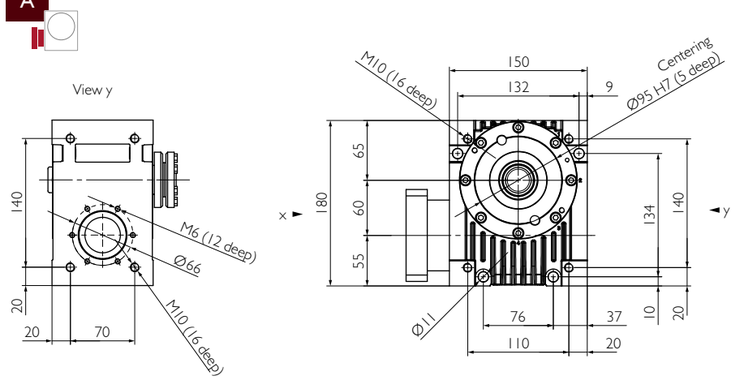
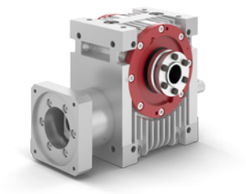
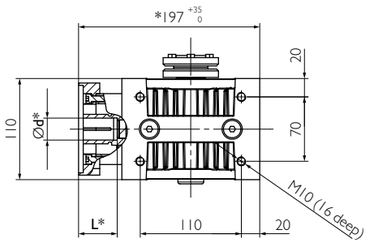
Input

A

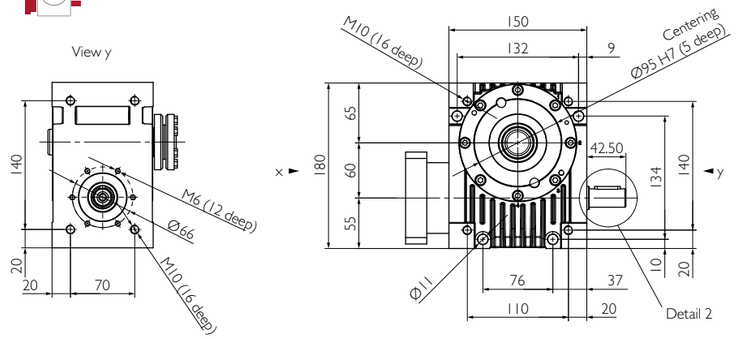


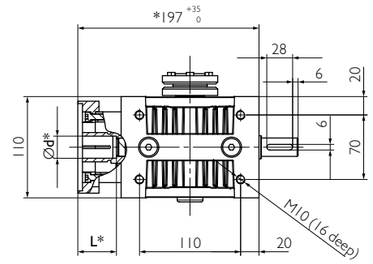


Example HPG 060 B2



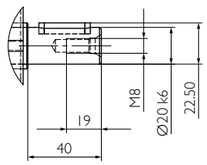
B





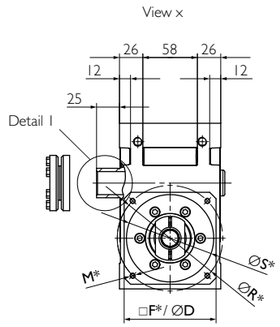
* Motor-specific gearbox dimensions
Ød: Ø motor shaft [mm], 8 ≤ **Ød** ≤ 35
L: Motor shaft length [mm], 25 ≤ **L** ≤ 66

Detail 2

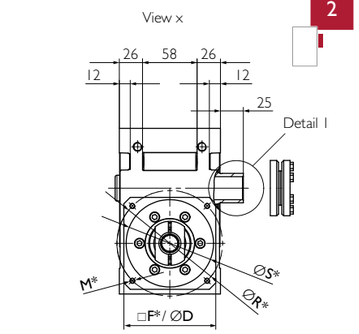


Output

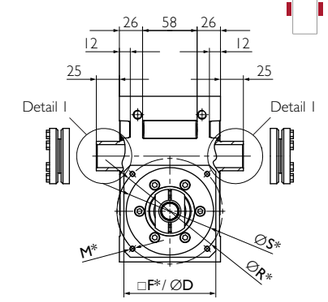
1



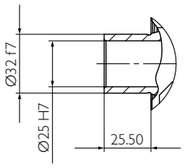
2



3



Detail I



* Motor-specific gearbox dimensions
S: min. 54 [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]	135	192	219	211	186	215	199	195	195	202	144	209	144
		η	[%]	89	89	88	88	87	84	82	78	74	67	64	54	50
	n_{1N} = 1000 rpm	T_{2N}	[Nm]	107	158	184	180	160	186	173	170	190	185	144	184	144
		η	[%]	90	90	90	89	88	86	84	81	77	70	65	56	53
	n_{1N} = 1500 rpm	T_{2N}	[Nm]	89	135	159	157	140	164	153	151	168	165	144	163	144
		η	[%]	90	91	90	89	89	86	84	81	78	70	65	56	52
	n_{1N} = 3000 rpm	T_{2N}	[Nm]	59	93	113	113	103	121	114	113	126	124	126	123	126
		η	[%]	90	90	90	89	88	86	83	80	77	69	64	55	50
	n_{1N} = 4500 rpm	T_{2N}	[Nm]	44	71	88	89	81	96	91	90	101	99	101	98	101
		η	[%]	89	89	89	88	87	84	82	78	75	67	61	52	47
	n_{1N} = 6000 rpm	T_{2N}	[Nm]	35	58	71	73	67	80	75	75	84	82	84	82	84
		η	[%]	88	88	88	87	85	83	80	75	72	64	58	48	44
Max. acceleration torque		T_{2B}	[Nm]	140	220									150	220	150
Emergency stop torque		T_{2Not}	[Nm]	300										200	300	200
Idling torque[a]		T_{012}	[Nm]	1.45			1.3				1.1					
Max. input speed		n_{1Max}	[rpm]	6000												
Max. backlash[b] at the output	PS	j_t	[arcmin]	<13	<10	<9	<9	<8	<7					<6		
	PR	j_t	[arcmin]	<9	<7	<6	<6	<5	<4.5					<4		
Torsional rigidity vom Abtrieb zum Eintrieb		C_{t21}	[Nm/arcmin]	2.5	4.8	7.6	8.6	10	11	12.1	13.3	14.5	15.4	15	16	15
Stability at the output		C_{2K}	[Nm/arcmin]	42												
Max. axial force[c)d)] at the output		F_{a2max}	[N]	1300	1700	2600	3600	4400	4100	4500	5100	5300	6500	7300	7500	7500
Max. radial force[c)e)] at the output		F_{r2max}	[N]	1300	1500	2100	2500	2800	2400	2500	2600	2700	3100	3300	3300	3300
Max. overturning torque[c)] at the output		M_{2max}	[Nm]	110	120	170	200	220	190	200	210	220	250	270	270	270
Max. axial force[c)d)] at the input		F_{a1max}	[N]	1700	990	750	1000	1400	1100	1400	1600	1200	1400	1300	1500	1300
Max. radial force[c)f)] at the input		F_{r1max}	[N]	690	510	390	520	720	560	710	760	610	650	620	690	630
Mass moment of inertia[g)]	Type 1[h)]	J_1	[10^{-6} kg m^2]	550	304	218	178	157	135	125	117	114	110	109	108	108
	Type 2[i)]	J_1	[10^{-6} kg m^2]	760	515	428	389	367	345	335	328	325	321	320	319	318
Service life		L_h	[h]	25000												
Weight without motor components		m	[kg]	9												
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												

