

# maxon A-max

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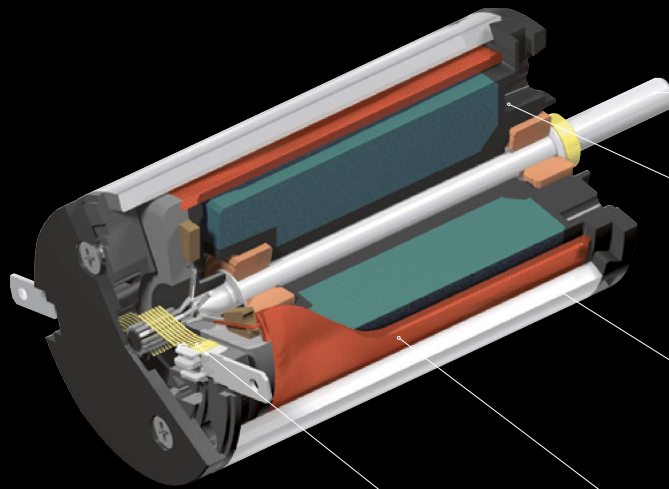


# maxon A-max

The drives use an ironless rotor and AlNiCo magnets. Automated manufacturing means that maxon's brushed A-max motors offer top performance at an attractive price. In maxon's modular system you can combine the A-max motors with gears, sensors and controllers for a complete drive system.

## Key data

Motor $\varnothing$	12 ... 32 mm
Motor length	21.2 ... 62.9 mm
Power	0.5 ... 20 W
Nominal torque	up to 45.5 mNm
Max. permissible speed	up to 19 000 rpm



Torque-resistant shaft. No recesses; the stress concentration is eliminated.

In a hybrid process, a stator is formed by assembling the motor housing and magnet in one step using injection molding of PPA plastic. Sintered bearings or ball bearings.

Motor housing made of strip steel, produced with highest precision at low cost, with no waste.

Proven winding procedure. Better performance resulting from optimal use of the air gap in the entire winding series.

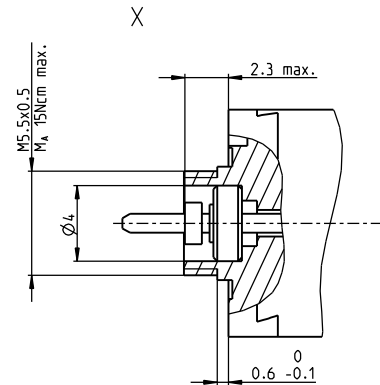
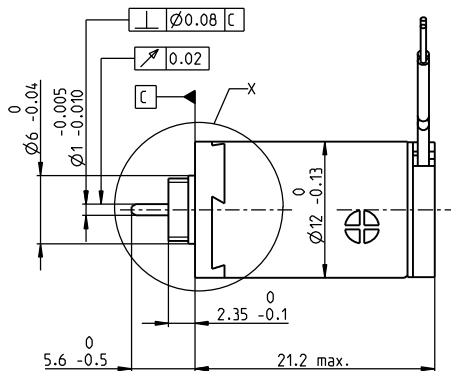
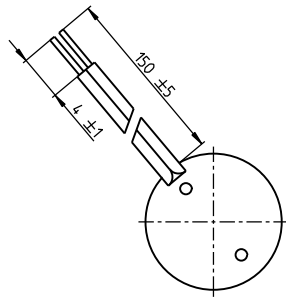
4-, 5- or 7-fingered precious metal brushes for fine rotary motions. Graphite brushes for heavy-duty use.

- Good price-performance ratio
- DC motor with AlNiCo magnet
- Torque-resistant shaft
- Automated manufacturing process
- Easily configured online

# 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 3:2

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

### Part Numbers

200937 265374 265375 **265376** 265377 265378

### 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	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	0.085	0.264	0.403	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 <sup>2</sup>	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

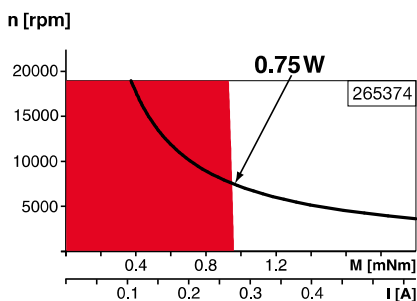
Mechanical data (sleeve bearings)		
23	Max. speed	19000 rpm
24	Axial play	0.05 - 0.15 mm
25	Radial play	0.012 mm
26	Max. axial load (dynamic)	0.15 N
27	Max. force for press fits (static)	15 N
28	Max. radial load, 4 mm from flange	0.4 N

### Other specifications

- 29 Number of pole pairs
- 30 Number of commutator segments
- 31 Weight of motor
- CLL = Capacitor Long Life
- Alignment of the electronic connections not specified.

Values listed in the table are nominal.  
Explanation of the figures on page 72.

### Operating Range



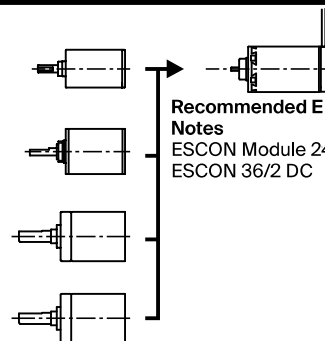
### Comments

- 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

Details on catalog page 34

- 1 **Planetary Gearhead**  
Ø10 mm  
0.01 - 0.15 Nm  
Page 361
- 7 **Spur Gearhead**  
Ø12 mm  
0.01 - 0.03 Nm  
Page 362
- 11 g **Planetary Gearhead**  
Ø13 mm  
0.05 - 0.15 Nm  
Page 363
- Planetary Gearhead**  
Ø13 mm  
0.2 - 0.35 Nm  
Page 364



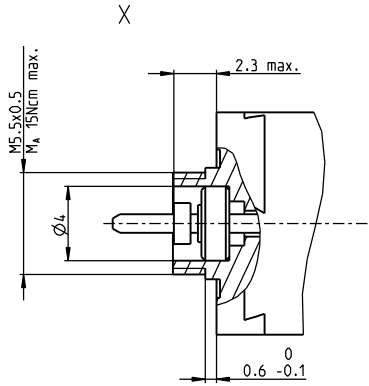
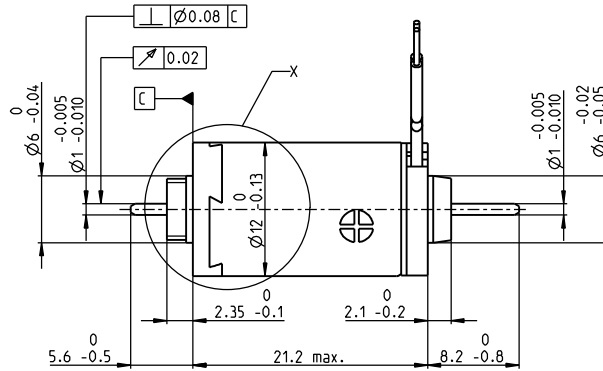
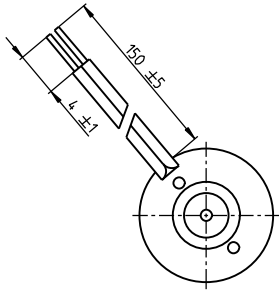
**Recommended Electronics:**  
Notes Page 34  
ESCON Module 24/2 486  
ESCON 36/2 DC 486

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

Kabel AWG 28/7  
cable UL Style 1061

⊕ Kabel rot  
cable red

A-max



M 3:2

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

## Part Numbers

200938|265389|265390|265391|**265392**|265393

## Motor Data

### Values at nominal voltage

	V	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

	Ω	3,8	10,3	16	40,9	71,6	116
10 Terminal resistance	Ω	3,8	10,3	16	40,9	71,6	116
11 Terminal inductance	mH	0,085	0,264	0,403	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 <sup>2</sup>	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	267 s
21 Ambient temperature	-30...+65°C
22 Max. winding temperature	+85°C

### Mechanical data (sleeve bearings)

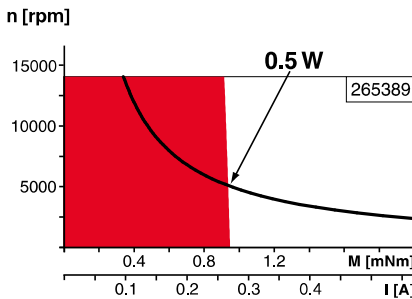
23 Max. speed	14000 rpm
24 Axial play	0,05 - 0,15 mm
25 Radial play	0,012 mm
26 Max. axial load (dynamic)	0,15 N
27 Max. force for press fits (static) (static, shaft supported)	15 N 70 N
28 Max. radial load, 4 mm from flange	0,4 N

### Other specifications

- 29 Number of pole pairs 1
  - 30 Number of commutator segments 7
  - 31 Weight of motor 12 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 72.

