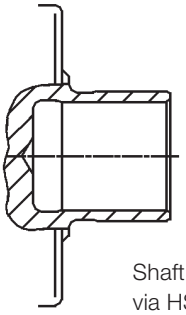
SP+ MF – The new generation

The classic all-rounder among planetary gearheads

MF version
Designed for:
- Cyclic applications
- Reverse operation
- Highly dynamic applications
- Greater positioning accuracy

SP+

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



Shaft mounted, mounted
via HSD shrink disc

Sensor flange

Shrink disc

Couplings

Rack / Pinion

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

Options

Output shaft with key / involute
NEW: Shaft mounted, mounted via HSD shrink disc
Washdown version
ATEX version
Food-grade grease
Version with optimized mass moment of inertia

Accessories

Rack / Pinion (see page 262)
Shrink disc (see page 294)
Couplings (see page 294)
Sensor flange

SP+ 060 MF 1-stage

					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	42	42	42	32
				in.lb	266	372	372	372	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	2800				
				lb_f	630				
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 *i*=10 and n_1=3000 rpm no load)			L_{PA}	dB(A)	≤ 58				
Max. permitted housing temperature				°C	+90				
				F	194				
Ambient temperature				°C	-15 to +40				
				F	5 to 104				
Lubrication					Lubricated for life				
Paint					Blue RAL 5002				
Direction of rotation					Motor and gearhead same direction				
Protection class					IP 65				
Moment of inertia (relates to the drive)	B	11	J_1	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

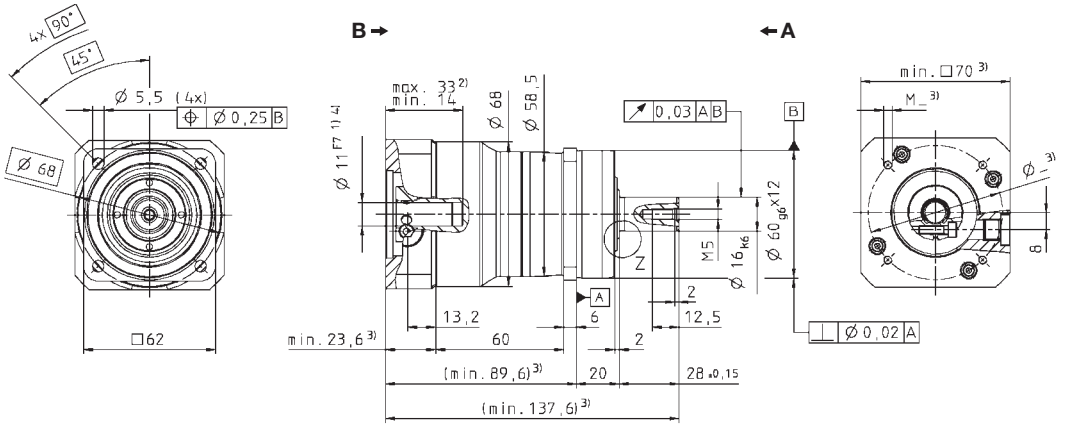
Reduced mass moments of inertia available on request.

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

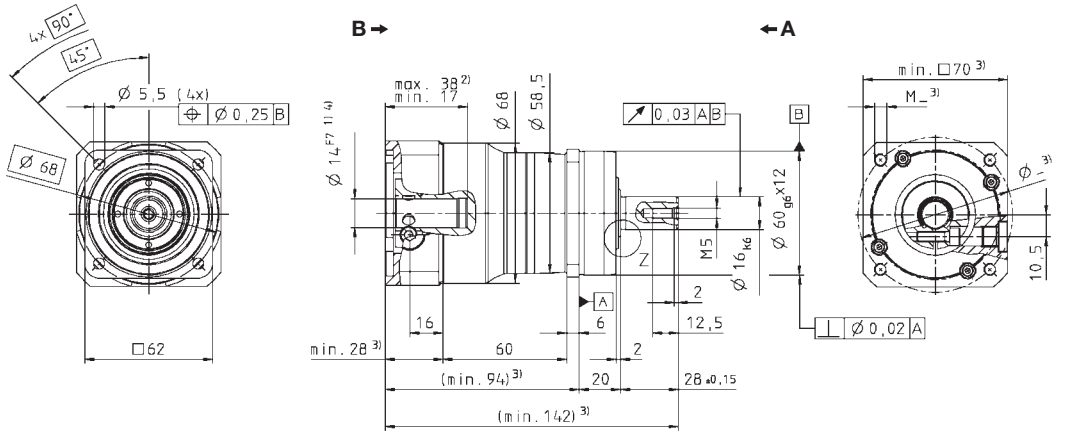
View A | View B

Motor shaft diameter [mm]

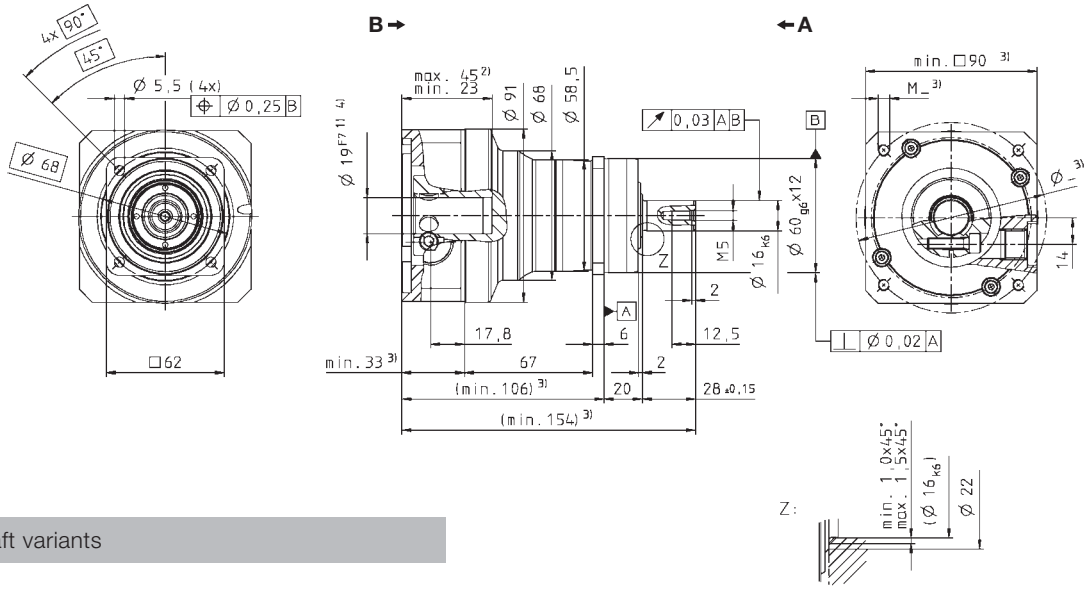
up to 11 [4] (B) clamping hub diameter



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

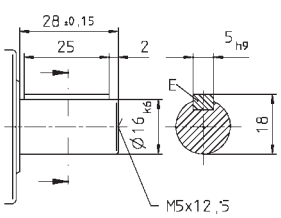


up to 19 [4] (E) clamping hub diameter

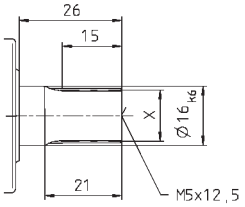


Alternatives: Output shaft variants

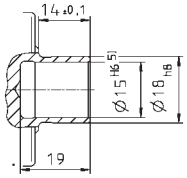
Keywayed output shaft in mm
E = key as per DIN 6885, sheet 1, form A



Involute gearing DIN 5480 in mm
X = W 16 x 0.8 x 30 x 18 x 6m, DIN 5480



Shaft mounted
Mounted via HSD shrink disc



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) Tolerance h6 for mounted shaft.

⚠ 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	42	42	42	42	42	42	42	42	32
			in.lb	372	372	372	372	372	372	372	372	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	2800								
			lb_f	630								
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 *i*=100 and n_1=3000 rpm no load)			L_{PA} dB(A)	≤ 58								
Max. permitted housing temperature			°C	+90								
			F	194								
Ambient temperature			°C	-15 to +40								
			F	5 to 104								
Lubrication				Lubricated for life								
Paint				Blue RAL 5002								
Direction of rotation				Motor and gearhead same direction								
Protection class				IP 65								
Moment of inertia (relates to the drive)	B	11	J_1 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

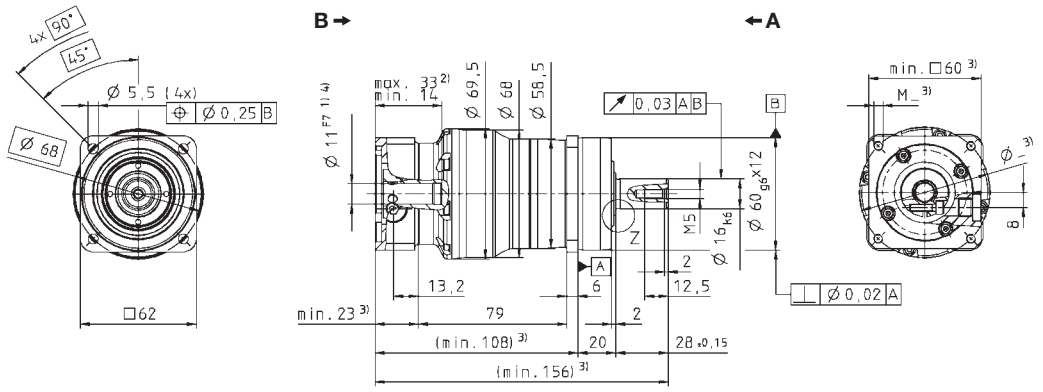
Reduced mass moments of inertia available on request.

[a] Other ratios available on request
[b] For higher ambient temperatures, please reduce input speed
[c] Valid for clamping hub diameter of 11 mm
[d] Refers to center of the output shaft or flange

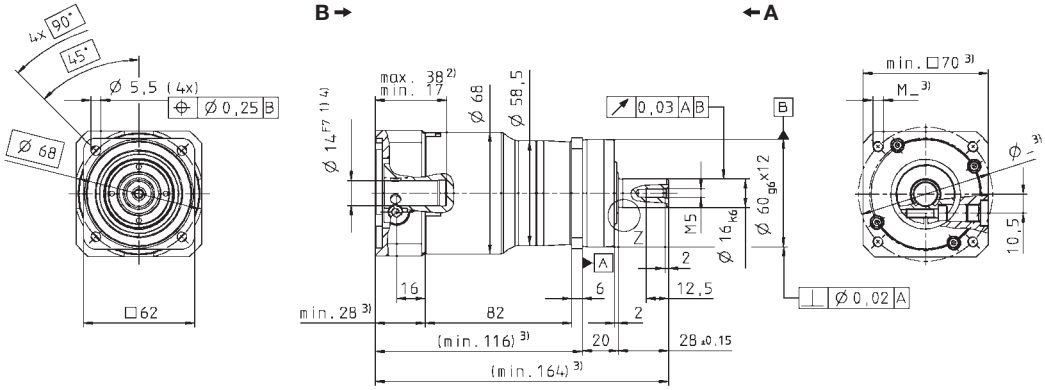
View A | View B

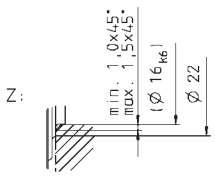
Motor shaft diameter [mm]

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



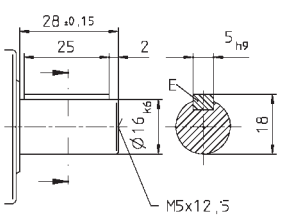
up to 14 [4] (C) clamping hub diameter



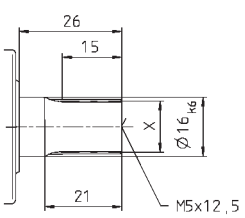


Alternatives: Output shaft variants

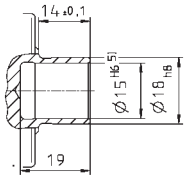
Keywayed output shaft in mm
E = key as per DIN 6885, sheet 1, form A



Involute gearing DIN 5480 in mm
X = W 16 x 0.8 x 30 x 18 x 6m, DIN 5480



Shaft mounted
Mounted via HSD shrink disc



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) Tolerance h6 for mounted shaft.

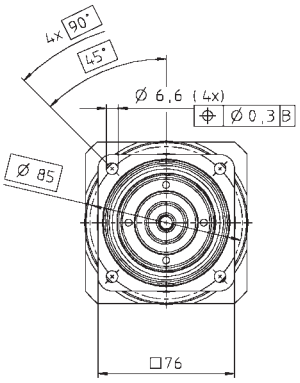
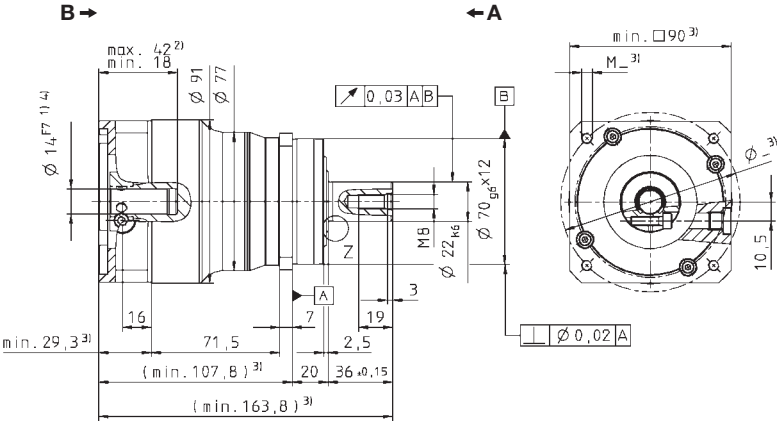
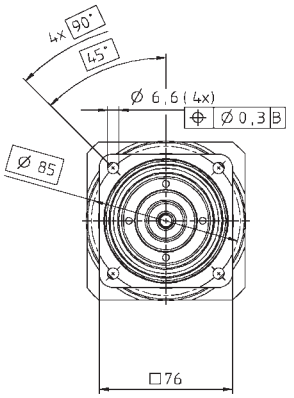
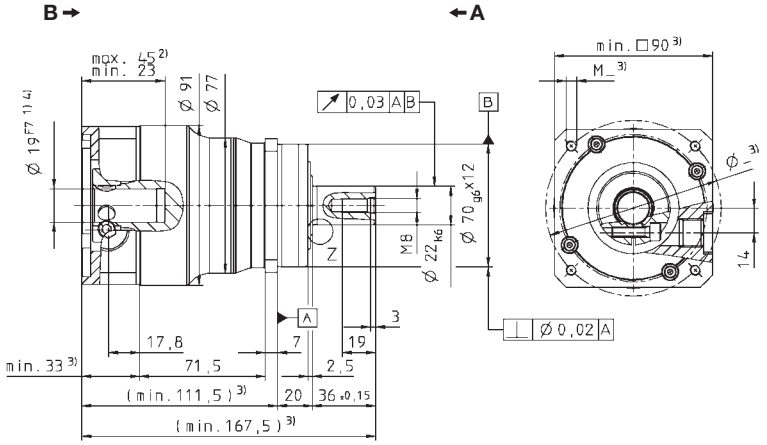
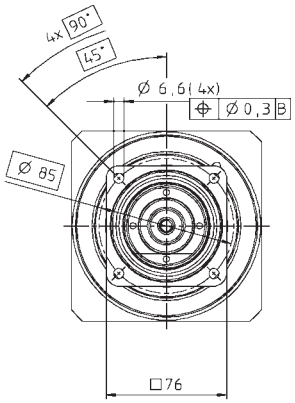
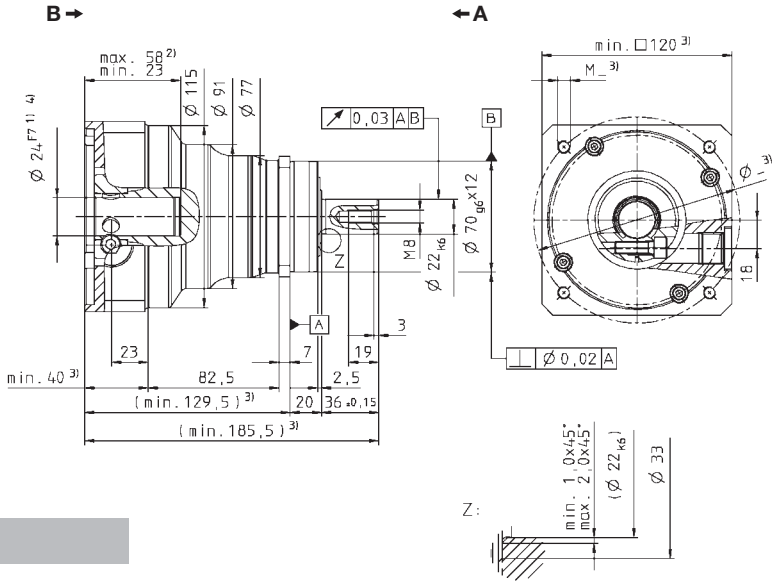
⚠ Motor mounting according to operating manual

					1-stage				
Ratio [a]			***i***		**3**	**4**	**5**	**7**	**10**
cymex®-optimized acceleration torque (please contact us regarding the design)			T_{2Bcym}	Nm	–	142	160	142	100
				in.lb	–	1254	1416	1254	883
Max. acceleration torque (max. 1000 cycles per hour)			T_{2B}	Nm	85	110	110	110	95
				in.lb	752	974	974	974	841
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	4200				
				lb_f	945				
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 i=10 and n_1=3000 rpm no load)			L_{PA}	dB(A)	≤ 59				
Max. permitted housing temperature				°C	+90				
				F	194				
Ambient temperature				°C	-15 to +40				
				F	5 to 104				
Lubrication					Lubricated for life				
Paint					Blue RAL 5002				
Direction of rotation					Motor and gearhead same direction				
Protection class					IP 65				
Moment of inertia (relates to the drive)	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

Reduced mass moments of inertia available on request.

