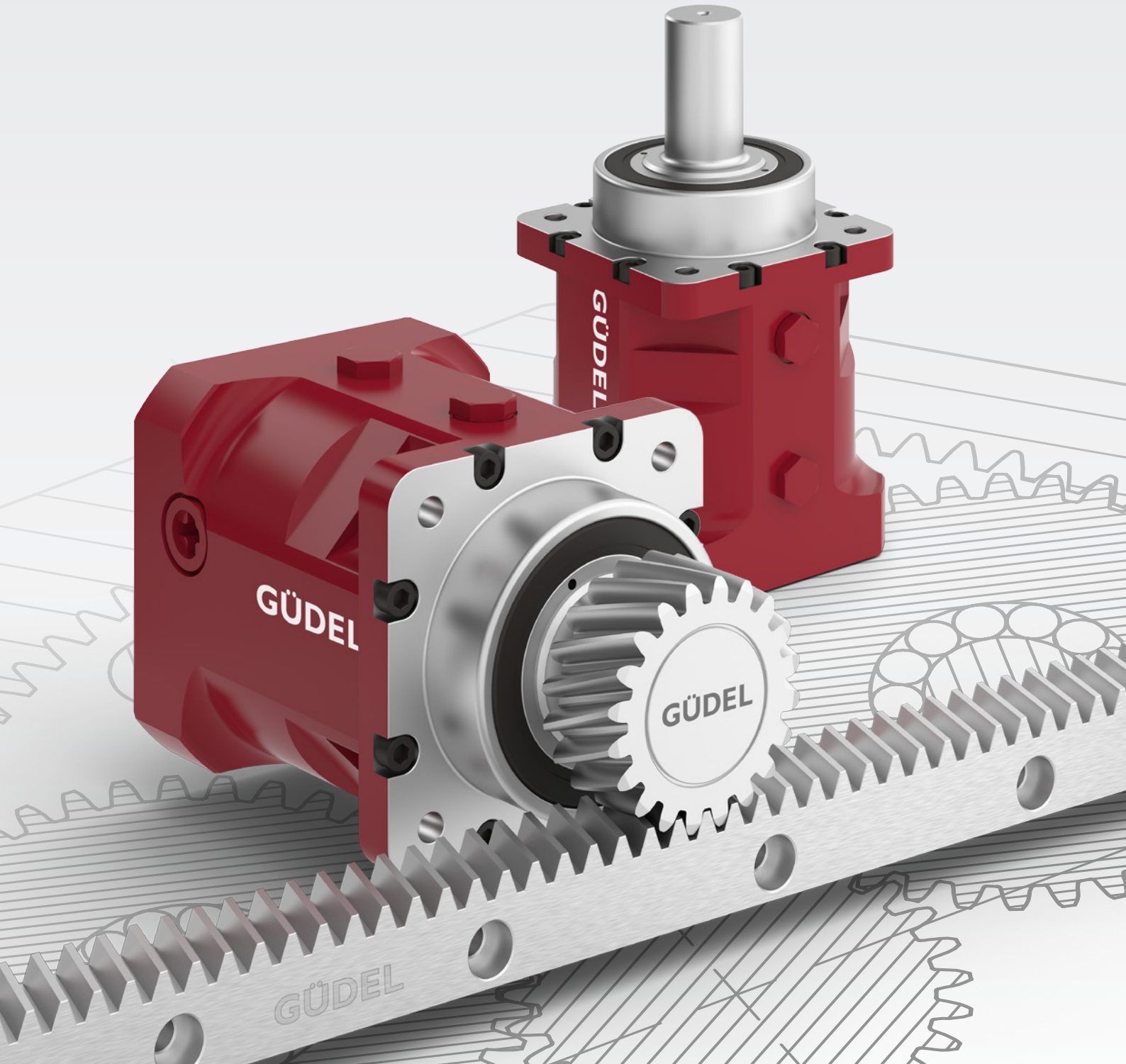
GÜDEL

High Precision
Planetary Gearboxes



Take five –
The Product at a Glance

Due to their outstanding properties, planetary gearboxes are used in all kind of industrial applications. Güdel high precision planetary gearboxes ideally cover demanding requirements – details are presented on the technical information pages.

