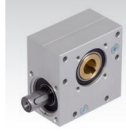
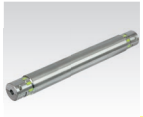
Gearboxes and Geared Motors Overview

Type		i	Md in Nm
	Helical Gearboxes Type BT/I with Two Shaft Ends, 2-stage	2,11 - 53,79	24,2 - 700
	Page 657		
	Shaft Mounted Flat Gearboxes Type BOC/I, 2-Stage	3,34 - 65,70	105 - 900
	Page 662		
	Bevel Gearboxes Type HUG	1 : 1	0,11 - 0,68
	Page 666		
	Angular Drives with Acetal Bevel Gears on Metal Plate	1 : 1	0,83 - 4,40
	Page 666		
	Bevel Gearboxes Type KEK	1 : 1	0,05 - 10
	Page 667		
	Bevel Gearboxes Type DZA and DZR (stainless) Versions A und B	1 : 1 - 2 : 1	2,0 89
	Page 668		
	Bevel Gearboxes Type DZA and DZR (stainless) Versions A und B	1 : 1 - 2 : 1	1,1 - 42
	Page 670		
	Bevel Gearboxes Type DZA model H	1 : 1 - 2 : 1 - 3 : 1	7 - 38
	Page 672		
	Bevel Gearboxes Type KU/I Models K and L	1 : 1 - 6 : 1	15 - 600
	Page 673		

Type		i	Md in Nm
	Bevel Gearboxes Type KU/I Model H	1 : 1 - 6 : 1	15 - 600
	Page 678		
	Worm Gear Units Type G/II	5 : 1 - 75 : 1	7 - 14
	Page 680		
	Worm Gear Units KES	13 : 1 - 65 : 1	4,5 - 18
	Page 681		
	Worm Gear Units Type H/I	7,5 : 1 - 100 : 1	12 - 187
	Page 682		
	Worm Gear Units Type ZM/I, Version A and Version HL	4,83 : 1 - 82 : 1	37 - 840
	Page 685		
	Ready to install Linear Actuators, 230 V AC/50Hz and 24 V DC	Lifting Power 133 N to 6000 N	
	Page 758		
	Linear drives 24 V DC	Lifting Power 400 N to 1200 N	
	Page 760		
	Worm Gear Screw Jacks Type NP/I Version A, B, C	Lifting Power 2500 N to 50000 N	
	Page 761		
	Connecting Shafts universal use		15 - 530
	Page 766		

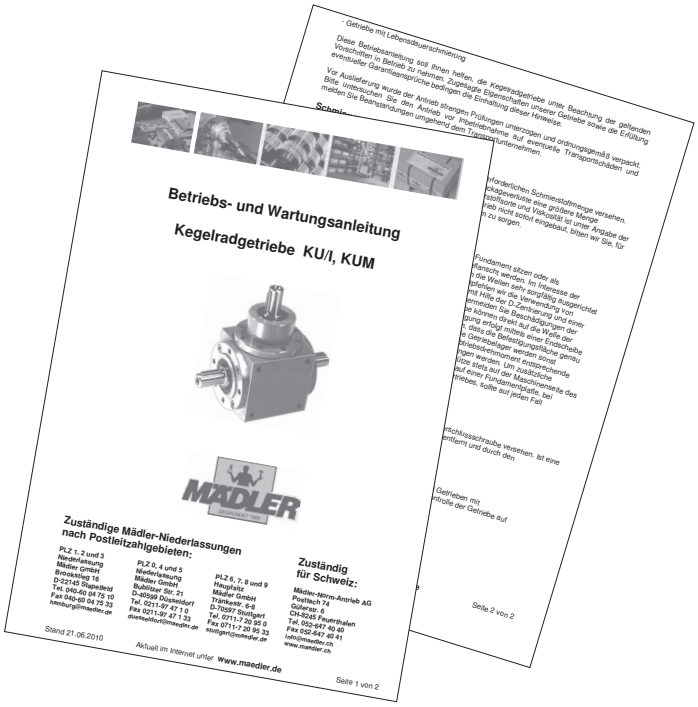
Type	P	n_2 min^{-1}	Md_2 Nm
 Standard Three-Phase Motors Type SM/I, 230/400V, 50 Hz	0,18 kw - 7,5 kW	750 - 3000	2 - 2,8
Page 692			
 Control Units for DC Drives			
Page 696			
 Frequency converters	- 2,2 kW		
Page 698			
 Small Geared Motors Type CRO, 230 V, 50 Hz	3,7 W	0,25 - 60	0,1 - 2,0
Page 700			
 Small Geared Motors Type GE/I 12 V DC 24 V DC 230 V AC	6,7 W	0,26 - 173,3	0,28 - 2,4
Page 702			
 Small Helical Geared Motors Type SF 24 V DC	0,31 W - 5,55 W	2 - 610	0,1 - 2
Page 704			
 Small Worm Geared Motors Type SFS 12 - 24 V DC and SG 24 V DC	2,1 W - 56 W 54W	7,4 - 543 54-1000	1 - 5 4,7
Page 705			
 Planetary Small Geared Motors Type PE 24 V DC	2,1 W - 49 W	22 - 600	0,46 - 6
Page 709			
 Small Geared Motors Type SE 12 V DC 24 V DC	7,8 W - 57 W	79 - 833	0,2 - 3,2
Page 711			
 Helical Geared Motors Type HR/I 230/400 V, 50 Hz	0,09 kW - 1,5 kW	5,8 - 407	9 - 603
Page 714			
 Helical Geared Motors Type NR/I 230/400 V, 50 Hz	0,12 kW - 1,5 kW	3.2 - 417	3 - 668
Page 719			
 Worm Geared Motors Type MEK and MEG 230/400 V, 50 Hz	45 W - 250 W	14 - 560	1,3 - 14
Page 723			

Type	P	n_2 min^{-1}	Md_2 Nm
 Worm Geared Motors Type MH with Hollow Shaft 230/400 V, 50 Hz	180 W - 250 W	19 - 560	3,6 - 14
Page 725			
 Worm Helical Geared Motors Type SRM 230/400V, 50 Hz	90 W - 120 W	2,8 - 224	4,3 - 25
Page 726			
 Worm Geared Motors Type R 230/400V, 50 Hz	180 W - 250 W	18 - 207	6,8 - 30
Page 727			
 Worm Geared Motors Type RH with Hollow Shaft 230/400V, 50 Hz	180 W - 250 W	18 - 207	6,8 - 30
Page 728			
 Worm Helical Geared Motors Type SRS 230/400V, 50 Hz	90 W - 120 W	2,4 - 190	5,1 - 10
Page 729			
 Worm Geared Motors Type MZ 230/400V, 50 Hz	90 W - 120 W	0,9 - 224	3,7 - 10
Page 730			
 Worm Geared Motors Type RL RM and RS 230/400V, 50 Hz	90 W - 250 W	0,6 - 224	3,7 - 60
Page 731			
 Worm Geared Motors Type HMD/I 230/400V, 50 Hz	0,09 kW - 1,5 kW	9 - 200	3 - 351
Page 734			
 Worm Geared Motors Type HMD/II 230/400V, 50 Hz	0,09 kW - 1,50 kW	9 - 200	3 - 351
Page 739			
 Worm Geared Motors Type ZMD/I 230/400V, 50 Hz	0,12 kW - 1,5 kW	13,4 - 380,7	15 - 333
Page 744			
 Worm Helical Geared Motors Type SZM/I 230/400V, 50 Hz	0,12 kW - 1,5 kW	3 - 114,6	51 - 634
Page 749			
 Continuously Variable Geared Motors Type MUN/I 230/400V, 50 Hz	0,18 kW	0,17 - 4200	0,27 - 70
Page 753			

Operating and maintenance instructions

on the internet at www.maedler.de

in the Section Downloads



On our website you can find operating and maintenance instructions in various languages for all our technically-sophisticated products. We are continuously extending this list of instructions.

Instructions available:	Language		
Bevel Gearboxes DZA, DZR	German	English	French
Bevel Gearboxes KU/I	German	English	French
Continuously Variable Geared Motors MUN/I	German	English	
Couplings DX	German	English	
Couplings RN / RNI / RNG	German	English	French
Couplings BW / BOS / BOZ	German	English	French
Electronic Drip Oilers ELO	German	English	
Frequency Converters FU6	German		
Frequency Converters RoFre 897	German		
Helical Gear Boxes BT/I	German	English	
Helical Geared Motor HR/I	German	English	
Helical Geared Motor NR/I	German	English	French
Linear Drives (Actuator Systems) GR/I	German	English	
Motor Controllers SFRG 05	German		
Motor Controllers SFRG 3	German		
Precision Worm Gear Sets	German		
Safety Clutches CM	German		
Safety Clutches SI	German	English	French
Shaft Mounted Gearboxes BOC/I	German	English	
Sliding Hubs FA	German		
Sliding Hubs FS	German	English	
Sliding Hubs ROBA®	German		
Sliding Hubs with Coupling RNR	German		
Slip Clutches KF	German	English	
Slip Clutches R2, R6	German		
SPANNBOX®, SPANNBOY®	Deutsch	English	
Standard Three-Phase-Motors SM/I	German		
Taper Bushes	German	English	French
Telescopic Slides Accuride	German	English	French
Worm Geared Motors HMD I / HMD II	German	English	French
Worm-Geared Motors MEG / MEK / MH / MZ	German	English	French
Worm-Geared Motors R / RH / RL / RM / RS	German	English	French
Worm-Geared Motors SRM / SRS	German	English	French
Worm-Geared Motors SZM, ZMD	German	English	French
Worm Gear Screw Jacks NP/I	German		
Worm Gear Units G/II	German	English	French
Worm Gear Units ZM	German	English	French

Helical Gear Boxes BT/I with Two Shaft Ends

Casing: Cast iron casing with thick walls and ribbed construction, sealed against oil leaks and dust.

Gears: Special steel, extremely hard wearing and case hardened. Smooth-running helical gear wheels with ground or scraped tooth profiles.

Bearing: Generously dimensioned bearings as standard version (heavy-duty bearings for higher overhung or thrust loads available at extra cost).

Lubrication: The gear boxes are delivered ready for work, filled with the correct level of oil or grease, which offers sufficient lubrication for about 10,000 operation hours, or for an operation period of max. 2 years, at a temperature of -30 to +80°C.

Before start up, the plastic plug must be taken out of the venting screw, otherwise excess pressure will build up inside the gearbox.

Ordering details: e.g.: Type, Size, Ratio, Model, Product No.

Size 1

Product No.	Ratio i	at f_B = 1 Mn_2 Nm	at n_1 = 1380 min^{-1}* n_2 min^{-1}	P kW	Permissible n_1* min^{-1}	Weight kg
400 100 01	2,90	24,2	476	1,27	4000	6,5
400 100 02	3,10	25,9	445	1,27	4000	6,5
400 100 03	3,31	27,6	417	1,27	4000	6,5
400 100 04	3,55	29,6	389	1,27	4000	6,5
400 100 05	3,81	31,8	362	1,27	4000	6,5
400 100 06	4,10	34,2	337	1,27	4000	6,5
400 100 07	4,43	37	311	1,27	4000	6,5
400 100 08	4,81	40,2	287	1,27	4000	6,5
400 100 09	5,23	43,7	264	1,27	4000	6,5
400 100 10	5,73	48	241	1,27	4000	6,5
400 100 11	6,30	50	219	1,21	4000	6,5
400 100 12	6,98	50	198	1,05	4000	6,5
400 100 13	7,79	33,3	177	0,65	4000	6,5
400 100 14	8,31	35,5	166	0,65	4000	6,5
400 100 15	8,89	38	155	0,65	4000	6,5
400 100 16	9,52	40,7	145	0,65	4000	6,5
400 100 17	10,23	43,7	135	0,65	4000	6,5
400 100 18	11,02	47,1	125	0,65	4000	6,5
400 100 19	11,90	50	116	0,64	4000	6,5
400 100 20	12,91	50	107	0,59	4000	6,5
400 100 21	14,06	50	98	0,54	4000	6,5
400 100 22	15,38	50	90	0,49	4000	6,5
400 100 23	16,93	50	82	0,45	4000	6,5
400 100 24	18,75	50	74	0,41	4000	6,5
400 100 25	21,11	40	65	0,29	4000	6,5
400 100 26	22,52	43	61	0,29	4000	6,5
400 100 27	24,08	46	57	0,29	4000	6,5
400 100 28	25,80	50	53	0,29	4000	6,5
400 100 29	27,71	50	50	0,27	4000	6,5
400 100 30	29,85	50	46	0,25	4000	6,5
400 100 31	32,25	50	43	0,24	4000	6,5
400 100 32	34,97	50	39	0,22	4000	6,5
400 100 33	38,09	50	36	0,20	4000	6,5
400 100 34	41,68	50	33	0,18	4000	6,5
400 100 35	45,87	50	30	0,17	4000	6,5
400 100 36	50,82	50	27	0,15	4000	6,5

* Lower and higher inputs than the given speeds n_1 are possible. Please enquire before application.
Dimensions tables see page 661.

Connecting Shafts Page 766

Size 2

Product No.	Ratio i	at f_B = 1 Mn_2 Nm	at n_1 = 1380 min^{-1}* n_2 min^{-1}	P kW	Permissible n_1* min^{-1}	Weight kg
400 110 01	2,39	68	579	3	4000	8
400 110 03	2,59	74	534	3	4000	8
400 110 04	2,81	80	491	3	4000	8
400 110 05	3,07	87	450	3	4000	8
400 110 06	3,36	96	411	3	4000	8
400 110 07	3,70	100	373	3	4000	8
400 110 08	4,03	100	343	3	4000	8
400 110 09	4,43	100	312	3	4000	8
400 110 10	4,90	100	282	3	4000	8
400 110 11	5,46	100	253	2,79	4000	8
400 110 12	6,13	100	225	2,48	4000	8
400 110 13	7,04	98	196	2,12	4000	8
400 110 14	7,68	100	180	1,98	4000	8
400 110 15	8,41	100	164	1,81	4000	8
400 110 16	9,26	100	149	1,64	4000	8
400 110 17	10,24	100	135	1,49	4000	8
400 110 18	11,40	100	121	1,33	4000	8
400 110 19	12,80	100	108	1,19	4000	8
400 110 20	13,57	98	102	1,10	4000	8
400 110 21	14,80	100	93	1,03	4000	8
400 110 23	16,21	100	83	0,94	4000	8
400 110 24	17,84	100	77	0,85	4000	8
400 110 25	19,73	100	71	0,77	4000	8
400 110 26	21,00	93	66	0,67	4000	8
400 110 27	22,76	96	61	0,64	4000	8
400 110 28	24,75	98	56	0,60	4000	8
400 110 29	27,00	100	51	0,56	4000	8
400 110 30	29,57	100	47	0,51	4000	8
400 110 31	32,54	100	42	0,47	4000	8
400 110 32	36,00	100	38	0,42	4000	8
400 110 33	40,09	100	34	0,38	4000	8
400 110 34	45,00	100	31	0,34	4000	8
400 110 35	51,00	100	27	0,30	4000	8

Size 3

Product No.	Ratio i	at f_B = 1 Mn_2 Nm	at n_1 = 1380 min^{-1}* n_2 min^{-1}	P kW	Permissible n_1* min^{-1}	Weight kg
400 120 01	2,13	117	648	8,36	4000	13
400 120 03	2,51	138	550	8,37	4000	13
400 120 06	2,99	165	462	8,40	4000	13
400 120 08	3,62	200	382	8,41	4000	13
400 120 10	4,01	200	344	7,59	4000	13
400 120 12	5,03	200	275	6,05	4000	13
400 120 14	6,04	184	229	4,64	4000	13
400 120 15	6,69	200	206	4,55	4000	13
400 120 16	7,47	200	185	4,07	4000	13
400 120 17	8,40	200	164	3,62	4000	13
400 120 18	9,53	200	145	3,19	4000	13
400 120 19	9,62	183	143	2,89	4000	13
400 120 20	10,56	200	131	2,88	4000	13
400 120 21	11,64	200	119	2,61	4000	13
400 120 22	12,91	200	107	2,36	4000	13
400 120 23	14,40	200	96	2,11	4000	13
400 120 24	16,19	200	85	1,88	4000	13
400 120 25	18,38	200	75	1,65	4000	13
400 120 26	19,60	200	70	1,55	4000	13
400 120 27	21,61	200	64	1,41	4000	13
400 120 28	23,96	200	58	1,27	4000	13
400 120 29	26,73	200	52	1,14	4000	13
400 120 30	28,15	200	49	1,08	4000	13
400 120 31	30,90	200	45	0,98	4000	13
400 120 32	34,07	200	41	0,89	4000	13
400 120 33	37,77	200	37	0,81	4000	13
400 120 34	42,14	200	33	0,72	4000	13
400 120 35	47,38	200	29	0,64	4000	13
400 120 36	53,79	200	26	0,57	4000	13

* Lower and higher inputs than the given speeds n_1 are possible. Please enquire before application.
Dimensions tables see page 661.

Size 4

Product No.	Ratio i	at f_B = 1 Mn_2 Nm	at n_1 = 1400 min^{-1}* n_2 min^{-1}	P kW	Permissible n_1* min^{-1}	Weight kg
400 130 01	2,22	147	632	10,20	4000	21
400 130 03	2,40	159	584	10,20	4000	21
400 130 05	2,83	188	495	10,30	4000	21
400 130 07	3,38	225	414	10,30	4000	21
400 130 09	4,12	274	340	10,30	4000	21
400 130 10	4,59	300	305	10,10	4000	21
400 130 11	5,16	300	272	8,98	4000	21
400 130 12	5,29	226	265	6,60	4000	21
400 130 13	5,89	252	238	6,60	4000	21
400 130 14	6,62	283	212	6,60	4000	21
400 130 15	6,82	181	205	4,10	4000	21
400 130 17	8,10	215	173	4,10	4000	21
400 130 18	8,87	236	158	4,11	4000	21
400 130 19	9,77	260	143	4,11	4000	21
400 130 20	10,81	287	130	4,10	4000	21
400 130 21	12,04	300	116	3,84	4000	21
400 130 22	13,52	300	104	3,42	4000	21
400 130 23	14,19	202	99	2,20	4000	21
400 130 24	15,39	219	91	2,20	4000	21
400 130 25	16,75	239	84	2,20	4000	21
400 130 26	18,28	261	77	2,20	4000	21
400 130 27	20,03	286	70	2,20	4000	21
400 130 28	22,05	300	64	2,10	4000	21
400 130 29	24,40	300	57	1,90	4000	21
400 130 30	27,19	300	52	1,70	4000	21
400 130 31	30,53	300	46	1,52	4000	21
400 130 32	33,42	300	42	1,39	4000	21
400 130 33	36,99	300	38	1,25	4000	21
400 130 34	41,21	300	34	1,12	4000	21
400 130 35	46,28	300	30	1,00	4000	21

Size 5

Product No.	Ratio i	at f_B = 1 Mn_2 Nm	at n_1 = 1400 min^{-1}* n_2 min^{-1}	P kW	Permissible n_1* min^{-1}	Weight kg
400 140 01	2,11	140	665	10,30	4000	28
400 140 03	2,29	152	611	10,20	4000	28
400 140 05	2,50	166	560	10,20	4000	28
400 140 07	2,74	182	512	10,30	4000	28
400 140 08	3,01	200	466	10,30	4000	28
400 140 10	3,32	221	422	10,30	4000	28
400 140 11	3,68	245	380	10,30	4000	28
400 140 12	4,11	274	340	10,30	4000	28
400 140 13	4,63	308	302	10,30	4000	28
400 140 14	5,26	350	266	10,30	4000	28
400 140 15	5,94	254	236	6,60	4000	28
400 140 16	6,75	289	207	6,61	4000	28
400 140 17	7,18	191	195	4,11	4000	28
400 140 18	7,89	210	178	4,11	4000	28
400 140 19	8,70	231	161	4,10	4000	28
400 140 20	9,66	257	145	4,11	4000	28
400 140 21	10,79	287	130	4,10	4000	28
400 140 22	12,14	323	115	4,10	4000	28
400 140 23	13,80	367	101	4,10	4000	28
400 140 24	14,80	211	95	2,20	4000	28
400 140 25	16,20	231	86	2,20	4000	28
400 140 26	17,80	254	79	2,20	4000	28
400 140 27	19,65	280	71	2,20	4000	28
400 140 28	21,81	311	64	2,20	4000	28
400 140 29	24,36	347	58	2,20	4000	28
400 140 30	27,42	391	51	2,20	4000	28
400 140 31	31,15	444	45	2,20	4000	28
400 140 32	33,06	314	42	1,47	4000	28
400 140 33	36,92	351	38	1,47	4000	28
400 140 34	41,56	395	34	1,47	4000	28
400 140 35	47,22	450	30	1,47	4000	28

* Lower and higher inputs than the given speeds n_1 are possible. Please enquire before application.

Dimensions tables see page 661.

Size 6

Product No.	Ratio i	at f_B = 1 Mn_2 Nm	at n_1 = 1420 min^{-1}* n_2 min^{-1}	P kW	Permissible n_1* min^{-1}	Weight kg
400 150 01	2,38	294	597	19,30	4000	32
400 150 03	2,82	349	503	19,30	4000	32
400 150 05	3,40	420	418	19,30	4000	32
400 150 07	3,75	463	379	19,30	4000	32
400 150 09	4,65	574	306	19,30	4000	32
400 150 11	5,63	405	252	11,20	4000	32
400 150 12	6,22	447	228	11,20	4000	32
400 150 13	6,9	496	206	11,20	4000	32
400 150 14	7,71	554	184	11,20	4000	32
400 150 15	8,68	623	164	11,20	4000	32
400 150 16	9,86	700	144	11,10	4000	32
400 150 17	10,90	566	130	8,10	4000	32
400 150 18	12,18	632	117	8,10	4000	32
400 150 19	13,71	700	104	8,00	4000	32
400 150 20	15,58	700	91	7,00	4000	32
400 150 21	16,43	667	86	6,35	4000	32
400 150 22	18,13	683	78	5,89	4000	32
400 150 24	20,13	700	71	5,44	4000	32
400 150 25	22,48	700	63	4,87	4000	32
400 150 26	25,30	700	56	4,33	4000	32
400 150 27	28,00	700	51	3,91	4000	32
400 150 28	31,27	700	45	3,50	4000	32
400 150 29	35,20	700	40	3,11	4000	32
400 150 30	37,92	700	38	2,89	4000	32
400 150 31	42,68	700	33	2,57	4000	32
400 150 32	48,50	700	29	2,26	4000	32

Size 7

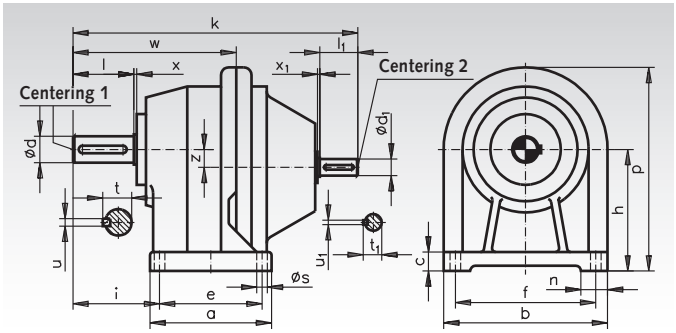
Product No.	Ratio i	at f_B = 1 Mn_2 Nm	at n_1 = 1420 min^{-1}* n_2 min^{-1}	P kW	Permissible n_1* min^{-1}	Weight kg
400 160 01	2,38	294	597	19,30	4000	34
400 160 03	2,82	349	503	19,30	4000	34
400 160 05	3,40	420	418	19,30	4000	34
400 160 07	3,75	463	379	19,30	4000	34
400 160 09	4,65	574	306	19,30	4000	34
400 160 11	5,63	405	252	11,20	4000	34
400 160 12	6,22	447	228	11,20	4000	34
400 160 13	6,90	496	206	11,20	4000	34
400 160 14	7,71	554	184	11,20	4000	34
400 160 15	8,68	623	164	11,20	4000	34
400 160 16	9,86	700	144	11,10	4000	34
400 160 17	10,90	566	130	8,10	4000	34
400 160 18	12,18	632	117	8,10	4000	34
400 160 19	13,71	700	104	8,00	4000	34
400 160 20	15,58	700	91	7,00	4000	34
400 160 21	16,43	667	86	6,35	4000	34
400 160 22	18,13	683	78	5,89	4000	34
400 160 24	20,13	700	71	5,44	4000	34
400 160 25	22,48	700	63	4,87	4000	34
400 160 26	25,30	700	56	4,33	4000	34
400 160 27	28,00	700	51	3,91	4000	34
400 160 28	31,27	700	45	3,50	4000	34
400 160 29	35,20	700	40	3,11	4000	34
400 160 30	37,92	700	38	2,89	4000	34

* Lower and higher inputs than the given speeds n_1 are possible. Please enquire before application.

