					3-stage													
Ratio [a]			*i*		**64**	**84**	**100**	**125**	**140**	**175**	**200**	**250**	**280**	**350**	**400**	**500**	**700**	**1000**
Max. acceleration torque (max. 1000 cycles per hour)			T_{2B}	Nm	280	280	300	300	300	300	300	300	300	300	200	250	300	225
				in.lb	2478	2478	2655	2655	2655	2655	2655	2655	2655	2655	1770	2213	2655	1991
Nominal output torque (with n_{1N})			T_{2N}	Nm	180	180	175	175	175	175	175	175	170	175	160	175	170	120
				in.lb	1593	1593	1549	1549	1549	1549	1549	1549	1505	1549	1416	1549	1505	1062
Emergency stop torque (permitted 1000 times during the service life of the gearhead)			T_{2Not}	Nm	400	400	500	500	500	500	500	500	625	500	400	500	625	500
				in.lb	3540	3540	4425	4425	4425	4425	4425	4425	5531	4425	3540	4425	5531	4425
Nominal input speed (with T_{2N} and 20°C ambient temperature) [b), c)]			n_{1N}	rpm	3500	3500	3500	3500	3500	3500	3500	3800	3500	3800	4500	4500	4500	4500
Max. continuous speed (with 20% T_{2N} and 20°C ambient temperature)			n_{1Ncym}	rpm	4500	4500	4500	4500	4500	4500	4500	4500	4500	4500	4500	4500	4500	4500
Max. input speed			n_{1Max}	rpm	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000
Mean no load running torque (with n_1 = 3000 rpm and 20°C gearhead temperature) [d)]			T_{012}	Nm	0.4	0.3	0.3	0.3	0.3	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
				in.lb	3.5	2.7	2.7	2.7	2.7	2.7	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8
Max. torsional backlash			j_t	arcmin	Standard ≤ 4 / Reduced ≤ 2													
Torsional rigidity			C_{t21}	Nm/ arcmin	31													
				in.lb/ arcmin	274													
Max. axial force [e)]			F_{2AMax}	N	5650													
				lb_f	1271													
Max. radial force [e)]			F_{2RMax}	N	6300													
				lb_f	1418													
Max. tilting moment			M_{2KMax}	Nm	487													
				in.lb	4310													
Efficiency at full load			η	%	92													
Service life (For calculation, see the Chapter "Information")			L_h	h	> 20000													
Weight incl. standard adapter plate			*m*	kg	10.3													
				lb_m	22.8													
Operating noise (with n_1 = 3000 rpm no load)			L_{PA}	dB(A)	≤ 68													
Max. permitted housing temperature				°C	+90													
				F	194													
Ambient temperature				°C	0 to +40													
				F	32 to 104													
Lubrication					Lubricated for life													
Paint					Blue RAL 5002													
Direction of rotation					Motor and gearhead opposite directions													
Protection class					IP 65													
Moment of inertia (relates to the drive) Clamping hub diameter [mm]	C	14	J_1	kgcm²	0.28	0.23	0.24	0.23	0.21	0.20	0.19	0.18	0.19	0.18	0.18	0.18	0.18	0.18
				10^{-3} in.lb.s²	0.25	0.20	0.21	0.20	0.19	0.18	0.17	0.16	0.17	0.16	0.16	0.16	0.16	0.16
	E	19	J_1	kgcm²	0.72	0.63	0.68	0.68	0.63	0.63	0.63	0.63	0.63	0.63	0.63	0.63	0.63	0.63
				10^{-3} in.lb.s²	0.64	0.56	0.60	0.60	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56

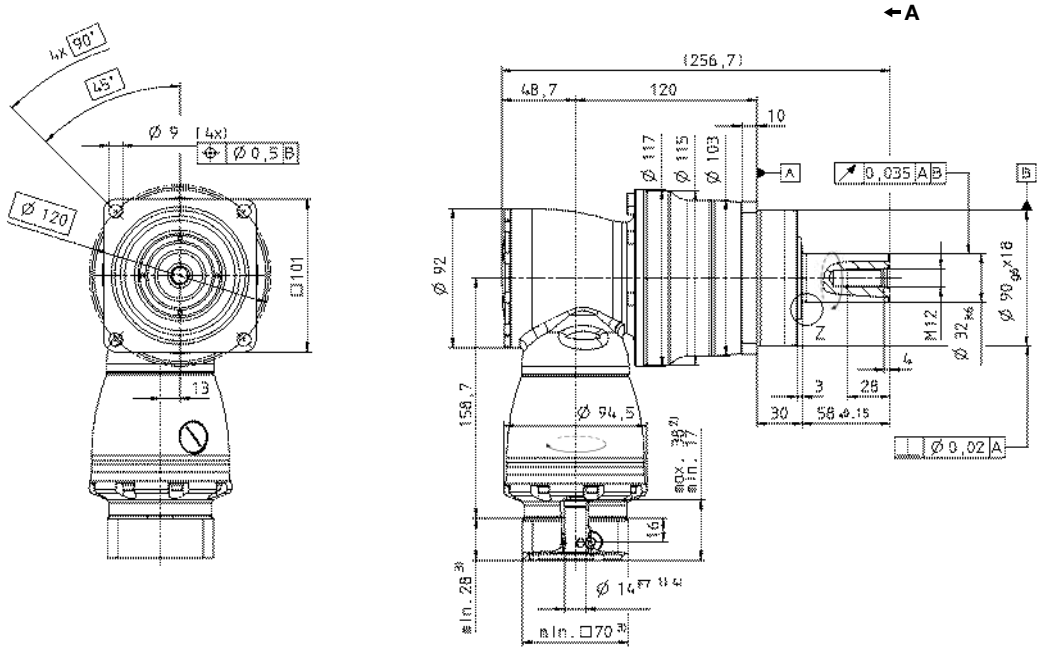
[a)] Other ratios up to i=1000 available on request
[b)] Higher speeds are possible if the nominal torque is reduced
[c)] For higher ambient temperatures, please reduce input speed
[d)] Idling torques decrease during operation
[e)] Refers to center of the output shaft or flange

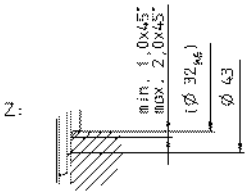
All technical data for front output side applies.
Technical data for rearward output versions, see page 422.

Please contact us for information on the best configuration for S1 conditions of use (continuous operation).

View A

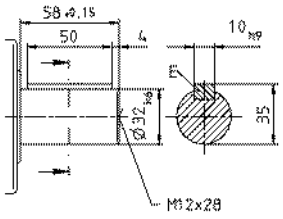
3-stage:



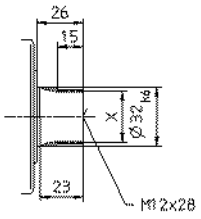


Alternatives: Output shaft variants

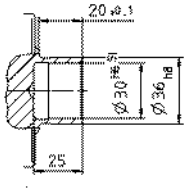
Keywayed output shaft in mm
E = key as per DIN 6885, sheet 1, form A



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



Shaft mounted
Mounted via shrink disc



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

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.

CAD data is available under
http://www.wittenstein-alpha.de/en/info-and-cad-finder.html

Motor mounting according to operating manual

				2-stage									
Ratio [a]			*i*	**12**	**16**	**20**	**25**	**28**	**35**	**40**	**50**	**70**	**100**
Max. acceleration torque (max. 1000 cycles per hour)			T_{2B} Nm	600	600	600	600	600	600	500	600	600	480
			T_{2B} in.lb	5310	5310	5310	5310	5310	5310	4425	5310	5310	4248
Nominal output torque (with n_{1N})			T_{2N} Nm	360	360	360	360	360	360	320	360	360	220
			T_{2N} in.lb	3186	3186	3186	3186	3186	3186	2832	3186	3186	1947
Emergency stop torque (permitted 1000 times during the service life of the gearhead)			T_{2Not} Nm	1000	1000	1250	1250	1250	1250	1000	1250	1250	1000
			T_{2Not} in.lb	8850	8850	11063	11063	11063	11063	8850	11063	11063	8850
Nominal input speed (with T_{2N} and 20°C ambient temperature) [b), c)]			n_{1N} rpm	1900	2300	2300	2600	2300	2300	2300	2300	2300	2300
Max. continuous speed (with 20% T_{2N} and 20°C ambient temperature)			n_{1Ncym} rpm	2700	3100	3100	3500	3100	3000	3000	3000	3000	3000
Max. input speed			n_{1Max} rpm	4500	4500	4500	4500	4500	4500	4500	4500	4500	4500
Mean no load running torque (with n_1 = 3000 rpm and 20°C gearhead temperature) [d)]			T_{012} Nm	4.0	3.7	3.6	2.8	3.5	3.9	3.1	3.1	3.1	3.1
			T_{012} in.lb	35.4	32.7	31.9	24.8	31	34.5	27.4	27.4	27.4	27.4
Max. torsional backlash			j_t arcmin	Standard ≤ 4 / Reduced ≤ 2									
Torsional rigidity			C_{t21} Nm/ arcmin	53									
			C_{t21} in.lb/ arcmin	469									
Max. axial force [e)]			F_{2AMax} N	9870									
			F_{2AMax} lb_f	2221									
Max. radial force [e)]			F_{2RMax} N	9450									
			F_{2RMax} lb_f	2126									
Max. tilting moment			M_{2KMax} Nm	952									
			M_{2KMax} 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	20									
			m lb_m	44									
Operating noise (with n_1 = 3000 rpm no load)			L_{PA} dB(A)	≤ 68									
Max. permitted housing temperature			°C	+90									
			F	194									
Ambient temperature			°C	0 to +40									
			F	32 to 104									
Lubrication				Lubricated for life									
Paint				Blue RAL 5002									
Direction of rotation				Motor and gearhead opposite directions									
Protection class				IP 65									
Moment of inertia (relates to the drive) Clamping hub diameter [mm]	H	28	J_1 kgcm²	4.68	3.82	3.75	3.31	3.68	2.97	2.80	2.79	2.78	2.77
			J_1 10^{-3} in.lb.s²	4.14	3.38	3.32	2.93	3.26	2.63	2.48	2.47	2.46	2.45
	K	38	J_1 kgcm²	11.8	11.0	10.9	10.5	10.9	10.1	9.96	9.95	9.94	9.94
			J_1 10^{-3} in.lb.s²	10.5	9.73	9.66	9.27	9.60	8.97	8.82	8.81	8.80	8.79

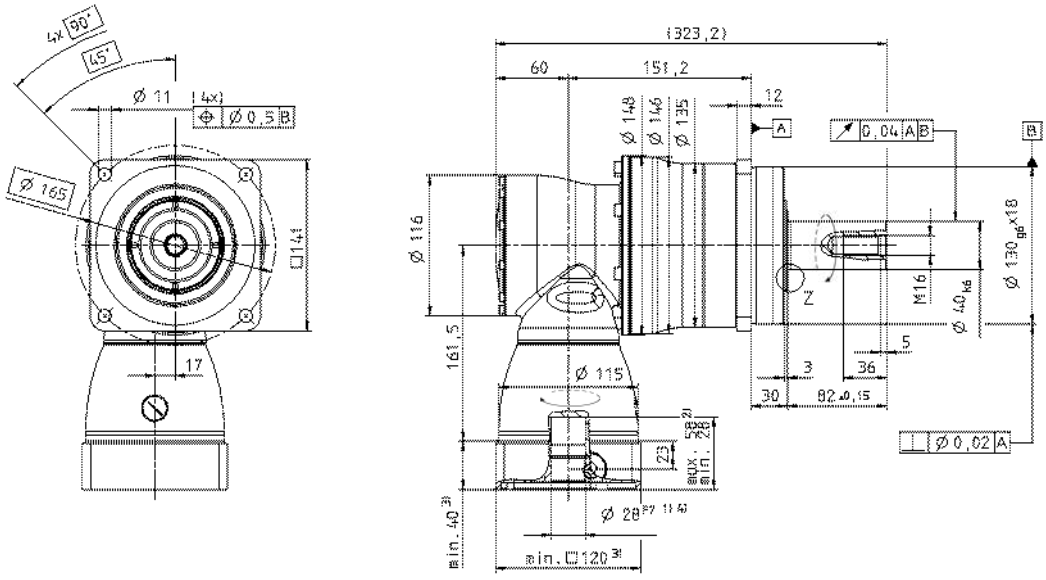
[a)] Other ratios up to i=1000 available on request
[b)] Higher speeds are possible if the nominal torque is reduced
[c)] For higher ambient temperatures, please reduce input speed
[d)] Idling torques decrease during operation
[e)] Refers to center of the output shaft or flange

All technical data for front output side applies.
Technical data for rearward output versions, see page 422.

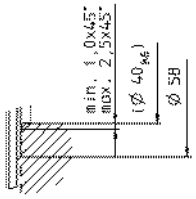
Please contact us for information on the best configuration for S1 conditions of use (continuous operation).

View A

2-stage:



Z:

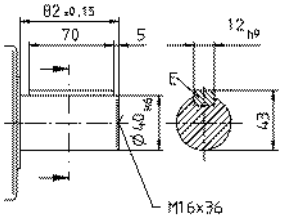


Right-angle gearheads
High End

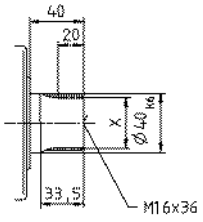
SPK+

Alternatives: Output shaft variants

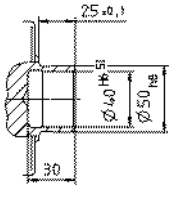
Keywayed output shaft in mm
E = key as per DIN 6885, sheet 1, form A



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



Shaft mounted
Mounted via shrink disc



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

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.

CAD data is available under
http://www.wittenstein-alpha.de/en/info-and-cad-finder.html

Motor mounting according to operating manual

SPK+ 140 MF 3-stage

				3-stage													
Ratio [a]			*i*	**64**	**84**	**100**	**125**	**140**	**175**	**200**	**250**	**280**	**350**	**400**	**500**	**700**	**1000**
Max. acceleration torque (max. 1000 cycles per hour)			T_{2B} Nm	600	600	600	600	600	600	600	600	600	600	500	600	600	480
			T_{2B} in.lb	5310	5310	5310	5310	5310	5310	5310	5310	5310	5310	4425	5310	5310	4248
Nominal output torque (with n_{1N})			T_{2N} Nm	360	360	360	360	360	360	360	360	360	360	320	360	360	220
			T_{2N} in.lb	3186	3186	3186	3186	3186	3186	3186	3186	3186	3186	2832	3186	3186	1947
Emergency stop torque (permitted 1000 times during the service life of the gearhead)			T_{2Not} Nm	1000	1000	1250	1250	1250	1250	1250	1250	1250	1250	1000	1250	1250	1000
			T_{2Not} in.lb	8850	8850	11063	11063	11063	11063	11063	11063	11063	11063	8850	11063	11063	8850
Nominal input speed (with T_{2N} and 20°C ambient temperature) [b), c)]			n_{1N} rpm	3100	3100	3100	3100	3100	3100	3100	3500	3100	3500	4200	4200	4200	4200
Max. continuous speed (with 20% T_{2N} and 20°C ambient temperature)			n_{1Ncym} rpm	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	4200	4200	4200	4200
Max. input speed			n_{1Max} rpm	4500	4500	4500	4500	4500	4500	4500	4500	4500	4500	4500	4500	4500	4500
Mean no load running torque (with n_1 = 3000 rpm and 20°C gearhead temperature) [d)]			T_{012} Nm	0.7	0.4	0.6	0.5	0.5	0.4	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
			T_{012} in.lb	6.2	3.5	5.3	4.4	4.4	3.5	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7
Max. torsional backlash			j_t arcmin	Standard ≤ 4 / Reduced ≤ 2													
Torsional rigidity			C_{t21} Nm/ arcmin	53													
			C_{t21} in.lb/ arcmin	469													
Max. axial force [e)]			F_{2AMax} N	9870													
			F_{2AMax} lb_f	2221													
Max. radial force [e)]			F_{2RMax} N	9450													
			F_{2RMax} lb_f	2126													
Max. tilting moment			M_{2KMax} Nm	952													
			M_{2KMax} in.lb	8425													
Efficiency at full load			η %	92													
Service life (For calculation, see the Chapter "Information")			L_h h	> 20000													
Weight incl. standard adapter plate			*m* kg	20.7													
			m lb_m	45.7													
Operating noise (with n_1 = 3000 rpm no load)			L_{PA} dB(A)	< 68													
Max. permitted housing temperature			°C	+90													
			F	194													
Ambient temperature			°C	0 to +40													
			F	32 to 104													
Lubrication				Lubricated for life													
Paint				Blue RAL 5002													
Direction of rotation				Motor and gearhead opposite directions													
Protection class				IP 65													
Moment of inertia (relates to the drive) Clamping hub diameter [mm]	E	19	J_1 kgcm²	1.01	0.76	0.88	0.85	0.76	0.75	0.70	0.69	0.70	0.69	0.69	0.69	0.69	0.69
			J_1 10^{-3} in.lb.s²	0.89	0.67	0.78	0.75	0.67	0.66	0.62	0.61	0.62	0.61	0.61	0.61	0.61	0.61
	G	24	J_1 kgcm²	2.57	2.32	2.44	2.42	2.32	2.31	2.26	2.25	2.26	2.25	2.25	2.25	2.25	2.25
			J_1 10^{-3} in.lb.s²	2.27	2.05	2.16	2.14	2.05	2.04	2.00	1.99	2.00	1.99	1.99	1.99	1.99	1.99

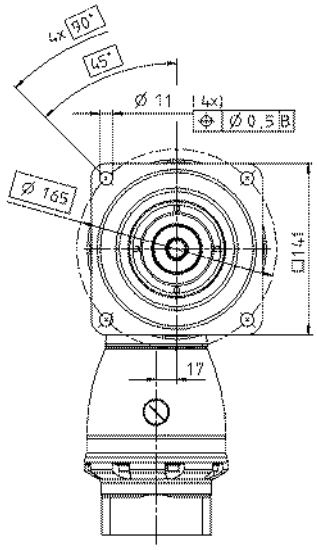
[a)] Other ratios up to i=1000 available on request
[b)] Higher speeds are possible if the nominal torque is reduced
[c)] For higher ambient temperatures, please reduce input speed
[d)] Idling torques decrease during operation
[e)] Refers to center of the output shaft or flange

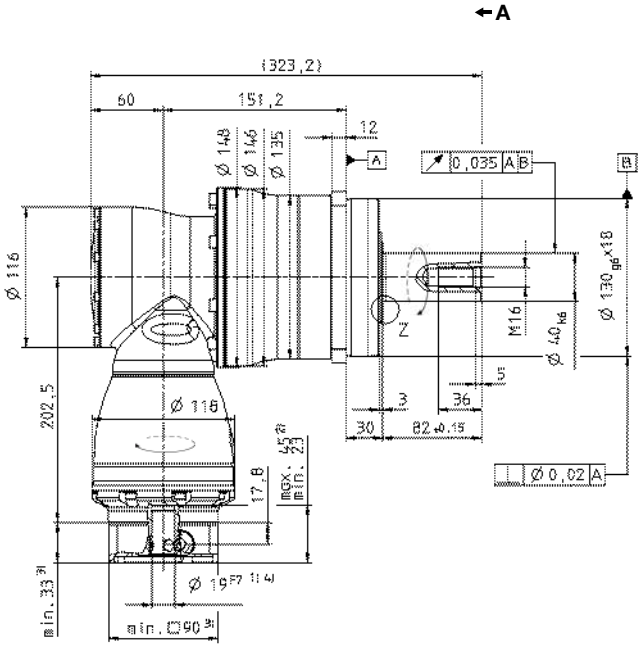
All technical data for front output side applies.
Technical data for rearward output versions, see page 422.

Please contact us for information on the best configuration for S1 conditions of use (continuous operation).

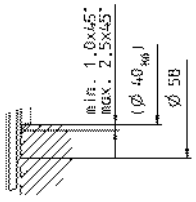
View A

3-stage:





Z:

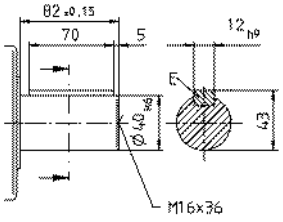


Right-angle gearheads
High End

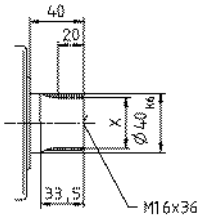
SPK+

Alternatives: Output shaft variants

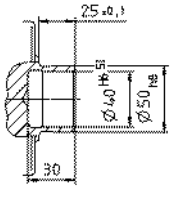
Keywayed output shaft in mm
E = key as per DIN 6885, sheet 1, form A



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



Shaft mounted
Mounted via shrink disc



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

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.

CAD data is available under
http://www.wittenstein-alpha.de/en/info-and-cad-finder.html

Motor mounting according to operating manual

				2-stage									
Ratio [a]			*i*	**12**	**16**	**20**	**25**	**28**	**35**	**40**	**50**	**70**	**100**
Max. acceleration torque (max. 1000 cycles per hour)			T_{2B} Nm	1100	1100	1100	1100	1100	1100	840	1050	1100	880
			T_{2B} in.lb	9735	9735	9735	9735	9735	9735	7434	9293	9735	7788
Nominal output torque (with n_{1N})			T_{2N} Nm	750	750	750	750	750	750	640	750	750	750
			T_{2N} in.lb	6638	6638	6638	6638	6638	6638	5664	6638	6638	6638
Emergency stop torque (permitted 1000 times during the service life of the gearhead)			T_{2Not} Nm	1600	1600	2000	2000	2750	2000	1600	2000	2750	2200
			T_{2Not} in.lb	14160	14160	17700	17700	24338	17700	14160	17700	24338	19470
Nominal input speed (with T_{2N} and 20°C ambient temperature) [b), c)]			n_{1N} rpm	1600	1900	1900	2100	1900	2100	2100	2100	2100	2100
Max. continuous speed (with 20% T_{2N} and 20°C ambient temperature)			n_{1Ncym} rpm	2300	2600	2600	2800	2600	3000	3000	3000	3000	3000
Max. input speed			n_{1Max} rpm	4500	4500	4500	4500	4500	4500	4500	4500	4500	4500
Mean no load running torque (with n_1 = 3000 rpm and 20°C gearhead temperature) [d)]			T_{012} Nm	9.0	6.5	6.5	5.5	6.0	8.0	6.0	6.0	6.0	6.0
			T_{012} in.lb	79.7	57.5	57.5	48.7	53.1	70.8	53.1	53.1	53.1	53.1
Max. torsional backlash			j_t arcmin	Standard ≤ 4 / Reduced ≤ 2									
Torsional rigidity			C_{t21} Nm/ arcmin	175									
			C_{t21} in.lb/ arcmin	1549									
Max. axial force [e)]			F_{2AMax} N	14150									
			F_{2AMax} lb_f	3184									
Max. radial force [e)]			F_{2RMax} N	14700									
			F_{2RMax} lb_f	3308									
Max. tilting moment			M_{2KMax} Nm	1600									
			M_{2KMax} in.lb	14160									
Efficiency at full load			η %	94									
Service life (For calculation, see the Chapter "Information")			L_h h	> 20000									
Weight incl. standardadapter plate			*m* kg	45									
			m lb_m	99									
Operating noise (with n_1 = 3000 rpm no load)			L_{PA} dB(A)	≤ 70									
Max. permitted housing temperature			°C	+90									
			F	194									
Ambient temperature			°C	0 to +40									
			F	32 to 104									
Lubrication				Lubricated for life									
Paint				Blue RAL 5002									
Direction of rotation				Motor and gearhead opposite directions									
Protection class				IP 65									
Moment of inertia (relates to the drive) Clamping hub diameter [mm]	K	38	J_1 kgcm²	24.7	19.5	19.0	16.3	18.6	14.0	12.9	12.8	12.7	12.7
			J_1 10^{-3} in.lb.s²	21.9	17.2	16.8	14.4	16.5	12.4	11.4	11.3	11.3	11.2

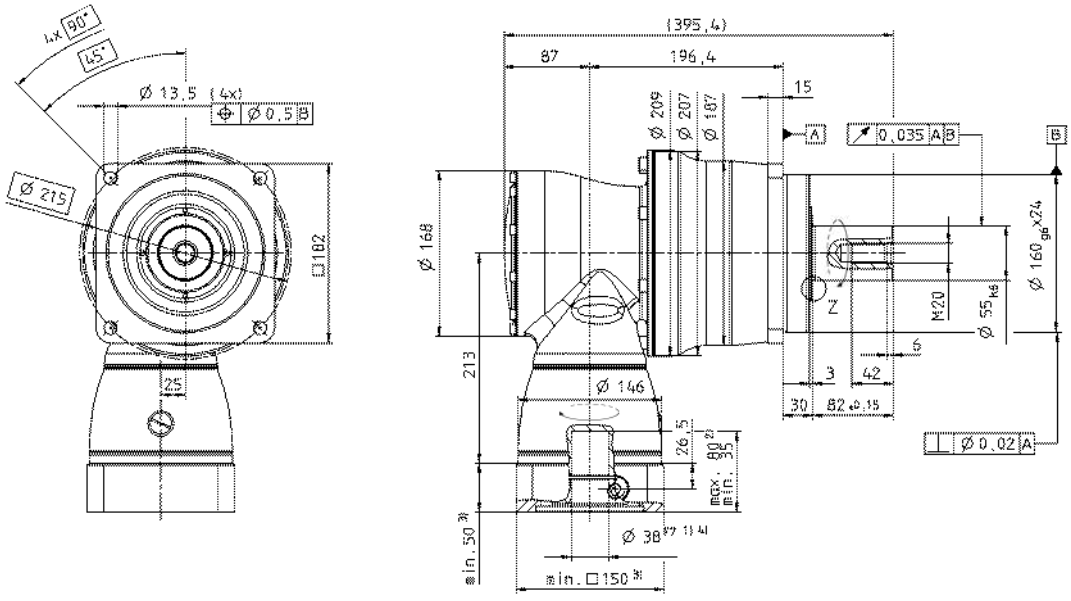
[a)] Other ratios up to i=1000 available on request
[b)] Higher speeds are possible if the nominal torque is reduced
[c)] For higher ambient temperatures, please reduce input speed
[d)] Idling torques decrease during operation
[e)] Refers to center of the output shaft or flange

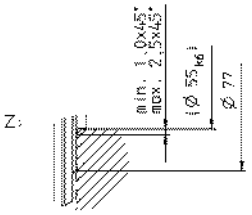
All technical data for front output side applies.
Technical data for rearward output versions, see page 422.

Please contact us for information on the best configuration for S1 conditions of use (continuous operation).

View A

2-stage:



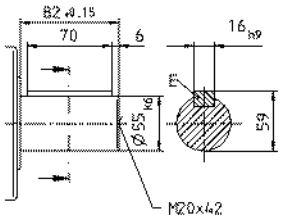


Right-angle gearheads
High End

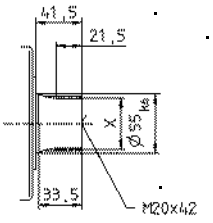
SPK+

Alternatives: Output shaft variants

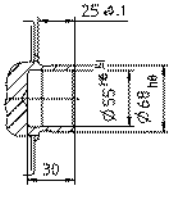
Keywayed output shaft in mm
E = key as per DIN 6885, sheet 1, form A



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



Shaft mounted
Mounted via shrink disc



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

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.

CAD data is available under
http://www.wittenstein-alpha.de/en/info-and-cad-finder.html

Motor mounting according to operating manual

					3-stage													
Ratio [a]			*i*		**64**	**84**	**100**	**125**	**140**	**175**	**200**	**250**	**280**	**350**	**400**	**500**	**700**	**1000**
Max. acceleration torque (max. 1000 cycles per hour)			T_{2B}	Nm	1100	1100	1100	1100	1100	1100	1100	1100	1100	1100	840	1050	1100	880
				in.lb	9735	9735	9735	9735	9735	9735	9735	9735	9735	9735	7434	9293	9735	7788
Nominal output torque (with n_{1N})			T_{2N}	Nm	750	750	750	750	750	750	750	750	750	750	640	750	750	750
				in.lb	6638	6638	6638	6638	6638	6638	6638	6638	6638	6638	5664	6638	6638	6638
Emergency stop torque (permitted 1000 times during the service life of the gearhead)			T_{2Not}	Nm	1600	1600	2000	2000	2000	2000	2000	2000	2750	2000	1600	2000	2750	2200
				in.lb	14160	14160	17700	17700	17700	17700	17700	17700	24338	17700	14160	17700	24338	19470
Nominal input speed (with T_{2N} and 20°C ambient temperature) [b), c)]			n_{1N}	rpm	2900	2900	2900	2900	2900	2900	2900	3200	2900	3200	3900	3900	3900	3900
Max. continuous speed (with 20% T_{2N} and 20°C ambient temperature)			n_{1Ncym}	rpm	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	4200	4200	4200	4200
Max. input speed			n_{1Max}	rpm	4500	4500	4500	4500	4500	4500	4500	4500	4500	4500	4500	4500	4500	4500
Mean no load running torque (with n_1 = 3000 rpm and 20°C gearhead temperature) [d)]			T_{012}	Nm	1	0.5	0.8	0.6	0.6	0.5	0.5	0.4	0.5	0.4	0.4	0.4	0.4	0.4
				in.lb	8.9	4.4	7.1	5.3	5.3	4.4	4.4	3.5	4.4	3.5	3.5	3.5	3.5	3.5
Max. torsional backlash			j_t	arcmin	Standard ≤ 4 / Reduced ≤ 2													
Torsional rigidity			C_{t21}	Nm/ arcmin	175													
				in.lb/ arcmin	1549													
Max. axial force [e)]			F_{2AMax}	N	14150													
				lb_f	3184													
Max. radial force [e)]			F_{2RMax}	N	14700													
				lb_f	3308													
Max. tilting moment			M_{2KMax}	Nm	1600													
				in.lb	14160													
Efficiency at full load			η	%	92													
Service life (For calculation, see the Chapter "Information")			L_h	h	> 20000													
Weight incl. standardadapter plate			*m*	kg	47.4													
				lb_m	104.8													
Operating noise (with n_1 = 3000 rpm no load)			L_{PA}	dB(A)	< 70													
Max. permitted housing temperature				°C	+90													
				F	194													
Ambient temperature				°C	0 to +40													
				F	32 to 104													
Lubrication					Lubricated for life													
Paint					Blue RAL 5002													
Direction of rotation					Motor and gearhead opposite directions													
Protection class					IP 65													
Moment of inertia (relates to the drive) Clamping hub diameter [mm]	G	24	J_1	kgcm²	3.97	2.82	3.36	3.22	2.82	2.75	2.50	2.47	2.50	2.44	2.42	2.42	2.42	2.42
				10^{-3} in.lb.s²	3.51	2.50	2.97	2.85	2.50	2.43	2.21	2.19	2.21	2.16	2.14	2.14	2.14	2.14
	K	38	J_1	kgcm²	10.90	9.74	10.30	10.10	9.74	9.66	9.41	9.38	9.41	9.38	9.33	9.33	9.33	9.33
				10^{-3} in.lb.s²	9.65	8.62	9.12	8.94	8.62	8.55	8.33	8.30	8.33	8.30	8.26	8.26	8.26	8.26

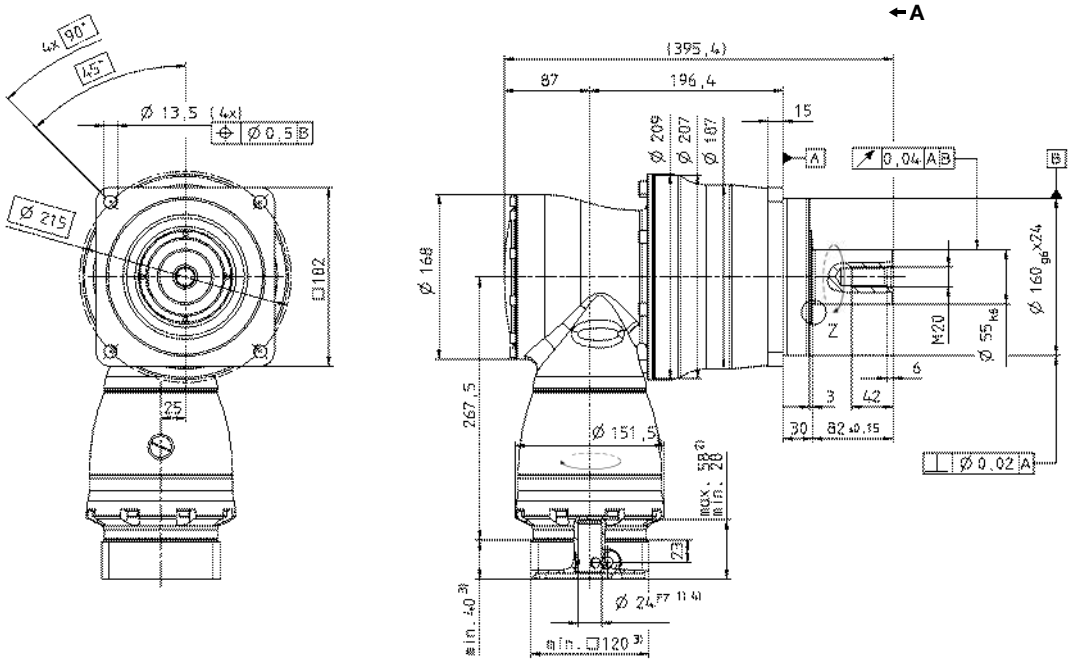
[a)] Other ratios up to i=1000 available on request
[b)] Higher speeds are possible if the nominal torque is reduced
[c)] For higher ambient temperatures, please reduce input speed
[d)] Idling torques decrease during operation
[e)] Refers to center of the output shaft or flange

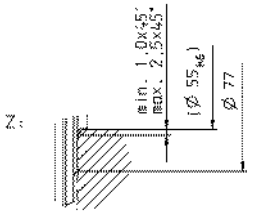
All technical data for front output side applies.
Technical data for rearward output versions, see page 422.

Please contact us for information on the best configuration for S1 conditions of use (continuous operation).

View A

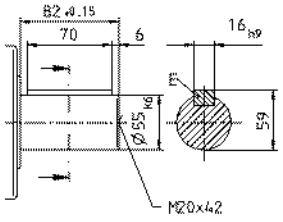
3-stage:



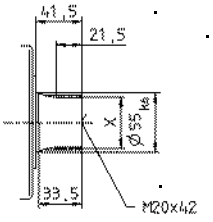


Alternatives: Output shaft variants

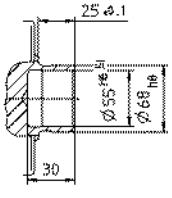
Keywayed output shaft in mm
E = key as per DIN 6885, sheet 1, form A



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



Shaft mounted
Mounted via shrink disc



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

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.

CAD data is available under
http://www.wittenstein-alpha.de/en/info-and-cad-finder.html

Motor mounting according to operating manual

			2-stage									
Ratio [a]	i		**12**	**16**	**20**	**25**	**28**	**35**	**40**	**50**	**70**	**100**
Max. acceleration torque (max. 1000 cycles per hour)	T_{2B}	Nm	2500	2500	2500	2500	2400	2400	1850	2300	2400	1900
		in.lb	22125	22125	22125	22125	21240	21240	16373	20355	21240	16815
Nominal output torque (with n_{1N})	T_{2N}	Nm	1500	1500	1500	1500	1400	1500	1400	1500	1400	1000
		in.lb	13.275	13275	13275	13275	12390	13275	12390	13275	12390	8850
Emergency stop torque (permitted 1000 times during the service life of the gearhead)	T_{2Not}	Nm	3600	4200	5200	5200	5200	5200	3600	4500	5200	5000
		in.lb	31860	37170	46020	46020	46020	46020	31860	39825	46020	44250
Nominal input speed (with T_{2N} and 20°C ambient temperature) [b), c)]	n_{1N}	rpm	1500	1700	1700	1900	1700	1900	1700	1700	1700	1700
Max. continuous speed (with 20 % T_{2N} and 20°C ambient temperature)	n_{1Ncym}	rpm	1900	2300	2300	2700	2300	2700	2400	2400	2400	2400
Max. input speed	n_{1Max}	rpm	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000
Mean no load running torque (with n_1 = 3000 rpm and 20°C gearhead temperature) [d)]	T_{012}	Nm	18.5	17.0	15.0	13.0	14.0	12.0	15.0	15.0	14.0	13.0
		in.lb	163.7	150.5	132.8	115.1	123.9	106.2	132.8	132.8	123.9	115.1
Max. torsional backlash	j_t	arcmin	Standard ≤4 / Reduced ≤2									
Torsional rigidity	C_{t21}	Nm/ arcmin	300	300	300	300	300	300	300	300	300	300
		in.lb/ arcmin	2.655	2.655	2.655	2.655	2.655	2.655	2.655	2.655	2.655	2.655
Max. axial force [e)]	F_{2AMax}	N	30000									
		lb_f	6750									
Max. radial force [e)]	F_{2RMax}	N	21000									
		lb_f	4725									
Max. tilting moment	M_{2KMax}	Nm	3100									
		in.lb	27435									
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	82									
		lb_m	181									
Operating noise (with n_1 = 3000 rpm no load)	L_{PA}	dB(A)	≤ 71									
Max. permitted housing temperature		°C	+90									
		F	194									
Ambient temperature		°C	0 to +40									
		F	32 to 104									
Lubrication			Lubricated for life									
Paint			Blue RAL 5002									
Direction of rotation			Motor and gearhead opposite directions									
Protection class			IP 65									
Moment of inertia (relates to the drive) **Clamping hub diameter [mm]** **M** **48**	J_1	$kgcm^2$	78.80	54.60	53.00	43.40	51.50	42.20	30.20	30.00	29.80	29.80
		10^{-3} in.lb.s^2	69.74	48.32	46.91	38.41	45.58	37.35	26.73	26.55	26.37	26.37

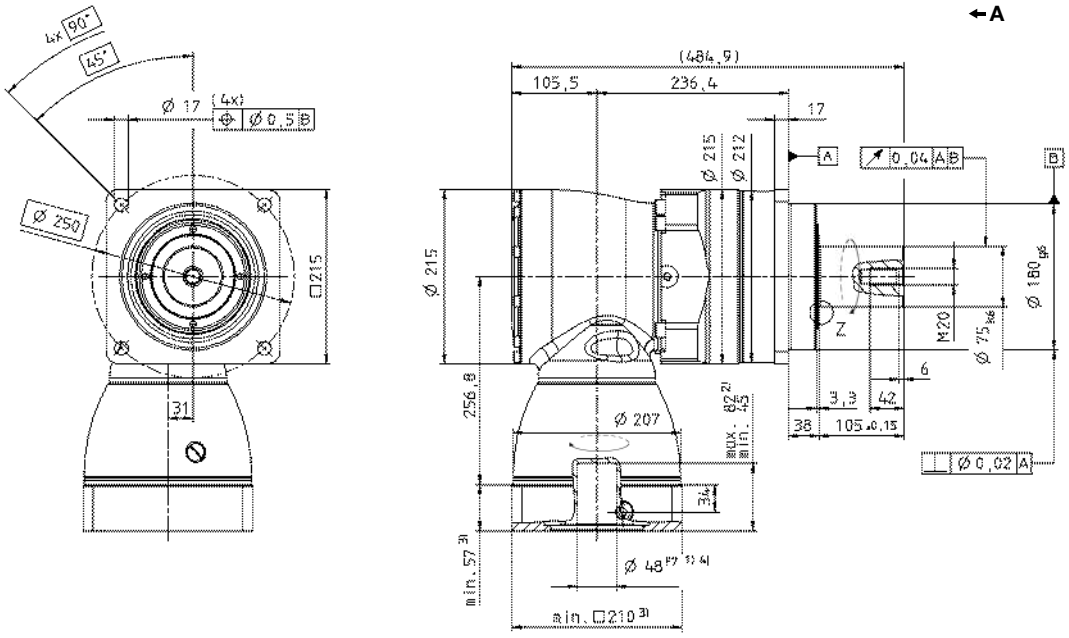
[a)] Other ratios available on request
[b)] Higher speeds are possible if the nominal torque is reduced
[c)] For higher ambient temperatures, please reduce input speed
[d)] Idling torques decrease during operation
[e)] Refers to center of the output shaft or flange

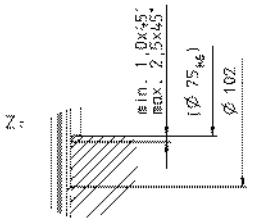
All technical data for front output side applies.
Technical data for rearward output versions, see page 422.

Please contact us for information on the best configuration for S1 conditions of use (continuous operation).

View A

2-stage:



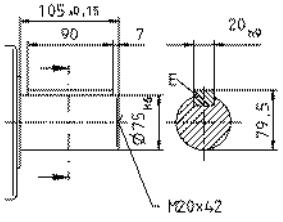


Right-angle gearheads
High End

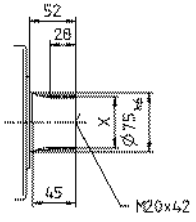
SPK+

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



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

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.

CAD data is available under
http://www.wittenstein-alpha.de/en/info-and-cad-finder.html

Motor mounting according to operating manual

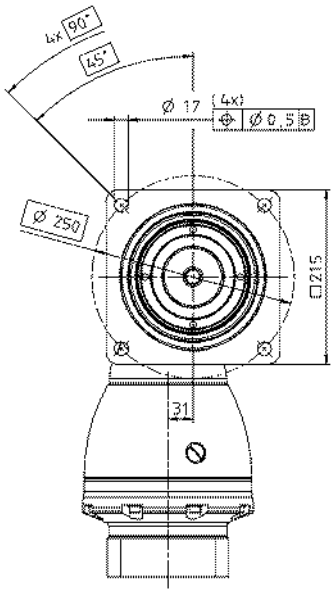
				3-stage													
Ratio [a]			*i*	**64**	**84**	**100**	**125**	**140**	**175**	**200**	**250**	**280**	**350**	**400**	**500**	**700**	**1000**
Max. acceleration torque (max. 1000 cycles per hour)			T_{2B} Nm	2400	2400	2500	2500	2500	2500	2500	2500	2400	2400	1900	2350	2400	1900
			T_{2B} in.lb	21240	21240	22125	22125	22125	22125	22125	22125	21240	21240	16815	20798	21240	16815
Nominal output torque (with n_{1N})			T_{2N} Nm	1500	1500	1500	1500	1500	1500	1500	1500	1400	1400	1500	1500	1400	1000
			T_{2N} in.lb	13275	13275	13275	13275	13275	13275	13275	13275	12390	12390	13275	13275	12390	8850
Emergency stop torque (permitted 1000 times during the service life of the gearhead)			T_{2Not} Nm	4200	3600	5200	5200	5200	5200	5200	5200	5200	5200	3600	4500	5200	5000
			T_{2Not} in.lb	37170	31860	46020	46020	46020	46020	46020	46020	46020	46020	31860	39825	46020	44250
Nominal input speed (with T_{2N} and 20°C ambient temperature) [b), c)]			n_{1N} rpm	2700	2700	2700	2700	2700	2700	2700	2900	2700	2900	3400	3400	3400	3400
Max. continuous speed (with 20 % T_{2N} and 20°C ambient temperature)			n_{1Ncym} rpm	3500	3500	3500	3500	3500	3500	3500	3500	3500	3500	3500	3500	3800	3800
Max. input speed			n_{1Max} rpm	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000
Mean no load running torque (with n_1 = 3000 rpm and 20°C gearhead temperature) [d)]			T_{012} Nm	2.4	1.2	1.9	1.7	1.3	1.3	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
			T_{012} in.lb	21.2	10.6	16.8	15.0	11.5	11.5	8.9	8.9	8.9	8.9	8.9	8.9	8.9	8.9
Max. torsional backlash			j_t arcmin	Standard ≤4 / Reduced ≤2													
Torsional rigidity			C_{t21} Nm/ arcmin	300	300	300	300	300	300	300	300	300	300	300	300	300	300
			C_{t21} in.lb/ arcmin	2.655	2.655	2.655	2.655	2.655	2.655	2.655	2.655	2.655	2.655	2.655	2.655	2.655	2.655
Max. axial force [e)]			F_{2AMax} N	30000													
			F_{2AMax} lb_f	6750													
Max. radial force [e)]			F_{2RMax} N	21000													
			F_{2RMax} lb_f	4725													
Max. tilting moment			M_{2KMax} Nm	3100													
			M_{2KMax} in.lb	27435													
Efficiency at full load			η %	92													
Service life (For calculation, see the Chapter "Information")			L_h h	> 20000													
Weight incl. standard adapter plate			*m* kg	86													
			m lb_m	190													
Operating noise (with n_1 = 3000 rpm no load)			L_{PA} dB(A)	≤ 71													
Max. permitted housing temperature			°C	+90													
			F	194													
Ambient temperature			°C	0 to +40													
			F	32 to 104													
Lubrication				Lubricated for life													
Paint				Blue RAL 5002													
Direction of rotation				Motor and gearhead opposite directions													
Protection class				IP 65													
Moment of inertia (relates to the drive) Clamping hub diameter [mm]	K	38	J_1 kgcm²	14.00	10.90	12.30	12.00	10.90	10.70	10.10	10.00	10.10	10.00	9.90	9.90	9.90	9.90
			J_1 10^{-3} in.lb.s²	12.39	9.65	10.89	10.62	9.65	9.47	8.94	8.85	8.94	8.85	8.76	8.76	8.76	8.76
	M	48	J_1 kgcm²	28.70	25.60	27.10	26.70	26.70	25.60	24.80	24.70	24.80	24.70	24.60	24.60	24.60	24.60
			J_1 10^{-3} in.lb.s²	25.40	22.66	23.98	23.63	23.63	22.66	21.95	21.86	21.95	21.86	21.77	21.77	21.77	21.77

[a)] Other ratios available on request
[b)] Higher speeds are possible if the nominal torque is reduced
[c)] For higher ambient temperatures, please reduce input speed
[d)] Idling torques decrease during operation
[e)] Refers to center of the output shaft or flange

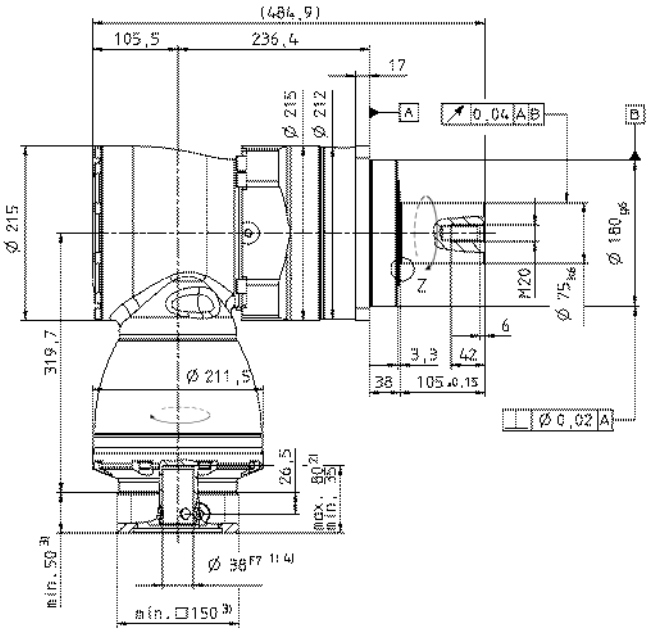
All technical data for front output side applies.
Technical data for rearward output versions, see page 422.

Please contact us for information on the best configuration for S1 conditions of use (continuous operation).

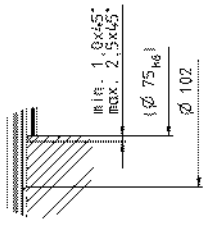
3-stage:



←A

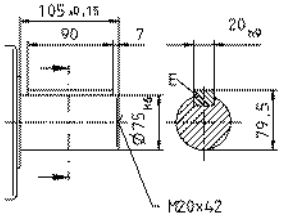


Z:

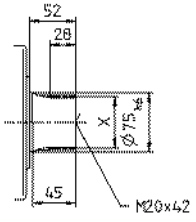


Alternatives: Output shaft variants

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



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



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

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.

CAD data is available under
http://www.wittenstein-alpha.de/en/info-and-cad-finder.html

Motor mounting according to operating manual

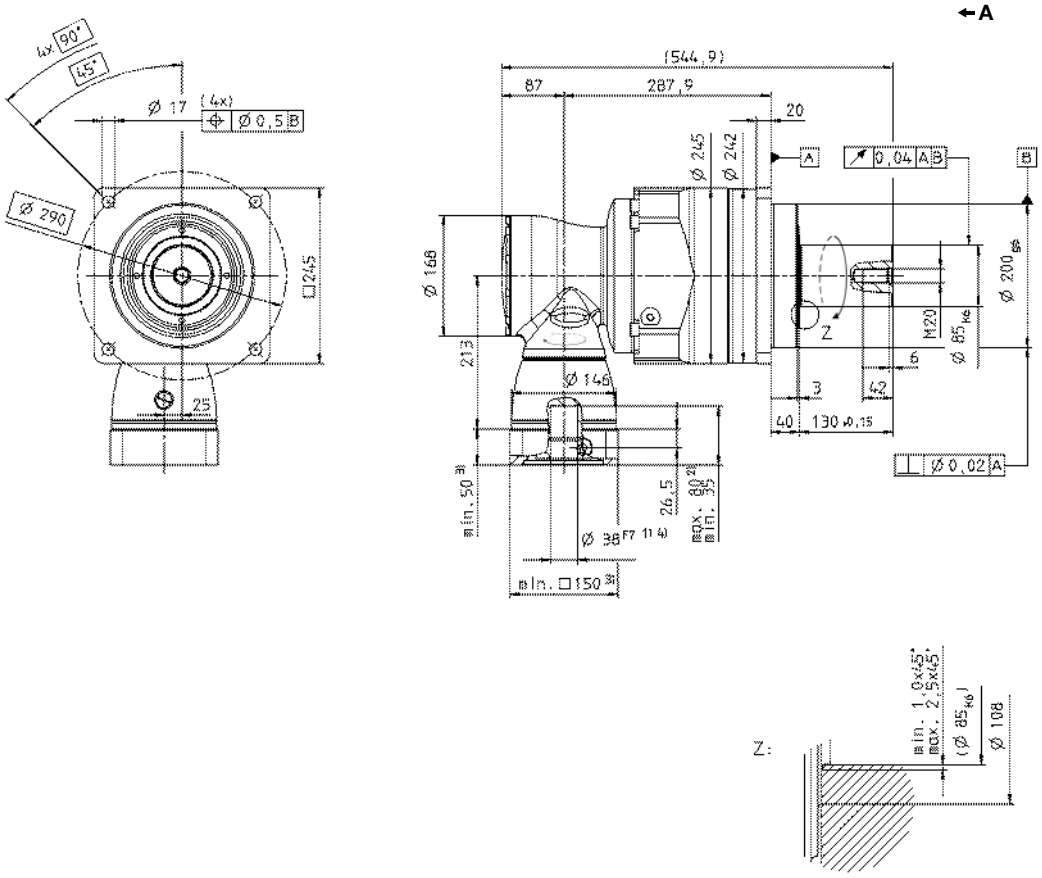
				3-stage													
Ratio [a]	i			**48**	**64**	**100**	**125**	**140**	**175**	**200**	**250**	**280**	**350**	**400**	**500**	**700**	**1000**
Max. acceleration torque (max. 1000 cycles per hour)	T_{2B}	Nm		4500	4500	4500	4500	4500	4500	4500	4500	4300	4500	4000	4300	4300	3400
		in.lb		39825	39825	39825	39825	39825	39825	39825	39825	38055	39825	35400	38055	38055	30090
Nominal output torque (with n_{1N})	T_{2N}	Nm		2500	2500	2500	2500	2500	2500	2500	2500	2300	2500	2500	2500	2300	1700
		in.lb		22125	22125	22125	22125	22125	22125	22125	22125	20355	22125	22125	22125	20355	15045
Emergency stop torque (permitted 1000 times during the service life of the gearhead)	T_{2Not}	Nm		6400	8000	8500	8500	8500	8500	8500	8500	8500	8500	8500	8500	8500	6800
		in.lb		56640	70800	75225	75225	75225	75225	75225	75225	75225	75225	75225	75225	75225	60180
Nominal input speed (with T_{2N} and 20°C ambient temperature) [b), c)]	n_{1N}	rpm		1800	1900	1900	2100	1900	2100	2100	2100	2100	2100	2100	2100	2100	2100
Max. continuous speed (with 20 % T_{2N} and 20°C ambient temperature)	n_{1Ncym}	rpm		2000	2200	2600	2600	2300	2300	2300	2300	2300	2300	2300	2300	2300	2300
Max. input speed	n_{1Max}	rpm		4500	4500	4500	4500	4500	4500	4500	4500	4500	4500	4500	4500	4500	4500
Mean no load running torque (with n_1 = 3000 rpm and 20°C gearhead temperature) [d)]	T_{012}	Nm		11.0	8.0	7.0	7.0	8.0	8.0	7.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
		in.lb		94.3	70.8	62.0	62.0	70.8	70.8	62.0	53.1	53.1	53.1	53.1	53.1	53.1	53.1
Max. torsional backlash	j_t	arcmin		Standard ≤ 5,5 / Reduced ≤ 3,5													
Torsional rigidity	C_{t21}	Nm/ arcmin		510	510	510	510	510	510	510	510	510	510	510	510	510	510
		in.lb/ arcmin		4.514	4.514	4.514	4.514	4.514	4.514	4.514	4.514	4.514	4.514	4.514	4.514	4.514	4.514
Max. axial force [e)]	F_{2AMax}	N		33000													
		lb_f		7425													
Max. radial force [e)]	F_{2RMax}	N		30000													
		lb_f		6750													
Max. tilting moment	M_{2KMax}	Nm		5000													
		in.lb		44250													
Efficiency at full load	η	%		92													
Service life (For calculation, see the Chapter "Information")	L_h	h		> 20000													
Weight incl. standard adapter plate	m	kg		93													
		lb_m		206													
Operating noise (with n_1 = 3000 rpm no load)	L_{PA}	dB(A)		≤ 71													
Max. permitted housing temperature		°C		+90													
		F		194													
Ambient temperature		°C		0 to +40													
		F		32 to 104													
Lubrication				Lubricated for life													
Paint				Blue RAL 5002													
Direction of rotation				Motor and gearhead opposite directions													
Protection class				IP 65													
Moment of inertia (relates to the drive) Clamping hub diameter [mm]	K	38	J_1	kgcm²	26.5	20.00	17.00	17.00	15.00	15.00	13.00	13.00	13.00	13.00	13.00	13.00	13.00	13.00
				10^{-3} in.lb.s²	23.40	17.70	15.05	15.05	13.28	13.28	11.51	11.51	11.51	11.51	11.51	11.51	11.51	11.51

[a)] Other ratios available on request
[b)] Higher speeds are possible if the nominal torque is reduced
[c)] For higher ambient temperatures, please reduce input speed
[d)] Idling torques decrease during operation
[e)] Refers to center of the output shaft or flange

All technical data for front output side applies.
Technical data for rearward output versions, see page 422.

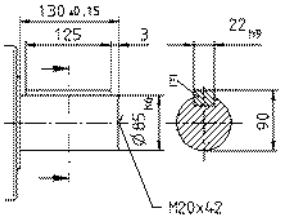
Please contact us for information on the best configuration for S1 conditions of use (continuous operation).

3-stage:

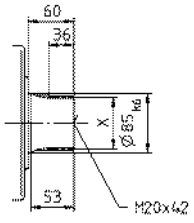


Alternatives: Output shaft variants

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



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

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.

CAD data is available under
http://www.wittenstein-alpha.de/en/info-and-cad-finder.html

Motor mounting according to operating manual

SPK+ 240 MF 4-stage i=144-1000

				4-stage												
Ratio [a]			*i*	**144**	**192**	**256**	**300**	**375**	**420**	**500**	**560**	**600**	**700**	**800**	**875**	**1000**
Max. acceleration torque (max. 1000 cycles per hour)			T_{2B} Nm	4500	4500	4500	4500	4500	4500	4500	4500	4500	4500	4500	4500	4500
			T_{2B} in.lb	39825	39825	39825	39825	39825	39825	39825	39825	39825	39825	39825	39825	39825
Nominal output torque (with n_{1N})			T_{2N} Nm	2500	2500	2500	2500	2500	2500	2500	2500	2500	2500	2500	2500	2500
			T_{2N} in.lb	22125	22125	22125	22125	22125	22125	22125	22125	22125	22125	22125	22125	22125
Emergency stop torque (permitted 1000 times during the service life of the gearhead)			T_{2Not} Nm	8000	8000	8000	8500	8500	8500	8500	8500	8500	8500	8500	8500	8500
			T_{2Not} in.lb	70800	70800	70800	75225	75225	75225	75225	75225	75225	75225	75225	75225	75225
Nominal input speed (with T_{2N} and 20°C ambient temperature) [b), c)]			n_{1N} rpm	2700	2900	2900	2900	2900	2900	2900	2900	2900	2900	2900	2900	3200
Max. continuous speed (with 20 % T_{2N} and 20°C ambient temperature)			n_{1Ncym} rpm	3800	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	4200
Max. input speed			n_{1Max} rpm	4500	4500	4500	4500	4500	4500	4500	4500	4500	4500	4500	4500	4500
Mean no load running torque (with n_1 = 3000 rpm and 20°C gearhead temperature) [d)]			T_{012} Nm	3.2	2.3	1.6	1.3	0.7	0.9	0.9	0.8	0.7	0.7	0.6	0.6	0.5
			T_{012} in.lb	28.3	20.4	14.2	11.5	6.2	8.0	8.0	7.1	6.2	6.2	5.3	5.3	4.4
Max. torsional backlash			j_t arcmin	Standard ≤ 5,5 / Reduced ≤ 3,5												
Torsional rigidity			C_{t21} Nm/ arcmin	510	510	510	510	510	510	510	510	510	510	510	510	510
			C_{t21} in.lb/ arcmin	4.514	4.514	4.514	4.514	4.514	4.514	4.514	4.514	4.514	4.514	4.514	4.514	4.514
Max. axial force [e)]			F_{2AMax} N	33000												
			F_{2AMax} lb_f	7425												
Max. radial force [e)]			F_{2RMax} N	30000												
			F_{2RMax} lb_f	6750												
Max. tilting moment			M_{2KMax} Nm	5000												
			M_{2KMax} in.lb	44250												
Efficiency at full load			η %	90												
Service life (For calculation, see the Chapter "Information")			L_h h	> 20000												
Weight incl. standard adapter plate			*m* kg	96												
			m lb_m	212												
Operating noise (with n_1 = 3000 rpm no load)			L_{PA} dB(A)	≤ 71												
Max. permitted housing temperature			°C	+90												
			F	194												
Ambient temperature			°C	0 to +40												
			F	32 to 104												
Lubrication				Lubricated for life												
Paint				Blue RAL 5002												
Direction of rotation				Motor and gearhead opposite directions												
Protection class				IP 65												
Moment of inertia (relates to the drive) Clamping hub diameter [mm]	G	24	J_1 kgcm²	5.96	4.30	3.90	3.32	3.31	2.80	3.18	2.80	2.49	2.73	2.49	2.73	2.46
			J_1 10^{-3} in.lb.s²	5.28	3.81	3.45	2.94	2.93	2.48	2.82	2.47	2.21	2.42	2.20	2.42	2.18
	K	38	J_1 kgcm²	12.87	11.19	10.81	10.23	10.22	9.72	10.09	9.71	9.40	9.65	9.40	9.65	9.37
			J_1 10^{-3} in.lb.s²	11.39	9.91	9.57	9.05	9.05	8.60	8.93	8.59	8.32	8.54	8.32	8.54	8.29

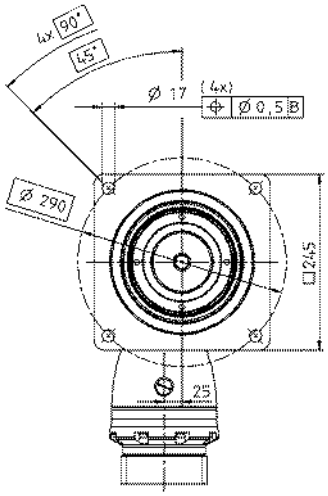
[a)] Other ratios available on request
[b)] Higher speeds are possible if the nominal torque is reduced
[c)] For higher ambient temperatures, please reduce input speed
[d)] Idling torques decrease during operation
[e)] Refers to center of the output shaft or flange

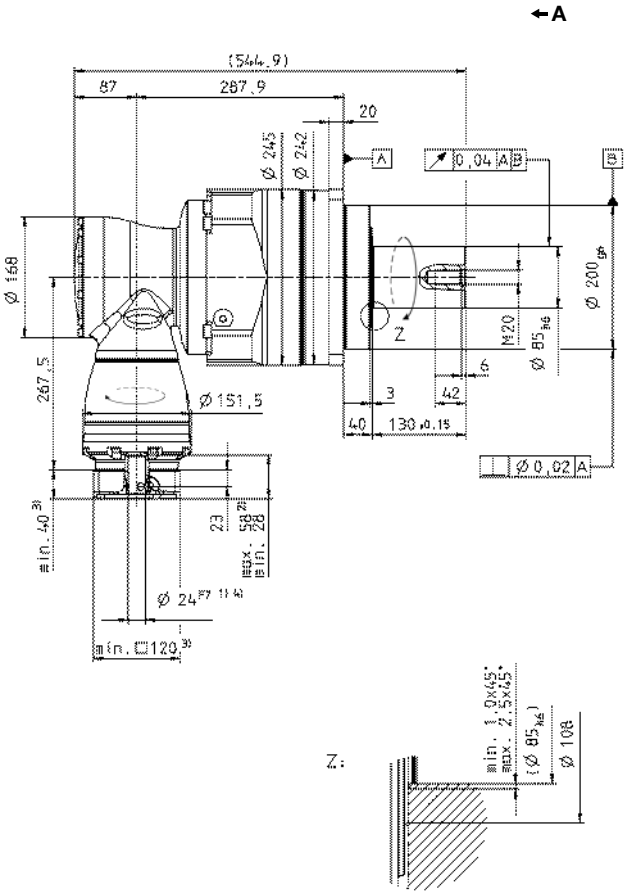
All technical data for front output side applies.
Technical data for rearward output versions, see page 422.

Please contact us for information on the best configuration for S1 conditions of use (continuous operation).

View A

4-stage:



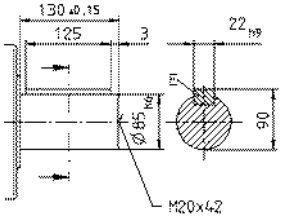


Right-angle gearheads
High End

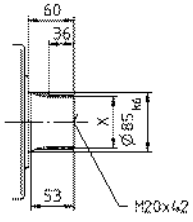
SPK+

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



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

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.

CAD data is available under
http://www.wittenstein-alpha.de/en/info-and-cad-finder.html

Motor mounting according to operating manual

SPK+ 240 MF 4-stage i=1225-10000

				4-stage								
Ratio [a]			***i***	**1225**	**1400**	**1750**	**2000**	**2800**	**3500**	**5000**	**7000**	**10000**
Max. acceleration torque (max. 1000 cycles per hour)			T_{2B} Nm	4500	4500	4500	4200	4300	4500	4300	4300	3400
			T_{2B} in.lb	39825	39825	39825	37170	38055	39825	38055	38055	30090
Nominal output torque (with n_{1N})			T_{2N} Nm	2500	2500	2500	2500	2300	2500	2500	2300	1700
			T_{2N} in.lb	22125	22125	22125	22125	20355	22125	22125	20355	15045
Emergency stop torque (permitted 1000 times during the service life of the gearhead)			T_{2Not} Nm	8500	8500	8500	8000	8500	8500	8500	8500	6800
			T_{2Not} in.lb	75225	75225	75225	70800	75225	75225	75225	75225	60180
Nominal input speed (with T_{2N} and 20°C ambient temperature) [b), c)]			n_{1N} rpm	2900	2900	3200	3900	3900	3900	3900	3900	3900
Max. continuous speed (with 20 % T_{2N} and 20°C ambient temperature)			n_{1Ncym} rpm	4000	4000	4200	4200	4200	4200	4200	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) [d)]			T_{012} Nm	0.6	0.6	0.4	0.4	0.4	0.4	0.4	0.3	0.3
			T_{012} in.lb	5.3	5.3	3.5	3.5	3.5	3.5	3.5	2.7	2.7
Max. torsional backlash			j_t arcmin	Standard ≤5,5 / Reduced ≤3,5								
Torsional rigidity			C_{t21} Nm/ arcmin	510	510	510	510	510	510	510	510	510
			C_{t21} in.lb/ arcmin	4.514	4.514	4.514	4.514	4.514	4.514	4.514	4.514	4.514
Max. axial force [e)]			F_{2AMax} N	33000								
			F_{2AMax} lb_f	7425								
Max. radial force [e)]			F_{2RMax} N	30000								
			F_{2RMax} lb_f	6750								
Max. tilting moment			M_{2KMax} Nm	5000								
			M_{2KMax} in.lb	44250								
Efficiency at full load			η %	90								
Service life (For calculation, see the Chapter "Information")			L_h h	> 20000								
Weight incl. standard adapter plate			m kg	96								
			m lb_m	212								
Operating noise (with n_1 = 3000 rpm no load)			L_{PA} dB(A)	≤ 71								
Max. permitted housing temperature			°C	+90								
			F	194								
Ambient temperature			°C	0 to +40								
			F	32 to 104								
Lubrication				Lubricated for life								
Paint				Blue RAL 5002								
Direction of rotation				Motor and gearhead opposite directions								
Protection class				IP 65								
Moment of inertia (relates to the drive) Clamping hub diameter [mm]	G	24	J_1 kgcm²	2.73	2.49	2.46	2.42	2.42	2.42	2.42	2.42	2.42
			J_1 10^{-3} in.lb.s²	2.42	2.20	2.17	2.14	2.14	2.14	2.14	2.14	2.14
	K	38	J_1 kgcm²	9.64	9.40	9.37	9.33	9.33	9.33	9.33	9.33	9.33
			J_1 10^{-3} in.lb.s²	8.53	8.32	8.29	8.26	8.26	8.26	8.26	8.26	8.26

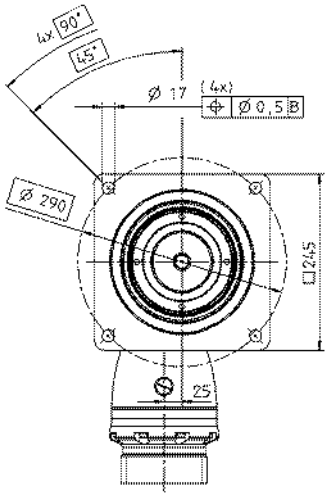
[a)] Other ratios available on request
[b)] Higher speeds are possible if the nominal torque is reduced
[c)] For higher ambient temperatures, please reduce input speed
[d)] Idling torques decrease during operation
[e)] Refers to center of the output shaft or flange

All technical data for front output side applies.
Technical data for rearward output versions, see page 422.

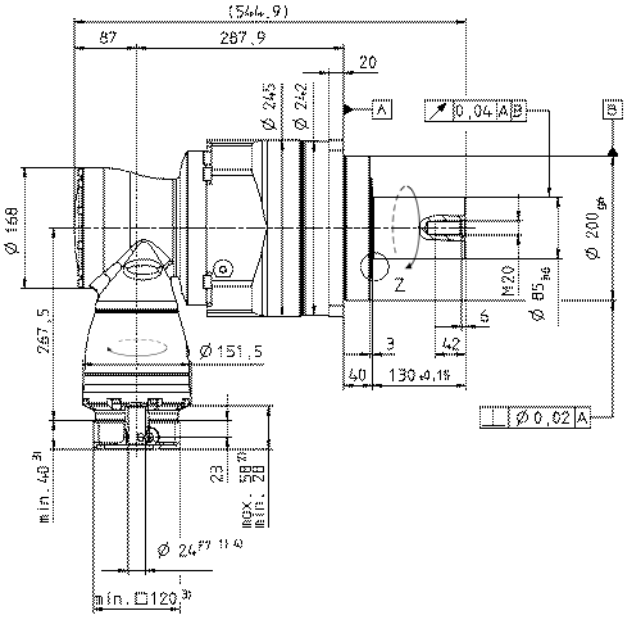
Please contact us for information on the best configuration for S1 conditions of use (continuous operation).

View A

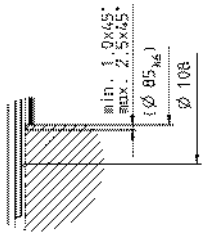
4-stage:



←A

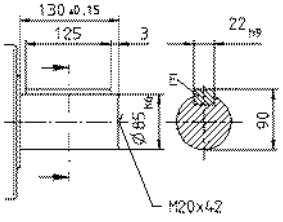


Z:

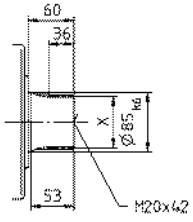


Alternatives: Output shaft variants

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



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

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.

CAD data is available under
http://www.wittenstein-alpha.de/en/info-and-cad-finder.html

Motor mounting according to operating manual

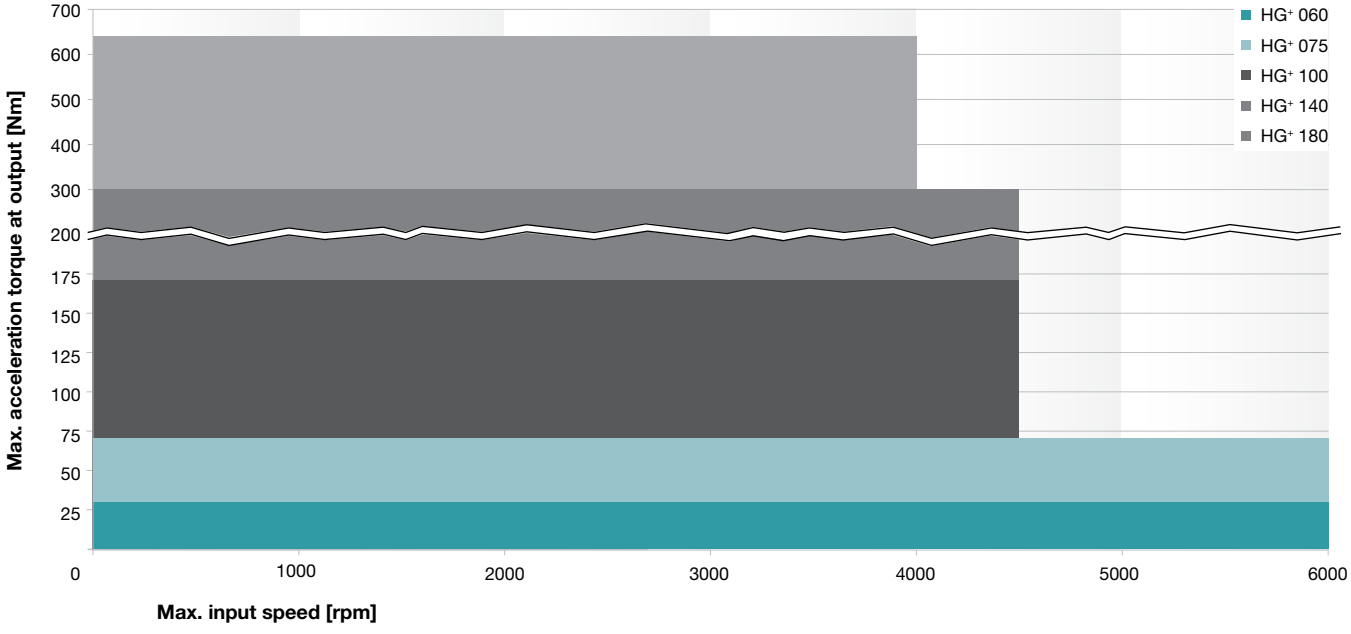
HG⁺ – Precise hollow shaft solution

The successor to our versatile hypoid gearhead with hollow shaft on one/both sides.

With the HG⁺, low torsional backlash and high torsional rigidity assure maximum positioning accuracy of your drives and precision of your machines – even during highly dynamic operation.

Quick size selection

HG⁺ MF (example for i = 5)
For applications in cyclic operation (DC ≤ 60%) or continuous operation (DC ≥ 60%)



Versions and Applications

Features	**HG+** MF version page 242
Power density	• •
Positioning accuracy (e.g clamped drives)	• •
Highly dynamic applications	• •

Product features

Ratios [c]		3 – 100
Torsional backlash [arcmin] [c]	Standard	≤ 4
	Reduced	–
Output type		
Smooth output shaft, rear side		•
Keywayed output shaft, rear side		•
Hollow shaft interface Connected via shrink disc		•
Hollow shaft interface, rear side Connected via shrink disc		•
Closed cover, rear side		•
Input type		
Motor mounted version		•
Type		
ATEX [a]		•
Food-grade lubrication [a] [b]		•
Corrosion resistant [a] [b]		•
Accessories		
Coupling		•
Shrink disc		•
torqXis sensor flange		•
Intermediate plate for cooling connection		•

[a] Power reduction: technical data available upon request [b] Please contact WITTENSTEIN alpha [c] In relation to reference sizes

HG+ 060 MF 1/2-stage

					1-stage					2-stage									
Ratio [a]			*i*		**3**	**4**	**5**	**7**	**10**	**12**	**16**	**20**	**25**	**28**	**35**	**40**	**50**	**70**	**100**
Max. acceleration torque (max. 1000 cycles per hour)			T_{2B}	Nm	30	30	30	25	20	30	30	30	30	30	30	30	30	25	20
				in.lb	266	266	266	221	177	266	266	266	266	266	266	266	266	221	177
Nominal output torque (with n_{1N})			T_{2N}	Nm	22	22	22	20	15	22	22	22	22	22	22	22	22	20	15
				in.lb	195	195	195	177	133	195	195	195	195	195	195	195	195	177	133
Emergency stop torque (permitted 1000 times during the service life of the gearhead)			T_{2Not}	Nm	40	50	50	45	40	50	50	50	50	50	50	50	50	45	40
				in.lb	354	443	443	398	354	443	443	443	443	443	443	443	443	398	354
Nominal input speed (with T_{2N} and 20°C ambient temperature) [b), c)]			n_{1N}	rpm	2500	2700	3000	3000	3000	4400	4400	4400	4400	4400	4400	4400	4800	5500	5500
Max. continuous speed (with 20% T_{2N} and 20°C ambient temperature)			n_{1Ncym}	rpm	3000	3500	4000	3500	3500	5000	5000	5000	5000	5000	5000	5000	5000	5500	5500
Max. input speed			n_{1Max}	rpm	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000
Mean no load running torque (with n_1 = 3000 rpm and 20°C gearhead temperature) [d)]			T_{012}	Nm	1.3	1.2	1.1	1.3	1.2	0.2	0.2	0.2	0.2	0.2	0.2	0.1	0.1	0.1	0.1
				in.lb	11.5	10.6	9.7	11.5	10.6	1.8	1.8	1.8	1.8	1.8	1.8	0.9	0.9	0.9	0.9
Max. torsional backlash			j_t	arcmin	≤ 5														
Torsional rigidity			C_{t21}	Nm/ arcmin	2.2	2.3	2.4	2.2	1.9	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.4	2.2	1.9
				in.lb/ arcmin	19	20	21	19	17	20	20	20	20	20	20	20	21	19	17
Max. axial force [e)]			F_{2AMax}	N	2400														
				lb_f	540														
Max. radial force [e)]			F_{2RMax}	N	2700														
				lb_f	608														
Max. tilting moment			M_{2KMax}	Nm	251														
				in.lb	2220														
Efficiency at full load			η	%	96					94									
Service life (For calculation, see the Chapter "Information")			L_h	h	> 20000														
Weight incl. standard adapter plate			*m*	kg	2.9					3.2									
				lb_m	6.4					7.1									
Operating noise (with n_1 = 3000 rpm no load)			L_{PA}	dB(A)	≤ 64														
Max. permitted housing temperature				°C	+90														
				F	194														
Ambient temperature				°C	0 to +40														
				F	32 to 104														
Lubrication					Lubricated for life														
Paint					Blue RAL 5002														
Direction of rotation					Motor and gearhead opposite directions														
Protection class					IP 65														
Moment of inertia (relates to the drive) Clamping hub diameter [mm]	B	11	J_1	kgcm²	–	–	–	–	–	0.09	0.09	0.07	0.07	0.06	0.06	0.06	0.06	0.06	0.06
				10^{-3} in.lb.s²						0.08	0.08	0.07	0.06	0.06	0.06	0.05	0.05	0.05	0.05
	C	14	J_1	kgcm²	0.52	0.44	0.40	0.36	0.34	0.20	0.20	0.19	0.19	0.18	0.18	0.17	0.17	0.17	0.17
				10^{-3} in.lb.s²	0.46	0.39	0.35	0.32	0.30	0.18	0.18	0.17	0.16	0.16	0.16	0.15	0.15	0.15	0.15
	E	19	J_1	kgcm²	0.87	0.79	0.75	0.71	0.70	–	–	–	–	–	–	–	–	–	–
				10^{-3} in.lb.s²	0.77	0.70	0.66	0.63	0.62										

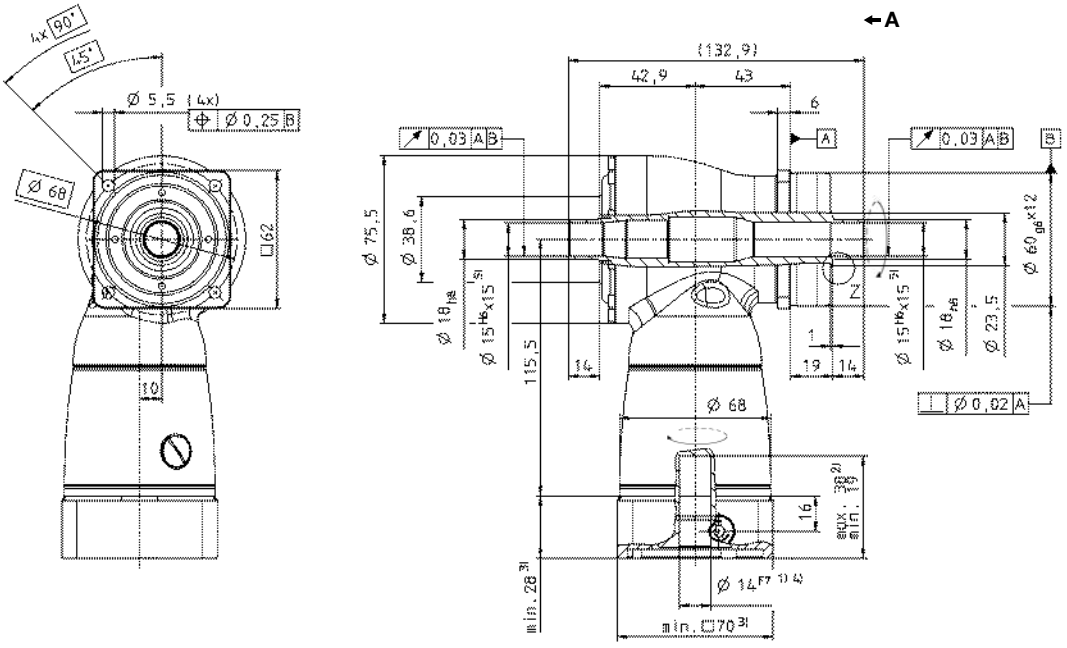
Please contact us for information on the best configuration for S1 conditions of use (continuous operation).

[a)] Other ratios available on request
[b)] Higher speeds are possible if the nominal torque is reduced
[c)] For higher ambient temperatures, please reduce input speed
[d)] Idling torques decrease during operation
[e)] Refers to center of the output shaft or flange

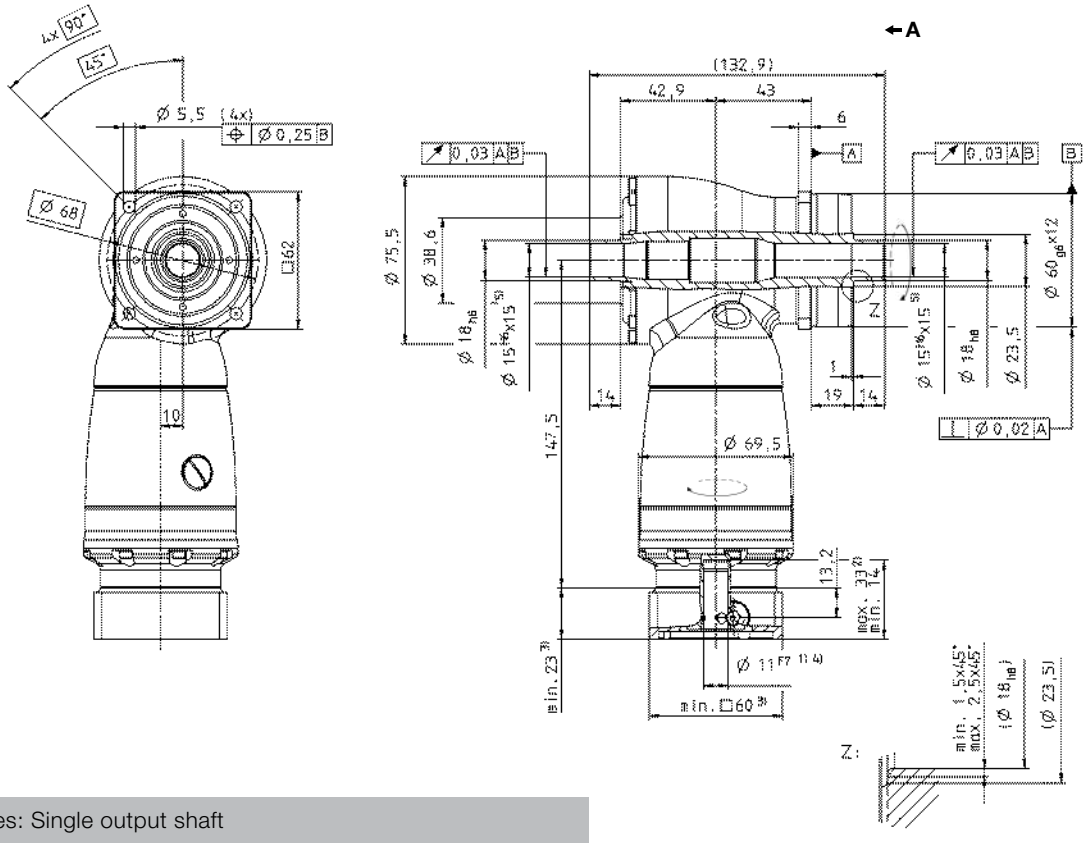
All technical data for front output side applies.
Technical data for rearward output versions, see page 422.

View A

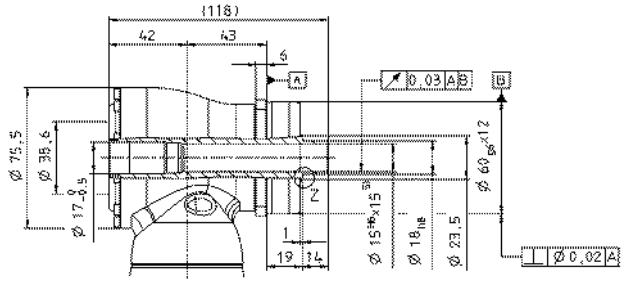
1-stage:



2-stage:



Alternatives: Single output shaft



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

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.