Quick delivery – Our philosophy is to have all parts on stock.

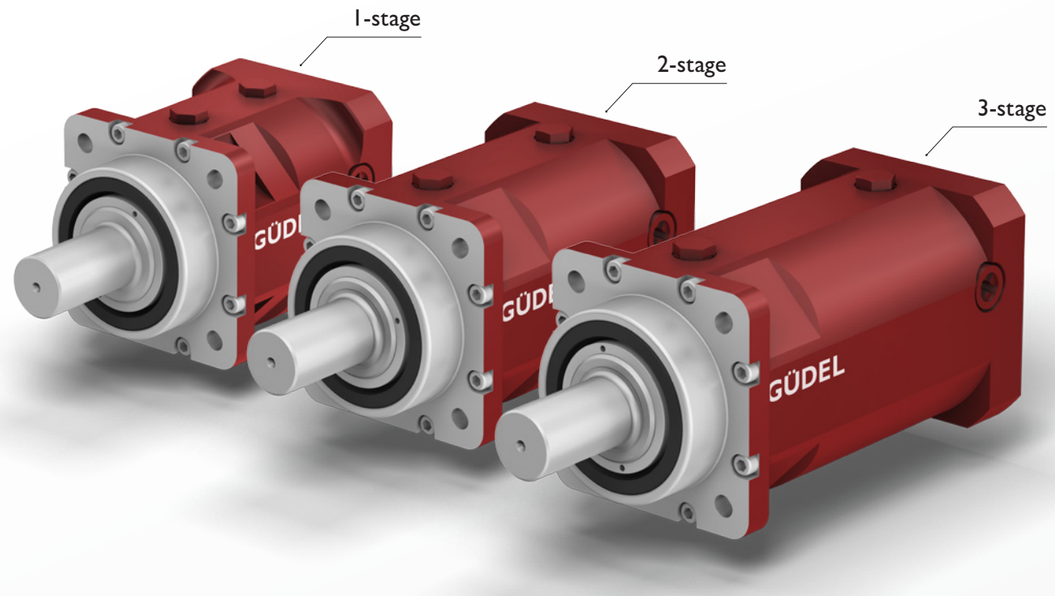
Precision – With regard to angular backlash, our long experience in the conception and the manufacturing of high performance gearboxes gives us the ability to provide all products in four different precision classes: 1, 3, 5 and 12 arcmin. On request 0.5 arcmin can be supplied.

Sizes – Our portfolio includes five sizes: 080, 100, 140, 180 and 240. In addition to this catalogue, we also offer other sizes with separate documentation.

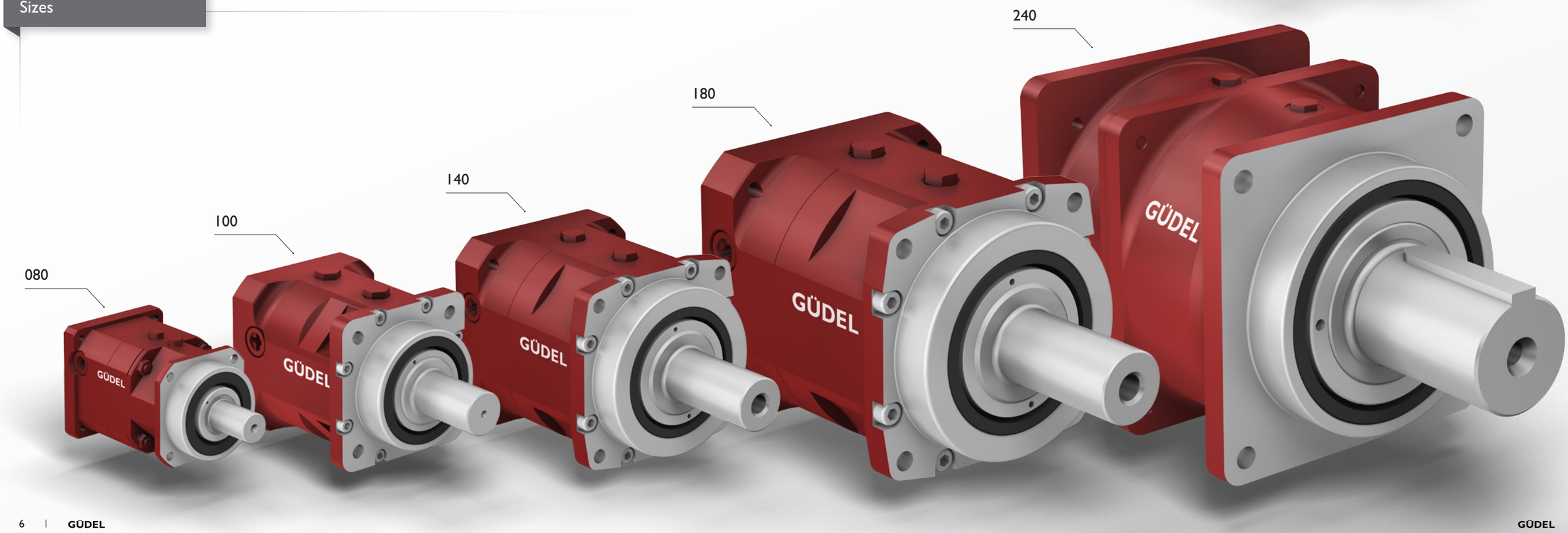
Ratios – A wide range of ratios can be selected – starting from 3 up to 1000. Depending on the ratio the gearbox will either have one, two or three stages.

