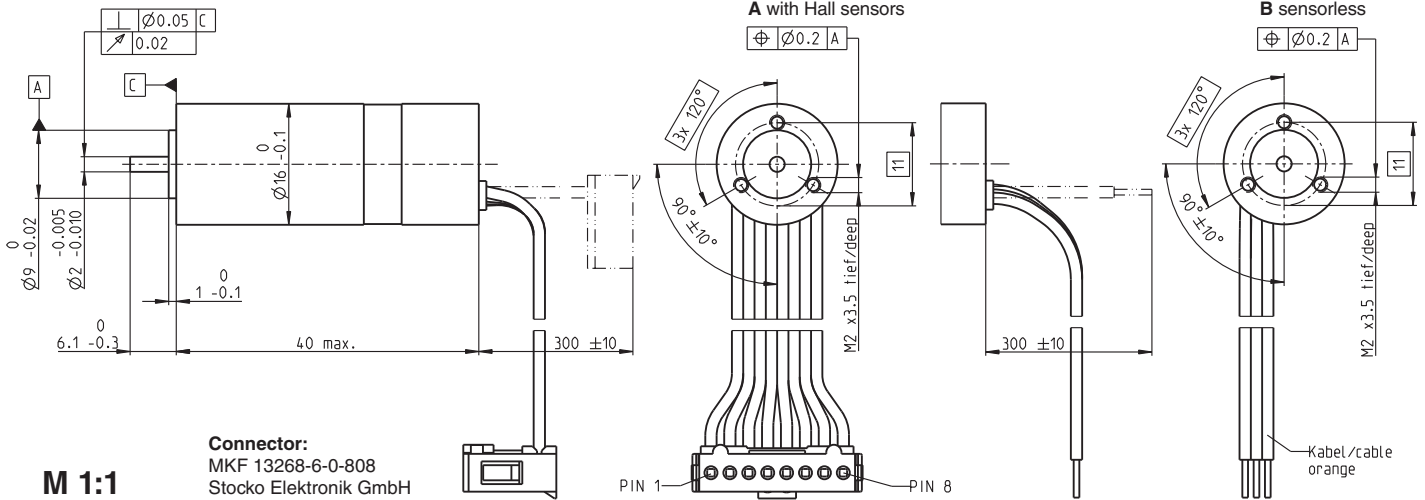


EC 16 Ø16 mm, brushless, 30 Watt

NEW

maxon EC motor



M 1:1

Connector:
MKF 13268-6-0-808
Stocko Elektronik GmbH

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

Order Number

A with Hall sensors	400160	405812	400161	405813	400162
B sensorless	404079	405817	404080	405818	404081

Motor Data (provisional)

Values at nominal voltage		12	18	24	36	48
1 Nominal voltage	V	12	18	24	36	48
2 No load speed	rpm	42400	40200	40700	43600	37700
3 No load current	mA	331	202	155	116	68.1
4 Nominal speed	rpm	37700	35600	36300	39100	33100
5 Nominal torque (max. continuous torque)	mNm	8.13	8.6	8.8	8.35	8.66
6 Nominal current (max. continuous current)	A	3.31	2.19	1.7	1.16	0.773
7 Stall torque	mNm	82.2	85.1	90.3	89.9	79.2
8 Starting current	A	30.8	20.1	16.2	11.5	6.59
9 Max. efficiency	%	81	81	82	82	81
Characteristics						
10 Terminal resistance phase to phase	Ω	0.39	0.895	1.48	3.12	7.29
11 Terminal inductance phase to phase	mH	0.0235	0.059	0.102	0.2	0.477
12 Torque constant	mNm / A	2.67	4.23	5.57	7.8	12
13 Speed constant	rpm / V	3570	2260	1710	1220	794
14 Speed / torque gradient	rpm / mNm	521	477	456	491	481
15 Mechanical time constant	ms	3.96	3.62	3.46	3.72	3.65
16 Rotor inertia	gcm ²	0.725	0.725	0.725	0.725	0.725

