

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.

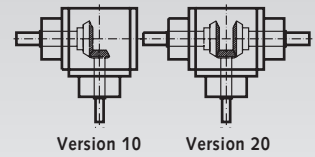
Model K: Input side A: Ratio for gearing up.
 Input side C: Transmission ratio for gearing down.

Model L: Straight-through shaft, slowly turning.

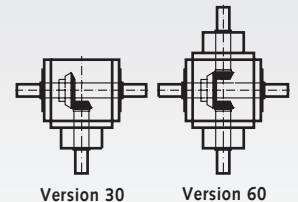
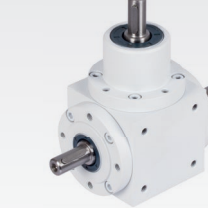
Model H: Straight-through hollow shaft, slowly turning.

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

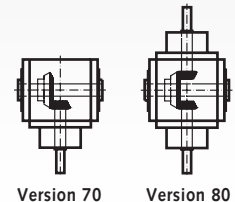
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Selection of the Gearbox Size

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 K, 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							
	10	20	50	250	500	750	1000	1500	3000	50	250	500	750	1000	1500	3000	
1:1	Size	Product No.	Product No.	50	250	500	750	1000	1500	3000	50	250	500	750	1000	1500	3000
	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	---	
1,5:1	Size	Product No.	Product No.	33	167	333	500	667	1000	2000	50	250	500	750	1000	1500	3000
	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	
2:1	Size	Product No.	Product No.	25	125	250	375	500	750	1500	50	250	500	750	1000	1500	3000
	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	
3:1	Size	Product No.	Product No.	17	83	167	250	333	500	1000	50	250	500	750	1000	1500	3000
	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	
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	412 004 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
5:1	Size	Product No.	Product No.	10	50	100	150	200	300	600	50	250	500	750	1000	1500	3000
	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
6:1	Size	Product No.	Product No.	8	42	83	125	167	250	500	50	250	500	750	1000	1500	3000
	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 719).

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

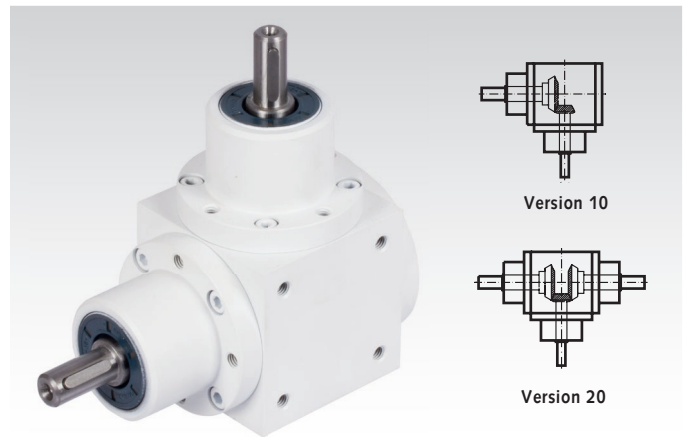
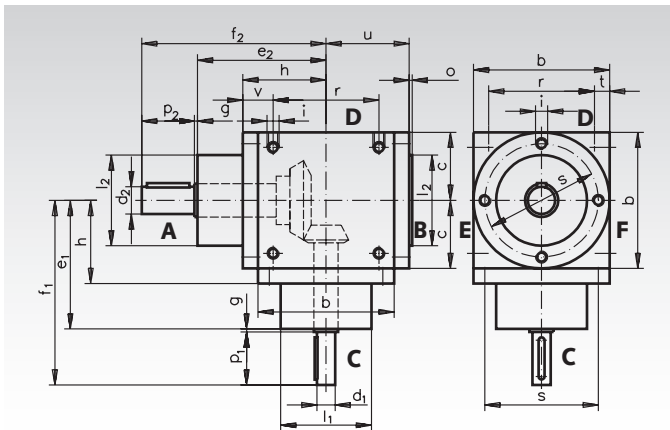
The maximum perm. radial forces stated in the table are calculated for the centre of the output shaft end, also calculating in the speed and torque. The values were calculated for the most unfavourable load direction. Precise calculation of load and rotational direction may lead to higher permissible 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 perm. 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 332-2, 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 (intermediate transmission ratios on request)

Size	b mm	c mm	d_1 j_6 mm			d_2 j_6 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	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 f_7 mm			l_2 f_7 mm	o mm
	1 : 1 1,5 : 1 2 : 1	3 : 1 4 : 1 6 : 1					1 : 1 1,5 : 1 2 : 1	3 : 1 4 : 1 6 : 1	5 : 1 6 : 1		
0	100	100	-	2	42	M6	44	44	-	44	2
1	122	122	132	2	55	M8	60	60	60	60	2
2	162	162	172	2	75	M10	80	80	70	80	3
25	212	212	232	2	95	M12	110	100	100	110	3
30	273	261	261	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 dm^3)	0,1	0,3	0,6	1,2	2,5