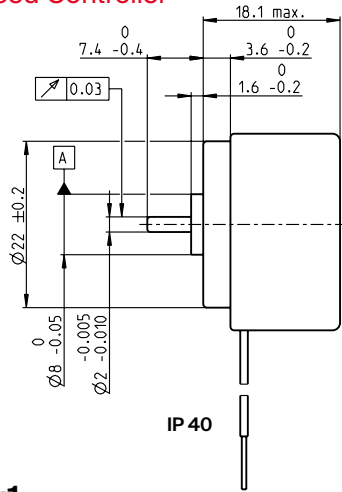
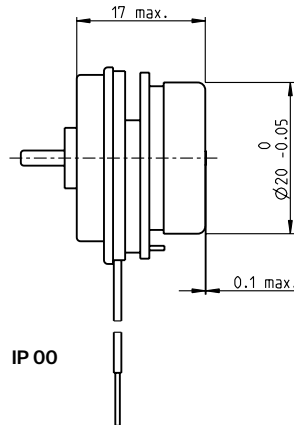


# EC 20 flat brushless, 2 Watt, with integrated electronics

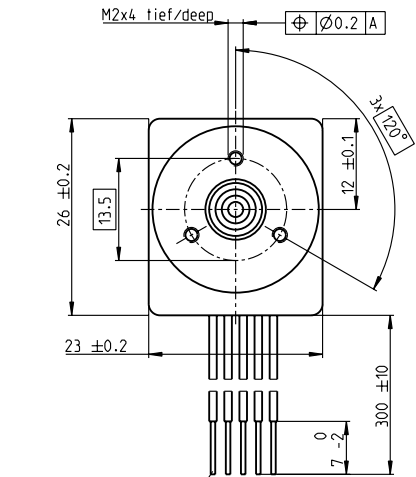
## 1-Q-Speed Controller



IP 40



IP 00



Kabel rot / cable red

M 1:1

EC flat

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

IP 40 (with cover)  
IP 00 (without cover)

### Part Numbers

5 wire version	
Enable	Direction
688690	688691
688710	688711

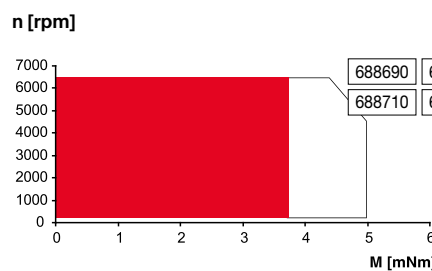
### Motor Data

Values at nominal voltage			
1 Nominal voltage	V	24	24
2 No load speed	rpm	6000	6000
3 No load current	mA	14.7	14.7
4 Nominal speed	rpm	6000	6000
5 Nominal torque (max. continuous torque)	mNm	3.55	3.55
6 Nominal current (max. continuous current)	A	0.208	0.208
33 Max. torque	mNm	6.13	6.13
34 Max. current	A	0.73	0.73
9 Max. efficiency	%	52	52
Characteristics			
35 Type of control		Speed	Speed
36 Supply voltage +V <sub>CC</sub>	V	10...28	10...28
37 Speed set value input	V	0.33...10.8	0.33...10.8
38 Scale speed set value input	rpm/V	600	600
39 Speed range	rpm	200...6480	200...6480
40 Max. acceleration	rpm/s	6000	6000

### Specifications

Thermal data	
17 Thermal resistance housing-ambient	17.2 K/W
18 Thermal resistance winding-housing	7.98 K/W
19 Thermal time constant winding	2.37 s
20 Thermal time constant motor	132 s
21 Ambient temperature	-40...+85°C
22 Max. winding temperature	+125°C
41 Max. temperature of electronics	+105°C
Mechanical data (preloaded ball bearings)	
16 Rotor inertia	3.84 gcm <sup>2</sup>
24 Axial play at axial load < 2.0 N	0 mm
> 2.0 N	0.14 mm
25 Radial play	preloaded
26 Max. axial load (dynamic)	1.8 N
27 Max. force for press fits (static) (static, shaft supported)	26 N
28 Max. radial load, 5 mm from flange	11 N

### Operating Range



### Comments

- Continuous operation**  
The drive can be operated with a speed controller and, taking account of the given thermal resistance (fig. 17 and 18) at an ambient temperature of 25°C, does not exceed the maximum permissible operating temperatures.
- Overload range**  
The drive reaches these operating points. Speed may vary from the set value. The overload protection shuts down the drive in the event of sustained overload.