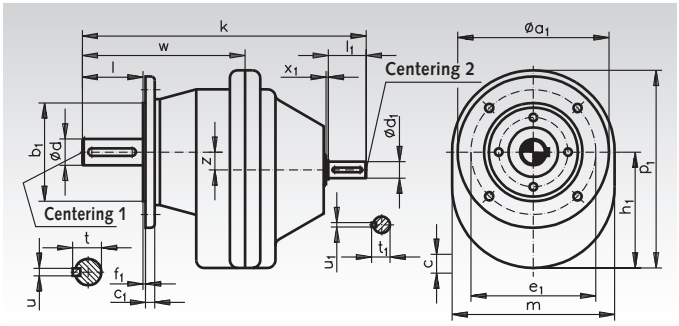
Dimensions tables see page 661.

Dimension Table for Helical Gearboxes BT/I With Two Shaft Ends

Foot Mounting Model B 3



Flange Mounting Model B 5



The shaft ends Ø d are machined according to ISO k6.
Feather keys according to DIN 6885.

Selection of available flanges: Mountings according to DIN 42948. Up to 300 mm diameter a_1 the recess Ø b_1 of the output flanges is manufactured according to ISO j6, over 300mm according to ISO h6.

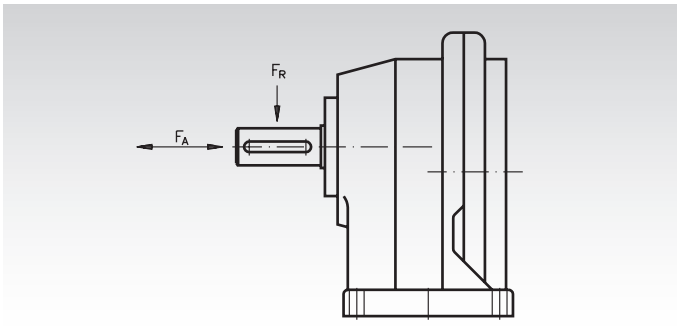
Size				Ø a_1	Ø b_1	c_1	Ø e_1	f_1	s_1
			1	120	80	10	100	3	4 x Ø 7
		3	**2**	140	95	10	115	3	4 x Ø 9
	4	**3**	**2**	160	110	10	130	3,5	4 x Ø 9
5	**4**	**3**	**2**	200	130	12	165	3,5	4 x Ø11
6	**4**	**3**		250	180	16	215	4	4 x Ø14
7				300	230	20	265	4	4 x Ø14

Size	a	b	c	Ø d x l	Ø d_1 x l_1	e	f	h	h_1	i	k	m	n	p	p_1	Ø s	t	t_1	u	u_1	w	x	x_1	z	Centering 1	Centering 2
	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	DIN 332/2	
1	78	130	12	16x40	11x23	50	110	86	84	52	210	120	20	146	144	9	18	12,5	5	4	120	2	2	0	M5	M4
2	110	135	14	20x40	14x30	85	105	102	101	67,5	232	135	30	170	169	9	22,5	16	6	5	129	2	2	0	M6	M5
3	124	154	16	25x60	16x40	100	130	125	123	97	289	154	24	202	200	11	28	18	8	5	169	3	2	0	M10	M5
4	175	190	20	30x70	22x50	140	155	130	128	115	370	170	35	215	213	14	33	24,5	8	6	208	3	2	0	M10	M8
5	160	215	25	35x80	22x50	135	185	160	153	114	375	215	35	268	261	14	38	24,5	10	6	215	4	2	23,5	M12	M8
6	164	215	25	40x80	25x60	134	175	175	173	120	386	215	40	283	281	14	43	28	12	8	224	4	2	0	M16	M10
7	164	215	25	50x100	25x60	134	175	175	173	140	406	215	40	283	281	14	53,5	28	14	8	244	4	2	0	M16	M10

Permissible Radial and Axial Loads of the Output Shaft

Size		Output Speeds n_2 [min^{-1}]						
		16	25	36	50	80	125	≥ 130
1	F_R [N]	600	500	450	400	350	300	250
1	F_A [N]	450	400	350	320	300	250	200
2	F_R [N]	1250	1100	1000	900	800	700	600
2	F_A [N]	500	450	400	360	320	280	250
3	F_R [N]	2000	1800	1700	1600	1500	1300	1200
3	F_A [N]	800	720	680	640	600	520	480
4	F_R [N]	3000	2700	2500	2300	2100	1700	1500
4	F_A [N]	1200	1080	1000	920	840	680	600
5	F_R [N]	3600	3400	3150	2900	2500	2000	1800
5	F_A [N]	1440	1370	1260	1150	1010	800	720
6	F_R [N]	4000	3800	3500	3200	2800	2200	2000
6	F_A [N]	1600	1520	1400	1280	1120	880	800
7	F_R [N]	10400	9880	9100	8320	7280	5720	5200
7	F_A [N]	4160	3950	3640	3330	2910	2290	2080

Size 7 is as standard equipped with a stronger bearing system.



The stated values for radial load (F_R) assume that the impact of the load is in the centre of the shaft length (see drawing). If both radial and axial forces occur, the permissible radial force (F_R) indicated in the table is reduced by the value of the occurring axial force (F_A).

Gearbox Selection for Operating Factors Larger Than f_B = 1

In addition to the input power (P) and output speed (n_2) you also enter the respective **operating factor (f_B)** into the formula. When selecting the gearbox from the table, the table value **(M_n) must be no smaller than** the calculated figure (M_n).

$$M_{n_2} = \frac{P \times 9550}{n_2} \times f_B$$

M_{n_2} [Nm] = Output torque.
P [kW] = Input power.
n_2 [min^{-1}] = Output speed.
f_B = Operating factor.

Shaft-Mounted Flat Gearboxes BOC/I, 2-Stage

General data: Compact design for confined spaces. Ratios of i = approx. 3.5:1 to 59:1. Larger ratios on request. Input power of 0.3 to 11.2 kW.

Version A: With hollow shaft on output side = Standard.
Version B: With torque arm.
Version C: With flange on the output side.
Version D: With foot mounting brackets, see drawing page 606.
Version E: With foot mounting brackets, see drawing page 606.
Version F: With single-sided solid output shaft.
(Version B - F on request).

Housing: Rigid, ribbed grey cast iron housing, thus quiet, low-vibration running characteristics. Fully sealed against oil leaks and protected against water jets.

Gears: The helical gear wheels are made from heat-treated and case-hardened steel. The gearing is hardened and precisely machined.

Bearing: Generously-dimensioned roller bearings.

Input shaft/end shield: The shaft tolerances, and the flange adapters which can be delivered on request, are suited for IEC standard motors.

Lubrication: The gear boxes are delivered ready for work, filled with the correct level of oil or grease (ambient temperature -10°C to 50°C), which offers sufficient lubrication for about 10,000 operation hours, or for an operation period of max. 2 years.

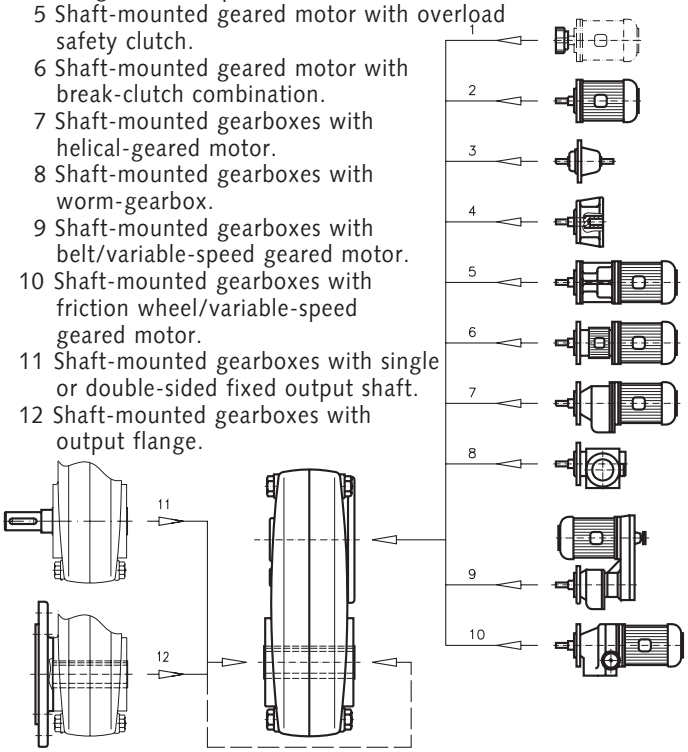
Before start up, the plastic plug must be taken out of the venting screw.

Ordering details: e.g.: Type, Version (A-F), Mounting Position (1 - 5), Size, Ratio, Product No.

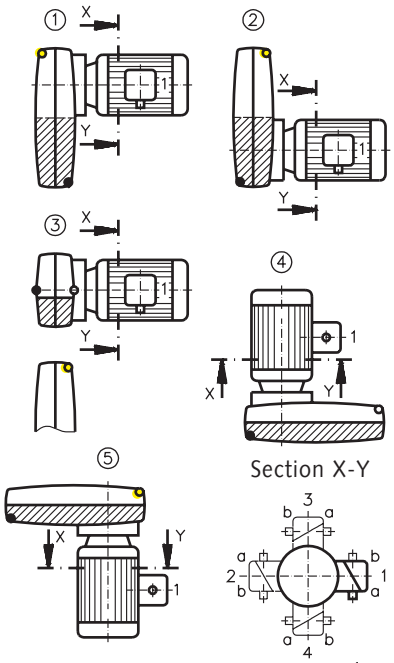
Foot mounting against extra charge.

Possible Combinations

1 Shaft-mounted gearboxes to connect to flange motors, motor shaft dimensions according to factory standard.
2 Shaft-mounted geared motor.
3 Shaft-mounted gearboxes with shaft end on input side.
4 Shaft-mounted gearboxes with assembled flange to take up standard IEC-motors.
5 Shaft-mounted geared motor with overload safety clutch.
6 Shaft-mounted geared motor with break-clutch combination.
7 Shaft-mounted gearboxes with helical-geared motor.
8 Shaft-mounted gearboxes with worm-gearbox.
9 Shaft-mounted gearboxes with belt/variable-speed geared motor.
10 Shaft-mounted gearboxes with friction wheel/variable-speed geared motor.
11 Shaft-mounted gearboxes with single or double-sided fixed output shaft.
12 Shaft-mounted gearboxes with output flange.



Mounting Positions



Lubricant Level
Venting Screw
Drain plug

Size 0, Version A

Product No.	Ratio i	M_{2max} Nm	at n_1 = 1380 min^{-1} and f_B = 1 n_2 min^{-1}	P_{max} kW	Weight kg
400 290 01	3,69	105	373,8	4,3	8
400 290 02	3,97	113	347,7	4,3	8
400 290 03	4,28	122	322,4	4,3	8
400 290 04	4,63	125	297,8	4,1	8
400 290 05	4,76	122	290,2	3,9	8
400 290 06	5,13	125	269	3,7	8
400 290 07	5,55	125	248,5	3,4	8
400 290 08	6,04	125	228,6	3,1	8
400 290 09	6,60	125	209,2	2,9	8
400 290 10	7,25	125	190,4	2,6	8
400 290 11	8,02	125	172,1	2,4	8
400 290 12	8,94	125	154,4	2,1	8
400 290 13	9,94	125	138,8	1,9	8
400 290 14	10,72	125	128,7	1,8	8
400 290 15	11,61	124	118,9	1,6	8
400 290 16	12,62	125	109,4	1,5	8
400 290 17	13,78	125	100,1	1,4	8
400 290 18	15,15	125	91,1	1,3	8
400 290 19	16,76	125	82,4	1,1	8
400 290 20	18,69	125	73,8	1,0	8
400 290 21	20,66	125	66,8	0,92	8
400 290 22	22,36	125	61,7	0,85	8
400 290 23	24,31	125	56,8	0,78	8
400 290 24	26,56	125	51,9	0,72	8
400 290 25	29,19	125	47,3	0,65	8
400 290 26	32,29	125	42,7	0,59	8
400 290 27	34,94	125	39,5	0,54	8
400 290 28	37,69	125	36,6	0,50	8
400 290 29	40,80	125	33,8	0,47	8
400 290 30	44,36	125	31,1	0,43	8
400 290 31	48,46	125	28,5	0,39	8
400 290 32	53,25	125	25,9	0,36	8
400 290 33	58,91	125	23,4	0,32	8
400 290 34	65,70	125	21,0	0,29	8

Size 1, Version A

Product No.	Ratio i	M_{2max} Nm	at n_1 = 1380 min^{-1} and f_B = 1 n_2 min^{-1}	P_{max} kW	Weight kg
400 300 01	3,34	184	413,6	8,4	12,5
400 300 02	3,58	197	385,2	8,4	12,5
400 300 03	3,86	213	357,7	8,4	12,5
400 300 04	4,17	230	331,2	8,4	12,5
400 300 05	4,52	250	305,5	8,4	12,5
400 300 06	4,92	250	280,6	7,7	12,5
400 300 07	5,38	250	256,5	7,1	12,5
400 300 08	5,92	250	233,1	6,4	12,5
400 300 09	6,44	196	214,2	4,6	12,5
400 300 10	6,96	212	198,3	4,6	12,5
400 300 11	7,54	229	182,9	4,6	12,5
400 300 12	8,21	250	168,0	4,6	12,5
400 300 13	8,98	250	153,6	4,2	12,5
400 300 14	9,89	250	139,6	3,8	12,5
400 300 15	10,75	204	128,4	2,9	12,5
400 300 16	11,54	219	119,6	2,9	12,5
400 300 17	12,42	236	111,1	2,9	12,5
400 300 18	13,42	250	102,8	2,8	12,5
400 300 19	14,55	250	94,8	2,6	12,5
400 300 20	15,84	250	87,1	2,4	12,5
400 300 21	17,33	250	79,6	2,2	12,5
400 300 22	19,07	250	72,4	2,0	12,5
400 300 23	19,94	227	69,2	1,7	12,5
400 300 24	21,41	244	64,4	1,7	12,5
400 300 25	23,06	250	59,8	1,6	12,5
400 300 26	24,91	250	55,4	1,5	12,5
400 300 27	27,00	250	51,1	1,4	12,5
400 300 28	29,40	250	46,9	1,3	12,5
400 300 29	32,16	250	42,9	1,2	12,5
400 300 30	35,39	250	39,0	1,1	12,5
400 300 31	36,35	250	38,0	1,0	12,5
400 300 32	39,27	250	35,1	0,97	12,5
400 300 33	42,57	250	32,4	0,89	12,5
400 300 34	46,35	250	29,8	0,82	12,5
400 300 35	50,71	250	27,2	0,75	12,5
400 300 36	55,79	250	24,7	0,68	12,5

Dimensions tables see page 665.

Size 2, Version A

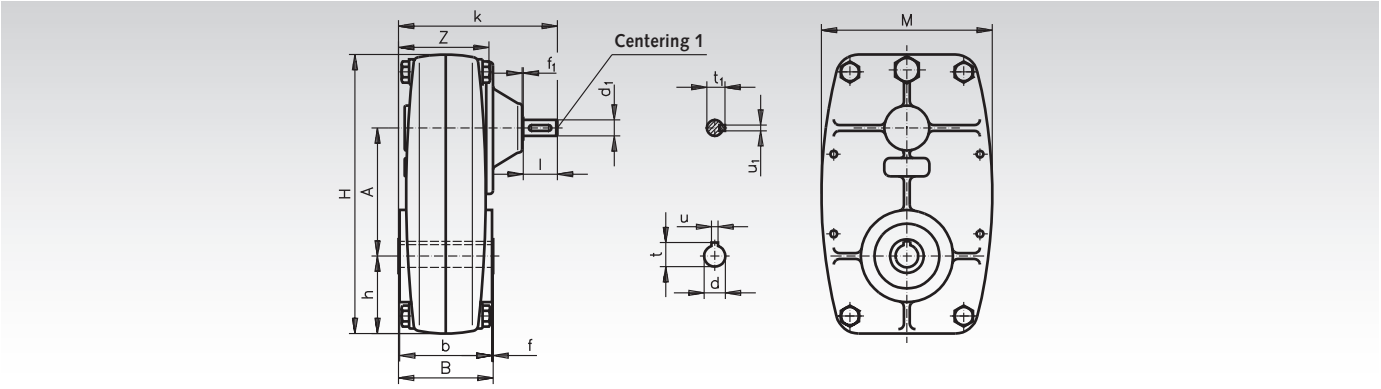
Product No.	Ratio i	M_{2max} Nm	at n_1 = 1400 min^{-1} and f_B = 1 n_2 min^{-1}	P_{max} kW	Weight kg
400 320 01	3,55	236	394,8	10,3	19,5
400 320 02	3,80	253	368,3	10,3	19,5
400 320 03	4,09	272	342,6	10,3	19,5
400 320 04	4,41	293	317,6	10,3	19,5
400 320 05	4,77	317	293,4	10,3	19,5
400 320 06	5,19	345	269,9	10,3	19,5
400 320 07	5,67	377	247,0	10,3	19,5
400 320 08	6,12	262	228,8	6,6	19,5
400 320 09	6,65	284	210,4	6,6	19,5
400 320 10	7,27	311	192,6	6,6	19,5
400 320 11	7,65	203	182,9	4,1	19,5
400 320 12	8,15	217	171,8	4,1	19,5
400 320 13	8,69	231	161,0	4,1	19,5
400 320 14	9,30	247	150,6	4,1	19,5
400 320 15	9,97	265	140,5	4,1	19,5
400 320 16	10,72	285	130,7	4,1	19,5
400 320 17	11,56	307	121,1	4,1	19,5
400 320 18	12,51	333	111,9	4,1	19,5
400 320 19	13,60	362	102,9	4,1	19,5
400 320 20	14,86	395	94,2	4,1	19,5
400 320 21	16,25	232	86,1	2,2	19,5
400 320 22	17,28	246	81,0	2,2	19,5
400 320 23	18,40	262	76,1	2,2	19,5
400 320 24	19,63	280	71,3	2,2	19,5
400 320 25	20,99	299	66,7	2,2	19,5
400 320 26	22,50	321	62,2	2,2	19,5
400 320 27	24,19	345	57,9	2,2	19,5
400 320 28	26,09	372	53,7	2,2	19,5
400 320 29	28,25	400	49,6	2,2	19,5
400 320 30	30,71	400	45,6	2,0	19,5
400 320 31	33,55	400	41,7	1,8	19,5
400 320 32	34,10	324	41,0	1,5	19,5
400 320 33	36,67	348	38,2	1,5	19,5
400 320 34	39,55	376	35,4	1,5	19,5
400 320 35	42,81	400	32,7	1,4	19,5
400 320 36	46,55	400	30,1	1,3	19,5
400 320 37	50,85	400	27,5	1,2	19,5

Size 3, Version A

Product No.	Ratio i	M_{2max} Nm	at n_1 = 1420 min^{-1} and f_B = 1 n_2 min^{-1}	P_{max} kW	Weight kg
400 340 01	4,13	510	344,1	19,3	36
400 340 02	4,46	551	318,4	19,3	36
400 340 03	4,84	597	293,6	19,3	36
400 340 04	5,27	650	269,6	19,3	36
400 340 05	5,76	712	246,4	19,3	36
400 340 06	6,34	783	223,9	19,3	36
400 340 07	6,84	492	207,5	11,3	36
400 340 08	7,40	531	192,0	11,2	36
400 340 09	8,02	576	177,0	11,2	36
400 340 10	8,73	627	162,6	11,2	36
400 340 11	9,56	686	148,6	11,2	36
400 340 12	10,52	755	135,0	11,2	36
400 340 13	10,81	561	131,3	8,1	36
400 340 14	11,68	606	121,5	8,1	36
400 340 15	12,67	657	112,1	8,1	36
400 340 16	13,80	716	102,9	8,1	36
400 340 17	15,10	783	94,1	8,1	36
400 340 18	16,62	862	85,5	8,1	36
400 340 19	18,53	900	76,6	7,6	36
400 340 20	19,96	900	71,2	7,1	36
400 340 21	21,56	900	65,9	6,5	36
400 340 22	23,38	900	60,7	6,0	36
400 340 23	25,46	900	55,8	5,5	36
400 340 24	27,87	900	51,0	5,1	36
400 340 25	30,00	900	47,3	4,7	36
400 340 26	32,53	900	43,6	4,3	36
400 340 27	35,43	900	40,1	4,0	36
400 340 28	38,77	900	36,6	3,6	36
400 340 29	42,67	900	33,3	3,3	36
400 340 30	47,01	900	30,2	3,0	36
400 340 31	51,73	900	27,4	2,7	36

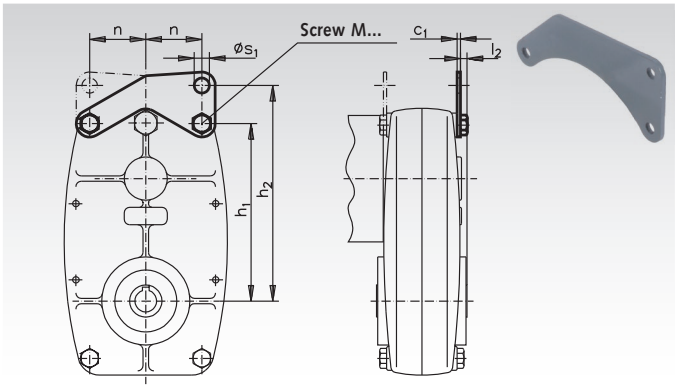
Dimensions tables see page 665.

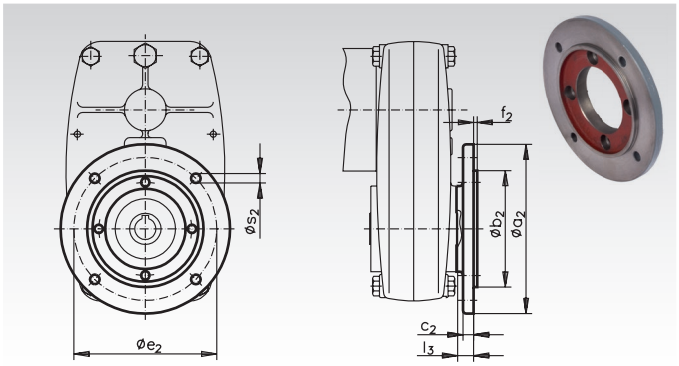
Dimensions Table Shaft-Mounted Flat Gearboxes BOC/I



Dimensions Version A

Size	A mm	B mm	b mm	Ød mm	Ød1 mm	f mm	f1 mm	H mm	h mm	k mm	l mm	M mm	t mm	t1 mm	u mm	u1 mm	Z mm	Center. 1 DIN 332/2
0	112,5	83	81	20^{H7}	14_{k6}	1	1	245	68	139,5	30	150	22,8	16	6^{JS9}	5	75,5	M5
1	143	95	93	30^{H7}	16_{k6}	1	1	288	82	161,5	40	176	33,3	18	8^{JS9}	5	81,5	M5
2	150,5	105	103	35^{H7}	22_{k6}	1	2	330	90	206,5	50	190	38,3	24,5	10^{JS9}	6	97,5	M8
3	207	140	138	40^{H7}	25_{k6}	1	2	430	120	221,0	60	265	43,3	28	12^{JS9}	8	125,0	M10



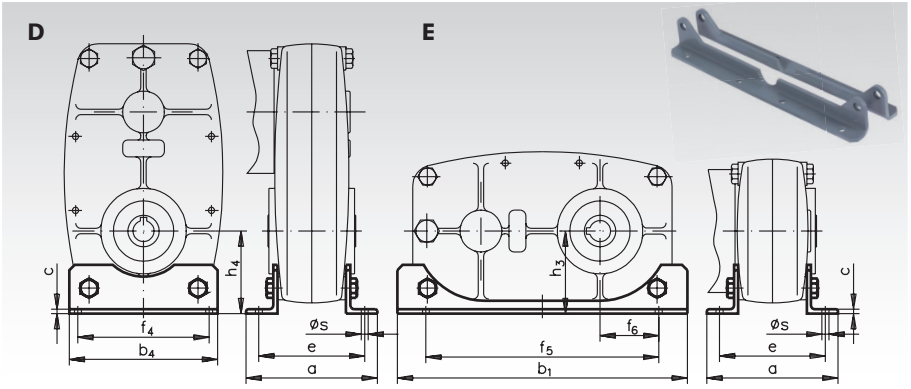


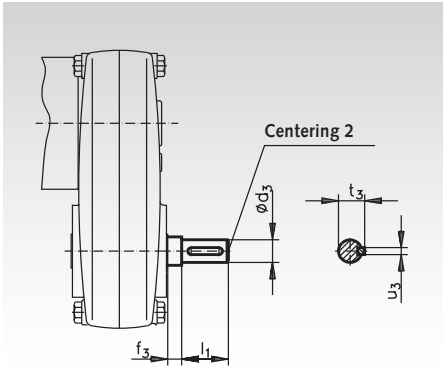
Dimensions Version B

Size	c_1 mm	h_1 mm	h_2 mm	l_2 mm	n mm	$Øs_1$ mm	Screw M
0	3	163	198	12,5	51,5	6,6	M6
1	3	187	230	12,5	58	9,0	M8
2	4	220	260	7,5	65	14,0	M10
3	5	277,5	347,5	21,0	92,5	14,0	M12

Dimensions Version C

Size	$Øa_2$ mm	$Øb_2$ mm	c_2 mm	$Øe_2$ mm	f_2 mm	l_3 mm	$Øs_2$ mm
0	160 200	110_{j6} 130_{j6}	10 12	130 165	3,5 3,5	15 15	9 11
1	160 200	110_{j6} 130_{j6}	16 12	130 165	3,5 3,5	22 22	9 11
2	160 200	110_{j6} 130_{j6}	16 12	130 165	3,5 3,5	22 22	9 11
3	250 300	180_{j6} 230_{j6}	16 20	215 265	4,0 4,0	21 21	14 14





Dimensions Version D and E

Size	a mm	b_1 mm	b_4 mm	c mm	e mm	f_4 mm	f_5 mm	f_6 mm	h_3 mm	h_4 mm	Øs mm
0	92	234	140	4	78	124	194	42,5	78	78	6,6
1	124	274	170	4	100	146	220	48	92	92	9
2	162	318	190	5	132	150	270	60	101	101	11
3	168	397	265	6	138	225	325	67,5	136,5	131,5	14

Dimensions Version F

Size	$Ød_3$ mm	f_3 mm	l_1 mm	t_3 mm	u_3 mm	Center. 2 DIN
0	20_{k6}	12	40	22,5	6	M6
1	30_{k6}	15	70	33	8	M10
2	35_{k6}	14	80	38	10	M12
3	40_{k6}	16,5	80	43	12	M16

Bevel Gearboxes HUG, Ratio 1:1

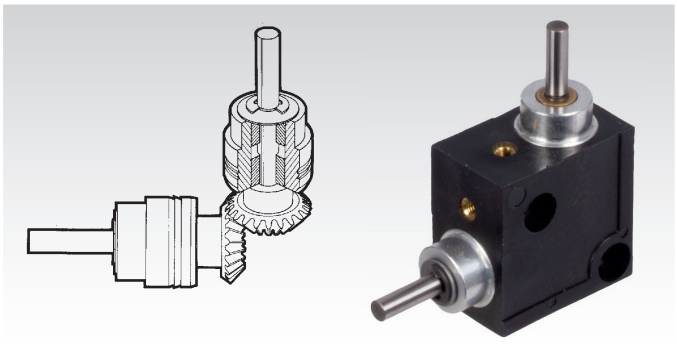
General: Miniaturised right-angle drives for light duty. Suitable for manual and short term drive applications.