CAD data is available under www.wittenstein-alpha.com

Motor mounting according to operating manual

HG+ 075 MF 1/2-stage

					1-stage					2-stage									
Ratio [a]			*i*		**3**	**4**	**5**	**7**	**10**	**12**	**16**	**20**	**25**	**28**	**35**	**40**	**50**	**70**	**100**
Max. acceleration torque (max. 1000 cycles per hour)			T_{2B}	Nm	70	70	70	60	50	70	70	70	70	70	70	70	70	60	50
				in.lb	620	620	620	531	443	620	620	620	620	620	620	620	620	531	443
Nominal output torque (with n_{1N})			T_{2N}	Nm	50	50	50	45	40	50	50	50	50	50	50	50	50	45	40
				in.lb	443	443	443	398	354	443	443	443	443	443	443	443	443	398	354
Emergency stop torque (permitted 1000 times during the service life of the gearhead)			T_{2Not}	Nm	95	115	115	110	100	115	115	115	115	115	115	115	115	110	100
				in.lb	841	1018	1018	974	885	1018	1018	1018	1018	1018	1018	1018	1018	974	885
Nominal input speed (with T_{2N} and 20°C ambient temperature) [b), c)]			n_{1N}	rpm	2300	2500	2800	2800	2800	3500	3500	3500	3500	3500	3500	3500	3800	4500	4500
Max. continuous speed (with 20?% T_{2N} and 20°C ambient temperature)			n_{1Ncym}	rpm	3000	3500	4000	3500	3500	4500	4500	4500	4500	4500	4500	4500	4500	4500	4500
Max. input speed			n_{1Max}	rpm	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000
Mean no load running torque (with n_1 = 3000 rpm and 20°C gearhead temperature) [d)]			T_{012}	Nm	2.2	1.9	1.7	2.2	2.0	0.3	0.3	0.2	0.2	0.2	0.2	0.1	0.1	0.1	0.1
				in.lb	19	17	15	19	18	2.7	2.7	1.8	1.8	1.8	1.8	0.9	0.9	0.9	0.9
Max. torsional backlash			j_t	arcmin	≤ 4														
Torsional rigidity			C_{t21}	Nm/ arcmin	5.3	5.9	6.7	6.6	6.5	5.9	5.9	5.9	5.9	5.9	5.9	5.9	6.7	6.6	6.5
				in.lb/ arcmin	47	52	60	58	57	52	52	52	52	52	52	52	59	58	58
Max. axial force [e)]			F_{2AMax}	N	3400														
				lb_f	765														
Max. radial force [e)]			F_{2RMax}	N	4000														
				lb_f	900														
Max. tilting moment			M_{2KMax}	Nm	437														
				in.lb	3867														
Efficiency at full load			η	%	96					94									
Service life (For calculation, see the Chapter "Information")			L_h	h	> 20000														
Weight incl. standard adapter plate			*m*	kg	4.8					5.1									
				lb_m	10.6					11.3									
Operating noise (with n_1 = 3000 rpm no load)			L_{PA}	dB(A)	≤ 66														
Max. permitted housing temperature				°C	+90														
				F	194														
Ambient temperature				°C	0 to +40														
				F	32 to 104														
Lubrication					Lubricated for life														
Paint					Blue RAL 5002														
Direction of rotation					Motor and gearhead opposite directions														
Protection class					IP 65														
Moment of inertia (relates to the drive) Clamping hub diameter [mm]	C	14	J_1	kgcm²	–	–	–	–	–	0.28	0.27	0.23	0.23	0.20	0.20	0.18	0.18	0.18	0.18
				10^{-3} in.lb.s²						0.25	0.24	0.21	0.20	0.18	0.18	0.16	0.16	0.16	0.16
	E	19	J_1	kgcm²	1.46	1.19	1.06	0.95	0.90	0.73	0.71	0.68	0.67	0.63	0.62	0.63	0.63	0.63	0.63
				10^{-3} in.lb.s²	1.29	1.05	0.94	0.84	0.79	0.64	0.63	0.60	0.59	0.55	0.55	0.56	0.55	0.55	0.55
	H	28	J_1	kgcm²	2.86	2.60	2.47	2.36	2.31	–	–	–	–	–	–	–	–	–	–
				10^{-3} in.lb.s²	2.53	2.30	2.19	2.09	2.04										

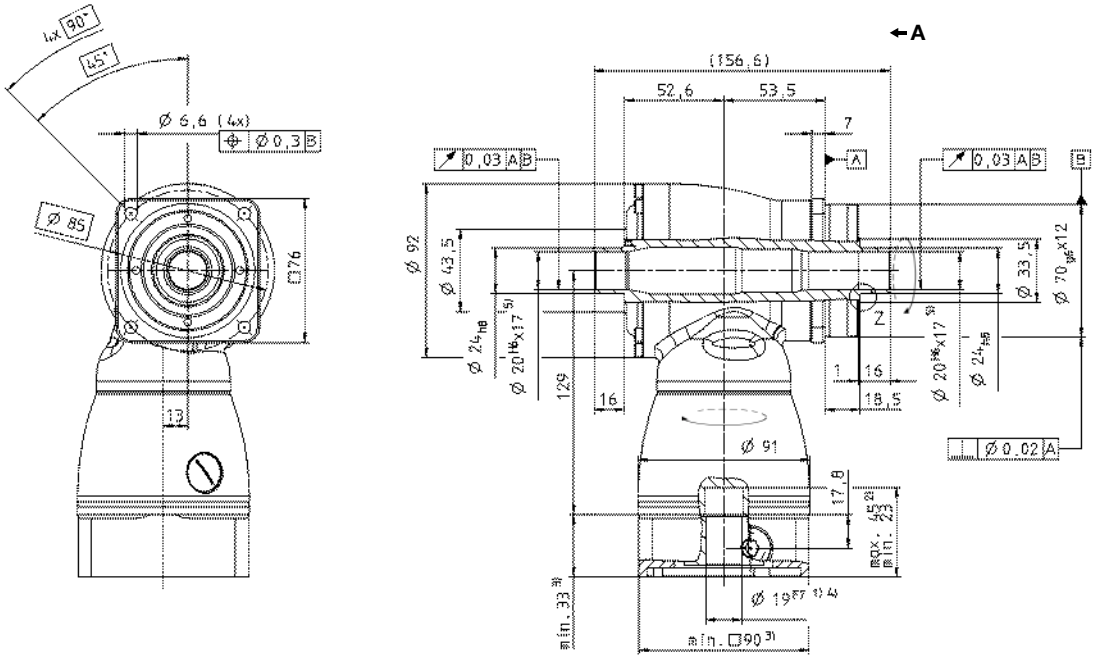
Please contact us for information on the best configuration for S1 conditions of use (continuous operation).

[a)] Other ratios available on request
[b)] Higher speeds are possible if the nominal torque is reduced
[c)] For higher ambient temperatures, please reduce input speed
[d)] Idling torques decrease during operation
[e)] Refers to center of the output shaft or flange

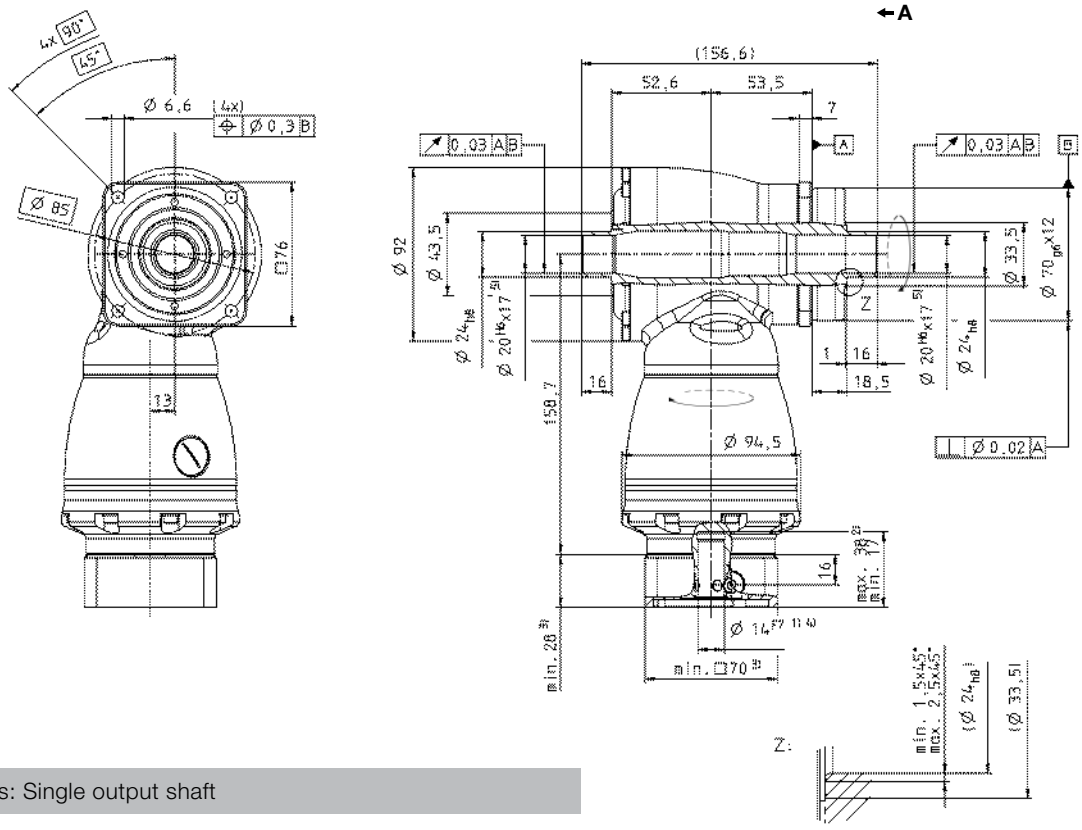
All technical data for front output side applies.
Technical data for rearward output versions, see page 422.

View A

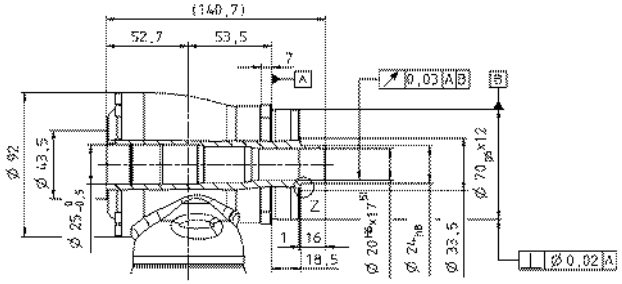
1-stage:



2-stage:



Alternatives: Single output shaft



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

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.

CAD data is available under www.wittenstein-alpha.com

Motor mounting according to operating manual

HG+ 100 MF 1/2-stage

					1-stage					2-stage									
Ratio [a]			*i*		**3**	**4**	**5**	**7**	**10**	**12**	**16**	**20**	**25**	**28**	**35**	**40**	**50**	**70**	**100**
Max. acceleration torque (max. 1000 cycles per hour)			T_{2B}	Nm	170	170	170	145	125	170	170	170	170	170	170	170	170	145	125
				in.lb	1505	1505	1505	1283	1106	1505	1505	1505	1505	1505	1505	1505	1505	1283	1106
Nominal output torque (with n_{1N})			T_{2N}	Nm	100	100	100	90	80	100	100	100	100	100	100	100	100	90	80
				in.lb	885	885	885	797	708	885	885	885	885	885	885	885	885	797	708
Emergency stop torque (permitted 1000 times during the service life of the gearhead)			T_{2Not}	Nm	220	260	260	255	250	260	260	260	260	260	260	260	260	255	250
				in.lb	1947	2301	2301	2257	2213	2301	2301	2301	2301	2301	2301	2301	2301	2257	2213
Nominal input speed (with T_{2N} and 20°C ambient temperature) [b), c)]			n_{1N}	rpm	2200	2400	2700	2500	2500	3100	3100	3100	3100	3100	3100	3100	3500	4200	4200
Max. continuous speed (with 20% T_{2N} and 20°C ambient temperature)			n_{1Ncym}	rpm	3000	3400	3800	3400	3400	4000	4000	4000	4000	4000	4000	4000	4000	4200	4200
Max. input speed			n_{1Max}	rpm	4500	4500	4500	4500	4500	4500	4500	4500	4500	4500	4500	4500	4500	4500	4500
Mean no load running torque (with n_1 = 3000 rpm and 20°C gearhead temperature) [d)]			T_{012}	Nm	4.2	3.3	2.5	3.9	3.1	0.7	0.7	0.6	0.4	0.4	0.3	0.2	0.2	0.2	0.2
				in.lb	37	29	22	35	27	6.2	6.2	5.3	3.5	3.5	2.7	1.8	1.8	1.8	1.8
Max. torsional backlash			j_t	arcmin	≤ 4														
Torsional rigidity			C_{t21}	Nm/ arcmin	10.7	12.1	14.0	14.2	14.4	12.1	12.1	12.1	12.1	12.1	12.1	12.1	14.0	14.2	14.4
				in.lb/ arcmin	95	107	124	126	127	107	107	107	107	107	107	107	124	126	127
Max. axial force [e)]			F_{2AMax}	N	5700														
				lb_f	1283														
Max. radial force [e)]			F_{2RMax}	N	6300														
				lb_f	1418														
Max. tilting moment			M_{2KMax}	Nm	833														
				in.lb	7370														
Efficiency at full load			η	%	96					94									
Service life (For calculation, see the Chapter "Information")			L_h	h	> 20000														
Weight incl. standard adapter plate			*m*	kg	9.3					9.5									
				lb_m	21					21									
Operating noise (with n_1 = 3000 rpm no load)			L_{PA}	dB(A)	≤ 66														
Max. permitted housing temperature				°C	+90														
				F	194														
Ambient temperature				°C	0 to +40														
				F	32 to 104														
Lubrication					Lubricated for life														
Paint					Blue RAL 5002														
Direction of rotation					Motor and gearhead opposite directions														
Protection class					IP 65														
Moment of inertia (relates to the drive) Clamping hub diameter [mm]	E	19	J_1	kgcm²	–	–	–	–	–	1.02	0.97	0.86	0.84	0.75	0.74	0.69	0.69	0.68	0.68
				10^{-3} in.lb.s²						0.91	0.86	0.76	0.74	0.66	0.66	0.61	0.61	0.60	0.60
	G	24	J_1	kgcm²	–	–	–	–	–	2.59	2.54	2.42	2.40	2.31	2.30	2.26	2.25	2.25	2.25
				10^{-3} in.lb.s²						2.29	2.25	2.14	2.13	2.05	2.04	2.00	1.99	1.99	1.99
	H	28	J_1	kgcm²	4.64	3.80	3.34	2.98	2.79	–	–	–	–	–	–	–	–	–	–
				10^{-3} in.lb.s²	4.10	3.36	2.95	2.64	2.47										
	K	38	J_1	kgcm²	11.8	11.0	10.6	10.2	10.0	–	–	–	–	–	–	–	–	–	–
				10^{-3} in.lb.s²	10.4	9.73	9.34	9.04	8.88										

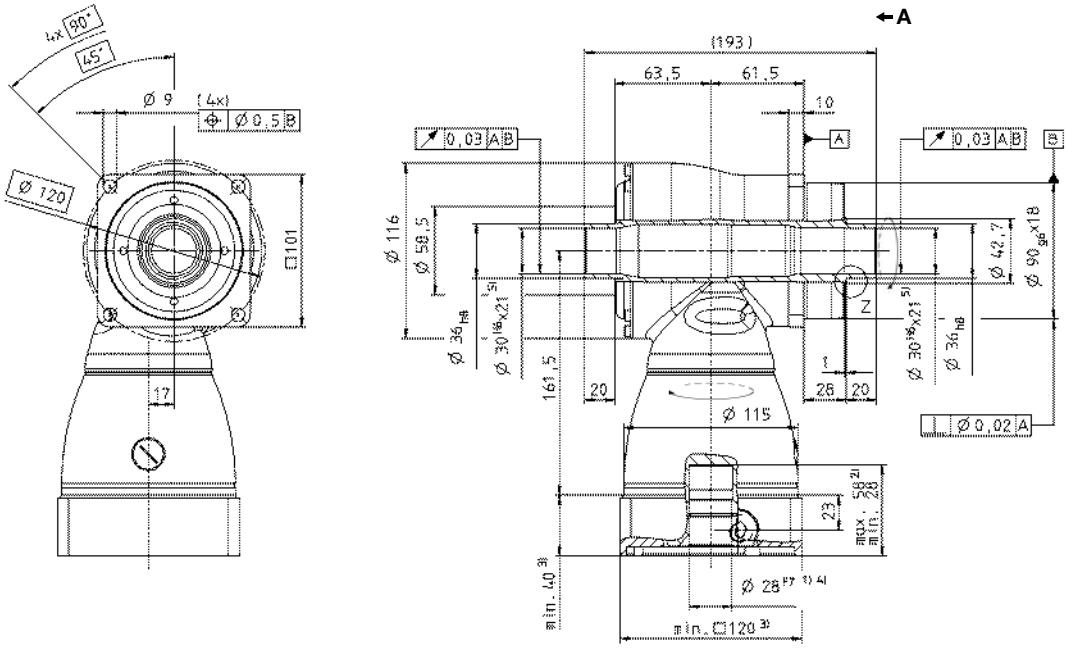
Please contact us for information on the best configuration for S1 conditions of use (continuous operation).

[a)] Other ratios available on request
[b)] Higher speeds are possible if the nominal torque is reduced
[c)] For higher ambient temperatures, please reduce input speed
[d)] Idling torques decrease during operation
[e)] Refers to center of the output shaft or flange

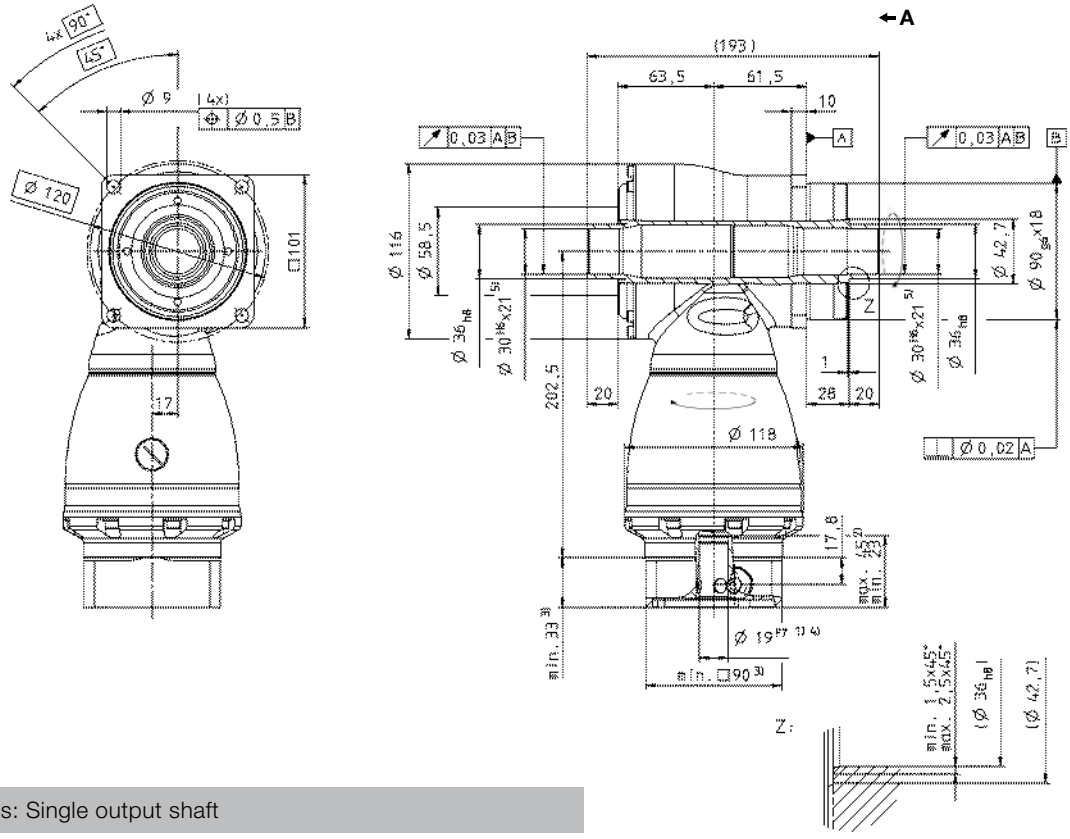
All technical data for front output side applies.
Technical data for rearward output versions, see page 422.

View A

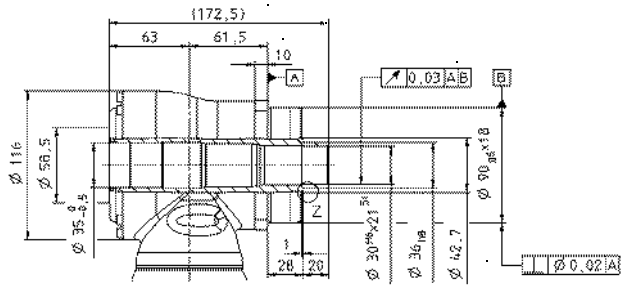
1-stage:



2-stage:



Alternatives: Single output shaft



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

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.

CAD data is available under www.wittenstein-alpha.com

Motor mounting according to operating manual

HG+ 140 MF 1/2-stage

				1-stage					2-stage									
Ratio [a]			*i*	**3**	**4**	**5**	**7**	**10**	**12**	**16**	**20**	**25**	**28**	**35**	**40**	**50**	**70**	**100**
Max. acceleration torque (max. 1000 cycles per hour)			T_{2B} Nm	300	300	300	250	210	300	300	300	300	300	300	300	300	250	210
			T_{2B} in.lb	2655	2655	2655	2213	1859	2655	2655	2655	2655	2655	2655	2655	2655	2213	1859
Nominal output torque (with n_{1N})			T_{2N} Nm	190	190	190	175	160	190	190	190	190	190	190	190	190	175	160
			T_{2N} in.lb	1682	1682	1682	1549	1416	1682	1682	1682	1682	1682	1682	1682	1682	1549	1416
Emergency stop torque (permitted 1000 times during the service life of the gearhead)			T_{2Not} Nm	400	500	500	450	400	500	500	500	500	500	500	500	500	450	400
			T_{2Not} in.lb	3540	4425	4425	3983	3540	4425	4425	4425	4425	4425	4425	4425	4425	3983	3540
Nominal input speed (with T_{2N} and 20°C ambient temperature) [b), c)]			n_{1N} rpm	1900	2000	2200	2000	2000	2900	2900	2900	2900	2900	2900	2900	3200	3200	3900
Max. continuous speed (with 20% T_{2N} and 20°C ambient temperature)			n_{1Ncym} rpm	2500	2800	3100	2800	2800	4000	4000	4000	4000	4000	4000	4000	4200	4200	4200
Max. input speed			n_{1Max} rpm	4500	4500	4500	4500	4500	4500	4500	4500	4500	4500	4500	4500	4500	4500	4500
Mean no load running torque (with n_1 = 3000 rpm and 20°C gearhead temperature) [d)]			T_{012} Nm	7.7	5.7	5.0	8.3	6.1	1.5	1.0	0.8	0.6	0.6	0.4	0.4	0.3	0.3	0.3
			T_{012} in.lb	68	50	44	73	54	13.3	8.9	7.1	5.3	5.3	3.5	3.5	2.7	2.7	2.7
Max. torsional backlash			j_t arcmin	≤ 4														
Torsional rigidity			C_{t21} Nm/ arcmin	32	36	41	39	38	36	36	36	36	36	36	36	41	39	38
			C_{t21} in.lb/ arcmin	287	321	360	346	337	319	319	319	319	319	319	319	363	345	336
Max. axial force [e)]			F_{2AMax} N	9900														
			F_{2AMax} lb_f	2228														
Max. radial force [e)]			F_{2RMax} N	9500														
			F_{2RMax} lb_f	2138														
Max. tilting moment			M_{2KMax} Nm	1692														
			M_{2KMax} in.lb	14974														
Efficiency at full load			η %	96					94									
Service life (For calculation, see the Chapter "Information")			L_h h	> 20000														
Weight incl. standardadapter plate			*m* kg	22.6					24									
			m lb_m	50					53									
Operating noise (with n_1 = 3000 rpm no load)			L_{PA} dB(A)	≤ 68														
Max. permitted housing temperature			°C	+90														
			F	194														
Ambient temperature			°C	0 to +40														
			F	32 to 104														
Lubrication				Lubricated for life														
Paint				Blue RAL 5002														
Direction of rotation				Motor and gearhead opposite directions														
Protection class				IP 65														
Moment of inertia (relates to the drive)	G	24	J_1 kgcm²	–	–	–	–	–	4.20	3.84	3.27	3.16	2.78	2.73	2.48	2.45	2.43	2.42
			J_1 10^{-3} in.lb.s²						3.71	3.40	2.90	2.80	2.46	2.41	2.20	2.17	2.15	2.14
Clamping hub diameter [mm]	K	38	J_1 kgcm²	25.0	19.1	16.3	14.1	12.8	11.1	10.7	10.2	10.1	9.69	9.64	9.39	9.37	9.34	9.33
			J_1 10^{-3} in.lb.s²	22.1	16.9	14.4	12.4	11.3	9.83	9.51	9.01	8.92	8.58	8.53	8.31	8.29	8.27	8.26

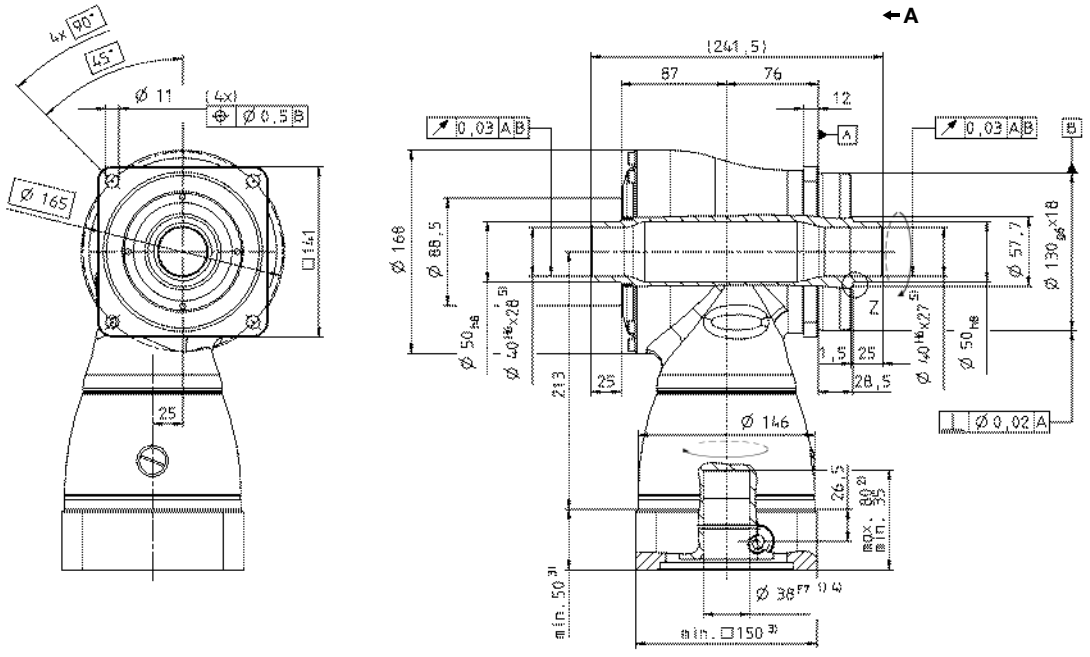
Please contact us for information on the best configuration for S1 conditions of use (continuous operation).

[a)] Other ratios available on request
[b)] Higher speeds are possible if the nominal torque is reduced
[c)] For higher ambient temperatures, please reduce input speed
[d)] Idling torques decrease during operation
[e)] Refers to center of the output shaft or flange

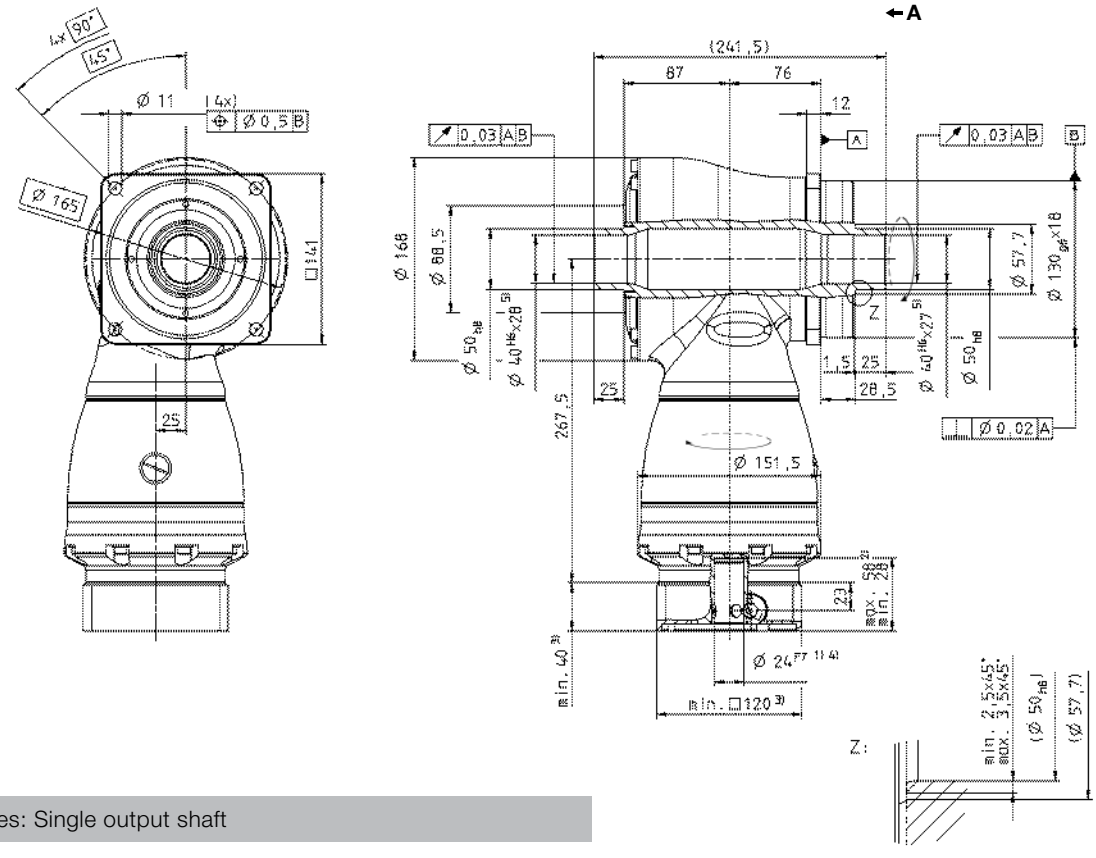
All technical data for front output side applies.
Technical data for rearward output versions, see page 422.

View A

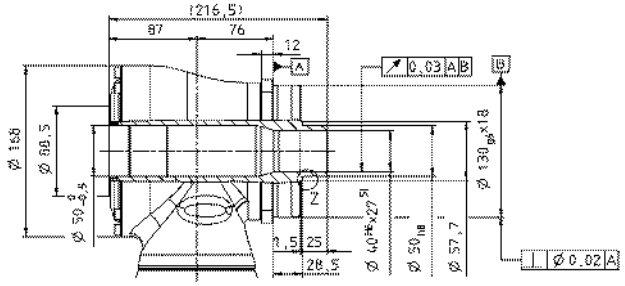
1-stage:



2-stage:



Alternatives: Single output shaft



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

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.

CAD data is available under www.wittenstein-alpha.com

Motor mounting according to operating manual

HG+ 180 MF 1/2-stage

				1-stage					2-stage									
Ratio [a]			***i***	**3**	**4**	**5**	**7**	**10**	**12**	**16**	**20**	**25**	**28**	**35**	**40**	**50**	**70**	**100**
Max. acceleration torque (max. 1000 cycles per hour)			T_{2B} Nm	640	640	640	550	470	640	640	640	640	640	640	640	640	550	470
			in.lb	5664	5664	5664	4868	4160	5664	5664	5664	5664	5664	5664	5664	5664	4868	4160
Nominal output torque (with n_{1N})			T_{2N} Nm	400	400	400	380	360	400	400	400	400	400	400	400	400	380	360
			in.lb	3540	3540	3540	3363	3186	3540	3540	3540	3540	3540	3540	3540	3540	3363	3186
Emergency stop torque (permitted 1000 times during the service life of the gearhead)			T_{2Not} Nm	900	1050	1050	970	900	1050	1050	1050	1050	1050	1050	1050	1050	970	900
			in.lb	7965	9293	9293	8585	7965	9293	9293	9293	9293	9293	9293	9293	9293	8585	7965
Nominal input speed (with T_{2N} and 20°C ambient temperature) [b), c)]			n_{1N} rpm	1600	1800	2000	1800	1800	2700	2700	2700	2700	2700	2700	2700	2900	3200	3400
Max. continuous speed (with 20% T_{2N} and 20°C ambient temperature)			n_{1Ncym} rpm	2000	2400	2800	2500	2500	3500	3500	3500	3500	3500	3500	3500	3500	3800	3800
Max. input speed			n_{1Max} rpm	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000
Mean no load running torque (with n_1 = 3000 rpm and 20°C gearhead temperature) [d)]			T_{012} Nm	16.0	13.0	11.0	16.5	14.0	3.3	2.5	2.0	1.8	1.4	1.3	1.0	1.0	1.0	1.0
			in.lb	142	115	97	146	124	29.2	22.1	17.7	15.9	12.4	11.5	8.9	8.9	8.9	8.9
Max. torsional backlash			j_t arcmin	≤ 4														
Torsional rigidity			C_{t21} Nm/ arcmin	71	80	91	89	88	80	80	80	80	80	80	80	91	89	88
			in.lb/ arcmin	633	711	803	791	780	708	708	708	708	708	708	708	805	788	779
Max. axial force [e)]			F_{2AMax} N	14200														
			lb_f	3195														
Max. radial force [e)]			F_{2RMax} N	14700														
			lb_f	3308														
Max. tilting moment			M_{2KMax} Nm	3213														
			in.lb	28435														
Efficiency at full load			η %	96					94									
Service life (For calculation, see the Chapter "Information")			L_h h	> 20000														
Weight incl. standardadapter plate			*m* kg	45.4					47									
			lb_m	100					104									
Operating noise (with n_1 = 3000 rpm no load)			L_{PA} dB(A)	≤ 68														
Max. permitted housing temperature			°C	+90														
			F	194														
Ambient temperature			°C	0 to +40														
			F	32 to 104														
Lubrication				Lubricated for life														
Paint				Blue RAL 5002														
Direction of rotation				Motor and gearhead opposite directions														
Protection class				IP 65														
Moment of inertia (relates to the drive) Clamping hub diameter [mm]	K	38	J_1 kgcm²	–	–	–	–	–	15.3	13.9	12.3	12.0	10.9	10.7	10.1	10.0	9.95	9.91
			10^{-3} in.lb.s²						13.5	12.3	10.9	10.6	9.65	9.48	8.96	8.88	8.80	8.77
	M	48	J_1 kgcm²	73.3	51.6	42.1	34.0	29.7	30.0	28.7	27.0	26.7	25.6	25.4	24.8	24.7	24.7	24.6
			10^{-3} in.lb.s²	64.9	45.6	37.3	30.1	26.3	26.6	25.4	23.9	23.6	22.7	22.5	22.0	21.9	21.8	21.8

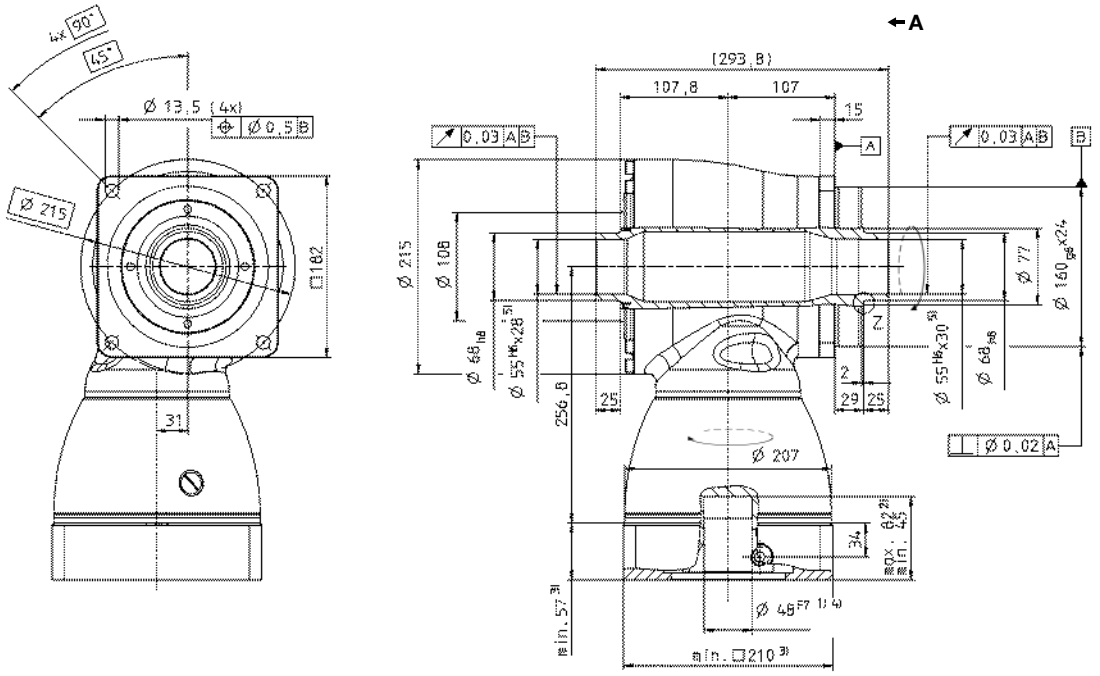
Please contact us for information on the best configuration for S1 conditions of use (continuous operation).

[a)] Other ratios available on request
[b)] Higher speeds are possible if the nominal torque is reduced
[c)] For higher ambient temperatures, please reduce input speed
[d)] Idling torques decrease during operation
[e)] Refers to center of the output shaft or flange

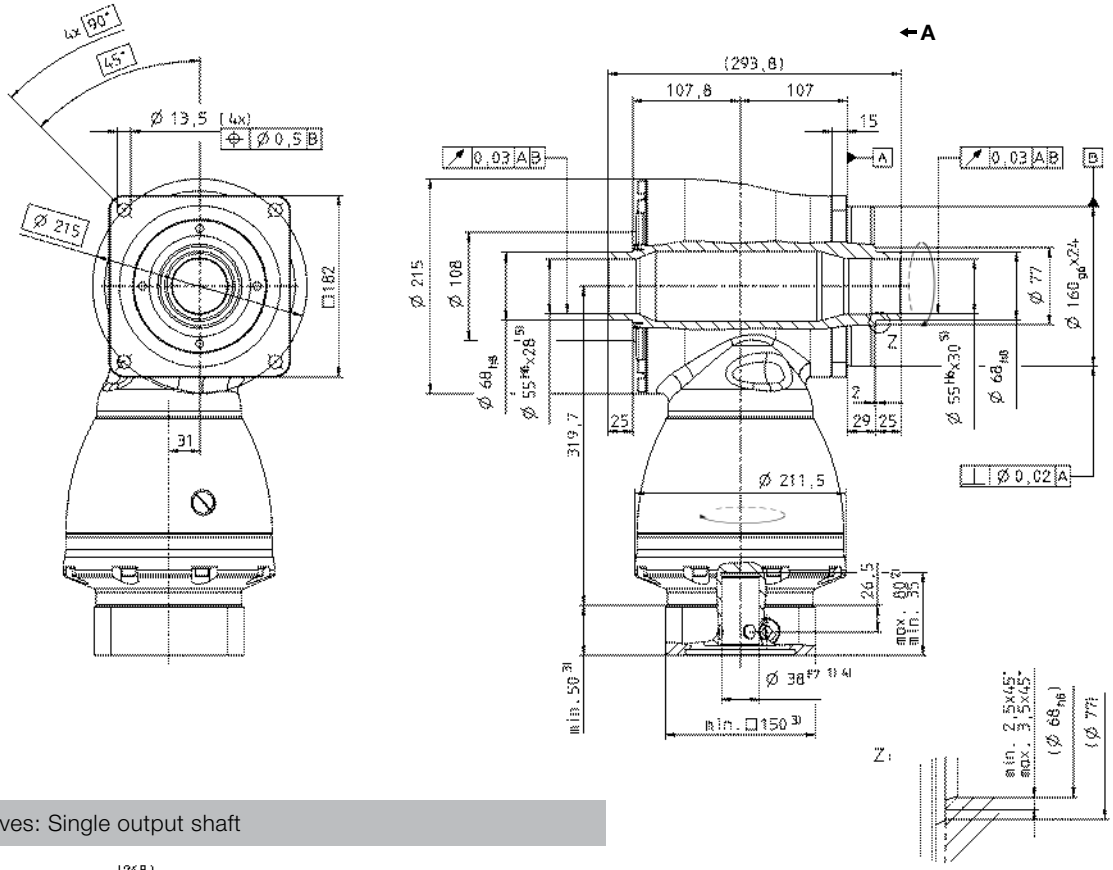
All technical data for front output side applies.
Technical data for rearward output versions, see page 422.

View A

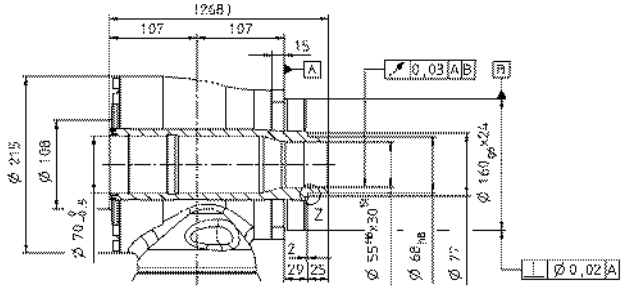
1-stage:



2-stage:



Alternatives: Single output shaft



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

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.

CAD data is available under www.wittenstein-alpha.com

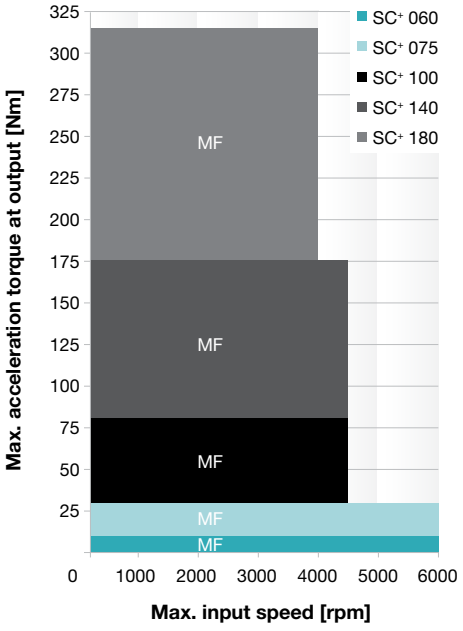
Motor mounting according to operating manual

SC+/SPC+/TPC+ – High performance with low ratios

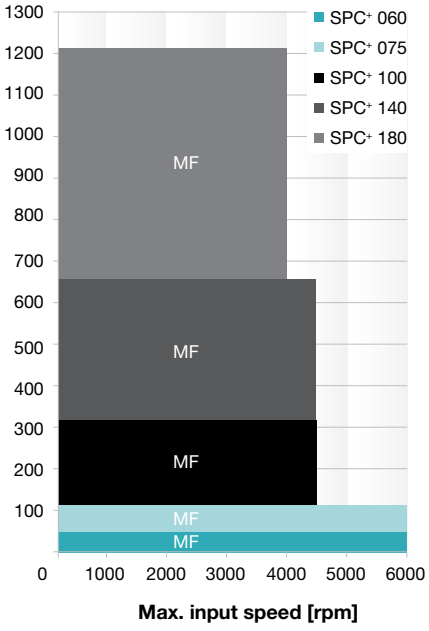
Low backlash right-angle gearheads with output shaft or output flange. This gearhead series is used in dynamic applications with low transmission ratios and demanding requirements with regard to precision, torque, and efficiency.

Quick size selection

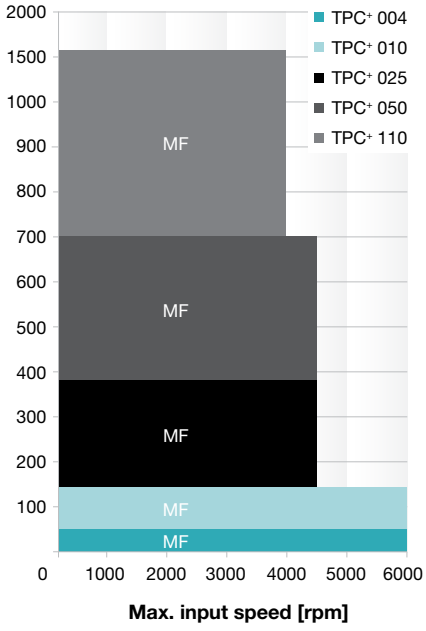
SC+ MF (example for i = 1)
For applications in cyclic operation
(duty cycle ≤ 60 %) or continuous operation
(duty cycle ≥ 60%)



SPC+ MF (example for i = 5)
For applications in cyclic operation
(duty cycle ≤ 60 %) or continuous operation
(duty cycle ≥ 60%)



TPC+ MF (example for i = 5)
For applications in cyclic operation
(duty cycle ≤ 60%) or continuous operation
(duty cycle ≥ 60%)



Versions and their uses

Features	**SC+** MF version Catalog page 254	**SPC+** MF version Catalog page 264	**TPC+** MF version Catalog page 274
Power density	• • •	• • •	• • •
Positioning accuracy (e.g clamped drives)	• •	• • •	• • •
Highly dynamic applications	• •	• •	• •
High output speeds	• • •	• •	• •

Product features

Ratios [c]		1 - 2	4 - 20	4 - 20
Backlash [arcmin] [c]	Standard	≤ 4	≤ 4	≤ 4
	Reduced	-	≤ 2	≤ 2
Output type				
Smooth output shaft		•	•	
Keywayed output shaft		•	•	
Output shaft with involute toothing			•	
Mounted shaft			•	
Output flange				•
System output with pinion				•
Input type				
Motor attachment version		•	•	•
Model				
Food-grade lubrication [a] [b]		•	•	•
Accessories				
Coupling		•	•	•
Rack		•	•	•
Pinion		•	•	•
Shrink disk			•	

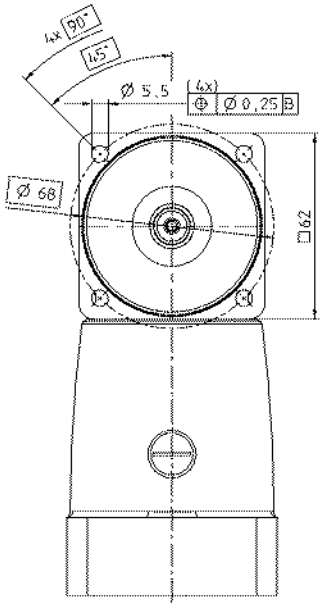
[a] Power reduction: Technical data available upon request [b] Please contact WITTENSTEIN alpha [c] Based on reference sizes

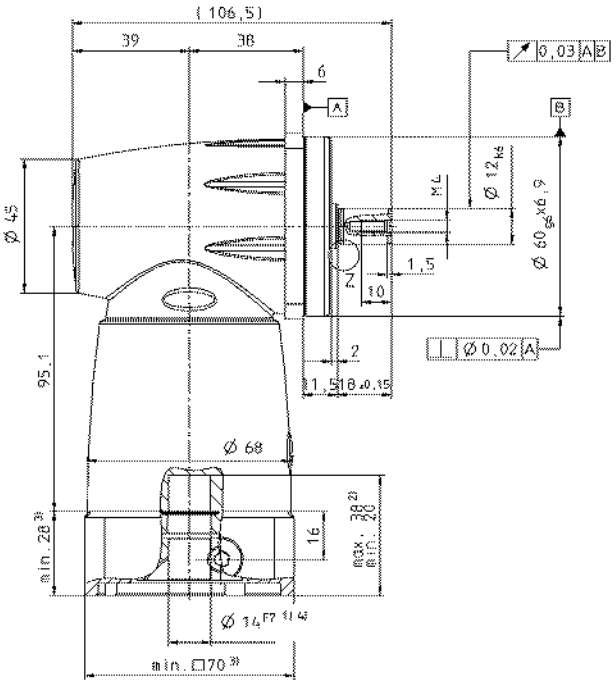
					1-stage	
Ratio			***i***		**1**	**2**
Max. acceleration torque (max. 1000 cycles per hour)			T_{2B}	Nm	10	10
				in.lb	89	89
Nominal output torque (with n_{1N})			T_{2N}	Nm	7	7
				in.lb	62	62
Emergency stop tourque (permitted 1000 times during the service life of the gearhead)			T_{2Not}	Nm	25	25
				in.lb	221	221
Nominal input speed (with T_{2N} and 20°C ambient temperature)			n_{1N}	rpm	5000	5500
Max. input speed			n_{1max}	rpm	6000	6000
Mean no-load running torque (with n_1=3000 rpm and 20°C gearhead temperature)			T_{012}	Nm	0.5	0.3
				in.lb	4.4	2.7
Max. torsional backlash			j_t	arcmin	≤ 5	
Torsional rigidity			C_{t21}	Nm/ arcmin	0.4	0.6
				in.lb/ arcmin	3.5	5.3
Max. axial force			F_{2AMax}	N	500	
				lb_f	113	
Max. radial force			F_{2RMax}	N	950	
				lb_f	214	
Max. tilting moment			M_{2KMax}	Nm	71	
				in.lb	628	
Efficiency at full load			η	%	97	
Service life			L_h	h	> 20000	
Weight (incl. ADP)			*m*	kg	1.9	
				lb_m	4.2	
Operating noise (with n1=3000 rpm no load)			L_{PA}	db(A)	≤ 66	
Max. permitted housing temperature				°C	+90	
				F	194	
Ambient temperature				°C	0 to +40	
				F	32 to 104	
Lubrication					Lubricated for life	
Paint					no paint	
Mounting position					any	
Direction of rotation					Motor and gearhead same direction	
Protection class					IP 65	
Moment of inertia (relates to the drive)	C	14	J_1	kgcm²	0.66	0.42
				10^{-3} in.lb.s²	0.58	0.37
Clamping hub diameter [mm]	E	19	J_1	kgcm²	0.99	0.75
				10^{-3} in.lb.s²	0.88	0.66

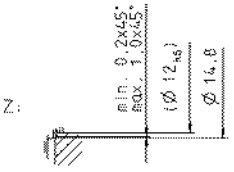
Please contact us for information on the best configuration for S1 conditions of use (continuous operation).

[a] Other ratios available on request
[b] Higher speeds are possible if the nominal torque is reduced
[c] For higher ambient temperatures, please reduce input speed
[d] Idling torques decrease during operation
[e] Refers to center of the output shaft or flange

1-stage:

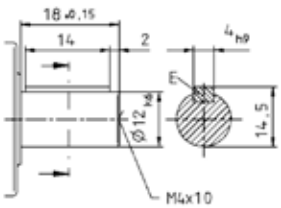






Alternatives: Output shaft variants

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



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

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.

CAD data is available under
http://www.wittenstein-alpha.de/en/info-and-cad-finder.html

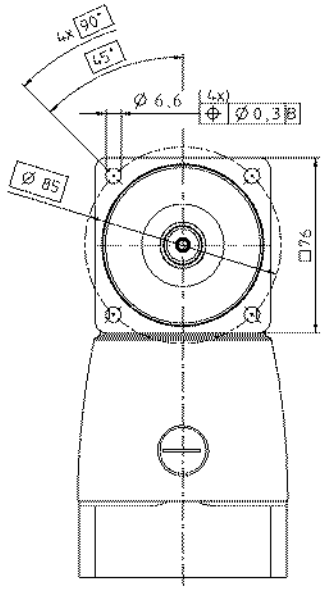
Motor mounting according to operating manual

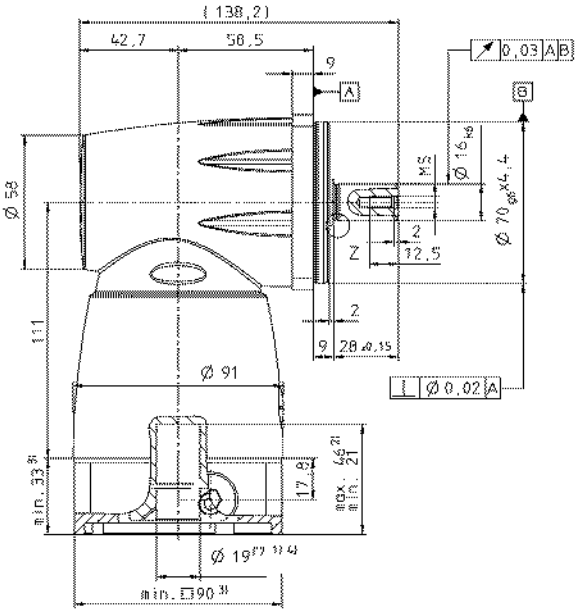
					1-stage	
Ratio			***i***		**1**	**2**
Max. acceleration torque (max. 1000 cycles per hour)			T_{2B}	Nm	30	30
				in.lb	266	266
Nominal output torque (with n_{1N})			T_{2N}	Nm	20	20
				in.lb	177	177
Emergency stop tourque (permitted 1000 times during the service life of the gearhead)			T_{2Not}	Nm	48	62
				in.lb	425	549
Nominal input speed (with T_{2N} and 20°C ambient temperature)			n_{1N}	rpm	2600	4000
Max. input speed			n_{1max}	rpm	6000	6000
Mean no-load running torque (with n_1=3000 rpm and 20°C gearhead temperature)			T_{012}	Nm	0.9	0.3
				in.lb	8.0	2.7
Max. torsional backlash			j_t	arcmin	≤ 4	
Torsional rigidity			C_{t21}	Nm/ arcmin	1.0	1.5
				in.lb/ arcmin	8.9	13.3
Max. axial force			F_{2AMax}	N	700	
				lb_f	158	
Max. radial force			F_{2RMax}	N	1300	
				lb_f	293	
Max. tilting moment			M_{2KMax}	Nm	131	
				in.lb	1159	
Efficiency at full load			η	%	97	
Service life			L_h	h	> 20000	
Weight (incl. ADP)			*m*	kg	3.6	
				lb_m	8.0	
Operating noise (with n1=3000 rpm no load)			L_{PA}	db(A)	≤ 68	
Max. permitted housing temperature				°C	+90	
				F	194	
Ambient temperature				°C	0 to +40	
				F	32 to 104	
Lubrication					Lubricated for life	
Paint					no paint	
Mounting position					any	
Direction of rotation					Motor and gearhead same direction	
Protection class					IP 65	
Moment of inertia (relates to the drive)	E	19	J_1	kgcm²	1.99	1.19
				10^{-3} in.lb.s²	1.76	1.05
Clamping hub diameter [mm]	H	28	J_1	kgcm²	3.43	2.63
				10^{-3} in.lb.s²	3.04	2.33

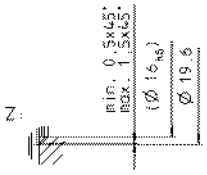
Please contact us for information on the best configuration for S1 conditions of use (continuous operation).

[a] Other ratios available on request
[b] Higher speeds are possible if the nominal torque is reduced
[c] For higher ambient temperatures, please reduce input speed
[d] Idling torques decrease during operation
[e] Refers to center of the output shaft or flange

1-stage:



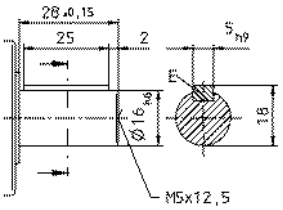




Alternatives: Output shaft variants

Keywayed output shaft in mm

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



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

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.

CAD data is available under
http://www.wittenstein-alpha.de/en/info-and-cad-finder.html

Motor mounting according to operating manual

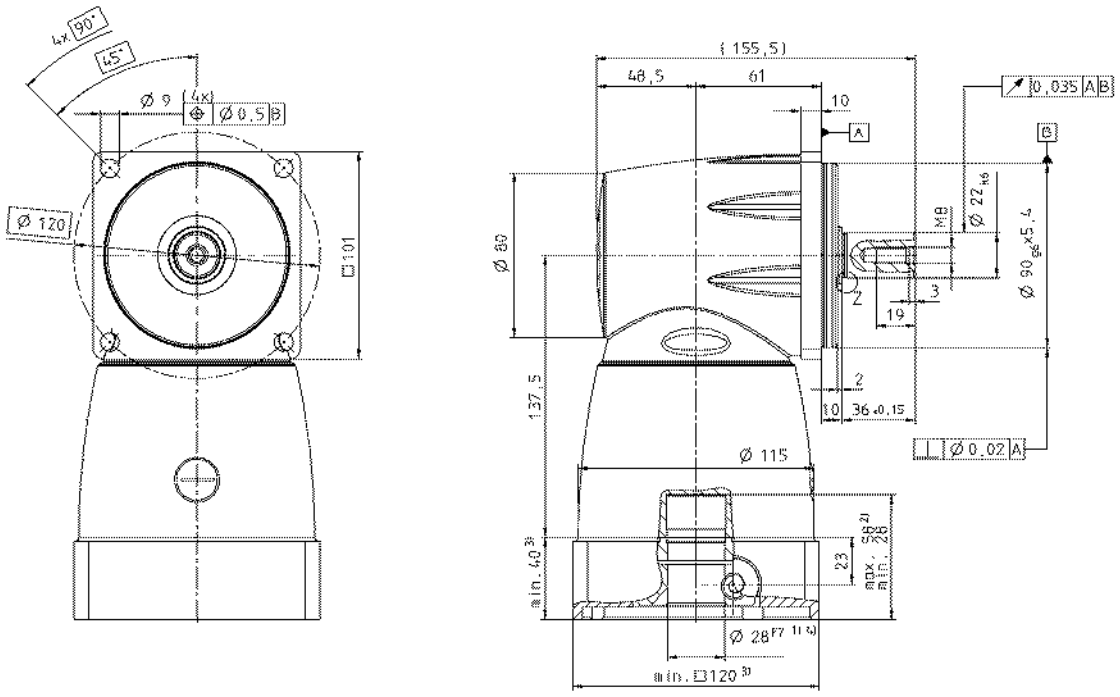
					1-stage	
Ratio			i		**1**	**2**
Max. acceleration torque (max. 1000 cycles per hour)			T_{2B}	Nm	81	81
				in.lb	717	717
Nominal output torque (with n_{1N})			T_{2N}	Nm	50	50
				in.lb	443	443
Emergency stop tourque (permitted 1000 times during the service life of the gearhead)			T_{2Not}	Nm	135	200
				in.lb	1195	1770
Nominal input speed (with T_{2N} and 20°C ambient temperature)			n_{1N}	rpm	2500	2800
Max. input speed			n_{1max}	rpm	4500	4500
Mean no-load running torque (with n_1=3000 rpm and 20°C gearhead temperature)			T_{012}	Nm	2.5	1.5
				in.lb	22.1	13.3
Max. torsional backlash			j_t	arcmin	≤ 4	
Torsional rigidity			C_{t21}	Nm/ arcmin	2.9	4.6
				in.lb/ arcmin	25.7	40.7
Max. axial force			F_{2AMax}	N	1900	
				lb_f	428	
Max. radial force			F_{2RMax}	N	3800	
				lb_f	855	
Max. tilting moment			M_{2KMax}	Nm	439	
				in.lb	3885	
Efficiency at full load			η	%	97	
Service life			L_h	h	> 20000	
Weight (incl. ADP)			m	kg	7.0	
				lb_m	15.5	
Operating noise (with n1=3000 rpm no load)			L_{PA}	db(A)	≤ 68	
Max. permitted housing temperature				°C	+90	
				F	194	
Ambient temperature				°C	0 to +40	
				F	32 to 104	
Lubrication					Lubricated for life	
Paint					no paint	
Mounting position					any	
Direction of rotation					Motor and gearhead same direction	
Protection class					IP 65	
Moment of inertia (relates to the drive)	H	28	J_1	kgcm²	7.1	4.8
				10^{-3} in.lb.s²	6.28	4.25
Clamping hub diameter [mm]	K	38	J_1	kgcm²	14.2	11.9
				10^{-3} in.lb.s²	12.57	10.53

Please contact us for information on the best configuration for S1 conditions of use (continuous operation).

[a] Other ratios available on request
[b] Higher speeds are possible if the nominal torque is reduced
[c] For higher ambient temperatures, please reduce input speed
[d] Idling torques decrease during operation
[e] Refers to center of the output shaft or flange

View A

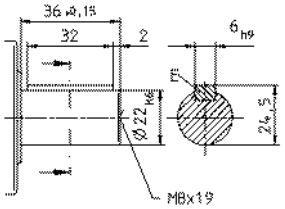
1-stage:



Alternatives: Output shaft variants

Keywayed output shaft in mm

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



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

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.

CAD data is available under
http://www.wittenstein-alpha.de/en/info-and-cad-finder.html

Motor mounting according to operating manual

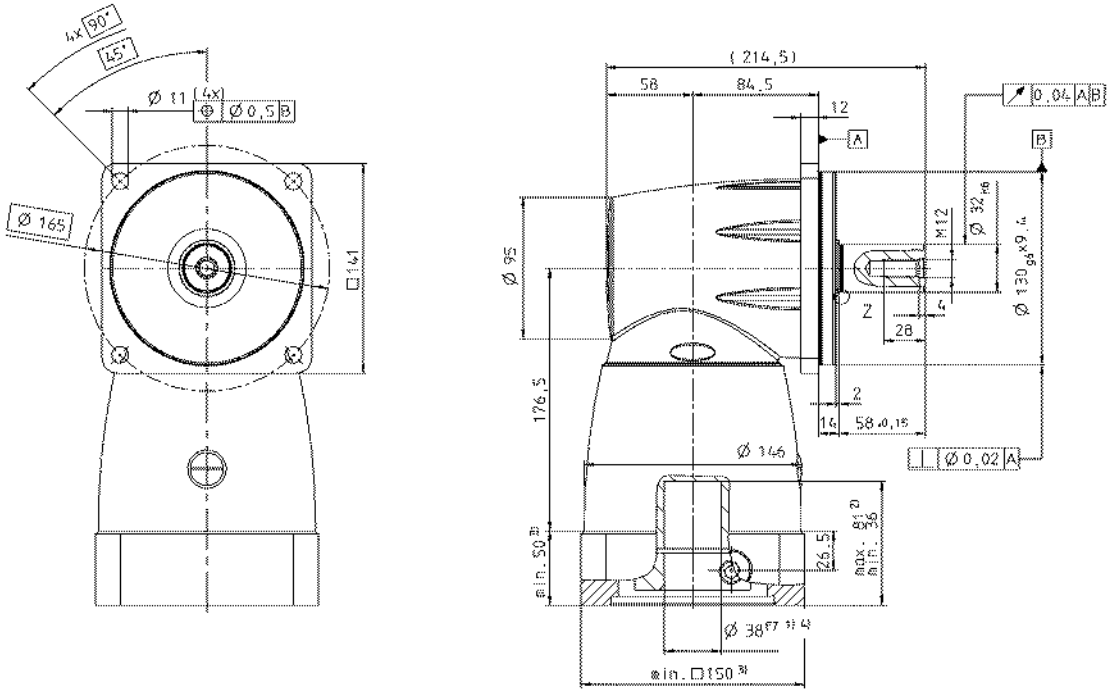
					1-stage	
Ratio			***i***		**1**	**2**
Max. acceleration torque (max. 1000 cycles per hour)			T_{2B}	Nm	175	175
				in.lb	1549	1549
Nominal output torque (with n_{1N})			T_{2N}	Nm	110	110
				in.lb	974	974
Emergency stop tourque (permitted 1000 times during the service life of the gearhead)			T_{2Not}	Nm	240	310
				in.lb	2124	2744
Nominal input speed (with T_{2N} and 20°C ambient temperature)			n_{1N}	rpm	1600	2100
Max. input speed			n_{1max}	rpm	4500	4500
Mean no-load running torque (with n_1=3000 rpm and 20°C gearhead temperature)			T_{012}	Nm	4.0	1.7
				in.lb	35.4	15.0
Max. torsional backlash			j_t	arcmin	≤ 4	
Torsional rigidity			C_{t21}	Nm/ arcmin	6.4	9.1
				in.lb/ arcmin	56.6	80.5
Max. axial force			F_{2AMax}	N	3000	
				lb_f	675	
Max. radial force			F_{2RMax}	N	6000	
				lb_f	1350	
Max. tilting moment			M_{2KMax}	Nm	957	
				in.lb	8469	
Efficiency at full load			η	%	97	
Service life			L_h	h	> 20000	
Weight (incl. ADP)			m	kg	14.7	
				lb_m	32.5	
Operating noise (with n1=3000 rpm no load)			L_{PA}	db(A)	≤ 70	
Max. permitted housing temperature				°C	+90	
				F	194	
Ambient temperature				°C	0 to +40	
				F	32 to 104	
Lubrication					Lubricated for life	
Paint					no paint	
Mounting position					any	
Direction of rotation					Motor and gearhead same direction	
Protection class					IP 65	
Moment of inertia (relates to the drive)	K	38	J_1	$kgcm^2$	41.3	21.3
Clamping hub diameter [mm]				10^{-3} in.lb.s²	36.55	18.85

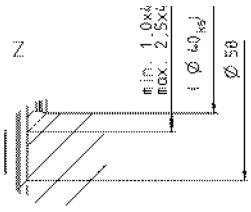
Please contact us for information on the best configuration for S1 conditions of use (continuous operation).

[a] Other ratios available on request
[b] Higher speeds are possible if the nominal torque is reduced
[c] For higher ambient temperatures, please reduce input speed
[d] Idling torques decrease during operation
[e] Refers to center of the output shaft or flange

View A

1-stage:

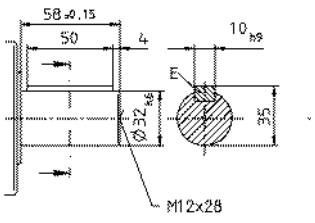




Alternatives: Output shaft variants

Keywayed output shaft in mm

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



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

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.

CAD data is available under
http://www.wittenstein-alpha.de/en/info-and-cad-finder.html

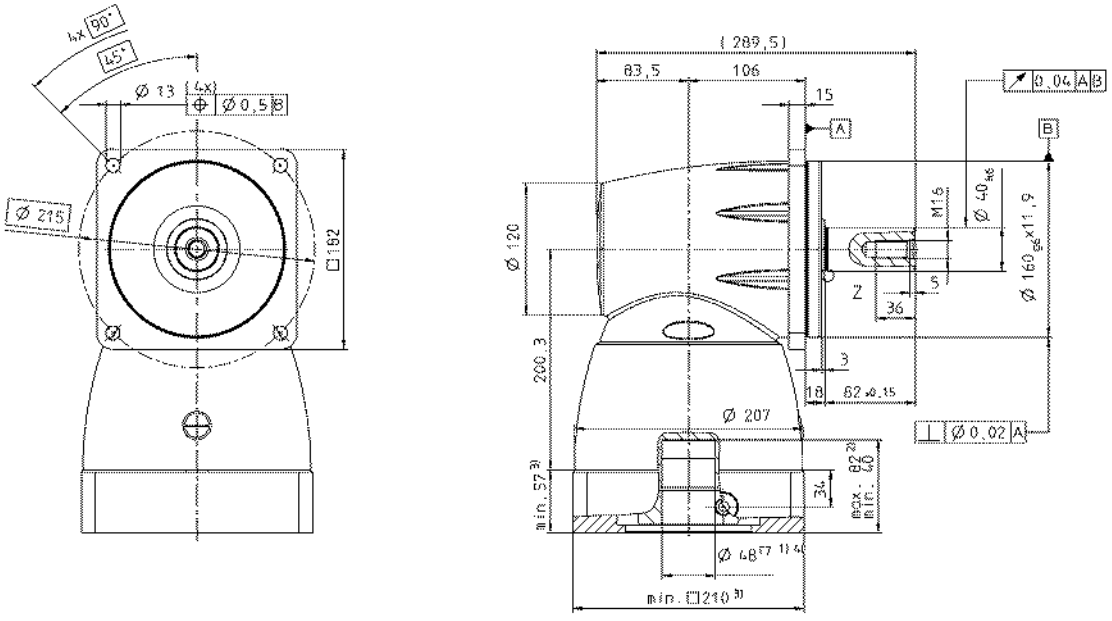
Motor mounting according to operating manual

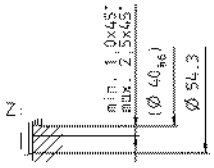
					1-stage	
Ratio			***i***		**1**	**2**
Max. accelaration torque (max. 1000 cycles per hour)			T_{2B}	Nm	315	315
				in.lb	2788	2788
Nominal output torque (with n_{1N})			T_{2N}	Nm	200	200
				in.lb	1770	1770
Emergency stop tourque (permitted 1000 times during the service life of the gearhead)			T_{2Not}	Nm	390	685
				in.lb	3452	6062
Nominal input speed (with T_{2N} and 20°C ambient temperature)			n_{1N}	rpm	1200	1500
Max. input speed			n_{1max}	rpm	4000	4000
Mean no load running torque (with n_1=3000 rpm and 20°C gearhead temperature)			T_{012}	Nm	9.5	5.5
				in.lb	84.1	48.7
Max. torsional backlash			j_t	arcmin	≤ 3	
Torsional rigidity			C_{t21}	Nm/ arcmin	13	22
				in.lb/ arcmin	115.1	194.7
Max. axial force			F_{2AMax}	N	4500	
				lb_f	1013	
Max. radial force			F_{2RMax}	N	9000	
				lb_f	2025	
Max. tilting moment			M_{2KMax}	Nm	1910	
				in.lb	16904	
Efficiency at full load			η	%	97	
Service life			L_h	h	> 20000	
Weight (incl. ADP)			*m*	kg	31.4	
				lb_m	69.4	
Operating noise (with n1=3000 rpm no load)			L_{PA}	db(A)	≤ 70	
Max.permitted housing temperature				°C	+90	
				F	194	
Ambient temperature				°C	0 to +40	
				F	32 to 104	
Lubrication					Lubricated for life	
Paint					no paint	
Mounting position					any	
Direction of rotation					Motor and gearhead same direction	
Protection class					IP 65	
Moment of inertia (relates to the drive)	**M**	**48**	J_1	$kgcm^2$	99.5	46.7
Clamping hub diameter [mm]				10^{-3} in.lb.s²	88.06	41.33

Please contact us for information on the best configuration for S1 conditions of use (continuous operation).

[a] Other ratios available on request
[b] Higher speeds are possible if the nominal torque is reduced
[c] For higher ambient temperatures, please reduce input speed
[d] Idling torques decrease during operation
[e] Refers to center of the output shaft or flange

1-stage:

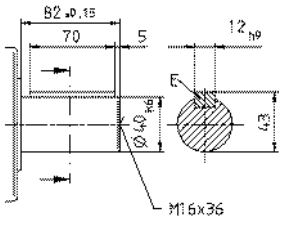




Alternatives: Output shaft variants

Keywayed output shaft in mm

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



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

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.

CAD data is available under
http://www.wittenstein-alpha.de/en/info-and-cad-finder.html

Motor mounting according to operating manual

SPC+ 060 MF 2-stage

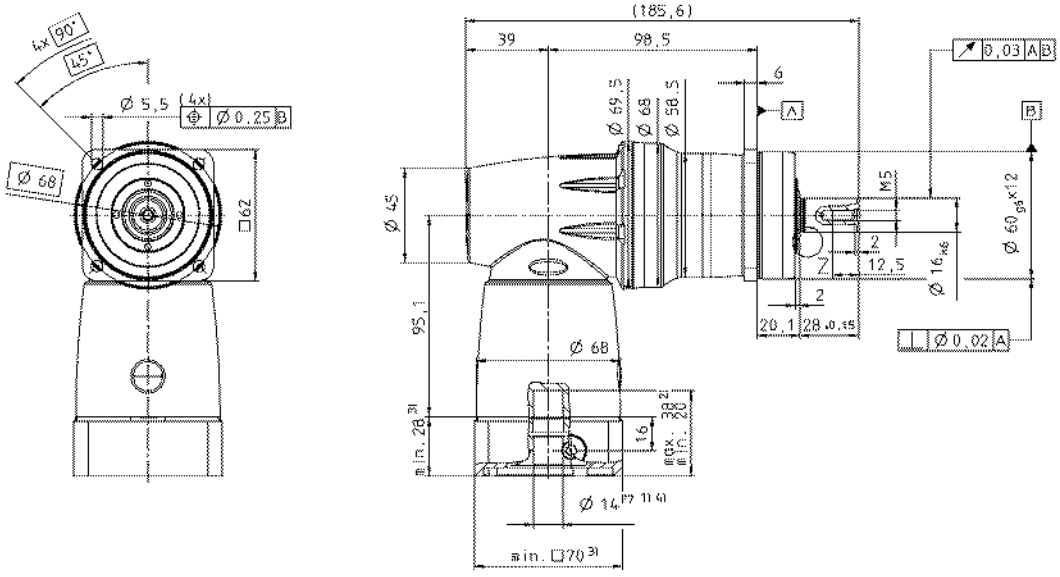
				2-stage						
Ratio			***i***	**4**	**5**	**7**	**8**	**10**	**14**	**20**
Max. acceleration torque (max. 1000 cycles per hour)			T_{2B} Nm	40	42	42	40	42	42	32
			T_{2B} in.lb	354	372	372	354	372	372	283
Nominal output torque (with n_{1N})			T_{2N} Nm	26	26	26	26	26	26	17
			T_{2N} in.lb	230	230	230	230	230	230	150
Emergency stop tourque (permitted 1000 times during the service life of the gearhead)			T_{2Not} Nm	100	100	100	100	100	100	80
			T_{2Not} in.lb	885	885	885	885	885	885	708
Nominal input speed (with T_{2N} and 20°C ambient temperature)			n_{1N} rpm	3000	3000	3200	3400	3400	3600	3600
Max. input speed			n_{1max} rpm	6000	6000	6000	6000	6000	6000	6000
Mean no-load running torque (with n_1=3000 rpm and 20°C gearhead temperature)			T_{012} Nm	1.2	1.1	0.9	0.6	0.6	0.5	0.4
			T_{012} in.lb	11	10	8	5	5	4	4
Max. torsional backlash			j_t arcmin	Standard ≤ 5 / Reduced ≤ 3						
Torsional rigidity			C_{t21} Nm/ arcmin	2.4	2.7	3.1	2.7	3.0	3.2	3.3
			C_{t21} in.lb/ arcmin	21	24	27	24	27	28	29
Max. axial force			F_{2AMax} N	2400						
			F_{2AMax} lb_f	540						
Max. radial force			F_{2RMax} N	2800						
			F_{2RMax} lb_f	630						
Max. tilting moment			M_{2KMax} Nm	152						
			M_{2KMax} in.lb	1345.2						
Efficiency at full load			η %	95						
Service life			L_h h	> 20000						
Weight (incl. ADP)			*m* kg	3.1						
			m lb_m	6.851						
Operating noise (with n1=3000 rpm no load)			L_{PA} db(A)	≤ 68						
Max. permitted housing temperature			°C	+90						
			F	194						
Ambient temperature			°C	0 to +40						
			F	32 to 104						
Lubrication				Lubricated for life						
Paint				Blue RAL 5002						
Mounting position				any						
Direction of rotation				Motor and gearhead same direction						
Protection class				IP 65						
Moment of inertia (relates to the drive)	C	14	J_1 kgcm²	0.72	0.7	0.66	0.44	0.43	0.43	0.43
			J_1 10^{-3} in.lb.s²	0.64	0.62	0.58	0.39	0.38	0.38	0.38
Clamping hub diameter [mm]	E	19	J_1 kgcm²	1.05	1.03	0.99	0.77	0.76	0.76	0.75
			J_1 10^{-3} in.lb.s²	0.93	0.91	0.88	0.68	0.67	0.67	0.66

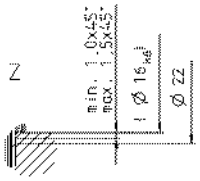
Please contact us for information on the best configuration for S1 conditions of use (continuous operation).

[a] Other ratios available on request
[b] Higher speeds are possible if the nominal torque is reduced
[c] For higher ambient temperatures, please reduce input speed
[d] Idling torques decrease during operation
[e] Refers to center of the output shaft or flange

View A

2-stage:



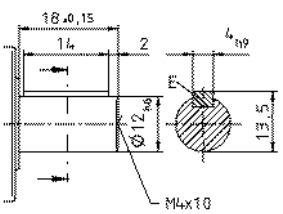


Right-angle gearheads
High End

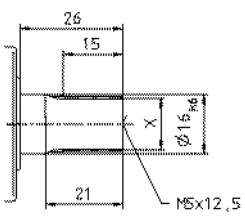
SPC¹

Alternatives: Output shaft variants

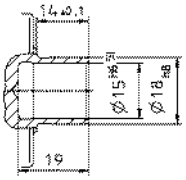
Keywayed output shaft in mm
E = key as per DIN 6885, sheet 1, form A



Involute gearing DIN 5480 in mm
X = W 16 x 0,8 x 30 x 18 x 6m, DIN 5480



Shaft mounted
Mounted via shrink disc



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

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.

CAD data is available under
http://www.wittenstein-alpha.de/en/info-and-cad-finder.html

Motor mounting according to operating manual

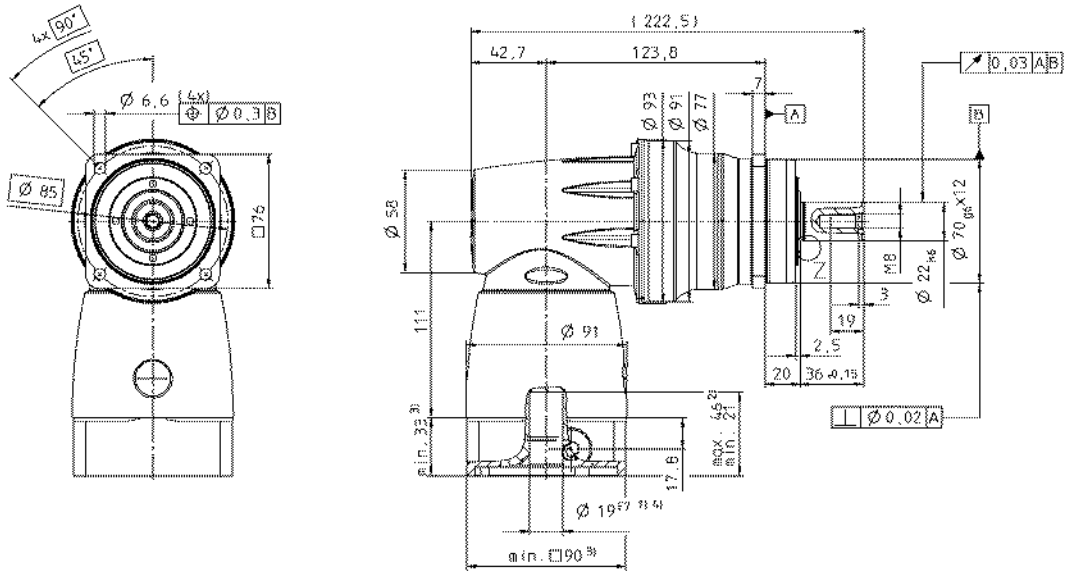
				2-stage						
Ratio			***i***	**4**	**5**	**7**	**8**	**10**	**14**	**20**
Max. acceleration torque (max. 1000 cycles per hour)			T_{2B} Nm	110	110	110	110	110	110	95
			T_{2B} in.lb	974	974	974	974	974	974	841
Nominal output torque (with n_{1N})			T_{2N} Nm	75	75	75	75	75	75	52
			T_{2N} in.lb	664	664	664	664	664	664	460
Emergency stop tourque (permitted 1000 times during the service life of the gearhead)			T_{2Not} Nm	195	245	250	250	250	250	200
			T_{2Not} in.lb	1726	2168	2213	2213	2213	2213	1770
Nominal input speed (with T_{2N} and 20°C ambient temperature)			n_{1N} rpm	2200	2200	2400	2650	2650	2800	2800
Max. input speed			n_{1max} rpm	6000	6000	6000	6000	6000	6000	6000
Mean no-load running torque (with n_1=3000 rpm and 20°C gearhead temperature)			T_{012} Nm	2.3	2.0	1.7	1.0	0.9	0.7	0.6
			T_{012} in.lb	20	18	15	9	8	6	5
Max. torsional backlash			j_t arcmin	Standard ≤ 4 / Reduced ≤ 2						
Torsional rigidity			C_{t21} Nm/ arcmin	6.6	7.5	8.6	7.6	8.3	9.1	9.5
			C_{t21} in.lb/ arcmin	58	66	76	67	73	81	84
Max. axial force			F_{2AMax} N	3350						
			F_{2AMax} lb_f	753.75						
Max. radial force			F_{2RMax} N	4200						
			F_{2RMax} lb_f	945						
Max. tilting moment			M_{2KMax} Nm	236						
			M_{2KMax} in.lb	2088.6						
Efficiency at full load			η %	95						
Service life			L_h h	> 20000						
Weight (incl. ADP)			*m* kg	5.9						
			m lb_m	13.039						
Operating noise (with n1=3000 rpm no load)			L_{PA} db(A)	≤ 68						
Max. permitted housing temperature			°C	+90						
			F	194						
Ambient temperature			°C	0 to +40						
			F	32 to 104						
Lubrication				Lubricated for life						
Paint				Blue RAL 5002						
Mounting position				any						
Direction of rotation				Motor and gearhead same direction						
Protection class				IP 65						
Moment of inertia (relates to the drive)	E	19	J_1 kgcm²	2.23	2.15	1.99	1.25	1.23	1.21	1.2
			J_1 10^{-3} in.lb.s²	1.97	1.90	1.76	1.11	1.09	1.07	1.06
Clamping hub diameter [mm]	H	28	J_1 kgcm²	3.66	3.59	3.43	2.68	2.67	2.65	2.64
			J_1 10^{-3} in.lb.s²	3.24	3.18	3.04	2.37	2.36	2.35	2.34

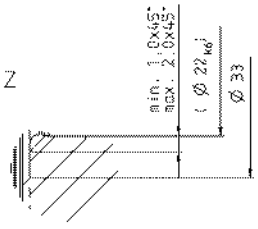
Please contact us for information on the best configuration for S1 conditions of use (continuous operation).

[a] Other ratios available on request
[b] Higher speeds are possible if the nominal torque is reduced
[c] For higher ambient temperatures, please reduce input speed
[d] Idling torques decrease during operation
[e] Refers to center of the output shaft or flange

View A

2-stage:



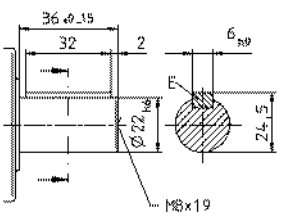


Right-angle gearheads
High End

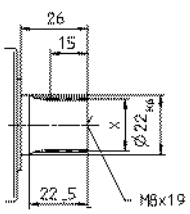
SPC¹

Alternatives: Output shaft variants

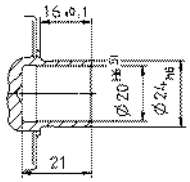
Keywayed output shaft in mm
E = key as per DIN 6885, sheet 1, form A



Involute gearing DIN 5480 in mm
X = W 16 x 0,8 x 30 x 18 x 6m, DIN 5480



Shaft mounted
Mounted via shrink disc



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

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.

