Ball screw drives KGT
General technical data

Manufacturing process
The thread profile is produced by cold rolling in the thread rolling method. Both screw and nut have a gothic thread profile. The load angle is 45°.

Linear speeds
At present, the permissible rotation limit is in the region of 3000 rpm. This limit defines the maximum rotation, which must be run only under ideal operating conditions.

Installed position
The position in which the screw drive is installed can always be freely chosen. Please consider that all radial forces that occur need to be absorbed by external guides.

Accuracy
The standard programme has a precision of 50 µm per 300 mm, screws from the ***MICRON*** *Line*®, series, which are available on request, achieve an accuracy of 23 µm per 300 mm.

Safety advice
Ball screw drives are generally not self-locking due to the low friction. It is therefore advisable to install suitable motors with holding brake, particularly when the ball screw drive is installed vertically.

Duty cycle
The ball screw drive permits a duty cycle of up to 100%. Extremely high charges in combination with high duty cycles can reduce the life time.

Temperatures
All screw drives are designed for continuous operation at ambient temperatures of -30° up to 80° C. Temperatures of up to 110° C are also permitted for brief periods. Ball screw drives are only in exeptional cases suitable for operation at subzero temperatures.

Repeatability
The repeatability is defined as the capability of a screw drive to reach an actual position that has once been reached again under the same conditions. It refers to the average position variation according to VDI/DGQ 3441. The repeatability is influenced amongst others by:
- Load
- Speed
- Deceleration
- Direction of travel
- Temperature

Aggressive ambient working conditions
In cases of heavy dirt and dust particles, an additional bellow or a spiral spring cover is recommended.

Installation and maintenance
See page 60

Technical Data	Ball screw drive KGS
▪ Thread	Gothic profile (pointed profile)
▪ Diameter	Standard: 12 – 63 mm ***MICRON*** *Line*®: 12 – 40 mm
▪ Lead	Standard: 5 – 50 mm ***MICRON*** *Line*®: 5 – 40 mm
▪ Number of starts	1 – 5
▪ Thread direction	Right hand thread, KGS 2005 also left hand thread
▪ Length	Standard: 5600 mm KGS 1205: 1300 mm
▪ Material	1.1213 (Cf 53) Ball track inductively hardened and polished, soft-annealed screw end and core
▪ Lead accuracy	Standard: 50 µm/300 mm ***MICRON*** *Line*®: 23 µm/300 mm
▪ Straightness	L < 500 mm: 0.05 mm/m L = 500 – 1000 mm: 0.08 mm/m L > 1000 mm: 0.1 mm/m
▪ Left and right hand screw	KGS 2005 only
▪ End machining	To customer specs

Ball screw drives
Ball nuts

NEFF ball screw nuts are made as flanged nuts (KGF) and cylindrical nuts (KGM). They can be combined with all screws with any kind of end machining. Single nuts are also available on assembly sleeves.

Flanged ball screw nuts are made with attachment holes; cylindrical ball screw nuts have a spline.

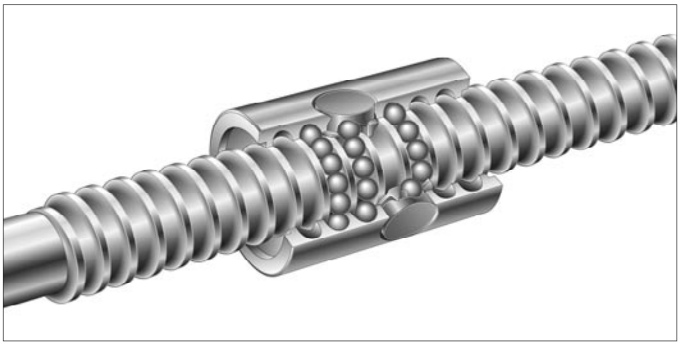
NEFF manufactures ball screw nuts with three different ball return systems, depending on the diameter and the lead of the screw used. Profiled wipers reduce the seepage of lubricant, and help to repel dirt.

Material:
Steel 1.7131 (ESP65) / 1.3505 (100 Cr 6)

NEFF ball return systems

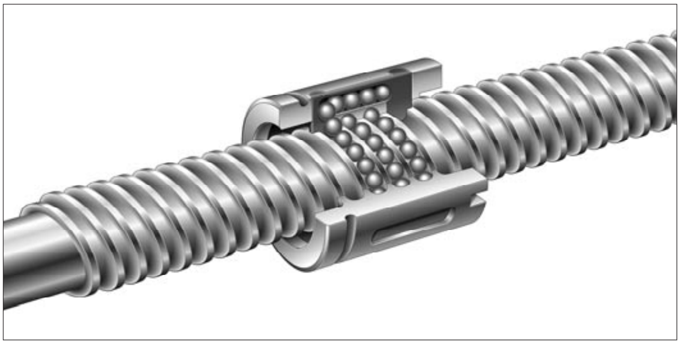
Single return duct
For single-start screw drives.

The balls are lifted out of the track after every turn of the screw and are moved back one thread lead. The NEFF guide piece, made of fibre glass re-inforced plastic, ensures perfect guidance and low ball wear.
Available for our thread leads 5 and 10 mm.



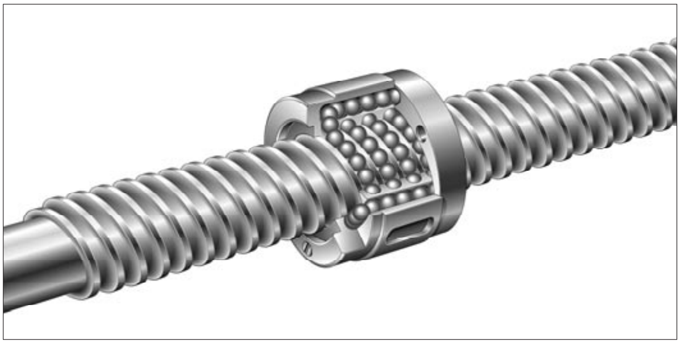
Return duct
For single- and multi-start screw drives.

After several revolutions, the balls are returned through a patented reverse and return system that is integrated in the nut.
Available for our thread leads 5, 10 and 20 mm.



Multi-turn return duct
For multi-start screw drives.

The balls are returned via two special recirculading lids and the return duct is integrated in the nut.
Available for our thread leads 20, 25, 40 and 50 mm.



Ball screw drives
Ball nuts

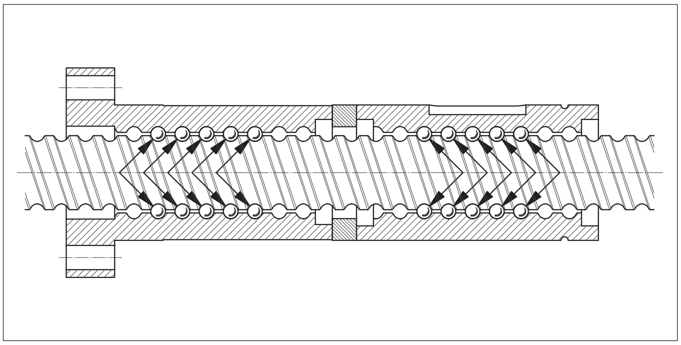
Ball nut units – pre-loaded

As a rule all nuts can be combined to form backlash-free, pre-loaded nut units except when the lead is equal to or greater than the diameter of the screw. NEFF supplies ready-to-install units with "O" pre-loading.

O pre-loading:
With this type of pre-loading the lines of forces run in a rhomboidal pattern (O-shaped), i.e. the nuts are pressed apart by the pre-loading force. This configuration offers particularly high rigidity against tilting. The standard pre-loading is equal to 10% of the dynamic load rating C.

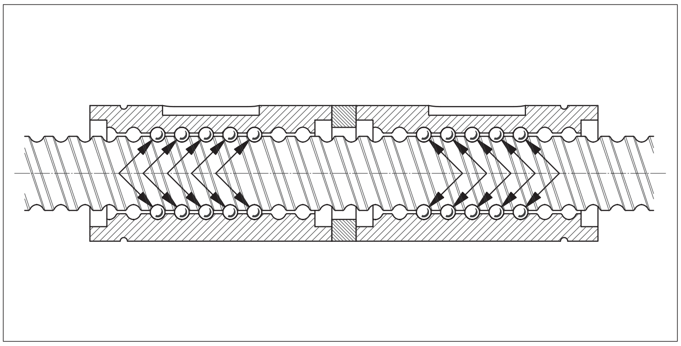
Pre-loading variants
KGT-FM

Ball screw drive with one KGF flanged nut and one KGM cylindrical nut with O-pre-loading.



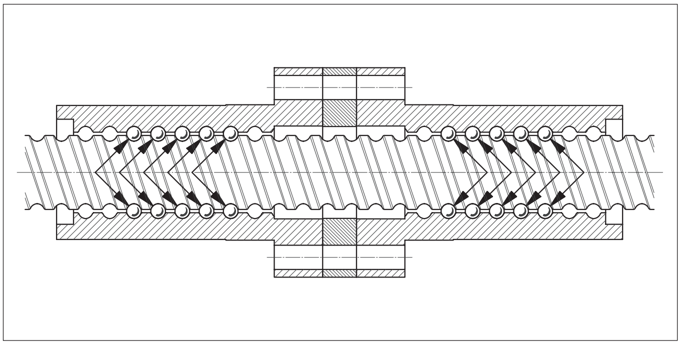
KGM-MM

Ball screw drive with two KGM cylindrical nuts and O-pre-loading. Only one of the two feather keys transmits the drive torque.



KGT-FF

Ball screw drive with two KGF flanged nuts with O-pre-loading.



