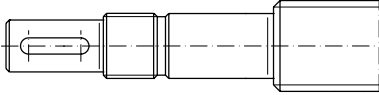
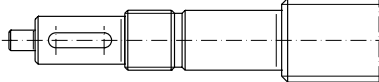
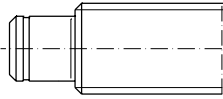
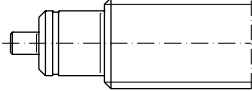

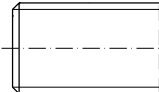
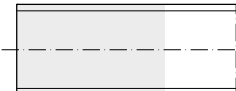

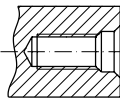


## END MACHINING

### Overview

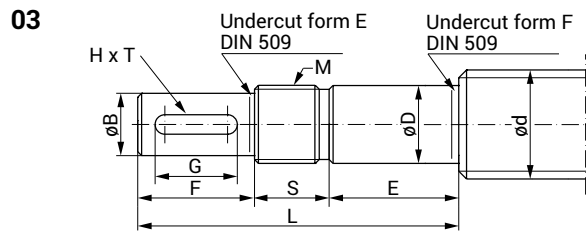
Form	Description	Presentation
03	Fixed side (for fixed support)	
04	Fixed side (for fixed support)	
05	Supported side (for simple support)	
06	Supported side (for simple support)	
0	Without end machining – cut to size	
C	End with chamfer	
A	End annealed	
SA	End machining according to the customer's drawing	

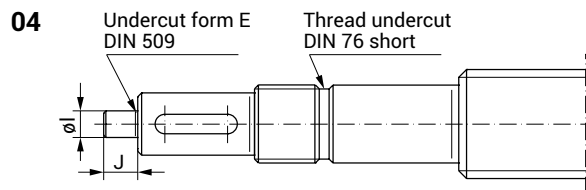
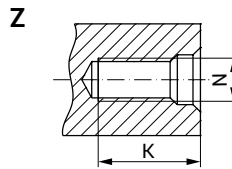
Option	Description	Presentation
Z	End face with centering hole	

**i** We also offer straightening of the screw shaft according to the customer's specification.

**Form 03, 04 – fixed side**



**Option**



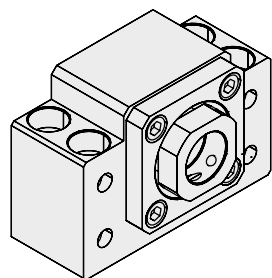
**i** Only for form 03

Support type	Dimensions [mm]															
	d	M	D	B (h7)	E	F	S	L	G	H (P9)	T	I	J	N	K	
BK10	16	M10x1	10 (-0,005/-0,012)	8	20	20	16	56	14	2	1,2	4	10	-	-	
BK12	16/20	M12x1	12 (-0,005/-0,012)	10	22	23	14	59	16	3	1,8	4	10	-	-	
BK15	20	M15x1	15 (-0,005/-0,014)	12	28	30	12	70	20	4	2,5	6	15	M5	12	
BK17	25	M17x1	17 (-0,005/-0,014)	15	36	30	17	83	20	5	3,0	6	15	M5	12	
BK20	32	M20x1	20 (-0,005/-0,014)	17	38	30	15	83	20	5	3,0	6	15	M5	12	
BK25	40	M25x1,5	25 (-0,005/-0,014)	20	47	50	18	115	36	6	3,5	6	15	M6	16	
BK30	40	M30x1,5	30 (-0,005/-0,015)	25	47	60	25	132	45	8	4,0	6	15	M8	19	

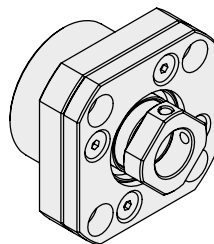
Support type	Dimensions [mm]															
	d	M	D	B (h7)	E	F	S	L	G	H (P9)	T	I	J	N	K	
EK06	8	M6x0,75	6 (-0,008/-0,015)	4	20	8	8	36	-	-	-	4	10	-	-	
EK08	10/12	M8x1	8 (-0,008/-0,015)	6	22	9	10	41	6	2	1,2	4	10	-	-	
FK10	16	M10x1	10 (-0,008/-0,015)	8	25	20	11	56	14	2	1,2	4	10	-	-	
FK12	16/20	M12x1	12 (-0,008/-0,017)	10	25	23	11	59	16	3	1,8	4	10	-	-	
FK15	20	M15x1	15 (-0,008/-0,017)	12	34	30	13	77	20	4	2,5	6	15	M5	12	
FK17	25	M17x1	17 (-0,008/-0,017)	15	43	30	15	88	20	5	3,0	6	15	M5	12	
FK20	32	M20x1	20 (-0,010/-0,020)	17	45	30	17	92	20	5	3,0	6	15	M5	12	
FK25	40	M25x1,5	25 (-0,010/-0,020)	20	56	50	20	126	36	6	3,5	6	15	M6	16	
FK30	40	M30x1,5	30 (-0,010/-0,020)	25	47	60	25	132	45	8	4,0	6	15	M8	19	

