NEW

## Brushed DC motors

# maxon DCX

**Powerful**
Up to 120 W continuous output power, robust and very quiet.

**Highly dynamic**
Patented ironless winding and the latest magnetic material.

**Efficient**
Efficiency of more than 90 %.

# maxon DC-max

**Cost-effective**
Unrivaled price-performance ratio.

**Dynamic**
Patented ironless winding and the latest magnetic material.

**Efficient**
Efficiency of almost 90 %.

## Brushless DC motors

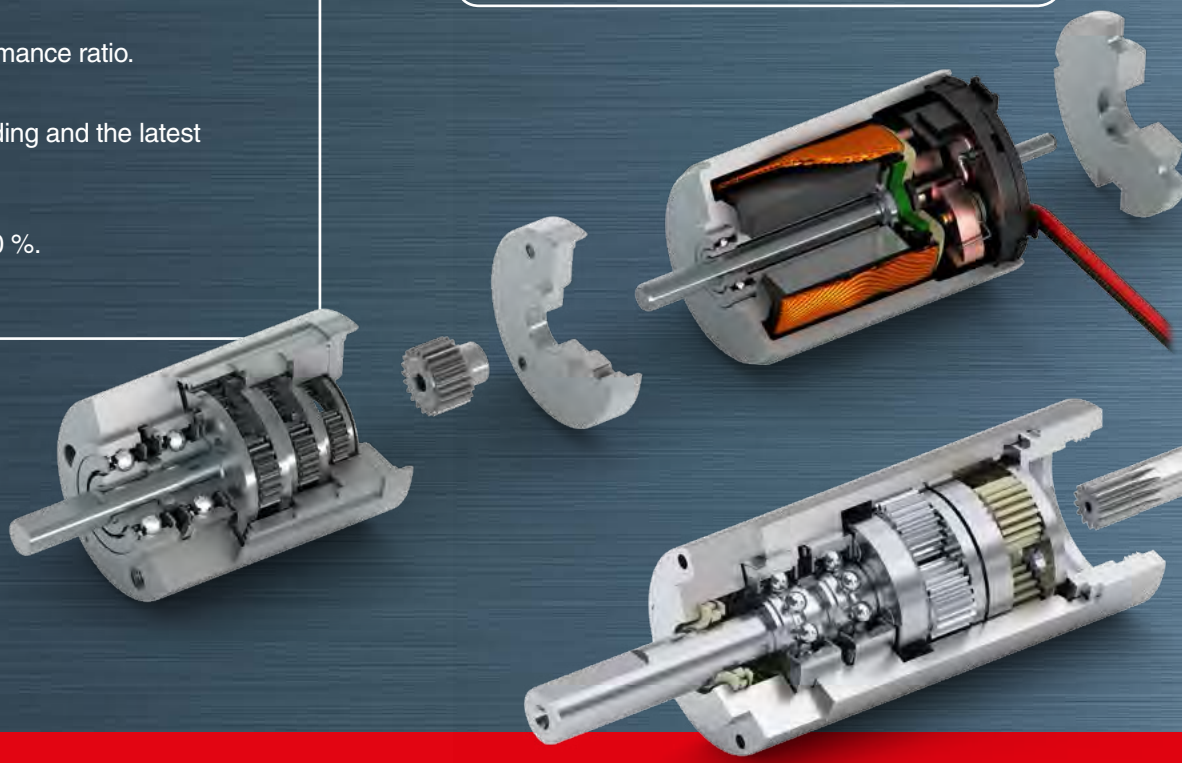
# maxon ECX

**High speed**
Up to 120 000 rpm, smooth-running, almost no heat development.

**Efficient**
Efficiency of more than 90 %.

**Large selection**
Various power stage options and diameters, electrical and mechanical interfaces.

**Sterilizable**
Sterilizable for up to 2000 cycles.



maxon X drives

# The best maxon drives at a glance.

**Configure your drive online – in accordance with your individual needs. Mechanical and electrical data, dimensional drawings and CAD files can be downloaded immediately after the configuration has been completed. Within 11 working days, your drive will be ready for shipment.**

## Planetary gearhead
## maxon GPX

**Modular**
High number of variants for different applications.

**High power density**
Transmission of high torques and speeds.

**High efficiency**
Up to 90 %.

**Sterilizable**
Sterilizable for up to 2000 cycles.

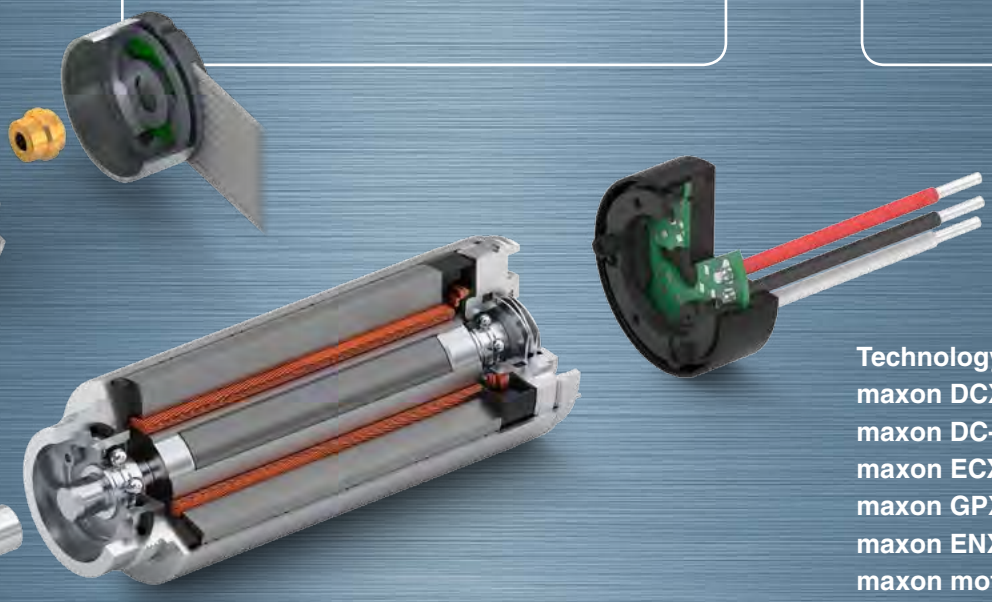
## Encoder
## maxon ENX

**Compact**
Metal housing with a length of only 8.5 mm.

**Robust**
Mechanically robust housing and interference-free operation.

**Differential signals**
3-channel encoder with differential output signals.

**Flexible**
Counts per turn can be custom programmed at the factory – 1 to 1024 cpt.





**xdrives.maxonmotor.com**

maxon motor

driven by precision

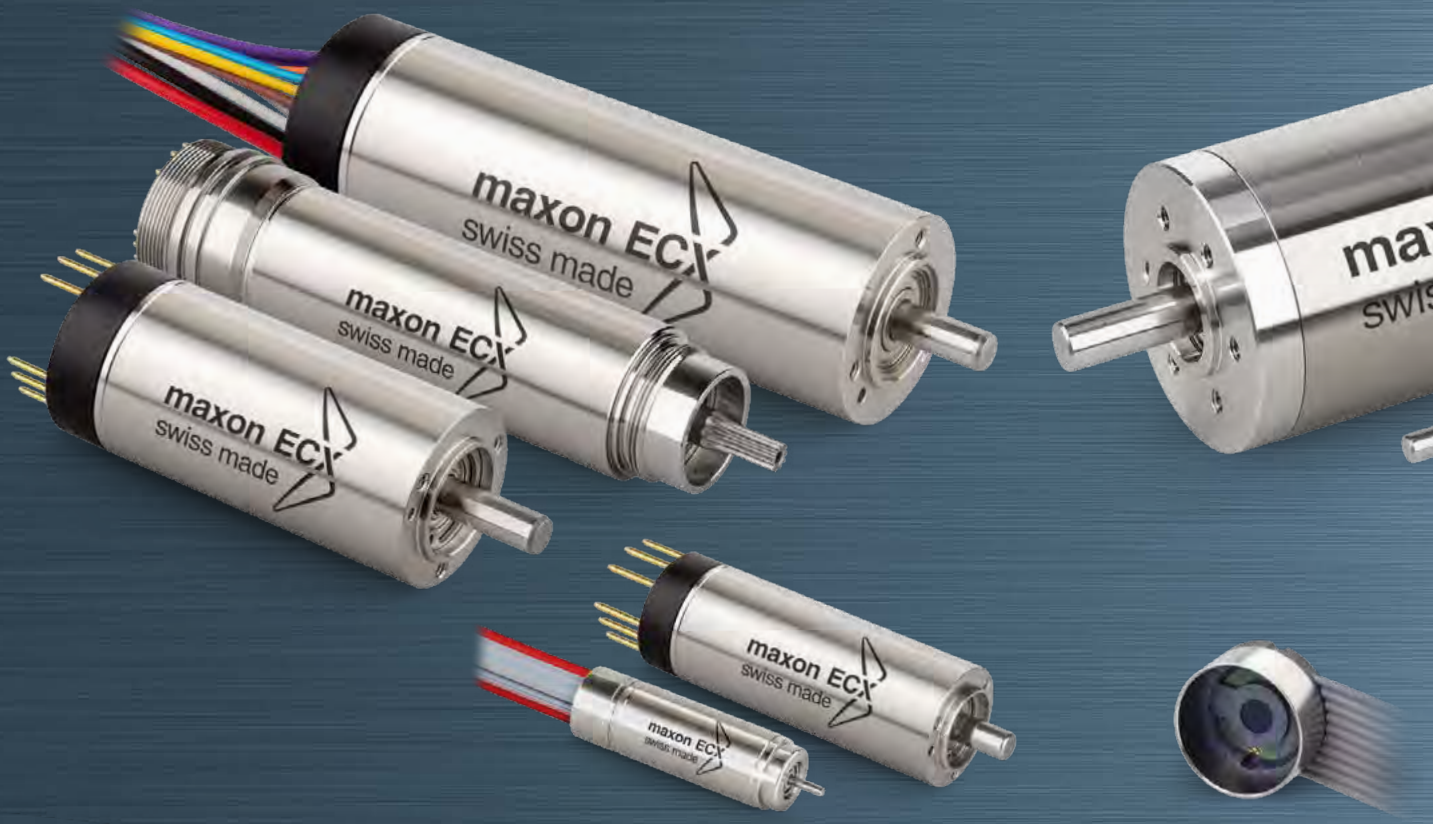
## maxon X drives

# Produced within 11 days.

**Lean, automated processes ensure that all drive versions are ready for shipment within 11 days.**

Assemble your individual brushed or brushless DC drive: You can configure the gear stages, the motor bearings, the shafts, the encoder and much more. Design your custom drive online today and your finished drive will ship from Switzerland in 11 working days.

**xdrives.maxonmotor.com**



# 11 READY IN DAYS


maxon motor

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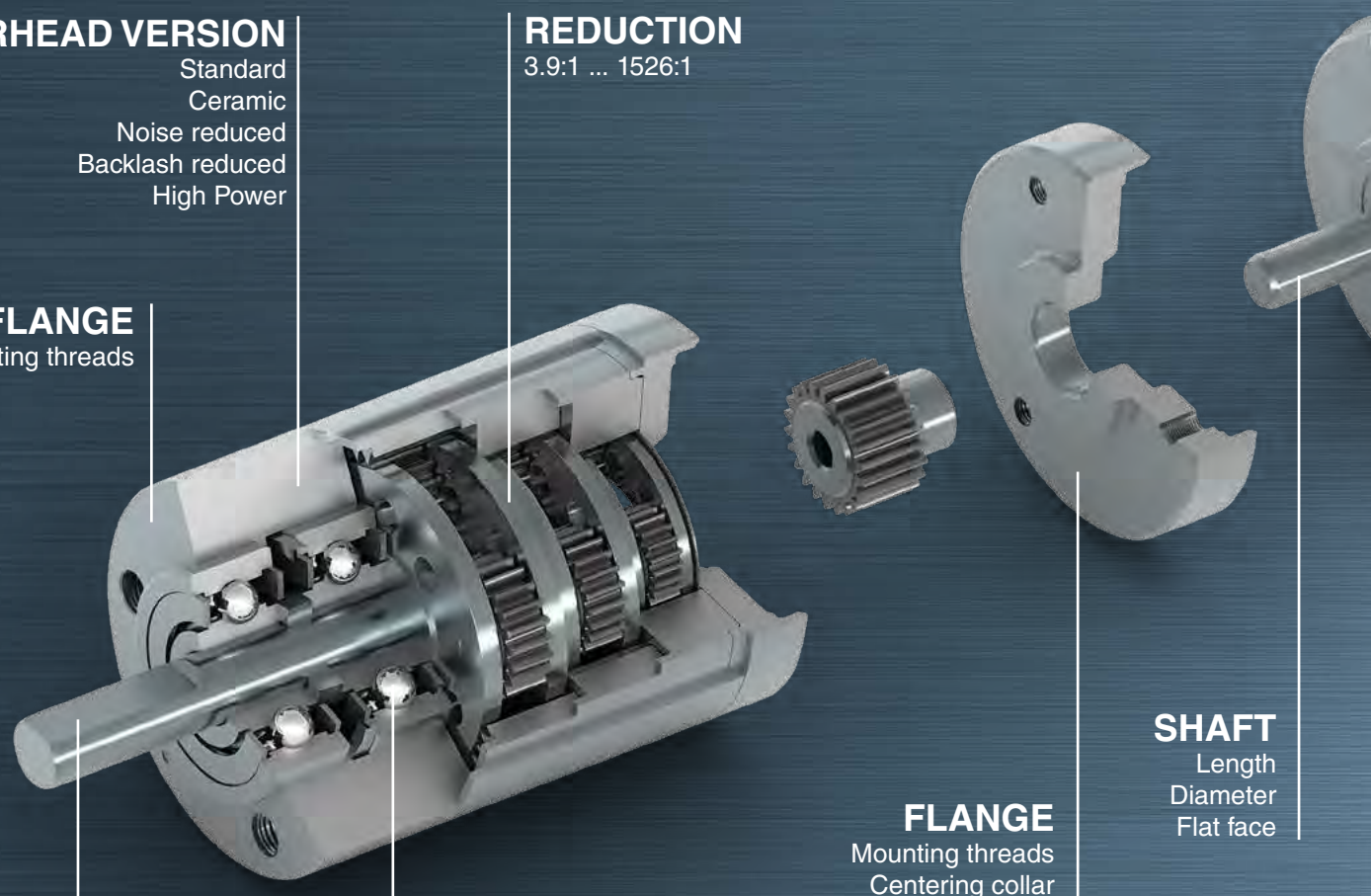
maxon DCX

# Configure your DC drive.

**GEARHEAD VERSION**
Standard
Ceramic
Noise reduced
Backlash reduced
High Power

**REDUCTION**
3.9:1 ... 1526:1

**FLANGE**
Mounting threads



**SHAFT**
Length
Flat face
Cross hole
Feather key

**BEARING MODULE**
Standard

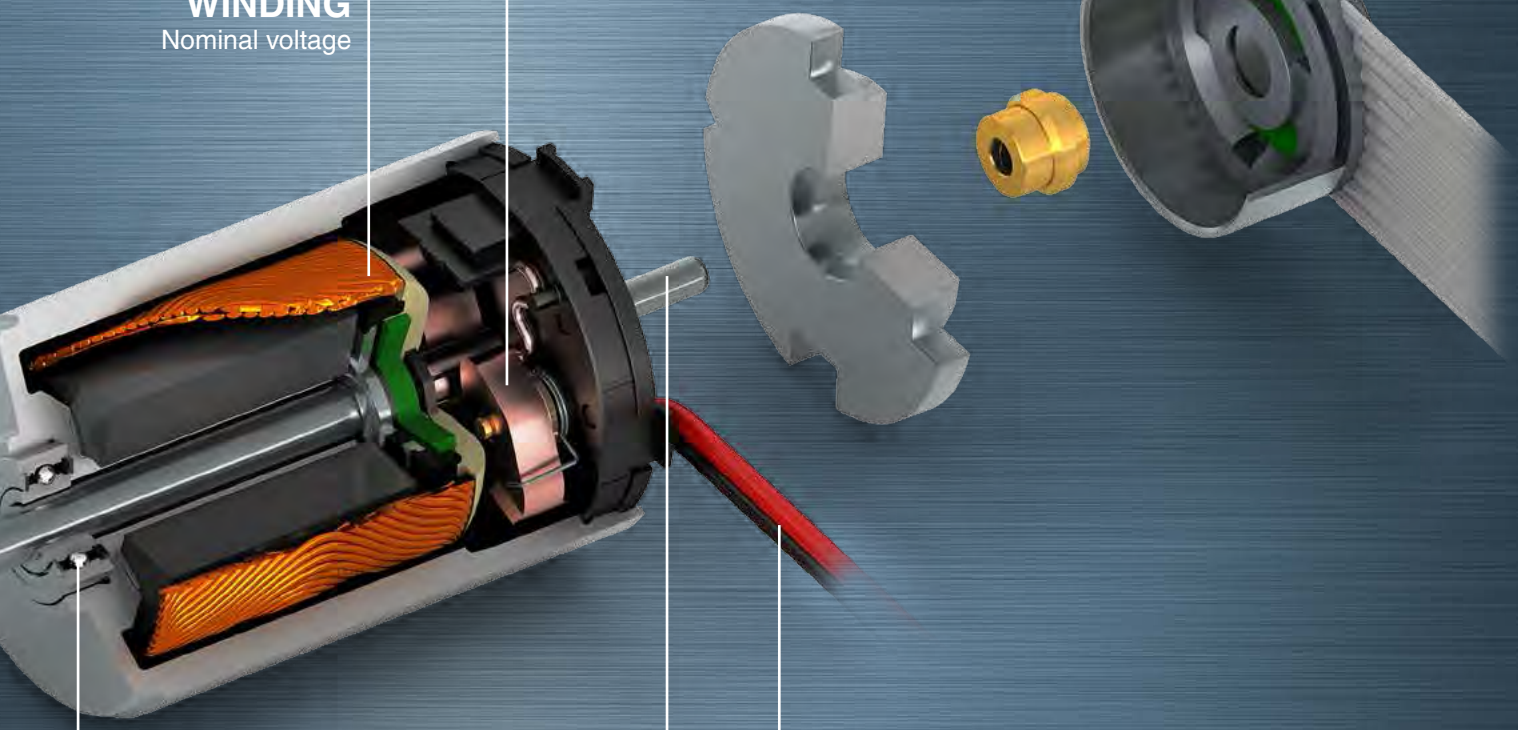
**FLANGE**
Mounting threads
Centering collar

**SHAFT**
Length
Diameter
Flat face

**ENCODER**
Counts per turn
Cable outlet angle with strain relief
Cable length

**COMMUTATION**
Graphite brushes
Precious metal brushes

**WINDING**
Nominal voltage



**CONNECTIONS**
Terminals
Cable
Connector

**SHAFT**
Length

**BEARING**
Ball bearing
Sleeve bearing

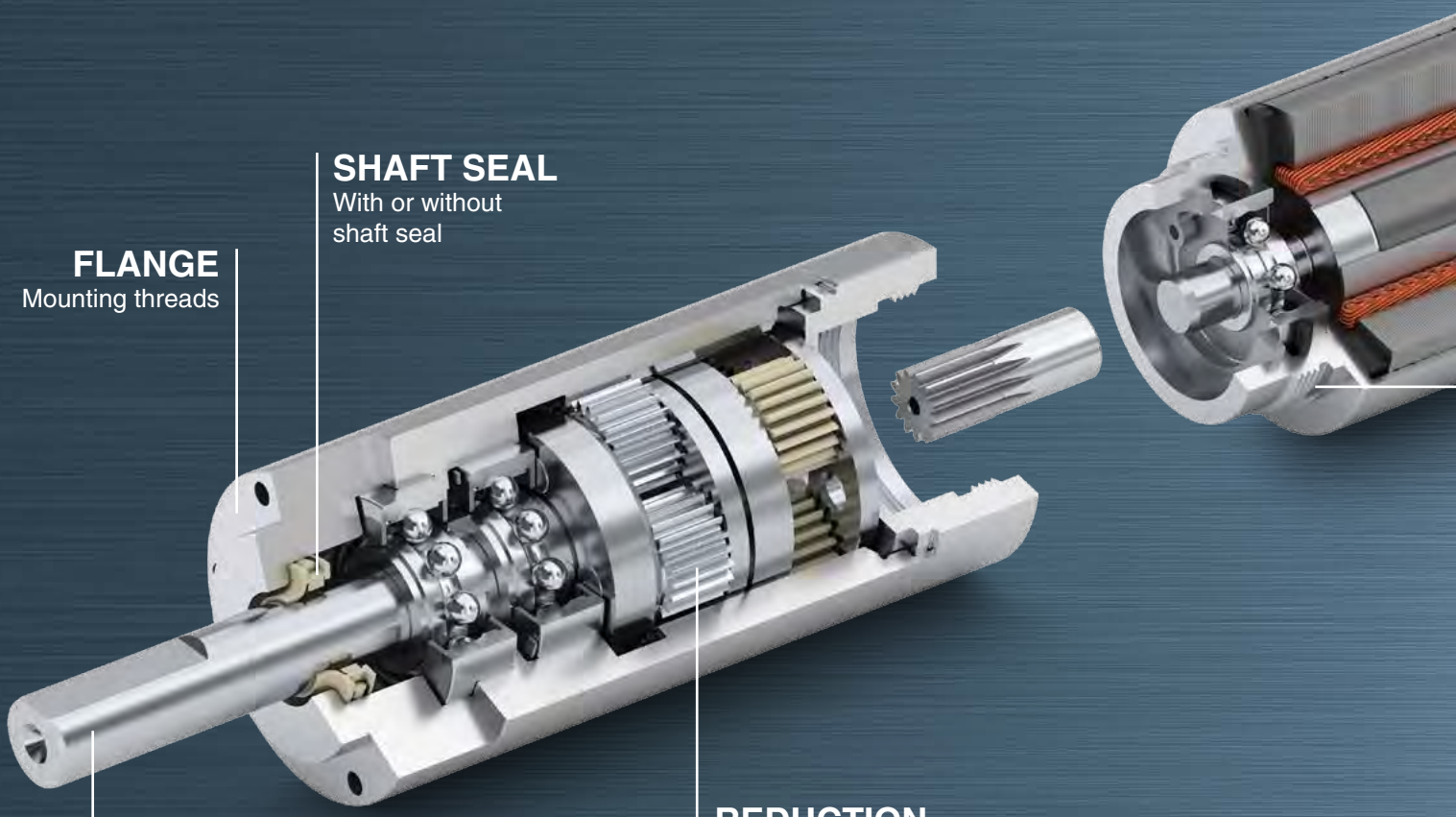
**dcx.maxonmotor.com**

**maxon motor**

**driven by precision**

maxon ECX

# Configure your BLDC drive.



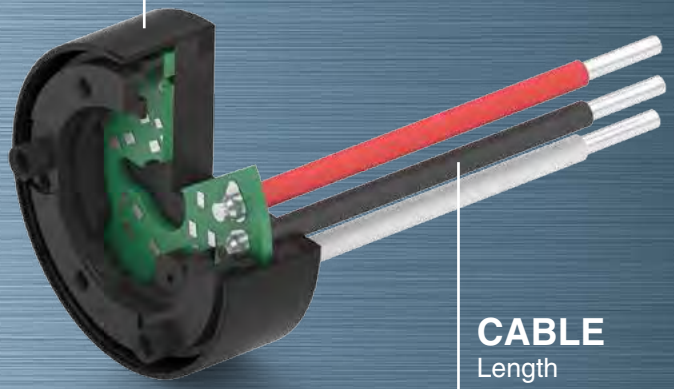
**SHAFT SEAL**
With or without
shaft seal

**FLANGE**
Mounting threads

**REDUCTION**
3.9:1 ... 44:1
Ø8 mm: 4:1 ... 1296:1

**SHAFT**
Length
Flat face
Cross hole

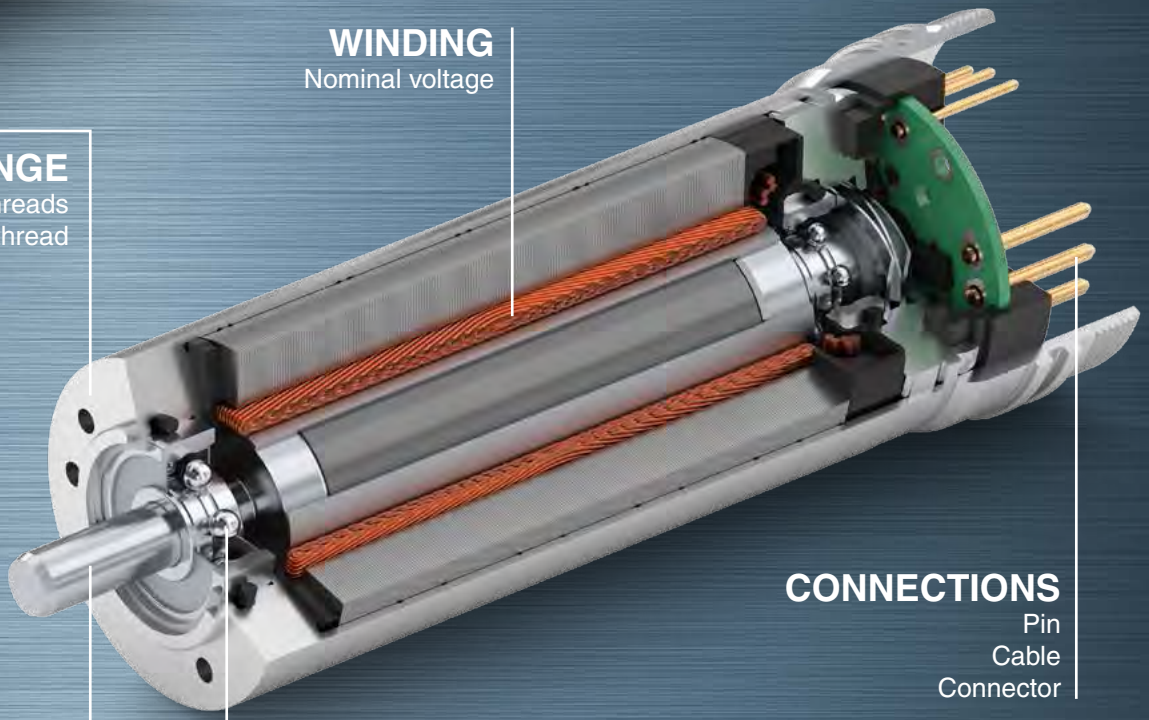
**SENSORS**
Sensorless or with Hall Sensors
Thermal sensor NTC
Encoder Incremental
Encoder Absolute



**CABLE**
Length
Ø8 mm: Insulation

**WINDING**
Nominal voltage

**FLANGE**
Mounting threads
External thread



**CONNECTIONS**
Pin
Cable
Connector

**SHAFT**
Lenght
Diameter

**BEARINGG**
Ball bearing steel
Ball bearing ceramic

**ecx.maxonmotor.com**

**maxon motor**

**driven by precision**

# Fast Processing – Worldwide Network.

**Configure and order your drive online:**
**xdrives.maxonmotor.com**


## Headquarters

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6072 Sachseln
Switzerland

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contact.maxonmotor.com

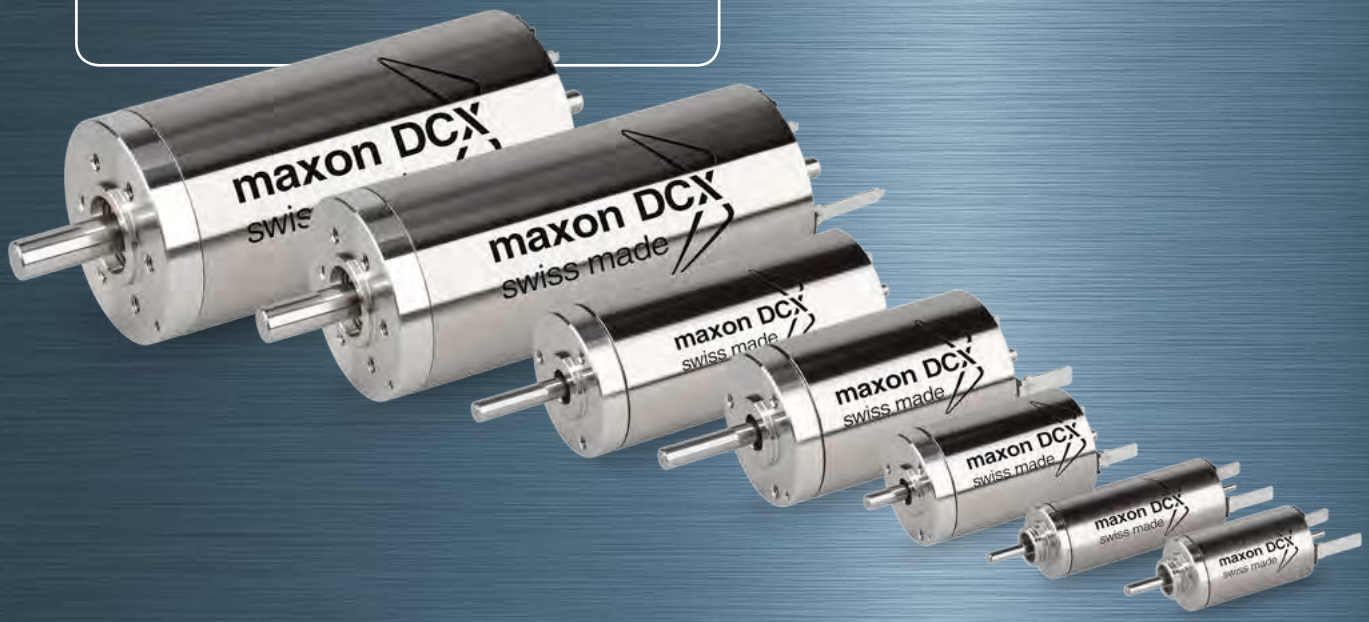
# maxon DCX

## Brushed DC motors
## maxon DCX

maxon DCX motors make an impression with their unsurpassed power density (torque/motor volume ratio) and their absolute quiet running. The robust construction together with the worldwide patented ironless rotor make the DCX motors a highly dynamic drive in almost any situation.

maxon DCX motors can be configured online and are ready for delivery within 11 working days.

**dcx.maxonmotor.com**

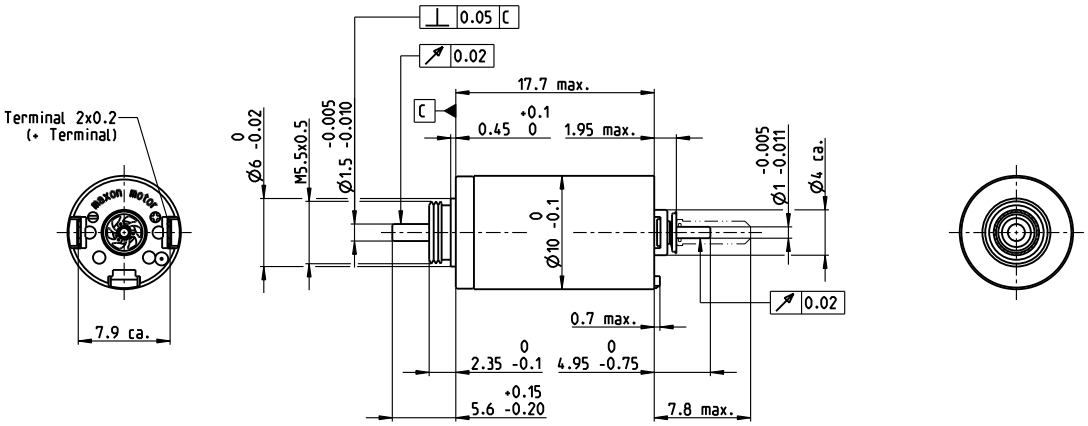



maxon motor

driven by precision

# DCX 10 S Precious Metal Brushes
## DC motor Ø10 mm


**1/1.4 W 0.9 mNm 14300 rpm**

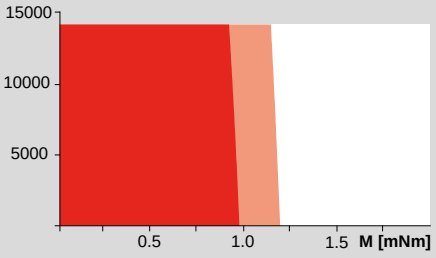



**M 3:2**

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | **Motor Data** | | | | | | | |
| 1_ | Nominal voltage | V | 1.5 | 3 | 4.5 | 6 | 9 | 12 |
| 2_ | No load speed | rpm | 12800 | 13100 | 12700 | 12700 | 12700 | 12700 |
| 3_ | No load current | mA | 84.9 | 44.2 | 28.3 | 21.2 | 14.1 | 10.6 |
| 4_ | Nominal speed | rpm | 4580 | 4750 | 4320 | 4150 | 3970 | 3930 |
| 5_ | Nominal torque (max. continuous torque) | mNm | 0.911 | 0.94 | 0.936 | 0.919 | 0.902 | 0.898 |
| 6_ | Nominal current (max. continuous current) | A | 0.924 | 0.49 | 0.316 | 0.233 | 0.152 | 0.114 |
| 7_ | Stall torque | mNm | 1.47 | 1.52 | 1.47 | 1.41 | 1.36 | 1.35 |
| 8_ | Stall current | A | 1.39 | 0.742 | 0.463 | 0.335 | 0.215 | 0.16 |
| 9_ | Max. efficiency | % | 58 | 58 | 58 | 57 | 56 | 56 |
| 10_ | Terminal resistance | Ω | 1.08 | 4.04 | 9.72 | 17.9 | 41.8 | 74.9 |
| 11_ | Terminal inductance | mH | 0.019 | 0.073 | 0.173 | 0.307 | 0.692 | 1.23 |
| 12_ | Torque constant | mNm/A | 1.05 | 2.05 | 3.16 | 4.22 | 6.33 | 8.44 |
| 13_ | Speed constant | rpm/V | 9050 | 4660 | 3020 | 2260 | 1510 | 1130 |
| 14_ | Speed/torque gradient | rpm/mNm | 9230 | 9170 | 9260 | 9610 | 9960 | 10000 |
| 15_ | Mechanical time constant | ms | 7.41 | 7.35 | 7.37 | 7.38 | 7.43 | 7.43 |
| 16_ | Rotor inertia | gcm² | 0.077 | 0.077 | 0.076 | 0.073 | 0.071 | 0.071 |
| | **Thermal data** | | | | | | | |
| 17_ | Thermal resistance housing-ambient | K/W | 37.6 | | | | | |
| 18_ | Thermal resistance winding-housing | K/W | 22.0 | | | | | |
| 19_ | Thermal time constant winding | s | 4.69 | | | | | |
| 20_ | Thermal time constant motor | s | 156 | | | | | |
| 21_ | Ambient temperature ball bearings | °C | -30…+85 | | | | | |
| | Ambient temperature sleeve bearings | °C | -30…+85 | | | | | |
| 22_ | Max. winding temperature | °C | 100 | | | | | |
| | **Mechanical data ball bearings** | | | | | | | |
| 23_ | Max. speed | rpm | 14300 | | | | | |
| 24_ | Axial play | mm | 0…0.1 | | | | | |
| | Preload | N | 0.5 | | | | | |
| 25_ | Radial play | mm | 0.015 | | | | | |
| 26_ | Max. axial load (dynamic) | N | 0.5 | | | | | |
| 27_ | Max. force for press fits (static) | N | 8.8 | | | | | |
| | (static, shaft supported) | N | 120 | | | | | |
| 28_ | Max. radial load [mm from flange] | N | 1.5 [5] | | | | | |
| | **Mechanical data sleeve bearings** | | | | | | | |
| 23_ | Max. speed | rpm | 14300 | | | | | |
| 24_ | Axial play | mm | 0…0.15 | | | | | |
| | Preload | N | 0 | | | | | |
| 25_ | Radial play | mm | 0.015 | | | | | |
| 26_ | Max. axial load (dynamic) | N | 0.1 | | | | | |
| 27_ | Max. force for press fits (static) | N | 30 | | | | | |
| | (static, shaft supported) | N | 120 | | | | | |
| 28_ | Max. radial load [mm from flange] | N | 0.8 [5] | | | | | |
| | **Other specifications** | | | | | | | |
| 29_ | Number of pole pairs | | 1 | | | | | |
| 30_ | Number of commutator segments | | 7 | | | | | |
| 31_ | Weight of motor | g | 6.3 | | | | | |
| 32_ | Typical noise level | dBA | 35 | | | | | |

**Operating Range**

**n [rpm] Winding 4.5 V**




- Continuous operation
- Continuous operation with reduced thermal resistance $R_{th2}$ 50%
- Intermittent operation

**maxon Modular System**

| maxon gear | Stages | maxon sensor | maxon motor control |
|---|---|---|---|
| 57_GPX 10 A | 1–5 | 82_ENX 10 EASY | 378_ESCON Module 24/2 |
| | | 82_ENX 10 QUAD | 378_ESCON 36/2 DC |
| | | | 386_EPOS2 24/2 (DC/EC) |
| | | | 386_EPOS2 Module 36/2 |

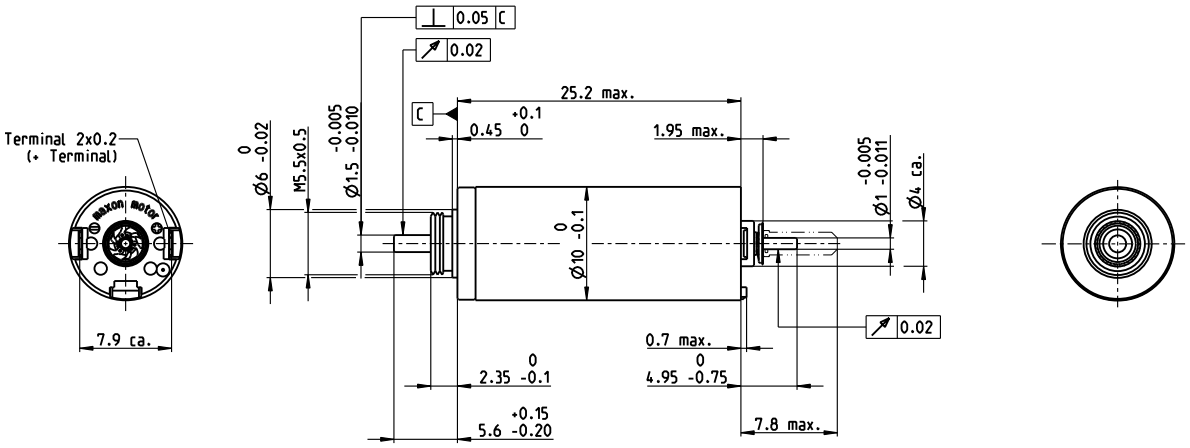
**Configuration**

Bearing: Sleeve bearings/ball bearings preloaded
Commutation: Precious metal brushes with or without CLL
Flange front/back: Standard flange/Flange with thread holes/no flange
Shaft front/back: Length
Electric connection: Terminals or cable/cable length/connector type

xdrives.maxonmotor.com

# DCX 10 L Precious Metal Brushes
## DC motor Ø10 mm


**1.5/3 W 2.2 mNm 14300 rpm**



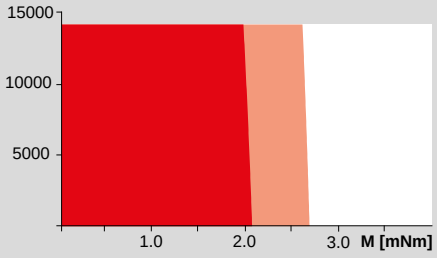

**M 3:2**

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | **Motor Data** | | | | | | | |
| 1_ | Nominal voltage | V | 1.5 | 3 | 4.5 | 6 | 9 | 12 |
| 2_ | No load speed | rpm | 11500 | 12100 | 11900 | 12100 | 11900 | 11200 |
| 3_ | No load current | mA | 83.5 | 45.1 | 29.3 | 22.5 | 14.6 | 10 |
| 4_ | Nominal speed | rpm | 9180 | 6910 | 7090 | 6620 | 6760 | 5960 |
| 5_ | Nominal torque (max. continuous torque) | mNm | 1.04 | 2.05 | 2.2 | 1.94 | 2.06 | 2.03 |
| 6_ | Nominal current (max. continuous current) | A | 0.924 | 0.919 | 0.646 | 0.435 | 0.303 | 0.211 |
| 7_ | Stall torque | mNm | 5.15 | 4.83 | 5.48 | 4.34 | 4.82 | 4.39 |
| 8_ | Stall current | A | 4.23 | 2.09 | 1.55 | 0.937 | 0.682 | 0.439 |
| 9_ | Max. efficiency | % | 74 | 73 | 75 | 72 | 74 | 73 |
| 10_ | Terminal resistance | Ω | 0.355 | 1.44 | 2.9 | 6.4 | 13.2 | 27.3 |
| 11_ | Terminal inductance | mH | 0.006 | 0.021 | 0.050 | 0.086 | 0.199 | 0.399 |
| 12_ | Torque constant | mNm/A | 1.22 | 2.32 | 3.54 | 4.63 | 7.07 | 10.0 |
| 13_ | Speed constant | rpm/V | 7830 | 4120 | 2700 | 2060 | 1350 | 955 |
| 14_ | Speed/torque gradient | rpm/mNm | 2280 | 2560 | 2220 | 2850 | 2520 | 2610 |
| 15_ | Mechanical time constant | ms | 3.64 | 3.53 | 3.5 | 3.54 | 3.53 | 3.56 |
| 16_ | Rotor inertia | gcm² | 0.153 | 0.132 | 0.151 | 0.119 | 0.134 | 0.130 |

| | | | |
|---|---|---|---|
| | **Thermal data** | | |
| 17_ | Thermal resistance housing-ambient | K/W | 36.5 |
| 18_ | Thermal resistance winding-housing | K/W | 10.6 |
| 19_ | Thermal time constant winding | s | 3.94 |
| 20_ | Thermal time constant motor | s | 151 |
| 21_ | Ambient temperature ball bearings | °C | -30…+85 |
| | Ambient temperature sleeve bearings | °C | -30…+85 |
| 22_ | Max. winding temperature | °C | 100 |
| | **Mechanical data ball bearings** | | |
| 23_ | Max. speed | rpm | 14300 |
| 24_ | Axial play | mm | 0…0.1 |
| | Preload | N | 0.5 |
| 25_ | Radial play | mm | 0.015 |
| 26_ | Max. axial load (dynamic) | N | 0.5 |
| 27_ | Max. force for press fits (static) | N | 8.8 |
| | (static, shaft supported) | N | 120 |
| 28_ | Max. radial load [mm from flange] | N | 1.5 [5] |
| | **Mechanical data sleeve bearings** | | |
| 23_ | Max. speed | rpm | 14300 |
| 24_ | Axial play | mm | 0…0.15 |
| | Preload | N | 0 |
| 25_ | Radial play | mm | 0.015 |
| 26_ | Max. axial load (dynamic) | N | 0.1 |
| 27_ | Max. force for press fits (static) | N | 30 |
| | (static, shaft supported) | N | 120 |
| 28_ | Max. radial load [mm from flange] | N | 0.8 [5] |
| | **Other specifications** | | |
| 29_ | Number of pole pairs | | 1 |
| 30_ | Number of commutator segments | | 7 |
| 31_ | Weight of motor | g | 11 |
| 32_ | Typical noise level | dBA | 37 |

**Operating Range**

**n [rpm] Winding 4.5 V**




- Continuous operation
- Continuous operation with reduced thermal resistance $R_{th2}$ 50%
- Intermittent operation

**maxon Modular System**

| maxon gear | Stages | maxon sensor | maxon motor control |
|---|---|---|---|
| 57_GPX 10 A | 1–5 | 82_ENX 10 EASY | 378_ESCON Module 24/2 |
| | | 82_ENX 10 QUAD | 378_ESCON 36/2 DC |
| | | | 386_EPOS2 24/2 (DC/EC) |
| | | | 386_EPOS2 Module 36/2 |

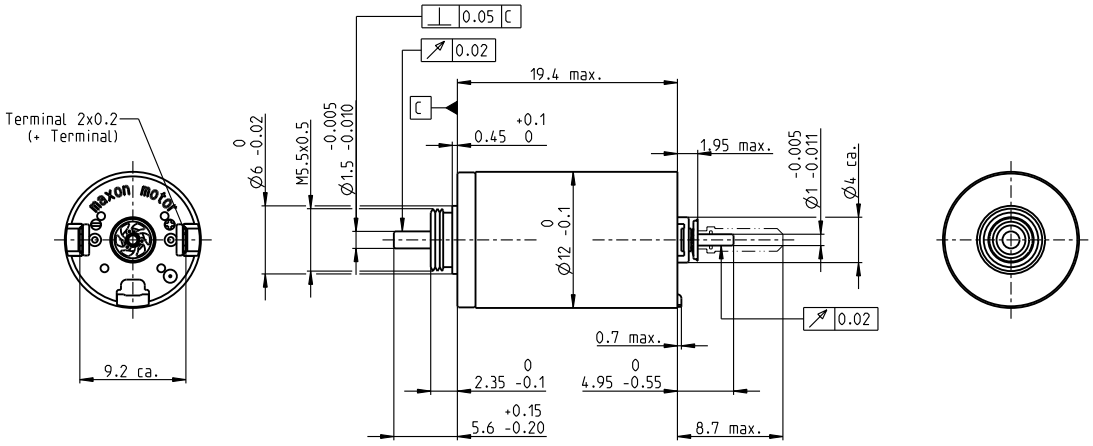
**Configuration**

Bearing: Sleeve bearings/ball bearings preloaded
Commutation: Precious metal brushes with or without CLL
Flange front/back: Standard flange/Flange with thread holes/no flange
Shaft front/back: Length
Electric connection: Terminals or cable/cable length/connector type

xdrives.maxonmotor.com

# DCX 12 S Precious Metal Brushes
## DC motor Ø12 mm


**1.6/2 W 2.0 mNm 14300 rpm**



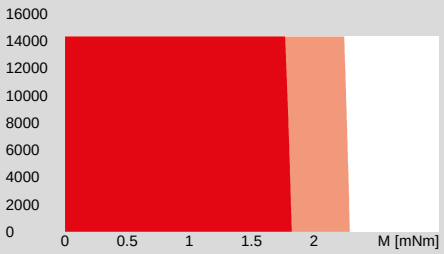

**M 3:2**

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | **Motor Data** | | | | | | | |
| 1_ | Nominal voltage | V | 1.5 | 3 | 4.5 | 6 | 9 | 12 |
| 2_ | No load speed | rpm | 8870 | 9130 | 9040 | 9130 | 9050 | 9060 |
| 3_ | No load current | mA | 42.2 | 21.9 | 14.4 | 11 | 7.21 | 5.42 |
| 4_ | Nominal speed | rpm | 4590 | 3730 | 3600 | 3840 | 3680 | 3600 |
| 5_ | Nominal torque (max. continuous torque) | mNm | 1.41 | 1.96 | 1.94 | 1.99 | 1.96 | 1.92 |
| 6_ | Nominal current (max. continuous current) | A | 0.924 | 0.655 | 0.427 | 0.332 | 0.216 | 0.159 |
| 7_ | Stall torque | mNm | 2.96 | 3.36 | 3.26 | 3.48 | 3.35 | 3.23 |
| 8_ | Stall current | A | 1.87 | 1.09 | 0.701 | 0.566 | 0.36 | 0.261 |
| 9_ | Max. efficiency | % | 72 | 74 | 74 | 75 | 74 | 74 |
| 10_ | Terminal resistance | Ω | 0.801 | 2.74 | 6.42 | 10.6 | 25 | 46 |
| 11_ | Terminal inductance | mH | 0.0162 | 0.0615 | 0.141 | 0.246 | 0.564 | 0.998 |
| 12_ | Torque constant | mNm/A | 1.58 | 3.08 | 4.65 | 6.15 | 9.31 | 12.4 |
| 13_ | Speed constant | rpm/V | 6050 | 3110 | 2050 | 1550 | 1030 | 771 |
| 14_ | Speed/torque gradient | rpm/mNm | 3070 | 2770 | 2830 | 2680 | 2760 | 2870 |
| 15_ | Mechanical time constant | ms | 8.64 | 8.29 | 8.24 | 8.22 | 8.25 | 8.25 |
| 16_ | Rotor inertia | gcm² | 0.269 | 0.286 | 0.278 | 0.293 | 0.286 | 0.275 |

| | | | |
|---|---|---|---|
| | **Thermal data** | | |
| 17_ | Thermal resistance housing-ambient | K/W | 35 |
| 18_ | Thermal resistance winding-housing | K/W | 14.4 |
| 19_ | Thermal time constant winding | s | 7.67 |
| 20_ | Thermal time constant motor | s | 146 |
| 21_ | Ambient temperature ball bearings | °C | -30…+85 |
| | Ambient temperature sleeve bearings | °C | -30…+85 |
| 22_ | Max. winding temperature | °C | 100 |
| | **Mechanical data ball bearings** | | |
| 23_ | Max. speed | rpm | 14300 |
| 24_ | Axial play | mm | 0…0.1 |
| | Preload | N | 0.5 |
| 25_ | Radial play | mm | 0.015 |
| 26_ | Max. axial load (dynamic) | N | 0.5 |
| 27_ | Max. force for press fits (static) | N | 8.8 |
| | (static, shaft supported) | N | 120 |
| 28_ | Max. radial load [mm from flange] | N | 1.5 [5] |
| | **Mechanical data sleeve bearings** | | |
| 23_ | Max. speed | rpm | 14300 |
| 24_ | Axial play | mm | 0…0.15 |
| | Preload | N | 0 |
| 25_ | Radial play | mm | 0.015 |
| 26_ | Max. axial load (dynamic) | N | 0.1 |
| 27_ | Max. force for press fits (static) | N | 30 |
| | (static, shaft supported) | N | 120 |
| 28_ | Max. radial load [mm from flange] | N | 0.8 [5] |
| | **Other specifications** | | |
| 29_ | Number of pole pairs | | 1 |
| 30_ | Number of commutator segments | | 7 |
| 31_ | Weight of motor | g | 11 |
| 32_ | Typical noise level | dBA | 40 |

**Operating Range**

**n [rpm] Winding 4.5 V**




Continuous operation
Continuous operation with reduced thermal resistance $R_{th2}$ 50%
Intermittent operation

**maxon Modular System**

| maxon gear | Stages | maxon sensor | maxon motor control |
|---|---|---|---|
| 64_GPX 12 A | 1–2 | 82_ENX 10 EASY | 378_ESCON Module 24/2 |
| 60_GPX 14 A, C | 3–4 | 82_ENX 10 QUAD | 378_ESCON 36/2 DC |
| 61_GPX 14 LN, LZ | 3–4 | | 386_EPOS2 24/2 (DC/EC) |
| | | | 386_EPOS2 Module 36/2 |

**Configuration**

Bearing: Sleeve bearings/ball bearings preloaded
Commutation: Precious metal brushes with or without CLL
Flange front/back: Standard flange/Flange with thread holes/no flange
Shaft front/back: Length
Electric connection: Terminals or cable/cable length/connector type

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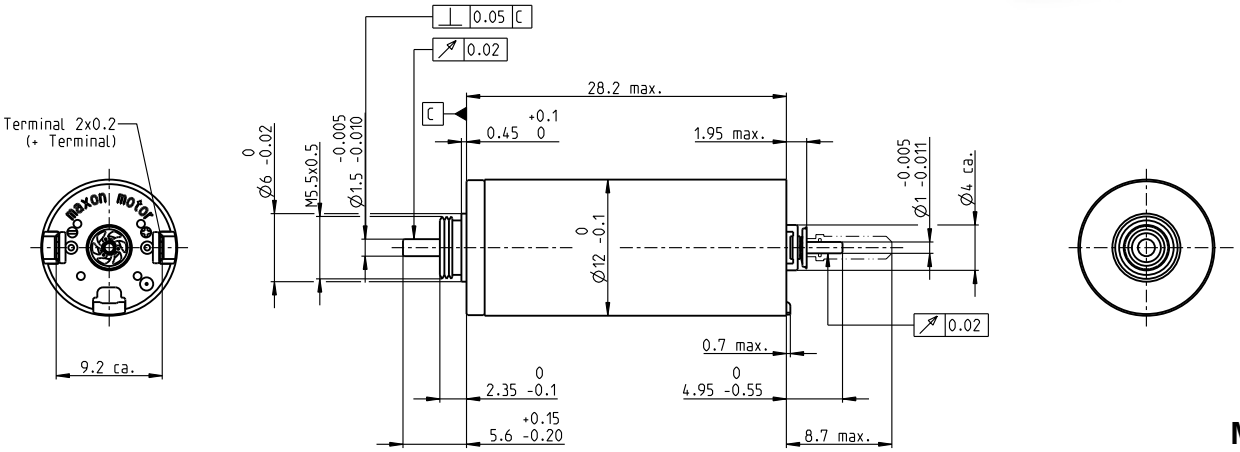
# **DCX 12 L** Precious Metal Brushes
## DC motor Ø12 mm