Specifications

- Thermal data**
- 17 Thermal resistance housing-ambient 16.3 K / W
 - 18 Thermal resistance winding-housing 1.68 K / W
 - 19 Thermal time constant winding 1.9 s
 - 20 Thermal time constant motor 240 s
 - 21 Ambient temperature -20 ... +100°C
 - 22 Max. permissible winding temperature +155°C

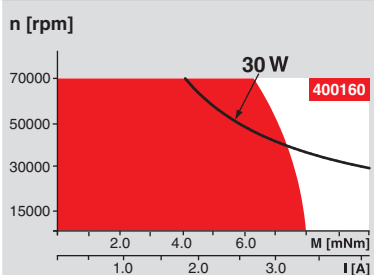
- Mechanical data (preloaded ball bearings)**
- 23 Max. permissible speed 70000 rpm
 - 24 Axial play at axial load < 3.5 N 0 mm
 - > 3.5 N max. 0.14 mm
 - 25 Radial play preloaded
 - 26 Max. axial load (dynamic) 3 N
 - 27 Max. force for press fits (static) 35 N
 - (static, shaft supported) 250 N
 - 28 Max. radial loading, 5 mm from flange 10 N

- Other specifications**
- 29 Number of pole pairs 1
 - 30 Number of phases 3
 - 31 Weight of motor 34 g
- Values listed in the table are nominal.

- Connection A**
- | | | |
|--------|--------------------|-------|
| brown | Motor winding 1 | Pin 1 |
| red | Motor winding 2 | Pin 2 |
| orange | Motor winding 3 | Pin 3 |
| yellow | VHall 3 ... 24 VDC | Pin 4 |
| green | GND | Pin 5 |
| blue | Hall sensor 1 | Pin 6 |
| violet | Hall sensor 2 | Pin 7 |
| grey | Hall sensor 3 | Pin 8 |
- Wiring diagram for Hall sensors see p. 27

- Connection B** (Cable AWG 24)
- | | |
|--------|-----------------|
| brown | Motor winding 1 |
| red | Motor winding 2 |
| orange | Motor winding 3 |