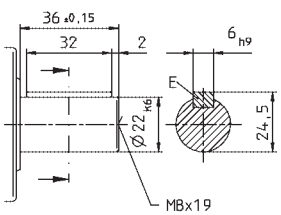
[a] Other ratios available on request
[b] For higher ambient temperatures, please reduce input speed
[c] Valid for clamping hub diameter of 19 mm
[d] Refers to centre of the output shaft or flange

Motor shaft diameter [mm]

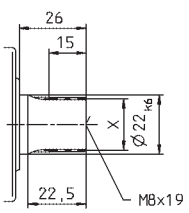
	View A	View B
up to 14 [4] (C) clamping hub diameter		
up to 19 [4] (E) clamping hub diameter		
up to 24 [4] (G) clamping hub diameter		

Alternatives: Output shaft variants

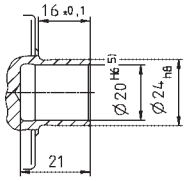
Keywayed output shaft in mm
E = key as per DIN 6885, sheet 1, form A



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



Shaft mounted
Mounted via HSD shrink disc



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) Tolerance h6 for mounted shaft.

⚠ 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	142	142	160	142	160	135	160	142	100
				in.lb	1254	1254	1416	1254	1416	1195	1416	1254	883
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	4200								
				lb_f	945								
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 i=100 and n_1 = 3000 rpm no load)			L_{PA}	dB(A)	≤ 59								
Max. permitted housing temperature				°C	+90								
				F	194								
Ambient temperature				°C	-15 to +40								
				F	5 to 104								
Lubrication					Lubricated for life								
Paint					Blue RAL 5002								
Direction of rotation					Motor and gearhead same direction								
Protection class					IP 65								
Moment of inertia (relates to the drive)	B	11	J_1	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

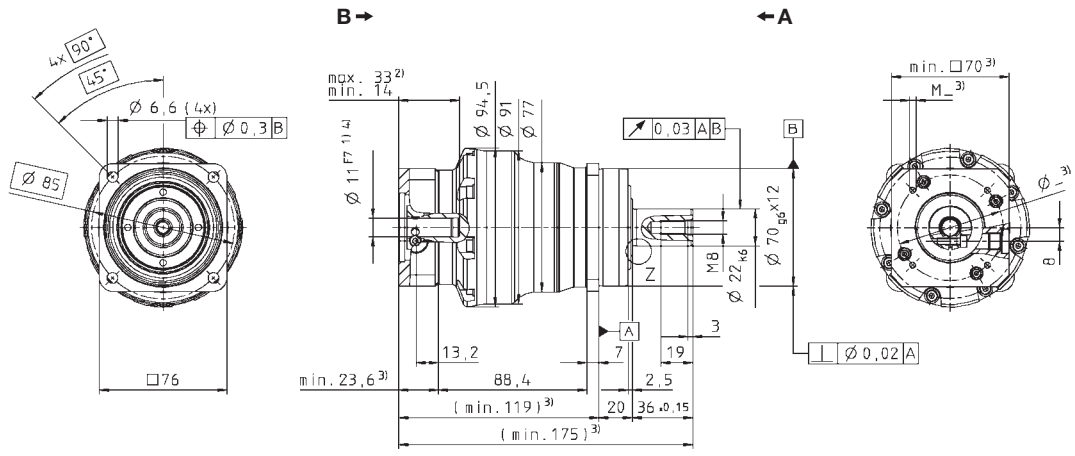
Reduced mass moments of inertia available on request.

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

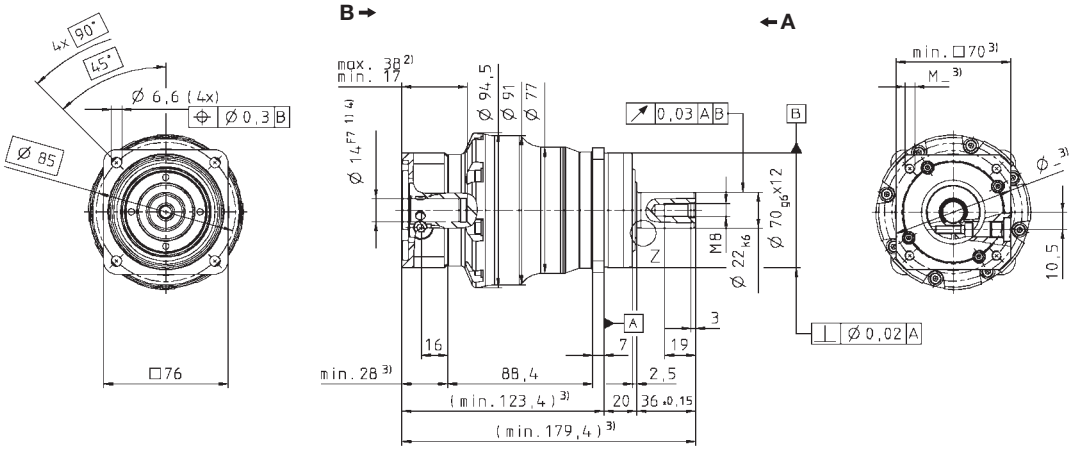
View A | View B

Motor shaft diameter [mm]

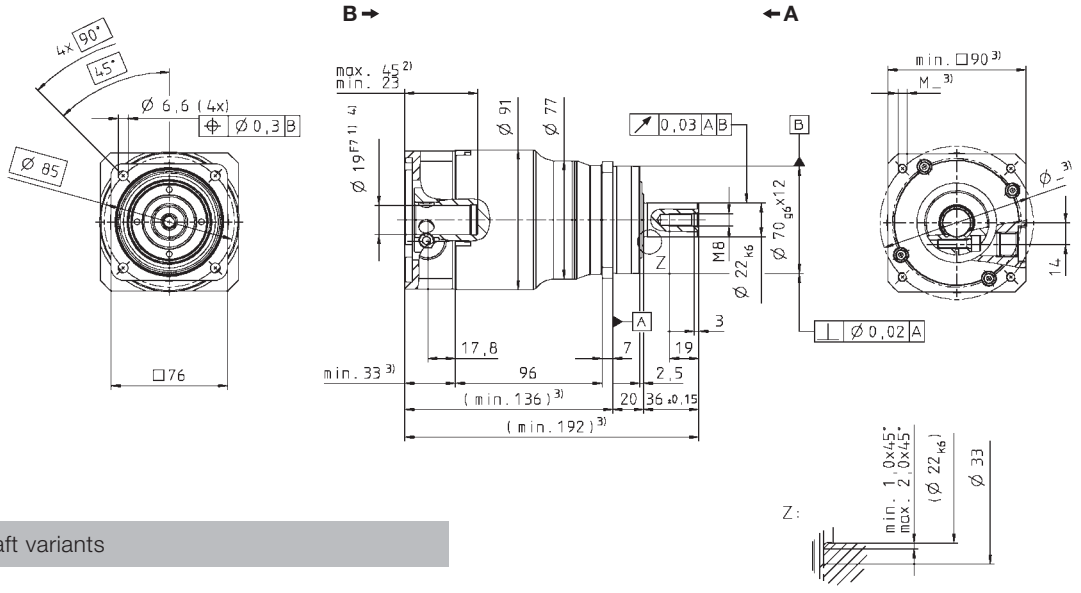
up to 11 [4] (B) clamping hub diameter



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

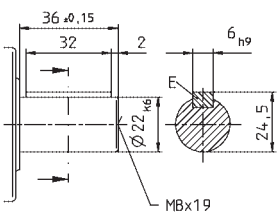


up to 19 [4] (E) clamping hub diameter

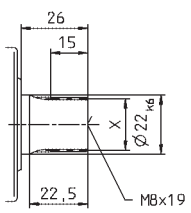


Alternatives: Output shaft variants

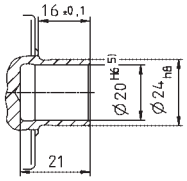
Keywayed output shaft in mm
E = key as per DIN 6885, sheet 1, form A



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



Shaft mounted
Mounted via HSD shrink disc



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) Tolerance h6 for mounted shaft.

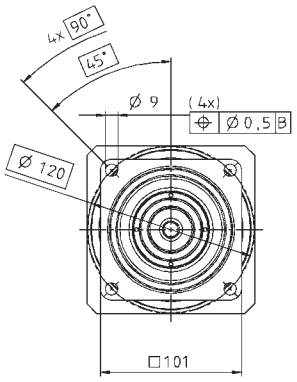
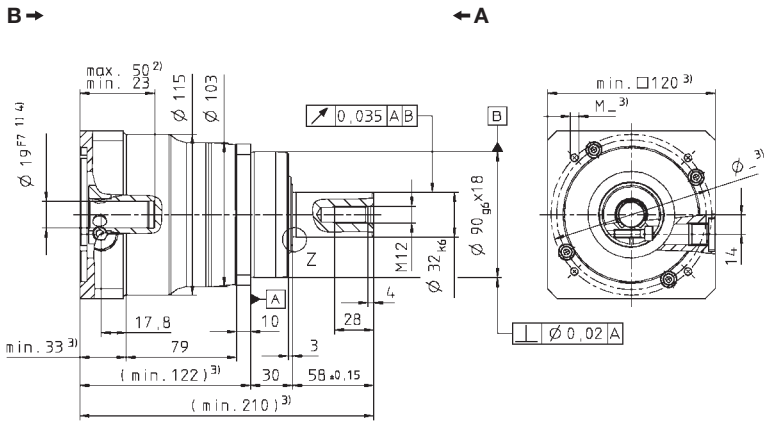
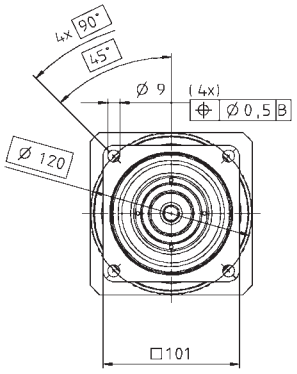
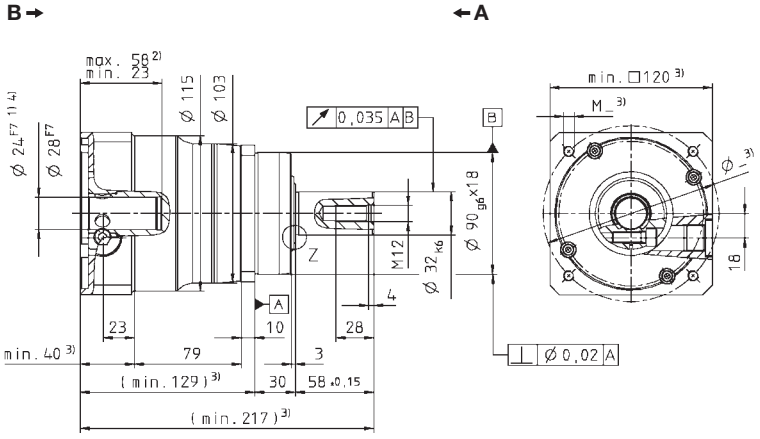
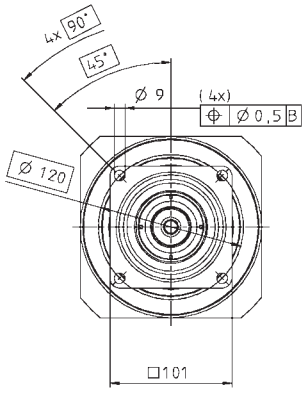
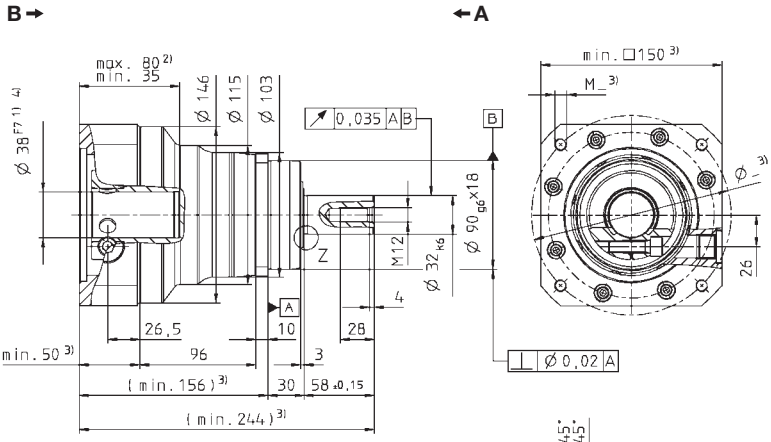
⚠ Motor mounting according to operating manual

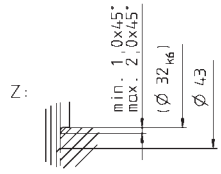
					1-stage				
Ratio [a]			***i***		**3**	**4**	**5**	**7**	**10**
cymex®-optimized acceleration torque (please contact us regarding the design)			T_{2Bcym}	Nm	–	370	400	330	260
				in.lb	–	3275	3540	2921	2301
Max. acceleration torque (max. 1000 cycles per hour)			T_{2B}	Nm	235	315	315	315	235
				in.lb	2080	2788	2788	2788	2080
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	6600				
				lb_f	1485				
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 *i*=10 and n_1 = 3000 rpm no load)			L_{PA}	dB(A)	≤ 64				
Max. permitted housing temperature				°C	+90				
				F	17.0				
Ambient temperature				°C	-15 to +40				
				F	5 to 104				
Lubrication					Lubricated for life				
Paint					Blue RAL 5002				
Direction of rotation					Motor and gearhead same direction				
Protection class					IP 65				
Moment of inertia (relates to the drive)	E	19	J_1	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	3.59	2.65	2.22	1.90	1.68
				10^{-3} in.lb.s²	3.18	2.35	1.97	1.68	1.49
	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

Reduced mass moments of inertia available on request.

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

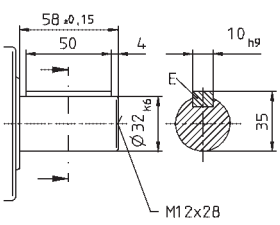
Motor shaft diameter [mm]

	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		

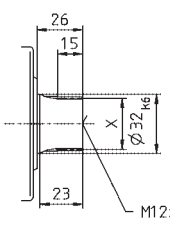


Alternatives: Output shaft variants

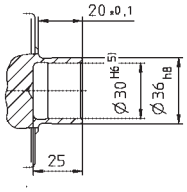
Keywayed output shaft in mm
E = key as per DIN 6885, sheet 1, form A



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



Shaft mounted
Mounted via HSD shrink disc



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) Tolerance h6 for mounted shaft.

⚠ Motor mounting according to operating manual

SP+ 100 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	370	370	400	370	400	370	400	330	260
				in.lb	3275	3275	3540	3275	3540	3275	3540	2921	2301
Max. acceleration torque (max. 1000 cycles per hour)			T_{2B}	Nm	315	315	315	315	315	315	315	315	235
				in.lb	2788	2788	2788	2788	2788	2788	2788	2788	2080
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	13.3	10.6	9.7	8.8	7.1	6.2	5.3	4.4	4.4
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	6600								
				lb_f	1485								
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 *i*=100 and n_1 = 3000 rpm no load)			L_{PA}	dB(A)	≤ 60								
Max. permitted housing temperature				°C	+90								
				F	194								
Ambient temperature				°C	-15 to +40								
				F	5 to 104								
Lubrication					Lubricated for life								
Paint					Blue RAL 5002								
Direction of rotation					Motor and gearhead same direction								
Protection class					IP 65								
Moment of inertia (relates to the drive)	C	14	J_1	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

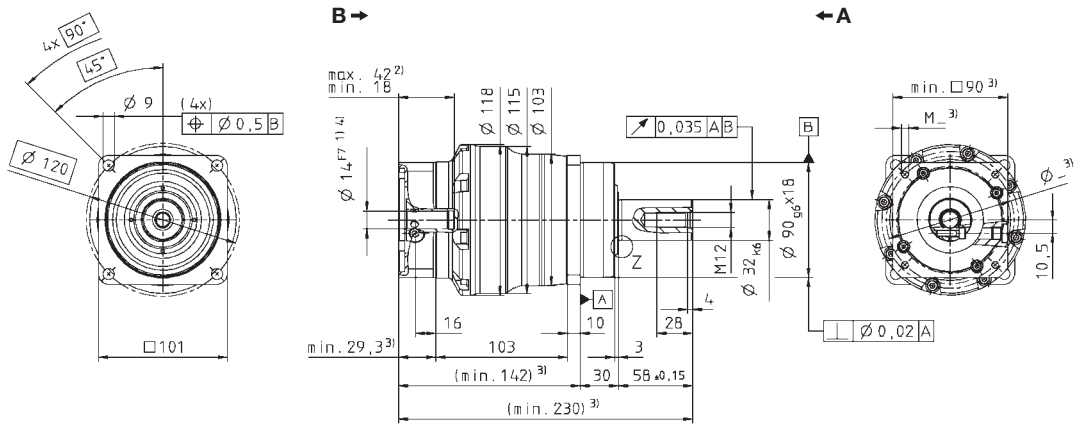
Reduced mass moments of inertia available on request.

