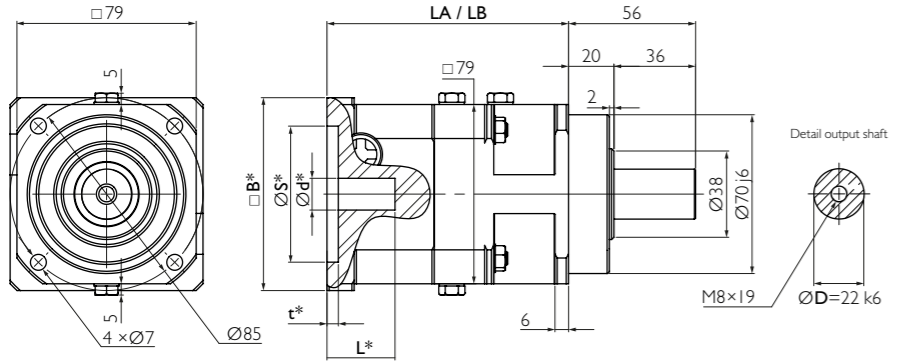


Input Standard Output Optional

A	for motor shaft	L ≤ 45	6 ≤ Ød ≤ 19	result in LA
B	for motor shaft	45 < L ≤ 55	19 < Ød ≤ 24	result in LB

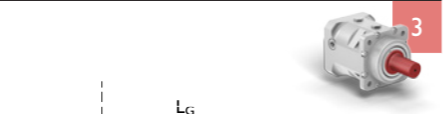
		1-stage	2-stage	3-stage
LA	[mm]	106.5	128.5	150.5
LB	[mm]	116	138	160



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



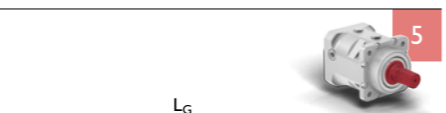
Example NR 080 A0, 1-stage



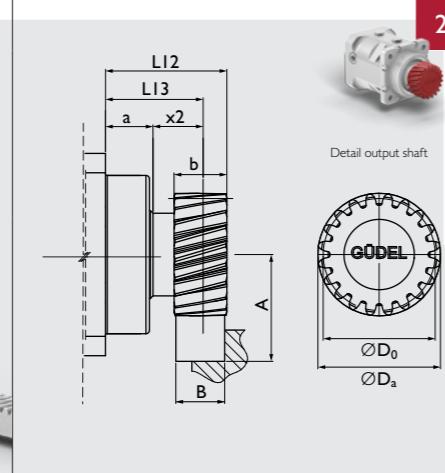
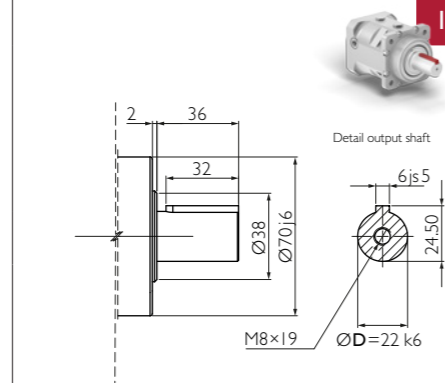
Option 3 on request. Adjustments can reduce capacity.
 ØD ≤ 22mm
 L_G ≤ 36mm



Option 4 on request. Adjustments can reduce capacity.
 L_G=44



Option 5 on request. Adjustments can reduce capacity.
 ØD ≤ 22mm
 L_G ≤ 36mm



Material 1.6MnCr5 DIN 1.7131
 Teeth pressure angle α = 20°, helical teeth left, 19°31'42" hardened (58^{±1} HRC), ground, crowned
 Quality 6f24 DIN 3962 / 63 / 67
 f_p [mm] Adjacent pitch error 0.006

Pinion I	m	z	A	b	B	D _a	D ₀	L12	L13	x2	a
Pinion I	[-]	2	20	43.221	25	24	46.44	42.441	52.5	40	20

m: Module, z: Number of teeth

Available ratios	i	1-stage						
		3	4	5	7	10		
Nominal torque S5 ^{a)}	T _{2N}	[Nm]	60	68	68	68	54	
Acceleration torque S5 ^{b)}	T _{2B}	[Nm]	80	100	100	100	82	
Nominal input speed S5 ^{c)}	n _{1N}	[rpm]	2 900	2 900	2 900	3 100	3 100	
Maximum input speed S5	n _{1max}	[rpm]	5 000	6 000	6 000	6 000	6 000	
Nominal torque S1 ^{a)}	T _{2N}	[Nm]	25	46	46	46	25	
Acceleration torque S1 ^{b)}	T _{2B}	[Nm]	40	71	71	71	45	
Nominal input speed S1 ^{c)}	n _{1N}	[rpm]	2 000	2 600	2 600	2 800	2 800	
Maximum input speed S1	n _{1max}	[rpm]	2 900	2 900	2 900	3 100	3 100	
Emergency stop torque ^{d)}	T _{2not}	[Nm]	200	250	250	220	177	
Efficiency	η	[%]	97%					
Life duration	L _h	[h]	> 20 000					
Weight	M	[kg]	4					
Angular backlash	j _t	[arcmin]	Precision P 1 ≤ 1 / P 3 ≤ 3 / P 5 ≤ 5 / P 12 ≤ 12					
Torsionnal rigidity ^{e)}	C ₂	[Nm/arcmin]	10.6	11.2	11.3	11.5	10.3	
Noise ^{f)}	L _{pA}	[dB(A)]	≤ 68					
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: 4 200 / End of output shaft: 3 285					
Max. axial force on output shaft ^{f)}	F _{amax}	[N]	3 600					
Color			Red RAL 3003					
Inertia in kg·cm ² ^{h)}	J ₁	[kgcm ²]	Ø 11	0.62	0.46	0.40	0.35	0.31
			Ø 14	1.18	1.02	0.95	0.90	0.87
			Ø 19	1.19	1.03	0.97	0.91	0.88
			Ø 24	2.01	1.85	1.78	1.73	1.70

- 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 19mm in 1-stage and 14mm 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 i=10 and n_{1N}=3000 rpm no load.

Rack



	Pinion I		
Max acceleration force	F _{2B}	[N]	7 480
Max acceleration torque	T _{2B}	[Nm]	159

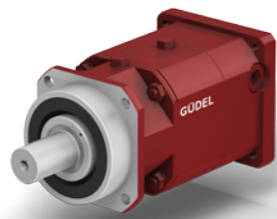
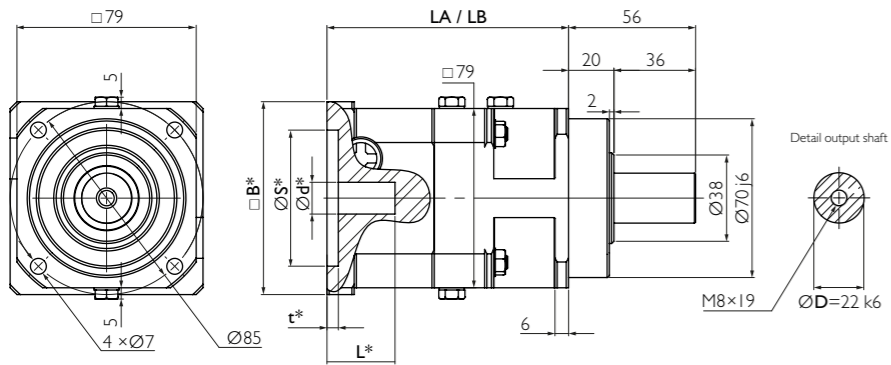
Above values for rack and pinion take into consideration a number of load cycles: 1x10⁶ for the rack; 1x10⁷ for the pinion. Both in pulsating operation.

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 Standard Output Optional

A	for motor shaft	L ≤ 45	6 ≤ Ød ≤ 19	result in LA
B	for motor shaft	45 < L ≤ 55	19 < Ød ≤ 24	result in LB

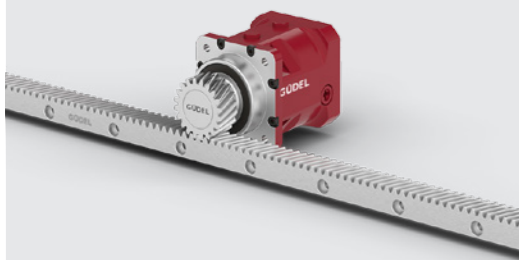
		1-stage	2-stage	3-stage
LA	[mm]	106.5	128.5	150.5
LB	[mm]	116	138	160



Example NR 080 A0, 2-stage

Your ideal Drive Train

Function Package with gearbox, rack and pinion from Güdel



Pinion

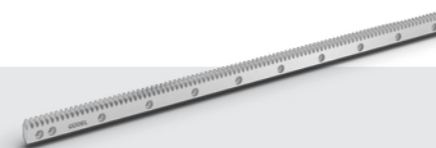
	m	z	A	b	B	D _a	D ₀	L12	L13	x2	a
Pinion I	[-]	2	20	43.221	25	24	46.44	42.441	52.5	40	20

m: Module, z: Number of teeth

Available ratios *	i		2-stage											
			12	16	20	25	30	35	40	50	70	100		
Nominal torque S5 ^{a)}	T _{2N}	[Nm]	60	68	68	68	60	68	68	68	68	68	68	54
Acceleration torque S5 ^{b)}	T _{2B}	[Nm]	80	100	100	100	80	100	100	100	100	100	100	82
Nominal input speed S5 ^{c)}	n _{1N}	[rpm]	3 300	3 500	3 500	3 500	3 500	3 500	3 500	3 500	3 500	3 800	4 500	4 500
Maximum input speed S5	n _{1max}	[rpm]	6 000	6 000	6 000	6 000	6 000	6 000	6 000	6 000	6 000	6 000	6 000	6 000
Nominal torque S1 ^{a)}	T _{2N}	[Nm]	43	43	43	43	43	43	43	43	43	43	43	30
Acceleration torque S1 ^{b)}	T _{2B}	[Nm]	68	68	68	68	68	68	68	68	68	68	68	40
Nominal input speed S1 ^{c)}	n _{1N}	[rpm]	2 300	3 100	3 100	3 100	3 100	3 100	3 100	3 100	3 100	3 400	4 000	4 000
Maximum input speed S1	n _{1max}	[rpm]	3 300	3 500	3 500	3 500	3 500	3 500	3 500	3 500	3 500	3 800	4 500	4 500
Emergency stop torque ^{d)}	T _{2not}	[Nm]	200	250	250	250	200	250	250	250	250	250	220	177
Efficiency	η	[%]	94%											
Life duration	L _h	[h]	> 20 000											
Weight	M	[kg]	5											
Angular backlash	j _t	[arcmin]	Precision P 1 ≤ 1 / P 3 ≤ 3 / P 5 ≤ 5 / P 12 ≤ 12											
Torsionnal rigidity ^{e)}	C ₂	[Nm/arcmin]	10.62	10.62	10.77	10.77	10.10	10.77	10.62	10.77	10.36	10.36	9.31	9.31
Noise ^{f)}	L _{pA}	[dB(A)]	≤ 68											
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: 4 200 / End of output shaft: 3 285											
Max. axial force on output shaft ^{f)}	F _{amax}	[N]	3 600											
Color			Red RAL 3 003											
Inertia in kg·cm ² ^{h)}	J ₁	[kg·cm ²]	Ø 11	0.46	0.45	0.45	0.39	0.31	0.34	0.31	0.31	0.31	0.31	0.31
			Ø 14	1.01	1.00	1.00	0.94	0.86	0.89	0.86	0.86	0.86	0.86	
			Ø 19	1.03	1.02	1.01	0.96	0.88	0.91	0.88	0.88	0.88	0.88	
			Ø 24	1.84	1.83	1.83	1.77	1.69	1.72	1.69	1.69	1.69	1.69	

- * Other ratios available. 9, 15, 21, 27, 28, 49 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 19mm in 1-stage and 14mm 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 i=10 and n_{1N}=3000 rpm no load.

Rack



			Pinion I
Max acceleration force	F _{2B}	[N]	7 480
Max acceleration torque	T _{2B}	[Nm]	159

Above values for rack and pinion take into consideration a number of load cycles: 1x10⁶ for the rack; 1x10⁷ for the pinion. Both in pulsating operation.

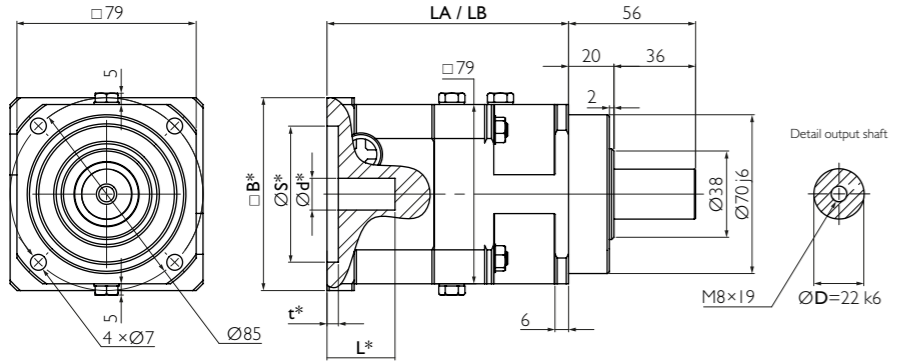
For proper sizing follow Flowchart Calculate your ideal Drive Train on pages 106 et seq.

