

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 pharmaceutical 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.

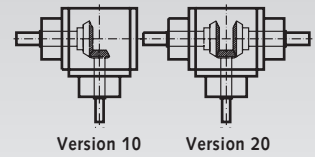
Model K: Input side A: Ratio for gearing up.
 Input side C: Transmission ratio for gearing down.

Model L: Straight-through shaft, slowly turning.

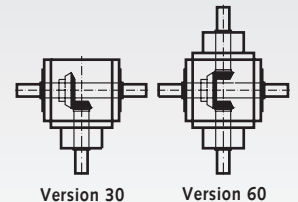
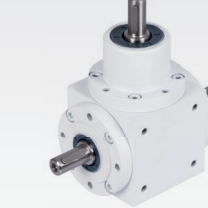
Model H: Straight-through hollow shaft, slowly turning.

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

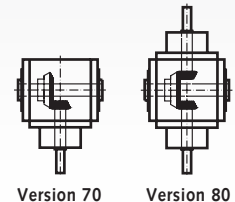
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Model H Page 724



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:

Input	Output (load type of driven machine)			Operating time
	Uniform	Medium shocks	Strong shocks	
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: $250 \text{ Nm} \times 1.5 \times 0.8 = 300 \text{ Nm}$; $i = 1$
 $: 1$; $n = 250 \text{ min}^{-1}$ = 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 !

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.

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

Example:

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

Bevel Gearboxes KU/I, Model L, Technical Data

Ratio	Version		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							
	30	60	50	250	500	750	1000	1500	3000	50	250	500	750	1000	1500	3000	
1:1	Size	Product No.	Product No.														
	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	---	
1,5:1	Size	Product No.	Product No.	33	167	333	500	667	1000	2000	50	250	500	750	1000	1500	3000
	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	
2:1	Size	Product No.	Product No.	25	125	250	375	500	750	1500	50	250	500	750	1000	1500	3000
	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	
3:1	Size	Product No.	Product No.	17	83	167	250	333	500	1000	50	250	500	750	1000	1500	3000
	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	
4:1	Size	Product No.	Product No.	12,5	62,5	125	187,5	250	375	750	50	250	500	750	1000	1500	3000
	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
5:1	Size	Product No.	Product No.	10	50	100	150	200	300	600	50	250	500	750	1000	1500	3000
	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
6:1	Size	Product No.	Product No.	8	42	83	125	167	250	500	50	250	500	750	1000	1500	3000
	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 719).

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

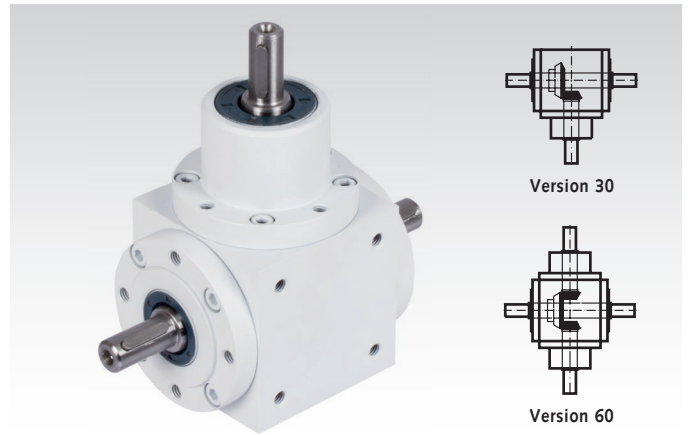
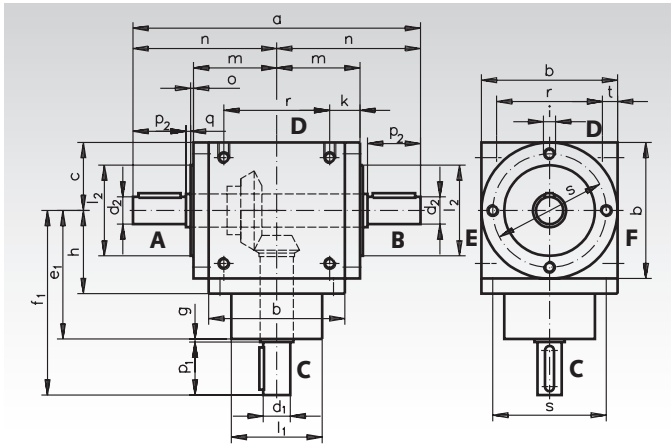
The maximum permissible radial forces stated in the table are calculated for the centre of the output shaft end, also calculating in the speed and torque. The values were calculated for the most unfavourable load direction. Precise calculation of load and rotational direction may lead to higher permissible 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 permissible 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 332-2 see page 863. 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	bis	1 : 1,5*	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	5 : 1	6 : 1				1 : 1 1,5 : 1 2 : 1 1 : 1,5* 1 : 2*	3 : 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	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