**2.5/4.8 W 4.2 mNm 12000 rpm**



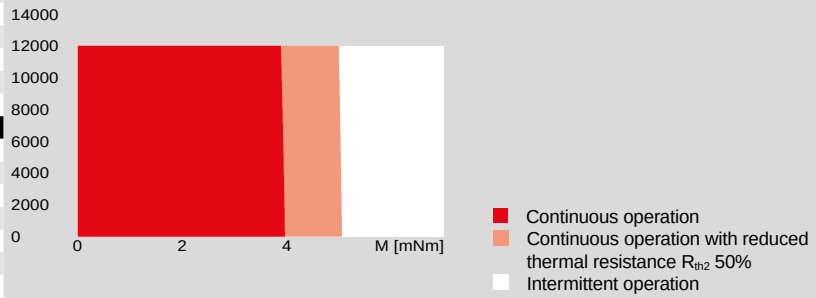

**M 3:2**

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | **Motor Data** | | | | | | | |
| 1_ | Nominal voltage | V | 3 | 4.5 | 6 | 9 | 12 | 18 |
| 2_ | No load speed | rpm | 8680 | 8690 | 8690 | 8700 | 8690 | 8690 |
| 3_ | No load current | mA | 33.9 | 22.6 | 17.0 | 11.3 | 8.49 | 5.66 |
| 4_ | Nominal speed | rpm | 6140 | 5570 | 5470 | 5680 | 5490 | 5470 |
| 5_ | Nominal torque (max. continuous torque) | mNm | 2.92 | 4.07 | 3.93 | 4.18 | 3.94 | 3.92 |
| 6_ | Nominal current (max. continuous current) | A | 0.924 | 0.85 | 0.616 | 0.436 | 0.308 | 0.204 |
| 7_ | Stall torque | mNm | 10.0 | 11.4 | 10.7 | 12.1 | 10.8 | 10.6 |
| 8_ | Stall current | A | 3.08 | 2.32 | 1.63 | 1.23 | 0.824 | 0.543 |
| 9_ | Max. efficiency | % | 80 | 81 | 81 | 82 | 81 | 81 |
| 10_ | Terminal resistance | Ω | 0.975 | 1.94 | 3.68 | 7.29 | 14.6 | 33.1 |
| 11_ | Terminal inductance | mH | 0.031 | 0.071 | 0.125 | 0.282 | 0.502 | 1.13 |
| 12_ | Torque constant | mNm/A | 3.26 | 4.90 | 6.53 | 9.79 | 13.1 | 19.6 |
| 13_ | Speed constant | rpm/V | 2930 | 1950 | 1460 | 975 | 731 | 488 |
| 14_ | Speed/torque gradient | rpm/mNm | 874 | 772 | 824 | 726 | 816 | 825 |
| 15_ | Mechanical time constant | ms | 4.43 | 4.31 | 4.28 | 4.25 | 4.26 | 4.27 |
| 16_ | Rotor inertia | gcm² | 0.484 | 0.533 | 0.496 | 0.559 | 0.498 | 0.495 |

| | | | |
|---|---|---|---|
| | **Thermal data** | | |
| 17_ | Thermal resistance housing-ambient | K/W | 31 |
| 18_ | Thermal resistance winding-housing | K/W | 10.3 |
| 19_ | Thermal time constant winding | s | 10.1 |
| 20_ | Thermal time constant motor | s | 194 |
| 21_ | Ambient temperature ball bearings | °C | -30…+85 |
| | Ambient temperature sleeve bearings | °C | -30…+85 |
| 22_ | Max. winding temperature | °C | 100 |
| | **Mechanical data ball bearings** | | |
| 23_ | Max. speed | rpm | 12000 |
| 24_ | Axial play | mm | 0…0.1 |
| | Preload | N | 0.5 |
| 25_ | Radial play | mm | 0.015 |
| 26_ | Max. axial load (dynamic) | N | 0.5 |
| 27_ | Max. force for press fits (static) | N | 8.8 |
| | (static, shaft supported) | N | 120 |
| 28_ | Max. radial load [mm from flange] | N | 1.5 [5] |
| | **Mechanical data sleeve bearings** | | |
| 23_ | Max. speed | rpm | 12000 |
| 24_ | Axial play | mm | 0…0.15 |
| | Preload | N | 0 |
| 25_ | Radial play | mm | 0.015 |
| 26_ | Max. axial load (dynamic) | N | 0.1 |
| 27_ | Max. force for press fits (static) | N | 30 |
| | (static, shaft supported) | N | 120 |
| 28_ | Max. radial load [mm from flange] | N | 0.8 [5] |
| | **Other specifications** | | |
| 29_ | Number of pole pairs | | 1 |
| 30_ | Number of commutator segments | | 7 |
| 31_ | Weight of motor | g | 16 |
| 32_ | Typical noise level | dBA | 44 |

**Operating Range**

**n [rpm] Winding 4.5 V**




**maxon Modular System**

| maxon gear | Stages | maxon sensor | maxon motor control |
|---|---|---|---|
| 64_GPX 12 A | 1–2 | 82_ENX 10 EASY | 378_ESCON Module 24/2 |
| 60_GPX 14 A, C | 3–4 | 82_ENX 10 QUAD | 378_ESCON 36/2 DC |
| 61_GPX 14 LN, LZ | 3–4 | | 386_EPOS2 24/2 (DC/EC) |
| | | | 386_EPOS2 Module 36/2 |

**Configuration**

Bearing: Sleeve bearings/ball bearings preloaded
Commutation: Precious metal brushes with or without CLL
Flange front/back: Standard flange/Flange with thread holes/no flange
Shaft front/back: Length
Electric connection: Terminals or cable/cable length/connector type

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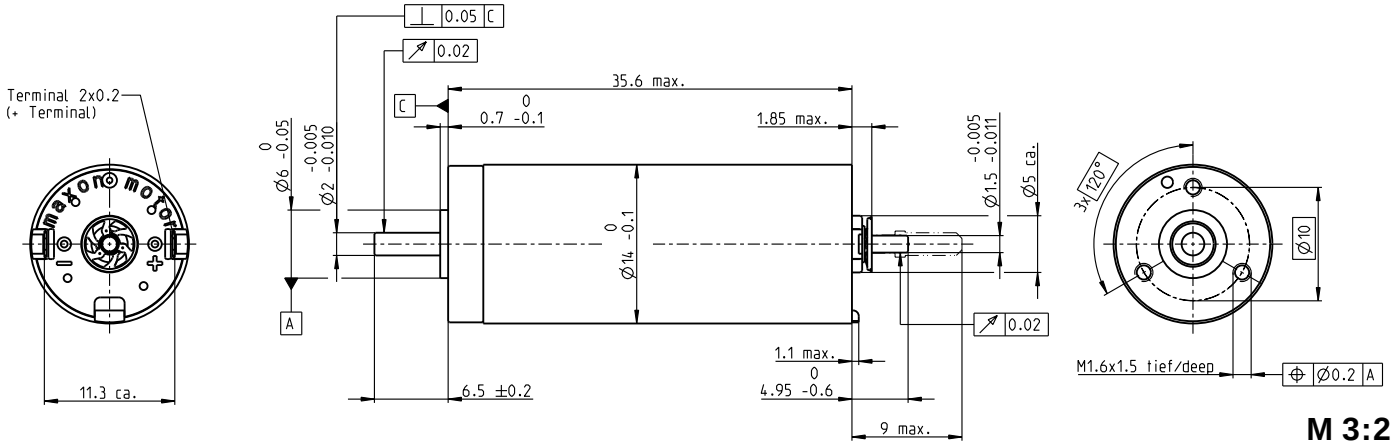
# DCX 14 L Precious Metal Brushes
## DC motor Ø14 mm


**3/5 W 6.3 mNm 8680 rpm**



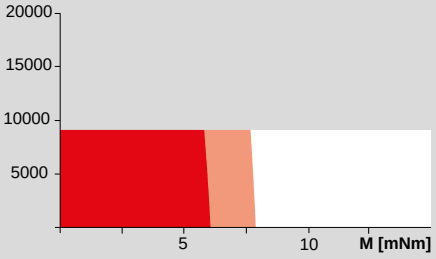

**M 3:2**

| | Motor Data | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 1_ | Nominal voltage | V | 3 | 4.5 | 6 | 9 | 12 | 18 | 24 |
| 2_ | No load speed | rpm | 7720 | 7730 | 7730 | 7740 | 7740 | 7720 | 7730 |
| 3_ | No load current | mA | 76.3 | 50.9 | 38.2 | 25.5 | 19.1 | 12.7 | 9.55 |
| 4_ | Nominal speed | rpm | 5770 | 5170 | 5150 | 5210 | 5220 | 5060 | 5160 |
| 5_ | Nominal torque (max. continuous torque) | mNm | 4.11 | 6.25 | 6.19 | 6.33 | 6.34 | 5.96 | 6.2 |
| 6_ | Nominal current (max. continuous current) | A | 1.2 | 1.19 | 0.884 | 0.602 | 0.452 | 0.284 | 0.221 |
| 7_ | Stall torque | mNm | 16.5 | 19.1 | 18.8 | 19.6 | 19.7 | 17.5 | 18.9 |
| 8_ | Stall current | A | 4.52 | 3.49 | 2.57 | 1.79 | 1.35 | 0.799 | 0.647 |
| 9_ | Max. efficiency | % | 75.6 | 77.3 | 77.2 | 77.7 | 77.7 | 76.5 | 77.3 |
| 10_ | Terminal resistance | Ω | 0.664 | 1.29 | 2.33 | 5.02 | 8.9 | 22.5 | 37.1 |
| 11_ | Terminal inductance | mH | 0.0252 | 0.0567 | 0.101 | 0.227 | 0.403 | 0.908 | 1.61 |
| 12_ | Torque constant | mNm/A | 3.65 | 5.47 | 7.3 | 10.9 | 14.6 | 21.9 | 29.2 |
| 13_ | Speed constant | rpm/V | 2620 | 1740 | 1310 | 872 | 654 | 436 | 327 |
| 14_ | Speed/torque gradient | rpm/mNm | 476 | 411 | 418 | 400 | 399 | 449 | 415 |
| 15_ | Mechanical time constant | ms | 4.14 | 4.06 | 4.05 | 4.04 | 4.05 | 4.1 | 4.09 |
| 16_ | Rotor inertia | gcm² | 0.831 | 0.942 | 0.926 | 0.966 | 0.97 | 0.872 | 0.939 |

| | Thermal data | | |
|---|---|---|---|
| 17_ | Thermal resistance housing-ambient | K/W | 22.2 |
| 18_ | Thermal resistance winding-housing | K/W | 8.63 |
| 19_ | Thermal time constant winding | s | 10.3 |
| 20_ | Thermal time constant motor | s | 226 |
| 21_ | Ambient temperature ball bearings | °C | -30…+85 |
| | Ambient temperature sleeve bearings | °C | -30…+85 |
| 22_ | Max. winding temperature | °C | 100 |
| | **Mechanical data ball bearings** | | |
| 23_ | Max. speed | rpm | 8680 |
| 24_ | Axial play | mm | 0…0.1 |
| | Preload | N | 0.8 |
| 25_ | Radial play | mm | 0.015 |
| 26_ | Max. axial load (dynamic) | N | 0.8 |
| 27_ | Max. force for press fits (static) | N | 18 |
| | (static, shaft supported) | N | 300 |
| 28_ | Max. radial load [mm from flange] | N | 10 [5] |
| | **Mechanical data sleeve bearings** | | |
| 23_ | Max. speed | rpm | 8680 |
| 24_ | Axial play | mm | 0…0.1 |
| | Preload | N | 0 |
| 25_ | Radial play | mm | 0.015 |
| 26_ | Max. axial load (dynamic) | N | 0.1 |
| 27_ | Max. force for press fits (static) | N | 60 |
| | (static, shaft supported) | N | 300 |
| 28_ | Max. radial load [mm from flange] | N | 2 [5] |
| | **Other specifications** | | |
| 29_ | Number of pole pairs | | 1 |
| 30_ | Number of commutator segments | | 7 |
| 31_ | Weight of motor | g | 26 |
| 32_ | Typical noise level | dBA | 44 |

**Operating Range**

**n [rpm] Winding 9 V**




- Continuous operation
- Continuous operation with reduced thermal resistance $R_{th2}$ 50%
- Intermittent operation

**maxon Modular System**

| maxon gear | Stages |
|---|---|
| 60_GPX 14 A, C | 1–2 |
| 61_GPX 14 LN, LZ | 1–2 |
| 62_GPX 16 A, C | 3–4 |
| 63_GPX 16 LN, LZ | 3–4 |
| 64_GPX 16 HP | 4 |

**maxon sensor**
82_ENX 10 EASY
82_ENX 10 QUAD

**maxon motor control**
378_ESCON Module 24/2
378_ESCON 36/2 DC
386_EPOS2 24/2 (DC/EC)
386_EPOS2 Module 36/2
393_EPOS3 70/10 EtherCAT
396_MAXPOS 50/5

**Configuration**

Bearing: Ball bearings preloaded/sleeve bearings
Commutation: Precious metal brushes with CLL/graphite brushes
Flange front/back: Standard flange/configurable flange/no flange
Shaft front/back: Length/diameter/flat face
Electric connection: Terminals or cable/alignment of connection/cable length/connector type

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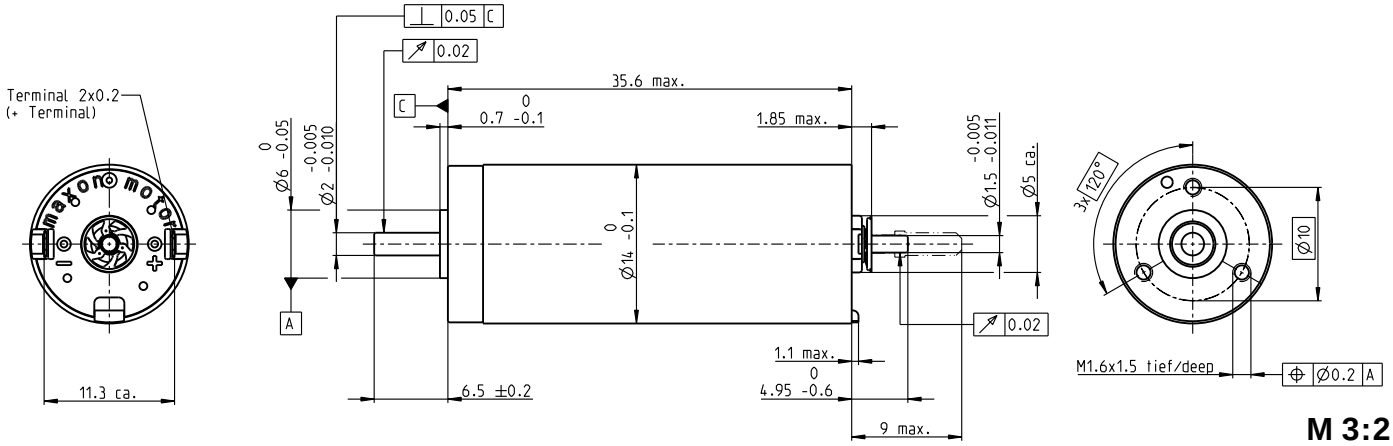
# DCX 14 L Graphite Brushes
## DC motor Ø14 mm


**6/10 W 6.9 mNm 17 000 rpm**



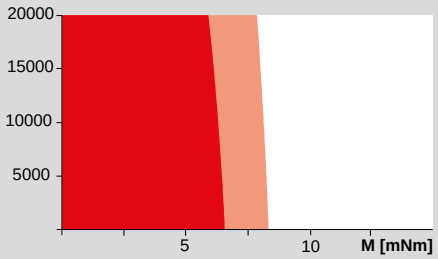

**M 3:2**

| | Motor Data | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 1_ | Nominal voltage | V | 4.5 | 6 | 9 | 12 | 18 | 24 |
| 2_ | No load speed | rpm | 11600 | 10400 | 11700 | 10300 | 11600 | 10300 |
| 3_ | No load current | mA | 74.8 | 48 | 37.4 | 24 | 18.7 | 12 |
| 4_ | Nominal speed | rpm | 8470 | 7430 | 8760 | 7370 | 8760 | 7310 |
| 5_ | Nominal torque (max. continuous torque) | mNm | 6.34 | 6.92 | 6.85 | 6.87 | 6.91 | 6.62 |
| 6_ | Nominal current (max. continuous current) | A | 1.8 | 1.31 | 0.972 | 0.649 | 0.491 | 0.313 |
| 7_ | Stall torque | mNm | 23.5 | 24.8 | 27.8 | 24.7 | 28.5 | 22.9 |
| 8_ | Stall current | A | 6.45 | 4.53 | 3.8 | 2.26 | 1.95 | 1.05 |
| 9_ | Max. efficiency | % | 79.2 | 80.4 | 81.2 | 79.7 | 81 | 79.7 |
| 10_ | Terminal resistance | Ω | 0.698 | 1.33 | 2.37 | 5.31 | 9.21 | 22.9 |
| 11_ | Terminal inductance | mH | 0.0252 | 0.0567 | 0.101 | 0.227 | 0.403 | 0.908 |
| 12_ | Torque constant | mNm/A | 3.65 | 5.47 | 7.3 | 10.9 | 14.6 | 21.9 |
| 13_ | Speed constant | rpm/V | 2620 | 1740 | 1310 | 872 | 654 | 436 |
| 14_ | Speed/torque gradient | rpm/mNm | 500 | 422 | 424 | 423 | 413 | 456 |
| 15_ | Mechanical time constant | ms | 4.35 | 4.17 | 4.11 | 4.28 | 4.19 | 4.17 |
| 16_ | Rotor inertia | gcm² | 0.831 | 0.942 | 0.926 | 0.966 | 0.97 | 0.872 |

| | Thermal data | | |
|---|---|---|---|
| 17_ | Thermal resistance housing-ambient | K/W | 22.2 |
| 18_ | Thermal resistance winding-housing | K/W | 8.63 |
| 19_ | Thermal time constant winding | s | 10.3 |
| 20_ | Thermal time constant motor | s | 226 |
| 21_ | Ambient temperature ball bearings | °C | -40…+100 |
| | Ambient temperature sleeve bearings | °C | -30…+100 |
| 22_ | Max. winding temperature | °C | 125 |
| | **Mechanical data ball bearings** | | |
| 23_ | Max. speed | rpm | 17000 |
| 24_ | Axial play | mm | 0…0.1 |
| | Preload | N | 0.8 |
| 25_ | Radial play | mm | 0.015 |
| 26_ | Max. axial load (dynamic) | N | 0.8 |
| 27_ | Max. force for press fits (static) | N | 18 |
| | (static, shaft supported) | N | 300 |
| 28_ | Max. radial load [mm from flange] | N | 10 [5] |
| | **Mechanical data sleeve bearings** | | |
| 23_ | Max. speed | rpm | 15000 |
| 24_ | Axial play | mm | 0…0.2 |
| | Preload | N | 0 |
| 25_ | Radial play | mm | 0.015 |
| 26_ | Max. axial load (dynamic) | N | 0.1 |
| 27_ | Max. force for press fits (static) | N | 60 |
| | (static, shaft supported) | N | 300 |
| 28_ | Max. radial load [mm from flange] | N | 2 [5] |
| | **Other specifications** | | |
| 29_ | Number of pole pairs | | 1 |
| 30_ | Number of commutator segments | | 7 |
| 31_ | Weight of motor | g | 26 |
| 32_ | Typical noise level | dBA | 40 |

**Operating Range**

**n [rpm] Winding 12 V**




- Continuous operation
- Continuous operation with reduced thermal resistance $R_{th2}$ 50%
- Intermittent operation

**maxon Modular System**

| maxon gear | Stages | maxon sensor | maxon motor control |
|---|---|---|---|
| 60_GPX 14 A, C | 1–2 | 82_ENX 10 EASY | 378_ESCON Module 24/2 |
| 61_GPX 14 LN, LZ | 1–2 | 82_ENX 10 QUAD | 378_ESCON 36/2 DC |
| 62_GPX 16 A, C | 3–4 | | 386_EPOS2 24/2 (DC/EC) |
| 63_GPX 16 LN, LZ | 3–4 | | 386_EPOS2 Module 36/2 |
| 64_GPX 16 HP | 4 | | 393_EPOS3 70/10 EtherCAT |
| | | | 396_MAXPOS 50/5 |

**Configuration**

Bearing: Ball bearings preloaded/sleeve bearings
Commutation: Precious metal brushes with CLL/graphite brushes
Flange front/back: Standard flange/configurable flange/no flange
Shaft front/back: Length/diameter/flat face
Electric connection: Terminals or cable/alignment of connection/cable length/connector type

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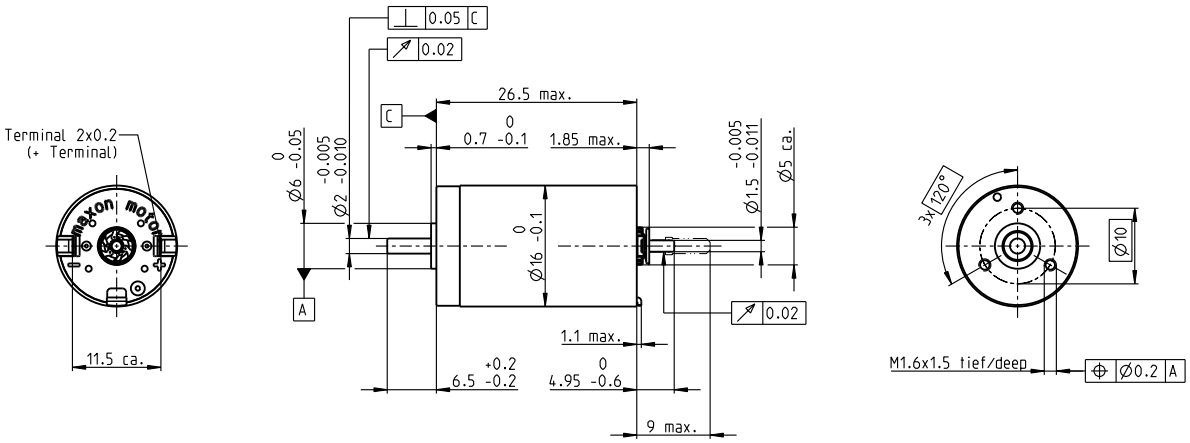
# DCX 16 S Precious Metal Brushes
## DC motor Ø16 mm


**3/5 W 5.3 mNm 8680 rpm**



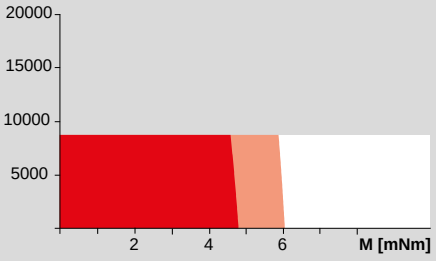

**M 1:1**

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | **Motor Data** | | | | | | | |
| 1_ | Nominal voltage | V | 3 | 4.5 | 6 | 9 | 12 | 24 |
| 2_ | No load speed | rpm | 6290 | 6290 | 6580 | 6290 | 6230 | 6220 |
| 3_ | No load current | mA | 56.0 | 37.3 | 29.6 | 18.7 | 13.8 | 6.91 |
| 4_ | Nominal speed | rpm | 3350 | 3300 | 3770 | 3280 | 3330 | 3210 |
| 5_ | Nominal torque (max. continuous torque) | mNm | 5.10 | 5.01 | 5.30 | 4.96 | 5.15 | 4.95 |
| 6_ | Nominal current (max. continuous current) | A | 1.20 | 0.782 | 0.648 | 0.388 | 0.298 | 0.143 |
| 7_ | Stall torque | mNm | 11.1 | 10.7 | 12.6 | 10.6 | 11.2 | 10.4 |
| 8_ | Stall current | A | 2.49 | 1.61 | 1.48 | 0.791 | 0.624 | 0.289 |
| 9_ | Max. efficiency | % | 73 | 72 | 74 | 72 | 73 | 72 |
| 10_ | Terminal resistance | Ω | 1.20 | 2.80 | 4.06 | 11.4 | 19.2 | 83.1 |
| 11_ | Terminal inductance | mH | 0.036 | 0.080 | 0.131 | 0.320 | 0.581 | 2.32 |
| 12_ | Torque constant | mNm/A | 4.45 | 6.67 | 8.53 | 13.3 | 18.0 | 36.0 |
| 13_ | Speed constant | rpm/V | 2150 | 1430 | 1120 | 715 | 531 | 265 |
| 14_ | Speed/torque gradient | rpm/mNm | 580 | 600 | 533 | 610 | 568 | 613 |
| 15_ | Mechanical time constant | ms | 6.09 | 6.09 | 6.05 | 6.13 | 6.11 | 6.17 |
| 16_ | Rotor inertia | gcm² | 1.00 | 0.97 | 1.08 | 0.959 | 1.03 | 0.960 |

| | | | |
|---|---|---|---|
| | **Thermal data** | | |
| 17_ | Thermal resistance housing-ambient | K/W | 23.5 |
| 18_ | Thermal resistance winding-housing | K/W | 9.9 |
| 19_ | Thermal time constant winding | s | 9.63 |
| 20_ | Thermal time constant motor | s | 227 |
| 21_ | Ambient temperature ball bearings | °C | -30…+85 |
| | Ambient temperature sleeve bearings | °C | -30…+85 |
| 22_ | Max. winding temperature | °C | 100 |
| | **Mechanical data ball bearings** | | |
| 23_ | Max. speed | rpm | 8680 |
| 24_ | Axial play | mm | 0…0.1 |
| | Preload | N | 0.8 |
| 25_ | Radial play | mm | 0.015 |
| 26_ | Max. axial load (dynamic) | N | 0.8 |
| 27_ | Max. force for press fits (static) | N | 18 |
| | (static, shaft supported) | N | 300 |
| 28_ | Max. radial load [mm from flange] | N | 10 [5] |
| | **Mechanical data sleeve bearings** | | |
| 23_ | Max. speed | rpm | 8680 |
| 24_ | Axial play | mm | 0…0.2 |
| | Preload | N | 0.8 |
| 25_ | Radial play | mm | 0.015 |
| 26_ | Max. axial load (dynamic) | N | 0.1 |
| 27_ | Max. force for press fits (static) | N | 18 |
| | (static, shaft supported) | N | 300 |
| 28_ | Max. radial load [mm from flange] | N | 10 [5] |
| | **Other specifications** | | |
| 29_ | Number of pole pairs | | 1 |
| 30_ | Number of commutator segments | | 7 |
| 31_ | Weight of motor | g | 26 |
| 32_ | Typical noise level | dBA | 40 |

**Operating Range**

**n [rpm] Winding 12 V**




- Continuous operation
- Continuous operation with reduced thermal resistance $R_{th2}$ 50%
- Intermittent operation

**maxon Modular System**

| maxon gear | Stages | maxon sensor | maxon motor control |
|---|---|---|---|
| 62_GPX 16 A, C | 1–2 | 82_ENX 10 EASY | 378_ESCON Module 24/2 |
| 63_GPX 16 LN, LZ | 1–2 | 82_ENX 10 QUAD | 378_ESCON 36/2 DC |
| 64_GPX 16 HP | 2–3 | 83_ENX 16 EASY | 386_EPOS2 24/2 (DC/EC) |
| 66_GPX 19 A, C | 3–4 | 84_ENX 16 EASY Abs. | 386_EPOS2 Module 36/2 |
| 67_GPX 19 LN, LZ | 3–4 | | 393_EPOS3 70/10 EtherCAT |
| | | | 396_MAXPOS 50/5 |

**Configuration**

Bearing: Ball bearings preloaded/sleeve bearings
Commutation: Precious metal brushes with CLL/graphite brushes
Flange front/back: Standard flange/configurable flange/no flange
Shaft front/back: Length/diameter/flat face
Electric connection: Terminals or cable/alignment of connection/cable length/connector type

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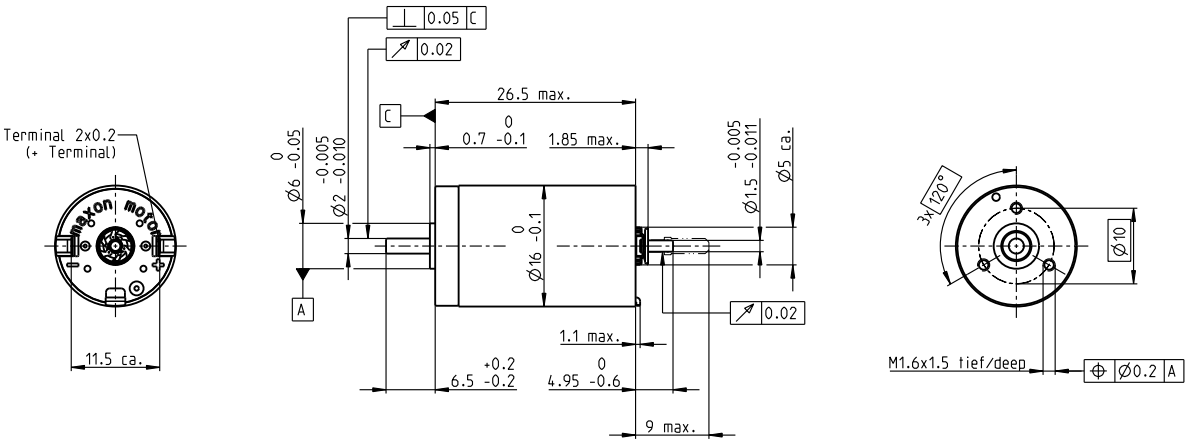
# DCX 16 S Graphite Brushes
## DC motor Ø16 mm


**5/10 W 5.7 mNm 17 000 rpm**

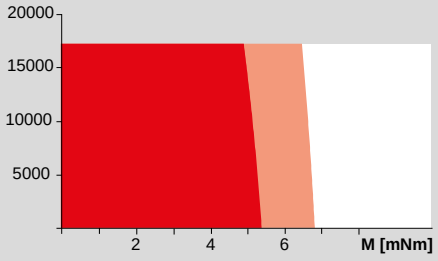



**M 1:1**

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | **Motor Data** | | | | | | | |
| 1_ | Nominal voltage | V | 6 | 9 | 12 | 18 | 24 | 48 |
| 2_ | No load speed | rpm | 12700 | 12700 | 13200 | 12700 | 12700 | 12600 |
| 3_ | No load current | mA | 67.1 | 44.8 | 35.4 | 22.4 | 16.8 | 8.28 |
| 4_ | Nominal speed | rpm | 9400 | 9410 | 9850 | 9260 | 9430 | 9250 |
| 5_ | Nominal torque (max. continuous torque) | mNm | 5.41 | 5.37 | 5.36 | 5.21 | 5.43 | 5.32 |
| 6_ | Nominal current (max. continuous current) | A | 1.28 | 0.845 | 0.662 | 0.411 | 0.321 | 0.156 |
| 7_ | Stall torque | mNm | 21.3 | 21 | 22.6 | 20.1 | 21.7 | 20.6 |
| 8_ | Stall current | A | 4.79 | 3.15 | 2.65 | 1.51 | 1.22 | 0.572 |
| 9_ | Max. efficiency | % | 77 | 78 | 76 | 76 | 78 | 77 |
| 10_ | Terminal resistance | Ω | 1.25 | 2.85 | 4.53 | 12 | 19.7 | 83.9 |
| 11_ | Terminal inductance | mH | 0.036 | 0.080 | 0.131 | 0.320 | 0.569 | 2.32 |
| 12_ | Torque constant | mNm/A | 4.45 | 6.67 | 8.53 | 13.3 | 17.8 | 36.0 |
| 13_ | Speed constant | rpm/V | 2150 | 1430 | 1120 | 715 | 536 | 265 |
| 14_ | Speed/torque gradient | rpm/mNm | 605 | 612 | 594 | 641 | 592 | 620 |
| 15_ | Mechanical time constant | ms | 6.35 | 6.21 | 6.74 | 6.43 | 6.32 | 6.23 |
| 16_ | Rotor inertia | gcm² | 1.00 | 0.970 | 1.08 | 0.959 | 1.02 | 0.960 |
| | **Thermal data** | | | | | | | |
| 17_ | Thermal resistance housing-ambient | K/W | 23.5 | | | | | |
| 18_ | Thermal resistance winding-housing | K/W | 9.9 | | | | | |
| 19_ | Thermal time constant winding | s | 9.63 | | | | | |
| 20_ | Thermal time constant motor | s | 227 | | | | | |
| 21_ | Ambient temperature ball bearings | °C | -40…+100 | | | | | |
| | Ambient temperature sleeve bearings | °C | -30…+100 | | | | | |
| 22_ | Max. winding temperature | °C | 125 | | | | | |
| | **Mechanical data ball bearings** | | | | | | | |
| 23_ | Max. speed | rpm | 17000 | | | | | |
| 24_ | Axial play | mm | 0…0.1 | | | | | |
| | Preload | N | 0.8 | | | | | |
| 25_ | Radial play | mm | 0.015 | | | | | |
| 26_ | Max. axial load (dynamic) | N | 0.8 | | | | | |
| 27_ | Max. force for press fits (static) | N | 18 | | | | | |
| | (static, shaft supported) | N | 300 | | | | | |
| 28_ | Max. radial load [mm from flange] | N | 10 [5] | | | | | |
| | **Mechanical data sleeve bearings** | | | | | | | |
| 23_ | Max. speed | rpm | 17000 | | | | | |
| 24_ | Axial play | mm | 0…0.2 | | | | | |
| | Preload | N | 0 | | | | | |
| 25_ | Radial play | mm | 0.015 | | | | | |
| 26_ | Max. axial load (dynamic) | N | 0.1 | | | | | |
| 27_ | Max. force for press fits (static) | N | 60 | | | | | |
| | (static, shaft supported) | N | 300 | | | | | |
| 28_ | Max. radial load [mm from flange] | N | 2 [5] | | | | | |
| | **Other specifications** | | | | | | | |
| 29_ | Number of pole pairs | | 1 | | | | | |
| 30_ | Number of commutator segments | | 7 | | | | | |
| 31_ | Weight of motor | g | 26 | | | | | |
| 32_ | Typical noise level | dBA | 38 | | | | | |

**Operating Range**

**n [rpm] Winding 12 V**




- Continuous operation
- Continuous operation with reduced thermal resistance $R_{th2}$ 50%
- Intermittent operation

**maxon Modular System**

| maxon gear | Stages | maxon sensor | maxon motor control |
|---|---|---|---|
| 62_GPX 16 A, C | 1–2 | 82_ENX 10 EASY | 378_ESCON Module 24/2 |
| 63_GPX 16 LN, LZ | 1–2 | 82_ENX 10 QUAD | 378_ESCON 36/2 DC |
| 64_GPX 16 HP | 2–3 | 83_ENX 16 EASY | 379_ESCON Module 50/5 |
| 66_GPX 19 A, C | 3–4 | 84_ENX 16 EASY Abs. | 379_ESCON 50/5 |
| 67_GPX 19 LN, LZ | 3–4 | | 386_EPOS2 24/2 (DC/EC) |
| | | | 386_EPOS2 Module 36/2 |
| | | | 387_EPOS2 50/5 |
| | | | 393_EPOS3 70/10 EtherCAT |
| | | | 396_MAXPOS 50/5 |

**Configuration**

Bearing: Ball bearings preloaded/sleeve bearings
Commutation: Precious metal brushes with CLL/graphite brushes
Flange front/back: Standard flange/configurable flange/no flange
Shaft front/back: Length/diameter/flat face
Electric connection: Terminals or cable/alignment of connection/cable length/connector type

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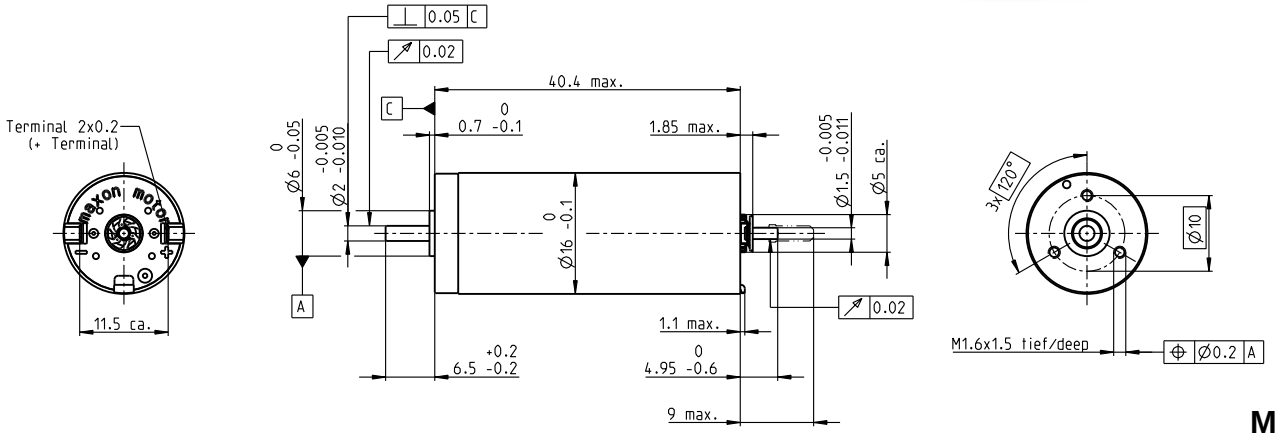
# DCX 16 L Precious Metal Brushes
## DC motor Ø16 mm

**5/10 W 11.5 mNm 8680 rpm**

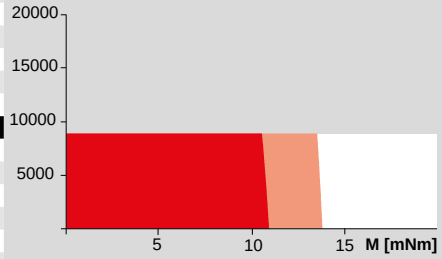

**M 1:1**

| | Motor Data | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 1_ | Nominal voltage | V | 3 | 6 | 9 | 12 | 18 | 24 |
| 2_ | No load speed | rpm | 6390 | 6620 | 6400 | 6400 | 6400 | 6560 |
| 3_ | No load current | mA | 66.8 | 34.9 | 22.3 | 16.7 | 11.1 | 8.62 |
| 4_ | Nominal speed | rpm | 5450 | 4920 | 4630 | 4500 | 4520 | 4640 |
| 5_ | Nominal torque (max. continuous torque) | mNm | 5.05 | 10.0 | 11.5 | 10.8 | 10.9 | 10.6 |
| 6_ | Nominal current (max. continuous current) | A | 1.20 | 1.20 | 0.887 | 0.622 | 0.419 | 0.315 |
| 7_ | Stall torque | mNm | 34.4 | 39.3 | 41.8 | 36.6 | 37.3 | 36.6 |
| 8_ | Stall current | A | 7.73 | 4.57 | 3.14 | 2.06 | 1.40 | 1.06 |
| 9_ | Max. efficiency | % | 82 | 83 | 84 | 83 | 83 | 83 |
| 10_ | Terminal resistance | Ω | 0.388 | 1.31 | 2.87 | 5.82 | 12.9 | 22.7 |
| 11_ | Terminal inductance | mH | 0.026 | 0.096 | 0.231 | 0.411 | 0.925 | 1.56 |
| 12_ | Torque constant | mNm/A | 4.44 | 8.59 | 13.3 | 17.8 | 26.7 | 34.7 |
| 13_ | Speed constant | rpm/V | 2150 | 1110 | 716 | 537 | 358 | 276 |
| 14_ | Speed/torque gradient | rpm/mNm | 188 | 170 | 154 | 176 | 173 | 181 |
| 15_ | Mechanical time constant | ms | 4.29 | 4.20 | 4.18 | 4.19 | 4.22 | 4.23 |
| 16_ | Rotor inertia | gcm² | 2.18 | 2.36 | 2.59 | 2.28 | 2.33 | 2.23 |

| | Thermal data | | |
|---|---|---|---|
| 17_ | Thermal resistance housing-ambient | K/W | 17.9 |
| 18_ | Thermal resistance winding-housing | K/W | 7.21 |
| 19_ | Thermal time constant winding | s | 21.5 |
| 20_ | Thermal time constant motor | s | 294 |
| 21_ | Ambient temperature ball bearings | °C | -30…+85 |
| | Ambient temperature sleeve bearings | °C | -30…+85 |
| 22_ | Max. winding temperature | °C | 100 |
| | **Mechanical data ball bearings** | | |
| 23_ | Max. speed | rpm | 8680 |
| 24_ | Axial play | mm | 0…0.1 |
| | Preload | N | 0.8 |
| 25_ | Radial play | mm | 0.015 |
| 26_ | Max. axial load (dynamic) | N | 0.8 |
| 27_ | Max. force for press fits (static) | N | 18 |
| | (static, shaft supported) | N | 300 |
| 28_ | Max. radial load [mm from flange] | N | 10 [5] |
| | **Mechanical data sleeve bearings** | | |
| 23_ | Max. speed | rpm | 8680 |
| 24_ | Axial play | mm | 0…0.1 |
| | Preload | N | 0 |
| 25_ | Radial play | mm | 0.015 |
| 26_ | Max. axial load (dynamic) | N | 0.1 |
| 27_ | Max. force for press fits (static) | N | 60 |
| | (static, shaft supported) | N | 300 |
| 28_ | Max. radial load [mm from flange] | N | 2 [5] |
| | **Other specifications** | | |
| 29_ | Number of pole pairs | | 1 |
| 30_ | Number of commutator segments | | 7 |
| 31_ | Weight of motor | g | 42 |
| 32_ | Typical noise level | dBA | 44 |

**Operating Range**

**n [rpm] Winding 9 V**




- Continuous operation
- Continuous operation with reduced thermal resistance $R_{th2}$ 50%
- Intermittent operation

**maxon Modular System**

| maxon gear | Stages | maxon sensor | maxon motor control |
|---|---|---|---|
| 62_GPX 16 A, C | 1–2 | 82_ENX 10 EASY | 378_ESCON Module 24/2 |
| 63_GPX 16 LN, LZ | 1–2 | 82_ENX 10 QUAD | 378_ESCON 36/2 DC |
| 64_GPX 16 HP | 2–3 | 83_ENX 16 EASY | 386_EPOS2 24/2 (DC/EC) |
| 66_GPX 19 A, C | 3–4 | 84_ENX 16 EASY Abs. | 386_EPOS2 Module 36/2 |
| 67_GPX 19 LN, LZ | 3–4 | | 390_EPOS2 P 24/5 |
| | | | 393_EPOS3 70/10 EtherCAT |
| | | | 396_MAXPOS 50/5 |

**Configuration**

Bearing: Ball bearings preloaded/sleeve bearings
Commutation: Precious metal brushes with CLL/graphite brushes
Flange front/back: Standard flange/configurable flange/no flange
Shaft front/back: Length/diameter/flat face
Electric connection: Terminals or cable/alignment of connection/cable length/connector type

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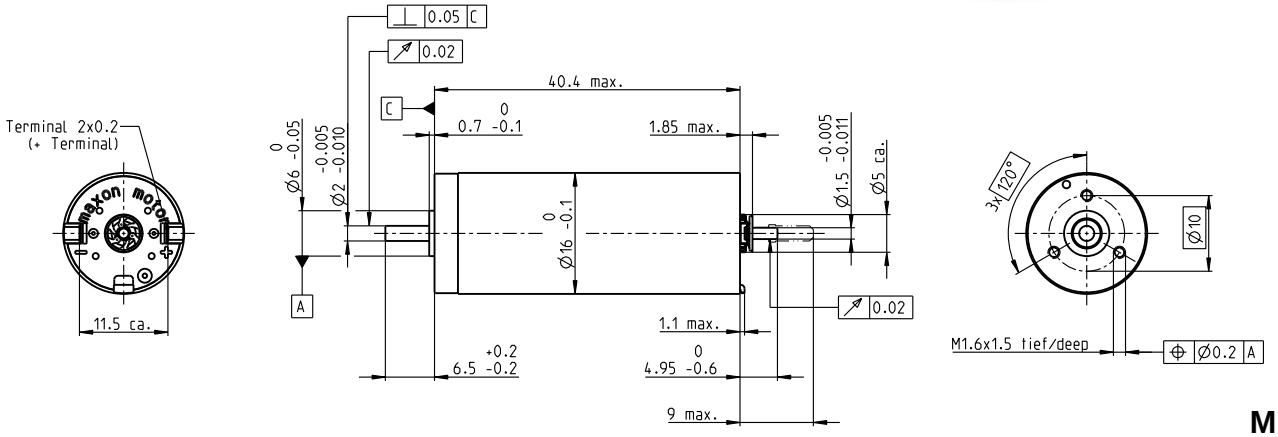
# DCX 16 L Graphite Brushes
## DC motor Ø16 mm

**10/19 W 12.5 mNm 17000 rpm**

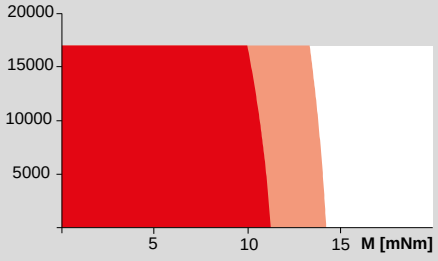

**M 1:1**

| | Motor Data | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 1_ | Nominal voltage | V | 6 | 9 | 12 | 18 | 24 | 36 |
| 2_ | No load speed | rpm | 12800 | 13100 | 13200 | 12800 | 12800 | 12800 |
| 3_ | No load current | mA | 79.3 | 54.8 | 41.6 | 26.4 | 19.8 | 13.2 |
| 4_ | Nominal speed | rpm | 11000 | 11000 | 10700 | 10600 | 10600 | 10700 |
| 5_ | Nominal torque (max. continuous torque) | mNm | 8.56 | 11.7 | 10.3 | 11.6 | 11.2 | 11.6 |
| 6_ | Nominal current (max. continuous current) | A | 2.00 | 1.85 | 1.24 | 0.894 | 0.649 | 0.446 |
| 7_ | Stall torque | mNm | 61.9 | 74.3 | 63.3 | 74.5 | 68.5 | 72.1 |
| 8_ | Stall current | A | 13.9 | 11.4 | 7.37 | 5.59 | 3.86 | 2.70 |
| 9_ | Max. efficiency | % | 85 | 86 | 83 | 85 | 85 | 86 |
| 10_ | Terminal resistance | Ω | 0.43 | 0.79 | 1.63 | 3.22 | 6.22 | 13.3 |
| 11_ | Terminal inductance | mH | 0.026 | 0.055 | 0.096 | 0.231 | 0.411 | 0.925 |
| 12_ | Torque constant | mNm/A | 4.44 | 6.52 | 8.59 | 13.3 | 17.8 | 26.7 |
| 13_ | Speed constant | rpm/V | 2150 | 1470 | 1110 | 716 | 537 | 358 |
| 14_ | Speed/torque gradient | rpm/mNm | 208 | 178 | 211 | 173 | 188 | 179 |
| 15_ | Mechanical time constant | ms | 4.76 | 4.46 | 5.21 | 4.70 | 4.48 | 4.37 |
| 16_ | Rotor inertia | gcm² | 2.18 | 2.40 | 2.36 | 2.59 | 2.28 | 2.33 |

| | Thermal data | | |
|---|---|---|---|
| 17_ | Thermal resistance housing-ambient | K/W | 17.9 |
| 18_ | Thermal resistance winding-housing | K/W | 7.21 |
| 19_ | Thermal time constant winding | s | 21.5 |
| 20_ | Thermal time constant motor | s | 294 |
| 21_ | Ambient temperature ball bearings | °C | -40…+100 |
| | Ambient temperature sleeve bearings | °C | -30…+100 |
| 22_ | Max. winding temperature | °C | 125 |
| | **Mechanical data ball bearings** | | |
| 23_ | Max. speed | rpm | 17000 |
| 24_ | Axial play | mm | 0…0.1 |
| | Preload | N | 0.8 |
| 25_ | Radial play | mm | 0.015 |
| 26_ | Max. axial load (dynamic) | N | 0.8 |
| 27_ | Max. force for press fits (static) | N | 18 |
| | (static, shaft supported) | N | 300 |
| 28_ | Max. radial load [mm from flange] | N | 10 [5] |
| | **Mechanical data sleeve bearings** | | |
| 23_ | Max. speed | rpm | 15000 |
| 24_ | Axial play | mm | 0…0.1 |
| | Preload | N | 0 |
| 25_ | Radial play | mm | 0.015 |
| 26_ | Max. axial load (dynamic) | N | 0.1 |
| 27_ | Max. force for press fits (static) | N | 60 |
| | (static, shaft supported) | N | 300 |
| 28_ | Max. radial load [mm from flange] | N | 2 [5] |
| | **Other specifications** | | |
| 29_ | Number of pole pairs | | 1 |
| 30_ | Number of commutator segments | | 7 |
| 31_ | Weight of motor | g | 42 |
| 32_ | Typical noise level | dBA | 40 |

**Operating Range**

**n [rpm] Winding 12 V**




- Continuous operation
- Continuous operation with reduced thermal resistance $R_{th2}$ 50%
- Intermittent operation

**maxon Modular System**

| maxon gear | Stages | maxon sensor | maxon motor control |
|---|---|---|---|
| 62_GPX 16 A, C | 1–2 | 82_ENX 10 EASY | 378_ESCON Module 24/2 |
| 63_GPX 16 LN, LZ | 1–2 | 82_ENX 10 QUAD | 378_ESCON 36/2 DC |
| 64_GPX 16 HP | 2–3 | 83_ENX 16 EASY | 386_EPOS2 24/2 (DC/EC) |
| 66_GPX 19 A, C | 3–4 | 84_ENX 16 EASY Abs. | 386_EPOS2 Module 36/2 |
| 67_GPX 19 LN, LZ | 3–4 | | 390_EPOS2 P 24/5 |
| | | | 393_EPOS3 70/10 EtherCAT |
| | | | 396_MAXPOS 50/5 |

**Configuration**

Bearing: Ball bearings preloaded/sleeve bearings
Commutation: Precious metal brushes with CLL/graphite brushes
Flange front/back: Standard flange/configurable flange/no flange
Shaft front/back: Length/diameter/flat face
Electric connection: Terminals or cable/alignment of connection/cable length/connector type

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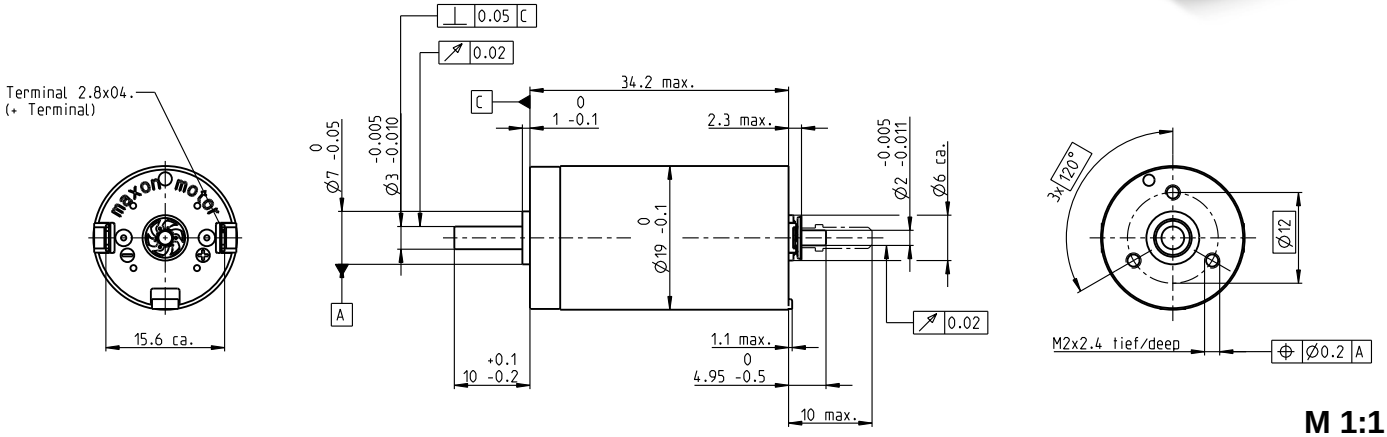
# DCX 19 S Precious Metal Brushes
## DC motor Ø19 mm