Accessories ball screw drives
Spiral spring cover

For KGT 4005
KGT 4040

D_3 = 48 mm
D_{10} = 42 mm
L_6 = 6 mm
L_9 = 26 mm

Type D_8/L_{7v}[1)]/L_8	L_{7h}[2)]	D_9
SF 50/150/30	90	63
SF 50/250/30	190	68
SF 50/250/50	150	62
SF 50/350/50	250	66
SF 50/450/50	350	70
SF 50/550/50	450	73
SF 50/550/60	430	68
SF 50/650/60	530	73
SF 50/750/60	630	76
SF 50/750/75	600	78
SF 50/900/75	750	84
SF 50/1100/75	950	90
SF 50/1100/100	900	77
SF 50/1300/100	1100	80
SF 50/1500/100	1300	87
SF 50/1800/100	–	94
SF 50/1700/120	1460	91
SF 50/1900/120	1660	97
SF 50/2100/120	1860	102
SF 50/2300/120	–	105
SF 50/2500/120	–	111
SF 50/2800/120	–	118
SF 50/2800/150	2500	119
SF 50/3000/150	–	124
SF 50/3000/180	2640	123
SF 50/3250/180	–	130
SF 50/3250/200	2850	128
SF 50/3500/200	–	134

1) L_{7v} = L_7 vertical installation
2) L_{7h} = L_7 horizontal installation

For KGT 4010
KGT 4020

D_3 = 53 mm
D_{10} = 46 mm
L_6 = 10 mm
L_9 = 35 mm

Type D_8/L_{7v}[1)]/L_8	L_{7h}[2)]	D_9
SF 55/150/30	90	68
SF 55/250/30	190	73
SF 55/250/50	150	66
SF 55/350/50	250	71
SF 55/450/50	350	74
SF 55/550/50	450	77
SF 55/550/60	430	75
SF 55/650/60	530	79
SF 55/750/60	630	83
SF 55/750/75	600	83
SF 55/900/75	750	89
SF 55/1100/75	950	94
SF 55/1100/100	900	88
SF 55/1300/100	1100	89
SF 55/1500/100	1300	94
SF 55/1800/100	–	102
SF 55/1700/120	1460	96
SF 55/1900/120	1660	103
SF 55/2100/120	1860	106
SF 55/2300/120	2060	110
SF 55/2500/120	–	117
SF 55/2800/120	–	119
SF 55/2800/150	2500	122
SF 55/3000/150	–	126
SF 55/3000/180	2640	127
SF 55/3250/180	–	130

For KGT 5010
KGT 5020

D_3 = 62 mm
D_{10} = 56 mm
L_6 = 11 mm
L_9 = 39 mm

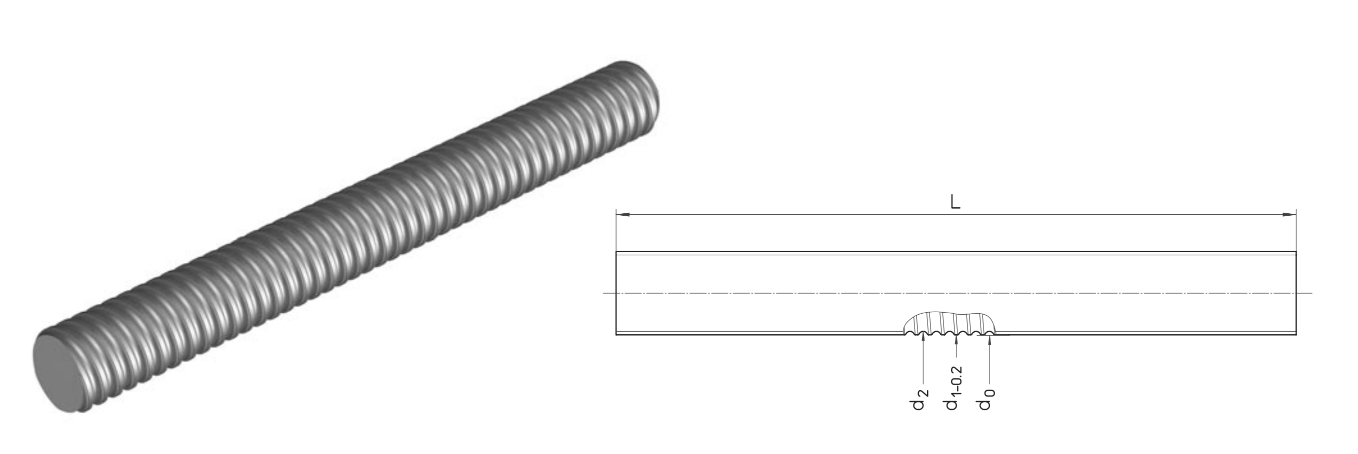
Type D_8/L_{7v}[1)]/L_8	L_{7h}[2)]	D_9
SF 65/250/30	190	85
SF 65/250/50	150	76
SF 65/350/50	250	83
SF 65/450/50	350	88
SF 65/550/60	430	88
SF 65/650/60	530	92
SF 65/750/60	630	96
SF 65/750/75	600	93
SF 65/900/75	750	99
SF 65/1100/75	950	107
SF 65/1100/100	900	95
SF 65/1300/100	1100	100
SF 65/1500/100	1300	109
SF 65/1800/100	–	120
SF 65/1700/120	1460	106
SF 65/1900/120	1660	109
SF 65/2100/120	1860	113
SF 65/2300/120	2060	118
SF 65/2500/120	–	128
SF 65/2800/120	–	132
SF 65/2800/150	2500	133
SF 65/3000/150	–	139
SF 65/3000/180	2640	136
SF 65/3250/180	–	146
SF 65/3250/200	2850	140

For KGT 6310

D_3 = 74 mm
D_{10} = 68 mm
L_6 = 11 mm
L_9 = 49 mm

Type D_8/L_{7v}[1)]/L_8	L_{7h}[2)]	D_9
SF 75/250/50	150	89
SF 75/350/50	250	94
SF 75/450/50	350	101
SF 75/550/60	430	100
SF 75/650/60	530	103
SF 75/750/60	630	109
SF 75/650/75	500	99
SF 75/750/75	600	104
SF 75/900/75	750	111
SF 75/1100/100	900	108
SF 75/1300/100	1100	114
SF 75/1500/100	1300	120
SF 75/1700/100	1500	126
SF 75/1500/120	1260	115
SF 75/1800/120	1560	125
SF 75/2000/120	1760	128
SF 75/2200/120	–	132
SF 75/2000/150	1700	135
SF 75/2400/150	2100	141
SF 75/2800/150	–	145
SF 75/2800/180	2440	142
SF 75/3000/180	–	148
SF 75/3250/180	–	156
SF 75/3250/200	2850	148
SF 75/3500/200	–	158

Ball screw drives
Summary of ball screws KGS

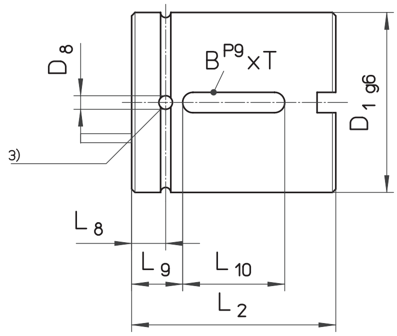


Type Diameter [mm] Lead [mm] Right hand thread	Accuracy class [µm/300mm]	Dimensions [mm] d_0	d_1	d_2	$L_{max.}$[1]	Weight m'_{KGS} [kg/m]	Planar moment of inertia Iy [10^4 mm^4]	Moment of resistance[2] [10^3 mm^3]	Mass moment of inertia [kg m^2/m]
KGS-1205	50	12	11.5	10.1	1300	0.75	0.051	0.101	$1.13 \cdot 10^{-5}$
KGS-1605	50	16	15.5	12.9	5600	1.26	0.136	0.211	$3.21 \cdot 10^{-5}$
KGS-1610	50	16	15.4	13.0	5600	1.26	0.140	0.216	$3.21 \cdot 10^{-5}$
KGS-2005	50	20	19.5	16.9	5600	2.04	0.400	0.474	$8.46 \cdot 10^{-5}$
KGS-2020	50	20	19.5	16.9	5600	2.04	0.400	0.474	$8.46 \cdot 10^{-5}$
KGS-2050	50	20	19.1	16.5	5600	2.04	0.364	0.441	$8.46 \cdot 10^{-5}$
KGS-2505	50	25	24.5	21.9	5600	3.33	1.129	1.031	$2.25 \cdot 10^{-4}$
KGS-2510	50	25	24.5	21.9	5600	3.33	1.129	1.031	$2.25 \cdot 10^{-4}$
KGS-2520	50	25	24.6	22.0	5600	3.33	1.150	1.045	$2.25 \cdot 10^{-4}$
KGS-2525	50	25	24.5	22.0	5600	3.33	1.150	1.045	$2.25 \cdot 10^{-4}$
KGS-2550	50	25	24.1	21.5	5600	3.33	1.049	0.976	$2.25 \cdot 10^{-4}$
KGS-3205	50	32	31.5	28.9	5600	5.63	3.424	2.370	$6.43 \cdot 10^{-4}$
KGS-3210	50	32	32.7	27.3	5600	5.63	2.727	1.998	$6.43 \cdot 10^{-4}$
KGS-3220	50	32	31.7	27.9	5600	5.63	2.974	2.132	$6.43 \cdot 10^{-4}$
KGS-3240	50	32	30.9	28.3	5600	5.63	3.149	2.225	$6.43 \cdot 10^{-4}$
KGS-4005	50	40	39.5	36.9	5600	9.01	9.101	4.933	$1.65 \cdot 10^{-3}$
KGS-4010	50	40	39.5	34.1	5600	8.35	6.737	3.893	$1.41 \cdot 10^{-3}$
KGS-4020	50	40	39.7	35.9	5600	9.01	8.154	4.542	$1.65 \cdot 10^{-3}$
KGS-4040	50	40	38.9	36.3	5600	9.01	8.523	4.696	$1.65 \cdot 10^{-3}$
KGS-5010	50	50	49.5	44.1	5600	13.50	18.566	8.420	$3.70 \cdot 10^{-3}$
KGS-5020	50	50	49.5	44.1	5600	13.50	18.566	8.420	$3.70 \cdot 10^{-3}$
KGS-6310	50	63	62.5	57.1	5600	22.03	52.181	18.280	$9.84 \cdot 10^{-3}$
Left hand thread									
KGS-2005 LH	50	20	19.5	16.9	5600	2.04	0.400	0.474	$8.46 \cdot 10^{-5}$

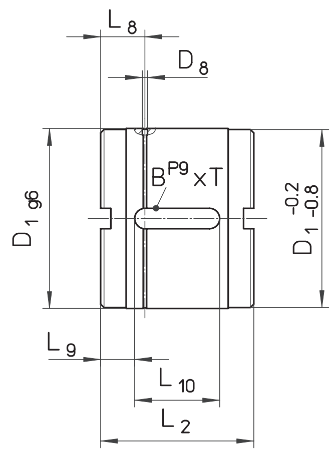
[1] Delivery length 6000 mm, hardened length at least 5600 mm, both ends soft annealed.
[2] The polar moment of resistance is double the moment of resistance.