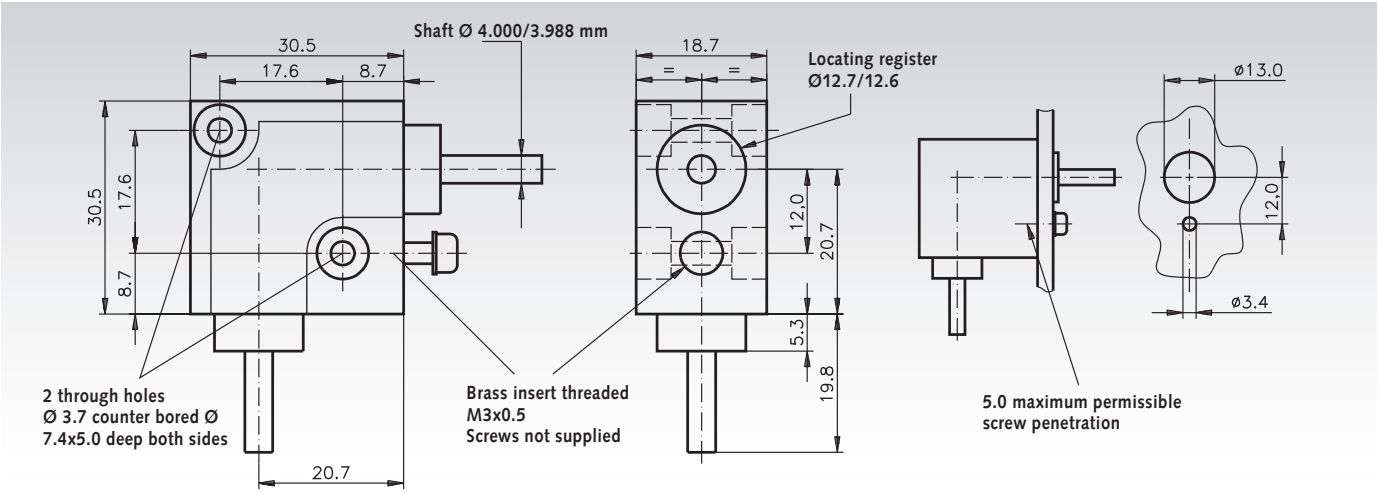
Housing: Gear cases are injection moulded in filled nylon 6.6 for low moisture take up, low thermal expansion, high rigidity. Electrical insulating. Shafts hardened and ground.

Gearing: straight teeth, max. backlash 2°. Speed max. 1,000min^{-1}.
Version A: with steel bevel gears, bonded onto the shafts.
Version B: with acteal bevel gears, moulded onto the shafts.

Ordering details: e.g.: Type, Version, Product No.

Product No.	Version	$T_{max.}$ (Ncm)	Weight (g)
410 000 00	A (steel gears)	68	41
410 001 00	B (acetal gears)	11	37





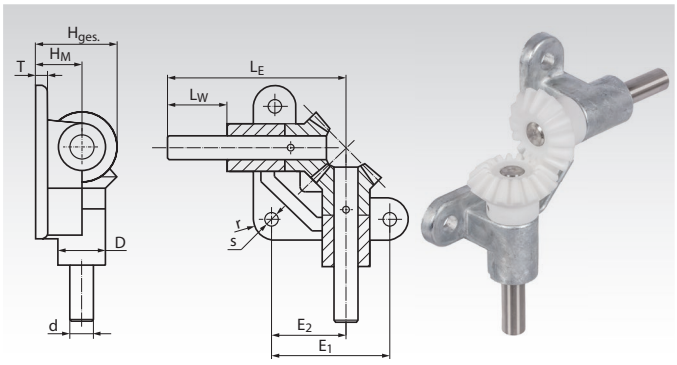
Angular Drive with Acetal Bevel Gears, Ratio 1:1

Material: Housing made from zinc die-cast ZnAl4Cu1. Shafts made from stainless steel 1.4301, dismountable. Bevel gears from acetal resin, injection-moulded.

STAINLESS

- Low cost angular gear drive, ratio 1:1, 6 sizes.
- Suitable for lower torques and intermittend use.
- Shafts running directly in the self-lubricating housing material.
- Easy to mount and maintenance-free.

Shaft angle = 90°. Temperature range - 20°C to +100° C.



Ordering details: e.g.:
Art.-Nr. 410 355 10, Angular drive with acetal bevel gears, shaft-Ø d=5mm

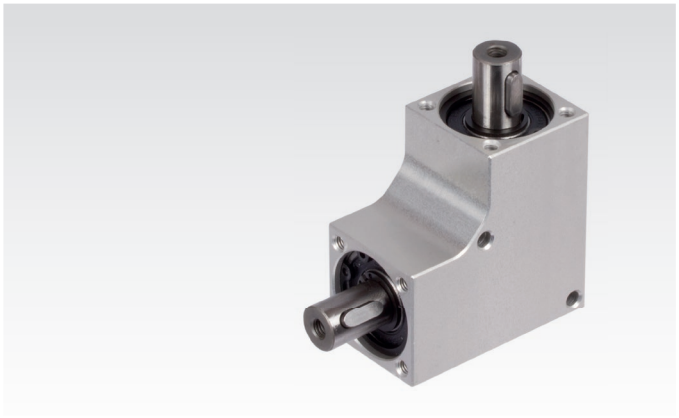
Product No.	d^{h6} mm	D mm	E_1 mm	E_2 mm	H_{Ges} mm	H_M mm	L_E mm	L_W mm	r mm	s mm	T mm	Module mm	Number of teeth	$T_{max.}$ Ncm	Weight g
410 355 10	5	12	32	19,4	18,8	10	50	15	6	4,8	4	1,0	16/16	8,3	60
410 355 15	8	18	45	28,4	28,2	15	70	20	9	5,8	5	1,5	16/16	29	180
410 355 20	10	22	55	35,0	37,5	20	90	30	11	7,0	6	2,0	16/16	73	320
410 355 25	12	25	65	41,0	46,8	25	105	35	12,5	9,0	7	2,5	16/16	145	480
410 355 30	15	30	75	47,5	56,2	30	120	40	15	9,0	8	3,0	16/16	250	760
410 355 35	18	33	85	54,0	65,7	35	135	45	16	11,0	9	3,5	16/16	440	1080

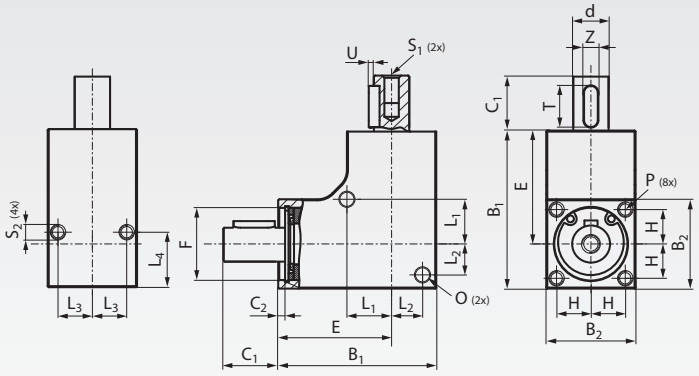
Bevel Gearboxes KEK

Angular drives with high torques at very low dimensions.
Suitable in a wide variety of applications
7 Sizes. Ratio 1:1.

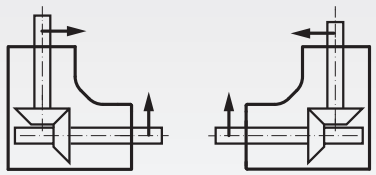
Housing: Aluminium, silver anodized. Sealed against lubricant leaks, protected against dust. Can be mounted in any position.
Gearing: Bevel gears from steel, surface hardened.
Bearing: Ball bearings with rubber seal RS.
Lubrication: Maintenance free grease lubrication.
Angular backlash: 3°+/-1°.
Operating time: 10% at 5 min.
Life time: 1,000 hours at max. performance at speed 500 min^{-1} and operating time 20%.
Permiss. operating temperature: -20° to +60°C.

Ordering Details: e.g.: Product No. 410 001 01 Bevel Gearbox KEK Size 1





Rotational Sense (Rot. direction interchangeable)



Performance Data

Product No.	Size	Shafts Ø d j6 mm	Ratio i	Permittable Torque at Speed 100 min^{-1} Nm	500 min^{-1} Nm	1.000 min^{-1} Nm	Permittable Power at Speed 100 min^{-1} W	500 min^{-1} W	1.000 min^{-1} W	Shaft Load F_R* N	F_A** N	Weight g
410 001 01	1	6	1 : 1	0,35	0,1	0,05	3,7	5,2	5,2	60	60	52
410 001 02	2	8	1 : 1	0,75	0,3	0,15	7,9	15,7	15,7	100	100	73
410 001 03	3	10	1 : 1	2,5	1	0,50	26,2	52,4	52,4	120	120	142
410 001 04	4	12	1 : 1	4	1,5	0,75	41,9	78,5	78,5	140	140	189
410 001 05	5	12	1 : 1	5	2	1,0	52	105	105	240	240	268
410 001 06	6	12	1 : 1	8	3	1,5	84	157	157	550	550	330
410 001 07	7	12	1 : 1	10	4	2,0	105	209	209	550	550	395

* Radial load F_R max. (on middle of the Output Shaft) for $F_A = 0$.
** Axial load F_A max. for $F_R = 0$.

Dimensiones

Size	B_1 mm	B_2 mm	C_1 mm	C_2 mm	d j6 mm	E mm	F mm	H mm	L_1 mm	L_2 mm	L_3 mm	L_4 mm	O mm	P mm	S_1 mm	S_2 mm	T mm	U mm	Z mm
1	32	18	12	2,1	6	23	13	6,5	8,5	6	6,5	11	3,1	M3 x 10	M3 x 8	M3 x 6	8	0,8	2
2	35	20	12	2,05	8	25	16	7,5	10	7	7,5	10	3,1	M3 x 10	M3 x 8	M3 x 6	8	0,8	2
3	42	24	16	2,0	10	30	19	9	12	8	9	16	4,1	M4 x 10	M4 x 8	M4 x 8	12	1,5	4
4	46	26	16	2,0	12	33	21	10	13	9	10	16	4,1	M4 x 10	M5 x 8	M4 x 8	12	1,5	4
5	53	30	16	2,1	12	38	24	11	15	11	11	16	4,1	M4 x 10	M5 x 8	M4 x 8	12	1,5	4
6	56	32	16	2,1	12	40	28	12	17	12	12	16	4,1	M4 x 10	M5 x 8	M4 x 8	12	1,5	4
7	60	35	16	2,1	12	42,5	30	13	17,5	13,5	13	16	4,1	M4 x 10	M5 x 8	M4 x 8	12	1,5	4

Bevel Gearboxes DZA

General data: 4 sizes and 2 versions.
Ratio either 1 : 1 or 2 : 1. Any mounting position possible.
Ratio for gearing up to max. 750 min^{-1} possible.

Housing: Thick-walled, one-piece cast aluminium housing, fully oil-tight and dust-proof.

Gearing: The gears are to the Coniflex system, case hardened.

Shafts/bearing system: Input and output shaft are ground and mounted on ball bearings. **From size 2 with keyways.**

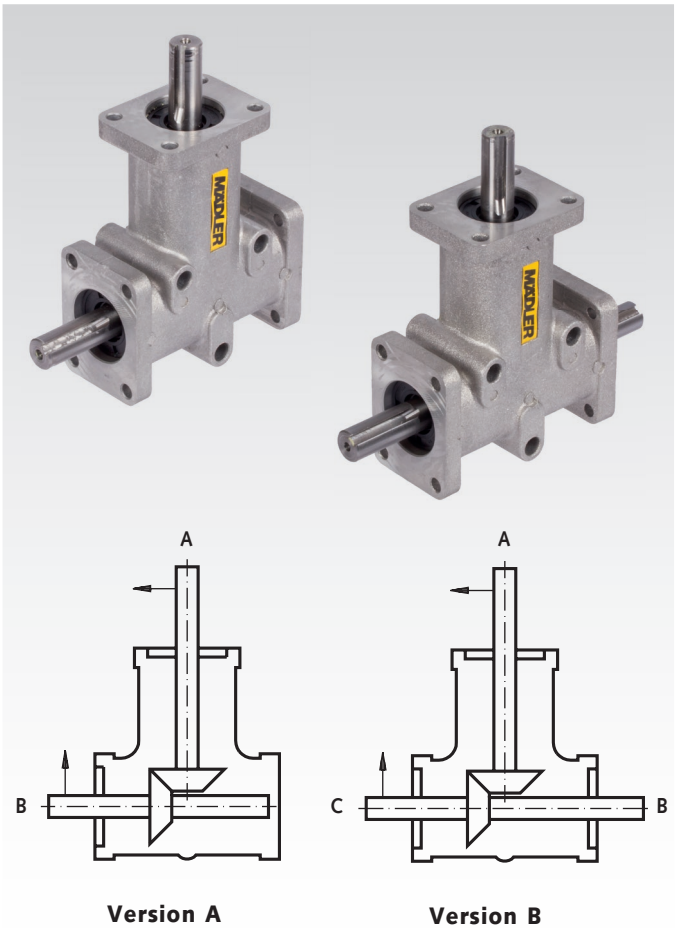
Lubrication/maintenance: Lubricated for life, viscosity ISO VG 150. Gearboxes are maintenance free.

Angular backlash: 15 to 30 angular minutes.

Permiss. operating temperature: -18°C to +80°C.

Ordering details: e.g.: Type, Size, Version, Ratio, Product No.

Product No.	Size	Version	Ratio i
410 010 00	1	A	1 : 1
410 010 02	1	A	2 : 1
410 020 00	1	B	1 : 1
410 020 02	1	B	2 : 1
410 012 00	2	A	1 : 1
410 012 02	2	A	2 : 1
410 022 00	2	B	1 : 1
410 022 02	2	B	2 : 1
410 014 00	3	A	1 : 1
410 014 02	3	A	2 : 1
410 024 00	3	B	1 : 1
410 024 02	3	B	2 : 1
410 016 00	4	A	1 : 1
410 016 02	4	A	2 : 1
410 026 00	4	B	1 : 1
410 026 02	4	B	2 : 1



Version A **Version B**

Performance Data

		Size 1		Size 2		Size 3		Size 4	
Output Speed* min^{-1}	Ratio i	Input Power kW	Output Torque** Nm	Input Power kW	Output Torque** Nm	Input Power kW	Output Torque** Nm	Input Power kW	Output Torque** Nm
50	1 : 1	0,026	4,7	0,093	16,5	0,280	50,5	0,500	89,0
50	2 : 1	0,010	1,7	0,038	6,7	0,150	27,0	0,260	46,0
100	1 : 1	0,047	4,2	0,162	14,5	0,490	44,0	0,890	79,0
100	2 : 1	0,017	1,5	0,069	6,2	0,290	26,0	0,490	44,0
200	1 : 1	0,082	3,7	0,280	12,6	0,850	38,0	1,540	69,0
200	2 : 1	0,030	1,3	0,131	5,9	0,550	24,5	0,950	42,5
400	1 : 1	0,142	3,2	0,470	10,6	1,440	32,5	2,600	58,7
400	2 : 1	0,053	1,2	0,235	5,3	0,980	22,0	1,730	39,0
600	1 : 1	0,195	2,9	0,665	10,0	1,980	29,7	3,530	53,1
600	2 : 1	0,074	1,1	0,332	5,0	1,400	21,0	2,460	37,0
1000	1 : 1	0,287	2,6	1,014	9,2	3,000	27,1	5,100	46,3
1000	2 : 1	0,106	1,0	0,496	4,5	2,090	19,0	3,640	33,0
1400	1 : 1	0,368	2,4	1,320	8,6	3,870	25,2	6,460	42,1
1400	2 : 1	0,135	0,9	0,645	4,2	2,790	17,9	4,530	29,5
1800***	1 : 1	0,442	2,3	1,571	8,0	4,610	23,5	9,680	39,1
2000***	1 : 1	0,476	2,2	1,723	7,9	4,980	22,8	8,270	37,9
2500***	1 : 1	0,556	2,1	2,105	7,8	5,750	21,3	9,530	35,3
3000***	1 : 1	0,632	2,0	2,494	7,7	6,540	20,2	10,780	33,3

* The gearboxes are thus dimensioned, that the lifetime comes to 10,000 hours at full load and a starting speed of 1,400 min^{-1}.

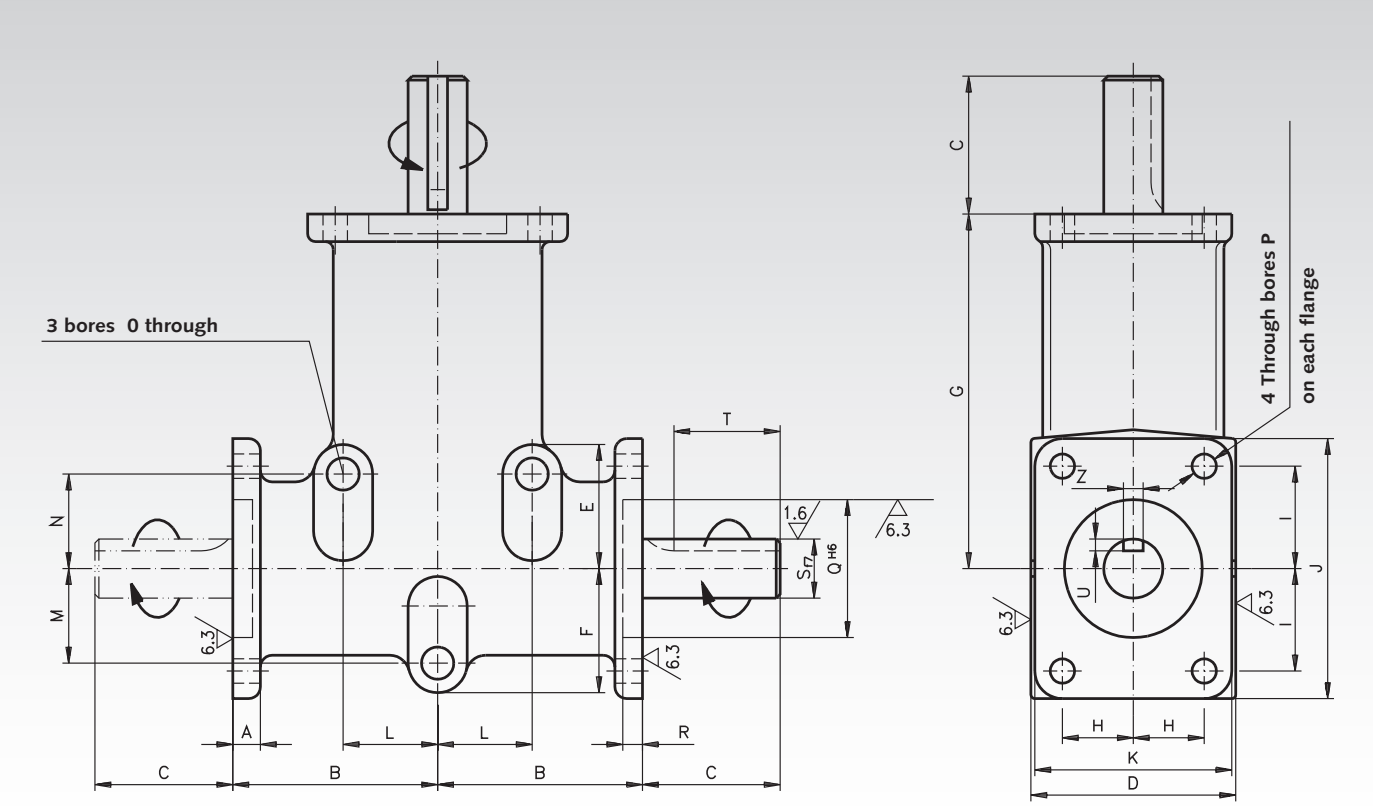
** Only for version A. At version B, the torque at each output shaft end may be only 50%.

*** Speeds above 1,400 min^{-1} shorten the lifespan and are only permitted for a short time. If the permiss. operating temperature is exceeded, oil leaks may occur.

Input shaft / output shaft, speed

At both types and both ratios, the input can be at shaft A as well as at shaft B/C.
At ratio 1:1 the maximum speed is 1,400 min^{-1}.
Ratio 2:1 can be used for gearing down and also for gearing up.
Gearing down: Input at shaft A with max. speed 1,400 min^{-1} (output speed max. 700 min^{-1}).
Gearing up: Input at shaft B/C with max. speed 750 min^{-1} (output speed max. 1,500 min^{-1}).

Dimensions Table Bevel Gearboxes DZA



Size	Shaft-Ø mm	No. of Output-Shafts	Ratio	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T*	U	Z	Weight kg
				Dim. in mm																						
1	8	1	1 : 1	6	34	15	34	21	21	60	11	15	40	32	16	16	16	5,2	4,2	22	2	8	-	-	-	0,30
1	8	2	1 : 1	6	34	15	34	21	21	60	11	15	40	32	16	16	16	5,2	4,2	22	2	8	-	-	-	0,31
1	8	1	2 : 1	6	34	15	34	21	21	60	11	15	40	32	16	16	16	5,2	4,2	22	2	8	-	-	-	0,30
1	8	2	2 : 1	6	34	15	34	21	21	60	11	15	40	32	16	16	16	5,2	4,2	22	2	8	-	-	-	0,31
2	15	1	1 : 1	10	52	35	52	31,5	31,5	90	18	26	66	50	24	24	24	8,2	6,2	35	3	15	27	3	5	1,25
2	15	2	1 : 1	10	52	35	52	31,5	31,5	90	18	26	66	50	24	24	24	8,2	6,2	35	3	15	27	3	5	1,31
2	15	1	2 : 1	10	52	35	52	31,5	31,5	90	18	26	66	50	24	24	24	8,2	6,2	35	3	15	27	3	5	1,25
2	15	2	2 : 1	10	52	35	52	31,5	31,5	90	18	26	66	50	24	24	24	8,2	6,2	35	3	15	27	3	5	1,31
3	20	1	1 : 1	8,5	75	50	76	47	47	140	27	38	97	74	38	38	38	9,0	8,5	52	2,5	20	40	3,5	6	3,75
3	20	2	1 : 1	8,5	75	50	76	47	47	140	27	38	97	74	38	38	38	9,0	8,5	52	2,5	20	40	3,5	6	3,89
3	20	1	2 : 1	8,5	75	50	76	47	47	140	27	38	97	74	38	38	38	9,0	8,5	52	2,5	20	40	3,5	6	3,75
3	20	2	2 : 1	8,5	75	50	76	47	47	140	27	38	97	74	38	38	38	9,0	8,5	52	2,5	20	40	3,5	6	3,89
4	25	1	1 : 1	13	80	70	100	81	57,5	150	38	38	99	98	45	45	70	10,3	10,3	62	3,5	25	60	4	8	6,20
4	25	2	1 : 1	13	80	70	100	81	57,5	150	38	38	99	98	45	45	70	10,3	10,3	62	3,5	25	60	4	8	6,52
4	25	1	2 : 1	13	80	70	100	81	57,5	150	38	38	99	98	45	45	70	10,3	10,3	62	3,5	25	60	4	8	6,20
4	25	2	2 : 1	13	80	70	100	81	57,5	150	38	38	99	98	45	45	70	10,3	10,3	62	3,5	25	60	4	8	6,52

* Size 1 without feather key groove.