NEW


**5/8 W 11.1 mNm 7500 rpm**



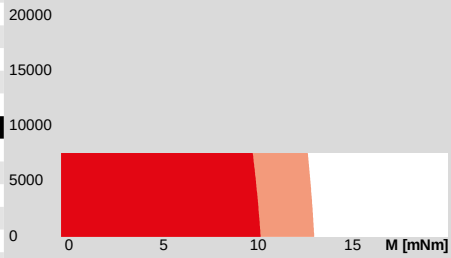

**M 1:1**

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | **Motor Data** | | | | | | | |
| 1_ | Nominal voltage | V | 4.5 | 6 | 9 | 12 | 18 | 24 |
| 2_ | No load speed | rpm | 6440 | 6350 | 6260 | 6360 | 6360 | 6350 |
| 3_ | No load current | mA | 72 | 53 | 34.6 | 26.5 | 17.7 | 13.2 |
| 4_ | Nominal speed | rpm | 5080 | 4540 | 4350 | 4490 | 4490 | 4480 |
| 5_ | Nominal torque (max. continuous torque) | mNm | 7.46 | 10.3 | 10.8 | 11.0 | 11.0 | 10.9 |
| 6_ | Nominal current (max. continuous current) | A | 1.20 | 1.20 | 0.829 | 0.643 | 0.428 | 0.319 |
| 7_ | Stall torque | mNm | 35.7 | 36.3 | 35.8 | 38.0 | 37.8 | 37.5 |
| 8_ | Stall current | A | 5.42 | 4.07 | 2.64 | 2.13 | 1.41 | 1.05 |
| 9_ | Max. efficiency | % | 78 | 79 | 79 | 79 | 79 | 79 |
| 10_ | Terminal resistance | Ω | 0.831 | 1.47 | 3.40 | 5.63 | 12.7 | 22.8 |
| 11_ | Terminal inductance | mH | 0.045 | 0.082 | 0.191 | 0.329 | 0.740 | 1.320 |
| 12_ | Torque constant | mNm/A | 6.58 | 8.90 | 13.5 | 17.8 | 26.7 | 35.6 |
| 13_ | Speed constant | rpm/V | 1450 | 1070 | 705 | 536 | 358 | 268 |
| 14_ | Speed/torque gradient | rpm/mNm | 183 | 177 | 177 | 170 | 170 | 172 |
| 15_ | Mechanical time constant | ms | 5.12 | 4.99 | 4.92 | 4.89 | 4.89 | 4.90 |
| 16_ | Rotor inertia | gcm² | 2.67 | 2.68 | 2.65 | 2.75 | 2.74 | 2.72 |

| | | | |
|---|---|---|---|
| | **Thermal data** | | |
| 17_ | Thermal resistance housing-ambient | K/W | 17.6 |
| 18_ | Thermal resistance winding-housing | K/W | 6.5 |
| 19_ | Thermal time constant winding | s | 11.6 |
| 20_ | Thermal time constant motor | s | 312 |
| 21_ | Ambient temperature ball bearings | °C | -30…+85 |
| | Ambient temperature sleeve bearings | °C | -30…+85 |
| 22_ | Max. winding temperature | °C | 100 |
| | **Mechanical data ball bearings** | | |
| 23_ | Max. speed | rpm | 7500 |
| 24_ | Axial play | mm | 0…0.1 |
| | Preload | N | 2.5 |
| 25_ | Radial play | mm | 0.02 |
| 26_ | Max. axial load (dynamic) | N | 2.5 |
| 27_ | Max. force for press fits (static) | N | 30 |
| | (static, shaft supported) | N | 440 |
| 28_ | Max. radial load [mm from flange] | N | 16 [5] |
| | **Mechanical data sleeve bearings** | | |
| 23_ | Max. speed | rpm | 7500 |
| 24_ | Axial play | mm | 0…0.2 |
| | Preload | N | 0 |
| 25_ | Radial play | mm | 0.02 |
| 26_ | Max. axial load (dynamic) | N | 0.1 |
| 27_ | Max. force for press fits (static) | N | 80 |
| | (static, shaft supported) | N | 440 |
| 28_ | Max. radial load [mm from flange] | N | 3 [5] |
| | **Other specifications** | | |
| 29_ | Number of pole pairs | | 1 |
| 30_ | Number of commutator segments | | 9 |
| 31_ | Weight of motor | g | 50 |
| 32_ | Typical noise level | dBA | 48 |

**Operating Range**

**n [rpm] Winding 9 V**




- Continuous operation
- Continuous operation with reduced thermal resistance $R_{th2}$ 50%
- Intermittent operation

**maxon Modular System**

| maxon gear | Stages | maxon sensor | maxon motor control |
|---|---|---|---|
| 66_GPX 19 A, C | 1–2 | 102_ENX 10 QUAD | 378_ESCON Module 24/2 |
| 67_GPX 19 LN, LZ | 1–2 | 103_ENX 16 EASY | 378_ESCON 36/2 DC |
| 68_GPX 22 A, C | 3–4 | 104_ENX 16 EASY Abs. | 386_EPOS2 24/2 (DC/EC) |
| 69_GPX 22 LN, LZ | 3–4 | | 386_EPOS2 Module 36/2 |
| 70_GPX 22 HP | 4 | | 390_EPOS2 P 24/5 |
| | | | 393_EPOS3 70/10 EtherCAT |
| | | | 396_MAXPOS 50/5 |

**Configuration**

Bearing: Ball bearings preloaded/sleeve bearings
Commutation: Precious metal brushes with CLL/graphite brushes
Flange front/back: Standard flange/configurable flange/no flange
Shaft front/back: Length/diameter/flat face
Electric connection: Terminals or cable/alignment of connection/cable length/connector type

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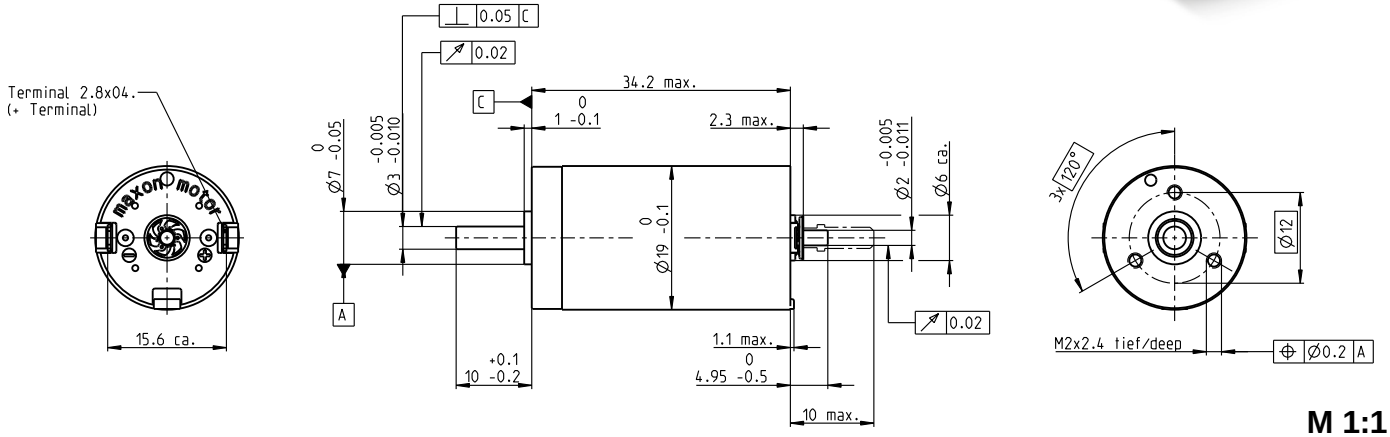
# DCX 19 S Graphite Brushes
## DC motor Ø19 mm

NEW

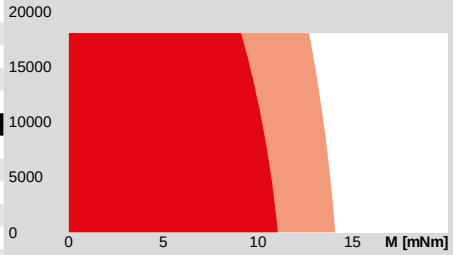
**11/17 W 11.3 mNm 18 000 rpm**


**M 1:1**

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | **Motor Data** | | | | | | | |
| 1_ | Nominal voltage | V | 9 | 12 | 18 | 24 | 36 | 48 |
| 2_ | No load speed | rpm | 12900 | 12800 | 12600 | 12700 | 12700 | 12700 |
| 3_ | No load current | mA | 102 | 75 | 48.9 | 37.4 | 25 | 18.7 |
| 4_ | Nominal speed | rpm | 10900 | 10800 | 10600 | 10600 | 10700 | 10700 |
| 5_ | Nominal torque (max. continuous torque) | mNm | 11.3 | 11.4 | 11.4 | 11.1 | 11.3 | 11.3 |
| 6_ | Nominal current (max. continuous current) | A | 1.81 | 1.35 | 0.884 | 0.657 | 0.445 | 0.335 |
| 7_ | Stall torque | mNm | 73.8 | 73.9 | 72.2 | 73.2 | 73.9 | 73.8 |
| 8_ | Stall current | A | 11.2 | 8.30 | 5.33 | 4.11 | 2.77 | 2.07 |
| 9_ | Max. efficiency | % | 82 | 82 | 82 | 81 | 82 | 82 |
| 10_ | Terminal resistance | Ω | 0.802 | 1.45 | 3.38 | 5.84 | 13.0 | 23.2 |
| 11_ | Terminal inductance | mH | 0.045 | 0.082 | 0.191 | 0.329 | 0.740 | 1.320 |
| 12_ | Torque constant | mNm/A | 6.58 | 8.90 | 13.5 | 17.8 | 26.7 | 35.6 |
| 13_ | Speed constant | rpm/V | 1450 | 1070 | 705 | 536 | 358 | 268 |
| 14_ | Speed/torque gradient | rpm/mNm | 177 | 174 | 176 | 176 | 174 | 174 |
| 15_ | Mechanical time constant | ms | 4.94 | 4.90 | 4.88 | 5.07 | 5.00 | 4.97 |
| 16_ | Rotor inertia | gcm² | 2.67 | 2.68 | 2.65 | 2.75 | 2.74 | 2.72 |
| | **Thermal data** | | | **Operating Range** | | | | |
| 17_ | Thermal resistance housing-ambient | K/W | 17.6 | | | | | |
| 18_ | Thermal resistance winding-housing | K/W | 6.5 | | | | | |
| 19_ | Thermal time constant winding | s | 11.6 | | | | | |
| 20_ | Thermal time constant motor | s | 312 | | | | | |
| 21_ | Ambient temperature ball bearings | °C | -40…+100 | | | | | |
| | Ambient temperature sleeve bearings | °C | -30…+100 | | | | | |
| 22_ | Max. winding temperature | °C | 125 | | | | | |
| | **Mechanical data ball bearings** | | | | | | | |
| 23_ | Max. speed | rpm | 18000 | | | | | |
| 24_ | Axial play | mm | 0…0.1 | | | | | |
| | Preload | N | 2.5 | | | | | |
| 25_ | Radial play | mm | 0.02 | | | | | |
| 26_ | Max. axial load (dynamic) | N | 2.5 | | | | | |
| 27_ | Max. force for press fits (static) | N | 30 | | | | | |
| | (static, shaft supported) | N | 440 | | | | | |
| 28_ | Max. radial load [mm from flange] | N | 16 [5] | | | | | |
| | **Mechanical data sleeve bearings** | | | **maxon Modular System** | | | | |
| 23_ | Max. speed | rpm | 13500 | | | | | |
| 24_ | Axial play | mm | 0…0.2 | | | | | |
| | Preload | N | 0 | | | | | |
| 25_ | Radial play | mm | 0.02 | | | | | |
| 26_ | Max. axial load (dynamic) | N | 0.1 | | | | | |
| 27_ | Max. force for press fits (static) | N | 80 | | | | | |
| | (static, shaft supported) | N | 440 | | | | | |
| 28_ | Max. radial load [mm from flange] | N | 3 [5] | | | | | |
| | **Other specifications** | | | | | | | |
| 29_ | Number of pole pairs | | 1 | | | | | |
| 30_ | Number of commutator segments | | 9 | | | | | |
| 31_ | Weight of motor | g | 50 | | | | | |
| 32_ | Typical noise level | dBA | 40 | | | | | |

**n [rpm] Winding 18 V**




- Continuous operation
- Continuous operation with reduced thermal resistance $R_{th2}$ 50%
- Intermittent operation

| **maxon gear** | Stages | **maxon sensor** | **maxon motor control** |
|---|---|---|---|
| 66_GPX 19 A, C | 1–2 | 102_ENX 10 QUAD | 378_ESCON Module 24/2 |
| 67_GPX 19 LN, LZ | 1–2 | 103_ENX 16 EASY | 378_ESCON 36/2 DC |
| 68_GPX 22 A, C | 3–4 | 104_ENX 16 EASY Abs. | 379_ESCON Module 50/5 |
| 69_GPX 22 LN, LZ | 3–4 | | 379_ESCON 50/5 |
| 70_GPX 22 HP | 4 | | 386_EPOS2 24/2 (DC/EC) |
| | | | 386_EPOS2 Module 36/2 |
| | | | 387_EPOS2 50/5 |
| | | | 390_EPOS2 P 24/5 |
| | | | 393_EPOS3 70/10 EtherCAT |
| | | | 396_MAXPOS 50/5 |

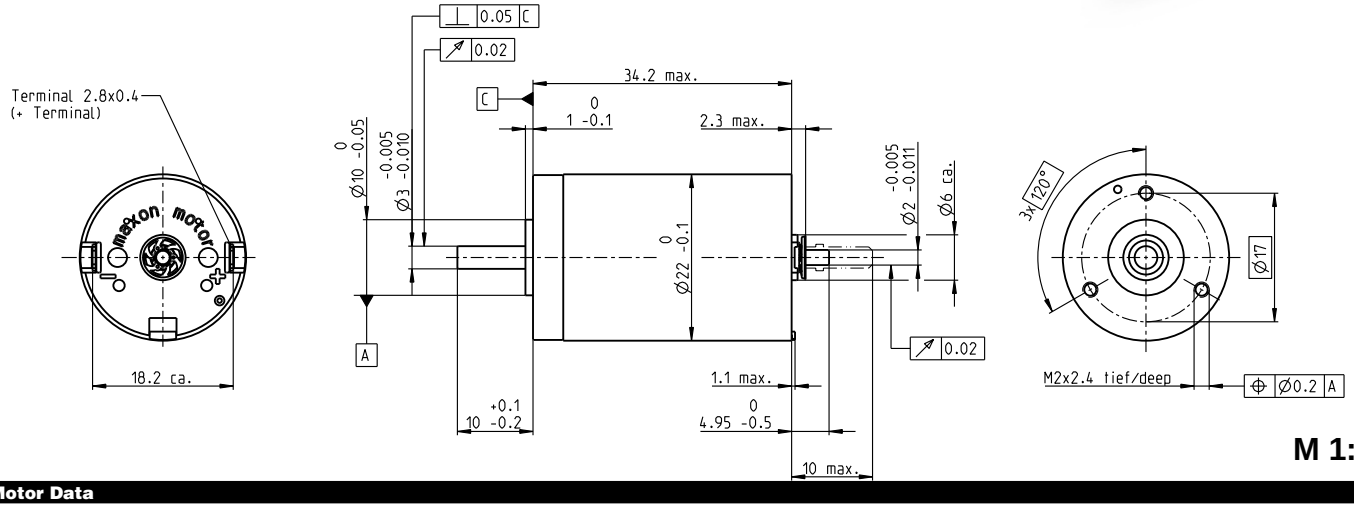
**Configuration**

Bearing: Ball bearings preloaded/sleeve bearings
Commutation: Precious metal brushes with CLL/graphite brushes
Flange front/back: Standard flange/configurable flange/no flange
Shaft front/back: Length/diameter/flat face
Electric connection: Terminals or cable/alignment of connection/cable length/connector type

xdrives.maxonmotor.com

# DCX 22 S Precious Metal Brushes
## DC motor Ø22 mm


**6/10 W 14.5 mNm 7160 rpm**



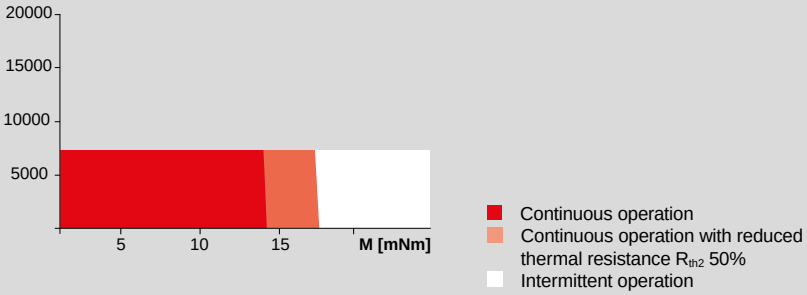

**M 1:1**

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | **Motor Data** | | | | | | | |
| 1_ | Nominal voltage | V | 6 | 12 | 18 | 24 | 36 | 48 |
| 2_ | No load speed | rpm | 6200 | 6200 | 6110 | 6340 | 6550 | 5890 |
| 3_ | No load current | mA | 39.2 | 19.6 | 12.8 | 10.1 | 7.09 | 4.55 |
| 4_ | Nominal speed | rpm | 4960 | 4670 | 4560 | 4700 | 4940 | 4240 |
| 5_ | Nominal torque (max. continuous torque) | mNm | 10.7 | 14.7 | 14.5 | 13.6 | 13.8 | 13.6 |
| 6_ | Nominal current (max. continuous current) | A | 1.20 | 0.817 | 0.531 | 0.388 | 0.272 | 0.180 |
| 7_ | Stall torque | mNm | 53.7 | 59.7 | 57.5 | 52.7 | 56.5 | 48.6 |
| 8_ | Stall current | A | 5.85 | 3.25 | 2.06 | 1.47 | 1.08 | 0.63 |
| 9_ | Max. efficiency | % | 84 | 85 | 85 | 84 | 85 | 84 |
| 10_ | Terminal resistance | Ω | 1.02 | 3.69 | 8.75 | 16.3 | 33.3 | 76.2 |
| 11_ | Terminal inductance | mH | 0.058 | 0.231 | 0.535 | 0.881 | 1.86 | 4.08 |
| 12_ | Torque constant | mNm/A | 9.18 | 18.4 | 28.0 | 35.9 | 52.2 | 77.2 |
| 13_ | Speed constant | rpm/V | 1040 | 520 | 342 | 266 | 183 | 124 |
| 14_ | Speed/torque gradient | rpm/mNm | 116 | 104 | 107 | 121 | 117 | 122 |
| 15_ | Mechanical time constant | ms | 6.14 | 6.07 | 6.09 | 5.93 | 6.15 | 6.19 |
| 16_ | Rotor inertia | gcm² | 5.05 | 5.55 | 5.44 | 4.67 | 5.03 | 4.84 |

| | | | |
|---|---|---|---|
| | **Thermal data** | | |
| 17_ | Thermal resistance housing-ambient | K/W | 16 |
| 18_ | Thermal resistance winding-housing | K/W | 7 |
| 19_ | Thermal time constant winding | s | 20 |
| 20_ | Thermal time constant motor | s | 528 |
| 21_ | Ambient temperature ball bearings | °C | -30…85 |
| | Ambient temperature sleeve bearings | °C | -30…85 |
| 22_ | Max. winding temperature | °C | 100 |
| | **Mechanical data ball bearings** | | |
| 23_ | Max. speed | rpm | 7160 |
| 24_ | Axial play | mm | 0…0.1 |
| | Preload | N | 2.5 |
| 25_ | Radial play | mm | 0.02 |
| 26_ | Max. axial load (dynamic) | N | 2.5 |
| 27_ | Max. force for press fits (static) | N | 30 |
| | (static, shaft supported) | N | 440 |
| 28_ | Max. radial load [mm from flange] | N | 16 [5] |
| | **Mechanical data sleeve bearings** | | |
| 23_ | Max. speed | rpm | 7160 |
| 24_ | Axial play | mm | 0…0.2 |
| | Preload | N | 0 |
| 25_ | Radial play | mm | 0.02 |
| 26_ | Max. axial load (dynamic) | N | 0.1 |
| 27_ | Max. force for press fits (static) | N | 80 |
| | (static, shaft supported) | N | 440 |
| 28_ | Max. radial load [mm from flange] | N | 3 [5] |
| | **Other specifications** | | |
| 29_ | Number of pole pairs | | 1 |
| 30_ | Number of commutator segments | | 9 |
| 31_ | Weight of motor | g | 66 |
| 32_ | Typical noise level | dBA | 48 |

**Operating Range**

**n [rpm] Winding 18 V**




**maxon Modular System**

| maxon gear | Stages | maxon sensor | maxon motor control |
|---|---|---|---|
| 68_GPX 22 A, C | 1–2 | 82_ENX 10 QUAD | 378_ESCON Module 24/2 |
| 69_GPX 22 LN, LZ | 1–2 | 83_ENX 16 EASY | 378_ESCON 36/2 DC |
| 70_GPX 22 HP | 2–3 | 84_ENX 16 EASY Abs. | 379_ESCON 50/5 |
| 71_GPX 26 A, C | 3 | 359_ENC SCH16F | 379_ESCON Module 50/5 |
| 72_GPX 26 LN, LZ | 3 | 367_ENC 30 HEDL 5540 | 386_EPOS2 24/2 (DC/EC) |
| | | | 386_EPOS2 Module 36/2 |
| | | | 387_EPOS2 50/5 |
| | | | 390_EPOS2 P 24/5 |
| | | | 393_EPOS3 70/10 EtherCAT |
| | | | 396_MAXPOS 50/5 |

**Configuration**

Bearing: Ball bearings preloaded/sleeve bearings
Commutation: Precious metal brushes with or without CLL/graphite brushes/EMI filter
Flange front/back: Standard flange/configurable flange/no flange
Shaft front/back: Length/diameter/flat face
Electric connection: Terminals or cable/alignment of connection/cable length/connector type

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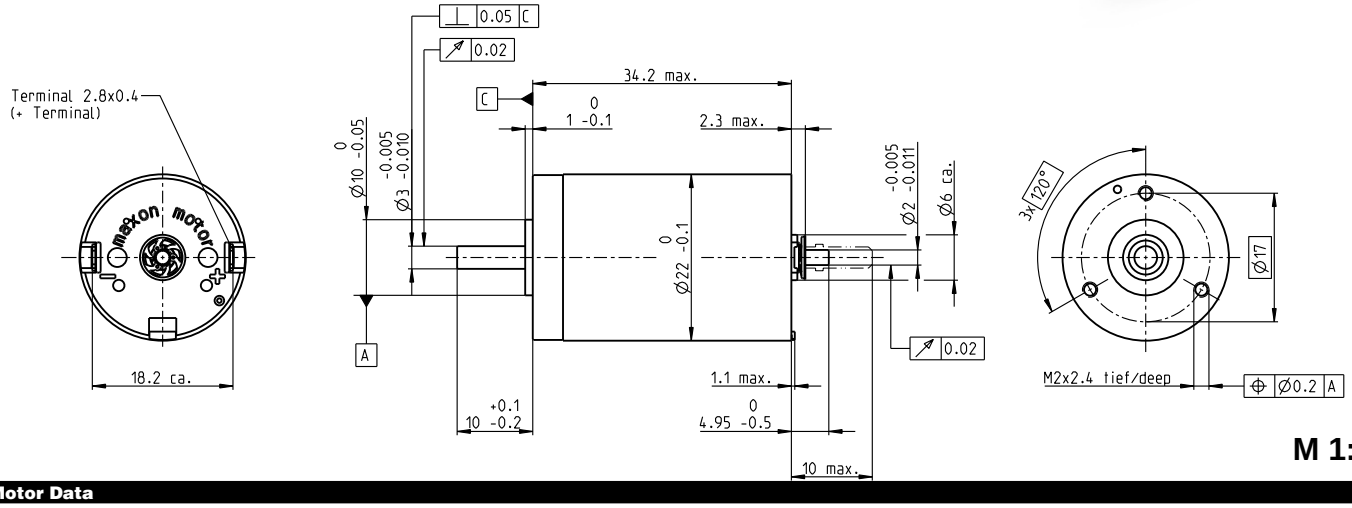
# DCX 22 S Graphite Brushes
## DC motor Ø22 mm


**14/24 W 15.3 mNm 18000 rpm**



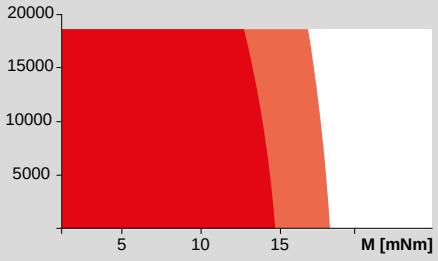

**M 1:1**

| | Motor Data | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 1_ | Nominal voltage | V | 6 | 12 | 18 | 24 | 36 | 48 |
| 2_ | No load speed | rpm | 11400 | 12400 | 12400 | 12400 | 12200 | 12700 |
| 3_ | No load current | mA | 126 | 71.7 | 47.8 | 35.9 | 23.4 | 18.5 |
| 4_ | Nominal speed | rpm | 9700 | 10700 | 10800 | 10800 | 10500 | 10900 |
| 5_ | Nominal torque (max. continuous torque) | mNm | 14.4 | 14.6 | 14.9 | 15.3 | 14.8 | 14.0 |
| 6_ | Nominal current (max. continuous current) | A | 3.00 | 1.65 | 1.12 | 0.869 | 0.552 | 0.406 |
| 7_ | Stall torque | mNm | 101 | 108 | 112 | 120 | 113 | 104 |
| 8_ | Stall current | A | 20.2 | 11.8 | 8.15 | 6.51 | 4.03 | 2.90 |
| 9_ | Max. efficiency | % | 85 | 85 | 85 | 86 | 85 | 84 |
| 10_ | Terminal resistance | Ω | 0.297 | 1.02 | 2.21 | 3.69 | 8.94 | 16.6 |
| 11_ | Terminal inductance | mH | 0.017 | 0.058 | 0.130 | 0.231 | 0.535 | 0.881 |
| 12_ | Torque constant | mNm/A | 5.01 | 9.18 | 13.8 | 18.4 | 28.0 | 35.9 |
| 13_ | Speed constant | rpm/V | 1910 | 1040 | 693 | 520 | 342 | 266 |
| 14_ | Speed/torque gradient | rpm/mNm | 113 | 116 | 111 | 104 | 109 | 123 |
| 15_ | Mechanical time constant | ms | 6.23 | 6.12 | 6.08 | 6.07 | 6.22 | 6.01 |
| 16_ | Rotor inertia | gcm² | 5.27 | 5.05 | 5.22 | 5.55 | 5.44 | 4.67 |

| | Thermal data | | |
|---|---|---|---|
| 17_ | Thermal resistance housing-ambient | K/W | 16 |
| 18_ | Thermal resistance winding-housing | K/W | 7 |
| 19_ | Thermal time constant winding | s | 20 |
| 20_ | Thermal time constant motor | s | 528 |
| 21_ | Ambient temperature ball bearings | °C | -40…+100 |
| | Ambient temperature sleeve bearings | °C | -30…+100 |
| 22_ | Max. winding temperature | °C | 125 |
| | **Mechanical data ball bearings** | | |
| 23_ | Max. speed | rpm | 18000 |
| 24_ | Axial play | mm | 0…0.1 |
| | Preload | N | 2.5 |
| 25_ | Radial play | mm | 0.02 |
| 26_ | Max. axial load (dynamic) | N | 2.5 |
| 27_ | Max. force for press fits (static) | N | 30 |
| | (static, shaft supported) | N | 440 |
| 28_ | Max. radial load [mm from flange] | N | 16 [5] |
| | **Mechanical data sleeve bearings** | | |
| 23_ | Max. speed | rpm | 18000 |
| 24_ | Axial play | mm | 0…0.2 |
| | Preload | N | 0 |
| 25_ | Radial play | mm | 0.02 |
| 26_ | Max. axial load (dynamic) | N | 0.1 |
| 27_ | Max. force for press fits (static) | N | 80 |
| | (static, shaft supported) | N | 440 |
| 28_ | Max. radial load [mm from flange] | N | 3 [5] |
| | **Other specifications** | | |
| 29_ | Number of pole pairs | | 1 |
| 30_ | Number of commutator segments | | 9 |
| 31_ | Weight of motor | g | 66 |
| 32_ | Typical noise level | dBA | 41 |

**Operating Range**

**n [rpm] Winding 18 V**




- Continuous operation
- Continuous operation with reduced thermal resistance $R_{th2}$ 50%
- Intermittent operation

**maxon Modular System**

| maxon gear | Stages | maxon sensor | maxon motor control |
|---|---|---|---|
| 68_GPX 22 A, C | 1–2 | 82_ENX 10 QUAD | 378_ESCON Module 24/2 |
| 69_GPX 22 LN, LZ | 1–2 | 83_ENX 16 EASY | 378_ESCON 36/2 DC |
| 70_GPX 22 HP | 2–3 | 84_ENX 16 EASY Abs. | 379_ESCON 50/5 |
| 71_GPX 26 A, C | 3 | 359_ENC SCH16F | 379_ESCON Module 50/5 |
| 72_GPX 26 LN, LZ | 3 | 367_ENC 30 HEDL 5540 | 386_EPOS2 24/2 (DC/EC) |
| | | | 386_EPOS2 Module 36/2 |
| | | | 387_EPOS2 24/5 |
| | | | 387_EPOS2 50/5 |
| | | | 390_EPOS2 P 24/5 |
| | | | 393_EPOS3 70/10 EtherCAT |
| | | | 396_MAXPOS 50/5 |

**Configuration**

Bearing: Ball bearings preloaded/sleeve bearings
Commutation: Precious metal brushes with or without CLL/graphite brushes/EMI filter
Flange front/back: Standard flange/configurable flange/no flange
Shaft front/back: Length/diameter/flat face
Electric connection: Terminals or cable/alignment of connection/cable length/connector type

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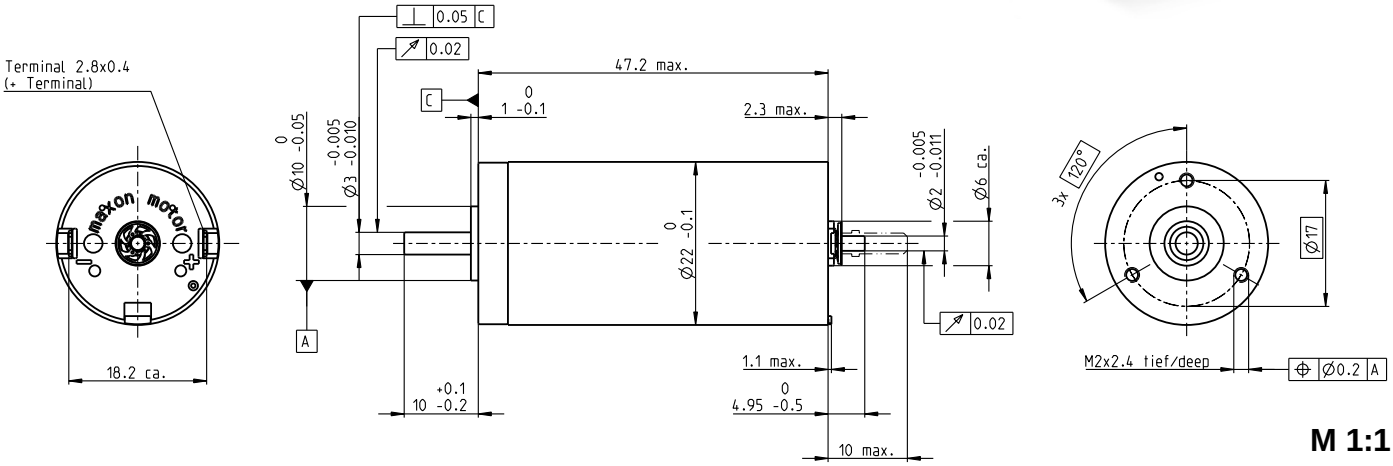
# DCX 22 L Precious Metal Brushes
## DC motor Ø22 mm


**11/20 W 29.8 mNm 7160 rpm**



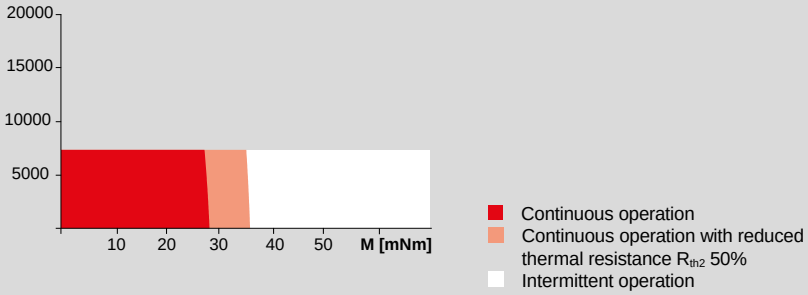

**M 1:1**

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | **Motor Data** | | | | | | | | |
| 1_ | Nominal voltage | V | 6 | 9 | 12 | 18 | 24 | 36 | 48 |
| 2_ | No load speed | rpm | 5870 | 5870 | 4980 | 5740 | 5060 | 6020 | 5220 |
| 3_ | No load current | mA | 51.0 | 34 | 20.0 | 16.4 | 10.2 | 8.82 | 5.36 |
| 4_ | Nominal speed | rpm | 5380 | 5210 | 4000 | 4780 | 4070 | 5040 | 4180 |
| 5_ | Nominal torque (max. continuous torque) | mNm | 14.1 | 21.4 | 29.5 | 29.8 | 29.2 | 29.2 | 27.8 |
| 6_ | Nominal current (max. continuous current) | A | 1.50 | 1.50 | 1.30 | 1.01 | 0.655 | 0.520 | 0.322 |
| 7_ | Stall torque | mNm | 170 | 191 | 150 | 178 | 150 | 180 | 140 |
| 8_ | Stall current | A | 17.5 | 13.1 | 6.54 | 5.97 | 3.31 | 3.16 | 1.60 |
| 9_ | Max. efficiency | % | 89 | 90 | 89 | 90 | 89 | 90 | 89 |
| 10_ | Terminal resistance | Ω | 0.343 | 0.687 | 1.84 | 3.01 | 7.25 | 11.4 | 29.9 |
| 11_ | Terminal inductance | mH | 0.035 | 0.078 | 0.192 | 0.326 | 0.746 | 1.19 | 2.80 |
| 12_ | Torque constant | mNm/A | 9.73 | 14.6 | 22.9 | 29.9 | 45.2 | 57.0 | 87.6 |
| 13_ | Speed constant | rpm/V | 981 | 654 | 416 | 320 | 211 | 168 | 109 |
| 14_ | Speed/torque gradient | rpm/mNm | 34.6 | 30.8 | 33.3 | 32.2 | 33.9 | 33.5 | 37.3 |
| 15_ | Mechanical time constant | ms | 3.28 | 3.17 | 3.14 | 3.13 | 3.14 | 3.14 | 3.17 |
| 16_ | Rotor inertia | gcm² | 9.06 | 9.82 | 9.00 | 9.26 | 8.85 | 8.94 | 8.12 |

| | | | |
|---|---|---|---|
| | **Thermal data** | | |
| 17_ | Thermal resistance housing-ambient | K/W | 13.6 |
| 18_ | Thermal resistance winding-housing | K/W | 4.57 |
| 19_ | Thermal time constant winding | s | 22 |
| 20_ | Thermal time constant motor | s | 646 |
| 21_ | Ambient temperature ball bearings | °C | -30…+85 |
| | Ambient temperature sleeve bearings | °C | -30…+85 |
| 22_ | Max. winding temperature | °C | 100 |
| | **Mechanical data ball bearings** | | |
| 23_ | Max. speed | rpm | 7160 |
| 24_ | Axial play | mm | 0…0.1 |
| | Preload | N | 2.5 |
| 25_ | Radial play | mm | 0.02 |
| 26_ | Max. axial load (dynamic) | N | 2.5 |
| 27_ | Max. force for press fits (static) | N | 30 |
| | (static, shaft supported) | N | 440 |
| 28_ | Max. radial load [mm from flange] | N | 16 [5] |
| | **Mechanical data sleeve bearings** | | |
| 23_ | Max. speed | rpm | 7160 |
| 24_ | Axial play | mm | 0…0.2 |
| | Preload | N | 0 |
| 25_ | Radial play | mm | 0.02 |
| 26_ | Max. axial load (dynamic) | N | 0.1 |
| 27_ | Max. force for press fits (static) | N | 80 |
| | (static, shaft supported) | N | 440 |
| 28_ | Max. radial load [mm from flange] | N | 3 [5] |
| | **Other specifications** | | |
| 29_ | Number of pole pairs | | 1 |
| 30_ | Number of commutator segments | | 9 |
| 31_ | Weight of motor | g | 95 |
| 32_ | Typical noise level | dBA | 52 |

**Operating Range**

**n [rpm] Winding 18 V**




**maxon Modular System**

| maxon gear | Stages | maxon sensor | maxon motor control |
|---|---|---|---|
| 68_GPX 22 A, C | 1–2 | 82_ENX 10 QUAD | 378_ESCON Module 24/2 |
| 69_GPX 22 LN, LZ | 1–2 | 83_ENX 16 EASY | 378_ESCON 36/2 DC |
| 70_GPX 22 HP | 2–3 | 84_ENX 16 EASY Abs. | 379_ESCON 50/5 |
| 71_GPX 26 A, C | 3 | 359_ENC SCH16F | 379_ESCON Module 50/5 |
| 72_GPX 26 LN, LZ | 3 | 367_ENC 30 HEDL 5540 | 386_EPOS2 24/2 (DC/EC) |
| | | | 386_EPOS2 Module 36/2 |
| | | | 387_EPOS2 50/5 |
| | | | 390_EPOS2 P 24/5 |
| | | | 393_EPOS3 70/10 EtherCAT |
| | | | 396_MAXPOS 50/5 |

**Configuration**

Bearing: Ball bearings preloaded/sleeve bearings
Commutation: Precious metal brushes with or without CLL/graphite brushes/EMI filter
Flange front/back: Standard flange/configurable flange/no flange
Shaft front/back: Length/diameter/flat face
Electric connection: Terminals or cable/alignment of connection/cable length/connector type

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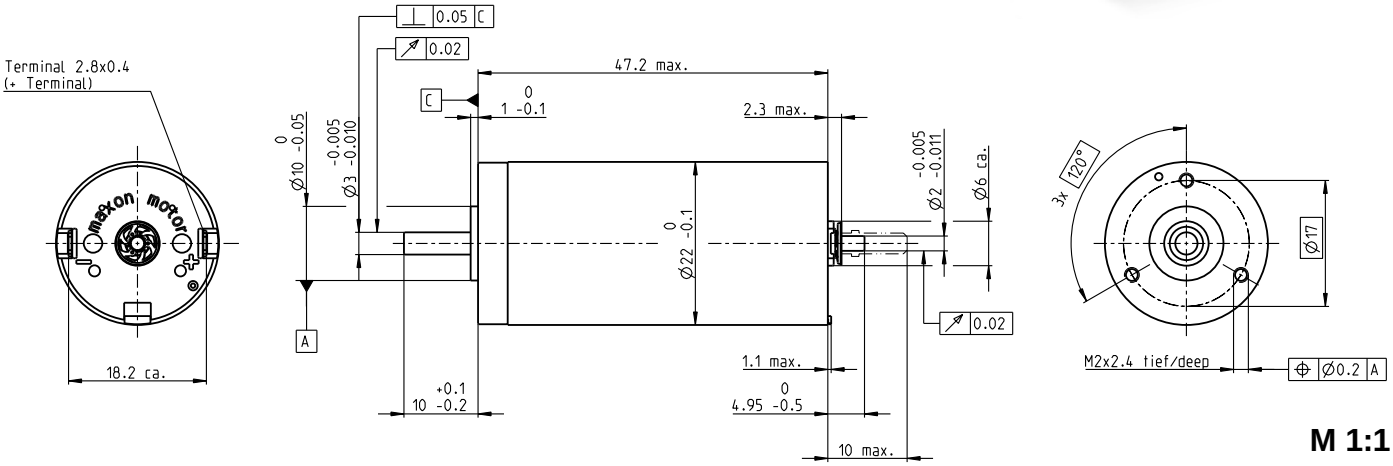
# DCX 22 L Graphite Brushes
## DC motor Ø22 mm


**20/49 W 32.2 mNm 18 000 rpm**




**M 1:1**

| | Motor Data | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 1_ | Nominal voltage | V | 9 | 12 | 18 | 24 | 36 | 48 |
| 2_ | No load speed | rpm | 12300 | 11700 | 11800 | 9970 | 11400 | 10100 |
| 3_ | No load current | mA | 118 | 81.8 | 54.6 | 31.8 | 26.3 | 16.2 |
| 4_ | Nominal speed | rpm | 11400 | 10700 | 10800 | 8920 | 10400 | 9020 |
| 5_ | Nominal torque (max. continuous torque) | mNm | 27.0 | 30.5 | 32.2 | 31.5 | 30.0 | 30.3 |
| 6_ | Nominal current (max. continuous current) | A | 4.00 | 3.21 | 2.26 | 1.40 | 1.03 | 0.687 |
| 7_ | Stall torque | mNm | 371 | 348 | 386 | 301 | 346 | 294 |
| 8_ | Stall current | A | 53.4 | 35.8 | 26.5 | 13.1 | 11.6 | 6.50 |
| 9_ | Max. efficiency | % | 90 | 91 | 91 | 90 | 90 | 90 |
| 10_ | Terminal resistance | Ω | 0.168 | 0.335 | 0.680 | 1.83 | 3.11 | 7.39 |
| 11_ | Terminal inductance | mH | 0.018 | 0.035 | 0.078 | 0.192 | 0.326 | 0.746 |
| 12_ | Torque constant | mNm/A | 6.95 | 9.73 | 14.6 | 22.9 | 29.9 | 45.2 |
| 13_ | Speed constant | rpm/V | 1370 | 981 | 654 | 416 | 320 | 211 |
| 14_ | Speed/torque gradient | rpm/mNm | 33.3 | 33.8 | 30.5 | 33.2 | 33.3 | 34.6 |
| 15_ | Mechanical time constant | ms | 3.27 | 3.21 | 3.13 | 3.13 | 3.23 | 3.20 |
| 16_ | Rotor inertia | gcm² | 9.37 | 9.06 | 9.82 | 9.00 | 9.26 | 8.85 |

| | Thermal data | | |
|---|---|---|---|
| 17_ | Thermal resistance housing-ambient | K/W | 13.6 |
| 18_ | Thermal resistance winding-housing | K/W | 4.57 |
| 19_ | Thermal time constant winding | s | 22 |
| 20_ | Thermal time constant motor | s | 646 |
| 21_ | Ambient temperature ball bearings | °C | -40…+100 |
| | Ambient temperature sleeve bearings | °C | -30…+100 |
| 22_ | Max. winding temperature | °C | 125 |

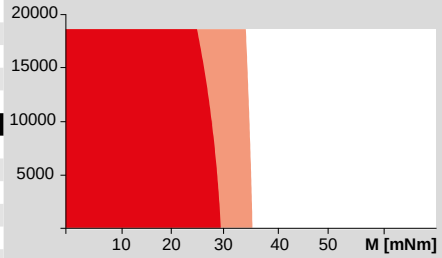
| | Mechanical data ball bearings | | |
|---|---|---|---|
| 23_ | Max. speed | rpm | 18 000 |
| 24_ | Axial play | mm | 0…0.1 |
| | Preload | N | 2.5 |
| 25_ | Radial play | mm | 0.02 |
| 26_ | Max. axial load (dynamic) | N | 2.5 |
| 27_ | Max. force for press fits (static) | N | 30 |
| | (static, shaft supported) | N | 440 |
| 28_ | Max. radial load [mm from flange] | N | 16 [5] |

| | Mechanical data sleeve bearings | | |
|---|---|---|---|
| 23_ | Max. speed | rpm | 18 000 |
| 24_ | Axial play | mm | 0…0.2 |
| | Preload | N | 0 |
| 25_ | Radial play | mm | 0.02 |
| 26_ | Max. axial load (dynamic) | N | 0.1 |
| 27_ | Max. force for press fits (static) | N | 80 |
| | (static, shaft supported) | N | 440 |
| 28_ | Max. radial load [mm from flange] | N | 3 [5] |

| | Other specifications | | |
|---|---|---|---|
| 29_ | Number of pole pairs | | 1 |
| 30_ | Number of commutator segments | | 9 |
| 31_ | Weight of motor | g | 95 |
| 32_ | Typical noise level | dBA | 44 |

**Operating Range**

**n [rpm] Winding 18 V**




- Continuous operation
- Continuous operation with reduced thermal resistance $R_{th2}$ 50%
- Intermittent operation

**maxon Modular System**

| maxon gear | Stages | maxon sensor | maxon motor control |
|---|---|---|---|
| 68_GPX 22 A, C | 1–2 | 82_ENX 10 QUAD | 378_ESCON Module 24/2 |
| 69_GPX 22 LN, LZ | 1–2 | 83_ENX 16 EASY | 378_ESCON 36/2 DC |
| 70_GPX 22 HP | 2–3 | 84_ENX 16 EASY Abs. | 379_ESCON 50/5 |
| 71_GPX 26 A, C | 3 | 359_ENC SCH16F | 379_ESCON Module 50/5 |
| 72_GPX 26 LN, LZ | 3 | 367_ENC 30 HEDL 5540 | 386_EPOS2 24/2 (DC/EC) |
| | | | 386_EPOS2 Module 36/2 |
| | | | 387_EPOS2 24/5 |
| | | | 387_EPOS2 50/5 |
| | | | 390_EPOS2 P 24/5 |
| | | | 393_EPOS3 70/10 EtherCAT |
| | | | 396_MAXPOS 50/5 |

**Configuration**

Bearing: Ball bearings preloaded/sleeve bearings
Commutation: Precious metal brushes with or without CLL/graphite brushes/EMI filter
Flange front/back: Standard flange/configurable flange/no flange
Shaft front/back: Length/diameter/flat face
Electric connection: Terminals or cable/alignment of connection/cable length/connector type

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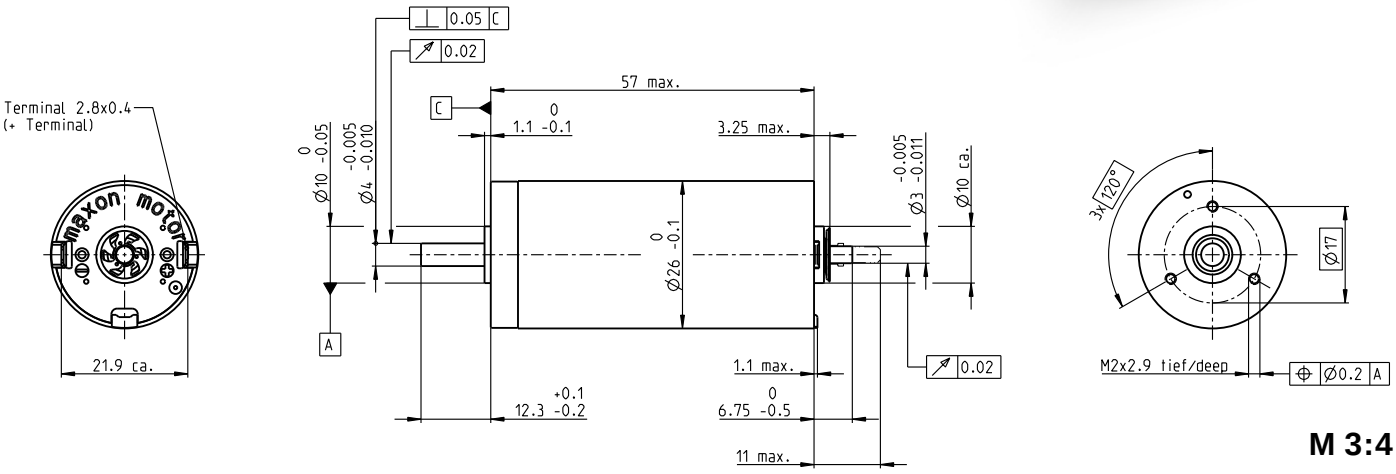
# DCX 26 L Precious Metal Brushes
## DC motor Ø26 mm


**18/29 W 52.3 mNm 5900 rpm**




**M 3:4**

| | Motor Data | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 1_ | Nominal voltage | V | 9 | 12 | 18 | 24 | 36 | 48 |
| 2_ | No load speed | rpm | 5530 | 5330 | 5530 | 5330 | 5430 | 5320 |
| 3_ | No load current | mA | 80.5 | 56.8 | 40.2 | 28.4 | 19.5 | 14.2 |
| 4_ | Nominal speed | rpm | 5060 | 4690 | 4770 | 4600 | 4680 | 4570 |
| 5_ | Nominal torque (max. continuous torque) | mNm | 32.9 | 46.1 | 49.8 | 52.3 | 50.8 | 50.3 |
| 6_ | Nominal current (max. continuous current) | A | 2.20 | 2.20 | 1.64 | 1.25 | 0.822 | 0.599 |
| 7_ | Stall torque | mNm | 384 | 384 | 362 | 384 | 370 | 355 |
| 8_ | Stall current | A | 24.8 | 17.9 | 11.7 | 8.95 | 5.86 | 4.14 |
| 9_ | Max. efficiency | % | 89 | 89 | 89 | 89 | 89 | 89 |
| 10_ | Terminal resistance | Ω | 0.363 | 0.671 | 1.54 | 2.68 | 6.15 | 11.6 |
| 11_ | Terminal inductance | mH | 0.067 | 0.129 | 0.268 | 0.514 | 1.11 | 2.06 |
| 12_ | Torque constant | mNm/A | 15.5 | 21.4 | 31.0 | 42.9 | 63.2 | 85.8 |
| 13_ | Speed constant | rpm/V | 616 | 445 | 308 | 223 | 151 | 111 |
| 14_ | Speed/torque gradient | rpm/mNm | 14.4 | 13.9 | 15.3 | 13.9 | 14.7 | 15.0 |
| 15_ | Mechanical time constant | ms | 3.23 | 3.13 | 3.11 | 3.09 | 3.10 | 3.11 |
| 16_ | Rotor inertia | gcm² | 21.3 | 21.4 | 19.4 | 21.2 | 20.1 | 19.7 |

| | Thermal data | | |
|---|---|---|---|
| 17_ | Thermal resistance housing-ambient | K/W | 10.2 |
| 18_ | Thermal resistance winding-housing | K/W | 3.01 |
| 19_ | Thermal time constant winding | s | 24 |
| 20_ | Thermal time constant motor | s | 620 |
| 21_ | Ambient temperature ball bearings | °C | -30…+85 |
| | Ambient temperature sleeve bearings | °C | -30…+85 |
| 22_ | Max. winding temperature | °C | 100 |

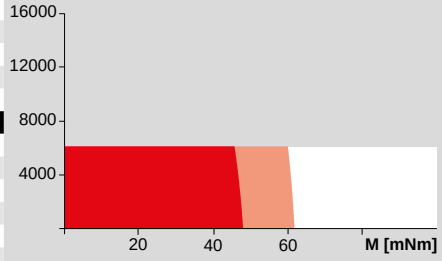
| | Mechanical data ball bearings | | |
|---|---|---|---|
| 23_ | Max. speed | rpm | 5900 |
| 24_ | Axial play | mm | 0…0.1 |
| | Preload | N | 5.5 |
| 25_ | Radial play | mm | 0.02 |
| 26_ | Max. axial load (dynamic) | N | 5.5 |
| 27_ | Max. force for press fits (static) | N | 40 |
| | (static, shaft supported) | N | 500 |
| 28_ | Max. radial load [mm from flange] | N | 20.5 [5] |

| | Mechanical data sleeve bearings | | |
|---|---|---|---|
| 23_ | Max. speed | rpm | 5900 |
| 24_ | Axial play | mm | 0…0.2 |
| | Preload | N | 0 |
| 25_ | Radial play | mm | 0.02 |
| 26_ | Max. axial load (dynamic) | N | 0.1 |
| 27_ | Max. force for press fits (static) | N | 80 |
| | (static, shaft supported) | N | 500 |
| 28_ | Max. radial load [mm from flange] | N | 5.5 [5] |

| | Other specifications | | |
|---|---|---|---|
| 29_ | Number of pole pairs | | 1 |
| 30_ | Number of commutator segments | | 11 |
| 31_ | Weight of motor | g | 170 |
| 32_ | Typical noise level | dBA | 48 |

**Operating Range**

**n [rpm] Winding 18 V**




- Continuous operation
- Continuous operation with reduced thermal resistance $R_{th2}$ 50%
- Intermittent operation

**maxon Modular System**

| maxon gear | Stages |
|---|---|
| 71_GPX 26 A, C | 1–2 |
| 72_GPX 26 LN, LZ | 1–2 |
| 73_GPX 32 A, C | 3 |
| 74_GPX 32 LN, LZ | 3 |
| 75_GPX 32 HP | 4 |

| maxon sensor |
|---|
| 82_ENX 10 QUAD |
| 83_ENX 16 EASY |
| 84_ENX 16 EASY Abs. |
| 367_ENC 30 HEDL 5540 |

| maxon motor control |
|---|
| 378_ESCON 36/2 DC |
| 379_ESCON 50/5 |
| 379_ESCON Module 50/5 |
| 386_EPOS2 24/2 (DC/EC) |
| 386_EPOS2 Module 36/2 |
| 387_EPOS2 24/5 |
| 387_EPOS2 50/5 |
| 390_EPOS2 P 24/5 |
| 393_EPOS3 70/10 EtherCAT |
| 396_MAXPOS 50/5 |

**Configuration**

Bearing: Ball bearings preloaded/sleeve bearings
Commutation: Precious metal brushes with CLL/graphite brushes
Flange front/back: Standard flange/configurable flange/no flange
Shaft front/back: Length/diameter/flat face
Electric connection: Terminals or cable/alignment of connection/cable length/connector type

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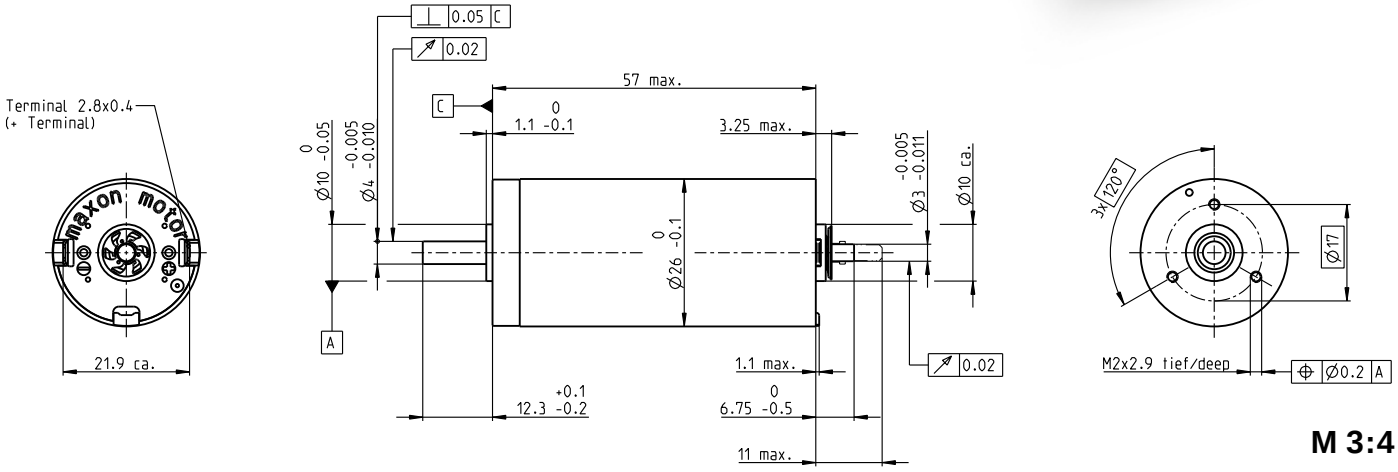
# DCX 26 L Graphite Brushes
## DC motor Ø26 mm


