

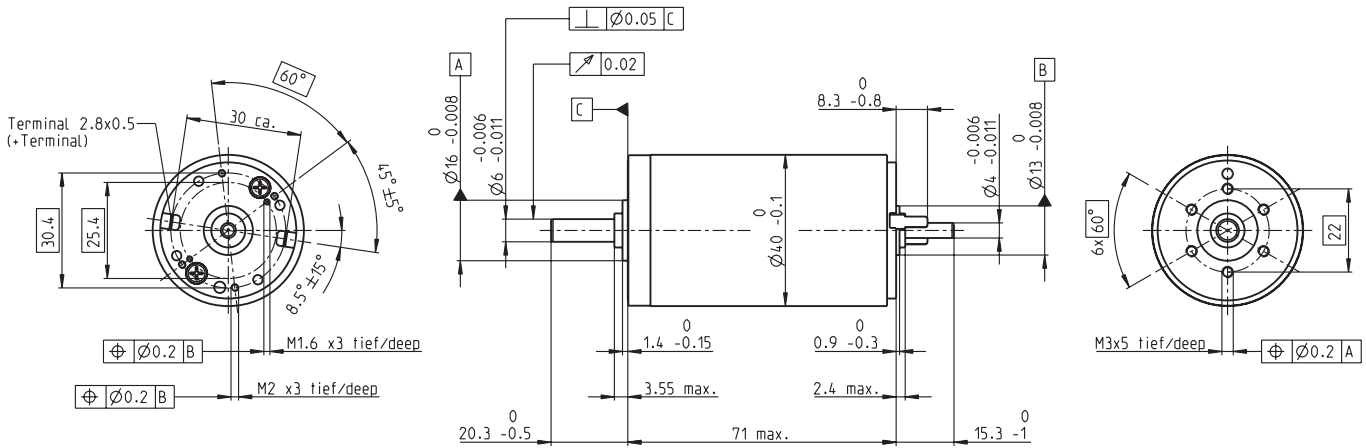
Platform drive

Motor: 148877

Gearhead: 203119

Encoder: 225787

RE 40 Ø40 mm, Graphite Brushes, 150 Watt



M 1:2

- Stock program
- Standard program
- Special program (on request)

Part Numbers											
148866	148867	148877	218008	218009	218010	218011	218012	218013	218014		

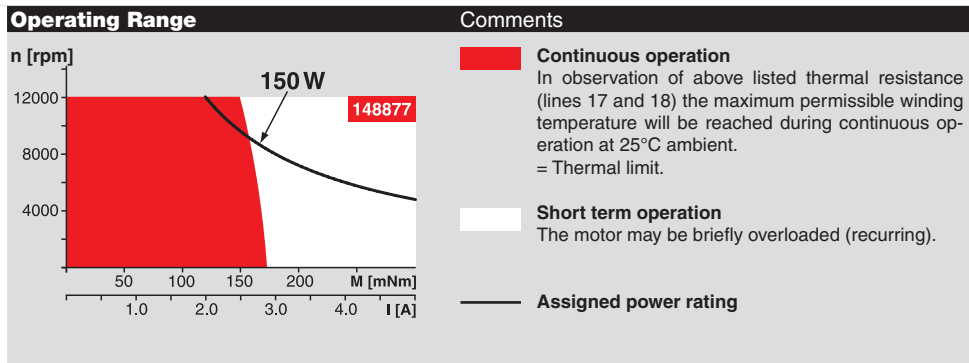
Motor Data												
Values at nominal voltage												
1 Nominal voltage	V	12	24	48	48	48	48	48	48	48	48	48
2 No load speed	rpm	6920	7580	7590	6420	5560	3330	2690	2130	1720	1420	
3 No load current	mA	241	137	68.6	53.6	43.7	21.9	16.6	12.5	9.66	7.76	
4 Nominal speed	rpm	6380	6940	7000	5810	4930	2710	2060	1510	1080	781	
5 Nominal torque (max. continuous torque)	mNm	94.9	177	187	186	180	189	190	192	192	190	
6 Nominal current (max. continuous current)	A	6	6	3.17	2.66	2.23	1.4	1.13	0.909	0.73	0.6	
7 Stall torque	mNm	1720	2420	2560	2040	1620	1020	814	655	523	424	
8 Starting current	A	105	80.2	42.4	28.6	19.7	7.43	4.79	3.06	1.97	1.32	
9 Max. efficiency	%	87	91	92	91	91	89	89	88	87	85	
Characteristics												
10 Terminal resistance	Ω	0.115	0.299	1.13	1.68	2.44	6.46	10	15.7	24.4	36.3	
11 Terminal inductance	mH	0.0245	0.0823	0.329	0.46	0.612	1.7	2.62	4.14	6.4	9.31	
12 Torque constant	mNm/A	16.4	30.2	60.3	71.3	82.2	137	170	214	266	321	
13 Speed constant	rpm/V	581	317	158	134	116	69.7	56.2	44.7	35.9	29.8	
14 Speed / torque gradient	rpm/mNm	4.05	3.14	2.97	3.16	3.45	3.29	3.31	3.27	3.29	3.37	
15 Mechanical time constant	ms	5.89	4.67	4.28	4.2	4.19	4.16	4.15	4.15	4.15	4.16	
16 Rotor inertia	gcm ²	139	142	137	127	116	121	120	121	120	118	