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

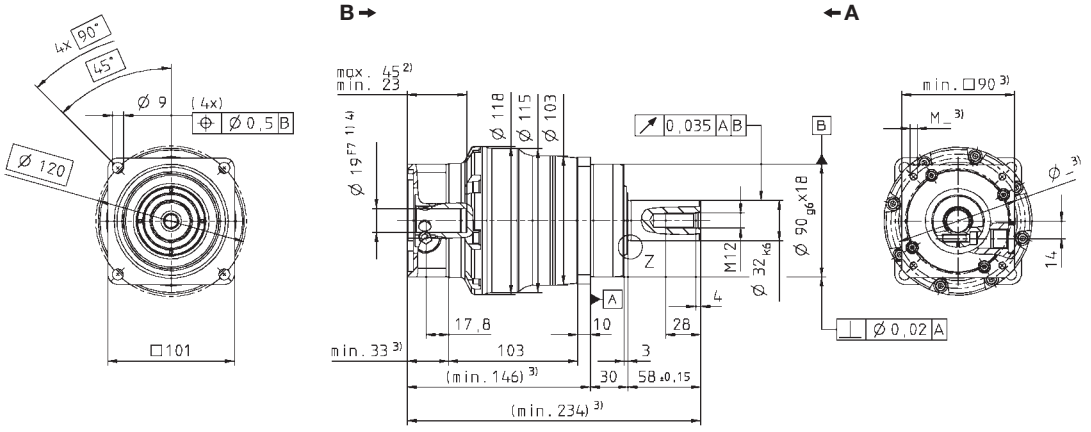
View A | View B

Motor shaft diameter [mm]

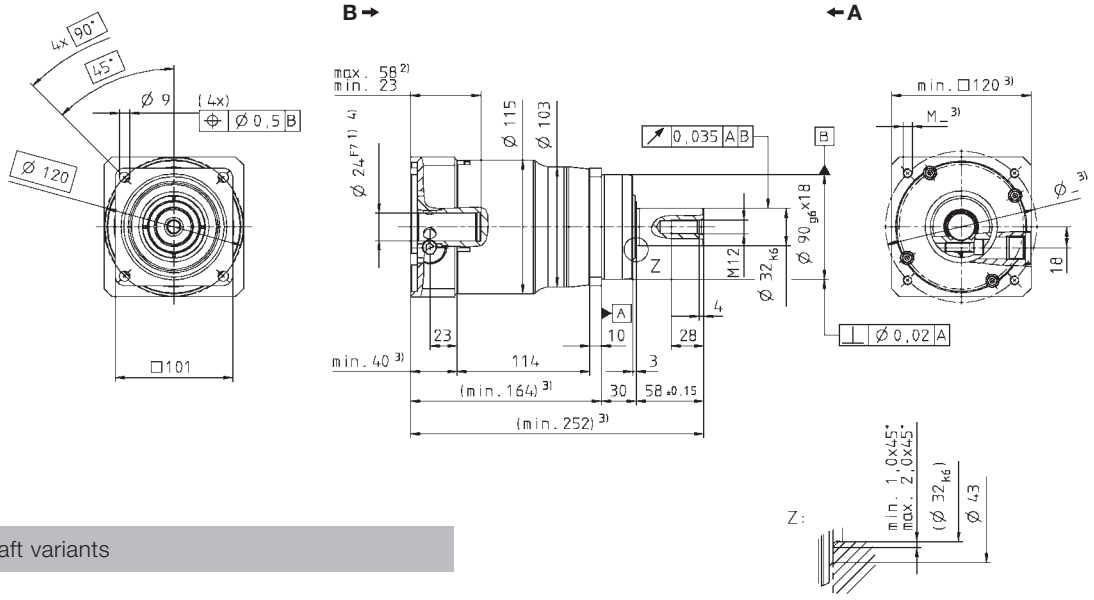
up to 14 [4] (C) clamping hub diameter



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

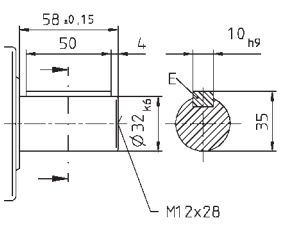


up to 24 [4] (G) clamping hub diameter

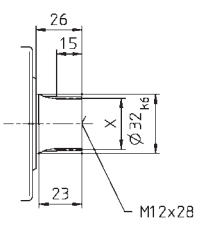


Alternatives: Output shaft variants

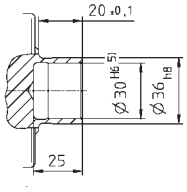
Keywayed output shaft in mm
E = key as per DIN 6885, sheet 1, form A



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



Shaft mounted
Mounted via HSD shrink disc



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) Tolerance h6 for mounted shaft.

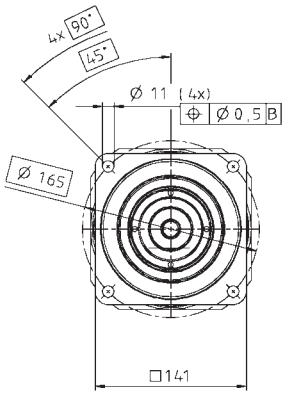
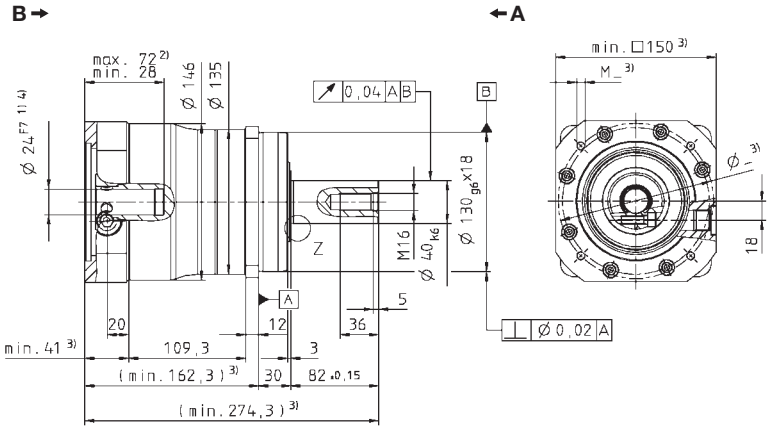
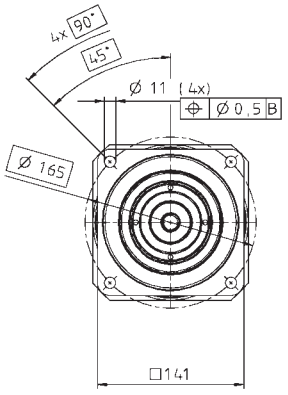
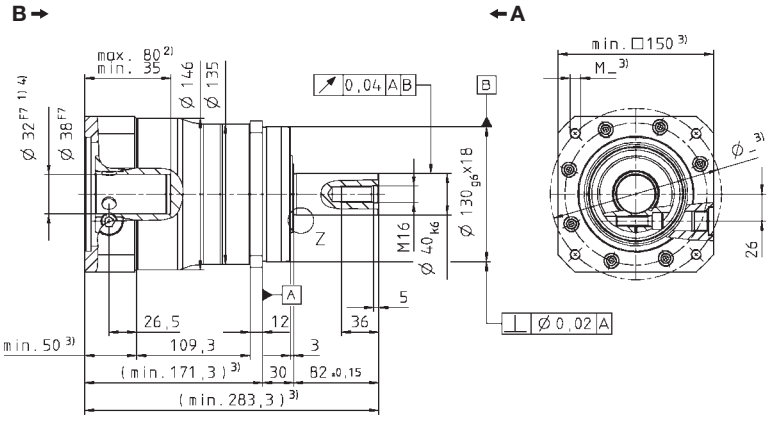
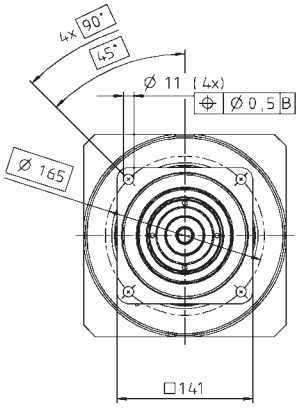
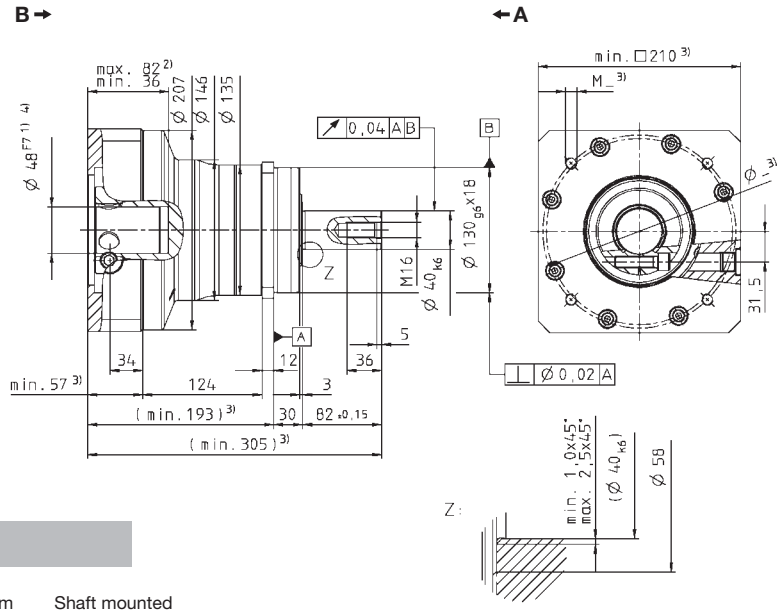
⚠ Motor mounting according to operating manual

					1-stage				
Ratio [a]			***i***		**3**	**4**	**5**	**7**	**10**
cymex®-optimized acceleration torque (please contact us regarding the design)			T_{2Bcym}	Nm	–	710	755	680	560
				in.lb	–	6284	6682	6018	4956
Max. acceleration torque (max. 1000 cycles per hour)			T_{2B}	Nm	390	660	660	660	530
				in.lb	3451.5	5841	5841	5841	4691
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	9900				
				lb_f	2228				
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 *i*=10 and n_1 = 3000 rpm no load)			L_{PA}	dB(A)	≤ 65				
Max. permitted housing temperature				°C	+90				
				F	194				
Ambient temperature				°C	-15 to +40				
				F	5 to 104				
Lubrication					Lubricated for life				
Paint					Blue RAL 5002				
Direction of rotation					Motor and gearhead same direction				
Protection class					IP 65				
Moment of inertia (relates to the drive)	G	24	J_1	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

Reduced mass moments of inertia available on request.

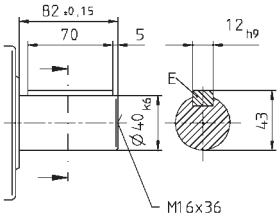
[a] Other ratios available on request
[b] For higher ambient temperatures, please reduce input speed
[c] Valid for clamping hub diameter of 38 mm
[d] Refers to center of the output shaft or flange

Motor shaft diameter [mm]

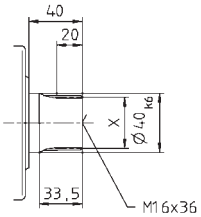
	View A	View B
up to 24 [4] (G) clamping hub diameter		
up to 32/38 [4] (I/K) clamping hub diameter		
up to 48 [4] (M) clamping hub diameter		

Alternatives: Output shaft variants

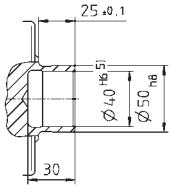
Keywayed output shaft in mm
E = key as per DIN 6885, sheet 1, form A



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



Shaft mounted
Mounted via HSD shrink disc



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) Tolerance h6 for mounted shaft.

⚠ 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	710	710	755	710	755	710	755	680	560
				in.lb	6284	6284	6682	6284	6682	6284	6682	6018	4956
Max. acceleration torque (max. 1000 cycles per hour)			T_{2B}	Nm	660	660	660	660	660	660	660	660	530
				in.lb	5841	5841	5841	5841	5841	5841	5841	5841	4691
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	29.2	23.9	21.2	16.9	15.9	12.4	11.5	10.6	9.7
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	9900								
				lb_f	2228								
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 i=100 and n_1 = 3000 rpm no load)			L_{PA}	dB(A)	≤ 63								
Max. permitted housing temperature				°C	+90								
				F	194								
Ambient temperature				°C	-15 to +40								
				F	5 to 104								
Lubrication					Lubricated for life								
Paint					Blue RAL 5002								
Direction of rotation					Motor and gearhead same direction								
Protection class					IP 65								
Moment of inertia (relates to the drive)	E	19	J_1	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

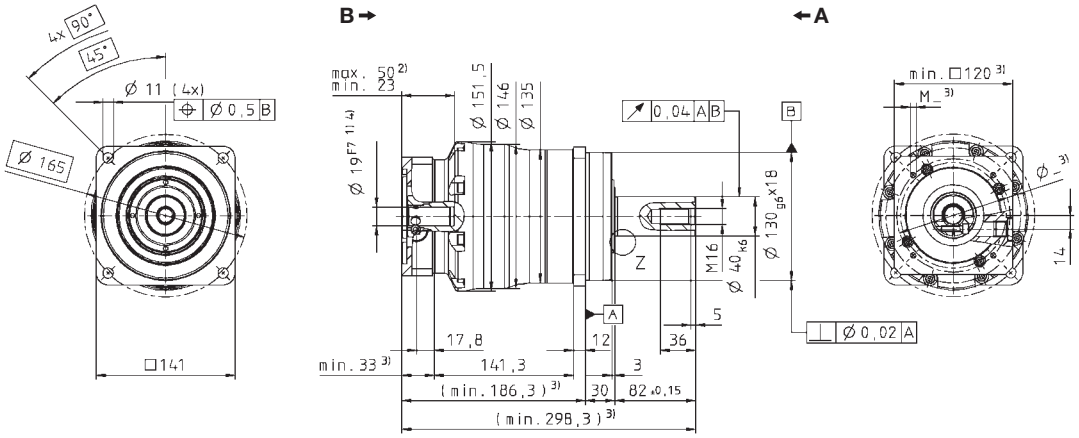
Reduced mass moments of inertia available on request.

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

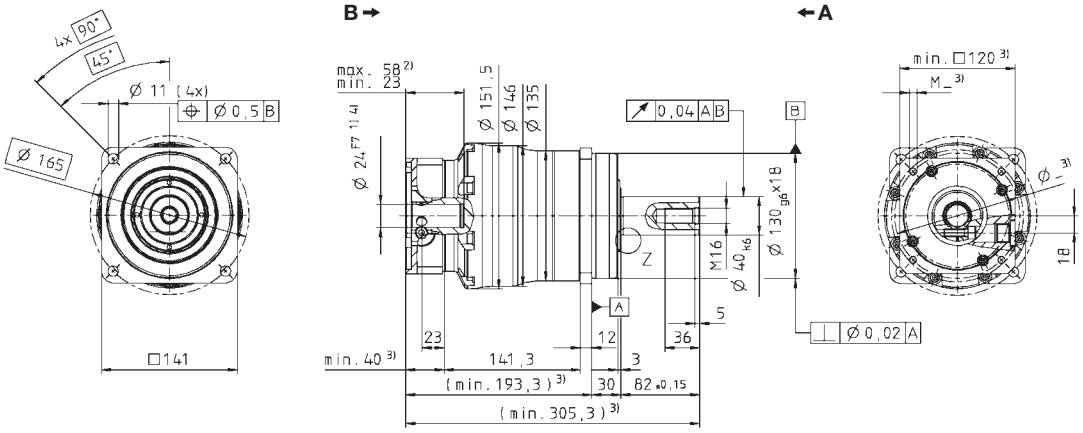
View A | View B

Motor shaft diameter [mm]

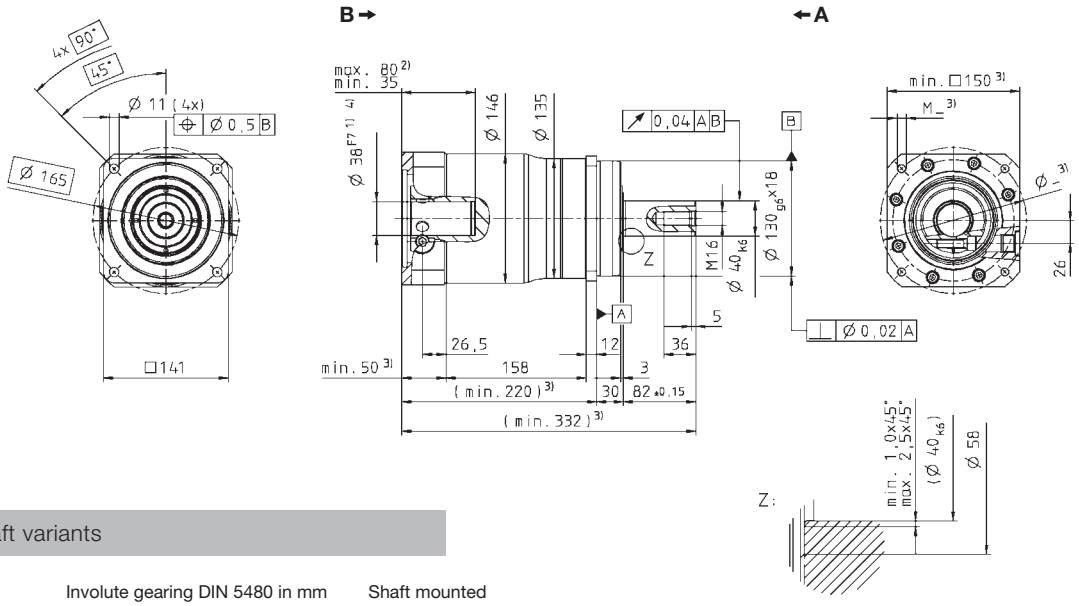
up to 19 [4] (E) clamping hub diameter



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

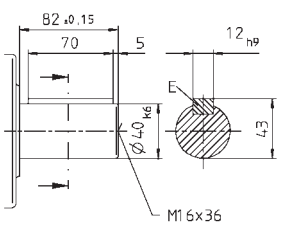


up to 38 [4] (K) clamping hub diameter

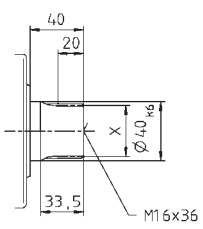


Alternatives: Output shaft variants

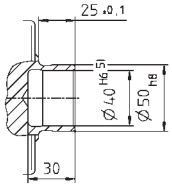
Keywayed output shaft in mm
E = key as per DIN 6885, sheet 1, form A



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



Shaft mounted
Mounted via HSD shrink disc



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) Tolerance h6 for mounted shaft.

