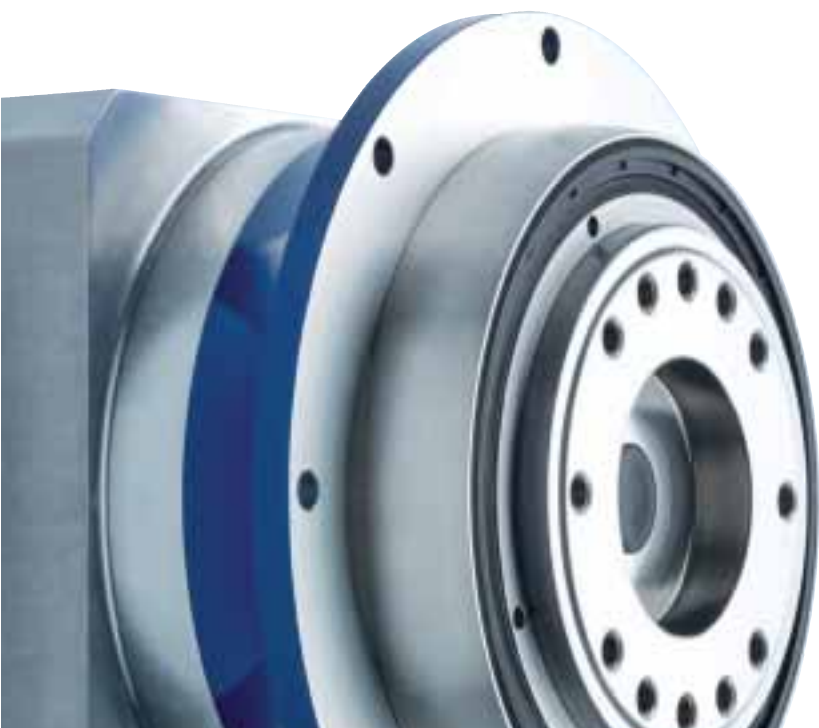


TP+ – The new generation

Top performer among compact planetary gearheads with drive flange



MF version

Designed for:

- Highly dynamic applications
- Greater positioning accuracy
- Space-saving designs

MA version (HIGH TORQUE)

Designed for:

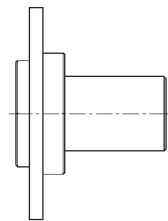
- Maximum power density
- Maximum positioning accuracy
- High torsional rigidity
- Demanding safety requirements

TP+

Specifications \ Version	TP+ MF/MA		
	+	++	+++
Positioning accuracy		MF	MA
Rigidity		MF	MA
Smooth-running		MF/MA	
Speed capacity		MF/MA	
Power density		MF	MA
Max. axial/radial forces		MF/MA	



With sensors



Shaft output




Coupling: BCT



Rack / Pinion

See our website and our separate flyer for more information about our washdown solutions

Options

With sensors (see page 322)
Washdown version
Food-grade grease 

Accessories

Rack / Pinion (see page 294)
Coupling: BCT (see page 326)
Shaft output



Also available as a motor/gearhead unit

TP+ 004 MF 1-stage

				1-stage				
Ratio ^{a)}	<i>i</i>		4	5	7	10		
cymex®-optimized acceleration torque (please contact us regarding the design)	T_{2Bcym}	Nm	60	62	60	–		
		in.lb	531	549	531	–		
Max. acceleration torque (max. 1000 cycles per hour)	T_{2B}	Nm	55	55	55	35		
		in.lb	487	487	487	310		
Nominal output torque (with n_n)	T_{2N}	Nm	28	28	28	18		
		in.lb	248	248	248	159		
Emergency stop torque (permitted 1000 times during the service life of the gearhead)	T_{2Not}	Nm	100	100	100	100		
		in.lb	885	885	885	885		
Nominal input speed (with T_{2N} and 20 °C ambient temperature ^{b)})	n_{1N}	rpm	3300	3300	4000	4000		
Max. input speed	n_{1Max}	rpm	6000	6000	6000	6000		
Mean no load running torque (with $n_1=3000$ rpm and 20 °C gearhead temperature ^{c)})	T_{012}	Nm	0.95	0.80	0.60	0.45		
		in.lb	8.41	7.08	5.31	3.98		
Max. torsional backlash	j_t	arcmin	Standard ≤ 4 / Reduced ≤ 2					
Torsional rigidity ^{c)}	C_{I21}	Nm/ arcmin	12	12	11	8		
		in.lb/ arcmin	106	106	97	71		
Tilting rigidity	C_{2K}	Nm/ arcmin	–					
		in.lb/ arcmin	–					
Max. axial force ^{d)}	F_{2AMax}	N	1630					
		lb _f	367					
Max. tilting moment	M_{2KMMax}	Nm	110					
		in.lb	974					
Efficiency at full load	η	%	97					
Service life (For calculation, see the Chapter "Information")	L_h	h	> 20000					
Weight incl. standard adapter plate	m	kg	1.4					
		lb _m	3.1					
Operating noise (with $i=10$ and $n_1=3000$ rpm no load)	L_{PA}	dB(A)	≤ 58					
Max. permitted housing temperature			°C					
			F					
Ambient temperature			°C					
			F					
Lubrication			Lubricated for life					
Paint			Blue RAL 5002					
Direction of rotation			Motor and gearhead same direction					
Protection class			IP 65					
Moment of inertia (relates to the drive)	B	11	J_1	kgcm ²	0.17	0.14	0.11	0.09
				10 ⁻³ in.lb.s ²	0.15	0.12	0.10	0.08
Clamping hub diameter [mm]	C	14	J_1	kgcm ²	0.25	0.21	0.18	0.17
				10 ⁻³ in.lb.s ²	0.22	0.19	0.16	0.15
	E	19	J_1	kgcm ²	0.57	0.54	0.51	0.49
				10 ⁻³ in.lb.s ²	0.50	0.47	0.45	0.43

Reduced mass moments of inertia available on request.

^{a)} Other ratios available on request

^{b)} For higher ambient temperatures, please reduce input speed

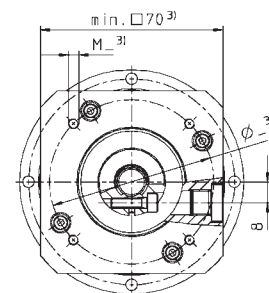
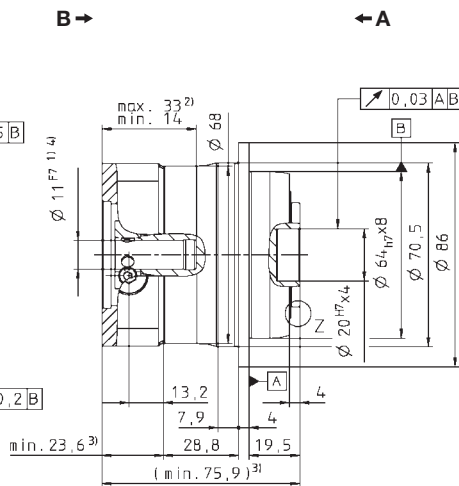
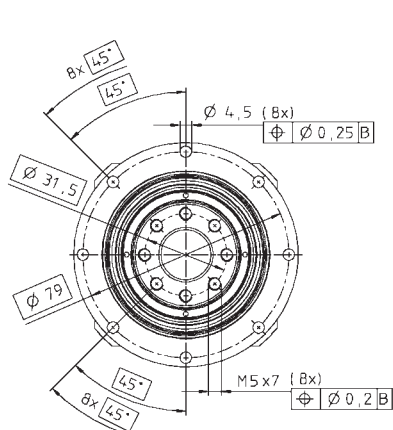
^{c)} Valid for clamping hub diameter of 14 mm

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

View A

View B

up to 11⁴⁾(B)
clamping hub
diameter

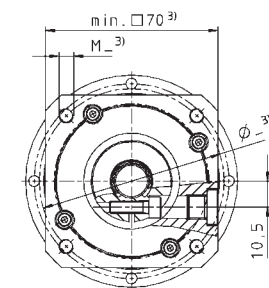
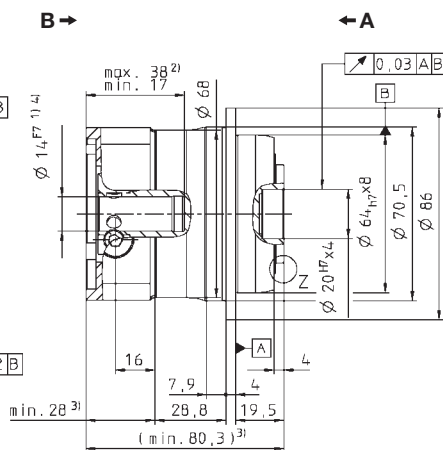
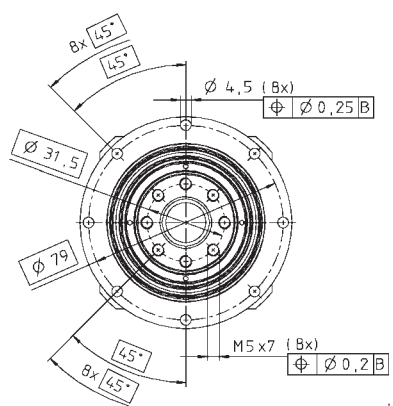


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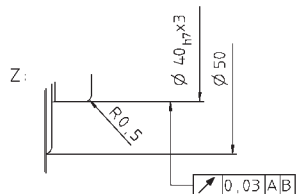
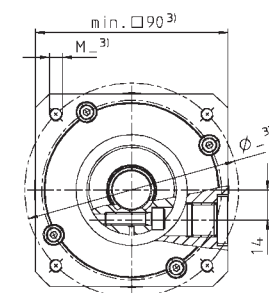
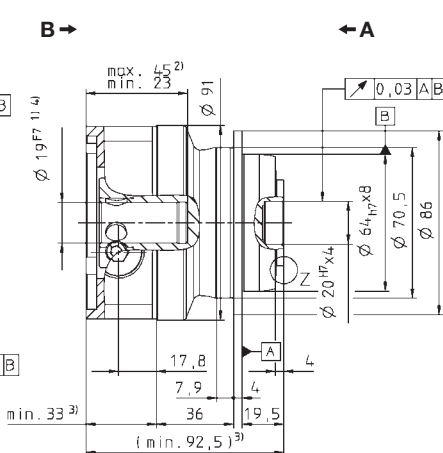
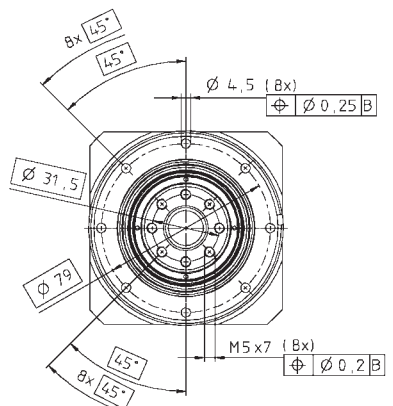


Motor shaft diameter [mm]

up to 14⁴⁾(C)
clamping hub
diameter



up to 19⁴⁾(E)
clamping hub
diameter



Non-tolerated dimensions ± 1 mm

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

Motor mounting according to operating manual

TP+ 004 MF 2-stage

			2-stage														
Ratio ^{a)}	<i>i</i>		16	20	21	25	28	31	35	40	50	61	70	91	100		
cymex [®] -optimized acceleration torque (please contact us regarding the design)	T_{2Bcym}	Nm	60	60	–	62	60	–	62	62	62	–	60	–	–		
		in.lb	531	531	–	549	531	–	549	549	549	–	531	–	–		
Max. acceleration torque (max. 1000 cycles per hour)	T_{2B}	Nm	55	55	40	55	55	40	55	55	55	45	55	32	35		
		in.lb	487	487	354	487	487	354	487	487	487	398	487	283	310		
Nominal output torque (with n_n)	T_{2N}	Nm	40	40	30	40	40	30	40	40	40	30	40	15	18		
		in.lb	354	354	266	354	354	266	354	354	354	266	354	133	159		
Emergency stop torque (permitted 1000 times during the service life of the gearhead)	T_{2Not}	Nm	100	100	100	100	100	100	100	100	100	100	100	100	100		
		in.lb	885	885	885	885	885	885	885	885	885	885	885	885	885		
Nominal input speed (with T_{2N} and 20 °C ambient temperature ^{b)})	n_{1N}	rpm	4000	4000	4000	4000	4000	4000	4000	4000	4800	5500	5500	5500	5500		
Max. input speed	n_{1Max}	rpm	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000		
Mean no load running torque (with $n_n=3000$ rpm and 20 °C gearhead temperature ^{c)})	T_{012}	Nm	0.55	0.45	0.45	0.45	0.35	0.35	0.30	0.25	0.25	0.20	0.20	0.20	0.20		
		in.lb	4.87	3.98	3.98	3.98	3.10	3.10	2.66	2.21	2.21	1.77	1.77	1.77	1.77		
Max. torsional backlash	j_t	arcmin	Standard ≤ 4 / Reduced ≤ 2														
Torsional rigidity ^{c)}	C_{t21}	Nm/arcmin	12	12	10	12	12	9	12	11	12	9	11	7	8		
		in.lb/arcmin	106	106	89	106	106	80	106	97	106	80	97	62	71		
Tilting rigidity	C_{2K}	Nm/arcmin	–														
		in.lb/arcmin	–														
Max. axial force ^{d)}	F_{2AMax}	N	1630														
		lb _f	367														
Max. tilting moment	M_{2KMMax}	Nm	110														
		in.lb	974														
Efficiency at full load	η	%	94														
Service life (For calculation, see the Chapter "Information")	L_h	h	> 20000														
Weight incl. standard adapter plate	m	kg	1.5														
		lb _m	3.3														
Operating noise (with $i=100$ and $n_n=3000$ rpm no load)	L_{PA}	dB(A)	≤ 58														
Max. permitted housing temperature		°C	+90														
		F	194														
Ambient temperature		°C	-15 to +40														
		F	5 to 104														
Lubrication			Lubricated for life														
Paint			Blue RAL 5002														
Direction of rotation			Motor and gearhead same direction														
Protection class			IP 65														
Moment of inertia (relates to the drive)	B	11	J_1	kgcm ²	0.078	0.070	0.074	0.068	0.062	0.072	0.061	0.051	0.057	0.058	0.056	0.057	0.056
				10 ⁻³ in.lb.s ²	0.069	0.062	0.066	0.060	0.054	0.064	0.054	0.051	0.050	0.051	0.050	0.051	0.050
Clamping hub diameter [mm]	C	14	J_1	kgcm ²	0.17	0.17	0.17	0.16	0.16	0.17	0.16	0.15	0.15	0.15	0.15	0.15	0.15
				10 ⁻³ in.lb.s ²	0.15	0.15	0.15	0.14	0.14	0.15	0.14	0.14	0.13	0.13	0.13	0.13	0.13

Reduced mass moments of inertia available on request.

