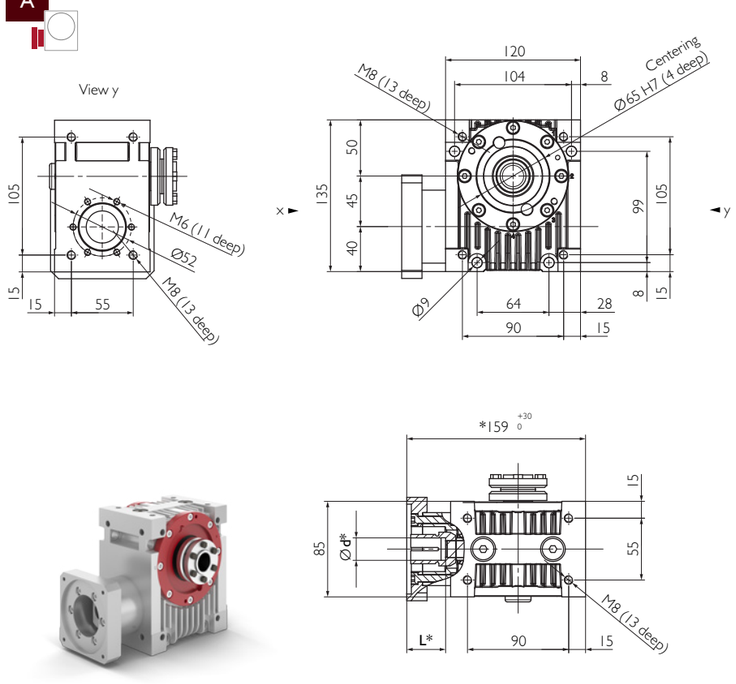
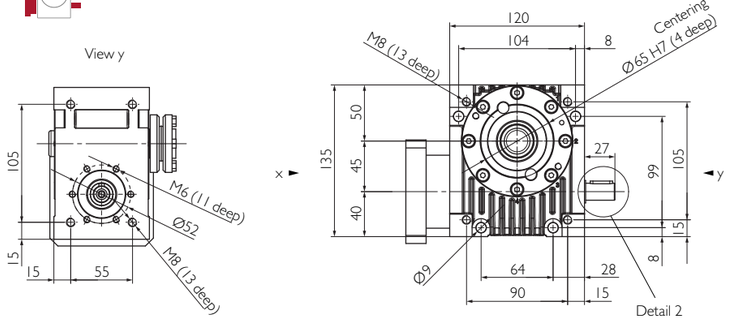
Input

A



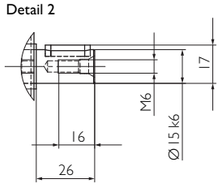
Example HPG 045 A2

B



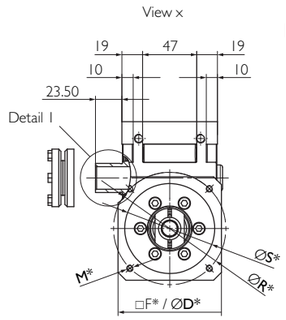
* Motor-specific gearbox dimensions
Ød: Ø motor shaft [mm], 6 ≤ **Ød** ≤ 24
L: Motor shaft length [mm], 20 ≤ **L** ≤ 53

Detail 2

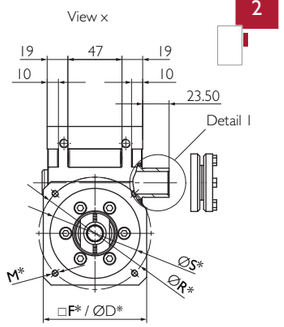


Output

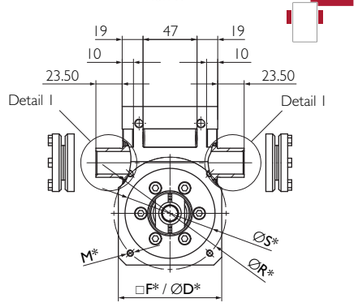
1



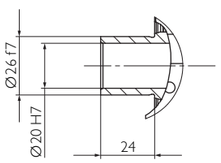
2



3



Detail I



* Motor-specific gearbox dimensions
S: min. 40 [mm], **R**: Pitch circle Ø [mm], **M**: Bore hole Ø or thread [mm], □**F** / Ø**D**: Specify flange [mm]

Ratio	i			2	3	4	5	6	8	10	13.33	16	24	30	47	60
Nominal torque at the output Efficiency	n_{1N} = 500 rpm	T_{2N}	[Nm]	52.7	73.9	83.9	80.5	70.8	81.7	75.5	73.9	75.0	77.9	54.5	79.4	54.5
		η	[%]	88	88	87	86	85	82	79	75	71	63	59	50	43
	n_{1N} = 1000 rpm	T_{2N}	[Nm]	43.8	63.3	73.1	71.0	62.9	72.9	67.7	66.4	74.0	72.2	54.5	71.5	55.5
		η	[%]	89	89	88	87	86	84	81	77	73	65	60	53	45
	n_{1N} = 1500 rpm	T_{2N}	[Nm]	37.4	55.4	64.8	63.4	56.5	65.8	61.3	60.3	67.2	65.6	55.5	65.1	55.5
		η	[%]	89	89	89	88	86	84	81	77	74	66	60	53	45
	n_{1N} = 3000 rpm	T_{2N}	[Nm]	26.0	40.3	48.3	48.1	43.4	51.0	47.8	47.2	52.7	51.6	51.8	51.3	51.8
		η	[%]	88	89	88	87	85	83	80	75	72	64	58	52	45
	n_{1N} = 4500 rpm	T_{2N}	[Nm]	20.0	31.6	38.5	38.7	35.2	41.6	39.2	38.8	43.3	42.5	42.7	42.3	42.7
		η	[%]	87	87	87	85	83	81	77	73	70	62	54	50	43
	n_{1N} = 6000 rpm	T_{2N}	[Nm]	16.2	26.0	32.0	32.4	29.6	35.2	33.2	33.0	36.8	36.1	36.4	36.0	36.4
		η	[%]	85	86	85	84	81	79	75	70	66	58	51	46	40
Max. acceleration torque		T_{2B}	[Nm]	60	90									60	90	60
Emergency stop torque		T_{2Not}	[Nm]	120										80	120	80
Idling torque[a]		T_{012}	[Nm]	1.05			0.95				0.8					
Max. input speed		n_{1Max}	[rpm]	6000												
Max. backlash[b] at the output	PS	j_t	[arcmin]	<15	<12	<11	<11	<9	<8					<7		
	PR	j_t	[arcmin]	<10	<8	<7	<7	<6	<5.5					<5		
Torsional rigidity vom Abtrieb zum Eintrieb		C_{t21}	[Nm/arcmin]	1.6	2.8	3.6	4	4.3	4.5	4.9	5.3	5.5	5.8	5.5	6	5.5
Stability at the output		C_{2K}	[Nm/arcmin]	30												
Max. axial force[c)d)] at the output			F_{a2max}	720	1000	1600	2200	2800	2900	3300	3700	3900	4700	4700	4800	4800
Max. radial force[c)e)] at the output			F_{r2max}	700	820	1200	1400	1600	1600	1600	1700	1800	2000	2100	2200	2200
Max. overturning torque[c)] at the output			M_{2max}	45	53	76	91	110	100	110	110	110	130	140	140	140
Max. axial force[c)d)] at the input			F_{a1max}	1400	980	860	1000	1300	1100	1300	1300	1200	1200	1200	1200	1200
Max. radial force[c)f)] at the input			F_{r1max}	510	470	430	510	590	550	610	630	580	610	600	620	600
Mass moment of inertia[g)]	Type 1[h)]	J_1	[10^{-6} kg m^2]	148	84	62	52	46	41	38	36	36	35	34	34	34
	Type 2[i)]	J_1	[10^{-6} kg m^2]	191	128	106	95	90	84	82	80	79	78	78	77	77
Service life		L_h	[h]	25000												
Weight without motor components		m	[kg]	4.5												
Max. permissible housing temperature			[°C]	+90												
Ambient temperature			[°C]	-15 up to +50												
Lubrication				synthetic gear oil (as per DIN 51502: CLP PG 460)												
Painting				None												
Protection class				IP65												