**Support types – fixed side (fixed bearings)**

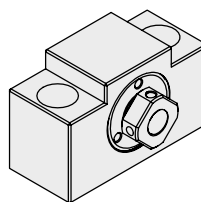
Type BK



Type FK

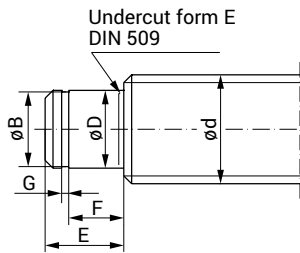


Type EK

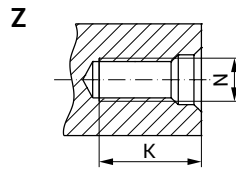


**Form 05, 06 – supported side**

**05**

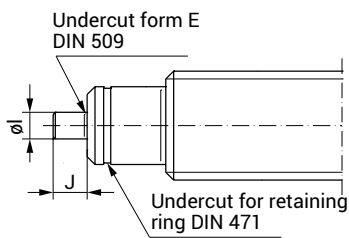


**Option**



**i** Only for form 05

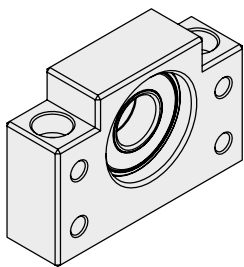
**06**



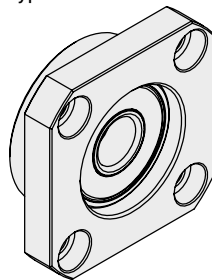
Support type	Dimensions [mm]									
	d	D	B (0/-0,2)	E	F (+0,2/0)	G (H13)	I	J	N	K
EF06	8	6 (-0,005/-0,012)	5,7	9	6,8	0,8	4	10	-	-
EF08	10/12	6 (-0,005/-0,012)	5,7	9	6,8	0,8	4	10	-	-
BF/FF10	16	8 (-0,005/-0,012)	7,6	10	7	1,1	4	10	-	-
BF/FF12	16/20	10 (-0,005/-0,012)	9,6	11	8	1,1	4	10	M4	10
BF/FF15	20	15 (-0,005/-0,014)	14,3	13	9	1,1	6	15	M5	12
BF/FF17	25	17 (-0,005/-0,014)	16,2	16	12	1,1	6	15	M6	16
(BF)/FF20	32	20 (-0,005/-0,014)	19,0	(16)/19	(12)/14	1,3	6	15	M6	16
BF/FF25	40	25 (-0,005/-0,014)	23,9	20	15	1,3	6	15	M10	22
BF/FF30	40	30 (-0,005/-0,015)	28,6	21	16	1,6	6	15	M10	22

**Support types – supported side (floating bearings)**

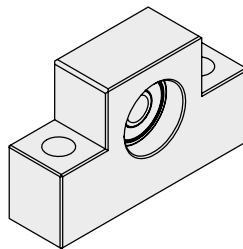
Type BF



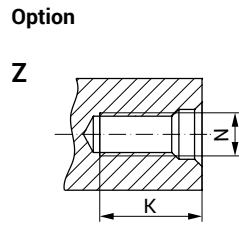
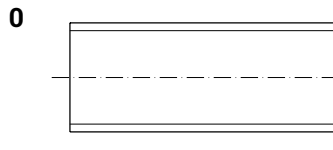
Type FF



Type EF



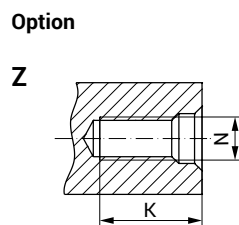
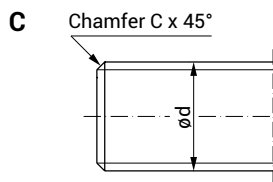
**Form 0 – without (cut to size)**



Dimensions [mm]		
d	N	K
8	-	-
10	-	-
12	-	-
16	-	-
20	M5	12
25	M6	16
32	M6	16
40	M10	22

