped by a cover, *Figure 5*.

ZKLN...-2RS-2AP

Figure 5

Matched pair, outer rings located using cover, preloaded using locknut



Sealing/lubricant

Bearings with the suffix 2RS have lip seals and highly effective sealing.

Bearings with the suffix 2Z are sealed using gap seals and are suitable for higher speeds.

The bearings are greased using a lithium soap grease to GA28 and can be lubricated via a lubrication slot and lubrication holes in the outer ring. For the majority of applications, the initial greasing is sufficient for the whole bearing operating life.



Axial angular contact ball bearings

Single row axial angular contact ball bearings, for combination in pairs

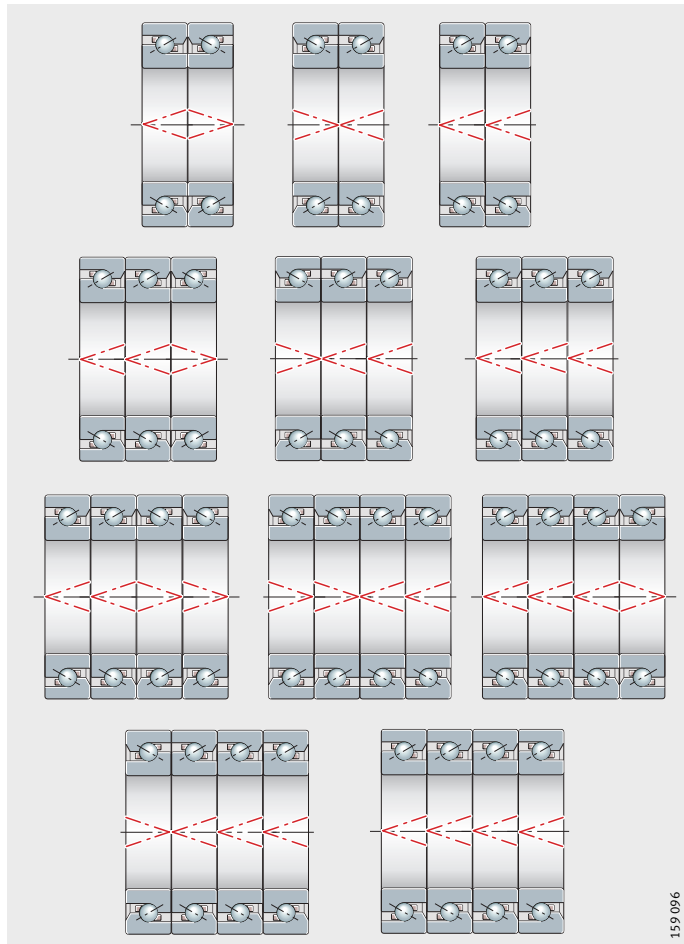
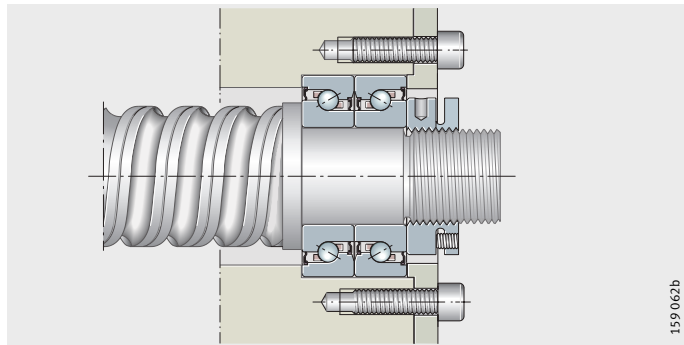
Bearings 7602, 7603 and BSB are designed as universal bearings, *Figure 6* and *Figure 7*.

They can be combined in a wide range of sets for different requirements, *Figure 7*.

7602...-2RS, 7603...-2RS, BSB...-2RS

Figure 6

Single row axial angular contact ball bearings, two-bearing set in O arrangement



7602, 7603, BSB

Figure 7

Set combinations

Sealing/lubricant

Single row axial angular contact ball bearings are not sealed and are not supplied greased. However, some sizes are fitted with seals. These bearings are greased for life with Arcanol L55.

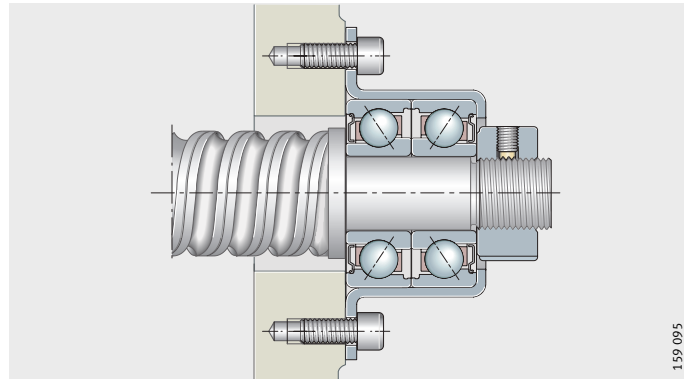
Angular contact ball bearing unit, for screw mounting

Angular contact ball bearing units ZKLR are low-cost bearings and therefore particularly economical. They comprise a deep drawn sheet steel housing with an integral matched pair of angular contact ball bearings in an X arrangement, *Figure 8*. The housing is plated with Corrotect® and is thus protected against rust. The ball bearings are sealed on both sides by lip seals or gap seals. The bearing assembly is preloaded clearance-free.

ZKLR...-2RS
ZKLR...-2Z

Figure 8

Angular contact ball bearing unit



Particularly easy to fit

The units are particularly easy to fit. They:

- are directly flange mounted, for example on the milled face of the adjacent construction. This eliminates the need for precise, costly fits and additional flange covers for seating and axial location of the bearings
- require no additional parts for location of the bearings in the housing
- reduce errors in fitting due to the smaller number of components compared to conventional solutions
- are self-aligning by means of the screw drive nut during fitting. This effectively eliminates any warping due to misalignment of the bearing seats
- have a defined preload. It is not necessary to preload the bearing during fitting as is usually the case with screw drive bearing arrangements
- require only clearance-free axial location on the threaded spindle.



Sealing/lubricant

Bearings with the suffix 2RS have lip seals and highly effective sealing. Bearings with the suffix 2Z are sealed using gap seals and are suitable for higher speeds. The bearings are greased using a lithium soap grease to DIN 51825-K2N-40.

Areas of application

The units are highly suitable, due to their dimensions and design, for space-saving and simple bearing arrangements in highly dynamic screw drives, for example:

- in inspection and measuring equipment
- in small machine tools
- in medical and laboratory equipment
- in precision engineering and electronic components manufacture
- where complete units will give a simpler bearing arrangement.

Axial angular contact ball bearings

Double row axial angular contact ball bearings with flange, for screw mounting

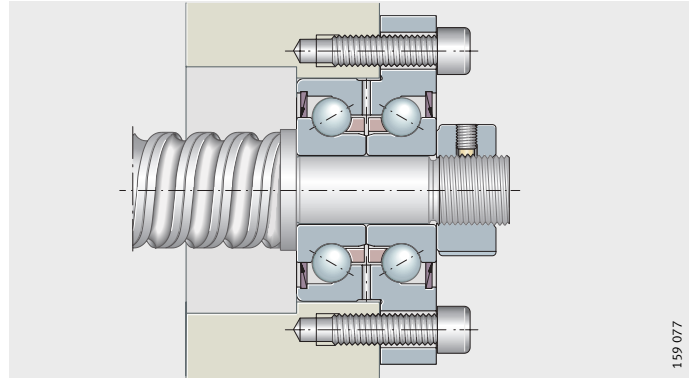
ZKLFA...-2RS
ZKLFA...-2Z

Figure 9

Outer ring screw mounted on adjacent construction, preloaded using locknut

Sealing/lubricant

Series ZKLFA has a stepped outer ring. It can therefore be screw mounted easily on the adjacent construction, *Figure 9*. The flange has flattened areas on both sides, so the radial design envelope in the adjacent construction can be kept very small.



Triple row axial angular contact ball bearings with flange, for screw mounting

DKLFA...-2RS

Figure 10

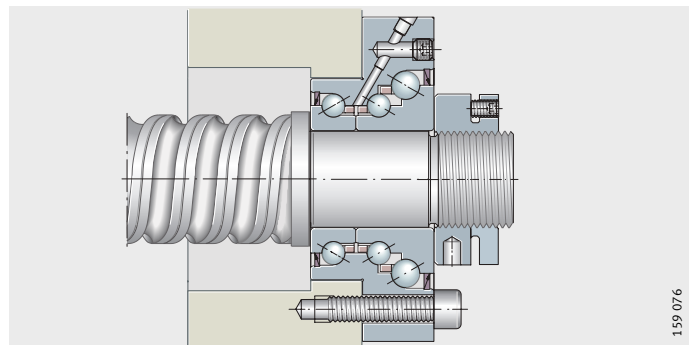
Outer ring screw mounted on adjacent construction, preloaded using locknut

Bearings with the suffix 2RS have lip seals and highly effective sealing. Bearings with the suffix 2Z are sealed using gap seals and are suitable for higher speeds.

The bearings are greased using a lithium soap grease to GA28 and can be lubricated via a lubrication slot and lubrication holes in the outer ring. For the majority of applications, the initial greasing is sufficient for the whole bearing operating life.

Axial angular contact ball bearings DKLFA...-2RS have, in addition to two rows of balls with a contact angle of 60° in an O arrangement, an extra row of balls, *Figure 10*. Due to this additional row, the bearings can support higher axial loads in one direction.

Due to the stepped outer ring, the bearings can be easily flange mounted on the adjacent construction. The flange has flattened areas on both sides. As a result, it requires only a small design envelope in the adjacent construction.



Caution! In order to make full use of the load carrying capacity of bearings DKLFA..-2RS, their design requires that they are subjected to continuous load in the main load direction. They are therefore used mainly in screw drives with a locating/locating bearing arrangement and tensioned spindles or in vertically arranged screw drive bearing arrangements.
For design of the bearing arrangement, please contact us.

Sealing/lubricant The bearings have lip seals on both sides.
They are greased using a lithium soap grease to GA28. If necessary, lubrication can be carried out via a threaded connector for central lubrication systems on the flange side.

Caution! For calculation of relubrication intervals based on a stated load spectrum (speed, load, operating duration, environmental conditions), please contact us.

Operating temperature Sealed axial angular contact ball bearings are suitable for operating temperatures from $-30\text{ }^{\circ}\text{C}$ to $+120\text{ }^{\circ}\text{C}$, restricted by the grease, the seal material and the plastic cages in the ball and cage assemblies.

Caution! The operating temperature influences the dynamic bearing characteristics. The values given in the dimension table are based on a room temperature of $+20\text{ }^{\circ}\text{C}$.

Cages The axial angular contact ball bearings have plastic cages. The cage design is not indicated in the suffix.
In series 7602, 7603 and BSB, the polyamide cages are indicated by the suffix TVP/T.



Suffixes Suffixes for the available designs: see table.

Available designs

Suffix	Description
PE	Less stringent bearing design
T, TVP	Polyamide cage, guided by balls
2AP	Axial angular contact ball bearings, matched pair (ZKLN, ZKLF)
2RS	Contact seals on both sides
2Z	Gap seals on both sides

Axial angular contact ball bearings

Design and safety guidelines Basic rating life

The decisive factors in determining the bearing size are the basic rating life, the static load safety factor and the axial limiting load. The basic rating life L and L_h are calculated as follows:

$$L = \left(\frac{C}{P} \right)^p$$

$$L_h = \frac{16666}{n} \cdot \left(\frac{C}{P} \right)^p$$

L 10^6 revolutions

Basic rating life in millions of revolutions

L_h h

Basic rating life in operating hours

C_r, C_a N

Basic dynamic radial or axial load rating according to dimension table

C_r is valid for a contact angle $\alpha \leq 45^\circ$, C_a is valid for a contact angle $\alpha > 45^\circ$

P N

Equivalent dynamic bearing load

p –

Life exponent $p = 3$

n min^{-1}

Operating speed.

Resultant and equivalent bearing load P for ZKLR

Bearing unit Designation	Factor P
ZKLR0624-2Z	$P = 140 + 0,13 F_a^{1,4} + 0,003 \cdot F_r^{1,9}$
ZKLR0828-2Z	$P = 210 + 0,28 F_a^{1,27} + 0,002 \cdot F_r^{1,9}$
ZKLR1035-2Z	$P = 240 + 0,47 F_a^{1,17} + 0,0015 \cdot F_r^{1,9}$
ZKLR1244-2RS	$P = 580 + 0,046 F_a^{1,3} + 0,076 \cdot F_r^{1,28}$
ZKLR1547-2RS	$P = 540 + 0,011 F_a^{1,5} + 0,022 \cdot F_r^{1,45}$
ZKLR2060-2RS	$P = 960 + 0,0082 F_a^{1,5} + 0,017 \cdot F_r^{1,45}$

Static limiting load diagrams for ZKLR

The easy-to-use static limiting load diagrams allow quick verification of the bearing size of series ZKLR – as a function of the axial and radial operating load, *Figure 21* to *Figure 23*, page 916. The decisive requirement is that the intersection between the axial and radial load must be below the limit line.

Example: If the operating loads F_a and F_r are below the limit line, the bearing size is suitable for the application, see example *Figure 23*, page 916.

Resultant and equivalent bearing load P for ZKLN, ZKLf, ZKLFA, DKLFA, BSB, 7602, 7603

The bearings are axially preloaded to a defined value if the recommended precision locknuts are used and the correct nut tightening torque is applied. The resultant axial bearing load $F_{a\text{ res}}$ is determined from the axial operating load F_{aB} and taking account of the axial preload according to *Figure 11 to Figure 15*, page 912 and page 913. For series 7602, 7603 and BSB, the $F_{a\text{ res}}$ diagrams are based on two-bearing sets in an O or X arrangement, *Figure 7*, page 906. For calculation of other set combinations, please contact us.

Caution! A load in excess of the limit value will lead to the rolling element row without load lifting off the raceway. As a result, higher wear will occur under rapid acceleration. For extreme moment loads and statically overdefined systems (locating/locating bearing arrangements), please contact us. The calculation program BEARINX® can give a precise design in this case.

Axial and radial operating loads

Under purely axial load, $P = F_{a\text{ res}}$. If additional radial operating loads are present, the equivalent bearing load P must be calculated using the following formula:

$$P = X \cdot F_r + Y \cdot F_{a\text{ res}}$$

The values X and Y are given in the following table:

Factors X and Y

Load ratio	Factor	
	X	Y
$\frac{F_{a\text{ res}}}{F_r} \leq 2,17$	1,9	0,55
$\frac{F_{a\text{ res}}}{F_r} > 2,17$	0,92	1



Load varying in steps

If the load values vary in steps, the equivalent load P and speed n are calculated using the following formulae (q = time duration %):

$$P = \sqrt[p]{\frac{q_1 \cdot n_1 \cdot P_1^p + \dots + q_z \cdot n_z \cdot P_z^p}{q_1 \cdot n_1 + \dots + q_z \cdot n_z}}$$

$$n = \frac{q_1 \cdot n_1 + \dots + q_z \cdot n_z}{100}$$

Static load safety factor

The static load safety factor S_0 indicates the security against impermissible permanent deformations in the bearing.

It is determined using the following formula:

$$S_0 = \frac{C_0}{P_0}$$

S_0 – Static load safety factor

C_0, C_{0a} – N

Basic static radial or axial load rating according to dimension table

C_{0r} is valid for a contact angle $\alpha \leq 45^\circ$, C_{0a} is valid for a contact angle $\alpha > 45^\circ$

P_0 – N

Maximum static load of bearing.

Caution! In machine tools, S_0 should be ≥ 4 .

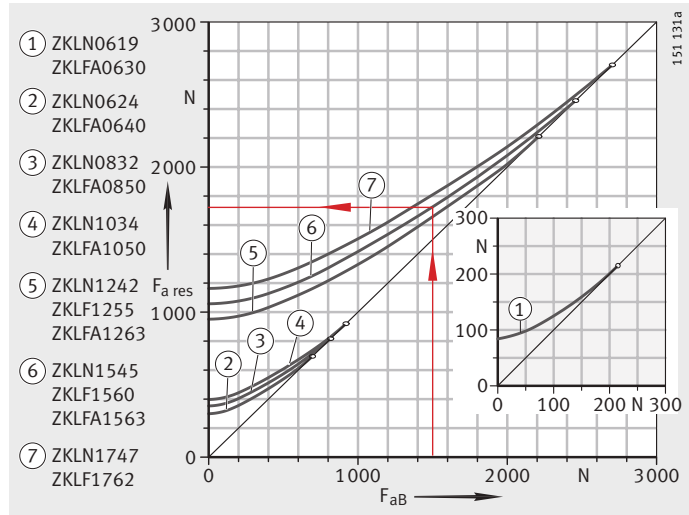
Axial angular contact ball bearings

Resultant bearing load – diagrams

Example 1
Bearing ZKLN1545
Axial operating load $F_{aB} = 1,5 \text{ kN}$
 $F_{a \text{ res}} = \text{approx. } 1,75 \text{ kN}$
Loading by operating load and preload
 $F_{aB} = \text{operating load}$
 $F_{a \text{ res}} = \text{resultant bearing load}$
° = limit value

Figure 11

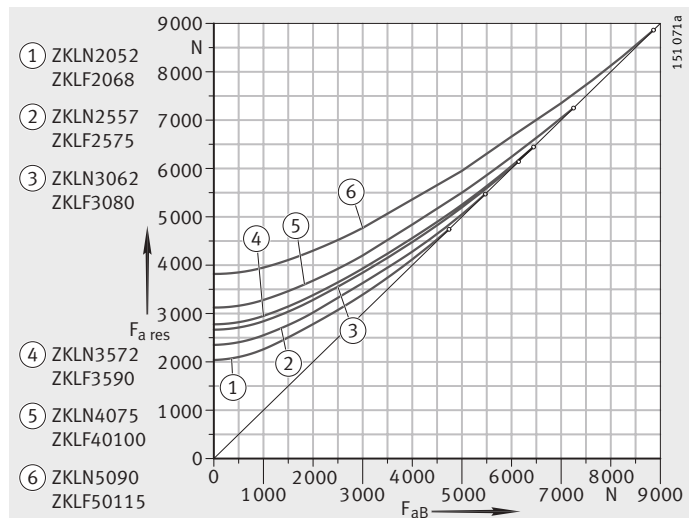
Resultant bearing load
ZKLN, ZKLF and ZKLFA,
up to $d = 17 \text{ mm}$



$F_{aB} = \text{operating load}$
 $F_{a \text{ res}} = \text{resultant bearing load}$
° = limit value

Figure 12

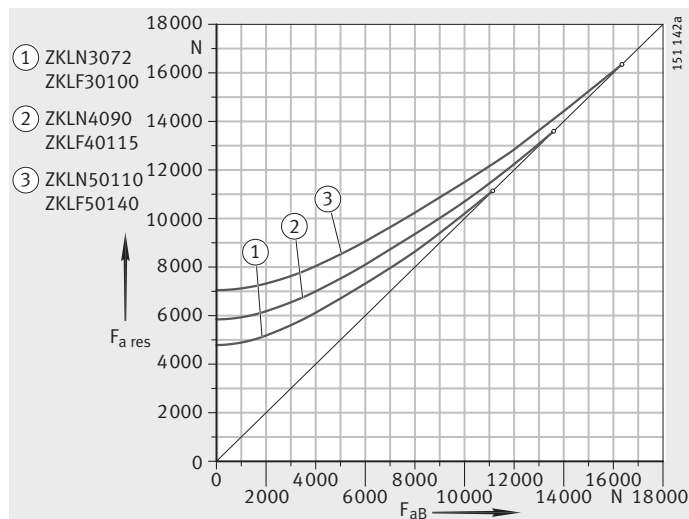
Resultant bearing load
ZKLN, ZKLF,
from $d = 20 \text{ mm}$ to 50 mm



$F_{aB} = \text{operating load}$
 $F_{a \text{ res}} = \text{resultant bearing load}$
° = limit value

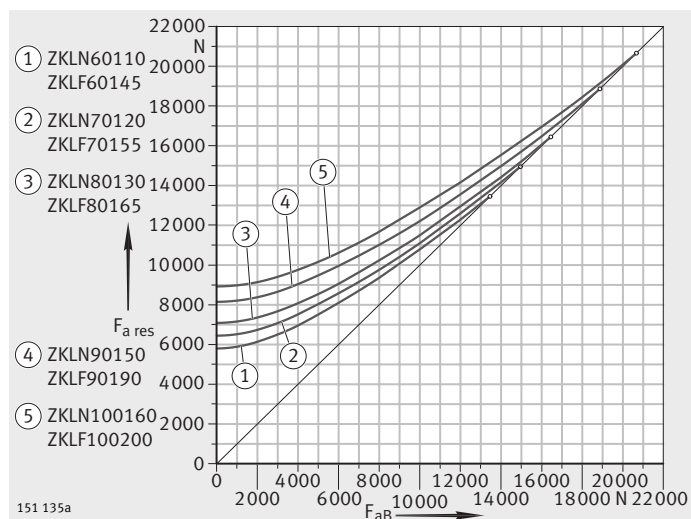
Figure 13

Resultant bearing load
ZKLN, ZKLF, heavy series



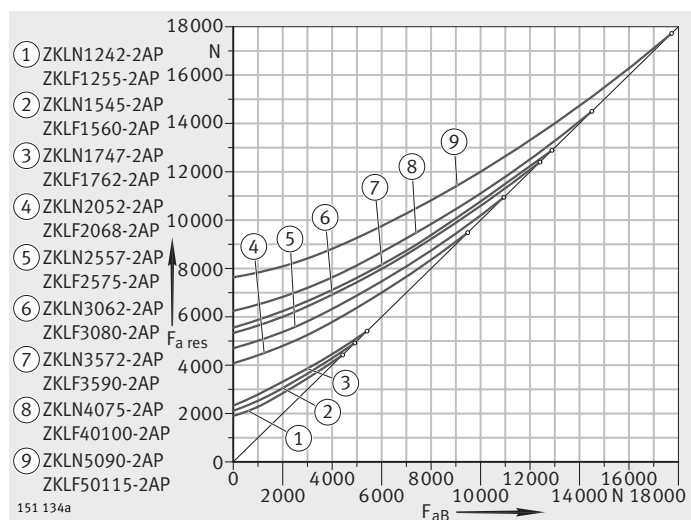
F_{aB} = operating load
 $F_{a\text{ res}}$ = resultant bearing load
 $^{\circ}$ = limit value

Figure 14
 Resultant bearing load
 ZKLN, ZKLF, from $d = 60\text{ mm}$



F_{aB} = operating load
 $F_{a\text{ res}}$ = resultant bearing load
 $^{\circ}$ = limit value

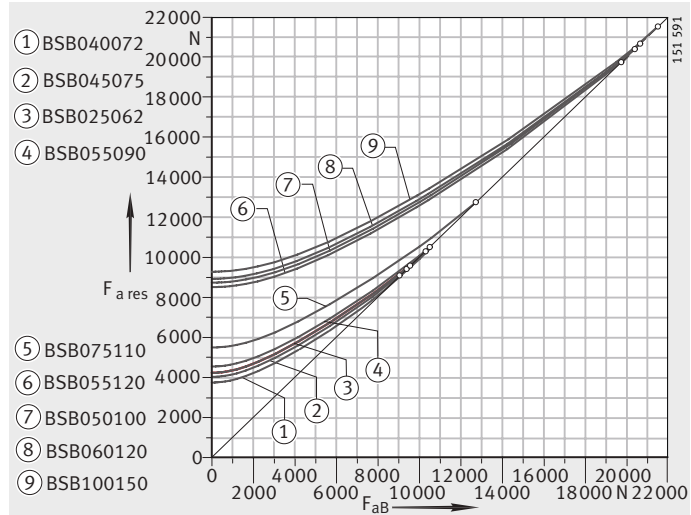
Figure 15
 Resultant bearing load
 ZKLN...2AP and ZKLF...2AP



Axial angular contact ball bearings

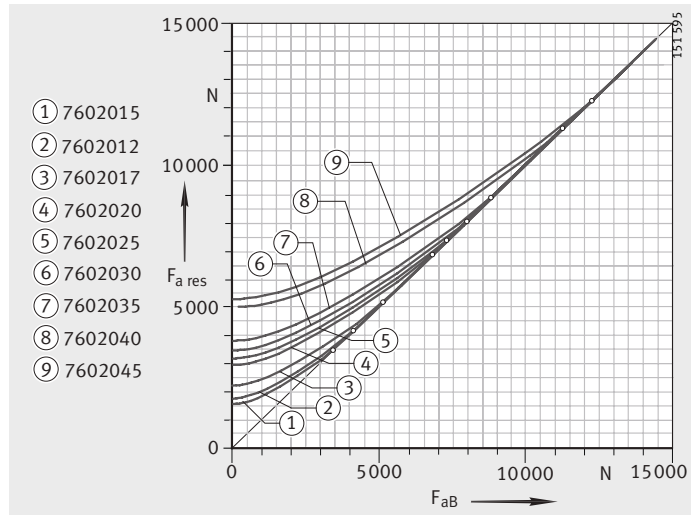
F_{aB} = operating load
 $F_{a\text{ res}}$ = resultant bearing load
 $\circ$ = limit value

Figure 16
 Resultant bearing load
 BSB



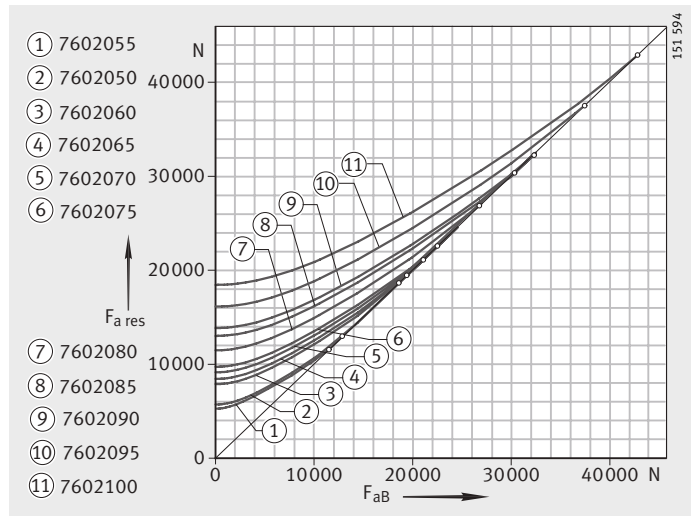
F_{aB} = operating load
 $F_{a\text{ res}}$ = resultant bearing load
 $\circ$ = limit value

Figure 17
 Resultant bearing load
 7602012 to 7602045



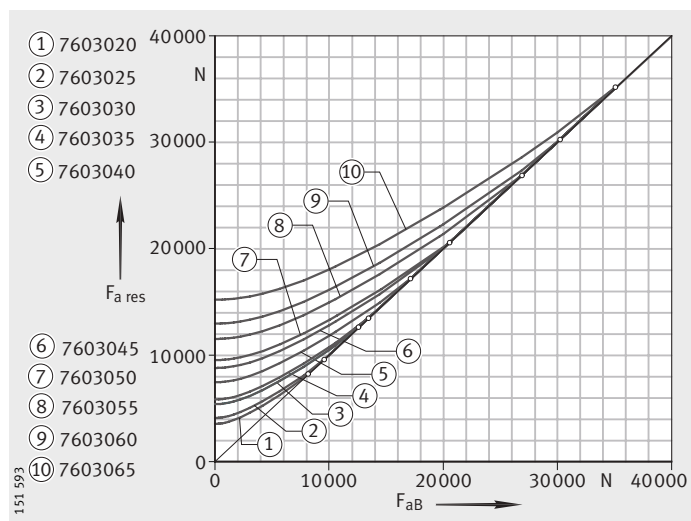
F_{aB} = operating load
 $F_{a\text{ res}}$ = resultant bearing load
 $\circ$ = limit value