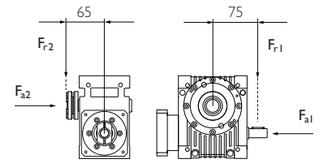
a) approximate, at n_1 = 3000 rpm and operating temperature.

b) Precision grade PS (standard backlash) for classic mechanical engineering applications.
Precision grade PR (reduced backlash) for precise process applications.

c) Bearing forces: Values valid at n_1 = 3000 rpm; ⅔ T_{2N} and duty cycle of 40%.
Consult with Güdel for composite bearing forces, axial and radial forces.
c) d) in relation to shaft center.
c) e) at a distance of 65 mm from the middle of the casing.
c) f) at a distance of 75 mm from the middle of the casing.

g) in relation to the input, including coupling and shrink disc at the output (output 1 & 2), with two shrink discs (output 3) increase values by 90/i^2.
g) h) Motor shaft diameter Ø**d** from Ø6 to Ø20, calculated at Ø11mm.
g) i) Motor shaft diameter Ø**d** from Ø21 to Ø24, calculated at Ø24mm.

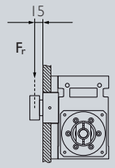
Bearing forces



Package

			Output Flange including Bearing & Pinion				
Radial rigidity	C_3	[N/mm]	23000				
Speed	n_{2N}	[rpm]	1500	750	400	150	100
Max. radial force[j)]	F_{rmax}	[N]	1900	2400	2900	3200	3500

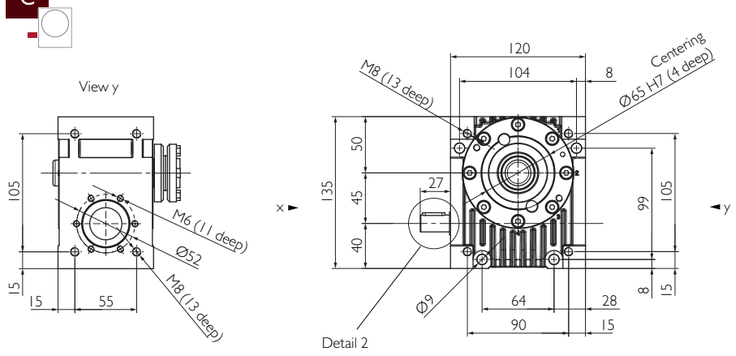
j) Bearing forces: Values valid at duty cycle of 40% at a distance of 15mm from the end of the bearing.

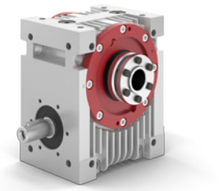


Detailed information about the **Package, Options & Accessories** on pages 46 and 47.