⚠ 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	–	1785	1890	1785	1400
			in.lb	–	15797	16727	15797	12390
Max. acceleration torque (max. 1000 cycles per hour)			T_{2B} Nm	970	1210	1210	1210	970
			in.lb	8585	10709	10709	10709	8585
Nominal output torque (with n_{1N})			T_{2N} Nm	530	750	750	750	750
			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
			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
			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				
			in.lb/ arcmin	1549				
Max. axial force [d]			F_{2AMax} N	14150				
			lb_f	3184				
Max. radial force [d]			F_{2RMax} N	15400				
			lb_f	3465				
Max. tilting moment			M_{2KMax} Nm	1600				
			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				
			lb_m	75.1				
Operating noise (with *i*=10 and n_1 = 3000 rpm no load)			L_{PA} dB(A)	≤ 66				
Max. permitted housing temperature			°C	+90				
			F	194				
Ambient temperature			°C	-15 to +40				
			F	5 to 104				
Lubrication				Lubricated for life				
Paint				Blue RAL 5002				
Direction of rotation				Motor and gearhead same direction				
Protection class				IP 65				
Moment of inertia (relates to the drive)	K	38	J_1 kgcm²	50.8	33.9	27.9	22.2	19.2
			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
			10^{-3} in.lb.s²	51.5	36.5	31.2	26.2	23.5

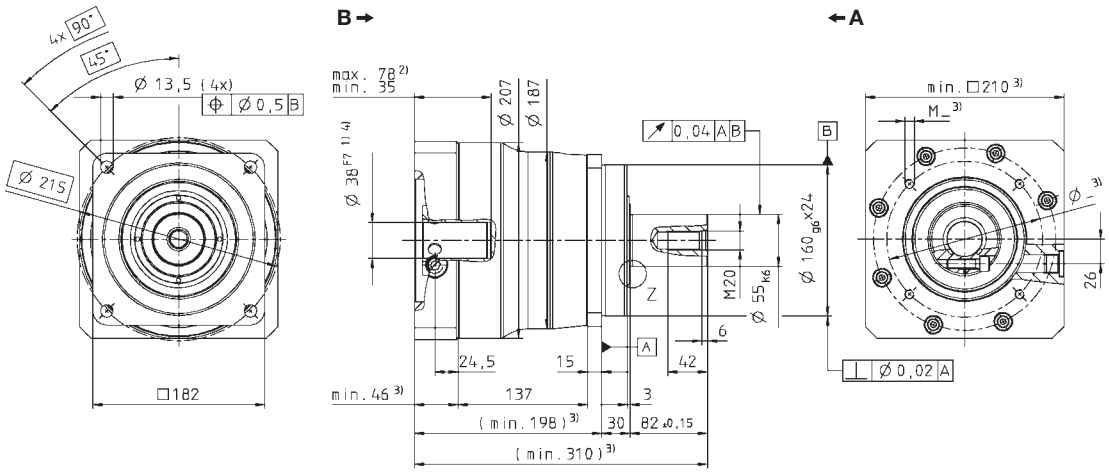
Reduced mass moments of inertia available on request.

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

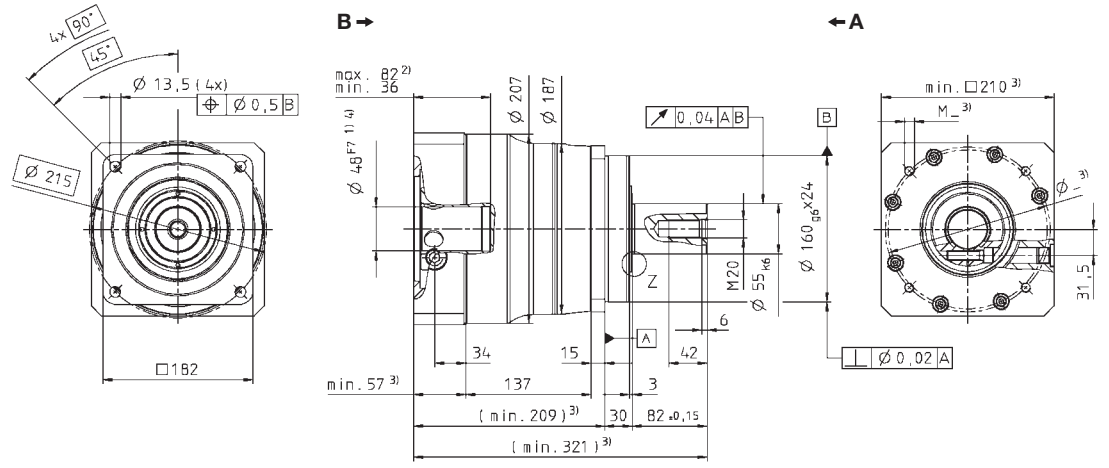
View A | View B

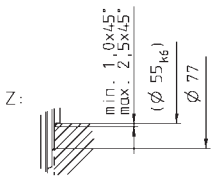
Motor shaft diameter [mm]

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



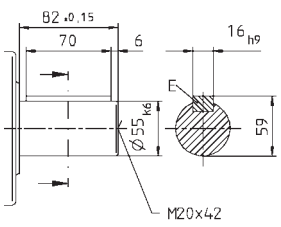
up to 48 [4] (M) clamping hub diameter



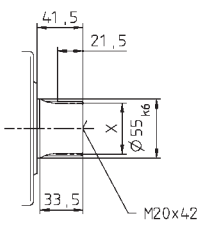


Alternatives: Output shaft variants

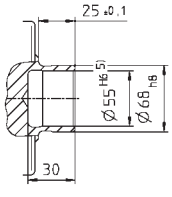
Keywayed output shaft in mm
E = key as per DIN 6885, sheet 1, form A



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



Shaft mounted
Mounted via HSD shrink disc



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) Tolerance h6 for mounted shaft.

⚠ Motor mounting according to operating manual

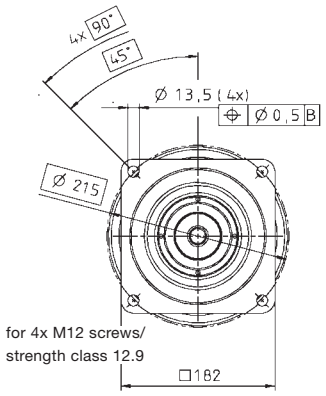
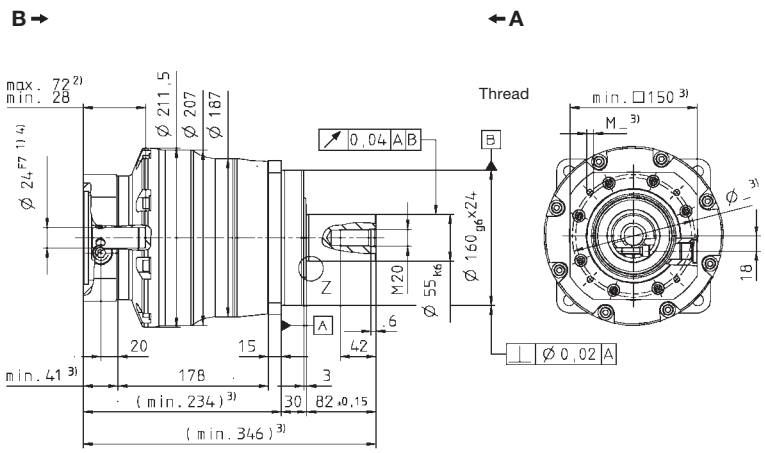
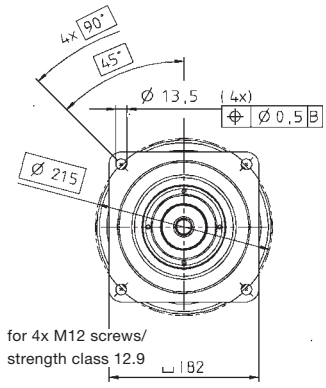
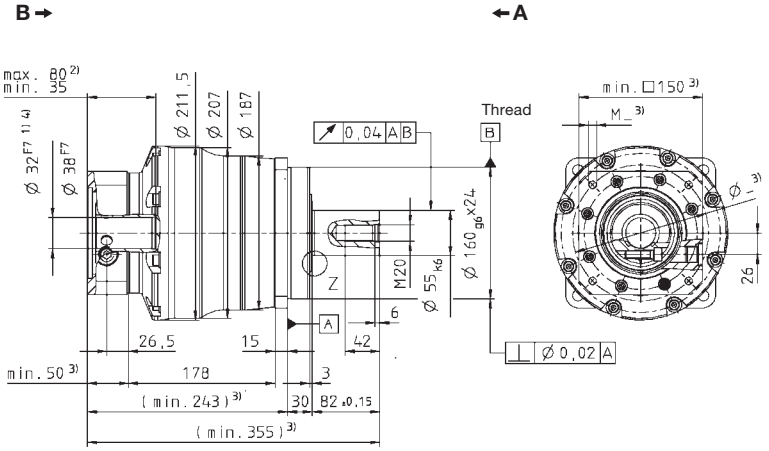
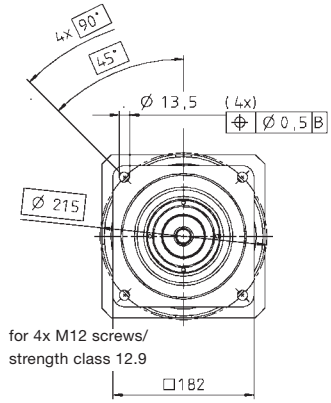
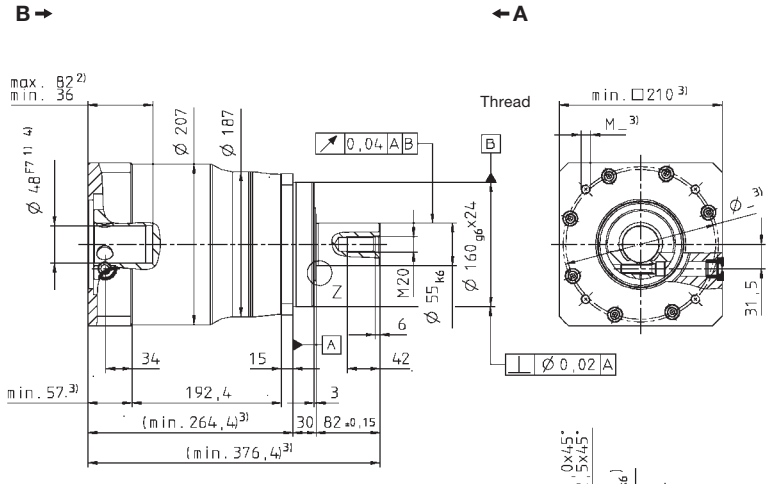
SP+ 180 MF 2-stage

					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	1785	1785	1890	1785	1890	1785	1800	1785	1400
				in.lb	15797	15797	16727	15797	16727	15797	15930	15797	12390
Max. acceleration torque (max. 1000 cycles per hour)			T_{2B}	Nm	1210	1210	1210	1210	1210	1210	1210	1210	970
				in.lb	10709	10709	10709	10709	10709	10709	10709	10709	8585
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	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	46,9	38,1	34,5	27,4	24,8	20,4	18,6	16,8	15,0
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	15400								
				lb_f	3465								
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 i=100 and n_1 = 3000 rpm no load)			L_{PA}	dB(A)	≤ 66								
Max. permitted housing temperature				°C	+90								
				F	194								
Ambient temperature				°C	-15 to +40								
				F	5 to 104								
Lubrication					Lubricated for life								
Paint					Blue RAL 5002								
Direction of rotation					Motor and gearhead same direction								
Protection class					IP 65								
Moment of inertia (relates to the drive)	G	24	J_1	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

Reduced mass moments of inertia available on request.

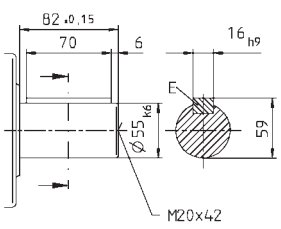
[a] Other ratios available on request
[b] For higher ambient temperatures, please reduce input speed
[c] Valid for clamping hub diameter of 38 mm
[d] Refers to center of the output shaft or flange

Motor shaft diameter [mm]

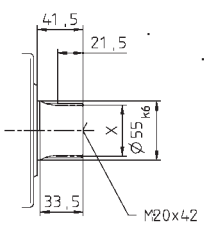
	View A	View B
up to 24 [4] (G) clamping hub diameter		
up to 32/38 [4] (I/K) clamping hub diameter		
up to 48 [4] (M) clamping hub diameter		

Alternatives: Output shaft variants

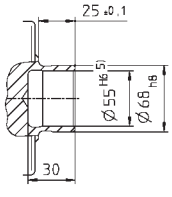
Keywayed output shaft in mm
E = key as per DIN 6885, sheet 1, form A



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



Shaft mounted
Mounted via HSD shrink disc



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.
5) Tolerance h6 for mounted shaft.

⚠ 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	32	22	17	11	7,0	7,0	6,0	5,5	4,5	4,0	3,5	3,5	3,5	3,0
				in.lb	283	195	151	97	62	62	53	49	40	35	31	31	31	27
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 *i*=10 and n_1 = 3000 rpm no load)			L_{PA}	dB(A)	≤ 64													
Max. permitted housing temperature				°C	+90													
				F	194													
Ambient temperature				°C	-15 to +40													
				F	5 to 104													
Lubrication					Lubricated for life													
Paint					Blue RAL 5002													
Direction of rotation					Motor and gearhead same direction													
Protection class					IP 65													
Moment of inertia (relates to the drive)	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									

Reduced mass moments of inertia available on request.