^{a)} Other ratios available on request

^{b)} For higher ambient temperatures, please reduce input speed

^{c)} Valid for clamping hub diameter of 11 mm

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

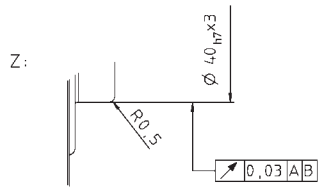
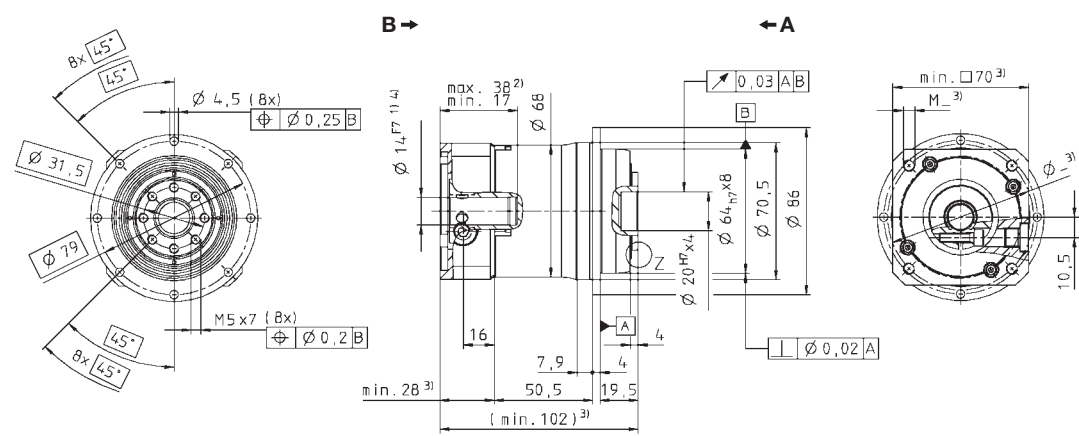
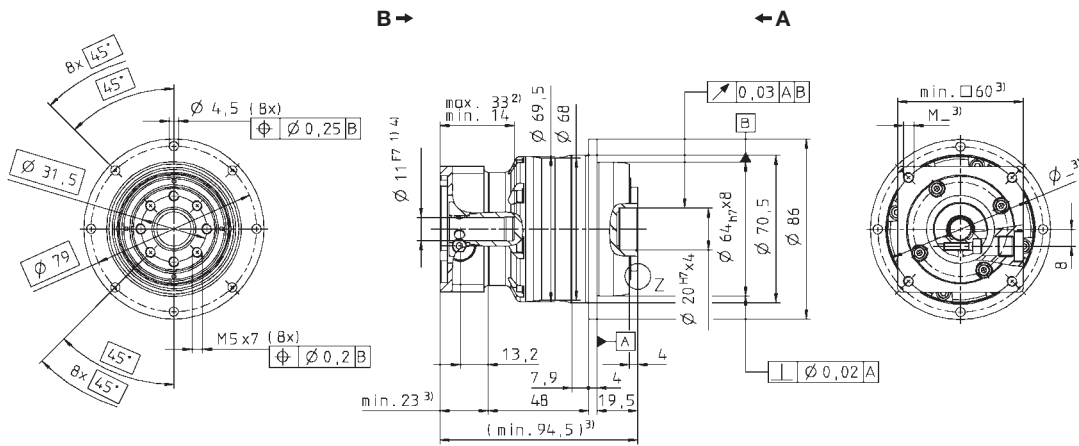
View A

View B

Motor shaft diameter [mm]

up to 11⁴⁾(B)
clamping hub
diameter

up to 14⁴⁾(C)
clamping hub
diameter



Non-tolerated dimensions ±1 mm

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

Motor mounting according to operating manual



TP+ 010 MF 1-stage

				1-stage				
Ratio ^{a)}	<i>i</i>		4	5	7	10		
cymex®-optimized acceleration torque (please contact us regarding the design)	T_{2Bcym}	Nm	150	162	162	-		
		in.lb	1328	1434	1434	-		
Max. acceleration torque (max. 1000 cycles per hour)	T_{2B}	Nm	143	143	143	105		
		in.lb	1266	1266	1266	929		
Nominal output torque (with n_{2N})	T_{2N}	Nm	75	75	75	60		
		in.lb	664	664	664	531		
Emergency stop torque (permitted 1000 times during the service life of the gearhead)	T_{2Not}	Nm	250	250	250	250		
		in.lb	2213	2213	2213	2213		
Nominal input speed (with T_{2N} and 20 °C ambient temperature ^{b)})	n_{1N}	rpm	2600	2900	3100	3100		
Max. input speed	n_{1Max}	rpm	6000	6000	6000	6000		
Mean no load running torque (with $n_1=3000$ rpm and 20 °C gearhead temperature ^{c)})	T_{012}	Nm	1.6	1.3	1.0	0.7		
		in.lb	14.2	11.5	8.85	6.20		
Max. torsional backlash	j_t	arcmin	Standard ≤ 3 / Reduced ≤ 1					
Torsional rigidity ^{c)}	C_{I21}	Nm/ arcmin	32	33	30	23		
		in.lb/ arcmin	283	292	266	204		
Tilting rigidity	C_{2K}	Nm/ arcmin	225					
		in.lb/ arcmin	1991					
Max. axial force ^{d)}	F_{2AMax}	N	2150					
		lb _f	484					
Max. tilting moment	M_{2KMMax}	Nm	270					
		in.lb	2390					
Efficiency at full load	η	%	97					
Service life (For calculation, see the Chapter "Information")	L_h	h	> 20000					
Weight incl. standard adapter plate	m	kg	3.8					
		lb _m	8.4					
Operating noise (with $i=10$ and $n_1=3000$ rpm no load)	L_{PA}	dB(A)	≤ 59					
Max. permitted housing temperature			°C					
			°F					
Ambient temperature			°C					
			°F					
Lubrication			Lubricated for life					
Paint			Blue RAL 5002					
Direction of rotation			Motor and gearhead same direction					
Protection class			IP 65					
Moment of inertia (relates to the drive)	C	14	J_1	kgcm ²	0.78	0.62	0.48	0.40
				10 ⁻³ in.lb.s ²	0.69	0.55	0.42	0.35
Clamping hub diameter [mm]	E	19	J_1	kgcm ²	0.95	0.79	0.64	0.57
				10 ⁻³ in.lb.s ²	0.84	0.70	0.57	0.50
	G	24	J_1	kgcm ²	2.32	2.16	2.02	1.94
				10 ⁻³ in.lb.s ²	2.05	1.91	1.78	1.72

Reduced mass moments of inertia available on request.

^{a)} Other ratios available on request

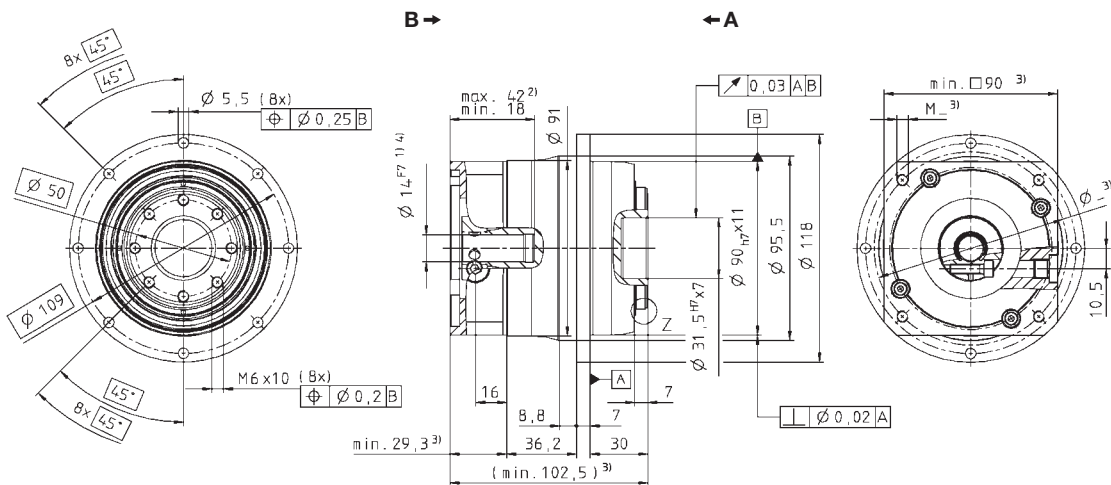
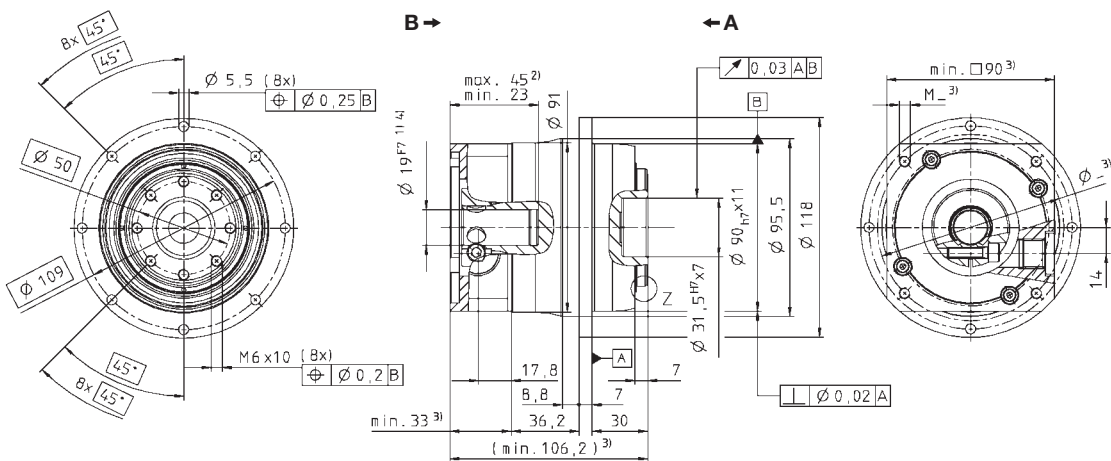
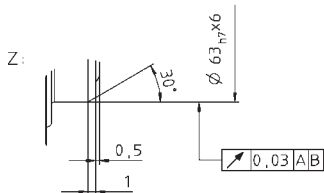
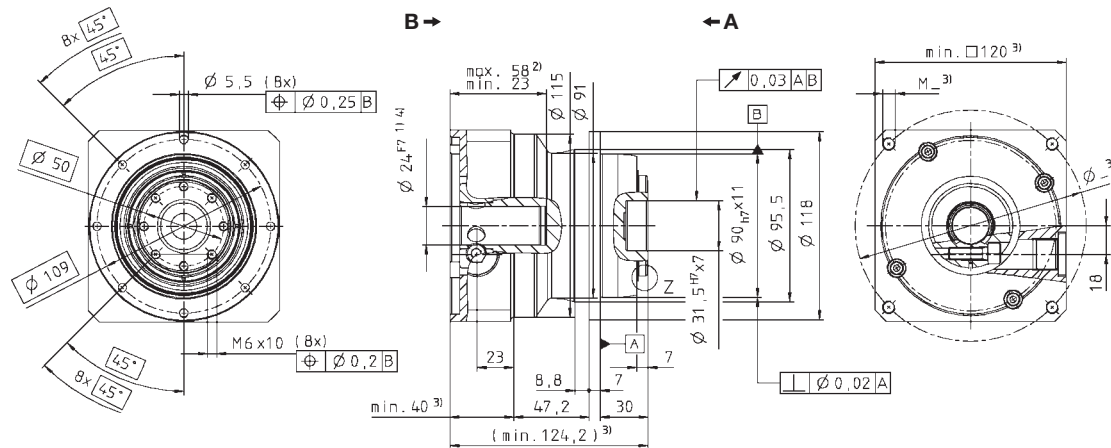
^{b)} For higher ambient temperatures, please reduce input speed

^{c)} Valid for clamping hub diameter of 19 mm

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

View A

View B

 up to 14⁴⁾(C)
clamping hub
diameter

 up to 19⁴⁾(E)
clamping hub
diameter

 up to 24⁴⁾(G)
clamping hub
diameter

 Non-tolerated dimensions ± 1 mm

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

Motor mounting according to operating manual

TP



TP+ 010 MF 2-stage

		2-stage															
Ratio ^{a)}	<i>i</i>		16	20	21	25	28	31	35	40	50	61	70	91	100		
cymex®-optimized acceleration torque (please contact us regarding the design)	T_{2Bcym}	Nm	162	162	–	162	162	–	162	–	162	–	162	–	–		
		in.lb	1434	1434	–	1434	1434	–	1434	–	1434	–	1434	–	–		
Max. acceleration torque (max. 1000 cycles per hour)	T_{2B}	Nm	143	143	100	143	143	110	143	140	143	110	143	80	105		
		in.lb	1266	1266	885	1266	1266	974	1266	1239	1266	974	1266	708	929		
Nominal output torque (with n_n)	T_{2N}	Nm	90	90	80	90	90	70	90	80	90	70	90	35	60		
		in.lb	797	797	708	797	797	620	797	708	797	620	797	310	531		
Emergency stop torque (permitted 1000 times during the service life of the gearhead)	T_{2Not}	Nm	250	250	250	250	250	250	250	250	250	250	250	250	250		
		in.lb	2213	2213	2213	2213	2213	2213	2213	2213	2213	2213	2213	2213	2213		
Nominal input speed (with T_{2N} and 20 °C ambient temperature ^{b)})	n_{1N}	rpm	3500	3500	3500	3500	3500	3500	3500	3500	3800	4500	4500	4500	4500		
Max. input speed	n_{1Max}	rpm	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000		
Mean no load running torque (with $n_i=3000$ rpm and 20 °C gearhead temperature ^{c)})	T_{012}	Nm	0.90	0.75	0.70	0.65	0.55	0.50	0.50	0.40	0.35	0.35	0.35	0.30	0.30		
		in.lb	7.97	6.64	6.20	5.75	4.87	4.43	4.43	3.54	3.10	3.10	3.10	2.66	2.66		
Max. torsional backlash	j_t	arcmin	Standard ≤ 3 / Reduced ≤ 1														
Torsional rigidity ^{c)}	C_{t21}	Nm/arcmin	32	32	26	32	31	24	32	30	30	24	28	21	22		
		in.lb/arcmin	283	283	230	283	274	212	283	266	266	212	248	186	195		
Tilting rigidity	C_{2K}	Nm/arcmin	225														
		in.lb/arcmin	1991														
Max. axial force ^{d)}	F_{2AMax}	N	2150														
		lb _f	484														
Max. tilting moment	M_{2KMax}	Nm	270														
		in.lb	2390														
Efficiency at full load	η	%	94														
Service life (For calculation, see the Chapter "Information")	L_h	h	> 20000														
Weight incl. standard adapter plate	m	kg	3.6														
		lb _m	8.0														
Operating noise (with $i=100$ and $n_i=3000$ rpm no load)	L_{PA}	dB(A)	≤ 59														
Max. permitted housing temperature		°C	+90														
		F	194														
Ambient temperature		°C	-15 to +40														
		F	5 to 104														
Lubrication			Lubricated for life														
Paint			Blue RAL 5002														
Direction of rotation			Motor and gearhead same direction														
Protection class			IP 65														
Moment of inertia (relates to the drive)	B	11	J_1	kgcm ²	0.17	0.14	0.15	0.13	0.11	0.13	0.10	0.09	0.09	0.09	0.09	0.09	
				10 ³ in.lb.s ²	0.15	0.12	0.13	0.12	0.10	0.12	0.09	0.08	0.08	0.08	0.08	0.08	0.08
Clamping hub diameter [mm]	C	14	J_1	kgcm ²	0.24	0.21	0.22	0.20	0.18	0.21	0.18	0.17	0.17	0.17	0.16	0.16	0.16
				10 ³ in.lb.s ²	0.21	0.19	0.19	0.19	0.16	0.18	0.16	0.15	0.15	0.15	0.15	0.14	0.15
	E	19	J_1	kgcm ²	0.56	0.53	0.55	0.53	0.51	0.53	0.50	0.49	0.49	0.49	0.49	0.49	
				10 ³ in.lb.s ²	0.50	0.47	0.49	0.47	0.45	0.47	0.44	0.43	0.43	0.43	0.43	0.43	0.43

Reduced mass moments of inertia available on request.

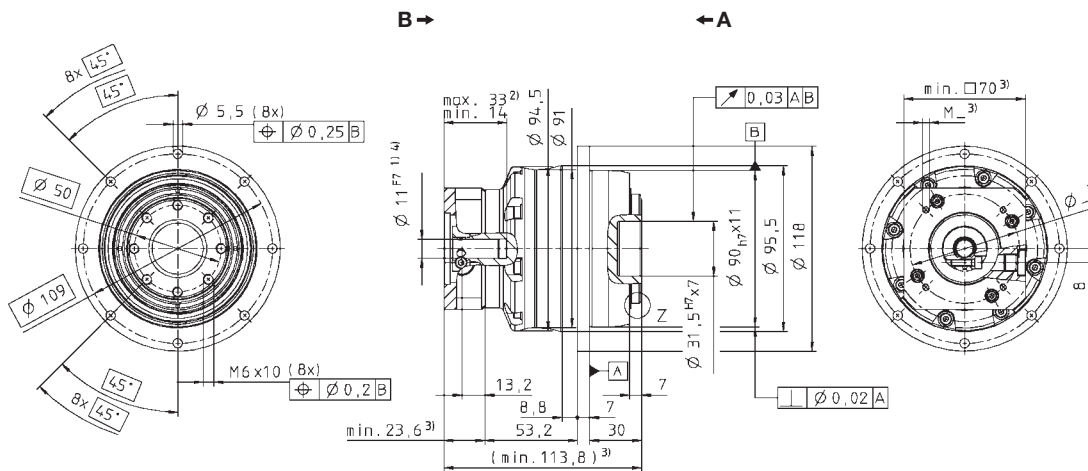
^{a)} Other ratios available on request

^{b)} For higher ambient temperatures, please reduce input speed

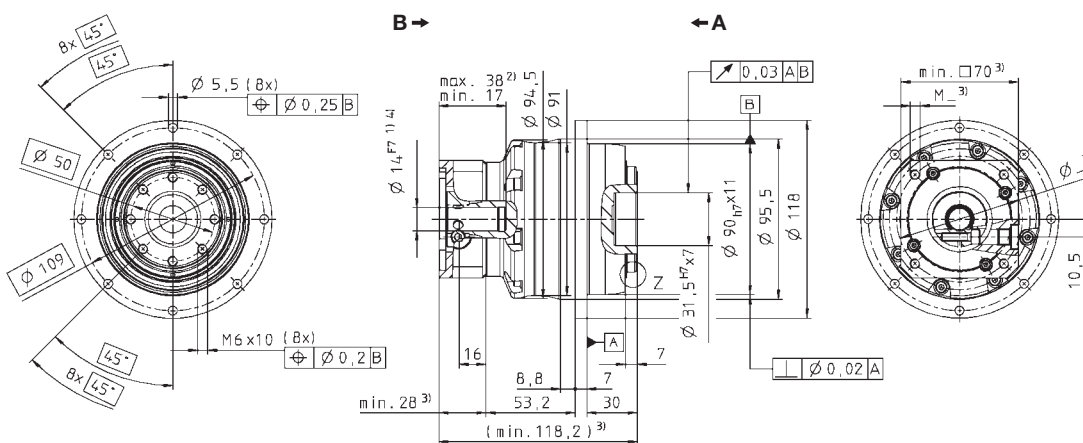
^{c)} Valid for clamping hub diameter of 14 mm