**i** Table is valid for forms 0, C and A

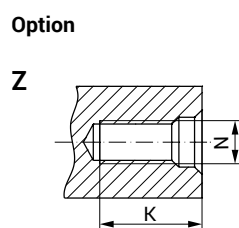
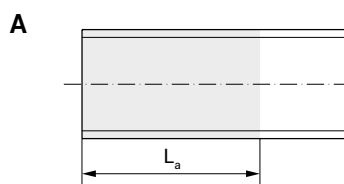
**Form C – end with chamfer**



Dimensions [mm]	
d	C
8	1
10	
12	
16	
20	2
25	
32	3
40	

**i** Dimensions can be found at form 0

**Form A – end annealed**



The length of annealing  $L_a$  [mm] must be specified in the additional text.

**i** Dimensions can be found at form 0

**Form SA – according to the customer's drawing**

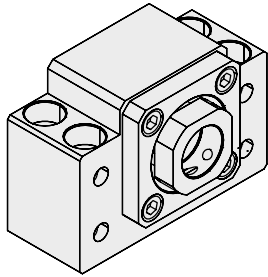
End machining according to an individual customer's drawing.

## SUPPORT UNITS OF THE BALL SCREW

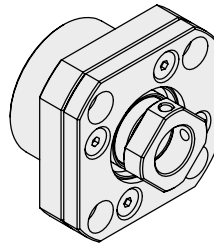
### Support units technical data

#### Fixed side support units

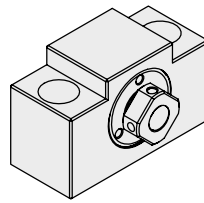
Type BK



Type FK



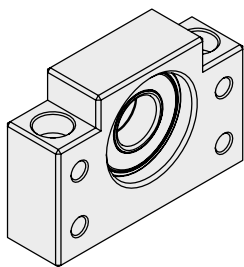
Type EK



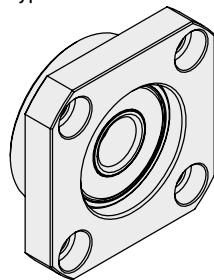
Support unit type	Bearing designation	Basic dynamic axial load rating [kN]	Basic static axial load rating [kN]	Max. starting load [N · cm]	Inner diameter d1 [mm]	Ball screw diameter d [mm]
EK06	706A DF	1,38	1,73	0,5	6	8
EK08	708A DF	2,42	3,35	0,9	8	10/12
BK10/FK10	7000A DF	7,06	7,88	1,9	10	16
BK12/FK12	7001A DF	7,58	9,02	2,1	12	16/20
BK15/FK15	7002A DF	8,02	10,38	2,3	15	20
BK17/FK17	7203A DF	14,20	18,18	3,7	17	25
BK20	7004A DF	14,20	20,00	3,8	20	32
FK20	7204A DF	18,95	25,15	5,5	20	32
BK25/FK25	7205A DF	21,21	31,06	7,3	25	40
BK30/FK30	7206A DF	29,44	44,70	10,5	30	40