### Other specifications

31 Weight of motor	30 g
32 Direction of rotation	Clockwise (CW)

Values listed in the table are nominal.

### Protective functions

Overload protection, blockage protection, inverse-polarity protection, thermal overload protection, low/high voltage cut-off

### Connection 5 wire version (Cable AWG 28)

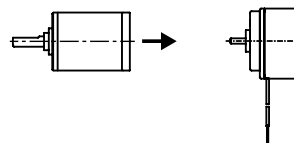
red	+V <sub>CC</sub> 10...28 VDC
black	GND
white	Speed set value input
green	Monitor n (6 pulses per revolution)
grey	Disable (Type Enable) or sense of direction (Type Direction)

### maxon Modular System

Details on catalog page 38

### Planetary Gearhead

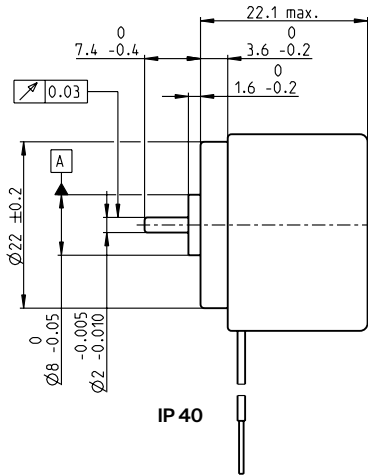
Ø22 mm  
0.5 - 2.0 Nm  
Page 374/377



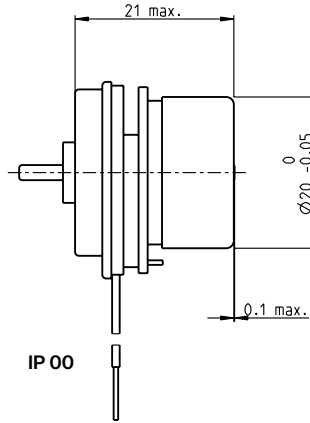
# EC 20 flat brushless, 5 Watt, with integrated electronics

1-Q-Speed Controller

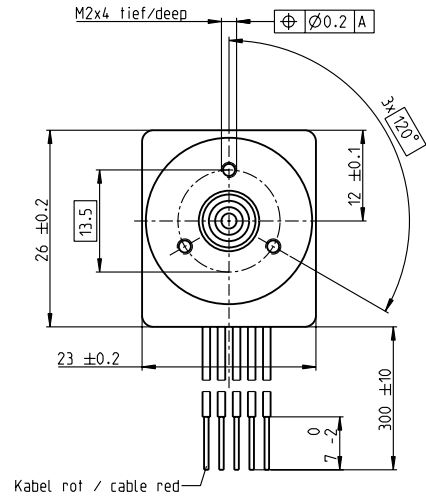
EC flat



IP 40



IP 00



M 1:1

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

## Part Numbers

5 wire version	
Enable	Direction
IP 40 (with cover) 688692	688693
IP 00 (without cover) 688712	688713