Ball screw drives
Cylindrical ball nuts KGM-D according to DIN 69051

Form E



Form S



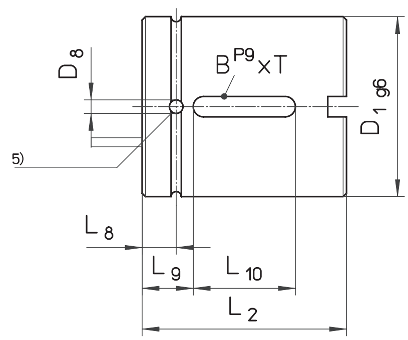
Material: 1.7131 (ESP65) / 1.3505 (100 Cr 6)

Type Diameter [mm] Lead [mm] Right hand thread	Form	Dimensions [mm]							Axial backlash max [mm]	No. of circuits	Load rating [kN]		
		D_1	D_8	L_2	L_8	L_9	L_{10}	BxT			C[1]	C[2]	C_0=C_{0a}
KGM-D 1605 RH-EE	E	28	3	34	7	7	20	5x2	0.08	3	12.5	9.3	13.1
KGM-D 1610 RH-EE	E	28	3	50	7	15	20	5x2	0.08	6	23.0	15.4	26.5
KGM-D 2005 RH-EE	E	36	3	34	7	7	20	5x2	0.08	3	14.0	10.5	16.6
KGM-D 2505 RH-EE	E	40	3	34	7	7	20	5x2	0.08	3	15.0	12.3	22.5
KGM-D 2510 RH-EE	E	40	3	45	7.5	12.5	20	5x2	0.08	3	17.5	13.2	25.3
KGM-D 2520 RH-EE	S	40	1.5	35	14	11.5	12	5x3	0.15	4	19.0	13.0	23.3
KGM-D 2525 RH-EE	S	40	1.5	35	11.5	11	13	5x3	0.08	5	21.0	16.7	32.2
KGM-D 2550 RH-EE	S	40	1.5	58	17	19	20	5x3	0.15	5	22.5	15.4	31.7
KGM-D 3205 RH-EE	E	50	3	45	7.5	8	30	6x2.5	0.08	5	24.0	21.5	49.3
KGM-D 4005 RH-EE	E	63	3	45	7.5	8	30	6x2.5	0.08	5	26.0	23.8	63.1
KGM-D 4010 RH-EE	E	63	4	60	10	15	30	6x2.5	0.08	3	50.0	38.0	69.1
KGM-D 4020 RH-EE	E	63	3	70	7.5	20	30	6x2.5	0.08	4	44.5	33.3	76.1
KGM-D 4040 RH-EE	S	63	1.5	85	15	27.5	30	6x3.5	0.08	8	42.0	35.0	101.9
Left hand thread													
KGM-D 2005 LH-EE	E	36	3	34	7	7	20	5x2	0.08	3	16.5	10.5	16.6

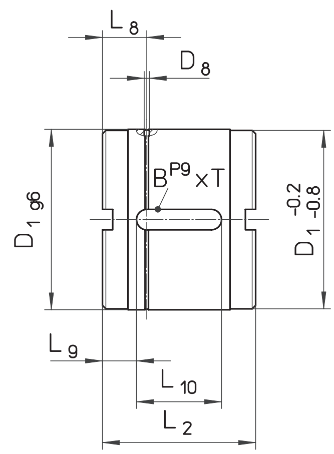
1) Dynamic load rating according to DIN 69051, part 4, draft 1978.
2) Dynamic load rating according to DIN 69051, part 4, draft 1989.
3) Position of grease holes not defined on circumference.

Ball screw drives
Cylindrical ball nuts KGM-N according to NEFF standard

Form E



Form S

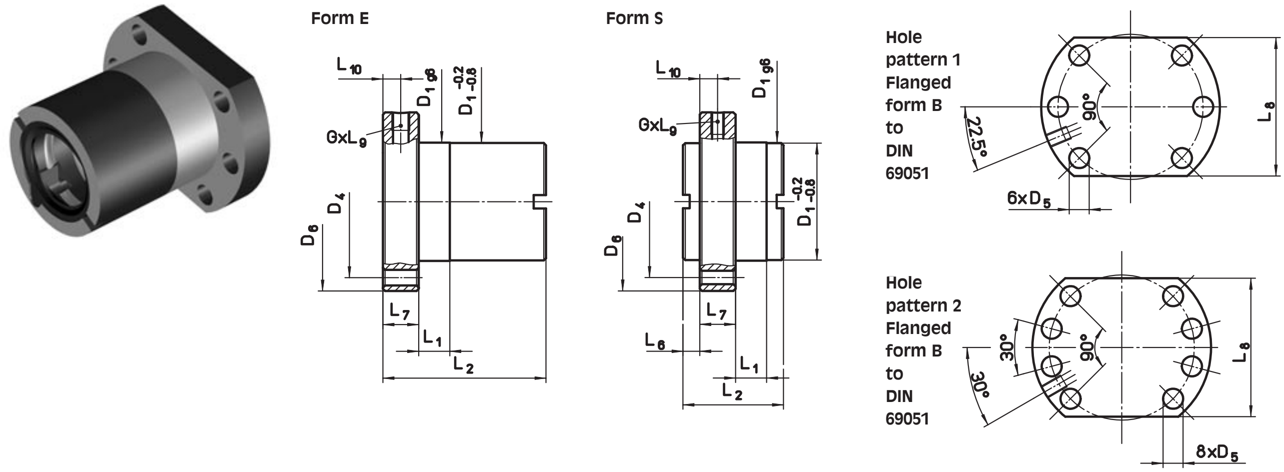


Material: 1.7131 (ESP65) / 1.3505 (100 Cr 6)

Type Diameter [mm] Lead [mm] Right hand thread	Form	Dimensions [mm]							Axial backlash max [mm]	No. of circuits	Load rating [kN]		
		D_1	D_8	L_2	L_8	L_9	L_{10}	BxT			C[2)]	C[3)]	$C_0=C_{0a}$
KGM-N 1205 RH-00	E	20[4)]	-	24	-	5	14	3x1.8	0.08	3	6.0	4.4	6.8
KGM-N 2005 RH-EE	E	32	3	34	7	7	20	5x2	0.08	3	14.0	10.5	16.6
KGM-N 2020 RH-EE	S	35	1.5	30	11.5	9	12	5x3	0.08	4	12.0	11.6	18.4
KGM-N 2050 RH-EE	S	35	1.5	56	16	18	20	5x3	0.15	5	18.0	13.0	24.6
KGM-N 2505 RH-EE	E	38	3	34	7	7	20	5x2	0.08	3	15.0	12.3	22.5
KGM-N 3205 RH-EE	E	45	3	45	7.5	8	30	6x2.5	0.08	5	24.0	21.5	49.3
KGM-N 3210 RH-EE	E	53	4	60	10	15	30	6x2.5	0.08	3	44.0	33.4	54.5
KGM-N 3220 RH-EE	E	53	3	70	7.5	20	30	6x2.5	0.08	4	42.5	29.7	59.8
KGM-N 3240 RH-EE	S	53[1)]	1.5	45	13	10	25	6x4	0.08	4	17.0	14.9	32.4
KGM-N 4005 RH-EE	E	53	3	45	7.5	8	30	6x2.5	0.08	5	26.0	23.8	63.1
KGM-N 5010 RH-EE	E	72	4	82	11	23	36	6x2.5	0.08	5	78.0	68.7	155.8
KGM-N 5020 RH-EE	E	85	4	82	10	23	36	6x2.5	0.08	4	82.0	60.0	136.3
KGM-N 6310 RH-EE	E	85	4	82	11	23	36	6x2.5	0.08	5	86.0	76.0	197.0

1) D_1 -0.2/-0.8 does not apply, therefore D_1 -1.0/-1.5
2) Dynamic load rating according to DIN 69051, part 4, draft 1978.
3) Dynamic load rating according to DIN 69051, part 4, draft 1989.
4) Nut without wiper
5) Position of grease holes not defined on circumference.

