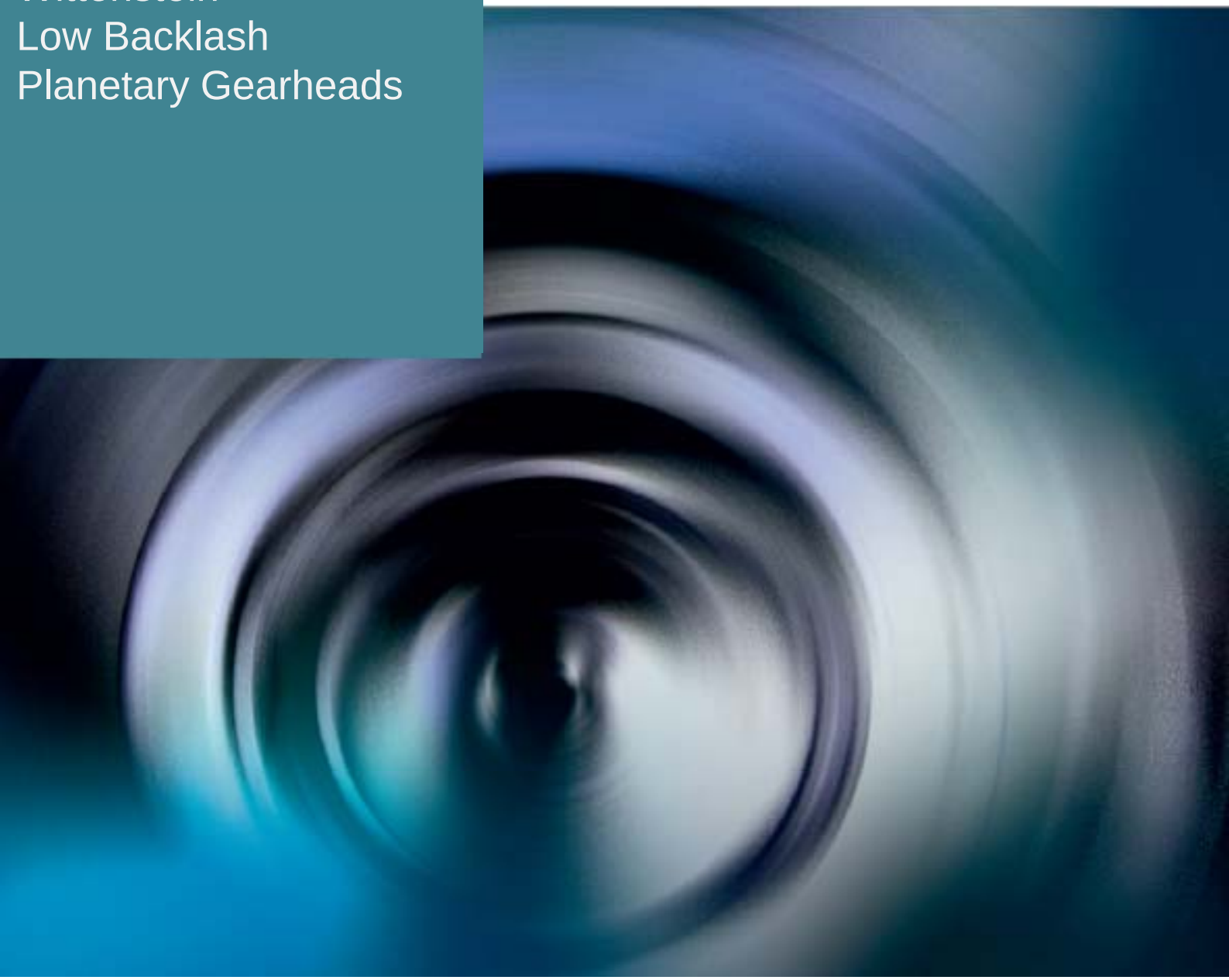
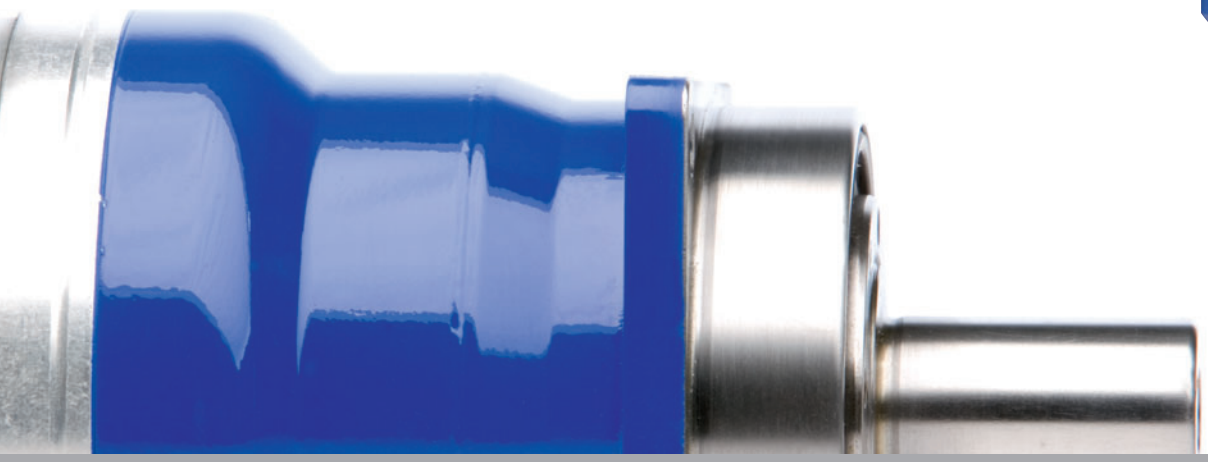
WITTENSTEIN

Wittenstein
Low Backlash
Planetary Gearheads



Low backlash planetary gearheads by WITTENSTEIN alpha are sure to win over the hearts and minds of engineers and designers who place emphasis on efficiency, productivity and process stability.

alpheno®



Low backlash planetary gearheads

Maximum power density

And the torques?
Although the previous series achieved outstanding results, we managed to increase the torques by up to 40%.
Raising the limits – Typical of WITTENSTEIN alpha!

Versatile installation

In whatever position you install your + gearhead, the gearhead always contains the same quantity of oil.

The gearheads are so flexible, you can install them vertically, horizontally or with the output facing upwards or downwards.

WITTENSTEIN

TP+	SP+	LP+	alphira®

Simple motor installation

Safe, faultless motor installation is possible in a single working step. The WITTENSTEIN alpha-patented motor attachment is also available with integrated thermal length compensation as an option.

Maximum positioning accuracy

SP and TP represented compact precision. Now the SP+ and TP+ represent maximum compact precision because we have managed to further reduce the torsional play compared with the previous series to less than one angular minute to enable you to significantly increase the positioning accuracy in your application.

Superior running thanks to the helical teeth

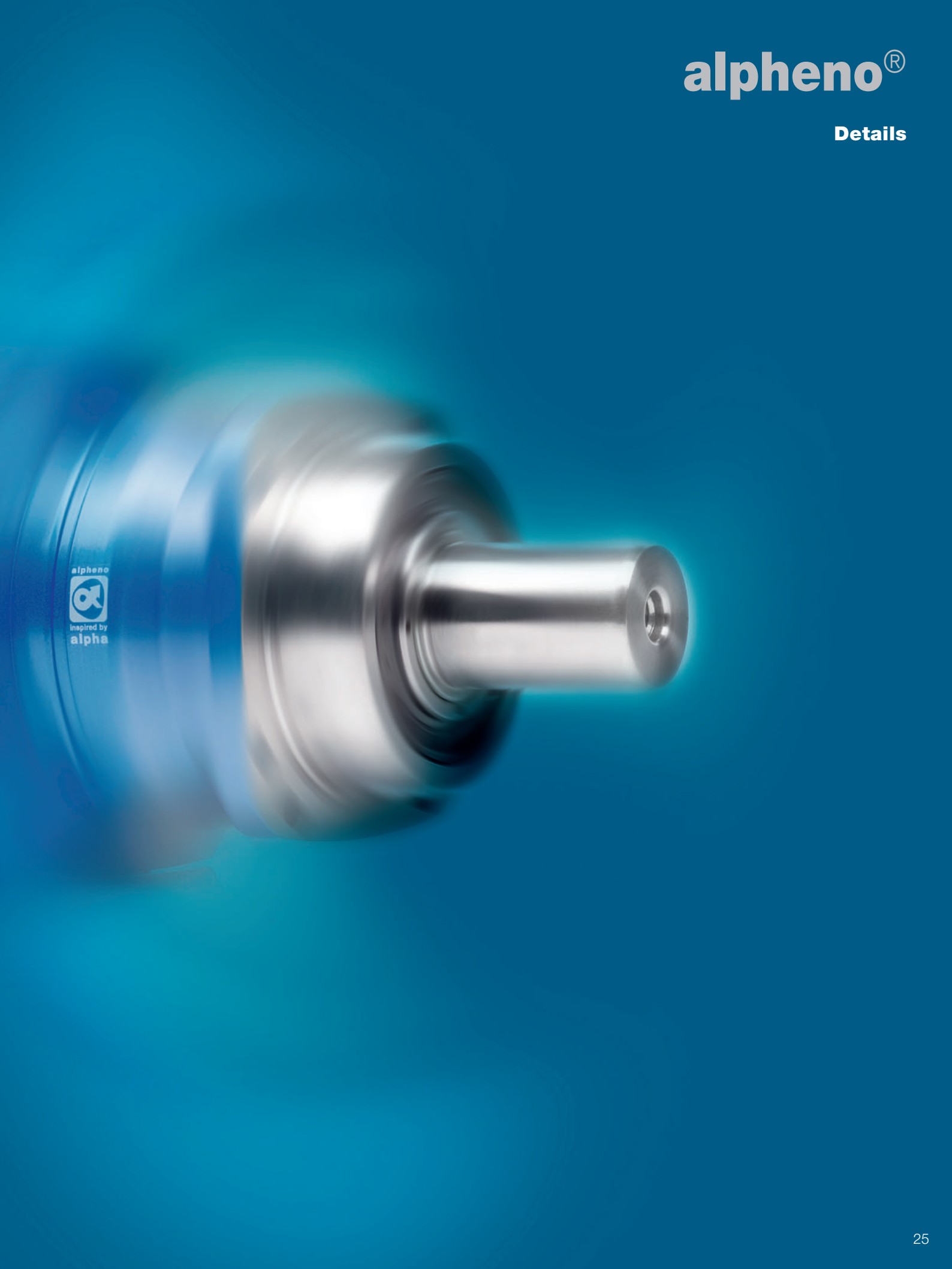
The SP+ and TP+ gearheads “whisper”.
Compared to the classic straight-toothed SP and TP, helical-toothed + gearheads are 6 dB(A) quieter during operation. And what a difference 64 instead of 70 decibels makes to added value. You will hardly notice the vibrations made by gearheads from the + series because they run so

World-class lifespan

The seal rings on the + gearhead series were specially developed and the material and geometry are both optimized to ensure an extremely long lifespan!

alpheno® – The personalized solution

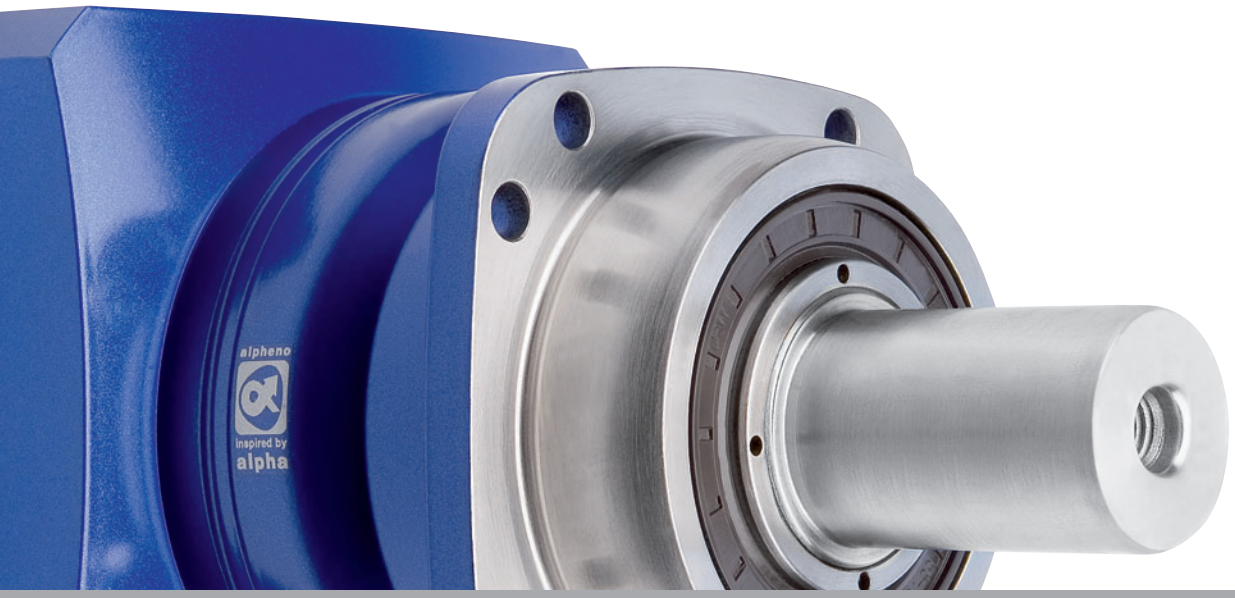
Details



alpheno® – Rendez-vous with the future

Anyone setting their sights on the future should always have the right partner on their side. Form a mutual partnership with us that promotes innovation and development. We develop advanced drive technology solutions together with our customers to help them rise to the challenge of a constantly changing market. An alliance of mutual success is top of our agenda.

alpheno® individual



alpheno®

alpheno® – Clear benefits for the customer

Reducing costs
- by decreasing the engineering workload
- shorter development times – time to market
- smaller installation spaces

Increasing profits
- by increasing productivity
- reduced unit costs
- better quality

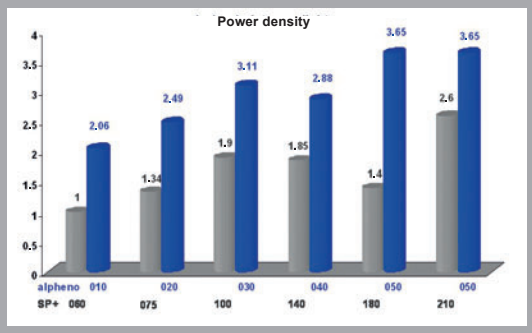
Securing markets
- through technical innovation
- maximum reliability
- improved competitiveness

Are you searching for a solution specially adapted to your needs? We enter into close collaboration with all our customers to develop personalized solutions and produce the perfect design for your drive applications.

alpheno® – Customized innovation

- if you require an even more compact drive
- if you wish to enhance the performance of your machine
- if you require a specific solution

We offer you compact solutions and improved performance.

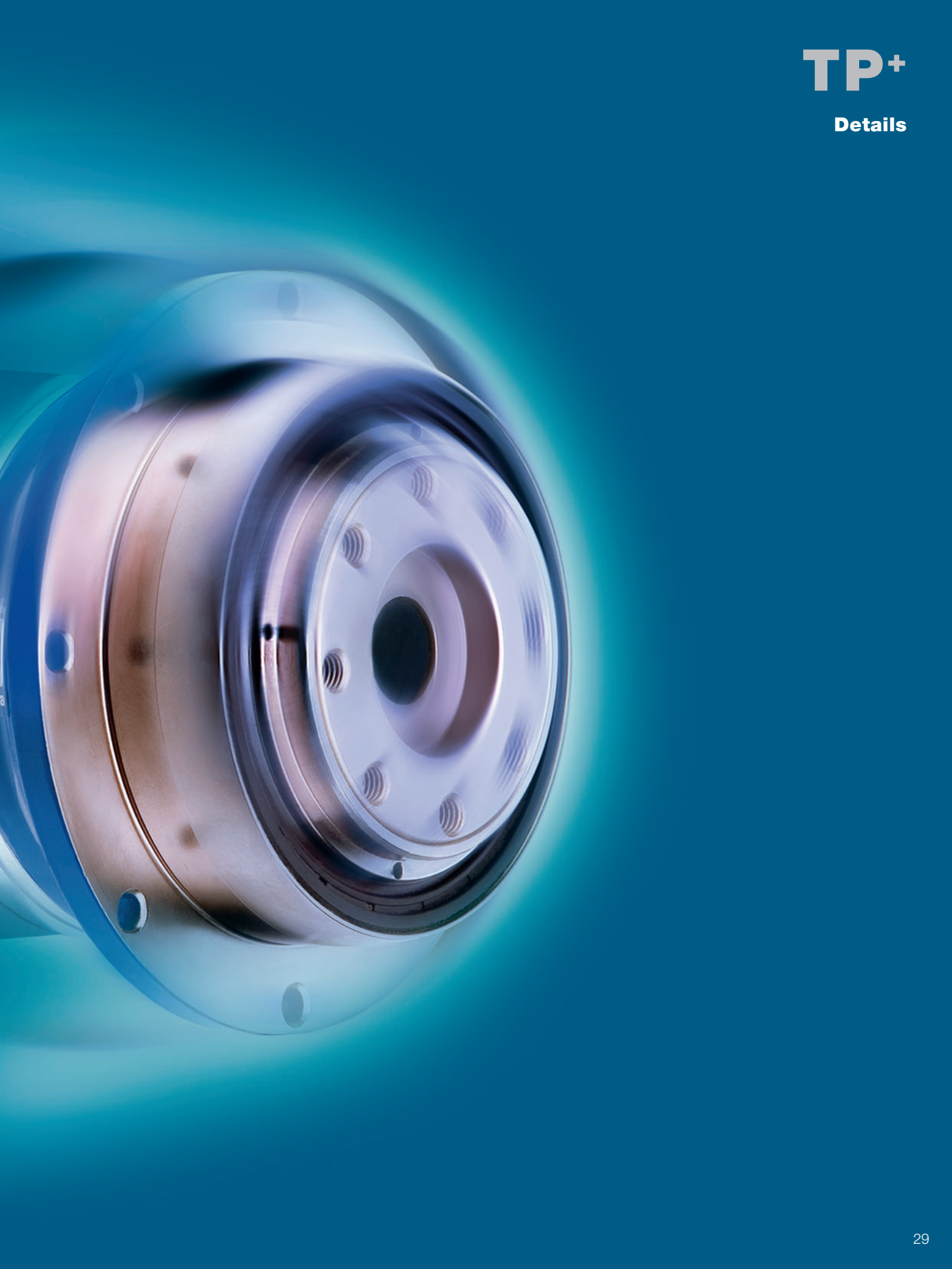


Power density comparison: Industrial standard with alpheno®

alpheno® is quality.

We define quality as a philosophy. An integrated QM system that incorporates state-of-the-art measuring and testing methods assures the quality of our products.

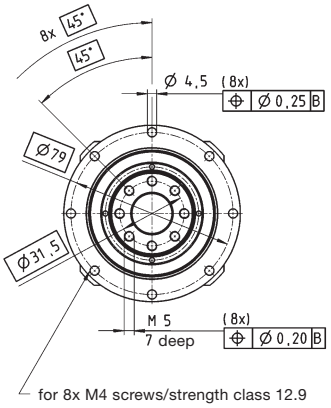
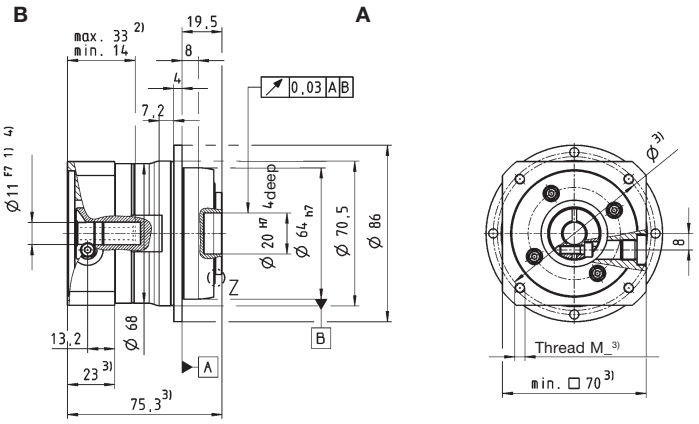
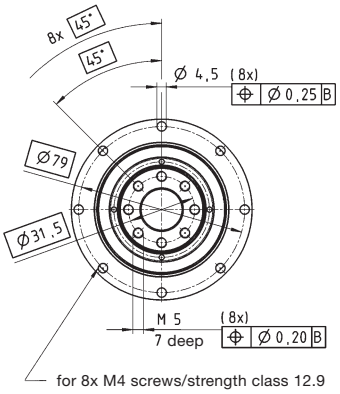
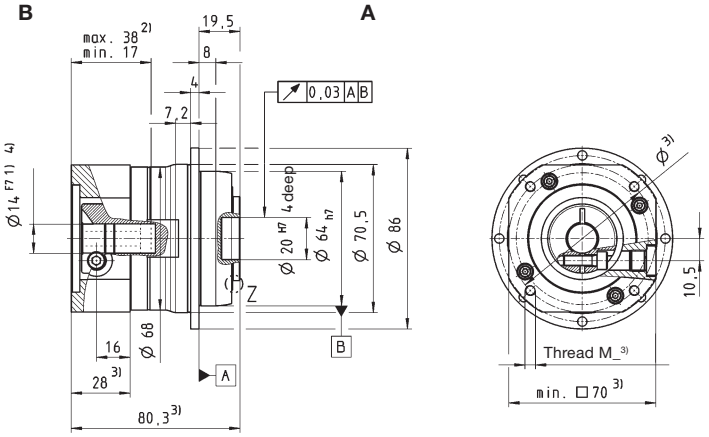
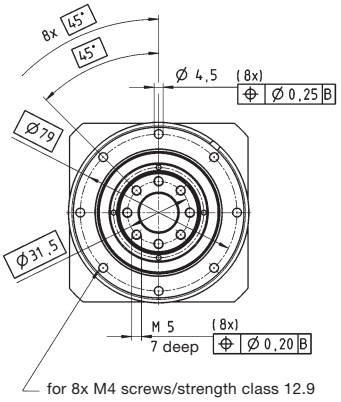
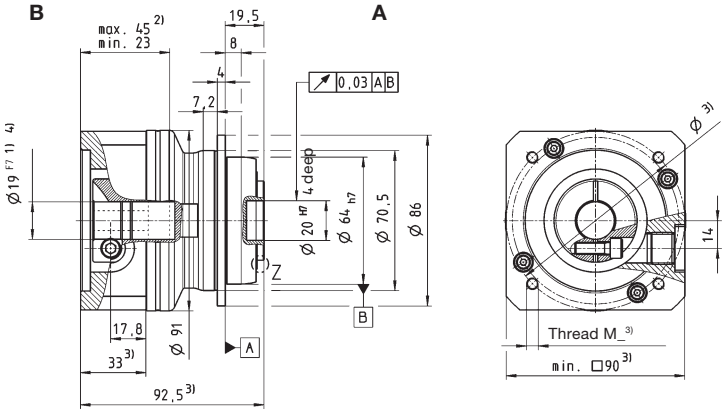
TP⁺ – Top performer among compact planetary gearheads with drive flange

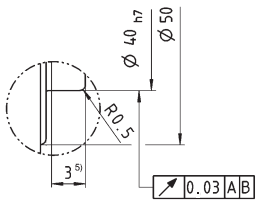


				1-stage			
Ratio [a]			***i***	**4**	**5**	**7**	**10**
Max. acceleration torque (max. 1000 cycles per hour)			T_{2B} Nm	50	50	50	35
			T_{2B} in.lb	443	443	443	310
Nominal output torque (with n_{1N})			T_{2N} Nm	28	28	28	18
			T_{2N} in.lb	248	248	248	159
Emergency stop torque (permitted 1000 times during the service life of the gearhead)			T_{2Not} Nm	100	100	100	100
			T_{2Not} 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
			T_{012} in.lb	8.41	7.08	5.31	3.98
Max. torsional backlash			j_t arcmin	Standard ≤ 4 / Reduced ≤ 2			
Torsional rigidity [c]			C_{t12} Nm/ arcmin	12	12	11	8
			C_{t12} in.lb/ arcmin	106	106	97	71
Tilting rigidity			C_{2K} Nm/ arcmin	–			
			C_{2K} in.lb/ arcmin				
Max. axial force [d]			F_{2AMax} N	1630			
			F_{2AMax} lb_f	367			
Max. tilting moment			M_{2KMax} Nm	110			
			M_{2KMax} 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			
			m lb_m	3.1			
Operating noise (with n_1=3000 rpm no load)			L_{PA} dB(A)	≤ 58			
Max. permitted housing temperature			°C	+90			
			F	194			
Ambient temperature			°C	0 to +40			
			F	32 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 kgcm²	0.17	0.14	0.11	0.09
			J_1 10^{-3} in.lb.s²	0.15	0.12	0.10	0.08
Clamping hub diameter [mm]	C	14	J_1 kgcm²	0.25	0.21	0.18	0.17
			J_1 10^{-3} in.lb.s²	0.22	0.19	0.16	0.15
	E	19	J_1 kgcm²	0.57	0.54	0.51	0.49
			J_1 10^{-3} in.lb.s²	0.50	0.47	0.45	0.43

[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

Motor shaft diameter [mm]

	View A	View B
up to 11 [4] (B) clamping hub diameter		
up to 14 [4] (C) clamping hub diameter		
up to 19 [4] (E) clamping hub diameter		



Z: Detail

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.
5) Fit length

⚠ Motor mounting according to operating manual

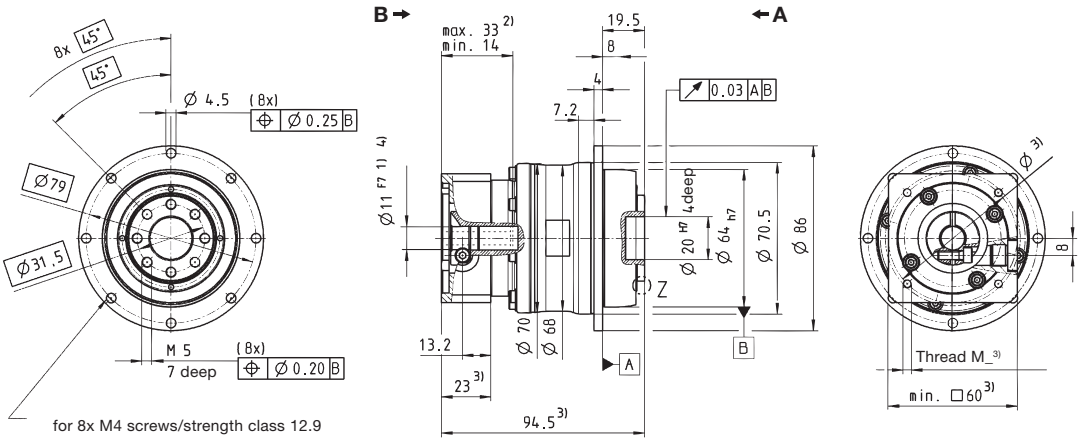
				2-stage												
Ratio [a]			***i***	**16**	**20**	**21**	**25**	**28**	**31**	**35**	**40**	**50**	**61**	**70**	**91**	**100**
Max. acceleration torque (max. 1000 cycles per hour)			T_{2B} Nm	50	50	40	50	50	40	50	50	50	45	50	32	35
			in.lb	443	443	354	443	443	354	443	443	443	398	443	283	310
Nominal output torque (with n_{1N})			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_1 = 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_{t12} 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_{2KMax} 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 n_1 = 3000 rpm no load)			L_{PA} dB(A)	≤ 58												
Max. permitted housing temperature			°C	+90												
			F	194												
Ambient temperature			°C	0 to +40												
			F	32 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) Clamping hub diameter [mm]	B	11	J_1 kgcm²	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.s²	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
	C	14	J_1 kgcm²	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.s²	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

[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

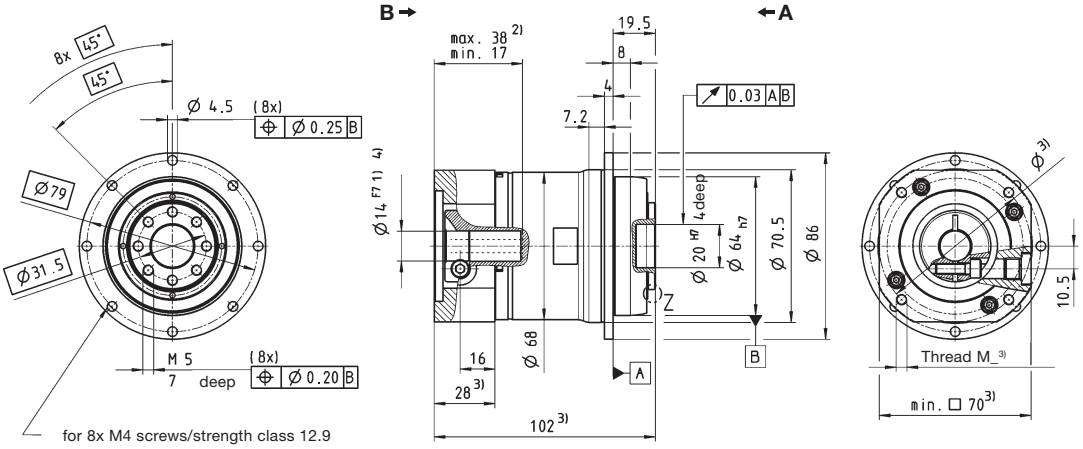
View A | View B

Motor shaft diameter [mm]

up to 11 [4] (B) clamping hub diameter



up to 14 [4] (C) clamping hub diameter



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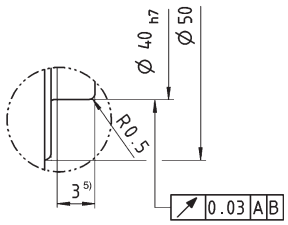


Non-tolerated dimensions ±1 mm

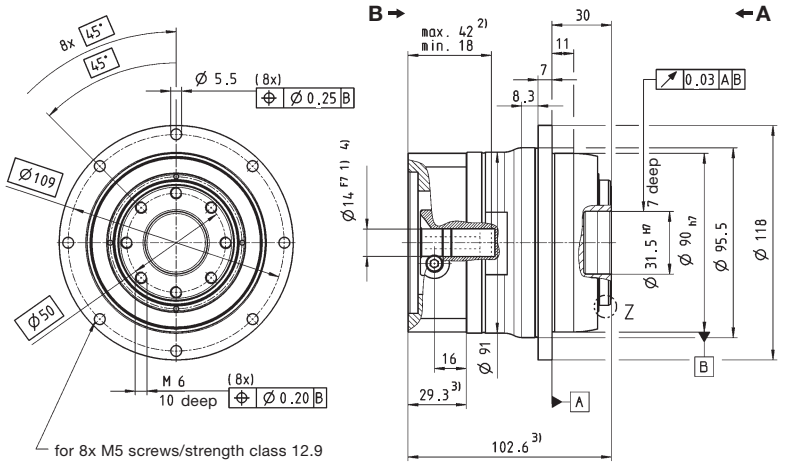
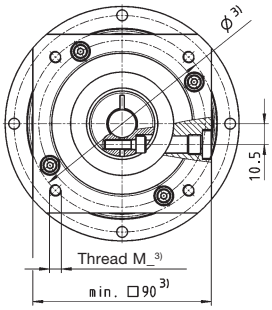
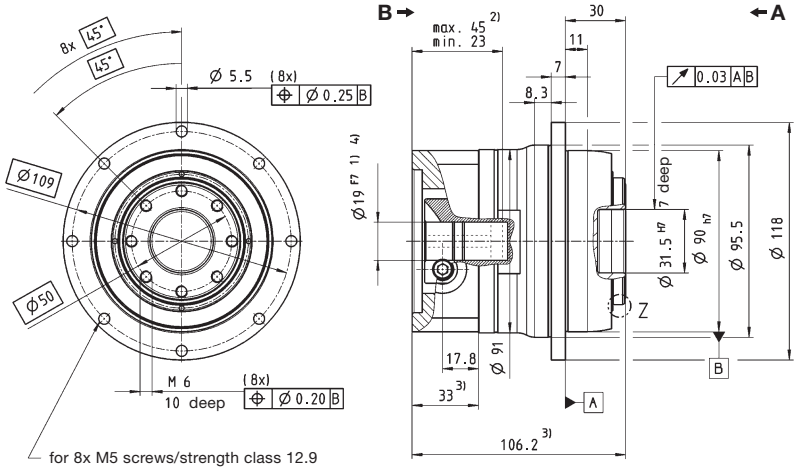
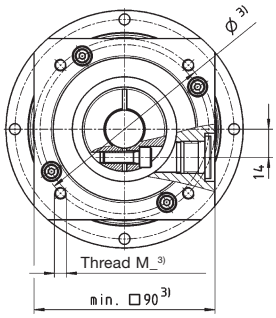
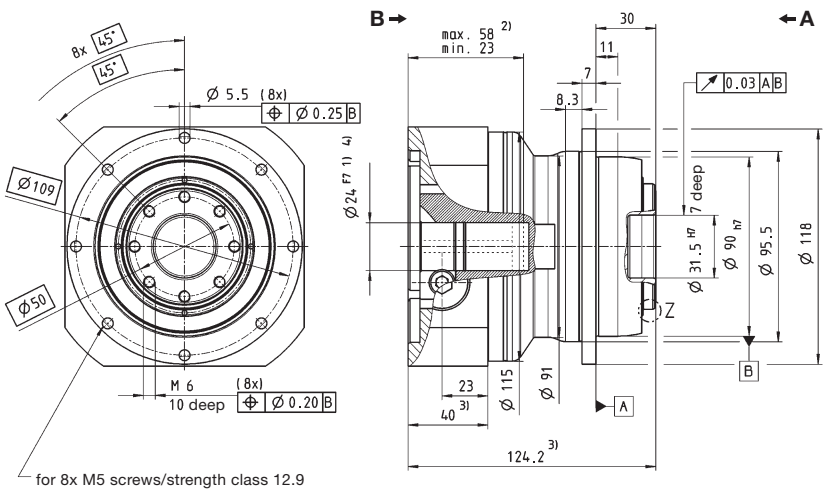
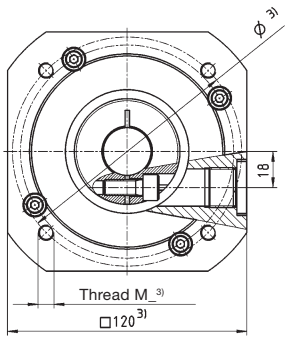
1) Check motor shaft fit.
2) Min./Max. permissible motor shaft length. Longer motor shafts are adaptable, please contact us.
3) The dimensions depend on the motor.
4) Smaller motor shaft diameter is compensated by a bushing with a minimum thickness of 1 mm.
5) Fit length

⚠ Motor mounting according to operating manual

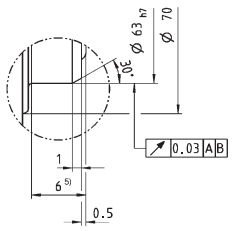
				1-stage			
Ratio [a]			***i***	**4**	**5**	**7**	**10**
Max. acceleration torque (max. 1000 cycles per hour)			T_{2B} Nm	130	130	130	100
			T_{2B} in.lb	1151	1151	1151	885
Nominal output torque (with n_{1N})			T_{2N} Nm	75	75	75	60
			T_{2N} in.lb	664	664	664	531
Emergency stop torque (permitted 1000 times during the service life of the gearhead)			T_{2Not} Nm	250	250	250	250
			T_{2Not} 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
			T_{012} in.lb	14.2	11.5	8.85	6.20
Max. torsional backlash			j_t arcmin	Standard ≤ 3 / Reduced ≤ 1			
Torsional rigidity [c]			C_{t12} Nm/ arcmin	32	33	30	23
			C_{t12} in.lb/ arcmin	283	292	266	204
Tilting rigidity			C_{2K} Nm/ arcmin	225			
			C_{2K} in.lb/ arcmin	1991			
Max. axial force [d]			F_{2AMax} N	2150			
			F_{2AMax} lb_f	484			
Max. tilting moment			M_{2KMax} Nm	270			
			M_{2KMax} 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			
			m lb_m	8.4			
Operating noise (with n_1=3000 rpm no load)			L_{PA} dB(A)	≤ 60			
Max. permitted housing temperature			°C	+90			
			F	194			
Ambient temperature			°C	0 to +40			
			F	32 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 kgcm²	0.78	0.62	0.48	0.40
			J_1 10^{-3} in.lb.s²	0.69	0.55	0.42	0.35
Clamping hub diameter [mm]	E	19	J_1 kgcm²	0.95	0.79	0.64	0.57
			J_1 10^{-3} in.lb.s²	0.84	0.70	0.57	0.50
	G	24	J_1 kgcm²	2.32	2.16	2.02	1.94
			J_1 10^{-3} in.lb.s²	2.05	1.91	1.78	1.72

[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

Motor shaft diameter [mm]

	View A	View B
up to 14 [4] (C) clamping hub diameter		
up to 19 [4] (E) clamping hub diameter		
up to 24 [4] (G) clamping hub diameter		

Z: Detail



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.
5) Fit length

⚠ Motor mounting according to operating manual

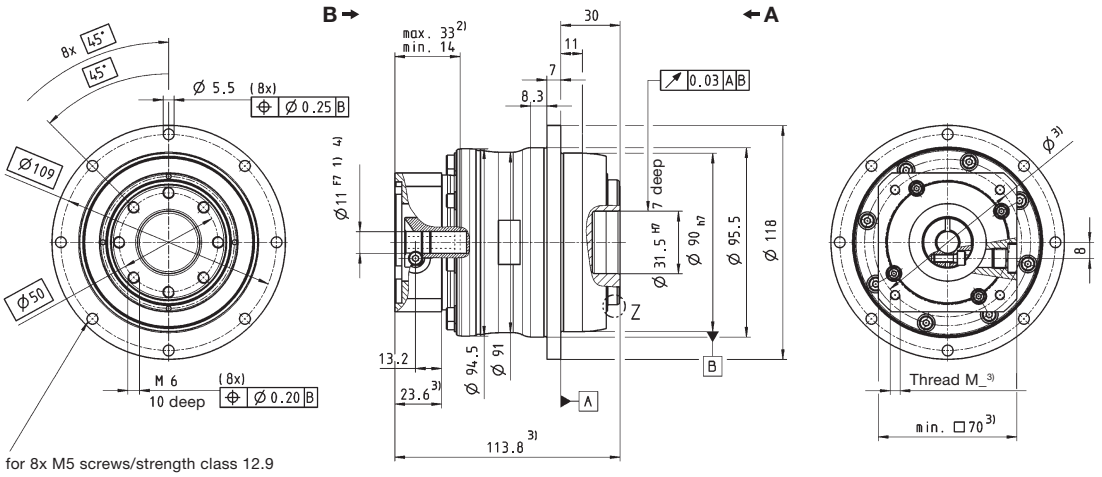
				2-stage												
Ratio [a]			***i***	**16**	**20**	**21**	**25**	**28**	**31**	**35**	**40**	**50**	**61**	**70**	**91**	**100**
Max. acceleration torque (max. 1000 cycles per hour)			T_{2B} Nm	130	130	100	130	130	110	130	130	130	110	130	80	100
			T_{2B} in.lb	1151	1151	885	1151	1151	974	1151	1151	1151	974	1151	708	885
Nominal output torque (with n_{1N})			T_{2N} Nm	90	90	80	90	90	70	90	80	90	70	90	35	60
			T_{2N} 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
			T_{2Not} 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_1=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
			T_{012} 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_{t12} Nm/ arcmin	32	32	26	32	31	24	32	30	30	24	28	21	22
			C_{t12} in.lb/ arcmin	283	283	230	283	274	212	283	266	266	212	248	186	195
Tilting rigidity			C_{2K} Nm/ arcmin	225												
			C_{2K} in.lb/ arcmin	1991												
Max. axial force [d]			F_{2AMax} N	2150												
			F_{2AMax} lb_f	484												
Max. tilting moment			M_{2KMax} Nm	270												
			M_{2KMax} 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												
			m lb_m	8.0												
Operating noise (with n_1=3000 rpm no load)			L_{PA} dB(A)	≤ 62												
Max. permitted housing temperature			°C	+90												
			F	194												
Ambient temperature			°C	0 to +40												
			F	32 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 kgcm²	0.17	0.14	0.15	0.13	0.11	0.13	0.10	0.09	0.09	0.09	0.09	0.09	0.09
			J_1 10^{-3} in.lb.s²	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 kgcm²	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
			J_1 10^{-3} in.lb.s²	0.21	0.19	0.19	0.19	0.16	0.18	0.16	0.15	0.15	0.15	0.14	0.15	0.14
	E	19	J_1 kgcm²	0.56	0.53	0.55	0.53	0.51	0.53	0.50	0.49	0.49	0.49	0.49	0.49	0.49
			J_1 10^{-3} in.lb.s²	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

[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

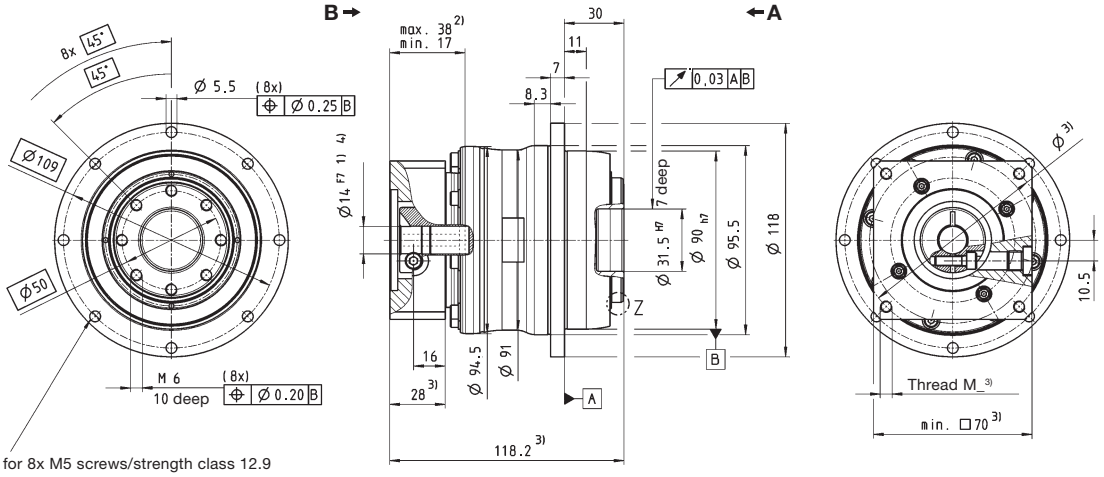
View A | View B

Motor shaft diameter [mm]