Specifications	
Thermal data	
17 Thermal resistance housing-ambient	4.7 K/W
18 Thermal resistance winding-housing	1.9 K/W
19 Thermal time constant winding	41.5 s
20 Thermal time constant motor	736 s
21 Ambient temperature	-30...+100°C
22 Max. permissible winding temperature	+155°C
Mechanical data (ball bearings)	
23 Max. permissible speed	12000 rpm
24 Axial play	0.05 - 0.15 mm
25 Radial play	0.025 mm
26 Max. axial load (dynamic)	5.6 N
27 Max. force for press fits (static) (static, shaft supported)	110 N
28 Max. radial load, 5 mm from flange	1200 N
	28 N

Other specifications	
29 Number of pole pairs	1
30 Number of commutator segments	13
31 Weight of motor	480 g

Values listed in the table are nominal.
Explanation of the figures on page 79.

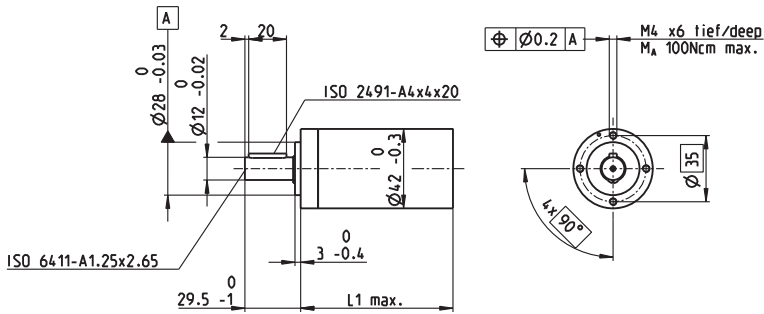
Option
Preloaded ball bearings



maxon Modular System		Overview on page 20–25	
<p>Planetary Gearhead Ø42 mm 3 - 15 Nm Page 283</p> <p>Planetary Gearhead Ø52 mm 4 - 30 Nm Page 287</p>		<p>Encoder MR 256 - 1024 CPT, 3 channels Page 320</p> <p>Encoder HED_ 5540 500 CPT, 3 channels Page 325/327</p> <p>Brake AB 28 24 VDC 0.4 Nm Page 372</p> <p>Industrial Version Encoder HEDL 9140 Page 331</p> <p>Brake AB 28 Page 373</p> <p>End cap Page 377</p>	<p>Recommended Electronics: ESCON Mod. 50/5 Page 343 ESCON 50/5 344 ESCON 70/10 344 EPOS2 24/5 351 EPOS2 50/5 351 EPOS2 70/10 351 EPOS2 P 24/5 354 EPOS3 70/10 EtherCAT 357 MAXPOS 50/5 360 Notes 22</p>

Planetary Gearhead GP 42 C $\varnothing 42$ mm, 3–15 Nm

Ceramic Version



Technical Data

Planetary Gearhead	straight teeth
Output shaft	stainless steel
Bearing at output	preloaded ball bearings
Radial play, 12 mm from flange	max. 0.06 mm
Axial play at axial load	< 5 N 0 mm > 5 N max. 0.3 mm
Max. permissible axial load	150 N
Max. permissible force for press fits	300 N
Sense of rotation, drive to output	=
Recommended input speed	< 8000 rpm
Recommended temperature range	-40...+100°C
Number of stages	1 2 3 4
Max. radial load, 12 mm from flange	120 N 240 N 360 N 360 N