## Operating Range



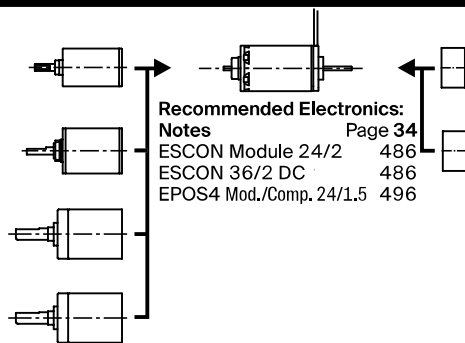
## Comments

- 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

Details on catalog page 34

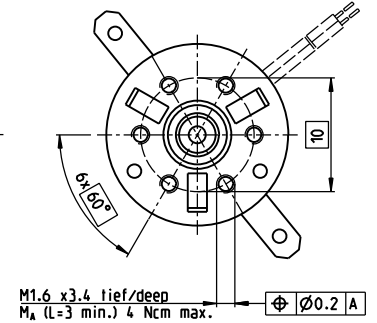
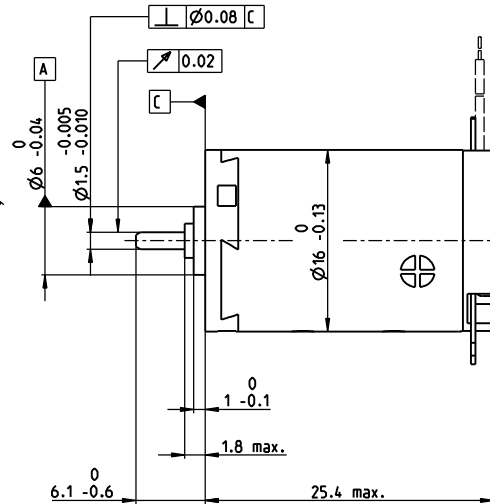
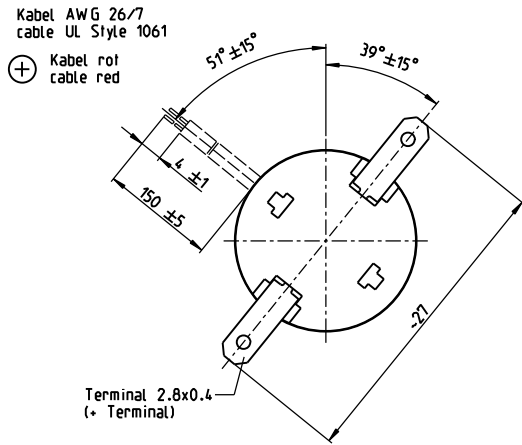
- 1 **Planetary Gearhead**  
Ø10 mm  
0,01 - 0,15 Nm  
Page 361
- 7 **Spur Gearhead**  
Ø12 mm  
0,01 - 0,03 Nm  
Page 362
- 12 g **Planetary Gearhead**  
Ø13 mm  
0,05 - 0,15 Nm  
Page 363
- Planetary Gearhead**  
Ø13 mm  
0,2 - 0,35 Nm  
Page 364



- Encoder MR**  
16 CPT,  
2 channels  
Page 457
- Encoder MR**  
64 - 256 CPT,  
2 channels  
Page 458

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

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



M 3:2

- 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		V	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	11000	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	%	76	75	75	76	76	76	76	76	76	74
Characteristics		Ω	0.41	1.52	8.3	12.8	23.1	31.1	39.7	57.9	76.2	183
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	0.052	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	2280	2770	2560	2590	2620	2600	2630	2670	2750	2880
15	Mechanical time constant	ms	25.3	23.8	23.2	23.3	23.3	23.4	23.5	23.4	23.5	23.9
16	Rotor inertia	gcm <sup>2</sup>	1.06	0.82	0.868	0.859	0.849	0.859	0.852	0.838	0.816	0.793

## Specifications

Thermal data		29.8 K/W
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)		19000 rpm
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)		19000 rpm
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

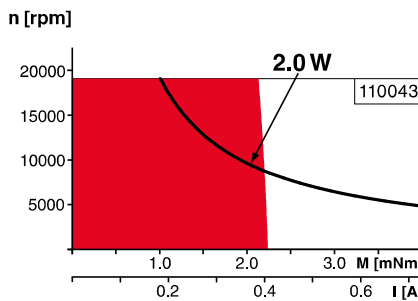
Other specifications		1
29	Number of pole pairs	1
30	Number of commutator segments	7
31	Weight of motor	21 g

Values listed in the table are nominal.  
Explanation of the figures on page 72.

## 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**

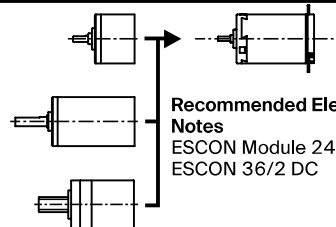
## maxon Modular System

Details on catalog page 34

**Spur Gearhead**  
Ø16 mm  
0.01 - 0.1 Nm  
Page 365-368

**Planetary Gearhead**  
Ø16 mm  
0.1 - 0.6 Nm  
Page 369/370

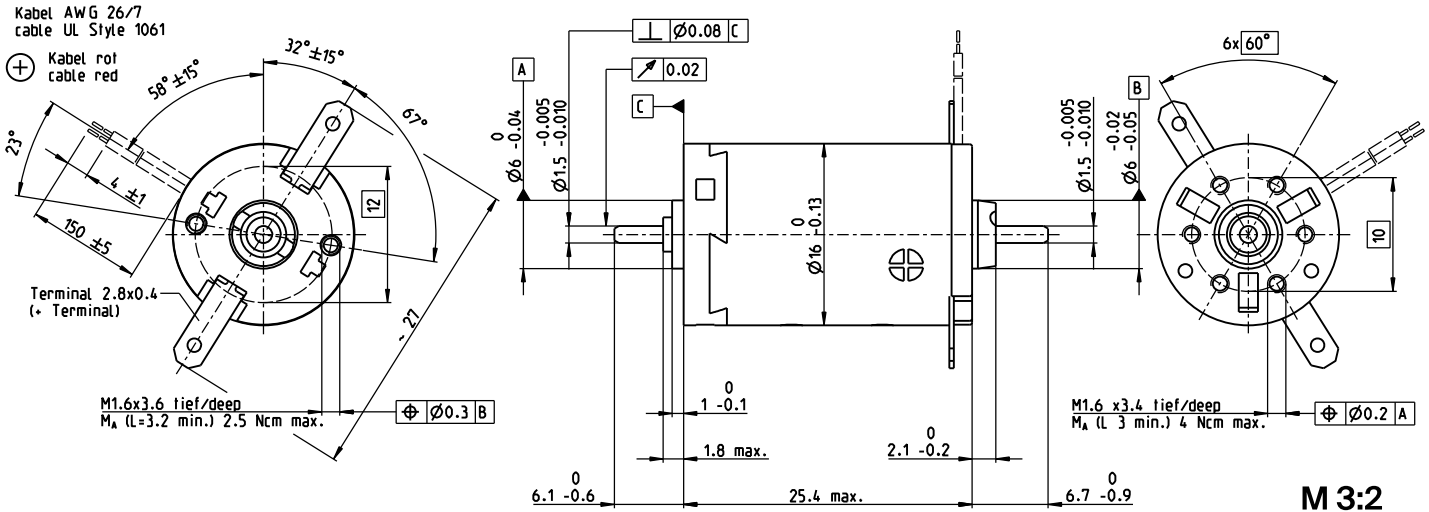
**Screw Drive**  
Ø16 mm  
Page 411-413



**Recommended Electronics:**  
Notes Page 34  
ESCON Module 24/2 486  
ESCON 36/2 DC 486

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

A-max



- 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											
<b>Values at nominal voltage</b>											
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
<b>Characteristics</b>											
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 <sup>2</sup>	1.06	0.818	0.866	0.857	0.847	0.857	0.85	0.836	0.814	0.791

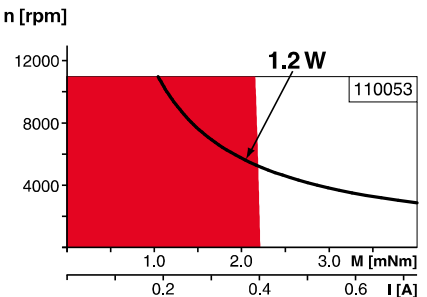
## Specifications Operating Range Comments

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



- 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 Details on catalog page 34

<b>Spur Gearhead</b> Ø16 mm 0.01 - 0.1 Nm Page 365-368 <b>Planetary Gearhead</b> Ø16 mm 0.1 - 0.6 Nm Page 369/370 <b>Screw Drive</b> Ø16 mm Page 411-413		<b>Encoder MR</b> 32 CPT, 2 / 3 channels Page 460 <b>Encoder MR</b> 128 / 256 / 512 CPT, 2 / 3 channels Page 461
<b>Recommended Electronics:</b> Notes Page 34 ESCON Module 24/2 486 ESCON 36/2 DC 486 EPOS4 Mod./Comp. 24/1.5 496		

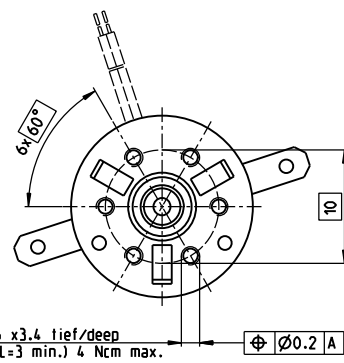
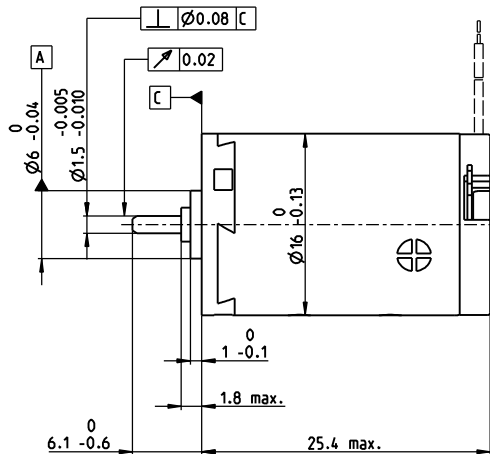
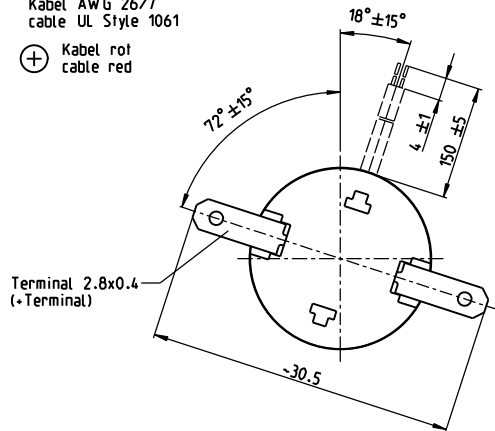
Values listed in the table are nominal.  
Explanation of the figures on page 72.

**Option**  
Ball bearings in place of sleeve bearings  
Without CLL

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

Kabel AWG 26/7  
cable UL Style 1061

⊕ Kabel rot  
cable red



**M 3:2**

- 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	50	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	0.017	0.052	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 <sup>2</sup>	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...+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

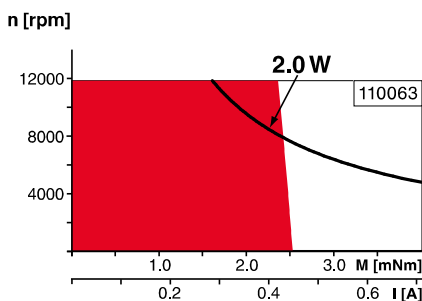
Other specifications		
29	Number of pole pairs	1
30	Number of commutator segments	7
31	Weight of motor	21 g

Values listed in the table are nominal.  
Explanation of the figures on page 72.