#### Supported side support units

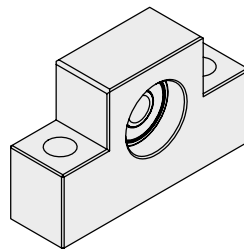
Type BF



Type FF

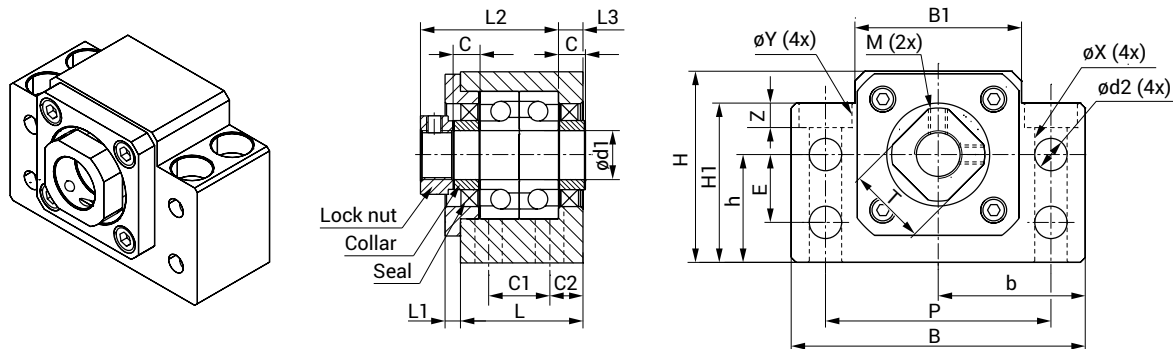


Type EF



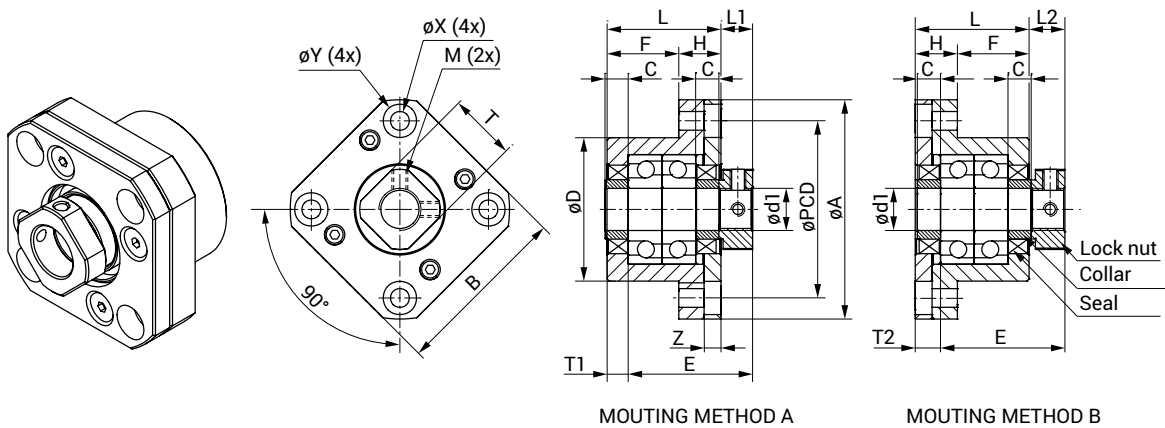
Support unit type	Bearing designation	Basic dynamic radial load rating [kN]	Basic static radial load rating [kN]	Inner diameter d1 [mm]	Ball screw diameter d [mm]
EF06	606 ZZ	2,26	0,84	6	8
EF08	606 ZZ	2,26	0,84	6	10/12
BF10/FF10	608 ZZ	3,30	1,37	8	16
BF12/FF12	6000 ZZ	4,55	1,97	10	16/20
BF15/FF15	6002 ZZ	5,60	2,83	15	20
BF17/FF17	6203 ZZ	9,55	4,80	17	25
BF20	6004 ZZ	9,40	5,00	20	32
FF20	6204 ZZ	12,80	6,60	20	32
BF25/FF25	6205 ZZ	14,00	7,85	25	40
BF30/FF30	6206 ZZ	19,50	11,30	30	40

**Support unit BK – fixed side, rectangular type**



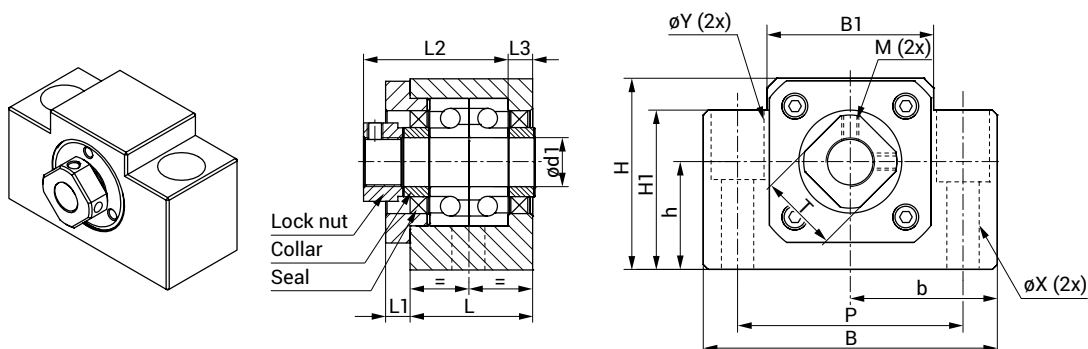
Type	Dimensions [mm]																						Mass [kg]
	d1	L	L1	L2	L3	C1	C2	B	H	b	h	B1	H1	E	P	d2	X	Y	Z	M	T	C	
BK10	10	25	5	29,5	5	13	6	60	39	30	22	34	32,5	15	46	5,5	6,6	10,8	5,0	M3	16	5,5	0,40
BK12	12	25	5	29,5	5	13	6	60	43	30	25	34	32,5	18	46	5,5	6,6	10,8	1,5	M4	19	5,5	0,41
BK15	15	27	6	32,0	6	15	6	70	48	35	28	40	38	18	54	5,5	6,6	11,0	6,5	M4	22	6,0	0,58
BK17	17	35	9	44,0	7	19	8	86	64	43	39	50	55	28	68	6,6	9,0	14,0	8,5	M4	24	7,0	1,30
BK20	20	35	8	43,0	8	19	8	88	60	44	34	52	50	22	70	6,6	9,0	14,0	8,5	M4	30	8,0	1,20
BK25	25	42	12	54,0	9	22	10	106	80	53	48	64	70	33	85	9,0	11,0	17,0	11,0	M6	35	9,0	2,35
BK30	30	45	14	61,0	9	23	11	128	89	64	51	76	78	33	102	11,0	14,0	20,0	13,0	M6	40	9,0	3,33