**40/74 W 59.8 mNm 14400 rpm**



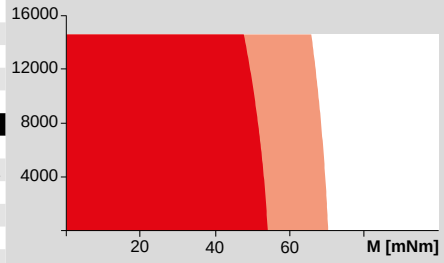

**M 3:4**

| | Motor Data | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 1_ | Nominal voltage | V | 12 | 18 | 24 | 36 | 48 | 60 |
| 2_ | No load speed | rpm | 10600 | 11100 | 10700 | 11100 | 10700 | 10900 |
| 3_ | No load current | mA | 131 | 93.0 | 65.7 | 46.5 | 32.9 | 27.3 |
| 4_ | Nominal speed | rpm | 9460 | 10000 | 9690 | 10000 | 9730 | 10000 |
| 5_ | Nominal torque (max. continuous torque) | mNm | 46.9 | 54.3 | 57.8 | 54.0 | 59.1 | 59.8 |
| 6_ | Nominal current (max. continuous current) | A | 4.50 | 3.59 | 2.76 | 1.79 | 1.41 | 1.17 |
| 7_ | Stall torque | mNm | 532 | 653 | 695 | 639 | 697 | 750 |
| 8_ | Stall current | A | 49.7 | 42.2 | 32.4 | 20.6 | 16.2 | 14.3 |
| 9_ | Max. efficiency | % | 87 | 89 | 90 | 90 | 91 | 91 |
| 10_ | Terminal resistance | Ω | 0.242 | 0.427 | 0.740 | 1.75 | 2.95 | 4.19 |
| 11_ | Terminal inductance | mH | 0.032 | 0.067 | 0.129 | 0.268 | 0.514 | 0.768 |
| 12_ | Torque constant | mNm/A | 10.7 | 15.5 | 21.4 | 31.0 | 42.9 | 52.4 |
| 13_ | Speed constant | rpm/V | 890 | 616 | 445 | 308 | 223 | 182 |
| 14_ | Speed/torque gradient | rpm/mNm | 20.1 | 17.0 | 15.4 | 17.4 | 15.3 | 14.6 |
| 15_ | Mechanical time constant | ms | 4.50 | 3.79 | 3.45 | 3.53 | 3.40 | 3.16 |
| 16_ | Rotor inertia | gcm² | 21.4 | 21.3 | 21.4 | 19.4 | 21.2 | 20.7 |

| | Thermal data | | |
|---|---|---|---|
| 17_ | Thermal resistance housing-ambient | K/W | 10.2 |
| 18_ | Thermal resistance winding-housing | K/W | 3.01 |
| 19_ | Thermal time constant winding | s | 24 |
| 20_ | Thermal time constant motor | s | 620 |
| 21_ | Ambient temperature ball bearings | °C | -40…+100 |
| | Ambient temperature sleeve bearings | °C | -30…+100 |
| 22_ | Max. winding temperature | °C | 125 |
| | **Mechanical data ball bearings** | | |
| 23_ | Max. speed | rpm | 14400 |
| 24_ | Axial play | mm | 0…0.1 |
| | Preload | N | 5.5 |
| 25_ | Radial play | mm | 0.02 |
| 26_ | Max. axial load (dynamic) | N | 5.5 |
| 27_ | Max. force for press fits (static) | N | 40 |
| | (static, shaft supported) | N | 500 |
| 28_ | Max. radial load [mm from flange] | N | 20.5 [5] |
| | **Mechanical data sleeve bearings** | | |
| 23_ | Max. speed | rpm | 8600 |
| 24_ | Axial play | mm | 0…0.2 |
| | Preload | N | 0 |
| 25_ | Radial play | mm | 0.02 |
| 26_ | Max. axial load (dynamic) | N | 0.1 |
| 27_ | Max. force for press fits (static) | N | 80 |
| | (static, shaft supported) | N | 500 |
| 28_ | Max. radial load [mm from flange] | N | 5.5 [5] |
| | **Other specifications** | | |
| 29_ | Number of pole pairs | | 1 |
| 30_ | Number of commutator segments | | 11 |
| 31_ | Weight of motor | g | 170 |
| 32_ | Typical noise level | dBA | 44 |

**Operating Range**

**n [rpm] Winding 18 V**




- Continuous operation
- Continuous operation with reduced thermal resistance $R_{th2}$ 50%
- Intermittent operation

**maxon Modular System**

| maxon gear | Stages | maxon sensor | maxon motor control |
|---|---|---|---|
| 71_GPX 26 A, C | 1–2 | 82_ENX 10 QUAD | 378_ESCON 36/2 DC |
| 72_GPX 26 LN, LZ | 1–2 | 83_ENX 16 EASY | 379_ESCON 50/5 |
| 73_GPX 32 A, C | 3 | 84_ENX 16 EASY Abs. | 379_ESCON Module 50/5 |
| 74_GPX 32 LN, LZ | 3 | 367_ENC 30 HEDL 5540 | 386_EPOS2 24/2 (DC/EC) |
| 75_GPX 32 HP | 4 | | 386_EPOS2 Module 36/2 |
| | | | 387_EPOS2 24/5 |
| | | | 387_EPOS2 50/5 |
| | | | 390_EPOS2 P 24/5 |
| | | | 393_EPOS3 70/10 EtherCAT |
| | | | 396_MAXPOS 50/5 |

**Configuration**

Bearing: Ball bearings preloaded/sleeve bearings
Commutation: Precious metal brushes with CLL/graphite brushes
Flange front/back: Standard flange/configurable flange/no flange
Shaft front/back: Length/diameter/flat face
Electric connection: Terminals or cable/alignment of connection/cable length/connector type

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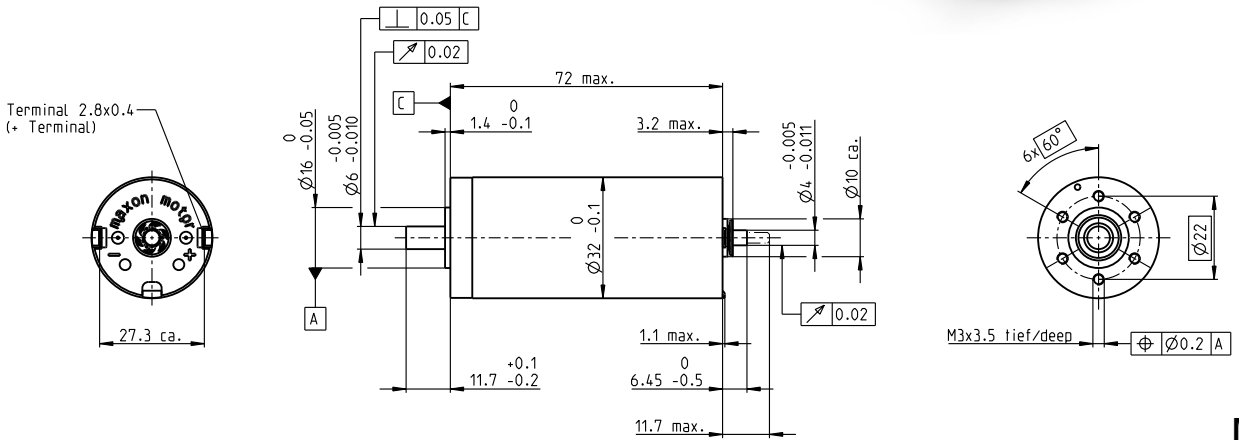
# DCX 32 L Graphite Brushes
## DC motor Ø32 mm


**70/110 W 128 mNm 11 300 rpm**



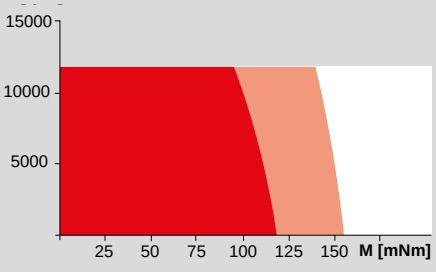

**M 1:2**

| | Motor Data | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 1_ | Nominal voltage | V | 12 | 18 | 24 | 36 | 48 | 60 |
| 2_ | No load speed | rpm | 7120 | 8630 | 8270 | 7940 | 7780 | 5840 |
| 3_ | No load current | mA | 274 | 234 | 164 | 103 | 75.2 | 41.6 |
| 4_ | Nominal speed | rpm | 6560 | 8070 | 7710 | 7410 | 7260 | 5290 |
| 5_ | Nominal torque (max. continuous torque) | mNm | 89.4 | 101 | 108 | 119 | 123 | 128 |
| 6_ | Nominal current (max. continuous current) | A | 6.00 | 5.42 | 4.12 | 2.87 | 2.17 | 1.35 |
| 7_ | Stall torque | mNm | 1730 | 2120 | 1980 | 2020 | 2000 | 1420 |
| 8_ | Stall current | A | 111 | 109 | 72.5 | 47.1 | 34.2 | 14.5 |
| 9_ | Max. efficiency | % | 85 | 88 | 88 | 90 | 90 | 89 |
| 10_ | Terminal resistance | Ω | 0.108 | 0.165 | 0.331 | 0.764 | 1.40 | 4.12 |
| 11_ | Terminal inductance | mH | 0.034 | 0.053 | 0.103 | 0.254 | 0.473 | 1.31 |
| 12_ | Torque constant | mNm/A | 15.6 | 19.5 | 27.3 | 42.9 | 58.5 | 97.5 |
| 13_ | Speed constant | rpm/V | 612 | 490 | 350 | 223 | 163 | 97.9 |
| 14_ | Speed/torque gradient | rpm/mNm | 4.24 | 4.15 | 4.24 | 3.96 | 3.92 | 4.14 |
| 15_ | Mechanical time constant | ms | 3.44 | 3.30 | 3.24 | 3.19 | 3.11 | 3.11 |
| 16_ | Rotor inertia | gcm² | 77.6 | 75.9 | 72.8 | 76.8 | 75.9 | 71.7 |

| | Thermal data | | |
|---|---|---|---|
| 17_ | Thermal resistance housing-ambient | K/W | 7.28 |
| 18_ | Thermal resistance winding-housing | K/W | 2.3 |
| 19_ | Thermal time constant winding | s | 42.2 |
| 20_ | Thermal time constant motor | s | 837 |
| 21_ | Ambient temperature | °C | -40…+100 |
| 22_ | Max. winding temperature | °C | 155 |
| | **Mechanical data ball bearings** | | |
| 23_ | Max. speed | rpm | 11 300 |
| 24_ | Axial play | mm | 0…0.1 |
| | Preload | N | 7 |
| 25_ | Radial play | mm | 0.02 |
| 26_ | Max. axial load (dynamic) | N | 7 |
| 27_ | Max. force for press fits (static) | N | 22.6 |
| | (static, shaft supported) | N | 2510 |
| 28_ | Max. radial load [mm from flange] | N | 65.3 [5] |
| | **Other specifications** | | |
| 29_ | Number of pole pairs | | 1 |
| 30_ | Number of commutator segments | | 11 |
| 31_ | 31 Weight of motor | g | 325 |
| 32_ | Typical noise level | dBA | 47 |

**Operating Range**

**n [rpm] Winding 36 V**




Continuous operation
Continuous operation with reduced thermal resistance $R_{th2}$ 50%
Intermittent operation

**maxon Modular System**

| maxon gear | Stages |
|---|---|
| 73_GPX 32 A, C | 1–2 |
| 74_GPX 32 LN, LZ | 1–2 |
| 75_GPX 32 HP | 2–3 |
| 76_GPX 37 A | 3 |
| 77_GPX 37 LN, LZ | 3 |

| maxon sensor |
|---|
| 82_ENX 10 QUAD |
| 83_ENX 16 EASY |
| 84_ENX 16 EASY Abs. |
| 360_ENC 2RMHF |
| 367_ENC 30 HEDL 5540 |

| maxon motor control |
|---|
| 379_ESCON 50/5 |
| 379_ESCON Module 50/5 |
| 379_ESCON 70/10 |
| 387_EPOS2 24/5 |
| 387_EPOS2 50/5 |
| 387_EPOS2 70/10 |
| 390_EPOS2 P 24/5 |
| 393_EPOS3 70/10 EtherCAT |
| 396_MAXPOS 50/5 |

**Configuration**

Bearing: Ball bearings preloaded
Commutation: Graphite brushes
Flange front/back: Standard flange/configurable flange/no flange
Shaft front/back: Length/diameter/flat face
Electric connection: Terminals or cable/alignment of connection/cable length/connector type

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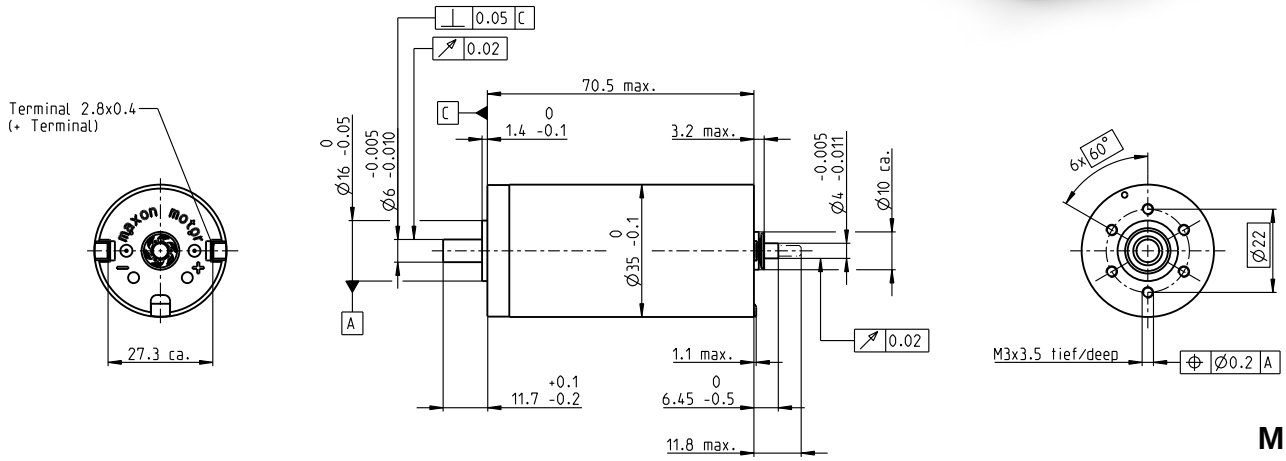
# DCX 35 L Graphite Brushes
## DC motor Ø35 mm

**80/120 W 138 mNm 12 300 rpm**

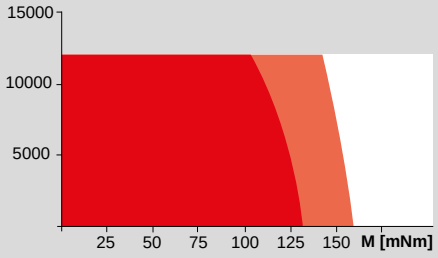

**M 1:2**

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | **Motor Data** | | | | | | | |
| 1_ | Nominal voltage | V | 12 | 18 | 24 | 36 | 48 | 60 |
| 2_ | No load speed | rpm | 8130 | 7200 | 7720 | 7940 | 6670 | 7690 |
| 3_ | No load current | mA | 320 | 177 | 146 | 101 | 58.6 | 57.5 |
| 4_ | Nominal speed | rpm | 7610 | 6640 | 7160 | 7410 | 6140 | 7160 |
| 5_ | Nominal torque (max. continuous torque) | mNm | 77.7 | 120 | 121 | 128 | 138 | 132 |
| 6_ | Nominal current (max. continuous current) | A | 6.00 | 5.32 | 4.26 | 3.07 | 2.08 | 1.84 |
| 7_ | Stall torque | mNm | 2080 | 1980 | 2030 | 2160 | 1860 | 2050 |
| 8_ | Stall current | A | 152 | 84.8 | 69.3 | 50.3 | 27.3 | 27.7 |
| 9_ | Max. efficiency | % | 85 | 88 | 89 | 90 | 90 | 90 |
| 10_ | Terminal resistance | Ω | 0.079 | 0.212 | 0.346 | 0.716 | 1.76 | 2.16 |
| 11_ | Terminal inductance | mH | 0.026 | 0.077 | 0.121 | 0.260 | 0.658 | 0.776 |
| 12_ | Torque constant | mNm/A | 13.7 | 23.4 | 29.3 | 42.9 | 68.3 | 74.1 |
| 13_ | Speed constant | rpm/V | 699 | 408 | 326 | 223 | 140 | 129 |
| 14_ | Speed/torque gradient | rpm/mNm | 4.04 | 3.70 | 3.86 | 3.72 | 3.61 | 3.76 |
| 15_ | Mechanical time constant | ms | 4.21 | 3.97 | 3.91 | 3.84 | 3.76 | 3.75 |
| 16_ | Rotor inertia | gcm² | 99.5 | 102 | 96.6 | 98.7 | 99.5 | 95.2 |

| | | | |
|---|---|---|---|
| | **Thermal data** | | |
| 17_ | Thermal resistance housing-ambient | K/W | 6.98 |
| 18_ | Thermal resistance winding-housing | K/W | 2.1 |
| 19_ | Thermal time constant winding | s | 43.9 |
| 20_ | Thermal time constant motor | s | 1030 |
| 21_ | Ambient temperature | °C | -40…+100 |
| 22_ | Max. winding temperature | °C | 155 |
| | **Mechanical data ball bearings** | | |
| 23_ | Max. speed | rpm | 12 300 |
| 24_ | Axial play | mm | 0…0.1 |
| | Preload | N | 7 |
| 25_ | Radial play | mm | 0.02 |
| 26_ | Max. axial load (dynamic) | N | 7 |
| 27_ | Max. force for press fits (static) | N | 22.6 |
| | (static, shaft supported) | N | 2510 |
| 28_ | Max. radial load [mm from flange] | N | 65.3 [5] |
| | **Other specifications** | | |
| 29_ | Number of pole pairs | | 1 |
| 30_ | Number of commutator segments | | 11 |
| 31_ | 31 Weight of motor | g | 385 |
| 32_ | Typical noise level | dBA | 48 |

**Operating Range**

**n [rpm] Winding 36 V**




- Continuous operation
- Continuous operation with reduced thermal resistance $R_{th2}$ 50%
- Intermittent operation

**maxon Modular System**

| maxon gear | Stages |
|---|---|
| 76_GPX 37 A | 1–2 |
| 77_GPX 37 LN, LZ | 1–2 |
| 78_GPX 42 C | 1–4 |

**maxon sensor**
- 82_ENX 10 QUAD
- 83_ENX 16 EASY
- 84_ENX 16 EASY Abs.
- 360_ENC 2RMHF
- 367_ENC 30 HEDL 5540

**maxon motor control**
- 379_ESCON 50/5
- 379_ESCON Module 50/5
- 379_ESCON 70/10
- 387_EPOS2 24/5
- 387_EPOS2 50/5
- 387_EPOS2 70/10
- 390_EPOS2 P 24/5
- 393_EPOS3 70/10 EtherCAT
- 396_MAXPOS 50/5

**Configuration**

Bearing: Ball bearings preloaded
Commutation: Graphite brushes
Flange front/back: Standard flange/configurable flange/no flange
Shaft front/back: Length/diameter/flat face
Electric connection: Terminals or cable/alignment of connection/cable length/connector type

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For your personal notes.

# maxon *DC*-max

**Brushed DC motors**

## maxon DC-max

Strong RE magnets, state-of-the-art winding technology, cost-optimized design, economical manufacturing: The maxon DC-max motors feature maximum performance at minimum volume and an unrivaled price-performance ratio.

maxon DC-max motors can be configured online and are ready for delivery within 11 working days.

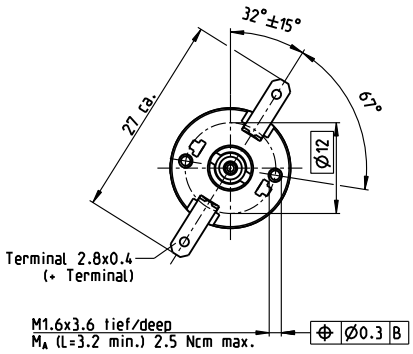
**dcmax.maxonmotor.com**

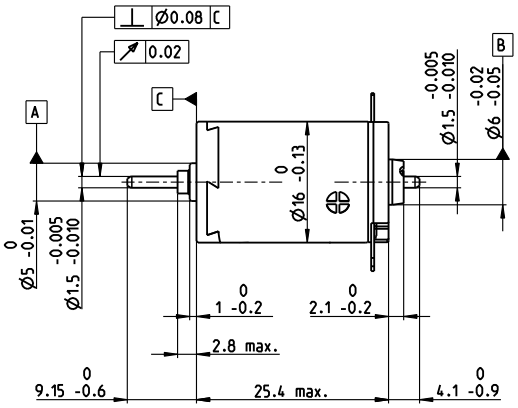

maxon motor

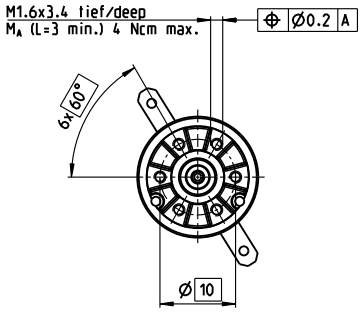
driven by precision

# DC-max 16 S Precious Metal Brushes
## DC motor Ø16 mm


**2/4.3 W 4.1 mNm 11 000 rpm**



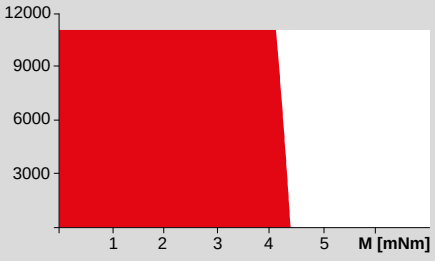

**M 1:1**

| | | | | | |
|---|---|---|---|---|---|
| | **Motor Data** | | | | |
| 1_ | Nominal voltage | V | 6 | 12 | 24 |
| 2_ | No load speed | rpm | 7890 | 7560 | 7470 |
| 3_ | No load current | mA | 14.7 | 6.90 | 3.40 |
| 4_ | Nominal speed | rpm | 4830 | 4390 | 4210 |
| 5_ | Nominal torque (max. continuous torque) | mNm | 4.06 | 3.92 | 3.80 |
| 6_ | Nominal current (max. continuous current) | A | 0.577 | 0.267 | 0.128 |
| 7_ | Stall torque | mNm | 10.5 | 9.44 | 8.75 |
| 8_ | Stall current | A | 1.46 | 0.629 | 0.289 |
| 9_ | Max. efficiency | % | 81 | 80 | 80 |
| 10_ | Terminal resistance | Ω | 4.10 | 19.1 | 83.2 |
| 11_ | Terminal inductance | mH | 0.140 | 0.610 | 2.49 |
| 12_ | Torque constant | mNm/A | 7.19 | 15.0 | 30.3 |
| 13_ | Speed constant | rpm/V | 1330 | 637 | 315 |
| 14_ | Speed/torque gradient | rpm/mNm | 758 | 809 | 864 |
| 15_ | Mechanical time constant | ms | 8.87 | 8.92 | 9.00 |
| 16_ | Rotor inertia | gcm² | 1.12 | 1.05 | 0.994 |

| | | | |
|---|---|---|---|
| | **Thermal data** | | |
| 17_ | Thermal resistance housing-ambient | K/W | 29.8 |
| 18_ | Thermal resistance winding-housing | K/W | 5.5 |
| 19_ | Thermal time constant winding | s | 5.35 |
| 20_ | Thermal time constant motor | s | 288 |
| 21_ | Ambient temperature | °C | -30…+65 |
| 22_ | Max. winding temperature | °C | 85 |
| | **Mechanical data ball bearings** | | |
| 23_ | Max. speed | rpm | 11 000 |
| 24_ | Axial play | mm | 0.15…0.05 |
| | Preload | N | 0 |
| 25_ | Radial play | mm | 0.025 |
| 26_ | Max. axial load (dynamic) | N | 2.2 |
| 27_ | Max. force for press fits (static) | N | 30 |
| | (static, shaft supported) | N | 200 |
| 28_ | Max. radial load [mm from flange] | N | 7.8 [5] |
| | **Mechanical data sleeve bearings** | | |
| 23_ | Max. speed | rpm | 11 000 |
| 24_ | Axial play | mm | 0.15…0.05 |
| | Preload | N | 0 |
| 25_ | Radial play | mm | 0.012 |
| 26_ | Max. axial load (dynamic) | N | 0.8 |
| 27_ | Max. force for press fits (static) | N | 35 |
| | (static, shaft supported) | N | 200 |
| 28_ | Max. radial load [mm from flange] | N | 1.4 [5] |
| | **Other specifications** | | |
| 29_ | Number of pole pairs | | 1 |
| 30_ | Number of commutator segments | | 7 |
| 31_ | Weight of motor | g | 23.3 |

**Operating Range**

**n [rpm] Winding 12 V**




- Continuous operation
- Continuous operation with reduced thermal resistance $R_{th2}$ 50%
- Intermittent operation

**maxon Modular System**

| maxon gear | Stages |
|---|---|
| 62_GPX 16 A, C | 1–2 |
| 63_GPX 16 LN, LZ | 1–2 |
| 66_GPX 19 A, C | 3–4 |
| 67_GPX 19 LN, LZ | 3–4 |

**maxon sensor**
82_ENX 10 QUAD
82_ENX 10 EASY

**maxon motor control**
378_ESCON Module 24/2
378_ESCON 36/2 DC
386_EPOS2 24/2 (DC/EC)
386_EPOS2 Module 36/2
393_EPOS3 70/10 EtherCAT
396_MAXPOS 50/5

**Configuration**

Bearing: Sleeve bearings/ball bearings
Commutation: Precious metal brushes with CLL/Graphite Brushes
Shaft front/back: Length
Electric connection: Terminals/cable

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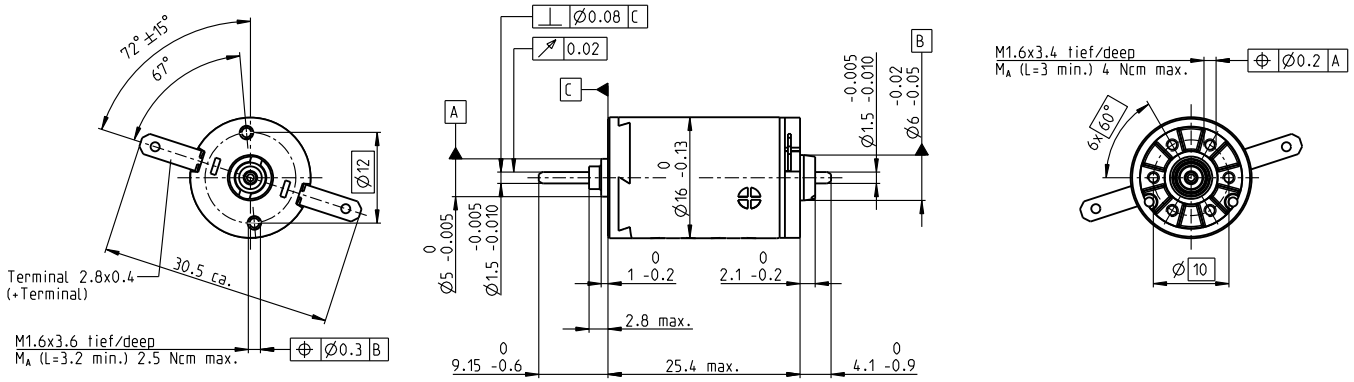
# DC-max 16 S Graphite Brushes
## DC motor Ø16 mm


**3/4.7 W 4.8 mNm 11 000 rpm**

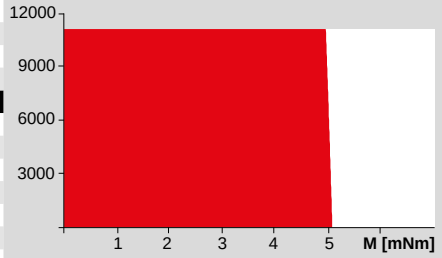



**M 1:1**

| | | | | | |
|---|---|---|---|---|---|
| | **Motor Data** | | | | |
| 1_ | Nominal voltage | V | 6 | 12 | 24 |
| 2_ | No load speed | rpm | 9870 | 9860 | 9920 |
| 3_ | No load current | mA | 67.3 | 33.6 | 16.8 |
| 4_ | Nominal speed | rpm | 6770 | 6200 | 6580 |
| 5_ | Nominal torque (max. continuous torque) | mNm | 3.71 | 4.31 | 4.76 |
| 6_ | Nominal current (max. continuous current) | A | 0.720 | 0.413 | 0.227 |
| 7_ | Stall torque | mNm | 12.1 | 11.9 | 14.4 |
| 8_ | Stall current | A | 2.15 | 1.05 | 0.64 |
| 9_ | Max. efficiency | % | 68 | 68 | 71 |
| 10_ | Terminal resistance | Ω | 2.79 | 11.4 | 37.5 |
| 11_ | Terminal inductance | mH | 0.086 | 0.343 | 1.37 |
| 12_ | Torque constant | mNm/A | 5.62 | 11.2 | 22.5 |
| 13_ | Speed constant | rpm/V | 1700 | 849 | 424 |
| 14_ | Speed/torque gradient | rpm/mNm | 843 | 858 | 707 |
| 15_ | Mechanical time constant | ms | 8.85 | 8.92 | 8.57 |
| 16_ | Rotor inertia | gcm² | 1.00 | 0.993 | 1.16 |
| | **Thermal data** | | | | |
| 17_ | Thermal resistance housing-ambient | K/W | 29.8 | | |
| 18_ | Thermal resistance winding-housing | K/W | 5.5 | | |
| 19_ | Thermal time constant winding | s | 5.35 | | |
| 20_ | Thermal time constant motor | s | 288 | | |
| 21_ | Ambient temperature | °C | -30…+85 | | |
| 22_ | Max. winding temperature | °C | 125 | | |
| | **Mechanical data ball bearings** | | | | |
| 23_ | Max. speed | rpm | 11 000 | | |
| 24_ | Axial play | mm | 0.15…0.05 | | |
| | Preload | N | 0 | | |
| 25_ | Radial play | mm | 0.025 | | |
| 26_ | Max. axial load (dynamic) | N | 2.2 | | |
| 27_ | Max. force for press fits (static) | N | 30 | | |
| | (static, shaft supported) | N | 200 | | |
| 28_ | Max. radial load [mm from flange] | N | 7.8 [5] | | |
| | **Mechanical data sleeve bearings** | | | | |
| 23_ | Max. speed | rpm | 11 000 | | |
| 24_ | Axial play | mm | 0.15…0.05 | | |
| | Preload | N | 0 | | |
| 25_ | Radial play | mm | 0.012 | | |
| 26_ | Max. axial load (dynamic) | N | 0.8 | | |
| 27_ | Max. force for press fits (static) | N | 35 | | |
| | (static, shaft supported) | N | 200 | | |
| 28_ | Max. radial load [mm from flange] | N | 1.4 [5] | | |
| | **Other specifications** | | | | |
| 29_ | Number of pole pairs | | 1 | | |
| 30_ | Number of commutator segments | | 7 | | |
| 31_ | Weight of motor | g | 23.1 | | |

**Operating Range**

**n [rpm] Winding 24 V**




- Continuous operation
- Continuous operation with reduced thermal resistance $R_{th2}$ 50%
- Intermittent operation

**maxon Modular System**

| maxon gear | Stages | maxon sensor | maxon motor control |
|---|---|---|---|
| 62_GPX 16 A, C | 1–2 | 82_ENX 10 QUAD | 378_ESCON Module 24/2 |
| 63_GPX 16 LN, LZ | 1–2 | 82_ENX 10 EASY | 378_ESCON 36/2 DC |
| 66_GPX 19 A, C | 3–4 | | 386_EPOS2 24/2 (DC/EC) |
| 67_GPX 19 LN, LZ | 3–4 | | 386_EPOS2 Module 36/2 |
| | | | 393_EPOS3 70/10 EtherCAT |
| | | | 396_MAXPOS 50/5 |

**Configuration**

Bearing: Sleeve bearings/ball bearings
Commutation: Precious metal brushes with CLL/Graphite Brushes
Shaft front/back: Length
Electric connection: Terminals/cable

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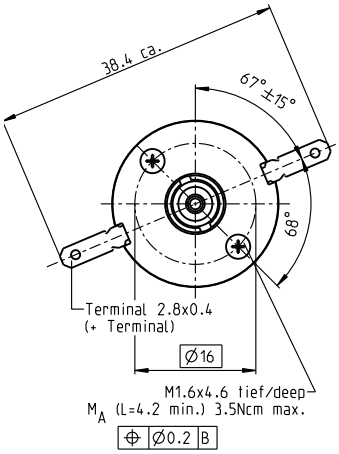
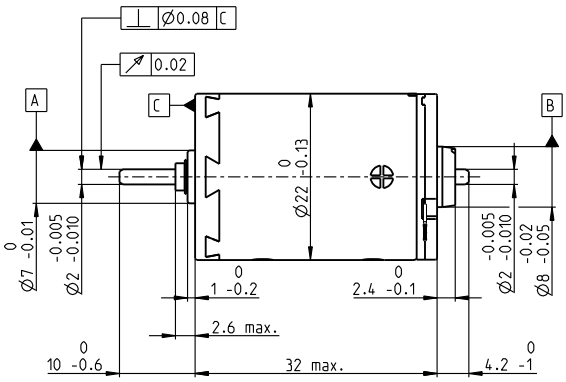
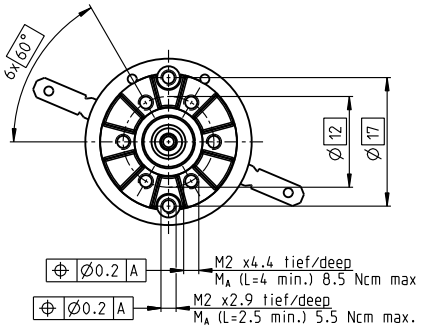
# DC-max 22 S Precious Metal Brushes
## DC motor Ø22 mm


**5/9.6 W 10.4 mNm 9000 rpm**



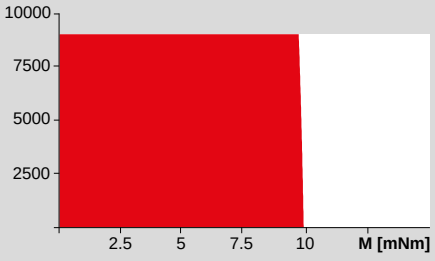

**M 1:1**

| | | | | | |
|---|---|---|---|---|---|
| | **Motor Data** | | | | |
| 1_ | Nominal voltage | V | 6 | 12 | 24 |
| 2_ | No load speed | rpm | 5500 | 5900 | 5100 |
| 3_ | No load current | mA | 13.6 | 7.49 | 3.07 |
| 4_ | Nominal speed | rpm | 4280 | 4240 | 3440 |
| 5_ | Nominal torque (max. continuous torque) | mNm | 8.60 | 10.4 | 10.4 |
| 6_ | Nominal current (max. continuous current) | A | 0.840 | 0.543 | 0.236 |
| 7_ | Stall torque | mNm | 39.0 | 36.9 | 32.3 |
| 8_ | Stall current | A | 3.75 | 1.91 | 0.721 |
| 9_ | Max. efficiency | % | 88 | 88 | 88 |
| 10_ | Terminal resistance | Ω | 1.60 | 6.28 | 33.3 |
| 11_ | Terminal inductance | mH | 0.119 | 0.413 | 2.21 |
| 12_ | Torque constant | mNm/A | 10.4 | 19.3 | 44.8 |
| 13_ | Speed constant | rpm/V | 919 | 494 | 213 |
| 14_ | Speed/torque gradient | rpm/mNm | 141 | 160 | 159 |
| 15_ | Mechanical time constant | ms | 8.44 | 8.36 | 8.39 |
| 16_ | Rotor inertia | gcm² | 5.70 | 4.98 | 5.05 |

| | | | |
|---|---|---|---|
| | **Thermal data** | | |
| 17_ | Thermal resistance housing-ambient | K/W | 20 |
| 18_ | Thermal resistance winding-housing | K/W | 6 |
| 19_ | Thermal time constant winding | s | 16.8 |
| 20_ | Thermal time constant motor | s | 538 |
| 21_ | Ambient temperature | °C | -30…65 |
| 22_ | Max. winding temperature | °C | 85 |
| | **Mechanical data ball bearings** | | |
| 23_ | Max. speed | rpm | 9000 |
| 24_ | Axial play | mm | 0.05…0.15 |
| | Preload | N | 0 |
| 25_ | Radial play | mm | 0.025 |
| 26_ | Max. axial load (dynamic) | N | 3.3 |
| 27_ | Max. force for press fits (static) | N | 45 |
| | (static, shaft supported) | N | 420 |
| 28_ | Max. radial load [mm from flange] | N | 12.3 [5] |
| | **Mechanical data sleeve bearings** | | |
| 23_ | Max. speed | rpm | 9000 |
| 24_ | Axial play | mm | 0.15…0.05 |
| | Preload | N | 0 |
| 25_ | Radial play | mm | 0.012 |
| 26_ | Max. axial load (dynamic) | N | 1 |
| 27_ | Max. force for press fits (static) | N | 80 |
| | (static, shaft supported) | N | 420 |
| 28_ | Max. radial load [mm from flange] | N | 2.8 [5] |
| | **Other specifications** | | |
| 29_ | Number of pole pairs | | 1 |
| 30_ | Number of commutator segments | | 9 |
| 31_ | Weight of motor | g | 53.8 |

**Operating Range**

**n [rpm] Winding 12 V**




- Continuous operation
- Continuous operation with reduced thermal resistance $R_{th2}$ 50%
- Intermittent operation

**maxon Modular System**

| maxon gear | Stages | maxon sensor | maxon motor control |
|---|---|---|---|
| 68_GPX 22 A, C | 1–2 | 82_ENX 10 QUAD | 378_ESCON Module 24/2 |
| 69_GPX 22 LN, LZ | 1–2 | 82_ENX 10 EASY | 378_ESCON 36/2 DC |
| 71_GPX 26 A, C | 3 | | 386_EPOS2 24/2 (DC/EC) |
| 72_GPX 26 LN, LZ | 3 | | 386_EPOS2 Module 36/2 |
| | | | 393_EPOS3 70/10 EtherCAT |
| | | | 396_MAXPOS 50/5 |

**Configuration**

Bearing: Sleeve bearings/ball bearings
Commutation: Precious metal brushes with CLL/Graphite Brushes
Shaft front/back: Length
Electric connection: Terminals/cable

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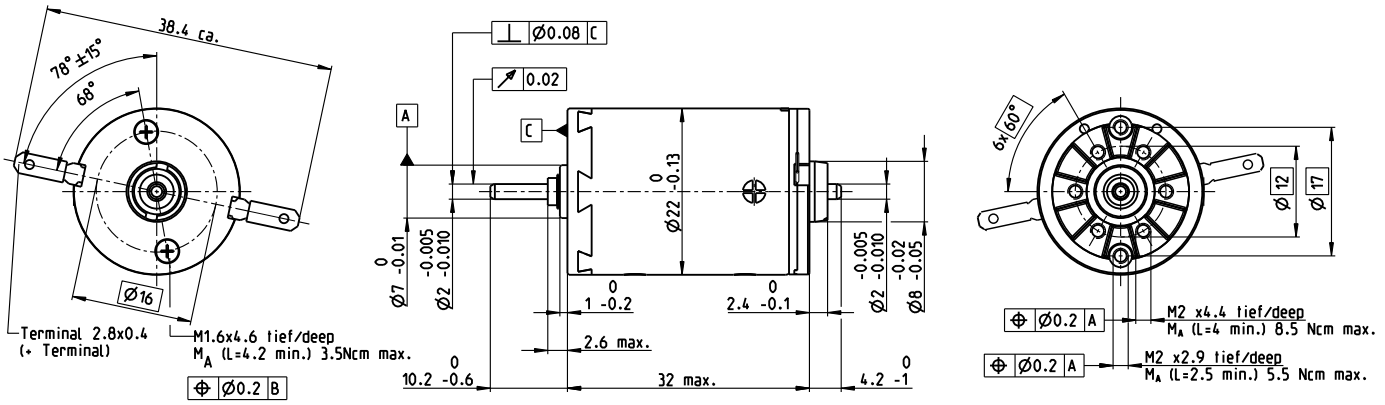
# DC-max 22 S Graphite Brushes

## DC motor Ø22 mm


**8/10 W 12.5 mNm 9000 rpm**



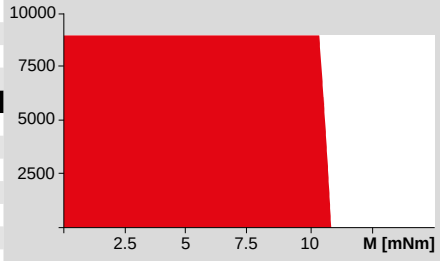

**M 1:1**

| | | | | | |
|---|---|---|---|---|---|
| | **Motor Data** | | | | |
| 1_ | Nominal voltage | V | 6 | 12 | 24 |
| 2_ | No load speed | rpm | 7030 | 7140 | 7330 |
| 3_ | No load current | mA | 58.8 | 29.5 | 15.1 |
| 4_ | Nominal speed | rpm | 4980 | 5260 | 5350 |
| 5_ | Nominal torque (max. continuous torque) | mNm | 11.3 | 12.5 | 11.8 |
| 6_ | Nominal current (max. continuous current) | A | 1.49 | 0.818 | 0.397 |
| 7_ | Stall torque | mNm | 42.4 | 49.4 | 44.6 |
| 8_ | Stall current | A | 5.39 | 3.14 | 1.45 |
| 9_ | Max. efficiency | % | 76 | 80 | 80 |
| 10_ | Terminal resistance | Ω | 1.11 | 3.83 | 16.6 |
| 11_ | Terminal inductance | mH | 0.069 | 0.274 | 1.05 |
| 12_ | Torque constant | mNm/A | 7.88 | 15.8 | 30.8 |
| 13_ | Speed constant | rpm/V | 1210 | 606 | 310 |
| 14_ | Speed/torque gradient | rpm/mNm | 171 | 147 | 167 |
| 15_ | Mechanical time constant | ms | 9.09 | 8.57 | 8.20 |
| 16_ | Rotor inertia | gcm² | 5.07 | 5.57 | 4.69 |

| | | | |
|---|---|---|---|
| | **Thermal data** | | |
| 17_ | Thermal resistance housing-ambient | K/W | 20 |
| 18_ | Thermal resistance winding-housing | K/W | 6 |
| 19_ | Thermal time constant winding | s | 16.8 |
| 20_ | Thermal time constant motor | s | 538 |
| 21_ | Ambient temperature | °C | -30…85 |
| 22_ | Max. winding temperature | °C | 125 |
| | **Mechanical data ball bearings** | | |
| 23_ | Max. speed | rpm | 9000 |
| 24_ | Axial play | mm | 0.05…0.15 |
| | Preload | N | 0 |
| 25_ | Radial play | mm | 0.025 |
| 26_ | Max. axial load (dynamic) | N | 3.3 |
| 27_ | Max. force for press fits (static) | N | 45 |
| | (static, shaft supported) | N | 420 |
| 28_ | Max. radial load [mm from flange] | N | 12.3 [5] |
| | **Mechanical data sleeve bearings** | | |
| 23_ | Max. speed | rpm | 9000 |
| 24_ | Axial play | mm | 0.05…0.15 |
| | Preload | N | 0 |
| 25_ | Radial play | mm | 0.012 |
| 26_ | Max. axial load (dynamic) | N | 1 |
| 27_ | Max. force for press fits (static) | N | 80 |
| | (static, shaft supported) | N | 420 |
| 28_ | Max. radial load [mm from flange] | N | 2.8 [5] |
| | **Other specifications** | | |
| 29_ | Number of pole pairs | | 1 |
| 30_ | Number of commutator segments | | 9 |
| 31_ | Weight of motor | g | 53.8 |

**Operating Range**

**n [rpm] Winding 12 V**




- Continuous operation
- Continuous operation with reduced thermal resistance $R_{th2}$ 50%
- Intermittent operation

**maxon Modular System**

| maxon gear | Stages |
|---|---|
| 68_GPX 22 A, C | 1–2 |
| 69_GPX 22 LN, LZ | 1–2 |
| 71_GPX 26 A, C | 3 |
| 72_GPX 26 LN, LZ | 3 |

**maxon sensor**
82_ENX 10 QUAD
82_ENX 10 EASY

**maxon motor control**
378_ESCON Module 24/2
378_ESCON 36/2 DC
386_EPOS2 24/2 (DC/EC)
386_EPOS2 Module 36/2
393_EPOS3 70/10 EtherCAT
396_MAXPOS 50/5

**Configuration**

Bearing: Sleeve bearings/ball bearings
Commutation: Precious metal brushes with CLL/Graphite Brushes
Shaft front/back: Length
Electric connection: Terminals/cable

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# **Explanation** for Terminology maxon DCX and DC-max

**Dimensional drawings**
Presentation of the views according to the projection method E (ISO). 
All dimensions in [mm].

**Mounting in plastic**
Screwed connections on motors with plastic flanges require special attention.

**$M_A$ Max. tightening torque** [Ncm]
A torque screw driver may be adjusted to this value.

**L Active depth of screw connection** [mm]
The relation of the depth of the screw connection to the thread diameter must be at least 2:1. The depth of the screw connection must be less than the usable length of the thread!

**Motor Data**
The values stated are based on a motor temperature of 25°C (so-called cold data).

**1 Nominal voltage** $U_N$ [Volt]
is the DC voltage on the motor connections on which all nominal data are based (lines 2–9). Lower and higher voltages are permissible, provided set limits are not exceeded.

**2 No load speed** $n_0$ [rpm] ±10%
This is the speed at which the motor turns at nominal voltage and without load. It is approximately proportional to the applied voltage.

**3 No load current** $I_0$ [mA] ±50%
This is the typical current that the unloaded motor draws when operating at nominal voltage. It depends on brush friction and friction in the bearings, and also increases with rising speed. No load friction depends heavily on temperature, particularly with precious metal commutation. In extended operation, no load friction decreases and increases at lower temperatures.

**4 Nominal speed** $n_N$ [rpm]
is the speed set for operation at nominal voltage and nominal torque at a motor temperature of 25°C.

**5 Nominal torque** $M_N$ [mNm]
is the torque generated for operation at nominal voltage and nominal current at a motor temperature of 25°C. It is at the limit of the motor's continuous operation range. Higher torques heat up the winding too much.

**6 Nominal current** $I_N$ [A]
is the current that, at 25°C ambient temperature, heats the winding up to the maximum permissible temperature (= max. permissible continuous current). $I_N$ decreases as speed increases due to additional friction losses.

**7 Stall torque** $M_H$ [mNm]
is the torque produced by the motor when at standstill. Rising motor temperatures reduce stall torque.

**8 Stall current** $I_A$ [A]
is the quotient from nominal voltage and the motor's terminal resistance. Stall current is equivalent to stall torque. With larger motors, $I_A$ cannot often be reached due to the amplifier's current limits.

**9 Max. efficiency** $\eta_{max}$ [%]
is the optimal relationship between input and output power at nominal voltage. It also doesn't always denote the optimal operating point.

**10 Terminal resistance** R [Ω]
is the resistance at the terminals at 25°C and determines the stall current at a given voltage. For graphite brushes, it should be noted that resistance is load-dependent and the value only applies to large currents.

**11 Terminal inductance** L [mH]
is the winding inductance when stationary and measured at 1 kHz, sinusoidal.

**12 Torque constant** $k_M$ [mNm/A]
This may also be referred to as "specific torque" and represents the quotient from generated torque and applicable current.

**13 Speed constant** $k_n$ [rpm/V]
shows the ideal no load speed per 1 volt of applied voltage. Friction losses not taken into account.

**14 Speed / torque gradient** $\Delta n / \Delta M$ [rpm/mNm]
The speed / torque gradient is an indicator of the motor's performance. The smaller the value, the more powerful the motor and consequently the less motor speed varies with load variations. It is based on the quotient of ideal no load speed and ideal stall torque.

**15 Mechanical time constant** $\tau_m$ [ms]
is the time required for the rotor to accelerate from standstill to 63% of its no load speed.

**16 Rotor inertia** $J_R$ [gcm²]
is the mass moment of inertia of the rotor, based on the axis of rotation.

**17 Thermal resistance housing-ambient** $R_{th2}$ [K/W]
and
**18 Thermal resistance winding-housing** $R_{th1}$ [K/W]
Characteristic values of thermal contact resistance without additional heat sinking. Lines 17 and 18 combined define the maximum heating at a given power loss (load). Thermal resistance $R_{th2}$ on motors with metal flanges can decrease by up to 80% if the motor is coupled directly to a good heat-conducting (e.g. metallic) mounting rather than a plastic panel.

**19 Thermal time constant winding** $\tau_w$ [s]
and
**20 Thermal time constant motor** $\tau_s$ [s]
These are the typical reaction times for a temperature change of winding and motor. It can be seen that the motor reacts much more sluggishly in thermal terms than the winding. The values are calculated from the product of thermal capacity and given heat resistances.

**21 Ambient temperature** [°C]
Operating temperature range. This derives from the heat reliability of the materials used and viscosity of bearing lubrication.

**22 Max. winding temperature** [°C]
Maximum permissible winding temperature.

**23 Max. speed** $n_{max}$ [rpm]
is the maximum recommended speed based on thermal and mechanical perspectives. A reduced service life can be expected at higher speeds.

**24 Axial play** [mm]
On motors that are not preloaded, these are the tolerance limits for the bearing play. A preload cancels out the axial play up to the specified axial force. When load is applied in the direction of the preload force (away from the flange), the axial play is always zero. The length tolerance of the shaft includes the maximum axial play.

**25 Radial play** [mm]
Radial play is the bearing's radial movement. A spring is utilized to preload the motor's bearings, eliminating radial play up to a given axial load.

**26 / 27 Max. axial load** [N]
**Dynamically:** axial load permissible in operation. If different values apply for traction and thrust, the smaller value is given.
**Statically:** maximum axial force applying to the shaft at standstill where no residual damage occurs.
**Shaft supported:** maximum axial force applying to the shaft at standstill if the force is not input at the other shaft end. This is not possible for motors with only one shaft end.

**28 Max. radial load** [N]
The value is given for a typical clearance from the flange; this value falls the greater the clearance.

**29 Number of pole pairs**
Number of north poles of the permanent magnet. The phase streams and commutation signals pass through per revolution p cycles. Servo-controllers require the correct details of the number of pole pairs.

**30 Number of commutator segments**

**31 Weight of motor** [g]

**32 Typical noise level** [dBA]
is that statistical average of the noise level measured according to maxon standard (10 cm distance radially to the drive, no load operation at a speed of 6,000 rpm. The drive lies freely on a plastic foam mat in the noise chamber).
The acoustic noise level depends on a number of factors, such as component tolerances, and it is greatly influenced by the overall system in which the drive is installed. When the drive is installed in an unfavorable constellation, the noise level may be significantly higher than the noise level of the drive alone.
The acoustic noise level is measured and determined during product qualification. In manufacturing, a structure-borne noise test is performed with defined limits. Impermissible deviations can thus be identified.

# maxon ECX

## Brushless DC motors
## maxon ECX

The brushless ECX motors (BLDC) are the perfect solution for applications that need 0–120 000 rpm. Quiet, highly efficient, durable and perfectly tailored to your needs – they are available in standard, high-power and sterilizable versions.

maxon ECX motors can be configured online and are ready for delivery within 11 working days.

