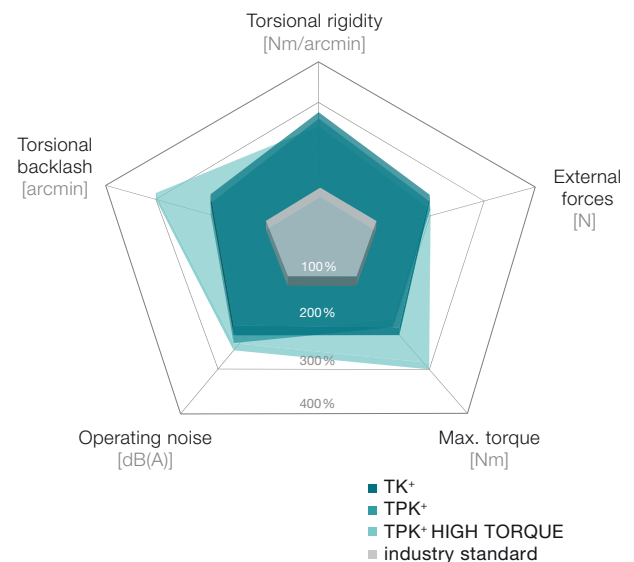


TK⁺ / TPK⁺ / TPK⁺ HIGH TORQUE – Space-saving right-angle precision with output flange

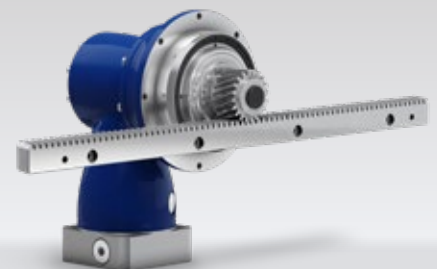


The versatile hypoid gearbox with TP⁺ compatible output flange and hollow shaft. TPK⁺ / TPK⁺ HIGH TORQUE gearboxes with planetary stage are especially suitable for high-precision applications requiring higher power and torsional rigidity.

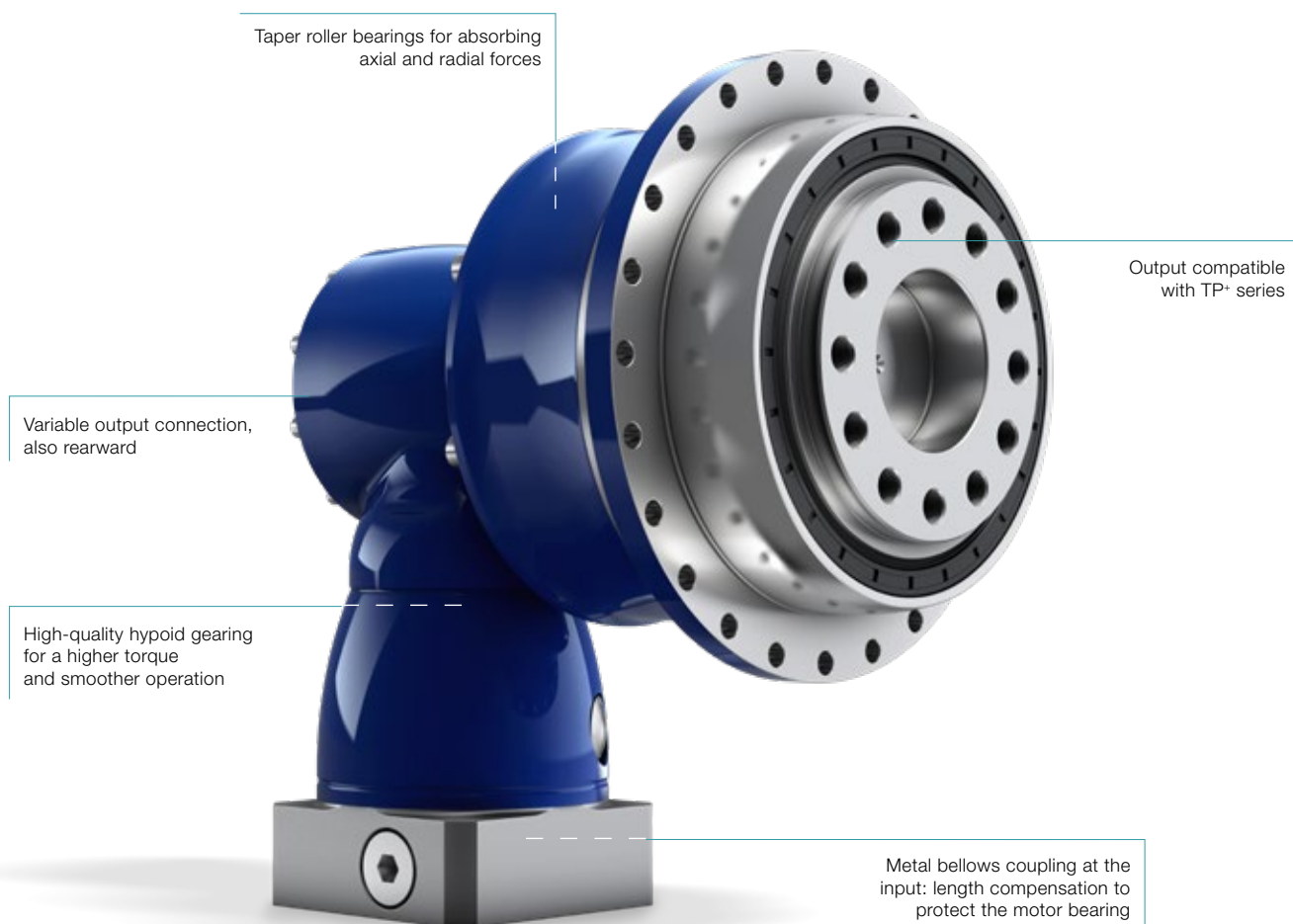
The TK⁺ / TPK⁺ / TK⁺ HIGH TORQUE compared to the industry standard



TK⁺ in corrosion-resistant design



TPK⁺ with rack and pinion



TPK+ HIGH TORQUE



TK+ with metal bellows coupling



TPK+ 2000 / 4000 available on request

TK⁺ 004 MF 1-/2-stage

				1-stage					2-stage										
Ratio			<i>i</i>		3	4	5	7	10	12	16	20	25	28	35	40	50	70	100
Max. torque ^{a) b)}			<i>T</i> _{2a}	<i>Nm</i>	36	36	36	25	20	36	36	36	36	36	36	36	36	25	20
				<i>in.lb</i>	319	319	319	221	177	319	319	319	319	319	319	319	319	319	221
Max. acceleration torque ^{b)} (max. 1000 cycles per hour)			<i>T</i> _{2B}	<i>Nm</i>	30	30	30	25	20	30	30	30	30	30	30	30	30	25	20
				<i>in.lb</i>	266	266	266	221	177	266	266	266	266	266	266	266	266	266	221
Nominal torque (at <i>n</i> _n)			<i>T</i> _{2N}	<i>Nm</i>	22	22	22	20	15	22	22	22	22	22	22	22	22	20	15
				<i>in.lb</i>	195	195	195	177	133	195	195	195	195	195	195	195	195	195	177
Emergency stop torque ^{a) b)} (permitted 1000 times during the service life of the gearbox)			<i>T</i> _{2Not}	<i>Nm</i>	40	50	50	45	40	50	50	50	50	50	50	50	50	45	40
				<i>in.lb</i>	354	443	443	398	354	443	443	443	443	443	443	443	443	443	398
Permitted average input speed (at <i>T</i> _{2N} and 20 °C ambient temperature) ^{d)}			<i>n</i> _{1N}	<i>n</i> _{1T}	2200	2400	2700	2700	2700	4400	4400	4400	4400	4400	4400	4400	4800	5500	5500
Max. input speed			<i>n</i> _{1Max}	<i>rpm</i>	7500	7500	7500	7500	7500	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000
Mean no load running torque ^{b)} (at <i>n</i> _i = 3000 rpm and 20 °C gearbox temperature)			<i>T</i> ₀₁₂	<i>Nm</i>	1.9	1.8	1.4	1.5	1.4	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
				<i>in.lb</i>	17	16	12	13	12	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8
Max. backlash			<i>j</i> _t	<i>arcmin</i>	Standard ≤ 5														
Torsional rigidity ^{b)}			<i>C</i> _{t21}	<i>Nm/arcmin</i>	2.6	2.8	3	2.6	2.3	2.8	2.8	2.8	2.8	2.8	2.8	2.8	3	2.6	2.3
				<i>in.lb/arcmin</i>	23	25	27	23	20	25	25	25	25	25	25	25	25	27	23
Max. axial force ^{c)}			<i>F</i> _{2AMax}	<i>N</i>	2400														
				<i>lb_f</i>	540														
Max. tilting moment			<i>M</i> _{2KMax}	<i>Nm</i>	251														
				<i>in.lb</i>	2222														
Efficiency at full load			<i>η</i>	%	96					94									
Service life			<i>L</i> _h	<i>h</i>	> 20000														
Weight (incl. standard adapter plate)			<i>m</i>	<i>kg</i>	2.9					3.2									
				<i>lb_m</i>	6					7									
Operating noise (at reference ratio and reference speed – ratio-specific values available in cymex®)			<i>L</i> _{PA}	<i>dB(A)</i>	≤ 64														
Max. permitted housing temperature				°C	+90														
				<i>F</i>	194														
Ambient temperature				°C	0 to +40														
				<i>F</i>	32 to 104														
Lubrication					Lubricated for life														
Direction of rotation					In- and output opposite direction														
Protection class					IP 65														
Metal bellows coupling (recommended product type – validate sizing with cymex®)					BCT - 00015AAX - 031.500														
Bore diameter of coupling on the application side				<i>mm</i>	X = 012.000 - 028.000														
Mass moment of inertia (relates to the drive) Clamping hub diameter [mm]	B	11	<i>J</i> _i	<i>kgcm²</i>	-	-	-	-	-	0.09	0.09	0.07	0.07	0.06	0.06	0.06	0.06	0.06	0.06
				<i>10⁻³ in.lb.s²</i>	-	-	-	-	-	0.08	0.08	0.06	0.06	0.05	0.05	0.05	0.05	0.05	0.05
	C	14	<i>J</i> _i	<i>kgcm²</i>	0.57	0.46	0.41	0.37	0.35	0.21	0.2	0.19	0.19	0.18	0.18	0.17	0.17	0.17	0.17
				<i>10⁻³ in.lb.s²</i>	0.5	0.41	0.36	0.33	0.31	0.19	0.18	0.17	0.17	0.16	0.16	0.15	0.15	0.15	0.15
	E	19	<i>J</i> _i	<i>kgcm²</i>	0.92	0.82	0.76	0.72	0.7	-	-	-	-	-	-	-	-	-	-
				<i>10⁻³ in.lb.s²</i>	0.81	0.73	0.67	0.64	0.62	-	-	-	-	-	-	-	-	-	-

Please use our sizing software cymex[®] for a detailed sizing – www.wittenstein-cymex.com
Please contact us for optimum sizing at S1 conditions (Continuous operation).

^{a)} At max. 10 % M_{2KMax}

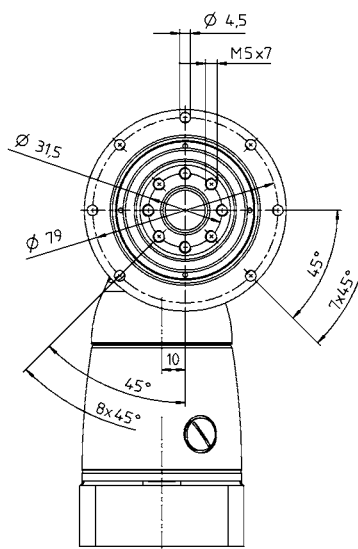
^{b)} Valid for standard clamping hub diameter

^{c)} Refers to center of the output shaft or flange

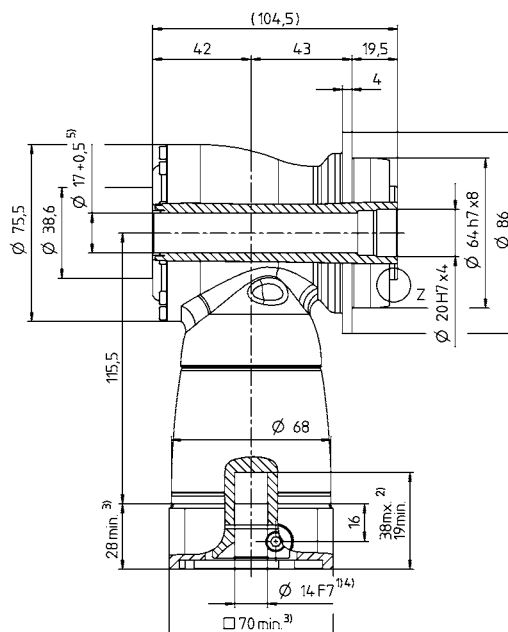
^{d)} Please reduce input speed at higher ambient temperatures

1-stage

up to 14/19⁴⁾
(C⁶⁾/E) clamping
hub diameter

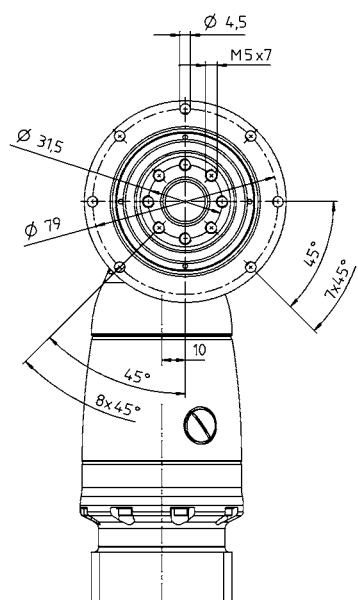


← A

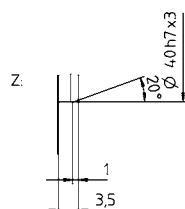
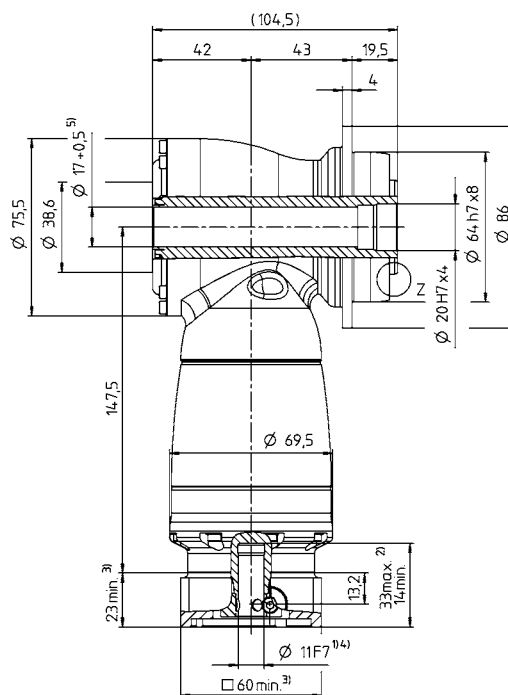


2-stage

up to 11/14⁴⁾
(B⁶⁾/C) clamping
hub diameter



← A



See technical data sheet for available clamping hub diameters (mass moment of inertia). Dimensions available on request.

Non-tolerated dimensions are nominal dimensions

¹⁾ Check motor shaft fit

²⁾ Min./Max. permissible motor shaft length. Longer motor shafts are possible, please contact alpha.

³⁾ The dimensions depend on the motor

⁴⁾ Smaller motor shaft diameter is compensated by a bushing with a minimum thickness of 1 mm

⁵⁾ Led through element max. Ø 16.8 mm

⁶⁾ Standard clamping hub diameter

TK⁺ 010 MF 1-/2-stage

				1-stage					2-stage										
Ratio			<i>i</i>		3	4	5	7	10	12	16	20	25	28	35	40	50	70	100
Max. torque ^{a) b)}			<i>T</i> _{2a}	<i>Nm</i>	84	84	84	60	50	84	84	84	84	84	84	84	84	60	50
				<i>in.lb</i>	743	743	743	531	443	743	743	743	743	743	743	743	743	743	531
Max. acceleration torque ^{b)} (max. 1000 cycles per hour)			<i>T</i> _{2B}	<i>Nm</i>	70	70	70	60	50	70	70	70	70	70	70	70	70	60	50
				<i>in.lb</i>	620	620	620	531	443	620	620	620	620	620	620	620	620	620	531
Nominal torque (at <i>n</i> _n)			<i>T</i> _{2N}	<i>Nm</i>	50	50	50	45	40	50	50	50	50	50	50	50	50	45	40
				<i>in.lb</i>	443	443	443	398	354	443	443	443	443	443	443	443	443	443	398
Emergency stop torque ^{a) b)} (permitted 1000 times during the service life of the gearbox)			<i>T</i> _{2Not}	<i>Nm</i>	95	115	115	110	100	115	115	115	115	115	115	115	115	110	100
				<i>in.lb</i>	841	1018	1018	974	885	1018	1018	1018	1018	1018	1018	1018	1018	1018	974
Permitted average input speed (at <i>T</i> _{2N} and 20 °C ambient temperature) ^{d)}			<i>n</i> _{1N}	<i>n</i> _{1T}	2100	2200	2500	2500	2500	3500	3500	3500	3500	3500	3500	3500	3800	4500	4500
Max. input speed			<i>n</i> _{1Max}	<i>rpm</i>	7500	7500	7500	7500	7500	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000
Mean no load running torque ^{b)} (at <i>n</i> _i = 3000 rpm and 20 °C gearbox temperature)			<i>T</i> ₀₁₂	<i>Nm</i>	3.3	2.8	2.1	2.4	2.2	0.4	0.4	0.3	0.3	0.3	0.3	0.2	0.2	0.2	0.2
				<i>in.lb</i>	29	25	19	21	19	3.5	3.5	2.7	2.7	2.7	2.7	2.7	1.8	1.8	1.8
Max. backlash			<i>j</i> _t	<i>arcmin</i>	Standard ≤ 4														
Torsional rigidity ^{b)}			<i>C</i> _{t21}	<i>Nm/arcmin</i>	6	7	8	8	8	7	7	7	7	7	7	7	8	8	8
				<i>in.lb/arcmin</i>	53	62	71	71	71	62	62	62	62	62	62	62	62	71	71
Max. axial force ^{c)}			<i>F</i> _{2AMax}	<i>N</i>	3400														
				<i>lb_f</i>	765														
Max. tilting moment			<i>M</i> _{2KMax}	<i>Nm</i>	437														
				<i>in.lb</i>	3868														
Efficiency at full load			<i>η</i>	%	96					94									
Service life			<i>L</i> _h	<i>h</i>	> 20000														
Weight (incl. standard adapter plate)			<i>m</i>	<i>kg</i>	5.3					6.1									
				<i>lb_m</i>	12					13									
Operating noise (at reference ratio and reference speed – ratio-specific values available in cymex®)			<i>L</i> _{PA}	<i>dB(A)</i>	≤ 66														
Max. permitted housing temperature				°C	+90														
				<i>F</i>	194														
Ambient temperature				°C	0 to +40														
				<i>F</i>	32 to 104														
Lubrication					Lubricated for life														
Direction of rotation					In- and output opposite direction														
Protection class					IP 65														
Metal bellows coupling (recommended product type – validate sizing with cymex®)					BCT - 00060AAX - 050.000														
Bore diameter of coupling on the application side				<i>mm</i>	X = 014.000 - 035.000														
Mass moment of inertia (relates to the drive) Clamping hub diameter [mm]	C	14	<i>J</i> _i	<i>kgcm²</i>	-	-	-	-	-	0.31	0.28	0.24	0.23	0.21	0.2	0.19	0.18	0.18	0.18
				<i>10⁻³ in.lb.s²</i>	-	-	-	-	-	0.27	0.25	0.21	0.2	0.19	0.18	0.17	0.16	0.16	0.16
	E	19	<i>J</i> _i	<i>kgcm²</i>	1.81	1.39	1.18	1.02	0.93	0.75	0.72	0.68	0.68	0.63	0.63	0.63	0.63	0.63	0.63
				<i>10⁻³ in.lb.s²</i>	1.6	1.23	1.04	0.9	0.82	0.66	0.64	0.6	0.6	0.56	0.56	0.56	0.56	0.56	0.56
	H	28	<i>J</i> _i	<i>kgcm²</i>	3.22	2.8	2.6	2.43	2.34	-	-	-	-	-	-	-	-	-	-
				<i>10⁻³ in.lb.s²</i>	2.85	2.48	2.3	2.15	2.07	-	-	-	-	-	-	-	-	-	-

Please use our sizing software cymex[®] for a detailed sizing – www.wittenstein-cymex.com
Please contact us for optimum sizing at S1 conditions (Continuous operation).

^{a)} At max. 10 % M_{2KMax}

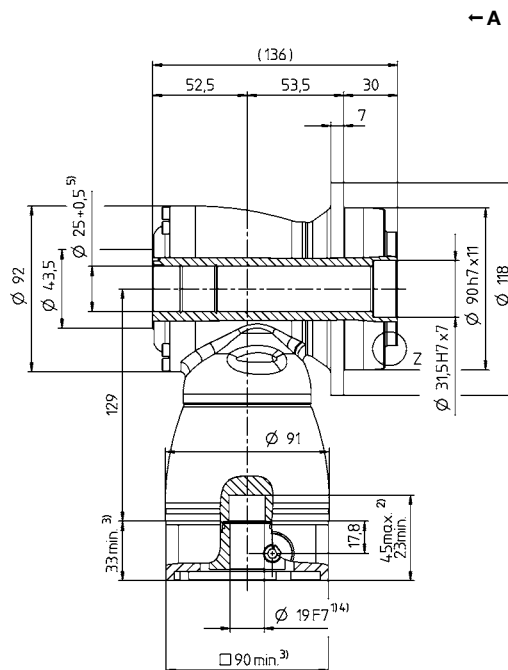
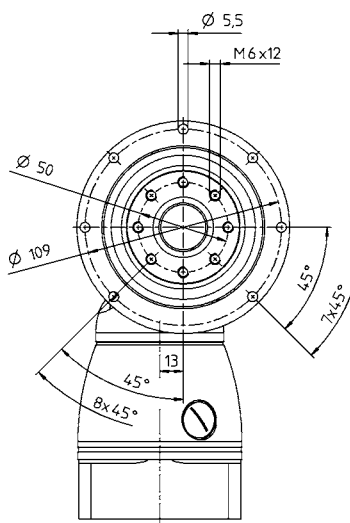
^{b)} Valid for standard clamping hub diameter

^{c)} Refers to center of the output shaft or flange

^{d)} Please reduce input speed at higher ambient temperatures

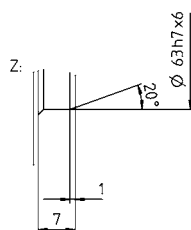
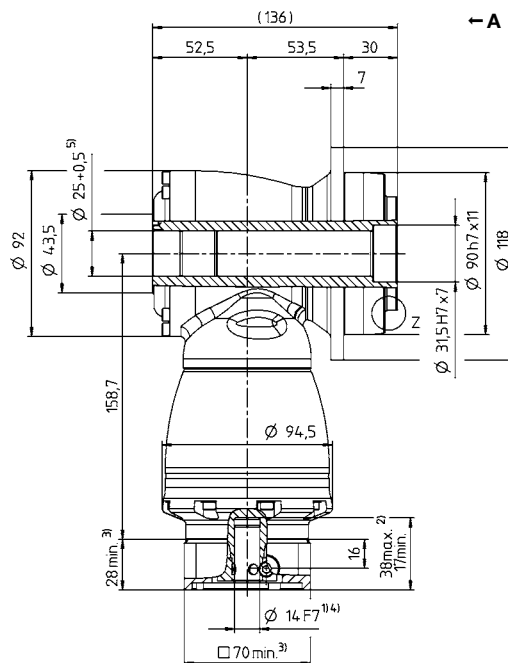
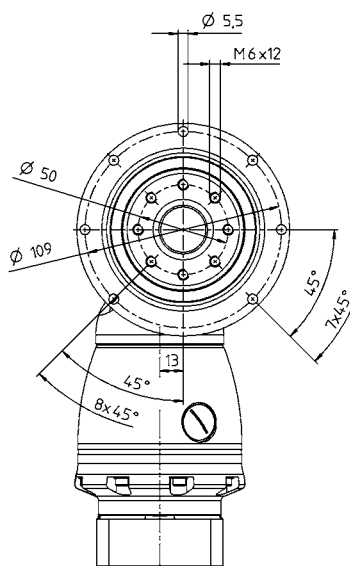
1-stage

up to 19/28 ⁴⁾
(E⁶⁾/H) clamping
hub diameter



2-stage

up to 14/19 ⁴⁾
(C⁶⁾/E) clamping
hub diameter



See technical data sheet for available clamping hub diameters (mass moment of inertia). Dimensions available on request.

Non-tolerated dimensions are nominal dimensions

¹⁾ Check motor shaft fit

²⁾ Min./Max. permissible motor shaft length. Longer motor shafts are possible, please contact alpha.

³⁾ The dimensions depend on the motor

⁴⁾ Smaller motor shaft diameter is compensated by a bushing with a minimum thickness of 1 mm

⁵⁾ Led through element max. Ø 24.8 mm

⁶⁾ Standard clamping hub diameter

TK⁺ 025 MF 1-/2-stage

					1-stage					2-stage										
Ratio				<i>i</i>		3	4	5	7	10	12	16	20	25	28	35	40	50	70	100
Max. torque ^{a) b)}				<i>T</i> _{2a}	<i>Nm</i>	204	204	204	145	125	204	204	204	204	204	204	204	204	145	125
					<i>in.lb</i>	1806	1806	1806	1283	1106	1806	1806	1806	1806	1806	1806	1806	1806	1806	1806
Max. acceleration torque ^{b)} (max. 1000 cycles per hour)				<i>T</i> _{2B}	<i>Nm</i>	170	170	170	145	125	170	170	170	170	170	170	170	170	145	125
					<i>in.lb</i>	1505	1505	1505	1283	1106	1505	1505	1505	1505	1505	1505	1505	1505	1505	1505
Nominal torque (at <i>n</i> _n)				<i>T</i> _{2N}	<i>Nm</i>	100	100	100	90	80	100	100	100	100	100	100	100	100	90	80
					<i>in.lb</i>	885	885	885	797	708	885	885	885	885	885	885	885	885	885	885
Emergency stop torque ^{a) b)} (permitted 1000 times during the service life of the gearbox)				<i>T</i> _{2Not}	<i>Nm</i>	220	260	260	255	250	260	260	260	260	260	260	260	260	255	250
					<i>in.lb</i>	1947	2301	2301	2257	2213	2301	2301	2301	2301	2301	2301	2301	2301	2301	2301
Permitted average input speed (at <i>T</i> _{2N} and 20 °C ambient temperature) ^{d)}				<i>n</i> _{1N}	<i>n</i> _{1T}	2000	2100	2400	2200	2200	3100	3100	3100	3100	3100	3100	3100	3500	4200	4200
Max. input speed				<i>n</i> _{1Max}	<i>rpm</i>	5500	5500	5500	5500	5500	4500	4500	4500	4500	4500	4500	4500	4500	4500	4500
Mean no load running torque ^{b)} (at <i>n</i> _i = 3000 rpm and 20 °C gearbox temperature)				<i>T</i> ₀₁₂	<i>Nm</i>	4.9	3.9	4	4.5	3.6	0.7	0.7	0.6	0.5	0.5	0.4	0.2	0.2	0.2	0.2
					<i>in.lb</i>	43	35	35	40	32	6.2	6.2	5.3	4.4	4.4	3.5	1.8	1.8	1.8	1.8
Max. backlash				<i>j</i> _t	<i>arcmin</i>	Standard ≤ 4														
Torsional rigidity ^{b)}				<i>C</i> ₁₂₁	<i>Nm/arcmin</i>	12	13	16	16	16	13	13	13	13	13	13	13	16	16	16
					<i>in.lb/arcmin</i>	106	115	142	142	142	115	115	115	115	115	115	115	115	115	142
Max. axial force ^{c)}				<i>F</i> _{2AMax}	<i>N</i>	5700														
					<i>lb_f</i>	1283														
Max. tilting moment				<i>M</i> _{2KMax}	<i>Nm</i>	833														
					<i>in.lb</i>	7373														
Efficiency at full load				<i>η</i>	%	96					94									
Service life				<i>L</i> _h	<i>h</i>	> 20000														
Weight (incl. standard adapter plate)				<i>m</i>	<i>kg</i>	8.9					10.6									
					<i>lb_m</i>	20					23									
Operating noise (at reference ratio and reference speed – ratio-specific values available in cymex®)				<i>L</i> _{PA}	<i>dB(A)</i>	≤ 66														
Max. permitted housing temperature					°C	+90														
					<i>F</i>	194														
Ambient temperature					°C	0 to +40														
					<i>F</i>	32 to 104														
Lubrication						Lubricated for life														
Direction of rotation						In- and output opposite direction														
Protection class						IP 65														
Metal bellows coupling (recommended product type – validate sizing with cymex®)						BCT - 00150AAX - 063.000														
Bore diameter of coupling on the application side					<i>mm</i>	X = 019.000 - 042.000														
Mass moment of inertia (relates to the drive) Clamping hub diameter [mm]	E	19	<i>J</i> _i	<i>kgcm²</i>	-	-	-	-	-	1.08	1.01	0.88	0.85	0.76	0.75	0.7	0.69	0.68	0.68	
				<i>10⁻³ in.lb.s²</i>	-	-	-	-	-	0.96	0.89	0.78	0.75	0.67	0.66	0.62	0.61	0.6	0.6	
	G	24	<i>J</i> _i	<i>kgcm²</i>	-	-	-	-	-	2.65	2.57	2.44	2.42	2.32	2.31	2.26	2.25	2.25	2.25	
				<i>10⁻³ in.lb.s²</i>	-	-	-	-	-	2.35	2.27	2.16	2.14	2.05	2.04	2	1.99	1.99	1.99	
	H	28	<i>J</i> _i	<i>kgcm²</i>	5.5	4.3	3.6	3.1	2.9	-	-	-	-	-	-	-	-	-	-	
				<i>10⁻³ in.lb.s²</i>	4.87	3.81	3.19	2.74	2.57	-	-	-	-	-	-	-	-	-	-	
K	38	<i>J</i> _i	<i>kgcm²</i>	12.7	11.5	10.9	10.4	10.1	-	-	-	-	-	-	-	-	-	-		
			<i>10⁻³ in.lb.s²</i>	11.24	10.18	9.65	9.2	8.94	-	-	-	-	-	-	-	-	-	-		

Please use our sizing software cymex® for a detailed sizing – www.wittenstein-cymex.com
Please contact us for optimum sizing at S1 conditions (Continuous operation).

^{a)} At max. 10 % M_{2KMax}

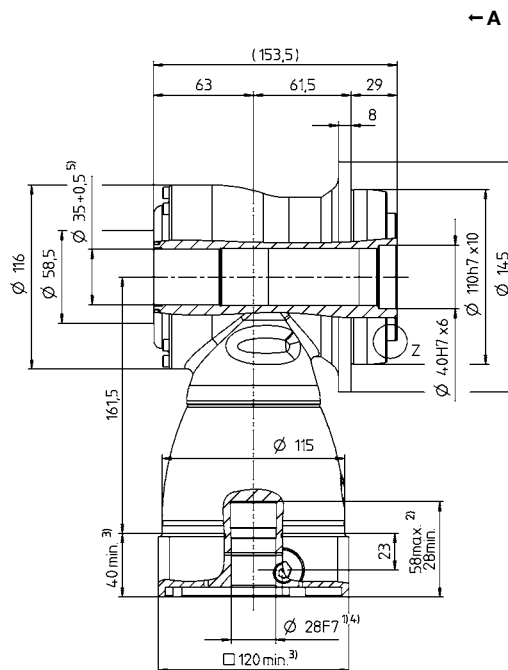
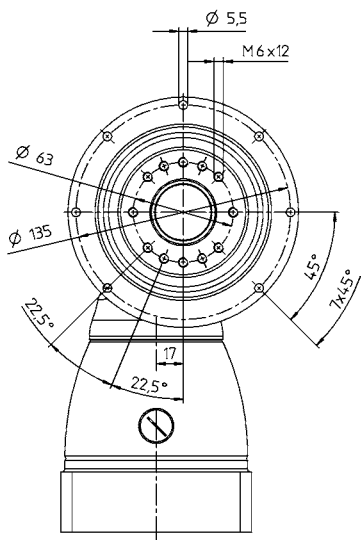
^{b)} Valid for standard clamping hub diameter

^{c)} Refers to center of the output shaft or flange

^{d)} Please reduce input speed at higher ambient temperatures

1-stage

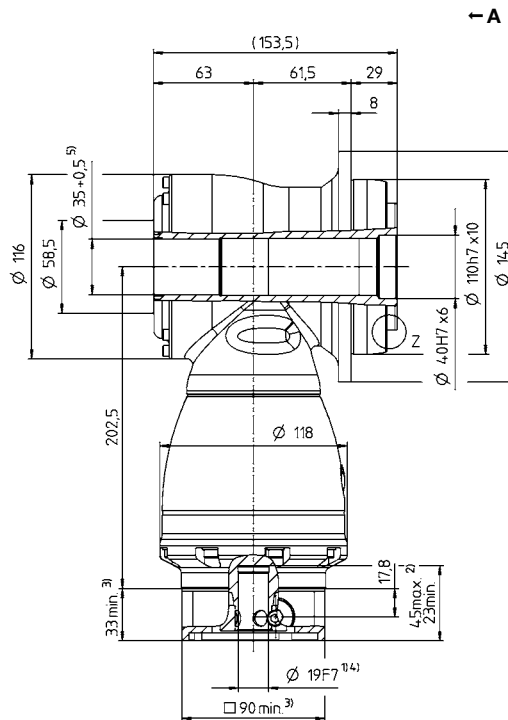
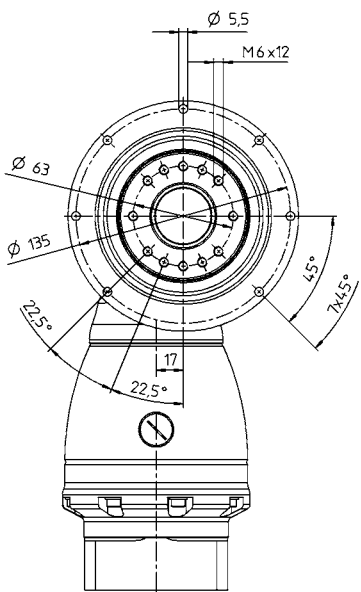
up to 28/38⁴⁾
(H⁶⁾/K) clamping
hub diameter



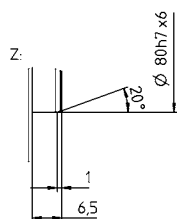
← A

2-stage

up to 19/24⁴⁾
(E⁶⁾/G) clamping
hub diameter



← A



See technical data sheet for available clamping hub diameters (mass moment of inertia). Dimensions available on request.

Non-tolerated dimensions are nominal dimensions

¹⁾ Check motor shaft fit

²⁾ Min./Max. permissible motor shaft length. Longer motor shafts are possible, please contact alpha.