## 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**

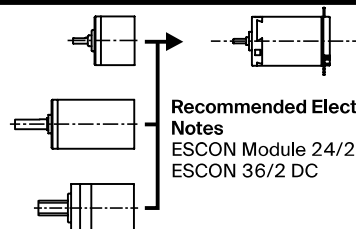
## maxon Modular System

Details on catalog page 34

**Spur Gearhead**  
Ø16 mm  
0.01 - 0.1 Nm  
Page 365-368

**Planetary Gearhead**  
Ø16 mm  
0.1 - 0.6 Nm  
Page 369/370

**Screw Drive**  
Ø16 mm  
Page 411-413



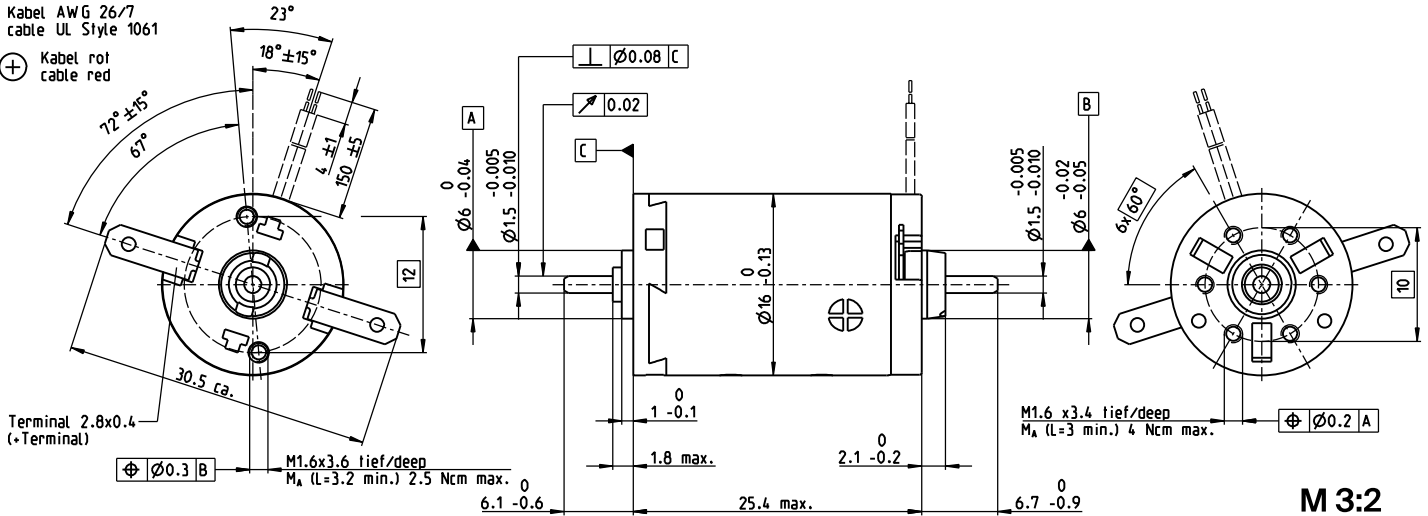
**Recommended Electronics:**  
**Notes** Page 34  
ESCON Module 24/2 486  
ESCON 36/2 DC 486

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

A-max

Kabel AWG 26/7  
cable UL Style 1061

⊕ Kabel rot  
cable red



**M 3:2**

- 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											
<b>Values at nominal voltage</b>											
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	50	48
<b>Characteristics</b>											
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	0.017	0.052	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 <sup>2</sup>	1.06	0.82	0.868	0.859	0.849	0.859	0.852	0.838	0.816	0.793

### Specifications

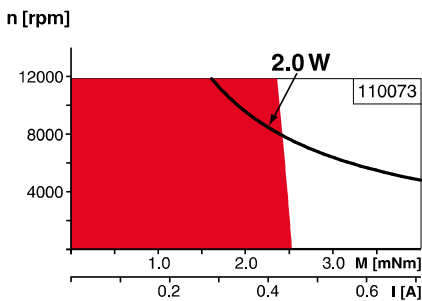
<b>Thermal data</b>	
17 Thermal resistance housing-ambient	29.8 K/W
18 Thermal resistance winding-housing	5.5 K/W
19 Thermal time constant winding	3.55 s
20 Thermal time constant motor	165 s
21 Ambient temperature	-30...+85°C
22 Max. winding temperature	+125°C

<b>Mechanical data (sleeve bearings)</b>	
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 / 280 N
28 Max. radial load, 5 mm from flange	1,4 N

<b>Mechanical data (ball bearings)</b>	
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 / 280 N
28 Max. radial load, 5 mm from flange	7,8 N

<b>Other specifications</b>	
29 Number of pole pairs	1
30 Number of commutator segments	7
31 Weight of motor	22 g

### Operating Range



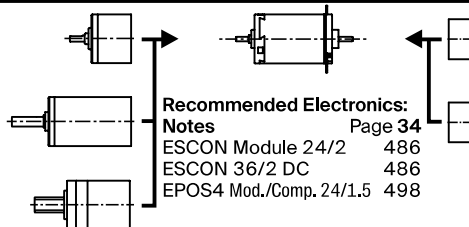
### Comments

- 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

Details on catalog page 34

Spur Gearhead Ø16 mm 0,01 - 0,1 Nm Page 365-368	Planetary Gearhead Ø16 mm 0,1 - 0,6 Nm Page 369/370	Screw Drive Ø16 mm Page 411-413
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### Recommended Electronics:

Notes	Page 34
ESCON Module 24/2	486
ESCON 36/2 DC	486
EPOS4 Mod./Comp. 24/1.5	498

**Encoder MR**  
32 CPT,  
2 / 3 channels  
Page 460

**Encoder MR**  
128 / 256 / 512 CPT,  
2 / 3 channels  
Page 461

Values listed in the table are nominal.  
Explanation of the figures on page 72.

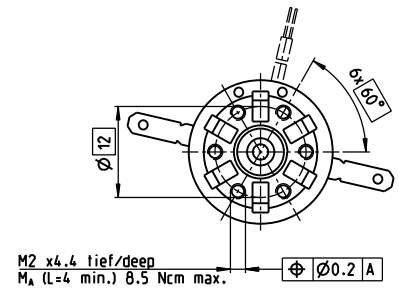
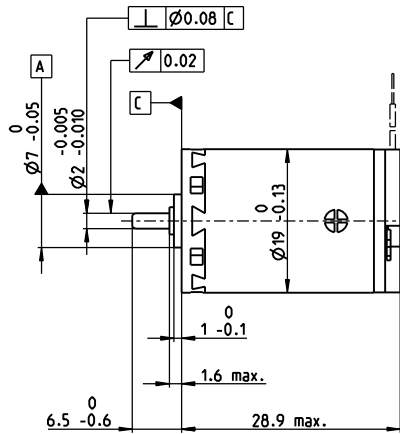
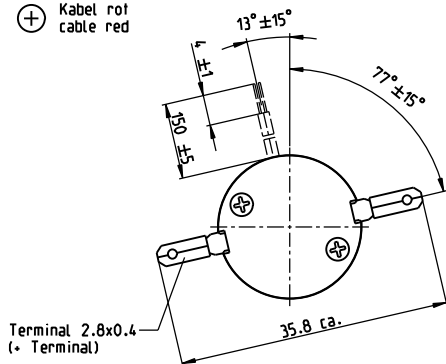
**Option**  
Ball bearings in place of sleeve bearings



# 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	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	76	76	76	76	76	76	75								
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	0.019	0.059	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 <sup>2</sup>	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	16 000 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	16 000 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

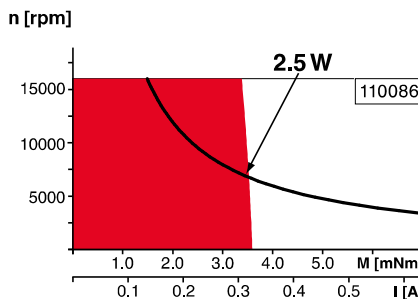
Other specifications		
29	Number of pole pairs	1
30	Number of commutator segments	9
31	Weight of motor	33 g

Values listed in the table are nominal.  
Explanation of the figures on page 72.

### 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

Details on catalog page 34

### Planetary Gearhead

Ø19 mm  
0.1 - 0.3 Nm  
Page 371

### Planetary Gearhead

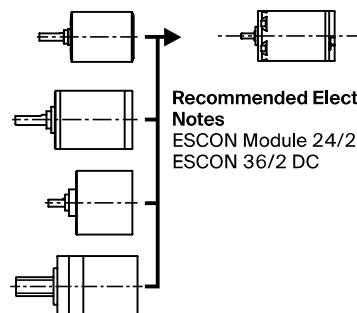
Ø22 mm  
0.5 - 2.0 Nm  
Page 374/376

### Spur Gearhead

Ø24 mm  
0.1 Nm  
Page 380

### Screw Drive

Ø22 mm  
Page 414/415



### Recommended Electronics:

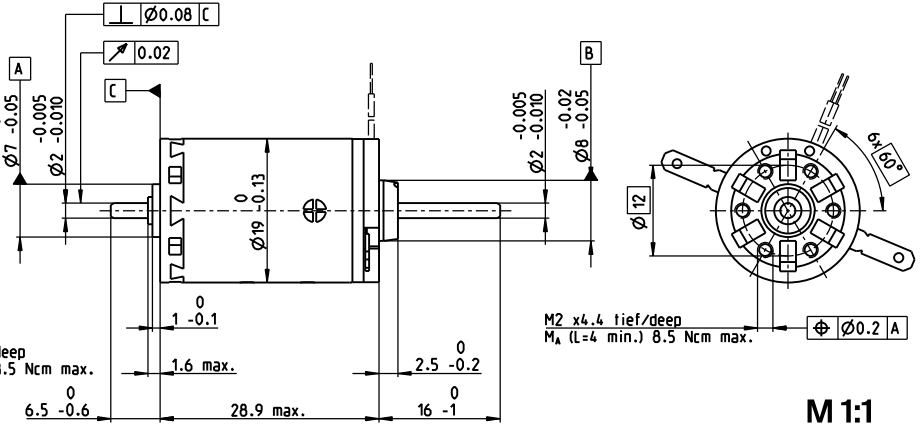
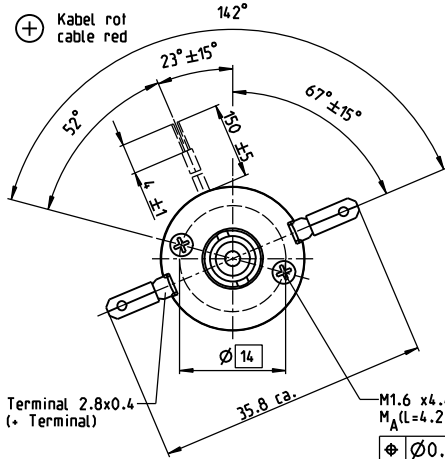
Notes	Page 34
ESCON Module 24/2	486
ESCON 36/2 DC	486

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

A-max

Kabel AWG 26/7  
cable UL Style 1061

⊕ Kabel rot  
cable red



M 1:1

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

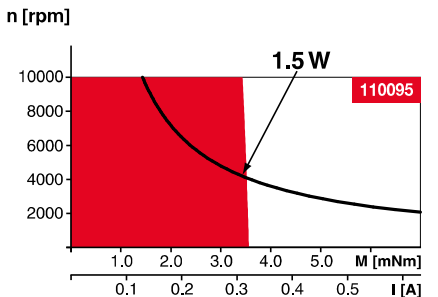
		Part Numbers								
with terminals		110090	110091	110092	110093	110094	110095	110096	110097	110098
with cables		139832	352925	352926	352927	352928	352929	352930	315468	352931

Motor Data											
<b>Values at nominal voltage</b>											
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	70	70	70	70
<b>Characteristics</b>											
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	0.019	0.059	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 <sup>2</sup>	2.54	2.08	2.18	2.15	2.17	2.09	2.09	2.06	1.99

Specifications	Operating Range	Comments
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**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



- 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	10 000 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	10 000 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	34 g

CLL = Capacitor Long Life

Values listed in the table are nominal.  
Explanation of the figures on page 72.

**Option**  
Ball bearings in place of sleeve bearings  
Without CLL

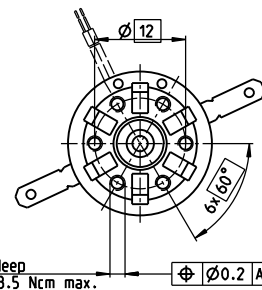
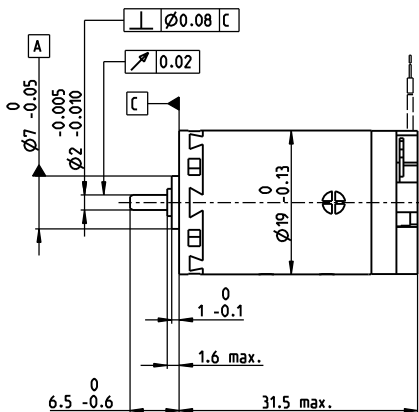
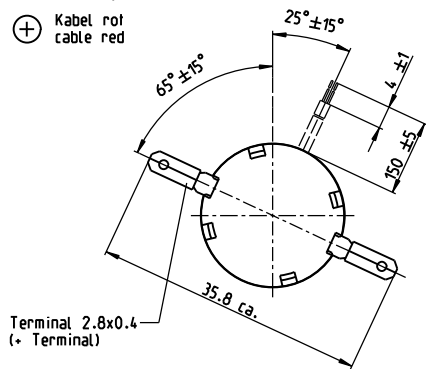
maxon Modular System	Details on catalog page 34
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<p><b>Planetary Gearhead</b> Ø19 mm 0.1 - 0.3 Nm Page 371</p> <p><b>Planetary Gearhead</b> Ø22 mm 0.5 - 2.0 Nm Page 374/376</p> <p><b>Spur Gearhead</b> Ø24 mm 0.1 Nm Page 380</p> <p><b>Screw Drive</b> Ø22 mm Page 414/415</p>	<p><b>Recommended Electronics:</b> Notes Page 34 ESCON Module 24/2 486 ESCON 36/2 DC 486 EPOS4 Mod./Comp. 24/1.5 496</p>	<p><b>Encoder MR</b> 32 CPT, 2 / 3 channels Page 460</p> <p><b>Encoder MR</b> 128 / 256 / 512 CPT, 2 / 3 channels Page 461</p> <p><b>Encoder Enc</b> 22 mm 100 CPT, 2 channels Page 468</p>
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# 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	0.019	0.059	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 <sup>2</sup>	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	11.0 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	12 000 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	12 000 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

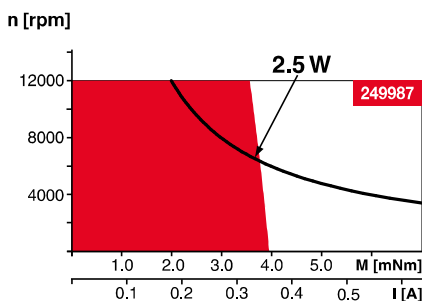
Other specifications	
29 Number of pole pairs	1
30 Number of commutator segments	9
31 Weight of motor	33 g

Values listed in the table are nominal.  
Explanation of the figures on page 72.

### 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

Details on catalog page 34

### Planetary Gearhead

Ø19 mm  
0.1 - 0.3 Nm  
Page 371

### Planetary Gearhead

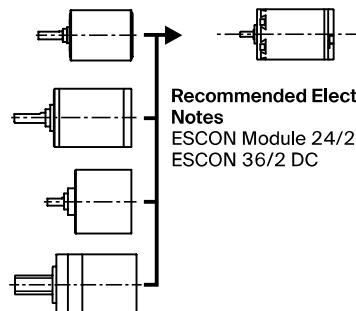
Ø22 mm  
0.5 - 2.0 Nm  
Page 374/376

### Spur Gearhead

Ø24 mm  
0.1 Nm  
Page 380

### Screw Drive

Ø22 mm  
Page 414/415



### Recommended Electronics:

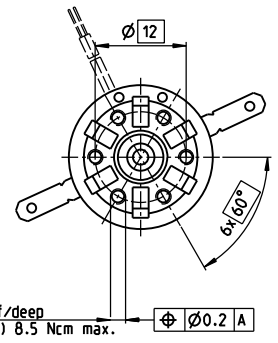
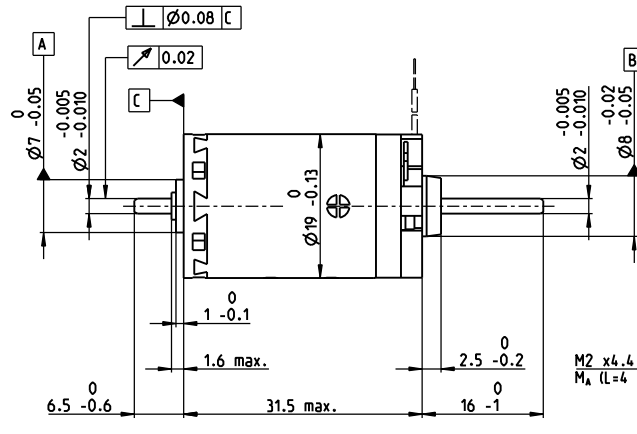
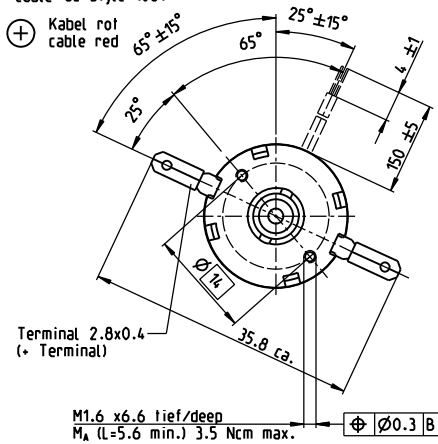
Notes	Page 34
ESCON Module 24/2	486
ESCON 36/2 DC	486

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

A-max

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												
		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	0.019	0.059	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 <sup>2</sup>	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	11.0 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 / 480 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

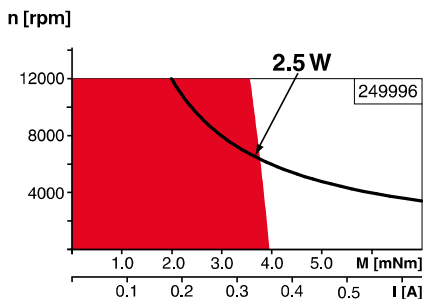
Other specifications		
29	Number of pole pairs	1
30	Number of commutator segments	9
31	Weight of motor	34 g

Values listed in the table are nominal.  
Explanation of the figures on page 72.

### Option

Ball bearings in place of sleeve bearings

## Operating Range



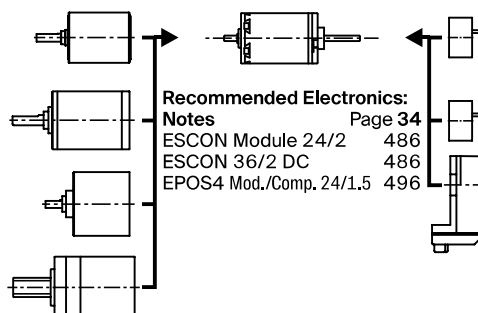
## Comments

- 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

Details on catalog page 34

- Planetary Gearhead**  
Ø19 mm  
0.1 - 0.3 Nm  
Page 371
- Planetary Gearhead**  
Ø22 mm  
0.5 - 2.0 Nm  
Page 374/376
- Spur Gearhead**  
Ø24 mm  
0.1 Nm  
Page 380
- Screw Drive**  
Ø22 mm  
Page 414/415