**ecx.maxonmotor.com**

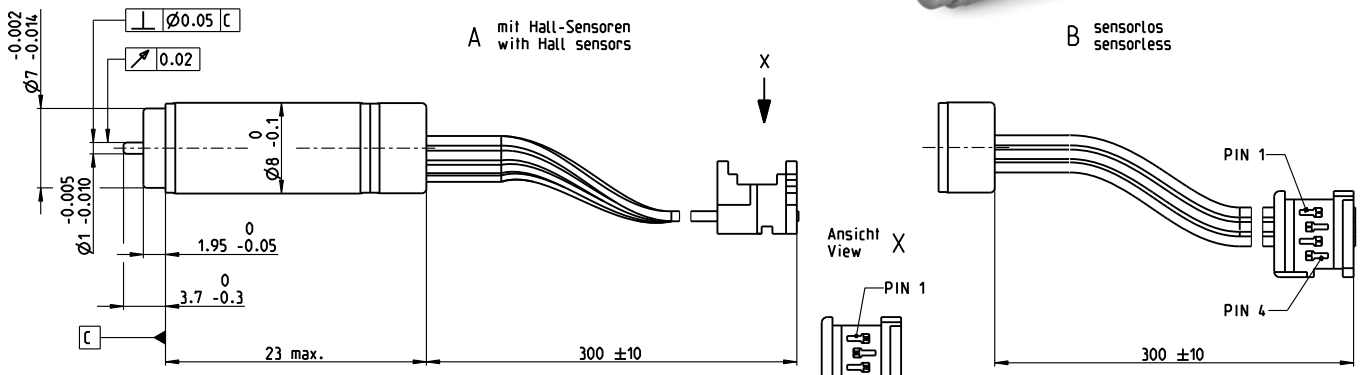

maxon motor

driven by precision

# ECX SPEED 8 M brushless
## BLDC motor Ø8 mm

NEW


**2/4.7 W 0.94 mNm 50000 rpm**




**Connector:**
8 pole, 1.27 mm, MICA08
Lumberg Connect GmbH

**Connector:**
4 pole, 1.27 mm, MICA08
Lumberg Connect GmbH

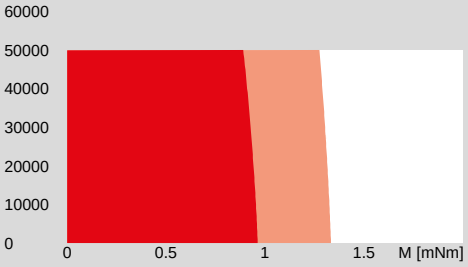
**M 3:2**

| | | | | | |
|---|---|---|---|---|---|
| | **Motor Data** | | | | |
| 1_ | Nominal voltage | V | 6 | 12 | 24 |
| 2_ | No load speed | rpm | 34500 | 42200 | 41100 |
| 3_ | No load current | mA | 87.6 | 58.2 | 28 |
| 4_ | Nominal speed | rpm | 23300 | 31900 | 31100 |
| 5_ | Nominal torque (max. continuous torque) | mNm | 0.979 | 0.937 | 0.94 |
| 6_ | Nominal current (max. continuous current) | A | 0.689 | 0.408 | 0.199 |
| 7_ | Stall torque | mNm | 3.15 | 4.02 | 4.05 |
| 8_ | Stall current | A | 1.98 | 1.54 | 0.755 |
| 9_ | Max. efficiency | % | 63 | 66 | 66 |
| 10_ | Terminal resistance | Ω | 3.02 | 7.8 | 31.8 |
| 11_ | Terminal inductance | mH | 0.039 | 0.106 | 0.447 |
| 12_ | Torque constant | mNm/A | 1.59 | 2.61 | 5.37 |
| 13_ | Speed constant | rpm/V | 6020 | 3660 | 1780 |
| 14_ | Speed/torque gradient | rpm/mNm | 11500 | 10900 | 10500 |
| 15_ | Mechanical time constant | ms | 3 | 2.85 | 2.75 |
| 16_ | Rotor inertia | gcm² | 0.025 | 0.025 | 0.025 |

| | | | |
|---|---|---|---|
| | **Thermal data** | | |
| 17_ | Thermal resistance housing-ambient | K/W | 51.2 |
| 18_ | Thermal resistance winding-housing | K/W | 3.5 |
| 19_ | Thermal time constant winding | s | 0.832 |
| 20_ | Thermal time constant motor | s | 154 |
| 21_ | Ambient temperature[1] | °C | -20…+85 |
| 22_ | Max. winding temperature | °C | 125 |
| | **Mechanical data ball bearings** | | |
| 23_ | Max. speed | rpm | 50000 |
| 24_ | Axial play | mm | 0…0.07 |
| | Preload | N | 0.3 |
| | Direction of force | | pull |
| 25_ | Radial play | | preloaded |
| 26_ | Max. axial load (dynamic) | N | 0.2 |
| 27_ | Max. force for press fits (static) | N | 10 |
| | (static, shaft supported) | N | 10 |
| 28_ | Max. radial load [mm from flange] | N | 2 [2] |
| | **Other specifications** | | |
| 29_ | Number of pole pairs | | 1 |
| 30_ | Number of phases | | 3 |
| 31_ | Weight of motor | g | 6 |
| 32_ | Typical noise level [rpm] | dBA | 49 [50000] |

**Operating Range**

**n [rpm] Winding 12 V**




**Connection A** (flat band cable AWG 28, pitch 1.27 mm)
Pin 1 Motor winding 1
Pin 2 Motor winding 2
Pin 3 Motor winding 3
Pin 4 $V_{Hall}$ 1.6…5.5 VDC
Pin 5 GND
Pin 6 Hall sensor 1
Pin 7 Hall sensor 2
Pin 8 Hall sensor 3
Output signal: CMOS compatible
Output current per channel: max 0.5 mA

**Connection B** (flat band cable AWG 28, pitch 1.27 mm)
Pin 1 Motor winding 1
Pin 2 Motor winding 2
Pin 3 Motor winding 3
Pin 4 N.C.

**maxon Modular System**

| maxon gear | Stages | maxon sensor | maxon motor control |
|---|---|---|---|
| 56_GPX 8 A | 1–5 | for motor type B:<br>80_ENX 8<br>81_ENX 8 Abs. | 378_ESCON Module 24/2<br>379_ESCON 36/3 EC<br>379_ESCON Module 50/4 EC-S<br>382_DEC Module 24/2<br>386_EPOS2 24/2<br>386_EPOS2 Module 36/2 |

**Configuration**

Shaft front: length
Electric connection: cable length
Cable insulation: PVC/PO/FEP

**Notes**

[1] For type A:
PVC-cable (-20…85°C)
PO- and FEP cable (-30…85°C)
For type B:
PVC-cable (-20…100°C)
PO- and FEP cable (-40…100°C)

Adapter Micromotor (Part number 498157) required for all maxon controllers.

xdrives.maxonmotor.com

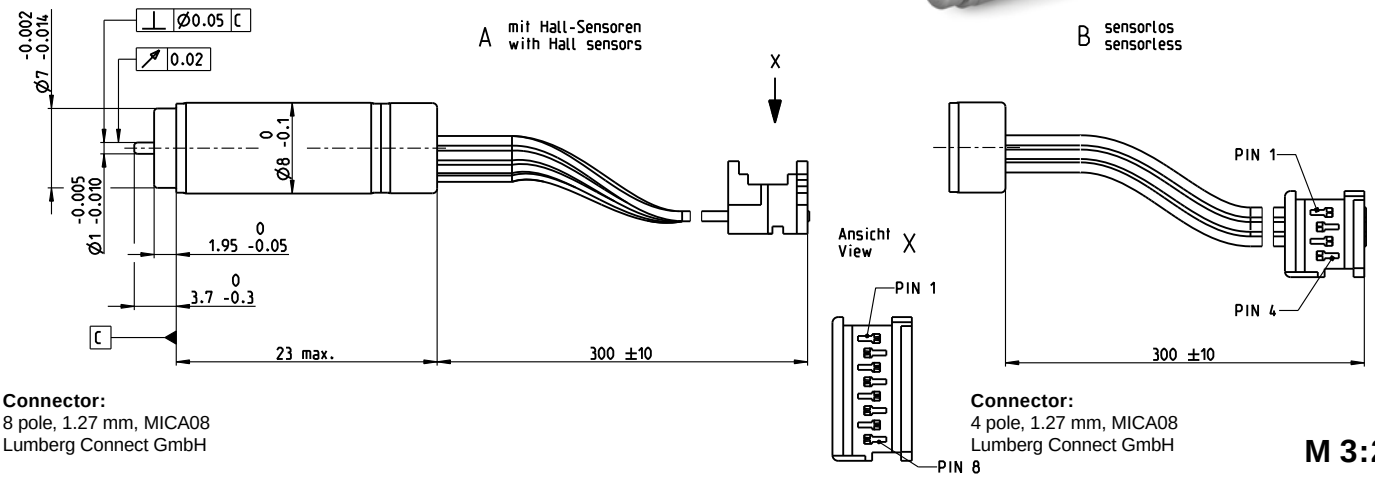
# ECX SPEED 8 M brushless

## BLDC motor Ø8 mm

High Power

**3/6.0 W 1.24 mNm 50000 rpm**

NEW


**Connector:**
8 pole, 1.27 mm, MICA08
Lumberg Connect GmbH

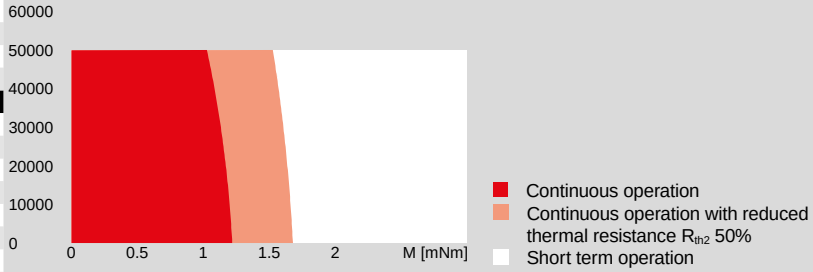
**Connector:**
4 pole, 1.27 mm, MICA08
Lumberg Connect GmbH

**M 3:2**

| | Motor Data | | | | |
|---|---|---|---|---|---|
| 1_ | Nominal voltage | V | 6 | 9 | 12 |
| 2_ | No load speed | rpm | 37900 | 31400 | 33000 |
| 3_ | No load current | mA | 88.2 | 43.4 | 35.2 |
| 4_ | Nominal speed | rpm | 28000 | 22500 | 24300 |
| 5_ | Nominal torque (max. continuous torque) | mNm | 1.24 | 1.24 | 1.24 |
| 6_ | Nominal current (max. continuous current) | A | 0.913 | 0.5 | 0.393 |
| 7_ | Stall torque | mNm | 4.91 | 4.53 | 4.85 |
| 8_ | Stall current | A | 3.34 | 1.7 | 1.43 |
| 9_ | Max. efficiency | % | 71 | 71 | 72 |
| 10_ | Terminal resistance | Ω | 1.8 | 5.3 | 8.38 |
| 11_ | Terminal inductance | mH | 0.0264 | 0.0888 | 0.144 |
| 12_ | Torque constant | mNm/A | 1.47 | 2.67 | 3.39 |
| 13_ | Speed constant | rpm/V | 6500 | 3580 | 2820 |
| 14_ | Speed/torque gradient | rpm/mNm | 7940 | 7110 | 6980 |
| 15_ | Mechanical time constant | ms | 2.08 | 1.73 | 1.69 |
| 16_ | Rotor inertia | gcm² | 0.025 | 0.025 | 0.025 |
| | **Thermal data** | | | | |
| 17_ | Thermal resistance housing-ambient | K/W | 51.2 | | |
| 18_ | Thermal resistance winding-housing | K/W | 4.11 | | |
| 19_ | Thermal time constant winding | s | 0.906 | | |
| 20_ | Thermal time constant motor | s | 154 | | |
| 21_ | Ambient temperature[1] | °C | -20…+85 | | |
| 22_ | Max. winding temperature | °C | 125 | | |
| | **Mechanical data ball bearings** | | | | |
| 23_ | Max. speed | rpm | 50000 | | |
| 24_ | Axial play | mm | 0…0.07 | | |
| | Preload | N | 0.3 | | |
| | Direction of force | | pull | | |
| 25_ | Radial play | | preloaded | | |
| 26_ | Max. axial load (dynamic) | N | 0.2 | | |
| 27_ | Max. force for press fits (static) | N | 10 | | |
| | (static, shaft supported) | N | 10 | | |
| 28_ | Max. radial load [mm from flange] | N | 2 [2] | | |
| | **Other specifications** | | | | |
| 29_ | Number of pole pairs | | 1 | | |
| 30_ | Number of phases | | 3 | | |
| 31_ | Weight of motor | g | 6 | | |
| 32_ | Typical noise level [rpm] | dBA | 49 [50000] | | |

**Operating Range**

**n [rpm] Winding 9 V**




**maxon Modular System**

| maxon gear | Stages | maxon sensor | maxon motor control |
|---|---|---|---|
| 56_GPX 8 A | 1–5 | for motor type B:<br>80_ENX 8<br>81_ENX 8 Abs. | 378_ESCON Module 24/2<br>379_ESCON 36/3 EC<br>379_ESCON Module 50/4 EC-S<br>382_DEC Module 24/2<br>386_EPOS2 24/2<br>386_EPOS2 Module 36/2 |

**Connection A** (flat band cable AWG 28, pitch 1.27 mm)

| | |
|---|---|
| Pin 1 | Motor winding 1 |
| Pin 2 | Motor winding 2 |
| Pin 3 | Motor winding 3 |
| Pin 4 | $V_{Hall}$ 1.6…5.5 VDC |
| Pin 5 | GND |
| Pin 6 | Hall sensor 1 |
| Pin 7 | Hall sensor 2 |
| Pin 8 | Hall sensor 3 |

Output signal: CMOS compatible
Output current per channel: max 0.5 mA

**Connection B** (flat band cable AWG 28, pitch 1.27 mm)

| | |
|---|---|
| Pin 1 | Motor winding 1 |
| Pin 2 | Motor winding 2 |
| Pin 3 | Motor winding 3 |
| Pin 4 | N.C. |

**Configuration**

Shaft front: length
Electric connection: cable length
Cable insulation: PVC/PO/FEP

**Notes**

[1] For type A:
PVC-cable (-20…85°C)
PO- and FEP cable (-30…85°C)
For type B:
PVC-cable (-20…100°C)
PO- and FEP cable (-40…100°C)

Adapter Micromotor (Part number 498157) required for all maxon controllers.

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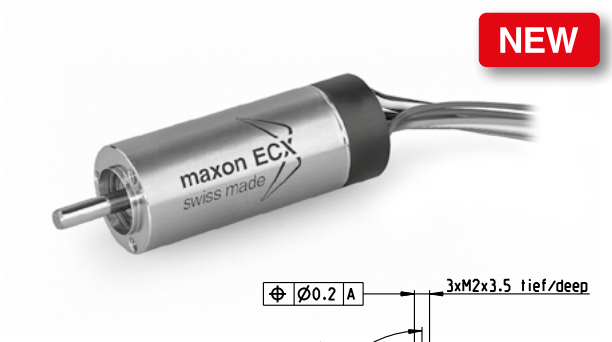
# ECX SPEED 16 M brushless

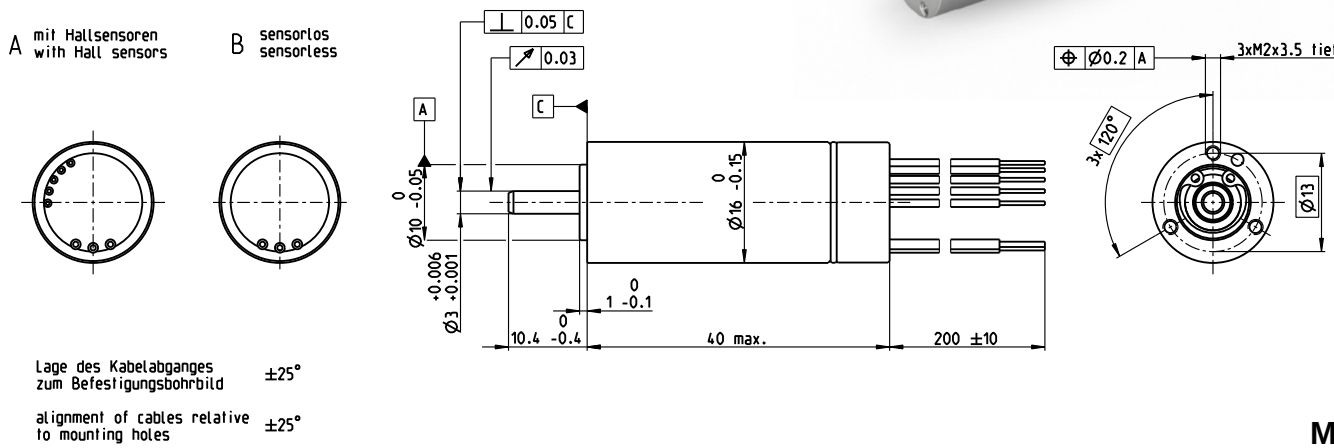
## BLDC motor Ø16 mm

Sterilizable

NEW




**40/51 W 6.6 mNm 70 000 rpm**




**M 1:1**

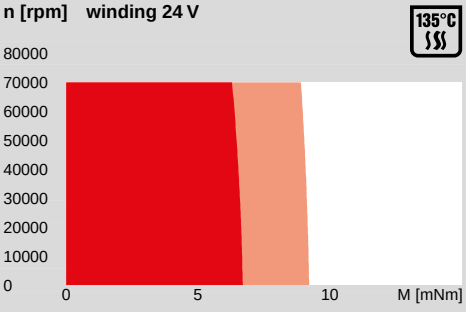
| | Motor Data | | | | |
|---|---|---|---|---|---|
| 1_ | Nominal voltage | V | 18 | 24 | 48 |
| 2_ | No load speed | rpm | 61500 | 65000 | 58900 |
| 3_ | No load current | mA | 275 | 227 | 96.2 |
| 4_ | Nominal speed | rpm | 56400 | 59900 | 53900 |
| 5_ | Nominal torque (max. continuous torque) | mNm | 6.88 | 6.61 | 6.64 |
| 6_ | Nominal current (max. continuous current) | A | 2.71 | 2.08 | 0.94 |
| 7_ | Stall torque | mNm | 97.3 | 99.6 | 91 |
| 8_ | Stall current | A | 35.1 | 28.5 | 11.8 |
| 9_ | Max. efficiency | % | 84 | 83 | 83 |
| 10_ | Terminal resistance | Ω | 0.512 | 0.841 | 4.06 |
| 11_ | Terminal inductance | mH | 0.0341 | 0.0542 | 0.264 |
| 12_ | Torque constant | mNm/A | 2.77 | 3.49 | 7.7 |
| 13_ | Speed constant | rpm/V | 3450 | 2740 | 1240 |
| 14_ | Speed/torque gradient | rpm/mNm | 638 | 659 | 654 |
| 15_ | Mechanical time constant | ms | 3.94 | 4.06 | 4.03 |
| 16_ | Rotor inertia | gcm² | 0.589 | 0.589 | 0.589 |

| | Thermal data | | |
|---|---|---|---|
| 17_ | Thermal resistance housing-ambient | K/W | 20.2 |
| 18_ | Thermal resistance winding-housing | K/W | 1.64 |
| 19_ | Thermal time constant winding | s | 1.97 |
| 20_ | Thermal time constant motor | s | 505 |
| 21_ | Ambient temperature | °C | -40…+135 |
| 22_ | Max. winding temperature | °C | 155 |

| | Mechanical data ball bearings | | |
|---|---|---|---|
| 23_ | Max. speed | rpm | 70 000 |
| 24_ | Axial play | mm | 0..0.29 |
| | Preload | N | 2.5 |
| | Direction of force | | pull |
| 25_ | Radial play | | preloaded |
| 26_ | Max. axial load (dynamic) | N | 2.5 |
| 27_ | Max. force for press fits (static) | N | 60 |
| | (static, shaft supported) | N | 2500 |
| 28_ | Max. radial load [mm from flange] | N | 10 [5] |

| | Other specifications | | |
|---|---|---|---|
| 29_ | Number of pole pairs | | 1 |
| 30_ | Number of phases | | 3 |
| 31_ | Weight of motor | g | 50 |
| 32_ | Typical noise level [rpm] | dBA | 50 [50 000] |

**Operating Range**




135°C SS

Sensorless: typical 2000 sterilization cycles
Hall sensors: typical 1000 sterilization cycles
Sterilization with steam

| | |
|---|---|
| Temperature | +134°C ±4°C |
| Compression pressure up to | 2.3 bar |
| Rel. humidity | 100% |
| Cycle length | 18 min. |

Continuous operation
Continuous operation with reduced thermal resistance $R_{th2}$ 50%
Short term operation

**maxon Modular System**

| maxon gear | Stages | maxon sensor | maxon motor control |
|---|---|---|---|
| 65_GPX 16 SPEED | 1–2 | | 378_ESCON Module 24/2 |
| | | | 379_ESCON 36/3 EC |
| | | | 379_ESCON Module 50/4 EC-S |
| | | | 379_ESCON Module 50/5 |
| | | | 379_ESCON 50/5 |
| | | | 382_DEC Module 24/2 |
| | | | 382_DEC Module 50/5 |

**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)

| | |
|---|---|
| orange | $V_{Hall}$ 3…24 VDC |
| blue | GND |
| yellow | Hall sensor 1 |
| brown | Hall sensor 2 |
| grey | Hall sensor 3 |

Wiring diagram for Hall sensors see page 33

**Connection NTC** (Cable AWG 26)

| | |
|---|---|
| purple | NTC |
| purple | NTC |

Resistance 25°C: 10 kOhm ±1%, beta (25–85°C): 3490 K

**Configuration**

Flange front: thread in flange/center thread
Flange back: without/center thread
Shaft front: length
Electric connection: cable length/pin connection
Themperature Sensor: NTC-Thermistor

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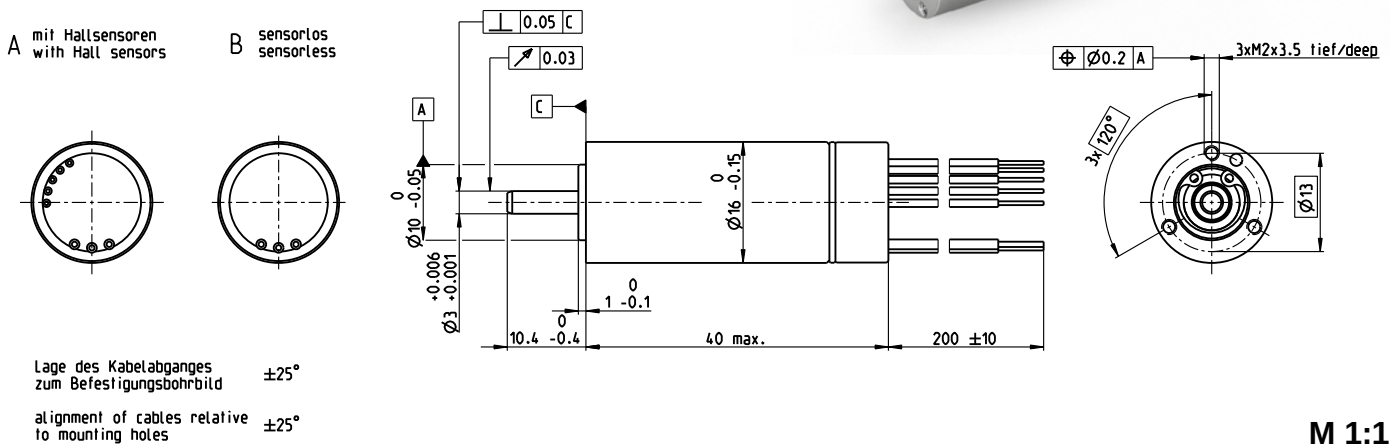
# ECX SPEED 16 M brushless

## BLDC motor Ø16 mm

Sterilizable, Ceramic Bearings

NEW


**40/72.4 W 6.6 mNm 120 000 rpm**




**M 1:1**

| | Motor Data | | | | |
|---|---|---|---|---|---|
| 1_ | Nominal voltage | V | 18 | 24 | 48 |
| 2_ | No load speed | rpm | 61500 | 65000 | 58900 |
| 3_ | No load current | mA | 275 | 227 | 96.2 |
| 4_ | Nominal speed | rpm | 56400 | 59900 | 53900 |
| 5_ | Nominal torque (max. continuous torque) | mNm | 6.88 | 6.61 | 6.64 |
| 6_ | Nominal current (max. continuous current) | A | 2.71 | 2.08 | 0.94 |
| 7_ | Stall torque | mNm | 97.3 | 99.6 | 91 |
| 8_ | Stall current | A | 35.1 | 28.5 | 11.8 |
| 9_ | Max. efficiency | % | 84 | 83 | 83 |
| 10_ | Terminal resistance | Ω | 0.512 | 0.841 | 4.06 |
| 11_ | Terminal inductance | mH | 0.0341 | 0.0542 | 0.264 |
| 12_ | Torque constant | mNm/A | 2.77 | 3.49 | 7.7 |
| 13_ | Speed constant | rpm/V | 3450 | 2740 | 1240 |
| 14_ | Speed/torque gradient | rpm/mNm | 638 | 659 | 654 |
| 15_ | Mechanical time constant | ms | 3.94 | 4.06 | 4.03 |
| 16_ | Rotor inertia | gcm² | 0.589 | 0.589 | 0.589 |

| | Thermal data | | |
|---|---|---|---|
| 17_ | Thermal resistance housing-ambient | K/W | 20.2 |
| 18_ | Thermal resistance winding-housing | K/W | 1.64 |
| 19_ | Thermal time constant winding | s | 1.97 |
| 20_ | Thermal time constant motor | s | 505 |
| 21_ | Ambient temperature | °C | -40…+135 |
| 22_ | Max. winding temperature | °C | 155 |

| | Mechanical data ball bearings | | |
|---|---|---|---|
| 23_ | Max. speed | rpm | 120 000 |
| 24_ | Axial play | mm | 0..0.29 |
| | Preload | N | 2.5 |
| | Direction of force | | pull |
| 25_ | Radial play | | preloaded |
| 26_ | Max. axial load (dynamic) | N | 2.5 |
| 27_ | Max. force for press fits (static) | N | 60 |
| | (static, shaft supported) | N | 2500 |
| 28_ | Max. radial load [mm from flange] | N | 10 [5] |

| | Other specifications | | |
|---|---|---|---|
| 29_ | Number of pole pairs | | 1 |
| 30_ | Number of phases | | 3 |
| 31_ | Weight of motor | g | 50 |
| 32_ | Typical noise level [rpm] | dBA | 50 [50 000] |

**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)

| | |
|---|---|
| orange | $V_{Hall}$ 3…24 VDC |
| blue | GND |
| yellow | Hall sensor 1 |
| brown | Hall sensor 2 |
| grey | Hall sensor 3 |

Wiring diagram for Hall sensors see page 33

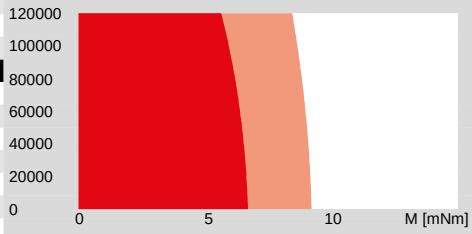
**Connection NTC** (Cable AWG 26)

| | |
|---|---|
| purple | NTC |
| purple | NTC |

Resistance 25°C: 10 kOhm ±1%, beta (25–85°C): 3490 K

### Operating Range

**n [rpm] winding 24 V**




135°C

Sensorless: typical 2000 sterilization cycles
Hall sensors: typical 1000 sterilization cycles
Sterilization with steam

| | |
|---|---|
| Temperature | +134°C ±4°C |
| Compression pressure up to | 2.3 bar |
| Rel. humidity | 100% |
| Cycle length | 18 min. |

- Continuous operation
- Continuous operation with reduced thermal resistance $R_{th2}$ 50%
- Short term operation

### maxon Modular System

| maxon gear | Stages | maxon sensor |
|---|---|---|
| 65_GPX 16 SPEED | 1–2 | |

**maxon motor control**

- 378_ESCON Module 24/2
- 379_ESCON 36/3 EC
- 379_ESCON Module 50/4 EC-S
- 379_ESCON Module 50/5
- 379_ESCON 50/5
- 382_DEC Module 24/2
- 382_DEC Module 50/5

### Configuration

Flange front: thread in flange/center thread
Flange back: without/center thread
Shaft front: length
Electric connection: cable length/pin connection
Themperature Sensor: NTC-Thermistor

xdrives.maxonmotor.com

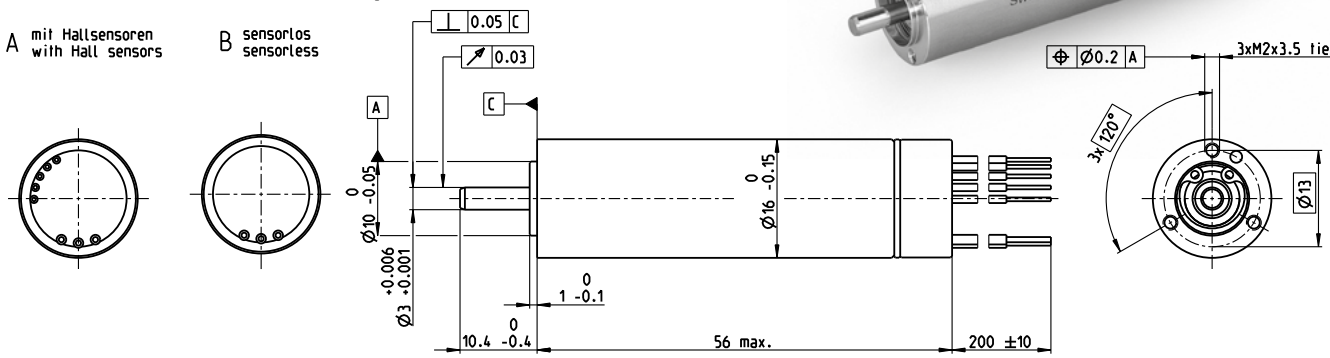
# ECX SPEED 16 L brushless

## BLDC motor Ø16 mm

Sterilizable

NEW


**80/97 W 13.9 mNm 70 000 rpm**




Lage des Kabelabganges zum Befestigungsbohrbild ±25°

alignment of cables relative to mounting holes ±25°

**M 1:1**

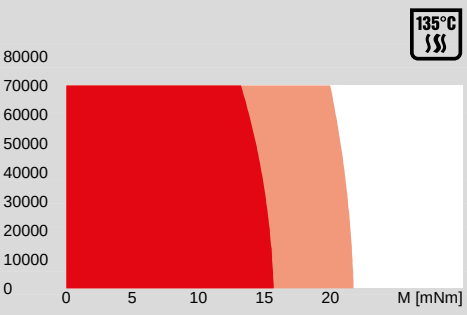
| | Motor Data | | | | | |
|---|---|---|---|---|---|---|
| 1_ | Nominal voltage | V | 18 | 24 | 36 | 48 |
| 2_ | No load speed | rpm | 67700 | 67700 | 67700 | 67700 |
| 3_ | No load current | mA | 567 | 425 | 283 | 213 |
| 4_ | Nominal speed | rpm | 64600 | 64900 | 65100 | 65100 |
| 5_ | Nominal torque (max. continuous torque) | mNm | 13.4 | 13.9 | 13.4 | 12.8 |
| 6_ | Nominal current (max. continuous current) | A | 5.82 | 4.52 | 2.9 | 2.1 |
| 7_ | Stall torque | mNm | 330 | 389 | 395 | 377 |
| 8_ | Stall current | A | 131 | 115 | 78.1 | 56 |
| 9_ | Max. efficiency | % | 88 | 89 | 89 | 88 |
| 10_ | Terminal resistance | Ω | 0.138 | 0.208 | 0.461 | 0.858 |
| 11_ | Terminal inductance | mH | 0.00567 | 0.0101 | 0.0227 | 0.0403 |
| 12_ | Torque constant | mNm/A | 2.53 | 3.37 | 5.06 | 6.74 |
| 13_ | Speed constant | rpm/V | 3780 | 2830 | 1890 | 1420 |
| 14_ | Speed/torque gradient | rpm/mNm | 206 | 175 | 172 | 180 |
| 15_ | Mechanical time constant | ms | 1.24 | 1.06 | 1.04 | 1.09 |
| 16_ | Rotor inertia | gcm² | 0.577 | 0.577 | 0.577 | 0.577 |

| | Thermal data | | |
|---|---|---|---|
| 17_ | Thermal resistance housing-ambient | K/W | 15.8 |
| 18_ | Thermal resistance winding-housing | K/W | 0.952 |
| 19_ | Thermal time constant winding | s | 1.88 |
| 20_ | Thermal time constant motor | s | 574 |
| 21_ | Ambient temperature | °C | -40…+135 |
| 22_ | Max. winding temperature | °C | 155 |

| | Mechanical data ball bearings | | |
|---|---|---|---|
| 23_ | Max. speed | rpm | 70 000 |
| 24_ | Axial play | mm | 0…0.29 |
| | Preload | N | 2.5 |
| | Direction of force | | pull |
| 25_ | Radial play | | preloaded |
| 26_ | Max. axial load (dynamic) | N | 2.5 |
| 27_ | Max. force for press fits (static) | N | 60 |
| | (static, shaft supported) | N | 2500 |
| 28_ | Max. radial load [mm from flange] | N | 10 [5] |

| | Other specifications | | |
|---|---|---|---|
| 29_ | Number of pole pairs | | 1 |
| 30_ | Number of phases | | 3 |
| 31_ | Weight of motor | g | 73 |
| 32_ | Typical noise level [rpm] | dBA | 52 [50 000] |

**Operating Range**




Sensorless: typical 2000 sterilization cycles
Hall sensors: typical 1000 sterilization cycles
Sterilization with steam

| | |
|---|---|
| Temperature | +134°C ±4°C |
| Compression pressure up to | 2.3 bar |
| Rel. humidity | 100% |
| Cycle length | 18 min. |

- Continuous operation
- Continuous operation with reduced thermal resistance $R_{th2}$ 50%
- Short term operation

**maxon Modular System**

| maxon gear | Stages | maxon sensor |
|---|---|---|
| 65_GPX 16 SPEED | 1–2 | |

**maxon motor control**
379_ESCON 36/3 EC
379_ESCON Module 50/4 EC-S
379_ESCON Module 50/5
379_ESCON 50/5
379_ESCON 70/10
382_DEC Module 50/5

**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)

| | |
|---|---|
| orange | $V_{Hall}$ 3…24 VDC |
| blue | GND |
| yellow | Hall sensor 1 |
| brown | Hall sensor 2 |
| grey | Hall sensor 3 |

Wiring diagram for Hall sensors see page 33

**Connection NTC** (Cable AWG 26)

| | |
|---|---|
| purple | NTC |
| purple | NTC |

Resistance 25°C: 10 kOhm ±1%, beta (25–85°C): 3490 K

**Configuration**

Flange front: thread in flange/center thread
Flange back: without/center thread
Shaft front: length
Electric connection: cable length/pin connection
Themperature Sensor: NTC-Thermistor

xdrives.maxonmotor.com

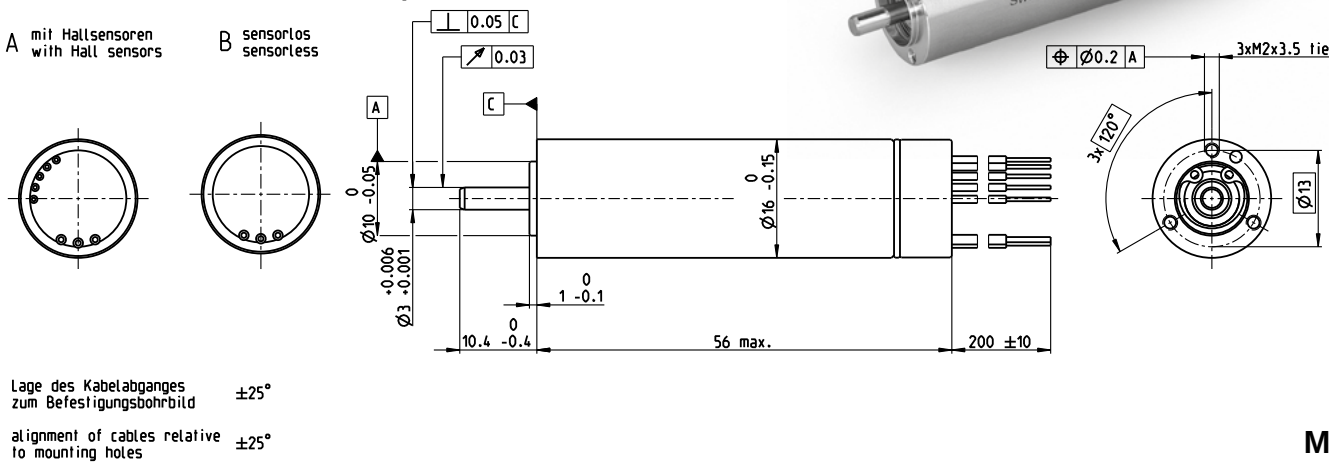
# ECX SPEED 16 L brushless

## BLDC motor Ø16 mm

Sterilizable, Ceramic Bearings

NEW


**80/104 W 13.9 mNm 120 000 rpm**




Lage des Kabelabganges zum Befestigungsbohrbild ±25°

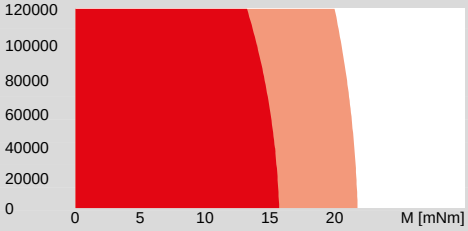
alignment of cables relative to mounting holes ±25°

**M 1:1**

| | Motor Data | | | | | |
|---|---|---|---|---|---|---|
| 1_ | Nominal voltage | V | 18 | 24 | 36 | 48 |
| 2_ | No load speed | rpm | 67700 | 67700 | 67700 | 67700 |
| 3_ | No load current | mA | 567 | 425 | 283 | 213 |
| 4_ | Nominal speed | rpm | 64600 | 64900 | 65100 | 65100 |
| 5_ | Nominal torque (max. continuous torque) | mNm | 13.4 | 13.9 | 13.4 | 12.8 |
| 6_ | Nominal current (max. continuous current) | A | 5.82 | 4.52 | 2.9 | 2.1 |
| 7_ | Stall torque | mNm | 330 | 389 | 395 | 377 |
| 8_ | Stall current | A | 131 | 115 | 78.1 | 56 |
| 9_ | Max. efficiency | % | 88 | 89 | 89 | 88 |
| 10_ | Terminal resistance | Ω | 0.138 | 0.208 | 0.461 | 0.858 |
| 11_ | Terminal inductance | mH | 0.00567 | 0.0101 | 0.0227 | 0.0403 |
| 12_ | Torque constant | mNm/A | 2.53 | 3.37 | 5.06 | 6.74 |
| 13_ | Speed constant | rpm/V | 3780 | 2830 | 1890 | 1420 |
| 14_ | Speed/torque gradient | rpm/mNm | 206 | 175 | 172 | 180 |
| 15_ | Mechanical time constant | ms | 1.24 | 1.06 | 1.04 | 1.09 |
| 16_ | Rotor inertia | gcm² | 0.577 | 0.577 | 0.577 | 0.577 |

| | Thermal data | | |
|---|---|---|---|
| 17_ | Thermal resistance housing-ambient | K/W | 15.8 |
| 18_ | Thermal resistance winding-housing | K/W | 0.952 |
| 19_ | Thermal time constant winding | s | 1.88 |
| 20_ | Thermal time constant motor | s | 574 |
| 21_ | Ambient temperature | °C | -40…+135 |
| 22_ | Max. winding temperature | °C | 155 |
| | **Mechanical data ball bearings** | | |
| 23_ | Max. speed | rpm | 120000 |
| 24_ | Axial play | mm | 0…0.29 |
| | Preload | N | 2.5 |
| | Direction of force | | pull |
| 25_ | Radial play | | preloaded |
| 26_ | Max. axial load (dynamic) | N | 2.5 |
| 27_ | Max. force for press fits (static) | N | 60 |
| | (static, shaft supported) | N | 2500 |
| 28_ | Max. radial load [mm from flange] | N | 10 [5] |
| | **Other specifications** | | |
| 29_ | Number of pole pairs | | 1 |
| 30_ | Number of phases | | 3 |
| 31_ | Weight of motor | g | 73 |
| 32_ | Typical noise level [rpm] | dBA | 52 [50000] |

**Operating Range**




Sensorless: typical 2000 sterilization cycles
Hall sensors: typical 1000 sterilization cycles
Sterilization with steam

| | |
|---|---|
| Temperature | +134°C ±4°C |
| Compression pressure up to | 2.3 bar |
| Rel. humidity | 100% |
| Cycle length | 18 min. |

- Continuous operation
- Continuous operation with reduced thermal resistance $R_{th2}$ 50%
- Short term operation

**maxon Modular System**

| maxon gear | Stages | maxon sensor | maxon motor control |
|---|---|---|---|
| 65_GPX 16 SPEED | 1–2 | | 379_ESCON 36/3 EC<br>379_ESCON Module 50/4 EC-S<br>379_ESCON Module 50/5<br>379_ESCON 50/5<br>379_ESCON 70/10<br>382_DEC Module 50/5 |

**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)

| | |
|---|---|
| orange | $V_{Hall}$ 3…24 VDC |
| blue | GND |
| yellow | Hall sensor 1 |
| brown | Hall sensor 2 |
| grey | Hall sensor 3 |

Wiring diagram for Hall sensors see page 33

**Connection NTC** (Cable AWG 26)

| | |
|---|---|
| purple | NTC |
| purple | NTC |

Resistance 25°C: 10 kOhm ±1%, beta (25–85°C): 3490 K

**Configuration**

Flange front: thread in flange/center thread
Flange back: without/center thread
Shaft front: length
Electric connection: cable length/pin connection
Themperature Sensor: NTC-Thermistor

xdrives.maxonmotor.com

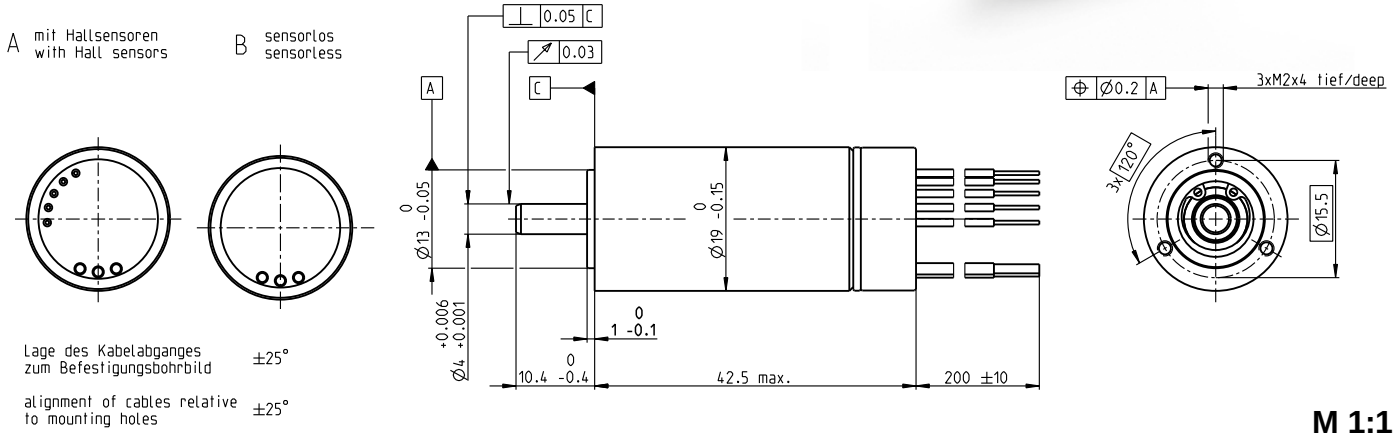
# ECX SPEED 19 M brushless

## BLDC motor Ø19 mm

Sterilizable

NEW


**60/68 W 10.3 mNm 70000 rpm**

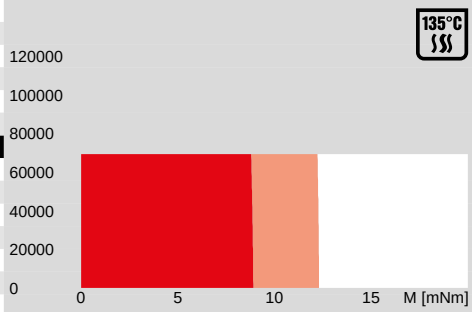



**M 1:1**

| | Motor Data | | | | | |
|---|---|---|---|---|---|---|
| 1_ | Nominal voltage | V | 18 | 24 | 36 | 48 |
| 2_ | No load speed | rpm | 64700 | 64400 | 64500 | 63300 |
| 3_ | No load current | mA | 307 | 229 | 153 | 112 |
| 4_ | Nominal speed | rpm | 59700 | 59300 | 59700 | 58600 |
| 5_ | Nominal torque (max. continuous torque) | mNm | 10.7 | 9.59 | 9.91 | 10.1 |
| 6_ | Nominal current (max. continuous current) | A | 4.28 | 2.89 | 1.99 | 1.49 |
| 7_ | Stall torque | mNm | 175 | 150 | 164 | 169 |
| 8_ | Stall current | A | 66.1 | 42.4 | 31 | 23.5 |
| 9_ | Max. efficiency | % | 87 | 86 | 87 | 87 |
| 10_ | Terminal resistance | Ω | 0.272 | 0.566 | 1.16 | 2.04 |
| 11_ | Terminal inductance | mH | 0.0234 | 0.0438 | 0.0986 | 0.182 |
| 12_ | Torque constant | mNm/A | 2.64 | 3.54 | 5.3 | 7.2 |
| 13_ | Speed constant | rpm/V | 3610 | 2700 | 1800 | 1330 |
| 14_ | Speed/torque gradient | rpm/mNm | 373 | 432 | 396 | 376 |
| 15_ | Mechanical time constant | ms | 4.49 | 5.2 | 4.77 | 4.53 |
| 16_ | Rotor inertia | gcm² | 1.15 | 1.15 | 1.15 | 1.15 |

| | Thermal data | | |
|---|---|---|---|
| 17_ | Thermal resistance housing-ambient | K/W | 16.9 |
| 18_ | Thermal resistance winding-housing | K/W | 1.1 |
| 19_ | Thermal time constant winding | s | 1.62 |
| 20_ | Thermal time constant motor | s | 700 |
| 21_ | Ambient temperature | °C | -40…+135 |
| 22_ | Max. winding temperature | °C | 155 |
| | **Mechanical data ball bearings** | | |
| 23_ | Max. speed | rpm | 70000 |
| 24_ | Axial play | mm | 0…0.29 |
| | Preload | N | 4 |
| | Direction of force | | pull |
| 25_ | Radial play | | preloaded |
| 26_ | Max. axial load (dynamic) | N | 4 |
| 27_ | Max. force for press fits (static) | N | 70 |
| | (static, shaft supported) | N | 5000 |
| 28_ | Max. radial load [mm from flange] | N | 12 [5] |
| | **Other specifications** | | |
| 29_ | Number of pole pairs | | 1 |
| 30_ | Number of phases | | 3 |
| 31_ | Weight of motor | g | 78 |
| 32_ | Typical noise level [rpm] | dBA | 48 [50000] |

**Operating Range**




Sensorless: typical 2000 sterilization cycles
Hall sensors: typical 1000 sterilization cycles
Sterilization with steam

| | |
|---|---|
| Temperature | +134°C ±4°C |
| Compression pressure up to | 2.3 bar |
| Rel. humidity | 100% |
| Cycle length | 18 min. |

- Continuous operation
- Continuous operation with reduced thermal resistance $R_{th2}$ 50%
- Short term operation

**maxon Modular System**

| maxon gear | maxon sensor | maxon motor control |
|---|---|---|
| | | 379_ESCON 36/3 EC |
| | | 379_ESCON Module 50/4 EC-S |
| | | 379_ESCON Module 50/5 |
| | | 379_ESCON 50/5 |
| | | 382_DEC Module 50/5 |

**Connection A and B, motor** (Cable AWG 20)

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

**Connection A, sensors** (Cable AWG 26)

| | |
|---|---|
| orange | $V_{Hall}$ 3…24 VDC |
| blue | GND |
| yellow | Hall sensor 1 |
| brown | Hall sensor 2 |
| grey | Hall sensor 3 |

Wiring diagram for Hall sensors see page 33

**Connection NTC** (Cable AWG 26)

| | |
|---|---|
| purple | NTC |
| purple | NTC |

Resistance 25°C: 10 kOhm ±1%, beta (25–85°C): 3490 K

**Configuration**

Flange front: thread in flange/center thread
Flange back: without/center thread
Shaft front: length
Electric connection: cable length/pin connection
Themperature Sensor: NTC-Thermistor

xdrives.maxonmotor.com

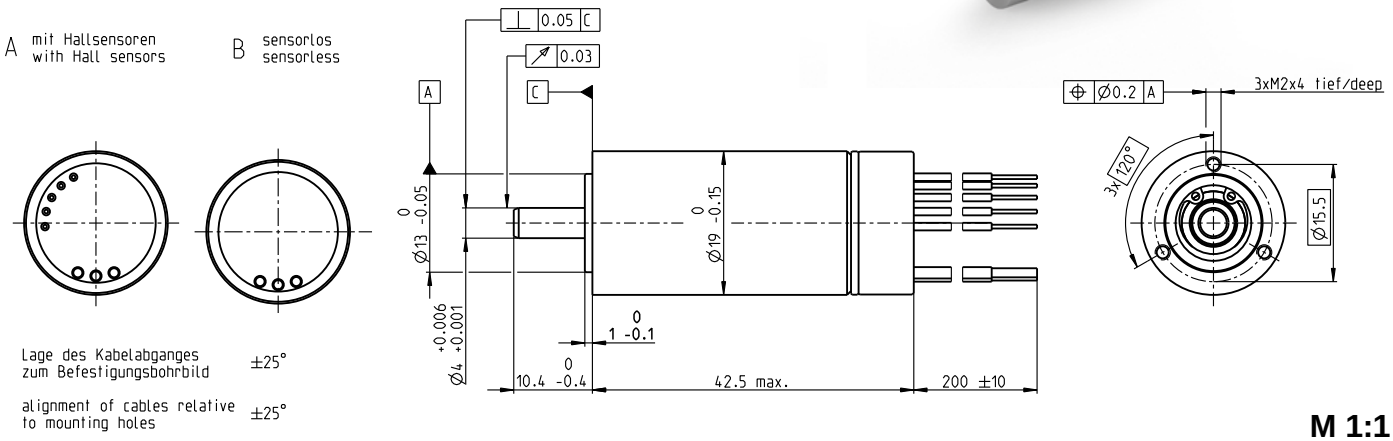
# ECX SPEED 19 M brushless

## BLDC motor Ø19 mm

Sterilizable, Ceramic Bearings

NEW


**60/94 W 10.3 mNm 100000 rpm**

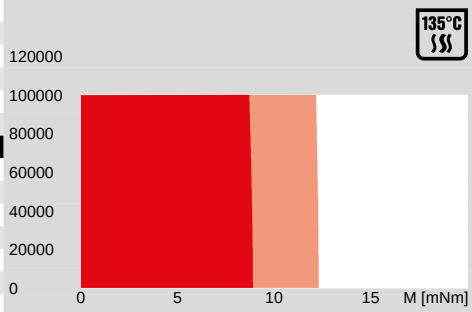



**M 1:1**

| | Motor Data | | | | | |
|---|---|---|---|---|---|---|
| 1_ | Nominal voltage | V | 18 | 24 | 36 | 48 |
| 2_ | No load speed | rpm | 64700 | 64400 | 64500 | 63300 |
| 3_ | No load current | mA | 307 | 229 | 153 | 112 |
| 4_ | Nominal speed | rpm | 59700 | 59300 | 59700 | 58600 |
| 5_ | Nominal torque (max. continuous torque) | mNm | 10.7 | 9.59 | 9.91 | 10.1 |
| 6_ | Nominal current (max. continuous current) | A | 4.28 | 2.89 | 1.99 | 1.49 |
| 7_ | Stall torque | mNm | 175 | 150 | 164 | 169 |
| 8_ | Stall current | A | 66.1 | 42.4 | 31 | 23.5 |
| 9_ | Max. efficiency | % | 87 | 87 | 87 | 87 |
| 10_ | Terminal resistance | Ω | 0.272 | 0.566 | 1.16 | 2.04 |
| 11_ | Terminal inductance | mH | 0.0234 | 0.0438 | 0.0986 | 0.182 |
| 12_ | Torque constant | mNm/A | 2.64 | 3.54 | 5.3 | 7.2 |
| 13_ | Speed constant | rpm/V | 3610 | 2700 | 1800 | 1330 |
| 14_ | Speed/torque gradient | rpm/mNm | 373 | 432 | 396 | 376 |
| 15_ | Mechanical time constant | ms | 4.49 | 5.2 | 4.77 | 4.53 |
| 16_ | Rotor inertia | gcm² | 1.15 | 1.15 | 1.15 | 1.15 |

| | Thermal data | | |
|---|---|---|---|
| 17_ | Thermal resistance housing-ambient | K/W | 16.9 |
| 18_ | Thermal resistance winding-housing | K/W | 1.1 |
| 19_ | Thermal time constant winding | s | 1.62 |
| 20_ | Thermal time constant motor | s | 700 |
| 21_ | Ambient temperature | °C | -40…+135 |
| 22_ | Max. winding temperature | °C | 155 |
| | **Mechanical data ball bearings** | | |
| 23_ | Max. speed | rpm | 100000 |
| 24_ | Axial play | mm | 0…0.29 |
| | Preload | N | 4 |
| | Direction of force | | pull |
| 25_ | Radial play | | preloaded |
| 26_ | Max. axial load (dynamic) | N | 4 |
| 27_ | Max. force for press fits (static) | N | 70 |
| | (static, shaft supported) | N | 5000 |
| 28_ | Max. radial load [mm from flange] | N | 12 [5] |
| | **Other specifications** | | |
| 29_ | Number of pole pairs | | 1 |
| 30_ | Number of phases | | 3 |
| 31_ | Weight of motor | g | 78 |
| 32_ | Typical noise level [rpm] | dBA | 48 [50000] |

**Operating Range**




Sensorless: typical 2000 sterilization cycles
Hall sensors: typical 1000 sterilization cycles
Sterilization with steam

| | |
|---|---|
| Temperature | +134°C ±4°C |
| Compression pressure up to | 2.3 bar |
| Rel. humidity | 100% |
| Cycle length | 18 min. |

- Continuous operation
- Continuous operation with reduced thermal resistance $R_{th2}$ 50%
- Short term operation

**maxon Modular System**

| maxon gear | maxon sensor | maxon motor control |
|---|---|---|
| | | 379_ESCON 36/3 EC |
| | | 379_ESCON Module 50/4 EC-S |
| | | 379_ESCON Module 50/5 |
| | | 379_ESCON 50/5 |
| | | 382_DEC Module 50/5 |