Ratios

We have planetary gearboxes in several different stages (ratios). The number of stages depends on the desired ratio. Stages 1 to 3 are presented on the technical information pages.



Sizes

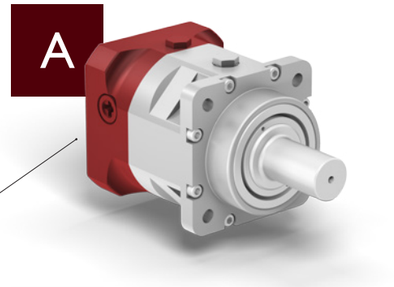


Great Adaptability – Standard & Optional Inputs

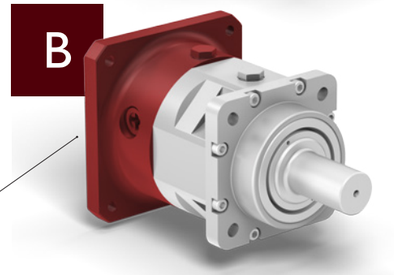
Due to our modular system all common servo motors can be easily mounted on our planetary gearboxes. Optional inputs such as primary shaft can be provided on request.

We have a standard flange solution for the most commonly used servo motors. We offer a total of three standard input versions: A, B and C. Your selection of an input will depend on the geometric dimensions of the motors that you use.