Operating Range



Comments

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

maxon Modular System

Overview on page 16 - 21

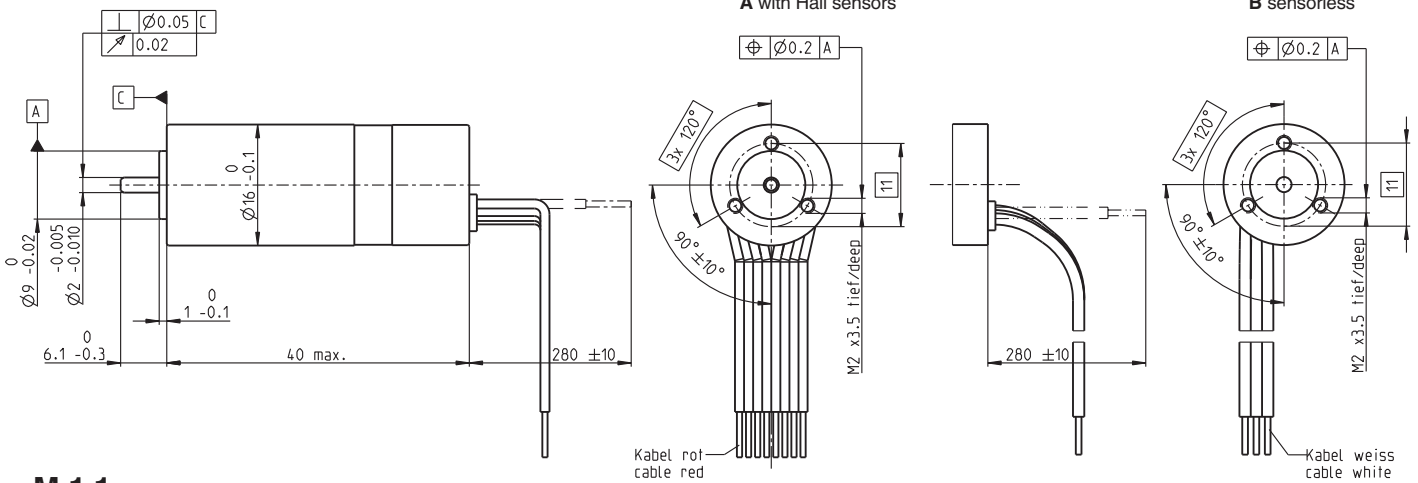
<p>Planetary Gearhead Ø16 mm 0.1 - 0.3 Nm Page 215</p> <p>Planetary Gearhead Ø22 mm 0.5 - 1.0 Nm Page 221</p>		<p>Recommended Electronics:</p> <table border="0"> <tr><td>DECS 50/5</td><td>Page 289</td></tr> <tr><td>DEC 24/3</td><td>290</td></tr> <tr><td>DEC Module 24/2</td><td>290</td></tr> <tr><td>DEC 50/5</td><td>291</td></tr> <tr><td>DEC Module 50/5</td><td>291</td></tr> <tr><td>DECV 50/5</td><td>297</td></tr> <tr><td>DES 50/5</td><td>298</td></tr> <tr><td>EPOS2 Module 36/2</td><td>304</td></tr> <tr><td>EPOS2 24/2</td><td>304</td></tr> <tr><td>EPOS2 24/5, EPOS2 50/5</td><td>305</td></tr> </table> <p>Notes 20</p>	DECS 50/5	Page 289	DEC 24/3	290	DEC Module 24/2	290	DEC 50/5	291	DEC Module 50/5	291	DECV 50/5	297	DES 50/5	298	EPOS2 Module 36/2	304	EPOS2 24/2	304	EPOS2 24/5, EPOS2 50/5	305
DECS 50/5	Page 289																					
DEC 24/3	290																					
DEC Module 24/2	290																					
DEC 50/5	291																					
DEC Module 50/5	291																					
DECV 50/5	297																					
DES 50/5	298																					
EPOS2 Module 36/2	304																					
EPOS2 24/2	304																					
EPOS2 24/5, EPOS2 50/5	305																					

for type A: Encoder MR
128 / 256 / 512 Imp.,
Page 261

EC 16 Ø16 mm, brushless, 30 Watt, sterilizable

NEW

maxon EC motor



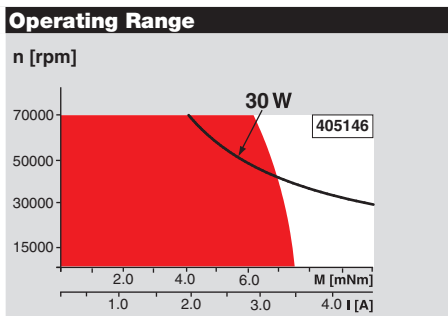
M 1:1

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

		Order Number		
A with Hall sensors		405146	405147	405148
B sensorless		405149	405150	405151

Motor Data (provisional)				
Values at nominal voltage				
1 Nominal voltage	V	12	12	12
2 No load speed	rpm	45000	21500	9770
3 No load current	mA	490	173	65.4
4 Nominal speed	rpm	40500	17000	5120
5 Nominal torque (max. continuous torque)	mNm	7.06	8.41	8.44
6 Nominal current (max. continuous current)	A	3.26	1.76	0.805
7 Stall torque	mNm	76.9	42.2	18.5
8 Starting current	A	30.8	8.11	1.65
9 Max. efficiency	%	77	73	64
Characteristics				
10 Terminal resistance phase to phase	Ω	0.39	1.48	7.29
11 Terminal inductance phase to phase	mH	0.0168	0.0729	0.34
12 Torque constant	mNm / A	2.5	5.21	11.2
13 Speed constant	rpm / V	3820	1830	849
14 Speed / torque gradient	rpm / mNm	596	521	550
15 Mechanical time constant	ms	4.52	3.95	4.18
16 Rotor inertia	gcm ²	0.725	0.725	0.725