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

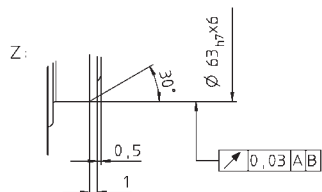
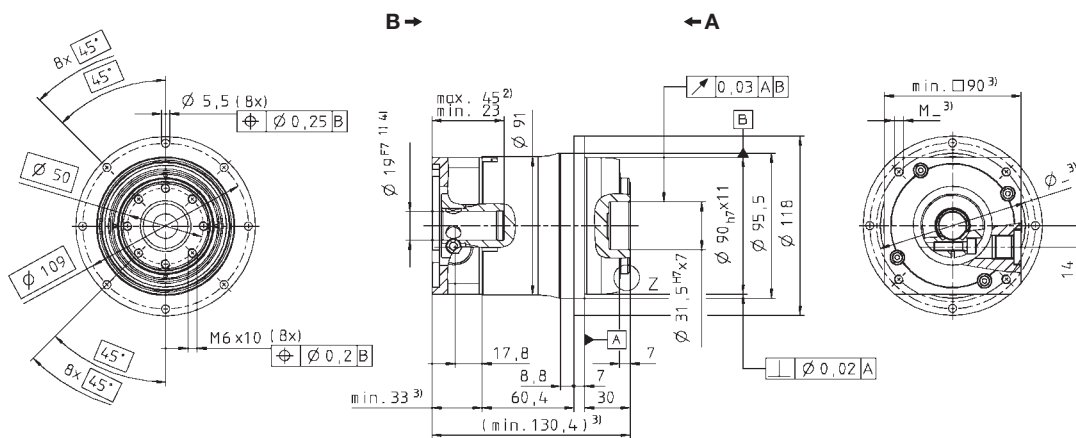
up to 11⁴⁾(B)
clamping hub
diameter



up to 14⁴⁾(C)
clamping hub
diameter



up to 19⁴⁾(E)
clamping hub
diameter



Non-tolerated dimensions ±1 mm

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

Motor mounting according to operating manual

TP:



TP+ 010 MA HIGH TORQUE®

		2-stage				3-stage						
Ratio ^{a)}	<i>i</i>	22	27.5	38.5	55	88	110	154	220			
Max. acceleration torque (max. 1000 cycles per hour)	T_{2B}	Nm	230	230	230	230	230	230	230			
		in.lb	2036	2036	2036	2036	2036	2036	2036			
Nominal output torque (with n_m)	T_{2V}	Nm	150	150	180	110	180	180	180			
		in.lb	1328	1328	1593	974	1593	1593	1593			
Emergency stop torque (permitted 1000 times during the service life of the gearhead)	T_{2Not}	Nm	525	525	525	525	525	525	525			
		in.lb	4646	4646	4646	4646	4646	4646	4646			
Nominal input speed (with T_{2V} and 20 °C ambient temperature) ^{b)}	n_{1N}	rpm	4000	4000	4000	4000	4500	4500	4500			
Max. input speed	n_{1Max}	rpm	6000	6000	6000	6000	6000	6000	6000			
Mean no load running torque (with $n_1=3000$ rpm and 20 °C gearhead temperature) ^{c)}	T_{012}	Nm	0.60	0.50	0.45	0.35	0.35	0.35	0.30			
		in.lb	5.30	4.40	4.00	3.10	3.10	3.10	2.70			
Max. torsional backlash	j_t	arcmin	≤ 1				≤ 1					
Torsional rigidity ^{c)}	C_{21}	Nm/ arcmin	43	43	43	42	42	42	42			
		in.lb/ arcmin	381	381	381	372	372	372	372			
Tilting rigidity	C_{2K}	Nm/ arcmin	225				225					
		in.lb/ arcmin	1991				1991					
Max. axial force ^{d)}	F_{2AMax}	N	2150				2150					
		lb _f	484				484					
Max. tilting moment	M_{2KMax}	Nm	400				400					
		in.lb	3540				3540					
Efficiency at full load	η	%	94				92					
Service life (For calculation, see the Chapter "Information")	L_n	h	> 20000				> 20000					
Weight incl. standard adapter plate	<i>m</i>	kg	3.2				3.6					
		lb _m	7.1				8.0					
Operating noise (with $n_1=3000$ rpm no load)	L_{PA}	dB(A)	≤ 60				≤ 60					
Max. permitted housing temperature	°C		+90									
	F		194									
Ambient temperature	°C		-15 to +40									
	F		5 to 104									
Lubrication	Lubricated for life											
Paint	Blue RAL 5002											
Direction of rotation	Motor and gearhead same direction											
Protection class	IP 65											
Moment of inertia (relates to the drive)	C	14	J_t	kgcm ²	0.21	0.18	0.16	0.14	0.16	0.15	0.14	0.13
				10 ⁻³ in.lb.in ²	0.19	0.16	0.14	0.12	0.14	0.13	0.12	0.12
Clamping hub diameter [mm]	E	19	J_t	kgcm ²	0.52	0.50	0.47	0.46	-	-	-	-
				10 ⁻³ in.lb.in ²	0.46	0.44	0.42	0.41	-	-	-	-

Reduced mass moments of inertia available on request.

^{a)} Other ratios available on request

^{b)} For higher ambient temperatures, please reduce input speed

^{c)} Valid for clamping hub diameter of 14 mm

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

TP+ 025 MF 1-stage

				1-stage				
Ratio ^{a)}		<i>i</i>		4	5	7	10	
cymex [®] -optimized acceleration torque (please contact us regarding the design)	T_{2Bcym}	Nm		390	420	350	275	
		in.lb		3452	3717	3098	2434	
Max. acceleration torque (max. 1000 cycles per hour)	T_{2B}	Nm		350	380	330	265	
		in.lb		3098	3363	2921	2345	
Nominal output torque (with n_m)	T_{2N}	Nm		170	170	170	120	
		in.lb		1505	1505	1505	1062	
Emergency stop torque (permitted 1000 times during the service life of the gearhead)	T_{2Not}	Nm		625	625	625	625	
		in.lb		5531	5531	5531	5531	
Nominal input speed (with T_{2N} and 20 °C ambient temperature) ^{b)}	n_{1N}	rpm		2300	2500	2500	2500	
Max. input speed	n_{1Max}	rpm		4500	4500	4500	4500	
Mean no load running torque (with $n_1=3000$ rpm and 20 °C gearhead temperature) ^{c)}	T_{012}	Nm		3.3	2.7	2.0	1.4	
		in.lb		29.2	23.9	17.7	12.4	
Max. torsional backlash	j_t	arcmin		Standard ≤ 3 / Reduced ≤ 1				
Torsional rigidity ^{c)}	C_{t21}	Nm/ arcmin		80	86	76	62	
		in.lb/ arcmin		708	761	673	549	
Tilting rigidity	C_{2K}	Nm/ arcmin		550				
		in.lb/ arcmin		4868				
Max. axial force ^{d)}	F_{2AMax}	N		4150				
		lb _f		934				
Max. tilting moment	M_{2KMMax}	Nm		440				
		in.lb		3894				
Efficiency at full load	η	%		97				
Service life (For calculation, see the Chapter "Information")	L_h	h		> 20000				
Weight incl. standard adapter plate	m	kg		6.5				
		lb _m		14.4				
Operating noise (with $i=10$ and $n_1=3000$ rpm no load)	L_{PA}	dB(A)		≤ 64				
Max. permitted housing temperature		°C		+90				
		F		194				
Ambient temperature		°C		-15 to +40				
		F		5 to 104				
Lubrication				Lubricated for life				
Paint				Blue RAL 5002				
Direction of rotation				Motor and gearhead same direction				
Protection class				IP 65				
Moment of inertia (relates to the drive)	E	19	J_1	kgcm ²	2.59	2.11	1.69	1.45
				10 ⁻² in.lb.s ²	2.29	1.87	1.50	1.28
Clamping hub diameter [mm]	G	24	J_1	kgcm ²	3.28	2.80	2.38	2.14
				10 ⁻² in.lb.s ²	2.90	2.48	2.11	1.89
	H	28	J_1	kgcm ²	2.89	2.41	1.99	1.75
				10 ⁻² in.lb.s ²	2.56	2.13	1.76	1.55
K	38	J_1	kgcm ²	10.3	9.87	9.45	9.21	
			10 ⁻² in.lb.s ²	9.11	8.73	8.36	8.15	

Reduced mass moments of inertia available on request.

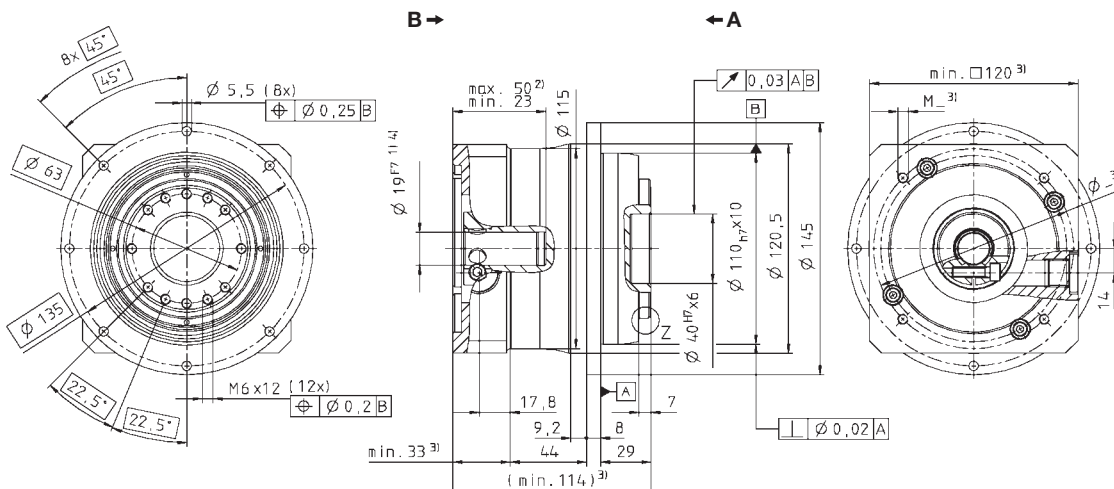
^{a)} Other ratios available on request

^{b)} For higher ambient temperatures, please reduce input speed

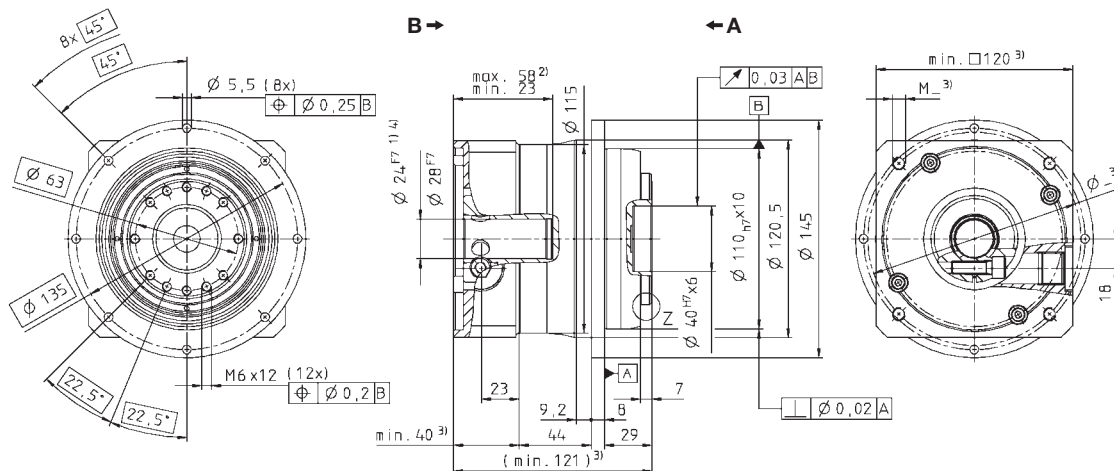
^{c)} Valid for clamping hub diameter of 24 and 28 mm

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

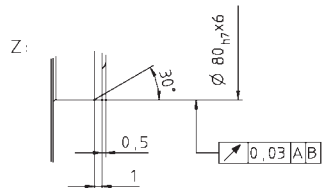
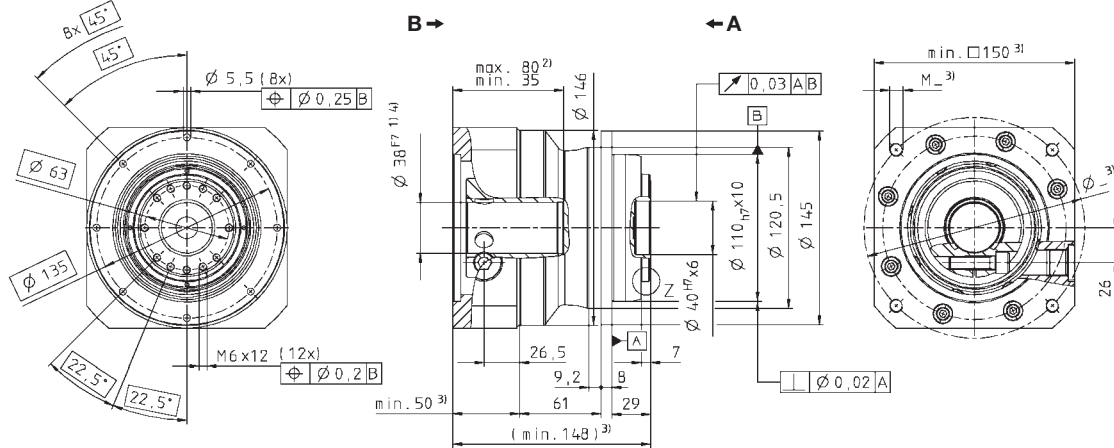
up to 19⁴⁾ (E)
clamping hub diameter



up to 24/28⁴⁾ (G/H)
clamping hub diameter



up to 38⁴⁾ (K)
clamping hub diameter



Non-tolerated dimensions ±1 mm

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

Motor mounting according to operating manual

TP:



TP+ 025 MF 2-stage

		2-stage															
Ratio ^{a)}	<i>i</i>		16	20	21	25	28	31	35	40	50	61	70	91	100		
cymex®-optimized acceleration torque (please contact us regarding the design)	T_{2Bcym}	Nm	390	390	–	420	390	–	420	390	420	–	350	–	275		
		in.lb	3452	3452	–	3717	3452	–	3717	3452	3717	–	3098	–	2434		
Max. acceleration torque (max. 1000 cycles per hour)	T_{2B}	Nm	350	350	300	380	350	300	380	350	380	280	330	250	265		
		in.lb	3098	3098	2655	3363	3098	2655	3363	3098	3363	2478	2921	2213	2345		
Nominal output torque (with n_n)	T_{2N}	Nm	200	210	170	200	210	190	220	200	220	170	200	100	120		
		in.lb	1770	1859	1505	1770	1859	1682	1947	1770	1947	1505	1770	885	1062		
Emergency stop torque (permitted 1000 times during the service life of the gearhead)	T_{2Not}	Nm	625	625	625	625	625	625	625	625	625	625	625	625	625		
		in.lb	5531	5531	5531	5531	5531	5531	5531	5531	5531	5531	5531	5531	5531		
Nominal input speed (with T_{2N} and 20 °C ambient temperature ^{b)})	n_{1N}	rpm	2800	2800	2800	2800	2800	2800	2800	2800	3100	3500	3500	4200	4200		
Max. input speed	n_{1Max}	rpm	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000		
Mean no load running torque (with $n_i=3000$ rpm and 20 °C gearhead temperature ^{c)})	T_{012}	Nm	1.8	1.5	1.4	1.4	1.1	1.1	1.0	0.8	0.8	0.7	0.7	0.6	0.6		
		in.lb	15.9	13.3	12.4	12.4	9.7	9.7	8.9	7.1	7.1	6.2	6.2	5.3	5.3		
Max. torsional backlash	j_t	arcmin	Standard ≤ 3 / Reduced ≤ 1														
Torsional rigidity ^{c)}	C_{I21}	Nm/arcmin	81	81	70	83	80	54	82	76	80	61	71	55	60		
		in.lb/arcmin	717	717	620	735	708	478	726	673	708	540	628	487	531		
Tilting rigidity	C_{2K}	Nm/arcmin	550														
		in.lb/arcmin	4867														
Max. axial force ^{d)}	F_{2AMax}	N	4150														
		lb _f	934														
Max. tilting moment	M_{2KMax}	Nm	440														
		in.lb	3894														
Efficiency at full load	η	%	94														
Service life (For calculation, see the Chapter "Information")	L_h	h	> 20000														
Weight incl. standard adapter plate	m	kg	6.7														
		lb _m	14.8														
Operating noise (with $i=100$ and $n_i=3000$ rpm no load)	L_{PA}	dB(A)	≤ 60														
Max. permitted housing temperature		°C	+90														
		F	194														
Ambient temperature		°C	-15 to +40														
		F	5 to 104														
Lubrication			Lubricated for life														
Paint			Blue RAL 5002														
Direction of rotation			Motor and gearhead same direction														
Protection class			IP 65														
Moment of inertia (relates to the drive)	C	14	J_1	kgcm ²	0.66	0.55	0.60	0.53	0.44	0.55	0.43	0.38	0.38	0.39	0.37	0.38	0.37
				10 ⁻³ in.lb.s ²	0.59	0.49	0.51	0.47	0.39	0.49	0.38	0.34	0.33	0.35	0.33	0.34	0.33
Clamping hub diameter [mm]	E	19	J_1	kgcm ²	0.83	0.71	0.77	0.69	0.61	0.72	0.60	0.55	0.54	0.55	0.54	0.54	0.54
				10 ⁻³ in.lb.s ²	0.73	0.63	0.68	0.61	0.54	0.64	0.53	0.49	0.48	0.4	0.48	0.48	0.48
	G	24	J_1	kgcm ²	2.20	2.08	2.14	2.06	1.98	2.09	1.97	1.92	1.92	1.92	1.91	1.92	1.91
				10 ⁻³ in.lb.s ²	1.95	1.84	1.89	1.82	1.75	1.85	1.74	1.70	1.70	1.70	1.70	1.69	1.70

Reduced mass moments of inertia available on request.