³⁾ The dimensions depend on the motor

⁴⁾ Smaller motor shaft diameter is compensated by a bushing with a minimum thickness of 1 mm

⁵⁾ Led through element max. Ø 34.8 mm

⁶⁾ Standard clamping hub diameter

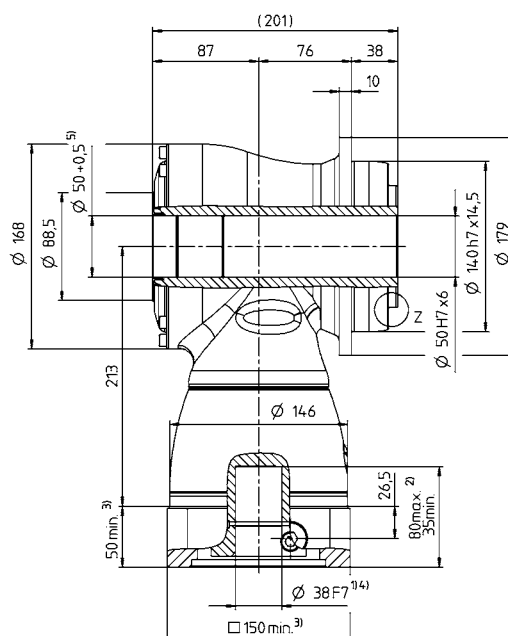
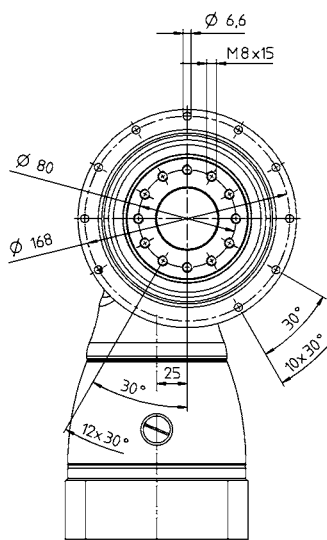
TK⁺ 050 MF 1-/2-stage

				1-stage					2-stage											
Ratio			<i>i</i>		3	4	5	7	10	12	16	20	25	28	35	40	50	70	100	
Max. torque ^{a) b)}			<i>T</i> _{2a}	<i>Nm</i>	360	360	360	250	210	360	360	360	360	360	360	360	360	250	210	
				<i>in.lb</i>	3186	3186	3186	2213	1859	3186	3186	3186	3186	3186	3186	3186	3186	3186	2213	1859
Max. acceleration torque ^{b)} (max. 1000 cycles per hour)			<i>T</i> _{2B}	<i>Nm</i>	300	300	300	250	210	300	300	300	300	300	300	300	300	250	210	
				<i>in.lb</i>	2655	2655	2655	2213	1859	2655	2655	2655	2655	2655	2655	2655	2655	2655	2213	1859
Nominal torque (at <i>n</i> _n)			<i>T</i> _{2N}	<i>Nm</i>	190	190	190	175	160	190	190	190	190	190	190	190	190	175	160	
				<i>in.lb</i>	1682	1682	1682	1549	1416	1682	1682	1682	1682	1682	1682	1682	1682	1682	1549	1416
Emergency stop torque ^{a) b)} (permitted 1000 times during the service life of the gearbox)			<i>T</i> _{2Not}	<i>Nm</i>	400	500	500	450	400	500	500	500	500	500	500	500	500	450	400	
				<i>in.lb</i>	3540	4425	4425	3983	3540	4425	4425	4425	4425	4425	4425	4425	4425	4425	3983	3540
Permitted average input speed (at <i>T</i> _{2a} and 20 °C ambient temperature) ^{d)}			<i>n</i> _{1N}	<i>n</i> _{1T}	1700	1800	2000	1800	1800	2900	2900	2900	2900	2900	2900	2900	3200	3200	3900	
Max. input speed			<i>n</i> _{1Max}	<i>rpm</i>	5000	5000	5000	5000	5000	4500	4500	4500	4500	4500	4500	4500	4500	4500	4500	
Mean no load running torque ^{b)} (at <i>n</i> _i = 3000 rpm and 20 °C gearbox temperature)			<i>T</i> ₀₁₂	<i>Nm</i>	9.6	7.1	8.4	9	6.6	1.7	1.1	0.8	0.6	0.6	0.5	0.5	0.4	0.4	0.4	
				<i>in.lb</i>	85	63	74	80	58	15	9.7	7.1	5.3	5.3	4.4	4.4	3.5	3.5	3.5	3.5
Max. backlash			<i>j</i> _t	<i>arcmin</i>	Standard ≤ 4															
Torsional rigidity ^{b)}			<i>C</i> _{t21}	<i>Nm/arcmin</i>	36	40	46	44	42	40	40	40	40	40	40	40	40	46	44	42
				<i>in.lb/arcmin</i>	319	354	407	389	372	354	354	354	354	354	354	354	354	354	407	389
Max. axial force ^{c)}			<i>F</i> _{2AMax}	<i>N</i>	9900															
				<i>lb_f</i>	2228															
Max. tilting moment			<i>M</i> _{2KMax}	<i>Nm</i>	1692															
				<i>in.lb</i>	14976															
Efficiency at full load			<i>η</i>	%	96					94										
Service life			<i>L</i> _h	<i>h</i>	> 20000															
Weight (incl. standard adapter plate)			<i>m</i>	<i>kg</i>	22					26										
				<i>lb_m</i>	49					57										
Operating noise (at reference ratio and reference speed – ratio-specific values available in cymex®)			<i>L</i> _{PA}	<i>dB(A)</i>	≤ 68															
Max. permitted housing temperature				°C	+90															
				<i>F</i>	194															
Ambient temperature				°C	0 to +40															
				<i>F</i>	32 to 104															
Lubrication					Lubricated for life															
Direction of rotation					In- and output opposite direction															
Protection class					IP 65															
Metal bellows coupling (recommended product type – validate sizing with cymex®)					BCT - 00300AAX - 080.000															
				<i>mm</i>	X = 024.000 - 060.000															
Mass moment of inertia (relates to the drive)		G	24	<i>J</i> _i	<i>kgcm²</i>	-	-	-	-	-	4.43	3.97	3.36	3.22	2.82	2.75	2.5	2.47	2.44	2.42
					<i>10⁻³ in.lb.s²</i>	-	-	-	-	-	3.92	3.51	2.97	2.85	2.5	2.43	2.21	2.19	2.16	2.14
		Clamping hub diameter [mm]	K	38	<i>J</i> _i	<i>kgcm²</i>	28.4	21	17.6	14.7	13.1	11.3	10.9	10.3	10.1	9.74	9.66	9.41	9.38	9.35
<i>10⁻³ in.lb.s²</i>	25.13					18.59	15.58	13.01	11.59	10	9.65	9.12	8.94	8.62	8.55	8.33	8.3	8.27	8.26	

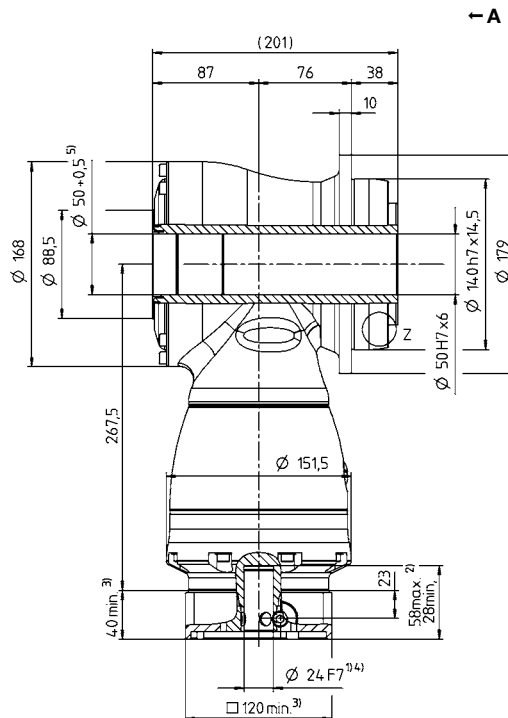
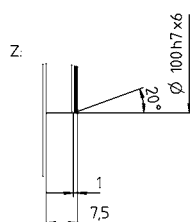
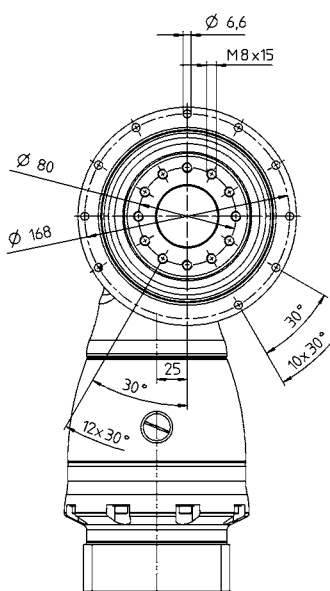
Please use our sizing software cymex[®] for a detailed sizing – www.wittenstein-cymex.com
Please contact us for optimum sizing at S1 conditions (Continuous operation).

- ^{a)} At max. 10 % M_{2KMax}
^{b)} Valid for standard clamping hub diameter
^{c)} Refers to center of the output shaft or flange
^{d)} Please reduce input speed at higher ambient temperatures

up to 38⁴⁾ (K)⁶⁾
clamping hub
diameter



up to 24/38 ⁴⁾
(G⁶/K) clamping
hub diameter



6) Standard clamping hub diameter

TK⁺ 110 MF 1- / 2-stage

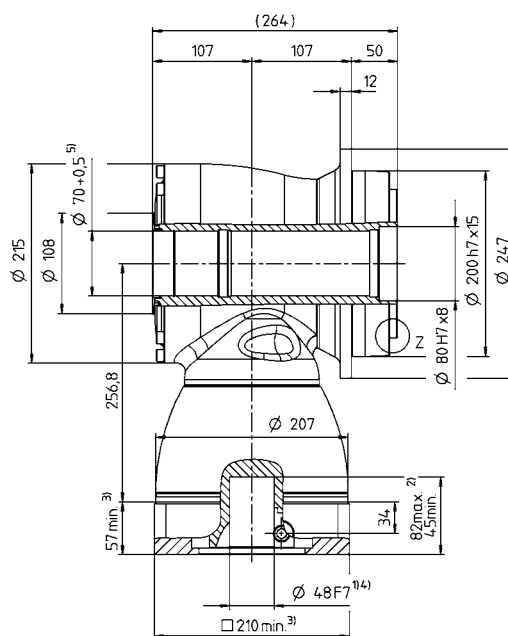
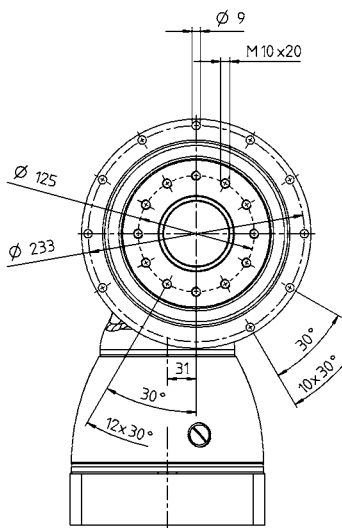
				1-stage					2-stage											
Ratio			<i>i</i>		3	4	5	7	10	12	16	20	25	28	35	40	50	70	100	
Max. torque ^{a) b)}			<i>T</i> _{2a}	<i>Nm</i>	768	768	768	550	470	768	768	768	768	768	768	768	768	550	470	
				<i>in.lb</i>	6797	6797	6797	4868	4160	6797	6797	6797	6797	6797	6797	6797	6797	6797	4868	4160
Max. acceleration torque ^{b)} (max. 1000 cycles per hour)			<i>T</i> _{2B}	<i>Nm</i>	640	640	640	550	470	640	640	640	640	640	640	640	640	550	470	
				<i>in.lb</i>	5665	5665	5665	4868	4160	5665	5665	5665	5665	5665	5665	5665	5665	5665	4868	4160
Nominal torque (at <i>n</i> _n)			<i>T</i> _{2N}	<i>Nm</i>	400	400	400	380	360	400	400	400	400	400	400	400	400	380	360	
				<i>in.lb</i>	3540	3540	3540	3363	3186	3540	3540	3540	3540	3540	3540	3540	3540	3540	3363	3186
Emergency stop torque ^{a) b)} (permitted 1000 times during the service life of the gearbox)			<i>T</i> _{2Not}	<i>Nm</i>	900	1050	1050	970	900	1050	1050	1050	1050	1050	1050	1050	1050	970	900	
				<i>in.lb</i>	7966	9293	9293	8585	7966	9293	9293	9293	9293	9293	9293	9293	9293	9293	8585	7966
Permitted average input speed (at <i>T</i> _{2a} and 20 °C ambient temperature) ^{d)}			<i>n</i> _{1N}	<i>n</i> _{1T}	1400	1600	1800	1600	1600	2700	2700	2700	2700	2700	2700	2700	2900	3200	3400	
Max. input speed			<i>n</i> _{1Max}	<i>rpm</i>	4500	4500	4500	4500	4500	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	
Mean no load running torque ^{b)} (at <i>n</i> _i = 3000 rpm and 20 °C gearbox temperature)			<i>T</i> ₀₁₂	<i>Nm</i>	20	17	18	19	16	3.6	2.8	2.2	1.9	1.6	1.4	1.1	1.1	1.1	1.1	
				<i>in.lb</i>	177	150	159	168	142	32	25	19	17	14	12	9.7	9.7	9.7	9.7	9.7
Max. backlash			<i>j</i> _t	<i>arcmin</i>	Standard ≤ 4															
Torsional rigidity ^{b)}			<i>C</i> _{t21}	<i>Nm/arcmin</i>	76	87	99	97	96	87	87	87	87	87	87	87	87	99	97	96
				<i>in.lb/arcmin</i>	673	770	876	859	850	770	770	770	770	770	770	770	770	770	876	859
Max. axial force ^{c)}			<i>F</i> _{2AMax}	<i>N</i>	14200															
				<i>lb_f</i>	3195															
Max. tilting moment			<i>M</i> _{2KMax}	<i>Nm</i>	3213															
				<i>in.lb</i>	28438															
Efficiency at full load			<i>η</i>	%	96					94										
Service life			<i>L</i> _h	<i>h</i>	> 20000															
Weight (incl. standard adapter plate)			<i>m</i>	<i>kg</i>	48					54										
				<i>lb_m</i>	106					119										
Operating noise (at reference ratio and reference speed – ratio-specific values available in cymex®)			<i>L</i> _{PA}	<i>dB(A)</i>	≤ 68															
Max. permitted housing temperature				°C	+90															
				<i>F</i>	194															
Ambient temperature				°C	0 to +40															
				<i>F</i>	32 to 104															
Lubrication					Lubricated for life															
Direction of rotation					In- and output opposite direction															
Protection class					IP 65															
Metal bellows coupling (recommended product type – validate sizing with cymex®)					BCT - 01500AAX - 125.000															
				<i>mm</i>	X = 050.000 - 080.000															
Mass moment of inertia (relates to the drive)		K	38	<i>J</i> _i	<i>kgcm²</i>	-	-	-	-	-	16.8	14.8	12.9	12.3	11.2	10.9	10.3	10.1	10	9.93
					<i>10⁻³ in.lb.s²</i>	-	-	-	-	-	14.87	13.1	11.42	10.89	9.91	9.65	9.12	8.94	8.85	8.79
		Clamping hub diameter [mm]	M	48	<i>J</i> _i	<i>kgcm²</i>	96.5	64.6	50.5	38.2	31.8	31.5	29.5	27.6	27	25.9	25.6	25	24.8	24.7
<i>10⁻³ in.lb.s²</i>	85.4					57.17	44.69	33.81	28.14	27.88	26.11	24.43	23.9	22.92	22.66	22.13	21.95	21.86	21.77	

Please use our sizing software cymex[®] for a detailed sizing – www.wittenstein-cymex.com
Please contact us for optimum sizing at S1 conditions (Continuous operation).

^{a)} At max. 10 % M_{2KMax}
^{b)} Valid for standard clamping hub diameter
^{c)} Refers to center of the output shaft or flange
^{d)} Please reduce input speed at higher ambient temperatures

1-stage

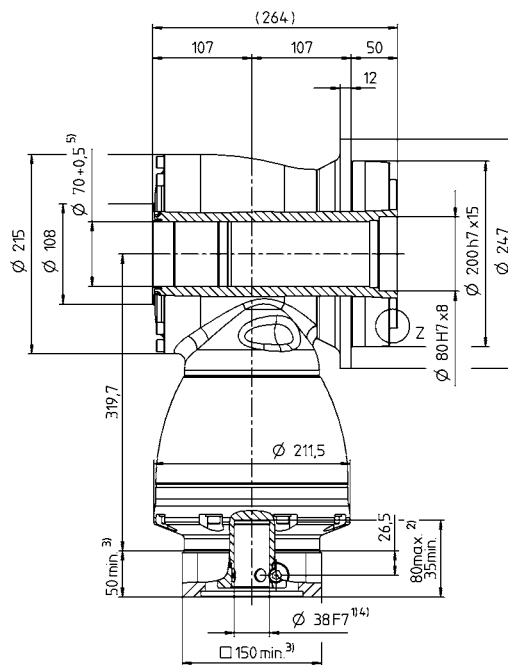
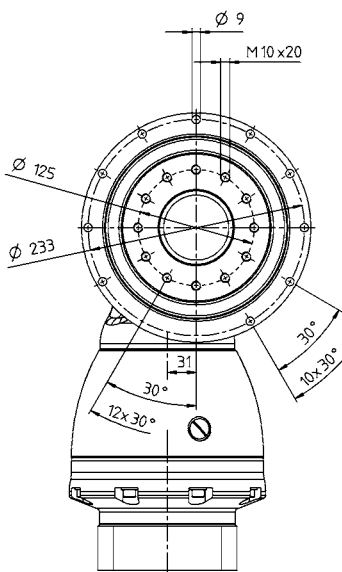
up to 48⁴⁾ (M)⁶⁾
clamping hub diameter



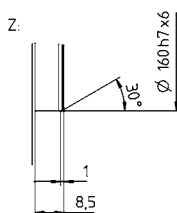
← A

2-stage

up to 38/48⁴⁾
(K⁶⁾/M) clamping
hub diameter



← A



See technical data sheet for available clamping hub diameters (mass moment of inertia). Dimensions available on request.

Non-tolerated dimensions are nominal dimensions

¹⁾ Check motor shaft fit

²⁾ Min./Max. permissible motor shaft length. Longer motor shafts are possible, please contact alpha.

³⁾ The dimensions depend on the motor

⁴⁾ Smaller motor shaft diameter is compensated by a bushing with a minimum thickness of 1 mm

⁵⁾ Led through element max. Ø 69.8 mm

⁶⁾ Standard clamping hub diameter

TPK+ 010 MF 2-stage

				2-stage											
Ratio			<i>i</i>		12	16	20	25	28	35	40	49	50	70	100
Max. torque ^{a) b)}			<i>T</i> _{2a}	<i>Nm</i>	144	144	180	180	210	210	80	175	100	140	168
				<i>in.lb</i>	1275	1275	1593	1593	1859	1859	708	1549	885	1239	1487
Max. acceleration torque ^{b)} (max. 1000 cycles per hour)			<i>T</i> _{2B}	<i>Nm</i>	120	120	150	150	172	172	80	172	100	140	126
				<i>in.lb</i>	1062	1062	1328	1328	1522	1522	708	1522	885	1239	1115
Nominal torque (at <i>n</i> _{in})			<i>T</i> _{2N}	<i>Nm</i>	75	75	75	75	75	75	60	75	75	75	60
				<i>in.lb</i>	664	664	664	664	664	664	531	664	664	664	531
Emergency stop torque ^{a) b)} (permitted 1000 times during the service life of the gearbox)			<i>T</i> _{2Not}	<i>Nm</i>	160	200	250	250	251	251	160	251	200	251	251
				<i>in.lb</i>	1416	1770	2213	2213	2222	2222	1416	2222	1770	2222	2222
Permitted average input speed (at <i>T</i> _{2N} and 20 °C ambient temperature) ^{d)}			<i>n</i> _{1N}	<i>n</i> _{1T}	2000	2400	2400	2700	2400	2500	2500	2500	2500	2500	2500
Max. input speed			<i>n</i> _{1Max}	<i>rpm</i>	7500	7500	7500	7500	7500	7500	7500	7500	7500	7500	7500
Mean no load running torque ^{b)} (at <i>n</i> _i = 3000 rpm and 20 °C gearbox temperature)			<i>T</i> ₀₁₂	<i>Nm</i>	1.7	1.4	1.3	1.2	1.3	1.3	1.4	1.4	1.4	1.3	1.3
				<i>in.lb</i>	15	12	12	11	12	12	12	12	12	12	12
Max. backlash			<i>j</i> _t	<i>arcmin</i>	Standard ≤ 5 / Reduced ≤ 3										
Torsional rigidity ^{b)}			<i>C</i> _{t21}	<i>Nm/arcmin</i>	16	16	20	21	23	24	15	23	19	22	27
				<i>in.lb/arcmin</i>	142	142	177	186	204	212	133	204	168	195	239
Tilting rigidity			<i>C</i> _{2K}	<i>Nm/arcmin</i>	225										
				<i>in.lb/arcmin</i>	1991										
Max. axial force ^{c)}			<i>F</i> _{2AMax}	<i>N</i>	2795										
				<i>lb_f</i>	629										
Max. tilting moment			<i>M</i> _{2KMax}	<i>Nm</i>	270										
				<i>in.lb</i>	2390										
Efficiency at full load			<i>η</i>	%	94										
Service life			<i>L</i> _h	<i>h</i>	> 20000										
Weight (incl. standard adapter plate)			<i>m</i>	<i>kg</i>	5.2										
				<i>lb_m</i>	11										
Operating noise (at reference ratio and reference speed – ratio-specific values available in cymex®)			<i>L</i> _{PA}	<i>dB(A)</i>	≤ 66										
Max. permitted housing temperature				°C	+90										
				<i>F</i>	194										
Ambient temperature				°C	0 to +40										
				<i>F</i>	32 to 104										
Lubrication					Lubricated for life										
Direction of rotation					In- and output opposite direction										
Protection class					IP 65										
Metal bellows coupling (recommended product type – validate sizing with cymex®)					BCT - 00060AAX - 050.000										
Bore diameter of coupling on the application side				<i>mm</i>	X = 014.000 - 035.000										
Mass moment of inertia (relates to the drive) Clamping hub diameter [mm]	C	14	<i>J</i> _i	<i>kgcm²</i>	0.55	0.46	0.44	0.39	0.43	0.36	0.34	0.37	0.34	0.34	0.34
				<i>10⁻³ in.lb.s²</i>	0.49	0.41	0.39	0.35	0.38	0.32	0.3	0.33	0.3	0.3	0.3
	E	19	<i>J</i> _i	<i>kgcm²</i>	0.9	0.81	0.79	0.75	0.78	0.71	0.7	0.72	0.7	0.69	0.69
<i>10⁻³ in.lb.s²</i>				0.8	0.72	0.7	0.66	0.69	0.63	0.62	0.64	0.62	0.61	0.61	

Please use our sizing software cymex[®] for a detailed sizing – www.wittenstein-cymex.com
Please contact us for optimum sizing at S1 conditions (Continuous operation).

^{a)} At max. 10 % M_{2KMax}

^{b)} Valid for standard clamping hub diameter

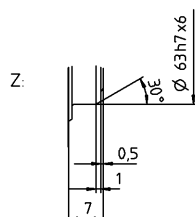
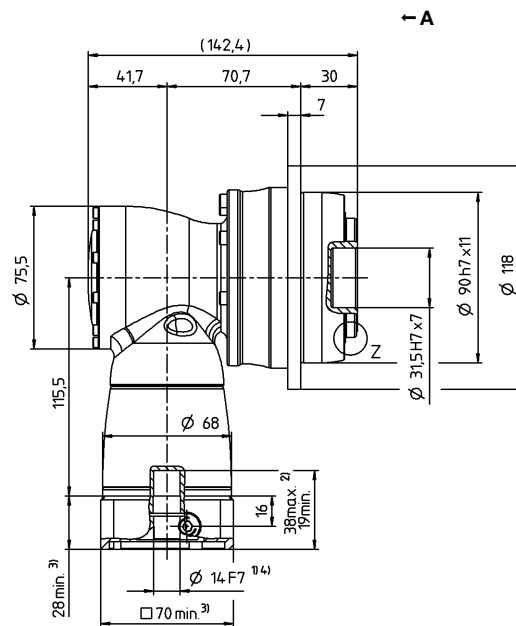
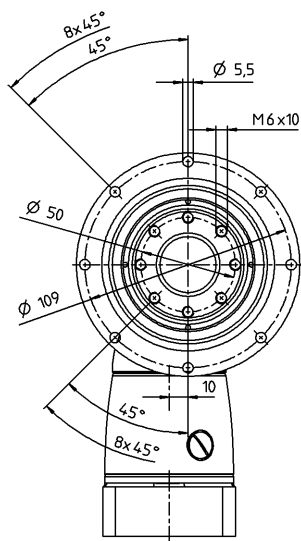
^{c)} Refers to center of the output shaft or flange

^{d)} Please reduce input speed at higher ambient temperatures

View A

Motor shaft diameter [mm]

2-stage

up to 14/19⁴⁾
(C⁵⁾ / E) clamping
hub diameter


See technical data sheet for available clamping hub diameters (mass moment of inertia). Dimensions available on request.

Non-tolerated dimensions are nominal dimensions

¹⁾ Check motor shaft fit

²⁾ Min./Max. permissible motor shaft length. Longer motor shafts are possible, please contact alpha.

³⁾ The dimensions depend on the motor

⁴⁾ Smaller motor shaft diameter is compensated by a bushing with a minimum thickness of 1 mm

⁵⁾ Standard clamping hub diameter

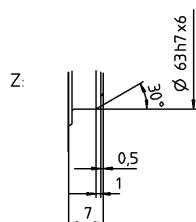
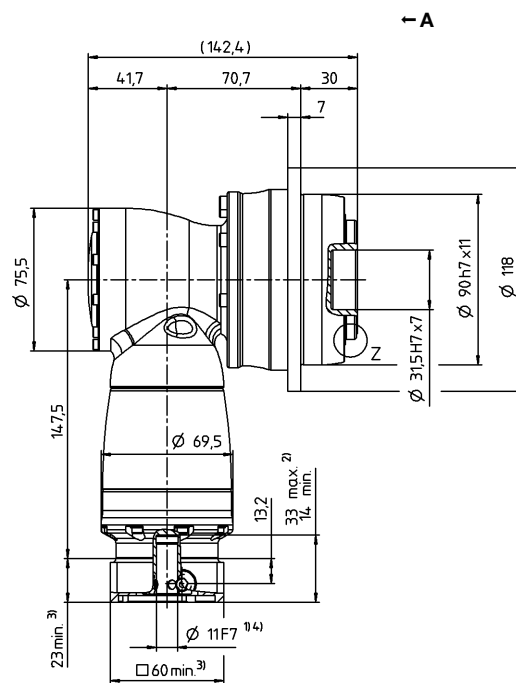
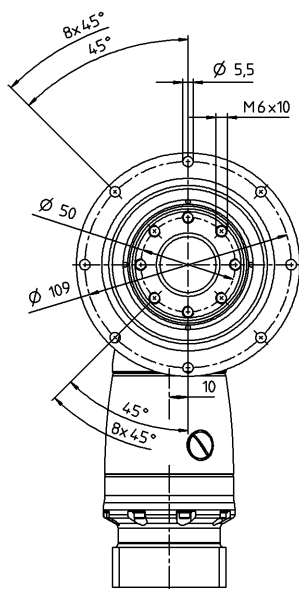
TPK+ 010 MF 3-stage

					3-stage													
Ratio			<i>i</i>		64	84	100	125	140	175	200	250	280	350	400	500	700	1000
Max. torque ^{a) b)}			<i>T</i> _{2a}	<i>Nm</i>	144	144	180	180	180	180	180	180	210	210	96	120	168	168
				<i>in.lb</i>	1275	1275	1593	1593	1593	1593	1593	1593	1859	1859	850	1062	1487	1487
Max. acceleration torque ^{b)} (max. 1000 cycles per hour)			<i>T</i> _{2B}	<i>Nm</i>	120	120	150	150	150	150	150	150	172	172	80	100	140	126
				<i>in.lb</i>	1062	1062	1328	1328	1328	1328	1328	1328	1522	1522	708	885	1239	1115
Nominal torque (at <i>n</i> _n)			<i>T</i> _{2N}	<i>Nm</i>	85	85	90	90	90	90	90	90	75	90	60	75	90	60
				<i>in.lb</i>	752	752	797	797	797	797	797	797	664	797	531	664	797	531
Emergency stop torque ^{a) b)} (permitted 1000 times during the service life of the gearbox)			<i>T</i> _{2Not}	<i>Nm</i>	200	160	250	250	250	250	250	250	251	251	160	200	251	251
				<i>in.lb</i>	1770	1416	2213	2213	2213	2213	2213	2213	2213	2222	2222	1416	1770	2222
Permitted average input speed (at <i>T</i> _{2n} and 20 °C ambient temperature) ^{d)}			<i>n</i> _{1N}	<i>n</i> _{1T}	4400	4400	4400	4400	4400	4400	4400	4800	4400	4800	5500	5500	5500	5500
Max. input speed			<i>n</i> _{1Max}	<i>rpm</i>	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000
Mean no load running torque ^{b)} (at <i>n</i> _i = 3000 rpm and 20 °C gearbox temperature)			<i>T</i> ₀₁₂	<i>Nm</i>	0.3	0.3	0.3	0.3	0.3	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
				<i>in.lb</i>	2.7	2.7	2.7	2.7	2.7	2.7	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8
Max. backlash			<i>j</i> _t	<i>arcmin</i>	Standard ≤ 5 / Reduced ≤ 3													
Torsional rigidity ^{b)}			<i>C</i> _{t21}	<i>Nm/arcmin</i>	16	16	20	21	20	21	20	21	23	24	15	19	22	27
				<i>in.lb/arcmin</i>	142	142	177	186	177	186	177	186	204	212	133	168	195	239
Tilting rigidity			<i>C</i> _{2K}	<i>Nm/arcmin</i>	225													
				<i>in.lb/arcmin</i>	1991													
Max. axial force ^{c)}			<i>F</i> _{2AMax}	<i>N</i>	2795													
				<i>lb_f</i>	629													
Max. tilting moment			<i>M</i> _{2KMax}	<i>Nm</i>	270													
				<i>in.lb</i>	2390													
Efficiency at full load			<i>η</i>	%	92													
Service life			<i>L</i> _h	<i>h</i>	> 20000													
Weight (incl. standard adapter plate)			<i>m</i>	<i>kg</i>	5.5													
				<i>lb_m</i>	12													
Operating noise (at reference ratio and reference speed – ratio-specific values available in cymex®)			<i>L</i> _{PA}	<i>dB(A)</i>	≤ 66													
Max. permitted housing temperature				°C	+90													
				<i>F</i>	194													
Ambient temperature				°C	0 to +40													
				<i>F</i>	32 to 104													
Lubrication					Lubricated for life													
Direction of rotation					In- and output opposite direction													
Protection class					IP 65													
Metal bellows coupling (recommended product type – validate sizing with cymex®)					BCT - 00060AAX - 050.000													
Bore diameter of coupling on the application side				<i>mm</i>	X = 014.000 - 035.000													
Mass moment of inertia (relates to the drive) Clamping hub diameter [mm]	B	11	<i>J</i> _i	<i>kgcm²</i>	0.09	0.07	0.08	0.07	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06
				<i>10⁻³ in.lb.s²</i>	0.08	0.06	0.07	0.06	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05
	C	14	<i>J</i> _i	<i>kgcm²</i>	0.2	0.18	0.19	0.19	0.18	0.18	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17
<i>10⁻³ in.lb.s²</i>				0.18	0.16	0.17	0.17	0.16	0.16	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	

Please use our sizing software cymex[®] for a detailed sizing – www.wittenstein-cymex.com
Please contact us for optimum sizing at S1 conditions (Continuous operation).

- ^{a)} At max. 10 % M_{2KMax}
^{b)} Valid for standard clamping hub diameter
^{c)} Refers to center of the output shaft or flange
^{d)} Please reduce input speed at higher ambient temperatures

up to 11/14 ⁴⁾
(B⁵/C) clamping
hub diameter



5) Standard clamping hub diameter

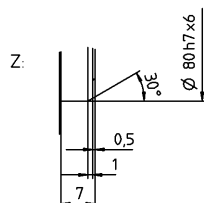
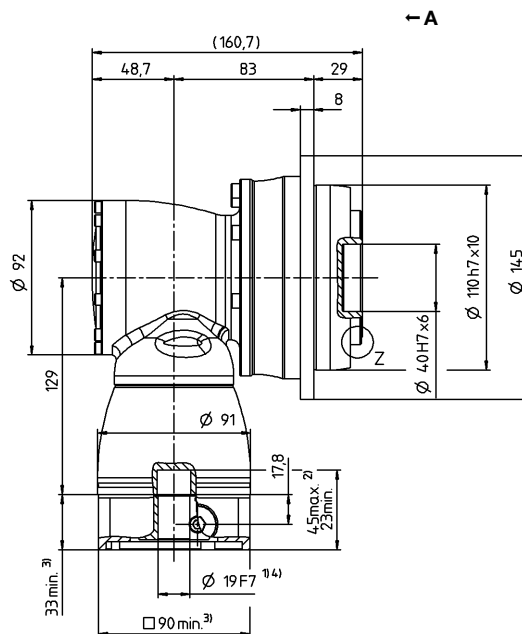
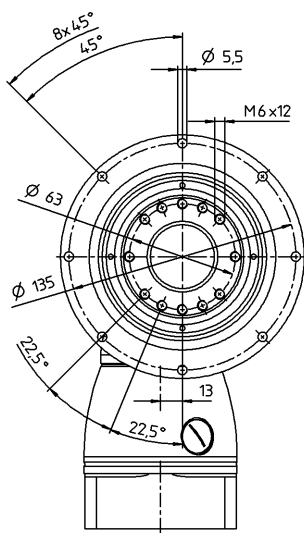
TPK+ 025 MF 2-stage

				2-stage											
Ratio			<i>i</i>		12	16	20	25	28	35	40	49	50	70	100
Max. torque ^{a) b)}			<i>T</i> _{2a}	<i>Nm</i>	336	336	380	380	352	352	200	352	250	350	352
				<i>in.lb</i>	2974	2974	3363	3363	3115	3115	1770	3115	2213	3098	3115
Max. acceleration torque ^{b)} (max. 1000 cycles per hour)			<i>T</i> _{2B}	<i>Nm</i>	280	280	350	350	352	352	200	352	250	350	318
				<i>in.lb</i>	2478	2478	3098	3098	3115	3115	1770	3115	2213	3098	2815
Nominal torque (at <i>n</i> _n)			<i>T</i> _{2N}	<i>Nm</i>	170	170	170	170	170	170	160	170	170	170	120
				<i>in.lb</i>	1505	1505	1505	1505	1505	1505	1416	1505	1505	1505	1062
Emergency stop torque ^{a) b)} (permitted 1000 times during the service life of the gearbox)			<i>T</i> _{2Not}	<i>Nm</i>	380	460	575	575	625	625	400	625	500	625	625
				<i>in.lb</i>	3363	4071	5089	5089	5532	5532	3540	5532	4425	5532	5532
Permitted average input speed (at <i>T</i> _{2N} and 20 °C ambient temperature) ^{d)}			<i>n</i> _{1N}	<i>n</i> _{1T}	2000	2400	2400	2700	2400	2500	2500	2500	2500	2500	2500
Max. input speed			<i>n</i> _{1Max}	<i>rpm</i>	7500	7500	7500	7500	7500	7500	7500	7500	7500	7500	7500
Mean no load running torque ^{b)} (at <i>n</i> _i = 3000 rpm and 20 °C gearbox temperature)			<i>T</i> ₀₁₂	<i>Nm</i>	2.5	2.1	2	1.8	2	2.2	2	2.2	2	2	2
				<i>in.lb</i>	22	19	18	16	18	19	18	19	18	18	18
Max. backlash			<i>j</i> _t	<i>arcmin</i>	Standard ≤ 4 / Reduced ≤ 2										
Torsional rigidity ^{b)}			<i>C</i> _{t21}	<i>Nm/arcmin</i>	40	42	53	55	59	60	44	60	55	60	56
				<i>in.lb/arcmin</i>	354	372	469	487	522	531	389	531	487	531	496
Tilting rigidity			<i>C</i> _{2K}	<i>Nm/arcmin</i>	550										
				<i>in.lb/arcmin</i>	4868										
Max. axial force ^{c)}			<i>F</i> _{2AMax}	<i>N</i>	4800										
				<i>lb_f</i>	1080										
Max. tilting moment			<i>M</i> _{2KMax}	<i>Nm</i>	440										
				<i>in.lb</i>	3894										
Efficiency at full load			<i>η</i>	%	94										
Service life			<i>L</i> _h	<i>h</i>	> 20000										
Weight (incl. standard adapter plate)			<i>m</i>	<i>kg</i>	9										
				<i>lb_m</i>	20										
Operating noise (at reference ratio and reference speed – ratio-specific values available in cymex®)			<i>L</i> _{PA}	<i>dB(A)</i>	≤ 68										
Max. permitted housing temperature				°C	+90										
				<i>F</i>	194										
Ambient temperature				°C	0 to +40										
				<i>F</i>	32 to 104										
Lubrication					Lubricated for life										
Direction of rotation					In- and output opposite direction										
Protection class					IP 65										
Metal bellows coupling (recommended product type – validate sizing with cymex®)					BCT - 00150AAX - 063.000										
Bore diameter of coupling on the application side				<i>mm</i>	X = 019.000 - 042.000										
Mass moment of inertia (relates to the drive) Clamping hub diameter [mm]	E	19	<i>J</i> _i	<i>kgcm²</i>	1.43	1.18	1.16	1.04	1.14	0.94	0.89	0.95	0.89	0.89	0.89
				<i>10⁻³ in.lb.s²</i>	1.27	1.04	1.03	0.92	1.01	0.83	0.79	0.84	0.79	0.79	0.79
	H	28	<i>J</i> _i	<i>kgcm²</i>	2.85	2.59	2.57	2.45	2.56	2.4	2.31	2.37	2.3	2.3	2.3
				<i>10⁻³ in.lb.s²</i>	2.52	2.29	2.27	2.17	2.27	2.12	2.04	2.1	2.04	2.04	2.04

Please use our sizing software cymex[®] for a detailed sizing – www.wittenstein-cymex.com
Please contact us for optimum sizing at S1 conditions (Continuous operation).