Permissible Radial and Axial Loads

Size	F_R** N	F_A*** N
1	100	20
2	250	50
3	400	80
4	800	160

** Permiss. radial force for F_A=0.
*** Permiss. axial force for F_R=0.

Size	1	2	3	4
Oil volume (in dm^3)	0.03	0.06	0.10	0.13

Operating Factors

Operating hours per day	3	8	12	24
Uniform load	0,7	0,9	1	1,3
Light shocks	0,9	1	1,3	1,8
Heavy shocks	1,3	1,6	1,8	2,3

Operating temperature -18° to + 80°C.

Bevel Gearboxes DZR, Stainless Steel

General data: High resistance to corrosion.
4 sizes and 2 versions.
Ratio either 1 : 1 or 2 : 1. Any mounting position possible.
Ratio for gearing up to max. 750 min^{-1} possible.

Housing: Stainless steel 1.4401 (V4A / AISI 316). Thick-walled, one-piece housing, fully oil-tight and dust-proof.

Gearing: Gleason-spiral bevel gears, hardened.

Shafts/bearing system: Stainless steel 1.4401 (V4A / AISI 316), ground and mounted on ball bearings. **From size 2 with keyways.**

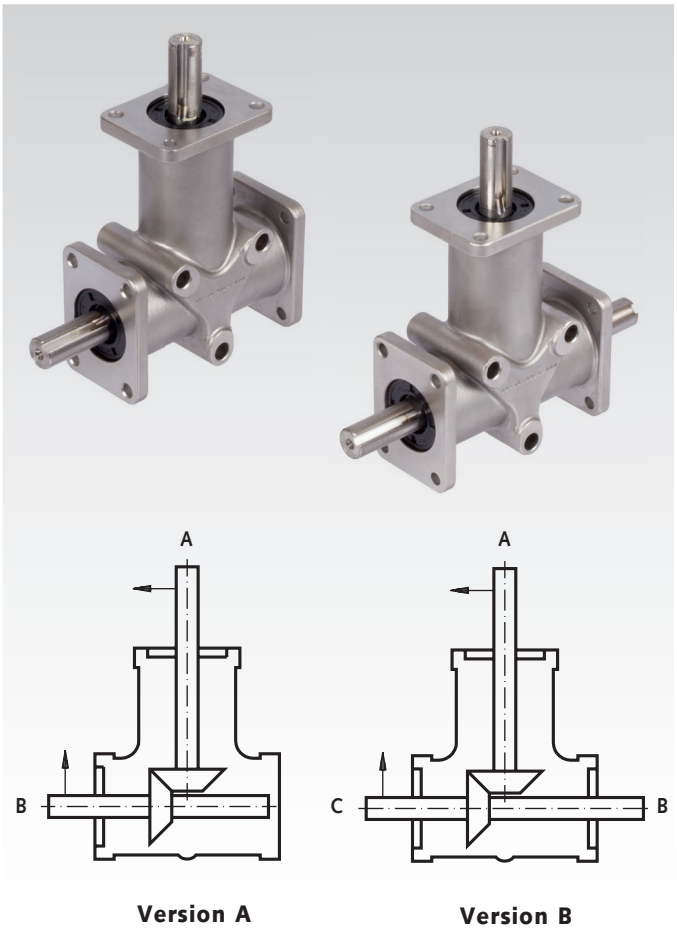
Lubrication/maintenance: Lubricated for life, viscosity ISO VG 150. Gearboxes are maintenance free.

Angular backlash: 15 to 30 angular minutes.

Permiss. operating temperature: -18°C to +80°C.

Ordering details: e.g.: Type, Size, Version, Ratio, Product No.

Product No.	Size	Version	Ratio i
410 910 00	1	A	1 : 1
410 910 02	1	A	2 : 1
410 920 00	1	B	1 : 1
410 920 02	1	B	2 : 1
410 912 00	2	A	1 : 1
410 912 02	2	A	2 : 1
410 922 00	2	B	1 : 1
410 922 02	2	B	2 : 1
410 914 00	3	A	1 : 1
410 914 02	3	A	2 : 1
410 924 00	3	B	1 : 1
410 924 02	3	B	2 : 1
410 916 00	4	A	1 : 1
410 916 02	4	A	2 : 1
410 926 00	4	B	1 : 1
410 926 02	4	B	2 : 1



Version A **Version B**

Performance Data

		Size 1		Size 2		Size 3		Size 4	
Output Speed* min^{-1}	Ratio i	Input Power kW	Output Torque** Nm	Input Power kW	Output Torque** Nm	Input Power kW	Output Torque** Nm	Input Power kW	Output Torque** Nm
50	1 : 1	0,012	2,2	0,038	7,2	0,11	21,0	0,220	42,0
50	2 : 1	0,008	1,6	0,030	5,7	0,099	19,0	0,204	39,0
100	1 : 1	0,021	2,0	0,070	6,7	0,215	20,5	0,419	40,0
100	2 : 1	0,016	1,5	0,058	5,5	0,188	18,0	0,387	37,0
200	1 : 1	0,037	1,75	0,136	6,5	0,419	20,0	0,796	38,0
200	2 : 1	0,031	1,5	0,105	5,0	0,356	17,0	0,733	35,0
400	1 : 1	0,073	1,75	0,272	6,5	0,817	19,5	1,508	36,0
400	2 : 1	0,059	1,4	0,209	5,0	0,670	16,0	1,382	33,0
700	1 : 1	0,125	1,7	0,440	6,0	1,393	19,0	2,492	34,0
700	2 : 1	0,103	1,4	0,348	4,75	1,026	14,0	2,126	29,0
1400	1 : 1	0,235	1,6	0,880	6,0	2,785	19,0	4,545	31,0
1400	2 : 1	0,161	1,1	0,586	4,0	1,759	12,0	3,372	23,0
2000***	1 : 1	0,272	1,3	0,942	4,5	3,351	16,0	5,236	25,0
3000***	1 : 1	0,346	1,1	1,257	4,02	4,398	14,0	6,911	22,0

* The gearboxes are thus dimensioned, that the lifetime comes to 10,000 hours at full load and a starting speed of 1,400 min^{-1}.

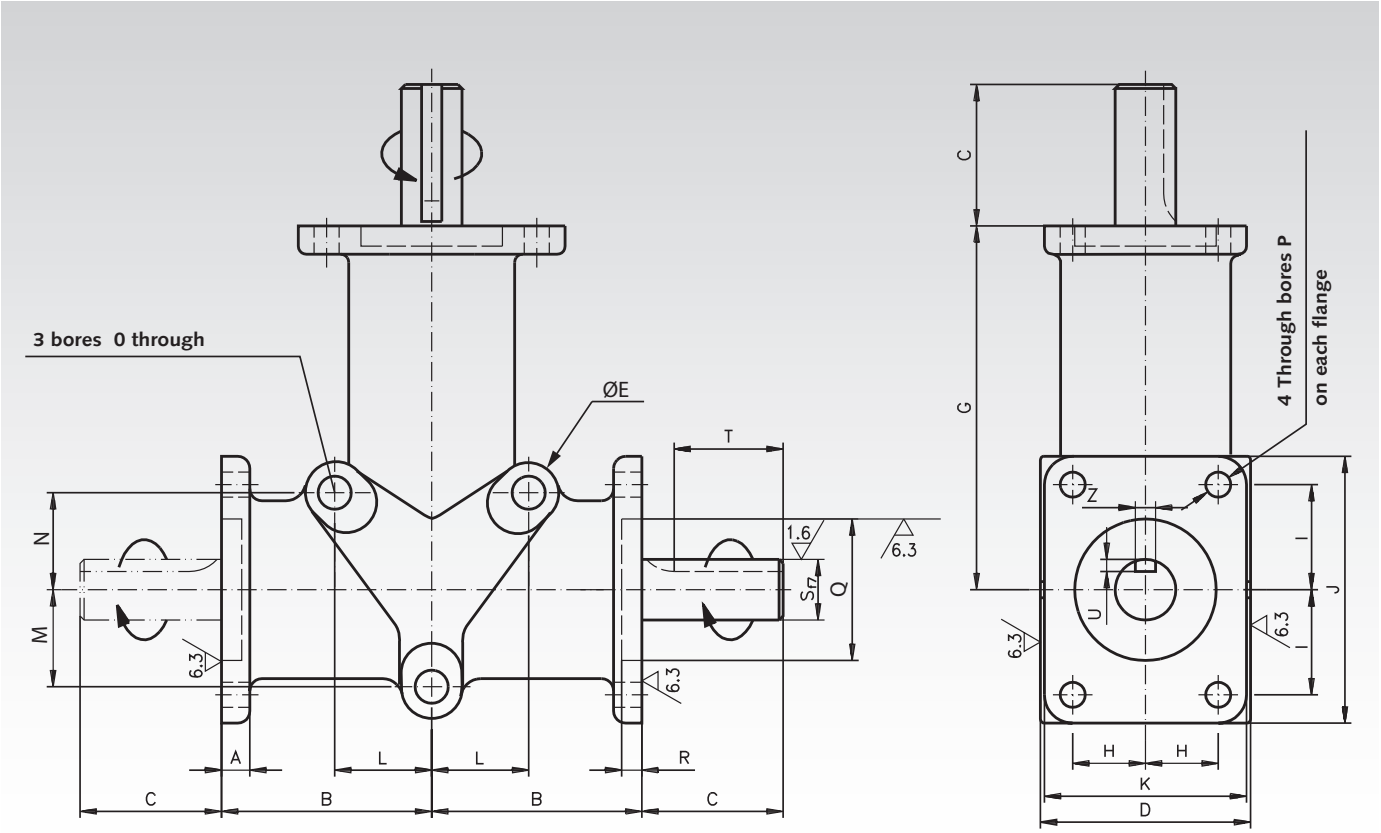
** Only for version A. At version B, the torque at each output shaft end may be only 50%.

*** Speeds above 1,400 min^{-1} shorten the lifespan and are only permitted for a short time. If the permiss. operating temperature is exceeded, oil leaks may occur.

Input shaft / output shaft, speed

At both types and both ratios, the input can be at shaft A as well as at shaft B/C.
At ratio 1:1 the maximum speed is 1,400 min^{-1}.
Ratio 2:1 can be used for gearing down and also for gearing up.
Gearing down: Input at shaft A with max. speed 1,400 min^{-1} (output speed max. 700 min^{-1}).
Gearing up: Input at shaft B/C with max. speed 750 min^{-1} (output speed max. 1,500 min^{-1}).

Dimensions Table Bevel Gearboxes DZR, Stainless Steel



Size	Shaft-Ø mm	No. of Output-Shafts	Ratio	A	B	C	D	E	G	H	I	J	K	L	M	N	O	P	Q^{H7}	R	S^{f7}	T*	U	Z	Weight kg
				Dim. in mm																					
1	8	1	1 : 1	5	34	15	33	11	60	11	15	42,4	32	16	16	16	5,2	4,2	22	1,3	8	-	-	-	0,483
1	8	2	1 : 1	5	34	15	33	11	60	11	15	42,4	32	16	16	16	5,2	4,2	22	1,3	8	-	-	-	0,492
1	8	1	2 : 1	5	34	15	33	11	60	11	15	42,4	32	16	16	16	5,2	4,2	22	1,3	8	-	-	-	0,483
1	8	2	2 : 1	5	34	15	33	11	60	11	15	42,4	32	16	16	16	5,2	4,2	22	1,3	8	-	-	-	0,492
2	15	1	1 : 1	7	52	35	52	17	90	18	26	65	50	24	24	24	8,5	6,2	35	2,0	15	27	3	5	1,795
2	15	2	1 : 1	7	52	35	52	17	90	18	26	65	50	24	24	24	8,5	6,2	35	2,0	15	27	3	5	1,855
2	15	1	2 : 1	7	52	35	52	17	90	18	26	65	50	24	24	24	8,5	6,2	35	2,0	15	27	3	5	1,795
2	15	2	2 : 1	7	52	35	52	17	90	18	26	65	50	24	24	24	8,5	6,2	35	2,0	15	27	3	5	1,855
3	20	1	1 : 1	9	75	50	76	18	140	27	38	94	74	38	38	38	9,0	8,5	52	2,0	20	40	3,5	6	5,388
3	20	2	1 : 1	9	75	50	76	18	140	27	38	94	74	38	38	38	9,0	8,5	52	2,0	20	40	3,5	6	5,536
3	20	1	2 : 1	9	75	50	76	18	140	27	38	94	74	38	38	38	9,0	8,5	52	2,0	20	40	3,5	6	5,538
3	20	2	2 : 1	9	75	50	76	18	140	27	38	94	74	38	38	38	9,0	8,5	52	2,0	20	40	3,5	6	5,536
4	25	1	1 : 1	11	80	70	100	25	150	38	38	101	98	45	45	70	12,5	10,3	62	3,0	25	60	4	8	9,136
4	25	2	1 : 1	11	80	70	100	25	150	38	38	101	98	45	45	70	12,5	10,3	62	3,0	25	60	4	8	9,445
4	25	1	2 : 1	11	80	70	100	25	150	38	38	101	98	45	45	70	12,5	10,3	62	3,0	25	60	4	8	9,136
4	25	2	2 : 1	11	80	70	100	25	150	38	38	101	98	45	45	70	12,5	10,3	62	3,0	25	60	4	8	9,445

* Size 1 without feather key groove.

Permissible Radial and Axial Loads

Size	F_R** N	F_A*** N
1	60	20
2	140	50
3	300	80
4	400	160

** Permiss. radial force for F_A=0.
*** Permiss. axial force for F_R=0.

Size	1	2	3	4
Oil volume (in dm^3)	0.03	0.06	0.10	0.13

Operating Factors

Operating hours per day	3	8	12	24
Uniform load	0,7	0,9	1	1,3
Light shocks	0,9	1	1,3	1,8
Heavy shocks	1,3	1,6	1,8	2,3

Operating temperature -18° to + 80°C.

Bevel Gearboxes DZA Model H

General data: Gearbox with hollow shaft on the output side. 2 sizes. Ratio either 1 : 1 or 2 : 1 or 3 : 1. Any mounting position possible. The maximum input speed (hollow shaft as input device) for gearing up is 750 min^{-1} at 2 : 1 and 500 min^{-1} at 3 : 1.

Housing: Thick-walled, one-piece cast aluminium housing, fully oil-tight and dust-proof.

Gearing: The gears are to the Coniflex system, case hardened.

Shafts/bearing system: Input and output shaft are ground and mounted on ball bearings.

Lubrication/maintenance: Lubricated for life, viscosity ISO VG 150. Gearboxes are maintenance free.

Angular backlash: 15 to 30 angular minutes.

Permiss. operating temperature: -18°C to +80°C.

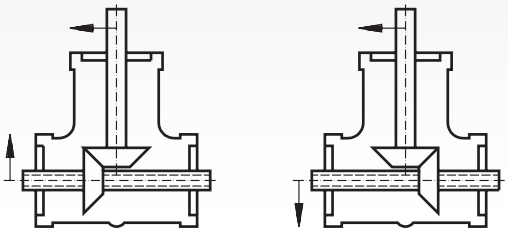
Size 2 Size 3

Ordering details: e.g.: Product No., Type, Size, Version, Ratio

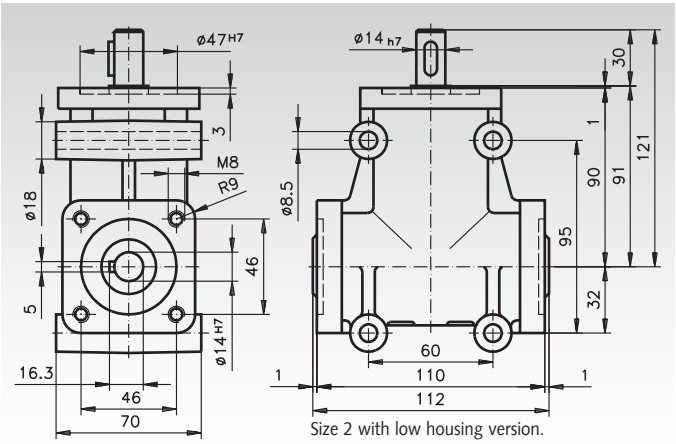
Product No.	Size	Ratio i	Input Power* kW	Output Torque* Nm	Oil Volume dm^3	Weight kg
410 132 00	2	1:1	1,83	13	0,075	2,0
410 132 02	2	2:1	0,5	7	0,075	2,0
410 132 03	2	3:1	0,25	5	0,075	2,0
410 134 00	3	1:1	5,5	38	0,12	4,8
410 134 02	3	2:1	1,83	25	0,12	4,8
410 134 03	3	3:1	0,91	18	0,12	4,8

*Permiss. max. values for input speed 1,400 min^{-1} (at the solid shaft) at continuous operation.

Rotational direction depends on mounting position:

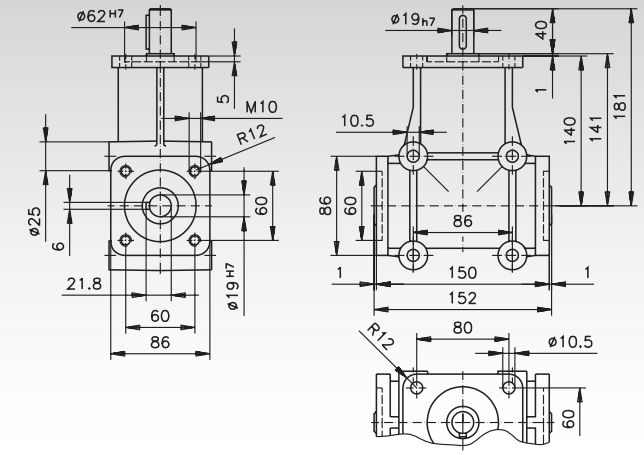


Dimensions Size 2



Size 2 with low housing version.
The dimensions and fastening threads M8 are the same on all three flanges.

Dimensions Size 3



Permissible Radial and Axial Loads

Size	F_R** N	F_A*** N
2	250	50
3	400	80

** Permiss. radial force at F_A=0.
*** Permiss. axial force at F_R=0.

Operating Factors

Operating hours per day	3	8	12	24
Uniform load	0,8	0,9	1	1,25
Light shocks	0,9	1	1,25	1,5
Strong shocks	1,0	1,5	1,6	1,8

Bevel Gearboxes KU/I (Rigid Design)

General data: 3 Designs, 6 standard version, and many further variations available as multi-shaft gearboxes, please enquire. **Also Available in corrosion-proof and NO-TOX version for the food processing and pharmaceutic industry.**

Housing: Thick-walled grey cast iron, fully sealed against oil leaks and protected against dust. Due to the cube shape, all 6 sides of the gear box can be used as mounting surfaces. The diameters l_1 and l_2 are provided for use as alignment studs.

Gearing: Hardened bevel gears, lapped in pairs

Ratios: 1:1, 1.5:1, 2:1, 3:1, 4:1, 5:1, 6:1
Special transmission ratios available on request. Size 0 only to 3:1.

Bearing System: Generously dimensioned roller bearings, reinforced bearings on request.

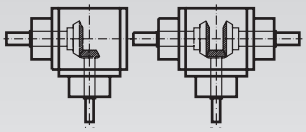
Lubrication: The gearboxes are fully enclosed, lubricated for life and maintenance free. On request, the gearboxes can also be supplied with oil change lubrication or NO-TOX lubrication for the food industry. If the gearbox is used at higher speeds (see table) venting must be provided. For this purpose, please state the mounting position (downward-facing side) and operating time.

Model K: Input side A: Ratio for gearing up.
Input side C: Transmission ratio for gearing down.

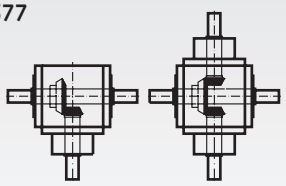
Model L: Straight-through shaft, slowly turning.

Model H: Straight-through hollow shaft, slowly turning.

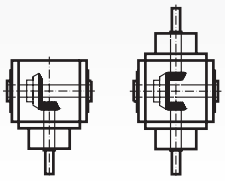
Model K **Page 674 - 675**



Model L **Page 676 - 677**



Model H **Page 678 - 679**



Ordering details: e.g.: Type, Model, Size, Version, Mounting Side (A-F), Ratio, Mounting Position, Output Speed, Product No.

Selection of the Gearbox Size

The following pages serve to determine the required gearbox size from the tables considering:

Output Torque – Power – Load of Input and Output Shaft

In this process, all 3 factors must be taken into consideration, when selecting the gearbox according to the specific requirements. The stated figures refer to an operating time of 100%. Operating time 8h/day. Ambient temperature 20°C, shock-free operation and no additional cooling. If the operating conditions differ from the above, the following factors have to be regarded when determining the required gearbox size (see examples).

Factors by which the transmissible torque has to be multiplied:

	Output (load type of driven machine)			
Input	Uniform	Medium shocks	Strong shocks	Operating time
Uniform	1.0	1.25	1.75	up to 2 h/day: Load factor x 0.8
Light shocks	1.25	1.5	2.0	up to 8 h/day: Load factor x 1.0
Medium shocks	1.5	1.75	2.25	up to 8 h/day: Load factor x 1.25

The product of **transmissible torque x load factor x operating time factor** has to be **smaller** than the **permiss. torque** stated in the table.

Example:
Torque: 250 Nm; Load factor 1.5; Operating time 1.5 h/day
Torque for gearbox selection: 250 Nm x 1.5 x 0.8 = 300 Nm; i = 1 : 1; n = 250 min^{-1} = Selected Gearbox Size 25.

Factors determining the max. transmissible power considering heating up of the gear box:

Ambient temperature T	Operating time OT
10° C: permiss. power x 1.2	OT 100% permiss. power x 1.0
20° C: permiss. power x 1.0	OT 80% permiss. power x 1.2
30° C: permiss. power x 0.9	OT 60% permiss. power x 1.4
40° C: permiss. power x 0.8	OT 40% permiss. power x 1.6
50° C: permiss. power x 0.7	OT 20% permiss. power x 1.8

At the same time do not exceed the permiss.T_2!

Max. permiss. power output without cooling at 100% OT	
Gearbox size 0	1.5 kW
Gearbox size 1	4.0 kW
Gearbox size 2	7.0 kW
Gearbox size 25	17.0 kW
Gearbox size 30	26.0 kW

If the **permissible** power multiplied with the ambient temperature factor and the operating time is **smaller** than the **existing** power, additional cooling of the gearbox must be provided.

Example:
Gearbox size 25; i = 1 : 1; n = 750 min^{-1};
P = 25.63 kW; T = 30°C, OT = 20%
Maximum power from the table: 17 kW x 0.9 x 1.8 = 27.5 kW
Gearbox size sufficient, no additional cooling required.