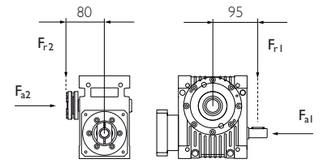
a) approximate, at n_1 = 3000 rpm and operating temperature.

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 80 mm from the middle of the casing.
c) f) at a distance of 95 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 200/i^2.
g) h) Motor shaft diameter Ø**d** from Ø8 to Ø24, calculated at Ø19mm.
g) i) Motor shaft diameter Ø**d** from Ø25 to Ø35, calculated at Ø28mm.

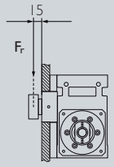
Bearing forces



Package

			Output Flange including Bearing & Pinion				
Radial rigidity	C_3	[N/mm]	24000				
Speed	n_{2N}	[rpm]	1500	750	400	150	100
Max. radial force[j)]	F_{rmax}	[N]	2500	3200	4000	4500	5000

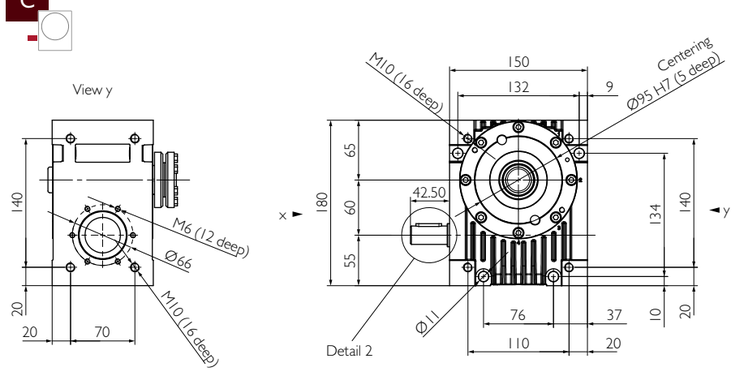
j) Bearing forces: Values valid at duty cycle of 40% at a distance of 15 mm from the end of the bearing.

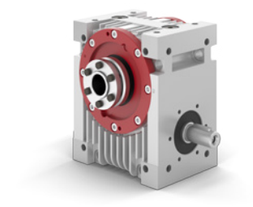


Detailed information about the **Package, Options & Accessories** on pages 60 and 61.