Specifications	
Thermal data	
17 Thermal resistance housing-ambient	16.3 K / W
18 Thermal resistance winding-housing	1.68 K / W
19 Thermal time constant winding	1.9 s
20 Thermal time constant motor	240 s
21 Ambient temperature	-40 ... +135°C
22 Max. permissible winding temperature	155°C
Mechanical data (preloaded ball bearings)	
23 Max. permissible speed	70000 rpm
24 Axial play at axial load < 3.5 N	0 mm
	> 3.5 N
25 Radial play	max. 0.14 mm
26 Max. axial load (dynamic)	3 N
27 Max. force for press fits (static)	40 N
(static, shaft supported)	250 N
28 Max. radial loading, 5 mm from flange	10 N



Comments

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

Other specifications	
29 Number of pole pairs	1
30 Number of phases	3
31 Weight of motor	34 g

Values listed in the table are nominal.

Connection A and B, motor (Cable AWG 22)

red Motor winding 1
black Motor winding 2
white Motor winding 3

Connection A, sensors (Cable AWG 26)

green V_{Hall} 3 ... 24 VDC
blue GND
red / grey Hall sensor 1
black / grey Hall sensor 2
white / grey Hall sensor 3

Wiring diagram for Hall sensors see p. 27

Application	Sterilization information
Medicine / surgery / chemicals	In normal use, the motor can be sterilized 100 times in an autoclave. No need to dismantle.
Hand tools that can be sterilized, such as bone saw, bone drilling and grinding machine	Sterilization with steam
Dermatological and dental tools	Temperature +134°C ± 4°C
Infusion pumps	Compression pressure up to 2.3 bar
ECG	Rel. humidity 100 %
Therapy aid, analysis and dialysis equipment	Cycle length 20 minutes

maxon modular system Overview on page 16 - 21

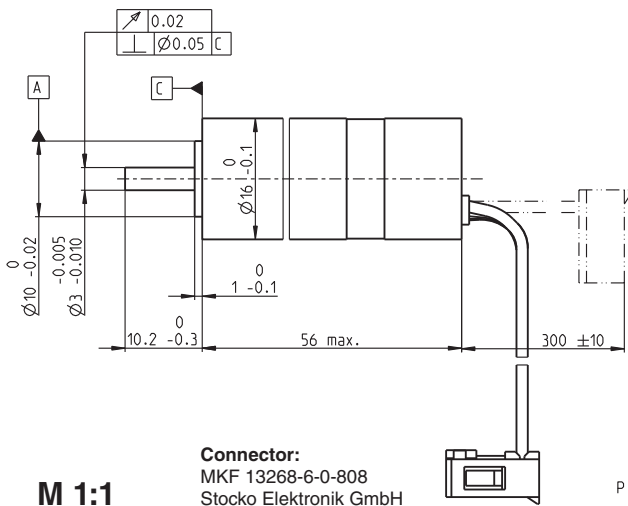
Planetary Gearhead
sterilizable
Ø16 mm
0.1 - 0.3 Nm
Page 216

Recommended Electronics:
DECS 50/5 Page 289
DEC 24/3 290
DEC Module 24/2 290
DEC 50/5, Module 50/5 291
DECV 50/5 297
Notes 20