**Support unit FK – fixed side, round type**



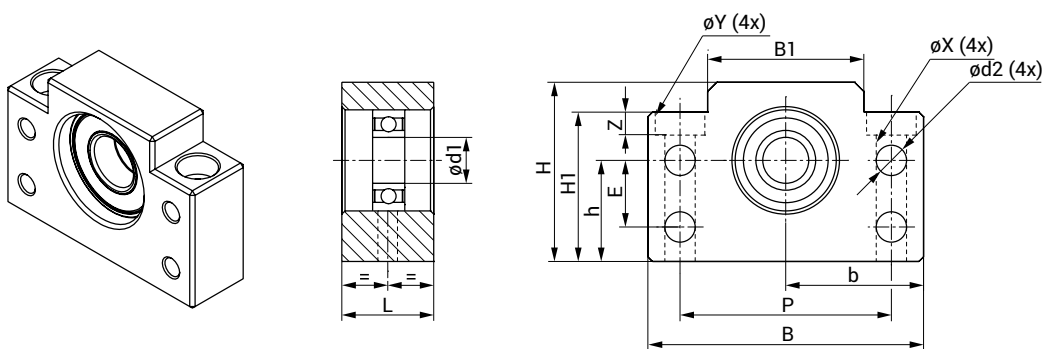
Type	Dimensions [mm]																			Mass [kg]
	d1	L	H	F	E	D (g6)	A	PCD	B	L1	T1	L2	T2	X	Y	Z	M	T	C	
FK10	10	27	10	17	29,5	34	52	42	42	7,5	5	8,5	6	4,5	8,0	4	M3	16	5,5	0,23
FK12	12	27	10	17	29,5	36	54	44	44	7,5	5	8,5	6	4,5	8,0	4	M4	19	5,5	0,25
FK15	15	32	15	17	36,0	40	63	50	52	10	6	12	8	5,5	9,5	6	M4	22	10,0	0,39
FK17	17	45	22	23	47,0	50	77	62	61	11	9	14	12	6,6	11,0	10	M4	24	10,0	0,81
FK20	20	52	22	30	50,0	57	85	70	68	8	10	12	14	6,6	11,0	10	M4	30	11,0	1,02
FK25	25	57	27	30	59,0	63	98	80	79	13	10	20	17	9,0	15,0	13	M5	35	15,0	1,48
FK30	30	62	30	32	61,0	75	117	95	93	11	12	17	18	11,0	17,5	15	M6	40	9,0	2,32

**Support unit EK – fixed side, rectangular type**



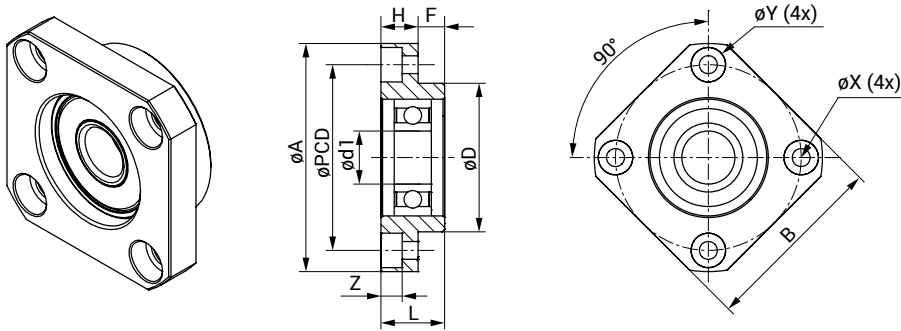
Type	Dimensions [mm]																	Mass [kg]
	d1	L	L1	L2	L3	H	B	b (±0,02)	h (±0,02)	B1	H1	P	X	Y	Z	M	T	
EK06	6	20	5,5	22	3,5	25	42	21	13	18	20	30	5,5	9,5	11	M3	12	0,15
EK08	8	23	7,0	26	4,0	32	52	26	17	25	26	38	6,6	11,0	12	M3	14	0,26