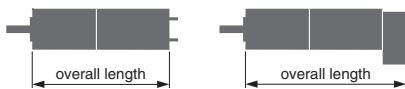
M 1:4

- Stock program
- Standard program
- Special program (on request)

Part Numbers

	203113	203115	203119	203120	203124	203129	203128	203133	203137	203141
Gearhead Data										
1 Reduction	3.5:1	12:1	26:1	43:1	81:1	156:1	150:1	285:1	441:1	756:1
2 Reduction absolute	7/2	49/4	26	343/8	2197/27	156	2401/16	15379/54	441	756
10 Mass inertia	gcm ² 14	15	9.1	15	9.4	9.1	15	15	14	14
3 Max. motor shaft diameter	mm 10	10	8	10	8	8	10	10	10	10
Part Numbers	203114	203116	260552*	203121	203125	260553*	203130	203134	203138	203142
1 Reduction	4.3:1	15:1	36:1	53:1	91:1	216:1	186:1	319:1	488:1	936:1
2 Reduction absolute	13/3	91/6	36/1	637/12	91	216/1	4489/24	637/2	4394/9	936
10 Mass inertia	gcm ² 9.1	15	5.0	15	15	5.0	15	15	9.4	9.1
3 Max. motor shaft diameter	mm 8	10	4	10	10	4	10	10	8	8
Part Numbers	260551*	203117		203122	203126		203131	203135	203139	260554*
1 Reduction	6:1	19:1		66:1	113:1		230:1	353:1	546:1	1296:1
2 Reduction absolute	6/1	169/9		1183/18	338/3		8281/36	28561/81	546	1296/1
10 Mass inertia	gcm ² 4.9	9.4		15	9.4		15	9.4	14	5.0
3 Max. motor shaft diameter	mm 4	8		10	8		10	8	10	4
Part Numbers		203118		203123	203127		203132	203136	203140	
1 Reduction		21:1		74:1	126:1		257:1	394:1	676:1	
2 Reduction absolute		21		147/2	126		1029/4	1183/3	676	
10 Mass inertia	gcm ² 14	14		15	14		15	15	9.1	
3 Max. motor shaft diameter	mm 10	10		10	10		10	10	8	
4 Number of stages	1	2	2	3	3	3	4	4	4	4
5 Max. continuous torque	Nm 3.0	7.5	7.5	15.0	15.0	15.0	15.0	15.0	15.0	15.0
6 Intermittently permissible torque at gear output	Nm 4.5	11.3	11.3	22.5	22.5	22.5	22.5	22.5	22.5	22.5
7 Max. efficiency	% 90	81	81	72	72	72	64	64	64	64
8 Weight	g 260	360	360	460	460	460	560	560	560	560
9 Average backlash no load	° 0.6	0.8	0.8	1.0	1.0	1.0	1.0	1.0	1.0	1.0
11 Gearhead length L1	mm 41.0	55.5	55.5	70.0	70.0	70.0	84.5	84.5	84.5	84.5

*no combination with EC 45 (150 W and 250 W)