Input

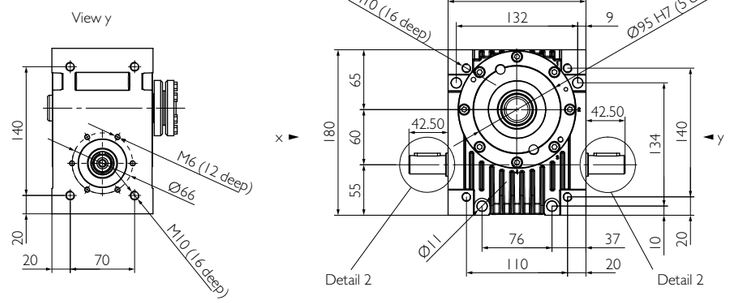
C

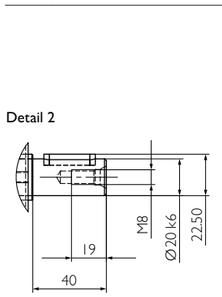


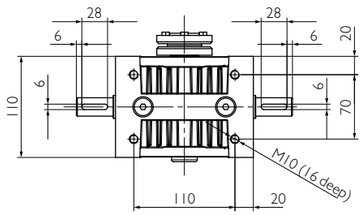


Example HPG 060 C1

D

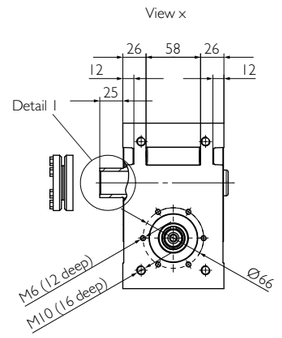




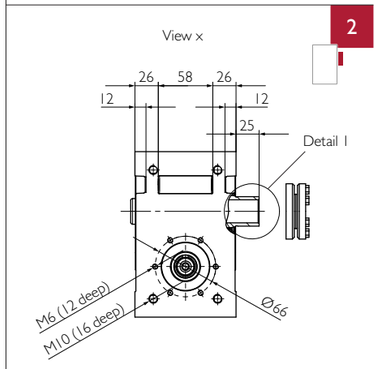


Output

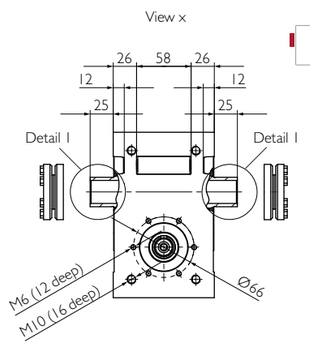
1



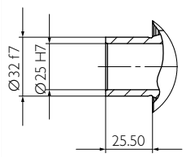
2



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]	135	192	219	211	186	215	199	195	195	202	144	209	144
		η	[%]	89	89	88	88	87	84	82	78	74	67	64	54	50
	n_{1N} = 1000 rpm	T_{2N}	[Nm]	107	158	184	180	160	186	173	170	190	185	144	184	144
		η	[%]	90	90	90	89	88	86	84	81	77	70	65	56	53
	n_{1N} = 1500 rpm	T_{2N}	[Nm]	89	135	159	157	140	164	153	151	168	165	144	163	144
		η	[%]	90	91	90	89	89	86	84	81	78	70	65	56	52
	n_{1N} = 3000 rpm	T_{2N}	[Nm]	59	93	113	113	103	121	114	113	126	124	126	123	126
		η	[%]	90	90	90	89	88	86	83	80	77	69	64	55	50
	n_{1N} = 4500 rpm	T_{2N}	[Nm]	44	71	88	89	81	96	91	90	101	99	101	98	101
		η	[%]	89	89	89	88	87	84	82	78	75	67	61	52	47
	n_{1N} = 6000 rpm	T_{2N}	[Nm]	35	58	71	73	67	80	75	75	84	82	84	82	84
		η	[%]	88	88	88	87	85	83	80	75	72	64	58	48	44
Max. acceleration torque		T_{2B}	[Nm]	140	220									150	220	150
Emergency stop torque		T_{2Not}	[Nm]	300										200	300	200
Idling torque[a]		T_{012}	[Nm]	1.45			1.3				1.1					
Max. input speed		n_{1Max}	[rpm]	6000												
Max. backlash[b] at the output	PS	j_t	[arcmin]	<13	<10	<9	<9	<8	<7					<6		
	PR	j_t	[arcmin]	<9	<7	<6	<6	<5	<4.5					<4		
Torsional rigidity vom Abtrieb zum Eintrieb		C_{t21}	[Nm/arcmin]	2.5	4.8	7.6	8.6	10	11	12.1	13.3	14.5	15.4	15	16	15
Stability at the output		C_{2K}	[Nm/arcmin]	42												
Max. axial force[c)d)] at the output		F_{a2max}	[N]	1300	1700	2600	3600	4400	4100	4500	5100	5300	6500	7300	7500	7500
Max. radial force[c)e)] at the output		F_{r2max}	[N]	1300	1500	2100	2500	2800	2400	2500	2600	2700	3100	3300	3300	3300
Max. overturning torque[c)] at the output		M_{2max}	[Nm]	110	120	170	200	220	190	200	210	220	250	270	270	270
Max. axial force[c)d)] at the input		F_{a1max}	[N]	1700	990	750	1000	1400	1100	1400	1600	1200	1400	1300	1500	1300
Max. radial force[c)f)] at the input		F_{r1max}	[N]	690	510	390	520	720	560	710	760	610	650	620	690	630
Mass moment of inertia[g]		J_1	[10^{-6} kg m^2]	467	221	135	95	74	52	42	34	31	27	26	25	25
Service life		L_h	[h]	25000												
Weight without motor components		m	[kg]	9												
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.

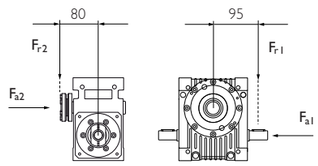
c) d) in relation to shaft center.

c) e) at a distance of 80 mm from the middle of the casing.

c) f) at a distance of 95 mm from the middle of the casing.

g) in relation to the input, including shrink disc at the output (output 1 & 2), with two shrink discs (output 3) increase values by 200/i^2.

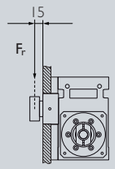
Bearing forces



Package

			Output Flange including Bearing & Pinion				
Radial rigidity	C_3	[N/mm]	24000				
Speed	n_{2N}	[rpm]	1500	750	400	150	100
Max. radial force[j]	F_{rmax}	[N]	2500	3200	4000	4500	5000

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

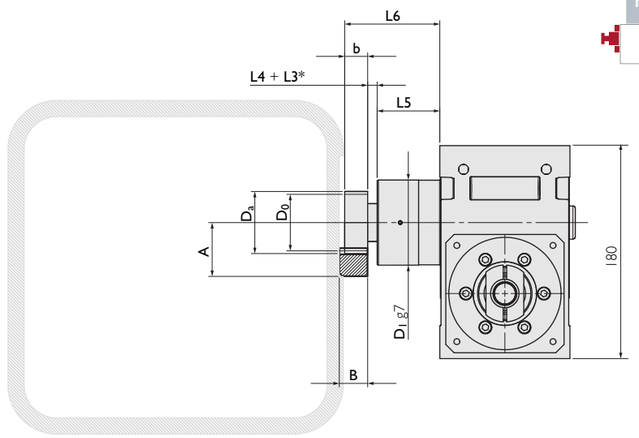


Detailed information about the **Package, Options & Accessories** on pages 60 and 61.

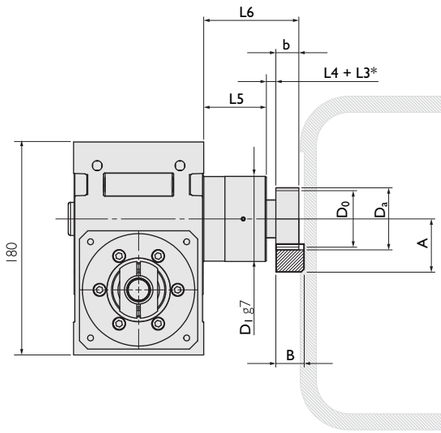
Output Flange including Bearing & Pinion[a)]

Package

Example HPG 060 C1 Package

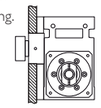


Package



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

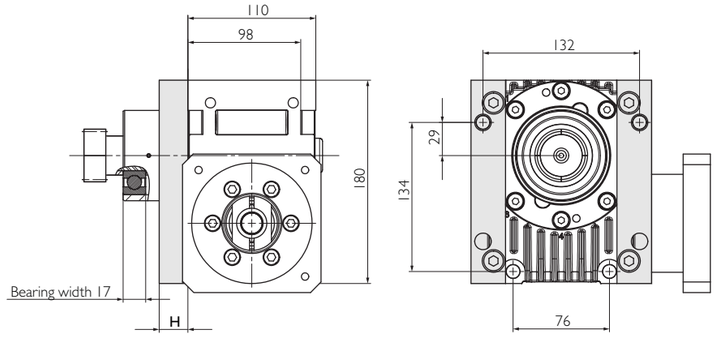
* **L3** for additional distance ring.