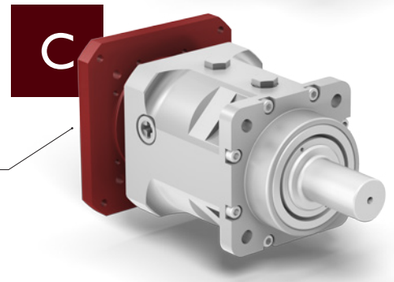
Input Motor Flange



Small Motor

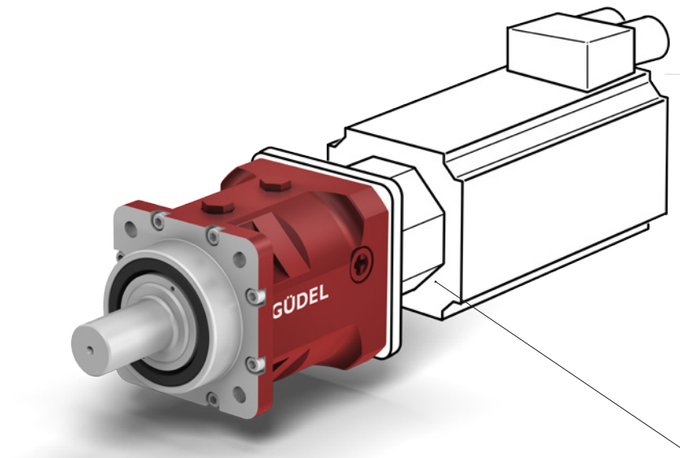


Medium Motor



Long Motor

Standard Inputs

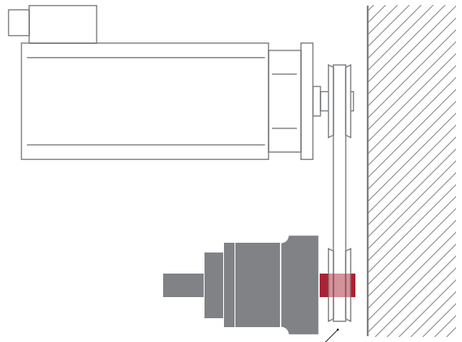


AM – Motor Adaptability

Optional Inputs

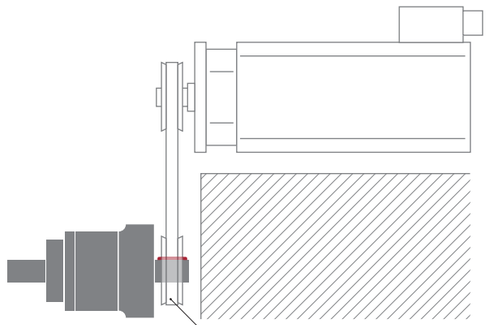
For special applications, in which the motor cannot be directly mounted on the gearbox, it is possible to fit the gearbox with an input shaft as an optional input.

Example AL



AL – Smooth Primary Shaft

Example AC



AC – Keyway Primary Shaft

Input

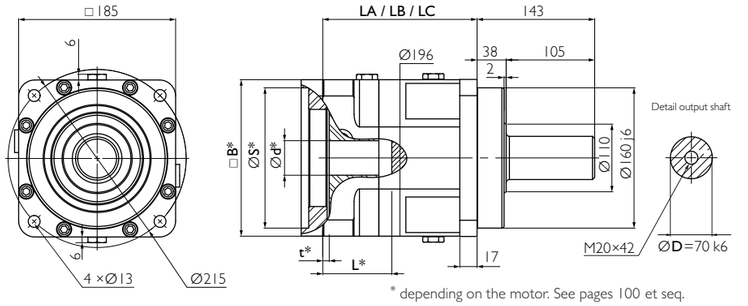
A	for motor shaft	L ≤ 60	19 ≤ Ød ≤ 32	result in LA
B	for motor shaft	60 < L ≤ 85	32 < Ød ≤ 48	result in LB
C	for motor shaft	85 < L ≤111	32 < Ød ≤ 48	result in LC

Output

		1-stage	2-stage	3-stage
LA	[mm]	168	220	273
LB	[mm]	193	246	298
LC	[mm]	219	272	

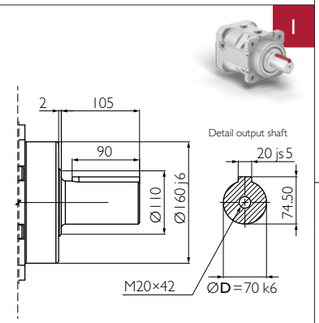
Standard

0



* depending on the motor. See pages 100 et seq.

1



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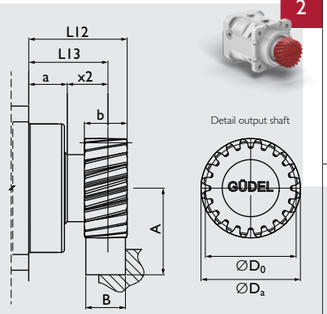
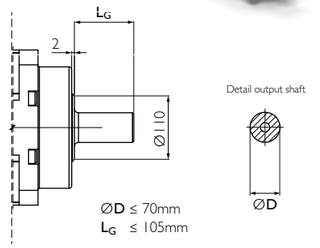


Option 2 on request. Adjustments can reduce capacity.