Bevel Gearboxes KU/I, Model K, Technical Data

Ratio	Size	Version 10 Product No.	Version 20 Product No.	Permissible Output Torque T_2 in Nm** at Output Speed n_2 in min^{-1}							Max. Input Power P_1 in kW** at Input Speed n_1 in min^{-1}						
				50	250	500	750	1000	1500	3000	50	250	500	750	1000	1500	3000
1 : 1	0	*412 001 00	412 002 00	18	17	15	13	12	11	10	0,1	0,47	0,83	1,07	1,32	1,82	3,31
	1	*412 004 00	412 005 00	50	44	40	37	34	32	27	0,28	1,21	2,2	3,06	3,75	5,29	8,93
	2	*412 007 00	412 008 00	130	123	115	103	92	82	66	0,72	3,39	6,34	8,51	10,14	13,56	21,82
	25	*412 010 00	412 011 00	380	350	330	310	290	260	---	2,09	9,64	18,19	25,63	31,96	42,99	---
	30	*412 013 00	412 014 00	750	710	620	555	510	450	---	4,13	19,56	34,17	45,88	56,21	74,4	---
	Size	**Product No.**	**Product No.**	**33**	**167**	**333**	**500**	**667**	**1000**	**2000**	**50**	**250**	**500**	**750**	**1000**	**1500**	**3000**
1,5 : 1	0	412 001 01	412 002 01	18	17	15	13	12	11	10	0,07	0,31	0,55	0,72	0,88	1,21	2,2
	1	412 004 01	412 005 01	45	40	37	35	32	29	25	0,16	0,74	1,36	1,93	2,35	3,2	5,51
	2	412 007 01	412 008 01	113	108	105	94	86	78	61	0,41	1,99	3,85	5,18	6,32	8,6	13,45
	25	412 010 01	412 011 01	355	330	315	295	280	252	185	1,29	6,07	11,56	16,26	20,59	27,78	40,78
	30	412 013 01	412 014 01	750	690	615	550	505	437	330	2,73	12,7	22,57	30,31	37,13	48,17	72,75
	Size	**Product No.**	**Product No.**	**25**	**125**	**250**	**375**	**500**	**750**	**1500**	**50**	**250**	**500**	**750**	**1000**	**1500**	**3000**
2 : 1	0	*412 001 02	412 002 02	18	17	15	13	12	11	10	0,05	0,23	0,41	0,54	0,66	0,91	1,65
	1	*412 004 02	412 005 02	37	36	34	32	31	27	23	0,1	0,5	0,94	1,32	1,71	2,23	3,8
	2	*412 007 02	412 008 02	107	98	92	86	81	73	56	0,29	1,35	2,54	3,55	4,46	6,03	9,26
	25	*412 010 02	412 011 02	355	320	300	280	270	245	170	0,98	4,41	8,27	11,57	14,88	20,25	28,11
	30	412 013 02	412 014 02	750	680	610	540	500	425	310	2,07	9,37	16,81	22,32	27,56	35,13	51,25
	Size	**Product No.**	**Product No.**	**17**	**83**	**167**	**250**	**333**	**500**	**1000**	**50**	**250**	**500**	**750**	**1000**	**1500**	**3000**
3 : 1	0	*412 001 03	412 002 03	14	13	13	12	12	11	10	0,03	0,12	0,24	0,33	0,44	0,61	1,1
	1	*412 004 03	412 005 03	37	36	34	32	31	27	23	0,07	0,33	0,63	0,88	1,14	1,49	2,54
	2	*412 007 03	412 008 03	110	95	90	87	82	74	58	0,21	0,87	1,66	2,40	3,01	4,08	6,39
	25	412 010 03	412 011 03	305	280	260	250	245	230	190	0,57	2,56	4,79	6,89	8,99	12,68	20,94
	30	412 013 03	412 014 03	690	630	600	530	490	470	420	1,29	5,76	11,04	15,98	20,37	28,38	46,29
	Size	**Product No.**	**Product No.**	**12,5**	**62,5**	**125**	**187,5**	**250**	**375**	**750**	**50**	**250**	**500**	**750**	**1000**	**1500**	**3000**
4 : 1	1	412 004 04	412 005 04	37	36	34	32	31	27	23	0,05	0,25	0,47	0,66	0,85	1,12	1,9
	2	412 007 04	412 008 04	90	87	84	82	79	74	60	0,12	0,6	1,16	1,69	2,18	3,06	4,96
	25	412 010 04	412 011 04	280	270	260	250	240	220	180	0,39	1,86	3,58	5,17	6,61	9,09	14,88
	30	412 013 04	412 014 04	580	550	525	510	485	420	350	0,8	3,79	7,23	10,54	13,36	18,81	28,93
	Size	**Product No.**	**Product No.**	**10**	**50**	**100**	**150**	**200**	**300**	**600**	**50**	**250**	**500**	**750**	**1000**	**1500**	**3000**
5 : 1	1	412 004 05	412 005 05	37	36	34	32	31	27	23	0,04	0,2	0,37	0,53	0,68	0,89	1,52
	2	412 007 05	412 008 05	95	92	89	86	80	72	60	0,1	0,51	0,98	1,42	1,76	2,38	3,97
	25	412 010 05	412 011 05	280	270	250	240	225	215	180	0,32	1,49	2,76	3,97	4,96	7,11	11,9
	30	412 013 05	412 014 05	525	505	470	440	420	380	300	0,58	2,78	5,18	7,27	9,26	12,57	19,84
	Size	**Product No.**	**Product No.**	**8**	**42**	**83**	**125**	**167**	**250**	**500**	**50**	**250**	**500**	**750**	**1000**	**1500**	**3000**
6 : 1	1	412 004 06	412 005 06	33	30	29	29	29	27	23	0,03	0,14	0,27	0,4	0,53	0,74	1,25
	2	412 007 06	412 008 06	71	69	68	68	66	64	54	0,06	0,33	0,63	0,94	1,22	1,75	2,95
	25	412 010 06	412 011 06	210	199	187	176	164	143	129	0,18	0,92	1,72	2,43	3,01	3,95	7,09

* Gearboxes in stock (without ventilation).

** Transmission ratio for gearing down. For gearing up the values for 1:1 apply. In addition the heating up process has to be considered (see page 673).

Max. Speed in min^{-1} for Gear Boxes without Ventilation, at the Output Shaft, i = 1:1 to 6:1

For version 10 and horizontal mounting position. For version 20 the values have to be halved. Values for other OT and other mounting positions on request.

Operating Time	Size 0	Size 1*	Size 2*	Size 25*	Size 30*
ED 100 %	1100	700	600	400	300
ED 30 %	1900	1300	1000	700	500

* From size 1 available with ventilation against surcharge.

Permissible Radial and Axial Loads at shaft d_1

Gearbox Size	T Nm	n_1 [min^{-1}] - F_R [N] 3000	1000	500	250	100	50<
0	< 12	180	250	300	350	450	550
	> 12	150	210	250	290	380	460
1	< 30	300	400	470	580	700	800
	> 30	250	330	390	490	590	670
2	< 80	470	620	720	900	1150	1400
	> 80	390	520	600	750	960	1170
25	< 220	1200	1600	1900	2200	2850	3300
	> 220	1000	1340	1590	1840	2380	2750
30	< 500	2200	1700	3200	3900	5000	6200
	> 500	1840	1420	2670	3250	4170	5170

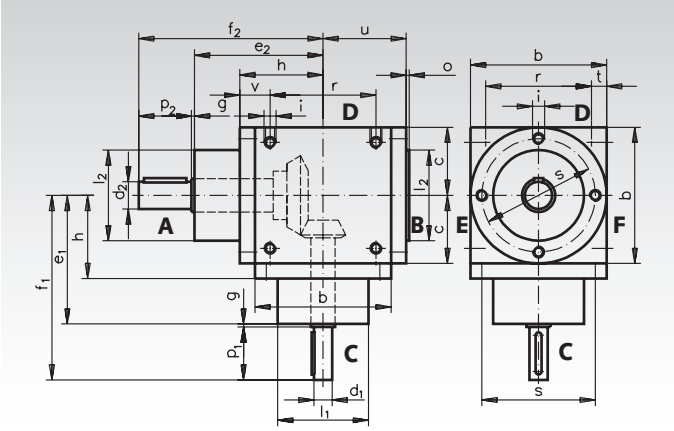
The maximum permiss. radial forces stated in the table are calculated for the centre of the output shaft end, also calculating in the speed and torque. The values were calculated for the most unfavourable load direction. Precise calculation of load and rotational direction may lead to higher permissible loads for the shaft – please ask us.

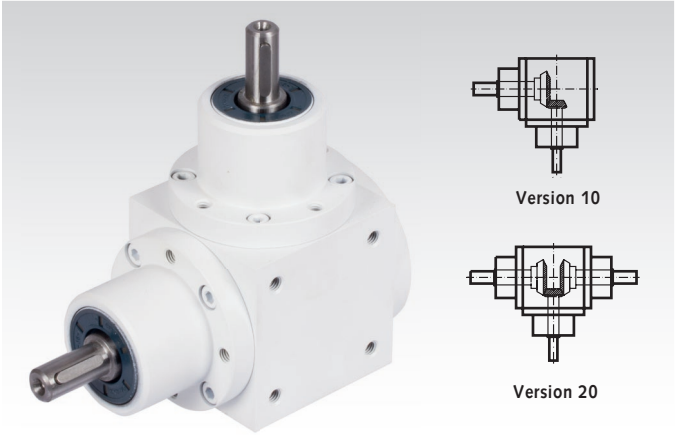
Permissible Radial and Axial Loads at shaft d_2

Gearbox Size	T Nm	n_1 [min^{-1}] - F_R [N] 3000	1000	500	250	100	50
0	< 12	180	250	300	350	450	550
	> 12	150	210	250	290	380	460
1	< 30	300	400	470	580	700	800
	> 30	250	330	390	490	590	670
2	< 80	470	620	720	900	1150	1400
	> 80	390	520	600	750	960	1170
25	< 220	1200	1600	1900	2200	2850	3300
	> 220	1000	1340	1590	1840	2380	2750
30	< 500	2200	1700	3200	3900	5000	6200
	> 500	1840	1420	2670	3250	4170	5170

Axial loads F_A can be absorbed, without need for further calculation, up to about 50% of the permiss. radial forces. If the axial load exceeds this value considerably or if combined loads of F_R and F_A occur – please ask us.

Dimensions Table Bevel Gearboxes KU/I Model K





The driving unit can be connected to either d_1 or d_2, so that transmission ratios of up to 6 : 1 for gearing down and for gearing up are possible (apart from gearbox size 0).
Shaft ends for all types: Tolerance = j_6; Thread alignment according to DIN 332 page 2; Keyways according to DIN 6885/1.
Threaded holes for mounting on all sides of the gearbox as standard. Thread depth of mounting holes = 2 x thread diameter or the thickness of the flange.

Dimensions for i = 1 : 1 to 6 : 1 (intermediate transmission ratios on request)

Size	b mm	c mm	d_1 j6 mm				d_2 j6 mm	e_1 mm			e_2 mm
			1 : 1 1,5 : 1 2 : 1	3 : 1	4 : 1	5 : 1 6 : 1	1 : 1 to 6 : 1	1 : 1 1,5 : 1 2 : 1	3 : 1	4 : 1 5 : 1 6 : 1	
0	65	32,5	12	12	-	-	12	72	72	-	72
1	90	45	18	12	12	12	18	85	85	95	85
2	120	60	25	20	20	15	25	115	115	125	115
25	160	80	35	28	24	24	35	150	150	170	150
30	200	100	42	35	35	28	42	190	190	190	190

Size	f_1 mm				f_2 mm	g mm	h mm	i mm	l_1 f7 mm			l_2 f7 mm	o mm
	1 : 1 1,5 : 1 2 : 1	3 : 1	4 : 1	5 : 1 6 : 1					1 : 1 1,5 : 1 2 : 1	3 : 1 4 : 1	5 : 1 6 : 1		
0	100	100	-	-	100	2	42	M6	44	44	-	44	2
1	122	122	132	132	122	2	55	M8	60	60	60	60	2
2	162	162	172	162	162	2	75	M10	80	80	70	80	3
25	212	212	232	232	212	2	95	M12	110	100	100	110	3
30	273	261	261	261	273	3	120	M12	120	120	110	120	3

Size	p_1 mm			p_2 mm	r mm	s mm	t mm	u mm	v mm
	1 : 1 1,5 : 1 2 : 1	3 : 1 4 : 1	5 : 1 6 : 1	1 : 1 to 6 : 1					
0	26	26	-	26	45	54	10	42	19,5
1	35	35	35	35	70	75	10	55	20,0
2	45	45	35	45	100	100	10	72	25,0
25	60	60	60	60	120	135	20	95	35,0
30	80	68	68	80	160	175	20	117	40,0

Size	Feather Key Size at d_1 mm			Feather Key Size at d_2 and d_3 mm	Weight kg
	1 : 1 1,5 : 1 2 : 1	3 : 1 4 : 1	5 : 1 6 : 1	1 : 1 to 6 : 1	
0	4 x 20	4 x 20	-	4 x 20	2,5
1	6 x 28	4 x 28	4 x 28	6 x 28	5,5
2	8 x 36	6 x 36	5 x 28	8 x 36	12
25	10 x 50	8 x 50	8 x 50	10 x 50	24
30	12 x 70	10 x 63	8 x 63	12 x 70	48

Size	K 0	K 1	K 2	K 25	K 30
Oil volume (in dm³)	0,1	0,3	0,6	1,2	2,5

Bevel Gearboxes KU/I, Model L, Technical Data

Ratio	Size	Version 30 Product No.	Version 60 Product No.	Permissible Output Torque T_2 in Nm** at Output Speed n_2 in min^{-1}							Max. Input Power P_1 in kW** at Input Speed n_1 in min^{-1}						
				50	250	500	750	1000	1500	3000	50	250	500	750	1000	1500	3000
1 : 1	0	*412 031 00	412 032 00	18	17	15	13	12	11	10	0,1	0,47	0,83	1,07	1,32	1,82	3,31
	1	*412 034 00	412 035 00	50	44	40	37	34	32	27	0,28	1,21	2,2	3,06	3,75	5,29	8,93
	2	*412 037 00	412 038 00	130	123	115	103	92	82	66	0,72	3,39	6,34	8,51	10,14	13,56	21,82
	25	*412 040 00	412 041 00	380	350	330	310	290	260	---	2,09	9,64	18,19	25,63	31,96	42,99	---
	30	412 043 00	412 044 00	750	710	620	555	510	450	---	4,13	19,56	34,17	45,88	56,21	74,4	---
	Size	**Product No.**	**Product No.**	**33**	**167**	**333**	**500**	**667**	**1000**	**2000**	**50**	**250**	**500**	**750**	**1000**	**1500**	**3000**
1,5 : 1	0	412 031 01	412 032 01	18	17	15	13	12	11	10	0,07	0,31	0,55	0,72	0,88	1,21	2,2
	1	412 034 01	412 035 01	45	40	37	35	32	29	25	0,16	0,74	1,36	1,93	2,35	3,2	5,51
	2	412 037 01	412 038 01	113	108	105	94	86	78	61	0,41	1,99	3,85	5,18	6,32	8,6	13,45
	25	412 040 01	412 041 01	355	330	315	295	280	252	185	1,29	6,07	11,56	16,26	20,59	27,78	40,78
	30	412 043 01	412 044 01	750	690	615	550	505	437	330	2,73	12,7	22,57	30,31	37,13	48,17	72,75
	Size	**Product No.**	**Product No.**	**25**	**125**	**250**	**375**	**500**	**750**	**1500**	**50**	**250**	**500**	**750**	**1000**	**1500**	**3000**
2 : 1	0	*412 031 02	412 032 02	18	17	15	13	12	11	10	0,05	0,23	0,41	0,54	0,66	0,91	1,65
	1	*412 034 02	412 035 02	37	36	34	32	31	27	23	0,1	0,5	0,94	1,32	1,71	2,23	3,8
	2	*412 037 02	412 038 02	107	98	92	86	81	73	56	0,29	1,35	2,54	3,55	4,46	6,03	9,26
	25	*412 040 02	412 041 02	355	320	300	280	270	245	170	0,98	4,41	8,27	11,57	14,88	20,25	28,11
	30	412 043 02	412 044 02	750	680	610	540	500	425	310	2,07	9,37	16,81	22,32	27,56	35,13	51,25
	Size	**Product No.**	**Product No.**	**17**	**83**	**167**	**250**	**333**	**500**	**1000**	**50**	**250**	**500**	**750**	**1000**	**1500**	**3000**
3 : 1	0	*412 031 03	412 032 03	14	13	13	12	12	11	10	0,03	0,12	0,24	0,33	0,44	0,61	1,1
	1	*412 034 03	412 035 03	37	36	34	32	31	27	23	0,07	0,33	0,63	0,88	1,14	1,49	2,54
	2	*412 037 03	412 038 03	110	95	90	87	82	74	58	0,21	0,87	1,66	2,40	3,01	4,08	6,39
	25	412 040 03	412 041 03	305	280	260	250	245	230	190	0,57	2,56	4,79	6,89	8,99	12,68	20,94
	30	412 043 03	412 044 03	690	630	600	530	490	470	420	1,29	5,76	11,04	15,98	20,37	28,38	46,29
	Size	**Product No.**	**Product No.**	**12,5**	**62,5**	**125**	**187,5**	**250**	**375**	**750**	**50**	**250**	**500**	**750**	**1000**	**1500**	**3000**
4 : 1	1	412 034 04	412 035 04	37	36	34	32	31	27	23	0,05	0,25	0,47	0,66	0,85	1,12	1,9
	2	412 037 04	412 038 04	90	87	84	82	79	74	60	0,12	0,6	1,16	1,69	2,18	3,06	4,96
	25	412 040 04	412 041 04	280	270	260	250	240	220	180	0,39	1,86	3,58	5,17	6,61	9,09	14,88
	30	412 043 04	412 044 04	580	550	525	510	485	420	350	0,8	3,79	7,23	10,54	13,36	18,81	28,93
	Size	**Product No.**	**Product No.**	**10**	**50**	**100**	**150**	**200**	**300**	**600**	**50**	**250**	**500**	**750**	**1000**	**1500**	**3000**
5 : 1	1	412 034 05	412 035 05	37	36	34	32	31	27	23	0,04	0,2	0,37	0,53	0,68	0,89	1,52
	2	412 037 05	412 038 05	95	92	89	86	80	72	60	0,1	0,51	0,98	1,42	1,76	2,38	3,97
	25	412 040 05	412 041 05	280	270	250	240	225	215	180	0,32	1,49	2,76	3,97	4,96	7,11	11,9
	30	412 043 05	412 044 05	525	505	470	440	420	380	300	0,58	2,78	5,18	7,27	9,26	12,57	19,84
	Size	**Product No.**	**Product No.**	**8**	**42**	**83**	**125**	**167**	**250**	**500**	**50**	**250**	**500**	**750**	**1000**	**1500**	**3000**
6 : 1	1	412 034 06	412 035 06	33	30	29	29	29	27	23	0,03	0,14	0,27	0,4	0,53	0,74	1,25
	2	412 037 06	412 038 06	71	69	68	68	66	64	54	0,06	0,33	0,63	0,94	1,22	1,75	2,95
	25	412 040 06	412 041 06	210	199	187	176	164	143	129	0,18	0,92	1,72	2,43	3,01	3,95	7,09

* Gearboxes in stock (without ventilation).

** Transmission ratio for gearing down. For gearing up the values for 1:1 apply. In addition the heating up process has to be considered (see page 673).

Max. Speed in min^{-1} for Gearbox without Ventilation, at the Output Shaft, i = 1:1 to 6:1

For version 30 and horizontal mounting position. For version 60 these values have to be halved. Values for other OT and other mounting positions on request.

Operating Time	Size 0	Size 1*	Size 2*	Size 25*	Size 30*
ED 100 %	1100	700	600	400	300
ED 30 %	1900	1300	1000	700	500

* From size 1 available with ventilation against surcharge.

Permissible Radial and Axial Loads at shaft d_1

Gearbox Size	T Nm	n_1 [min^{-1}] - F_R [N] 3000	1000	500	250	100	50
0	< 12	180	250	300	350	450	550
	> 12	150	210	250	290	380	460
1	< 30	300	400	470	580	700	800
	> 30	250	330	390	490	590	670
2	< 80	470	620	720	900	1150	1400
	> 80	390	520	600	750	960	1170
25	< 220	1200	1600	1900	2200	2850	3300
	> 220	1000	1340	1590	1840	2380	2750
30	< 500	2200	1700	3200	3900	5000	6200
	> 500	1840	1420	2670	3250	4170	5170

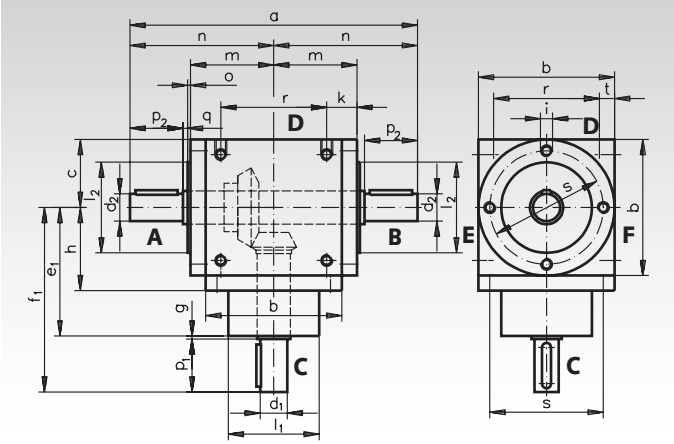
The maximum permiss. radial forces stated in the table are calculated for the centre of the output shaft end, also calculating in the speed and torque. The values were calculated for the most unfavourable load direction. Precise calculation of load and rotational direction may lead to higher permissible loads for the shaft – please enquire.

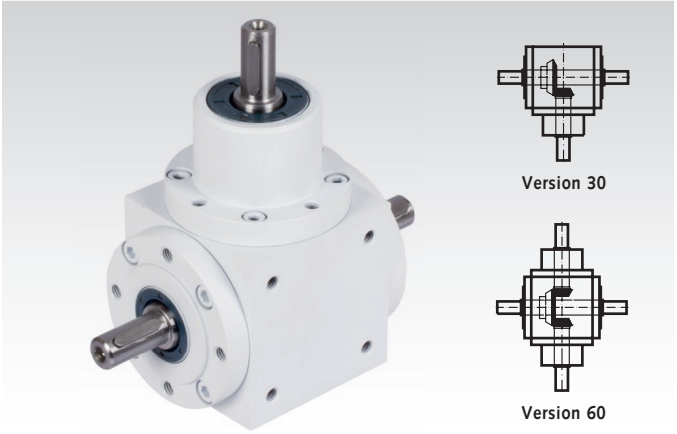
Permissible Radial and Axial Loads at shaft d_2

Gearbox Size	T Nm	n_1 [min^{-1}] - F_R [N] 3000	1000	500	250	100	50
0	< 12	300	400	500	650	750	900
	> 12	250	330	420	540	630	750
1	< 30	500	660	800	950	1250	1500
	> 30	420	550	670	790	1040	1250
2	< 80	750	1000	1250	1500	1900	2200
	> 80	630	830	1040	1250	1580	1830
25	< 220	2000	2800	3300	4000	5000	6500
	> 220	1670	2340	2750	3340	4170	5420
30	< 500	3200	4300	5000	6500	8000	10000
	> 500	2670	3580	4170	5420	6670	8330

Axial loads F_A can be absorbed, without need for further calculation, up to about 50% of the permiss. radial forces. If the axial load exceeds this value considerably or if combined loads of F_R and F_A occur – please ask us.

Dimensions Table Bevel Gearboxes KU/I Model L





The large bevel gear is usually mounted on the straight-through shaft. It is the slow running one.
The gearbox sizes 1, 2, 25 and 30 can also be supplied as Type LS with straight-through, fast running shaft. In this case the transmission ratio is max. 1 : 2.
Shaft ends for all types: Tolerance = j_6; Thread alignment according to DIN 332 page 2; Keyways according to DIN 6885/1.

Threaded holes for mounting on all sides of the gearbox as standard. Thread depth of mounting holes = 2 x thread diameter or the thickness of the flange.

Dimensions for i = 1 : 1 to 6 : 1, power input at d_1 (intermediate transmission ratios on request) *Type LS: straight-through fast running shaft.