Helical modular pitch	Art. Nr.	m	z	A	b	B	D_a	D_0	D_1	L4	L5	L6
Pinion 1	211220	2	20	43.22	20	24	46.44	42.44	72	8	53	81
											58	86
											83	111
Pinion 2	211320	2.5	20	48.025	25	24	58.05	53.05	72	8	53	86
											58	91
											83	116
Pinion 3	211416	3	16	52.365	30	29	58.73	52.73	52.73	8	53	91
											58	96
											83	121

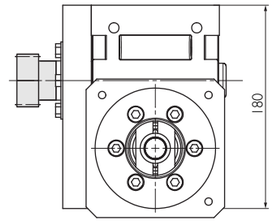
Straight modular pitch	Art. Nr.	m	z	A	b	B	D_a	D_0	D_1	L4	L5	L6
Pinion 4	201220	2	20	42.0	20	24	44.0	40.0	72	8	53	81
											58	86
											83	111
Pinion 5	201320	2.5	20	46.5	25	24	55.0	50.0	72	8	53	86
											58	91
											83	116
Pinion 6	201416	3	16	50.9	30	29	55.8	49.8	72	8	53	91
											58	96
											83	121

Spacer Elements

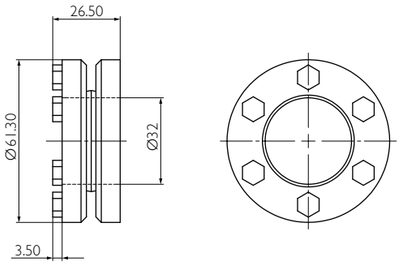


Casing can only be fastened with long screws as per the bore hole pattern.
Screws M10 of length 98mm + **H** + thread depth, tightening torque 42Nm.

with Pinion special solutions on request

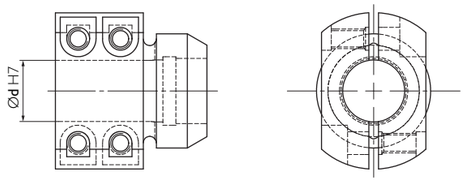


Shrink Disc



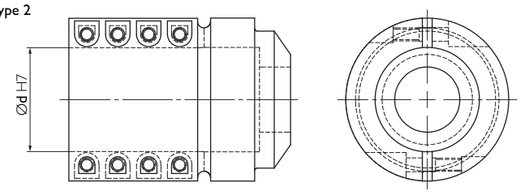
Coupling

Type 1



Motor shaft diameter [mm], 8 ≤ Ø**d** ≤ 24

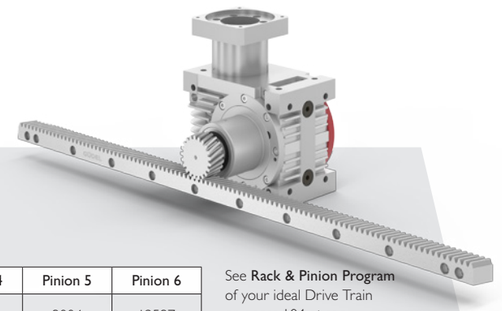
Type 2



Motor shaft diameter [mm], 25 ≤ Ø**d** ≤ 35

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	Pinion 5	Pinion 6
Maximum acceleration force	F_N	[N]	7480	10363	13589	5958	9004	12597
Maximum acceleration torque	T_N	[Nm]	159	275	346	119	225	302

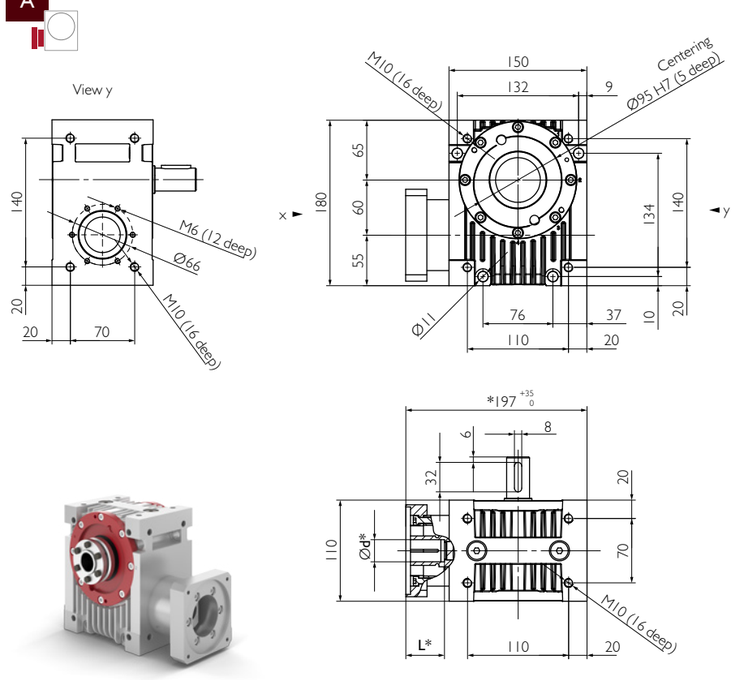
Higher value for rack and pinion taking account of the number of load cycles: 1×10^6 for the rack; 1×10^7 for the pinion. Both in cycle mode.

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.

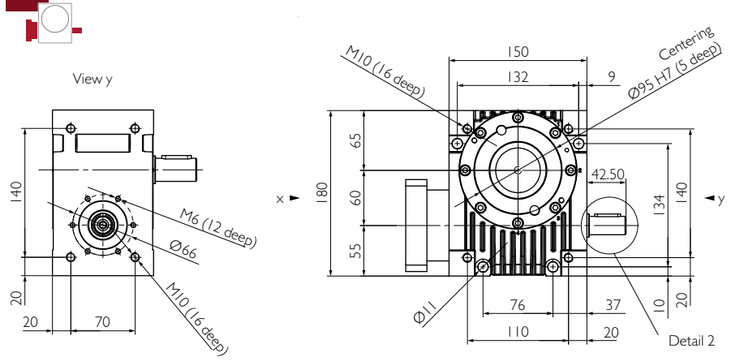
Input

A



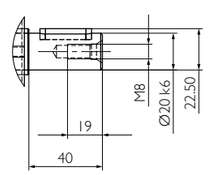
Example HPG 060 A6

B



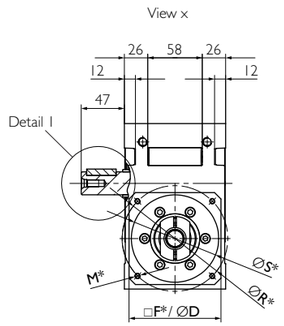
* Motor-specific gearbox dimensions
Ød: Ø motor shaft [mm], 4 ≤ **Ød** ≤ 19
L: Motor shaft length [mm], 20 ≤ **L** ≤ 33

Detail 2



Output

4



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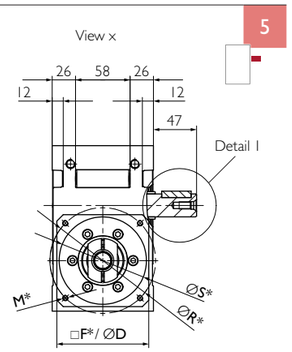