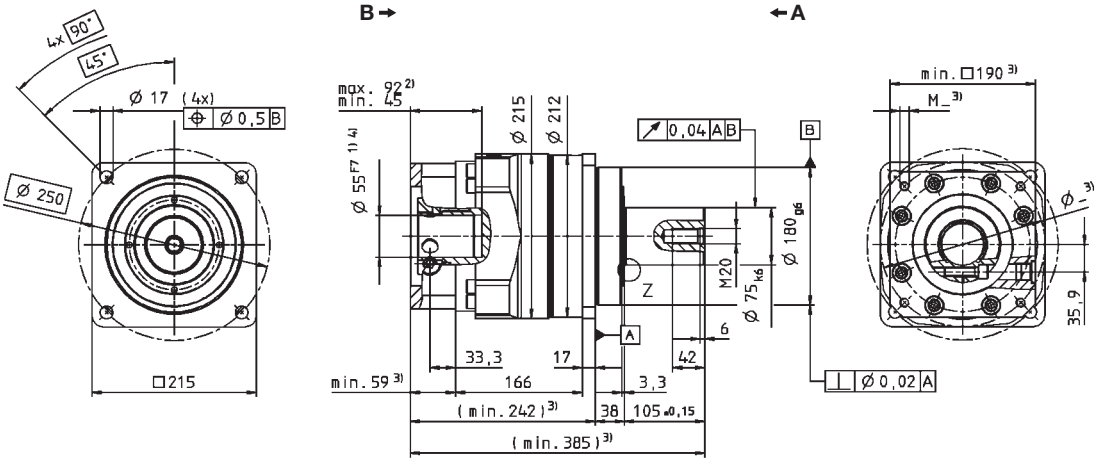
[a] Other ratios available on request
[b] For higher ambient temperatures, please reduce input speed
[c] Refers to center of the output shaft or flange

View A | View B

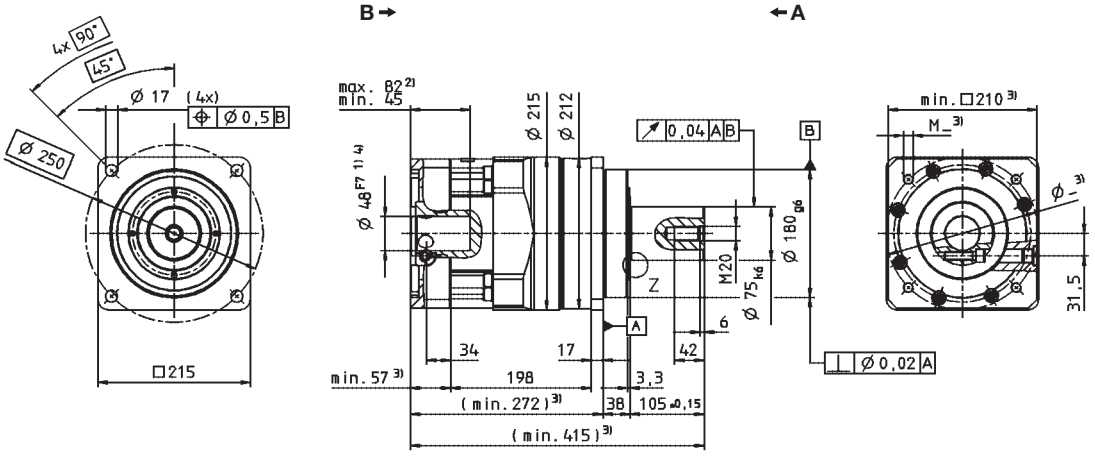
Motor shaft diameter [mm]

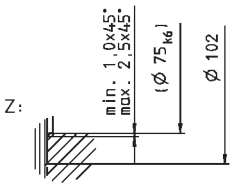
up to 55 [4] (N) clamping hub diameter

1-stage:



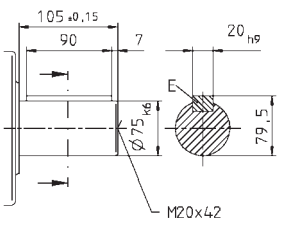
2-stage:



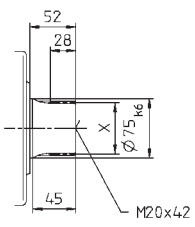


Alternatives: Output shaft variants

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	45	35	26	16	11	11	9,0	8,0	7,0	6,0	5,0	4,5	4,0	4,0
				in.lb	398	310	230	142	97	97	80	71	62	53	44	40	35	35
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 *i*=10 and n_1 = 3000 rpm no load)			L_{PA}	dB(A)	≤ 66													
Max. permitted housing temperature				°C	+90													
				F	194													
Ambient temperature				°C	-15 to +40													
				F	5 to 104													
Lubrication					Lubricated for life													
Paint					Blue RAL 5002													
Direction of rotation					Motor and gearhead same direction													
Protection class					IP 65													
Moment of inertia (relates to the drive)	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									

Reduced mass moments of inertia available on request.

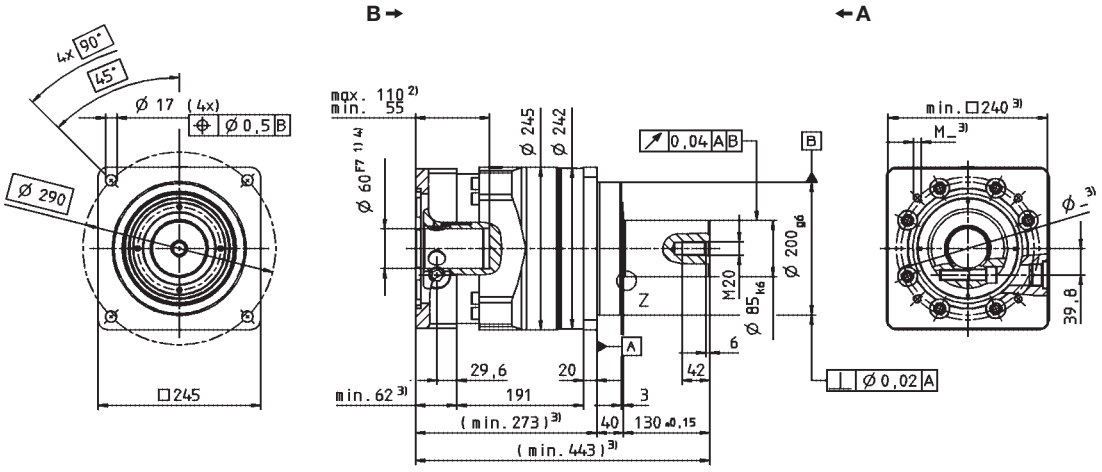
[a] Other ratios available on request
[b] For higher ambient temperatures, please reduce input speed
[c] Refers to center of the output shaft or flange

View A | View B

Motor shaft diameter [mm]

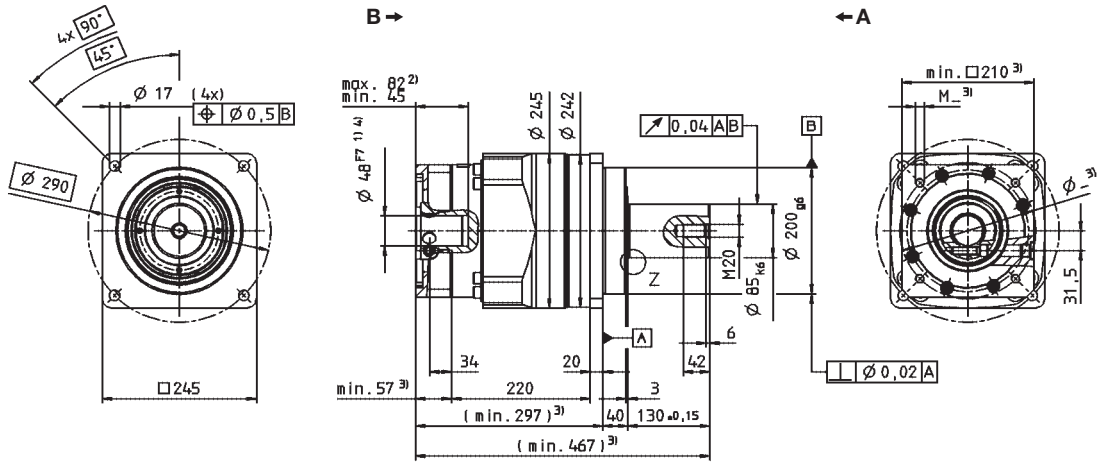
up to 60 [4] (O) clamping hub diameter

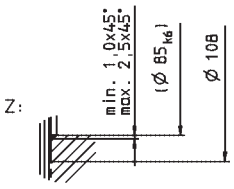
1-stage:



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

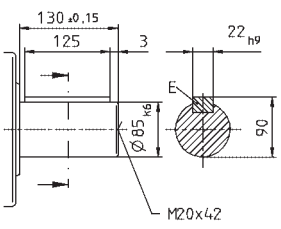
2-stage:



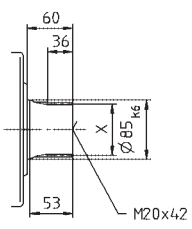


Alternatives: Output shaft variants

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+ MC version HIGH SPEED®

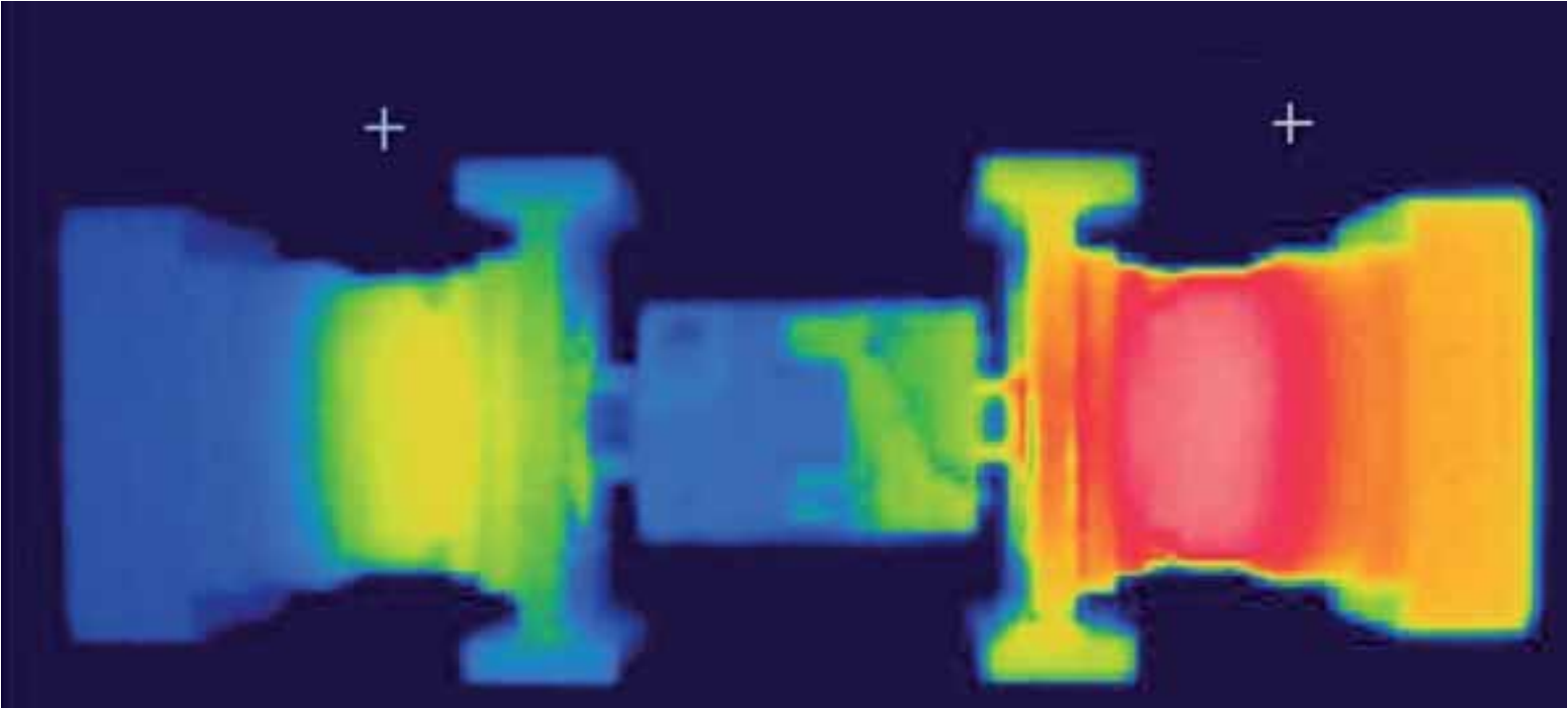
Energy savings for your drive

MC version HIGH SPEED®
Preferred use:
- Long duty cycles (>60%)
- High nominal speeds
- Temperature-sensitive applications
- Drive trains with high control quality

Friction optimized MC version (L)
Preferred use:
- Long duty cycles (>60%)
- Very high nominal speeds
- Highly temperature-sensitive applications
- Drive trains with high control quality
- Very low no-load running torque

SP+

Specifications \ Version	**SP+ MC** HIGH SPEED®		
	+	**++**	**+++**
Positioning accuracy			
Rigidity			
Smooth-running			
Speed capacity			
Power density			
Max. axial/radial forces			



SP+ MC version HIGH SPEED®
The energy saver from WITTENSTEIN alpha

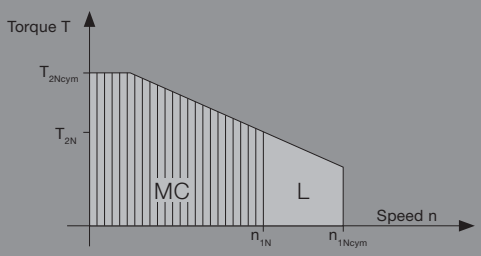
Industrial standard

Compared with conventional planetary gearheads, the SP+ HIGH SPEED® represents a significant development in efficiency. This can be illustrated directly using thermal imaging. Left: the alpha energy saver; right: a conventional industrial standard gearhead. You can see how the gearhead on the right becomes hot (due to radiated heat loss), while the SP+ HIGH SPEED® remains cool. In absolute values, this means: approx. 40 degrees Celsius (104 degrees Fahrenheit) on the left, approx. 80 degrees Celsius (176 degrees Fahrenheit) on the right.

Options

Food-grade grease
Version with optimized mass moment of inertia
L version (high nominal speed, friction optimized)

Performance data description, MC/L version



Accessories

Rack / Pinion (see page 262)
Shrink disc (see page 294)
Couplings (see page 294)
Sensor flange

					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	4200				
				lb_f	945				
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 i=10 and n_1=3000 rpm no load)			L_{PA}	dB(A)	≤ 59				
Max. permitted housing temperature				°C	+90				
				F	194				
Ambient temperature				°C	-15 to +40				
				F	5 to 104				
Lubrication					Lubricated for life				
Paint					Blue RAL 5002				
Direction of rotation					Motor and gearhead same direction				
Protection class					IP 65				
Moment of inertia (relates to the drive)	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
Clamping hub diameter [mm]	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

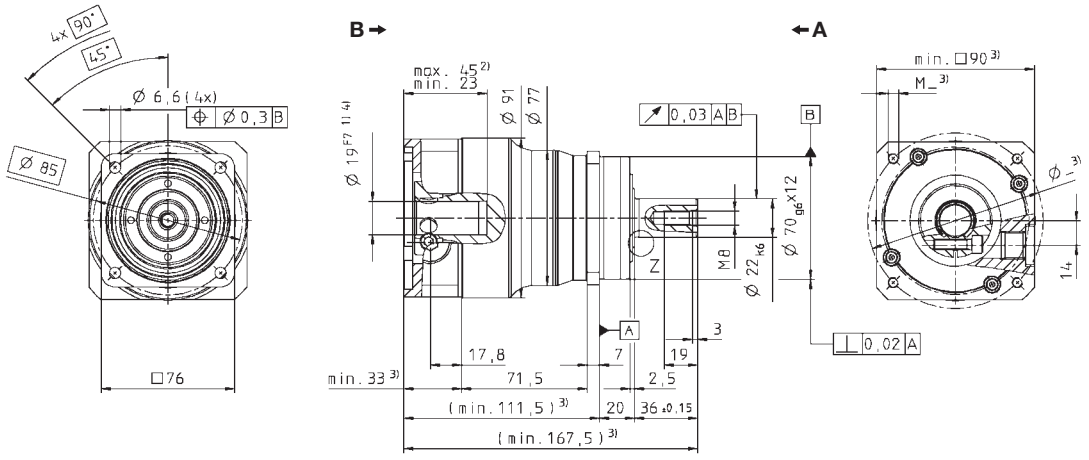
Reduced mass moments of inertia available on request.

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

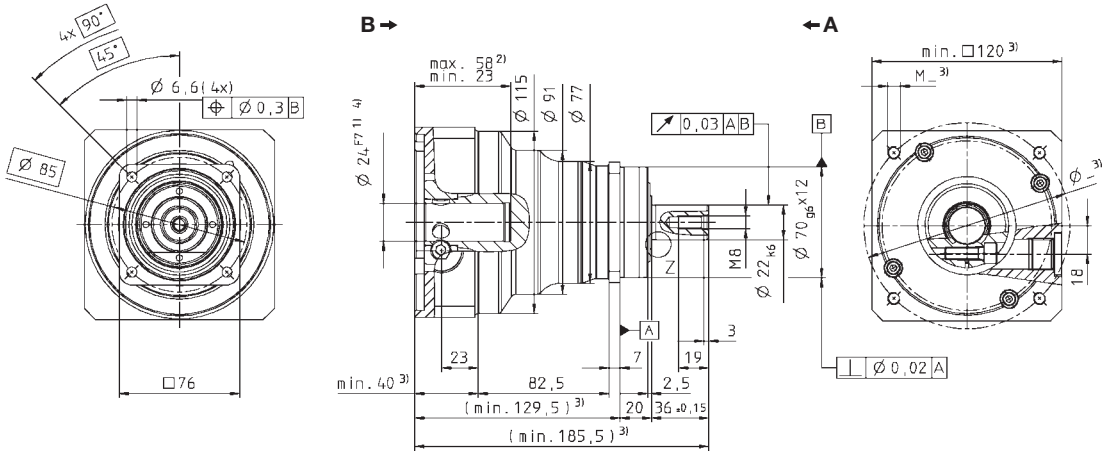
View A | View B

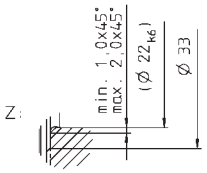
Motor shaft diameter [mm]

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



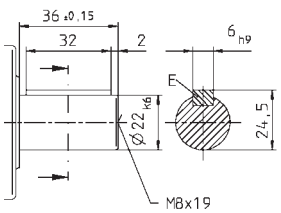
up to 24 [4] (G) clamping hub diameter



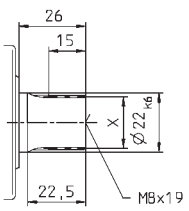


Alternatives: Output shaft variants

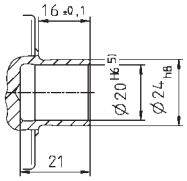
Keywayed output shaft in mm
E = key as per DIN 6885, sheet 1, form A



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



Shaft mounted
Mounted via HSD shrink disc



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) Tolerance h6 for mounted shaft.