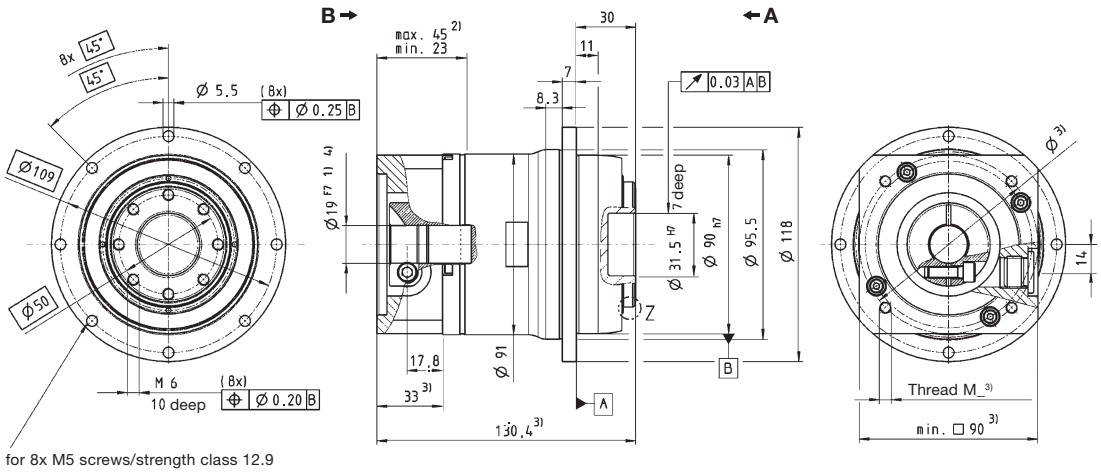
up to 11 [4] (B) clamping hub diameter



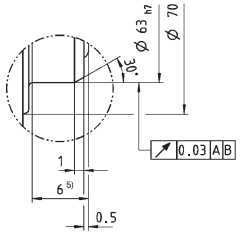
up to 14 [4] (C) clamping hub diameter



up to 19 [4] (E) clamping hub diameter



Z: Detail



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.
5) Fit length

⚠ Motor mounting according to operating manual

					2-stage				3-stage			
Ratio [a]			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	230
				in.lb	2036	2036	2036	2036	2036	2036	2036	2036
Nominal output torque (with n_{1N})			T_{2N}	Nm	150	150	180	110	180	180	180	180
				in.lb	1328	1328	1593	974	1593	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	525
				in.lb	4646	4646	4646	4646	4646	4646	4646	4646
Nominal input speed (with T_{2N} and 20°C ambient temperature) [b]			n_{1N}	rpm	4000	4000	4000	4000	4500	4500	4500	4500
Max. input speed			n_{1Max}	rpm	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	0.42	–	–	–	–	0.23	–	–
				in.lb	3.72					2.04		
Max. torsional backlash			j_t	arcmin	≤ 1				≤ 1			
Torsional rigidity [c]			C_{t12}	Nm/ arcmin	43	43	43	42	42	42	42	42
				in.lb/ arcmin	381	381	381	372	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_h	h	> 20000				> 20000			
Weight incl. standard adapter plate			m	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	0 to +40							
				F	32 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	kgcm²	0.21	0.18	0.16	0.14	0.16	0.15	0.14	0.13
				10^{-3} in.lb.s²	0.19	0.16	0.14	0.12	0.14	0.13	0.12	0.12
Clamping hub diameter [mm]	E	19	J_1	kgcm²	0.52	0.50	0.47	0.46	–	–	–	–
				10^{-3} in.lb.s²	0.46	0.44	0.42	0.41				

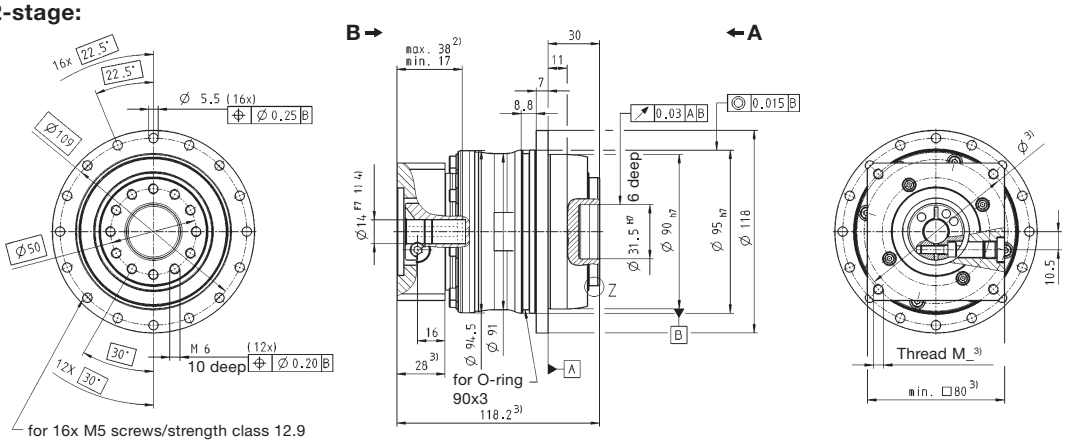
[a] Other ratios available on request
[b] For higher ambient temperatures, please reduce input speed
[c] Valid for clamping hub diameter of 14 mm
[d] Refers to center of the output shaft or flange

View A | View B

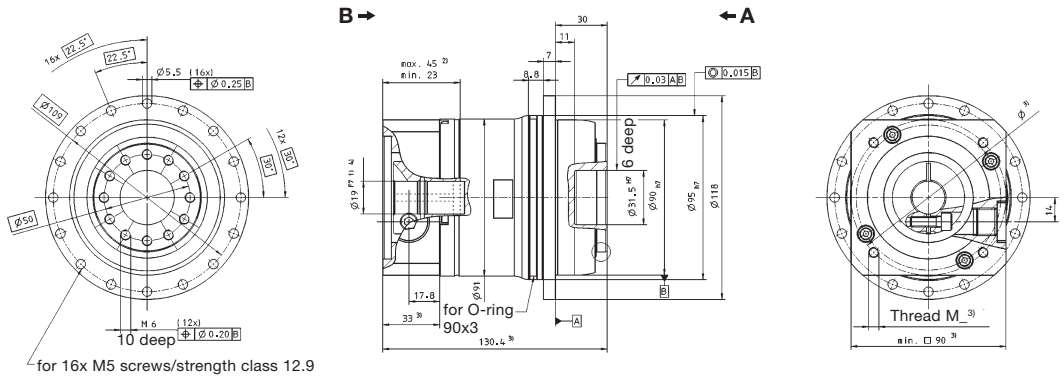
Motor shaft diameter [mm]

2-stage:

up to 14 [4] (C) clamping hub diameter

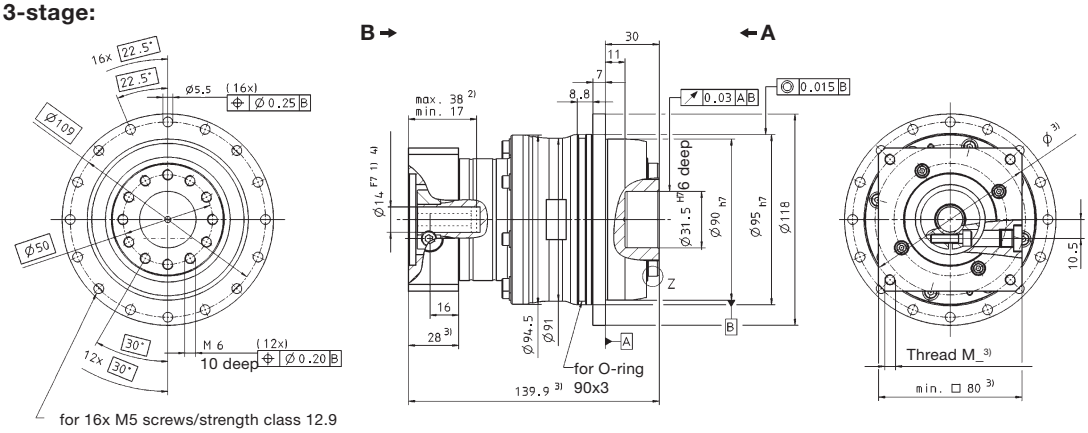


up to 19 [4] (E) clamping hub diameter

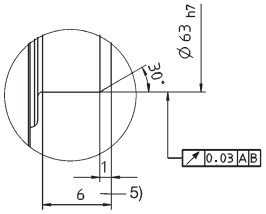


3-stage:

up to 14 [4] (C) clamping hub diameter



Z: Detail



Non-tolerated dimensions ±1 mm

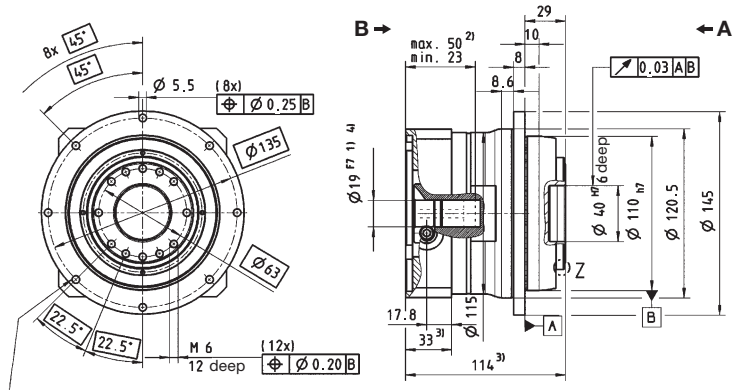
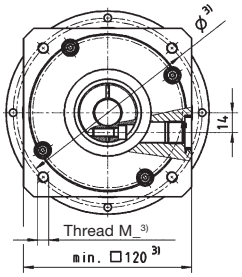
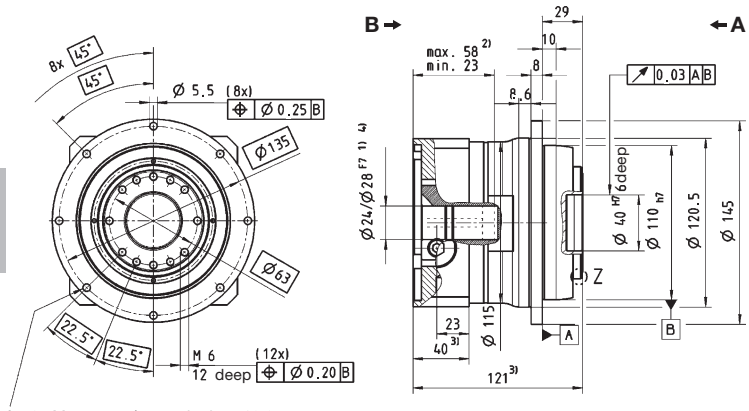
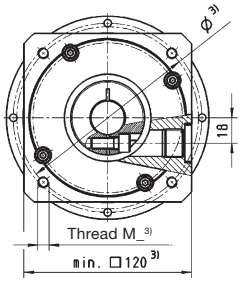
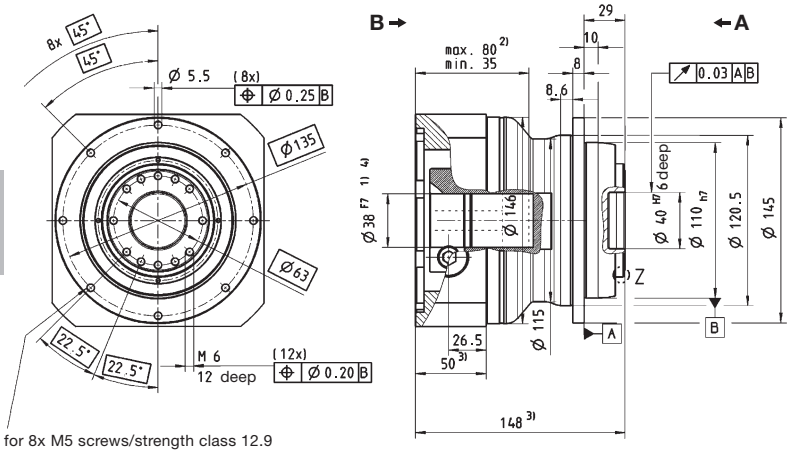
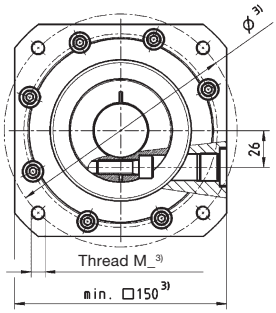
1) Check motor shaft fit.
2) Min./Max. permissible motor shaft length. Longer motor shafts are adaptable, please contact us.
3) The dimensions depend on the motor.
4) Smaller motor shaft diameter is compensated by a bushing with a minimum thickness of 1 mm.
5) Fit length

⚠ Motor mounting according to operating manual

					1-stage			
Ratio [a]			i		**4**	**5**	**7**	**10**
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_{1N})			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_{t12}	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_{2KMax}	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 n_1=3000 rpm no load i = 10)			L_{PA}	dB(A)	≤ 64			
Max. permitted housing temperature				°C	+90			
				F	194			
Ambient temperature				°C	0 to +40			
				F	32 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) Clamping hub diameter [mm]	E	19	J_1	kgcm²	2.59	2.11	1.69	1.45
				10^{-3} in.lb.s²	2.29	1.87	1.50	1.28
	G	24	J_1	kgcm²	3.28	2.80	2.38	2.14
				10^{-3} in.lb.s²	2.90	2.48	2.11	1.89
	H	28	J_1	kgcm²	2.76	2.36	1.98	1.74
				10^{-3} in.lb.s²	2.44	2.09	1.75	1.54
	K	38	J_1	kgcm²	10.3	9.87	9.45	9.21
				10^{-3} in.lb.s²	9.11	8.73	8.36	8.15

[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

Motor shaft diameter [mm]

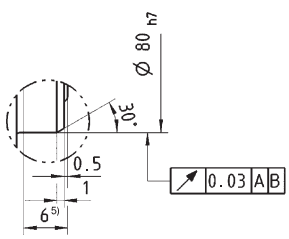
	View A	View B
up to 19 [4] (E) clamping hub diameter		
up to 24/28 [4] (G/H) clamping hub diameter		
up to 38 [4] (K) clamping hub diameter		

for 8x M5 screws/strength class 12.9

for 8x M5 screws/strength class 12.9

for 8x M5 screws/strength class 12.9

Z: Detail



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.
5) Fit length

⚠ Motor mounting according to operating manual

TP+ 025 2-stage

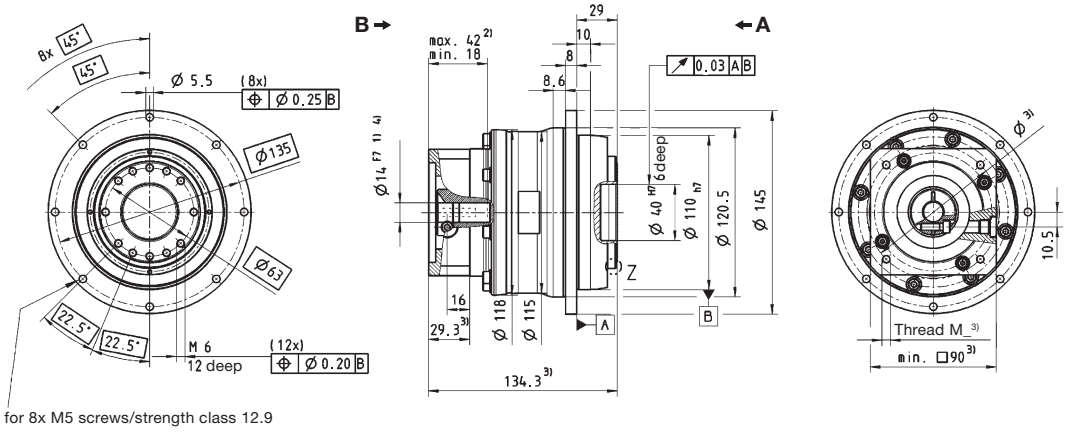
					2-stage												
Ratio [a]			i		**16**	**20**	**21**	**25**	**28**	**31**	**35**	**40**	**50**	**61**	**70**	**91**	**100**
Max. acceleration torque (max. 1000 cycles per hour)			T_{2B}	Nm	350	350	300	380	350	300	380	350	380	280	330	250	265
				in.lb	3098	3098	2655	3363	2098	2655	3363	3098	3363	2478	2921	2213	2345
Nominal output torque (with n_{1N})			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_1=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_{t12}	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 n_1=3000 rpm no load)			L_{PA}	dB(A)	≤ 64												
Max. permitted housing temperature				°C	+90												
				F	194												
Ambient temperature				°C	0 to +40												
				F	32 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	kgcm²	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.s²	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	kgcm²	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.s²	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	kgcm²	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.s²	1.95	1.84	1.89	1.82	1.75	1.85	1.74	1.70	1.70	1.70	1.69	1.70	1.69

[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

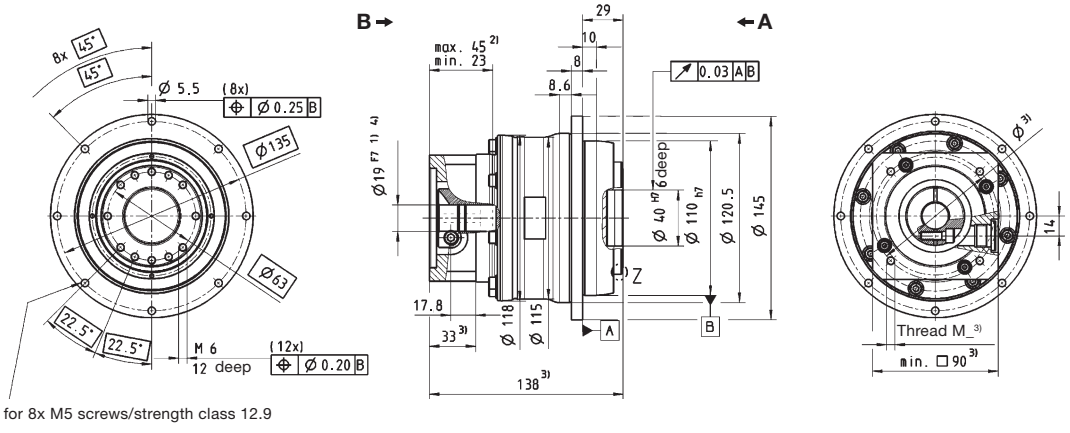
Motor shaft diameter [mm]

up to 14 [4] (C) clamping hub diameter



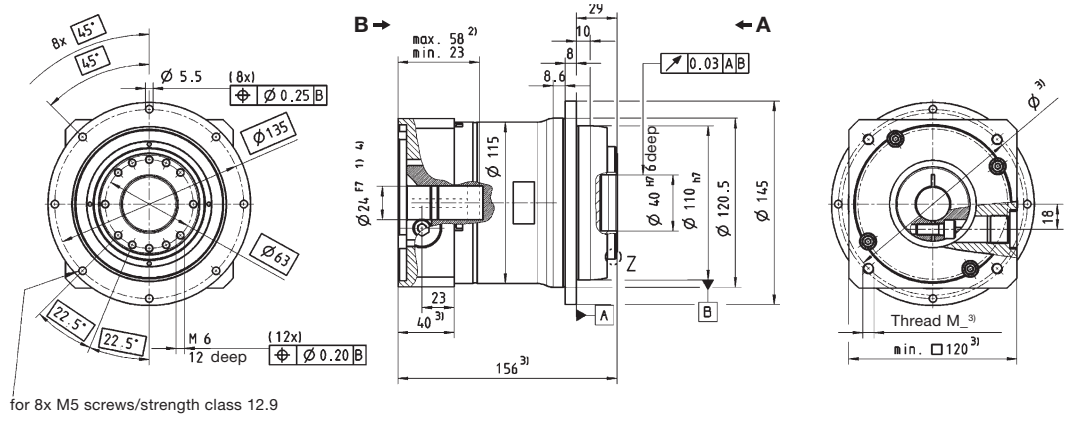
for 8x M5 screws/strength class 12.9

up to 19 [4] (E) clamping hub diameter



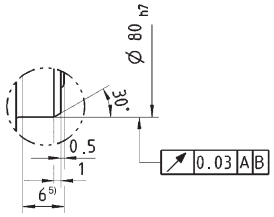
for 8x M5 screws/strength class 12.9

up to 24 [4] (G) clamping hub diameter



for 8x M5 screws/strength class 12.9

Z: Detail



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.
5) Fit length

⚠ Motor mounting according to operating manual

					2-stage				3-stage				
Ratio			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_{1N})			T_{2N}	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_{2N} 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	1.0	–	–	–	–	–	0.5	–	–
				in.lb	8.9						4.4		
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	413				413				
				in.lb/ arcmin	3655				3655				
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			m	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	0 to +40								
				F	32 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	kgcm²	0.87	0.70	0.60	0.55	0.63	0.56	0.53	0.51	0.50
				10^{-3} in.lb.s²	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	kgcm²	2.39	2.22	2.12	2.07	–	–	–	–	–
				10^{-3} in.lb.s²	2.12	1.96	1.88	1.83					

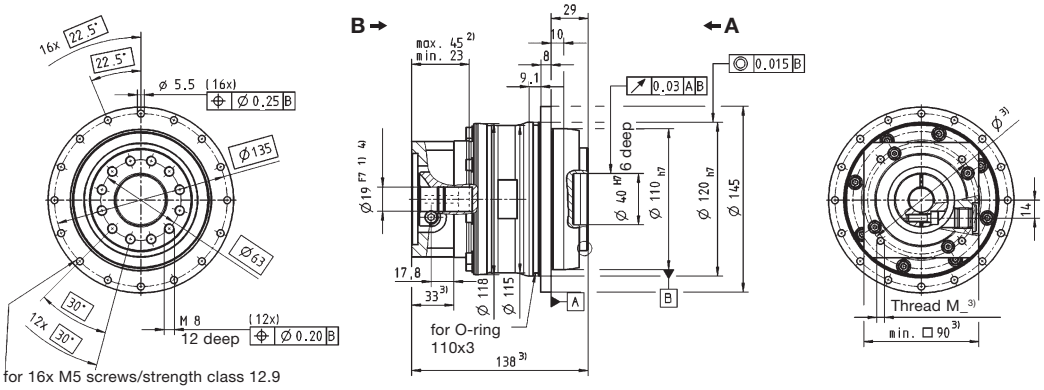
[b] For higher ambient temperatures, please reduce input speed
[c] Valid for clamping hub diameter of 19 mm
[d] Refers to center of the output shaft or flange

View A | View B

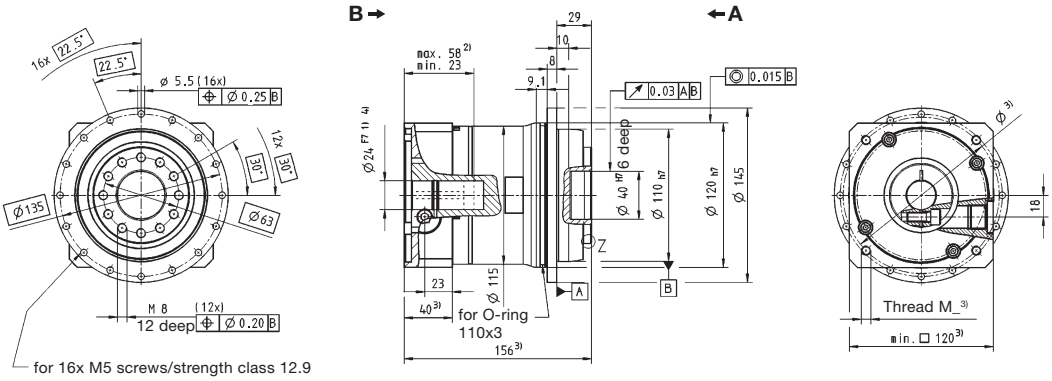
Motor shaft diameter [mm]

2-stage:

up to 19 [4] (E) clamping hub diameter

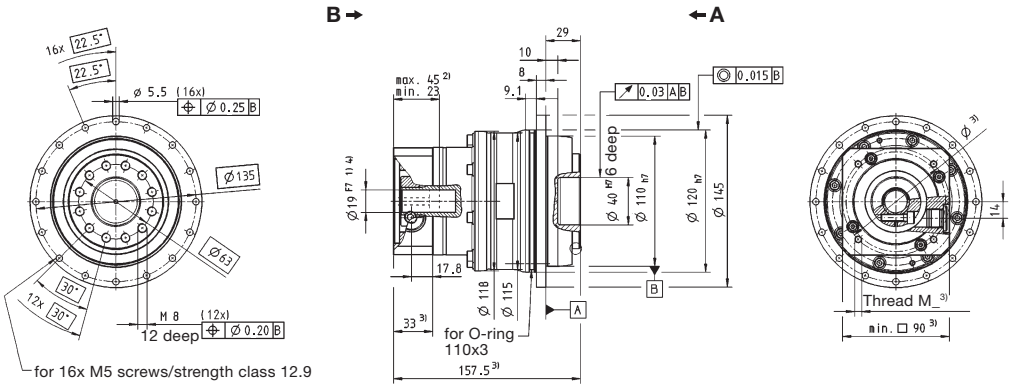


up to 24 [4] (G) clamping hub diameter

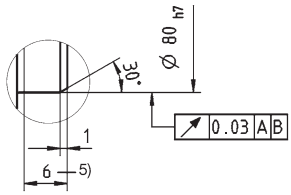


3-stage:

up to 19 [4] (E) clamping hub diameter



Z: Detail



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.
5) Fit length

⚠ Motor mounting according to operating manual

TP+ 050 1-stage

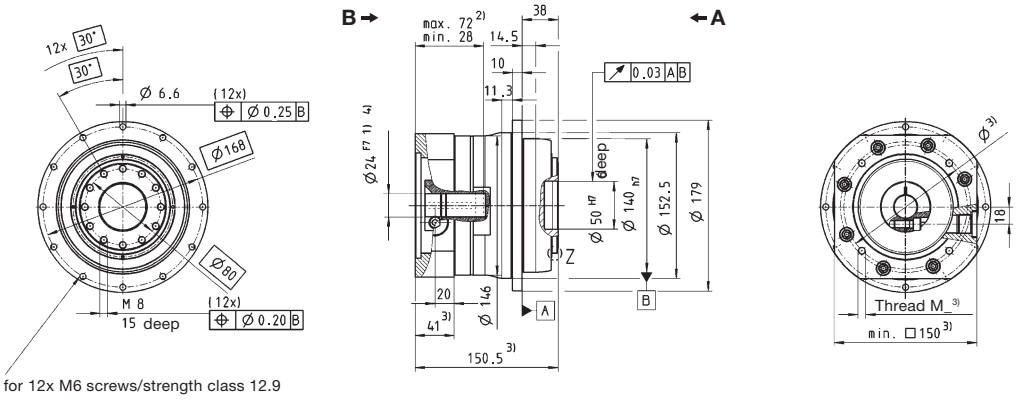
					1-stage			
Ratio [a]			i		**4**	**5**	**7**	**10**
Max. acceleration torque (max. 1000 cycles per hour)			T_{2B}	Nm	700	700	700	540
				in.lb	6195	6195	6195	4779
Nominal output torque (with n_{1N})			T_{2N}	Nm	370	370	370	240
				in.lb	3275	3275	3275	2124
Emergency stop torque (permitted 1000 times during 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_1=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_{t12}	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_{2KMax}	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 n_1=3000 rpm no load)			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			
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	kgcm²	9.47	7.85	6.39	5.54
				10^{-3} in.lb.s²	8.38	6.95	5.66	4.90
Clamping hub diameter [mm]	I	32	J_1	kgcm²	12.6	11.0	9.55	8.71
				10^{-3} in.lb.s²	11.1	9.74	8.45	7.70
	K	38	J_1	kgcm²	13.7	12.1	10.6	9.78
				10^{-3} in.lb.s²	12.1	10.7	9.38	8.65
	M	48	J_1	kgcm²	28.3	26.7	25.3	24.4
				10^{-3} in.lb.s²	25.0	23.6	22.4	21.6

[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

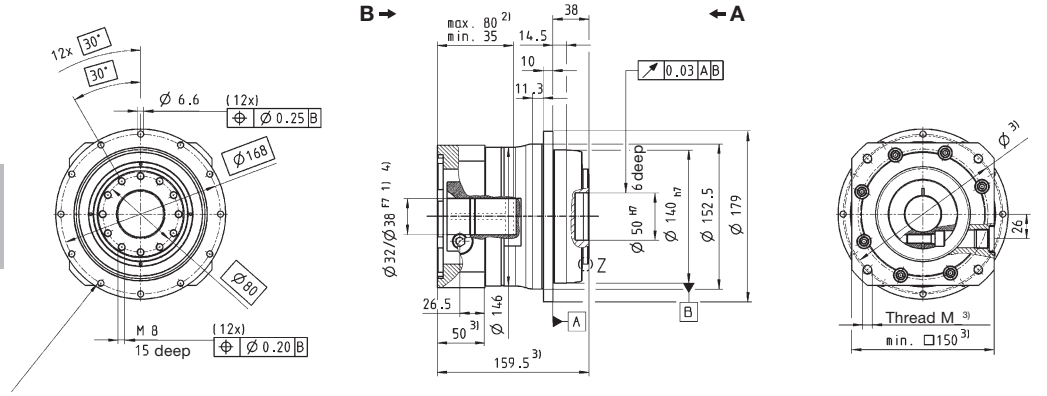
Motor shaft diameter [mm]

up to 24 [4] (G) clamping hub diameter



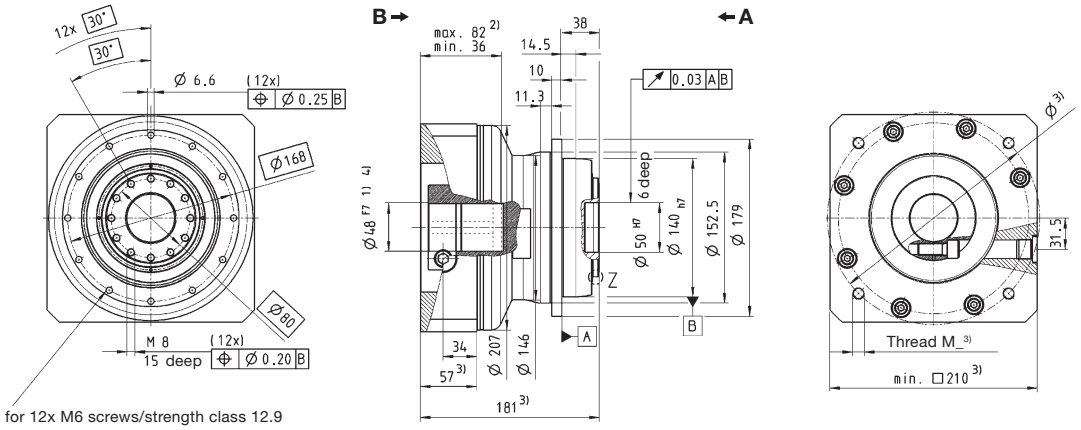
for 12x M6 screws/strength class 12.9

up to 32/38 [4] (I/K) clamping hub diameter



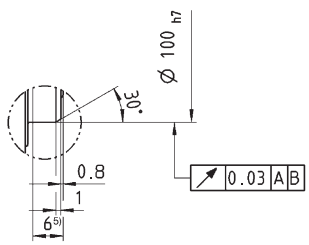
for 12x M6 screws/strength class 12.9

up to 48 [4] (M) clamping hub diameter



for 12x M6 screws/strength class 12.9

Z: Detail



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.
5) Fit length

⚠ Motor mounting according to operating manual

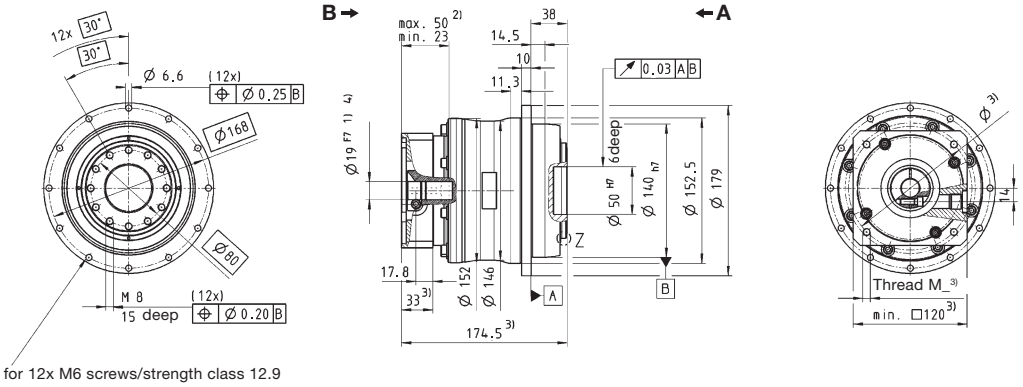
					2-stage												
Ratio [a]			i		**16**	**20**	**21**	**25**	**28**	**31**	**35**	**40**	**50**	**61**	**70**	**91**	**100**
Max. acceleration torque (max. 1000 cycles per hour)			T_{2B}	Nm	750	750	600	750	750	620	750	750	750	550	700	500	540
				in.lb	6638	6638	5310	6638	6638	5487	6638	6638	6638	4868	6195	4425	4779
Nominal output torque (with n_{1N})			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_1=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_{t12}	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_{2KMax}	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. standardadapter plate			m	kg	14.1												
				lb_m	31.2												
Operating noise (with n_1=3000 rpm no load)			L_{PA}	dB(A)	≤ 65												
Max. permitted housing temperature				°C	+90												
				F	194												
Ambient temperature				°C	0 to +40												
				F	32 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	kgcm²	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.s²	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	kgcm²	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.s²	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	kgcm²	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.s²	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

[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

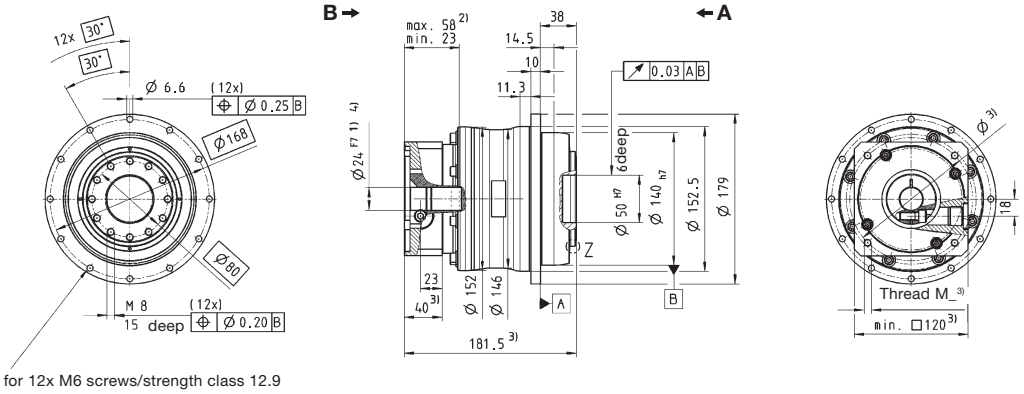
Motor shaft diameter [mm]

up to 19 [4] (E) clamping hub diameter



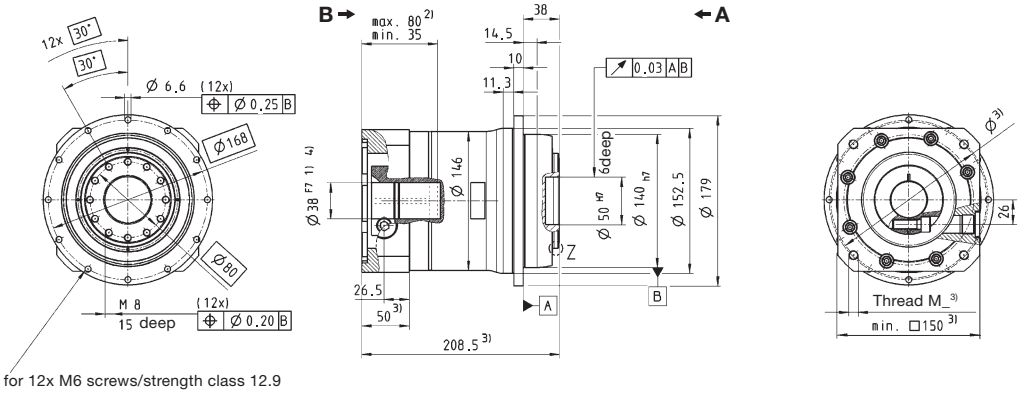
for 12x M6 screws/strength class 12.9

up to 24 [4] (G) clamping hub diameter



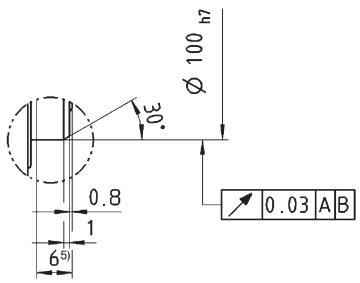
for 12x M6 screws/strength class 12.9

up to 38 [4] (K) clamping hub diameter



for 12x M6 screws/strength class 12.9

Z: Detail



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.
5) Fit length

⚠ Motor mounting according to operating manual

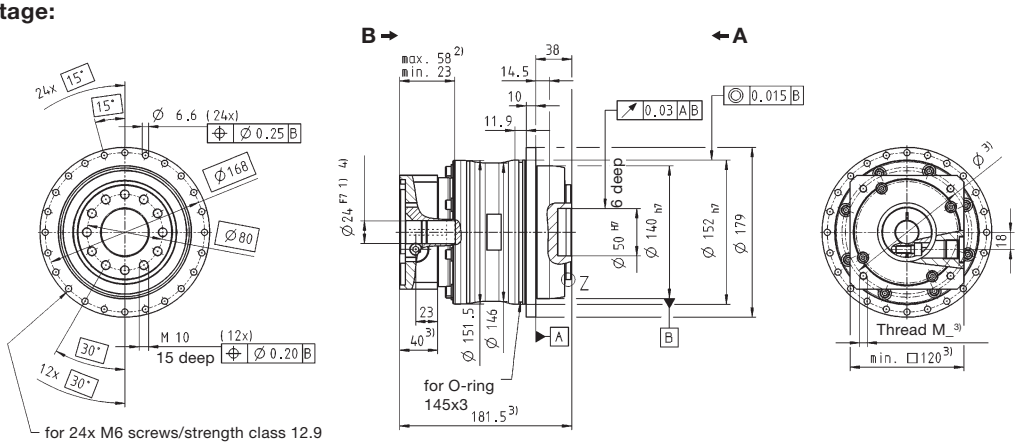
					2-stage				3-stage				
Ratio			i		**22**	**27.5**	**38.5**	**55**	**66**	**88**	**110**	**154**	**220**
Max. acceleration torque (max. 1000 cycles per hour)			T_{2B}	Nm	950	950	950	950	950	950	950	950	950
				in.lb	8408	8408	8408	8408	8408	8408	8408	8408	8408
Nominal output torque (with n_{1N})			T_{2N}	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_{2N} 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	2.7	–	–	–	–	–	1.1	–	0.7
				in.lb	23.9						9.7		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_h	h	> 20000				> 20000				
Weight incl. standard adapter plate			m	kg	12.5				13.4				
				lb_m					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	0 to +40								
				F	32 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	kgcm²	3.76	3.32	3.01	2.82	2.61	2.42	2.22	2.12	2.07
				10^{-3} in.lb.s²	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	kgcm²	10.7	10.3	9.92	9.73	–	–	–	–	–
				10^{-3} in.lb.s²	9.47	9.11	8.78	8.61					

[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

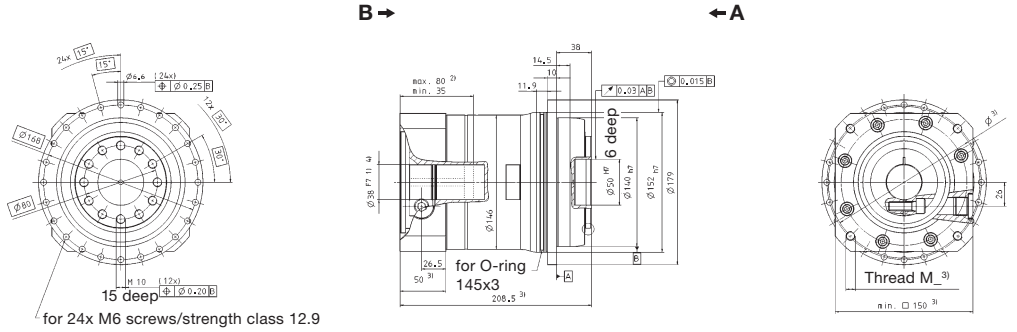
Motor shaft diameter [mm]