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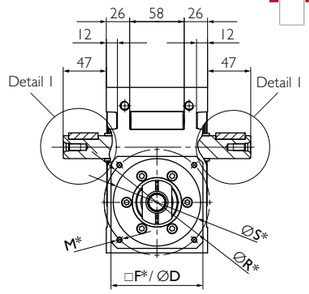
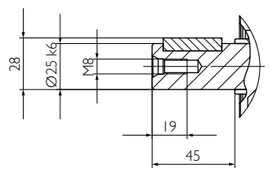


Detail I

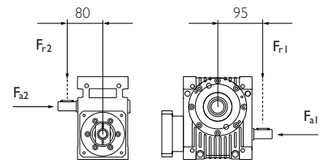


* Motor-specific gearbox dimensions
S: min. 32 [mm], **R**: Pitch circle Ø [mm], **M**: Bore hole Ø or thread [mm], □**F** / Ø**D**: Specify flange [mm]

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]	135	192	219	211	186	215	199	195	195	202	144	209	144
		η	[%]	89	89	88	88	87	84	82	78	74	67	64	54	50
	n_{1N} = 1000 rpm	T_{2N}	[Nm]	107	158	184	180	160	186	173	170	190	185	144	184	144
		η	[%]	90	90	90	89	88	86	84	81	77	70	65	56	53
	n_{1N} = 1500 rpm	T_{2N}	[Nm]	89	135	159	157	140	164	153	151	168	165	144	163	144
		η	[%]	90	91	90	89	89	86	84	81	78	70	65	56	52
	n_{1N} = 3000 rpm	T_{2N}	[Nm]	59	93	113	113	103	121	114	113	126	124	126	123	126
		η	[%]	90	90	90	89	88	86	83	80	77	69	64	55	50
	n_{1N} = 4500 rpm	T_{2N}	[Nm]	44	71	88	89	81	96	91	90	101	99	101	98	101
		η	[%]	89	89	89	88	87	84	82	78	75	67	61	52	47
	n_{1N} = 6000 rpm	T_{2N}	[Nm]	35	58	71	73	67	80	75	75	84	82	84	82	84
		η	[%]	88	88	88	87	85	83	80	75	72	64	58	48	44
Max. acceleration torque		T_{2B}	[Nm]	140	220									150	220	150
Emergency stop torque		T_{2Not}	[Nm]	300										200	300	200
Idling torque[a]		T_{012}	[Nm]	1.45			1.3				1.1					
Max. input speed		n_{1Max}	[rpm]	6000												
Max. backlash[b] at the output	PS	j_t	[arcmin]	<13	<10	<9	<9	<8	<7					<6		
	PR	j_t	[arcmin]	<9	<7	<6	<6	<5	<4.5					<4		
Torsional rigidity vom Abtrieb zum Eintrieb		C_{t21}	[Nm/arcmin]	2.5	4.8	7.6	8.6	10	11	12.1	13.3	14.5	15.4	15	16	15
Stability at the output		C_{2K}	[Nm/arcmin]	42												
Max. axial force[c) d)] at the output		F_{a2max}	[N]	1300	1700	2600	3600	4400	4100	4500	5100	5300	6500	7300	7500	7500
Max. radial force[c) e)] at the output		F_{r2max}	[N]	1300	1500	2100	2500	2800	2400	2500	2600	2700	3100	3300	3300	3300
Max. overturning torque[c)] at the output		M_{2max}	[Nm]	110	120	170	200	220	190	200	210	220	250	270	270	270
Max. axial force[c) d)] at the input		F_{a1max}	[N]	1700	990	750	1000	1400	1100	1400	1600	1200	1400	1300	1500	1300
Max. radial force[c) f)] at the input		F_{r1max}	[N]	690	510	390	520	720	560	710	760	610	650	620	690	630
Mass moment of inertia[g]	Type 1[h)]	J_1	[10^{-6} kg m^2]	550	304	218	178	157	135	125	117	114	110	109	108	108
	Type 2[i)]	J_1	[10^{-6} kg m^2]	760	515	428	389	367	345	335	328	325	321	320	319	318
Service life		L_h	[h]	25000												
Weight without motor components		m	[kg]	9												
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												

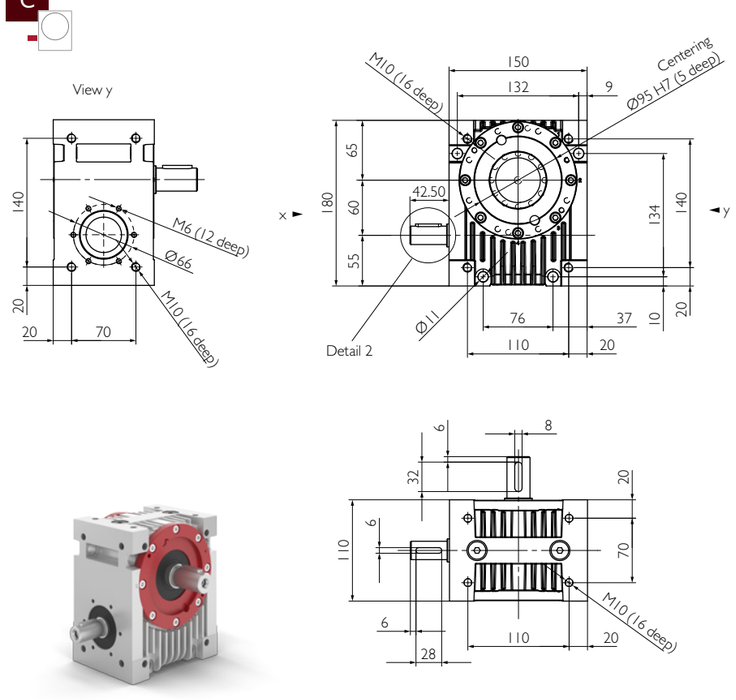
a) approximate, at n_1 = 3000 rpm and operating temperature.
b) Precision grade PS (standard backlash) for classic mechanical engineering applications.
Precision grade PR (reduced backlash) for precise process applications.
c) Bearing forces: Values valid at n_1 = 3000 rpm; ⅔ T_{2N} and duty cycle of 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 80 mm from the middle of the casing.
c) f) at a distance of 95 mm from the middle of the casing.
g) in relation to the input, including coupling.
g) h) Motor shaft diameter Ø**d** from Ø8 to Ø24, calculated at Ø19mm.
g) i) Motor shaft diameter Ø**d** from Ø25 to Ø35, calculated at Ø28mm.