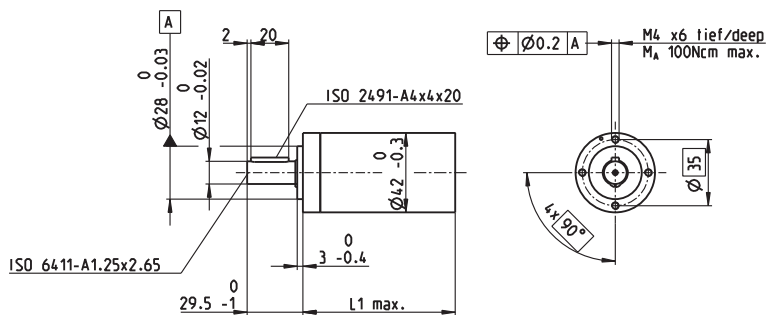


maxon Modular System

+ Motor	Page	+ Sensor	Page	Brake	Page	Overall length [mm] = Motor length + gearhead length + (sensor/brake) + assembly parts									
RE 35, 90 W	112					112.1	126.6	126.6	141.1	141.1	141.1	155.6	155.6	155.6	155.6
RE 35, 90 W	112	MR	320			123.5	138.0	138.0	152.5	152.5	152.5	167.0	167.0	167.0	167.0
RE 35, 90 W	112	HED_ 5540	325/327			132.8	147.3	147.3	161.8	161.8	161.8	176.3	176.3	176.3	176.3
RE 35, 90 W	112	DCT 22	336			130.2	144.7	144.7	159.2	159.2	159.2	173.7	173.7	173.7	173.7
RE 35, 90 W	112			AB 28	372	148.2	162.7	162.7	177.2	177.2	177.2	191.7	191.7	191.7	191.7
RE 35, 90 W	112	HED_ 5540	325/327	AB 28	372	165.4	179.9	179.9	194.4	194.4	194.4	208.9	208.9	208.9	208.9
RE 40, 150 W	114					112.1	126.6	126.6	141.1	141.1	141.1	155.6	155.6	155.6	155.6
RE 40, 150 W	114	MR	320			123.5	138.0	138.0	152.5	152.5	152.5	167.0	167.0	167.0	167.0
RE 40, 150 W	114	HED_ 5540	325/327			132.8	147.3	147.3	161.8	161.8	161.8	176.3	176.3	176.3	176.3
RE 40, 150 W	114	HEDL 9140	331			166.2	180.7	180.7	195.2	195.2	195.2	209.7	209.7	209.7	209.7
RE 40, 150 W	114			AB 28	372	148.2	162.7	162.7	177.2	177.2	177.2	191.7	191.7	191.7	191.7
RE 40, 150 W	114			AB 28	373	156.2	170.7	170.7	185.2	185.2	185.2	199.7	199.7	199.7	199.7
RE 40, 150 W	114	HED_ 5540	325/327	AB 28	372	165.4	179.9	179.9	194.4	194.4	194.4	208.9	208.9	208.9	208.9
RE 40, 150 W	114	HEDL 9140	331	AB 28	373	176.7	191.2	191.2	205.7	205.7	205.7	220.2	220.2	220.2	220.2
EC 40, 170 W	193					121.1	135.6	135.6	150.1	150.1	150.1	164.6	164.6	164.6	164.6
EC 40, 170 W	193	HED_ 5540	326/328			144.5	159.0	159.0	175.5	175.5	175.5	188.0	188.0	188.0	188.0
EC 40, 170 W	193	Res 26	337			148.3	162.8	162.8	177.3	177.3	177.3	191.8	191.8	191.8	191.8
EC 40, 170 W	193			AB 32	374	163.8	178.3	178.3	192.8	192.8	192.8	207.3	207.3	207.3	207.3
EC 40, 170 W	193	HED_ 5540	326/328	AB 32	374	182.2	196.7	196.7	211.2	211.2	211.2	225.7	225.7	225.7	225.7
EC 45, 150 W	194					152.3	166.8	166.8	181.3	181.3	181.3	195.8	195.8	195.8	195.8
EC 45, 150 W	194	HEDL 9140	331			167.9	182.4	182.4	196.9	196.9	196.9	211.4	211.4	211.4	211.4
EC 45, 150 W	194	Res 26	337			152.3	166.8	166.8	181.3	181.3	181.3	195.8	195.8	195.8	195.8
EC 45, 150 W	194			AB 28	373	159.7	174.2	174.2	188.7	188.7	188.7	203.2	203.2	203.2	203.2
EC 45, 150 W	194	HEDL 9140	331	AB 28	373	176.7	191.2	191.2	205.7	205.7	205.7	220.2	220.2	220.2	220.2
EC 45, 250 W	195					185.1	199.6	199.6	214.1	214.1	214.1	228.6	228.6	228.6	228.6
EC 45, 250 W	195	HEDL 9140	331			200.7	215.2	215.2	229.7	229.7	229.7	244.2	244.2	244.2	244.2
EC 45, 250 W	195	Res 26	337			185.1	199.6	199.6	214.1	214.1	214.1	228.6	228.6	228.6	228.6
EC 45, 250 W	195			AB 28	373	192.5	207.0	207.0	221.5	221.5	221.5	236.0	236.0	236.0	236.0
EC 45, 250 W	195	HEDL 9140	331	AB 28	373	209.5	224.0	224.0	238.5	238.5	238.5	253.0	253.0	253.0	253.0