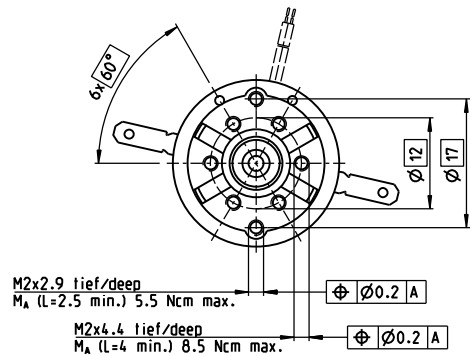
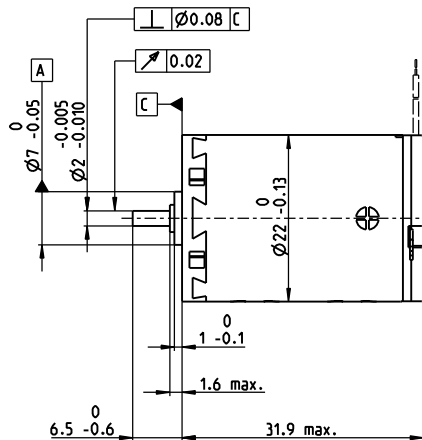
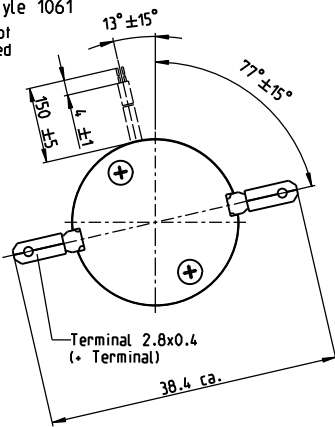
**Recommended Electronics:**  
Notes Page 34  
ESCON Module 24/2 486  
ESCON 36/2 DC 486  
EPOS4 Mod./Comp. 24/1.5 496

- Encoder MR**  
32 CPT,  
2 / 3 channels  
Page 460
- Encoder MR**  
128 / 256 / 512 CPT,  
2 / 3 channels  
Page 461
- Encoder Enc**  
22 mm  
100 CPT, 2 channels  
Page 468

# 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

	V	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 <sup>2</sup>	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	16 000 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	16 000 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

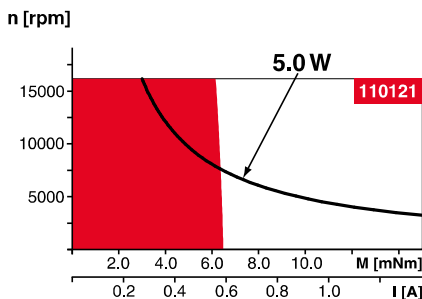
29 Number of pole pairs	1
30 Number of commutator segments	9
31 Weight of motor	54 g

Values listed in the table are nominal.  
Explanation of the figures on page 72.

### 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

Details on catalog page 34

### Planetary Gearhead

Ø22 mm  
0.1 - 0.6 Nm  
Page 372/373

### Planetary Gearhead

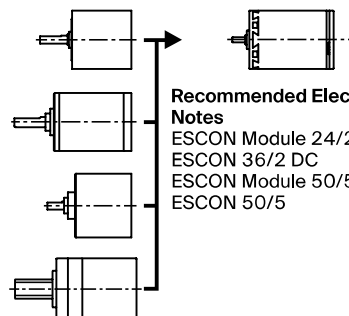
Ø22 mm  
0.5 - 2.0 Nm  
Page 374/376

### Spur Gearhead

Ø24 mm  
0.1 Nm  
Page 380

### Screw Drive

Ø22 mm  
Page 414/415

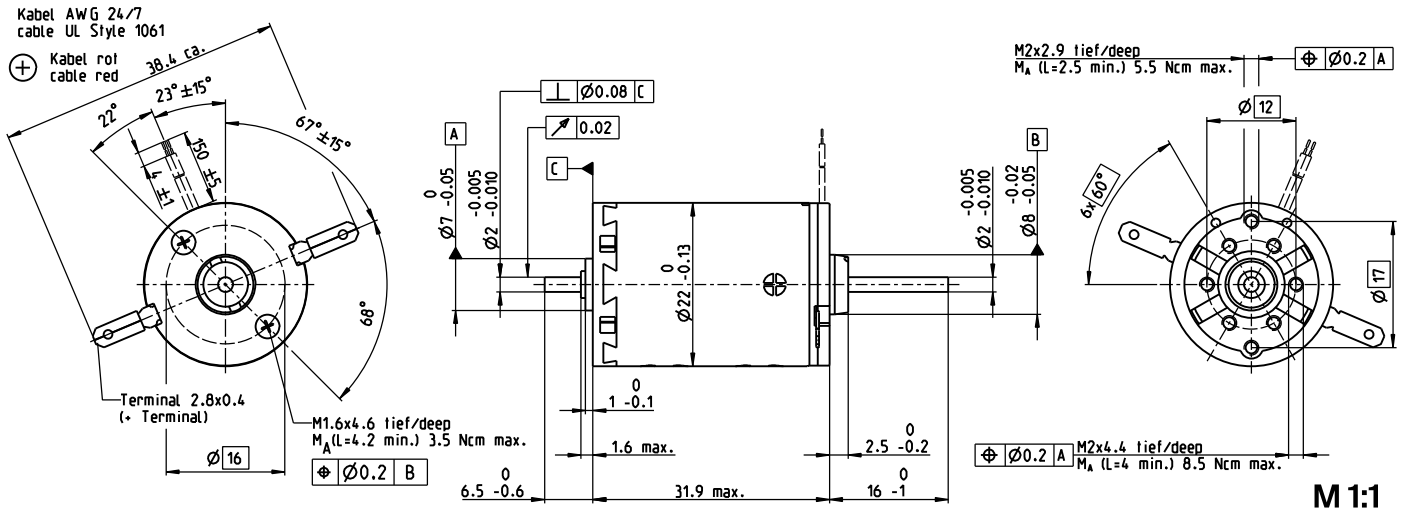


### Recommended Electronics:

Notes	Page 34
ESCON Module 24/2	486
ESCON 36/2 DC	486
ESCON Module 50/5	487
ESCON 50/5	489

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

A-max



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

## Part Numbers

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

## Motor Data

Values at nominal voltage		4.5	6	7.2	7.2	7.2	9	12	15	18	24	36	42	
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	5010	3940	4330	3550	2890	3400	3890	3930	3710	3720	4100	4490
5	Nominal torque (max. continuous torque)	mNm	4.82	6.27	6.31	6.31	6.24	6.21	6.16	6.15	6.11	6.05	5.91	5.95
6	Nominal current (max. continuous current)	A	0.84	0.749	0.662	0.589	0.525	0.457	0.368	0.296	0.237	0.177	0.123	0.112
7	Stall torque	mNm	15.4	15.3	16.4	14.6	12.8	14	14.9	15	14.4	14.2	14.5	15.5
8	Stall current	A	2.61	1.79	1.69	1.34	1.06	1.01	0.872	0.706	0.547	0.407	0.296	0.286
9	Max. efficiency	%	81	81	82	81	80	81	81	81	81	81	81	81
Characteristics														
10	Terminal resistance	Ω	1.72	3.36	4.27	5.39	6.78	8.9	13.8	21.2	32.9	59	122	147
11	Terminal inductance	mH	0.106	0.222	0.288	0.362	0.445	0.585	0.89	1.37	2.1	3.69	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	474	438	430	432	443	443	449	450	456	465	485	477
15	Mechanical time constant	ms	20.2	19.8	19.7	19.7	19.8	19.8	19.8	19.8	19.9	19.9	20.2	20
16	Rotor inertia	gcm <sup>2</sup>	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

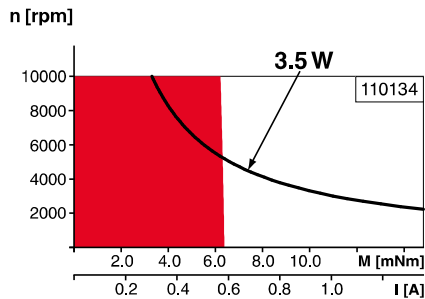
Mechanical data (ball bearings)		
23	Max. speed	10000 rpm
24	Axial play	0.05 - 0.15 mm
25	Radial play	0.025 mm
26	Max. axial load (dynamic)	3.3 N
27	Max. force for press fits (static) (static, shaft supported)	45 N / 440 N
28	Max. radial load, 5 mm from flange	12.3 N

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 72.

**Option**  
Ball bearings in place of sleeve bearings  
Without CLL

## Operating Range



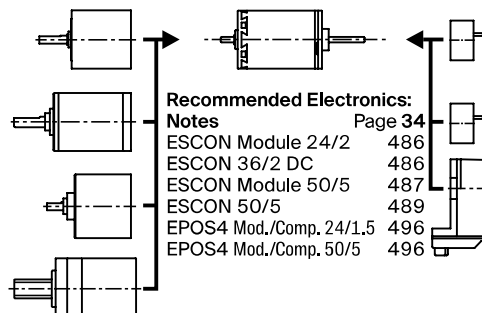
## Comments

- 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

Details on catalog page 34

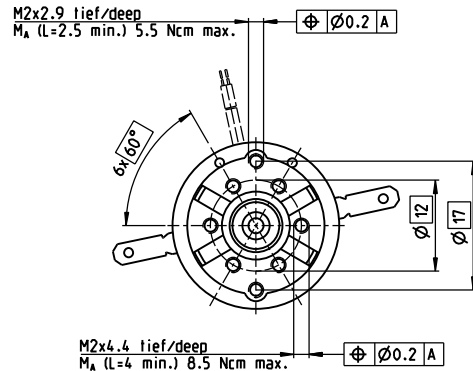
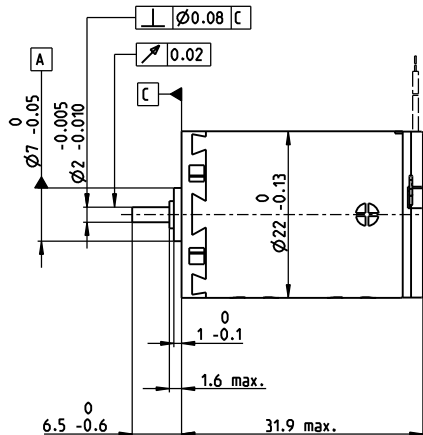
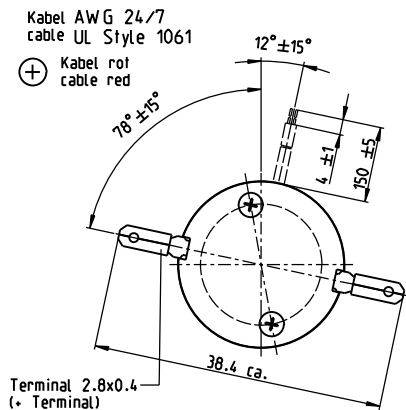
- Planetary Gearhead**  
Ø22 mm  
0.1 - 0.6 Nm  
Page 372/373
- Planetary Gearhead**  
Ø22 mm  
0.5 - 2.0 Nm  
Page 374/376
- Spur Gearhead**  
Ø24 mm  
0.1 Nm  
Page 380
- Screw Drive**  
Ø22 mm  
Page 414/415