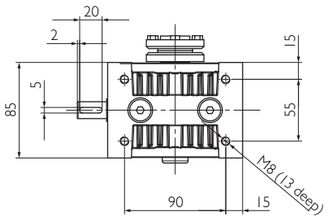
Input

C

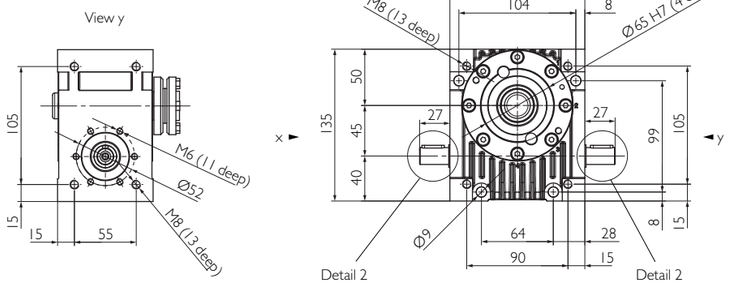


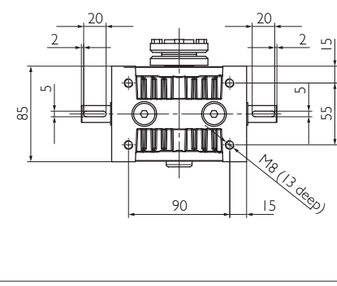


Example HPG 045 C2

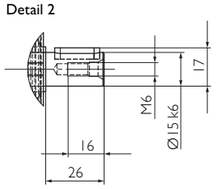


D



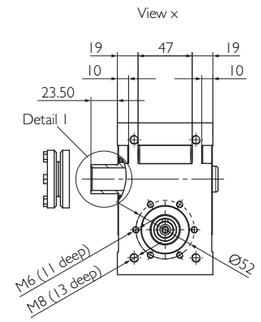


Detail 2

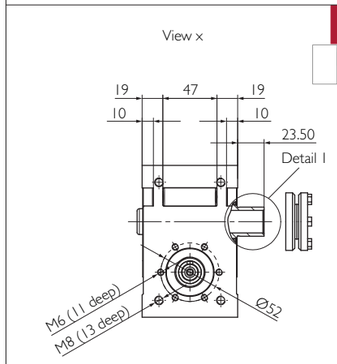


Output

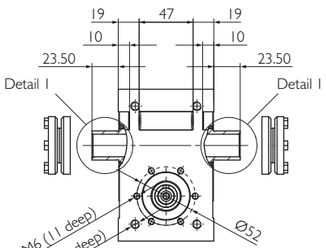
1



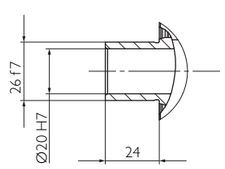
2



3



Detail 1



Ratio	i			2	3	4	5	6	8	10	13.33	16	24	30	47	60
Nominal torque at the output Efficiency	n_{1N} = 500 rpm	T_{2N}	[Nm]	52.7	73.9	83.9	80.5	70.8	81.7	75.5	73.9	75.0	77.9	54.5	79.4	54.5
		η	[%]	88	88	87	86	85	82	79	75	71	63	59	50	43
	n_{1N} = 1000 rpm	T_{2N}	[Nm]	43.8	63.3	73.1	71.0	62.9	72.9	67.7	66.4	74.0	72.2	54.5	71.5	55.5
		η	[%]	89	89	88	87	86	84	81	77	73	65	60	53	45
	n_{1N} = 1500 rpm	T_{2N}	[Nm]	37.4	55.4	64.8	63.4	56.5	65.8	61.3	60.3	67.2	65.6	55.5	65.1	55.5
		η	[%]	89	89	89	88	86	84	81	77	74	66	60	53	45
	n_{1N} = 3000 rpm	T_{2N}	[Nm]	26.0	40.3	48.3	48.1	43.4	51.0	47.8	47.2	52.7	51.6	51.8	51.3	51.8
		η	[%]	88	89	88	87	85	83	80	75	72	64	58	52	45
	n_{1N} = 4500 rpm	T_{2N}	[Nm]	20.0	31.6	38.5	38.7	35.2	41.6	39.2	38.8	43.3	42.5	42.7	42.3	42.7
		η	[%]	87	87	87	85	83	81	77	73	70	62	54	50	43
	n_{1N} = 6000 rpm	T_{2N}	[Nm]	16.2	26.0	32.0	32.4	29.6	35.2	33.2	33.0	36.8	36.1	36.4	36.0	36.4
		η	[%]	85	86	85	84	81	79	75	70	66	58	51	46	40
Max. acceleration torque		T_{2B}	[Nm]	60	90									60	90	60
Emergency stop torque		T_{2Not}	[Nm]	120										80	120	80
Idling torque[a]		T_{012}	[Nm]	1.05			0.95				0.8					
Max. input speed		n_{1Max}	[rpm]	6000												
Max. backlash[b] at the output	PS	j_t	[arcmin]	<15	<12	<11	<11	<9	<8					<7		
	PR	j_t	[arcmin]	<10	<8	<7	<7	<6	<5.5					<5		
Torsional rigidity vom Abtrieb zum Eintrieb		C_{t21}	[Nm/arcmin]	1.6	2.8	3.6	4	4.3	4.5	4.9	5.3	5.5	5.8	5.5	6	5.5
Stability at the output		C_{2K}	[Nm/arcmin]	30												
Max. axial force[c)d)] at the output			[N]	720	1000	1600	2200	2800	2900	3300	3700	3900	4700	4700	4800	4800
Max. radial force[c)e)] at the output			[N]	700	820	1200	1400	1600	1600	1600	1700	1800	2000	2100	2200	2200
Max. overturning torque[c)] at the output			[Nm]	45	53	76	91	110	100	110	110	110	130	140	140	140
Max. axial force[c)d)] at the input			[N]	1400	980	860	1000	1300	1100	1300	1300	1200	1200	1200	1200	1200
Max. radial force[c)f)] at the input			[N]	510	470	430	510	590	550	610	630	580	610	600	620	600
Mass moment of inertia[g]		J_1	[10^{-6} kg m^2]	120	57	34	24	19	13	10	9	8	7	6	6	6
Service life		L_h	[h]	25000												
Weight without motor components		m	[kg]	4												
Max. permissible housing temperature			[°C]	+90												
Ambient temperature			[°C]	-15 up to +50												
Lubrication				synthetic gear oil (as per DIN 51502: CLP PG 460)												
Painting				None												
Protection class				IP65												

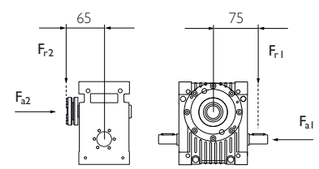
a) approximate, at n_1 = 3000 rpm and operating temperature.

b) Precision grade PS (standard backlash) for classic mechanical engineering applications.
Precision grade PR (reduced backlash) for precise process applications.

c) Bearing forces: Values valid at n_1 = 3000 rpm; ⅔ T_{2N} and duty cycle of 40%.
Consult with Güdel for composite bearing forces, axial and radial forces.
c) d) in relation to shaft center.
c) e) at a distance of 65 mm from the middle of the casing.
c) f) at a distance of 75 mm from the middle of the casing.

g) in relations to the input, including shrink disc at the output (output 1 & 2), with two shrink discs (output 3) increase values by 90/i^2.

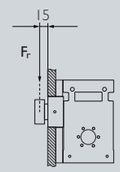
Bearing forces



Package

			Output Flange including Bearing & Pinion				
Radial rigidity	C_3	[N/mm]	23000				
Speed	n_{2N}	[rpm]	1500	750	400	150	100
Max. radial force[j]	F_{rmax}	[N]	1900	2400	2900	3200	3500

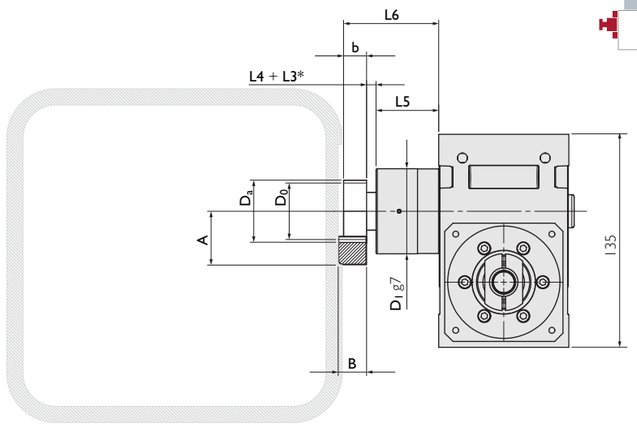
j) Bearing forces: Values valid at duty cycle of 40% at a distance of 15mm from the end of the bearing.

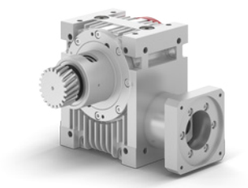


Detailed information about the **Package, Options & Accessories** on pages 46 and 47.

Output Flange including Bearing & Pinion[a)]

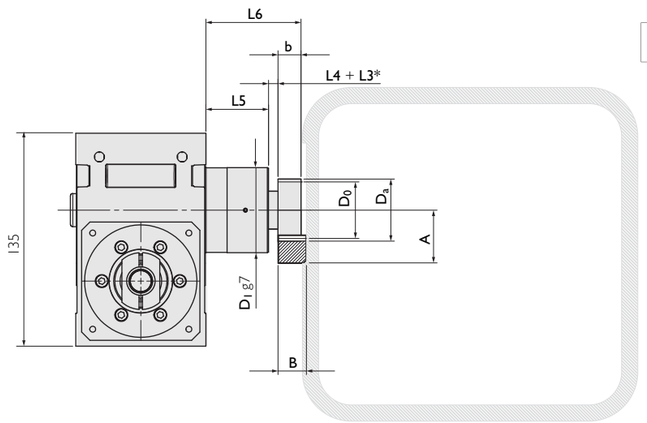
Package





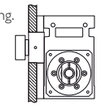
Example HPG 045 A1 Package

Package



a) Output flange in the area of the bearing is provided by the customer. Hole diameter tolerance H8.

* **L3** for additional distance ring.