⚠ 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	90	90	90	90	90	90	90	90	70
			T_{2B} 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
			T_{2Ncym} in.lb						531			310
Nominal output torque (with n_{1N})			T_{2N} Nm	60	60	60	60	60	55	60	60	30
			T_{2N} 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
			T_{2Not} 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
			T_{012} 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								
			C_{t21} in.lb/ arcmin	89								
Max. axial force [d]			F_{2AMax} N	3350								
			F_{2AMax} lb_f	754								
Max. radial force [d]			F_{2RMax} N	4200								
			F_{2RMax} lb_f	945								
Max. tilting moment			M_{2KMax} Nm	236								
			M_{2KMax} 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								
			m lb_m	8.0								
Operating noise (with *i*=100 and n_1 = 3000 rpm no load)			L_{PA} dB(A)	≤ 59								
Max. permitted housing temperature			°C	+90								
			F	194								
Ambient temperature			°C	-15 to +40								
			F	5 to 104								
Lubrication				Lubricated for life								
Paint				Blue RAL 5002								
Direction of rotation				Motor and gearhead same direction								
Protection class				IP 65								
Moment of inertia (relates to the drive)	C	14	J_1 kgcm²	0.23	0.20	0.20	0.18	0.18	0.16	0.16	0.16	0.16
			J_1 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
			J_1 10^{-3} in.lb.s²	0.49	0.47	0.46	0.45	0.44	0.43	0.43	0.43	0.43

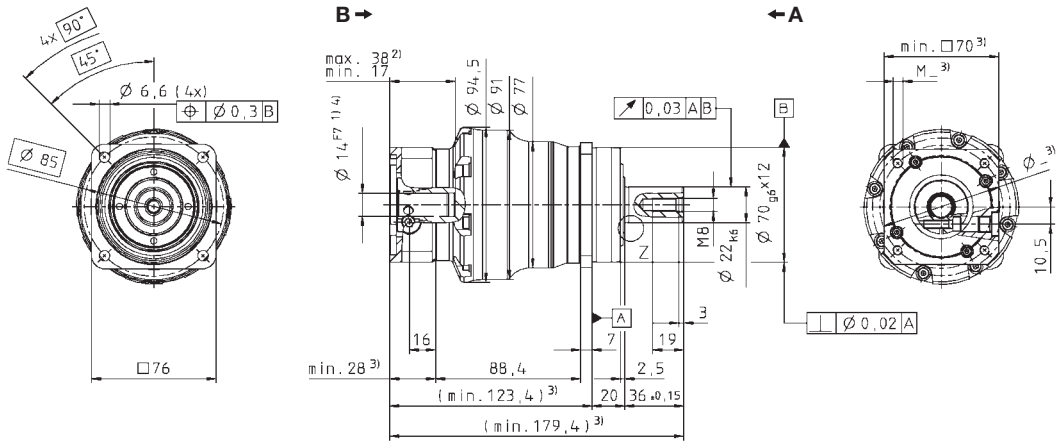
Reduced mass moments of inertia available on request.

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

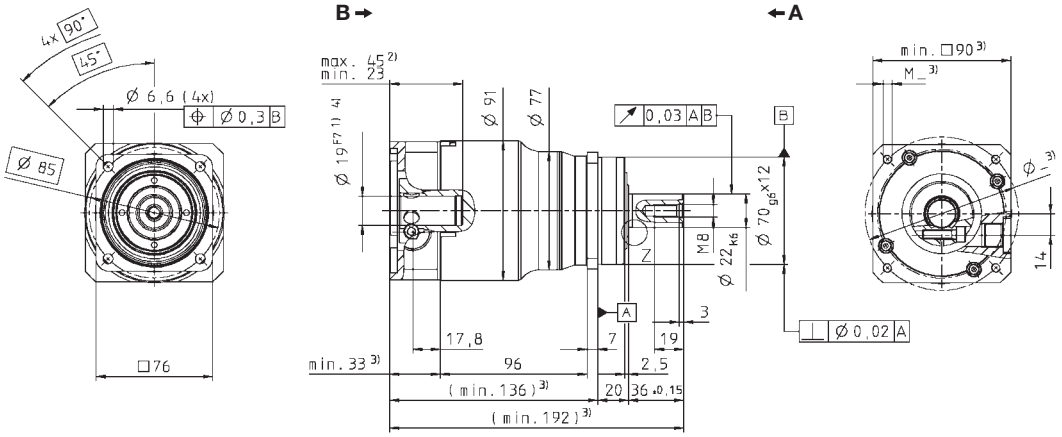
View A | View B

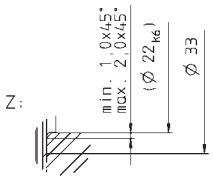
Motor shaft diameter [mm]

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



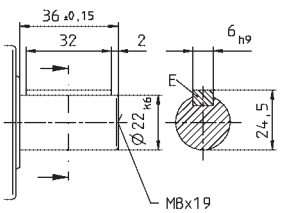
up to 19 [4] (E) clamping hub diameter



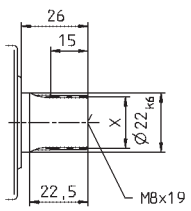


Alternatives: Output shaft variants

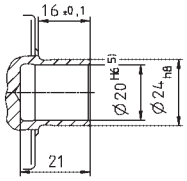
Keywayed output shaft in mm
E = key as per DIN 6885, sheet 1, form A



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



Shaft mounted
Mounted via HSD shrink disc



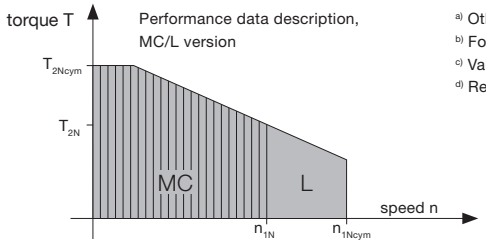
Non-tolerated dimensions ± 1 mm

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) Tolerance h6 for mounted shaft.

⚠ Motor mounting according to operating manual

				Standard version MC					Friction optimized version L				
Ratio [a]			***i***	**3**	**4**	**5**	**7**	**10**	**3**	**4**	**5**	**7**	**10**
Max. acceleration torque (max. 1000 cycles per hour)			T_{2B} Nm	180	240	240	240	180	180	240	240	240	180
			T_{2B} in.lb	1593	2124	2124	2124	1593	1593	2124	2124	2124	1593
cymex®-optimal nominal torque (please contact us regarding the design)			T_{2Ncym} Nm	95	135	135	135	90	95	135	135	135	90
			T_{2Ncym} in.lb	841	1195	1195	1195	797	841	1195	1195	1195	797
Nominal output torque (with n_{1N})			T_{2N} Nm	70	100	105	105	80	70	100	105	105	80
			T_{2N} in.lb	620	885	929	929	708	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	500	625	625	625	500
			T_{2Not} in.lb	4425	5531	5531	5531	4425	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	3500	4000	4500	4500	4500
cymex® optimized speed (please contact us regarding the design)			n_{1Ncym} rpm	–	–	–	–	–	4500	5000	5000	5000	5000
Max. input speed			n_{1Max} rpm	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	2.4	2.1	1.8	1.1	0.8	0.7	–	–	–	–
			T_{012} in.lb	21.2	18.6	15.9	9.74	7.08	6.2	–	–	–	–
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	6600					1000				
			F_{2RMax} lb_f	1485					225				
Max. tilting moment			M_{2KMax} Nm	487					72				
			M_{2KMax} in.lb	4310									
Efficiency at full load			η %	98.5					99				
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 i=10 and n_1=3000 rpm no load)			L_{PA} dB(A)	≤ 64									
Max. permitted housing temperature			°C	+90									
			F	194									
Ambient temperature			°C	-15 to +40									
			F	5 to 104									
Lubrication				Lubricated for life									
Paint				Blue RAL 5002									
Direction of rotation				Motor and gearhead same direction									
Protection class				IP 65					IP 52				
Moment of inertia (relates to the drive)	G	24	J_1 kgcm²	3.99	3.04	2.61	2.29	2.07	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	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	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	9.78	8.95	8.57	8.28	8.09

Reduced mass moments of inertia available on request.



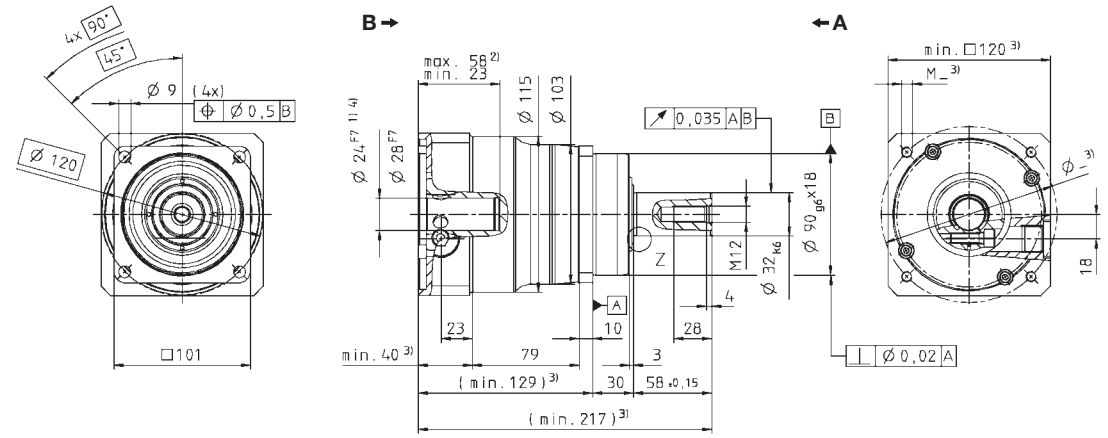
[a] Other ratios available on request
[b] For higher ambient temperatures, please reduce input speed
[c] Valid for clamping hub diameter of 24 mm
[d] Refers to centre of the output shaft or flange

View A

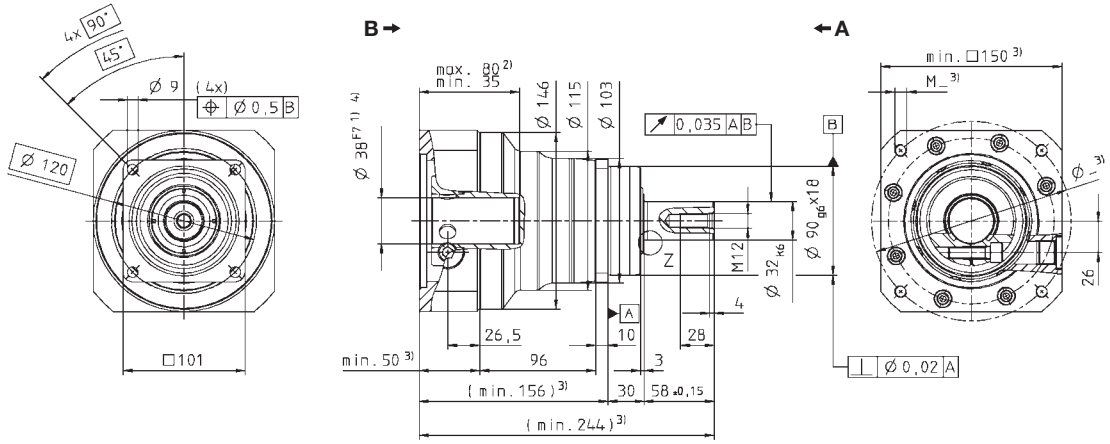
View B

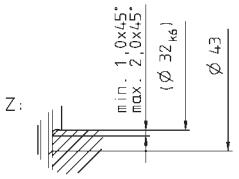
Motor shaft diameter [mm]

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



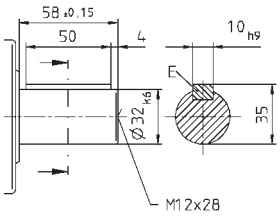
up to 38 [4] (K) clamping hub diameter



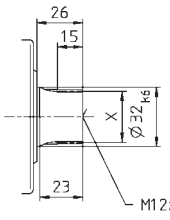


Alternatives: Output shaft variants

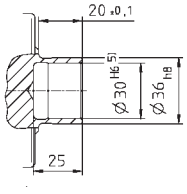
Keywayed output shaft in mm
E = key as per DIN 6885, sheet 1, form A



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



Shaft mounted
Mounted via HSD shrink disc



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) Tolerance h6 for mounted shaft.

⚠ 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	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	6600								
			F_{2RMax} lb_f	1485								
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 *i*=100 and n_1 = 3000 rpm no load)			L_{PA} dB(A)	≤ 60								
Max. permitted housing temperature			°C	+90								
			F	194								
Ambient temperature			°C	-15 to +40								
			F	5 to 104								
Lubrication				Lubricated for life								
Paint				Blue RAL 5002								
Direction of rotation				Motor and gearhead same direction								
Protection class				IP 65								
Moment of inertia (relates to the drive)	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

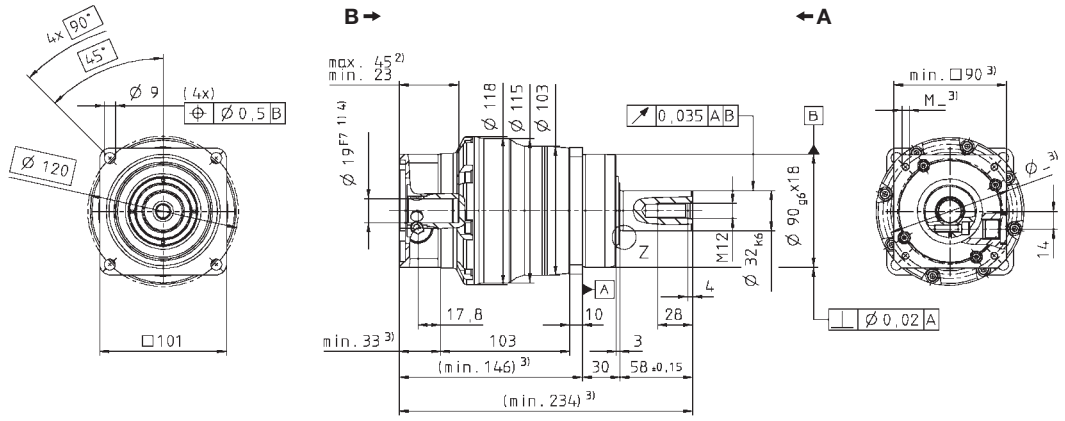
Reduced mass moments of inertia available on request.

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

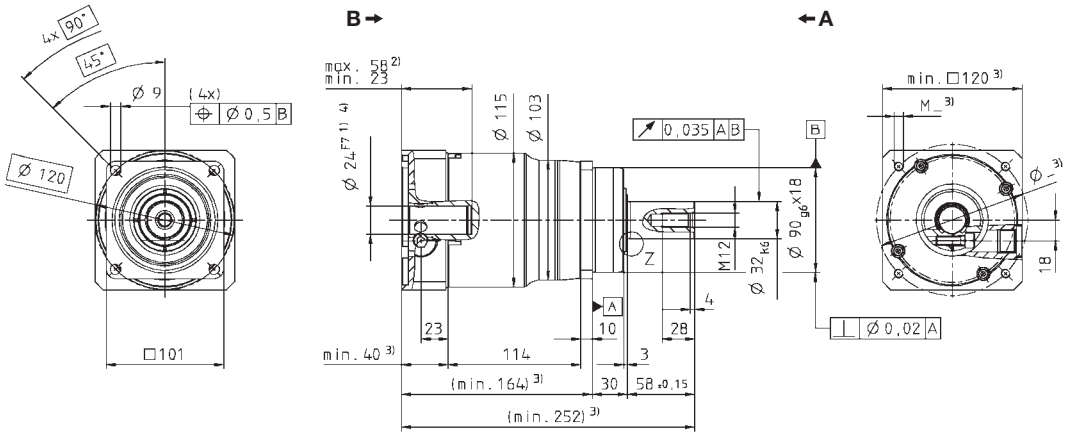
View A | View B

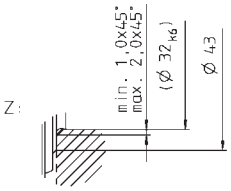
Motor shaft diameter [mm]

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



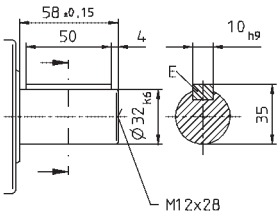
up to 24 [4] (G) clamping hub diameter



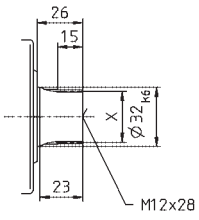


Alternatives: Output shaft variants

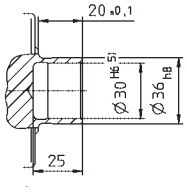
Keywayed output shaft in mm
E = key as per DIN 6885, sheet 1, form A



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



Shaft mounted
Mounted via HSD shrink disc



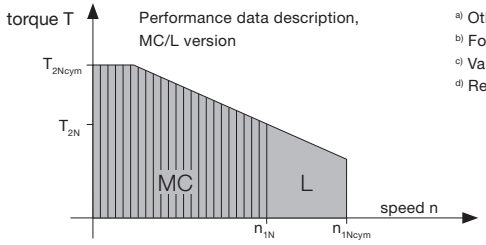
Non-tolerated dimensions ± 1 mm

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) Tolerance h6 for mounted shaft.

