



maxon A-max

maxon A-max

- Good price/performance ratio
- Equipped with AlNiCo magnets
- High and consistent quality thanks to mastery and monitoring of the processes
- Same part platform – compatible with the RE-max
- Automated manufacturing process
- Open for customer-oriented modifications

Summary 118

DC motor 12–32 mm in diameter 119–144

X Drives
(configurable)

DC Motor

EC Motor
(BLDC Motor)

Gearhead

Spindle
drive

Sensor

Motor
control

Compact
Drive

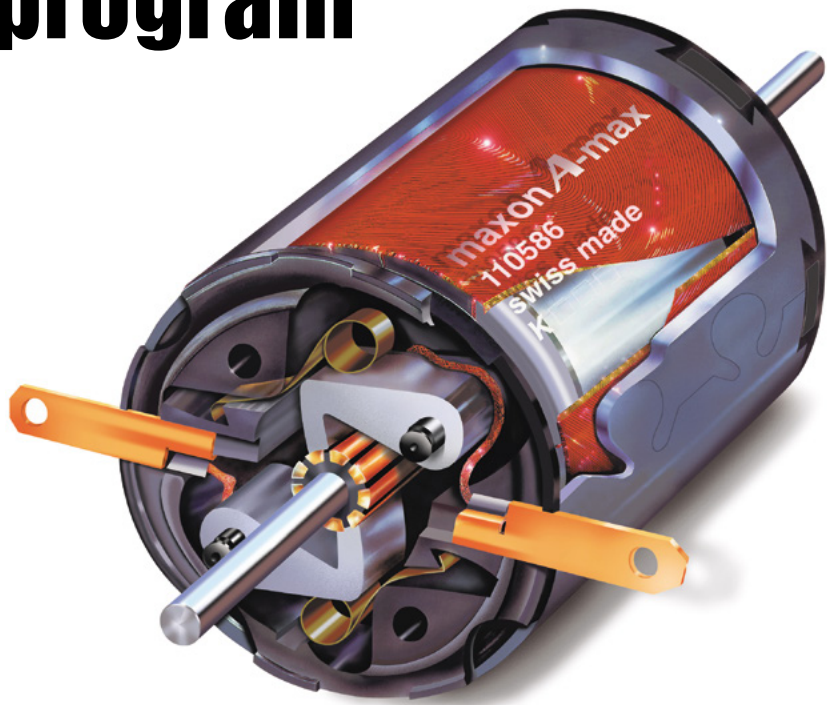
Accessories

Ceramic

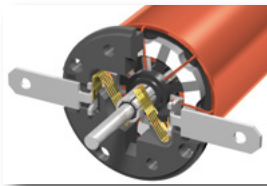


maxon A-max program

The economically priced DC motor program that gives you top performance and convincing quality.



Motor housing, precision-made from rolled steel, delivers high strength yet minimizes waste material to reduce costs.



Power leads or AMP-compatible terminals. Save strain relieve on power leads.



Elimination of a C-Clip groove results in higher torsional stability and greater cross-sectional strength.



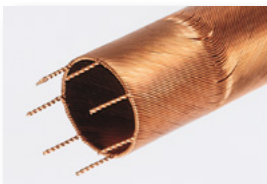
Reduced-diameter commutator, employing more segments, provides longer life.



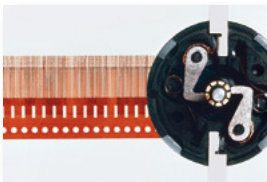
Hybrid process forms the stator by assembling motor housing, magnet and end cap in one step using injection molding of PPA plastic. Customers can select either sleeve or ball bearings.



Glass-fibre reinforced polyphthalamide plastic (PPA), impact-resistant, heat-resistant up to 125°C and noise absorbing.

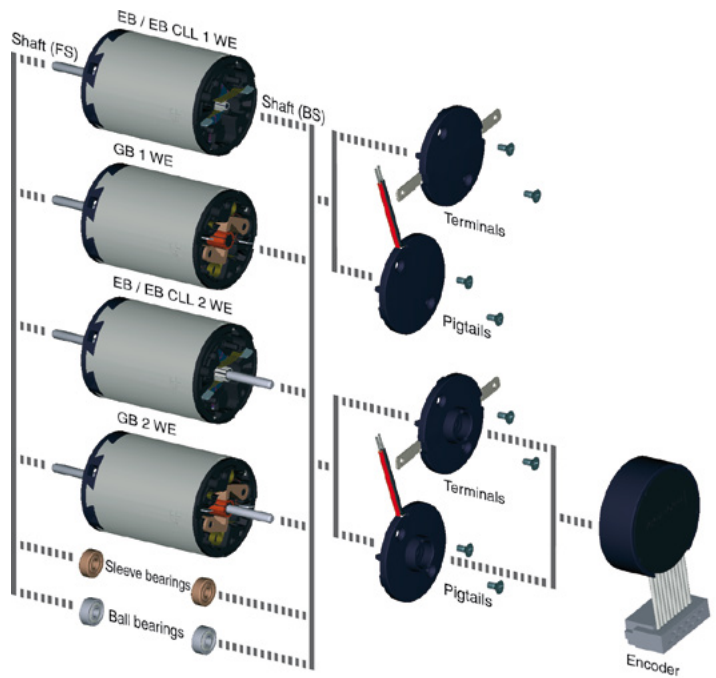


Proven winding technology provides a high-performance relationship between the coil and magnet system.



Graphite brushes for the most demanding tasks. 4-, 5- or 7-fingered precious metal brushes for fine rotary motions.

Modular construction of the A-max series

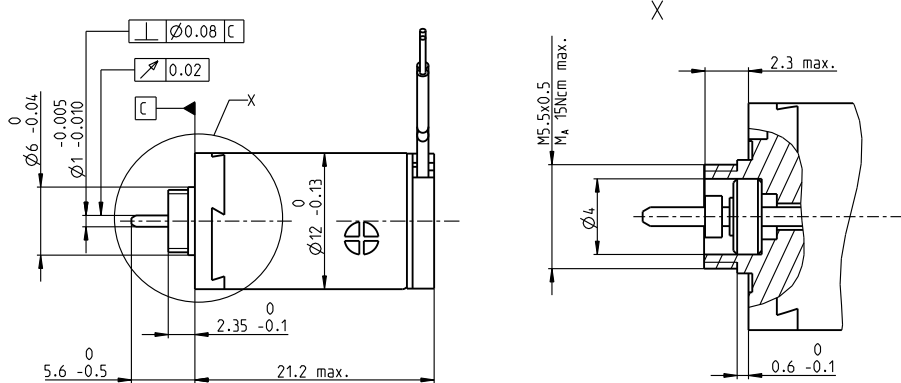
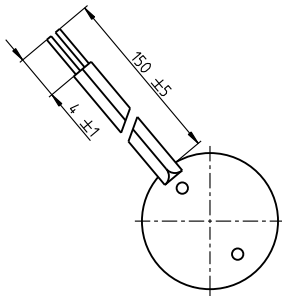


	WE = Shaft end	A-max 12 1 WE	A-max 12 2 WE	A-max 16 1 WE	A-max 16 2 WE	A-max 19 1 WE	A-max 19 2 WE	A-max 22 1 WE	A-max 22 2 WE	A-max 26 1 WE	A-max 26 2 WE	A-max 32 1 WE	A-max 32 2 WE
X = Standard X = Option													
Precious Metal Brushes (EB)				X	X	X	X	X	X	X	X	X	X
Precious Metal Brushes (EB) and CLL	X	X	X	X	X	X	X	X	X	X	X	X	X
Graphite Brushes (GB)				X	X	X	X	X	X	X	X	X	X
Sleeve Bearings	X	X	X	X	X	X	X	X	X	X	X	X	X
Ball Bearings	X	X	X	X	X	X	X	X	X	X	X	X	X
Terminals				X	X	X	X	X	X	X	X	X	X
Pigtails	X	X	X	X	X	X	X	X	X	X	X	X	X
Shaft flange side (FS)	min.	4.5	4.5	4.5	4.5	5.0	5.0	5.0	5.0	6.0	6.0	6.0	6.0
	max.	10.0	10.0	15.0	15.0	27.4	27.4	25.0	25.0	27.0	27.0	27.0	27.0
Shaft brush side (BS)	min.			2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	3.0	3.0
	max.			9.4	10.0	16.6	16.6	16.0	16.0	16.0	16.0	19.3	19.3

A-max 12 Ø12 mm, Precious Metal Brushes CLL, 0.75 Watt

Kabel AWG 28/7
cable UL Style 1061

⊕ Kabel rot
cable red



M 1.5:1

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

Part Numbers

200937 **265374** 265375 **265376** 265377 265378

Motor Data		200937	265374	265375	265376	265377	265378
Values at nominal voltage							
1 Nominal voltage	V	3	4.5	6	9	12	15
2 No load speed	rpm	13900	11900	12800	12100	12300	13800
3 No load current	mA	21.1	11.5	9.47	5.87	4.5	4.2
4 Nominal speed	rpm	5980	4380	5260	4470	4610	5030
5 Nominal torque (max. continuous torque)	mNm	0.897	0.961	0.948	0.941	0.931	0.804
6 Nominal current (max. continuous current)	A	0.465	0.282	0.225	0.141	0.107	0.0836
7 Stall torque	mNm	1.58	1.55	1.63	1.52	1.52	1.29
8 Stall current	A	0.789	0.438	0.374	0.22	0.168	0.129
9 Max. efficiency	%	70	71	71	70	70	68
Characteristics							
10 Terminal resistance	Ω	3.8	10.3	16	40.9	71.6	116
11 Terminal inductance	mH	0.0851	0.263	0.402	1.01	1.74	2.13
12 Torque constant	mNm/A	2.01	3.53	4.36	6.92	9.06	10
13 Speed constant	rpm/V	4760	2710	2190	1380	1050	952
14 Speed / torque gradient	rpm/mNm	9030	7880	8060	8170	8330	11000
15 Mechanical time constant	ms	20.6	20.3	20.4	20.4	20.5	21.1
16 Rotor inertia	gcm ²	0.218	0.246	0.241	0.238	0.235	0.183

Specifications

Thermal data	
17 Thermal resistance housing-ambient	44.5 K/W
18 Thermal resistance winding-housing	15 K/W
19 Thermal time constant winding	5.03 s
20 Thermal time constant motor	245 s
21 Ambient temperature	-30...+65°C
22 Max. winding temperature	+85°C
Mechanical data (sleeve bearings)	
23 Max. speed	19000 rpm
24 Axial play	0.05 - 0.15 mm
25 Radial play	0.012 mm
26 Max. axial load (dynamic)	0.15 N
27 Max. force for press fits (static)	15 N
28 Max. radial load, 4 mm from flange	0.4 N

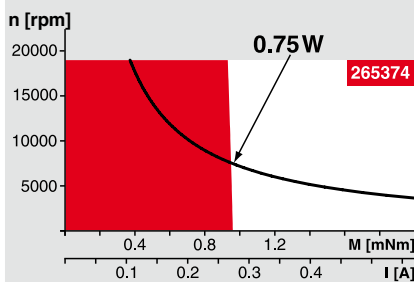
Other specifications

29 Number of pole pairs	1
30 Number of commutator segments	7
31 Weight of motor	11 g

CLL = Capacitor Long Life
Alignment of the electronic connections not specified.

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

Operating Range



Comments

- Continuous operation**
In observation of above listed thermal resistance (lines 17 and 18) the maximum permissible winding temperature will be reached during continuous operation at 25°C ambient.
= Thermal limit.
- Short term operation**
The motor may be briefly overloaded (recurring).
- Assigned power rating**

maxon Modular System

Overview on page 20–25

Planetary Gearhead

Ø10 mm
0.005 - 0.15 Nm
Page 245

Spur Gearhead

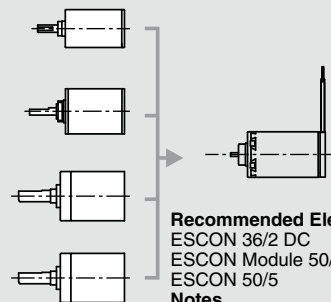
Ø12 mm
0.008 - 0.025 Nm
Page 246

Planetary Gearhead

Ø13 mm
0.05 - 0.15 Nm
Page 247

Planetary Gearhead

Ø13 mm
0.2 - 0.35 Nm
Page 248



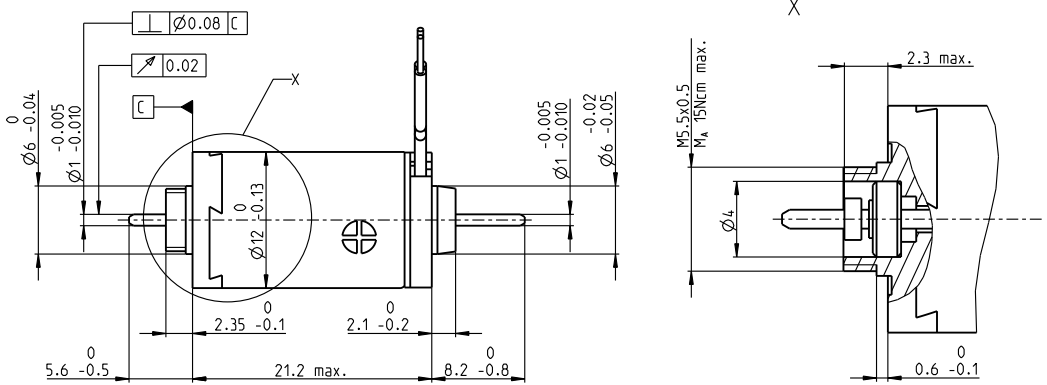
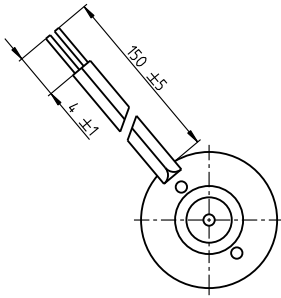
Recommended Electronics:

ESCON 36/2 DC	Page 342
ESCON Module 50/5	343
ESCON 50/5	344
Notes	22

A-max 12 Ø12 mm, Precious Metal Brushes CLL, 0.5 Watt

Kabel AWG 28/7
cable UL Style 1061

⊕ Kabel rot
cable red



M 1.5:1

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

Part Numbers

200938 265389 265390 265391 265392 265393

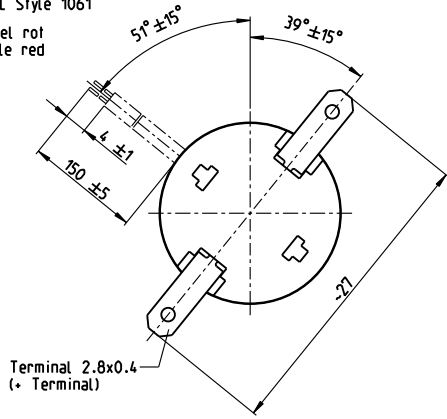
Motor Data								
Values at nominal voltage								
		3	4.5	6	9	12	15	
1	Nominal voltage	V	3	4.5	6	9	12	15
2	No load speed	rpm	13700	11700	12600	11900	12100	13500
3	No load current	mA	34.5	18.8	15.5	9.63	7.38	6.88
4	Nominal speed	rpm	6000	4390	5280	4480	4620	5050
5	Nominal torque (max. continuous torque)	mNm	0.872	0.937	0.923	0.918	0.908	0.78
6	Nominal current (max. continuous current)	A	0.464	0.282	0.225	0.141	0.106	0.0835
7	Stall torque	mNm	1.58	1.55	1.63	1.52	1.52	1.29
8	Stall current	A	0.789	0.438	0.374	0.22	0.168	0.129
9	Max. efficiency	%	63	63	64	63	63	60
Characteristics								
10	Terminal resistance	Ω	3.8	10.3	16	40.9	71.6	116
11	Terminal inductance	mH	0.0851	0.263	0.402	1.01	1.74	2.13
12	Torque constant	mNm/A	2.01	3.53	4.36	6.92	9.06	10
13	Speed constant	rpm/V	4760	2710	2190	1380	1050	952
14	Speed / torque gradient	rpm/mNm	9030	7880	8060	8170	8330	11000
15	Mechanical time constant	ms	20.6	20.3	20.4	20.4	20.5	21.1
16	Rotor inertia	gcm ²	0.218	0.246	0.241	0.238	0.235	0.183

Specifications	Operating Range	Comments
<p>Thermal data</p> <p>17 Thermal resistance housing-ambient 44.5 K/W</p> <p>18 Thermal resistance winding-housing 15 K/W</p> <p>19 Thermal time constant winding 5.03 s</p> <p>20 Thermal time constant motor 267 s</p> <p>21 Ambient temperature -30...+65°C</p> <p>22 Max. winding temperature +85°C</p> <p>Mechanical data (sleeve bearings)</p> <p>23 Max. speed 14000 rpm</p> <p>24 Axial play 0.05 - 0.15 mm</p> <p>25 Radial play 0.012 mm</p> <p>26 Max. axial load (dynamic) 0.15 N</p> <p>27 Max. force for press fits (static) (static, shaft supported) 15 N / 70 N</p> <p>28 Max. radial load, 4 mm from flange 0.4 N</p>		<p> Continuous operation In observation of above listed thermal resistance (lines 17 and 18) the maximum permissible winding temperature will be reached during continuous operation at 25°C ambient. = Thermal limit.</p> <p> Short term operation The motor may be briefly overloaded (recurring).</p> <p> Assigned power rating</p>

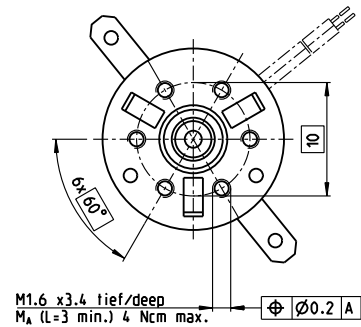
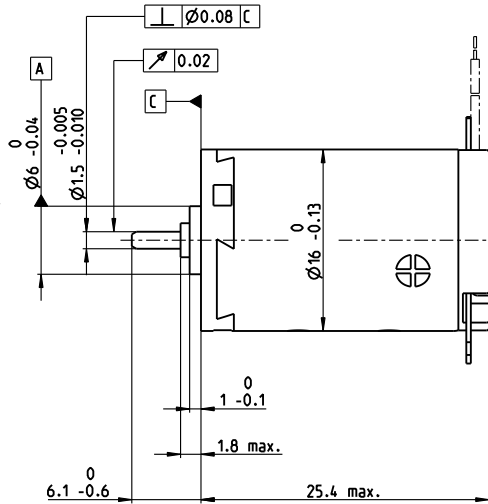
Other specifications	maxon Modular System	Overview on page 20-25
<p>29 Number of pole pairs 1</p> <p>30 Number of commutator segments 7</p> <p>31 Weight of motor 12 g</p> <p>CLL = Capacitor Long Life Alignment of the electronic connections not specified.</p> <p>Values listed in the table are nominal. Explanation of the figures on page 79.</p>	<p>Planetary Gearhead Ø10 mm 0.01 - 0.15 Nm Page 245</p> <p>Spur Gearhead Ø12 mm 0.008 - 0.025 Nm Page 246</p> <p>Planetary Gearhead Ø13 mm 0.05 - 0.15 Nm Page 247</p> <p>Planetary Gearhead Ø13 mm 0.2 - 0.35 Nm Page 248</p>	<p>Encoder MR 16 CPT, 2 channels Page 312</p> <p>Encoder MR 64 - 256 CPT, 2 channels Page 313</p> <p>Recommended Electronics: ESCON 36/2 DC Page 342 ESCON Module 50/5 343 ESCON 50/5 344 EPOS2 24/2 350 EPOS2 Module 36/2 350 EPOS3 70/10 EtherCAT 357 MAXPOS 50/5 360 Notes 22</p>

A-max 16 Ø16 mm, Precious Metal Brushes CLL, 2 Watt

Kabel AWG 26/7
cable UL Style 1061
⊕ Kabel rot
cable red



M 1.5:1



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

Part Numbers

with terminals	110041	110042	110043	110044	110045	110046	110047	110048	110049	110050
with cables	139820	352815	134844	231379	220514	304672	352823	352816	260678	352817

Motor Data

Values at nominal voltage		1.5	3	6	9	12	15	18	21	24	30
1 Nominal voltage	V	1.5	3	6	9	12	15	18	21	24	30
2 No load speed	rpm	10800	12300	10100	12300	12300	13200	14100	13700	13800	11400
3 No load current	mA	61.4	38.1	13.9	12.7	9.54	8.57	7.99	6.53	5.83	3.37
4 Nominal speed	rpm	9360	8810	4530	6700	6660	7590	8480	8040	8120	5480
5 Nominal torque (max. continuous torque)	mNm	0.712	1.3	2.22	2.19	2.17	2.17	2.15	2.14	2.11	2.08
6 Nominal current (max. continuous current)	A	0.6	0.6	0.408	0.327	0.243	0.209	0.185	0.153	0.134	0.0864
7 Stall torque	mNm	4.79	4.51	4.03	4.82	4.77	5.16	5.44	5.22	5.12	4.04
8 Stall current	A	3.66	1.97	0.723	0.702	0.52	0.482	0.453	0.362	0.315	0.164
9 Max. efficiency	%	77	75	75	76	76	76	76	76	76	74
Characteristics											
10 Terminal resistance	Ω	0.41	1.52	8.3	12.8	23.1	31.1	39.7	57.9	76.2	183
11 Terminal inductance	mH	0.017	0.0519	0.306	0.467	0.831	1.13	1.42	2.05	2.61	6.01
12 Torque constant	mNm/A	1.31	2.29	5.57	6.88	9.17	10.7	12	14.4	16.3	24.7
13 Speed constant	rpm/V	7290	4170	1720	1390	1040	893	795	663	587	387
14 Speed / torque gradient	rpm/mNm	2280	2770	2560	2590	2620	2600	2630	2670	2750	2880
15 Mechanical time constant	ms	25.3	23.8	23.3	23.3	23.3	23.4	23.5	23.4	23.5	23.9
16 Rotor inertia	gcm ²	1.06	0.82	0.868	0.859	0.849	0.859	0.852	0.838	0.816	0.793

Specifications

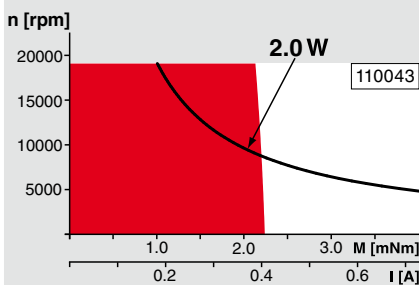
Thermal data	
17 Thermal resistance housing-ambient	29.8 K/W
18 Thermal resistance winding-housing	5.5 K/W
19 Thermal time constant winding	3.55 s
20 Thermal time constant motor	165 s
21 Ambient temperature	-30...+65°C
22 Max. winding temperature	+85°C
Mechanical data (sleeve bearings)	
23 Max. speed	19000 rpm
24 Axial play	0.05 - 0.15 mm
25 Radial play	0.012 mm
26 Max. axial load (dynamic)	0.8 N
27 Max. force for press fits (static)	35 N
28 Max. radial load, 5 mm from flange	1.4 N
Mechanical data (ball bearings)	
23 Max. speed	19000 rpm
24 Axial play	0.05 - 0.15 mm
25 Radial play	0.025 mm
26 Max. axial load (dynamic)	2.2 N
27 Max. force for press fits (static)	30 N
28 Max. radial load, 5 mm from flange	7.8 N
Other specifications	
29 Number of pole pairs	1
30 Number of commutator segments	7
31 Weight of motor	21 g
CLL = Capacitor Long Life	

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

Option

Ball bearings in place of sleeve bearings
Without CLL

Operating Range



Comments

Continuous operation
In observation of above listed thermal resistance (lines 17 and 18) the maximum permissible winding temperature will be reached during continuous operation at 25°C ambient.
= Thermal limit.