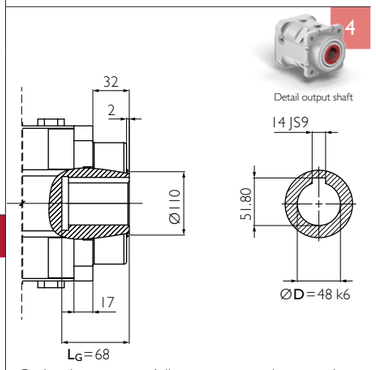
Option

3



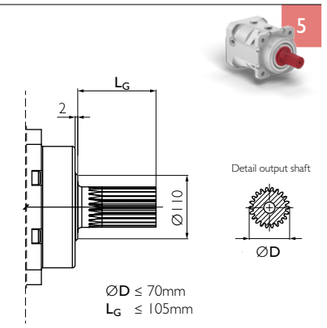
Option 3 on request. Adjustments can reduce capacity.

4



Option 4 on request. Adjustments can reduce capacity.

5

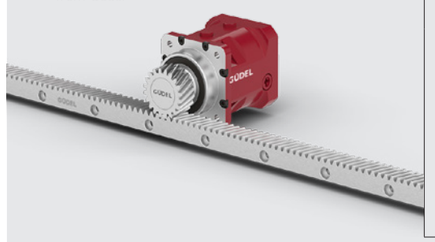


Option 5 on request. Adjustments can reduce capacity.

Example PR 180 A1, 1-stage

Your ideal Drive Train

Function Package with gearbox, rack and pinion from Güdel



Pinion

Pinion for PR on request

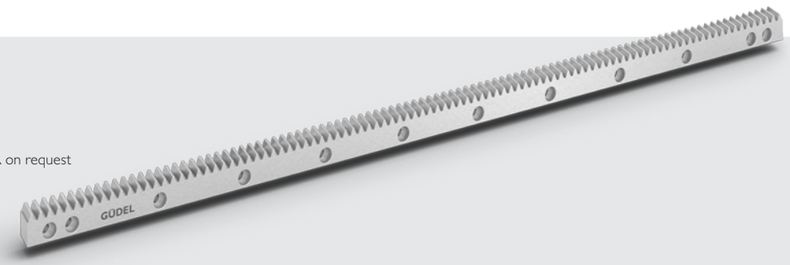
Material	16MnCr5 DIN 1.7131
Teeth	pressure angle α = 20°, helical teeth left, 19°31'42" hardened (58^{+4}_{0} HRC), ground, crowned
Quality	6f24 DIN 3962 / 63 / 67
f_p [mm]	Adjacent pitch error 0.006

Available ratios		i		1-stage	2-stage				
				3	9	12	15	21	30
Nominal torque S5 [a]		T_{2N}	[Nm]	1 600	1 600	1 600	1 600	1 600	1 600
Acceleration torque S5 [b]		T_{2B}	[Nm]	1 925	1 900	1 900	1 900	1 900	1 900
Nominal input speed S5 [c]		n_{1N}	[rpm]	1 200	2 000	2 000	2 100	2 100	2 100
Maximum input speed S5		n_{1max}	[rpm]	2 400	2 400	3 200	3 200	3 200	3 200
Emergency stop torque [d]		T_{2not}	[Nm]	3 000	3 000	3 000	3 000	3 000	3 000
Efficiency		η	[%]	94%	91%				
Life duration		L_h	[h]	> 20 000					
Weight		M	[kg]	32	39				
Angular backlash		j_t	[arcmin]	Precision **P 1** ≤ 1 / **P 3** ≤ 3 / **P 5** ≤ 5 / **P 12** ≤12					
Torsionnal rigidity [e]		C_{t2}	[Nm/arcmin]	366.6	349.1	333.4	300.3	281.1	274.1
Noise [i]		L_{pA}	[dB(A)]	≤ 72					
Max. permitted housing temperature [g]		T	[°C]	90					
Protection class				IP 65					
Direction of rotation				Same way Input / Output					
Max. radial force on output shaft [f]		F_{rmax}	[N]	Center of output shaft: 18 000 / End of output shaft: 13 000					
Max. axial force on output shaft [f]		F_{amax}	[N]	20 000					
Color				Red RAL 3003					
Inertia in kg.cm² [h]	Ø19	J_1	[kgcm²]	38.19	38.58	16.57	17.35	12.20	9.22
	Ø24			39.24	39.63	17.62	18.40	13.25	10.27
	Ø32			41.45	41.84	19.83	20.61	15.46	12.48
	Ø35			44.37	44.76	22.75	23.53	18.38	15.40
	Ø38			49.97	50.36	28.35	29.13	23.98	21.00
	Ø42			49.47	49.86	27.85	28.63	23.48	20.50
	Ø48			49.87	50.26	28.25	29.03	23.88	20.90