2-stage:

up to 24 [4] (G) clamping hub diameter

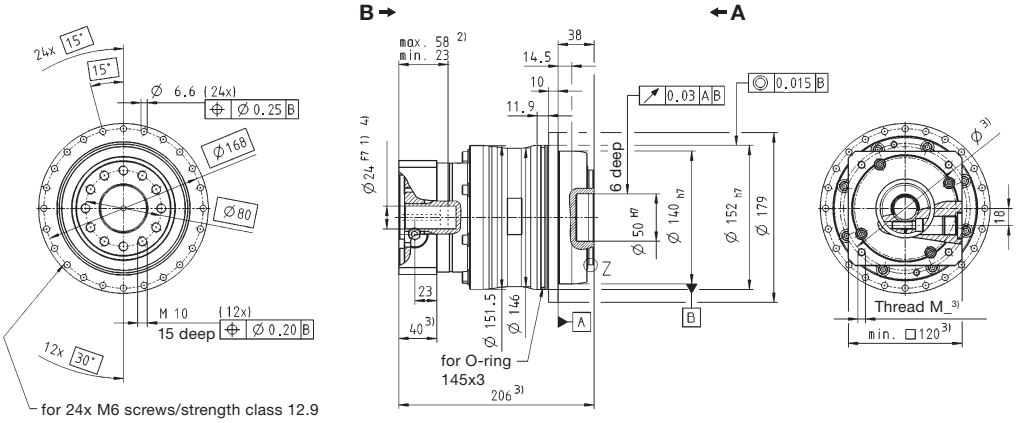


up to 38 [4] (K) clamping hub diameter

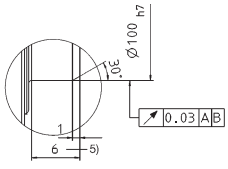


3-stage:

up to 24 [4] (G) clamping hub diameter



Z: Detail



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.
5) Fit length

⚠ Motor mounting according to operating manual

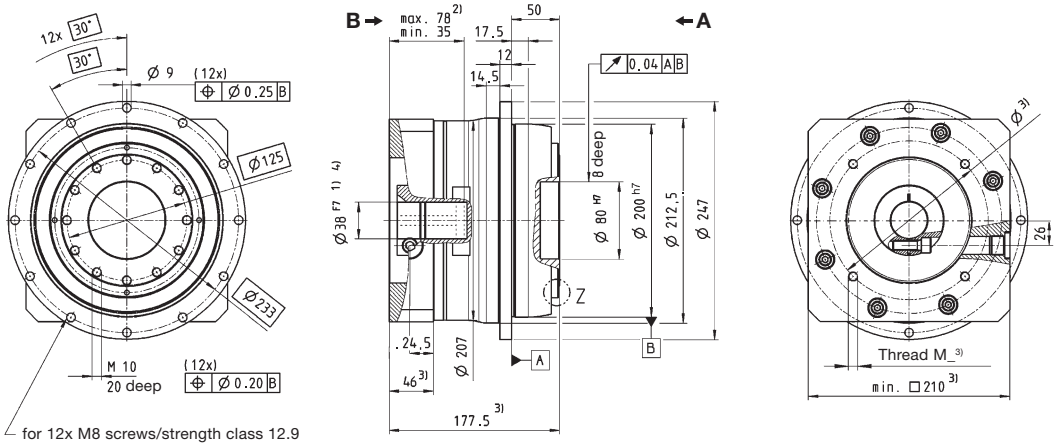
				1-stage			
Ratio [a]			***i***	**4**	**5**	**7**	**10**
Max. acceleration torque (max. 1000 cycles per hour)			T_{2B} Nm	1600	1600	1600	1400
			T_{2B} in.lb	14160	14160	14160	12390
Nominal output torque (with n_{1N})			T_{2N} Nm	700	750	750	750
			T_{2N} in.lb	6195	6638	6638	6638
Emergency stop torque (permitted 1000 times during the service life of the gearhead)			T_{2Not} Nm	2750	2750	2750	2750
			T_{2Not} 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_1=3000 rpm and 20°C gearhead temperature) [c]			T_{012} Nm	15.6	12.7	9.4	7.0
			T_{012} in.lb	138.1	112.4	83.2	62.0
Max. torsional backlash			j_t arcmin	Standard ≤ 3 / Reduced ≤ 1			
Torsional rigidity [c]			C_{t12} Nm/ arcmin	610	610	550	445
			C_{t12} in.lb/ arcmin	5399	5399	4868	3938
Tilting rigidity			C_{2K} Nm/ arcmin	1452			
			C_{2K} in.lb/ arcmin	12850			
Max. axial force [d]			F_{2AMax} N	10050			
			F_{2AMax} lb_f	2261			
Max. tilting moment			M_{2KMax} Nm	3280			
			M_{2KMax} 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			
			m lb_m	66			
Operating noise (with n_1=3000 rpm no load)			L_{PA} dB(A)	≤ 70			
Max. permitted housing temperature			°C	+90			
			F	194			
Ambient temperature			°C	0 to +40			
			F	32 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 kgcm²	44.5	34.6	25.5	20.6
			J_1 10^{-3} in.lb.s²	39.4	30.6	22.6	18.2
Clamping hub diameter [mm]	M	48	J_1 kgcm²	51.8	41.9	32.9	28.0
			J_1 10^{-3} in.lb.s²	45.8	37.1	29.1	24.8

[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

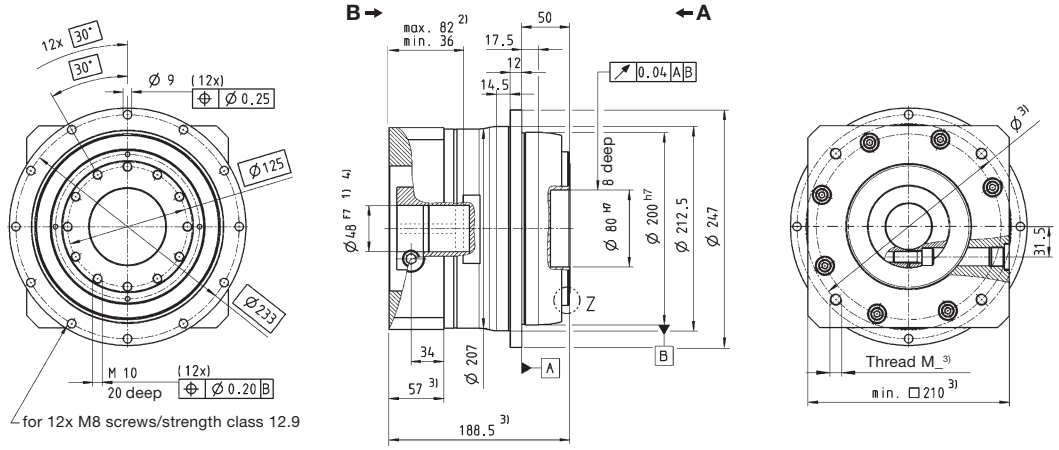
View A | View B

Motor shaft diameter [mm]

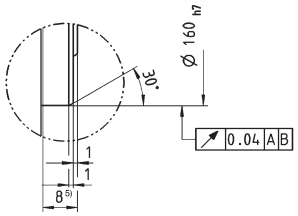
up to 38 [4] (K) clamping hub diameter



up to 48 [4] (M) clamping hub diameter



Z: Detail



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.
5) Fit length

⚠ Motor mounting according to operating manual

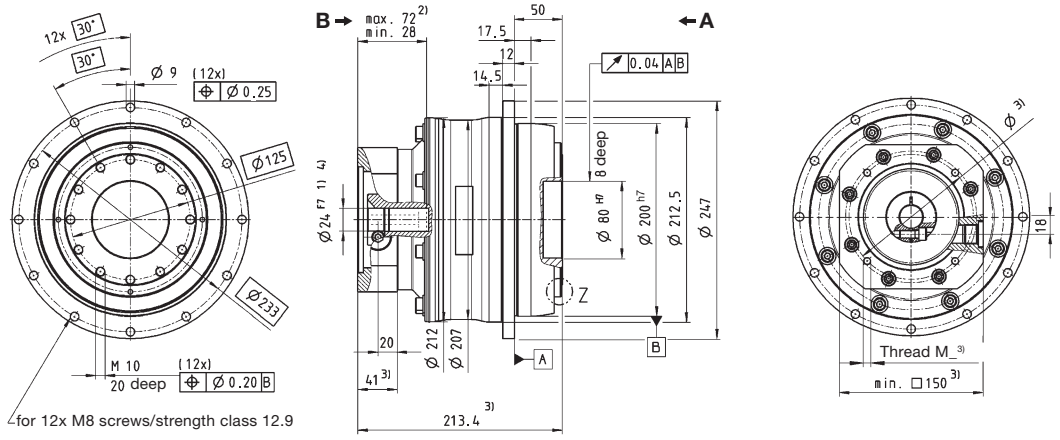
					2-stage												
Ratio [a]			i		**16**	**20**	**21**	**25**	**28**	**31**	**35**	**40**	**50**	**61**	**70**	**91**	**100**
Max. acceleration torque (max. 1000 cycles per hour)			T_{2B}	Nm	1600	1600	1400	1600	1600	1600	1600	1600	1600	1400	1600	1300	1400
				in.lb	14160	14160	12390	14160	14160	14160	14160	14160	14160	12390	14160	11505	12390
Nominal output torque (with n_{1N})			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_1=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_{t12}	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_{2KMax}	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. standardadapter plate			m	kg	34.0												
				lb_m	75.1												
Operating noise (with n_1=3000 rpm no load)			L_{PA}	dB(A)	≤ 72												
Max. permitted housing temperature				°C	+90												
				F	194												
Ambient temperature				°C	0 to +40												
				F	32 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	kgcm²	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^{-3} in.lb.s²	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	kgcm²	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^{-3} in.lb.s²	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	kgcm²	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^{-3} in.lb.s²	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	kgcm²	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^{-3} in.lb.s²	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

[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

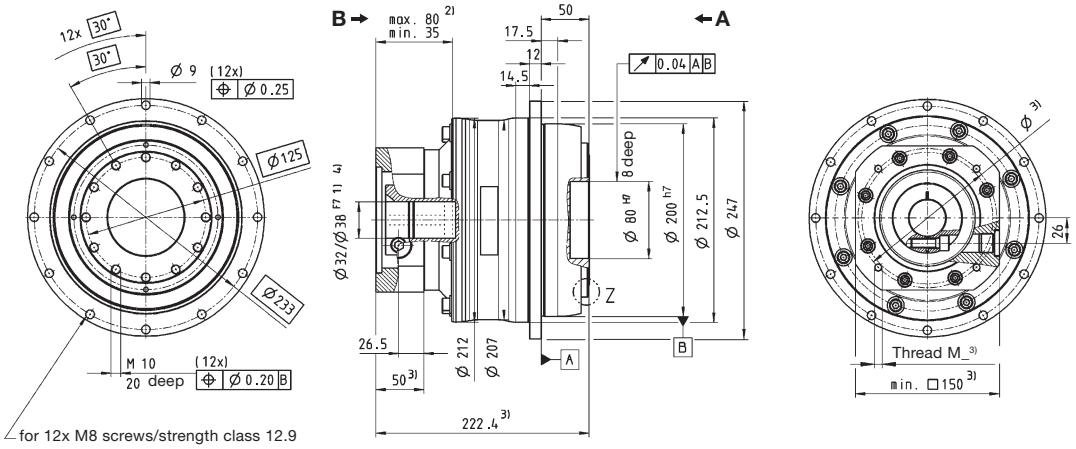
View A | View B

Motor shaft diameter [mm]

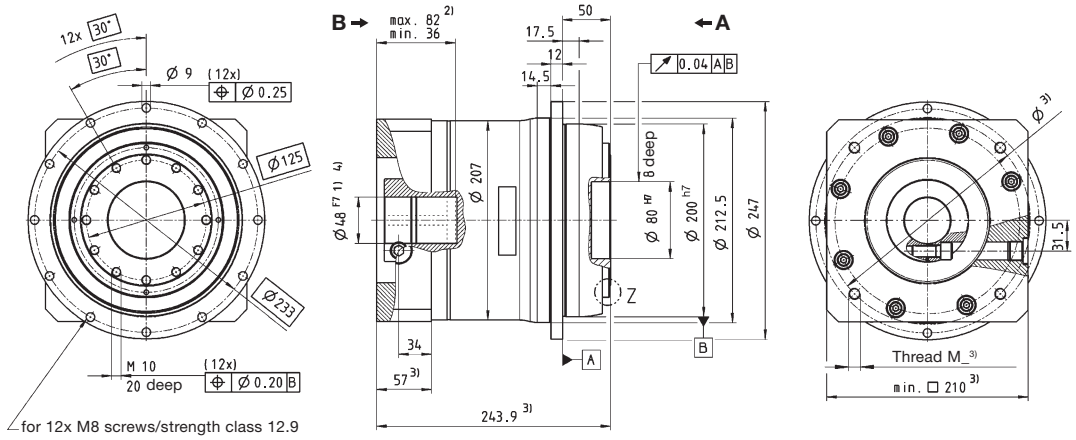
up to 24 [4] (G) clamping hub diameter



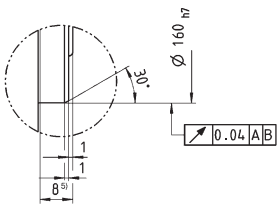
up to 32/38 [4] (I/K) clamping hub diameter



up to 48 [4] (M) clamping hub diameter



Z: Detail



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.
5) Fit length

⚠ Motor mounting according to operating manual

					2-stage				3-stage				
Ratio			***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_{1N})			T_{2N}	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_{2N} and 20°C ambient temperature) [b]			n_{1N}	rpm	2500	2500	2500	2500	3000	3000	3000	3000	3000
Max. input speed			n_{1Max}	rpm	4500	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	6.5	–	–	–	–	3.3	2.5	–	–
				in.lb	57.5					29.2	22.1		
Max. torsional backlash			j_t	arcmin	≤ 1				≤ 1				
Torsional rigidity [c]			C_{t12}	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_h	h	> 20000				> 20000				
Weight incl. standard adapter plate			m	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				°C	+90								
				F	194								
Ambient temperature				°C	0 to +40								
				F	32 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	kgcm²	16.6	15.2	13.9	13.1	13.8	10.2	9.77	9.47	9.16
				10^{-3} in.lb.s²	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	kgcm²	31.4	29.9	28.7	28.0	–	–	–	–	–
				10^{-3} in.lb.s²	27.8	26.5	25.4	24.8					

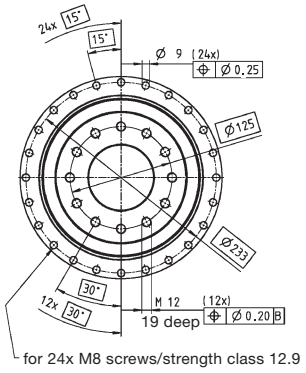
[b] For higher ambient temperatures, please reduce input speed
[c] Valid for clamping hub diameter of 38 mm
[d] Refers to center of the output shaft or flange

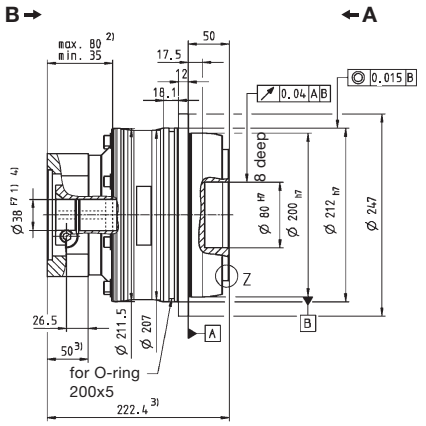
View A | View B

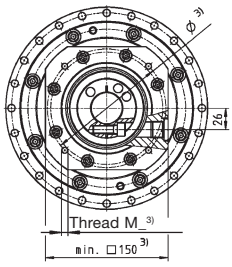
Motor shaft diameter [mm]

2-stage:

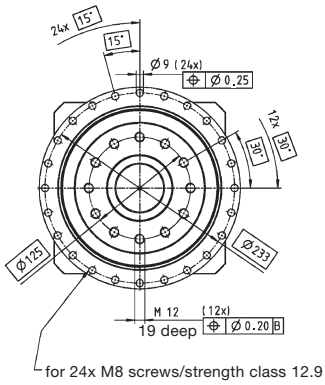
up to 38 [4] (K) clamping hub diameter

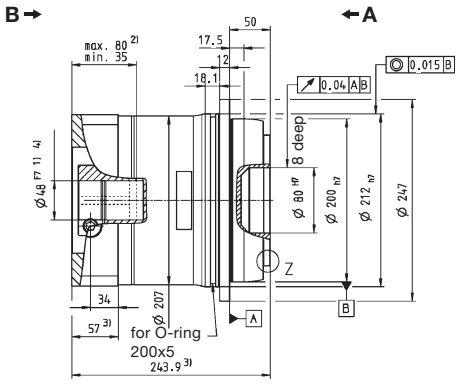


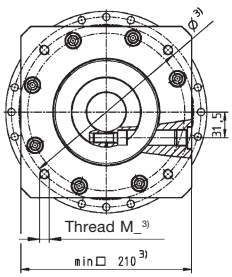




up to 48 [4] (M) clamping hub diameter

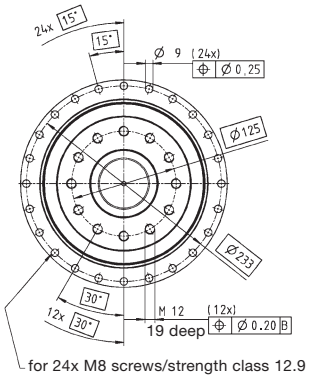


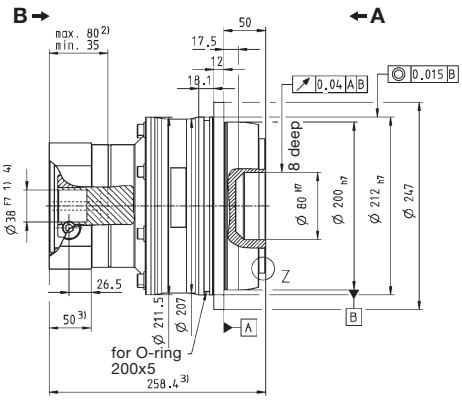


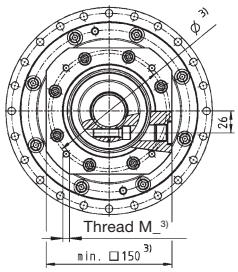


3-stage:

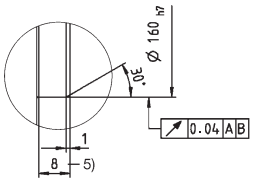
up to 38 [4] (K) clamping hub diameter







Z: Detail



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.
5) Fit length

⚠ Motor mounting according to operating manual

TP+ 300 1/2-stage

					1-stage			2-stage									
Ratio [a]			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	1200	1700	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	–	–	11	–	–	–	–	–	–	2.8	–	–	–
				in.lb			97.4							24.8			
Max. torsional backlash			j_t	arcmin	Standard ≤ 3 / Reduced ≤ 1			Standard ≤ 3 / Reduced ≤ 2									
Torsional rigidity			C_{t12}	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	5900												
				in.lb	52215												
Efficiency at full load			η	%	95			93									
Service life (For calculation, see the Chapter "Information")			L_h	h	> 20000												
Weight incl. standard adapter plate			m	kg	60			58.5									
				lb_m	132.6			129.3									
Operating noise (with n_1=2000 rpm without load)			L_{PA}	dB(A)	≤ 67												
Max. permitted housing temperature				°C	+90												
				F	194												
Ambient temperature				°C	0 to +40												
				F	32 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	kgcm²	–	–	–	27.5	27.0	25.9	25.6	22.4	21.5	21.4	21.3	21.2	21.2
				10^{-3} in.lb.s²				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	kgcm²	82.6	61.2	49.5	–	–	–	–	–	–	–	–	–	–
				10^{-3} in.lb.s²	73.1	54.2	43.8										

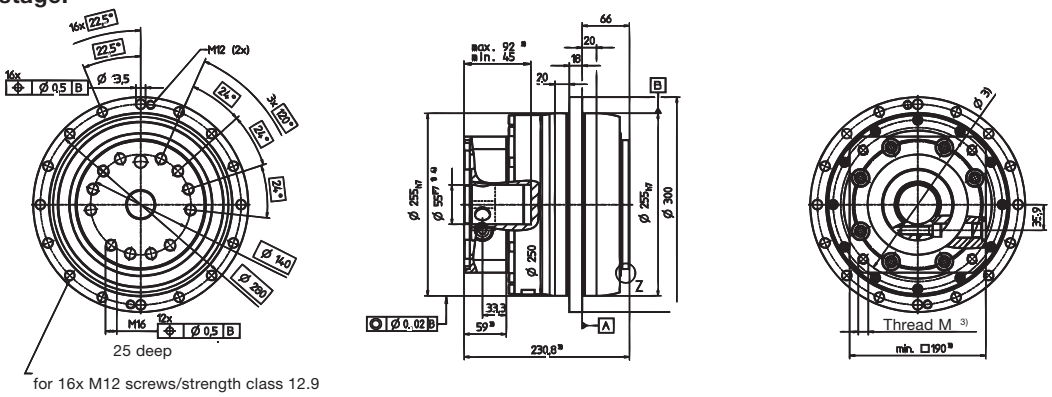
[a] Other ratios available on request
[b] For higher ambient temperatures, please reduce input speed
[c] Refers to center of the output shaft or flange

View A | View B

Motor shaft diameter [mm]

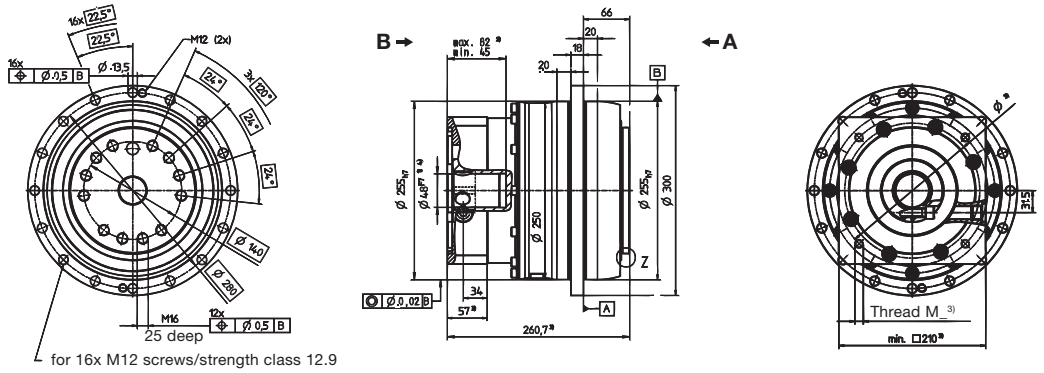
up to 55 [4] (N) clamping hub diameter

1-stage:

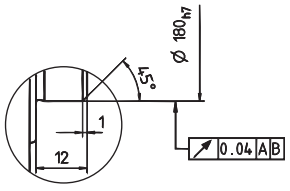


up to 48 [4] (M) clamping hub diameter

2-stage:



Z: Detail



Non-tolerated dimensions ±1 mm

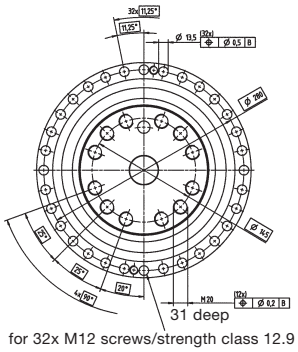
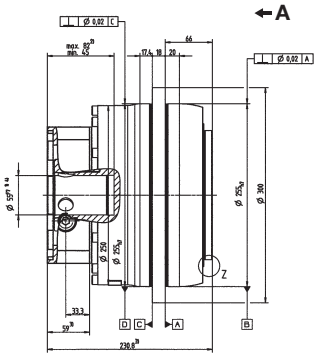
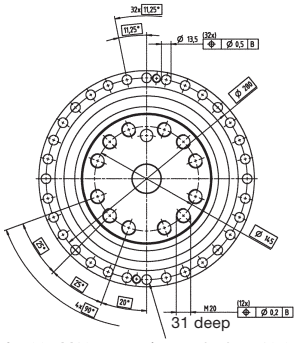
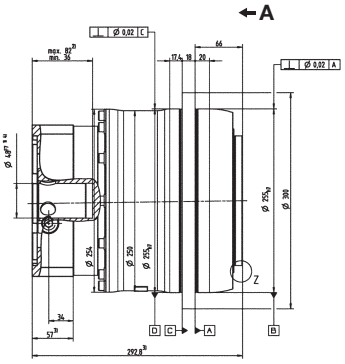
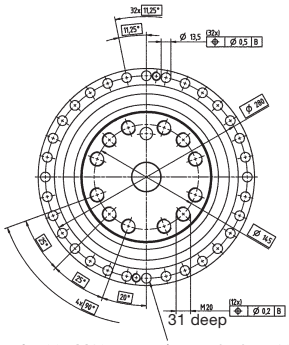
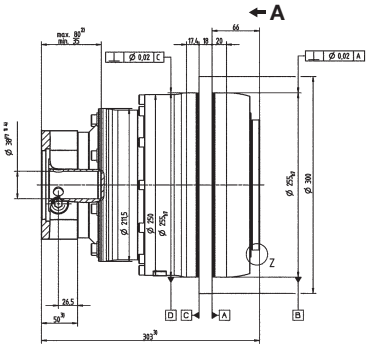
1) Check motor shaft fit.
2) Min./Max. permissible motor shaft length. Longer motor shafts are adaptable, please contact us.
3) The dimensions depend on the motor.
4) Smaller motor shaft diameter is compensated by a bushing with a minimum thickness of 1 mm.

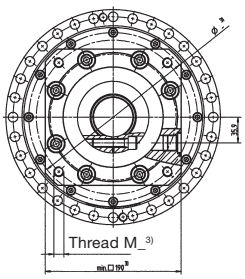
⚠ Motor mounting according to operating manual

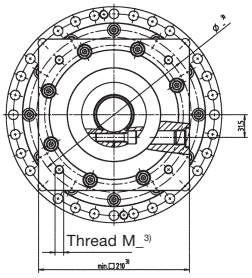
				1-stage	2-stage				3-stage				
Ratio [a]			*i*	**5.5**	**22**	**27.5**	**38.5**	**55**	**66**	**88**	**110**	**154**	**220**
Max. acceleration torque (max. 1000 cycles per hour)			T_{2B} Nm	4600	5500	5500	5500	3900	5500	5500	5500	5500	5500
			T_{2B} in.lb	40714	48679	48679	48679	34518	48679	48679	48679	48679	48679
Nominal output torque (with n_{1N})			T_{2N} Nm	2200	3500	3500	3500	2500	3500	3500	3500	3500	3500
			T_{2N} in.lb	19472	30978	30978	30978	22127	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
			T_{2Not} in.lb	77445	117273	117273	117273	117273	117273	117273	117273	117273	117273
Nominal input speed (with T_{2N} 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	20	8.00	–	–	–	–	–	–	–	1.50
			T_{012} in.lb	177	71								13
Max. torsional backlash			j_t arcmin	Standard ≤ 2 / Reduced ≤ 1	Standard ≤ 3 / Reduced ≤ 1								
Torsional rigidity			C_{t12} Nm/ arcmin	1400	1200	–	–	–	–	–	1200	–	–
			C_{t12} in.lb/ arcmin	12391	10621						10621		
Tilting rigidity			C_{2K} Nm/ arcmin	5560									
			C_{2K} in.lb/ arcmin	49210									
Max. axial force [c]			F_{2AMax} N	33000									
			F_{2AMax} lb_f	7425									
Max. tilting moment			M_{2KMax} Nm	3900	6500								
			M_{2KMax} in.lb	34518	57530								
Efficiency at full load			η %	95	93								
Service life (For calculation. see "Technical Basics")			L_h h	> 20000									
Weight incl. standard adapter plate			*m* kg	55	64				67				
			m 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	0 to +40									
			F	32 to 104									
Lubrication				Lubricated for life									
Paint				Blue RAL 5002									
Mounting position				Motor and gearhead same direction									
Protection class				IP 65									
Moment of inertia (relates to the drive)	K	38	J_1 kgcm²	–	–	–	–	–	16.6	12.9	11.6	10.3	9.50
			J_1 10^{-3} in.lb.s²						0.0147	0.0114	0.0103	0.0091	0.0084
Clamping hub diameter [mm]	M	48	J_1 kgcm²		30.8	27.6	24.9	23.0	–	–	–	–	–
			J_1 10^{-3} in.lb.s²		0.0273	0.0244	0.0220	0.0204					
	N	55	J_1 kgcm²	129	–	–	–	–	–	–	–	–	–
			J_1 10^{-3} in.lb.s²	0.1142									

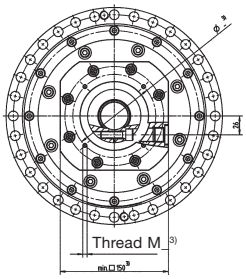
[a] Other ratios available on request
[b] For higher ambient temperatures, please reduce input speed
[c] Refers to center of the output shaft or flange

Motor shaft diameter [mm]

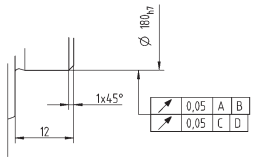
	View A	View B
up to 55 [4] (N) clamping hub diameter	 for 32x M12 screws/strength class 12.9	B → ← A 
up to 48 [4] (M) clamping hub diameter	 for 32x M12 screws/strength class 12.9	B → ← A 
up to 38 [4] (K) clamping hub diameter	 for 32x M12 screws/strength class 12.9	B → ← A 







Z: Detail



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.
5) Fit length

⚠ Motor mounting according to operating manual

				1-stage			2-stage									
Ratio [a]			*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_{2N} 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_{2N} and 20°C ambient temperature) [b]			n_{1N} rpm	1000	1500	1500	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	3500
Mean no load running torque (with n_1=2000 rpm and 20°C gearhead temperature)			T_{012} Nm	20	–	14	–	–	–	–	–	–	–	–	2	–
			in.lb	177		123.9									17.7	
Max. torsional backlash			j_t arcmin	Standard ≤ 3 / Reduced ≤ 1			Standard ≤ 3 / Reduced ≤ 2									
Torsional rigidity			C_{t12} Nm/ arcmin	1450	1300	1050	1400	1200	1450	1200	1400	1300	1100	1250	950	1050
			in.lb/ arcmin	12833	11505	9293	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	8800												
			in.lb	77880												
Efficiency at full load			η %	95			93									
Service life (For calculation, see the Chapter "Information")			L_h h	> 20000												
Weight incl. standard adapter plate			*m* kg	82			77.5									
			lb_m	181.2			171.3									
Operating noise (with n_1=2000 rpm no load)			L_{PA} dB(A)	≤ 69												
Max. permitted housing temperature			°C	+90												
			F	194												
Ambient temperature			°C	0 to +40												
			F	32 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 kgcm²	–	–	–	32.3	37.6	31.1	32.8	25.1	23.2	23.6	23.2	23.0	22.7
			10^{-3} in.lb.s²				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 kgcm²	175.5	137.0	115.8	–	–	–	–	–	–	–	–	–	–
			10^{-3} in.lb.s²	155.3	121.2	102.5										

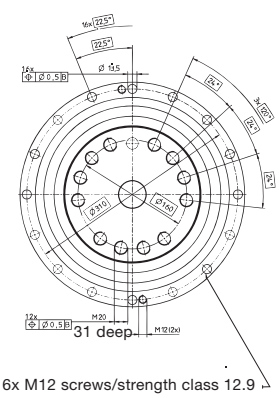
[a] Other ratios available on request
[b] For higher ambient temperatures, please reduce input speed
[c] Refers to center of the output shaft or flange

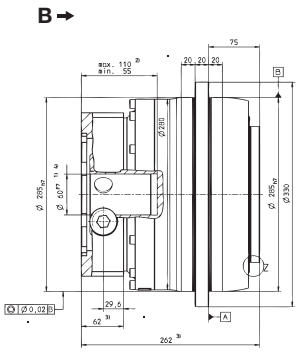
View A | View B

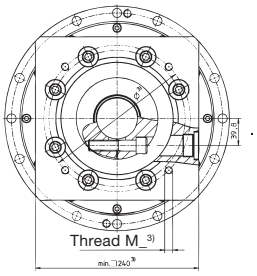
Motor shaft diameter [mm]

1-stage:

up to 60 [4] (O) clamping hub diameter

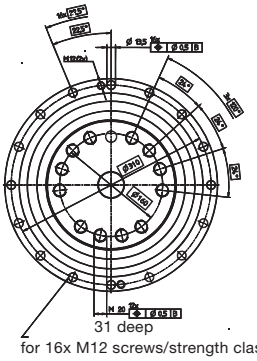


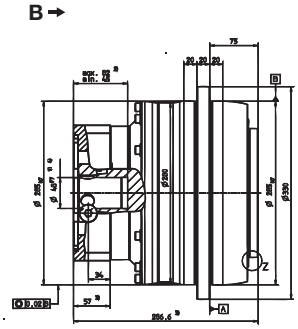


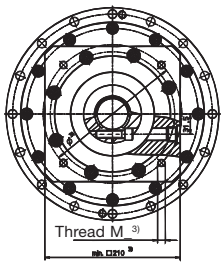


2-stage:

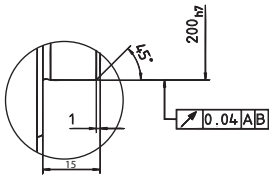
up to 48 [4] (M) clamping hub diameter







Z: Detail



Non-tolerated dimensions ±1 mm

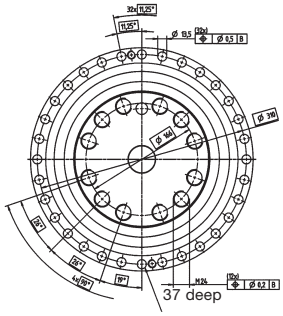
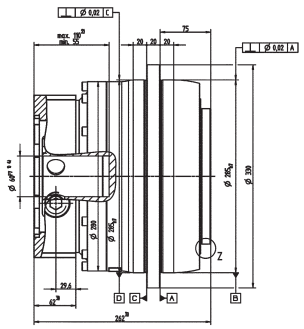
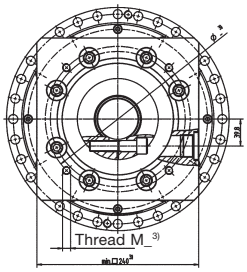
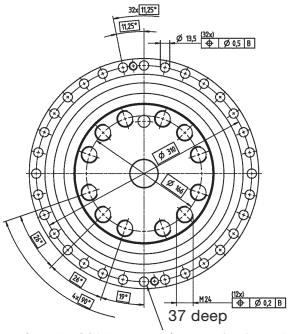
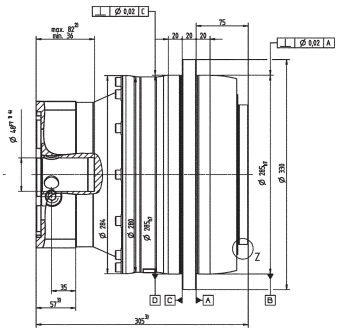
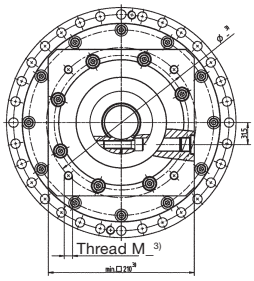
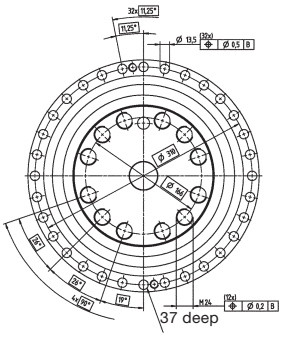
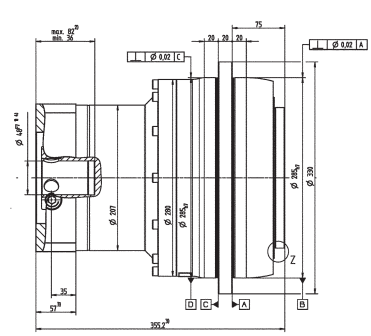
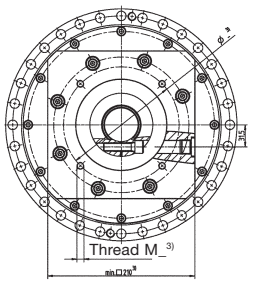
1) Check motor shaft fit.
2) Min./Max. permissible motor shaft length. Longer motor shafts are adaptable, please contact us.
3) The dimensions depend on the motor.
4) Smaller motor shaft diameter is compensated by a bushing with a minimum thickness of 1 mm.

⚠ Motor mounting according to operating manual

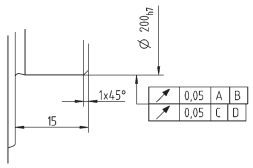
				1-stage	2-stage				3-stage				
Ratio [a]			*i*	**5.5**	**22**	**27.5**	**38.5**	**55**	**66**	**88**	**110**	**154**	**220**
Max. acceleration torque (max. 1000 cycles per hour)			T_{2B}	Nm	8000	10000	10000	10000	7200	10000	10000	10000	10000	10000
				in.lb	70806	88508	88508	88508	63726	88508	88508	88508	88508	88508
Nominal output torque (with n_{1N})			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
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
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	28.0	13.0	–	–	–	–	–	–	–	2.50
				in.lb	248	115								22
Max. torsional backlash			j_t	arcmin	Standard ≤ 2 / Reduced ≤ 1	Standard ≤ 3 / Reduced ≤ 1								
Torsional rigidity			C_{t12}	Nm/ arcmin	2000	1500	–	–	–	–	–	1500	–	–
				in.lb/ arcmin	17702	13276						13276		
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_h	h	> 20000									
Weight incl. standardadapter plate			*m*	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	0 to +40									
				F	32 to 104									
Lubrication					Lubricated for life									
Paint					Blue RAL 5002									
Mounting position					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
				10^{-3} in.lb.s²		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	–	–	–	–	–	–	–	–	–
				10^{-3} in.lb.s²	0.1549									

[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

Motor shaft diameter [mm]

	View A	View B
up to 60 [4] (O) clamping hub diameter	 for 32x M12 screws/strength class 12.9	 
up to 48 [4] (M) clamping hub diameter	 for 32x M12 screws/strength class 12.9	 
up to 48 [4] (M) clamping hub diameter	 for 32x M12 screws/strength class 12.9	 

Z: Detail



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.
5) Fit length

⚠ Motor mounting according to operating manual

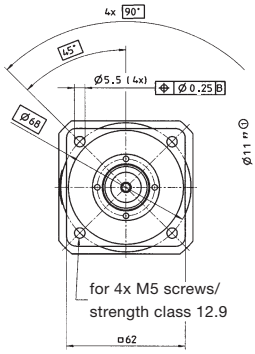
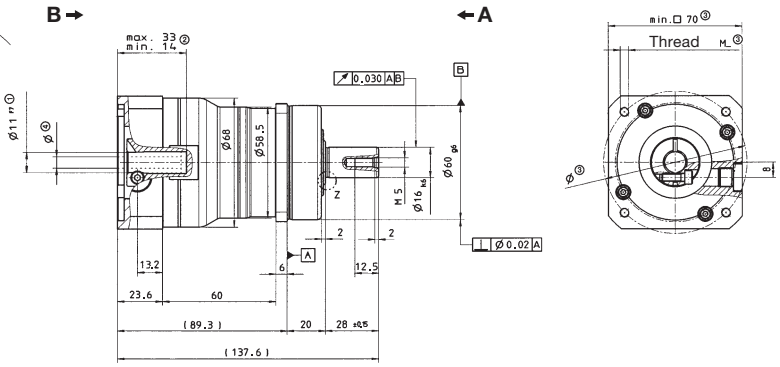
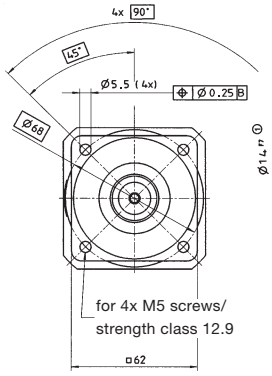
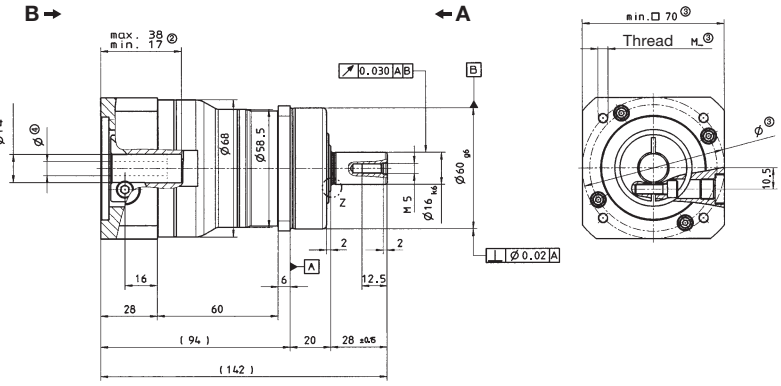
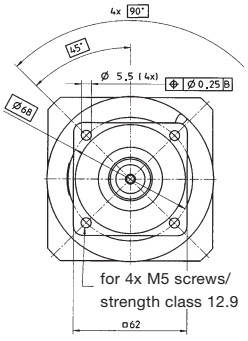
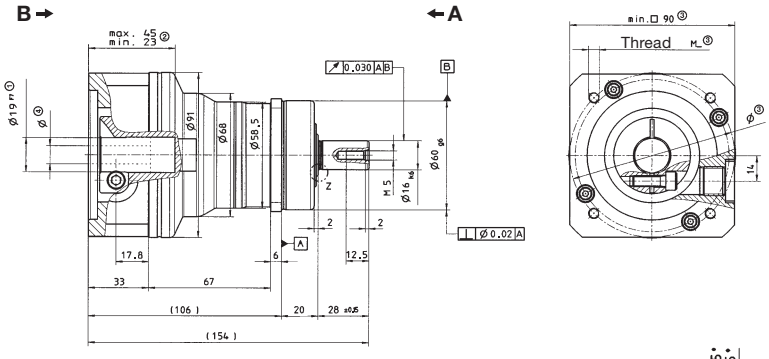
SP⁺ – The classic all-rounder among planetary gearheads

MF version for Cyclic operation S5 from page 68 on
MC version for Continuous operation S1 from page 92 on

					1-stage				
Ratio [a]			***i***		**3**	**4**	**5**	**7**	**10**
cymex®-optimized acceleration torque (please contact us regarding the design)			T_{2Bcym}	Nm	–	58	60	54	–
				in.lb		513	531	478	
Max. acceleration torque (max. 1000 cycles per hour)			T_{2B}	Nm	30	40	40	40	32
				in.lb	266	354	354	354	283
Nominal output torque (with n_{1N})			T_{2N}	Nm	17	26	26	26	17
				in.lb	150	230	230	230	150
Emergency stop torque (permitted 1000 times during the service life of the gearhead)			T_{2Not}	Nm	80	100	100	100	80
				in.lb	708	885	885	885	708
Nominal input speed (with T_{2N} and 20°C ambient temperature) [b]			n_{1N}	rpm	3300	3300	3300	4000	4000
Max. input speed			n_{1max}	rpm	6000	6000	6000	6000	6000
Mean no load running torque (with n_1=3000 rpm and 20°C gearhead temperature) [c]			T_{012}	Nm	0.9	0.7	0.6	0.4	0.3
				in.lb	8.0	6.2	5.3	3.5	2.7
Max. torsional backlash			j_t	arcmin	Standard ≤ 4 / Reduced ≤ 2				
Torsional rigidity			C_{t21}	Nm/ arcmin	3.5				
				in.lb/ arcmin	31				
Max. axial force [d]			F_{2AMax}	N	2400				
				lb_f	540				
Max. radial force [d]			F_{2RMax}	N	2700				
				lb_f	608				
Max. tilting torque			M_{2KMax}	Nm	152				
				in.lb	1345				
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	1.9				
				lb_m	4.2				
Operating noise (with n_1=3000 rpm no load)			L_{PA}	dB(A)	≤ 64				
Max. permitted housing temperature				°C	+90				
				F	194				
Ambient temperature				°C	0 to +40				
				F	32 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	kgcm²	0.21	0.15	0.12	0.10	0.09
				10^{-3} in.lb.s²	0.18	0.13	0.11	0.09	0.08
Clamping hub diameter [mm]	C	14	J_1	kgcm²	0.28	0.22	0.20	0.18	0.17
				10^{-3} in.lb.s²	0.25	0.20	0.17	0.16	0.15
	E	19	J_1	kgcm²	0.61	0.55	0.52	0.50	0.49
				10^{-3} in.lb.s²	0.54	0.48	0.46	0.44	0.43