Size	a mm	b mm	c mm	d_1 j6 mm				d_2 j6 mm		e_1 mm			f_1 mm				g mm
				1 : 1 1,5 : 1 2 : 1 1 : 1,5* 1 : 2*	3 : 1	4 : 1	5 : 1 6 : 1	1 : 1 bis 6 : 1	1 : 1,5* 1 : 2*	1 : 1 1,5 : 1 2 : 1 1 : 1,5* 1 : 2*	3 : 1	4 : 1 5 : 1 6 : 1	1 : 1 1,5 : 1 2 : 1 1 : 1,5* 1 : 2*	3 : 1	4 : 1	5 : 1 6 : 1	
0	144	65	32,5	12	12	-	-	12	-	72	72	-	100	100	-	-	2
1	190	90	45,0	18	12	12	12	18	14	85	85	98	122	122	132	132	2
2	244	120	60,0	25	20	20	15	25	16	115	115	125	162	162	172	162	2
25	320	160	80,0	35	28	24	24	35	25	150	150	170	212	212	232	232	2
30	406	200	100,0	42	35	35	28	42	35	190	190	190	273	261	261	261	3

Size	h mm	i mm	k mm	l_1 f7 mm			l_2 f7 mm	m mm	n mm	o mm	p_1 mm			p_2 mm
				1 : 1 1,5 : 1 2 : 1 1 : 1,5* 1 : 2*	3 : 1 4 : 1	5 : 1 6 : 1					1 : 1 1,5 : 1 2 : 1 1 : 1,5* 1 : 2*	3 : 1 4 : 1	5 : 1 6 : 1	
0	42	M6	19,5	44	44	-	44	42	72	2	26	26	-	26
1	55	M8	20,0	60	60	60	60	55	95	2	35	35	35	35
2	75	M10	22,0	80	80	70	80	72	122	3	45	45	35	45
25	95	M12	35,0	110	100	100	110	95	160	3	60	60	60	60
30	120	M12	37,0	120	120	110	120	117	203	3	80	68	68	80

Size	q mm	r mm	s mm	t mm	Feather Key Size at d_1 mm			Feather Key Size at d_2 u. d_3 mm		Weight kg
					1 : 1 1,5 : 1 2 : 1 1 : 1,5* 1 : 2*	3 : 1 4 : 1	5 : 1 6 : 1	1 : 1 to 6 : 1	1 : 1,5* 1 : 2*	
0	2	45	54	10	4 x 20	4 x 20	-	4 x 20	-	2,5
1	3	70	75	10	6 x 28	4 x 28	4 x 28	6 x 28	5 x 28	5,5
2	2	100	100	10	8 x 36	6 x 36	5 x 28	8 x 36	5 x 36	12,0
25	2	120	135	20	10 x 50	8 x 50	8 x 50	10 x 50	8 x 50	24,0
30	3	160	175	20	12 x 70	10 x 63	8 x 63	12 x 70	10 x 70	48,0

Size	L 0	L 1	L 2	L 25	L 30
Oil volume (in dm^3)	0,1	0,3	0,6	1,2	2,5

Bevel Gearboxes KU/I, Model H, Technical Data

Ratio	Size	Version 70 Product No.	Version 80 Product No.	Permissible Output Torque T_2 in Nm** at Output Speed n_2 in min^{-1}							Max. Input Power P_1 in kW** at Input Speed n_1 in min^{-1}						
				50	250	500	750	1000	1500	3000	50	250	500	750	1000	1500	3000
1 : 1	0	*412 061 00	412 062 00	18	17	15	13	12	11	10	0,1	0,47	0,83	1,07	1,32	1,82	3,31
	1	*412 064 00	412 065 00	50	44	40	37	34	32	27	0,28	1,21	2,2	3,06	3,75	5,29	8,93
	2	*412 067 00	412 068 00	130	123	115	103	92	82	66	0,72	3,39	6,34	8,51	10,14	13,56	21,82
	25	*412 070 00	412 071 00	380	350	330	310	290	260	---	2,09	9,64	18,19	25,63	31,96	42,99	---
	30	412 073 00	412 074 00	750	710	620	555	510	450	---	4,13	19,56	34,17	45,88	56,21	74,4	---
	Size	**Product No.**	**Product No.**	**33**	**167**	**333**	**500**	**667**	**1000**	**2000**	**50**	**250**	**500**	**750**	**1000**	**1500**	**3000**
1,5 : 1	0	412 061 01	412 062 01	18	17	15	13	12	11	10	0,07	0,31	0,55	0,72	0,88	1,21	2,2
	1	412 064 01	412 065 01	45	40	37	35	32	29	25	0,16	0,74	1,36	1,93	2,35	3,2	5,51
	2	412 067 01	412 068 01	113	108	105	94	86	78	61	0,41	1,99	3,85	5,18	6,32	8,6	13,45
	25	412 070 01	412 071 01	355	330	315	295	280	252	185	1,29	6,07	11,56	16,26	20,59	27,78	40,78
	30	412 073 01	412 074 01	750	690	615	550	505	437	330	2,73	12,7	22,57	30,31	37,13	48,17	72,75
	Size	**Product No.**	**Product No.**	**25**	**125**	**250**	**375**	**500**	**750**	**1500**	**50**	**250**	**500**	**750**	**1000**	**1500**	**3000**
2 : 1	0	*412 061 02	412 062 02	18	17	15	13	12	11	10	0,05	0,23	0,41	0,54	0,66	0,91	1,65
	1	*412 064 02	412 065 02	37	36	34	32	31	27	23	0,1	0,5	0,94	1,32	1,71	2,23	3,8
	2	*412 067 02	412 068 02	107	98	92	86	81	73	56	0,29	1,35	2,54	3,55	4,46	6,03	9,26
	25	*412 070 02	412 071 02	355	320	300	280	270	245	170	0,98	4,41	8,27	11,57	14,88	20,25	28,11
	30	412 073 02	412 074 02	750	680	610	540	500	425	310	2,07	9,37	16,81	22,32	27,56	35,13	51,25
	Size	**Product No.**	**Product No.**	**17**	**83**	**167**	**250**	**333**	**500**	**1000**	**50**	**250**	**500**	**750**	**1000**	**1500**	**3000**
3 : 1	0	*412 061 03	412 062 03	14	13	13	12	12	11	10	0,03	0,12	0,24	0,33	0,44	0,61	1,1
	1	*412 064 03	412 065 03	37	36	34	32	31	27	23	0,07	0,33	0,63	0,88	1,14	1,49	2,54
	2	*412 067 03	412 068 03	110	95	90	87	82	74	58	0,21	0,87	1,66	2,40	3,01	4,08	6,39
	25	*412 070 03	412 071 03	305	280	260	250	245	230	190	0,57	2,56	4,79	6,89	8,99	12,68	20,94
	30	412 073 03	412 074 03	690	630	600	530	490	470	420	1,29	5,76	11,04	15,98	20,37	28,38	46,29
	Size	**Product No.**	**Product No.**	**12,5**	**62,5**	**125**	**187,5**	**250**	**375**	**750**	**50**	**250**	**500**	**750**	**1000**	**1500**	**3000**
4 : 1	1	412 064 04	412 065 04	37	36	34	32	31	27	23	0,05	0,25	0,47	0,66	0,85	1,12	1,9
	2	412 067 04	412 068 04	90	87	84	82	79	74	60	0,12	0,6	1,16	1,69	2,18	3,06	4,96
	25	412 070 04	412 071 04	280	270	260	250	240	220	180	0,39	1,86	3,58	5,17	6,61	9,09	14,88
	30	412 073 04	412 074 04	580	550	525	510	485	420	350	0,8	3,79	7,23	10,54	13,36	18,81	28,93
	Size	**Product No.**	**Product No.**	**10**	**50**	**100**	**150**	**200**	**300**	**600**	**50**	**250**	**500**	**750**	**1000**	**1500**	**3000**
5 : 1	1	412 064 05	412 065 05	37	36	34	32	31	27	23	0,04	0,2	0,37	0,53	0,68	0,89	1,52
	2	412 067 05	412 068 05	95	92	89	86	80	72	60	0,1	0,51	0,98	1,42	1,76	2,38	3,97
	25	412 070 05	412 071 05	280	270	250	240	225	215	180	0,32	1,49	2,76	3,97	4,96	7,11	11,9
	30	412 073 05	412 074 05	525	505	470	440	420	380	300	0,58	2,78	5,18	7,27	9,26	12,57	19,84
	Size	**Product No.**	**Product No.**	**8**	**42**	**83**	**125**	**167**	**250**	**500**	**50**	**250**	**500**	**750**	**1000**	**1500**	**3000**
6 : 1	1	412 064 06	412 065 06	33	30	29	29	29	27	23	0,03	0,14	0,27	0,4	0,53	0,74	1,25
	2	412 067 06	412 068 06	71	69	68	68	66	64	54	0,06	0,33	0,63	0,94	1,22	1,75	2,95
	25	412 070 06	412 071 06	210	199	187	176	164	143	129	0,18	0,92	1,72	2,43	3,01	3,95	7,09

* Gearboxes in stock (without ventilation).

** Transmission ratio for gearing down. For gearing up the values for 1:1 apply. In addition the heating up process has to be considered (see page 673).

Max. Speed in min^{-1} for Gearbox without Ventilation, at the Output Shaft, i = 1:1 to 6:1

For version 70 and horizontal mounting position. For version 80 these values have to be halved. Values for other OT and other mounting positions on request.

Operating Time	Size 0	Size 1*	Size 2*	Size 25*	Size 30*
ED 100 %	1100	700	600	400	300
ED 30 %	1900	1300	1000	700	500

* From size 1 available with ventilation against surcharge.

Permissible Radial and Axial Loads at shaft d_1

Gearbox Size	T Nm	n_1 [min^{-1}] - F_R [N] 3000	1000	500	250	100	50
0	< 12	180	250	300	350	450	550
	> 12	150	210	250	290	380	460
1	< 30	300	400	470	580	700	800
	> 30	250	330	390	490	590	670
2	< 80	470	620	720	900	1150	1400
	> 80	390	520	600	750	960	1170
25	< 220	1200	1600	1900	2200	2850	3300
	> 220	1000	1340	1590	1840	2380	2750
30	< 500	2200	1700	3200	3900	5000	6200
	> 500	1840	1420	2670	3250	4170	5170

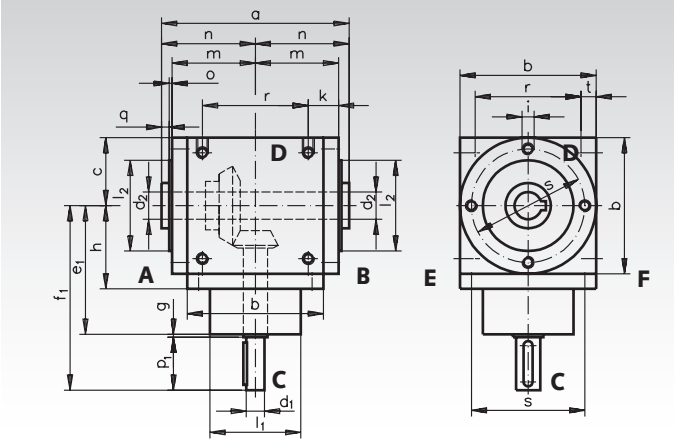
The maximum permiss. radial forces stated in the table are calculated for the centre of the output shaft end, also calculating in the speed and torque. The values were calculated for the most unfavourable load direction. Precise calculation of load and rotational direction may lead to higher permissible loads for the shaft – please ask us.

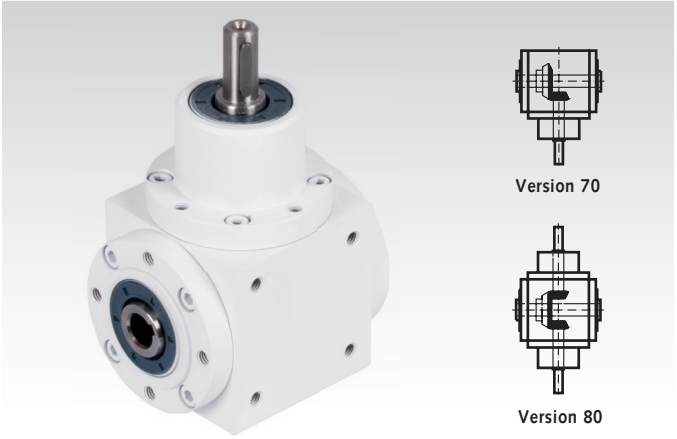
Permissible Radial and Axial Loads at shaft d_2

Gearbox Size	T Nm	n_1 [min^{-1}] - F_R [N] 3000	1000	500	250	100	50
0	< 12	300	400	500	650	750	900
	> 12	250	330	420	540	630	750
1	< 30	500	660	800	950	1250	1500
	> 30	420	550	670	790	1040	1250
2	< 80	900	1200	1400	1700	2100	2500
	> 80	750	1000	1170	1420	1750	2080
25	< 220	2300	3100	3600	4300	5300	7000
	> 220	1920	2580	3000	3580	4420	5830
30	< 500	3600	4700	5400	7200	9000	11000
	> 500	3000	3900	4500	6000	7500	9200

Axial loads F_A can be absorbed, without need for further calculation, up to about 50% of the permiss. radial forces. If the axial load exceeds this value considerably or if combined loads of F_R and F_A occur – please ask us.

Dimensions Table Bevel Gearboxes KU/I Model H





Shaft ends for all types: Tolerance = j_6; Thread alignment according to DIN 332 page 2; Keyways according to DIN 6885/1. Tolerance of hollow shaft bore = H7. The hollow shaft is always the slower running one.

Threaded holes for mounting on all sides of the gearbox as standard. Thread depth of mounting holes = 2 x thread diameter or the thickness of the flange.

Dimensions at i = 1 : 1 to 6 : 1, standard power input at d_1 (intermediate transmission ratios on request).

Size	a mm	b mm	c mm	$d_1{}^{j6}$ mm				$d_2{}^{H7}$ mm	e_1 mm	
	1 : 1 to 6 : 1			1 : 1 1,5 : 1 2 : 1	3 : 1	4 : 1	5 : 1 6 : 1	1 : 1 to 6 : 1	1 : 1 bis 3 : 1	4 : 1 5 : 1 6 : 1
0	92	65	32,5	12	12	-	-	12	72	-
1	124	90	45	18	12	12	12	18	85	95
2	170	120	60	25	20	20	15	25	115	125
25	206	160	80	35	28	24	24	35	150	170
30	250	200	100	42	35	35	28	42	190	190

Size	f_1 mm				g mm	h mm	i mm	k mm	$l_1{}^{f7}$ mm			$l_2{}^{f7}$ mm	m mm	n mm
	1 : 1 1,5 : 1 2 : 1	3 : 1	4 : 1	5 : 1 6 : 1					1 : 1 1,5 : 1 2 : 1	3 : 1 4 : 1	5 : 1 6 : 1			
0	100	100	-	-	2	42	M6	19,5	44	44	-	44	42	46
1	122	122	132	132	2	55	M8	20	60	60	60	60	55	62
2	162	162	172	162	2	75	M10	27	80	80	70	80	77	85
25	213	212	232	232	2	95	M12	35	110	100	100	110	95	103
30	273	261	261	261	3	120	M12	37	120	120	110	120	117	125

Size	o mm	p_1 mm			q mm	r mm	s mm	t mm
	1 : 1 to 6 : 1	1 : 1 1,5 : 1 2 : 1	3 : 1 4 : 1	5 : 1 6 : 1	1 : 1 to 6 : 1			
0	2	26	26	-	2	45	54	10
1	2	35	35	35	5	70	75	10
2	3	45	45	35	5	100	100	10
25	3	60	60	60	5	120	135	20
30	3	80	68	68	5	160	175	20

Size	Feather Key Size at d_1 mm			Keyway Size in Hollow Shaft mm	Weight kg
	1 : 1 1,5 : 1 2 : 1	3 : 1 4 : 1	5 : 1 6 : 1		
0	4 x 20	4 x 20	-	4JS9	2,1
1	6 x 28	4 x 28	4 x 28	6JS9	5,5
2	8 x 36	6 x 36	5 x 28	8JS9	12,0
25	10 x 50	8 x 50	8 x 50	10JS9	24,0
30	12 x 70	10 x 63	8 x 63	12JS9	48,0

Size	H0	H 1	H 2	H 25	H 30
Oil Volume (in dm³)	0,1	0,3	0,6	1,2	2,5

Worm Gear Units G/II

General data: **Version A:** Centre distance 31 mm.
Version B: Centre distance 33 mm.

Housing: Aluminium permanent-mould casting, fully sealed against oil leaks and protected against dust, can be mounted in any position.

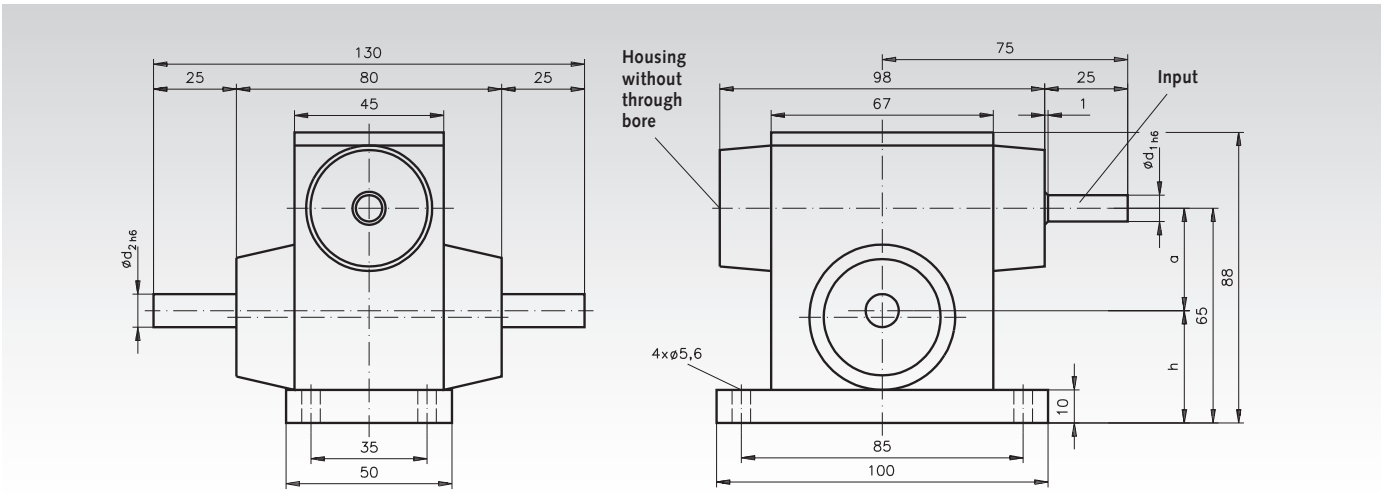
Gear set: Worms hardened and ground, worm gears made from special bronze.

Bearing System: Input and output shaft with roller bearing.

Lubrication: As a special gearbox oil has been used, in most applications no relubrication or change is required.

Input shaft is the smaller shaft d_1.
The permiss. output torque refers to shaft d_2.

Ordering details: e.g.: Type, Version, Ratio, Product No.



Version A (Load Bearing Capacity of the Output Shaft Radial = 100 N, Axial = 60 N)

Product No.	Ratio i	Centre Distance a mm	d_1 mm	d_2 mm	h mm	max. Output Torque Nm	Weight kg
420 005 00	5 : 1	31	8	10	34	10	1,05
420 007 00	7 : 1	31	8	10	34	10	1,05
420 010 00	10 : 1	31	8	10	34	10	1,05
420 012 00	12 : 1	31	8	10	34	12	1,05
420 015 00	15 : 1	31	8	10	34	11	1,05
420 018 00	18 : 1	31	8	10	34	10	1,05
420 020 00	20 : 1	31	8	10	34	10	1,05
420 024 00	24 : 1	31	8	10	34	9	1,05
420 030 00	30 : 1	31	8	10	34	10	1,05
420 038 00	38 : 1	31	8	10	34	11	1,05
420 050 00	50 : 1	31	8	10	34	9	1,05
420 075 00	75 : 1	31	8	10	34	7	1,05

Version B (Load Bearing Capacity of the Output Shaft Radial = 150 N, Axial = 100 N)

Product No.	Ratio i	Centre Distance a mm	d_1 mm	d_2 mm	h mm	max. Output Torque Nm	Weight kg
420 107 00	7 : 1	33	10	12	32	12	1,15
420 111 00	11,33 : 1	33	10	12	32	13	1,15
420 115 00	15 : 1	33	10	12	32	13	1,15
420 117 00	17 : 1	33	10	12	32	14	1,15
420 120 00	20 : 1	33	10	12	32	13	1,15
420 124 00	24 : 1	33	10	12	32	13	1,15
420 130 00	30 : 1	33	10	12	32	13	1,15
420 132 00	32 : 1	33	10	12	32	14	1,15
420 138 00	38 : 1	33	10	12	32	14	1,15
420 156 00	56 : 1	33	10	12	32	10	1,15
420 175 00	75 : 1	33	10	12	32	9	1,15

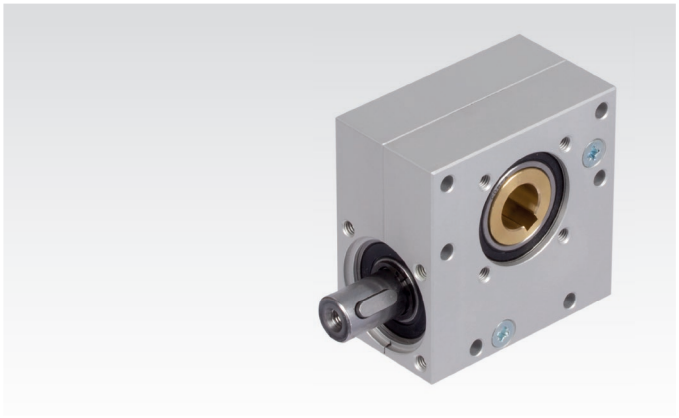
All shaft diameters with tolerance h6.
Dimensions without stated tolerance are non binding.

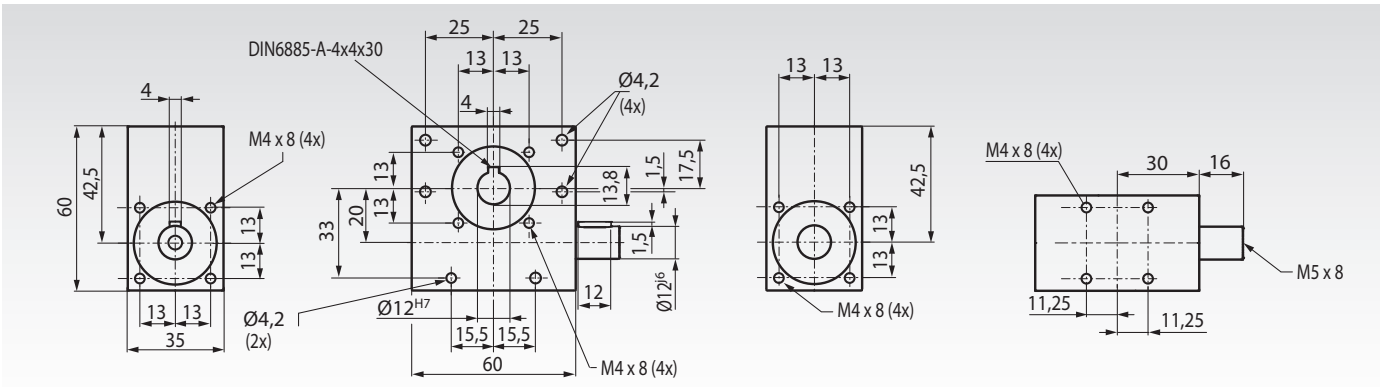
Worm Gear Units KES

Angular drives with hollow output shaft for high torques at very low dimensions. Suitable in a wide variety of applications.
One size with center distance 20mm, in 7 ratios.

Housing: Aluminium, silver anodized. Sealed against lubricant leaks, protected against dust. Can be mounted in any position. Worm shaft in vertically position not recommended for continuous operation.
Gearing: Worm from steel, wheel from special brass.
Bearing: Ball bearings with rubber seal RS.
Lubrication: Maintenance free grease lubrication.
Angular backlash: +/-1°. **Operating time:** 10% at 5 min.
Life time: 1,000 hours at max. performance at speed 500 min^{-1} and operating time 20%.
Permiss. operating temperature: -20° to +60°C.

Ordering Details: e.g.: Product No. 420 020 13 Bevel Gearbox KES Size 1





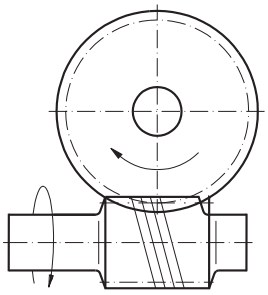
Performance Data

Product No.	Ratio	Self-locking	Permittable Output Torque at Speed			Permittable Input Power at Speed			Efficiency	Shaft Load		Weight
			100 min^{-1}	500 min^{-1}	1.000 min^{-1}	100 min^{-1}	500 min^{-1}	1.000 min^{-1}	approx.	F_R*	F_A**	
	i		Nm	Nm	Nm	W	W	W	η	N	N	g
420 020 13	13 : 1	no	18,0	17,0	15,5	18	86	156	0,80	200	200	422
420 020 15	15 : 1	no	17,5	16,5	15,0	16	76	138	0,76	250	250	425
420 020 18	18 : 1	no	17,5	16,0	15,0	14	63	118	0,74	250	250	426
420 020 23	23 : 1	no	16,5	16,0	15,0	11	52	98	0,70	250	250	428
420 020 30	30 : 1	no	15,0	14,0	13,5	8	37	71	0,66	350	350	438
420 020 40	40 : 1	yes	9,5	9,5	9,5	4	21	42	0,59	400	400	426
420 020 65	65 : 1	yes	4,5	4,5	4,5	1	8	16	0,51	500	500	432

* Permiss. radial force at F_A=0.
** Permiss. axial force at F_R=0.

Rotational Sense (Rot. direction interchangeable)

Output:
Worm wheel on hollow shaft



Input:
Worm shaft

Torque Conversion

Output torque = Input Torque x Efficiency x Transmission

$$\text{Input torque} = \frac{\text{Output torque}}{\text{Efficiency x Ratio}}$$

$$\text{Power } P = \frac{M \times n}{9550}$$

$$\text{Torque } M = \frac{9550 \times P}{n}$$

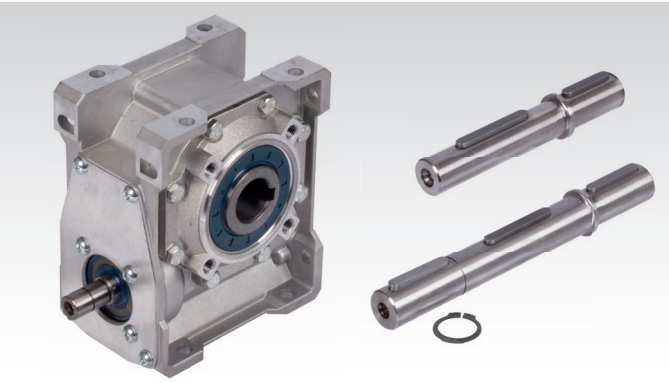
M = Torque [Nm]
P = Power [kW]
n = Speed [min^{-1}]

Worm Gear Units H/I

Housing: Aluminium die-cast, with connecting threads on both input and output sides. With mounting holes on all other sides.
Worm shaft: hardened and ground.
Worm Gear: Bronze, on cast iron hub.
Lubrication: synthetic oil (lubricated for life).

