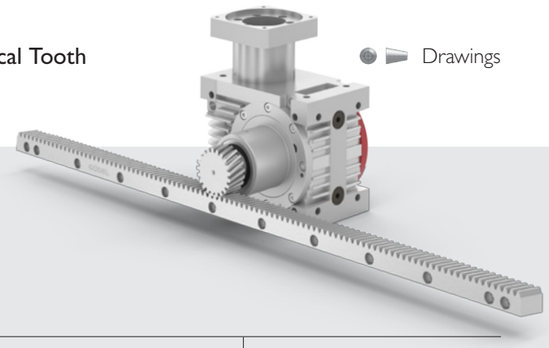
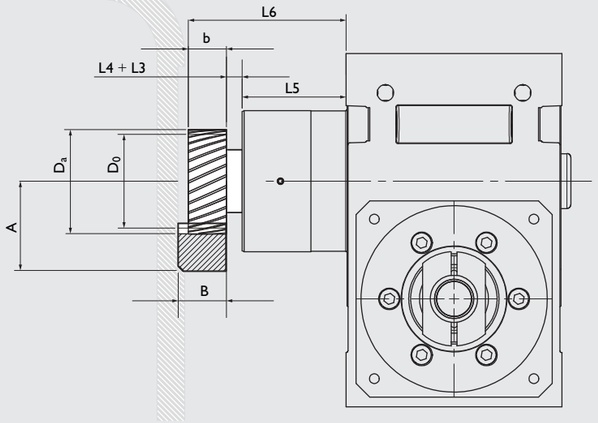
Rack & Pinon Program

Our Function Package with gearbox,
output flange, pinion and rack by Güdel.



Helical modular pitch



Hardened and ground

Material
16MnCr5 DIN 1.7131
shaft/bore soft

Teeth
pressure angle α = 20°
helical tooth system
helix angle ß = 19° 31'42"
hardened (58^{+4}_{0} HRC)
ground, crowned

Quality
6f24 DIN 3962/63/67

f_p [mm]
Adjacent pitch error
modul m ≤ 3 ; 0.006
modul m > 3 ; 0.008

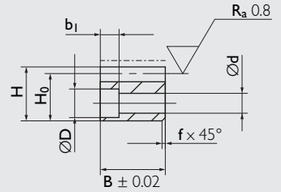
Geometric Information

Size	m	z	A	b	D_a	D_0	L4	L5	L6	M	Part. No.
030	1.5	16	30.68	20	29.36	26.36	4.5	38	62.5	0.14	211116
								43	67.5		
045	1.5	20	33.415	20	34.83	31.83	4.5	43	67.5	0.34	211120
								53	77.5		
	2	16	39.575		39.15	35.15	8	43	71	0.39	211216
								53	81		
060	2	20	43.22	20	46.44	42.44	8	53	81	0.7	211220
								58	86		
								83	111		
	2.5		48.025	25	58.05	53.05		53	86	0.91	211320
								58	91		
								83	116		
	3	16	52.365	30	58.73	52.73		53	91	0.99	211416
								58	96		
								83	121		
090	3	20	57.83	30	69.66	63.66	12.5	63	105.5	2.38	211420
								104.5	147		
	4		77.44	40	92.88	84.88	18	63	121	3.43	211520
								104.5	162.5		
120	4	20	77.44	40	92.88	84.88	14.5	123	177.5	7.89	211521
	5		87.05	50	116.1	106.1	35	123	208	9.96	211620
180	6	20	106.66	60	139.3	127.32	20	160	240	20.7	211720
	8		155.88	80	185.7	169.76	35	160	275	28.2	211820
	10	15	171.58	100	185.2	165.16	40	160	300	31.63	211915

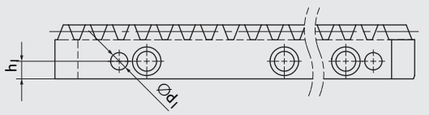
m: modul, z: number of teeth, M: Weight [kg]

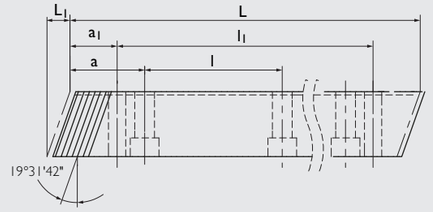
Rack

Helical modular pitch



hardened





Hardened and ground

Material
C45E DIN 1.1191
1.7131 (16MnCr5) on request

Profil
all faces ground

Teeth
pressure angle α = 20°
helical tooth system right
ß = 19° 31'42"
hardened (54^{+4}_{0} HRC)
and ground