Ball screw drives
Flanged ball nuts KGF-D according to DIN 69051

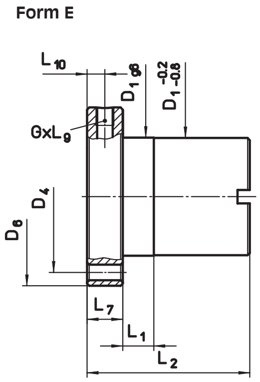


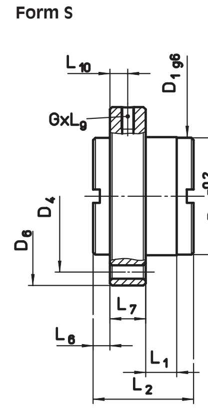
Material: 1.7131 (ESP65) / 1.3505 (100 Cr 6)

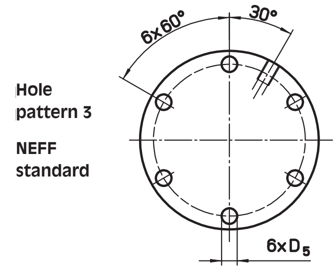
Type Diameter [mm] Lead [mm] Right hand thread	Form	Hole pattern	Dimensions [mm]											Lubrication hole	Axial backlash max [mm]	No. of circuits	Load rating [kN]		
			D_1	D_4	D_5	D_6	L_1	L_2	L_6	L_7	L_8	L_9	L_{10}	G			C[2]	C[3]	C_0=C_{oa}
KGF-D 1605 RH-EE	E	1	28	38	5.5	48	10	42	–	10	40	10	5	M 6	0.08	3	12.0	9.3	13.1
KGF-D 1610 RH-EE	E	1	28	38	5.5	48	10	55	–	10	40	10	5	M 6	0.08	6	23.0	15.4	26.5
KGF-D 2005 RH-EE	E	1	36	47	6.6	58	10	42	–	10	44	10	5	M 6	0.08	3	14.0	10.5	16.6
KGF-D 2505 RH-EE	E	1	40	51	6.6	62	10	42	–	10	48	10	5	M 6	0.08	3	15.0	12.3	22.5
KGF-D 2510 RH-EE	E	1	40	51	6.6	62	16	55	–	10	48	10	5	M 6	0.08	3	17.5	13.2	25.3
KGF-D 2520 RH-EE	S	1	40	51	6.6	62	4	35	10.5	10	48	8	5	M 6	0.15	4	19.0	13.0	23.3
KGF-D 2525 RH-EE	S	1	40	51	6.6	62	9	35	8	10	-[4]	8	5	M 6	0.08	5	21.0	16.7	32.2
KGF-D 2550 RH-EE	S	1	40	51	6.6	62	10	58	10.0	10	48	8	5	M 6	0.15	5	22.5	15.4	31.7
KGF-D 3205 RH-EE	E	1	50	65	9	80	10	55	–	12	62	10	6	M 6	0.08	5	24.0	21.5	49.3
KGF-D 3210 RH-EE	E	1	53[1]	65	9	80	16	69	–	12	62	10	6	M 8x1	0.08	3	44.0	33.4	54.5
KGF-D 3220 RH-EE	E	1	53[1]	65	9	80	16	80	–	12	62	10	6	M 6	0.08	4	42.5	29.7	59.8
KGF-D 4005 RH-EE	E	2	63	78	9	93	10	57	–	14	70	10	7	M 6	0.08	5	26.0	23.8	63.1
KGF-D 4010 RH-EE	E	2	63	78	9	93	16	71	–	14	70	10	7	M 8x1	0.08	3	50.0	38.0	69.1
KGF-D 4020 RH-EE	E	2	63	78	9	93	16	80	–	14	70	10	7	M 8x1	0.08	4	44.5	33.3	76.1
KGF-D 4040 RH-EE	S	2	63	78	9	93	16	85	7.5	14	-[4]	10	7	M 8x1	0.08	8	42.0	35.0	101.9
KGF-D 5010 RH-EE	E	2	75	93	11	110	16	95	–	16	85	10	8	M 8x1	0.08	5	78.0	68.7	155.8
KGF-D 5020 RH-EE	E	2	85[1]	103[1]	11	125	22	95	–	18	95	10	9	M 8x1	0.08	4	82.0	60.0	136.3
Left hand thread																			
KGF-D 2005 LH-EE	E	1	36	47	6.6	58	10	42	–	10	44	10	5	M 6	0.08	3	16.5	10.5	16.6

1) D_1 not conforming to DIN 69051.
2) Dynamic load rating according to DIN 69051 part 4, draft 1978.
3) Dynamic load rating according to DIN 69051 part 4, draft 1989.
4) Round flange

Ball screw drives
Flanged ball nuts KGF-N according to NEFF standard







Material: 1.7131 (ESP65) / 1.3505 (100 Cr 6)

Type Diameter [mm] Lead [mm] Right hand thread	Form	Dimensions [mm]											Axial backlash max [mm]	No. of circuits	Load rating [kN]		
		D_1	D_4	D_5	D_6	L_1	L_2	L_6	L_7	L_9	L_{10}	Lubrication hole G			C[1]	C[2]	C_0=C_{0a}
KGF-N 1605 RH-EE	E	28	38	5.5	48	8	44	–	12	8	6	M 6	0.08	3	12.0	9.3	13.1
KGF-N 2005 RH-EE	E	32	45	7	55	8	44	–	12	8	6	M 6	0.08	3	14.0	10.5	16.6
KGF-N 2020 RH-EE	S	35	50	7	62	4	30	8	10	8	5	M 6	0.08	4	12.0	11.6	18.4
KGF-N 2050 RH-EE	S	35	50	7	62	10	56	9	10	8	5	M 6	0.15	5	18.0	13.0	24.6
KGF-N 2505 RH-EE	E	38	50	7	62	8	46	–	14	8	7	M 6	0.08	3	15.0	12.3	22.5
KGF-N 3205 RH-EE	E	45	58	7	70	10	59	–	16	8	8	M 6	0.08	5	24.0	21.5	49.3
KGF-N 3210 RH-EE	E	53	68	7	80	10	73	–	16	8	8	M 8x1	0.08	3	44.0	33.4	54.5
KGF-N 3240 RH-EE	S	53	68	7	80	14	45	7.5	16	10	8	M 6	0.08	4	17.0	14.9	32.4
KGF-N 4005 RH-EE	E	53	68	7	80	10	59	–	16	8	8	M 6	0.08	5	26.0	23.8	63.1
KGF-N 4010 RH-EE	E	63	78	9	95	10	73	–	16	8	8	M 8x1	0.08	3	50.0	38.0	69.1
KGF-N 5010 RH-EE	E	72	90	11	110	10	97	–	18	8	9	M 8x1	0.08	5	78.0	68.7	155.8
KGF-N 6310 RH-EE	E	85	105	11	125	10	99	–	20	8	10	M 8x1	0.08	4	86.0	76.0	197.0

[1] Dynamic load rating according to DIN 69051, part 4, draft 1978.
[2] Dynamic load rating according to DIN 69051, part 4, draft 1989.

Installation and maintenance

Installation and maintance of ball screw drives

Installation
Ball screw drives are precision machine components; their installation requires specialist knowledge and suitable measuring facilities. Alignment errors can generally not be felt when the screw drive is turned by hand, due to the low friction. Radial or eccentric forces must be taken up by external guides. Ball screw drives can absorb only axial forces. To avoid damage to the ball screw drive, limit switches and end stops must be installed in the machine.

Cover
Dirt that occurs during installation should be removed with paraffin, oil or petrol. Cold cleaners and paint solvents are not permitted. Ball screw drives must be protected against dust, chips, etc. even if equipped with wipers. Possible protective measures include:

– Bellows (suitable only for vertical installation without additional guide).

– Spiral spring cover.

– Telescopic tubes or sleeves (these take up a lot of axial space).

We also offer fully-protected complete systems:

– NEFF KGT-KOKON ball screw drives with self-closing cover strips (see p. 55)

– NEFF WIESEL mechanical linear drive units with integrated guide systems in encapsulated aluminium profile. Please contact us for further information.

Lubrication
Proper lubrication is important for the achievement of the calculated service lifetime of a ball screw drive, to prevent excessive warming, and to ensure smooth, quiet running. The same lubricants are used for the ball screw drives as for roller bearings.

Oil-mist lubrication
In the case of central lubrication with oil mist, note that only ball screw nuts without wipers may be used.

Oil lubrication
The oil supply should not exceed the volume lost via the wipers; otherwise use recirculating-oil lubrication.
Oil types: Viscosity 25 to 100 mm^2/s at 100°C.

Grease lubrication
Add grease as appropriate to the volume lost via the wipers (under normal operating conditions, it is sufficient to add grease every 200 to 300 hours). Experience shows that one-time lubrication for the service lifetime is not sufficient because of the seepage of grease.

Grease type: Roller bearing grease without solid lubricant shares. Fuchs Lubritech URETHYN E/M1 roller bearing grease in accordance with NLGI1 DIN ISO 2137 is used for the initial grease filling in the factory. For higher loads, use a grease with NGLI2 in accordance with DIN ISO 2137. You will find detailed information on the required quantities of grease in the Internet at www.neffaa.de

Operating temperature
The permissible operating temperature range for ball screw drives is between −30°C and +80°C, up to 110°C. for brief periods. A precondition for this is correct lubrication.
The torque may increase by a factor of up to 10 at temperatures below −20°C.

Installation and maintenance of trapezoidal screw drives

Installation
Trapezoidal screw drives must be aligned carefully during installation – if suitable measuring equipment is not available, the screw drive should be turned through its entire length by hand before the drive unit is attached. Variations in the amount of force required and/or marks on the external diameter of the screw indicate alignment errors between the spindle axis and guide. In this case, the relevant mounting bolts should first be loosened and the screw drive should be turned through by hand. If the amount of force required is now constant throughout, the appropriate components should be aligned, otherwise the alignment error should be localised by loosening further mounting bolts.

Cover
By virtue of their design, trapezoidal screw drives are less sensitive to dirt than ball screw drives, particularly at low speeds (manual operation).

Never the less motion drives, especially with plastic nuts, in particular require protection against dirt in the same way as ball screw drives.

Lubrication

Oil lubrication
Used only in special cases for trapezoidal screw drives.

Grease lubrication
The usual lubrication method for trapezoidal screw drives. Lubrication intervals are governed by operating conditions; it is advisable to clean the screw before greasing especially at use of heavy-duty lubricating machines.