- ^{a)} At max. 10 % M_{2KMax}
^{b)} Valid for standard clamping hub diameter
^{c)} Refers to center of the output shaft or flange
^{d)} Please reduce input speed at higher ambient temperatures

up to 19/28 ⁴⁾
(E⁵)/H) clamping
hub diameter



Hypoid gearboxes

TPK⁺

MF

5) Standard clamping hub diameter

TPK+ 025 MF 3-stage

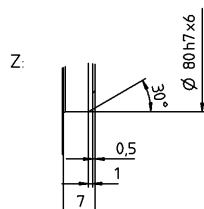
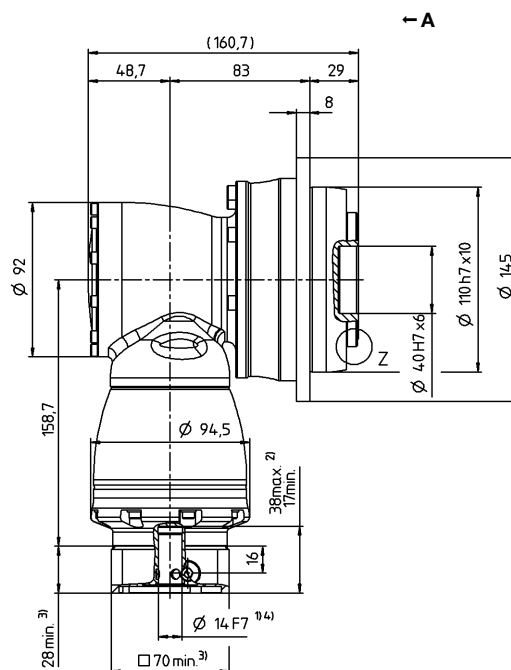
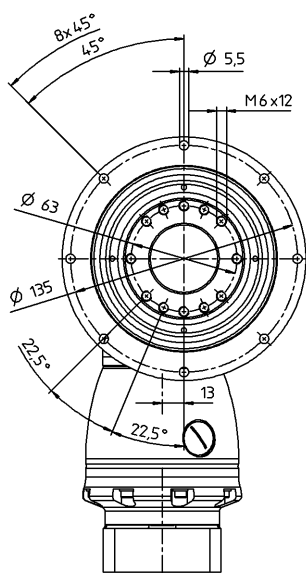
				3-stage														
Ratio			<i>i</i>		64	84	100	125	140	175	200	250	280	350	400	500	700	1000
Max. torque ^{a) b)}			<i>T</i> _{2a}	<i>Nm</i>	336	336	380	380	380	380	380	380	352	352	240	300	352	352
				<i>in.lb</i>	2974	2974	3363	3363	3363	3363	3363	3115	3115	2124	2655	3115	3115	
Max. acceleration torque ^{b)} (max. 1000 cycles per hour)			<i>T</i> _{2B}	<i>Nm</i>	280	280	350	350	350	350	350	350	352	352	200	250	350	318
				<i>in.lb</i>	2478	2478	3098	3098	3098	3098	3098	3098	3115	3115	1770	2213	3098	2815
Nominal torque (at <i>n</i> _n)			<i>T</i> _{2N}	<i>Nm</i>	200	170	200	200	200	200	200	200	210	200	160	200	200	120
				<i>in.lb</i>	1770	1505	1770	1770	1770	1770	1770	1770	1859	1770	1416	1770	1770	1062
Emergency stop torque ^{a) b)} (permitted 1000 times during the service life of the gearbox)			<i>T</i> _{2Not}	<i>Nm</i>	460	380	575	575	575	575	575	575	625	625	400	500	625	625
				<i>in.lb</i>	4071	3363	5089	5089	5089	5089	5089	5089	5532	5532	3540	4425	5532	5532
Permitted average input speed (at <i>T</i> _{2n} and 20 °C ambient temperature) ^{d)}			<i>n</i> _{1N}	<i>n</i> _{1T}	3500	3500	3500	3500	3500	3500	3500	3800	3500	3800	4500	4500	4500	4500
Max. input speed			<i>n</i> _{1Max}	<i>rpm</i>	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000
Mean no load running torque ^{b)} (at <i>n</i> _i = 3000 rpm and 20 °C gearbox temperature)			<i>T</i> ₀₁₂	<i>Nm</i>	0.6	0.45	0.45	0.45	0.45	0.45	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
				<i>in.lb</i>	5.3	4.0	4.0	4.0	4.0	4.0	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7
Max. backlash			<i>j</i> _t	<i>arcmin</i>	Standard ≤ 4 / Reduced ≤ 2													
Torsional rigidity ^{b)}			<i>C</i> _{t21}	<i>Nm/arcmin</i>	42	40	53	55	53	55	53	55	59	60	44	55	60	56
				<i>in.lb/arcmin</i>	372	354	469	487	469	487	469	487	522	531	389	487	531	496
Tilting rigidity			<i>C</i> _{2K}	<i>Nm/arcmin</i>	550													
				<i>in.lb/arcmin</i>	4868													
Max. axial force ^{c)}			<i>F</i> _{2AMax}	<i>N</i>	4800													
				<i>lb_f</i>	1080													
Max. tilting moment			<i>M</i> _{2KMax}	<i>Nm</i>	440													
				<i>in.lb</i>	3894													
Efficiency at full load			<i>η</i>	%	92													
Service life			<i>L</i> _h	<i>h</i>	> 20000													
Weight (incl. standard adapter plate)			<i>m</i>	<i>kg</i>	9.8													
				<i>lb_m</i>	22													
Operating noise (at reference ratio and reference speed – ratio-specific values available in cymex®)			<i>L</i> _{PA}	<i>dB(A)</i>	≤ 68													
Max. permitted housing temperature				°C	+90													
				<i>F</i>	194													
Ambient temperature				°C	0 to +40													
				<i>F</i>	32 to 104													
Lubrication					Lubricated for life													
Direction of rotation					In- and output opposite direction													
Protection class					IP 65													
Metal bellows coupling (recommended product type – validate sizing with cymex®)					BCT - 00150AAX - 063.000													
Bore diameter of coupling on the application side				<i>mm</i>	X = 019.000 - 042.000													
Mass moment of inertia (relates to the drive) Clamping hub diameter [mm]	C	14	<i>J</i> _i	<i>kgcm²</i>	0.28	0.23	0.24	0.23	0.21	0.2	0.19	0.18	0.19	0.18	0.18	0.18	0.18	0.18
				<i>10⁻³ in.lb.s²</i>	0.25	0.2	0.21	0.2	0.19	0.18	0.17	0.16	0.17	0.16	0.16	0.16	0.16	0.16
	E	19	<i>J</i> _i	<i>kgcm²</i>	0.72	0.63	0.68	0.68	0.63	0.63	0.63	0.63	0.63	0.63	0.63	0.63	0.63	0.63
<i>10⁻³ in.lb.s²</i>				0.64	0.56	0.6	0.6	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	

Please use our sizing software cymex[®] for a detailed sizing – www.wittenstein-cymex.com
Please contact us for optimum sizing at S1 conditions (Continuous operation).

- ^{a)} At max. 10 % M_{2KMax}
^{b)} Valid for standard clamping hub diameter
^{c)} Refers to center of the output shaft or flange
^{d)} Please reduce input speed at higher ambient temperatures

Motor shaft diameter [mm]

3-stage

up to 14/19⁴⁾
(C⁵⁾/E) clamping
hub diameter


See technical data sheet for available clamping hub diameters (mass moment of inertia). Dimensions available on request.

Non-tolerated dimensions are nominal dimensions

¹⁾ Check motor shaft fit

²⁾ Min./Max. permissible motor shaft length. Longer motor shafts are possible, please contact alpha.

³⁾ The dimensions depend on the motor

⁴⁾ Smaller motor shaft diameter is compensated by a bushing with a minimum thickness of 1 mm

⁵⁾ Standard clamping hub diameter

TPK+ 050 MF 2-stage

				2-stage											
Ratio			<i>i</i>		12	16	20	25	28	35	40	49	50	70	100
Max. torque ^{a) b)}			<i>T</i> _{2a}	<i>Nm</i>	816	816	992	992	868	868	500	868	625	868	720
				<i>in.lb</i>	7222	7222	8780	8780	7682	7682	4425	7682	5532	7682	6373
Max. acceleration torque ^{b)} (max. 1000 cycles per hour)			<i>T</i> _{2B}	<i>Nm</i>	680	680	840	840	840	840	500	840	625	840	648
				<i>in.lb</i>	6019	6019	7435	7435	7435	7435	4425	7435	5532	7435	5735
Nominal torque (at <i>n</i> _N)			<i>T</i> _{2N}	<i>Nm</i>	370	370	370	370	370	370	320	370	370	370	240
				<i>in.lb</i>	3275	3275	3275	3275	3275	3275	2832	3275	3275	3275	2124
Emergency stop torque ^{a) b)} (permitted 1000 times during the service life of the gearbox)			<i>T</i> _{2Not}	<i>Nm</i>	880	1040	1250	1250	1250	1250	1000	1250	1250	1250	1250
				<i>in.lb</i>	7789	9205	11064	11064	11064	11064	8851	11064	11064	11064	11064
Permitted average input speed (at <i>T</i> _{2N} and 20 °C ambient temperature) ^{d)}			<i>n</i> _{1N}	<i>n</i> _{1T}	1900	2300	2300	2600	2300	2300	2300	2300	2300	2300	2300
Max. input speed			<i>n</i> _{1Max}	<i>rpm</i>	5500	5500	5500	5500	5500	5500	5500	5500	5500	5500	5500
Mean no load running torque ^{b)} (at <i>n</i> _i = 3000 rpm and 20 °C gearbox temperature)			<i>T</i> ₀₁₂	<i>Nm</i>	5.6	4.3	4.2	3.4	4.1	4.7	3.3	4.1	3.3	3.3	3.3
				<i>in.lb</i>	50	38	37	30	36	42	29	36	29	29	29
Max. backlash			<i>j</i> _t	<i>arcmin</i>	Standard ≤ 4 / Reduced ≤ 2										
Torsional rigidity ^{b)}			<i>C</i> _{t21}	<i>Nm/arcmin</i>	87	91	111	119	123	127	96	127	115	125	112
				<i>in.lb/arcmin</i>	770	805	982	1053	1089	1124	850	1124	1018	1106	991
Tilting rigidity			<i>C</i> _{2K}	<i>Nm/arcmin</i>	560										
				<i>in.lb/arcmin</i>	4956										
Max. axial force ^{c)}			<i>F</i> _{2AMax}	<i>N</i>	6130										
				<i>lb_f</i>	1379										
Max. tilting moment			<i>M</i> _{2KMax}	<i>Nm</i>	1335										
				<i>in.lb</i>	11816										
Efficiency at full load			<i>η</i>	%	94										
Service life			<i>L</i> _h	<i>h</i>	> 20000										
Weight (incl. standard adapter plate)			<i>m</i>	<i>kg</i>	17										
				<i>lb_m</i>	38										
Operating noise (at reference ratio and reference speed – ratio-specific values available in cymex®)			<i>L</i> _{PA}	<i>dB(A)</i>	≤ 68										
Max. permitted housing temperature				°C	+90										
				<i>F</i>	194										
Ambient temperature				°C	0 to +40										
				<i>F</i>	32 to 104										
Lubrication					Lubricated for life										
Direction of rotation					In- and output opposite direction										
Protection class					IP 65										
Metal bellows coupling (recommended product type – validate sizing with cymex®)					BCT - 00300AAX - 080.000										
Bore diameter of coupling on the application side				<i>mm</i>	X = 024.000 - 060.000										
Mass moment of inertia (relates to the drive) Clamping hub diameter [mm]	H	28	<i>J</i> _i	<i>kgcm²</i>	4.56	3.76	3.71	3.28	3.66	3	2.79	3.1	2.78	2.77	2.77
				<i>10⁻³ in.lb.s²</i>	4.04	3.33	3.28	2.9	3.24	2.66	2.47	2.74	2.46	2.45	2.45
	K	38	<i>J</i> _i	<i>kgcm²</i>	11.7	10.9	10.9	10.4	10.8	10.3	9.95	10.4	9.94	9.94	9.94
<i>10⁻³ in.lb.s²</i>				10.35	9.65	9.65	9.2	9.56	9.12	8.81	9.2	8.8	8.8	8.8	

Please use our sizing software cymex[®] for a detailed sizing – www.wittenstein-cymex.com
Please contact us for optimum sizing at S1 conditions (Continuous operation).

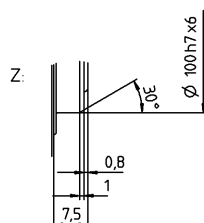
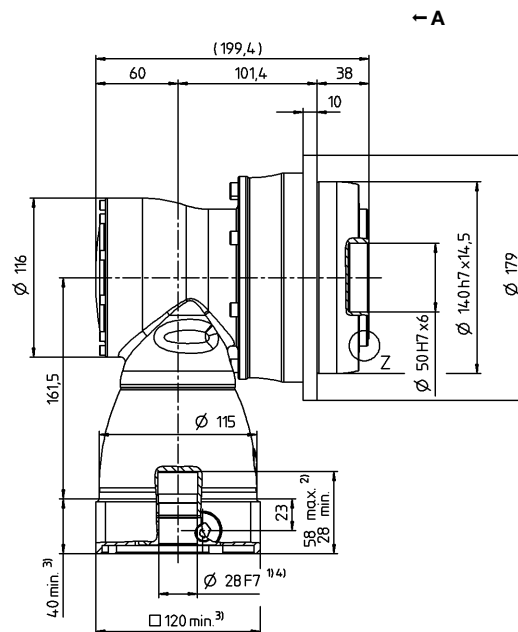
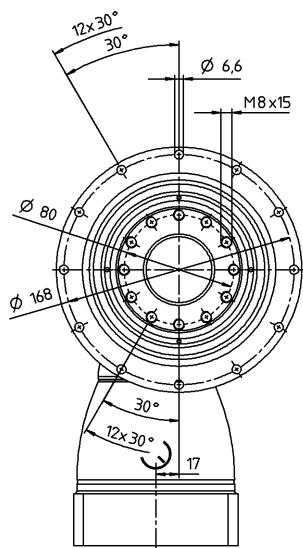
^{a)} At max. 10 % M_{2KMax}

^{b)} Valid for standard clamping hub diameter

^{c)} Refers to center of the output shaft or flange

^{d)} Please reduce input speed at higher ambient temperatures

up to 28/38 ⁴⁾
(H⁵/K) clamping
hub diameter

TPK⁺

MF

Non-tolerated dimensions are nominal dimensions

- 1) Check motor shaft fit
- 2) Min. / Max. permissible motor shaft length. Longer motor shafts are possible, please contact alpha.
- 3) The dimensions depend on the motor
- 4) Smaller motor shaft diameter is compensated by bushing with a minimum thickness of 1 mm
- 5) Standard clamping hub diameter

TPK+ 050 MF 3-stage

			3-stage													
Ratio	<i>i</i>		64	84	100	125	140	175	200	250	280	350	400	500	700	1000
Max. torque ^{a) b)}	T_{2a}	Nm	816	816	992	992	992	992	992	992	868	868	600	750	868	720
		in.lb	7222	7222	8780	8780	8780	8780	8780	8780	7682	7682	5310	6638	7682	6373
Max. acceleration torque ^{b)} (max. 1000 cycles per hour)	T_{2B}	Nm	680	680	840	840	840	840	840	840	840	840	500	625	840	648
		in.lb	6019	6019	7435	7435	7435	7435	7435	7435	7435	7435	4425	5532	7435	5735
Nominal torque (at n_{1N})	T_{2N}	Nm	400	400	400	400	400	400	400	400	400	400	320	370	400	240
		in.lb	3540	3540	3540	3540	3540	3540	3540	3540	3540	3540	2832	3275	3540	2124
Emergency stop torque ^{a) b)} (permitted 1000 times during the service life of the gearbox)	T_{2Not}	Nm	1040	880	1250	1250	1250	1250	1250	1250	1250	1250	1000	1250	1250	1250
		in.lb	9205	7789	11064	11064	11064	11064	11064	11064	11064	11064	8851	11064	11064	11064
Permitted average input speed (at T_{2N} and 20 °C ambient temperature) ^{d)}	n_{1N}	n_{1T}	3100	3100	3100	3100	3100	3100	3100	3500	3100	3500	4200	4200	4200	4200
Max. input speed	n_{1Max}	rpm	4500	4500	4500	4500	4500	4500	4500	4500	4500	4500	4500	4500	4500	4500
Mean no load running torque ^{b)} (at $n_1 = 3000$ rpm and 20 °C gearbox temperature)	T_{012}	Nm	1.1	0.9	0.9	0.75	0.75	0.6	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45
		in.lb	9.7	8.0	8.0	6.6	6.6	5.3	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Max. backlash	j_t	arcmin	Standard ≤ 4 / Reduced ≤ 2													
Torsional rigidity ^{b)}	C_{t21}	Nm/arcmin	91	87	111	119	111	119	111	119	123	127	95	115	125	112
		in.lb/arcmin	805	770	982	1053	982	1053	982	1053	1089	1124	841	1018	1106	991
Tilting rigidity	C_{2K}	Nm/arcmin	560													
		in.lb/arcmin	4956													
Max. axial force ^{c)}	F_{2AMax}	N	6130													
		lb _f	1379													
Max. tilting moment	M_{2KMax}	Nm	1335													
		in.lb	11816													
Efficiency at full load	η	%	92													
Service life	L_h	h	> 20000													
Weight (incl. standard adapter plate)	m	kg	18.7													
		lb _m	41													
Operating noise (at reference ratio and reference speed – ratio-specific values available in cymex [®])	L_{PA}	dB(A)	≤ 68													
Max. permitted housing temperature		°C	+90													
		F	194													
Ambient temperature		°C	0 to +40													
		F	32 to 104													
Lubrication			Lubricated for life													
Direction of rotation			In- and output opposite direction													
Protection class			IP 65													
Metal bellows coupling (recommended product type – validate sizing with cymex [®])			BCT - 00300AAX - 080.000													
Bore diameter of coupling on the application side		mm	X = 024.000 - 060.000													
Mass moment of inertia (relates to the drive) Clamping hub diameter [mm]	E 19	J_1	kgcm ²	1.01	0.76	0.88	0.85	0.76	0.75	0.7	0.69	0.7	0.69	0.69	0.69	0.69
			10 ⁻³ in.lb.s ²	0.89	0.67	0.78	0.75	0.67	0.66	0.62	0.61	0.62	0.61	0.61	0.61	0.61
	G 24	J_1	kgcm ²	2.57	2.32	2.44	2.42	2.32	2.31	2.26	2.25	2.26	2.25	2.25	2.25	2.25
			10 ⁻³ in.lb.s ²	2.27	2.05	2.16	2.14	2.05	2.04	2	1.99	2	1.99	1.99	1.99	1.99

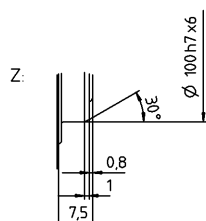
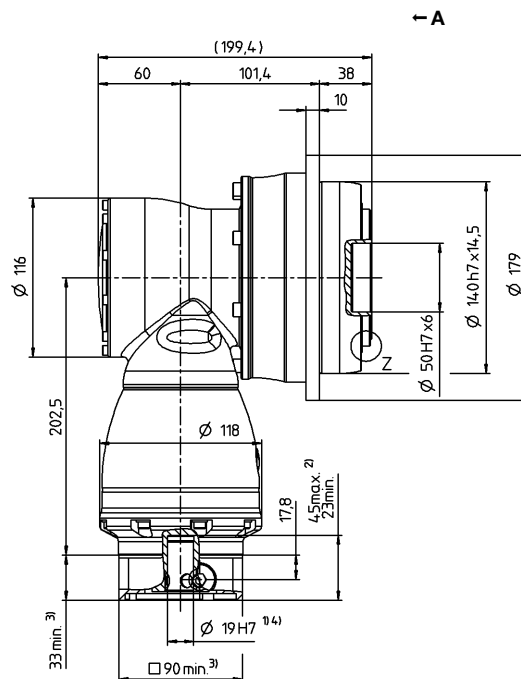
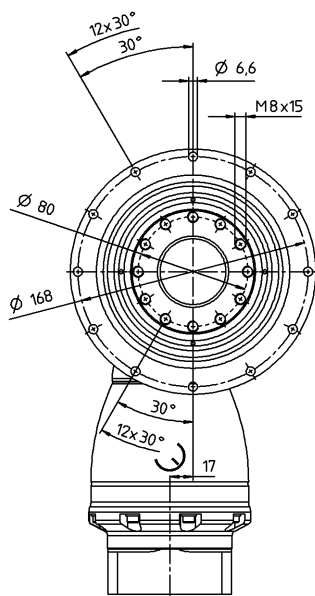
Please use our sizing software cymex[®] for a detailed sizing – www.wittenstein-cymex.com
Please contact us for optimum sizing at S1 conditions (Continuous operation).

- ^{a)} At max. 10 % M_{2KMax}
^{b)} Valid for standard clamping hub diameter
^{c)} Refers to center of the output shaft or flange
^{d)} Please reduce input speed at higher ambient temperatures

View A

Motor shaft diameter [mm]

3-stage

up to 19/24⁴⁾
(E⁵⁾/G) clamping
hub diameter


See technical data sheet for available clamping hub diameters (mass moment of inertia). Dimensions available on request.

Non-tolerated dimensions are nominal dimensions

¹⁾ Check motor shaft fit

²⁾ Min./Max. permissible motor shaft length. Longer motor shafts are possible, please contact alpha.

³⁾ The dimensions depend on the motor

⁴⁾ Smaller motor shaft diameter is compensated by a bushing with a minimum thickness of 1 mm

⁵⁾ Standard clamping hub diameter

Hypoid gearboxes

TPK+

MF

TPK+ 110 MF 2-stage

				2-stage											
Ratio			<i>i</i>		12	16	20	25	28	35	40	49	50	70	100
Max. torque ^{a) b)}			<i>T</i> _{2a}	<i>Nm</i>	1440	1440	1800	1800	2520	2520	840	1750	1050	1470	2100
				<i>in.lb</i>	12745	12745	15931	15931	22304	22304	7435	15489	9293	13011	18587
Max. acceleration torque ^{b)} (max. 1000 cycles per hour)			<i>T</i> _{2B}	<i>Nm</i>	1200	1200	1500	1500	1920	1920	840	1750	1050	1470	1680
				<i>in.lb</i>	10621	10621	13276	13276	16994	16994	7435	15489	9293	13011	14869
Nominal torque (at <i>n</i> _{in})			<i>T</i> _{2N}	<i>Nm</i>	700	700	750	750	750	750	640	750	750	750	750
				<i>in.lb</i>	6196	6196	6638	6638	6638	6638	5665	6638	6638	6638	6638
Emergency stop torque ^{a) b)} (permitted 1000 times during the service life of the gearbox)			<i>T</i> _{2Not}	<i>Nm</i>	1600	2000	2500	2500	3075	3075	1600	3075	2000	2800	3075
				<i>in.lb</i>	14161	17702	22127	22127	27216	27216	14161	27216	17702	24782	27216
Permitted average input speed (at <i>T</i> _{2a} and 20 °C ambient temperature) ^{d)}			<i>n</i> _{1N}	<i>n</i> _{1T}	1600	1900	1900	2100	1900	2100	2100	2100	2100	2100	2100
Max. input speed			<i>n</i> _{1Max}	<i>rpm</i>	5000	5000	5000	5000	5000	5000	5000	5000	5000	5000	5000
Mean no load running torque ^{b)} (at <i>n</i> _i = 3000 rpm and 20 °C gearbox temperature)			<i>T</i> ₀₁₂	<i>Nm</i>	12	8.9	8.9	5.5	8.2	8	7.5	10	7.5	7.4	7.4
				<i>in.lb</i>	106	79	79	49	73	71	66	89	66	65	65
Max. backlash			<i>j</i> _t	<i>arcmin</i>	Standard ≤ 4 / Reduced ≤ 2										
Torsional rigidity ^{b)}			<i>C</i> _{t21}	<i>Nm/arcmin</i>	253	269	336	346	400	407	274	410	341	404	389
				<i>in.lb/arcmin</i>	2239	2381	2974	3062	3540	3602	2425	3629	3018	3576	3443
Tilting rigidity			<i>C</i> _{2K}	<i>Nm/arcmin</i>	1452										
				<i>in.lb/arcmin</i>	12851										
Max. axial force ^{c)}			<i>F</i> _{2AMax}	<i>N</i>	10050										
				<i>lb_f</i>	2261										
Max. tilting moment			<i>M</i> _{2KMax}	<i>Nm</i>	3280										
				<i>in.lb</i>	29030										
Efficiency at full load			<i>η</i>	%	94										
Service life			<i>L</i> _h	<i>h</i>	> 20000										
Weight (incl. standard adapter plate)			<i>m</i>	<i>kg</i>	41										
				<i>lb_m</i>	91										
Operating noise (at reference ratio and reference speed – ratio-specific values available in cymex®)			<i>L</i> _{PA}	<i>dB(A)</i>	≤ 70										
Max. permitted housing temperature				°C	+90										
				<i>F</i>	194										
Ambient temperature				°C	0 to +40										
				<i>F</i>	32 to 104										
Lubrication					Lubricated for life										
Direction of rotation					In- and output opposite direction										
Protection class					IP 65										
Metal bellows coupling (recommended product type – validate sizing with cymex®)					BCT - 01500AAX - 125.000										
Bore diameter of coupling on the application side				<i>mm</i>	X = 050.000 - 080.000										
Mass moment of inertia (relates to the drive) Clamping hub diameter [mm]	K	38	<i>J</i> _i	<i>kgcm²</i>	24.3	19	18.7	16.1	18.5	15.7	12.8	17.5	12.7	12.7	12.7
				<i>10⁻³ in.lb.s²</i>	21.51	16.82	16.55	14.25	16.37	13.89	11.33	15.49	11.24	11.24	11.24

Please use our sizing software cymex[®] for a detailed sizing – www.wittenstein-cymex.com
Please contact us for optimum sizing at S1 conditions (Continuous operation).

^{a)} At max. 10 % M_{2KMax}

^{b)} Valid for standard clamping hub diameter

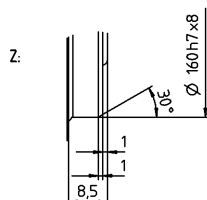
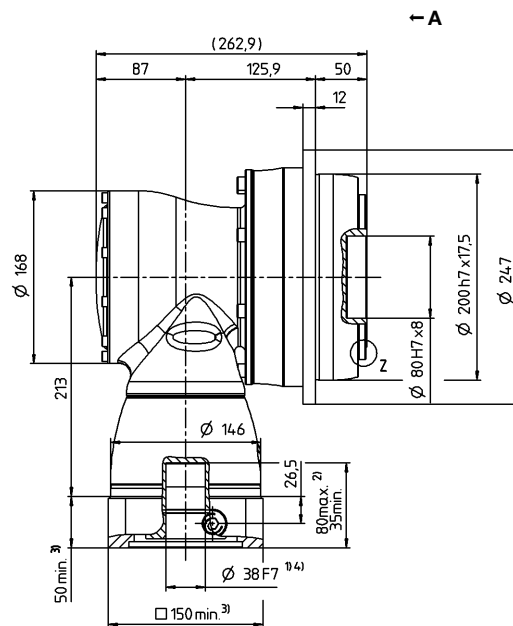
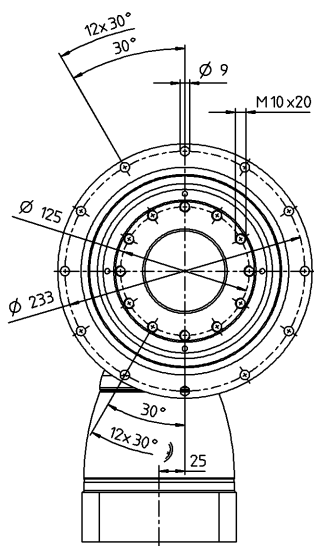
^{c)} Refers to center of the output shaft or flange

^{d)} Please reduce input speed at higher ambient temperatures

View A

Motor shaft diameter [mm]

2-stage

up to 38 ⁴⁾ (K) ⁵⁾
clamping hub
diameter


See technical data sheet for available clamping hub diameters (mass moment of inertia). Dimensions available on request.

Non-tolerated dimensions are nominal dimensions

¹⁾ Check motor shaft fit

²⁾ Min./Max. permissible motor shaft length. Longer motor shafts are possible, please contact alpha.

³⁾ The dimensions depend on the motor

⁴⁾ Smaller motor shaft diameter is compensated by a bushing with a minimum thickness of 1 mm

⁵⁾ Standard clamping hub diameter

Hypoid gearboxes

TPK+

MF

TPK+ 110 MF 3-stage

				3-stage													
Ratio	<i>i</i>			64	84	100	125	140	175	200	250	280	350	400	500	700	1000
Max. torque ^{a) b)}	T_{2a}	<i>Nm</i>		1440	1440	1800	1800	1800	1800	1800	1800	2520	2520	1008	1260	1764	2240
		<i>in.lb</i>		12745	12745	15931	15931	15931	15931	15931	15931	22304	22304	8922	11152	15613	19826
Max. acceleration torque ^{b)} (max. 1000 cycles per hour)	T_{2B}	<i>Nm</i>		1200	1200	1500	1500	1500	1500	1500	1500	1920	1920	840	1050	1470	1680
		<i>in.lb</i>		10621	10621	13276	13276	13276	13276	13276	13276	16994	16994	7435	9293	13011	14869
Nominal torque (at n_{IN})	T_{2N}	<i>Nm</i>		700	700	950	950	950	950	950	950	1120	1250	640	750	1120	800
		<i>in.lb</i>		6196	6196	8408	8408	8408	8408	8408	8408	9913	11064	5665	6638	9913	7081
Emergency stop torque ^{a) b)} (permitted 1000 times during the service life of the gearbox)	T_{2Not}	<i>Nm</i>		2000	1600	2500	2500	2500	2500	2500	2500	3075	3075	1600	2000	2800	3075
		<i>in.lb</i>		17702	14161	22127	22127	22127	22127	22127	22127	27216	27216	14161	17702	24782	27216
Permitted average input speed (at T_{2N} and 20 °C ambient temperature) ^{d)}	n_{1N}	n_{1T}		2900	2900	2900	2900	2900	2900	2900	3200	2900	3200	3900	3900	3900	3900
Max. input speed	n_{1Max}	<i>rpm</i>		4500	4500	4500	4500	4500	4500	4500	4500	4500	4500	4500	4500	4500	4500
Mean no load running torque ^{b)} (at $n_i = 3000$ rpm and 20 °C gearbox temperature)	T_{012}	<i>Nm</i>		3	1.5	2.4	1.8	1.8	1.5	1.5	1.2	1.5	1.2	1.2	1.2	1.2	1.2
		<i>in.lb</i>		27	13	21	16	16	13	13	11	13	11	11	11	11	11
Max. backlash	j_t	<i>arcmin</i>		Standard ≤ 4 / Reduced ≤ 2													
Torsional rigidity ^{b)}	C_{t21}	<i>Nm/arcmin</i>		269	252	336	346	336	346	336	346	400	407	274	341	404	389
		<i>in.lb/arcmin</i>		2381	2230	2974	3062	2974	3062	2974	3062	3540	3602	2425	3018	3576	3443
Tilting rigidity	C_{2K}	<i>Nm/arcmin</i>		1452													
		<i>in.lb/arcmin</i>		12851													
Max. axial force ^{c)}	F_{2AMax}	<i>N</i>		10050													
		<i>lb_f</i>		2261													
Max. tilting moment	M_{2KMax}	<i>Nm</i>		3280													
		<i>in.lb</i>		29030													
Efficiency at full load	η	%		92													
Service life	L_h	<i>h</i>		> 20000													
Weight (incl. standard adapter plate)	<i>m</i>	<i>kg</i>		45.4													
		<i>lb_m</i>		100													
Operating noise (at reference ratio and reference speed – ratio-specific values available in cymex [®])	L_{PA}	<i>dB(A)</i>		≤ 70													
Max. permitted housing temperature		°C		+90													
		<i>F</i>		194													
Ambient temperature		°C		0 to +40													
		<i>F</i>		32 to 104													
Lubrication				Lubricated for life													
Direction of rotation				In- and output opposite direction													
Protection class				IP 65													
Metal bellows coupling (recommended product type – validate sizing with cymex [®])				BCT - 01500AAX - 125.000													
Bore diameter of coupling on the application side		<i>mm</i>		X = 050.000 - 080.000													
Mass moment of inertia (relates to the drive) Clamping hub diameter [mm]	G	24	J_1	<i>kgcm²</i>	3.97	2.82	3.36	3.22	2.82	2.75	2.5	2.47	2.5	2.44	2.42	2.42	2.42
				<i>10⁻³ in.lb.s²</i>	3.51	2.5	2.97	2.85	2.5	2.43	2.21	2.19	2.21	2.16	2.14	2.14	2.14
	K	38	J_1	<i>kgcm²</i>	10.9	9.74	10.3	10.1	9.74	9.66	9.41	9.38	9.41	9.38	9.33	9.33	9.33
				<i>10⁻³ in.lb.s²</i>	9.65	8.62	9.12	8.94	8.62	8.55	8.33	8.3	8.33	8.3	8.26	8.26	8.26

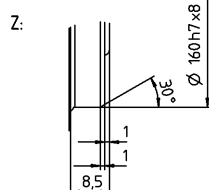
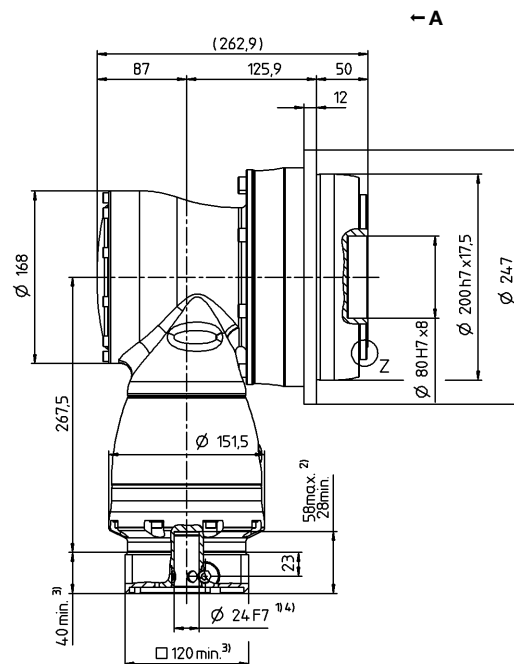
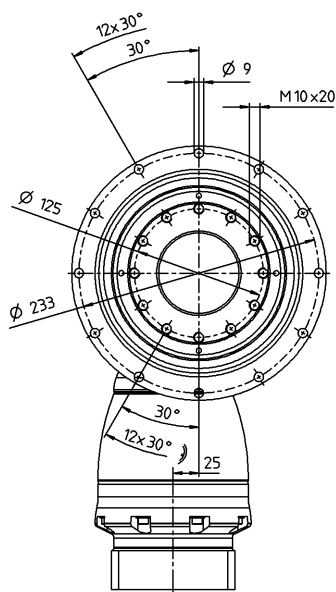
Please use our sizing software cymex[®] for a detailed sizing – www.wittenstein-cymex.com
Please contact us for optimum sizing at S1 conditions (Continuous operation).

- ^{a)} At max. 10 % M_{2KMax}
^{b)} Valid for standard clamping hub diameter
^{c)} Refers to center of the output shaft or flange
^{d)} Please reduce input speed at higher ambient temperatures

View A

Motor shaft diameter [mm]

3-stage

up to 24/38⁴⁾
(G⁵⁾/K) clamping
hub diameter


See technical data sheet for available clamping hub diameters (mass moment of inertia). Dimensions available on request.

Non-tolerated dimensions are nominal dimensions

¹⁾ Check motor shaft fit

²⁾ Min./Max. permissible motor shaft length. Longer motor shafts are possible, please contact alpha.