Quality
6h23 DIN 3962/63/67

f_p [mm]
Adjacent pitch error
modul m ≤ 3 ; 0.006
modul m > 3 ; 0.008

p_f [mm]
-0.05/-0.2, Tolerance of cut
for continuous mounting

F_{pL} [mm]
Cumulative pitch error,
based on length L

Geometric Information

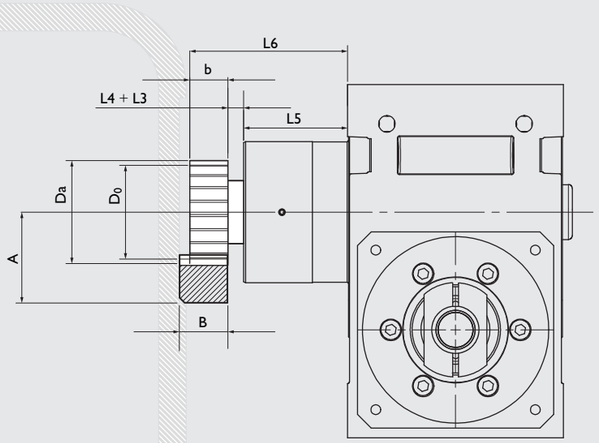
Size	p_t	m	L	L_l	z	B	H	H_0	f+0.5	a	l	h_l	d	D	b_0	a_l	l_l	d_l	F_{pL}	M	Part. No.
30 **45**	5	1.5	500	6.7	100	19	19	17.50 0/-027	2	62.5	125.00	8	7	11	7	31.7	436.6	5.7	0.029	1.3	246012
			1000		200												936.6		0.043	2.6	246013
45 **60**	6.67	2	500	8.5	75	24	24	22.00 0/-027	2	62.5	125.00	8	7	11	7	31.7	436.6	5.7	0.025	2.1	246022
			1000		150												936.6		0.036	4.1	246023
			2000		300												1936.6		0.058	8.2	246024
60	8.33	2.5	500	8.5	60	24	24	21.50 0/-027	2	62.5	125.00	9	7	11	7	31.7	436.6	5.7	0.027	2.0	246032
			1000		120												936.6		0.036	4.1	246033
			2000		240												1936.6		0.053	8.2	246034
60 **90**	10.00	3	500	10.3	50	29	29	26.00 0/-034	2	62.5	125.00	9	10	15	9	35.0	430.0	7.7	0.028	3.0	246042
			1000		100												930.0		0.037	5.9	246043
			2000		200												1930.0		0.054	11.2	246044
90 **120**	13.33	4	506.67	13.8	38	39	39	35.00 0/-034	3	62.5	125.00	12	10	15	9	33.3	433.0	7.7	0.030	5.4	246052
			1000		75												933.4		0.036	10.7	246053
			2000		150												1933.4		0.050	20.5	246054
120	16.67	5	500	17.4	30	49	39	34.00 0/-034	3	62.5	125.00	12	14	20	13	37.5	425.0	11.7	0.028	6.5	246062
			1000		60												925.0		0.034	13.1	246063
			2000		120												1925.0		0.045	24.5	246064
180	20.00	6	500	20.9	25	59	49	43.00 0/-041	3	62.5	125.00	16	18	26	17	37.5	425.0	15.7	0.031	10.0	246072
			1000		50												925.0		0.036	19.9	246073
			2000		100												1925.0		0.046	36.5	246074
180	26.66	8	480	28.0	18	79	79	71.00 0/-041	3	60.0	125.00	25	22	33	21	120.0	240.0	19.7	0.029	22.0	246082
			960		36												720.0		0.033	44.0	246083
			1920		72												168.0		0.040	78.0	246084
180	33.33	10	500	35.1	15	99	99	89.00 0/-041	3	62.5	125.00	32	33	48	32	125.0	250.0	19.7	0.029	34.0	246092
			1000		30												750.0		0.032	68.0	246093

m: modul, z: number of teeth p: pitch, p_t: transvers, M: Weight [kg]

Pinion

Straight modular pitch

Hardened and ground



Material
16MnCr5 DIN 1.7131
shaft/bore soft

Teeth
pressure angle α = 20°
straight teeth
hardened (58^{+4}_{0} HRC)
ground, crowned

Quality
6f24 DIN 3962/63/67

f_p [mm]
Adjacent pitch error
modul m ≤ 3 ; 0.006
modul m > 3 ; 0.008

Geometric Information

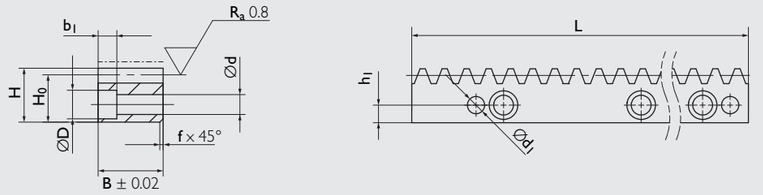
Size	m	z	A	b	D_a	D_0	L4	L5	L6	M	Part. No.
030	1.5	16	29.95	20	27.9	24.9	4.5	38	82.5	0.14	201116
								43	67.5		
045	1.5	20	32.5	20	33.0	30.0	4.5	43	67.5	0.34	201120
								53	77.5		
	2	16	38.6		37.2	33.2	8	43	71	0.37	201216
								53	81		
060	2	20	42.0	20	44.0	40.0	8	53	81	0.68	201220
								58	86		
								83	111		
	2.5		46.0	25	55.0	50.0		53	86	0.86	201320
								58	91		
								83	116		
	3	16	50.9	30	55.8	49.8		53	91	0.93	201416
								58	96		
								83	121		
090	3	20	56.0	30	66.0	60.0	12.5	63	105.5	2.30	201420
								104.5	147		
	4		75.0	40	88.0	80.0	18	63	121	3.24	201520
								104.5	162.5		
120	5	20	84.0	50	110.0	100.0	35	123	208	9.57	201620
	6		103.0	60	132.0	120.0	35		218	11.8	201720
	8		151.0	80	176.0	160.0	35		238	28.31	201820
180	8	20	151.0	80	176.0	160.0	35	160	275	28.31	201821
	10	16	172.0	100	186.0	166.0	40		300	31.78	201916

m: modul, z: number of teeth, M: Weight [kg]

Rack

Straight modular pitch

Hardened and ground



-·-·- hardened

Material
C45E DIN 1.1191
1.7131 (16MnCr5) on request

Profil
all faces ground

Teeth
pressure angle α = 20°
straight tooth system
hardened (54^{+4}_{0} HRC)
and ground