Operating temperature
This depends on the type of nut used, the lubrication conditions and the user's requirements. Please consult us in the case of temperatures above 100°C (plastic nuts 70°C).

Wear
This can be checked manually: if the axial backlash with a single-start screw drive is more than $1/4$ of the lead, the nut should be replaced.

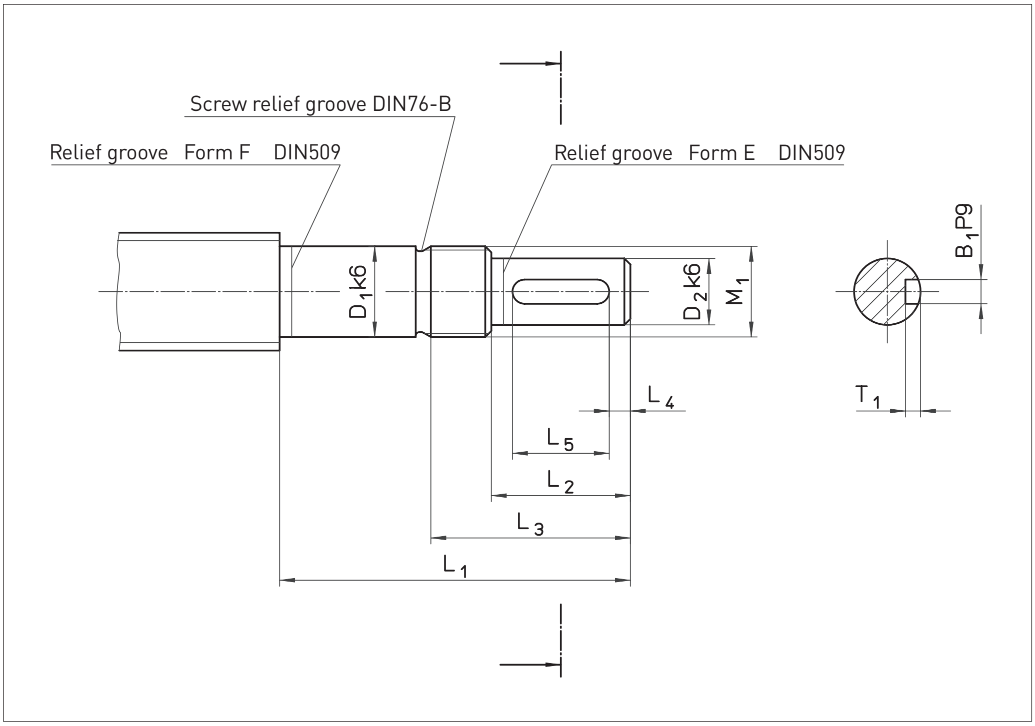
Ball screw drives
Screw end machining for movable/ fixed bearing

Screw end machining for movable/fixed bearing

The type of bearing influences the stiffness of the entire screw drive, and also the vibration and buckling behaviour of the screw. The end machining is carried out on the ball screws as necessary for the various types of bearing.

Note:
Bearings are not part of our delivery programme.

Form D – L



Form D	Dimensions [mm]									Bearing
KGT	D_1	D_2	L_1	L_2	L_3	L_4	L_5	M_1	B_1xT_1	ZKLF…2RS
1605, 1610	12	9	55	20	32	2.5	16	M 12x1	3x1.8	1255
2005, 2020, 2050	15	11	58	23	35	3.5	16	M 15x1	4x2.5	1560
2505, 2510, 2520, 2525, 2550	20	14	70	30	44	4	22	M 20x1	5x3	2068
3205, 3210, 3220, 3240	25	19	82	40	57	6	28	M 25x1.5	6x3.5	2575
4005, 4010, 4020, 4040	30	24	92	50	67	7	36	M 30x1.5	8x4	3080

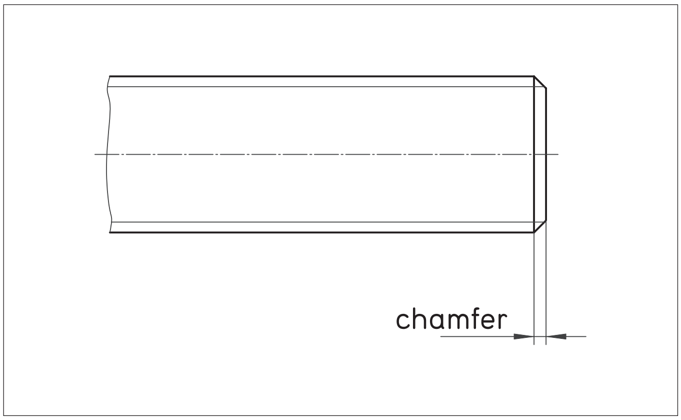
Form F	Dimensions [mm]									Bearing
KGT	D_1	D_2	L_1	L_2	L_3	L_4	L_5	M_1	B_1xT_1	ZARN…LTN
2505, 2510, 2520, 2525, 2550	15	11	73	23	35	3.5	16	M 15x1	4x2.5	1545
3205, 3240	20	14	88	30	45	4	22	M 20x1	5x3	2052
3210, 3220	20	14	107	30	50	4	22	M 20x1	5x3	2062
4005	25	19	105	40	58	6	28	M 25x1.5	6x3.5	2557
4010, 4020, 4040	25	19	120	40	63	6	28	M 25x1.5	6x3.5	2572
5010, 5020	35	28	145	60	82	10	40	M 35x1.5	8x4	3585
6310	40	36	175	80	103	8.5	63	M 40x1.5	10x5	4090

Ball screw drives
Screw end machining for movable/ fixed bearing

Form H	Dimensions [mm]									Bearing
KGT	D_1	D_2	L_1	L_2	L_3	L_4	L_5	M_1	B_1xT_1	ZARF...LTN
2505, 2510, 2520, 2525, 2550	15	11	85	23	35	3.5	16	M 15x1	4x2.5	1560
3205, 3240	20	14	102	30	44	4	22	M 20x1	5x3	2068
3210, 3220	20	14	122	30	49	4	22	M 20x1	5x3	2080
4005	25	19	120	40	57	6	28	M 25x1.5	6x3.5	2575
4010, 4020, 4040	25	19	135	40	63	6	28	M 25x1.5	6x3.5	2590
5010, 5020	35	28	160	60	81	10	40	M 35x1.5	8x4	35110
6310	40	36	195	80	105	8.5	63	M 40x1.5	10x5	40115

Form J	Dimensions [mm]									Bearing
KGT	D_1	D_2	L_1	L_2	L_3	L_4	L_5	M_1	B_1xT_1	FDX
1605, 1610	12	9	88	20	32	2.5	16	M 12x1	3x1.8	12
2005, 2020, 2050	15	11	92	23	35	3.5	16	M 15x1	4x2.5	15
2505, 2510, 2520, 2525, 2550	20	14	107	30	44	4	22	M 20x1	5x3	20
3205, 3210, 3220, 3240	25	19	122	40	57	6	28	M 25x1.5	6x3.5	25
4005, 4010, 4020, 4040	30	24	136	50	72	7	36	M 30x1.5	8x4	30
5010, 5020	40	36	182	80	102	8.5	63	M 40x1.5	10x5	40

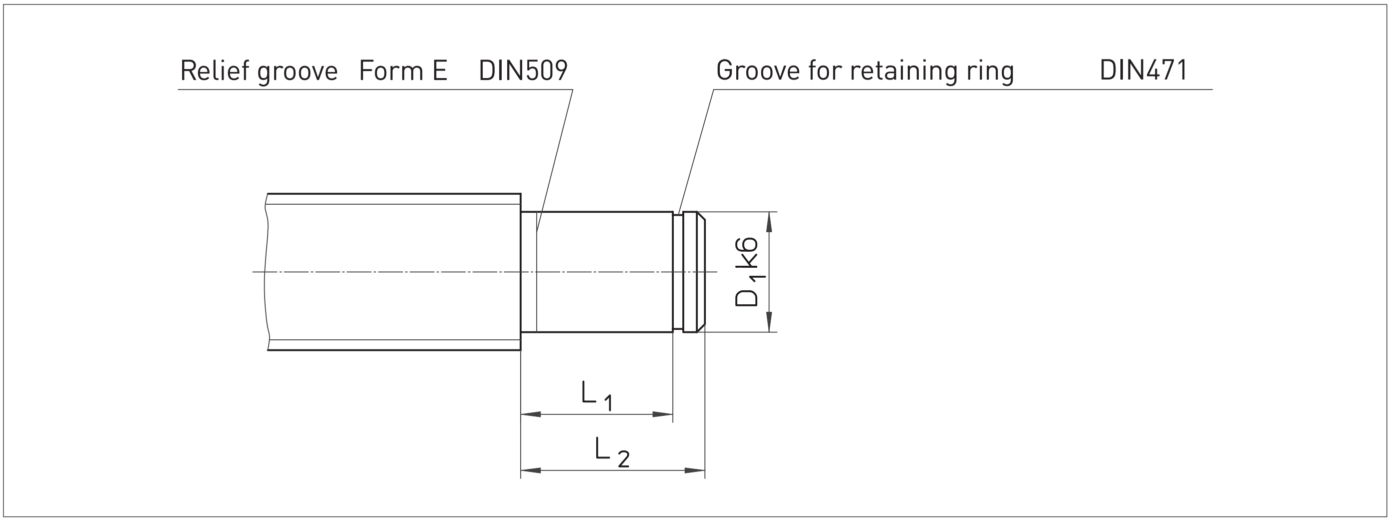
Form L	Dimensions [mm]									
KGT	D_1	D_2	L_1	L_2	L_3	L_4	L_5	M_1	B_1xT_1	Bearing
1605, 1610, 2005, 2020, 2050	12	9	58	20	30	2.5	16	M 12x1	3x1.8	7201 BE RS
2505, 2510, 2520, 2525, 2550	15	11	73	23	33	3.5	16	M 15x1	4x2.5	7202 BE RS
3205, 3210, 3220, 3240	20	14	88	30	43	4	22	M 20x1	5x3	7204 BE RS
4005, 4010, 4020, 4040	25	19	120	40	55	6	28	M 25x1.5	6x3.5	7205 BE RS
5010, 5020	35	28	145	60	77	10	40	M 35x1.5	8x4	7207 BE RS
6310	40	36	175	80	103	8.5	63	M 40x1.5	10x5	7208 BE RS