Short term operation
The motor may be briefly overloaded (recurring).

Assigned power rating

maxon Modular System

Overview on page 20–25

Spur Gearhead

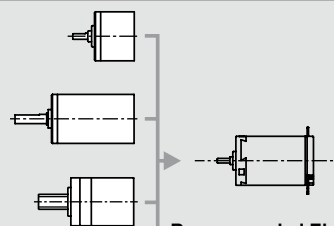
Ø16 mm
0.01 - 0.1 Nm
Page 250–253

Planetary Gearhead

Ø16 mm
0.1 - 0.6 Nm
Page 254/255

Spindle Drive

Ø16 mm
Page 296–298



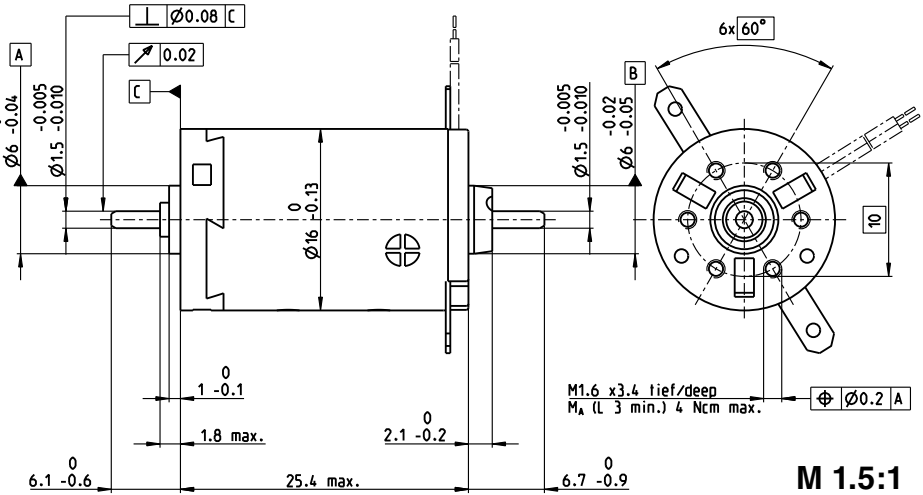
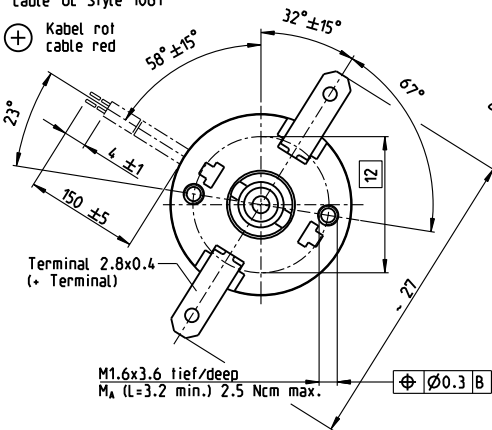
Recommended Electronics:

ESCON 36/2 DC	Page 342
ESCON Module 50/5	343
ESCON 50/5	344
Notes	22

A-max 16 Ø16 mm, Precious Metal Brushes CLL, 1.2 Watt

Kabel AWG 26/7
cable UL Style 1061

⊕ Kabel rot
cable red



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

Part Numbers										
with terminals	110051	110052	110053	110054	110055	110056	110057	110058	110059	110060
with cables	139823	352825	352826	352827	352828	352829	352830	352831	352832	352833

Motor Data											
Values at nominal voltage											
1 Nominal voltage	V	1.2	2.4	6	7.2	9	12	15	18	18	30
2 No load speed	rpm	8560	9730	10000	9740	9120	10400	11600	11600	10300	11300
3 No load current	mA	73.9	44.1	18.3	14.7	10.8	9.69	8.99	7.49	6.34	4.33
4 Nominal speed	rpm	7170	6310	4540	4200	3530	4900	6090	6050	4580	5500
5 Nominal torque (max. continuous torque)	mNm	0.694	1.29	2.18	2.17	2.16	2.16	2.13	2.12	2.09	2.04
6 Nominal current (max. continuous current)	A	0.6	0.6	0.407	0.327	0.244	0.21	0.185	0.153	0.134	0.0862
7 Stall torque	mNm	3.83	3.61	4.03	3.86	3.57	4.13	4.54	4.48	3.84	4.04
8 Stall current	A	2.93	1.58	0.723	0.561	0.39	0.386	0.378	0.311	0.236	0.164
9 Max. efficiency	%	71	70	71	71	70	71	72	72	71	71
Characteristics											
10 Terminal resistance	Ω	0.41	1.52	8.3	12.8	23.1	31.1	39.7	57.9	76.2	183
11 Terminal inductance	mH	0.017	0.0519	0.306	0.467	0.831	1.13	1.42	2.05	2.61	6.01
12 Torque constant	mNm/A	1.31	2.29	5.57	6.88	9.17	10.7	12	14.4	16.3	24.7
13 Speed constant	rpm/V	7290	4170	1720	1390	1040	893	795	663	587	387
14 Speed / torque gradient	rpm/mNm	2280	2770	2560	2590	2620	2600	2630	2670	2750	2880
15 Mechanical time constant	ms	25.3	23.7	23.2	23.3	23.3	23.3	23.4	23.3	23.4	23.8
16 Rotor inertia	gcm ²	1.06	0.818	0.866	0.857	0.847	0.857	0.85	0.836	0.814	0.791

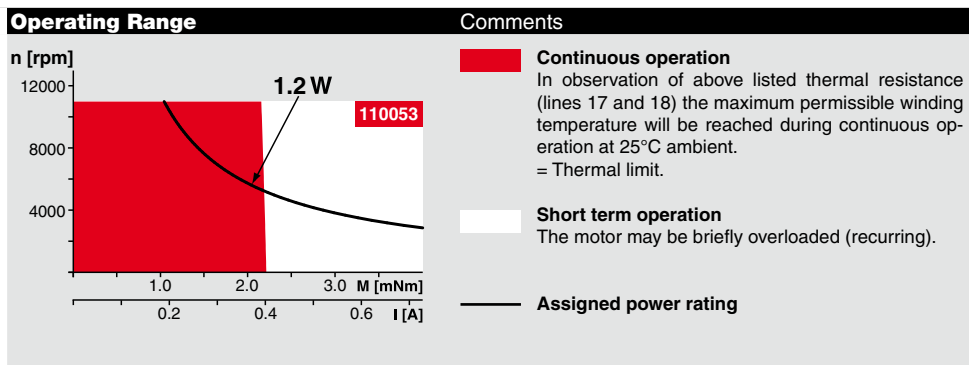
Specifications	
Thermal data	
17 Thermal resistance housing-ambient	29.8 K/W
18 Thermal resistance winding-housing	5.5 K/W
19 Thermal time constant winding	3.55 s
20 Thermal time constant motor	165 s
21 Ambient temperature	-30...+65°C
22 Max. winding temperature	+85°C
Mechanical data (sleeve bearings)	
23 Max. speed	11000 rpm
24 Axial play	0.05 - 0.15 mm
25 Radial play	0.012 mm
26 Max. axial load (dynamic)	0.8 N
27 Max. force for press fits (static) (static, shaft supported)	35 N / 280 N
28 Max. radial load, 5 mm from flange	1.4 N

Mechanical data (ball bearings)	
23 Max. speed	11000 rpm
24 Axial play	0.05 - 0.15 mm
25 Radial play	0.025 mm
26 Max. axial load (dynamic)	2.2 N
27 Max. force for press fits (static) (static, shaft supported)	30 N / 280 N
28 Max. radial load, 5 mm from flange	7.8 N

Other specifications	
29 Number of pole pairs	1
30 Number of commutator segments	7
31 Weight of motor	22 g
CLL = Capacitor Long Life	

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

Option
Ball bearings in place of sleeve bearings
Without CLL

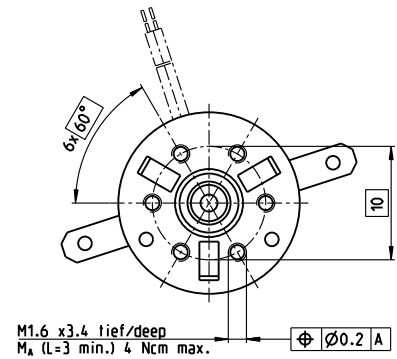
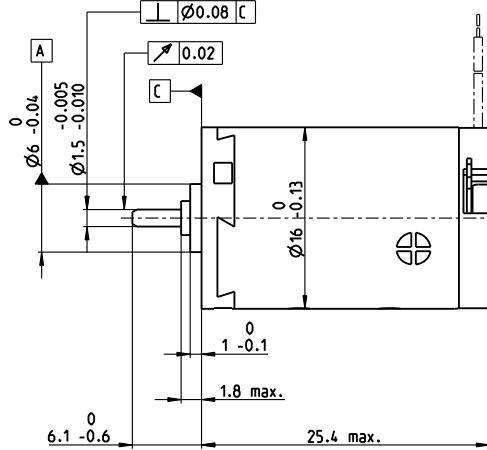
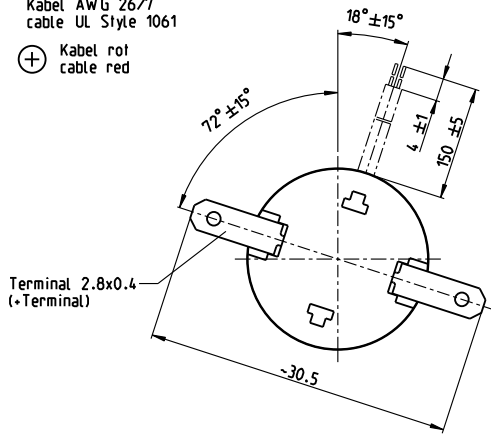


maxon Modular System		Overview on page 20-25	
<p>Spur Gearhead Ø16 mm 0.01 - 0.1 Nm Page 250-253</p> <p>Planetary Gearhead Ø16 mm 0.1 - 0.6 Nm Page 254/255</p> <p>Spindle Drive Ø16 mm Page 296-298</p>		<p>Encoder MR 32 CPT, 2 / 3 channels Page 315</p> <p>Encoder MR 128 / 256 / 512 CPT, 2 / 3 channels Page 317</p> <p>Encoder MEnc Ø13 mm 16 CPT, 2 channels Page 334</p>	<p>Recommended Electronics: ESCON 36/2 DC Page 342 ESCON Module 50/5 343 ESCON 50/5 344 EPOS2 24/2 350 EPOS2 Module 36/2 350 EPOS3 70/10 EtherCAT 357 MAXPOS 50/5 360 Notes 22</p>

A-max 16 Ø16 mm, Graphite Brushes, 2 Watt

Kabel AWG 26/7
cable UL Style 1061

⊕ Kabel rot
cable red



M 1.5:1

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

Part Numbers

with terminals	110061	110062	110063	110064	110065	110066	110067	110068	110069	110070
with cables	139821	352853	352854	352855	325083	352856	205903	352857	266076	352858

Motor Data

Values at nominal voltage		1.5	3	6	9	12	14	15	18	21	30
1 Nominal voltage	V	1.5	3	6	9	12	14	15	18	21	30
2 No load speed	rpm	10200	11500	9360	11500	11500	11500	11000	10900	11300	10500
3 No load current	mA	282	164	65.6	54.6	41	35.1	31.1	25.9	23	15
4 Nominal speed	rpm	9010	8060	3280	5510	5460	5500	4860	4810	5100	4180
5 Nominal torque (max. continuous torque)	mNm	0.579	1.29	2.42	2.36	2.34	2.35	2.35	2.33	2.28	2.24
6 Nominal current (max. continuous current)	A	0.72	0.72	0.495	0.394	0.293	0.253	0.224	0.186	0.162	0.105
7 Stall torque	mNm	5.36	4.65	4.05	4.84	4.78	4.82	4.54	4.48	4.49	4.04
8 Stall current	A	4.1	2.03	0.727	0.704	0.521	0.451	0.378	0.311	0.276	0.164
9 Max. efficiency	%	54	51	49	52	52	52	51	51	51	48
Characteristics											
10 Terminal resistance	Ω	0.366	1.48	8.25	12.8	23	31.1	39.7	57.9	76.1	183
11 Terminal inductance	mH	0.0169	0.0519	0.306	0.467	0.83	1.13	1.42	2.05	2.61	6.01
12 Torque constant	mNm/A	1.31	2.29	5.57	6.88	9.17	10.7	12	14.4	16.3	24.7
13 Speed constant	rpm/V	7290	4170	1720	1390	1040	893	795	663	587	387
14 Speed / torque gradient	rpm/mNm	2040	2690	2540	2580	2620	2590	2630	2660	2750	2880
15 Mechanical time constant	ms	22.6	23.1	23.1	23.2	23.3	23.3	23.5	23.4	23.5	23.9
16 Rotor inertia	gcm ²	1.06	0.82	0.868	0.859	0.849	0.859	0.852	0.838	0.816	0.793

Specifications

Thermal data	
17 Thermal resistance housing-ambient	29.8 K/W
18 Thermal resistance winding-housing	5.5 K/W
19 Thermal time constant winding	4.42 s
20 Thermal time constant motor	165 s
21 Ambient temperature	-30...+85°C
22 Max. winding temperature	+125°C

Mechanical data (sleeve bearings)	
23 Max. speed	11900 rpm
24 Axial play	0.05 - 0.15 mm
25 Radial play	0.012 mm
26 Max. axial load (dynamic)	0.8 N
27 Max. force for press fits (static)	35 N
28 Max. radial load, 5 mm from flange	1.4 N

Mechanical data (ball bearings)	
23 Max. speed	11900 rpm
24 Axial play	0.05 - 0.15 mm
25 Radial play	0.025 mm
26 Max. axial load (dynamic)	2.2 N
27 Max. force for press fits (static)	30 N
28 Max. radial load, 5 mm from flange	7.8 N

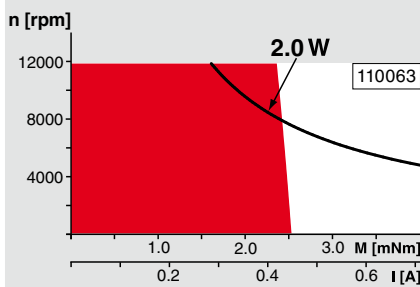
Other specifications	
29 Number of pole pairs	1
30 Number of commutator segments	7
31 Weight of motor	21 g

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

Option

Ball bearings in place of sleeve bearings

Operating Range



Comments

Continuous operation
In observation of above listed thermal resistance (lines 17 and 18) the maximum permissible winding temperature will be reached during continuous operation at 25°C ambient.
= Thermal limit.

Short term operation
The motor may be briefly overloaded (recurring).

Assigned power rating

maxon Modular System

Overview on page 20-25

Spur Gearhead

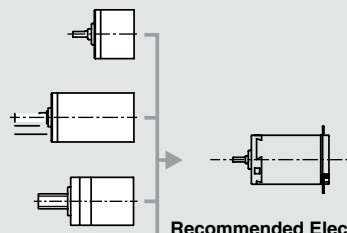
Ø16 mm
0.01 - 0.1 Nm
Page 250-253

Planetary Gearhead

Ø16 mm
0.1 - 0.6 Nm
Page 254/255

Spindle Drive

Ø16 mm
Page 296-298

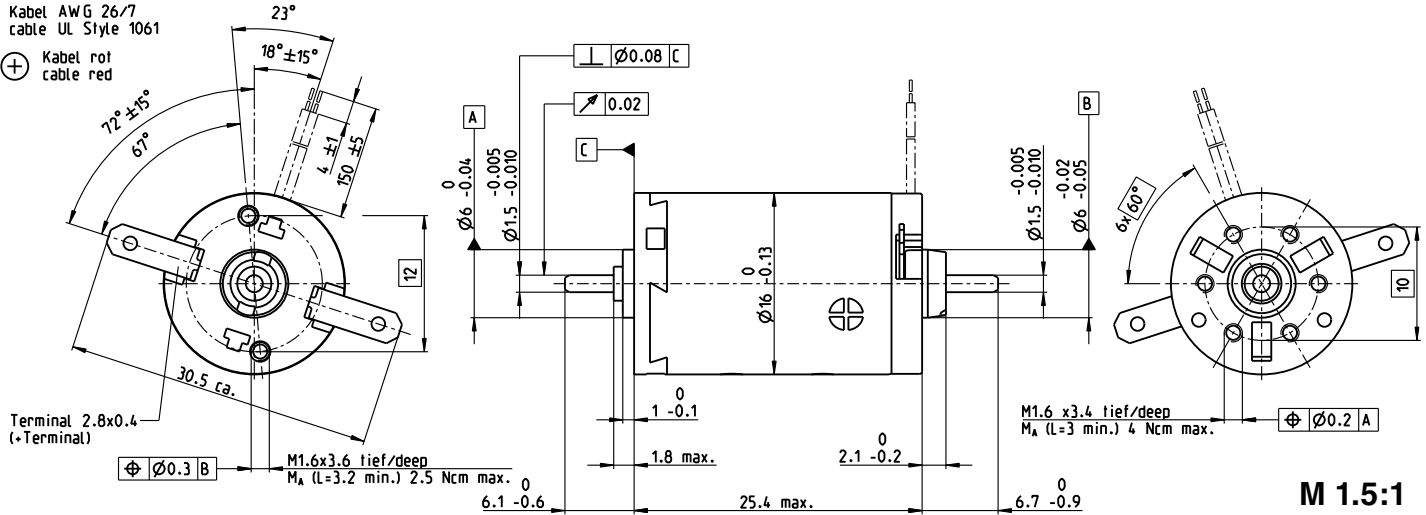


Recommended Electronics:

ESCON 36/2 DC	Page 342
ESCON Module 50/5	343
ESCON 50/5	344
Notes	22

A-max 16 Ø16 mm, Graphite Brushes, 2 Watt

Kabel AWG 26/7
cable UL Style 1061
⊕ Kabel rot
cable red



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

Part Numbers										
with terminals	110071	110072	110073	110074	110075	110076	110077	110078	110079	110080
with cables	139825	352870	352871	352872	352873	352874	352875	352876	352877	352878

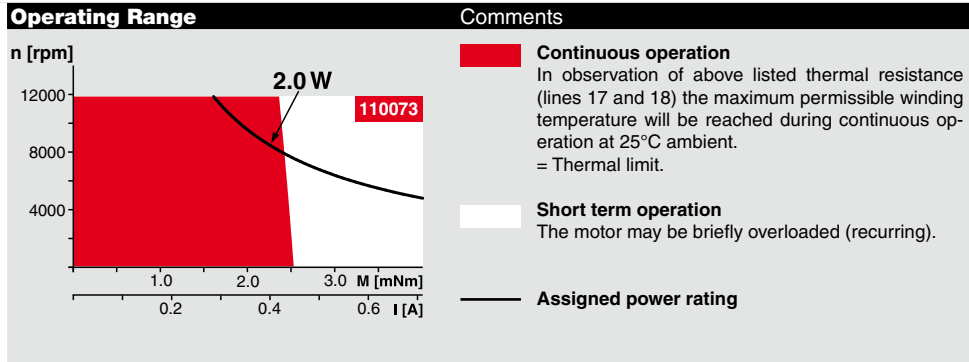
Motor Data												
Values at nominal voltage												
		1.5	3	6	9	12	14	15	18	21	30	
1	Nominal voltage	V	1.5	3	6	9	12	14	15	18	21	30
2	No load speed	rpm	10200	11500	9360	11500	11500	11500	11000	10900	11300	10500
3	No load current	mA	282	164	65.6	54.6	41	35.1	31.1	25.9	23	15
4	Nominal speed	rpm	9010	8060	3280	5510	5460	5500	4860	4810	5100	4180
5	Nominal torque (max. continuous torque)	mNm	0.579	1.29	2.42	2.36	2.34	2.35	2.35	2.33	2.28	2.24
6	Nominal current (max. continuous current)	A	0.72	0.72	0.495	0.394	0.293	0.253	0.224	0.186	0.162	0.105
7	Stall torque	mNm	5.36	4.65	4.05	4.84	4.78	4.82	4.54	4.48	4.49	4.04
8	Stall current	A	4.1	2.03	0.727	0.704	0.521	0.451	0.378	0.311	0.276	0.164
9	Max. efficiency	%	54	51	49	52	52	52	51	51	51	48
Characteristics												
10	Terminal resistance	Ω	0.366	1.48	8.25	12.8	23	31.1	39.7	57.9	76.1	183
11	Terminal inductance	mH	0.0169	0.0519	0.306	0.467	0.83	1.13	1.42	2.05	2.61	6.01
12	Torque constant	mNm/A	1.31	2.29	5.57	6.88	9.17	10.7	12	14.4	16.3	24.7
13	Speed constant	rpm/V	7290	4170	1720	1390	1040	893	795	663	587	387
14	Speed / torque gradient	rpm/mNm	2040	2690	2540	2580	2620	2590	2630	2660	2750	2880
15	Mechanical time constant	ms	22.6	23.1	23.1	23.2	23.3	23.3	23.5	23.4	23.5	23.9
16	Rotor inertia	gcm ²	1.06	0.82	0.868	0.859	0.849	0.859	0.852	0.838	0.816	0.793

Specifications		
Thermal data		
17	Thermal resistance housing-ambient	29.8 K/W
18	Thermal resistance winding-housing	5.5 K/W
19	Thermal time constant winding	4.42 s
20	Thermal time constant motor	165 s
21	Ambient temperature	-30...+85°C
22	Max. winding temperature	+125°C
Mechanical data (sleeve bearings)		
23	Max. speed	11900 rpm
24	Axial play	0.05 - 0.15 mm
25	Radial play	0.012 mm
26	Max. axial load (dynamic)	0.8 N
27	Max. force for press fits (static) (static, shaft supported)	35 N
28	Max. radial load, 5 mm from flange	280 N
		1.4 N

Mechanical data (ball bearings)		
23	Max. speed	11900 rpm
24	Axial play	0.05 - 0.15 mm
25	Radial play	0.025 mm
26	Max. axial load (dynamic)	2.2 N
27	Max. force for press fits (static) (static, shaft supported)	30 N
28	Max. radial load, 5 mm from flange	280 N
		7.8 N
Other specifications		
29	Number of pole pairs	1
30	Number of commutator segments	7
31	Weight of motor	22 g