Planetary Gearhead GP 42 C $\varnothing 42$ mm, 3–15 Nm

Ceramic Version



Technical Data

Planetary Gearhead	straight teeth
Output shaft	stainless steel
Bearing at output	preloaded ball bearings
Radial play, 12 mm from flange	max. 0.06 mm
Axial play at axial load	< 5 N > 5 N
	0 mm max. 0.3 mm
Max. permissible axial load	150 N
Max. permissible force for press fits	300 N
Sense of rotation, drive to output	=
Recommended input speed	< 8000 rpm
Recommended temperature range	-40...+100°C
Number of stages	1 2 3 4
Max. radial load, 12 mm from flange	120 N 240 N 360 N 360 N

M 1:4

- Stock program
- Standard program
- Special program (on request)

Part Numbers

	203113	203115	203119	203120	203124	203129	203128	203133	203137	203141
Gearhead Data										
1 Reduction	3.5:1	12:1	26:1	43:1	81:1	156:1	150:1	285:1	441:1	756:1
2 Reduction absolute	7/2	49/4	26	343/8	2197/27	156	2401/16	15379/54	441	756
10 Mass inertia	gcm ² 14	15	9.1	15	9.4	9.1	15	15	14	14
3 Max. motor shaft diameter	mm 10	10	8	10	8	8	10	10	10	10
Part Numbers	203114	203116	260552*	203121	203125	260553*	203130	203134	203138	203142
1 Reduction	4.3:1	15:1	36:1	53:1	91:1	216:1	186:1	319:1	488:1	936:1
2 Reduction absolute	13/3	91/6	36/1	637/12	91	216/1	4459/24	637/2	4394/9	936
10 Mass inertia	gcm ² 9.1	15	5.0	15	15	5.0	15	15	9.4	9.1
3 Max. motor shaft diameter	mm 8	10	4	10	10	4	10	10	8	8
Part Numbers	260551*	203117		203122	203126		203131	203135	203139	260554*
1 Reduction	6:1	19:1		66:1	113:1		230:1	353:1	546:1	1296:1
2 Reduction absolute	6/1	169/9		1183/18	338/3		8281/36	28561/81	546	1296/1
10 Mass inertia	gcm ² 4.9	9.4		15	9.4		15	9.4	14	5.0
3 Max. motor shaft diameter	mm 4	8		10	8		10	8	10	4
Part Numbers		203118		203123	203127		203132	203136	203140	
1 Reduction		21:1		74:1	126:1		257:1	394:1	676:1	
2 Reduction absolute		21		147/2	126		1029/4	1183/3	676	
10 Mass inertia	gcm ²	14		15	14		15	15	9.1	
3 Max. motor shaft diameter	mm	10		10	10		10	10	8	
4 Number of stages		1	2	2	3	3	3	4	4	4
5 Max. continuous torque	Nm	3.0	7.5	7.5	15.0	15.0	15.0	15.0	15.0	15.0
6 Intermittently permissible torque at gear output	Nm	4.5	11.3	11.3	22.5	22.5	22.5	22.5	22.5	22.5
7 Max. efficiency	%	90	81	81	72	72	72	64	64	64
8 Weight	g	260	360	360	460	460	460	560	560	560
9 Average backlash no load	°	0.6	0.8	0.8	1.0	1.0	1.0	1.0	1.0	1.0
11 Gearhead length L1**	mm	41.0	55.5	55.5	70.0	70.0	70.0	84.5	84.5	84.5

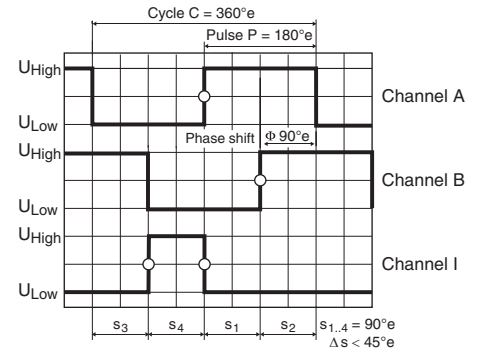
*no combination with EC-i 40 (50 W and 70 W)