CAD data is available under
http://www.wittenstein-alpha.de/en/info-and-cad-finder.html

Motor mounting according to operating manual

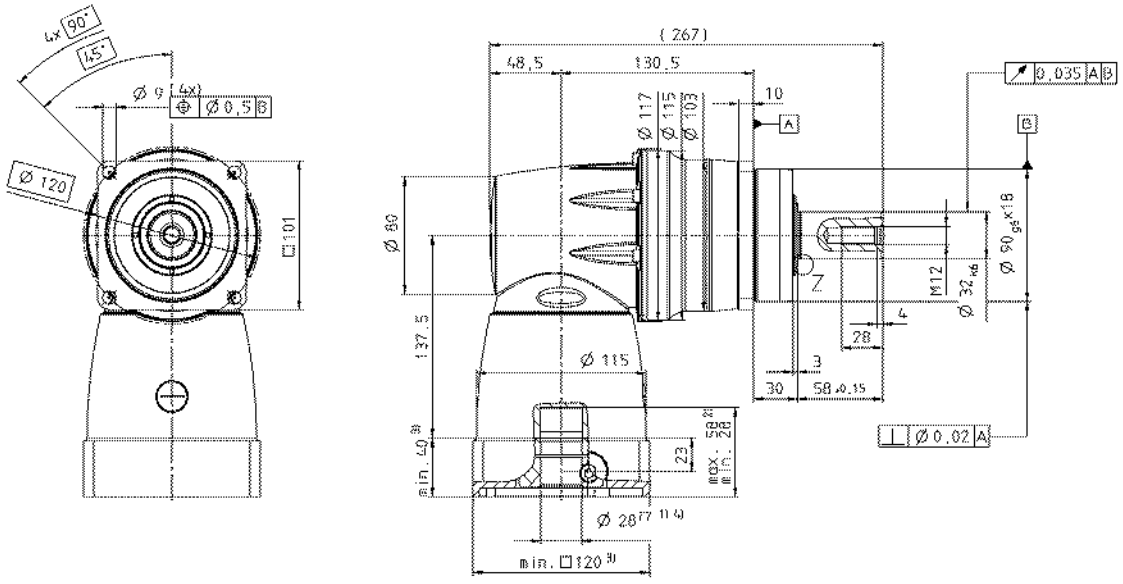
					2-stage						
Ratio			i		**4**	**5**	**7**	**8**	**10**	**14**	**20**
Max. acceleration torque (max. 1000 cycles per hour)			T_{2B}	Nm	315	315	315	315	315	315	235
				in.lb	2788	2788	2788	2788	2788	2788	2080
Nominal output torque (with n_{1N})			T_{2N}	Nm	180	175	170	180	175	170	120
				in.lb	1593	1549	1505	1593	1549	1505	1062
Emergency stop tourque (permitted 1000 times during the service life of the gearhead)			T_{2Not}	Nm	540	625	625	625	625	625	500
				in.lb	4779	5531	5531	5531	5531	5531	4425
Nominal input speed (with T_{2N} and 20°C ambient temperature)			n_{1N}	rpm	2000	2000	2200	2300	2300	2400	2400
Max. input speed			n_{1max}	rpm	4500	4500	4500	4500	4500	4500	4500
Mean no-load running torque (with n_1=3000 rpm and 20°C gearhead temperature)			T_{012}	Nm	5.2	4.9	4.1	2.9	2.7	2.3	2.2
				in.lb	46	43	36	26	24	20	19
Max. torsional backlash			j_t	arcmin	Standard ≤ 4 / Reduced ≤ 2						
Torsional rigidity			C_{t21}	Nm/ arcmin	20.0	23.0	26.0	24.0	26.0	28.0	30.0
				in.lb/ arcmin	177	204	230	212	230	248	266
Max. axial force			F_{2AMax}	N	5650						
				lb_f	1271.25						
Max. radial force			F_{2RMax}	N	6600						
				lb_f	1485						
Max. tilting moment			M_{2KMax}	Nm	487						
				in.lb	4309.95						
Efficiency at full load			η	%	95						
Service life			L_h	h	> 20000						
Weight (incl. ADP)			m	kg	11.7						
				lb_m	25.857						
Operating noise (with n1=3000 rpm no load)			L_{PA}	db(A)	≤ 68						
Max. permitted housing temperature				°C	+90						
				F	194						
Ambient temperature				°C	0 to +40						
				F	32 to 104						
Lubrication					Lubricated for life						
Paint					Blue RAL 5002						
Mounting position					any						
Direction of rotation					Motor and gearhead same direction						
Protection class					IP 65						
Moment of inertia (relates to the drive)	H	28	J_1	kgcm²	8	7.6	7	5	4.9	4.9	4.8
				10^{-3} in.lb.s²	7.08	6.73	6.20	4.43	4.34	4.34	4.25
Clamping hub diameter [mm]	K	38	J_1	kgcm²	15	14.7	14.1	12.1	12	11.9	11.9
				10^{-3} in.lb.s²	13.28	13.01	12.48	10.71	10.62	10.53	10.53

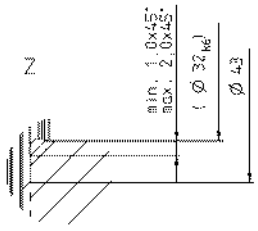
Please contact us for information on the best configuration for S1 conditions of use (continuous operation).

[a] Other ratios available on request
[b] Higher speeds are possible if the nominal torque is reduced
[c] For higher ambient temperatures, please reduce input speed
[d] Idling torques decrease during operation
[e] Refers to center of the output shaft or flange

View A

2-stage:



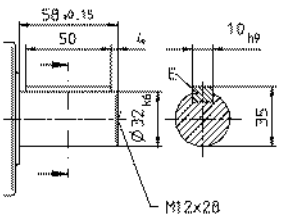


Right-angle gearheads
High End

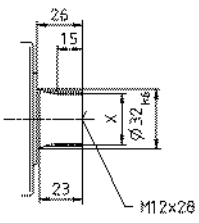
SPC¹

Alternatives: Output shaft variants

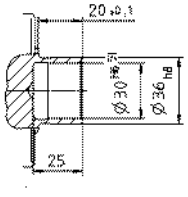
Keywayed output shaft in mm
E = key as per DIN 6885, sheet 1, form A



Involute gearing DIN 5480 in mm
X = W 16 x 0,8 x 30 x 18 x 6m, DIN 5480



Shaft mounted
Mounted via shrink disc



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

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.

CAD data is available under
http://www.wittenstein-alpha.de/en/info-and-cad-finder.html

Motor mounting according to operating manual

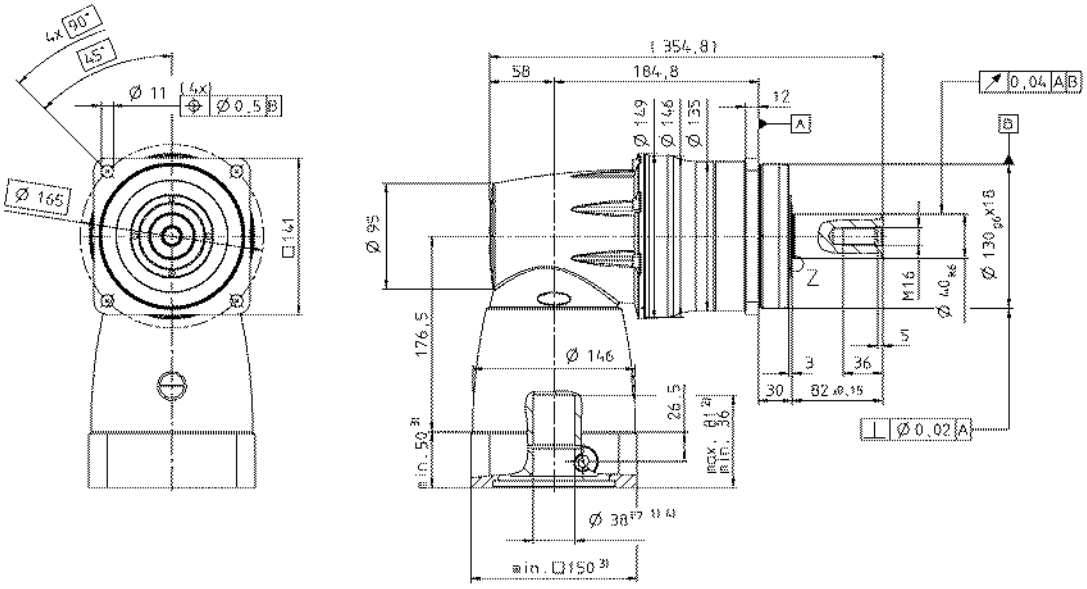
				2-stage						
Ratio			***i***	**4**	**5**	**7**	**8**	**10**	**14**	**20**
Max. acceleration torque (max. 1000 cycles per hour)			T_{2B} Nm	660	660	660	660	660	660	530
			T_{2B} in.lb	5841	5841	5841	5841	5841	5841	4691
Nominal output torque (with n_{1N})			T_{2N} Nm	360	360	360	360	360	360	220
			T_{2N} in.lb	3186	3186	3186	3186	3186	3186	1947
Emergency stop tourque (permitted 1000 times during the service life of the gearhead)			T_{2Not} Nm	960	1200	1250	1250	1250	1250	1000
			T_{2Not} in.lb	8496	10620	11063	11063	11063	11063	8850
Nominal input speed (with T_{2N} and 20°C ambient temperature)			n_{1N} rpm	1300	1300	1400	1500	1500	1600	1600
Max. input speed			n_{1max} rpm	4500	4500	4500	4500	4500	4500	4500
Mean no-load running torque (with n_1=3000 rpm and 20°C gearhead temperature)			T_{012} Nm	9.8	8.7	7.4	4.6	4.0	3.4	2.9
			T_{012} in.lb	87	77	65	41	35	30	26
Max. torsional backlash			j_t arcmin	Standard ≤ 4 / Reduced ≤ 2						
Torsional rigidity			C_{t21} Nm/ arcmin	37.0	41.0	46.0	41.0	45.0	48.0	51.0
			C_{t21} in.lb/ arcmin	327	363	407	363	398	425	451
Max. axial force			F_{2AMax} N	9870						
			F_{2AMax} lb_f	2220.75						
Max. radial force			F_{2RMax} N	9900						
			F_{2RMax} lb_f	2227.5						
Max. tilting moment			M_{2KMax} Nm	952						
			M_{2KMax} in.lb	8425.2						
Efficiency at full load			η %	95						
Service life			L_h h	> 20000						
Weight (incl. ADP)			*m* kg	24.7						
			m lb_m	54.587						
Operating noise (with n1=3000 rpm no load)			L_{PA} db(A)	≤ 70						
Max. permitted housing temperature			°C	+90						
			F	194						
Ambient temperature			°C	0 to +40						
			F	32 to 104						
Lubrication				Lubricated for life						
Paint				Blue RAL 5002						
Mounting position				any						
Direction of rotation				Motor and gearhead same direction						
Protection class				IP 65						
Moment of inertia (relates to the drive)	K	38	J_1 kgcm²	30.6	29.7	27.9	18.9	18.7	18.5	18.4
Clamping hub diameter [mm]			J_1 10^{-3} in.lb.s²	27.08	26.28	24.69	16.73	16.55	16.37	16.28

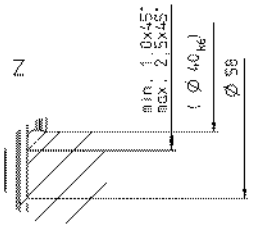
Please contact us for information on the best configuration for S1 conditions of use (continuous operation).

[a] Other ratios available on request
[b] Higher speeds are possible if the nominal torque is reduced
[c] For higher ambient temperatures, please reduce input speed
[d] Idling torques decrease during operation
[e] Refers to center of the output shaft or flange

View A

2-stage:



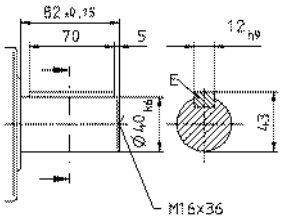


Right-angle gearheads
High End

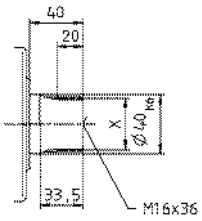
SPC+

Alternatives: Output shaft variants

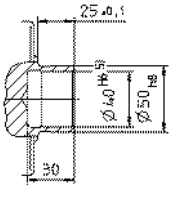
Keywayed output shaft in mm
E = key as per DIN 6885, sheet 1, form A



Involute gearing DIN 5480 in mm
X = W 16 x 0,8 x 30 x 18 x 6m, DIN 5480



Shaft mounted
Mounted via shrink disc



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

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.

CAD data is available under
http://www.wittenstein-alpha.de/en/info-and-cad-finder.html

Motor mounting according to operating manual

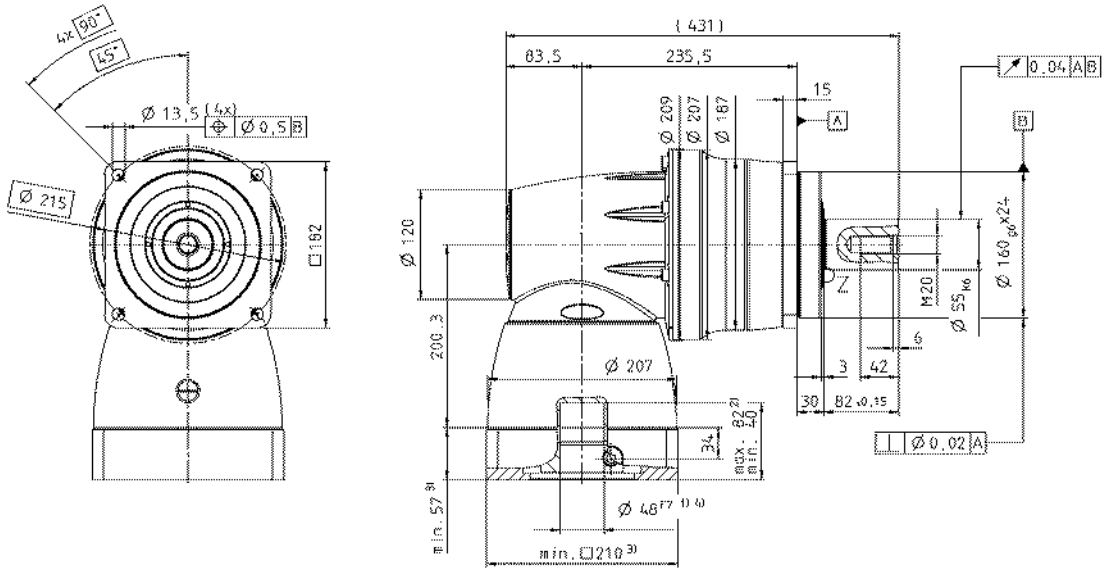
				2-stage						
Ratio			***i***	**4**	**5**	**7**	**8**	**10**	**14**	**20**
Max. acceleration torque (max. 1000 cycles per hour)			T_{2B} Nm	1210	1210	1210	1210	1210	1210	970
			T_{2B} in.lb	10709	10709	10709	10709	10709	10709	8585
Nominal output torque (with n_{1N})			T_{2N} Nm	750	750	750	750	750	750	750
			T_{2N} in.lb	6638	6638	6638	6638	6638	6638	6638
Emergency stop tourque (permitted 1000 times during the service life of the gearhead)			T_{2Not} Nm	1560	1955	2735	2750	2750	2750	2200
			T_{2Not} in.lb	13806	17302	24205	24338	24338	24338	19470
Nominal input speed (with T_{2N} and 20°C ambient temperature)			n_{1N} rpm	1000	1000	1100	1200	1200	1300	1300
Max. input speed			n_{1max} rpm	4000	4000	4000	4000	4000	4000	4000
Mean no-load running torque (with n_1=3000 rpm and 20°C gearhead temperature)			T_{012} Nm	20.5	18.5	16.5	11.0	10.0	9.0	8.0
			T_{012} in.lb	181	164	146	97	89	80	71
Max. torsional backlash			j_t arcmin	Standard ≤ 4 / Reduced ≤ 2						
Torsional rigidity			C_{t21} Nm/ arcmin	104.0	122.0	143.0	130.0	144.0	157.0	166.0
			C_{t21} in.lb/ arcmin	920	1080	1266	1151	1274	1389	1469
Max. axial force			F_{2AMax} N	14150						
			F_{2AMax} lb_f	3183.75						
Max. radial force			F_{2RMax} N	15400						
			F_{2RMax} lb_f	3465						
Max. tilting moment			M_{2KMax} Nm	1600						
			M_{2KMax} in.lb	14160						
Efficiency at full load			η %	95						
Service life			L_h h	> 20000						
Weight (incl. ADP)			m kg	54.7						
			m lb_m	120.887						
Operating noise (with n1=3000 rpm no load)			L_{PA} db(A)	≤ 70						
Max. permitted housing temperature			°C	+90						
			F	194						
Ambient temperature			°C	0 to +40						
			F	32 to 104						
Lubrication				Lubricated for life						
Paint				Blue RAL 5002						
Mounting position				any						
Direction of rotation				Motor and gearhead same direction						
Protection class				IP 65						
Moment of inertia (relates to the drive)	M	48	J_1 kgcm²	109.5	105	94.7	49.2	48.1	46.9	46.2
Clamping hub diameter [mm]			J_1 10^{-3} in.lb.s²	96.91	92.93	83.81	43.54	42.57	41.51	40.89

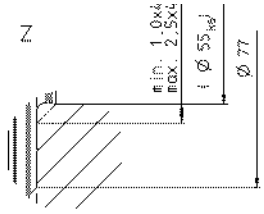
Please contact us for information on the best configuration for S1 conditions of use (continuous operation).

[a] Other ratios available on request
[b] Higher speeds are possible if the nominal torque is reduced
[c] For higher ambient temperatures, please reduce input speed
[d] Idling torques decrease during operation
[e] Refers to center of the output shaft or flange

View A

2-stage:



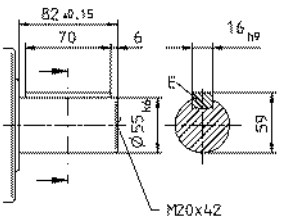


Right-angle gearheads
High End

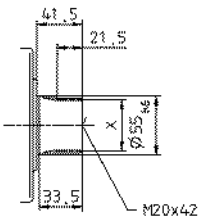
SPC+

Alternatives: Output shaft variants

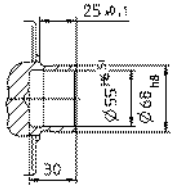
Keywayed output shaft in mm
E = key as per DIN 6885, sheet 1, form A



Involute gearing DIN 5480 in mm
X = W 16 x 0,8 x 30 x 18 x 6m, DIN 5480



Shaft mounted
Mounted via shrink disc



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

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.

CAD data is available under
http://www.wittenstein-alpha.de/en/info-and-cad-finder.html

Motor mounting according to operating manual

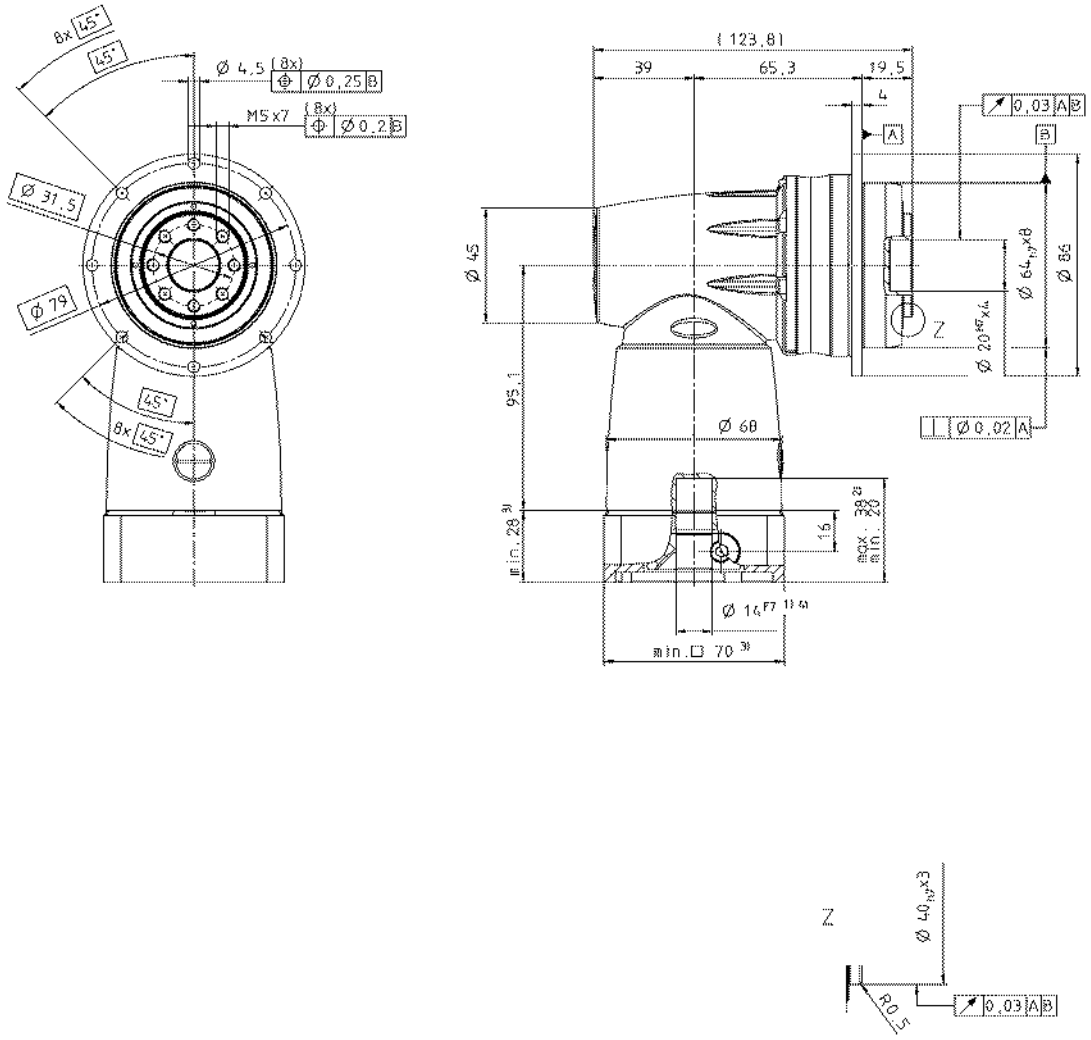
TPC+ 004 MF 2-stage

				2-stage						
Ratio			***i***	**4**	**5**	**7**	**8**	**10**	**14**	**20**
Max. acceleration torque (max. 1000 cycles per hour)			T_{2B} Nm	40	50	55	40	50	55	35
			T_{2B} in.lb	354	443	487	354	443	487	310
Nominal output torque (with n_{1N})			T_{2N} Nm	28	28	28	28	28	28	18
			T_{2N} in.lb	248	248	248	248	248	248	159
Emergency stop tourque (permitted 1000 times during the service life of the gearhead)			T_{2Not} Nm	100	100	100	100	100	100	100
			T_{2Not} in.lb	885	885	885	885	885	885	885
Nominal input speed (with T_{2N} and 20°C ambient temperature)			n_{1N} rpm	2900	2900	3100	3400	3400	3600	3600
Max. input speed			n_{1max} rpm	6000	6000	6000	6000	6000	6000	6000
Mean no-load running torque (with n_1=3000 rpm and 20°C gearhead temperature)			T_{012} Nm	1.5	1.3	1.1	0.8	0.7	0.6	0.5
			T_{012} in.lb	13	12	10	7	6	5	4
Max. torsional backlash			j_t arcmin	Standard ≤ 5 / Reduced ≤ 3						
Torsional rigidity			C_{t21} Nm/ arcmin	4.8	6.2	7.6	6.1	7.4	8.5	7.3
			C_{t21} in.lb/ arcmin	42	55	67	54	65	75	65
Tilting rigidity			C_{2K} Nm/ arcmin	-						
			C_{2K} in.lb/ arcmin	-						
Max. axial force			F_{2AMax} N	1630.0						
			F_{2AMax} lb_t	366.8						
Max. tilting moment			M_{2KMax} Nm	110.0						
			M_{2KMax} in.lb	973.5						
Efficiency at full load			η %	95.0						
Service life			L_h h	> 20000						
Weight (incl. ADP)			*m* kg	2.6						
			m lb_m	5.7						
Operating noise (with n1=3000 rpm no load)			L_{PA} db(A)	≤ 68						
Max. permitted housing temperature			°C	+90						
			F	194						
Ambient temperature			°C	0 to +40						
			F	32 to 104						
Lubrication				Lubricated for life						
Paint				Blue RAL 5002						
Mounting position				any						
Direction of rotation				Motor and gearhead same direction						
Protection class				IP 65						
Moment of inertia (relates to the drive)	C	14	J_1 kgcm²	0.72	0.7	0.66	0.44	0.43	0.43	0.43
			J_1 10^{-3} in.lb.s²	0.64	0.62	0.58	0.39	0.38	0.38	0.38
Clamping hub diameter [mm]	E	19	J_1 kgcm²	1.05	1.03	0.99	0.77	0.76	0.76	0.75
			J_1 10^{-3} in.lb.s²	0.93	0.91	0.88	0.68	0.67	0.67	0.66

Please contact us for information on the best configuration for S1 conditions of use (continuous operation).

[a] Other ratios available on request
[b] Higher speeds are possible if the nominal torque is reduced
[c] For higher ambient temperatures, please reduce input speed
[d] Idling torques decrease during operation
[e] Refers to center of the output shaft or flange

2-stage:



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

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.

CAD data is available under
http://www.wittenstein-alpha.de/en/info-and-cad-finder.html

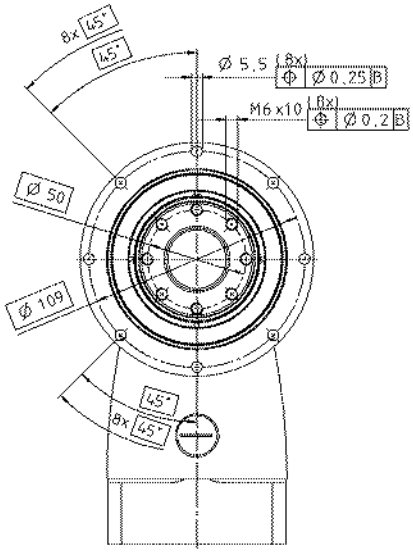
Motor mounting according to operating manual

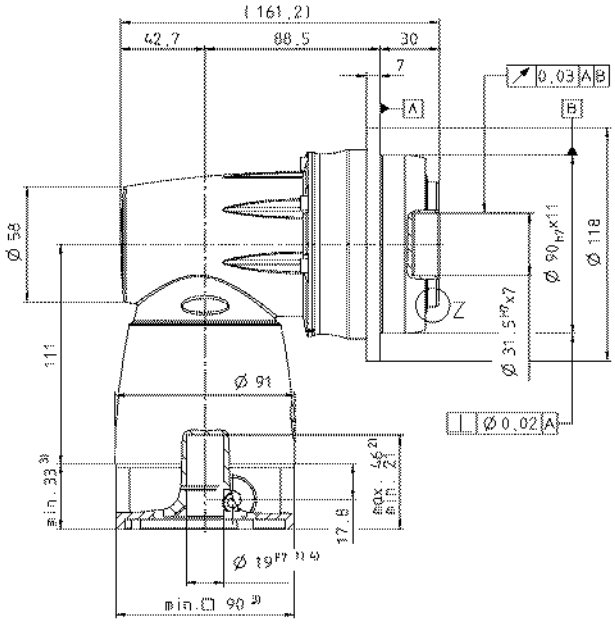
				2-stage						
Ratio			***i***	**4**	**5**	**7**	**8**	**10**	**14**	**20**
Max. acceleration torque (max. 1000 cycles per hour)			T_{2B} Nm	120	143	143	120	143	143	105
			T_{2B} in.lb	1062	1266	1266	1062	1266	1266	929
Nominal output torque (n_{1N})			T_{2N} Nm	75	75	75	75	75	75	60
			T_{2N} in.lb	664	664	664	664	664	664	531
Emergency stop tourque (permitted 1000 times during the service life of the gearhead)			T_{2Not} Nm	195	245	250	250	250	250	250
			T_{2Not} in.lb	1726	2168	2213	2213	2213	2213	2213
Nominal input speed (T_{2N} and 20°C ambient temperature)			n_{1N} rpm	2100	2100	2300	2650	2650	2800	2800
Max. input speed			n_{1max} rpm	6000	6000	6000	6000	6000	6000	6000
Mean no-load running torque (n_1=3000 rpm and 20°C gearhead temperature)			T_{012} Nm	2.5	2.2	1.9	1.1	1.0	0.8	0.7
			T_{012} in.lb	22	19	17	10	9	7	6
Max. torsional backlash			j_t arcmin	Standard ≤ 4 / Reduced ≤ 2						
Torsional rigidity			C_{t21} Nm/ arcmin	12.0	16.0	20.0	16.0	20.0	23.0	21.0
			C_{t21} in.lb/ arcmin	106	142	177	142	177	204	186
Tilting rigidity			C_{2K} Nm/ arcmin	225						
			C_{2K} in.lb/ arcmin	1991						
Max. axial force			F_{2AMax} N	2150						
			F_{2AMax} lb_f	484						
Max. tilting moment			M_{2KMax} Nm	270						
			M_{2KMax} in.lb	2390						
Efficiency at full load			η %	95						
Service life			L_h h	> 20000						
Weight (incl. ADP)			*m* kg	6						
			m lb_m	13						
Operating noise (with n1=3000 rpm no load)			L_{PA} db(A)	≤ 68						
Max. permitted housing temperature			°C	+90						
			F	194						
Ambient temperature			°C	0 to +40						
			F	32 to 104						
Lubrication				Lubricated for life						
Paint				Blue RAL 5002						
Mounting position				any						
Direction of rotation				Motor and gearhead same direction						
Protection class				IP 65						
Moment of inertia (relates to the drive)	E	19	J_1 kgcm²	2.41	2.27	1.99	1.29	1.26	122	1.21
			J_1 10^{-3} in.lb.s²	2.13	2.01	1.76	1.14	1.12	107.97	1.07
Clamping hub diameter [mm]	H	28	J_1 kgcm²	3.85	3.71	3.43	2.73	2.7	2.66	2.64
			J_1 10^{-3} in.lb.s²	3.41	3.28	3.04	2.42	2.39	2.35	2.34

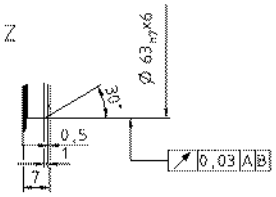
Please contact us for information on the best configuration for S1 conditions of use (continuous operation).

[a] Other ratios available on request
[b] Higher speeds are possible if the nominal torque is reduced
[c] For higher ambient temperatures, please reduce input speed
[d] Idling torques decrease during operation
[e] Refers to center of the output shaft or flange

2-stage:







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

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.

CAD data is available under
http://www.wittenstein-alpha.de/en/info-and-cad-finder.html

Motor mounting according to operating manual

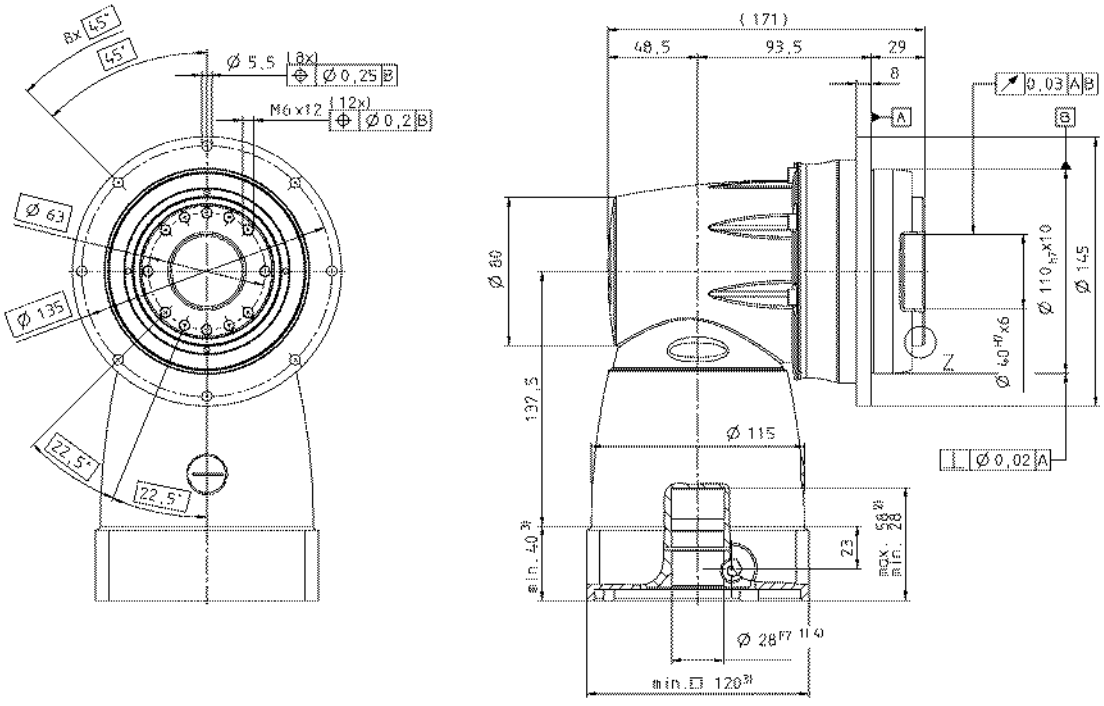
				2-stage						
Ratio			***i***	**4**	**5**	**7**	**8**	**10**	**14**	**20**
Max. acceleration torque (max. 1000 cycles per hour)			T_{2B} Nm	320	380	330	320	380	330	265
			T_{2B} in.lb	2832	3363	2921	2832	3363	2921	2345
Nominal output torque (with n_{1N})			T_{2N} Nm	170	170	170	170	170	170	120
			T_{2N} in.lb	1505	1505	1505	1505	1505	1505	1062
Emergency stop tourque (permitted 1000 times during the service life of the gearhead)			T_{2Not} Nm	540	625	625	625	625	625	625
			T_{2Not} in.lb	4779	5531	5531	5531	5531	5531	5531
Nominal input speed (with T_{2N} and 20°C ambient temperature)			n_{1N} rpm	1900	1900	2100	2300	2300	2400	2400
Max. input speed			n_{1max} rpm	4500	4500	4500	4500	4500	4500	4500
Mean no-load running torque (with n_1=3000 rpm and 20°C gearhead temperature)			T_{012} Nm	5.8	5.2	4.5	3.2	2.9	2.5	2.2
			T_{012} in.lb	51	46	40	28	26	22	19
Max. torsional backlash			j_t arcmin	Standard ≤ 4 / Reduced ≤ 2						
Torsional rigidity			C_{t21} Nm/ arcmin	33.0	43.0	53.0	45.0	56.0	61.0	57.0
			C_{t21} in.lb/ arcmin	292	381	469	398	496	540	504
Tilting rigidity			C_{2K} Nm/ arcmin	550						
			C_{2K} in.lb/ arcmin	4868						
Max. axial force			F_{2AMax} N	4150						
			F_{2AMax} lb_t	934						
Max. tilting moment			M_{2KMax} Nm	440						
			M_{2KMax} in.lb	3894						
Efficiency at full load			η %	95						
Service life			L_h h	> 20000						
Weight (incl. ADP)			*m* kg	11						
			m lb_m	23						
Operating noise (with n1=3000 rpm no load)			L_{PA} db(A)	≤ 68						
Max. permitted housing temperature			°C	+90						
			F	194						
Ambient temperature			°C	0 to +40						
			F	32 to 104						
Lubrication				Lubricated for life						
Paint				Blue RAL 5002						
Mounting position				any						
Direction of rotation				Motor and gearhead same direction						
Protection class				IP 65						
Moment of inertia (relates to the drive)	H	28	J_1 $kgcm^2$	8.3	7.9	7	5.1	5	4.9	4.8
			J_1 10^{-3} in.lb.s²	7.35	6.99	6.20	4.51	4.43	4.34	4.25
Clamping hub diameter [mm]	K	38	J_1 $kgcm^2$	15.4	14.9	14.1	12.2	12.1	12	11.9
			J_1 10^{-3} in.lb.s²	13.63	13.19	12.48	10.80	10.71	10.62	10.53

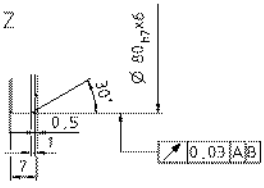
Please contact us for information on the best configuration for S1 conditions of use (continuous operation).

[a] Other ratios available on request
[b] Higher speeds are possible if the nominal torque is reduced
[c] For higher ambient temperatures, please reduce input speed
[d] Idling torques decrease during operation
[e] Refers to center of the output shaft or flange

View A

2-stage:





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

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.

CAD data is available under
http://www.wittenstein-alpha.de/en/info-and-cad-finder.html

Motor mounting according to operating manual

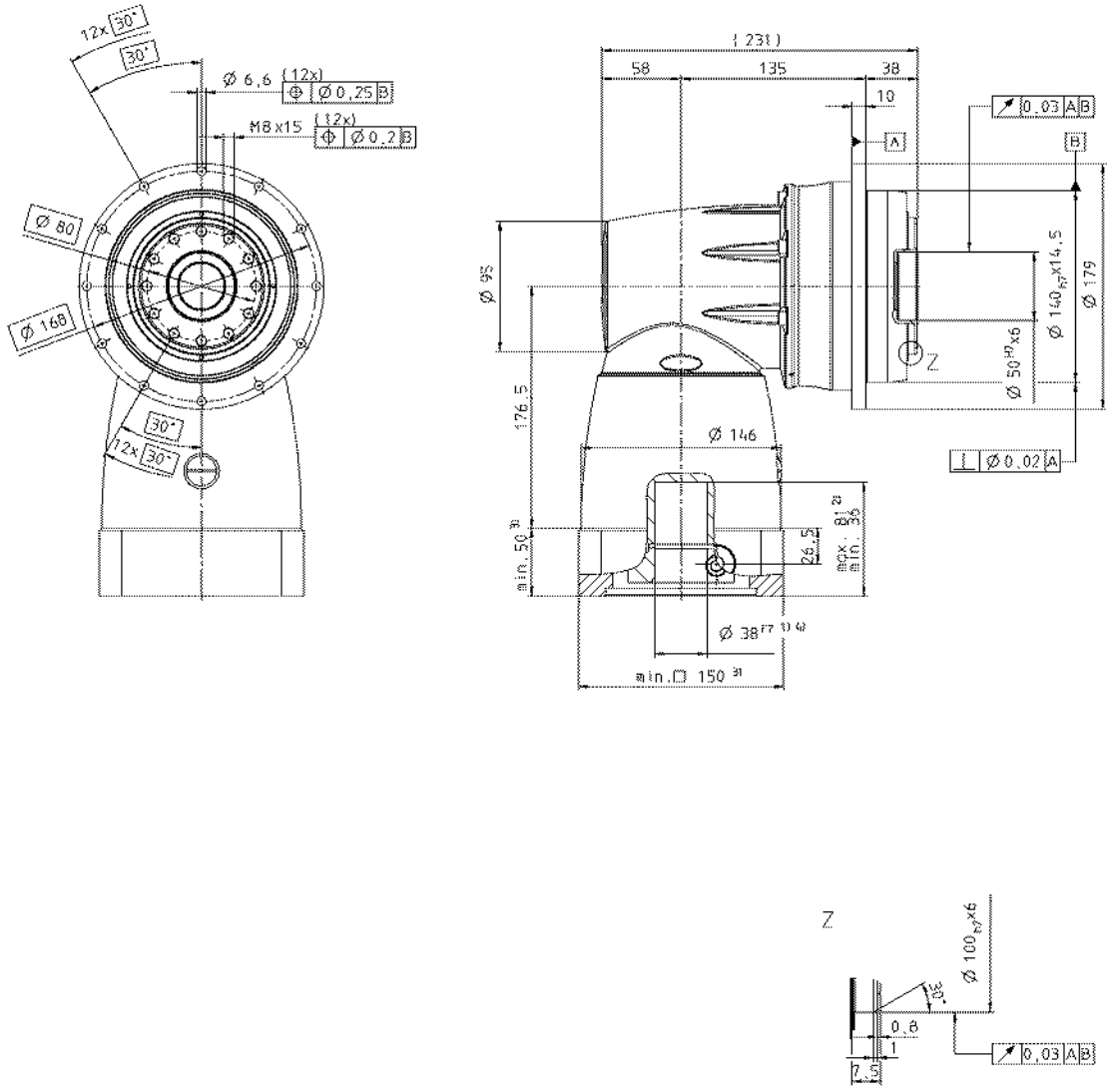
				2-stage						
Ratio			*i*	**4**	**5**	**7**	**8**	**10**	**14**	**20**
Max. acceleration torque (max. 1000 cycles per hour)			T_{2B}	Nm	700	700	700	700	700	700	540
				in.lb	6195	6195	6195	6195	6195	6195	4779
Nominal output torque (with n_{1N})			T_{2N}	Nm	370	370	370	370	370	370	240
				in.lb	3275	3275	3275	3275	3275	3275	2124
Emergency stop tourque (permitted 1000 times during the service life of the gearhead)			T_{2Not}	Nm	960	1200	1250	1250	1250	1250	1250
				in.lb	8496	10620	11063	11063	11063	11063	11063
Nominal input speed (with T_{2N} and 20°C ambient temperature)			n_{1N}	rpm	1200	1200	1300	1500	1500	1600	1600
Max. input speed			n_{1max}	rpm	4500	4500	4500	4500	4500	4500	4500
Mean no-load running torque (with n_1=3000 rpm and 20°C gearhead temperature)			T_{012}	Nm	12.0	10.5	8.8	5.7	5.0	4.1	3.4
				in.lb	106	93	78	50	44	36	30
Max. torsional backlash			j_t	arcmin	Standard ≤ 4 / Reduced ≤ 2						
Torsional rigidity			C_{t21}	Nm/ arcmin	73.0	93.0	111.0	93.0	113.0	124.0	111.0
				in.lb/ arcmin	646	823	982	823	1000	1097	982
Tilting rigidity			C_{2K}	Nm/ arcmin	560						
				in.lb/ arcmin	4956						
Max. axial force			F_{2AMax}	N	6130						
				lb_f	1379						
Max. tilting moment			M_{2KMax}	Nm	1335						
				in.lb	11815						
Efficiency at full load			η	%	95						
Service life			L_h	h	> 20000						
Weight (incl. ADP)			*m*	kg	22						
				lb_m	48						
Operating noise (with n1=3000 rpm no load)			L_{PA}	db(A)	≤ 70						
Max. permitted housing temperature				°C	+90						
				F	194						
Ambient temperature				°C	0 to +40						
				F	32 to 104						
Lubrication					Lubricated for life						
Paint					Blue RAL 5002						
Mounting position					any						
Direction of rotation					Motor and gearhead same direction						
Protection class					IP 65						
Moment of inertia (relates to the drive)	K	38	J_1	kgcm²	32.3	30.8	27.90	19.4	19.00	18.7	18.50
Clamping hub diameter [mm]				10^{-3} in.lb.s²	28.59	27.26	24.69	17.17	16.82	16.55	16.37

Please contact us for information on the best configuration for S1 conditions of use (continuous operation).

[a] Other ratios available on request
[b] Higher speeds are possible if the nominal torque is reduced
[c] For higher ambient temperatures, please reduce input speed
[d] Idling torques decrease during operation
[e] Refers to center of the output shaft or flange

View A

2-stage:



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

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.

CAD data is available under
http://www.wittenstein-alpha.de/en/info-and-cad-finder.html

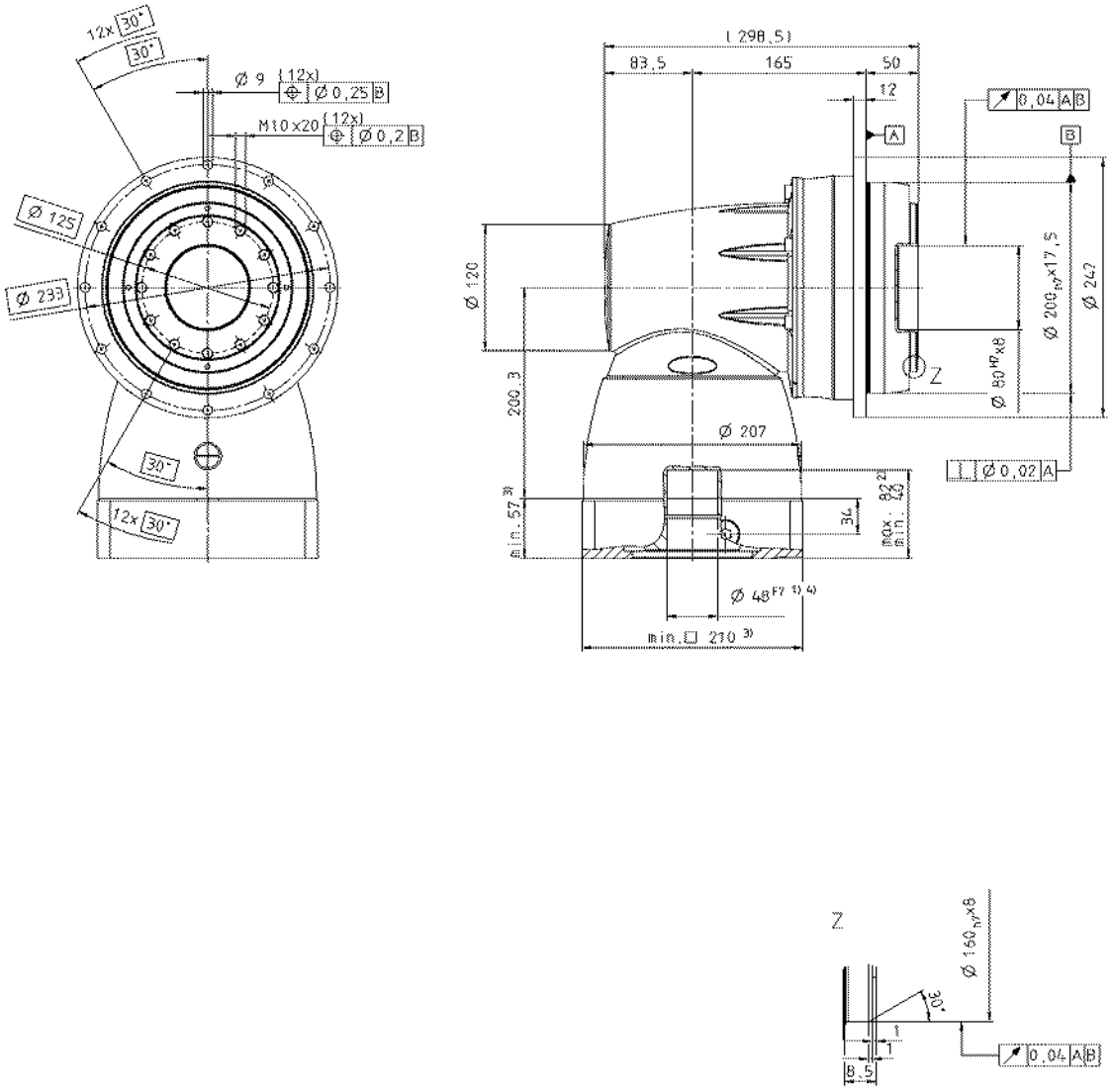
Motor mounting according to operating manual

				2-stage						
Ratio			***i***	**4**	**5**	**7**	**8**	**10**	**14**	**20**
Max. acceleration torque (max. 1000 cycles per hour)			T_{2B} Nm	1260	1575	1600	1260	1575	1600	1400
			T_{2B} in.lb	11151	13939	14160	11151	13939	14160	12390
Nominal output torque (with n_{1N})			T_{2N} Nm	700	750	750	700	750	750	750
			T_{2N} in.lb	6195	6638	6638	6195	6638	6638	6638
Emergency stop tourque (permitted 1000 times during the service life of the gearhead)			T_{2Not} Nm	1560	1955	2735	2750	2750	2750	2750
			T_{2Not} in.lb	13806	17302	24205	24338	24338	24338	24338
Nominal input speed (with T_{2N} and 20°C ambient temperature)			n_{1N} rpm	900	900	1000	1200	1200	1300	1300
Max. input speed			n_{1max} rpm	4000	4000	4000	4000	4000	4000	4000
Mean no-load running torque (with n_1=3000 rpm and 20°C gearhead temperature)			T_{012} Nm	25.0	22.0	19.0	13.5	12.0	10.0	9.0
			T_{012} in.lb	221	195	168	119	106	89	80
Max. torsional backlash			j_t arcmin	Standard ≤ 4 / Reduced ≤ 2						
Torsional rigidity			C_{t21} Nm/ arcmin	181.0	242.0	324.0	278.0	345.0	407.0	390.0
			C_{t21} in.lb/ arcmin	1602	2142	2867	2460	3053	3602	3452
Tilting rigidity			C_{2K} Nm/ arcmin	1452						
			C_{2K} in.lb/ arcmin	12850						
Max. axial force			F_{2AMax} N	10050						
			F_{2AMax} lb_f	2261						
Max. tilting moment			M_{2KMax} Nm	3280						
			M_{2KMax} in.lb	29028						
Efficiency at full load			η %	95						
Service life			L_h h	> 20000						
Weight (incl. ADP)			m kg	51						
			m lb_m	112						
Operating noise (with n1=3000 rpm no load)			L_{PA} db(A)	≤ 70						
Max. permitted housing temperature			°C	+90						
			F	194						
Ambient temperature			°C	0 to +40						
			F	32 to 104						
Lubrication				Lubricated for life						
Paint				Blue RAL 5002						
Mounting position				any						
Direction of rotation				Motor and gearhead same direction						
Protection class				IP 65						
Moment of inertia (relates to the drive)	M	48	J_1 kgcm²	121.2	112.6	94.7	52.1	50	47.9	46.7
Clamping hub diameter [mm]			J_1 10^{-3} in.lb.s²	107.26	99.65	83.81	46.11	44.25	42.39	41.33

Please contact us for information on the best configuration for S1 conditions of use (continuous operation).

[a] Other ratios available on request
[b] Higher speeds are possible if the nominal torque is reduced
[c] For higher ambient temperatures, please reduce input speed
[d] Idling torques decrease during operation
[e] Refers to center of the output shaft or flange

2-stage:



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

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.

CAD data is available under
http://www.wittenstein-alpha.de/en/info-and-cad-finder.html

Motor mounting according to operating manual

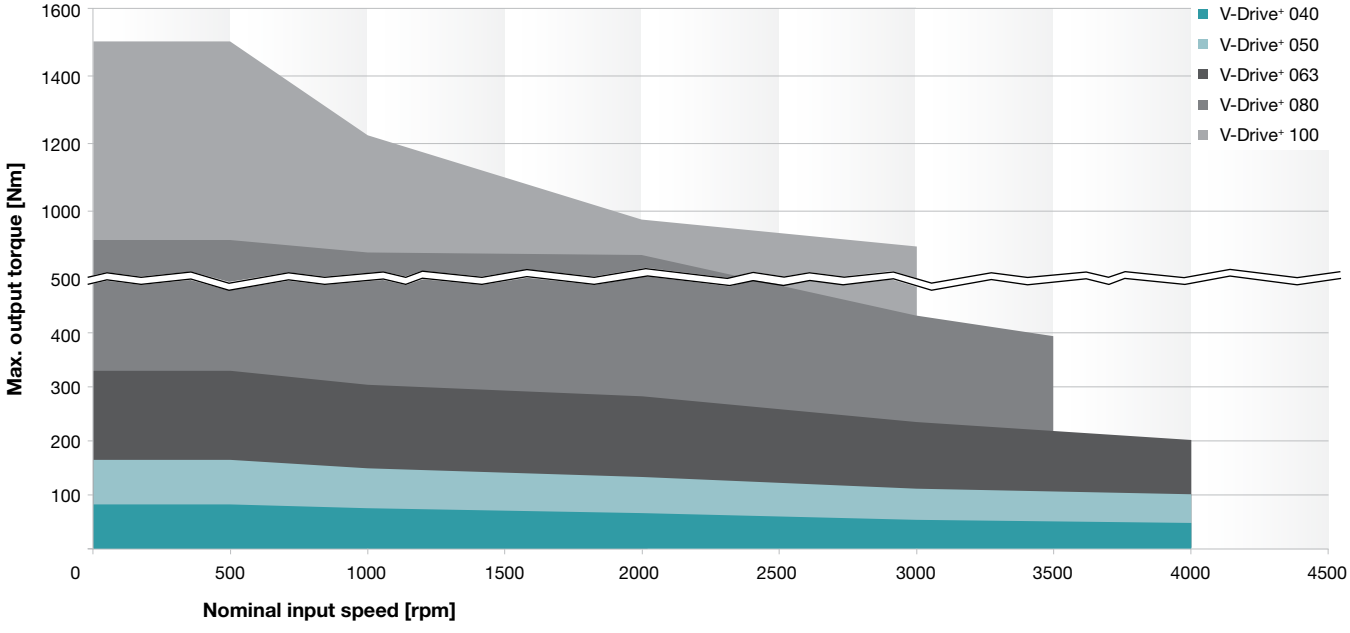
V-Drive+ – Powerful torque but quiet running

Servo worm gearhead with solid shaft, hollow shaft, and hollow shaft flange outputs. The V-Drive+ impresses with its high power density and low torsional backlash. It is especially suitable for continuous duty applications.

VDT+ VDH+ VDS+

Quick size selection

V-Drive+ (example for i = 28)
For applications in cyclic operation (DC ≤ 60%) or continuous operation (DC ≥ 60%)



Versions and Applications

Features	VDT+ with flange shaft page 286	VDH+ with smooth/keyed hollow shaft page 294	VDS+ with smooth/keyed shaft or involute shaft page 304
Power density	••	••	••
Positioning accuracy	••	••	••
Torsional rigidity	•••	••	••
Smooth-running	•••	•••	•••

Product features

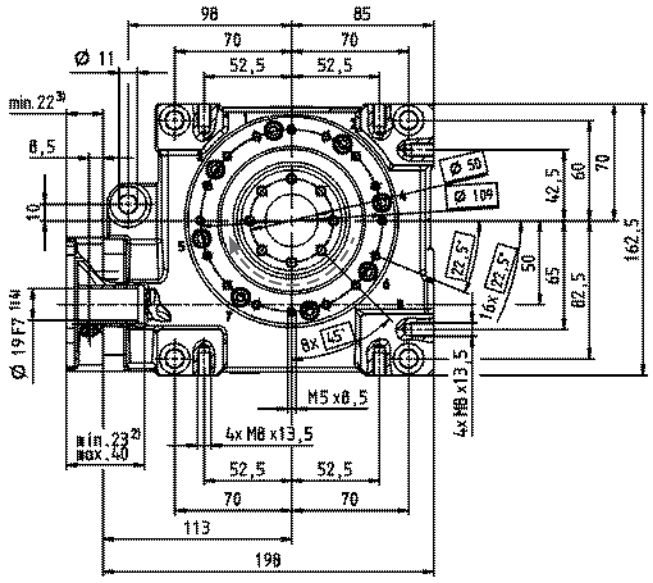
Ratios	4 – 40	4 – 40	4 – 40
Torsional backlash [arcmin]	≤ 3	≤ 3	≤ 3
Output type			
Smooth output shaft			•
Keywayed output shaft			•
Output shaft with involute gearing			•
Output flange	•		
Hollow shaft interface Connected via shrink disc		•	
Hollow shaft interface, rear side Connected via shrink disc		•	
Flanged hollow shaft	•		
Shaft on both sides			•
Input type			
Motor mounted version	•	•	•
Type			
Food-grade lubrication	•	•	•
Corrosion resistant [a]	•	•	•
Accessories			
Coupling	•		•
Rack	•		•
Pinion	•		•
Shrink disc		•	
Flange shaft	•		

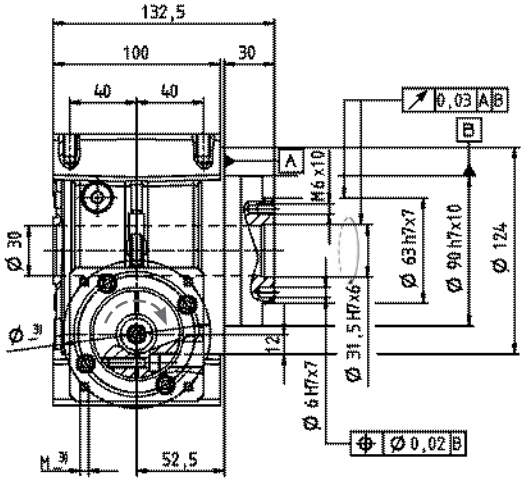
[a] Please contact WITTENSTEIN alpha

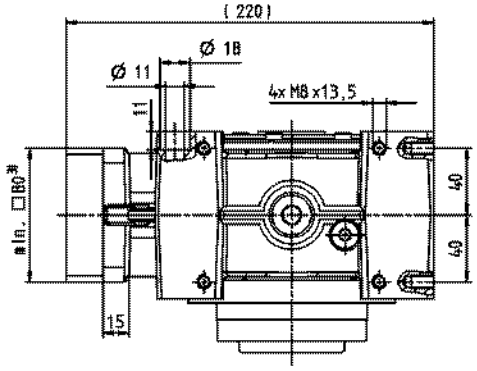
			1-stage					
Ratio	***i***		**4**	**7**	**10**	**16**	**28**	**40**
n_{1N}=500 rpm	T_{2Max}	Nm	124	132	148	154	165	158
		in.lb	1097	1168	1310	1363	1460	1398
	T_{2Servo}	Nm	54	71	74	81	90	74
		in.lb	478	628	655	717	797	655
	η	%	92	89	86	82	72	64
n_{1N}=1000 rpm	T_{2Max}	Nm	124	130	136	140	151	142
		in.lb	1097	1151	1204	1239	1336	1257
	T_{2Servo}	Nm	58	76	80	88	97	81
		in.lb	513	673	708	779	858	717
	η	%	94	91	89	85	77	69
n_{1N}=2000 rpm	T_{2Max}	Nm	88	106	112	120	134	122
		in.lb	779	938	991	1062	1186	1080
	T_{2Servo}	Nm	60	78	82	89	99	83
		in.lb	531	690	726	788	876	735
	η	%	95	93	91	88	75	75
n_{1N}=3000 rpm	T_{2Max}	Nm	72	86	95	106	112	108
		in.lb	637	761	841	938	991	956
	T_{2Servo}	Nm	59	77	81	88	97	81
		in.lb	522	681	717	779	858	717
	η	%	96	94	93	90	83	78
n_{1N}=4000 rpm	T_{2Max}	Nm	62	77	83	92	102	95
		in.lb	549	681	735	814	903	841
	T_{2Servo}	Nm	58	76	79	87	96	80
		in.lb	513	673	699	770	850	708
	η	%	96	95	93	91	85	80
Emergency stop torque	T_{2Not}	Nm	230	242	242	250	262	236
		in.lb	2036	2142	2142	2213	2319	2089
Max. input speed	n_{1Max}	rpm	6000					
Mean no load running torque [a] (With n_1=3000 min^{-1} and 20° C gear temperature)	T_{012}	Nm	1,3	1,2	1,2	1,1	1	0,9
		in.lb	11,5	10,6	10,6	9,7	8,9	8,0
Max. torsional backlash	j_t	arcmin	≤3					
Torsional rigidity	C_{t21}	Nm/arcmin	17					
		in.lb/arcmin	150					
Max. axial force [b]	F_{2AMax}	N	5000					
		lb_f	1125					
Max. radial force [b]	F_{2RMax}	N	3800					
		lb_f	855					
Max. tilting moment	M_{2KMax}	Nm	409					
		in.lb	3620					
Tilting rigidity	C_{2K}	Nm/arcmin	504					
		in.lb/arcmin	4460					
Service life (For calculation see "Information")	L_h	h	> 20000					
Weight incl. standardadapter plate	m	kg	8,8					
		lb_m	19,4					
Operating noise (with n_1 = 3000 rpm no load)	L_{PA}	dB(A)	≤ 62					
Max. permitted housing temperature		°C	+90					
		F	194					
Ambient temperature		°C	-15 to +40					
		F	5 to 104					
Lubrication			Synthetic transmission oil					
Paint			None					
Direction of rotation			See drawing					
Protection class			IP 65					
Moment of inertia (relates to the drive)	J_1	kgcm²	2,59	2,12	1,98	1,86	1,82	1,86
		10^{-3} in.lb.s²	2,29	1,87	1,75	1,64	1,61	1,65

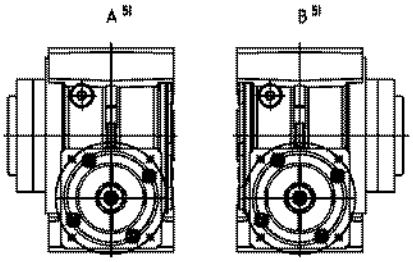
[a] Idling torques decrease during operation

[b] Refers to center of the output shaft or flange









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) Output side

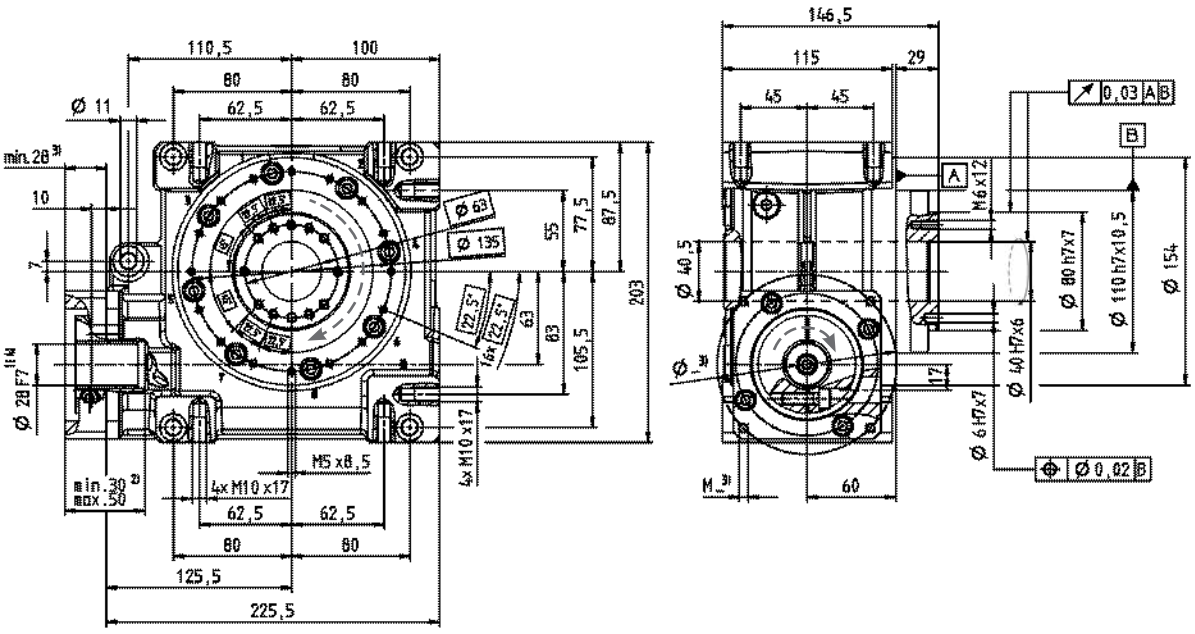
CAD data is available under www.wittenstein-alpha.com

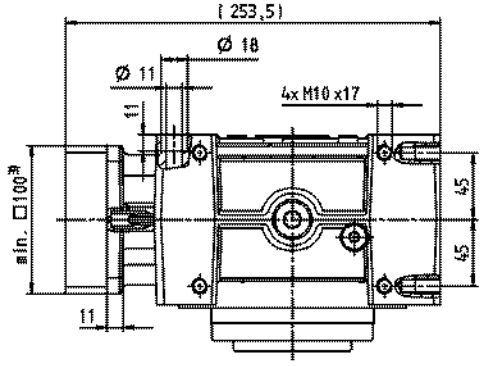
Motor mounting according to operating manual

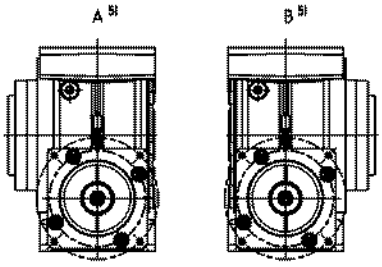
			1-stage					
Ratio	***i***		**4**	**7**	**10**	**16**	**28**	**40**
n_{1N}=500 rpm	T_{2Max}	Nm	302	314	315	320	328	324
		in.lb	2673	2779	2788	2832	2903	2867
	T_{2Servo}	Nm	198	210	225	221	229	226
		in.lb	1752	1859	1991	1956	2027	2000
	η	%	93	91	88	83	74	68
n_{1N}=1000 rpm	T_{2Max}	Nm	264	284	290	298	304	301
		in.lb	2336	2513	2567	2637	2690	2664
	T_{2Servo}	Nm	192	228	240	238	245	241
		in.lb	1699	2018	2124	2106	2168	2133
	η	%	94	93	91	86	78	73
n_{1N}=2000 rpm	T_{2Max}	Nm	202	243	262	271	282	278
		in.lb	1788	2151	2319	2398	2496	2460
	T_{2Servo}	Nm	174	212	230	238	248	243
		in.lb	1540	1876	2036	2106	2195	2151
	η	%	96	94	93	89	83	78
n_{1N}=3000 rpm	T_{2Max}	Nm	164	190	202	209	235	231
		in.lb	1451	1682	1788	1850	2080	2044
	T_{2Servo}	Nm	128	166	184	209	198	194
		in.lb	1133	1469	1628	1850	1752	1717
	η	%	96	95	94	91	85	81
n_{1N}=4000 rpm	T_{2Max}	Nm	128	148	164	175	201	198
		in.lb	1133	1310	1451	1549	1779	1752
	T_{2Servo}	Nm	104	132	152	175	165	162
		in.lb	920	1168	1345	1549	1460	1434
	η	%	97	96	94	92	86	83
Emergency stop torque	T_{2Not}	Nm	460	484	491	494	518	447
		in.lb	4071	4283	4345	4372	4584	3956
Max. input speed	n_{1Max}	rpm	4500					
Mean no load running torque [a] (With n_1=3000 min^{-1} and 20° C gear temperature)	T_{012}	Nm	2,1	1,9	1,8	1,7	1,6	1,4
		in.lb	18,6	16,8	15,9	15,0	14,2	12,4
Max. torsional backlash	j_t	arcmin	≤3					
Torsional rigidity	C_{t21}	Nm/arcmin	50					
		in.lb/arcmin	443					
Max. axial force [b]	F_{2AMax}	N	8250					
		lb_f	1856					
Max. radial force [b]	F_{2RMax}	N	6000					
		lb_f	1350					
Max. tilting moment	M_{2KMax}	Nm	843					
		in.lb	7461					
Tilting rigidity	C_{2K}	Nm/arcmin	603					
		in.lb/arcmin	5337					
Service life (For calculation see "Information")	L_h	h	> 20000					
Weight incl. standard adapter plate	*m*	kg	14,5					
		lb_m	32					
Operating noise (with n_1 = 3000 rpm no load)	L_{PA}	dB(A)	≤ 64					
Max. permitted housing temperature		°C	+90					
		F	194					
Ambient temperature		°C	-15 to +40					
		F	5 to 104					
Lubrication			Synthetic transmission oil					
Paint			None					
Direction of rotation			See drawing					
Protection class			IP 65					
Moment of inertia (relates to the drive)	J_1	kgcm²	7,45	6,02	5,65	5,49	5,42	5,36
		10^{-3} in.lb.s²	6,60	5,33	5,00	4,86	4,80	4,75

[a] Idling torques decrease during operation

[b] Refers to center of the output shaft or flange







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) Output side

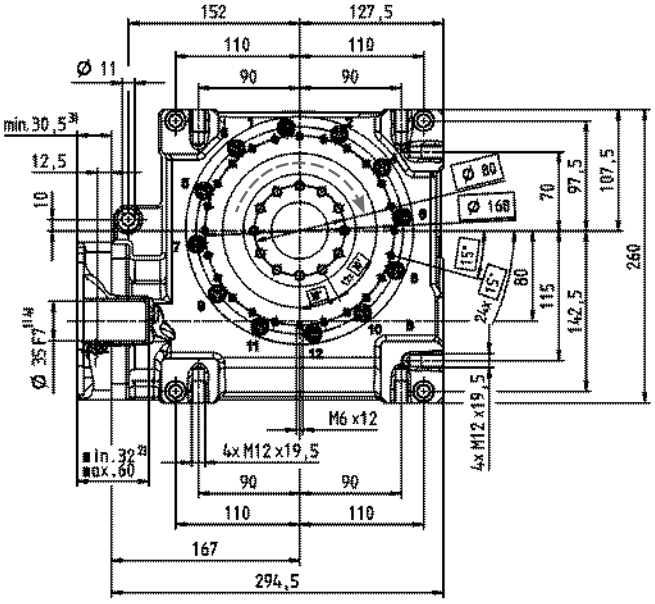
CAD data is available under www.wittenstein-alpha.com

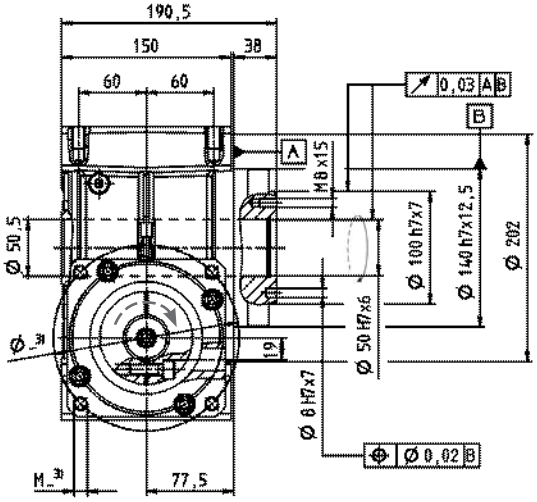
Motor mounting according to operating manual

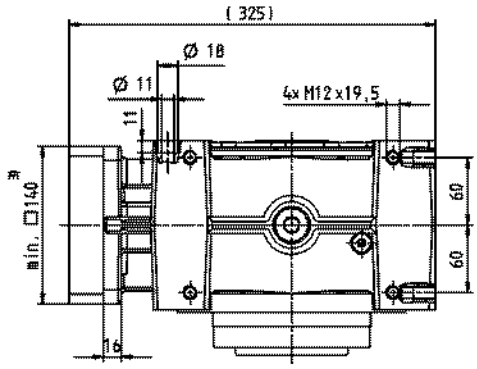
			1-stage					
Ratio	***i***		**4**	**7**	**10**	**16**	**28**	**40**
n_{1N}=500 rpm	T_{2Max}	Nm	578	646	672	702	785	676
		in.lb	5115	5717	5947	6213	6947	5983
	T_{2Servo}	Nm	469	601	613	677	764	631
		in.lb	4151	5319	5425	5991	6761	5584
	η	%	94	92	89	86	77	70
n_{1N}=1000 rpm	T_{2Max}	Nm	514	602	588	656	698	613
		in.lb	4549	5328	5204	5806	6177	5425
	T_{2Servo}	Nm	491	574	561	625	665	584
		in.lb	4345	5080	4965	5531	5885	5168
	η	%	95	93	91	88	81	74
n_{1N}=2000 rpm	T_{2Max}	Nm	350	435	431	500	536	470
		in.lb	3098	3850	3814	4425	4744	4160
	T_{2Servo}	Nm	335	415	411	476	511	448
		in.lb	2965	3673	3637	4213	4522	3965
	η	%	96	95	93	89	84	79
n_{1N}=3000 rpm	T_{2Max}	Nm	259	336	334	400	433	380
		in.lb	2292	2974	2956	3540	3832	3363
	T_{2Servo}	Nm	247	320	319	381	413	362
		in.lb	2186	2832	2823	3372	3655	3204
	η	%	97	96	94	92	86	81
n_{1N}=3500 rpm	T_{2Max}	Nm	227	299	300	362	394	346
		in.lb	2009	2646	2655	3204	3487	3062
	T_{2Servo}	Nm	217	285	286	345	376	330
		in.lb	1920	2522	2531	3053	3328	2921
	η	%	97	96	94	92	87	82
Emergency stop torque	T_{2Not}	Nm	938	993	963	1005	1064	941
		in.lb	8301	8788	8523	8894	9416	8328
Max. input speed	n_{1Max}	rpm	4000					
Mean no load running torque [a] (With n_1=3000 min^{-1} and 20° C gear temperature)	T_{012}	Nm	3,6	3,5	3,4	3,2	3	2,8
		in.lb	31,9	31,0	30,1	28,3	26,6	24,8
Max. torsional backlash	j_t	arcmin	≤3					
Torsional rigidity	C_{t21}	Nm/arcmin	113					
		in.lb/arcmin	1000					
Max. axial force [b]	F_{2AMax}	N	13900					
		lb_f	3128					
Max. radial force [b]	F_{2RMax}	N	9000					
		lb_f	2025					
Max. tilting moment	M_{2KMax}	Nm	1544					
		in.lb	13664					
Tilting rigidity	C_{2K}	Nm/arcmin	1178					
		in.lb/arcmin	10425					
Service life (For calculation see "Information")	L_h	h	> 20000					
Weight incl. standard adapter plate	*m*	kg	31					
		lb_m	68,5					
Operating noise (with n_1 = 3000 rpm no load)	L_{PA}	dB(A)	≤ 66					
Max. permitted housing temperature		°C	+90					
		F	194					
Ambient temperature		°C	-15 to +40					
		F	5 to 104					
Lubrication			Synthetic transmission oil					
Paint			None					
Direction of rotation			See drawing					
Protection class			IP 65					
Moment of inertia (relates to the drive)	J_1	kgcm²	23,99	18,64	18,23	16,54	16,32	16,94
		10^{-3} in.lb.s²	21,23	16,49	16,13	14,64	14,44	14,99

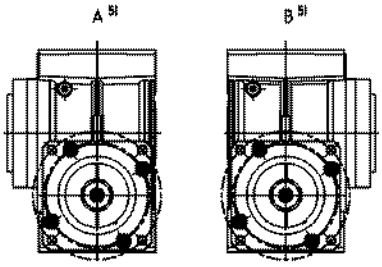
[a] Idling torques decrease during operation

[b] Refers to center of the output shaft or flange









Non-tolerated dimensions ± 1 mm

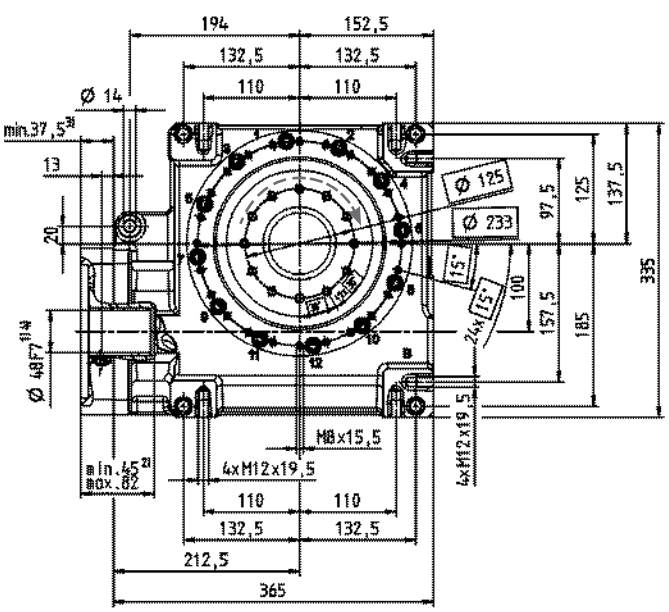
1) Check motor shaft fit.
2) Min./Max. permissible motor shaft length.
   Longer motor shafts are adaptable, please contact us.
3) The dimensions depend on the motor.
4) Smaller motor shaft diameter is compensated by a bushing with a minimum thickness of 1 mm.
5) Output side

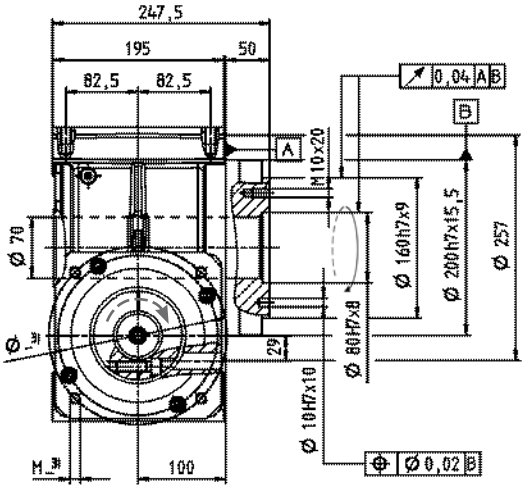
CAD data is available under www.wittenstein-alpha.com

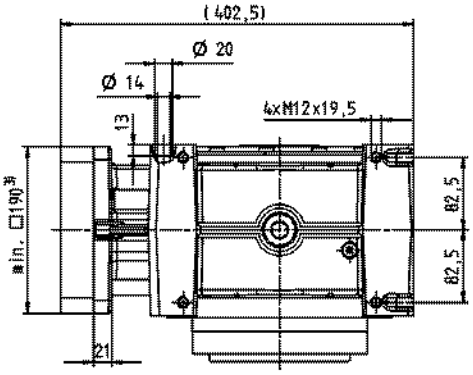
Motor mounting according to operating manual

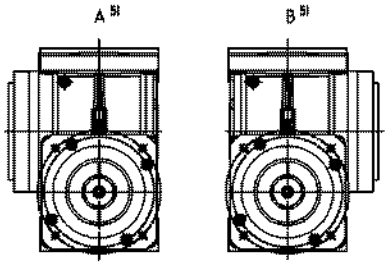
			1-stage					
Ratio	***i***		**4**	**7**	**10**	**16**	**28**	**40**
n_{1N}=500 rpm	T_{2Max}	Nm	1184	1336	1377	1392	1505	1376
		in.lb	10478	11824	12186	12319	13319	12178
	T_{2Servo}	Nm	1155	1304	1343	1359	1469	1343
		in.lb	10222	11540	11886	12027	13001	11886
	η	%	95	93	91	87	80	76
n_{1N}=1000 rpm	T_{2Max}	Nm	905	1070	1122	1140	1251	1162
		in.lb	8009	9470	9930	10089	11071	10284
	T_{2Servo}	Nm	883	1044	1095	1113	1221	1134
		in.lb	7815	9239	9691	9850	10806	10036
	η	%	95	94	92	88	82	79
n_{1N}=2000 rpm	T_{2Max}	Nm	595	748	807	830	930	883
		in.lb	5266	6620	7142	7346	8231	7815
	T_{2Servo}	Nm	581	730	788	810	908	862
		in.lb	5142	6461	6974	7169	8036	7629
	η	%	96	95	94	91	86	82
n_{1N}=3000 rpm [c]	T_{2Max}	Nm	430	564	621	644	735	709
		in.lb	3806	4991	5496	5699	6505	6275
	T_{2Servo}	Nm	420	551	606	629	718	692
		in.lb	3717	4876	5363	5567	6354	6124
	η	%	97	96	95	92	87	84
n_{1N}=3500 rpm	T_{2Max}	Nm	–	–	–	–	–	–
		in.lb						
	T_{2Servo}	Nm	–	–	–	–	–	–
		in.lb						
	η	%	–	–	–	–	–	–
Emergency stop torque	T_{2Not}	Nm	1819	1932	1940	1955	2073	1856
		in.lb	16098	17098	17169	17302	18346	16426
Max. input speed	n_{1Max}	rpm	3500					
Mean no load running torque [a] (With n_1=3000 min^{-1} and 20° C gear temperature)	T_{012}	Nm	9,8	8,1	7,4	6,7	5,8	5
		in.lb	86,7	71,7	65,5	59,3	51,3	44,3
Max. torsional backlash	j_t	arcmin	≤3					
Torsional rigidity	C_{t21}	Nm/arcmin	213					
		in.lb/arcmin	1885					
Max. axial force [b]	F_{2AMax}	N	19500					
		lb_f	4388					
Max. radial force [b]	F_{2RMax}	N	14000					
		lb_f	3150					
Max. tilting moment	M_{2KMax}	Nm	3059					
		in.lb	27072					
Tilting rigidity	C_{2K}	Nm/arcmin	2309					
		in.lb/arcmin	20435					
Service life (For calculation see "Information")	L_h	h	> 20000					
Weight incl. standardadapter plate	*m*	kg	62					
		lb_m	137					
Operating noise (with n_1 = 3000 rpm no load)	L_{PA}	dB(A)	≤ 70					
Max. permitted housing temperature		°C	+90					
		F	194					
Ambient temperature		°C	-15 to +40					
		F	5 to 104					
Lubrication			Synthetic transmission oil					
Paint			None					
Direction of rotation			See drawing					
Protection class			IP 65					
Moment of inertia (relates to the drive)	J_1	kgcm²	83,51	64,27	59,95	59,40	56,32	56,49
		10^{-3} in.lb.s²	73,90	56,88	53,06	52,56	49,85	50,00

[a] Idling torques decrease during operation
[b] Refers to center of the output shaft or flange
[c] Reduce by 20% in S1 operation at 20°C ambient temperature.









Non-tolerated dimensions ± 1 mm

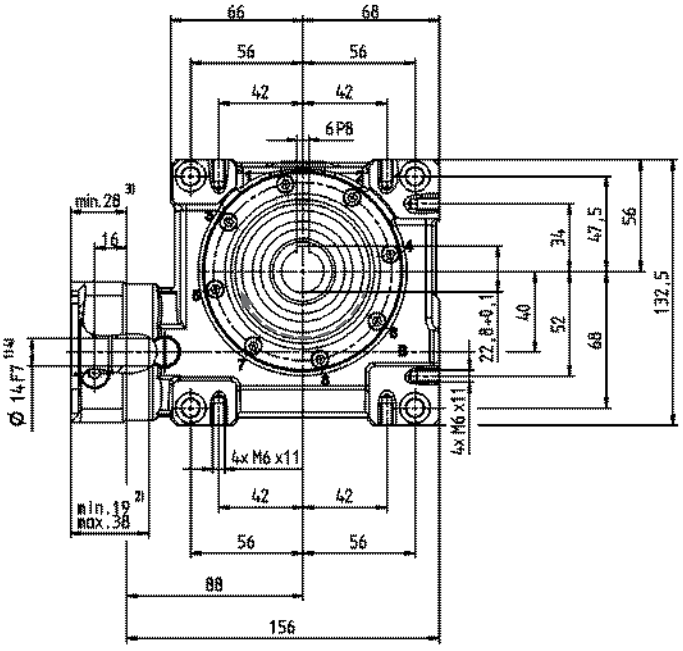
1) Check motor shaft fit.
2) Min./Max. permissible motor shaft length.
   Longer motor shafts are adaptable, please contact us.
3) The dimensions depend on the motor.
4) Smaller motor shaft diameter is compensated by a bushing with a minimum thickness of 1 mm.
5) Output side

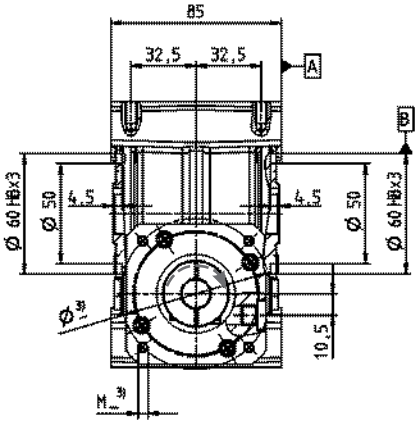
CAD data is available under www.wittenstein-alpha.com

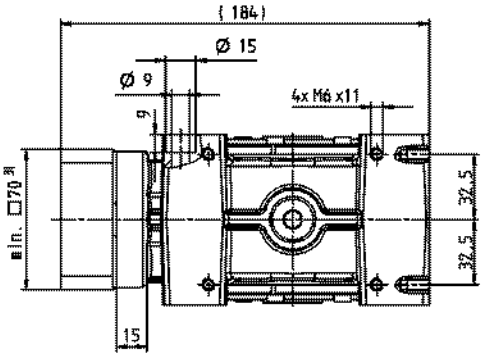
Motor mounting according to operating manual

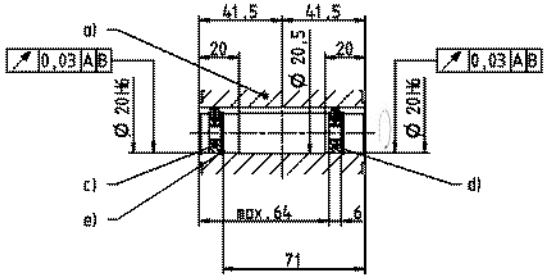
					1-stage					
Ratio			***i***		**4**	**7**	**10**	**16**	**28**	**40**
n_{1N}=500 rpm			T_{2Max}	Nm	60	75	83	86	91	83
				in.lb	531	664	735	761	805	735
			T_{2Servo}	Nm	17	24	25	26	29	25
				in.lb	150	212	221	230	257	221
			η	%	93	90	88	82	73	67
n_{1N}=1000 rpm			T_{2Max}	Nm	45	60	68	75	75	76
				in.lb	398	531	602	664	664	673
			T_{2Servo}	Nm	19	26	28	29	32	28
				in.lb	168	230	248	257	283	248
			η	%	94	92	90	86	77	73
n_{1N}=2000 rpm			T_{2Max}	Nm	35	50	54	59	63	65
				in.lb	310	443	478	522	558	575
			T_{2Servo}	Nm	19	26	28	29	33	29
				in.lb	168	230	248	257	292	257
			η	%	96	94	92	88	81	77
n_{1N}=3000 rpm			T_{2Max}	Nm	30	42	46	51	53	56
				in.lb	266	372	407	451	469	496
			T_{2Servo}	Nm	19	26	28	29	32	28
				in.lb	168	230	248	257	283	248
			η	%	96	95	93	90	83	79
n_{1N}=4000 rpm			T_{2Max}	Nm	28	38	43	44	47	50
				in.lb	248	336	381	389	416	443
			T_{2Servo}	Nm	19	25	27	28	31	27
				in.lb	168	221	239	248	274	239
			η	%	96	95	94	91	84	81
Emergency stop torque			T_{2Not}	Nm	118	126	125	129	134	122
				in.lb	1044	1115	1106	1142	1186	1080
Max. input speed			n_{1Max}	rpm	6000					
Mean no load running torque [a] (With n_1=3000 min^{-1} and 20° C gear temperature)			T_{012}	Nm	0,8	0,7	0,5	0,5	0,4	0,4
				in.lb	7,1	6,2	4,4	4,4	3,5	3,5
Max. torsional backlash			j_t	arcmin	≤3					
Torsional rigidity			C_{t21}	Nm/arcmin	4,5					
				in.lb/arcmin	40					
Max. axial force [b]			F_{2AMax}	N	3000					
				lb_f	675					
Max. radial force [b]			F_{2RMax}	N	2400					
				lb_f	540					
Max. tilting moment			M_{2KMax}	Nm	205					
				in.lb	1814					
Service life (For calculation see "Information")			L_h	h	> 20000					
Weight incl. standard adapter plate			m	kg	4,0					
				lb_m	8,8					
Operating noise (with n_1 = 3000 rpm no load)			L_{PA}	dB(A)	≤ 54					
Max. permitted housing temperature				°C	+90					
				F	194					
Ambient temperature				°C	-15 to +40					
				F	5 to 104					
Lubrication					Synthetic transmission oil					
Paint					None					
Direction of rotation					See drawing					
Protection class					IP 65					
Moment of inertia (relates to the drive) Moments of inertia for motor shaft diameter 14 and 19 mm	C	14	J_1	kgcm²	0.52	0.38	0.34	0.32	0.32	0.31
				10^{-3} in.lb.s²	0.46	0.34	0.30	0.28	0.28	0.27
	E	19	J_1	kgcm²	0.54	0.40	0.37	0.35	0.34	0.33
				10^{-3} in.lb.s²	0.48	0.35	0.33	0.31	0.30	0.29

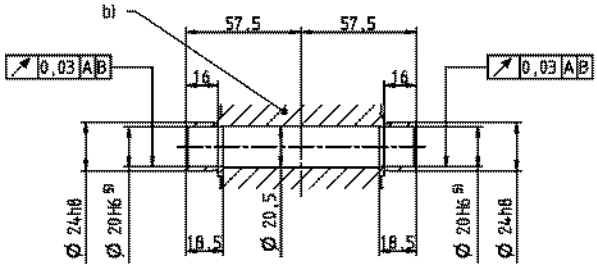
[a] Idling torques decrease during operation
[b] Refers to center of the output shaft or flange











a) Hollow shaft, keywayed
b) Hollow shaft, smooth
c) End disc for screw M6
d) End disc as forcing washer for screw M8
e) Locking ring – DIN 472

Non-tolerated dimensions ± 1 mm
1) Check motor shaft fit.
2) Min./Max. permissible motor shaft length.
   Longer motor shafts are adaptable, please contact us.
3) The dimensions depend on the motor.
4) Smaller motor shaft diameter is compensated by a bushing with a minimum thickness of 1 mm. Motor shaft diameters up to 19 mm available – please contact WITTENSTEIN alpha.
5) Tolerance h6 for mounted shaft.