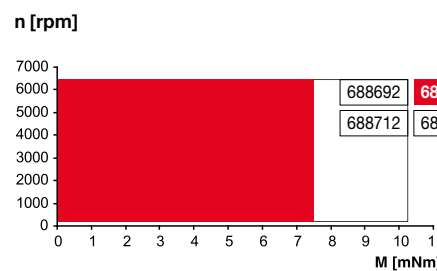
## Motor Data

Values at nominal voltage			
1 Nominal voltage	V	24	24
2 No load speed	rpm	6000	6000
3 No load current	mA	32.9	32.9
4 Nominal speed	rpm	6000	6000
5 Nominal torque (max. continuous torque)	mNm	7.31	7.31
6 Nominal current (max. continuous current)	A	0.377	0.377
33 Max. torque	mNm	13.2	13.2
34 Max. current	A	0.73	0.73
9 Max. efficiency	%	54	54
Characteristics			
35 Type of control		Speed	Speed
36 Supply voltage +V <sub>CC</sub>	V	10...28	10...28
37 Speed set value input	V	0.33...10.8	0.33...10.8
38 Scale speed set value input	rpm/V	600	600
39 Speed range	rpm	200...6480	200...6480
40 Max. acceleration	rpm/s	6000	6000

## Specifications

Thermal data	
17 Thermal resistance housing-ambient	10.6 K/W
18 Thermal resistance winding-housing	5.32 K/W
19 Thermal time constant winding	3.66 s
20 Thermal time constant motor	13.9 s
21 Ambient temperature	-40...+85°C
22 Max. winding temperature	+125°C
41 Max. temperature of electronics	+105°C
Mechanical data (preloaded ball bearings)	
16 Rotor inertia	5.1 gcm <sup>2</sup>
24 Axial play at axial load < 2.0 N	0 mm
	> 2.0 N
	0.14 mm
25 Radial play	preloaded
26 Max. axial load (dynamic)	1.8 N
27 Max. force for press fits (static)	26 N
(static, shaft supported)	200 N
28 Max. radial load, 5 mm from flange	12 N

## Operating Range



## Comments

- Continuous operation**  
The drive can be operated with a speed controller and, taking account of the given thermal resistance (fig. 17 and 18) at an ambient temperature of 25°C, does not exceed the maximum permissible operating temperatures.
- Overload range**  
The drive reaches these operating points. Speed may vary from the set value. The overload protection shuts down the drive in the event of sustained overload.

## Other specifications

31 Weight of motor	37 g
32 Direction of rotation	Clockwise (CW)

Values listed in the table are nominal.

## Protective functions

Overload protection, blockage protection, inverse-polarity protection, thermal overload protection, low/high voltage cut-off

## Connection 5 wire version (Cable AWG 28)

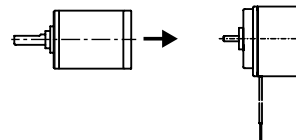
red	+V <sub>CC</sub> 10...28 VDC
black	GND
white	Speed set value input
green	Monitor n (6 pulses per revolution)
grey	Disable (Type Enable) or sense of direction (Type Direction)

## maxon Modular System

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## Planetary Gearhead

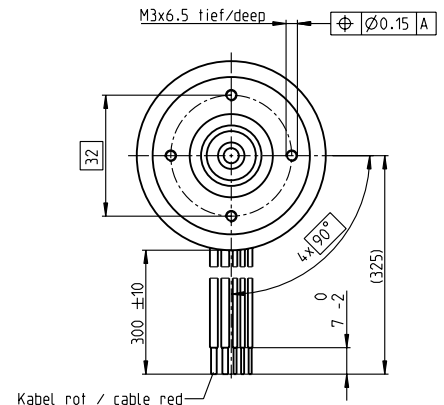
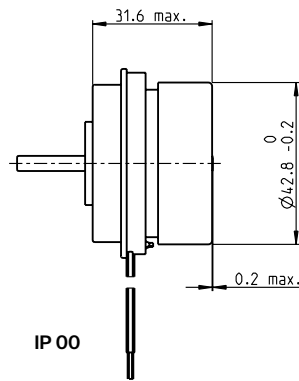
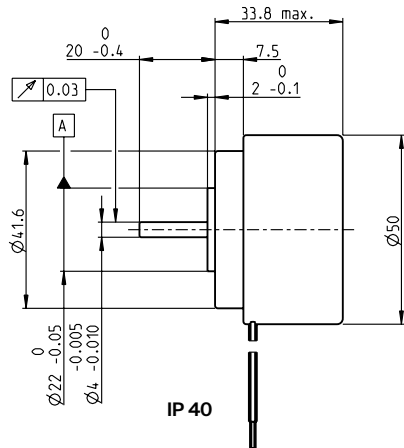
Ø22 mm  
0.5 - 2.0 Nm  
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# EC 45 flat brushless, 30 Watt, with integrated electronics