Quality
6h23 DIN 3962/63/67

f_p [mm]
Adjacent pitch error
modul m ≤ 3 ; 0.006
modul m > 3 ; 0.008

p_f [mm]
-0.05/-0.2, Tolerance of cut
for continuous mounting

F_{pL} [mm]
Cumulative pitch error, based on
length L

Geometric Information

Size	p	m	L	z	B	H	H_0	f+0.5	a	l	h_1	d	D	b_1	a_1	l_1	d_1	F_{pL}	M	Part. No.
30	4.712	1.5	499.51	106	19	19	17.50 0/-027	2	62.44	124.88	8	7	11	7	29	441.5	5.7	0.029	1.3	240012
45			999.03	212												941.0		0.043	2.6	240013
45	6.283	2	502.65	80	24	24	22.00 0/-027	2	62.83	125.66	8	7	11	7	31.3	440.1	5.7	0.025	2.1	240022
60			1005.31	160												942.7		0.036	4.2	240023
			2010.62	320												1948.0		0.058	8.0	240024
60	7.854	2.5	502.65	64	24	24	21.50 0/-027	2	62.83	125.66	9	7	11	7	31.3	440.1	5.7	0.027	2.0	240032
			1005.31	128												942.7		0.036	4.1	240033
			2010.62	256												1948.0		0.053	8.0	240034
60	9.425	3	508.94	54	29	29	26.00 0/-034	2	63.62	127.23	9	10	15	9	34.4	440.1	7.7	0.029	3.0	240042
90			1017.88	108												949.1		0.037	6.0	240043
			2035.75	216												1967.0		0.055	11.5	240044
90	12.566	4	502.65	40	39	39	35.00 0/-034	2	62.83	125.66	12	10	15	9	37.5	427.7	7.7	0.030	5.40	240052
			1005.31	80												930.3		0.037	10.8	240053
			2010.62	160												1935.6		0.050	21.0	240054
120	15.708	5	502.65	32	49	39	34.00 0/-034	3	62.83	125.66	12	14	20	13	30.2	442.3	11.7	0.028	6.6	240062
			1005.31	64												944.9		**0.034**	13.1	240063
			2010.62	128												1950.2		0.045	24.7	240064
120	18.850	6	508.94	27	59	49	43.00 0/-041	3	63.62	127.23	16	18	26	17	31.4	446.1	15.7	0.031	10.1	240072
			1017.88	54												955.0		0.036	20.3	240073
			2035.75	108												1973.0		0.047	37.5	240074
120	25.133	8	502.65	20	79	79	71.00 0/-041	3	62.83	125.66	25	22	33	21	26.7	449.3	19.7	0.029	22.1	240082
180			1005.31	40												952.0		0.033	44.3	240083
			2010.62	80												1957.3		0.041	82.5	240084
180	31.416	10	502.65	16	99	99	89.00 0/-041	3	62.83	125.66	32	33	48	32	125.2	252.3	19.7	0.029	34.8	240092
			1005.31	32												755.0		0.032	69.5	240093

m: modul, z: number of teeth p: pitch, p_t: transvers, M: Weight [kg]

Order Reference

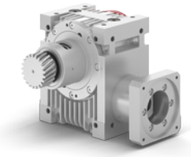
Define the Code of your High Performance Angle Gearbox

Package
(Output Flange including Bearing & Pinion)

Type	Size		Configuration		Ratio		Precision Grades	Centering		Mounting Position		
HPG	060	-	A	I	5	-	PS	0	-	SU	-	Motor

Güdel Pinion		Request of the Output Flange		Assembly		Spacer Elements (optional)
211320	-	86	53	-	-	22

Example
HPG 060-A1-5-PS-0-211320-86-53-22-SU



HPG High Performance Angle Gearbox

030 045 060 090 120 180

Input: **A** B C D

Output: **1** 2 3 4 5 6 7

i = **2** 3 4 5 6 8 10 13.33 16 24 30 47 60

PS Standard circumferential backlash
PR Reduced circumferential backlash *

* PR can not be selected in sizes 030 and 180

0 without
1 at input 1 for configuration C and D
2 at input 2 (input shaft) for configuration B and D
3 for input 1 and 2 for configuration B und D

SS vertical standing worm
SU vertical worm below
SL flat lying worm
SO vertical worm upstairs

Part. No. acc. to catalogue

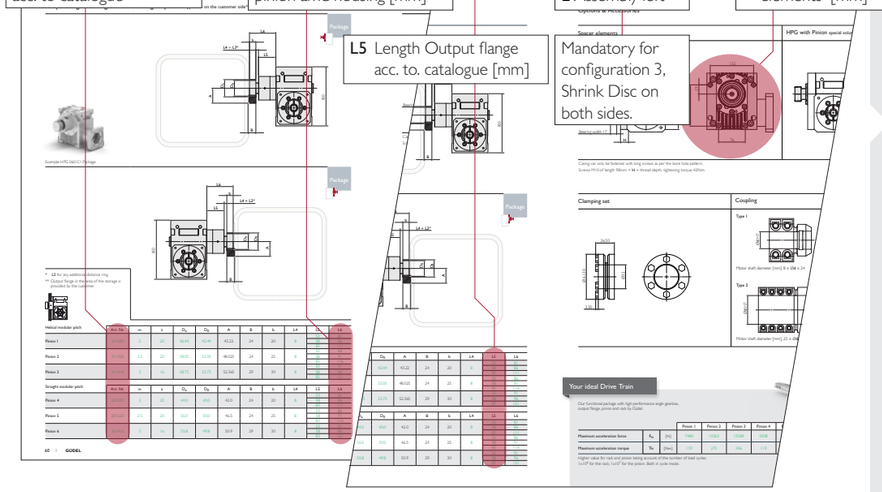
L6 Distance between pinion amd housing [mm]

L5 Length Output flange acc. to. catalogue [mm]

R Assembly right
L Assembly left

Mandatory for configuration 3, Shrink Disc on both sides.

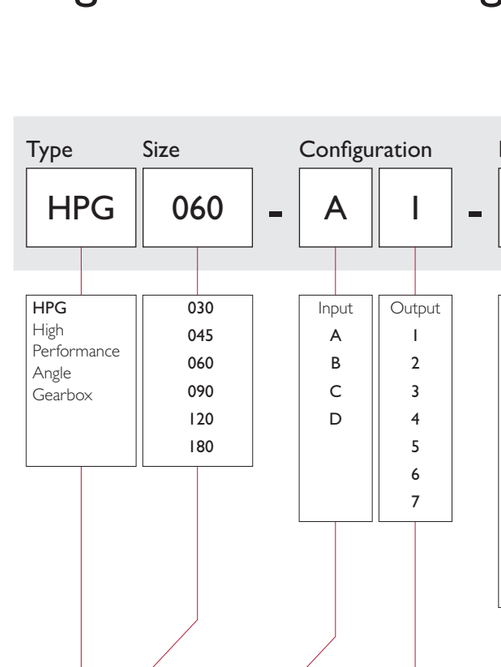
H Heigth of spacer elements [mm]

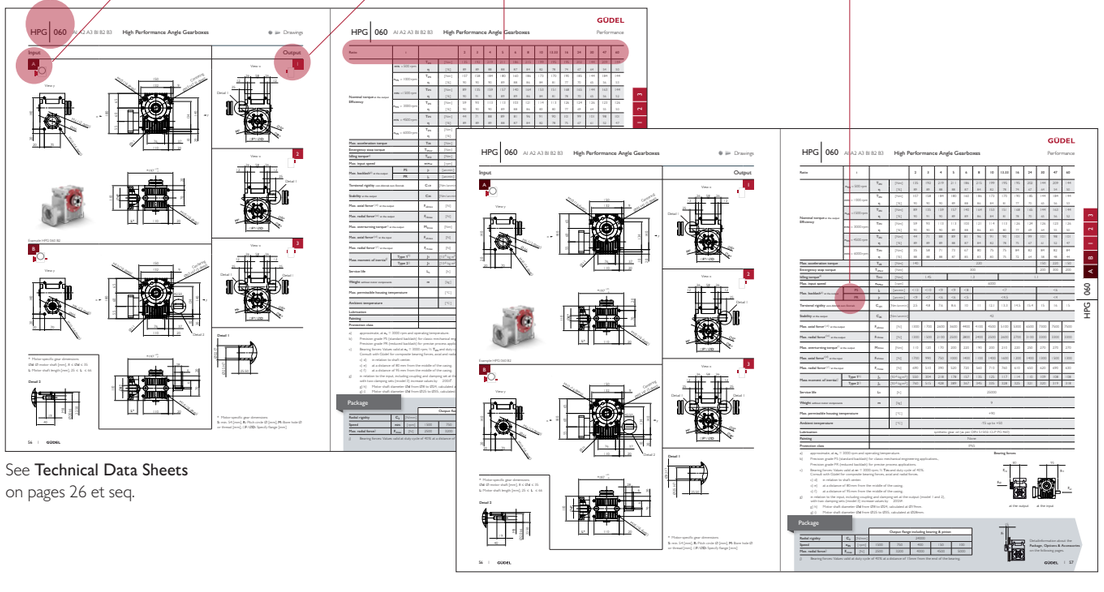


Unless a pinion is required

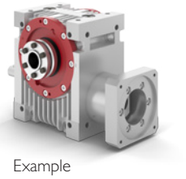
Unless a Package is required (Output Flange including Bearing & Pinion)

Unless no spacer elements are required

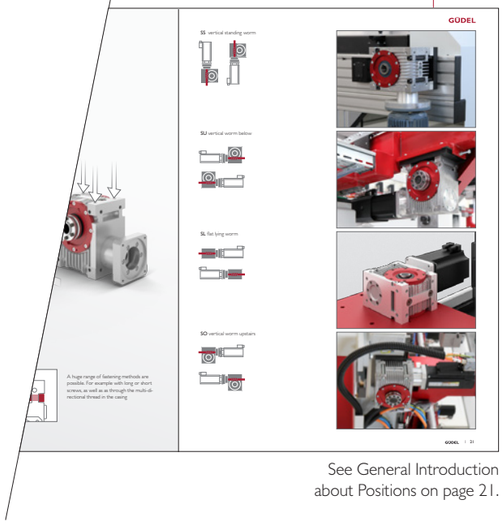




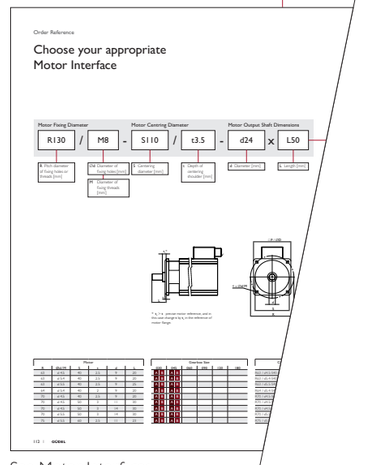
See **Technical Data Sheets** on pages 26 et seq.



Example
HPG 060-A1-5-PS-0-SU



See General Introduction about Positions on page 21.



See Motor Interfaces on pages 112 et seq.

Order Reference

Choose your appropriate Motor Interface

Motor Fixing Diameter		Motor Centring Diameter		Motor Output Shaft Dimensions	
R130	/ M8	- S110	/ t3.5	- d24	x L50

R Pitch diameter of fixing holes or threads [mm]

Ød Diameter of fixing holes [mm]

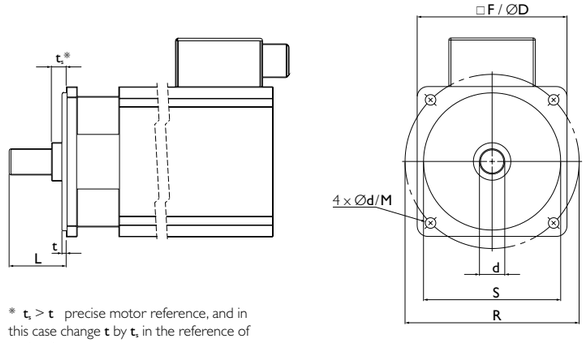
M Diameter of fixing threads [mm]

S Centering diameter [mm]

t Depth of centering shoulder [mm]

d Diameter [mm]

L Length [mm]



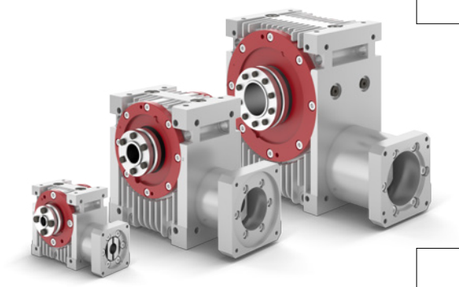
* $t_1 > t$ precise motor reference, and in this case change **t** by t_1 in the reference of motor flange.

Motor						Gearbox Size						Code
R	Ød/M	S	t	d	L	030	045	060	090	120	180	
63	d 4.5	40	2.5	9	20	A B	A B					R63 / d4.5-S40 / t2.5-d9×20
63	d 5.4	40	2.5	9	20	A B	A B					R63 / d5.4-S40 / t2.5-d9×20
63	d 5.5	40	2.5	9	25	A B	A B					R63 / d5.5-S40 / t2.5-d9×25
64	d 5.4	40	2	9	20	A B	A B					R64 / d5.4-S40 / t2-d9×20
70	d 4.5	40	2.5	9	20	A B	A B					R70 / d4.5-S40 / t2.5-d9×20
70	d 4.5	50	3	11	30	A B	A B					R70 / d4.5-S50 / t3-d11×30
70	d 4.5	50	3	14	30	A B	A B					R70 / d4.5-S50 / t3-d14×30
70	d 5.5	50	3	14	30	A B	A B					R70 / d5.5-S50 / t3-d14×30
75	d 5.5	60	2.5	11	23	A B	A B					R75 / d5.5-S60 / t2.5-d11×23