³⁾ The dimensions depend on the motor

⁴⁾ Smaller motor shaft diameter is compensated by a bushing with a minimum thickness of 1 mm

⁵⁾ Standard clamping hub diameter

Hypoid gearboxes

TPK+

MF

TPK⁺ 300 MF 2-stage

			2-stage							
Ratio	<i>i</i>		15	20	25	35	49	50	70	100
Max. torque ^{a) b)}	T_{2a}	Nm	3840	3840	3840	5250	3840	2350	3290	2800
		in.lb	33987	33987	33987	46467	33987	20799	29119	24782
Max. acceleration torque ^{b)} (max. 1000 cycles per hour)	T_{2B}	Nm	3200	3200	3200	3960	3850	2350	3290	2280
		in.lb	28323	28323	28323	35049	34076	20799	29119	20180
Nominal torque (at n_n)	T_{2N}	Nm	2000	2000	2000	1800	1800	1800	1800	1600
		in.lb	17702	17702	17702	15931	15931	15931	15931	14161
Emergency stop torque ^{a) b)} (permitted 1000 times during the service life of the gearbox)	T_{2Not}	Nm	4500	5250	5250	7350	6790	4500	6300	8750
		in.lb	39829	46467	46467	65053	60097	39829	55760	77445
Permitted average input speed (at T_{2N} and 20 °C ambient temperature) ^{d)}	n_{1N}	n_{1T}	1500	1700	1900	1900	1700	1700	1700	1700
Max. input speed	n_{1Max}	rpm	4500	4500	4500	4500	4500	4500	4500	4500
Mean no load running torque ^{b)} (at $n_i = 3000$ rpm and 20 °C gearbox temperature)	T_{012}	Nm	24	19	15	14	17	21	17	16
		in.lb	212	168	133	124	150	186	150	142
Max. backlash	j_t	arcmin	Standard ≤ 4 / Reduced ≤ 2							
Torsional rigidity ^{b)}	C_{t21}	Nm/arcmin	615	640	664	730	728	658	727	642
		in.lb/arcmin	5443	5665	5877	6461	6443	5824	6435	5682
Tilting rigidity	C_{2K}	Nm/arcmin	5560							
		in.lb/arcmin	49210							
Max. axial force ^{c)}	F_{2AMax}	N	33000							
		lb _f	7425							
Max. tilting moment	M_{2KMax}	Nm	5900							
		in.lb	52220							
Efficiency at full load	η	%	94							
Service life	L_h	h	> 20000							
Weight (incl. standard adapter plate)	m	kg	83							
		lb _m	183							
Operating noise (at reference ratio and reference speed – ratio-specific values available in cymex [®])	L_{PA}	dB(A)	≤ 71							
Max. permitted housing temperature		°C	+90							
		F	194							
Ambient temperature		°C	0 to +40							
		F	32 to 104							
Lubrication			Lubricated for life							
Direction of rotation			In- and output opposite direction							
Protection class			IP 65							
Metal bellows coupling (recommended product type – validate sizing with cymex [®])			-							
Bore diameter of coupling on the application side		mm	-							
Mass moment of inertia (relates to the drive) Clamping hub diameter [mm]	M 48	J_1	kgcm ²	74	52	43	43	35	30	30
			10 ⁻³ in.lb.s ²	65.49	46.02	38.06	38.06	30.98	26.55	26.55

Please use our sizing software cymex[®] for a detailed sizing – www.wittenstein-cymex.com
Please contact us for optimum sizing at S1 conditions (Continuous operation).

^{a)} At max. 10 % M_{2KMax}

^{b)} Valid for standard clamping hub diameter

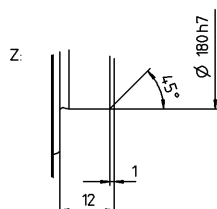
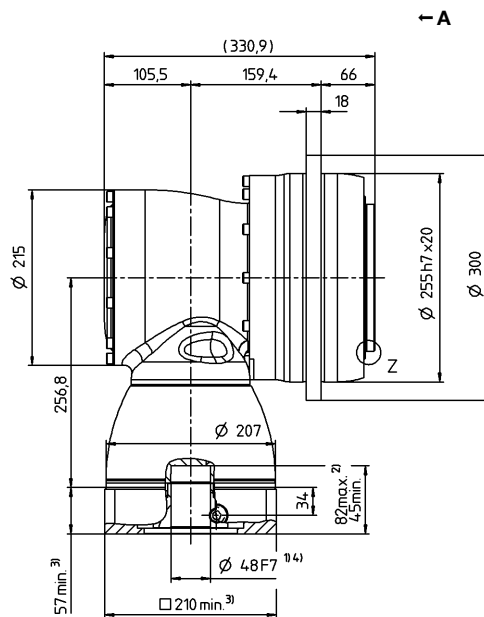
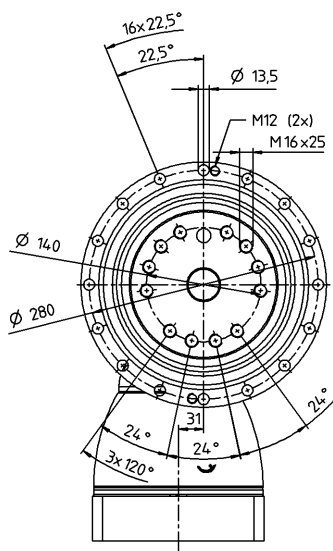
^{c)} Refers to center of the output shaft or flange

^{d)} Please reduce input speed at higher ambient temperatures

View A

Motor shaft diameter [mm]

2-stage

up to 48 ⁴⁾ (M) ⁵⁾
clamping hub
diameter


See technical data sheet for available clamping hub diameters (mass moment of inertia). Dimensions available on request.

Non-tolerated dimensions are nominal dimensions

¹⁾ Check motor shaft fit

²⁾ Min./Max. permissible motor shaft length. Longer motor shafts are possible, please contact alpha.

³⁾ The dimensions depend on the motor

⁴⁾ Smaller motor shaft diameter is compensated by a bushing with a minimum thickness of 1 mm

⁵⁾ Standard clamping hub diameter

TPK+ 300 MF 3-stage

				3-stage													
Ratio			<i>i</i>		63	100	125	140	175	200	250	280	350	500	700	1000	
Max. torque ^{a) b)}			<i>T</i> _{2a}	<i>Nm</i>	5250	3840	3840	3840	3840	3840	3840	5250	5250	2820	3948	2800	
				<i>in.lb</i>	46467	33987	33987	33987	33987	33987	46467	46467	24959	34943	24782		
Max. acceleration torque ^{b)} (max. 1000 cycles per hour)			<i>T</i> _{2B}	<i>Nm</i>	3960	3200	3200	3200	3200	3200	3200	3960	3960	2350	3290	2280	
				<i>in.lb</i>	35049	28323	28323	28323	28323	28323	35049	35049	20799	29119	20180		
Nominal torque (at <i>n</i> _N)			<i>T</i> _{2N}	<i>Nm</i>	1800	2000	2000	2000	2000	2000	2000	1800	1800	1800	1800	1600	
				<i>in.lb</i>	15931	17702	17702	17702	17702	17702	15931	15931	15931	15931	14161		
Emergency stop torque ^{a) b)} (permitted 1000 times during the service life of the gearbox)			<i>T</i> _{2Not}	<i>Nm</i>	6300	5250	5250	5250	5250	5250	5250	7350	7350	4500	6300	8750	
				<i>in.lb</i>	55760	46467	46467	46467	46467	46467	46467	65053	65053	39829	55760	77445	
Permitted average input speed (at <i>T</i> _{2N} and 20 °C ambient temperature) ^{c)}			<i>n</i> _{1N}	<i>n</i> _{1T}	2700	2700	2700	2700	2700	2700	2900	2700	2900	3400	3400	3400	
Max. input speed			<i>n</i> _{1Max}	<i>rpm</i>	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	
Mean no load running torque ^{b)} (at <i>n</i> _i = 3000 rpm and 20 °C gearbox temperature)			<i>T</i> ₀₁₂	<i>Nm</i>	11	6	5	4.2	3.8	3	2.8	2.6	2.4	2.2	2.2	2	
				<i>in.lb</i>	97	53	44	37	34	27	25	23	21	19	19	18	
Max. backlash			<i>j</i> _t	<i>arcmin</i>	Standard ≤ 4 / Reduced ≤ 2												
Torsional rigidity ^{b)}			<i>C</i> _{t21}	<i>Nm/arcmin</i>	699	640	664	640	664	640	664	715	730	658	727	642	
				<i>in.lb/arcmin</i>	6187	5665	5877	5665	5877	5665	5877	6328	6461	5824	6435	5682	
Tilting rigidity			<i>C</i> _{2K}	<i>Nm/arcmin</i>	5560												
				<i>in.lb/arcmin</i>	49210												
Max. axial force ^{c)}			<i>F</i> _{2AMax}	<i>N</i>	33000												
				<i>lb_f</i>	7425												
Max. tilting moment			<i>M</i> _{2KMax}	<i>Nm</i>	5900												
				<i>in.lb</i>	52220												
Efficiency at full load			<i>η</i>	%	92												
Service life			<i>L</i> _h	<i>h</i>	> 20000												
Weight (incl. standard adapter plate)			<i>m</i>	<i>kg</i>	87												
				<i>lb_m</i>	192												
Operating noise (at reference ratio and reference speed – ratio-specific values available in cymex®)			<i>L</i> _{PA}	<i>dB(A)</i>	≤ 71												
Max. permitted housing temperature				°C	+90												
				<i>F</i>	194												
Ambient temperature				°C	0 to +40												
				<i>F</i>	32 to 104												
Lubrication					Lubricated for life												
Direction of rotation					In- and output opposite direction												
Protection class					IP 65												
Metal bellows coupling (recommended product type – validate sizing with cymex®)					-												
Bore diameter of coupling on the application side				<i>mm</i>	-												
Mass moment of inertia (relates to the drive) Clamping hub diameter [mm]		K	38	<i>J</i> _i	<i>kgcm²</i>	17.8	14.1	12.1	11	10.8	10.2	10.1	10.1	10	9.9	9.9	9.9
					<i>10⁻³ in.lb.s²</i>	15.75	12.48	10.71	9.74	9.56	9.03	8.94	8.94	8.85	8.76	8.76	8.76
		M	48	<i>J</i> _i	<i>kgcm²</i>	32.5	28.8	26.8	25.7	25.5	24.9	24.8	24.9	24.8	24.6	24.6	24.6
<i>10⁻³ in.lb.s²</i>	28.76				25.49	23.72	22.74	22.57	22.04	21.95	22.04	21.95	21.77	21.77	21.77		

Please use our sizing software cymex[®] for a detailed sizing – www.wittenstein-cymex.com
Please contact us for optimum sizing at S1 conditions (Continuous operation).

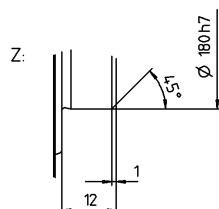
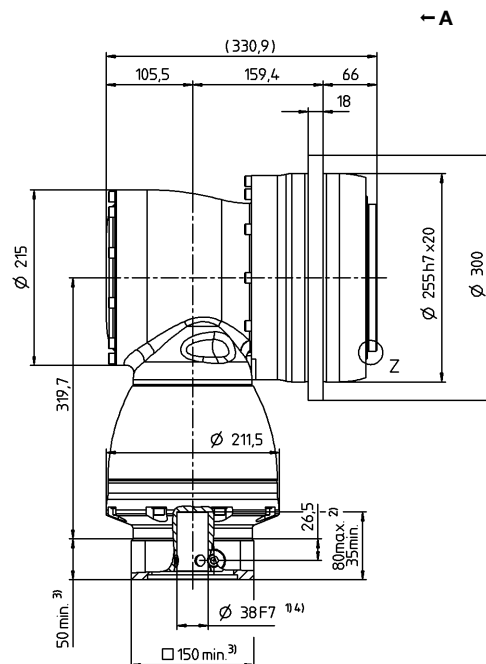
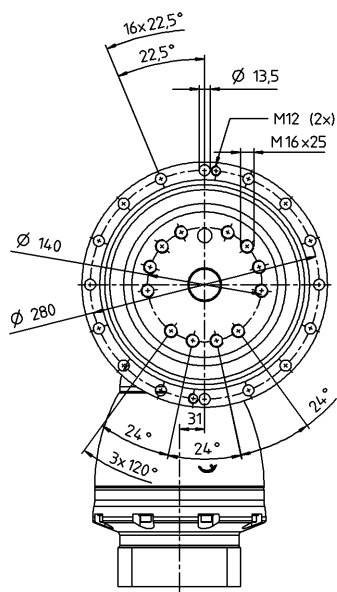
^{a)} At max. 10 % M_{2KMax}

^{b)} Valid for standard clamping hub diameter

^{c)} Refers to center of the output shaft or flange

^{d)} Please reduce input speed at higher ambient temperatures

up to 38/48 ⁴⁾
(K⁵⁾/M) clamping
hub diameter



5) Standard clamping hub diameter

TPK⁺ 500 MF 3-stage

				3-stage									
Ratio	<i>i</i>			100	125	140	175	200	250	350	500	700	1000
Max. torque ^{a) b)}	T_{2a}	Nm		5446	6808	5200	6250	4200	5250	6808	4975	5500	4800
		in.lb		48201	60256	46024	55318	37173	46467	60256	44033	48679	42484
Max. acceleration torque ^{b)} (max. 1000 cycles per hour)	T_{2B}	Nm		5446	6808	5000	6250	4200	5250	6808	4975	5500	4800
		in.lb		48201	60256	44254	55318	37173	46467	60256	44033	48679	42484
Nominal torque (at n_n)	T_{2N}	Nm		3350	3800	3350	3800	3350	3800	3800	2900	2800	2900
		in.lb		29650	33633	29650	33633	29650	33633	33633	25667	24782	25667
Emergency stop torque ^{a) b)} (permitted 1000 times during the service life of the gearbox)	T_{2Not}	Nm		10000	12500	9000	11250	8000	10000	14000	15000	15000	15000
		in.lb		88508	110635	79657	99572	70806	88508	123911	132762	132762	132762
Permitted average input speed (at T_{2N} and 20 °C ambient temperature) ^{d)}	n_{1N}	n_{1T}		2100	2100	1900	1900	1900	1900	1900	1900	1900	1900
Max. input speed	n_{1Max}	rpm		5000	5000	5000	5000	5000	5000	5000	5000	5000	5000
Mean no load running torque ^{b)} (at $n_i = 3000$ rpm and 20 °C gearbox temperature)	T_{012}	Nm		7.2	7.2	11	11	7.8	7.8	7.8	7.8	7.8	7.8
		in.lb		64	64	97	97	69	69	69	69	69	69
Max. backlash	j_t	arcmin		Standard ≤ 3.3 / Reduced ≤ 2.3									
Torsional rigidity ^{b)}	C_{t21}	Nm/arcmin		1250	1350	1250	1350	1250	1350	1350	1280	1240	1050
		in.lb/arcmin		11064	11949	11064	11949	11064	11949	11949	11329	10975	9293
Tilting rigidity	C_{2K}	Nm/arcmin		9480									
		in.lb/arcmin		83906									
Max. axial force ^{c)}	F_{2AMax}	N		50000									
		lb _f		11250									
Max. tilting moment	M_{2KMax}	Nm		8800									
		in.lb		77887									
Efficiency at full load	η	%		92									
Service life	L_h	h		> 20000									
Weight (incl. standard adapter plate)	m	kg		96									
		lb _m		212									
Operating noise (at reference ratio and reference speed – ratio-specific values available in cymex [®])	L_{PA}	dB(A)		≤ 71									
Max. permitted housing temperature		°C		+90									
		F		194									
Ambient temperature		°C		0 to +40									
		F		32 to 104									
Lubrication				Lubricated for life									
Direction of rotation				In- and output opposite direction									
Protection class				IP 65									
Metal bellows coupling (recommended product type – validate sizing with cymex [®])				-									
Bore diameter of coupling on the application side		mm		-									
Mass moment of inertia (relates to the drive) Clamping hub diameter [mm]	K 38	J_i	kgcm ²	16.7	16.7	15.5	16.5	16.4	16.4	16.4	16.4	16.4	16.4
			10 ⁻³ in.lb.s ²	14.78	14.78	13.72	14.6	14.51	14.51	14.51	14.51	14.51	14.51

Please use our sizing software cymex[®] for a detailed sizing – www.wittenstein-cymex.com
Please contact us for optimum sizing at S1 conditions (Continuous operation).

^{a)} At max. 10 % M_{2KMax}

^{b)} Valid for standard clamping hub diameter

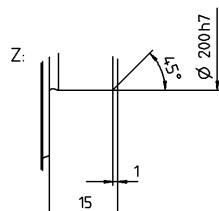
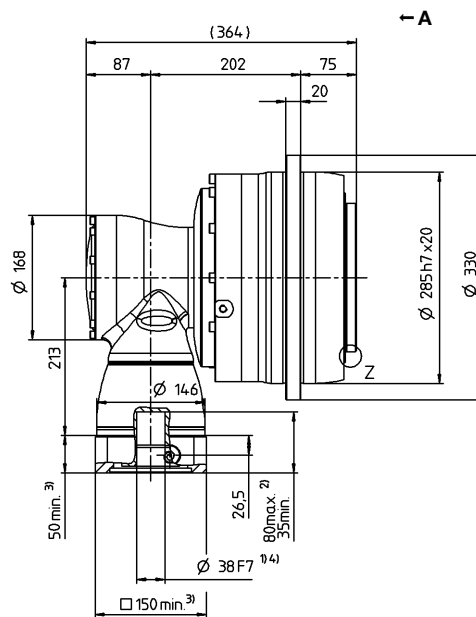
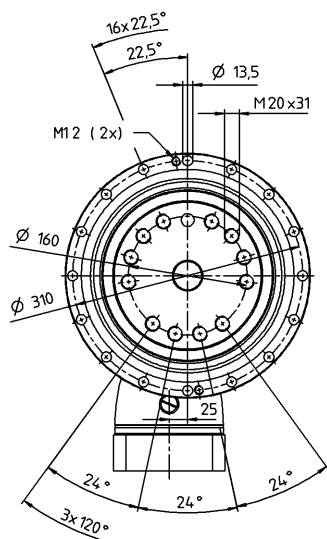
^{c)} Refers to center of the output shaft or flange

^{d)} Please reduce input speed at higher ambient temperatures

View A

Motor shaft diameter [mm]

3-stage

up to 38 ⁴⁾ (K) ⁵⁾
clamping hub
diameter


See technical data sheet for available clamping hub diameters (mass moment of inertia). Dimensions available on request.

Non-tolerated dimensions are nominal dimensions

¹⁾ Check motor shaft fit

²⁾ Min./Max. permissible motor shaft length. Longer motor shafts are possible, please contact alpha.

³⁾ The dimensions depend on the motor

⁴⁾ Smaller motor shaft diameter is compensated by a bushing with a minimum thickness of 1 mm

⁵⁾ Standard clamping hub diameter

Hypoid gearboxes

TPK+

MF

TPK+ 500 MF 4-stage i=180-1000

				4-stage												
Ratio			<i>i</i>		180	240	300	375	420	500	560	600	700	800	875	1000
Max. torque ^{a) b)}			<i>T</i> _{2a}	<i>Nm</i>	5446	5446	5446	6808	5446	5446	5446	5446	5446	5446	5446	5446
				<i>in.lb</i>	48201	48201	48201	60256	48201	48201	48201	48201	48201	48201	48201	48201
Max. acceleration torque ^{b)} (max. 1000 cycles per hour)			<i>T</i> _{2B}	<i>Nm</i>	5446	5446	5446	6808	5446	5446	5446	5446	5446	5446	6808	5446
				<i>in.lb</i>	48201	48201	48201	60256	48201	48201	48201	48201	48201	48201	48201	60256
Nominal torque (at <i>n</i> _N)			<i>T</i> _{2N}	<i>Nm</i>	3350	3350	3350	3800	3350	3350	3350	3350	3350	3350	3800	3350
				<i>in.lb</i>	29650	29650	29650	33633	29650	29650	29650	29650	29650	29650	29650	33633
Emergency stop torque ^{a) b)} (permitted 1000 times during the service life of the gearbox)			<i>T</i> _{2Not}	<i>Nm</i>	8000	8000	8000	10000	8000	10000	10000	8000	10000	10000	12500	10000
				<i>in.lb</i>	70806	70806	70806	88508	70806	88508	88508	70806	88508	88508	110635	88508
Permitted average input speed (at <i>T</i> _{2N} and 20 °C ambient temperature) ^{c)}			<i>n</i> _{1N}	<i>n</i> _{1T}	2700	2900	2900	2900	2900	2900	2900	2900	2900	2900	2900	3200
Max. input speed			<i>n</i> _{1Max}	<i>rpm</i>	4500	4500	4500	4500	4500	4500	4500	4500	4500	4500	4500	4500
Mean no load running torque ^{b)} (at <i>n</i> _i = 3000 rpm and 20 °C gearbox temperature)			<i>T</i> ₀₁₂	<i>Nm</i>	5.1	3.8	2.4	2.1	1.7	1.5	1.5	1.2	1.2	1.1	1.1	0.9
				<i>in.lb</i>	45	34	21	19	15	13	13	11	11	9.7	9.7	8.0
Max. backlash			<i>j</i> _t	<i>arcmin</i>	Standard ≤ 3.3 / Reduced ≤ 2.3											
Torsional rigidity ^{b)}			<i>C</i> _{t21}	<i>Nm/arcmin</i>	1250	1250	1250	1300	1250	1350	1250	1250	1262	1250	1350	1250
				<i>in.lb/arcmin</i>	11064	11064	11064	11506	11064	11949	11064	11064	11170	11064	11949	11064
Tilting rigidity			<i>C</i> _{2K}	<i>Nm/arcmin</i>	9480											
				<i>in.lb/arcmin</i>	83906											
Max. axial force ^{c)}			<i>F</i> _{2AMax}	<i>N</i>	50000											
				<i>lb_f</i>	11250											
Max. tilting moment			<i>M</i> _{2KMax}	<i>Nm</i>	8800											
				<i>in.lb</i>	77887											
Efficiency at full load			<i>η</i>	%	90											
Service life			<i>L</i> _h	<i>h</i>	> 20000											
Weight (incl. standard adapter plate)			<i>m</i>	<i>kg</i>	99											
				<i>lb_m</i>	219											
Operating noise (at reference ratio and reference speed – ratio-specific values available in cymex®)			<i>L</i> _{PA}	<i>dB(A)</i>	≤ 71											
Max. permitted housing temperature				°C	+90											
				<i>F</i>	194											
Ambient temperature				°C	0 to +40											
				<i>F</i>	32 to 104											
Lubrication					Lubricated for life											
Direction of rotation					In- and output opposite direction											
Protection class					IP 65											
Metal bellows coupling (recommended product type – validate sizing with cymex®)					-											
Bore diameter of coupling on the application side				<i>mm</i>	-											
Mass moment of inertia (relates to the drive) Clamping hub diameter [mm]	G	24	<i>J</i> _i	<i>kgcm²</i>	5.93	4.29	3.33	3.32	2.81	3.19	2.8	2.5	2.74	2.49	2.74	2.46
				<i>10⁻³ in.lb.s²</i>	5.25	3.8	2.95	2.94	2.49	2.82	2.48	2.21	2.42	2.2	2.42	2.18
	K	38	<i>J</i> _i	<i>kgcm²</i>	12.84	11.18	10.24	10.23	9.72	10.1	9.71	9.41	9.65	9.4	9.65	9.37
				<i>10⁻³ in.lb.s²</i>	11.36	9.89	9.06	9.05	8.6	8.94	8.59	8.33	8.54	8.32	8.54	8.29

Please use our sizing software cymex[®] for a detailed sizing – www.wittenstein-cymex.com
Please contact us for optimum sizing at S1 conditions (Continuous operation).

^{a)} At max. 10 % M_{2KMax}

^{b)} Valid for standard clamping hub diameter

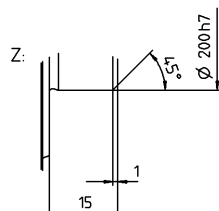
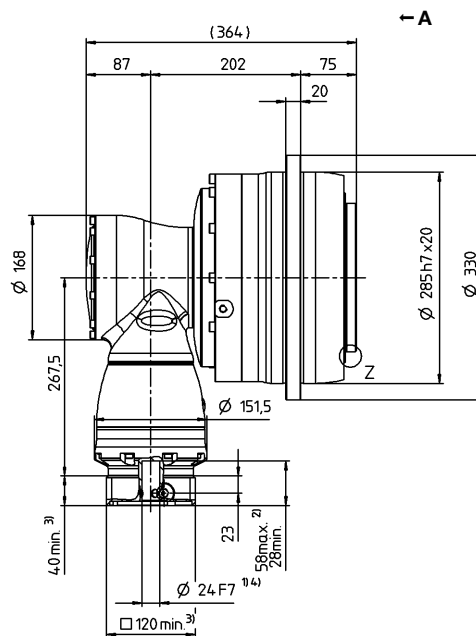
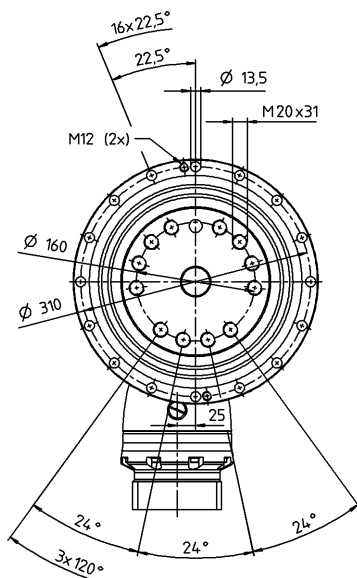
^{c)} Refers to center of the output shaft or flange

^{d)} Please reduce input speed at higher ambient temperatures

View A

Motor shaft diameter [mm]

4-stage

up to 24/38⁴⁾
(G⁵⁾/K) clamping
hub diameter


Hypoid gearboxes

TPK⁺

MF

See technical data sheet for available clamping hub diameters (mass moment of inertia). Dimensions available on request.

Non-tolerated dimensions are nominal dimensions

¹⁾ Check motor shaft fit

²⁾ Min./Max. permissible motor shaft length. Longer motor shafts are possible, please contact alpha.

³⁾ The dimensions depend on the motor

⁴⁾ Smaller motor shaft diameter is compensated by a bushing with a minimum thickness of 1 mm

⁵⁾ Standard clamping hub diameter

TPK⁺ 500 MF 4-stage i=1125-10000

				4-stage									
Ratio			<i>i</i>		1225	1400	1750	2000	2800	3500	5000	7000	10000
Max. torque ^{a) b)}			<i>T</i> _{2a}	<i>Nm</i>	6808	6808	6808	5040	7056	6808	4975	5500	4800
				<i>in.lb</i>	60256	60256	60256	44608	62451	60256	44033	48679	42484
Max. acceleration torque ^{b)} (max. 1000 cycles per hour)			<i>T</i> _{2B}	<i>Nm</i>	6808	6808	6808	4200	5500	6808	4975	5500	4800
				<i>in.lb</i>	60256	60256	60256	37173	48679	60256	44033	48679	42484
Nominal torque (at <i>n</i> _n)			<i>T</i> _{2N}	<i>Nm</i>	3800	3800	3800	3200	2800	3800	2900	2800	2900
				<i>in.lb</i>	33633	33633	33633	28323	24782	33633	25667	24782	25667
Emergency stop torque ^{a) b)} (permitted 1000 times during the service life of the gearbox)			<i>T</i> _{2Not}	<i>Nm</i>	15000	15000	15000	8000	11200	14000	15000	15000	15000
				<i>in.lb</i>	132762	132762	132762	70806	99129	123911	132762	132762	132762
Permitted average input speed (at <i>T</i> _{2n} and 20 °C ambient temperature) ^{d)}			<i>n</i> _{1N}	<i>n</i> _{1T}	2900	2900	3200	3900	3900	3900	3900	3900	3900
Max. input speed			<i>n</i> _{1Max}	<i>rpm</i>	4500	4500	4500	4500	4500	4500	4500	4500	4500
Mean no load running torque ^{b)} (at <i>n</i> _i = 3000 rpm and 20 °C gearbox temperature)			<i>T</i> ₀₁₂	<i>Nm</i>	0.9	0.9	0.6	0.6	0.6	0.6	0.6	0.6	0.6
				<i>in.lb</i>	8.0	8.0	5.3	5.3	5.3	5.3	5.3	5.3	5.3
Max. backlash			<i>j</i> _t	<i>arcmin</i>	Standard ≤ 3.3 / Reduced ≤ 2.3								
Torsional rigidity ^{b)}			<i>C</i> _{t21}	<i>Nm/arcmin</i>	1350	1350	1350	1250	1250	1350	1250	1250	1050
				<i>in.lb/arcmin</i>	11949	11949	11949	11064	11064	11949	11064	11064	9293
Tilting rigidity			<i>C</i> _{2K}	<i>Nm/arcmin</i>	9480								
				<i>in.lb/arcmin</i>	83906								
Max. axial force ^{c)}			<i>F</i> _{2AMax}	<i>N</i>	50000								
				<i>lb_f</i>	11250								
Max. tilting moment			<i>M</i> _{2KMax}	<i>Nm</i>	8800								
				<i>in.lb</i>	77887								
Efficiency at full load			<i>η</i>	%	90								
Service life			<i>L</i> _h	<i>h</i>	> 20000								
Weight (incl. standard adapter plate)			<i>m</i>	<i>kg</i>	99								
				<i>lb_m</i>	219								
Operating noise (at reference ratio and reference speed – ratio-specific values available in cymex®)			<i>L</i> _{PA}	<i>dB(A)</i>	≤ 71								
Max. permitted housing temperature				°C	+90								
				<i>F</i>	194								
Ambient temperature				°C	0 to +40								
				<i>F</i>	32 to 104								
Lubrication					Lubricated for life								
Direction of rotation					In- and output opposite direction								
Protection class					IP 65								
Metal bellows coupling (recommended product type – validate sizing with cymex®)					-								
Bore diameter of coupling on the application side				<i>mm</i>	-								
Mass moment of inertia (relates to the drive) Clamping hub diameter [mm]	G	24	<i>J</i> _i	<i>kgcm²</i>	2.73	2.49	2.46	2.42	2.42	2.42	2.42	2.42	2.42
				<i>10⁻³ in.lb.s²</i>	2.42	2.2	2.18	2.14	2.14	2.14	2.14	2.14	
	K	38	<i>J</i> _i	<i>kgcm²</i>	9.64	9.4	9.37	9.33	9.33	9.33	9.33	9.33	9.33
<i>10⁻³ in.lb.s²</i>				8.53	8.32	8.29	8.26	8.26	8.26	8.26	8.26	8.26	

Please use our sizing software cymex[®] for a detailed sizing – www.wittenstein-cymex.com
Please contact us for optimum sizing at S1 conditions (Continuous operation).

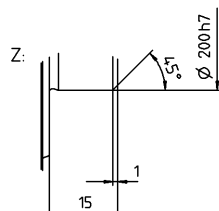
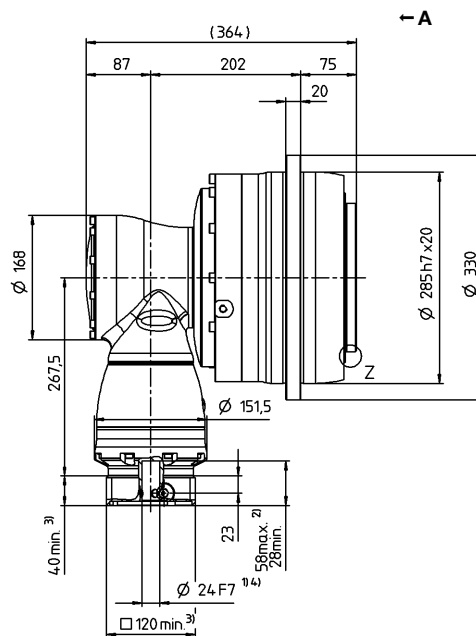
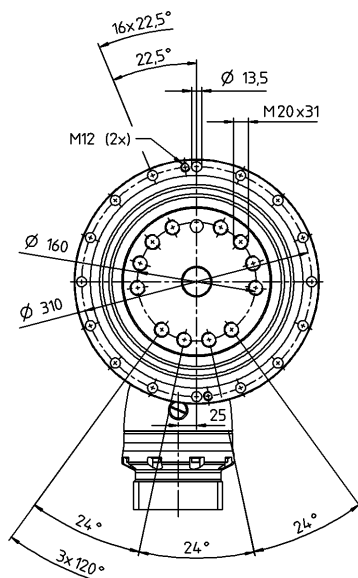
^{a)} At max. 10 % M_{2KMax}

^{b)} Valid for standard clamping hub diameter

^{c)} Refers to center of the output shaft or flange

^{d)} Please reduce input speed at higher ambient temperatures

up to 24/38 ⁴⁾
(G⁵/K) clamping
hub diameter

TPK⁺

MF

5) Standard clamping hub diameter

TPK+ 025 MA 3-/4-stage

			3-stage								4-stage									
Ratio			i		66	88	110	137.5	154	220	385	330	462	577.5	770	1078	1540	2695	3850	5500
Max. torque ^{a) b)}			T _{2a}	Nm	583	583	583	583	550	440	583	583	583	583	583	583	583	583	583	583
				in.lb	5160	5160	5160	5160	4868	3894	5160	5160	5160	5160	5160	5160	5160	5160	5160	5160
Max. acceleration torque ^{b)} (max. 1000 cycles per hour)			T _{2B}	Nm	530	530	530	530	530	440	530	530	530	530	530	530	530	530	530	530
				in.lb	4691	4691	4691	4691	4691	3894	4691	4691	4691	4691	4691	4691	4691	4691	4691	4691
Nominal torque (at n _n)			T _{2N}	Nm	375	375	375	375	375	330	375	375	375	375	375	375	375	375	375	375
				in.lb	3319	3319	3319	3319	3319	2921	3319	3319	3319	3319	3319	3319	3319	3319	3319	3319
Emergency stop torque ^{a) b)} (permitted 1000 times during the service life of the gearbox)			T _{2Not}	Nm	880	1100	1100	1200	990	880	1200	880	1200	1200	1200	1200	1200	1200	1200	1200
				in.lb	7789	9736	9736	10621	8762	7789	10621	7789	10621	10621	10621	10621	10621	10621	10621	10621
Permitted average input speed (at T _{2N} and 20 °C ambient temperature) ^{d)}			n _{1N}	n _{1T}	2400	2600	2900	2900	2900	2900	2900	4300	4300	4300	4300	4300	4300	5400	5400	5400
Max. input speed			n _{1Max}	rpm	7500	7500	7500	7500	7500	7500	7500	6000	6000	6000	6000	6000	6000	6000	6000	6000
Mean no load running torque ^{b)} (at n _i = 3000 rpm and 20 °C gearbox temperature)			T ₀₁₂	Nm	1.4	1.2	1.2	1.4	1.6	1.6	1.2	0.45	0.45	0.3	0.3	0.3	0.2	0.2	0.2	0.2
				in.lb	12	11	11	12	14	14	11	4.0	4.0	2.7	2.7	2.7	1.8	1.8	1.8	1.8
Max. backlash			j _t	arcmin	Standard ≤ 1.3															
Torsional rigidity ^{b)}			C ₁₂₁	Nm/arcmin	95	95	96	99	95	94	101	95	101	98	98	102	102	101	101	98
				in.lb/arcmin	841	841	850	876	841	832	894	841	894	867	867	903	903	894	894	867
Tilting rigidity			C _{2K}	Nm/arcmin	550															
				in.lb/arcmin	4868															
Max. axial force ^{c)}			F _{2AMax}	N	4800															
				lb _f	1080															
Max. tilting moment			M _{2KMax}	Nm	550															
				in.lb	4868															
Efficiency at full load			η	%	92								90							
Service life			L _h	h	> 20000															
Weight (incl. standard adapter plate)			m	kg	8.4								8.7							
				lb _m	19								19							
Operating noise (at reference ratio and reference speed – ratio-specific values available in cymex®)			L _{PA}	dB(A)	≤ 66															
Max. permitted housing temperature				°C	+90															
				F	194															
Ambient temperature				°C	0 to +40															
				F	32 to 104															
Lubrication					Lubricated for life															
Direction of rotation					In- and output opposite direction															
Protection class					IP 65															
Metal bellows coupling (recommended product type – validate sizing with cymex®)					BCT - 00300AAX - 063.000															
Bore diameter of coupling on the application side				mm	X = 030.000 - 056.000															
Mass moment of inertia (relates to the drive) Clamping hub diameter [mm]	B	11	J _i	kgcm ²	-	-	-	-	-	-	-	0.08	0.09	0.06	0.06	0.06	0.06	0.06	0.06	0.06
				10 ⁻³ in.lb.s ²	-	-	-	-	-	-	-	0.07	0.08	0.05	0.05	0.05	0.05	0.05	0.05	0.05
	C	14	J _i	kgcm ²	0.56	0.46	0.41	0.4	0.37	0.35	0.34	0.19	0.2	0.18	0.18	0.18	0.17	0.17	0.17	0.17
				10 ⁻³ in.lb.s ²	0.5	0.41	0.36	0.35	0.33	0.31	0.3	0.17	0.18	0.16	0.16	0.16	0.15	0.15	0.15	0.15
	E	19	J _i	kgcm ²	0.91	0.81	0.76	0.76	0.72	0.7	0.7	-	-	-	-	-	-	-	-	-
				10 ⁻³ in.lb.s ²	0.81	0.72	0.67	0.67	0.64	0.62	0.62	-	-	-	-	-	-	-	-	-

Please use our sizing software cymex[®] for a detailed sizing – www.wittenstein-cymex.com
Please contact us for optimum sizing at S1 conditions (Continuous operation).