EC 16 Ø16 mm, brushless, 60 Watt

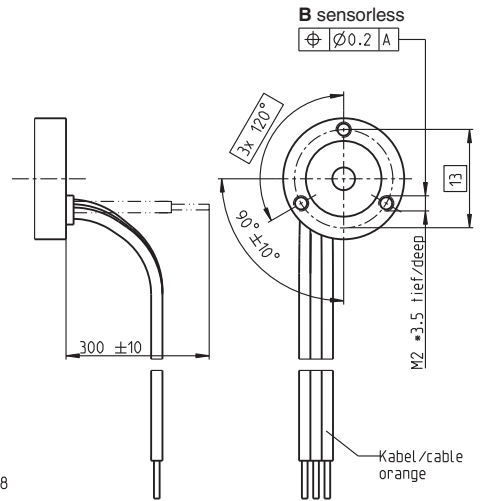
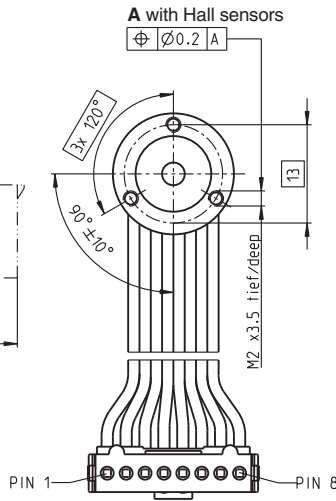
NEW

maxon EC motor



M 1:1

Connector:
MKF 13268-6-0-808
Stocko Elektronik GmbH



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

Order Number

A with Hall sensors	394216	396916	395588	396928	405794
B sensorless	397162	397294	397292	397295	405795

Motor Data (provisional)

Values at nominal voltage		12	18	24	32	48
1 Nominal voltage	V	12	18	24	32	48
2 No load speed	rpm	35000	40900	40900	40900	39200
3 No load current	mA	247	211	159	119	74.2
4 Nominal speed	rpm	31100	37100	37200	37300	35600
5 Nominal torque (max. continuous torque)	mNm	16.7	17.1	17.8	18.2	18.5
6 Nominal current (max. continuous current)	A	5.29	4.23	3.3	2.52	1.64
7 Stall torque	mNm	167	218	235	244	238
8 Starting current	A	51.4	52	42.2	32.8	20.5
9 Max. efficiency	%	87	88	88	89	89
Characteristics						
10 Terminal resistance phase to phase	Ω	0.233	0.346	0.569	0.976	2.34
11 Terminal inductance phase to phase	mH	0.0199	0.033	0.0586	0.104	0.254
12 Torque constant	mNm / A	3.26	4.19	5.58	7.44	11.6
13 Speed constant	rpm / V	2930	2280	1710	1280	821
14 Speed / torque gradient	rpm / mNm	210	189	174	168	165
15 Mechanical time constant	ms	2.36	2.11	1.95	1.89	1.85
16 Rotor inertia	gcm ²	1.07	1.07	1.07	1.07	1.07

Specifications

- Thermal data**
- 17 Thermal resistance housing-ambient 10.3 K / W
 - 18 Thermal resistance winding-housing 1.2 K / W
 - 19 Thermal time constant winding 2.53 s
 - 20 Thermal time constant motor 299 s
 - 21 Ambient temperature -20 ... +100°C
 - 22 Max. permissible winding temperature 155°C
- Mechanical data (preloaded ball bearings)**
- 23 Max. permissible speed 70000 rpm
 - 24 Axial play at axial load < 3.5 N 0 mm
 - > 3.5 N max. 0.14 mm
 - 25 Radial play preloaded
 - 26 Max. axial load (dynamic) 3 N
 - 27 Max. force for press fits (static) 35 N
 - (static, shaft supported) 250 N
 - 28 Max. radial loading, 5 mm from flange 10 N
- Other specifications**
- 29 Number of pole pairs 1
 - 30 Number of phases 3
 - 31 Weight of motor 58 g

Values listed in the table are nominal.