a) Nominal output torque when operating at n_{1N}.
b) 1000 cycles per hour max.
c) Valid for an ambient temperature of 20°C and T_{2N}. At higher ambient temperatures, please reduce speed.
d) Valid 1000 times the gearbox life.
e) Valid for an input Ø of 48mm in 1-stage and 38mm in 2- and 3-stage.
f) Values for 300 rpm.
g) For other temperatures, please contact us. Nominal output torque when operating at n_{1N}.
h) Depending on the motor output shaft Ø.
i) With n_{1N}=2500 rpm no load.

Rack

Rack for PR on request



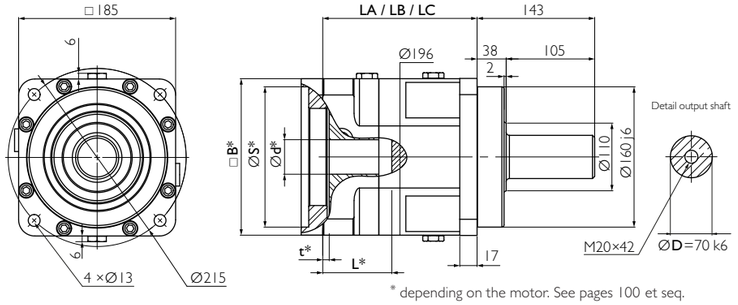
For proper sizing follow Flowchart **Calculate your ideal Drive Train** on pages 106 et seq.

More on the Technical Datasheets **Your ideal Drive Train** on pages 94 et seq.

Input

A	for motor shaft	L ≤ 60	19 ≤ Ød ≤ 32	result in **LA**
B	for motor shaft	60 < L ≤ 85	32 < Ød ≤ 48	result in **LB**
C	for motor shaft	85 < L ≤ 111	32 < Ød ≤ 48	result in **LC**

		1-stage	2-stage	3-stage
LA	[mm]	168	220	273
LB	[mm]	193	246	298
LC	[mm]	219	272	



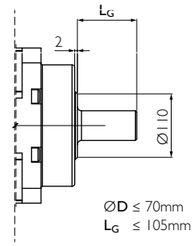
* depending on the motor. See pages 100 et seq.

Example PR 180 A4, 1-stage

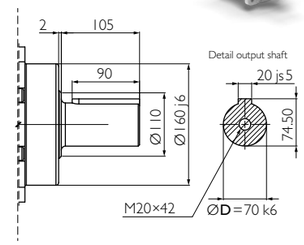
Output

Standard

0



1

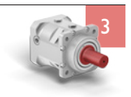


2

Option 2 on request. Adjustments can reduce capacity.

Option

3



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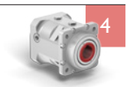
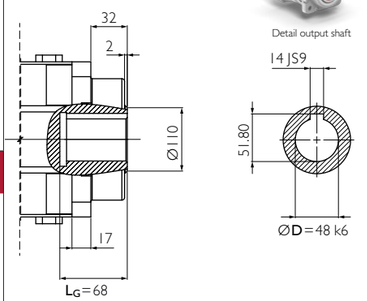
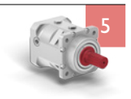
4

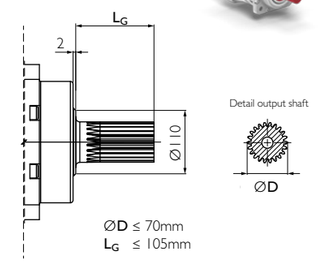




Option 4 on request. Adjustments can reduce capacity.

5





Option 5 on request. Adjustments can reduce capacity.