**Connection A and B, motor** (Cable AWG 20)

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

**Connection A, sensors** (Cable AWG 26)

| | |
|---|---|
| orange | $V_{Hall}$ 3…24 VDC |
| blue | GND |
| yellow | Hall sensor 1 |
| brown | Hall sensor 2 |
| grey | Hall sensor 3 |

Wiring diagram for Hall sensors see page 33

**Connection NTC** (Cable AWG 26)

| | |
|---|---|
| purple | NTC |
| purple | NTC |

Resistance 25°C: 10 kOhm ±1%, beta (25–85°C): 3490 K

**Configuration**

Flange front: thread in flange/center thread
Flange back: without/center thread
Shaft front: length
Electric connection: cable length/pin connection
Themperature Sensor: NTC-Thermistor

xdrives.maxonmotor.com

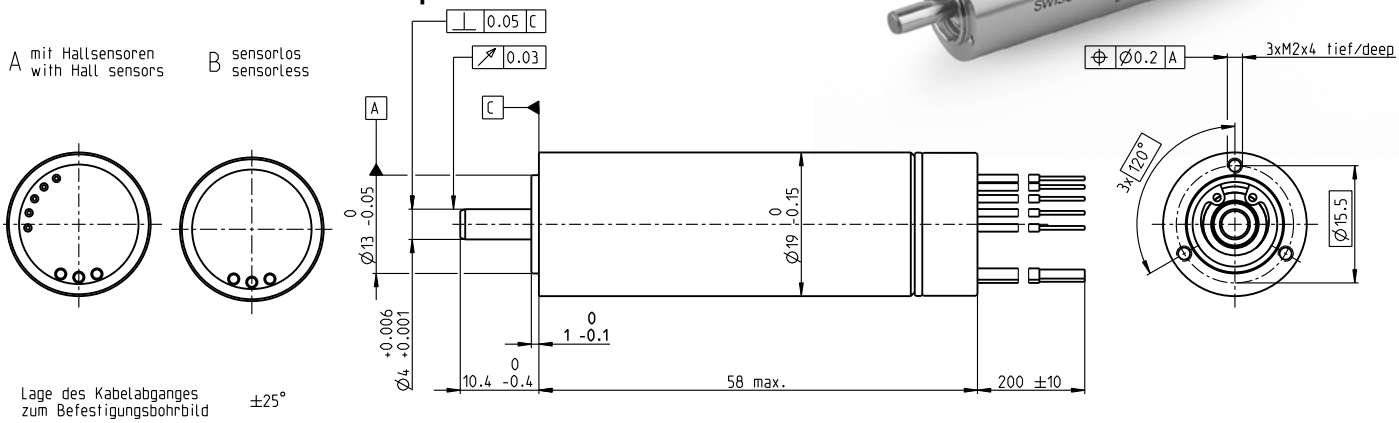
# ECX SPEED 19 L brushless

## BLDC motor Ø19 mm

Sterilizable

NEW


**120/145 W 22.7 mNm 70 000 rpm**

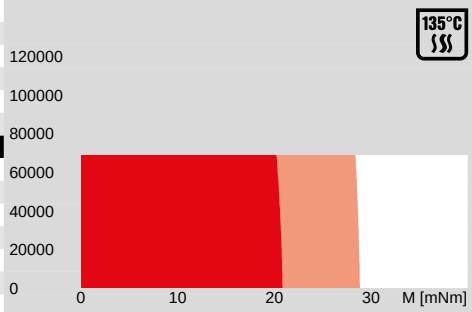



**M 1:1**

| | | | | | | |
|---|---|---|---|---|---|---|
| | **Motor Data** | | | | | |
| 1_ | Nominal voltage | V | 18 | 24 | 36 | 48 |
| 2_ | No load speed | rpm | 60800 | 60800 | 57600 | 63400 |
| 3_ | No load current | mA | 426 | 319 | 194 | 172 |
| 4_ | Nominal speed | rpm | 57200 | 57600 | 54700 | 60500 |
| 5_ | Nominal torque (max. continuous torque) | mNm | 23.3 | 22.7 | 23.5 | 22.6 |
| 6_ | Nominal current (max. continuous current) | A | 8.56 | 6.27 | 4.09 | 3.27 |
| 7_ | Stall torque | mNm | 503 | 551 | 613 | 655 |
| 8_ | Stall current | A | 178 | 146 | 103 | 90.8 |
| 9_ | Max. efficiency | % | 91 | 91 | 91 | 92 |
| 10_ | Terminal resistance | Ω | 0.101 | 0.164 | 0.35 | 0.528 |
| 11_ | Terminal inductance | mH | 0.0096 | 0.0171 | 0.0428 | 0.0627 |
| 12_ | Torque constant | mNm/A | 2.82 | 3.76 | 5.95 | 7.21 |
| 13_ | Speed constant | rpm/V | 3390 | 2540 | 1600 | 1320 |
| 14_ | Speed/torque gradient | rpm/mNm | 121 | 111 | 94.2 | 97.1 |
| 15_ | Mechanical time constant | ms | 2.27 | 2.07 | 1.77 | 1.82 |
| 16_ | Rotor inertia | gcm² | 1.79 | 1.79 | 1.79 | 1.79 |

| | | | |
|---|---|---|---|
| | **Thermal data** | | |
| 17_ | Thermal resistance housing-ambient | K/W | 14 |
| 18_ | Thermal resistance winding-housing | K/W | 0.9 |
| 19_ | Thermal time constant winding | s | 2.97 |
| 20_ | Thermal time constant motor | s | 580 |
| 21_ | Ambient temperature | °C | -40…+135 |
| 22_ | Max. winding temperature | °C | 155 |
| | **Mechanical data ball bearings** | | |
| 23_ | Max. speed | rpm | 70 000 |
| 24_ | Axial play | mm | 0…0.29 |
| | Preload | N | 4 |
| | Direction of force | | pull |
| 25_ | Radial play | | preloaded |
| 26_ | Max. axial load (dynamic) | N | 4 |
| 27_ | Max. force for press fits (static) | N | 70 |
| | (static, shaft supported) | N | 5000 |
| 28_ | Max. radial load [mm from flange] | N | 12 [5] |
| | **Other specifications** | | |
| 29_ | Number of pole pairs | | 1 |
| 30_ | Number of phases | | 3 |
| 31_ | Weight of motor | g | 108 |
| 32_ | Typical noise level [rpm] | dBA | 51 [50 000] |

**Operating Range**




Sensorless: typical 2000 sterilization cycles
Hall sensors: typical 1000 sterilization cycles
Sterilization with steam

| | |
|---|---|
| Temperature | +134°C ±4°C |
| Compression pressure up to | 2.3 bar |
| Rel. humidity | 100% |
| Cycle length | 18 min. |

- Continuous operation
- Continuous operation with reduced thermal resistance $R_{th2}$ 50%
- Short term operation

**maxon Modular System**

| maxon gear | maxon sensor | maxon motor control |
|---|---|---|
| | | 379_ESCON Module 50/4 EC-S |
| | | 379_ESCON Module 50/5 |
| | | 379_ESCON 50/5 |
| | | 379_ESCON 70/10 |
| | | 382_DEC Module 50/5 |

**Connection A and B, motor** (Cable AWG 20)

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

**Connection A, sensors** (Cable AWG 26)

| | |
|---|---|
| orange | $V_{Hall}$ 3…24 VDC |
| blue | GND |
| yellow | Hall sensor 1 |
| brown | Hall sensor 2 |
| grey | Hall sensor 3 |

Wiring diagram for Hall sensors see page 33

**Connection NTC** (Cable AWG 26)

| | |
|---|---|
| purple | NTC |
| purple | NTC |

Resistance 25°C: 10 kOhm ±1%, beta (25–85°C): 3490 K

**Configuration**

Flange front: thread in flange/center thread
Flange back: without/center thread
Shaft front: length
Electric connection: cable length/pin connection
Themperature Sensor: NTC-Thermistor

xdrives.maxonmotor.com

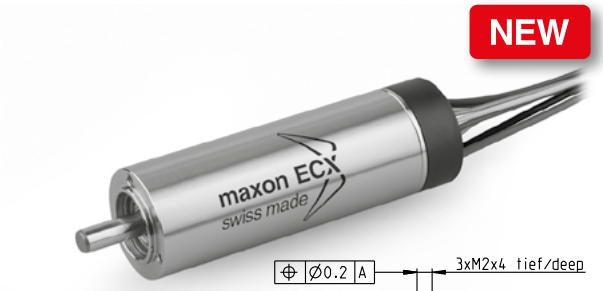
# ECX SPEED 19 L brushless

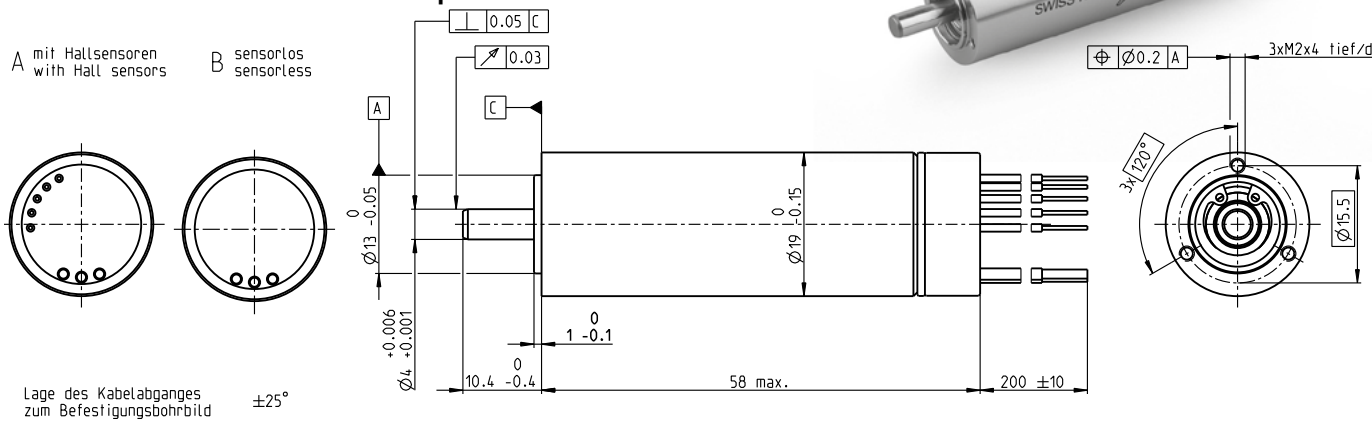
## BLDC motor Ø19 mm

Sterilizable, Ceramic Bearings

**120/200 W 22.7 mNm 100 000 rpm**

NEW




**M 1:1**

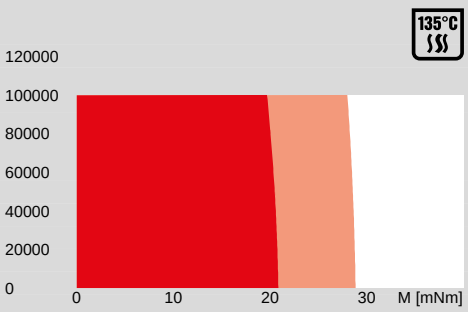
| | Motor Data | | | | | |
|---|---|---|---|---|---|---|
| 1_ | Nominal voltage | V | 18 | 24 | 36 | 48 |
| 2_ | No load speed | rpm | 60800 | 60800 | 57600 | 63400 |
| 3_ | No load current | mA | 426 | 319 | 194 | 172 |
| 4_ | Nominal speed | rpm | 57200 | 57600 | 54700 | 60500 |
| 5_ | Nominal torque (max. continuous torque) | mNm | 23.3 | 22.7 | 23.5 | 22.6 |
| 6_ | Nominal current (max. continuous current) | A | 8.56 | 6.27 | 4.09 | 3.27 |
| 7_ | Stall torque | mNm | 503 | 551 | 613 | 655 |
| 8_ | Stall current | A | 178 | 146 | 103 | 90.8 |
| 9_ | Max. efficiency | % | 91 | 91 | 91 | 92 |
| 10_ | Terminal resistance | Ω | 0.101 | 0.164 | 0.35 | 0.528 |
| 11_ | Terminal inductance | mH | 0.0096 | 0.0171 | 0.0428 | 0.0627 |
| 12_ | Torque constant | mNm/A | 2.82 | 3.76 | 5.95 | 7.21 |
| 13_ | Speed constant | rpm/V | 3390 | 2540 | 1600 | 1320 |
| 14_ | Speed/torque gradient | rpm/mNm | 121 | 111 | 94.2 | 97.1 |
| 15_ | Mechanical time constant | ms | 2.27 | 2.07 | 1.77 | 1.82 |
| 16_ | Rotor inertia | gcm² | 1.79 | 1.79 | 1.79 | 1.79 |

| | Thermal data | | |
|---|---|---|---|
| 17_ | Thermal resistance housing-ambient | K/W | 14 |
| 18_ | Thermal resistance winding-housing | K/W | 0.9 |
| 19_ | Thermal time constant winding | s | 2.97 |
| 20_ | Thermal time constant motor | s | 580 |
| 21_ | Ambient temperature | °C | -40…+135 |
| 22_ | Max. winding temperature | °C | 155 |

| | Mechanical data ball bearings | | |
|---|---|---|---|
| 23_ | Max. speed | rpm | 100 000 |
| 24_ | Axial play | mm | 0…0.29 |
| | Preload | N | 4 |
| | Direction of force | | pull |
| 25_ | Radial play | | preloaded |
| 26_ | Max. axial load (dynamic) | N | 4 |
| 27_ | Max. force for press fits (static) | N | 70 |
| | (static, shaft supported) | N | 5000 |
| 28_ | Max. radial load [mm from flange] | N | 12 [5] |

| | Other specifications | | |
|---|---|---|---|
| 29_ | Number of pole pairs | | 1 |
| 30_ | Number of phases | | 3 |
| 31_ | Weight of motor | g | 108 |
| 32_ | Typical noise level [rpm] | dBA | 51 [50 000] |

**Operating Range**




Sensorless: typical 2000 sterilization cycles
Hall sensors: typical 1000 sterilization cycles
Sterilization with steam

| | |
|---|---|
| Temperature | +134°C ±4°C |
| Compression pressure up to | 2.3 bar |
| Rel. humidity | 100% |
| Cycle length | 18 min. |

- Continuous operation
- Continuous operation with reduced thermal resistance $R_{th2}$ 50%
- Short term operation

**maxon Modular System**

| maxon gear | maxon sensor | maxon motor control |
|---|---|---|
| | | 379_ESCON Module 50/4 EC-S |
| | | 379_ESCON Module 50/5 |
| | | 379_ESCON 50/5 |
| | | 379_ESCON 70/10 |
| | | 382_DEC Module 50/5 |

**Connection A and B, motor** (Cable AWG 20)

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

**Connection A, sensors** (Cable AWG 26)

| | |
|---|---|
| orange | $V_{Hall}$ 3…24 VDC |
| blue | GND |
| yellow | Hall sensor 1 |
| brown | Hall sensor 2 |
| grey | Hall sensor 3 |

Wiring diagram for Hall sensors see page 33

**Connection NTC** (Cable AWG 26)

| | |
|---|---|
| purple | NTC |
| purple | NTC |

Resistance 25°C: 10 kOhm ±1%, beta (25–85°C): 3490 K

**Configuration**

Flange front: thread in flange/center thread
Flange back: without/center thread
Shaft front: length
Electric connection: cable length/pin connection
Themperature Sensor: NTC-Thermistor

xdrives.maxonmotor.com

# ECX SPEED 22 M brushless

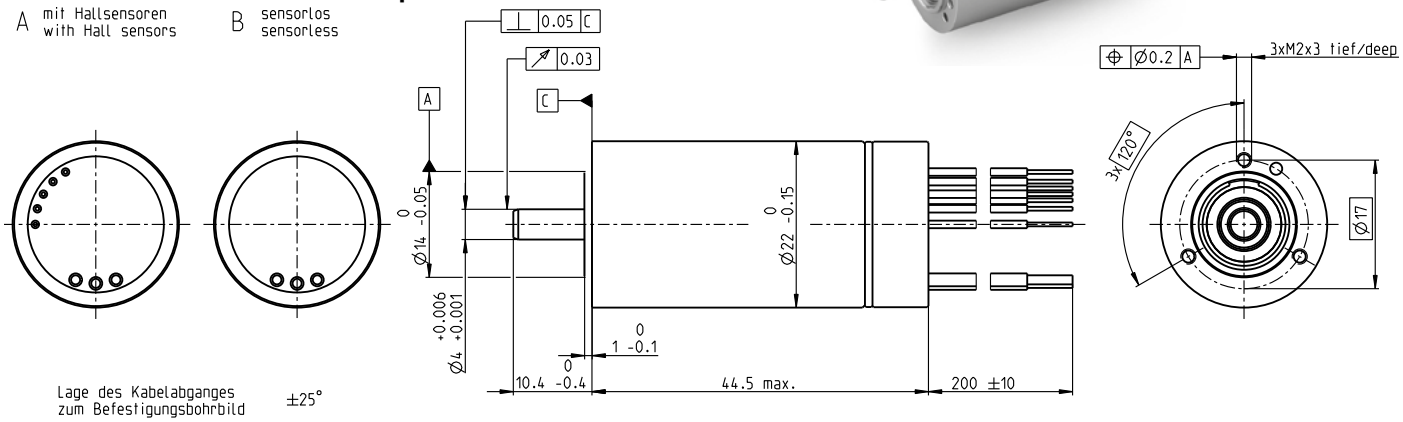
## BLDC motor Ø22 mm

Sterilizable

NEW


**80/106 W 19.5 mNm 60 000 rpm**

A mit Hallsensoren with Hall sensors B sensorlos sensorless




Lage des Kabelabganges zum Befestigungsbohrbild ±25°

alignment of cables relative to mounting holes ±25°

**M 1:1**

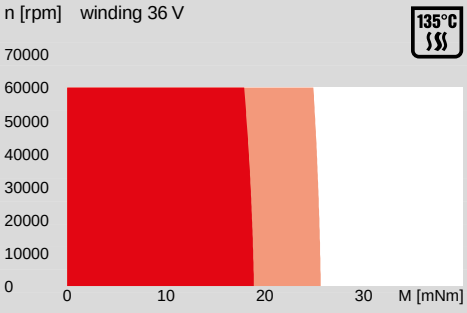
| | Motor Data | | | | | |
|---|---|---|---|---|---|---|
| 1_ | Nominal voltage | V | 18 | 24 | 36 | 48 |
| 2_ | No load speed | rpm | 52800 | 54800 | 56900 | 54800 |
| 3_ | No load current | mA | 286 | 227 | 161 | 114 |
| 4_ | Nominal speed | rpm | 49400 | 51500 | 53600 | 51500 |
| 5_ | Nominal torque (max. continuous torque) | mNm | 19.5 | 19.4 | 18.7 | 19 |
| 6_ | Nominal current (max. continuous current) | A | 6.23 | 4.85 | 3.23 | 2.37 |
| 7_ | Stall torque | mNm | 340 | 365 | 362 | 361 |
| 8_ | Stall current | A | 105 | 87.5 | 60.1 | 43.3 |
| 9_ | Max. efficiency | % | 90 | 90 | 90 | 90 |
| 10_ | Terminal resistance | Ω | 0.172 | 0.274 | 0.599 | 1.11 |
| 11_ | Terminal inductance | mH | 0.00934 | 0.0154 | 0.0322 | 0.0617 |
| 12_ | Torque constant | mNm/A | 3.24 | 4.17 | 6.02 | 8.34 |
| 13_ | Speed constant | rpm/V | 2940 | 2290 | 1590 | 1150 |
| 14_ | Speed/torque gradient | rpm/mNm | 156 | 151 | 158 | 152 |
| 15_ | Mechanical time constant | ms | 3.12 | 3.01 | 3.15 | 3.05 |
| 16_ | Rotor inertia | gcm² | 1.91 | 1.91 | 1.91 | 1.91 |

| | Thermal data | | |
|---|---|---|---|
| 17_ | Thermal resistance housing-ambient | K/W | 12 |
| 18_ | Thermal resistance winding-housing | K/W | 1 |
| 19_ | Thermal time constant winding | s | 2.09 |
| 20_ | Thermal time constant motor | s | 334 |
| 21_ | Ambient temperature | °C | -40…+135 |
| 22_ | Max. winding temperature | °C | 155 |

| | Mechanical data ball bearings | | |
|---|---|---|---|
| 23_ | Max. speed | rpm | 60 000 |
| 24_ | Axial play | mm | 0…0.24 |
| | Preload | N | 4 |
| | Direction of force | | pull |
| 25_ | Radial play | | preloaded |
| 26_ | Max. axial load (dynamic) | N | 4 |
| 27_ | Max. force for press fits (static) | N | 110 |
| | (static, shaft supported) | N | 6000 |
| 28_ | Max. radial load [mm from flange] | N | 16 [5] |

| | Other specifications | | |
|---|---|---|---|
| 29_ | Number of pole pairs | | 1 |
| 30_ | Number of phases | | 3 |
| 31_ | Weight of motor | g | 106 |
| 32_ | Typical noise level [rpm] | dBA | 54 [50 000] |

**Operating Range**




135°C SS

Sensorless: typical 2000 sterilization cycles
Hall sensors: typical 1000 sterilization cycles
Sterilization with steam
Temperature +134°C ±4°C
Compression pressure up to 2.3 bar
Rel. humidity 100%
Cycle length 18 min.

Continuous operation
Continuous operation with reduced thermal resistance $R_{th2}$ 50%
Short term operation

**maxon Modular System**

| maxon gear | maxon sensor | maxon motor control |
|---|---|---|
| | | 379_ESCON Module 50/4 EC-S |
| | | 379_ESCON Module 50/5 |
| | | 379_ESCON 50/5 |
| | | 379_ESCON 70/10 |
| | | 382_DEC Module 50/5 |

**Connection A and B, motor** (Cable AWG 18)

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

**Connection A, sensors** (Cable AWG 26)

| | |
|---|---|
| orange | $V_{Hall}$ 3…24 VDC |
| blue | GND |
| yellow | Hall sensor 1 |
| brown | Hall sensor 2 |
| grey | Hall sensor 3 |

Wiring diagram for Hall sensors see page 33

**Connection NTC** (Cable AWG 26)

| | |
|---|---|
| purple | NTC |
| purple | NTC |

Resistance 25°C: 10 kOhm ±1%, beta (25–85°C): 3490 K

**Configuration**

Flange front: thread in flange/center thread
Flange back: without/center thread
Shaft front: length
Electric connection: cable length/pin connection
Themperature Sensor: NTC-Thermistor

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# ECX SPEED 22 M brushless

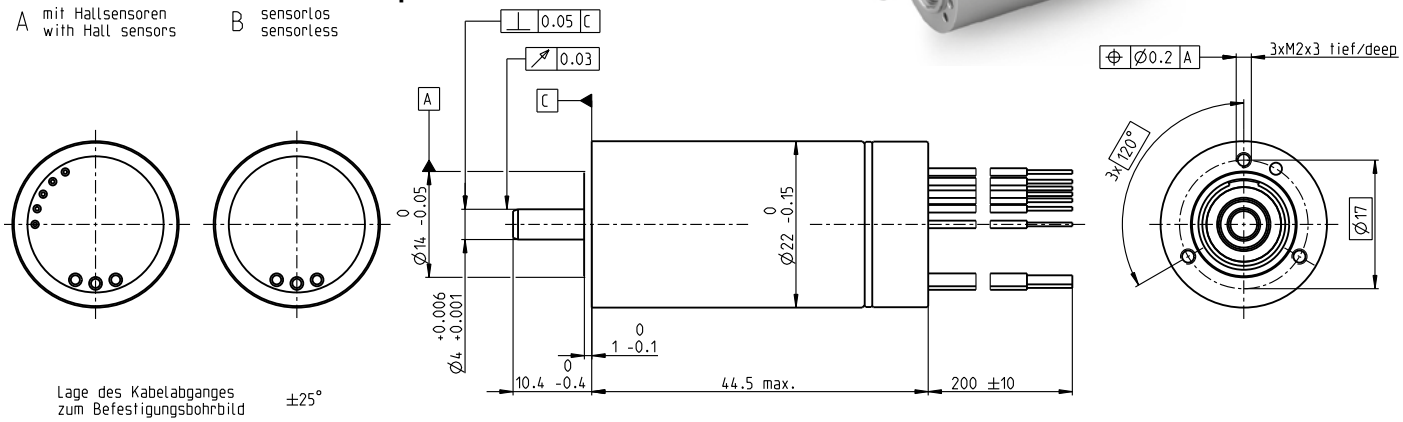
## BLDC motor Ø22 mm

Sterilizable, Ceramic Bearings

NEW


**80/168 W 19.5 mNm 85000 rpm**

A mit Hallsensoren with Hall sensors B sensorlos sensorless




Lage des Kabelabganges zum Befestigungsbohrbild ±25°

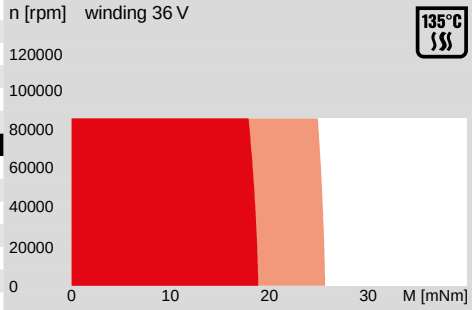
alignment of cables relative to mounting holes ±25°

**M 1:1**

| | Motor Data | | | | | |
|---|---|---|---|---|---|---|
| 1_ | Nominal voltage | V | 18 | 24 | 36 | 48 |
| 2_ | No load speed | rpm | 52800 | 54800 | 56900 | 54800 |
| 3_ | No load current | mA | 286 | 227 | 161 | 114 |
| 4_ | Nominal speed | rpm | 49400 | 51500 | 53600 | 51500 |
| 5_ | Nominal torque (max. continuous torque) | mNm | 19.5 | 19.9 | 18.7 | 19 |
| 6_ | Nominal current (max. continuous current) | A | 6.23 | 4.85 | 3.23 | 2.37 |
| 7_ | Stall torque | mNm | 340 | 365 | 362 | 361 |
| 8_ | Stall current | A | 105 | 87.5 | 60.1 | 43.3 |
| 9_ | Max. efficiency | % | 90 | 90 | 90 | 90 |
| 10_ | Terminal resistance | Ω | 0.172 | 0.274 | 0.599 | 1.11 |
| 11_ | Terminal inductance | mH | 0.00934 | 0.0154 | 0.0322 | 0.0617 |
| 12_ | Torque constant | mNm/A | 3.24 | 4.17 | 6.02 | 8.34 |
| 13_ | Speed constant | rpm/V | 2940 | 2290 | 1590 | 1150 |
| 14_ | Speed/torque gradient | rpm/mNm | 156 | 151 | 158 | 152 |
| 15_ | Mechanical time constant | ms | 3.12 | 3.01 | 3.15 | 3.05 |
| 16_ | Rotor inertia | gcm² | 1.91 | 1.91 | 1.91 | 1.91 |

| | Thermal data | | |
|---|---|---|---|
| 17_ | Thermal resistance housing-ambient | K/W | 12 |
| 18_ | Thermal resistance winding-housing | K/W | 1 |
| 19_ | Thermal time constant winding | s | 2.09 |
| 20_ | Thermal time constant motor | s | 334 |
| 21_ | Ambient temperature | °C | -40…+135 |
| 22_ | Max. winding temperature | °C | 155 |
| | **Mechanical data ball bearings** | | |
| 23_ | Max. speed | rpm | 85000 |
| 24_ | Axial play | mm | 0…0.24 |
| | Preload | N | 4 |
| | Direction of force | | pull |
| 25_ | Radial play | | preloaded |
| 26_ | Max. axial load (dynamic) | N | 4 |
| 27_ | Max. force for press fits (static) | N | 110 |
| | (static, shaft supported) | N | 6000 |
| 28_ | Max. radial load [mm from flange] | N | 16 [5] |
| | **Other specifications** | | |
| 29_ | Number of pole pairs | | 1 |
| 30_ | Number of phases | | 3 |
| 31_ | Weight of motor | g | 106 |
| 32_ | Typical noise level [rpm] | dBA | 54 [50000] |

**Operating Range**




135°C

Sensorless: typical 2000 sterilization cycles
Hall sensors: typical 1000 sterilization cycles
Sterilization with steam
Temperature +134°C ±4°C
Compression pressure up to 2.3 bar
Rel. humidity 100%
Cycle length 18 min.

Continuous operation
Continuous operation with reduced thermal resistance $R_{th2}$ 50%
Short term operation

**maxon Modular System**

**maxon gear**

**maxon sensor**

**maxon motor control**
379_ESCON Module 50/4 EC-S
379_ESCON Module 50/5
379_ESCON 50/5
379_ESCON 70/10
382_DEC Module 50/5

**Connection A and B, motor** (Cable AWG 18)
red Motor winding 1
black Motor winding 2
white Motor winding 3

**Connection A, sensors** (Cable AWG 26)
orange $V_{Hall}$ 3…24 VDC
blue GND
yellow Hall sensor 1
brown Hall sensor 2
grey Hall sensor 3

Wiring diagram for Hall sensors see page 33

**Connection NTC** (Cable AWG 26)
purple NTC
purple NTC
Resistance 25°C: 10 kOhm ±1%, beta (25–85°C): 3490 K

**Configuration**

Flange front: thread in flange/center thread
Flange back: without/center thread
Shaft front: length
Electric connection: cable length/pin connection
Themperature Sensor: NTC-Thermistor

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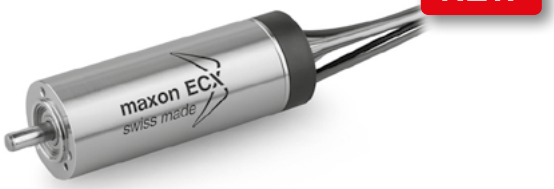
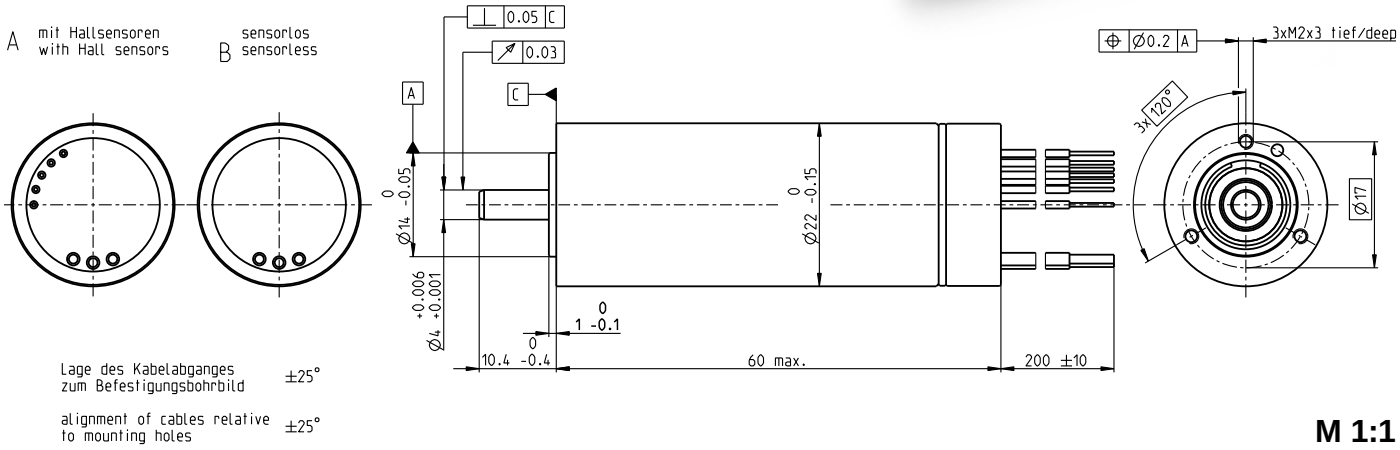
# ECX SPEED 22 L brushless
## BLDC motor Ø22 mm
Sterilizable

NEW




**120/190 W 33 mNm 60 000 rpm**




**M 1:1**

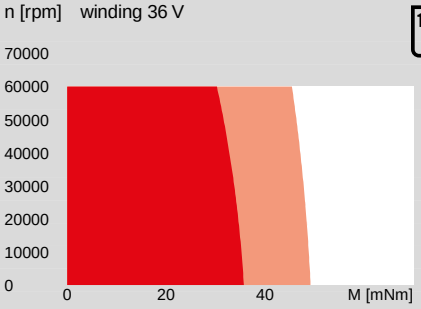
| | Motor Data | | | | |
|---|---|---|---|---|---|
| 1_ | Nominal voltage | V | 24 | 36 | 48 |
| 2_ | No load speed | rpm | 54100 | 56200 | 57300 |
| 3_ | No load current | mA | 425 | 303 | 235 |
| 4_ | Nominal speed | rpm | 51800 | 54000 | 55200 |
| 5_ | Nominal torque (max. continuous torque) | mNm | 32.6 | 33.5 | 31.6 |
| 6_ | Nominal current (max. continuous current) | A | 8.05 | 5.72 | 4.14 |
| 7_ | Stall torque | mNm | 965 | 1160 | 1120 |
| 8_ | Stall current | A | 228 | 190 | 140 |
| 9_ | Max. efficiency | % | 92 | 92 | 92 |
| 10_ | Terminal resistance | Ω | 0.105 | 0.189 | 0.343 |
| 11_ | Terminal inductance | mH | 0.0114 | 0.0237 | 0.0406 |
| 12_ | Torque constant | mNm/A | 4.23 | 6.11 | 7.99 |
| 13_ | Speed constant | rpm/V | 2260 | 1560 | 1200 |
| 14_ | Speed/torque gradient | rpm/mNm | 56.1 | 48.4 | 51.3 |
| 15_ | Mechanical time constant | ms | 1.39 | 1.2 | 1.27 |
| 16_ | Rotor inertia | gcm² | 2.36 | 2.36 | 2.36 |

| | Thermal data | | |
|---|---|---|---|
| 17_ | Thermal resistance housing-ambient | K/W | 10 |
| 18_ | Thermal resistance winding-housing | K/W | 0.823 |
| 19_ | Thermal time constant winding | s | 2.9 |
| 20_ | Thermal time constant motor | s | 507 |
| 21_ | Ambient temperature | °C | -40…+135 |
| 22_ | Max. winding temperature | °C | 155 |

| | Mechanical data ball bearings | | |
|---|---|---|---|
| 23_ | Max. speed | rpm | 60 000 |
| 24_ | Axial play | mm | 0…0.24 |
| | Preload | N | 4 |
| | Direction of force | | pull |
| 25_ | Radial play | | preloaded |
| 26_ | Max. axial load (dynamic) | N | 4 |
| 27_ | Max. force for press fits (static) | N | 110 |
| | (static, shaft supported) | N | 6000 |
| 28_ | Max. radial load [mm from flange] | N | 16 [5] |

| | Other specifications | | |
|---|---|---|---|
| 29_ | Number of pole pairs | | 1 |
| 30_ | Number of phases | | 3 |
| 31_ | Weight of motor | g | 148 |
| 32_ | Typical noise level [rpm] | dBA | 55 [50 000] |

**Operating Range**




135°C SS

Sensorless: typical 2000 sterilization cycles
Hall sensors: typical 1000 sterilization cycles
Sterilization with steam

| | |
|---|---|
| Temperature | +134°C ±4°C |
| Compression pressure up to | 2.3 bar |
| Rel. humidity | 100% |
| Cycle length | 18 min. |

Continuous operation
Continuous operation with reduced thermal resistance $R_{th2}$ 50%
Short term operation

**maxon Modular System**

| maxon gear | maxon sensor | maxon motor control |
|---|---|---|
| | | 379_ESCON Module 50/4 EC-S |
| | | 379_ESCON Module 50/5 |
| | | 379_ESCON 50/5 |
| | | 379_ESCON 70/10 |
| | | 382_DEC Module 50/5 |

**Connection A and B, motor** (Cable AWG 18)

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

**Connection A, sensors** (Cable AWG 26)

| | |
|---|---|
| orange | $V_{Hall}$ 3…24 VDC |
| blue | GND |
| yellow | Hall sensor 1 |
| brown | Hall sensor 2 |
| grey | Hall sensor 3 |

Wiring diagram for Hall sensors see page 33

**Connection NTC** (Cable AWG 26)

| | |
|---|---|
| purple | NTC |
| purple | NTC |

Resistance 25°C: 10 kOhm ±1%, beta (25–85°C): 3490 K

**Configuration**

Flange front: thread in flange/center thread
Flange back: without/center thread
Shaft front: length
Electric connection: cable length/pin connection
Themperature Sensor: NTC-Thermistor

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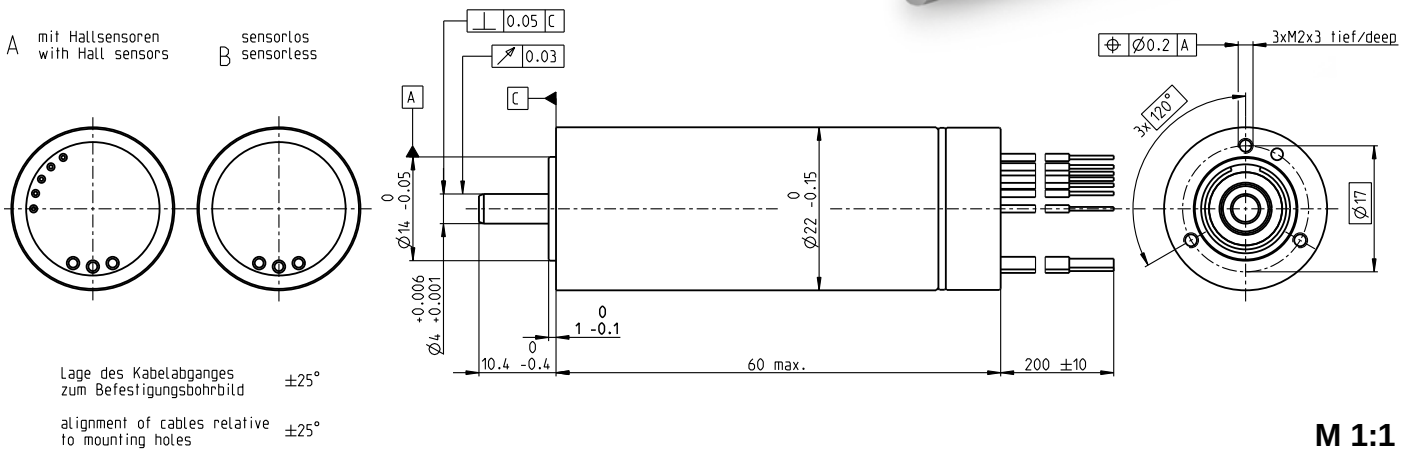
# ECX SPEED 22 L brushless

## BLDC motor Ø22 mm

Sterilizable, Ceramic Bearings

NEW


**120/233 W 33 mNm 85000 rpm**

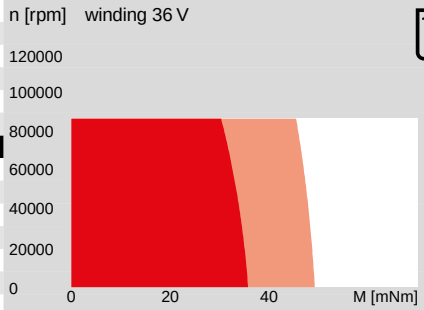



**M 1:1**

| | Motor Data | | | | |
|---|---|---|---|---|---|
| 1_ | Nominal voltage | V | 24 | 36 | 48 |
| 2_ | No load speed | rpm | 54100 | 56200 | 57300 |
| 3_ | No load current | mA | 425 | 303 | 235 |
| 4_ | Nominal speed | rpm | 51800 | 54000 | 55200 |
| 5_ | Nominal torque (max. continuous torque) | mNm | 32.6 | 33.5 | 31.6 |
| 6_ | Nominal current (max. continuous current) | A | 8.05 | 5.32 | 4.14 |
| 7_ | Stall torque | mNm | 965 | 1160 | 1120 |
| 8_ | Stall current | A | 228 | 190 | 140 |
| 9_ | Max. efficiency | % | 92 | 92 | 92 |
| 10_ | Terminal resistance | Ω | 0.105 | 0.189 | 0.343 |
| 11_ | Terminal inductance | mH | 0.0114 | 0.0237 | 0.0406 |
| 12_ | Torque constant | mNm/A | 4.23 | 6.11 | 7.99 |
| 13_ | Speed constant | rpm/V | 2260 | 1560 | 1200 |
| 14_ | Speed/torque gradient | rpm/mNm | 56.1 | 48.4 | 51.3 |
| 15_ | Mechanical time constant | ms | 1.39 | 1.2 | 1.27 |
| 16_ | Rotor inertia | gcm² | 2.36 | 2.36 | 2.36 |

| | Thermal data | | |
|---|---|---|---|
| 17_ | Thermal resistance housing-ambient | K/W | 10 |
| 18_ | Thermal resistance winding-housing | K/W | 0.823 |
| 19_ | Thermal time constant winding | s | 2.9 |
| 20_ | Thermal time constant motor | s | 507 |
| 21_ | Ambient temperature | °C | -40…+135 |
| 22_ | Max. winding temperature | °C | 155 |
| | **Mechanical data ball bearings** | | |
| 23_ | Max. speed | rpm | 85000 |
| 24_ | Axial play | mm | 0…0.24 |
| | Preload | N | 4 |
| | Direction of force | | pull |
| 25_ | Radial play | | preloaded |
| 26_ | Max. axial load (dynamic) | N | 4 |
| 27_ | Max. force for press fits (static) | N | 110 |
| | (static, shaft supported) | N | 6000 |
| 28_ | Max. radial load [mm from flange] | N | 16 [5] |
| | **Other specifications** | | |
| 29_ | Number of pole pairs | | 1 |
| 30_ | Number of phases | | 3 |
| 31_ | Weight of motor | g | 148 |
| 32_ | Typical noise level [rpm] | dBA | 55 [50000] |

**Operating Range**




135°C

Sensorless: typical 2000 sterilization cycles
Hall sensors: typical 1000 sterilization cycles
Sterilization with steam

| | |
|---|---|
| Temperature | +134°C ±4°C |
| Compression pressure up to | 2.3 bar |
| Rel. humidity | 100% |
| Cycle length | 18 min. |

- Continuous operation
- Continuous operation with reduced thermal resistance $R_{th2}$ 50%
- Short term operation

**maxon Modular System**

| maxon gear | maxon sensor | maxon motor control |
|---|---|---|
| | | 379_ESCON Module 50/4 EC-S |
| | | 379_ESCON Module 50/5 |
| | | 379_ESCON 50/5 |
| | | 379_ESCON 70/10 |
| | | 382_DEC Module 50/5 |

**Connection A and B, motor** (Cable AWG 18)

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

**Connection A, sensors** (Cable AWG 26)

| | |
|---|---|
| orange | $V_{Hall}$ 3…24 VDC |
| blue | GND |
| yellow | Hall sensor 1 |
| brown | Hall sensor 2 |
| grey | Hall sensor 3 |

Wiring diagram for Hall sensors see page 33

**Connection NTC** (Cable AWG 26)

| | |
|---|---|
| purple | NTC |
| purple | NTC |

Resistance 25°C: 10 kOhm ±1%, beta (25–85°C): 3490 K

**Configuration**

Flange front: thread in flange/center thread
Flange back: without/center thread
Shaft front: length
Electric connection: cable length/pin connection
Themperature Sensor: NTC-Thermistor

xdrives.maxonmotor.com

# **Explanation** for Terminology maxon ECX

**Dimensional drawings**
Presentation of the views according to the projection method E (ISO). 
All dimensions in [mm].

**Motor Data**
The values in lines 2 – 15 are valid when using block commutation.

**1 Nominal voltage** $U_N$ [Volt]
is the applied voltage between two powered phases in block commutation. See page 32 for the timing diagram of the voltage in the three phases. All nominal data (lines 2 – 9) refer to this voltage. Lower and higher voltages are permissible, provided that limits are not exceeded.

**2 No load speed** $n_0$ [rpm] ±10%
is the speed at which the unloaded motor runs with the nominal voltage applied. It is approximately proportional to the applied voltage.

**3 No load current** $I_0$ [mA] ±50%
This is the typical current that the unloaded motor draws when operating at nominal voltage. It increases with rising speed owing to bearing friction and iron losses. No load friction depends heavily on temperature. It decreases in extended operation and increases at lower temperatures.

**4 Nominal speed** $n_N$ [rpm]
is the speed set for operation at nominal voltage and nominal torque at a motor temperature of 25°C.

**5 Nominal torque** $M_N$ [mNm]
is the torque generated for operation at nominal voltage and nominal current at a motor temperature of 25°C. It is at the limit of the motor's continuous operation range. Higher torques heat up the winding too much.

**6 Nominal current** $I_N$ [A]
is the current in the active phase in block commutation that generates the nominal torque at the given nominal speed (= max. permissible continuous load current). The maximum winding temperature is reached at 25°C ambient temperature in continuous operation with $I_N$. $I_N$ decreases as speed increases due to additional losses in the lamination. For the EC 10 flat motor the nominal operating point is given varying at half no load speed, as the thermal limit is not reached at nominal voltage.

**7 Stall torque** $M_H$ [mNm]
is the torque produced by the motor when at standstill. Rising motor temperatures reduce stall torque.

**8 Stall current** $I_A$ [A]
is the quotient from nominal voltage and the motor's terminal resistance. Stall current is equivalent to stall torque. With larger motors, $I_A$ cannot often be reached due to the amplifier's current limits.

**9 Max. efficiency** $\eta_{max}$ [%]
is the optimal relationship between input and output power at nominal voltage. It also doesn't always denote the optimal operating point.

**10 Terminal resistance phase to phase** R [Ω]
is determined through the resistance at 25°C between two connections.

**11 Terminal inductance phase to phase** L [mH]
is the winding inductance between two connections. It is measured at 1 kHz, sinusoidal.

**12 Torque constant** $k_M$ [mNm/A]
This may also be referred to as «specific torque» and represents the quotient from generated torque and applicable current.

**13 Speed constant** $k_n$ [rpm/V]
indicates the theoretical no load speed per volt of applied voltage, disregarding friction losses.

**14 Speed/torque gradient**
$\Delta_n/\Delta_M$ [rpm/mNm]
The speed/torque gradient is an indicator of the motor's performance. The smaller the value, the more powerful the motor and consequently the less motor speed varies with load variations. It is based on the quotient of ideal no load speed and ideal stall torque (tolerance ± 20%).
With flat motors, the real gradient depends on speed: at higher speeds, it is steeper, but flatter at lower speeds. The real gradient at nominal voltage can be approximated by a straight line between no load speed and the nominal operating point (see page 45).

**15 Mechanical time constant** $\tau_m$ [ms]
is the time required for the rotor to accelerate from standstill to 63% of its no load speed.

**16 Rotor moment of inertia** $J_R$ [gcm²]
is the mass moment of inertia of the rotor, based on the axis of rotation.

**17 Thermal resistance housing-ambient** $R_{th2}$ [K/W]
and
**18 Thermal resistance winding-housing** $R_{th1}$ [K/W]
Characteristic values of thermal contact resistance without additional heat sinking. Lines 17 and 18 combined define the maximum heating at a given power loss (load). Thermal resistance $R_{th2}$ on motors with metal flanges can decrease by up to 80% if the motor is coupled directly to a good heat-conducting (e.g. metallic) mounting rather than a plastic panel.

**19 Thermal time constant winding** $\tau_w$ [s]
and
**20 Thermal time constant motor** $\tau_s$ [s]
These are the typical reaction times for a temperature change of winding and motor. It can be seen that the motor reacts much more sluggishly in thermal terms than the winding. The values are calculated from the product of thermal capacity and given heat resistances.

**21 Ambient temperature** [°C]
Operating temperature range. This derives from the heat reliability of the materials used and viscosity of bearing lubrication.

**22 Max. winding temperature** [°C]
Maximum permissible winding temperature.

**23 Max. speed** $n_{max}$ [rpm]
is the maximum recommended speed based on thermal and mechanical perspectives. A reduced service life can be expected at higher speeds.

**24 Axial play** [mm]
On motors that are not preloaded, these are the tolerance limits for the bearing play. A preload cancels out the axial play up to the specified axial force. When load is applied in the direction of the preload force (away from the flange), the axial play is always zero. The length tolerance of the shaft includes the maximum axial play.

**25 Radial play** [mm]
Radial play is the bearing's radial movement. A spring is utilized to preload the motor's bearings, eliminating radial play up to a given axial load.

**26/27 Max. axial load** [N]
**Dynamically:** axial loading permissible in operation. If different values apply for traction and thrust, the smaller value is given.
**Statically:** maximum axial force applying to the shaft at standstill where no residual damage occurs.
**Shaft supported:** maximum axial force applying to the shaft at standstill if the force is not input at the other shaft end. This is not possible for motors with only one shaft end.

**28 Max. radial load** [N]
The value is given for a typical clearance from the flange; this value falls the greater the clearance.

**29 Number of pole pairs**
Number of north poles of the permanent magnet. The phase streams and commutation signals pass through per revolution p cycles. Servo-controllers require the correct details of the number of pole pairs.

**30 Number of phases**
All maxon EC motors have three phases.

**31 Weight of motor** [g]

**32 Typical noise level** [dBA]
is that statistical average of the noise level measured according to maxon standard (10 cm distance radially to the drive, no load operation at a speed of 6,000 or 50,000 rpm. The drive lies freely on a plastic foam mat in the noise chamber).
The acoustic noise level depends on a number of factors, such as component tolerances, and it is greatly influenced by the overall system in which the drive is installed. When the drive is installed in an unfavorable constellation, the noise level may be significantly higher than the noise level of the drive alone.
The acoustic noise level is measured and determined during product qualification. In manufacturing, a structure-borne noise test is performed with defined limits. Impermissible deviations can thus be identified.

**33 Max. torque** $M_{max}$ [mNm]
Maximum torque the motor can briefly deliver. It is limited by the overload protection of the electronics.

**34 Max. current** $I_{max}$ [A]
Surge current with which the peak torque is generated at nominal voltage. With an active speed controller, surge current is not proportionate to the torque, but also depends on the supply voltage. As a result, this value only applies at nominal voltage.

**35 Type of control**
«Speed» means that the drive is fitted with an integral speed controller. «Controlled» means that the drive is fitted with true commutation electronics.

**36 Supply voltage** $+V_{CC}$ [V]
Range of supply voltages measured in respect of GND at which the drive functions.

**37 Speed set value input** $U_C$ [V]
Range of analog voltage for set speed value measured in respect of GND. For 2 wire solutions, the supply voltage acts as speed setting at the same time.

**38 Scaling Set speed value input** $k_c$ [rpm/V]
Set speed value $n_c$ is based on the product $n_c = k_c \cdot U_c$.

**39 Speed range**
Achievable speeds in the controlled range.

**40 Max. acceleration**
The set speed value follows a sudden set point change with a ramp. This value indicates the increase in the ramp.

# maxon GPX

## Planetary Gearhead
## maxon GPX

maxon GPX gearheads make an impression with the highest power transmission in a very short compact design. The modular construction and the scaled stages form the basis for a custom made drive solution. High torque, high speed, low noise, low backlash; maxon GPX gearheads fulfill practically all requirements.

maxon GPX gearheads can be configured online and are ready for delivery within 11 working days.