^{a)} At max. 10 % M_{2KMax}

^{b)} Valid for standard clamping hub diameter

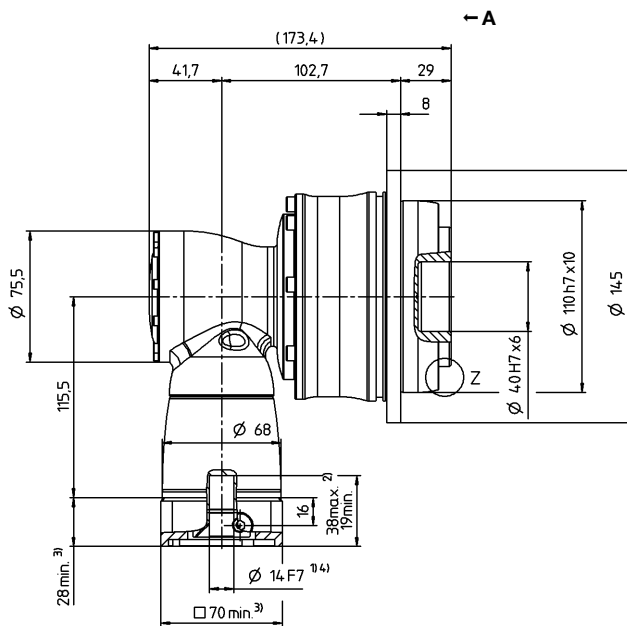
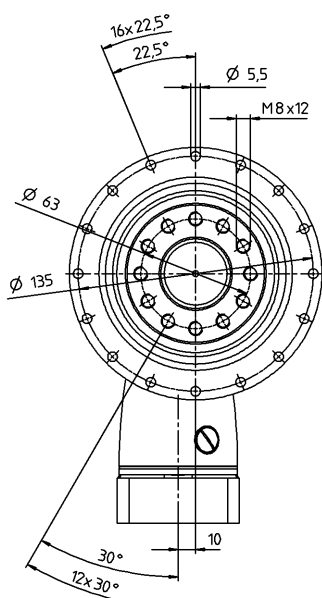
^{c)} Refers to center of the output shaft or flange

^{d)} Please reduce input speed at higher ambient temperatures

View A

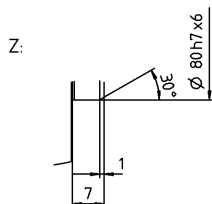
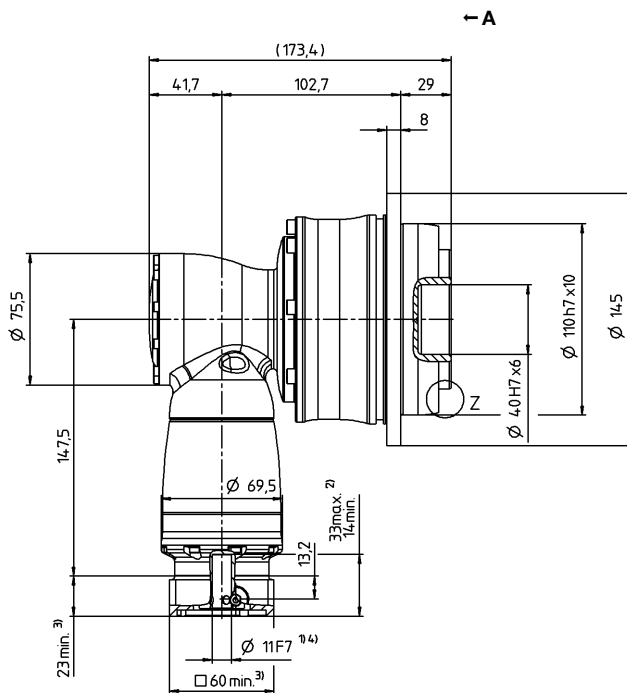
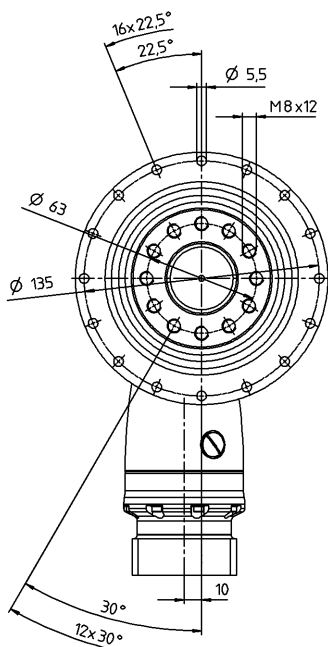
3-stage

up to 14/19⁴⁾
(C⁵⁾/E) clamping
hub diameter



4-stage

up to 11/14⁴⁾
(B⁵⁾/C) clamping
hub diameter



See technical data sheet for available clamping hub diameters (mass moment of inertia). Dimensions available on request.

Non-tolerated dimensions are nominal dimensions

¹⁾ Check motor shaft fit

²⁾ Min./Max. permissible motor shaft length. Longer motor shafts are possible, please contact alpha.

³⁾ The dimensions depend on the motor

⁴⁾ Smaller motor shaft diameter is compensated by a bushing with a minimum thickness of 1 mm

⁵⁾ Standard clamping hub diameter

Hypoid gearboxes

TPK⁺

MA

TPK⁺ 050 MA 3-/4-stage

			3-stage								4-stage										
Ratio			<i>i</i>		66	88	110	137.5	154	220	385	330	462	577.5	770	1078	1540	2695	3850	5500	
Max. torque ^{a) b)}			<i>T</i> _{2a}	<i>Nm</i>	1402	1402	1402	1402	1320	1100	1402	1402	1402	1402	1402	1402	1402	1402	1402	1402	1402
				<i>in.lb</i>	12409	12409	12409	12409	11683	9736	12409	12409	12409	12409	12409	12409	12409	12409	12409	12409	12409
Max. acceleration torque ^{b)} (max. 1000 cycles per hour)			<i>T</i> _{2B}	<i>Nm</i>	992	992	992	992	992	992	992	992	992	992	992	992	992	992	992	992	992
				<i>in.lb</i>	8780	8780	8780	8780	8780	8780	8780	8780	8780	8780	8780	8780	8780	8780	8780	8780	8780
Nominal torque (at <i>n</i> _{in})			<i>T</i> _{2N}	<i>Nm</i>	675	675	675	675	675	675	675	675	675	675	675	675	675	675	675	675	675
				<i>in.lb</i>	5974	5974	5974	5974	5974	5974	5974	5974	5974	5974	5974	5974	5974	5974	5974	5974	5974
Emergency stop torque ^{a) b)} (permitted 1000 times during the service life of the gearbox)			<i>T</i> _{2Not}	<i>Nm</i>	2090	2375	2375	2375	2375	2375	2375	2090	2375	2375	2375	2375	2375	2375	2375	2375	2375
				<i>in.lb</i>	18498	21021	21021	21021	21021	21021	21021	18498	21021	21021	21021	21021	21021	21021	21021	21021	21021
Permitted average input speed (at <i>T</i> _{2N} and 20 °C ambient temperature) ^{d)}			<i>n</i> _{1N}	<i>n</i> _{1T}	2200	2400	2700	2700	2700	2700	2700	3400	3400	3400	3400	3400	3400	4400	4400	4400	
Max. input speed			<i>n</i> _{1Max}	<i>rpm</i>	7500	7500	7500	7500	7500	7500	7500	6000	6000	6000	6000	6000	6000	6000	6000	6000	
Mean no load running torque ^{b)} (at <i>n</i> _i = 3000 rpm and 20 °C gearbox temperature)			<i>T</i> ₀₁₂	<i>Nm</i>	2.9	2.4	2	2.1	2.4	2.1	2	0.6	0.75	0.45	0.45	0.45	0.3	0.15	0.15	0.15	
				<i>in.lb</i>	26	21	18	19	21	19	18	5.3	6.6	4.0	4.0	4.0	2.7	1.3	1.3	1.3	
Max. backlash			<i>j</i> _t	<i>arcmin</i>	Standard ≤ 1.3																
Torsional rigidity ^{b)}			<i>C</i> ₁₂₁	<i>Nm/arcmin</i>	202	203	205	210	205	205	215	202	214	208	209	214	214	215	215	217	
				<i>in.lb/arcmin</i>	1788	1797	1814	1859	1814	1814	1903	1788	1894	1841	1850	1894	1894	1903	1903	1921	
Tilting rigidity			<i>C</i> _{2K}	<i>Nm/arcmin</i>	560																
				<i>in.lb/arcmin</i>	4956																
Max. axial force ^{c)}			<i>F</i> _{2AMax}	<i>N</i>	6130																
				<i>lb_f</i>	1379																
Max. tilting moment			<i>M</i> _{2KMax}	<i>Nm</i>	1335																
				<i>in.lb</i>	11816																
Efficiency at full load			<i>η</i>	%	92								90								
Service life			<i>L</i> _h	<i>h</i>	> 20000																
Weight (incl. standard adapter plate)			<i>m</i>	<i>kg</i>	16.9								17.5								
				<i>lb_m</i>	37								39								
Operating noise (at reference ratio and reference speed – ratio-specific values available in cymex®)			<i>L</i> _{PA}	<i>dB(A)</i>	≤ 68																
Max. permitted housing temperature				°C	+90																
				<i>F</i>	194																
Ambient temperature				°C	0 to +40																
				<i>F</i>	32 to 104																
Lubrication					Lubricated for life																
Direction of rotation					In- and output opposite direction																
Protection class					IP 65																
Metal bellows coupling (recommended product type – validate sizing with cymex®)					BCT - 00300AAX - 080.000																
Bore diameter of coupling on the application side				<i>mm</i>	X = 045.000 - 056.000																
Mass moment of inertia (relates to the drive) Clamping hub diameter [mm]	C	14	<i>J</i> ₁	<i>kgcm²</i>	-	-	-	-	-	-	-	0.24	0.29	0.2	0.2	0.2	0.19	0.18	0.18	0.18	
				<i>10⁻³ in.lb.s²</i>	-	-	-	-	-	-	-	0.21	0.26	0.18	0.18	0.18	0.17	0.16	0.16	0.16	
	E	19	<i>J</i> ₁	<i>kgcm²</i>	1.65	1.3	1.13	1.11	0.99	0.91	0.9	0.68	0.73	0.63	0.63	0.63	0.63	0.63	0.63	0.63	
				<i>10⁻³ in.lb.s²</i>	1.46	1.15	1	0.98	0.88	0.81	0.8	0.6	0.65	0.56	0.56	0.56	0.56	0.56	0.56	0.56	
	H	28	<i>J</i> ₁	<i>kgcm²</i>	3.07	2.71	2.54	2.53	2.4	2.53	2.32	-	-	-	-	-	-	-	-	-	
				<i>10⁻³ in.lb.s²</i>	2.72	2.4	2.25	2.24	2.12	2.24	2.05	-	-	-	-	-	-	-	-	-	

Please use our sizing software cymex[®] for a detailed sizing – www.wittenstein-cymex.com
Please contact us for optimum sizing at S1 conditions (Continuous operation).

^{a)} At max. 10 % M_{2KMax}

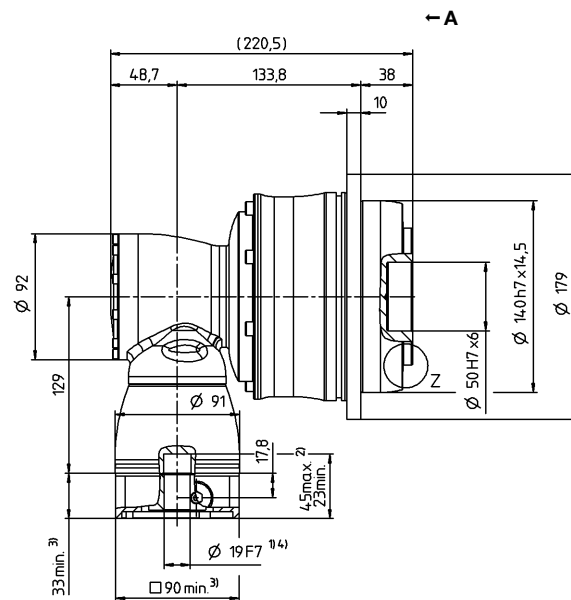
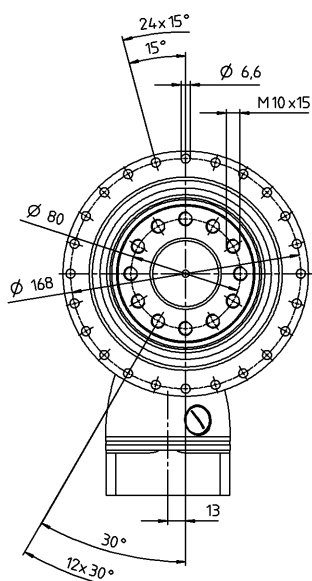
^{b)} Valid for standard clamping hub diameter

^{c)} Refers to center of the output shaft or flange

^{d)} Please reduce input speed at higher ambient temperatures

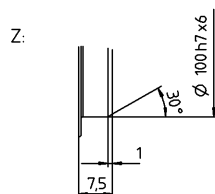
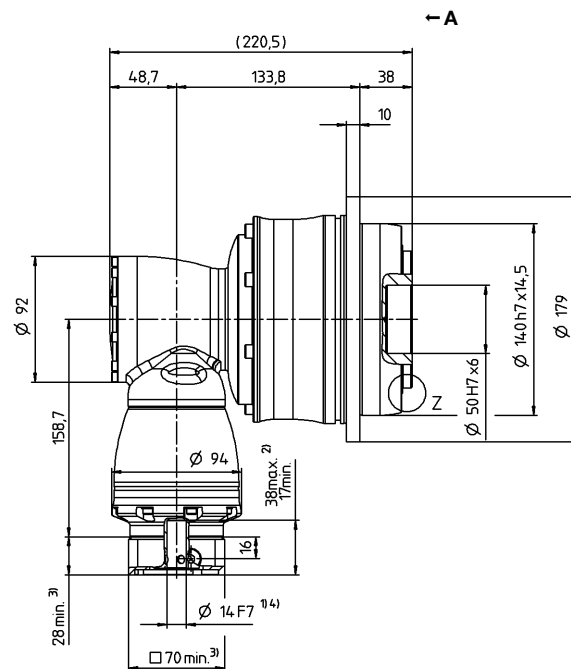
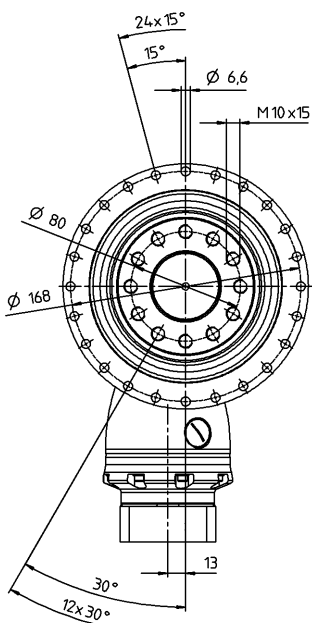
3-stage

up to 19/28⁴⁾
(E⁵⁾/H) clamping
hub diameter



4-stage

up to 14/19⁴⁾
(C⁵⁾/E) clamping
hub diameter



See technical data sheet for available clamping hub diameters (mass moment of inertia). Dimensions available on request.

Non-tolerated dimensions are nominal dimensions

¹⁾ Check motor shaft fit

²⁾ Min./Max. permissible motor shaft length. Longer motor shafts are possible, please contact alpha.

³⁾ The dimensions depend on the motor

⁴⁾ Smaller motor shaft diameter is compensated by a bushing with a minimum thickness of 1 mm

⁵⁾ Standard clamping hub diameter

TPK⁺ 110 MA 3-/4-stage

				3-stage								4-stage									
Ratio			<i>i</i>		66	88	110	137.5	154	220	385	330	462	577.5	770	1078	1540	2695	3850	5500	
Max. torque ^{a) b)}			<i>T</i> _{2a}	<i>Nm</i>	3822	3822	3822	3822	3190	2750	3822	3822	3822	3822	3822	3822	3822	3822	3822	3822	3200
				<i>in.lb</i>	33828	33828	33828	33828	28234	24340	33828	33828	33828	33828	33828	33828	33828	33828	33828	33828	33828
Max. acceleration torque ^{b)} (max. 1000 cycles per hour)			<i>T</i> _{2B}	<i>Nm</i>	3100	3100	3100	3100	3100	2750	3100	3100	3100	3100	3100	3100	3100	3100	3100	3100	2400
				<i>in.lb</i>	27437	27437	27437	27437	27437	24340	27437	27437	27437	27437	27437	27437	27437	27437	27437	27437	27437
Nominal torque (at <i>n</i> _{IN})			<i>T</i> _{2N}	<i>Nm</i>	1650	1650	1650	1650	1650	1650	1650	1650	1650	1650	1650	1650	1650	1650	1650	1650	1400
				<i>in.lb</i>	14604	14604	14604	14604	14604	14604	14604	14604	14604	14604	14604	14604	14604	14604	14604	14604	14604
Emergency stop torque ^{a) b)} (permitted 1000 times during the service life of the gearbox)			<i>T</i> _{2Not}	<i>Nm</i>	4840	5720	5720	6500	5610	5500	6500	4840	6500	6050	6500	6500	6500	6500	6500	6500	6500
				<i>in.lb</i>	42838	50627	50627	57530	49653	48679	57530	42838	57530	53547	57530	57530	57530	57530	57530	57530	57530
Permitted average input speed (at <i>T</i> _{2N} and 20 °C ambient temperature) ^{d)}			<i>n</i> _{1N}	<i>n</i> _{1T}	2100	2300	2600	2600	2400	2400	2400	3000	3000	3000	3000	3000	3000	4100	4100	4100	
Max. input speed			<i>n</i> _{1Max}	<i>rpm</i>	5500	5500	5500	5500	5500	5500	5500	4500	4500	4500	4500	4500	4500	4500	4500	4500	4500
Mean no load running torque ^{b)} (at <i>n</i> ₁ = 3000 rpm and 20 °C gearbox temperature)			<i>T</i> ₀₁₂	<i>Nm</i>	6	4.6	3.6	3.4	4.4	3.5	3.3	1.4	1.5	1.1	0.9	0.9	0.45	0.45	0.3	0.3	
				<i>in.lb</i>	53	41	32	30	39	31	29	12	13	9.7	8.0	8.0	4.0	4.0	2.7	2.7	
Max. backlash			<i>j</i> _t	<i>arcmin</i>	Standard ≤ 1.3																
Torsional rigidity ^{b)}			<i>C</i> _{t21}	<i>Nm/arcmin</i>	634	642	654	675	654	648	687	634	682	662	667	685	685	689	687	658	
				<i>in.lb/arcmin</i>	5611	5682	5788	5974	5788	5735	6080	5611	6036	5859	5903	6063	6063	6098	6080	5824	
Tilting rigidity			<i>C</i> _{2K}	<i>Nm/arcmin</i>	1452																
				<i>in.lb/arcmin</i>	12851																
Max. axial force ^{c)}			<i>F</i> _{2AMax}	<i>N</i>	10050																
				<i>lb_f</i>	2261																
Max. tilting moment			<i>M</i> _{2KMax}	<i>Nm</i>	3280																
				<i>in.lb</i>	29031																
Efficiency at full load			<i>η</i>	%	92								90								
Service life			<i>L</i> _h	<i>h</i>	> 20000																
Weight (incl. standard adapter plate)			<i>m</i>	<i>kg</i>	39.9								40.6								
				<i>lb_m</i>	88								90								
Operating noise (at reference ratio and reference speed – ratio-specific values available in cymex®)			<i>L</i> _{PA}	<i>dB(A)</i>	≤ 70																
Max. permitted housing temperature				°C	+90																
				<i>F</i>	194																
Ambient temperature				°C	0 to +40																
				<i>F</i>	32 to 104																
Lubrication					Lubricated for life																
Direction of rotation					In- and output opposite direction																
Protection class					IP 65																
Metal bellows coupling (recommended product type – validate sizing with cymex®)					BCT - 01500AAX - 125.000																
Bore diameter of coupling on the application side				<i>mm</i>	X = 055.000 - 070.000																
Mass moment of inertia (relates to the drive) Clamping hub diameter [mm]	E	19	<i>J</i> ₁	<i>kgcm²</i>	-	-	-	-	-	-	-	0.89	1.06	0.76	0.76	0.76	0.69	0.68	0.68	0.68	
				<i>10⁻³ in.lb.s²</i>	-	-	-	-	-	-	-	0.79	0.94	0.67	0.67	0.67	0.61	0.6	0.6	0.6	
	G	24	<i>J</i> ₁	<i>kgcm²</i>	-	-	-	-	-	-	-	2.46	2.63	2.33	2.32	2.32	2.26	2.25	2.25	2.25	
				<i>10⁻³ in.lb.s²</i>	-	-	-	-	-	-	-	2.18	2.33	2.06	2.05	2.05	2	1.99	1.99	1.99	
	H	28	<i>J</i> ₁	<i>kgcm²</i>	5.48	4.27	3.64	3.58	3.14	2.87	2.84	-	-	-	-	-	-	-	-	-	
				<i>10⁻³ in.lb.s²</i>	4.85	3.78	3.22	3.17	2.78	2.54	2.51	-	-	-	-	-	-	-	-	-	-
	K	38	<i>J</i> ₁	<i>kgcm²</i>	12.72	11.52	10.89	10.83	10.39	10.12	10.09	-	-	-	-	-	-	-	-	-	
				<i>10⁻³ in.lb.s²</i>	11.26	10.2	9.64	9.58	9.2	8.96	8.93	-	-	-	-	-	-	-	-	-	

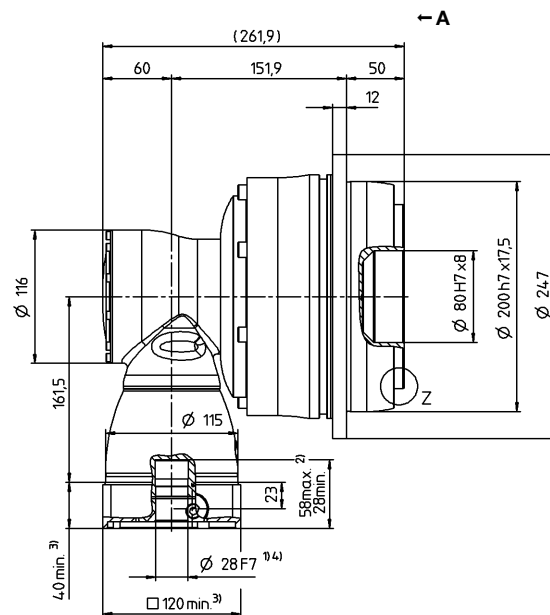
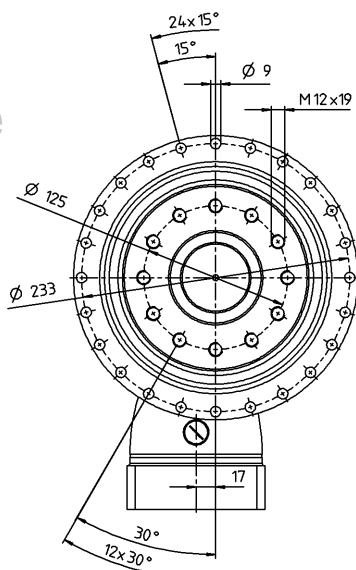
Please use our sizing software cymex[®] for a detailed sizing – www.wittenstein-cymex.com
Please contact us for optimum sizing at S1 conditions (Continuous operation).

^{a)} At max. 10 % M_{2KMax}
^{b)} Valid for standard clamping hub diameter
^{c)} Refers to center of the output shaft or flange
^{d)} Please reduce input speed at higher ambient temperatures

View A

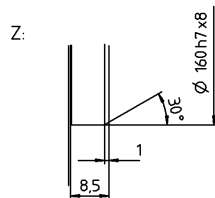
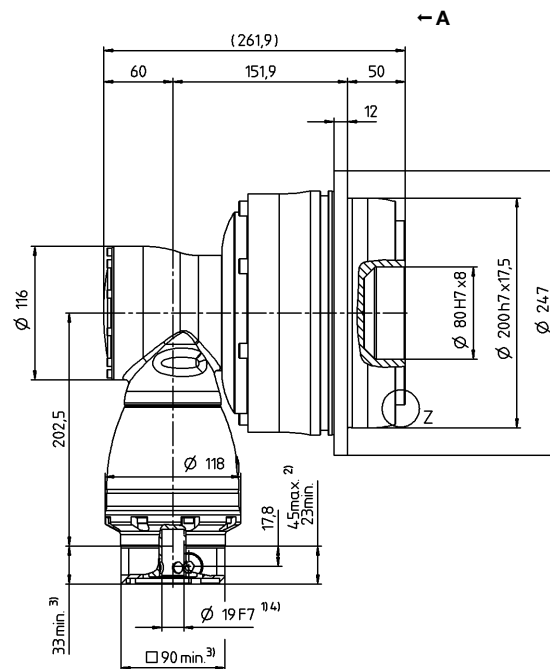
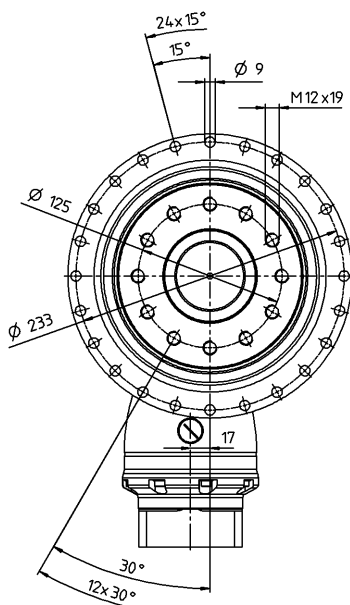
3-stage

up to 28/38⁴⁾
(H⁵⁾/K) clamping
hub diameter



4-stage

up to 19/24⁴⁾
(E⁵⁾/G) clamping
hub diameter



See technical data sheet for available clamping hub diameters (mass moment of inertia). Dimensions available on request.

Non-tolerated dimensions are nominal dimensions

¹⁾ Check motor shaft fit

²⁾ Min./Max. permissible motor shaft length. Longer motor shafts are possible, please contact alpha.

³⁾ The dimensions depend on the motor

⁴⁾ Smaller motor shaft diameter is compensated by a bushing with a minimum thickness of 1 mm

⁵⁾ Standard clamping hub diameter

TPK⁺ 300 MA 3- / 4-stage

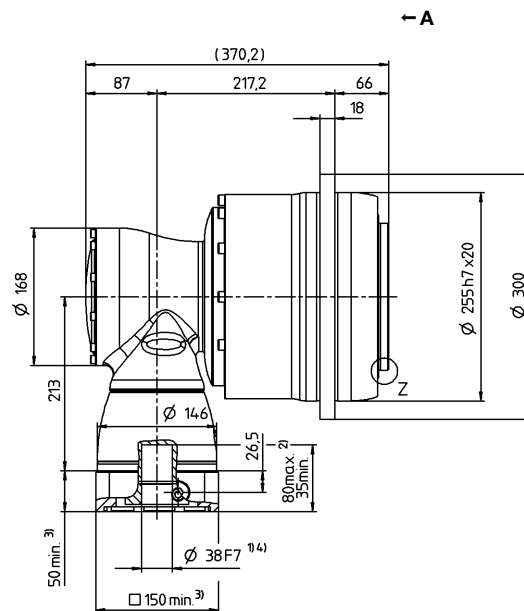
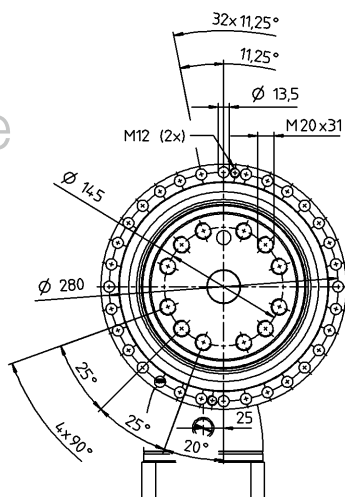
				3-stage								4-stage										
Ratio				i		66	88	110	137.5	154	220	385	330	462	577.5	770	1078	1540	2695	3850	5500	
Max. torque ^{a) b)}				T _{2a}	Nm	7535	7535	7535	7535	5500	4620	7535	7535	7535	7535	7535	7535	7535	7535	7535	5473	
					in.lb	66691	66691	66691	66691	48679	40891	66691	66691	66691	66691	66691	66691	66691	66691	66691	66691	66691
Max. acceleration torque ^{b)} (max. 1000 cycles per hour)				T _{2B}	Nm	6600	6600	6600	6600	5500	4620	6600	6600	6600	6600	6600	6600	6600	6600	6600	4680	
					in.lb	58415	58415	58415	58415	48679	40891	58415	58415	58415	58415	58415	58415	58415	58415	58415	58415	58415
Nominal torque (at n _n)				T _{2N}	Nm	3500	3500	3500	3500	3500	3500	3500	3500	3500	3500	3500	3500	3500	3500	3500	3500	
					in.lb	30978	30978	30978	30978	30978	30978	30978	30978	30978	30978	30978	30978	30978	30978	30978	30978	30978
Emergency stop torque ^{a) b)} (permitted 1000 times during the service life of the gearbox)				T _{2Not}	Nm	8800	11000	11000	13750	9900	8800	15296	8800	15296	11000	13750	15296	15296	15296	15296	15333	
					in.lb	77887	97359	97359	121699	87623	77887	135382	77887	135382	97359	121699	135382	135382	135382	135382	135382	135709
Permitted average input speed (at T _{2n} and 20 °C ambient temperature) ^{d)}				n _{1N}	n _{1T}	1800	1900	2100	2100	1900	1900	1900	2800	2800	2800	2800	2800	2800	3100	3800	3800	
Max. input speed				n _{1Max}	rpm	5000	5000	5000	5000	5000	5000	5000	4500	4500	4500	4500	4500	4500	4500	4500	4500	
Mean no load running torque ^{b)} (at n _i = 3000 rpm and 20 °C gearbox temperature)				T ₀₁₂	Nm	11	8.2	6.9	6.5	9.2	7.8	7.5	2.3	3.3	1.5	1.4	1.2	0.9	0.6	0.6	0.6	
					in.lb	97	73	61	58	81	69	66	20	29	13	12	11	8.0	5.3	5.3	5.3	
Max. backlash				j _t	arcmin	Standard ≤ 3.3 / Reduced ≤ 1.8																
Torsional rigidity ^{b)}				C _{t21}	Nm/arcmin	1099	1108	1114	960	1114	1111	979	1099	976	953	958	978	978	979	979	989	
					in.lb/arcmin	9727	9807	9860	8497	9860	9833	8665	9727	8638	8435	8479	8656	8656	8665	8665	8753	
Tilting rigidity				C _{2K}	Nm/arcmin	5560																
					in.lb/arcmin	49210																
Max. axial force ^{c)}				F _{2AMax}	N	33000																
					lb _f	7425																
Max. tilting moment				M _{2KMax}	Nm	6500																
					in.lb	57530																
Efficiency at full load				η	%	92								90								
Service life				L _h	h	> 20000																
Weight (incl. standard adapter plate)				m	kg	83								87								
					lb _m	183								192								
Operating noise (at reference ratio and reference speed – ratio-specific values available in cymex®)				L _{PA}	dB(A)	≤ 71																
Max. permitted housing temperature					°C	+90																
					F	194																
Ambient temperature					°C	0 to +40																
					F	32 to 104																
Lubrication						Lubricated for life																
Direction of rotation						In- and output opposite direction																
Protection class						IP 65																
Metal bellows coupling (recommended product type – validate sizing with cymex®)						BCT - 04000AAX - 145.000																
Bore diameter of coupling on the application side					mm	X = 070.000 - 100.000																
Mass moment of inertia (relates to the drive) Clamping hub diameter [mm]				G	24	J _i	kgcm ²	-	-	-	-	-	-	3.32	4.24	2.8	2.79	2.79	2.49	2.43	2.42	2.42
							10 ⁻³ in.lb.s ²	-	-	-	-	-	-	2.94	3.75	2.48	2.47	2.47	2.2	2.15	2.14	2.14
				K	38	J _i	kgcm ²	26.04	19.71	16.71	16.58	14.26	12.89	12.83	10.23	11.15	9.71	9.7	9.7	9.4	9.34	9.33
10 ⁻³ in.lb.s ²	23.05	17.44	14.79				14.67	12.62	11.41	11.35	9.05	9.87	8.59	8.58	8.58	8.32	8.27	8.26	8.26			

Please use our sizing software cymex[®] for a detailed sizing – www.wittenstein-cymex.com
Please contact us for optimum sizing at S1 conditions (Continuous operation).

- ^{a)} At max. 10 % M_{2KMax}
^{b)} Valid for standard clamping hub diameter
^{c)} Refers to center of the output shaft or flange
^{d)} Please reduce input speed at higher ambient temperatures

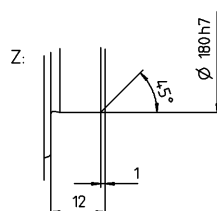
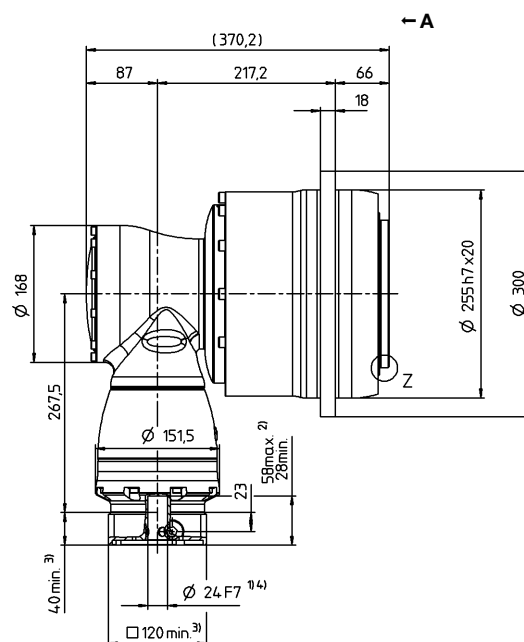
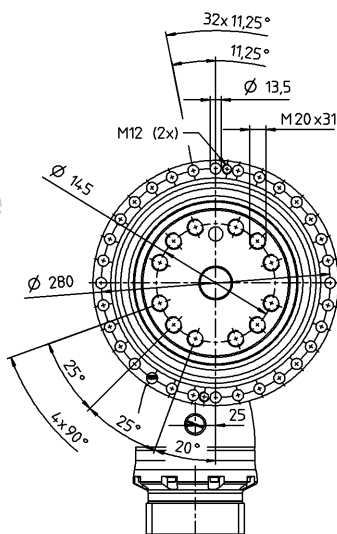
3-stage

up to 38⁴⁾ (K)⁵⁾
clamping hub diameter



4-stage

up to 24/38⁴⁾
(G⁵⁾/K) clamping hub diameter



See technical data sheet for available clamping hub diameters (mass moment of inertia). Dimensions available on request.

Non-tolerated dimensions are nominal dimensions

¹⁾ Check motor shaft fit

²⁾ Min./Max. permissible motor shaft length. Longer motor shafts are possible, please contact alpha.