^{a)} Other ratios available on request

^{b)} For higher ambient temperatures, please reduce input speed

^{c)} Valid for clamping hub diameter of 19 mm

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

TP+ 025 MA HIGH TORQUE®

		2-stage				3-stage							
Ratio ^{a)}	<i>i</i>		22	27.5	38.5	55	66	88	110	154	220		
Max. acceleration torque (max. 1000 cycles per hour)	T_{2B}	Nm	530	530	530	530	480	480	480	480	480		
		in.lb	4691	4691	4691	4691	4248	4248	4248	4248	4248		
Nominal output torque (with n_m)	T_{2V}	Nm	320	350	375	375	260	260	260	260	260		
		in.lb	2832	3098	3319	3319	2301	2301	2301	2301	2301		
Emergency stop torque (permitted 1000 times during the service life of the gearhead)	T_{2Not}	Nm	1200	1200	1200	1200	1200	1200	1200	1200	1200		
		in.lb	10620	10620	10620	10620	10620	10620	10620	10620	10620		
Nominal input speed (with T_{2V} and 20 °C ambient temperature) ^{b)}	n_{1N}	rpm	3500	3500	3500	3500	4000	4000	4000	4000	4000		
Max. input speed	n_{1Max}	rpm	6000	6000	6000	6000	6000	6000	6000	6000	6000		
Mean no load running torque (with $n_1=3000$ rpm and 20 °C gearhead temperature) ^{c)}	T_{012}	Nm	1.1	1.0	0.8	0.6	0.7	0.7	0.6	0.4	0.4		
		in.lb	9.7	8.9	7.1	5.3	6.2	6.2	5.3	3.5	3.5		
Max. torsional backlash	j_t	arcmin	≤ 1				≤ 1						
Torsional rigidity ^{c)}	C_{t21}	Nm/arcmin	105	105	105	100	95	95	95	95	95		
		in.lb/arcmin	929	929	929	885	841	841	841	841	841		
Tilting rigidity	C_{2K}	Nm/arcmin	550				550						
		in.lb/arcmin	4868				4868						
Max. axial force ^{d)}	F_{2AMax}	N	4150				4150						
		lb _f	934				934						
Max. tilting moment	M_{2KMax}	Nm	550				550						
		in.lb	4868				4868						
Efficiency at full load	η	%	94				92						
Service life (For calculation, see the Chapter "Information")	L_h	h	> 20000				> 20000						
Weight incl. standard adapter plate	<i>m</i>	kg	5.6				6.1						
		lb _m	12.4				13.5						
Operating noise (with $n_1=3000$ rpm no load)	L_{PA}	dB(A)	≤ 62				≤ 62						
Max. permitted housing temperature	°C		+90										
	F		194										
Ambient temperature	°C		-15 to +40										
	F		5 to 104										
Lubrication	Lubricated for life												
Paint	Blue RAL 5002												
Direction of rotation	Motor and gearhead same direction												
Protection class	IP 65												
Moment of inertia (relates to the drive)	E	19	J_1	kgcm ²	0.87	0.70	0.60	0.55	0.63	0.56	0.53	0.51	0.50
				10 ⁻² in.lb.in ²	0.77	0.62	0.53	0.49	0.56	0.50	0.47	0.45	0.44
Clamping hub diameter [mm]	G	24	J_1	kgcm ²	2.39	2.22	2.12	2.07	-	-	-	-	-
				10 ⁻³ in.lb.in ²	2.12	1.96	1.88	1.83	-	-	-	-	-

Reduced mass moments of inertia available on request.

^{a)} Other ratios available on request

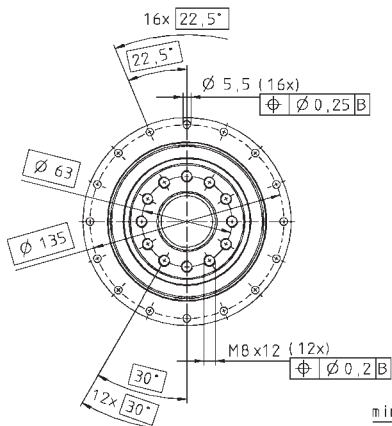
^{b)} For higher ambient temperatures, please reduce input speed

^{c)} Valid for clamping hub diameter of 19 mm

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

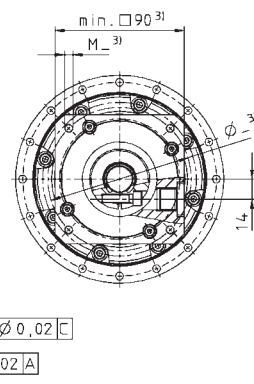
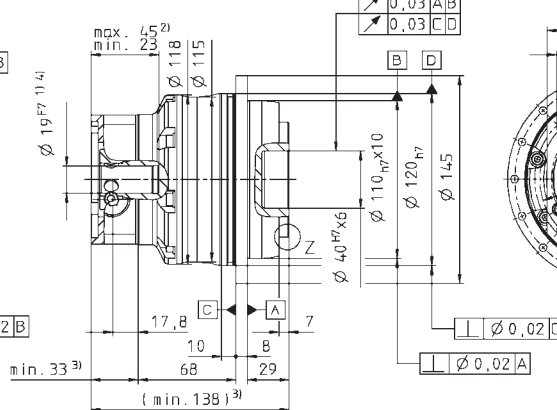
View A

View B

2-stage:


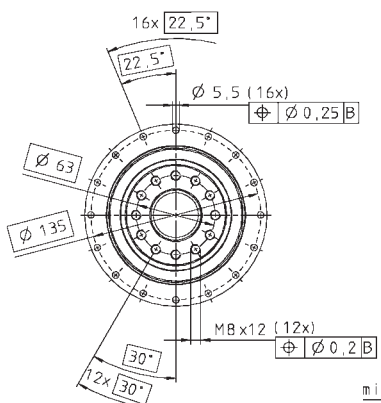
B →

← A


 up to 19⁴⁾ (E)
clamping hub
diameter

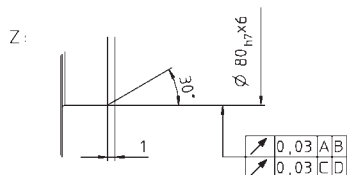
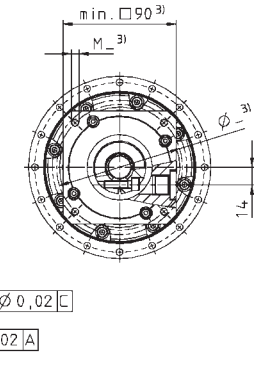
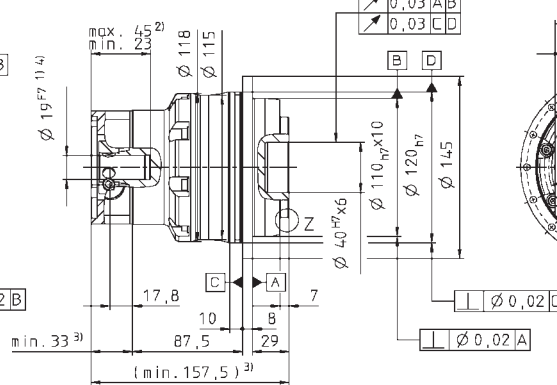
Motor shaft diameter [mm]

 up to 24⁴⁾ (G)
clamping hub
diameter

3-stage:


B →

← A


 Non-tolerated dimensions ± 1 mm

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

Motor mounting according to operating manual

TP



TP+ 050 MF 1-stage

				1-stage				
Ratio ^{a)}		<i>i</i>		4	5	7	10	
cymex®-optimized acceleration torque (please contact us regarding the design)	T_{2Bcym}	Nm		750	800	–	600	
		in.lb		6638	7080	–	5310	
Max. acceleration torque (max. 1000 cycles per hour)	T_{2B}	Nm		700	700	700	540	
		in.lb		6195	6195	6195	4779	
Nominal output torque (with n_n)	T_{2N}	Nm		370	370	370	240	
		in.lb		3275	3275	3275	2124	
Emergency stop torque (permitted 1000 times during the service life of the gearhead)	T_{2Not}	Nm		1250	1250	1250	1250	
		in.lb		11063	11063	11063	11063	
Nominal input speed (with T_{2N} and 20 °C ambient temperature) ^{b)}	n_{1N}	rpm		1900	2000	2500	2500	
Max. input speed	n_{1Max}	rpm		4000	4000	4000	4000	
Mean no load running torque (with $n_n=3000$ rpm and 20 °C gearhead temperature) ^{c)}	T_{012}	Nm		8.1	6.6	4.8	3.5	
		in.lb		71.7	58.4	42.5	31.0	
Max. torsional backlash	j_t	arcmin		Standard ≤ 3 / Reduced ≤ 1				
Torsional rigidity ^{c)}	C_{t21}	Nm/ arcmin		190	187	159	123	
		in.lb/ arcmin		1682	1655	1407	1089	
Tilting rigidity	C_{2K}	Nm/ arcmin		560				
		in.lb/ arcmin		4956				
Max. axial force ^{d)}	F_{2AMax}	N		6130				
		lb _f		1379				
Max. tilting moment	M_{2KMMax}	Nm		1335				
		in.lb		11815				
Efficiency at full load	η	%		97				
Service life (For calculation, see the Chapter "Information")	L_h	h		> 20000				
Weight incl. standard adapter plate	m	kg		14.0				
		lb _m		30.9				
Operating noise (with $i=10$ and $n_n=3000$ rpm no load)	L_{PA}	dB(A)		≤ 65				
Max. permitted housing temperature		°C		+90				
		F		194				
Ambient temperature		°C		-15 to +40				
		F		5 to 104				
Lubrication				Lubricated for life				
Paint				Blue RAL 5002				
Direction of rotation				Motor and gearhead same direction				
Protection class				IP 65				
Moment of inertia (relates to the drive)	G	24	J_1	kgcm ²	9.47	7.85	6.39	5.54
				10 ⁻² in.lb.s ²	8.38	6.95	5.66	4.90
Clamping hub diameter [mm]	I	32	J_1	kgcm ²	12.6	11.0	9.55	8.71
				10 ⁻² in.lb.s ²	11.1	9.74	8.45	7.70
	K	38	J_1	kgcm ²	13.7	12.1	10.6	9.78
				10 ⁻² in.lb.s ²	12.1	10.7	9.38	8.65
M	48	J_1	kgcm ²	28.3	26.7	25.3	24.4	
			10 ⁻² in.lb.s ²	25.0	23.6	22.4	21.6	

Reduced mass moments of inertia available on request.

^{a)} Other ratios available on request

^{b)} For higher ambient temperatures, please reduce input speed

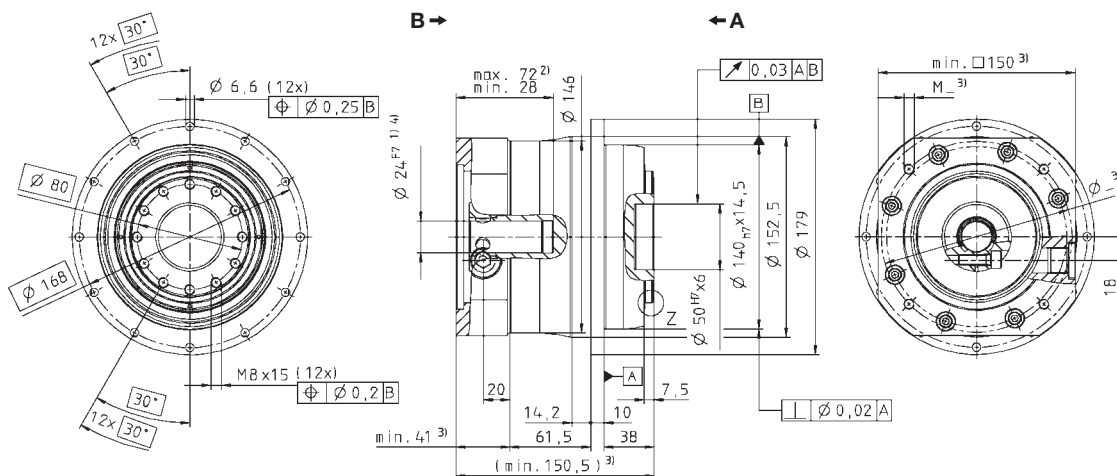
^{c)} Valid for clamping hub diameter of 32 and 38 mm