Motor						Gearbox Size						Code
R	Ød/M	S	t	d	L	030	045	060	090	120	180	
75	d 5.5	60	2.5	14	30	A B	A B	A B				R75 / d5.5-S60 / t2.5-d14×30
75	d 5.5	60	3	14	30	A B	A B	A B				R75 / d5.5-S60 / t3-d14×30
75	d 5.8	60	2.5	11	23	A B	A B					R75 / d5.8-S60 / t2.5-d11×23
75	d 6.5	60	3	14	30	A B	A B	A B				R75 / d6.5-S60 / t3-d14×30
90	d 6	70	3	19	35	A B*	A B	A B				R90 / d6-S70 / t3-d19×35
90	d 7	70	3	14	30	A B	A B	A B				R90 / d7-S70 / t3-d14×30
90	d 7	70	3	16	40	A B*	A B	A B				R90 / d7-S70 / t3-d16×40
95	d 6.6	50	2.5	14	30	A B	A B					R95 / d6.6-S50 / t2.5-d14×30
100	d 7	80	3	14	30	A B	A B	A B				R100 / d7-S80 / t3-d14×30
100	d 7	80	3	19	40	A B*	A B	A B	A B			R100 / d7-S80 / t3-d19×40
100	d 6.5	80	2.5	14	30	A B	A B	A B				R100 / d6.5-S80 / t2.5-d14×30
100	d 6.5	80	3	19	40	A B*	A B	A B	A B			R100 / d6.5-S80 / t3-d19×40
100	d 6.6	80	4	10	32	A B	A B*	A B				R100 / d6.6-S80 / t4-d10×32
100	d 6.6	80	5	14	37	A B*	A B*	A B				R100 / d6.6-S80 / t5-d14×37
100	d 6.6	80	5	16	40	A B*	A B*	A B	A B			R100 / d6.6-S80 / t5-d16×40
115	d 9	95	3	19	40		A B	A B	A B	A B		R115 / d9-S95 / t3-d19×40
115	d 7	95	3	24	45		A B	A B	A B	A B		R115 / d7-S95 / t3-d24×45
115	d 10	95	3	19	40		A B	A B	A B	A B		R115 / d10-S95 / t3-d19×40
130	d 9	95	3	19	40		A B	A B	A B	A B		R130 / d9-S95 / t3-d19×40
130	d 9	95	3	24	50		A B	A B	A B	A B		R130 / d9-S95 / t3-d24×50
130	d 9	110	3	24	50		A B	A B	A B	A B		R130 / d9-S110 / t3-d24×50
130	d 9	110	3.5	24	50		A B	A B	A B	A B		R130 / d9-S110 / t3.5-d24×50
130	d 9	110	3.5	19	40		A B	A B	A B	A B		R130 / d9-S110 / t3.5-d19×40
130	M8	110	3.5	19	40		A B	A B	A B	A B	A	R130 / M8-S110 / t3.5-d19×40
130	M8	110	3.5	24	50		A B	A B	A B	A B		R130 / M8-S110 / t3.5-d24×50
130	M8	110	3.5	28	60			A B	A B	A B	A B	R130 / M8-S110 / t3.5-d28×60
130	M8	110	3.5	38	80				A B	A B	A B	R130 / M8-S110 / t3.5-d38×80
145	d 9	110	6	19	55		A B*	A B	A B*	A B*		R145 / d9-S110 / t6-d19×55
145	d 9	110	6	19	58		A B*	A B	A B*	A B*		R145 / d9-S110 / t6-d19×58
145	d 9	110	6	22	58		A B*	A B	A B*	A B*	A B	R145 / d9-S110 / t6-d22×58
145	d 9	110	6	24	58		A B*	A B	A B*	A B*	A B	R145 / d9-S110 / t6-d24×58
145	d 9	110	6	28	63			A B	A B*	A B*	A B	R145 / d9-S110 / t6-d28×63
145	d 10	110	3.5	16	40	A B	A B	A B				R145 / d10-S110 / t3.5-d16×40
145	d 10	110	3.5	19	40	A B	A B	A B	A B			R145 / d10-S110 / t3.5-d19×40
165	d 11	110	4	24	50		A B	A B	A B			R165 / d11-S110 / t4-d24×50
165	d 11	130	3	28	60		A B	A B	A B	A B		R165 / d11-S130 / t3-d28×60
165	d 11	130	3.5	19	28		A B					R165 / d11-S130 / t3.5-d19×28
165	d 11	130	3.5	24	50		A B	A B	A B			R165 / d11-S130 / t3.5-d24×50
165	d 11	130	3.5	32	58		A B	A B	A B	A B		R165 / d11-S130 / t3.5-d32×58
165	d 11	130	4	32	58		A B	A B	A B	A B		R165 / d11-S130 / t4-d32×58
190	d 11	155	3.5	32	60			A B	A B	A B		R190 / d11-S155 / t3.5-d32×60
190	d 11	155	3.5	35	60			A B	A B	A B		R190 / d11-S155 / t3.5-d35×60
200	d 13.5	114.3	3.2	35	79			A B	A B	A B		R200 / d13.5-S114.3 / t3.2-d35×79
200	d 13.5	114.3	3.2	42	113				A B*	A B		R200 / d13.5-S114.3 / t3.2-d42×113
215	d 14	130	4	32	60			A B	A B	A B		R215 / d14-S130 / t4-d32×60
215	d 14	130	4	38	60			A B	A B	A B		R215 / d14-S130 / t4-d38×60
215	d 13	180	4	28	60			A B	A B	A B		R215 / d13-S180 / t4-d28×60
215	d 13	180	4	38	80			A B	A B	A B		R215 / d13-S180 / t4-d38×80
215	d 14	180	4	28	42			A B	A B			R215 / d14-S180 / t4-d28×42
215	d 14	180	4	28	60			A B	A B	A B		R215 / d14-S180 / t4-d28×60
215	d 14	180	4	32	58			A B	A B	A B		R215 / d14-S180 / t4-d32×58
215	d 14	180	4	32	60			A B	A B	A B		R215 / d14-S180 / t4-d32×60
215	d 14	180	4	32	80			A B	A B	A B		R215 / d14-S180 / t4-d32×80
215	d 14	180	4	38	80			A B	A B	A B		R215 / d14-S180 / t4-d38×80
235	d 13.5	200	4	42	116					A B*	A B	R235 / d13.5-S200 / t4-d42×116
265	d 13	230	4	38	80					A B	A B	R265 / d13-S230 / t4-d38×80
265	d 14	230	4	38	80					A B	A B	R265 / d14-S230 / t4-d38×80
265	d 14	230	4	55	110						A B	R265 / d14-S230 / t4-d55×110
300	d 18	250	5	42	110					A B	A B	R300 / d18-S250 / t5-d42×110
300	d 18	250	5	48	82					A B	A B	R300 / d18-S250 / t5-d48×82
300	d 18	250	5	48	110					A B	A B	R300 / d18-S250 / t5-d48×110
300	d 19	250	5	48	110					A B	A B	R300 / d19-S250 / t5-d48×110
350	d 18	300	5	55	110						A B	R350 / d18-S300 / t5-d55×110
350	d 18	300	5	60	110						A B	R350 / d18-S300 / t5-d60×110

* Motorenflansch dicker als üblich.

Calculate your High Performance Angle Gearbox



Define the maximum output speed
n_{2max} [rpm]

Define ratio **i**

$n_{1max} < n_{1Max}$ — no → Select smaller ratio **i**

Define maximum acceleration torque
T_{2b}

$T_{2b} < T_{2B}$ — no → Select larger gearbox

Define the emergency stop torque
T_{2not} [Nm]

$T_{2not} < T_{2Not}$ — no → Select larger gearbox

Define the average nominal output torque
T_{2m} [Nm]

$$T_{2m} = \sqrt[3]{\frac{(|n|/2)\times t_1 \times |T_1|^3 + |n| \times t_2 \times |T_2|^3 + (|n|/2)\times t_3 \times |T_3|^3}{(|n|/2)\times t_1 \times |n| \times t_2 + (|n|/2)\times t_3}}$$

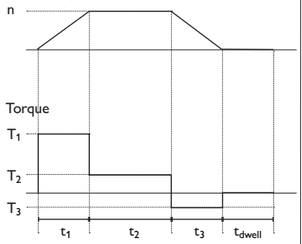
Define the average output speed
n_{1m} [rpm]

$$n_{1m} = \frac{(|n|/2)\times t_1 + |n| \times t_2 \times (|n|/2)\times t_3}{t_1 + t_2 + t_3}$$

Define the duty cycle
ED

$$ED = (t_1 + t_2 + t_3)/(t_1 + t_2 + t_3 + t_{dwell}) \times 100\%$$

Rotation speed



Input	S hock factor f_B
Polynomia	1.0
Standard Servo / Sinus2	1.1
FU / VFD	1.25
AC- Motor	1.4
External Output-shock	1.6

Define the shock factor
f_B

Define the starting frequency factor
f_A

Starting frequency	Starting frequency factor f_A
< 60 / h	0.7
< 360 / h	0.8
< 1200 / h	1.0
< 3600 / h	1.3

	Size					
	030	045	060	090	120	180
n_{1m} < 500 rpm	5.50	3.00	1.70	1.10	1.00	1.00
n_{1m} < 1000 rpm	4.00	2.30	1.40	1.05	1.00	1.00
n_{1m} < 1500 rpm	3.30	2.00	1.30	1.05	1.00	1.00
n_{1m} < 3000 rpm	2.30	1.50	1.15	1.05	1.00	1.00
n_{1m} < 4500 rpm	1.70	1.30	1.05	1.00	1.00	
n_{1m} < 6000 rpm	1.50	1.20	1.00			

Abrasion factor f_P* for high-accuracy applications, otherwise $f_P = 1$.