## 1-Q-Speed Controller

EC flat



M 1:2

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

### Part Numbers

5 wire version			
Enable		Direction	
IP 40 (with cover)	688721	688722	688726
IP 00 (without cover)	688725	688726	688726

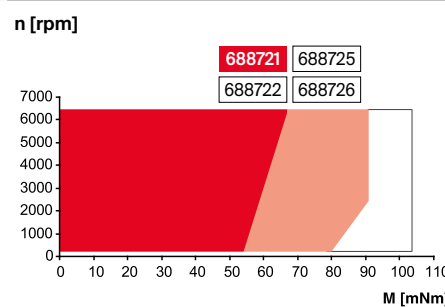
### Motor Data (provisional)

Values at nominal voltage					
1 Nominal voltage	V	24	24	24	24
2 No load speed	rpm	6000	6000	6000	6000
3 No load current	mA	210	210	210	210
4 Nominal speed	rpm	6000	6000	6000	6000
5 Nominal torque (max. continuous torque)	mNm	59.4	89.6	59.4	89.6
6 Nominal current (max. continuous current)	A	2.06	3.1	2.06	3.1
33 Max. torque	mNm	104	104	104	104
34 Max. current	A	3.62	3.62	3.62	3.62
9 Max. efficiency	%	76	76	76	76
Characteristics					
35 Type of control		Speed	Speed	Speed	Speed
36 Supply voltage +V <sub>cc</sub>	V	10...28	10...28	10...28	10...28
37 Speed set value input	V	0.33...10.8	0.33...10.8	0.33...10.8	0.33...10.8
38 Scale speed set value input	rpm/V	600	600	600	600
39 Speed range	rpm	200...6480	200...6480	200...6480	200...6480
40 Max. acceleration	rpm/s	6000	6000	6000	6000

### Specifications

Thermal data	
17 Thermal resistance housing-ambient	5.6 (3.12) K/W
18 Thermal resistance winding-housing	7.7 (4.5) K/W
19 Thermal time constant winding	37.6 (22) s
20 Thermal time constant motor	633 (353) s
21 Ambient temperature	-40...+85°C
22 Max. winding temperature	+125°C
41 Max. temperature of electronics	+105°C
Mechanical data (preloaded ball bearings)	
16 Rotor inertia	135 gcm <sup>2</sup>
24 Axial play at axial load	< 7.0 N: 0 mm > 7.0 N: 0.14 mm
25 Radial play	preloaded
26 Max. axial load (dynamic)	6.8 N
27 Max. force for press fits (static)	95 N
(static, shaft supported)	1000 N
28 Max. radial load, 5 mm from flange	55 N

### Operating Range



### Comments

- Continuous operation**  
The drive can be operated with a speed controller and, taking account of the given thermal resistance (fig. 17 and 18) at an ambient temperature of 25°C, does not exceed the maximum permissible operating temperatures.
- Overload range**  
The drive reaches these operating points. Speed may vary from the set value. The overload protection shuts down the drive in the event of sustained overload.

### Other specifications

31 Weight of motor	226 g
32 Direction of rotation	Clockwise (CW)

Values listed in the table are nominal.

### Protective functions

Overload protection, blockage protection, inverse-polarity protection, thermal overload protection, low/high voltage cut-off

### Connection 5 wire version (Cable AWG 18/24)

red	+V <sub>cc</sub> 10...28 VDC
black	GND
white	Speed set value input
green	Monitor n (6 pulses per revolution)
grey	Disable (Type Enable) or sense of direction (Type Direction)

### maxon Modular System

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#### Planetary Gearhead

Ø42 mm  
3 - 15 Nm  
Page 398

#### Spur Gearhead

Ø45 mm  
0.5 - 2.0 Nm  
Page 400