**gpx.maxonmotor.com**


maxon motor

driven by precision

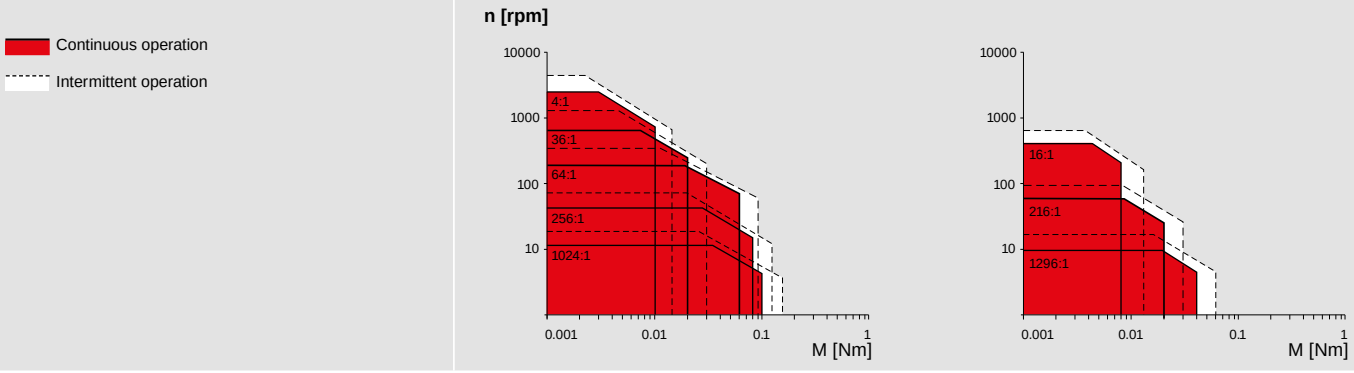
# GPX 8

## Planetary Gearhead Ø8 mm

NEW


| Key Data | | A Standard Version |
|---|---|---|
| Max. transmittable power | W | 0.84 |
| Max. continuous torque | Nm | 0.1 |
| Max. continuous input speed | rpm | 12000 |
| Ambient temperature | °C | -15 ... +80 |
| Bearing at output | | Ball bearing |

**Operating Range (output shaft)** — **A Standard Version**

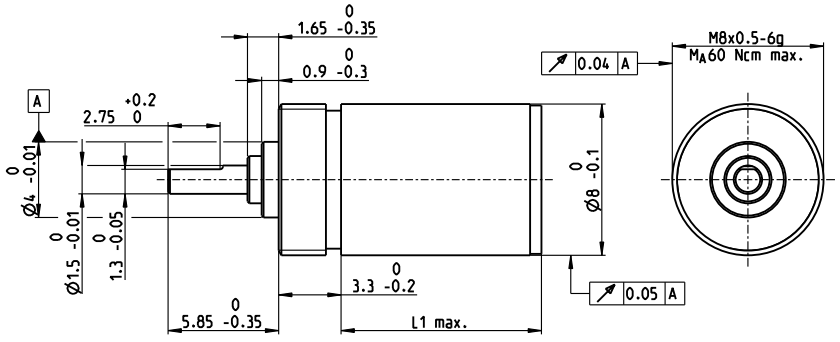



| Specifications | | A Standard Version | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Number of stages | | 1 | 2 | 2 | 3 | 3 | 4 | 4 | 5 |
| Max. transmittable power (continuous) | W | 0.840 | 0.520 | 0.140 | 0.390 | 0.060 | 0.130 | 0.040 | 0.040 |
| Max. transmittable power (intermittent) | W | 1.05 | 0.650 | 0.180 | 0.490 | 0.080 | 0.160 | 0.060 | 0.050 |
| Max. continuous torque | Nm | 0.010 | 0.020 | 0.008 | 0.060 | 0.020 | 0.080 | 0.040 | 0.100 |
| Max. intermittent torque | Nm | 0.015 | 0.030 | 0.012 | 0.090 | 0.030 | 0.120 | 0.060 | 0.150 |
| Max. continuous input speed | rpm | 12000 | 12000 | 12000 | 12000 | 12000 | 12000 | 12000 | 12000 |
| Max. intermittent input speed | rpm | 20000 | 20000 | 20000 | 20000 | 20000 | 20000 | 20000 | 20000 |
| Max. efficiency | % | 90 | 81 | 76 | 73 | 66 | 65 | 57 | 59 |
| Average backlash no load | ° | 1.8 | 2.0 | 2.4 | 2.2 | 2.6 | 2.5 | 2.8 | 2.8 |
| Max. axial load (dynamic) | N | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 |
| Max. radial load, 5 mm from flange | N | 5 | 6 | 6 | 7 | 7 | 8 | 8 | 8 |
| Gearhead length L1 | mm | 5.5 | 8.1 | 8.3 | 10.7 | 11.1 | 13.3 | 13.9 | 15.9 |
| Weight | g | 2.6 | 3.2 | 3.2 | 3.8 | 3.8 | 4.4 | 4.4 | 5.0 |

| Configuration | | A Standard Version | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Number of stages | | 1 | 2 | 2 | 3 | 3 | 4 | 4 | 5 |
| Reduction | X:1 | 4 | 16 | 36 | 64 | 216 | 256 | 1296 | 1024 |
| Version | | Standard | | | | | | | |
| Flange | | Standard flange | | | | | | | |
| Shaft | | Length/flat face | | | | | | | |

| maxon Modular System | | Page |
|---|---|---|
| **maxon EC motor** | Number of stages | |
| ECX 8 | 1–5 | 28 |

**Dimensions** — **M 2:1**

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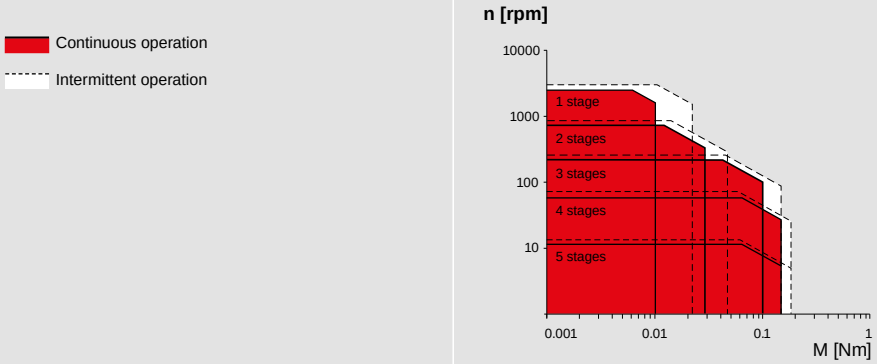
# GPX 10
## Planetary Gearhead Ø10 mm


| Key Data | | A Standard Version |
|---|---|---|
| Max. transmittable power | W | 1.6 |
| Max. continuous torque | Nm | 0.15 |
| Max. continuous input speed | rpm | 12000 |
| Ambient temperature | °C | -15 ... +80 |
| Bearing at output | | Ball bearing |

**Operating Range (output shaft)** — **A Standard Version**

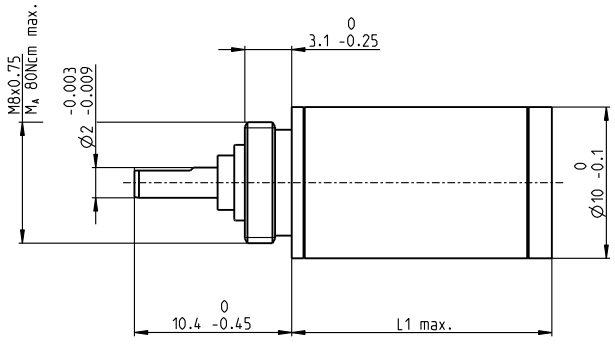



| Specifications | | A Standard Version | | | | |
|---|---|---|---|---|---|---|
| Number of stages | | 1 | 2 | 3 | 4 | 5 |
| Max. transmittable power (continuous) | W | 1.6 | 1.2 | 1.0 | 0.40 | 0.10 |
| Max. transmittable power (intermittent) | W | 2.0 | 1.5 | 1.3 | 0.50 | 0.13 |
| Max. continuous torque | Nm | 0.01 | 0.03 | 0.10 | 0.15 | 0.15 |
| Max. intermittent torque | Nm | 0.02 | 0.05 | 0.15 | 0.20 | 0.20 |
| Max. continuous input speed | rpm | 12000 | 12000 | 12000 | 12000 | 12000 |
| Max. intermittent input speed | rpm | 15000 | 15000 | 15000 | 15000 | 15000 |
| Max. efficiency | % | 90 | 81 | 73 | 65 | 59 |
| Average backlash no load | ° | 1.5 | 1.8 | 2.0 | 2.2 | 2.5 |
| Max. axial load (dynamic) | N | 5 | 5 | 5 | 5 | 5 |
| Max. radial load, 5 mm from flange | N | 5 | 10 | 15 | 20 | 25 |
| Gearhead length L1 | mm | 10.4 | 14.1 | 17.2 | 20.4 | 23.5 |
| Weight | g | 6.7 | 7.2 | 7.7 | 8.2 | 8.7 |

| Configuration | | A Standard Version | | | | |
|---|---|---|---|---|---|---|
| Number of stages | | 1 | 2 | 3 | 4 | 5 |
| Reduction | X:1 | 4 | 16 | 64 | 256 | 1024 |
| Version | | Standard | | | | |
| Flange | | Standard flange | | | | |
| Shaft | | Length/flat face | | | | |

| maxon Modular System | | Page |
|---|---|---|
| **maxon DC motor** | Number of stages | |
| DCX 10 S | 1–5 | 12 |
| DCX 10 L | 1–5 | 13 |

**Dimensions** — **M 2:1**

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# GPX 12

## Planetary Gearhead Ø12 mm

NEW

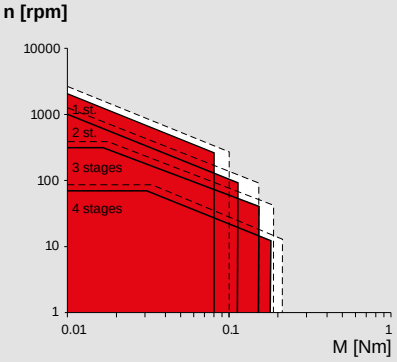

| Key Data | | A Standard Version | C Ceramic Version |
|---|---|---|---|
| Max. transmittable power | W | 2 | 2 |
| Max. continuous torque | Nm | 0.17 | 0.2 |
| Max. continuous input speed | rpm | 16000 | 16000 |
| Ambient temperature | °C | -40 … +100 | -40 … +100 |
| Bearing at output | | Ball bearing | Ball bearing |

**Operating Range (output shaft)**

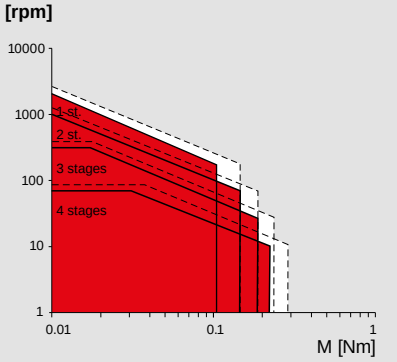
Continuous operation

Intermittent operation

**A Standard Version**




**C Ceramic Version**

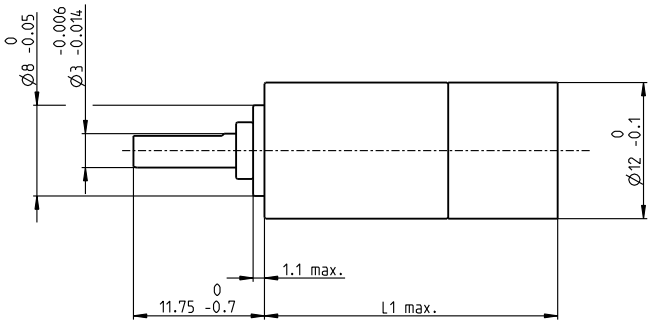



| Specifications | | A Standard Version | | | | C Ceramic Version | | | |
|---|---|---|---|---|---|---|---|---|---|
| Number of stages | | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 |
| Max. transmittable continuous power | W | 2.0 | 1.0 | 0.50 | 0.25 | 2.0 | 1.0 | 0.50 | 0.25 |
| Max. transmittable intermittent power | W | 2.5 | 1.25 | 0.65 | 0.30 | 2.5 | 1.25 | 0.65 | 0.30 |
| Max. continuous torque | Nm | 0.08 | 0.11 | 0.14 | 0.17 | 0.08 | 0.11 | 0.14 | 0.17 |
| Max. intermittent torque | Nm | 0.10 | 0.14 | 0.18 | 0.21 | 0.10 | 0.14 | 0.18 | 0.21 |
| Max. continuous input speed | rpm | 16000 | 16000 | 16000 | 16000 | 16000 | 16000 | 16000 | 16000 |
| Max. intermittent input speed | rpm | 20000 | 20000 | 20000 | 20000 | 20000 | 20000 | 20000 | 20000 |
| Max. efficiency | % | 90 | 80 | 75 | 65 | 90 | 80 | 75 | 65 |
| Average backlash no load | ° | 1.4 | 1.6 | 2.0 | 2.4 | 1.4 | 1.6 | 2.0 | 2.4 |
| Max. axial load (dynamic) | N | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 |
| Max. radial load, 5 mm from flange | N | 30 | 35 | 50 | 50 | 30 | 35 | 50 | 50 |
| Gearhead length L1 | mm | 15.5 | 20.4 | 25.2 | 30.1 | 15.5 | 20.4 | 25.2 | 30.1 |
| Weight | g | 11 | 14 | 17 | 19 | 11 | 14 | 17 | 19 |

| Configuration | | A Standard Version | | | | C Ceramic Version | | | |
|---|---|---|---|---|---|---|---|---|---|
| Number of stages | | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 |
| Reduction | X:1 | 3.9, 5.3 | 16, 21, 26, 28, 35 | 62, 83, 103, 111, 138, 150, 172, 186, 231 | 243, 326, 406, 439, 546, 590, 679, 734, 794, 913, 987, 1135, 1227, 1526 | 3.9, 5.3 | 16, 21, 26, 28, 35 | 62, 83, 103, 111, 138, 150, 172, 186, 231 | 243, 326, 406, 439, 546, 590, 679, 734, 794, 913, 987, 1135, 1227, 1526 |
| Version | | Standard/ceramic version/noise reduced/reduced backlash | | | | | | | |
| Flange | | Standard flange/configurable flange | | | | | | | |
| Shaft | | Length/flat face | | | | | | | |

| maxon Modular System | | Page |
|---|---|---|
| **maxon DC motor** | Number of stages | |
| DCX 12 S | 1–4 | 14 |
| DCX 12 L | 1–4 | 15 |

**Dimensions** M 3:2

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# GPX 12
## Planetary Gearhead Ø12 mm

NEW

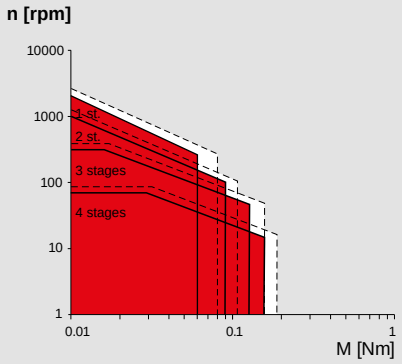

| Key Data | | LN Noise Reduced | LZ Backlash Reduced |
|---|---|---|---|
| Max. transmittable power | W | 1.6 | 1 |
| Max. continuous torque | Nm | 0.14 | 0.2 |
| Max. continuous input speed | rpm | 16000 | 16000 |
| Ambient temperature | °C | -40 ... +85 | -40 ... +100 |
| Bearing at output | | Ball bearing | Ball bearing |
| Typical noise level | dBA | -5 dBA compared to standard configuration | |

**Operating Range (output shaft)**

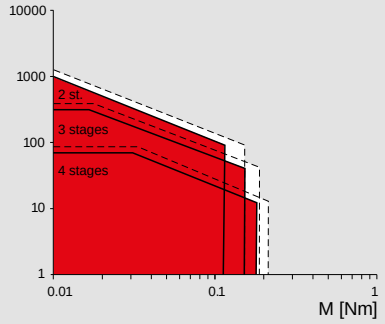
Continuous operation

Intermittent operation

**LN Noise Reduced**




**LZ Backlash Reduced**

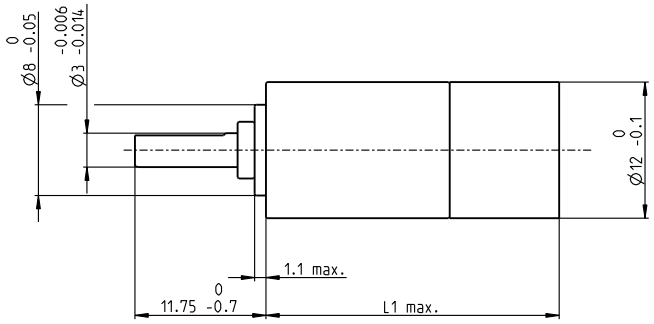



| Specifications | | LN Noise Reduced | | | | LZ Backlash Reduced | | |
|---|---|---|---|---|---|---|---|---|
| Number of stages | | 1 | 2 | 3 | 4 | 2 | 3 | 4 |
| Max. transmittable continuous power | W | 1.6 | 0.8 | 0.40 | 0.20 | 1.0 | 0.50 | 0.25 |
| Max. transmittable intermittent power | W | 2.0 | 1.00 | 0.50 | 0.25 | 1.25 | 0.65 | 0.30 |
| Max. continuous torque | Nm | 0.06 | 0.09 | 0.11 | 0.14 | 0.11 | 0.14 | 0.17 |
| Max. intermittent torque | Nm | 0.08 | 0.11 | 0.14 | 0.18 | 0.14 | 0.18 | 0.21 |
| Max. continuous input speed | rpm | 16000 | 16000 | 16000 | 16000 | 16000 | 16000 | 16000 |
| Max. intermittent input speed | rpm | 20000 | 20000 | 20000 | 20000 | 20000 | 20000 | 20000 |
| Max. efficiency | % | 90 | 80 | 75 | 65 | 80 | 75 | 65 |
| Average backlash no load | ° | 1.4 | 1.6 | 2.0 | 2.4 | 1.2 | 1.4 | 1.6 |
| Max. axial load (dynamic) | N | 20 | 20 | 20 | 20 | 20 | 20 | 20 |
| Max. radial load, 5 mm from flange | N | 30 | 35 | 50 | 50 | 35 | 50 | 50 |
| Gearhead length L1 | mm | 15.5 | 20.4 | 25.2 | 30.1 | 20.4 | 25.2 | 30.1 |
| Weight | g | 11 | 14 | 17 | 19 | 14 | 17 | 19 |

| Configuration | | LN Noise Reduced | | | | LZ Backlash Reduced | | |
|---|---|---|---|---|---|---|---|---|
| Number of stages | | 1 | 2 | 3 | 4 | 2 | 3 | 4 |
| Reduction | X:1 | 3.9, 5.3 | 16, 21, 26, 28, 35 | 62, 83, 103, 111, 138, 150, 172, 186, 231 | 243, 326, 406, 439, 546, 590, 679, 734, 794, 913, 987, 1135, 1227, 1526 | 16, 21, 26, 28, 35 | 62, 83, 103, 111, 138, 150, 172, 186, 231 | 243, 326, 406, 439, 546, 590, 679, 734, 794, 913, 987, 1135, 1227, 1526 |
| Version | | Standard/ceramic version/noise reduced/backlash reduced | | | | | | |
| Flange | | Standard flange/configurable flange | | | | | | |
| Shaft | | Length/flat face | | | | | | |

| maxon Modular System | | Page |
|---|---|---|
| **maxon DC motor** | Number of stages | |
| DCX 12 S | 1–4 | 14 |
| DCX 12 L | 1–4 | 15 |

**Dimensions** M 3:2

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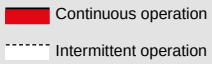
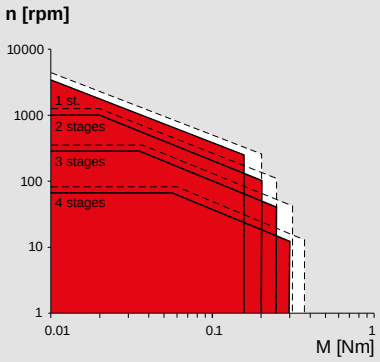
# GPX 14
## Planetary Gearhead Ø14 mm


| Key Data | | A Standard Version | C Ceramic Version |
|---|---|---|---|
| Max. transmittable power | W | 4 | 4.8 |
| Max. continuous torque | Nm | 0.3 | 0.4 |
| Max. continuous input speed | rpm | 16000 | 16000 |
| Ambient temperature | °C | -40 … +100 | -40 … +100 |
| Bearing at output | | Ball bearing | Ball bearing |

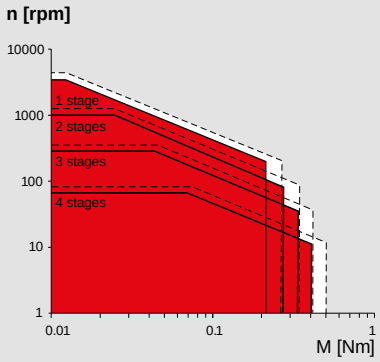
**Operating Range (output shaft)**




**A Standard Version**




**C Ceramic Version**



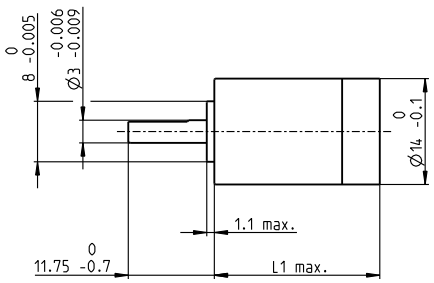

| Specifications | | A Standard Version | | | | C Ceramic Version | | | |
|---|---|---|---|---|---|---|---|---|---|
| Number of stages | | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 |
| Max. transmittable continuous power | W | 4.0 | 2.0 | 1.0 | 0.4 | 4.8 | 2.4 | 1.2 | 0.5 |
| Max. transmittable intermittent power | W | 5.0 | 2.5 | 1.25 | 0.5 | 6.0 | 3.0 | 1.50 | 0.6 |
| Max. continuous torque | Nm | 0.16 | 0.20 | 0.25 | 0.30 | 0.21 | 0.27 | 0.33 | 0.40 |
| Max. intermittent torque | Nm | 0.20 | 0.25 | 0.31 | 0.38 | 0.26 | 0.34 | 0.41 | 0.50 |
| Max. continuous input speed | rpm | 14000 | 16000 | 16000 | 16000 | 14000 | 16000 | 16000 | 16000 |
| Max. intermittent input speed | rpm | 17500 | 20000 | 20000 | 20000 | 17500 | 20000 | 20000 | 20000 |
| Max. efficiency | % | 90 | 80 | 75 | 65 | 90 | 80 | 75 | 65 |
| Average backlash no load | ° | 1.4 | 1.6 | 2 | 2.4 | 1.4 | 1.6 | 2 | 2.4 |
| Max. axial load (dynamic) | N | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 |
| Max. radial load, 5 mm from flange | N | 30 | 45 | 60 | 60 | 30 | 45 | 60 | 60 |
| Gearhead length L1 | mm | 15.7 | 20.8 | 25.5 | 30.3 | 15.7 | 20.8 | 25.5 | 30.3 |
| Weight | g | 14 | 19 | 21 | 23 | 14 | 19 | 21 | 23 |

| Configuration | | A Standard Version | | | | C Ceramic Version | | | |
|---|---|---|---|---|---|---|---|---|---|
| Number of stages | | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 |
| Reduction | X:1 | 3.9, 5.3, 6.6 | 16, 21, 26, 28, 35 | 62, 83, 103, 111, 138, 150, 172, 186, 231 | 243, 326, 406, 439, 546, 590, 679, 734, 794, 913, 987, 1135, 1227, 1526 | 3.9, 5.3, 6.6 | 16, 21, 26, 28, 35 | 62, 83, 103, 111, 138, 150, 172, 186, 231 | 243, 326, 406, 439, 546, 590, 679, 734, 794, 913, 987, 1135, 1227, 1526 |
| Version | | Standard/ceramic version/noise reduced/reduced backlash | | | | | | | |
| Flange | | Standard flange/configurable flange | | | | | | | |
| Shaft | | Length/flat face | | | | | | | |

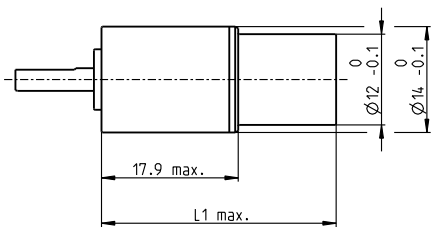
| maxon Modular System | | Page |
|---|---|---|
| **maxon DC motor** | Number of stages | |
| DCX 12 S | 3–4 | 14 |
| DCX 12 L | 3–4 | 15 |
| DCX 14 L | 1–2 | 16–17 |

**Dimensions** M 1:1

1–2 stages




3–4 stages

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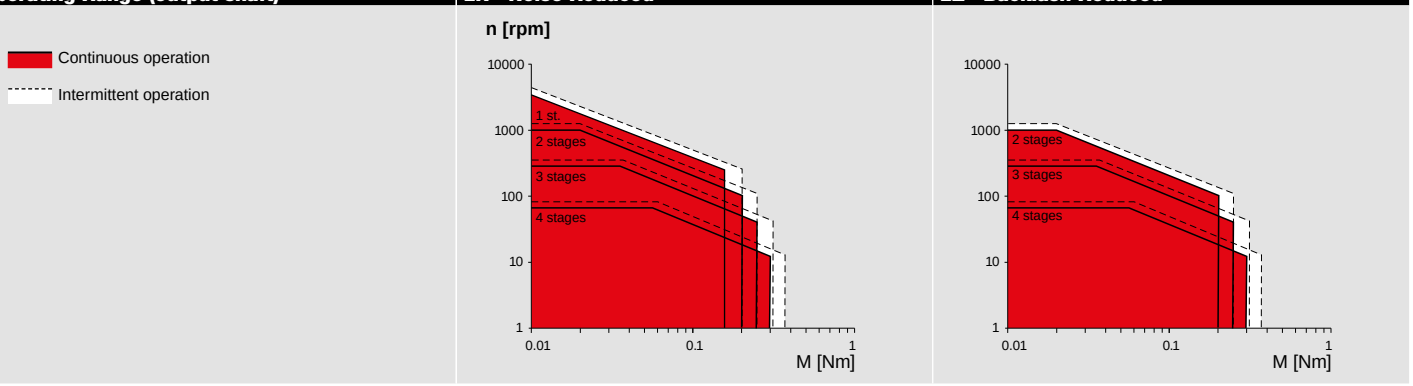
# GPX 14
## Planetary Gearhead Ø14 mm


| Key Data | | LN Noise Reduced | LZ Backlash Reduced |
|---|---|---|---|
| Max. transmittable power | W | 3.2 | 3 |
| Max. continuous torque | Nm | 0.24 | 0.3 |
| Max. continuous input speed | rpm | 16000 | 16000 |
| Ambient temperature | °C | -40 ... +85 | -40 ... +100 |
| Bearing at output | | Ball bearing | Ball bearing |
| Typical noise level | dBA | -5 dBA compared to standard configuration | |

**Operating Range (output shaft)**

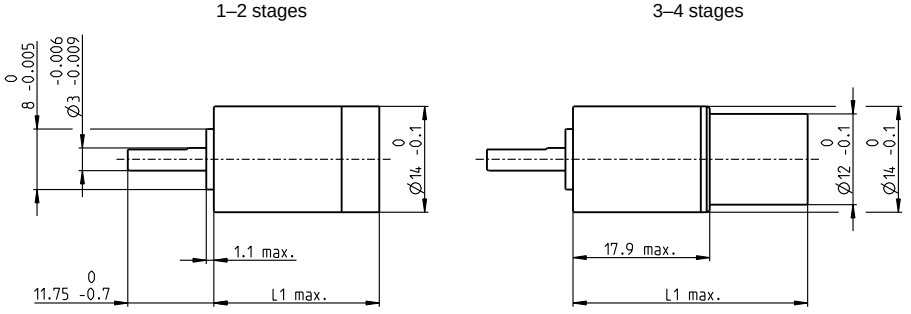



| Specifications | | LN Noise Reduced | | | | LZ Backlash Reduced | | |
|---|---|---|---|---|---|---|---|---|
| Number of stages | | 1 | 2 | 3 | 4 | 2 | 3 | 4 |
| Max. transmittable continuous power | W | 3.2 | 1.6 | 0.8 | 0.3 | 2.0 | 1.0 | 0.4 |
| Max. transmittable intermittent power | W | 4.0 | 2.0 | 1.0 | 0.4 | 2.5 | 1.25 | 0.5 |
| Max. continuous torque | Nm | 0.13 | 0.16 | 0.20 | 0.24 | 0.20 | 0.25 | 0.30 |
| Max. intermittent torque | Nm | 0.16 | 0.20 | 0.25 | 0.30 | 0.25 | 0.31 | 0.38 |
| Max. continuous input speed | rpm | 14000 | 16000 | 16000 | 16000 | 16000 | 16000 | 16000 |
| Max. intermittent input speed | rpm | 17500 | 20000 | 20000 | 20000 | 20000 | 20000 | 20000 |
| Max. efficiency | % | 90 | 80 | 75 | 65 | 80 | 75 | 65 |
| Average backlash no load | ° | 1.4 | 1.6 | 2.0 | 2.4 | 1.2 | 1.4 | 1.6 |
| Max. axial load (dynamic) | N | 20 | 20 | 20 | 20 | 20 | 20 | 20 |
| Max. radial load, 5 mm from flange | N | 30 | 45 | 60 | 60 | 45 | 60 | 60 |
| Gearhead length L1 | mm | 15.7 | 20.8 | 25.5 | 30.3 | 20.8 | 25.5 | 30.3 |
| Weight | g | 14 | 19 | 21 | 23 | 19 | 21 | 23 |

| Configuration | | LN Noise Reduced | | | | LZ Backlash Reduced | | |
|---|---|---|---|---|---|---|---|---|
| Number of stages | | 1 | 2 | 3 | 4 | 2 | 3 | 4 |
| Reduction | X:1 | 3.9, 5.3, 6.6 | 16, 21, 26, 28, 35 | 62, 83, 103, 111, 138, 150, 172, 186, 231 | 243, 326, 406, 439, 546, 590, 679, 734, 794, 913, 987, 1135, 1227, 1526 | 16, 21, 26, 28, 35 | 62, 83, 103, 111, 138, 150, 172, 186, 231 | 243, 326, 406, 439, 546, 590, 679, 734, 794, 913, 987, 1135, 1227, 1526 |
| Version | | Standard/ceramic version/noise reduced/backlash reduced | | | | | | |
| Flange | | Standard flange/configurable flange | | | | | | |
| Shaft | | Length/flat face | | | | | | |

| maxon Modular System | | Page |
|---|---|---|
| **maxon DC motor** | Number of stages | |
| DCX 12 S | 3–4 | 14 |
| DCX 12 L | 3–4 | 15 |
| DCX 14 L | 1–2 | 16–17 |

**Dimensions** M 1:1

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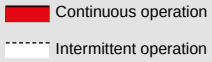
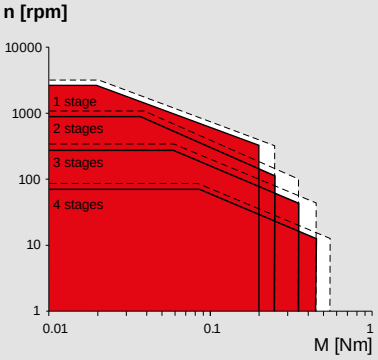
# GPX 16
## Planetary Gearhead Ø16 mm


| Key Data | | A Standard Version | C Ceramic Version |
|---|---|---|---|
| Max. transmittable power | W | 6.5 | 7.8 |
| Max. continuous torque | Nm | 0.45 | 0.6 |
| Max. continuous input speed | rpm | 16000 | 16000 |
| Ambient temperature | °C | -40 … +100 | -40 … +100 |
| Bearing at output | | Ball bearing | Ball bearing |

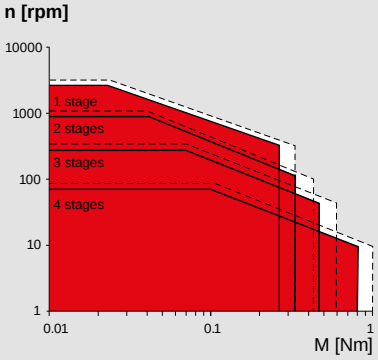
**Operating Range (output shaft)**




**A Standard Version**




**C Ceramic Version**



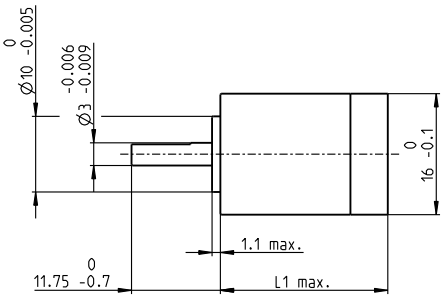

| Specifications | | A Standard Version | | | | C Ceramic Version | | | |
|---|---|---|---|---|---|---|---|---|---|
| Number of stages | | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 |
| Max. transmittable continuous power | W | 6.5 | 3.2 | 1.6 | 0.60 | 7.8 | 3.8 | 1.9 | 0.7 |
| Max. transmittable intermittent power | W | 8.0 | 4.0 | 2.0 | 0.75 | 10.0 | 5.0 | 2.5 | 1.0 |
| Max. continuous torque | Nm | 0.20 | 0.25 | 0.35 | 0.45 | 0.27 | 0.33 | 0.47 | 0.60 |
| Max. intermittent torque | Nm | 0.25 | 0.35 | 0.45 | 0.55 | 0.33 | 0.42 | 0.58 | 0.75 |
| Max. continuous input speed | rpm | 12000 | 14000 | 16000 | 16000 | 12000 | 14000 | 16000 | 16000 |
| Max. intermittent input speed | rpm | 15000 | 17500 | 20000 | 20000 | 15000 | 17500 | 20000 | 20000 |
| Max. efficiency | % | 90 | 80 | 75 | 65 | 90 | 80 | 75 | 65 |
| Average backlash no load | ° | 1.4 | 1.6 | 2.0 | 2.4 | 1.4 | 1.6 | 2.0 | 2.4 |
| Max. axial load (dynamic) | N | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 |
| Max. radial load, 5 mm from flange | N | 30 | 45 | 70 | 70 | 30 | 45 | 70 | 70 |
| Gearhead length L1 | mm | 15.8 | 20.7 | 25.7 | 30.6 | 15.8 | 20.7 | 25.7 | 30.6 |
| Weight | g | 20 | 25 | 27 | 31 | 20 | 25 | 27 | 31 |

| Configuration | | A Standard Version | | | | C Ceramic Version | | | |
|---|---|---|---|---|---|---|---|---|---|
| Number of stages | | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 |
| Reduction | X:1 | 3.9, 5.3, 6.6 | 16, 21, 26, 28, 35, 44 | 62, 83, 103, 111, 138, 150, 172, 186, 231 | 243, 326, 406, 439, 546, 590, 679, 734, 794, 913, 987, 1135, 1227, 1526 | 3.9, 5.3, 6.6 | 16, 21, 26, 28, 35, 44 | 62, 83, 103, 111, 138, 150, 172, 186, 231 | 243, 326, 406, 439, 546, 590, 679, 734, 794, 913, 987, 1135, 1227, 1526 |
| Version | | Standard/ceramic version/noise reduced/reduced backlash/high power | | | | | | | |
| Flange | | Standard flange/configurable flange | | | | | | | |
| Shaft | | Length/flat face | | | | | | | |

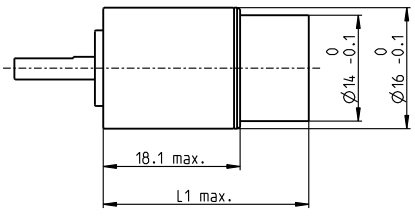
| maxon Modular System | | Page |
|---|---|---|
| **maxon DC motor** | Number of stages | |
| DCX 14 L | 3–4 | 16–17 |
| DCX 16 S | 1–2 | 18–19 |
| DCX 16 L | 1–2 | 20–21 |
| DC-max 16 S | 1–2 | 34–35 |

**Dimensions** M 1:1

1–2 stages




3–4 stages

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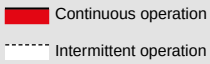
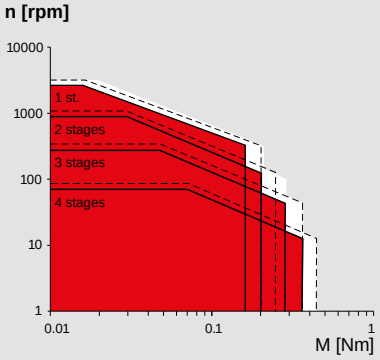
# GPX 16
## Planetary Gearhead Ø16 mm


| Key Data | | LN Noise Reduced | LZ Backlash Reduced |
|---|---|---|---|
| Max. transmittable power | W | 5.2 | 3.2 |
| Max. continuous torque | Nm | 0.36 | 0.5 |
| Max. continuous input speed | rpm | 16000 | 16000 |
| Ambient temperature | °C | -40 ... +85 | -40 ... +100 |
| Bearing at output | | Ball bearing | Ball bearing |
| Typical noise level | dBA | -5 dBA compared to standard configuration | |

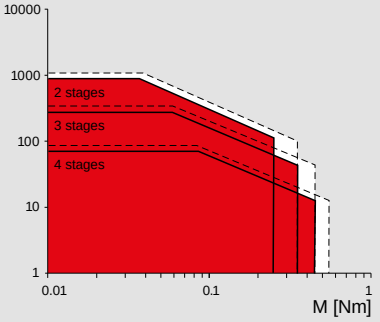
**Operating Range (output shaft)**




**LN Noise Reduced**




**LZ Backlash Reduced**



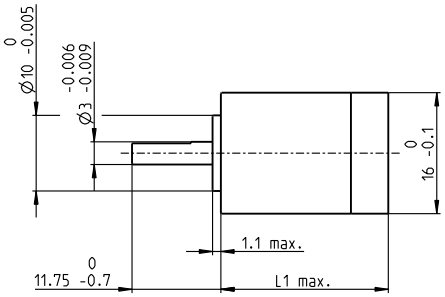

| Specifications | | LN Noise Reduced | | | | LZ Backlash Reduced | | |
|---|---|---|---|---|---|---|---|---|
| Number of stages | | 1 | 2 | 3 | 4 | 2 | 3 | 4 |
| Max. transmittable continuous power | W | 5.2 | 2.6 | 1.3 | 0.5 | 3.2 | 1.6 | 0.6 |
| Max. transmittable intermittent power | W | 6.5 | 3.3 | 1.6 | 0.6 | 4.0 | 2.0 | 0.8 |
| Max. continuous torque | Nm | 0.16 | 0.20 | 0.28 | 0.36 | 0.25 | 0.35 | 0.45 |
| Max. intermittent torque | Nm | 0.20 | 0.25 | 0.35 | 0.45 | 0.35 | 0.45 | 0.55 |
| Max. continuous input speed | rpm | 12000 | 14000 | 16000 | 16000 | 14000 | 16000 | 16000 |
| Max. intermittent input speed | rpm | 15000 | 17500 | 20000 | 20000 | 17500 | 20000 | 20000 |
| Max. efficiency | % | 90 | 80 | 75 | 65 | 80 | 75 | 65 |
| Average backlash no load | ° | 1.4 | 1.6 | 2.0 | 2.4 | 1.3 | 1.6 | 1.9 |
| Max. axial load (dynamic) | N | 20 | 20 | 20 | 20 | 20 | 20 | 20 |
| Max. radial load, 5 mm from flange | N | 30 | 45 | 70 | 70 | 45 | 70 | 70 |
| Gearhead length L1 | mm | 15.8 | 20.7 | 25.7 | 30.6 | 20.7 | 25.7 | 30.6 |
| Weight | g | 20 | 25 | 27 | 30.6 | 25 | 27 | 30.6 |

| Configuration | | LN Noise Reduced | | | | LZ Backlash Reduced | | |
|---|---|---|---|---|---|---|---|---|
| Number of stages | | 1 | 2 | 3 | 4 | 2 | 3 | 4 |
| Reduction | X:1 | 3.9, 5.3, 6.6 | 16, 21, 26, 28, 35, 44 | 62, 83, 103, 111, 138, 150, 172, 186, 231 | 243, 326, 406, 439, 546, 590, 679, 734, 794, 913, 987, 1135, 1227, 1526 | 16, 21, 26, 28, 35, 44 | 62, 83, 103, 111, 138, 150, 172, 186, 231 | 243, 326, 406, 439, 546, 590, 679, 734, 794, 913, 987, 1135, 1227, 1526 |
| Version | | Standard/ceramic version/noise reduced/backlash reduced/high power | | | | | | |
| Flange | | Standard flange/configurable flange | | | | | | |
| Shaft | | Length/flat face | | | | | | |

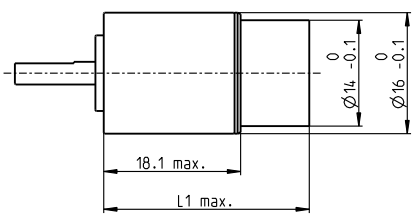
| maxon Modular System | | Page |
|---|---|---|
| **maxon DC motor** | Number of stages | |
| DCX 14 L | 3–4 | 16–17 |
| DCX 16 S | 1–2 | 18–19 |
| DCX 16 L | 1–2 | 20–21 |
| DC-max 16 S | 1–2 | 34–35 |

**Dimensions** M 1:1

1–2 stages




3–4 stages

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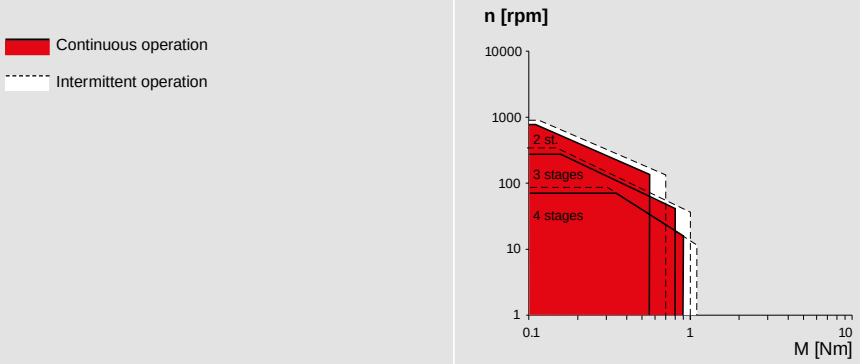
# GPX 16

## Planetary Gearhead Ø16 mm

NEW


| Key Data | | HP High Power |
|---|---|---|
| Max. transmittable power | W | 8 |
| Max. continuous torque | Nm | 0.9 |
| Max. continuous input speed | rpm | 16000 |
| Ambient temperature | °C | -40 ... +100 |
| Bearing at output | | Ball bearing |

**Operating Range (output shaft)** — **HP High Power**

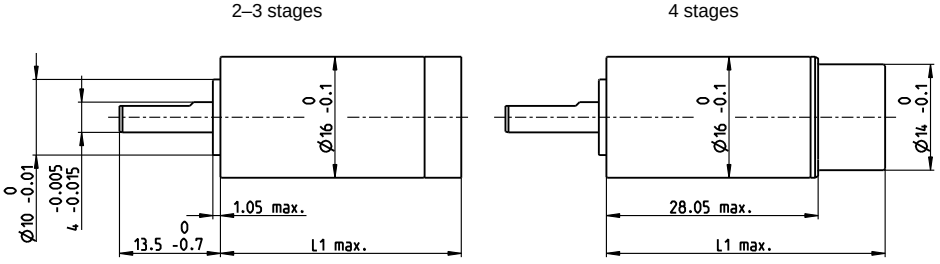



| Specifications | | HP High Power | | |
|---|---|---|---|---|
| Number of stages | | 2 | 3 | 4 |
| Max. transmittable power (continuous) | W | 8.0 | 4.0 | 1.5 |
| Max. transmittable power (intermittent) | W | 10.0 | 4.4 | 1.5 |
| Max. continuous torque | Nm | 0.55 | 0.80 | 0.90 |
| Max. intermittent torque | Nm | 0.70 | 1.00 | 1.10 |
| Max. continuous input speed | rpm | 12000 | 14000 | 16000 |
| Max. intermittent input speed | rpm | 15000 | 17500 | 20000 |
| Max. efficiency | % | 75 | 65 | 55 |
| Average backlash no load | ° | 1.6 | 2.0 | 2.4 |
| Max. axial load (dynamic) | N | 30 | 30 | 30 |
| Max. radial load, 5 mm from flange | N | 80 | 90 | 90 |
| Gearhead length L1 | mm | 26.1 | 30.8 | 35.6 |
| Weight | g | 31 | 35 | 39 |

| Configuration | | HP High Power | | |
|---|---|---|---|---|
| Number of stages | | 2 | 3 | 4 |
| Reduction | X:1 | 16, 21, 26, 28, 35, 44 | 62, 83, 103, 111, 138, 150, 172, 186, 231 | 243, 326, 406, 439, 546, 590, 679, 734, 794, 913, 987, 1135, 1227, 1526 |
| Version | | Standard/ceramic version/noise reduced/backlash reduced/high power | | |
| Flange | | Standard flange/configurable flange | | |
| Shaft | | Length/flat face/cross hole | | |

| maxon Modular System | | Page |
|---|---|---|
| **maxon DC motor** | Number of stages | |
| DCX 14 L | 4 | 16–17 |
| DCX 16 S | 2–3 | 18–19 |
| DCX 16 L | 2–3 | 20–21 |

**Dimensions** M 1:1

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# GPX 16 SPEED

## Planetary Gearhead Ø16 mm

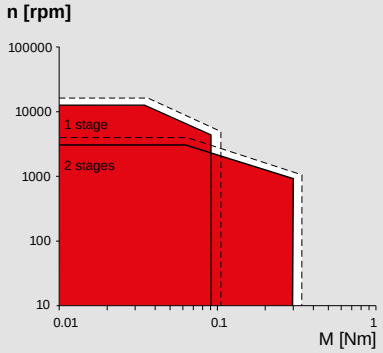
Sterilizable

NEW

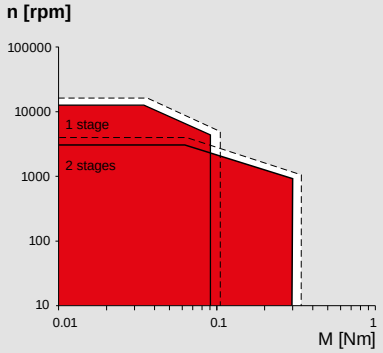

| Key Data | | Without shaft seal | With shaft seal |
|---|---|---|---|
| Max. transmittable power | W | 42 | 42 |
| Max. continuous torque | Nm | 0.2 | 0.2 |
| Max. continuous input speed | rpm | 50000 | 50000 |
| Ambient temperature | °C | -10 ... +100 | -10 ... +100 |
| Bearing at output | | Ball bearing | Ball bearing |

**Operating Range (output shaft)**

Without shaft seal




With shaft seal




Continuous operation

Intermittent operation

**Sterilization information**

Without shaft seal: typically 1000 autoclave cycles
With shaft seal: typically 2000 autoclave cycles

Sterilization with steam

| | |
|---|---|
| Temperature | 134°C ± 4°C |
| Compression pressure up to | 2.3 bar |
| Rel. humidity | 100 % |
| Cycle length | 18 minutes |

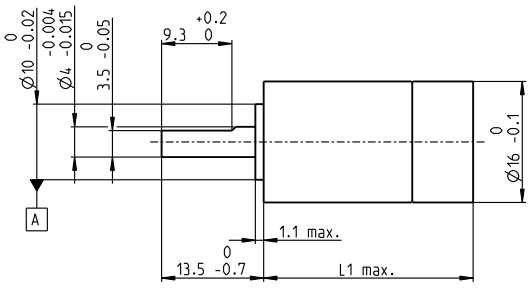
135°C

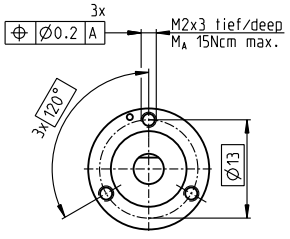
| Specifications | | Without shaft seal | | With shaft seal | |
|---|---|---|---|---|---|
| Number of stages | | 1 | 2 | 1 | 2 |
| Max. transmittable continuous power | W | 42 | 20 | 42 | 20 |
| Max. transmittable intermittent power | W | 50 | 24 | 50 | 24 |
| Max. continuous torque | Nm | 0.09 | 0.2 | 0.09 | 0.2 |
| Max. intermittent torque | Nm | 0.11 | 0.24 | 0.11 | 0.24 |
| Max. continuous input speed | rpm | 50000 | 50000 | 50000 | 50000 |
| Max. intermittent input speed | rpm | 60000 | 60000 | 60000 | 60000 |
| Max. efficiency | % | 85 | 80 | 85 | 80 |
| Average backlash no load | ° | 1.4 | 1.6 | 1.4 | 1.6 |
| Max. axial load (dynamic) | N | 30 | 30 | 30 | 30 |
| Max. radial load, 5 mm from flange | N | 25 | 35 | 15 | 20 |
| Gearhead length L1 | mm | 27.7 | 35.1 | 35.5 | 42.7 |
| Weight | g | 27 | 35 | 37.2 | 45 |

| Configuration | | Without shaft seal | | With shaft seal | |
|---|---|---|---|---|---|
| Number of stages | | 1 | 2 | 1 | 2 |
| Reduction | X:1 | 3.9, 5.3, 6.6 | 16, 21, 26, 28, 35, 44 | 3.9, 5.3, 6.6 | 16, 21, 26, 28, 35, 44 |
| Version | | Without shaft seal/With shaft seal | | | |
| Flange | | Standard flange/configurable flange | | | |
| Shaft | | Length/flat face/cross hole | | | |

| maxon Modular System | | Page |
|---|---|---|
| **maxon EC motor** | Number of stages | |
| ECX SPEED 16 M | 1–2 | 42–43 |
| ECX SPEED 16 L | 1–2 | 44–45 |

**Dimensions** M 1:1

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# GPX 19

## Planetary Gearhead Ø19 mm

NEW

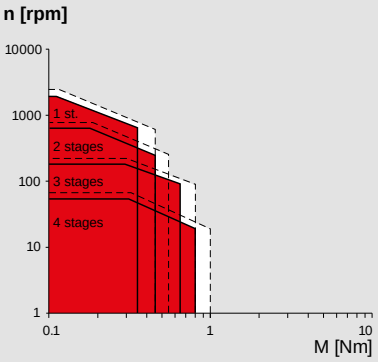

| Key Data | | A Standard Version | C Ceramic Version |
|---|---|---|---|
| Max. transmittable power | W | 13 | 16 |
| Max. continuous torque | Nm | 0.8 | 1.1 |
| Max. continuous input speed | rpm | 14000 | 14000 |
| Ambient temperature | °C | -40 … +100 | -40 … +100 |
| Bearing at output | | Ball bearing | Ball bearing |

**Operating Range (output shaft)**

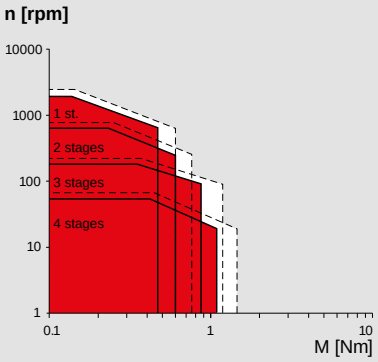
Continuous operation

Intermittent operation

**A Standard Version**




**C Ceramic Version**



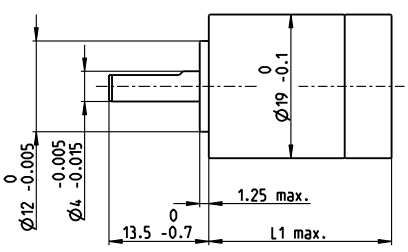

| Specifications | | A Standard Version | | | | C Ceramic Version | | | |
|---|---|---|---|---|---|---|---|---|---|
| Number of stages | | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 |
| Max. transmittable continuous power | W | 13.0 | 6.5 | 3.2 | 0.9 | 15.5 | 7.8 | 3.9 | 1.0 |
| Max. transmittable intermittent power | W | 16.2 | 8.1 | 4.1 | 1.1 | 19.4 | 9.7 | 4.9 | 1.3 |
| Max. continuous torque | Nm | 0.35 | 0.45 | 0.65 | 0.80 | 0.47 | 0.60 | 0.86 | 1.05 |
| Max. intermittent torque | Nm | 0.45 | 0.55 | 0.80 | 1.00 | 0.60 | 0.75 | 1.10 | 1.30 |
| Max. continuous input speed | rpm | 10000 | 12000 | 14000 | 14000 | 10000 | 12000 | 14000 | 14000 |
| Max. intermittent input speed | rpm | 12500 | 15000 | 17500 | 17500 | 12500 | 15000 | 17500 | 17500 |
| Max. efficiency | % | 90 | 80 | 75 | 65 | 90 | 80 | 75 | 65 |
| Average backlash no load | ° | 1.0 | 1.2 | 1.4 | 1.6 | 1.0 | 1.2 | 1.4 | 1.6 |
| Max. axial load (dynamic) | N | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 |
| Max. radial load, 5 mm from flange | N | 50 | 80 | 90 | 90 | 50 | 80 | 90 | 90 |
| Gearhead length L1 | mm | 16.7 | 22.9 | 27.0 | 36.2 | 16.7 | 22.9 | 27.0 | 36.2 |
| Weight | g | 30 | 40 | 43 | 55 | 30 | 40 | 43 | 55 |

| Configuration | | A Standard Version | | | | C Ceramic Version | | | |
|---|---|---|---|---|---|---|---|---|---|
| Number of stages | | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 |
| Reduction | X:1 | 3.9, 5.3, 6.6 | 16, 21, 26, 28, 35 | 62, 83, 103, 111, 138, 150, 172, 186, 231 | 243, 326, 406, 439, 546, 590, 679, 734, 794, 913, 987, 1135, 1227, 1526 | 3.9, 5.3, 6.6 | 16, 21, 26, 28, 35 | 62, 83, 103, 111, 138, 150, 172, 186, 231 | 243, 326, 406, 439, 546, 590, 679, 734, 794, 913, 987, 1135, 1227, 1526 |
| Version | | Standard/ceramic version/noise reduced/reduced backlash | | | | | | | |
| Flange | | Standard flange/configurable flange | | | | | | | |
| Shaft | | Length/flat face/cross hole | | | | | | | |

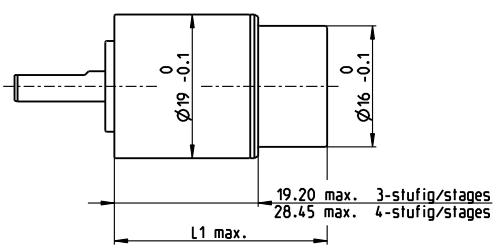
| maxon Modular System | | Page |
|---|---|---|
| **maxon DC motor** | Number of stages | |
| DCX 16 S | 3–4 | 18–19 |
| DCX 16 L | 3–4 | 20–21 |
| DCX 19 S | 1–2 | 22–23 |
| DC-max 16 S | 3–4 | 34–35 |