⚠ Motor mounting according to operating manual

			Standard version MC					Friction optimized version L				
Ratio [a]	i		**3**	**4**	**5**	**7**	**10**	**3**	**4**	**5**	**7**	**10**
Max. acceleration torque (max. 1000 cycles per hour)	T_{2B}	Nm	310	480	480	480	380	310	480	480	480	380
		in.lb	2744	4248	4248	4248	3363	2744	4248	4248	4248	3363
cymex®-optimal nominal torque (please contact us regarding the design)	T_{2Ncym}	Nm	150	240	240	270	180	150	240	240	270	180
		in.lb	1328	2124	2124	2390	1593	2744	4248	4248	4248	3363
Nominal output torque (with n_{1N})	T_{2N}	Nm	130	195	205	210	160	130	195	205	210	160
		in.lb	1151	1726	1814	1859	1416	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	1000	1250	1250	1250	1000
		in.lb	8850	11063	11063	11063	8850	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	3000	3500	4500	4500	4500
cymex® optimized speed (please contact us regarding the design)	n_{1Ncym}	rpm	–	–	–	–	–	4000	4500	5000	5000	5000
Max. input speed	n_{1Max}	rpm	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	5.1	3.9	3.1	2.3	1.6	1.0	–	–	–	–
		in.lb	45.1	34.5	27.4	20.4	14.2	8.9	–	–	–	–
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	9900					1200				
		lb_f	2228					270				
Max. tilting moment	M_{2KMax}	Nm	952					110				
		in.lb	8425									
Efficiency at full load	η	%	98.5					110				
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 i=10 and n_1=3000 rpm no load)	L_{PA}	dB(A)	≤ 65									
Max. permitted housing temperature		°C	+90									
		F	194									
Ambient temperature		°C	-15 to +40									
		F	5 to 104									
Lubrication			Lubricated for life									
Paint			Blue RAL 5002									
Direction of rotation			Motor and gearhead same direction									
Protection class			IP 65					IP 52				
Moment of inertia (relates to the drive) K 38	J_1	kgcm²	14.9	12.1	11.0	10.1	9.51	14.9	12.1	11.0	10.1	9.51
		10^{-3} in.lb.s²	13.2	10.7	9.8	8.9	8.4	13.2	10.7	9.8	8.9	8.4
Clamping hub diameter [mm] M 48	J_1	kgcm²	29.5	26.7	25.6	24.7	24.2	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	26.1	23.6	22.7	21.9	21.4

Reduced mass moments of inertia available on request.

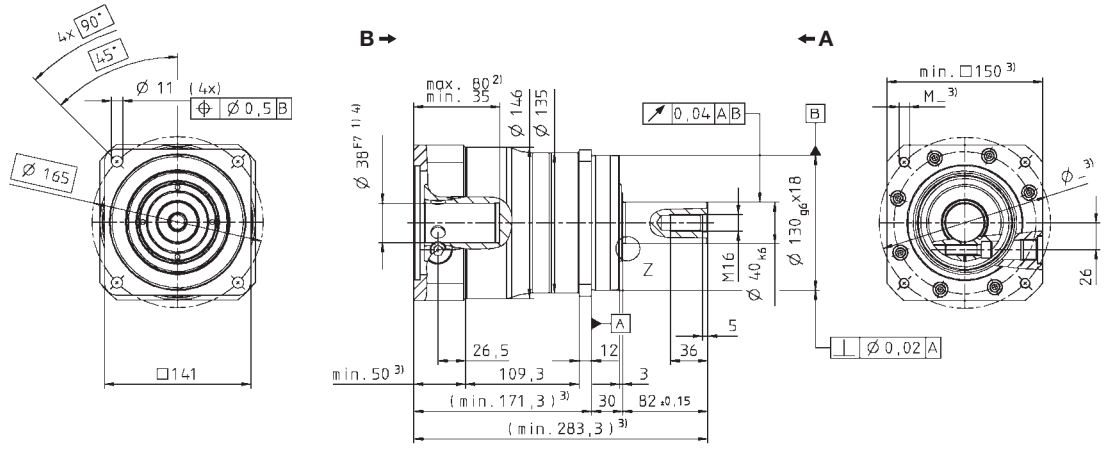


[a] Other ratios available on request
[b] For higher ambient temperatures, please reduce input speed
[c] Valid for clamping hub diameter of 38 mm
[d] Refers to center of the output shaft or flange

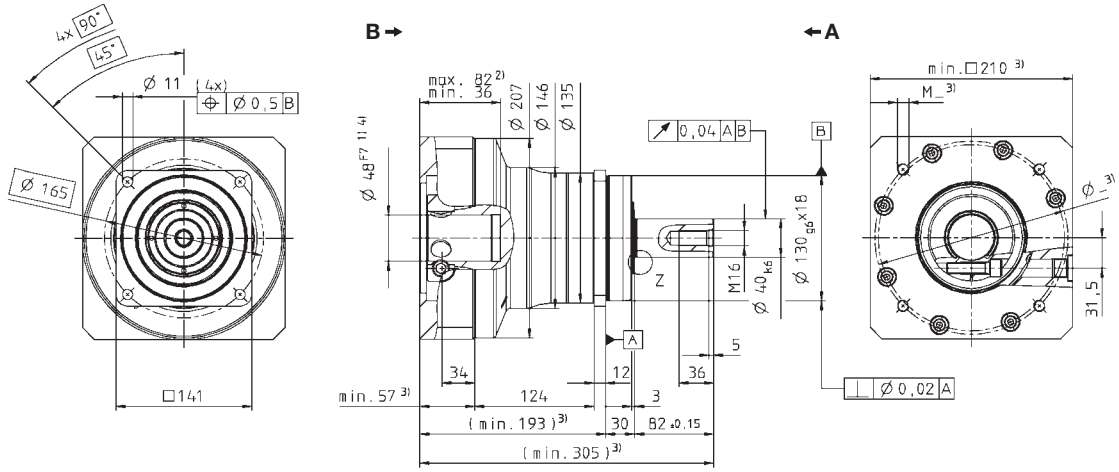
View A | View B

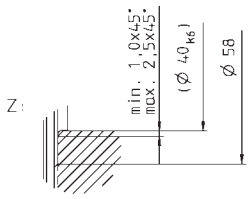
Motor shaft diameter [mm]

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



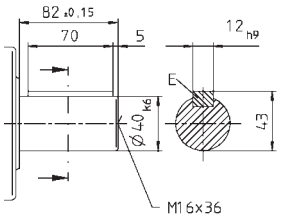
up to 48 [4] (M) clamping hub diameter



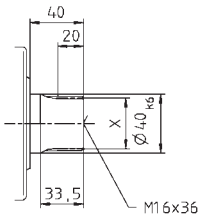


Alternatives: Output shaft variants

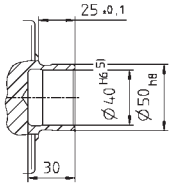
Keywayed output shaft in mm
E = key as per DIN 6885, sheet 1, form A



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



Shaft mounted
Mounted via HSD shrink disc



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) Tolerance h6 for mounted shaft.

⚠ 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
			T_{2B} 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	–	–	–	–	–	–
			T_{2Ncym} in.lb	2567	2567	2567						
Nominal output torque (with n_{1N})			T_{2N} Nm	260	280	280	290	290	290	290	260	180
			T_{2N} 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
			T_{2Not} 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
			T_{012} 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								
			C_{t21} in.lb/ arcmin	469								
Max. axial force [d]			F_{2AMax} N	9870								
			F_{2AMax} lb_f	2221								
Max. radial force [d]			F_{2RMax} N	9900								
			F_{2RMax} lb_f	2228								
Max. tilting moment			M_{2KMax} Nm	952								
			M_{2KMax} 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								
			m lb_m	38								
Operating noise (with *i*=100 and n_1 = 3000 rpm no load)			L_{PA} dB(A)	≤ 63								
Max. permitted housing temperature			°C	+90								
			F	194								
Ambient temperature			°C	-15 to +40								
			F	5 to 104								
Lubrication				Lubricated for life								
Paint				Blue RAL 5002								
Direction of rotation				Motor and gearhead same direction								
Protection class				IP 65								
Moment of inertia (relates to the drive)	G	24	J_1 kgcm²	3.19	2.71	2.67	2.34	2.32	2.10	2.08	2.08	2.07
			J_1 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
			J_1 10^{-3} in.lb.s²	9.07	8.65	8.61	8.33	8.31	8.11	8.10	8.09	8.09

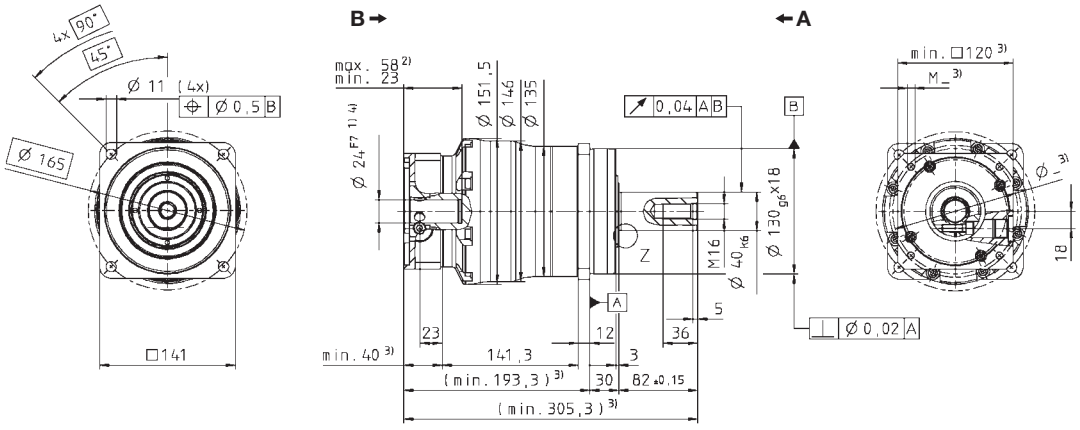
Reduced mass moments of inertia available on request.

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

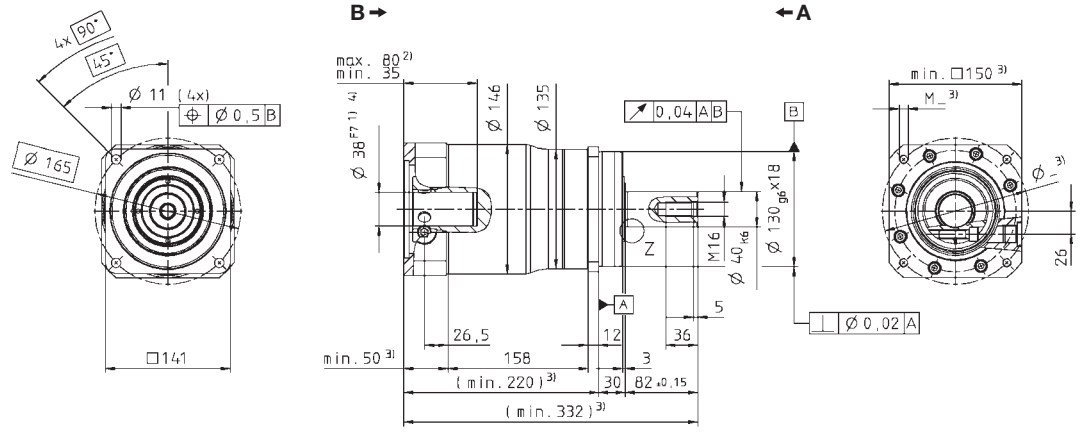
View A | View B

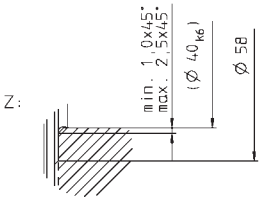
Motor shaft diameter [mm]

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



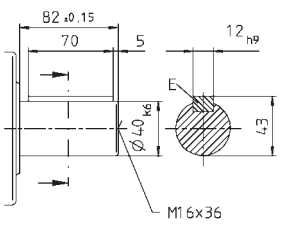
up to 38 [4] (K) clamping hub diameter



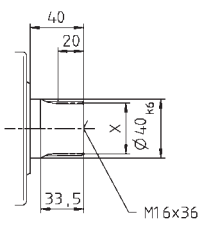


Alternatives: Output shaft variants

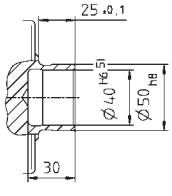
Keywayed output shaft in mm
E = key as per DIN 6885, sheet 1, form A



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



Shaft mounted
Mounted via HSD shrink disc



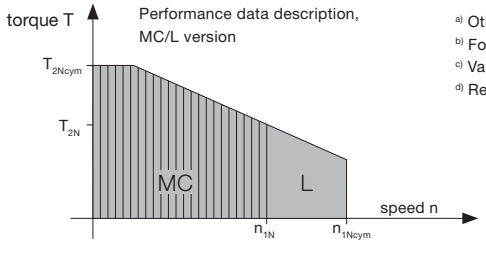
Non-tolerated dimensions ± 1 mm

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) Tolerance h6 for mounted shaft.

⚠ Motor mounting according to operating manual

			Standard version MC					Friction optimized version L				
Ratio [a]	i		**3**	**4**	**5**	**7**	**10**	**3**	**4**	**5**	**7**	**10**
Max. acceleration torque (max. 1000 cycles per hour)	T_{2B}	Nm	700	880	880	880	700	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	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	290	450	450	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	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	3000	3500	4500	4500	4500
cymex® optimized speed (please contact us regarding the design)	n_{1Ncym}	rpm	–	–	–	–	–	4000	4500	5000	5000	5000
Max. input speed	n_{1Max}	rpm	4500	6000	6000	6000	6000	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	3.0	–	–	–	–
		in.lb	90.3	68.1	54.9	39.8	28.3	26.6	–	–	–	–
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	15400					2000				
		lb_f	3465					450				
Max. tilting moment	M_{2KMax}	Nm	1600					208				
		in.lb	14160									
Efficiency at full load	η	%	98.5					99				
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 i=10 and n_1=3000 rpm no load)	L_{PA}	dB(A)	≤ 66									
Max. permitted housing temperature		°C	+90									
		F	194									
Ambient temperature		°C	-15 to +40									
		F	5 to 104									
Lubrication			Lubricated for life									
Paint			Blue RAL 5002									
Direction of rotation			Motor and gearhead same direction									
Protection class			IP 65					IP 52				
Moment of inertia (relates to the drive) **M** **48**	J_1	kgcm²	58.5	41.6	35.6	30.0	26.9	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	51.8	36.8	31.5	26.6	23.8

Reduced mass moments of inertia available on request.

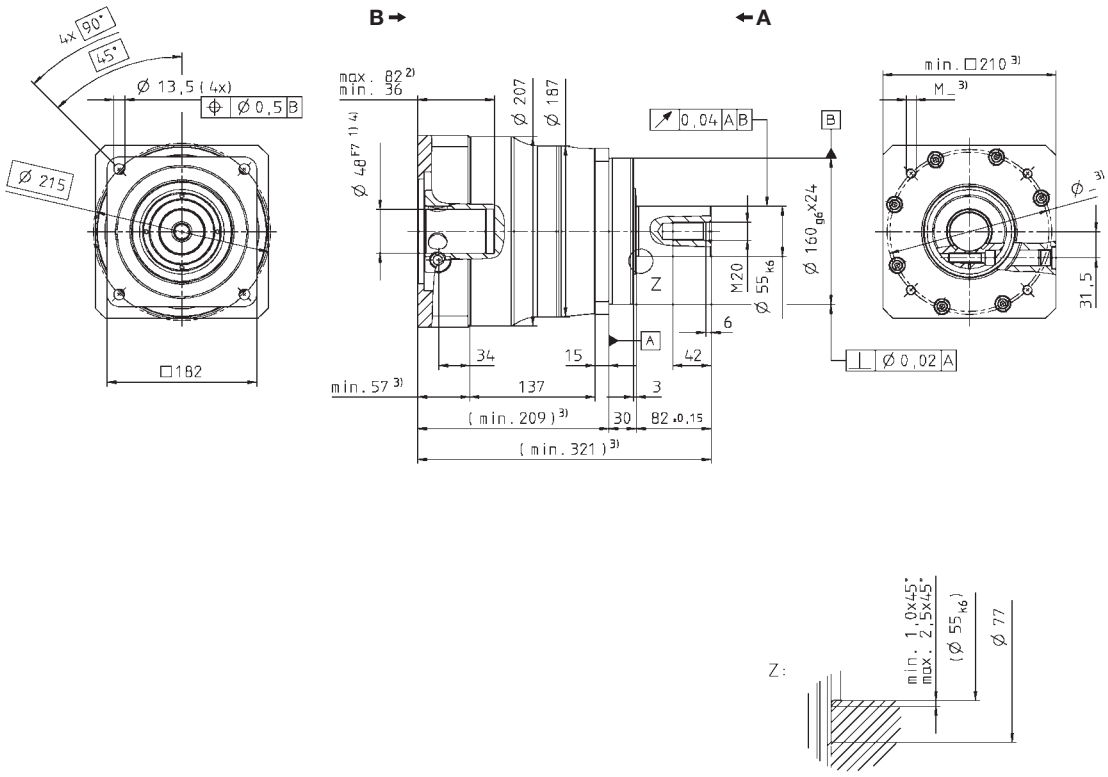


[a] Other ratios available on request
[b] For higher ambient temperatures, please reduce input speed
[c] Valid for clamping hub diameter of 48 mm
[d] Refers to center of the output shaft or flange

View A View B

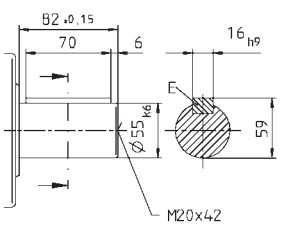
Motor shaft diameter [mm]

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

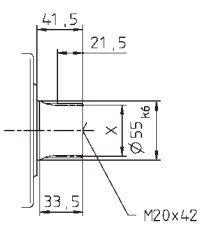


Alternatives: Output shaft variants

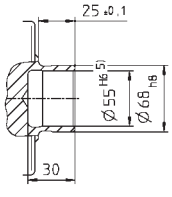
Keywayed output shaft in mm
E = key as per DIN 6885, sheet 1, form A



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



Shaft mounted
Mounted via HSD shrink disc



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) Tolerance h6 for mounted shaft.

⚠ Motor mounting according to operating manual

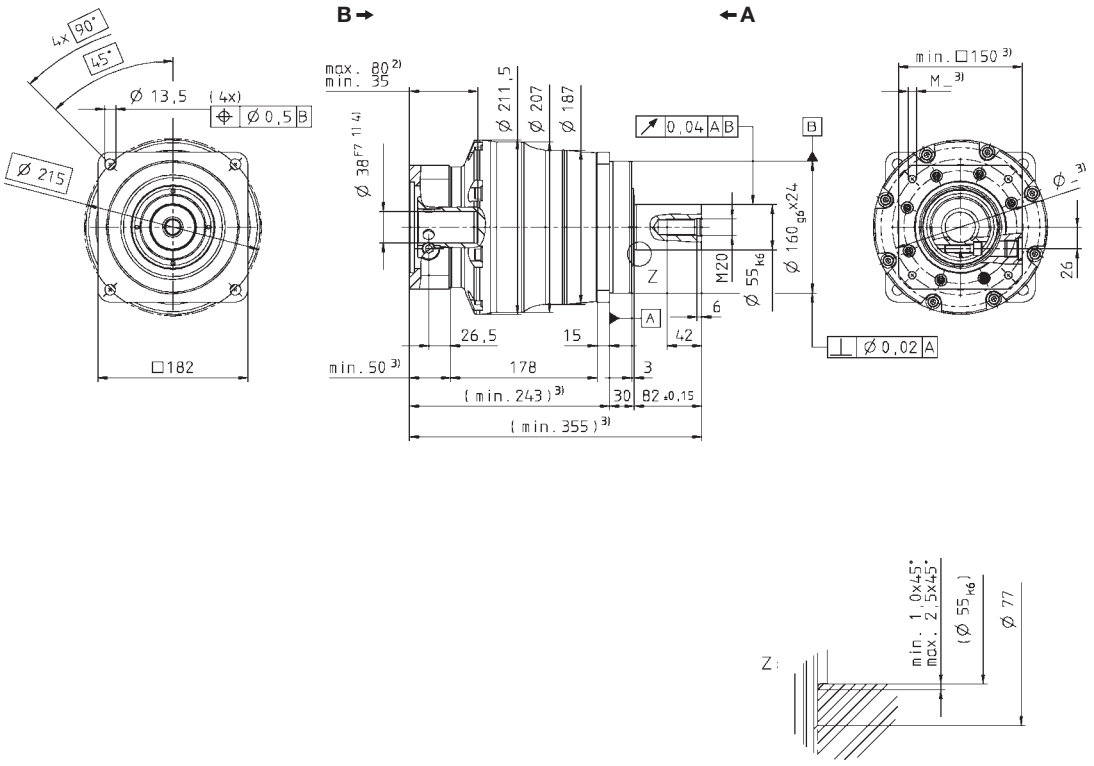
			2-stage								
Ratio [a]	i		**16**	**20**	**25**	**28**	**35**	**40**	**50**	**70**	**100**
Max. acceleration torque (max. 1000 cycles per hour)	T_{2B}	Nm	880	880	880	880	880	880	880	880	700
		in.lb	7788	7788	7788	7788	7788	7788	7788	7788	6195
cymex®-optimal nominal torque (please contact us regarding the design)	T_{2Ncym}	Nm	–	–	–	–	–	–	–	–	–
		in.lb									
Nominal output torque (with n_{1N})	T_{2N}	Nm	600	600	600	600	600	600	600	600	600
		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
		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
		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								
		in.lb/ arcmin	149								
Max. axial force [d]	F_{2AMax}	N	14150								
		lb_f	3184								
Max. radial force [d]	F_{2RMax}	N	15400								
		lb_f	3465								
Max. tilting moment	M_{2KMax}	Nm	1600								
		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								
		lb_m	80								
Operating noise (with i=100 and n_1 = 3000 rpm no load)	L_{PA}	dB(A)	≤ 66								
Max. permitted housing temperature		°C	+90								
		F	194								
Ambient temperature		°C	-15 to +40								
		F	5 to 104								
Lubrication			Lubricated for life								
Paint			Blue RAL 5002								
Direction of rotation			Motor and gearhead same direction								
Protection class			IP 65								
Moment of inertia (relates to the drive)	K	38	J_1	kgcm²	13.5	12.0	11.7	10.6	10.4	9.74	9.68	9.63	9.60
Clamping hub diameter [mm]				10^{-3} in.lb.s²	12.0	10.6	10.4	9.34	9.23	8.62	8.57	8.52	8.49

Reduced mass moments of inertia available on request.

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

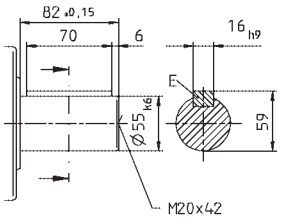
Motor shaft diameter [mm]

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

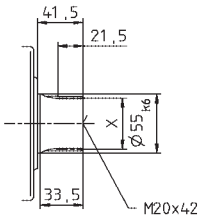


Alternatives: Output shaft variants

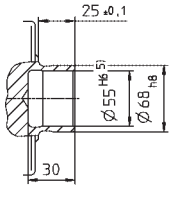
Keywayed output shaft in mm
E = key as per DIN 6885, sheet 1, form A



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



Shaft mounted
Mounted via HSD shrink disc



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) Tolerance h6 for mounted shaft.

⚠ Motor mounting according to operating manual

SP+ 210 MC HIGH SPEED® 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	1200	2000	2000	1700	1200	1680	1800	2000	1680	1920	1040	1300	1700	1200
			T_{2B} in.lb	10620	17700	17700	15045	10620	14868	15930	17700	14868	16992	9204	11505	15045	10620
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	900	1300	1150	1000	800	840	780	975	780	975	800	1000	1000	800
			T_{2N} in.lb	7965	11505	10178	8850	7080	7434	6903	8629	6903	8629	7080	8850	8850	7080
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
			T_{2Not} 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	2,5	2,0	2,0	1,5	1,5	1,5	1,5
			T_{012} in.lb	115.1	79.7	57.5	35.4	22.1	27	22	22	18	18	13	13	13	13
Max. torsional backlash			j_t arcmin	Standard ≤ 4 / Reduced ≤ 2					Standard ≤ 5 / Reduced ≤ 4								
Torsional rigidity			C_{t21} Nm/ arcmin	400					400								
			C_{t21} in.lb/ arcmin	3540					3540								
Max. axial force [c]			F_{2AMax} N	30000					30000								
			F_{2AMax} lb_f	6750					6750								
Max. radial force [c]			F_{2RMax} N	21000					21000								
			F_{2RMax} lb_f	4725					4725								
Max. tilting moment			M_{2KMax} Nm	3100					3100								
			M_{2KMax} 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								
			m lb_m	124					117								
Operating noise (with i=10 and n_1 = 2000 rpm no load)			L_{PA} dB(A)	≤ 64													
Max. permitted housing temperature			°C	+90													
			F	194													
Ambient temperature			°C	-15 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
			J_1 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	-	-	-	-	-	-	-	-	-
			J_1 10^{-3} in.lb.s²	123.0	83.5	68.1	54.4	47.0									

Reduced mass moments of inertia available on request.

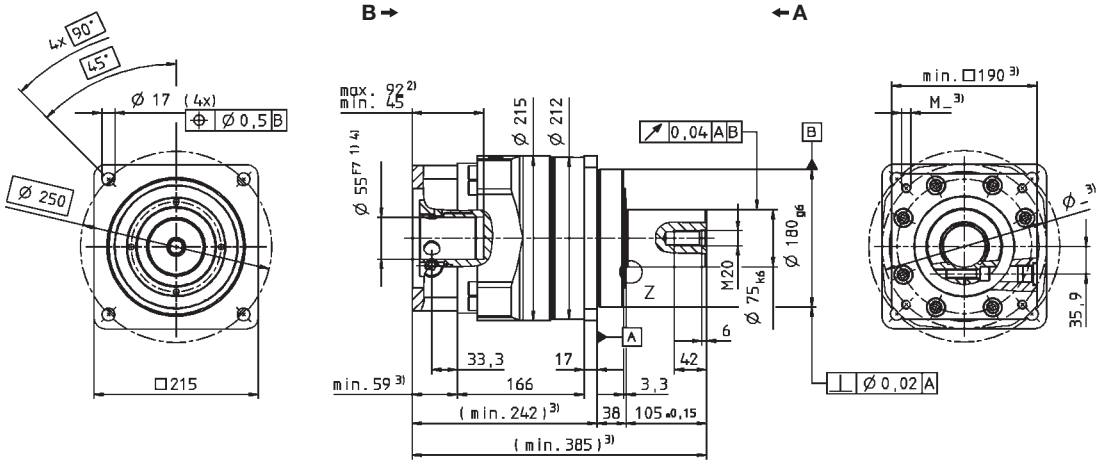
[a] Other ratios available on request
[b] For higher ambient temperatures, please reduce input speed
[c] Refers to center of the output shaft or flange

View A | View B

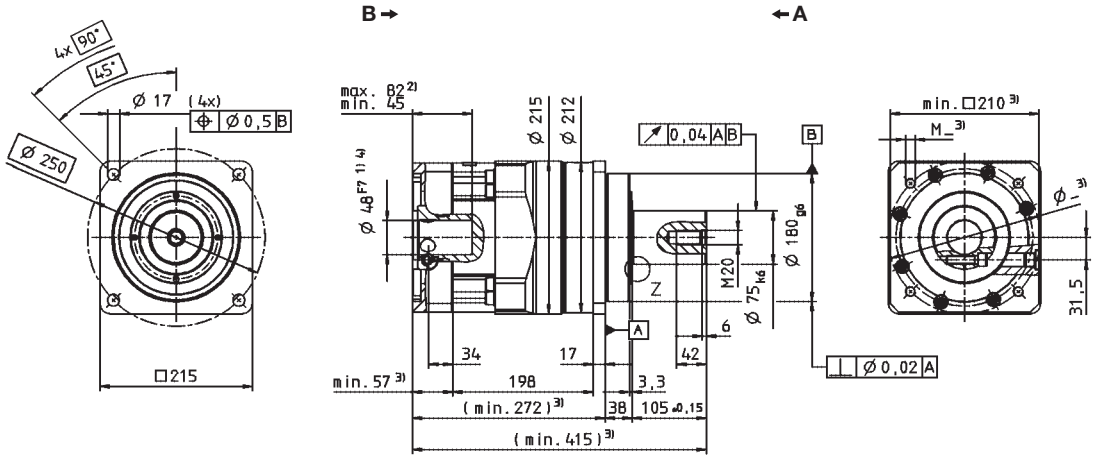
Motor shaft diameter [mm]

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

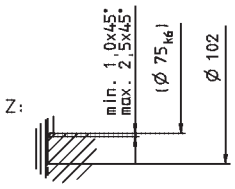
1-stage:



2-stage:

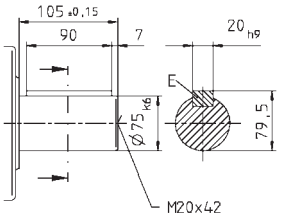


up to 48 [4] (M) clamping hub diameter

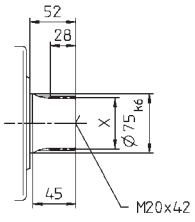


Alternatives: Output shaft variants

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



Involute gearing DIN 5480 in mm
X = W 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 HIGH SPEED® 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	1750	3500	3600	2700	1800	3500	3500	3600	2900	3600	1680	2100	2700	1800
			T_{2B} in.lb	15488	30975	31860	23895	15930	30975	30975	31860	25665	31860	14868	18585	23895	15930
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	1400	1960	1770	1500	1100	1790	1770	1730	1840	1930	1300	1625	1500	1100
			T_{2N} in.lb	12390	17346	15665	13275	9735	15842	15665	15311	16284	17081	11505	14381	13275	9735
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	24	18	13	7,0	5,0	5,0	4,5	4,0	3,5	3,0	2,5	2,5	2,5	2,0
			T_{012} in.lb	212	159	115	62	44	44	40	35	31	27	22	22	22	18
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 i=10 and n_1 = 3000 rpm no load)			L_{PA} dB(A)	≤ 66													
Max. permitted housing temperature			°C	+90													
			F	194													
Ambient temperature			°C	-15 to +40													
			F	5 to 104													
Lubrication				Lubricated for life													
Paint				Blue RAL 5002													
Direction of rotation				Motor and gearhead same direction													
Protection class				IP 65													
Moment of inertia (relates to the drive)	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									

Reduced mass moments of inertia available on request.

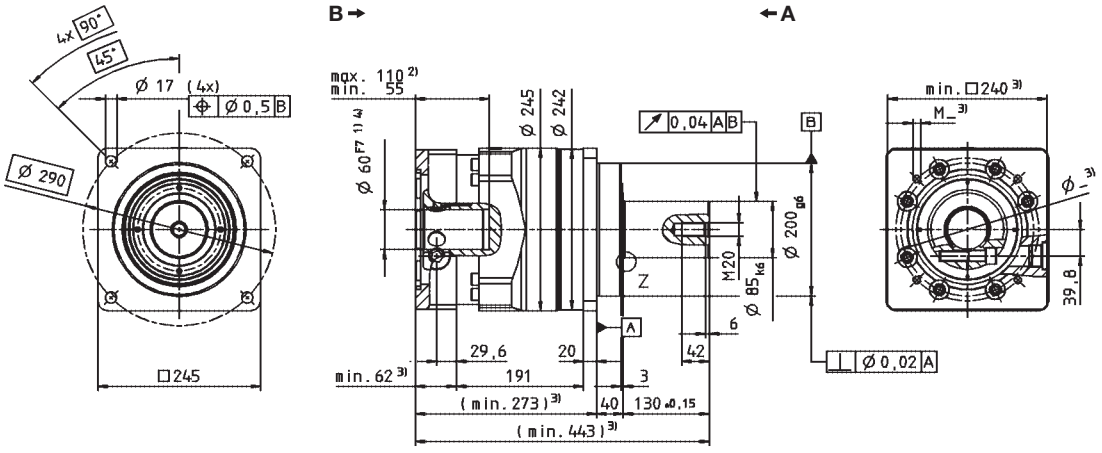
[a] Other ratios available on request
[b] For higher ambient temperatures, please reduce input speed
[c] Refers to center of the output shaft or flange

View A | View B

Motor shaft diameter [mm]

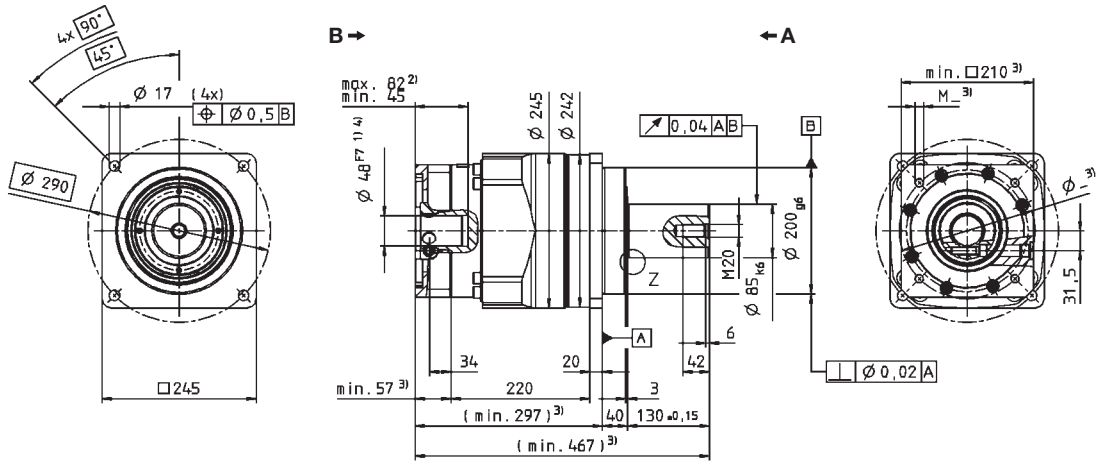
up to 60 [4] (O) clamping hub diameter

1-stage:

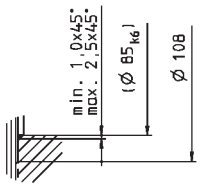


up to 48 [4] (M) clamping hub diameter

2-stage:

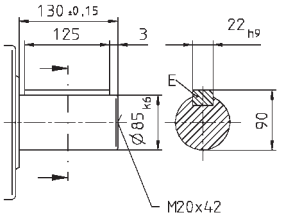


Z:

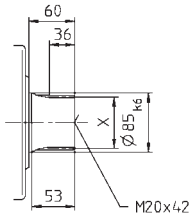


Alternatives: Output shaft variants

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