Bearing forces



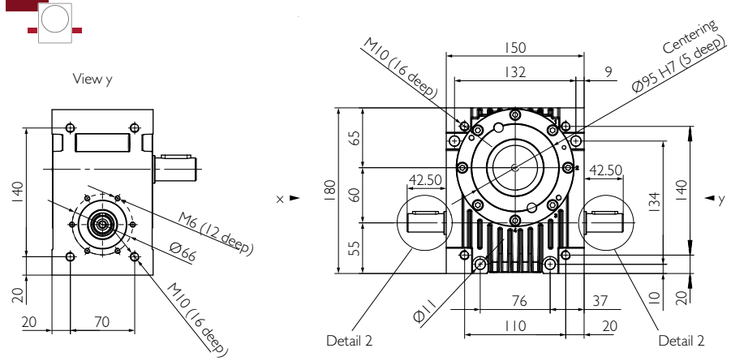
Input

C

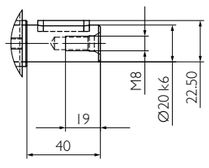


Example HPG 060 C5

D

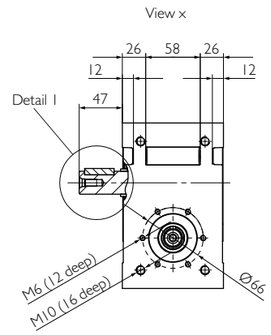


Detail 2



Output

4



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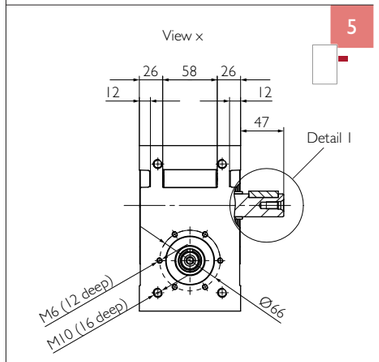

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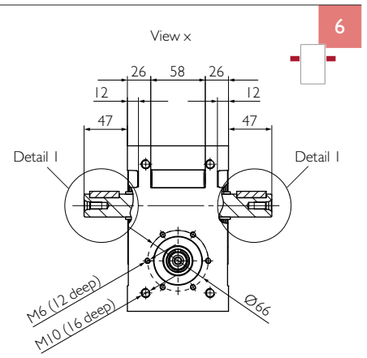
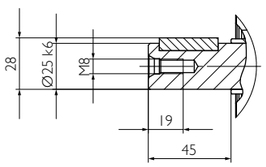


Detail 1



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]	135	192	219	211	186	215	199	195	195	202	144	209	144
		η	[%]	89	89	88	88	87	84	82	78	74	67	64	54	50
	n_{1N} = 1000 rpm	T_{2N}	[Nm]	107	158	184	180	160	186	173	170	190	185	144	184	144
		η	[%]	90	90	90	89	88	86	84	81	77	70	65	56	53
	n_{1N} = 1500 rpm	T_{2N}	[Nm]	89	135	159	157	140	164	153	151	168	165	144	163	144
		η	[%]	90	91	90	89	89	86	84	81	78	70	65	56	52
	n_{1N} = 3000 rpm	T_{2N}	[Nm]	59	93	113	113	103	121	114	113	126	124	126	123	126
		η	[%]	90	90	90	89	88	86	83	80	77	69	64	55	50
	n_{1N} = 4500 rpm	T_{2N}	[Nm]	44	71	88	89	81	96	91	90	101	99	101	98	101
		η	[%]	89	89	89	88	87	84	82	78	75	67	61	52	47
	n_{1N} = 6000 rpm	T_{2N}	[Nm]	35	58	71	73	67	80	75	75	84	82	84	82	84
		η	[%]	88	88	88	87	85	83	80	75	72	64	58	48	44
Max. acceleration torque		T_{2B}	[Nm]	140	220									150	220	150
Emergency stop torque		T_{2Not}	[Nm]	300										200	300	200
Idling torque[a]		T_{012}	[Nm]	1.45			1.3				1.1					
Max. input speed		n_{1Max}	[rpm]	6000												
Max. backlash[b] at the output	PS	j_t	[arcmin]	<13	<10	<9	<9	<8	<7					<6		
	PR	j_t	[arcmin]	<9	<7	<6	<6	<5	<4.5					<4		
Torsional rigidity vom Abtrieb zum Eintrieb		C_{t21}	[Nm/arcmin]	2.5	4.8	7.6	8.6	10	11	12.1	13.3	14.5	15.4	15	16	15
Stability at the output		C_{2K}	[Nm/arcmin]	42												
Max. axial force[c)d)] at the output		F_{a2max}	[N]	1300	1700	2600	3600	4400	4100	4500	5100	5300	6500	7300	7500	7500
Max. radial force[c)e)] at the output		F_{r2max}	[N]	1300	1500	2100	2500	2800	2400	2500	2600	2700	3100	3300	3300	3300
Max. overturning torque[c)] at the output		M_{2max}	[Nm]	110	120	170	200	220	190	200	210	220	250	270	270	270
Max. axial force[c)d)] at the input		F_{a1max}	[N]	1700	990	750	1000	1400	1100	1400	1600	1200	1400	1300	1500	1300
Max. radial force[c)f)] at the input		F_{r1max}	[N]	690	510	390	520	720	560	710	760	610	650	620	690	630
Mass moment of inertia[g]		J_1	[10^{-6} kg m^2]	467	221	135	95	74	52	42	34	31	27	26	25	25
Service life		L_h	[h]	25000												
Weight without motor components		m	[kg]	9												
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.

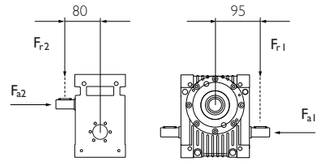
c) d) in relation to shaft center.

c) e) at a distance of 80 mm from the middle of the casing.

c) f) at a distance of 95 mm from the middle of the casing.

g) in relation to the input.