[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

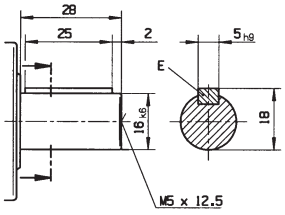
Motor shaft diameter [mm]

	View A	View B
up to 11 [4] (B) clamping hub diameter		
up to 14 [4] (C) clamping hub diameter)		
up to 19 [4] (E) clamping hub diameter		

Alternatives: Output shaft variants

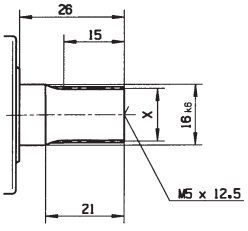
Keywayed output shaft in mm

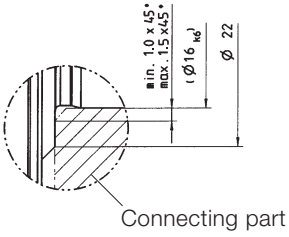
E = key as per DIN 6885, sheet 1, form A



Involute gearing DIN 5480 in mm

X = W 16 x 0.8 x 30 x 18 x 6m, DIN 5480





Z: Detail

Connecting part

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

SP+ 060 MF 2-stage

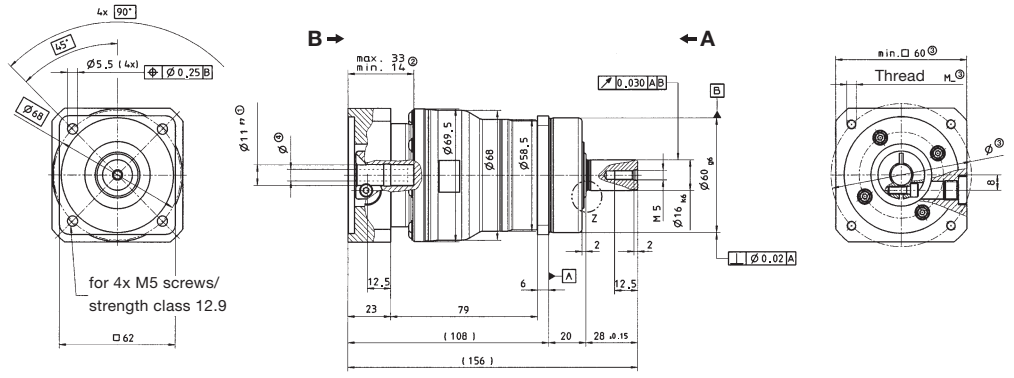
				2-stage							
Ratio [a]			*i*	**16**	**20**	**25**	**28**	**35**	**40**	**50**	**70**	**100**
cymex®-optimized acceleration torque (please contact us regarding the design)			T_{2Bcym} Nm	58	58	60	58	60	58	60	54	–
			in.lb	513	513	531	513	531	513	531	478	–
Max. acceleration torque (max. 1000 cycles per hour)			T_{2B} Nm	40	40	40	40	40	40	40	40	32
			in.lb	354	354	354	354	354	354	354	354	283
Nominal output torque (with n_{1N})			T_{2N} Nm	26	26	26	26	26	26	26	26	17
			in.lb	230	230	230	230	230	230	230	230	150
Emergency stop torque (permitted 1000 times during the service life of the gearhead)			T_{2Not} Nm	100	100	100	100	100	100	100	100	80
			in.lb	885	885	885	885	885	885	885	885	708
Nominal input speed (with T_{2N} and 20°C ambient temperature) [b]			n_{1N} rpm	4400	4400	4400	4400	4400	4400	4800	5500	5500
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	0.5	0.4	0.4	0.3	0.3	0.3	0.3	0.3	0.2
			in.lb	4.4	3.5	3.5	2.7	2.7	2.7	2.7	2.7	1.8
Max. torsional backlash			j_t arcmin	Standard ≤ 6 / Reduced ≤ 4								
Torsional rigidity			C_{t21} Nm/ arcmin	3.5								
			in.lb/ arcmin	31.0								
Max. axial force [d]			F_{2AMax} N	2400								
			lb_f	540								
Max. radial force [d]			F_{2RMax} N	2700								
			lb_f	608								
Max. tilting moment			M_{2KMax} Nm	152								
			in.lb	1345								
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	2.0								
			lb_m	4.4								
Operating noise (with n_1=3000 rpm no load)			L_{PA} dB(A)	≤ 64								
Max. permitted housing temperature			°C	+90								
			F	194								
Ambient temperature			°C	0 to +40								
			F	32 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 kgcm²	0.077	0.069	0.068	0.061	0.061	0.057	0.057	0.056	0.056
			10^{-3} in.lb.s²	0.068	0.061	0.060	0.054	0.054	0.050	0.050	0.050	0.050
Clamping hub diameter [mm]	C	14	J_1 kgcm²	0.17	0.16	0.16	0.16	0.16	0.15	0.15	0.15	0.15
			10^{-3} in.lb.s²	0.15	0.15	0.14	0.14	0.14	0.14	0.13	0.13	0.13

[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

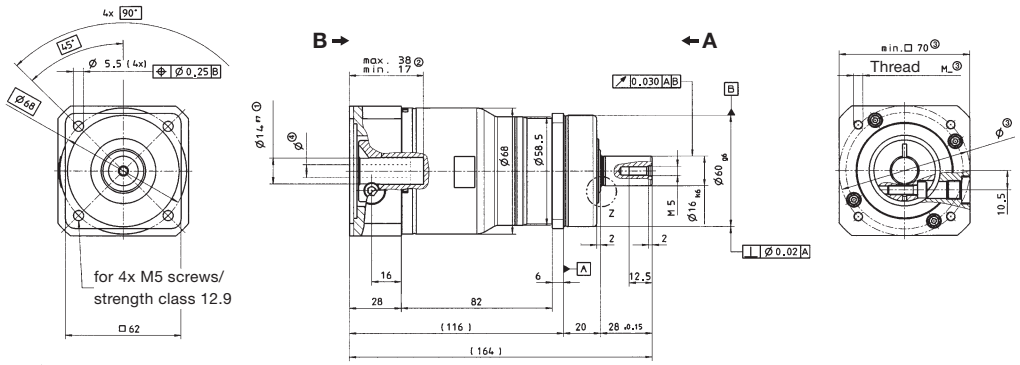
View A | View B

Motor shaft diameter [mm]

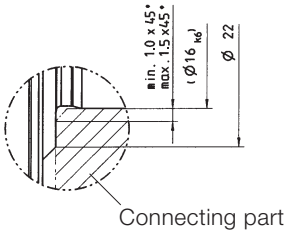
up to 11 [4] (B) clamping hub diameter



up to 14 [4] (C) clamping hub diameter



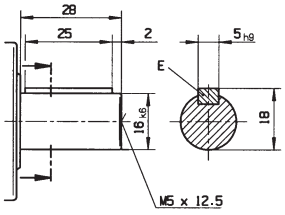
Z: Detail



Alternatives: Output shaft variants

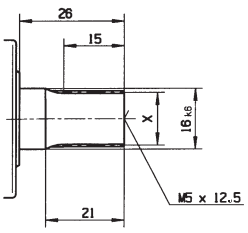
Keywayed output shaft in mm

E = key as per DIN 6885, sheet 1, form A



Involute gearing DIN 5480 in mm

X = W 16 x 0.8 x 30 x 18 x 6m, DIN 5480



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

SP+

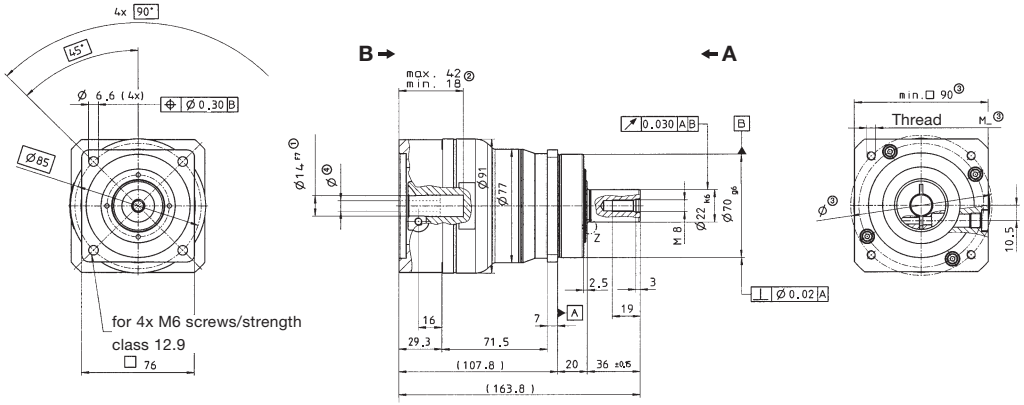
					1-stage				
Ratio [a]			***i***		**3**	**4**	**5**	**7**	**10**
cymex®-optimized acceleration torque (please contact us regarding the design)			T_{2Bcym}	Nm	–	135	150	135	95
				in.lb	–	1195	1328	1195	841
Max. acceleration torque (max. 1000 cycles per hour)			T_{2B}	Nm	85	110	110	110	90
				in.lb	752	974	974	974	797
Nominal output torque (with n_{1N})			T_{2N}	Nm	47	75	75	75	52
				in.lb	416	664	664	664	460
Emergency stop torque (permitted 1000 times during the service life of the gearhead)			T_{2Not}	Nm	200	250	250	250	200
				in.lb	1770	2213	2213	2213	1770
Nominal input speed (with T_{2N} and 20°C ambient temperature) [b]			n_{1N}	rpm	2900	2900	2900	3100	3100
Max. input speed			n_{1Max}	rpm	6000	6000	6000	6000	6000
Mean no load running torque (with n_1=3000 rpm and 20°C gearhead temperature) [c]			T_{012}	Nm	1.8	1.4	1.1	0.8	0.6
				in.lb	15.9	12.4	9.7	7.1	5.3
Max. torsional backlash			j_t	arcmin	Standard ≤ 4 / Reduced ≤ 2				
Torsional rigidity			C_{t21}	Nm/ arcmin	10				
				in.lb/ arcmin	89				
Max. axial force [d]			F_{2AMax}	N	3350				
				lb_f	754				
Max. radial force [d]			F_{2RMax}	N	4000				
				lb_f	900				
Max. tilting moment			M_{2KMax}	Nm	236				
				in.lb	2089				
Efficiency at full load			η	%	97				
Service life (For calculation, see the Chapter "Information")			L_h	h	> 20000				
Weight incl. standardadapter plate			*m*	kg	3.9				
				lb_m	8.6				
Operating noise (with n_1=3000 rpm no load)			L_{PA}	dB(A)	≤ 64				
Max. permitted housing temperature				°C	+90				
				F	194				
Ambient temperature				°C	0 to +40				
				F	32 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	kgcm²	0.86	0.61	0.51	0.42	0.38
				10^{-3} in.lb.s²	0.76	0.54	0.46	0.37	0.33
Clamping hub diameter [mm]	E	19	J_1	kgcm²	1.03	0.78	0.68	0.59	0.54
				10^{-3} in.lb.s²	0.91	0.69	0.60	0.52	0.48
	G	24	J_1	kgcm²	2.40	2.15	2.05	1.96	1.91
				10^{-3} in.lb.s²	2.12	1.90	1.81	1.73	1.69

[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 centre of the output shaft or flange

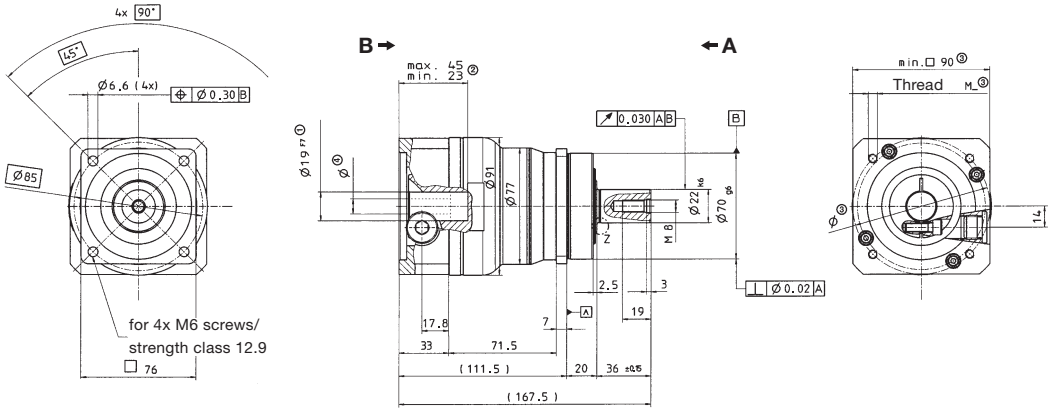
View A | View B

Motor shaft diameter [mm]

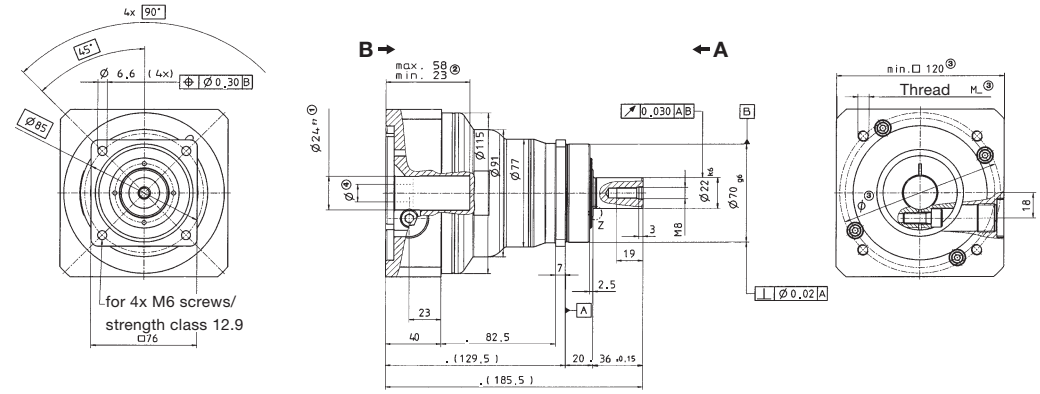
up to 14 [4] (C) clamping hub diameter



up to 19 [4] (E) clamping hub diameter

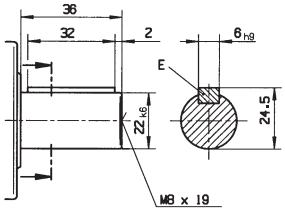


up to 24 [4] (G) clamping hub diameter

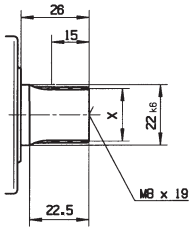


Alternatives: Output shaft variants

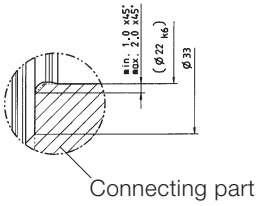
Keywayed output shaft in mm
E = key as per DIN 6885, sheet 1, form A



Involute gearing DIN 5480 in mm
X = W 22 x 1.25 x 30 x 16 x 6m, DIN 5480



Z: Detail



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

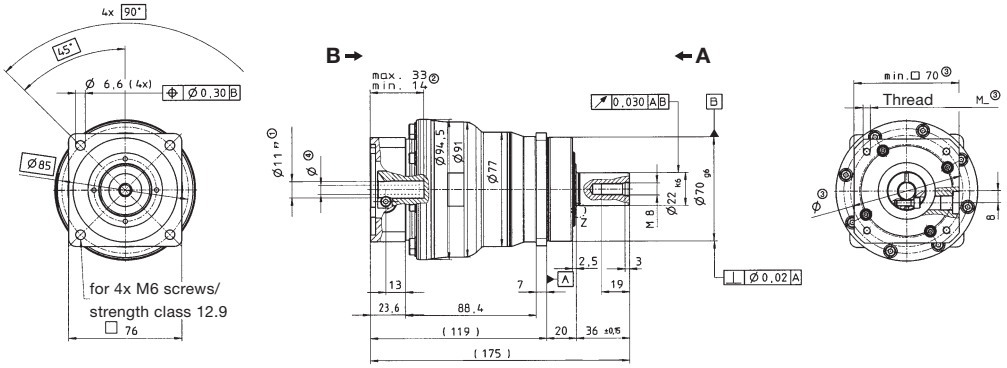
					2-stage								
Ratio [a]			***i***		**16**	**20**	**25**	**28**	**35**	**40**	**50**	**70**	**100**
cymex®-optimized acceleration torque (please contact us regarding the design)			T_{2Bcym}	Nm	135	135	150	135	150	135	150	135	95
				in.lb	1195	1195	1328	1195	1328	1195	1328	1195	841
Max. acceleration torque (max. 1000 cycles per hour)			T_{2B}	Nm	110	110	110	110	110	110	110	110	90
				in.lb	974	974	974	974	974	974	974	974	797
Nominal output torque (with n_{1N})			T_{2N}	Nm	75	75	75	75	75	75	75	75	52
				in.lb	664	664	664	664	664	664	664	664	460
Emergency stop torque (permitted 1000 times during the service life of the gearhead)			T_{2Not}	Nm	250	250	250	250	250	250	250	250	200
				in.lb	2213	2213	2213	2213	2213	2213	2213	2213	1770
Nominal input speed (with T_{2N} and 20°C ambient temperature) [b]			n_{1N}	rpm	3500	3500	3500	3500	3500	3500	3800	4500	4500
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	0.8	0.6	0.6	0.5	0.4	0.4	0.3	0.3	0.3
				in.lb	4.4	3.5	3.5	2.7	2.7	1.8	1.8	1.8	1.8
Max. torsional backlash			j_t	arcmin	Standard ≤ 6 / Reduced ≤ 4								
Torsional rigidity			C_{t21}	Nm/ arcmin	10								
				in.lb/ arcmin	89								
Max. axial force [d]			F_{2AMax}	N	3350								
				lb_f	754								
Max. radial force [d]			F_{2RMax}	N	4000								
				lb_f	900								
Max. tilting moment			M_{2KMax}	Nm	236								
				in.lb	2089								
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 n_1 = 3000 rpm no load)			L_{PA}	dB(A)	≤ 64								
Max. permitted housing temperature				°C	+90								
				F	194								
Ambient temperature				°C	0 to +40								
				F	32 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	kgcm²	0.16	0.13	0.13	0.10	0.10	0.091	0.090	0.089	0.089
				10^{-3} in.lb.s²	0.14	0.11	0.11	0.092	0.090	0.081	0.080	0.079	0.079
Clamping hub diameter [mm]	C	14	J_1	kgcm²	0.23	0.20	0.20	0.18	0.18	0.17	0.16	0.16	0.16
				10^{-3} in.lb.s²	0.20	0.18	0.18	0.16	0.16	0.15	0.15	0.14	0.14
	E	19	J_1	kgcm²	0.55	0.53	0.52	0.50	0.50	0.49	0.49	0.49	0.49
				10^{-3} in.lb.s²	0.49	0.47	0.46	0.44	0.44	0.43	0.43	0.43	0.43

[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 centre of the output shaft or flange

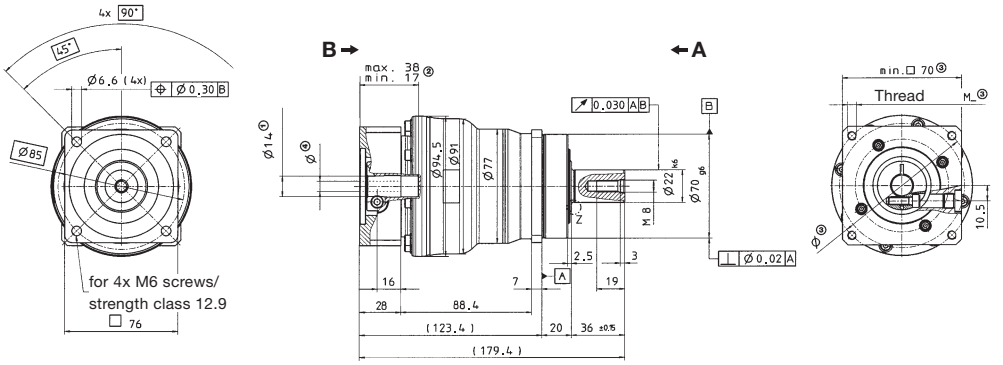
View A | View B

Motor shaft diameter [mm]

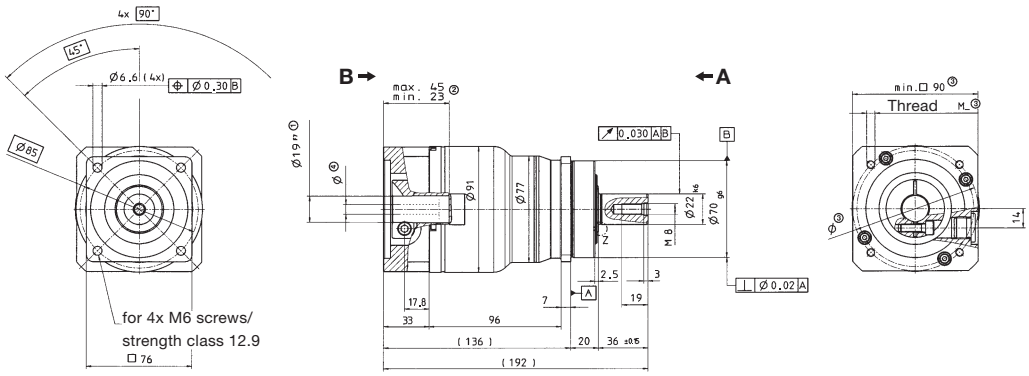
up to 11 [4] (B) clamping hub diameter



up to 14 [4] (C) clamping hub diameter



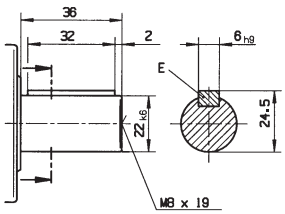
up to 19 [4] (E) clamping hub diameter



Alternatives: Output shaft variants

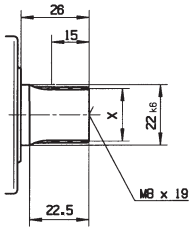
Keywayed output shaft in mm

E = key as per DIN 6885, sheet 1, form A

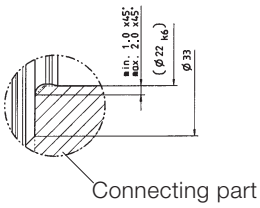


Involute gearing DIN 5480 in mm

X = W 22 x 1.25 x 30 x 16 x 6m, DIN 5480



Z: Detail



Non-tolerated dimensions ± 1 mm

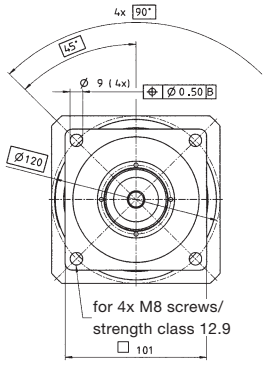
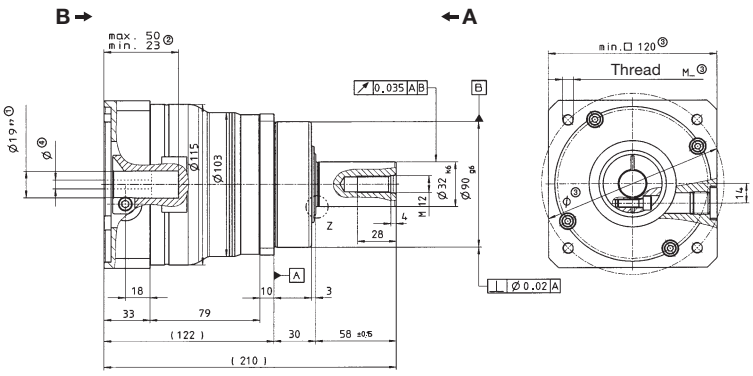
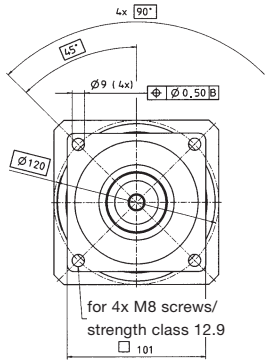
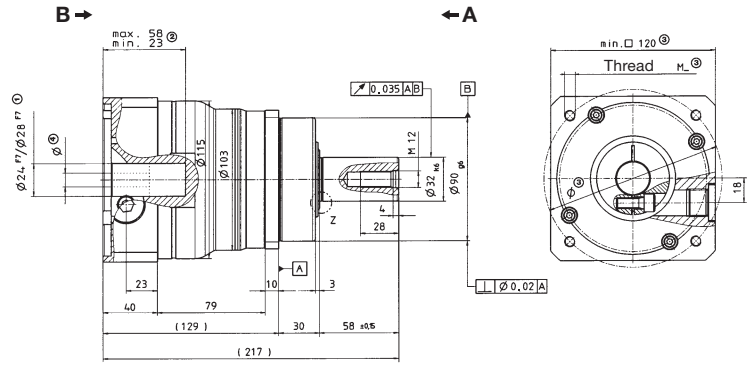
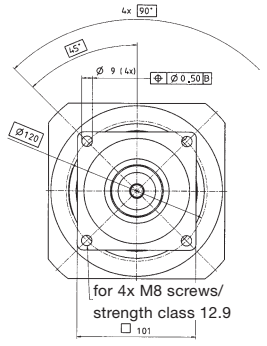
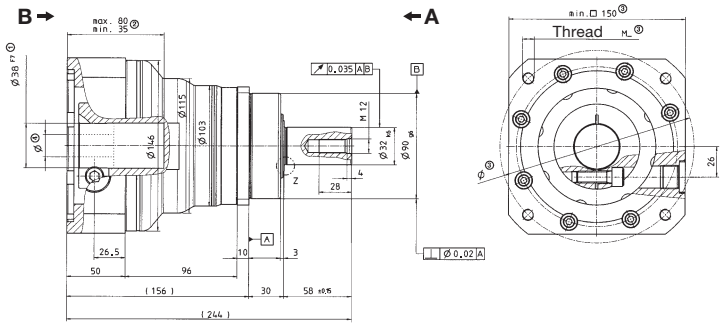
1) Check motor shaft fit.
2) Min./Max. permissible motor shaft length. Longer motor shafts are adaptable, please contact us.
3) The dimensions depend on the motor.
4) Smaller motor shaft diameter is compensated by a bushing with a minimum thickness of 1 mm.

⚠ Motor mounting according to operating manual

					1-stage				
Ratio [a]			***i***		**3**	**4**	**5**	**7**	**10**
cymex®-optimized acceleration torque (please contact us regarding the design)			T_{2Bcym}	Nm	–	350	380	315	250
				in.lb	–	3098	3363	2788	2213
Max. acceleration torque (max. 1000 cycles per hour)			T_{2B}	Nm	225	300	300	300	225
				in.lb	1991	2655	2655	2655	1991
Nominal output torque (with n_{1N})			T_{2N}	Nm	120	180	175	170	120
				in.lb	1062	1593	1549	1505	1062
Emergency stop torque (permitted 1000 times during the service life of the gearhead)			T_{2Not}	Nm	500	625	625	625	500
				in.lb	4425	5531	5531	5531	4425
Nominal input speed (with T_{2N} and 20°C ambient temperature) [b]			n_{1N}	rpm	2500	2500	2500	2800	2800
Max. input speed			n_{1Max}	rpm	4500	4500	4500	4500	4500
Mean no load running torque (with n_1 = 3000 rpm and 20°C gearhead temperature) [c]			T_{012}	Nm	3.5	2.7	2.4	1.6	1.4
				in.lb	31.0	23.9	21.2	14.2	12.4
Max. torsional backlash			j_t	arcmin	Standard ≤ 3 / Reduced ≤ 1				
Torsional rigidity			C_{t21}	Nm/ arcmin	31				
				in.lb/ arcmin	274				
Max. axial force [d]			F_{2AMax}	N	5650				
				lb_f	1271				
Max. radial force [d]			F_{2RMax}	N	6300				
				lb_f	1418				
Max. tilting moment			M_{2KMax}	Nm	487				
				in.lb	4310				
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	7.7				
				lb_m	17.0				
Operating noise (with n_1 = 3000 rpm no load i = 4)			L_{PA}	dB(A)	≤ 66				
Max. permitted housing temperature				°C	+90				
				F	17.0				
Ambient temperature				°C	0 to +40				
				F	32 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	kgcm²	3.29	2.35	1.92	1.60	1.38
				10^{-3} in.lb.s²	2.91	2.08	1.70	1.42	1.22
Clamping hub diameter [mm]	G	24	J_1	kgcm²	3.99	3.04	2.61	2.29	2.07
				10^{-3} in.lb.s²	3.53	2.69	2.31	2.03	1.83
	H	28	J_1	kgcm²	3.01	2.53	2.17	1.89	1.68
				10^{-3} in.lb.s²	2.66	2.24	1.92	1.67	1.48
	K	38	J_1	kgcm²	11.1	10.1	9.68	9.36	9.14
				10^{-3} in.lb.s²	9.78	8.95	8.57	8.28	8.09

[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 centre of the output shaft or flange

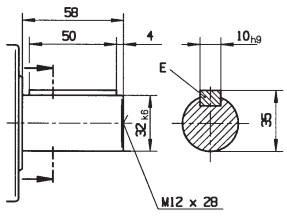
Motor shaft diameter [mm]

	View A	View B
up to 19 [4] (E) clamping hub diameter		
up to 24/28 [4] (G/H) clamping hub diameter		
up to 38 [4] (K) clamping hub diameter		

Alternatives: Output shaft variants

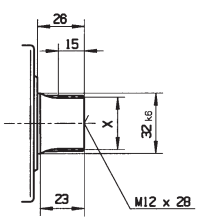
Keywayed output shaft in mm

E = key as per DIN 6885, sheet 1, form A

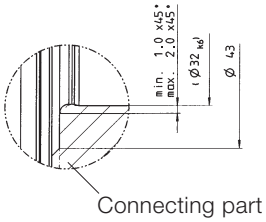


Involute gearing DIN 5480 in mm

X = W 32 x 1.25 x 30 x 24 x 6m, DIN 5480



Z: Detail



Non-tolerated dimensions ± 1 mm

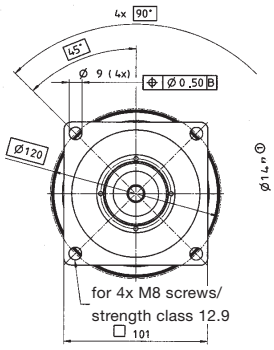
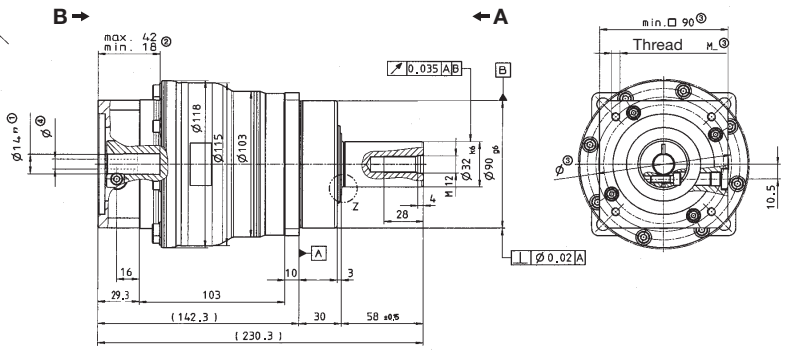
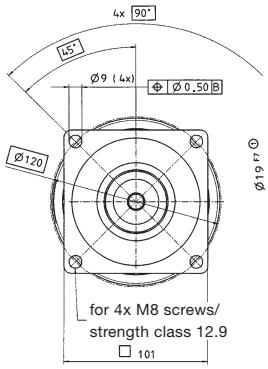
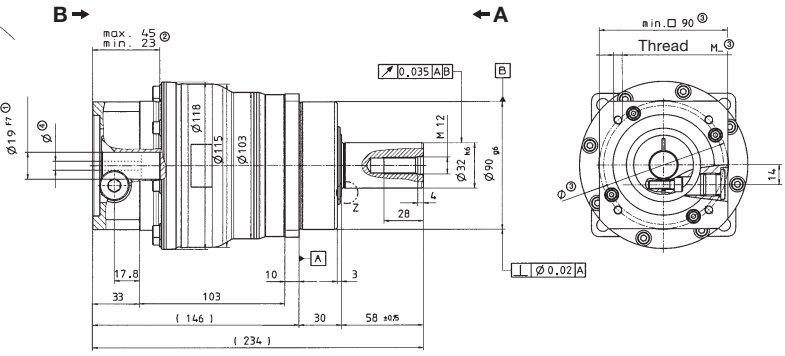
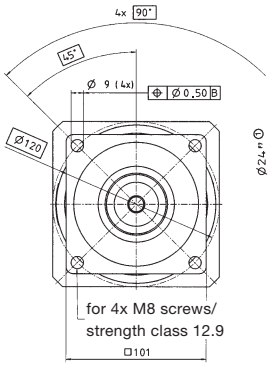
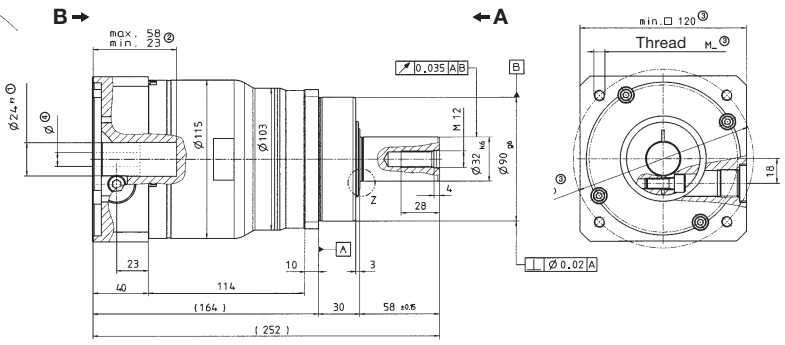
1) Check motor shaft fit.
2) Min./Max. permissible motor shaft length. Longer motor shafts are adaptable, please contact us.
3) The dimensions depend on the motor.
4) Smaller motor shaft diameter is compensated by a bushing with a minimum thickness of 1 mm.

⚠ Motor mounting according to operating manual

					2-stage								
Ratio [a]			***i***		**16**	**20**	**25**	**28**	**35**	**40**	**50**	**70**	**100**
cymex®-optimized acceleration torque (please contact us regarding the design)			T_{2Bcym}	Nm	350	350	380	350	380	350	380	315	250
				in.lb	3098	3098	3363	3098	3363	3098	3363	2788	2213
Max. acceleration torque (max. 1000 cycles per hour)			T_{2B}	Nm	300	300	300	300	300	300	300	300	225
				in.lb	2655	2655	2655	2655	2655	2655	2655	2655	1991
Nominal output torque (with n_{1N})			T_{2N}	Nm	180	180	175	180	175	180	175	170	120
				in.lb	1593	1593	1549	1593	1549	1593	1549	1505	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	500
				in.lb	5531	5531	5531	5531	5531	5531	5531	5531	4425
Nominal input speed (with T_{2N} and 20°C ambient temperature) [b]			n_{1N}	rpm	3100	3100	3100	3100	3100	3100	3500	4200	4200
Max. input speed			n_{1Max}	rpm	4500	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	1.5	1.2	1.1	0.9	0.8	0.7	0.6	0.5	0.5
				in.lb	7.1	6.2	5.3	4.4	3.5	3.5	2.7	2.7	2.7
Max. torsional backlash			j_t	arcmin	Standard ≤ 5 / Reduced ≤ 3								
Torsional rigidity			C_{t21}	Nm/ arcmin	31								
				in.lb/ arcmin	274								
Max. axial force [d]			F_{2AMax}	N	5650								
				lb_f	1271								
Max. radial force [d]			F_{2RMax}	N	6300								
				lb_f	1418								
Max. tilting moment			M_{2KMax}	Nm	487								
				in.lb	4310								
Efficiency at full load			η	%	94								
Service life (For calculation, see the Chapter "Information")			L_h	h	> 20000								
Weight incl. standardadapter plate			m	kg	7.9								
				lb_m	17.5								
Operating noise (with n_1 = 3000 rpm no load)			L_{PA}	dB(A)	≤ 64								
Max. permitted housing temperature				°C	+90								
				F	194								
Ambient temperature				°C	0 to +40								
				F	32 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	kgcm²	0.64	0.54	0.52	0.43	0.43	0.38	0.38	0.37	0.37
				10^{-3} in.lb.s²	0.57	0.47	0.46	0.38	0.38	0.34	0.33	0.33	0.33
Clamping hub diameter [mm]	E	19	J_1	kgcm²	0.81	0.70	0.69	0.60	0.59	0.55	0.54	0.54	0.54
				10^{-3} in.lb.s²	0.72	0.62	0.61	0.53	0.52	0.48	0.48	0.48	0.47
	G	24	J_1	kgcm²	2.18	2.07	2.05	1.97	1.96	1.92	1.91	1.91	1.91
				10^{-3} in.lb.s²	1.93	1.83	1.82	1.74	1.74	1.70	1.69	1.69	1.69

[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 centre of the output shaft or flange

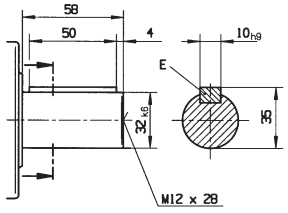
Motor shaft diameter [mm]

	View A	View B
up to 14 [4] (C) clamping hub diameter		
up to 19 [4] (E) clamping hub diameter		
up to 24 [4] (G) clamping hub diameter		

Alternatives: Output shaft variants

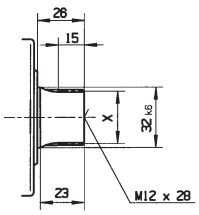
Keywayed output shaft in mm

E = key as per DIN 6885, sheet 1, form A

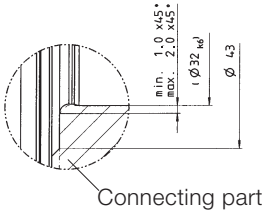


Involute gearing DIN 5480 in mm

X = W 32 x 1.25 x 30 x 24 x 6m, DIN 5480



Z: Detail



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

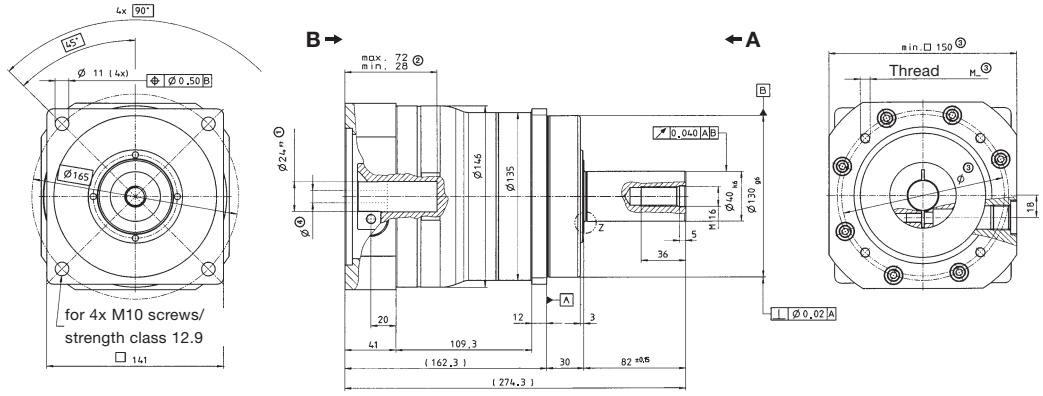
					1-stage				
Ratio [a]			***i***		**3**	**4**	**5**	**7**	**10**
cymex®-optimized acceleration torque (please contact us regarding the design)			T_{2Bcym}	Nm	–	675	720	630	540
				in.lb	–	5974	6372	5576	4779
Max. acceleration torque (max. 1000 cycles per hour)			T_{2B}	Nm	390	600	600	600	480
				in.lb	3451,5	5310	5310	5310	4248
Nominal output torque (with n_{1N})			T_{2N}	Nm	200	360	360	360	220
				in.lb	1770	3186	3186	3186	1947
Emergency stop torque (permitted 1000 times during the service life of the gearhead)			T_{2Not}	Nm	1000	1250	1250	1250	1000
				in.lb	8850	11063	11063	11063	8850
Nominal input speed (with T_{2N} and 20°C ambient temperature) [b]			n_{1N}	rpm	2100	2100	2100	2600	2600
Max. input speed			n_{1Max}	rpm	4000	4000	4000	4000	4000
Mean no load running torque (with n_1 = 3000 rpm and 20°C gearhead temperature) [c]			T_{012}	Nm	7.6	5.8	4.7	3.4	2.5
				in.lb	67	51	42	30	22
Max. torsional backlash			j_t	arcmin	Standard ≤ 3 / Reduced ≤ 1				
Torsional rigidity			C_{t21}	Nm/ arcmin	53				
				in.lb/ arcmin	469				
Max. axial force [d]			F_{2AMax}	N	9870				
				lb_f	2221				
Max. radial force [d]			F_{2RMax}	N	9450				
				lb_f	2126				
Max. tilting moment			M_{2KMax}	Nm	952				
				in.lb	8425				
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	17.2				
				lb_m	38.0				
Operating noise (with n_1 = 3000 rpm no load i = 10)			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				
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	kgcm²	10.7	7.82	6.79	5.84	5.28
				10^{-3} in.lb.s²	9.45	6.92	6.01	5.17	4.67
Clamping hub diameter [mm]	I	32	J_1	kgcm²	13.8	11.0	9.95	9.01	8.44
				10^{-3} in.lb.s²	12.3	9.72	8.81	7.97	7.47
	K	38	J_1	kgcm²	14.9	12.1	11.0	10.1	9.51
				10^{-3} in.lb.s²	13.2	10.7	9.76	8.92	8.42
	M	48	J_1	kgcm²	29.5	26.7	25.6	24.7	24.2
				10^{-3} in.lb.s²	26.1	23.6	22.7	21.9	21.4