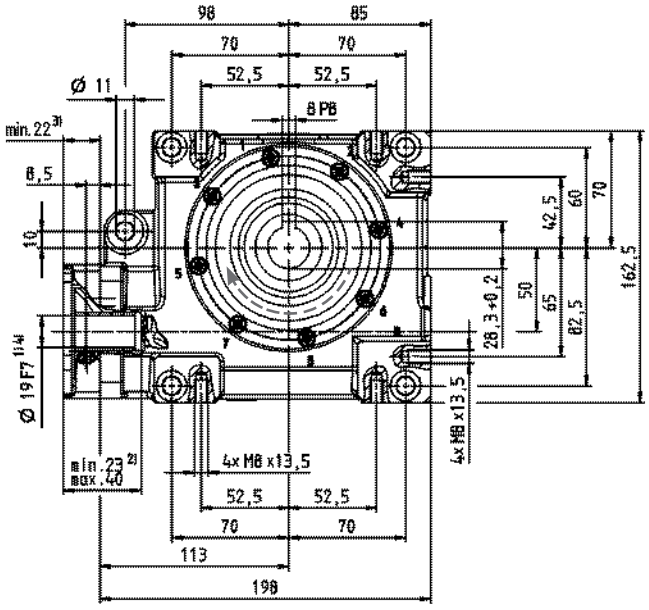
CAD data is available under www.wittenstein-alpha.com

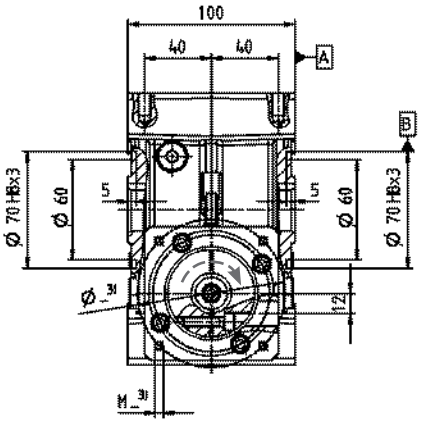
Motor mounting according to operating manual

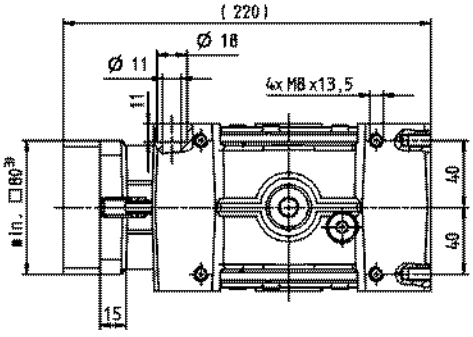
			1-stage					
Ratio	***i***		**4**	**7**	**10**	**16**	**28**	**40**
n_{1N}=500 rpm	T_{2Max}	Nm	124	132	148	154	165	158
		in.lb	1097	1168	1310	1363	1460	1398
	T_{2Servo}	Nm	54	71	74	81	90	74
		in.lb	478	628	655	717	797	655
	η	%	92	89	86	82	72	64
n_{1N}=1000 rpm	T_{2Max}	Nm	124	130	136	140	151	142
		in.lb	1097	1151	1204	1239	1336	1257
	T_{2Servo}	Nm	58	76	80	88	97	81
		in.lb	513	673	708	779	858	717
	η	%	94	91	89	85	77	69
n_{1N}=2000 rpm	T_{2Max}	Nm	88	106	112	120	134	122
		in.lb	779	938	991	1062	1186	1080
	T_{2Servo}	Nm	60	78	82	89	99	83
		in.lb	531	690	726	788	876	735
	η	%	95	93	91	88	75	75
n_{1N}=3000 rpm	T_{2Max}	Nm	72	86	95	106	112	108
		in.lb	637	761	841	938	991	956
	T_{2Servo}	Nm	59	77	81	88	97	81
		in.lb	522	681	717	779	858	717
	η	%	96	94	93	90	83	78
n_{1N}=4000 rpm	T_{2Max}	Nm	62	77	83	92	102	95
		in.lb	549	681	735	814	903	841
	T_{2Servo}	Nm	58	76	79	87	96	80
		in.lb	513	673	699	770	850	708
	η	%	96	95	93	91	85	80
Emergency stop torque	T_{2Not}	Nm	230	242	242	250	262	236
		in.lb	2036	2142	2142	2213	2319	2089
Max. input speed	n_{1Max}	rpm	6000					
Mean no load running torque [a] (With n_1=3000 min^{-1} and 20° C gear temperature)	T_{012}	Nm	1,3	1,2	1,2	1,1	1	0,9
		in.lb	11,5	10,6	10,6	9,7	8,9	8,0
Max. torsional backlash	j_t	arcmin	≤3					
Torsional rigidity	C_{t21}	Nm/arcmin	8					
		in.lb/arcmin	71					
Max. axial force [b]	F_{2AMax}	N	5000					
		lb_f	1125					
Max. radial force [b]	F_{2RMax}	N	3800					
		lb_f	855					
Max. tilting moment	M_{2KMax}	Nm	409					
		in.lb	3620					
Service life (For calculation see "Information")	L_h	h	> 20000					
Weight incl. standard adapter plate	m	kg	7,4					
		lb_m	16,4					
Operating noise (with n_1 = 3000 rpm no load)	L_{PA}	dB(A)	≤ 62					
Max. permitted housing temperature		°C	+90					
		F	194					
Ambient temperature		°C	-15 to +40					
		F	5 to 104					
Lubrication			Synthetic transmission oil					
Paint			None					
Direction of rotation			See drawing					
Protection class			IP 65					
Moment of inertia (relates to the drive)	J_1	kgcm²	2.31	2.02	1.93	1.84	1.81	1.86
		10^{-3} in.lb.s²	2.04	1.79	1.71	1.63	1.60	1.64

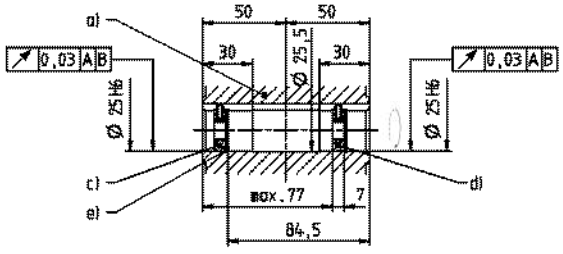
[a] Idling torques decrease during operation

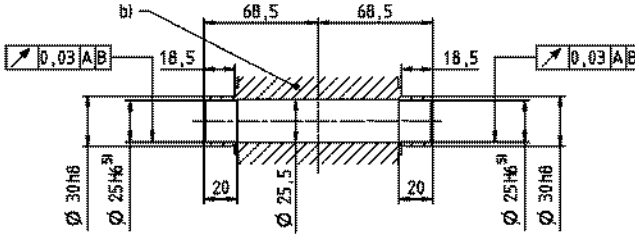
[b] Refers to center of the output shaft or flange











a) Hollow shaft, keywayed
b) Hollow shaft, smooth
c) End disc for screw M10
d) End disc as forcing washer for screw M12
e) Locking ring – DIN 472

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.

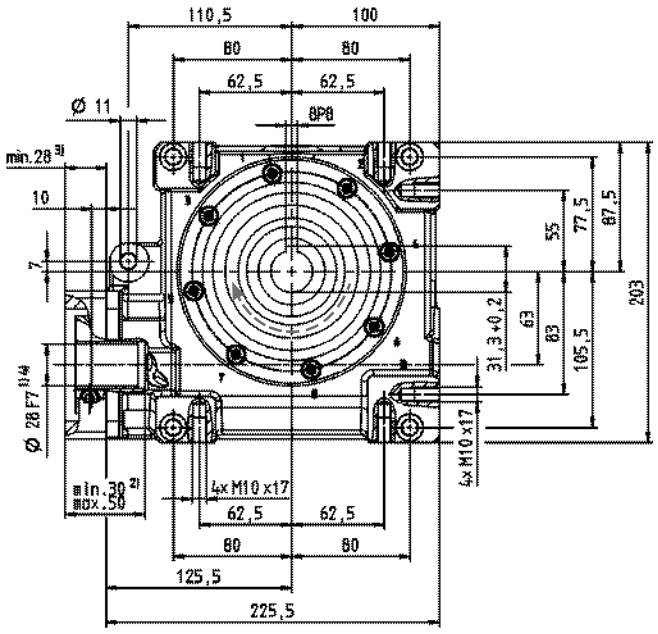
CAD data is available under www.wittenstein-alpha.com

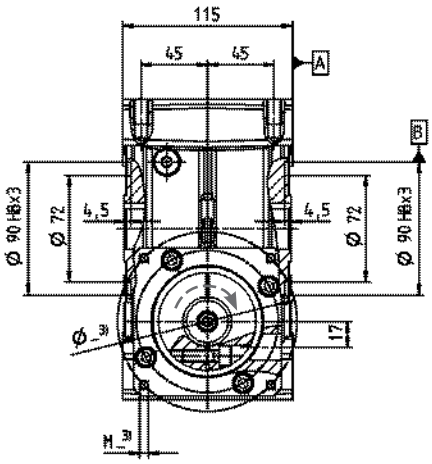
Motor mounting according to operating manual

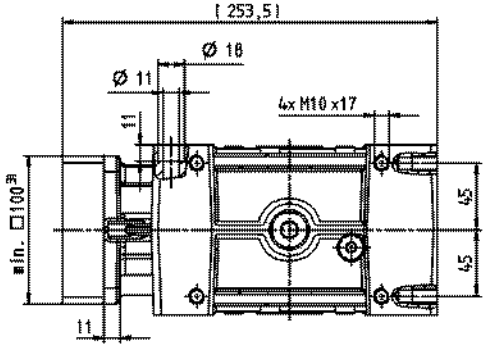
			1-stage					
Ratio	***i***		**4**	**7**	**10**	**16**	**28**	**40**
n_{1N}=500 rpm	T_{2Max}	Nm	302	314	315	320	328	324
		in.lb	2673	2779	2788	2832	2903	2867
	T_{2Servo}	Nm	198	210	225	221	229	226
		in.lb	1752	1859	1991	1956	2027	2000
	η	%	93	91	88	83	74	68
n_{1N}=1000 rpm	T_{2Max}	Nm	264	284	290	298	304	301
		in.lb	2336	2513	2567	2637	2690	2664
	T_{2Servo}	Nm	192	228	240	238	245	241
		in.lb	1699	2018	2124	2106	2168	2133
	η	%	94	93	91	86	78	73
n_{1N}=2000 rpm	T_{2Max}	Nm	202	243	262	271	282	278
		in.lb	1788	2151	2319	2398	2496	2460
	T_{2Servo}	Nm	174	212	230	238	248	243
		in.lb	1540	1876	2036	2106	2195	2151
	η	%	96	94	93	89	83	78
n_{1N}=3000 rpm	T_{2Max}	Nm	164	190	202	209	235	231
		in.lb	1451	1682	1788	1850	2080	2044
	T_{2Servo}	Nm	128	166	184	209	198	194
		in.lb	1133	1469	1628	1850	1752	1717
	η	%	96	95	94	91	85	81
n_{1N}=4000 rpm	T_{2Max}	Nm	128	148	164	175	201	198
		in.lb	1133	1310	1451	1549	1779	1752
	T_{2Servo}	Nm	104	132	152	175	165	162
		in.lb	920	1168	1345	1549	1460	1434
	η	%	97	96	94	92	86	83
Emergency stop torque	T_{2Not}	Nm	460	484	491	494	518	447
		in.lb	4071	4283	4345	4372	4584	3956
Max. input speed	n_{1Max}	rpm	4500					
Mean no load running torque [a] (With n_1=3000 min^{-1} and 20° C gear temperature)	T_{012}	Nm	2,1	1,9	1,8	1,7	1,6	1,4
		in.lb	18,6	16,8	15,9	15,0	14,2	12,4
Max. torsional backlash	j_t	arcmin	≤3					
Torsional rigidity	C_{t21}	Nm/arcmin	28					
		in.lb/arcmin	248					
Max. axial force [b]	F_{2AMax}	N	8250					
		lb_f	1856					
Max. radial force [b]	F_{2RMax}	N	6000					
		lb_f	1350					
Max. tilting moment	M_{2KMax}	Nm	843					
		in.lb	7461					
Service life (For calculation see "Information")	L_h	h	> 20000					
Weight incl. standard adapter plate	*m*	kg	12					
		lb_m	26,5					
Operating noise (with n_1 = 3000 rpm no load)	L_{PA}	dB(A)	≤ 64					
Max. permitted housing temperature		°C	+90					
		F	194					
Ambient temperature		°C	-15 to +40					
		F	5 to 104					
Lubrication			Synthetic transmission oil					
Paint			None					
Direction of rotation			See drawing					
Protection class			IP 65					
Moment of inertia (relates to the drive)	J_1	kgcm²	6.68	5.77	5.53	5.44	5.40	5.35
		10^{-3} in.lb.s²	5.91	5.11	4.89	4.81	4.78	4.74

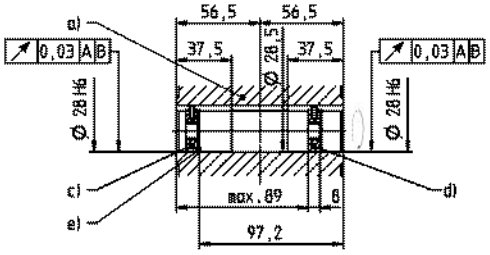
[a] Idling torques decrease during operation

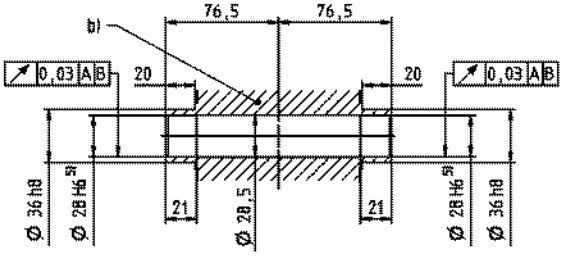
[b] Refers to center of the output shaft or flange











a) Hollow shaft, keywayed
b) Hollow shaft, smooth
c) End disc for screw M10
d) End disc as forcing washer for screw M12
e) Locking ring – DIN 472

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.

CAD data is available under www.wittenstein-alpha.com

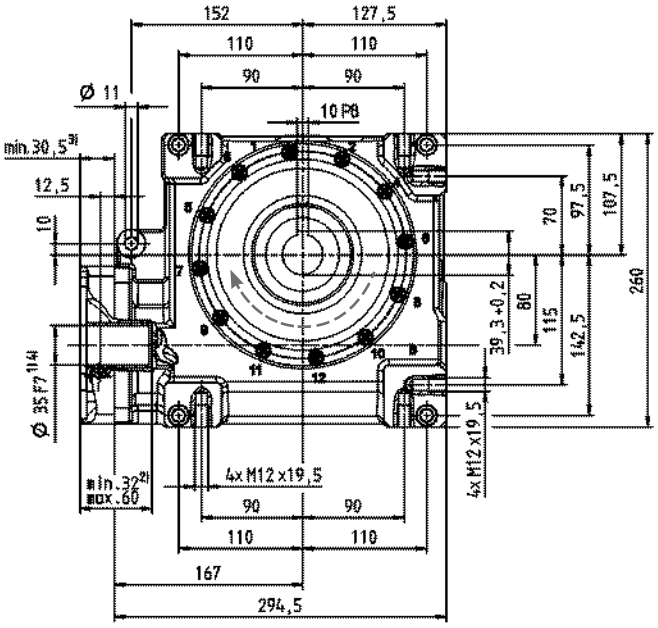
Motor mounting according to operating manual

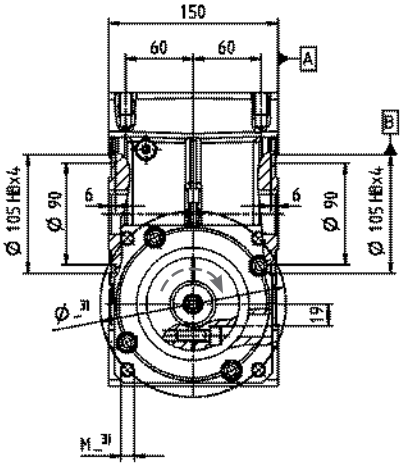
VDH+ 080 1-stage

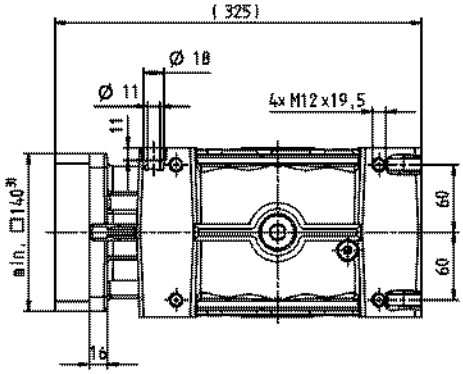
			1-stage					
Ratio	***i***		**4**	**7**	**10**	**16**	**28**	**40**
n_{1N}=500 rpm	T_{2Max}	Nm	578	646	672	702	785	676
		in.lb	5115	5717	5947	6213	6947	5983
	T_{2Servo}	Nm	469	601	613	677	764	631
		in.lb	4151	5319	5425	5991	6761	5584
	η	%	94	92	89	86	77	70
n_{1N}=1000 rpm	T_{2Max}	Nm	514	602	588	656	698	613
		in.lb	4549	5328	5204	5806	6177	5425
	T_{2Servo}	Nm	491	574	561	625	665	584
		in.lb	4345	5080	4965	5531	5885	5168
	η	%	95	93	91	88	81	74
n_{1N}=2000 rpm	T_{2Max}	Nm	350	435	431	500	536	470
		in.lb	3098	3850	3814	4425	4744	4160
	T_{2Servo}	Nm	335	415	411	476	511	448
		in.lb	2965	3673	3637	4213	4522	3965
	η	%	96	95	93	89	84	79
n_{1N}=3000 rpm	T_{2Max}	Nm	259	336	334	400	433	380
		in.lb	2292	2974	2956	3540	3832	3363
	T_{2Servo}	Nm	247	320	319	381	413	362
		in.lb	2186	2832	2823	3372	3655	3204
	η	%	97	96	94	92	86	81
n_{1N}=3500 rpm	T_{2Max}	Nm	227	299	300	362	394	346
		in.lb	2009	2646	2655	3204	3487	3062
	T_{2Servo}	Nm	217	285	286	345	376	330
		in.lb	1920	2522	2531	3053	3328	2921
	η	%	97	96	94	92	87	82
Emergency stop torque	T_{2Not}	Nm	938	993	963	1005	1064	941
		in.lb	8301	8788	8523	8894	9416	8328
Max. input speed	n_{1Max}	rpm	4000					
Mean no load running torque [a] (With n_1=3000 min^{-1} and 20° C gear temperature)	T_{012}	Nm	3,6	3,5	3,4	3,2	3	2,8
		in.lb	31,9	31,0	30,1	28,3	26,6	24,8
Max. torsional backlash	j_t	arcmin	≤3					
Torsional rigidity	C_{t21}	Nm/arcmin	78					
		in.lb/arcmin	690					
Max. axial force [b]	F_{2AMax}	N	13900					
		lb_f	3128					
Max. radial force [b]	F_{2RMax}	N	9000					
		lb_f	2025					
Max. tilting moment	M_{2KMax}	Nm	1544					
		in.lb	13664					
Service life (For calculation see "Information")	L_h	h	> 20000					
Weight incl. standard adapter plate	m	kg	26					
		lb_m	57,5					
Operating noise (with n_1 = 3000 rpm no load)	L_{PA}	dB(A)	≤ 66					
Max. permitted housing temperature		°C	+90					
		F	194					
Ambient temperature		°C	-15 to +40					
		F	5 to 104					
Lubrication			Synthetic transmission oil					
Paint			None					
Direction of rotation			See drawing					
Protection class			IP 65					
Moment of inertia (relates to the drive)	J_1	kgcm²	21.31	17.76	17.80	16.38	16.27	16.91
		10^{-3} in.lb.s²	18.86	15.72	15.75	14.49	14.40	14.97

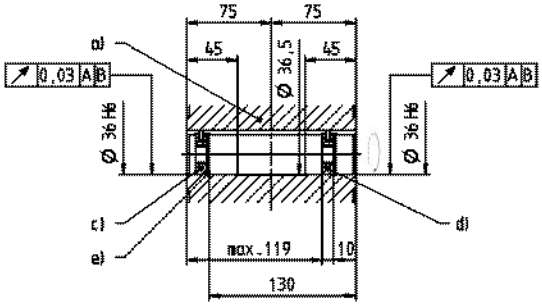
[a] Idling torques decrease during operation

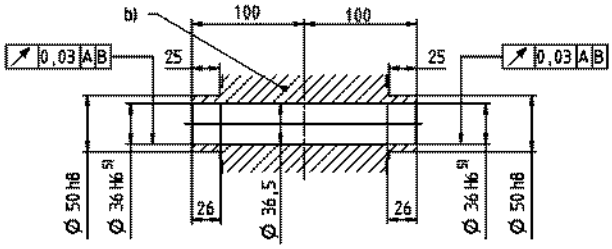
[b] Refers to center of the output shaft or flange











a) Hollow shaft, keywayed
b) Hollow shaft, smooth
c) End disc for screw M12
d) End disc as forcing washer for screw M16
e) Locking ring – DIN 472

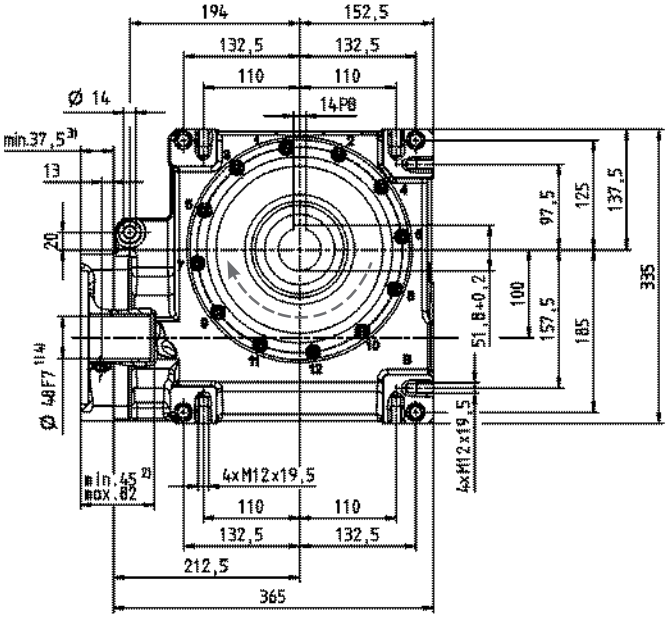
Non-tolerated dimensions ± 1 mm
1) Check motor shaft fit.
2) Min./Max. permissible motor shaft length.
   Longer motor shafts are adaptable, please contact us.
3) The dimensions depend on the motor.
4) Smaller motor shaft diameter is compensated by a bushing with a minimum thickness of 1 mm.
5) Tolerance h6 for mounted shaft.

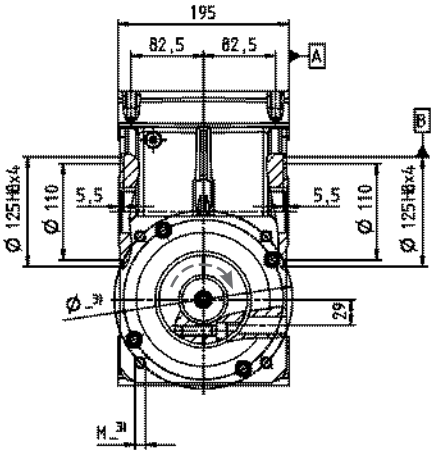
CAD data is available under www.wittenstein-alpha.com

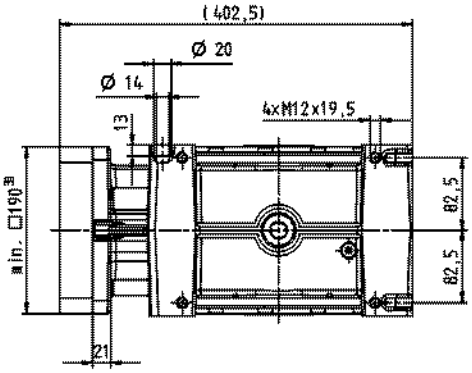
Motor mounting according to operating manual

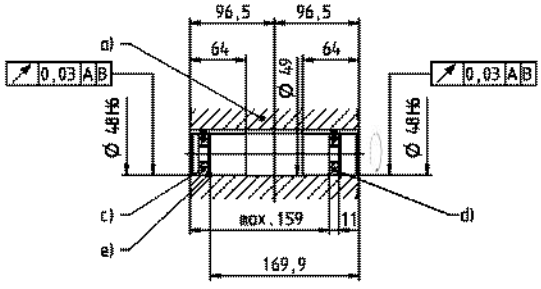
			1-stage					
Ratio	***i***		**4**	**7**	**10**	**16**	**28**	**40**
n_{1N}=500 rpm	T_{2Max}	Nm	1184	1336	1377	1392	1505	1376
		in.lb	10478	11824	12186	12319	13319	12178
	T_{2Servo}	Nm	1155	1304	1343	1359	1469	1343
		in.lb	10222	11540	11886	12027	13001	11886
	η	%	95	93	91	87	80	76
n_{1N}=1000 rpm	T_{2Max}	Nm	905	1070	1122	1140	1251	1162
		in.lb	8009	9470	9930	10089	11071	10284
	T_{2Servo}	Nm	883	1044	1095	1113	1221	1134
		in.lb	7815	9239	9691	9850	10806	10036
	η	%	95	94	92	88	82	79
n_{1N}=2000 rpm	T_{2Max}	Nm	595	748	807	830	930	883
		in.lb	5266	6620	7142	7346	8231	7815
	T_{2Servo}	Nm	581	730	788	810	908	862
		in.lb	5142	6461	6974	7169	8036	7629
	η	%	96	95	94	91	86	82
n_{1N}=3000 rpm [c]	T_{2Max}	Nm	430	564	621	644	735	709
		in.lb	3806	4991	5496	5699	6505	6275
	T_{2Servo}	Nm	420	551	606	629	718	692
		in.lb	3717	4876	5363	5567	6354	6124
	η	%	97	96	95	92	87	84
n_{1N}=3500 rpm	T_{2Max}	Nm in.lb	–	–	–	–	–	–
	T_{2Servo}	Nm in.lb	–	–	–	–	–	–
	η	%	–	–	–	–	–	–
Emergency stop torque	T_{2Not}	Nm	1819	1932	1940	1955	2073	1856
		in.lb	16098	17098	17169	17302	18346	16426
Max. input speed	n_{1Max}	rpm	3500					
Mean no load running torque [a] (With n_1=3000 min^{-1} and 20° C gear temperature)	T_{012}	Nm	9,8	8,1	7,4	6,7	5,8	5
		in.lb	86,7	71,7	65,5	59,3	51,3	44,3
Max. torsional backlash	j_t	arcmin	≤3					
Torsional rigidity	C_{t21}	Nm/arcmin	153					
		in.lb/arcmin	1354					
Max. axial force [b]	F_{2AMax}	N	19500					
		lb_f	4388					
Max. radial force [b]	F_{2RMax}	N	14000					
		lb_f	3150					
Max. tilting moment	M_{2KMax}	Nm	3059					
		in.lb	27072					
Service life (For calculation see "Information")	L_h	h	> 20000					
Weight incl. standard adapter plate	m	kg	50					
		lb_m	110,5					
Operating noise (with n_1 = 3000 rpm no load)	L_{PA}	dB(A)	≤ 70					
Max. permitted housing temperature		°C	+90					
		F	194					
Ambient temperature		°C	-15 to +40					
		F	5 to 104					
Lubrication			Synthetic transmission oil					
Paint			None					
Direction of rotation			See drawing					
Protection class			IP 65					
Moment of inertia (relates to the drive)	J_1	kgcm²	65.82	56.27	54.34	55.19	52.72	53.04
		10^{-3} in.lb.s²	58.25	49.80	48.09	48.84	46.66	46.94

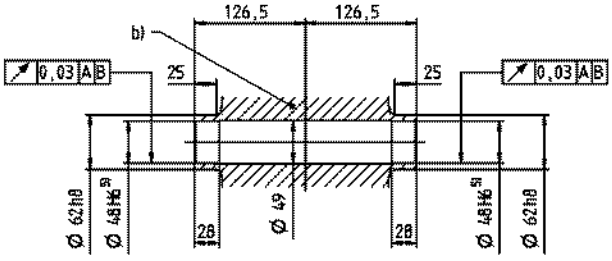
[a] Idling torques decrease during operation
[b] Refers to center of the output shaft or flange
[c] Reduce by 20% in S1 operation at 20°C ambient temperature.











a) Hollow shaft, keywayed
b) Hollow shaft, smooth
c) End disc for screw M16
d) End disc as forcing washer for screw M20
e) Locking ring – DIN 472

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.

CAD data is available under www.wittenstein-alpha.com

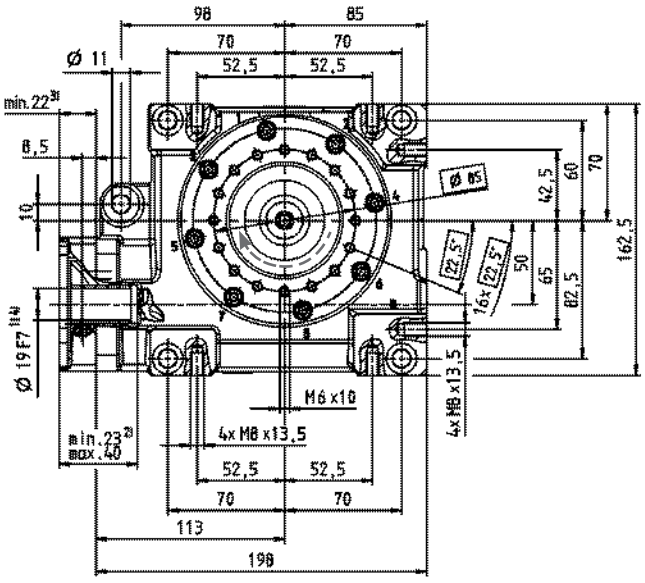
Motor mounting according to operating manual

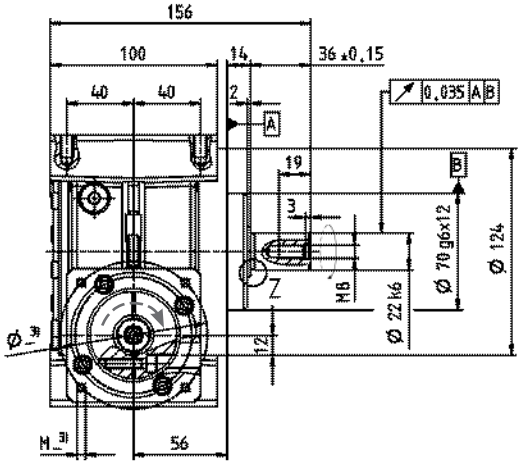
VDS+ 050 1-stage

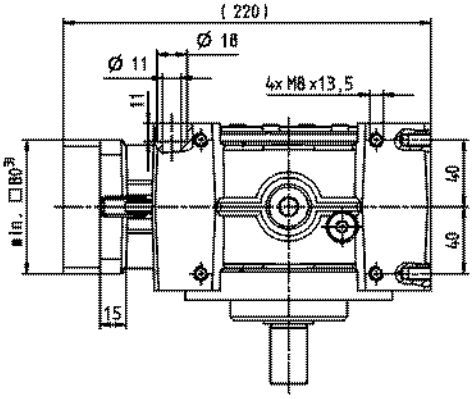
			1-stage					
Ratio	***i***		**4**	**7**	**10**	**16**	**28**	**40**
n_{1N}=500 rpm	T_{2Max}	Nm	124	132	148	154	165	158
		in.lb	1097	1168	1310	1363	1460	1398
	T_{2Servo}	Nm	54	71	74	81	90	74
		in.lb	478	628	655	717	797	655
	η	%	92	89	86	82	72	64
n_{1N}=1000 rpm	T_{2Max}	Nm	124	130	136	140	151	142
		in.lb	1097	1151	1204	1239	1336	1257
	T_{2Servo}	Nm	58	76	80	88	97	81
		in.lb	513	673	708	779	858	717
	η	%	94	91	89	85	77	69
n_{1N}=2000 rpm	T_{2Max}	Nm	88	106	112	120	134	122
		in.lb	779	938	991	1062	1186	1080
	T_{2Servo}	Nm	60	78	82	89	99	83
		in.lb	531	690	726	788	876	735
	η	%	95	93	91	88	75	75
n_{1N}=3000 rpm	T_{2Max}	Nm	72	86	95	106	112	108
		in.lb	637	761	841	938	991	956
	T_{2Servo}	Nm	59	77	81	88	97	81
		in.lb	522	681	717	779	858	717
	η	%	96	94	93	90	83	78
n_{1N}=4000 rpm	T_{2Max}	Nm	62	77	83	92	102	95
		in.lb	549	681	735	814	903	841
	T_{2Servo}	Nm	58	76	79	87	96	80
		in.lb	513	673	699	770	850	708
	η	%	96	95	93	91	85	80
Emergency stop torque	T_{2Not}	Nm	230	242	242	250	262	236
		in.lb	2036	2142	2142	2213	2319	2089
Max. input speed	n_{1Max}	rpm	6000					
Mean no load running torque [a] (With n_1=3000 min^{-1} and 20° C gear temperature)	T_{012}	Nm	1,3	1,2	1,2	1,1	1	0,9
		in.lb	11,5	10,6	10,6	9,7	8,9	8,0
Max. torsional backlash	j_t	arcmin	≤3					
Torsional rigidity	C_{t21}	Nm/arcmin	8					
		in.lb/arcmin	71					
Max. axial force [b]	F_{2AMax}	N	5000					
		lb_f	1125					
Max. radial force [b]	F_{2RMax}	N	3800					
		lb_f	855					
Max. tilting moment	M_{2KMax}	Nm	409					
		in.lb	3620					
Service life (For calculation see "Information")	L_h	h	> 20000					
Weight incl. standard adapter plate	m	kg	8,5					
		lb_m	18,8					
Operating noise (with n_1 = 3000 rpm no load)	L_{PA}	dB(A)	≤ 62					
Max. permitted housing temperature		°C	+90					
		F	194					
Ambient temperature		°C	-15 to +40					
		F	5 to 104					
Lubrication			Synthetic transmission oil					
Paint			None					
Direction of rotation			See drawing					
Protection class			IP 65					
Moment of inertia (relates to the drive)	J_1	kgcm²	2.27	2.03	1.94	1.84	1.81	1.86
		10^{-3} in.lb.s²	2.01	1.80	1.72	1.63	1.60	1.64

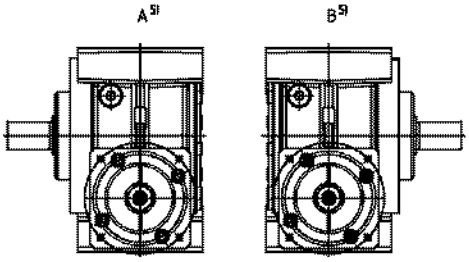
[a] Idling torques decrease during operation

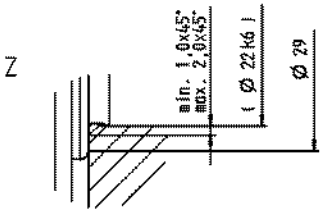
[b] Refers to center of the output shaft or flange

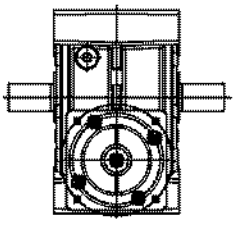








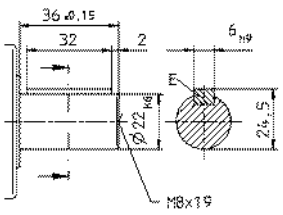




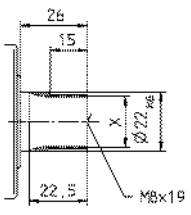
Optional dual-shaft output. Drawings available upon request.
Involute gearing is not possible.

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



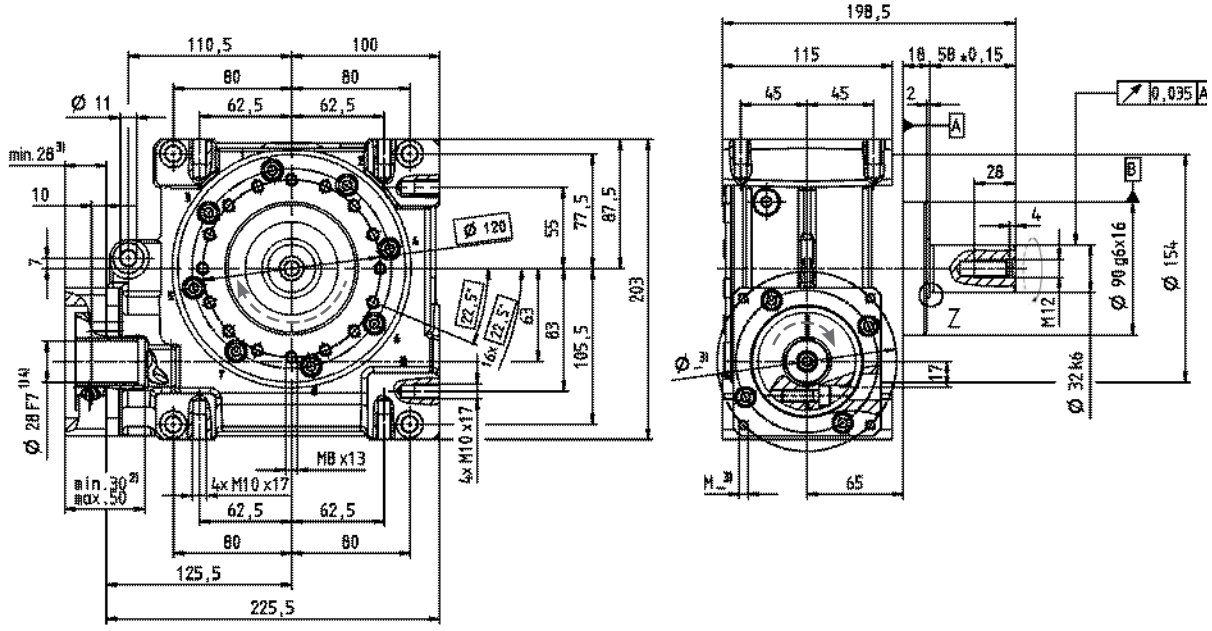
Non-tolerated dimensions ± 1 mm
1) Check motor shaft fit.
2) Min./Max. permissible motor shaft length.
Longer motor shafts are adaptable, please contact us.
3) The dimensions depend on the motor.
4) Smaller motor shaft diameter is compensated by a bushing with a minimum thickness of 1 mm.
5) Output side

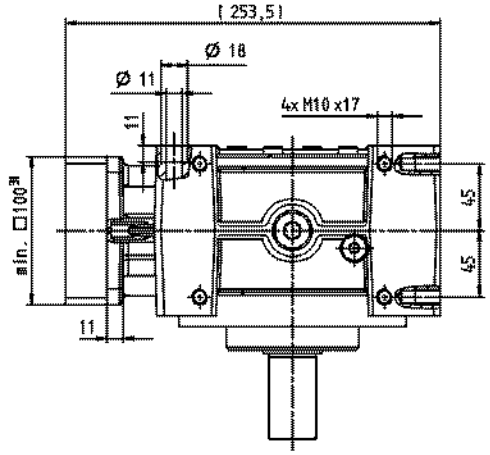
CAD data is available under www.wittenstein-alpha.com

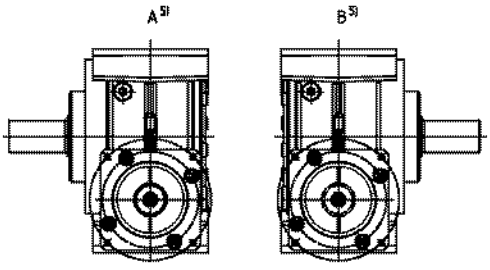
Motor mounting according to operating manual

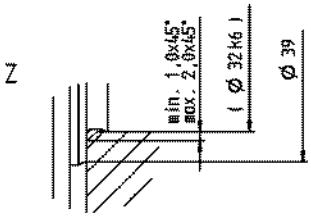
			1-stage					
Ratio	***i***		**4**	**7**	**10**	**16**	**28**	**40**
n_{1N}=500 rpm	T_{2Max}	Nm	302	314	315	320	328	324
		in.lb	2673	2779	2788	2832	2903	2867
	T_{2Servo}	Nm	198	210	225	221	229	226
		in.lb	1752	1859	1991	1956	2027	2000
	η	%	93	91	88	83	74	68
n_{1N}=1000 rpm	T_{2Max}	Nm	264	284	290	298	304	301
		in.lb	2336	2513	2567	2637	2690	2664
	T_{2Servo}	Nm	192	228	240	238	245	241
		in.lb	1699	2018	2124	2106	2168	2133
	η	%	94	93	91	86	78	73
n_{1N}=2000 rpm	T_{2Max}	Nm	202	243	262	271	282	278
		in.lb	1788	2151	2319	2398	2496	2460
	T_{2Servo}	Nm	174	212	230	238	248	243
		in.lb	1540	1876	2036	2106	2195	2151
	η	%	96	94	93	89	83	78
n_{1N}=3000 rpm	T_{2Max}	Nm	164	190	202	209	235	231
		in.lb	1451	1682	1788	1850	2080	2044
	T_{2Servo}	Nm	128	166	184	209	198	194
		in.lb	1133	1469	1628	1850	1752	1717
	η	%	96	95	94	91	85	81
n_{1N}=4000 rpm	T_{2Max}	Nm	128	148	164	175	201	198
		in.lb	1133	1310	1451	1549	1779	1752
	T_{2Servo}	Nm	104	132	152	175	165	162
		in.lb	920	1168	1345	1549	1460	1434
	η	%	97	96	94	92	86	83
Emergency stop torque	T_{2Not}	Nm	460	484	491	494	518	447
		in.lb	4071	4283	4345	4372	4584	3956
Max. input speed	n_{1Max}	rpm	4500					
Mean no load running torque [a] (With n_1=3000 min^{-1} and 20° C gear temperature)	T_{012}	Nm	2,1	1,9	1,8	1,7	1,6	1,4
		in.lb	18,6	16,8	15,9	15,0	14,2	12,4
Max. torsional backlash	j_t	arcmin	≤3					
Torsional rigidity	C_{t21}	Nm/arcmin	28					
		in.lb/arcmin	248					
Max. axial force [b]	F_{2AMax}	N	8250					
		lb_f	1856					
Max. radial force [b]	F_{2RMax}	N	6000					
		lb_f	1350					
Max. tilting moment	M_{2KMax}	Nm	843					
		in.lb	7461					
Service life (For calculation see "Information")	L_h	h	> 20000					
Weight incl. standard adapter plate	*m*	kg	15					
		lb_m	33,2					
Operating noise (with n_1 = 3000 rpm no load)	L_{PA}	dB(A)	≤ 64					
Max. permitted housing temperature		°C	+90					
		F	194					
Ambient temperature		°C	-15 to +40					
		F	5 to 104					
Lubrication			Synthetic transmission oil					
Paint			None					
Direction of rotation			See drawing					
Protection class			IP 65					
Moment of inertia (relates to the drive)	J_1	kgcm²	6.72	5.79	5.54	5.44	5.41	5.35
		10^{-3} in.lb.s²	5.95	5.12	4.90	4.82	4.78	4.74

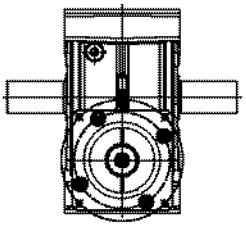
[a] Idling torques decrease during operation
[b] Refers to center of the output shaft or flange







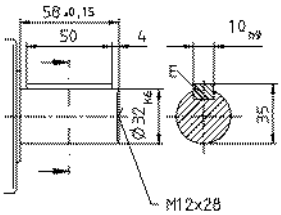




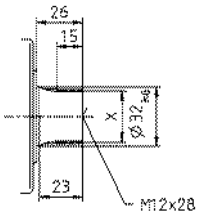
Optional dual-shaft output. Drawings available upon request.
Involute gearing is not possible.

Alternatives: Output shaft variants

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



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



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) Output side

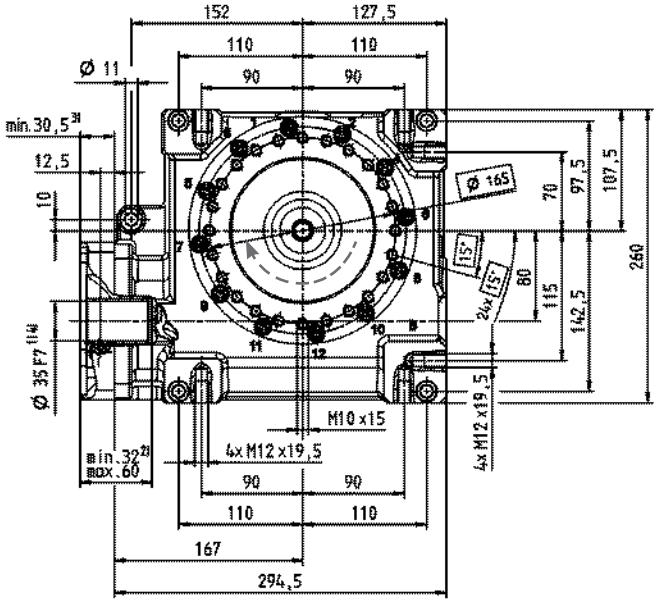
CAD data is available under www.wittenstein-alpha.com

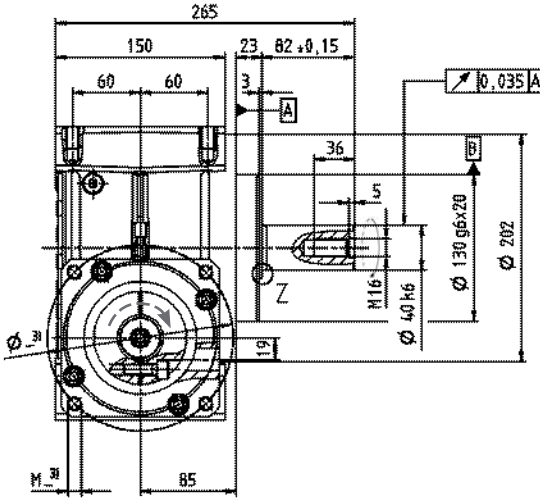
Motor mounting according to operating manual

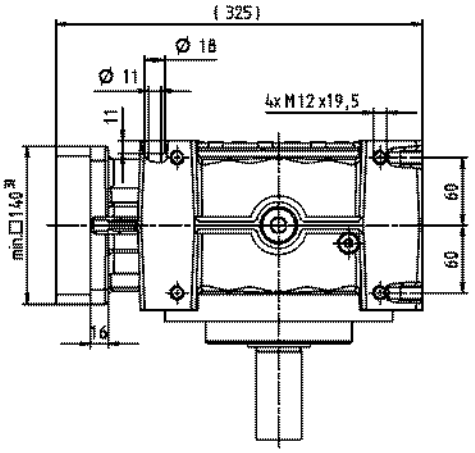
			1-stage					
Ratio	***i***		**4**	**7**	**10**	**16**	**28**	**40**
n_{1N}=500 rpm	T_{2Max}	Nm	578	646	672	702	785	676
		in.lb	5115	5717	5947	6213	6947	5983
	T_{2Servo}	Nm	469	601	613	677	764	631
		in.lb	4151	5319	5425	5991	6761	5584
	η	%	94	92	89	86	77	70
n_{1N}=1000 rpm	T_{2Max}	Nm	514	602	588	656	698	613
		in.lb	4549	5328	5204	5806	6177	5425
	T_{2Servo}	Nm	491	574	561	625	665	584
		in.lb	4345	5080	4965	5531	5885	5168
	η	%	95	93	91	88	81	74
n_{1N}=2000 rpm	T_{2Max}	Nm	350	435	431	500	536	470
		in.lb	3098	3850	3814	4425	4744	4160
	T_{2Servo}	Nm	335	415	411	476	511	448
		in.lb	2965	3673	3637	4213	4522	3965
	η	%	96	95	93	89	84	79
n_{1N}=3000 rpm	T_{2Max}	Nm	259	336	334	400	433	380
		in.lb	2292	2974	2956	3540	3832	3363
	T_{2Servo}	Nm	247	320	319	381	413	362
		in.lb	2186	2832	2823	3372	3655	3204
	η	%	97	96	94	92	86	81
n_{1N}=3500 rpm	T_{2Max}	Nm	227	299	300	362	394	346
		in.lb	2009	2646	2655	3204	3487	3062
	T_{2Servo}	Nm	217	285	286	345	376	330
		in.lb	1920	2522	2531	3053	3328	2921
	η	%	97	96	94	92	87	82
Emergency stop torque	T_{2Not}	Nm	938	993	963	1005	1064	941
		in.lb						
Max. input speed	n_{1Max}	rpm	4000					
Mean no load running torque [a] (With n_1=3000 min^{-1} and 20° C gear temperature)	T_{012}	Nm	3,6	3,5	3,4	3,2	3	2,8
		in.lb	31,9	31,0	30,1	28,3	26,6	24,8
Max. torsional backlash	j_t	arcmin	≤3					
Torsional rigidity	C_{t21}	Nm/arcmin	78					
		in.lb/arcmin	690					
Max. axial force [b]	F_{2AMax}	N	13900					
		lb_f	3128					
Max. radial force [b]	F_{2RMax}	N	9000					
		lb_f	2025					
Max. tilting moment	M_{2KMax}	Nm	1544					
		in.lb	13664					
Service life (For calculation see "Information")	L_h	h	> 20000					
Weight incl. standard adapter plate	m	kg	32					
		lb_m	70,7					
Operating noise (with n_1 = 3000 rpm no load)	L_{PA}	dB(A)	≤ 66					
Max. permitted housing temperature		°C	+90					
		F	194					
Ambient temperature		°C	-15 to +40					
		F	5 to 104					
Lubrication			Synthetic transmission oil					
Paint			None					
Direction of rotation			See drawing					
Protection class			IP 65					
Moment of inertia (relates to the drive)	J_1	kgcm²	20.74	17.57	17.70	16.34	16.25	16.91
		10^{-3} in.lb.s²	18.36	15.55	15.67	14.46	14.38	14.96

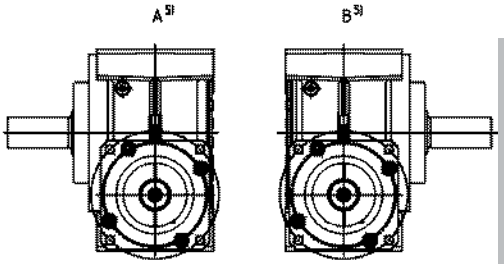
[a] Idling torques decrease during operation

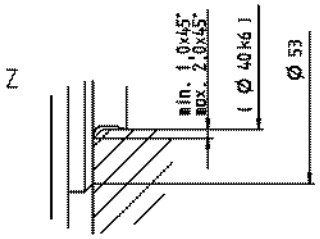
[b] Refers to center of the output shaft or flange

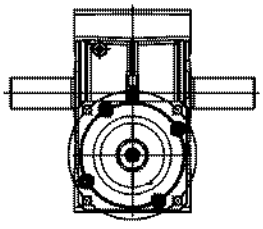








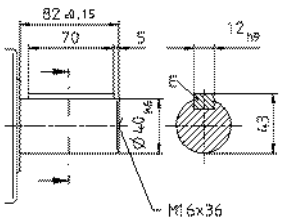




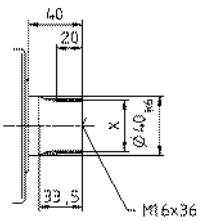
Optional dual-shaft output. Drawings available upon request.
Involute gearing is not possible.

Alternatives: Output shaft variants

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



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



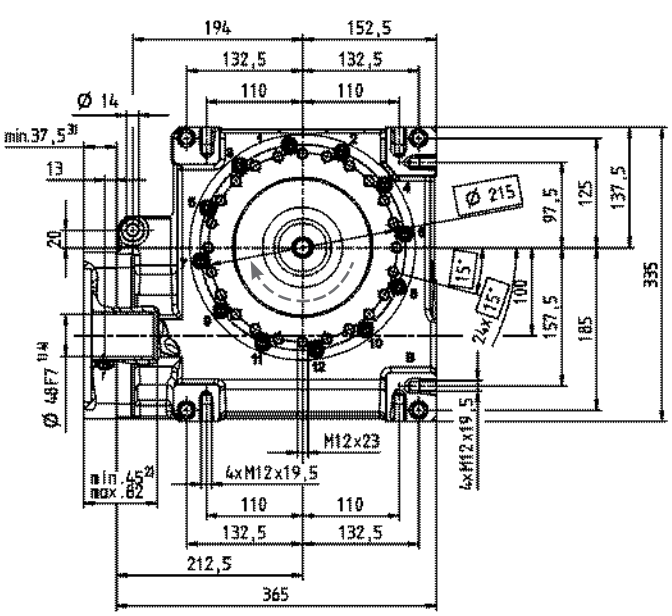
Non-tolerated dimensions ± 1 mm
1) Check motor shaft fit.
2) Min./Max. permissible motor shaft length.
Longer motor shafts are adaptable, please contact us.
3) The dimensions depend on the motor.
4) Smaller motor shaft diameter is compensated by a bushing with a minimum thickness of 1 mm.
5) Output side

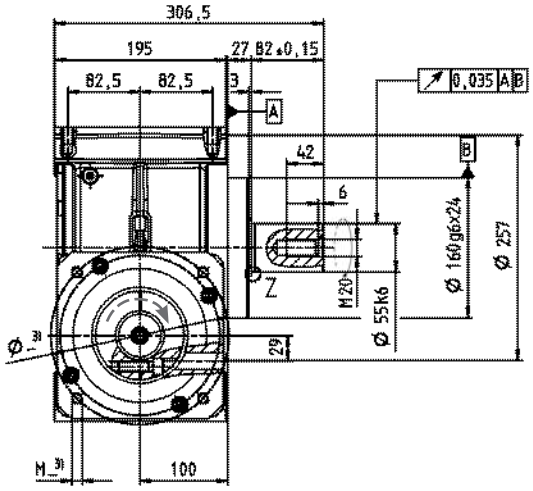
CAD data is available under www.wittenstein-alpha.com

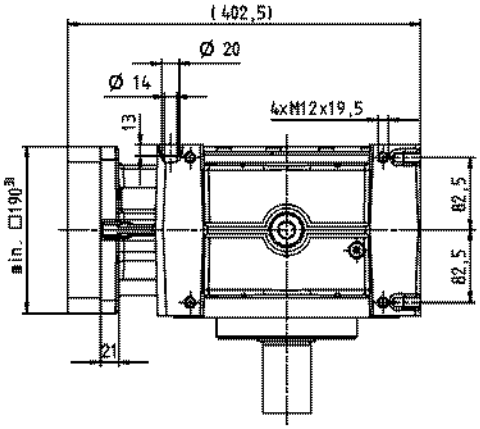
Motor mounting according to operating manual

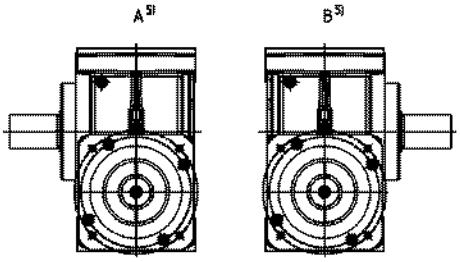
			1-stage					
Ratio	***i***		**4**	**7**	**10**	**16**	**28**	**40**
n_{1N}=500 rpm	T_{2Max}	Nm	1184	1336	1377	1392	1505	1376
		in.lb	10478	11824	12186	12319	13319	12178
	T_{2Servo}	Nm	1155	1304	1343	1359	1469	1343
		in.lb	10222	11540	11886	12027	13001	11886
	η	%	95	93	91	87	80	76
n_{1N}=1000 rpm	T_{2Max}	Nm	905	1070	1122	1140	1251	1162
		in.lb	8009	9470	9930	10089	11071	10284
	T_{2Servo}	Nm	883	1044	1095	1113	1221	1134
		in.lb	7815	9239	9691	9850	10806	10036
	η	%	95	94	92	88	82	79
n_{1N}=2000 rpm	T_{2Max}	Nm	595	748	807	830	930	883
		in.lb	5266	6620	7142	7346	8231	7815
	T_{2Servo}	Nm	581	730	788	810	908	862
		in.lb	5142	6461	6974	7169	8036	7629
	η	%	96	95	94	91	86	82
n_{1N}=3000 rpm [c]	T_{2Max}	Nm	430	564	621	644	735	709
		in.lb	3806	4991	5496	5699	6505	6275
	T_{2Servo}	Nm	420	551	606	629	718	692
		in.lb	3717	4876	5363	5567	6354	6124
	η	%	97	96	95	92	87	84
n_{1N}=3500 rpm	T_{2Max}	Nm	–	–	–	–	–	–
		in.lb						
	T_{2Servo}	Nm	–	–	–	–	–	–
		in.lb						
	η	%	–	–	–	–	–	–
Emergency stop torque	T_{2Not}	Nm	1819	1932	1940	1955	2073	1856
		in.lb	16098	17098	17169	17302	18346	16426
Max. input speed	n_{1Max}	rpm	3500					
Mean no load running torque [a] (With n_1=3000 min^{-1} and 20° C gear temperature)	T_{012}	Nm	9,8	8,1	7,4	6,7	5,8	5
		in.lb	86,7	71,7	65,5	59,3	51,3	44,3
Max. torsional backlash	j_t	arcmin	≤3					
Torsional rigidity	C_{t21}	Nm/arcmin	153					
		in.lb/arcmin	1354					
Max. axial force [b]	F_{2AMax}	N	19500					
		lb_f	4388					
Max. radial force [b]	F_{2RMax}	N	14000					
		lb_f	3150					
Max. tilting moment	M_{2KMax}	Nm	3059					
		in.lb	27072					
Service life (For calculation see "Information")	L_h	h	> 20000					
Weight incl. standard adapter plate	*m*	kg	61					
		lb_m	134,8					
Operating noise (with n_1 = 3000 rpm no load)	L_{PA}	dB(A)	≤ 70					
Max. permitted housing temperature		°C	+90					
		F	194					
Ambient temperature		°C	-15 to +40					
		F	5 to 104					
Lubrication			Synthetic transmission oil					
Paint			None					
Direction of rotation			See drawing					
Protection class			IP 65					
Moment of inertia (relates to the drive)	J_1	kgcm²	65.59	56.20	54.30	55.17	52.71	53.04
		10^{-3} in.lb.s²	58.05	49.73	48.06	48.83	46.65	46.94

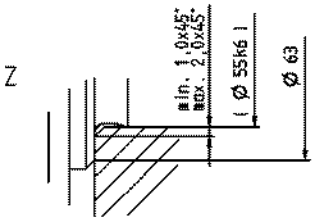
[a] Idling torques decrease during operation
[b] Refers to center of the output shaft or flange
[c] Reduce by 20% in S1 operation at 20°C ambient temperature.

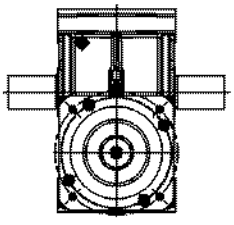








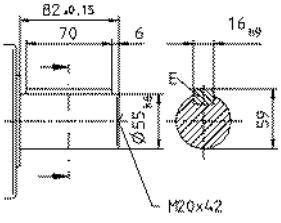




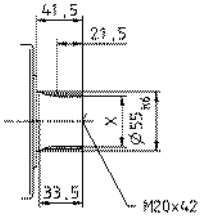
Optional dual-shaft output. Drawings available upon request.
Involute gearing is not possible.

Alternatives: Output shaft variants

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



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



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) Output side

CAD data is available under www.wittenstein-alpha.com

Motor mounting according to operating manual

Servo right-angle gearheads Economy

LK⁺/LPK⁺
Economical right-angle precision

- Low backlash bevel gears with output shaft
- Applications in cyclic or continuous operation
- Torsional backlash: ≤ 8 arcmin
- Ratios: 1-100

Product highlights
- Diverse range of transmission ratios
- High nominal speeds

LPBK⁺
Economical right-angle precision

- Low backlash bevel gears with output flange
- Applications in cyclic or continuous operation
- Torsional backlash: ≤ 8 arcmin
- Ratios: 3-10

Product highlights
- Diverse range of transmission ratios
- High nominal speeds
- Optionally available with belt pulley

Power density

Simple and convenient

From an optimized design with our cymex® software to the classic, patented WITTENSTEIN alpha motor mounting and grease volume adapted to each model – WITTENSTEIN alpha right-angle gearheads make your life so much easier.

Reliable and accurate

The low torsional backlash and high torsional rigidity of your WITTENSTEIN alpha right-angle gearhead assure maximum positioning accuracy of your drives and precision of your machines – even during highly dynamic operation up to 50,000 cycles/hour.

V-Drive economy
Economical servo worm

- Low backlash servo worm gearhead with output shaft and hollow shaft
- Applications in cyclic or continuous operation
- Torsional backlash: ≤ 8 arcmin
- Ratios: 4-40

Product highlights:
- Hollow shaft version
- Single-stage up to i=40
- Smooth-running

Maximum durability

Your WITTENSTEIN alpha right-angle gearhead is extremely reliable due to the overall design and 100% WITTENSTEIN alpha inspections: **"mount and forget"**. A length compensation feature integrated in your WITTENSTEIN alpha right-angle gearhead as standard maximizes the lifespan of your servo motor during high-speed continuous operation.

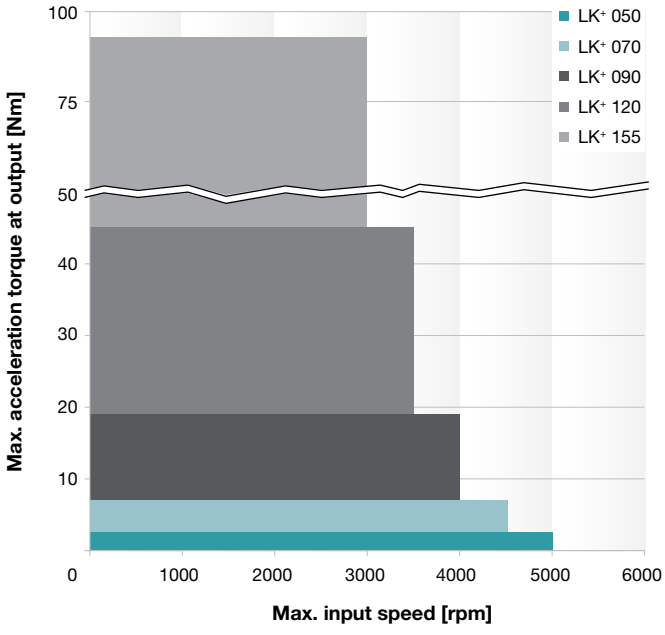
LK+/LPK+/LPBK+ – Economical right-angle precision

Low backlash right-angle gearheads with output shaft or output flange. This gearhead series is suitable for economical applications.

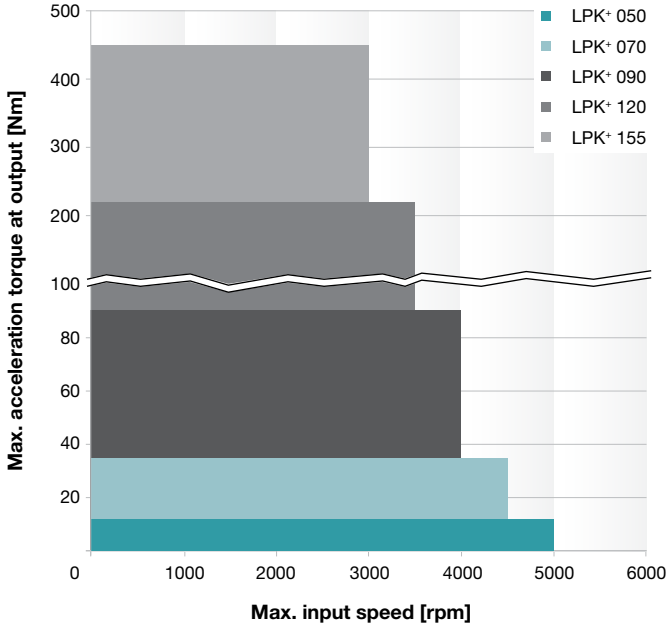
The LPBK+ is especially suitable for compact belt drives.

Quick size selection

LK+ (example for i = 1)
For applications in cyclic operation (DC ≤ 60%)
or continuous operation (DC ≥ 60%)



LPK+/LPBK+ (example for i = 5)
For applications in cyclic operation (DC ≤ 60%)
or continuous operation (DC ≥ 60%)



Versions and Applications

Features	**LK+** MO version page 316	**LPK+** MO version page 326	**LPBK+** MO version page 336
Power density	•	• •	• •
Positioning accuracy	•	• •	• •
High input speeds	• •	• •	• •
Torsional rigidity	•	•	• •
Space-saving design	• •	• •	• • •

Product features

Ratios [c]		1 – 1	3 – 100	3 – 10
Torsional backlash [arcmin] [c]	Standard	≤ 15	≤ 12	≤ 12
	Reduced	–	–	–
Output type				
Smooth output shaft			•	
Keywayed output shaft		•	•	
Output flange				•
Input type				
Motor mounted version		•	•	•
Type				
Food-grade lubrication [a] [b]		•	•	•
Accessories				
Coupling		•	•	
Rack		•	•	
Belt pulley				•
B5 flange		•	•	

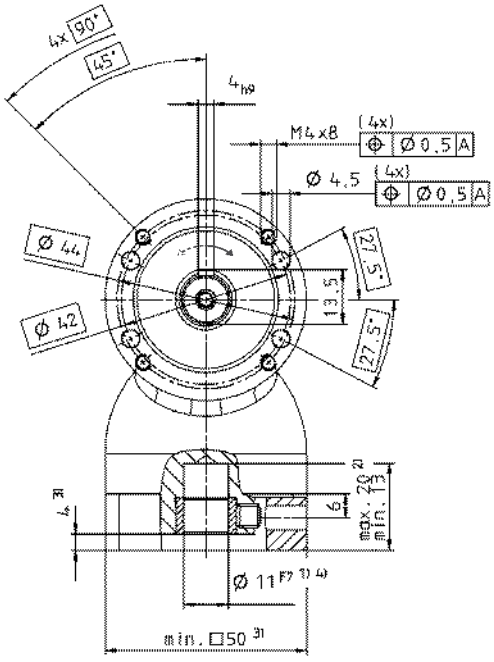
[a] Power reduction: technical data available upon request [b] Please contact WITTENSTEIN alpha [c] In relation to reference sizes

			1-stage
Ratio	i		**1**
Max. acceleration torque (max. 1000 cycles per hour)	T_{2B}	Nm	2.5
		in.lb	22
Nominal output torque (with n_{1N})	T_{2N}	Nm	1.2
		in.lb	11
Emergency stop torque (permitted 1000 times during the service life of the gearhead)	T_{2Not}	Nm	5
		in.lb	44
Nominal input speed (with T_{2N} and 20°C ambient temperature) [a]	n_{1N}	rpm	3200
Max. input speed	n_{1Max}	rpm	5000
Mean no load running torque (with n_1 = 3000 rpm and 20°C gearhead temperature)	T_{012}	Nm	0.2
		in.lb	1.8
Max. torsional backlash	j_t	arcmin	≤ 25
Torsional rigidity	C_{t21}	Nm/ arcmin	–
		in.lb/ arcmin	
Max. axial force [b]	F_{2AMax}	N	100
		lb_f	23
Max. radial force [b]	F_{2RMax}	N	650
		lb_f	146
Efficiency at full load	η	%	95
Service life (For calculation, see the Chapter “Information”)	L_h	h	> 20000
Weight incl. standard adapter plate	m	kg	0.7
		lb_m	1.5
Operating noise (with n_1 = 3000 rpm no load)	L_{PA}	dB(A)	≤ 72
Max. permitted housing temperature		°C	+90
		F	194
Ambient temperature		°C	-15 to +40
		F	5 to 104
Lubrication			Lubricated for life
Paint			without
Direction of rotation			Motor and gearhead same direction
Protection class			IP 64
Moment of inertia (relates to the drive)	J_1	$kgcm^2$	0.14
		10^{-3} in.lb.s²	0.12

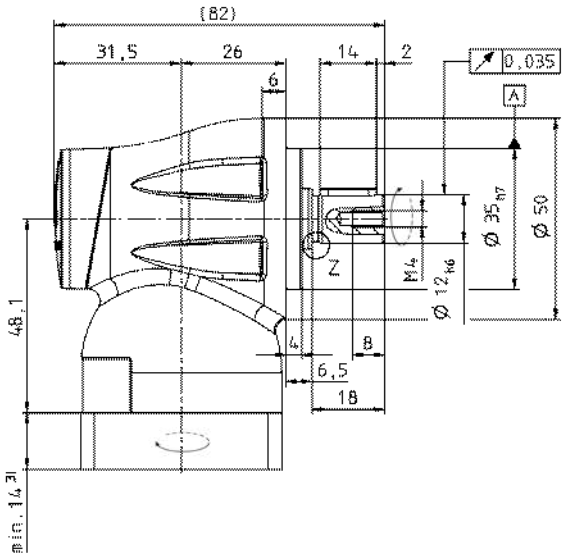
[a] For higher ambient temperatures, please reduce input speed
[b] Refers to center of the output shaft, if n_2 = 1000 rpm

View A

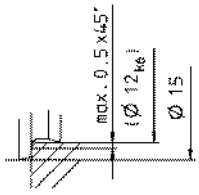
1-stage:



←A



Z:



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.

CAD data is available under
http://www.wittenstein-alpha.de/en/info-and-cad-finder.html

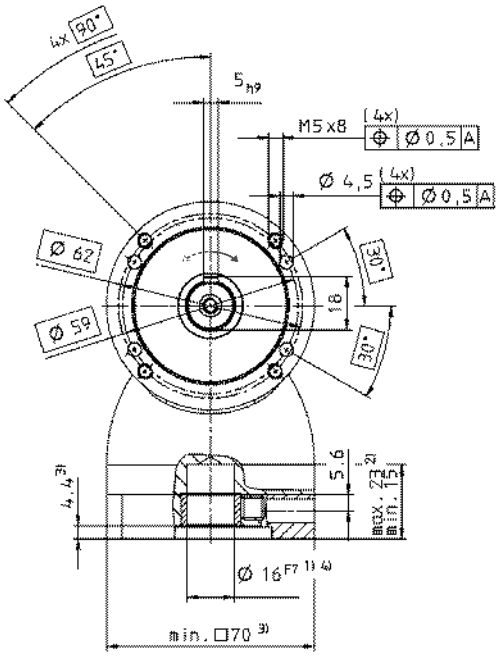
Motor mounting according to operating manual

			1-stage
Ratio	***i***		**1**
Max. acceleration torque (max. 1000 cycles per hour)	T_{2B}	Nm	7
		in.lb	60
Nominal output torque (with n_{1N})	T_{2N}	Nm	3.7
		in.lb	33
Emergencye stop torque (permitted 1000 times during the service life of the gearhead)	T_{2Not}	Nm	15
		in.lb	130
Nominal input speed (with T_{2N} and 20°C ambient temperature) [a]	n_{1N}	rpm	3000
Max. input speed	n_{1Max}	rpm	4500
Mean no load running torque (with n_1 = 3000 rpm and 20°C gearhead temperature)	T_{012}	Nm	0.4
		in.lb	3.5
Max. torsional backlash	j_t	arcmin	≤ 20
Torsional rigidity	C_{t21}	Nm/ arcmin	–
		in.lb/ arcmin	
Max. axial force [b]	F_{2AMax}	N	200
		lb_f	45
Max. radial force [b]	F_{2RMax}	N	1450
		lb_f	330
Efficiency at full load	η	%	95
Service life (For calculation, see the Chapter “Information”)	L_h	h	> 20000
Weight incl. standard adapter plate	*m*	kg	1.9
		lb_m	4.2
Operating noise (with n_1 = 3000 rpm no load)	L_{PA}	dB(A)	≤ 73
Max. permitted housing temperature		°C	+90
		F	194
Ambient temperature		°C	-15 to 40
		F	5 to 104
Lubrication			Lubricated for life
Paint			without
Direction of rotation			Motor and gearhead same direction
Protection class			IP 64
Moment of inertia (relates to the drive)	J_1	$kgcm^2$	0.7
		10^{-3} in.lb.s²	0.6

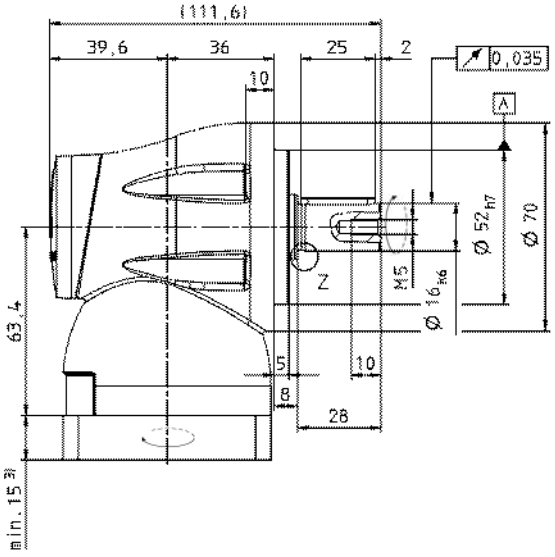
[a] For higher ambient temperatures, please reduce input speed
[b] Refers to center of the output shaft, if n_2 = 1000 rpm

View A

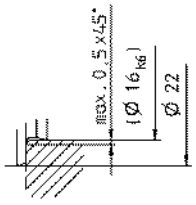
1-stage:



←A



Z:



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.

CAD data is available under
http://www.wittenstein-alpha.de/en/info-and-cad-finder.html

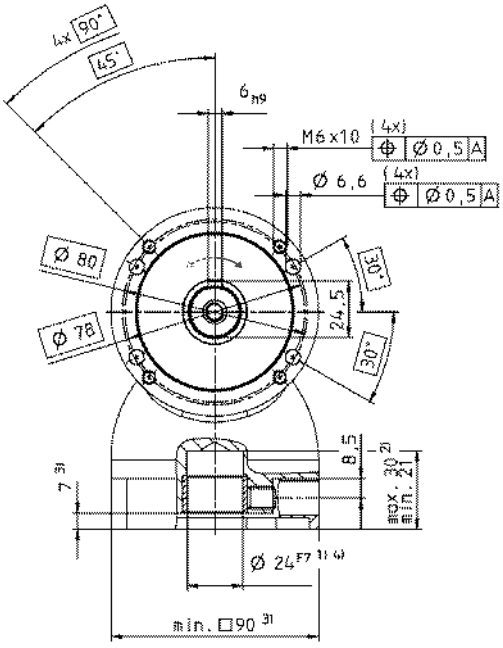
Motor mounting according to operating manual

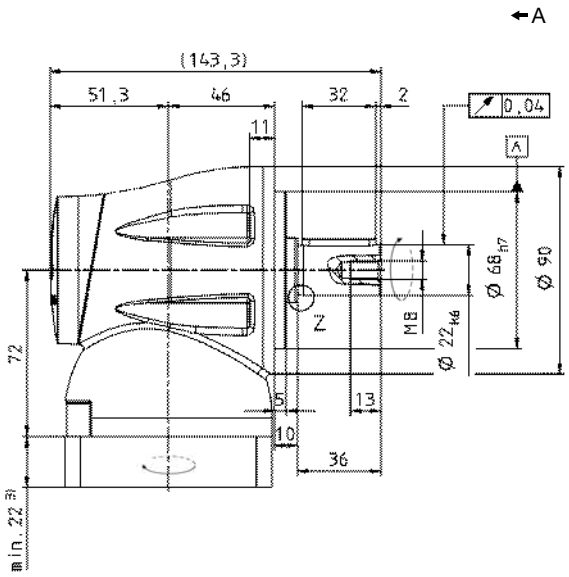
			1-stage
Ratio	i		**1**
Max. acceleration torque (max. 1000 cycles per hour)	T_{2B}	Nm	19
		in.lb	170
Nominal output torque (with n_{1N})	T_{2N}	Nm	9.3
		in.lb	82
Emergencye stop torque (permitted 1000 times during the service life of the gearhead)	T_{2Not}	Nm	37
		in.lb	330
Nominal input speed (with T_{2N} and 20°C ambient temperature) [a]	n_{1N}	rpm	2700
Max. input speed	n_{1Max}	rpm	4000
Mean no load running torque (with n_1 = 3000 rpm and 20°C gearhead temperature)	T_{012}	Nm	0.9
		in.lb	8.0
Max. torsional backlash	j_t	arcmin	≤ 15
Torsional rigidity	C_{t21}	Nm/ arcmin	1.3
		in.lb/ arcmin	11
Max. axial force [b]	F_{2AMax}	N	450
		lb_f	100
Max. radial force [b]	F_{2RMax}	N	2400
		lb_f	540
Efficiency at full load	η	%	95
Service life (For calculation, see the Chapter “Information”)	L_h	h	> 20000
Weight incl. standard adapter plate	m	kg	3.2
		lb_m	7.1
Operating noise (with n_1 = 3000 rpm no load)	L_{PA}	dB(A)	≤ 76
Max. permitted housing temperature		°C	+90
		F	194
Ambient temperature		°C	-15 to 40
		F	5 to 104
Lubrication			Lubricated for life
Paint			without
Direction of rotation			Motor and gearhead same direction
Protection class			IP 64
Moment of inertia (relates to the drive)	J_1	$kgcm^2$	3.3
		10^{-3} in.lb.s²	2.9

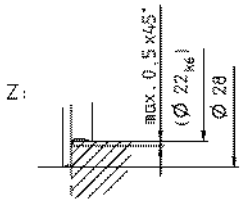
[a] For higher ambient temperatures, please reduce input speed
[b] Refers to center of the output shaft, if n_2 = 1000 rpm

View A

1-stage:







Non-tolerated dimensions ±1 mm

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

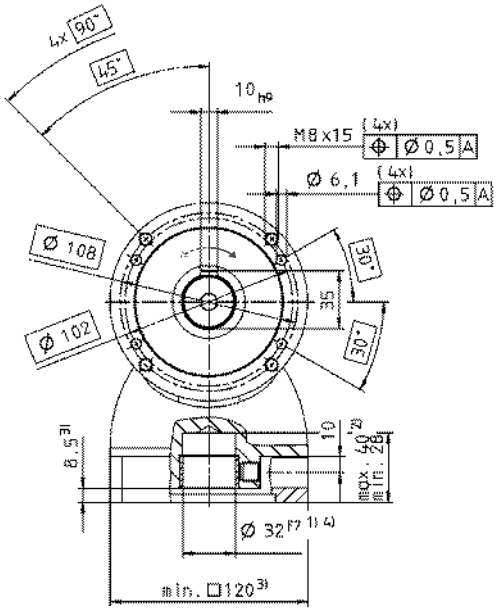
CAD data is available under
http://www.wittenstein-alpha.de/en/info-and-cad-finder.html

Motor mounting according to operating manual

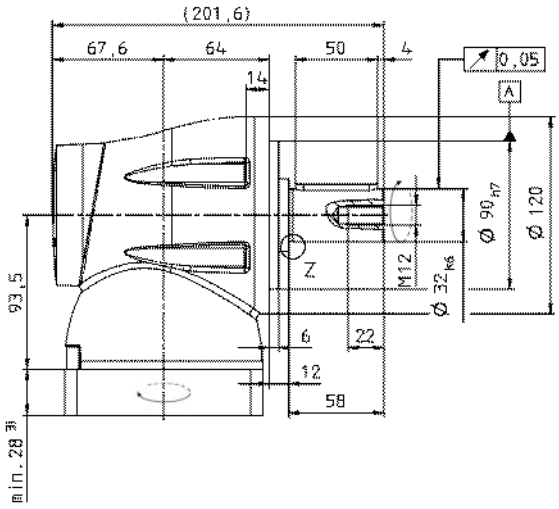
			1-stage
Ratio	i		**1**
Max. acceleration torque (max. 1000 cycles per hour)	T_{2B}	Nm	45
		in.lb	400
Nominal output torque (with n_{1N})	T_{2N}	Nm	23
		in.lb	200
Emergency stop torque (permitted 1000 times during the service life of the gearhead)	T_{2Not}	Nm	93
		in.lb	820
Nominal input speed (with T_{2N} and 20°C ambient temperature) [a]	n_{1N}	rpm	2100
Max. input speed	n_{1Max}	rpm	3500
Mean no load running torque (with n_1 = 3000 rpm and 20°C gearhead temperature)	T_{012}	Nm	2.5
		in.lb	22
Max. torsional backlash	j_t	arcmin	≤ 10
Torsional rigidity	C_{t21}	Nm/ arcmin	–
		in.lb/ arcmin	
Max. axial force [b]	F_{2AMax}	N	750
		lb_f	170
Max. radial force [b]	F_{2RMax}	N	4600
		lb_f	1040
Efficiency at full load	η	%	95
Service life (For calculation, see the Chapter “Information”)	L_h	h	> 20000
Weight incl. standard adapter plate	m	kg	8.9
		lb_m	20
Operating noise (with n_1 = 3000 rpm no load)	L_{PA}	dB(A)	≤ 76
Max. permitted housing temperature		°C	+90
		F	194
Ambient temperature		°C	-15 to 40
		F	5 to 104
Lubrication			Lubricated for life
Paint			without
Direction of rotation			Motor and gearhead same direction
Protection class			IP 64
Moment of inertia (relates to the drive)	J_1	$kgcm^2$	14
		10^{-3} in.lb.s²	12

[a] For higher ambient temperatures, please reduce input speed
[b] Refers to center of the output shaft, if n_2 = 1000 rpm

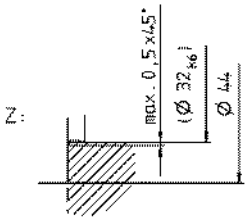
1-stage:



←A



Z:



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.