- Recommended Electronics:**
- | Notes                   | Page 34 |
|-------------------------|---------|
| ESCON Module 24/2       | 486     |
| ESCON 36/2 DC           | 486     |
| ESCON Module 50/5       | 487     |
| ESCON 50/5              | 489     |
| EPOS4 Mod./Comp. 24/1.5 | 496     |
| EPOS4 Mod./Comp. 50/5   | 496     |

- Encoder MR**  
32 CPT,  
2 / 3 channels  
Page 460
- Encoder MR**  
128 / 256 / 512 CPT,  
2 / 3 channels  
Page 461
- Encoder Enc**  
22 mm  
100 CPT, 2 channels  
Page 468

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



M 1:1

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

## Part Numbers

	110143	110145	110146	110147	110148	110149	110150	110151	110152	110153	110154	110155
with terminals												
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
2	No load speed	rpm	9240	9690	8500	10200	9170	10000	9770	10500	8480	9630	9110
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
4	Nominal speed	rpm	6240	6530	5350	7060	6000	6890	6600	7380	5270	6420	5840
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	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
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
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
9	Max. efficiency	%	67	70	69	72	70	72	72	73	70	72	71
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
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
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
13	Speed constant	rpm/V	1620	1120	981	875	790	689	558	450	364	274	195
14	Speed / torque gradient	rpm/mNm	500	454	446	444	455	452	457	456	461	468	487
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
16	Rotor inertia	gcm <sup>2</sup>	4	4,25	4,3	4,29	4,19	4,2	4,13	4,13	4,09	4,02	3,9

## 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	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

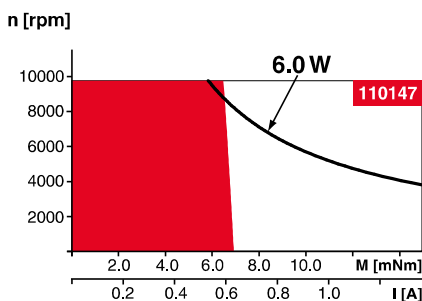
Mechanical data (ball bearings)		
23	Max. speed	9800 rpm
24	Axial play	0,05 - 0,15 mm
25	Radial play	0,025 mm
26	Max. axial load (dynamic)	3,3 N
27	Max. force for press fits (static)	45 N
28	Max. radial load, 5 mm from flange	12,3 N

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 72.

**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

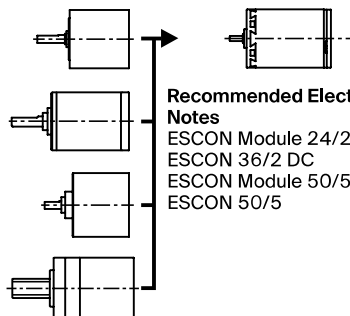
Details on catalog page 34

**Planetary Gearhead**  
Ø22 mm  
0,1 - 0,6 Nm  
Page 372/373

**Planetary Gearhead**  
Ø22 mm  
0,5 - 2,0 Nm  
Page 374/376

**Spur Gearhead**  
Ø24 mm  
0,1 Nm  
Page 380

**Screw Drive**  
Ø22 mm  
Page 414/415



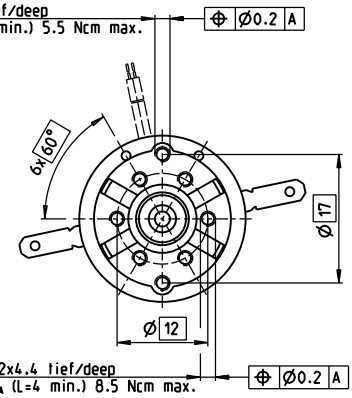
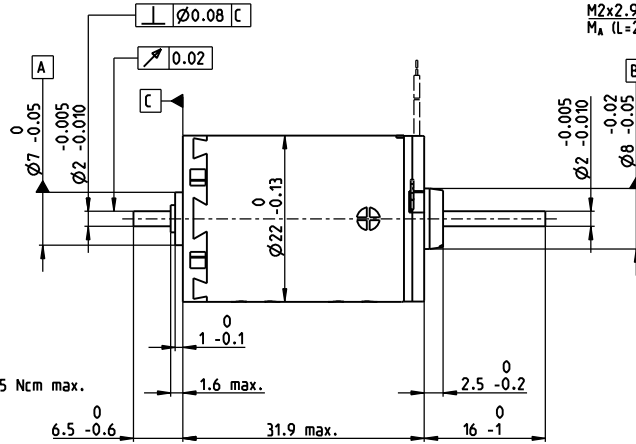
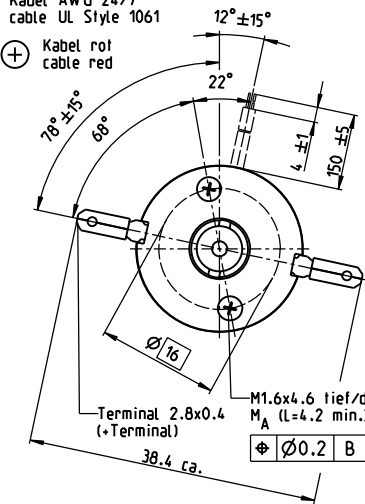
**Recommended Electronics:**  
Notes Page 34  
ESCON Module 24/2 486  
ESCON 36/2 DC 486  
ESCON Module 50/5 487  
ESCON 50/5 489

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

A-max

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	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 <sup>2</sup>	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 -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 / 440 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

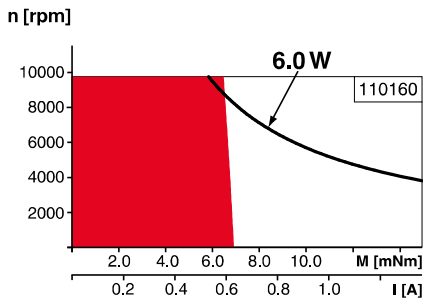
- Other specifications**
- 29 Number of pole pairs 1
  - 30 Number of commutator segments 9
  - 31 Weight of motor 54 g

Values listed in the table are nominal.  
Explanation of the figures on page 72.

### 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

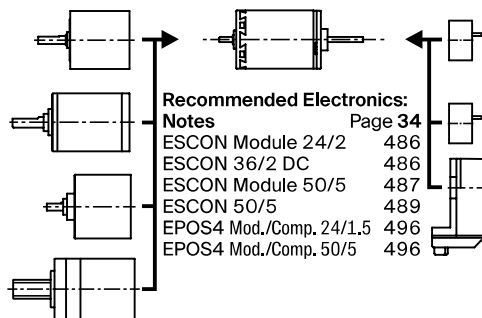
Details on catalog page 34

**Planetary Gearhead**  
Ø22 mm  
0.1 - 0.6 Nm  
Page 372/373

**Planetary Gearhead**  
Ø22 mm  
0.5 - 2.0 Nm  
Page 374/376

**Spur Gearhead**  
Ø24 mm  
0.1 Nm  
Page 380

**Screw Drive**  
Ø22 mm  
Page 414/415



### Recommended Electronics:

- Notes** Page 34
- ESCON Module 24/2 486
  - ESCON 36/2 DC 486
  - ESCON Module 50/5 487
  - ESCON 50/5 489
  - EPOS4 Mod./Comp. 24/1.5 496
  - EPOS4 Mod./Comp. 50/5 496

**Encoder MR**  
32 CPT,  
2 / 3 channels  
Page 460

**Encoder MR**  
128 / 256 / 512 CPT,  
2 / 3 channels  
Page 461

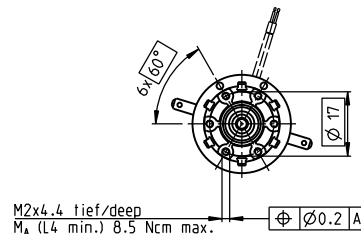
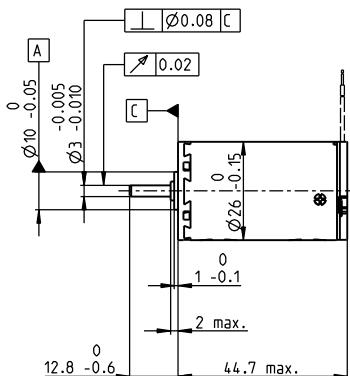
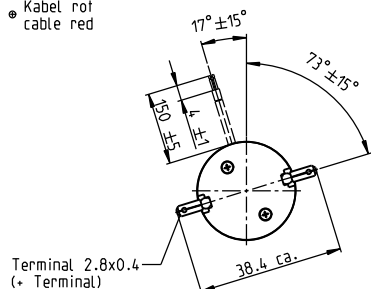
**Encoder Enc**  
22 mm  
100 CPT, 2 channels  
Page 468



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

Kabel AWG 24/7  
cable UL Style 1061

• Kabel rot  
cable red



A-max

## 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																					
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	0.04	0.051	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 <sup>2</sup>	14.4	12.9	13.6	13.2	13.3	13.1	12.5	12.6	12.5	12.2	12.1								

### Specifications Operating Range Comments

**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	11000 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	11000 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

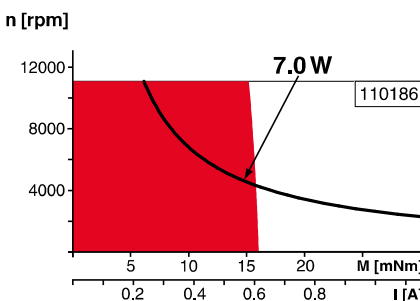
**Other specifications**

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 72.