³⁾ The dimensions depend on the motor

⁴⁾ Smaller motor shaft diameter is compensated by a bushing with a minimum thickness of 1 mm

⁵⁾ Standard clamping hub diameter

TPK⁺ 500 MA 3-/4-stage

				3-stage								4-stage									
Ratio			<i>i</i>		66	88	110	137.5	154	220	385	330	462	577.5	770	1078	1540	2695	3850	5500	
Max. torque ^{a) b)}			<i>T</i> _{2a}	<i>Nm</i>	10450	10450	10450	10450	10450	10340	10450	10450	10450	10450	10450	10450	10450	10450	10450	10450	10450
				<i>in.lb</i>	92491	92491	92491	92491	92491	91517	92491	92491	92491	92491	92491	92491	92491	92491	92491	92491	92491
Max. acceleration torque ^{b)} (max. 1000 cycles per hour)			<i>T</i> _{2B}	<i>Nm</i>	10450	10450	10450	10450	10450	10340	10450	10450	10450	10450	10450	10450	10450	10450	10450	10450	8640
				<i>in.lb</i>	92491	92491	92491	92491	92491	91517	92491	92491	92491	92491	92491	92491	92491	92491	92491	92491	92491
Nominal torque (at <i>n</i> _n)			<i>T</i> _{2N}	<i>Nm</i>	5400	5400	5400	5400	5400	5400	5400	5400	5400	5400	5400	5400	5400	5400	5400	5400	5400
				<i>in.lb</i>	47794	47794	47794	47794	47794	47794	47794	47794	47794	47794	47794	47794	47794	47794	47794	47794	47794
Emergency stop torque ^{a) b)} (permitted 1000 times during the service life of the gearbox)			<i>T</i> _{2Not}	<i>Nm</i>	19800	23100	23100	25000	21340	19800	25000	19800	25000	24750	25000	25000	25000	25000	25000	25000	25000
				<i>in.lb</i>	175246	204453	204453	221270	188876	175246	221270	175246	221270	219057	221270	221270	221270	221270	221270	221270	221270
Permitted average input speed (at <i>T</i> _{2n} and 20 °C ambient temperature) ^{d)}			<i>n</i> _{1N}	<i>n</i> _{1T}	1500	1700	1900	1900	1700	1700	1700	2600	2600	2600	2600	2600	2600	3100	3300	3300	
Max. input speed			<i>n</i> _{1Max}	<i>rpm</i>	4500	4500	4500	4500	4500	4500	4500	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000
Mean no load running torque ^{b)} (at <i>n</i> _i = 3000 rpm and 20 °C gearbox temperature)			<i>T</i> ₀₁₂	<i>Nm</i>	19	15	13	13	17	15	15	4.1	6	3	2.7	2.6	1.8	1.7	1.5	1.5	
				<i>in.lb</i>	168	133	115	115	150	133	133	36	53	27	24	23	16	15	13	13	
Max. backlash			<i>j</i> _t	<i>arcmin</i>	Standard ≤ 3.3 / Reduced ≤ 1.8																
Torsional rigidity ^{b)}			<i>C</i> _{t21}	<i>Nm/arcmin</i>	1879	1890	1901	1747	1899	1898	1772	1879	1766	1735	1742	1770	1770	1772	1772	1786	
				<i>in.lb/arcmin</i>	16631	16728	16825	15462	16808	16799	15684	16631	15631	15356	15418	15666	15666	15684	15684	15808	
Tilting rigidity			<i>C</i> _{2K}	<i>Nm/arcmin</i>	9480																
				<i>in.lb/arcmin</i>	83906																
Max. axial force ^{c)}			<i>F</i> _{2AMax}	<i>N</i>	50000																
				<i>lb_f</i>	11250																
Max. tilting moment			<i>M</i> _{2KMax}	<i>Nm</i>	9500																
				<i>in.lb</i>	84083																
Efficiency at full load			<i>η</i>	%	92								90								
Service life			<i>L</i> _h	<i>h</i>	> 20000																
Weight (incl. standard adapter plate)			<i>m</i>	<i>kg</i>	120								124								
				<i>lb_m</i>	265								274								
Operating noise (at reference ratio and reference speed – ratio-specific values available in cymex®)			<i>L</i> _{PA}	<i>dB(A)</i>	≤ 71																
Max. permitted housing temperature				°C	+90																
				<i>F</i>	194																
Ambient temperature				°C	0 to +40																
				<i>F</i>	32 to 104																
Lubrication					Lubricated for life																
Direction of rotation					In- and output opposite direction																
Protection class					IP 65																
Metal bellows coupling (recommended product type – validate sizing with cymex®)					BCT - 10000AAX - 166.000																
				<i>mm</i>	X = 080.000 - 180.000																
Mass moment of inertia (relates to the drive) Clamping hub diameter [mm]		K 38	<i>J</i> _i	<i>kgcm²</i>	-	-	-	-	-	-	-	12.43	15.36	10.93	10.92	10.91	10.13	9.95	9.91	9.91	
				<i>10⁻³ in.lb.s²</i>	-	-	-	-	-	-	-	11	13.59	9.67	9.66	9.66	8.97	8.81	8.77	8.77	
		M 48	<i>J</i> _i	<i>kgcm²</i>	75.54	52.83	42.94	42.67	34.37	29.87	29.73	27.14	30.07	25.64	25.63	25.62	24.84	24.66	24.62	24.62	
<i>10⁻³ in.lb.s²</i>	66.85			46.75	38	37.76	30.42	26.43	26.31	24.02	26.61	22.69	22.68	22.67	21.98	21.82	21.79	21.79			

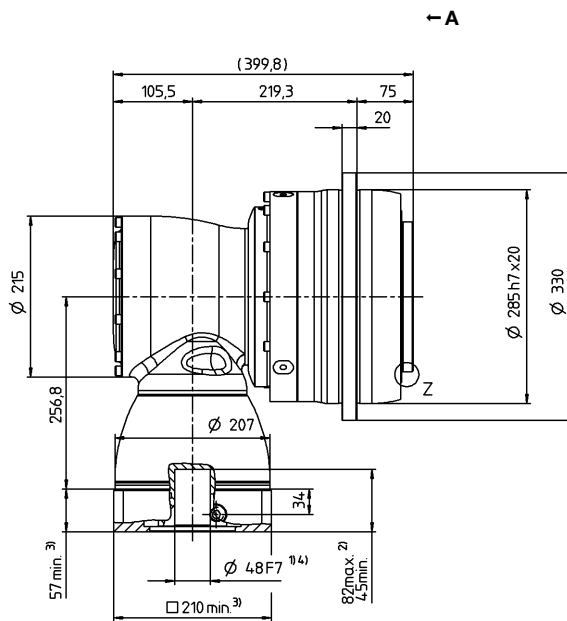
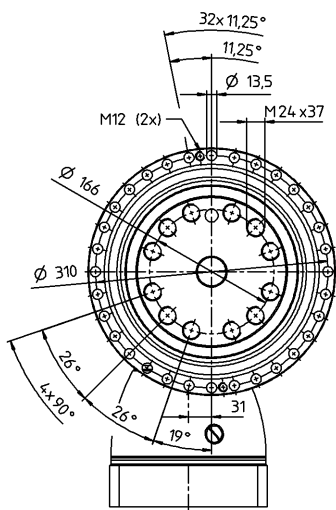
Please use our sizing software cymex[®] for a detailed sizing – www.wittenstein-cymex.com
Please contact us for optimum sizing at S1 conditions (Continuous operation).

- ^{a)} At max. 10 % M_{2KMax}
- ^{b)} Valid for standard clamping hub diameter
- ^{c)} Refers to center of the output shaft or flange
- ^{d)} Please reduce input speed at higher ambient temperatures

View A

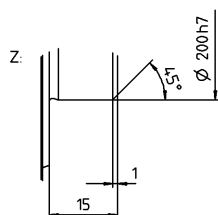
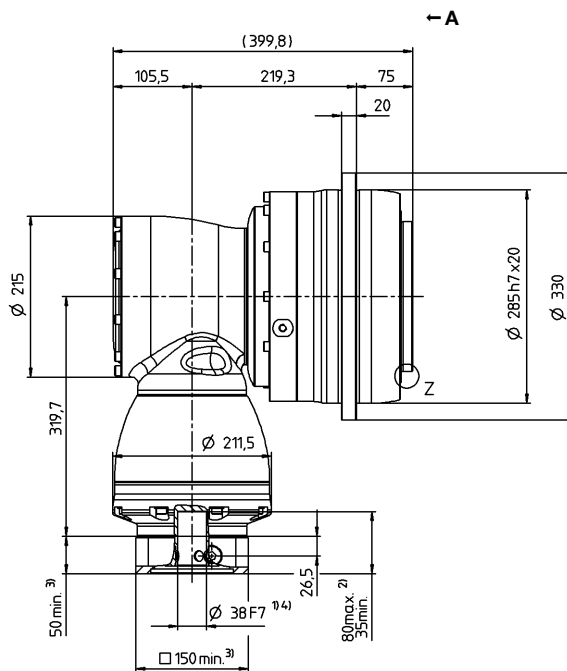
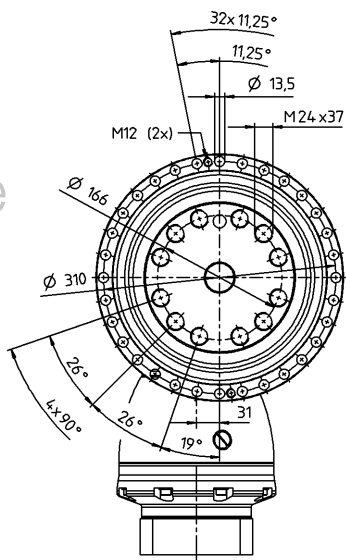
3-stage

up to 48⁴⁾ (M)⁵⁾
clamping hub diameter



4-stage

up to 38/48⁴⁾
(K⁵⁾ / M) clamping hub diameter



See technical data sheet for available clamping hub diameters (mass moment of inertia). Dimensions available on request.

Non-tolerated dimensions are nominal dimensions

¹⁾ Check motor shaft fit

²⁾ Min./Max. permissible motor shaft length. Longer motor shafts are possible, please contact alpha.

³⁾ The dimensions depend on the motor

⁴⁾ Smaller motor shaft diameter is compensated by a bushing with a minimum thickness of 1 mm

⁵⁾ Standard clamping hub diameter

Hypoid gearboxes

TPK⁺

MA

Basic Line gearbox overview



Product type		CP	CPS	CPK	CPSK	CVH	CVS
Version		MF	MF	MF	MF	MF / MT	MF / MT
Ratio ^{c)}	min. $i =$	3	3	3	3	7	7
	max. $i =$	100	100	100	100	40	40
Max. torsional backlash [arcmin] ^{c)}	Standard	≤ 12	≤ 12	≤ 13	≤ 15	≤ 15	≤ 15
	Reduced	–	–	–	–	–	–
Output shape							
Smooth shaft		x	x	x	x	–	x
Shaft with key ^{d)}		x	x	x	x	–	x
Splined shaft (DIN 5480)		–	–	–	–	–	–
Blind hollow shaft		–	–	–	–	–	–
Hollow shaft interface		–	–	–	–	x	–
Keyed hollow shaft		–	–	–	–	x	–
Flanged hollow shaft		–	–	–	–	–	–
Flange		–	–	–	–	–	–
System output		–	–	–	–	–	–
Output on both sides		–	–	–	–	x	x
Input type							
Motor-mounted		x	x	x	x	x	x
Self-contained version ^{b)}		–	–	–	–	–	–
Characteristic							
Flange with slotted holes		–	–	–	–	–	–
ATEX ^{a)}		–	–	–	–	–	–
Food-grade lubrication ^{a) b)}		x	x	x	x	x	x
Corrosion resistant ^{a) b)}		–	–	–	–	–	–
Optimized mass inertia ^{a)}		–	–	–	–	–	–
System solutions							
Linear system (rack / pinion)		–	–	–	–	–	–
Servo actuator		–	–	–	–	–	–
Accessories (please refer to the product pages for further options)							
Coupling		x	x	x	x	–	x
Shrink disc		–	–	–	–	x	–

^{a)} Power reduction: technical data available on request

^{b)} Please contact WITTENSTEIN alpha

^{c)} In relation to reference sizes

^{d)} Power reduction: Please use our sizing software cymex® for a detailed sizing – www.wittenstein-cymex.com

Value Line gearbox overview



Product type		NP	NPL	NPS	NPT	NPR	NPK	NPLK	NPSK	NPTK	NPRK	NVH	NVS	HDV
Version		MF / MA	MF / MA	MF / MA	MF / MA	MF / MA	MF	MF	MF	MF	MF	MF	MF	MF / MT
Ratio ^{a)}	min. $i =$	3	3	3	3	3	3	3	3	3	3	4	4	4
	max. $i =$	100	100	100	100	100	100	100	100	100	100	400	400	100
Max. torsional backlash [arcmin] ^{c)}	Standard	≤ 8	≤ 8	≤ 8	≤ 8	≤ 8	≤ 11	≤ 11	≤ 11	≤ 11	≤ 11	≤ 6	≤ 6	≤ 10
	Reduced	–	–	–	–	–	–	–	–	–	–	–	–	–
Output type														
Smooth shaft		x	x	x	–	x	x	x	x	–	x	–	x	x
Shaft with key ^{d)}		x	x	x	–	x	x	x	x	–	x	–	x	x
Splined shaft (DIN 5480)		–	x	x	–	x	–	x	x	–	x	–	–	–
Blind hollow shaft		–	–	–	–	–	–	–	–	–	–	–	–	–
Hollow shaft interface		–	–	–	–	–	–	–	–	–	–	x	–	–
Keyed hollow shaft		–	–	–	–	–	–	–	–	–	–	x	–	–
Flanged hollow shaft		–	–	–	–	–	–	–	–	–	–	–	–	–
Flange		–	–	–	x	–	–	–	–	x	–	–	–	–
System output		–	–	–	–	–	–	–	–	–	–	–	–	–
Output on both sides		–	–	–	–	–	–	–	–	–	–	x	x	–
Input type														
Motor-mounted		x	x	x	x	x	x	x	x	x	x	x	x	x
Self-contained version ^{b)}		–	–	–	–	–	–	–	–	–	–	–	–	–
Characteristic														
Flange with slotted holes		–	–	–	–	x	–	–	–	–	x	–	–	–
ATEX ^{a)}		–	–	–	–	–	–	–	–	–	–	–	–	–
Food-grade lubrication ^{a) b)}		x	x	x	x	x	x	x	x	x	x	x	x	x
Corrosion resistant ^{a) b)}		–	–	–	–	–	–	–	–	–	–	x	x	x
Optimized mass inertia ^{a)}		–	–	–	–	–	–	–	–	–	–	–	–	–
System solutions														
Linear system (rack / pinion)		x	x	x	–	x	x	x	x	–	x	–	x	–
Servo actuator		–	–	–	–	–	–	–	–	–	–	–	–	x
Accessories (please refer to the product pages for further options)														
Coupling		x	x	x	x	x	x	x	x	–	x	–	x	–
Shrink disc		–	–	–	–	–	–	–	–	–	–	x	–	–

^{a)} Power reduction: technical data available on request

^{b)} Please contact WITTENSTEIN alpha

^{c)} In relation to reference sizes

^{d)} Power reduction: Please use our sizing software cymex® for a detailed sizing – www.wittenstein-cymex.com

Advanced Line gearbox overview



Product type		SP+	SP+ HIGH SPEED	SP+ HIGH SPEED friction optimized	TP+	TP+ HIGH TORQUE	HG+	SK+	SPK+
Version		MF	MC	MC-L	MF	MA	MF	MF	MF
Catalog page		26	26	26	80	80	128	140	150
Ratio ^{c)}	min. i =	3	3	3	4	22	3	3	12
	max. i =	100	100	10	100	302.5	100	100	10000
Max. torsional backlash [arcmin] ^{c)}	Standard	≤ 3	≤ 4	≤ 4	≤ 3	≤ 1	≤ 4	≤ 4	≤ 4
	Reduced	≤ 1	≤ 2	≤ 2	≤ 1	–	–	–	≤ 2
Output shape									
Smooth shaft		x	x	x	–	–	–	x	x
Shaft with key ^{d)}		x	x	x	–	–	–	x	x
Splined shaft (DIN 5480)		x	x	x	–	–	–	x	x
Blind hollow shaft		x	x	x	–	–	–	–	x
Hollow shaft interface		–	–	–	–	–	x	–	–
Keyed hollow shaft		–	–	–	–	–	–	–	–
Flanged hollow shaft		–	–	–	–	–	–	–	–
Flange		–	–	–	x	x	–	–	–
System output		–	–	–	x	x	–	–	–
Output on both sides		–	–	–	–	–	x	x	x
Input type									
Motor-mounted		x	x	x	x	x	x	x	x
Self-contained version ^{b)}		x	–	–	x	–	–	–	–
Characteristic									
Flange with slotted holes		x	–	–	–	–	–	–	–
ATEX ^{a)}		x	x	–	–	–	x	x	–
Food-grade lubrication ^{a) b)}		x	x	x	x	x	x	x	x
Corrosion resistant ^{a) b)}		x	x	x	x	x	x	x	x
Optimized mass inertia ^{a)}		x	x	x	x	x	–	–	–
System solutions									
Linear system (rack / pinion)		x	x	–	x	x	–	x	x
Servo actuator		x	–	–	x	x	–	–	–
Accessories (please refer to the product pages for further options)									
Coupling		x	x	x	x	x	–	x	x
Shrink disc		x	x	x	–	–	x	–	x

^{a)} Power reduction; technical data available on request

^{b)} Please contact WITTENSTEIN alpha

^{c)} In relation to reference sizes

^{d)} Power reduction: Please use our sizing software cymex® for a detailed sizing – www.wittenstein-cymex.com



TK+	TPK+	TPK+ HIGH TORQUE	SC+	SPC+	TPC+	VH+	VS+	VT+	DP+	HDP+
MF	MF	MA	MF	MF	MF	MF	MF	MF	MF / MA	MA
178	188	188	228	238	248	262	272	280	292	308
3	12	66	1	4	4	4	4	4	16	22
100	10000	5500	2	20	20	400	400	400	55	55
≤ 4	≤ 4	≤ 1.3	≤ 4	≤ 4	≤ 4	≤ 3	≤ 3	≤ 3	≤ 3	≤ 1
–	≤ 2	–	–	≤ 2	≤ 2	≤ 2	≤ 2	≤ 2	≤ 1	–

–	–	–	x	x	–	–	x	–	–	–
–	–	–	x	x	–	–	x	–	–	–
–	–	–	–	x	–	–	x	–	–	–
–	–	–	–	x	–	–	–	–	–	–
–	–	–	–	–	–	x	–	–	–	–
–	–	–	–	–	–	x	–	–	–	–
x	–	–	–	–	–	–	–	x	–	–
–	x	x	–	–	x	–	–	–	x	x
–	x	x	–	–	x	–	–	–	–	–
x	x	x	–	–	–	x	x	–	–	–

x	x	x	x	x	x	x	x	x	x	x
–	–	–	–	–	–	–	–	–	–	–

–	–	–	–	–	–	–	–	–	–	–
x	–	–	–	–	–	–	–	–	–	–
x	x	x	x	x	x	x	x	x	x	x
x	x	x	–	–	–	x	x	x	x	x
–	–	–	–	–	–	–	–	–	x	x

x	x	x	x	x	x	–	x	x	–	–
–	–	–	–	–	–	–	–	–	–	–

x	x	x	x	x	x	–	x	x	–	–
–	–	–	–	x	–	x	–	–	–	–

Premium Line gearbox overview



Product type		XP ⁺	RP ⁺	XPK ⁺	RPK ⁺	XPC ⁺	RPC ⁺
Version		MF / MC	MF / MA	MF	MA	MF	MA
Ratio ^{c)}	min. $i =$	3	22	12	48	4	22
	max. $i =$	100	220	1000	5500	20	55
Max. torsional backlash [arcmin] ^{c)}	Standard	≤ 3	≤ 1	≤ 4	≤ 1.3	≤ 4	≤ 1.3
	Reduced	≤ 1	–	≤ 2	–	≤ 2	–
Output shape							
Smooth shaft		x	–	x	–	x	–
Shaft with key ^{d)}		x	–	x	–	x	–
Splined shaft (DIN 5480)		x	–	x	–	x	–
Blind hollow shaft		x	–	x	–	x	–
Hollow shaft interface		–	–	–	–	–	–
Keyed hollow shaft		–	–	–	–	–	–
Flanged hollow shaft		–	–	–	–	–	–
Flange		–	x	–	x	–	x
System output		x	x	x	x	x	x
Output on both sides		–	–	–	–	–	–
Input type							
Motor-mounted		x	x	x	x	x	x
Self-contained version ^{b)}		x	–	–	–	–	–
Characteristic							
Flange with slotted holes		x	x	x	x	x	x
ATEX ^{a)}		–	–	–	–	–	–
Food-grade lubrication ^{a) b)}		x	x	x	x	x	x
Corrosion resistant ^{a) b)}		–	–	–	–	–	–
Optimized mass inertia ^{a)}		x	x	–	–	–	–
System solutions							
Linear system (rack / pinion)		x	x	x	x	x	x
Servo actuator		x	x	–	–	–	–
Accessories (please refer to the product pages for further options)							
Coupling		x	–	x	–	x	–
Shrink disc		x	–	x	–	x	–

^{a)} Power reduction: technical data available on request

^{b)} Please contact WITTENSTEIN alpha

^{c)} In relation to reference sizes

^{d)} Power reduction: Please use our sizing software cymex[®] for a detailed sizing – www.wittenstein-cymex.com

Overview of gearbox variants

SP 100 S - M F 1 - 10 - 0 G 1 - 2 S

Characteristic:

B = Modular output combination
 C = Reverse centering
 E = ATEX
 F = Food grade lubrication
 G = Grease
 H = Food-grade grease
 L = Friction optimized
 R = Flange with slotted holes
 S = Standard
 W = Corrosion resistant

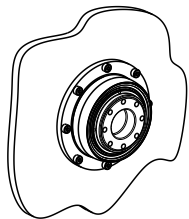
Explanation of variants
 deviating from the standard:

B = Modular output combination

An additional backward output type is available for hypoid gearboxes. See page 353 for details.

C = Reverse centering

To save space, this variant offers greater flexibility in mounting the product on the machine.



E = ATEX

Devices bearing the Ex symbol comply with EU Directive 2014/34/EN (ATEX) and are approved for use in defined explosion-prone zones. Performance data is limited and can be found in the operating instructions.

F = Food grade lubrication

These products are available with food-grade lubrication and can therefore be used in the food industry. Please note that the torque ratings in the catalog are reduced by 20 % (excluding V-Drive).

G = Grease

This variant allows you to lubricate selected products with grease instead of oil. Please note that the torque ratings in the catalog are reduced by 20 %.

H = Food-grade grease

This variant allows you to lubricate selected products with food-safe grease instead of oil. Please note that the torque ratings in the catalog are reduced by 40%.

L = Friction optimized

A friction-optimized variant is available for HIGH SPEED products.

Design changes allow the products to be used particularly in applications with high temperature sensitivity, high nominal speeds or long duty cycles.

R = Flange with slotted holes

This output type is designed for linear applications with rack and pinion or belt pulley. Integrated slotted holes enable easy positioning of the pinion or simple tensioning of the belt.

W = Corrosion resistant

These products can be used in corrosive environments, e.g. in the food industry, pharmaceutical industry or packaging industry. All external product areas have been designed to avoid corrosion. In addition the products are provided with food-grade grease lubrication. Please note that the torque ratings in the catalog are reduced by 20 % (excluding V-Drive).

alpha Advanced Linear Systems

Strong performance in the advanced segment

Advanced Linear Systems are adapted to applications with average to high demands in terms of smooth running, positioning accuracy and feed force. Different gearbox versions and options such as HIGH TORQUE or HIGH SPEED can be selected to utilize the most appropriate system for the application. Typical fields of application include wood, plastic and composite machining, machining centers and automation.

The alpha preferred linear system – The best of each segment

Our preferred linear systems in the Advanced Segment are always comprised of the perfect combination of gearbox, pinion, rack and lubrication system. The systems are optimized to achieve the required feed force, feed speed, rigidity and degree of utilization of the individual components.



For further information, refer to our alpha Linear Systems catalog and our website:
www.wittenstein-alpha.com/linear-systems

For a wide range of applications

Linear systems from WITTENSTEIN alpha are suitable for a wide range of applications and industries. New standards and advantages have been achieved in the following areas:

- Smooth operation
- Positioning accuracy
- Feed force
- Power density
- Rigidity
- Easy installation
- Design options
- Scalability

Together with a comprehensive range of services, we pledge to support you from the initial concept to the design, installation and commissioning phase. We will also ensure a consistent supply of spare parts.

Your benefits at a glance

Perfectly adapted linear systems available with planetary, right-angle and worm gearboxes or as an actuator

Optionally with INIRA®

Large individual configuration range due to numerous pinion/gearbox combinations



INIRA®: The revolution in rack assembly



Simply scan the QR code using your smartphone to see INIRA® in action.

INIRA® combines our existing innovative concepts for the simple, safe and efficient installation of racks. INIRA® clamping, INIRA® adjusting and INIRA® pinning have already made the assembly process much faster, more accurate and more ergonomic. Available for the Advanced and Premium Linear Systems.

INIRA® clamping: Simply faster and more ergonomic
Previously, enormous effort was required to clamp racks to the machine bed using screw clamps. INIRA® clamping integrates the clamping device in the rack. The rack incorporates a mounting sleeve which is guided over the head of the fastening screw to ensure quick and ergonomic clamping.

INIRA® pinning: Simply better and more efficient
The previous method used for pinning racks was extremely time-consuming. Precision bores have to be drilled and the chips generated must be carefully removed from the assembly. INIRA® pinning now offers a completely new solution for the chipless pinning of racks, which reduces installation times considerably (time spent on each rack ~ 1 min).

INIRA® adjusting: Simply safer and more precise
In combination with INIRA® clamping, INIRA® adjusting is the ideal solution for perfectly adjusting the transition between two rack segments. The innovative setting tool can adjust the transition extremely reliably and precisely, accurate to the micrometer.



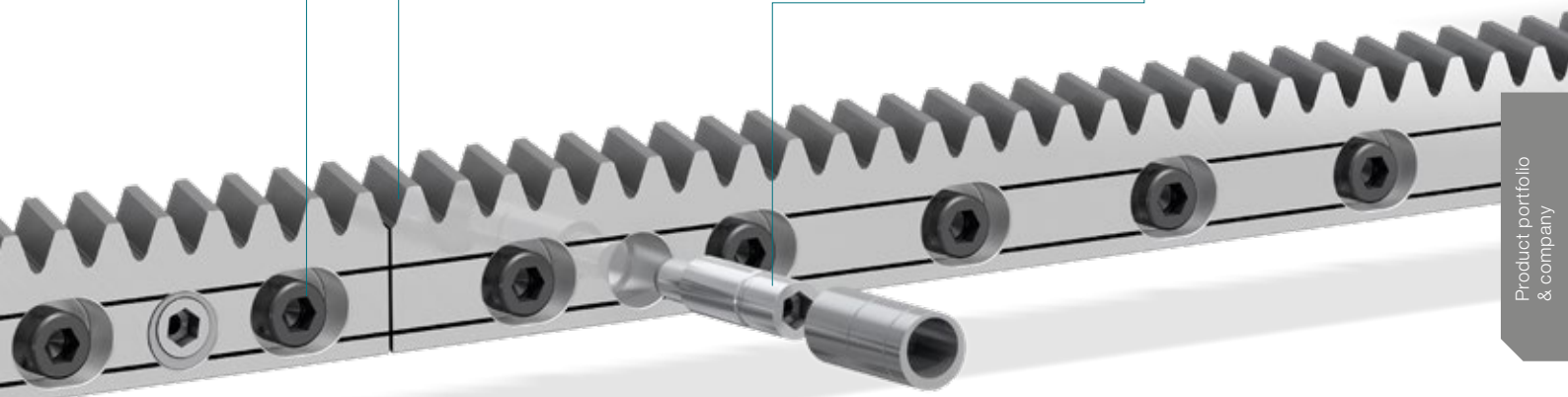
INIRA® clamping



INIRA® adjusting



INIRA® pinning



Precision meets motion = premo® by WITTENSTEIN alpha

premo® is a new, powerful servo actuator platform that combines absolute precision with perfect movement. The central idea behind this first fully scalable servo actuator platform is uncompromising flexibility from the viewpoint of the user. Motors and gearboxes with application-related graduated performance characteristics can be configured modularly to individual servo actuators. The result is a

highly versatile modular system with customizable power, designed for a wide variety of applications. The core of the servo actuator is a torsionally rigid precision gearbox with low backlash and excellent torque density combined with the equally powerful, permanent magnet servo motor with a split winding that guarantees low cogging and minimal velocity ripple.

premo® – clearly superior in performance

- Higher machine performance thanks to higher acceleration torque
- High torque density combined with a compact design allow for the realization of higher performance machines with significant space saving
- Improved connectivity to next generation controllers from leading system providers through the use of digital feedback (EnDat 2.2, DSL, HIPERFACE DSL®, DRIVE-CLiQ)
- Compatibility for high bus voltages up to 750 V DC
- Reduced wiring requirement through single-connector technology
- Improved reliability and safety through the use of more powerful brakes and SIL 2 encoders

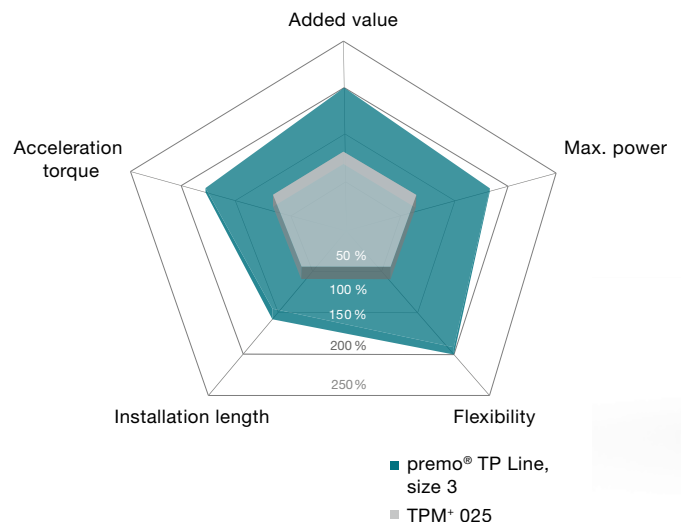


Product highlights

Optimized power density for greater energy efficiency and productivity

Flexible mechanical and electrical interfaces for high scalability

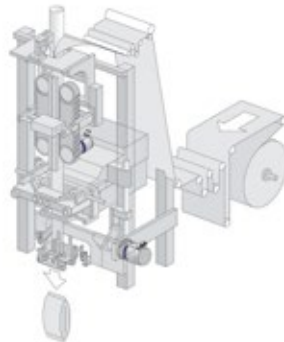
Variety of options for individually upgrading the basic configuration



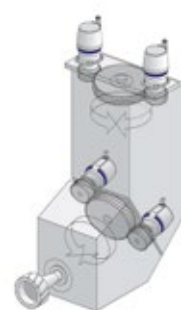
premo® application examples



Handling portal
premo® SP Line



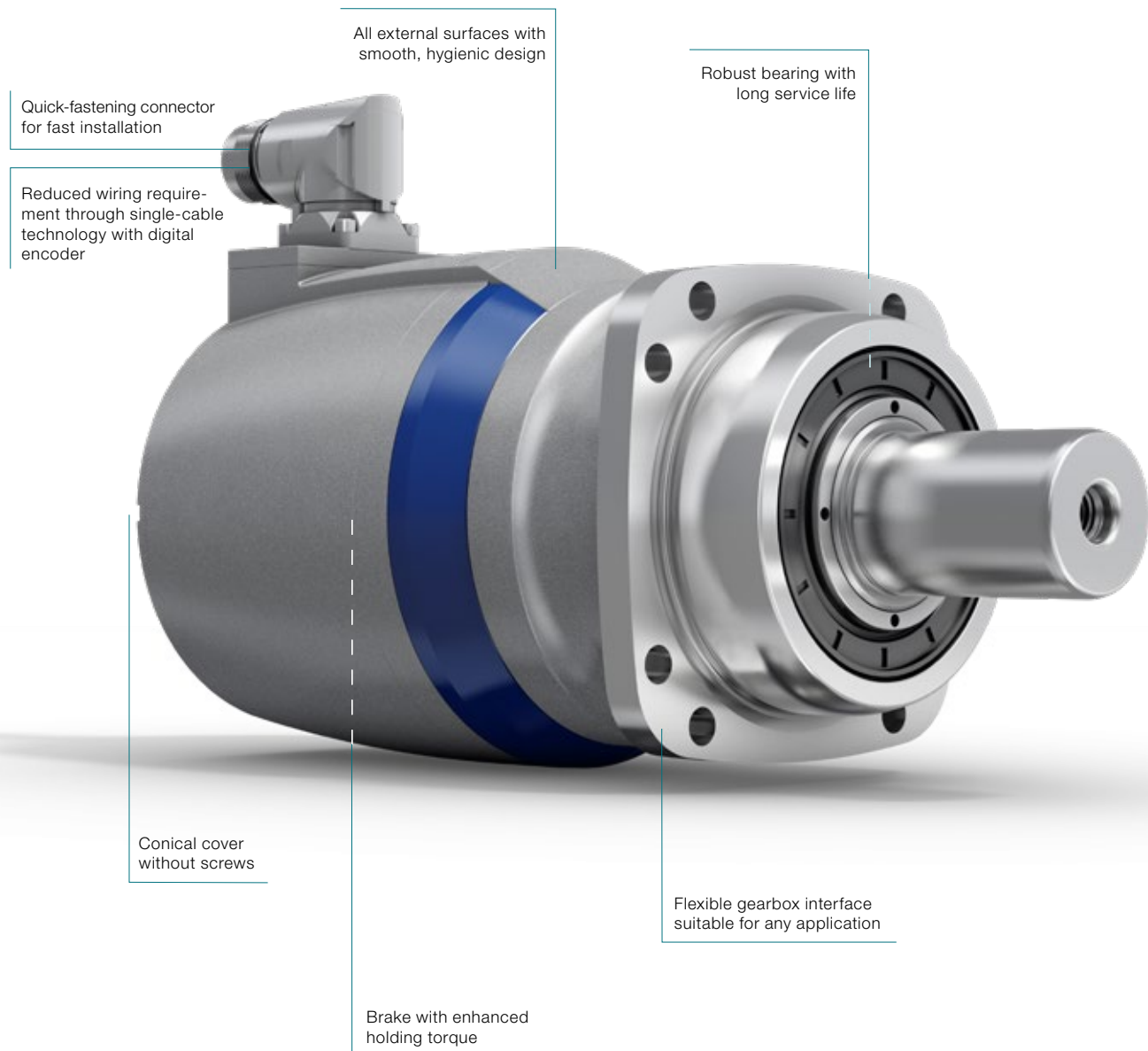
Fill and Seal machine
premo® TP Line



Milling cutter for a machining center
premo® XP Line

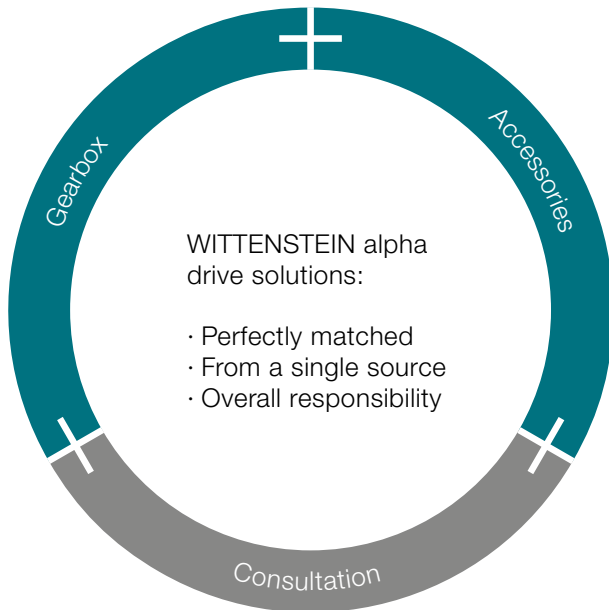
Typical fields of application and industry solutions

- Delta robot (axes 1–3, swivel axis)
- Handling portal (Z-axis, swivel / rotating axis)
- Machine tool reaming (rotating axes A–C, tool changer)
- Fill and Seal Machine (incl. jaw stroke, sealing jaw, blade)
- Folding carton packaging (incl. assembly / folding, filling valve)
- Plastic thermoform (tool axis)



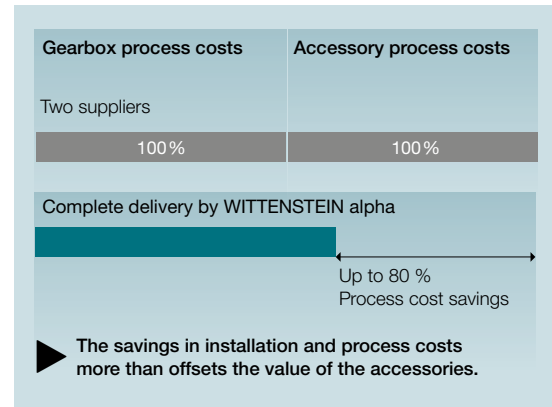
Accessories – smart additions for intelligent performance

Gearboxes, accessories and consulting from a single source



Optimization of your added value chain

Use the combination of gearbox and accessories in a complete package to streamline your internal processes.



Shrink disks

Shrink disks are frictional hub / shaft connections. Together with our hollow shaft or mounted shaft gearboxes for mounting directly on load shafts, machines can be designed to take up a minimal installation space.