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

Option
Ball bearings in place of sleeve bearings

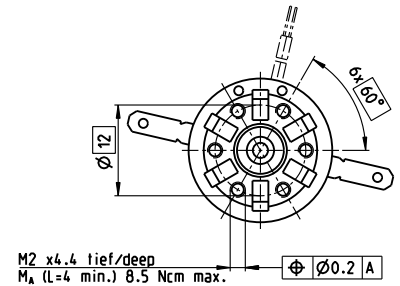
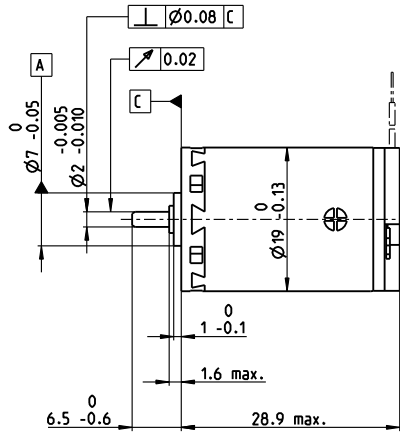
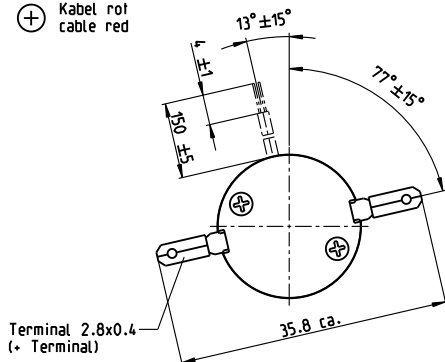


maxon Modular System		Overview on page 20-25	
<p>Spur Gearhead Ø16 mm 0.01 - 0.1 Nm Page 250-253</p> <p>Planetary Gearhead Ø16 mm 0.1 - 0.6 Nm Page 254/255</p> <p>Spindle Drive Ø16 mm Page 296-298</p>		<p>Encoder MR 32 CPT, 2 / 3 channels Page 315</p> <p>Encoder MR 128 / 256 / 512 CPT, 2 / 3 channels Page 317</p> <p>Encoder MEnc Ø13 mm 16 CPT, 2 channels Page 334</p>	<p>Recommended Electronics: ESCON 36/2 DC Page 342 ESCON Module 50/5 343 ESCON 50/5 344 EPOS2 24/2 350 EPOS2 Module 36/2 350 EPOS3 70/10 EtherCAT 357 MAXPOS 50/5 360 Notes 22</p>

A-max 19 Ø19 mm, Precious Metal Brushes CLL, 2.5 Watt

Kabel AWG 26/7
cable UL Style 1061

⊕ Kabel rot
cable red



M 1:1

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

Part Numbers

with terminals	110081	110082	110083	110084	110085	110086	110087	110088	110089
with cables	139828	202411	352922	202412	352923	233453	238388	267427	235373

Motor Data

Values at nominal voltage		1.5	3.6	4.5	6	9	12	15	18	24
1 Nominal voltage	V	1.5	3.6	4.5	6	9	12	15	18	24
2 No load speed	rpm	8040	10800	9420	7790	9220	10300	10300	9300	8870
3 No load current	mA	78	52.9	33.6	18.6	16.2	14.6	11.7	8.25	5.73
4 Nominal speed	rpm	6840	8080	5710	4000	5470	6510	6500	5380	4900
5 Nominal torque (max. continuous torque)	mNm	1.35	2.48	3.61	3.59	3.59	3.49	3.48	3.42	3.39
6 Nominal current (max. continuous current)	A	0.84	0.84	0.83	0.51	0.403	0.33	0.264	0.195	0.138
7 Stall torque	mNm	7.79	9.43	9	7.36	8.83	9.47	9.45	8.16	7.63
8 Stall current	A	4.44	3.02	2.01	1.02	0.963	0.867	0.692	0.45	0.301
9 Max. efficiency	%	76	76	77	76	76	76	76	76	75
Characteristics		0.338	1.19	2.24	5.88	9.34	13.8	21.7	40	79.7
10 Terminal resistance	Ω	0.338	1.19	2.24	5.88	9.34	13.8	21.7	40	79.7
11 Terminal inductance	mH	0.0186	0.0587	0.121	0.314	0.506	0.719	1.12	1.98	3.87
12 Torque constant	mNm/A	1.76	3.12	4.49	7.22	9.17	10.9	13.7	18.1	25.4
13 Speed constant	rpm/V	5440	3060	2130	1320	1040	874	699	526	377
14 Speed / torque gradient	rpm/mNm	1050	1170	1060	1080	1060	1110	1110	1160	1180
15 Mechanical time constant	ms	27.9	25.4	24.3	24.2	24.1	24.2	24.3	25	24.6
16 Rotor inertia	gcm ²	2.54	2.07	2.18	2.14	2.16	2.09	2.09	2.06	1.99

Specifications

Thermal data	
17 Thermal resistance housing-ambient	21.3 K/W
18 Thermal resistance winding-housing	10.5 K/W
19 Thermal time constant winding	11 s
20 Thermal time constant motor	201 s
21 Ambient temperature	-30...+65°C
22 Max. winding temperature	+85°C

Mechanical data (sleeve bearings)	
23 Max. speed	16000 rpm
24 Axial play	0.05 - 0.15 mm
25 Radial play	0.012 mm
26 Max. axial load (dynamic)	1 N
27 Max. force for press fits (static)	80 N
28 Max. radial load, 5 mm from flange	2.7 N

Mechanical data (ball bearings)	
23 Max. speed	16000 rpm
24 Axial play	0.05 - 0.15 mm
25 Radial play	0.025 mm
26 Max. axial load (dynamic)	3.3 N
27 Max. force for press fits (static)	45 N
28 Max. radial load, 5 mm from flange	11.9 N

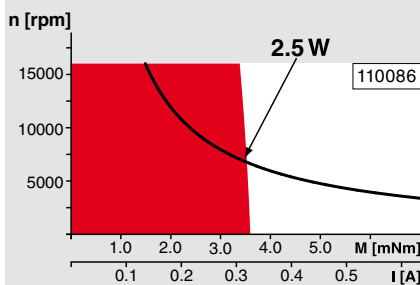
Other specifications	
29 Number of pole pairs	1
30 Number of commutator segments	9
31 Weight of motor	33 g
CLL = Capacitor Long Life	

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

Option

Ball bearings in place of sleeve bearings
Without CLL

Operating Range



Comments

Continuous operation
In observation of above listed thermal resistance (lines 17 and 18) the maximum permissible winding temperature will be reached during continuous operation at 25°C ambient.
= Thermal limit.

Short term operation
The motor may be briefly overloaded (recurring).

— **Assigned power rating**

maxon Modular System

Overview on page 20–25

Planetary Gearhead

Ø19 mm
0.1 - 0.3 Nm
Page 257

Planetary Gearhead

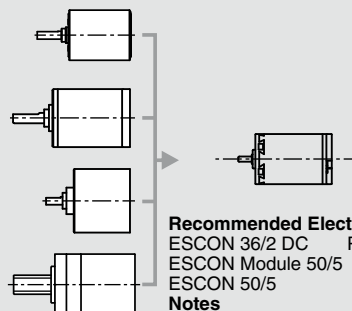
Ø22 mm
0.1 - 2.0 Nm
Page 262/264

Spur Gearhead

Ø24 mm
0.1 Nm
Page 269

Spindle Drive

Ø22 mm
Page 299/300



Recommended Electronics:

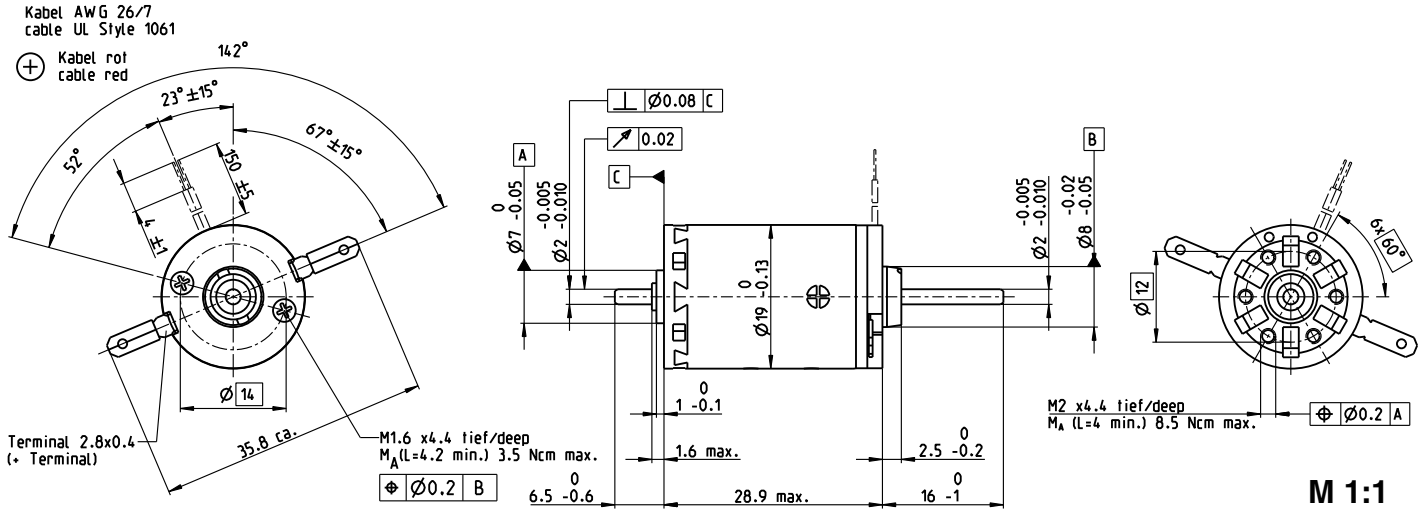
ESCON 36/2 DC Page 342

ESCON Module 50/5 343

ESCON 50/5 344

Notes 22

A-max 19 Ø19 mm, Precious Metal Brushes CLL, 1.5 Watt



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

		Part Numbers								
with terminals		110090	110091	110092	110093	110094	110095	110096	110097	110098
with cables		139832	352925	352926	352927	352928	352929	352930	315468	352931

Motor Data											
Values at nominal voltage											
1 Nominal voltage	V	1.2	2.4	3	4.8	6	7.2	9	12	18	
2 No load speed	rpm	6390	7160	6230	6190	6090	6130	6130	6140	6590	
3 No load current	mA	88.3	52	34.2	21.2	16.6	14	11.2	8.41	6.19	
4 Nominal speed	rpm	5210	4410	2500	2410	2330	2290	2280	2210	2630	
5 Nominal torque (max. continuous torque)	mNm	1.33	2.49	3.62	3.57	3.59	3.51	3.51	3.43	3.38	
6 Nominal current (max. continuous current)	A	0.84	0.84	0.833	0.511	0.405	0.332	0.265	0.195	0.138	
7 Stall torque	mNm	6.23	6.28	6	5.89	5.89	5.68	5.67	5.44	5.73	
8 Stall current	A	3.55	2.01	1.34	0.816	0.642	0.52	0.415	0.3	0.226	
9 Max. efficiency	%	72	71	71	71	71	71	71	70	70	
Characteristics											
10 Terminal resistance	Ω	0.338	1.19	2.24	5.88	9.34	13.8	21.7	40	79.7	
11 Terminal inductance	mH	0.0186	0.0587	0.121	0.314	0.506	0.719	1.12	1.98	3.87	
12 Torque constant	mNm/A	1.76	3.12	4.49	7.22	9.17	10.9	13.7	18.1	25.4	
13 Speed constant	rpm/V	5440	3060	2130	1320	1040	874	699	526	377	
14 Speed / torque gradient	rpm/mNm	1050	1170	1060	1080	1060	1110	1110	1160	1180	
15 Mechanical time constant	ms	27.9	25.4	24.3	24.2	24.1	24.3	24.3	25	24.7	
16 Rotor inertia	gcm ²	2.54	2.08	2.18	2.15	2.17	2.09	2.09	2.06	1.99	

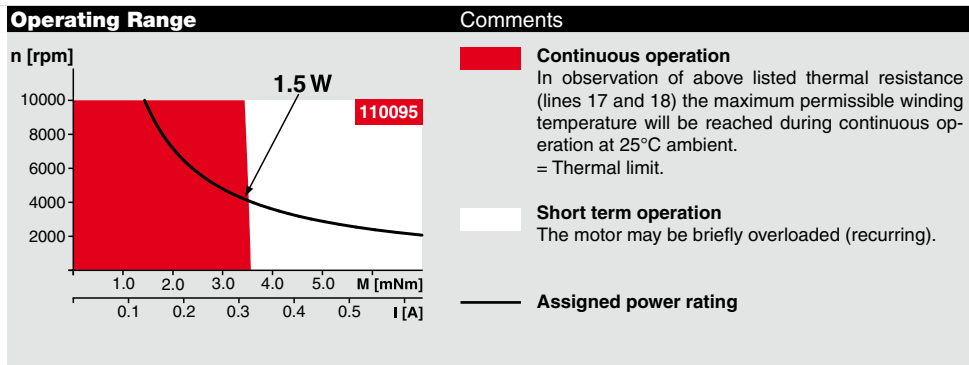
Specifications	
Thermal data	
17 Thermal resistance housing-ambient	21.3 K/W
18 Thermal resistance winding-housing	10.5 K/W
19 Thermal time constant winding	11 s
20 Thermal time constant motor	201 s
21 Ambient temperature	-30...+65°C
22 Max. winding temperature	+85°C
Mechanical data (sleeve bearings)	
23 Max. speed	10000 rpm
24 Axial play	0.05 - 0.15 mm
25 Radial play	0.012 mm
26 Max. axial load (dynamic)	1 N
27 Max. force for press fits (static) (static, shaft supported)	80 N / 440 N
28 Max. radial load, 5 mm from flange	2.7 N

Mechanical data (ball bearings)	
23 Max. speed	10000 rpm
24 Axial play	0.05 - 0.15 mm
25 Radial play	0.025 mm
26 Max. axial load (dynamic)	3.3 N
27 Max. force for press fits (static) (static, shaft supported)	45 N / 440 N
28 Max. radial load, 5 mm from flange	11.9 N

Other specifications	
29 Number of pole pairs	1
30 Number of commutator segments	9
31 Weight of motor g	34 g

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

Option
Ball bearings in place of sleeve bearings
Without CLL

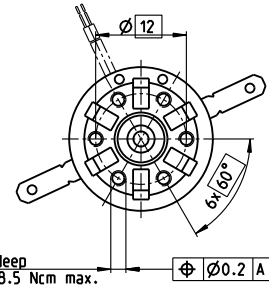
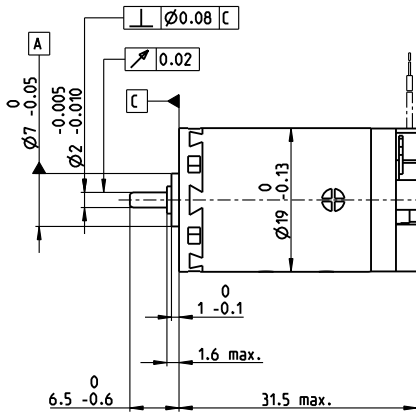
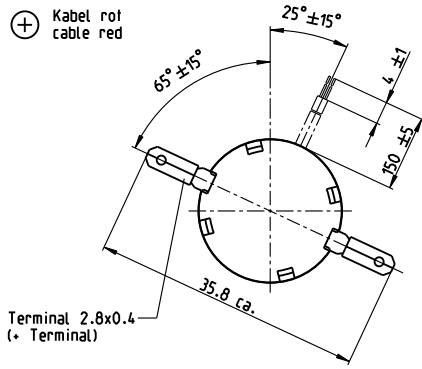


maxon Modular System		Overview on page 20–25
Planetary Gearhead Ø19 mm 0.1 - 0.3 Nm Page 257		Encoder MR 32 CPT, 2 / 3 channels Page 315
Planetary Gearhead Ø22 mm 0.1 - 2.0 Nm Page 262/264		Encoder MR 128 / 256 / 512 CPT, 2 / 3 channels Page 317
Spur Gearhead Ø24 mm 0.1 Nm Page 269		Encoder Enc 22 mm 100 CPT, 2 channels Page 324
Spindle Drive Ø22 mm Page 299/300		Encoder MEnc Ø13 mm 16 CPT, 2 channels Page 334
Recommended Electronics: ESCON 36/2 DC Page 342 ESCON Module 50/5 Page 343 ESCON 50/5 Page 344 EPOS2 24/2 Page 350 EPOS2 Module 36/2 Page 350 EPOS3 70/10 EtherCAT Page 357 MAXPOS 50/5 Page 360 Notes Page 22		

A-max 19 Ø19 mm, Graphite Brushes, 2.5 Watt

Kabel AWG 26/7
cable UL Style 1061

⊕ Kabel rot
cable red



M 1:1

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

Part Numbers

with terminals	249982	249983	249984	249985	249986	249987	249988	249989	249990
with cables	240133	352942	310977	352943	352944	352945	352946	352947	310980

Motor Data

Values at nominal voltage		2.4	3.6	6	7.2	9	12	15	18	24
1 Nominal voltage	V	2.4	3.6	6	7.2	9	12	15	18	24
2 No load speed	rpm	12400	10400	12200	8980	8850	9930	9930	8910	8470
3 No load current	mA	292	158	114	66.1	51.9	44.6	35.7	26.3	18.6
4 Nominal speed	rpm	11700	8350	9310	4750	4630	5670	5670	4520	4020
5 Nominal torque (max. continuous torque)	mNm	0.759	1.78	2.75	3.98	4.02	3.89	3.89	3.83	3.8
6 Nominal current (max. continuous current)	A	0.72	0.72	0.72	0.612	0.485	0.397	0.317	0.235	0.167
7 Stall torque	mNm	14.1	9.66	12.1	8.84	8.83	9.47	9.44	8.16	7.63
8 Stall current	A	8.04	3.09	2.71	1.23	0.963	0.867	0.691	0.45	0.301
9 Max. efficiency	%	64	59	63	59	59	60	60	58	57
Characteristics										
10 Terminal resistance	Ω	0.299	1.16	2.22	5.88	9.35	13.8	21.7	40	79.8
11 Terminal inductance	mH	0.0186	0.0587	0.121	0.314	0.506	0.719	1.12	1.98	3.87
12 Torque constant	mNm/A	1.76	3.12	4.49	7.22	9.17	10.9	13.7	18.1	25.4
13 Speed constant	rpm/V	5440	3060	2130	1320	1040	874	699	526	377
14 Speed / torque gradient	rpm/mNm	925	1140	1050	1080	1060	1110	1110	1160	1180
15 Mechanical time constant	ms	24.9	25.1	24.4	24.5	24.4	24.6	24.7	25.4	25
16 Rotor inertia	gcm ²	2.57	2.1	2.21	2.17	2.2	2.12	2.12	2.09	2.02

Specifications

Thermal data	
17 Thermal resistance housing-ambient	21.3 K/W
18 Thermal resistance winding-housing	10.5 K/W
19 Thermal time constant winding	13.7 s
20 Thermal time constant motor	201 s
21 Ambient temperature	-30...+85°C
22 Max. winding temperature	+125°C

Mechanical data (sleeve bearings)	
23 Max. speed	12000 rpm
24 Axial play	0.05 - 0.15 mm
25 Radial play	0.012 mm
26 Max. axial load (dynamic)	1 N
27 Max. force for press fits (static)	80 N
28 Max. radial load, 5 mm from flange	2.7 N

Mechanical data (ball bearings)	
23 Max. speed	12000 rpm
24 Axial play	0.05 - 0.15 mm
25 Radial play	0.025 mm
26 Max. axial load (dynamic)	3.3 N
27 Max. force for press fits (static)	45 N
28 Max. radial load, 5 mm from flange	11.9 N

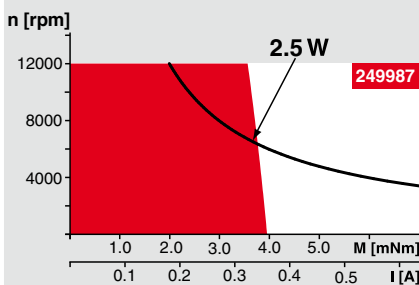
Other specifications	
29 Number of pole pairs	1
30 Number of commutator segments	9
31 Weight of motor	33 g

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

Option

Ball bearings in place of sleeve bearings

Operating Range



Comments

Continuous operation
In observation of above listed thermal resistance (lines 17 and 18) the maximum permissible winding temperature will be reached during continuous operation at 25°C ambient.
= Thermal limit.

Short term operation
The motor may be briefly overloaded (recurring).