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

Input Standard Output Optional

A	for motor shaft	L ≤ 45	6 ≤ Ød ≤ 19	result in LA
B	for motor shaft	45 < L ≤ 55	19 < Ød ≤ 24	result in LB

		1-stage	2-stage	3-stage
LA	[mm]	106.5	128.5	150.5
LB	[mm]	116	138	160



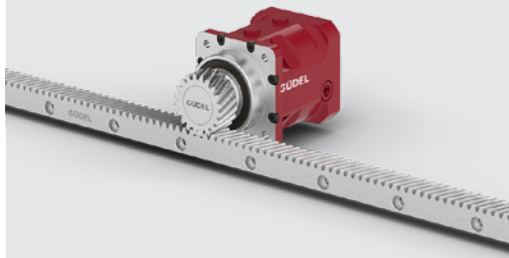
* depending on the motor. See pages 100 et seq.



Example NR 080 A2, 3-stage

Your ideal Drive Train

Function Package with gearbox, rack and pinion from Güdel



Pinion

	m	z	A	b	B	D _a	D ₀	L12	L13	x2	a
Pinion I	[-]	2	20	43.221	25	24	46.44	42.441	52.5	40	20

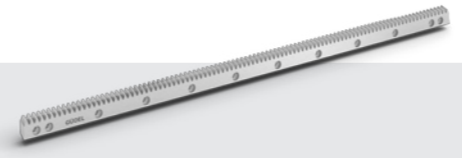
m: Module, z: Number of teeth

Available ratios * i 3-stage

			105	125	175	200	250	300	400	500	700	1 000	
Nominal torque S5 ^{a)}	T _{2N}	[Nm]	68	68	68	68	68	60	68	68	68	54	
Acceleration torque S5 ^{b)}	T _{2B}	[Nm]	100	100	100	100	100	80	100	100	100	82	
Nominal input speed S5 ^{c)}	n _{1N}	[rpm]	4 500	4 500	4 500	4 500	4 500	4 500	4 500	4 500	4 500	4 500	
Maximum input speed S5	n _{1max}	[rpm]	6 000	6 000	6 000	6 000	6 000	6 000	6 000	6 000	6 000	6 000	
Nominal torque S1 ^{a)}	T _{2N}	[Nm]	50	50	50	50	50	50	50	50	50	50	
Acceleration torque S1 ^{b)}	T _{2B}	[Nm]	68	68	68	68	68	68	68	68	68	68	
Nominal input speed S1 ^{c)}	n _{1N}	[rpm]	4 000	4 000	4 000	4 000	4 000	4 000	4 000	4 000	4 000	4 000	
Maximum input speed S1	n _{1max}	[rpm]	4 500	4 500	4 500	4 500	4 500	4 500	4 500	4 500	4 500	4 500	
Emergency stop torque ^{d)}	T _{2not}	[Nm]	250	250	250	250	250	200	250	250	220	177	
Efficiency	η	[%]	92%										
Life duration	L _h	[h]	> 20 000										
Weight	M	[kg]	6										
Angular backlash	j _t	[arcmin]	Precision P 1 ≤ 1 / P 3 ≤ 3 / P 5 ≤ 5 / P 12 ≤ 12										
Torsionnal rigidity ^{e)}	C ₂	[Nm/arcmin]	9.31	10.21	10.21	10.21	10.21	9.60	9.60	10.36	10.36	9.31	
Noise ^{f)}	L _{pA}	[dB(A)]	≤ 68										
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: 4 200 / End of output shaft: 3 285										
Max. axial force on output shaft ^{f)}	F _{amax}	[N]	3 600										
Color			Red RAL 3003										
Inertia in kg·cm ² ^{h)}	J ₁	[kg·cm ²]	Ø 11	0.34	0.39	0.34	0.31	0.31	0.31	0.31	0.31	0.31	0.31
			Ø 14	0.90	0.94	0.89	0.86	0.86	0.86	0.86	0.86	0.86	0.86
			Ø 19	0.91	0.95	0.91	0.88	0.88	0.88	0.88	0.88	0.88	0.88
			Ø 24	1.73	1.77	1.72	1.69	1.69	1.69	1.69	1.69	1.69	1.69

* Other ratios available. 112, 120, 140, 147, 150, 160, 196, 210, 245, 280, 343, 350, 490 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 19mm in 1-stage and 14mm 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 i=10 and n_{1N}=3000 rpm no load.

Rack



			Pinion I
Max acceleration force	F _{2B}	[N]	7 480
Max acceleration torque	T _{2B}	[Nm]	159

Above values for rack and pinion take into consideration a number of load cycles: 1x10⁶ for the rack; 1x10⁷ for the pinion. Both in pulsating operation.

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.

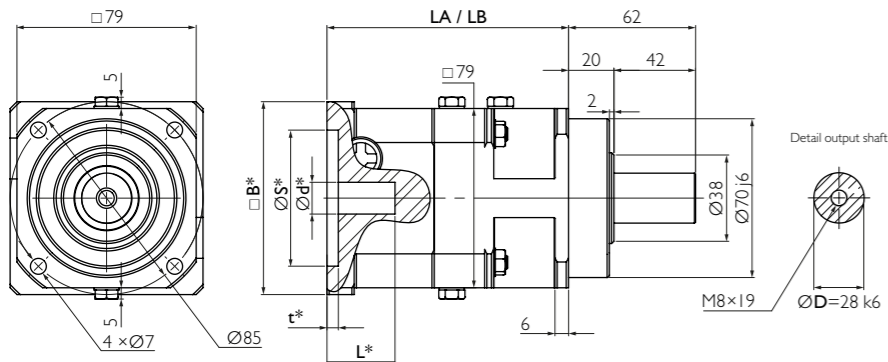
Input

A	for motor shaft	L ≤ 45	6 ≤ Ød ≤ 19	result in LA
B	for motor shaft	45 < L ≤ 55	19 < Ød ≤ 24	result in LB

		1-stage	2-stage	3-stage
LA	[mm]	106.5	128.5	150.5
LB	[mm]	116	138	160

Output

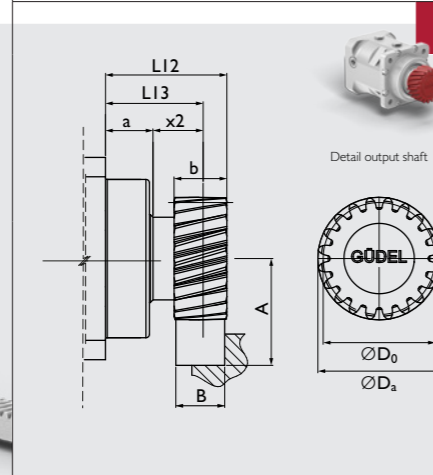
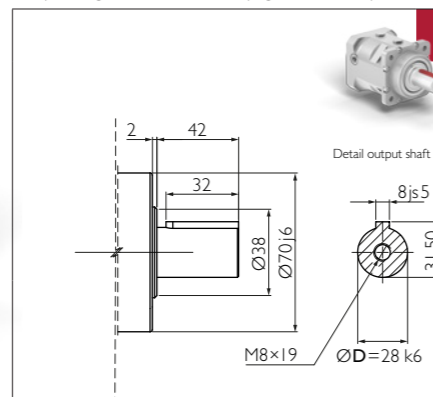
Option



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



Example SR 080 B0, 2-stage



Pinion

	m	z	A	b	B	Da	D0	L12	L13	x2	a
Pinion I	[-]	2	20	43.221	25	24	46.44	42.441	52.5	40	20

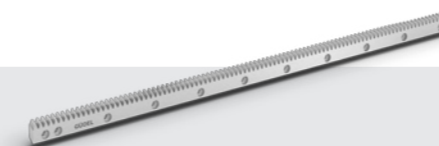
m: Module, z: Number of teeth

Available ratios	i	1-stage						2-stage	
		4	12	16	20	28	40		
Nominal torque S5 ^{a)}	T _{2N}	[Nm]	95	95	95	95	95	95	95
Acceleration torque S5 ^{b)}	T _{2B}	[Nm]	150	140	140	140	140	140	140
Nominal input speed S5 ^{c)}	n _{1N}	[rpm]	2 600	2 900	3 100	3 100	3 100	3 100	3 100
Maximum input speed S5	n _{1max}	[rpm]	5 400	5 400	5 400	5 400	5 400	5 400	5 400
Emergency stop torque ^{d)}	T _{2not}	[Nm]	250	250	250	250	250	250	250
Efficiency	η	[%]	96%	93%					
Life duration	L _h	[h]	> 20 000						
Weight	M	[kg]	4	5					
Angular backlash	j _c	[arcmin]	Precision P 1 ≤ 1 / P 3 ≤ 3 / P 5 ≤ 5 / P 12 ≤ 12						
Torsionnal rigidity ^{e)}	C ₂	[Nm/arcmin]	11.7	11.1	11.1	11.3	11.1	11.1	11.1
Noise ^{f)}	L _{pA}	[dB(A)]	≤ 70						
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: 4 200 / End of output shaft: 3 285						
Max. axial force on output shaft ^{f)}	F _{amax}	[N]	3 600						
Color			Red RAL 3003						

Inertia in kg·cm ² ^{h)}	Ø	J ₁	[kg·cm ²]									
				Ø11	Ø14	Ø19	Ø24					
				0.46	1.02	1.03	1.85	0.46	0.45	0.45	0.34	0.31
				1.01	1.00	1.01	1.83	1.00	1.01	1.01	0.89	0.86

- 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 19mm in 1-stage and 14mm 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



			Pinion I
Max acceleration force	F _{2B}	[N]	7 480
Max acceleration torque	T _{2B}	[Nm]	159

Above values for rack and pinion take into consideration a number of load cycles: 1×10⁶ for the rack; 1×10⁷ for the pinion. Both in pulsating operation.

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.

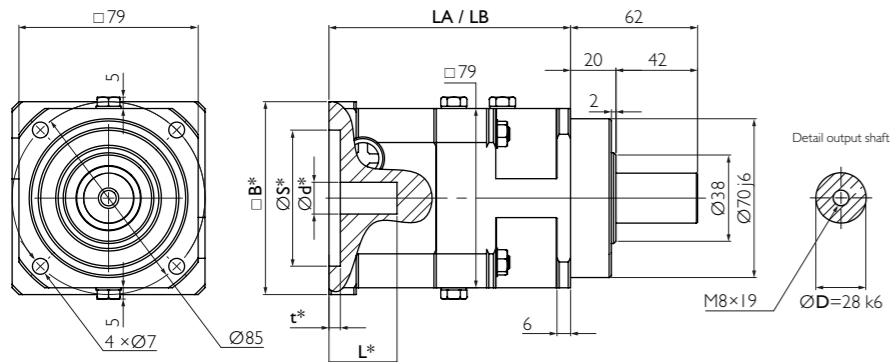
Input

A	for motor shaft	$L \leq 45$	$6 \leq \varnothing d \leq 19$	result in LA
B	for motor shaft	$45 < L \leq 55$	$19 < \varnothing d \leq 24$	result in LB

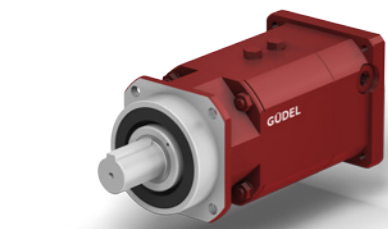
		1-stage	2-stage	3-stage
LA	[mm]	106.5	128.5	150.5
LB	[mm]	116	138	160

Output

Option



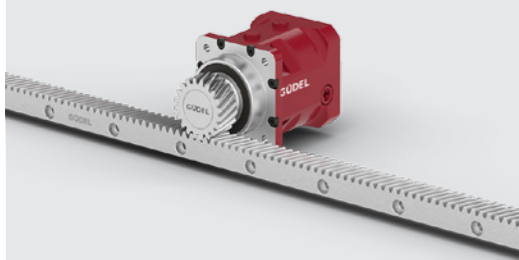
* depending on the motor. See pages 100 et seq.