Connection A

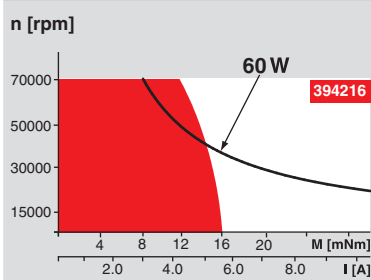
- brown Motor winding 1 Pin 1
- red Motor winding 2 Pin 2
- orange Motor winding 3 Pin 3
- yellow VHall 3 ... 24 VDC Pin 4
- green GND Pin 5
- blue Hall sensor 1 Pin 6
- violet Hall sensor 2 Pin 7
- gray Hall sensor 3 Pin 8

Wiring diagram for Hall sensors see p. 27

Connection B (Cable AWG 24)

- brown Motor winding 1
- red Motor winding 2
- orange Motor winding 3

Operating Range



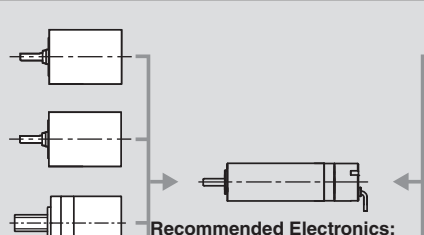
Comments

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

maxon Modular System

Overview on page 16 - 21

- Planetary Gearhead**
Ø22 mm
0.5 - 1.0 Nm
Page 221
- Planetary Gearhead**
Ø22 mm
0.5 - 2.0 Nm
Page 223
- Spindle Drive**
Ø22 mm
Page 247/248



Recommended Electronics:

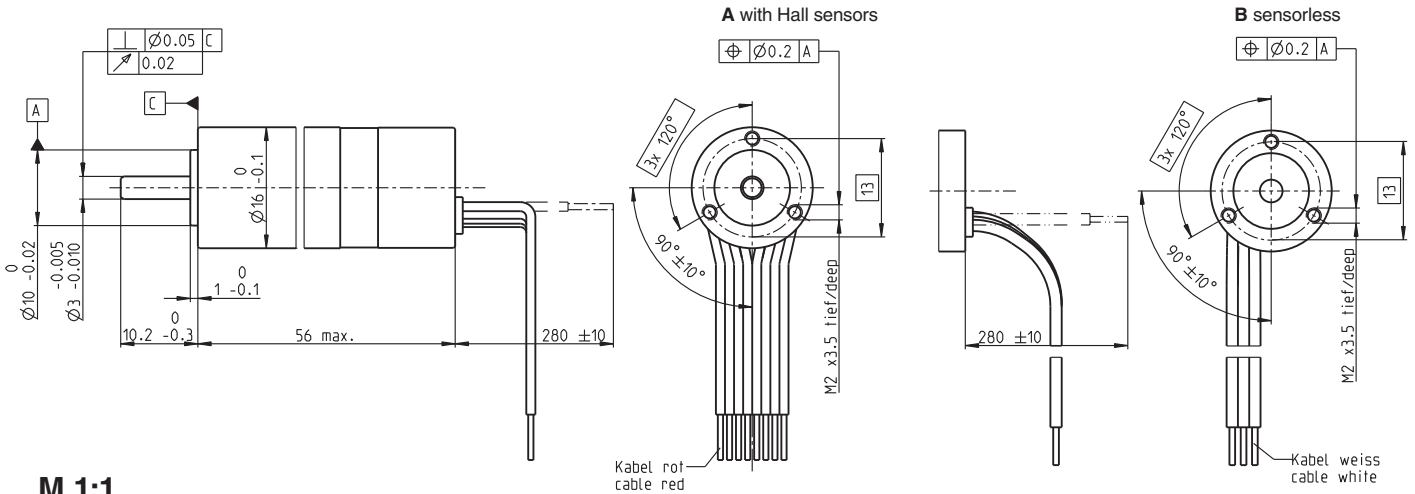
- DECS 50/5 Page 289
- DEC 24/3 290
- DEC 50/5 291
- DEC Module 50/5 291
- DECV 50/5 297
- DES 50/5 298
- EPOS2 Module 36/2 304
- EPOS2 24/2 304
- EPOS2 24/5, EPOS2 50/5 305
- Notes 20

for type A:
Encoder MR
128 / 256 / 512 Imp.,
Page 261

EC 16 Ø16 mm, brushless, 60 Watt, sterilizable

NEW

maxon EC motor



M 1:1

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

Order Number

A with Hall sensors	399264	399263
B sensorless	399696	399678

Motor Data (provisional)