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

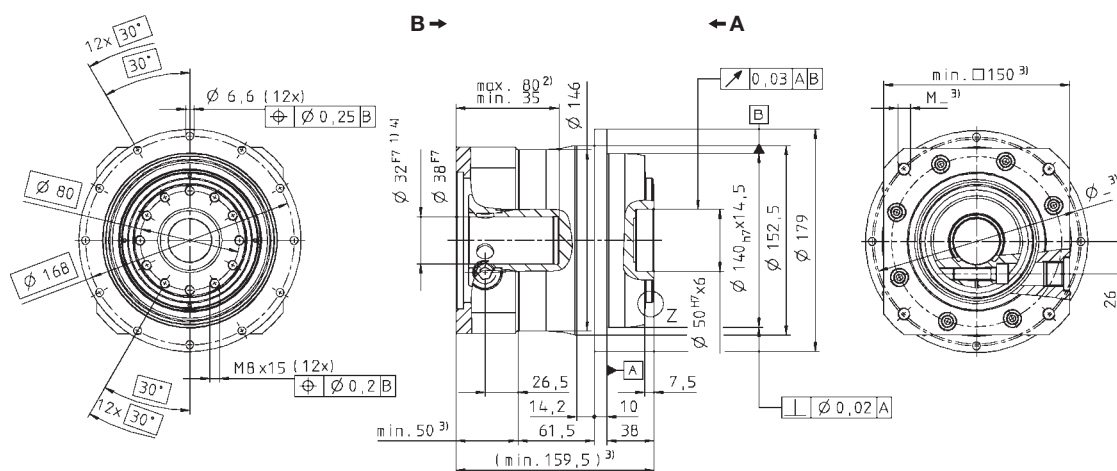
View A

View B

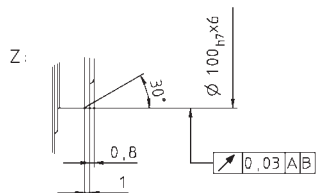
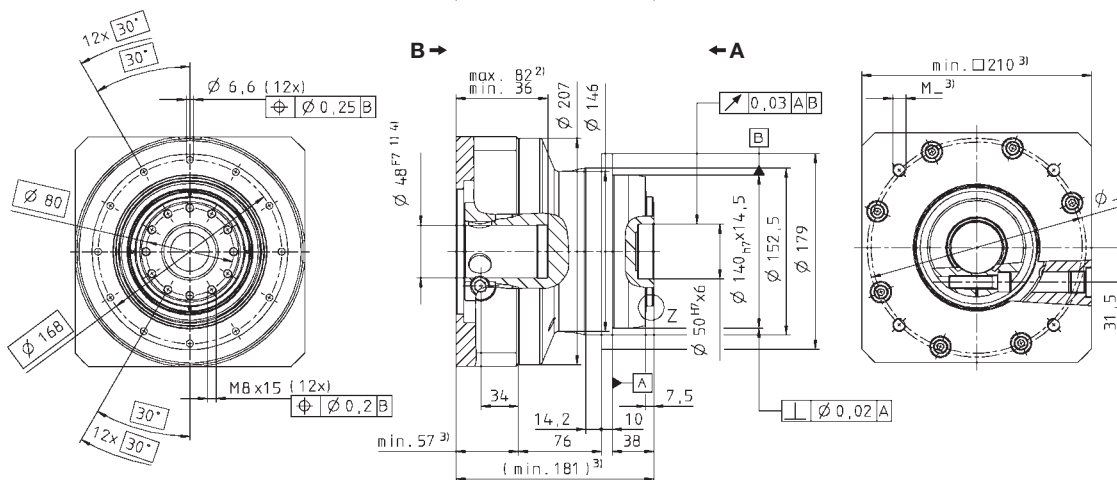
up to 24⁴⁾ (G)
clamping hub
diameter



up to 32/38⁴⁾
(L/K) clamping hub
diameter



up to 48⁴⁾ (M)
clamping hub
diameter



Non-tolerated dimensions ± 1 mm

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

Motor mounting according to operating manual

TP



TP+ 050 MF 2-stage

			2-stage														
Ratio ^{a)}	<i>i</i>		16	20	21	25	28	31	35	40	50	61	70	91	100		
cymex [®] -optimized acceleration torque (please contact us regarding the design)	T_{2Bcym}	Nm	800	800	–	800	800	–	800	800	800	–	–	–	600		
		in.lb	7080	7080	–	7080	7080	–	7080	7080	7080	–	–	–	5310		
Max. acceleration torque (max. 1000 cycles per hour)	T_{2B}	Nm	750	750	600	750	750	620	750	750	750	550	700	500	540		
		in.lb	6638	6638	5310	6638	6638	5487	6638	6638	6638	4868	6195	4425	4779		
Nominal output torque (with n_n)	T_{2N}	Nm	400	400	350	400	400	400	400	400	400	350	400	220	240		
		in.lb	3540	3540	3098	3540	3540	3540	3540	3540	3540	3098	3540	1947	2124		
Emergency stop torque (permitted 1000 times during the service life of the gearhead)	T_{2Not}	Nm	1250	1250	1250	1250	1250	1250	1250	1250	1250	1250	1250	1250	1250		
		in.lb	11063	11063	11063	11063	11063	11063	11063	11063	11063	11063	11063	11063	11063		
Nominal input speed (with T_{2N} and 20 °C ambient temperature ^{b)})	n_{1N}	rpm	2900	2900	2900	2900	2900	2900	2900	2900	3200	3200	3200	3900	3900		
Max. input speed	n_{1Max}	rpm	5000	5000	5000	5000	5000	5000	5000	5000	5000	5000	5000	5000	5000		
Mean no load running torque (with $n_n=3000$ rpm and 20 °C gearhead temperature ^{c)})	T_{012}	Nm	4.2	3.4	3.3	3.1	2.5	2.4	2.3	1.8	1.7	1.5	1.5	1.4	1.3		
		in.lb	37.2	30.1	29.2	27.4	22.1	21.2	20.4	15.9	15.1	13.3	13.3	12.4	11.5		
Max. torsional backlash	j_t	arcmin	Standard ≤ 3 / Reduced ≤ 1														
Torsional rigidity ^{c)}	C_{I21}	Nm/ arcmin	180	185	145	180	180	130	175	175	175	123	145	100	115		
		in.lb/ arcmin	1593	1637	1283	1593	1593	1151	1549	1549	1549	1089	1283	885	1018		
Tilting rigidity	C_{2K}	Nm/ arcmin	560														
		in.lb/ arcmin	4956														
Max. axial force ^{d)}	F_{2AMax}	N	6130														
		lb _f	1379														
Max. tilting moment	M_{2KMMax}	Nm	1335														
		in.lb	11815														
Efficiency at full load	η	%	94														
Service life (For calculation, see the Chapter "Information")	L_h	h	> 20000														
Weight incl. standard adapter plate	m	kg	14.1														
		lb _m	31.2														
Operating noise (with $i=100$ and $n_n=3000$ rpm no load)	L_{PA}	dB(A)	≤ 63														
Max. permitted housing temperature		°C	+90														
		F	194														
Ambient temperature		°C	-15 to +40														
		F	5 to 104														
Lubrication			Lubricated for life														
Paint			Blue RAL 5002														
Direction of rotation			Motor and gearhead same direction														
Protection class			IP 65														
Moment of inertia (relates to the drive)	E	19	J_1	kgcm ²	2.53	2.07	2.30	2.01	1.67	2.12	1.64	1.44	1.42	1.46	1.41	1.43	1.40
				10 ⁻³ in.lb.s ²	2.24	1.83	2.04	1.78	1.48	1.88	1.45	1.27	1.26	1.29	1.25	1.27	1.24
Clamping hub diameter [mm]	G	24	J_1	kgcm ²	3.22	2.77	2.99	2.70	2.36	2.81	2.33	2.13	2.12	2.15	2.10	2.12	2.09
				10 ⁻³ in.lb.s ²	2.85	2.45	2.65	2.39	2.09	2.49	2.06	1.89	1.88	1.90	1.86	1.88	1.85
	K	38	J_1	kgcm ²	10.3	9.83	10.1	9.77	9.43	9.88	9.40	9.20	9.18	9.22	9.17	9.19	9.16
				10 ⁻³ in.lb.s ²	9.11	8.70	8.94	8.64	8.35	8.74	8.32	8.14	8.12	8.16	8.12	8.13	8.11

Reduced mass moments of inertia available on request.

^{a)} Other ratios available on request

^{b)} For higher ambient temperatures, please reduce input speed

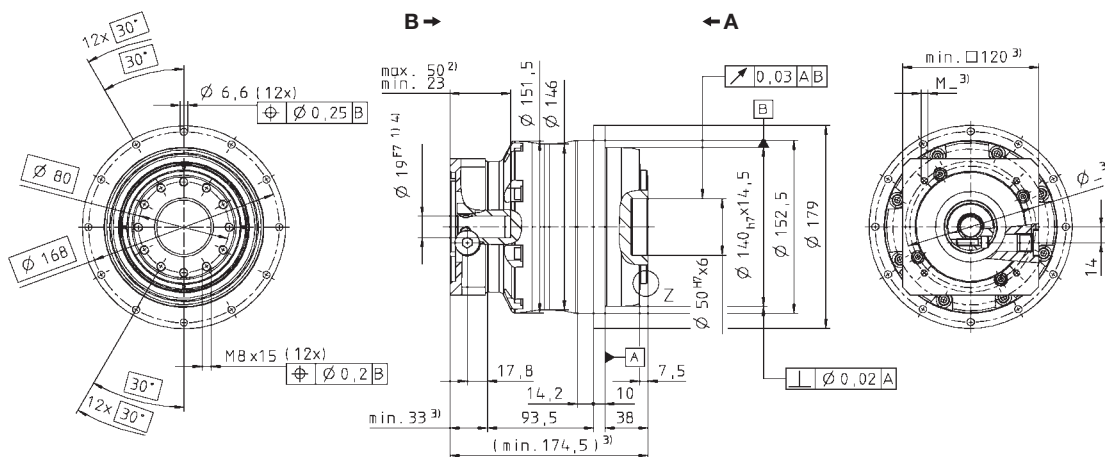
^{c)} Valid for clamping hub diameter of 24 mm

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

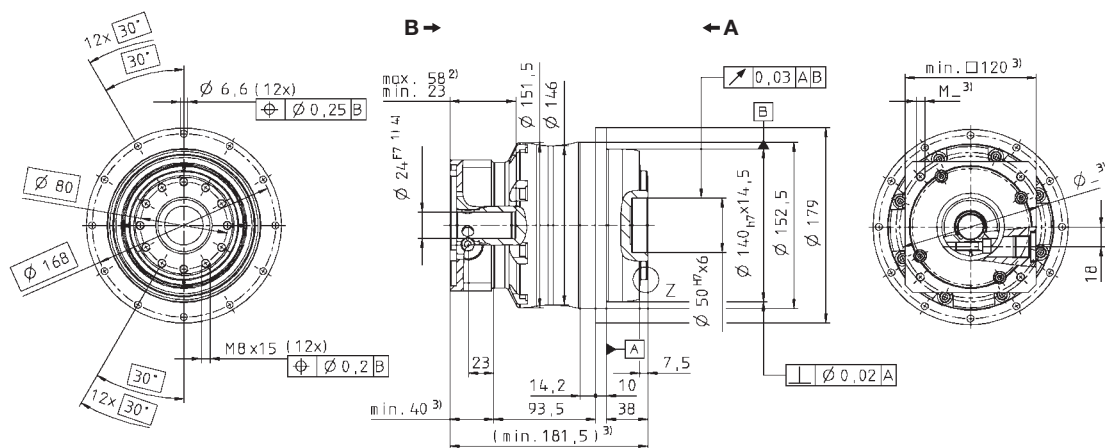
View A

View B

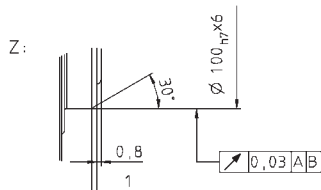
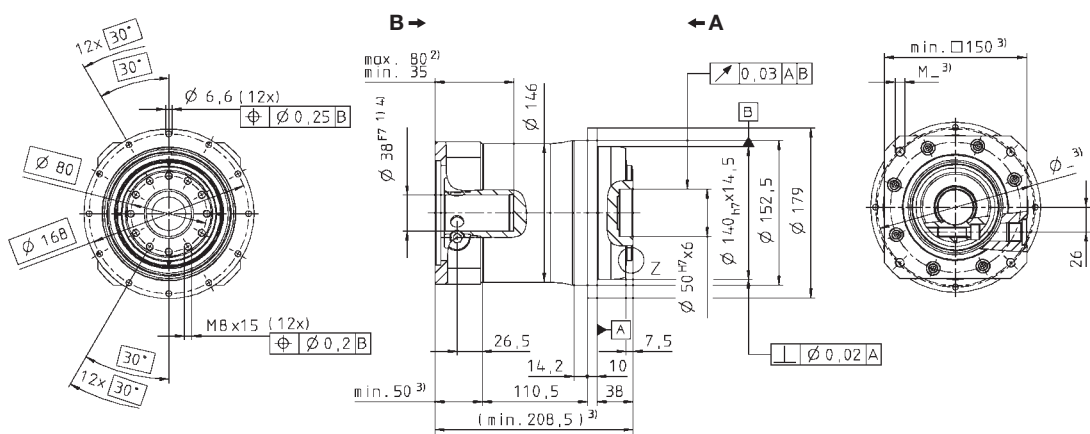
up to 19⁴⁾ (E)
clamping hub
diameter



up to 24⁴⁾ (G)
clamping hub
diameter



up to 38⁴⁾ (K)
clamping hub
diameter



Non-tolerated dimensions ± 1 mm

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

Motor mounting according to operating manual

TP:



TP+ 050 MA HIGH TORQUE®

		2-stage				3-stage							
Ratio ^{a)}	<i>i</i>	22	27.5	38.5	55	66	88	110	154	220			
Max. acceleration torque (max. 1000 cycles per hour)	T_{2B}	Nm	950	950	950	950	950	950	950	950	950		
		in.lb	8408	8408	8408	8408	8408	8408	8408	8408	8408		
Nominal output torque (with n_m)	T_{2V}	Nm	575	600	650	675	675	675	675	675	675		
		in.lb	5089	5310	5753	5974	5974	5974	5974	5974	5974		
Emergency stop torque (permitted 1000 times during the service life of the gearhead)	T_{2Not}	Nm	2375	2375	2375	2375	2375	2375	2375	2375	2375		
		in.lb	21019	21019	21019	21019	21019	21019	21019	21019	21019		
Nominal input speed (with T_{2V} and 20 °C ambient temperature) ^{b)}	n_{1N}	rpm	3000	3000	3000	3000	3500	3500	3500	3500	3500		
Max. input speed	n_{1Max}	rpm	5000	5000	5000	5000	5000	5000	5000	5000	5000		
Mean no load running torque (with $n_1=3000$ rpm and 20 °C gearhead temperature) ^{c)}	T_{012}	Nm	3.7	2.9	2.0	1.7	2.0	1.6	1.4	0.9	0.7		
		in.lb	32.7	25.7	17.7	15.0	17.7	14.2	12.4	8.0	6.2		
Max. torsional backlash	j_t	arcmin	≤ 1				≤ 1						
Torsional rigidity ^{c)}	C_{t21}	Nm/ arcmin	220	220	220	220	205	205	205	205	205		
		in.lb/ arcmin	1947	1947	1947	1947	1814	1814	1814	1814	1814		
Tilting rigidity	C_{2K}	Nm/ arcmin	560				560						
		in.lb/ arcmin	4956				4956						
Max. axial force ^{d)}	F_{2AMax}	N	6130				6130						
		lb _f	1379				1379						
Max. tilting moment	M_{2KMax}	Nm	1335				1335						
		in.lb	11815				11815						
Efficiency at full load	η	%	94				92						
Service life (For calculation, see the Chapter "Information")	L_n	h	> 20000				> 20000						
Weight incl. standard adapter plate	<i>m</i>	kg	12.5				13.4						
		lb _m	27.6				29.6						
Operating noise (with $n_1=3000$ rpm no load)	L_{PA}	dB(A)	≤ 64				≤ 64						
Max. permitted housing temperature	°C		+90										
	F		194										
Ambient temperature	°C		-15 to +40										
	F		5 to 104										
Lubrication	Lubricated for life												
Paint	Blue RAL 5002												
Direction of rotation	Motor and gearhead same direction												
Protection class	IP 65												
Moment of inertia (relates to the drive)	G	24	J_1	kgcm ²	3.76	3.32	3.01	2.82	2.61	2.42	2.22	2.12	2.07
				10 ⁻³ in.lb.s ²	3.33	2.94	2.66	2.50	2.31	2.14	1.96	1.88	1.83
Clamping hub diameter [mm]	K	38	J_1	kgcm ²	10.7	10.3	9.92	9.73	-	-	-	-	-
				10 ⁻³ in.lb.s ²	9.47	9.11	8.78	8.61	-	-	-	-	-

Reduced mass moments of inertia available on request.