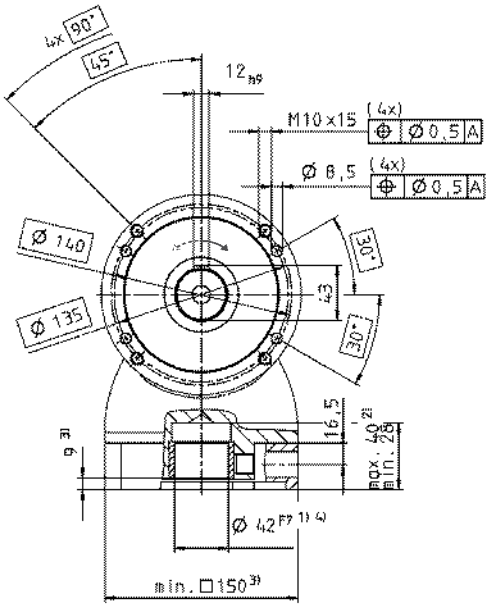
CAD data is available under
http://www.wittenstein-alpha.de/en/info-and-cad-finder.html

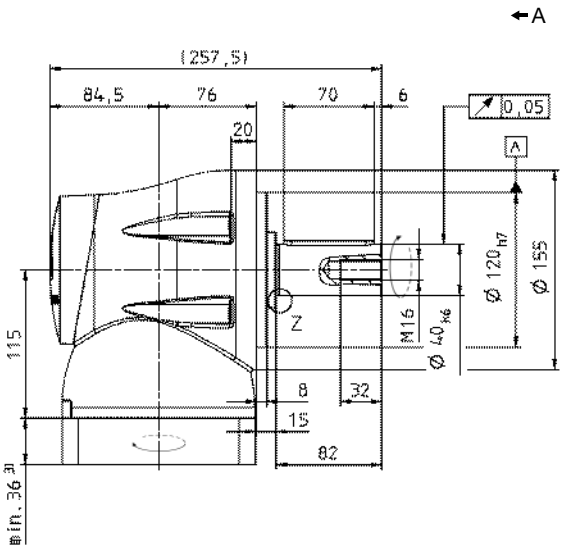
Motor mounting according to operating manual

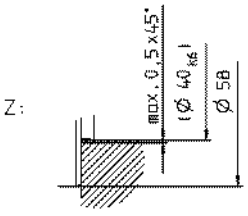
			1-stage
Ratio	i		**1**
Max. acceleration torque (max. 1000 cycles per hour)	T_{2B}	Nm	93
		in.lb	820
Nominal output torque (with n_{1N})	T_{2N}	Nm	66
		in.lb	580
Emergency stop torque (permitted 1000 times during the service life of the gearhead)	T_{2Not}	Nm	194
		in.lb	1720
Nominal input speed (with T_{2N} and 20°C ambient temperature) [a]	n_{1N}	rpm	1600
Max. input speed	n_{1Max}	rpm	3000
Mean no load running torque (with n_1 = 3000 rpm and 20°C gearhead temperature)	T_{012}	Nm	4.5
		in.lb	
Max. torsional backlash	j_t	arcmin	≤ 8
			40
Torsional rigidity	C_{t21}	Nm/ arcmin	–
		in.lb/ arcmin	
Max. axial force [b]	F_{2AMax}	N	1000
		lb_f	225
Max. radial force [b]	F_{2RMax}	N	7500
		lb_f	1690
Efficiency at full load	η	%	95
Service life (For calculation, see the Chapter “Information”)	L_h	h	> 20000
Weight incl. standard adapter plate	m	kg	19
		lb_m	42
Operating noise (with n_1 = 3000 rpm no load)	L_{PA}	dB(A)	≤ 78
Max. permitted housing temperature		°C	+90
		F	194
Ambient temperature		°C	-15 to 40
		F	5 to 104
Lubrication			Lubricated for life
Paint			without
Direction of rotation			Motor and gearhead same direction
Protection class			IP 64
Moment of inertia (relates to the drive)	J_1	$kgcm^2$	57
		10^{-3} in.lb.s²	51

[a] For higher ambient temperatures, please reduce input speed
[b] Refers to center of the output shaft, if n_2 = 1000 rpm

1-stage:







Non-tolerated dimensions ±1 mm

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

CAD data is available under
http://www.wittenstein-alpha.de/en/info-and-cad-finder.html

Motor mounting according to operating manual

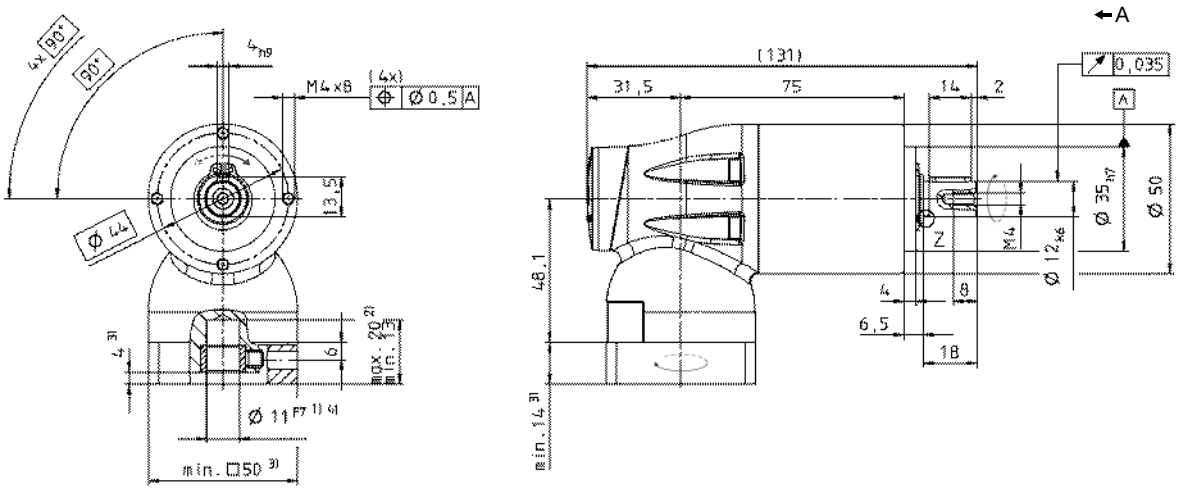
			2-stage				3-stage						
Ratio	***i***		**4**	**5**	**7**	**10**	**16**	**20**	**25**	**35**	**50**	**70**	**100**
Max. acceleration torque (max. 1000 cycles per hour)	T_{2B}	Nm	11	12	12	11	11	11	12	12	12	12	11
		in.lb	100	110	110	100	100	100	110	110	110	110	100
Nominal output torque (with n_{1N})	T_{2N}	Nm	5.2	5.7	5.7	5.2	5.2	5.2	5.7	5.7	5.7	5.7	5.2
		in.lb	46	50	50	46	46	46	50	50	50	50	46
Emergency stop torque (permitted 1000 times during the service life of the gearhead)	T_{2Not}	Nm	26	26	26	26	26	26	26	26	26	26	26
		in.lb	230	230	230	230	230	230	230	230	230	230	230
Nominal input speed (with T_{2N} and 20°C ambient temperature) [a]	n_{1N}	rpm	3200	3200	3200	3200	3200	3200	3200	3200	3200	3200	3200
Max. input speed	n_{1Max}	rpm	5000	5000	5000	5000	5000	5000	5000	5000	5000	5000	5000
Mean no load running torque (with n_1 = 3000 rpm and 20°C gearhead temperature)	T_{012}	Nm	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
		in.lb	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8
Max. torsional backlash	j_t	arcmin	≤ 16				≤ 15						
Torsional rigidity	C_{t21}	Nm/ arcmin	–				–						
		in.lb/ arcmin											
Max. axial force [b]	F_{2AMax}	N	700				700						
		lb_f	160				160						
Max. radial force [b]	F_{2RMax}	N	650				650						
		lb_f	150				150						
Efficiency at full load	η	%	92				90						
Service life (For calculation. see the Chapter “Information”)	L_h	h	> 20000				> 20000						
Weight incl. standard adapter plate	m	kg	1.4				1.6						
		lb_m	3.1				3.5						
Operating noise (for i = 10 and n_1 = 3000 rpm without load)	L_{PA}	dB(A)	≤72										
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 64										
Moment of inertia (relates to the drive)	J_1	kgcm²	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16
		10^{-3} in.lb.s²	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14

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

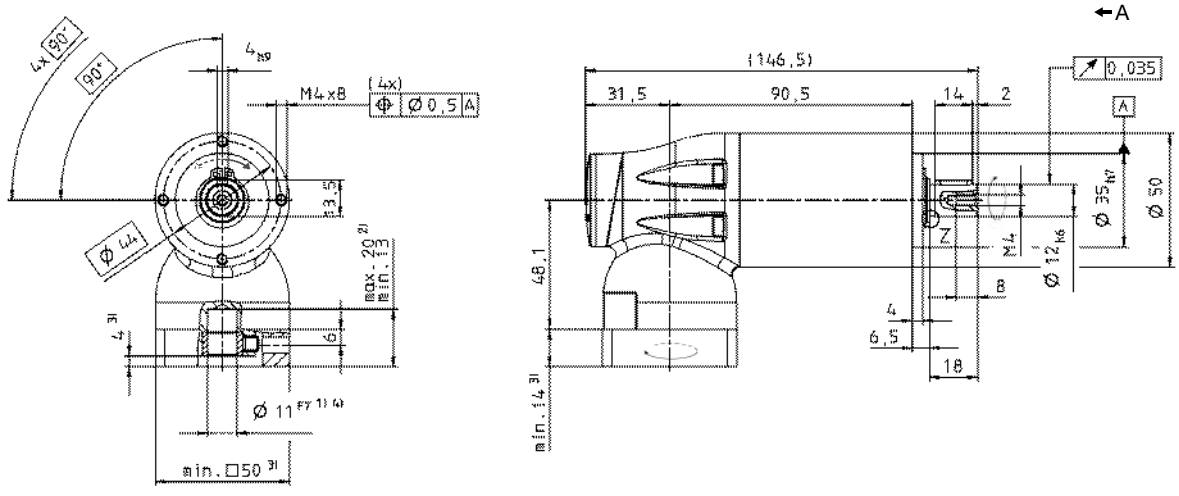
[b] Refers to center of the output shaft, if n_2 = 100 rpm

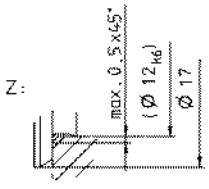
View A

2-stage:



3-stage:





Non-tolerated dimensions ±1 mm

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

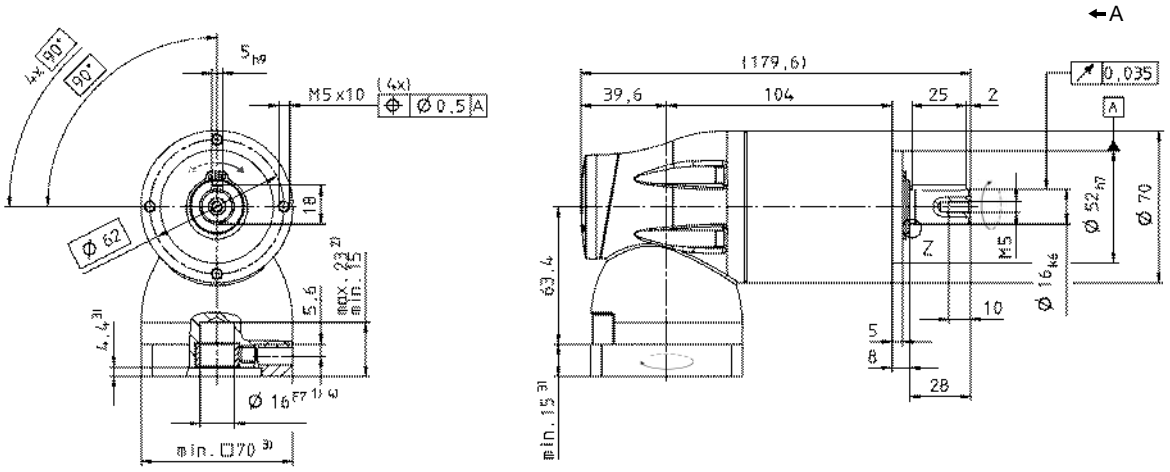
CAD data is available under
http://www.wittenstein-alpha.de/en/info-and-cad-finder.html

Motor mounting according to operating manual

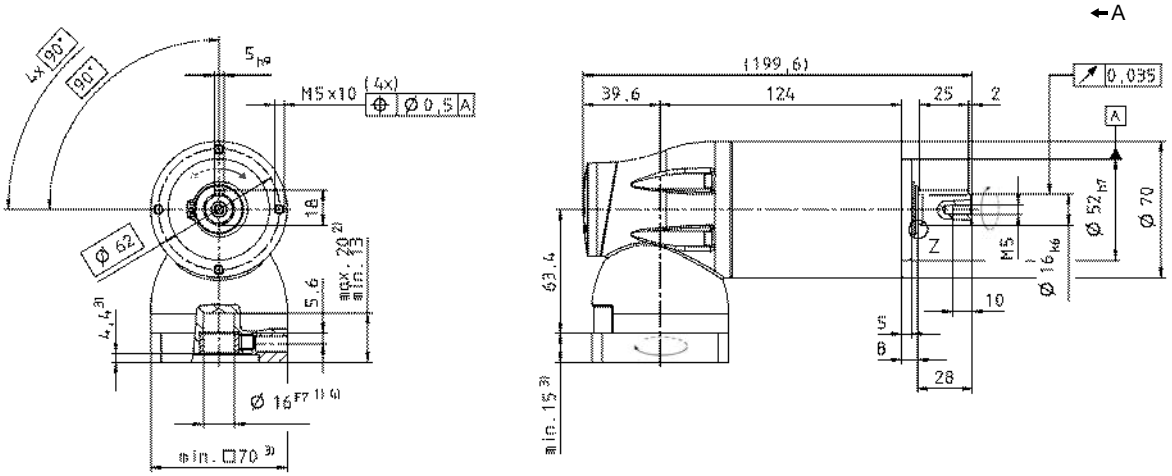
			2-stage					3-stage						
Ratio [c]	i		**3**	**4**	**5**	**7**	**10**	**16**	**20**	**25**	**30**	**50**	**70**	**100**
Max. acceleration torque (max. 1000 cycles per hour)	T_{2B}	Nm	22	29	35	35	32	35	35	35	32	35	35	32
		in.lb	190	260	310	310	280	310	310	310	280	310	310	280
Nominal output torque (with n_{1N})	T_{2N}	Nm	11	15	18	18	16.5	18	18	18	16.5	18	18	16.5
		in.lb	100	130	160	160	150	160	160	160	160	160	160	160
Emergency stop torque (permitted 1000 times during the service life of the gearhead)	T_{2Not}	Nm	45	60	75	75	75	75	75	75	75	75	75	75
		in.lb	400	530	664	660	660	660	660	660	660	660	660	660
Nominal input speed (with T_{2N} and 20°C ambient temperature) [a]	n_{1N}	rpm	3000	3000	3000	3000	3000	3000	3000	3000	3000	3000	3000	3000
Max. input speed	n_{1Max}	rpm	4500	4500	4500	4500	4500	4500	4500	4500	4500	4500	4500	4500
Mean no load running torque (with n_1 = 3000 rpm and 20°C gearhead temperature)	T_{012}	Nm	0.6	0.55	0.5	0.44	0.44	0.44	0.44	0.44	0.44	0.44	0.44	0.4
		in.lb	5.3	4.9	4.4	3.9	3.9	3.9	3.9	3.9	3.9	3.9	3.9	3.5
Max. torsional backlash	j_t	arcmin	≤ 14					≤ 12						
Torsional rigidity	C_{t21}	Nm/ arcmin	1	1,5	2	2	2	3	3	3	3	3	3	3
		in.lb/ arcmin	9	13	17	21	21	27	27	27	25	28	28	25
Max. axial force [b]	F_{2AMax}	N	1550					1550						
		lb_f	350					350						
Max. radial force [b]	F_{2RMax}	N	1450					1450						
		lb_f	330					330						
Efficiency at full load	η	%	92					90						
Service life (For calculation, see the Chapter "Information")	L_h	h	> 20000					> 20000						
Weight incl. standard adapter plate	m	kg	3.8					4.2						
		lb_m	8.4					9.3						
Operating noise (for i = 10 and n_1 = 3000 rpm without load)	L_{PA}	dB(A)	≤73											
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 64											
Moment of inertia (relates to the drive)	J_1	kgcm²	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
		10^{-3} in.lb.s²	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75

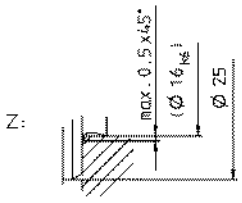
[a] For higher ambient temperatures, please reduce input speed
[b] Refers to center of the output shaft, if n_2 = 100 rpm
[c] Other ratios are available on request: i = 15, 21, 28 and 35

2-stage:



3-stage:





Non-tolerated dimensions ±1 mm

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

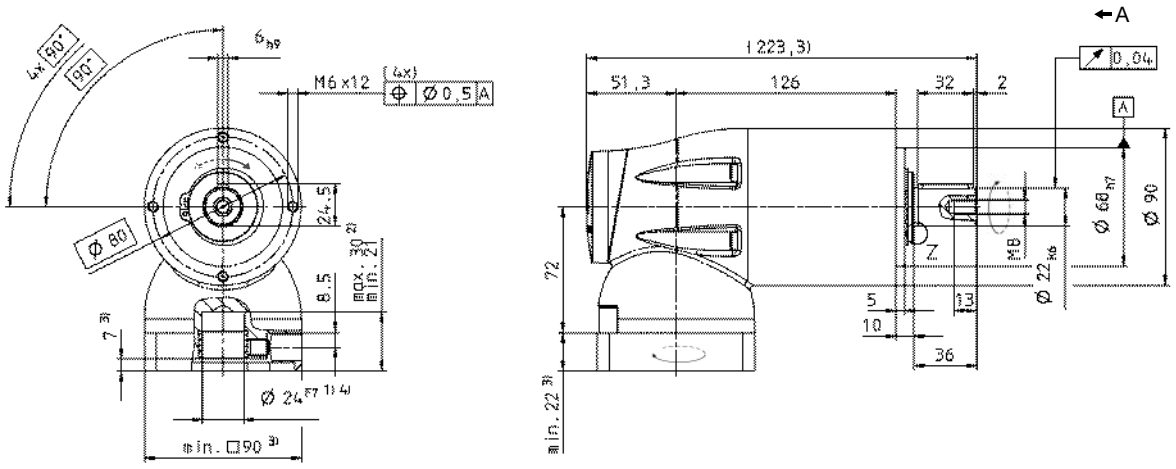
CAD data is available under
http://www.wittenstein-alpha.de/en/info-and-cad-finder.html

Motor mounting according to operating manual

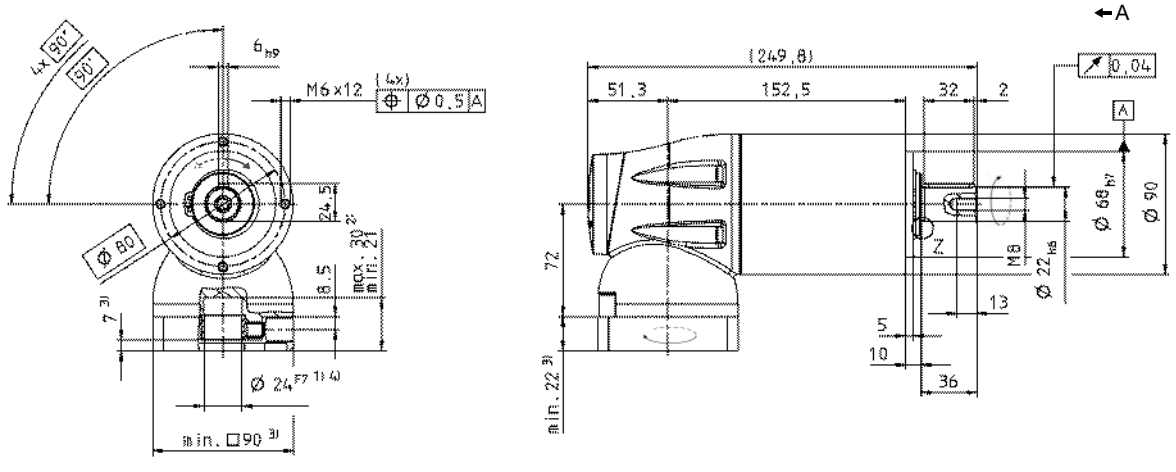
			2-stage					3-stage						
Ratio [c]	i		**3**	**4**	**5**	**7**	**10**	**16**	**20**	**25**	**30**	**50**	**70**	**100**
Max. acceleration torque (max. 1000 cycles per hour)	T_{2B}	Nm	56	74	90	90	80	90	90	90	80	90	90	80
		in.lb	500	650	800	800	710	800	800	800	710	800	800	710
Nominal output torque (with n_{1N})	T_{2N}	Nm	28	37	45	45	40	45	45	45	40	45	45	40
		in.lb	250	330	400	400	350	400	400	400	400	400	400	350
Emergency stop torque (permitted 1000 times during the service life of the gearhead)	T_{2Not}	Nm	110	150	190	190	190	190	190	190	190	190	190	190
		in.lb	970	1330	1680	1680	1680	1680	1680	1680	1680	1680	1680	1680
Nominal input speed (with T_{2N} and 20°C ambient temperature) [a]	n_{1N}	rpm	2700	2700	2700	2700	2700	2700	2700	2700	2700	2700	2700	2700
Max. input speed	n_{1Max}	rpm	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000
Mean no load running torque (with n_1 = 3000 rpm and 20°C gearhead temperature)	T_{012}	Nm	1.3	1.3	1.2	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.0
		in.lb	12	11	11	10	10	10	10	10	10	10	10	9
Max. torsional backlash	j_t	arcmin	≤ 12					≤ 11						
Torsional rigidity	C_{t21}	Nm/ arcmin	4.9	6.5	7.3	8.2	8.0	9.2	9.4	9.4	8.4	9.5	9.5	8.5
		in.lb/ arcmin	43	58	65	73	71	81	83	83	74	84	84	75
Max. axial force [b]	F_{2AMax}	N	1900					1900						
		lb_f	430					430						
Max. radial force [b]	F_{2RMax}	N	2400					2400						
		lb_f	540					540						
Efficiency at full load	η	%	92					90						
Service life (For calculation, see the Chapter "Information")	L_h	h	> 20000					> 20000						
Weight incl. standard adapter plate	m	kg	6.9					7.9						
		lb_m	15					17						
Operating noise (for i = 10 and n_1 = 3000 rpm without load)	L_{PA}	dB(A)	≤ 76											
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 64											
Moment of inertia (relates to the drive)	J_1	$kgcm^2$	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1
		10^{-3} in.lb.s²	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6

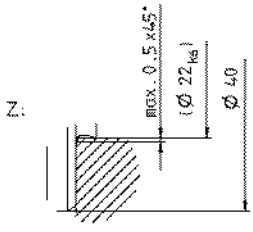
[a] For higher ambient temperatures, please reduce input speed
[b] Refers to center of the output shaft, if n_2 = 100 rpm
[c] Other ratios are available on request: i = 15, 21, 28 and 35

2-stage:



3-stage:





Non-tolerated dimensions ±1 mm

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

CAD data is available under
http://www.wittenstein-alpha.de/en/info-and-cad-finder.html

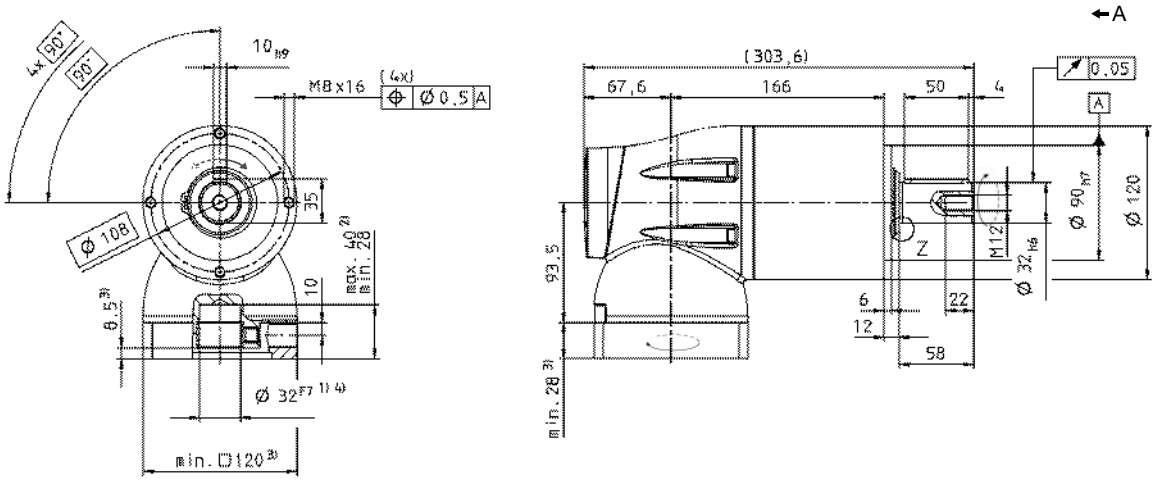
Motor mounting according to operating manual

			2-stage					3-stage						
Ratio [c]	i		**3**	**4**	**5**	**7**	**10**	**16**	**20**	**25**	**30**	**50**	**70**	**100**
Max. acceleration torque (max. 1000 cycles per hour)	T_{2B}	Nm	136	181	220	220	200	220	220	220	200	220	220	200
		in.lb	1200	1600	1950	1950	1770	1950	1950	1950	1770	1950	1950	1770
Nominal output torque (with n_{1N})	T_{2N}	Nm	68	91	110	110	100	110	110	110	100	110	110	100
		in.lb	600	810	970	970	890	970	970	970	890	970	970	890
Emergency stop torque (permitted 1000 times during the service life of the gearhead)	T_{2Not}	Nm	280	380	480	480	480	480	480	480	480	480	480	480
		in.lb	2500	3400	4200	4200	4200	4200	4200	4200	4200	4200	4200	4200
Nominal input speed (with T_{2N} and 20°C ambient temperature) [a]	n_{1N}	rpm	2100	2100	2100	2100	2100	2100	2100	2100	2100	2100	2100	2100
Max. input speed	n_{1Max}	rpm	3500	3500	3500	3500	3500	3500	3500	3500	3500	3500	3500	3500
Mean no load running torque (with n_1 = 3000 rpm and 20°C gearhead temperature)	T_{012}	Nm	3.5	3.3	3.2	3.1	3.1	2.9	2.8	2.8	2.7	2.7	2.7	2.7
		in.lb	31	29	28	27	27	26	25	25	24	24	24	24
Max. torsional backlash	j_t	arcmin	≤ 11					≤ 11						
Torsional rigidity	C_{t21}	Nm/ arcmin	19	22	23	24	22	25	25	25	22	25	25	22
		in.lb/ arcmin	170	190	210	210	190	220	220	220	190	220	220	190
Max. axial force [b]	F_{2AMax}	N	4000					4000						
		lb_f	900					900						
Max. radial force [b]	F_{2RMax}	N	4600					4600						
		lb_f	1040					1040						
Efficiency at full load	η	%	92					90						
Service life (For calculation, see the Chapter "Information")	L_h	h	> 20000					> 20000						
Weight incl. standard adapter plate	m	kg	17					19						
		lb_m	37					42						
Operating noise (for i = 10 and n_1 = 3000 rpm without load)	L_{PA}	dB(A)	≤ 76											
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 64											
Moment of inertia (relates to the drive)	J_1	kgcm²	17	17	17	17	17	17	17	17	17	17	17	17
		10^{-3} in.lb.s²	15	15	15	15	15	15	15	15	15	15	15	15

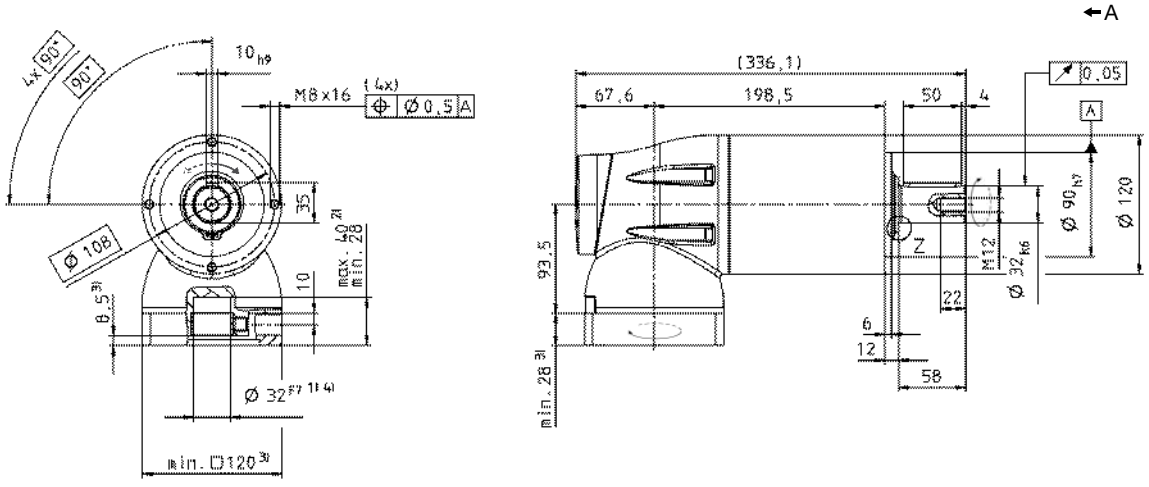
[a] For higher ambient temperatures, please reduce input speed
[b] Refers to center of the output shaft, if n_2 = 100 rpm
[c] Other ratios are available on request: i = 15, 21, 28 and 35

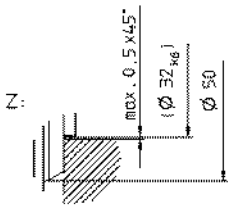
View A

2-stage:



3-stage:





Non-tolerated dimensions ±1 mm

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

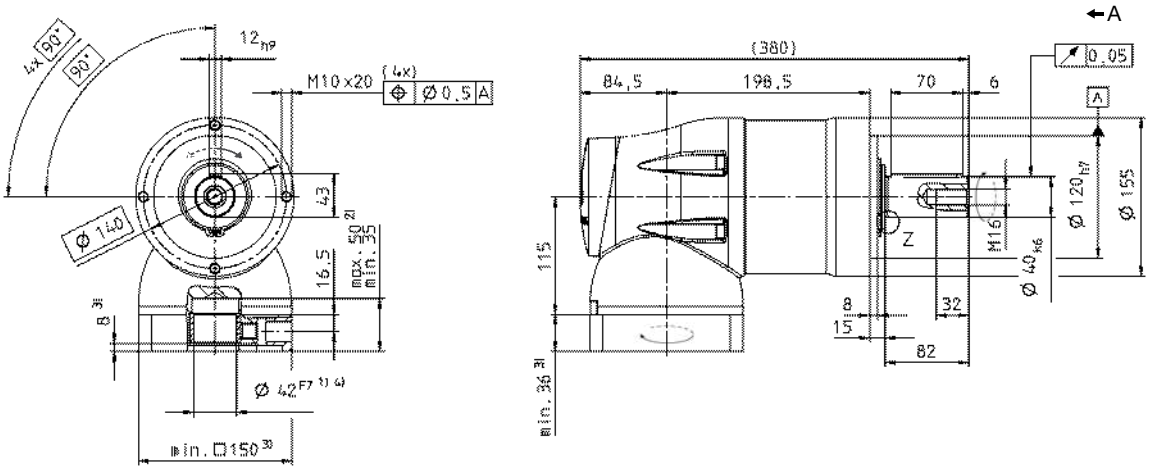
CAD data is available under
http://www.wittenstein-alpha.de/en/info-and-cad-finder.html

Motor mounting according to operating manual

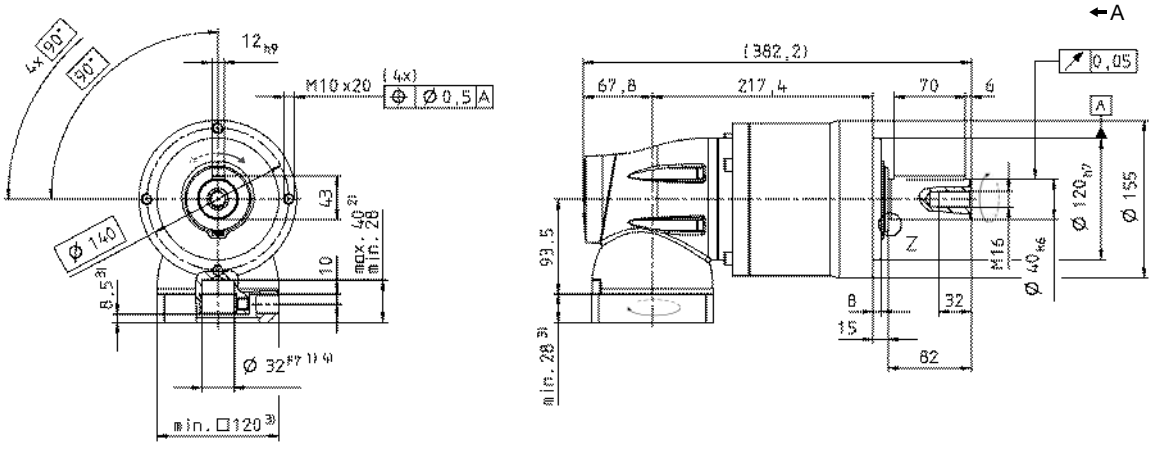
			2-stage		3-stage		
Ratio	***i***		**5**	**10**	**25**	**50**	**100**
Max. acceleration torque (max. 1000 cycles per hour)	T_{2B}	Nm	450	350	450	450	350
		in.lb	4000	3100	4000	4000	3100
Nominal output torque (with n_{1N})	T_{2N}	Nm	320	190	320	320	190
		in.lb	2800	1700	2800	2800	1700
Emergency stop torque (permitted 1000 times during the service life of the gearhead)	T_{2Not}	Nm	1000	1000	1000	1000	1000
		in.lb	8850	8850	8850	8850	8850
Nominal input speed (with T_{2N} and 20°C ambient temperature) [a]	n_{1N}	rpm	1600	1600	1600	1600	1600
Max. input speed	n_{1Max}	rpm	3000	3000	3500	3500	3500
Mean no load running torque (with n_1 = 3000 rpm and 20°C gearhead temperature)	T_{012}	Nm	7.3	7.0	3.5	3.3	3.2
		in.lb					
Max. torsional backlash	j_t	arcmin	≤ 10		≤ 11		
Torsional rigidity	C_{t21}	Nm/ arcmin	44	42	55	55	44
		in.lb/ arcmin	390	370	480	490	390
Max. axial force [b]	F_{2AMax}	N	6000		6000		
		lb_f	1350		1350		
Max. radial force [b]	F_{2RMax}	N	7500		7500		
		lb_f	1690		1690		
Efficiency at full load	η	%	92		90		
Service life (For calculation, see the Chapter “Information”)	L_h	h	> 20000		> 20000		
Weight incl. standard adapter plate	*m*	kg	35		39		
		lb_m	77		86		
Operating noise (for i = 10 and n_1 = 3000 rpm without load)	L_{PA}	dB(A)	≤ 78				
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 64				
Moment of inertia (relates to the drive)	J_1	$kgcm^2$	75	75	17	17	17
		10^{-3} in.lb.s²	66	66	15	15	15

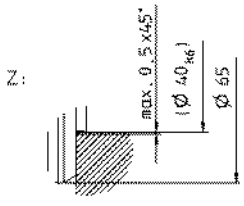
[a] For higher ambient temperatures, please reduce input speed
[b] Refers to center of the output shaft, if = 100 rpm

2-stage:



3-stage:





Non-tolerated dimensions ±1 mm

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

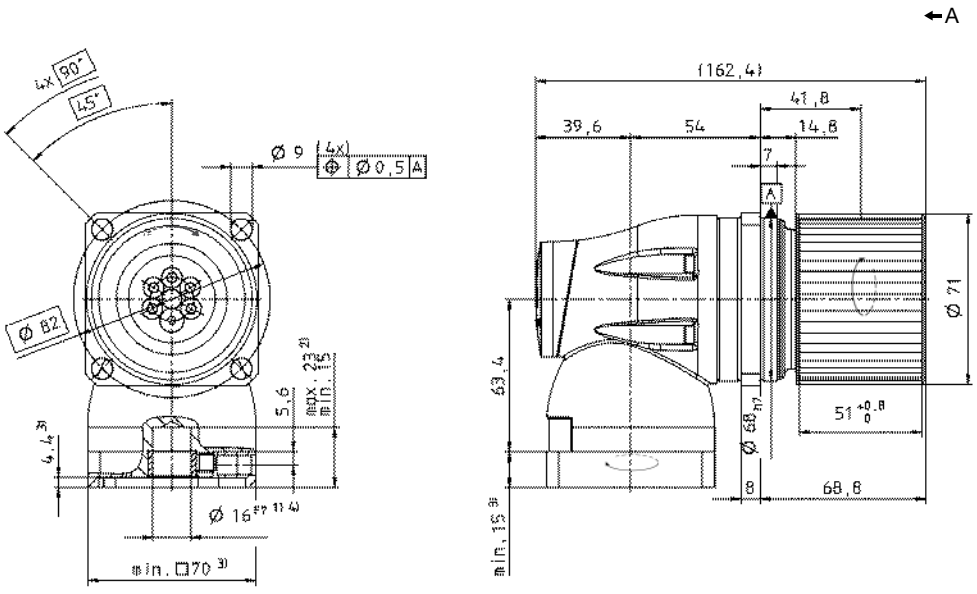
CAD data is available under
http://www.wittenstein-alpha.de/en/info-and-cad-finder.html

Motor mounting according to operating manual

			2-stage				
Ratio	***i***		**3**	**4**	**5**	**7**	**10**
Max. acceleration torque (max. 1000 cycles per hour)	T_{2B}	Nm	22	29	35	35	32
		in.lb	190	260	310	310	280
Nominal output torque (with n_{1N})	T_{2N}	Nm	11	15	18	18	16.5
		in.lb	100	130	160	160	150
Emergency stop torque (permitted 1000 times during the service life of the gearhead)	T_{2Not}	Nm	45	60	75	75	75
		in.lb	400	530	660	660	660
Nominal input speed (with T_{2N} and 20°C ambient temperature) [a]	n_{1N}	rpm	3000	3000	3000	3000	3000
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)	T_{012}	Nm	0.6	0.55	0.5	0.45	0.45
		in.lb	5.3	4.9	4.4	4.0	4.0
Max. torsional backlash	j_t	arcmin	≤ 14				
Torsional rigidity	C_{t21}	Nm/ arcmin	–	–	–	–	–
		in.lb/ arcmin	–	–	–	–	–
Max. axial force [b]	F_{2AMax}	N	1550				
		lb_f	350				
Max. radial force [c]	F_{2RMax}	N	3000				
		lb_f	680				
Efficiency at full load	η	%	92				
Service life (For calculation, see the Chapter “Information”)	L_h	h	> 20000				
Weight incl. standard adapter plate	m	kg	3.4				
		lb_m	7.5				
Operating noise (for i = 10 and n_1 = 3000 rpm without load)	L_{PA}	dB(A)	≤73				
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 64				
Moment of inertia (relates to the drive)	J_1	$kgcm^2$	0.85	0.85	0.85	0.85	0.85
		10^{-3} in.lb.s²	0.75	0.75	0.75	0.75	0.75

[a] For higher ambient temperatures, please reduce input speed
[b] Refers to center of the output shaft, if n_2 = 100 rpm
[c] With mounted PLPB+ belt pulley and 100 rpm

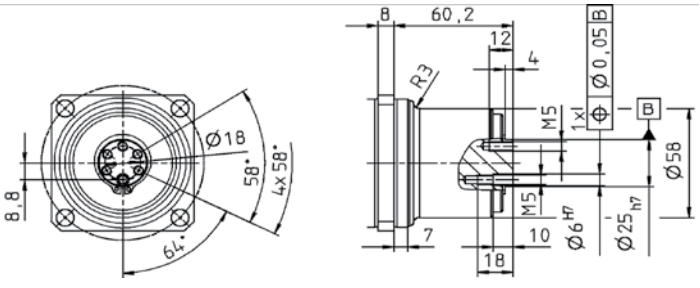
2-stage:



Supplement: Belt pulley PLPB+ (not included in the scope of delivery – please order separately)

Belt Pulley PLPB+ 070 Profile AT5-0			
Pitch	*p*	mm	5
Number of teeth	*z*		43
Circumference	*z* * *p*	mm/rotation	215
Inertia	*J*	kgcm²	3.86
Mass	*m*	kg	0.48

Illustration: Output flange without belt pulley



Non-tolerated dimensions ±1 mm

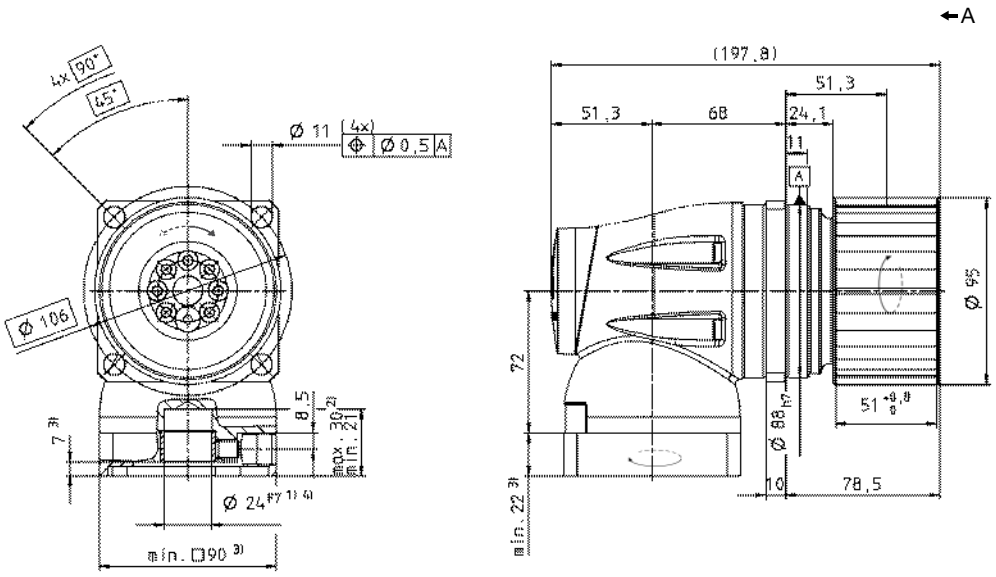
1) Check motor shaft fit.
2) Min./Max. permissible motor shaft length. Longer motor shafts are adaptable, please contact us.
3) The dimensions depend on the motor.
4) Smaller motor shaft diameter is compensated by a bushing.

CAD data is available under
http://www.wittenstein-alpha.de/en/info-and-cad-finder.html
Motor mounting according to operating manual

			2-stage				
Ratio	***i***		**3**	**4**	**5**	**7**	**10**
Max. acceleration torque (max. 1000 cycles per hour)	T_{2B}	Nm	56	74	90	90	80
		in.lb	500	650	800	800	710
Nominal output torque (with n_{1N})	T_{2N}	Nm	28	37	45	45	40
		in.lb	250	330	400	400	350
Emergency stop torque (permitted 1000 times during the service life of the gearhead)	T_{2Not}	Nm	110	150	190	190	190
		in.lb	970	1330	1680	1680	1680
Nominal input speed (with T_{2N} and 20°C ambient temperature) [a]	n_{1N}	rpm	2700	2700	2700	2700	2700
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)	T_{012}	Nm	1.3	1.3	1.2	1.1	1.1
		in.lb	12	11	11	10	10
Max. torsional backlash	j_t	arcmin	≤ 12				
Torsional rigidity	C_{t21}	Nm/ arcmin	–	–	–	–	–
		in.lb/ arcmin	–	–	–	–	–
Max. axial force [b]	F_{2AMax}	N	1900				
		lb_f	430				
Max. radial force [c]	F_{2RMax}	N	4300				
		lb_f	970				
Efficiency at full load	η	%	92				
Service life (For calculation, see the Chapter “Information”)	L_h	h	> 20000				
Weight incl. standard adapter plate	*m*	kg	6.2				
		lb_m	14				
Operating noise (for i = 10 and n_1 = 3000 rpm without load)	L_{PA}	dB(A)	≤ 76				
Max. permitted housing temperature		°C					
		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 64				
Moment of inertia (relates to the drive)	J_1	$kgcm^2$	4.1	4.1	4.1	4.1	4.1
		10^{-3} in.lb.s²	3.6	3.6	3.6	3.6	3.6

[a] For higher ambient temperatures, please reduce input speed
[b] Refers to center of the output shaft, if n_2 = 100 rpm
[c] With mounted PLPB+ belt pulley and 100 rpm

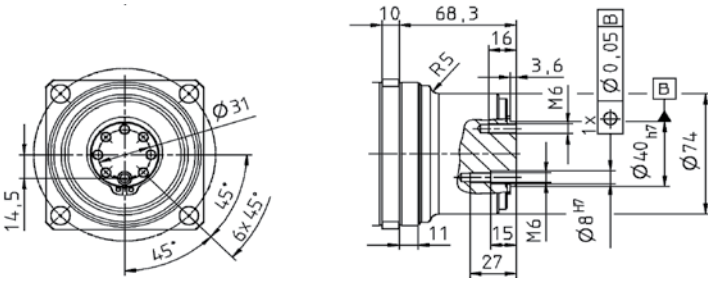
2-stage:



Supplement: Belt pulley PLPB⁺ (not included in the scope of delivery – please order separately)

Belt Pulley PLPB⁺ 090 Profile AT10-0			
Pitch	*p*	mm	10
Number of teeth	*z*		28
Circumference	*z* * *p*	mm/rotation	280
Inertia	*J*	kgcm²	10.95
Mass	*m*	kg	0.82

Illustration: Output flange without belt pulley



Non-tolerated dimensions ±1 mm

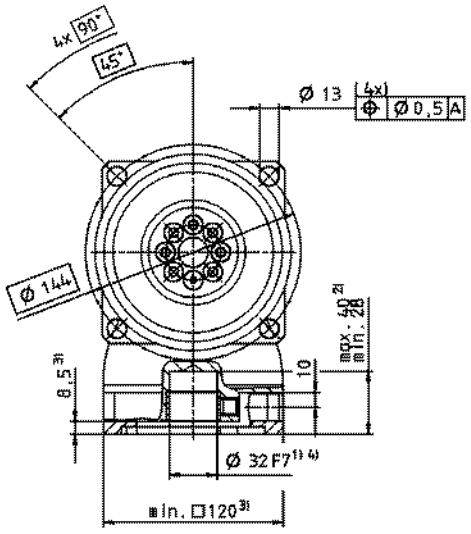
1) Check motor shaft fit.
2) Min./Max. permissible motor shaft length. Longer motor shafts are adaptable, please contact us.
3) The dimensions depend on the motor.
4) Smaller motor shaft diameter is compensated by a bushing.

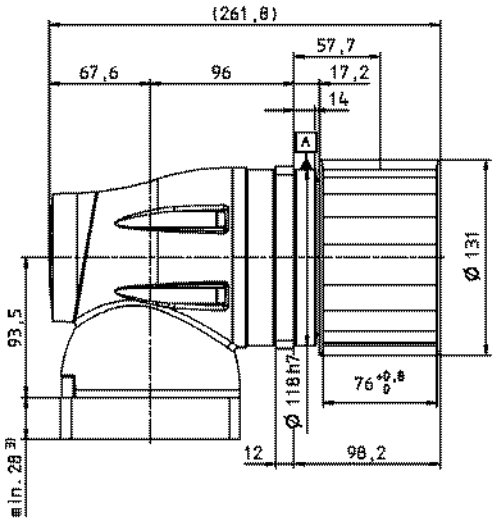
CAD data is available under
http://www.wittenstein-alpha.de/en/info-and-cad-finder.html
Motor mounting according to operating manual

			2-stage				
Ratio	***i***		**3**	**4**	**5**	**7**	**10**
Max. acceleration torque (max. 1000 cycles per hour)	T_{2B}	Nm	136	181	220	220	200
		in.lb	1200	1600	1950	1950	1770
Nominal output torque (with n_{1N})	T_{2N}	Nm	68	91	110	110	100
		in.lb	600	810	970	970	890
Emergency stop torque (permitted 1000 times during the service life of the gearhead)	T_{2Not}	Nm	280	380	480	480	480
		in.lb	2500	3400	4200	4200	4200
Nominal input speed (with T_{2N} and 20°C ambient temperature) [a]	n_{1N}	rpm	2100	2100	2100	2100	2100
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)	T_{012}	Nm	3,5	3,3	3,2	3,1	3,1
		in.lb	31	29	28	27	27
Max. torsional backlash	j_t	arcmin	≤ 11				
Torsional rigidity	C_{t21}	Nm/ arcmin	–	–	–	–	–
		in.lb/ arcmin	–	–	–	–	–
Max. axial force [b]	F_{2AMax}	N	4000				
		lb_f	900				
Max. radial force [c]	F_{2RMax}	N	9500				
		lb_f	2100				
Efficiency at full load	η	%	92				
Service life (For calculation, see the Chapter "Information")	L_h	h	> 20000				
Weight incl. standard adapter plate	*m*	kg	16				
		lb_m	34				
Operating noise (for i = 10 and n_1 = 3000 rpm without load)	L_{PA}	dB(A)	≤ 76				
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 64				
Moment of inertia (relates to the drive)	J_1	$kgcm^2$	17	17	17	17	17
		10^{-3} in.lb.s²	15	15	15	15	15

[a] For higher ambient temperatures, please reduce input speed
[b] Refers to center of the output shaft, if n_2 = 100 rpm
[c] With mounted PLPB+ belt pulley and 100 rpm

2-stage:

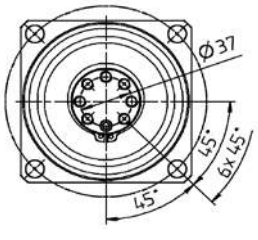


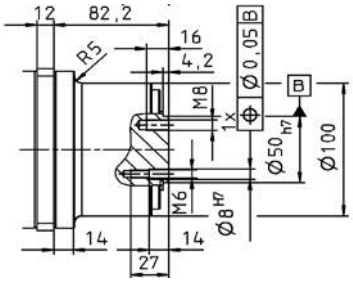


Supplement: Belt pulley PLPB⁺ (not included in the scope of delivery – please order separately)

Belt Pulley PLPB⁺ 120 Profile AT20-0			
Pitch	*p*	mm	20
Number of teeth	*z*		19
Circumference	*z* * *p*	mm/rotation	380
Inertia	*J*	kgcm²	50.62
Mass	*m*	kg	2.61

Illustration: Output flange without belt pulley





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.

CAD data is available under
http://www.wittenstein-alpha.de/en/info-and-cad-finder.html
Motor mounting according to operating manual

V-Drive economy – Economical servo worm

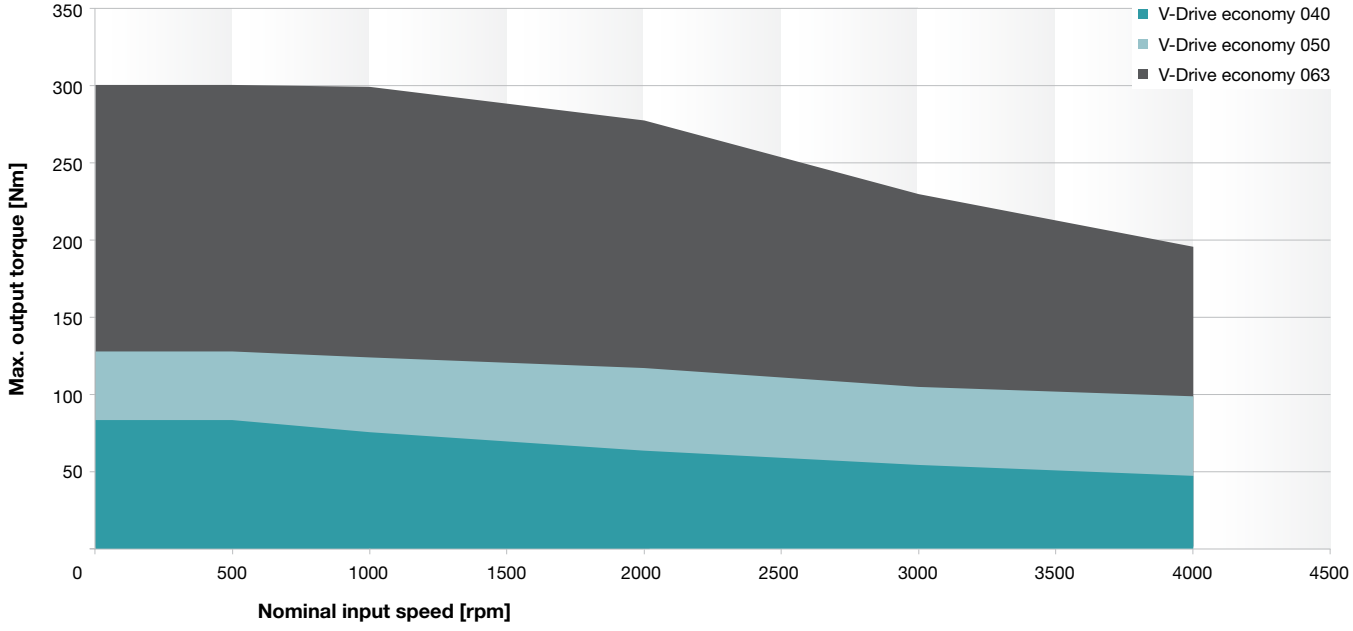
VDHe

VDSe

Low backlash servo worm gearheads with output shaft and hollow shaft. The V-Drive economy impresses with its high power density and medium torsional backlash.
It is especially suitable for economical applications in continuous operation.

Quick size selection

V-Drive economy (example for i = 28)
For applications in cyclic operation (DC ≤ 60%) or continuous operation (DC ≥ 60%)



Versions and Applications

Features	**VDHe** with smooth/keyed hollow shaft page 344	**VDSe** with smooth/keywayed solid shaft page 350
Power density	••	••
Smooth-running	•••	•••

Product features

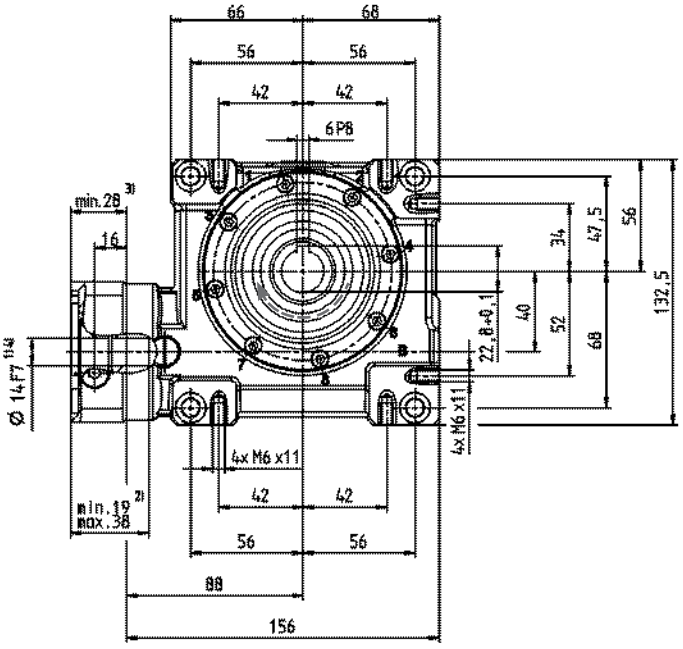
Ratios	4 – 40	4 – 40
Torsional backlash [arcmin]	≤ 8	≤ 8
Output type		
Smooth output shaft		•
Keywayed output shaft		•
Hollow shaft interface Connected via shrink disc	•	
Hollow shaft interface, rear side Connected via shrink disc	•	
Shaft on both sides		•
Input type		
Motor mounted version	•	•
Type		
Food-grade lubrication	•	•
Corrosion resistant [a]	•	•
Accessories		
Coupling		•
Rack		•
Pinion		•
Shrink disc	•	

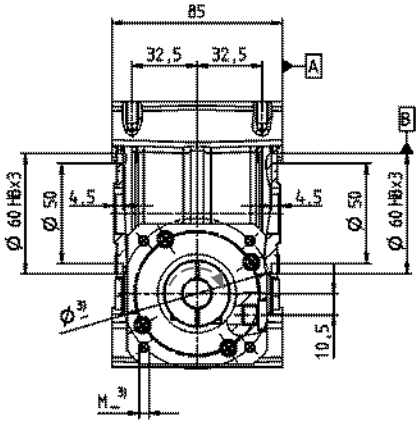
[a] Please contact WITTENSTEIN alpha

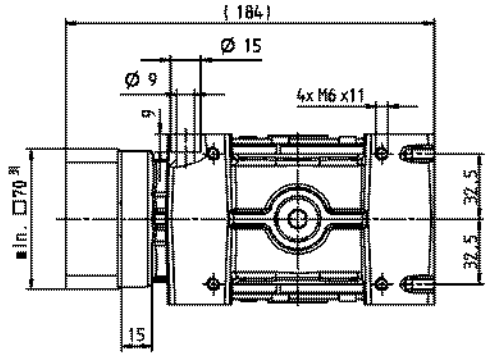
VDH economy 040 1-stage

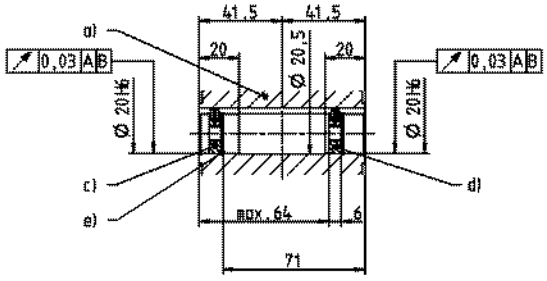
					1-stage					
Ratio			***i***		**4**	**7**	**10**	**16**	**28**	**40**
n_{1N}=500 rpm			T_{2Max}	Nm	60	75	76	79	83	76
				in.lb	531	664	673	699	735	673
			T_{2Servo}	Nm	17	24	25	26	29	25
				in.lb	150	212	221	230	257	221
			η	%	93	90	88	82	73	67
n_{1N}=1000 rpm			T_{2Max}	Nm	45	60	68	72	75	70
				in.lb	398	531	602	637	664	620
			T_{2Servo}	Nm	19	26	28	29	32	28
				in.lb	168	230	248	257	283	248
			η	%	94	92	90	86	77	73
n_{1N}=2000 rpm			T_{2Max}	Nm	35	50	54	59	63	60
				in.lb	310	443	478	522	558	531
			T_{2Servo}	Nm	19	26	28	29	33	29
				in.lb	168	230	248	257	292	257
			η	%	96	94	92	88	81	77
n_{1N}=3000 rpm			T_{2Max}	Nm	30	42	46	51	53	52
				in.lb	266	372	407	451	469	460
			T_{2Servo}	Nm	19	26	28	29	32	28
				in.lb	168	230	248	257	283	248
			η	%	96	95	93	90	83	79
n_{1N}=4000 rpm			T_{2Max}	Nm	28	36	40	44	47	46
				in.lb	248	319	354	389	416	407
			T_{2Servo}	Nm	19	25	27	28	31	27
				in.lb	168	221	239	248	274	239
			η	%	96	95	94	91	84	81
Emergency stop torque			T_{2Not}	Nm	118	126	125	129	134	122
				in.lb	1044	1115	1106	1142	1186	1080
Max. input speed			n_{1Max}	rpm	6000					
Mean no load running torque [a] (With n_1=3000 min^{-1} and 20° C gear temperature)			T_{012}	Nm	0,8	0,7	0,5	0,5	0,4	0,4
				in.lb	7,1	6,2	4,4	4,4	3,5	3,5
Max. torsional backlash			j_t	arcmin	≤8					
Torsional rigidity			C_{t21}	Nm/arcmin	4,5					
				in.lb/arcmin	40					
Max. axial force [b]			F_{2AMax}	N	3000					
				lb_f	675					
Max. radial force [b]			F_{2RMax}	N	2400					
				lb_f	540					
Max. tilting moment			M_{2KMax}	Nm	205					
				in.lb	1814					
Service life (For calculation see "Information")			L_h	h	> 20000					
Weight incl. standardadapter plate			m	kg	4,0					
				lb_m	8,8					
Operating noise (with n_1 = 3000 rpm no load)			L_{PA}	dB(A)	< 54					
Max. permitted housing temperature				°C	+90					
				F	194					
Ambient temperature				°C	-15 to +40					
				F	5 to 104					
Lubrication					Synthetic transmission oil					
Paint					None					
Direction of rotation					See drawing					
Protection class					IP 65					
Moment of inertia (relates to the drive)	C	14	J_1	kgcm²	0.52	0.38	0.34	0.32	0.32	0.31
Moments of inertia for motor shaft diameter 14 and 19 mm				10^{-3} in.lb.s²	0.46	0.34	0.30	0.28	0.28	0.27
	E	19	J_1	kgcm²	0.54	0.40	0.37	0.35	0.34	0.33
				10^{-3} in.lb.s²	0.48	0.35	0.33	0.31	0.30	0.29

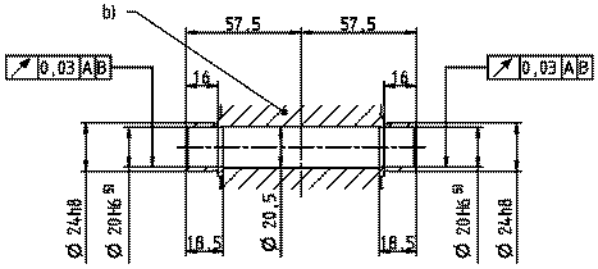
[a] Idling torques decrease during operation
[b] Refers to center of the output shaft or flange











a) Hollow shaft, keywayed
b) Hollow shaft, smooth
c) End disc for screw M6 (on request)
d) End disc as forcing washer for screw M8 (on request)
e) Locking ring – DIN 472

Non-tolerated dimensions ± 1 mm
1) Check motor shaft fit.
2) Min./Max. permissible motor shaft length.
   Longer motor shafts are adaptable, please contact us.
3) The dimensions depend on the motor.
4) Smaller motor shaft diameter is compensated by a bushing with a minimum thickness of 1 mm. Motor shaft diameters up to 19 mm available – please contact WITTENSTEIN alpha.
5) Tolerance h6 for mounted shaft.

CAD data is available under www.wittenstein-alpha.com

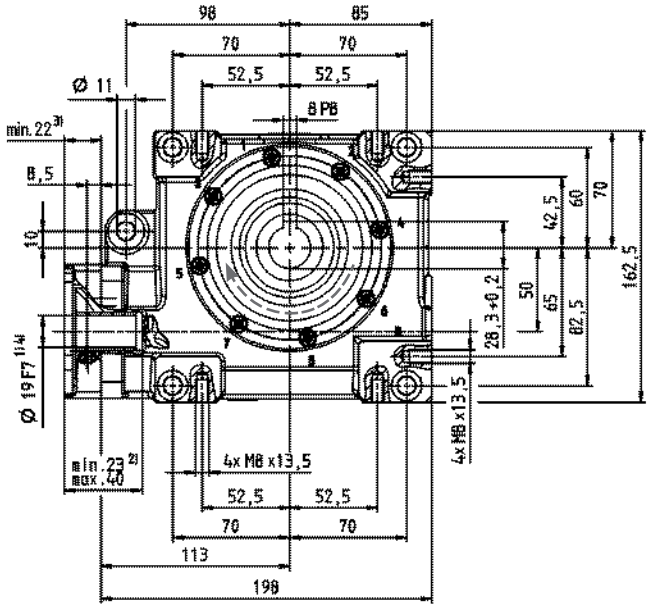
Motor mounting according to operating manual

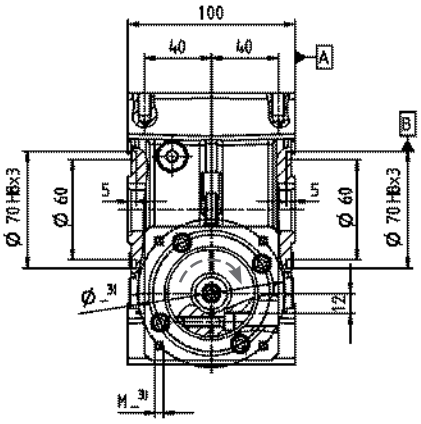
VDH economy 050 1-stage

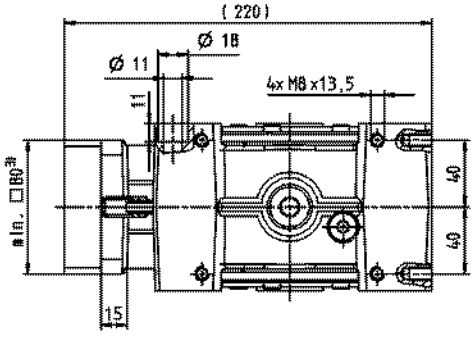
			1-stage					
Ratio	***i***		**4**	**7**	**10**	**16**	**28**	**40**
n_{1N}=500 rpm	T_{2Max}	Nm	–	102	111	118	128	116
		in.lb	–	903	982	1044	1133	1027
	T_{2Servo}	Nm	–	62	64	70	78	64
		in.lb	–	549	566	620	690	566
	η	%	–	89	86	82	72	64
n_{1N}=1000 rpm	T_{2Max}	Nm	–	103	108	114	124	112
		in.lb	–	912	956	1009	1097	991
	T_{2Servo}	Nm	–	66	70	76	84	70
		in.lb	–	584	620	673	743	620
	η	%	–	91	89	85	77	69
n_{1N}=2000 rpm	T_{2Max}	Nm	–	92	97	105	117	103
		in.lb	–	814	858	929	1035	912
	T_{2Servo}	Nm	–	68	71	77	86	72
		in.lb	–	602	628	681	761	637
	η	%	–	93	91	88	75	75
n_{1N}=3000 rpm	T_{2Max}	Nm	–	82	88	97	105	95
		in.lb	–	726	779	858	929	841
	T_{2Servo}	Nm	–	67	70	76	84	70
		in.lb	–	593	620	673	743	620
	η	%	–	94	93	90	83	78
n_{1N}=4000 rpm	T_{2Max}	Nm	–	77	81	90	99	88
		in.lb	–	681	717	797	876	779
	T_{2Servo}	Nm	–	64	69	75	83	69
		in.lb	–	566	611	664	735	611
	η	%	–	95	93	91	85	80
Emergency stop torque	T_{2Not}	Nm	–	242	242	250	262	236
		in.lb	–	2142	2142	2213	2319	2089
Max. input speed	n_{1Max}	rpm	6000					
Mean no load running torque [a] (With n_1=3000 min^{-1} and 20° C gear temperature)	T_{012}	Nm	–	1,2	1,2	1,1	1	0,9
		in.lb	–	10,6	10,6	9,7	8,9	8,0
Max. torsional backlash	j_t	arcmin	≤8					
Torsional rigidity	C_{t21}	Nm/arcmin	8					
		in.lb/arcmin	71					
Max. axial force [b]	F_{2AMax}	N	5000					
		lb_f	1125					
Max. radial force [b]	F_{2RMax}	N	3800					
		lb_f	855					
Max. tilting moment	M_{2KMax}	Nm	409					
		in.lb	3620					
Service life (For calculation see "Information")	L_h	h	> 20000					
Weight incl. standardadapter plate	m	kg	7,4					
		lb_m	16,4					
Operating noise (with n_1 = 3000 rpm no load)	L_{PA}	dB(A)	≤ 62					
Max. permitted housing temperature		°C	+90					
		F	194					
Ambient temperature		°C	-15 to +40					
		F	5 to 104					
Lubrication			Synthetic transmission oil					
Paint			None					
Direction of rotation			See drawing					
Protection class			IP 65					
Moment of inertia (relates to the drive)	J_1	kgcm²	–	2,02	1,93	1,84	1,81	1,86
		10^{-3} in.lb.s²	–	1,79	1,71	1,63	1,60	1,64

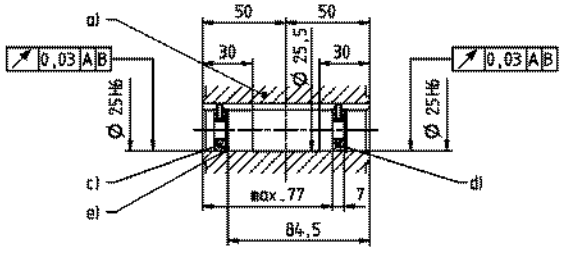
[a] Idling torques decrease during operation

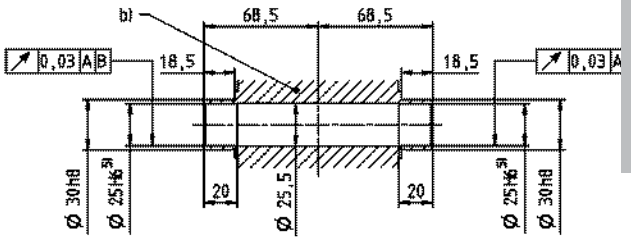
[b] Refers to center of the output shaft or flange











a) Hollow shaft, keywayed
b) Hollow shaft, smooth
c) End disc for screw M10 (on request)
d) End disc as forcing washer for screw M12 (on request)
e) Locking ring – DIN 472 (on request)

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.

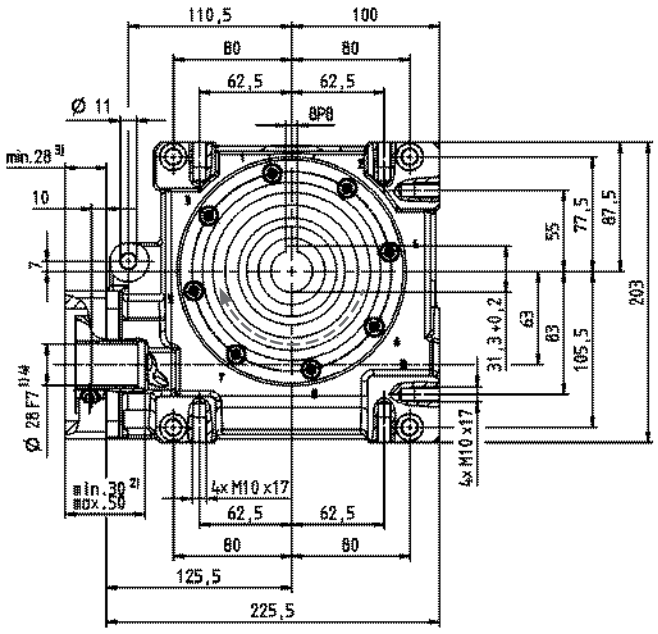
CAD data is available under www.wittenstein-alpha.com

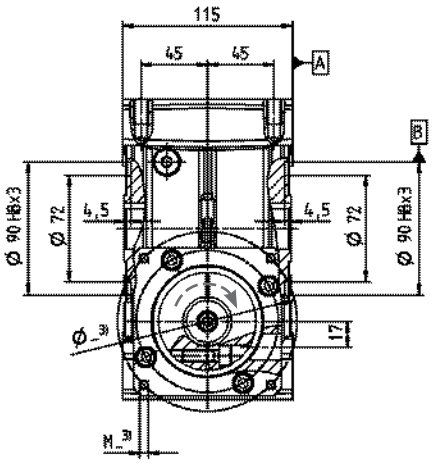
Motor mounting according to operating manual

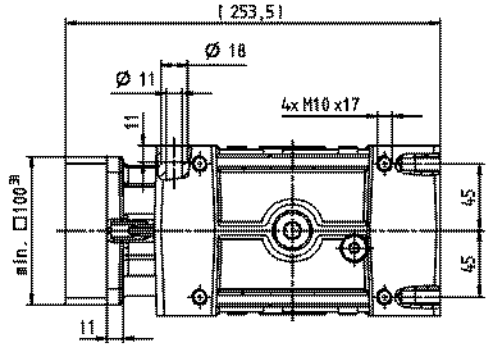
			1-stage					
Ratio	***i***		**4**	**7**	**10**	**16**	**28**	**40**
n_{1N}=500 rpm	T_{2Max}	Nm	–	264	270	279	301	282
		in.lb	–	2336	2390	2469	2664	2496
	T_{2Servo}	Nm	–	183	195	198	215	201
		in.lb	–	1620	1726	1752	1903	1779
	η	%	–	91	88	83	74	68
n_{1N}=1000 rpm	T_{2Max}	Nm	–	256	265	276	299	280
		in.lb	–	2266	2345	2443	2646	2478
	T_{2Servo}	Nm	–	197	208	212	230	215
		in.lb	–	1743	1841	1876	2036	1903
	η	%	–	93	91	86	78	73
n_{1N}=2000 rpm	T_{2Max}	Nm	–	234	252	263	277	269
		in.lb	–	2071	2230	2328	2451	2381
	T_{2Servo}	Nm	–	188	203	212	224	217
		in.lb	–	1664	1797	1876	1982	1920
	η	%	–	94	93	89	83	78
n_{1N}=3000 rpm	T_{2Max}	Nm	–	183	198	209	230	224
		in.lb	–	1620	1752	1850	2036	1982
	T_{2Servo}	Nm	–	145	163	181	182	177
		in.lb	–	1283	1443	1602	1611	1566
	η	%	–	95	94	91	85	81
n_{1N}=4000 rpm	T_{2Max}	Nm	–	146	162	175	196	193
		in.lb	–	1292	1434	1549	1735	1708
	T_{2Servo}	Nm	–	114	134	152	152	149
		in.lb	–	1009	1186	1345	1345	1319
	η	%	–	96	94	92	86	83
Emergency stop torque	T_{2Not}	Nm	–	484	491	494	518	447
		in.lb	–	4283	4345	4372	4584	3956
Max. input speed	n_{1Max}	rpm	4500					
Mean no load running torque [a] (With n_1=3000 min^{-1} and 20° C gear temperature)	T_{012}	Nm	–	1,9	1,8	1,7	1,6	1,4
		in.lb	–	16,8	15,9	15,0	14,2	12,4
Max. torsional backlash	j_t	arcmin	≤8					
Torsional rigidity	C_{t21}	Nm/arcmin	28					
		in.lb/arcmin	248					
Max. axial force [b]	F_{2AMax}	N	8250					
		lb_f	1856					
Max. radial force [b]	F_{2RMax}	N	6000					
		lb_f	1350					
Max. tilting moment	M_{2KMax}	Nm	843					
		in.lb	7461					
Service life (For calculation see "Information")	L_h	h	> 20000					
Weight incl. standardadapter plate	*m*	kg	12					
		lb_m	26,5					
Operating noise (with n_1 = 3000 rpm no load)	L_{PA}	dB(A)	≤ 64					
Max. permitted housing temperature		°C	+90					
		F	194					
Ambient temperature		°C	-15 to +40					
		F	5 to 104					
Lubrication			Synthetic transmission oil					
Paint			None					
Direction of rotation			See drawing					
Protection class			IP 65					
Moment of inertia (relates to the drive)	J_1	kgcm²	–	5,77	5,53	5,44	5,40	5,35
		10^{-3} in.lb.s²	–	5,11	4,89	4,81	4,78	4,74

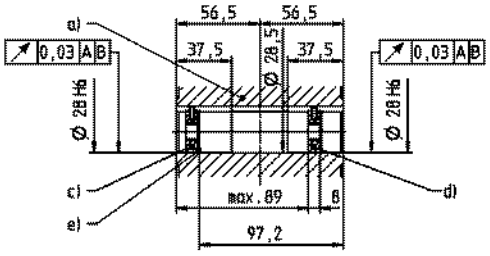
[a] Idling torques decrease during operation

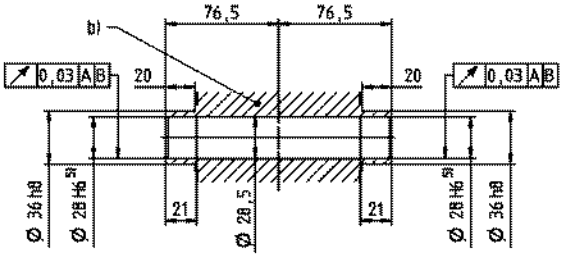
[b] Refers to center of the output shaft or flange











a) Hollow shaft, keywayed
b) Hollow shaft, smooth
c) End disc for screw M10 (on request)
d) End disc as forcing washer for screw M12 (on request)
e) Locking ring – DIN 472 (on request)

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.

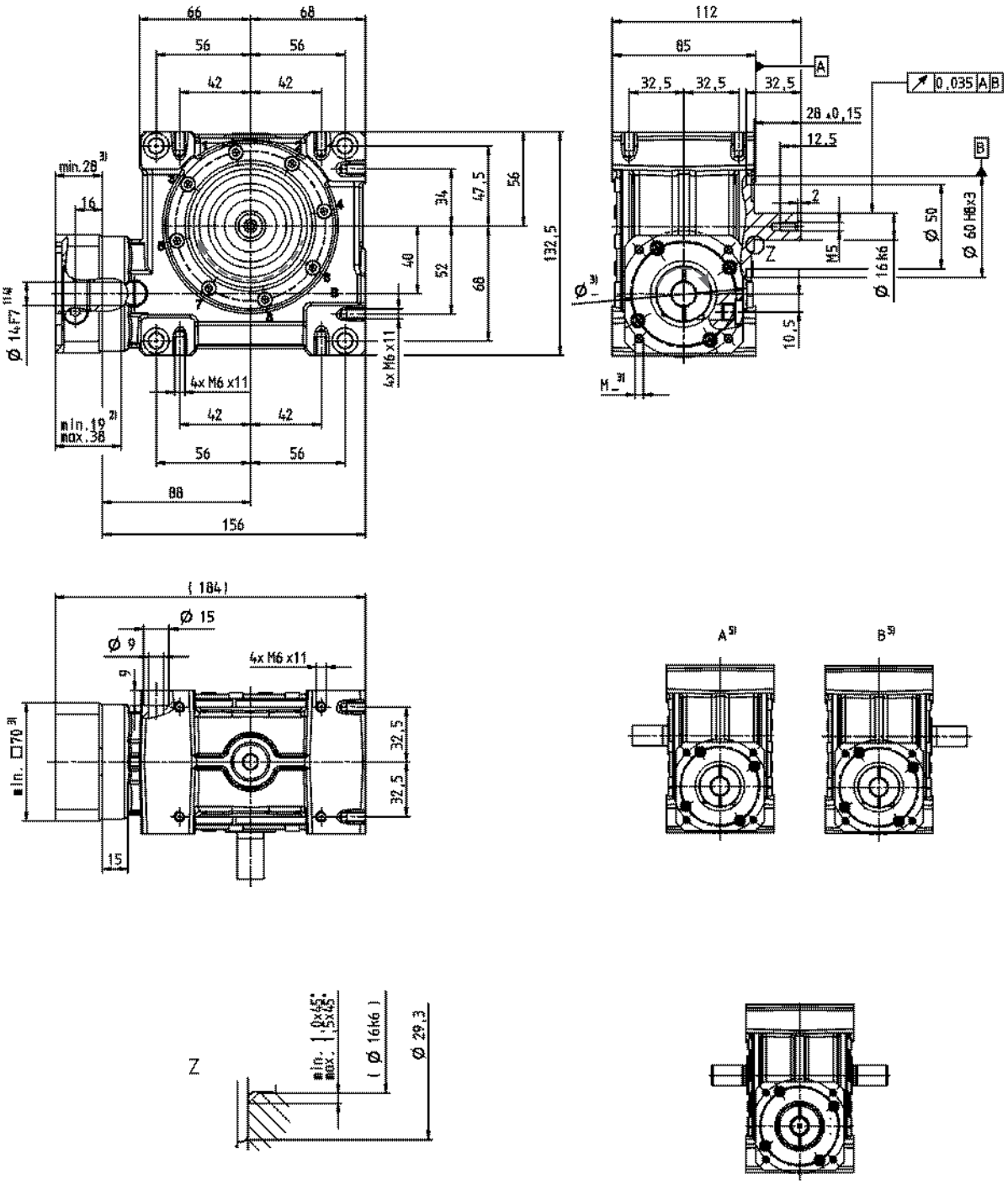
CAD data is available under www.wittenstein-alpha.com

Motor mounting according to operating manual

VDS economy 040 1-stage

					1-stage					
Ratio			***i***		**4**	**7**	**10**	**16**	**28**	**40**
n_{1N}=500 rpm			T_{2Max}	Nm	45	60	68	72	75	70
				in.lb	398	531	602	637	664	620
			T_{2Servo}	Nm	19	26	28	29	32	28
				in.lb	168	230	248	257	283	248
			η	%	93	90	88	82	73	67
n_{1N}=1000 rpm			T_{2Max}	Nm	45	60	68	72	75	70
				in.lb	398	531	602	637	664	620
			T_{2Servo}	Nm	19	26	28	29	32	28
				in.lb	168	230	248	257	283	248
			η	%	94	92	90	86	77	73
n_{1N}=2000 rpm			T_{2Max}	Nm	35	50	54	59	63	60
				in.lb	310	443	478	522	558	531
			T_{2Servo}	Nm	19	26	28	29	33	29
				in.lb	168	230	248	257	292	257
			η	%	96	94	92	88	81	77
n_{1N}=3000 rpm			T_{2Max}	Nm	30	42	46	51	53	52
				in.lb	266	372	407	451	469	460
			T_{2Servo}	Nm	19	26	28	29	32	28
				in.lb	168	230	248	257	283	248
			η	%	96	95	93	90	83	79
n_{1N}=4000 rpm			T_{2Max}	Nm	28	36	40	44	47	46
				in.lb	248	319	354	389	416	407
			T_{2Servo}	Nm	19	25	27	28	31	27
				in.lb	168	221	239	248	274	239
			η	%	96	95	94	91	84	81
Emergency stop torque			T_{2Not}	Nm	118	126	125	129	134	122
				in.lb	1044	1115	1106	1142	1186	1080
Max. input speed			n_{1Max}	rpm	6000					
Mean no load running torque [a] (With n_1=3000 min^{-1} and 20° C gear temperature)			T_{012}	Nm	0,8	0,7	0,5	0,5	0,4	0,4
				in.lb	7,1	6,2	4,4	4,4	3,5	3,5
Max. torsional backlash			j_t	arcmin	≤8					
Torsional rigidity			C_{t21}	Nm/arcmin	4,5					
				in.lb/arcmin	40					
Max. axial force [b]			F_{2AMax}	N	3000					
				lb_f	675					
Max. radial force [b]			F_{2RMax}	N	2400					
				lb_f	540					
Max. tilting moment			M_{2KMax}	Nm	205					
				in.lb	1814					
Service life (For calculation see "Information")			L_h	h	> 20000					
Weight incl. standardadapter plate			*m*	kg	4,1					
				lb_m	9,1					
Operating noise (with n_1 = 3000 rpm no load)			L_{PA}	dB(A)	≤ 54					
Max. permitted housing temperature				°C	+90					
				F	194					
Ambient temperature				°C	-15 to +40					
				F	5 to 104					
Lubrication					Synthetic transmission oil					
Paint					None					
Direction of rotation					See drawing					
Protection class					IP 65					
Moment of inertia (relates to the drive) Moments of inertia for motor shaft diameter 14 and 19 mm	C	14	J_1	kgcm²	0.52	0.38	0.34	0.32	0.32	0.31
				10^{-3} in.lb.s²	0.46	0.34	0.30	0.28	0.28	0.27
	E	19	J_1	kgcm²	0.54	0.40	0.37	0.35	0.34	0.33
				10^{-3} in.lb.s²	0.48	0.35	0.33	0.31	0.30	0.29

[a] Idling torques decrease during operation
[b] Refers to center of the output shaft or flange

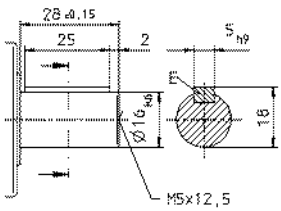


Optional dual-shaft output. Drawings available upon request.