Your ideal Drive Train

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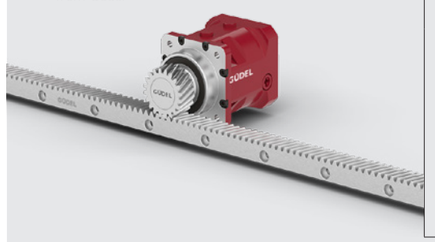

Pinion

Pinion for PR on request

Material	16MnCr5 DIN 1.7131
Teeth	pressure angle α = 20°, helical teeth left, 19°31'42" hardened (58^{+4}_{0} HRC), ground, crowned
Quality	6f24 DIN 3962 / 63 / 67
f_p [mm]	Adjacent pitch error 0.006

Available ratios *	i		3-stage 36	45	60	75	90	105	120	150	210	300
Nominal torque S5 a)	T_{2N}	[Nm]	1 600	1 600	1 600	1 600	1 600	1 600	1 600	1 600	1 600	1 600
Acceleration torque S5 b)	T_{2B}	[Nm]	1 900	1 900	1 900	1 900	1 900	1 900	1 900	1 900	1 900	1 900
Nominal input speed S5 c)	n_{1N}	[rpm]	2 200	2 700	2 700	2 700	2 700	2 700	2 700	2 700	2 700	2 700
Maximum input speed S5	n_{1max}	[rpm]	3 200	3 200	3 200	3 200	3 200	3 200	3 200	3 200	3 200	3 200
Emergency stop torque d)	T_{2not}	[Nm]	3 000	3 000	3 000	3 000	3 000	3 000	3 000	3 000	3 000	3 000
Efficiency	η	[%]	88%									
Life duration	L_h	[h]	> 20 000									
Weight	M	[kg]	46									
Angular backlash	j_t	[arcmin]	Precision **P 1** ≤ 1 / **P 3** ≤ 3 / **P 5** ≤ 5 / **P 12** ≤12									
Torsionnal rigidity e)	C_{t2}	[Nm/arcmin]	300.0	270.3	270.3	270.3	246.8	270.3	300.0	270.3	253.1	220.5
Noise i)	L_{pA}	[dB(A)]	≤ 72									
Max. permitted housing temperature g)	T	[°C]	90									
Protection class			IP 65									
Direction of rotation			Same way Input / Output									
Max. radial force on output shaft f)	$F_{r\,max}$	[N]	Center of output shaft: 18 000 / End of output shaft: 13 000									
Max. axial force on output shaft f)	$F_{a\,max}$	[N]	20 000									
Color			Red RAL 3003									
Inertia in kg.cm² h) Ø19	J_1	[kgcm²]	23.60	17.37	16.77	16.52	9.22	11.77	9.07	9.01	8.96	8.93
Ø24			24.65	18.42	17.82	17.57	10.27	12.82	10.12	10.06	10.01	9.98
Ø32			26.86	20.63	20.03	19.78	12.48	15.03	12.33	12.27	12.22	12.19
Ø35			29.78	23.55	22.95	22.70	15.40	17.95	15.25	15.19	15.14	15.11
Ø38			35.38	29.15	28.55	28.30	21.00	23.55	20.85	20.79	20.74	20.71
Ø42			34.88	28.65	28.05	27.80	20.50	23.05	20.35	20.29	20.24	20.21
Ø48			35.28	29.05	28.45	28.20	20.90	23.45	20.75	20.69	20.64	20.61

* Other ratios available. 27, 48, 63, 84, 147 on request.

a) Nominal output torque when operating at n_{1N}.
b) 1000 cycles per hour max.
c) Valid for an ambient temperature of 20°C and T_{2N}. At higher ambient temperatures, please reduce speed.
d) Valid 1000 times the gearbox life.
e) Valid for an input Ø of 48mm in 1-stage and 38mm in 2- and 3-stage.
f) Values for 300 rpm.
g) For other temperatures, please contact us. Nominal output torque when operating at n_{1N}.
h) Depending on the motor output shaft Ø.
i) With n_{1N}=2500 rpm no load.

Rack

Rack for PR on request

For proper sizing follow Flowchart **Calculate your ideal Drive Train** on pages 106 et seq.

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