Define the abrasion factor
f_P

Define the duty factor
f_{ED}

Duty cycle	Duty service factor f_{ED}
< 25%	0.7
< 40%	1.0
< 60%	1.2
< 70%	1.3
< 80%	1.4
< 100%	1.8

	Size					
	030	045	060	090	120	180
n_{1m} < 500 rpm	0.40	0.40	0.40	0.60	0.80	0.90
n_{1m} < 1000 rpm	0.40	0.40	0.45	0.70	0.90	1.10[a]
n_{1m} < 1500 rpm	0.40	0.40	0.55	0.80	1.20	1.30[a]
n_{1m} < 3000 rpm	0.40	0.40	0.70	0.95[a]	2.00[a]	2.40[b]
n_{1m} < 4500 rpm	0.40	0.40	0.70	1.00[a]	2.80[a]	
n_{1m} < 6000 rpm	0.40	0.40	0.75			

a) Maximum duty cycle 80%
b) Maximum duty cycle 60%

Define the **temperature factor** (ambient air)
f_U

Ambient temperature	Temperature factor f_U
< 10°C	0.85
< 20°C	1.0
< 30°C	1.2
< 40°C	1.5
< 50°C	1.9

Define the **temperature factor**
f_T

$T_{2mech} = T_{2m} \times f_B \times f_A \times f_P$*

$T_{2mech} < T_{2N}$ — no → Select a larger gearbox

$T_{2therm} = T_{2m} \times f_{ED} \times f_T \times f_U$

$T_{2therm} < T_{2N}$ — no → Select a larger gearbox

Transmittable torque of the coupling [Nm]

Motor shaft diameter Ød [mm]	Size 030	045	060	090	120	180
8	3.5					
9	3.9	6.8				
10	4.3	7.6	17.5			
11	4.8	8.3	19.2			
14	6.1	10.6	24.5	44.9		
16	6.9	12.1	28.0	51.3		
19	8.2	14.4	33.2	61.0	61.0	
22		19.1	38.4	70.6	70.6	168
24		20.8	41.9	77.0	77.0	183
28			42.3	89.8	89.8	214
32			48.4	103	103	244
35			52.9	112	112	267
38				133	122	290
42				147	135	321
48					168	367
55						420
60						458

Compare the tightening hub and the motor shaft diameter Ø**d**

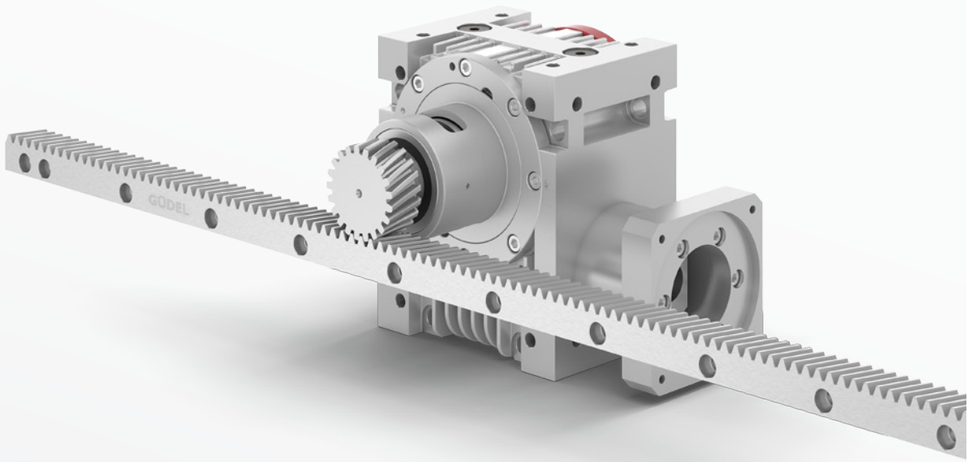
Compare the motor shaft length **L** with the min./ max. steps