— Assigned power rating

maxon Modular System

Overview on page 20–25

Planetary Gearhead

Ø19 mm
0.1 - 0.3 Nm
Page 257

Planetary Gearhead

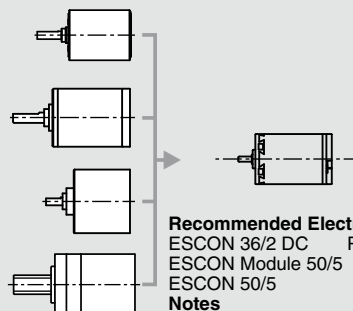
Ø22 mm
0.1 - 2.0 Nm
Page 262/264

Spur Gearhead

Ø24 mm
0.1 Nm
Page 269

Spindle Drive

Ø22 mm
Page 299/300



Recommended Electronics:

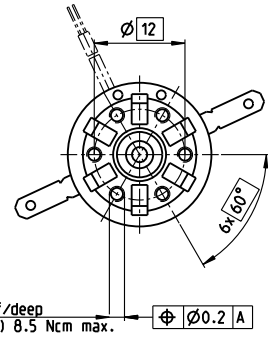
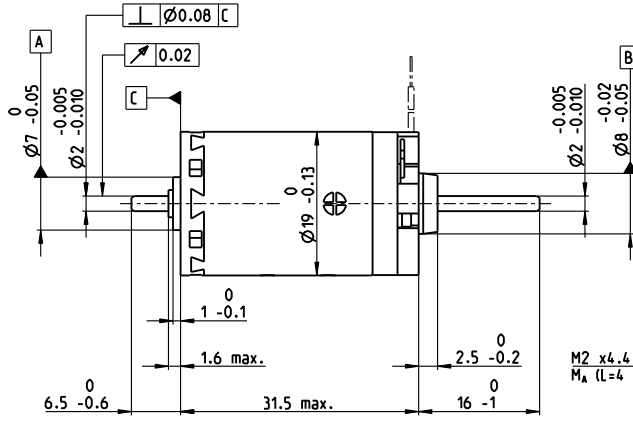
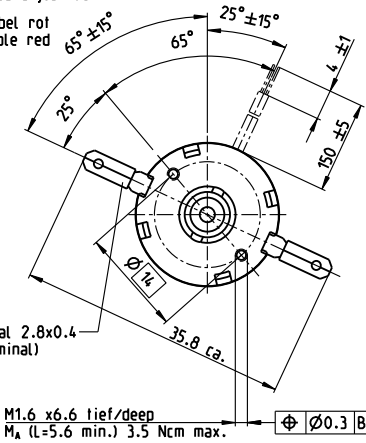
ESCON 36/2 DC Page 342
ESCON Module 50/5 343
ESCON 50/5 344

Notes 22

A-max 19 Ø19 mm, Graphite Brushes, 2.5 Watt

Kabel AWG 26/7
cable UL Style 1061

⊕ Kabel rot
cable red



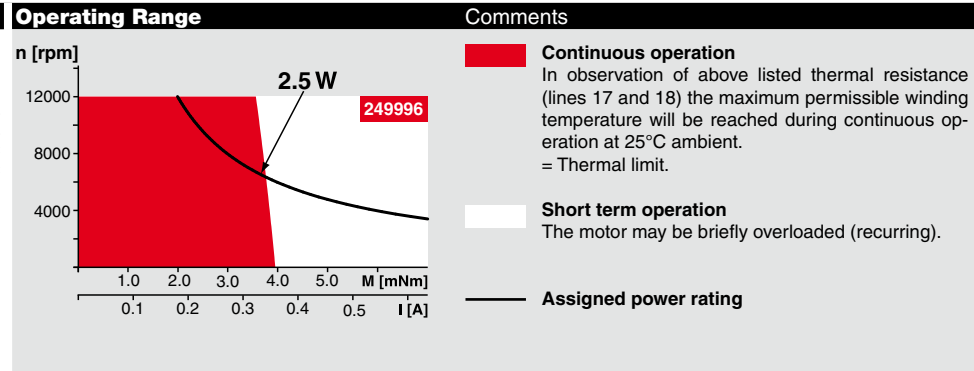
M 1:1

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

Part Numbers										
with terminals	249991	249992	249993	249994	249995	249996	249997	249998	249999	
with cables	240035	352971	353590	352972	352973	344596	352974	352975	352976	

Motor Data										
Values at nominal voltage										
	V	2.4	3.6	6	7.2	9	12	15	18	24
1 Nominal voltage	V	2.4	3.6	6	7.2	9	12	15	18	24
2 No load speed	rpm	12400	10400	12200	8980	8850	9930	9930	8910	8470
3 No load current	mA	292	158	114	66.1	51.9	44.6	35.7	26.3	18.6
4 Nominal speed	rpm	11700	8350	9310	4750	4630	5670	5670	4520	4020
5 Nominal torque (max. continuous torque)	mNm	0.759	1.78	2.75	3.98	4.02	3.89	3.89	3.83	3.8
6 Nominal current (max. continuous current)	A	0.72	0.72	0.72	0.612	0.485	0.397	0.317	0.235	0.167
7 Stall torque	mNm	14.1	9.66	12.1	8.84	8.83	9.47	9.44	8.16	7.63
8 Stall current	A	8.04	3.09	2.71	1.23	0.963	0.867	0.691	0.45	0.301
9 Max. efficiency	%	64	59	63	59	59	60	60	58	57
Characteristics										
10 Terminal resistance	Ω	0.299	1.16	2.22	5.88	9.35	13.8	21.7	40	79.8
11 Terminal inductance	mH	0.0186	0.0587	0.121	0.314	0.506	0.719	1.12	1.98	3.87
12 Torque constant	mNm/A	1.76	3.12	4.49	7.22	9.17	10.9	13.7	18.1	25.4
13 Speed constant	rpm/V	5440	3060	2130	1320	1040	874	699	526	377
14 Speed / torque gradient	rpm/mNm	925	1140	1050	1080	1060	1110	1110	1160	1180
15 Mechanical time constant	ms	24.6	24.8	24	24.2	24.1	24.2	24.3	25	24.6
16 Rotor inertia	gcm ²	2.54	2.07	2.18	2.14	2.16	2.09	2.09	2.06	1.99

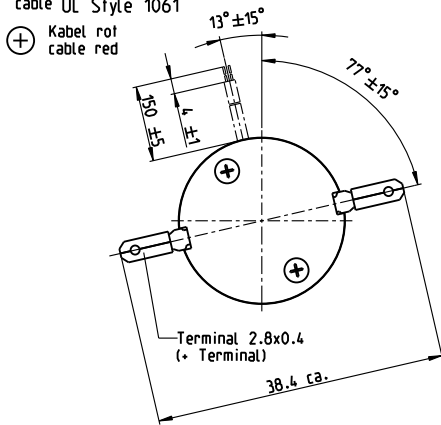
Specifications	
Thermal data	
17 Thermal resistance housing-ambient	21.3 K/W
18 Thermal resistance winding-housing	10.5 K/W
19 Thermal time constant winding	13.7 s
20 Thermal time constant motor	201 s
21 Ambient temperature	-30...+85°C
22 Max. winding temperature	+125°C
Mechanical data (sleeve bearings)	
23 Max. speed	12000 rpm
24 Axial play	0.05 - 0.15 mm
25 Radial play	0.012 mm
26 Max. axial load (dynamic)	1 N
27 Max. force for press fits (static) (static, shaft supported)	80 N / 240 N
28 Max. radial load, 5 mm from flange	2.7 N
Mechanical data (ball bearings)	
23 Max. speed	12000 rpm
24 Axial play	0.05 - 0.15 mm
25 Radial play	0.025 mm
26 Max. axial load (dynamic)	3.3 N
27 Max. force for press fits (static) (static, shaft supported)	45 N / 240 N
28 Max. radial load, 5 mm from flange	11.9 N
Other specifications	
29 Number of pole pairs	1
30 Number of commutator segments	9
31 Weight of motor	34 g
Values listed in the table are nominal. Explanation of the figures on page 79.	
Option Ball bearings in place of sleeve bearings	



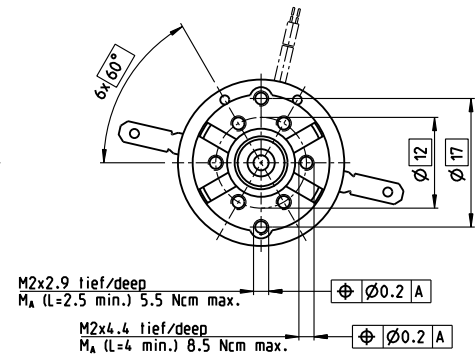
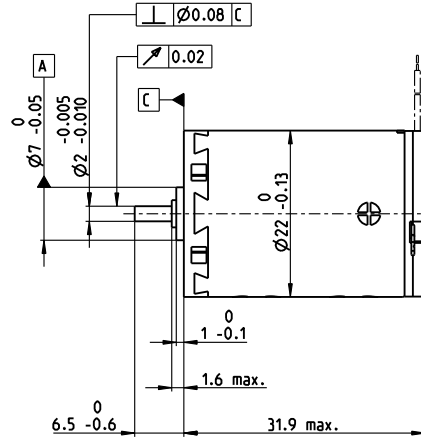
maxon Modular System		Overview on page 20-25
Planetary Gearhead Ø19 mm 0.1 - 0.3 Nm Page 257		Encoder MR 32 CPT, 2 / 3 channels Page 315
Planetary Gearhead Ø22 mm 0.1 - 2.0 Nm Page 262/264		Encoder MR 128 / 256 / 512 CPT, 2 / 3 channels Page 317
Spur Gearhead Ø24 mm 0.1 Nm Page 269		Encoder Enc 22 mm 100 CPT, 2 channels Page 324
Spindle Drive Ø22 mm Page 299/300		Encoder MEnc Ø13 mm 16 CPT, 2 channels Page 334
Recommended Electronics: ESCON 36/2 DC Page 342 ESCON Module 50/5 Page 343 ESCON 50/5 Page 344 EPOS2 24/2 Page 350 EPOS2 Module 36/2 Page 350 EPOS3 70/10 EtherCAT Page 357 MAXPOS 50/5 Page 360 Notes Page 22		

A-max 22 Ø22 mm, Precious Metal Brushes CLL, 5 Watt

Kabel AWG 24/7
cable UL Style 1061
Kabel rot
cable red



M 1:1



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

Part Numbers

with terminals	110117	110119	110120	110121	110122	110123	110124	110125	110126	110127	110128	110129
with cables	139838	218799	238798	202413	258367	137255	134267	134666	267423	137476	310003	342390

Motor Data

Values at nominal voltage		6	9	9	12	12	15	18	24	30	36	48	48
1 Nominal voltage	V	6	9	9	12	12	15	18	24	30	36	48	48
2 No load speed	rpm	9630	9970	8760	10400	9400	10300	9970	10700	10800	9800	9280	8370
3 No load current	mA	29.5	20.8	16.8	16.8	14.2	13.1	10.4	8.81	7.18	5.06	3.47	2.93
4 Nominal speed	rpm	7390	7300	6100	7770	6700	7530	7220	7970	8070	7000	6420	5520
5 Nominal torque (max. continuous torque)	mNm	4.81	6.22	6.3	6.24	6.18	6.1	6.05	6.02	5.98	5.94	5.83	5.9
6 Nominal current (max. continuous current)	A	0.84	0.745	0.661	0.586	0.523	0.451	0.362	0.291	0.234	0.175	0.122	0.111
7 Stall torque	mNm	20.1	22.9	20.5	24.3	21.4	22.9	22	23.5	23.5	20.8	19	17.4
8 Stall current	A	3.42	2.68	2.11	2.23	1.77	1.65	1.28	1.11	0.894	0.599	0.387	0.32
9 Max. efficiency	%	83	84	83	84	83	83	83	83	83	83	82	82
Characteristics													
10 Terminal resistance	Ω	1.76	3.36	4.27	5.39	6.78	9.07	14	21.6	33.5	60.1	124	150
11 Terminal inductance	mH	0.106	0.222	0.288	0.362	0.445	0.584	0.89	1.37	2.1	3.68	7.29	8.95
12 Torque constant	mNm/A	5.9	8.55	9.73	10.9	12.1	13.9	17.1	21.2	26.2	34.8	48.9	54.3
13 Speed constant	rpm/V	1620	1120	981	875	790	689	558	450	364	274	195	176
14 Speed / torque gradient	rpm/mNm	482	438	430	432	443	451	458	459	465	474	494	486
15 Mechanical time constant	ms	20.5	19.8	19.7	19.7	19.8	20.2	20.1	20.2	20.3	20.3	20.5	20.4
16 Rotor inertia	gcm ²	4.07	4.32	4.37	4.36	4.26	4.27	4.2	4.2	4.16	4.09	3.97	4.01

Specifications

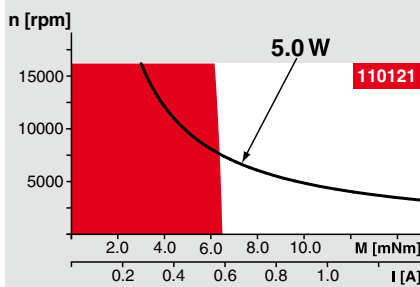
Thermal data		
17 Thermal resistance housing-ambient		20 K/W
18 Thermal resistance winding-housing		6.0 K/W
19 Thermal time constant winding		10.2 s
20 Thermal time constant motor		313 s
21 Ambient temperature	C	-30...+65°C
22 Max. winding temperature		+85°C
Mechanical data (sleeve bearings)		
23 Max. speed		16000 rpm
24 Axial play		0.05 - 0.15 mm
25 Radial play		0.012 mm
26 Max. axial load (dynamic)		1 N
27 Max. force for press fits (static)		80 N
28 Max. radial load, 5 mm from flange		2.8 N
Mechanical data (ball bearings)		
23 Max. speed		16000 rpm
24 Axial play		0.05 - 0.15 mm
25 Radial play		0.025 mm
26 Max. axial load (dynamic)		3.3 N
27 Max. force for press fits (static)		45 N
28 Max. radial load, 5 mm from flange		12.3 N
Other specifications		
29 Number of pole pairs		1
30 Number of commutator segments		9
31 Weight of motor		54 g
CLL = Capacitor Long Life		

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

Option

Ball bearings in place of sleeve bearings
Without CLL

Operating Range



Comments

- Continuous operation**
In observation of above listed thermal resistance (lines 17 and 18) the maximum permissible winding temperature will be reached during continuous operation at 25°C ambient.
= Thermal limit.
- Short term operation**
The motor may be briefly overloaded (recurring).
- Assigned power rating**

maxon Modular System

Overview on page 20-25

Planetary Gearhead

Ø22 mm
0.1 - 0.6 Nm
Page 260/261

Planetary Gearhead

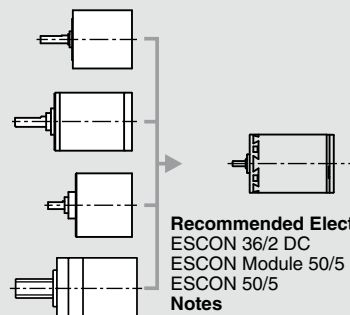
Ø22 mm
0.5 - 2.0 Nm
Page 262/264

Spur Gearhead

Ø24 mm
0.1 Nm
Page 269

Spindle Drive

Ø22 mm
Page 299/300



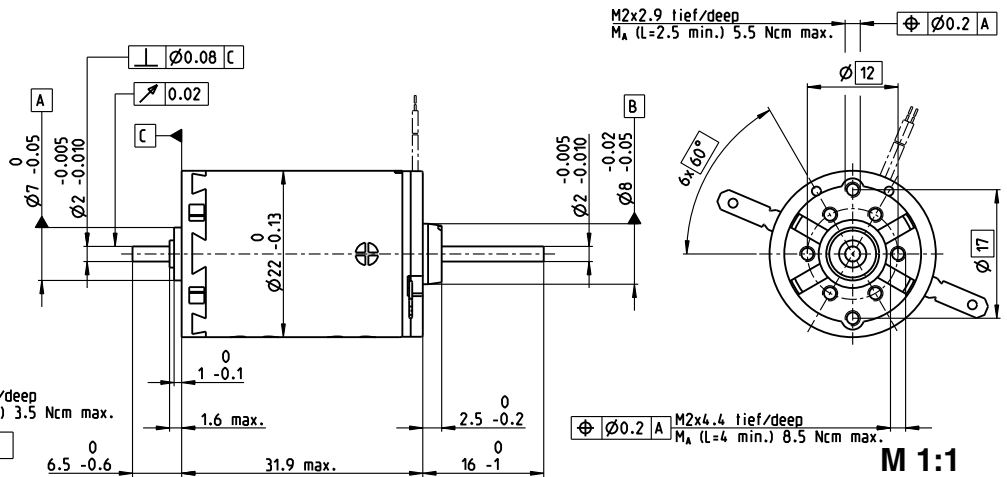
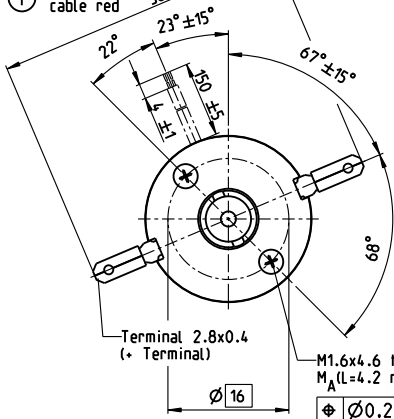
Recommended Electronics:

ESCON 36/2 DC	Page 342
ESCON Module 50/5	343
ESCON 50/5	344
Notes	22

A-max 22 Ø22 mm, Precious Metal Brushes CLL, 3.5 Watt

Kabel AWG 24/7
cable UL Style 1061

Kabel rot
cable red



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

Part Numbers												
with terminals	110130	110132	110133	110134	110135	110136	110137	110138	110139	110140	110141	110142
with cables	139846	352986	352987	352988	352989	352990	352991	352992	352993	352994	352995	352996

Motor Data													
Values at nominal voltage													
1 Nominal voltage	V	4.5	6	7.2	7.2	7.2	9	12	15	18	24	36	42
2 No load speed	rpm	7210	6630	7000	6240	5620	6140	6630	6680	6480	6520	6950	7320
3 No load current	mA	26.7	17.8	16	13.6	11.8	10.6	8.88	7.17	5.73	4.33	3.16	2.92
4 Nominal speed	rpm	4970	4380	4770	3990	3340	3830	4320	4360	4140	4160	4540	4940
5 Nominal torque (max. continuous torque)	mNm	4.82	5.24	5.27	5.27	5.22	5.15	5.1	5.09	5.05	5	4.89	4.92
6 Nominal current (max. continuous current)	A	0.84	0.628	0.555	0.495	0.442	0.381	0.306	0.246	0.197	0.147	0.103	0.0932
7 Stall torque	mNm	15.1	15.3	16.4	14.6	12.8	13.7	14.6	14.7	14.1	13.9	14.2	15.2
8 Stall current	A	2.56	1.79	1.69	1.34	1.06	0.992	0.856	0.693	0.537	0.399	0.29	0.28
9 Max. efficiency	%	81	81	82	81	80	81	81	81	81	81	81	81
Characteristics													
10 Terminal resistance	Ω	1.76	3.36	4.27	5.39	6.78	9.07	14	21.6	33.5	60.1	124	150
11 Terminal inductance	mH	0.106	0.222	0.288	0.362	0.445	0.584	0.89	1.37	2.1	3.68	7.29	8.95
12 Torque constant	mNm/A	5.9	8.55	9.73	10.9	12.1	13.9	17.1	21.2	26.2	34.8	48.9	54.3
13 Speed constant	rpm/V	1620	1120	981	875	790	689	558	450	364	274	195	176
14 Speed / torque gradient	rpm/mNm	482	438	430	432	443	451	458	459	465	474	494	486
15 Mechanical time constant	ms	20.6	19.8	19.7	19.7	19.8	20.2	20.1	20.2	20.3	20.3	20.6	20.4
16 Rotor inertia	gcm ²	4.07	4.32	4.38	4.36	4.26	4.27	4.2	4.21	4.16	4.1	3.97	4.01

Specifications	
Thermal data	
17 Thermal resistance housing-ambient	20 K/W
18 Thermal resistance winding-housing	6.0 K/W
19 Thermal time constant winding	10.2 s
20 Thermal time constant motor	313 s
21 Ambient temperature	-30...+65°C
22 Max. winding temperature	+85°C

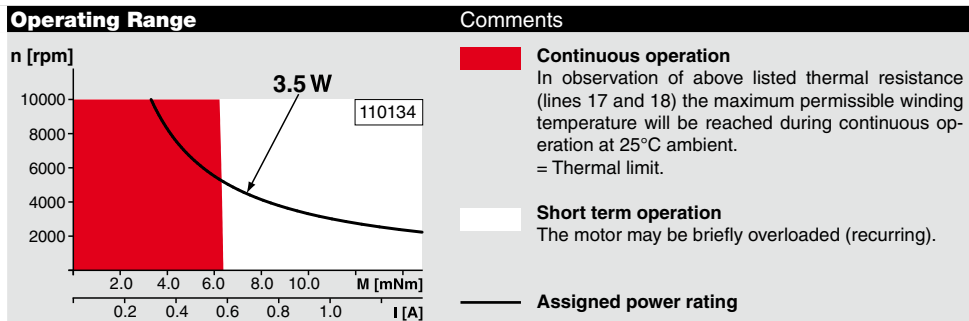
Mechanical data (sleeve bearings)	
23 Max. speed	10000 rpm
24 Axial play	0.05 - 0.15 mm
25 Radial play	0.012 mm
26 Max. axial load (dynamic)	1 N
27 Max. force for press fits (static) (static, shaft supported)	80 N / 440 N
28 Max. radial load, 5 mm from flange	2.8 N

Mechanical data (ball bearings)	
23 Max. speed	10000 rpm
24 Axial play	0.05 - 0.15 mm
25 Radial play	0.025 mm
26 Max. axial load (dynamic)	3.3 N
27 Max. force for press fits (static) (static, shaft supported)	45 N / 440 N
28 Max. radial load, 5 mm from flange	12.3 N

Other specifications	
29 Number of pole pairs	1
30 Number of commutator segments	9
31 Weight of motor	54 g
CLL = Capacitor Long Life	

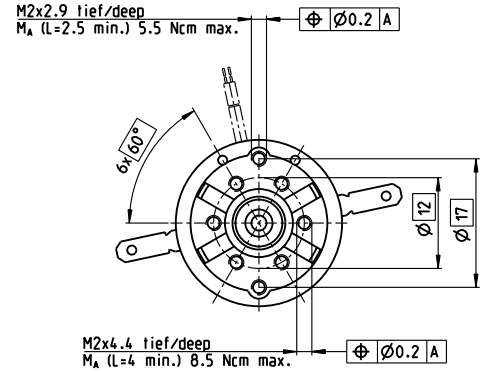
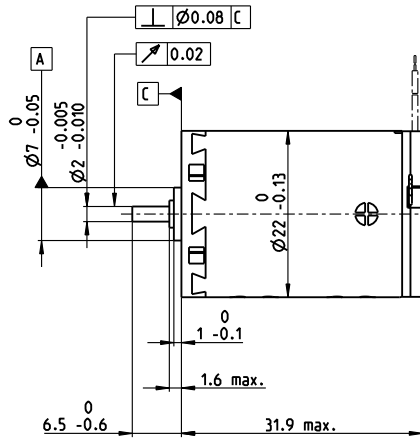
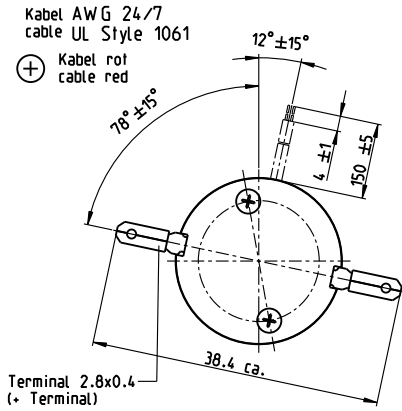
Values listed in the table are nominal.
Explanation of the figures on page 79.