The benefits:

- Simple mounting and removal
- Quick selection, easy and convenient
- Optional: corrosion resistant version



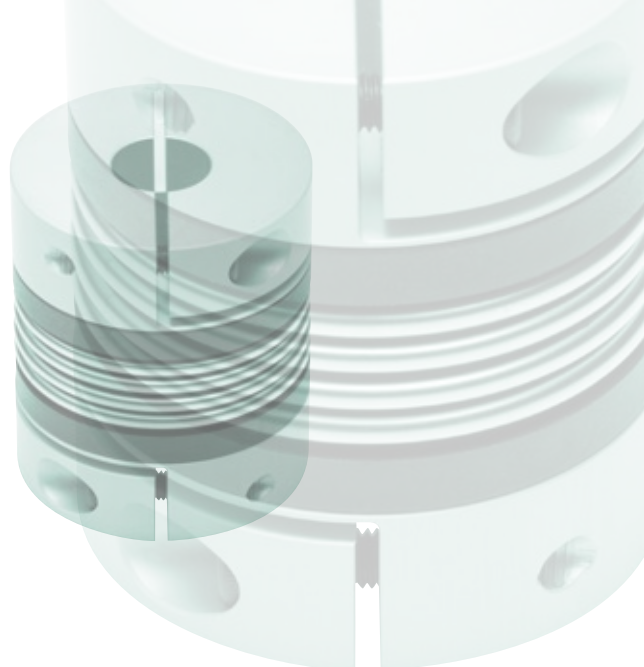
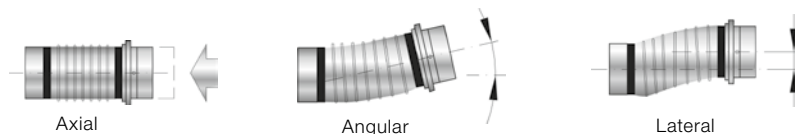
Preferred shrink disk series

To view a wide range of nickel-plated, stainless steel and other shrink disks as well as all the relevant technical data and dimensions, visit our homepage www.wittenstein-alpha.com

Couplings

Couplings are used for compensating misalignment during assembly and material-related heat expansion

Compensation for shaft misalignment



Metal bellows coupling

- Compensation for shaft misalignment
- Completely backlash free
- Corrosion resistant version available as an option (BC2, BC3, BCT)
- High torsional rigidity



Elastomer coupling

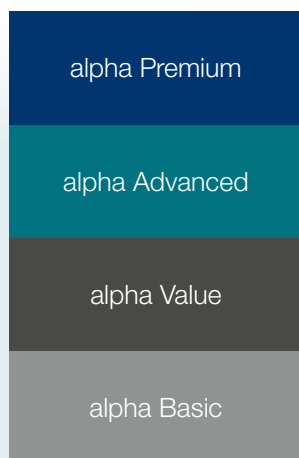
- Compensation for shaft misalignment
- Completely backlash free
- Selectable torsional rigidity / damping
- Compact design
- Extremely simple installation (plug-in)



Torque limiter

- Compensation for shaft misalignment
- Completely backlash free
- Precise, preset overload protection (switch-off in 1 – 3 ms)
- Precise repeat accuracy
- Just one protection element per axis

Preferred coupling series



Preferred series are defined for the relevant gearbox segments to make selection easier. Preferred couplings are defined based on the maximum torque that the gearbox can transmit. Standard industrial conditions for the number of cycles (1000/h) and ambient temperature were adopted.

Please note that the coupling load is based on the torque that the gearbox can transmit and not the torque in your application. We recommend using our cymex®5 design software to create a more detailed design. (www.wittenstein-cymex.com)

For more coupling types, please visit www.wittenstein-alpha.com

Support at each interaction stage

With the WITTENSTEIN alpha service concept, we are also setting new standards in the field of customer support.

Global presence

Our global consultation network will help you overcome your complex challenges through our extensive experience, a variety of design tools and individual engineering services.

Speed counts

Our speedline® team guarantees fast response times in the area of logistics. We provide on-site support during the installation and commissioning of mechanical systems to give you a sustained competitive edge.

Personal consultation

Our highly qualified and committed expert personnel will accompany you throughout the entire product lifecycle - around the clock. When it comes to customer support, you can count on us!

Design

Consultation
CAD POINT
SIZING ASSISTANT
Sizing software cymex®
Engineering

Installation

speedline® delivery
Installation on-site
Operating & installation instructions
Pick-up & return service



We are happy to advise you:

24 h service hotline: +49 7931 493-12900

No matter where you need us:

A comprehensive sales and service network provides quick availability and competent support worldwide.

Support at each interaction stage

Design

Whatever your requirements are: we offer the right design methodology. Use the CAD POINT to gain easy access to CAD files, the SIZING ASSISTANT for creating simple

designs, cymex® 5 for precise dimensioning and our engineering service for individual solutions.

Consultation

- Personal contact on-site
- Professional application calculations and drive design create the best solutions



CAD POINT

- 3D data of selected solution
- Online comparison with motor geometry
- Transparent and simple selection of required components

Engineering

Catalog gearboxes:

- Advanced software tools for accurate calculation, simulation and analysis of the drive train
- Optimization of your productivity and reduction in development costs



SIZING ASSISTANT

- Efficient online design within seconds
- Convenient comparison function
- Automatic geometry adjustment

Special gearboxes:

- Gearing design and development
- Development and production of special gearboxes
- Send all inquiries to: sondergetriebe@wittenstein.de



cymex® 5 sizing software

- Dimensioning, design and evaluation of the entire drive train
- Reliable, efficient design
- Optimization of drive system



Installation

All delivered products are perfectly matched to your application environment and fully operational right away.

Our service experts support you in the installation and commissioning of complex mechatronic systems, guaranteeing maximum availability of your plant.

speedline® delivery

Tel. +49 7931 493-10444

- Delivery of standard series in 24 or 48 hours ex works*
- Outstanding flexibility for fast deliveries at short notice

Operating and installation instructions

- Detailed explanations of how to use the product
- Motor installation videos
- Assembly videos on rack and pinion system

Installation on-site

- Professional installation
- Optimal integration of the system in your application
- Explanation of the drive function

Pick-up and return service

- Cost savings through minimization of downtimes
- Professional logistics organization
- Reduction of transport risks through customized, direct pick-up and delivery



* Non-binding delivery time depending on part availability.

Support at each interaction stage

Maintenance

WITTENSTEIN alpha guarantees fast repairs of the highest quality and precision – with short throughput times and intensive support. In addition, we will provide you with information about various measurements, material

analyses and condition monitoring inspections. You can rely on short response times, unbureaucratic processing and individual support.

24 h service hotline

Tel. +49 7931 493-12900

- Available round the clock
- Personal, prompt service for resolving time-critical maintenance issues

cymex® statistics

- Systematic field data acquisition
- Reliability calculations (MTBF)
- Customized evaluations

Maintenance and inspection

- Documentation regarding condition and expected service life
- Maintaining required state
- Customized maintenance schedules

Modernization

- Professional retrofitting
- Reliable compatibility testing of existing solutions

Repair

- Restoring to required state
- Short throughput times
- Immediate response in time-critical situations



Training

Discover how our products function and how they can add value to your application. We offer you training courses at our premises or on-site at your plant. Benefit from

practice-oriented learning methods and a highly skilled team of trainers.

Product training

Greater knowledge enables greater achievement. We will be pleased to share our expert knowledge with you: Profit from our many years of experience and learn more about the product portfolio of WITTENSTEIN alpha.

Sizing training

Become a design expert! We will provide you with training courses on our design software, adapted to your requirements. Whether for beginners or experts, for occasional or regular users – we adapt our training course to your wishes and requirements.

Installation training

We offer you individual training courses on-site for your system application of selected linear axes as well as professional installation.

Service training

Participation in a service training course is a prerequisite for sourcing spare parts at the parts list level. We offer you training courses at our premises or on-site at your plant. Moreover, we regularly host maintenance workshops at which the participants are instructed in safe handling during mounting of the motor to the gearbox as well as the independent replacement of wearing parts and gearbox assemblies.



The WITTENSTEIN group – The company and its fields of business



WITTENSTEIN

With approximately 2,900 employees worldwide, WITTENSTEIN SE stands for innovation, precision and excellence in the world of mechatronic drive technology, both nationally and internationally. The group is active in seven innovative fields of business. Furthermore, WITTENSTEIN SE is represented by some 60 subsidiaries in around 40 countries in all important technology and sales markets worldwide.



Our fields of expertise

We provide know-how for a host of different sectors:

- Machine and plant construction
- Software development
- Aerospace
- Automotive & E-mobility
- Energy
- Oil & Gas Exploration and Production
- Medical technology
- Measurement and testing technology
- Nanotechnology
- Simulation

The WITTENSTEIN Group



alpha

WITTENSTEIN alpha GmbH
High-precision servo drives and linear systems



cyber motor

WITTENSTEIN cyber motor GmbH
Highly dynamic servo motors and drive electronics



galaxie

WITTENSTEIN galaxie GmbH
Superior gearboxes and drive systems



motion control

WITTENSTEIN motion control GmbH
Customized linear and rotary servo systems



aerospace
& simulation

WITTENSTEIN aerospace & simulation GmbH
Mechatronic drive systems for aerospace & simulation



attocube systems AG
Nanoprecision drive and measurement technology solutions



baramundi software AG
Secure management of IT infrastructure in offices and production areas



Product portfolio
& company

WITTENSTEIN – one with the future

www.wittenstein.de

Gearbox general – Detailed sizing

Cyclic operation **S5** and continuous operation **S1**

Calculate the duty cycle ED

$$ED = \frac{(t_b + t_c + t_d)}{(t_b + t_c + t_d + t_e)} \cdot 100$$

$$ED = t_b + t_c + t_d$$

ED ≤ 60 %
and ED ≤ 20 min.

ED > 60 % or
ED > 20 min

Cyclic operation:
SP+ MF

Continuous operation:
SP+ MC
(otherwise consult us)

$$Z_n = \frac{3600}{(t_b + t_c + t_d + t_e)} \quad \text{see diagram 1}$$

f_s is dependent on Z_n see diagram 2

T_{2b} depends on the application

$$T_{2b, fs} = T_{2b} \cdot f_s$$

$$f_0 = \frac{t_{\alpha 1} + \dots + t_{\alpha n}}{t_{ges}}$$

t_{α} = elevation time
 t_{α} = operating time with

$$T_{2b, fs} \geq T_{2B}$$

$$n_{2m} = \frac{|n_{2b}| \cdot t_b + \dots + |n_{2n}| \cdot t_n}{t_b + \dots + t_n} \quad \text{incl. pause time}$$

$$n_{2m\alpha} = \frac{|n_{2\alpha 1}| \cdot t_{\alpha 1} + \dots + |n_{2\alpha n}| \cdot t_{\alpha n}}{t_{\alpha 1} + \dots + t_{\alpha n}}$$

$$f_{\alpha} = n_{2m\alpha} \cdot L_h \cdot f_0$$

L_h = required service life

i depends on
n – required output speed (for the application)
– reasonable input speed (gearbox / motor)

$$n_{1max} = n_{2max} \cdot i$$

$$n_{1max} \leq n_{1Mot max}$$

T – consisting of corresponding output and input torque

$$T_{1b} = T_{2b} \cdot \frac{1}{i} \cdot \frac{1}{\eta} \quad T_{1b} \leq T_{Mot max}$$

λ – from resulting inertia ratio.
Guide value: $1 \leq \lambda \leq 10$
(see alphabet for calculation)

n_{2max} depends on the application

Calculate the number of cycles Z_n

Calculate the shock factor f_s see diagram 2

Calculate the max. acceleration torque at the output including the shock factor $T_{2b, fs}$

Calculate the elevation range f_0

Calculate the average elevation speed $n_{2m\alpha}$

Calculate the relevant output shaft revolutions f_{α}

Calculate of $T_{2\alpha, zul}$ see diagramm 3

$$T_{2b, fs} \leq T_{2\alpha, zul}$$

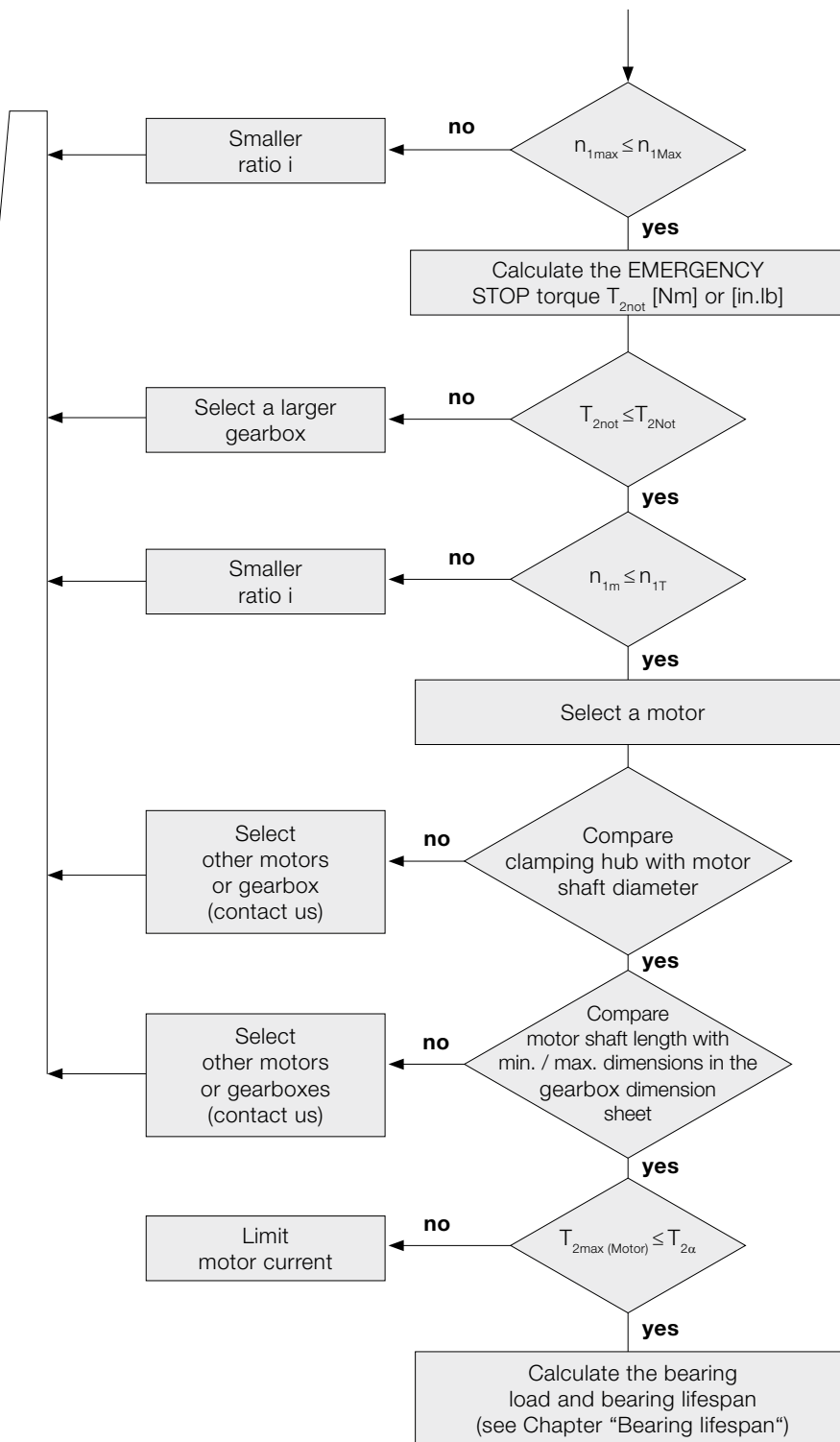
no

Select a larger gearbox or please consult

yes

Calculate the max. output speed n_{2max} see diagram 1

Calculate the ratio i



Please refer to the relevant technical data for information on the max. permissible characteristic values for your gearbox.

T_{2not} depends on the application

$$n_{1m} = n_{2m} \cdot i$$

$$D_{W, Mot} \leq D_{clamping\ hub}$$

The motor shaft must be inserted far enough into the clamping hub.

The motor shaft must protrude far enough into the clamping hub without making contact.

$$T_{2max (Motor)} = T_{1max (Motor)} \cdot i \cdot \eta_{gearbox}$$

The gearbox should not be damaged when the motor operates at full load, limit the motor current if necessary.

Diagram 1
Standard collective load at output. At input speeds up to rated speed n_{1N} or thermal speed limit n_{1T} , the temperature of the gearbox will not exceed 90 °C under average ambient conditions.

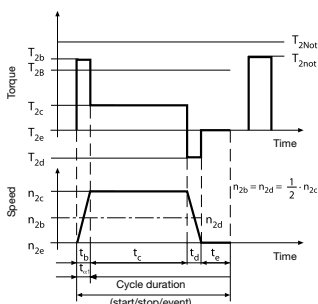


Diagram 2
Large number of cycles combined with short acceleration times may cause the drive train to vibrate. Use the shock factor f_s to include the resulting excess torque values in calculations.

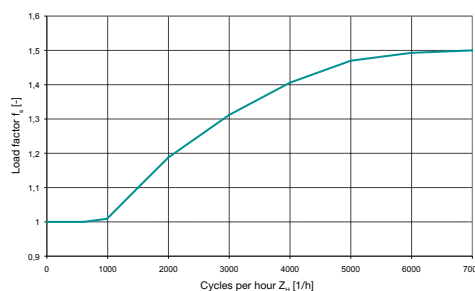
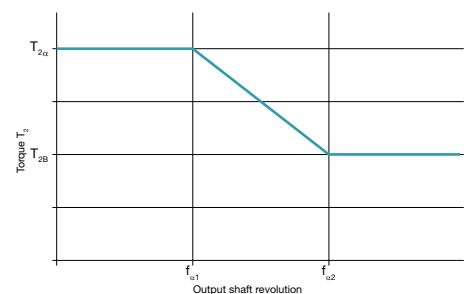
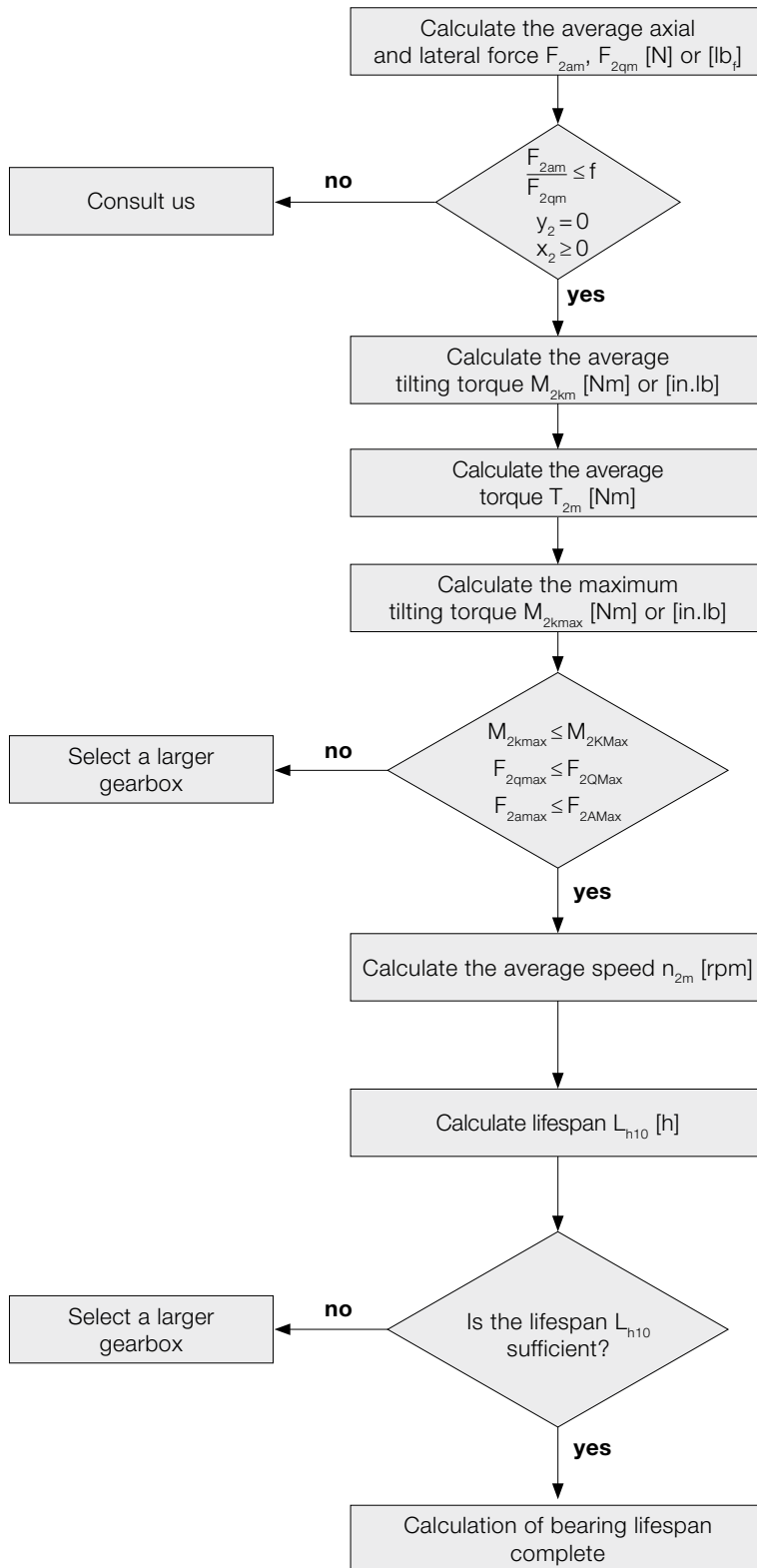


Diagram 3
The transmittable torque $T_{2u, per}$ of the gearbox is dependent on the number of output shaft revolutions. In the lower output shaft revolution range, the fatigue strength range of the toothing can be fully utilized up to the maximum value T_{2u} .



Gearbox general – Detailed sizing

Bearing lifespan L_{h10}



$$F_{2am} = \sqrt[3]{\frac{|n_{2b}| \cdot t_b \cdot |F_{2ab}|^3 + \dots + |n_{2n}| \cdot t_n \cdot |F_{2an}|^3}{|n_{2b}| \cdot t_b + \dots + |n_{2n}| \cdot t_n}}$$

$$F_{2qm} = \sqrt[3]{\frac{|n_{2b}| \cdot t_b \cdot |F_{2qb}|^3 + \dots + |n_{2n}| \cdot t_n \cdot |F_{2qn}|^3}{|n_{2b}| \cdot t_b + \dots + |n_{2n}| \cdot t_n}}$$

$$M_{2km} = \frac{F_{2am} \cdot y_2 + F_{2qm} \cdot (x_2 + z_2)^a}{W}$$

$$T_{2m} = \sqrt[3]{\frac{|n_{2b}| \cdot t_b \cdot |T_{2b}|^3 + \dots + |n_{2n}| \cdot t_n \cdot |T_{2n}|^3}{|n_{2b}| \cdot t_b + \dots + |n_{2n}| \cdot t_n}}$$

$$M_{2kmax} = \frac{F_{2amax} \cdot y_2 + F_{2qmax} \cdot (x_2 + z_2)^a}{W}$$

a) x, y, z in mm

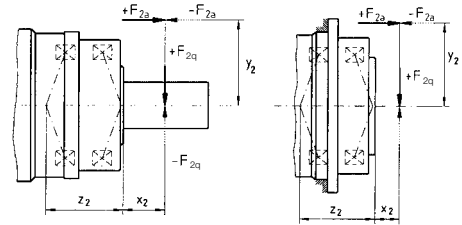
$$n_{2m} = \frac{n_{2b} \cdot t_b + \dots + n_{2n} \cdot t_n}{t_b + \dots + t_n}$$

$$L_{h10} = \frac{16666}{n_{2m}} \cdot \left[\frac{K1_2}{M_{2km}} \right]^{p_2}$$

	metric	inch
W	1000	1

	TP ⁺ /TPK ⁺	SP ⁺ /SPK ⁺
f	0.37	0.40

Example with output shaft and flange:



SP ⁺ /SPK ⁺ /SPC ⁺		060	075	100	140	180	210	240
z ₂	[mm]	42.2	44.8	50.5	63.0	79.2	94.0	99.0
	[in]	1.66	1.76	1.99	2.48	3.12	3.70	3.90
K ₁₂	[Nm]	795	1109	1894	3854	9456	15554	19521
	[in.lb]	7036	9815	16762	34108	83686	137653	172761
p ₂		3.33	3.33	3.33	3.33	3.33	3.33	3.33

TP ⁺ /TPK ⁺ /TPC ⁺ /DP ⁺		004	010	025	050	110	300	500	2000	4000
z ₂	[mm]	57.6	82.7	94.5	81.2	106.8	140.6	157	216	283
	[in]	2.27	3.26	3.72	3.20	4.21	5.48	6.12	8.50	11.1
K ₁₂	[Nm]	536	1325	1896	4048	9839	18895	27251	96400	184000
	[in.lb]	4744	11726	16780	35825	87075	167220	241171	853140	1628400
p ₂		3.33	3.33	3.33	3.33	3.33	3.33	3.33	3.33	3.33

HDP ⁺		010	025	050
z ₂	[mm]	90.4	99.1	83.5
	[in]	3.56	3.90	3.29
K ₁₂	[Nm]	1325	1896	4048
	[in.lb]	11726	16780	35825
p ₂		3.33	3.33	3.33

TK⁺/SK⁺/HG⁺/SC⁺/VH⁺/VS⁺/VT⁺: Calculation using cymex®.
Please contact us for further information.

Hypoid gearboxes – Detailed sizing

Gearbox types and sizes			TK* 004 SK* 060 HG* 060	SPK* 075 TPK* 010 TPK* 025 MA	TK* 010 SK* 075 HG* 075	SPK* 100 TPK* 025 TPK* 050 MA	
Dimensions of rearward drive							
Solid shaft:	diameter	øD _{K6}	mm	16	16	22	22
	length	L	mm	28 ±0.15	28 ±0.15	36 ±0.15	36 ±0.15
Hollow shaft interface outer diameter		øD _{H6}	mm	18	18	24	24
Hollow shaft interface inner diameter		ød _{H6}	mm	15	15	20	20
Hollow shaft interface length		L _{HW}	mm	14	14	16	16
Distance from input axis		A	mm	42.9	42.9	52.6	52.6
Key dimensions (E = key as per DIN 6885, sheet 1, form A)	l	mm	25	25	32	32	
	b _{H6}	mm	5	5	6	6	
	a	mm	2	2	2	2	
	h	mm	18	18	24.5	24.5	
Output shaft threaded bore		B	M5x12.5	M5x12.5	M8x19	M8x19	
Permissible load of rearward drive							
Max. acceleration torque ^{c)}	T _{3a,zul}	= T _{2a,zul} on the condition that T _{2b,fs} + T _{3b,fs} ≤ T _{2a,zul}		Please contact us	= T _{2a,zul} on the condition that T _{2b,fs} + T _{3b,fs} ≤ T _{2a,zul}		Please contact us
Nominal output torque ^{c)}	T _{3N}	= T _{2N} - T _{2n}			= T _{2N} - T _{2n}		
EMERGENCY STOP torque ^{c)}	T _{3Not}	= T _{2Not} - T _{2not}			= T _{2Not} - T _{2not}		
Max. axial force ^{b)}	F _{3Amax}	1500		1500	1800	1800	
Max. lateral force ^{b)}	F _{3Qmax}	2300		2300	3000	3000	
Max. tilting torque	M _{3Kmax}	60		60	100	100	
Calculation of average tilting torque at the rearward drive							
Factor for tilting torque calculation	z ₃	mm	11.9	11.9	15.6	15.6	
Distance between axial force and center of gearbox	y ₃	mm	Application-dependent				
Distance between lateral force and shaft collar	x ₃	mm	Application-dependent				

^{a)} Connection via shrink discs

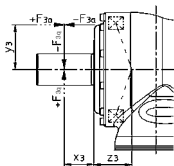
^{b)} Refers to center of shaft

^{c)} See also page 336, "Detailed dimensioning – Gearbox"

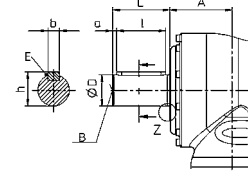
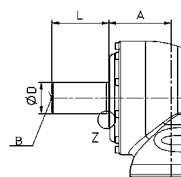
Rearward drive:

Smooth shaft

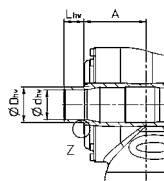
Shaft with key



$$M_{3k} = F_{3a} \cdot y_3 + F_{3q} \cdot (x_3 + z_3)$$



TK* 025 SK* 100 HG* 100	SPK* 140 TPK* 050 TPK* 110 MA	TK* 050 SK* 140 HG* 140	SPK* 180 SPK* 240 TPK* 110 TPK* 500 TPK* 300 MA	TK* 110 SK* 180 HG* 180	SPK* 210 TPK* 300 TPK* 500 MA
32	32	40	40	55	55
58 ±0.15	58 ±0.15	82 ±0.15	82 ±0.15	82 ±0.15	82 ±0.15
36	36	50	50	68	68
30	30	40	40	55	55
20	20	25	25	25	25
63.5	63.5	87	87	107.8	107.8
50	50	70	70	70	70
10	10	12	12	16	16
4	4	5	5	6	6
35	35	43	43	59	59
M12x28	M12x28	M16x36	M16x36	M20x42	M20x42
$= T_{2a,zul}$ on the condition that $T_{2b,fs} + T_{3b,fs} \leq T_{2a,zul}$ $= T_{2N} - T_{2n}$ $= T_{2Not} - T_{2not}$	Please contact us	$= T_{2a,zul}$ on the condition that $T_{2b,fs} + T_{3b,fs} \leq T_{2a,zul}$ $= T_{2N} - T_{2n}$ $= T_{2Not} - T_{2not}$	Please contact us	$= T_{2a,zul}$ on the condition that $T_{2b,fs} + T_{3b,fs} \leq T_{2a,zul}$ $= T_{2N} - T_{2n}$ $= T_{2Not} - T_{2not}$	Please contact us
2000	2000	9900	9900	4000	4000
3300	3300	9500	9500	11500	11500
150	150	580	580	745	745
16.5	16.5	20	20	23.75	23.75
Application-dependent					
Application-dependent					

Hollow shaft interface ^{a)}

Hollow shaft



No connection possible

Cover



No connection possible

Worm gearboxes – Detailed sizing

A: Simplified sizing for servo motors based on the maximum motor torque: $M_{\max} \cdot i \leq T_{2\alpha}$

B: Sizing based on the application

Step 1:

Determine the application data

$T_{2b} = \underline{\hspace{2cm}}$ [Nm] $n_{1n} = \underline{\hspace{2cm}}$ [rpm]

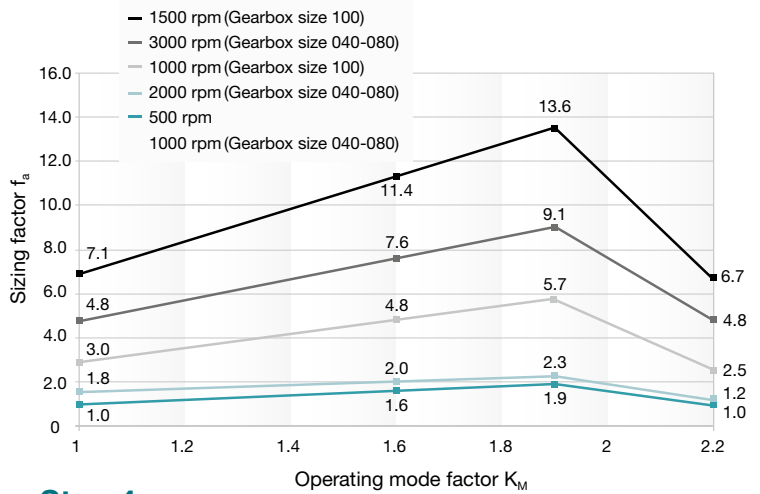
Step 2:

Determine the operating mode factor $K_M = \underline{\hspace{2cm}}$

Typical applications	Cycle	Torque characteristic	Operating mode factor K_M
Format changing, e.g. in packaging machines, drives for processing equipment, actuators etc.	S5 operation: Low duty cycle Small number of cycles Low dynamics		1.0
Tool changers with low dynamics, pick & place gantry axes, tire building machines etc.	S5 operation: Medium duty cycle Small number of cycles Medium dynamics		1.6
Linear axes in plasma, laser or water jet cutters, portals, tool changers with high dynamics	S5 operation: Medium duty cycle Medium number of cycles High dynamics		1.9
Roller drives in printing presses, star drives in rackers etc.	S1 operation: High duty cycle		2.2
cymex® 5 also allows sizing calculations for other applications / cycles!			

Step 3:

Determine the sizing factor f_a with the operating mode factor K_M $f_a = \underline{\hspace{2cm}}$



Step 4:

Compare the equivalent application torque with the maximum gearbox $T_{2\alpha}$ (see table, Step 5)

$$T_{2eq} = f_a \cdot T_{2b} \leq T_{2\alpha}$$

$$T_{2eq} = \underline{\hspace{2cm}} \cdot \underline{\hspace{2cm}} \leq T_{2\alpha}$$

$$T_{2eq} = \underline{\hspace{2cm}} \text{ [Nm]} \leq \underline{\hspace{2cm}} \text{ [Nm]}$$

We recommend using a vent screw for duty cycles $\geq 60\%$, longer than 20 min (S1 operation) and $n_{1N} \geq 3000$ rpm.

Step 5: Quick selection of the technical data

			V-Drive Advanced				
			040	050	063	080	100
Ratio	i		4 - 400				
Maximum torque ^{a)} (at $n_1 = 500$ rpm)	$T_{2\alpha}$	Nm	74-106	165-204	319-372	578-785	1184-1505
		in.lb	655-938	1460-1805	2823-3292	5115-6947	10478-13319
Max. input speed	n_{1max}	rpm	6000	6000	4500	4000 / 4500 ^{b)}	3500 / 4000 ^{b)}
Max. lateral force	F_{20Max}	N	2400	3800	6000	9000	14000
		lb _f	540	855	1350	2025	3150
Operating noise (with $n_1 = 3000$ rpm no load)	L_{PA}	dB(A)	≤ 54	≤ 62	≤ 64	≤ 66	≤ 70
Max. torsional backlash	j_t	arcmin	≤ 3	≤ 3	≤ 3	≤ 3	≤ 3
Service life (For calculation see "Information")	L_h	h	> 20000	> 20000	> 20000	> 20000	> 20000

^{a)} The maximum torques depend on the ratio.

^{b)} First value for single-stage version, second value for two-stage version.

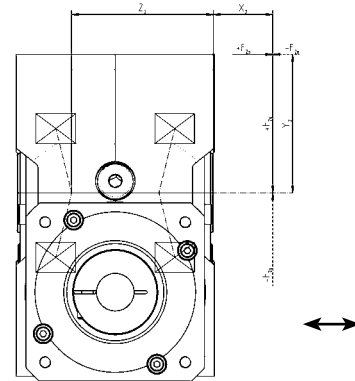
Account must be taken of the lateral and axial forces at the output:

Please also carry out steps 6 and 7 if forces are present at the output (e.g. if timing belt pulleys, pinions or levers are mounted there).

Step 6 (if external forces are present):

Determine the forces acting on the output and check the boundary conditions

Lateral force $F_{2q} = \underline{\hspace{2cm}}$ [N]
 Lateral force distance $x_2 = \underline{\hspace{2cm}}$ [mm]
 Axial force $F_{2a} = \underline{\hspace{2cm}}$ [N]
 Axial force distance $y_2 = \underline{\hspace{2cm}}$ [mm]
 (required if F_{2a} is present)



Conditions if axial force F_{2a} is present:

1. $F_{2a} \leq 0.25 * F_{2q} \Rightarrow (\underline{\hspace{2cm}} \leq 0.25 * \underline{\hspace{2cm}})$ ☐ Met ☐ Not met: Sizing with cymex® 5
2. $y_2 \leq x_2 \Rightarrow (\underline{\hspace{2cm}} \leq \underline{\hspace{2cm}})$ ☐ Met ☐ Not met: Sizing with cymex® 5

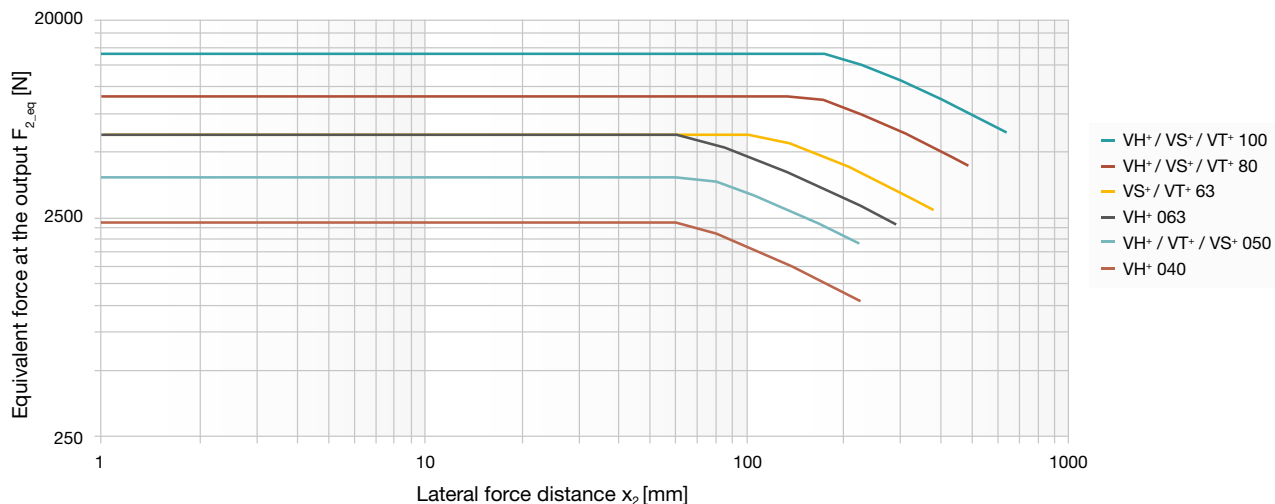
Step 7:

Determine the maximum equivalent force acting on the output F_{2eq}

$$F_{2eq} = F_{2q} + 0.25 * F_{2a} \leq F_{2QMax} \quad (F_{2QMax} \text{ can be determined from the diagram below})$$

$$F_{2eq} = \underline{\hspace{2cm}} + 0.25 * \underline{\hspace{2cm}} \leq \underline{\hspace{2cm}}$$

$$F_{2eq} = \underline{\hspace{2cm}} \text{ [N]} \leq \underline{\hspace{2cm}} \text{ [N]} \quad \text{ ☐ Met ☐ Not met: Sizing with cymex® 5 }$$



Glossary – the alphabet

Adapter plate

WITTENSTEIN alpha uses a system of standardized adapter plates to connect the motor and the gearbox, making it possible to mount a WITTENSTEIN alpha gearbox to any desired motor without difficulty.