Form Z
Chamfer 2 x 45°: KGS of ø 12 – 25 mm
Chamfer 3 x 45°: KGS of ø 26 – 40 mm
Chamfer 4 x 45°: KGS of ø 44 – 50 mm

Ball screw drives
Screw end machining for movable/ fixed bearing

Form S – W



Form S	Dimensions [mm]				
KGT	D_1	L_1	L_2	Spacer sleeve	Bearing
1605, 1610	12	40	45	18x12.1x24	6001 RS
2005, 2020, 2050	15	46	51	21x15.1x28	6002 RS
2505, 2510, 2520, 2525, 2550	20	53	58	27x20.1x29	6004 RS
3205, 3210, 3220, 3240	25	53	58	32x25.1x23	6205 RS
4005, 4010, 4020, 4040	30	60	68	40x30.1x28	6206 RS
5010, 5020	40	80	88	50x40.1x44	6208 RS
6310	55	102	110	65x55.1x60	6211 RS

Form T	Dimensions [mm]				
KGT	D1	L1	L2	Inner ring	Roller bearing
1605, 1610	12	40	45	2 IR 12x16x20	HK 1614 RS
2005, 2020, 2050	15	46	51	2 IR 15x20x23	HK 2018 RS
2505, 2510, 2520, 2525, 2550	20	53	58	2 LR 20x25x26.5	HK 2518 RS
3205, 3210, 3220, 3240	25	53	58	2 LR 25x30x26.5	HK 3018 RS
4005, 4010, 4020, 4040	30	60	68	2 LR 30x35x30	HK 3518 RS
5010, 5020	40	80	88	4 LR 40x45x20	HK 4518 RS

Form W	Dimensions [mm]			
KGT	D1	L1	L2	Bearing
1605, 1610	12	8	12	6001 RS
2005, 2020, 2050	15	9	13	6002 RS
2505, 2510, 2520, 2525, 2550	20	12	16	6004 RS
3205, 3210, 3220, 3240	25	15	20	6205 RS
4005, 4010, 4020, 4040	30	16	21	6206 RS
5010, 5020	40	18	25	6208 RS
6310	55	21	29	6211 RS

Form G: Screw end annealed to customer's specification.

Form K: Produced specially to customer's drawing.

Ball screw drives
Sizing and selection

Lifetime
The (nominal) lifetime of a ball screw drive can be calculated analogue to that of a ball bearing.

! Note that vibration and shocks reduce the lifetime of the ball screw drive.

Average speed

$$n_m = \frac{n_1 \cdot q_1 + n_2 \cdot q_2 + \ldots + n_i \cdot q_i}{100} \qquad \text{(I)}$$

$n_1, n_2, \ldots$ Speeds [rpm] during $q_1, q_2, \ldots$

n_m Average speed [rpm]

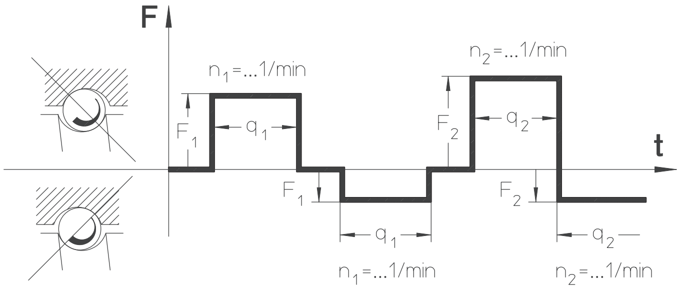
$q_1, q_2, \ldots$ Components of the duration of a load in one load direction in [%]

Dynamic equivalent bearing load

$$F_m = \sqrt[3]{F_1^3 \cdot \frac{n_1 \cdot q_1}{n_m \cdot 100} + F_2^3 \cdot \frac{n_2 \cdot q_2}{n_m \cdot 100} + \ldots + F_i^3 \cdot \frac{n_i \cdot q_i}{n_m \cdot 100}} \qquad \text{(II)}$$

$F_1, F_2, \ldots$ Axial loads [N] in one load direction during $q_1, q_2, \ldots$

F_m Dynamic equivalent bearing load [N]
Since loads can act on a ball screw drive in two directions, F_m should first be determined for each of two load directions; the larger value should then be included in the calculation of L. It is in general useful to draw a schematic diagram like the one below:



It should be noted that any pre-loading represents a continuous load.

Lifetime of a ball screw

$$L_{10} = \left(\frac{C}{F_m}\right)^3 \cdot 10^6 \qquad \text{(III)}$$

C Axial, dynamic load rating [N]
Centrally applied load [N] of constant force direction at which an appropriately large number of identical ball screw drives achieve a nominal lifetime of 10^6 revolutions.

➲ Technical data KGM/KGF see page 14 – 17

L_{10} Lifetime of the ball screw drive. Expressed as the number of revolutions achieved or exceeded by 90 % (L_{10}) of a sufficiently large sample of obviously identical ball screw drives before the first signs of material fatigue occur.

Ball screw drives
Sizing and selection

Example calculation lifetime of a ball screw drive

Given:
$F_1 = 30000$ N at $n_1 = 150$ 1/min for $q_1 = 21$ % of the duration of operation
$F_2 = 18000$ N at $n_2 = 1000$ 1/min for $q_2 = 13$ % of the duration of operation
$F_3 = 42000$ N at $n_3 = 75$ 1/min for $q_3 = 52$ % of the duration of operation
$F_4 = 1800$ N at $n_4 = 2500$ 1/min for $q_4 = 14$ % of the duration of operation

$\Sigma = 100$ %

Ball screw drive KGT 5010

Required: Maximum achievable lifetime under the given operating conditions.

Average speed n_m

from (I)

$$n_m = \frac{n_1 \cdot q_1 + n_2 \cdot q_2 + n_3 \cdot q_3 + n_4 \cdot q_4}{100}$$

$$n_m = \frac{150 \cdot 21 + 1000 \cdot 13 + 75 \cdot 52 + 2500 \cdot 14}{100} \; 1/\text{min}$$

$$\Rightarrow n_m = 550.5 \; 1/\text{min}$$

Dynamic equivalent bearing load F_m

from (II)

$$F_m = \sqrt[3]{F_1^3 \cdot \frac{n_1 \cdot q_1}{n_m \cdot 100} + F_2^3 \cdot \frac{n_2 \cdot q_2}{n_m \cdot 100} + F_3^3 \cdot \frac{n_3 \cdot q_3}{n_m \cdot 100} + F_4^3 \cdot \frac{n_4 \cdot q_4}{n_m \cdot 100}}$$

$$F_m = \sqrt[3]{^3 \cdot \frac{150 \cdot}{550.5 \cdot 100} + 18000^3 \cdot \frac{1000 \cdot 13}{550.5 \cdot 100} + 42000^3 \cdot \frac{75 \cdot 52}{550.5 \cdot 100} + 1800^3 \cdot \frac{2500 \cdot 14}{550.5 \cdot 100}} \; \text{N}$$

$$F_m = 20144 \text{ N}$$

Lifetime of a ball screw drive L_{10}

from (III)

$$L_{10} = \left(\frac{C}{F_m}\right)^3 \cdot 10^6$$

Axial, dynamic load rating C = 68700 N
➲ Technical data KGM/KGF see page 14 – 17

$$L_{10} = \left(\frac{68700}{20144}\right)^3 \cdot 10^6$$

$$L_{10} = 3.966 \cdot 10^7$$

Number of revolutions L_{10}

$$L_h = \frac{L_{10}}{n_m \cdot 60} = \frac{3.966 \cdot 10^7}{550.5 \cdot 60} = 1201 \text{ h}$$

Lifetime in hours L_h

Result:

Under the given load conditions, the selected screw drive has a total lifetime of $3.966 \cdot 10^7$ revolutions, which represents a time of 1201 hours.

Ball screw drives
Sizing and selection

Lifetime of a ball screw drive with pre-loaded nut system
The pre-loading force of the nut unit has the effect of a permanent load on the ball screw drive

Calculation of the dynamic equivalent bearing load F_m
Analog to the single nut (see page 25 equations (I) and (II))

Lifetime L

$$L = \left(F_{m1}^{\frac{10}{3}} + F_{m2}^{\frac{10}{3}}\right)^{-0.9} \cdot C^3 \cdot 10^6 \qquad \text{(IV)}$$

F_{m1}, F_{m2}, …	Dynamic equivalent bearing load of the first or second nut [N]
C	Axial, dynamic load rating [N] Centrally applied load [N] of constant force direction at which an appropriately large number of identical ball screw drives achieve a nominal lifetime of 10^6 revolutions.

➲ Technical data KGM/KGF see page 14 – 17

The calculation methods above are valid only under correct lubrication conditions. Dirt or lack of lubricant may significantly reduce the lifetime. Reduced lifetime must also be expected in the case of very short strokes – please contact us in these cases.