Alternatives: Output shaft variants

Keywayed output shaft in mm

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



Non-tolerated dimensions ± 1 mm

1) Check motor shaft fit.
2) Min./Max. permissible motor shaft length.
   Longer motor shafts are adaptable, please contact us.
3) The dimensions depend on the motor.
4) Smaller motor shaft diameter is compensated by a bushing with a minimum thickness of 1 mm. Motor shaft diameters up to 19 mm available – please contact WITTENSTEIN alpha
5) Output side

CAD data is available under www.wittenstein-alpha.com

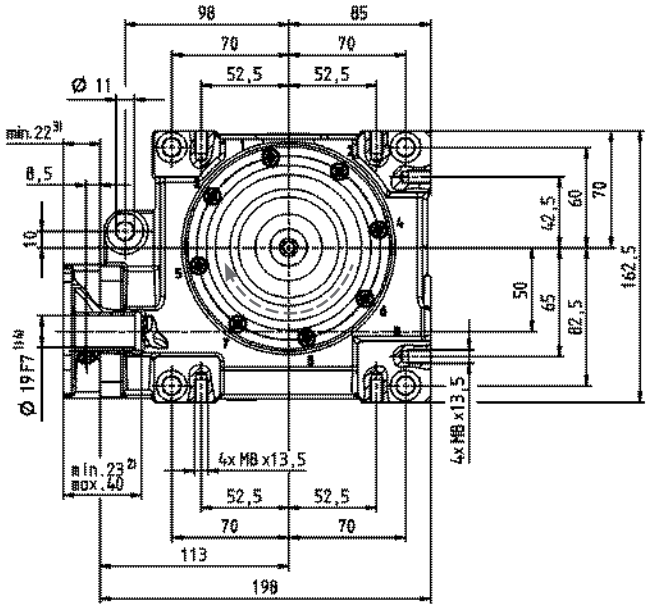
Motor mounting according to operating manual

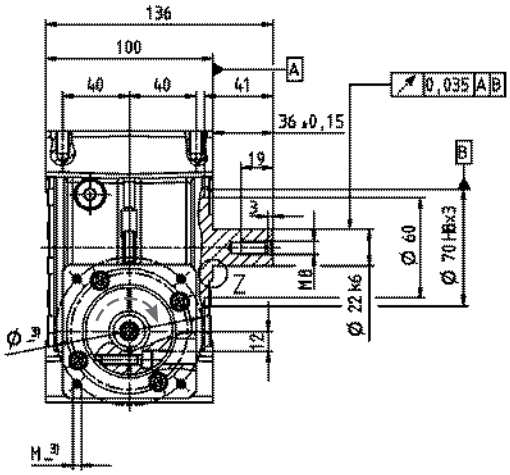
VDS economy 050 1-stage

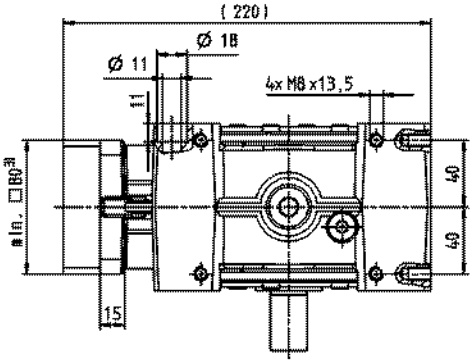
			1-stage					
Ratio	***i***		**4**	**7**	**10**	**16**	**28**	**40**
n_{1N}=500 rpm	T_{2Max}	Nm	–	102	111	118	128	116
		in.lb	–	903	982	1044	1133	1027
	T_{2Servo}	Nm	–	62	64	70	78	64
		in.lb	–	549	566	620	690	566
	η	%	–	89	86	82	72	64
n_{1N}=1000 rpm	T_{2Max}	Nm	–	103	108	114	124	112
		in.lb	–	912	956	1009	1097	991
	T_{2Servo}	Nm	–	66	70	76	84	70
		in.lb	–	584	620	673	743	620
	η	%	–	91	89	85	77	69
n_{1N}=2000 rpm	T_{2Max}	Nm	–	92	97	105	117	103
		in.lb	–	814	858	929	1035	912
	T_{2Servo}	Nm	–	68	71	77	86	72
		in.lb	–	602	628	681	761	637
	η	%	–	93	91	88	75	75
n_{1N}=3000 rpm	T_{2Max}	Nm	–	82	88	97	105	95
		in.lb	–	726	779	858	929	841
	T_{2Servo}	Nm	–	67	70	76	84	70
		in.lb	–	593	620	673	743	620
	η	%	–	94	93	90	83	78
n_{1N}=4000 rpm	T_{2Max}	Nm	–	77	81	90	99	88
		in.lb	–	681	717	797	876	779
	T_{2Servo}	Nm	–	64	69	75	83	69
		in.lb	–	566	611	664	735	611
	η	%	–	95	93	91	85	80
Emergency stop torque	T_{2Not}	Nm	–	242	242	250	262	236
		in.lb	–	2142	2142	2213	2319	2089
Max. input speed	n_{1Max}	rpm	6000					
Mean no load running torque [a] (With n_1=3000 min^{-1} and 20° C gear temperature)	T_{012}	Nm	–	1,2	1,2	1,1	1	0,9
		in.lb	–	10,6	10,6	9,7	8,9	8,0
Max. torsional backlash	j_t	arcmin	≤8					
Torsional rigidity	C_{t21}	Nm/arcmin	8					
		in.lb/arcmin	71					
Max. axial force [b]	F_{2AMax}	N	5000					
		lb_f	1125					
Max. radial force [b]	F_{2RMax}	N	3800					
		lb_f	855					
Max. tilting moment	M_{2KMax}	Nm	409					
		in.lb	3620					
Service life (For calculation see "Information")	L_h	h	> 20000					
Weight incl. standardadapter plate	*m*	kg	7,7					
		lb_m	17,0					
Operating noise (with n_1 = 3000 rpm no load)	L_{PA}	dB(A)	≤ 62					
Max. permitted housing temperature		°C	+90					
		F	194					
Ambient temperature		°C	-15 to +40					
		F	5 to 104					
Lubrication			Synthetic transmission oil					
Paint			None					
Direction of rotation			See drawing					
Protection class			IP 65					
Moment of inertia (relates to the drive)	J_1	kgcm²	–	2,01	1,93	1,84	1,81	1,86
		10^{-3} in.lb.s²	–	1,78	1,71	1,63	1,60	1,64

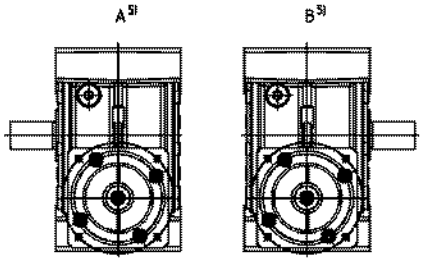
[a] Idling torques decrease during operation

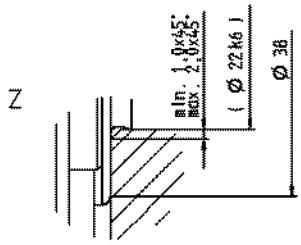
[b] Refers to center of the output shaft or flange

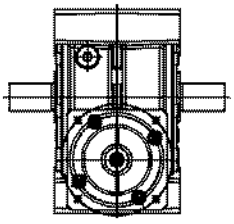










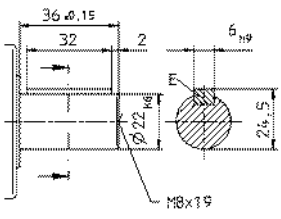


Optional dual-shaft output. Drawings available upon request.

Alternatives: Output shaft variants

Keywayed output shaft in mm

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



Non-tolerated dimensions ± 1 mm

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

CAD data is available under www.wittenstein-alpha.com

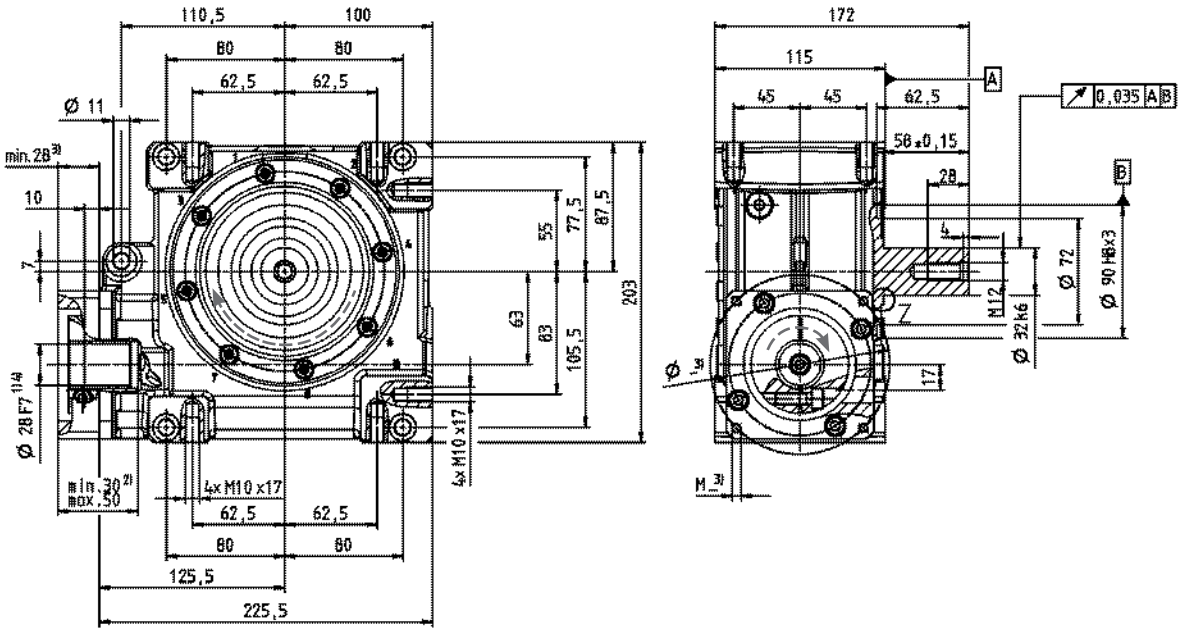
Motor mounting according to operating manual

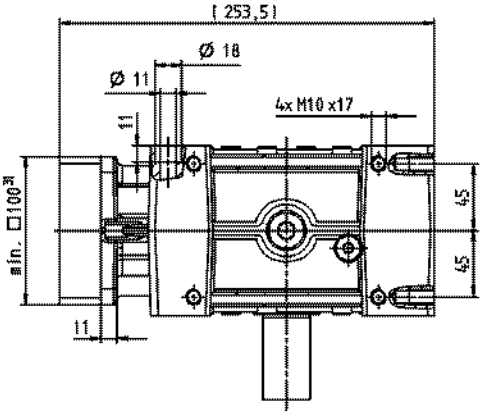
VDS economy 063 1-stage

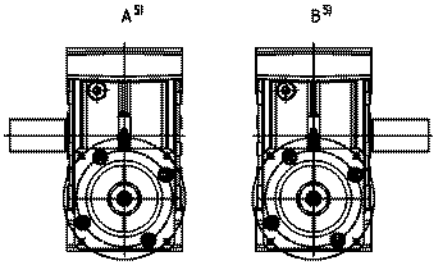
			1-stage					
Ratio	***i***		**4**	**7**	**10**	**16**	**28**	**40**
n_{1N}=500 rpm	T_{2Max}	Nm	–	264	270	279	301	282
		in.lb	–	2336	2390	2469	2664	2496
	T_{2Servo}	Nm	–	183	195	198	215	201
		in.lb	–	1620	1726	1752	1903	1779
	η	%	–	91	88	83	74	68
n_{1N}=1000 rpm	T_{2Max}	Nm	–	256	265	276	299	280
		in.lb	–	2266	2345	2443	2646	2478
	T_{2Servo}	Nm	–	197	208	212	230	215
		in.lb	–	1743	1841	1876	2036	1903
	η	%	–	93	91	86	78	73
n_{1N}=2000 rpm	T_{2Max}	Nm	–	234	252	263	277	269
		in.lb	–	2071	2230	2328	2451	2381
	T_{2Servo}	Nm	–	188	203	212	224	217
		in.lb	–	1664	1797	1876	1982	1920
	η	%	–	94	93	89	83	78
n_{1N}=3000 rpm	T_{2Max}	Nm	–	183	198	209	230	224
		in.lb	–	1620	1752	1850	2036	1982
	T_{2Servo}	Nm	–	145	163	181	182	177
		in.lb	–	1283	1443	1602	1611	1566
	η	%	–	95	94	91	85	81
n_{1N}=4000 rpm	T_{2Max}	Nm	–	146	162	175	196	193
		in.lb	–	1292	1434	1549	1735	1708
	T_{2Servo}	Nm	–	114	134	152	152	149
		in.lb	–	1009	1186	1345	1345	1319
	η	%	–	96	94	92	86	83
Emergency stop torque	T_{2Not}	Nm	–	484	491	494	518	447
		in.lb	–	4283	4345	4372	4584	3956
Max. input speed	n_{1Max}	rpm	4500					
Mean no load running torque [a] (With n_1=3000 min^{-1} and 20° C gear temperature)	T_{012}	Nm	–	1,9	1,8	1,7	1,6	1,4
		in.lb	–	16,8	15,9	15,0	14,2	12,4
Max. torsional backlash	j_t	arcmin	≤8					
Torsional rigidity	C_{t21}	Nm/arcmin	28					
		in.lb/arcmin	248					
Max. axial force [b]	F_{2AMax}	N	8250					
		lb_f	1856					
Max. radial force [b]	F_{2RMax}	N	6000					
		lb_f	1350					
Max. tilting moment	M_{2KMax}	Nm	843					
		in.lb	7461					
Service life (For calculation see "Information")	L_h	h	> 20000					
Weight incl. standardadapter plate	*m*	kg	12,5					
		lb_m	27,6					
Operating noise (with n_1 = 3000 rpm no load)	L_{PA}	dB(A)	≤ 64					
Max. permitted housing temperature		°C	+90					
		F	194					
Ambient temperature		°C	-15 to +40					
		F	5 to 104					
Lubrication			Synthetic transmission oil					
Paint			None					
Direction of rotation			See drawing					
Protection class			IP 65					
Moment of inertia (relates to the drive)	J_1	kgcm²	–	5,78	5,53	5,44	5,40	5,35
		10^{-3} in.lb.s²	–	5,12	4,90	4,82	4,78	4,74

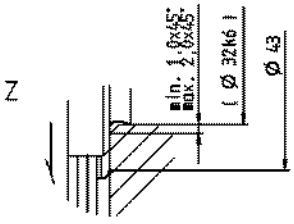
[a] Idling torques decrease during operation

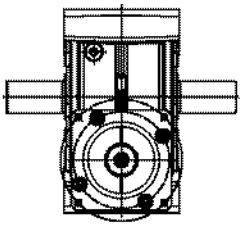
[b] Refers to center of the output shaft or flange









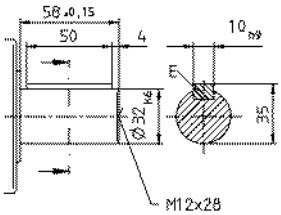


Optional dual-shaft output. Drawings available upon request.

Alternatives: Output shaft variants

Keywayed output shaft in mm

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



Non-tolerated dimensions ± 1 mm

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

CAD data is available under www.wittenstein-alpha.com

Motor mounting according to operating manual

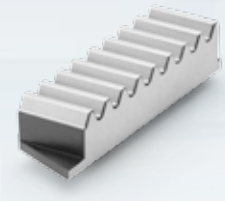
System solutions

alpha rack & pinion system
Precise rack and pinion drives tailored to your applications

We provide you with an optimum system solution comprising a gearhead, rack and pinion precisely tailored to your requirements. A selected range of accessories for lubrication and mounting complete the linear system.

www.rack-pinion.com

Lubrication



Assembly jig

Your benefits:

Dynamic
- Maximum movement speed and acceleration with low moments of inertia
- Excellent control characteristics due to constant linear rigidity along the entire movement path

Precise
- Drive solutions with unique true running accuracy
- Maximum positioning accuracy due to precision alignment of components

Efficient
- Effortless commissioning
- Minimal mounting space and high power density
- Huge savings potential

alpha IQ
Low backlash planetary gearboxes with integrated sensors

Achieving compatibility.
Utilizing intelligence.
Increasing efficiency.

WITTENSTEIN alpha gearhead with integrated sensors – helping you better understand your processes.

torqXis sensors
Modular intelligent sensor solution for measuring mechanical parameters in the drive train.

A window to the process:
Innovative systems are the result of in-dpeth process analysis – the decisive factor for understanding, monitoring and control of drive components.

Our services

- Customer-specific sensor solutions
- Empirical drive design
- On-site service
- Rental systems
- Measurement service

Your benefits:

- Energy-efficient drive control
- Dimensioning of drives
- Process-integrated monitoring of relevant process parameters
- Effective design optimization
- Effortless integration in the drive train
- Robust measurement tool (IP65)

alpha rack & pinion system

WITTENSTEIN alpha rack and pinion systems – the perfect symbiosis of state-of-the-art technology and many years of experience.
Our specialist knowledge extends from the coupling of gearhead, motor, pinion and rack to complete system solutions.

30 years of experience in the fields of gearhead construction, toothing technology and the design of complete drive systems go into our rack and pinion systems.

For more detailed information, please visit: **www.rack-pinion.com**

The alternative – not only for long distances

Rack and pinion combinations not only excel in applications involving long, precise movement paths. The alpha technology achieves an excellent degree of precision using an electronic tensioning system. The high-precision manufacture of individual components is an essential aspect here because manufacturers and users must be able to rely on the installed drives to achieve the level of accuracy required.

We offer the highest levels of precision, dynamics and rigidity as well as an extended service life that more than satisfy the demanding requirements of machine and system manufacturers. The result of our efforts is maximum performance across the board. WITTENSTEIN alpha has succeeded in opening up new areas of application for the old established system of gearhead, rack and pinion, while also setting new standards in terms of moving forces, power density and rigidity.

The alpha rack & pinion system in direct comparison with other linear systems

Worse Better

Features	Ball screw	Linear motor	alpha linear system
Movement speed			
Moving force			
Acceleration			
Surface finish			
Noise level			
Energy requirement			
Safety in the event of a power failure			
Service life			
Sensitivity in the event of a crash			
Service friendliness			
Investment costs			
Repair costs			
Operating efficiency (under extreme load)			
Operating efficiency (low load			

The comparison is based on typical processes involved in machining large workpieces and machines with long movement paths.

The alpha rack & pinion system compared

High Performance Linear System

Planetary gearhead RP+
High-performance pinion
High-performance rack

- Maximum degrees of freedom in design
- Cost reductions through downsizing
- Maximum power density
- Maximum precision in master/slave configuration
- Application e.g. for HSC milling machines or highly dynamic and precise handling applications

150% greater moving force*
100% higher power density*
50% higher system reliability*
50% less mounting effort*
15% more accurate positioning*

* Compared to industry standard

You can download the system catalog from
www.rack-pinion.com

Precision System

Planetary gearhead TP+
Premium Class+/
Premium Class RTP pinion
Premium Class rack

- Maximum positioning accuracy with single drive
- Cost reductions through omission of direct measuring systems possible
- Unsurpassed precision in master/slave configuration
- Applications e.g. for laser machines or milling machines

Performance Linear System

Planetary gearhead alpheno®
Premium Class+ pinion
Performance Class rack

- Maximum power output
- Added efficiency
- Compliance with the increased statutory requirements with regard to machine safety
- Maximum precision in master/slave configuration
- Application e.g. for updating existing wood, plastic/composite machining center designs or in automation

alpha
rack and pinion system

In addition to the standard planetary gearheads, the relevant servo right-angle gearheads are of course also available for our rack and pinion systems. The range is completed by the integrated motor/gearhead units TPM+ and RPM+ from WITTENSTEIN motion control.
Please refer to the further information on servo right-angle gearheads in this catalog. To the actuators under
www.wittenstein-motion-control.de

The system quick selection is available on the next two pages:

Standard System

Planetary gearhead SP+
Standard Class RSP pinion
Value Class rack

- Adapted to linear standard applications in the mid-range area with medium/normal requirements for positioning accuracy
- Application e.g. for wood, plastic/composite machining centers and in automation

Economy System

Planetary gearhead LP+
Planetary gearhead SP+
Value Class pinion
Value Class rack

- Adapted to linear applications in the economy segment with comparatively low requirements for positioning accuracy and moving force
- Applications e.g. for wood processing machines or in automation

Master/slave configuration – electrically clamped drives

The closed-loop control clamped drives enable a machine accuracy* of up to < 5 µm to be achieved. This is regardless of the moving force, movement speed or axis length! Here, maximum precision can only be achieved through the optimal interaction between the individual components. Such accuracy is only possible for a system supplier such as WITTENSTEIN alpha GmbH.

* depending on other parameters

Quick system selection –
the right system for each application

Laser machines
Source: TRUMPF Werkzeugmaschinen GmbH + Co. KG

Machine accuracy [µm]*

Sample applications

- Eroding machines
- Grinding machines
- HSC portal milling machines
- Turning machines
- Machining centers
- Laser machines
- Boring machines
- Punching machines
- Water jet cutting machines
- Wood/plastic machining centers
- Pipe bending machines
- Gas cutting machines
- Automation engineering
- Foam cutting machines

Direct measuring system

Indirect measuring system

1
5
20
50
100
200
> 300

Master/slave with Precision/Performance Linear System
Contact us!

Precision System
Page 370 – 373

Performance Linear System
Page 374/375

Standard System
Page 376/377

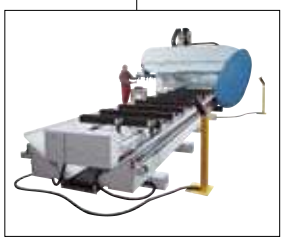
Economy System
Page 378/379

20.000

40.000

Automation engineering
Source: MOTOMAN Robotics Europe AB

Gas cutting machines
Source: LIND GmbH Industrial Equipment



CNC wood/plastic processing machines
Source: MAKA – Max Mayer Maschinenbau GmbH © MAKA

Profile machining centers
Source: Handtmann A-Punkt Automation GmbH

HSC portal milling machines
Source: F. Zimmermann GmbH

Master/slave with High Performance Linear System
Contact us!

High Performance Linear System
Page 375

alpha rack & pinion systems

60.000 80.000 100.000 120.000 240.000

Moving force [N]

Pipe bending machines
Source: Wafios AG

Press transfer
Source: Strothmann Machines & Handling GmbH

* depending on other parameters

Pinion versions for the system

Premium Class⁺ pinion

In conjunction with Precision and Performance Linear System

- High-precision and optimally designed toothing geometries for best possible power transmission, superior running and precision in application
- Innovative pinion/gearhead connection ensures:
  - → Highest linear rigidity through the direct connection of pinions with small partial circle diameter
  - → Maximum flexibility in pinion selection
  - → Optimally dimensioned and rigid pinions
  - → Compact drive design
- Factory assembled with marked high point
- In addition to our standard pinions for rack and pinion applications, we offer you further options for special applications, e.g. slew ring drives. Contact us!

Premium Class RTP pinion

In conjunction with Precision system

- High-precision and optimally designed toothing geometries for best possible power transmission, superior running and precision in application
- Adapted to the standard gearhead series with the proven TP⁺ output flange
- High movement speeds with low input speeds thanks to large pitch diameter
- Compact pinion/gearhead connection
- Factory assembled with marked high point

Standard Class RSP pinion

In conjunction with Standard system

- Precise toothing with optimally designed toothing geometry
- Positive involute connection between pinion and gearhead
- Compact design
- Factory assembled with marked high point

Factory assembled

All of our pinions are supplied factory assembled. For you, this results in the **following benefits:**

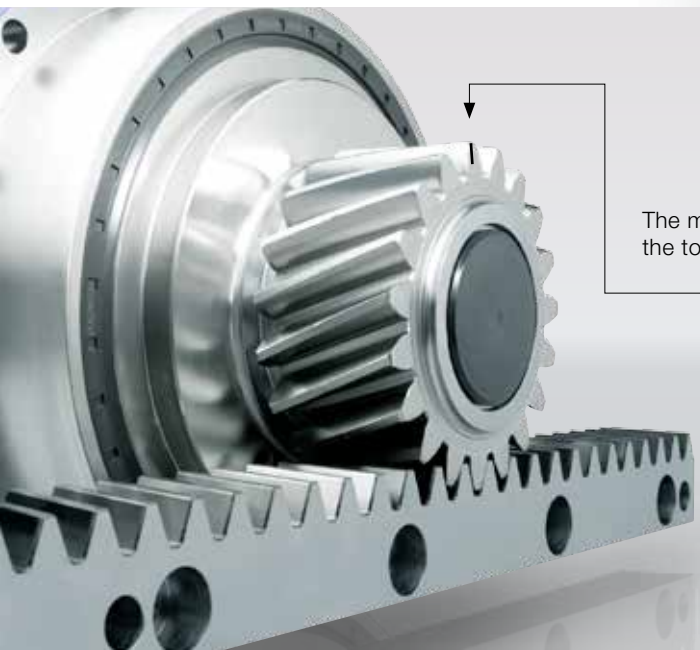
- Tested quality through 100% final inspection
- Highest quality and reliability, perfect setting of the tooth backlash between pinion and rack through aligned pinion and marked high point*
- Prevention of potential sources of error during assembly at your plant

*not for Value Class pinions

Value Class pinion

In conjunction with Economy system

- Precise toothing with optimally designed toothing geometry
- Low backlash shrink-fit/bonded connection with key as overload protection
- Factory-made shrink-fit/bonded connection ensures perfect seating of the pinion throughout the entire service life



The marked high point enables perfect setting of the tooth backlash between pinion and rack.

Rack versions for the system

Premium Class rack

In conjunction with Precision system

Solution for extremely dynamic, precision high-end-applications. For even greater precision: linear and gantry sorting possible. Contact us!

Your benefits:

- Best toothing quality ensures greatest precision, even in single-drive applications
- Up to a machine accuracy of approx. 30 µm, an indirect measuring system is sufficient in single-drive applications in conjunction with assorted racks

Performance Class rack

In conjunction with Performance Linear System

The solution for highly dynamic Mid-Range and precise high-end applications (with electrically clamped drives).

Your benefits:

- Significantly higher strength in the surface layer and in the core structure
- Higher permissible bending loads
- Maximum fatigue strength against vibration loads
- Maximum wear resistance

Where your requirements exceed these significantly, our High Performance Linear System is the right solution for you. Further information is available in the download area at **www.rack-pinion.com**

Value Class rack

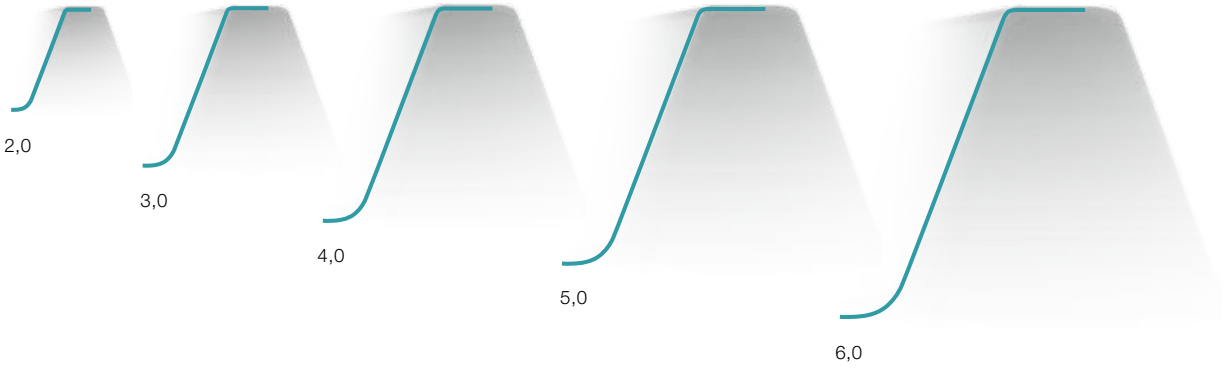
In conjunction with Economy system

The cost-effective solution for mid-range and economy applications with comparatively low requirements for positioning accuracy and moving force. Helical teeth ensure the usual smooth running.

The right rack for all requirements

The correct rack is an essential component in realizing your machine concepts. WITTENSTEIN alpha offers three classes of rack, Premium Class, Value Class and Smart Class, to find the right solution for your application requirements in conjunction with a matched gearhead and pinion.

Meeting your requirements without limits!



Toothing size comparison (DIN 867).

Premium Class rack

Module	p_t	L	z	a	a_1	B	d	d_1 [b)]	D	$f^{+0.5}$	h	h_B	h_D	H	l	l_1	L_1	m
2	6.67	500	75	31.7	436.6	24	7	5.7	11	2	22	8	7	24	62.5	125.0	8.5	1.99
2	6.67	333	50	31.7	269.9	24	7	5.7	11	2	22	8	7	24	62.5	104.2	8.5	1.32
2	6.67	167	25	31.7	103.3	24	7	5.7	11	2	22	8	7	24	62.5	41.7	8.5	0.65
3	10.00	500	50	35.0	430.0	29	10	7.7	15	2	26	9	9	29	62.5	125.0	10.3	2.80
3	10.00	250	25	35.0	180.0	29	10	7.7	15	2	26	9	9	29	62.5	125.0	10.3	1.39
4	13.33	507	38	18.3	460.0	39	12	9.7	18	3	35	12	11	39	62.5	125.0	13.8	5.11
5	16.67	500	30	37.5	425.0	49	14	11.7	20	3	34	12	13	39	62.5	125.0	17.4	6.05
6	20.00	500	25	37.5	425.0	59	18	15.7	26	3	43	16	17	49	62.5	125.0	20.9	9.01

All dimensions in [mm]
Cumulative pitch error F_p= 12 µm for m2 (500 mm) and m3 (250 mm in length); F_p= 15 µm for m > 2
Single pitch error f_p= 3 µm
[b)] Recommended tolerance dimension: $6^{H7}/8^{H7}/10^{H7}/12^{H7}/16^{H7}$
[c)] Hole spacing between two racks on module 4 is 131.67 mm.

p_t = Reference circle pitch
z = Number of teeth
m = Mass in kg

Performance Class rack

Module	p_t	L	z	a	a_1	B	d	d_1 [b)]	D	$f^{+0.5}$	h	h_B	h_D	H	l	l_1	L_1	m
2	6.67	1000	150	31.7	936.6	24	7	5.7	11	2	22	8	7	24	62.5	125.0	8.5	4.01
3	10.00	1000	100	35.0	930.0	29	10	7.7	15	2	26	9	9	29	62.5	125.0	10.3	5.64
4	13.33	1000	75	33.3	933.4	39	10	7.7	15	3	35	12	9	39	62.5	125.0	13.8	10.32
5	16.67	1000	60	37.5	925.0	49	14	11.7	20	3	34	12	13	39	62.5	125.0	17.4	12.23
6	20.00	1000	50	37.5	925.0	59	18	15.7	26	3	43	16	17	49	62.5	125.0	20.9	18.28

All dimensions in [mm]
Cumulative pitch error F_p= 35 µm/1000 mm
Single pitch error f_p= 8 µm; 10 µm at m5 and m6
[b)] Recommended tolerance dimension: $6^{H7}/8^{H7}/10^{H7}/12^{H7}/16^{H7}/20^{H7}$

p_t = Reference circle pitch
z = Number of teeth
m = Mass in kg

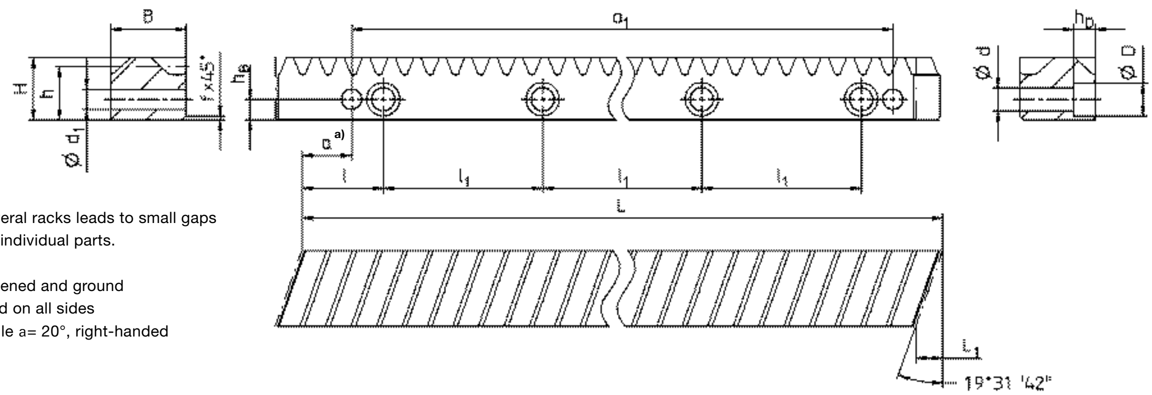
Value Class rack

Module	p_t	L	z	a	a_1	B	d	d_1 [b)]	D	$f^{+0,5}$	h	h_B	h_D	H	l	l_1	L_1	m
2	6.67	1000	150	31.7	936.6	24	7	5.7	11	2	22	8	7	24	62.5	125.0	8.5	4.01
3	10.00	1000	100	35.0	930.0	29	10	7.7	15	2	26	9	9	29	62.5	125.0	10.3	5.64
4	13.33	1000	75	33.3	933.4	39	10	7.7	15	3	35	12	9	39	62.5	125.0	13.8	10.32
5	16.67	1000	60	37.5	925.0	49	14	11.7	20	3	34	12	13	39	62.5	125.0	17.4	12.23
6	20.00	1000	50	37.5	925.0	59	18	15.7	26	3	43	16	17	49	62.5	125.0	20.9	18.28

All dimensions in [mm]
Cumulative pitch error F_p= 35 µm/1000 mm
Single pitch error f_p= 8 µm; 10 µm at m5 and m6
[b)] Recommended tolerance dimension: $6^{H7}/8^{H7}/10^{H7}/12^{H7}/16^{H7}$

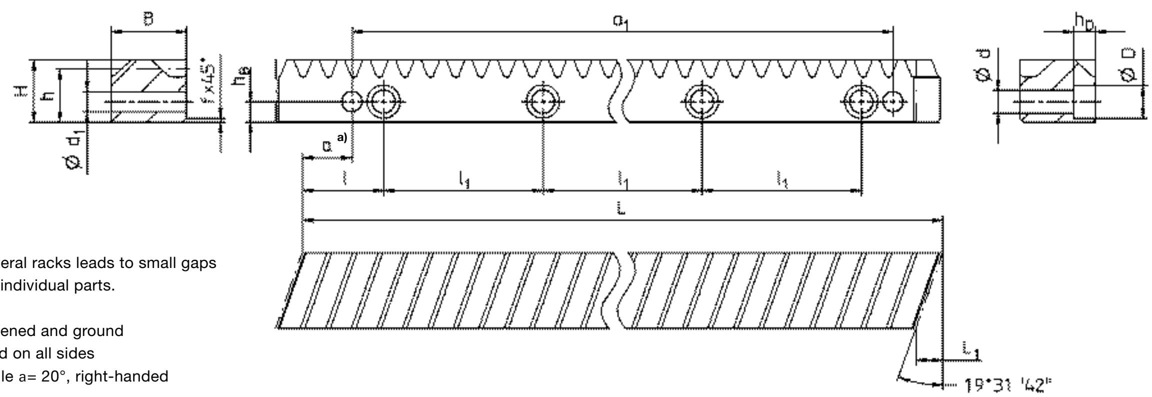
p_t = Reference circle pitch
z = Number of teeth
m = Mass in kg

Please refer to the operating instructions available at **www.wittenstein-alpha.com** for instructions on assembly and design of the machine bed



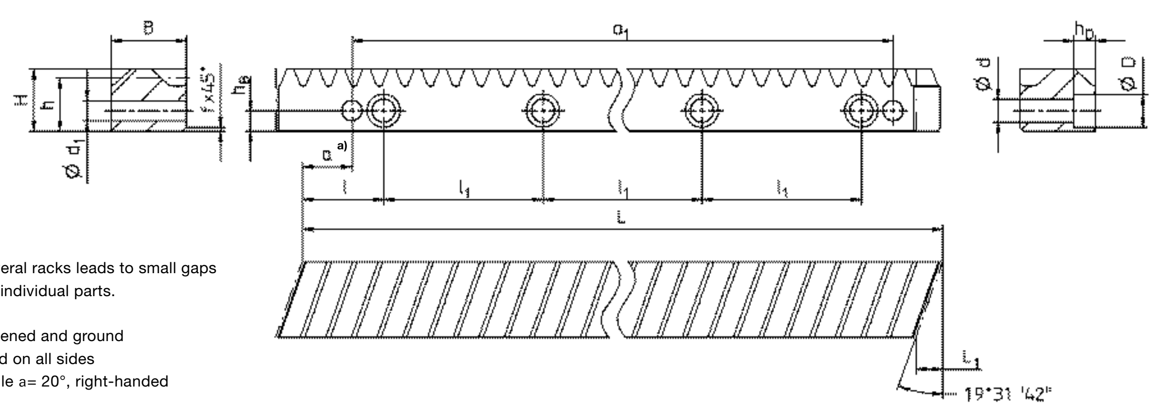
[a] Installing several racks leads to small gaps between the individual parts.

Gearing hardened and ground
Profile ground on all sides
Pressure angle a= 20°, right-handed



[a] Installing several racks leads to small gaps between the individual parts.

Gearing hardened and ground
Profile ground on all sides
Pressure angle a= 20°, right-handed



[a] Installing several racks leads to small gaps between the individual parts.

Gearing hardened and ground
Profile ground on all sides
Pressure angle a= 20°, right-handed

Planetary gearhead TP+ (HIGH TORQUE) / right-angle gearhead TPK+ (HIGH TORQUE) with Premium Class+ pinion and Premium Class rack (all pinions, pressure angle α=20°, inclination angle β=19.5283° left-handed)

Gearhead size [b]	Module	z	A ±0,3 [a]	b	B	d_a	d	x	L12	L13	x2	L15	L16	L17
TP+ / TPK+ 010	2	20	44.021	26	24	48.3	42.441	0.4	71.0	50.5	20.5	8.5	38.5	33.5
TP+ / TPK+ 025	2	20	44.021	26	24	48.3	42.441	0.4	73.5	53.0	24.0	12.0	41.0	33.5
	3	20	59.031	31	29	72.3	63.662	0.4	76.0	52.5	23.5	9.0	38.0	39.0
TP+ / TPK+ 050	3	20	59.031	31	29	72.3	63.662	0.4	89.5	66.0	28.0	13.5	51.5	39.0
	4	20	78.241	41	39	94.8	84.882	0.2	97.0	67.5	29.5	10.0	48.0	50.0
TP+ / TPK+ 110	4	20	78.241	41	39	94.8	84.882	0.2	112.5	83.0	33.0	13.5	63.5	50.0
	5	19	86.399	51	49	115.1	100.798	0.4	120.0	85.0	35.0	10.5	60.5	60.5
TP+ / TPK+ 300	5	19	86.399	51	49	115.1	100.798	0.4	139.0	104.0	38.0	13.5	79.5	60.5
	6	19	105.879	61	59	138.0	120.958	0.4	142.5	106.0	40.0	10.5	76.5	67.0
TP+ / TPK+ 500	6	19	105.879	61	59	138.0	120.958	0.4	155.0	118.5	43.5	14.0	89.0	67.0

All dimensions in [mm]

[a] Align mechanism recommended (alignment dimension ± 0.3 mm)

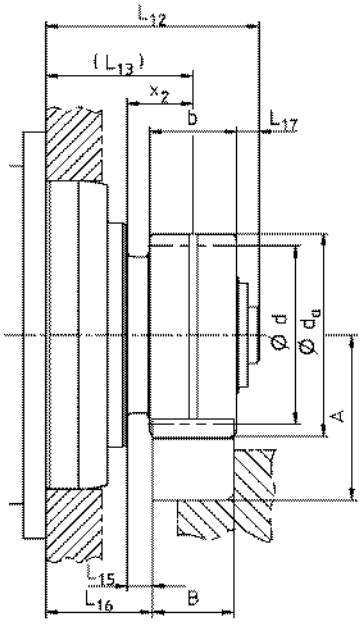
[b] Output type: 3 – system output

z = Number of teeth

d_a = Tip diameter

d = Partial circle diameter

x = Profile correction factor



Planetary gearhead TP+ / right-angle gearhead TPK+ with Premium Class+ pinion and Premium Class rack · Technical data for the smallest possible ratio

Gearhead size	Module	z	F_{2T}		T_{2B}		v_{Max} *		m_{pinion}	
	[mm]	[ ]	[N]	[lb_f]	[Nm]	[in.lb]	[m/min]	[in/sec]	[kg]	[lb_m]
TP+ / TPK+ 010	2	20	2285	514	48	429	200	131	0.4	0.8
TP+ / TPK+ 025	2	20	3270	736	69	614	150	98	0.4	0.8
	3	20	3193	718	102	900	225	148	1.0	2.1
TP+ / TPK+ 050	3	20	10401	2340	331	2930	200	131	1.0	2.1
	4	20	9983	2246	424	3750	267	175	1.9	4.3
TP+ / TPK+ 110	4	20	19889	4475	844	7471	233	153	1.9	4.3
	5	19	19308	4344	973	8613	277	182	3.1	6.8
TP+ / TPK+ 300	5	19	28155	6335	1419	12559	158	104	3.1	6.8
	6	19	27436	6173	1659	14686	190	125	5.8	12.8
TP+ / TPK+ 500	6	19	37228	8376	2252	19928	190	125	5.8	12.8

Technical data based on max. 1000 load cycles per hour.
Further gearhead/pinion combinations in cymex®.
* Depending on ratio

F_{2T} = Max. moving force
T_{2B} = Max. acceleration torque
z = Number of teeth
v_{max} = Max. movement speed
m_{pinion} = Pinion mass

Planetary gearhead TP+ HIGH TORQUE/ right-angle gearhead TPK+ HIGH TORQUE with Premium Class+ pinion and Premium Class rack · Technical data for the smallest possible ratio

Gearhead size	Module	z	F_{2T}		T_{2B}		v_{max} *		m_{pinion}	
	[mm]	[ ]	[N]	[lb_f]	[Nm]	[in.lb]	[m/min]	[in/sec]	[kg]	[lb_m]
TP+ 010	2	20	3385	762	72	636	36	24	0.4	0.8
TP+ / TPK+ 025	2	20	4088	920	87	768	36	24	0.4	0.8
	3	20	3992	898	127	1125	55	36	1.0	2.1
TP+ / TPK+ 050	3	20	10401	2340	331	2930	45	30	1.0	2.1
	4	20	9983	2246	424	3750	61	40	1.9	4.3
TP+ / TPK+ 110	4	20	19889	4475	844	7471	55	36	1.9	4.3
	5	19	19308	4344	973	8613	65	43	3.1	6.8
TP+ / TPK+ 300	5	19	31051	6986	1565	13851	36	24	3.1	6.8
	6	19	30226	6801	1828	16180	43	28	5.8	12.8
TP+ / TPK+ 500	6	19	40189	9043	2431	21513	43	28	5.8	12.8

Technical data based on max. 1000 load cycles per hour.
Further gearhead/pinion combinations in cymex®.
* Depending on ratio

F_{2T} = Max. moving force
T_{2B} = Max. acceleration torque
z = Number of teeth
v_{max} = Max. movement speed
m_{pinion} = Pinion mass

Planetary gearhead TP+ / right-angle gearhead TK+/TPK+ with Premium Class RTP pinion and Premium Class rack (all pinions, pressure angle α=20°,inclination angle β=19.5283° left-handed)

Gearhead size [c]	Module	z	A ±0,3 [b]	b	B	d_a	d	x	L12	L13	x2	L15	L16
TP+/TK+/TPK+ 004	2	26	50.4	26	24	61.0	55.174	0.4	45.5	32.5	13.0	1.0	20.5
TP+/TK+/TPK+ 010	2	29	53.4	26	24	66.9	61.540	0.3	66.0	53.0	23.0	11.0	41.0
	2	33	57.6	26	24	75.4	70.028	0.3	56.0	43.0	13.0	1.0	31.0
	2	37	61.9	26	24	83.9	78.517	0.3	56.0	43.0	13.0	1.0	31.0
TP+/TK+/TPK+ 025	2	35	59.7	26	24	79.7	74.272	0.3	65.0	52.0	23.0	11.0	40.0
	2	40	65.0	26	24	90.3	84.883	0.3	55.0	42.0	13.0	1.0	30.0
	2	45	70.2	26	24	100.6	95.493	0.22	55.0	42.0	13.0	1.0	30.0
TP+/TK+/TPK+ 050	3	31	76.2	31	29	106.7	98.676	0.3	82.0	66.5	28.5	14.0	52.0
	3	35	82.6	31	29	119.4	111.409	0.3	69.0	53.5	15.5	1.0	39.0
	3	40	90.6	31	29	135.3	127.324	0.3	69.0	53.5	15.5	1.0	39.0
TP+/TK+/TPK+ 110	4	38	116.6	41	39	171.4	161.277	0.25	91.0	70.5	20.5	1.0	51.0
TP+/TK+/TPK+ 300	5	32	120.3	51	49	182.8	169.766	0.285	142.0	116.5	50.5	26.0	92.0
TP+/TK+/TPK+ 500	6	31	143.4	61	59	213.0	197.352	0.295	171.0	140.5	65.5	36.0	111.0

All dimensions in [mm]
[b] Align mechanism recommended (alignment dimension ± 0.3 mm)
[c] Output type: 0 – Flange

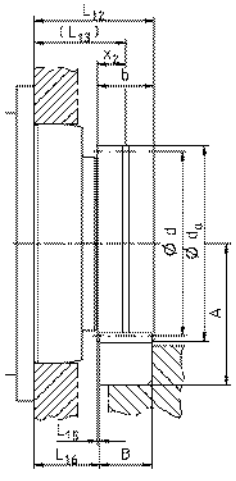
z = Number of teeth
d_a = Tip diameter
d = Partial circle diameter
x = Profile correction factor

Planetary gearhead TP+ HIGH TORQUE / right-angle gearhead TPK+ HIGH TORQUE with Premium Class RTP pinion and Premium Class rack (all pinions, pressure angle α=20°,inclination angle β=19.5283° left-handed)

Gearhead size [c]	Module	z	A ±0,3 [b]	b	B	d_a	d	x	L12	L13	x2	L15	L16
TP+/TPK+ 025	2	35	59.7	26	24	79.7	74.272	0.3	65.0	52.0	23.0	11.0	40.0
TP+/TPK+ 050	3	31	76.2	31	29	106.7	98.676	0.3	82.0	66.5	28.5	14.0	52.0
	3	40	90.6	31	29	135.3	127.324	0.3	69.0	53.5	15.5	1.0	39.0
TP+/TPK+ 110	4	40	119.9	41	39	177.9	169.766	0	91.0	70.5	20.5	1.0	51.0
TP+/TPK+ 300	5	32	120.3	51	49	182.8	169.766	0.285	142.0	116.5	50.5	26.0	92.0

All dimensions in [mm]
[b] Align mechanism recommended (alignment dimension ± 0.3 mm)
[c] Output type: 0 – Flange

z = Number of teeth
d_a = Tip diameter
d = Partial circle diameter
x = Profile correction factor



Planetary gearhead TP+ / right-angle gearhead TK+/TPK+ with Premium Class RTP pinion and Premium Class rack Technical data for the smallest possible ratio

Gearhead size	Module	z	F_{2T}		T_{2B}		v_{max} *		m_{pinion}	
	[mm]		[N]	[lb_f]	[Nm]	[in.lb]	[m/min]	[in/sec]	[kg]	[lb_m]
TP+/ TK+/ TPK+ 004	2	26	1287	290	36	314	260	171	0.5	1.0
TP+/ TK+/ TPK+ 010	2	29	2174	489	67	592	290	190	0.5	1.2
	2	33	2348	528	82	728	330	217	0.7	1.5
	2	37	2317	521	91	805	370	243	0.9	2.0
TP+/ TK+/ TPK+ 025	2	35	3163	712	117	1040	263	172	0.7	1.6
	2	40	3377	760	143	1269	300	197	0.9	2.1
	2	45	3329	749	159	1407	338	221	1.3	2.8
TP+/ TK+/ TPK+ 050	3	31	9882	2223	488	4315	310	203	1.6	3.6
	3	35	10817	2434	603	5333	350	230	1.9	4.3
	3	40	10575	2379	673	5959	400	262	2.7	5.9
TP+/ TK+/ TPK+ 110	4	38	19842	4464	1600	14162	443	291	5.9	13.1
TP+/ TK+/ TPK+ 300	5	32	25111	5650	2131	18865	267	175	7.7	16.9
TP+/ TK+/ TPK+ 500	6	31	32174	7239	3175	28100	310	203	14.3	31.5

Technical data based on max. 1000 load cycles per hour.
Further gearhead/pinion combinations in cymex®.
* Depending on ratio

F_{2T} = Max. moving force
T_{2B} = Max. acceleration torque
z = Number of teeth
v_{max} = Max. movement speed
m_{pinion} = Pinion mass

Planetary gearhead TP+ HIGH TORQUE / right-angle gearhead TPK+ HIGH TORQUE with Premium Class RTP pinion and Premium Class rack Technical data for the smallest possible ratio

Gearhead size	Module	z	F_{2T}		T_{2B}		v_{max} *		m_{pinion}	
	[mm]	[ ]	[N]	[lb_f]	[Nm]	[in.lb]	[m/min]	[in/sec]	[kg]	[lb_m]
TP+/ TPK+ 025	2	40	4221	950	179	1586	73	48	0.9	2.1
TP+/ TPK+ 050	3	35	10817	2434	603	5333	79	52	1.9	4.3
	3	40	10575	2379	673	5959	91	60	2.7	5.9
TP+/ TPK+ 110	4	40	19692	4431	1672	14794	109	72	6.3	13.8
TP+/ TPK+ 300	5	32	27664	6224	2348	20783	85	56	7.7	16.9

Technical data based on max. 1000 load cycles per hour.
Further gearhead/pinion combinations in cymex®.
* Depending on ratio

F_{2T} = Max. moving force
T_{2B} = Max. acceleration torque
z = Number of teeth
v_{max} = Max. movement speed
m_{pinion} = Pinion mass

Performance Linear System –
new performance dimensions

More performance in less space!

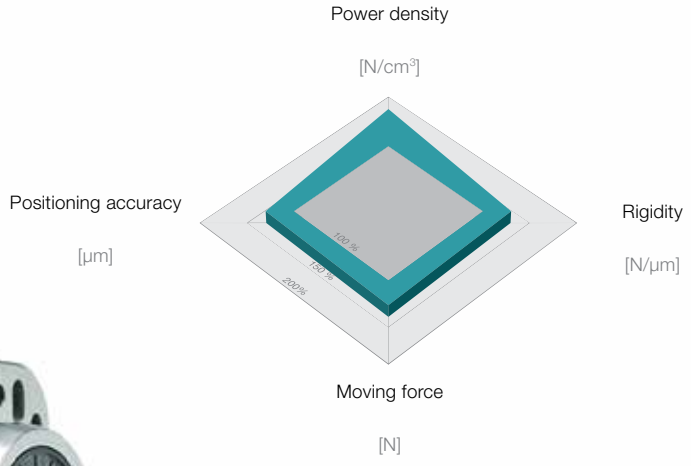
The Performance Linear System meets customer requirements for compact and efficient solutions of the highest quality. In addition to the extended design options, possibilities for the efficiency enhancement of existing applications are also available to users.
And there are plenty of customization options as well. Users can size and optimize the Performance package according to their requirements.

The right linear drive system for your application

Performance Linear System – PLS*	**Max. moving force [N]**	**Max. speed [m/min]**
PLS 2.2	6000	200
PLS 3.2	9000	200
PLS 4.3	12000	200

*In conjunction with alpheno® Further versions available upon request

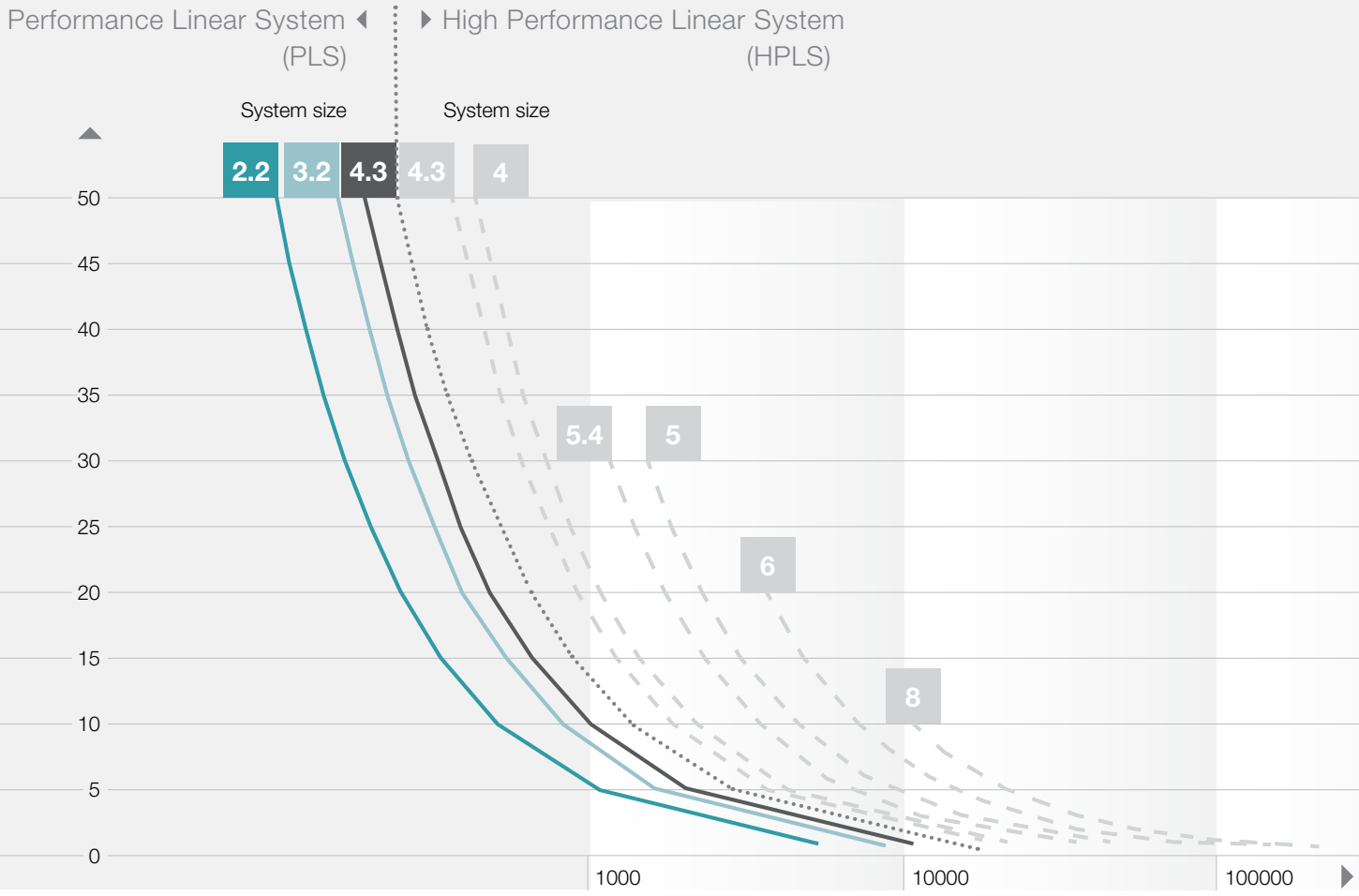
Comparison of technical data between the industry standard and the Performance Linear System



Performance Linear System
with a positioning accuracy of < 5 µm and an efficiency of ≤ 97%.

Further information on the High Performance Linear System are available in the system catalog "High Performance Linear System" or on the Internet at **www.rack-pinion.com**

Quick system selection



Planetary gearhead SP+/ right-angle gearhead SK+/ SPK+ with Standard Class RSP pinion and Value Class rack (all pinions, pressure angle α=20°, inclination angle β=19.5283° left-handed)

Gearhead size [b]	Module	z	A ±0,3 [a]	b	B	d_a	d	x	L12	L13	x2	L15	L16
SP+/SK+ 060	2	15	38.9	26	24	38.0	31.831	0.5	52.0	39.0	19.0	7.0	27.0
	2	16	40.0	26	24	40.2	33.953	0.5	52.0	39.0	19.0	7.0	27.0
	2	18	41.9	26	24	44.0	38.197	0.4	52.0	39.0	19.0	7.0	27.0
SP+/SK+/SPK+ 075	2	18	41.9	26	24	44.0	38.197	0.4	53.0	40.0	20.0	8.0	28.0
	2	20	44.0	26	24	48.3	42.441	0.4	53.0	40.0	20.0	8.0	28.0
	2	22	46.1	26	24	52.5	46.686	0.4	53.0	40.0	20.0	8.0	28.0
SP+/SK+/SPK+ 100	2	23	47.2	26	24	54.6	48.808	0.4	64.0	51.0	21.0	9.0	39.0
	2	25	49.3	26	24	58.8	53.052	0.4	64.0	51.0	21.0	9.0	39.0
	2	27	51.2	26	24	62.7	57.296	0.3	64.0	51.0	21.0	9.0	39.0
SP+/SK+/SPK+ 140	3	20	59.0	31	29	72.3	63.662	0.4	81.0	65.5	35.5	21.0	51.0
	3	22	62.2	31	29	78.6	70.028	0.4	81.0	65.5	35.5	21.0	51.0
	3	24	65.4	31	29	85.0	76.394	0.4	81.0	65.5	35.5	21.0	51.0
SP+/SK+/SPK+ 180	4	20	79.0	41	39	96.3	84.883	0.4	84.0	63.5	33.5	14.0	44.0
SP+ 210	4	25	89.4	41	39	117.0	106.103	0.34	103.0	82.5	44.5	25.0	63.0
SP+ 240	5	24	99.4	51	49	141.0	127.324	0.35	113.0	87.5	47.5	23.0	63.0

All dimensions in [mm]

[a] Align mechanism recommended (alignment dimension ±0.3 mm)

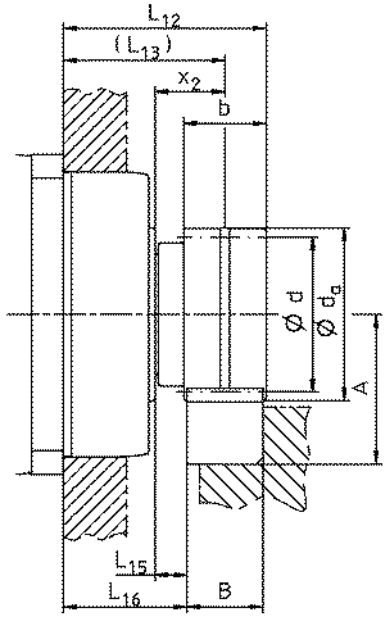
[b] Output type: 2 – Involute as per DIN5480; also available with V-Drive worm gearhead

z = Number of teeth

d_a = Tip diameter

d = Partial circle diameter

x = Profile correction factor



Planetary gearhead SP+/ right-angle gearhead SK+/ SPK+ with Standard Class RSP pinion and Value Class rack · Technical data for the smallest possible ratio

Gearhead size	Module	z	F_{2T}		T_{2B}		v_{max} *		m_{pinion}	
	[mm]	[ ]	[N]	[lb_f]	[Nm]	[in.lb]	[m/min]	[in/sec]	[kg]	[lb_m]
SP+/SK+ 060	2	15	2183	491	35	308	200	131	0.21	0.46
	2	16	2122	477	36	319	213	140	0.23	0.51
	2	18	2100	473	40	355	240	157	0.29	0.64
SP+/SK+/SPK+ 075	2	18	3096	697	59	523	240	157	0.26	0.57
	2	20	3065	690	65	576	267	175	0.33	0.73
	2	22	3036	683	71	627	293	192	0.40	0.88
SP+/SK+/SPK+ 100	2	23	4300	968	105	929	230	151	0.36	0.79
	2	25	4300	968	114	1010	250	164	0.46	1.01
	2	27	4300	968	123	1090	270	177	0.55	1.21
SP+/SK+/SPK+ 140	3	20	8000	1800	255	2254	267	175	0.91	2.01
	3	22	8000	1800	280	2479	293	192	1.18	2.60
	3	24	7991	1798	305	2702	320	210	1.48	3.26
SP+/SK+/SPK+ 180	4	20	11776	2650	500	4424	311	204	1.8	3.99
SP+ 210	4	25	18531	4169	983	8701	278	182	2.8	6.17
SP+ 240	5	24	27836	6263	1772	15684	333	219	4.9	10.80

Technical data based on max. 1000 load cycles per hour.
Further gearhead/pinion combinations in cymex®.
* Depending on ratio

F_{2T} = Max. moving force
T_{2B} = Max. acceleration torque
z = Number of teeth
v_{max} = Max. movement speed
m_{pinion} = Pinion mass

Planetary gearhead LP+/ right-angle gearhead LK+/ LPK+ with Value Class pinion and rack

(all pinions, pressure angle α=20°, inclination angle β=19.5283° left-handed)

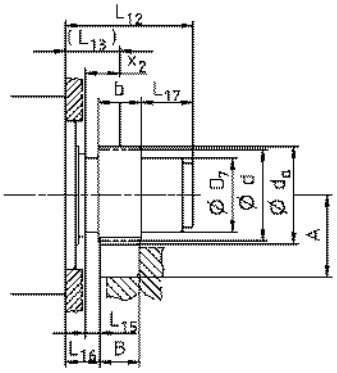
Gearhead size [b]	Module	z	A ±0,3 [a]	b	B	d_a	d	x	L12	L13	x2	L15	L16	L17
LP+/ LK+/ LPK+ 070	2	18	41.899	26	24	43.7	38.197	0.4	42.0	27.0	19.0	7.0	15.0	2.0
LP+/ LK+/ LPK+ 090	2	22	45.743	26	24	51.4	46.686	0.2	52.0	30.0	20.0	8.0	18.0	9.0
LP+/ LK+/ LPK+ 120	2	26	49.587	26	24	59.1	55.174	0	77.5	33.0	21.0	9.0	21.0	31.5
LP+/ LK+/ LPK+ 155	3	24	64.197	31	29	82.3	76.394	0	107.0	50.5	35.5	21.0	36.0	41.0

All dimensions in [mm]

[a] Align mechanism recommended (alignment dimension ± 0.3 mm)

[b] Output type: 1 – Shaft with key

z = Number of teeth
d_a = Tip diameter
d = Partial circle diameter
x = Profile correction



Planetary gearhead SP+/ right-angle gearhead SK+/ SPK+ with Value Class pinion and rack

(all pinions, pressure angle α=20°, inclination angle β=19.5283° left-handed)

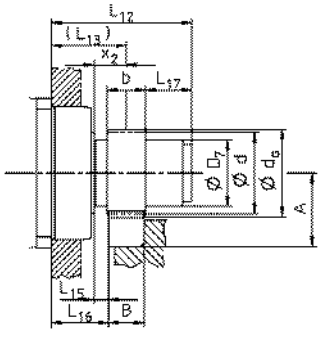
Gearhead size [b]	Module	z	A ±0,3 [a]	b	B	d_a	d	x	L12	L13	x2	L15	L16	L17
SP+/ SK+ 060	2	18	41.899	26	24	43.7	38.197	0.4	54.0	39.0	19.0	7.0	27.0	2.0
SP+/ SK+/ SPK+ 075	2	22	45.743	26	24	51.4	46.686	0.2	62.0	40.0	20.0	8.0	28.0	9.0
SP+/ SK+/ SPK+ 100	2	26	49.587	26	24	59.1	55.174	0	95.5	51.0	21.0	9.0	39.0	31.5
SP+/ SK+/ SPK+ 140	3	24	64.197	31	29	82.3	76.394	0	122.0	65.5	35.5	21.0	51.0	41.0

All dimensions in [mm]

[a] Align mechanism recommended (alignment dimension ± 0.3 mm)

[b] Output type: 1 – Shaft with key, also available with V-Drive worm gearhead

z = Number of teeth
d_a = Tip diameter
d = Partial circle diameter
x = Profile correction



Planetary gearhead LP+/ right-angle gearhead LK+/ LPK+ with Value Class pinion and rack

Gearhead size	Module	z	F_{2T}		T_{2B}		v_{max} *		m_{pinion}	
	[mm]	[ ]	[N]	[lb_f]	[Nm]	[in.lb]	[m/min]	[in/sec]	[kg]	[lb_m]
LP+/ LK+/ LPK+ 070	**2**	18	1360	306	26	230	240	157	0.28	0.62
LP+/ LK+/ LPK+ 090	**2**	22	2270	511	53	469	293	192	0.41	0.90
LP+/ LK+/ LPK+ 120	**2**	26	4300	968	119	1050	277	182	0.58	1.28
LP+/ LK+/ LPK+ 155	**3**	24	7000	1575	267	2367	288	189	1.52	3.35

Technical data based on max. 1000 load cycles per hour.
Further gearhead/pinion combinations in cymex®.
* Depending on ratio

F_{2T} = Max. moving force
T_{2B} = Max. acceleration torque
z = Number of teeth
v_{max} = Max. movement speed
m_{pinion} = Pinion mass

Planetary gearhead SP+/ right-angle gearhead SK+/ SPK+ with Value Class pinion and rack

Gearhead size	Module	z	F_{2T}		T_{2B}		v_{max} *		m_{pinion}	
	[mm]	[ ]	[N]	[lb_f]	[Nm]	[in.lb]	[m/min]	[in/sec]	[kg]	[lb_m]
SP+/ SK+ 060	**2**	18	2100	473	40	355	240	157	0.28	0.62
SP+/ SK+/ SPK+ 075	**2**	22	3036	683	71	627	293	192	0.41	0.90
SP+/ SK+/ SPK+ 100	**2**	26	5635	1268	155	1376	260	171	0.58	1.28
SP+/ SK+/ SPK+ 140	**3**	24	7991	1798	305	2702	320	210	1.52	3.35

Technical data based on max. 1000 load cycles per hour.
Further gearhead/pinion combinations in cymex®.
* Depending on ratio

F_{2T} = Max. moving force
T_{2B} = Max. acceleration torque
z = Number of teeth
v_{max} = Max. movement speed
m_{pinion} = Pinion mass

alpha rack & pinion system accessory range – Lubrication

Replaceable lubricant container 400 ccm

Up to 4 outlets with up to 2 different, freely adjustable lubricant quantities

Control and voltage supply via machine control system

Lubricator LUC⁺ 400
Solution for decentralized lubrication – a solution you can rely on.

High-pressure plastic hose
Pre-filled, suitable for cable tracks

Open pore polyurethane foam stores the lubricant and dispenses it evenly

Axle has no interference contour (countersunk screw)

Low-wearing thanks to integrated bearing bushing

Lubricating pinion
Perfectly adapted to our rack and pinion systems

Perfect lubrication – for a perfect system

In order to achieve a long service life, our rack and pinion systems require adequate lubrication. We offer you suitable lubricating pinions, fastening axles, and lubricators, all adapted perfectly to our systems. The polyurethane foam lubricating pinion is supplied with a preset quantity of grease via a lubricator or central lubricating system. This ensures an optimal lubricating film on the rack and pinion. In addition to the supply of lubricant, the lubricating pinion also ensures cleaning of the open toothing.

Your benefits

- Greatly reduced maintenance costs:
  - Replaceable cartridge
  - Up to 16 lubrication points can be supplied with just one lubricator
  - Lubricating pinion has a long service life
- Can be fully integrated in the machine control system:
  - Direct control
  - Different error messages via PLC
- Lubricant quantities can be precisely adjusted to the application (minimal-quantity lubrication)
- Minimal current required
- Perfectly adapted for the lubrication of rack and pinion systems

Technical information on the LUC+ 400 lubricator

Technical data

Dimensions (W x H x D)	Max. 112x196x94mm
Weight	1120g
Lubricant volume	400 cm³
Lubricant type	Grease up to NLGI 3
Method of operation	Piston pump
Operating pressure	Max. 70 bar
Metering volume/stroke	0.15 cm³ (output/pulse signal)
No. of outlets	1, 2, 3, 4
Outlet	Rotating, right-angled hose connections 6mm to 150bar
Operating voltage	24 VDC
Current input	I_{max} during operation 350mA (regular < 200mA)
Fuse	350 mA (characteristic: medium slow-blow or slow-blow)
Protection class	IP 65
Operating temperature	-20°C to +70°C
Control	Integrated, microelectronic
Pressure monitoring	Integrated, electronic (system pressure measurement)
Fill level monitoring	Integrated; reed contact
Control connection	Connector; M12x1, 4-pole
Activation of progressive distributor	Suitable

Lubricator versions

Overview of lubricating sets	Outlets	Pump body	Lubricant	Scope of delivery of hoses	Article code
LUC+400-0511-02	1	1	WITTENSTEIN alpha G11	2m	20058416
LUC+400-0521-02	2	1	WITTENSTEIN alpha G11	2 x 2m	20058418
LUC+400-0531-02	3	2	WITTENSTEIN alpha G11	3 x 2m	20058420
LUC+400-0541-02	4	2	WITTENSTEIN alpha G11	4 x 2m	20058422
LUC+400-0551-02	2	2	WITTENSTEIN alpha G11	2 x 2m	20058424

Lengths up to 10m per outlet via hose connector 6-0 and LUH hose possible. Sets with 5m hose length available on request.

Replacement cartridge and individual hoses

Designation	Thread	Model	Hose diameter/filling quantity	Article code
Hose 2m, G11 LUH-02-05 [a]	-	2 m	6	20058134
Hose 5m, G11 LUH-05-05 [a]	-	5 m	6	20058135
Hose connector 6-0	-	Straight	6	20058148
Replacement cartridge LUE+400-05	-	G11	400 cm³	20058120
Grease gun cartridge LGC-400-05 [b]	-	G11	400 cm³	20058111

[a] Pre-filled hoses. Only use air-free, pre-filled hoses! [b] For pre-greasing lubricating pinions, movement path

Hose connectors and splitters

Designation	Thread/ connection	Model/no. of outlets	Hose diameter	Article code
Hose connection G1/4-6-0	G 1/4"	Straight	6	20058144
Hose connection M06-6-1	M6x1	Angled	6	20058145
Hose connection M1/8-6-1	G 1/8"	Angled	6	20058146
Hose connection G1/4-6-1	G 1/4"	Angled	6	20058147
Splitter LUS 2-0-NL	Plug-in	2	6	20058103
Splitter LUS 3-0-NL	Plug-in	3	6	20058104
Splitter LUS 4-0-NL	Plug-in	4	6	20058105

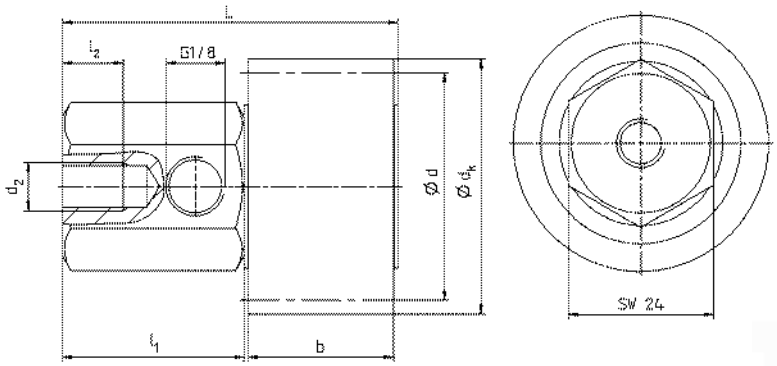
alpha rack & pinion system accessory range – Dimensions of lubricating pinion and fastening axles

Technical data of lubricating pinion set

The design options will dictate whether the rack or the output pinion should be lubricated. Lubrication via the output pinion is preferable owing to the better lubricant distribution.

Module	Number of teeth	Use	Order number	Order code	d	d_K	b	l_1	l_2	d_2	L
2	18	Rack	20053903	LMT 200-PU-18L1-024-1	38,2	42,2	24	30	10	M8	55,4
		Pinion	20053904	LMT 200-PU-18R1-024-1							
3	18	Rack	20053905	LMT 300-PU-18L1-030-1	57,3	63,3	30	30	10	M8	61,4
		Pinion	20053906	LMT 300-PU-18R1-030-1							
4	18	Rack	20053907	LMT 400-PU-18L1-040-1	76,4	84,4	40	30	10	M8	71,4
		Pinion	20053908	LMT 400-PU-18R1-040-1							
5	17	Rack	20053909	LMT 500-PU-17L1-050-1	90,2	100,2	50	30	10	M8	81,4
		Pinion	20053910	LMT 500-PU-17R1-050-1							
6	17	Rack	20053911	LMT 600-PU-17L1-060-1	108,2	120,2	60	30	10	M8	91,4
		Pinion	20053912	LMT 600-PU-17R1-060-1							
8	17	Rack	20053913	LMT 800-PU-17L1-080-1	144,3	160,3	80	30	10	M8	111,4
		Pinion	20053914	LMT 800-PU-17R1-080-1							

Connector for hose Ø 6x4 mm included in scope of delivery. Lubricating pinions must be soaked in lubricant before operation.



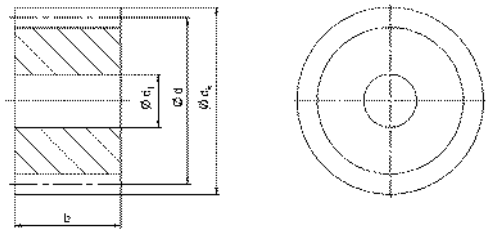
Lubricating pinion for racks, left-handed

Lubricating pinion for gear wheels, right-handed

Lubricating pinion

Module	z	Use	d	d_1	d_K	b	Order code	Article code
2	18 LH	Rack	38,2	12	42,2	24	RLU 200-PU-18L1-024	20053683
	18 RH	Pinion					RLU 200-PU-18R1-024	20053684
3	18 LH	Rack	57,3	12	63,3	30	RLU 300-PU-18L1-030	20053685
	18 RH	Pinion					RLU 300-PU-18R1-030	20053686
4	18 LH	Rack	76,4	12	84,4	40	RLU 400-PU-18L1-040	20053687
	18 RH	Pinion					RLU 400-PU-18R1-040	20053688
5	18 LH	Rack	90,2	20	100,2	50	RLU 500-PU-17L1-050	20053689
	18 RH	Pinion					RLU 500-PU-17R1-050	20053690
6	18 LH	Rack	108,2	20	120,2	60	RLU 600-PU-17L1-060	20053691
	18 RH	Pinion					RLU 600-PU-17R1-060	20053692
8	18 LH	Rack	144,3	20	160,3	80	RLU 800-PU-17L1-080	20053693
	18 RH	Pinion					RLU 800-PU-17R1-080	20053694

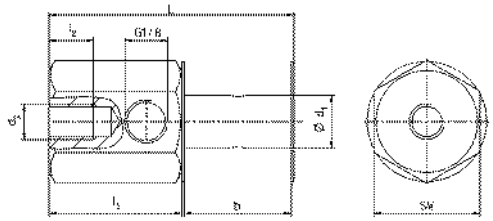
Lubricating pinions must be soaked in lubricant before operation.
Customized pinions: We also have solutions for your special requirements, please contact us!



Fastening axle, right-angle

Module	L	l_1	l_2	b	d_1	d_2	SW	Connection thread d_3	Order code	Article code
2	55,4	30	10	24	12	M8	24	G1/8"	LAS-024-012-1	20053696
3	61,4	30	10	30	12	M8	24	G1/8"	LAS-030-012-1	20053698
4	71,4	30	10	40	12	M8	24	G1/8"	LAS-040-012-1	20053700
5	81,4	30	10	50	20	M8	24	G1/8"	LAS-050-020-1	20053702
6	91,4	30	10	60	20	M8	24	G1/8"	LAS-060-020-1	20053704
8	111,4	30	10	80	20	M8	24	G1/8"	LAS-080-020-1	20053706

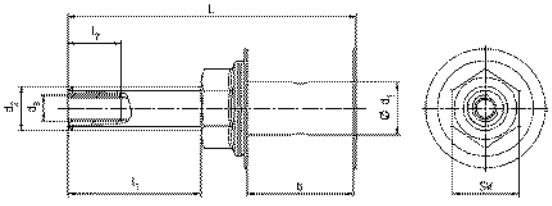
Connector for hose Ø 6 x 4 mm included in scope of delivery.



Fastening axle, straight

Module	L	l_1	l_2	b	d_1	d_2	SW	Connection thread d_3	Order code	Article code
2	61	30	12	24	12	M10	15	M6	LAS-024-012-0	20053695
3	71	30	12	30	12	M10	15	M6	LAS-030-012-0	20053697
4	81	30	12	40	12	M10	15	M6	LAS-040-012-0	20053699
5	116	30	12	50	20	M16	24	G1/8"	LAS-050-020-0	20053701
6	126	30	12	60	20	M16	24	G1/8"	LAS-060-020-0	20053703
8	146	30	12	80	20	M16	24	G1/8"	LAS-080-020-0	20053705

Connector for hose Ø 6 x 4 mm included in scope of delivery.



Lubricating pinion – general information

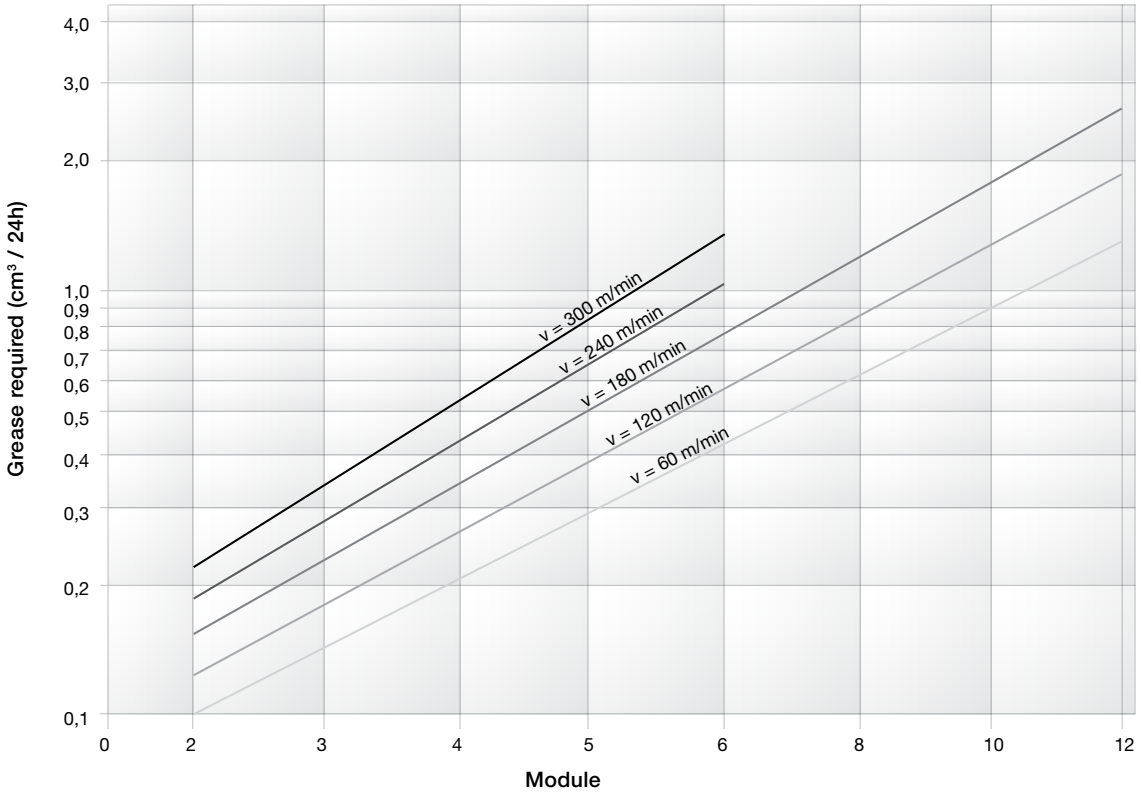
Due to the possibility of high moving forces and dynamics of the drives used, the open toothing of our rack and pinion drives must be lubricated. We recommend automatic re-lubrication using our polyurethane lubricating pinions.

Re-lubrication with the PU lubricating pinion ensures that the lubricant is applied to the toothing continuously and automatically. For this purpose, the lubricating pinion, which is adapted to the toothing of the pinion or rack, engages with the teeth, where it transfers the lubricant to the toothing torque-free.

The open-cell polyurethane foam ensures an optimal supply of the toothing with lubricant, even over extremely lengthy periods. The material partially stores the lubricant and dispenses minute amounts of it. This ensures that continuous lubrication and wear through insufficient lubrication is prevented.

In order to ensure full functionality of the lubricating pinion from the start of operation onwards and to prevent damage to the drive through dry starting, it must be pre-lubricated (ideally soak in the grease used for several hours)!

Chart for determining lubricant quantities depending on the module and movement speed



alpha rack & pinion system accessory range – Assembly jig

Assembly jig

You will need an assembly jig to align the transitions between the individual racks.

Module	L	Order codes	Order number
2	100	ZMT 200-PD5-100	20020582
3	100	ZMT 300-PD5-100	20021966
4	156	ZMT 400-PD5-156	20037466
5	156	ZMT 500-PD5-156	20037469
6	156	ZMT 600-PD5-156	20037470

Needle roller

High-precision needle rollers are required when making checks during and after assembly using the dial gauge.

Module	Order number
2	20001001
3	20000049
4	20038001
5	20038002
6	20038003

alpha IQ and torqXis –
integrated sensor technology or modular sensor systems

alpha IQ

torqXis

Understanding processes
Intelligent sensor systems

Whether integrated in the gearhead or as a modular solution, sensors allow you to measure, diagnose and assess process parameters directly, i.e. all mechanical loads processed by the gearhead can be measured at the output drive.

Further information is available on the Internet at:
www.wittenstein-sensors.com

Use of sensors

Cost savings – drive design

Thanks to this innovative technology, it has now become possible to take real values into account during drive design. This not only saves costs, but also enables a compact design.

Controlling the forces in the drive train

Unforeseen failures in the drive train result in enormous costs. The acting load spectra are measured, analyzed and diagnosed using innovative sensors.

Preventive tool wear warning system

With the aid of sensor technology, conclusions can be drawn regarding the condition of the driven tools based on changes in the applied torque or the lateral force in the drive train.

Enhancing machine availability

Intelligent systems continuously monitor the drive status, allow maintenance measures to be planned more effectively and shorten the response time for maintenance deployments to a minimum.