[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

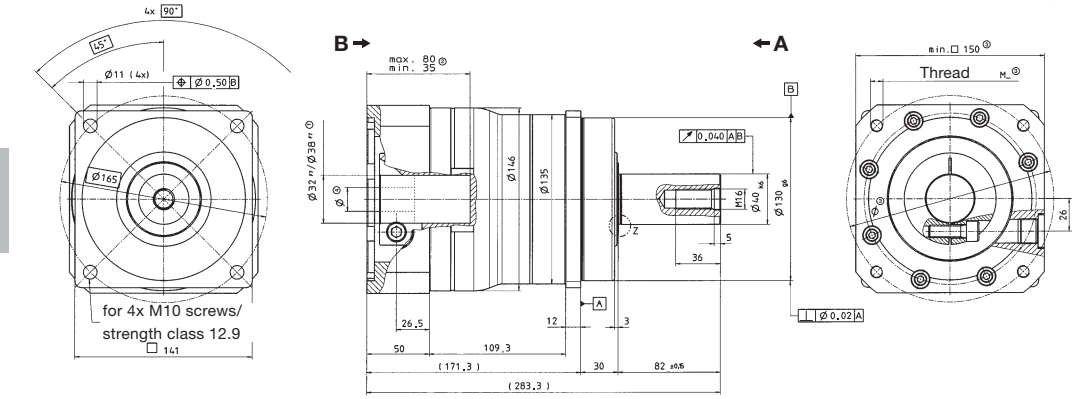
View A | View B

Motor shaft diameter [mm]

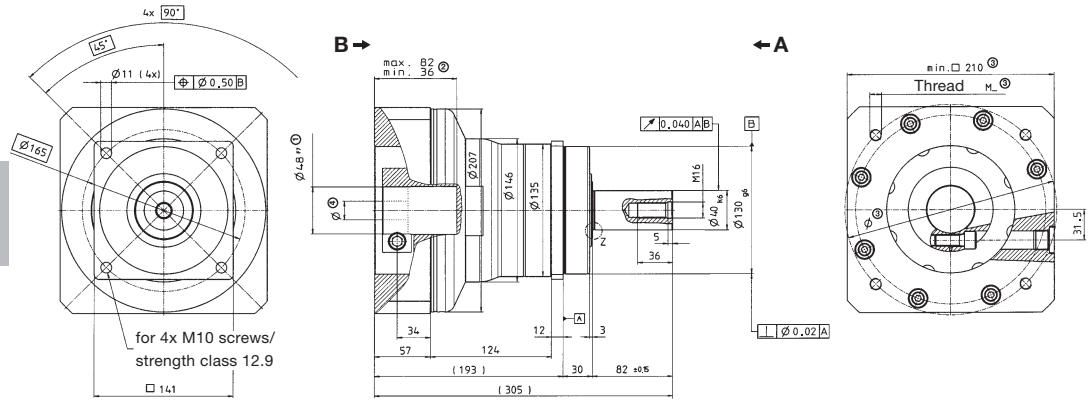
up to 24 [4] (G) clamping hub diameter



up to 32/38 [4] (I/K) clamping hub diameter

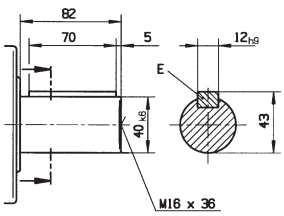


up to 48 [4] (M) clamping hub diameter

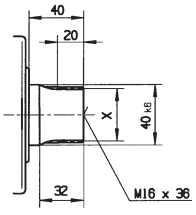


Alternatives: Output shaft variants

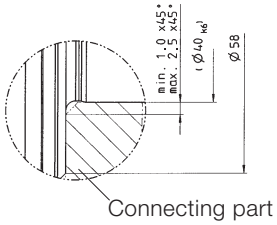
Keywayed output shaft in mm
E = key as per DIN 6885, sheet 1, form A



Involute gearing DIN 5480 in mm
X = W 40 x 2 x 30 x 18 x 6m, DIN 5480



Z: Detail



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

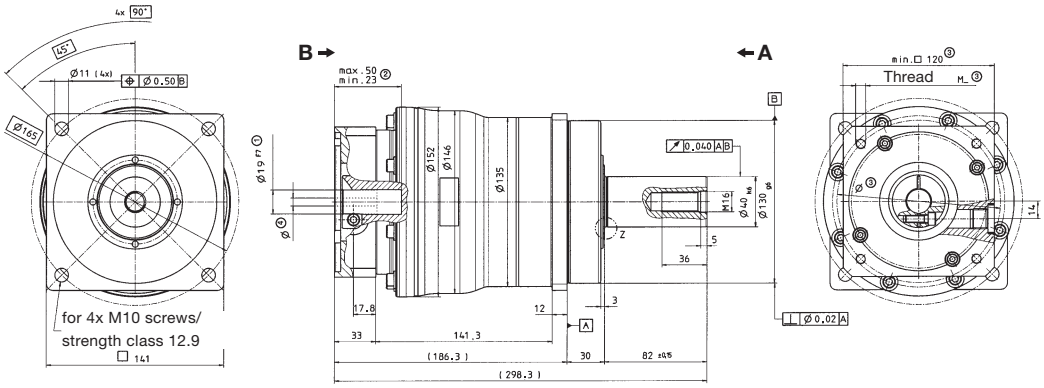
					2-stage								
Ratio [a]			***i***		**16**	**20**	**25**	**28**	**35**	**40**	**50**	**70**	**100**
cymex®-optimized acceleration torque (please contact us regarding the design)			T_{2Bcym}	Nm	675	675	720	675	720	675	720	630	540
				in.lb	5974	5974	6372	5974	6372	5974	6372	5576	4779
Max. acceleration torque (max. 1000 cycles per hour)			T_{2B}	Nm	600	600	600	600	600	600	600	600	480
				in.lb	5310	5310	5310	5310	5310	5310	5310	5310	4248
Nominal output torque (with n_{1N})			T_{2N}	Nm	360	360	360	360	360	360	360	360	220
				in.lb	3186	3186	3186	3186	3186	3186	3186	3186	1947
Emergency stop torque (permitted 1000 times during the service life of the gearhead)			T_{2Not}	Nm	1250	1250	1250	1250	1250	1250	1250	1250	1000
				in.lb	11063	11063	11063	11063	11063	11063	11063	11063	8850
Nominal input speed (with T_{2N} and 20°C ambient temperature) [b]			n_{1N}	rpm	2900	2900	2900	2900	2900	2900	3200	3200	3900
Max. input speed			n_{1Max}	rpm	4000	4000	4000	4000	4000	4000	4000	4000	4000
Mean no load running torque (with n_1 = 3000 rpm and 20°C gearhead temperature) [c]			T_{012}	Nm	3.3	2.7	2.4	1.9	1.8	1.4	1.3	1.2	1.1
				in.lb	14.2	11.5	10.6	8.9	8.0	6.2	5.3	4.4	4.4
Max. torsional backlash			j_t	arcmin	Standard ≤ 5 / Reduced ≤ 3								
Torsional rigidity			C_{t21}	Nm/ arcmin	53								
				in.lb/ arcmin	469								
Max. axial force [d]			F_{2AMax}	N	9870								
				lb_f	2221								
Max. radial force [d]			F_{2RMax}	N	9450								
				lb_f	2126								
Max. tilting moment			M_{2KMax}	Nm	952								
				in.lb	8425								
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	17								
				lb_m	37.6								
Operating noise (with n_1 = 3000 rpm no load)			L_{PA}	dB(A)	≤ 65								
Max. permitted housing temperature				°C	+90								
				F	194								
Ambient temperature				°C	0 to +40								
				F	32 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	kgcm²	2.50	2.01	1.97	1.65	1.63	1.40	1.39	1.38	1.38
				10^{-3} in.lb.s²	2.21	1.78	1.75	1.46	1.44	1.24	1.23	1.22	1.22
Clamping hub diameter [mm]	G	24	J_1	kgcm²	3.19	2.71	2.67	2.34	2.32	2.10	2.08	2.08	2.07
				10^{-3} in.lb.s²	2.82	2.40	2.36	2.07	2.05	1.85	1.85	1.84	1.83
	K	38	J_1	kgcm²	10.3	9.77	9.73	9.41	9.39	9.16	9.15	9.14	9.14
				10^{-3} in.lb.s²	9.07	8.65	8.61	8.33	8.31	8.11	8.10	8.09	8.09

[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

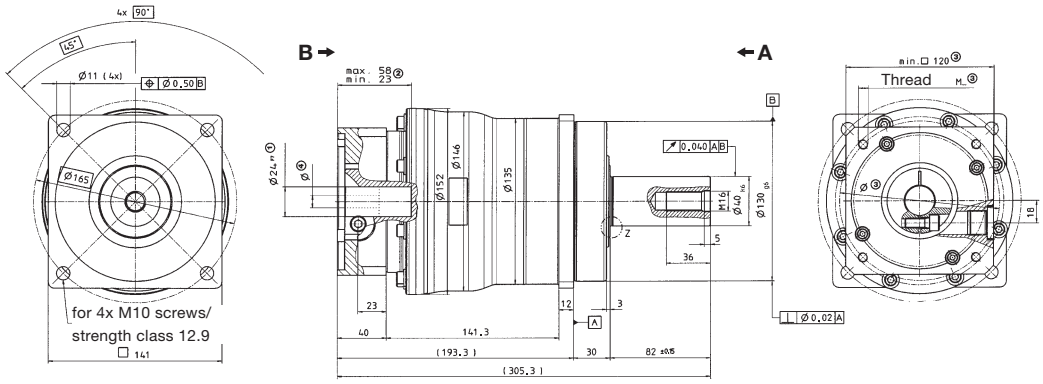
View A | View B

Motor shaft diameter [mm]

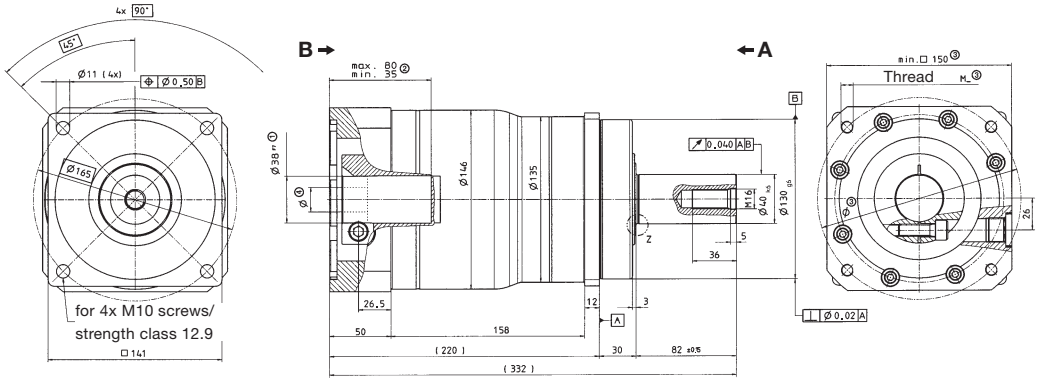
up to 19 [4] (E) clamping hub diameter



up to 24 [4] (G) clamping hub diameter

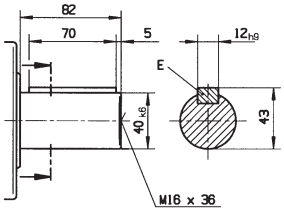


up to 38 [4] (K) clamping hub diameter

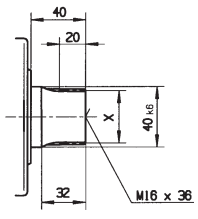


Alternatives: Output shaft variants

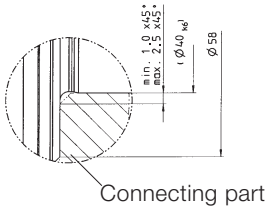
Keywayed output shaft in mm
E = key as per DIN 6885, sheet 1, form A



Involute gearing DIN 5480 in mm
X = W 40 x 2 x 30 x 18 x 6m, DIN 5480



Z: Detail



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

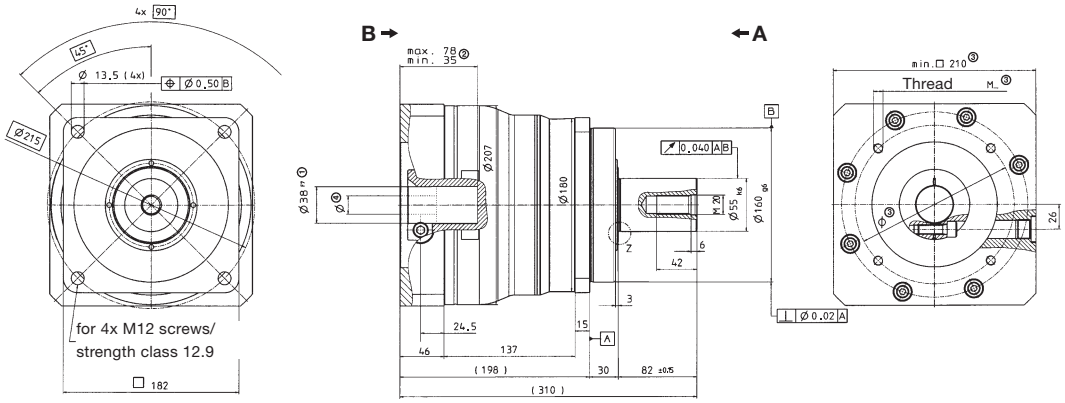
				1-stage				
Ratio [a]			***i***	**3**	**4**	**5**	**7**	**10**
cymex®-optimized acceleration torque (please contact us regarding the design)			T_{2Bcym} Nm	900	1700	1800	1700	1350
			T_{2Bcym} in.lb	7965	15045	15930	15045	11948
Max. acceleration torque (max. 1000 cycles per hour)			T_{2B} Nm	880	1100	1100	1100	880
			T_{2B} in.lb	7788	9735	9735	9735	7788
Nominal output torque (with n_{1N})			T_{2N} Nm	530	750	750	750	750
			T_{2N} in.lb	4691	6638	6638	6638	6638
Emergency stop torque (permitted 1000 times during the service life of the gearhead)			T_{2Not} Nm	2200	2750	2750	2750	2200
			T_{2Not} in.lb	19470	24338	24338	24338	29470
Nominal input speed (with T_{2N} and 20°C ambient temperature) [b]			n_{1N} rpm	1500	1500	1500	2300	2300
Max. input speed			n_{1Max} rpm	3500	3500	3500	3500	3500
Mean no load running torque (with n_1 = 3000 rpm and 20°C gearhead temperature) [c]			T_{012} Nm	14.0	11.0	9.0	6.8	5.0
			T_{012} in.lb	123.9	97.4	79.7	60.2	44.3
Max. torsional backlash			j_t arcmin	Standard ≤ 3 / Reduced ≤ 1				
Torsional rigidity			C_{t21} Nm/ arcmin	175				
			C_{t21} in.lb/ arcmin	1549				
Max. axial force [d]			F_{2AMax} N	14150				
			F_{2AMax} lb_f	3184				
Max. radial force [d]			F_{2RMax} N	14700				
			F_{2RMax} lb_f	3308				
Max. tilting moment			M_{2KMax} Nm	1600				
			M_{2KMax} in.lb	14160				
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	34				
			m lb_m	75.1				
Operating noise (with n_1 = 3000 rpm no load i = 10)			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				
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 kgcm²	50.8	33.9	27.9	22.2	19.2
			J_1 10^{-3} in.lb.s²	45.0	30.0	24.7	19.7	17.0
Clamping hub diameter [mm]	M	48	J_1 kgcm²	58.2	41.2	35.3	29.6	26.5
			J_1 10^{-3} in.lb.s²	51.5	36.5	31.2	26.2	23.5

[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

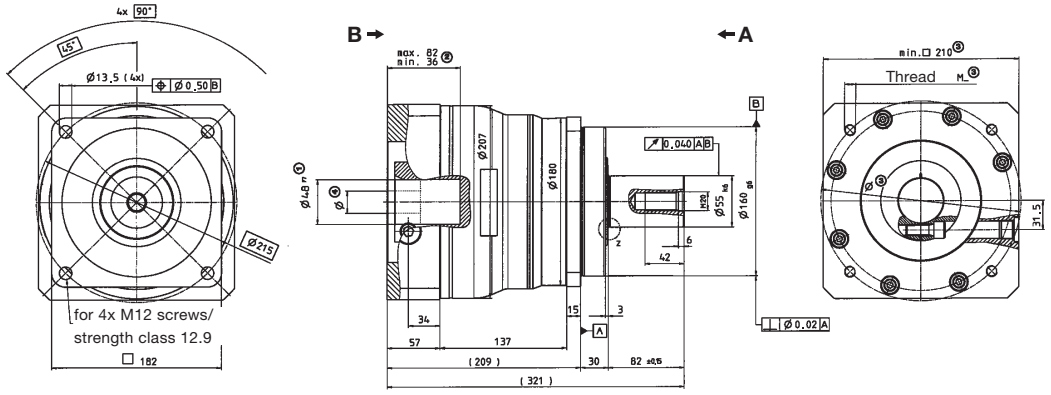
View A | View B

Motor shaft diameter [mm]

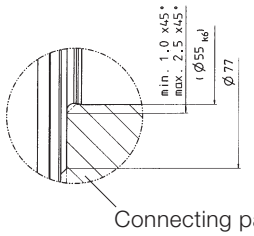
up to 38 [4] (K) clamping hub diameter



up to 48 [4] (M) clamping hub diameter

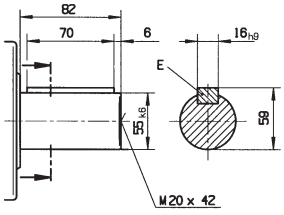


Z: Detail

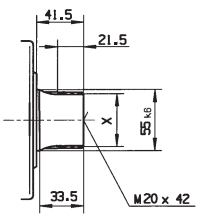


Alternatives: Output shaft variants

Keywayed output shaft in mm
E = key as per DIN 6885, sheet 1, form A



Involute gearing DIN 5480 in mm
X = W 55 x 2 x 30 x 26 x 6m, DIN 5480



Non-tolerated dimensions ± 1 mm

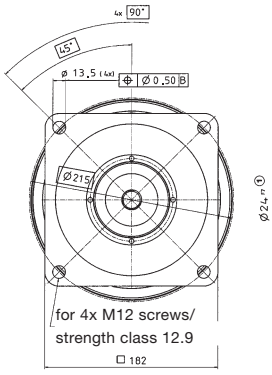
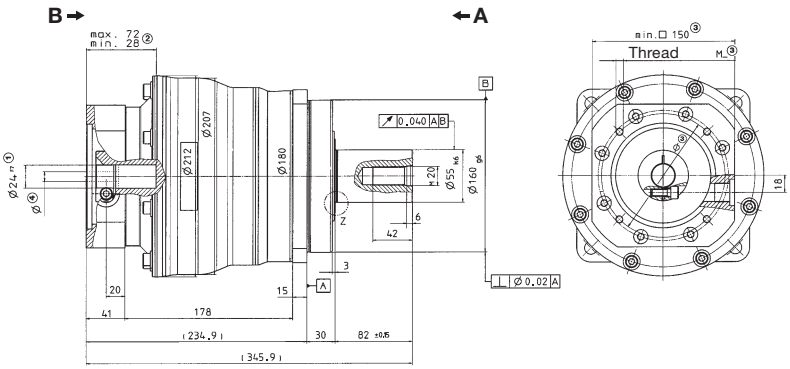
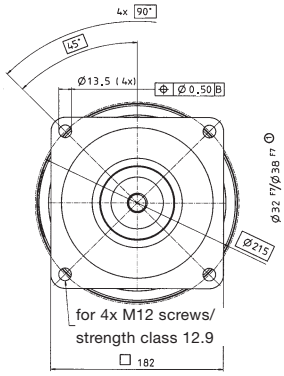
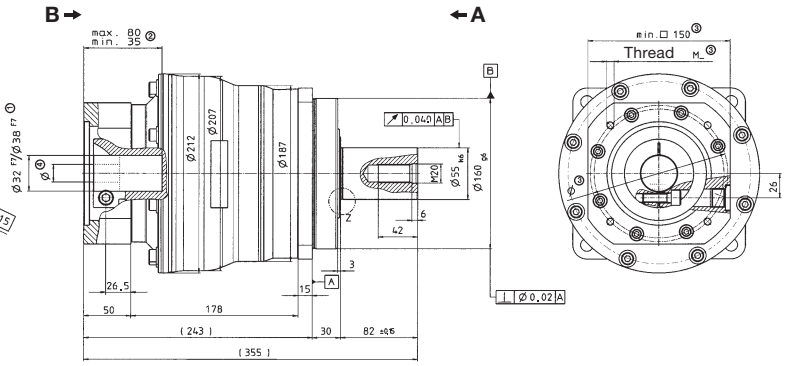
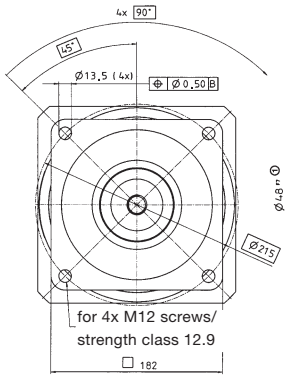
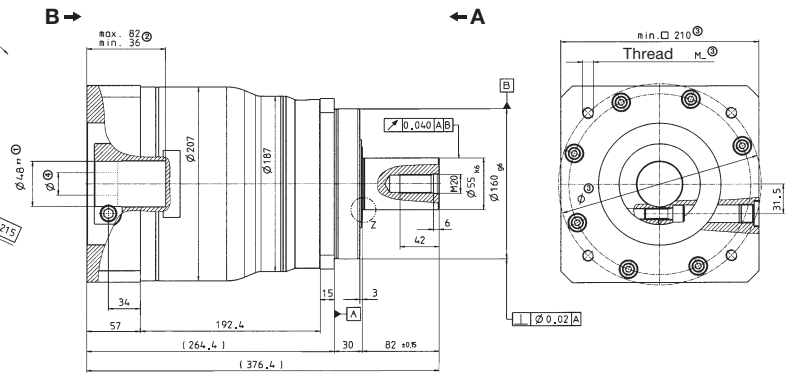
1) Check motor shaft fit.
2) Min./Max. permissible motor shaft length. Longer motor shafts are adaptable, please contact us.
3) The dimensions depend on the motor.
4) Smaller motor shaft diameter is compensated by a bushing with a minimum thickness of 1 mm.

⚠ Motor mounting according to operating manual

					2-stage								
Ratio [a]			***i***		**16**	**20**	**25**	**28**	**35**	**40**	**50**	**70**	**100**
cymex®-optimized acceleration torque (please contact us regarding the design)			T_{2Bcym}	Nm	1700	1700	1800	1700	1800	1700	1800	1700	1350
				in.lb	15045	15045	15930	15045	15930	15045	15930	15045	11948
Max. acceleration torque (max. 1000 cycles per hour)			T_{2B}	Nm	1100	1100	1100	1100	1100	1100	1100	1100	880
				in.lb	9735	9735	9735	9735	9735	9735	9735	9735	7788
Nominal output torque (with n_{1N})			T_{2N}	Nm	750	750	750	750	750	750	750	750	750
				in.lb	6638	6638	6638	6638	6638	6638	6637	6638	6638
Emergency stop torque (permitted 1000 times during the service life of the gearhead)			T_{2Not}	Nm	2750	2750	2750	2750	2750	2750	2750	2750	2200
				in.lb	24338	24338	24338	24338		24338	24338	24338	19470
Nominal input speed (with T_{2N} and 20°C ambient temperature) [b]			n_{1N}	rpm	2700	2700	2700	2700	2700	2700	2900	3200	3400
Max. input speed			n_{1Max}	rpm	4000	4000	4000	4000	4000	4000	4000	4000	4000
Mean no load running torque (with n_1 = 3000 rpm and 20°C gearhead temperature) [c]			T_{012}	Nm	5.3	4.3	3.9	3.1	2.8	2.3	2.1	1.9	1.7
				in.lb	28.3	23.0	20.4	16.8	15.0	12.4	10.6	8.9	8.0
Max. torsional backlash			j_t	arcmin	Standard ≤ 5 / Reduced ≤ 3								
Torsional rigidity			C_{t21}	Nm/ arcmin	175								
				in.lb/ arcmin	1549								
Max. axial force [d]			F_{2AMax}	N	14150								
				lb_f	3184								
Max. radial force [d]			F_{2RMax}	N	14700								
				lb_f	3308								
Max. tilting moment			M_{2KMax}	Nm	1600								
				in.lb	14160								
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	36.4								
				lb_m	80.4								
Operating noise (with n_1 = 3000 rpm no load)			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								
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	kgcm²	9.27	7.72	7.48	6.32	6.20	5.51	5.45	5.39	5.36
				10^{-3} in.lb.s²	8.20	6.83	6.62	5.59	5.49	4.88	4.82	4.77	4.74
Clamping hub diameter [mm]	I	32	J_1	kgcm²	12.4	10.9	10.6	9.48	9.36	8.67	8.61	8.55	8.52
				10^{-3} in.lb.s²	11.0	9.63	9.42	8.39	8.28	7.67	7.62	7.57	7.54
	K	38	J_1	kgcm²	13.5	12.0	11.7	10.6	10.4	9.74	9.68	9.63	9.60
				10^{-3} in.lb.s²	12.0	10.6	10.4	9.34	9.23	8.62	8.57	8.52	8.49
	M	48	J_1	kgcm²	28.1	26.6	26.3	25.2	25.1	24.4	24.3	24.3	24.3
				10^{-3} in.lb.s²	24.9	23.5	23.3	22.3	22.2	21.6	21.5	21.5	21.5

[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

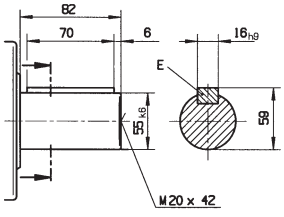
Motor shaft diameter [mm]

	View A	View B
up to 24 [4] (G) clamping hub diameter		
up to 32/38 [4] (I/K) clamping hub diameter		
up to 48 [4] (M) clamping hub diameter		

Alternatives: Output shaft variants

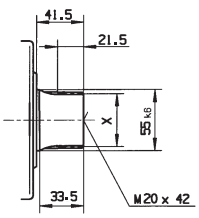
Keywayed output shaft in mm

E = key as per DIN 6885, sheet 1, form A

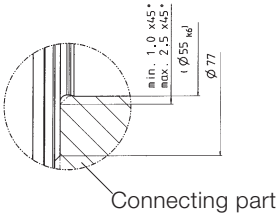


Involute gearing DIN 5480 in mm

X = W 55 x 2 x 30 x 26 x 6m, DIN 5480



Z: Detail



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

SP+ 210 MF 1/2-stage

				1-stage					2-stage								
Ratio [a]			***i***	**3**	**4**	**5**	**7**	**10**	**16**	**20**	**25**	**28**	**35**	**40**	**50**	**70**	**100**
cymex®-optimized acceleration torque (please contact us regarding the design)			T_{2Bcym}	Nm	- Please contact us -												
				in.lb													
Max. acceleration torque (max. 1000 cycles per hour)			T_{2B}	Nm	1600	2500	2500	2400	1900	2400	2500	2500	2400	2400	2400	2400	2400	1900
				in.lb	14160	22125	22125	21240	16815	21240	22125	22125	21240	21240	21240	21240	21240	16815
Nominal output torque (with n_{1N})			T_{2N}	Nm	1100	1500	1500	1400	1000	1500	1500	1500	1500	1500	1500	1500	1400	1000
				in.lb	9735	13275	13275	12390	8850	13275	13275	13275	13275	13275	13275	13275	12390	8850
Emergency stop torque (permitted 1000 times during the service life of the gearhead)			T_{2Not}	Nm	5000	5200	5200	5200	5000	5200	5200	5200	5200	5200	5200	5200	5200	5000
				in.lb	44250	46020	46020	46020	44250	46020	46020	46020	46020	46020	46020	46020	46020	44250
Nominal input speed (with T_{2N} and 20°C ambient temperature) [b]			n_{1N}	rpm	1200	1200	1500	1700	2000	2500	2500	2500	2500	2500	2500	2500	3000	3000
Max. input speed			n_{1Max}	rpm	2500	2500	2500	2500	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	30	20	15	9.0	6.0	4.5	4.0	3.5	3.0	2.5	2.5	2.5	2.0	2.0
				in.lb	265.5	177.0	132.8	79.7	53.1	39.8	35.4	31.0	26.6	22.1	22.1	22.1	17.7	17.7
Max. torsional backlash			j_t	arcmin	Standard ≤ 3 / Reduced ≤ 1					Standard ≤ 5 / Reduced ≤ 3								
Torsional rigidity			C_{t21}	Nm/ arcmin	400					400								
				in.lb/ arcmin	3540					3540								
Max. axial force [c]			F_{2AMax}	N	30000					30000								
				lb_f	6750					6750								
Max. radial force [c]			F_{2RMax}	N	21000					21000								
				lb_f	4725					4725								
Max. tilting moment			M_{2KMax}	Nm	3100					3100								
				in.lb	27435					2744								
Efficiency at full load			η	%	97					94								
Service life (For calculation, see the Chapter "Information")			L_h	h	> 20000					> 20000								
Weight incl. standard adapter plate			m	kg	56					53								
				lb_m	124					117								
Operating noise (with n_1 = 3000 rpm no load)			L_{PA}	dB(A)	≤ 70													
Max. permitted housing temperature				°C	+90													
				F	194													
Ambient temperature				°C	0 to +40													
				F	32 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	kgcm²	-	-	-	-	-	34.5	31.5	30.8	30.0	29.7	28.5	28.3	28.1	28.0
				10^{-3} in.lb.s²						30.5	27.9	27.3	26.6	26.3	25.2	25.0	24.9	24.8
Clamping hub diameter (mm)	N	55	J_1	kgcm²	139.0	94.3	76.9	61.5	53.1	-	-	-	-	-	-	-	-	-
				10^{-3} in.lb.s²	118.2	80.2	65.4	52.3	45.1									

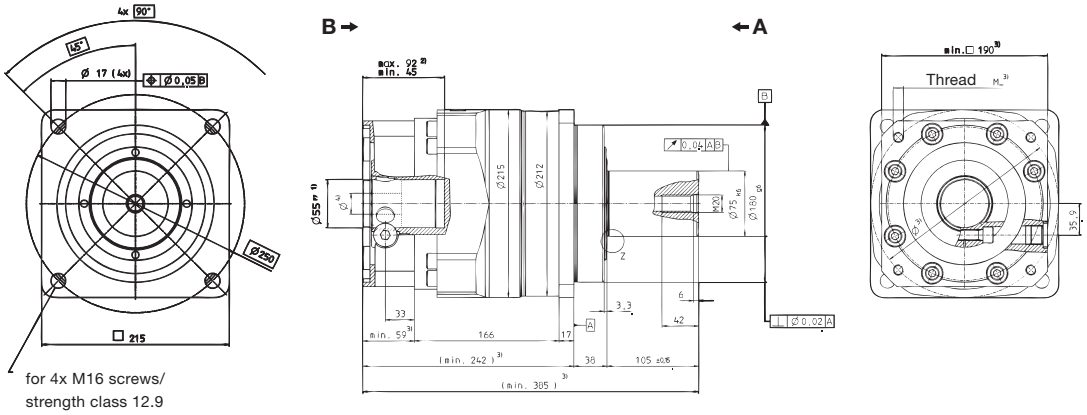
[a] Other ratios available on request
[b] For higher ambient temperatures, please reduce input speed
[c] Refers to center of the output shaft or flange

View A | View B

Motor shaft diameter [mm]

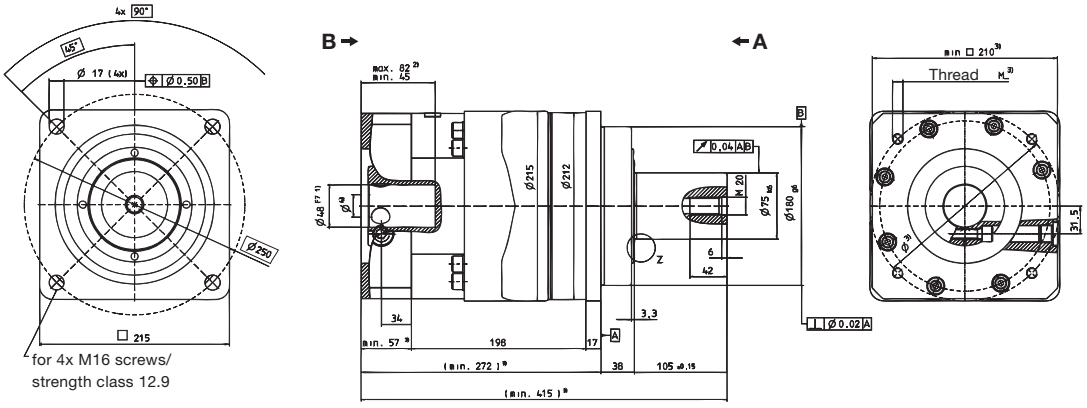
up to 55 [4] (N) clamping hub diameter

1-stage:

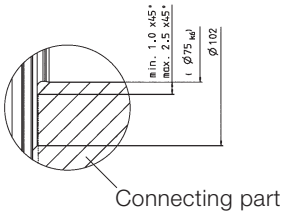


up to 48 [4] (M) clamping hub diameter

2-stage:

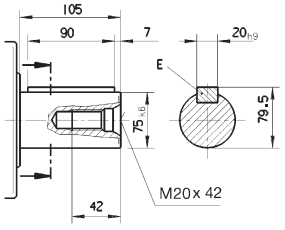


Z: Detail

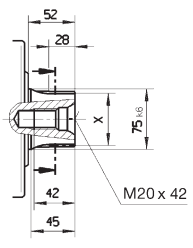


Alternatives: Output shaft variants

Keywayed output shaft in mm
E = key as per DIN 6885, sheet 1, form A



Involute gearing DIN 5480 in mm
X = W 70 x 2 x 30 x 34 x 6m, DIN 5480



Non-tolerated dimensions ± 1.5 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

SP+ 240 MF 1/2-stage

					1-stage					2-stage								
Ratio [a]			***i***		**3**	**4**	**5**	**7**	**10**	**16**	**20**	**25**	**28**	**35**	**40**	**50**	**70**	**100**
cymex®-optimized acceleration torque (please contact us regarding the design)			T_{2Bcym}	Nm	- Please contact us -													
				in.lb														
Max. acceleration torque (max. 1000 cycles per hour)			T_{2B}	Nm	2750	4500	4500	4300	3400	4500	4500	4500	4500	4500	4000	4300	4300	3400
				in.lb	24338	39825	39825	38055	30090	39825	39825	39825	39825	39825	35400	38055	38055	30090
Nominal output torque (with n_{1N})			T_{2N}	Nm	1500	2500	2500	2300	1700	2500	2500	2500	2500	2500	2500	2500	2300	1700
				in.lb	13275	22125	22125	20355	15045	22125	22125	22125	22125	22125	22125	22125	20355	15045
Emergency stop torque (permitted 1000 times during the service life of the gearhead)			T_{2Not}	Nm	6800	8500	8500	8500	6800	8500	8500	8500	8500	8500	8500	8500	8500	6800
				in.lb	60180	75225	75225	75225	60180	75225	75225	75225	75225	75225	75225	75225	75225	60180
Nominal input speed (with T_{2N} and 20°C ambient temperature) [b]			n_{1N}	rpm	1000	1000	1200	1500	1700	2300	2500	2500	2500	2500	2500	2500	2800	2800
Max. input speed			n_{1Max}	rpm	2200	2200	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	–	–	–	–	–	–	–	–	–	–	–	–	–	–
				in.lb														
Max. torsional backlash			j_t	arcmin	Standard ≤ 3 / Reduced ≤ 1					Standard ≤ 5 / Reduced ≤ 3								
Torsional rigidity			C_{t21}	Nm/ arcmin	550					550								
				in.lb/ arcmin	4868					4868								
Max. axial force [c]			F_{2AMax}	N	33000					33000								
				lb_f	7425					7425								
Max. radial force [c]			F_{2RMax}	N	30000					30000								
				lb_f	6750					6750								
Max. tilting moment			M_{2KMax}	Nm	5000					5000								
				in.lb	44250					44250								
Efficiency at full load			η	%	97					94								
Service life (For calculation, see the Chapter "Information")			L_h	h	> 20000					> 20000								
Weight incl. standard adapter plate			*m*	kg	77					76								
				lb_m	170					168								
Operating noise (with n_1 = 3000 rpm no load)			L_{PA}	dB(A)	≤ 70													
Max. permitted housing temperature				°C	+90													
				F	194													
Ambient temperature				°C	0 to +40													
				F	32 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	kgcm²	-	-	-	-	-	39.2	34.6	33.2	30.5	29.7	28.2	27.9	27.6	27.5
				10^{-3} in.lb.s²						34.7	30.6	29.4	27.0	26.3	25.0	24.7	24.4	24.3
Clamping hub diameter [mm]	O	60	J_1	kgcm²	260.2	198.2	163.0	84.4	70.8	-	-	-	-	-	-	-	-	-
				10^{-3} in.lb.s²	230.3	175.4	144.3	74.7	62.7									

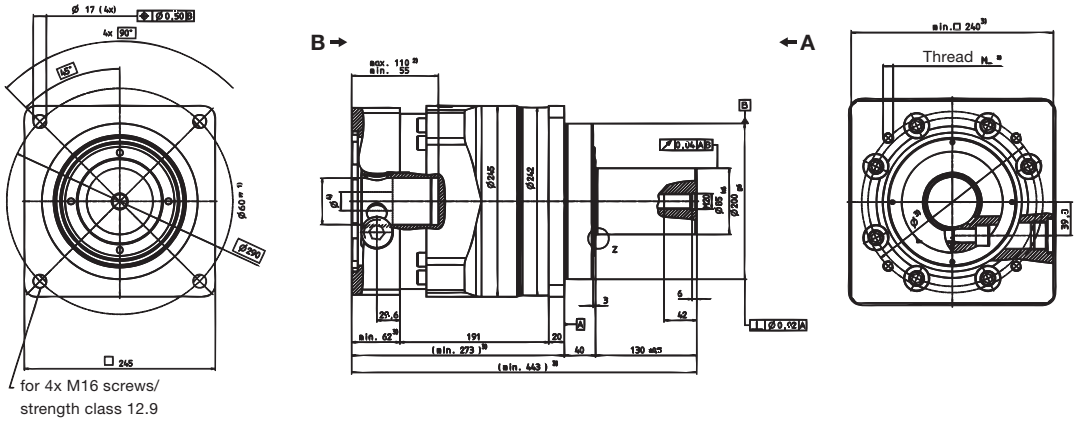
[a] Other ratios available on request
[b] For higher ambient temperatures, please reduce input speed
[c] Refers to center of the output shaft or flange

View A | View B

Motor shaft diameter [mm]

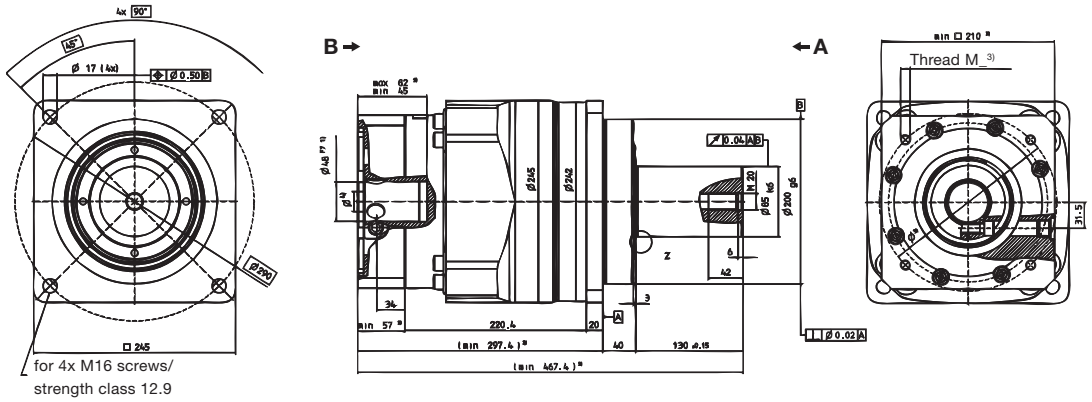
up to 60 [4] (O) clamping hub diameter

1-stage:

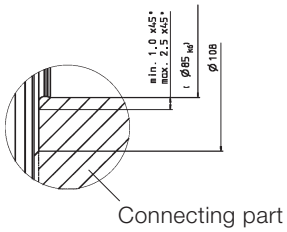


up to 48 [4] (M) clamping hub diameter

2-stage:

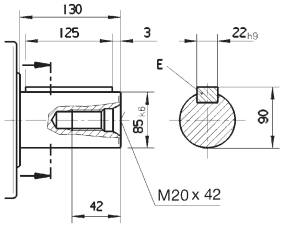


Z: Detail

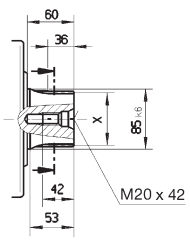


Alternatives: Output shaft variants

Keywayed output shaft in mm
E = key as per DIN 6885, sheet 1, form A



Involute gearing DIN 5480 in mm
X = W 80 x 2 x 30 x 38 x 6m, DIN 5480



Non-tolerated dimensions ± 1.5 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.

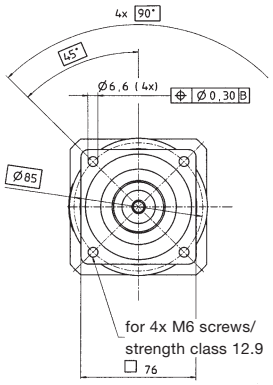
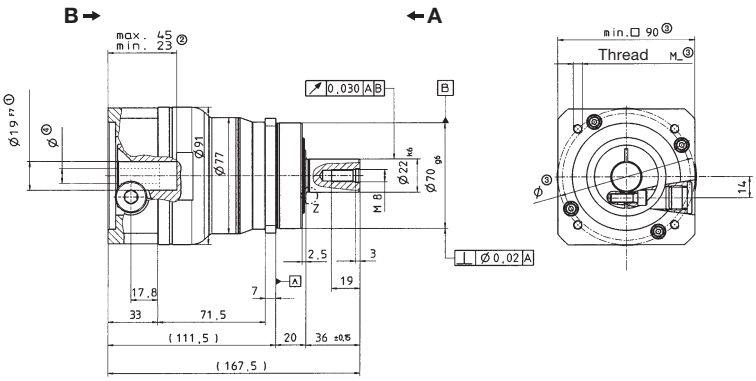
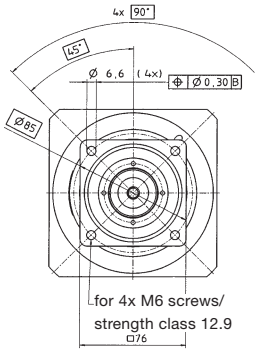
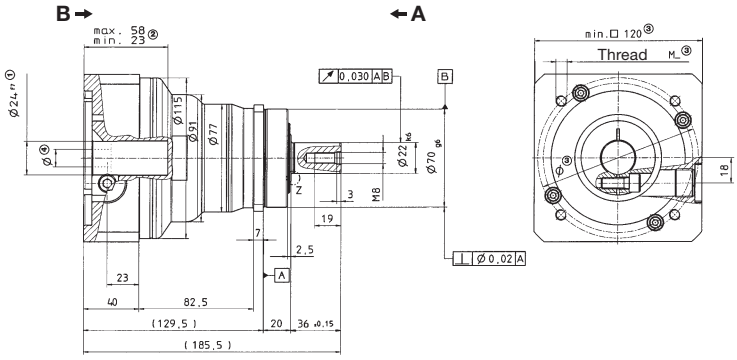
⚠ Motor mounting according to operating manual

SP+ 075 MC 1-stage

					1-stage				
Ratio [a]			***i***		**3**	**4**	**5**	**7**	**10**
Max. acceleration torque (max. 1000 cycles per hour)			T_{2B}	Nm	68	90	90	90	70
				in.lb	602	797	797	797	620
cymex®-optimal nominal torque (please contact us regarding the design)			T_{2Ncym}	Nm	–	60	60	60	35
				in.lb	–	531	531	531	310
Nominal output torque (with n_{1N})			T_{2N}	Nm	28	48	48	48	30
				in.lb	248	425	425	425	266
Emergency stop torque (permitted 1000 times during the service life of the gearhead)			T_{2Not}	Nm	200	250	250	250	200
				in.lb	1770	2213	2213	2213	1770
Nominal input speed (with T_{2N} and 20°C ambient temperature) [b]			n_{1N}	rpm	4500	4500	4500	4500	4500
Max. input speed			n_{1Max}	rpm	6000	6000	6000	6000	6000
Mean no load running torque (with n_1=3000 rpm and 20°C gearhead temperature) [c]			T_{012}	Nm	1.4	1.1	0.9	0.6	0.5
				in.lb	12.4	9.7	8.0	5.3	4.4
Max. torsional backlash			j_t	arcmin	Standard ≤ 6 / Reduced ≤ 4				
Torsional rigidity			C_{t21}	Nm/ arcmin	10				
				in.lb/ arcmin	89				
Max. axial force [d]			F_{2AMax}	N	3350				
				lb_f	754				
Max. radial force [d]			F_{2RMax}	N	4000				
				lb_f	900				
Max. tilting moment			M_{2KMax}	Nm	236				
				in.lb	2089				
Efficiency at full load			η	%	98.5				
Service life (For calculation, see the Chapter "Information")			L_h	h	> 30000				
Weight incl. standardadapter plate			m	kg	3.9				
				lb_m	8.6				
Operating noise (with n_1=3000 rpm no load)			L_{PA}	dB(A)	≤ 64				
Max. permitted housing temperature				°C	+90				
				F	194				
Ambient temperature				°C	0 to +40				
				F	32 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	$kgcm^2$	1.03	0.78	0.68	0.59	0.54
				10^{-3} in.lb.s²	0.91	0.69	0.60	0.52	0.48
Clamping hub diameter [mm]	G	24	J_1	$kgcm^2$	2.40	2.15	2.05	1.96	1.91
				10^{-3} in.lb.s²	2.12	1.90	1.81	1.73	1.69

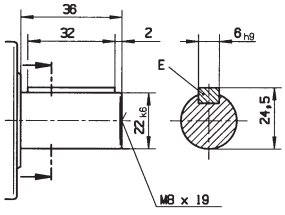
[a] Other ratios available on request
[b] For higher ambient temperatures, please reduce input speed
[c] Valid for clamping hub diameter of 19 mm
[d] Refers to centre of the output shaft or flange

Motor shaft diameter [mm]

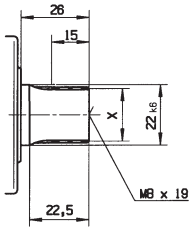
	View A	View B
up to 19 [4] (E) clamping hub diameter		
up to 24 [4] (G) clamping hub diameter		

Alternatives: Output shaft variants

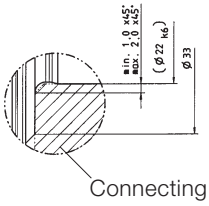
Keywayed output shaft in mm
E = key as per DIN 6885, sheet 1, form A



Involute gearing DIN 5480 in mm
X = W 22 x 1.25 x 30 x 16 x 6m, DIN 5480



Z: Detail



Connecting part

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

SP+ 075 MC 2-stage

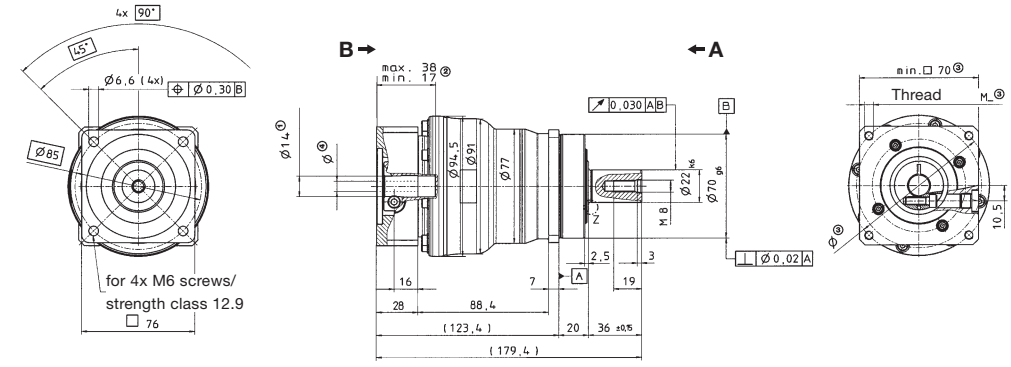
					2-stage								
Ratio [a]			***i***		**16**	**20**	**25**	**28**	**35**	**40**	**50**	**70**	**100**
Max. acceleration torque (max. 1000 cycles per hour)			T_{2B}	Nm	90	90	90	90	90	90	90	90	70
				in.lb	797	797	797	797	797	797	797	797	620
cymex®-optimal nominal torque (please contact us regarding the design)			T_{2Ncym}	Nm	–	–	–	–	–	60	–	–	35
				in.lb						531			310
Nominal output torque (with n_{1N})			T_{2N}	Nm	60	60	60	60	60	55	60	60	30
				in.lb	531	531	531	531	531	487	531	531	266
Emergency stop torque (permitted 1000 times during the service life of the gearhead)			T_{2Not}	Nm	250	250	250	250	250	250	250	250	200
				in.lb	2213	2213	2213	2213	2213	2213	2213	2213	1770
Nominal input speed (with T_{2N} and 20°C ambient temperature) [b]			n_{1N}	rpm	4500	4500	4500	4500	4500	4500	4500	4500	4500
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	0.5	0.4	0.4	0.3	0.3	0.2	0.2	0.2	0.2
				in.lb	4.4	3.5	3.5	2.7	2.7	1.8	1.8	1.8	1.8
Max. torsional backlash			j_t	arcmin	Standard ≤ 8 / Reduced ≤ 6								
Torsional rigidity			C_{t21}	Nm/ arcmin	10								
				in.lb/ arcmin	89								
Max. axial force [d]			F_{2AMax}	N	3350								
				lb_f	754								
Max. radial force [d]			F_{2RMax}	N	4000								
				lb_f	900								
Max. tilting moment			M_{2KMax}	Nm	236								
				in.lb	2089								
Efficiency at full load			η	%	96,5								
Service life (For calculation, see the Chapter "Information")			L_h	h	> 30000								
Weight incl. standard adapter plate			m	kg	3,6								
				lb_m	8.0								
Operating noise (with n_1 = 3000 rpm no load)			L_{PA}	dB(A)	≤ 64								
Max. permitted housing temperature				°C	+90								
				F	194								
Ambient temperature				°C	0 to +40								
				F	32 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	kgcm²	0.23	0.20	0.20	0.18	0.18	0.16	0.16	0.16	0.16
				10^{-3} in.lb.s²	0.20	0.18	0.18	0.16	0.16	0.15	0.15	0.14	0.14
Clamping hub diameter [mm]	E	19	J_1	kgcm²	0.55	0.53	0.52	0.50	0.50	0.49	0.49	0.49	0.49
				10^{-3} in.lb.s²	0.49	0.47	0.46	0.45	0.44	0.43	0.43	0.43	0.43

[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 centre of the output shaft or flange

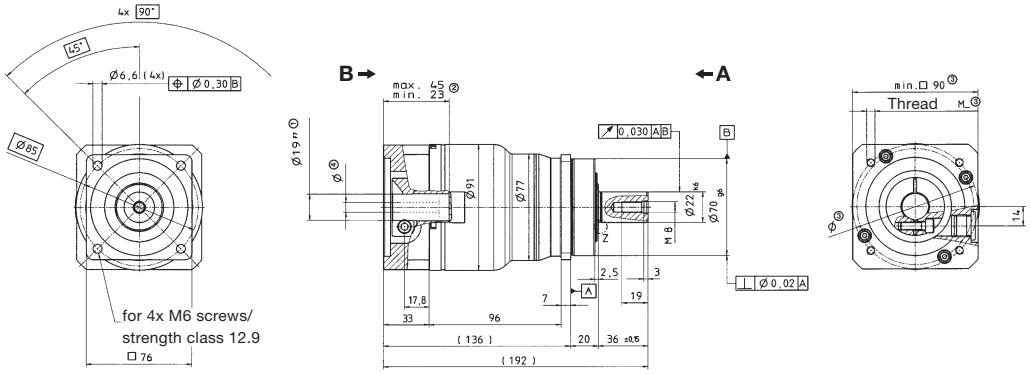
View A | View B

Motor shaft diameter [mm]

up to 14 [4] (C) clamping hub diameter



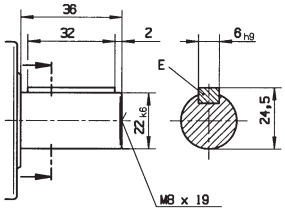
up to 19 [4] (E) clamping hub diameter



Alternatives: Output shaft variants

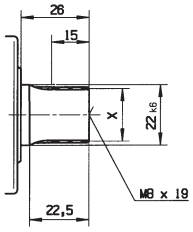
Keywayed output shaft in mm

E = key as per DIN 6885, sheet 1, form A

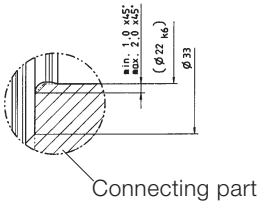


Involute gearing DIN 5480 in mm

X = W 22 x 1.25 x 30 x 16 x 6m, DIN 5480



Z: Detail



Non-tolerated dimensions ± 1 mm

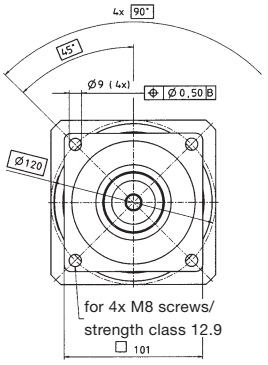
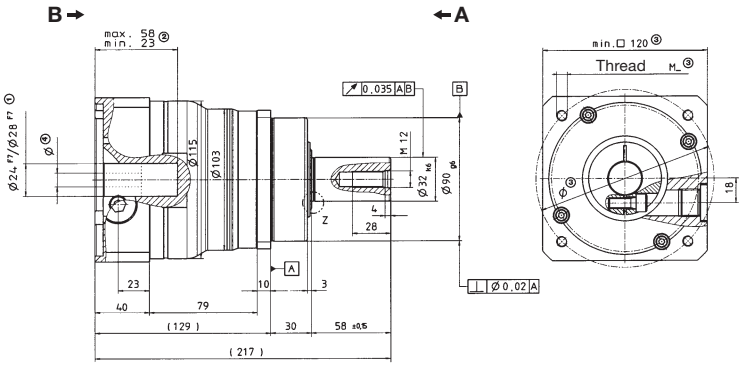
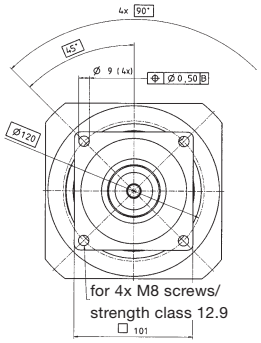
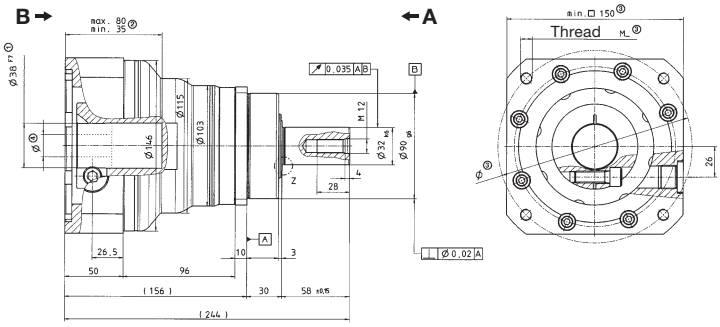
1) Check motor shaft fit.
2) Min./Max. permissible motor shaft length. Longer motor shafts are adaptable, please contact us.
3) The dimensions depend on the motor.
4) Smaller motor shaft diameter is compensated by a bushing with a minimum thickness of 1 mm.

⚠ Motor mounting according to operating manual

				1-stage				
Ratio [a]			***i***	**3**	**4**	**5**	**7**	**10**
Max. acceleration torque (max. 1000 cycles per hour)			T_{2B} Nm	180	240	240	240	180
			T_{2B} in.lb	1593	2124	2124	2124	1593
cymex®-optimal nominal torque (please contact us regarding the design)			T_{2Ncym} Nm	95	135	135	135	90
			T_{2Ncym} in.lb	841	1195	1195	1195	797
Nominal output torque (with n_{1N})			T_{2N} Nm	70	100	105	105	80
			T_{2N} in.lb	620	885	929	929	708
Emergency stop torque (permitted 1000 times during the service life of the gearhead)			T_{2Not} Nm	500	625	625	625	500
			T_{2Not} in.lb	4425	5531	5531	5531	4425
Nominal input speed (with T_{2N} and 20°C ambient temperature) [b]			n_{1N} rpm	3500	4000	4500	4500	4500
Max. input speed			n_{1Max} rpm	6000	6000	6000	6000	6000
Mean no load running torque (with n_1 = 3000 rpm and 20°C gearhead temperature) [c]			T_{012} Nm	2.4	2.1	1.8	1.1	0.8
			T_{012} in.lb	21.2	18.6	15.9	9.74	7.08
Max. torsional backlash			j_t arcmin	Standard ≤ 4 / Reduced ≤ 2				
Torsional rigidity			C_{t21} Nm/ arcmin	31				
			C_{t21} in.lb/ arcmin	274				
Max. axial force [d]			F_{2AMax} N	5650				
			F_{2AMax} lb_f	1271				
Max. radial force [d]			F_{2RMax} N	6300				
			F_{2RMax} lb_f	1418				
Max. tilting moment			M_{2KMax} Nm	487				
			M_{2KMax} in.lb	4310				
Efficiency at full load			η %	98.5				
Service life (For calculation, see the Chapter "Information")			L_h h	> 30000				
Weight incl. standard adapter plate			m kg	7.7				
			m lb_m	17.0				
Operating noise (with n_1 = 3000 rpm no load i = 4)			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				
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 kgcm²	3.99	3.04	2.61	2.29	2.07
			J_1 10^{-3} in.lb.s²	3.53	2.69	2.31	2.03	1.83
Clamping hub diameter [mm]	K	38	J_1 kgcm²	11.1	10.1	9.68	9.36	9.14
			J_1 10^{-3} in.lb.s²	9.78	8.95	8.57	8.28	8.09

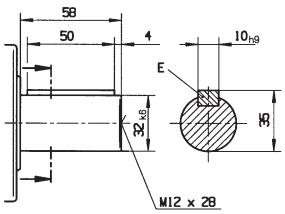
[a] Other ratios available on request
[b] For higher ambient temperatures, please reduce input speed
[c] Valid for clamping hub diameter of 24 mm
[d] Refers to centre of the output shaft or flange

Motor shaft diameter [mm]

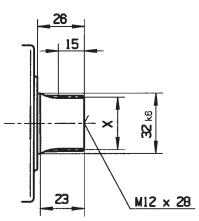
	View A	View B
up to 24 [4] (G) clamping hub diameter		
up to 38 [4] (K) clamping hub diameter		

Alternatives: Output shaft variants

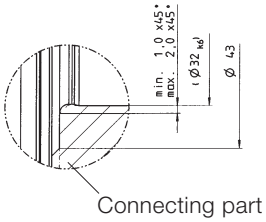
Keywayed output shaft in mm
E = key as per DIN 6885, sheet 1, form A



Involute gearing DIN 5480 in mm
X = W 32 x 1.25 x 30 x 24 x 6m, DIN 5480



Z: Detail



Connecting part

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.

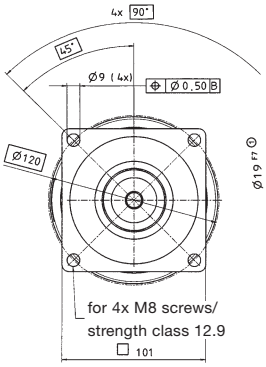
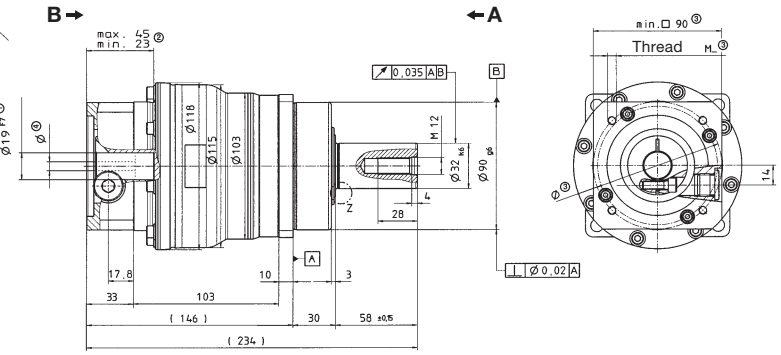
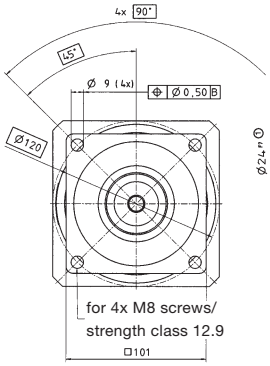
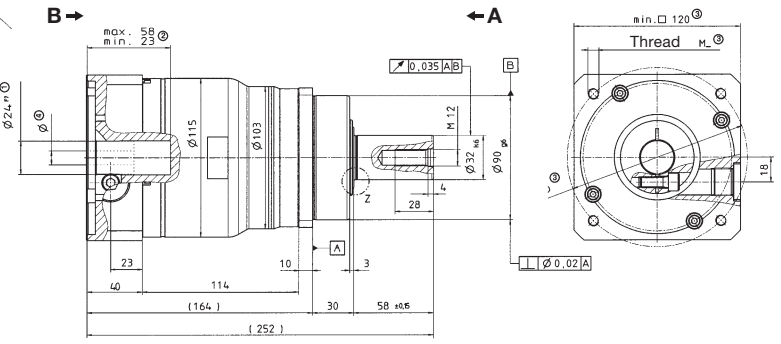
⚠ Motor mounting according to operating manual

SP+ 100 MC 2-stage

				2-stage								
Ratio [a]			***i***	**16**	**20**	**25**	**28**	**35**	**40**	**50**	**70**	**100**
Max. acceleration torque (max. 1000 cycles per hour)			T_{2B} Nm	240	240	240	240	240	240	240	240	180
			T_{2B} in.lb	2124	2124	2124	2124	2124	2124	2124	2124	1593
cymex®-optimal nominal torque (please contact us regarding the design)			T_{2Ncym} Nm	–	–	–	–	–	–	–	–	90
			T_{2Ncym} in.lb									797
Nominal output torque (with n_{1N})			T_{2N} Nm	140	140	140	140	140	140	140	135	80
			T_{2N} in.lb	1239	1239	1239	1239	1239	1239	1239	1195	708
Emergency stop torque (permitted 1000 times during the service life of the gearhead)			T_{2Not} Nm	625	625	625	625	625	625	625	625	500
			T_{2Not} in.lb	5531	5531	5531	5531	5531	5531	5531	5531	4425
Nominal input speed (with T_{2N} and 20°C ambient temperature) [b]			n_{1N} rpm	4500	4500	4500	4500	4500	4500	4500	4500	4500
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	0.8	0.7	0.6	0.5	0.4	0.4	0.3	0.3	0.3
			T_{012} in.lb	7.1	6.2	5.3	4.4	3.5	3.5	2.7	2.7	2.7
Max. torsional backlash			j_t arcmin	Standard ≤ 6 / Reduced ≤ 4								
Torsional rigidity			C_{t21} Nm/ arcmin	31								
			C_{t21} in.lb/ arcmin	274								
Max. axial force [d]			F_{2AMax} N	5650								
			F_{2AMax} lb_f	1271								
Max. radial force [d]			F_{2RMax} N	6300								
			F_{2RMax} lb_f	1418								
Max. tilting moment			M_{2KMax} Nm	487								
			M_{2KMax} in.lb	4310								
Efficiency at full load			η %	96.5								
Service life (For calculation, see the Chapter "Information")			L_h h	> 30000								
Weight incl. standardadapter plate			m kg	7.9								
			m lb_m	17.5								
Operating noise (with n_1 = 3000 rpm no load)			L_{PA} dB(A)	≤ 64								
Max. permitted housing temperature			°C	+90								
			F	194								
Ambient temperature			°C	0 to +40								
			F	32 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 kgcm²	0.81	0.70	0.69	0.60	0.59	0.55	0.54	0.54	0.54
			J_1 10^{-3} in.lb.s²	0.72	0.62	0.61	0.53	0.52	0.48	0.48	0.48	0.47
Clamping hub diameter [mm]	G	24	J_1 kgcm²	2.18	2.07	2.05	1.97	1.96	1.92	1.91	1.91	1.91
			J_1 10^{-3} in.lb.s²	1.93	1.83	1.82	1.74	1.74	1.70	1.69	1.69	1.69

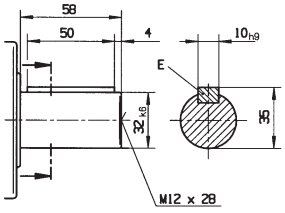
[a] Other ratios available on request
[b] For higher ambient temperatures, please reduce input speed
[c] Valid for clamping hub diameter of 19 mm
[d] Refers to centre of the output shaft or flange

Motor shaft diameter [mm]

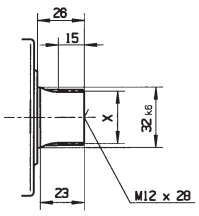
	View A	View B
up to 19 [4] (E) clamping hub diameter		
up to 24 [4] (G) clamping hub diameter		

Alternatives: Output shaft variants

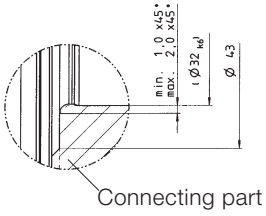
Keywayed output shaft in mm
E = key as per DIN 6885, sheet 1, form A



Involute gearing DIN 5480 in mm
X = W 32 x 1.25 x 30 x 24 x 6m, DIN 5480



Z: Detail



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

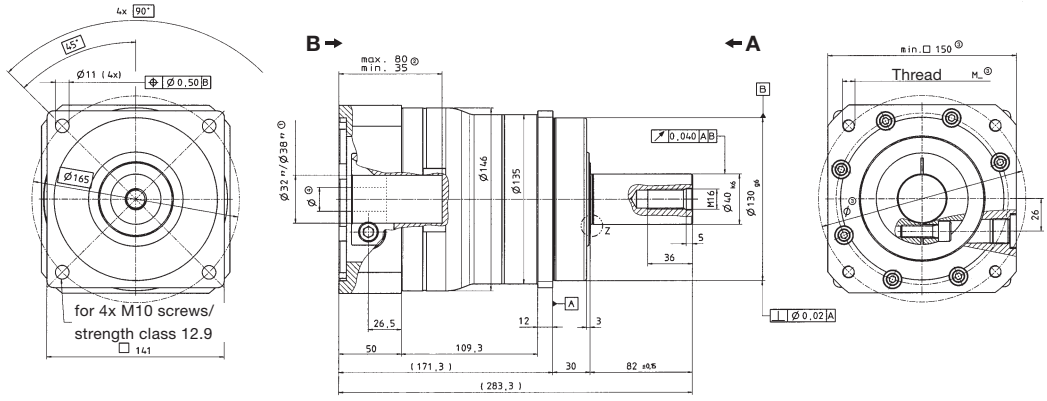
				1-stage				
Ratio [a]			***i***	**3**	**4**	**5**	**7**	**10**
Max. acceleration torque (max. 1000 cycles per hour)			T_{2B}	Nm	310	480	480	480	380
				in.lb	2744	4248	4248	4248	3363
cymex®-optimal nominal torque (please contact us regarding the design)			T_{2Ncym}	Nm	150	240	240	270	180
				in.lb	1328	2124	2124	2390	1593
Nominal output torque (with n_{1N})			T_{2N}	Nm	130	195	205	210	160
				in.lb	1151	1726	1814	1859	1416
Emergency stop torque (permitted 1000 times during the service life of the gearhead)			T_{2Not}	Nm	1000	1250	1250	1250	1000
				in.lb	8850	11063	11063	11063	8850
Nominal input speed (with T_{2N} and 20°C ambient temperature) [b]			n_{1N}	rpm	3000	3500	4500	4500	4500
Max. input speed			n_{1Max}	rpm	6000	6000	6000	6000	6000
Mean no load running torque (with n_1 = 3000 rpm and 20°C gearhead temperature) [c]			T_{012}	Nm	5.1	3.9	3.1	2.3	1.6
				in.lb	45.1	34.5	27.4	20.4	14.2
Max. torsional backlash			j_t	arcmin	Standard ≤ 4 / Reduced ≤ 2				
Torsional rigidity			C_{t21}	Nm/ arcmin	53				
				in.lb/ arcmin	469				
Max. axial force [d]			F_{2AMax}	N	9870				
				lb_f	2221				
Max. radial force [d]			F_{2RMax}	N	9450				
				lb_f	2126				
Max. tilting moment			M_{2KMax}	Nm	952				
				in.lb	8425				
Efficiency at full load			η	%	98.5				
Service life (For calculation, see the Chapter "Information")			L_h	h	> 30000				
Weight incl. standard adapter plate			m	kg	17.2				
				lb_m	38				
Operating noise (with n_1 = 3000 rpm no load i = 10)			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				
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	kgcm²	14.9	12.1	11.0	10.1	9.51
Clamping hub diameter [mm]				10^{-3} in.lb.s²	13.2	10.7	9.8	8.9	8.4

[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

Motor shaft diameter [mm]

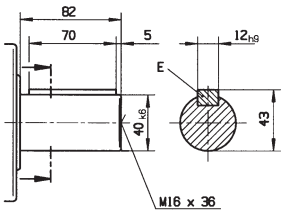
up to 38 [4] (K) clamping hub diameter



Alternatives: Output shaft variants

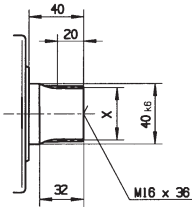
Keywayed output shaft in mm

E = key as per DIN 6885, sheet 1, form A

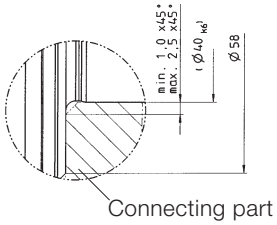


Involute gearing DIN 5480 in mm

X = W 40 x 2 x 30 x 18 x 6m, DIN 5480



Z: Detail



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

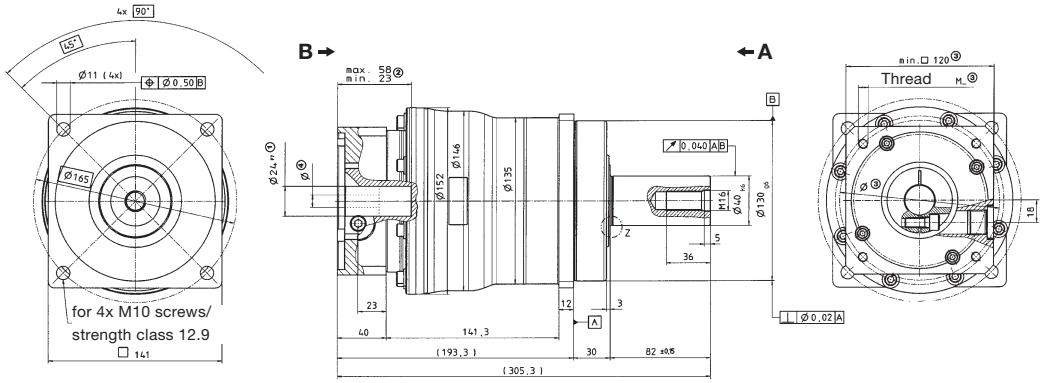
					2-stage								
Ratio [a]			***i***		**16**	**20**	**25**	**28**	**35**	**40**	**50**	**70**	**100**
Max. acceleration torque (max. 1000 cycles per hour)			T_{2B}	Nm	480	480	480	480	480	480	480	480	380
				in.lb	4248	4248	4248	4248	4248	4248	4248	4248	3363
cymex®-optimal nominal torque (please contact us regarding the design)			T_{2Ncym}	Nm	290	290	290	–	–	–	–	–	–
				in.lb	2567	2567	2567						
Nominal output torque (with n_{1N})			T_{2N}	Nm	260	280	280	290	290	290	290	260	180
				in.lb	2301	2478	2478	2567	2567	2567	2567	2301	1593
Emergency stop torque (permitted 1000 times during the service life of the gearhead)			T_{2Not}	Nm	1250	1250	1250	1250	1250	1250	1250	1250	1000
				in.lb	11063	11063	11063	11063	11063	11063	11063	11063	8850
Nominal input speed (with T_{2N} and 20°C ambient temperature) [b]			n_{1N}	rpm	4500	4500	4500	4500	4500	4500	4500	4500	4500
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	1.6	1.3	1.2	1.0	0.9	0.7	0.6	0.5	0.5
				in.lb	14.2	11.5	10.6	8.9	8.0	6.2	5.3	4.4	4.4
Max. torsional backlash			j_t	arcmin	Standard ≤ 6 / Reduced ≤ 4								
Torsional rigidity			C_{t21}	Nm/ arcmin	53								
				in.lb/ arcmin	469								
Max. axial force [d]			F_{2AMax}	N	9870								
				lb_f	2221								
Max. radial force [d]			F_{2RMax}	N	9450								
				lb_f	2126								
Max. tilting moment			M_{2KMax}	Nm	952								
				in.lb	8425								
Efficiency at full load			η	%	96.5								
Service life (For calculation, see the Chapter "Information")			L_h	h	> 30000								
Weight incl. standard adapter plate			m	kg	17								
				lb_m	38								
Operating noise (with n_1 = 3000 rpm no load)			L_{PA}	dB(A)	≤ 65								
Max. permitted housing temperature				°C	+90								
				F	194								
Ambient temperature				°C	0 to +40								
				F	32 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	kgcm²	3.19	2.71	2.67	2.34	2.32	2.10	2.08	2.08	2.07
				10^{-3} in.lb.s²	2.82	2.40	2.36	2.07	2.05	1.85	1.85	1.84	1.83
Clamping hub diameter [mm]	K	38	J_1	kgcm²	10.3	9.77	9.73	9.41	9.39	9.16	9.15	9.14	9.14
				10^{-3} in.lb.s²	9.07	8.65	8.61	8.33	8.31	8.11	8.10	8.09	8.09

[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

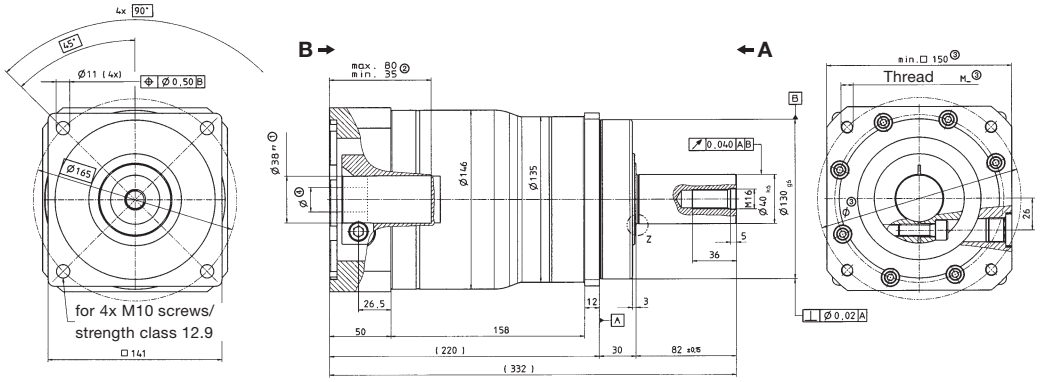
View A | View B

Motor shaft diameter [mm]

up to 24 [4] (G) clamping hub diameter



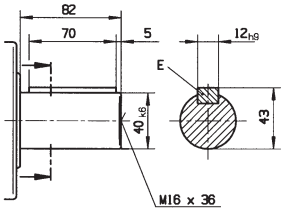
up to 38 [4] (K) clamping hub diameter



Alternatives: Output shaft variants

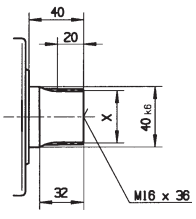
Keywayed output shaft in mm

E = key as per DIN 6885, sheet 1, form A

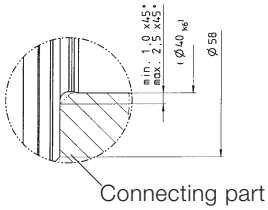


Involute gearing DIN 5480 in mm

X = W 40 x 2 x 30 x 18 x 6m, DIN 5480



Z: Detail



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

SP+

SP+ 180 MC 1-stage

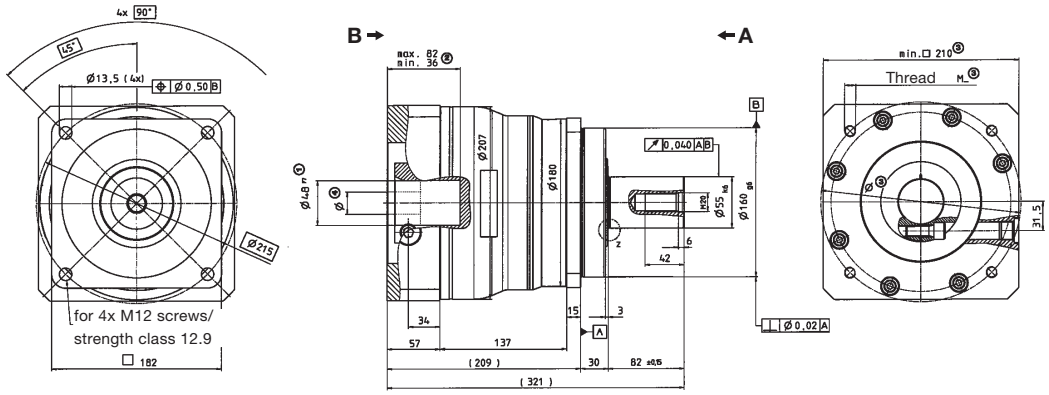
				1-stage				
Ratio [a]			***i***	**3**	**4**	**5**	**7**	**10**
Max. acceleration torque (max. 1000 cycles per hour)			T_{2B}	Nm	700	880	880	880	700
				in.lb	6195	7788	7788	7788	6195
cymex®-optimal nominal torque (please contact us regarding the design)			T_{2Ncym}	Nm	350	600	600	600	540
				in.lb	3098	5310	5310	5310	4779
Nominal output torque (with n_{1N})			T_{2N}	Nm	290	450	440	450	400
				in.lb	2567	3983	3894	3983	3540
Emergency stop torque (permitted 1000 times during the service life of the gearhead)			T_{2Not}	Nm	2200	2750	2750	2750	2200
				in.lb	19470	24338	24338	24338	19470
Nominal input speed (with T_{2N} and 20°C ambient temperature) [b]			n_{1N}	rpm	3000	3500	4500	4500	4500
Max. input speed			n_{1Max}	rpm	4500	6000	6000	6000	6000
Mean no load running torque (with n_1 = 3000 rpm and 20°C gearhead temperature) [c]			T_{012}	Nm	10.2	7.7	6.2	4.5	3.2
				in.lb	90.3	68.1	54.9	39.8	28.3
Max. torsional backlash			j_t	arcmin	Standard ≤ 4 / Reduced ≤ 2				
Torsional rigidity			C_{t21}	Nm/ arcmin	175				
				in.lb/ arcmin	1549				
Max. axial force [d]			F_{2AMax}	N	14150				
				lb_f	3184				
Max. radial force [d]			F_{2RMax}	N	14700				
				lb_f	3308				
Max. tilting moment			M_{2KMax}	Nm	1600				
				in.lb	14160				
Efficiency at full load			η	%	98.5				
Service life (For calculation, see the Chapter "Information")			L_h	h	> 30000				
Weight incl. standard adapter plate			m	kg	34				
				lb_m	75				
Operating noise (with n_1 = 3000 rpm no load i = 10)			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				
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	kgcm²	58.5	41.6	35.6	30.0	26.9
Clamping hub diameter [mm]				10^{-3} in.lb.s²	51.8	36.8	31.5	26.6	23.8

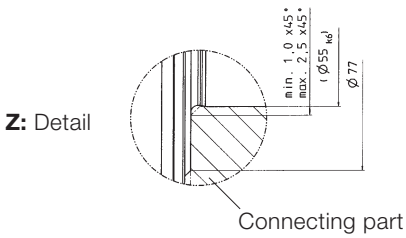
[a] Other ratios available on request
[b] For higher ambient temperatures, please reduce input speed
[c] Valid for clamping hub diameter of 48 mm
[d] Refers to center of the output shaft or flange

View A | View B

Motor shaft diameter [mm]

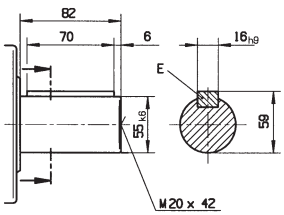
up to 48 [4] (M) clamping hub diameter



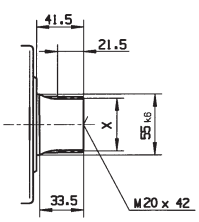


Alternatives: Output shaft variants

Keywayed output shaft in mm
E = key as per DIN 6885, sheet 1, form A



Involute gearing DIN 5480 in mm
X = W 55 x 2 x 30 x 26 x 6m, DIN 5480



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

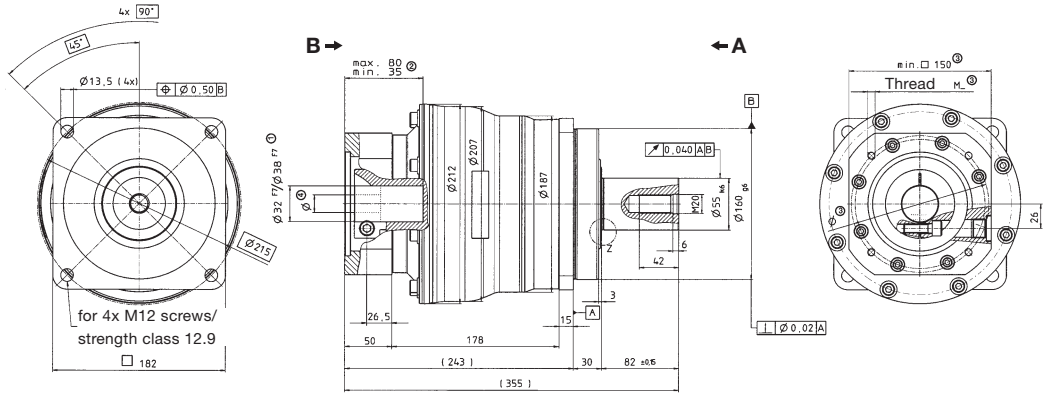
				2-stage								
Ratio [a]			***i***	**16**	**20**	**25**	**28**	**35**	**40**	**50**	**70**	**100**
Max. acceleration torque (max. 1000 cycles per hour)			T_{2B} Nm	880	880	880	880	880	880	880	880	700
			T_{2B} in.lb	7788	7788	7788	7788	7788	7788	7788	7788	6195
cymex®-optimal nominal torque (please contact us regarding the design)			T_{2Ncym} Nm	–	–	–	–	–	–	–	–	–
			T_{2Ncym} in.lb									
Nominal output torque (with n_{1N})			T_{2N} Nm	600	600	600	600	600	600	600	600	600
			T_{2N} in.lb	5310	5310	5310	5310	5310	5310	5310	5310	5310
Emergency stop torque (permitted 1000 times during the service life of the gearhead)			T_{2Not} Nm	2750	2750	2750	2750	2750	2750	2750	2750	2200
			T_{2Not} in.lb	24338	24338	24338	24338	24338	24338	24338	24338	19470
Nominal input speed (with T_{2N} and 20°C ambient temperature) [b]			n_{1N} rpm	4500	4500	4500	4500	4500	4500	4500	4500	4500
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	3.2	2.6	2.3	1.9	1.7	1.4	1.2	1.0	0.9
			T_{012} in.lb	28.3	23.0	20.4	16.8	15.0	12.4	10.6	8.9	8.0
Max. torsional backlash			j_t arcmin	Standard ≤ 6 / Reduced ≤ 4								
Torsional rigidity			C_{t21} Nm/ arcmin	175								
			C_{t21} in.lb/ arcmin	149								
Max. axial force [d]			F_{2AMax} N	14150								
			F_{2AMax} lb_f	3184								
Max. radial force [d]			F_{2RMax} N	14700								
			F_{2RMax} lb_f	3308								
Max. tilting moment			M_{2KMax} Nm	1600								
			M_{2KMax} in.lb	14160								
Efficiency at full load			η %	96.5								
Service life (For calculation, see the Chapter "Information")			L_h h	> 30000								
Weight incl. standard adapter plate			m kg	36								
			m lb_m	80								
Operating noise (with n_1 = 3000 rpm no load)			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								
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 kgcm²	13.5	12.0	11.7	10.6	10.4	9.74	9.68	9.63	9.60
Clamping hub diameter [mm]			J_1 10^{-3} in.lb.s²	12.0	10.6	10.4	9.34	9.23	8.62	8.57	8.52	8.49