maxon Modular System

+ Motor	Page	+ Sensor	Page	Brake	Page	Overall length [mm] = Motor length + gearhead length + (sensor/brake) + assembly parts									
EC-max 30, 60 W	205					105.1	119.6	119.6	134.1	134.1	134.1	148.6	148.6	148.6	148.6
EC-max 30, 60 W	205	MR	319			117.3	131.8	131.8	146.3	146.3	146.3	160.8	160.8	160.8	160.8
EC-max 30, 60 W	205	HEDL 5540	328			125.7	140.2	140.2	154.7	154.7	154.7	169.2	169.2	169.2	169.2
EC-max 30, 60 W	205			AB 20	370	141.2	155.1	155.1	169.6	169.6	169.6	184.1	184.1	184.1	184.1
EC-max 30, 60 W	205	HEDL 5540	328	AB 20	370	161.4	175.9	175.9	190.4	190.4	190.4	204.9	204.9	204.9	204.9
EC-max 40, 70 W	206					99.1	113.6	113.6	128.1	128.1	128.1	142.6	142.6	142.6	142.6
EC-max 40, 70 W	206	MR	320			115.0	129.5	129.5	144.0	144.0	144.0	158.5	158.5	158.5	158.5
EC-max 40, 70 W	206	HEDL 5540	328			122.5	137.0	137.0	151.5	151.5	151.5	166.0	166.0	166.0	166.0
EC-max 40, 70 W	206			AB 28	371	133.4	147.9	147.9	162.4	162.4	162.4	176.9	176.9	176.9	176.9
EC-max 40, 70 W	206	HEDL 5540	328	AB 28	371	151.7	166.2	166.2	180.7	180.7	180.7	195.2	195.2	195.2	195.2
EC-4pole 30, 100 W	213					88.1	102.6	102.6	117.1	117.1	117.1	131.6	131.6	131.6	131.6
EC-4pole 30, 100 W	213	MR	319			100.3	114.8	114.8	129.3	129.3	129.3	143.8	143.8	143.8	143.8
EC-4pole 30, 100 W	213	HEDL 5540	329			108.7	123.2	123.2	137.7	137.7	137.7	152.2	152.2	152.2	152.2
EC-4pole 30, 100 W	213			AB 20	370	124.3	138.8	138.8	153.3	153.3	153.3	167.8	167.8	167.8	167.8
EC-4pole 30, 100 W	213	HEDL 5540	329	AB 20	370	145.1	159.6	159.6	174.1	174.1	174.1	188.6	188.6	188.6	188.6
EC-4pole 30, 200 W	214					105.1	119.6	119.6	134.1	134.1	134.1	148.6	148.6	148.6	148.6
EC-4pole 30, 200 W	214	MR	319			117.3	131.8	131.8	146.3	146.3	146.3	160.8	160.8	160.8	160.8
EC-4pole 30, 200 W	214	HEDL 5540	329			125.7	140.2	140.2	154.7	154.7	154.7	169.2	169.2	169.2	169.2
EC-4pole 30, 200 W	214			AB 20	370	141.3	155.8	155.8	170.3	170.3	170.3	184.8	184.8	184.8	184.8
EC-4pole 30, 200 W	214	HEDL 5540	329	AB 20	370	162.1	176.6	176.6	191.1	191.1	191.1	205.6	205.6	205.6	205.6
EC-i 40, 50 W	228					67.1	81.6	81.6	96.1	96.1	96.1	110.6	110.6	110.6	110.6
EC-i 40, 50 W	228	16 EASY				78.8	93.3	93.3	107.8	107.8	107.8	122.3	122.3	122.3	122.3
EC-i 40, 50 W	228	HEDL 5540				90.1	104.6	104.6	119.1	119.1	119.1	133.6	133.6	133.6	133.6
EC-i 40, 70 W	229					77.1	91.6	91.6	106.1	106.1	106.1	120.6	120.6	120.6	120.6
EC-i 40, 70 W	229	16 EASY				88.8	103.3	103.3	117.8	117.8	117.8	132.3	132.3	132.3	132.3
EC-i 40, 70 W	229	HEDL 5540				100.1	114.6	114.6	129.1	129.1	129.1	143.6	143.6	143.6	143.6

Encoder MR Type L, 256–1024 CPT, 3 Channels, with Line Driver



Direction of rotation cw (definition cw p. 78)

- Stock program
- Standard program
- Special program (on request)

Part Numbers

225783	228452	225785	228456	225787
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Type	225783	228452	225785	228456	225787
Counts per turn	256	500	512	1000	1024
Number of channels	3	3	3	3	3
Max. operating frequency (kHz)	80	200	160	200	320
Max. speed (rpm)	18750	24000	18750	12000	18750