Option
Ball bearings in place of sleeve bearings
Without CLL



maxon Modular System		Overview on page 20-25
Planetary Gearhead Ø22 mm 0.1 - 0.6 Nm Page 260/261 Planetary Gearhead Ø22 mm 0.5 - 2.0 Nm Page 262/264 Spur Gearhead Ø24 mm 0.1 Nm Page 269 Spindle Drive Ø22 mm Page 299/300		Encoder MR 32 CPT, 2 / 3 channels Page 315 Encoder MR 128 / 256 / 512 CPT, 2 / 3 channels Page 317 Encoder Enc 22 mm 100 CPT, 2 channels Page 324 Encoder MEnc Ø13 mm 16 CPT, 2 channels Page 335
Recommended Electronics: ESCON 36/2 DC Page 342 ESCON Module 50/5 Page 343 ESCON 50/5 Page 344 EPOS2 24/2 Page 350 EPOS2 Module 36/2 Page 350 EPOS3 70/10 EtherCAT Page 357 MAXPOS 50/5 Page 360 Notes Page 22		

A-max 22 Ø22 mm, Graphite Brushes, 6 Watt



M 1:1

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

Part Numbers

with terminals	110143	110145	110146	110147	110148	110149	110150	110151	110152	110153	110154	110155
with cables	139840	353017	199807	320206	323856	108828	199424	202921	267433	325492	313302	353019

Motor Data

Values at nominal voltage		6	9	9	12	12	15	18	24	24	36	48	48
1 Nominal voltage	V	6	9	9	12	12	15	18	24	24	36	48	48
2 No load speed	rpm	9240	9690	8500	10200	9170	10000	9770	10500	8480	9630	9110	8210
3 No load current	mA	83.1	57.9	49.6	45.8	40.5	36	29	23.7	18.4	14.2	9.99	8.84
4 Nominal speed	rpm	6240	6530	5350	7060	6000	6890	6600	7380	5270	6420	5840	4940
5 Nominal torque (max. continuous torque)	mNm	5.91	6.88	7.04	6.96	6.95	6.93	6.92	6.9	6.97	6.86	6.75	6.86
6 Nominal current (max. continuous current)	A	1.08	0.859	0.77	0.681	0.613	0.534	0.432	0.347	0.283	0.21	0.147	0.135
7 Stall torque	mNm	19.4	22.1	19.8	23.7	20.9	22.9	22	23.7	18.9	21.1	19.2	17.6
8 Stall current	A	3.29	2.59	2.04	2.17	1.72	1.65	1.29	1.12	0.721	0.606	0.393	0.325
9 Max. efficiency	%	67	70	69	72	70	72	72	73	70	72	71	70
Characteristics													
10 Terminal resistance	Ω	1.82	3.48	4.42	5.53	6.96	9.09	14	21.5	33.3	59.4	122	148
11 Terminal inductance	mH	0.106	0.223	0.288	0.363	0.445	0.585	0.891	1.37	2.1	3.69	7.3	8.97
12 Torque constant	mNm/A	5.9	8.55	9.73	10.9	12.1	13.9	17.1	21.2	26.2	34.8	48.9	54.3
13 Speed constant	rpm/V	1620	1120	981	875	790	689	558	450	364	274	195	176
14 Speed / torque gradient	rpm/mNm	500	454	446	444	455	452	457	456	461	468	487	479
15 Mechanical time constant	ms	20.9	20.2	20.1	19.9	19.9	19.9	19.7	19.7	19.8	19.7	19.9	19.8
16 Rotor inertia	gcm ²	4	4.25	4.3	4.29	4.19	4.2	4.13	4.13	4.09	4.02	3.9	3.94

Specifications

Thermal data

17 Thermal resistance housing-ambient	20 K/W
18 Thermal resistance winding-housing	6.0 K/W
19 Thermal time constant winding	9.43 s
20 Thermal time constant motor	314 s
21 Ambient temperature	-30...+85°C
22 Max. winding temperature	+125°C

Mechanical data (sleeve bearings)

23 Max. speed	9800 rpm
24 Axial play	0.05 - 0.15 mm
25 Radial play	0.012 mm
26 Max. axial load (dynamic)	1 N
27 Max. force for press fits (static)	80 N
28 Max. radial load, 5 mm from flange	2.8 N

Mechanical data (ball bearings)

23 Max. speed	9800 rpm
24 Axial play	0.05 - 0.15 mm
25 Radial play	0.025 mm
26 Max. axial load (dynamic)	3.3 N
27 Max. force for press fits (static)	45 N
28 Max. radial load, 5 mm from flange	12.3 N

Other specifications

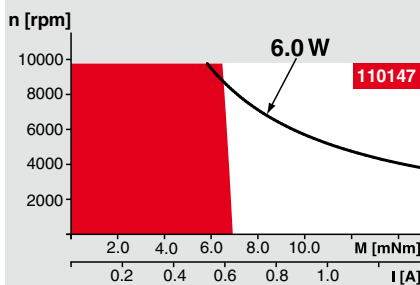
29 Number of pole pairs	1
30 Number of commutator segments	9
31 Weight of motor	54 g

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

Option

Ball bearings in place of sleeve bearings

Operating Range



Comments

Continuous operation
In observation of above listed thermal resistance (lines 17 and 18) the maximum permissible winding temperature will be reached during continuous operation at 25°C ambient.
= Thermal limit.

Short term operation
The motor may be briefly overloaded (recurring).

— Assigned power rating

maxon Modular System

Overview on page 20–25

Planetary Gearhead

Ø22 mm
0.1 - 0.6 Nm
Page 260/261

Planetary Gearhead

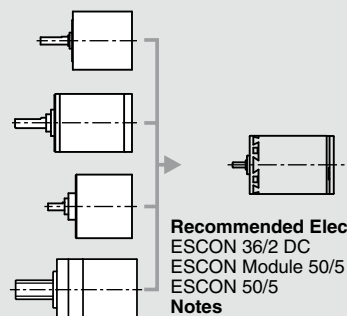
Ø22 mm
0.5 - 2.0 Nm
Page 262/264

Spur Gearhead

Ø24 mm
0.1 Nm
Page 269

Spindle Drive

Ø22 mm
Page 299/300



Recommended Electronics:

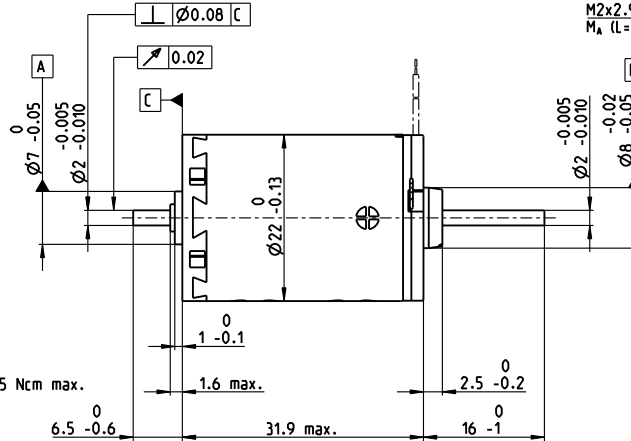
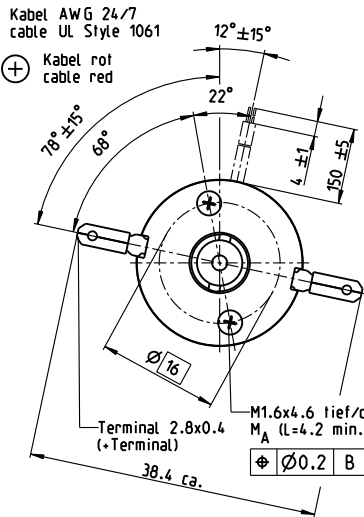
ESCON 36/2 DC Page 342
ESCON Module 50/5 343
ESCON 50/5 344

Notes 22

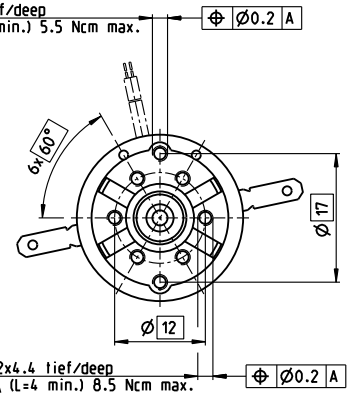
A-max 22 Ø22 mm, Graphite Brushes, 6 Watt

Kabel AWG 24/7
cable UL Style 1061

⊕ Kabel rot
cable red



M2x2.9 tief/deep
M_A (L=2.5 min.) 5.5 Ncm max.



M 1:1

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

Part Numbers												
with terminals	110156	110158	110159	110160	110161	110162	110163	110164	110165	110166	110167	110168
with cables	139848	353023	353024	231171	353025	353026	231174	353027	353028	353029	316659	353603

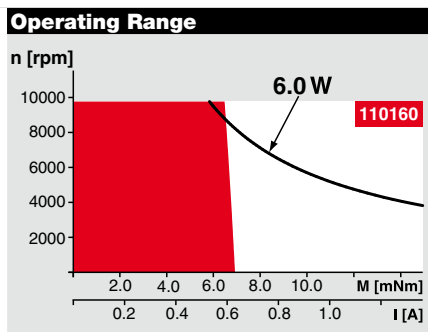
Motor Data													
Values at nominal voltage													
1 Nominal voltage	V	6	9	9	12	12	15	18	24	24	36	48	48
2 No load speed	rpm	9240	9690	8500	10200	9170	10000	9770	10500	8480	9630	9110	8210
3 No load current	mA	83.1	57.9	49.6	45.8	40.5	36	29	23.7	18.4	14.2	9.99	8.84
4 Nominal speed	rpm	6240	6530	5350	7060	6000	6890	6600	7380	5270	6420	5840	4940
5 Nominal torque (max. continuous torque)	mNm	5.91	6.88	7.04	6.96	6.95	6.93	6.92	6.9	6.97	6.86	6.75	6.86
6 Nominal current (max. continuous current)	A	1.08	0.859	0.77	0.681	0.613	0.534	0.432	0.347	0.283	0.21	0.147	0.135
7 Stall torque	mNm	19.4	22.1	19.8	23.7	20.9	22.9	22	23.7	18.9	21.1	19.2	17.6
8 Stall current	A	3.29	2.59	2.04	2.17	1.72	1.65	1.29	1.12	0.721	0.606	0.393	0.325
9 Max. efficiency	%	67	70	69	72	70	72	72	73	70	72	71	70
Characteristics													
10 Terminal resistance	Ω	1.82	3.48	4.42	5.53	6.96	9.09	14	21.5	33.3	59.4	122	148
11 Terminal inductance	mH	0.106	0.223	0.288	0.363	0.445	0.585	0.891	1.37	2.1	3.69	7.3	8.97
12 Torque constant	mNm/A	5.9	8.55	9.73	10.9	12.1	13.9	17.1	21.2	26.2	34.8	48.9	54.3
13 Speed constant	rpm/V	1620	1120	981	875	790	689	558	450	364	274	195	176
14 Speed / torque gradient	rpm/mNm	500	454	446	444	455	452	457	456	461	468	487	479
15 Mechanical time constant	ms	21.3	20.5	20.4	20.2	20.3	20.2	20.1	20.1	20.1	20.1	20.2	20.1
16 Rotor inertia	gcm ²	4.07	4.32	4.37	4.36	4.26	4.27	4.2	4.2	4.16	4.09	3.97	4.01

Specifications	
Thermal data	
17 Thermal resistance housing-ambient	20 K/W
18 Thermal resistance winding-housing	6.0 K/W
19 Thermal time constant winding	9.43 s
20 Thermal time constant motor	313 s
21 Ambient temperature	-30...+85°C
22 Max. winding temperature	+125°C
Mechanical data (sleeve bearings)	
23 Max. speed	9800 rpm
24 Axial play	0.05 - 0.15 mm
25 Radial play	0.012 mm
26 Max. axial load (dynamic)	1 N
27 Max. force for press fits (static) (static, shaft supported)	80 N / 240 N
28 Max. radial load, 5 mm from flange	2.8 N

Mechanical data (ball bearings)	
23 Max. speed	9800 rpm
24 Axial play	0.05 - 0.15 mm
25 Radial play	0.025 mm
26 Max. axial load (dynamic)	3.3 N
27 Max. force for press fits (static) (static, shaft supported)	45 N / 240 N
28 Max. radial load, 5 mm from flange	12.3 N
Other specifications	
29 Number of pole pairs	1
30 Number of commutator segments	9
31 Weight of motor	54 g

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

Option
Ball bearings in place of sleeve bearings



Comments

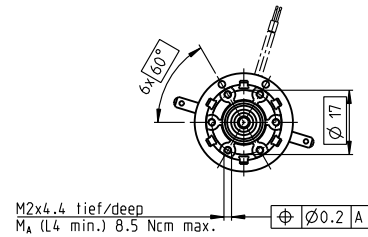
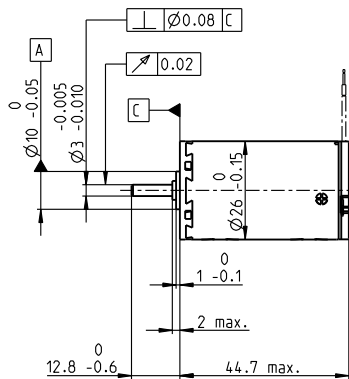
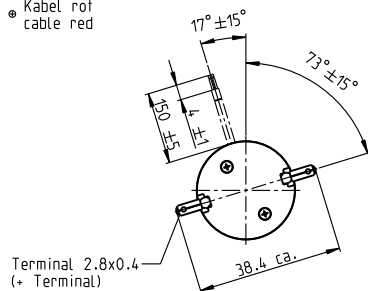
- Continuous operation**
In observation of above listed thermal resistance (lines 17 and 18) the maximum permissible winding temperature will be reached during continuous operation at 25°C ambient.
= Thermal limit.
- Short term operation**
The motor may be briefly overloaded (recurring).
- Assigned power rating**

maxon Modular System		Overview on page 20-25	
Planetary Gearhead Ø22 mm 0.1 - 0.6 Nm Page 260/261 Planetary Gearhead Ø22 mm 0.5 - 2.0 Nm Page 262/264 Spur Gearhead Ø24 mm 0.1 Nm Page 269 Spindle Drive Ø22 mm Page 299/300		Encoder MR 32 CPT, 2 / 3 channels Page 315 Encoder MR 128 / 256 / 512 CPT, 2 / 3 channels Page 317 Encoder Enc 22 mm 100 CPT, 2 channels Page 324 Encoder MEnc Ø13 mm 16 CPT, 2 channels Page 335	Recommended Electronics: ESCON 36/2 DC Page 342 ESCON Module 50/5 343 ESCON 50/5 344 EPOS2 24/2 350 EPOS2 Module 36/2 350 EPOS3 70/10 EtherCAT 357 MAXPOS 50/5 360 Notes 22

A-max 26 Ø26 mm, Precious Metal Brushes CLL, 4 Watt

Kabel AWG 24/7
cable UL Style 1061

* Kabel rot
cable red



M 1:2

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

Part Numbers

with terminals	110169	110170	110171	110172	110173	110174	110175	110176	110177	110178	110179	110180
with cables	353039	353040	353041	353042	220031	353043	353044	353045	353046	353047	353048	353049

Motor Data

Values at nominal voltage		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	
1 Nominal voltage	V	4.5	4.5	4.5	7.2	12	12	15	18	18	24	30	42					
2 No load speed	rpm	6120	5230	3860	5110	5590	5020	5430	5980	5340	5670	5890	5520					
3 No load current	mA	60	47.4	30.4	28.5	19.6	16.7	15	14.5	12.2	10	8.5	5.51					
4 Nominal speed	rpm	5140	3910	2400	3290	3470	2880	3190	3690	3160	3500	3680	3270					
5 Nominal torque (max. continuous torque)	mNm	5.45	6.46	8.95	10.9	12.4	12.4	11.8	11.4	12.1	12.1	11.9	11.7					
6 Nominal current (max. continuous current)	A	0.84	0.84	0.84	0.84	0.631	0.565	0.464	0.414	0.392	0.312	0.255	0.168					
7 Stall torque	mNm	32.6	24.9	23.3	30.2	32.8	29.3	28.6	29.9	29.9	31.8	31.9	28.9					
8 Stall current	A	4.7	3.08	2.12	2.27	1.62	1.3	1.1	1.05	0.94	0.797	0.665	0.403					
9 Max. efficiency	%	79	77	78	79	80	79	78	78	79	79	79	79					
Characteristics		10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26
10 Terminal resistance	Ω	0.958	1.46	2.12	3.17	7.41	9.24	13.7	17.1	19.2	30.1	45.1	104					
11 Terminal inductance	mH	0.101	0.138	0.254	0.372	0.862	1.07	1.42	1.69	2.13	3.35	4.85	10.8					
12 Torque constant	mNm/A	6.94	8.09	11	13.3	20.2	22.5	26	28.3	31.8	39.9	48	71.6					
13 Speed constant	rpm/V	1380	1180	869	718	472	423	367	337	300	239	199	133					
14 Speed / torque gradient	rpm/mNm	190	213	168	171	173	193	193	203	181	181	187	194					
15 Mechanical time constant	ms	24.6	24.4	23.8	23.7	23.6	23.6	23.8	23.9	23.7	23.7	23.8	24					
16 Rotor inertia	gcm ²	12.3	10.9	13.6	13.2	13.1	13	11.8	11.2	12.5	12.5	12.2	11.8					

Specifications

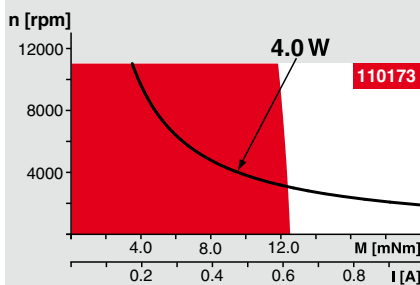
Thermal data	
17 Thermal resistance housing-ambient	13.2 K/W
18 Thermal resistance winding-housing	3.2 K/W
19 Thermal time constant winding	12.5 s
20 Thermal time constant motor	423 s
21 Ambient temperature	-30...+65°C
22 Max. winding temperature	+85°C
Mechanical data (sleeve bearings)	
23 Max. speed	11 000 rpm
24 Axial play	0.1 - 0.2 mm
25 Radial play	0.012 mm
26 Max. axial load (dynamic)	1.7 N
27 Max. force for press fits (static)	80 N
28 Max. radial load, 5 mm from flange	5.5 N
Mechanical data (ball bearings)	
23 Max. speed	11 000 rpm
24 Axial play	0.1 - 0.2 mm
25 Radial play	0.025 mm
26 Max. axial load (dynamic)	5 N
27 Max. force for press fits (static)	75 N
28 Max. radial load, 5 mm from flange	20.5 N
Other specifications	
29 Number of pole pairs	1
30 Number of commutator segments	13
31 Weight of motor	100 g
CLL = Capacitor Long Life	

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

Option

Ball bearings in place of sleeve bearings
Without CLL

Operating Range



Comments

- Continuous operation**
In observation of above listed thermal resistance (lines 17 and 18) the maximum permissible winding temperature will be reached during continuous operation at 25°C ambient.
= Thermal limit.
- Short term operation**
The motor may be briefly overloaded (recurring).
- Assigned power rating**

maxon Modular System

Overview on page 20–25

Planetary Gearhead

Ø26 mm
0.75 - 4.5 Nm
Page 270

Spur Gearhead

Ø30 mm
0.07 - 0.2 Nm
Page 271

Planetary Gearhead

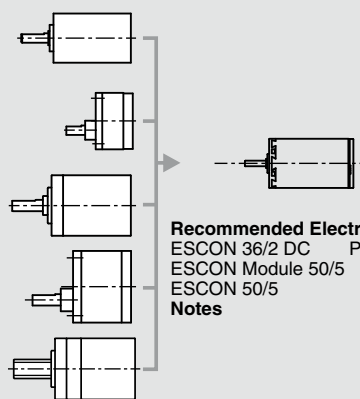
Ø32 mm
0.75 - 6.0 Nm
Page 272/273/276

Spur Gearhead

Ø38 mm
0.1 - 0.6 Nm
Page 282

Spindle Drive

Ø32 mm
Page 301–303



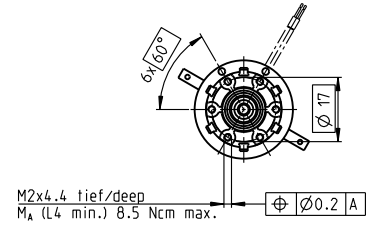
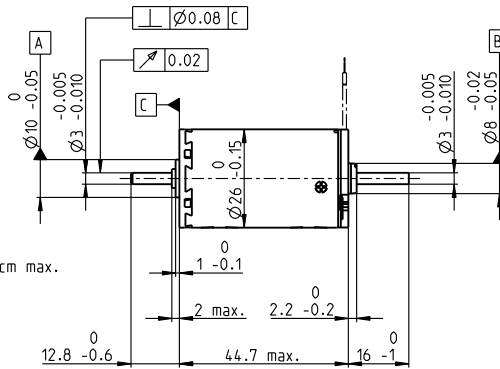
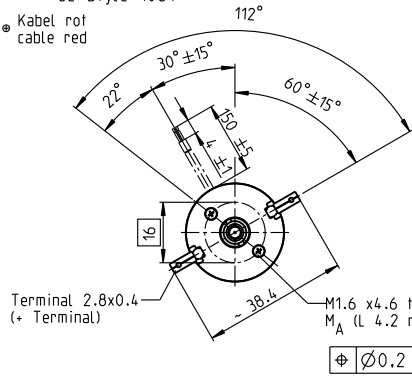
Recommended Electronics:

ESCON 36/2 DC	Page 342
ESCON Module 50/5	343
ESCON 50/5	344
Notes	22

A-max 26 Ø26 mm, Precious Metal Brushes CLL, 4 Watt

Kabel AWG 24/7
cable UL Style 1061

⊙ Kabel rot
cable red



M 1:2

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

		Part Numbers											
with terminals		110192	110193	110194	110195	110196	110197	110198	110199	110200	110201	110202	110203
with cables		353064	353065	353066	353067	205635	353068	353069	353070	353071	353072	353073	353074

Motor Data													
Values at nominal voltage													
1 Nominal voltage	V	3.6	4.5	6	7.2	9	9	12	15	18	21	24	30
2 No load speed	rpm	4870	5210	5140	5090	4180	3740	4320	4970	5320	4950	4690	3920
3 No load current	mA	63.9	56.8	41.5	34.1	20.2	17.2	16	15.8	14.6	11.2	9.04	5.54
4 Nominal speed	rpm	3910	3910	3700	3350	2400	1960	2450	3060	3530	3140	2850	2040
5 Nominal torque (max. continuous torque)	mNm	5.43	6.4	8.84	10.4	10.4	10.4	9.83	9.5	10	10.1	9.94	9.82
6 Nominal current (max. continuous current)	A	0.84	0.84	0.84	0.811	0.531	0.476	0.39	0.348	0.328	0.262	0.214	0.141
7 Stall torque	mNm	26.1	24.9	31.1	30.2	24.6	22	22.8	24.9	29.9	27.8	25.5	20.6
8 Stall current	A	3.76	3.08	2.83	2.27	1.22	0.974	0.878	0.879	0.94	0.697	0.532	0.288
9 Max. efficiency	%	76	75	78	78	76	76	75	76	77	77	76	75
Characteristics													
10 Terminal resistance	Ω	0.958	1.46	2.12	3.17	7.41	9.24	13.7	17.1	19.2	30.1	45.1	104
11 Terminal inductance	mH	0.101	0.138	0.254	0.372	0.862	1.07	1.42	1.69	2.13	3.35	4.85	10.8
12 Torque constant	mNm/A	6.94	8.09	11	13.3	20.2	22.5	26	28.3	31.8	39.9	48	71.6
13 Speed constant	rpm/V	1380	1180	869	718	472	423	367	337	300	239	199	133
14 Speed / torque gradient	rpm/mNm	190	213	168	171	173	173	193	203	181	181	187	194
15 Mechanical time constant	ms	24.6	24.4	23.8	23.7	23.6	23.6	23.8	24	23.8	23.7	23.9	24
16 Rotor inertia	gcm ²	12.4	11	13.6	13.2	13.1	13	11.8	11.3	12.6	12.5	12.2	11.8