Efficient drive control

Load-dependent process control is made possible through online calculation of the torque and lateral force. Innovative sensors used as an active control element not only improve process quality, but also help in understanding and improving the process.

Quality verification in the drive train

The top priority is of course to prevent faults. However, when a fault does arise, it is just as important to analyze it as accurately as possible! In many cases, this can be achieved with the aid of sensor technology.

Versions and Applications

alpha IQ

Achieving compatibility.
Utilizing intelligence.
Increasing efficiency.
WITTENSTEIN alpha gearhead with integrated sensors – helping you to better understand your processes.

torqXis sensors

Modular sensor solution for measuring mechanical parameters in the drive train.

alpha IQ / torqXis Measured parameters

Torque | Temperature | X direction | Y direction

Product features

	alpha IQ				torqXis				
Solution	Integrated solution – intelligent sensors and low backlash gearhead in one unit				Modular solution – the sensor can simply installed like a flange between the output and the machine bed.				
	1-3 measured parameters Simultaneous measurement of torque and/or lateral forces				**Standard version (S)** Simultaneous measurement of torque and lateral forces in X and Y directions				
					Light version (L) Measurement of torque or lateral force in one direction				
Size	TP+ 025 IQ	TP+ 050 IQ	TP+ 110 IQ	TP+ 300 IQ	SFR 004 for TP+ 004	SFR 010 for TP+ 010	SFR 025 for TP+ 025	SFR 050 for TP+ 050	SFR 110 for TP+ 110
Torque measurement range	250 Nm	500 Nm	1,500 Nm	3,000 Nm	50 Nm	100 Nm	250 Nm	500 Nm	1,500 Nm
	800 Nm	1,500 Nm	3,000 Nm	8,750 Nm		300 Nm	800 Nm	1,500 Nm	3,000 Nm
Lateral force measurement range (X/Y)	2,500 N	5,000 N	10,000 N	15,000 N	850 N	1,500 N	2,500 N	5,000 N	10,000 N
	10,000 N	15,000 N	30,000 N	44,000 N		4,500 N	10,000 N	15,000 N	30,000 N
Type of measurement	Reaction forces / reaction torques – sensors not corotating								
Absolute accuracy	< 2%								
Repeat accuracy	< 0.5%								
Evaluation	torqXis software for measurement, storage and evaluation of data / configuration of sensor system								
Analog interfaces	Voltage interface, current interface								
Digital interfaces	RS 232, USB, Ethernet/IP								

Accessories –
smart additions for efficiency and intelligent performance

Metal bellows couplings
Perfectionists you can count on

Metal bellows couplings are designed for the highest requirements in servo drive technology. The compact design ensures that installation space is kept to a minimum. High torsional rigidity enables precise results and dynamics.

- Compensation for shaft misalignment
- Completely backlash free
- Compact and easy to mount
- Maintenance-free and fatigue endurable
- Corrosion resistant version available as an option (BC2, BC3, BCT)

Elastomer couplings
Harmonious endurance runners

Elastomer couplings ensure precisely manufactured hubs and attachable intermediate elements for maximum true-running accuracy in the drive train. In addition, torque peaks and vibrations are damped to ensure superior smooth running.

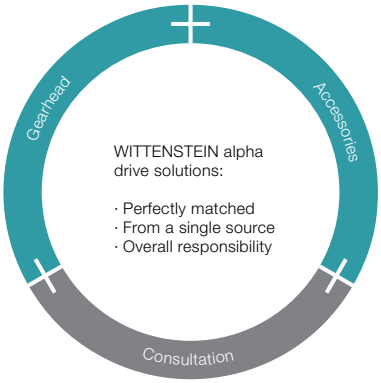
- Compensation for shaft misalignment
- Completely backlash free
- Choice of torsional rigidity/damping
- Compact design
- Extremely simple installation (plug-in)
- Maintenance-free and fatigue endurable
- Ideal for connection to spindle drives, toothed belt drives, and linear modules

Torque limiters
Intelligent monitors

Torque limiters with integrated mechanical switching mechanism combine dynamic and precise transmission with TÜV-certified torque limitation. They therefore protect the drive and machine from overload.

- Machine downtimes are avoided
- High availability and productivity
- Precise, preset overload protection (switch-off in 1 – 3 ms)
- Precise repeat accuracy
- Compact and completely backlash free
- Just one protection element per axle

Gearheads, accessories and consulting from a single source



Flexibility without limits

Broad range of precision gearheads with perfectly matched accessories.
Surely an ideal solution for you!

WITTENSTEIN alpha accessories give you even greater design freedom and options.

In the fast lane with WITTENSTEIN alpha!

Gearheads and accessories
· Perfectly adapted
· One complete delivery
· One contact
Every detail is important for your success!

Shrink disks
Compact athletes

With our hollow shaft or mounted shaft gearheads for mounting directly on load shafts, machines can be designed to take up a minimal installation space.

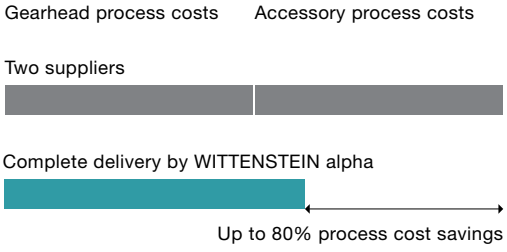
· Reliable torque transmission
· Simple mounting and removal
· Quick selection, easy and convenient
· Optional: Corrosion resistant version

Flange shafts
Flexible design

Our flange shafts provide you with output options that are especially adapted for work with TP+, TPK+ and TK+ flange gearheads.

· Flexible shaft diameter
· Can be adapted to your output components
· Customized options available

Reduce costs



→The savings in installation and process costs more than offsets the value of the accessories

Optimization of your added value chain

Use the combination of gearhead and accessories in a complete package to streamline your internal processes:

One consultation service
One complete delivery
One internal process

→ Minimize your internal effort
→ Maximize your time and cost savings
Your long-term advantage with complete delivery!

Couplings – securing – transmitting – equalizing

Your customized coupling completes the drive train:

- Flexible in design
- Fine-tuning your drive
- Maximum performance

Selection and calculation made easy:

Info- & CAD-Finder

cymex®

For further information, please visit
www.wittenstein-alpha.de/en/

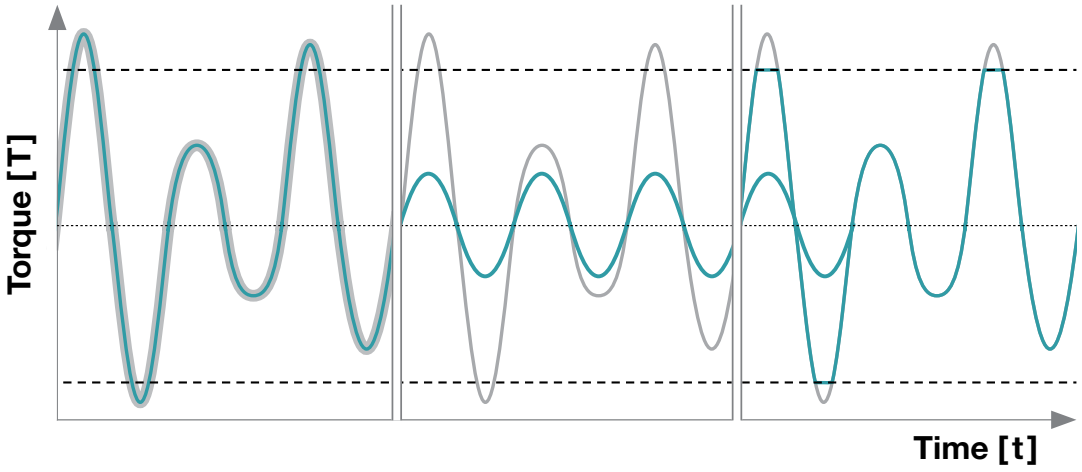
Quick coupling selection

		Metal bellows coupling					Elastomer coupling		Torque limiter		
Feature	**Application**	BCT	BCH	BC2	BC3	EC2	EL6	ELC	TL1	TL2	TL3
Transmission characteristics	High torsional rigidity	•	•	•	•	•			•	•	•
	Damping of torque peaks and vibration						•	•			
Compensation characteristics	Compensation of shaft misalignments (axial, angular, lateral)	•	•	•	•	•	•	•		•	•
Protection characteristics	Switching protection element for the protection of components in the event of overload								•	•	•
Mounting	Standard clamping hub (radial)	•	•	•		•		•	•	•	
	Conical clamping hub (axial)	•			•		•		•		•
	Plug-in connection						•	•			
Drive interfaces	Shaft		•	•	•	•	•	•	•	•	•
	Flange	•									
Output interfaces	Shaft	•	•	•	•	•	•	•		•	•
	Indirect (belt pulley, sprocket wheel)								•		

Versions and Applications

By combining gearheads and accessories, your application receives an individual drive concept with optimized overall performance.

- Maximum service life of all drive components
- Integrated safety functions
- Harmonious drive characteristics



Precise, torsionally rigid transmission
→ Metal bellows coupling

Damping of peaks / vibrations
→ Elastomer coupling

Safe torque limitation
→ Torque limiter

Compare

Features	Metal bellows coupling					Elastomer coupling		Torque limiter		
	BCT	BCH	BC2	BC3	EC2	EL6	ELC	TL1	TL2	TL3
Max. acceleration torque T_B / T_{BE} / T_{Dis} [Nm]	50 – 8500	15 – 1500	15 – 6000	15 – 10000	2 – 500	6 – 2150	1 – 2150	0,1 – 2800	0,1 – 1800	5 – 2800
Torsional backlash	Completely backlash free									
Geometry										
Selectable bore diameter D_1 / D_2 [mm]	12 - 100	8 - 80	8 - 140	10 - 180	4 - 62	6 - 80	3 - 80	4 - 100	3 - 80	10 - 100
Bore D_1 / D_2 smooth	•	•	•	•	•	•	•	•	•	•
Bore D_1 / D_2 key	•	•	•	•	•	•	•	•	•	•
Selectable coupling length (A, B)		•	•	•					•	•
Options										
Corrosion resistant (stainless steel hubs, welded)	•		•	•						
Including self-opening clamp system					•					
Selectable disengagement mechanism								•	•	•
Torque adjusting wrench and switch								•	•	•
Selectable intermediate element (elastomer insert)						•	•			

BCT – bellows coupling with flange connection

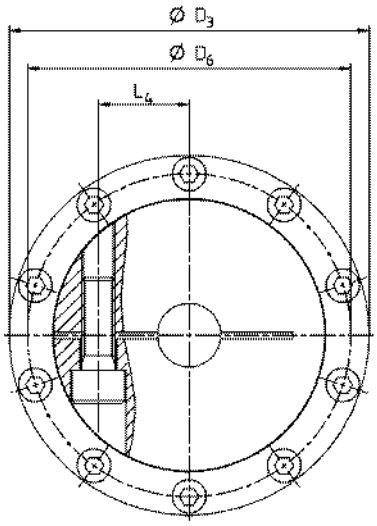
			Standard series					HIGH TORQUE series	
Technical data			**15**	**60**	**150**	**300**	**1500**	**1500**	**4000**
Gearhead output	TP+, TPK+, TK+, VDT+, TPM, TPC		**004 MF**	**010 MF**	**025 MF**	**050 MF**	**110 MF**	**110 MA**	**300 MA**
Max. acceleration torque [a] (max. 1000 cycles per hour)	T_B	Nm	50	210	380	750	2600	6000	8500
		in.lb	443	1859	3363	6638	23010	53104	75231
Max. speed	n_{Max}	rpm	10000						
Axial misalignment 	Max. values	mm	1	1.5	2	2.5	3	1.5	3
Angular misalignment 	Max. values	°	1	1	1	1	1	1	1
Lateral misalignment 	Max. values	mm	0.25	0.25	0.25	0.25	0.2	0.2	0.4
Axial spring stiffness	C_a	N/mm	28.6	76.9	86.9	112	322	1024	1154
Lateral spring stiffness	C_1	N/mm	475	1410	1620	3860	5890	21000	7750
Torsional rigidity	C_T	Nm/arcmin	6.7	21.0	41.0	156	379	437	1455
		in.lb/arcmin	59.3	185.9	362.9	1381	3354	3867	12877
Moment of inertia	J	kgcm²	1.5	6.5	13.0	55	450	470	1850
		10^{-3} in.lb.s²	1.3	5.8	11.5	49	398	416	1637
Hub material			Al	Al	Al	Steel	Steel	Steel	Steel
Bellows material			highly flexible stainless steel						
Adapter flange material			Steel						
Approx. weight	m	kg	0.3	0.7	1	2.8	10	10.5	27.4
		lb	0.67	1.5	2.21	6.18	22.5	23	60.3
Max. permitted temperature		°C	-30 to +100 (bonded)				-30 to +300 (welded)		
		F	-22 to +212 (bonded)				-22 to +XXX (welded)		
Dimensions									
Overall length including adapter flange (without L_S)	L_1	mm	51.5	73.5	77.5	96.5	148	139.5	207
Fit length [b]	L_2	mm	16.5	23	27.5	34	55	61	80
Distance	L_3	mm	6.5	9.5	11	13	22.5	-	-
Distance between centers	L_4	mm	1 x 17.5	1 x 23	1 x 27	1 x 39	2 x 55	-	-
Length installation space (without L_S)	L_7	mm	48.5	67	72	90	140	131.5	195
Screw head length	L_S	mm	-	-	-	-	-	7.5	10
Bore diameter from Ø to Ø H7	D_1	mm	12 - 28	14 - 35	19 - 42	24 - 60	50 - 80	35 - 70	50 - 100
TP flange hole circle diameter [c]	D_2	mm	31.5 8 x M5	50 8 x M6	63 12 x M6	80 12 x M8	125 12 x M10	125 12 x M12	145 12 x M20
Outer diameter (flange)	D_3	mm	63.5	86	108	132	188	190	244
Outer diameter of hub/bellows	D_5	mm	49	66	82	110	157	157	200
Adapter flange hole circle diameter [c]	D_6	mm	56.5 10 x M4	76 10 x M5	97 10 x M6	120 12 x M6	170 16 x M8	172 16 x M8	221 20 x M12

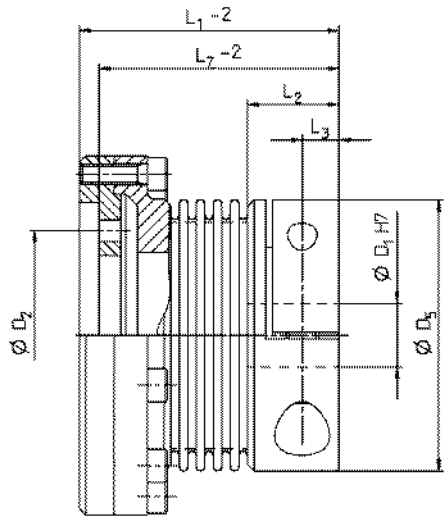
[a] valid for maximum bore diameter (see D_1)

[b] Tolerance for shaft/hub connection 0.01-0.05 mm.

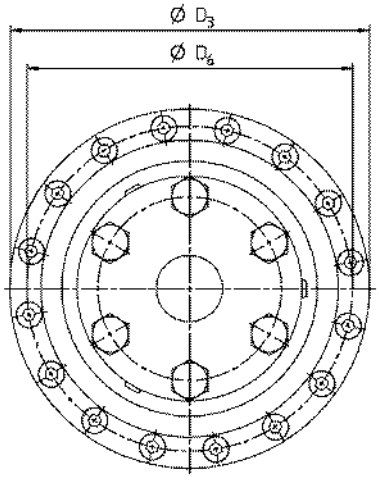
[c] Adapter flange and screws included in scope of delivery

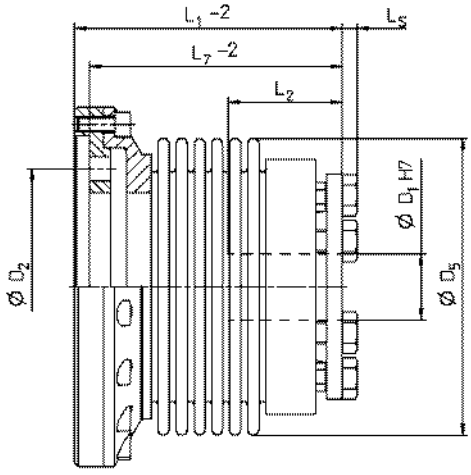
BCT Standard
with Standard clamping hub





BCT HIGH TORQUE
with conical clamping hub





Your benefits:
· Completely backlash free
· High torsional rigidity
· Small installation place and compactness
· Fatigue endurable and maintenance free
· Perfectly matched technically and geometrically to flange gearhead

Optional:
· Bores with key / involute
· Corrosion resistant version
· Other designs, geometry

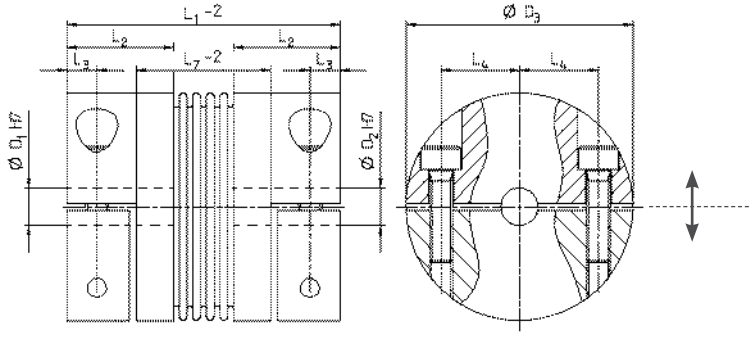
BCH – bellows coupling with split clamping hub

Technical data			Series																			
			15		30		60		80		150		200		300		500		800	1500
Length options (see ordering code)			A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	A
Max. acceleration torque (max. 1000 cycles per hour)	T_B	Nm	15		30		60		80		150		200		300		500		800	1500
		in.lb	133		266		531		708		1328		1770		2655		4425		7080	13275
EMERGENCY STOP torque (briefly permissible)	T_{Emer}	Nm	22.5		45		90		120		225		300		450		750		1200	2250
		in.lb	199		398		797		1062		1991		2655		3983		6638		10620	19913
Max. speed	n_{Max}	rpm	10000																	
Axial misalignment	Max. values	mm	1.0	2.0	1.0	2.0	1.5	2.0	2.0	3.0	2.0	3.0	2.0	3.0	2.5	3.5	2.5	3.5	3.5	3.5
Angular misalignment	Max. values	°	1.0	1.5	1.0	1.5	1.0	1.5	1.0	1.5	1.0	1.5	1.0	1.5	1.0	1.5	1.0	1.5	1.5	1.5
Lateral misalignment	Max. values	mm	0.15	0.2	0.2	0.25	0.2	0.25	0.2	0.25	0.2	0.25	0.25	0.3	0.25	0.30	0.30	0.35	0.35	0.35
Axial spring stiffness	C_a	N/mm	25	15	50	30	72	48	48	32	82	52	90	60	105	71	70	48	100	320
Lateral spring stiffness	C_l	N/mm	475	137	900	270	1200	420	920	290	1550	435	2040	610	3750	1050	2500	840	2000	3600
Torsional rigidity	C_T	Nm/arcmin	5.8	4.4	11	8.1	22	16	38	25	51	32	56	41	131	102	148	146	227	379
		in.lb/arcmin	52	39	100	72	196	142	332	219	451	283	492	361	1159	901	1313	1288	2009	3359
Moment of inertia	J	$kgcm^2$	0.7	0.8	1.4	1.5	2.3	2.6	6.5	6.7	25	32	45	54	85	105	173	196	243	492
		10^{-3} in.lb.s^2	0.6	0.7	1.2	1.3	2.0	2.2	5.5	5.7	21	27	38	46	72	89	147	167	207	418
Hub material			Al		Al		Al		Al		Steel		Steel		Steel		Steel		Steel	Steel
Bellows material			highly flexible stainless steel																	
Approx. weight	m	kg	0.15		0.30		0.40		0.80		1.7		2.5		4.0		7.5		7.0	12
		lb	0.33		0.66		0.88		1.8		3.8		5.5		8.8		17		15	27
Max. permitted temperature		°C	-30 to +100 (bonded)																-30 to +300 (welded)	
		F	-22 to +212 (bonded)																-22 to +572 (welded)	
Dimensions																				
Overall length	L_1	mm	59	66	69	77	83	93	94	106	95	107	105	117	111	125	133	146	140	166
Fit length [a]	L_2	mm	22		27		31		36		36		41		43		51		45	55
Distance	L_3	mm	6.5		7.5		9.5		11		11		12.5		13		16.5		18	22.5
Distance between centers	L_4	mm	17		19		23		27		27		31		39		41		48	55
Insertion length	L_7 [-2]	mm	29	36	35	43	41	51	47	59	48	60	51	63	55	69	62	75	65.5	71
Bore diameter from Ø to Ø H7	$D_{1/2}$	mm	8 - 28		10 - 30		12 - 35		14 - 42		19 - 42		22 - 45		24 - 60		35 - 60		40 - 75	50 - 80
Outer diameter	D_3	mm	49		55		66		81		81		90		110		124		134	157

[a] Tolerance for shaft/hub connection 0.01-0.05 mm.
[b] per clamping hub, 180° apart

Your benefits:
- Mounting time is greatly reduced through clamping hubs in half-shell design
- Precise preliminary alignment of shafts possible
- Completely backlash free
- High torsional rigidity
- High dynamics through low mass moment
- Fatigue endurable and maintenance free

Optional:
- Bores with key / involute
- Other hub materials
- Other designs, geometry



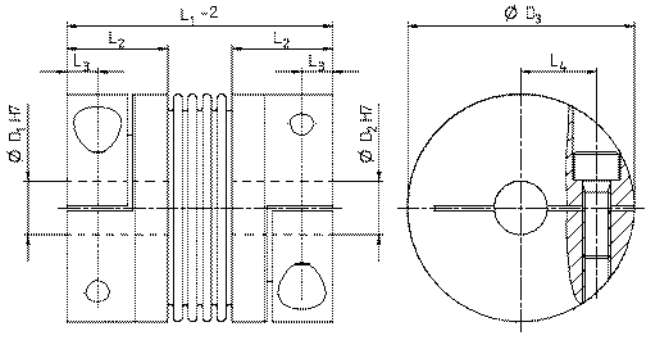
BC2 – bellows coupling with clamping hub

Technical data			Series																							
			15		30		60		80		150		200		300		500		800		1500		4000	6000
Length options (see ordering code)			A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	A
Max. acceleration torque (max. 1000 cycles per hour)	T_B	Nm	15		30		60		80		150		200		300		500		800		1500		4000	6000
		in.lb	133		266		531		708		1328		1770		2655		4425		7080		13275		35400	53100
EMERGENCY STOP torque (briefly permissible)	T_{Emer}	Nm	22.5		45		90		120		225		300		450		750		1200		2250		6000	9000
		in.lb	199		398		797		1062		1991		2655		3983		6638		10620		19913		53100	79650
Max. speed	n_{Max}	rpm	10000																							
Axial misalignment 	Max. values	mm	1	2	1	2	1.5	2	2	3	2	3	2	3	2.5	3.5	2.5	3.5	3.5	4.5	3.5	4.5	3.5	3
Angular misalignment 	Max. values	°	1	1.5	1	1.5	1	1.5	1	1.5	1	1.5	1	1.5	1	1.5	1	1.5	1.5	2	1.5	2	1.5	1.5
Lateral misalignment 	Max. values	mm	0.15	0.2	0.2	0.25	0.2	0.25	0.2	0.25	0.2	0.25	0.25	0.3	0.25	0.3	0.3	0.35	0.35	1	0.35	1	0.4	0.4
Axial spring stiffness	C_a	N/mm	25	15	50	30	72	48	48	32	82	52	90	60	105	71	70	48	100	285	320	440	565	1030
Lateral spring stiffness	C_l	N/mm	475	137	900	270	1200	420	920	290	1550	435	2040	610	3750	1050	2500	840	2000	1490	3600	1700	6070	19200
Torsional rigidity	C_T	Nm/arcmin	5.8	4.4	11.3	8.1	22.1	16.0	37.5	24.7	50.9	32.0	55.6	40.7	131	102	148	145	227	207	379	343	989	1658
		in.lb/arcmin	51.5	38.6	100.4	72.1	195.7	141.6	332.1	218.8	450.5	283.2	491.7	360.4	1158	901	1313	1287	2008	1830	3357	3038	8753	14674
Moment of inertia	J	kgcm²	0.6	0.7	1.2	1.3	3.2	3.5	8.0	8.5	19.0	20.0	32.0	34.0	76	79	143	146	162	170	435	450	1650	4950
		10^{-3} in.lb.s²	0.5	0.6	1.1	1.2	2.8	3.1	7.1	7.5	16.8	17.7	28.3	30.1	67	70	127	129	143	150	385	398	1460	4381
Hub material			Al		Al		Al		Al		Steel		Steel		Steel		Steel		Steel		Steel		Steel	Steel
Bellows material			highly flexible stainless steel																							
Approx. weight	m	kg	0.16		0.26		0.48		0.8		1.85		2.65		4.0		6.3		5.7		11.5		28.8	49.4
		lb	0.35		0.57		1.06		1.77		4.09		5.86		8.84		13.9		12.6		25.4		63.6	109
Max. permitted temperature		°C	-30 to +100 (bonded)																-30 to +300 (welded)							
		F	-22 to +212 (bonded)																-22 to +572 (welded)							
Dimensions																										
Overall length	L_1	mm	59	66	69	77	83	93	94	106	95	107	105	117	111	125	133	146	140	179	166	230	225	252
Fit length [a]	L_2	mm	22		27		31		36		36		41		43		51		45		55		85	107
Distance	L_3	mm	6.5		7.5		9.5		11		11		12.5		13		16.5		18		22.5		28	35
Distance between centers	L_4	mm	17		19		23		27		27		31		39		41		2 x 48		2 x 55		65	90
Bore diameter from Ø to Ø H7	$D_{1/2}$	mm	8 - 28		10 - 30		12 - 35		14 - 42		19 - 42		22 - 45		24 - 60		35 - 60		40 - 75		50 - 80		50 - 90	60 - 140
Outer diameter	D_3	mm	49		55		66		81		81		90		110		124		134		157		200	253

[a] Tolerance for shaft/hub connection 0.01-0.05 mm.

Your benefits:
- Completely backlash free
- Fatigue endurable and maintenance free
- High power density through compact design
- High dynamics through low mass moment
- Simple mounting thanks to clamping screw

Optional:
- Bores with key / involute
- Corrosion resistant version
- Other designs, geometry



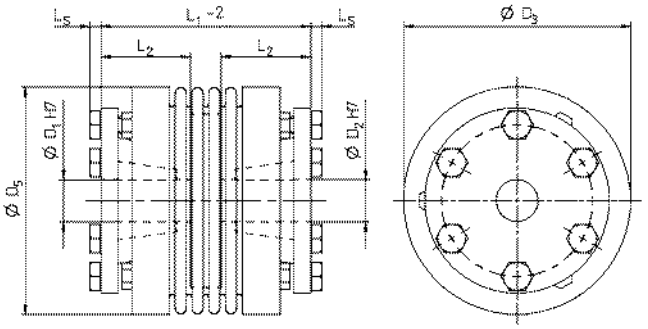
BC3 – bellows coupling with conical clamping hub

Technical data			Series																			
			15		30		60		150		200		300		500		800	1500	4000	6000	10000
Length options (see order codes)			A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	A	A	A	A
Max. acceleration torque (max. 1000 cycles per hour)	T_B	Nm	15		30		60		150		200		300		500		800	1500	4000	6000	10000
		in.lb	133		266		531		1328		1770		2655		4425		7080	13275	35400	53100	88500
EMERGENCY STOP torque (briefly permissible)	T_{Emer}	Nm	22.5		45		90		225		300		450		750		1200	2250	6000	9000	15000
		in.lb	199		398		797		1991		2655		3983		6638		10620	19913	53100	79650	132750
Max. speed	n_{Max}	rpm	10000																		
Axial misalignment 	Max. values	mm	1	2	1	2	1.5	2	2	3	2	3	2.5	3.5	2.5	3.5	3.5	3.5	3.5	3	3
Angular misalignment 	Max. values	°	1	1.5	1	1.5	1	1.5	1	1.5	1	1.5	1	1.5	1	1.5	1.5	1.5	1.5	1.5	1.5
Lateral misalignment 	Max. values	mm	0.15	0.2	0.2	0.25	0.2	0.25	0.2	0.25	0.25	0.3	0.25	0.3	0.3	0.35	0.35	0.35	0.4	0.4	0.4
Axial spring stiffness	C_a	N/mm	25	15	50	30	72	48	82	52	90	60	105	71	70	48	100	320	565	1030	985
Lateral spring stiffness	C_l	N/mm	475	137	900	270	1200	420	1500	435	2040	610	3750	1050	2500	840	2000	3600	6070	19200	21800
Torsional rigidity	C_T	Nm/arcmin	5.8	4.4	11.3	8.1	22.1	16.0	50.9	32.0	55.6	40.7	130.9	101.8	148	145	227	379	989	1658	3185
		in.lb/arcmin	51.5	38.6	100.4	72.1	195.7	141.6	450.5	283.2	491.7	360.4	1158.5	901.0	1313	1287	2008	3357	8753	14674	28189
Moment of inertia	J	$kgcm^2$	0.7	0.8	1.5	1.6	3.9	4.1	12.0	16.0	17.0	25.0	51.0	59.0	91	99	132	349	855	2540	6290
		10^{-3} in.lb.s^2	0.6	0.7	1.3	1.4	3.5	3.6	10.6	14.2	15.0	22.1	45.1	52.2	81	88	117	309	757	2248	5567
Hub material			Steel																		
Bellows material			highly flexible stainless steel																		
Approx. weight	m	kg	0.26	0.27	0.42	0.44	0.71	0.74	1.2		1.8		3		4.2		5.6	8.2	23	32.6	45.5
		lb	0.57	0.60	0.93	0.97	1.57	1.63	2.65		3.97		6.61		9.33		12.3	18.1	50.7	71.9	100.3
Max. permitted temperature		°C	-30 to +100 (bonded)														-30 to +300 (welded)				
		F	-22 to +212 (bonded)														-22 to +572 (welded)				
Dimensions																					
Overall length (without L_S)	L_1	mm	48	55	57	65	66	76	75	87	78	90	89	103	97	110	114	141	195	210	217
Fit length [a]	L_2	mm	19		22		27		32		32		41		41		50	61	80	85	92
Screw head length	L_S	mm	2.8		3.5		3.5		4		4		5.3		5.3		6.4	7.5	10	10	10
Bore diameter from Ø to Ø H7	$D_{1/2}$	mm	10 - 22		12 - 23		12 - 29		15 - 38		15 - 44		24 - 56		24 - 60		30 - 60	35 - 70	50 - 100	60 - 140	70 - 180
Outer diameter	D_3	mm	49		55		66		81		90		110		124		133	157	200	253	303
Outer diameter of hub	D_5	mm	49		55		66		81		90		110		122		116	135	180	246	295

[a] Tolerance for shaft/hub connection 0.01-0.05 mm.

Your benefits:
- Completely backlash free
- Fatigue endurable and maintenance free
- High torques owing to conical clamping hub
- High dynamics through higher clamping forces
- Axial mounting via conical clamping hub

Optional:
- Bores with key / involute
- Corrosion resistant version
- Other designs



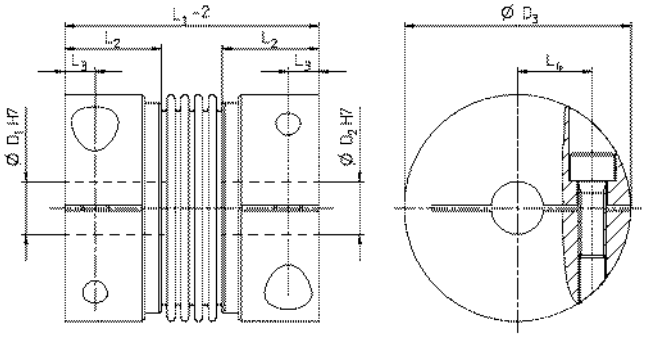
EC2 – bellows coupling Economy with clamping hub

Technical data			Series									
			2	**4.5**	**10**	**15**	**30**	**60**	**80**	**150**	**300**	**500**
Max. acceleration torque (max. 1000 cycles per hour)	T_B	Nm	2	4.5	10	15	30	60	80	150	300	500
		in.lb	18	40	89	133	266	531	708	1328	2655	4425
EMERGENCY STOP torque (briefly permissible)	T_{Emer}	Nm	3	6.75	15	22.5	45	90	120	225	450	750
		in.lb	27	60	133	199	398	797	1062	1991	3983	6638
Max. speed	n_{Max}	rpm	10000									
Axial misalignment 	Max. values	mm	0.5	1	1	1	1	1.5	2	2	2	2.5
Angular misalignment 	Max. values	°	1	1	1	1	1	1	1	1	1	1
Lateral misalignment 	Max. values	mm	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
Axial spring stiffness	C_a	N/mm	8	35	30	30	50	67	44	77	112	72
Lateral spring stiffness	C_l	N/mm	50	350	320	315	366	679	590	960	2940	1450
Torsional rigidity	C_T	Nm/arcmin	0.44	2.0	2.6	6.7	9	21	23	41	46	84
		in.lb/arcmin	3.9	18	23	59	80	186	204	363	407	743
Moment of inertia	J	$kgcm^2$	0.02	0.07	0.16	0.65	1.2	3	7.5	18	75	117
		10^{-3} in.lb.s^2	0.02	0.06	0.14	0.58	1.1	2.7	6.6	16	66	104
Hub material			Al	Al	Al	Al	Al	Al	Al	Steel	Steel	Steel
Bellows material			highly flexible stainless steel									
Approx. weight	m	kg	0.02	0.05	0.06	0.16	0.25	0.4	0.7	1.7	3.8	4.9
		lb	0.044	0.110	0.132	0.353	0.551	0.882	1.54	3.75	8.38	10.8
Max. permitted temperature		°C	-30 to +100 (bonded)									
		F	-22 to +212 (bonded)									
Dimensions												
Overall length	L_1	mm	30	40	44	58	68	79	92	92	109	114
Fit length [a]	L_2	mm	10.5	13	13	21.5	26	28	32.5	32.5	41	42.5
Distance	L_3	mm	4	5	5	6.5	7.5	9.5	11	11	13	17
Distance between centers	L_4	mm	8	11	14	17	20	23	27	27	39	41
Clamping hub from Ø to Ø H7	$D_{1/2}$	mm	4 - 12.7	6 - 16	6 - 24	8 - 28	10 - 32	14 - 35	16 - 42	19 - 42	24 - 60	35 - 62
Outer diameter	D_3	mm	25	32	40	49	56	66	82	82	110	123

[a] Tolerance for shaft/hub connection 0.01-0.05 mm.

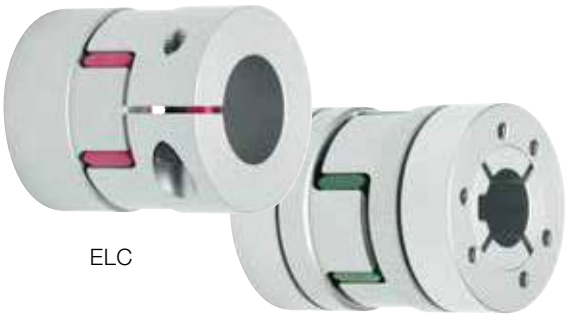
Your benefits:
- Completely backlash free
- Fatigue endurable and maintenance free
- Low-cost version
- High dynamics through very low mass moment
- Simple mounting thanks to clamping screw

Optional:
- Bores with key / involute
- Optional mounting / self-opening clamp system
- Different hub material (aluminum, steel)



EL – Elastomer couplings

Elastomer couplings ensure precisely manufactured hubs and attachable intermediate elements for maximum true-running accuracy in the drive train. In addition, torque peaks and vibrations are damped to ensure superior smooth running.



ELC

EL6

Your benefits:
- Compensation for shaft misalignment
- Completely backlash free
- Selectable torsional rigidity/damping
- Compact design
- Extremely simple installation (plug-in)
- Maintenance-free and fatigue endurable
- Ideal for connection to spindle drives, toothed belt drives and linear modules

Fields of application:
- Machine tools
- Packaging machines
- Automation and handling technology
- Printing presses
- Particularly linear drives (spindle drives, toothed belt axes)
- Applications in continuous operation

The elastomer insert you select largely determines the characteristics of the entire drive train. Select between 3 versions and thereby determine the damping characteristics and torsional rigidity you require.

Version A
Shore hardness 98 Sh A

Version B
Shore hardness 64 Sh D

Version C
Shore hardness 80 Sh A

Description of elastomer inserts

Version	Features	Relative damping (ψ)	Shore hardness	Material	Temperature range	Color
A	Good damping	0.4-0.5	98 Sh A	TPU	-30°C to +100°C	Red
B	High torsional rigidity	0.3-0.45	64 Sh D	TPU	-30°C to +120°C	Green
C	Very good damping	0.3-0.4	80 Sh A	TPU	-30°C to +100°C	Yellow

The values for proportional damping and the full torque load of the respective elastomer inserts were determined at 10 Hz and +20°C

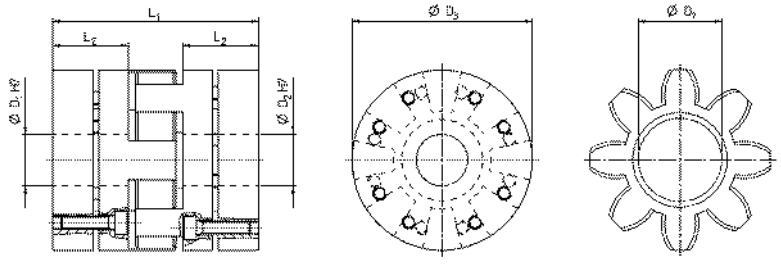
EL6 – elastomer coupling with conical clamping ring

Technical data			Series																			
			10			20			60			150			300			450			800		
Elastomer insert version (see order code)			A	B	C	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C
Max. rated torque	T_{NE}	Nm	12.6	16	4.0	17	21	6.0	60	75	20	160	200	42	325	405	84	530	660	95	950	1100	240
		in.lb	112	142	35	150	186	53	531	664	177	1416	1770	372	2876	3584	743	4691	5841	841	8408	9735	2124
Max. acceleration torque (max. 1000 cycles per hour)	T_{BE}	Nm	25	32	6	34	42	12	120	150	35	320	400	85	650	810	170	1060	1350	190	1900	2150	400
		in.lb	221	283	53	301	372	106	1062	1328	310	2832	3540	752	5753	7169	1505	9381	11948	1682	16815	19028	3540
Max. speed	n_{Max}	rpm	20000			19000			14000			13000			10000			9000			4000		
Axial misalignment	Max. values	mm	±1			±2			±2			±2			±2			±2			±2		
Angular misalignment	Max. values	°	1	0.8	1.2	1	0.8	1.2	1	0.8	1.2	1	0.8	1.2	1	0.8	1.2	1	0.8	1.2	1	0.8	1.2
Lateral misalignment	Max. values	mm	0.1	0.08	0.22	0.1	0.08	0.25	0.12	0.1	0.25	0.15	0.12	0.3	0.18	0.14	0.35	0.2	0.18	0.35	0.25	0.2	0.4
Static torsional rigidity (at 50% T_{BE})	C_T	Nm/arcmin	0.076	0.17	0.026	0.33	0.73	0.15	0.96	2.8	0.41	1.4	3.1	0.33	3.6	5.2	0.37	4.4	7.9	1.2	12	19	3.0
		in.lb/arcmin	0.67	1.5	0.23	2.9	6.5	1.3	8.5	24.8	3.6	12.4	27.4	2.9	31.9	46	3.3	38.9	69.9	10.6	106	168	26.6
Dynamic torsional rigidity (at T_{BE})	C_{Tdy}	Nm/arcmin	0.16	0.48	0.065	0.74	1.3	0.25	2.3	3.5	0.39	3.9	8.5	1	6.9	12	1.8	16	24	3.4	24	52	8.3
		in.lb/arcmin	1.4	4.2	0.58	6.6	11.5	2.2	20.4	31.0	3.5	34.5	75.2	8.9	61.1	106	15.9	142	212	30.1	212	460	73.5
Moment of inertia	J	$kgcm^2$	0.08			0.30			1.0			2.0			6.0			17			184		
		10^{-3} in.lb.s^2	0.07			0.27			0.89			1.8			5.3			15			163		
Hub material			Al			Al			Al			Al			Al			Al			Steel		
Elastomer material			Polymer																				
Approx. weight	m	kg	0.08			0.12			0.3			0.5			0.9			1.5			9.6		
		lb	0.18			0.27			0.66			1.1			2.0			3.3			21		
Dimensions																							
Overall length	L_1	mm	42			56			64			76			96			110			138		
Fit length [a]	L_2	mm	15			20			23			28			36			42			53		
Bore diameter from Ø to Ø H7	$D_{1/2}$	mm	6 - 16			8 - 24			12 - 32			19 - 35			20 - 45			28 - 55			32 - 80		
Outer diameter	D_3	mm	32			43			56			66			82			102			136.5		
Maximum internal diameter (elastomer insert)	D_7	mm	14.2			19.2			26.2			29.2			36.2			46.2			60.5		
Fastening screws (ISO 4762(12.9)			3x M3			6x M4			4x M5			8x M5			8x M6			8x M8			8x M10		

[a] Tolerance for shaft/hub connection 0.01-0.05 mm.

Your benefits:
- Extremely simple axial mounting (plug-in)
- Selectable damping characteristics/torsional rigidity (see elastomer options)
- Completely backlash free
- Damping of vibration and torque peaks
- Ideal for connecting linear modules
- High true-running accuracy and smooth running

Optional:
- Bores with key / involute
- Other designs



ELC – elastomer coupling
Compact version with clamping hub

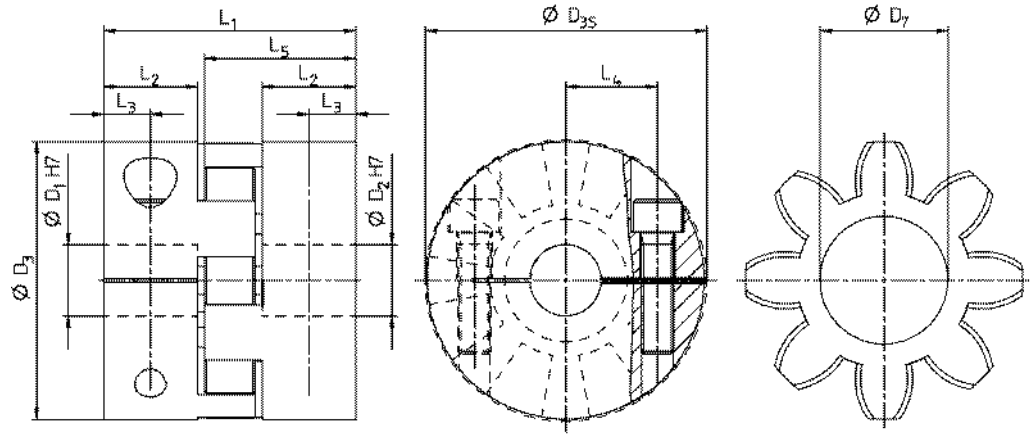
Technical data			Series																										
			2			5			10			20			60			150			300			450			800		
Elastomer insert version (see order code)			A	B	C	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C
Max. rated torque for elastomer insert [a]	T_{NE}	Nm	2	2.4	0.5	9	12	2	12.5	16	4	17	21	6	60	75	20	160	200	42	325	405	84	530	660	95	950	1100	240
		in.lb	18	21	4.4	80	106	18	111	142	35	150	186	53	531	664	177	1416	1770	372	2876	3584	743	4691	5841	841	8408	9735	2124
Max. acceleration torque of elastomer insert (max. 1000 cycles per hour) [a]	T_{BE}	Nm	4	4.8	1.0	18	24	4	25	32	6	34	42	12	120	150	35	320	400	85	650	810	170	1060	1350	190	1900	2150	400
		in.lb	35	42	8.9	159	212	35	221	283	53	301	372	106	1062	1328	310	2832	3540	752	5753	7169	1505	9381	11948	1682	16815	19028	3540
Max. speed	n_{Max}	rpm	15000			15000			13000			12500			11000			10000			9000			8000			4000		
Axial misalignment	Max. values	mm	±1			±1			±1			±2			±2			±2			±2			±2			±2		
Angular misalignment	Max. values	°	1	0.8	1.2	1	0.8	1.2	1	0.8	1.2	1	0.8	1.2	1	0.8	1.2	1	0.8	1.2	1	0.8	1.2	1	0.8	1.2	1	0.8	1.2
Lateral misalignment	Max. values	mm	0.08	0.06	0.2	0.08	0.06	0.2	0.1	0.08	0.22	0.1	0.08	0.25	0.12	0.1	0.25	0.15	0.12	0.3	0.18	0.14	0.35	0.2	0.18	0.35	0.25	0.2	0.4
Static torsional rigidity at (50% T_{BE})	C_T	Nm/arcmin	0.02	0.03	0.01	0.04	0.10	0.02	0.08	0.17	0.03	0.33	0.73	0.15	0.96	2.8	0.41	1.4	3.1	0.33	3.6	5.2	0.37	4.4	7.9	1.2	12	19	3.0
		in.lb/arcmin	0.13	0.29	0.04	0.39	0.89	0.13	0.67	1.5	0.23	2.9	6.5	1.33	8.5	25	3.6	12	27	2.9	32	46	3.3	39	70	11	106	168	27
Dynamic torsional rigidity at (T_{BE})	C_{Tdy}	Nm/arcmin	0.03	0.07	0.01	0.09	0.2	0.03	0.16	0.48	0.07	0.74	1.3	0.25	2.3	3.5	0.39	3.9	8.5	1.0	6.9	12	1.8	16	24	3.4	24	52	8.3
		in.lb/arcmin	0.26	0.59	0.09	0.77	1.8	0.27	1.4	4.2	0.58	6.5	12	2.2	20	30.9	3.5	35	75	8.9	61	106	16	142	212	30	212	460	73
Moment of inertia	J	$kgcm^2$	0.01			0.04			0.06			0.20			0.80			1.60			6.00			13.2			160		
		10^{-3} in.lb.s^2	0.01			0.04			0.05			0.18			0.71			1.42			5.31			11.7			142		
Hub material			Al			Al			Al			Al			Al			Al			Al			Al			Steel		
Elastomer material			Polymer																										
Approx. weight	m	kg	0.008			0.02			0.05			0.12			0.30			0.50			0.90			1.5			8.5		
		lb	0.018			0.044			0.11			0.27			0.66			1.1			2.0			3.3			18.8		
Dimensions																													
Overall length	L_1	mm	20			26			32			50			58			62			86			94			123		
Fit length [b]	L_2	mm	6			8			10.3			17			20			21			31			34			46		
Distance	L_3	mm	3			4			5			8.5			10			11			15			17.5			23		
Distance between centers	L_4	mm	5.5			8			10.5			15.5			21			24			29			38			50.5		
Hub length	L_5	mm	12			16.7			20.7			31			36			39			52			57			74		
Bore diameter from Ø to Ø H7	$D_{1/2}$	mm	3 - 8			4 - 12.7			4 - 16			8 - 25			12 - 32			19 - 36			20 - 45			28 - 60			35 - 80		
Outer diameter	D_3	mm	16			25			32			42			56			66.5			82			102			136.5		
Outer diameter with screw head	D_{3S}	mm	17			25			32			44.5			57			68			85			105			139		
Maximum internal diameter (elastomer insert)	D_7	mm	6.2			10.2			14.2			19.2			26.2			29.2			36.2			46.2			60.5		

[a] Max. torque additionally dependent on minimum selected bore diameter on drive or output side ($D_{1/2}$).
This only applies to ELC couplings. Please check using "Maximum transmittable torque" table.
[b] Tolerance for shaft/hub connection 0.01-0.05 mm.

Maximum transmittable torque [Nm]

Series \ $D_{1/2}$	Ø 3	Ø 4	Ø 5	Ø 8	Ø 16	Ø 19	Ø 25	Ø 30	Ø 32	Ø 35	Ø 45	Ø 50	Ø 55	Ø 60	Ø 65	Ø 70	Ø 75	Ø 80
2	0,2	0,8	1,5	2,5														
5		1,5	2	8														
10			4	12	32													
20				20	35	45	60											
60					50	80	100	110	120									
150						120	160	180	200	220								
300						200	230	300	350	380	420							
450								420	480	510	600	660	750	850				
800										700	750	800	835	865	900	925	950	1000

Maximum transmittable torque according to minimum selected bore diameter ($D_{1/2}$) and ELC series
If intermediate value, please perform linear interpolation
Higher torques possible by means of additional keys.



Your benefits:
- Extremely simple radial mounting (plug-in)
- Selectable damping characteristics/torsional rigidity (see elastomer options)
- Completely backlash free
- Damping of vibration and torque peaks
- Ideal for connecting linear modules
- High true-running accuracy and smooth running

Optional:
- Bores with key / involute
- intermediate cardan piece (higher lateral misalignment)
- Other designs

TL – torque limiters

Torque limiters with integrated mechanical switching mechanism combine dynamic and precise transmission with TÜV-certified torque limitation. They therefore protect the drive and machine from overload.

Your benefits:
- Machine downtimes are avoided
- High availability and productivity
- Precise, preset overload protection (switch-off in 1 – 3 ms)
- Precise repeat accuracy
- Compact and completely backlash free
- Just one protection element per axle

Your benefits:
- Extremely high machine availability
- Extremely high machine dynamics
- Minimal maintenance requirements
- Extremely high service life of machine and components
- TÜV certification

Selectable function systems – re-engagement after overload has been rectified

Single position re-engagement (W) (Standard)

Re-engagement after exactly 360°
Guaranteed synchronism
Switch signal in the event of overload*

Applications:
Packaging machines
Machine tools
Automation systems

Multi-position (D)

Re-engagement after exactly 60° (Standard)
Optionally after (30, 45, 60, 90, 120°)
System is immediately available again
Switch signal in the event of overload*

Applications:
Packaging machines
Machine tools
Automation systems

Full engagement (F)

Permanent separation of drive and output
Free deceleration of centrifugal masses
Manual re-engagement (every 60°)
Switch signal in the event of overload*

Applications:
Applications with extremely high speeds and kinetic energy

Load holding version (G)

None, or limited
Separation of drive and output
Only slow rotation possible during overload
Re-engagement after torque drop
Guaranteed load safety
Switch signal in the event of overload*

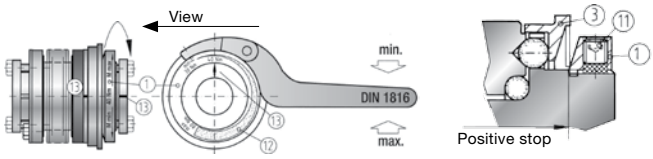
Applications:
Particularly for vertical axes such as presses, load-lifting equipment

*(For suitable switches, see Page 403)

Accessories for TL – torque limiters

Alpha torque limiters are factory adjusted to the specified disengagement torque, which is marked on the coupling.
Thanks to the installed disc springs with special degressive spring characteristics it is also possible to adjust the preset disengagement torque within the adjustment range.
Adjustment of the disengagement torque can be carried out using a torque adjusting wrench

Torque adjusting wrench for DIN 1816 nuts



(1) Adjustment nut
(3) Steel actuation ring
(13) Marking
(11) Locking screw
(12) Adjustment range

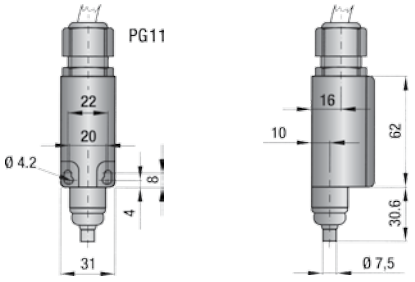
Smaller coupling sizes do not require a torque adjusting wrench. The adjusting nut for the 1.5 / 2 / 4.5 / 10 series can be adjusted with a bolt or pin.

Torque adjusting wrench			
Series	Designation	AC according to the function system	
		W, D, G*	F*
15	GHS TL 15	20047730	20047730
30	GHS TL 30	20047731	20047731
60	GHS TL 60	20047732	20047749
80	GHS TL 80	20047733	20047733
150	GHS TL 150	20047733	20047733
200	GHS TL 200	20047734	20047750
300	GHS TL 300	20047735	20047735
500	GHS TL 500	20047736	20047736
800	GHS TL 800	20047737	20047751
1500	GHS TL 1500	20047738	20047738
2500	GHS TL 2500	20047739	20047752

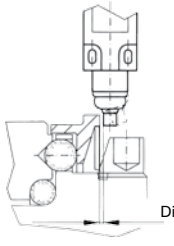
*Function systems: single position (W), multi-position (D), load holding (G), full disengagement (F)

Mechanical limit switch (emergency cut-off)

Dimension drawings

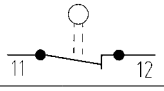


Important:
The switch function must always be checked 100 % after mounting.



The actuation tappet should be positioned as close as possible to the actuation ring of the torque limiter (approx. 0.1 – 0.2 mm).

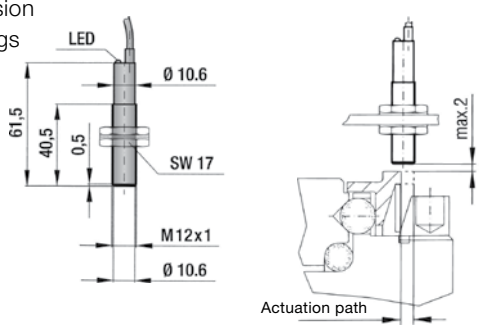
Distance approx. 0.1 – 0.2 mm

Technical data	ME TL AC: 20022999
Max. voltage:	500 V AC
Max. constant current:	10 A
Degree of protection:	IP 65
Contact type:	NC contact (positive opening)
Ambient temperature:	-30 °C to +80 °C
Actuation:	Tappet (metal)
Circuit symbol:	

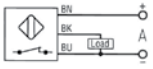
The mechanical limit switch is suitable for size 30 and above.

Proximity switch (emergency cut-off)

Dimension drawings



Important:
The switch function must always be checked 100 % after mounting.

Technical data	NAS TL AC: 20022998
Voltage range:	10 to 30 V DC
Max. output current:	200 mA
Max. switching frequency:	800 Hz
Temperature range:	-25 °C to +70 °C
Degree of protection:	IP 67
Switch type:	PNP NC contact
Detection gap:	max. 2 mm
Circuit symbol:	

TL1 – Torque limiter for indirect drives

Technical data

				Miniature version (Standard clamping hub)				Standard version (Conical clamping hub)									
Series				**1.5**	**2**	**4.5**	**10**	**15**	**30**	**60**	**150**	**200**	**300**	**500**	**800**	**1500**	**2500**
Adjustment range from min. to max. disengagement torque T_{Dis} (approx. values) Function systems: single position (W), multi-position (D) and load holding (G)	T_{Dis}	Nm	**A**	0.1-0.6	0.2-1.5	1-3	2-6	5-15	5-20	10-30	20-70	30-90	100-200	80-200	400-650	600-800	1500-2000
		in.lb		1-6	2-14	9-27	18-54	45-133	45-177	89-266	177-620	266-797	885-1770	708-1770	3540-5753	5310-7080	13275-17700
		Nm	**B**	0.4-1	0.5-2.2	2-4.5	4-12	12-25	10-30	25-80	45-150	60-160	150-240	200-350	500-800	700-1200	2000-2500
		in.lb		4-9	5-20	18-40	36-107	107-222	89-266	222-708	399-1328	531-1416	1328-2124	1770-3098	4425-7080	6195-10620	17700-22125
		Nm	**C**	0.8-2	1.5-3.5	3-7	7-18	20-40	20-60	50-115	80-225	140-280	220-440	320-650	650-950	1000-1800	2300-2800
		in.lb		8-18	14-31	27-62	62-160	177-354	177-531	443-1018	708-1992	1239-2478	1947-3894	2832-5753	5753-8408	8850-15930	20355-24780
		Nm	**D**	-	-	-	-	35-70	50-100	-	-	250-400	-	-	-	-	-
		in.lb		-	-	-	-	310-620	443-885	-	-	222-3540	-	-	-	-	-
Adjustment range from min. to max. disengagement torque T_{Dis} (approx. values) Function system: Full engagement (F)	T_{Dis}	Nm	**A**	0.3-0.8	0.5-2	2.5-4.5	2-5	7-15	8-20	10-30	20-60	80-140	120-180	50-150	200-400	1000-1250	1400-2200
		in.lb		3-8	5-18	23-40	18-45	62-133	71-177	89-266	177-531	708-1239	1062-1593	443-1328	1770-3540	8850-11063	12390-19470
		Nm	**B**	0.6-1.3	-	-	4-10	-	16-30	20-40	40-80	130-200	160-300	100-300	450-850	1250-1500	1800-2700
		in.lb		6-12	-	-	36-89	-	142-266	177-354	354-708	1151-1770	1416-2655	885-2655	3983-7523	11063-13275	15930-23895
		Nm	**C**	-	-	-	8-15	-	-	30-60	80-150	-	300 - 450	250-500	-	-	-
		in.lb		-	-	-	71-133	-	-	266-531	708-1328	-	2655 - 3983	2213-4425	-	-	-
Max. radial force (radial load capacity) within the permitted distance range S [a]	F_R	N		50	100	200	500	1400	1800	2300	3000	3500	4500	5600	8000	12000	20000
	S	mm		3 - 6	5 - 8	5 - 11	6 - 14	7 - 17	10 - 24	10 - 24	12 - 24	12 - 26	12 - 28	16 - 38	16 - 42	20 - 50	28 - 60
Moment of inertia	J	kgcm²		0.1	0.2	0.5	0.7	1.5	2.5	5.0	16	27	52	86	200	315	2100
		in.lb.s².10⁻³		0.1	0.2	0.4	0.6	1.3	2.2	4.4	14	24	46	76	177	279	1859
Max. speed [b]	n_{Max}	rpm		3000							2000			1000			
Material				Hardened steel													
Approx. weight	m	kg		0.03	0.065	0.12	0.22	0.4	0.7	1.0	1.3	2.0	3.0	4.0	5.5	10	28
		lb		0.07	0.14	0.27	0.49	0.9	1.5	2.2	2.9	4.4	6.6	8.8	12	22	61
Max. permitted temperature		°C		-30 to +120													
		F		-22 to +572													

[a] If different, additional bearing required (see illustration 1)

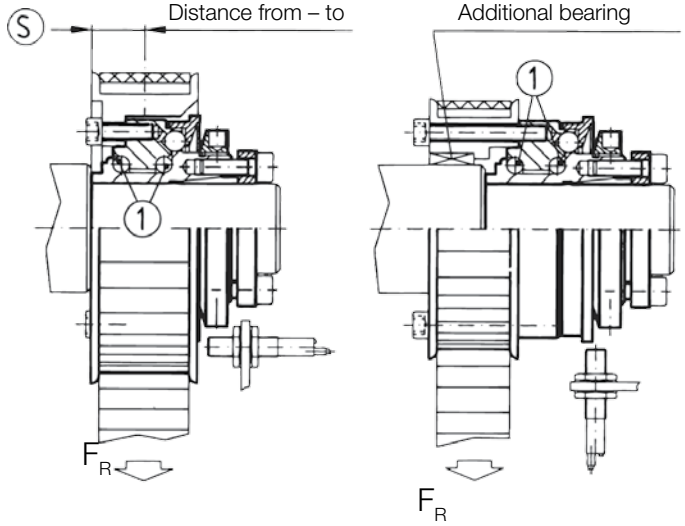
[b] If you have more stringent requirements, please contact WITTENSTEIN alpha

Your benefits:

- Ideal for connecting toothed belt pulleys and sprocket wheels
- Integrated bearing for indirect drives
- Certified disengagement mechanism in the event of overload
- Pre-set disengagement torque
- Completely backlash free
- Fatigue endurable and maintenance free
- High compactness
- High dynamics through low mass moment

Optional:

- Bores with key
- Other designs



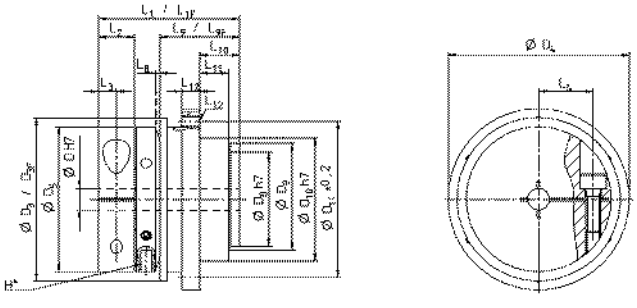
1: Integrated bearings
F_R: Permitted radial force (radial load capacity)
S: permitted distance range

Dimensions

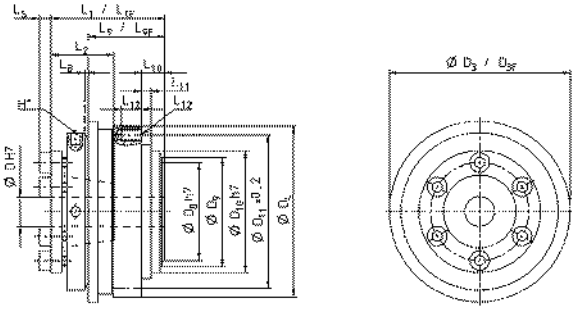
			Miniature version (Standard clamping hub)				Standard version (Conical clamping hub)									
Series			**1.5**	**2**	**4.5**	**10**	**15**	**30**	**60**	**150**	**200**	**300**	**500**	**800**	**1500**	**2500**
Overall length (without L_S)	L_1	mm	23	28	32	39	40	50	54	58	63	70	84	95	109	146
Overall length F (without L_S)	L_{1F}	mm	23	28	32	39	40	50	54	58	66	73	88	95	117	152
Fit length [b]	L_2	mm	7	8	11	11	19	22	27.5	32	32	41	41	49	61	80
Distance	L_3	mm	3.5	4	5	5	-	-	-	-	-	-	-	-	-	-
Distance between centers	L_4	mm	6.5	8	10	15	-	-	-	-	-	-	-	-	-	-
Actuation path	L_8	mm	0.7	0.8	0.8	1.2	1.5	1.5	1.7	1.9	2.2	2.2	2.2	2.2	3.0	3.0
Distance	L_9	mm	11	15	17	22	27	35	37	39	44	47	59	67	82	112
Distance F	L_{9F}	mm	11.5	16	18	24	27	37	39	41.5	47	51.5	62	75	94	120
Distance	L_{10}	mm	5	6	8	11	8	11	11	12	12	15	21	19	25	34
Centering length -0.2	L_{11}	mm	2.5	3.5	5	8	3	5	5	5	5	6	9	10	13.5	20
Thread			4xM2	4xM2.5	6xM2.5	6xM3	6xM4	6xM5	6xM5	6xM6	6xM6	6xM8	6xM8	6xM10	6xM12	6xM16
Thread length	L_{12}	mm	3	4	4	5	6	8	9	10	10	10	12	15	16	24
Distance	L_{13}	mm	1	1.3	1.5	1.5	2.5	2.5	2.5	2.5	3	3	4	4	4.5	6
Screw head length	L_S	mm	-	-	-	-	4	5	5	6	6	8	8	10	12	16
Bore diameter from Ø to Ø H7	D	mm	4-8	4-12	5-14	6-20	8-22	12-22	12-29	15-37	20-44	25-56	25-56	30-60	35-70	50-100
Outer diameter of actuation ring	D_3	mm	23	29	35	45	55	65	73	92	99	120	135	152	174	242
Outer diameter of actuation ring F	D_{3F}	mm	24	32	42	51.5	62	70	83	98	117	132	155	177	187	258
Flange diameter -0.2	D_4	mm	26	32	40	50	53	63	72	87	98	112	128	140	165	240
Outer diameter of hub	D_5	mm	20	25	32	40	-	-	-	-	-	-	-	-	-	-
Diameter h7	D_8	mm	11	14	17	24	27	32	39	50	55	65	72	75	92	128
Diameter	D_9	mm	13	18	21	30	35	42	49	62	67	75	84	91	112	154
Centering diameter h7	D_{10}	mm	14	22	25	34	40	47	55	68	75	82	90	100	125	168
Hole circle diameter ± 0.2	D_{11}	mm	22	28	35	43	47	54	63	78	85	98	110	120	148	202

[b] Tolerance for shaft/hub connection 0.01-0.05 mm.
L_{1F} , L_{9F} , D_{3F} = Full disengagement version (F)

TL 1 miniature version (1.5-10 series)
with Standard clamping hub



TL 1 Standard version (15-2500 series)
with conical clamping hub



* Bore for torque adjusting wrench, see Page 403

TL2 – Torque limiter

Technical data

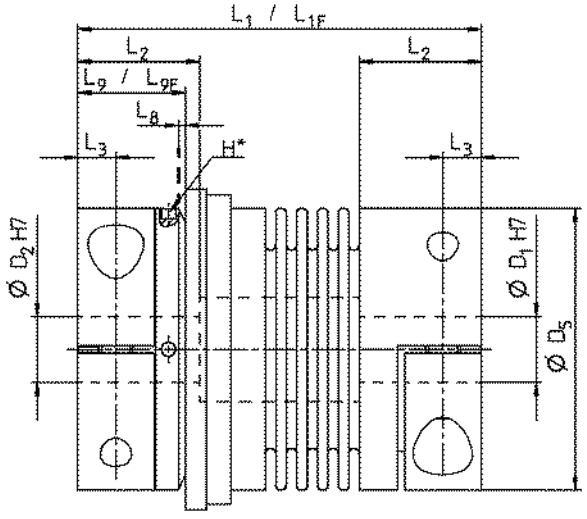
Series				1.5	2		4.5		10		15		30		60		80		150		200		300		500		800	1500
Length options (see order codes)				A	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	A
Adjustment range from min. to max. disengagement torque T_{Dis} (approx. values) Function systems: single position (W), multi-position (D) and load holding (G)	T_{Dis}	Nm	A	0.1-0.6	0.2-1.5		1-3		2-6		5-10		10-25		10-30		20-70		20-70		30-90		100-200		80-200		400-650	650-800
		in.lb		1-6	2-14		9-27		18-54		45-89		89-222		89-266		177-620		177-620		266-797		885-1770		708-1770		3540-5753	5753-7080
		Nm	B	0.4-1	0.5-2		3-6		4-12		8-20		20-40		25-80		30-90		45-150		60-160		150-240		200-350		500-800	700-1200
		in.lb		4-9	5-18		27-54		36-107		71-177		177-354		221-708		266-797		399-1328		531-1416		1328-2124		1770-3098		4425-2080	6195-10620
		Nm	C	0.8-1.5	-		-		-		-		-		-		-		80-180		120-240		200-320		300-500		650-850	1000-1800
		in.lb		8-14															708-1593		1062-2124		1770-2832		2655-4425		5753-7523	8850-15930
Adjustment range from min. to max. disengagement torque T_{Dis} (approx. values) Function system: Full engagement (F)	T_{Dis}	Nm	A	0.3-0.8	0.5-2		2.5-4.5		2-5		7-15		8-20		20-40		20-60		20-60		80-140		120-180		60-150		200-400	1000-1250
		in.lb		3-8	5-18		22-40		18-45		62-133		71-177		177-354		177-531		177-531		708-1239		1062-1592		531-1328		1770-3540	8850-11063
		Nm	B	0.6-1.3	-		-		5-10		-		16-30		30-60		40-80		40-80		130-200		160-300		100-300		450-800	1250-1500
		in.lb		6-12					45-89				142-266		268-531		354-708		354-708		1151-1770		1416-2655		885-2655		3983-7080	11063-13275
		Nm	C	-	-		-		-		-		-		-		-		80-150		-		-		250-500		-	-
		in.lb																	708-1328						2213-4425			
Axial misalignment	Max. values	mm		0.5	0.5	0.6	0.7	1	1	1.2	1	2	1	2	1.5	2	2	3	2	3	2	3	2.5	3.5	2.5	3.5	3.5	3.5
Angular misalignment	Max. values	°		1	1	1.5	1.5	2	1.5	2	1	1.5	1	1.5	1	1.5	1	1.5	1	1.5	1.5	2	1.5	2	2	2.5	2.5	2.5
Lateral misalignment	Max. values	mm		0.15	0.15	0.20	0.20	0.25	0.20	0.30	0.15	0.2	0.20	0.25	0.20	0.25	0.20	0.25	0.20	0.25	0.25	0.30	0.25	0.3	0.30	0.35	0.35	0.35
Axial spring stiffness	C_a	N/mm		16	11	20	25	29	36	48	25	15	50	30	72	48	48	32	82	52	90	60	105	71	70	48	100	320
Lateral spring stiffness	C_l	N/mm		70	40	30	290	45	280	145	475	137	900	270	1200	420	920	255	1550	435	2040	610	3750	1050	2500	840	2000	3600
Torsional rigidity	C_T	Nm/arcmin		0.20	0.35	0.38	2.0	1.5	2.6	2.3	5.8	4.4	11	8	22	16	38	25	51	32	56	41	122	102	148	145	227	379
		in.lb/arcmin		1.8	3.1	3.3	18	13	23	21	51	39	100	72	196	142	332	219	451	283	492	360	1081	901	1313	1287	2008	3357
Moment of inertia	J	$kgcm^2$		0.1	0.1	0.1	0.2	0.2	0.6	0.7	1	1.5	2.7	3.2	7.5	8	18	19	25	28	51	53	115	118	228	230	420	830
		$in.lb.s^2.10^{-3}$		0.09	0.09	0.09	0.18	0.18	0.53	0.62	0.89	1.33	2.39	2.83	6.64	7.1	16	17	22	25	45	47	102	104	202	204	372	735
Hub material				Al	Al		Al		Al		Al		Al		Al		Al		Steel		Steel		Steel		Steel		Steel	Steel
Max. speed [b]	n_{Max}	rpm		3000													2000								1000			
Bellows material				highly flexible stainless steel																								
Protection element material				Hardened steel																								
Approx. weight	m	kg		0.035	0.07		0.2		0.3		0.4		0.6		1.0		2.0		2.4		4.0		5.9		9.6		14	21
		lb		0.08	0.15		0.44		0.66		0.88		1.32		2.21		4.41		5.30		8.82		13.1		21.2		30.9	46.3
Max. permitted temperature		°C		-30 to +100 (bonded)																							-30 to +300 (welded)	
		F		-22 to +212 (bonded)																							-22 to +572 (welded)	

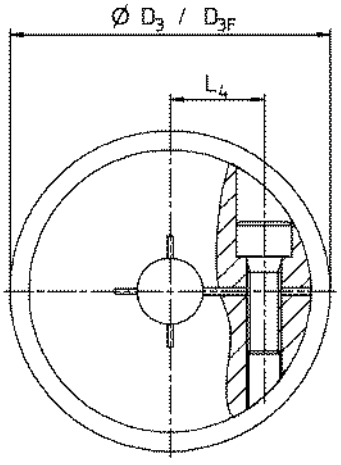
[b] If you have more stringent requirements, please contact WITTENSTEIN alpha

Dimensions

Series			1.5	2		4.5		10		15		30		60		80		150		200		300		500		800	1500
Length options (see order codes)			A	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	A
Overall length	L_1	mm	42	46	51	57	65	65	74	75	82	87	95	102	112	115	127	116	128	128	140	139	153	163	177	190	223
Overall length F	L_{1F}	mm	42	46	51	57	65	65	74	75	82	87	95	102	112	117	129	118	130	131	143	142	156	167	181	201	232
Fit length [a]	L_2	mm	11	13		16		16		22		27		31		35		35		40		42		51		48	67
Distance	L_3	mm	3.5	4		5		5		6.5		7.5		9.5		11		11		12.5		13		17		18	22.5
Distance between centers	L_4	mm	6	8		10		15		17		19		23		27		27		31		39		41		2x48	2x55
Actuation path	L_8	mm	0.7	0.8		0.8		1.2		1.5		1.5		1.7		1.9		1.9		2.2		2.2		2.2		2.2	3.0
Distance	L_9	mm	12	13		15		17		19		24		28		31		31		35		35		45		50	63
Distance (F)	L_{9F}	mm	11.5	12		14		16		19		22		29		31		30		33		35		43		54	61
Bore diameter from Ø to Ø H7	$D_{1/2}$	mm	3 - 9	4-12		5-14		6-20		10-26		12-30		15-32		19-42		19-42		24-45		30-60		35-60		40-75	50-80
Outer diameter of actuation ring	D_3	mm	23	29		35		45		55		65		73		92		92		99		120		135		152	174
Outer diameter of actuation ring F	D_{3F}	mm	24	32		42		51.5		62		70		83		98		98		117		132		155		177	187
Outer diameter of hub	D_5	mm	19	25		32		40		49		55		66		81		81		90		110		123		134	157
Max. internal diameter	D_7	mm	9.1	12.1		14.1		20.1		21.1		24.1		32.1		36.1		36.1		42.1		58.1		60.1		60.1	68.1

[a] Tolerance for shaft/hub connection 0.01-0.05 mm.
L_{1F}, L_{9F}, D_{3F} = Full disengagement version (F)





* Bore for torque adjusting wrench, see Page 403

Your benefits:
- Certified disengagement mechanism in the event of overload
- Pre-set disengagement torque
- Completely backlash free
- Fatigue endurable and maintenance free
- Compensation of shaft misalignments
- Small installation space despite protection element
- Radial mounting via clamping screw

Optional:
- Bores with key / involute
- Other designs

TL3 – Torque limiter

Technical data

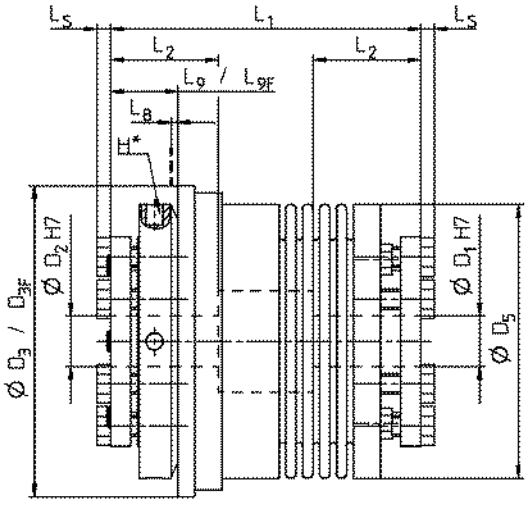
Series				15		30		60		150		200		300		500		800	1500	2500
Length options (see order codes)				**A**	**B**	**A**	**B**	**A**	**B**	**A**	**B**	**A**	**B**	**A**	**B**	**A**	**B**	**A**	**A**	**A**
Adjustment range from min. to max. disengagement torque T_{Dis} (approx. values) Function systems: single position (W), multi-position (D) and load holding (G)	T_{Dis}	Nm	A	5-10		10-25		10-30		20-70		30-90		100-200		80-200		400-650	650-850	1500-2000
		in.lb		45-89		89-222		89-266		177-620		266-797		885-1770		708-1770		3540-5753	5753-7523	13275-17700
		Nm	B	8-20		20-40		25-80		45-150		60-160		150-240		200-350		500-800	700-1200	2000-2500
		in.lb		71-177		177-354		222-708		399-1328		531-1416		1328-2124		1770-3098		4425-7080	6195-10620	17700-22125
		Nm	C	-		-		-		80-200		140-280		220-400		300-500		600-900	1000-1800	2300-2800
		in.lb								708-1770		1239-2478		1947-3540		2655-4425		5310-7965	8850-15930	20355-24780
Adjustment range from min. to max. disengagement torque T_{Dis} (approx. values) Function system: Full engagement (F)	T_{Dis}	Nm	A	7-15		8-20		20-40		20-60		80-140		120-180		60-150		200-400	1000-1250	1400-2200
		in.lb		62-133		71-177		177-354		177-531		708-1239		1062-1593		531-1328		1770-3540	8850-11063	12390-19470
		Nm	B	-		16-30		30-60		40-80		130-200		160-300		100-300		450-800	1250-1500	1800-2700
		in.lb				142-266		266-531		354-706		1151-1770		1416-2655		885-2855		3982-7080	11063-13275	15930-23895
		Nm	C	-		-		-		80-150		-		-		250-500		-	-	-
		in.lb								708-1328						2213-4425				
Axial misalignment 	Max. values	mm		1	2	1	2	1.5	2	2	3	2	3	2.5	3.5	2.5	3.5	3.5	3.5	3.5
Angular misalignment 	Max. values	°		1	1.5	1	1.5	1	1.5	1	1.5	1.5	2	1.5	2	2	2.5	2.5	2.5	2.5
Lateral misalignment 	Max. values	mm		0.15	0.20	0.20	0.25	0.20	0.25	0.20	0.25	0.25	0.30	0.25	0.30	0.30	0.35	0.35	0.35	0.35
Axial spring stiffness	C_a	N/mm		25	15	50	30	72	48	82	52	90	60	105	71	70	48	100	320	1150
Lateral spring stiffness	C_l	N/mm		475	137	900	270	1200	380	1550	435	2040	610	3750	1050	2500	840	2000	3600	6070
Torsional rigidity	C_T	Nm/arcmin		5.8	4.4	11	8.1	22	16	51	32	56	41	122	102	148	145	227	379	989
		in.lb/arcmin		51	39	100	72	196	142	451	283	492	360	1081	901	1313	1287	2008	3357	8753
Moment of inertia	J	$kgcm^2$		1.0	1.5	2.8	3.0	7.5	8.0	19	20	28	30	55	60	110	128	200	420	2570
		$in.lb.s^2.10^{-3}$		0.85	1.3	2.4	2.6	6.4	6.8	16	17	24	26	47	51	94	109	170	357	2185
Max. speed [b]	n_{Max}	rpm		3000						2000						1000				
Hub material				Steel																
Bellows material				highly flexible stainless steel																
Protection element material				Hardened steel																
Approx. weight	m	kg		0.3		0.4		1.2		2.3		3.0		5.0		6.5		9.0	16.3	35
		lb		0.66		0.88		2.65		5.07		6.61		11.0		14.3		19.8	35.9	77.2
Max. permitted temperature		°C		-30 to +100 (bonded)														-30 to +300 (welded)		
		F		-22 to +212 (bonded)														-22 to +572 (welded)		

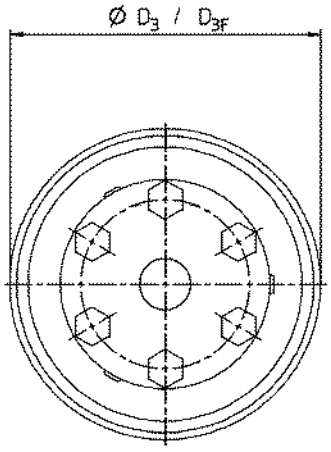
[b] If you have more stringent requirements, please contact WITTENSTEIN alpha

Dimensions

Series			15		30		60		150		200		300		500		800	1500	2500
Length options (see order codes)			**A**	**B**	**A**	**B**	**A**	**B**	**A**	**B**	**A**	**B**	**A**	**B**	**A**	**B**	**A**	**A**	**A**
Overall length (without L_S)	L_1	mm	62	69	72	80	84	94	93	105	99	111	114	128	123	136	151	175	246
Overall length F	L_{1F}	mm	62	69	72	80	84	94	93	105	102	114	117	131	127	140	151	184	252
Fit length [a]	L_2	mm	19		22		27		32		32		41		41		49	61	80
Actuation path	L_8	mm	1.5		1.5		1.7		1.9		2.2		2.2		2.2		2.2	3	3
Distance	L_3	mm	13		16		18		19		19		23		25		31	30	34
Distance F	L_{9F}	mm	13		14		17		18		17		20		22		20	26	31
Screw head length	L_S	mm	2.8		3.5		3.5		4		4		5.3		5.3		6.4	7.5	10
Bore diameter from Ø to Ø H7	$D_{1/2}$	mm	10-22		12-23		12-29		15-37		20-44		25-56		25-60		30-60	35-70	50-100
Outer diameter of actuation ring	D_3	mm	55		65		73		92		99		120		135		152	174	243
Outer diameter of actuation ring F	D_{3F}	mm	62		70		83		98		117		132		155		177	187	258
Outer diameter of hub	D_5	mm	49		55		66		81		90		110		123		133	157	200

[a] Tolerance for shaft/hub connection 0.01-0.05 mm.
L_{1F}, L_{9F}, D_{3F} = Full disengagement version F





* Bore for torque adjusting wrench, see Page 403

Your benefits:
- Certified disengagement mechanism in the event of overload
- Pre-set disengagement torque
- Completely backlash free
- Fatigue endurable and maintenance free
- Compensation of shaft misalignments
- Small installation space despite protection element
- Axial mounting via conical clamping hub

Optional:
- Bores with key / involute
- Other designs

Shrink discs – Always well connected

Harmony in perfection:
Our shrink discs are ideally adapted to your extremely compact hollow shaft or mounted shaft connection. This means maximum performance of your drive!

The best accessories for the best gearhead in order to achieve full performance.

Your benefits:

- Technically and geometrically matched
- Compact version
- Simple mounting and removal
- Backlash-free, positive connection
- High true-running accuracy
- Two-part design

Your benefits

- Reliable and safe transmission
- Huge installation space reduction
- Multiple reuse
- High dynamism and accuracy
- Extremely smooth-running
- Corrosion resistant design

Quick shrink disc selection

Gearhead type	Order code/Article code				d	D	A	H*	H2*	J [kgcm²]
		Standard	Nickel plated	Stainless steel						
SP+/SPK+/HG+ 060	Order code	SD 018x044 S2	SD 018x044 N2	SD 018x044 E2	18	44	30	15	19	0,252
	Article code	20000744	20048496	20048491						
SP+/SPK+/HG+ 075	Order code	SD 024x050 S2	SD 024x050 N2	SD 024x050 E2	24	50	36	18	22	0,729
	Article code	20001389	20047957	20043198						
SP+/SPK+/HG+ 100	Order code	SD 036x072 S2	SD 036x072 N2	SD 036x072 E2	36	72	52	22	27,5	3,94
	Article code	20001391	20048497	20035055						
SP+/SPK+/HG+ 140	Order code	SD 050x090 S2	SD 050x090 N2	SD 050x090 E2	50	90	68	26	31,5	11,1
	Article code	20001394	20048498	20047937						
SP+/SPK+/HG+ 180	Order code	SD 068x115 S2	SD 068x115 N2	SD 068x115 E2	68	115	86	29	34,5	31,1
	Article code	20001396	20048499	20048492						

*Apply for the unclamped state.
Shrink discs suitable for alpheno® and PKF gearheads upon request.

Gearhead type	Order code/Article code				d	D	A	H*	H2*	J [kgcm²]
		Standard	Nickel plated	Stainless steel						
VDH+/VDHe 040	Order code	SD 024x050 S2	SD 024x050 N2	SD 024x050 E2	24	50	36	18	22	0,729
	Article code	20001389	20047957	20043198						
VDH+/VDHe 050	Order code	SD 030x060 S2V	SD 030x060 N2	SD 030x060 E2	30	60	44	20	24	1,82
	Article code	20020687	20047934	20047885						
VDH+/VDHe 063	Order code	SD 036x072 S2V	SD 036x072 N2V	SD 036x072 E2	36	72	52	22	27,5	3,94
	Article code	20020688	20047530	20035055						
VDH+080	Order code	SD 050x090 S2V	SD 050x090 N2V	SD 050x090 E2	50	90	68	26	31,5	11,1
	Article code	20020689	20047935	20047937						
VDH+100	Order code	SD 062x110 S2V	SD 062x110 N2	SD 062x110 E2	62	110	80	29	34,5	27
	Article code	20020690	20047927	20047860						

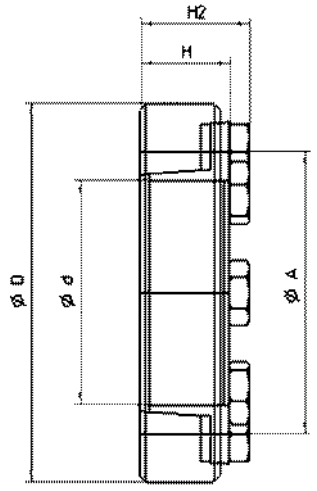
*Apply for the unclamped state.