[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

View A | View B

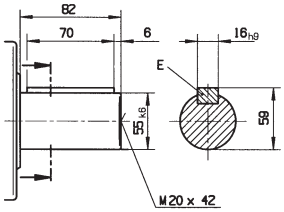
Motor shaft diameter [mm]

up to 38 [4] (K) clamping hub diameter

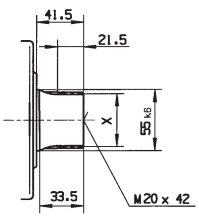


Alternatives: Output shaft variants

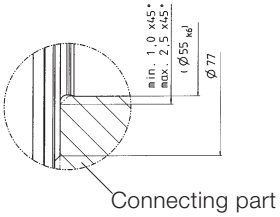
Keywayed output shaft in mm
E = key as per DIN 6885, sheet 1, form A



Involute gearing DIN 5480 in mm
X = W 55 x 2 x 30 x 26 x 6m, DIN 5480



Z: Detail



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

SP+ 210 MC 1/2-stage

				1-stage					2-stage								
Ratio [a]			***i***	**3**	**4**	**5**	**7**	**10**	**16**	**20**	**25**	**28**	**35**	**40**	**50**	**70**	**100**
Max. acceleration torque (max. 1000 cycles per hour)			T_{2B} Nm	530	820	860	900	1000	820	860	860	900	860	820	860	900	1000
			in.lb	4691	7257	7611	7965	8850	7257	7611	7611	7965	7611	7257	7611	7965	8850
cymex®-optimal nominal torque (please contact us regarding the design)			T_{2Ncym} Nm	- Please contact us -													
			in.lb														
Nominal output torque (with n_{1N})			T_{2N} Nm	340	510	550	560	630	510	550	550	560	550	510	550	560	630
			in.lb	3009	4514	4868	4956	5576	4514	4868	4868	4956	4868	4514	4868	4956	5576
Emergency stop torque (permitted 1000 times during the service life of the gearhead)			T_{2Not} Nm	5000	5200	5200	5200	5000	5200	5200	5200	5200	5200	5200	5200	5200	5000
			in.lb	44250	46020	46020	46020	44250	46020	46020	46020	46020	46020	46020	46020	46020	44250
Nominal input speed (with T_{2N} and 20°C ambient temperature) [b]			n_{1N} rpm	2250	2500	3500	3500	3500	3500	4500	4500	4500	4500	4500	4500	4500	4500
Max. input speed			n_{1Max} rpm	3400	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000
Mean no load running torque (with n_1 = 2000 rpm and 20°C gearhead temperature)			T_{012} Nm	13.0	9.0	6.5	4.0	2.5	3.0	2.5	2.0	1.5	1.5	1.0	1.0	1.0	1.0
			in.lb	115.1	79.7	57.5	35.4	22.1	26.6	22.1	17.7	13.3	13.3	8.85	8.85	8.85	8.85
Max. torsional backlash			j_t arcmin	Standard ≤ 4 / Reduced ≤ 2					Standard ≤ 5 / Reduced ≤ 4								
Torsional rigidity			C_{t21} Nm/ arcmin	400					400								
			in.lb/ arcmin	3540					3540								
Max. axial force [c]			F_{2AMax} N	30000					30000								
			lb_f	6750					6750								
Max. radial force [c]			F_{2RMax} N	21000					21000								
			lb_f	4725					4725								
Max. tilting moment			M_{2KMax} Nm	3100					3100								
			in.lb	27435					27435								
Efficiency at full load			η %	98.5					96.5								
Service life (For calculation, see the Chapter "Information")			L_h h	> 30000					> 30000								
Weight incl. standard adapter plate			m kg	56					53								
			lb_m	124					117								
Operating noise (with n_1 = 3000 rpm no load)			L_{PA} dB(A)	≤ 70													
Max. permitted housing temperature			°C	+90													
			F	194													
Ambient temperature			°C	0 to +40													
			F	32 to 194													
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 kgcm²	-	-	-	-	-	34.5	31.5	30.8	30.0	29.7	28.5	28.3	28.1	28.0
			10^{-3} in.lb.s²						30.5	27.9	27.3	26.6	26.3	25.2	25.0	24.9	24.8
Clamping hub diameter (mm)	N	55	J_1 kgcm²	139.0	94.3	76.9	61.5	53.1	-	-	-	-	-	-	-	-	-
			10^{-3} in.lb.s²	123.0	83.5	68.1	54.4	47.0									

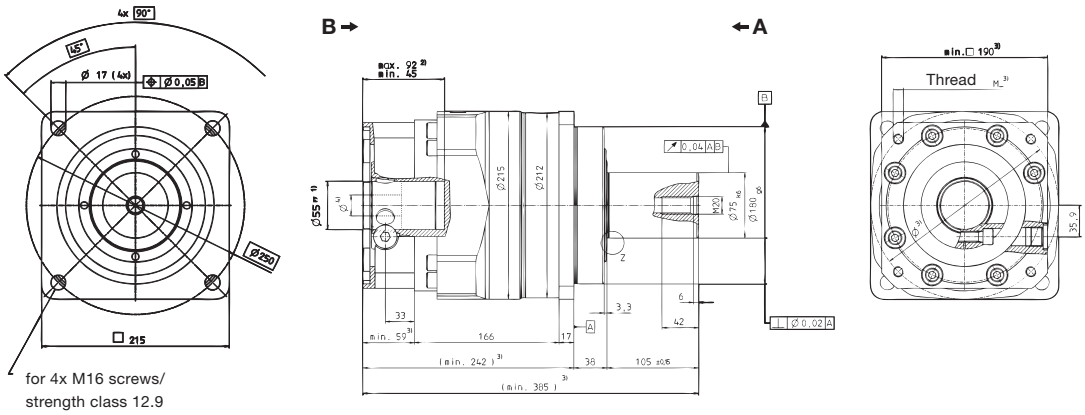
[a] Other ratios available on request
[b] For higher ambient temperatures, please reduce input speed
[c] Refers to center of the output shaft or flange

View A | View B

Motor shaft diameter [mm]

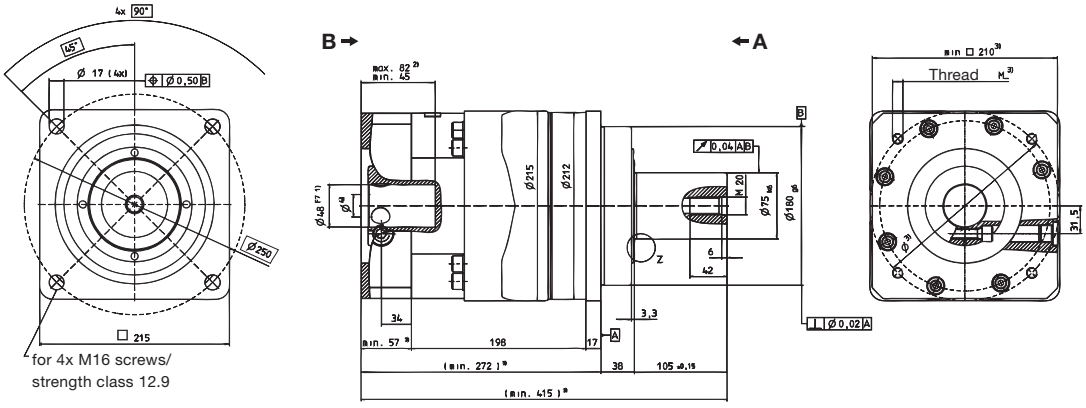
up to 55 [4] (N) clamping hub diameter

1-stage:

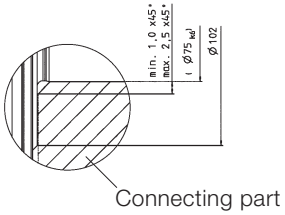


up to 48 [4] (M) clamping hub diameter

2-stage:

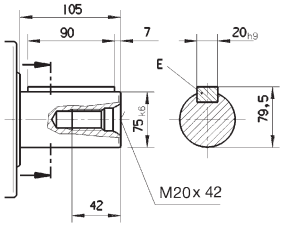


Z: Detail

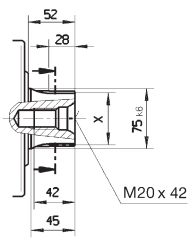


Alternatives: Output shaft variants

Keywayed output shaft in mm
E = key as per DIN 6885, sheet 1, form A



Involute gearing DIN 5480 in mm
X = W 70 x 2 x 30 x 34 x 6m, DIN 5480



Non-tolerated dimensions ± 1.5 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

SP+ 240 MC 1/2-stage

				1-stage					2-stage								
Ratio [a]			***i***	**3**	**4**	**5**	**7**	**10**	**16**	**20**	**25**	**28**	**35**	**40**	**50**	**70**	**100**
Max. acceleration torque (max. 1000 cycles per hour)			T_{2B} Nm	870	1300	1370	1430	1500	1300	1370	1370	1430	1370	1300	1370	1430	1500
			T_{2B} in.lb	7700	11505	12125	12656	13275	11505	12125	12125	12656	12125	11505	12125	12656	13275
cymex®-optimal nominal torque (please contact us regarding the design)			T_{2Ncym} Nm	- Please contact us -													
			T_{2Ncym} in.lb														
Nominal output torque (with n_{1N})			T_{2N} Nm	560	860	900	940	1000	860	900	900	940	900	860	900	940	1000
			T_{2N} in.lb	4956	7611	7965	8319	8850	7611	7965	7965	8319	7965	7611	7965	8319	8850
Emergency stop torque (permitted 1000 times during the service life of the gearhead)			T_{2Not} Nm	6800	8500	8500	8500	6800	8500	8500	8500	8500	8500	8500	8500	8500	6800
			T_{2Not} in.lb	60180	75225	75225	75225	60180	75225	75225	75225	75225	75225	75225	75225	75225	60180
Nominal input speed (with T_{2N} and 20°C ambient temperature) [b]			n_{1N} rpm	1750	2250	3000	3000	3000	3500	4500	4500	4500	4500	4500	4500	4500	4500
Max. input speed			n_{1Max} rpm	3400	4000	5000	5000	5000	6000	6000	6000	6000	6000	6000	6000	6000	6000
Mean no load running torque (with n_1 = 2000 rpm and 20°C gearhead temperature)			T_{012} Nm	–	–	–	–	–	–	–	–	–	–	–	–	–	–
			T_{012} in.lb														
Max. torsional backlash			j_t arcmin	Standard ≤ 4 / Reduced ≤ 2					Standard ≤ 5 / Reduced ≤ 4								
Torsional rigidity			C_{t21} Nm/ arcmin	550					550								
			C_{t21} in.lb/ arcmin	4868					4868								
Max. axial force [c]			F_{2AMax} N	33000					33000								
			F_{2AMax} lb_f	7425					7425								
Max. radial force [c]			F_{2RMax} N	30000					30000								
			F_{2RMax} lb_f	6750					6750								
Max. tilting moment			M_{2KMax} Nm	5000					5000								
			M_{2KMax} in.lb	44250					44250								
Efficiency at full load			η %	98.5					96.5								
Service life (For calculation, see the Chapter "Information")			L_h h	> 30000					> 30000								
Weight incl. standard adapter plate			m kg	77					76								
			m lb_m	170					168								
Operating noise (with n_1 = 3000 rpm no load)			L_{PA} dB(A)	≤ 70													
Max. permitted housing temperature			°C	+90													
			F	194													
Ambient temperature			°C	0 to +40													
			F	32 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 kgcm²	-	-	-	-	-	39.2	34.6	33.2	30.5	29.7	28.2	27.9	27.6	27.5
			J_1 10^{-3} in.lb.s²						34.7	30.6	29.4	27.0	26.3	25.0	24.7	24.4	24.3
Clamping hub diameter [mm]	O	60	J_1 kgcm²	260.2	198.2	163.0	84.4	70.8	-	-	-	-	-	-	-	-	-
			J_1 10^{-3} in.lb.s²	230.3	175.4	144.3	74.7	62.7									

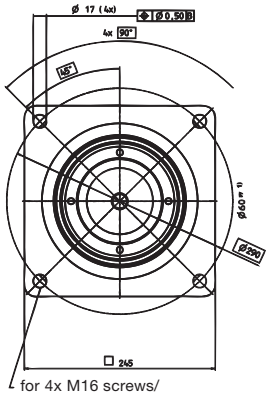
[a] Other ratios available on request
[b] For higher ambient temperatures, please reduce input speed
[c] Refers to center of the output shaft or flange

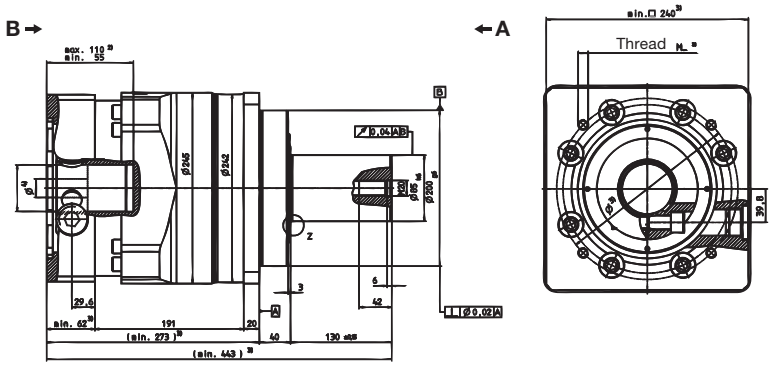
View A | View B

Motor shaft diameter [mm]

up to 60 [4] (O) clamping hub diameter

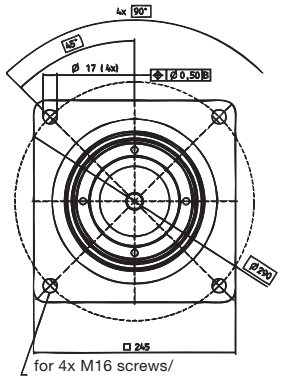
1-stage:

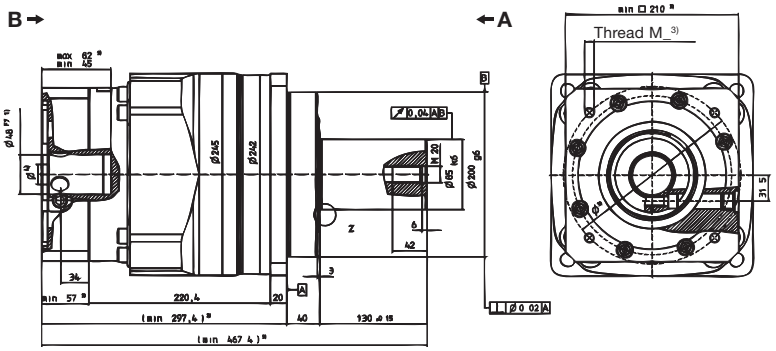




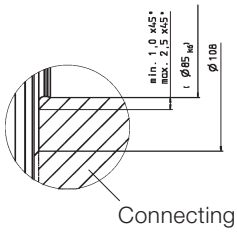
up to 48 [4] (M) clamping hub diameter

2-stage:



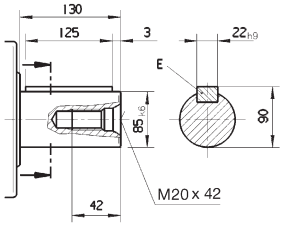


Z: Detail

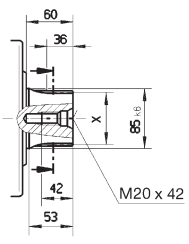


Alternatives: Output shaft variants

Keywayed output shaft in mm
E = key as per DIN 6885, sheet 1, form A



Involute gearing DIN 5480 in mm
X = W 80 x 2 x 30 x 38 x 6m, DIN 5480



Non-tolerated dimensions ± 1.5 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

LP⁺ – A reliable and durable player among planetary gearheads

LP+/LPB+

Details

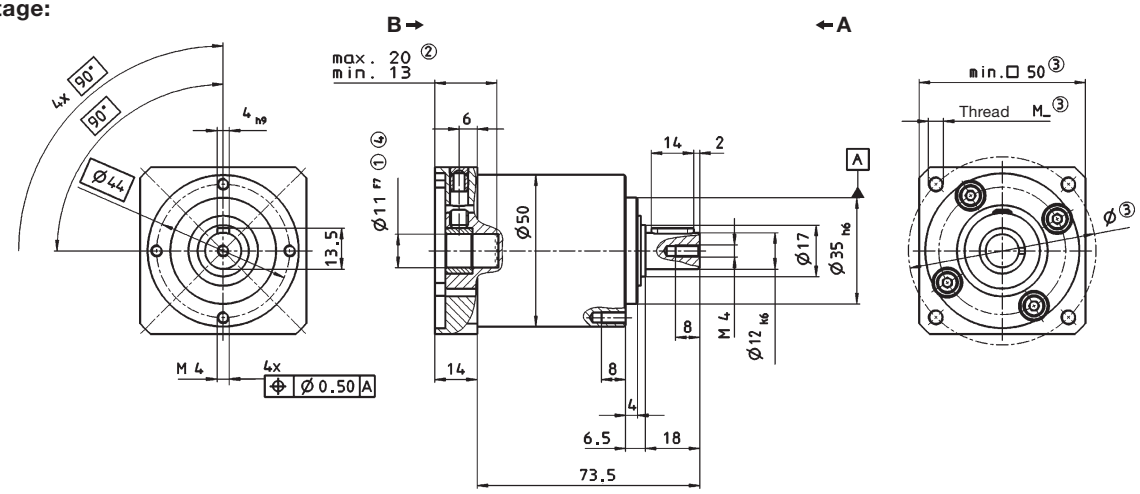
LP+ 050 1/2-stage

			1-stage		2-stage		
Ratio	***i***		**5**	**10**	**25**	**50**	**100**
Max. acceleration torque (max. 1000 cycles per hour)	T_{2B}	Nm	12	11	12	12	11
		in.lb	106	97	106	106	97
Nominal output torque (with n_{1N})	T_{2N}	Nm	5.7	5.2	5.7	5.7	5.2
		in.lb	50	46	50	50	46
Emergency stop torque (permitted 1000 times during the service life of the gearhead)	T_{2Not}	Nm	26	26	26	26	26
		in.lb	230	230	230	230	230
Nominal input speed (with T_{2N} and 20°C ambient temperature) [a]	n_{1N}	rpm	4000	4000	4000	4000	4000
Max. input speed	n_{1Max}	rpm	8000	8000	8000	8000	8000
Mean no load running torque (with n_1 = 3000 rpm and 20°C gearhead temperature)	T_{012}	Nm	0.05	0.05	0.05	0.05	0.05
		in.lb	0.44	0.44	0.44	0.44	0.44
Max. torsional backlash	j_t	arcmin	Standard ≤ 12 / Reduced ≤ 10		Standard ≤ 15 / Reduced ≤ 13		
Torsional rigidity	C_{t21}	Nm/ arcmin	1.2	0.85	1.2	1.2	0.85
		in.lb/ arcmin	10.6	7.5	10.6	10.6	7.5
Max. axial force [b]	F_{2AMax}	N	700		700		
		lb_f	158		158		
Max. radial force [b]	F_{2RMax}	N	650		650		
		lb_f	146		146		
Efficiency at full load	η	%	97		95		
Service life (For calculation, see the Chapter "Information")	L_h	h	> 20000		> 20000		
Weight incl. standard adapter plate	m	kg	0.75		0.95		
		lb_m	1.7		2.1		
Operating noise (with n_1 = 3000 rpm no load)	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				
Paint			Blue RAL 5002				
Direction of rotation			Motor and gearhead same direction				
Protection class			IP 64				
Moment of inertia (relates to the drive)	J_1	$kgcm^2$	0.050	0.046	0.049	0.046	0.046
		10^{-3} in.lb.s²	0.044	0.041	0.043	0.041	0.041

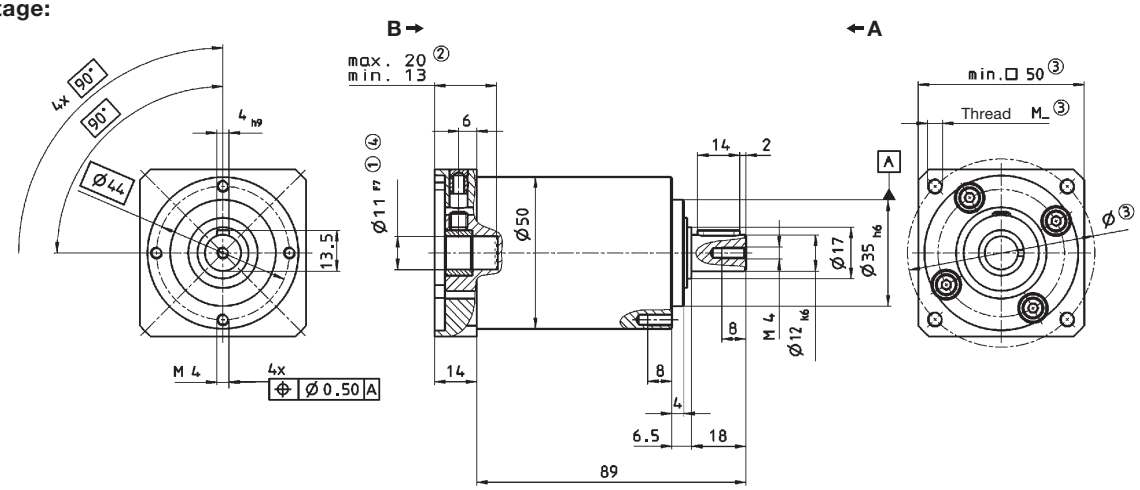
[a] For higher ambient temperatures, please reduce input speed

[b] Refers to center of the output shaft, if n_2 = 100 rpm

LP⁺ 1-stage:



LP⁺ 2-stage:



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.

⚠ Motor mounting according to operating manual

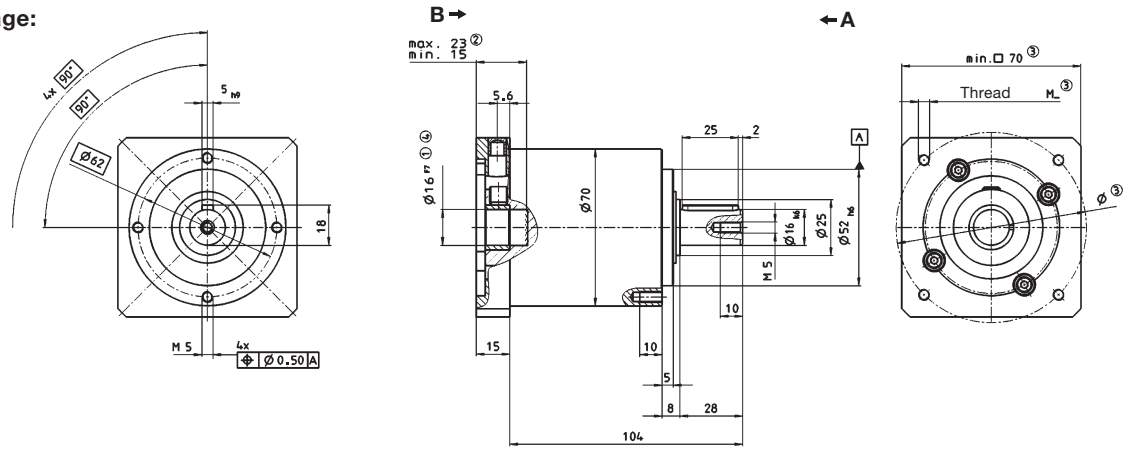
LP+/LPB+ 070 1/2-stage

				1-stage					2-stage						
Ratio [a]	i			**3**	**4**	**5**	**7**	**10**	**15**	**16**	**25**	**30**	**50**	**70**	**100**
Max. acceleration torque (max. 1000 cycles per hour)	T_{2B}	Nm		32	35	35	35	32	32	35	35	32	35	35	32
		in.lb		283	310	310	310	283	283	310	310	283	310	310	283
Nominal output torque (with n_{1N})	T_{2N}	Nm		16.5	18	18	18	16.5	16.5	18	18	16.5	18	18	16.5
		in.lb		146	159	159	159	146	146	159	159	146	159	159	146
Emergency stop torque (permitted 1000 times during the service life of the gearhead)	T_{2Not}	Nm		65	75	75	75	75	75	75	75	75	75	75	75
		in.lb		575	664	664	664	664	664	664	664	664	664	664	664
Nominal input speed (with T_{2N} and 20°C ambient temperature) [b]	n_{1N}	rpm		3700	3700	3700	3700	3700	3700	3700	3700	3700	3700	3700	3700
Max. input speed	n_{1Max}	rpm		6000	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000
Mean no load running torque (with n_1 = 3000 rpm and 20°C gearhead temperature)	T_{012}	Nm		0.30	0.25	0.20	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.10
		in.lb		2.7	2.2	1.8	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	0.9
Max. torsional backlash	j_t	arcmin		Standard ≤ 12 / Reduced ≤ 8					Standard ≤ 15 / Reduced ≤ 10						
Torsional rigidity	C_{t21}	Nm/ arcmin	LP+	2.8	3.3	3.3	3.3	2.8	2.8	3.3	3.3	2.8	3.3	3.3	2.8
		in.lb/ arcmin	LP+	25	29	29	29	25	25	29	29	25	29	29	25
			LPB+	–	–	–	–	–	–	–	–	–	–	–	–
Max. axial force [c]	F_{2AMax}	N	LP+	1550					1550						
		lb$_f$	LP+	349					349						
Max. radial force	F_{2RMax}	N	LP+ [c]	1450					1450						
		lb$_f$	LP+ [c]	326					326						
		N	LPB+ [d]	3000					–						
		lb$_f$	LPB+ [d]	675											
Efficiency at full load	η	%		97					95						
Service life (For calculation, see the Chapter “Information”)	L_h	h		> 20000					> 20000						
Weight incl. standard adapter plate	m	kg	LP+	2.0					2.4						
		lb$_m$	LP+	4.4					5.3						
		kg	LPB+	1.6					–						
		lb$_m$	LPB+	3.5											
Operating noise (with n_1 = 3000 rpm no load)	L_{PA}	dB(A)		≤ 70											
Max. permitted housing temperature		°C		+90											
		F		194											
Ambient temperature		°C		0 to +40											
		F		32 to 104											
Lubrication				Lubricated for life											
Paint				Blue RAL 5002											
Direction of rotation				Motor and gearhead same direction											
Protection class				IP 64											
Moment of inertia (relates to the drive)	J_1	kgcm^2	LP+	0.30	0.25	0.23	0.22	0.21	0.23	0.24	0.22	0.21	0.21	0.21	0.21
		10^{-3} in.lb.s^2	LP+	0.27	0.22	0.20	0.19	0.19	0.20	0.21	0.19	0.19	0.19	0.19	0.19
		kgcm^2	LPB+	0.30	0.25	0.23	0.22	0.21	–	–	–	–	–	–	–
		10^{-3} in.lb.s^2	LPB+	0.27	0.22	0.20	0.19	0.19							

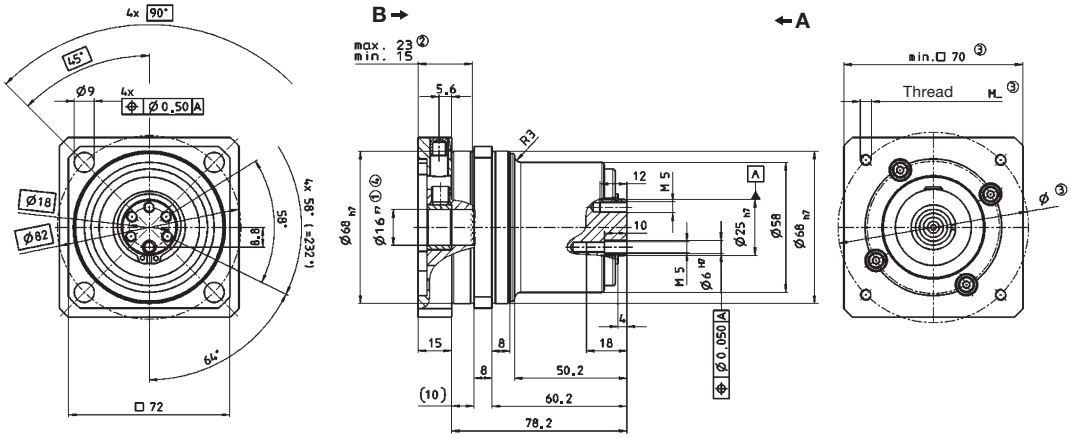
[a] LPB available with ratio 3, 4, 5, 7, 10
[b] For higher ambient temperatures, please reduce input speed
[c] Refers to center of the output shaft, if n_2 = 100 rpm
[d] With mounted PLPB+ belt pulley and 100 rpm

View A View B

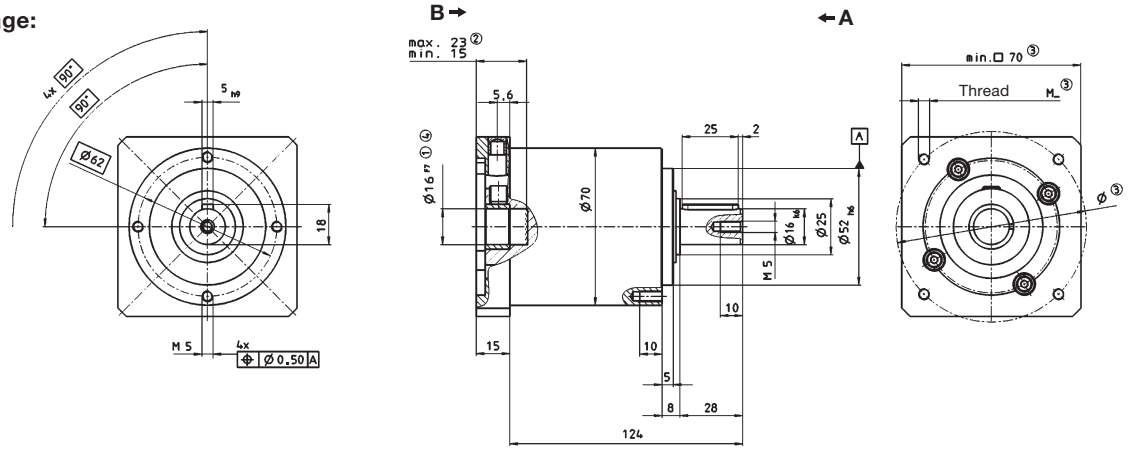
LP⁺ 1-stage:



LPB⁺ 1-stage:

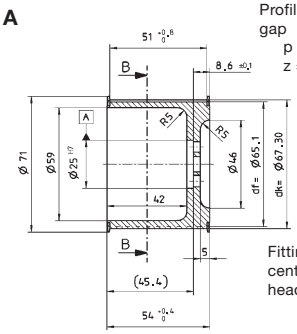


LP⁺ 2-stage:



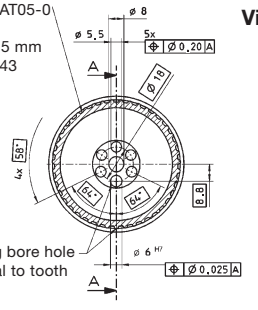
Supplement: Belt pulley PLPB⁺

View A



Profile AT05-0
gap
p = 5 mm
z = 43

View B



PCD effective diameter			$d_0 = (z \cdot p) / \pi$
Weight	m	*kg*	0.48
		lb_m	1.06
Moment of inertia	J_1	$kgcm^2$	3.86
		10^{-3} in.lb.s²	3.41

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.

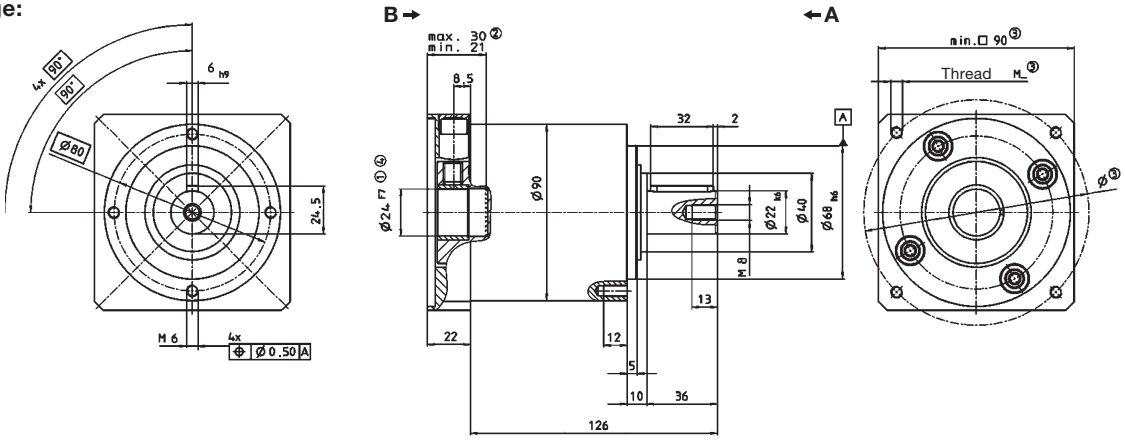
⚠ Motor mounting according to operating manual

				1-stage					2-stage						
Ratio [a]	***i***			**3**	**4**	**5**	**7**	**10**	**15**	**16**	**25**	**30**	**50**	**70**	**100**
Max. acceleration torque (max. 1000 cycles per hour)	T_{2B}	Nm		80	90	90	90	80	80	90	90	80	90	90	80
		in.lb		708	797	797	797	708	708	797	797	708	797	797	708
Nominal output torque (with n_{1N})	T_{2N}	Nm		40	45	45	45	40	40	45	45	40	45	45	40
		in.lb		354	398	398	398	354	354	398	398	354	398	398	354
Emergency stop torque (permitted 1000 times during the service life of the gearhead)	T_{2Not}	Nm		185	190	190	190	190	190	190	190	190	190	190	190
		in.lb		1637	1682	1682	1682	1682	1682	1682	1682	1682	1682	1682	1682
Nominal input speed (with T_{2N} and 20°C ambient temperature) [b]	n_{1N}	rpm		3400	3400	3400	3400	3400	3400	3400	3400	3400	3400	3400	3400
Max. input speed	n_{1Max}	rpm		6000	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000
Mean no load running torque (with n_1 = 3000 rpm and 20°C gearhead temperature)	T_{012}	Nm		0.60	0.55	0.50	0.40	0.38	0.30	0.30	0.30	0.30	0.25	0.25	0.25
		in.lb		5.3	4.9	4.4	3.5	3.4	2.7	2.7	2.7	2.7	2.2	2.2	2.2
Max. torsional backlash	j_t	arcmin		Standard ≤ 12 / Reduced ≤ 8					Standard ≤ 15 / Reduced ≤ 10						
Torsional rigidity	C_{t21}	Nm/ arcmin	LP+	8.5	9.5	9.5	9.5	8.5	8.5	9.5	9.5	8.5	9.5	9.5	8.5
		in.lb/ arcmin	LP+	75	84	85	85	75	75	84	84	75	84	84	75
			LPB+	–	–	–	–	–	–	–	–	–	–	–	–
Max. axial force [c]	F_{2AMax}	N	LP+	1900					1900						
		lb_f	LP+	428					428						
Max. radial force	F_{2RMax}	N	LP+ [c]	2400					2400						
		lb_f	LP+ [c]	540					540						
		N	LPB+ [d]	4300					–						
		lb_f	LPB+ [d]	967.5											
Efficiency at full load	η	%		97					95						
Service life (For calculation, see the Chapter "Information")	L_h	h		> 20000					> 20000						
Weight incl. standard adapter plate	*m*	kg	LP+	4.0					5.0						
		lb_m	LP+	8.8					11.1						
		kg	LPB+	3.3					–						
		lb_m	LPB+	7.3											
Operating noise (with n_1 = 3000 rpm no load)	L_{PA}	dB(A)		≤ 72											
Max. permitted housing temperature		°C		+90											
		F		194											
Ambient temperature		°C		0 to +40											
		F		32 to 104											
Lubrication				Lubricated for life											
Paint				Blue RAL 5002											
Direction of rotation				Motor and gearhead same direction											
Protection class				IP 64											
Moment of inertia (relates to the drive)	J_1	kgcm²	LP+	1.83	1.62	1.55	1.47	1.43	1.50	1.49	1.42	1.42	1.42	1.42	1.42
		10^{-3} in.lb.s²	LP+	1.62	1.43	1.37	1.30	1.27	1.33	1.32	1.26	1.26	1.26	1.26	1.26
		kgcm²	LPB+	1.82	1.62	1.54	1.47	1.43	–	–	–	–	–	–	–
		10^{-3} in.lb.s²	LPB+	1.61	1.43	1.36	1.30	1.27							

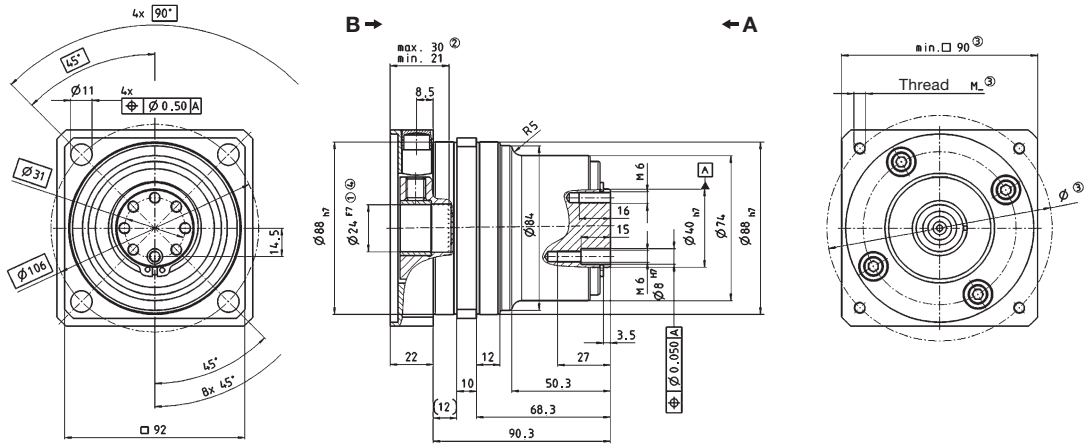
[a] LPB available with ratio 3, 4, 5, 7, 10
[b] For higher ambient temperatures, please reduce input speed
[c] Refers to center of the output shaft, if n_2 = 100 rpm
[d] With mounted PLPB+ belt pulley and 100 rpm

View A View B

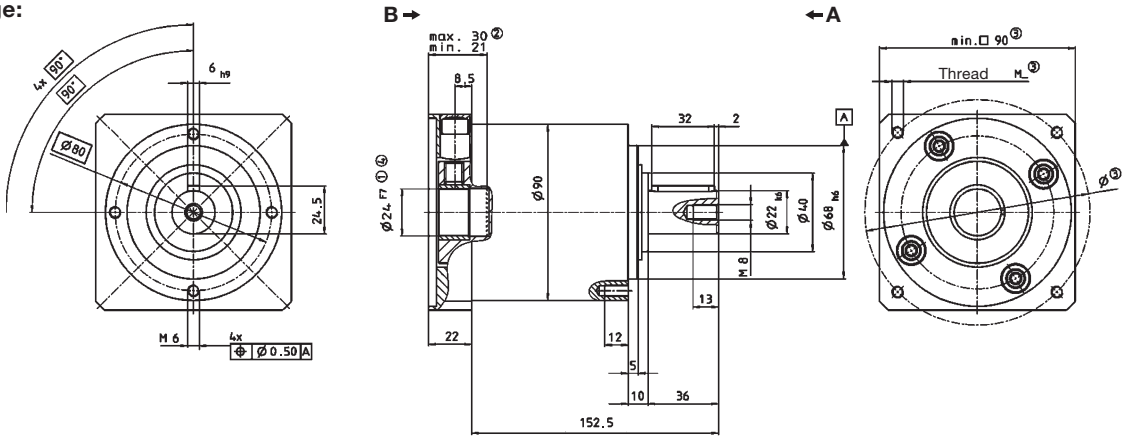
LP⁺ 1-stage:



LPB⁺ 1-stage:

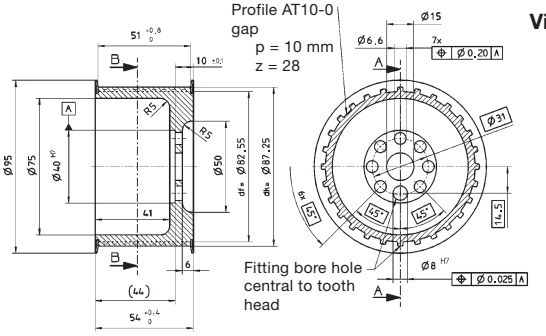


LP⁺ 2-stage:



Supplement: Belt pulley PLPB⁺

View A



View B

PCD effective diameter			$d_0 = (z \cdot p) / \pi$
Weight	m	kg	0.82
		lb_m	1.81
Moment of inertia	J_1	$kgcm^2$	10.95
		10^{-3} in.lb.s²	9.69

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.