Figure 18
 Resultant bearing load
 7602050 to 7602100



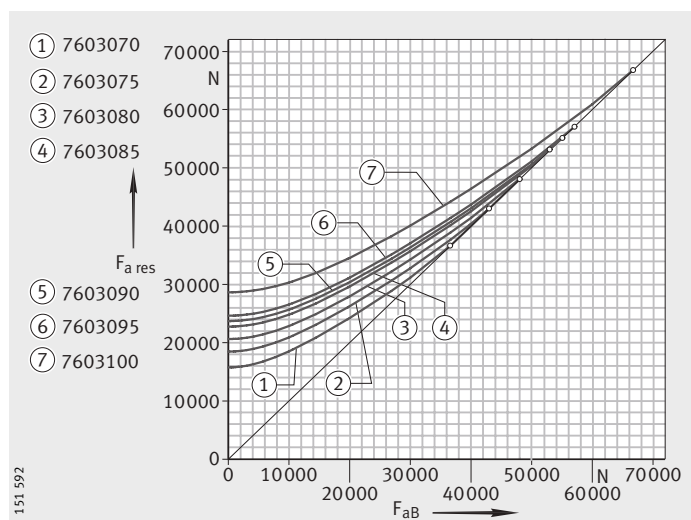
F_{aB} = operating load
 $F_{a\text{ res}}$ = resultant bearing load
 $^{\circ}$ = limit value

Figure 19
 Resultant bearing load
 7603020 to 7603065



F_{aB} = operating load
 $F_{a\text{ res}}$ = resultant bearing load
 $^{\circ}$ = limit value

Figure 20
 Resultant bearing load
 7603070 to 7603100

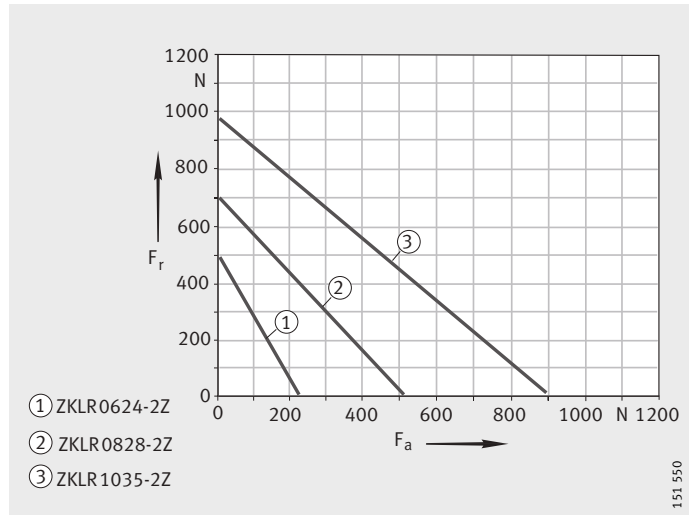


Axial angular contact ball bearings

F_r = radial load
 F_a = axial load

Figure 21

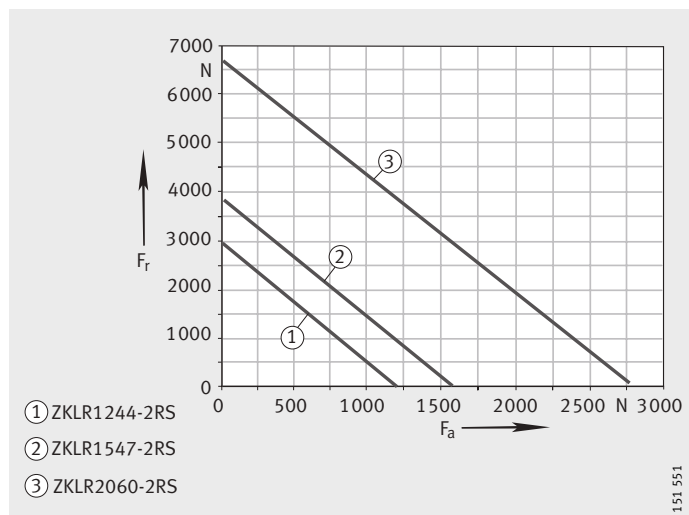
Static limiting load diagrams ZKLR



F_r = radial load
 F_a = axial load

Figure 22

Static limiting load diagrams ZKLR

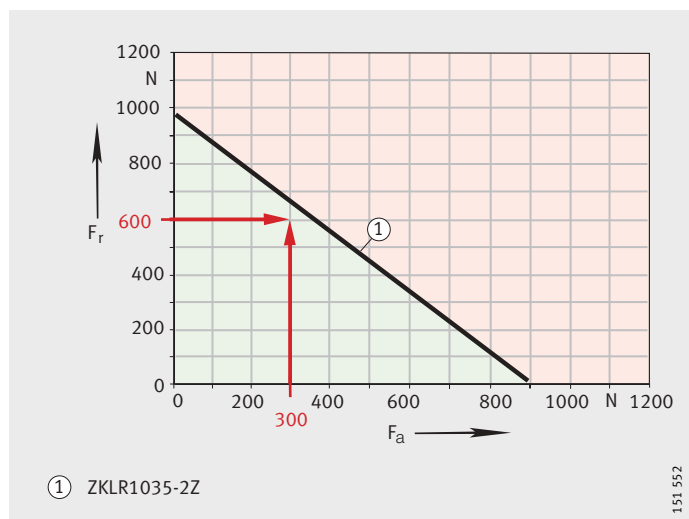


F_r = 600 N
 F_a = 300 N

Bearing is suitable in static terms since the intersection F_a/F_r is below the limit line.

Figure 23

Static limiting load diagram – example ZKLR1035-2Z



Maximum radial load on screw connections for ZKLF

If bearings of series ZKLF are screw mounted on a flat adjacent construction, the maximum radial load that can be supported by the screw connections must be taken into consideration.

If the screws used are as stated in the dimension tables to DIN EN ISO 4 762, the maximum radial load that can be supported before the outer ring moves is restricted to approx. $0,1 \times C_{0a}$.

If the outer ring is additionally bonded in place, for example using Loctite 638, the maximum radial load that can be supported increases to approx. $0,5 \times C_{0a}$.

If the maximum radial loads that can be supported (without any axial load content) are considered in relation to the rolling element set, it can be seen that:

- With a static load safety factor of $S_0 \geq 4$ as required for machine tools, the load that can be supported by the screw connections of the outer ring is in any case greater than the radial load restricted by the rolling element set.

This means that (at least in theory) radial loads can be supported that, in relation to the rolling element set, will lead to a static load safety factor of $S_0 \leq 1$ (incipient plastic deformation of rolling elements), if the outer ring is additionally bonded in place.

This means that, under normal design criteria and with the decisive static load safety factor for the corresponding areas of application (e.g. $S_0 = 4$ for machine tools), the rolling element set is always the decisive criterion.

Permissible static axial load for ZKLF

For bearings of series ZKLF, the permissible static axial load in the direction of the screw connections, *Figure 24*, is:

$$P_{0\text{per}} \leq \frac{C_{0a}}{2}$$

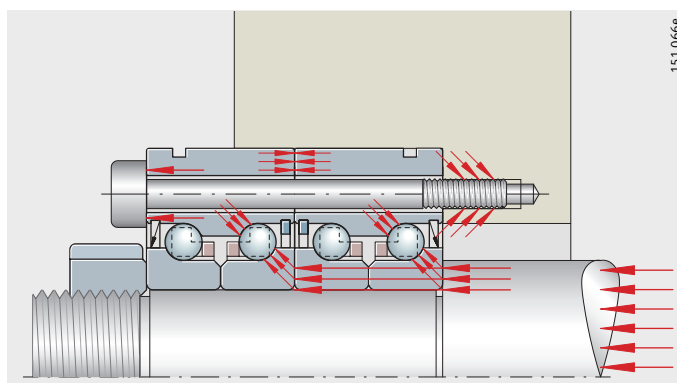
The basic static axial load rating C_{0a} is stated in the dimension tables.



ZKLF

Figure 24

Static axial load in the direction of the screw connections



Axial angular contact ball bearings

Design of adjacent construction	The adjacent construction (the shaft and housing) must be designed in accordance with the data in the dimension tables. The abutment diameters for the shaft and housing shoulders d_a and D_a must be in accordance with the dimension tables.
Caution!	D_a and d_a are recommended minimum abutment diameters. If these values are not used, the rib diameter d_1 according to the dimension table must be observed.
Matched bearings	In matched bearing pairs of series ZKLN and ZKLF, the depth of the housing bore must be defined such that the outer ring of the outermost bearing is radially supported to at least $\frac{1}{4}$ of its width.
Speeds	The limiting speeds n_G given in the dimension tables are based on the following conditions: ■ bearing preloaded, no external operating load ■ operating duration 25% ■ max. equilibrium temperature +50 °C. Under favourable environmental influences, a bearing with gap seals (suffix 2Z) can be used instead of contact seals. The limiting speed of these bearings is approximately twice that of axial angular contact ball bearings with contact seals.
Friction	In most applications, preloading of bearings by means of the locknut tightening torque gives sufficiently accurate setting values. The reference here is the tightening torque M_A according to the dimension table in conjunction with an INA precision locknut. The frictional torque M_{RL} given in the dimension tables is a guide value. The frictional torques are based, for bearings of series ZKLN, ZKLF, ZKLFA, DKLFA, 7602..-2RS, 7603..-2RS, BSB..-2RS and ZKLK on grease lubrication, measured at a speed of $n = 5 \text{ min}^{-1}$. For unsealed bearings of series 7602, 7603 and BSB, the frictional torque M_{RL} is based on lightly oiled raceways. For dimensioning of the drive, the starting frictional torque and the frictional torque at high speeds of 2 to $3 \times M_{RL}$ must be taken into consideration.
Seal friction	In axial angular contact ball bearings with contact seals (suffix 2RS), the extent of seal friction must not be neglected. Sealing influences the limiting speeds.
Frictional energy	The frictional energy N_R of the bearings can be calculated as follows: $N_R = \frac{M_{RL} \cdot n}{9,55}$ N_R Frictional energy W M_{RL} Bearing frictional torque Nm n Operating speed. min^{-1} In any analysis of the thermal balance, the various operating speeds n_i must be taken into consideration with their time durations q_i.

Lubrication

Bearings for screw drives can be lubricated with grease or oil. In machine tools, however, the mean bearing temperature should not exceed +50 °C. If this is the case, a lubrication method without heat dissipation such as grease lubrication or oil impulse lubrication can be selected.

Caution! For higher bearing temperatures and unsealed bearings, recirculating oil lubrication should be used.

Grease lubrication

Bearings with a relubrication facility of series ZKLN, ZKLF, ZKLFA and DKLFA are greased with a lithium soap grease to GA28 and are preferably run with grease lubrication. In most cases, the initial greasing is sufficient for the whole operating life of the bearing.

Under certain application conditions, relubrication may be necessary. In this case, Arcanol MULTITOP is suitable. The initial greasing is compatible with greases with a mineral oil base.

For checking by calculation of the grease operating life or relubrication interval, please contact us.

Relubrication interval

The relubrication intervals cannot be determined precisely in advance. They are dependent to a significant extent on the operating conditions and the environmental influences such as temperature, contamination, dust, water, etc.

Caution! Bearings must always be relubricated:

- before and after long stoppage periods
- in conditions of high humidity
- within the defined lubrication intervals as stated in the technical proposal letter.

For the following conditions, please contact us:

- if the bearings are stationary
- vibrations
- very small oscillating movements.

Relubrication quantity

If bearings of series ZKLN, ZKLF, ZKLFA and DKLFA must be relubricated due to the application conditions, please contact us regarding the relubrication quantities.

Oil lubrication

Other lubrication methods such as oil impulse lubrication or recirculating oil lubrication are also possible. For oil lubrication, good results have been obtained with oils CLP to DIN 51 517 and HLP to DIN 51 524 in classes ISO VG 32 to ISO VG 100.

If oil impulse lubrication is intended for series ZKLN and ZKLF, gap seals are advantageous. They prevent contamination entering the bearing and allow oil to leave the bearing. This prevents overlubrication.



Axial angular contact ball bearings

Mounting guidelines

Caution!

Bearings should only be fitted and dismantled in accordance with the Fitting and Maintenance Manual TPI 100. This TPI is available upon request.

During fitting of bearings, mounting forces should be applied only to the bearing ring to be fitted. Mounting forces must never be directed through the rolling elements or sealing rings.

The characteristics of the bearings are only valid when used in combination with INA precision locknuts and the associated tightening torques given in the dimension tables.

Axial angular contact ball bearings are self-retaining and the individual bearing components are matched to each other. The inner rings must not be removed from the bearing during fitting and dismantling. If individual bearing components are removed from the bearing, please contact us before carrying out any reassembly.

Location of outer ring using ring nut for 7602, 7603, BSB

Axial angular contact ball bearings 7602, 7603 and BSB must be located clearance-free in the housing and on the shaft and must be axially preloaded during fitting. The axial preload force must be distributed evenly over the circumference in order to avoid deformation of the raceways.

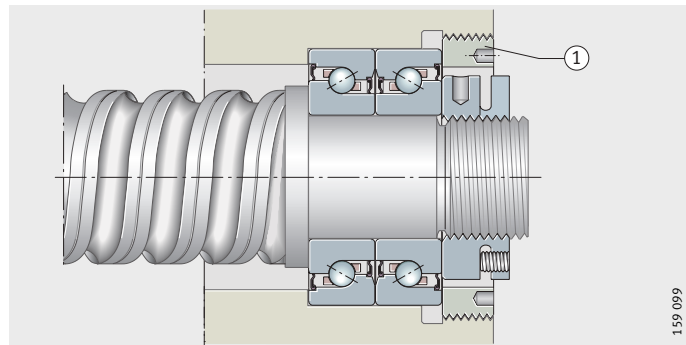
Outer rings are axially tensioned to the preload force given in the dimension table by means of a ring nut (not supplied), *Figure 25*. The ring nut must be secured against loosening (e.g. using Loctite 638).

Ring nuts with a runout of max. 5 µm apply the preload force evenly over the bearing rings and should therefore be used in preference to location by means of a cover.

① Ring nut
7602, 7603, BSB

Figure 25

Two-bearing set in O arrangement, locknut, ring nut



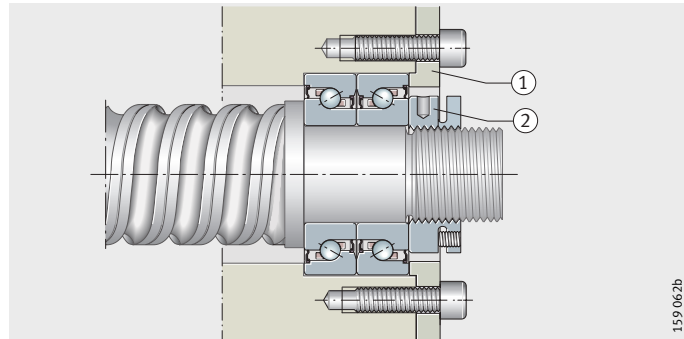
Location of outer ring using a cover

Clamping of the outer rings using a cover and cap screws leads to deformation of the raceways, *Figure 26*. In order to minimise the deformation and achieve the calculated life:

- the cover should be designed with adequate rigidity
- the number of fixing screws should be selected in accordance with the load but at least four should be used
- the screws should be tightened in a cross-wise sequence in four stages (finger tight, 40%, 70%, 100% of M_A).

Caution!

Observe the axial preload force in the dimension table. If other values are used, this will influence the bearing preload, bearing friction and heat generation in the bearing position.



159 062b

Axial angular contact ball bearings must be axially preloaded during fitting by means of a precision locknut.

The preload force for series DKLFA is determined specifically on the basis of the operating conditions (load spectrum). Please contact us.

A diagram of a double door with two large circular windows. The windows are positioned side-by-side in the upper half of the door. The door is shown in a closed position, with a central vertical line indicating the hinge and latch area.

Caution! If other suitable locknuts are used, the manufacturer's guidance on calculation of the necessary tightening torque should be observed. Only locknuts with a minimum accuracy of the end face to the thread of 5 µm should be used.

The fixing screws for the outer ring must be tightened in a crosswise sequence. They may be loaded up to 70% of their elastic limit. If the bearing outer ring is supported by an additional housing cover, it must be ensured that the fixing screws are sufficiently well dimensioned.

Axial angular contact ball bearings

Fitting of angular contact ball bearing units

Angular contact ball bearing units ZKLR require no additional preload after fitting. They can often therefore be located on the spindle simply by means of clearance-free clamping.

Caution! The type of axial location depends on the load to be supported.

The adjacent construction can be a milled flat face or, if necessary, even an unmachined screw mounting surface without radial centring.

Fitting

Locate the bearing unit using a locknut ① or clearance-free clamping on the threaded spindle ②, *Figure 27*.

Screw mount the bearing unit on the adjacent construction; tighten the screws only finger tight ③.

Move the screw drive nut ④ towards the bearing unit (the position of the screw drive is the datum for the linear guidance system, the nut serves as a functional element for alignment).

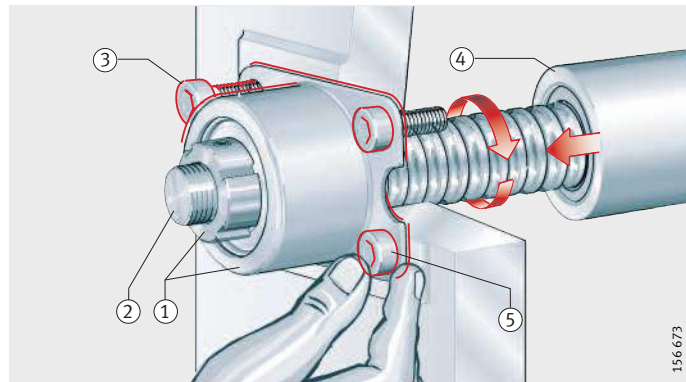
The bearing will align itself to the optimum radial position (due to the constraining forces exerted by the datum).

Screw the bearing unit to the adjacent construction using the tightening torque specified in the assembly drawing ⑤.

- ① Locknut
- ② Threaded spindle
- ③ Tightening of fixing screws finger tight
- ④ Screw drive nut
- ⑤ Tightening of fixing screws

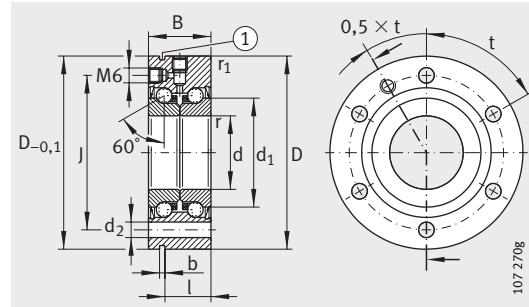
ZKLR

Figure 27
Fitting of bearing unit



Axial angular contact ball bearings

For screw mounting



ZKLF...-2RS, ZKLF...-2Z, ($d \leq 50 \text{ mm}$)

① Extraction slot

Pitch t: see dimension table

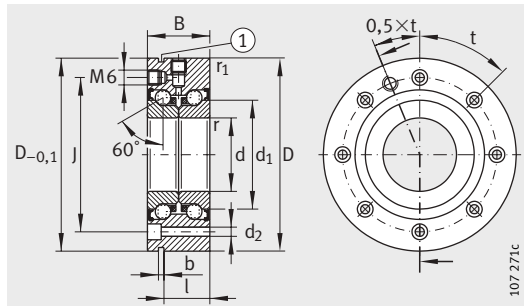
Dimension table · Dimensions in mm														
Designation	Mass	Dimensions										Mounting dimensions		Fixing screws ¹⁾ DIN 912-10.9
		d	D	B	d ₁	r	r ₁	J	d ₂	b	l	D _a	d _a	
	≈ kg			-0,25		min.	min.					max.	min.	Size Quantity
ZKLF1255-2RS	0,37	12 _{-0,005}	55 _{-0,01}	25	25	0,3	0,6	42	6,8	3	17	33	16	M6 3
ZKLF1255-2Z	0,37	12 _{-0,005}	55 _{-0,01}	25	25	0,3	0,6	42	6,8	3	17	33	16	M6 3
ZKLF1560-2RS	0,43	15 _{-0,005}	60 _{-0,01}	25	28	0,3	0,6	46	6,8	3	17	35	20	M6 3
ZKLF1560-2Z	0,43	15 _{-0,005}	60 _{-0,01}	25	28	0,3	0,6	46	6,8	3	17	35	20	M6 3
ZKLF1762-2RS	0,45	17 _{-0,005}	62 _{-0,01}	25	30	0,3	0,6	48	6,8	3	17	37	23	M6 3
ZKLF1762-2Z	0,45	17 _{-0,005}	62 _{-0,01}	25	30	0,3	0,6	48	6,8	3	17	37	23	M6 3
ZKLF2068-2RS	0,61	20 _{-0,005}	68 _{-0,01}	28	34,5	0,3	0,6	53	6,8	3	19	43	25	M6 4
ZKLF2068-2Z	0,61	20 _{-0,005}	68 _{-0,01}	28	34,5	0,3	0,6	53	6,8	3	19	43	25	M6 4
ZKLF2575-2RS	0,72	25 _{-0,005}	75 _{-0,01}	28	40,5	0,3	0,6	58	6,8	3	19	48	32	M6 4
ZKLF2575-2Z	0,72	25 _{-0,005}	75 _{-0,01}	28	40,5	0,3	0,6	58	6,8	3	19	48	32	M6 4
ZKLF3080-2RS	0,78	30 _{-0,005}	80 _{-0,01}	28	45,5	0,3	0,6	63	6,8	3	19	53	40	M6 6
ZKLF3080-2Z	0,78	30 _{-0,005}	80 _{-0,01}	28	45,5	0,3	0,6	63	6,8	3	19	53	40	M6 6
ZKLF30100-2RS ³⁾	1,63	30 _{-0,005}	100 _{-0,01}	38	51	0,3	0,6	80	8,8	3	30	64	47	M8 8
ZKLF30100-2Z	1,63	30 _{-0,005}	100 _{-0,01}	38	51	0,3	0,6	80	8,8	3	30	64	47	M8 8
ZKLF3590-2RS	1,13	35 _{-0,005}	90 _{-0,01}	34	52	0,3	0,6	75	8,8	3	25	62	45	M8 4
ZKLF3590-2Z	1,13	35 _{-0,005}	90 _{-0,01}	34	52	0,3	0,6	75	8,8	3	25	62	45	M8 4
ZKLF40100-2RS	1,46	40 _{-0,005}	100 _{-0,01}	34	58	0,3	0,6	80	8,8	3	25	67	50	M8 4
ZKLF40100-2Z	1,46	40 _{-0,005}	100 _{-0,01}	34	58	0,3	0,6	80	8,8	3	25	67	50	M8 4
ZKLF40115-2RS ³⁾	2,2	40 _{-0,005}	115 _{-0,01}	46	65	0,6	0,6	94	8,8	3	36	80	56	M8 12
ZKLF40115-2Z ³⁾	2,2	40 _{-0,005}	115 _{-0,01}	46	65	0,6	0,6	94	8,8	3	36	80	56	M8 12
ZKLF50115-2RS	1,86	50 _{-0,005}	115 _{-0,01}	34	72	0,3	0,6	94	8,8	3	25	82	63	M8 6
ZKLF50115-2Z	1,86	50 _{-0,005}	115 _{-0,01}	34	72	0,3	0,6	94	8,8	3	25	82	63	M8 6
ZKLF50140-2RS ³⁾	4,7	50 _{-0,005}	140 _{-0,01}	54	80	0,6	0,6	113	11	3	45	98	63	M10 12
ZKLF50140-2Z ³⁾	4,7	50 _{-0,005}	140 _{-0,01}	54	80	0,6	0,6	113	11	3	45	98	63	M10 12
ZKLF60145-2Z	4,3	60 _{-0,005}	145 _{-0,015}	45	85	0,6	0,6	120	8,8	3	35	100	82	M8 8
ZKLF70155-2Z	4,9	70 _{-0,008}	155 _{-0,015}	45	85	0,6	0,6	130	8,8	3	35	110	92	M8 8
ZKLF80165-2Z	5,3	80 _{-0,008}	165 _{-0,015}	45	105	0,6	0,6	140	8,8	3	35	120	102	M8 8
ZKLF90190-2Z	8,7	90 _{-0,008}	190 _{-0,015}	55	120	0,6	0,6	165	11	3	45	138	116	M10 8
ZKLF100200-2Z	9,3	100 _{-0,008}	200 _{-0,015}	55	132	0,6	0,6	175	11	3	45	150	128	M10 8

¹⁾ Tightening torque of fixing screws according to manufacturer's data.
Screws are not included in the delivery.

²⁾ Mass moment of inertia for rotating inner ring.

³⁾ Heavy series.

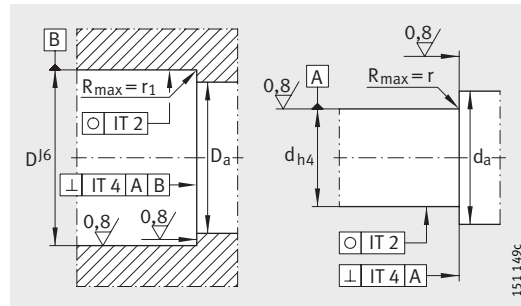
⁴⁾ Only valid in conjunction with INA precision locknuts.



ZKL.-22, (60 mm ≤ d ≤ 100 mm)

① Extraction slot

Pitch t: see dimension table



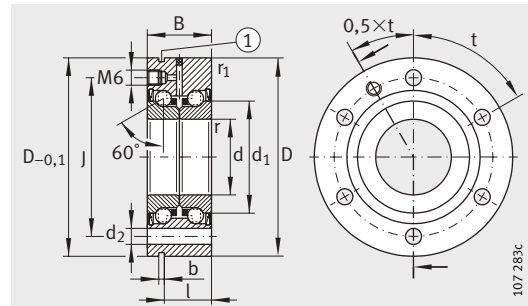
Design of adjacent construction

Pitch t	Basic load ratings axial		Limiting speed n _G grease min ⁻¹	Bearing frictional torque M _{RL} Nm	Rigid- ity axial c _{aL} N/μm	Tilting rigid- ity c _{kL} Nm/mrad	Mass moment of inertia ²⁾ M _m kg · cm ²	Axial runout μm	Recommended INA locknut; to be ordered separately		
	dyn. C _a	stat. C _{0a}							Designation	Tight- ening torque ⁴⁾ M _A Nm	Axial pre- load force N
	N	N									
3X120°	16900	24 700	3800	0,16	375	50	0,068	2	ZM12 –	8	5 038
3X120°	16900	24 700	7600	0,08	375	50	0,068	2	ZM12 –	8	5 038
3X120°	17 900	28 000	3500	0,2	400	65	0,102	2	ZM15 AM15	10	5 484
3X120°	17 900	28 000	7000	0,1	400	65	0,102	2	ZM15 AM15	10	5 484
3X120°	18 800	31 000	3300	0,24	450	80	0,132	2	ZM17 AM17	15	7 157
3X120°	18 800	31 000	6600	0,12	450	80	0,132	2	ZM17 AM17	15	7 157
4X 90°	26 000	47 000	3000	0,3	650	140	0,273	2	ZM20 AM20	18	9 079
4X 90°	26 000	47 000	5400	0,15	650	140	0,273	2	ZM20 AM20	18	9 079
4X 90°	27 500	55 000	2600	0,4	750	200	0,486	2	ZM25 AM25	25	9 410
4X 90°	27 500	55 000	4700	0,2	750	200	0,486	2	ZM25 AM25	25	9 410
6X 60°	29 000	64 000	2200	0,5	850	300	0,73	2,5	ZM30 AM30	32	10 451
6X 60°	29 000	64 000	4300	0,25	850	300	0,73	2,5	ZM30 AM30	32	10 451
8X 45°	59 000	108 000	2100	0,8	950	400	1,91	2,5	ZMA30/52 AM30	65	19 509
8X 45°	59 000	108 000	4000	0,4	950	400	1,91	2,5	ZMA30/52 AM30	65	19 509
4X 90°	41 000	89 000	2000	0,6	900	400	1,51	2,5	ZM35 AM35/58	40	10 770
4X 90°	41 000	89 000	3800	0,3	900	400	1,51	2,5	ZM35 AM35/58	40	10 770
4X 90°	43 000	101 000	1800	0,7	1000	550	2,26	2,5	ZM40 AM40	55	13 412
4X 90°	43 000	101 000	3300	0,35	1000	550	2,26	2,5	ZM40 AM40	55	13 412
12X 30°	72 000	149 000	1600	1,3	1200	750	5,5	2,5	ZMA40/62 AM40	110	25 185
12X 30°	72 000	149 000	3100	0,65	1200	750	5,5	2,5	ZMA40/62 AM40	110	25 815
6X 60°	46 500	126 000	1500	0,9	1250	1000	5,24	2,5	ZM50 AM50	85	17 009
6X 60°	46 500	126 000	3000	0,45	1250	1000	5,24	2,5	ZM50 AM50	85	17 009
12X 30°	113 000	250 000	1200	2,6	1400	1500	15,2	2,5	ZMA50/75 AM50	150	29 436
12X 30°	113 000	250 000	2500	1,3	1400	1500	15,2	2,5	ZMA50/75 AM50	150	29 436
8X 45°	84 000	214 000	3000	1	1300	1650	13,7	3	ZMA60/98 AM60	100	17 893
8X 45°	88 000	241 000	2800	1,2	1450	2250	19,8	3	ZMA70/110 AM70	130	19 717
8X 45°	91 000	265 000	2700	1,4	1600	3000	27,6	3	ZMA80/120 AM80	160	20 604
8X 45°	135 000	395 000	2300	2,3	1700	4400	59,9	3	ZMA90/130 AM90	200	25 198
8X 45°	140 000	435 000	2150	2,6	1900	5800	85,3	3	ZMA100/140 AM100	250	28 760



Axial angular contact ball bearings

For screw mounting
Less stringent tolerances



ZKLF..-2RS-PE

① Extraction slot

Pitch t: see dimension table

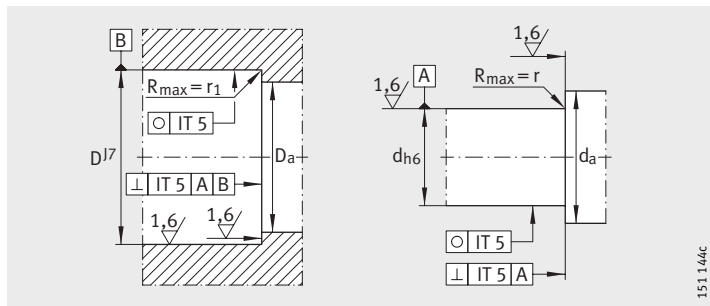
Dimension table · Dimensions in mm

Designation	Mass	Dimensions											Mounting dimensions		Fixing screws ¹⁾ DIN 912-10.9	
	m	d	D	B	d ₁	r	r ₁	J	d ₂	b	l	D _a	d _a			
		≈kg	−0,01		−0,25		min.	min.					max.	min.	Size	Quantity
ZKLF1255-2RS-PE	0,37	12	55 _{−0,013}	25	25	0,3	0,6	42	6,8	3	17	33	16	M6	3	
ZKLF1560-2RS-PE	0,43	15	60 _{−0,013}	25	28	0,3	0,6	46	6,8	3	17	35	20	M6	3	
ZKLF1762-2RS-PE	0,45	17	62 _{−0,013}	25	30	0,3	0,6	48	6,8	3	17	37	23	M6	3	
ZKLF2068-2RS-PE	0,61	20	68 _{−0,013}	28	34,5	0,3	0,6	53	6,8	3	19	43	25	M6	4	
ZKLF2575-2RS-PE	0,72	25	75 _{−0,013}	28	40,5	0,3	0,6	58	6,8	3	19	48	32	M6	4	
ZKLF3080-2RS-PE	0,78	30	80 _{−0,013}	28	45,5	0,3	0,6	63	6,8	3	19	53	40	M6	6	
ZKLF3590-2RS-PE	1,13	35	90 _{−0,015}	34	52	0,3	6,8	75	8,8	3	25	62	45	M8	4	
ZKLF40100-2RS-PE	1,46	40	100 _{−0,015}	34	58	0,3	6,8	80	8,8	3	25	67	50	M8	4	
ZKLF50115-2RS-PE	1,86	50	115 _{−0,015}	34	72	0,3	6,8	94	8,8	3	25	82	63	M8	6	

¹⁾ Tightening torque of fixing screws according to manufacturer's data.
Screws are not included in the delivery.

²⁾ Mass moment of inertia for rotating inner ring.

³⁾ Only valid in conjunction with INA precision locknuts.



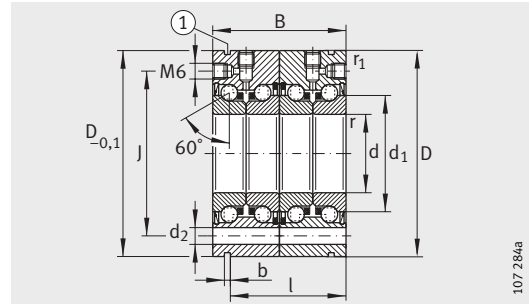
Design of adjacent construction

Pitch t QuantityXt	Basic load ratings axial		Limiting speed n_G grease min^{-1}	Bearing frictional torque M_{RL} Nm	Rigid-ity axial c_{aL} $\text{N}/\mu\text{m}$	Tilting rigidity c_{kL} Nm/mrad	Mass moment of inertia ²⁾ M_m $\text{kg} \cdot \text{cm}^2$	Axial runout μm	Recommended INA locknut; to be ordered separately		
	dyn. C_a	stat. C_{0a}							Designation	Tight-ening torque ³⁾ M_A Nm	Axial pre-load force N
	N	N									
3X120°	16 900	24 700	3800	0,16	375	50	0,068	5	ZM12 –	8	5 038
3X120°	17 900	28 000	3500	0,2	400	65	0,102	5	ZM15 AM15	10	5 484
3X120°	18 800	31 000	3300	0,24	450	80	0,132	5	ZM17 AM17	15	7 157
4X 90°	26 000	47 000	3000	0,3	650	140	0,273	5	ZM20 AM20	18	9 079
4X 90°	27 500	55 000	2600	0,4	750	200	0,486	5	ZM25 AM25	25	9 410
6X 60°	29 000	64 000	2200	0,5	850	300	0,73	5	ZM30 AM30	32	10 451
4X 90°	41 000	89 000	2000	0,6	900	400	1,51	5	ZM35 AM35/58	40	10 770
4X 90°	43 000	101 000	1800	0,7	1000	550	2,26	5	ZM40 AM40	55	13 412
6X 60°	46 500	126 000	1500	0,9	1250	1000	5,24	5	ZM50 AM50	85	17 009



Axial angular contact ball bearings

For screw mounting
Matched pair



ZKL...-2RS-2AP

① Extraction slot

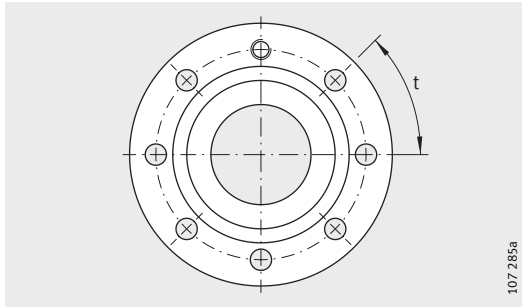
Dimension table · Dimensions in mm

Designation	Mass	Dimensions											Mounting dimensions		Fixing screws ¹⁾ DIN 912-10.9	
	m	d	D	B	d ₁	r	r ₁	J	d ₂	l	b	D _a	d _a			
	≈kg	-0,005	-0,010	-0,50		min.	min.					max.	min.	Size	Quan- tity	
ZKL1762-2RS-2AP	0,9	17	62	50	30	0,3	0,6	48	6,8	42	3	37	23	M6X60	5	
ZKL2068-2RS-2AP	1,22	20	68	56	34,5	0,3	0,6	53	6,8	47	3	43	25	M6X70	7	
ZKL2575-2RS-2AP	1,44	25	75	56	40,5	0,3	0,6	58	6,8	47	3	48	32	M6X70	7	
ZKL3080-2RS-2AP	1,56	30	80	56	45,5	0,3	0,6	63	6,8	47	3	53	40	M6X70	11	
ZKL3590-2RS-2AP	2,26	35	90	68	52	0,3	0,6	75	8,8	59	3	62	45	M8X80	7	
ZKL40100-2RS-2AP	2,92	40	100	68	58	0,3	0,6	80	8,8	59	3	67	50	M8X80	7	
ZKL50115-2RS-2AP	3,72	50	115	68	72	0,3	0,6	94	8,8	59	3	82	63	M8X80	11	

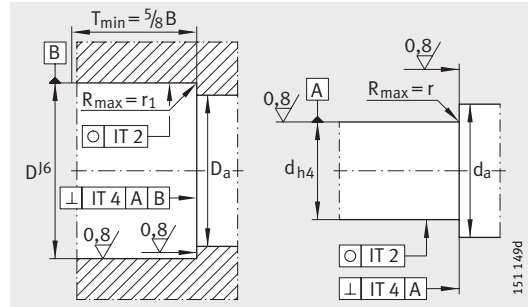
¹⁾ Tightening torque of fixing screws according to manufacturer's data.
Screws are not included in the delivery.

²⁾ Mass moment of inertia for rotating inner ring.

³⁾ Only valid in conjunction with INA precision locknuts.



Hole pattern
Pitch t: see dimension table



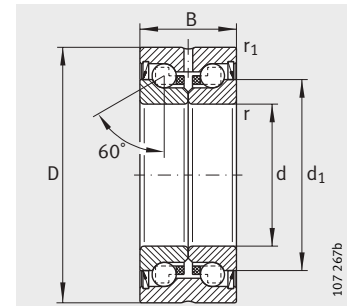
Design of adjacent construction

Pitch t QuantityXt	Basic load ratings axial		Limiting speed	Bearing frictional torque	Rigidity axial	Tilting rigidity	Mass moment of inertia ²⁾	Axial runout	Recommended INA locknut; to be ordered separately		
	dyn. C _a	stat. C _{0a}	n _G grease	M _{RL}	c _{aL}	c _{kL}	M _m		Designation	Tightening torque ³⁾	Axial pre-load force
	N	N	min ⁻¹	Nm	N/μm	Nm/mrad	kg · cm ²	μm		M _A Nm	N
6X60°	30 500	62 000	3300	0,36	800	200	0,264	2	ZM17 AM17	15	7 157
8X45°	42 000	94 000	3000	0,45	1150	320	0,564	2	ZMA20/38 AM20	18	9 079
8X45°	44 500	111 000	2600	0,6	1300	450	0,972	2	ZMA25/45 AM25	25	9 410
12X30°	47 500	127 000	2200	0,75	1500	620	1,46	2,5	ZMA30/52 AM30	32	10 451
8X45°	66 000	177 000	2000	0,9	1600	900	3,02	2,5	ZMA35/58 AM35/58	40	10 770
8X45°	70 000	202 000	1800	1,05	1750	1200	4,52	2,5	ZMA40/62 AM40	55	13 412
12X30°	76 000	250 000	1500	1,35	2200	2250	10,48	2,5	ZMA50/75 AM50	85	17 009



Axial angular contact ball bearings

Not for screw mounting



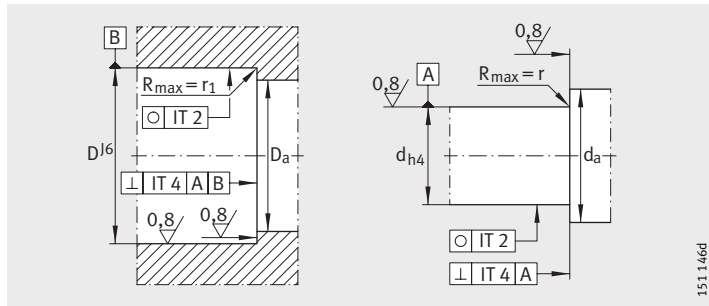
ZKLN...-2RS
ZKLN...-2Z

Dimension table · Dimensions in mm											
Designation	Mass	Dimensions						Mounting dimensions		Basic load ratings axial	
	m	d	D	B	d ₁	r	r ₁	D _a	d _a	dyn. C _a	stat. C _{0a}
	≈kg	-0,005	-0,010	-0,25		min.	min.	max.	min.	N	N
ZKLN0619-2Z	0,02	6 ^{+0,002 -0,003}	19	12	12	0,3	0,3	16	9	4 900	6 100
ZKLN0624-2RS	0,03	6 ^{+0,002 -0,003}	24	15	14	0,3	0,6	19	9	6 900	8 500
ZKLN0624-2Z	0,03	6 ^{+0,002 -0,003}	24	15	14	0,3	0,6	19	9	6 900	8 500
ZKLN0832-2RS	0,09	8	32	20	19	0,3	0,6	26	11	12 500	16 300
ZKLN0832-2Z	0,09	8	32	20	19	0,3	0,6	26	11	12 500	16 300
ZKLN1034-2RS	0,1	10	34	20	21	0,3	0,6	28	14	13 400	18 800
ZKLN1034-2Z	0,1	10	34	20	21	0,3	0,6	28	14	13 400	18 800
ZKLN1242-2RS	0,2	12	42	25	25	0,3	0,6	33	16	17 000	24 700
ZKLN1242-2Z	0,2	12	42	25	25	0,3	0,6	33	16	17 000	24 700
ZKLN1545-2RS	0,21	15	45	25	28	0,3	0,6	35	20	17 900	28 000
ZKLN1545-2Z	0,21	15	45	25	28	0,3	0,6	35	20	17 900	28 000
ZKLN1747-2RS	0,22	17	47	25	30	0,3	0,6	37	23	18 800	31 000
ZKLN1747-2Z	0,22	17	47	25	30	0,3	0,6	37	23	18 800	31 000
ZKLN2052-2RS	0,31	20	52	28	34,5	0,3	0,6	43	25	26 000	47 000
ZKLN2052-2Z	0,31	20	52	28	34,5	0,3	0,6	43	26	26 000	47 000
ZKLN2557-2RS	0,34	25	57	28	40,5	0,3	0,6	48	32	27 500	55 000
ZKLN2557-2Z	0,34	25	57	28	40,5	0,3	0,6	48	32	27 500	55 000
ZKLN3062-2RS	0,39	30	62	28	45,5	0,3	0,6	53	40	29 000	64 000
ZKLN3062-2Z	0,39	30	62	28	45,5	0,3	0,6	53	40	29 000	64 000
ZKLN3072-2RS ²⁾	0,72	30	72	38	51	0,3	0,6	64	47	59 000	108 000
ZKLN3072-2Z ²⁾	0,72	30	72	38	51	0,3	0,6	64	47	59 000	108 000
ZKLN3572-2RS	0,51	35	72	34	52	0,3	0,6	62	45	41 000	89 000
ZKLN3572-2Z	0,51	35	72	34	52	0,3	0,6	62	45	41 000	89 000

¹⁾ Mass moment of inertia for rotating inner ring.

²⁾ Heavy series.

³⁾ Only valid in conjunction with INA precision locknuts.



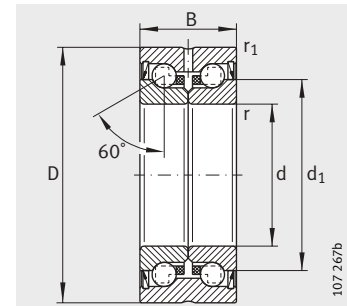
Design of adjacent construction

Limiting speed n_G grease min^{-1}	Bearing frictional torque M_{RL} Nm	Rigidity axial c_{aL} N/ μm	Tilting rigidity c_{kL} Nm/mrad	Mass moment of inertia ¹⁾ M_m kg · cm ²	Axial runout μm	Recommended INA locknut; to be ordered separately			
						Designation	Tightening torque ³⁾ M_A Nm	Axial preload force N	
14000	0,01	150	4	0,0019	2	ZM06 –	2	916	
6800	0,04	200	8	0,0044	2	ZM06 –	2	2 404	
12000	0,02	200	8	0,0044	2	ZM06 –	2	2 404	
5100	0,08	250	20	0,02	2	ZM08 –	4	2 216	
9500	0,04	250	20	0,02	2	ZM08 –	4	2 216	
4600	0,12	325	25	0,029	2	ZM10 –	6	4 891	
8600	0,06	325	25	0,029	2	ZM10 –	6	4 891	
3800	0,16	375	50	0,068	2	ZM12 –	8	5 038	
7600	0,08	375	50	0,068	2	ZM12 –	8	5 038	
3500	0,2	400	65	0,102	2	ZM15 AM15	10	5 484	
7000	0,1	400	65	0,102	2	ZM15 AM15	10	5 484	
3300	0,24	450	80	0,132	2	ZM17 AM17	15	7 157	
6600	0,12	450	80	0,132	2	ZM17 AM17	15	7 157	
3000	0,3	650	140	0,273	2	ZM20 AM20	18	9 079	
5400	0,15	650	140	0,273	2	ZM20 AM20	18	9 079	
2600	0,4	750	200	0,486	2	ZM25 AM25	25	9 410	
4700	0,2	750	200	0,486	2	ZM25 AM25	25	9 410	
2200	0,5	850	300	0,73	2,5	ZM30 AM30	32	10 451	
4300	0,25	850	300	0,73	2,5	ZM30 AM30	32	10 451	
2100	0,8	950	400	1,91	2,5	ZMA30/52 AM30	65	19 509	
4000	0,4	950	400	1,91	2,5	ZMA30/52 AM30	65	19 509	
2000	0,6	900	400	1,51	2,5	ZM35 AM35/58	40	10 770	
3800	0,3	900	400	1,51	2,5	ZM35 AM35/58	40	10 770	



Axial angular contact ball bearings

Not for screw mounting



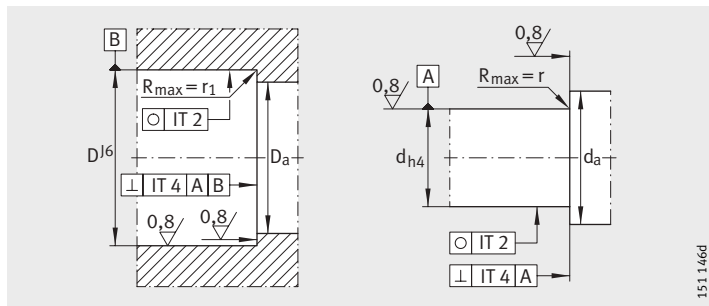
ZKLN...-2RS
ZKLN...-2Z

Dimension table (continued) · Dimensions in mm											
Designation	Mass m ≈kg	Dimensions						Mounting dimensions		Basic load ratings axial	
		d	D	B	d ₁	r	r ₁	D _a	d _a	dyn. C _a	stat. C _{0a}
				-0,25		min.	min.	max.	min.	N	N
ZKLN4075-2RS	0,61	40_{-0,005}	75 _{-0,01}	34	58	0,3	0,6	67	50	43 000	101 000
ZKLN4075-2Z	0,61	40_{-0,005}	75 _{-0,01}	34	58	0,3	0,6	67	50	43 000	101 000
ZKLN4090-2RS²⁾	0,95	40_{-0,005}	90 _{-0,01}	46	65	0,6	0,6	80	56	72 000	149 000
ZKLN4090-2Z²⁾	0,95	40_{-0,005}	90 _{-0,01}	46	65	0,6	0,6	80	56	72 000	149 000
ZKLN5090-2RS	0,88	50_{-0,005}	90 _{-0,01}	34	72	0,3	0,6	82	63	46 500	126 000
ZKLN5090-2Z	0,88	50_{-0,005}	90 _{-0,01}	34	72	0,3	0,6	82	63	46 500	126 000
ZKLN50110-2RS²⁾	2,5	50_{-0,005}	110 _{-0,01}	54	80	0,6	0,6	98	63	113 000	250 000
ZKLN50110-2Z²⁾	2,5	50_{-0,005}	110 _{-0,01}	54	80	0,6	0,6	98	63	113 000	250 000
ZKLN60110-2Z	2,2	60_{-0,008}	110 _{-0,015}	45	85	0,6	0,6	100	82	84 000	214 000
ZKLN70120-2Z	2,4	70_{-0,008}	120 _{-0,015}	45	95	0,6	0,6	110	92	88 000	241 000
ZKLN80130-2Z	2,7	80_{-0,008}	130 _{-0,015}	45	105	0,6	0,6	120	102	91 000	265 000
ZKLN90150-2Z	4,5	90_{-0,008}	150 _{-0,015}	55	120	0,6	0,6	138	116	135 000	395 000
ZKLN100160-2Z	4,9	100_{-0,008}	160 _{-0,015}	55	132	0,6	0,6	150	128	140 000	435 000

¹⁾ Mass moment of inertia for rotating inner ring.

²⁾ Heavy series.

³⁾ Only valid in conjunction with INA precision locknuts.



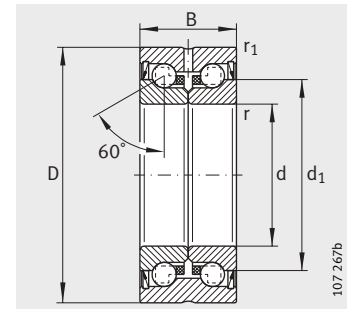
Design of adjacent construction

Limiting speed n_G grease min^{-1}	Bearing frictional torque M_{RL} Nm	Rigidity axial c_{aL} N/ μm	Tilting rigidity c_{kL} Nm/mrad	Mass moment of inertia ¹⁾ M_m kg · cm ²	Axial runout μm	Recommended INA locknut; to be ordered separately		
						Designation	Tightening torque ³⁾ M_A Nm	Axial preload force N
1800	0,7	1000	550	2,26	2,5	ZM40 AM40	55	13 412
3300	0,35	1000	550	2,26	2,5	ZM40 AM40	55	13 412
1600	1,3	1200	750	5,5	2,5	ZMA40/62 AM40	110	25 185
3100	0,65	1200	750	5,5	2,5	ZMA40/62 AM40	110	25 185
1500	0,9	1250	1000	5,24	2,5	ZM50 AM50	85	17 009
3000	0,45	1250	1000	5,24	2,5	ZM50 AM50	85	17 009
1200	2,6	1400	1500	15,2	2,5	ZMA50/75 AM50	150	29 436
2500	1,3	1400	1500	15,2	2,5	ZMA50/75 AM50	150	29 436
3000	1	1300	1650	13,7	3	ZMA60/98 AM60	100	17 893
2800	1,2	1450	2250	19,8	3	ZMA70/110 AM70	130	19 171
2700	1,4	1600	3000	27,6	3	ZMA80/120 AM80	160	20 604
2300	2,3	1700	4400	59,9	3	ZMA90/130 AM90	200	25 198
2150	2,6	1900	5800	85,3	3	ZMA100/140 AM100	250	28 760



Axial angular contact ball bearings

Not for screw mounting
Less stringent tolerances



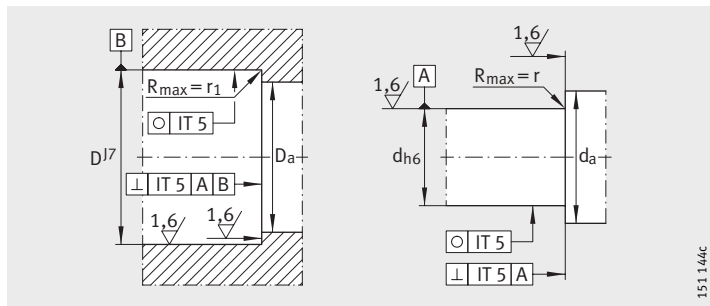
ZKLN...-2RS-PE

Dimension table · Dimensions in mm

Designation	Mass	Dimensions						Mounting dimensions		Basic load ratings axial	
	m	d	D	B	d ₁	r	r ₁	D _a	d _a	dyn. C _a	stat. C _{0a}
	≈ kg	-0,01		-0,25		min.	min.	max.	min.	N	N
ZKLN0624-2RS-PE	0,03	6	24 _{-0,01}	15	14	0,3	0,6	19	9	6 900	8 500
ZKLN1034-2RS-PE	0,1	10	34 _{-0,011}	20	21	0,3	0,6	28	14	13 400	18 800
ZKLN1242-2RS-PE	0,2	12	42 _{-0,011}	25	25	0,3	0,6	33	16	16 900	24 700
ZKLN1545-2RS-PE	0,21	15	45 _{-0,011}	25	28	0,3	0,6	35	20	17 900	28 000
ZKLN1747-2RS-PE	0,22	17	47 _{-0,011}	25	30	0,3	0,6	37	23	18 800	31 000
ZKLN2052-2RS-PE	0,31	20	52 _{-0,013}	28	34,5	0,3	0,6	43	25	26 000	47 000
ZKLN2557-2RS-PE	0,34	25	57 _{-0,013}	28	40,5	0,3	0,6	48	32	27 500	55 000
ZKLN3062-2RS-PE	0,39	30	62 _{-0,013}	28	45,5	0,3	0,6	53	40	29 000	64 000
ZKLN3572-2RS-PE	0,51	35	72 _{-0,013}	34	52	0,3	0,6	62	45	41 000	89 000
ZKLN5090-2RS-PE	0,88	50	90 _{-0,015}	34	72	0,3	0,6	82	63	46 500	126 000

¹⁾ Mass moment of inertia for rotating inner ring.

²⁾ Only valid in conjunction with INA precision locknuts.



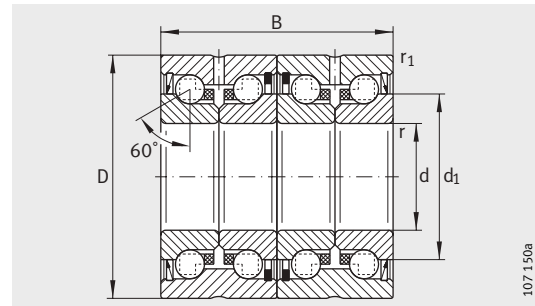
Design of adjacent construction

Limiting speed n_G grease min^{-1}	Bearing frictional torque M_{RL} Nm	Rigidity axial c_{aL} N/ μm	Tilting rigidity c_{kL} Nm/mrad	Mass moment of inertia ¹⁾ M_m kg · cm ²	Axial runout μm	Recommended INA locknut; to be ordered separately			
						Designation	Tightening torque ²⁾ M_A Nm	Axial preload force N	
6800	0,04	200	8	0,0044	5	ZM06 –	2	2 404	
4600	0,12	325	25	0,029	5	ZM10 –	6	4 891	
3800	0,16	375	50	0,068	5	ZM12 –	8	5 038	
3500	0,2	400	65	0,102	5	ZM15 AM15	10	5 484	
3300	0,24	450	80	0,132	5	ZM17 AM17	15	7 157	
3000	0,3	650	140	0,273	5	ZM20 AM20	18	9 079	
2600	0,4	750	200	0,486	5	ZM25 AM25	25	9 410	
2200	0,5	850	300	0,73	5	ZM30 AM30	32	10 451	
2000	0,6	900	400	1,51	5	ZM35 AM35/38	40	10 770	
1500	0,9	1250	1000	5,24	5	ZM50 AM50	85	17 009	



Axial angular contact ball bearings

Not for screw mounting
Matched pair

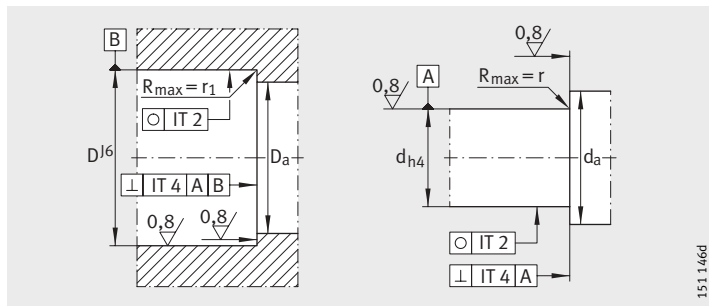


ZKLN...-2RS-2AP

Dimension table · Dimensions in mm											
Designation	Mass	Dimensions						Mounting dimensions		Basic load ratings axial	
	m	d	D	B	d ₁	r	r ₁	D _a	d _a	dyn. C _a	stat. C _{0a}
	≈kg	−0,005	−0,01	−0,5		min.	min.	max.	min.	N	N
ZKLN1747-2RS-2AP	0,44	17	47	50	30	0,3	0,6	37	23	30 500	62 000
ZKLN2052-2RS-2AP	0,62	20	52	56	34,5	0,3	0,6	43	25	42 000	94 000
ZKLN2557-2RS-2AP	0,68	25	57	56	40,5	0,3	0,6	48	32	44 500	111 000
ZKLN3062-2RS-2AP	0,78	30	62	56	45,5	0,3	0,6	53	40	47 500	127 000
ZKLN3572-2RS-2AP	1,02	35	72	68	52	0,3	0,6	62	45	66 000	177 000
ZKLN4075-2RS-2AP	1,22	40	75	68	58	0,3	0,6	67	50	70 000	202 000
ZKLN5090-2RS-2AP	1,76	50	90	68	72	0,3	0,6	82	63	76 000	250 000

¹⁾ Mass moment of inertia for rotating inner ring.

²⁾ Only valid in conjunction with INA precision locknuts.



Design of adjacent construction

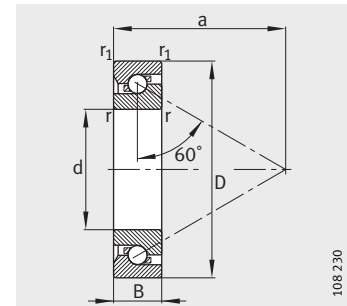
Limiting speed	Bearing frictional torque	Rigidity axial	Tilting rigidity	Mass moment of inertia ¹⁾	Axial runout	Recommended INA locknut; to be ordered separately		
n_G grease	M_{RL}	c_{aL}	c_{kL}	M_m		Designation	Tightening torque ²⁾	Axial preload force
min^{-1}	Nm	N/ μm	Nm/mrad	$\text{kg} \cdot \text{cm}^2$	μm		M_A Nm	N
3300	0,36	800	200	0,264	2	ZM17 AM17	15	7157
3000	0,45	1150	320	0,546	2	ZMA20/38 AM20	18	9079
2600	0,6	1300	450	0,972	2	ZMA25/45 AM25	25	9410
2200	0,75	1500	620	1,46	2,5	ZMA30/52 AM30	32	10451
2000	0,9	1600	900	3,02	2,5	ZMA35/58 AM35/58	40	10770
1800	1,05	1750	1200	4,52	2,5	ZMA40/62 AM40	55	13412
1500	1,35	2200	2250	10,48	2,5	ZMA50/75 AM50	85	17009



Axial angular contact ball bearings

Single direction

Unsealed



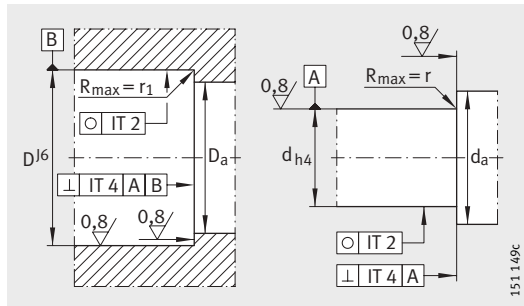
7602, 7603, BSB

Dimension table · Dimensions in mm										
Designation	Mass m ≈ kg	Dimensions					Mounting dimensions		Basic load ratings axial	
		d	D	B	r, r ₁	a	D _a H12	d _a h12	stat. C _a	dyn. C _{0a}
					min.	≈			N	N
7602012-TVP	0,042	12_{-0,004}	32 _{-0,006}	10 _{-0,08}	0,6	24	27	17	12 200	20 700
7602015-TVP	0,052	15_{-0,004}	36 _{-0,006}	11 _{-0,08}	0,6	27,5	30	20,5	13 100	24 700
7602017-TVP	0,074	17_{-0,004}	40 _{-0,006}	12 _{-0,08}	0,6	31	34,5	23	17 200	32 500
7602020-TVP	0,139	20_{-0,005}	47 _{-0,006}	14 _{-0,12}	1	36	39,5	27,5	19 100	38 000
BSB020047T	0,13	20_{-0,005}	47 _{-0,006}	15 _{-0,12}	1	36,5	39,5	27,5	20 800	43 000
7603020-TVP	0,17	20_{-0,005}	52 _{-0,007}	15 _{-0,12}	1,1	39,5	43,5	30,5	25 500	53 000
7602025-TVP	0,147	25_{-0,005}	52 _{-0,007}	15 _{-0,12}	1	41	45	32	23 200	50 000
BSB025062-T	0,24	25_{-0,005}	62 _{-0,007}	15 _{-0,12}	1	46,5	52	38	29 500	68 000
7603025-TVP	0,275	25_{-0,005}	62 _{-0,007}	17 _{-0,12}	1,1	47,5	52	38	29 500	68 000
BSB030062-T	0,22	30_{-0,005}	62 _{-0,007}	15 _{-0,12}	1	47,5	52,5	39,5	27 500	66 000
7602030-TVP	0,232	30_{-0,005}	62 _{-0,007}	16 _{-0,12}	1	48	52,5	39,5	27 500	66 000
7603030-TVP	0,409	30_{-0,005}	72 _{-0,007}	19 _{-0,12}	1,1	55,5	61	45	36 500	89 000
BSB035072-T	0,3	35_{-0,006}	72 _{-0,007}	15 _{-0,12}	1	54	60,5	46,5	31 500	81 000
7602035-TVP	0,339	35_{-0,006}	72 _{-0,007}	17 _{-0,12}	1,1	55	60,5	46,5	31 500	81 000
7603035-TVP	0,546	35_{-0,006}	80 _{-0,007}	21 _{-0,12}	1,5	61,5	67	51	38 000	100 000
BSB040072-T	0,26	40_{-0,006}	72 _{-0,007}	15 _{-0,12}	1	56	62,5	49	29 500	82 000
7602040-TVP	0,418	40_{-0,006}	80 _{-0,007}	18 _{-0,12}	1,1	62,5	69,5	53,5	39 000	106 000
BSB040090-T	0,65	40_{-0,006}	90 _{-0,008}	20 _{-0,12}	1,5	67	75,5	56,5	52 000	138 000
7603040-TVP	0,751	40_{-0,006}	90 _{-0,008}	23 _{-0,12}	1,5	68,5	75,5	56,5	52 000	138 000
BSB045075-T	0,26	45_{-0,006}	75 _{-0,007}	15 _{-0,12}	1	59,5	68	52	30 000	85 000
7602045-TVP	0,488	45_{-0,006}	85 _{-0,008}	19 _{-0,12}	1,1	66	73	57	39 500	111 000
BSB045100-T	0,81	45_{-0,006}	100 _{-0,008}	20 _{-0,12}	1,5	75	85,5	64,5	62 000	172 000
7603045-TVP	0,992	45_{-0,006}	100 _{-0,008}	25 _{-0,12}	1,5	77,5	85,5	64,5	62 000	172 000
7602050-TVP	0,557	50_{-0,006}	90 _{-0,008}	20 _{-0,12}	1,1	71,5	79	63	41 000	122 000
BSB050100-T	0,75	50_{-0,006}	100 _{-0,008}	20 _{-0,12}	1,5	75	85,5	64,5	62 000	172 000
7603050-TVP	1,29	50_{-0,006}	110 _{-0,008}	27 _{-0,12}	2	85,5	94	72	72 000	203 000
BSB055090-T	0,38	55_{-0,007}	90 _{-0,008}	15 _{-0,15}	1,0	70,5	80	65	33 500	98 000
7602055-TVP	0,74	55_{-0,007}	100 _{-0,008}	21 _{-0,15}	1,5	77,5	85,5	69,5	42 000	132 000
BSB055120-T	1,2	55_{-0,007}	120 _{-0,008}	20 _{-0,15}	2,0	86	97,5	77	63 000	188 000
7603055-TVP	1,67	55_{-0,007}	120 _{-0,008}	29 _{-0,15}	2	91,5	101	77	85 000	255 000

¹⁾ Valid for matched pair of bearings in O or X arrangement.

²⁾ Valid for individual bearing with stated preload force, bearing lightly oiled.

³⁾ Only valid in conjunction with INA precision locknuts.



Design of adjacent construction

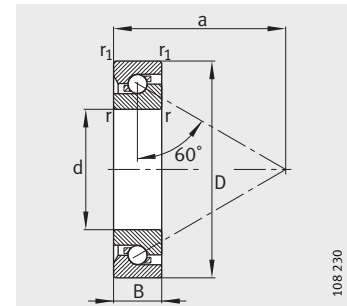
Limiting speed n_G grease min^{-1}	Bearing frictional torque ²⁾ M_{RL} Nm	Rigidity ¹⁾ axial c_{aL} $\text{N}/\mu\text{m}$	Axial runout μm	Recommended INA locknut; to be ordered separately			
				Designation	Tightening torque ³⁾ M_A Nm	Axial preload force N	
8 000	0,015	476	2	ZM12 AM12	8	5 676	
6 700	0,02	516	2	ZM15 AM15	10	5 777	
6 000	0,03	596	2	ZM17 AM17	15	7 888	
5 000	0,05	703	2	ZM20 AM20	18	8 387	
5 600	0,05	703	2	ZM20 AM20	18	8 387	
4 500	0,06	787	2	ZM20 AM20	25	9 423	
4 500	0,065	772	2	ZM25 AM25	25	9 341	
4 300	0,085	917	2	ZM25 AM25	40	11 837	
3 800	0,085	917	2	ZM25 AM25	40	11 837	
4 200	0,085	893	2	ZM30 AM30	32	10 200	
3 800	0,085	893	2	ZM30 AM30	32	10 200	
3 200	0,13	1073	2	ZM30 AM30	55	13 517	
3 700	0,115	1020	2	ZM35 AM35	40	11 064	
3 200	0,115	1020	2	ZM35 AM35	40	11 064	
3 000	0,17	1192	2	ZM35 AM35	65	12 781	
3 500	0,115	1016	2	ZM40 AM40	40	11 214	
2 800	0,17	1190	2	ZM40 AM40	55	12 943	
3 100	0,225	1292	2	ZM40 AM40	110	20 710	
2 600	0,225	1292	2	ZM40 AM40	110	20 710	
3 300	0,13	1072	2	ZM45 AM45	50	9 799	
2 600	0,19	1247	2	ZM45 AM45	65	14 970	
2 700	0,3	1473	2	ZM45 AM45	120	19 287	
2 200	0,3	1473	2	ZM45 AM45	120	19 287	
2 400	0,23	1360	2	ZM50 AM50	85	16 535	
2 700	0,33	1473	2	ZM50 AM50	120	17 670	
2 000	0,36	1601	2	ZM50 AM50	150	28 928	
2 800	0,19	1246	3	ZM55 AM55	60	11 369	
2 200	0,25	1394	3	ZM55 AM55	85	15 647	
2 400	0,36	1553	3	ZM55 AM55	110	16 361	
1 900	0,46	1723	3	ZM55 AM55	130	31 446	



Axial angular contact ball bearings

Single direction

Unsealed



7602, 7603, BSB

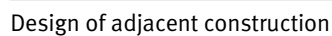
Dimension table (continued) · Dimensions in mm								
Designation ⁴⁾	Mass	Dimensions					Mounting dimensions	
	m	d	D	B	r, r ₁	a	D _a H12	d _a h12
	≈ kg				min.	≈		
7602060-TVP	0,94	60 _{-0,007}	110 _{-0,008}	22 _{-0,15}	1,5	86	96	77
BSB060120-T	1,1	60 _{-0,007}	120 _{-0,009}	22 _{-0,15}	1,5	88	100,5	79,5
7603060-TVP	2,08	60 _{-0,007}	130 _{-0,009}	31 _{-0,15}	2,1	98	107,5	82,5
7602065-TVP	1,19	65 _{-0,007}	120 _{-0,009}	23 _{-0,15}	1,5	92,5	103	84
7603065-TVP	2,58	65 _{-0,007}	140 _{-0,009}	33 _{-0,15}	2,1	107,5	118,5	91,5
7602070-TVP	1,3	70 _{-0,007}	125 _{-0,009}	24 _{-0,15}	1,5	96,5	108	87
7603070-TVP	3,16	70 _{-0,007}	150 _{-0,009}	35 _{-0,15}	2,1	113	124,5	95,5
BSB075110-T	0,47	75 _{-0,007}	110 _{-0,008}	15 _{-0,15}	1,5	87,5	99,5	85
7602075-TVP	1,42	75 _{-0,007}	130 _{-0,009}	25 _{-0,15}	1,5	102,5	114,5	93,5
7603075-TVP	3,74	75 _{-0,007}	160 _{-0,01}	37 _{-0,15}	2,1	123	135,5	105,5
7602080-TVP	1,72	80 _{-0,007}	140 _{-0,009}	26 _{-0,15}	2	109	122	100
7603080-TVP	4,5	80 _{-0,007}	170 _{-0,01}	39 _{-0,15}	2,1	129,5	143	111
7602085-TVP	2,17	85 _{-0,008}	150 _{-0,009}	28 _{-0,2}	2	117	131	107
7603085-TVP	5,24	85 _{-0,008}	180 _{-0,01}	41 _{-0,2}	3	136	151	116
7602090-TVP	2,67	90 _{-0,008}	160 _{-0,01}	30 _{-0,2}	2	124	138,5	113,5
7603090-TVP	6,18	90 _{-0,008}	190 _{-0,011}	43 _{-0,2}	3	142,5	157,5	122,5
7602095-TVP	3,25	95 _{-0,008}	170 _{-0,01}	32 _{-0,2}	2,1	131	146,5	119,5
7603095-TVP	7,22	95 _{-0,008}	200 _{-0,011}	45 _{-0,2}	3	150	165	130
BSB100150-T	1,4	100 _{-0,008}	150 _{-0,009}	22,5 _{-0,2}	2	119,5	135	114,5
7602100-TVP	3,9	100 _{-0,008}	180 _{-0,01}	34 _{-0,2}	2,1	138	154,5	125,5
7603100-TVP	8,78	100 _{-0,008}	215 _{-0,011}	47 _{-0,2}	3	161	178	140

¹⁾ Valid for matched pair of bearings in O or X arrangement.

²⁾ Valid for individual bearing with stated preload force, bearing lightly oiled.

³⁾ Only valid in conjunction with INA precision locknuts.

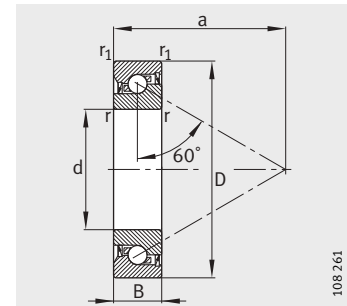
⁴⁾ Available by agreement.



Axial angular contact ball bearings

Single direction

Sealed on both sides



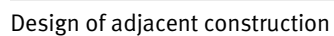
7602...-2RS, 7603...-2RS,
BSB...-2RS

Dimension table · Dimensions in mm								
Designation	Mass	Dimensions					Mounting dimensions	
	m	d	D	B	r, r ₁	a	D _a H12	d _a h12
	≈kg				min.	≈		
7602012-2RS-TVP	0,042	12_{-0,004}	32 _{-0,006}	10 _{-0,08}	0,6	24	27	17
7602015-2RS-TVP	0,052	15_{-0,004}	35 _{-0,006}	11 _{-0,08}	0,6	27,5	30	20,5
7602020-2RS-TVP	0,12	20_{-0,005}	47 _{-0,006}	14 _{-0,12}	1	36	39,5	27,5
7603020-2RS-TVP	0,17	20_{-0,005}	52 _{-0,007}	15 _{-0,12}	1,1	36,5	43,5	30,5
7602025-2RS-TVP	0,15	25_{-0,005}	52 _{-0,007}	15 _{-0,12}	1	41	45	32
BSB025062-2RS-T	0,24	25_{-0,005}	62 _{-0,007}	15 _{-0,12}	1	46,5	52	38
7603025-2RS-TVP	0,27	25_{-0,005}	62 _{-0,007}	17 _{-0,12}	1,1	47,5	52	38
BSB030062-2RS-T	0,22	30_{-0,005}	62 _{-0,007}	15 _{-0,12}	1	47,5	52,5	39,5
7602030-2RS-TVP	0,23	30_{-0,005}	62 _{-0,007}	16 _{-0,12}	1	48	52,5	39,5
BSB035072-2RS-T	0,3	35_{-0,006}	72 _{-0,007}	15 _{-0,12}	1	54	60,5	46,5
BSB040072-2RS-T	0,26	40_{-0,006}	72 _{-0,007}	15 _{-0,12}	1	56	62,5	49

1) Valid for matched pair of bearings in O or X arrangement.

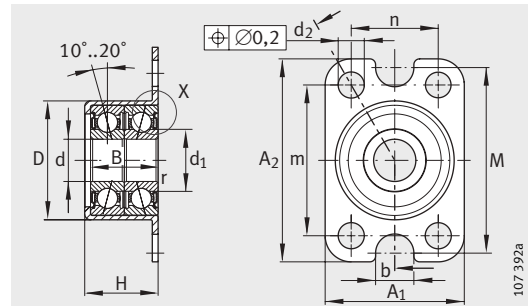
2) Valid for individual bearing with stated preload force, bearing lightly oiled.

3) Only valid in conjunction with INA precision locknuts.



Angular contact ball bearing units

For screw mounting



ZKLR0624-2Z, ZKLR0828-2Z

Dimension table · Dimensions in mm														
Designation	Mass m ≈ kg	Dimensions												
		d	A ₁	A ₂	D	B	d ₁	r	d ₂	b	m	n	M	H
					+0,03 -0,01	-0,25		min.						-0,5
ZKLR0624-2Z	23	6_{-0,008}	24	35	20,5	12	10,4	0,3	4,5	6,6	26	15	32	13
ZKLR0828-2Z	30	8_{-0,008}	28	35	23,9	14	11,8	0,3	4,5	6,6	26	20	35	15,5
ZKLR1035-2Z	50	10_{-0,008}	35	35	28,14	16	14,7	0,3	4,5	—	26	26	—	17,5
ZKLR1244-2RS	120	12_{-0,007}	44	50	35,45	20	16,6	0,3	6,6	—	38	32	—	22
ZKLR1547-2RS	140	15_{-0,007}	47	51	38,45	22	18	0,3	6,6	—	39	35	—	24
ZKLR2060-2RS	300	20_{-0,008}	60	60	50,45	28	24,4	0,3	6,6	—	47	47	—	30

1) Tightening torque for the fixing screws as recommended by the manufacturer.
Screws must be ordered separately.

2) Mass moment of inertia for rotating inner ring.

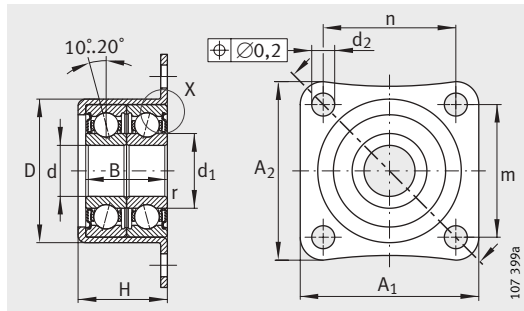
3) The locknut is only used to axially locate the bearing unit.
It has no influence on the bearing preload.

4) Stated geometrical tolerances only required in diameter area between D_{ai} and D_{aa} .

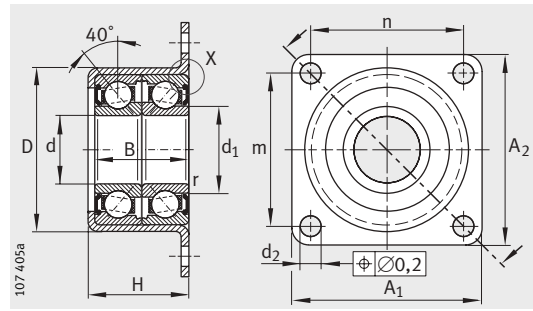
5) Only valid in conjunction with INA precision locknuts.

Diagram showing the axial abutment area of the outer ring. Dimensions include D_{ai} (inner diameter of housing), $D_{aa \text{ min.}}$ (minimum outer diameter of housing), and D_{aa} (outer diameter of housing). Reference number 107 400a is present.

Diagram showing the design of adjacent construction. Dimensions include D_{ai} (inner diameter of housing), D_{aa} (outer diameter of housing), dh_6 (hole diameter), da (outer diameter of housing), and $R_{max} = r$ (fillet radius). Tolerances are indicated as $\perp | IT 5-7 | A$. Reference number 107 390c is present.



ZKLR1035-2Z



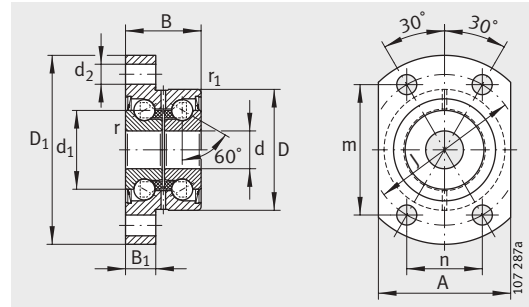
ZKLR1244-2RS, ZKLR1547-2RS, ZKLR2060-2RS

			Fixing screws DIN 912 ¹⁾		Basic load ratings				Bearing frictional torque	Rigidity axial	Mass moment of inertia ²⁾	Recommended INA locknut; to be ordered separately ³⁾		
					radial		axial					Design- nation	Tightening torque ⁵⁾	
					dyn. C _r	stat. C _{0r}	dyn. C _a	stat. C _{0a}						
			d _a	D _{ai}	D _{aa}	Size	Quan- tity	N				N	N	N
		min.			N	N	N	N	Nm	N/μm	kg · cm ²		Nm	
8	16	19	M4 M6	4 2	3 850	1 870	1 340	1 250	0,04	17	0,0014	ZM06	2	
10,4	18	22	M4 M6	4 2	4 900	2 280	1 810	1 520	0,08	20	0,0028	ZM08	4	
12,4	22	26	M4	4	7 400	3 600	2 550	2 420	0,12	26	0,0075	ZM10	6	
14	27	32	M6	4	13 600	8 500	13 200	17 900	0,16	200	0,0102	ZM12	8	
17,5	29	35	M6	4	16 700	10 700	16 400	22 400	0,2	130	0,0178	ZM15	10	
24	39	47	M6	4	28 000	19 100	27 500	40 000	0,3	250	0,263	ZM20	18	



Double row axial angular contact ball bearings with flange

For screw mounting



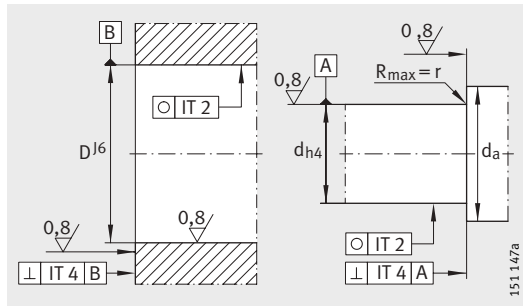
ZKLFA..-2RS, ZKLFA..-2Z

Dimension table · Dimensions in mm															
Designation	Mass	Dimensions													Mounting dimensions
	m	d	D	B	d ₁	D ₁	r	r ₁	B ₁	d ₂	m	J	n	A	
	≈ kg	-0,005	-0,01	-0,25			min.	min.							min. max.
ZKLFA0630-2Z	0,05	6	19	12	12	30	0,3	0,3	5	3,5	21	24	12	22	9 15
ZKLFA0640-2RS	0,08	6	24	15	14	40	0,3	0,6	6	4,5	27,5	32	16	27	9 18
ZKLFA0640-2Z	0,08	6	24	15	14	40	0,3	0,6	6	4,5	27,5	32	16	27	9 18
ZKLFA0850-2RS	0,17	8	32	20	19	50	0,3	0,6	8	5,5	34,5	40	20	35	11 25
ZKLFA0850-2Z	0,17	8	32	20	19	50	0,3	0,6	8	5,5	34,5	40	20	35	11 25
ZKLFA1050-2RS	0,18	10	32	20	21	50	0,3	0,6	8	5,5	34,5	40	20	35	14 27
ZKLFA1050-2Z	0,18	10	32	20	21	50	0,3	0,6	8	5,5	34,5	40	20	35	14 27
ZKLFA1263-2RS	0,3	12	42	25	25	63	0,3	0,6	10	6,8	46	53	26,5	45	16 31
ZKLFA1263-2Z	0,3	12	42	25	25	63	0,3	0,6	10	6,8	46	53	26,5	45	16 31
ZKLFA1563-2RS	0,31	15	42	25	28	63	0,3	0,6	10	6,8	46	53	26,5	45	20 34
ZKLFA1563-2Z	0,31	15	42	25	28	63	0,3	0,6	10	6,8	46	53	26,5	45	20 34

1) Tightening torque for the fixing screws as recommended by the manufacturer.
Screws must be ordered separately.

2) Mass moment of inertia for rotating inner ring.

3) Only valid in conjunction with INA precision locknuts.



Design of adjacent construction

Fixing screws ¹⁾ DIN 912-10.9		Basic load ratings axial		Limiting speed n_G grease min^{-1}	Bearing frictional torque M_{RL} Nm	Rigidity axial c_{aL} $\text{N}/\mu\text{m}$	Tilting rigidity c_{kL} Nm/mrad	Mass moment of inertia ²⁾ M_m $\text{kg} \cdot \text{cm}^2$	Axial runout μm	Recommended INA locknut; to be ordered separately		
										Designation	Tight- ening torque ³⁾ M_A Nm	Axial pre- load force N
Size	Quan- tity	dyn. C_a N	stat. C_{0a} N									
M3	4	4 900	6 100	14 000	0,01	150	4	0,0019	2	ZM06 –	2	916
M4	4	6 900	8 500	6 800	0,04	200	8	0,0044	2	ZM06 –	2	2 404
M4	4	6 900	8 500	12 000	0,02	200	8	0,0044	2	ZM06 –	2	2 404
M5	4	12 500	16 300	5 100	0,08	250	20	0,02	2	ZM08 –	4	2 216
M5	4	12 500	16 300	9 500	0,04	250	20	0,02	2	ZM08 –	4	2 216
M5	4	13 400	18 800	4 600	0,12	325	25	0,029	2	ZM10 –	6	4 891
M5	4	13 400	18 800	8 600	0,06	325	25	0,029	2	ZM10 –	6	4 891
M6	4	16 900	24 700	3 800	0,16	375	50	0,068	2	ZM12 –	8	5 038
M6	4	16 900	24 700	7 600	0,08	375	50	0,068	2	ZM12 –	8	5 038
M6	4	17 600	28 000	3 500	0,2	400	65	0,102	2	ZM15 AM15	10	5 484
M6	4	17 900	28 000	7 000	0,1	400	65	0,102	2	ZM15 AM15	10	5 484

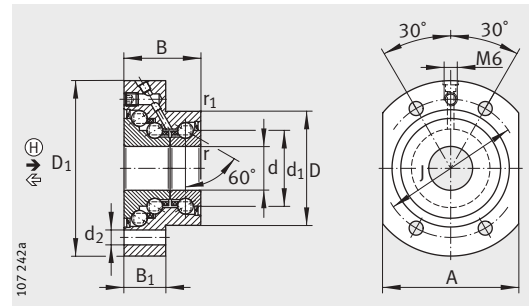


Triple row axial angular contact ball bearings with flange

For screw mounting

Caution!

The bearings require continuous load in the main load direction $\oplus$.



DKLFA...-2RS ($d \leq 20$ mm)

Dimension table · Dimensions in mm

Designation	Mass m ≈ kg	Dimensions											Mounting dimensions	
		d	D	B	d ₁	D ₁	r	r ₁	B ₁	d ₂	J	A	d _a	
		-0,010	-0,013	-0,25			min.	min.					min.	max.
DKLFA1575-2RS	0,53	15	45	32	28	75	0,3	0,6	18	6,8	58	55	20	35
DKLFA2080-2RS	0,7	20	52	35	34,5	80	0,3	0,6	19	6,8	63	62	25	43
DKLFA2590-2RS	0,9	25	57	38	40,5	90	0,3	0,6	22	8,8	75	70	32	48
DKLFA30100-2RS	1	30	62	38	45,5	100	0,3	0,6	22	8,8	80	72	40	53
DKLFA30110-2RS ³⁾	2,5	30	75	56	51	110	0,3	0,6	35	8,8	95	85	47	64
DKLFA40115-2RS	1,5	40	72	42	58	115	0,3	0,6	23	8,8	94	90	50	67
DKLFA40140-2RS ³⁾	4,2	40	90	60	65	140	0,3	0,6	35	11	118	110	56	80

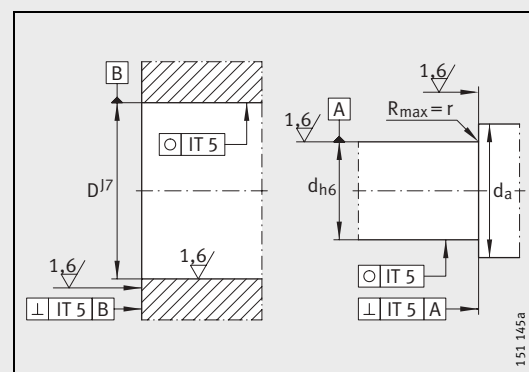
1) Tightening torque for the fixing screws as recommended by the manufacturer.
Screws must be ordered separately.

2) Mass moment of inertia for rotating inner ring.

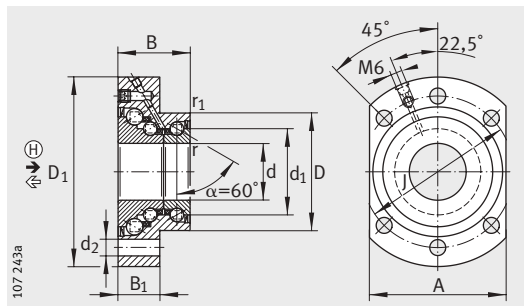
3) Heavy series.

INA locknuts (accessories)

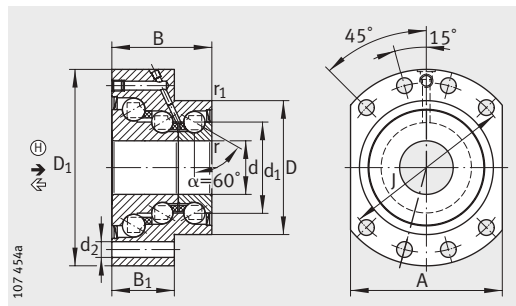
Triple row angular contact ball bearing Designation	Recommended INA locknut; to be ordered separately Designation		
	①	②	
DKLFA1575-2RS	AM15	ZMA15/33	ZM17
DKLFA2080-2RS	AM20	ZMA20/38	ZM25
DKLFA2590-2RS	AM25	ZMA25/45	AM30
DKLFA30100-2RS	AM30	ZMA30/52	ZM35
DKLFA30110-2RS	AM30/65	—	ZM35
DKLFA40115-2RS	AM40	ZMA40/62	ZM45
DKLFA40140-2RS	AM40/85	—	ZM45



Design of adjacent construction

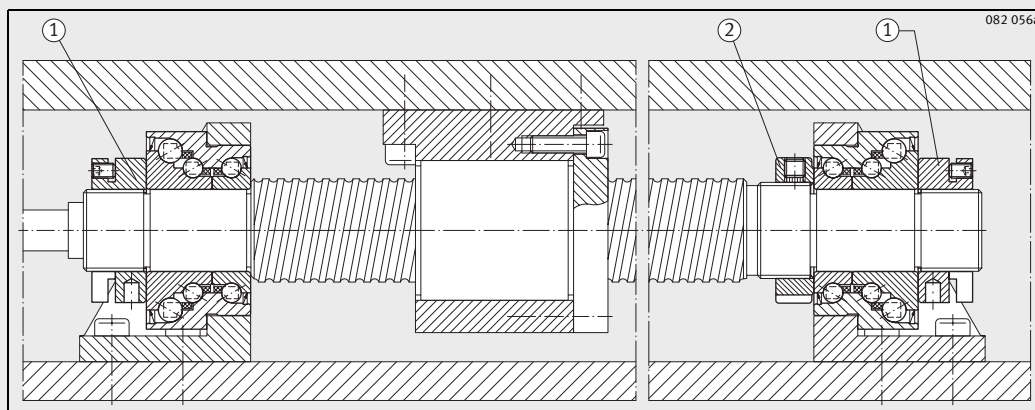


DKLFA...-2RS ($d \geq 25 \text{ mm}$)



DKLFA...-2RS
Heavy series

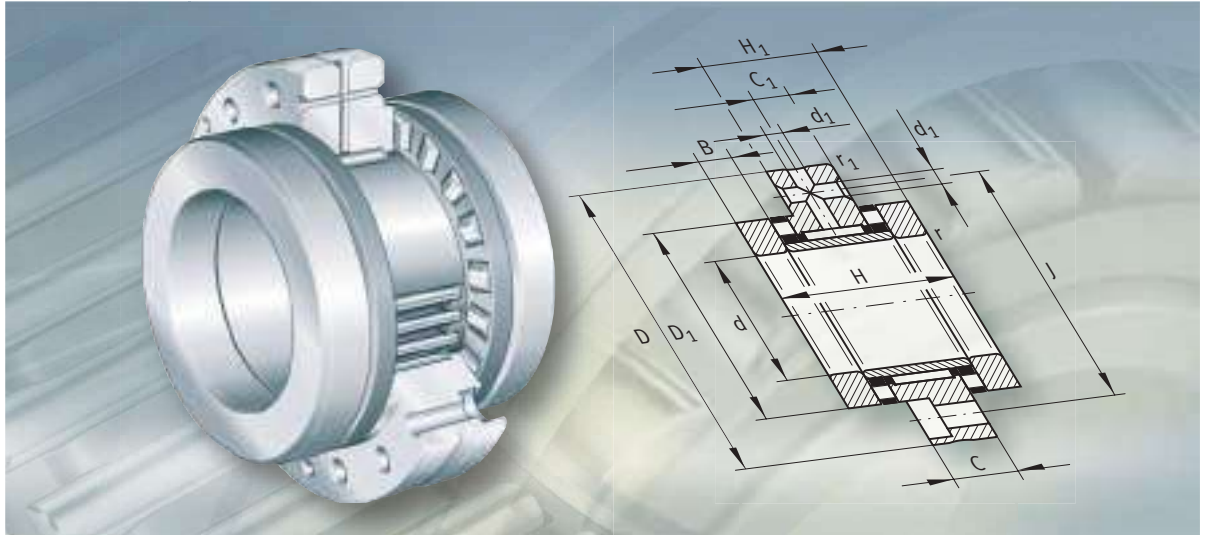
Fixing screws ¹⁾ DIN 912-10.9		Basic load ratings				Limiting speed <							



Ball screw drive spindle with locating bearing arrangement on both sides
For meaning of circled numbers, see accessories table, page 948



FAG

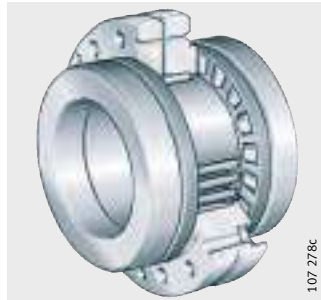


**Needle roller/
axial cylindrical roller bearings**

Product overview **Needle roller/ axial cylindrical roller bearings**

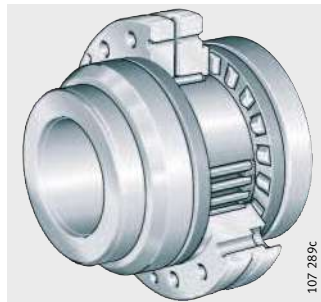
For screw mounting

ZARF



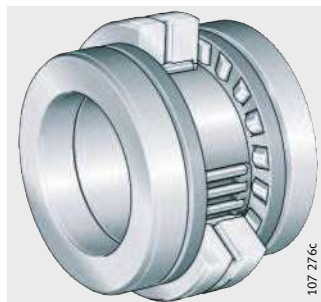
**With extended
shaft locating washer**

ZARF..-L



Not for screw mounting

ZARN



**With extended
shaft locating washer**

ZARN..-L



Needle roller/ axial cylindrical roller bearings

Features

Needle roller/axial cylindrical roller bearings comprise an outer ring with radial and axial raceways, two shaft locating washers, an inner ring, a radial needle roller and cage assembly and two axial cylindrical roller and cage assemblies. The bearings are available in versions for screw mounting and not for screw mounting.

Radial and axial load carrying capacity

In addition to radial forces, the bearings can also support axial forces from both directions and tilting moments.

Preload/internal clearance

The outer ring, inner ring and axial cages are matched to each other such that the bearing is axially clearance-free after preloading by means of an INA precision locknut. The radial internal clearance is C2 according to DIN 620.

Needle roller/axial cylindrical roller bearings, for screw mounting

Needle roller/axial cylindrical roller bearings ZARF(L) have holes in the outer ring. These are used for screw mounting directly on the adjacent construction or in a radial locating bore, *Figure 1*.

Due to screw mounting of the outer ring, the cover that would otherwise be required and the matching work can therefore be dispensed with.

The bearings are preloaded against the shaft shoulder by means of a precision locknut AM or ZM(A).

With seal carrier assembly

In the interests of a simpler design, a seal carrier assembly DRS, *Figure 1*, ①, is recommended. The seal carrier assembly is centred on the outer ring and seals the bearing against outside influences.



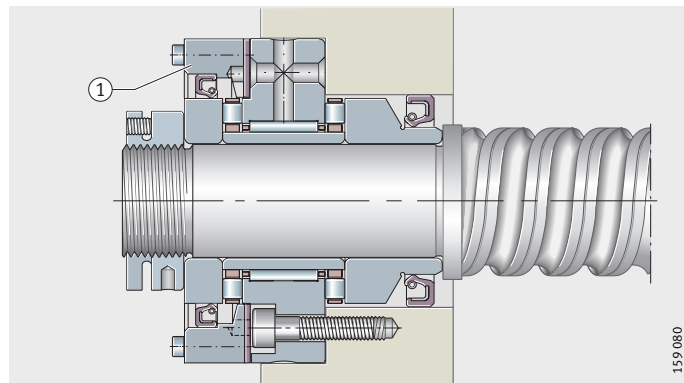
① Seal carrier assembly DRS

ZARF..-L

Figure 1

With DRS

Outer ring screw mounted in bore,
preloaded using locknut.
Stepped shaft locating washer
with sealing ring



With extended shaft locating washer

ZARF..-L has an extended and stepped shaft locating washer, *Figure 1*. These series are used in preference where the shaft locating washers are not adequately supported axially by the shaft shoulder or the bearing unit cannot be sealed on the outside surface of the normal shaft locating washer due to space conditions in the adjacent construction.

Heavy series

ZARF(L) is also available in a heavy series.

The heavy series has a larger cross-section for the same shaft diameter and therefore higher basic load ratings.

Needle roller/ axial cylindrical roller bearings

Needle roller/axial cylindrical roller bearings, not for screw mounting

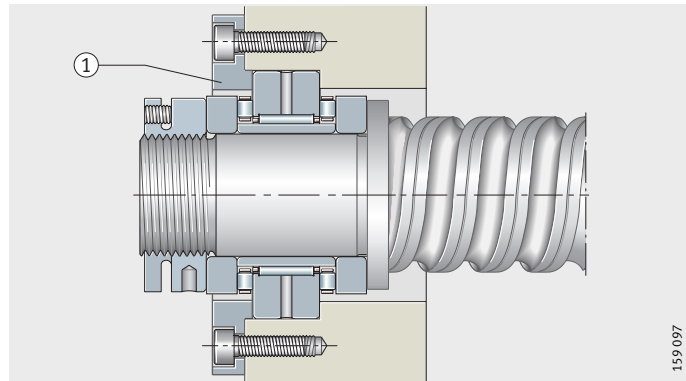
Series ZARN(L) is mounted in a housing bore and the outer ring is located using a cover, *Figure 2*.

The bearings are preloaded against the shaft shoulder by means of a precision locknut AM or ZM(A).

① Cover
ZARN

Figure 2

Outer ring located using cover,
preloaded using locknut



With extended shaft locating washer

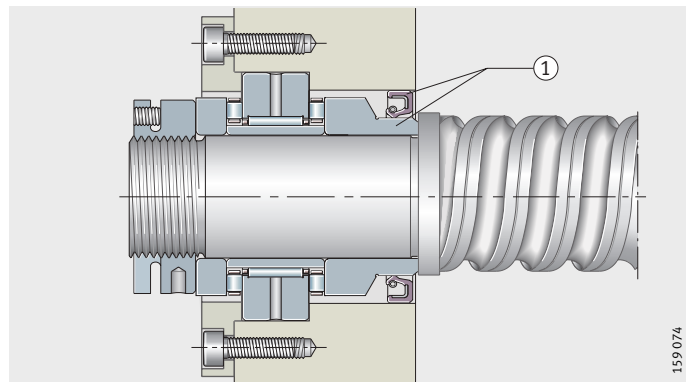
ZARN..-L has an extended and stepped shaft locating washer, *Figure 3*.

This series is used in preference where the shaft locating washer is not adequately supported axially by the shaft shoulder or the bearing unit cannot be sealed on the outside surface of the normal shaft locating washer due to space conditions in the adjacent construction.

① Extended,
stepped shaft locating washer with seal
ZARN..-L

Figure 3

Outer ring located using cover,
preloaded using locknut.
Stepped shaft locating washer
with sealing ring



Heavy series

ZARN(L) is also available in a heavy series.

The heavy series has a larger cross-section for the same shaft diameter and therefore higher basic load ratings.

Operating temperature

The bearings are suitable for operating temperatures from -30 °C to $+120\text{ °C}$.

Suffixes

Suffixes for the available designs: see table.

Available designs

Suffix	Description
L	Extended, stepped shaft locating washer
TV	Cages made from glass fibre reinforced polyamide 66

Design and safety guidelines

Basic rating life

The decisive factors in determining the bearing size are the basic rating life, the static load safety factor and the axial limiting load. The basic rating life L and L_h are calculated as follows:

$$L = \left(\frac{C}{P} \right)^p$$

$$L_h = \frac{16666}{n} \cdot \left(\frac{C}{P} \right)^p$$

L 10^6 revolutions
Basic rating life in millions of revolutions
 L_h h
Basic rating life in operating hours
 C_r, C_a N
Basic dynamic radial or axial load rating according to dimension table
 P N
Equivalent dynamic bearing load
 p –
Life exponent $p = 10/3$
 n min⁻¹
Operating speed.

Resultant and equivalent bearing load

The resultant axial bearing load $F_{a \text{ res}}$ is determined from the axial operating load F_{aB} and taking account of the axial preload, *Figure 4* to *Figure 6*, page 956.

Under purely axial load, $P = F_{a \text{ res}}$. If additional radial operating loads are present, these must be calculated separately using the radial basic load ratings.

The limit values up to which the axial load can be supported clearance-free are shown, *Figure 4* to *Figure 6*.

Caution! A load in excess of the limit value will lead to the rolling element row without load lifting off the raceway. As a result, higher wear will occur under rapid acceleration. For extreme moment loads and statically overdefined systems (locating/locating bearing arrangements), please contact us. The calculation program BEARINX® can give a precise design in this case.

Load varying in steps

If the load values vary in steps, the equivalent load P and speed n are calculated using the following formulae (q = time duration %):

$$P = \sqrt[p]{\frac{q_1 \cdot n_1 \cdot P_1^p + \dots + q_z \cdot n_z \cdot P_z^p}{q_1 \cdot n_1 + \dots + q_z \cdot n_z}}$$

$$n = \frac{q_1 \cdot n_1 + \dots + q_z \cdot n_z}{100}$$

Static load safety factor

The static load safety factor S_0 is calculated using the following formula (see also page 911):

$$S_0 = \frac{C_0}{P_0}$$

Caution! In machine tools, S_0 should be ≥ 4 .

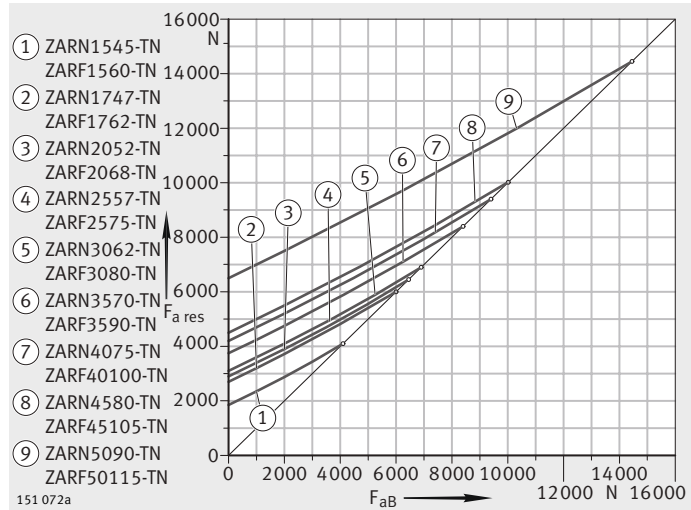


Needle roller/ axial cylindrical roller bearings

Resultant bearing load – diagrams

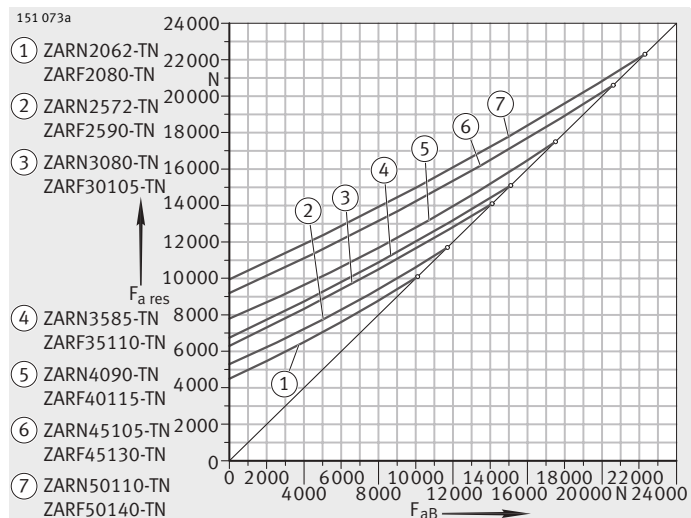
F_{aB} = operating load
 $F_{a\text{ res}}$ = resultant bearing load
 ° = limit value

Figure 4
 Resultant bearing load
 ZARN, ZARF, heavy series



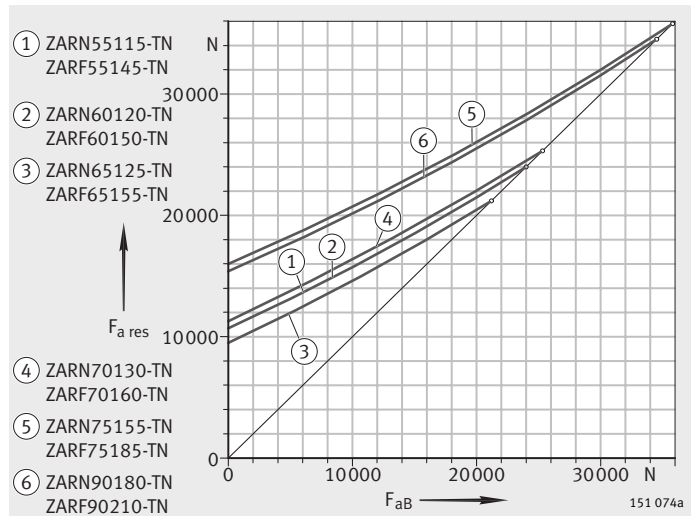
F_{aB} = operating load
 $F_{a\text{ res}}$ = resultant bearing load
 ° = limit value

Figure 5
 Resultant bearing load
 ZARN, ZARF,
 heavy series up to $d = 50$ mm



F_{aB} = operating load
 $F_{a\text{ res}}$ = resultant bearing load
 ° = limit value

Figure 6
 Resultant bearing load
 ZARN, ZARF,
 heavy series from $d = 55$ mm



Design of adjacent construction

The adjacent construction (the shaft and housing) must be designed in accordance with the data in the dimension tables.

The abutment diameters for the shaft and housing shoulders d_a and D_a must be in accordance with the dimension tables.

Caution!

The permissible contact pressure for the adjacent construction must be observed.

Examples of possible lubricant feeds: see *Figure 7* and *Figure 8*, page 958.

Sealing of the bearing position

The bearings are sealed, *Figure 1*, page 953:

- in the direction of the spindle by a rotary shaft seal on the outside surface machined free from spiral marks of the extended shaft locating washer (ZARN...L, ZARF...L)
- in the direction of the drive by the seal carrier assembly DRS.

Speeds

The limiting speeds n_G given in the dimension tables are based on the following conditions:

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

Caution!

The limiting speeds n_G are valid for oil lubrication with adequate cooling.

Friction

In most applications, preloading of bearings by means of the locknut tightening torque gives sufficiently accurate setting values.

The reference here is the tightening torque M_A according to the dimension tables in conjunction with an INA precision locknut.

The frictional torque M_{RL} given in the dimension tables is a guide value. It is based on lightly oiled bearings, measured at a speed of $n = 5 \text{ min}^{-1}$.

For dimensioning of the drive, the starting frictional torque and the frictional torque at high speeds of 2 to $3 \times M_{RL}$ must be taken into consideration.



Frictional torque and bearing preload

For applications in which the frictional torque is decisive (e.g. temperature development, frictional torque compensation between different bearing positions, etc.), it is recommended that the bearing preload should be set in accordance with the bearing frictional torque M_{RL} .

Frictional energy

The frictional energy N_R of the bearings can be calculated as follows:

$$N_R = \frac{M_{RL} \cdot n}{9,55}$$

N_R	W
Frictional energy	
M_{RL}	Nm
Bearing frictional torque	
n	min^{-1}
Operating speed.	

In any analysis of the thermal balance, the various operating speeds n_i must be taken into consideration with their time durations q_i .

Needle roller/ axial cylindrical roller bearings

Lubrication

Needle roller/axial cylindrical roller bearings can be relubricated via the outer ring. They are supplied with oil-based or dry preservative and should preferably be lubricated with oil.

Good results have been obtained with oils CLP to DIN 51 517 and HLP to DIN 51 524 of classes ISO VG 32 to ISO VG 100.

Relubrication for grease lubrication

Relubrication should be carried out with the bearing rotating and still warm from operation in order to achieve good replacement and distribution of grease.

The relubrication interval and quantity can only be determined under operating conditions since it is not possible to calculate all the influences in advance. Relubrication: see Fitting and Maintenance Manual TPI 100.

Caution!

Where a vertical axis of rotation is used in conjunction with automatic lubrication systems, the lubrication impulse should be selected such that the supply to the upper axial bearing is sufficient.

Lubricant feed

Examples of lubricant feeds for ZARF(L) are shown in *Figure 7*, *Figure 8*.

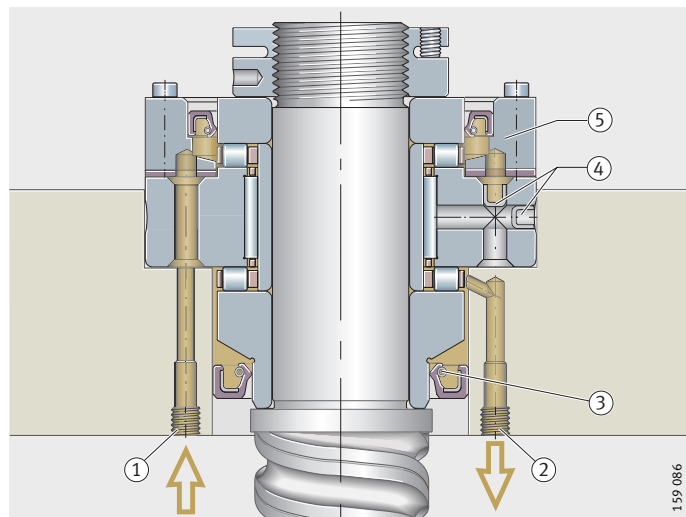
Caution!

Before initial operation, it must be ensured that all raceways are adequately supplied with lubricant.

- ① Oil inlet
- ② Oil outlet
- ③ Rotary shaft seal
- ④ Cover
- ⑤ Seal carrier assembly

ZARF..-L

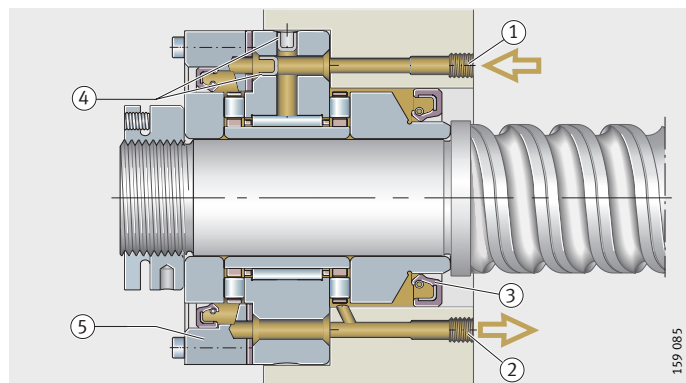
Figure 7
Lubricant feed for
vertical mounting position



- ① Oil inlet
- ② Oil outlet
- ③ Rotary shaft seal
- ④ Cover
- ⑤ Seal carrier assembly

ZARF..-L

Figure 8
Lubricant feed for
horizontal mounting position



Mounting guidelines

Caution!

Bearings should only be fitted and dismantled in accordance with Fitting and Maintenance Manual TPI 100. This TPI is available upon request.

During fitting of bearings, mounting forces should be applied only to the bearing ring to be fitted. Mounting forces must never be directed through the rolling elements.

The characteristics of the bearings are only valid when used in combination with INA precision locknuts and the associated tightening torques given in the dimension tables.

ZARN and ZARF are not self-retaining. The individual bearing components are matched to each other. The individual parts of different bearings must not be interchanged during fitting.

Setting the axial preload

Caution!

The preload in the axial component of ZARF (L) bearings is decisive for the function. It must therefore be set with sufficient accuracy.

Since direct force measurement of these values in fitting is not cost-effective, the axial preload is set indirectly using the following methods:

- either by means of the tightening torque M_A of the precision locknut. The frictional torque may deviate from the value given in the dimension table
- or by means of the bearing frictional torque M_{RL} .

Preloading by locknut

Needle roller/axial cylindrical roller bearings must be axially preloaded during fitting by means of a precision locknut.

When preloading the bearing unit by means of the bearing inner rings using the recommended precision locknut, the tightening torques given in the dimension tables must be observed or the preload must be set using the bearing frictional torque given in the dimension tables. The tightening torques given for the individual bearing sizes are only valid for the INA precision locknuts listed.

In order to counteract settling, it is recommended that the locknut should initially be tightened to twice the tightening torque M_A and then relieved of load again. It should only then be tightened again to the stated tightening torque M_A . Finally, the precision locknut should be secured against rotation by the torque-controlled tightening of the set screws.

Fixing screws

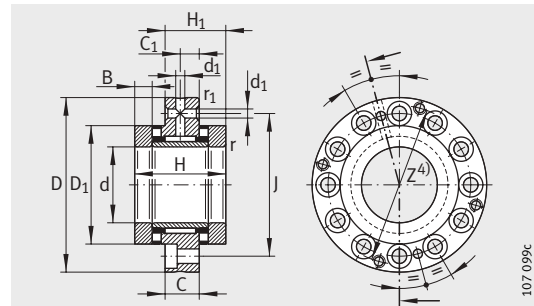
The fixing screws for the outer ring must be tightened in a crosswise sequence. They may be loaded up to 70% of their elastic limit. If the bearing outer ring is supported by an additional housing cover, it must be ensured that the fixing screws are sufficiently well dimensioned.



Needle roller/ axial cylindrical roller bearings

Light series

For screw mounting



ZARF

Dimension table · Dimensions in mm																			
Designation	Mass	Dimensions																	
	m	d	D	H	H ₁	H ₂	H ₃	C	C ₁	D ₁	D ₂	D ₃	B	B ₁	B ₂	r	r ₁	d ₁	J
	≈kg															min.	min.		
ZARF1560-TV	0,42	15	60	40	26	–	–	14	8	35	–	–	7,5	–	–	0,3	0,6	3,2	46
ZARF1560-L-TV	0,45	15	60	–	–	53	39	14	8	35	24	34	7,5	20,5	11	0,3	0,6	3,2	46
ZARF1762-TV	0,49	17	62	43	27,5	–	–	14	8	38	–	–	9	–	–	0,3	0,6	3,2	48
ZARF1762-L-TV	0,52	17	62	–	–	57	41,5	14	8	38	28	38	9	23	11	0,3	0,6	3,2	48
ZARF2068-TV	0,56	20	68	46	29	–	–	14	8	42	–	–	10	–	–	0,3	0,6	3,2	53
ZARF2068-L-TV	0,61	20	68	–	–	60	43	14	8	42	30	40	10	24	11	0,3	0,6	3,2	53
ZARF2575-TV	0,78	25	75	50	33	–	–	18	10	47	–	–	10	–	–	0,3	0,6	3,2	58
ZARF2575-L-TV	0,84	25	75	–	–	65	48	18	10	47	36	45	10	25	11	0,3	0,6	3,2	58
ZARF3080-TV	0,85	30	80	50	33	–	–	18	10	52	–	–	10	–	–	0,3	0,6	3,2	63
ZARF3080-L-TV	0,9	30	80	–	–	65	48	18	10	52	40	50	10	25	11	0,3	0,6	3,2	63

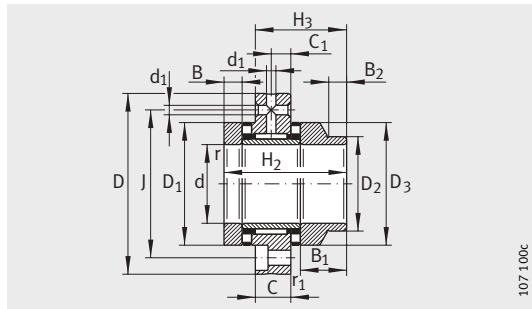
¹⁾ If rotary shaft seals are used, the outside diameter of the sealing ring must be taken into consideration.

²⁾ Tightening torque of fixing screws according to manufacturer's data.
Screws are not included in the delivery.

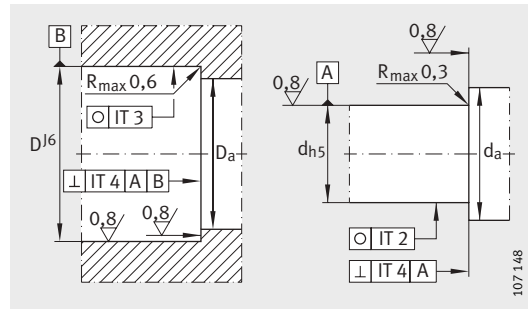
³⁾ Mass moment of inertia for rotating inner ring.

⁴⁾ Mounting dimension for seal carrier assembly DRS.
Seal carrier assemblies: see page 979 and page 983.

⁵⁾ Only valid in conjunction with INA precision locknuts.



ZARF..-L



Design of adjacent construction

Mounting dimensions ¹⁾		Basic load ratings				Limiting speeds		Bearing frictional torque	Rigidity axial	Tilting rigidity	Mass moment of inertia ³⁾	Axial runout
		axial		radial								
		D _a	d _a	dyn. C _a	stat. C _{0a}	dyn. C _r	stat. C _{0r}					
max.	min.	N	N	N	N	min ⁻¹	min ⁻¹	Nm	N/μm	Nm/mrad	kg · cm ²	μm
36	28	24 900	53 000	13 000	17 500	8 500	2 200	0,35	1 400	110	0,24	1
36	22	24 900	53 000	13 000	17 500	8 500	2 200	0,35	1 400	110	0,274	1
39	28	26 000	57 000	14 000	19 900	7 800	2 100	0,4	1 600	160	0,373	1
39	26	26 000	57 000	14 000	19 900	7 800	2 100	0,4	1 600	160	0,464	1
43	33	33 500	76 000	14 900	22 400	7 000	2 000	0,5	1 800	230	0,615	1
43	28	33 500	76 000	14 900	22 400	7 000	2 000	0,5	1 800	230	0,683	1
48	39	35 500	86 000	22 600	36 000	6 000	1 900	0,55	1 900	350	0,989	1
48	34	35 500	86 000	22 600	36 000	6 000	1 900	0,55	1 900	350	1,15	1
53	44	39 000	101 000	24 300	41 500	5 500	1 800	0,65	2 200	520	1,46	1
53	38	39 000	101 000	24 300	41 500	5 500	1 800	0,65	2 200	520	1,7	1

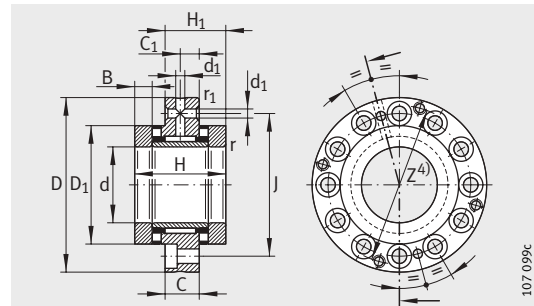


Designation	Recommended INA locknut; to be ordered separately			Rotary shaft seal to DIN 3 760; to be ordered separately	Fixing screws ²⁾ DIN 912-10.9		
	Designation	Tightening torque ⁵⁾ M _A Nm	Axial preload force N		Size	Quan- tity	
ZARF1560-TV	ZMA15/33	AM15	10	6 506	–	M6	6
ZARF1560-L-TV	ZMA15/33	AM15	10	6 506	24X35X7	M6	6
ZARF1762-TV	ZM17	AM17	12	7 078	–	M6	6
ZARF1762-L-TV	ZM17	AM17	12	7 078	28X40X7	M6	6
ZARF2068-TV	ZMA20/38	AM20	18	9 376	–	M6	8
ZARF2068-L-TV	ZMA20/38	AM20	18	9 376	30X42X7	M6	8
ZARF2575-TV	ZMA25/45	AM25	25	10 470	–	M6	8
ZARF2575-L-TV	ZMA25/45	AM25	25	10 470	36X47X7	M6	8
ZARF3080-TV	ZMA30/52	AM30	32	11 091	–	M6	12
ZARF3080-L-TV	ZMA30/52	AM30	32	11 091	40X52X7	M6	12

Needle roller/ axial cylindrical roller bearings

Light series

For screw mounting



ZARF

Dimension table (continued) · Dimensions in mm

Designation	Mass m ≈kg	Dimensions																	
		d	D	H	H ₁	H ₂	H ₃	C	C ₁	D ₁	D ₂	D ₃	B	B ₁	B ₂	r	r ₁	d ₁	J
																min.	min.		
ZARF3590-TV	1,12	35	90	54	35	—	—	18	10	60	—	—	11	—	—	0,3	0,6	3,2	73
ZARF3590-L-TV	1,25	35	90	—	—	70	51	18	10	60	45	58	11	27	12	0,3	0,6	3,2	73
ZARF40100-TV	1,35	40	100	54	35	—	—	18	10	65	—	—	11	—	—	0,3	0,6	3,2	80
ZARF40100-L-TV	1,45	40	100	—	—	70	51	18	10	65	50	63	11	27	12	0,3	0,6	3,2	80
ZARF45105-TV	1,7	45	105	60	40	—	—	22,5	12,5	70	—	—	11,5	—	—	0,3	0,6	6	85
ZARF45105-L-TV	1,85	45	105	—	—	75	55	22,5	12,5	70	56	68	11,5	26,5	12	0,3	0,6	6	85
ZARF50115-TV	2,1	50	115	60	40	—	—	22,5	12,5	78	—	—	11,5	—	—	0,3	0,6	6	94
ZARF50115-L-TV	2,45	50	115	—	—	78	58	22,5	12,5	78	60	78	11,5	29,5	12	0,3	0,6	6	94

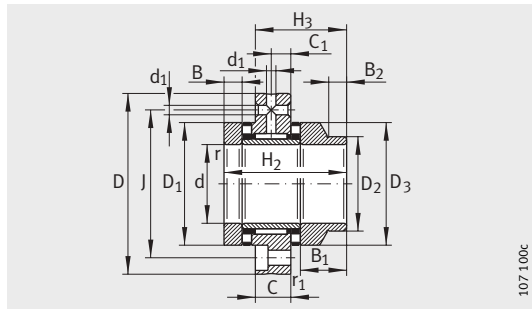
¹⁾ If rotary shaft seals are used, the outside diameter of the sealing ring must be taken into consideration.

²⁾ Tightening torque of fixing screws according to manufacturer's data.
Screws are not included in the delivery.

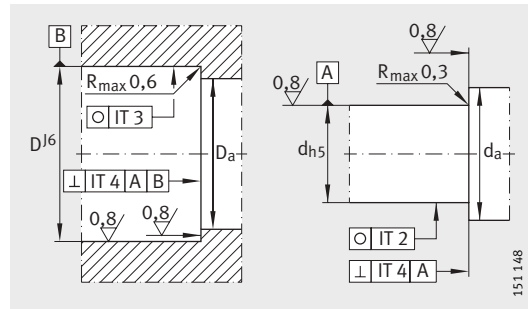
³⁾ Mass moment of inertia for rotating inner ring.

⁴⁾ Mounting dimension for seal carrier assembly DRS.
Seal carrier assemblies: see page 979 and page 983.

⁵⁾ Only valid in conjunction with INA precision locknuts.



ZARF..-L



Design of adjacent construction

Mounting dimensions ¹⁾		Basic load ratings				Limiting speeds		Bearing frictional torque	Rigidity axial	Tilting rigidity	Mass moment of inertia ³⁾	Axial runout
		axial		radial								
D _a	d _a	dyn. C _a	stat. C _{0a}	dyn. C _r	stat. C _{0r}	n _G oil	n _G grease					
max.	min.	N	N	N	N	min ⁻¹	min ⁻¹	Nm	N/μm	Nm/mrad	kg · cm ²	μm
61	50	56 000	148 000	26 000	47 000	4 800	1 700	0,9	2 600	740	2,8	1
61	43	56 000	148 000	26 000	47 000	4 800	1 700	0,9	2 600	740	3,21	1
66	55	59 000	163 000	27 500	53 000	4 400	1 600	1	2 800	1 030	3,78	1
66	48	59 000	163 000	27 500	53 000	4 400	1 600	1	2 800	1 030	4,35	1
71	60	61 000	177 000	38 000	74 000	4 000	1 500	1,2	3 000	1 340	5,33	1
71	54	61 000	177 000	38 000	74 000	4 000	1 500	1,2	3 000	1 340	6,03	1
79	67	90 000	300 000	40 000	82 000	3 600	1 200	2,2	4 800	2 470	8,42	1
79	58	90 000	300 000	40 000	82 000	3 600	1 200	2,2	4 800	2 470	10,46	1

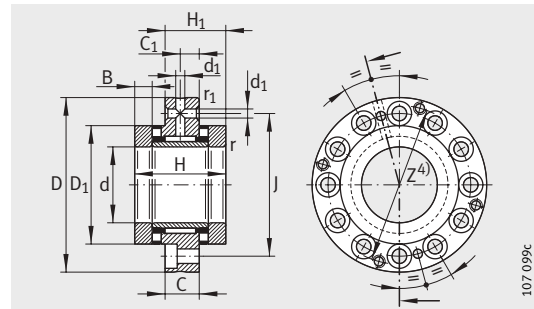


Designation	Recommended INA locknut; to be ordered separately				Rotary shaft seal to DIN 3 760; to be ordered separately	Fixing screws ²⁾ DIN 912-10.9	
	Designation		Tightening torque ⁵⁾ M _A Nm	Axial preload force N		Size	Quan- tity
ZARF3590-TV	ZMA35/58	AM35/58	42	12 486	—	M6	12
ZARF3590-L-TV	ZMA35/58	AM35/58	42	12 486	45X60X8	M6	12
ZARF40100-TV	ZMA40/62	AM40	55	14 240	—	M8	8
ZARF40100-L-TV	ZMA40/62	AM40	55	14 240	50X65X8	M8	8
ZARF45105-TV	ZMA45/68	AM45	65	15 765	—	M8	8
ZARF45105-L-TV	ZMA45/68	AM45	65	15 765	56X70X8	M8	8
ZARF50115-TV	ZMA50/75	AM50	85	18 410	—	M8	12
ZARF50115-L-TV	ZMA50/75	AM50	85	18 410	60X80X8	M8	12

Needle roller/ axial cylindrical roller bearings

Heavy series

For screw mounting



ZARF

Dimension table · Dimensions in mm

Designation	Mass m ≈kg	Dimensions															
		d	D	H	H ₁	H ₂	H ₃	C	C ₁	D ₁	D ₂	D ₃	B	B ₁	B ₂	r	r ₁
																min.	min.
ZARF2080-TV	1,1	20	80	60	38	—	—	18	10	52	—	—	12,5	—	—	0,3	0,6
ZARF2080-L-TV	1,22	20	80	—	—	75	53	18	10	52	40	50	12,5	27,5	11	0,3	0,6
ZARF2590-TV	1,6	25	90	60	38	—	—	18	10	62	—	—	12,5	—	—	0,3	0,6
ZARF2590-L-TV	1,75	25	90	—	—	75	53	18	10	62	48	60	12,5	27,5	11	0,3	0,6
ZARF30105-TV	1,95	30	105	66	41	—	—	18	10	68	—	—	14	—	—	0,3	0,6
ZARF30105-L-TV	2,15	30	105	—	—	82	57	18	10	68	52	66	14	30	12	0,3	0,6
ZARF35110-TV	1,6	35	110	66	41	—	—	18	10	73	—	—	14	—	—	0,3	0,6
ZARF35110-L-TV	1,85	35	110	—	—	82	57	18	10	73	60	73	14	30	12	0,3	0,6
ZARF40115-TV	2,7	40	115	75	47,5	—	—	22,5	12,5	78	—	—	16	—	—	0,3	0,6
ZARF40115-L-TV	3	40	115	—	—	93	65,5	22,5	12,5	78	60	78	16	34	12	0,3	0,6
ZARF45130-TV	3,9	45	130	82	51	—	—	22,5	12,5	90	—	—	17,5	—	—	0,3	0,6
ZARF45130-L-TV	4,3	45	130	—	—	103	72	22,5	12,5	90	70	88	17,5	38,5	14	0,3	0,6

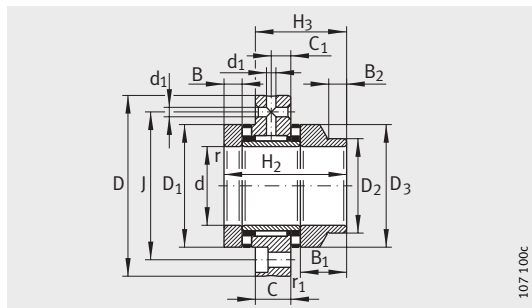
¹⁾ If rotary shaft seals are used, the outside diameter of the sealing ring must be taken into consideration.

²⁾ Tightening torque of fixing screws according to manufacturer's data.
Screws are not included in the delivery.

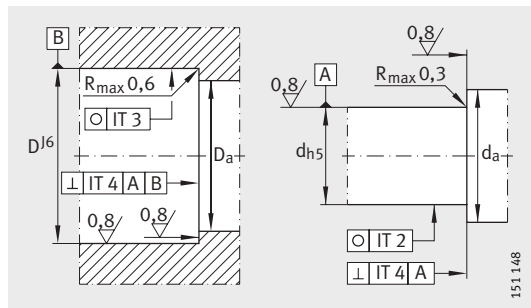
³⁾ Mass moment of inertia for rotating inner ring.

⁴⁾ Mounting dimension for seal carrier assembly DRS.
Seal carrier assemblies: see page 979 and page 983.

⁵⁾ Only valid in conjunction with INA precision locknuts.



ZARF..-L



Design of adjacent construction

		Mounting dimensions ¹⁾		Basic load ratings				Limiting speeds		Bearing frictional torque	Rigidity axial	Tilting rigidity	Mass moment of inertia ³⁾	Axial runout
d ₁	J	Da	d _a	dyn. C _a	stat. C _{0a}	dyn. C _r	stat. C _{0r}	n _G oil	n _G grease	M _{RL}	c _{aL}	c _{kL}	M _m	
		max.	min.	N	N	N	N	min ⁻¹	min ⁻¹	Nm	N/μm	Nm/mrad	kg · cm ²	μm
3,2	63	53	38	64 000	141 000	22 600	36 000	6 000	1 500	1,3	2 300	400	1,98	1
3,2	63	53	38	64 000	141 000	22 600	36 000	6 000	1 500	1,3	2 300	400	2,27	1
3,2	73	63	45	80 000	199 000	24 300	41 500	4 900	1 400	1,6	3 000	800	3,88	1
3,2	73	63	45	80 000	199 000	24 300	41 500	4 900	1 400	1,6	3 000	800	4,51	1
3,2	85	69	52	107 000	265 000	26 000	47 000	4 400	1 300	2,1	3 300	1 100	6,53	1
3,2	85	69	50	107 000	265 000	26 000	47 000	4 400	1 300	2,1	3 300	1 100	7,43	1
3,2	88	74	60	105 000	265 000	27 500	53 000	4 000	1 250	2,3	2 500	1 300	8,47	1
3,2	88	74	58	105 000	265 000	27 500	53 000	4 000	1 250	2,3	3 500	1 300	10,4	1
6	94	79	65	117 000	315 000	38 000	74 000	3 700	1 200	2,5	3 800	1 800	13,3	1
6	94	79	58	117 000	315 000	38 000	74 000	3 700	1 200	2,5	3 800	1 800	15,5	1
6	105	91	70	154 000	405 000	40 000	82 000	3 300	1 150	3,5	4 000	2 100	23,7	1
6	105	91	68	154 000	405 000	40 000	82 000	3 300	1 150	3,5	4 000	2 100	28,1	1

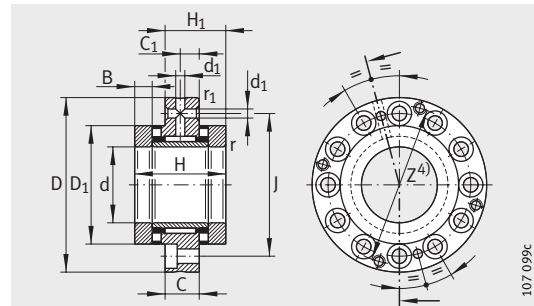


Designation	Recommended INA locknut; to be ordered separately			Rotary shaft seal to DIN 3 760; to be ordered separately	Fixing screws ²⁾ DIN 912-10.9	
	Designation	Tightening torque ⁵⁾ M _A Nm	Axial preload force N		Size	Quantity
ZARF2080-TV	ZMA20/52 AM20	38	18 448	–	M6	12
ZARF2080-L-TV	ZMA20/52 AM20	38	18 448	40X52X7	M6	12
ZARF2590-TV	ZMA25/58 AM25	55	20 790	–	M6	12
ZARF2590-L-TV	ZMA25/58 AM25	55	20 790	48X62X8	M6	12
ZARF30105-TV	ZMA30/65 AM30	75	24 287	–	M8	12
ZARF30105-L-TV	ZMA30/65 AM30	75	24 287	52X68X8	M8	12
ZARF35110-TV	ZMA35/70 AM35	100	27 480	–	M8	12
ZARF35110-L-TV	ZMA35/70 AM35	100	27 480	60X75X8	M8	12
ZARF40115-TV	ZMA40/75 AM40	120	29 834	–	M8	12
ZARF40115-L-TV	ZMA40/75 AM40	120	29 834	60X80X8	M8	12
ZARF45130-TV	ZMA45/85 AM45	150	33 549	–	M8	12
ZARF45130-L-TV	ZMA45/85 AM45	150	33 549	70X90X10	M8	12

Needle roller/ axial cylindrical roller bearings

Heavy series

For screw mounting



ZARF

Dimension table (continued) · Dimensions in mm

Designation	Mass	Dimensions																	
	m ≈kg	d	D	H	H ₁	H ₂	H ₃	C	C ₁	D ₁	D ₂	D ₃	B	B ₁	B ₂	r	r ₁	d ₁	J
																	min.	min.	
ZARF50140-TV	4,2	50	140	82	51	—	—	22,5	12,5	95	—	—	17,5	—	—	0,3	0,6	6	113
ZARF50140-L-TV	4,65	50	140	—	—	103	72	22,5	12,5	95	75	93	17,5	38,5	14	0,3	0,6	6	113
ZARF55145-TV	4,5	55	145	82	51	—	—	22,5	12,5	100	—	—	17,5	—	—	0,3	0,6	6	118
ZARF55145-L-TV	5	55	145	—	—	103	72	22,5	12,5	100	80	98	17,5	38,5	14	0,3	0,6	6	118
ZARF60150-TV	4,7	60	150	82	51	—	—	22,5	12,5	105	—	—	17,5	—	—	0,3	0,6	6	123
ZARF60150-L-TV	5,35	60	150	—	—	103	72	22,5	12,5	105	90	105	17,5	38,5	16	0,3	0,6	6	123
ZARF65155-TV	5,1	65	155	82	51	—	—	22,5	12,5	110	—	—	17,5	—	—	0,3	0,6	6	128
ZARF65155-L-TV	5,7	65	155	—	—	103	72	22,5	12,5	110	90	108	17,5	38,5	16	0,3	0,6	6	128
ZARF70160-TV	5,2	70	160	82	51	—	—	22,5	12,5	115	—	—	17,5	—	—	0,3	0,6	6	133
ZARF70160-L-TV	5,95	70	160	—	—	103	72	22,5	12,5	115	100	115	17,5	38,5	16	0,3	0,6	6	133
ZARF75185-TV	9,4	75	185	100	62	—	—	27	15	135	—	—	21	—	—	0,3	1	6	155
ZARF75185-L-TV	10,6	75	185	—	—	125	87	27	15	135	115	135	21	46	16	0,3	1	6	155
ZARF90210-TV	13,7	90	210	110	69,5	—	—	32	17,5	160	—	—	22,5	—	—	0,3	1	8	180
ZARF90210-L-TV	15,1	90	210	—	—	135	94,5	32	17,5	160	130	158	22,5	47,5	16	0,3	1	8	180

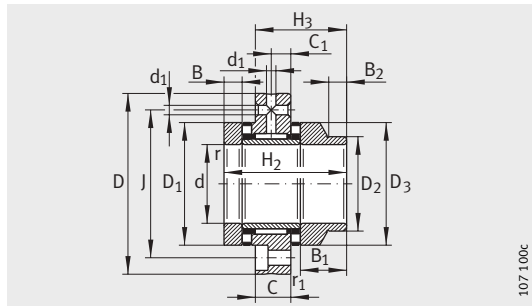
¹⁾ If rotary shaft seals are used, the outside diameter of the sealing ring must be taken into consideration.

²⁾ Tightening torque of fixing screws according to manufacturer's data.
Screws are not included in the delivery.

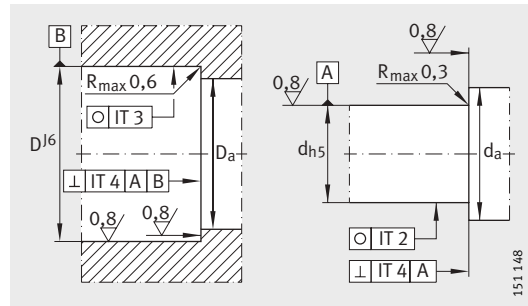
³⁾ Mass moment of inertia for rotating inner ring.

⁴⁾ Mounting dimension for seal carrier assembly DRS.
Seal carrier assemblies: see page 979 and page 983.

⁵⁾ Only valid in conjunction with INA precision locknuts.



ZARF..L



Design of adjacent construction

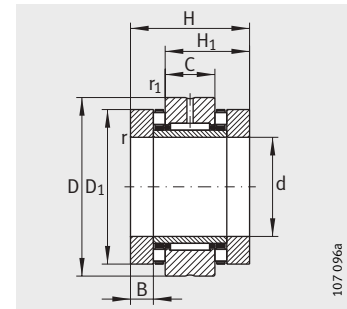
Mounting dimensions ¹⁾		Basic load ratings				Limiting speeds		Bearing frictional torque	Rigidity axial	Tilting rigidity	Mass moment of inertia ³⁾	Axial runout	
		axial		radial									
Da	d _a	dyn. C _a	stat. C _{0a}	dyn. C _r	stat. C _{0r}	n _G oil	n _G grease	M _{RL}	c _{aL}	c _{kL}	M _m		
max.	min.	N	N	N	N	min ⁻¹	min ⁻¹	Nm	N/μm	Nm/mrad	kg · cm ²	μm	
96	75	172 000	480 000	42 000	90 000	3 100	1 100	3,8	4 600	2 900	29,8	1	
96	73	172 000	480 000	42 000	90 000	3 100	1 100	3,8	4 600	2 900	35,3	1	
101	85	177 000	500 000	44 000	98 000	2 900	1 000	4	4 900	3 600	36,1	1	
101	78	177 000	500 000	44 000	98 000	2 900	1 000	4	4 900	3 600	43	1	
106	90	187 000	550 000	44 500	92 000	2 700	950	4,2	5 300	4 300	43,8	1	
106	88	187 000	550 000	44 500	92 000	2 700	950	4,2	5 300	4 300	54,5	1	
111	97	172 000	500 000	54 000	104 000	2 600	900	4	4 800	4 000	51	1	
111	88	172 000	500 000	54 000	104 000	2 600	900	4	4 800	4 000	60,1	1	
116	100	201 000	630 000	56 000	119 000	2 400	800	4,8	5 800	6 000	62,2	1	
116	98	201 000	630 000	56 000	119 000	2 400	800	4,8	5 800	6 000	77,3	1	
136	113	290 000	890 000	72 000	132 000	2 100	700	8	6 600	8 500	149	2	
136	110	290 000	890 000	72 000	132 000	2 100	700	8	6 600	8 500	188	2	
161	130	325 000	1 030 000	98 000	210 000	1 800	700	10,5	7 700	14 500	312	2	
161	125	325 000	1 030 000	98 000	210 000	1 800	700	10,5	7 700	14 500	372	2	



Designation	Recommended INA locknut; to be ordered separately				Rotary shaft seal to DIN 3 760; to be ordered separately	Fixing screws ²⁾ DIN 912-10.9	
	Designation		Tightening torque ⁵⁾ M _A Nm	Axial preload force N		Size	Quantity
ZARF50140-TV	ZMA50/92	AM50	180	37 109	–	M10	12
ZARF50140-L-TV	ZMA50/92	AM50	180	37 109	75X95X10	M10	12
ZARF55145-TV	ZMA55/98	AM55	220	40 772	–	M10	12
ZARF55145-L-TV	ZMA55/98	AM55	220	40 772	80X100X10	M10	12
ZARF60150-TV	ZMA60/98	AM60	250	42 190	–	M10	12
ZARF60150-L-TV	ZMA60/98	AM60	250	42 190	90X110X12	M10	12
ZARF65155-TV	ZMA65/105	AM65	270	41 778	–	M10	12
ZARF65155-L-TV	ZMA65/105	AM65	270	41 778	90X110X12	M10	12
ZARF70160-TV	ZMA70/110	AM70	330	47 692	–	M10	12
ZARF70160-L-TV	ZMA70/110	AM70	330	47 692	100X120X12	M10	12
ZARF75185-TV	ZMA75/125	AM75	580	76 339	–	M12	12
ZARF75185-L-TV	ZMA75/125	AM75	580	76 339	115X140X12	M12	12
ZARF90210-TV	ZMA90/155	AM90	960	102 468	–	M12	16
ZARF90210-L-TV	ZMA90/155	AM90	960	102 468	130X160X12	M12	16

Needle roller/axial cylindrical roller bearings

Light series



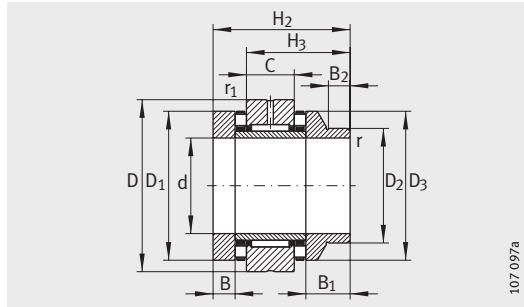
ZARN

Dimension table · Dimensions in mm																
Designation	Mass m ≈kg	Dimensions														
		d	D	H	H ₁	H ₂	H ₃	C	D ₁	D ₂	D ₃	B	B ₁	B ₂	r	r ₁
															min.	min.
ZARN1545-TV	0,34	15	45	40	28	–	–	16	35	–	–	7,5	–	–	0,3	0,6
ZARN1545-L-TV	0,37	15	45	–	–	53	41	16	35	24	34	7,5	20,5	11	0,3	0,6
ZARN1747-TV	0,37	17	47	43	29,5	–	–	16	38	–	–	9	–	–	0,3	0,6
ZARN1747-L-TV	0,41	17	47	–	–	57	43,5	16	38	28	38	9	23	11	0,3	0,6
ZARN2052-TV	0,41	20	52	46	31	–	–	16	42	–	–	10	–	–	0,3	0,6
ZARN2052-L-TV	0,46	20	52	–	–	60	45	16	42	30	40	10	24	11	0,3	0,6
ZARN2557-TV	0,53	25	57	50	35	–	–	20	47	–	–	10	–	–	0,3	0,6
ZARN2557-L-TV	0,59	25	57	–	–	65	50	20	47	36	45	10	25	11	0,3	0,6
ZARN3062-TV	0,6	30	62	50	35	–	–	20	52	–	–	10	–	–	0,3	0,6
ZARN3062-L-TV	0,75	30	62	–	–	65	50	20	52	40	50	10	25	11	0,3	0,6

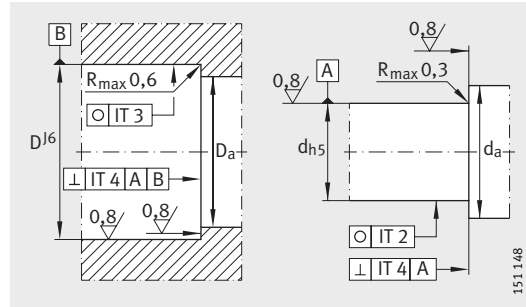
¹⁾ If rotary shaft seals are used, the outside diameter of the sealing ring must be taken into consideration.

²⁾ Mass moment of inertia for rotating inner ring.

³⁾ Only valid in conjunction with INA precision locknuts.



ZARN...-L



Design of adjacent construction

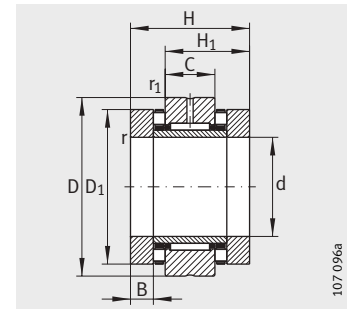
Mounting dimensions ¹⁾		Basic load ratings				Limiting speeds		Bearing frictional torque	Rigidity axial	Tilting rigidity	Mass moment of inertia ²⁾	Axial runout
		axial		radial								
D _a	d _a	dyn. C _a	stat. C _{0a}	dyn. C _r	stat. C _{0r}	n _G oil	n _G grease	M _{RL}	C _{aL}	C _{kL}	M _m	
max.	min.	N	N	N	N	min ⁻¹	min ⁻¹	Nm	N/μm	Nm/mrad	kg · cm ²	μm
36	28	24 900	53 000	13 000	17 500	8 500	2 200	0,35	1 400	110	0,24	1
36	22	24 900	53 000	13 000	17 500	8 500	2 200	0,35	1 400	110	0,274	1
39	28	26 000	57 000	14 000	19 900	7 800	2 100	0,4	1 600	160	0,373	1
39	26	26 000	57 000	14 000	19 900	7 800	2 100	0,4	1 600	160	0,464	1
43	33	33 500	76 000	14 900	22 400	7 000	2 000	0,5	1 800	230	0,615	1
43	28	33 500	76 000	14 900	22 400	7 000	2 000	0,5	1 800	230	0,683	1
48	39	35 500	86 000	22 600	36 000	6 000	1 900	0,55	1 900	350	0,989	1
48	34	35 500	86 000	22 900	36 000	6 000	1 900	0,55	1 900	350	1,15	1
53	44	39 000	101 000	24 300	41 500	5 500	1 800	0,65	2 200	520	1,46	1
53	38	39 000	101 000	24 300	41 500	5 500	1 800	0,65	2 200	520	1,7	1



Designation	Recommended INA locknut; to be ordered separately			Rotary shaft seal to DIN 3 760; to be ordered separately
	Designation	Tightening torque ³⁾	Axial preload force	
		M _A Nm	N	
ZARN1545-TV	ZMA15/33 AM15	10	6 506	—
ZARN1545-L-TV	ZMA15/33 AM15	10	6 506	24X35X7
ZARN1747-TV	ZM17 AM17	12	7 078	—
ZARN1747-L-TV	ZM17 AM17	12	7 078	28X40X7
ZARN2052-TV	ZMA20/38 AM20	18	9 376	—
ZARN2052-L-TV	ZMA20/38 AM20	18	9 376	30X42X7
ZARN2557-TV	ZMA25/45 AM25	25	10 470	—
ZARN2557-L-TV	ZMA25/45 AM25	25	10 470	36X47X7
ZARN3062-TV	ZMA30/52 AM30	32	11 091	—
ZARN3062-L-TV	ZMA30/52 AM30	32	11 091	40X52X7

Needle roller/axial cylindrical roller bearings

Light series



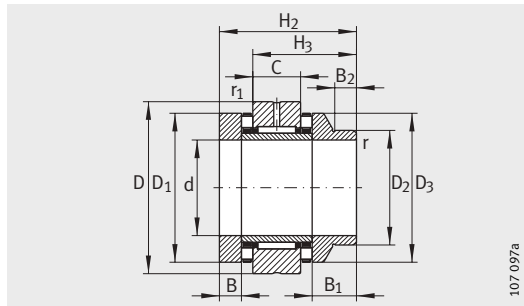
ZARN

Dimension table (continued) - Dimensions in mm																
Designation	Mass	Dimensions														
	m	d	D	H	H ₁	H ₂	H ₃	C	D ₁	D ₂	D ₃	B	B ₁	B ₂	r	r ₁
	≈kg														min.	min.
ZARN3570-TV	0,8	35	70	54	37	–	–	20	60	–	–	11	–	–	0,3	0,6
ZARN3570-L-TV	0,93	35	70	–	–	70	53	20	60	45	58	11	27	12	0,3	0,6
ZARN4075-TV	0,9	40	75	54	37	–	–	20	65	–	–	11	–	–	0,3	0,6
ZARN4075-L-TV	1	40	75	–	–	70	53	20	65	50	63	11	27	12	0,3	0,6
ZARN4580-TV	1,12	45	80	60	42,5	–	–	25	70	–	–	11,5	–	–	0,3	0,6
ZARN4580-L-TV	1,27	45	80	–	–	75	57,5	25	70	56	68	11,5	26,5	12	0,3	0,6
ZARN5090-TV	1,43	50	90	60	42,5	–	–	25	78	–	–	11,5	–	–	0,3	0,6
ZARN5090-L-TV	1,78	50	90	–	–	78	60,5	25	78	60	78	11,5	29,5	12	0,3	0,6

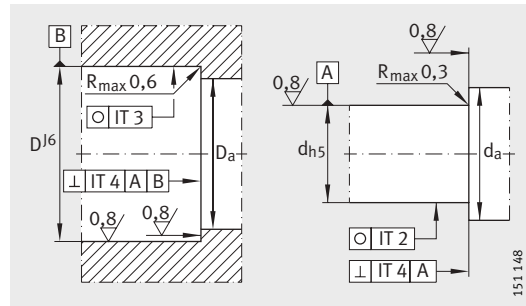
¹⁾ If rotary shaft seals are used, the outside diameter of the sealing ring must be taken into consideration.

²⁾ Mass moment of inertia for rotating inner ring.

³⁾ Only valid in conjunction with INA precision locknuts.



ZARN...-L



Design of adjacent construction

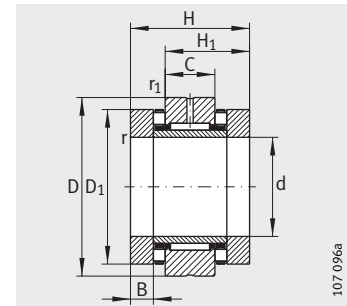
Mounting dimensions ¹⁾		Basic load ratings				Limiting speeds		Bearing frictional torque	Rigidity axial	Tilting rigidity	Mass moment of inertia ²⁾	Axial runout
		axial		radial								
D _a	d _a	dyn. C _a	stat. C _{0a}	dyn. C _r	stat. C _{0r}	n _G oil	n _G grease					
max.	min.	N	N	N	N	min ⁻¹	min ⁻¹	Nm	N/μm	Nm/mrad	kg · cm ²	μm
61	50	56 000	148 000	26 000	47 000	4 800	1 700	0,9	2 600	740	2,8	1
61	43	56 000	148 000	26 000	47 000	4 800	1 700	0,9	2 600	740	3,21	1
66	55	59 000	163 000	27 500	53 000	4 400	1 600	1	2 800	1 030	3,78	1
66	48	59 000	163 000	27 500	53 000	4 400	1 600	1	2 800	1 030	4,35	1
71	60	61 000	177 000	38 000	74 000	4 000	1 500	1,2	3 000	1 340	5,33	1
71	54	61 000	177 000	38 000	74 000	4 000	1 500	1,2	3 000	1 340	6,03	1
79	67	90 000	300 000	40 000	82 000	3 600	1 200	2,2	4 800	2 470	8,42	1
79	58	90 000	300 000	40 000	82 000	3 600	1 200	2,2	4 800	2 470	10,46	1



Designation	Recommended INA locknut; to be ordered separately			Rotary shaft seal to DIN 3 760; to be ordered separately
	Designation	Tightening torque ³⁾	Axial preload force	
		M _A Nm	N	
ZARN3570-TV	ZMA35/58 AM35/58	42	12 486	—
ZARN3570-L-TV	ZMA35/58 AM35/58	42	12 486	45X60X8
ZARN4075-TV	ZMA40/62 AM40	55	14 240	—
ZARN4075-L-TV	ZMA40/62 AM40	55	14 240	50X65X8
ZARN4580-TV	ZMA45/68 AM45	65	15 765	—
ZARN4580-L-TV	ZMA45/68 AM45	65	15 765	56X70X8
ZARN5090-TV	ZMA50/75 AM50	85	18 410	—
ZARN5090-L-TV	ZMA50/75 AM50	85	18 410	60X80X8

Needle roller/axial cylindrical roller bearings

Heavy series



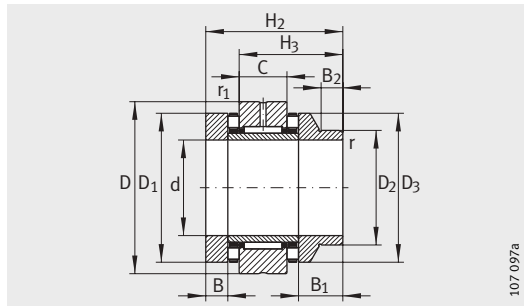
ZARN

Dimension table · Dimensions in mm																
Designation	Mass	Dimensions														
	m	d	D	H	H ₁	H ₂	H ₃	C	D ₁	D ₂	D ₃	B	B ₁	B ₂	r	r ₁
	≈ kg														min.	min.
ZARN2062-TV	0,87	20	62	60	40	–	–	20	52	–	–	12,5	–	–	0,3	0,6
ZARN2062-L-TV	0,99	20	62	–	–	75	55	20	52	40	50	12,5	27,5	11	0,3	0,6
ZARN2572-TV	1,17	25	72	60	40	–	–	20	62	–	–	12,5	–	–	0,3	0,6
ZARN2572-L-TV	1,32	25	72	–	–	75	55	20	62	48	60	12,5	27,5	11	0,3	0,6
ZARN3080-TV	1,5	30	80	66	43	–	–	20	68	–	–	14	–	–	0,3	0,6
ZARN3080-L-TV	1,7	30	80	–	–	82	59	20	68	52	66	14	30	12	0,3	0,6
ZARN3585-TV	1,65	35	85	66	43	–	–	20	73	–	–	14	–	–	0,3	0,6
ZARN3585-L-TV	1,8	35	85	–	–	82	59	20	73	60	73	14	30	12	0,3	0,6
ZARN4090-TV	2,09	40	90	75	50	–	–	25	78	–	–	16	–	–	0,3	0,6
ZARN4090-L-TV	2,39	40	90	–	–	93	68	25	78	60	78	16	34	12	0,3	0,6
ZARN45105-TV	3,02	45	105	82	53,5	–	–	25	90	–	–	17,5	–	–	0,3	0,6
ZARN45105-L-TV	3,42	45	105	–	–	103	74,5	25	90	70	88	17,5	38,5	14	0,3	0,6
ZARN50110-TV	3,3	50	110	82	53,5	–	–	25	95	–	–	17,5	–	–	0,3	0,6
ZARN50110-L-TV	3,75	50	110	–	–	103	74,5	25	95	75	93	17,5	38,5	14	0,3	0,6

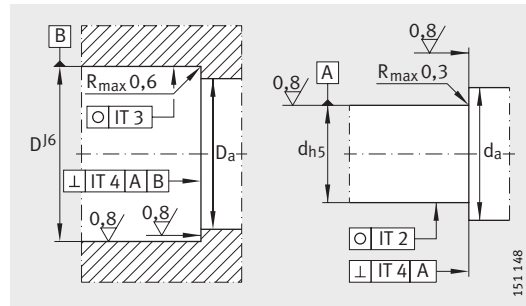
¹⁾ If rotary shaft seals are used, the outside diameter of the sealing ring must be taken into consideration.

²⁾ Mass moment of inertia for rotating inner ring.

³⁾ Only valid in conjunction with INA precision locknuts.



ZARN...-L



Design of adjacent construction

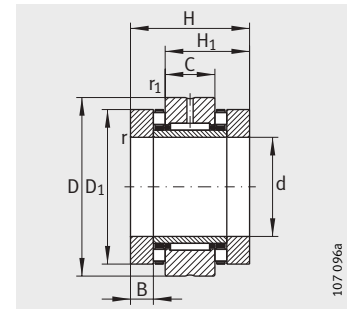
Mounting dimensions ¹⁾		Basic load ratings				Limiting speeds		Bearing frictional torque	Rigidity axial	Tilting rigidity	Mass moment of inertia ²⁾	Axial runout
		axial		radial								
D _a	d _a	dyn. C _a	stat. C _{0a}	dyn. C _r	stat. C _{0r}	n _G oil	n _G grease	M _{RL}	c _{aL}	c _{kL}	M _m	
max.	min.	N	N	N	N	min ⁻¹	min ⁻¹	Nm	N/μm	Nm/mrad	kg · cm ²	μm
53	38	64 000	141 000	22 600	36 000	6 000	1 500	1,3	2 300	400	1,98	1
53	38	64 000	141 000	26 600	36 000	6 000	1 500	1,3	2 300	400	2,27	1
63	45	80 000	199 000	24 300	41 500	4 900	1 400	1,6	3 000	800	3,88	1
63	45	80 000	199 000	24 300	41 500	4 900	1 400	1,6	3 000	800	4,51	1
69	52	107 000	265 000	26 000	47 000	4 400	1 300	2,1	3 300	1 100	6,53	1
69	50	107 000	265 000	26 000	47 000	4 400	1 300	2,1	3 300	1 100	7,43	1
74	60	105 000	265 000	27 500	53 000	4 000	1 250	2,3	3 500	1 300	8,47	1
74	58	105 000	265 000	27 500	53 000	4 000	1 250	2,3	3 500	1 300	10,4	1
79	65	117 000	315 000	38 000	74 000	3 700	1 200	2,5	3 800	1 800	13,3	1
79	58	117 000	315 000	38 000	74 000	3 700	1 200	2,5	3 800	1 800	15,5	1
91	70	154 000	405 000	40 000	82 000	3 300	1 150	3,5	4 000	2 100	23,7	1
91	68	154 000	405 000	40 000	82 000	3 300	1 150	3,5	4 000	2 100	28,1	1
96	75	172 000	480 000	42 000	90 000	3 100	1 100	3,8	4 600	2 900	29,8	1
96	73	172 000	480 000	42 000	90 000	3 100	1 100	3,8	4 600	2 900	35,3	1



Designation	Recommended INA locknut; to be ordered separately			Rotary shaft seal to DIN 3 760; to be ordered separately
	Designation	Tightening torque ³⁾	Axial preload force	
		MA Nm	N	
ZARN2062-TV	ZMA20/52 AM20	38	18 448	—
ZARN2062-L-TV	ZMA20/52 AM20	38	18 448	40X52X7
ZARN2572-TV	ZMA25/58 AM25	55	20 790	—
ZARN2572-L-TV	ZMA25/58 AM25	55	20 790	48X62X8
ZARN3080-TV	ZMA30/65 AM30	75	24 287	—
ZARN3080-L-TV	ZMA30/65 AM30	75	24 287	52X68X8
ZARN3585-TV	ZMA35/70 AM35	100	27 480	—
ZARN3585-L-TV	ZMA35/70 AM35	100	27 480	60X75X8
ZARN4090-TV	ZMA40/75 AM40	120	29 834	—
ZARN4090-L-TV	ZMA40/75 AM40	120	29 834	60X80X8
ZARN45105-TV	ZMA45/85 AM45	150	33 549	—
ZARN45105-L-TV	ZMA45/85 AM45	150	33 549	70X90X10
ZARN50110-TV	ZMA50/92 AM50	180	37 109	—
ZARN50110-L-TV	ZMA50/92 AM50	180	37 109	75X95X10

Needle roller/axial cylindrical roller bearings

Heavy series



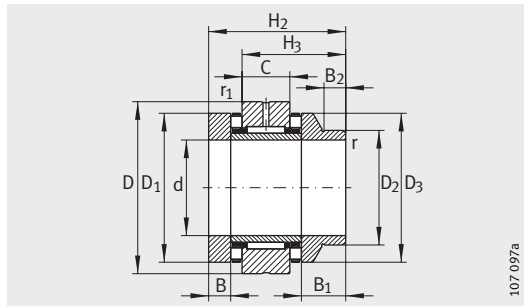
ZARN

Dimension table (continued) · Dimensions in mm																
Designation	Mass	Dimensions														
	m	d	D	H	H ₁	H ₂	H ₃	C	D ₁	D ₂	D ₃	B	B ₁	B ₂	r	r ₁
	≈kg														min.	min.
ZARN55115-TV	3,5	55	115	82	53,5	–	–	25	100	–	–	17,5	–	–	0,3	0,6
ZARN55115-L-TV	4	55	115	–	–	103	74,5	25	100	80	98	17,5	38,5	14	0,3	0,6
ZARN60120-TV	3,7	60	120	82	53,5	–	–	25	105	–	–	17,5	–	–	0,3	0,6
ZARN60120-L-TV	4,85	60	120	–	–	103	74,5	25	105	90	105	17,5	38,5	16	0,3	0,6
ZARN65125-TV	4	65	125	82	53,5	–	–	25	110	–	–	17,5	–	–	0,3	0,6
ZARN65125-L-TV	4,6	65	125	–	–	103	74,5	25	110	90	108	17,5	38,5	16	0,3	0,6
ZARN70130-TV	4,1	70	130	82	53,5	–	–	25	115	–	–	17,5	–	–	0,3	0,6
ZARN70130-L-TV	4,85	70	130	–	–	103	74,5	25	115	100	115	17,5	38,5	16	0,3	0,6
ZARN75155-TV	7,9	75	155	100	65	–	–	30	135	–	–	21	–	–	0,3	1
ZARN75155-L-TV	9,1	75	155	–	–	125	90	30	135	115	135	21	46	16	0,3	1
ZARN90180-TV	11,8	90	180	110	72,5	–	–	35	160	–	–	22,5	–	–	0,3	1
ZARN90180-L-TV	13,2	90	180	–	–	135	97,5	35	160	130	158	22,5	47,5	16	0,3	1

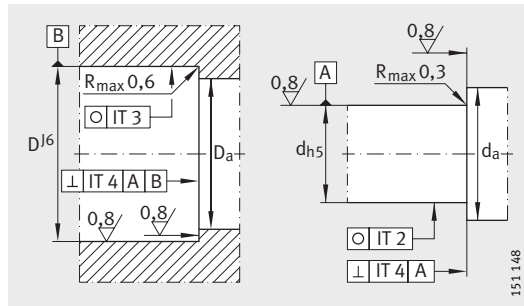
1) If rotary shaft seals are used, the outside diameter of the sealing ring must be taken into consideration.

2) Mass moment of inertia for rotating inner ring.

3) Only valid in conjunction with INA precision locknuts.