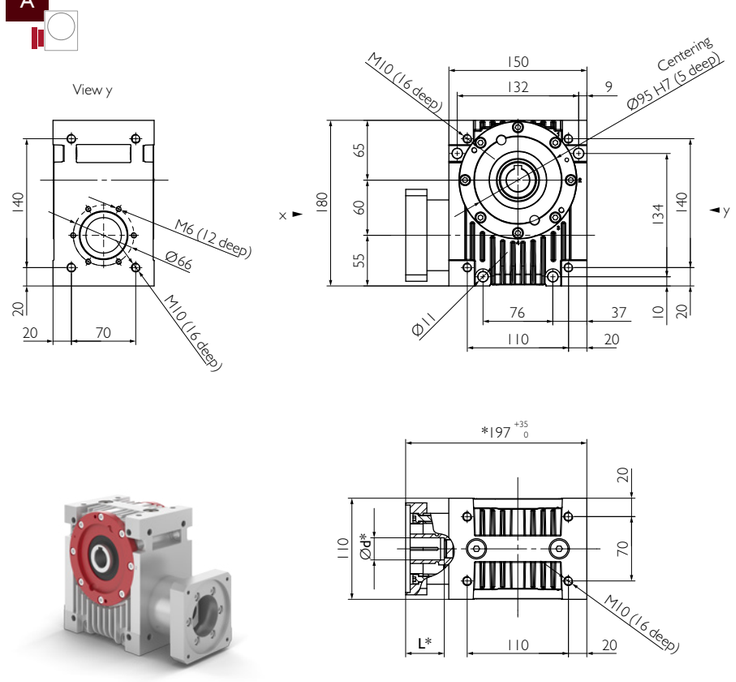
Bearing forces



at the output at the input

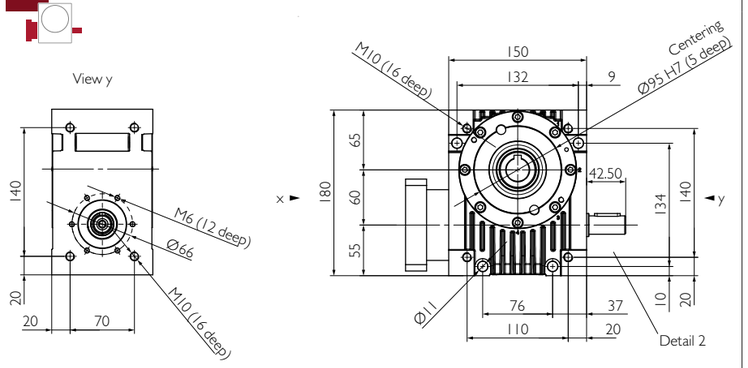
Input

A



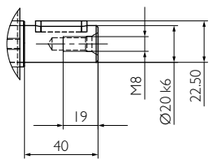
Example HPG 060 A7

B



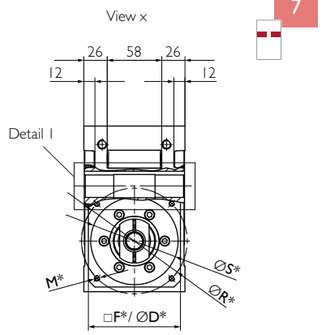
* Motor-specific gearbox dimensions
Ød: Ø motor shaft [mm], 8 ≤ **Ød** ≤ 35
L: Motor shaft length [mm], 25 ≤ **L** ≤ 66

Detail 2

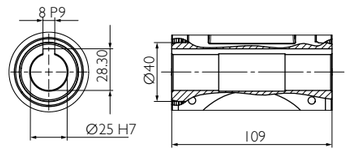


Output

7



Detail 1

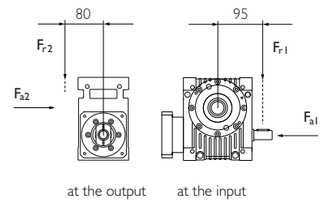


* Motor-specific gearbox dimensions
S: min. 54 [mm], **R**: Pitch circle Ø [mm], **M**: Bore hole Ø or thread [mm], □**F** / Ø**D**: Specify flange [mm]

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]	135	192	219	211	186	215	199	195	195	202	144	209	144
		η	[%]	89	89	88	88	87	84	82	78	74	67	64	54	50
	n_{1N} = 1000 rpm	T_{2N}	[Nm]	107	158	184	180	160	186	173	170	190	185	144	184	144
		η	[%]	90	90	90	89	88	86	84	81	77	70	65	56	53
	n_{1N} = 1500 rpm	T_{2N}	[Nm]	89	135	159	157	140	164	153	151	168	165	144	163	144
		η	[%]	90	91	90	89	89	86	84	81	78	70	65	56	52
	n_{1N} = 3000 rpm	T_{2N}	[Nm]	59	93	113	113	103	121	114	113	126	124	126	123	126
		η	[%]	90	90	90	89	88	86	83	80	77	69	64	55	50
	n_{1N} = 4500 rpm	T_{2N}	[Nm]	44	71	88	89	81	96	91	90	101	99	101	98	101
		η	[%]	89	89	89	88	87	84	82	78	75	67	61	52	47
	n_{1N} = 6000 rpm	T_{2N}	[Nm]	35	58	71	73	67	80	75	75	84	82	84	82	84
		η	[%]	88	88	88	87	85	83	80	75	72	64	58	48	44
Max. acceleration torque		T_{2B}	[Nm]	140	220									150	220	150
Emergency stop torque		T_{2Not}	[Nm]	300										200	300	200
Idling torque[a]		T_{012}	[Nm]	1.45			1.3				1.1					
Max. input speed		n_{1Max}	[rpm]	6000												
Max. backlash[b] at the output	PS	j_t	[arcmin]	<13	<10	<9	<9	<8	<7					<6		
	PR	j_t	[arcmin]	<9	<7	<6	<6	<5	<4.5					<4		
Torsional rigidity vom Abtrieb zum Eintrieb		C_{t21}	[Nm/arcmin]	2.5	4.8	7.6	8.6	10	11	12.1	13.3	14.5	15.4	15	16	15
Stability at the output		C_{2K}	[Nm/arcmin]	42												
Max. axial force[c)d)] at the output		F_{a2max}	[N]	780	1100	1900	2800	3600	3300	3800	4300	4500	5600	6300	6400	6400
Max. radial force[c)e)] at the output		F_{r2max}	[N]	840	1200	1500	2200	2400	2000	2100	2300	2300	2700	2900	2900	2900
Max. overturning torque[c)] at the output		M_{2max}	[Nm]	67	95	120	170	190	160	170	180	190	220	230	240	230
Max. axial force[c)d)] at the input		F_{a1max}	[N]	1700	990	750	1000	1400	1100	1400	1600	1200	1400	1300	1500	1300
Max. radial force[c)f)] at the input		F_{r1max}	[N]	690	510	390	520	720	560	710	760	610	650	620	690	630
Mass moment of inertia[g)]	Type 1[h)]	J_1	[10^{-6} kg m^2]	499	282	205	170	151	132	123	116	114	110	109	108	108
	Type 2[i)]	J_1	[10^{-6}kg m^2]	710	492	416	380	361	342	333	327	324	320	320	318	318
Service life		L_h	[h]	25000												
Weight without motor components		m	[kg]	9												
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												