Example SR 080 A1, 3-stage

Your ideal Drive Train

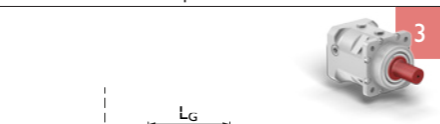
Function Package with gearbox, rack and pinion from Güdel



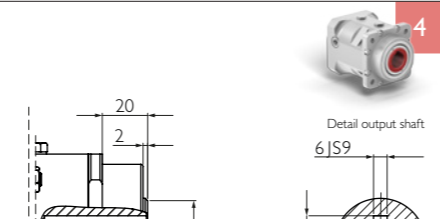
Pinion

	m	z	A	b	B	D _a	D ₀	L12	L13	x2	a
Pinion I	[-]	2	20	43.221	25	24	46.44	42.441	52.5	40	20

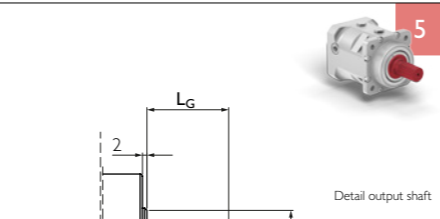
m: Module, z: Number of teeth



Option 3 on request. Adjustments can reduce capacity.



Option 4 on request. Adjustments can reduce capacity.



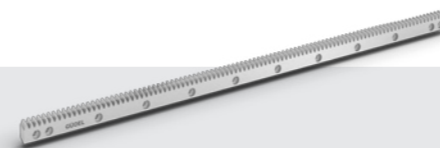
Option 5 on request. Adjustments can reduce capacity.

Material 1.6MnCr5 DIN 1.7131
 Teeth pressure angle $\alpha = 20^\circ$, helical teeth left, $19^\circ 31' 42''$ hardened (58^{±1} HRC), ground, crowned
 Quality 6f24 DIN 3962 / 63 / 67
 f_p [mm] Adjacent pitch error 0.006

Available ratios *	i	3-stage												
		60	80	100	112	120	140	160	200	280	400			
Nominal torque S5 ^{a)}	T _{2N}	[Nm]	95	95	95	95	95	95	95	95	95	95	95	95
Acceleration torque S5 ^{b)}	T _{2B}	[Nm]	140	140	140	140	140	140	140	140	140	140	140	140
Nominal input speed S5 ^{c)}	n _{1N}	[rpm]	4 000	4 000	4 000	4 000	4 000	4 000	4 000	4 000	4 000	4 000	4 000	4 000
Maximum input speed S5	n _{1max}	[rpm]	5 400	5 400	5 400	5 400	5 400	5 400	5 400	5 400	5 400	5 400	5 400	5 400
Emergency stop torque ^{d)}	T _{2not}	[Nm]	250	250	250	250	250	250	250	250	250	250	250	250
Efficiency	η	[%]	90%											
Life duration	L _h	[h]	> 20 000											
Weight	M	[kg]	6											
Angular backlash	j _t	[arcmin]	Precision P 1 ≤ 1 / P 3 ≤ 3 / P 5 ≤ 5 / P 12 ≤ 12											
Torsionnal rigidity ^{e)}	C ₂	[Nm/arcmin]	10.7	10.7	9.8	10.6	10.6	10.7	10.6	10.7	10.6	10.7	10.6	10.1
Noise ^{f)}	L _{pA}	[dB(A)]	≤ 70											
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: 4 200 / End of output shaft: 3 285											
Max. axial force on output shaft ^{f)}	F _{amax}	[N]	3 600											
Color			Red RAL 3003											
Inertia in kg·cm ² ^{h)}	J ₁	[kg·cm ²]	0.46	0.45	0.31	0.34	0.31	0.34	0.31	0.31	0.31	0.31	0.31	0.31
			1.01	1.00	0.86	0.89	0.86	0.89	0.86	0.86	0.86	0.86	0.86	
			1.03	1.02	0.88	0.91	0.88	0.91	0.88	0.88	0.88	0.88	0.88	
			1.84	1.83	1.69	1.72	1.69	1.72	1.69	1.69	1.69	1.69	1.69	

- * Other ratios available. 36, 64, 84, 180, 196, 300, 360, 500, 600, 700, 1 000 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 19mm in 1-stage and 14mm 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



	Pinion I		
Max acceleration force	F _{2B}	[N]	7 480
Max acceleration torque	T _{2B}	[Nm]	159

Above values for rack and pinion take into consideration a number of load cycles: 1x10⁶ for the rack; 1x10⁷ for the pinion. Both in pulsating operation.

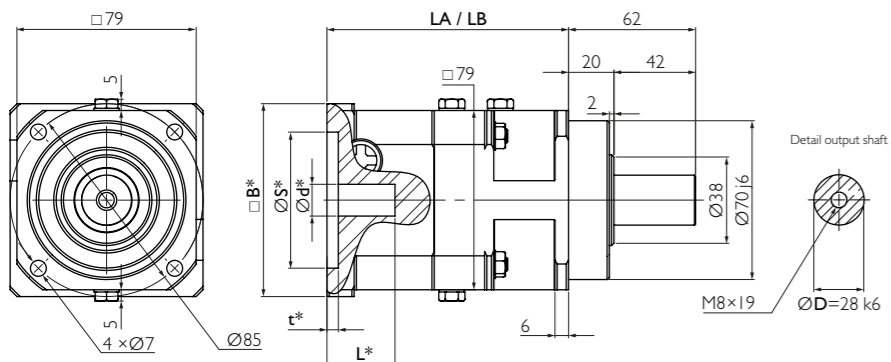
For proper sizing follow Flowchart Calculate your ideal Drive Train on pages 106 et seq.

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

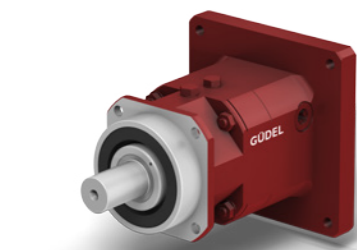
Input Standard Output Option

A	for motor shaft	$L \leq 45$	$6 \leq \varnothing d \leq 19$	result in LA
B	for motor shaft	$45 < L \leq 55$	$19 < \varnothing d \leq 24$	result in LB

		1-stage	2-stage	3-stage
LA	[mm]	106.5	128.5	150.5
LB	[mm]	116	138	160



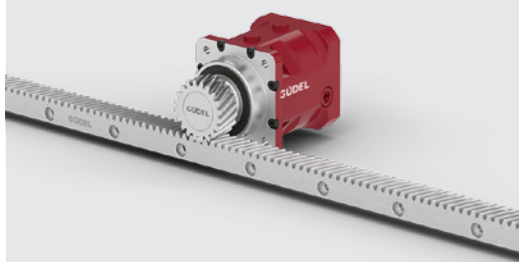
* depending on the motor. See pages 100 et seq.



Example PR 080 B0, 1-stage

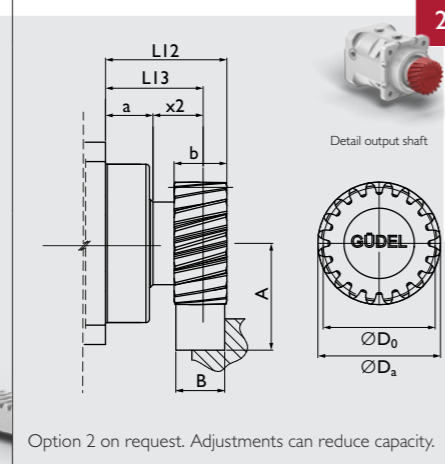
Your ideal Drive Train

Function Package with gearbox, rack and pinion from Güdel



Pinion

Pinion for PR on request



Option 2 on request. Adjustments can reduce capacity.

Material 16MnCr5 DIN 1.7131
 Teeth pressure angle $\alpha = 20^\circ$, helical teeth left, $19^\circ 31' 42''$ hardened ($58^{+}HRC$), 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]	120	120	120	120	120	120	
Acceleration torque S5 ^{b)}	T_{2B}	[Nm]	160	160	160	160	160	160	
Nominal input speed S5 ^{c)}	n_{1N}	[rpm]	2 300	2 300	2 600	2 800	2 800	2 800	
Maximum input speed S5	n_{1max}	[rpm]	4 000	4 000	4 800	4 800	4 800	4 800	
Emergency stop torque ^{d)}	T_{2not}	[Nm]	210	200	200	200	200	200	
Efficiency	η	[%]	94%	91%					
Life duration	L_h	[h]	> 20 000						
Weight	M	[kg]	4	5					
Angular backlash	j_c	[arcmin]	Precision P 1 ≤ 1 / P 3 ≤ 3 / P 5 ≤ 5 / P 12 ≤ 12						
Torsionnal rigidity ^{e)}	C_{t2}	[Nm/arcmin]	12.2	11.6	12.2	11.6	11.6	11.6	
Noise ^{f)}	L_{pA}	[dB(A)]	≤ 70						
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: 4 200 / End of output shaft: 3 285						
Max. axial force on output shaft ^{f)}	F_{Amax}	[N]	3 600						
Color			Red RAL 3003						
Inertia in kg.cm ² ^{h)}	J_1	[kg.cm ²]	$\varnothing 11$	0.62	0.62	0.46	0.40	0.34	0.31
			$\varnothing 14$	1.18	1.17	1.01	0.95	0.90	0.86
			$\varnothing 19$	1.19	1.19	1.03	0.96	0.91	0.88
			$\varnothing 24$	2.01	2.00	1.84	1.78	1.73	1.69

- 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 \varnothing of 19mm in 1-stage and 14mm 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 \varnothing .
- 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.

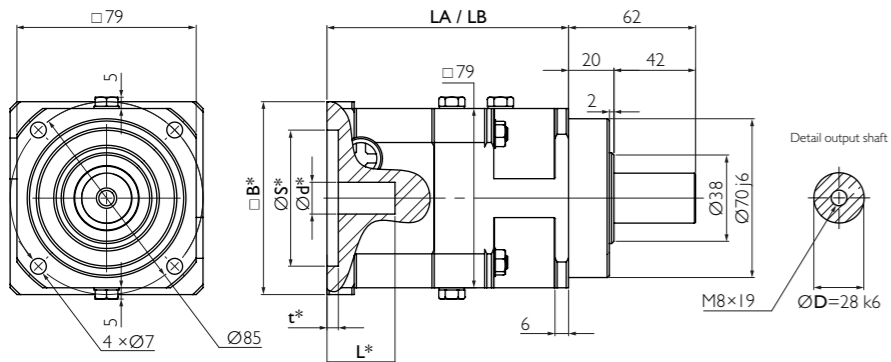
Input

A	for motor shaft	$L \leq 45$	$6 \leq \varnothing d \leq 19$	result in LA
B	for motor shaft	$45 < L \leq 55$	$19 < \varnothing d \leq 24$	result in LB

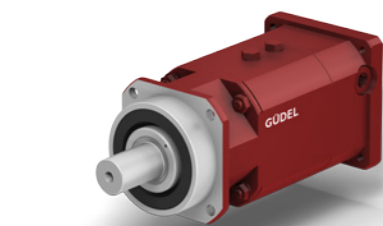
		1-stage	2-stage	3-stage
LA	[mm]	106.5	128.5	150.5
LB	[mm]	116	138	160

Output

Option



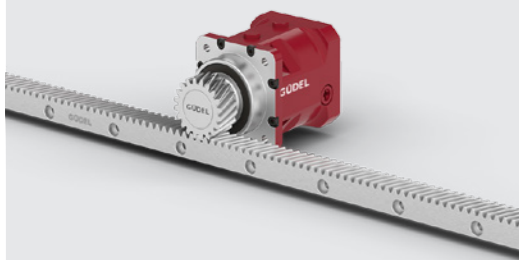
* depending on the motor. See pages 100 et seq.



Example PR 080 A0, 3-stage

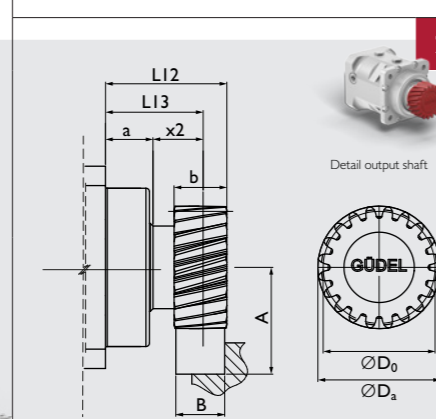
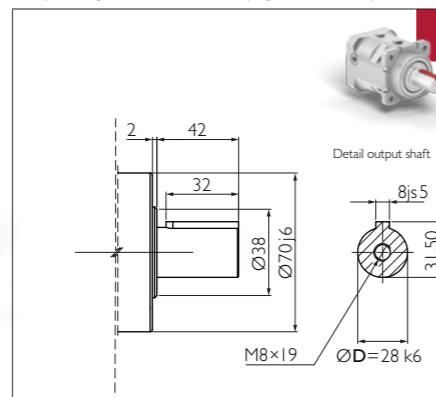
Your ideal Drive Train

Function Package with gearbox, rack and pinion from Güdel

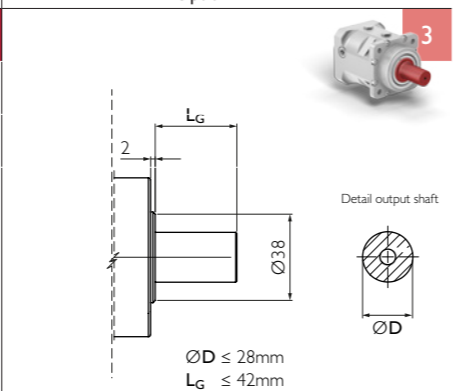


Pinion

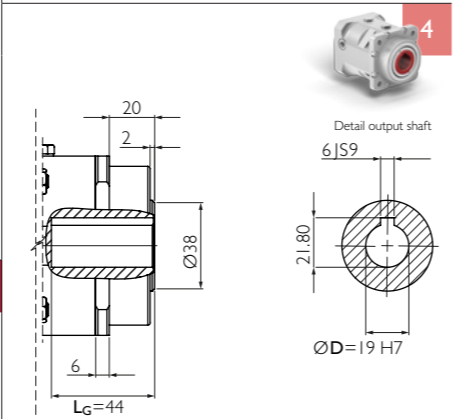
Pinion for PR on request



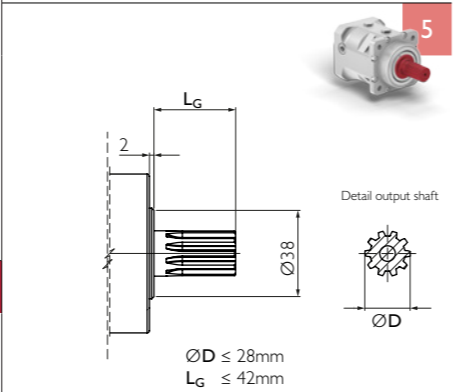
Option 2 on request. Adjustments can reduce capacity.



Option 3 on request. Adjustments can reduce capacity.



Option 4 on request. Adjustments can reduce capacity.



Option 5 on request. Adjustments can reduce capacity.

Material 16MnCr5 DIN 1.7131
 Teeth pressure angle $\alpha = 20^\circ$, helical teeth left, $19^\circ 31' 42''$
 hardened (58^HHRC), ground, crowned
 Quality 6f24 DIN 3962 / 63 / 67
 f_p [mm] Adjacent pitch error 0.006

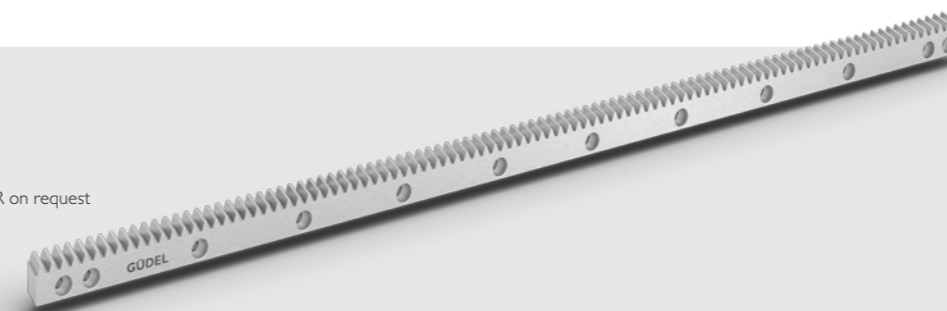
Available ratios	i	3-stage												
		36	45	60	75	90	105	120	150	210	300			
Nominal torque S5 ^{a)}	T_{2N}	[Nm]	120	120	120	120	120	120	120	120	120	120	120	120
Acceleration torque S5 ^{b)}	T_{2B}	[Nm]	160	160	160	160	160	160	160	160	160	160	160	160
Nominal input speed S5 ^{c)}	n_{1N}	[rpm]	3 000	3 600	3 600	3 600	3 600	3 600	3 600	3 600	3 600	3 600	3 600	3 600
Maximum input speed S5	n_{1max}	[rpm]	4 800	4 800	4 800	4 800	4 800	4 800	4 800	4 800	4 800	4 800	4 800	4 800
Emergency stop torque ^{d)}	T_{2not}	[Nm]	200	200	200	200	200	200	200	200	200	200	200	200
Efficiency	η	[%]	88%											
Life duration	L_h	[h]	> 20 000											
Weight	M	[kg]	6											
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]	11.6	11.6	11.8	11.8	11.1	11.8	11.6	11.8	11.9	11.1	11.1	11.1
Noise ^{f)}	L_{pA}	[dB(A)]	≤ 71											
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: 4 200 / End of output shaft: 3 285											
Max. axial force on output shaft ^{f)}	F_{Amax}	[N]	3 600											
Color			Red RAL 3003											
Inertia in kg.cm ² ^{h)}	J_1	[kg.cm ²]	$\varnothing 11$	0.46	0.40	0.46	0.40	0.31	0.34	0.31	0.31	0.31	0.31	0.31
			$\varnothing 14$	1.01	0.95	1.01	0.95	0.86	0.90	0.86	0.86	0.86	0.86	0.86
			$\varnothing 19$	1.03	0.96	1.03	0.96	0.88	0.91	0.88	0.88	0.88	0.88	0.88
			$\varnothing 24$	1.84	1.78	1.84	1.78	1.69	1.73	1.69	1.69	1.69	1.69	1.69

- * 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 \varnothing of 19mm in 1-stage and 14mm 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 \varnothing .
- i) With $n_{1N}=2500$ rpm no load.

Rack

Rack for PR on request

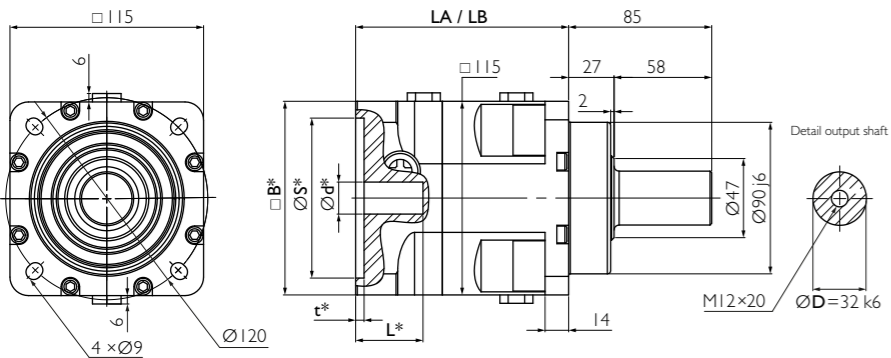


For proper sizing follow Flowchart
 Calculate your ideal Drive Train
 on pages 106 et seq.

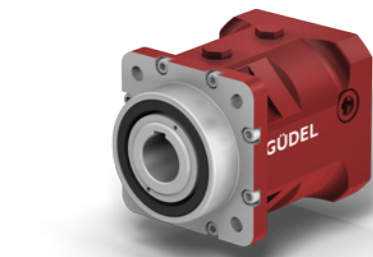
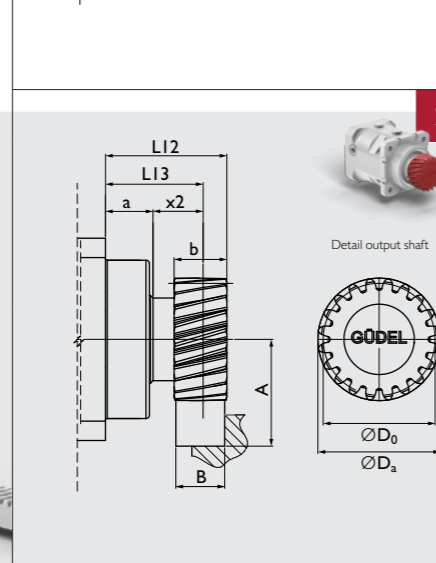
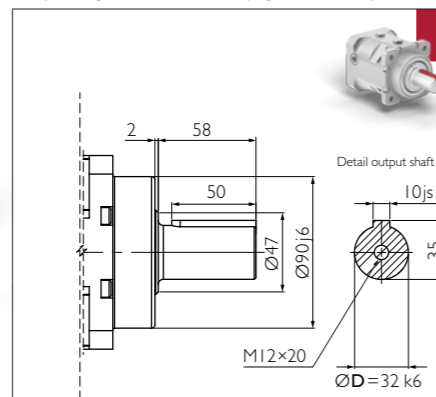
More on the Technical Datasheets
 Your ideal Drive Train
 on pages 94 et seq.

Input		Standard			Output	
A	for motor shaft	L ≤ 50	9 ≤ Ød ≤ 24	result in LA	0	
B	for motor shaft	51 < L ≤ 64	24 < Ød ≤ 35	result in LB	3	

		1-stage	2-stage	3-stage
LA	[mm]	126	164	202
LB	[mm]	140	178	216



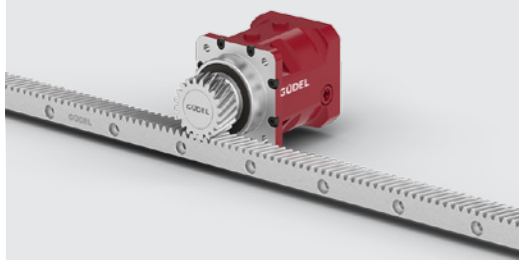
* depending on the motor. See pages 100 et seq.



Example NR 100 A4, 1-stage

Your ideal Drive Train

Function Package with gearbox, rack and pinion from GÜDEL

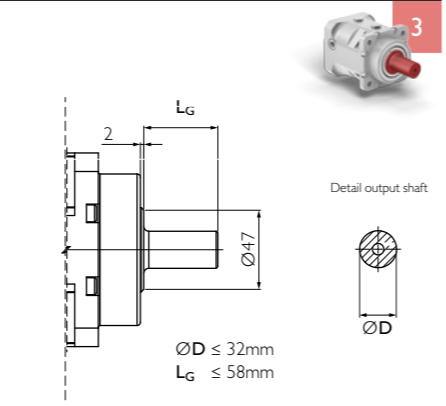


Pinion

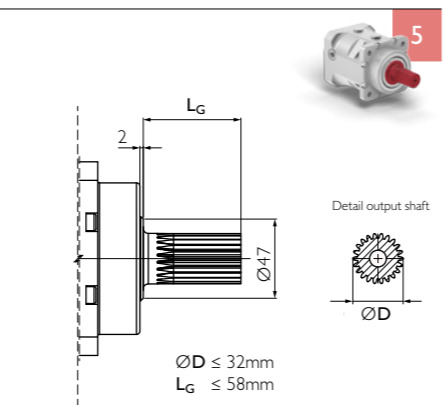
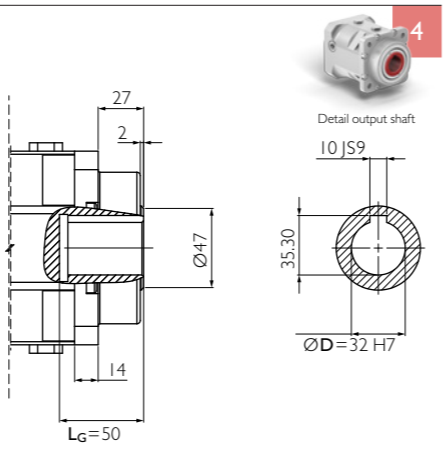
	m	z	A	b	B	Da	D0	L12	L13	x2	a	
Pinion 1	[-]	2	25	48.526	25	24	57.05	53.052	63.3	49.8	23.8	27
Pinion 2	[-]	3	20	57.831	30	29	69.66	63.662	69	55.5	27	27

m: Module, z: Number of teeth

Option	
3	
4	
5	



Option 3 on request. Adjustments can reduce capacity.



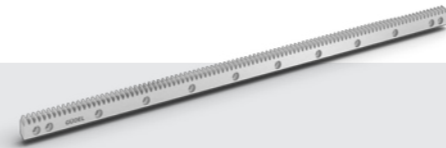
Option 5 on request. Adjustments can reduce capacity.

Material 1.6MnCr5 DIN 1.7131
 Teeth pressure angle α = 20°, helical teeth left, 19°31'42" hardened (58^H HRC), ground, crowned
 Quality 6f24 DIN 3962 / 63 / 67
 f_p [mm] Adjacent pitch error 0.006

Available ratios	i	I-stage					
		3	4	5	7	10	
Nominal torque S5 ^{a)}	T _{2N} [Nm]	174	226	235	217	130	
Acceleration torque S5 ^{b)}	T _{2B} [Nm]	278	304	304	287	230	
Nominal input speed S5 ^{c)}	n _{1N} [rpm]	2 500	2 500	2 500	2 800	2 800	
Maximum input speed S5	n _{1max} [rpm]	4 000	4 500	4 500	4 500	4 500	
Nominal torque S1 ^{a)}	T _{2N} [Nm]	70	122	122	122	87	
Acceleration torque S1 ^{b)}	T _{2B} [Nm]	165	217	217	217	165	
Nominal input speed S1 ^{c)}	n _{1N} [rpm]	1 700	2 200	2 200	2 500	2 500	
Maximum input speed S1	n _{1max} [rpm]	2 500	2 500	2 500	2 800	2 800	
Emergency stop torque ^{d)}	T _{2not} [Nm]	435	565	587	543	326	
Efficiency	η [%]	97%					
Life duration	L _h [h]	> 20 000					
Weight	M [kg]	8					
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]	32.0	39.0	40.7	41.6	34.3	
Noise ^{f)}	L _{pA} [dB(A)]	≤ 69					
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: 6 600 / End of output shaft: 4 300					
Max. axial force on output shaft ^{f)}	F _{amax} [N]	6 000					
Color		Red RAL 3 003					
Inertia in kg.cm ² ^{h)}	J ₁ [kg.cm ²]	Ø14	4.08	2.83	2.32	1.88	1.62
		Ø19	4.08	2.83	2.32	1.88	1.62
		Ø24	4.09	2.84	2.33	1.89	1.63
		Ø32	7.29	6.04	5.53	5.09	4.83
		Ø35	9.92	8.67	8.16	7.72	7.46

- 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 24mm in 1-stage and 19mm 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 i=10 and n_{1N}=3000 rpm no load.

Rack



			Pinion 1	Pinion 2
Max acceleration force	F _{2B} [N]		7 530	13 700
Max acceleration torque	T _{2B} [Nm]		200	436

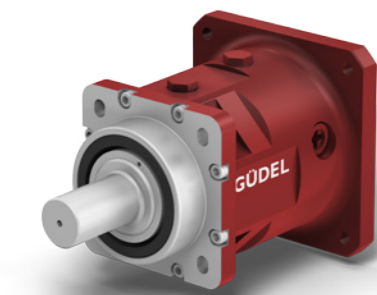
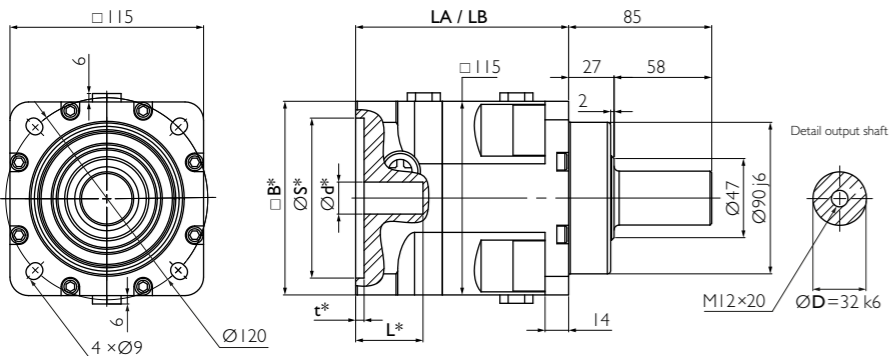
Above values for rack and pinion take into consideration a number of load cycles: 1x10⁶ for the rack; 1x10⁷ for the pinion. Both in pulsating operation.

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 Standard Output Option

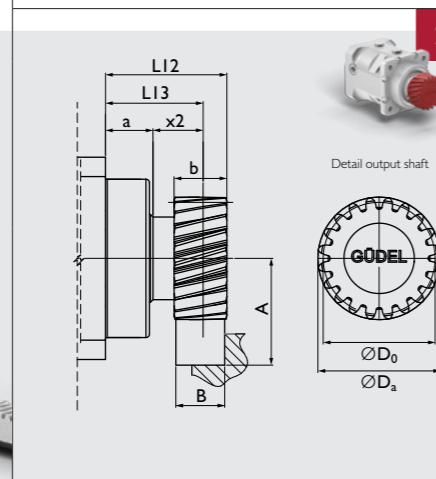
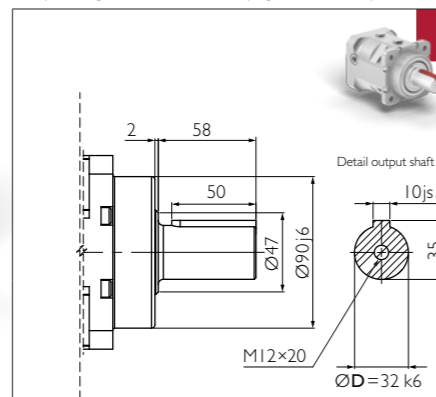
A	for motor shaft	L ≤ 50	9 ≤ Ød ≤ 24	result in LA	0
B	for motor shaft	51 < L ≤ 64	24 < Ød ≤ 35	result in LB	3

		1-stage	2-stage	3-stage
LA	[mm]	126	164	202
LB	[mm]	140	178	216



Example NR 080 B0

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



Pinion

	m	z	A	b	B	D _a	D ₀	L12	L13	x2	a	
Pinion 1	[-]	2	25	48.526	25	24	57.05	53.052	63.3	49.8	23.8	27
Pinion 2	[-]	3	20	57.831	30	29	69.66	63.662	69	55.5	27	27

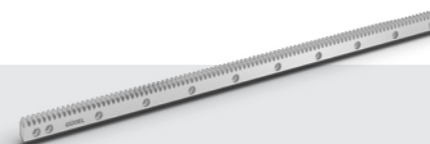
m: Module, z: Number of teeth

Available ratios *	i		2-stage										
			12	16	20	25	30	35	40	50	70	100	
Nominal torque S5 ^{a)}	T _{2N}	[Nm]	174	226	235	235	174	235	226	235	217	130	
Acceleration torque S5 ^{b)}	T _{2B}	[Nm]	278	278	304	304	278	304	304	278	287	230	
Nominal input speed S5 ^{c)}	n _{1N}	[rpm]	2 900	3 100	3 100	3 100	3 100	3 100	3 100	3 500	4 200	4 200	
Maximum input speed S5	n _{1max}	[rpm]	4 500	4 500	4 500	4 500	4 500	4 500	4 500	4 500	4 500	4 500	
Nominal torque S1 ^{a)}	T _{2N}	[Nm]	122	122	122	130	130	130	130	130	130	87	
Acceleration torque S1 ^{b)}	T _{2B}	[Nm]	217	217	217	217	217	217	217	217	217	165	
Nominal input speed S1 ^{c)}	n _{1N}	[rpm]	2 000	2 200	2 800	2 800	2 800	2 800	2 800	3 100	3 800	3 800	
Maximum input speed S1	n _{1max}	[rpm]	2 900	3 100	3 100	3 100	3 100	3 100	3 100	3 500	4 200	4 200	
Emergency stop torque ^{d)}	T _{2not}	[Nm]	435	565	587	587	435	587	565	587	543	326	
Efficiency	η	[%]	94%										
Life duration	L _h	[h]	> 20 000										
Weight	M	[kg]	10										
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]	30.6	37.0	36.7	38.7	30.6	38.7	37.0	38.7	39.6	32.6	
Noise ^{f)}	L _{pA}	[dB(A)]	≤ 69										
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: 6 600 / End of output shaft: 4 300										
Max. axial force on output shaft ^{f)}	F _{a max}	[N]	6 000										
Color			Red RAL 3003										
Inertia in kg·cm ² ^{h)}	J ₁	[kg·cm ²]	Ø14	2.76	2.69	2.23	2.21	1.61	1.82	1.60	1.59	1.59	1.59
			Ø19	2.76	2.69	2.23	2.21	1.61	1.82	1.60	1.59	1.59	1.59
			Ø24	2.77	2.70	2.24	2.22	1.62	1.83	1.61	1.60	1.60	1.60
			Ø32	5.97	5.97	5.44	5.42	4.82	5.03	4.81	4.80	4.80	4.80
			Ø35	8.60	8.53	8.07	8.05	7.45	7.66	7.44	7.43	7.43	7.43

* Other ratios available. 9, 15, 21, 27, 28, 49 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 24mm in 1-stage and 19mm 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 i=10 and n_{1N}=3000 rpm no load.

Rack



			Pinion 1	Pinion 2
Max acceleration force	F _{2B}	[N]	7 530	13 700
Max acceleration torque	T _{2B}	[Nm]	200	436

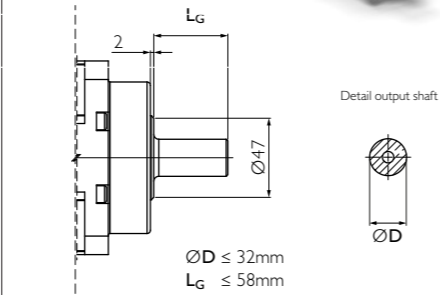
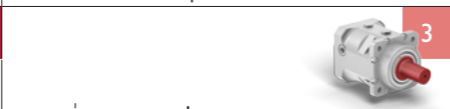
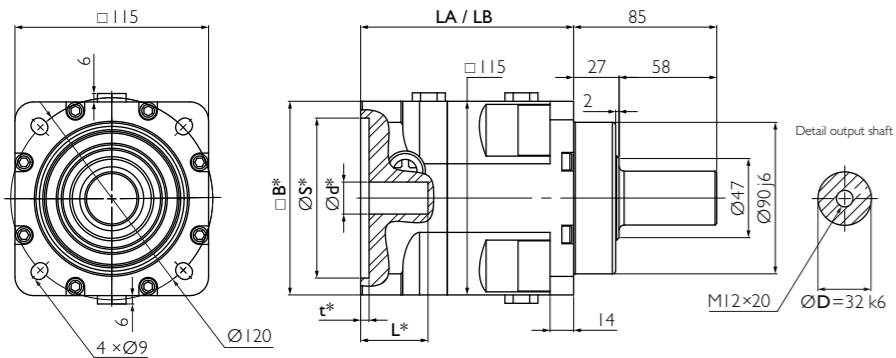
Above values for rack and pinion take into consideration a number of load cycles: 1x10⁶ for the rack; 1x10⁷ for the pinion. Both in pulsating operation.

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

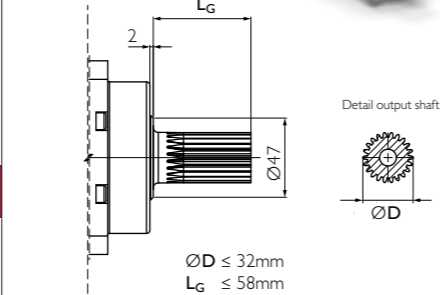
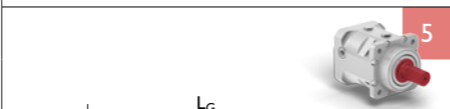
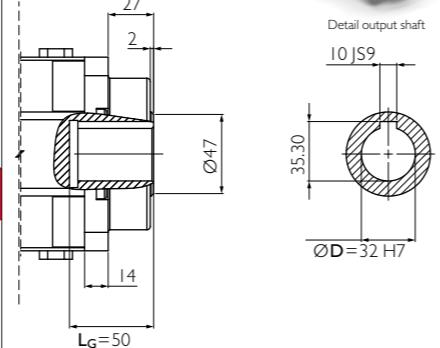
More on the Technical Datasheets Your ideal Drive Train on pages 94 et seq.

Input		Standard			Output	
A	for motor shaft	L ≤ 50	9 ≤ Ød ≤ 24	result in LA	0	
B	for motor shaft	51 < L ≤ 64	24 < Ød ≤ 35	result in LB		3

		1-stage	2-stage	3-stage
LA	[mm]	126	164	202
LB	[mm]	140	178	216

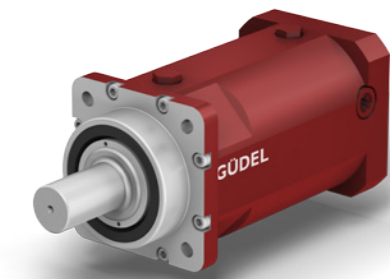


Option 3 on request. Adjustments can reduce capacity.



Option 5 on request. Adjustments can reduce capacity.

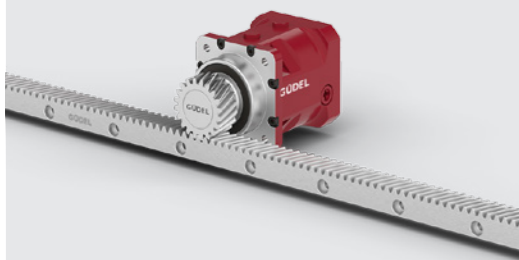
Material 1.6MnCr5 DIN 1.7131
 Teeth pressure angle α = 20°, helical teeth left, 19°31'42" hardened (58^H HRC), ground, crowned
 Quality 6f24 DIN 3962 / 63 / 67
 f_p [mm] Adjacent pitch error 0.006



Example NR 100 A0, 3-stage

Your ideal Drive Train

Function Package with gearbox, rack and pinion from GÜDEL



Pinion

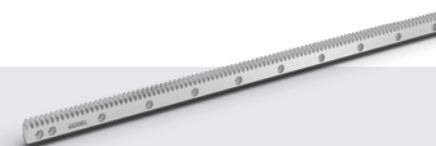
	m	z	A	b	B	D _a	D ₀	L12	L13	x2	a	
Pinion 1	[-]	2	25	48.526	25	24	57.05	53.052	63.3	49.8	23.8	27
Pinion 2	[-]	3	20	57.831	30	29	69.66	63.662	69	55.5	27	27

m: Module, z: Number of teeth

Available ratios *	i	3-stage										
		105	125	175	200	250	300	400	500	700	1 000	
Nominal torque S5 ^{a)}	T _{2N} [Nm]	235	245	245	245	245	200	250	245	250	140	
Acceleration torque S5 ^{b)}	T _{2B} [Nm]	304	300	300	300	300	255	305	304	290	180	
Nominal input speed S5 ^{c)}	n _{1N} [rpm]	4 200	4 200	4 200	4 200	4 200	4 200	4 200	4 200	4 200	4 200	
Maximum input speed S5	n _{1max} [rpm]	5 000	5 000	5 000	5 000	5 000	5 000	5 000	5 000	5 000	5 000	
Nominal torque S1 ^{a)}	T _{2N} [Nm]	122	122	122	122	122	70	122	122	122	87	
Acceleration torque S1 ^{b)}	T _{2B} [Nm]	217	217	217	217	217	165	217	217	217	140	
Nominal input speed S1 ^{c)}	n _{1N} [rpm]	3 800	3 800	3 800	3 800	3 800	3 800	3 800	3 800	3 800	3 800	
Maximum input speed S1	n _{1max} [rpm]	4 200	4 200	4 200	4 200	4 200	4 200	4 200	4 200	4 200	4 200	
Emergency stop torque ^{d)}	T _{2not} [Nm]	600	600	600	600	600	500	600	600	550	350	
Efficiency	η [%]	91%										
Life duration	L _h [h]	> 20 000										
Weight	M [kg]	12										
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]	36.7	36.7	36.7	36.7	36.7	35.2	35.2	36.7	36.7	30.8	
Noise ^{f)}	L _{pA} [dB(A)]	≤ 69										
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: 6 600 / End of output shaft: 4 300										
Max. axial force on output shaft ^{f)}	F _{amax} [N]	6 000										
Color		Red RAL 3003										
Inertia in kg·cm ² ^{h)}	J ₁ [kg·cm ²]	Ø14	1.82	2.21	1.82	1.59	1.59	1.59	1.59	1.59	1.59	1.59
		Ø19	1.82	2.21	1.82	1.59	1.59	1.59	1.59	1.59	1.59	1.59
		Ø24	1.83	2.22	1.83	1.60	1.60	1.60	1.60	1.60	1.60	1.60
		Ø32	5.03	5.42	5.03	4.80	4.80	4.80	4.80	4.80	4.80	4.80
		Ø35	7.66	8.05	7.66	7.43	7.43	7.43	7.43	7.43	7.43	7.43

* Other ratios available. 112, 120, 140, 147, 150, 160, 196, 210, 245, 280, 343, 350, 490 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 24mm in 1-stage and 19mm 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 i=10 and n_{1N}=3000 rpm no load.

Rack



			Pinion 1	Pinion 2
Max acceleration force	F _{2B} [N]		7 530	13 700
Max acceleration torque	T _{2B} [Nm]		200	436

Above values for rack and pinion take into consideration a number of load cycles: 1x10⁶ for the rack; 1x10⁷ for the pinion. Both in pulsating operation.

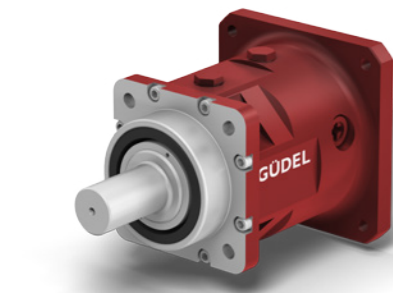
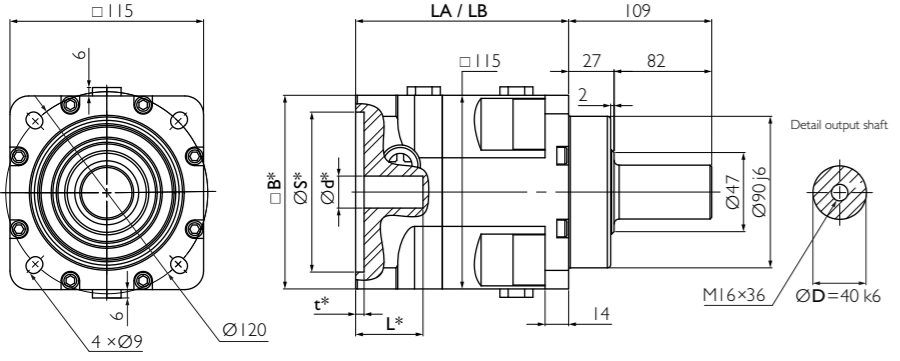
For proper sizing follow Flowchart Calculate your ideal Drive Train on pages 106 et seq.

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

Input		Output		
		Standard	Option	

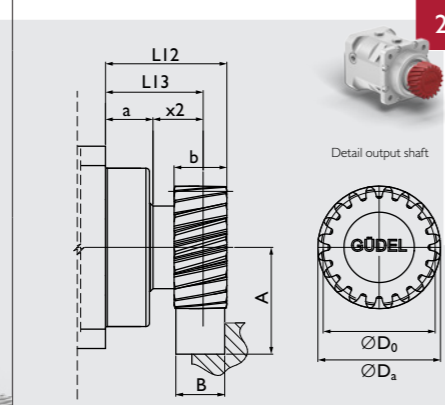
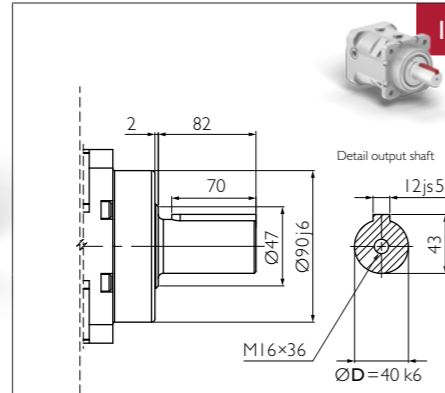
A	for motor shaft	$L \leq 50$	$9 \leq \varnothing d \leq 24$	result in LA
B	for motor shaft	$51 < L \leq 64$	$24 < \varnothing d \leq 35$	result in LB

		1-stage	2-stage	3-stage
LA	[mm]	126	164	202
LB	[mm]	140	178	216

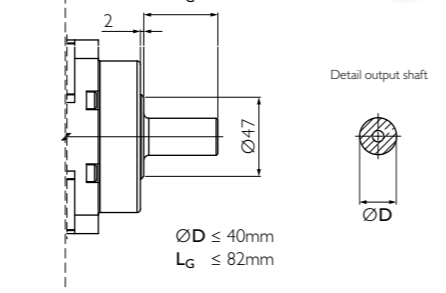


Example SR 100 A0, 1-stage

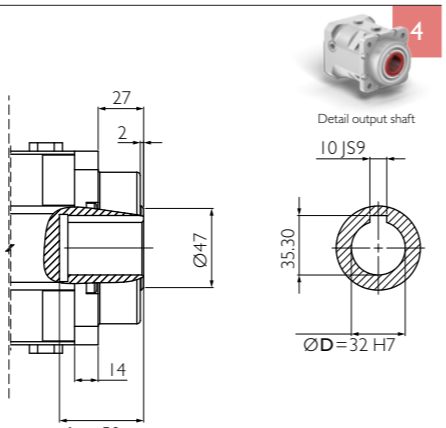
* depending on the motor. See pages 100 et seq.



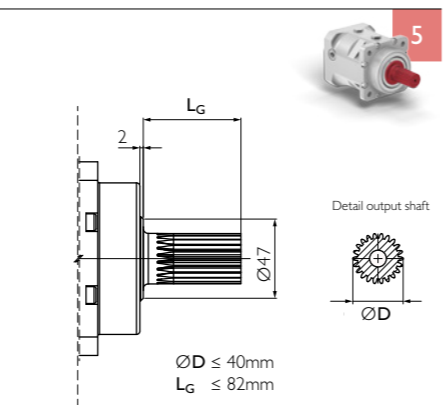
0	
3	



Option 3 on request. Adjustments can reduce capacity.



Option 4 on request. Adjustments can reduce capacity.



Option 5 on request. Adjustments can reduce capacity.

Material 16MnCr5 DIN 1.7131
 Teeth pressure angle $\alpha = 20^\circ$, helical teeth left, $19^\circ 31' 42''$ hardened (58^H HRC), ground, crowned
 Quality 6f24 DIN 3962 / 63 / 67
 f_p [mm] Adjacent pitch error 0.006

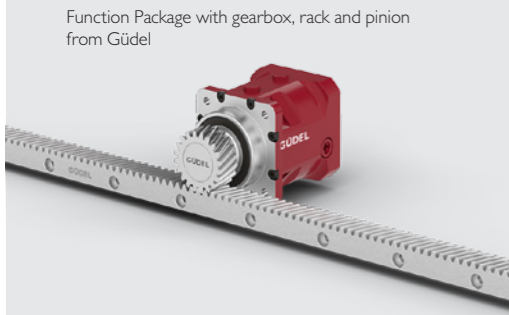
Pinion	m	z	A	b	B	D _a	D ₀	L12	L13	x2	a	
Pinion 1	[-]	2	25	48.526	25	24	57.05	53.052	63.3	49.8	23.8	27
Pinion 2	[-]	3	20	57.831	30	29	69.66	63.662	69	55.5	27	27

m: Module, z: Number of teeth

Available ratios	i	1-stage		2-stage					
		4	12	16	20	28	40		
Nominal torque S5 ^{a)}	T _{2N}	[Nm]	300	300	300	300	300	300	
Acceleration torque S5 ^{b)}	T _{2B}	[Nm]	370	370	370	370	370	370	
Nominal input speed S5 ^{c)}	n _{1N}	[rpm]	2 200	2 600	2 800	2 800	2 800	2 800	
Maximum input speed S5	n _{1max}	[rpm]	4 000	4 000	4 000	4 000	4 000	4 000	
Emergency stop torque ^{d)}	T _{2not}	[Nm]	800	800	800	800	800	800	
Efficiency	η	[%]	96%	93%					
Life duration	L _h	[h]	> 20 000						
Weight	M	[kg]	8	10					
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]	41.0	32.0	38.7	38.4	36.8	38.7	
Noise ^{f)}	L _{pA}	[dB(A)]	≤ 71						
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: 6 600 / End of output shaft: 4 300						
Max. axial force on output shaft ^{f)}	F _{a max}	[N]	6 000						
Color			Red RAL 3003						
Inertia in kg·cm ² ^{h)}	J ₁	[kg·cm ²]	Ø14	2.83	2.76	2.69	2.23	1.83	1.60
			Ø19	2.83	2.76	2.69	2.23	1.83	1.60
			Ø24	2.84	2.77	2.70	2.24	1.84	1.61
			Ø32	6.04	5.97	5.90	5.44	5.04	4.81
			Ø35	8.67	8.60	8.53	8.07	7.67	7.44

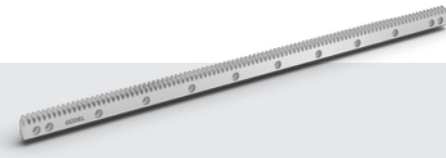
- a) Nominal output torque when operating at n_{1N}.
- b) 1000 cycles per hour max.
- c) Valid for an ambient temperature of 20°C and T_{2N}. At higher ambient temperatures, please reduce speed.
- d) Valid 1000 times the gearbox life.
- e) Valid for an input Ø of 24mm in 1-stage and 19mm in 2- and 3-stage.
- 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.

Your ideal Drive Train



Function Package with gearbox, rack and pinion from GÜDEL

Rack



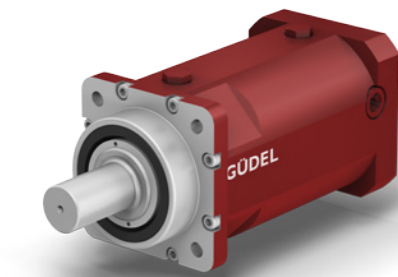
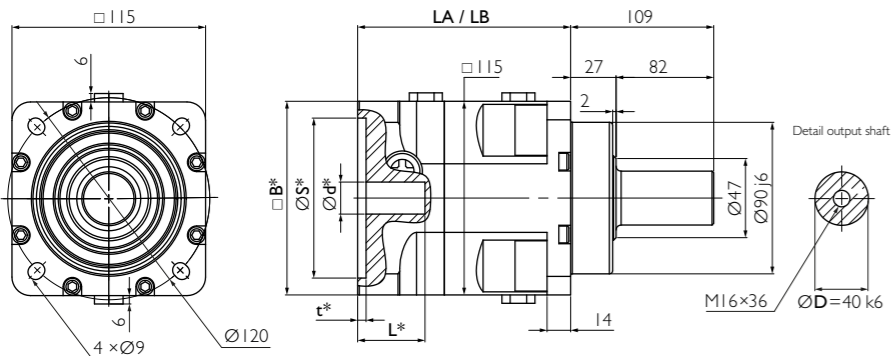
			Pinion 1	Pinion 2
Max acceleration force	F _{2B}	[N]	7 530	13 700
Max acceleration torque	T _{2B}	[Nm]	200	436

Above values for rack and pinion take into consideration a number of load cycles: 1x10⁶ for the rack; 1x10⁷ for the pinion. Both in pulsating operation.

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.

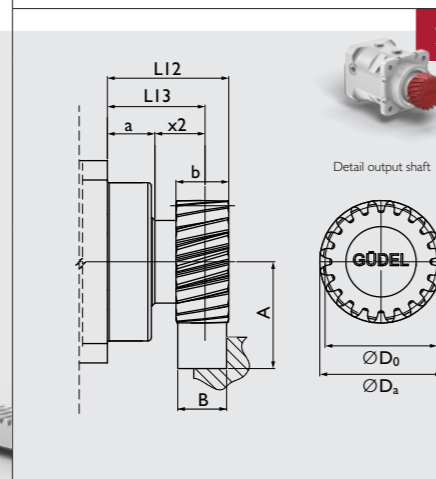
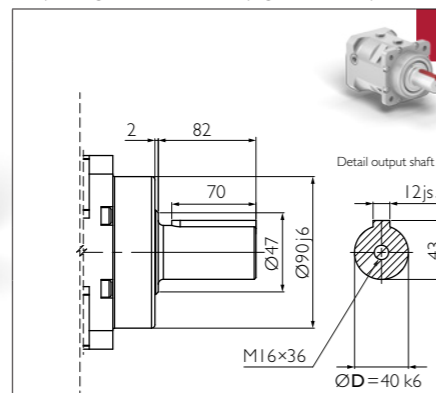
Input		Standard			Output	
A	for motor shaft	L ≤ 50	9 ≤ Ød ≤ 24	result in LA	0	
B	for motor shaft	51 < L ≤ 64	24 < Ød ≤ 35	result in LB		3

		1-stage	2-stage	3-stage
LA	[mm]	126	164	202
LB	[mm]	140	178	216



Example SR 100 A0, 3-stage

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

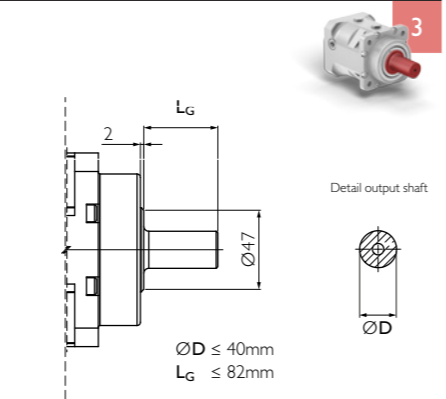


Pinion

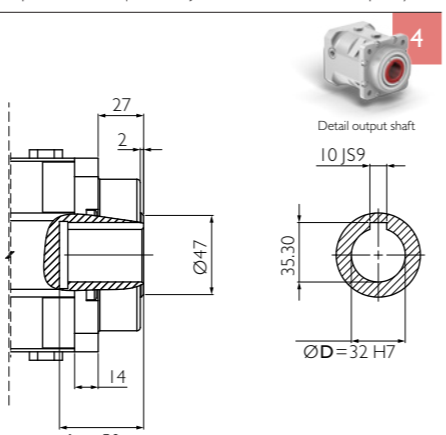
	m	z	A	b	B	D _a	D ₀	L12	L13	x2	a	
Pinion 1	[-]	2	25	48.526	25	24	57.05	53.052	63.3	49.8	23.8	27
Pinion 2	[-]	3	20	57.831	30	29	69.66	63.662	69	55.5	27	27

m: Module, z: Number of teeth

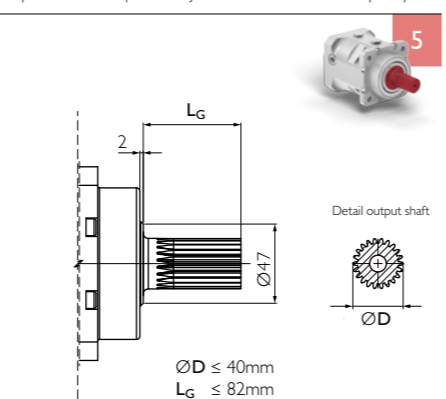
Option



Option 3 on request. Adjustments can reduce capacity.



Option 4 on request. Adjustments can reduce capacity.

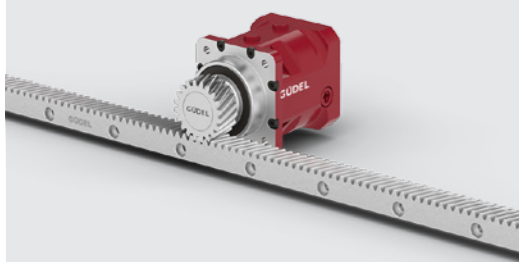


Option 5 on request. Adjustments can reduce capacity.

Material 1.6MnCr5 DIN 1.7131
 Teeth pressure angle α = 20°, helical teeth left, 19°31'42" hardened (58[±] HRC), ground, crowned
 Quality 6f24 DIN 3962 / 63 / 67
 f_p [mm] Adjacent pitch error 0.006

Your ideal Drive Train

Function Package with gearbox, rack and pinion from Güdel



Available ratios *	i	3-stage													
		60	80	100	112	120	140	160	200	280	400				
Nominal torque S5 ^{a)}	T _{2N}	[Nm]	300	300	300	300	300	300	300	300	300	300	300	300	300
Acceleration torque S5 ^{b)}	T _{2B}	[Nm]	404	404	404	404	404	404	404	404	404	404	404	404	404
Nominal input speed S5 ^{c)}	n _{1N}	[rpm]	3 800	3 800	3 800	3 800	3 800	3 800	3 800	3 800	3 800	3 800	3 800	3 800	3 800
Maximum input speed S5	n _{1max}	[rpm]	4 500	4 500	4 500	4 500	4 500	4 500	4 500	4 500	4 500	4 500	4 500	4 500	4 500
Emergency stop torque ^{d)}	T _{2not}	[Nm]	800	800	800	800	800	800	800	800	800	800	800	800	800
Efficiency	η	[%]	90%												
Life duration	L _h	[h]	> 20 000												
Weight	M	[kg]	12												
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]	38.4	38.4	34.3	37.0	37.0	38.4	37.0	38.4	37.0	38.4	37.0	37.0	37.0
Noise ^{f)}	L _{pA}	[dB(A)]	≤ 71												
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: 6 600 / End of output shaft: 4 300												
Max. axial force on output shaft ^{f)}	F _{a max}	[N]	6 000												
Color			Red RAL 3003												
Inertia in kg·cm ² ^{h)}	J _I	[kg·cm ²]	Ø14	2.23	2.22	1.59	1.83	1.59	1.82	1.60	1.59	1.59	1.59	1.59	1.59
			Ø19	2.23	2.22	1.59	1.83	1.59	1.82	1.60	1.59	1.59	1.59	1.59	1.59
			Ø24	2.24	2.23	1.60	1.84	1.61	1.83	1.61	1.60	1.60	1.60	1.60	1.60
			Ø32	5.44	5.43	4.80	5.04	4.80	5.03	4.81	4.80	4.80	4.80	4.80	4.80
			Ø35	8.07	8.06	7.43	7.67	7.44	7.66	7.44	7.43	7.43	7.43	7.43	7.43

* Other ratios available. 36, 64, 84, 180, 196, 300, 360, 500, 600, 700, 1000 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 24mm in 1-stage and 19mm in 2- and 3-stage.

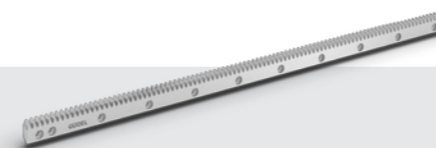
f) Values for 300 rpm.

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



			Pinion 1	Pinion 2
Max acceleration force	F _{2B}	[N]	7 530	13 700
Max acceleration torque	T _{2B}	[Nm]	200	436

Above values for rack and pinion take into consideration a number of load cycles: 1x10⁶ for the rack; 1x10⁷ for the pinion. Both in pulsating operation.

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.

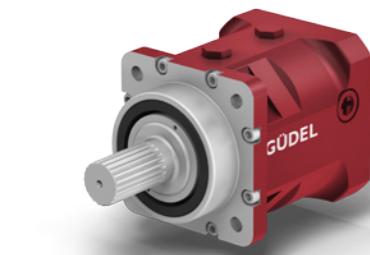
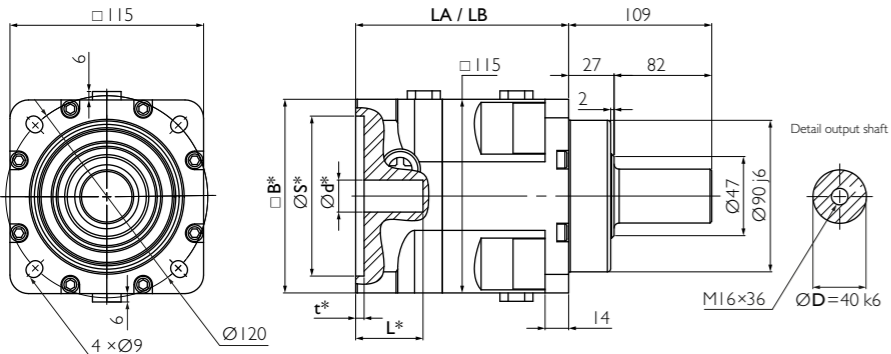
Input

A	for motor shaft	$L \leq 50$	$9 \leq \varnothing d \leq 24$	result in LA
B	for motor shaft	$51 < L \leq 64$	$24 < \varnothing d \leq 35$	result in LB

		1-stage	2-stage	3-stage
LA	[mm]	126	164	202
LB	[mm]	140	178	216

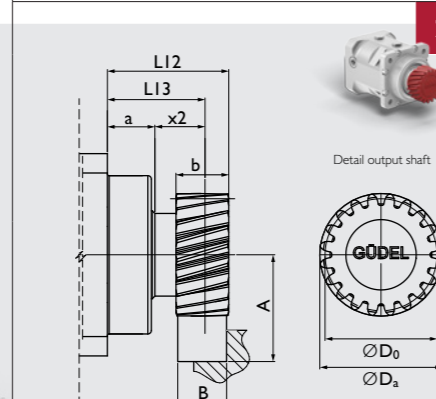
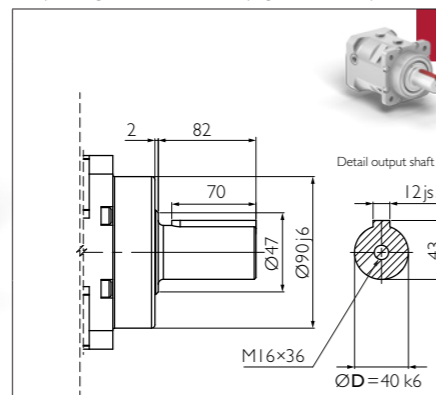
Output

Option



Example PR 100 A5, 1-stage

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



Option 2 on request. Adjustments can reduce capacity.

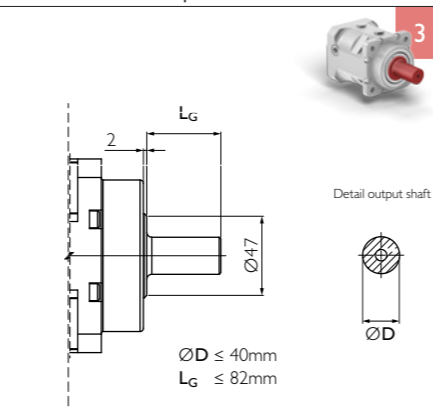
Pinion

Pinion for PR on request

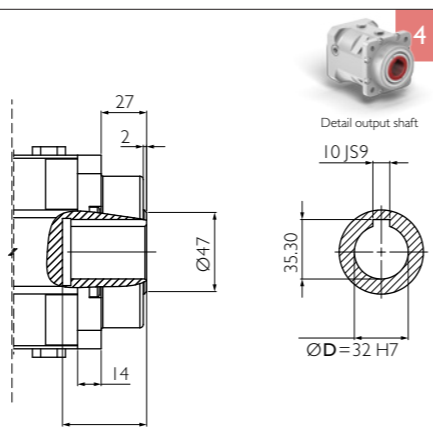


Available ratios	i	1-stage		2-stage					
		3	9	12	15	21	30		
Nominal torque S5 ^{a)}	T _{2N}	[Nm]	348	350	350	350	350	350	
Acceleration torque S5 ^{b)}	T _{2B}	[Nm]	556	500	500	500	500	500	
Nominal input speed S5 ^{c)}	n _{1N}	[rpm]	2 000	2 000	2 300	2 500	2 500	2 500	
Maximum input speed S5	n _{1max}	[rpm]	3 200	3 200	3 600	3 600	3 600	3 600	
Emergency stop torque ^{d)}	T _{2not}	[Nm]	870	785	785	785	785	785	
Efficiency	η	[%]	94%	91%					
Life duration	L _h	[h]	> 20 000						
Weight	M	[kg]	8	10					
Angular backlash	j _c	[arcmin]	Precision P 1 ≤ 1 / P 3 ≤ 3 / P 5 ≤ 5 / P 12 ≤ 12						
Torsionnal rigidity ^{e)}	C _{t2}	[Nm/arcmin]	37.0	35.2	35.2	35.2	35.2	35.2	
Noise ^{f)}	L _{pA}	[dB(A)]	≤ 71						
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: 6 600 / End of output shaft: 4 300						
Max. axial force on output shaft ^{f)}	F _{amax}	[N]	6 000						
Color			Red RAL 3003						
Inertia in kg·cm ² ^{h)}	J ₁	[kg·cm ²]	Ø14	4.08	3.97	2.76	2.33	1.86	1.61
			Ø19	4.08	3.97	2.76	2.33	1.86	1.61
			Ø24	4.09	3.98	2.77	2.34	1.87	1.62
			Ø32	7.29	7.18	5.97	5.54	5.07	4.82
			Ø35	9.9	9.81	8.60	8.17	7.70	7.45

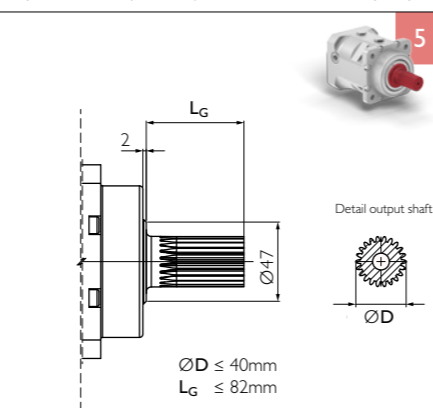
- a) Nominal output torque when operating at n_{1N}.
- b) 1000 cycles per hour max.
- c) Valid for an ambient temperature of 20°C and T_{2N}. At higher ambient temperatures, please reduce speed.
- d) Valid 1000 times the gearbox life.
- e) Valid for an input Ø of 24mm in 1-stage and 19mm in 2- and 3-stage.
- 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.



Option 3 on request. Adjustments can reduce capacity.



Option 4 on request. Adjustments can reduce capacity.

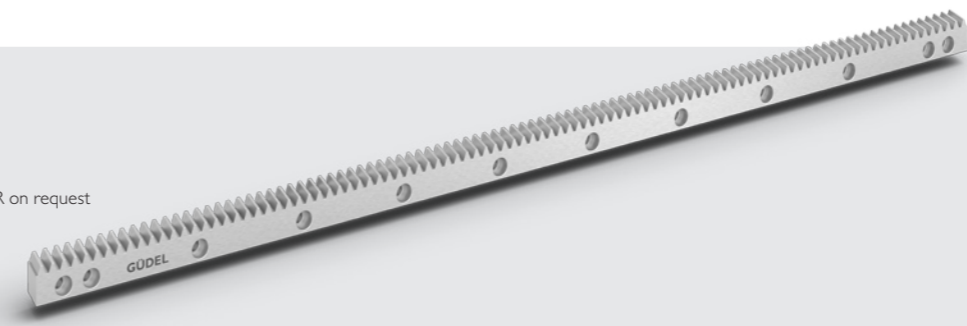


Option 5 on request. Adjustments can reduce capacity.

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

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.

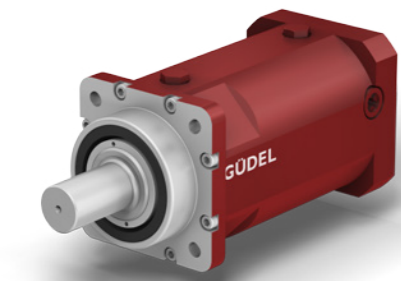
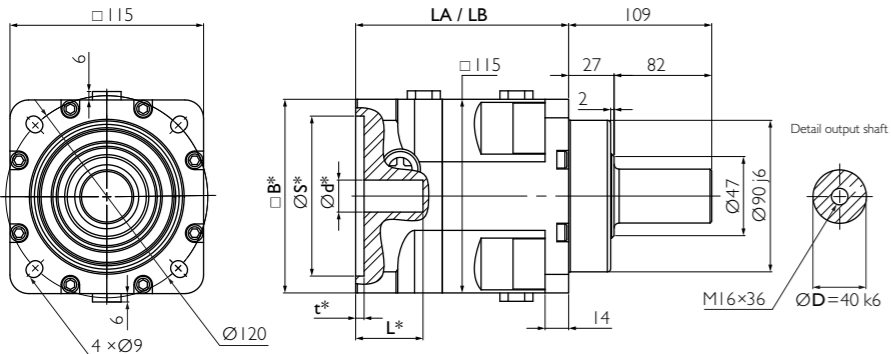
Input

- A** for motor shaft $L \leq 50$ $9 \leq \varnothing d \leq 24$ result in LA
- B** for motor shaft $51 < L \leq 64$ $24 < \varnothing d \leq 35$ result in LB

		1-stage	2-stage	3-stage
LA	[mm]	126	164	202
LB	[mm]	140	178	216

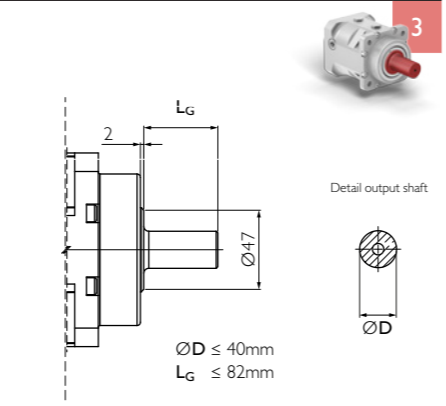
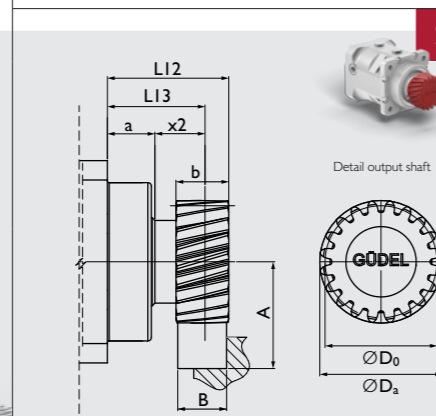
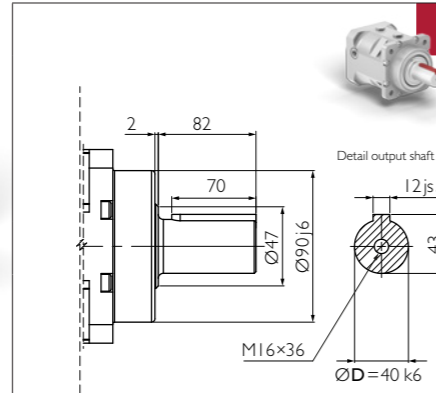
Output

Option

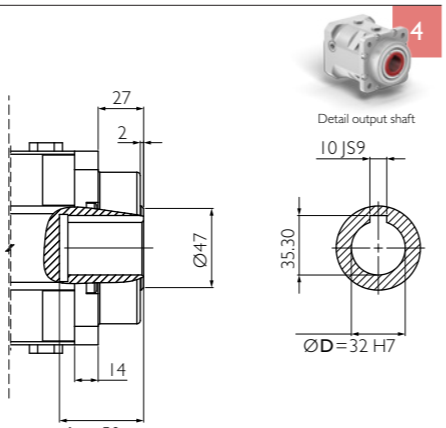


Example PR 100 A0, 3-stage

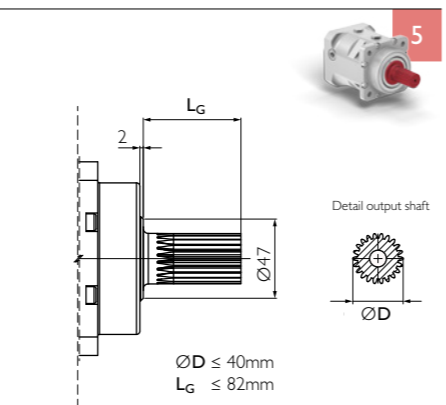
* depending on the motor. See pages 100 et seq.



Option 3 on request. Adjustments can reduce capacity.



Option 4 on request. Adjustments can reduce capacity.

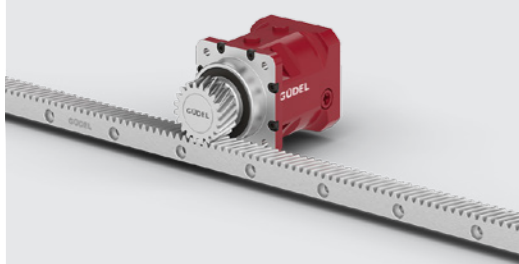


Option 5 on request. Adjustments can reduce capacity.

Material 16MnCr5 DIN 1.7131
 Teeth pressure angle $\alpha = 20^\circ$, helical teeth left, $19^\circ 31' 42''$ hardened (58^HHRC), ground, crowned
 Quality 6f24 DIN 3962 / 63 / 67
 f_p [mm] Adjacent pitch error 0.006

Your ideal Drive Train

Function Package with gearbox, rack and pinion from GÜDEL



Pinion

Pinion for PR on request



Available ratios *	i	3-stage												
		36	45	60	75	90	105	120	150	210	300			
Nominal torque S5 ^{a)}	T_{2N}	[Nm]	350	350	350	350	350	350	350	350	350	350	350	350
Acceleration torque S5 ^{b)}	T_{2B}	[Nm]	500	500	500	500	500	500	500	500	500	500	500	500
Nominal input speed S5 ^{c)}	n_{1N}	[rpm]	2 700	3 300	3 300	3 300	3 300	3 300	3 300	3 300	3 300	3 300	3 300	3 300
Maximum input speed S5	n_{1max}	[rpm]	4 000	4 000	4 000	4 000	4 000	4 000	4 000	4 000	4 000	4 000	4 000	4 000
Emergency stop torque ^{d)}	T_{2not}	[Nm]	785	785	785	785	785	785	785	785	785	785	785	785
Efficiency	η	[%]	88%											
Life duration	L_h	[h]	> 20 000											
Weight	M	[kg]	12											
Angular backlash	j_c	[arcmin]	Precision P 1 \leq 1 / P 3 \leq 3 / P 5 \leq 5 / P 12 \leq 12											
Torsionnal rigidity ^{e)}	C_{r2}	[Nm/arcmin]	33.5	33.5	42.2	42.2	33.5	42.2	40.4	42.2	43.1	40.4		
Noise ^{f)}	L_{pA}	[dB(A)]	\leq 71											
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: 6 600 / End of output shaft: 4 300											
Max. axial force on output shaft ^{f)}	F_{Amax}	[N]	6 000											
Color			Red RAL 3003											
Inertia in kg·cm ² ^{h)}	J_1	[kg·cm ²]	$\varnothing 14$	2.76	2.28	2.23	2.21	1.61	1.82	1.60	1.59	1.59	1.59	
			$\varnothing 19$	2.76	2.28	2.23	2.21	1.61	1.82	1.60	1.59	1.59	1.59	
			$\varnothing 24$	2.77	2.29	2.24	2.22	1.62	1.83	1.61	1.60	1.60	1.60	
			$\varnothing 32$	5.97	5.49	5.44	5.42	4.82	5.03	4.81	4.80	4.80	4.80	
			$\varnothing 35$	8.60	8.12	8.07	8.05	7.45	7.66	7.44	7.43	7.43	7.43	

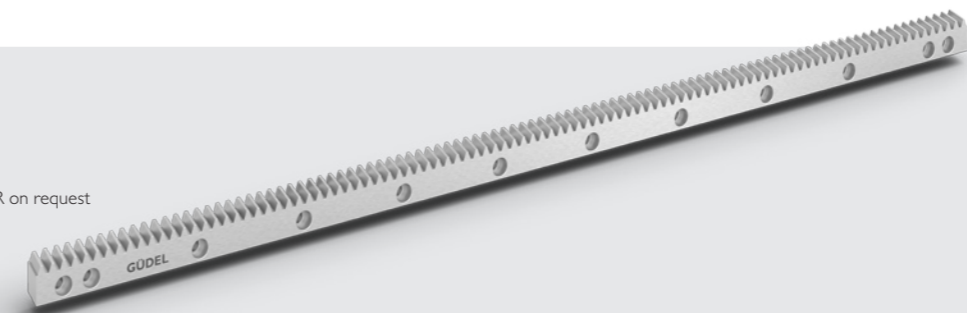
* Other ratios available. 27, 48, 63, 84, 147 on request.

- 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 \varnothing of 24mm in 1-stage and 19mm 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 \varnothing .
- 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.