

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.

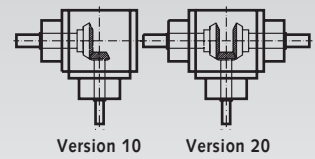
Model K: Input side A: Ratio for gearing up.
 Input side C: Transmission ratio for gearing down.

Model L: Straight-through shaft, slowly turning.

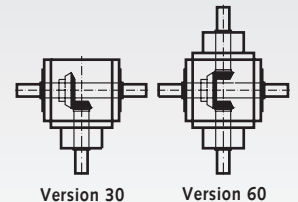
Model H: Straight-through hollow shaft, slowly turning.

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

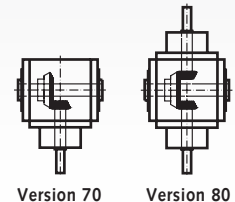
Model K Page 720



Model L Page 722



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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: $250 \text{ Nm} \times 1.5 \times 0.8 = 300 \text{ Nm}$; $i = 1$
 $;$ $n = 250 \text{ min}^{-1} = \text{Selected Gearbox Size 25.}$

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 H, Technical Data

Ratio	Version 70		Version 80		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						
	Size	Product No.	Product No.	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	---
1,5:1	Size	Product No.	Product No.	33	167	333	500	667	1000	2000	50	250	500	750	1000	1500	3000
	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
2:1	Size	Product No.	Product No.	25	125	250	375	500	750	1500	50	250	500	750	1000	1500	3000
	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
3:1	Size	Product No.	Product No.	17	83	167	250	333	500	1000	50	250	500	750	1000	1500	3000
	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
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	412 064 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
5:1	Size	Product No.	Product No.	10	50	100	150	200	300	600	50	250	500	750	1000	1500	3000
	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
6:1	Size	Product No.	Product No.	8	42	83	125	167	250	500	50	250	500	750	1000	1500	3000
	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
	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 719).

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	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

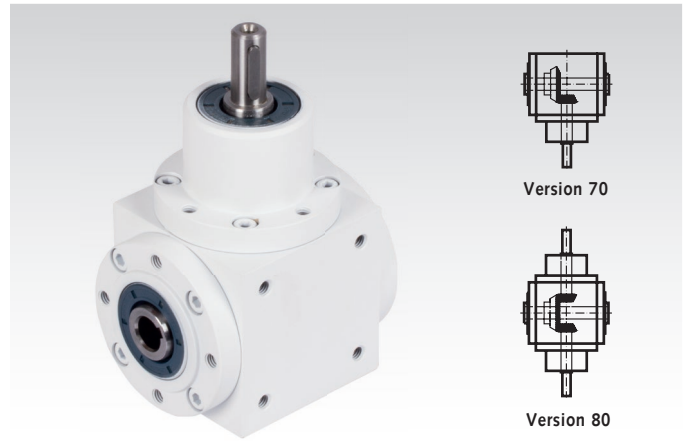
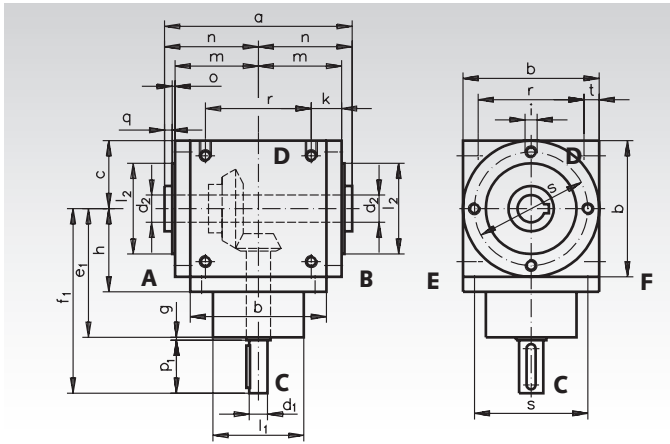
Permissible Radial and Axial Loads at shaft d_2

Gearbox	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

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 ask us.

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 H



Shaft ends for all types: Tolerance = j_6 ; thread alignment according to DIN 332-2 see page 863. 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
1	2	35	35	35	5	70
2	3	45	45	35	5	100
25	3	60	60	60	5	120
30	3	80	68	68	5	160

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 dm^3)	0,1	0,3	0,6	1,2	2,5