One shrink disk per gearhead is sufficient. Please refer to the operating instructions for information on correct shrink disc installation.
The instructions are enclosed with the order.

Mounting/operating manual at **www.wittenstein-alpha.de/en/download**

Recommendation for the load shaft:
Tolerance h6
Surface roughness ≤ Rz 16
Minimum yield strength Rp 0.2 ≥ 385 N/mm²

The shrink disc is not included in the scope of delivery of the gearhead. Therefore, it must be ordered separately (for the V-Drive gearhead type, this is possible in the order code).



Flange shafts – Flexible in design

More design freedom for the output: Our flange shafts provide you with made to measure output shafts, especially adapted for TP+, TPK+, TK+ and TPC+ flange gearheads:

- Flexible shaft diameter
- Can be adapted to your output components
- Customized options possible

Your benefits

- Geometrically adapted to the gearhead
- Choice of shaft diameters
- Can also be combined with couplings
- Other options available on request (material, geometry)

Your benefits

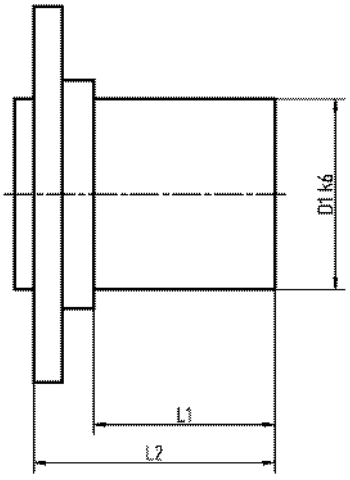
- Simple selection
- Greater design freedom
- A flexible solution for your drive

Quick flange shaft selection

Gearhead TP+/ TPK+/ TK+/ TPC+	Diam. of shaft D1 option A [mm]	Order code	Diam. of shaft D1 option B [mm]	Order code	Effective shaft length L1 [mm]	Overall length L2 [mm]
004 MF	16	FLW TP 004-S-016-023-033	22	FLW TP 004-S-022-023-033	23	033
010 MF	22	FLW TP 010-S-022-030-041	32	FLW TP 010-S-032-030-041	30	041
010 MA	22	FLW TP 010-A-022-042-065	32	FLW TP 010-A-032-042-065	42	065
025 MF	32	FLW TP 025-S-032-038-051	40	FLW TP 025-S-040-038-051	38	051
025 MA	32	FLW TP 025-A-032-050-079	40	FLW TP 025-A-040-050-079	50	079
050 MF	40	FLW TP 050-S-040-038-054	55	FLW TP 050-S-055-038-054	38	054
050 MA	40	FLW TP 050-A-040-062-095	55	FLW TP 050-A-055-062-095	62	095
110 MF	55	FLW TP 110-S-055-052-073	75	FLW TP 110-S-075-052-073	52	073
110 MA	55	FLW TP 110-A-055-081-119	75	FLW TP 110-A-075-081-119	81	119
300 MF	90	FLW TP 300-S-090-123-150			123	150
300 MA	90	FLW TP 300-A-090-123-150			090	150

Technical characteristics:
Material
Yield strength
Tolerance k6
Surface roughness

The flange shaft and fastening screws are not included with the gearhead.
For more precise information on mounting, please see the gearhead operating instructions.



Schematic diagram:
D1 = Shaft diameter
L1 = Effective shaft length
L2 = Overall length

Information

Always there for you!

Technical support:
Tel. +49 7931 493-10800

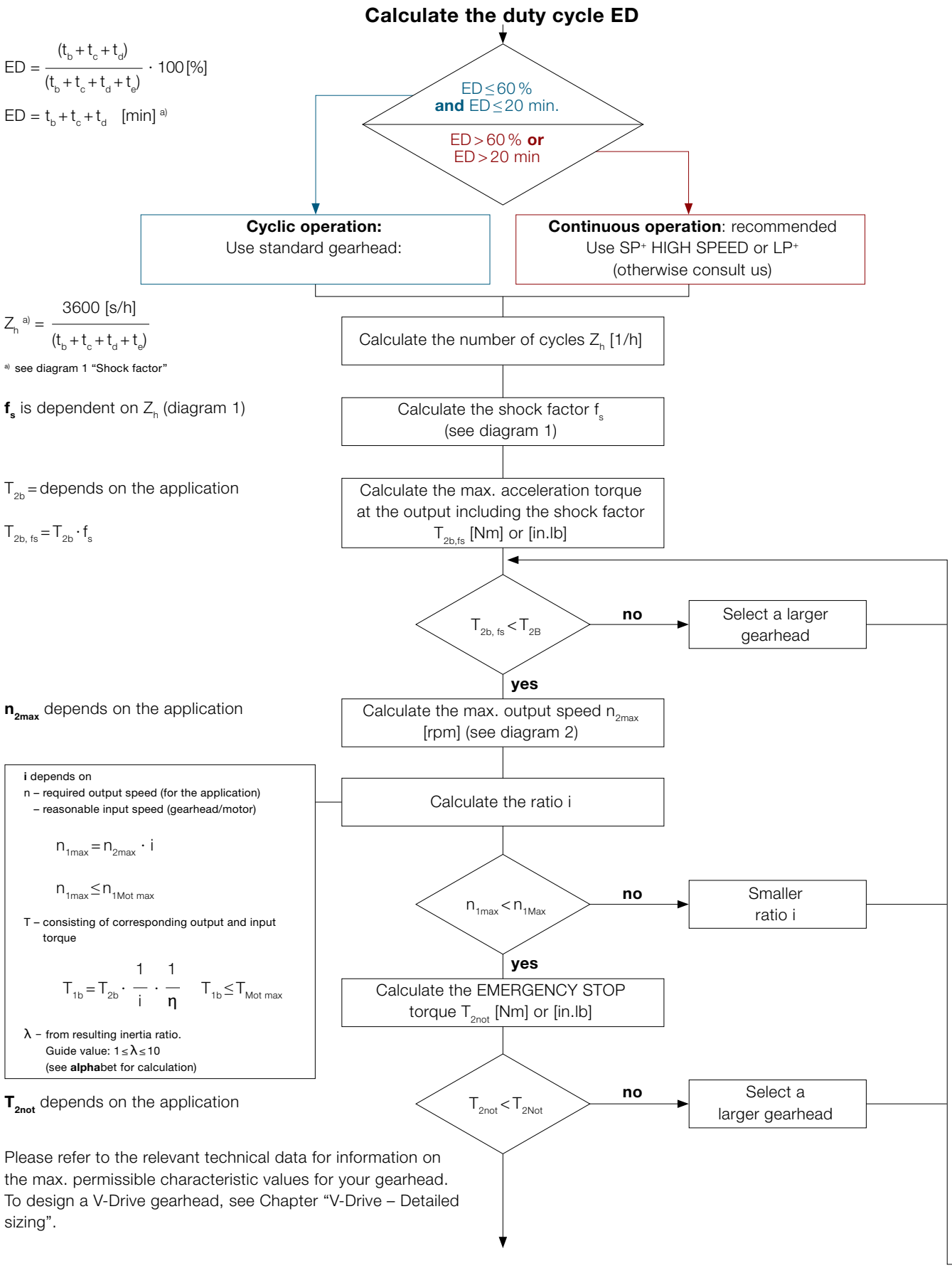
Quick gearhead selection

The quick gearhead selection feature is designed exclusively for calculating gearhead sizes approximately. Quick selection is not a substitute for the detailed sizing feature! To select a specific gearhead, proceed as described in the Chapter "Gearhead – Detailed sizing" or "V-Drive – Detailed sizing". For quick, convenient and reliable gearhead selection, we recommend using WITTENSTEIN alpha's cymex® sizing software.

Cyclic operation S5 Valid for ≤ 1000 cycles/hour Duty cycle < 60 % and < 20 min.[a)]	1. Calculate the max. motor acceleration torque using motor data **T_{MaxMot} [Nm] or [in.lb]** 2. Calculate the max. available acceleration torque at the gearhead output T_{2b} [Nm] or [in.lb] **$T_{2b} = T_{MaxMot} \cdot i$** 3. Compare the max. available acceleration torque T_{2b} [Nm] or [in.lb] with the max. permissible acceleration torque T_{2B} [Nm] or [in.lb] at the gearhead output **$T_{2b} \leq T_{2B}$**	4. Compare the bore hole diameter on the clamping hub (see technical data sheets) 5. Compare the motor shaft length L_{Mot} [mm] or [in] with the min. and max. dimensions in the corresponding dimension sheet
Continuous operation S1 Duty cycle ≥ 60 % or ≥ 20 min.[a)]	1. Select cyclic operation S5 2. Calculate the rated motor torque **T_{1NMot} [Nm] or [in.lb]** 3. Calculate the previous rated torque at the gearhead output T_{2n} [Nm] or [in.lb] **$T_{2n} = T_{1NMot} \cdot i$**	4. Compare the previous rated torque T_{2n} [Nm] or [in.lb] with the permissible nominal torque T_{2N} [Nm] or [in.lb] at the gearhead output **$T_{2n} \leq T_{2N}$** 5. Calculate the previous input speed **n_{1n} [rpm]** 6. Compare the previous input speed n_{1n} [rpm] with the permissible rated speed n_{1N} [rpm] **$n_{1n} \leq n_{1N}$**

[a)] recommended by WITTENSTEIN alpha. Please contact us if you require further assistance.

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



Please refer to the relevant technical data for information on the max. permissible characteristic values for your gearhead. To design a V-Drive gearhead, see Chapter "V-Drive – Detailed sizing".

Calculate the average output torque T_{2m} [Nm] or [in.lb] (see diagram 2)

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

$T_{2m} < T_{2N}$ — **no** → Select a larger gearhead

yes

Calculate the average input speed n_{1m} [rpm] (see diagram 2)

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

$n_{1m} < n_{1N}$ — **no** → Smaller ratio i

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

yes

Select a motor

Compare clamping hub with motor shaft diameter — **no** → Select other motors or gearheads (contact us)

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

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

yes

Compare motor shaft length with min./max. dimensions in the gearhead dimension sheet — **no** → Select other motors or gearheads (contact us)

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

yes

$T_{2max\ (Motor)} \leq T_{2B}$ — **no** → Limit motor current

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

yes

Calculate the bearing load and bearing lifespan (see Chapter “Bearing lifespan“)

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

Diagram 1

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

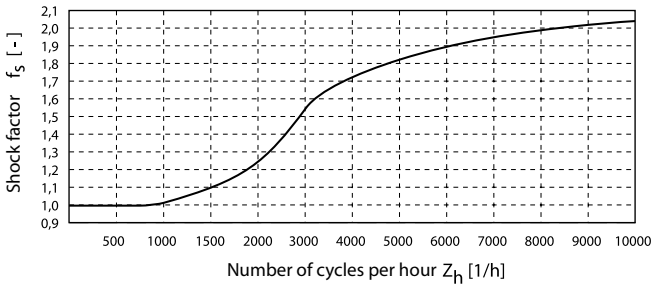
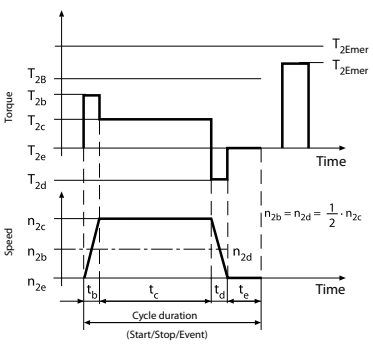


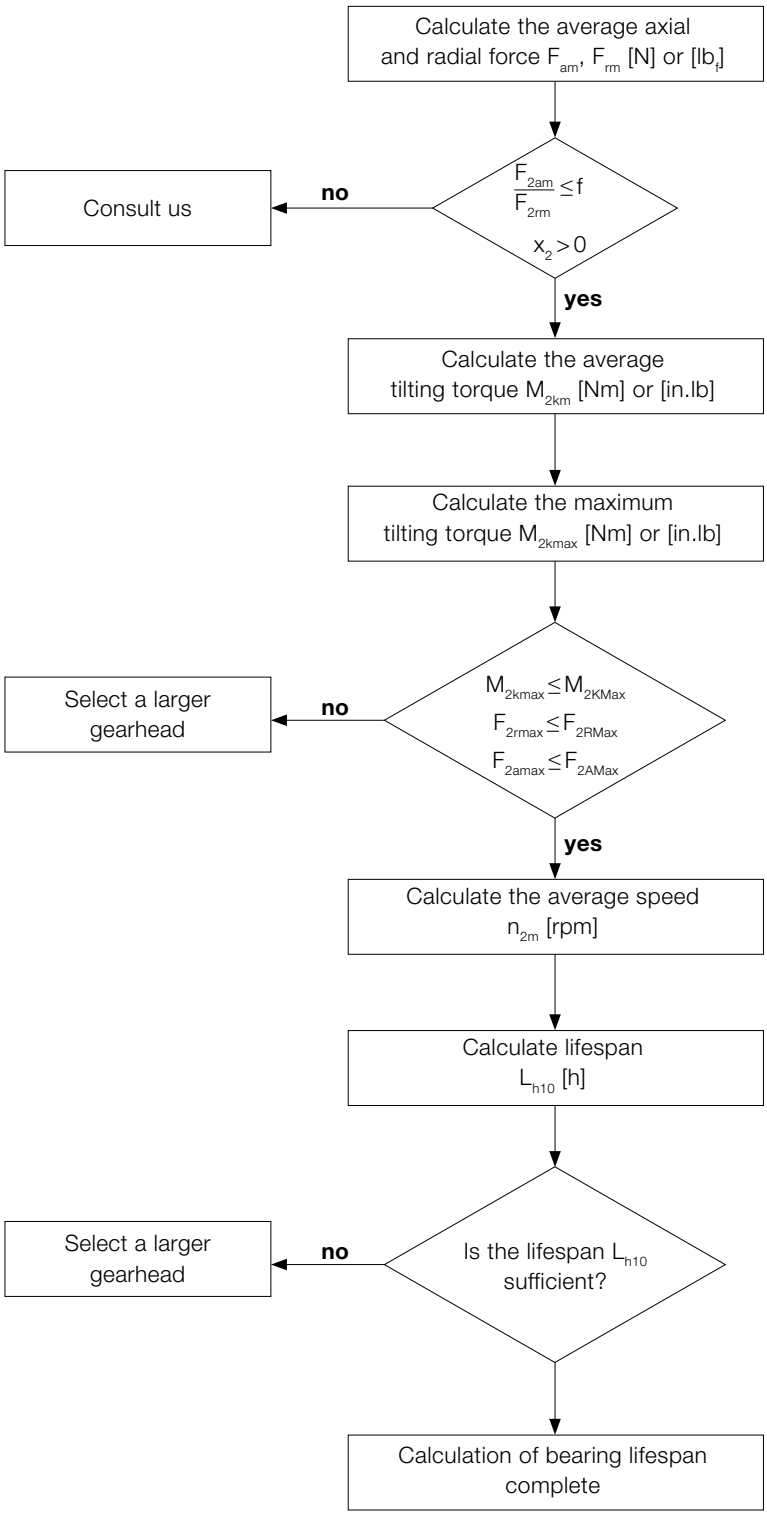
Diagram 2

Standard collective load at output

If the load on the gearhead in continuous operation S1 is less than or equal to the rated torque T_{2N}, the gearing is. At input speeds less than/equal to the rated speed n_{1N}, the temperature of the gearhead will not exceed 90 °C under average ambient conditions.



Bearing lifespan L_{h10} (output bearing)



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

$$F_{2rm} = \sqrt[3]{\frac{|n_{2b}| \cdot t_b \cdot |F_{2rb}|^3 + \ldots + |n_{2n}| \cdot t_n| \cdot F_{2rn}|^3}{|n_{2b}| \cdot t_b + \ldots + |n_{2n}| \cdot t_n}}$$

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

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

a) x_2, y_2, z_2 in mm or in

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

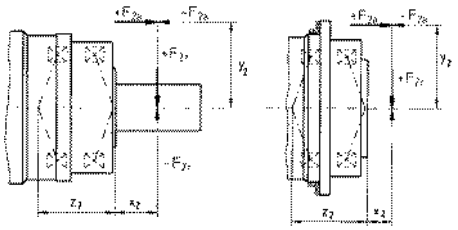
$$L_{h10} = \frac{16666}{n_{2m}} \cdot \left[\frac{K1_2}{M_{2km}} \right]^{p_2}$$

	metric	inch
W	1000	1

	TP+/TPK+	SP+/SPK+	LP+/LPB+ LPK+	alphira® (CP)
f	0.37	0.40	0.24	0.24

LP+/LPB+/LPK+		050	070	090	120	155
z_2	[mm]	20	28.5	31	40	47
	[in]	0.79	1.12	1.22	1.58	1.85
$K1_2$	[Nm]	75	252	314	876	1728
	[in.lb]	664	2230	2779	7753	15293
p_2		3	3	3	3	3

Example with output shaft and flange:



alphira® (CP)		040	060	080	115
z_2	[mm]	12.5	19.5	23.5	28.5
	[in]	0.49	0.77	0.93	1.12
$K1_2$	[Nm]	15.7	70.0	157.0	255.0
	[in.lb]	139	620	1389	2257
p_2		3	3	3	3

SP+/SPK+		060	075	100	140	180	210	240
z_2	[mm]	42.2	44.8	50.5	63.0	79.2	94.0	99.0
	[in]	1.66	1.76	1.99	2.48	3.12	3.70	3.90
$K1_2$	[Nm]	795	1109	1894	3854	9456	15554	19521
	[in.lb]	7036	9815	16762	34108	83686	137653	172761
p_2		3.33	3.33	3.33	3.33	3.33	3.33	3.33

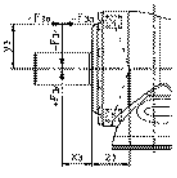
TP+/TPK+		004	010	025	050	110	300	500	2000	4000
z_2	[mm]	57.6	82.7	94.5	81.2	106.8	140.6	157	216	283
	[in]	2.27	3.26	3.72	3.20	4.21	5.48	6.12	8.50	11.1
$K1_2$	[Nm]	536	1325	1896	4048	9839	18895	27251	96400	184000
	[in.lb]	4744	11726	16780	35825	87075	167220	241171	853140	1628400
p_2		3.33	3.33	3.33	3.33	3.33	3.33	3.33	3.33	3.33

TK+/SK+/HG+/LK+: Calculation using cymex®.
Please contact us for further information.

Gearhead types and sizes			TK+ 004 SK+ 060 HG+ 060	SPK+ 075 TPK+ 010 TPK+ 025 MA	TK+ 010 SK+ 075 HG+ 075	SPK+ 100 TPK+ 025 TPK+ 050 MA
Dimensions of rearward drive						
Solid shaft diameter	$øD_{k6}$	mm	16	16	22	22
Solid shaft length	L	mm	28 ±0.15	28 ±0.15	36 ±0.15	36 ±0.15
Hollow shaft interface outer diameter	$øD_{h8}$	mm	18	18	24	24
Hollow shaft interface inner diameter	$ød_{h6}$	mm	15	15	20	20
Hollow shaft interface length	L_{hw}	mm	14	14	16	16
Distance from input axis	A	mm	42.9	42.9	52.6	52.6
Key dimensions (E = key as per DIN 6885, sheet 1, form A)	l	mm	25	25	32	32
	b_{h9}	mm	5	5	6	6
	a	mm	2	2	2	2
	h	mm	18	18	24.5	24.5
Output shaft threaded bore	B		M5x12.5	M5x12.5	M8x19	M8x19
Permissible load of rearward drive						
Max. acceleration torque [c]	T_{3B}		$= T_{2B} - T_{2b}$	Please contact us	$= T_{2B} - T_{2b}$	Please contact us
Nominal output torque [c]	T_{3N}		$= T_{2N} - T_{2n}$		$= T_{2N} - T_{2n}$	
EMERGENCY STOP torque [c]	T_{3Not}		$= T_{2Not} - T_{2not}$		$= T_{2Not} - T_{2not}$	
Max. axial force [b]	F_{3Amax}		1,500	1,500	1,800	1,800
Max. radial force [b]	F_{3Rmax}		2,300	2,300	3,000	3,000
Max. tilting torque	M_{3Kmax}		60	60	100	100
Calculation of average tilting torque at the rearward drive						
Factor for tilting torque calculation	z_3	mm	11.9	11.9	15.6	15.6
Distance between axial force and center of gearhead	y_3	mm	Application-dependent			
Distance between lateral force and shaft collar	x_3	mm	Application-dependent			

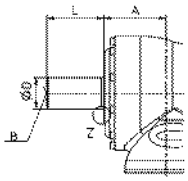
[a] Connection via shrink discs (see from page 410)
[b] Refers to center of shaft
[c] Index as small letter = existing value (application-dependent);
index as capital letter = permissible value
(see catalog values from page 150)

Rearward drive:

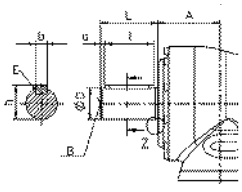


$$M_{3k} = F_{3a} \cdot y_3 + F_{3r} \cdot (x_3 + z_3)$$

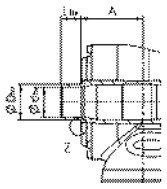
Solid shaft



with key



TK+ 025 SK+ 100 HG+ 100	SPK+ 140 TPK+ 050 TPK+ 110 MA	TK+ 050 SK+ 140 HG+ 140	SPK+ 180 SPK+ 240 TPK+ 110 TPK+ 500 TPK+ 300 MA	TK+ 110 SK+ 180 HG+ 180	SPK+ 210 TPK+ 300 TPK+ 500 MA
32	32	40	40	55	55
58 ±0.15	58 ±0.15	82 ±0.15	82 ±0.15	82 ±0.15	82 ±0.15
36	36	50	50	68	68
30	30	40	40	55	55
20	20	25	25	25	25
63.5	63.5	87	87	107.8	107.8
50	50	70	70	70	70
10	10	12	12	16	16
4	4	5	5	6	6
35	35	43	43	59	59
M12x28	M12x28	M16x36	M16x36	M20x42	M20x42
$= T_{2B} - T_{2b}$	Please contact us	$= T_{2B} - T_{2b}$	Please contact us	$= T_{2B} - T_{2b}$	Please contact us
$= T_{2N} - T_{2n}$		$= T_{2N} - T_{2n}$		$= T_{2N} - T_{2n}$	
$= T_{2Not} - T_{2not}$		$= T_{2Not} - T_{2not}$		$= T_{2Not} - T_{2not}$	
2,000	2,000	9,900	9,900	4,000	4,000
3,300	3,300	9,500	9,500	11,500	11,500
150	150	580	580	745	745
16.5	16.5	20	20	23.75	23.75
Application-dependent					
Application-dependent					

Hollow shaft interface [a)]	Hollow shaft	Closed cover
		
	No connection possible	No connection possible

Modular system matrix **"Output type"**

HG+/SK+/SPK+/TK+/TPK+

S	K	+	_	1	0	0	B	–	M	F	1	–	7	–	D	E	1	/ motor

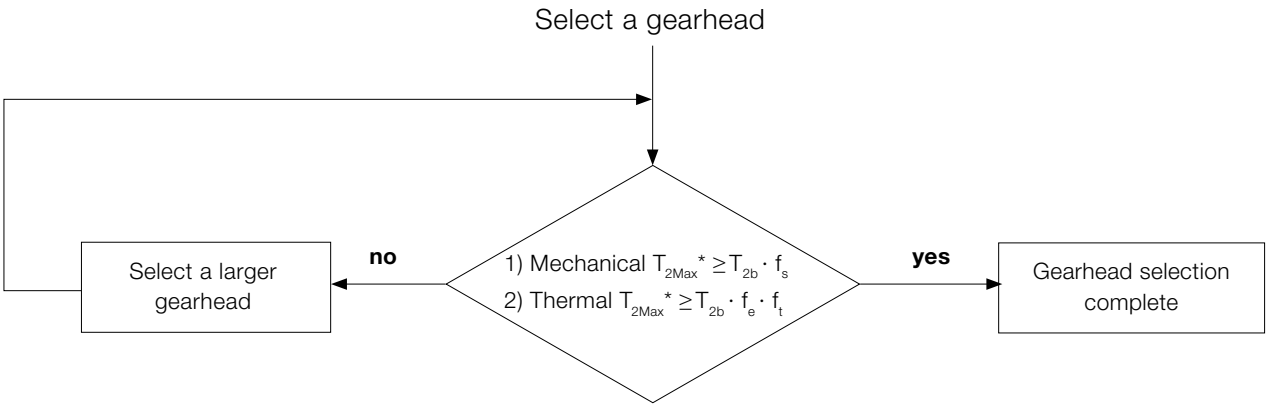
Type code: **B = Modular output combination**
S = Standard

Output shaft shape

When selecting an output combination from the modular system, please select the letter "B" as the type code in the order code. The digit for the required type of output is the modular matrix system.
Example: If you opt for an SK+ with a smooth shaft and require an additional output in the form of a keywayed output shaft, then select the letter "G" and enter in the order key under "Output shaft shape".

	Backward / Output type / Front	 Smooth shaft	 Keywayed shaft	 Hollow shaft interface	 Hollow shaft	 Cover
SK+ / SPK+	 Smooth shaft	D	G	A	-	0*
	 Keywayed shaft	E	H	B	-	1*
	 Involute	F	I	C	-	2*
SPK+	 Attachable shaft	O	P	N	-	5*
TK+	 Flanged hollow shaft	D	G	6	5*	0
TPK+	 Flanged hollow shaft	D	G	6	-	0*
HG+	 Hollow shaft	D	G	6*	5*	0

* Standard version: please specify type code "S" in the order code



Cycles per hour	Load factor f_s
0	1
1000	1,3
3000	1,9
6000	2,2
10000	2,3

Duty cycle for each hour (DC%)	f_e for duty cycle
100	1
80	0,94
60	0,86
40	0,74
20	0,56

Temperature factor f_t

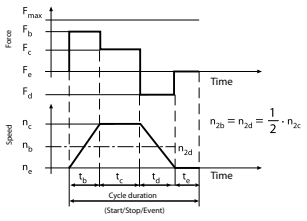
	VD 040						VD 050					
Ratio	**4**	**7**	**10**	**16**	**28**	**40**	**4**	**7**	**10**	**16**	**28**	**40**
n_{1N}= 500 rpm	0,53	0,53	0,53	0,53	0,53	0,53	0,53	0,53	0,53	0,53	0,53	0,53
n_{1N}= 1,000 rpm	0,53	0,53	0,53	0,53	0,53	0,53	0,53	0,53	0,53	0,53	0,53	0,53
n_{1N}= 2,000 rpm	0,53	0,53	0,53	0,53	0,53	0,53	0,53	0,53	0,53	0,56	0,61	0,53
n_{1N}= 3,000 rpm	0,64	0,89	0,96	0,88	0,96	0,84	0,57	0,75	0,78	0,86	0,95	0,79
n_{1N}= 4,000 rpm	1,03	1,15	1,24	1,29	1,40	1,25	0,89	1,16	1,22	1,16	1,28	1,23
	VD 063						**VD 080**					
Ratio	**4**	**7**	**10**	**16**	**28**	**40**	**4**	**7**	**10**	**16**	**28**	**40**
n_{1N}= 500 rpm	0,53	0,53	0,53	0,53	0,53	0,53	0,53	0,53	0,54	0,57	0,64	0,53
n_{1N}= 1,000 rpm	0,53	0,53	0,53	0,56	0,65	0,57	0,7	0,82	0,8	0,83	0,88	0,78
n_{1N}= 2,000 rpm	0,76	0,95	0,94	0,99	1,06	1,01	0,9	1,12	1,1	1,28	1,37	1,2
n_{1N}= 3,000 rpm	1	1,11	1,23	1,32	1,42	1,38	1,22	1,58	1,57	1,88	2,03	1,78
n_{1N}= 3,500 rpm	1,44	1,56	1,74	1,9	2,07	2,03	1,66	1,78	1,79	2,16	2,35	2,06
	VD 100											
Ratio	**4**	**7**	**10**	**16**	**28**	**40**						
n_{1N}= 500 rpm	0,62	0,7	0,72	0,73	0,79	0,69						
n_{1N}= 1,000 rpm	0,79	0,93	0,98	0,99	1,09	0,94						
n_{1N}= 2,000 rpm	1,18	1,3	1,4	1,44	1,62	1,53						
n_{1N}= 3,000 rpm	1,83	1,96	2,16	2,24	2,56	2,46						
n_{1N}= 4,000 rpm	-	-	-	-	-	-						

$T_{2Max}{}^{*}$ = Max. permissible torque at gearhead
T_{2b} Process torque

Ratios i = 28 and i = 40 are self-locking at zero speed.
The self-locking state may be overcome and therefore the gearhead should not replace a brake.
For applications that run at a continuous speed of 3,000 rpm or more in installation position F or G, please contact us.

* For applications with maximum precision requirements throughout lifespan, T_{2Servo} should be used

Bearing lifespan L_{h10} (output bearing)



Output (VDT⁺-, VDH⁺-, VDHe-, VDS⁺- & VDSe- version)

Calculate the average axial and radial force F_{2am}, F_{2rm} [N]

$\frac{F_{2am}}{F_{2rm}} \leq 0.4$; $x_2 > 0$

yes — Index "2" ≙ output

no — Please contact us!

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

$$F_{2rm} = \sqrt[3]{\frac{n_{2b} \cdot t_b \cdot F_{2rb}{}^3 + \ldots + n_{2n} \cdot t_n \cdot F_{2rn}{}^3}{n_{2b} \cdot t_b + \ldots + n_{2n} \cdot t_n}}$$

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

	metric
W	1,000

Z_2 [mm]	VDT⁺	VDH⁺/VDHe/ VDSe	VDS⁺
VD 040	-	57.25	-
VD 050	104	71.5	92.25
VD 063	113.5	82	111.5
VD 080	146.75	106.25	143.25
VD 100	196	145.5	181

Calculate the average tilting torque $M_{2k\,m}$ [Nm]

$$M_{2\,k\,max} = \frac{F_{2\,a\,max} \cdot y_2 + F_{2\,r\,max} \cdot (x_2 + z_2)}{W}$$

Calculate the maximum tilting torque $M_{2k\,max}$ [Nm]

Type	VD 040	VD 050	VD 063	VD 080	VD 100
$M_{2K\,Max}$ [Nm]	205	409	843	1,544	3,059
$F_{2R\,Max}$ [N]	2,400	3,800	6,000	9,000	14,000
$F_{2A\,Max}$ [N]	3,000	5,000	8,250	13,900	19,500

$M_{2\,k\,max} \leq M_{2\,K\,Max}$
$F_{2\,r\,max} \leq F_{2\,R\,Max}$
$F_{2\,a\,max} \leq F_{2\,A\,Max}$

no — Select a larger gearhead

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

yes

$K1_2$ [Nm]	VDT⁺	VDH⁺/VDHe/ VDSe	VDS⁺
VD 040	-	1,230	-
VD 050	3,050	2,320	2,580
VD 063	4,600	3,620	5,600
VD 080	9,190	9,770	10,990
VD 100	20,800	15,290	20,400

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

Calculate the average speed $n_{2\,m}$ [rpm]

P_t	T/H/S
i=4	1.5
i=7	0.72
i=10	0.6
i=16	0.5
i=28	0.4
i=40	0.36

$$L_{h10} = \frac{16666}{n_{2m}} \cdot \left[\frac{K1_2}{p_t \cdot T_{2m} + M_{2km}} \right]^{3.33}$$

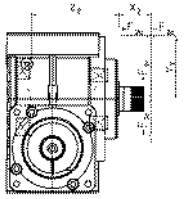
Calculate lifespan L_{h10} [h]

Is the lifespan L_{h10} sufficient?

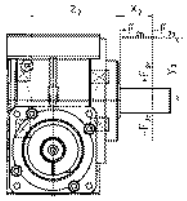
no — Select a larger gearhead

yes — Gearhead selection complete

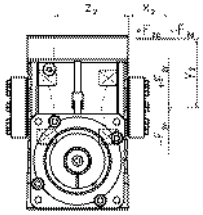
VDS⁺ involute



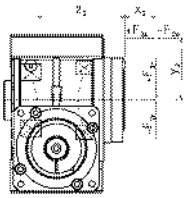
VDS⁺ / VDSe smooth, keywayed



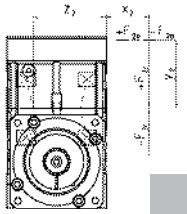
VDH⁺ /VDHe smooth



VDT⁺



VDH⁺ /VDHe keywayed



Metal bellows and torque limiters – Detailed sizing (EC2, BC2, BC3, BCH, BCT, TL1, TL2, TL3)

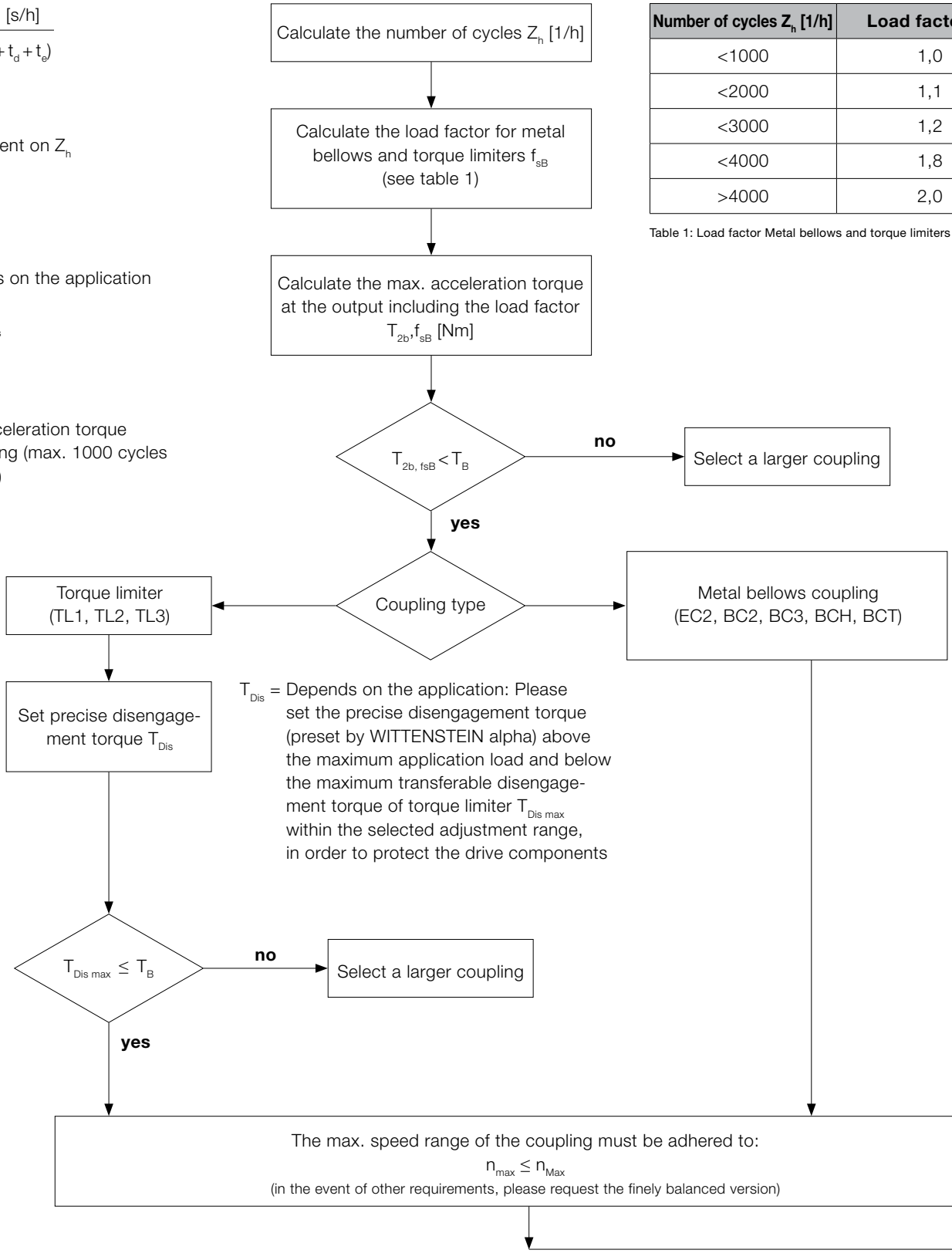
$$Z_h = \frac{3600\ [s/h]}{(t_b + t_c + t_d + t_e)}$$

f_{sB} is dependent on Z_h (table 1)

T_{2b} = depends on the application

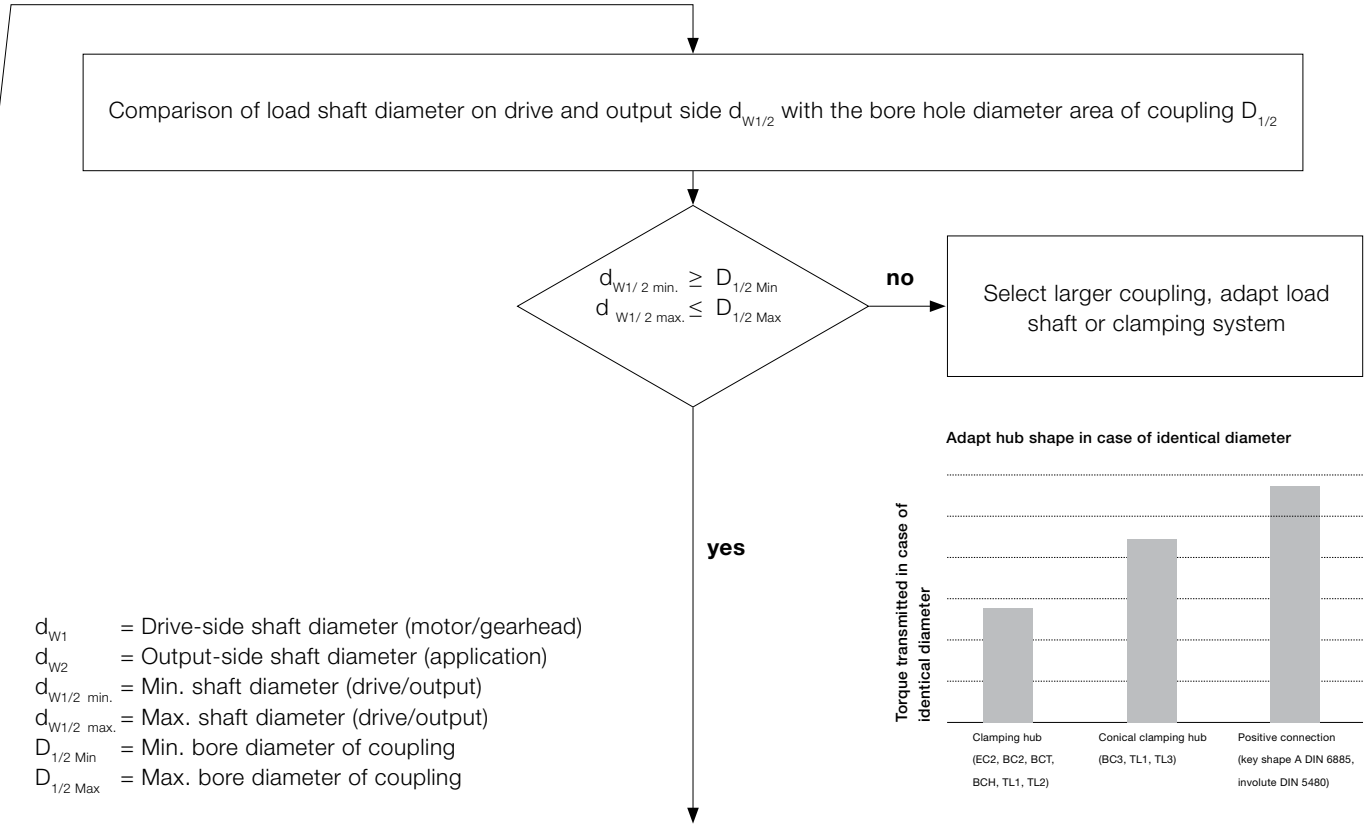
$T_{2b,\ f_{sB}} = T_{2b} \cdot f_s$

T_B = Max. acceleration torque of coupling (max. 1000 cycles per hour)



Number of cycles Z_h [1/h]	Load factor f_{sB}
<1000	1,0
<2000	1,1
<3000	1,2
<4000	1,8
>4000	2,0

Table 1: Load factor Metal bellows and torque limiters



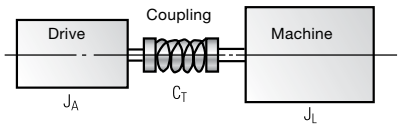
d_{W1} = Drive-side shaft diameter (motor/gearhead)
d_{W2} = Output-side shaft diameter (application)
$d_{W1/2\ min.}$ = Min. shaft diameter (drive/output)
$d_{W1/2\ max.}$ = Max. shaft diameter (drive/output)
$D_{1/2\ Min}$ = Min. bore diameter of coupling
$D_{1/2\ Max}$ = Max. bore diameter of coupling

Detailed sizing of metal bellows and torque limiters complete

Note:

The resonant frequency of the coupling must be higher or lower than the machine frequency. For the purpose of calculation, the drive is reduced to a two-mass system:
Best practices in sizing: $f_e \geq 2 \times f_{er}$

Two-mass system



$$f_e = \frac{1}{2 \cdot \pi} \sqrt{C_T \cdot \frac{J_A + J_L}{J_A \cdot J_L}} \quad [Hz]$$

C_T = Torsional rigidity of coupling [Nm/rad]
f_e = Natural frequency of 2-mass system [Hz]
f_{er} = Excitation frequency of drive [Hz]
J_L = Moment of inertia of machine [kgm²]
J_A = Moment of inertia on drive side [kgm²]

Maximum misalignments:
Permissible values (axial, angular, lateral) for shaft misalignments must be adhered to

EMERGENCY STOP torque:
If there is a need for the transmission of EMERGENCY STOP situations, it is recommended to use torque limiters (TL1, TL2 and TL3) in order to protect further drive components and to increase the overall service life. Models EC2, BC2, BC3 and BCH can briefly transmit 1.5 times the T_B of the coupling, provided all the other instructions are complied with (see T_{Emer}).
For torque limiters with the "Load holding version" functional system, double load safety is ensured for the TL1 coupling (indirect drives), while an adequate size must be ensured for the TL2 and TL3 models with bellows attachment: Blocking load < T_B of the coupling!

Elastomer couplings – detailed sizing (EL6, ELC)

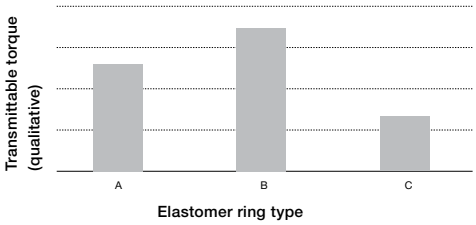
T_{2n} = Depends on the application

f_{tE} = The temperature factor for elastomer couplings is dependent on the elastomer ring and the ambient temperature at the coupling (see table 1)

T_{NE}* = Max. rated torque of elastomer ring

Temperature factor f_{tE}	Elastomer ring		
Temperature [°C]	**A**	**B**	**C**
> -30 to -10	1,5	1,7	1,4
> -10 to +30	1,0	1,0	1,0
> +30 to +40	1,2	1,1	1,3
> +40 to +60	1,4	1,3	1,5
> +60 to +80	1,7	1,5	1,8
> +80 to +100	2,0	1,8	2,1
> +100 to +120	-	2,4	-

Table 1: Temperature factor for elastomer couplings dependent on elastomer ring and ambient temperature



Calculate the rated torque of the application T_{2n} [Nm]

Calculate the temperature factor f_{tE} (see table 1)

$T_{2n} \times f_{tE} \leq T_{NE}^*$ — **no** → Select larger coupling or different elastomer ring

yes

$$Z_h = \frac{3600\ [s/h]}{(t_b + t_c + t_d + t_e)}$$

Calculate the number of cycles Z_h [1/h]

Number of cycles Zh [1/h]	Impact factor f_{sE}
<1000	1,0
<2000	1,2
<3000	1,4
<4000	1,8
>4000	2,0

Table 2: Load factor for elastomer couplings

f_{sE} The load factor of elastomer couplings is dependent on Z_h (table 2)

Calculate the load factor of elastomer couplings f_{sE} (see table 2)

T_{2b} = depends on the application

$T_{2b,fsE,ftE} = T_{2b} \cdot f_{sE} \cdot f_{tE}$

Calculate the max. acceleration torque at the output including the temperature factor and load factor for elastomer couplings $T_{2b,fsE,ftE}$ [Nm]

T_{BE} = max. acceleration torque of elastomer (max. 1000 cycles per hour)

* = The maximum torque transmitted by the ELC coupling is also dependent on the minimum bore diameter (please also compare with table on catalog page 401 ELC couplings)

Coupling model

EL6 → $T_{2b,fsE,ftE} \leq T_{BE}$ — **no** → Select larger coupling, different elastomer ring or bore diameter

ELC → $T_{2b,fsE,ftE} \leq T_{BE^*}$ — **no** → Select larger coupling, different elastomer ring or bore diameter

The max. speed range of the coupling must be adhered to:

$n_{max} \leq n_{Max}$

(in the event of other requirements, please request the finely balanced version)

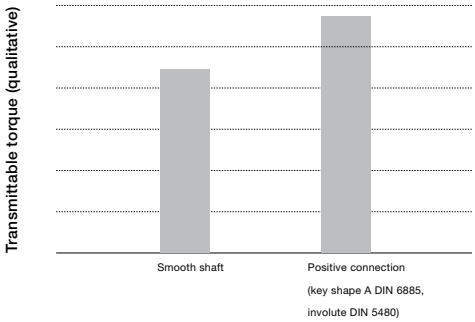
Comparison of load shaft diameter on drive and output side $d_{W\,1/\,2}$ with the bore hole diameter area of coupling $D_{1/2}$

$d_{W1/\,2\,min.} \geq D_{1/2\,Min}$
$d_{W1/\,2\,max.} \leq D_{1/2\,Max}$

no → Select larger coupling, adapt load shaft or clamping system

yes

Adapt clamping system in the event of identical diameter



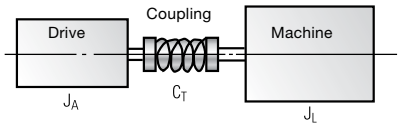
d_{W1} = Drive-side shaft diameter (motor/gearhead)
d_{W2} = Output-side shaft diameter (application)
$d_{W1/2\ min.}$ = Min. shaft diameter (drive/output)
$d_{W1/2\ max.}$ = Max. shaft diameter (drive/output)
$D_{1/2\ Min}$ = Min. bore diameter of coupling
$D_{1/2\ Max}$ = Max. bore diameter of coupling

Detailed sizing of elastomer couplings complete

Note:

The resonant frequency of the coupling must be higher or lower than the machine frequency. For the purpose of calculation, the drive is reduced to a two-mass system:
Best practices in sizing: $f_e \geq 2 \times f_{er}$

Two-mass system



$$f_e = \frac{1}{2 \cdot \pi} \sqrt{C_T \cdot \frac{J_A + J_L}{J_A \cdot J_L}} \quad \textbf{[Hz]}$$

C_T = Torsional rigidity of coupling [Nm/rad]
f_e = Natural frequency of 2-mass system [Hz]
f_{er} = Excitation frequency of drive [Hz]
J_L = Moment of inertia of machine [kgm²]
J_A = Moment of inertia on drive side [kgm²]

The max. speed range of the coupling must be adhered to:
$n_{max} \leq n_{Max}$ (in the case of other requirements, please request the finely balanced version)

Emergency stop torque: Dimensioning does not take emergency stop torques into consideration.
Instead, please regard the required emergency stop torque as the maximum torque of the application.

Maximum misalignments:
Permissible values (axial, angular, lateral) for shaft misalignments must be adhered to

Based on angle of torsion

Transmission errors due to a torsional load on the metal bellows (EC2, BC2, BC3, BCH, BCT, TL2 und TL3):

$$\varphi = \frac{180}{\pi} \cdot \frac{T_{2b}}{C_T} \quad \textbf{[degrees]}$$

φ = angle of turn [degrees]
C_T = torsional rigidity of coupling [Nm/rad]
T_{2b} = max. available acceleration torque [Nm]

The **alpha**bet

Acceleration torque (T_{2B})

The acceleration torque T_{2B} is the maximum permissible torque that can briefly be transmitted at the output by the gearhead after ≤1000/h cycles. For >1000/h cycles, the → **Shock factor** must be taken into account. T_{2B} is the limiting parameter in cyclic operation.

Adapter plate

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

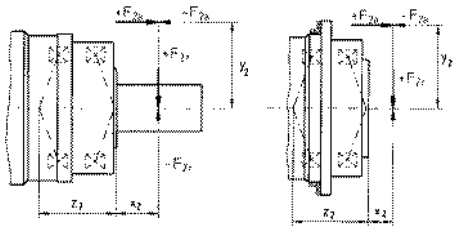
Angular minute

A degree is subdivided into 60 angular minutes (=60 arcmin=60'). In other words, if the torsional backlash is specified as 1 arcmin, for example, the output can be turned 1/60°. The repercussions for the actual application are determined by the arc length: $b = 2 \cdot \pi \cdot r \cdot \alpha° / 360°$. A pinion with a radius r=50 mm on a gearhead with standard torsional backlash j_t=3' can be turned b=0.04 mm.

Axial force (F_{2AMax})

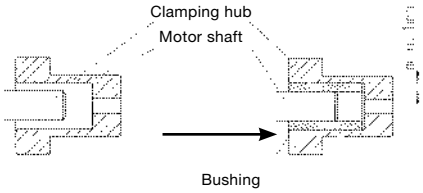
In the case of SP+/LP+/SPK+, the axial force F_{2AMax} acting on a gearhead runs parallel to its output shaft. On a TP+, the force runs perpendicular to its output shaft. It may be applied with axial offset via a lever arm y_2 under certain circumstances, in which case it also generates a bending moment.
If the axial force exceeds the permissible catalogue values, additional design features (e.g. axial bearings) must be implemented to absorb these forces.

Example with output shaft and flange:



Bushing

If the motor shaft diameter is smaller than the → **clamping hub**, a bushing is used to compensate the difference in diameter.



Clamping hub

The clamping hub ensures a frictional connection between the motor shaft and gearhead. A → **bushing** is used as the connecting element if the motor shaft diameter is smaller than that of the clamping hub.

Continuous operation (S1)

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

Cyclic operation (S5)

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

cymex®

cymex® is the calculation software developed by our company for dimensioning complete drive trains. We can also provide training to enable you to make full use of all the possibilities provided by the software.

Degree of protection (IP)

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

Example: **IP65**

Protection against impurities (Dust resistance)	Protection against water

Duty cycle (ED)

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

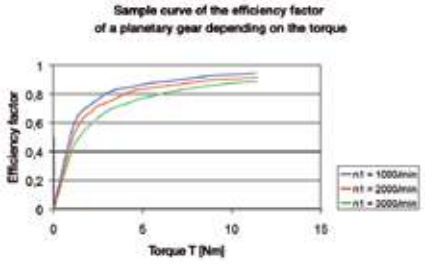
$$ED\,[\%] = \left[\frac{t_b + t_c + t_d}{t_b + t_c + t_d + t_e}\right] \cdot 100 \quad \frac{\text{Motion duration}}{\text{Cycle duration}}$$

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

Efficiency (η)

Efficiency [%] η is the ratio of output power to input power. Power lost through friction reduces efficiency to less than 1 or 100 %.
$\eta = P_{out} / P_{in} = (P_{in} - P_{lost}) / P_{in}$

WITTENSTEIN alpha always measures the efficiency of a gearhead during operation at full load (T_{2B}). If the input power or torque are lower, the efficiency rating is also lower due to the constant no-load torque. Power losses do not increase as a result. Speed also has an effect on efficiency, as shown in the example diagram above.



Emergency stop torque (T_{2Not})

The emergency stop torque [Nm] T_{2Not} is the maximum permissible torque at the gearhead output and must not be reached more than 1000 times during the life of the gearhead. It must never be exceeded!

→ Refer to this term for further details.

Ex symbol

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

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

HIGH SPEED (MC)

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

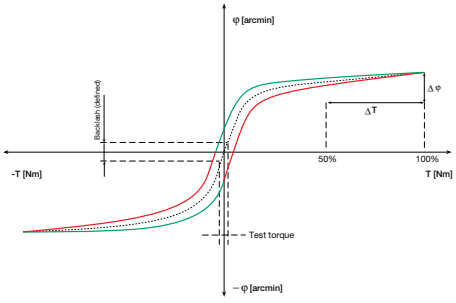
HIGH TORQUE (MA)

The HIGH TORQUE version of our TP+ gearhead has been specially developed for applications requiring extremely high torques and maximum rigidity.

MA = HIGH TORQUE
MC = HIGH SPEED
MF = standard versions of our WITTENSTEIN alpha servo gearheads

Hysteresis curve

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



If the input shaft is locked, the gearhead is loaded with a torque that increases continuously up to T_{2B} and is then relieved at the output in both directions. The torsional angle is plotted against the torque. This yields a closed curve from which the → **torsional backlash** and → **torsional rigidity** can be calculated.

Jerk

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

Lateral force (F_R)

Lateral force is the force component acting at right angles to the output shaft with the SP+/LP+/SPK+ or parallel to the output flange with the TP+. It acts perpendicular to the axial force and can assume an axial distance of x_2 in relation to the shaft nut with the SP+/LP+) or shaft flange with the TP+, which acts as a lever arm. The lateral force produces a bending moment (see also axial force).

Mass moment of inertia (J)

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

Mesh frequency (f_z)

The mesh frequency may cause problems regarding vibrations in an application, especially if the excitation frequency corresponds to the intrinsic frequency of the application.
The mesh frequency can be calculated for all SP+, TP+ , LP+ and alphira® gearheads using the formula $f_z = 1{,}8 \cdot n_2$ [rpm] and is therefore independent of the ratio if the output speed is the same.
If it does indeed become problematic, the intrinsic frequency of the system can be changed or another gearhead (e.g. hypoid gearhead) with a different mesh frequency can be selected.

NSF symbol

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

No load running torque (T_{012})

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

T_{012}: 0 (no load) 1→2 (from input end to output end)

Nominal torque (T_{2N})

The nominal torque [Nm] T_{2N} is the torque continuously transmitted by a gearhead over a long period of time, i.e. in **→continuous operation** (without wear).

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

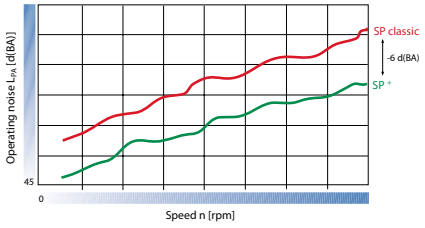
When selecting a gearhead, it is important to consider whether the motion profile is characterized by frequent acceleration and deceleration phases in cyclic operation (S5) as well as pauses, or whether it is designed for continuous operation (S1), i.e. with long phases of constant motion.

Operating noise (L_{PA})

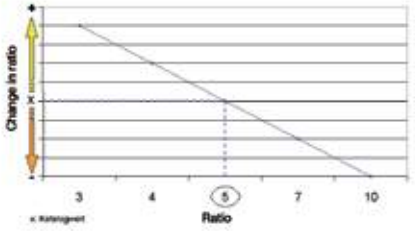
Low noise level L_{PA} is a factor of growing importance for environmental and health reasons. WITTENSTEIN alpha has succeeded in reducing the noise of the new SP+ gearheads by another 6 dB(A) over the former SP units (i.e. sound reduced to one quarter). Noise levels are now currently 64 - 70 dB(A) depending on the size of the gearhead.
The gear ratio and speed both affect the noise level. The relationships are demonstrated in the following trend graphs. As a general rule: A higher speed means a higher noise level, while a higher ratio means a lower noise level. The values specified in our catalog relate to gearheads with the ratio i = 10/100 at a speed of n = 3000 rpm.

Positioning accuracy

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



Change in operating noise in relation to the ratio



Rate of mass moment of inertia (λ = Lambda)

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

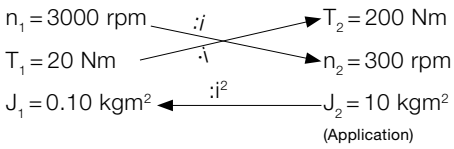
$$\lambda = \frac{J_{external}}{J_{internal}}$$

$J_{external}$ reduced to the gear input:
$J'_{external} = J_{external} / i^2$

Simple applications ≤ 10
Dynamic applications ≤ 5
Highlydynamic applications ≤ 1

Ratio (i)

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

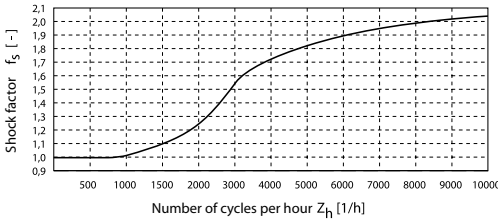


Safety notice

If your application has to meet special safety requirements (e.g. vertical axes, tensioned drives), we recommend using exclusively our alpheno®, RP+, TP+ and TP+ HIGH TORQUE products or contact WITTENSTEIN alpha for advice.

Shock factor (f_s)

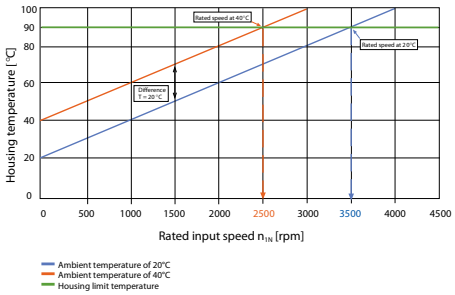
The maximum permissible acceleration torque during cyclic operation specified in the catalog applies for a cycle rate less than 1000/h. Higher cycle rates combined with short acceleration times can cause vibrations in the drive train. Use the shock factor f_s to include the resulting excess torque values in calculations.
The shock factor f_s can be determined with reference to the curve. This calculated value is multiplied by the actual acceleration torque T_{2b} and then compared with the maximum permissible acceleration torque T_{2B}. ($T_{2b} \cdot f_s = T_{2b,\,fs} < T_{2B}$)



Speed (n)

Two speeds are of relevance when dimensioning a gearhead: the maximum speed and the nominal speed at the input. The maximum permissible speed n_{1Max} must not be exceeded because it serves as the basis for dimensioning

→ **cyclic operation**. The nominal speed n_{1N} must not be exceeded in → **continuous operation**.
The housing temperature limits the nominal speed, which must not exceed 90 °C. The nominal input speed specified in the catalogue applies to an ambient temperature of 20 °C. As can be seen in the diagram below, the temperature limit is reached more quickly in the presence of an elevated outside temperature. In other words, the nominal input speed must be reduced if the ambient temperature is high. The values applicable to your gearhead are available from WITTENSTEIN alpha on request.



Synchronization error

The synchronization error is equal to the variations in speed measured between the input and output during one revolution of the output shaft. The error is caused by manufacturing tolerances and results in minute angular deviations and fluctuations in ratio.

T_{2Max}

T_{2Max} means the maximum torque which can be transmitted by the gearbox.
This value can be chosen for applications that can accept a slight increase in backlash over time.

T_{2Servo}

T_{2Servo} is a special value for precision applications in which a minimum backlash must be guaranteed over the life of the gearbox. The increase in backlash seen in other worm gears is less due to the optimized hollow flank teeth.

Technical data

The technical data relating to our products can be downloaded from our homepage. Alternatively, you can send your requests, suggestions and comments to the address below.

Tilting moment (M_{2K})

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

Timing belt

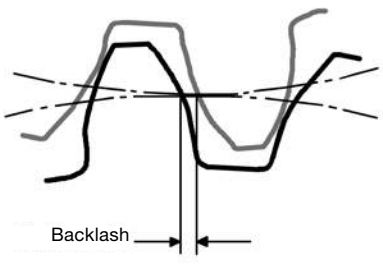
The AT profile of the Wittenstein standard belt pulley is a flank-centered profile for backlash-free torque transmission.
Effective diameter
d0 = Number of teeth z x Pitch p / Pi
Recommended preload per strand for linear drives Fv ≥ Fu
Radial force at the output shaft for the determination of the bearing life:
Fr = 2 x Fv

Torque (M)

The torque is the actual driving force of a rotary motion. It is the product of lever arm and force. $M = F \cdot l$

Torsional backlash (j_t)

Torsional backlash j_t is the maximum angle of torsion of the output shaft in relation to the input. Torsional backlash is measured with the input shaft locked.



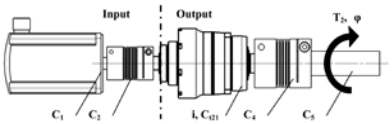
The output is then loaded with a defined test torque in order to overcome the internal gearhead friction. The main factor affecting torsional backlash is the face clearance between the gear teeth. The low torsional backlash of WITTENSTEIN alpha gearheads is due to their high manufacturing accuracy and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

→ Refer to this term for further details.

Torsional rigidity (C_{t21})

Torsional rigidity [Nm/arcmin] C_{t21} is defined as the quotient of applied torque and generated torsion angle ($C_{t21} = \Delta T / \Delta\varphi$). It consequently shows the torque required to turn the output shaft by one angular minute. The torsional rigidity can be determined from the → **hysteresis curve**. Only the area between 50 % and 100 % of T_{2B} is considered for because this area of the curve profile can be considered linear.

Torsional rigidity C , Torsion angle Φ



Reduce all torsional rigidities to the output:

$$C_{(n),output} = C_{(n),input} * i^2$$

with i = Gear ratio [-]
$C_{(n)}$ = single stiffness [Nm/arcmin]

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

Series connection of torsional rigidities

$$1/C_{ges} = 1/C_{1,output} + 1/C_{2,output} + \ldots + 1/C_{(n)}$$

Torsion angle Φ [arcmin]

$\Phi = T_2 * 1/C_{ges}$
with T_2 = Output torque [Nm]

WITTENSTEIN alpha speedline®

If required, we can deliver a new SP+, TP+ or LP+ within 24 or 48 hours ex works.

Formulae

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

Conversion table

1 mm	= 0.039 in
1 Nm	= 8.85 in lb
1 kgcm^2	= 8.85 x 10^{-4} in.lb.s^2
1 N	= 0.225 lb_f
1 kg	= 2.21 lb_m

Symbols

Symbol	Unit	Designation
C	Nm/arcmin	Rigidity
ED	%, min	Duty cycle
F	N	Force
f_s	–	Shock factor
f_t	–	Temperature factor
f_e	–	Factor for duty cycle
i	–	Ratio
j	arcmin	Backlash
J	kgm^2	Moment of inertia
K1	Nm	Factor for bearing calculation
L	h	Service life
L_{PA}	dB(A)	Operating noise
m	kg	Mass
M	Nm	Torque
n	rpm	Speed
p	–	Exponent for bearing calculation
η	%	Efficiency
t	s	Time
T	Nm	Torque
v	m/min	Linear velocity
x	mm	Distance between lateral force and shaft collar
y	mm	Distance between axial force and center of gearhead
z	mm	Factor for bearing calculation
Z	1/h	Number of cycles

Index

Capital letter	Permissible values
Small letter	Actual values
1	Drive
2	Output
3	Rearward drive (for hypoid gearheads)
A/a	Axial
B/b	Acceleration
c	Constant
cym	cymex® values (load-related characteristic values)
d	Deceleration
e	Pause
h	Hours
K/k	Tilting
m	Mean
Max/max	Maximum
Mot	Motor
N	Nominal
Not/not	Emergency stop
0	No load
R/r	Radial
t	Torsional
T	Tangential

Order information

Gearhead type
TP⁺ 004 – TP⁺ 4000
SP⁺ 060 – SP⁺ 240

Type code
S = Standard
A = Optimized mass moment of inertia [b]
E = Version in ATEX [b]
F = Food-grade lubrication [b]
G = Grease [b]
L = Low friction (SP⁺ 100 - 240 HIGH SPEED)
W = Corrosion resistant [b]

Gearhead variations
M = Motor attachment gearhead
S = Separate version

Gearhead model
F = Standard
A = HIGH TORQUE (only TP⁺)
C = HIGH SPEED (only SP⁺)

Number of stages
1 = 1-stage
2 = 2-stage
3 = 3-stage

[a] Order shrink discs separately, see section accessories, shrink discs on page 410
[b] Reduced specification available on request

Gearhead type
TK⁺ 004 – TK⁺ 110
TPK⁺ 010 – TPK⁺ 500
SK⁺ 060 – SK⁺ 180
SPK⁺ 075 – SPK⁺ 240
HG⁺ 060 – HG⁺ 180
SC⁺ 060 – SC⁺ 180
SPC⁺ 060 – SPC⁺ 180
TPC⁺ 004 – TPC⁺ 110

Type code
S = Standard
B = Modular output combination (SK⁺, SPK⁺, TK⁺, TPK⁺, HG⁺) [c]
E = Version in ATEX [b] [d]
F = Food-grade lubrication [b]
W = Corrosion resistant [b]

Gearhead variations
M = Motor attachment gearhead

Gearhead model
F = Standard
A = HIGH TORQUE (only TPK⁺)

Number of stages
1 = 1-stage
2 = 2-stage
3 = 3-stage
4 = 4-stage

[a] Order shrink discs separately, see section accessories, shrink discs on page 410
[b] Reduced specification available on request
[c] See modular system matrix, page 424
[d] SK⁺/TK⁺/HG⁺ only

Gearhead type
LP⁺ 050 – LP⁺ 155
LPB⁺ 070 – LPB⁺ 120

Type code
S = Standard
F = Food lubrication

Gearhead variations
M = Motor attachment gearhead

Gearhead model
F = Standard

Number of stages
1 = 1-stage
2 = 2-stage

Gearhead type
LK 050 – LK 155
LPK 050 – LPK 155
LPBK 070 – LPBK 120
CP 040 – CP 115
(alphira®)

Gearhead variations
M = Motor attachment gearhead

Gearhead model
O = Standard
L = Food-grade grease

Number of stages
1 = 1-stage
2 = 2-stage
3 = 3-stage (LPK⁺)

Ratios
See technical data sheets.

Gearhead type
VDT = TP flange
VDH = hollow shaft
VDS = shaft

Gearhead version
e = economy
(only for VDH and VDS, size 040, 050 and 063)

Distance between axes
040, 050, 063, 080, 100

Gearhead variations
M = Motor attachment gearhead

Gearhead model
F = Standard
L = Food-grade lubrication
W = Corrosion resistant

Number of stages
1 = 1-stage

** See section accessories, shrink discs on page 410

Ratios
See technical data sheets.

Output shape
0 = smooth shaft/flange
1 = shaft with key
2 = involute to DIN 5480
3 = system output
4 = other
5 = Shaft mounted (SP+) [a)]

Clamping hub bore hole diameter
(see technical data sheets and clamping hub diameter table)

Backlash
1 = Standard
0 = Reduced
(see technical data sheets)

Installation on motor side
S = Push-on sleeve
K = Coupling

X = Special model

Ratios
See technical data sheets.

Output shape
0 = smooth shaft/flange (no hollow shaft)
1 = shaft with key
2 = involute to DIN 5480
3 = system output
4 = other
5 = Hollow shaft interface / Flanged hollow shaft (TK+) [a)]
Shaft mounted (SPK+/SPC+) [a)]
6 = 2 hollow shaft interfaces (HG+) [a)]
(see technical data sheets)

Clamping hub bore hole diameter
(see technical data sheets and clamping hub diameter table)

Backlash
1 = Standard
0 = Reduced
(see technical data sheets)

Installation on motor side
S = Push-on sleeve
K = Coupling

X = Special model

Ratios
See technical data sheets.

Output shape
0 = Smooth shaft/flange
1 = Shaft with key

Clamping hub bore hole diameter
(see technical data sheets and clamping hub diameter table)

Backlash
1 = Standard
(see technical data sheets)

Installation on motor side
S = Push-on sleeve
K = Coupling

Output shape
0 = Smooth shaft (for LP+ only)
1 = Shaft with key
LPBK+
1 = Centering on output side

Clamping hub bore hole diameter
1 = Standard
(see technical data sheets)

Backlash
1 = Standard

X = Special model

Ratios
4 (not for economy sizes 050 and 063)
7
10
16
28
40

Output shape
0 = smooth shaft/flange
1 = shaft with key
2 = involute to DIN 5480 (VDS+)
4 = other (see technical data sheets)
8 = Dual-shaft output, smooth (VDS+, VDSe)
9 = Dual-shaft output with key (VDS+, VDSe)

Clamping hub bore hole diameter
2 = 14 mm (040)
3 = 19 mm (040, 050)
4 = 28 mm (063)
5 = 35 mm (080)
7 = 48 mm (100)

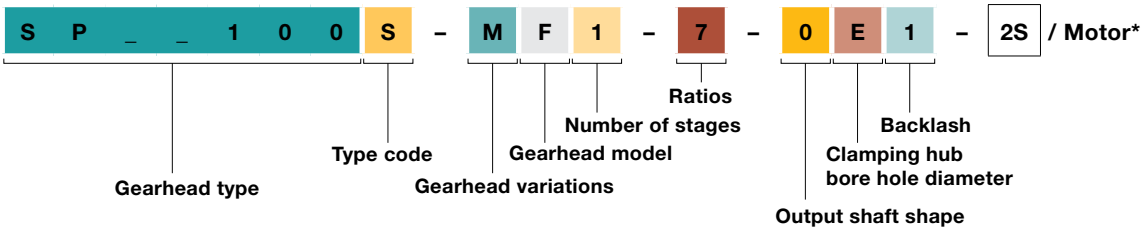
Backlash
1 = Standard
0 = Reduced

VDH – number of shrink discs**
0 = no shrink disc
1 = one shrink disc
2 = two shrink discs

X = Special model

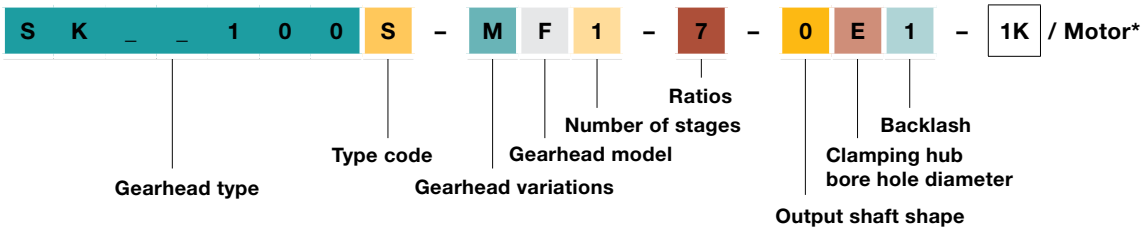
Order codes

TP+/SP+



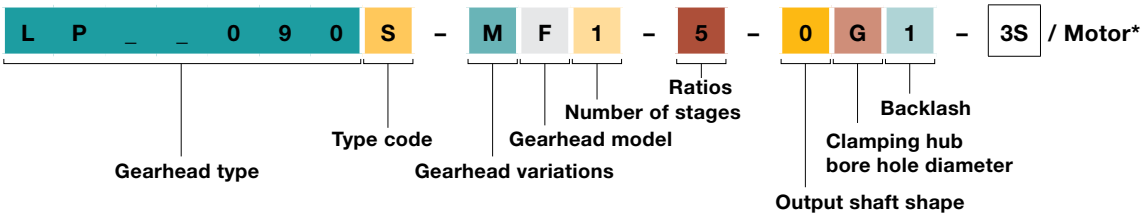
* Full motor designation only required for determining gearhead attached components!

TK+/TPK+/SK+/SPK+/HG+/SC+/SPC+/TPC+

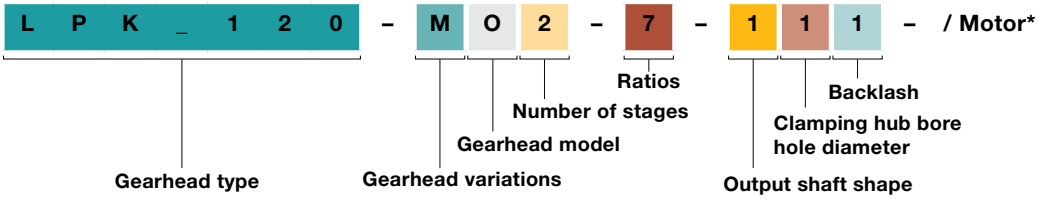


* Full motor designation only required for determining gearhead attached components!

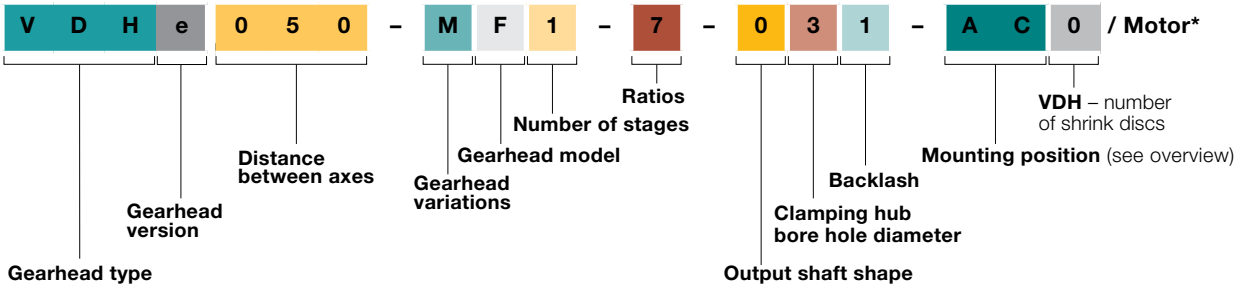
LP+/LPB+ Generation 3



LK+/LPK+/LPBK+/CP (alphira®)



V-Drive

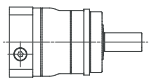


Mounting positions and clamping hub diameters

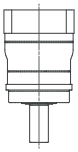
Coaxial gearheads

TP⁺ 2000/4000: Please contact WITTENSTEIN alpha

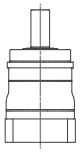
B5 – horizontal



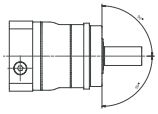
V1 – vertical
Output shaft downwards



V3 – vertical
Output shaft upwards



S – can be tilted
±90° from a horizontal position



Clamping hub diameter

(the technical data sheet contains all diameters available for TP⁺, SP⁺, TK⁺,TPK⁺, SK⁺, SPK⁺, SC⁺, SPC⁺, TPC⁺, HG⁺ and LP⁺ models)

Code letter	mm	Code letter	mm
B	11	I	32
C	14	K	38
D	16	L	42
E	19	M	48
G	24	N	55
H	28	O	60

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

Right-angle gearheads

For information purposes only – not required when placing orders!

Permitted standard mounting positions for right-angle gearheads (see illustrations)

If the mounting position is different, contact WITTENSTEIN alpha

B5/V3
Output shaft, horizontal
Motor shaft upwards

B5/V1
Output shaft, horizontal
Motor shaft downwards

V1/B5
Output shaft, vertical
Motor shaft, horizontal

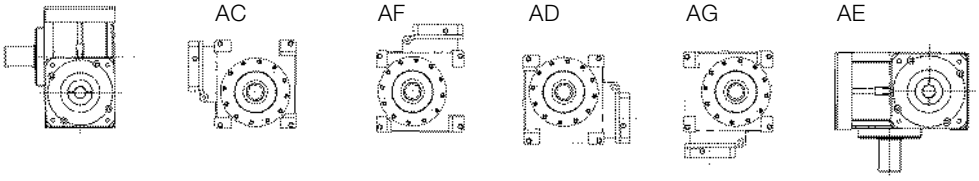
V3/B5
Output shaft, vertical, upwards
Motor shaft, horizontal

B5/B5
Output shaft, horizontal
Motor shaft, horizontal

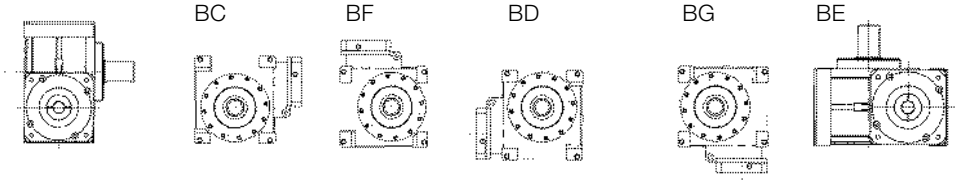
Worm gearheads

Mounting position (only relevant for oil volume)

Output side A:
View of motor interface
Only valid for VDS⁺, VDSe and VDT⁺



Output side B:
View of motor interface
Only valid for VDS⁺, VDSe und VDT⁺



For VDH⁺, VDHe and VDS⁺/VDSe with Dual-shaft output, A and B must be replaced with 0 (zero).

Order information

Rack and assembly jig

Rack type
ZST = Rack
ZMT = Assembly jig

Module
200 = 2.00
300 = 3.00
400 = 4.00
500 = 5.00
600 = 6.00

Version
PA5 = Premium Class
HE6 = Performance Class
VB6 = Value Class
PD5 = Assembly jig

Length
100 = Assembly jig (module 2 – 3)
156 = Assembly jig (module 4 – 6)
480 = Smart Class (module 2 – 4)
167/333 = Premium Class (module 2)
250 = Premium Class (module 3)
500 = Premium Class (module 2 – 6)
1000 = Value Class (module 2 – 6)

Premium Class+ and Value Class pinion

Designation
RMT = Pinion mounted ex works
RMX = Pinion mounted offset 180°
(for VC pinions only)

Module
200 = 2.00
300 = 3.00
400 = 4.00
500 = 5.00
600 = 6.00

Version
PC5 = Premium Class
VC6 = Value Class

Number of teeth
(see technical data sheet)

Premium Class RTP and Standard Class RSP pinions

Designation
RSP = Standard Class RSP pinion for SP
Involute output as per DIN 5480
RTP = Premium Class RTP pinion for TP output
RTPA = Premium Class RTP pinion for TP High Torque output

Gearhead size
For SP output:
060, 075, 100, 140, 180, 210, 240
For TP output:
004, 010, 025, 050, 110, 300, 500
(see technical data sheets)

Module
A02 = 2.00
A03 = 3.00
A04 = 4.00
A05 = 5.00
A06 = 6.00

Tolerance class
5e24 = Premium Class RTP/ RTPA
6e25 = Standard Class RSP

Number of teeth
(see technical data sheet)

Torque limiter, bellows coupling and elastomer coupling

Model
Torque limiter
TL1 / TL 2 / TL3
Metal bellows coupling
BCT / BCH / BC2 / BC3 / EC2
Elastomer coupling
ELC / EL6

Series
(see technical data sheets)

Length option
A = First length
B = Second length
Elastomer ring option
A = 98 Sh A
B = 64 Sh D
C = 80 Sh A

Torque limiter (TL) function
W = Single position (360°)
D = Multi-position (60°)
G = Load holding
F = Full engagement
Metal bellows coupling function (BC, EC)
A = Standard
B = incl. self-opening clamp system (EC2)
Elastomer coupling function (EL)
A = Standard

Internal diameter D_1 (drive side)
TL1: $D_1 = D_2$
BCT: D_1 = Output side

Bore version D_1
0 = Smooth
1 = Key shape A DIN 6885
2 = Involute DIN 5480 (on request)
3 = Key shape A ANSI B17.1

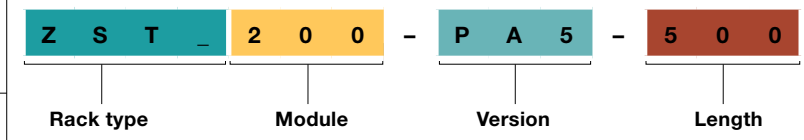
Internal diameter D_2 (output side)
TL1: $D_1 = D_2$
BCT: D_2 = TP+ flange hole circle

Bore version D_2
0 = Smooth
1 = Key shape A DIN 6885
2 = Involute DIN 5480 (on request)
3 = Key shape A ANSI B17.1
A = Hole circle BCT HIGH TORQUE

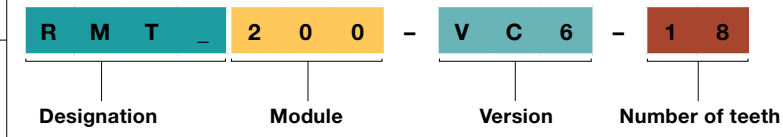
Torque limiter (TL) adjustment range
A = First series
B = Second series
C = Third series
D = Fourth series (for TL1 only)

Disengagement torque Torque limiter T_{Dis} [Nm]
(see technical data sheets for torque limiter)

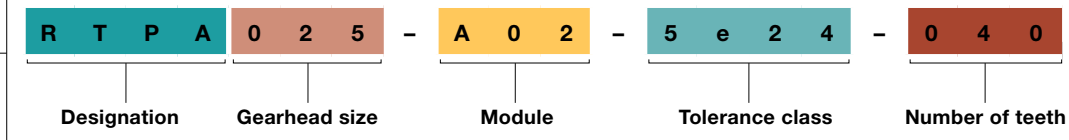
Order codes



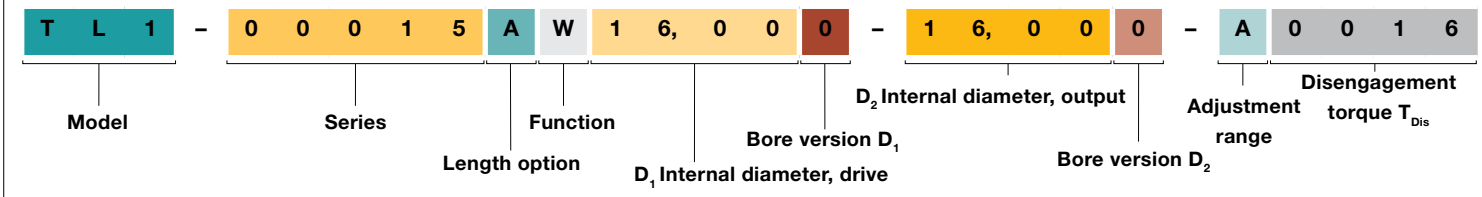
Premium Class+ and Value Class pinion



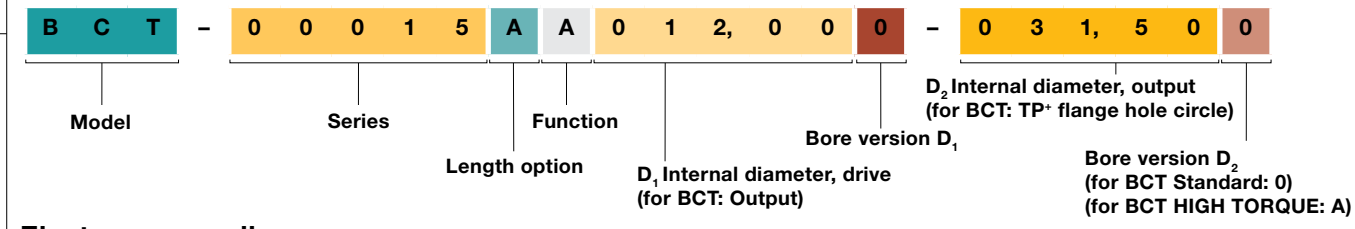
Premium Class RTP and Standard Class RSP pinions



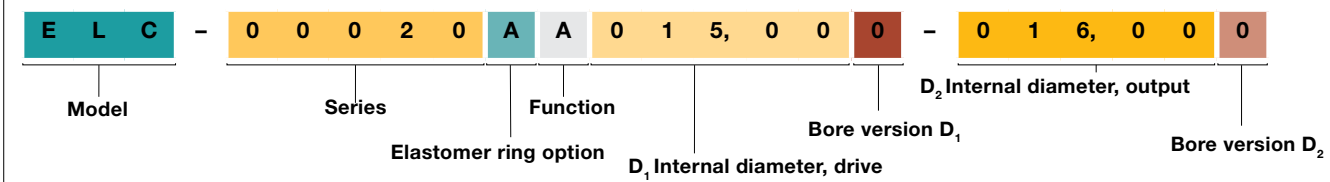
Torque limiter



Bellows coupling



Elastomer coupling



YOUR NOTE

YOUR NOTE

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

Central: Tel. +49 7931 493-0
24h-Service-Hotline: Tel. +49 7931 493-12900
speedline®: Tel. +49 7931 493-10333 or 10444
info-alpha@wittenstein.de

WITTENSTEIN alpha – intelligent drive systems

www.wittenstein-alpha.com