Lightweight, high quality model range, 5 sizes, centre distance 31.5, 40, 50, 63 and 75 mm. Size 90 and 110 on request. The gearboxes can be used without ventilation and **independent from the mounting position**.

Output shaft push-in type: The basic gearbox version has a hollow shaft. They can, however, also be supplied with a push in type output shaft (single sided, to be used left and right, or double sided).
These output shafts have their own product No. and have to be ordered separately.



a = Centre distance
i = Ratio
n_1, n_2 = Input/Output speed
T_2 = Output torque
$P_{1\ perm.}$ = Input power
η = Operating efficiency

Ordering Details: e.g.: Product No., Type, Size, Ratio
If required: Output Shaft Single Sided (or Double Sided), Prod No., Size

Product No.	a mm	i_{ist}	$n_{1max.}$ min^{-1}	n_2 min^{-1}	$T_{2perm.}$ Nm	$P_{1perm.}$ kW	η	Weight kg	Accessories * Product No. Single-Sided Output Shaft	Accessories * Product No. Double-Sided Output Shaft
422 031 07	31,5	7,5	1400	187	21	0,49	0,84	1,4	**422 031 01**	**422 031 02**
422 031 10	31,5	10	1400	140	22	0,40	0,82	1,4	**422 031 01**	**422 031 02**
422 031 15	31,5	15	1400	93	22	0,28	0,77	1,4	**422 031 01**	**422 031 02**
422 031 20	31,5	20	1400	70	19	0,19	0,72	1,4	**422 031 01**	**422 031 02**
422 031 25	31,5	25	1400	56	21	0,18	0,69	1,4	**422 031 01**	**422 031 02**
422 031 30	31,5	30	1400	47	20	0,15	0,66	1,4	**422 031 01**	**422 031 02**
422 031 40	31,5	40	1400	35	21	0,13	0,59	1,4	**422 031 01**	**422 031 02**
422 031 50	31,5	50	1400	28	19	0,10	0,55	1,4	**422 031 01**	**422 031 02**
422 031 65	31,5	65	1400	22	20	0,09	0,51	1,4	**422 031 01**	**422 031 02**
422 031 80	31,5	80	1400	18	17	0,06	0,48	1,4	**422 031 01**	**422 031 02**
422 031 11	31,5	100	1400	14	14	0,05	0,45	1,4	**422 031 01**	**422 031 02**
422 040 07	40	7,5	1400	187	40	0,92	0,85	2,4	**422 040 01**	**422 040 02**
422 040 10	40	10	1400	140	41	0,73	0,83	2,4	**422 040 01**	**422 040 02**
422 040 15	40	15	1400	93	42	0,52	0,79	2,4	**422 040 01**	**422 040 02**
422 040 20	40	20	1400	70	40	0,39	0,76	2,4	**422 040 01**	**422 040 02**
422 040 25	40	25	1400	56	35	0,29	0,72	2,4	**422 040 01**	**422 040 02**
422 040 30	40	30	1400	47	41	0,29	0,68	2,4	**422 040 01**	**422 040 02**
422 040 40	40	40	1400	35	38	0,22	0,64	2,4	**422 040 01**	**422 040 02**
422 040 50	40	50	1400	28	38	0,19	0,59	2,4	**422 040 01**	**422 040 02**
422 040 65	40	65	1400	22	35	0,15	0,54	2,4	**422 040 01**	**422 040 02**
422 040 80	40	80	1400	18	33	0,12	0,52	2,4	**422 040 01**	**422 040 02**
422 040 11	40	100	1400	14	28	0,08	0,49	2,4	**422 040 01**	**422 040 02**
422 050 07	50	7,5	1400	187	70	1,60	0,86	4,0	**422 050 01**	**422 050 02**
422 050 10	50	10	1400	140	73	1,30	0,84	4,0	**422 050 01**	**422 050 02**
422 050 15	50	15	1400	93	74	0,90	0,80	4,0	**422 050 01**	**422 050 02**
422 050 20	50	20	1400	70	75	0,71	0,78	4,0	**422 050 01**	**422 050 02**
422 050 25	50	25	1400	56	65	0,51	0,74	4,0	**422 050 01**	**422 050 02**
422 050 30	50	30	1400	47	66	0,46	0,71	4,0	**422 050 01**	**422 050 02**
422 050 40	50	40	1400	35	69	0,38	0,67	4,0	**422 050 01**	**422 050 02**
422 050 50	50	50	1400	28	70	0,33	0,62	4,0	**422 050 01**	**422 050 02**
422 050 65	50	65	1400	22	64	0,25	0,58	4,0	**422 050 01**	**422 050 02**
422 050 80	50	80	1400	18	60	0,20	0,54	4,0	**422 050 01**	**422 050 02**
422 050 11	50	100	1400	14	55	0,16	0,51	4,0	**422 050 01**	**422 050 02**
422 063 07	63	7,5	1400	187	120	2,70	0,87	6,6	**422 063 01**	**422 063 02**
422 063 10	63	10	1400	140	127	2,20	0,85	6,6	**422 063 01**	**422 063 02**
422 063 15	63	15	1400	93	130	1,60	0,81	6,6	**422 063 01**	**422 063 02**
422 063 20	63	20	1400	70	144	1,30	0,80	6,6	**422 063 01**	**422 063 02**
422 063 25	63	25	1400	56	118	0,90	0,77	6,6	**422 063 01**	**422 063 02**
422 063 30	63	30	1400	47	142	0,95	0,73	6,6	**422 063 01**	**422 063 02**
422 063 40	63	40	1400	35	150	0,79	0,69	6,6	**422 063 01**	**422 063 02**
422 063 50	63	50	1400	28	122	0,55	0,65	6,6	**422 063 01**	**422 063 02**
422 063 65	63	65	1400	22	122	0,45	0,61	6,6	**422 063 01**	**422 063 02**
422 063 80	63	80	1400	18	113	0,36	0,58	6,6	**422 063 01**	**422 063 02**
422 063 11	63	100	1400	14	102	0,28	0,53	6,6	**422 063 01**	**422 06302**
422 075 07	75	7,5	1400	187	180	4,0	0,87	11	**422 075 01**	**422 075 02**
422 075 15	75	15	1400	93	202	2,4	0,83	11	**422 075 01**	**422 075 02**
422 075 20	75	20	1400	70	226	2,0	0,81	11	**422 075 01**	**422 075 02**
422 075 30	75	30	1400	47	220	1,5	0,74	11	**422 075 01**	**422 075 02**
422 075 50	75	50	1400	28	211	0,92	0,67	11	**422 075 01**	**422 075 02**
422 075 65	75	65	1400	22	195	0,70	0,63	11	**422 075 01**	**422 075 02**
422 075 11	75	100	1400	14	162	0,43	0,56	11	**422 075 01**	**422 075 02**

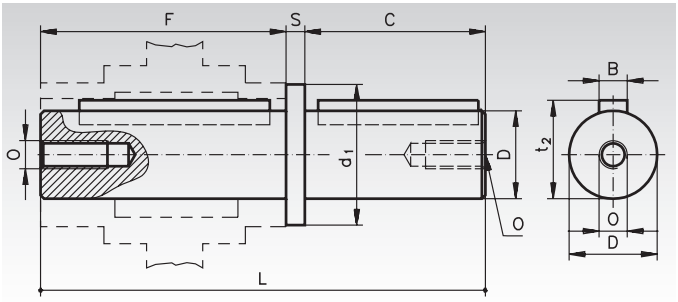
Dimensions table page 684. For gearbox size 75 , i = 10:1, 25:1, 40:1 and 80:1 available on request.

* More details see page 683.

Push-In Type Output Shafts, Single Sided

Material: Steel.

To change the gearboxes H/I over from hollow shaft to solid shaft. The shaft is only pushed in and secured with the enclosed cover disc and mounting screw. The shaft can be pushed in either left or right.



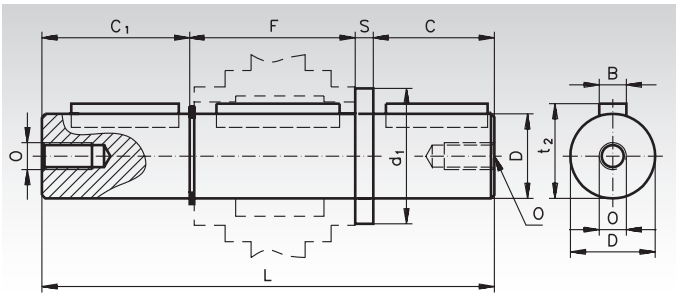
Ordering details: e.g.: Prod. No. 422 031 01, Push-In Type Output Shaft, Single-Sided, Gearbox Size 031

Product No.	Gearbox Size	B mm	C mm	D^{h6} mm	d_1 mm	F mm	L mm	O mm	S mm	t_2 mm	Weight kg
422 031 01	031	5	30	14	18,5	62	94,5	M6x16	2,5	16,3	0,16
422 040 01	040	6	40	18	23,5	77	120,0	M6x16	3,0	20,8	0,27
422 050 01	050	8	50	25	31,5	90	143,5	M8x22	3,5	28,3	0,59
422 063 01	063	8	50	25	31,5	111	165,0	M8x22	4,0	28,3	0,68
422 075 01	075	8	60	28	34,5	119	183,0	M8x22	4,0	31,3	1,05

Push-In Type Output Shafts, Double Sided

Material: Stahl.

To change the gearboxes H/I over from hollow shaft to double-sided solid shaft. The shaft is only pushed in and secured with the enclosed retaining ring.



Ordering details: e.g.: Prod. No. 422 031 02, Push-In Type Output Shaft, Double Sided, Gearbox Size 031

Product No.	Gearbox Size	B mm	C mm	C_1 mm	D^{h6} mm	d_1 mm	F mm	L mm	O mm	S mm	t_2 mm	Weight kg
422 031 02	031	5	30	29,0	14	18,5	64,0	125,5	M6x16	2,5	16,3	0,18
422 040 02	040	6	40	38,8	18	23,5	79,2	161,0	M6x16	3,0	20,8	0,32
422 050 02	050	8	50	50,0	25	31,5	93,2	196,7	M8x22	3,5	28,3	0,77
422 063 02	063	8	50	48,8	25	31,5	113,2	216,0	M8x22	4,0	28,3	0,98
422 075 02	075	8	60	58,8	28	34,5	121,0	244,0	M8x22	4,0	31,3	1,49

Permissible Radial and Axial Forces

The values are calculated for the centre of the output shaft end, also calculating in the transmission ratio. F_R is the max. radial force for $F_A = 0$.
F_A is the max. permissible axial force for $F_R = 0$.

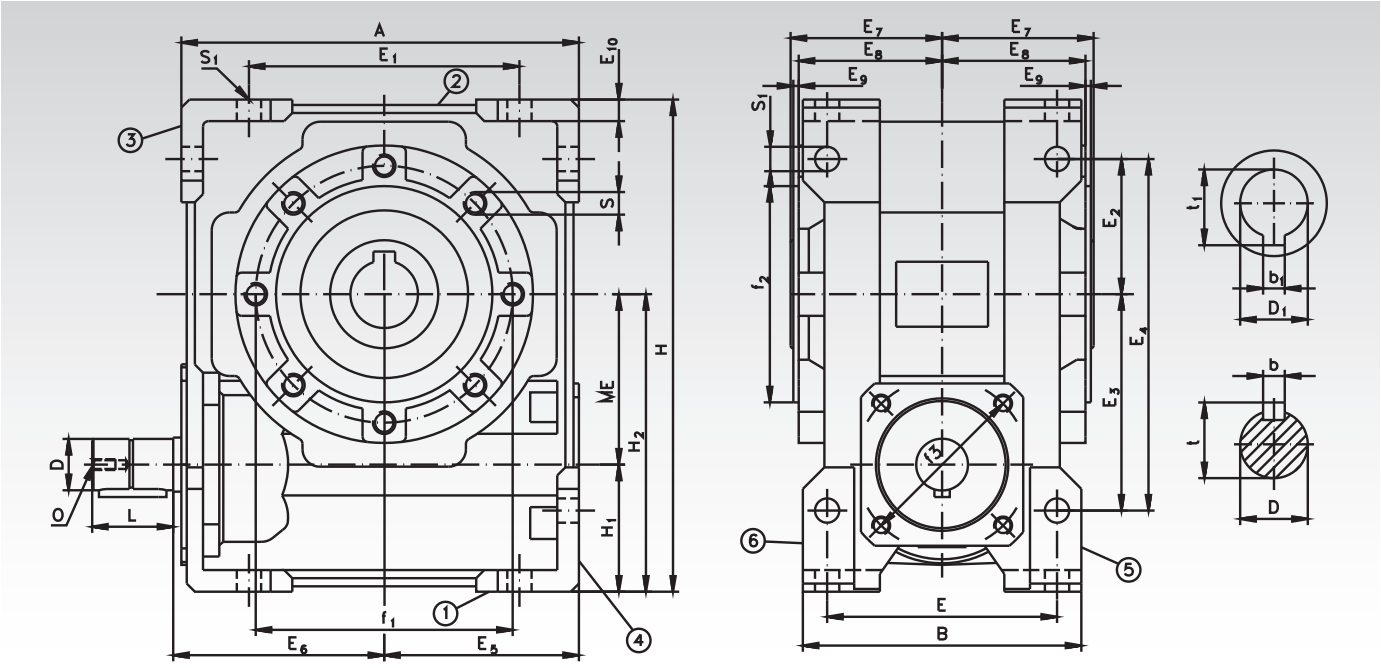
Gearbox Size	i = 7.5		i = 10		i = 15		i = 20		i = 25		i = 30		i = 40		i = 50		i = 65		i = 80		i = 100	
	F_R N	F_A N	F_R N	F_A N	F_R N	F_A N	F_R N	F_A N	F_R N	F_A N	F_R N	F_A N	F_R N	F_A N	F_R N	F_A N	F_R N	F_A N	F_R N	F_A N	F_R N	F_A N
031	750	150	775	115	800	160	850	170	900	180	950	190	1000	200	1100	220	1200	240	1300	260	1450	290
040	1150	230	1200	240	1250	250	1350	270	1500	300	1600	320	1700	340	1800	360	1950	390	2100	420	2300	460
050	1200	240	1400	280	1600	320	1900	380	2100	420	2500	500	2800	560	3000	600	3200	640	3200	640	3200	640
063	1250	250	1700	340	1750	350	2000	400	2500	500	2700	540	3000	600	3250	650	3500	700	3700	740	3900	780
075	1300	260	1900	380	2300	460	2500	500	3000	600	3200	640	3500	700	3800	760	4100	820	4400	880	4700	940

Lubricant Volume in Litre (dm^3)

The gearboxes are lubricated for life using synthetic oil. Under normal operating conditions, no oil change is required. The lubricant volume is identical for all mounting positions.

Size	031	040	050	063	075
Oil quantity	0.05	0.07	0.15	0.4	0.6

Dimensions Table Worm Gear Units H/I

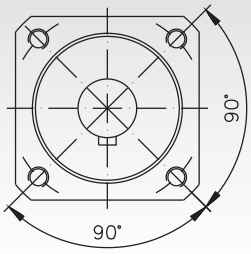


Size	Centre distance	Shaft dimensions							Housing dimensions							
	mm	D^{j6} mm	b mm	t mm	O mm	D_1^{H7} mm	b_1 mm	t_1 mm	A mm	B mm	E mm	E_1 mm	E_2 mm	E_3 mm	E_4 mm	E_5 mm
031	31,5	9	3	10,2	M4x10	14	5	16,3	80	56	44	54	27	44	71	40
040	40,0	11	4	12,5	M4x12	18	6	20,8	105	71	60	70	35	55	90	50
050	50,0	14	5	16	M5x13	25	8	28,3	125	85	70	80	40	64	104	60
063	63,0	19	6	21,5	M8x20	25	8	28,3	147	103	85	100	50	80	130	72
075	75,0	24	8	27	M8x20	28	8	31,3	176	112	90	120	60	93	153	86

Size	E_6 mm	E_7 mm	E_8 mm	E_9 mm	E_{10} mm	f_1* mm	f_2^{h8} mm	f_3 mm	H mm	H_1 mm	H_2 mm	L mm	ME mm	S mm	S_1 mm	Weight kg
031	44,5	31,5	29,0	1,5	5,5	65	55	35,4	97	25,5	57	15	31,5	M6x8	6,5	1,4
040	57,5	39	36,5	1,5	6,0	75	60	42,4	125	35	75	20	40,0	M6x10	6,5	2,4
050	67,5	46	43,5	1,5	7,0	85	70	53,7	150	40	90	25	50,0	M8x10	8,5	4,0
063	77,5	56	53,0	2,0	8,0	95	80	60,8	182	47	110	30	63,0	M8x14	9,0	6,6
075	95,0	60	57,0	2,0	10	115	95	70,7	219,5	58,5	133,5	40	75,0	M8x14	11	11,1

Mounting Holes on the Drive Side

Size 31: 4 Threads M5
Size 40: 4 Threads M5
Size 50: 4 Threads M6
Size 63: 4 Threads M6
Size 75: 4 Threads M8



Ø of circle with holes: See size f_3 in table.

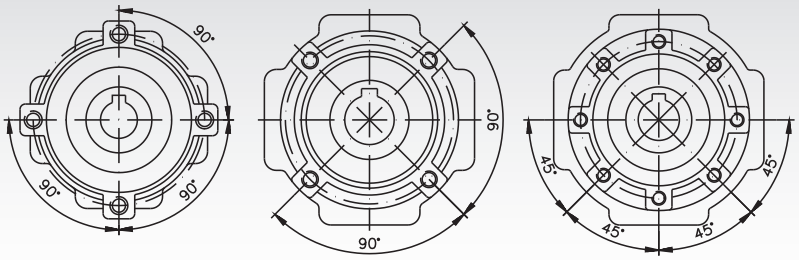
Mounting Holes on the Output Side

Size 031
4 Threads M6 x 8

Size 040
4 Threads M6 x 10

Size 050
4 Threads M8 x 10

Size 063 and 075
8 Threads M8 x 14



Ø of circle with holes: See size f_1 in table.

Worm Gear Units ZM/I

General data: Universal heavy-duty gearboxes.
4 sizes, centre distance 40, 50, 63 and 80 mm.
Centre distance 100 - 315 mm available on request.

Housing: High-quality grey cast iron, all sides machined and with mounting holes on 5 sides.

Gearing: 13 ratios from 5 to 83 : 1; worm shaft hardened and ground. Worm gear made from special centrifugally cast bronze.

Efficiency factor: The efficiency factors stated in the selection tables are guideline values for properly run-in and lubricated gearboxes at operating temperature with nominal load and driving worm shaft. Proper running in is a crucial factor influencing the lifetime of the gearbox. The starting efficiency factor (η_A) is, as the operating efficiency factor (h), depending on the lead angle.

Self-locking: Self-locking only occurs in worm gear units, when the unit cannot be driven from the output side. Worms with 4 and 6 threads sometimes permit transmission ratios for gearing up (i = 5 : 1 to 13.3 : 1). If a gearbox must be implicitly self-locking, or must implicitly not be self-locking, we urge you to contact us.
Ratio 72:1 is static and dynamic self-locking.

Bearing system: All gearbox shafts with generously dimensioned roller bearings.

Lubrication: The gearboxes are lubricated for life using synthetic oil. Under normal operating conditions, no maintenance is required. The housing should be checked for leakages at an interval of approx. 2 years.

Ventilation: Size (centre distance) 40 is supplied without ventilation. With the other gearboxes, the sealing plug has to be exchanged with the separately packed venting filter.

Version A

Version HL

Venting Filter (VF)

Size	A mm	B mm	C mm	D mm	E mm	F mm
40*	-	-	-	-	-	-
50	50	20	33	22	58	25
63	62,5	27,5	37	22	67	25
80	77,5	32,5	57	22	82	25

* Size 40 without Ventilation.

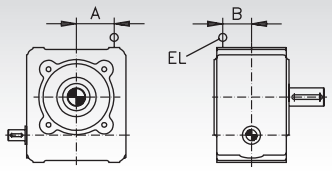
Lubrication Volume in Litre (dm^3)

Size	Mounting Position 1	2	3 + 4	5 + 6
40	0,20	0,25	0,20	0,20
50	0,30	0,60	0,45	0,45
63	0,50	1,10	0,70	0,80
80	0,90	2,10	1,40	1,60

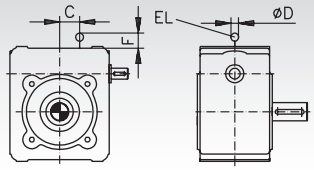
The standard lubrication volume is calculated for mounting position 2. For other mounting positions and high permanent speeds it might have to be reduced, to avoid oil leakages.

Position of the Oil Fittings Size 50 - 80

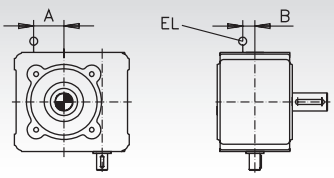
Mounting Position 1



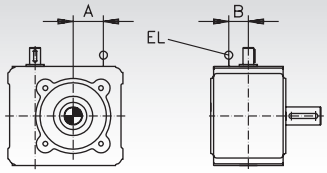
Mounting Position 2



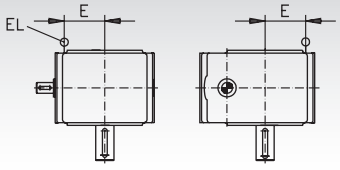
Mounting Position 3



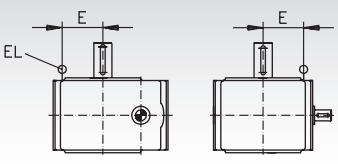
Mounting Position 4



Mounting Position 5



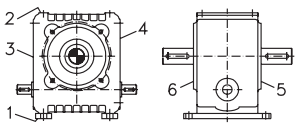
Mounting Position 6



Mounting Sides

The worm gear units can be mounted in any position and the shaft ends can be positioned to your requirements.

Sizes 40 - 80



The input power $P_{1\ perm}$ and output torques $T_{2\ perm}$ listed in the selection tables are based on shock-free continuous operation, an operating time of 8 hours/day, 3 starts per hour, operating time (OT) = 100% and 20°C ambient temperature. The maximum output torques T_{2max} may frequently be reached in short-term load peaks but they must not be exceeded. With an operating time under 90%, the permissible gearbox output can usually be increased.

i_n, i_{ist} = nominal ratio, real ratio.
n_1, n_2 [min^{-1}] = input speed, output speed.
$P_{1\ perm}$ [kW] = permittable input power.
$T_{2\ perm}$ [Nm] = permittable output torque (permanent).
T_{2max} [Nm] = maximum output torque (peak).
η = operating efficiency.

Dimensions Table Page 690.

Version with foot mounting brackets or shafts on both sides on request.

Version A Output Side 5 Product No.	Version A Output Side 6 Product No.	Version HL Hollow Shaft Product No.	Ratio i =	n_1 min^{-1}	n_2 min^{-1}	$P_{1\ perm}$ kW	$T_{2\ perm}$ Nm	T_{2max} Nm	η
421 001 00	**421 001 01**	**421 003 00**	4,83 : 1	1500	300	1,77	52	73	0,94
			*29/6	1000	200	1,24	54	73	0,94
				500	100	0,69	59	73	0,91
				10	2	0,02	73	73	0,86
421 001 02	**421 001 03**	**421 003 01**	7,25 : 1	1500	200	1,29	55	83	0,92
			*29/4	1000	133	0,91	57	83	0,91
				500	67	0,50	62	83	0,88
				10	1,3	0,01	83	83	0,82
421 001 04	**421 001 05**	**421 003 02**	9,75 : 1	1500	150	0,77	43	77	0,90
			*39/4	1000	100	0,55	45	77	0,89
				500	50	0,32	50	77	0,87
				10	1	0,01	70	77	0,82
421 001 06	**421 001 07**	**421 003 03**	13,0 : 1	1500	113	0,45	32	67	0,87
			*52/4	1000	75	0,32	34	67	0,86
				500	38	0,18	39	67	0,85
				10	0,75	0,01	55	67	0,82
421 001 08	**421 001 09**	**421 003 04**	14,5 : 1	1500	100	0,77	61	97	0,86
			*29/2	1000	67	0,54	63	97	0,84
				500	33	0,32	72	97	0,80
				10	0,67	0,01	97	97	0,73
421 001 10	**421 001 11**	**421 003 05**	19,5 : 1	1500	75	0,49	50	90	0,83
			*39/2	1000	50	0,35	53	90	0,86
				500	25	0,20	58	90	0,78
				10	0,5	0,01	82	90	0,72
421 001 12	**421 001 13**	**421 003 06**	26,0 : 1	1500	57	0,29	38	80	0,80
			*52/2	1000	38	0,21	40	80	0,77
				500	19	0,12	45	80	0,75
				10	0,38	0,004	65	80	0,72
421 001 14	**421 001 15**	**421 003 07**	29,0 : 1	1500	50	0,45	63	107	0,75
			*29/1	1000	33	0,33	65	107	0,72
				500	17	0,20	75	107	0,67
				10	0,33	0,01	107	107	0,58
421 001 16	**421 001 17**	**421 003 08**	39,0 : 1	1500	38	0,34	61	99	0,72
			*39/1	1000	25	0,25	64	99	0,69
				500	13	0,15	71	99	0,65
				10	0,25	0,005	99	99	0,58
421 001 18	**421 001 19**	**421 003 09**	52,0 : 1	1500	28	0,21	46	88	0,66
			*52/1	1000	19	0,15	48	88	0,65
				500	9,4	0,09	55	88	0,62
				10	0,19	0,003	74	88	0,58
421 001 20	**421 001 21**	**421 003 10**	63,0 : 1	1500	24	0,20	48	72	0,60
			*63/1	1000	16	0,15	51	72	0,58
				500	8,1	0,09	56	72	0,54
				10	0,16	0,002	57	72	0,48
421 001 24	**421 001 25**	**421 003 12**	72,0 : 1	1500	21	0,18	46	62	0,55
			*72/1	1000	14	0,13	46	62	0,52
				500	6,9	0,07	46	62	0,47
				10	0,14	0,002	46	62	0,41
421 001 26[1)]	**421 001 27**[1)]	**421 003 13**[1)]	72,0 : 1	100	1,39	0,02	46	62	0,44
			*72/1 optimized for manual operation[1)]	10	0,14	0,002	46	62	0,41
421 001 22	**421 001 23**	**421 003 11**	82,0 : 1	1500	18	0,13	37	64	0,54
			*82/1	1000	12	0,09	38	64	0,52
				500	6	0,05	38	64	0,49
				10	0,12	0,001	38	64	0,46

* Example: Worm gear number of teeth 29 / worm shaft 6 threads.