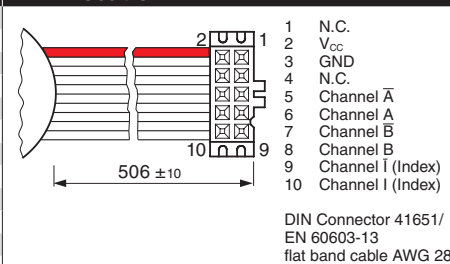
maxon Modular System

+ Motor	Page	+ Gearhead	Page	+ Brake	Page	Overall length [mm] / ● see Gearhead				
RE 30, 15 W	110					79.4	79.4	79.4	79.4	79.4
RE 30, 15 W	110	GP 32, 0.75 - 4.5 Nm	274			●	●	●	●	●
RE 30, 60 W	111					79.4	79.4	79.4	79.4	79.4
RE 30, 60 W	111	GP 32, 0.75 - 4.5 Nm	272			●	●	●	●	●
RE 30, 60 W	111	GP 32, 0.75 - 6.0 Nm	274-278			●	●	●	●	●
RE 30, 60 W	111	GP 32 S	301-303			●	●	●	●	●
RE 35, 90 W	112					82.4	82.4	82.4	82.4	82.4
RE 35, 90 W	112	GP 32, 0.75 - 4.5 Nm	272			●	●	●	●	●
RE 35, 90 W	112	GP 32, 0.75 - 6.0 Nm	274-278			●	●	●	●	●
RE 35, 90 W	112	GP 32, 4.0 - 8.0 Nm	279			●	●	●	●	●
RE 35, 90 W	112	GP 42, 3 - 15 Nm	283			●	●	●	●	●
RE 35, 90 W	112	GP 32 S	301-303			●	●	●	●	●
RE 40, 150 W	114					82.4	82.4	82.4	82.4	82.4
RE 40, 150 W	114	GP 42, 3 - 15 Nm	283			●	●	●	●	●
RE 40, 150 W	114	GP 52, 4 - 30 Nm	287			●	●	●	●	●
A-max 32	142/144					72.7	72.7	72.7	72.7	72.7
A-max 32	142/144	GP 32, 0.75 - 6.0 Nm	274-277			●	●	●	●	●
A-max 32	142/144	GS 38, 0.1 - 0.6 Nm	282			●	●	●	●	●
A-max 32	142/144	GP 32 S	301-303			●	●	●	●	●
EC-max 40, 70 W	206					73.9	73.9	73.9	73.9	73.9
EC-max 40, 70 W	206	GP 42, 3 - 15 Nm	284			●	●	●	●	●
EC-max 40, 120 W	207					103.9	103.9	103.9	103.9	103.9
EC-max 40, 120 W	207	GP 52, 4 - 30 Nm	288			●	●	●	●	●
EC-i 40, 50 W	228					41.9	41.9	41.9	41.9	41.9
EC-i 40, 50 W	228	GP 32, 1 - 6 Nm	277			●	●	●	●	●
EC-i 40, 50 W	228	GP 32 S	301-303			●	●	●	●	●
EC-i 40, 70 W	229					51.9	51.9	51.9	51.9	51.9
EC-i 40, 70 W	229	GP 32, 1 - 6 Nm	277			●	●	●	●	●
EC-i 40, 70 W	229	GP 32 S	301-303			●	●	●	●	●

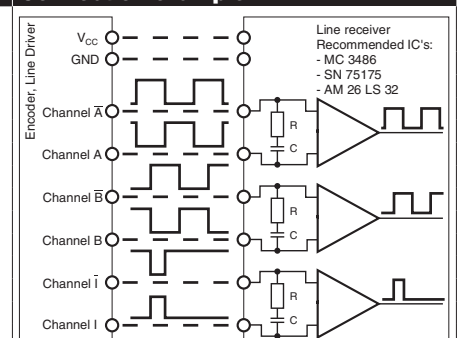
Technical Data

Supply voltage V_{CC}	5 V \pm 5%
Output signal	TTL compatible
Phase shift Φ	90°e \pm 45°e
Index pulse width	90°e \pm 45°e
Operating temperature range	-25...+85 °C
Moment of inertia of code wheel	\leq 1.7 gcm ²
Output current per channel	max. 5 mA

Pin Allocation



Connection example



Terminal resistance $R =$ typical 120 Ω
Capacitor $C \geq$ 0.1 nF per m line length