^{a)} Other ratios available on request

^{b)} For higher ambient temperatures, please reduce input speed

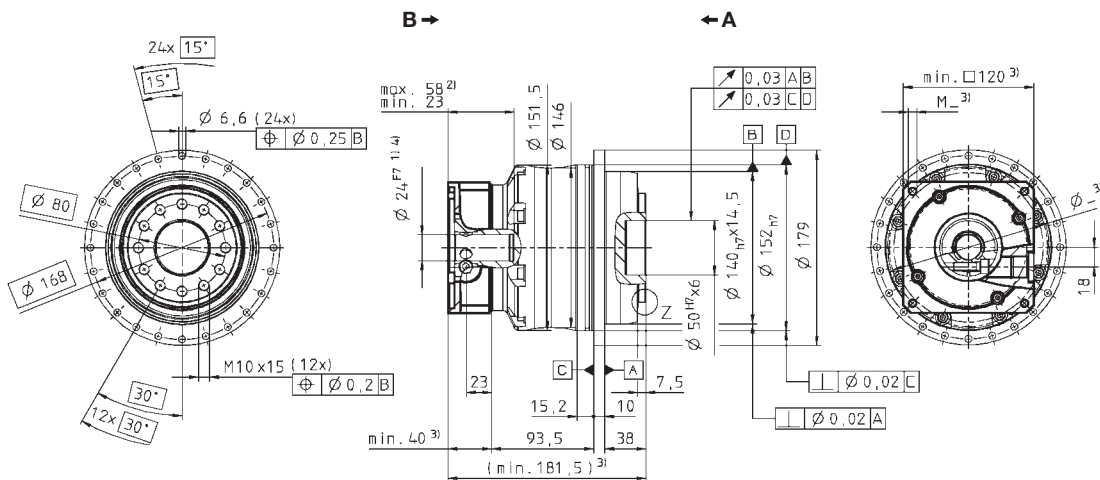
^{c)} Valid for clamping hub diameter of 24 mm

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

View A

View B

2-stage:

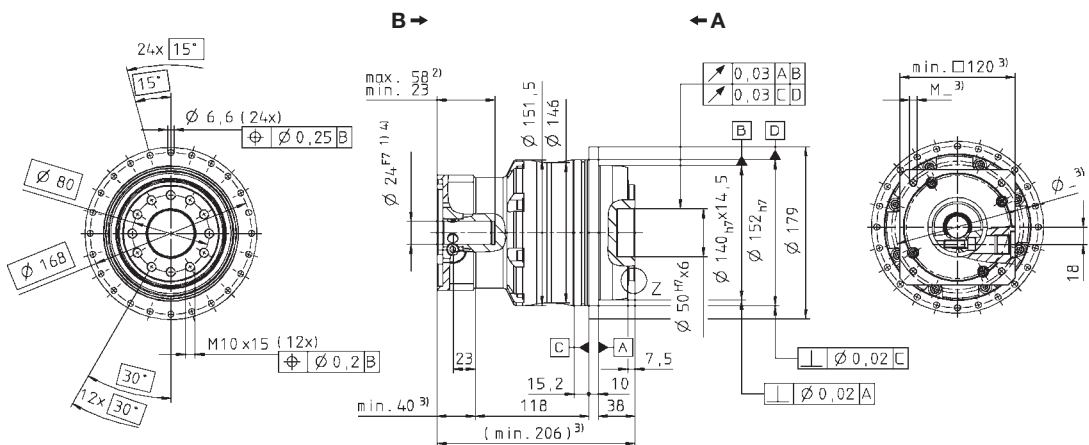


up to 24⁴⁾ (G)
clamping hub
diameter

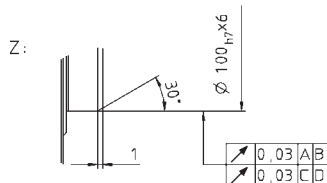
Motor shaft diameter [mm]

up to 38⁴⁾ (K)
clamping hub
diameter

3-stage:



up to 24⁴⁾ (G)
clamping hub
diameter



Non-tolerated dimensions ±1 mm

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

Motor mounting according to operating manual

TP:



TP+ 110 MF 1-stage

				1-stage				
Ratio ^{a)}		<i>i</i>		4	5	7	10	
cymex®-optimized acceleration torque (please contact us regarding the design)	T_{2Bcym}	Nm		1900	2000	1900	1500	
		in.lb		16815	17700	16815	13275	
Max. acceleration torque (max. 1000 cycles per hour)	T_{2B}	Nm		1600	1600	1600	1400	
		in.lb		14160	14160	14160	12390	
Nominal output torque (with n_n)	T_{2N}	Nm		700	750	750	750	
		in.lb		6195	6638	6638	6638	
Emergency stop torque (permitted 1000 times during the service life of the gearhead)	T_{2Not}	Nm		2750	2750	2750	2750	
		in.lb		24338	24338	24338	24338	
Nominal input speed (with T_{2N} and 20 °C ambient temperature ^{b)})	n_{1N}	rpm		1400	1500	2000	2000	
Max. input speed	n_{1Max}	rpm		3500	3500	3500	3500	
Mean no load running torque (with $n_n=3000$ rpm and 20 °C gearhead temperature ^{c)})	T_{012}	Nm		15.6	12.7	9.4	7.0	
		in.lb		138.1	112.4	83.2	62.0	
Max. torsional backlash	j_t	arcmin		Standard ≤ 3 / Reduced ≤ 1				
Torsional rigidity ^{c)}	C_{t21}	Nm/arcmin		610	610	550	445	
		in.lb/arcmin		5399	5399	4868	3938	
Tilting rigidity	C_{2K}	Nm/arcmin		1452				
		in.lb/arcmin		12850				
Max. axial force ^{d)}	F_{2AMax}	N		10050				
		lb _f		2261				
Max. tilting moment	M_{2KMMax}	Nm		3280				
		in.lb		29028				
Efficiency at full load	η	%		97				
Service life (For calculation, see the Chapter "Information")	L_h	h		> 20000				
Weight incl. standard adapter plate	m	kg		30.0				
		lb _m		66				
Operating noise (with $i=10$ and $n_n=3000$ rpm no load)	L_{PA}	dB(A)		≤ 66				
Max. permitted housing temperature		°C		+90				
		F		194				
Ambient temperature		°C		-15 to +40				
		F		5 to 104				
Lubrication				Lubricated for life				
Paint				Blue RAL 5002				
Direction of rotation				Motor and gearhead same direction				
Protection class				IP 65				
Moment of inertia (relates to the drive)	K	38	J_1	kgcm ²	44.5	34.6	25.5	20.6
				10 ³ in.lb.s ²	39.4	30.6	22.6	18.2
Clamping hub diameter [mm]	M	48	J_1	kgcm ²	51.8	41.9	32.9	28.0
				10 ³ in.lb.s ²	45.8	37.1	29.1	24.8

Reduced mass moments of inertia available on request.

^{a)} Other ratios available on request

^{b)} For higher ambient temperatures, please reduce input speed

^{c)} Valid for clamping hub diameter of 48 mm

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

TP+ 110 MF 2-stage

		2-stage															
Ratio ^{a)}	<i>i</i>		16	20	21	25	28	31	35	40	50	61	70	91	100		
cymex®-optimized acceleration torque (please contact us regarding the design)	T_{2Bcym}	Nm	2000	2000	–	2000	2000	–	2000	1800	1800	–	1800	–	1500		
		in.lb	17700	17700	–	17700	17700	–	17700	15930	15930	–	15930	–	13275		
Max. acceleration torque (max. 1000 cycles per hour)	T_{2B}	Nm	1600	1600	1400	1600	1600	1600	1600	1600	1600	1400	1600	1300	1400		
		in.lb	14160	14160	12390	14160	14160	14160	14160	14160	14160	12390	14160	11505	12390		
Nominal output torque (with n_n)	T_{2N}	Nm	980	980	850	1050	1050	1250	1250	850	1050	1100	900	700	800		
		in.lb	8673	8673	7523	9293	9293	11063	11063	7523	9293	9735	7965	6195	7080		
Emergency stop torque (permitted 1000 times during the service life of the gearhead)	T_{2Not}	Nm	2750	2750	2750	2750	2750	2750	2750	2750	2750	2750	2750	2750	2750		
		in.lb	24338	24338	24338	24338	24338	24338	24338	24338	24338	24338	24338	24338	24338		
Nominal input speed (with T_{2N} and 20 °C ambient temperature) ^{b)}	n_{1N}	rpm	2500	2500	2500	2500	2500	2500	2500	2500	2900	3200	3200	3400	3400		
Max. input speed	n_{1Max}	rpm	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000		
Mean no load running torque (with $n_n=3000$ rpm and 20 °C gearhead temperature) ^{c)}	T_{012}	Nm	6.9	5.6	5.5	5.0	4.1	3.9	3.7	3.0	2.7	2.5	2.4	2.2	2.2		
		in.lb	61.1	49.6	48.7	44.3	36.3	34.5	32.7	26.6	23.9	22.1	21.2	19.5	19.5		
Max. torsional backlash	j_t	arcmin	Standard ≤ 3 / Reduced ≤ 1														
Torsional rigidity ^{c)}	C_{I21}	Nm/arcmin	585	580	465	570	560	440	560	520	525	415	480	360	395		
		in.lb/arcmin	5177	5133	4115	5045	4956	3894	4956	4602	4646	3673	4248	3186	3496		
Tilting rigidity	C_{2K}	Nm/arcmin	1452														
		in.lb/arcmin	12850														
Max. axial force ^{d)}	F_{2AMax}	N	10050														
		lb _f	2261														
Max. tilting moment	M_{2KMMax}	Nm	3280														
		in.lb	29028														
Efficiency at full load	η	%	94														
Service life (For calculation, see the Chapter "Information")	L_h	h	> 20000														
Weight incl. standard adapter plate	m	kg	34.0														
		lb _m	75.1														
Operating noise (with $i=100$ and $n_n=3000$ rpm no load)	L_{PA}	dB(A)	≤ 66														
Max. permitted housing temperature		°C	+90														
		F	194														
Ambient temperature		°C	-15 to +40														
		F	5 to 104														
Lubrication			Lubricated for life														
Paint			Blue RAL 5002														
Direction of rotation			Motor and gearhead same direction														
Protection class			IP 65														
Moment of inertia (relates to the drive)	G	24	J_1	kgcm ²	8.51	8.21	8.98	7.82	6.57	8.09	6.37	5.63	5.54	5.63	5.44	5.50	5.39
				10 ⁴ in.lb.s ²	7.53	7.27	7.95	6.92	5.81	7.16	5.64	4.99	4.90	4.99	4.82	4.87	4.77
Clamping hub diameter [mm]	I	32	J_1	kgcm ²	11.7	11.4	12.1	11.0	9.73	11.3	9.54	8.80	8.70	8.79	8.61	8.67	8.56
				10 ⁴ in.lb.s ²	10.3	10.1	10.7	9.72	8.61	9.96	8.44	7.78	7.70	7.78	7.62	7.67	7.57
	K	38	J_1	kgcm ²	12.7	12.5	13.2	12.1	10.8	12.3	10.6	9.87	9.77	9.87	9.68	9.74	9.63
				10 ⁴ in.lb.s ²	11.3	11.0	11.7	10.7	9.6	10.9	9.39	8.73	8.65	8.73	8.56	8.62	8.52
M	48	J_1	kgcm ²	27.4	27.1	27.8	26.7	25.4	26.9	25.3	24.5	24.4	24.5	24.3	24.4	24.3	
			10 ⁴ in.lb.s ²	24.2	24.0	24.6	23.6	22.5	23.8	22.3	21.7	21.6	21.7	21.5	21.6	21.5	

Reduced mass moments of inertia available on request.

^{a)} Other ratios available on request

^{b)} For higher ambient temperatures, please reduce input speed

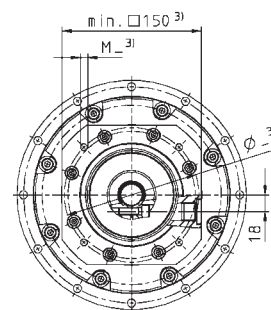
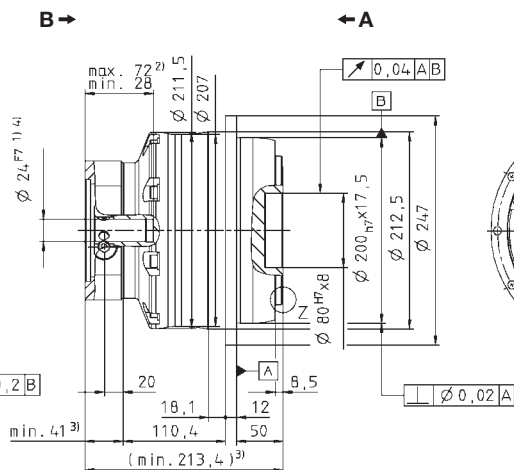
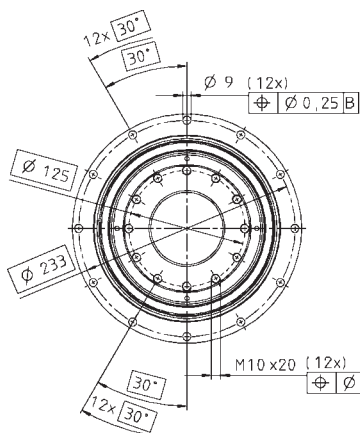
^{c)} Valid for clamping hub diameter of 32 and 38 mm

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

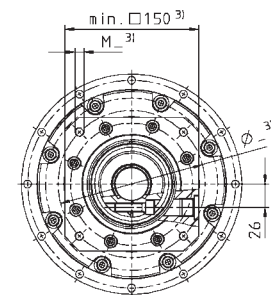
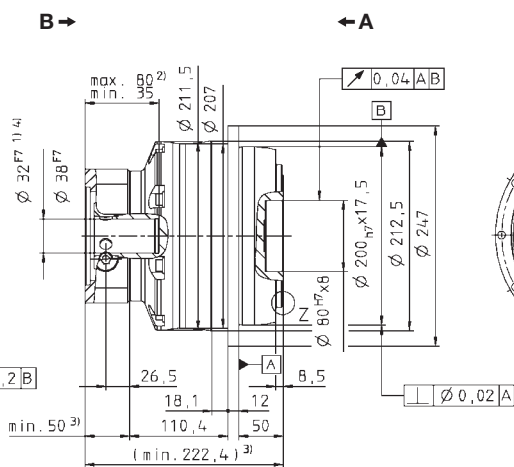
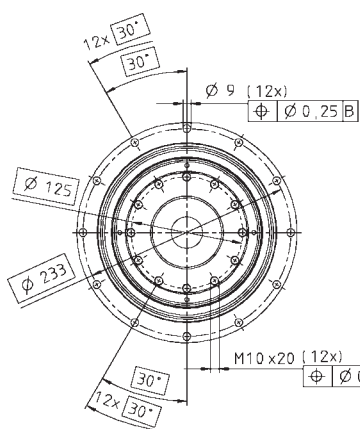
View A

View B

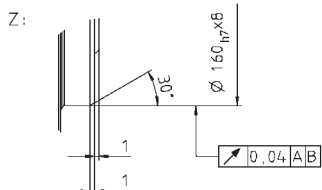
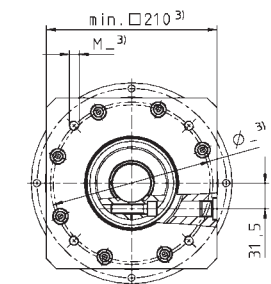
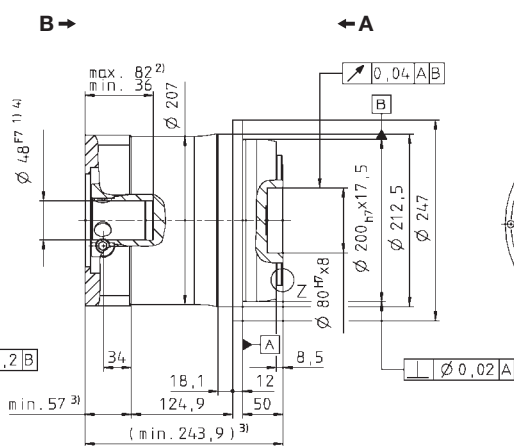
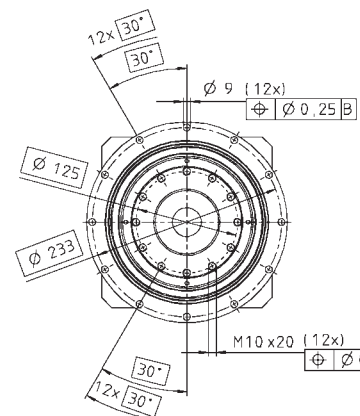
up to 24⁴⁾ (G)
clamping hub
diameter



up to 32/38⁴⁾ (I/K)
clamping hub
diameter



up to 48⁴⁾ (M)
clamping hub
diameter



Non-tolerated dimensions ± 1 mm

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

Motor mounting according to operating manual

TP



TP+ 110 MA HIGH TORQUE®

		2-stage				3-stage							
Ratio ^{a)}	<i>i</i>	22	27.5	38.5	55	66	88	110	154	220			
Max. acceleration torque (max. 1000 cycles per hour)	T_{2B}	Nm	3100	3100	3100	2000	2600	2600	2600	2600	2600		
		in.lb	27435	27435	27435	17700	23010	23010	23010	23010	23010		
Nominal output torque (with n_m)	T_{2V}	Nm	1570	1600	1650	1400	1600	1750	1750	1750	1750		
		in.lb	13895	14160	14603	12390	14160	15488	15488	15488	15488		
Emergency stop torque (permitted 1000 times during the service life of the gearhead)	T_{2Not}	Nm	6500	6500	6500	6500	6500	6500	6500	6500	6500		
		in.lb	57525	57525	57525	57525	57525	57525	57525	57525	57525		
Nominal input speed (with T_{2V} and 20 °C ambient temperature) ^{b)}	n_{1N}	rpm	2500	2500	2500	2500	3000	3000	3000	3000			
Max. input speed	n_{1Max}	rpm	4500	4500	4500	4500	4500	4500	4500	4500			
Mean no load running torque (with $n_1=3000$ rpm and 20 °C gearhead temperature) ^{c)}	T_{012}	Nm	8.0	5.5	4.5	4.0	5.0	4.0	3.5	2.0	1.8		
		in.lb	70.8	48.7	39.8	35.4	44.3	35.4	31.0	17.7	15.9		
Max. torsional backlash	j_t	arcmin	≤ 1				≤ 1						
Torsional rigidity ^{c)}	C_{2T}	Nm/ arcmin	730	725	715	670	650	650	650	650	650		
		in.lb/ arcmin	6461	6416	6328	5930	5753	5753	5753	5753	5753		
Tilting rigidity	C_{2K}	Nm/ arcmin	1452				1452						
		in.lb/ arcmin	12850				12850						
Max. axial force ^{d)}	F_{2AMax}	N	10050				10050						
		lb _f	2261				2261						
Max. tilting moment	M_{2KMax}	Nm	3280				3280						
		in.lb	29028				29028						
Efficiency at full load	η	%	94				92						
Service life (For calculation, see the Chapter "Information")	L_n	h	> 20000				> 20000						
Weight incl. standard adapter plate	<i>m</i>	kg	33.1				35.4						
		lb _m	73.2				78.2						
Operating noise (with $n_1=3000$ rpm no load)	L_{PA}	dB(A)	≤ 66				≤ 66						
Max. permitted housing temperature			+90										
			194										
Ambient temperature			-15 to +40										
			5 to 104										
Lubrication			Lubricated for life										
Paint			Blue RAL 5002										
Direction of rotation			Motor and gearhead same direction										
Protection class			IP 65										
Moment of inertia (relates to the drive)	K	38	J_1	kgcm ²	16.6	15.2	13.9	13.1	13.8	10.2	9.77	9.47	9.16
				10 ⁻³ in.lb.in ²	14.7	13.5	12.3	11.6	12.2	9.03	8.65	8.38	8.11
Clamping hub diameter [mm]	M	48	J_1	kgcm ²	31.4	29.9	28.7	28.0	-	-	-	-	-
				10 ⁻³ in.lb.in ²	27.8	26.5	25.4	24.8	-	-	-	-	-

Reduced mass moments of inertia available on request.