**Support unit BF – supported side, rectangular type**



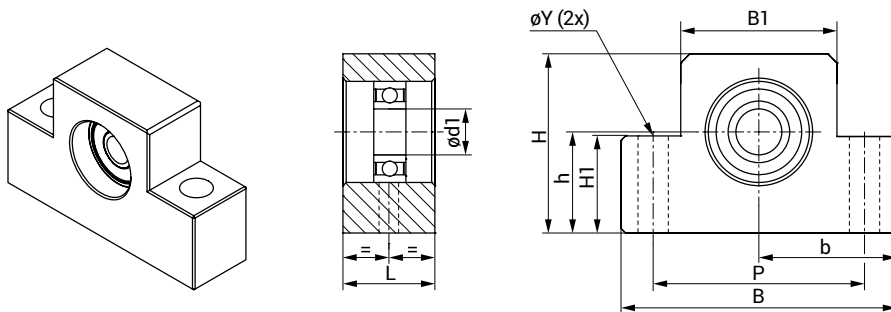
Type	Dimensions [mm]														Mass [kg]
	d1	L	B	H	b (±0,02)	h (±0,02)	B1	H1	E	P	d2	X	Y	Z	
BF10	8	20	60	39	30	22	34	32,5	15	46	5,5	6,6	10,8	5,0	0,30
BF12	10	20	60	43	30	25	34	32,5	18	46	5,5	6,6	10,8	1,5	0,30
BF15	15	20	70	48	35	28	40	38,0	18	54	5,5	6,6	11,0	6,5	0,40
BF17	17	23	86	64	43	39	50	55,0	28	68	6,6	9,0	14,0	8,5	0,75
BF20	20	26	88	60	44	34	52	50,0	22	70	6,6	9,0	14,0	8,5	0,76
BF25	25	30	106	80	53	48	64	70,0	33	85	9,0	11,0	17,0	11,0	1,43
BF30	30	32	128	89	64	51	76	78,0	33	102	11,0	14,0	20,0	13,0	1,94

**Support unit FF – fixed side, round type**



Type	Dimensions [mm]												Mass [kg]
	d1	L	H	F	D (g6)	A	PCD	B	X	Y	Z		
FF10	8	12	7	5	28	43	35	35	3,4	6,5	4,0	0,10	
FF12	10	15	7	8	34	52	42	42	4,5	8,0	4,0	0,13	
FF15	15	17	9	8	40	63	50	52	5,5	9,5	5,5	0,20	
FF17	17	20	11	9	50	77	62	61	6,6	11,0	6,5	0,33	
FF20	20	20	11	9	57	85	70	68	6,6	11,0	6,5	0,43	
FF25	25	24	14	10	63	98	80	79	9,0	14,0	8,5	0,66	
FF30	30	27	18	9	75	117	95	93	11,0	17,0	11,0	1,03	

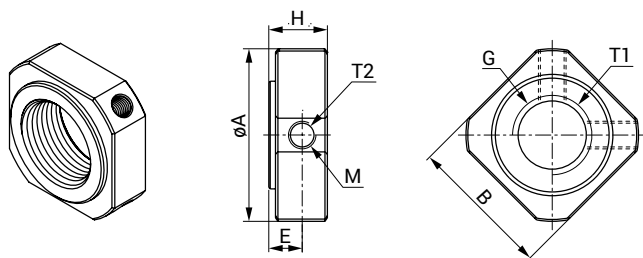
**Support unit EF – supported side, rectangular type**



Type	Dimensions [mm]												Mass [kg]
	d1	L	B	H	b (±0,02)	h (±0,02)	B1	H1	P	X	Y	Z	
EF06	6	12	42	25	21	13	18	20	30	5,5	9,5	11	0,10
EF08	6	14	52	32	26	17	25	26	38	6,6	11,0	12	0,15