**Option**  
Ball bearings in place of sleeve bearings  
Without CLL



- 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

Details on catalog page 34

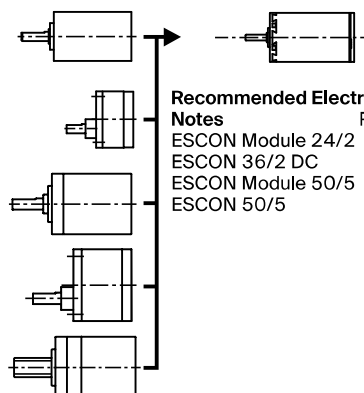
**Planetary Gearhead**  
Ø26 mm  
0.75 - 4.5 Nm  
Page 381

**Spur Gearhead**  
Ø30 mm  
0.07 - 0.2 Nm  
Page 382

**Planetary Gearhead**  
Ø32 mm  
0.75 - 6.0 Nm  
Page 383/384/387

**Spur Gearhead**  
Ø38 mm  
0.1 - 0.6 Nm  
Page 395

**Screw Drive**  
Ø32 mm  
Page 416-421



**Recommended Electronics:**  
**Notes** Page 34

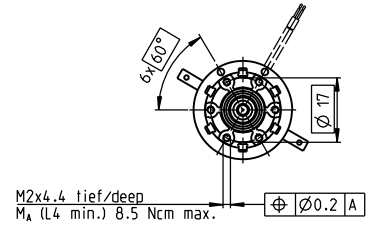
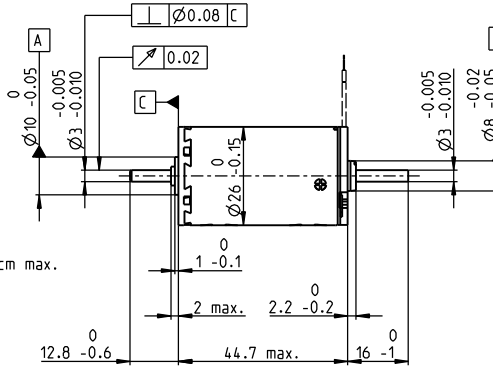
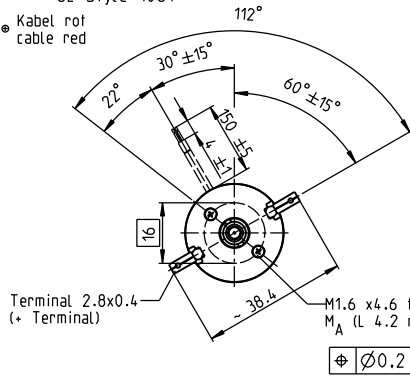
ESCON Module 24/2	486
ESCON 36/2 DC	486
ESCON Module 50/5	487
ESCON 50/5	489

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

A-max

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

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

Motor Data		110204	110205	110206	110207	110208	110209	110210	110211	110212	110213	110214
<b>Values at nominal voltage</b>												
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	677	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	81	80	81	81	81
<b>Characteristics</b>												
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 <sup>2</sup>	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 / 1200 N
28 Max. radial load, 5 mm from flange	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 / 1200 N
28 Max. radial load, 5 mm from flange	20.5 N

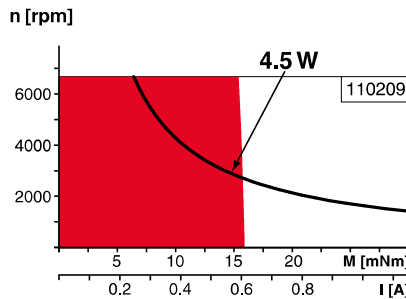
Other specifications	
29 Number of pole pairs	1
30 Number of commutator segments	13
31 Weight of motor	119 g

CLL = Capacitor Long Life

Values listed in the table are nominal.  
Explanation of the figures on page 72.

**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

Details on catalog page 34

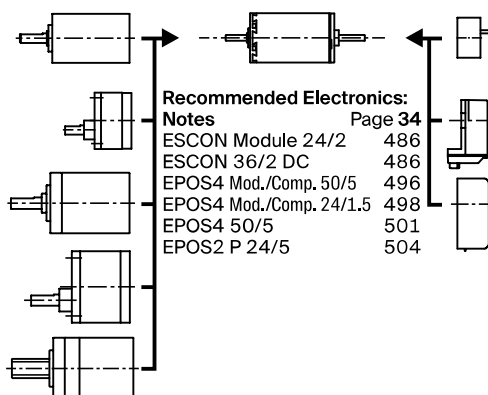
**Planetary Gearhead**  
Ø26 mm  
0.75 - 4.5 Nm  
Page 381

**Spur Gearhead**  
Ø30 mm  
0.07 - 0.2 Nm  
Page 382

**Planetary Gearhead**  
Ø32 mm  
0.75 - 6.0 Nm  
Page 383/384/387

**Spur Gearhead**  
Ø38 mm  
0.1 - 0.6 Nm  
Page 395

**Screw Drive**  
Ø32 mm  
Page 416-421



## Recommended Electronics:

Notes Page 34

ESCON Module 24/2	486
ESCON 36/2 DC	486
EPOS4 Mod./Comp. 50/5	496
EPOS4 Mod./Comp. 24/1.5	498
EPOS4 50/5	501
EPOS2 P 24/5	504

**Encoder MR**  
128 - 1000 CPT,  
3 channels  
Page 463

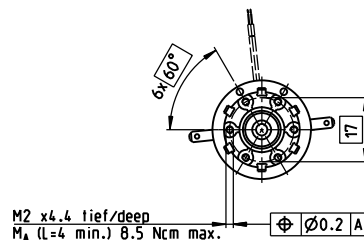
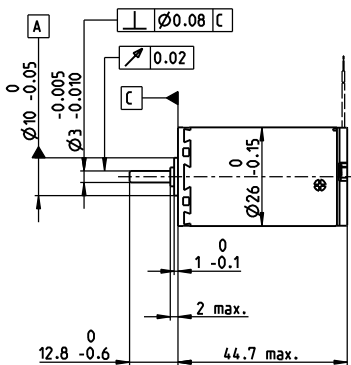
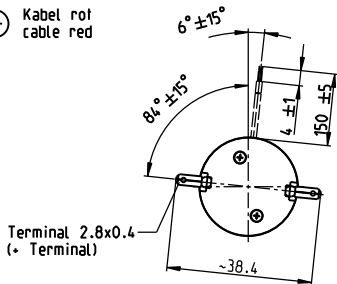
**Encoder Enc**  
22 mm  
100 CPT, 2 channels  
Page 468

**Encoder HED\_5540**  
500 CPT,  
3 channels  
Page 472/474

# A-max 26 Ø26 mm, Graphite Brushes, 11 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	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			0.345	0.49	2.07	3.13	4.94	7.36	19.1	25.8	30.1	45.1	70.2
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	0.04	0.051	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 <sup>2</sup>	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			13.2 K/W
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...+85°C
22	Max. winding temperature		+125°C

## Mechanical data (ball bearings)

23	Max. speed		10 400 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 N

## Mechanical data (sleeve bearings)

23	Max. speed		10 400 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

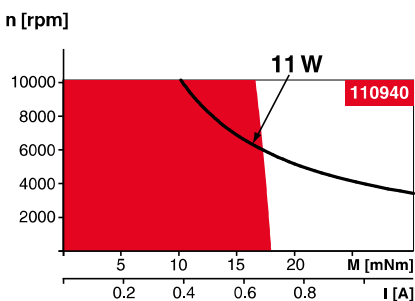
29	Number of pole pairs		1
30	Number of commutator segments		13
31	Weight of motor		117 g

Values listed in the table are nominal.  
Explanation of the figures on page 72.

## 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

Details on catalog page 34

### Planetary Gearhead

∅26 mm  
0.75 - 4.5 Nm  
Page 381

### Spur Gearhead

∅30 mm  
0.07 - 0.2 Nm  
Page 382

### Planetary Gearhead

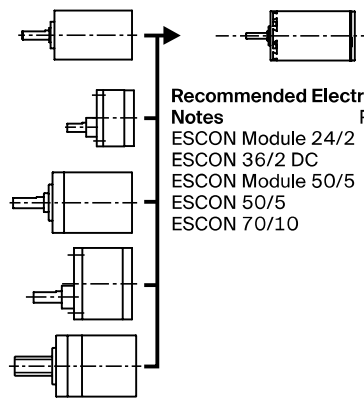
∅32 mm  
0.75 - 6.0 Nm  
Page 383/384/387

### Spur Gearhead

∅38 mm  
0.1 - 0.6 Nm  
Page 395

### Screw Drive

∅32 mm  
Page 416-421



## Recommended Electronics:

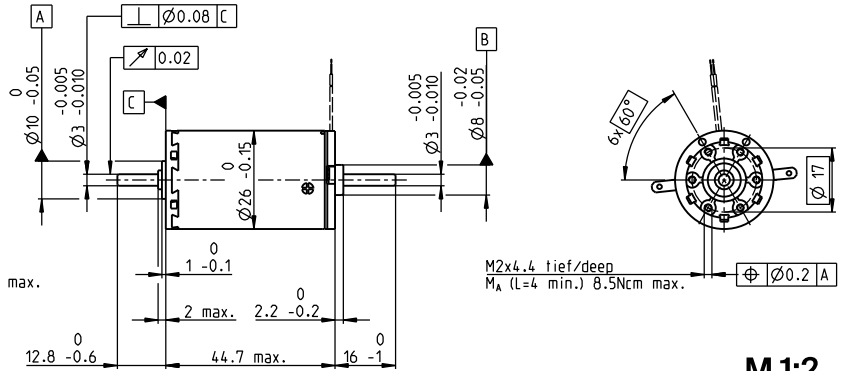
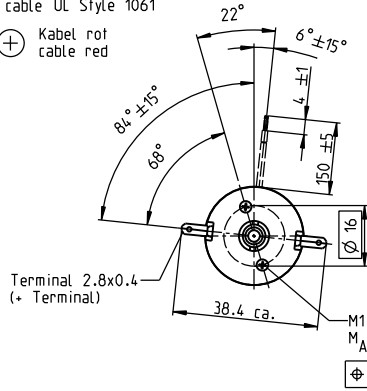
Notes	Page 34
ESCON Module 24/2	486
ESCON 36/2 DC	486
ESCON Module 50/5	487
ESCON 50/5	489
ESCON 70/10	489

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

A-max

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	0,04	0,051	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 <sup>2</sup>	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	12.5 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 1200 N
28 Max. radial load, 5 mm from flange	20 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	1200 N 5,5 N

## Other specifications

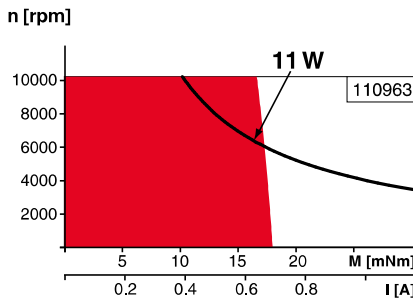
29 Number of pole pairs	1
30 Number of commutator segments	13
31 Weight of motor	119 g

Values listed in the table are nominal.  
Explanation of the figures on page 72.