^{a)} Other ratios available on request

^{b)} For higher ambient temperatures, please reduce input speed

^{c)} Valid for clamping hub diameter of 38 mm

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

TP+ 300 MF 1/2-stage

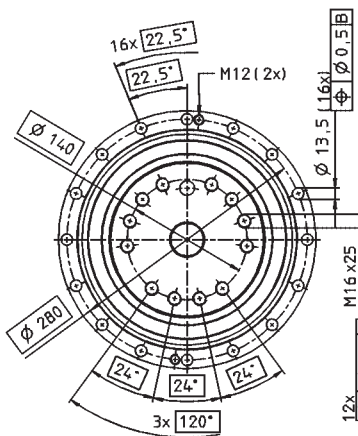
		1-stage			2-stage												
Ratio ^{a)}	<i>i</i>		5	7	10	20	21	25	31	35	50	61	70	91	100		
Max. acceleration torque (max. 1000 cycles per hour)	T_{2B}	Nm	3500	3300	1900	3500	3400	3500	3500	3500	3000	2800	3300	2800	2800		
		in.lb	30975	29205	16815	30975	30090	30975	30975	30975	26550	24780	29205	24780	24780		
Nominal output torque (with n_{1N})	T_{2N}	Nm	2200	1800	1000	2300	2100	2400	2200	2500	1900	1600	1800	1600	1600		
		in.lb	19470	15930	8850	20355	18585	21240	19470	22125	16815	14160	15930	14160	14160		
Emergency stop torque (permitted 1000 times during the service life of the gearhead)	T_{2Not}	Nm	8750	8750	8750	8750	8750	8750	8750	8750	8750	8750	8750	8750	8750		
		in.lb	77438	77438	77438	77438	77438	77438	77438	77438	77438	77438	77438	77438	77438		
Nominal input speed (with T_{2N} and 20 °C ambient temperature) ^{b)}	n_{1N}	rpm	1000	1400	1700	2000	2000	2000	2000	2000	2300	2400	2400	2500	2500		
Max. input speed	n_{1Max}	rpm	2500	2500	2500	3500	3500	3500	3500	3500	3500	3500	3500	3500	3500		
Mean no load running torque (with $n_1=2000$ rpm and 20 °C gearhead temperature)	T_{012}	Nm	23	17	11	10	9,5	9,0	7,0	6,0	5,0	4,0	4,0	3,5	3,5		
		in.lb	204	150	97	89	84	80	62	53	44	35	35	31	31		
Max. torsional backlash	j_t	arcmin	Standard ≤ 3 / Reduced ≤ 1			Standard ≤ 3 / Reduced ≤ 2											
Torsional rigidity	C_{2T}	Nm/arcmin	1000	900	700	850	800	950	750	900	800	700	800	600	650		
		in.lb/arcmin	8850	7965	6195	7523	7080	9408	6638	7965	7080	6195	7080	5310	5753		
Tilting rigidity	C_{2K}	Nm/arcmin	5560														
		in.lb/arcmin	49206														
Max. axial force ^{c)}	F_{2AMax}	N	33000														
		lb _f	7425														
Max. tilting moment	M_{2KMax}	Nm	3900			5900											
		in.lb	34515			52215											
Efficiency at full load	η	%	95			93											
Service life (For calculation, see the Chapter "Information")	L_n	h	> 20000														
Weight incl. standard adapter plate	<i>m</i>	kg	60			58.5											
		lb _m	132.6			129.3											
Operating noise (with $i=10$ and $n_1=2000$ rpm without load)	L_{PA}	dB(A)	≤ 64														
Max. permitted housing temperature			°C														
			F														
Ambient temperature			°C														
			F														
Lubrication			Lubricated for life														
Paint			Blue RAL 5002														
Direction of rotation			Motor and gearhead same direction														
Protection class			IP 65														
Moment of inertia (relates to the drive)	M	48	J_1	kgcm ²	—	—	—	27.5	27.0	25.9	25.6	22.4	21.5	21.4	21.3	21.2	21.2
				10 ⁻³ in.lb.in. ²	—	—	—	24.3	23.9	22.9	22.7	19.8	19.0	18.9	18.9	18.8	18.8
Clamping hub diameter [mm]	N	55	J_1	kgcm ²	82.6	61.2	49.5	—	—	—	—	—	—	—	—	—	—
				10 ⁻³ in.lb.in. ²	73.1	54.2	43.8	—	—	—	—	—	—	—	—	—	—

Reduced mass moments of inertia available on request.

^{a)} Other ratios available on request

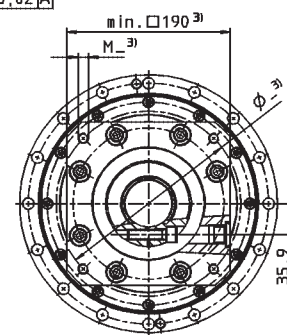
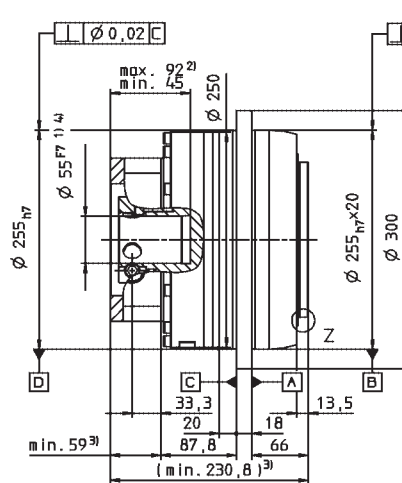
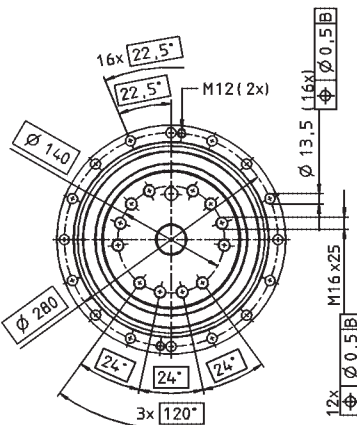
^{b)} For higher ambient temperatures, please reduce input speed

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

1-stage:


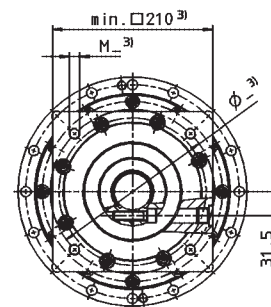
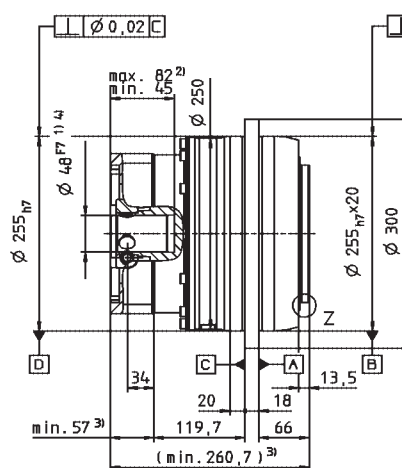
B →

← A


2-stage:


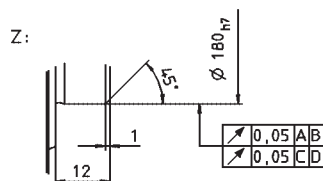
B →

← A



Motor shaft diameter [mm]

 up to 55⁴⁾ (N)
clamping hub
diameter

 up to 48⁴⁾ (M)
clamping hub
diameter


Non-tolerated dimensions ±1 mm

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

Motor mounting according to operating manual

TP



TP+ 300 MA HIGH TORQUE®

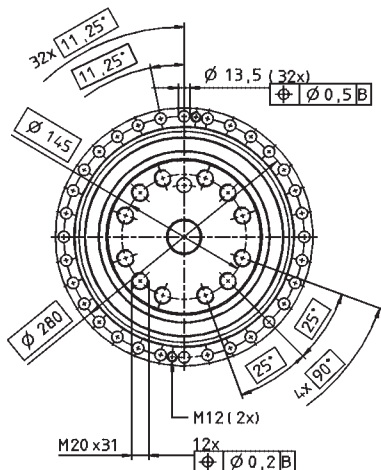
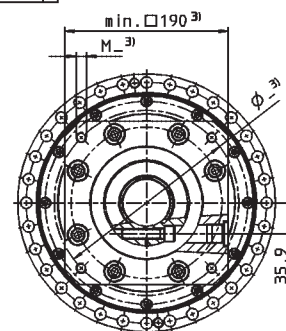
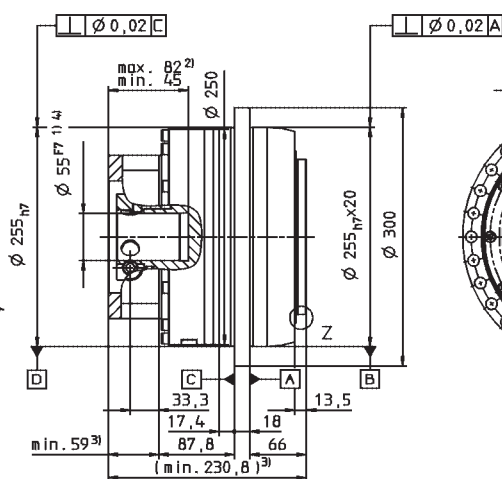
				1-stage	2-stage				3-stage					
Ratio ^{a)}		<i>i</i>		5.5	22	27.5	38.5	55	66	88	110	154	220	
Max. acceleration torque (max. 1000 cycles per hour)	T_{2B}	Nm		4600	5500	5500	5500	3900	5500	5500	5500	5500	5500	
		in.lb		40714	48679	48679	48679	34518	48679	48679	48679	48679	48679	48679
Nominal output torque (with n_n)	T_{2V}	Nm		2200	3500	3500	3500	2500	3500	3500	3500	3500	3500	
		in.lb		19472	30978	30978	30978	22127	30978	30978	30978	30978	30978	30978
Emergency stop torque (permitted 1000 times during the service life of the gearhead)	T_{2Not}	Nm		8750	13250	13250	13250	13250	13250	13250	13250	13250	13250	
		in.lb		77445	117273	117273	117273	117273	117273	117273	117273	117273	117273	117273
Nominal input speed (with T_{2V} and 20 °C ambient temperature) ^{b)}	n_{1N}	rpm		1000	2000	2000	2000	2000	2000	2000	2000	2000	2000	
Max. input speed	n_{1Max}	rpm		2500	3500	3500	3500	3500	3500	3500	3500	3500	3500	
Mean no load running torque (with $n_1=2000$ rpm and 20 °C gearhead temperature)	T_{012}	Nm		22	12	10	9,0	7,0	6,5	4,5	4,0	3,0	2,0	
		in.lb		195	106	89	80	62	58	40	35	27	18	
Max. torsional backlash	j_t	arcmin		Standard ≤ 2 / Reduced ≤ 1		Standard ≤ 3 / Reduced ≤ 1.5								
Torsional rigidity	C_{21}	Nm/ arcmin		1400	1200	-	-	-	-	-	1200	-	-	
		in.lb/ arcmin		12391	10621	-	-	-	-	-	10621	-	-	
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		3900								6500		
		in.lb		34518								57530		
Efficiency at full load	η	%		95								93		
Service life (For calculation, see "Technical Basics")	L_n	h		> 20000										
Weight incl. standard adapter plate	<i>m</i>	kg		55	64				67					
		lb _m		121.25	141.1				147.7					
Operating noise (with $n_1=2000$ rpm no load)	L_{PA}	dB(A)		≤ 68	≤ 67				≤ 66					
Max. permitted housing temperature			°C	+90										
			F	194										
Ambient temperature			°C	-15 to +40										
			F	5 to 104										
Lubrication			Lubricated for life											
Paint			Blue RAL 5002											
Direction of rotation			Motor and gearhead same direction											
Protection class			IP 65											
Moment of inertia (relates to the drive)	K	38	J_1	kgcm ²	-	-	-	-	-	16.6	12.9	11.6	10.3	9.50
				in.lb.s ²	-	-	-	-	-	0.0147	0.0114	0.0103	0.0091	0.0084
Clamping hub diameter [mm]	M	48	J_1	kgcm ²	-	30.8	27.6	24.9	23.0	-	-	-	-	-
				in.lb.s ²	-	0.0273	0.0244	0.0220	0.0204	-	-	-	-	-
	N	55	J_1	kgcm ²	129	-	-	-	-	-	-	-	-	-
				in.lb.s ²	0.1142	-	-	-	-	-	-	-	-	-

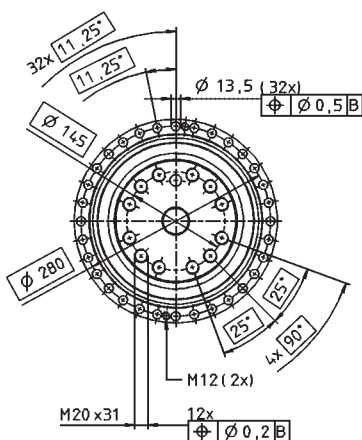
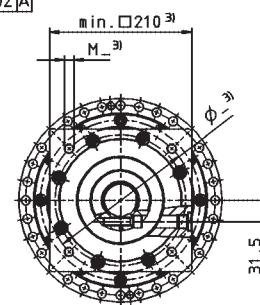
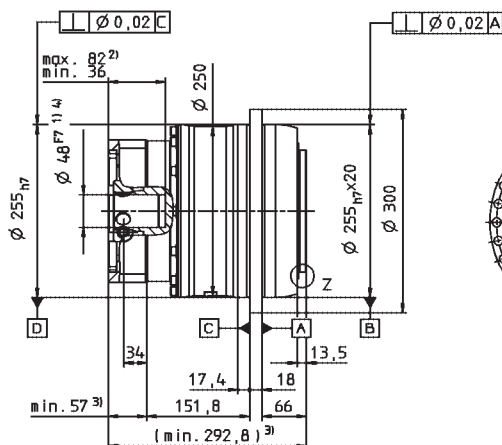
Reduced mass moments of inertia available on request.