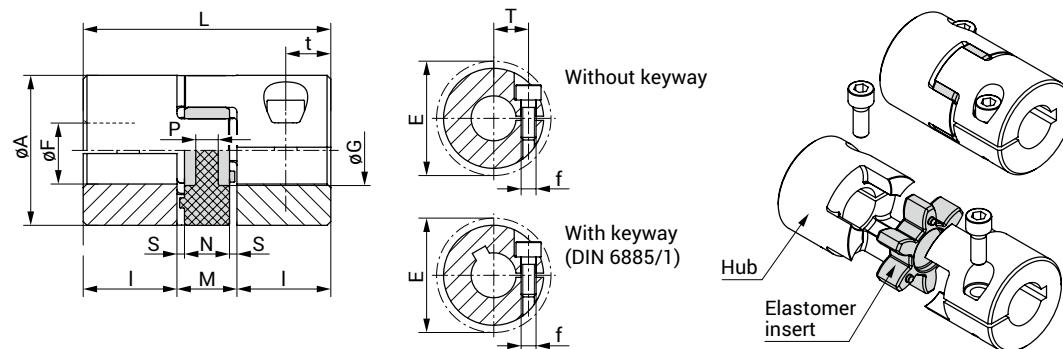
### Precision lock nut



Type	Dimensions [mm]						Tightening torque [Nm]		Weight [g]
	A	H	G	B	E	M	T1	T2	
M10x1	19,0	8	M10x1,0	16	5,5	M3	3,0	0,6	8
M12x1	22,8	8	M12x1,0	19	5,5	M4	6,5	1,5	14
M15x1	25,8	8	M15x1,0	22	4,75	M4	8,0	1,5	16
M17x1	29,0	13	M17x1,0	24	9,0	M4	9,5	1,5	24
M20x1	35,0	11	M20x1,0	30	7,0	M4	17,0	1,5	34
M25x1,5	43,0	15	M25x1,5	35	10,0	M6	21,0	5,0	54
M30x1,5	48,0	20	M30x1,5	40	14,0	M6	32,0	5,0	76

### COUPLINGS

#### Zero backlash couplings



**i** Hub material: aluminum

Size	T <sub>K0</sub> [Nm]	T <sub>Kmax</sub> [Nm]	F (F7)		f	M <sub>s</sub> [Nm]	Hub		n <sub>max</sub> [min <sup>-1</sup> ]	A [mm]	G [mm]	L [mm]	I [mm]	M [mm]	N [mm]	S [mm]	P [mm]	t [mm]	T [mm]	E [mm]	Misalignments		
			min [mm]	max [mm]			Mass [kg]	J [10 <sup>-6</sup> -kg·m <sup>2</sup> ]													ΔK <sub>s</sub> [mm]	ΔK <sub>c</sub> [mm]	ΔK <sub>α</sub> [°]
7	2	4	3	7	M2	0,35	0,003	0,085	40000	14	-	22	7	8	6	1,0	6	4	5,25	15,0	0,6	±0,10	±1,0
9	5	10	4	9	M2,5	0,75	0,007	0,42	28000	20	7,2	30	10	10	8	1,0	2	5	7,25	23,4	0,8	±0,10	±1,0
14	12,5	25	6	16	M3	1,4	0,018	2,6	19000	30	10,5	35	11	13	10	1,5	2	5,5	11,25	32,2	1,0	±0,09	±0,9
19/24	17	34	10	20	M6	11	0,071	18,1	14000	40	18	66	25	16	12	2,0	3,5	12	15,00	45,7	1,2	±0,06	±0,9
24/28	60	120	10	32	M6	11	0,156	74,9	10600	55	27	78	30	18	14	2,0	4	12	20,75	56,4	1,4	±0,10	±0,9
28/38	160	320	14	35	M8	25	0,240	163,9	8500	65	30	90	35	20	15	2,5	5,2	13,5	25,00	72,6	1,5	±0,11	±0,9
38/45	325	650	19	45	M8	25	0,440	465,5	7100	80	38	114	45	24	18	3,0	5,6	16	31,25	83,3	1,8	±0,12	±0,9

$T_{KN}$	Coupling nominal torque
$T_{Kmax}$	Coupling maximum torque
$M_S$	Screw tightening torque
$J$	Moment of inertia of coupling hub
$n_{max}$	Maximum rotational speed
$\Delta K_a$	Maximum axial misalignment
$\Delta K_r$	Maximum radial misalignment
$\Delta K_w$	Maximum angular misalignment

In the case of coupling hub without keyway, the maximum transmissible torque is a lower value between the coupling maximum torque  $T_{Kmax}$  and the transmissible torque, which can be found in the following table.