Values at nominal voltage			
1 Nominal voltage	V	12	24
2 No load speed	rpm	45500	52600
3 No load current	mA	379	241
4 Nominal speed	rpm	41300	48800
5 Nominal torque (max. continuous torque)	mNm	13.2	13.7
6 Nominal current (max. continuous current)	A	5.58	3.36
7 Stall torque	mNm	154	212
8 Starting current	A	61.8	48.9
9 Max. efficiency	%	85	87
Characteristics			
10 Terminal resistance phase to phase	Ω	0.194	0.491
11 Terminal inductance phase to phase	mH	0.00968	0.0291
12 Torque constant	mNm / A	2.5	4.33
13 Speed constant	rpm / V	3820	2210
14 Speed / torque gradient	rpm / mNm	297	250
15 Mechanical time constant	ms	3.33	2.8
16 Rotor inertia	gcm ²	1.07	1.07

Specifications

Thermal data		
17 Thermal resistance housing-ambient	10.3 K / W	
18 Thermal resistance winding-housing	1.2 K / W	
19 Thermal time constant winding	2.18 s	
20 Thermal time constant motor	299 s	
21 Ambient temperature	-40 ... +135°C	
22 Max. permissible winding temperature	155°C	
Mechanical data (preloaded ball bearings)		
23 Max. permissible speed	70000 rpm	
24 Axial play at axial load < 3.5 N	0 mm	
> 3.5 N	max. 0.14 mm	
25 Radial play	preloaded	
26 Max. axial load (dynamic)	3 N	
27 Max. force for press fits (static) (static, shaft supported)	40 N	
28 Max. radial loading, 5 mm from flange	250 N	
	10 N	

Other specifications

29 Number of pole pairs	1
30 Number of phases	3
31 Weight of motor	58 g

Values listed in the table are nominal.

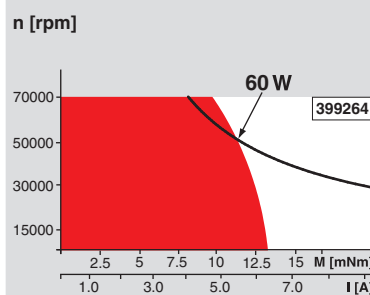
Connection A and B, motor (Cable AWG 22)

- red Motor winding 1
- black Motor winding 2
- white Motor winding 3

Connection A, sensors (Cable AWG 26)

- green VHall 3 ... 24 VDC
 - blue GND
 - red / grey Hall sensor 1
 - black / grey Hall sensor 2
 - white / grey Hall sensor 3
- Wiring diagram for Hall sensors see p. 27

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

Application

Medicine / surgery / chemicals

- Hand tools that can be sterilized, such as bone saw, bone drilling and grinding machine
- Dermatological and dental tools
- Infusion pumps
- ECG
- Therapy aid, analysis and dialysis equipment

Sterilization information

In normal use, the motor can be sterilized 100 times in an autoclave. No need to dismantle.

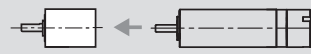
Sterilization with steam	
Temperature	+134°C ± 4°C
Compression pressure up to	2.3 bar
Rel. humidity	100 %
Cycle length	20 minutes

maxon modular system

Overview on page 16 - 21

Planetary Gearhead

sterilizable
Ø16 mm
0.1 - 0.3 Nm
Page 216



Recommended Electronics:

DECS 50/5	Page 289
DEC 24/3	290
DEC 50/5	291
DEC Module 50/5	291
DECV 50/5	297
Notes	20