Angular minute

A degree is subdivided into 60 angular minutes (= 60 arcmin = 60').

Example:

If the torsional backlash is $j_t = 1$ arcmin, the output can be turned $1/60^\circ$. The repercussions for the application are determined by the arc length:

$$b = 2 \cdot \pi \cdot r \cdot \alpha^\circ / 360^\circ$$

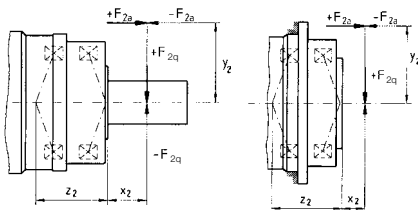
Example:

A pinion with a radius $r = 50$ mm mounted on a gearbox with torsional backlash $j_t = 3$ arcmin can be turned $b = 0.04$ mm.

Axial force ($F_{2A\max}$)

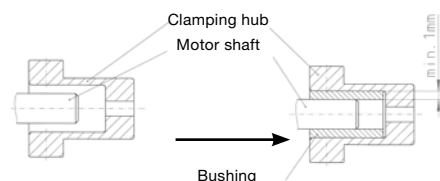
The axial force acting on a gearbox runs parallel to its output shaft or perpendicular to its output shaft. It may be applied with axial offset via a lever arm y_2 under certain circumstances, in which case it also generates a bending moment. If the axial force exceeds the permissible catalog values (max. axial force $F_{2A\max}$), additional design features (e.g. axial bearings) must be implemented to absorb these forces.

Example with output shaft and flange:



Bushing

If the motor shaft diameter is smaller than the → **clamping hub**, a bushing is used to compensate the difference in diameter. The bushing must have a minimum thickness of 1 mm and a motor shaft diameter of 2 mm.



CAD POINT

Performance data, dimension sheets and CAD data for all types of gearbox can be found online in our CAD POINT together with comprehensive documentation of the selection.

(www.wittenstein-cad-point.com)

Clamping hub

The clamping hub ensures a frictional connection between the motor shaft and gearbox. A → **bushing** is used as the connecting element if the motor shaft diameter is smaller than that of the clamping hub. Optionally, a positive connection via a parallel key is also possible.

Continuous operation (S1)

Continuous operation is defined by the → **duty cycle**. If the duty cycle is greater than 60 % and / or longer than 20 minutes, this qualifies as continuous operation. → **Operating modes**

Cyclic operation (S5)

Cyclic operation is defined via the → **duty cycle**. If the duty cycle is less than 60 % and shorter than 20 minutes, it qualifies as cyclic operation (→ **operating modes**).

cymex®

cymex® is the calculation software developed by our company for dimensioning complete drive trains. The software enables the precise simulation of motion and load variables. The software is available for download from our website (www.wittenstein-cymex.com). We can also provide training to enable you to make full use of all the possibilities provided by the software.

Degree of protection (IP)

The various degrees of protection are defined in DIN EN 60529 "Degrees of protection offered by enclosure (IP code)". The IP degree of protection (International Protection) is represented by two digits. The first digit indicates the protection against the ingress of impurities and the second the protection against the ingress of water.

Example:

IP65

Protection against the ingress of dust (dust-proof)

Protection against spray water

Duty cycle (DC)

The cycle determines the duty cycle DC. The times for acceleration (t_b), constant travel if applicable (t_c) and deceleration (t_d) combined yield the duty cycle in minutes. The duty cycle is expressed as a percentage with inclusion of the pause time t_e .

$$DC [\%] = \frac{t_b + t_c + t_d}{t_b + t_c + t_d + t_e} \cdot 100 \frac{\text{Motion duration}}{\text{Cycle duration}}$$

$$DC [\text{min}] = t_b + t_c + t_d$$

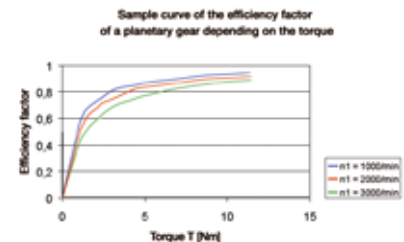
Emergency stop torque ($T_{2\text{Not}}$)

The Emergency stop torque $T_{2\text{Not}}$ is the maximum permissible torque at the gearbox output and must not be reached more than 1000 times during the life of the gearbox. It must never be exceeded!

Efficiency (η)

Efficiency [%] η is the ratio of output power to input power. Power lost through friction reduces efficiency to less than 1 or 100 %.

$$\eta = P_{\text{off}} / P_{\text{on}} = (P_{\text{on}} - P_{\text{loss}}) / P_{\text{on}}$$



WITTENSTEIN alpha always measures the efficiency of a gearbox during operation at full load. If the input power or torque are lower, the efficiency rating is also lower due to the constant no-load torque. Power losses do not increase as a result. A lower efficiency is also expected at high speeds (see illustration).



Ex symbol

Devices bearing the Ex symbol comply with EU Directive 94 / 9 / EC (ATEX) and are approved for use in defined explosion-hazardous zones.

Detailed information on explosion groups and categories, as well as further information on the relevant gearbox are available upon request.

Food-grade lubrication (F)

These products are designed with food-grade lubrication and can therefore be used in the food industry. Note the reduced torques compared to the standard products. (V-Drive excluded). The exact torques can be found in cymex® 5 or CAD POINT.

HIGH SPEED (MC)

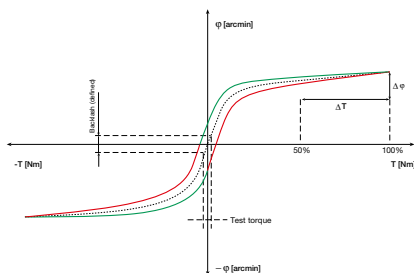
The HIGH SPEED version of our gearbox has been specially developed for applications in continuous operation at high input speeds, e.g. as found in the printing and packaging industries.

HIGH TORQUE (MA)

WITTENSTEIN alpha gearboxes are also available in a HIGH TORQUE version. These gearboxes are particularly suited to applications requiring extremely high torques and maximum stiffness.

Hysteresis curve

The hysteresis is measured to determine the torsional rigidity of a gearbox. The result of this measurement is known as the hysteresis curve.



If the input shaft is locked, the gearbox is continuously loaded and relieved at the output in both directions up to a defined torque. The torsional angle is plotted against the torque. This yields a closed curve from which the → **torsional backlash** and → **torsional rigidity** can be calculated.

Jerk (j)

Jerk is derived from acceleration and is defined as the change in acceleration within a unit of time. The term impact is used if the acceleration curve changes abruptly and the jerk is infinitely large.

Lateral force (F_{2QMax})

The max. lateral force F_{2QMax} [N] is the force component acting at right angles to the output shaft or parallel to the output flange. It acts perpendicular to the → axial force and can assume an axial distance of x_2 in relation to the shaft nut or shaft flange, which acts as a lever arm. The lateral force produces a bending moment (see also → axial force).

Mass inertia ratio ($\lambda = \text{Lambda}$)

The mass inertia ratio λ is the ratio of external inertia (application side) to internal inertia (motor and gearbox side). It is an important parameter determining the controllability of an application. Accurate control of dynamic processes becomes more difficult with differing mass moments of inertia and as λ becomes greater. WITTENSTEIN alpha recommends that a guideline value of $\lambda < 5$ is maintained. A gearbox reduces the external mass moment of inertia by a factor of $1/i^2$.

$$\lambda = \frac{J_{\text{extern}}}{J_{\text{intern}}}$$

J reduced externally at input:

$$J'_{\text{external}} = J_{\text{external}} / i^2$$

Simple applications ≤ 10

Dynamic applications ≤ 5

Highly dynamic applications ≤ 1

Mass moment of inertia (J)

The mass moment of inertia J [kg/cm²] is a measurement of the effort applied by an object to maintain its momentary condition (at rest or moving).

Mesh frequency (f_z)

The mesh frequency may cause problems regarding vibrations in an application, especially if the excitation frequency corresponds to a intrinsic frequency of the application. The mesh frequency can be calculated for planetary gearboxes from WITTENSTEIN alpha (exception: gearboxes with ratio $i = 8$) using the formula $f_z = 1.8 \cdot n_2$ [rpm] and on planetary gearboxes from WITTENSTEIN alpha, is independent of the ratio. If it does indeed become problematic, the intrinsic frequency of the system can be changed or another gearbox (e.g. hypoid gearbox) with a different mesh frequency can be selected.

No-load running torque (T_{012})

The no-load running torque T_{012} is the torque which must be applied to a gearbox in order to overcome the internal friction; it is therefore considered lost torque. The values specified in the catalog are calculated by WITTENSTEIN alpha at a speed of $n_1 = 3000$ rpm and an ambient temperature of 20 °C.

$$T_{012}: \begin{matrix} 0 & 1 \rightarrow 2 \\ \text{without} & \text{from input side towards} \\ \text{load} & \text{output side} \end{matrix}$$

Idling torques decrease during operation.

NSF

Lubricants certified as grade H1 by the NSF (National Sanitation Foundation) can be used in the food sector where occasional unavoidable contact with food cannot be excluded.

Operating modes

(continuous operation **S1** and cyclic operation **S5**)

Gearboxes are selected depending on whether the motion profile is characterized by frequent acceleration and deceleration phases in → **cyclic operation** (S5) as well as pauses, or whether it is designed for → **continuous operation** (S1), i.e. with long phases of constant motion.

Operating noise (L_{PA})

The gear ratio and speed affect the noise level. As a general rule: A higher speed means a higher noise level, while a higher ratio means a lower noise level. The values specified in our catalog are based on a reference ratio and speed. The reference speed is either $n_1 = 3000$ rpm or $n_1 = 2000$ rpm depending on the size of the gearbox. You can find ratio-specific values in cymex® – www.wittenstein-cymex.com.

Output shaft revolution (f_a)

Factor f_a determines the number of life time cycles for the required gearbox service life. It describes the number of revolutions at the output used to assess the torque permitted at the output.

Glossary – the alphabet

Positioning accuracy

The positioning accuracy is determined by the angular deviation from a setpoint and equals the sum of the torsional angles due to load → **(torsional rigidity and torsional backlash)** and kinetics → **(synchronization error) occurring simultaneously in practise**.

Quality control

All Premium and Advanced gearboxes are subject to a final inspection before they leave the WITTENSTEIN alpha factory to ensure that they are all delivered within specification.

Ratio (i)

The gear ratio i indicates the factor by which the gearbox transforms the three relevant parameters of motion (speed, torque and mass moment of inertia). The factor is a result of the geometry of the gearing elements (Example: $i = 10$).

$$\begin{array}{lcl} n_1 = 3000 \text{ min}^{-1} & \xrightarrow{:i} & T_2 = 200 \text{ Nm} \\ T_1 = 20 \text{ Nm} & \xrightarrow{\cdot i} & n_2 = 300 \text{ min}^{-1} \\ J_1 = 0,10 \text{ kgm}^2 & \xleftarrow{} & J_2 = 10 \text{ kgm}^2 \text{ (Application)} \end{array}$$

Safety note

For applications with special safety requirements (e.g. vertical axes, clamped drives), we recommend exclusive use of our Premium and Advanced products (excluding V-Drive).

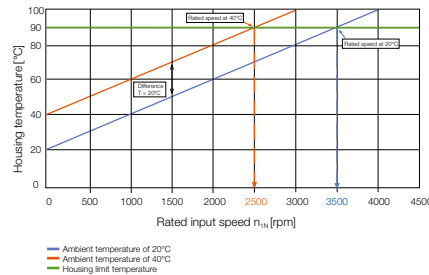
SIZING ASSISTANT

The online SIZING ASSISTANT from WITTENSTEIN alpha allows the efficient selection of a gearbox in seconds. You can use various motor or application entry options to select the right gearbox for your application in seconds (www.sizing-assistant.com).

Speed (n)

Two speeds are of relevance when dimensioning a gearbox: the maximum speed and the thermal speed limit at the input. The maximum permissible speed $n_{1\text{Max}}$ must not be exceeded because it serves as the basis for dimensioning → **cyclic operation**. The nominal speed n_{1N} must not be exceeded in → **continuous operation**. The thermal speed limit n_{1T} at an ambient temperature of 20° C, is determined by the maximum

gearbox temperature of $T = 90^\circ \text{ C}$ at no-load. As can be seen in the diagram below, the temperature limit is reached more quickly in the presence of an elevated outside temperature. In other words: the nominal input speed must be reduced if the ambient temperature is high. The values applicable to your gearbox are available from WITTENSTEIN alpha on request.



Delivery of speedline®

If necessary, you can receive delivery of standard series in 24 or 48 hours ex works. Outstanding flexibility for fast deliveries at short notice

Synchronization

Synchronization refers to the measurable speed variation between the input and output during one revolution of the output shaft. It is caused by manufacturing tolerances and causes minute angular deviations and ratio fluctuations.

Technical data

You can download further technical data relating to the entire product portfolio from our website

Tilting rigidity

The tilting rigidity C_{2K} [Nm/arcmin] of the gearbox consists of the bending stiffness of the output or pinion shaft and the stiffness of the output bearing. It is defined as the quotient of tilting moment M_{2K} [Nm] and tilting angle Φ [arcmin]

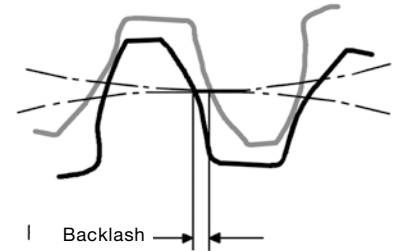
$$(C_{2K} = M_{2K} / \Phi).$$

Tilting torque (M_{2K})

The tilting torque M_{2K} is a result of the → **axial and lateral forces** applied and their respective points of application in relation to the inner radial bearing on the output side.

Torsional backlash (j_t)

Torsional backlash j_t [arcmin] is the maximum angle of torsion of the output shaft in relation to the input. Simply put, the torsional backlash represents the gap between two tooth flanks.



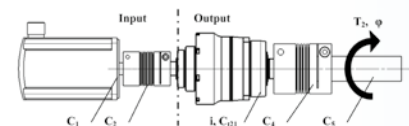
Torsional backlash is measured with the input shaft locked.

The output is then loaded with a defined test torque in order to overcome the internal gearbox friction. The main factor affecting torsional backlash is the face clearance between the gear teeth. The low torsional backlash of WITTENSTEIN alpha gearboxes is due to their high manufacturing accuracy and the specific combination of gear wheels.

Torsional rigidity (C_{t21})

Torsional rigidity [Nm/arcmin] C_{t21} is defined as the quotient of applied torque and resulting torsion angle ($C_{t21} = \Delta T / \Delta \Phi$). It shows the torque required to turn the output shaft by one angular minute. The torsional rigidity can be determined from the → **hysteresis curve**.

Torsional rigidity C , angle of torsion Φ



Reduce all torsional rigidity values at the output:

$$C_{(n),out} = C_{(n),in} \cdot i^2$$

with i = Gearbox ratio [-]

$C_{(n)}$ = Individual rigidity values [Nm/arcmin]

→ Refer to this term for further details.

Note: The torsional rigidity C_{t21} for the gearbox always relates to the output.

Series connection of torsional rigidity values

$$1/C_{\text{tot}} = 1/C_{1,\text{out}} + 1/C_{2,\text{out}} + \dots + 1/C_{(n)}$$

Angle of torsion Φ [arcmin]

$$\Phi = T_2 \cdot 1/C_{\text{tot}}$$

with T_2 = output torque [Nm]

Torque (M)

The torque is the actual driving force of a rotary motion. The force and lever arm combine to produce the torque that acts around the axis of rotation. $M = F \cdot l$

Torque ($T_{2\alpha}$)

$T_{2\alpha}$ represents the maximum torque transmitted by the gearbox. This value may decrease depending on the application-specific conditions and the precise evaluation of the movement profile.



Glossary – Formulae

Formulae

Torque [Nm]	$T = J \cdot \alpha$	J = Mass moment of inertia [kgm ²] α = Angular acceleration [1/s ²]
Torque [Nm]	$T = F \cdot l$	F = Force [N] l = Lever, length [m]
Acceleration force [N]	$F_b = m \cdot a$	m = Mass [kg] a = Linear acceleration [m/s ²]
Frictional force [N]	$F_{\text{Reib}} = m \cdot g \cdot \mu$	g = Acceleration due to gravity 9.81 m/s ² μ = Coefficient of friction
Angular speed [1/s]	$\omega = 2 \cdot \pi \cdot n / 60$	n = Speed [rpm] π = PI = 3.14...
Linear speed [m/s]	$v = \omega \cdot r$	v = Linear speed [m/s] r = Radius [m]
Linear speed [m/s] (spindle)	$v_{\text{sp}} = \omega \cdot h / (2 \cdot \pi)$	h = Screw pitch [m]
Linear acceleration [m/s²]	$a = v / t_b$	t_b = Acceleration time [s]
Angular acceleration [1/s²]	$\alpha = \omega / t_b$	
Pinion path [mm]	$s = m_n \cdot z \cdot \pi / \cos \beta$	m_n = Normal module [mm] z = Number of teeth [-] β = Helix angle [°]

Conversion table

1 mm	= 0.039 in
1 Nm	= 8.85 in.lb
1 kgcm²	= 8.85 x 10 ⁻⁴ in.lb.s ²
1 N	= 0.225 lb _f
1 kg	= 2.21 lb _m

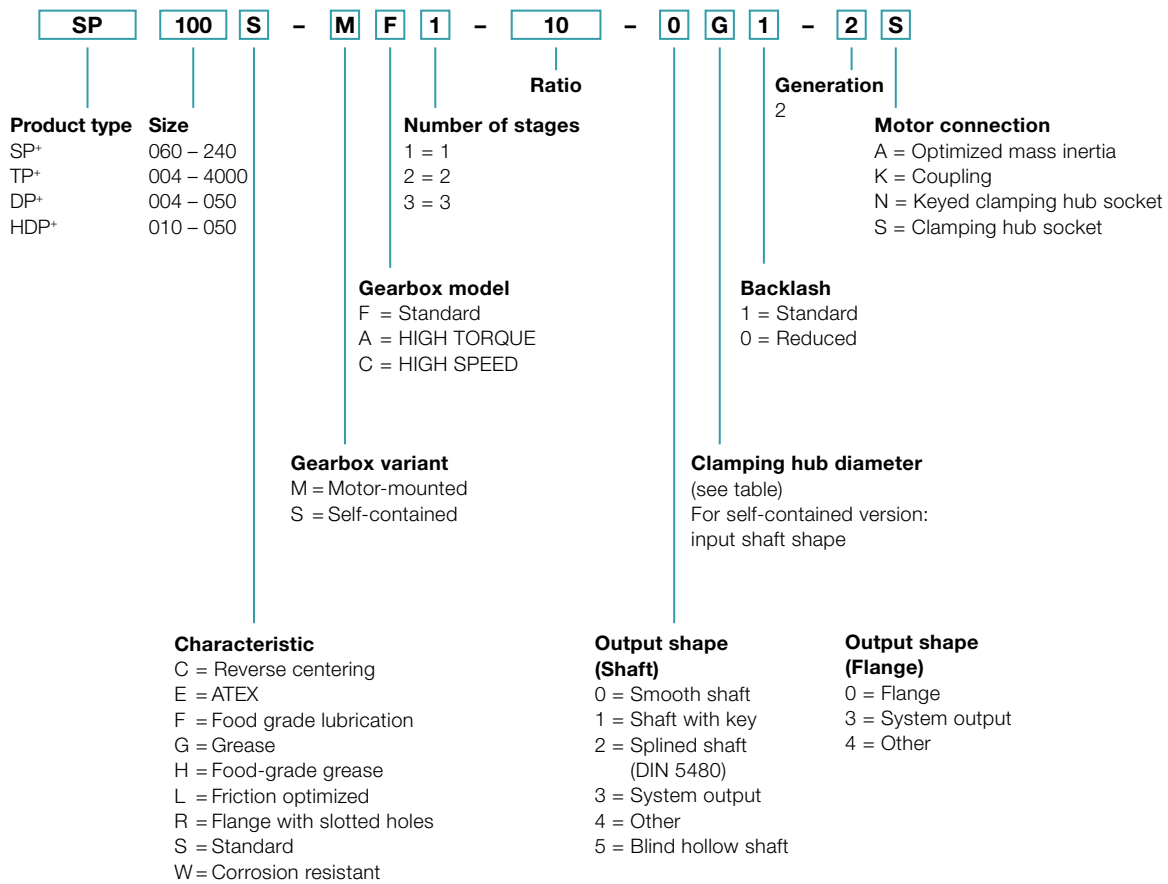
Symbol

Symbol	Unit	Designation
C	Nm/arcmin	Stiffness
ED	%, min	Duty cycle
F	N	Force
f_s	–	Load factor
f_e	–	Factor for duty cycle
i	–	Ratio
j	arcmin	Backlash
J	kgm ²	Mass moment of inertia
$K1$	Nm	Factor for bearing calculation
L	h	Service life
L_{PA}	dB(A)	Operating noise
m	kg	Mass
M	Nm	Torque
n	rpm	Speed
p	–	Exponent for bearing calculation
η	%	Efficiency
t	s	Time
T	Nm	Torque
v	m/min	Linear speed
z	1/h	Number of cycles

Index

Index	Designation
Capital letter	Permissible values
Small letter	Actual values
1	Input
2	Output
A/a	Axial
B/b	Acceleration
c	Constant
d	Deceleration
e	Pause
h	Hours
K/k	Tilting
m	Mean
Max/max	Maximum
Mot	Motor
N	Nominal
Not/not	Emergency stop
0	No load
Q/q	Lateral
t	Torsional
T	Tangential

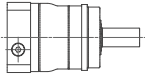
Ordering code – Planetary gearbox



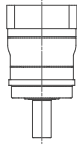
Mounting positions and clamping hub diameters

Clamping hub diameter
(see technical data sheet for possible diameters)

B5
Horizontal



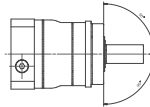
V1
Output vertical
downwards



V3
Output vertical
upwards



S
Can be tilted $\pm 90^\circ$
from a horizontal
position



Code letter	mm	Code letter	mm
B	11	I	32
C	14	K	38
E	19	M	48
G	24	N	55
H	28	O	60

Intermediate sizes possible using bushings with a minimum thickness of 1 mm.

For information purposes only – not required when placing orders!

Exceptions:

- The mounting position of TP+ 2000 / 4000 must be specified.
- DP+ / HDP+ products are designed for mounting position B5 as standard!

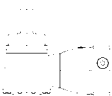
If the mounting position is different, contact WITTENSTEIN alpha without fail.

Ordering code – Hypoid- / Bevel gearboxes

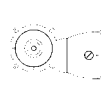
[illegible]

Mounting positions

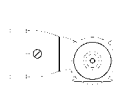
B5/V3
Output horizontal/
motor shaft vertical upwards



B5/V1
Output horizontal/
motor shaft vertical down-
wards



V1 / B5
Output vertical downwards /
motor shaft horizontal



V3 / B5
Output vertical upwards /
motor shaft horizontal

B5 / B5
Output horizontal /
motor shaft horizontal

Please note the orientation when placing your order.

Exceptions:

- Exceptions:**
- The mounting position of TPK+ 2000 / 4000 must be specified.
 - If the mounting position is different, contact WITTENSTEIN alpha without fail.

Characteristic: Modular output combination (B)

HG ⁺ / SK ⁺ / SPK ⁺ / TK ⁺ / TPK ⁺									
SK ⁺	100	B	-	M	F	1	-	10	- G E 1 / motor
		Characteristic: B = Modular output combination S = Standard					Output shape		

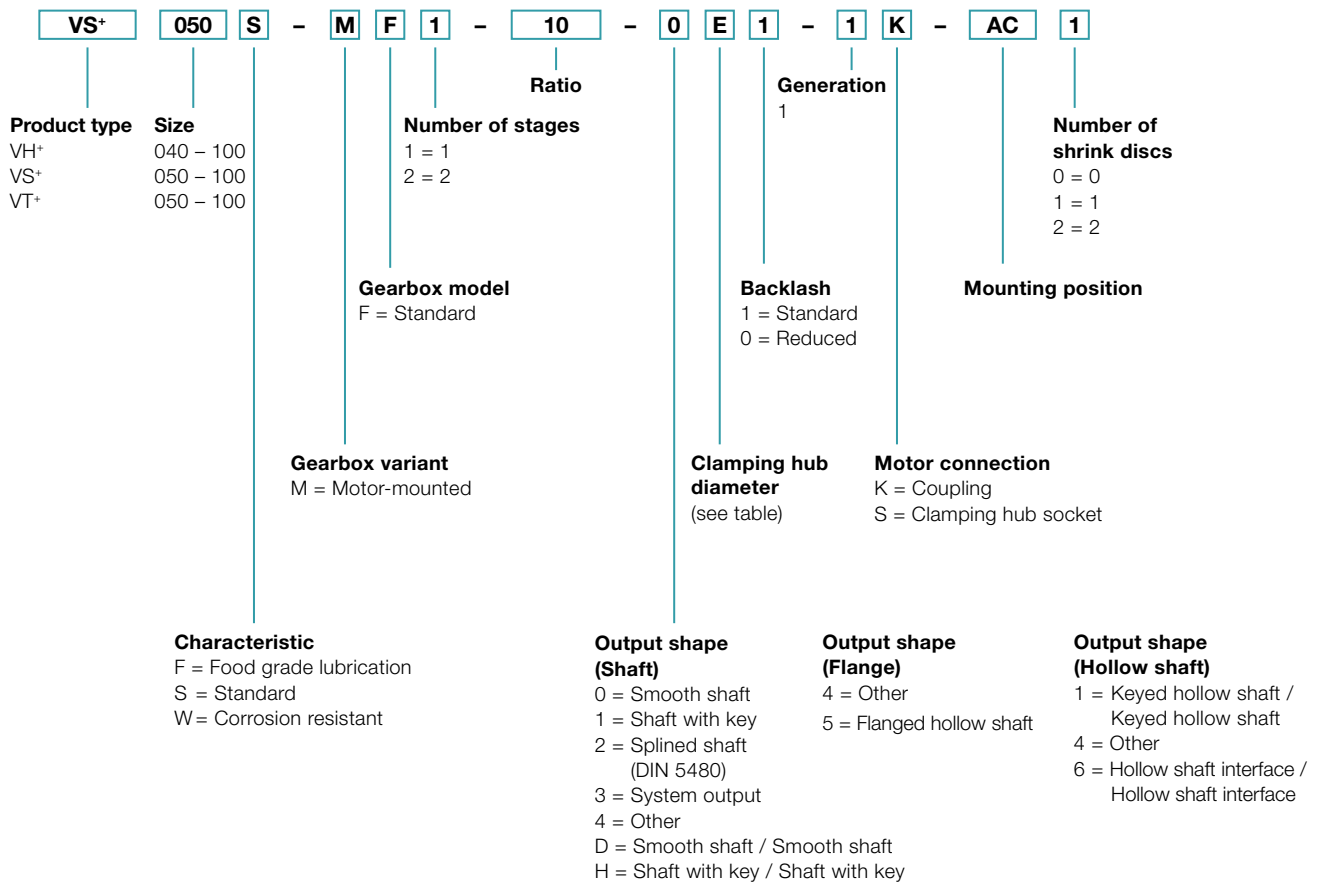
When selecting an output combination from the modular system, please select the letter „B“ as the characteristic in the ordering code. The digit for the required output shape is the modular matrix system.

Example: If you opt for an SK+ with a smooth shaft and require an additional output in the form of a shaft with key, then select the letter „G“ and enter in the order key under „Output shape“.

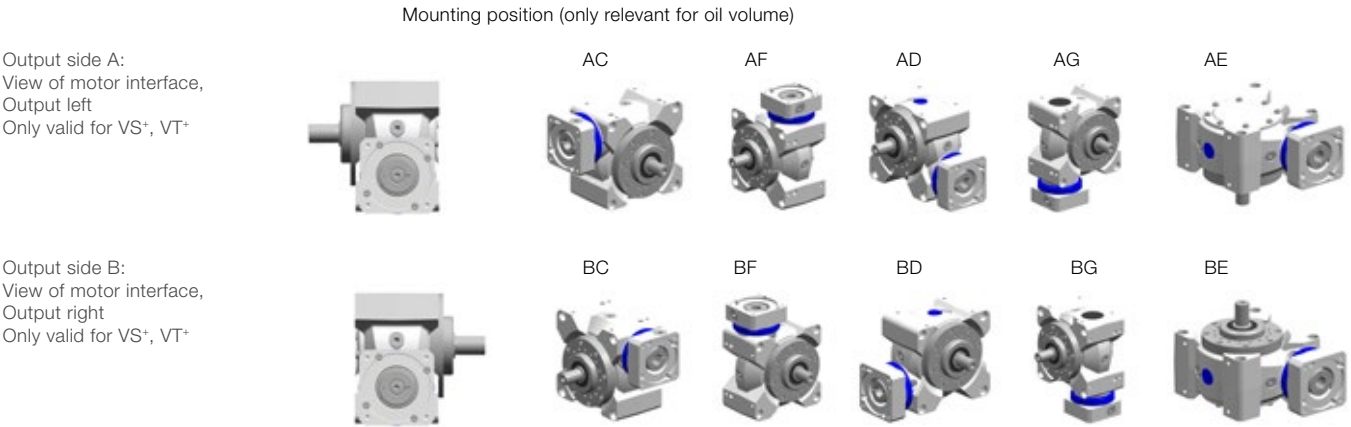
Output shape		Backward					
		Smooth shaft	Shaft with key	Hollow shaft interface	Hollow shaft	Cover	
SK ⁺ / SPK ⁺	Smooth shaft	D	G	A	-	0*	
	Shaft with key	E	H	B	-	1*	
	Splined shaft (DIN 5480)	F	I	C	-	2*	
SPK ⁺	Blind hollow shaft	O	P	N	-	5*	
TK ⁺	Flanged hollow shaft	D	G	6	5*	0	
TPK ⁺	Flange	D	G	6	-	0*	
HG ⁺	Hollow shaft	D	G	6*	5*	0	

* Standard version: please specify characteristic „S“ in the order code

Ordering code – Worm gearboxes



Mounting positions and clamping hub diameters



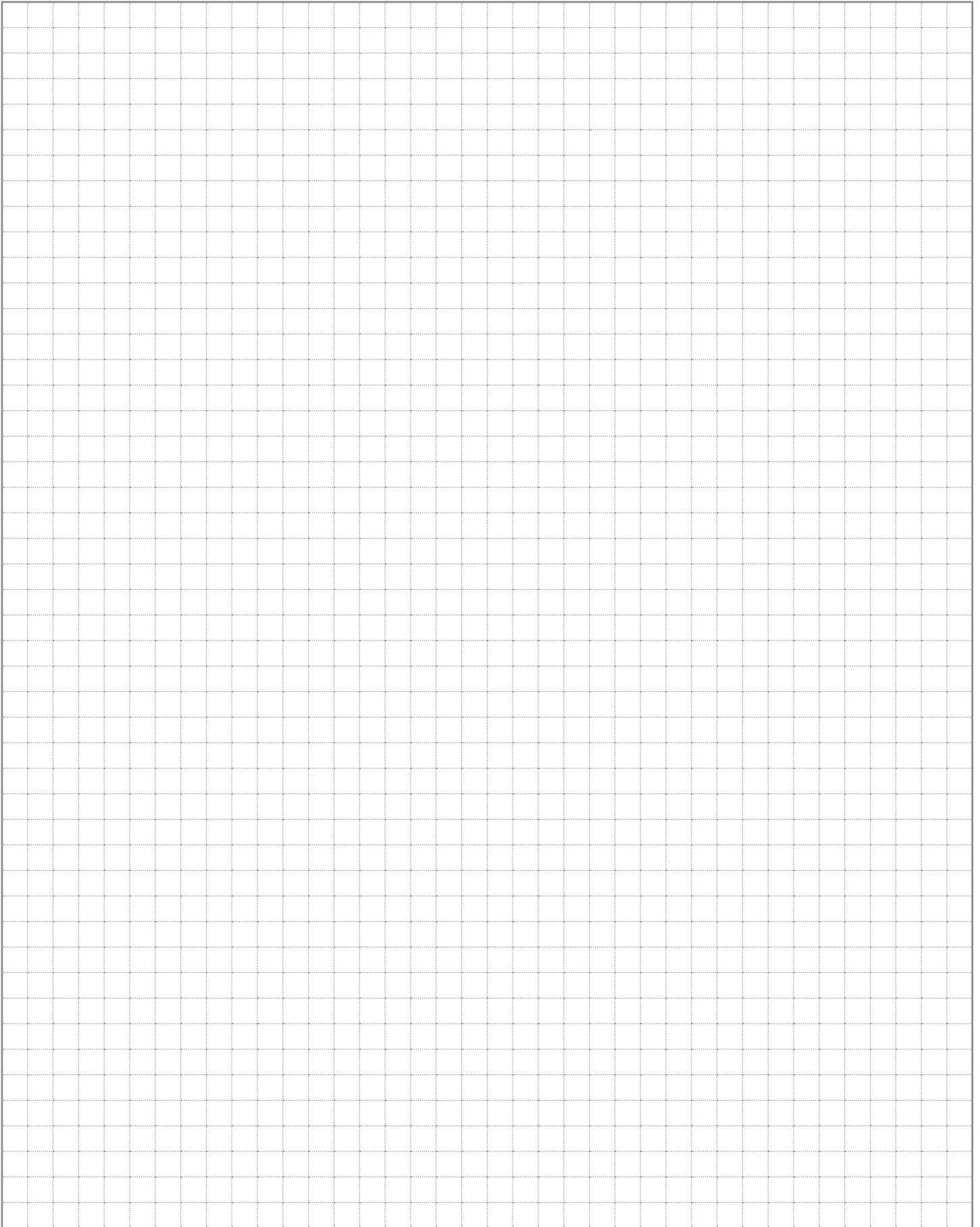
For VH* and VS* with dual-shaft output or hollow shaft, A and B in the mounting position must be replaced with 0 (zero).

Clamping hub diameter

(see technical data sheet for possible diameters)

Code letter	mm	Code letter	mm
B	11	I	32
C	14	K	38
E	19	M	48
G	24	N	55
H	28	O	60

Intermediate diameters possible in combination with a bushing with a minimum thickness of 1 mm.





alpha

WITTENSTEIN alpha GmbH
Walter-Wittenstein-Straße 1
97999 Igersheim
Germany

Tel. +49 7931 493-0
24h-Service-Hotline: Tel. +49 7931 493-12900
speedline®: Tel. +49 7931 493-10444
info@wittenstein-alpha.com

Subject to technical changes. alpha Advanced Line

WITTENSTEIN alpha – **Intelligent** drive systems

www.wittenstein-alpha.com

The entire world of drive technology – Catalogs available on request or online at
www.wittenstein-alpha.com/catalogs



alpha Advanced Line. Maximum power density and outstanding positioning accuracy for complex applications.



alpha Basic / Value Line. Reliable, flexible and economical solutions for a wide range of applications.



alpha Linear Systems. Precise, dynamic system solutions for every requirement.



alpha Mechatronic Systems. Energy-efficient, versatile and flexible mechatronic drive systems.