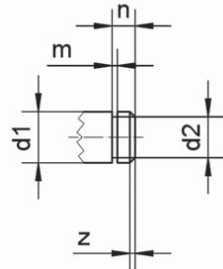
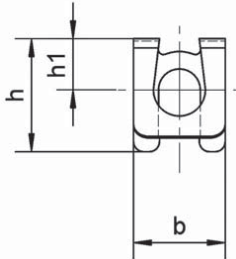
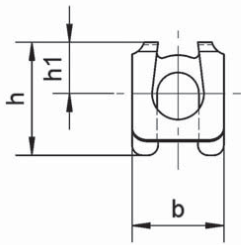


SL-retainers

for bolts and shafts with groove; compensating for play



SL-retainers with relief ²⁾
(mbo standard 88)

SL-retainers without relief

mbo standard 08

Example for ordering: SL-retainer for bolt diameter $d1 = 10 \text{ mm}$;
SL-retainer 10 mbo 08; order number: 10 08 0000 0010

mbo identifier	Order number	Nom. size d1	Retainer					Max. axial thrust ca. N ¹⁾	Mass (kg) 100 pcs	Bolts				
			b	h	h1	a ≈	s			d1 h11	d2 h11	m ³⁾ +0.1	n ³⁾	z
4 mbo 08	10 08 0000 0004	4	7	8.6	4.1	2.7	0.3	1000	0.019	4	3.2	0.64	2	0.5
5 mbo 08	10 08 0000 0005	5	9	10.9	5	3.3	0.4	1300	0.034	5	4	0.74	2.5	0.5
6 mbo 08	10 08 0000 0006	6	11	13.9	6.2	3.8	0.4	1500	0.063	6	5	0.74	3	0.75
8 mbo 08	10 08 0000 0008	8	14	18	8.6	3.9	0.45	3600	0.109	8	6	0.94	3.5	1
10 mbo 08	10 08 0000 0010	10	18	22	10	4.9	0.5	6400	0.211	10	8	1.05	4.5	1
12 mbo 08	10 08 0000 0012	12	22	25.9	11.8	5	0.5	9600	0.28	12	9	1.15	5	1.25
14 mbo 08	10 08 0000 0014	14	25.1	30.2	13.5	6.3	0.6	11320	0.474	14	10	1.25	5.5	1.5
16 mbo 08	10 08 0000 0016	16	28	34	16.2	5.4	0.6	13500	0.563	16	12	1.35	6	1.5

¹⁾ for bolts of 500 N/mm² tensile strength

²⁾ only for size 8 mbo 08

³⁾ dimensional variations according to DIN 2768, medium

13_01
01/2007

Material:

spring band steel, hardened and annealed to 1450 to 1600 N/mm² tensile strength

Surface protection:

phosphatized and oiled

optional: electroplated galvanized, passivated in white-blue (silver/clear) or yellow

Assembly:

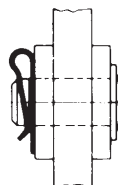
possible with or without tools; removable

Assembly tools:

see mbo catalog section 15

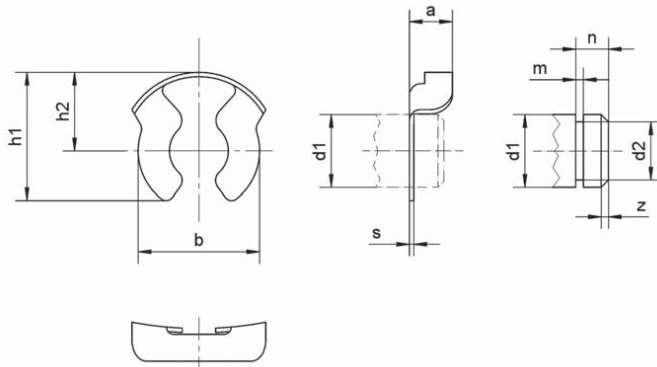
Special versions upon request

Example of application:



KL-retainers

for bolts and shafts with groove;



Example for ordering: KL-retainer for bolt diameter $d_1 = 12$ mm;
KL-retainer 12 mbo 09; Order number: 10 09 000 0012

mbo standard 09

mbo identifier	Order number	Nom. size d^1	Retainer					Max. axial thrust ca. N ¹⁾	Mass (kg) 100 pcs	Bolts				
			$\approx b$	$\approx h1$	$\approx h2$	a	s			$d1$ h11	$d2$ h11	$m^* +0.1$	$n^{2)}$	z
3 mbo 09	10 09 0000 0003	3	4.4	4.8	3	1.9	0.4	1050	0.0049	3	2.3	0.64	1.5	0.5
4 mbo 09	10 09 0000 0004	4	6.6	7.2	4.3	2.8	0.4	1500	0.0109	4	3.2	0.64	2	0.5
5 mbo 09	10 09 0000 0005	5	7.5	8.4	5.2	2.8	0.5	3000	0.0195	5	4	0.74	2.5	0.5
6 mbo 09	10 09 0000 0006	6	10.6	11.35	6.8	3.5	0.5	4850	0.0332	6	5	0.74	3	0.75
8 mbo 09	10 09 0000 0008	8	11.5	11.9	7.4	4.1	0.5	5500	0.0408	8	6	0.94	3.5	1
10 mbo 09	10 09 0000 0010	10	15.5	16.3	9.5	5.9	0.6	9500	0.0899	10	8	1.05	4.5	1
12 mbo 09	10 09 0000 0012	12	16.8	18	10.5	6.2	0.6	10700	0.1102	12	9	1.15	5	1.25
14 mbo 09	10 09 0000 0014	14	19	20	11.5	6.5	0.7	12700	0.1578	14	10	1.25	5.5	1.5
16 mbo 09	10 09 0000 0016	16	22.7	24	13.8	7.6	0.8	14000	0.2282	16	12	1.35	6	1.5
24 mbo 09 ³⁾	10 09 0000 0024	24 ³⁾	34	34	19	9.8	1	-	0.6171	20-25 ³⁾	16-18	1.8	8	1.5

¹⁾ dimensional variations according to DIN 2768, medium

¹⁾ for bolts of 500 N/mm² tensile strength

²⁾ corresponds to standard version mbo standard 07, however, extendible at will

³⁾ size 24 may be used for cardan joints with diameter 20 or 25 mm

13_02
01/2007

Material:

spring band steel, hardened and annealed to 1450 to 1600 N/mm² tensile strength

Assembly tools:

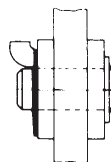
see mbo catalog section 15

Special versions upon request

Surface protection:

phosphatized, oiled;
optional: electroplated galvanized, passivated in white-blue (silver/clear) or yellow

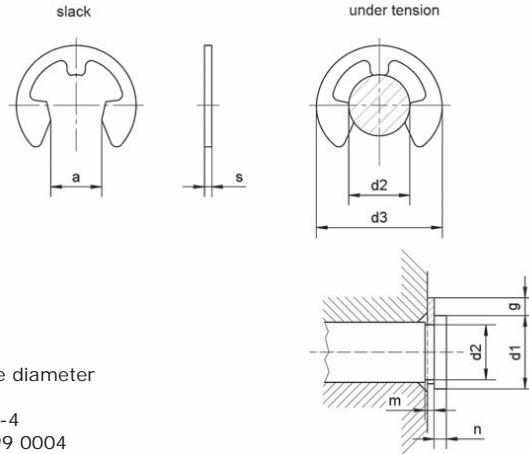
Example of application:



Assembly:

possible with or without tools; removable

Locking washers according to DIN 6799 for bolts and shafts with groove



Example for ordering: Locking washer for groove diameter (nom. size) d2 = 4mm;
Locking washer DIN 6799-4
Order number: 10 00 6799 0004

Dia- meter groove d2 Nom. size	Order number	Range of cardan joint ø		Locking washer			Groove			Supplementary data										
		From	To	s	a	Weight per 1000 piece in kg ≈	d2	m	n	d3	F _N	F _S	g	F _{Sg}	n _{abl}					
				Adm. var.	Adm. var. (± IT10)		Adm. var. (h 11)	Adm. var.	Min.	Max.	kN	With d1'	kN	kN	kN	Min. ⁻¹				
3.2	10 00 6799 0032	4	5	0.6	±0.02	2.7	±0.04	0.088	3.2	0	0.64	0	1	7.3	0.22	4	0.65	0.9	0.32	35000
4	10 00 6799 0040	5	7	0.7	±0.02	3.34	±0.048	0.158	4	0	0.74	+0.05	1.2	9.3	0.25	5	0.95	1	0.47	32000
5	10 00 6799 0050	6	8	0.7	±0.02	4.11	±0.048	0.236	5	-0.075	0.74	0	1.2	11.3	0.9	7	1.15	1	0.6	28000
6	10 00 6799 0060	7	9	0.7	±0.02	5.26	±0.048	0.255	6	0	0.74	0	1.2	12.3	1.1	8	1.35	1.1	0.7	25000
7	10 00 6799 0070	8	11	0.9	±0.02	5.84	±0.048	0.474	7	0	0.94	0	1.5	14.3	1.25	9	1.8	1.3	1	22000
8	10 00 6799 0080	9	12	1.1	±0.02	6.52	±0.048	0.66	8	0	1.05	0	1.8	16.3	1.42	10	2.5	1.5	1.25	20000
9	10 00 6799 0090	10	14	1.1	±0.03	7.63	±0.058	1.09	9	-0.09	1.15	+0.08	2	18.8	1.6	11	3	1.6	1.5	17000
10	10 00 6799 0100	11	15	1.2	±0.03	8.32	±0.058	1.25	10	0	1.25	0	2	20.4	1.7	12	3.5	1.8	1.75	12000
12	10 00 6799 0120	13	18	1.3	±0.03	10.45	±0.07	1.63	12	0-0.11	1.35	0	2.5	23.4	3.1	15	4.7	1.9	2.3	13000
19*	10 00 6799 0190	20	31	1.75	±0.03	15.92	±0.07	6.42	19	0-0.13	1.8	0	3.5	37.6	10	25	11	2.5	3.6	7600

* size 19 only in stainless steel

Additional sizes upon request

Material:

spring steel C 60 to Ck 75 according to DIN 17222; hardened and annealed to 460 to 580 HV (equivalent to 46 to 54 HRC)
alternative: stainless steel



Surface protection:

optional: phosphatized or mechanically galvanized; white-blue or yellow

Note:

The values in the table for thickness "s" are valid for washers in the phosphatized, blackened or polished version.

DIN 6799 load capacity of groove F_N:

The F_N values refer to the cardan joint diameter d1'. If the bolt diameter d1' is different from d1, the load capacity of groove F_N' is determined by the formula:

$$F_N' = F_N \frac{d1 - d2}{d1' - d2}$$

Assembly:

possible with or without tools; removable

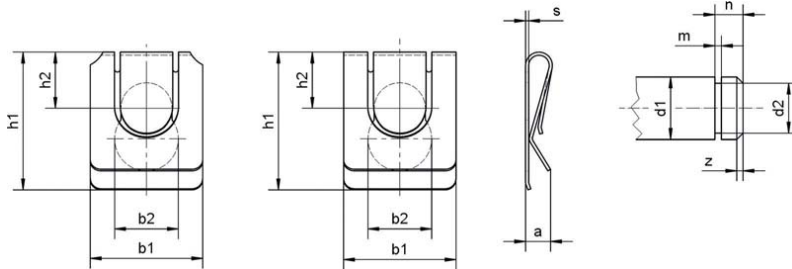
Assembly tools:

see mbo catalog section 15

Special versions upon request

Bayonet clips

retainers for bolts and shafts with groove



Bayonet clips **with** relief³⁾
(mbo standard 66)

Bayonet clips **without** relief



Example for ordering: Bayonet clip for bolt diameter $d_1 = 10$ mm,
Bayonet clip 10 mbo 06; Order number: 10 06 0000 0010

mbo standard 06

mbo identifier	Order number	Nom. size d_1	Retainer						Max. axial thrust	Mass (kg) 100 pcs	Bolts				
			b_1	$b_2 \pm 0.05$	h_1	h_2	$a \approx$	s			d_1	d_2	+0.1 m	$n^{2)}$	z
4 mbo 06	10 06 0000 0004	4	7	4.2	9	3.5	2	0.35	1600	0.02	4	3.2	0.64	2	0.5
5 mbo 06	10 06 0000 0005	5	9	5.2	11	4.5	2.3	0.33	2350	0.04	5	4.2	0.74	2.5	0.5
6 mbo 06	10 06 0000 0006	6	11	6.1	13.6	5.5	2.8	0.4	4500	0.07	6	5	0.74	3	0.75
8 mbo 06	10 06 0000 0008	8	14	8.2	18	7	4.2	0.6	7900	0.17	8	6	0.94	3.5	1
10 mbo 06	10 06 0000 0010	10	18	10.2	22	9	4	0.5	13860	0.24	10	8	1.05	4.5	1
12 mbo 06	10 06 0000 0012	12	22	12.2	26	10	5	0.6	14140	0.41	12	9	1.15	5	1.25
14 mbo 06	10 06 0000 0014	14	25	14.2	30	12	6	0.7	16190	0.66	14	10	1.25	5.5	1.5
16 mbo 06	10 06 0000 0016	16	28	16.4	37	16	6.5	0.8	20650	0.98	16	12	1.35	6	1.5

¹⁾ for bolts of 500 N/mm² tensile strength

²⁾ dimensional variations according to DIN 2768, medium

³⁾ only for size 6 mbo 06

13_04
01/2007

Material:

spring band steel, hardened and annealed to 1450 to 1600 N/mm² tensile strength

Surface protection:

phosphatized, oiled;
optional: electroplated galvanized, passivated in white-blue (silver/clear) or yellow

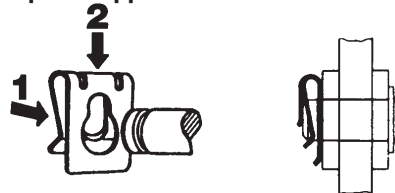
Assembly:

possible with or without tools; removable

Assembly tools:

see mbo catalog section 15

Example of application:



Special versions upon request