ZARN...-L

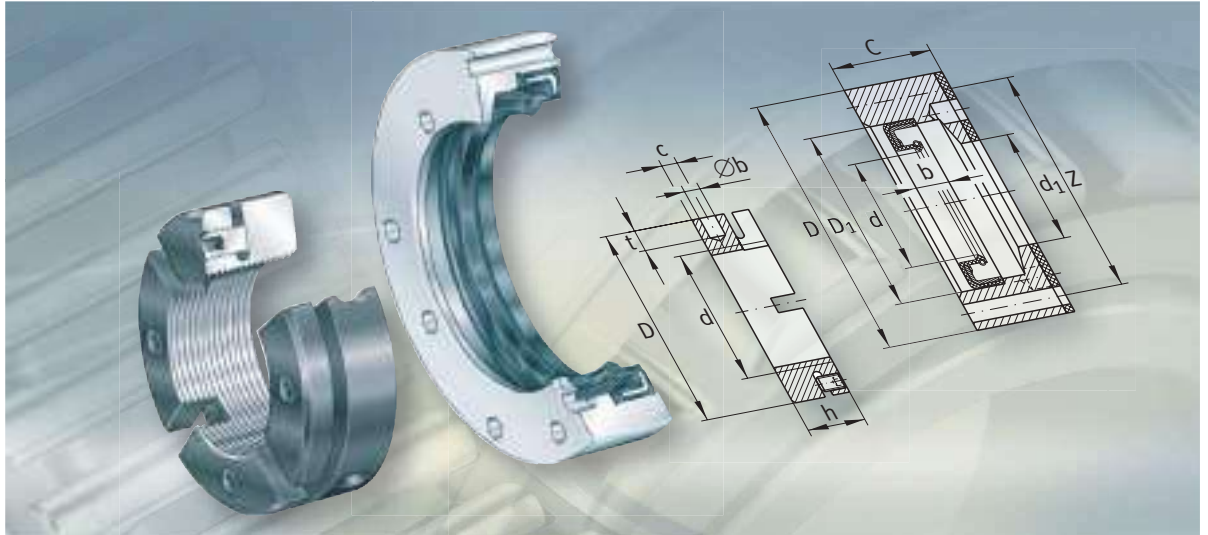


Design of adjacent construction

Mounting dimensions ¹⁾		Basic load ratings				Limiting speeds		Bearing frictional torque	Rigidity axial	Tilting rigidity	Mass moment of inertia ²⁾	Axial runout
		axial		radial								
D _a	d _a	dyn. C _a	stat. C _{0a}	dyn. C _r	stat. C _{0r}	n _G oil	n _G grease	M _{RL}	c _{aL}	c _{kL}	M _m	
max.	min.	N	N	N	N	min ⁻¹	min ⁻¹	Nm	N/μm	Nm/mrad	kg · cm ²	μm
101	85	177 000	500 000	44 000	98 000	2 900	1 000	4	4 900	3 600	36,1	1
101	78	177 000	500 000	44 000	98 000	2 900	1 000	4	4 900	3 600	43	1
106	90	187 000	550 000	44 500	92 000	2 700	950	4,2	5 300	4 300	43,8	1
106	88	187 000	550 000	44 500	92 000	2 700	950	4,2	5 300	4 300	54,5	1
111	97	172 000	500 000	54 000	104 000	2 600	900	4	4 800	4 000	51	1
111	88	172 000	500 000	54 000	104 000	2 600	900	4	4 800	4 000	60,1	1
116	100	201 000	630 000	56 000	119 000	2 400	800	4,8	5 800	6 000	62,2	1
116	98	201 000	630 000	56 000	119 000	2 400	800	4,8	5 800	6 000	77,3	1
136	113	290 000	890 000	72 000	132 000	2 100	700	8	6 600	8 500	149	2
136	110	290 000	890 000	72 000	132 000	2 100	700	8	6 600	8 500	188	2
161	130	325 000	1 030 000	98 000	210 000	1 800	700	10,5	7 700	14 500	312	2
161	125	325 000	1 030 000	98 000	210 000	1 800	700	10,5	7 700	14 500	372	2



Designation	Recommended INA locknut; to be ordered separately			Rotary shaft seal to DIN 3 760; to be ordered separately
	Designation	Tightening torque ³⁾	Axial preload force	
		M _A Nm	N	
ZARN55115-TV	ZMA55/98 AM55	220	40 772	—
ZARN55115-L-TV	ZMA55/98 AM55	220	40 772	80X100X10
ZARN60120-TV	ZMA60/98 AM60	250	42 190	—
ZARN60120-L-TV	ZMA60/98 AM60	250	42 190	90X110X12
ZARN65125-TV	ZMA65/105 AM65	270	41 778	—
ZARN65125-L-TV	ZMA65/105 AM65	270	41 778	90X110X12
ZARN70130-TV	ZMA70/110 AM70	330	47 692	—
ZARN70130-L-TV	ZMA70/110 AM70	330	47 692	100X120X12
ZARN75155-TV	ZMA75/125 AM75	580	76 339	—
ZARN75155-L-TV	ZMA75/125 AM75	580	76 339	115X140X12
ZARN90180-TV	ZMA90/155 AM90	960	102 246	—
ZARN90180-L-TV	ZMA90/155 AM90	960	102 246	130X160X12



Seal carrier assemblies

Precision locknuts

Product overview

Seal carrier assemblies

Precision locknuts

Seal carrier assemblies

DRS



Precision locknuts

For axial locking

AM



For radial locking

ZM, ZMA



Seal carrier assemblies Precision locknuts

Features

Seal carrier assemblies

Seal carrier assemblies DRS are screw mounted to the outer ring of needle roller/axial cylindrical roller bearings ZARF(L) and precisely centred in this position, *Figure 1*, ①. They seal the bearings against outside influences.

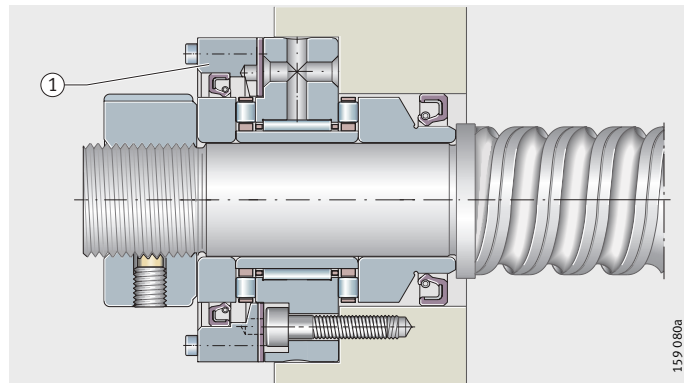
The sealing elements are supplied as a complete kit and comprise a seal carrier with an integral rotary shaft seal, a gasket and hexagonal socket cap screws for fixing the carrier to the central washer of the bearing.

① Seal carrier assembly DRS

DRS
ZMA
ZARF..-L

Figure 1

Needle roller/
axial cylindrical roller bearing,
seal carrier assembly, locknut



Operating temperature

Seal carrier assemblies are suitable for operating temperatures from -30 °C to $+120\text{ °C}$, restricted by the seal material.

Seal carrier assemblies

Precision locknuts

Precision locknuts

Precision locknuts are used where high axial forces must be supported and high runout accuracy and rigidity are required, *Figure 2*, ①, *Figure 3*, ①.

The thread and the axial face of the locknut in contact with the rolling bearing are produced in a single clamping operation. This allows very high runout accuracy to be achieved.

Locknuts are available in the designs AM, ZM and ZMA. If handled correctly, they can be reused several times.

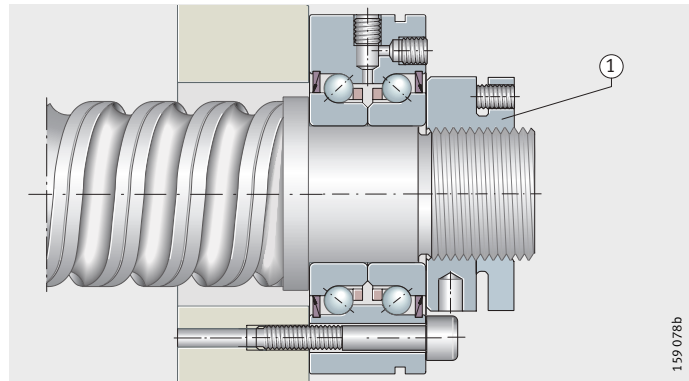
Axial locking by segments

Locknuts of series AM are divided into several segments for applying the locking forces. When the hexagonal socket set screws are tightened, the segments are elastically deformed. As a result, the thread flanks of the segments are pressed against the flanks of the shaft thread and give a high frictional force that acts to prevent loosening of the nut. The runout of the nut is not affected by this method of locking.

① Precision locknut AM

AM
ZKLF..-2RS

Figure 2
Axial angular
contact ball bearing ZKLF
with locknut



Locking by radial locking pegs

Locknuts ZM and ZMA are secured against rotation by means of two radially acting locking pegs, *Figure 3*, ①. ZMA is the heavy series.

The locking pegs are manufactured together with the internal thread of the locknut. They mesh in the thread of the shaft without affecting the runout or damaging the thread, *Figure 3*, ②.

The locking pegs are secured by set screws with a hexagonal socket arranged concentrically over the locking pegs, *Figure 3*, ③.

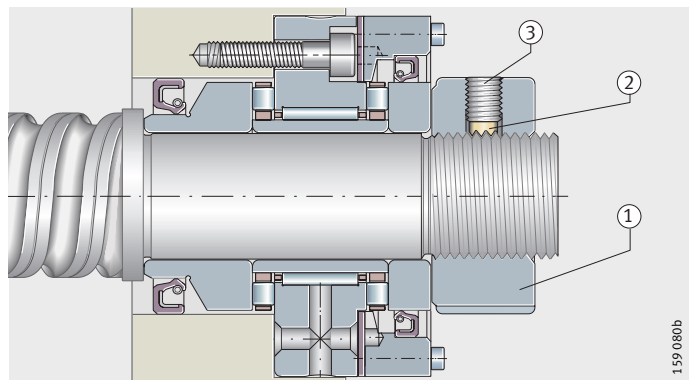
① Precision locknut ZMA

② Locking peg

③ Set screw

DRS
ZMA
ZARF..-L

Figure 3
Needle roller/
axial cylindrical roller bearing ZARF
with seal carrier assembly, locknut



Design and safety guidelines

Shaft threads for the precision locknuts must be precision machined; see table.

Recommended shaft thread

Shaft thread	
Tolerance class "medium"	Tolerance class "fine"
6g DIN 13 T21-24	4h DIN 13 T21-24

Caution! The journal thread must support the locknut over its whole width.

Breakaway torque

The breakaway torques M_L given in the dimension tables are based on a locknut tightened against a rigid shaft shoulder to the reference tightening torque M_{AL} and secured.

Ultimate axial load

The ultimate axial loads F_{aB} are valid for a journal thread with a tolerance of 6g or better and a minimum strength of 700 N/mm². For dynamic loading, the permissible value can be taken as 75% of the ultimate axial load F_{aB} .

Fitting and dismantling

Caution! For the fitting and dismantling of bearings and precision locknuts, the information in Fitting and Maintenance Manual TPI 100 must be observed.

Locknuts must be fully screwed onto the shaft thread.

Precision locknuts with axial locking

Locknuts AM can be tightened using a hook wrench to DIN 1810B that engages in four, six or eight holes around the circumference. The set screws are then tightened in a crosswise sequence to the specified tightening torque M_m using an Allan key. Dismantling is carried out by uniformly loosening set screws of all segments in order to prevent a single segment being left tensioned.

Caution! Tightening by means of just one segment is not permissible. For tightening, an adapter of series AMS can be used that ensures uniform loading of all segments. The adapter AMS must be ordered separately, see dimension table, page 985.

For tightening using the adapter AMS, a hook wrench to DIN 1810A or to DIN 1810B can be used.

If precision locknuts AM are fitted using the adapter AMS, a maximum tightening torque of twice the value given in the dimension table for the bearing is permissible.

Segments can be axially deformed if the set screws are not tightened uniformly in a crosswise sequence or the locknut AM is not fully screwed onto the shaft thread. The specified tightening torque M_m according to the dimension table must be observed.



Seal carrier assemblies

Precision locknuts

Precision locknuts with radial locking

Locknuts ZM and ZMA can be tightened using a hook wrench to DIN 1810A that engages in one of the four slots around the circumference.

The two set screws are then tightened alternately to the specified tightening torque M_m using an Allan key; for M_m , see dimension tables for the bearings.

For dismantling, the two set screws are first loosened and the locking pegs loosened by light impacts with a plastic hammer on the outside surface of the locknut (in the vicinity of the screw holes).

The locknut can then be easily unscrewed without damaging the journal thread.

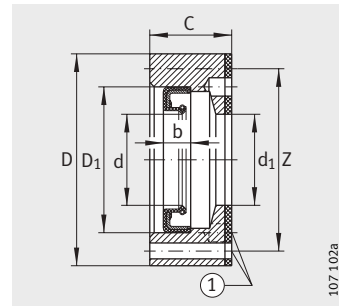
Accuracy

The accuracy of the precision locknuts is shown in the table.

Runout/thread

Axial runout Thread/axial face μm	Metric ISO thread "fine"
5	5H, DIN 13 T21-24

Seal carrier assemblies



DRS¹⁾
① 4 holes, offset by 90°

Dimension table · Dimensions in mm										
Designation	Mass m ≈kg	Dimensions				Rotary shaft seal				Corresponding bearing in standard or L design Designation
		D	C	d ₁	Z ²⁾	d	D ₁	b	Socket head screws DIN 912 each 4 pieces	
DRS1560	0,16	60	14	35	52,4	35	45	7	M3X20	ZARF1560-TV
DRS1762	0,18	62	15,5	38	54,4	38	47	7	M3X25	ZARF1762-TV
DRS2068	0,11	68	17	42	60,4	42	55	8	M3X25	ZARF2068-TV
DRS2080	0,2	80	22	52	73,4	52	68	8	M3X30	ZARF2080-TV
DRS2575	0,16	75	17	47	67,4	47	62	6	M3X25	ZARF2575-TV
DRS2590	0,3	90	22	62	81	62	75	10	M3X30	ZARF2590-TV
DRS3080	0,15	80	17	52	73,4	52	68	8	M3X25	ZARF3080-TV
DRS30105	0,35	105	25	68	95	68	85	10	M4X35	ZARF30105-TV
DRS3590	0,15	90	19	60	80	60	72	8	M4X30	ZARF3590-TV
DRS35110	0,3	110	25	73	101	73	95	10	M3X30	ZARF35110-TV
DRS40100	0,25	100	19	65	90	65	80	8	M4X30	ZARF40100-TV
DRS40115	0,5	115	27,5	78	106	78	100	10	M3X35	ZARF40115-TV
DRS45105	0,3	105	20	70	95	70	85	8	M4X30	ZARF45105-TV
DRS45130	0,7	130	31	90	120	90	110	12	M4X40	ZARF45130-TV
DRS50115	0,2	115	20	78	106	78	100	10	M3X30	ZARF50115-TV
DRS50140	0,8	140	30	95	127,5	95	115	13	M5X40	ZARF50140-TV
DRS55145	0,9	145	30	100	132,5	100	120	12	M5X40	ZARF55145-TV
DRS60150	0,9	150	30	105	137,5	105	125	12	M5X40	ZARF60150-TV
DRS65155	1	155	30	110	142,5	110	130	12	M5X40	ZARF65155-TV
DRS70160	1	160	30	115	147,5	115	135	13	M5X40	ZARF70160-TV
DRS75185	1,8	185	36	135	172,5	135	160	15	M5X50	ZARF75185-TV
DRS90210	2,7	210	38	160	194	160	180	15	M5X50	ZARF90210-TV

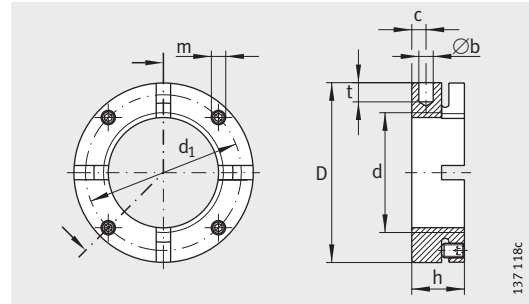
¹⁾ The seal carrier assembly is supplied as a kit comprising:

- seal carrier
- rotary shaft seal
- flange seal
- socket head screws.

²⁾ Four holes offset by 90°.



Precision locknuts



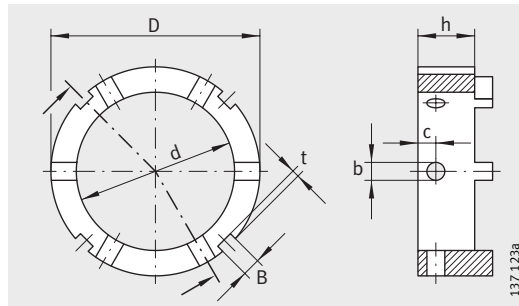
AM15 to AM40 with 4 segments
AM45 to AM90 with 6 segments
AM100 to AM130 with 8 segments

Dimension table · Dimensions in mm														
Designation	Nut thread	Mass m ≈kg	Dimensions							Grub screw Tightening torque M _m Nm	Locknut ¹⁾			
											Axial rupture load F _{aB} N	Tightening torque M _L at Nm	Reference tightening torque M _{AL} Nm	Mass moment of inertia M _M kg · cm ²
	d		D	h	b H11	t	d ₁	c	m					
AM15	M15X1	0,06	30	18	4	5	24	5	M5	3	100 000	20	10	0,09
AM17	M17X1	0,07	32	18	4	5	26	5	M5	3	120 000	25	15	0,11
AM20	M20X1	0,13	38	18	4	6	31	5	M6	5	145 000	45	18	0,23
AM25	M25X1,5	0,16	45	20	5	6	38	6	M6	5	205 000	60	25	0,49
AM30	M30X1,5	0,20	52	20	5	7	45	6	M6	5	250 000	70	32	0,86
AM30/65	M30X1,5	0,50	65	30	6	8	45	6	M6	5	400 000	70	32	2,8
AM35/58	M35X1,5	0,23	58	20	5	7	51	6	M6	5	280 000	90	40	1,3
AM35	M35X1,5	0,33	65	22	6	8	58	6	M6	5	330 000	100	40	2,4
AM40	M40X1,5	0,30	65	22	6	8	58	6	M6	5	350 000	120	55	2,3
AM40/85	M40X1,5	0,75	85	32	6	8	58	6	M6	5	570 000	120	55	7,6
AM45	M45X1,5	0,34	70	22	6	8	63	6	M6	5	360 000	220	65	2,9
AM50	M50X1,5	0,43	75	25	6	8	68	8	M6	5	450 000	280	85	4,3
AM55	M55X2	0,60	85	26	6	8	75	8	M8	15	520 000	320	95	7,7
AM60	M60X2	0,65	90	26	6	8	80	8	M8	15	550 000	365	100	9,4
AM65	M65X2	0,83	100	26	8	10	88	8	M8	15	560 000	400	120	14,6
AM70	M70X2	0,79	100	28	8	10	90	9	M8	15	650 000	450	130	14,7
AM75	M75X2	1,23	115	30	8	10	102	10	M10	20	750 000	610	150	29
AM80	M80X2	0,93	110	30	8	10	98	10	M10	20	670 000	770	160	21,3
AM85	M85X2	0,97	115	30	8	10	102	10	M10	20	690 000	930	180	24,8
AM90	M90X2	1,53	130	32	8	10	118	13	M10	20	900 000	1100	200	48
AM100	M100X2	1,12	130	30	8	10	118	10	M10	20	740 000	1200	250	38
AM110	M110X2	1,22	140	30	8	10	128	10	M10	20	770 000	1300	250	48
AM120	M120X2	1,56	155	30	8	10	142	10	M10	20	880 000	1450	250	75
AM130	M130X2	1,67	165	30	8	10	152	10	M10	20	900 000	1600	250	92

¹⁾ Note!

If precision locknuts AM are fitted using the adapter AMS,
a maximum tightening torque of twice the value given in the dimension table for the bearing is permissible.

Adapters

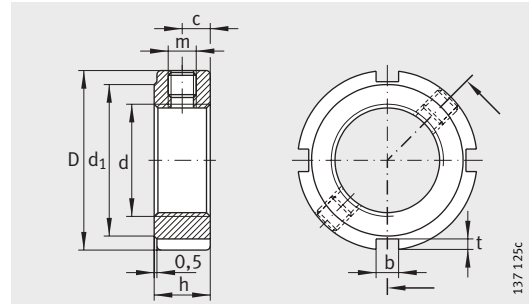


AMS

Dimension table · Dimensions in mm									
Designation	Mass m ≈kg	Dimensions							For precision locknuts
		D	h	d	b H11	c	B	t	
AMS20	0,047	32	14	22	4	5	4	2	AM15, AM17, AM20
AMS30	0,093	45	15	35	5	5	5	2	AM25, AM30, AM35/58, AM30/65
AMS40	0,217	65	16	45	6	6	6	2,5	AM35, AM40
AMS50	0,245	70	19	53	6	6	6	2,5	AM45, AM50
AMS60	0,37	85	20	65	6	6	7	3	AM55, AM60
AMS70	0,615	98	25	75	8	10	8	3,5	AM65, AM70
AMS80	0,755	110	25	85	8	10	8	3,5	AM75, AM80, AM85
AMS90	1,215	130	25	95	8	10	10	4	AM90
AMS110	0,74	130	25	110	8	10	10	4	AM100, AM110
AMS130	1,485	155	25	130	8	10	12	5	AM120, AM130



Precision locknuts

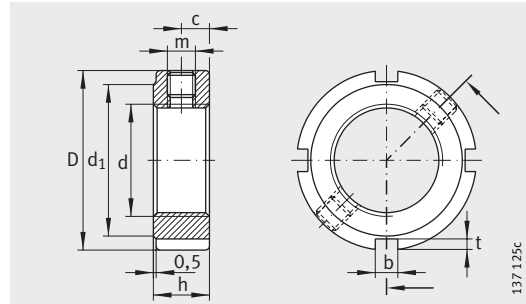


ZM, ZMA

Dimension table · Dimensions in mm														
Designation	Thread	Mass m ≈ kg	Dimensions							Grub screw Tight- ening torque M _m Nm	Locknut			
											Axial rupture load F _{aB} N	Tight- ening torque M _L at Nm	Reference tightening torque M _{AL} Nm	Mass moment of inertia M _M kg · cm ²
ZM06	M6X0,5	0,01	16	8	3	2	11	4	M4	1	17 000	20	2	0,004
ZM08 ¹⁾	M8X0,75	0,01	16	8	3	2	11	4	M4	1	23 000	25	4	0,004
ZM10 ¹⁾	M10X1	0,01	18	8	3	2	14	4	M4	1	31 000	30	6	0,006
ZM12	M12X1	0,015	22	8	3	2	18	4	M4	1	38 000	30	8	0,013
ZM15	M15X1	0,018	25	8	3	2	21	4	M4	1	50 000	30	10	0,021
ZMA15/33	M15X1	0,08	33	16	4	2	28	8	M5	3	106 000	30	10	0,14
ZM17	M17X1	0,028	28	10	4	2	23	5	M5	3	57 000	30	15	0,401
ZM20	M20X1	0,035	32	10	4	2	27	5	M5	3	69 000	40	18	0,068
ZMA20/38	M20X1	0,12	38	20	5	2	33	10	M5	3	174 000	40	18	0,297
ZMA20/52	M20X1	0,32	52	25	5	2	47	12,5	M5	3	218 000	40	18	1,38
ZM25	M25X1,5	0,055	38	12	5	2	33	6	M6	5	90 000	60	25	0,157
ZMA25/45	M25X1,5	0,16	45	20	5	2	40	10	M6	5	211 000	60	25	0,572
ZMA25/58	M25X1,5	0,43	58	28	6	2,5	52	14	M6	5	305 000	60	25	2,36
ZM30	M30X1,5	0,075	45	12	5	2	40	6	M6	5	112 000	70	32	0,304
ZMA30/52	M30X1,5	0,22	52	22	5	2	47	11	M6	5	270 000	70	32	1,1
ZMA30/65	M30X1,5	0,55	65	30	6	2,5	59	15	M6	5	390 000	70	32	3,94
ZM35	M35X1,5	0,099	52	12	5	2	47	6	M6	5	134 000	80	40	0,537
ZMA35/58	M35X1,5	0,26	58	22	6	2,5	52	11	M6	5	300 000	80	40	1,66
ZMA35/70	M35X1,5	0,61	70	30	6	2,5	64	15	M6	5	460 000	80	40	5,2
ZM40	M40X1,5	0,14	58	14	6	2,5	52	7	M6	5	157 000	95	55	0,945
ZMA40/62	M40X1,5	0,27	62	22	6	2,5	56	11	M8	15	310 000	95	55	2,07
ZMA40/75	M40X1,5	0,67	75	30	6	2,5	69	15	M8	15	520 000	95	55	6,72
ZM45	M45X1,5	0,17	65	14	6	2,5	59	7	M6	5	181 000	110	65	1,48
ZMA45/68	M45X1,5	0,35	68	24	6	2,5	62	12	M8	15	360 000	110	65	3,2
ZMA45/85	M45X1,5	0,92	85	32	7	3	78	16	M8	15	630 000	110	65	11,9
ZM50	M50X1,5	0,19	70	14	6	2,5	64	7	M6	5	205 000	130	85	1,92
ZMA50/75	M50X1,5	0,43	75	25	6	2,5	68	12,5	M8	15	415 000	130	85	4,89
ZMA50/92	M50X1,5	1,06	92	32	8	3,5	84	16	M8	15	680 000	130	85	16,1
ZM55	M55X2	0,23	75	16	7	3	68	8	M6	5	229 000	150	95	2,77
ZMA55/98	M55X2	1,17	98	32	8	3,5	90	16	M8	15	620 000	150	95	20,5

¹⁾ When clamped, the grub screw protrudes by approx. 0,5 mm.

Precision locknuts



ZM, ZMA

Dimension table (continued) · Dimensions in mm														
Designation	Thread	Mass	Dimensions							Grub screw	Locknut			
											Tightening torque	Axial rupture load	Tightening torque	Reference tightening torque
		m ≈kg	D	h	b	t	d ₁	c	m	M _m Nm	F _{aB} N	M _L at Nm	M _{AL} Nm	M _M kg · cm ²
ZM60	M60X2	0,25	80	16	7	3	73	8	M6	5	255 000	180	100	3,45
ZMA60/98	M60X2	1,07	98	32	8	3,5	90	16	M8	15	680 000	180	100	19,6
ZM65	M65X2	0,27	85	16	7	3	78	8	M6	5	280 000	200	120	4,24
ZMA65/105	M65X2	1,21	105	32	8	3,5	97	16	M8	15	750 000	200	120	25,6
ZM70	M70X2	0,36	92	18	8	3,5	85	9	M8	15	305 000	220	130	6,61
ZMA70/110	M70X2	1,4	110	35	8	3,5	102	17,5	M8	15	810 000	220	130	33
ZM75	M75X2	0,4	98	18	8	3,5	90	9	M8	15	331 000	260	150	8,41
ZMA75/125	M75X2	2,11	125	38	8	3,5	117	19	M8	15	880 000	260	150	62,2
ZM80	M80X2	0,46	105	18	8	3,5	95	9	M8	15	355 000	285	160	11,2
ZMA80/120	M80X2	1,33	120	35	8	4	105	17,5	M8	15	810 000	285	160	44,6
ZM85	M85X2	0,49	110	18	8	3,5	102	9	M8	15	385 000	320	190	13,1
ZM90	M90X2	0,7	120	20	10	4	108	10	M8	15	410 000	360	200	21,8
ZMA90/130	M90X2	2,01	130	38	10	4	120	19	M8	15	910 000	360	200	64,1
ZMA90/155	M90X2	3,36	155	38	10	4	146	19	M8	15	1 080 000	360	200	150
ZM100	M100X2	0,77	130	20	10	4	120	10	M8	15	465 000	425	250	28,6
ZMA100/140	M100X2	2,23	140	38	12	5	128	19	M10	20	940 000	425	250	82,8
ZM105	M105X2	1,05	140	22	12	5	126	11	M10	20	495 000	475	300	44,5
ZM110	M110X2	1,09	145	22	12	5	133	11	M10	20	520 000	510	350	50,1
ZM115	M115X2	1,13	150	22	12	5	137	11	M10	20	550 000	550	400	56,2
ZM120	M120X2	1,28	155	24	12	5	138	12	M10	20	580 000	600	450	68,4
ZM125	M125X2	1,33	160	24	12	5	148	12	M10	20	610 000	640	500	76,1
ZM130	M130X2	1,36	165	24	12	5	149	12	M10	20	630 000	700	550	84,3
ZM140	M140X2	1,85	180	26	14	6	160	13	M12	38	690 000	800	600	133
ZM150	M150X2	2,24	195	26	14	6	171	13	M12	38	750 000	900	650	188





По вопросам продаж и поддержки обращайтесь:				
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