⚠ Motor mounting according to operating manual

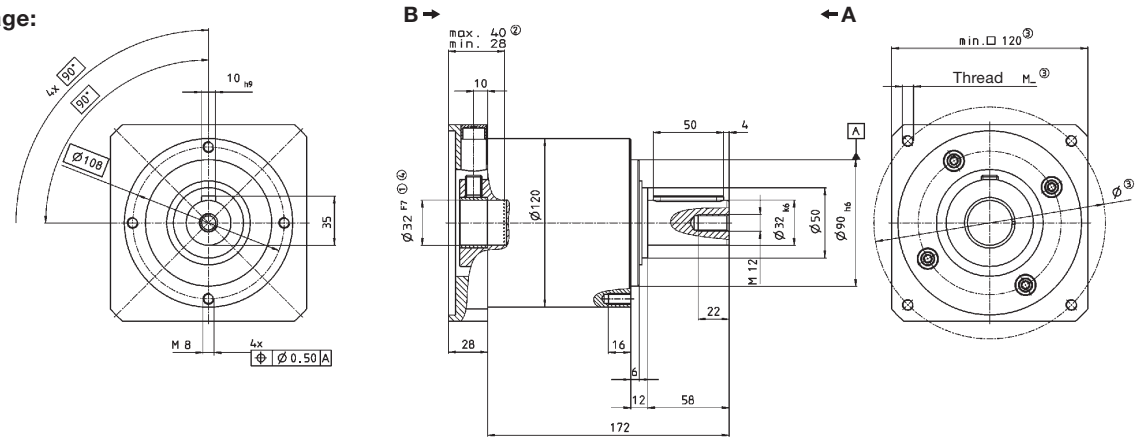
LP+/LPB+ 120 1/2-stage

				1-stage					2-stage						
Ratio [a]	i			**3**	**4**	**5**	**7**	**10**	**15**	**16**	**25**	**30**	**50**	**70**	**100**
Max. acceleration torque (max. 1000 cycles per hour)	T_{2B}	Nm		200	200	220	220	200	200	220	220	200	220	220	200
		in.lb		1770	1770	1947	1947	1770	1770	1947	1947	1770	1947	1947	1770
Nominal output torque (with n_{1N})	T_{2N}	Nm		100	110	110	110	100	100	110	110	100	110	110	100
		in.lb		885	974	974	974	885	885	974	974	885	974	974	885
Emergency stop torque (permitted 1000 times during the service life of the gearhead)	T_{2Not}	Nm		400	480	480	480	480	480	480	480	480	480	480	480
		in.lb		3540	4248	4248	4248	4248	4248	4248	4248	4248	4248	4248	4248
Nominal input speed (with T_{2N} and 20°C ambient temperature) [b]	n_{1N}	rpm		2600	2600	2600	2600	2600	2600	2600	2600	2600	2600	2600	2600
Max. input speed	n_{1Max}	rpm		4800	4800	4800	4800	4800	4800	4800	4800	4800	4800	4800	4800
Mean no load running torque (with n_1 = 3000 rpm and 20°C gearhead temperature)	T_{012}	Nm		1.1	1.0	0.9	0.8	0.8	0.6	0.55	0.5	0.4	0.4	0.4	0.4
		in.lb		9.7	8.9	8.0	7.1	7.1	5.3	4.9	4.4	3.5	3.5	3.5	3.5
Max. torsional backlash	j_t	arcmin		Standard ≤ 12 / Reduced ≤ 8					Standard ≤ 15 / Reduced ≤ 10						
Torsional rigidity	C_{t21}	Nm/ arcmin	LP+	22	25	25	25	22	22	25	25	22	25	25	22
		in.lb/ arcmin	LP+	195	221	221	221	195	195	221	221	195	221	221	195
			LPB+	–	–	–	–	–	–	–	–	–	–	–	–
Max. axial force [c]	F_{2AMax}	N	LP	4000					4000						
		lb_f	LP	900					900						
Max. radial force	F_{2RMax}	N	LP+ [c]	4600					4600						
		lb_f	LP+ [c]	1035					1035						
		N	LPB+ [d]	9500					–						
		lb_f	LPB+ [d]	2138											
Efficiency at full load	η	%		97					95						
Service life (For calculation, see the Chapter "Information")	L_h	h		> 20000					> 20000						
Weight incl. standardadapter plate	m	kg	LP+	8.6					11.0						
		lb_m	LP+	19.0					24.3						
		kg	LPB+	7.3					–						
		lb_m	LPB+	16.1											
Operating noise (with n_1 = 3000 rpm no load)	L_{PA}	dB(A)		≤ 74											
Max. permitted housing temperature		°C		+90											
		F		194											
Ambient temperature		°C		0 to +40											
		F		32 to 104											
Lubrication				Lubricated for life											
Paint				Blue RAL 5002											
Direction of rotation				Motor and gearhead same direction											
Protection class				IP 64											
Moment of inertia (relates to the drive)	J_1	$kgcm^2$	LP+	6.90	5.94	5.58	5.24	5.06	5.35	5.53	5.30	5.00	4.99	4.99	4.99
		10^{-3} in.lb.s²	LP+	6.11	5.26	4.94	4.64	4.48	4.73	4.89	4.69	4.43	4.42	4.42	4.42
		$kgcm^2$	LPB+	6.84	5.91	5.56	5.24	5.06	–	–	–	–	–	–	–
		10^{-3} in.lb.s²	LPB+	6.05	5.23	4.92	4.64	4.48							

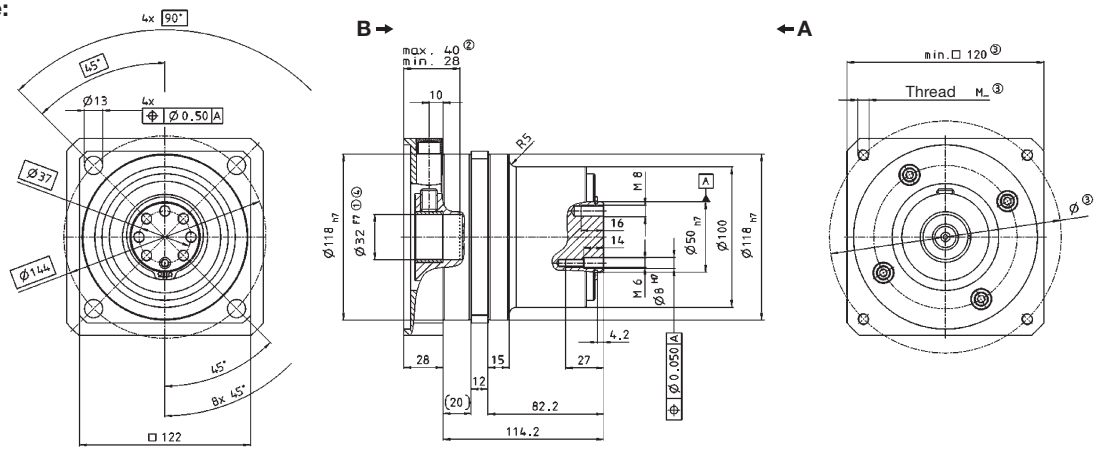
[a] LPB available with ratio 3, 4, 5, 7, 10
[b] For higher ambient temperatures, please reduce input speed
[c] Refers to center of the output shaft, if n_2 = 100 rpm
[d] With mounted PLPB+ belt pulley and 100 rpm

View A | View B

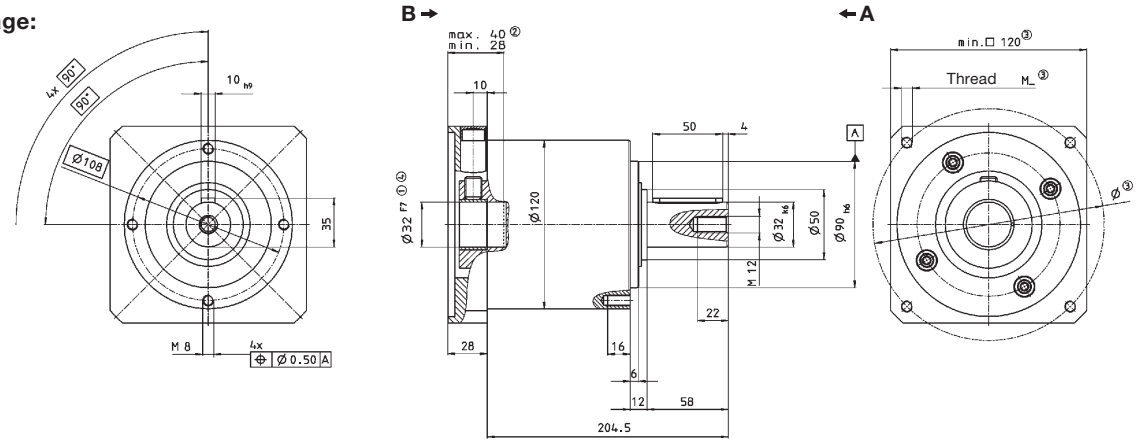
LP⁺ 1-stage:



LPB⁺ 1-stage:

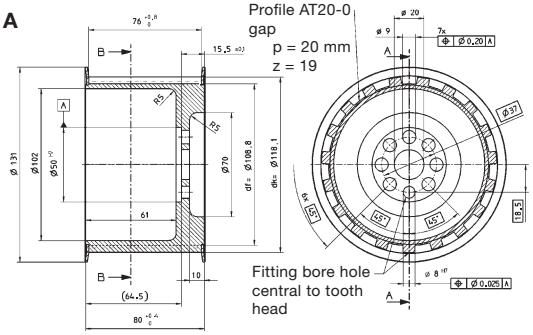


LP⁺ 2-stage:



Supplement: Belt pulley PLPB⁺

View A



View B

PCD effective diameter			$d_0 = (z \cdot p) / \pi$
Weight	m	kg	2.61
		lb_m	5.77
Moment of inertia	J_1	$kgcm^2$	50.62
		10^{-3} in.lb.s²	44.80

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.

⚠ Motor mounting according to operating manual

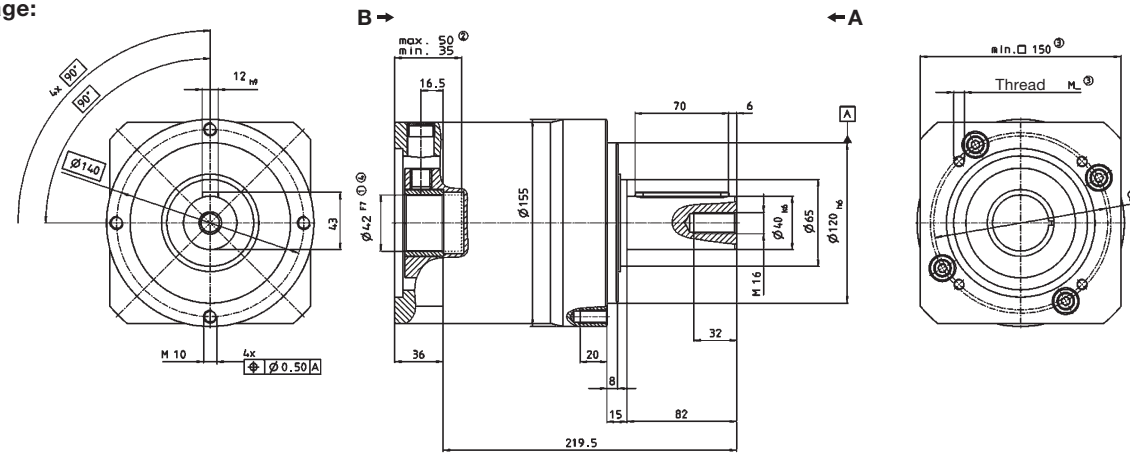
LP+ 155 1/2-stage

			1-stage		2-stage		
Ratio	***i***		**5**	**10**	**25**	**50**	**100**
Max. acceleration torque (max. 1000 cycles per hour)	T_{2B}	Nm	450	350	450	450	350
		in.lb	3983	3098	3983	3983	3098
Nominal output torque (with n_{1N})	T_{2N}	Nm	320	190	320	320	190
		in.lb	2832	1682	2832	2832	1682
Emergency stop torque (permitted 1000 times during the service life of the gearhead)	T_{2Not}	Nm	1000	1000	1000	1000	1000
		in.lb	8850	8850	8850	8850	8850
Nominal input speed (with T_{2N} and 20°C ambient temperature) [a]	n_{1N}	rpm	2000	2000	2000	2000	2000
Max. input speed	n_{1Max}	rpm	3600	3600	3600	3600	3600
Mean no load running torque (with n_1 = 3000 rpm and 20°C gearhead temperature)	T_{012}	Nm	2.8	2.5	1.0	0.8	0.7
		in.lb	24.8	22.1	8.9	7.1	6.2
Max. torsional backlash	j_t	arcmin	Standard ≤ 12 / Reduced ≤ 8		Standard ≤ 15 / Reduced ≤ 10		
Torsional rigidity	C_{t21}	Nm/ arcmin	55	44	55	55	44
		in.lb/ arcmin	487	389	487	487	389
Max. axial force [b]	F_{2AMax}	N	6000		6000		
		lb_f	1350		1350		
Max. radial force [b]	F_{2RMax}	N	7500		7500		
		lb_f	1688		1688		
Efficiency at full load	η	%	97		95		
Service life (For calculation, see the Chapter "Information")	L_h	h	> 20000		> 20000		
Weight incl. standard adapter plate	m	kg	17.0		21.0		
		lb_m	37.6		46.4		
Operating noise (with n_1 = 3000 rpm no load)	L_{PA}	dB(A)	≤ 75				
Max. permitted housing temperature		°C	+90				
		F	194				
Ambient temperature		°C	0 to +40				
		F	32 to 104				
Lubrication			Lubricated for life				
Paint			Blue RAL 5002				
Direction of rotation			Motor and gearhead same direction				
Protection class			IP 64				
Moment of inertia (relates to the drive)	J_1	$kgcm^2$	17.1	15.7	5.4	5.0	5.0
		10^{-3} in.lb.s²	15.1	13.9	4.8	4.4	4.4

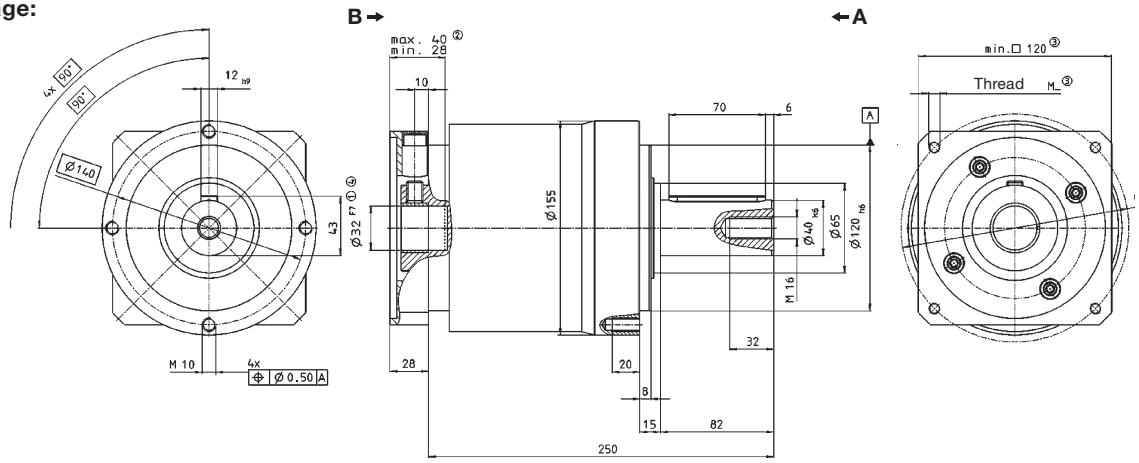
[a] For higher ambient temperatures, please reduce input speed

[b] Refers to center of the output shaft, if n_2 = 100 rpm

LP⁺ 1-stage:



LP⁺ 2-stage:

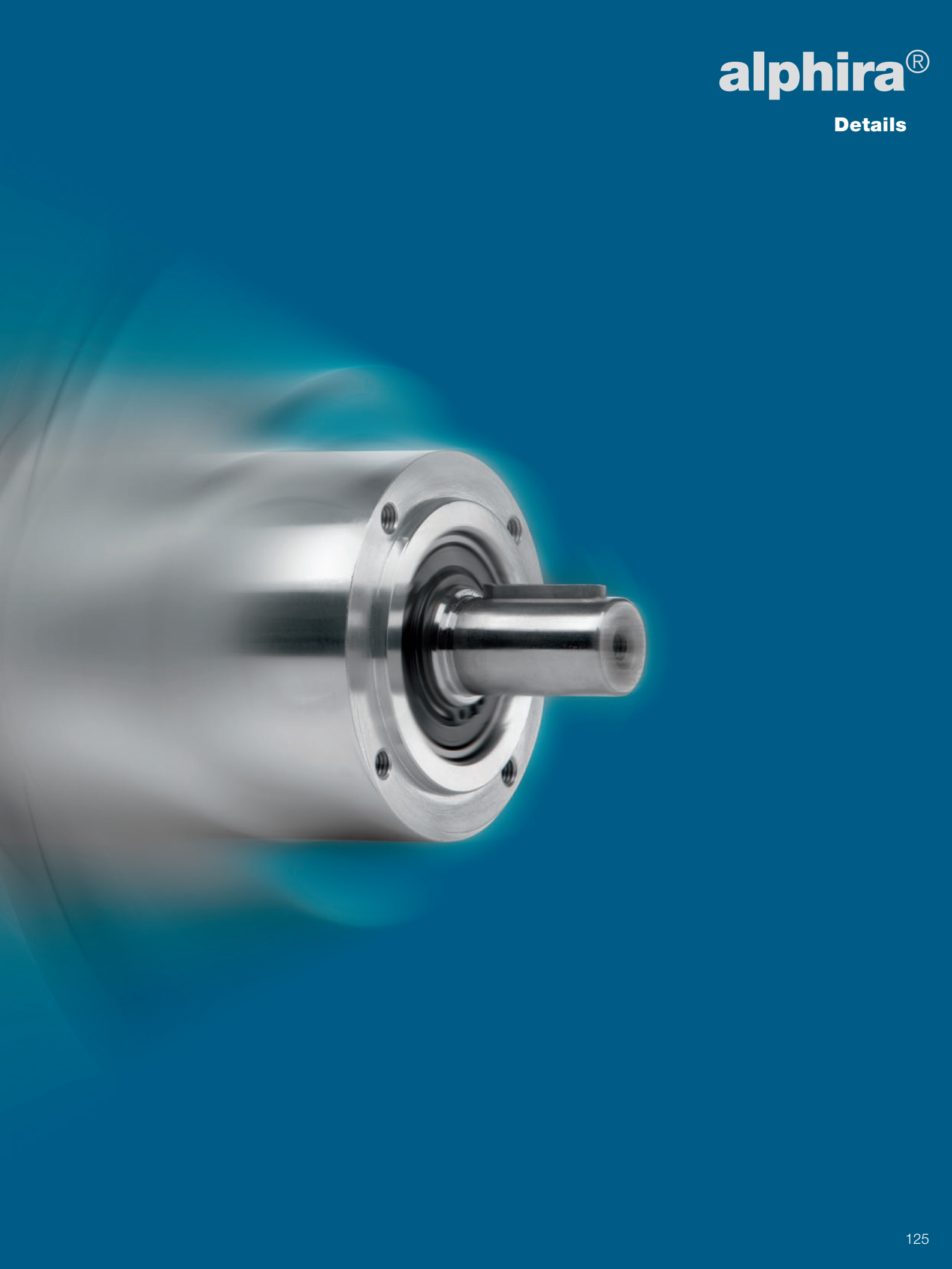


Non-tolerated dimensions ±1 mm

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.

⚠ Motor mounting according to operating manual

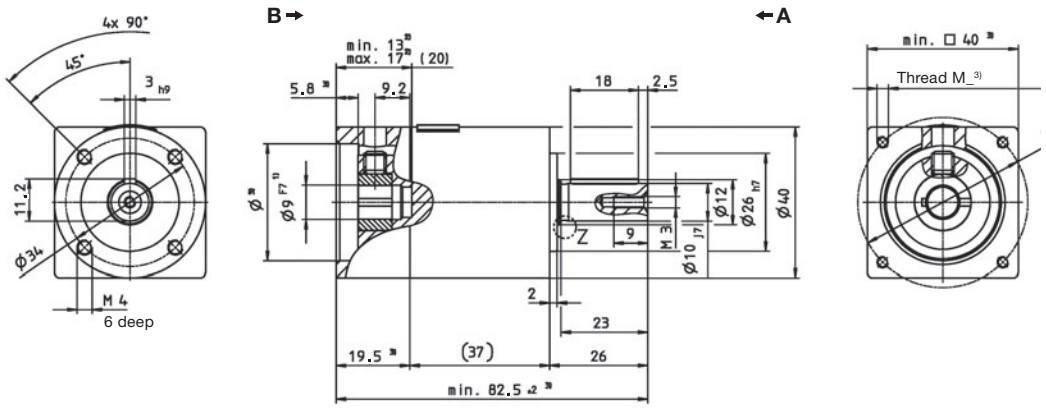
alphira® – The basic class among planetary gearheads



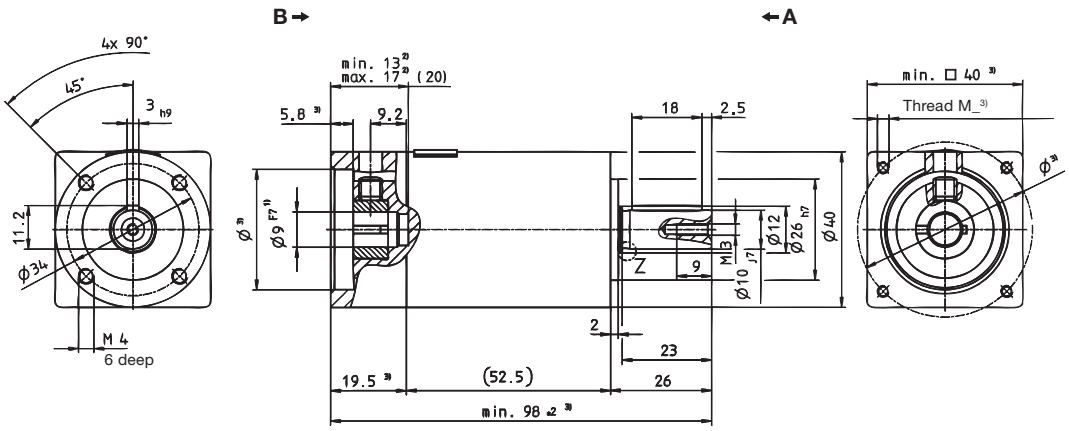
			1-stage		2-stage		
Ratio	***i***		**5**	**10**	**25**	**50**	**100**
Max. acceleration torque (max. 1000 cycles per hour)	T_{2B}	Nm	11.5	10.5	11.5	11.5	10.5
		in.lb	102	93	102	102	93
Nominal output torque (with n_{1N})	T_{2N}	Nm	5.7	5.2	5.7	5.7	5.2
		in.lb	50	46	50	50	46
Emergency stop torque (permitted 1000 times during the service life of the gearhead)	T_{2Not}	Nm	26	26	26	26	26
		in.lb	230	230	230	230	230
Nominal input speed (with T_{2N} and 20°C ambient temperature) [a]	n_{1N}	rpm	4000	4000	4000	4000	4000
Max. input speed	n_{1Max}	rpm	8000	8000	8000	8000	8000
Mean no load running torque (with n_1 = 3000 rpm and 20°C gearhead temperature)	T_{012}	Nm	0.05	0.05	0.05	0.05	0.05
		in.lb	0.44	0.44	0.44	0.44	0.44
Max. torsional backlash	j_t	arcmin	≤ 20		≤ 25		
Torsional rigidity	C_{t21}	Nm/ arcmin	0.58	0.52	0.58	0.58	0.52
		in.lb/ arcmin	5.1	4.6	5.1	5.1	4.6
Max. axial force [b]	F_{2AMax}	N	230		230		
		lb_f	51		51		
Max. radial force [b]	F_{2RMax}	N	200		200		
		lb_f	45		45		
Efficiency at full load	η	%	97		95		
Service life (For calculation, see the Chapter "Information")	L_h	h	> 20000		> 20000		
Weight incl. standard adapter plate	m	kg	0.31		0.52		
		lb_m	0.69		1.15		
Operating noise (with n_1 = 3000 rpm no load)	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				
Paint			Alu, polished				
Direction of rotation			Motor and gearhead same direction				
Protection class			IP 64				
Moment of inertia (relates to the drive)	J_1	$kgcm^2$	0.041	0.041	0.041	0.041	0.041
		10^{-3} in.lb.s²	0.036	0.036	0.036	0.036	0.036

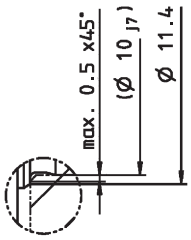
[a] For higher ambient temperatures, please reduce input speed
[b] Relates to center of the output shaft or flange, at 100 rpm

1-stage:



2-stage:





Z: Detail

Non-tolerated dimensions ±1 mm

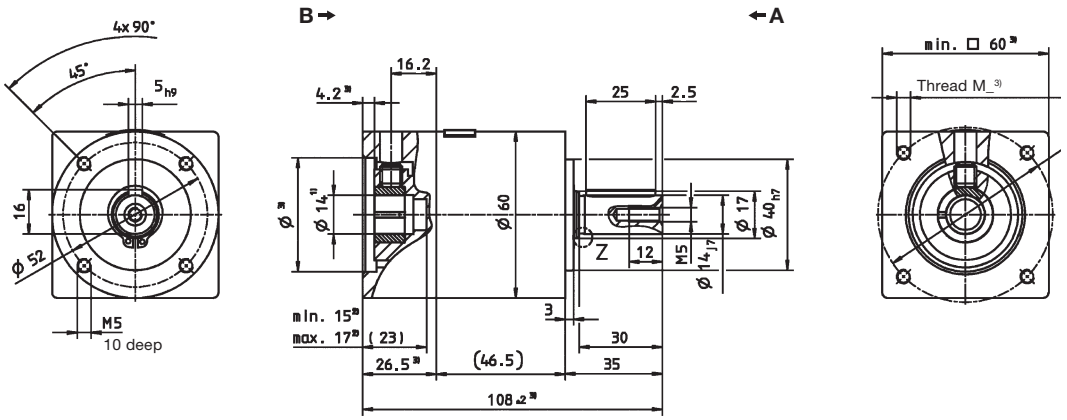
1) Check motor shaft fit.
2) Min./Max. permissible motor shaft length. Longer motor shafts are adaptable, please contact us.
3) The dimensions depend on the motor.
4) Smaller motor shaft diameter is compensated by a bushing.

⚠ Motor mounting according to operating manual

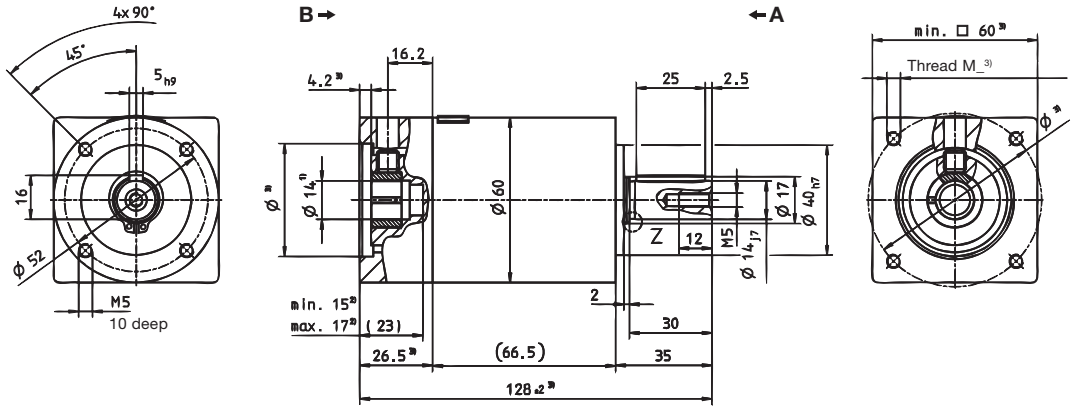
			1-stage		2-stage		
Ratio	***i***		**5**	**10**	**25**	**50**	**100**
Max. acceleration torque (max. 1000 cycles per hour)	T_{2B}	Nm	32	29	32	32	29
		in.lb	283	257	283	283	257
Nominal output torque (with n_{1N})	T_{2N}	Nm	16	15	16	16	15
		in.lb	142	133	142	142	133
Emergency stop torque (permitted 1000 times during the service life of the gearhead)	T_{2Not}	Nm	75	75	75	75	75
		in.lb	664	664	664	664	664
Nominal input speed (with T_{2N} and 20°C ambient temperature) [a]	n_{1N}	rpm	3700	3700	3700	3700	3700
Max. input speed	n_{1Max}	rpm	6000	6000	6000	6000	6000
Mean no load running torque (with n_1 = 3000 rpm and 20°C gearhead temperature)	T_{012}	Nm	0.11	0.11	0.11	0.11	0.11
		in.lb	0.97	0.97	0.97	0.97	0.97
Max. torsional backlash	j_t	arcmin	≤ 20		≤ 25		
Torsional rigidity	C_{t21}	Nm/ arcmin	2.1	1.9	2.1	2.1	1.9
		in.lb/ arcmin	19	17	19	19	17
Max. axial force [b]	F_{2AMax}	N	750		750		
		lb_f	169		169		
Max. radial force [b]	F_{2RMax}	N	650		650		
		lb_f	146		146		
Efficiency at full load	η	%	97		95		
Service life (For calculation, see the Chapter "Information")	L_h	h	> 20000		> 20000		
Weight incl. standard adapter plate	m	kg	0.88		1.1		
		lb_m	1.9		2.4		
Operating noise (with n_1 = 3000 rpm no load)	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				
Paint			Alu, polished				
Direction of rotation			Motor and gearhead same direction				
Protection class			IP 64				
Moment of inertia (relates to the drive)	J_1	$kgcm^2$	0.17	0.17	0.17	0.17	0.17
		10^{-3} in.lb.s²	0.15	0.15	0.15	0.15	0.15

[a] For higher ambient temperatures, please reduce input speed
[b] Relates to center of the output shaft or flange, at 100 rpm

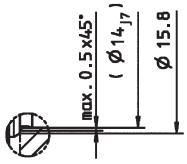
1-stage:



2-stage:



Z: Detail



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.

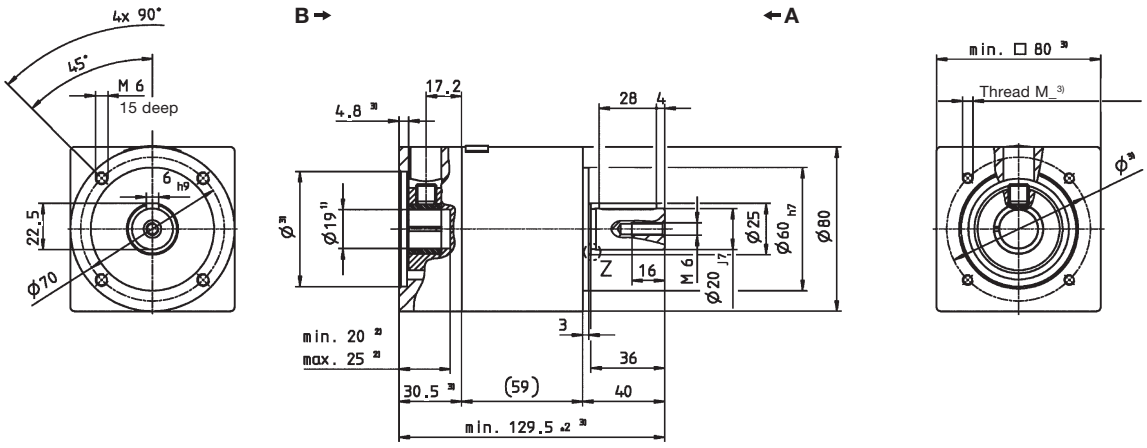
⚠ Motor mounting according to operating manual

			1-stage		2-stage		
Ratio	***i***		**5**	**10**	**25**	**50**	**100**
Max. acceleration torque (max. 1000 cycles per hour)	T_{2B}	Nm	80	72	80	80	72
		in.lb	708	637	708	708	637
Nominal output torque (with n_{1N})	T_{2N}	Nm	40	35	40	40	35
		in.lb	354	310	354	354	310
Emergency stop torque (permitted 1000 times during the service life of the gearhead)	T_{2Not}	Nm	190	190	190	190	190
		in.lb	1682	1682	1682	1682	1682
Nominal input speed (with T_{2N} and 20°C ambient temperature) [a]	n_{1N}	rpm	3400	3400	3400	3400	3400
Max. input speed	n_{1Max}	rpm	6000	6000	6000	6000	6000
Mean no load running torque (with n_1 = 3000 rpm and 20°C gearhead temperature)	T_{012}	Nm	0.28	0.28	0.28	0.28	0.28
		in.lb	2.5	2.5	2.5	2.5	2.5
Max. torsional backlash	j_t	arcmin	≤ 20		≤ 25		
Torsional rigidity	C_{t21}	Nm/ arcmin	6.1	5.5	6.1	6.1	5.5
		in.lb/ arcmin	54	49	54	54	48.9
Max. axial force [b]	F_{2AMax}	N	1600		1600		
		lb_f	360		360		
Max. radial force [b]	F_{2RMax}	N	1200		1200		
		lb_f	270		270		
Efficiency at full load	η	%	97		95		
Service life (For calculation, see the Chapter “Information”)	L_h	h	> 20000		> 20000		
Weight incl. standard adapter plate	m	kg	2.1		2.8		
		lb_m	4.6		6.2		
Operating noise (with n_1 = 3000 rpm no load)	L_{PA}	dB(A)	≤ 70				
Max. permitted housing temperature		°C	+90				
		F	194				
Ambient temperature		°C	0 to +40				
		F	32 to 104				
Lubrication			Lubricated for life				
Paint			Alu, polished				
Direction of rotation			Motor and gearhead same direction				
Protection class			IP 64				
Moment of inertia (relates to the drive)	J_1	kgcm²	0.54	0.54	0.54	0.54	0.54
		10^{-3} in.lb.s²	0.48	0.48	0.48	0.48	0.48

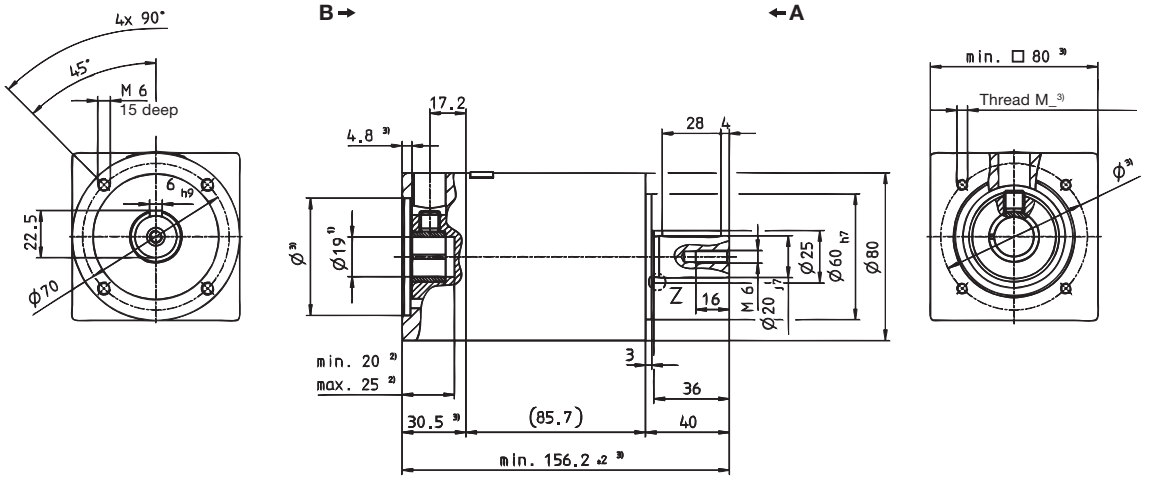
[a] For higher ambient temperatures, please reduce input speed
[b] Relates to center of the output shaft or flange, at 100 rpm

View A View B

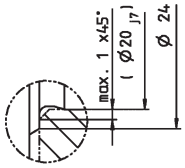
1-stage:



2-stage:



Z: Detail



Non-tolerated dimensions ±1 mm

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3) The dimensions depend on the motor.
4) Smaller motor shaft diameter is compensated by a bushing.

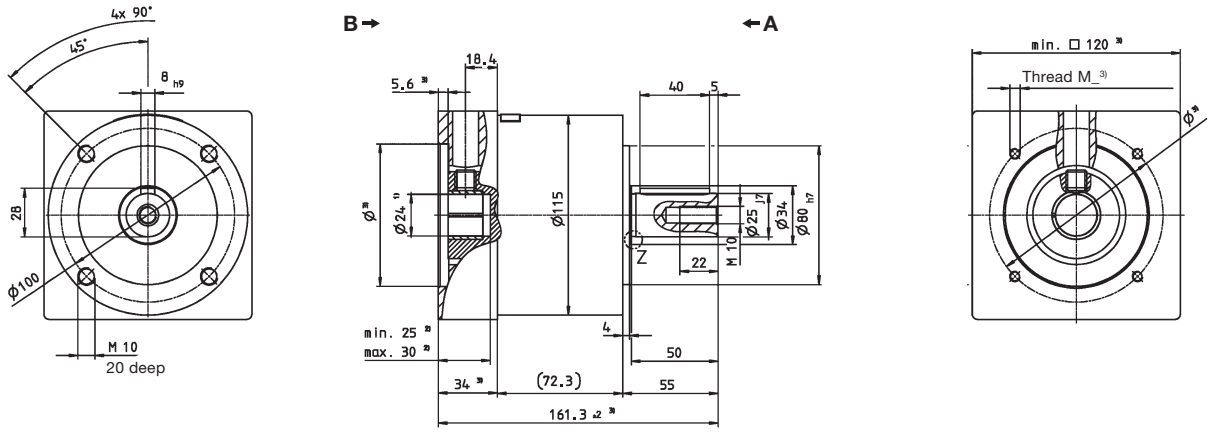
⚠ Motor mounting according to operating manual

			1-stage		2-stage		
Ratio	***i***		**5**	**10**	**25**	**50**	**100**
Max. acceleration torque (max. 1000 cycles per hour)	T_{2B}	Nm	200	180	200	200	180
		in.lb	1770	1593	1770	1770	1593
Nominal output torque (with n_{1N})	T_{2N}	Nm	100	90	100	100	90
		in.lb	885	797	885	885	797
Emergency stop torque (permitted 1000 times during the service life of the gearhead)	T_{2Not}	Nm	480	480	480	480	480
		in.lb	4248	4248	4248	4248	4248
Nominal input speed (with T_{2N} and 20°C ambient temperature) [a]	n_{1N}	rpm	2600	2600	2600	2600	2600
Max. input speed	n_{1Max}	rpm	4800	4800	4800	4800	4800
Mean no load running torque (with n_1 = 3000 rpm and 20°C gearhead temperature)	T_{012}	Nm	0.5	0.5	0.5	0.5	0.5
		in.lb	4.4	4.4	4.4	4.4	4.4
Max. torsional backlash	j_t	arcmin	≤ 20		≤ 25		
Torsional rigidity	C_{t21}	Nm/ arcmin	16.5	14.5	16.5	16.5	14.5
		in.lb/ arcmin	146	128	146	146	128
Max. axial force [b]	F_{2AMax}	N	2100		2100		
		lb_f	472		472		
Max. radial force [b]	F_{2RMax}	N	1550		1550		
		lb_f	349		349		
Efficiency at full load	η	%	97		95		
Service life (For calculation, see the Chapter "Information")	L_h	h	> 20000		> 20000		
Weight incl. standard adapter plate	*m*	kg	5.2		6.9		
		lb_m	11.5		15.2		
Operating noise (with n_1 = 3000 rpm no load)	L_{PA}	dB(A)	≤ 72				
Max. permitted housing temperature		°C	+90				
		F	194				
Ambient temperature		°C	0 to +40				
		F	32 to 104				
Lubrication			Lubricated for life				
Paint			Alu, polished				
Direction of rotation			Motor and gearhead same direction				
Protection class			IP 64				
Moment of inertia (relates to the drive)	J_1	$kgcm^2$	1.82	1.82	1.82	1.82	1.82
		10^{-3} in.lb.s²	1.61	1.61	1.61	1.61	1.61

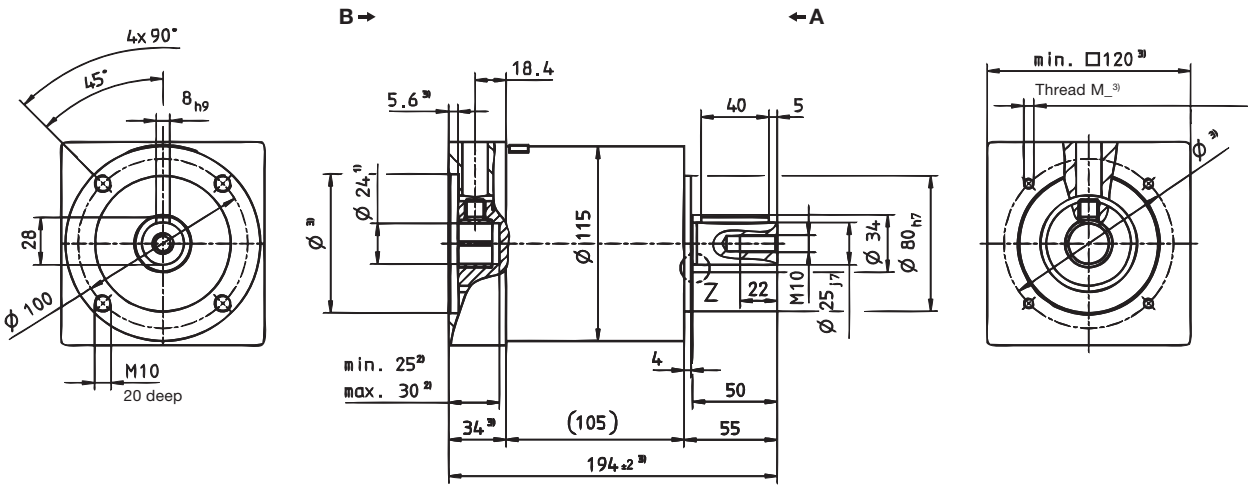
[a] For higher ambient temperatures, please reduce input speed
[b] Relates to center of the output shaft or flange, at 100 rpm

View A View B

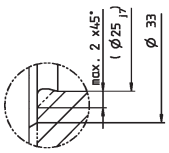
1-stage:



2-stage:



Z: Detail



Non-tolerated dimensions ±1 mm

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⚠ Motor mounting according to operating manual