[1)] This implicity self-locking version is optimezed for hand operation (special worm surface and special oil).

Worm Gear Units ZM/I, Technical Data, Size 50

The input power $P_{1\ perm}$ and output torques $T_{2\ perm}$ listed in the selection tables are based on shock-free continuous operation, an operating time of 8 hours/day, 3 starts per hour, operating time (OT) = 100% and 20°C ambient temperature. The maximum output torques T_{2max} may frequently be reached in short-term load peaks but they must not be exceeded. With an operating time under 90%, the permissible gearbox output can usually be increased.

i_n, i_{ist} = nominal ratio, real ratio.
n_1, n_2 [min^{-1}] = input speed, output speed.
$P_{1\ perm}$ [kW] = permittable input power.
$T_{2\ perm}$ [Nm] = permittable output torque (permanent).
T_{2max} [Nm] = maximum output torque (peak).
η = operating efficiency.

Dimensions Table Page 690.

Version with foot mounting brackets or shafts on both sides on request.

Version A		Version HL							
Output Side 5 Product No.	Output Side 6 Product No.	Hollow Shaft Product No.	Ratio i =	n_1 min^{-1}	n_2 min^{-1}	$P_{1\ perm}$ kW	$T_{2\ perm}$ Nm	T_{2max} Nm	η
421 011 00	**421 011 01**	**421 013 00**	4,83 : 1	1500	300	3,71	109	144	0,95
			*29/6	1000	200	2,58	113	144	0,95
				500	100	1,40	120	144	0,93
				10	2	0,04	144	144	0,86
421 011 02	**421 011 03**	**421 013 01**	7,25 : 1	1500	200	2,60	113	164	0,94
			*29/4	1000	133	1,82	117	164	0,93
				500	67	1,00	125	164	0,90
				10	1,3	0,03	164	164	0,83
421 011 04	**421 011 05**	**421 013 02**	9,5 : 1	1500	150	1,62	91	150	0,92
			*38/4	1000	100	1,14	94	150	0,91
				500	50	0,63	102	150	0,88
				10	1	0,02	139	150	0,82
421 011 06	**421 011 07**	**421 013 03**	12,75 : 1	1500	113	0,82	60	107	0,89
			*51/4	1000	75	0,58	62	107	0,88
				500	38	0,32	67	107	0,86
				10	0,75	0,01	107	107	0,82
421 011 08	**421 011 09**	**421 013 04**	14,5 : 1	1500	100	1,57	128	194	0,88
			*29/2	1000	67	1,13	136	194	0,86
				500	33	0,63	145	194	0,83
				10	0,67	0,02	194	194	0,74
421 011 10	**421 011 11**	**421 013 05**	19,0 : 1	1500	75	1,02	106	176	0,86
			*38/2	1000	50	0,72	110	176	0,84
				500	25	0,41	119	176	0,80
				10	0,5	0,01	164	176	0,73
421 011 12	**421 011 13**	**421 013 06**	25,5 : 1	1500	57	0,57	77	140	0,82
			*51/2	1000	38	0,41	80	140	0,80
				500	19	0,23	87	140	0,77
				10	0,38	0,01	134	140	0,72
421 011 14	**421 011 15**	**421 013 07**	29,0 : 1	1500	50	0,87	126	215	0,78
			*29/1	1000	33	0,70	148	215	0,70
				500	17	0,45	176	215	0,71
				10	0,33	0,01	215	215	0,60
421 011 16	**421 011 17**	**421 013 08**	38,0 : 1	1500	38	0,76	128	194	0,76
			*38/1	1000	25	0,51	134	194	0,73
				500	13	0,29	145	194	0,68
				10	0,25	0,01	194	194	0,58
421 011 18	**421 011 19**	**421 013 09**	51,0 : 1	1500	28	0,37	84	156	0,70
			*51/1	1000	19	0,27	88	156	0,68
				500	9,4	0,15	96	156	0,64
				10	0,19	0,01	154	156	0,58
421 011 20	**421 011 21**	**421 013 10**	62,0 : 1	1500	24	0,41	105	139	0,65
			*62/1	1000	16	0,30	109	139	0,62
				500	8,1	0,17	113	139	0,56
				10	0,16	0,004	113	139	0,47
421 011 24	**421 011 25**	**421 013 12**	72,0 : 1	1500	21	0,32	86	121	0,59
			*72/1	1000	14	0,22	86	121	0,56
				500	6,9	0,12	86	121	0,50
				10	0,14	0,004	86	121	0,41
421 011 26[1)]	**421 011 27**[1)]	**421 013 13**[1)]	72,0 : 1	100	1,38	0,04	86	121	0,46
			*72/1 optimized for manual operation[1)]	10	0,14	0,004	86	121	0,41
421 011 22	**421 011 23**	**421 013 11**	83,0 : 1	1500	18	0,20	61	114	0,57
			*83/1	1000	12	0,14	64	114	0,56
				500	6	0,08	69	114	0,52
				10	0,12	0,002	75	114	0,47

* Example: Worm gear number of teeth 29 / worm shaft 6 threads.

1) This implicity self-locking version is optimezed for hand operation (special worm surface and special oil).

Worm Gear Units ZM/I, Technical Data, Size 63

The input power $P_{1\ perm}$ and output torques $T_{2\ perm}$ listed in the selection tables are based on shock-free continuous operation, an operating time of 8 hours/day, 3 starts per hour, operating time (OT) = 100% and 20°C ambient temperature. The maximum output torques T_{2max} may frequently be reached in short-term load peaks but they must not be exceeded. With an operating time under 90%, the permissible gearbox output can usually be increased.

i_n, i_{ist} = nominal ratio, real ratio.
n_1, n_2 [min^{-1}] = input speed, output speed.
$P_{1\ perm}$ [kW] = permittable input power.
$T_{2\ perm}$ [Nm] = permittable output torque (permanent).
T_{2max} [Nm] = maximum output torque (peak).
η = operating efficiency.

Dimensions Table Page 690.

Version with foot mounting brackets or shafts on both sides on request.

Version A		Version HL							
Output Side 5 Product No.	Output Side 6 Product No.	Hollow Shaft Product No.	Ratio i =	n_1 min^{-1}	n_2 min^{-1}	$P_{1\ perm}$ kW	$T_{2\ perm}$ Nm	T_{2max} Nm	η
421 021 00	**421 021 01**	**421 023 00**	4,83 : 1	1500	300	5,87	174	288	0,96
			*29/6	1000	200	4,25	188	288	0,95
				500	100	2,57	223	288	0,94
				10	2	0,07	288	288	0,86
421 021 02	**421 021 03**	**421 023 01**	7,25 : 1	1500	200	4,44	194	328	0,95
			*29/4	1000	133	3,17	206	328	0,94
				500	67	1,93	244	328	0,91
				10	1,3	0,06	328	328	0,83
421 021 04	**421 021 05**	**421 023 02**	9,75 : 1	1500	150	3,35	195	301	0,94
			*39/4	1000	100	2,35	203	301	0,93
				500	50	1,29	216	301	0,90
				10	1	0,04	289	301	0,83
421 021 06	**421 021 07**	**421 023 03**	12,75 : 1	1500	113	1,81	135	243	0,92
			*51/4	1000	75	1,28	142	243	0,91
				500	38	0,71	152	243	0,88
				10	0,75	0,02	239	243	0,82
421 021 08	**421 021 09**	**421 023 04**	14,5 : 1	1500	100	2,24	186	387	0,89
			*29/2	1000	67	1,78	217	387	0,88
				500	33	1,14	268	387	0,84
				10	0,67	0,04	387	387	0,74
421 021 10	**421 021 11**	**421 023 05**	19,5 : 1	1500	75	2,00	220	355	0,88
			*39/2	1000	50	1,46	235	355	0,87
				500	25	0,82	252	355	0,83
				10	0,5	0,02	339	355	0,74
421 021 12	**421 021 13**	**421 023 06**	25,5 : 1	1500	57	1,25	174	314	0,86
			*51/2	1000	38	0,89	182	314	0,84
				500	19	0,50	197	314	0,80
				10	0,38	0,02	281	314	0,73
421 021 14	**421 021 15**	**421 023 07**	29,0 : 1	1500	50	1,22	183	429	0,81
			*29/1	1000	33	0,99	215	429	0,79
				500	17	0,67	274	429	0,73
				10	0,33	0,03	429	429	0,60
421 021 16	**421 021 17**	**421 023 08**	39,0 : 1	1500	38	1,11	217	393	0,79
			*39/1	1000	25	0,89	255	393	0,76
				500	13	0,58	305	393	0,71
				10	0,25	0,02	393	393	0,60
421 021 18	**421 021 19**	**421 023 09**	51,0 : 1	1500	28	0,78	191	346	0,75
			*51/1	1000	19	0,57	201	346	0,73
				500	9,4	0,33	218	346	0,68
				10	0,19	0,01	298	346	0,58
421 021 20	**421 021 21**	**421 023 10**	61,0 : 1	1500	24	0,78	211	281	0,70
			*61/1	1000	16	0,58	226	281	0,67
				500	8,1	0,32	226	281	0,60
				10	0,16	0,01	226	281	0,47
421 021 24	**421 021 25**	**421 023 12**	72,0 : 1	1500	21	0,60	176	235	0,64
			*72/1	1000	14	0,43	176	235	0,60
				500	6,9	0,24	176	235	0,53
				10	0,14	0,01	176	235	0,39
421 021 26[1)]	**421 021 27**[1)]	**421 023 13**[1)]	72,0 : 1	100	1,38	0,09	176	235	0,41
			*72/1 optimized for manual operation[1)]	10	0,14	0,01	176	235	0,39
421 021 22	**421 021 23**	**421 023 11**	82,0 : 1	1500	18	0,45	152	247	0,64
			*82/1	1000	12	0,32	152	247	0,61
				500	6	0,17	152	247	0,56
				10	0,12	0,004	152	247	0,46

* Example: Worm gear number of teeth 29 / worm shaft 6 threads.

[1)] This implicity self-locking version is optimezed for hand operation (special worm surface and special oil).

The input power $P_{1permiss.}$ and output torques $T_{2permiss.}$ listed in the selection tables are based on shock-free continuous operation, an operating time of 8 hours/day, 3 starts per hour, operating time (OT) = 100% and 20°C ambient temperature. The maximum output torques T_{2max} may frequently be reached in short-term load peaks but they must not be exceeded. With an operating time under 90%, the permissible gearbox output can usually be increased.

i_n, i_{ist} = nominal ratio, real ratio.
n_1, n_2 [min^{-1}] = input speed, output speed.
$P_{1\ perm}$ [kW] = permittable input power.
$T_{2\ perm}$ [Nm] = permittable output torque (permanent).
T_{2max} [Nm] = maximum output torque (peak).
η = operating efficiency.

Dimensions Table Page 690.

Version with foot mounting brackets or shafts on both sides on request.

Version A		Version HL							
Output Side 5 Product No.	Output Side 6 Product No.	Hollow Shaft Product No.	Ratio i =	n_1 min^{-1}	n_2 min^{-1}	$P_{1\ perm}$ kW	$T_{2\ perm}$ Nm	T_{2max} Nm	η
421 031 00	**421 031 01**	**421 033 00**	5,0 : 1	1500	300	9,82	303	597	0,97
			*30/6	1000	200	7,16	329	597	0,96
				500	100	4,40	399	597	0,95
				10	2	0,14	597	597	0,87
421 031 02	**421 031 03**	**421 033 01**	7,5 : 1	1500	200	7,22	330	681	0,96
			*30/4	1000	133	5,35	364	681	0,95
				500	67	3,31	441	681	0,93
				10	1,3	0,11	681	681	0,84
421 031 04	**421 031 05**	**421 033 02**	10,0 : 1	1500	150	6,17	373	613	0,94
			*40/4	1000	100	4,35	391	613	0,94
				500	50	2,70	473	613	0,92
				10	1	0,08	613	613	0,83
421 031 06	**421 031 07**	**421 033 03**	13,25 : 1	1500	113	2,40	188	335	0,93
			*53/4	1000	75	1,69	197	335	0,92
				500	38	0,93	212	335	0,89
				10	0,75	0,03	335	335	0,83
421 031 08	**421 031 09**	**421 033 04**	15,0 : 1	1500	100	3,59	313	810	0,91
			*30/2	1000	67	2,86	370	810	0,90
				500	33	1,83	455	810	0,87
				10	0,67	0,08	810	810	0,75
421 031 10	**421 031 11**	**421 033 05**	20,0 : 1	1500	75	3,11	356	725	0,90
			*40/2	1000	50	2,46	416	725	0,89
				500	25	1,59	518	725	0,85
				10	0,5	0,05	725	725	0,74
421 031 12	**421 031 13**	**421 033 06**	26,5 : 1	1500	57	1,67	245	444	0,87
			*53/2	1000	38	1,18	257	444	0,86
				500	19	0,67	277	444	0,82
				10	0,38	0,03	444	444	0,73
421 031 14	**421 031 15**	**421 033 07**	30,0 : 1	1500	50	1,92	308	878	0,84
			*30/1	1000	33	1,55	364	878	0,82
				500	17	1,03	454	878	0,77
				10	0,33	0,04	878	878	0,60
421 031 16	**421 031 17**	**421 033 08**	40,0 : 1	1500	38	1,69	350	802	0,81
			*40/1	1000	25	1,36	411	802	0,79
				500	13	0,74	519	802	0,74
				10	0,25	0,04	802	802	0,60
421 031 18	**421 031 19**	**421 033 09**	53,0 : 1	1500	28	1,04	271	501	0,78
			*53/1	1000	19	0,75	285	501	0,75
				500	9,4	0,43	309	501	0,70
				10	0,19	0,02	501	501	0,59
421 031 20	**421 031 21**	**421 033 10**	62,0 : 1	1500	24	1,16	333	570	0,73
			*62/1	1000	16	0,94	393	570	0,70
				500	8,1	0,60	448	570	0,63
				10	0,16	0,02	448	570	0,47
421 031 24	**421 031 25**	**421 033 12**	72,0 : 1	1500	21	1,00	314	498	0,69
			*72/1	1000	14	0,82	370	498	0,66
				500	6,9	0,46	370	498	0,58
				10	0,14	0,02	370	498	0,41
421 031 26[1)]	**421 031 27**[1)]	**421 033 13**[1)]	72,0 : 1	100	1,38	0,18	370	498	0,50
			*72/1 optimized for manual operation[1)]	10	0,14	0,02	370	498	0,41
421 031 22	**421 031 23**	**421 033 11**	82,0 : 1	1500	18	0,84	304	510	0,69
			*82/1	1000	12	0,59	304	510	0,66
				500	6	0,33	304	510	0,60
				10	0,12	0,01	304	510	0,47

* Example: Worm gear number of teeth 30 / worm shaft 6 threads.

[1)] This implicity self-locking version is optimezed for hand operation (special worm surface and special oil).

Dimensions Table Worm Gear Units ZM/I

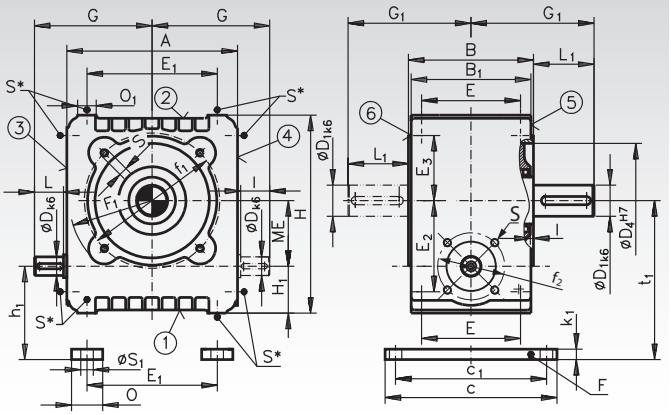
The sides 1 to 6 are machined and can be used as mounting surfaces. The foot mounting brackets F can be connected to the sides 1 and 2.

(1) The sides 1, 2, 3, 5 and 6 are ex-works always supplied with threaded bores.

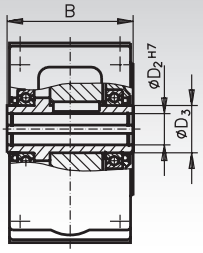
If side 4 is to be used as mounting surface, the respective surface is supplied with threaded bores. The worm shaft end can be fitted on side 3 or 4 as desired. Shaft end with thread alignment according to DIN 332/page 2, feather keys and grooves according to DIN 6885/1. Position of the venting filter according to the table on page 685. The gearbox can function in any mounting position.

Version with foot mounting bracket or double-sided output shaft on request.

Version A



Version HL



Gearbox Dimensions

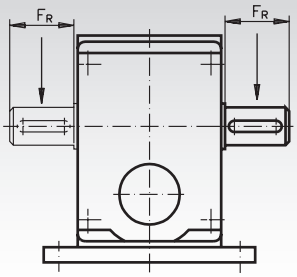
Size	ME	A	B	B_1	c	c_1	D_4	D x L	D_1 x L_1	D_2	D_3	E	E_1	E_2*	E_3*	F_1
		mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm
40	40	104	90	85	125	110	70	14 x 24	22 x 36	22	35	70	70	55	35	53
50	50	140	105	100	150	130	90	16 x 28	25 x 42	25	40	80	100	70	50	65
63	63	164	120	115	165	145	110	18 x 28	30 x 58	30	45	95	125	87,5	62,5	80
80	80	204	140	135	190	165	140	24 x 36	38 x 58	38	55	115	155	107,5	77,5	100

Size	f_1	f_2	G	G_1	H_1	h_1	H	I	k_1	O	O_1	S*	S_1	t_1	Weight
	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	g
40	85	50	79	81	32	40	124	3	8	25	14	M6 x 12	10	80	7
50	110	64	100	94,5	40	50	160	3	10	30	18	M8 x 14	12	100	12
63	130	70	113	118	45	55	190	3	10	30	18	M8 x 14	12	118	18
80	165	81	141	128	55	67	237	3	12	35	22	M10 x 17	15	147	28

* Threaded bores on page 4 at extra charge. Dimensions may be subject to alteration.

Permissible Radial Loads F_R [N] for Normal Output Shaft and Bearing System

The permiss. radial loads indicated in the table are calculated for the centre of the output shaft end, also calculating in the output speed and the nominal output torque. The values were calculated for the adverse rotational direction. The permiss. radial loads only apply to unilateral load. If in your application high radial loads occur in combination with axial loads, we ask you to contact us.



Size	Output Torques Nm	Permiss. Radial Load [N] at Output Speeds n_2 [min^{-1}]																	
		6	8	10	12	16	20	25	32	40	50	63	80	100	125	160	200	250	320
40	0 - 80	2500	2375	2250	2125	2000	1875	1775	1675	1575	1400	1325	1250	1175	1125	1050	925	875	800
50	0 - 125	3500	3325	3150	2970	2800	2620	2480	2340	2200	1960	1850	1750	1640	1570	1470	1290	1220	1120
	125 - 160	3200	3040	2880	2720	2560	2400	2270	2140	2010	1790	1700	1600	1500	1440	1340	1180	1120	1020
63	0 - 200	5000	4750	4500	4250	4000	3750	3550	3350	3150	2800	2650	2500	2350	2250	2100	1850	1750	1600
	200 - 250	4600	4360	4140	3910	3680	3450	3260	3080	2900	2570	2440	2300	2160	2070	1930	1700	1610	1470
	250 - 320	3500	3325	3150	2975	2800	2625	2485	2345	2205	1960	1855	1750	1645	1575	1470	1295	1225	1120
80	0 - 500	7500	7120	6740	6370	6000	5620	5320	5000	4700	4200	4000	3750	3500	3370	3140	2770	2620	2400

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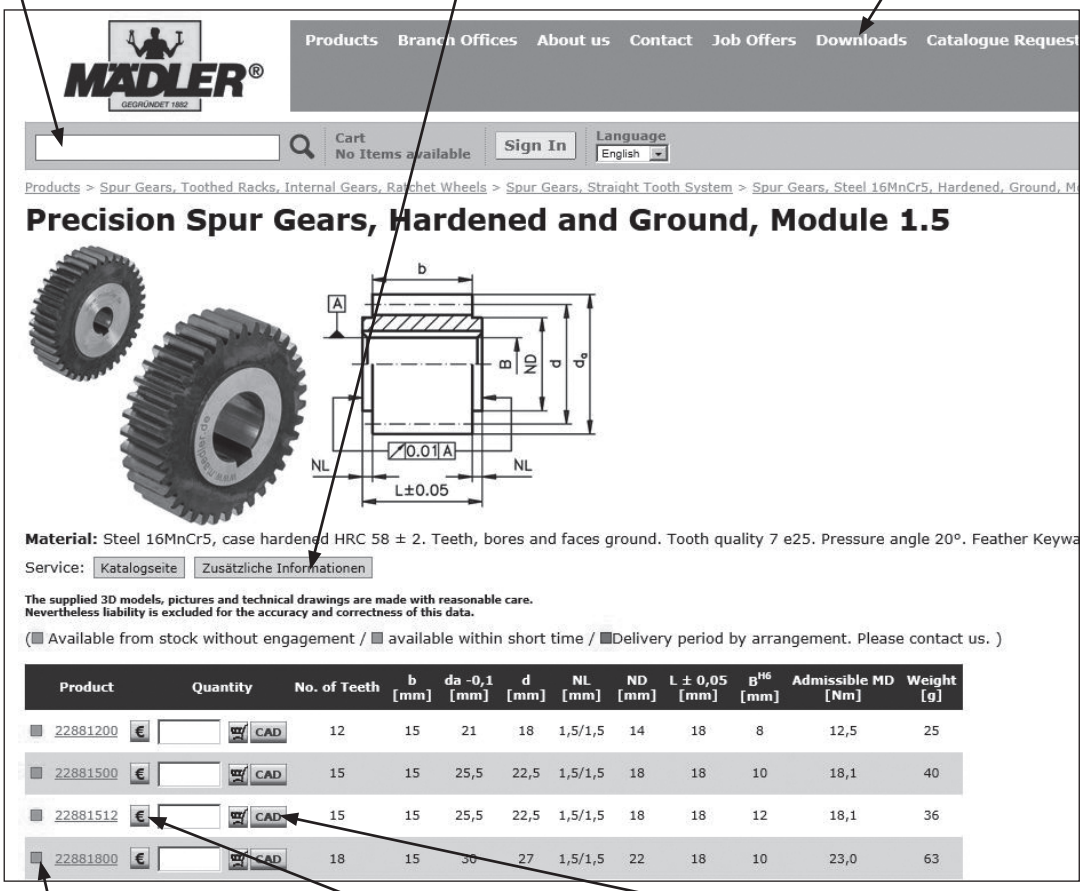

Product	Quantity	No. of Teeth	b [mm]	da -0,1 [mm]	d [mm]	NL [mm]	ND [mm]	L ± 0,05 [mm]	B^{H6} [mm]	Admissible MD [Nm]	Weight [g]
22881200	€	12	15	21	18	1,5/1,5	14	18	8	12,5	25
22881500	€	15	15	25,5	22,5	1,5/1,5	18	18	10	18,1	40
22881512	€	15	15	25,5	22,5	1,5/1,5	18	18	12	18,1	36
22881800	€	18	15	30	27	1,5/1,5	22	18	10	23,0	63

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