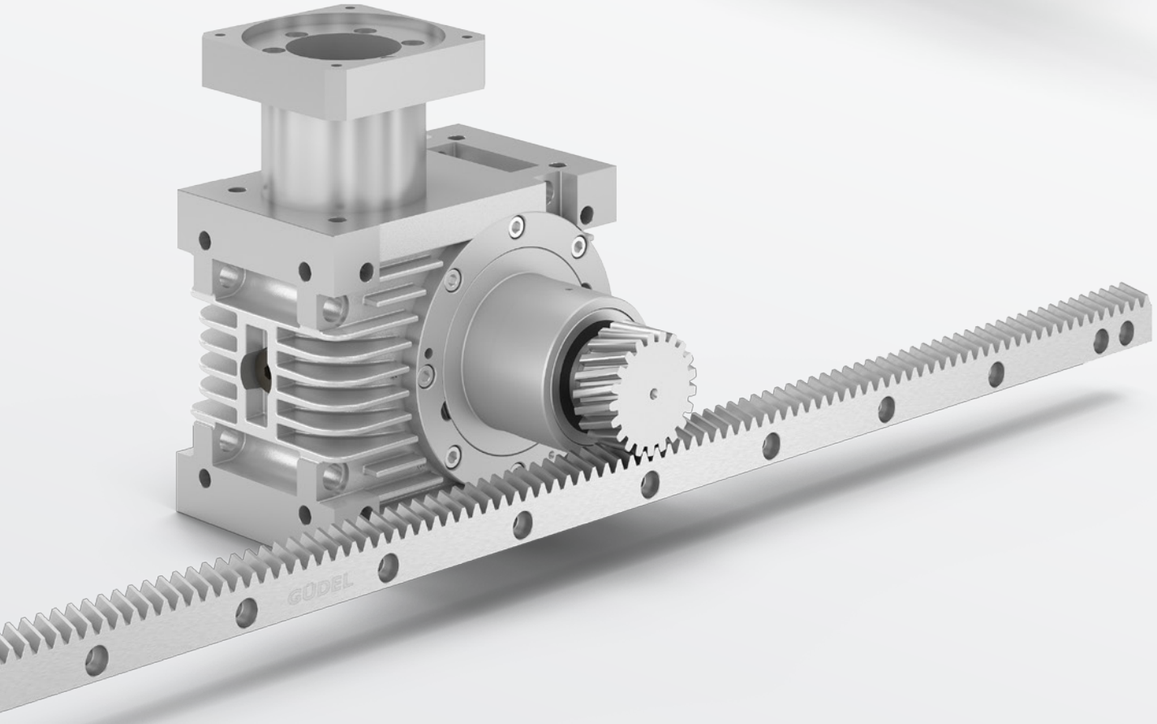
$T_{2maxmot} < T_{coupling}$ — no → Limit the motor current

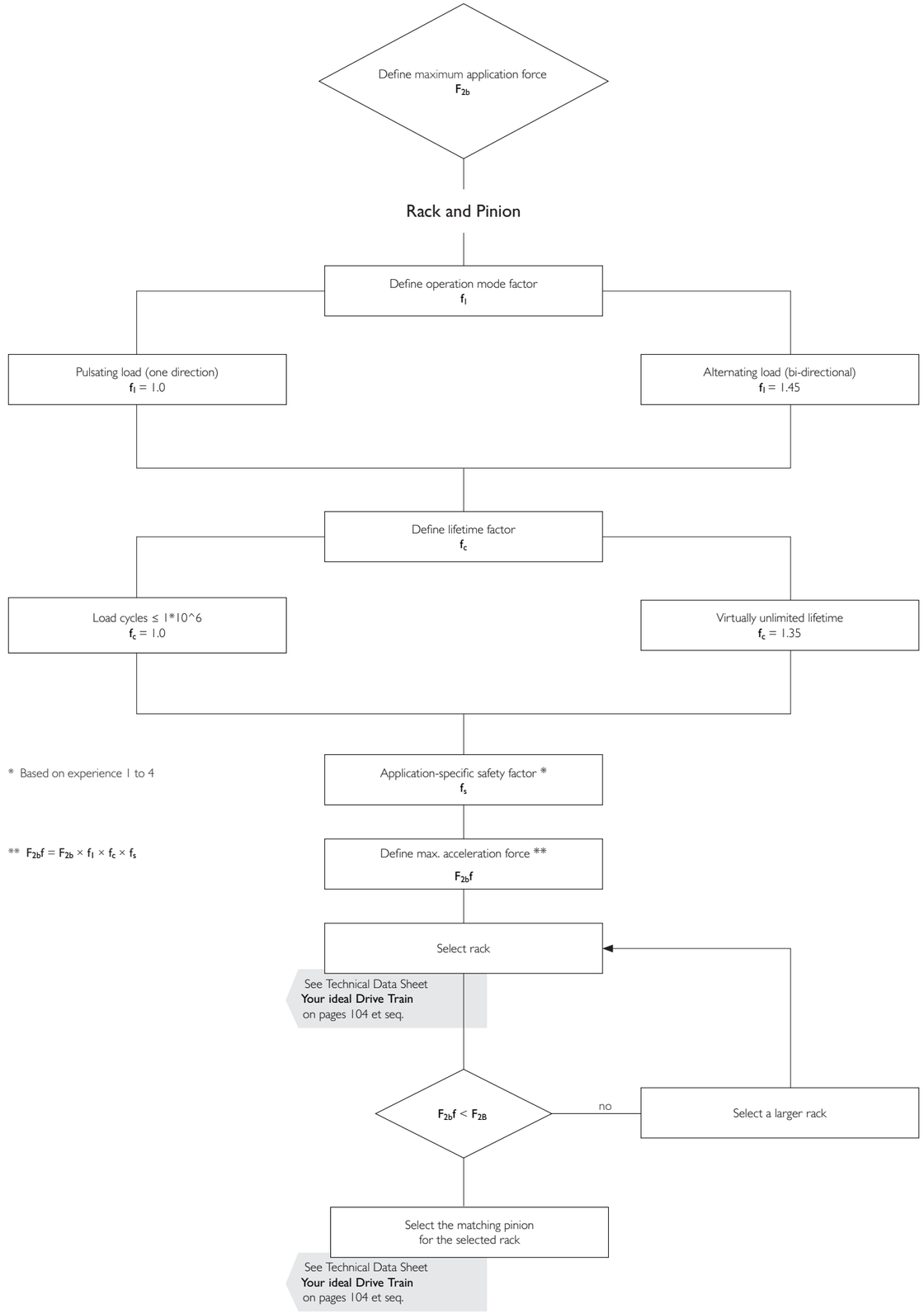
$T_{2maxmot} < T_{2B}$ — no

HPG Gearbox design finished

Find your ideal Drive Train







* Based on experience 1 to 4

** $F_{2b}f = F_{2b} \times f_l \times f_c \times f_s$