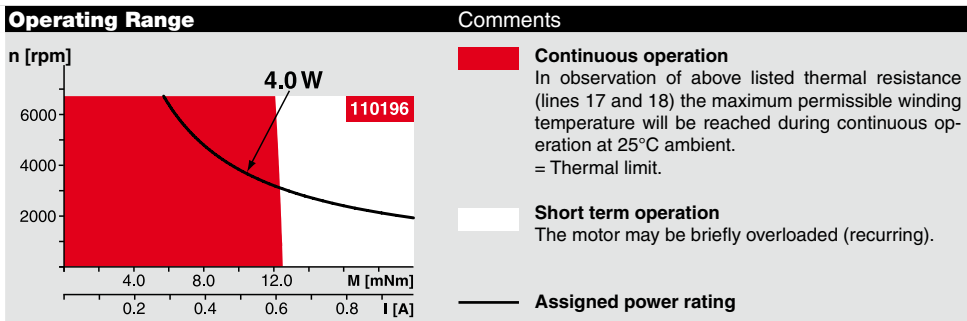
Specifications	
Thermal data	
17 Thermal resistance housing-ambient	13.2 K/W
18 Thermal resistance winding-housing	3.2 K/W
19 Thermal time constant winding	12.5 s
20 Thermal time constant motor	660 s
21 Ambient temperature	-30...+65°C
22 Max. winding temperature	+85°C
Mechanical data (sleeve bearings)	
23 Max. speed	6700 rpm
24 Axial play	0.1 - 0.2 mm
25 Radial play	0.012 mm
26 Max. axial load (dynamic)	1.7 N
27 Max. force for press fits (static) (static, shaft supported)	80 N
28 Max. radial load, 5 mm from flange	1200 N

Mechanical data (ball bearings)	
23 Max. speed	6700 rpm
24 Axial play	0.1 - 0.2 mm
25 Radial play	0.025 mm
26 Max. axial load (dynamic)	5.0 N
27 Max. force for press fits (static) (static, shaft supported)	75 N
28 Max. radial load, 5 mm from flange	1200 N

Other specifications	
29 Number of pole pairs	1
30 Number of commutator segments	13
31 Weight of motor	100 g

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

Option
Ball bearings in place of sleeve bearings
Without CLL



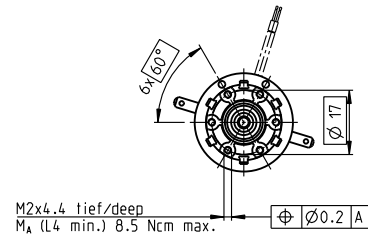
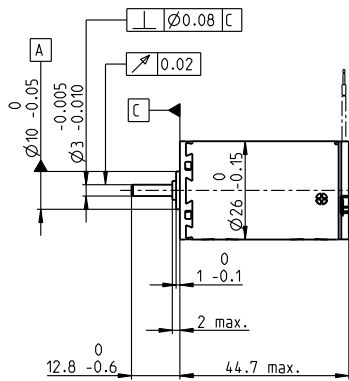
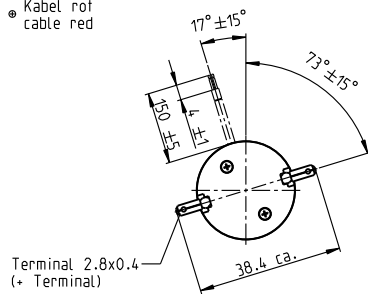
maxon Modular System	Overview on page 20-25
<p>Planetary Gearhead Ø26 mm 0.75 - 4.5 Nm Page 270</p> <p>Spur Gearhead Ø30 mm 0.07 - 0.2 Nm Page 271</p> <p>Planetary Gearhead Ø32 mm 0.75 - 6.0 Nm Page 272/273/276</p> <p>Spur Gearhead Ø38 mm 0.1 - 0.6 Nm Page 282</p> <p>Spindle Drive Ø32 mm Page 301-303</p>	<p>Encoder MR 128 - 1000 CPT, 3 channels Page 319</p> <p>Encoder Enc 22 mm 100 CPT, 2 channels Page 324</p> <p>Encoder HED_ 5540 500 CPT, 3 channels Page 326/327</p> <p>Encoder MEnc Ø13 mm 16 CPT, 2 channels Page 335</p> <p>Recommended Electronics: ESCON 36/2 DC Page 342 ESCON Module 50/5 Page 343 ESCON 50/5 Page 344 EPOS2 24/2 Page 350 EPOS2 Module 36/2 Page 350 EPOS2 24/5, EPOS2 50/5 Page 351 EPOS2 P 24/5 Page 354 EPOS3 70/10 EtherCAT Page 357 MAXPOS 50/5 Page 360</p> <p>Notes 22</p>

A-max 26 Ø26 mm, Precious Metal Brushes CLL, 7 Watt

High Power

Kabel AWG 24/7
cable UL Style 1061

* Kabel rot
cable red



M 1:2

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

Part Numbers

with terminals	110181	110182	110183	110184	110185	110186	110187	110188	110189	110190	110191
with cables	353078	353079	353080	353081	329757	353082	332818	353083	353084	353085	353086

Motor Data

Values at nominal voltage		4.5	6	9	12	15	18	24	30	36	42	48	
1	Nominal voltage	V	4.5	6	9	12	15	18	24	30	36	42	48
2	No load speed	rpm	7320	8670	6160	6780	6720	6690	5670	6090	6780	6570	6050
3	No load current	mA	78.9	77.7	30.2	26.3	20.7	17.1	9.97	8.9	8.76	7.15	5.5
4	Nominal speed	rpm	6900	8130	5000	5340	5060	5010	3940	4370	5060	4820	4280
5	Nominal torque (max. continuous torque)	mNm	4.46	5.02	11.3	13.7	15.8	15.6	15.3	15.3	15.2	15	15
6	Nominal current (max. continuous current)	A	0.84	0.84	0.84	0.84	0.766	0.627	0.391	0.336	0.31	0.254	0.204
7	Stall torque	mNm	67.3	73.5	58.8	63.5	63.6	62.1	50.3	54.2	60.2	56.4	51.4
8	Stall current	A	11.5	11.2	4.25	3.78	3.01	2.43	1.25	1.16	1.2	0.93	0.683
9	Max. efficiency	%	84	84	84	84	84	84	83	84	84	84	83
Characteristics													
10	Terminal resistance	Ω	0.39	0.536	2.12	3.17	4.99	7.41	19.2	25.8	30.1	45.1	70.2
11	Terminal inductance	mH	0.0402	0.0509	0.227	0.333	0.529	0.77	1.9	2.58	2.99	4.34	6.68
12	Torque constant	mNm/A	5.84	6.57	13.9	16.8	21.2	25.5	40.1	46.7	50.3	60.6	75.2
13	Speed constant	rpm/V	1640	1450	689	569	451	374	238	205	190	158	127
14	Speed / torque gradient	rpm/mNm	109	119	105	108	106	108	114	113	114	117	119
15	Mechanical time constant	ms	16.5	16	15	14.9	14.8	14.8	14.9	14.9	14.9	15	15
16	Rotor inertia	gcm ²	14.4	12.9	13.6	13.2	13.3	13.1	12.5	12.6	12.5	12.2	12.1

Specifications

Thermal data		
17	Thermal resistance housing-ambient	13.2 K/W
18	Thermal resistance winding-housing	3.2 K/W
19	Thermal time constant winding	13.8 s
20	Thermal time constant motor	473 s
21	Ambient temperature	-30...+65°C
22	Max. winding temperature	+85°C

Mechanical data (sleeve bearings)		
23	Max. speed	11 000 rpm
24	Axial play	0.1 - 0.2 mm
25	Radial play	0.012 mm
26	Max. axial load (dynamic)	1.7 N
27	Max. force for press fits (static)	80 N
28	Max. radial load, 5 mm from flange	5.5 N

Mechanical data (ball bearings)		
23	Max. speed	11 000 rpm
24	Axial play	0.1 - 0.2 mm
25	Radial play	0.025 mm
26	Max. axial load (dynamic)	5 N
27	Max. force for press fits (static)	75 N
28	Max. radial load, 5 mm from flange	20.5 N

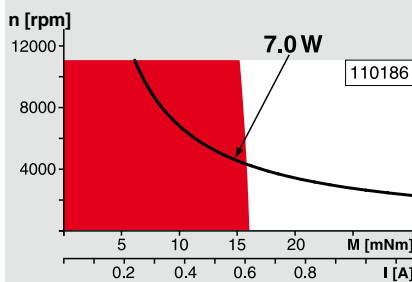
Other specifications		
29	Number of pole pairs	1
30	Number of commutator segments	13
31	Weight of motor	117 g
CLL = Capacitor Long Life		

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

Option

Ball bearings in place of sleeve bearings
Without CLL

Operating Range



Comments

Continuous operation
In observation of above listed thermal resistance (lines 17 and 18) the maximum permissible winding temperature will be reached during continuous operation at 25°C ambient.
= Thermal limit.

Short term operation
The motor may be briefly overloaded (recurring).

— Assigned power rating

maxon Modular System

Overview on page 20–25

Planetary Gearhead

Ø26 mm
0.75 - 4.5 Nm
Page 270

Spur Gearhead

Ø30 mm
0.07 - 0.2 Nm
Page 271

Planetary Gearhead

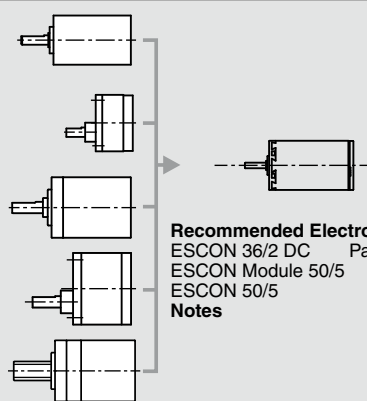
Ø32 mm
0.75 - 6.0 Nm
Page 272/273/276

Spur Gearhead

Ø38 mm
0.1 - 0.6 Nm
Page 282

Spindle Drive

Ø32 mm
Page 301–303



Recommended Electronics:

ESCON 36/2 DC Page 342
ESCON Module 50/5 343
ESCON 50/5 344

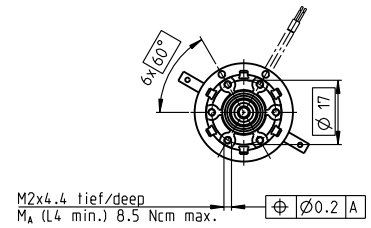
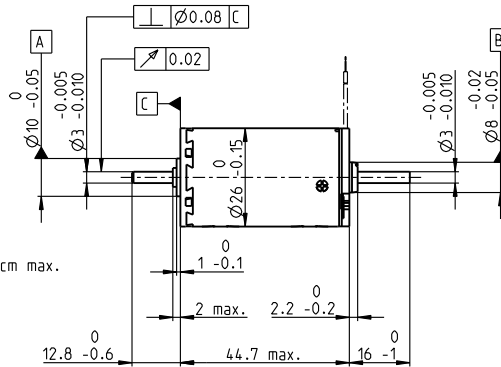
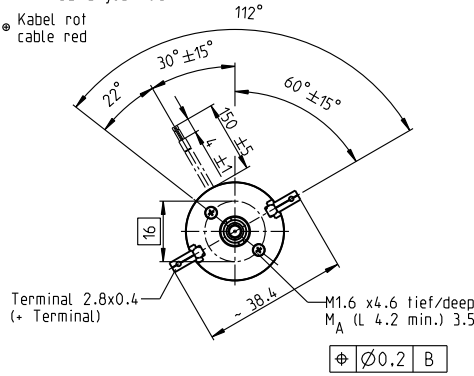
Notes 22

A-max 26 Ø26 mm, Precious Metal Brushes CLL, 4.5 Watt

High Power

Kabel AWG 24/7
cable UL Style 1061

● Kabel rot
cable red



M 1:2

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

		Part Numbers										
with terminals		110204	110205	110206	110207	110208	110209	110210	110211	110212	110213	110214
with cables		353109	353110	353111	353112	353113	353114	353115	353116	353117	353118	353119

Motor Data																
Values at nominal voltage																
1 Nominal voltage	V	2.4	3.6	6	7.2	9	12	15	18	24	30	36				
2 No load speed	rpm	3890	5190	4090	4060	4020	4440	3530	3640	4510	4680	4520				
3 No load current	mA	67.7	69.9	29.2	24	19	16.5	9.41	8.2	8.45	7.16	5.67				
4 Nominal speed	rpm	3460	4640	2940	2650	2620	3030	2070	2180	3060	3210	3050				
5 Nominal torque (max. continuous torque)	mNm	4.53	5.08	11.3	13.3	13.4	13.2	12.9	12.9	12.8	12.6	12.5				
6 Nominal current (max. continuous current)	A	0.84	0.84	0.84	0.814	0.647	0.529	0.33	0.284	0.262	0.214	0.171				
7 Stall torque	mNm	35.9	44.1	39.2	38.1	38.2	41.4	31.4	32.5	40.1	40.3	38.5				
8 Stall current	A	6.15	6.71	2.83	2.27	1.8	1.62	0.783	0.697	0.797	0.665	0.513				
9 Max. efficiency	%	81	81	81	81	81	81	80	80	81	81	81				
Characteristics																
10 Terminal resistance	Ω	0.39	0.536	2.12	3.17	4.99	7.41	19.2	25.8	30.1	45.1	70.2				
11 Terminal inductance	mH	0.0402	0.0509	0.227	0.332	0.528	0.77	1.9	2.57	2.99	4.34	6.68				
12 Torque constant	mNm/A	5.84	6.57	13.9	16.8	21.2	25.5	40.1	46.7	50.3	60.6	75.2				
13 Speed constant	rpm/V	1640	1450	689	569	451	374	238	205	190	158	127				
14 Speed / torque gradient	rpm/mNm	109	119	105	108	106	108	114	113	114	117	119				
15 Mechanical time constant	ms	16.6	16.1	15	14.9	14.9	14.9	14.9	14.9	14.9	15	15				
16 Rotor inertia	gcm ²	14.4	12.9	13.6	13.2	13.3	13.1	12.6	12.6	12.5	12.2	12.1				

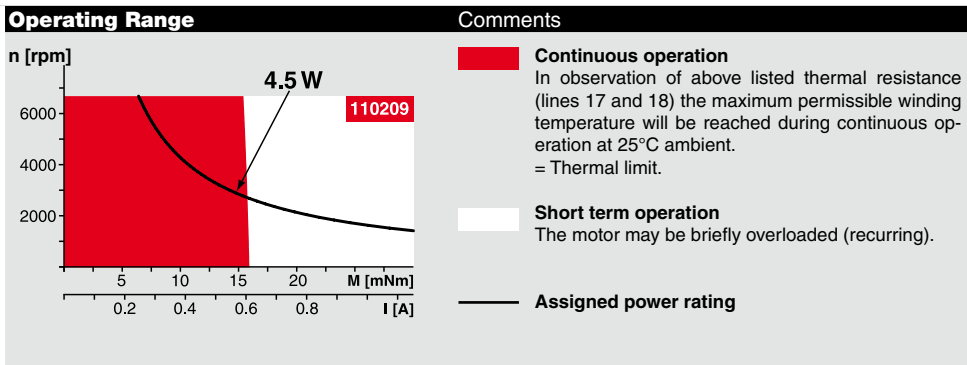
Specifications	
Thermal data	
17 Thermal resistance housing-ambient	13.2 K/W
18 Thermal resistance winding-housing	3.2 K/W
19 Thermal time constant winding	12.5 s
20 Thermal time constant motor	473 s
21 Ambient temperature	-30...+65°C
22 Max. winding temperature	+85°C
Mechanical data (sleeve bearings)	
23 Max. speed	6700 rpm
24 Axial play	0.1 - 0.2 mm
25 Radial play	0.012 mm
26 Max. axial load (dynamic)	1.7 N
27 Max. force for press fits (static) (static, shaft supported)	80 N
28 Max. radial load, 5 mm from flange	1200 N
	5.5 N

Mechanical data (ball bearings)	
23 Max. speed	6700 rpm
24 Axial play	0.1 - 0.2 mm
25 Radial play	0.025 mm
26 Max. axial load (dynamic)	5.0 N
27 Max. force for press fits (static) (static, shaft supported)	75 N
28 Max. radial load, 5 mm from flange	1200 N
	20.5 N

Other specifications	
29 Number of pole pairs	1
30 Number of commutator segments	13
31 Weight of motor	119 g

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

Option
Ball bearings in place of sleeve bearings
Without CLL

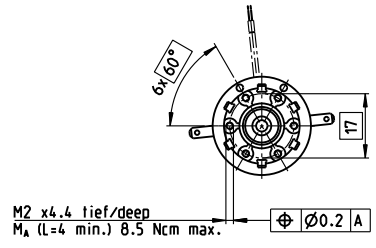
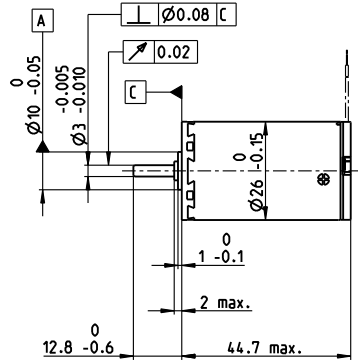
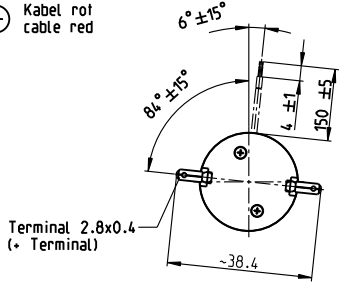


maxon Modular System		Overview on page 20-25
<p>Planetary Gearhead Ø26 mm 0.75 - 4.5 Nm Page 270</p> <p>Spur Gearhead Ø30 mm 0.07 - 0.2 Nm Page 271</p> <p>Planetary Gearhead Ø32 mm 0.4 - 6.0 Nm Page 272/273/276</p> <p>Spur Gearhead Ø38 mm 0.1 - 0.6 Nm Page 282</p> <p>Spindle Drive Ø32 mm Page 301-303</p>		<p>Encoder MR 128 - 1000 CPT, 3 channels Page 319</p> <p>Encoder Enc 22 mm 100 CPT, 2 channels Page 324</p> <p>Encoder HED_ 5540 500 CPT, 3 channels Page 326/327</p> <p>Encoder MEnc Ø13 mm 16 CPT, 2 channels Page 335</p>
<p>Recommended Electronics: ESCON 36/2 DC Page 342 ESCON Module 50/5 Page 343 ESCON 50/5 Page 344 EPOS2 24/2 Page 350 EPOS2 Module 36/2 Page 350 EPOS2 24/5, EPOS2 50/5 Page 351 EPOS2 P 24/5 Page 354 EPOS3 70/10 EtherCAT Page 357 MAXPOS 50/5 Page 360 Notes Page 22</p>		

A-max 26 Ø26 mm, Graphite Brushes, 6 Watt

Kabel AWG 24/7
cable UL Style 1061

⊕ Kabel rot
cable red



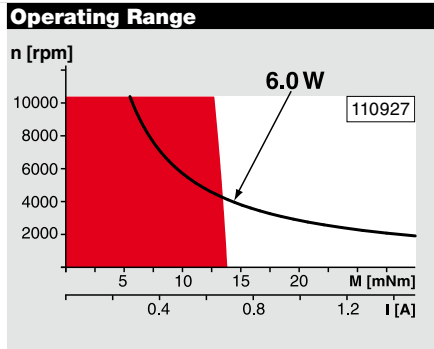
M 1:2

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

		Part Numbers											
with terminals		110923	110924	110925	110926	110927	110928	110929	110930	110931	110932	110933	110934
with cables		353132	353133	353134	353135	340503	353136	353137	353138	353139	353140	353141	353605

Motor Data													
Values at nominal voltage													
1 Nominal voltage	V	7.2	9	12	12	18	18	24	24	30	36	42	48
2 No load speed	rpm	9790	10500	10300	8510	8380	7510	8680	7950	8890	8500	8230	6280
3 No load current	mA	121	106	77.7	60.2	39.4	34.2	31	27.7	25.5	20.1	16.5	10.3
4 Nominal speed	rpm	8580	8840	8510	6210	5890	5000	6050	5250	6350	5950	5630	3590
5 Nominal torque (max. continuous torque)	mNm	6.67	7.91	11	13.6	14.5	14.6	13.7	13.4	14.1	14.1	13.9	13.8
6 Nominal current (max. continuous current)	A	1.08	1.08	1.08	1.08	0.755	0.679	0.554	0.498	0.467	0.373	0.305	0.203
7 Stall torque	mNm	54.6	51.4	63.4	50.9	49.4	44	45.7	39.8	49.8	47.6	44.6	32.9
8 Stall current	A	7.89	6.36	5.79	3.84	2.45	1.96	1.76	1.41	1.57	1.2	0.931	0.461
9 Max. efficiency	%	77	76	79	77	77	76	76	74	76	76	76	73
Characteristics													
10 Terminal resistance	Ω	0.912	1.41	2.07	3.13	7.36	9.19	13.6	17	19.1	30.1	45.1	104
11 Terminal inductance	mH	0.101	0.138	0.254	0.372	0.861	1.07	1.42	1.69	2.13	3.35	4.85	10.8
12 Torque constant	mNm/A	6.92	8.07	11	13.3	20.2	22.5	25.9	28.3	31.7	39.8	47.9	71.4
13 Speed constant	rpm/V	1380	1180	872	720	473	425	368	338	301	240	199	134
14 Speed / torque gradient	rpm/mNm	182	207	165	170	173	174	193	204	181	181	188	195
15 Mechanical time constant	ms	23.5	23.7	23.4	23.5	23.6	23.6	23.8	24	23.8	23.8	23.9	24.1
16 Rotor inertia	gcm ²	12.3	10.9	13.6	13.2	13.1	13	11.8	11.2	12.5	12.5	12.2	11.8

Specifications	
Thermal data	
17 Thermal resistance housing-ambient	13.2 K/W
18 Thermal resistance winding-housing	3.2 K/W
19 Thermal time constant winding	11.7 s
20 Thermal time constant motor	423 s
21 Ambient temperature	-30...+85°C
22 Max. winding temperature	+125°C
Mechanical data (ball bearings)	
23 Max. speed	10400 rpm
24 Axial play	0.1 - 0.2 mm
25 Radial play	0.025 mm
26 Max. axial load (dynamic)	5 N
27 Max. force for press fits (static)	75 N
28 Max. radial load, 5 mm from flange	20.5 N



Comments

Continuous operation
In observation of above listed thermal resistance (lines 17 and 18) the maximum permissible winding temperature will be reached during continuous operation at 25°C ambient.
= Thermal limit.

Short term operation
The motor may be briefly overloaded (recurring).