## 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

Details on catalog page 34

### Planetary Gearhead

Ø26 mm  
0.75 - 4.5 Nm  
Page 381

### Spur Gearhead

Ø30 mm  
0.07 - 0.2 Nm  
Page 382

### Planetary Gearhead

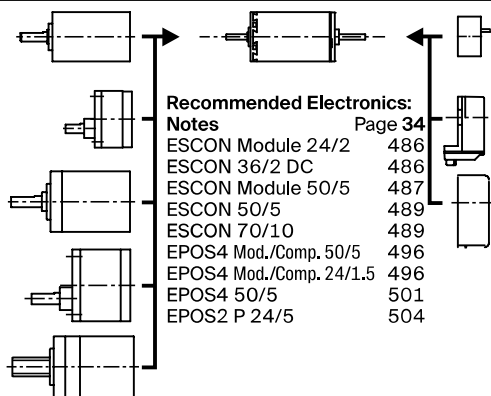
Ø32 mm  
0.75 - 6.0 Nm  
Page 383/384/387

### Spur Gearhead

Ø38 mm  
0.1 - 0.6 Nm  
Page 395

### Screw Drive

Ø32 mm  
Page 416-421



## Recommended Electronics:

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ESCON Module 24/2	486
ESCON 36/2 DC	486
ESCON Module 50/5	487
ESCON 50/5	489
ESCON 70/10	489
EPOS4 Mod./Comp. 50/5	496
EPOS4 Mod./Comp. 24/1.5	496
EPOS4 50/5	501
EPOS2 P 24/5	504

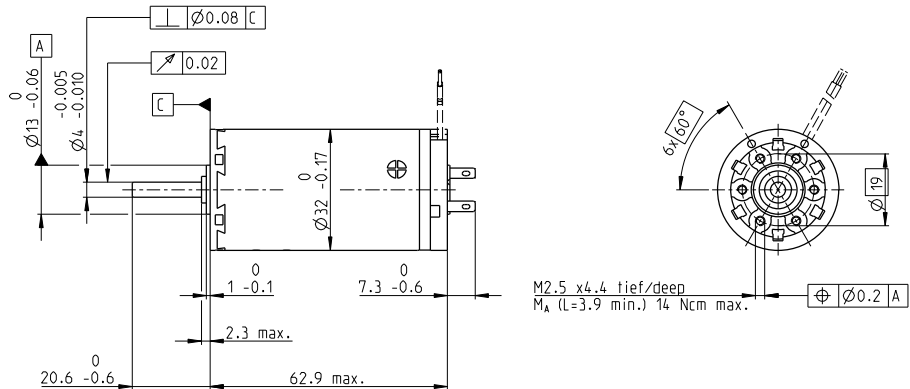
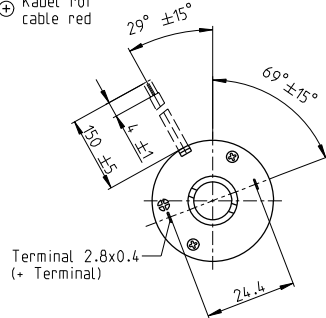
**Encoder MR**  
128 - 1000 CPT,  
3 channels  
Page 463

**Encoder Enc**  
22 mm  
100 CPT, 2 channels  
Page 468

**Encoder HED\_5540**  
500 CPT,  
3 channels  
Page 472/474

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

Kabel AWG 22/7  
 cable UL Style 1061  
 ⊕ Kabel rot  
 cable red



A-max

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									
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	80	80	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	0,06	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 <sup>2</sup>	44.2	40.8	41.7	45.3	44.2	44.6	43.8	

## Specifications Operating Range Comments

**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)	76 N
27 Max. force for press fits (static)	110 N
28 Max. radial load, 5 mm from flange	32 N

**Mechanical data (sleeve bearings)**

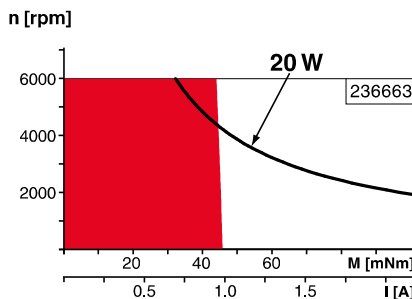
23 Max. speed	6000 rpm
24 Axial play	0,12 - 0,22 mm
25 Radial play	0,012 mm
26 Max. axial load (dynamic)	5 N
27 Max. force for press fits (static)	110 N
28 Max. radial load, 5 mm from flange	10,5 N

**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 72.

**Option**  
 Sleeve bearings in place of ball bearings

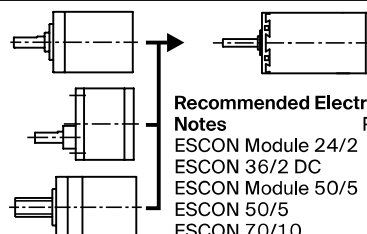


- Continuous operation**  
 In observation of above listed thermal resistance (lines 17 and 18) the maximum permissible winding temperature will be reached during continuous operation at 25°C ambient.  
 = Thermal limit.
- Short term operation**  
 The motor may be briefly overloaded (recurring).
- Assigned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

## maxon Modular System

Details on catalog page 34

- Planetary Gearhead**  
 Ø32 mm  
 0.75 - 6.0 Nm  
 Page 383-385/387-388
- Spur Gearhead**  
 Ø38 mm  
 0.1 - 0.6 Nm  
 Page 395
- Screw Drive**  
 Ø32 mm  
 Page 416-421

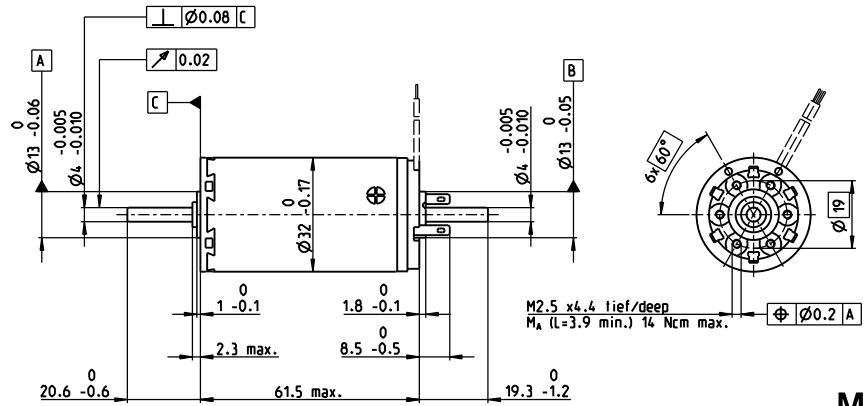
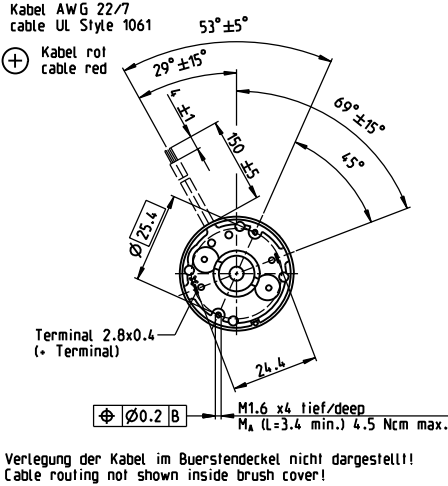


**Recommended Electronics:**

<b>Notes</b>	Page 34
ESCON Module 24/2	486
ESCON 36/2 DC	486
ESCON Module 50/5	487
ESCON 50/5	489
ESCON 70/10	489

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

A-max



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	80	80	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	0.06	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 <sup>2</sup>	44.2	40.8	41.7	45.3	44.2	44.6	43.8	

## Specifications Operating Range Comments

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

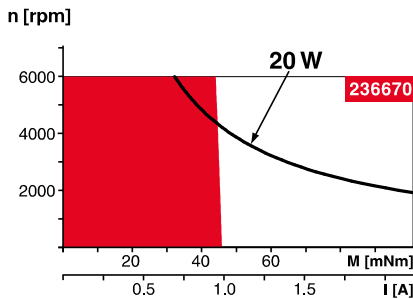
Mechanical data (ball bearings)		
23	Max. speed	6000 rpm
24	Axial play	0.12 - 0.22 mm
25	Radial play	0.025 mm
26	Max. axial load (dynamic)	76 N
27	Max. force for press fits (static) (static, shaft supported)	110 N / 2000 N
28	Max. radial load, 5 mm from flange	32 N

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) (static, shaft supported)	110 N / 2000 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 72.

**Option**  
Sleeve bearings in place of ball bearings

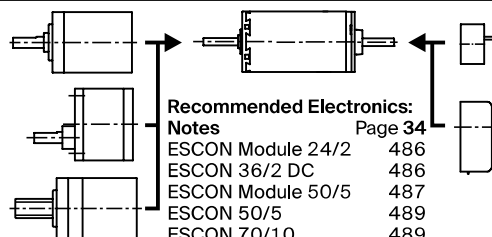


- Continuous operation**  
In observation of above listed thermal resistance (lines 17 and 18) the maximum permissible winding temperature will be reached during continuous operation at 25°C ambient. = Thermal limit.
- Short term operation**  
The motor may be briefly overloaded (recurring).
- Assigned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

## maxon Modular System

Details on catalog page 34

- Planetary Gearhead**  
Ø32 mm  
0.75 - 6.0 Nm  
Page 383-385/387-388
- Spur Gearhead**  
Ø38 mm  
0.1 - 0.6 Nm  
Page 395
- Screw Drive**  
Ø32 mm  
Page 416-421



- Recommended Electronics:**
- | Notes                   | Page 34 |
|-------------------------|---------|
| ESCON Module 24/2       | 486     |
| ESCON 36/2 DC           | 486     |
| ESCON Module 50/5       | 487     |
| ESCON 50/5              | 489     |
| ESCON 70/10             | 489     |
| EPOS4 Mod./Comp. 50/5   | 496     |
| EPOS4 Mod./Comp. 24/1.5 | 496     |
| EPOS4 50/5              | 501     |
| EPOS2 P 24/5            | 504     |

- Encoder MR**  
256 - 1024 CPT,  
3 channels  
Page 464
- Encoder HED\_ 5540**  
500 CPT,  
3 channels  
Page 472/474