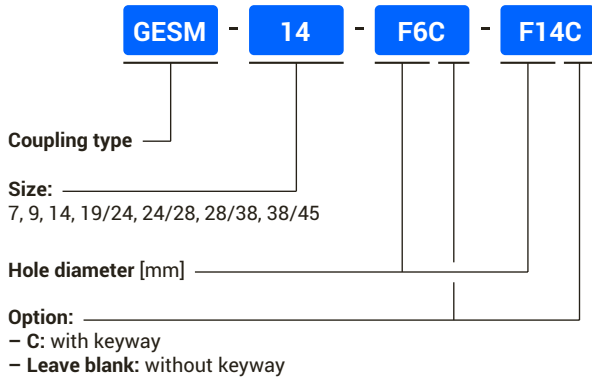
Recommended coupling bore diameter F [mm] and transmissible torque [Nm], valid for shaft tolerances k6:

Size	Ø 4	Ø 5	Ø 6	Ø 7	Ø 8	Ø 9	Ø 10	Ø 11	Ø 12	Ø 14	Ø 15	Ø 16	Ø 19	Ø 20	Ø 22	Ø 24	Ø 25	Ø 28	Ø 30	Ø 32	Ø 35	Ø 38	Ø 40	Ø 42	Ø 45
7	0,7	0,8	1	1,1																					
9	1,1	1,4	1,7	1,9	2,2	2,5																			
14			2,5	2,9	3,3	3,7	4,1	4,6	5	5,8	6,2	6,6													
19/24							23	25	27	32	34	36	43	45											
24/28							23	25	27	32	34	36	43	45	50	54	57	63							
28/38										58	62	66	79	83	91	100	104	116	124	133	145				
38/45													79	83	91	100	104	116	124	133	145	158	166	174	187

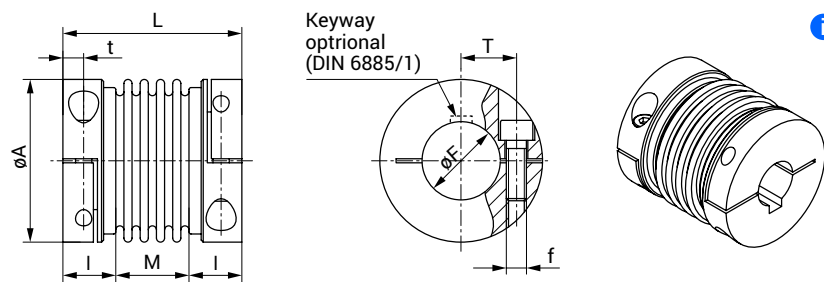
**Operating conditions**

Operating temperature	-30 ~ +90	[°C]
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**How to order**



## Bellow couplings



**i** Hub material: aluminum (size 150 – hub material: steel)

Size	T <sub>KN</sub> [Nm]	T <sub>Kmax</sub> * [Nm]	F (F7)		f	M <sub>s</sub> [Nm]	Coupling		A [mm]	L [mm]	l [mm]	M [mm]	t [mm]	T [mm]	Misalignments		
			min [mm]	max [mm]			Mass [kg]	J [10 <sup>-3</sup> ·kg·m <sup>2</sup> ]							ΔK <sub>a</sub> [mm]	ΔK <sub>r</sub> [mm]	ΔK <sub>w</sub> [°]
2	2	3	4	12,7	M3	2,3	0,02	0,002	25	30	10,5	9	4,0	8	± 0,5	± 0,2	± 1
4,5	4,5	7	6	16	M4	4	0,05	0,007	32	40	13,0	14	5,0	11	± 1,0	± 0,2	± 1
10	10	15	6	24	M4	4,5	0,06	0,016	40	44	13,0	18	5,0	14	± 1,0	± 0,2	± 1
15	15	23	8	28	M5	8	0,16	0,065	49	58	21,5	15	6,5	17	± 1,0	± 0,2	± 1
30	30	45	10	32	M5	15	0,25	0,120	56	68	26,0	16	7,5	20	± 1,0	± 0,2	± 1
60	60	90	14	35	M6	40	0,40	0,300	66	79	28,0	23	9,5	23	± 1,5	± 0,2	± 1
80	80	120	16	42	M8	70	0,70	0,750	82	92	32,5	27	11,0	27	± 2,0	± 0,2	± 1
150	150	225	19	42	M10	85	1,70	1,800	82	92	32,5	27	11,0	27	± 2,0	± 0,2	± 1

\* ≈ 1,5 × TKN. Brief overloads of up to 1,5 × the rated (nominal) torque are acceptable.

T <sub>KN</sub>	Coupling nominal torque
T <sub>Kmax</sub>	Coupling maximum torque
M <sub>s</sub>	Screw tightening torque
J	Moment of inertia of coupling
ΔK <sub>a</sub>	Maximum axial misalignment
ΔK <sub>r</sub>	Maximum radial misalignment
ΔK <sub>w</sub>	Maximum angular misalignment

### Operating conditions

Operating temperature	-30 ~ +100	[°C]
Max. rotational speed	Up to 10000	[min <sup>-1</sup> ]

### How to order