Assigned power rating

Mechanical data (sleeve bearings)	
23 Max. speed	10400 rpm
24 Axial play	0.1 - 0.2 mm
25 Radial play	0.012 mm
26 Max. axial load (dynamic)	1.7 N
27 Max. force for press fits (static)	80 N
28 Max. radial load, 5 mm from flange	5.5 N

Other specifications

29 Number of pole pairs: 1

30 Number of commutator segments: 13

31 Weight of motor: 98 g

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

Option
Sleeve bearings in place of ball bearings

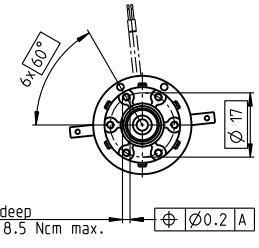
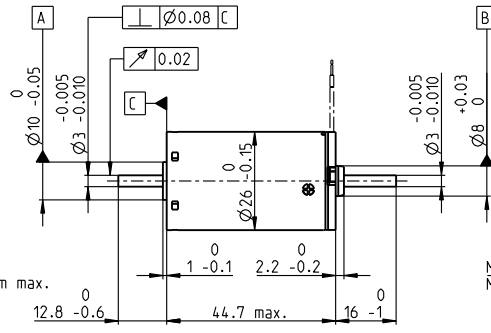
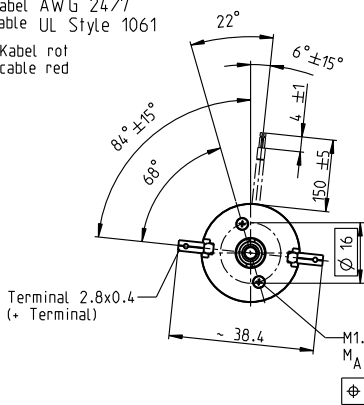
maxon Modular System Overview on page 20–25

<p>Planetary Gearhead Ø26 mm 0.75 - 4.5 Nm Page 270</p> <p>Spur Gearhead Ø30 mm 0.07 - 0.2 Nm Page 271</p> <p>Planetary Gearhead Ø32 mm 0.4 - 6.0 Nm Page 272/273/276</p> <p>Spur Gearhead Ø38 mm 0.1 - 0.6 Nm Page 282</p> <p>Spindle Drive Ø32 mm Page 301–303</p>		<p>Recommended Electronics: ESCON 36/2 DC Page 342 ESCON Module 50/5 343 ESCON 50/5 344 Notes 22</p>
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A-max 26 Ø26 mm, Graphite Brushes, 6 Watt

Kabel AWG 24/7
cable UL Style 1061

⊕ Kabel rot
cable red



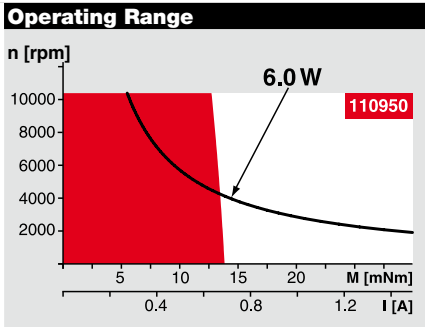
M 1:2

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

Part Numbers												
with terminals	110946	110947	110948	110949	110950	110951	110952	110953	110954	110955	110956	110957
with cables	353143	353144	353145	353146	353147	353148	353149	353150	353151	353152	353153	353154

Motor Data													
Values at nominal voltage													
1 Nominal voltage	V	7.2	9	12	12	18	18	24	24	30	36	42	48
2 No load speed	rpm	9790	10500	10300	8510	8380	7510	8680	7950	8890	8500	8230	6280
3 No load current	mA	121	106	77.7	60.2	39.4	34.2	31	27.7	25.5	20.1	16.5	10.3
4 Nominal speed	rpm	8580	8840	8510	6210	5890	5000	6050	5250	6350	5950	5630	3590
5 Nominal torque (max. continuous torque)	mNm	6.67	7.91	11	13.6	14.5	14.6	13.7	13.4	14.1	14.1	13.9	13.8
6 Nominal current (max. continuous current)	A	1.08	1.08	1.08	1.08	0.755	0.679	0.554	0.498	0.467	0.373	0.305	0.203
7 Stall torque	mNm	54.6	51.4	63.4	50.9	49.4	44	45.7	39.8	49.8	47.6	44.6	32.9
8 Stall current	A	7.89	6.36	5.79	3.84	2.45	1.96	1.76	1.41	1.57	1.2	0.931	0.461
9 Max. efficiency	%	77.1	76.2	78.5	76.8	76.5	75.6	75.6	74.3	76.4	76.1	75.5	72.7
Characteristics													
10 Terminal resistance	Ω	0.912	1.41	2.07	3.13	7.36	9.19	13.6	17	19.1	30.1	45.1	104
11 Terminal inductance	mH	0.101	0.138	0.254	0.372	0.861	1.07	1.42	1.69	2.13	3.35	4.85	10.8
12 Torque constant	mNm/A	6.92	8.07	11	13.3	20.2	22.5	25.9	28.3	31.7	39.8	47.9	71.4
13 Speed constant	rpm/V	1380	1180	872	720	473	425	368	338	301	240	199	134
14 Speed / torque gradient	rpm/mNm	182	207	165	170	173	174	193	204	181	181	188	195
15 Mechanical time constant	ms	23.5	23.7	23.4	23.5	23.6	23.6	23.8	24	23.8	23.8	23.9	24.1
16 Rotor inertia	gcm ²	12.3	10.9	13.6	13.2	13.1	13	11.8	11.2	12.5	12.5	12.2	11.8

Specifications	
Thermal data	
17 Thermal resistance housing-ambient	13.2 K/W
18 Thermal resistance winding-housing	3.2 K/W
19 Thermal time constant winding	11.7 s
20 Thermal time constant motor	660 s
21 Ambient temperature	-30...+85°C
22 Max. winding temperature	+125°C
Mechanical data (ball bearings)	
23 Max. speed	10400 rpm
24 Axial play	0.1 - 0.2 mm
25 Radial play	0.025 mm
26 Max. axial load (dynamic)	5 N
27 Max. force for press fits (static) (static, shaft supported)	75 N
28 Max. radial load, 5 mm from flange	1200 N
20.5 N	



Comments

Continuous operation
In observation of above listed thermal resistance (lines 17 and 18) the maximum permissible winding temperature will be reached during continuous operation at 25°C ambient.
= Thermal limit.

Short term operation
The motor may be briefly overloaded (recurring).

Assigned power rating

Mechanical data (sleeve bearings)	
23 Max. speed	10400 rpm
24 Axial play	0.1 - 0.2 mm
25 Radial play	0.012 mm
26 Max. axial load (dynamic)	1.7 N
27 Max. force for press fits (static) (static, shaft supported)	80 N
28 Max. radial load, 5 mm from flange	1200 N
5.5 N	
Other specifications	
29 Number of pole pairs	1
30 Number of commutator segments	13
31 Weight of motor	100 g
Values listed in the table are nominal. Explanation of the figures on page 79.	
Option Sleeve bearings in place of ball bearings	

maxon Modular System

Planetary Gearhead
Ø26 mm
0.75 - 4.5 Nm
Page 270

Spur Gearhead
Ø30 mm
0.07 - 0.2 Nm
Page 271

Planetary Gearhead
Ø32 mm
0.4 - 6.0 Nm
Page 272/273/276

Spur Gearhead
Ø38 mm
0.1 - 0.6 Nm
Page 282

Spindle Drive
Ø32 mm
Page 301-303

Recommended Electronics:
 ESCON 36/2 DC Page 342
 ESCON Module 50/5 Page 343
 ESCON 50/5 Page 344
 EPOS2 24/2 Page 350
 EPOS2 Module 36/2 Page 350
 EPOS2 24/5, EPOS2 50/5 Page 351
 EPOS2 P 24/5 Page 354
 EPOS3 70/10 EtherCAT Page 357
 MAXPOS 50/5 Page 360
Notes Page 22

Overview on page 20-25

- Encoder MR**
128 - 1000 CPT,
3 channels
Page 319
- Encoder Enc**
22 mm
100 CPT, 2 channels
Page 324
- Encoder HED_ 5540**
500 CPT,
3 channels
Page 326/327
- Encoder MEnc**
Ø13 mm
16 CPT, 2 channels
Page 335

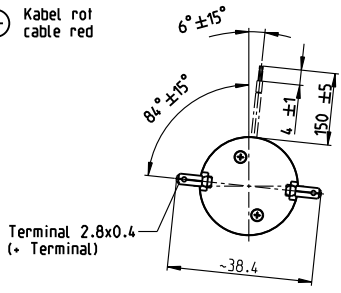
A-max 26 Ø26 mm, Graphite Brushes, 11 Watt

High Power

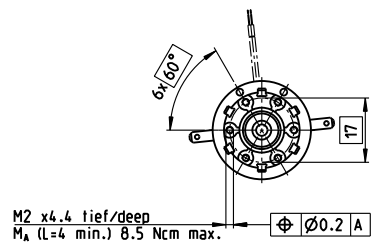
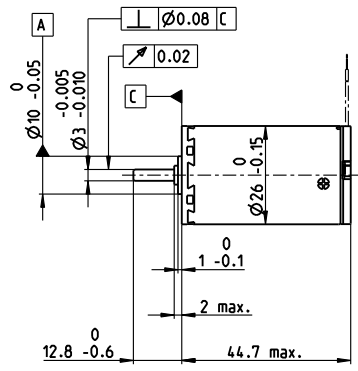
maxon A-max

Kabel AWG 24/7
cable UL Style 1061

⊕ Kabel rot
cable red



Terminal 2.8x0.4
(+ Terminal)



M 1:2

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

Part Numbers

with terminals	110935	110936	110937	110938	110939	110940	110941	110942	110943	110944	110945
with cables	139852	353166	353167	353168	353169	206344	353171	314214	202893	353174	353175

Motor Data

Values at nominal voltage		6	7.2	12	15	18	24	30	36	42	48	48
1 Nominal voltage	V	6	7.2	12	15	18	24	30	36	42	48	48
2 No load speed	rpm	9740	10400	8190	8450	8040	8890	7050	7280	7880	7470	6010
3 No load current	mA	143	130	57	47.5	37.1	31.7	18.9	16.4	15.5	12.7	9.66
4 Nominal speed	rpm	9210	9700	6720	6620	6080	6910	5000	5230	5840	5390	3900
5 Nominal torque (max. continuous torque)	mNm	5.48	6.26	14.2	17.4	18.7	18.4	18.2	18.2	18.1	17.8	17.9
6 Nominal current (max. continuous current)	A	1.08	1.08	1.08	1.08	0.919	0.749	0.47	0.404	0.373	0.305	0.247
7 Stall torque	mNm	102	96.4	80.2	80.5	77.1	83.3	63	65.2	70.3	64.5	51.4
8 Stall current	A	17.4	14.7	5.79	4.8	3.64	3.26	1.57	1.4	1.4	1.06	0.684
9 Max. efficiency	%	83	82	81	81	81	82	80	80	80	80	78
Characteristics												
10 Terminal resistance	Ω	0.345	0.49	2.07	3.13	4.94	7.36	19.1	25.8	30.1	45.1	70.2
11 Terminal inductance	mH	0.0402	0.0509	0.227	0.333	0.529	0.77	1.9	2.58	2.99	4.34	6.68
12 Torque constant	mNm/A	5.84	6.57	13.9	16.8	21.2	25.5	40.1	46.7	50.3	60.6	75.2
13 Speed constant	rpm/V	1640	1450	689	569	451	374	238	205	190	158	127
14 Speed / torque gradient	rpm/mNm	96.6	109	103	106	105	108	113	113	113	117	119
15 Mechanical time constant	ms	14.6	14.7	14.6	14.7	14.7	14.7	14.9	14.9	14.9	15	15
16 Rotor inertia	gcm ²	14.4	12.9	13.6	13.2	13.3	13.1	12.5	12.6	12.5	12.2	12.1

Specifications

- Thermal data**
- 17 Thermal resistance housing-ambient 13.2 K/W
 - 18 Thermal resistance winding-housing 3.2 K/W
 - 19 Thermal time constant winding 13.8 s
 - 20 Thermal time constant motor 473 s
 - 21 Ambient temperature -30...+85°C
 - 22 Max. winding temperature +125°C
- Mechanical data (ball bearings)**
- 23 Max. speed 10400 rpm
 - 24 Axial play 0.1 - 0.2 mm
 - 25 Radial play 0.025 mm
 - 26 Max. axial load (dynamic) 5 N
 - 27 Max. force for press fits (static) 75 N
 - 28 Max. radial load, 5 mm from flange 20.5 N

- Mechanical data (sleeve bearings)**
- 23 Max. speed 10400 rpm
 - 24 Axial play 0.1 - 0.2 mm
 - 25 Radial play 0.012 mm
 - 26 Max. axial load (dynamic) 1.7 N
 - 27 Max. force for press fits (static) 80 N
 - 28 Max. radial load, 5 mm from flange 5.5 N

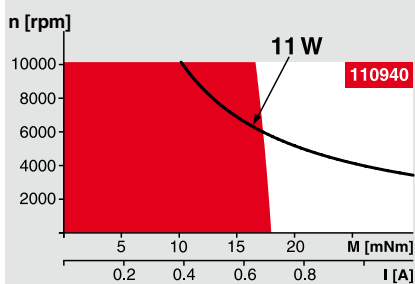
- Other specifications**
- 29 Number of pole pairs 1
 - 30 Number of commutator segments 13
 - 31 Weight of motor 117 g

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

Option

Sleeve bearings in place of ball bearings

Operating Range



Comments

- Continuous operation**
In observation of above listed thermal resistance (lines 17 and 18) the maximum permissible winding temperature will be reached during continuous operation at 25°C ambient.
= Thermal limit.
- Short term operation**
The motor may be briefly overloaded (recurring).
- Assigned power rating**

maxon Modular System

Overview on page 20–25

Planetary Gearhead

Ø26 mm
0.75 - 4.5 Nm
Page 270

Spur Gearhead

Ø30 mm
0.07 - 0.2 Nm
Page 271

Planetary Gearhead

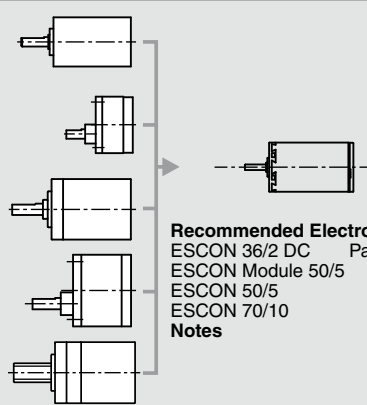
Ø32 mm
0.4 - 6.0 Nm
Page 272/273/276

Spur Gearhead

Ø38 mm
0.1 - 0.6 Nm
Page 282

Spindle Drive

Ø32 mm
Page 301–303



Recommended Electronics:

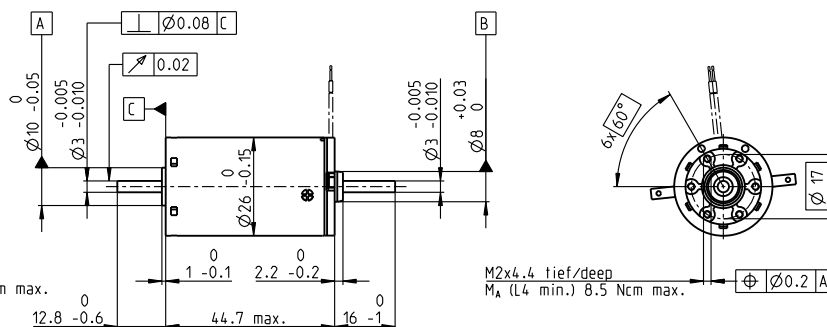
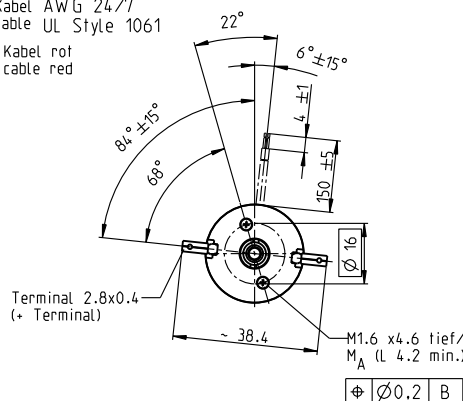
ESCON 36/2 DC	Page 342
ESCON Module 50/5	343
ESCON 50/5	344
ESCON 70/10	344
Notes	22

A-max 26 Ø26 mm, Graphite Brushes, 11 Watt

High Power

Kabel AWG 24/7
cable UL Style 1061

⊗ Kabel rot
cable red



M 1:2

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

		Part Numbers										
with terminals		110958	110959	110960	110961	110962	110963	110964	110965	110966	110967	110968
with cables		353606	353607	353608	353609	353610	353611	353612	353613	353614	353615	353616

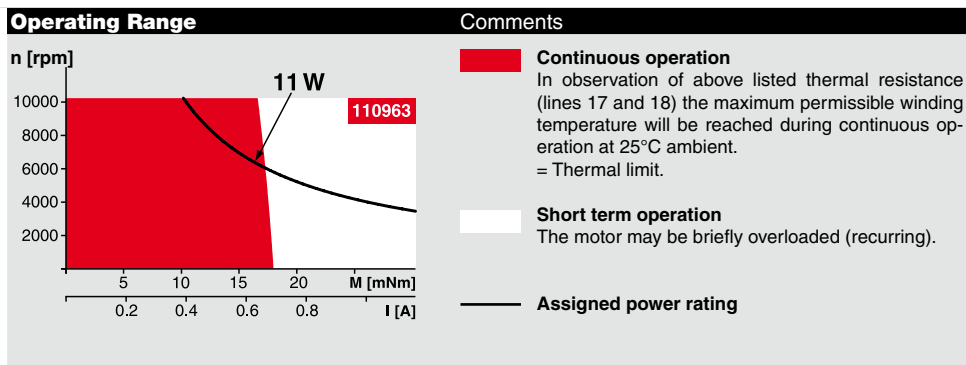
Motor Data														
Values at nominal voltage														
1 Nominal voltage	V	6	7.2	12	15	18	24	30	36	42	48	48		
2 No load speed	rpm	9740	10400	8190	8450	8040	8890	7050	7280	7880	7470	6010		
3 No load current	mA	143	130	57	47.5	37.1	31.7	18.9	16.4	15.5	12.7	9.66		
4 Nominal speed	rpm	9210	9700	6720	6620	6080	6910	5000	5230	5840	5390	3900		
5 Nominal torque (max. continuous torque)	mNm	5.48	6.26	14.2	17.4	18.7	18.4	18.2	18.2	18.1	17.8	17.9		
6 Nominal current (max. continuous current)	A	1.08	1.08	1.08	1.08	0.919	0.749	0.47	0.404	0.373	0.305	0.247		
7 Stall torque	mNm	102	96.4	80.2	80.5	77.1	83.3	63	65.2	70.3	64.5	51.4		
8 Stall current	A	17.4	14.7	5.79	4.8	3.64	3.26	1.57	1.4	1.4	1.06	0.684		
9 Max. efficiency	%	83	82	81	81	81	82	80	80	80	80	78		
Characteristics														
10 Terminal resistance	Ω	0.345	0.49	2.07	3.13	4.94	7.36	19.1	25.8	30.1	45.1	70.2		
11 Terminal inductance	mH	0.0402	0.0509	0.227	0.333	0.529	0.77	1.9	2.58	2.99	4.34	6.68		
12 Torque constant	mNm/A	5.84	6.57	13.9	16.8	21.2	25.5	40.1	46.7	50.3	60.6	75.2		
13 Speed constant	rpm/V	1640	1450	689	569	451	374	238	205	190	158	127		
14 Speed / torque gradient	rpm/mNm	96.6	109	103	106	105	108	113	113	113	117	119		
15 Mechanical time constant	ms	14.6	14.7	14.6	14.7	14.7	14.7	14.9	14.9	14.9	15	15		
16 Rotor inertia	gcm ²	14.4	12.9	13.6	13.2	13.3	13.1	12.5	12.6	12.5	12.2	12.1		

Specifications	
Thermal data	
17 Thermal resistance housing-ambient	13.2 K/W
18 Thermal resistance winding-housing	3.2 K/W
19 Thermal time constant winding	13.8 s
20 Thermal time constant motor	473 s
21 Ambient temperature	-30...+85°C
22 Max. winding temperature	+125°C
Mechanical data (ball bearings)	
23 Max. speed	10400 rpm
24 Axial play	0.1 - 0.2 mm
25 Radial play	0.025 mm
26 Max. axial load (dynamic)	5 N
27 Max. force for press fits (static) (static, shaft supported)	75 N
28 Max. radial load, 5 mm from flange	1200 N

Mechanical data (sleeve bearings)	
23 Max. speed	10400 rpm
24 Axial play	0.1 - 0.2 mm
25 Radial play	0.012 mm
26 Max. axial load (dynamic)	1.7 N
27 Max. force for press fits (static) (static, shaft supported)	80 N
28 Max. radial load, 5 mm from flange	1200 N
Other specifications	
29 Number of pole pairs	1
30 Number of commutator segments	13
31 Weight of motor	119 g

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

Option
Sleeve bearings in place of ball bearings

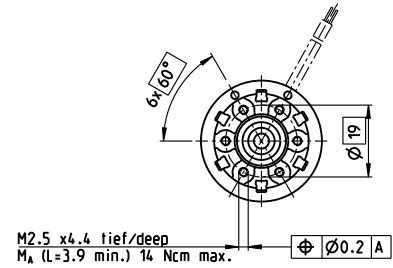
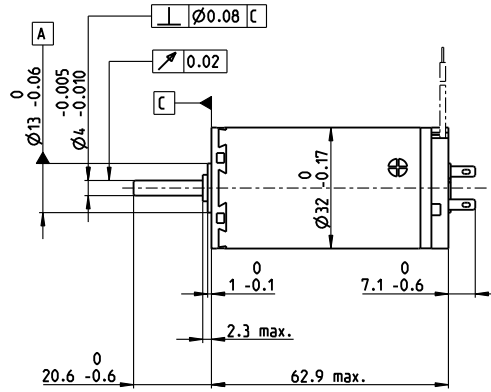
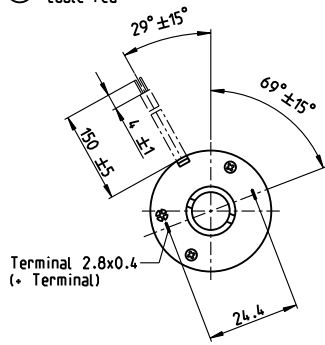


maxon Modular System		Overview on page 20-25
Planetary Gearhead Ø26 mm 0.75 - 4.5 Nm Page 270		Encoder MR 128 - 1000 CPT, 3 channels Page 319 Encoder Enc 22 mm 100 CPT, 2 channels Page 324 Encoder HED_ 5540 500 CPT, 3 channels Page 326/327 Encoder MEnc Ø13 mm 16 CPT, 2 channels Page 335
Spur Gearhead Ø30 mm 0.07 - 0.2 Nm Page 271		
Planetary Gearhead Ø32 mm 0.4 - 6.0 Nm Page 272/273/276		
Spur Gearhead Ø38 mm 0.1 - 0.6 Nm Page 282		
Spindle Drive Ø32 mm Page 301-303		
Recommended Electronics: ESCON 36/2 DC Page 342 ESCON Module 50/5 343 ESCON 50/5 344 ESCON 70/10 344 EPOS2 24/2 350 EPOS2 Module 36/2 350 EPOS2 24/5, EPOS2 50/5 351 EPOS2 P 24/5 354 EPOS3 70/10 EtherCAT 357 MAXPOS 50/5 360 Notes 22		

A-max 32 Ø32 mm, Graphite Brushes, 15 Watt

Kabel AWG 22/7
cable UL Style 1061

⊕ Kabel rot
cable red



M 1:2

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

Part Numbers

with terminals	236643	236644	236645	236646	236647	236648	236649	236650
with cables	353184	353185	353186	353187	353188	353189	353190	353191