! **Ball screw drives cannot absorb radial forces or tilting moments**

Ball screw drives
Sizing and selection

Critical speed of ball screws

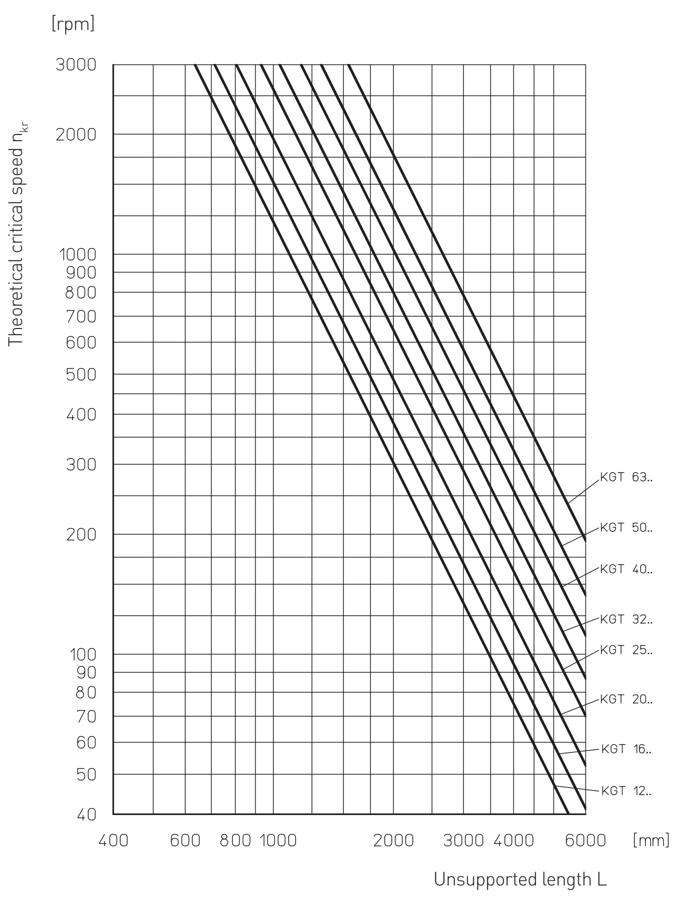
With thin, fast-rotating screws, there is a danger of "whipping". The method described below allows the resonant frequency to be estimated assuming a sufficiently rigid assembly. Furthermore, speeds in the vicinity of the critical speed considerably increase the risk of lateral buckling. The critical speed is therefore included in the calculation of the critical buckling force.

Maximum permissible speed

$$n_{zul} = 0.8 \cdot n_{kr} \cdot f_{kr} \quad \text{(V)}$$

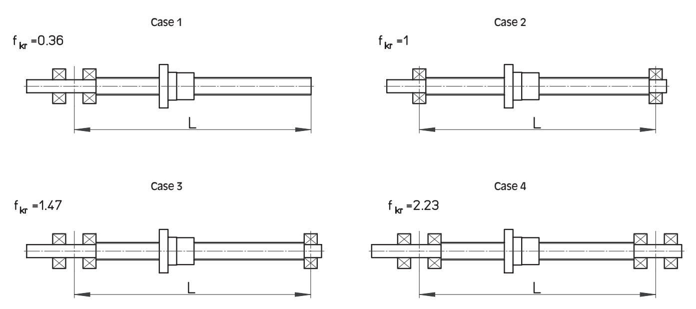
n_{zul}	Maximum permissible speed [rpm]
n_{kr}	Theoretical critical speed [rpm], that can lead to resonance effects ➲ see diagram
f_{kr}	Correction factor, considering the bearing support of the screw. ➲ see table
!	The operating speed must not exceed 80 % of the maximum speed

Theoretical critical speed n_{kr}



Bearing support

Typical values of correction factor f_{kr} corresponding to the usual cases of installation for standard screw bearings.



Ball screw drives
Sizing and selection

Critical buckling force of ball screws

With thin, fast-rotating screws under compressive load, there is a danger of lateral buckling. The procedure described below can be used to calculate the permissible axial force according to Euler.

Before the permissible compressive force is defined, allowance must be made for safety factors appropriate to the installation.

Maximum permissible axial force

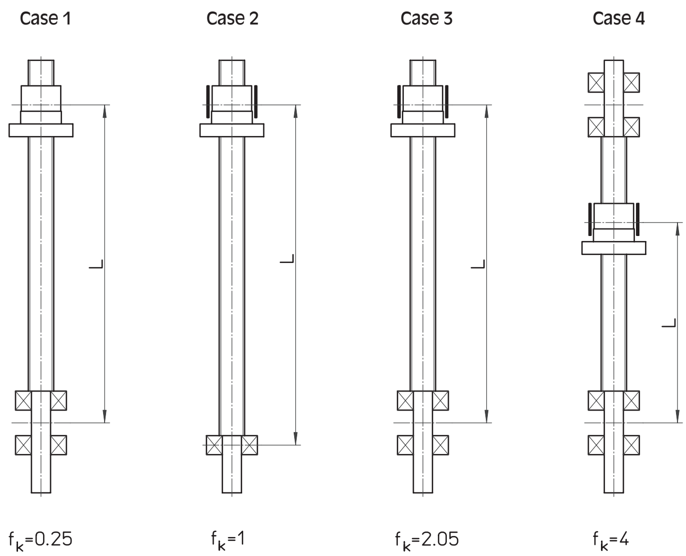
$$F_{zul} = 0.8 \cdot F_k \cdot f_k \qquad \text{(VI)}$$

F_{zul} Maximum permissible axial force [kN]
F_k Theoretical critical buckling force [kN] ➲ see diagram
f_k Correction factor, considering the bearing support of the screw. ➲ see table

! The operating force must not exceed 80 % of the maximum permissible axial force

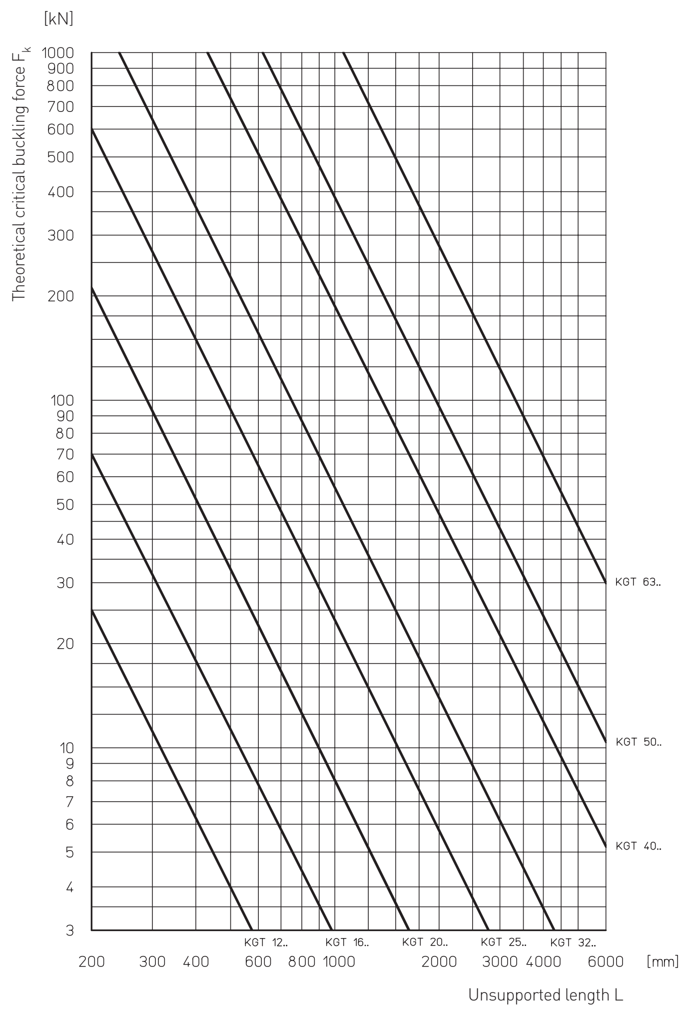
Bearing support

Typical values of correction factor f_k corresponding to the usual cases of installation for standard screw bearings.



Theoretical critical buckling force F_k

! The permissible maximum load is limited by the load rating.



Ball screw drives
Sizing and selection

Deflection of the screw under its own weight

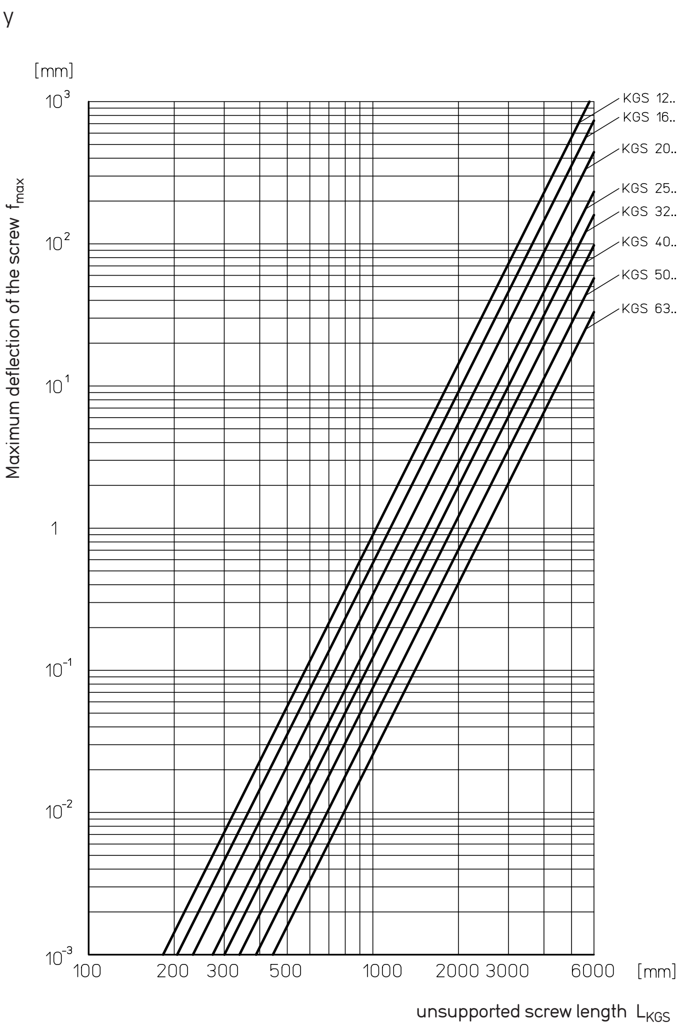
Even in the case of correctly installed screw drives where the resulting radial forces are absorbed by external guides, the weight of the unsupported screw itself may lead to deflection. The formula below allows you to calculate the maximum deflection of the screw.