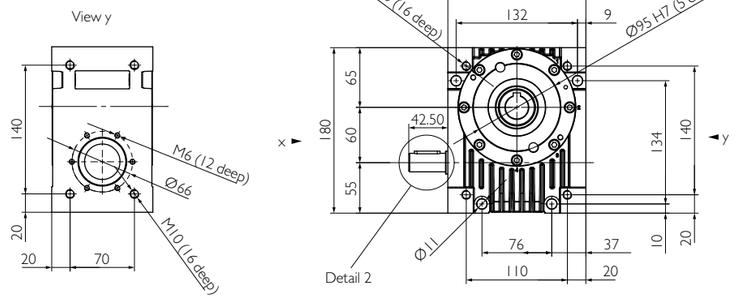
a) approximate, at n_1 = 3000 rpm and operating temperature.
b) Precision grade PS (standard backlash) for classic mechanical engineering applications.
Precision grade PR (reduced backlash) for precise process applications.
c) Bearing forces: Values valid at n_1 = 3000 rpm; ⅔ T_{2N} and duty cycle of 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 80 mm from the middle of the casing.
c) f) at a distance of 95 mm from the middle of the casing.
g) in relation to the input, including coupling.
g) h) Motor shaft diameter Ø**d** from Ø8 to Ø24, calculated at Ø19mm.
g) i) Motor shaft diameter Ø**d** from Ø25 to Ø35, calculated at Ø28mm.

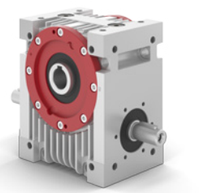
Bearing forces



Input

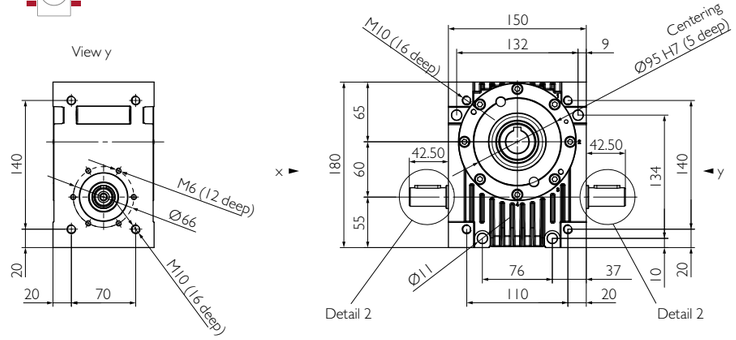
C



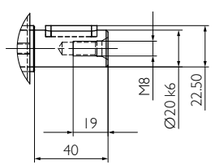


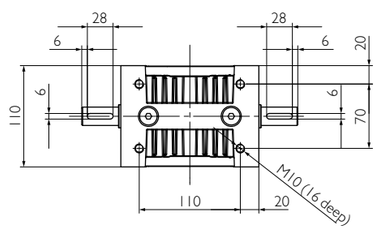
Example HPG 060 D7

D



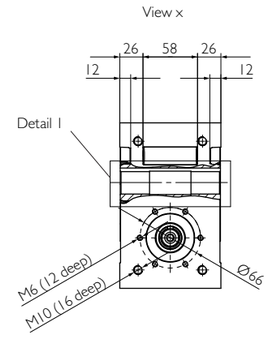
Detail 2



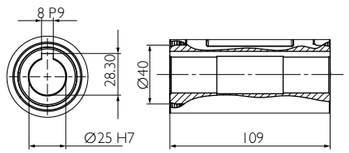


Output

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]	135	192	219	211	186	215	199	195	195	202	144	209	144
		η	[%]	89	89	88	88	87	84	82	78	74	67	64	54	50
	n_{1N} = 1000 rpm	T_{2N}	[Nm]	107	158	184	180	160	186	173	170	190	185	144	184	144
		η	[%]	90	90	90	89	88	86	84	81	77	70	65	56	53
	n_{1N} = 1500 rpm	T_{2N}	[Nm]	89	135	159	157	140	164	153	151	168	165	144	163	144
		η	[%]	90	91	90	89	89	86	84	81	78	70	65	56	52
	n_{1N} = 3000 rpm	T_{2N}	[Nm]	59	93	113	113	103	121	114	113	126	124	126	123	126
		η	[%]	90	90	90	89	88	86	83	80	77	69	64	55	50
	n_{1N} = 4500 rpm	T_{2N}	[Nm]	44	71	88	89	81	96	91	90	101	99	101	98	101
		η	[%]	89	89	89	88	87	84	82	78	75	67	61	52	47
	n_{1N} = 6000 rpm	T_{2N}	[Nm]	35	58	71	73	67	80	75	75	84	82	84	82	84
		η	[%]	88	88	88	87	85	83	80	75	72	64	58	48	44
Max. acceleration torque		T_{2B}	[Nm]	140	220									150	220	150
Emergency stop torque		T_{2Not}	[Nm]	300										200	300	200
Idling torque[a]		T_{012}	[Nm]	1.45			1.3				1.1					
Max. input speed		n_{1Max}	[rpm]	6000												
Max. backlash[b] at the output	PS	j_t	[arcmin]	<13	<10	<9	<9	<8	<7					<6		
	PR	j_t	[arcmin]	<9	<7	<6	<6	<5	<4.5					<4		
Torsional rigidity vom Abtrieb zum Eintrieb		C_{t21}	[Nm/arcmin]	2.5	4.8	7.6	8.6	10	11	12.1	13.3	14.5	15.4	15	16	15
Stability at the output		C_{2K}	[Nm/arcmin]	42												
Max. axial force[c)d)] at the output		F_{a2max}	[N]	780	1100	1900	2800	3600	3300	3800	4300	4500	5600	6300	6400	6400
Max. radial force[c)e)] at the output		F_{r2max}	[N]	840	1200	1500	2200	2400	2000	2100	2300	2300	2700	2900	2900	2900
Max. overturning torque[c)] at the output		M_{2max}	[Nm]	67	95	120	170	190	160	170	180	190	220	230	240	230
Max. axial force[c)d)] at the input		F_{a1max}	[N]	1700	990	750	1000	1400	1100	1400	1600	1200	1400	1300	1500	1300
Max. radial force[c)f)] at the input		F_{r1max}	[N]	690	510	390	520	720	560	710	760	610	650	620	690	630
Mass moment of inertia[g]		J_1	[10^{-6} kg m^2]	416	199	122	87	68	49	40	33	30	27	26	25	25
Service life		L_h	[h]	25000												
Weight without motor components		m	[kg]	8												
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.

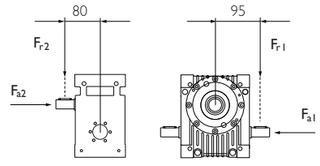
c) d) in relation to shaft center.

c) e) at a distance of 80 mm from the middle of the casing.

c) f) at a distance of 95 mm from the middle of the casing.

g) in relation to the input.

Bearing forces



at the output at the input