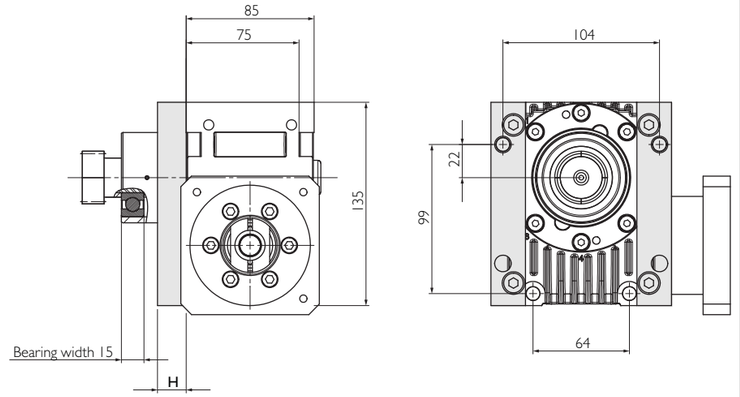


Geometric information

Helical modular pitch	Art. Nr.	m	z	A	b	B	D_a	D_0	D_1	L4	L5	L6
Pinion 1	211120	1.5	20	33.415	20	19	34.83	31.83	60	4.5	43	67.5
											53	77.5
Pinion 2	211216	2	16	39.575	20	24	39.15	35.15	60	8	43	71
											53	81

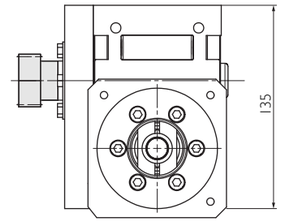
Straight modular pitch	Art. Nr.	m	z	A	b	B	D_a	D_0	D_1	L4	L5	L6
Pinion 3	201120	1.5	20	32.5	20	19	33.0	30.0	60	4.5	43	67.5
											53	77.5
Pinion 4	201216	2	16	38.6	20	24	37.2	33.2	60	8	43	71
											53	81

Spacer Elements

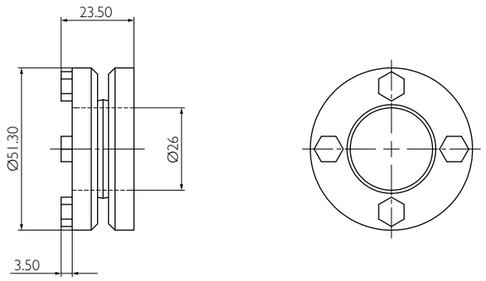


Casing can only be fastened with long screws as per the bore hole pattern.
Screws M8 of length 75mm + **H** + thread depth, tightening torque 22Nm.

with Pinion special solutions on request

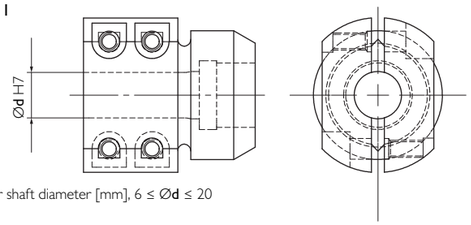


Shrink Disc



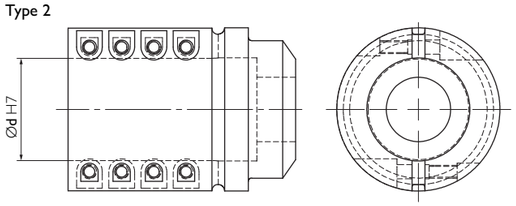
Coupling

Type 1



Motor shaft diameter [mm], 6 ≤ Ø**d** ≤ 20

Type 2



Motor shaft diameter [mm], 21 ≤ Ø**d** ≤ 24

Your ideal Drive Train

Our Function Package with high-performance angle gearbox, output flange, pinion and rack by Güdel.

			Pinion 1	Pinion 2	Pinion 3	Pinion 4
Maximum acceleration force	F_N	[N]	4237	5417	3638	4810
Maximum acceleration torque	T_N	[Nm]	67	92	55	77

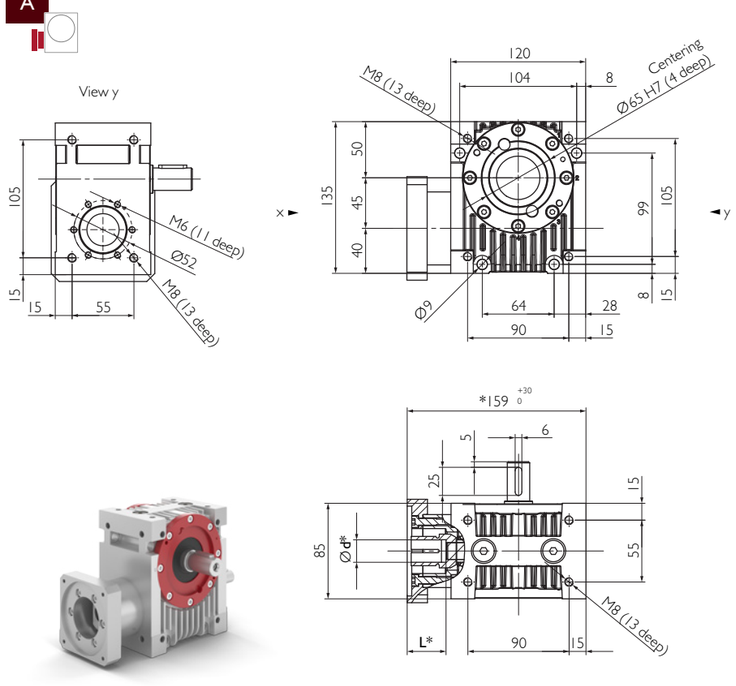
Higher value for rack and pinion taking account of the number of load cycles: 1×10^6 for the rack; 1×10^7 for the pinion. Both in cycle mode.

See **Rack & Pinion Program** of your ideal Drive Train on pages 104 et seq.

See **Flowcharts** to find your ideal Drive Train on pages 116 et seq.

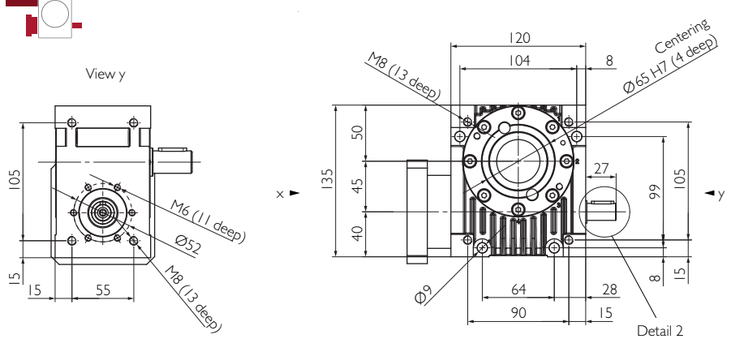
Input

A



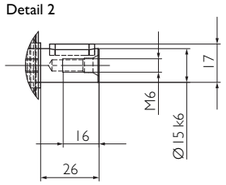
Example HPG 045 B5

B



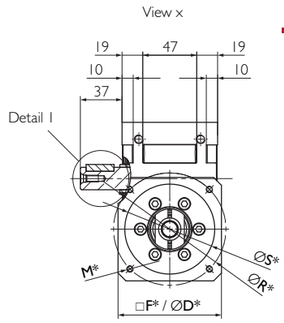
* Motor-specific gearbox dimensions
Ød: Ø motor shaft [mm], 6 ≤ **Ød** ≤ 24
L: Motor shaft length [mm], 20 ≤ **L** ≤ 53

Detail 2

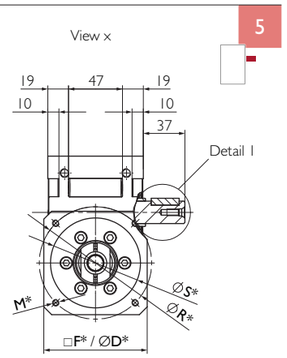


Output

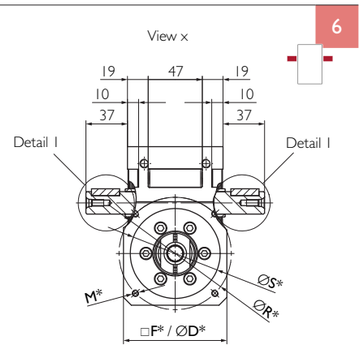
4



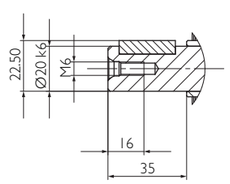
5



6



Detail I



* Motor-specific gearbox dimensions
S: min. 40 [mm], **R:** Pitch circle Ø [mm], **M:** Bore hole Ø or thread [mm], □**F** / Ø**D:** Specify flange [mm]