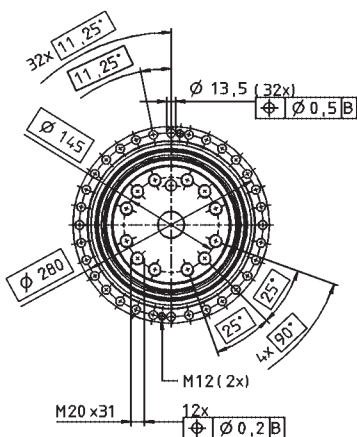
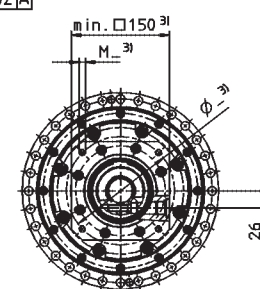
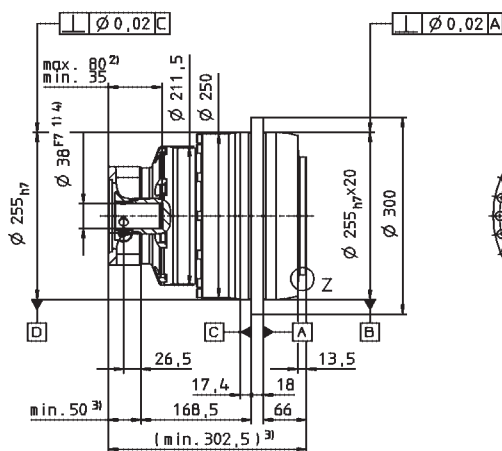
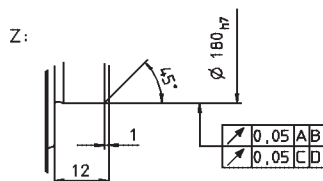
^{a)} Other ratios available on request

^{b)} For higher ambient temperatures, please reduce input speed

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

1-stage:

B →
← A

 up to 55⁴⁾ (N)
clamping hub
diameter

2-stage:

B →
← A

 up to 48⁴⁾ (M)
clamping hub
diameter

3-stage:

B →
← A

 up to 38⁴⁾ (K)
clamping hub
diameter

 Non-tolerated dimensions ± 1 mm

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

Motor mounting according to operating manual

TP:



Motor shaft diameter [mm]

TP+ 500 MF 1/2-stage

		1-stage			2-stage												
Ratio ^{a)}	<i>i</i>	5	7	10	20	21	25	31	35	50	61	70	91	100			
Max. acceleration torque (max. 1000 cycles per hour)	T_{2B}	Nm	6000	5000	3400	6000	5000	6000	6000	6000	4500	4800	5000	4800	4800		
		in.lb	53100	44250	30090	53100	44250	53100	53100	53100	39825	42480	44250	42480	42480		
Nominal output torque (with n_{1N})	T_{2V}	Nm	3250	2800	1700	3350	3200	3800	3700	3800	2900	2900	2800	2900	2900		
		in.lb	28763	24780	15045	29648	28320	33630	32745	33630	25665	25665	24780	25665	25665		
Emergency stop torque (permitted 1000 times during the service life of the gearhead)	T_{2Not}	Nm	15000	15000	15000	15000	15000	15000	15000	15000	15000	15000	15000	15000	15000		
		in.lb	132750	132750	132750	132750	132750	132750	132750	132750	132750	132750	132750	132750	132750		
Nominal input speed (with T_{2V} and 20 °C ambient temperature) ^{b)}	n_{1N}	rpm	900	1300	1500	1500	1500	1500	1500	2000	2100	2100	2200	2200			
Max. input speed	n_{1Max}	rpm	2200	2200	2200	3500	3500	3500	3500	3500	3500	3500	3500	3500			
Mean no load running torque (with $n_1=2000$ rpm and 20 °C gearhead temperature)	T_{012}	Nm	30	22	14	13	12	10	8,0	7,0	6,0	5,0	5,0	4,5	4,5		
		in.lb	266	195	124	115	106	89	71	62	53	44	44	40	40		
Max. torsional backlash	j_t	arcmin	Standard ≤ 3 / Reduced ≤ 1			Standard ≤ 3 / Reduced ≤ 2											
Torsional rigidity	C_{2T}	Nm/arcmin	1450	1300	1100	1400	1200	1450	1200	1400	1300	1100	1250	950	1050		
		in.lb/arcmin	12833	11505	9735	12390	10620	12833	10620	12390	11505	9735	11063	8401	9293		
Tilting rigidity	C_{2K}	Nm/arcmin	9480														
		in.lb/arcmin	83898														
Max. axial force ^{c)}	F_{2AMax}	N	50000														
		lb _f	11250														
Max. tilting moment	M_{2KMax}	Nm	5500			8800											
		in.lb	48675			77880											
Efficiency at full load	η	%	95			93											
Service life (For calculation, see the Chapter "Information")	L_n	h	> 20000														
Weight incl. standard adapter plate	<i>m</i>	kg	82			77.5											
		lb _m	181.2			171.3											
Operating noise (with $i=10$ and $n_1=2000$ rpm no load)	L_{PA}	dB(A)	≤ 66														
Max. permitted housing temperature		°C	+90														
		F	194														
Ambient temperature		°C	-15 to +40														
		F	5 to 104														
Lubrication			Lubricated for life														
Paint			Blue RAL 5002														
Direction of rotation			Motor and gearhead same direction														
Protection class			IP 65														
Moment of inertia (relates to the drive)	M	48	J_1	kgcm ²	-	-	-	32.3	37.6	31.1	32.8	25.1	23.2	23.6	23.2	23.0	22.7
				10 ⁻² in.lb.in. ²	-	-	-	28.6	33.3	27.5	29.0	22.2	20.5	20.9	20.5	20.4	20.1
Clamping hub diameter [mm]	O	60	J_1	kgcm ²	175.5	137.0	115.8	-	-	-	-	-	-	-	-	-	-
				10 ⁻³ in.lb.in. ²	155.3	121.2	102.5	-	-	-	-	-	-	-	-	-	-

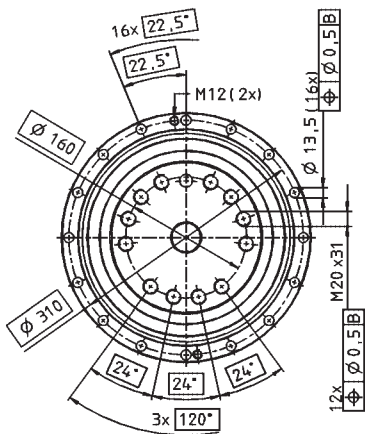
Reduced mass moments of inertia available on request.

^{a)} Other ratios available on request

^{b)} For higher ambient temperatures, please reduce input speed

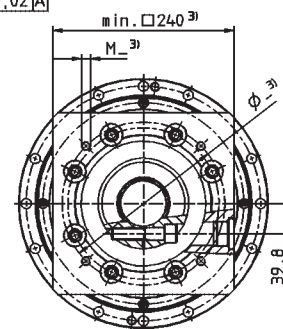
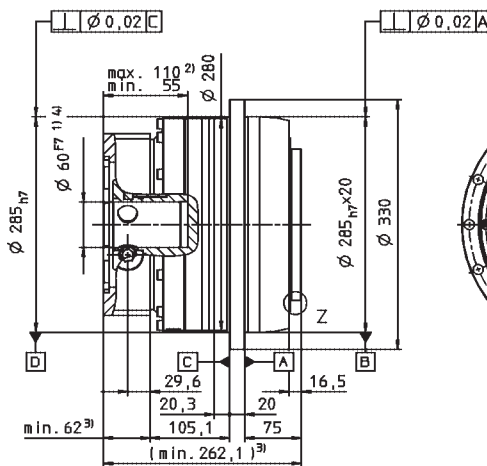
^{c)} Refers to center of the output shaft or flange

1-stage:



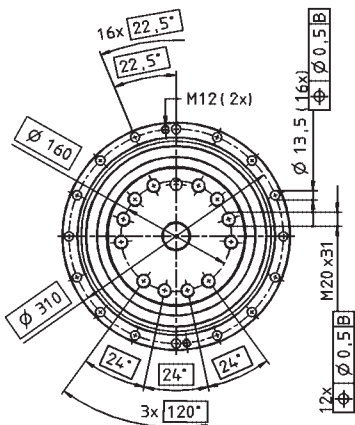
B →

← A



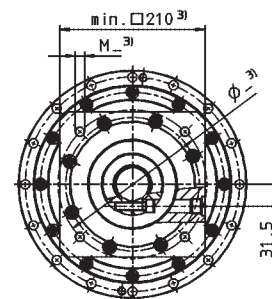
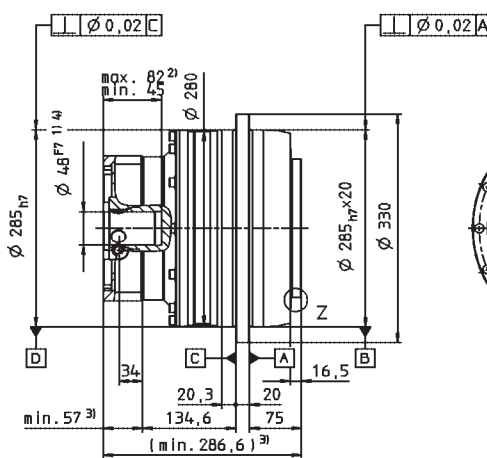
up to 60⁴⁾(O)
clamping hub
diameter

2-stage:

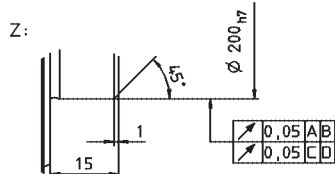


B →

← A



up to 48⁴⁾(M)
clamping hub
diameter



Non-tolerated dimensions ±1 mm

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

⚠ Motor mounting according to operating manual

TP:



TP+ 500 MA HIGH TORQUE®

				1-stage	2-stage				3-stage					
Ratio ^{a)}		<i>i</i>		5.5	22	27.5	38.5	55	66	88	110	154	220	
Max. acceleration torque (max. 1000 cycles per hour)	T_{2B}	Nm		8000	10000	10000	10000	7200	10000	10000	10000	10000	10000	
		in.lb		70806	88508	88508	88508	63726	88508	88508	88508	88508	88508	88508
Nominal output torque (with n_{2N})	T_{2N}	Nm		3500	6000	4600	4600	4700	6000	6000	6000	6000	6000	
		in.lb		30978	53105	40714	40714	41599	53105	53105	53105	53105	53105	53105
Emergency stop torque (permitted 1000 times during the service life of the gearhead)	T_{2Not}	Nm		15000	25000	25000	25000	25000	25000	25000	25000	25000	25000	
		in.lb		132762	221270	221270	221270	221270	221270	221270	221270	221270	221270	221270
Nominal input speed (with T_{2N} and 20 °C ambient temperature) ^{b)}	n_{1N}	rpm		900	1500	1500	1500	1500	1500	1500	1500	1500	1500	
Max. input speed	n_{1Max}	rpm		2500	3500	3500	3500	3500	3500	3500	3500	3500	3500	
Mean no load running torque (with $n_1=2000$ rpm and 20 °C gearhead temperature)	T_{012}	Nm		28	18	14	12	9.0	8.5	6.5	6.0	5.0	4.0	
		in.lb		248	159.3	124	106	80	75	58	53	44	35	
Max. torsional backlash	j_t	arcmin		Standard ≤ 2 / Reduced ≤ 1		Standard ≤ 3 / Reduced ≤ 1.5								
Torsional rigidity	C_{2T}	Nm/arcmin		1650	2000	-	-	-	-	-	1500	-	1800	
		in.lb/arcmin		14603	17700						13275		15930	
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		6600	9500									
		in.lb		58415	84083									
Efficiency at full load	η	%		95	93									
Service life (For calculation, see "Technical Basics")	L_n	h		> 20000										
Weight incl. standard adapter plate	<i>m</i>	kg		80				89						
		lb _m		176.4				196.2						
Operating noise (with $n_1=2000$ rpm no load)	L_{PA}	dB(A)		≤ 68				≤ 67						
Max. permitted housing temperature			°C	+90										
			F	194										
Ambient temperature			°C	-15 to +40										
			F	5 to 104										
Lubrication			Lubricated for life											
Paint			Blue RAL 5002											
Direction of rotation			Motor and gearhead same direction											
Protection class			IP 65											
Moment of inertia (relates to the drive)	M	48	J_1	kgcm ²		43.8	36.9	30.5	27.0	32.7	28.3	26.7	25.2	24.4
				in.lb.s ²		0.0388	0.0327	0.0270	0.0239	0.0289	0.0250	0.0236	0.0223	0.0216
Clamping hub diameter [mm]	O	60	J_1	kgcm ²	175	-	-	-	-	-	-	-	-	-
				in.lb.s ²	0.1549	-	-	-	-	-	-	-	-	-

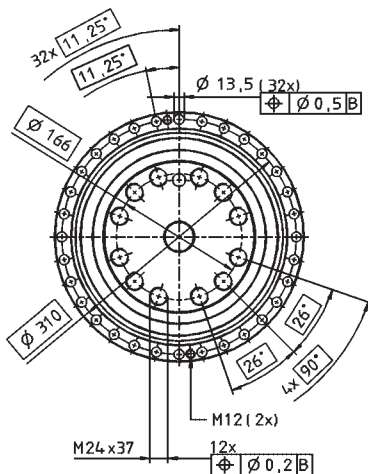
Reduced mass moments of inertia available on request.

^{a)} Other ratios available on request

^{b)} For higher ambient temperatures, please reduce input speed

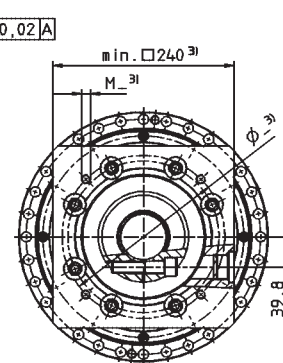
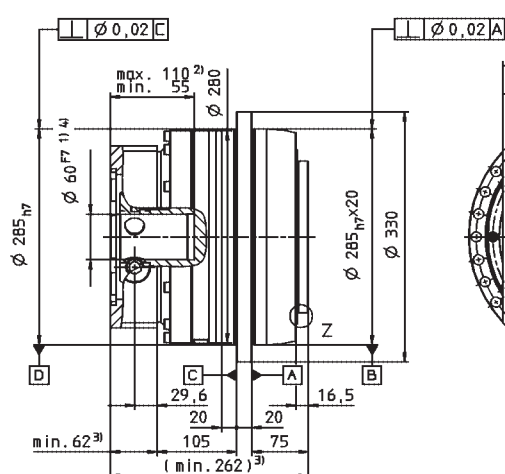
^{c)} Refers to center of the output shaft or flange

1-stage:



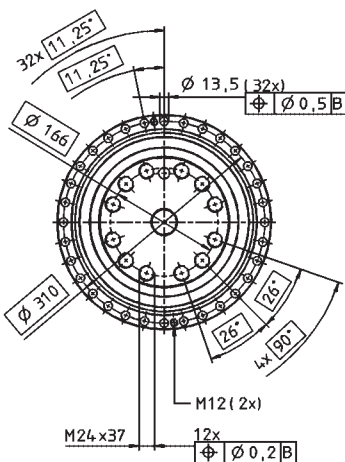
B →

← A



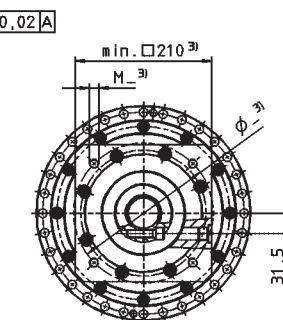
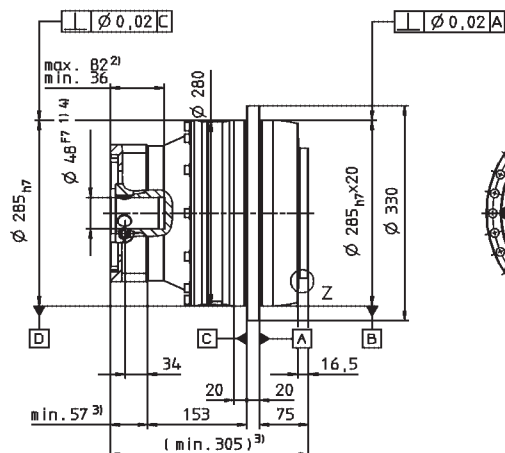
up to 60⁴⁾ (O)
clamping hub
diameter

2-stage:



B →

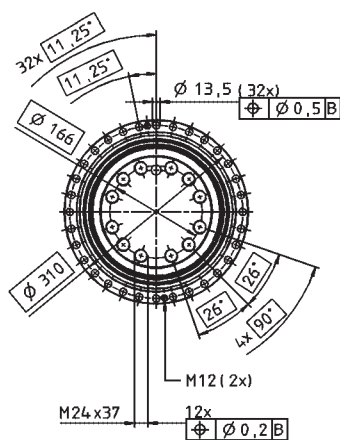
← A



Motor shaft diameter [mm]

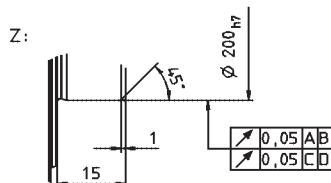
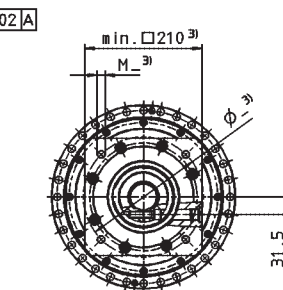
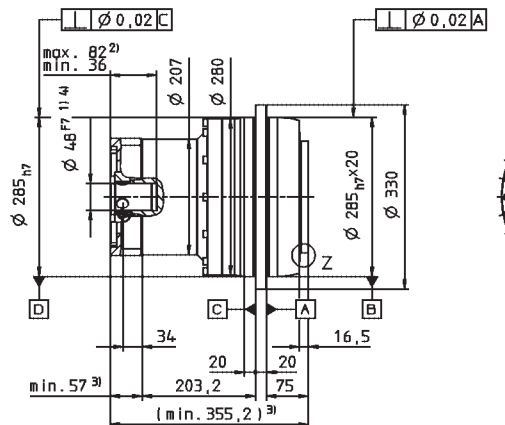
up to 48⁴⁾ (M)
clamping hub
diameter

3-stage:



B →

← A



Non-tolerated dimensions ±1 mm

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

▲ Motor mounting according to operating manual

TP:

