Input

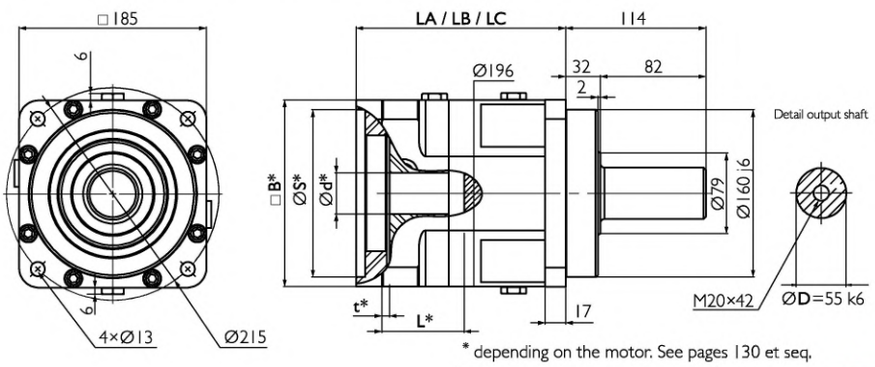
A	for motor shaft	L ≤ 60	19 ≤ Ød ≤ 32	result in **LA**
B	for motor shaft	60 < L ≤ 85	32 < Ød ≤ 48	result in **LB**
C	for motor shaft	85 < L ≤111	32 < Ød ≤ 48	result in **LC**

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

Output

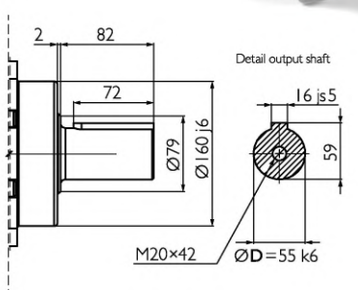
Standard

0



* depending on the motor. See pages 130 et seq.

1



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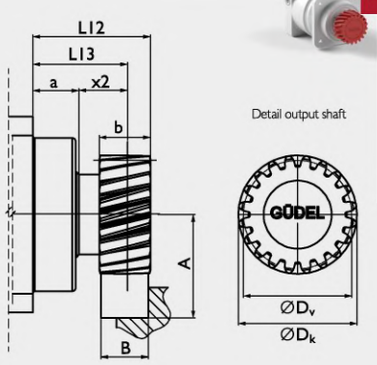
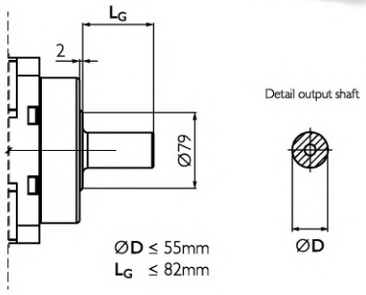


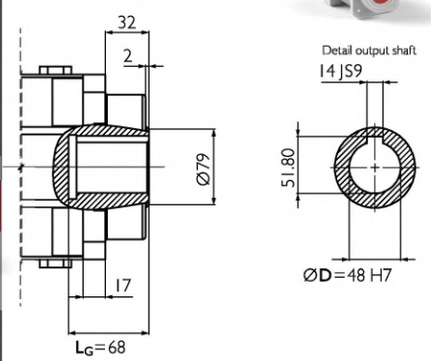
Optional

3

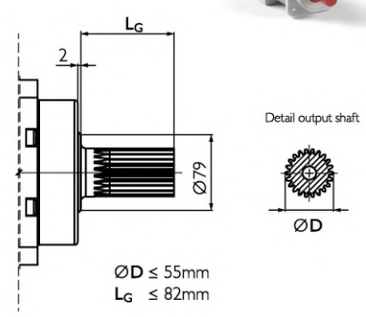


Option 3 on request. Adjustments can reduce capacity.

4



5



Option 5 on request. Adjustments can reduce capacity.

Example NR 180 C0, 1-stage

Your ideal drive train

Function Package with gearbox, rack and pinion from Güdel

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

Pinion

		m_n	P_t	z	A	b	D_k	D_0	D_v	L12	L13	x2	a	M
Pinion 1	[-]	4	13.33	20	77.441	40	92.88	84.883	84.883	83.5	63.5	31.5	32	1.5
Pinion 2	[-]	5	16.66	20	87.052	50	116.10	106.103	106.103	89.5	64.5	32.5	32	3.0

m_n: Normal module, P_t: Transverse pitch [mm], z: Number of teeth, D_0: Pitch circle diameter for calculation, D_v: Pitch circle diameter for design, M: Weight [kg]

Available ratios		i		1-stage 3	4	5	7	10
Nominal torque S5 a)		T_{2N}	[Nm]	750	770	780	760	680
Acceleration torque S5 b)		T_{2B}	[Nm]	1 150	1 150	1 150	1 150	880
Nominal input speed S5 c)		n_{1N}	[rpm]	1 500	1 500	1 500	2 300	2 300
Maximum input speed S5		n_{1max}	[rpm]	3 000	3 500	3 500	3 500	3 500
Nominal torque S1 a)		T_{2N}	[Nm]	380	380	380	380	340
Acceleration torque S1 b)		T_{2B}	[Nm]	560	560	560	560	570
Nominal input speed S1 c)		n_{1N}	[rpm]	1 100	1 300	1 300	2 100	2 100
Maximum input speed S1		n_{1max}	[rpm]	1 500	1 500	1 500	2 300	2 300
Emergency stop torque d)		T_{2not}	[Nm]	2 550	2 780	2 780	2 780	2 250
Efficiency		η	[%]	97				
Lifetime		L_h	[h]	> 20 000				
Weight		M	[kg]	32				
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]	156.3	182.7	193.5	210.1	183.3
Noise i)		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: 15 500 / End of output shaft: 11 500				
Max. axial force on output shaft f)		F_{amax}	[N]	15 000				
Color				Red, RAL 3003				
Inertia in kg.cm² h)	Ø19	J_1	[kgcm²]	38.19	23.35	17.21	12.12	9.18
	Ø24			39.24	24.40	18.26	13.17	10.23
	Ø32			41.45	26.61	20.47	15.38	12.44
	Ø35			44.37	29.53	23.39	18.30	15.36
	Ø38			49.97	35.13	28.99	23.90	20.96
	Ø42			49.47	34.63	28.49	23.40	20.46
	Ø48			49.87	35.03	28.89	23.80	20.86

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 48 mm in 1-stage and 38 mm 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 Q6	Q7	Q9	Pinion 2 Q6	Q7	Q9
Max acceleration force	F_{2B}	[N]	28 585	14 084	24 045	44 505	23 785	40 048
Max acceleration torque	T_{2B}	[Nm]	1 213	598	1 021	2 361	1 262	2 125
Precision			P1		P12	P1		P12
Feed force			High	Medium	Elevated	High	Medium	Elevated

Above values for rack and pinion take into consideration a number of load cycles: $1x10^6$ for the rack; $1x10^7$ for the pinion. Both in pulsating operation.

For proper sizing follow flowchart **calculate your ideal drive train** on pages 136 et seq.

More on the technical datasheets **your ideal drive train** on pages 120 et seq.

NR 180 | 2-stage — Planetary gearboxes

Drawings

Input

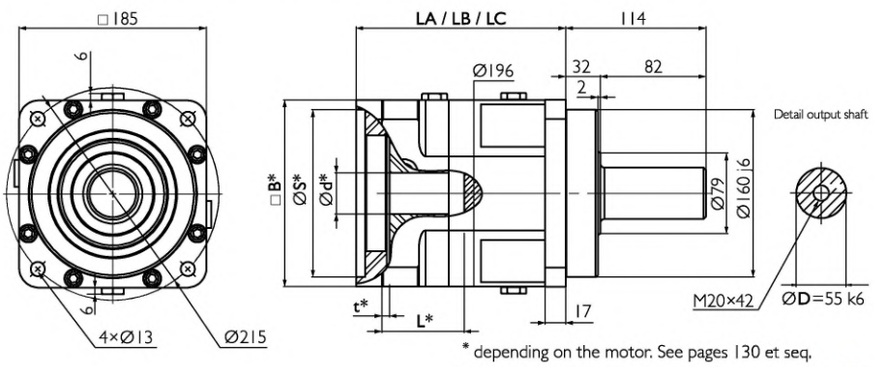
A	for motor shaft	L ≤ 60	19 ≤ Ød ≤ 32	result in **LA**
B	for motor shaft	60 < L ≤ 85	32 < Ød ≤ 48	result in **LB**
C	for motor shaft	85 < L ≤111	32 < Ød ≤ 48	result in **LC**

Output

Standard

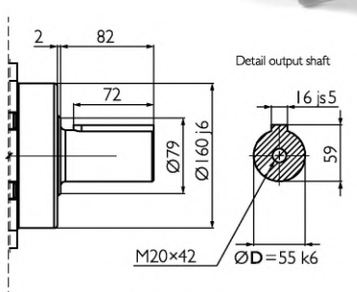
0

		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 130 et seq.

1



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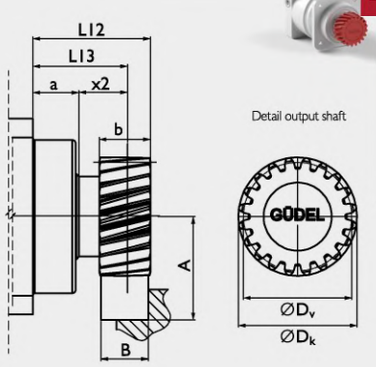
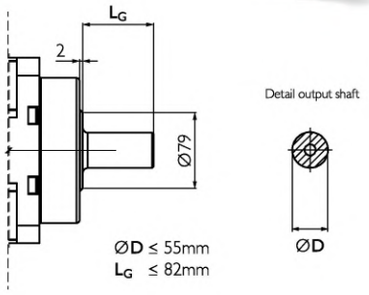


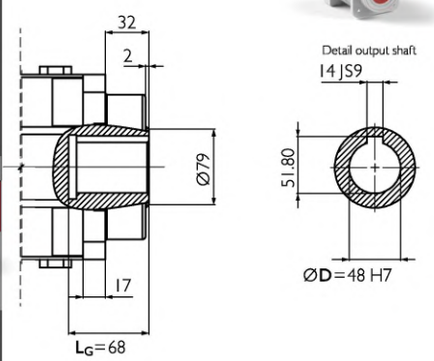
Optional

3



Option 3 on request. Adjustments can reduce capacity.

4



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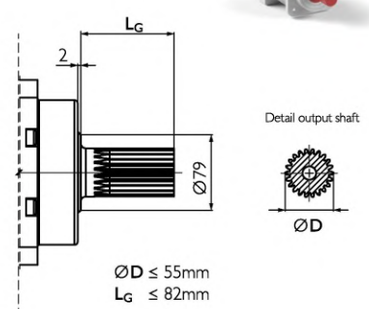


Option 5 on request. Adjustments can reduce capacity.

Example NR 180 A5, 1-stage

Your ideal drive train

Function Package with gearbox, rack and pinion from Güdel

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

Pinion

		m_n	P_t	z	A	b	D_k	D_0	D_v	L12	L13	x2	a	M
Pinion 1	[-]	4	13.33	20	77.441	40	92.88	84.883	84.883	83.5	63.5	31.5	32	1.5
Pinion 2	[-]	5	16.66	20	87.052	50	116.10	106.103	106.103	89.5	64.5	32.5	32	3.0

m_n: Normal module, P_t: Transverse pitch [mm], z: Number of teeth, D_0: Pitch circle diameter for calculation, D_v: Pitch circle diameter for design, M: Weight [kg]

Available ratios *		i		2-stage									
				12	16	20	25	30	35	40	50	70	100
Nominal torque S5 a)		T_{2N}	[Nm]	750	770	780	780	750	780	770	780	760	680
Acceleration torque S5 b)		T_{2B}	[Nm]	1 150	1 150	1 150	1 150	1 150	1 150	1 150	1 150	1 150	880
Nominal input speed S5 c)		n_{1N}	[rpm]	2 500	2 700	2 700	2 700	2 700	2 700	2 700	2 900	2 900	3 400
Maximum input speed S5		n_{1max}	[rpm]	3 800	3 800	3 800	3 800	3 800	3 800	3 800	3 800	3 800	3 800
Nominal torque S1 a)		T_{2N}	[Nm]	380	380	380	380	380	380	380	380	380	340
Acceleration torque S1 b)		T_{2B}	[Nm]	560	560	560	560	560	560	560	560	570	570
Nominal input speed S1 c)		n_{1N}	[rpm]	1 700	2 400	2 400	2 400	2 400	2 400	2 400	2 600	2 600	3 000
Maximum input speed S1		n_{1max}	[rpm]	2 500	2 700	2 700	2 700	2 700	2 700	2 700	2 900	2 900	3 400
Emergency stop torque d)		T_{2not}	[Nm]	2 780	2 780	2 780	2 780	2 550	2 780	2 780	2 780	2 780	2 250
Efficiency		η	[%]	94									
Lifetime		L_h	[h]	> 20 000									
Weight		M	[kg]	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]	140.6	164.4	174.0	174.0	140.6	174.0	164.4	174.0	189.2	165.0
Noise i)		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: 15 500 / End of output shaft: 11 500									
Max. axial force on output shaft f)		F_{amax}	[N]	15 000									
Color				Red, RAL 3003									
Inertia in kg.cm² h)	Ø19	J_1	[kgcm²]	23.57	22.65	16.76	16.51	9.22	11.77	9.07	9.01	8.96	8.93
	Ø24			24.62	23.7	17.81	17.56	10.27	12.82	10.12	10.06	10.01	9.98
	Ø32			26.83	25.91	20.02	19.77	12.48	15.03	12.33	12.27	12.22	12.19
	Ø35			29.75	28.83	22.94	22.69	15.4	17.95	15.25	15.19	15.14	15.11
	Ø38			35.35	34.43	28.54	28.29	21	23.55	20.85	20.79	20.74	20.71
	Ø42			34.85	33.93	28.04	27.79	20.5	23.05	20.35	20.29	20.24	20.21
	Ø48			35.25	34.33	28.44	28.19	20.9	23.45	20.75	20.69	20.64	20.61

* 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 48 mm in 1-stage and 38 mm 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		
			Q6	Q7	Q9	Q6	Q7	Q9
Max acceleration force	F_{2B}	[N]	28 585	14 084	24 045	44 505	23 785	40 048
Max acceleration torque	T_{2B}	[Nm]	1 213	598	1 021	2 361	1 262	2 125
Precision			P1		P12	P1		P12
Feed force			High	Medium	Elevated	High	Medium	Elevated

Above values for rack and pinion take into consideration a number of load cycles:
$1x10^6$ for the rack; $1x10^7$ for the pinion. Both in pulsating operation.

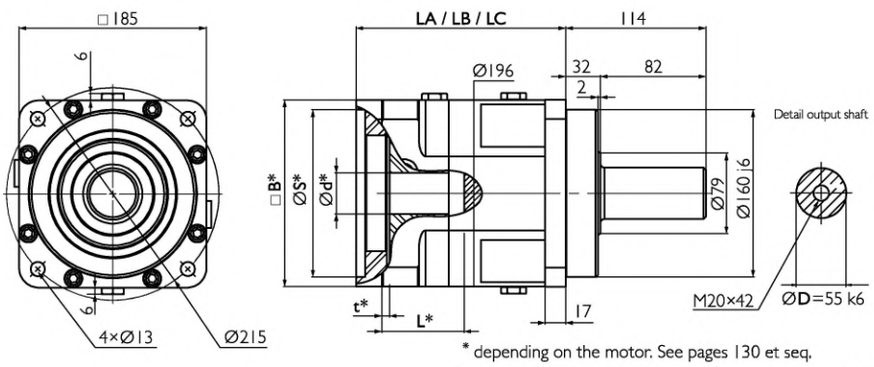
For proper sizing follow flowchart **calculate your ideal drive train** on pages 136 et seq.

More on the technical datasheets **your ideal drive train** on pages 120 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	



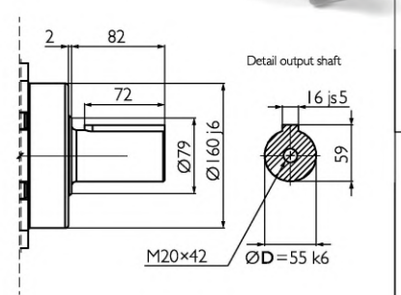
* depending on the motor. See pages 130 et seq.

Example NR 180 A0, 1-stage

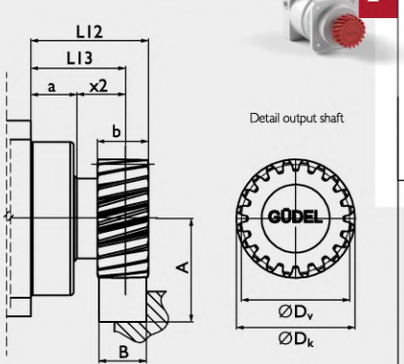
Output

Standard

0



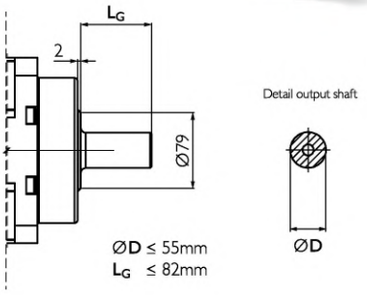
1



2

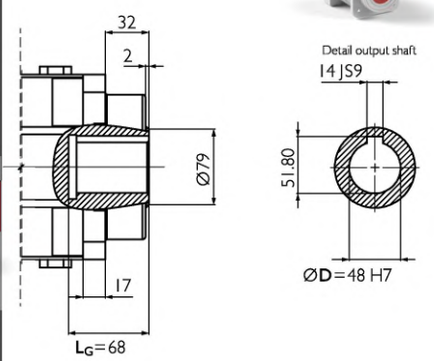
Optional

3

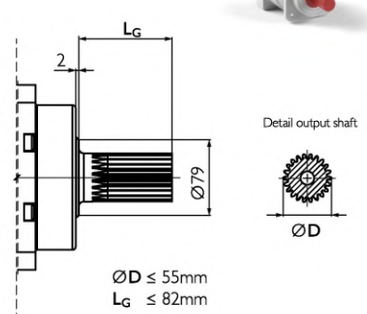


Option 3 on request. Adjustments can reduce capacity.

4



5



Option 5 on request. Adjustments can reduce capacity.

Your ideal drive train

Function Package with gearbox, rack and pinion from Güdel

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

Pinion

		m_n	P_t	z	A	b	D_k	D_0	D_v	L12	L13	x2	a	M
Pinion 1	[-]	4	13.33	20	77.441	40	92.88	84.883	84.883	83.5	63.5	31.5	32	1.5
Pinion 2	[-]	5	16.66	20	87.052	50	116.10	106.103	106.103	89.5	64.5	32.5	32	3.0

m_n: Normal module, P_t: Transverse pitch [mm], z: Number of teeth, D_0: Pitch circle diameter for calculation, D_v: Pitch circle diameter for design, M: Weight [kg]

Available ratios *		i		3-stage									
				105	125	175	200	250	300	400	500	700	1 000
Nominal torque S5 a)		T_{2N}	[Nm]	780	780	780	780	780	750	770	780	760	680
Acceleration torque S5 b)		T_{2B}	[Nm]	1 150	1 150	1 150	1 150	1 150	1 150	1 150	1 150	1 150	880
Nominal input speed S5 c)		n_{1N}	[rpm]	3 400	3 400	3 400	3 400	3 400	3 400	3 400	3 400	3 400	3 400
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
Nominal torque S1 a)		T_{2N}	[Nm]	400	400	400	400	400	400	400	400	400	340
Acceleration torque S1 b)		T_{2B}	[Nm]	570	570	570	570	570	570	570	570	570	570
Nominal input speed S1 c)		n_{1N}	[rpm]	3 000	3 000	3 000	3 000	3 000	3 000	3 000	3 000	3 000	3 000
Maximum input speed S1		n_{1max}	[rpm]	3 400	3 400	3 400	3 400	3 400	3 400	3 400	3 400	3 400	3 400
Emergency stop torque d)		T_{2not}	[Nm]	2 780	2 780	2 780	2 780	2 780	2 550	2 780	2 780	2 780	2 250
Efficiency		η	[%]	91									
Lifetime		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]	165.3	165.3	165.5	133.3	165.3	133.3	156.3	165.3	179.5	156.6
Noise i)		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: 15 500 / End of output shaft: 11 500									
Max. axial force on output shaft f)		F_{amax}	[N]	15 000									
Color				Red, RAL 3003									
Inertia in kg.cm² h)	Ø19	J_1	[kgcm²]	11.77	16.48	11.77	9.00	9.00	8.93	8.93	8.93	8.93	8.93
	Ø24			12.82	17.53	12.82	10.05	10.05	9.98	9.98	9.98	9.98	9.98
	Ø32			15.03	19.74	15.03	12.26	12.26	12.19	12.19	12.19	12.19	12.19
	Ø35			17.95	22.66	17.95	15.18	15.18	15.11	15.11	15.11	15.11	15.11
	Ø38			23.55	28.26	23.55	20.78	20.78	20.71	20.71	20.71	20.71	20.71
	Ø42			23.05	27.76	23.05	20.28	20.28	20.21	20.21	20.21	20.21	20.21
	Ø48			23.45	28.16	23.45	20.68	20.68	20.61	20.61	20.61	20.61	20.61

* 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 48 mm in 1-stage and 38 mm 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		
			Q6	Q7	Q9	Q6	Q7	Q9
Max acceleration force	F_{2B}	[N]	28 585	14 084	24 045	44 505	23 785	40 048
Max acceleration torque	T_{2B}	[Nm]	1 213	598	1 021	2 361	1 262	2 125
Precision			P1		P12	P1		P12
Feed force			High	Medium	Elevated	High	Medium	Elevated

Above values for rack and pinion take into consideration a number of load cycles: $1x10^6$ for the rack; $1x10^7$ for the pinion. Both in pulsating operation.

For proper sizing follow flowchart **calculate your ideal drive train** on pages 136 et seq.

More on the technical datasheets **your ideal drive train** on pages 120 et seq.

Input

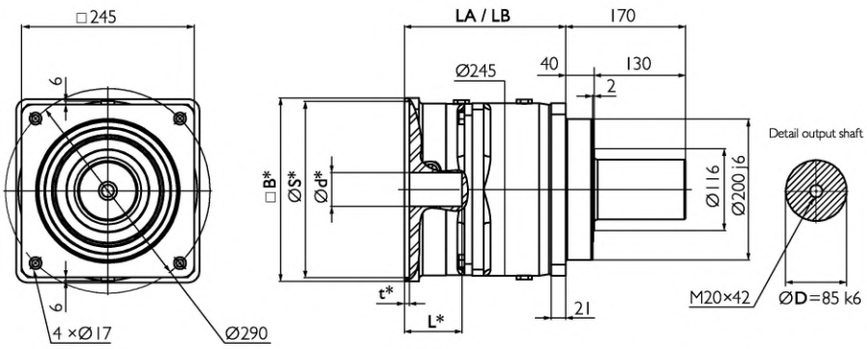
A	for motor shaft	L ≤ 85	24≤ Ød ≤ 48	result in **LA**
B	for motor shaft	85 < L ≤115	48 < Ød ≤ 55	result in **LB**

Output

Standard

0

		1-stage	2-stage	3-stage
LA	[mm]	229	300	371
LB	[mm]	259	330	

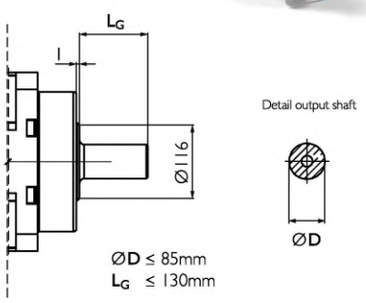


* depending on the motor. See pages 130 et seq.

Example NR 240 A0, 1-stage

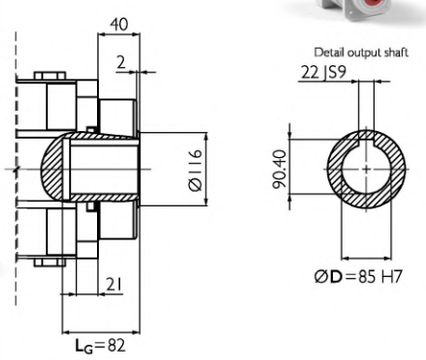
Optional

3

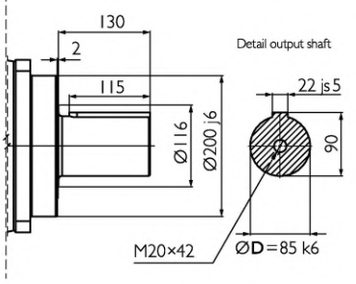


Option 3 on request. Adjustments can reduce capacity.

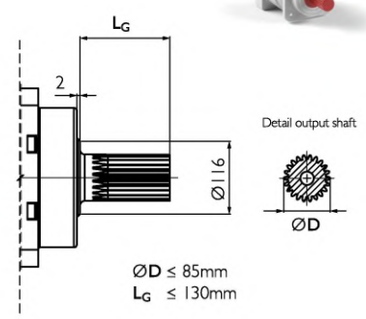
4



1

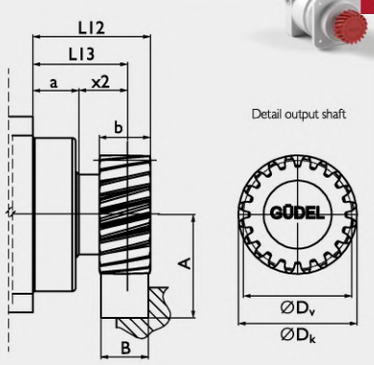


5



Option 5 on request. Adjustments can reduce capacity.

2



Your ideal drive train

Function Package with gearbox, rack and pinion from Güdel

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

Pinion

		m_n	P_t	z	A	b	D_k	D_0	D_v	L12	L13	x2	a	M
Pinion 1	[-]	5	16.66	24	97.662	50	137.32	127.324	127.324	112.5	87.5	47.5	40	5.4
Pinion 2	[-]	6	20.00	20	106.662	60	139.32	127.324	127.324	111.0	81.0	41.0	40	5.6

m_n: Normal module, P_t: Transverse pitch [mm], z: Number of teeth, D_0: Pitch circle diameter for calculation, D_v: Pitch circle diameter for design, M: Weight [kg]

Available ratios		i		1-stage 3	4	5	7	10
Nominal torque S5 a)		T_{2N}	[Nm]	2 400	2 700	2 700	2 500	1 700
Acceleration torque S5 b)		T_{2B}	[Nm]	3 400	3 800	3 800	3 600	2 400
Nominal input speed S5 c)		n_{1N}	[rpm]	1 000	1 000	1 000	1 500	1 500
Maximum input speed S5		n_{1max}	[rpm]	2 000	2 200	2 200	2 200	2 200
Nominal torque S1 a)		T_{2N}	[Nm]	1 400	1 600	1 600	1 600	1 600
Acceleration torque S1 b)		T_{2B}	[Nm]	1 750	1 750	1 750	1 750	1 750
Nominal input speed S1 c)		n_{1N}	[rpm]	700	900	900	1 350	1 350
Maximum input speed S1		n_{1max}	[rpm]	1 000	1 000	1 000	1 500	1 500
Emergency stop torque d)		T_{2not}	[Nm]	6 900	8 500	8 500	8 500	6 800
Efficiency		η	[%]	97				
Lifetime		L_h	[h]	> 20 000				
Weight		M	[kg]	70				
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]	626	684	698	728	698
Noise i)		L_{pA}	[dB(A)]	≤ 72				
Max. permitted housing temperature g)		T	[°C]	90				
Protection class				IP 65				
Direction of rotation				Motor way				
Max. radial force on output shaft f)		F_{rmax}	[N]	Center of output shaft: 30 000 / End of output shaft: 20 000				
Max. axial force on output shaft f)		F_{amax}	[N]	34 000				
Color				Red, RAL 3003				
Inertia in kg.cm² h)	Ø24	J_1	[kgcm²]	151.00	83.30	58.00	36.80	24.30
	Ø32			153.20	85.50	60.20	39.00	26.50
	Ø35			158.50	90.80	65.50	44.30	31.80
	Ø38			161.90	94.20	68.90	47.70	35.20
	Ø42			161.40	93.70	68.40	47.20	34.70
	Ø48			161.60	93.90	68.60	47.40	34.90
	Ø55			184.20	116.50	91.20	70.00	57.50

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 55 mm in 1-stage and 48 mm 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}=2000 rpm no load.

Rack

			Pinion 1 Q6	Q7	Q9	Pinion 2 Q6	Q7	Q9
Max acceleration force	F_{2B}	[N]	44 786	29 748	39 992	63 300	-	59 005
Max acceleration torque	T_{2B}	[Nm]	2 851	1 894	2 546	4 030	-	3 756
Precision			P1		P12	P1		P12
Feed force			High	Medium	Elevated	High	Medium	Elevated

Above values for rack and pinion take into consideration a number of load cycles: $1x10^6$ for the rack; $1x10^7$ for the pinion. Both in pulsating operation.

For proper sizing follow flowchart **calculate your ideal drive train** on pages 136 et seq.

More on the technical datasheets **your ideal drive train** on pages 120 et seq.

NR 240 | 2-stage — Planetary gearboxes — Drawings

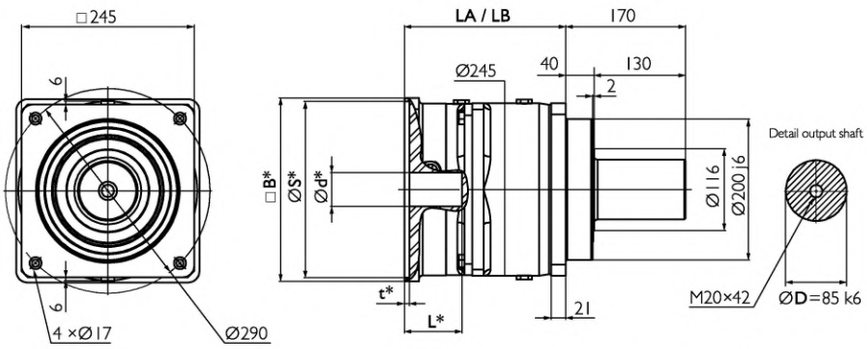
Input

A	for motor shaft	L ≤ 85	24≤ Ød ≤ 48	result in **LA**
B	for motor shaft	85 < L ≤115	48 < Ød ≤ 55	result in **LB**

Output

Standard

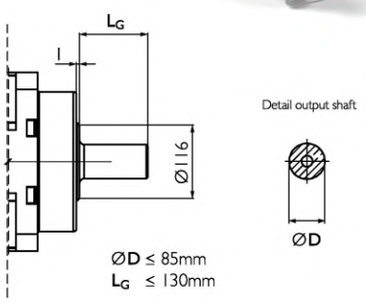
		1-stage	2-stage	3-stage
LA	[mm]	229	300	371
LB	[mm]	259	330	



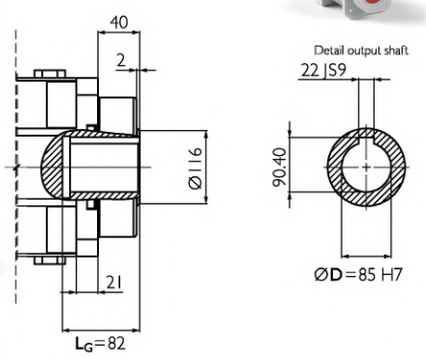
* depending on the motor. See pages 130 et seq.

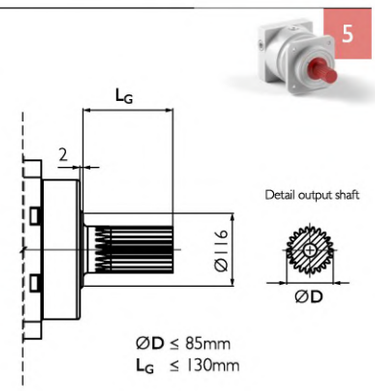
Example NR 240 A1, 1-stage

Optional

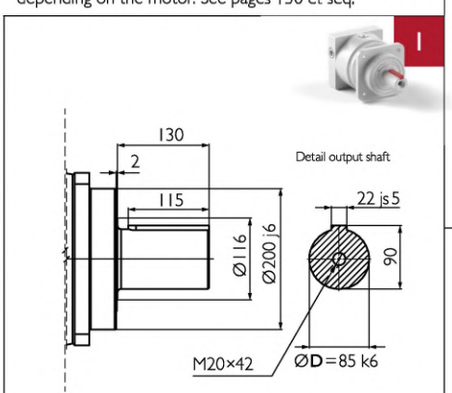


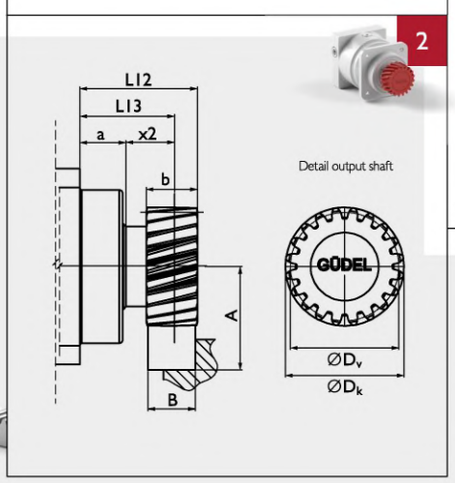
Option 3 on request. Adjustments can reduce capacity.





Option 5 on request. Adjustments can reduce capacity.





Your ideal drive train

Function Package with gearbox, rack and pinion from Güdel

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

Pinion

		m_n	P_t	z	A	b	D_k	D_0	D_v	L12	L13	x2	a	M
Pinion 1	[-]	5	16.66	24	97.662	50	137.32	127.324	127.324	112.5	87.5	47.5	40	5.4
Pinion 2	[-]	6	20.00	20	106.662	60	139.32	127.324	127.324	111.0	81.0	41.0	40	5.6

m_n: Normal module, P_t: Transverse pitch [mm], z: Number of teeth, D_0: Pitch circle diameter for calculation, D_v: Pitch circle diameter for design, M: Weight [kg]

NR 240 2-stage — Planetary gearboxes

Available ratios *		i		2-stage									
				12	16	20	25	30	35	40	50	70	100
Nominal torque S5 a)		T_{2N}	[Nm]	2 400	2 700	2 700	2 700	2 400	2 700	2 700	2 700	2 500	1 700
Acceleration torque S5 b)		T_{2B}	[Nm]	3 200	3 800	3 800	3 800	3 200	3 800	3 800	3 800	3 600	2 200
Nominal input speed S5 c)		n_{1N}	[rpm]	1 700	1 900	1 900	1 900	1 900	1 900	1 900	2 100	2 100	2 400
Maximum input speed S5		n_{1max}	[rpm]	3 500	3 500	3 500	3 500	3 500	3 500	3 500	3 500	3 500	3 500
Nominal torque S1 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 S1 b)		T_{2B}	[Nm]	1 750	1 750	1 750	1 750	1 750	1 750	1 750	1 750	1 750	1 750
Nominal input speed S1 c)		n_{1N}	[rpm]	1 200	1 700	1 700	1 700	1 700	1 700	1 700	1 900	1 900	2 100
Maximum input speed S1		n_{1max}	[rpm]	1 700	1 900	1 900	1 900	1 900	1 900	1 900	2 100	2 100	2 400
Emergency stop torque d)		T_{2not}	[Nm]	6 900	8 500	8 500	8 500	6 900	8 500	8 500	8 500	8 500	6 800
Efficiency		η	[%]	94									
Lifetime		L_h	[h]	> 20 000									
Weight		M	[kg]	90									
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]	564.5	582.0	599.5	599.5	564.5	599.5	582.0	599.5	587.8	564.5
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_{rmax}	[N]	Center of output shaft: 30 000 / End of output shaft: 20 000									
Max. axial force on output shaft f)		F_{amax}	[N]	34 000									
Color				Red, RAL 3003									
Inertia in kg.cm² h)	Ø24	J_1	[kgcm²]	79.1	74.9	73.3	51.5	23.6	33.5	22.9	22.7	22.4	22.3
	Ø32			81.3	77.1	75.5	53.7	25.8	35.7	25.1	24.9	24.6	24.5
	Ø35			86.6	82.4	80.8	59	31.1	41	30.4	30.2	29.9	29.8
	Ø38			90	85.8	84.2	62.4	34.5	44.4	33.8	33.6	33.3	33.2
	Ø42			89.5	85.3	83.7	61.9	34	43.9	33.3	33.1	32.8	32.7
	Ø48			89.7	85.5	83.9	62.1	34.2	44.1	33.5	33.3	33	32.9
	Ø55			112.3	108.1	106.5	84.7	56.8	66.7	56.1	55.9	55.6	55.5

* 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 55 mm in 1-stage and 48 mm 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}=2000 rpm no load.

Rack

			Pinion 1			Pinion 2		
			Q6	Q7	Q9	Q6	Q7	Q9
Max acceleration force	F_{2B}	[N]	44 786	29 748	39 992	63 300	-	59 005
Max acceleration torque	T_{2B}	[Nm]	2 851	1 894	2 546	4 030	-	3 756
Precision			P1		P12	P1		P12
Feed force			High	Medium	Elevated	High	Medium	Elevated

Above values for rack and pinion take into consideration a number of load cycles:
$1x10^6$ for the rack; $1x10^7$ for the pinion. Both in pulsating operation.

For proper sizing follow flowchart **calculate your ideal drive train** on pages 136 et seq.

More on the technical datasheets **your ideal drive train** on pages 120 et seq.

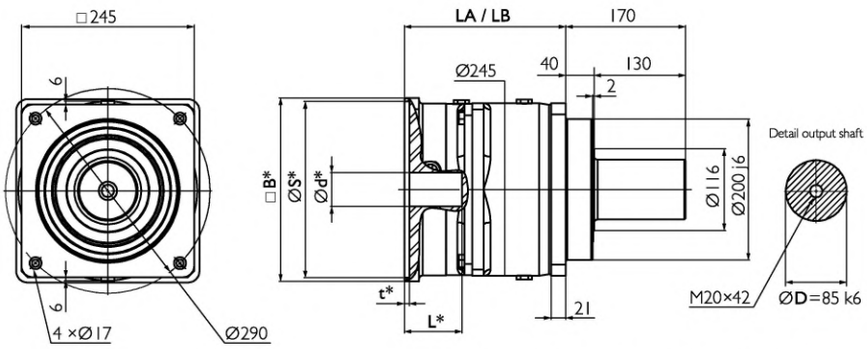
NR 240 | 3-stage — Planetary gearboxes

Drawings

Input

A	for motor shaft	L ≤ 85	24≤ Ød ≤ 48	result in **LA**
B	for motor shaft	85 < L ≤115	48 < Ød ≤ 55	result in **LB**

		1-stage	2-stage	3-stage
LA	[mm]	229	300	371
LB	[mm]	259	330	



* depending on the motor. See pages 130 et seq.

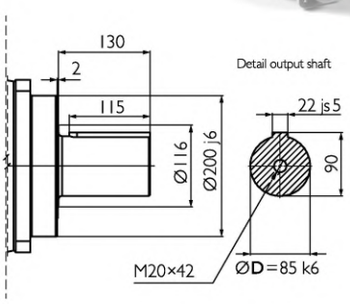
Example NR 240 A2, 1-stage

Output

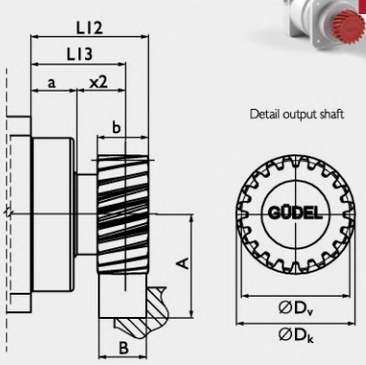
Standard

0

1

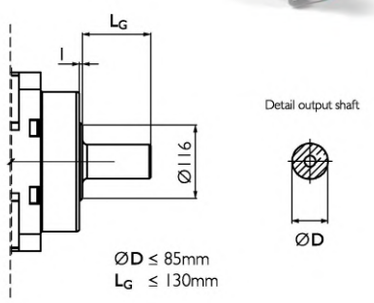


2



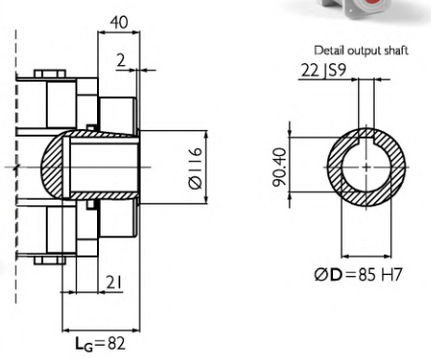
Optional

3

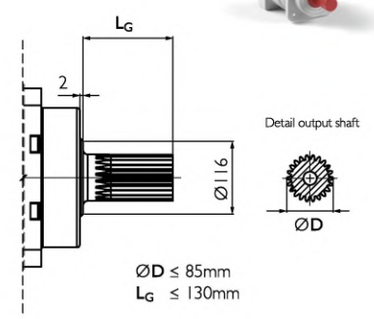


Option 3 on request. Adjustments can reduce capacity.

4



5



Option 5 on request. Adjustments can reduce capacity.

Your ideal drive train

Function Package with gearbox, rack and pinion from Güdel

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

Pinion

		m_n	P_t	z	A	b	D_k	D_0	D_v	L12	L13	x2	a	M
Pinion 1	[-]	5	16.66	24	97.662	50	137.32	127.324	127.324	112.5	87.5	47.5	40	5.4
Pinion 2	[-]	6	20.00	20	106.662	60	139.32	127.324	127.324	111.0	81.0	41.0	40	5.6

m_n: Normal module, P_t: Transverse pitch [mm], z: Number of teeth, D_0: Pitch circle diameter for calculation, D_v: Pitch circle diameter for design, M: Weight [kg]

NR 240 3-stage Planetary gearboxes

Available ratios *	i		3-stage 105	125	175	200	250	300	400	500	700	1 000
Nominal torque S5 a)	T_{2N}	[Nm]	2 700	2 700	2 700	2 700	2 700	2 400	2 700	2 700	2 500	1 500
Acceleration torque S5 b)	T_{2B}	[Nm]	3 800	3 800	3 800	3 800	3 800	3 000	3 800	3 800	3 600	2 200
Nominal input speed S5 c)	n_{1N}	[rpm]	2 400	2 400	2 400	2 400	2 400	2 400	2 400	2 400	2 400	2 400
Maximum input speed S5	n_{1max}	[rpm]	3 500	3 500	3 500	3 500	3 500	3 500	3 500	3 500	3 500	3 500
Nominal torque S1 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 S1 b)	T_{2B}	[Nm]	1 750	1 750	1 750	1 750	1 750	1 750	1 750	1 750	1 750	1 750
Nominal input speed S1 c)	n_{1N}	[rpm]	2 100	2 100	2 100	2 100	2 100	2 100	2 100	2 100	2 100	2 100
Maximum input speed S1	n_{1max}	[rpm]	2 400	2 400	2 400	2 400	2 400	2 400	2 400	2 400	2 400	2 400
Emergency stop torque d)	T_{2not}	[Nm]	8 500	8 500	8 500	8 500	8 500	6 900	8 500	8 500	8 500	6 800
Efficiency	η	[%]	91									
Lifetime	L_h	[h]	> 20 000									
Weight	M	[kg]	110									
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]	538	538	538	538	538	506	524	538	556	524
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: 30 000 / End of output shaft: 20 000									
Max. axial force on output shaft f)	F_{amax}	[N]	34 000									
Color			Red, RAL 3003									
Inertia in kg.cm² h) Ø24	J_1	[kgcm²]	35.10	51.30	35.10	22.80	22.60	22.30	22.30	22.30	22.30	22.30
Ø32			37.30	53.50	37.30	25.00	24.80	24.50	24.50	24.50	24.50	24.50
Ø35			42.60	58.80	42.60	30.30	30.10	29.80	29.80	29.80	29.80	29.80
Ø38			46.00	62.20	46.00	33.70	33.50	33.20	33.20	33.20	33.20	33.20
Ø42			45.50	61.70	45.50	33.20	33.00	32.70	32.70	32.70	32.70	32.70
Ø48			45.70	61.70	45.70	33.40	33.20	32.90	32.90	32.90	32.90	32.90
Ø55			68.30	84.50	68.30	56.00	55.80	55.50	55.50	55.50	55.50	55.50

* 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 55 mm in 1-stage and 48 mm 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}=2000 rpm no load.

Rack

			Pinion 1 Q6	Q7	Q9	Pinion 2 Q6	Q7	Q9
Max acceleration force	F_{2B}	[N]	44 786	29 748	39 992	63 300	-	59 005
Max acceleration torque	T_{2B}	[Nm]	2 851	1 894	2 546	4 030	-	3 756
Precision			P1		P12	P1		P12
Feed force			High	Medium	Elevated	High	Medium	Elevated

Above values for rack and pinion take into consideration a number of load cycles: $1x10^6$ for the rack; $1x10^7$ for the pinion. Both in pulsating operation.

For proper sizing follow flowchart **calculate your ideal drive train** on pages 136 et seq.

More on the technical datasheets **your ideal drive train** on pages 120 et seq.