Ratio	i			2	3	4	5	6	8	10	13.33	16	24	30	47	60
Nominal torque at the output Efficiency	n_{1N} = 500 rpm	T_{2N}	[Nm]	52.7	73.9	83.9	80.5	70.8	81.7	75.5	73.9	75.0	77.9	54.5	79.4	54.5
		η	[%]	88	88	87	86	85	82	79	75	71	63	59	50	43
	n_{1N} = 1000 rpm	T_{2N}	[Nm]	43.8	63.3	73.1	71.0	62.9	72.9	67.7	66.4	74.0	72.2	54.5	71.5	55.5
		η	[%]	89	89	88	87	86	84	81	77	73	65	60	53	45
	n_{1N} = 1500 rpm	T_{2N}	[Nm]	37.4	55.4	64.8	63.4	56.5	65.8	61.3	60.3	67.2	65.6	55.5	65.1	55.5
		η	[%]	89	89	89	88	86	84	81	77	74	66	60	53	45
	n_{1N} = 3000 rpm	T_{2N}	[Nm]	26.0	40.3	48.3	48.1	43.4	51.0	47.8	47.2	52.7	51.6	51.8	51.3	51.8
		η	[%]	88	89	88	87	85	83	80	75	72	64	58	52	45
	n_{1N} = 4500 rpm	T_{2N}	[Nm]	20.0	31.6	38.5	38.7	35.2	41.6	39.2	38.8	43.3	42.5	42.7	42.3	42.7
		η	[%]	87	87	87	85	83	81	77	73	70	62	54	50	43
	n_{1N} = 6000 rpm	T_{2N}	[Nm]	16.2	26.0	32.0	32.4	29.6	35.2	33.2	33.0	36.8	36.1	36.4	36.0	36.4
		η	[%]	85	86	85	84	81	79	75	70	66	58	51	46	40
Max. acceleration torque		T_{2B}	[Nm]	60	90									60	90	60
Emergency stop torque		T_{2Not}	[Nm]	120										80	120	80
Idling torque[a]		T_{012}	[Nm]	1.05			0.95				0.8					
Max. input speed		n_{1Max}	[rpm]	6000												
Max. backlash[b] at the output	PS	j_t	[arcmin]	<15	<12	<11	<11	<9	<8					<7		
	PR	j_t	[arcmin]	<10	<8	<7	<7	<6	<5.5					<5		
Torsional rigidity vom Abtrieb zum Eintrieb		C_{t21}	[Nm/arcmin]	1.6	2.8	3.6	4	4.3	4.5	4.9	5.3	5.5	5.8	5.5	6	5.5
Stability at the output		C_{2K}	[Nm/arcmin]	30												
Max. axial force[c)d)] at the output			[N]	720	1000	1600	2200	2800	2900	3300	3700	3900	4700	4700	4800	4800
Max. radial force[c)e)] at the output			[N]	700	820	1200	1400	1600	1600	1600	1700	1800	2000	2100	2200	2200
Max. overturning torque[c)] at the output			[Nm]	45	53	76	91	110	100	110	110	110	130	140	140	140
Max. axial force[c)d)] at the input			[N]	1400	980	860	1000	1300	1100	1300	1300	1200	1200	1200	1200	1200
Max. radial force[c)f)] at the input			[N]	510	470	430	510	590	550	610	630	580	610	600	620	600
Mass moment of inertia[g)]	Type 1[h)]	J_1	[10^{-6} kg m^2]	148	84	62	52	46	41	38	36	36	35	34	34	34
	Type 2[i)]	J_1	[10^{-6} kg m^2]	191	128	106	95	90	84	82	80	79	78	78	77	77
Service life		L_h	[h]	25000												
Weight without motor components		m	[kg]	4.5												
Max. permissible housing temperature			[°C]	+90												
Ambient temperature			[°C]	-15 up to +50												
Lubrication				synthetic gear oil (as per DIN 51502: CLP PG 460)												
Painting				None												
Protection class				IP65												

a) approximate, at n_1 = 3000 rpm and operating temperature.

b) Precision grade PS (standard backlash) for classic mechanical engineering applications.
Precision grade PR (reduced backlash) for precise process applications.

c) Bearing forces: Values valid at n_1 = 3000 rpm; ⅔ T_{2N} and duty cycle of 40%.
Consult with Güdel for composite bearing forces, axial and radial forces.

c) d) in relation to shaft center.

c) e) at a distance of 65 mm from the middle of the casing.

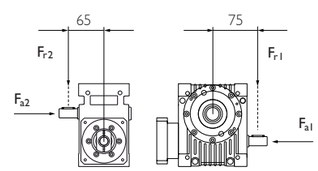
c) f) at a distance of 75 mm from the middle of the casing.

g) in relation to the input, including coupling.

g) h) Motor shaft diameter Ød from Ø6 to Ø20, calculated at Ø11mm.

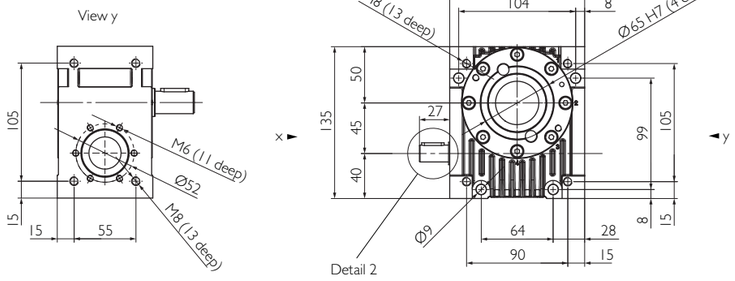
g) i) Motor shaft diameter Ød from Ø21 to Ø24, calculated at Ø24mm.

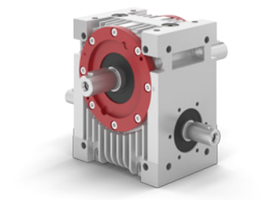
Bearing forces



Input

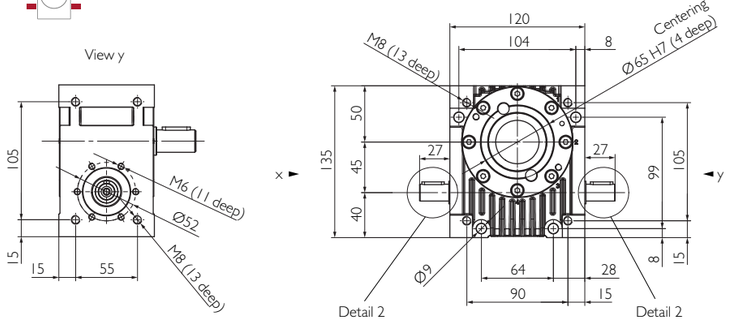
C

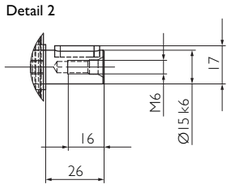


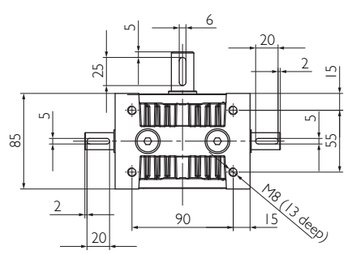


Example HPG 045 D6

D

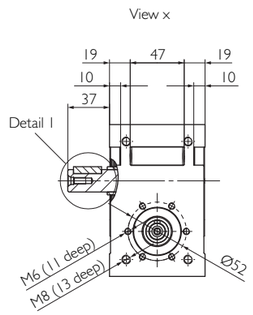






Output

4



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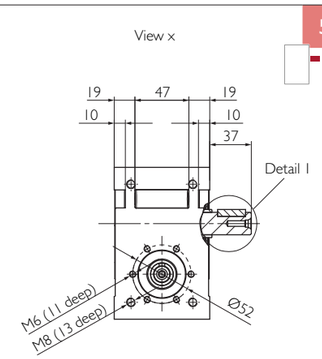
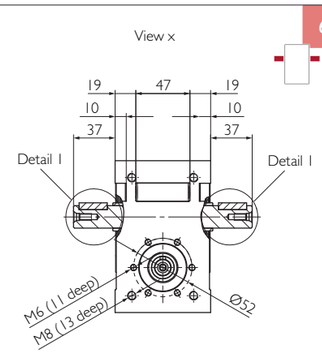
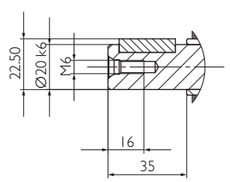


6



Detail 1



Ratio	i			2	3	4	5	6	8	10	13.33	16	24	30	47	60
Nominal torque at the output Efficiency	n_{1N} = 500 rpm	T_{2N}	[Nm]	52.7	73.9	83.9	80.5	70.8	81.7	75.5	73.9	75.0	77.9	54.5	79.4	54.5
		η	[%]	88	88	87	86	85	82	79	75	71	63	59	50	43
	n_{1N} = 1000 rpm	T_{2N}	[Nm]	43.8	63.3	73.1	71.0	62.9	72.9	67.7	66.4	74.0	72.2	54.5	71.5	55.5
		η	[%]	89	89	88	87	86	84	81	77	73	65	60	53	45
	n_{1N} = 1500 rpm	T_{2N}	[Nm]	37.4	55.4	64.8	63.4	56.5	65.8	61.3	60.3	67.2	65.6	55.5	65.1	55.5
		η	[%]	89	89	89	88	86	84	81	77	74	66	60	53	45
	n_{1N} = 3000 rpm	T_{2N}	[Nm]	26.0	40.3	48.3	48.1	43.4	51.0	47.8	47.2	52.7	51.6	51.8	51.3	51.8
		η	[%]	88	89	88	87	85	83	80	75	72	64	58	52	45
	n_{1N} = 4500 rpm	T_{2N}	[Nm]	20.0	31.6	38.5	38.7	35.2	41.6	39.2	38.8	43.3	42.5	42.7	42.3	42.7
		η	[%]	87	87	87	85	83	81	77	73	70	62	54	50	43
	n_{1N} = 6000 rpm	T_{2N}	[Nm]	16.2	26.0	32.0	32.4	29.6	35.2	33.2	33.0	36.8	36.1	36.4	36.0	36.4
		η	[%]	85	86	85	84	81	79	75	70	66	58	51	46	40
Max. acceleration torque		T_{2B}	[Nm]	60	90									60	90	60
Emergency stop torque		T_{2Not}	[Nm]	120										80	120	80
Idling torque[a]		T_{012}	[Nm]	1.05			0.95				0.8					
Max. input speed		n_{1Max}	[rpm]	6000												
Max. backlash[b] at the output	PS	j_t	[arcmin]	<15	<12	<11	<11	<9	<8					<7		
	PR	j_t	[arcmin]	<10	<8	<7	<7	<6	<5.5					<5		
Torsional rigidity vom Abtrieb zum Eintrieb		C_{t21}	[Nm/arcmin]	1.6	2.8	3.6	4	4.3	4.5	4.9	5.3	5.5	5.8	5.5	6	5.5
Stability at the output		C_{2K}	[Nm/arcmin]	30												
Max. axial force[c)d)] at the output			[N]	720	1000	1600	2200	2800	2900	3300	3700	3900	4700	4700	4800	4800
Max. radial force[c)e)] at the output			[N]	700	820	1200	1400	1600	1600	1600	1700	1800	2000	2100	2200	2200
Max. overturning torque[c)] at the output			[Nm]	45	53	76	91	110	100	110	110	110	130	140	140	140
Max. axial force[c)d)] at the input			[N]	1400	980	860	1000	1300	1100	1300	1300	1200	1200	1200	1200	1200
Max. radial force[c)f)] at the input			[N]	510	470	430	510	590	550	610	630	580	610	600	620	600
Mass moment of inertia[g]		J_1	[10^{-6} kg m^2]	120	57	34	24	19	13	10	9	8	7	6	6	6
Service life		L_h	[h]	25000												
Weight without motor components		m	[kg]	4												
Max. permissible housing temperature			[°C]	+90												
Ambient temperature			[°C]	-15 up to +50												
Lubrication				synthetic gear oil (as per DIN 51502: CLP PG 460)												
Painting				None												
Protection class				IP65												

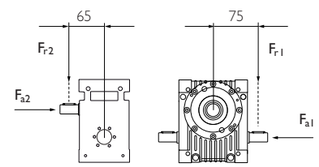
a) approximate, at n_1 = 3000 rpm and operating temperature.

b) Precision grade PS (standard backlash) for classic mechanical engineering applications.
Precision grade PR (reduced backlash) for precise process applications.

c) Bearing forces: Values valid at n_1 = 3000 rpm; ⅔ T_{2N} and duty cycle of 40%.
Consult with Güdel for composite bearing forces, axial and radial forces.
c) d) in relation to shaft center.
c) e) at a distance of 65 mm from the middle of the casing.
c) f) at a distance of 75 mm from the middle of the casing.

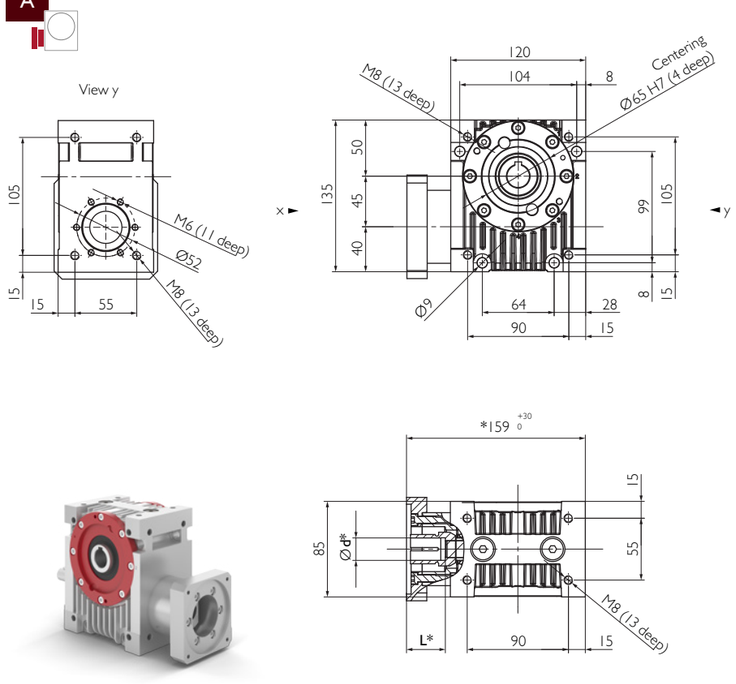
g) in relation to the input.

Bearing forces



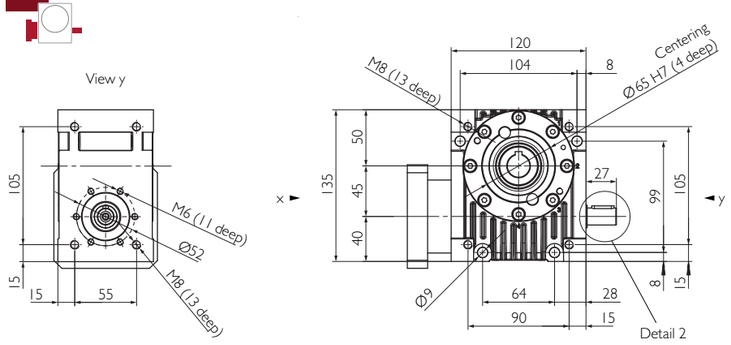
Input

A



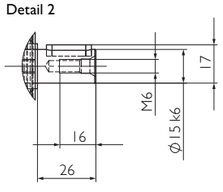
Example HPG 045 B7

B



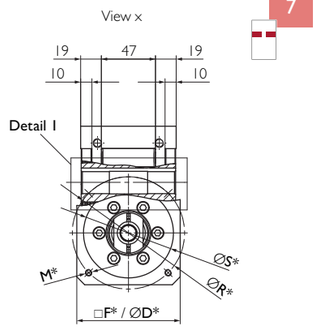
* Motor-specific gearbox dimensions
Ød: Ø motor shaft [mm], 6 ≤ **Ød** ≤ 24
L: Motor shaft length [mm], 20 ≤ **L** ≤ 53

Detail 2

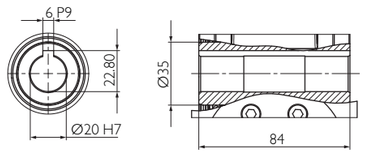


Output

7



Detail I



* Motor-specific gearbox dimensions
S: min. 40 [mm], **R:** Pitch circle Ø [mm], **M:** Bore hole Ø or thread [mm], □**F** / Ø**D:** Specify flange [mm]

Ratio	i			2	3	4	5	6	8	10	13.33	16	24	30	47	60
Nominal torque at the output Efficiency	n_{1N} = 500 rpm	T_{2N}	[Nm]	52.7	73.9	83.9	80.5	70.8	81.7	75.5	73.9	75.0	77.9	54.5	79.4	54.5
		η	[%]	88	88	87	86	85	82	79	75	71	63	59	50	43
	n_{1N} = 1000 rpm	T_{2N}	[Nm]	43.8	63.3	73.1	71.0	62.9	72.9	67.7	66.4	74.0	72.2	54.5	71.5	55.5
		η	[%]	89	89	88	87	86	84	81	77	73	65	60	53	45
	n_{1N} = 1500 rpm	T_{2N}	[Nm]	37.4	55.4	64.8	63.4	56.5	65.8	61.3	60.3	67.2	65.6	55.5	65.1	55.5
		η	[%]	89	89	89	88	86	84	81	77	74	66	60	53	45
	n_{1N} = 3000 rpm	T_{2N}	[Nm]	26.0	40.3	48.3	48.1	43.4	51.0	47.8	47.2	52.7	51.6	51.8	51.3	51.8
		η	[%]	88	89	88	87	85	83	80	75	72	64	58	52	45
	n_{1N} = 4500 rpm	T_{2N}	[Nm]	20.0	31.6	38.5	38.7	35.2	41.6	39.2	38.8	43.3	42.5	42.7	42.3	42.7
		η	[%]	87	87	87	85	83	81	77	73	70	62	54	50	43
	n_{1N} = 6000 rpm	T_{2N}	[Nm]	16.2	26.0	32.0	32.4	29.6	35.2	33.2	33.0	36.8	36.1	36.4	36.0	36.4
		η	[%]	85	86	85	84	81	79	75	70	66	58	51	46	40
Max. acceleration torque		T_{2B}	[Nm]	60	90									60	90	60
Emergency stop torque		T_{2Not}	[Nm]	120										80	120	80
Idling torque[a]		T_{012}	[Nm]	1.05			0.95				0.8					
Max. input speed		n_{1Max}	[rpm]	6000												
Max. backlash[b] at the output	PS	j_t	[arcmin]	<15	<12	<11	<11	<9	<8					<7		
	PR	j_t	[arcmin]	<10	<8	<7	<7	<6	<5.5					<5		
Torsional rigidity vom Abtrieb zum Eintrieb		C_{t21}	[Nm/arcmin]	1.6	2.8	3.6	4	4.3	4.5	4.9	5.3	5.5	5.8	5.5	6	5.5
Stability at the output		C_{2K}	[Nm/arcmin]	30												
Max. axial force[c)d)] at the output			[N]	360	600	1100	1600	2200	2400	2700	3100	3200	4000	4300	4400	4400
Max. radial force[c)e)] at the output			[N]	370	580	780	1200	1400	1400	1400	1500	1500	1700	1900	1900	1900
Max. overturning torque[c)] at the output			[Nm]	24	38	51	75	89	88	91	96	98	110	120	120	120
Max. axial force[c)d)] at the input			[N]	1400	980	860	1000	1300	1100	1300	1300	1200	1200	1200	1200	1200
Max. radial force[c)f)] at the input			[N]	510	470	430	510	590	550	610	630	580	610	600	620	600
Mass moment of inertia[g)]	Type 1[h)]	J_1	[10^{-6} kg m^2]	125	74	57	48	44	39	37	36	35	34	34	34	34
	Type 2[i)]	J_1	[10^{-6} kg m^2]	168	118	100	92	87	83	81	79	79	78	78	77	77
Service life		L_h	[h]	25000												
Weight without motor components		m	[kg]	4.5												
Max. permissible housing temperature			[°C]	+90												
Ambient temperature			[°C]	-15 up to +50												
Lubrication				synthetic gear oil (as per DIN 51502: CLP PG 460)												
Painting				None												
Protection class				IP65												

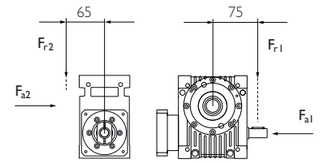
a) approximate, at n_1 = 3000 rpm and operating temperature.

b) Precision grade PS (standard backlash) for classic mechanical engineering applications.
Precision grade PR (reduced backlash) for precise process applications.

c) Bearing forces: Values valid at n_1 = 3000 rpm; ⅔ T_{2N} and duty cycle of 40%.
Consult with Güdel for composite bearing forces, axial and radial forces.
c) d) in relation to shaft center.
c) e) at a distance of 65 mm from the middle of the casing.
c) f) at a distance of 75 mm from the middle of the casing.

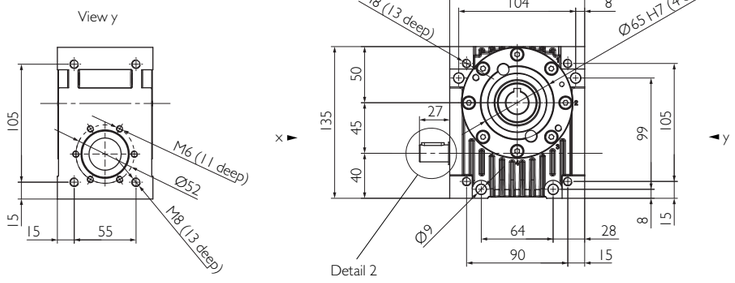
g) in relation to the input, including coupling.
g) h) Motor shaft diameter Ø**d** from Ø6 to Ø20, calculated at Ø11mm.
g) i) Motor shaft diameter Ø**d** from Ø21 to Ø24, calculated at Ø24mm.

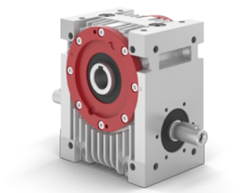
Bearing forces



Input

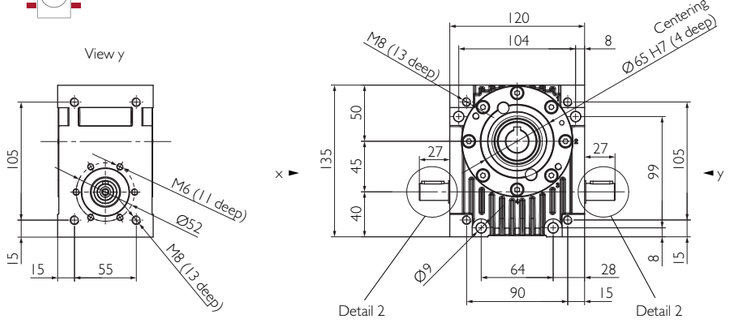
C

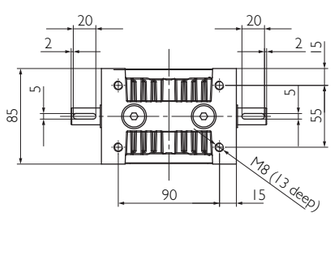




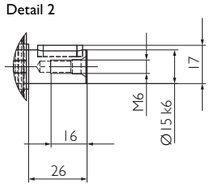
Example HPG 045 D7

D



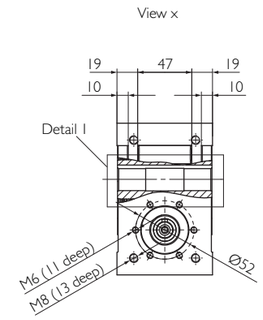


Detail 2

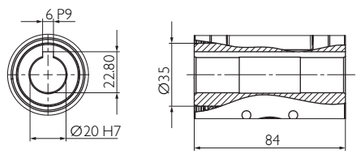


Output

7



Detail 1



Ratio	i			2	3	4	5	6	8	10	13.33	16	24	30	47	60
Nominal torque at the output Efficiency	n_{1N} = 500 rpm	T_{2N}	[Nm]	52.7	73.9	83.9	80.5	70.8	81.7	75.5	73.9	75.0	77.9	54.5	79.4	54.5
		η	[%]	88	88	87	86	85	82	79	75	71	63	59	50	43
	n_{1N} = 1000 rpm	T_{2N}	[Nm]	43.8	63.3	73.1	71.0	62.9	72.9	67.7	66.4	74.0	72.2	54.5	71.5	55.5
		η	[%]	89	89	88	87	86	84	81	77	73	65	60	53	45
	n_{1N} = 1500 rpm	T_{2N}	[Nm]	37.4	55.4	64.8	63.4	56.5	65.8	61.3	60.3	67.2	65.6	55.5	65.1	55.5
		η	[%]	89	89	89	88	86	84	81	77	74	66	60	53	45
	n_{1N} = 3000 rpm	T_{2N}	[Nm]	26.0	40.3	48.3	48.1	43.4	51.0	47.8	47.2	52.7	51.6	51.8	51.3	51.8
		η	[%]	88	89	88	87	85	83	80	75	72	64	58	52	45
	n_{1N} = 4500 rpm	T_{2N}	[Nm]	20.0	31.6	38.5	38.7	35.2	41.6	39.2	38.8	43.3	42.5	42.7	42.3	42.7
		η	[%]	87	87	87	85	83	81	77	73	70	62	54	50	43
	n_{1N} = 6000 rpm	T_{2N}	[Nm]	16.2	26.0	32.0	32.4	29.6	35.2	33.2	33.0	36.8	36.1	36.4	36.0	36.4
		η	[%]	85	86	85	84	81	79	75	70	66	58	51	46	40
Max. acceleration torque		T_{2B}	[Nm]	60	90									60	90	60
Emergency stop torque		T_{2Not}	[Nm]	120										80	120	80
Idling torque[a]		T_{012}	[Nm]	1.05			0.95				0.8					
Max. input speed		n_{1Max}	[rpm]	6000												
Max. backlash[b] at the output	PS	j_t	[arcmin]	<15	<12	<11	<11	<9	<8					<7		
	PR	j_t	[arcmin]	<10	<8	<7	<7	<6	<5.5					<5		
Torsional rigidity vom Abtrieb zum Eintrieb		C_{t21}	[Nm/arcmin]	1.6	2.8	3.6	4	4.3	4.5	4.9	5.3	5.5	5.8	5.5	6	5.5
Stability at the output		C_{2K}	[Nm/arcmin]	30												
Max. axial force[c)d)] at the output			[N]	360	600	1100	1600	2200	2400	2700	3100	3200	4000	4300	4400	4400
Max. radial force[c)e)] at the output			[N]	370	580	780	1200	1400	1400	1400	1500	1500	1700	1900	1900	1900
Max. overturning torque[c)] at the output			[Nm]	24	38	51	75	89	88	91	96	98	110	120	120	120
Max. axial force[c)d)] at the input			[N]	1400	980	860	1000	1300	1100	1300	1300	1200	1200	1200	1200	1200
Max. radial force[c)f)] at the input			[N]	510	470	430	510	590	550	610	630	580	610	600	620	600
Mass moment of inertia[g]		J_1	[10^{-6} kg m^2]	97	47	29	21	16	12	10	8	7	7	6	6	6
Service life		L_h	[h]	25000												
Weight without motor components		m	[kg]	4												
Max. permissible housing temperature			[°C]	+90												
Ambient temperature			[°C]	-15 up to +50												
Lubrication				synthetic gear oil (as per DIN 51502: CLP PG 460)												
Painting				None												
Protection class				IP65												

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b) Precision grade PS (standard backlash) for classic mechanical engineering applications.
Precision grade PR (reduced backlash) for precise process applications.

c) Bearing forces: Values valid at n_1 = 3000 rpm; ⅔ T_{2N} and duty cycle of 40%.
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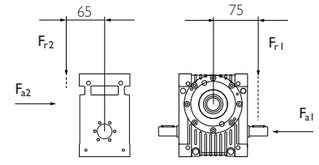
c) d) in relation to shaft center.

c) e) at a distance of 65 mm from the middle of the casing.

c) f) at a distance of 75 mm from the middle of the casing.

g) in relation to the input.

Bearing forces



at the output at the input