Motor Data

Values at nominal voltage		6	9	12	18	24	30	36	48
1 Nominal voltage	V	6	9	12	18	24	30	36	48
2 No load speed	rpm	5870	4940	4680	5280	5930	5870	5830	3870
3 No load current	mA	154	83.5	58.6	44.9	38.7	30.6	25.3	11.8
4 Nominal speed	rpm	4110	3090	2920	3590	4210	4160	4100	2090
5 Nominal torque (max. continuous torque)	mNm	36.5	35	37.2	38.3	37.3	37.5	37.1	37
6 Nominal current (max. continuous current)	A	3.95	2.13	1.6	1.23	1.01	0.806	0.661	0.328
7 Stall torque	mNm	127	95.3	101	122	130	130	127	81.6
8 Stall current	A	13.2	5.58	4.19	3.78	3.42	2.7	2.17	0.7
9 Max. efficiency	%	78	77	77	79	80	80	80	76
Characteristics		0.454	1.61	2.86	4.76	7.03	11.1	16.6	68.6
10 Terminal resistance	Ω	0.454	1.61	2.86	4.76	7.03	11.1	16.6	68.6
11 Terminal inductance	mH	0.0657	0.209	0.416	0.739	1.04	1.66	2.43	9.71
12 Torque constant	mNm/A	9.58	17.1	24.1	32.2	38.2	48.2	58.3	117
13 Speed constant	rpm/V	996	559	396	297	250	198	164	81.9
14 Speed / torque gradient	rpm/mNm	47.2	52.8	47	44	46	45.6	46.6	48.2
15 Mechanical time constant	ms	21.9	21.7	21.4	21.3	21.3	21.3	21.4	21.5
16 Rotor inertia	gcm ²	44.2	39.2	43.5	46.2	44.2	44.6	43.8	42.6

Specifications

Thermal data	
17 Thermal resistance housing-ambient	7.5 K/W
18 Thermal resistance winding-housing	2.1 K/W
19 Thermal time constant winding	17.8 s
20 Thermal time constant motor	791 s
21 Ambient temperature	-20...+85°C
22 Max. winding temperature	+125°C
Mechanical data (ball bearings)	
23 Max. speed	6000 rpm
24 Axial play	0.12 - 0.22 mm
25 Radial play	0.025 mm
26 Max. axial load (dynamic)	7.6 N
27 Max. force for press fits (static)	110 N
28 Max. radial load, 5 mm from flange	32 N

Mechanical data (sleeve bearings)	
23 Max. speed	6000 rpm
24 Axial play	0.12 - 0.22 mm
25 Radial play	0.012 mm
26 Max. axial load (dynamic)	5.0 N
27 Max. force for press fits (static)	110 N
28 Max. radial load, 5 mm from flange	10.5 N

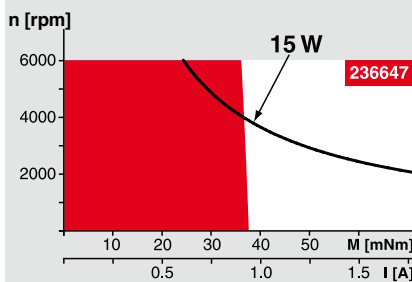
Other specifications	
29 Number of pole pairs	1
30 Number of commutator segments	13
31 Weight of motor	211 g

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

Option

Sleeve bearings in place of ball bearings

Operating Range



Comments

- Continuous operation**
In observation of above listed thermal resistance (lines 17 and 18) the maximum permissible winding temperature will be reached during continuous operation at 25°C ambient.
= Thermal limit.
- Short term operation**
The motor may be briefly overloaded (recurring).
- Assigned power rating**

maxon Modular System

Overview on page 20–25

Planetary Gearhead

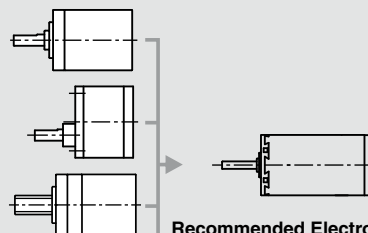
Ø32 mm
0.75 - 6.0 Nm
Page 272–278

Spur Gearhead

Ø38 mm
0.1 - 0.6 Nm
Page 282

Spindle Drive

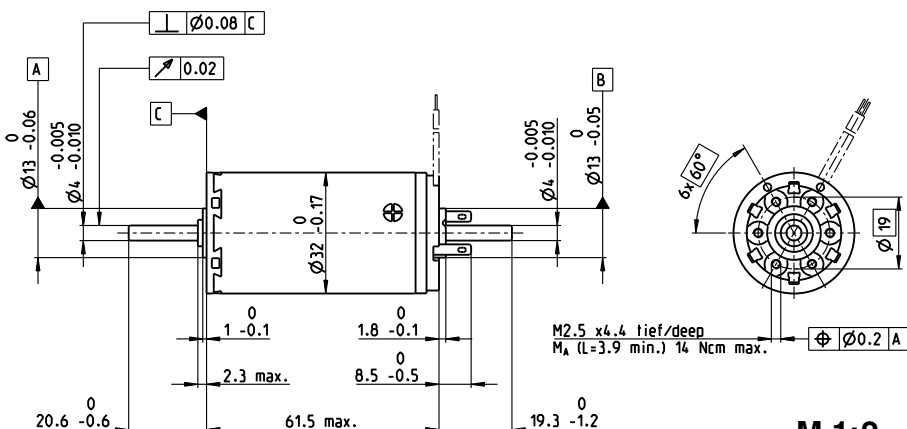
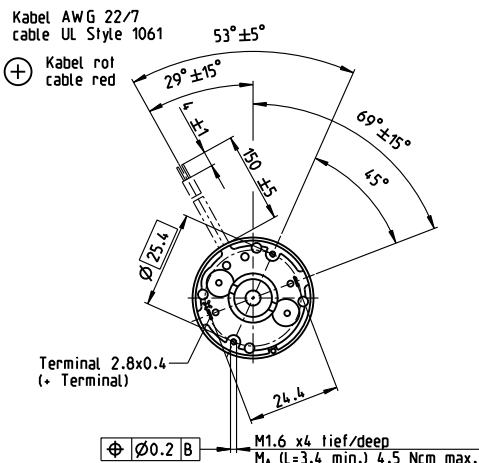
Ø32 mm
Page 301–303



Recommended Electronics:

ESCON 36/2 DC	Page 342
ESCON Module 50/5	343
ESCON 50/5	344
ESCON 70/10	344
Notes	22

A-max 32 Ø32 mm, Graphite Brushes, 15 Watt



Verlegung der Kabel im Buerstendeckel nicht dargestellt!
Cable routing not shown inside brush cover!

M 1:2

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

Part Numbers

with terminals	236651	236652	236653	236654	236655	236656	236657	236658
with cables	353220	353221	353222	353223	353224	353225	353226	353227

Motor Data

Values at nominal voltage		6	9	12	18	24	30	36	48	
1	Nominal voltage	V	6	9	12	18	24	30	36	48
2	No load speed	rpm	5870	4940	4680	5280	5930	5870	5830	3870
3	No load current	mA	154	83.5	58.6	44.9	38.7	30.6	25.3	11.8
4	Nominal speed	rpm	4110	3090	2920	3590	4210	4160	4100	2090
5	Nominal torque (max. continuous torque)	mNm	36.5	35	37.2	38.3	37.3	37.5	37.1	37
6	Nominal current (max. continuous current)	A	3.95	2.13	1.6	1.23	1.01	0.806	0.661	0.328
7	Stall torque	mNm	127	95.3	101	122	130	130	127	81.6
8	Stall current	A	13.2	5.58	4.19	3.78	3.42	2.7	2.17	0.7
9	Max. efficiency	%	78	77	77	79	80	80	80	76
Characteristics			0.454	1.61	2.86	4.76	7.03	11.1	16.6	68.6
10	Terminal resistance	Ω	0.454	1.61	2.86	4.76	7.03	11.1	16.6	68.6
11	Terminal inductance	mH	0.0657	0.209	0.416	0.739	1.04	1.66	2.43	9.71
12	Torque constant	mNm/A	9.58	17.1	24.1	32.2	38.2	48.2	58.3	117
13	Speed constant	rpm/V	996	559	396	297	250	198	164	81.9
14	Speed / torque gradient	rpm/mNm	47.2	52.8	47	44	46	45.6	46.6	48.2
15	Mechanical time constant	ms	21.9	21.7	21.4	21.3	21.3	21.3	21.4	21.5
16	Rotor inertia	gcm ²	44.2	39.2	43.5	46.2	44.2	44.6	43.8	42.6

Specifications

Thermal data		
17	Thermal resistance housing-ambient	7.5 K/W
18	Thermal resistance winding-housing	2.1 K/W
19	Thermal time constant winding	17.8 s
20	Thermal time constant motor	791 s
21	Ambient temperature	-20...+85°C
22	Max. winding temperature	+125°C

Mechanical data (ball bearings)		
23	Max. speed	6000 rpm
24	Axial play	0.12 - 0.22 mm
25	Radial play	0.025 mm
26	Max. axial load (dynamic)	7.6 N
27	Max. force for press fits (static) (static, shaft supported)	110 N
28	Max. radial load, 5 mm from flange	2000 N

Mechanical data (sleeve bearings)		
23	Max. speed	6000 rpm
24	Axial play	0.12 - 0.22 mm
25	Radial play	0.012 mm
26	Max. axial load (dynamic)	5.0 N
27	Max. force for press fits (static) (static, shaft supported)	110 N
28	Max. radial load, 5 mm from flange	2000 N

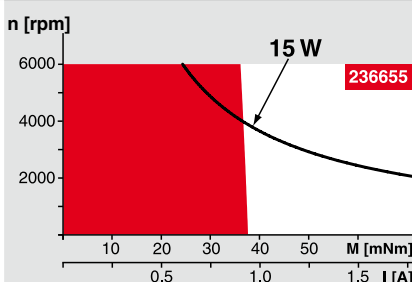
Other specifications		
29	Number of pole pairs	1
30	Number of commutator segments	13
31	Weight of motor	211 g

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

Option

Sleeve bearings in place of ball bearings

Operating Range



Comments

Continuous operation
In observation of above listed thermal resistance (lines 17 and 18) the maximum permissible winding temperature will be reached during continuous operation at 25°C ambient.
= Thermal limit.

Short term operation
The motor may be briefly overloaded (recurring).

— Assigned power rating

maxon Modular System

Planetary Gearhead

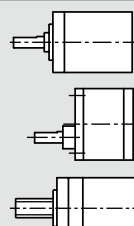
Ø32 mm
0.75 - 6.0 Nm
Page 272-277

Spur Gearhead

Ø38 mm
0.1 - 0.6 Nm
Page 282

Spindle Drive

Ø32 mm
Page 301-303



Recommended Electronics:

ESCON 36/2 DC	Page 342
ESCON Module 50/5	343
ESCON 50/5	344
ESCON 70/10	344
EPOS2 24/2	350
EPOS2 Module 36/2	350
EPOS2 24/5, EPOS2 50/5	351
EPOS2 P 24/5	354
EPOS3 70/10 EtherCAT	357
MAXPOS 50/5	360
Notes	22

Overview on page 20-25

Encoder MR
256 - 1024 CPT,
3 channels
Page 320

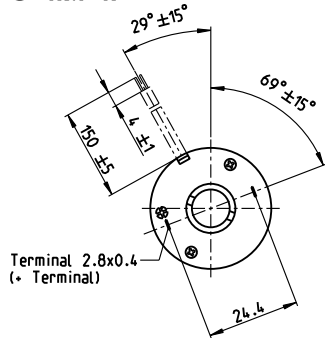
Encoder HED_ 5540
500 CPT,
3 channels
Page 326/327

A-max 32 Ø32 mm, Graphite Brushes, 20 Watt

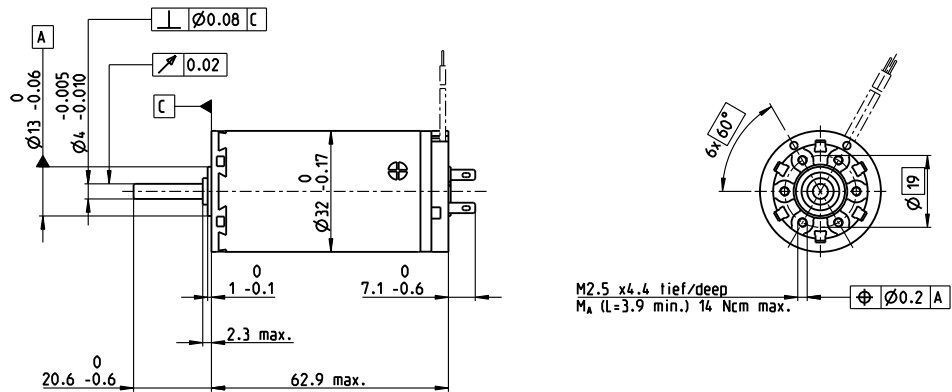
High Power

Kabel AWG 22/7
cable UL Style 1061

⊕ Kabel rot
cable red



M 1:2



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

Part Numbers

with terminals	236659	236660	236661	236662	236663	236664	236665
with cables	353230	353231	353232	262500	341970	353233	353234

Motor Data

Values at nominal voltage		6	9	12	24	30	36	42
1 Nominal voltage	V	6	9	12	24	30	36	42
2 No load speed	rpm	4880	5000	4670	6460	6160	5860	5650
3 No load current	mA	123	84.2	58.2	42.8	32.3	25.3	20.8
4 Nominal speed	rpm	3400	3480	3170	5060	4740	4430	4210
5 Nominal torque (max. continuous torque)	mNm	44.5	43.1	44	45.5	45.1	45.4	45
6 Nominal current (max. continuous current)	A	3.96	2.62	1.87	1.33	1.01	0.804	0.659
7 Stall torque	mNm	153	146	140	212	197	189	178
8 Stall current	A	13.2	8.57	5.77	6.02	4.27	3.24	2.54
9 Max. efficiency	%	80	81	81	84	83	83	83
Characteristics								
10 Terminal resistance	Ω	0.454	1.05	2.08	3.99	7.02	11.1	16.6
11 Terminal inductance	mH	0.0601	0.13	0.264	0.556	0.954	1.52	2.22
12 Torque constant	mNm/A	11.6	17	24.3	35.2	46.1	58.2	70.4
13 Speed constant	rpm/V	825	562	394	271	207	164	136
14 Speed / torque gradient	rpm/mNm	32.4	34.8	33.8	30.8	31.6	31.3	31.9
15 Mechanical time constant	ms	15	14.9	14.7	14.6	14.6	14.6	14.7
16 Rotor inertia	gcm ²	44.2	40.8	41.7	45.3	44.2	44.6	43.8

Specifications

Thermal data	
17 Thermal resistance housing-ambient	7.5 K/W
18 Thermal resistance winding-housing	2.1 K/W
19 Thermal time constant winding	17.8 s
20 Thermal time constant motor	521 s
21 Ambient temperature	-20...+85°C
22 Max. winding temperature	+125°C

Mechanical data (ball bearings)	
23 Max. speed	6000 rpm
24 Axial play	0.12 - 0.22 mm
25 Radial play	0.025 mm
26 Max. axial load (dynamic)	7.6 N
27 Max. force for press fits (static)	110 N
28 Max. radial load, 5 mm from flange	32 N

Mechanical data (sleeve bearings)	
23 Max. speed	6000 rpm
24 Axial play	0.12 - 0.22 mm
25 Radial play	0.012 mm
26 Max. axial load (dynamic)	5 N
27 Max. force for press fits (static)	110 N
28 Max. radial load, 5 mm from flange	10.5 N

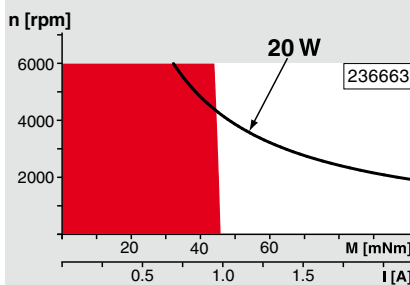
Other specifications	
29 Number of pole pairs	1
30 Number of commutator segments	13
31 Weight of motor	240 g

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

Option

Sleeve bearings in place of ball bearings

Operating Range



Comments

Continuous operation
In observation of above listed thermal resistance (lines 17 and 18) the maximum permissible winding temperature will be reached during continuous operation at 25°C ambient.
= Thermal limit.

Short term operation
The motor may be briefly overloaded (recurring).

— **Assigned power rating**

maxon Modular System

Overview on page 20–25

Planetary Gearhead

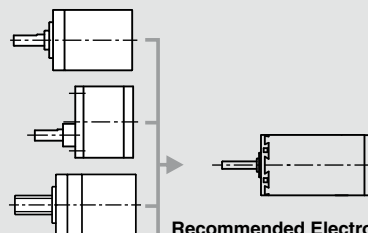
Ø32 mm
0.75 - 6.0 Nm
Page 272–277

Spur Gearhead

Ø38 mm
0.1 - 0.6 Nm
Page 282

Spindle Drive

Ø32 mm
Page 301–303



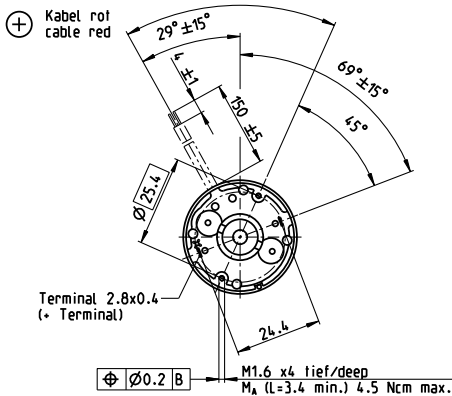
Recommended Electronics:

ESCON 36/2 DC	Page 342
ESCON Module 50/5	343
ESCON 50/5	344
ESCON 70/10	344
Notes	22

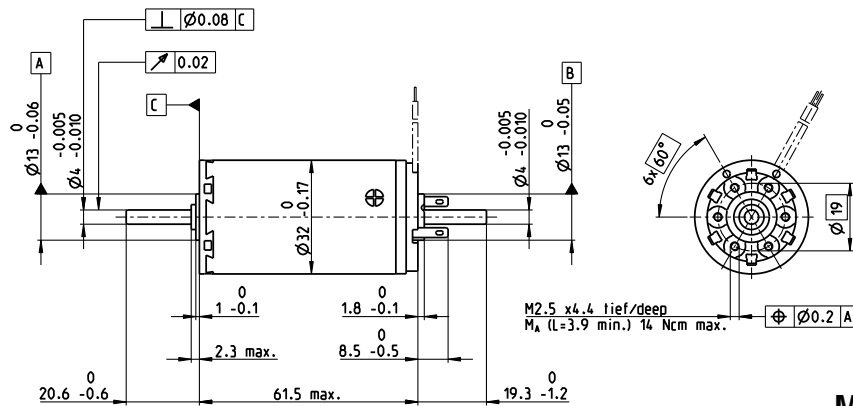
A-max 32 Ø32 mm, Graphite Brushes, 20 Watt

High Power

Kabel AWG 22/7
cable UL Style 1061



Verlegung der Kabel im Buerstendeckel nicht dargestellt!
Cable routing not shown inside brush cover!



M 1:2

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

Part Numbers

with terminals	236666	236667	236668	236669	236670	236671	236672
with cables	353236	353237	301030	353239	353240	353241	353242

Motor Data

Values at nominal voltage		6	9	12	24	30	36	42
1 Nominal voltage	V	6	9	12	24	30	36	42
2 No load speed	rpm	4880	5000	4670	6460	6160	5860	5650
3 No load current	mA	123	84.2	58.2	42.8	32.3	25.3	20.8
4 Nominal speed	rpm	3400	3480	3170	5060	4740	4430	4210
5 Nominal torque (max. continuous torque)	mNm	44.5	43.1	44	45.5	45.1	45.4	45
6 Nominal current (max. continuous current)	A	3.96	2.62	1.87	1.33	1.01	0.804	0.659
7 Stall torque	mNm	153	146	140	212	197	189	178
8 Stall current	A	13.2	8.57	5.77	6.02	4.27	3.24	2.54
9 Max. efficiency	%	80	81	81	84	83	83	83
Characteristics								
10 Terminal resistance	Ω	0.454	1.05	2.08	3.99	7.02	11.1	16.6
11 Terminal inductance	mH	0.0601	0.13	0.264	0.556	0.954	1.52	2.22
12 Torque constant	mNm/A	11.6	17	24.3	35.2	46.1	58.2	70.4
13 Speed constant	rpm/V	825	562	394	271	207	164	136
14 Speed / torque gradient	rpm/mNm	32.4	34.8	33.8	30.8	31.6	31.3	31.9
15 Mechanical time constant	ms	15	14.9	14.7	14.6	14.6	14.6	14.7
16 Rotor inertia	gcm ²	44.2	40.8	41.7	45.3	44.2	44.6	43.8

Specifications

Thermal data	
17 Thermal resistance housing-ambient	7.5 K/W
18 Thermal resistance winding-housing	2.1 K/W
19 Thermal time constant winding	17.8 s
20 Thermal time constant motor	521 s
21 Ambient temperature	-20...+85°C
22 Max. winding temperature	+125°C

Mechanical data (ball bearings)	
23 Max. speed	6000 rpm
24 Axial play	0.12 - 0.22 mm
25 Radial play	0.025 mm
26 Max. axial load (dynamic)	7.6 N
27 Max. force for press fits (static) (static, shaft supported)	110 N
28 Max. radial load, 5 mm from flange	2000 N

Mechanical data (sleeve bearings)	
23 Max. speed	6000 rpm
24 Axial play	0.12 - 0.22 mm
25 Radial play	0.012 mm
26 Max. axial load (dynamic)	5.0 N
27 Max. force for press fits (static) (static, shaft supported)	110 N
28 Max. radial load, 5 mm from flange	2000 N

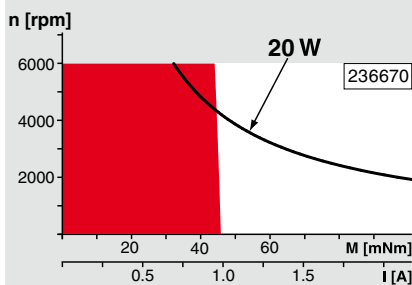
Other specifications	
29 Number of pole pairs	1
30 Number of commutator segments	13
31 Weight of motor	240 g

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

Option

Sleeve bearings in place of ball bearings

Operating Range



Comments

Continuous operation
In observation of above listed thermal resistance (lines 17 and 18) the maximum permissible winding temperature will be reached during continuous operation at 25°C ambient.
= Thermal limit.

Short term operation
The motor may be briefly overloaded (recurring).

Assigned power rating

maxon Modular System

Planetary Gearhead

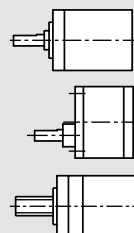
Ø32 mm
0.75 - 6.0 Nm
Page 272-277

Spur Gearhead

Ø38 mm
0.1 - 0.6 Nm
Page 282

Spindle Drive

Ø32 mm
Page 301-303



Recommended Electronics:

ESCON 36/2 DC	Page 342
ESCON Module 50/5	343
ESCON 50/5	344
ESCON 70/10	344
EPOS2 24/2	350
EPOS2 Module 36/2	350
EPOS2 24/5, EPOS2 50/5	351
EPOS2 P 24/5	354
EPOS3 70/10 EtherCAT	357
MAXPOS 50/5	360
Notes	22

Overview on page 20-25

Encoder MR

256 - 1024 CPT,
3 channels
Page 320

Encoder HED_ 5540

500 CPT,
3 channels
Page 326/327