Maximum deflection of screw

$$f_{max} = f_B \cdot 0.061 \cdot \frac{m'_{KGS} \cdot L_{KGS}{}^4}{I_Y} \qquad \text{(VII)}$$

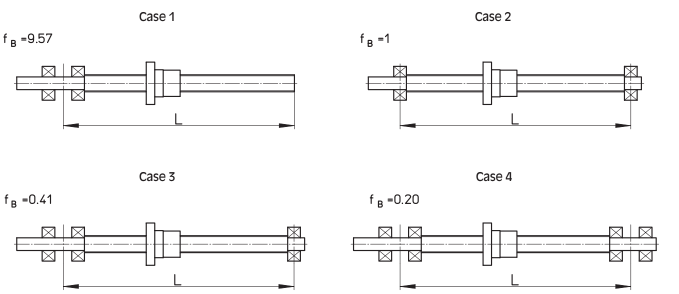
f_{max}	Maximum deflection of the screw [mm]
f_B	Correction factor considering the bearing support of the screw ➲ see table
I_Y	Planar moment of inertia [10^4 mm^4] ➲ see table page 11
L_{KGS}	Unsupported screw length [mm]
m'_{KGS}	Weight [kg/m]

Theoretical maximum deflection of screw



Bearing support

Typical values of correction factor f_B corresponding to the usual cases of installation for standard screw bearings.



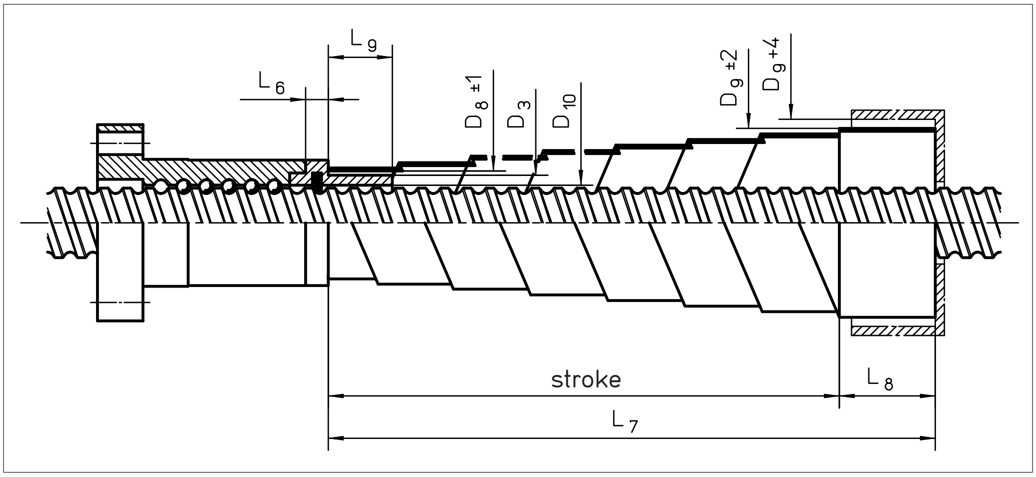
Accessories ball screw drives
Spiral spring cover

Spiral spring cover SF

Spiral spring cover for protection against ambient influences. Suitable for horizontal and vertical installation position.

Material:
Tempered spring band steel

When a spiral spring cover is used, seal form Z (centering sleeve) is used on the attachment side of the ball-screw nut. (see order code page 62)



For KGT 1605 / KGT 1610

D_3 = 22 mm
D_{10} = 17 mm
L_6 = 6 mm
L_9 = 21 mm

Type D_8/L_{7v}[1)]$/L_8$	L_{7h}[2)]	D_9
SF 25/100/20	60	35
SF 25/150/20	110	38
SF 25/200/20	160	41
SF 25/250/20	210	44
SF 25/300/30	240	43
SF 25/350/30	290	46
SF 25/400/30	340	49
SF 25/450/40	370	48
SF 25/500/40	420	51

For KGT 2005 / KGT 2020 / KGT 2050

D_3 = 26 mm
D_{10} = 21 mm
L_6 = 6 mm
L_9 = 21 mm

Type D_8/L_{7v}[1)]$/L_8$	L_{7h}[2)]	D_9
SF 30/150/30	90	39
SF 30/250/30	190	44
SF 30/350/30	290	49
SF 30/450/40	370	53
SF 30/550/40	470	58
SF 30/650/50	550	55
SF 30/750/50	650	59

For KGT 2505 / KGT 2510 / KGT 2520 / KGT 2525 / KGT 2550

D_3 = 28 mm
D_{10} = 26 mm
L_6 = 6 mm
L_9 = 21 mm

Type D_8/L_{7v}[1)]$/L_8$	L_{7h}[2)]	D_9
SF 30/150/30	90	39
SF 30/250/30	190	44
SF 30/350/30	290	49
SF 30/450/40	370	53
SF 30/550/40	470	58
SF 30/650/50	550	55
SF 30/750/50	650	59

For KGT 3205 / KGT 3240

D_3 = 38 mm
D_{10} = 33 mm
L_6 = 6 mm
L_9 = 26 mm

Type D_8/L_{7v}[1)]$/L_8$	L_{7h}[2)]	D_9
SF 40/150/30	90	51
SF 40/250/30	190	56
SF 40/350/30	290	60
SF 40/450/40	370	64
SF 40/550/40	470	68
SF 40/350/50	250	55
SF 40/450/50	350	59

For KGT 3205 / KGT 3240 (continued)

D_3 = 38 mm
D_{10} = 33 mm
L_6 = 6 mm
L_9 = 26 mm

Type D_8/L_{7v}[1)]$/L_8$	L_{7h}[2)]	D_9
SF 40/550/50	450	61
SF 40/650/50	550	66
SF 40/750/50	650	69
SF 40/450/60	330	55
SF 40/550/60	430	58
SF 40/650/60	530	62
SF 40/750/60	630	66
SF 40/900/60	780	70
SF 40/650/75	500	63
SF 40/750/75	600	66
SF 40/900/75	750	72
SF 40/1100/75	950	78
SF 40/1300/75	1150	84
SF 40/1500/75	-	87
SF 40/1000/100	800	69
SF 40/1200/100	1000	71
SF 40/1500/100	1300	79
SF 40/1800/100	1600	82
SF 40/1800/120	1560	83
SF 40/2000/120	1760	86
SF 40/2200/120	-	91

1) $L_{7v} = L_7$ vertical installation
2) $L_{7h} = L_7$ horizontal installation

For KGT 3210 (KGT 3220)

D_3 = 44 (48) mm
D_{10} = 35 mm
L_6 = 8 mm
L_9 = 27 mm

Type D_8/L_{7v}[1)]$/L_8$	L_{7h}[2)]	D_9
SF 50/150/30	90	63
SF 50/250/30	190	68
SF 50/250/50	150	62
SF 50/350/50	250	66
SF 50/450/50	350	70
SF 50/550/50	450	73
SF 50/550/60	430	68
SF 50/650/60	530	73
SF 50/750/60	630	76
SF 50/750/75	600	78
SF 50/900/75	750	84
SF 50/1100/75	950	90
SF 50/1100/100	900	77
SF 50/1300/100	1100	80
SF 50/1500/100	1300	87
SF 50/1800/100	–	94
SF 50/1700/120	1460	91
SF 50/1900/120	1660	97
SF 50/2100/120	1860	102
SF 50/2300/120	–	105
SF 50/2500/120	–	111
SF 50/2800/120	–	118
SF 50/2800/150	2500	119
SF 50/3000/150	–	124
SF 50/3000/180	2640	123
SF 50/3250/180	–	130
SF 50/3250/200	2850	128
SF 50/3500/200	–	134

Ball screw drives
Sizing and selection

Example calculation for a ball screw drive

Given: !

Ball screw drive KGT 5010,
Length L = 2000 mm
Installation case 3
Maximum operating speed: n_{max} = 3000 [1/min]

Required: ?

Is the operating speed uncritical?
What is the permissible axial force?
What is the maximum deflection?

Maximum permissible speed n_{zul}

from (V)

$$n_{zul} = 0.8 \cdot n_{kr} \cdot f_{kr} = 0.8 \cdot 1290 \ \ 1/min \cdot 1.47 = 1517 \ \ 1/min$$

$$\Rightarrow n_{zul} \equiv 1517 \ \ 1/min \quad (< \text{limit speed!})$$

Theoretical critical speed n_{kr} = 1290 rpm
➲ from diagram "Theoretical critical speed"

from (VI)

$$F_{zul} = 0.8 \cdot F_k \cdot f_k = 0.8 \cdot 95 kN \cdot 2.05 = 156 kN$$

$$\Rightarrow F_{zul} = 153 \ \ kN \ (\text{max. static load rating } C_0 \, !)$$

Theoretical critical buckling force F_K = 95 kN
➲ from diagram "Theoretical critical buckling force"

from (VII)

$$f_{max} = f_B \cdot 0.061 \cdot \frac{m'_{KGS} \cdot L_{KGS}}{I_Y} = 0.41 \cdot 0.061 \cdot \frac{13.50 \, kg/m \cdot 2m}{18.566 \, cm^4}$$

$$f_{max} = 0.036 \ mm$$

Weight m'_{KGS} = 13.50 kg/m
Planar moment of inertia I_Y = 18.566 cm^4
➲ from table page 11

Result:

The selected screw drive may be operated only at n_{max} = 1517 rpm.
It can be statically loaded with a maximum axial force of 150 kN,
and when installed horizontally has a maximum deflection of 0.036 mm

Note the dynamic load rating!