**Dimensions** M 1:1

1–2 stages




3–4 stages

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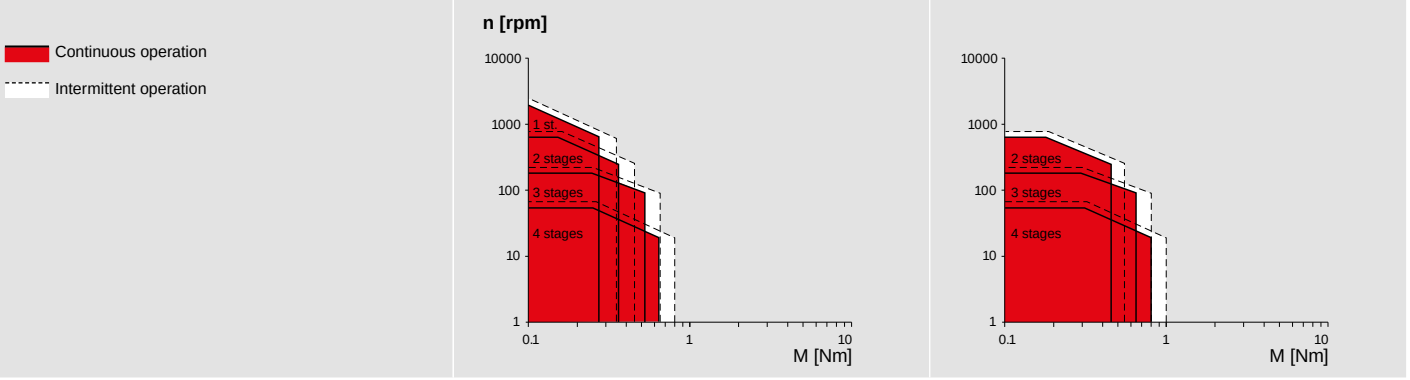
# GPX 19
## Planetary Gearhead Ø19 mm

NEW


| Key Data | | LN Noise Reduced | LZ Backlash Reduced |
|---|---|---|---|
| Max. transmittable power | W | 10.4 | 7 |
| Max. continuous torque | Nm | 0.64 | 0.8 |
| Max. continuous input speed | rpm | 14000 | 14000 |
| Ambient temperature | °C | -40 ... +85 | -40 ... +100 |
| Bearing at output | | Ball bearing | Ball bearing |
| Typical noise level | dBA | -5 dBA compared to standard configuration | |

**Operating Range (output shaft)**

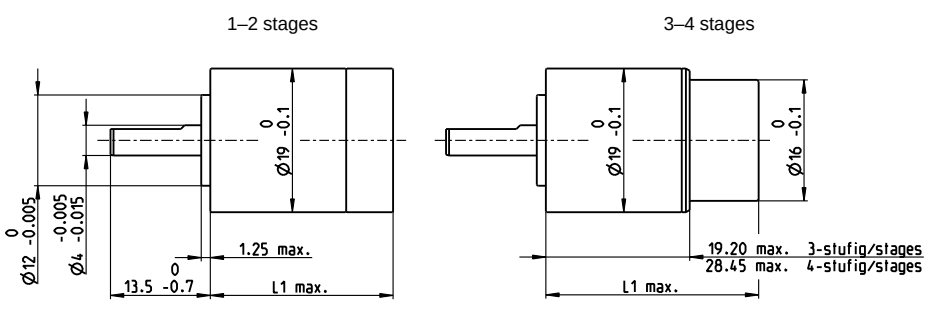



| Specifications | | LN Noise Reduced | | | | LZ Backlash Reduced | | |
|---|---|---|---|---|---|---|---|---|
| Number of stages | | 1 | 2 | 3 | 4 | 2 | 3 | 4 |
| Max. transmittable continuous power | W | 10.4 | 5.2 | 2.6 | 0.7 | 6.5 | 3.2 | 0.9 |
| Max. transmittable intermittent power | W | 13.0 | 6.5 | 3.2 | 0.9 | 8.1 | 4.1 | 1.1 |
| Max. continuous torque | Nm | 0.28 | 0.36 | 0.52 | 0.64 | 0.45 | 0.65 | 0.80 |
| Max. intermittent torque | Nm | 0.35 | 0.45 | 0.65 | 0.80 | 0.55 | 0.80 | 1.00 |
| Max. continuous input speed | rpm | 10000 | 12000 | 14000 | 14000 | 12000 | 14000 | 14000 |
| Max. intermittent input speed | rpm | 12500 | 15000 | 17500 | 17500 | 15000 | 17500 | 17500 |
| Max. efficiency | % | 90 | 80 | 75 | 65 | 80 | 75 | 65 |
| Average backlash no load | ° | 1.0 | 1.2 | 1.4 | 1.6 | 1.0 | 1.1 | 1.3 |
| Max. axial load (dynamic) | N | 40 | 40 | 40 | 40 | 40 | 40 | 40 |
| Max. radial load, 5 mm from flange | N | 50 | 80 | 90 | 90 | 80 | 90 | 90 |
| Gearhead length L1 | mm | 16.7 | 22.9 | 27.0 | 36.2 | 22.9 | 27.0 | 36.2 |
| Weight | g | 30 | 40 | 43 | 55 | 40 | 43 | 55 |

| Configuration | | LN Noise Reduced | | | | LZ Backlash Reduced | | |
|---|---|---|---|---|---|---|---|---|
| Number of stages | | 1 | 2 | 3 | 4 | 2 | 3 | 4 |
| Reduction | X:1 | 3.9, 5.3, 6.6 | 16, 21, 26, 28, 35 | 62, 83, 103, 111, 138, 150, 172, 186, 231 | 243, 326, 406, 439, 546, 590, 679, 734, 794, 913, 987, 1135, 1227, 1526 | 16, 21, 26, 28, 35 | 62, 83, 103, 111, 138, 150, 172, 186, 231 | 243, 326, 406, 439, 546, 590, 679, 734, 794, 913, 987, 1135, 1227, 1526 |
| Version | | Standard/ceramic version/noise reduced/backlash reduced | | | | | | |
| Flange | | Standard flange/configurable flange | | | | | | |
| Shaft | | Length/flat face/cross hole | | | | | | |

| maxon Modular System | | Page |
|---|---|---|
| **maxon DC motor** | Number of stages | |
| DCX 16 S | 3–4 | 18–19 |
| DCX 16 L | 3–4 | 20–21 |
| DCX 19 S | 1–2 | 22–23 |
| DC-max 16 S | 3–4 | 34–35 |

**Dimensions** M 1:1

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# GPX 22

## Planetary Gearhead Ø22 mm

NEW

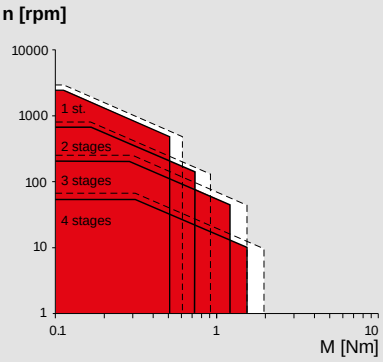

| Key Data | | A Standard Version | C Ceramic Version |
|---|---|---|---|
| Max. transmittable power | W | 24 | 30 |
| Max. continuous torque | Nm | 1.5 | 2 |
| Max. continuous input speed | rpm | 12000 | 12000 |
| Ambient temperature | °C | -40 ... +100 | -40 ... +100 |
| Bearing at output | | Ball bearing | Ball bearing |

**Operating Range (output shaft)**

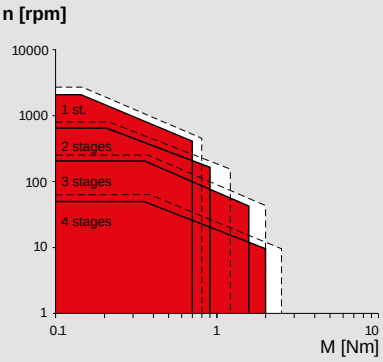
Continuous operation

Intermittent operation

**A Standard Version**




**C Ceramic Version**

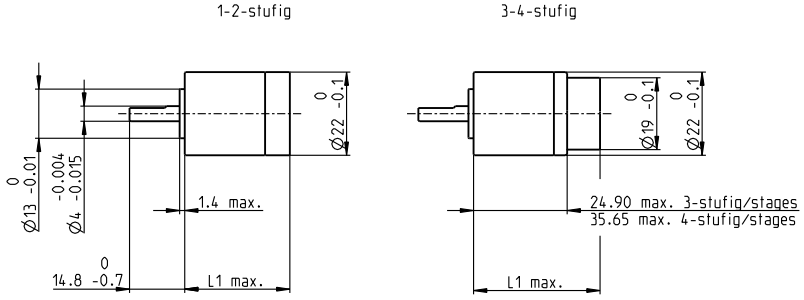



| Specifications | | A Standard Version | | | | C Ceramic Version | | | |
|---|---|---|---|---|---|---|---|---|---|
| Number of stages | | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 |
| Max. transmittable power (continuous) | W | 24.0 | 12.0 | 6.0 | 1.6 | 30.0 | 15.0 | 7.0 | 2.0 |
| Max. transmittable power (intermittent) | W | 30.0 | 15.0 | 7.5 | 2.0 | 38.0 | 19.0 | 9.0 | 2.5 |
| Max. continuous torque | Nm | 0.50 | 0.70 | 1.20 | 1.50 | 0.70 | 0.90 | 1.60 | 2.00 |
| Max. intermittent torque | Nm | 0.60 | 0.90 | 1.50 | 1.90 | 0.80 | 1.20 | 2.00 | 2.50 |
| Max. continuous input speed | rpm | 8000 | 10000 | 12000 | 12000 | 8000 | 10000 | 12000 | 12000 |
| Max. intermittent input speed | rpm | 10000 | 12500 | 15000 | 15000 | 10000 | 12500 | 15000 | 15000 |
| Max. efficiency | % | 90 | 81 | 74 | 66 | 90 | 81 | 74 | 66 |
| Average backlash no load | ° | 1.4 | 1.6 | 1.75 | 1.9 | 1.4 | 1.6 | 1.75 | 1.9 |
| Max. axial load (dynamic) | N | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 |
| Max. radial load, 10 mm from flange | N | 65 | 100 | 120 | 120 | 65 | 100 | 120 | 120 |
| Gearhead length L1 | mm | 19.9 | 26.4 | 32.2 | 43.0 | 19.9 | 26.4 | 32.2 | 43.0 |
| Weight | g | 45 | 58 | 67 | 89 | 45 | 58 | 67 | 89 |

| Configuration | | A Standard Version | | | | C Ceramic Version | | | |
|---|---|---|---|---|---|---|---|---|---|
| Number of stages | | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 |
| Reduction | X:1 | 3.9, 5.3, 6.6 | 16, 21, 26, 28, 35, 44 | 62, 83, 103, 111, 138, 150, 172, 186, 231 | 243, 326, 406, 439, 546, 590, 679, 734, 794, 913, 987, 1135, 1227, 1526 | 3.9, 5.3, 6.6 | 16, 21, 26, 28, 35, 44 | 62, 83, 103, 111, 138, 150, 172, 186, 231 | 243, 326, 406, 439, 546, 590, 679, 734, 794, 913, 987, 1135, 1227, 1526 |
| Version | | Standard/ceramic version/noise reduced/backlash reduced/high power | | | | | | | |
| Flange | | Standard flange/configurable flange | | | | | | | |
| Shaft | | Length/flat face/cross hole | | | | | | | |

| maxon Modular System | | Page |
|---|---|---|
| **maxon DC motor** | Number of stages | |
| DCX 19 S | 3–4 | 22–23 |
| DCX 22 S | 1–2 | 24–25 |
| DCX 22 L | 1–2 | 26–27 |
| DC-max 22 S | 1–2 | 36–37 |

**Dimensions** M 1:2

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# GPX 22

## Planetary Gearhead Ø22 mm

NEW

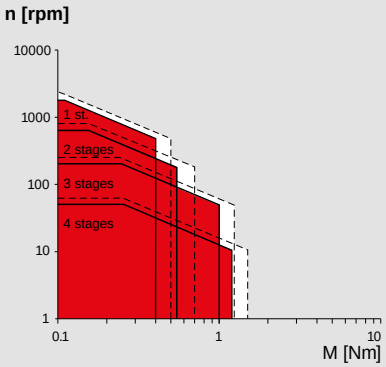

| Key Data | | LN Noise Reduced | LZ Backlash Reduced |
|---|---|---|---|
| Max. transmittable power | W | 20 | 12 |
| Max. continuous torque | Nm | 1.2 | 1.5 |
| Max. continuous input speed | rpm | 12000 | 12000 |
| Ambient temperature | °C | -40 ... +85 | -40 ... +100 |
| Bearing at output | | Ball bearing | Ball bearing |
| Typical noise level | dBA | -5 dBA compared to standard configuration | |

**Operating Range (output shaft)**

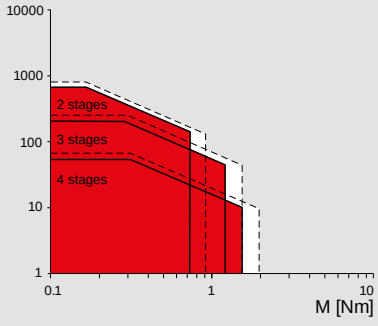
Continuous operation

Intermittent operation

**LN Noise Reduced**




**LZ Backlash Reduced**

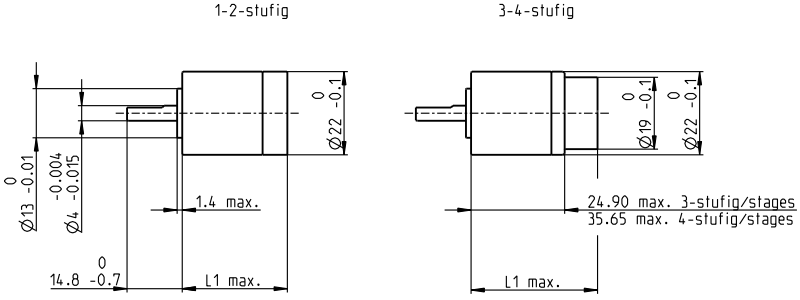



| Specifications | | LN Noise Reduced | | | | LZ Backlash Reduced | | |
|---|---|---|---|---|---|---|---|---|
| Number of stages | | 1 | 2 | 3 | 4 | 2 | 3 | 4 |
| Max. transmittable power (continuous) | W | 20.0 | 10.0 | 5.0 | 1.3 | 12.0 | 6.0 | 1.6 |
| Max. transmittable power (intermittent) | W | 25.0 | 13.0 | 6.3 | 1.6 | 15.0 | 7.5 | 2.0 |
| Max. continuous torque | Nm | 0.40 | 0.55 | 1.00 | 1.20 | 0.70 | 1.20 | 1.50 |
| Max. intermittent torque | Nm | 0.50 | 0.70 | 1.25 | 1.50 | 0.90 | 1.50 | 1.90 |
| Max. continuous input speed | rpm | 8000 | 10000 | 12000 | 12000 | 10000 | 12000 | 12000 |
| Max. intermittent input speed | rpm | 10000 | 12500 | 15000 | 15000 | 12500 | 15000 | 15000 |
| Max. efficiency | % | 90 | 81 | 74 | 66 | 81 | 74 | 66 |
| Average backlash no load | ° | 1.4 | 1.6 | 1.75 | 1.9 | 1.1 | 1.2 | 1.4 |
| Max. axial load (dynamic) | N | 40 | 40 | 40 | 40 | 40 | 40 | 40 |
| Max. radial load, 10 mm from flange | N | 65 | 100 | 120 | 120 | 100 | 120 | 120 |
| Gearhead length L1 | mm | 19.9 | 26.4 | 32.2 | 43.0 | 26.4 | 32.2 | 43.0 |
| Weight | g | 45 | 58 | 67 | 89 | 58 | 67 | 89 |

| Configuration | | LN Noise Reduced | | | | LZ Backlash Reduced | | |
|---|---|---|---|---|---|---|---|---|
| Number of stages | | 1 | 2 | 3 | 4 | 2 | 3 | 4 |
| Reduction | X:1 | 3.9, 5.3, 6.6 | 16, 21, 26, 28, 35, 44 | 62, 83, 103, 111, 138, 150, 172, 186, 231 | 243, 326, 406, 439, 546, 590, 679, 734, 794, 913, 987, 1135, 1227, 1526 | 16, 21, 26, 28, 35, 44 | 62, 83, 103, 111, 138, 150, 172, 186, 231 | 243, 326, 406, 439, 546, 590, 679, 734, 794, 913, 987, 1135, 1227, 1526 |
| Version | | Standard/ceramic version/noise reduced/backlash reduced/high power | | | | | | |
| Flange | | Standard flange/configurable flange | | | | | | |
| Shaft | | Length/flat face/cross hole | | | | | | |

| maxon Modular System | | Page |
|---|---|---|
| **maxon DC motor** | Number of stages | |
| DCX 19 S | 3–4 | 22–23 |
| DCX 22 S | 1–2 | 24–25 |
| DCX 22 L | 1–2 | 26–27 |
| DC-max 22 S | 1–2 | 36–37 |

**Dimensions** M 1:2

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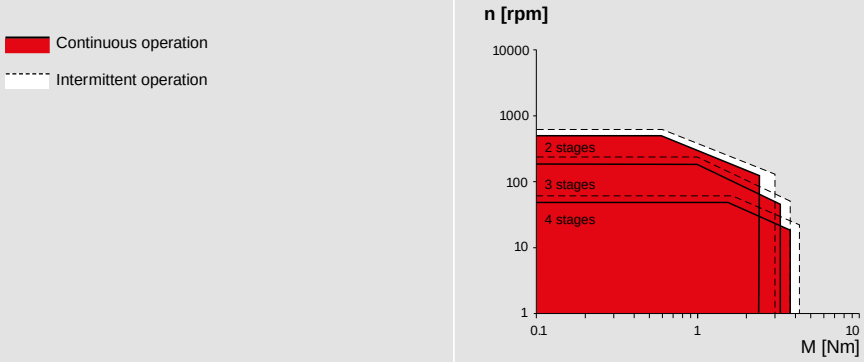
# GPX 22

## Planetary Gearhead Ø22 mm

NEW


| Key Data | | HP High Power |
|---|---|---|
| Max. transmittable power | W | 30 |
| Max. continuous torque | Nm | 3.7 |
| Max. continuous input speed | rpm | 12000 |
| Ambient temperature | °C | -40 ... +85 |
| Bearing at output | | Ball bearing |

**Operating Range (output shaft)** — **HP High Power**



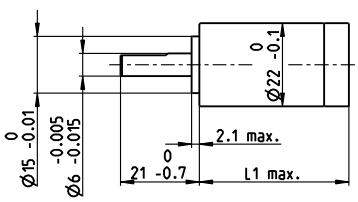

| Specifications | | HP High Power | | |
|---|---|---|---|---|
| Number of stages | | 2 | 3 | 4 |
| Max. transmittable power (continuous) | W | 30.0 | 15.0 | 8.0 |
| Max. transmittable power (intermittent) | W | 40.0 | 20.0 | 10.0 |
| Max. continuous torque | Nm | 2.40 | 3.30 | 3.70 |
| Max. intermittent torque | Nm | 3.00 | 3.80 | 4.20 |
| Max. continuous input speed | rpm | 8000 | 10000 | 12000 |
| Max. intermittent input speed | rpm | 10000 | 12500 | 15000 |
| Max. efficiency | % | 75 | 65 | 55 |
| Average backlash no load | ° | 1.6 | 1.75 | 1.9 |
| Max. axial load (dynamic) | N | 80 | 80 | 80 |
| Max. radial load, 5 mm from flange | N | 145 | 150 | 150 |
| Gearhead length L1 | mm | 31.7 | 38.2 | 44.0 |
| Weight | g | 73 | 86 | 95 |

| Configuration | | HP High Power | | |
|---|---|---|---|---|
| Number of stages | | 2 | 3 | 4 |
| Reduction | X:1 | 16, 21, 26, 28, 35, 44 | 62, 83, 103, 111, 138, 150, 172, 186, 231 | 243, 326, 406, 439, 546, 590, 679, 734, 794, 913, 987, 1135, 1227, 1526 |
| Version | | Standard/ceramic version/noise reduced/backlash reduced/high power | | |
| Flange | | Standard flange/configurable flange | | |
| Shaft | | Length/flat face/cross hole | | |

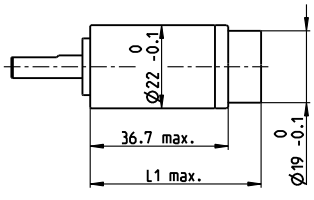
| maxon Modular System | | Page |
|---|---|---|
| **maxon DC motor** | Number of stages | |
| DCX 19 S | 4 | 22–23 |
| DCX 22 S | 2–3 | 24–25 |
| DCX 22 L | 2–3 | 26–27 |

**Dimensions** M 1:2

2–3 stages




4 stages

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# GPX 26
## Planetary Gearhead Ø26 mm

NEW

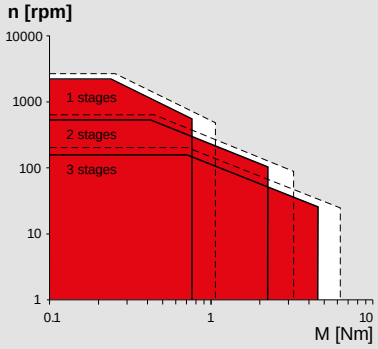

| Key Data | | A Standard Version | C Ceramic Version |
|---|---|---|---|
| Max. transmittable power | W | 48 | 55 |
| Max. continuous torque | Nm | 2.25 | 3.0 |
| Max. continuous input speed | rpm | 8000 | 8000 |
| Ambient temperature | °C | -40 ... +100 | -40 ... +100 |
| Bearing at output | | Ball bearing | Ball bearing |

**Operating Range (output shaft)**

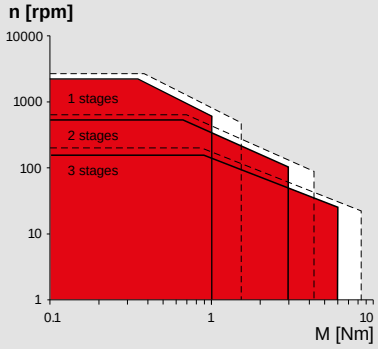
Continuous operation

Intermittent operation

**A Standard Version**




**C Ceramic Version**



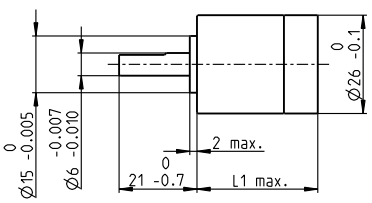

| Specifications | | A Standard Version | | | C Ceramic Version | | |
|---|---|---|---|---|---|---|---|
| Number of stages | | 1 | 2 | 3 | 1 | 2 | 3 |
| Max. transmittable continuous power | W | 48 | 24 | 12.0 | 55 | 30 | 15.0 |
| Max. transmittable intermittent power | W | 60 | 30 | 15.0 | 70 | 35 | 18.0 |
| Max. continuous torque | Nm | 0.75 | 2.25 | 4.50 | 1.00 | 3.00 | 6.00 |
| Max. intermittent torque | Nm | 1.10 | 3.20 | 6.20 | 1.50 | 4.25 | 8.25 |
| Max. continuous input speed | rpm | 7000 | 8000 | 10000 | 7000 | 8000 | 10000 |
| Max. intermittent input speed | rpm | 8750 | 10000 | 12500 | 8750 | 10000 | 12500 |
| Max. efficiency | % | 90 | 78 | 75 | 90 | 78 | 75 |
| Average backlash no load | ° | 1.2 | 1.3 | 1.60 | 1.2 | 1.3 | 1.60 |
| Max. axial load (dynamic) | N | 80 | 80 | 80 | 80 | 80 | 80 |
| Max. radial load, 10 mm from flange | N | 95 | 145 | 150 | 95 | 145 | 150 |
| Gearhead length L1 | mm | 21.3 | 30.2 | 35.6 | 21.3 | 30.2 | 35.6 |
| Weight | g | 75 | 95 | 105 | 75 | 95 | 105 |

| Configuration | | A Standard Version | | | C Ceramic Version | | |
|---|---|---|---|---|---|---|---|
| Number of stages | | 1 | 2 | 3 | 1 | 2 | 3 |
| Reduction | X:1 | 3.9, 5.3, 6.6 | 16, 21, 26, 28, 35 | 62, 83, 103, 111, 138, 150, 172, 186, 231 | 3.9, 5.3, 6.6 | 16, 21, 26, 28, 35 | 62, 83, 103, 111, 138, 150, 172, 186, 231 |
| Version | | Standard/ceramic version/noise reduced/reduced backlash | | | | | |
| Flange | | Standard flange/configurable flange | | | | | |
| Shaft | | Length/flat face/cross hole | | | | | |

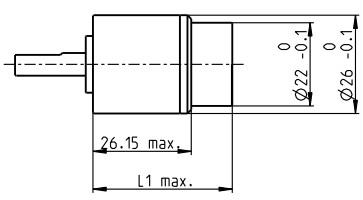
| maxon Modular System | | Page |
|---|---|---|
| **maxon DC motor** | Number of stages | |
| DCX 22 S | 3 | 24–25 |
| DCX 22 L | 3 | 26–27 |
| DCX 26 L | 1–2 | 28–29 |
| DC-max 22 S | 3 | 36–37 |

**Dimensions** M 1:2

1–2 stages




3 stages

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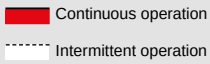
# GPX 26

## Planetary Gearhead Ø26 mm

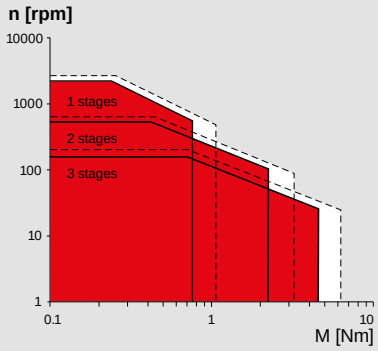
NEW


| Key Data | | LN Noise Reduced | LZ Backlash Reduced |
|---|---|---|---|
| Max. transmittable power | W | 38 | 24 |
| Max. continuous torque | Nm | 1.8 | 2.3 |
| Max. continuous input speed | rpm | 8000 | 8000 |
| Ambient temperature | °C | -40 … +85 | -40 … +100 |
| Bearing at output | | Ball bearing | Ball bearing |
| Typical noise level | dBA | -5 dBA compared to standard configuration | |

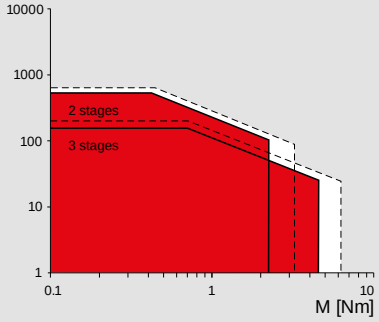
**Operating Range (output shaft)**




**LN Noise Reduced**




**LZ Backlash Reduced**



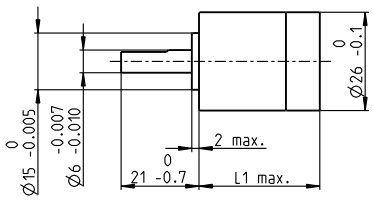

| Specifications | | LN Noise Reduced | | | LZ Backlash Reduced | |
|---|---|---|---|---|---|---|
| Number of stages | | 1 | 2 | 3 | 2 | 3 |
| Max. transmittable continuous power | W | 38 | 19 | 10.0 | 24 | 12.0 |
| Max. transmittable intermittent power | W | 48 | 24 | 12.0 | 30 | 15.0 |
| Max. continuous torque | Nm | 0.60 | 1.80 | 3.60 | 2.25 | 4.50 |
| Max. intermittent torque | Nm | 0.75 | 2.25 | 4.50 | 3.20 | 6.20 |
| Max. continuous input speed | rpm | 7000 | 8000 | 10000 | 8000 | 10000 |
| Max. intermittent input speed | rpm | 8750 | 10000 | 12500 | 10000 | 12500 |
| Max. efficiency | % | 90 | 78 | 75 | 78 | 75 |
| Average backlash no load | ° | 1.2 | 1.3 | 1.60 | 0.7 | 0.80 |
| Max. axial load (dynamic) | N | 80 | 80 | 80 | 80 | 80 |
| Max. radial load, 10 mm from flange | N | 95 | 145 | 150 | 145 | 150 |
| Gearhead length L1 | mm | 21.3 | 30.2 | 35.5 | 30.2 | 35.5 |
| Weight | g | 75 | 95 | 105 | 95 | 105 |

| Configuration | | LN Noise Reduced | | | LZ Backlash Reduced | |
|---|---|---|---|---|---|---|
| Number of stages | | 1 | 2 | 3 | 2 | 3 |
| Reduction | X:1 | 3.9, 5.3, 6.6 | 16, 21, 26, 28, 35 | 62, 83, 103, 111, 138, 150, 172, 186, 231 | 16, 21, 26, 28, 35 | 62, 83, 103, 111, 138, 150, 172, 186, 231 |
| Version | | Standard/ceramic version/noise reduced/backlash reduced | | | | |
| Flange | | Standard flange/configurable flange | | | | |
| Shaft | | Length/flat face/cross hole | | | | |

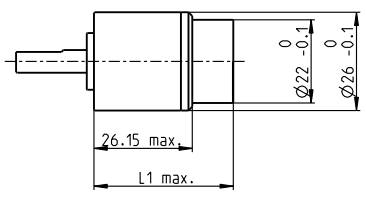
| maxon Modular System | | Page |
|---|---|---|
| **maxon DC motor** | Number of stages | |
| DCX 22 S | 3 | 24–25 |
| DCX 22 L | 3 | 26–27 |
| DCX 26 L | 1–2 | 28–29 |
| DC-max 22 S | 3 | 36–37 |

**Dimensions** M 1:2

1–2 stages




3 stages

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# GPX 32
## Planetary Gearhead Ø32 mm

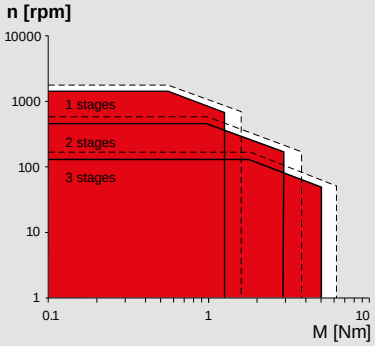

| Key Data | | A Standard Version | C Ceramic Version |
|---|---|---|---|
| Max. transmittable power | W | 100 | 120 |
| Max. continuous torque | Nm | 5 | 6.6 |
| Max. continuous input speed | rpm | 8000 | 8000 |
| Ambient temperature | °C | -40 ... +100 | -40 ... +100 |
| Bearing at output | | Ball bearing | Ball bearing |

**Operating Range (output shaft)**

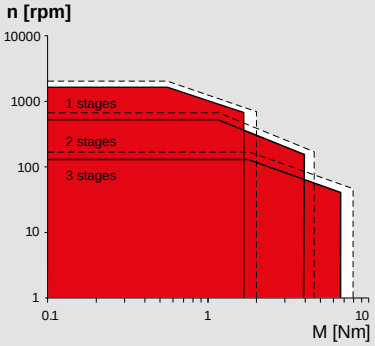
Continuous operation

Intermittent operation

**A Standard Version**




**C Ceramic Version**



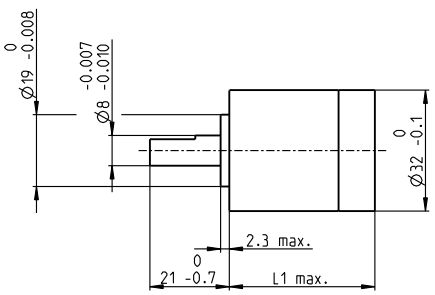

| Specifications | | A Standard Version | | | C Ceramic Version | | |
|---|---|---|---|---|---|---|---|
| Number of stages | | 1 | 2 | 3 | 1 | 2 | 3 |
| Max. transmittable continuous power | W | 100 | 50 | 25 | 120 | 60 | 30 |
| Max. transmittable intermittent power | W | 125 | 62 | 31 | 150 | 75 | 37 |
| Max. continuous torque | Nm | 1.25 | 2.90 | 5.00 | 1.60 | 3.80 | 6.60 |
| Max. intermittent torque | Nm | 1.60 | 3.60 | 6.25 | 2.00 | 4.50 | 8.00 |
| Max. continuous input speed | rpm | 6000 | 7000 | 8000 | 6000 | 7000 | 8000 |
| Max. intermittent input speed | rpm | 7500 | 8750 | 10000 | 7500 | 8750 | 10000 |
| Max. efficiency | % | 90 | 78 | 75 | 90 | 78 | 75 |
| Average backlash no load | ° | 1.4 | 1.5 | 1.7 | 1.4 | 1.5 | 1.7 |
| Max. axial load (dynamic) | N | 110 | 110 | 110 | 110 | 110 | 110 |
| Max. radial load, 10 mm from flange | N | 160 | 180 | 180 | 160 | 180 | 180 |
| Gearhead length L1 | mm | 26.7 | 36.3 | 43.9 | 26.7 | 36.3 | 43.9 |
| Weight | g | 140 | 185 | 230 | 140 | 185 | 230 |

| Configuration | | A Standard Version | | | C Ceramic Version | | |
|---|---|---|---|---|---|---|---|
| Number of stages | | 1 | 2 | 3 | 1 | 2 | 3 |
| Reduction | X:1 | 3.9, 5.3 | 16, 21, 26, 28, 35 | 62, 83, 103, 111, 138, 150, 172, 186, 231 | 3.9, 5.3 | 16, 21, 26, 28, 35 | 62, 83, 103, 111, 138, 150, 172, 186, 231 |
| Version | | Standard/ceramic version/noise reduced/backlash reduced/high power | | | | | |
| Flange | | Standard flange/configurable flange | | | | | |
| Shaft | | Length/flat face/cross hole | | | | | |

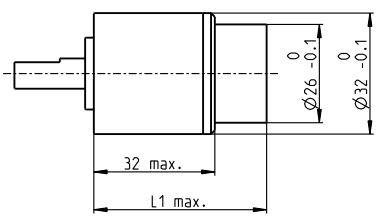
| maxon Modular System | | Page |
|---|---|---|
| **maxon DC motor** | Number of stages | |
| DCX 26 L | 3 | 28–29 |
| DCX 32 L | 1–2 | 30 |

**Dimensions** M 1:2

1–2 stages




3 stages

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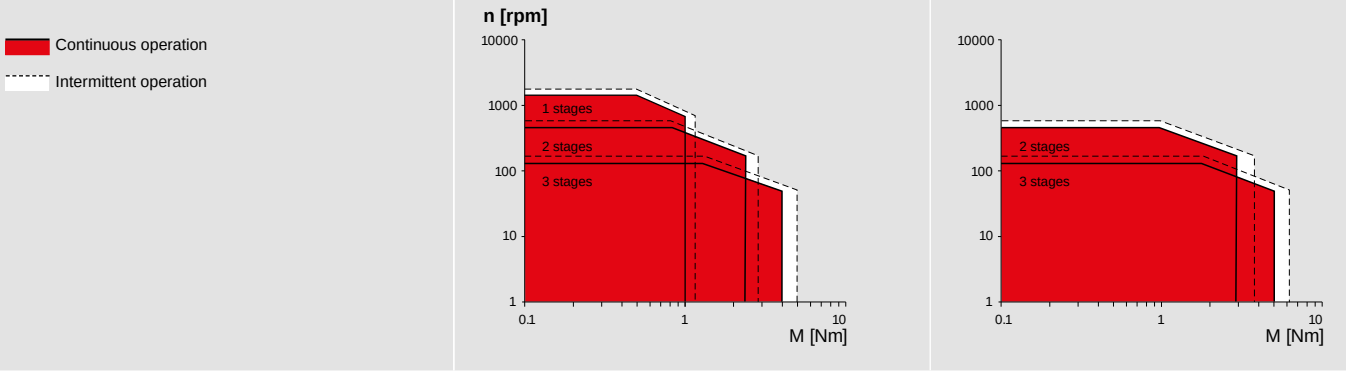
# GPX 32
## Planetary Gearhead Ø32 mm


| Key Data | | LN Noise Reduced | LZ Backlash Reduced |
|---|---|---|---|
| Max. transmittable power | W | 80 | 50 |
| Max. continuous torque | Nm | 4 | 5 |
| Max. continuous input speed | rpm | 8000 | 8000 |
| Ambient temperature | °C | -40 … +100 | -40 … +100 |
| Bearing at output | | Ball bearing | Ball bearing |
| Typical noise level | dBA | -5 dBA compared to standard configuration | |

**Operating Range (output shaft)**

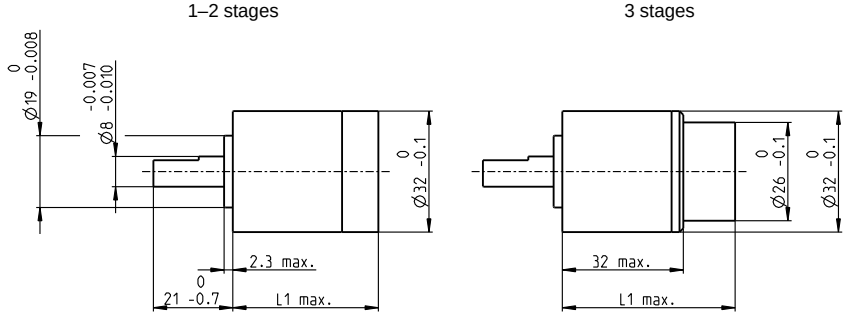



| Specifications | | LN Noise Reduced | | | LZ Backlash Reduced | |
|---|---|---|---|---|---|---|
| Number of stages | | 1 | 2 | 3 | 2 | 3 |
| Max. transmittable continuous power | W | 80 | 40 | 20 | 50 | 25 |
| Max. transmittable intermittent power | W | 100 | 50 | 25 | 62 | 31 |
| Max. continuous torque | Nm | 1.00 | 2.30 | 4.00 | 2.90 | 5.00 |
| Max. intermittent torque | Nm | 1.30 | 2.90 | 5.00 | 3.60 | 6.25 |
| Max. continuous input speed | rpm | 6000 | 7000 | 8000 | 7000 | 8000 |
| Max. intermittent input speed | rpm | 7500 | 8750 | 10000 | 8750 | 10000 |
| Max. efficiency | % | 90 | 78 | 75 | 78 | 75 |
| Average backlash no load | ° | 1.4 | 1.5 | 1.7 | 0.8 | 1.0 |
| Max. axial load (dynamic) | N | 110 | 110 | 110 | 110 | 110 |
| Max. radial load, 10 mm from flange | N | 160 | 180 | 180 | 180 | 180 |
| Gearhead length L1 | mm | 26.7 | 36.3 | 43.9 | 36.3 | 43.9 |
| Weight | g | 140 | 185 | 230 | 185 | 230 |

| Configuration | | LN Noise Reduced | | | LZ Backlash Reduced | |
|---|---|---|---|---|---|---|
| Number of stages | | 1 | 2 | 3 | 2 | 3 |
| Reduction | X:1 | 3.9, 5.3 | 16, 21, 26, 28, 35 | 62, 83, 103, 111, 138, 150, 172, 186, 231 | 16, 21, 26, 28, 35 | 62, 83, 103, 111, 138, 150, 172, 186, 231 |
| Version | | Standard/ceramic version/noise reduced/backlash reduced/high power | | | | |
| Flange | | Standard flange/configurable flange | | | | |
| Shaft | | Length/flat face/cross hole | | | | |

| maxon Modular System | | Page |
|---|---|---|
| **maxon DC motor** | Number of stages | |
| DCX 26 L | 3 | 28–29 |
| DCX 32 L | 1–2 | 30 |

**Dimensions** M 1:2

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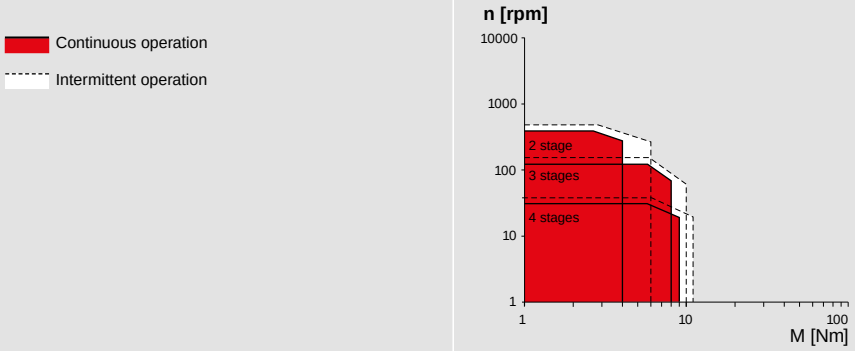
# GPX 32

## Planetary Gearhead Ø32 mm

NEW


| Key Data | | HP High Power |
|---|---|---|
| Max. transmittable power | W | 110 |
| Max. continuous torque | Nm | 9 |
| Max. continuous input speed | rpm | 8000 |
| Ambient temperature | °C | -40 ... +100 |
| Bearing at output | | Ball bearing |

**Operating Range (output shaft)** — **HP High Power**



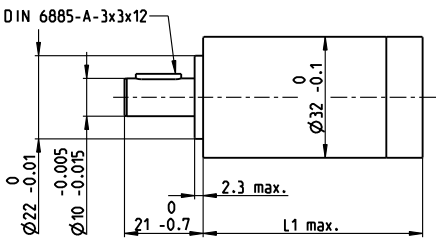

| Specifications | | HP High Power | | |
|---|---|---|---|---|
| Number of stages | | 2 | 3 | 4 |
| Max. transmittable power (continuous) | W | 110 | 55 | 18.0 |
| Max. transmittable power (intermittent) | W | 140 | 70 | 25.0 |
| Max. continuous torque | Nm | 4.00 | 8.00 | 9.00 |
| Max. intermittent torque | Nm | 6.00 | 10.00 | 12.00 |
| Max. continuous input speed | rpm | 6000 | 7000 | 8000 |
| Max. intermittent input speed | rpm | 7500 | 8750 | 10000 |
| Max. efficiency | % | 76 | 65 | 55 |
| Average backlash no load | ° | 1.5 | 1.7 | 2.0 |
| Max. axial load (dynamic) | N | 110 | 110 | 110 |
| Max. radial load, 5 mm from flange | N | 200 | 250 | 250.0 |
| Gearhead length L1 | mm | 46.3 | 55.9 | 63.5 |
| Weight | g | 200 | 220 | 250 |

| Configuration | | HP High Power | | |
|---|---|---|---|---|
| Number of stages | | 2 | 3 | 4 |
| Reduction | X:1 | 16, 21, 26, 28, 35 | 62, 83, 103, 111, 138, 150, 172, 186, 231 | 243, 326, 406, 439, 546, 590, 679, 734, 794, 913, 987, 1135, 1227, 1526 |
| Version | | Standard/ceramic version/noise reduced/backlash reduced/high power | | |
| Flange | | Standard flange/configurable flange | | |
| Shaft | | Length/flat face/feather key | | |

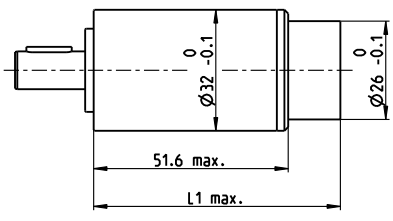
| maxon Modular System | | Page |
|---|---|---|
| **maxon DC motor** | Number of stages | |
| DCX 26 L | 4 | 28–29 |
| DCX 32 L | 2–3 | 30 |

**Dimensions** — **M 1:2**

2–3 stages




4 stages

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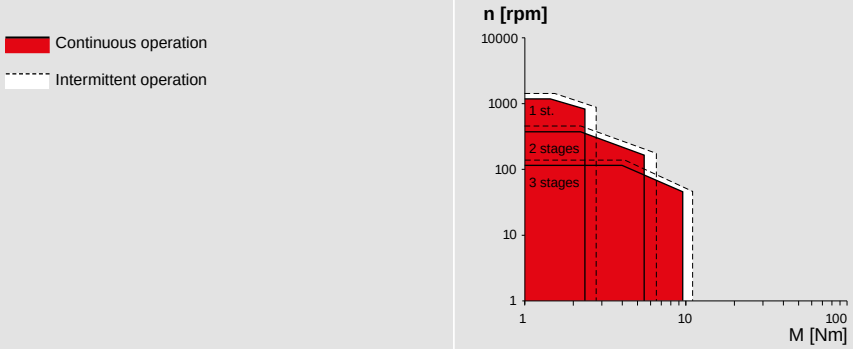
# GPX 37
## Planetary Gearhead Ø37 mm


| Key Data | | A Standard Version |
|---|---|---|
| Max. transmittable power | W | 185 |
| Max. continuous torque | Nm | 9.3 |
| Max. continuous input speed | rpm | 7000 |
| Ambient temperature | °C | -40 … +100 |
| Bearing at output | | Ball bearing |

**Operating Range (output shaft)** — **A Standard Version**

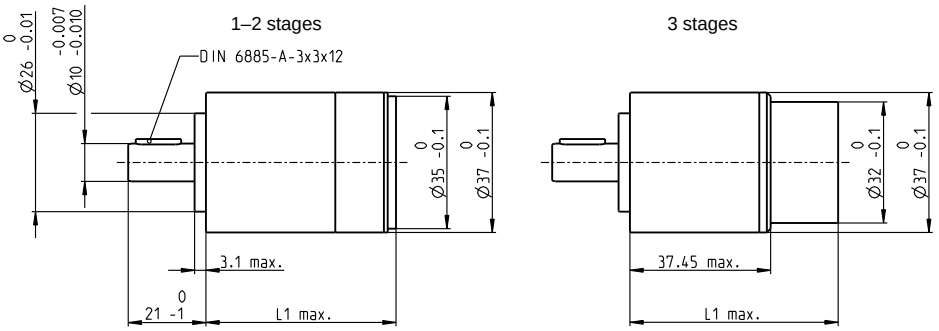



| Specifications | | A Standard Version | | |
|---|---|---|---|---|
| Number of stages | | 1 | 2 | 3 |
| Max. transmittable continuous power | W | 185 | 90 | 45 |
| Max. transmittable intermittent power | W | 230 | 115 | 60 |
| Max. continuous torque | Nm | 2.30 | 5.40 | 9.30 |
| Max. intermittent torque | Nm | 2.90 | 6.80 | 11.60 |
| Max. continuous input speed | rpm | 5000 | 6000 | 7000 |
| Max. intermittent input speed | rpm | 6250 | 7500 | 8750 |
| Max. efficiency | % | 90 | 80 | 75 |
| Average backlash no load | ° | 1.4 | 1.5 | 1.7 |
| Max. axial load (dynamic) | N | 240 | 240 | 240 |
| Max. radial load, 10 mm from flange | N | 200 | 250 | 250 |
| Gearhead length L1 | mm | 35.4 | 48.3 | 52.9 |
| Weight | g | 230 | 310 | 410 |

| Configuration | | A Standard Version | | |
|---|---|---|---|---|
| Number of stages | | 1 | 2 | 3 |
| Reduction | X:1 | 3.9 | 16, 26 | 62, 83, 103, 111, 138, 150, 172, 186, 231 |
| Version | | Standard/noise reduced/reduced backlash | | |
| Flange | | Standard flange/configurable flange | | |
| Shaft | | Length/flat face/feather key | | |

| maxon Modular System | | Page |
|---|---|---|
| **maxon DC motor** | Number of stages | |
| DCX 32 L | 3 | 30 |
| DCX 35 L | 1–2 | 31 |

**Dimensions** — **M 1:2**

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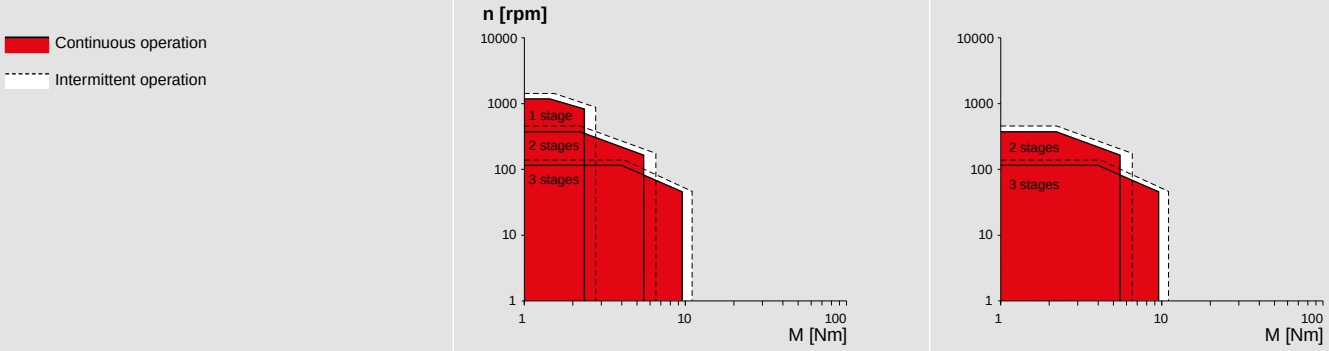
October 2015 edition / provisional data / subject to change

# GPX 37
## Planetary Gearhead Ø37 mm


| Key Data | | LN Noise Reduced | LZ Backlash Reduced |
|---|---|---|---|
| Max. transmittable power | W | 150 | 90 |
| Max. continuous torque | Nm | 7.4 | 9.3 |
| Max. continuous input speed | rpm | 7000 | 7000 |
| Ambient temperature | °C | -40 ... +85 | -40 ... +100 |
| Bearing at output | | Ball bearing | Ball bearing |
| Typical noise level | dBA | -5 dBA compared to standard configuration | |

**Operating Range (output shaft)**

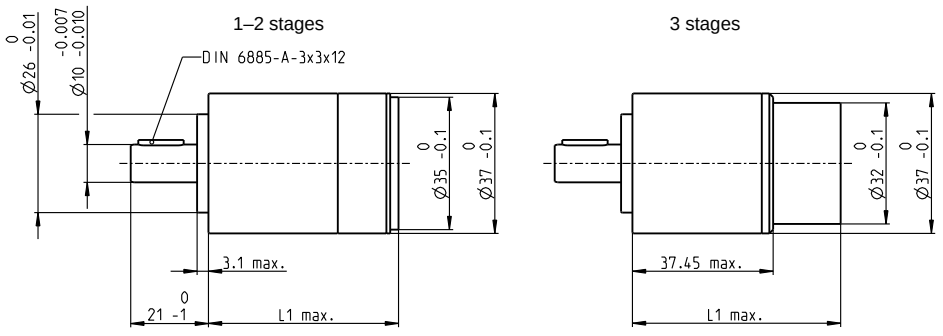



| Specifications | | LN Noise Reduced | | | LZ Backlash Reduced | |
|---|---|---|---|---|---|---|
| Number of stages | | 1 | 2 | 3 | 2 | 3 |
| Max. transmittable continuous power | W | 150 | 75 | 37 | 90 | 45 |
| Max. transmittable intermittent power | W | 185 | 90 | 45 | 115 | 60 |
| Max. continuous torque | Nm | 1.85 | 4.30 | 7.40 | 5.40 | 9.30 |
| Max. intermittent torque | Nm | 2.30 | 5.40 | 9.20 | 6.80 | 11.60 |
| Max. continuous input speed | rpm | 5000 | 6000 | 7000 | 6000 | 7000 |
| Max. intermittent input speed | rpm | 6250 | 7500 | 8750 | 7500 | 8750 |
| Max. efficiency | % | 90 | 80 | 75 | 80 | 75 |
| Average backlash no load | ° | 1.4 | 1.5 | 1.7 | 0.8 | 1.0 |
| Max. axial load (dynamic) | N | 240 | 240 | 240 | 240 | 240 |
| Max. radial load, 10 mm from flange | N | 200 | 250 | 250 | 250 | 250 |
| Gearhead length L1 | mm | 35.4 | 48.3 | 52.9 | 48.3 | 52.9 |
| Weight | g | 230 | 310 | 410 | 310 | 410 |

| Configuration | | LN Noise Reduced | | | LZ Backlash Reduced | |
|---|---|---|---|---|---|---|
| Number of stages | | 1 | 2 | 3 | 2 | 3 |
| Reduction | X:1 | 3.9 | 16, 26 | 62, 83, 103, 111, 138, 150, 172, 186, 231 | 16, 26 | 62, 83, 103, 111, 138, 150, 172, 186, 231 |
| Version | | Standard/noise reduced/backlash reduced | | | | |
| Flange | | Standard flange/configurable flange | | | | |
| Shaft | | Length/flat face/feather key | | | | |

| maxon Modular System | | Page |
|---|---|---|
| **maxon DC motor** | Number of stages | |
| DCX 32 L | 3 | 30 |
| DCX 35 L | 1–2 | 31 |

**Dimensions** M 1:2

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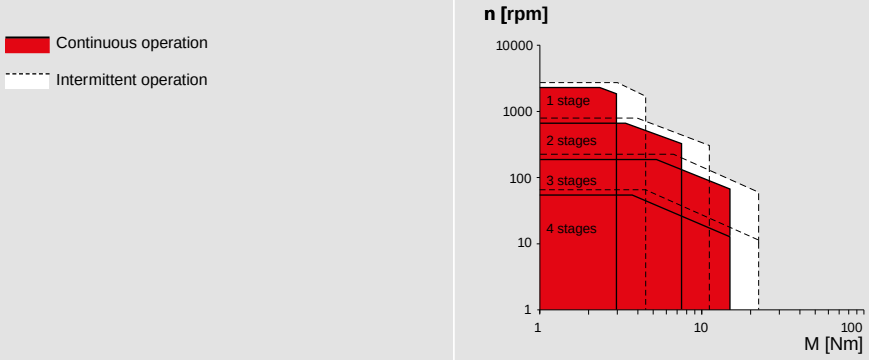
# GPX 42
## Planetary Gearhead Ø42 mm


| Key Data | | C Ceramic Version |
|---|---|---|
| Max. transmittable power | W | 580 |
| Max. continuous torque | Nm | 15.0 |
| Max. continuous input speed | rpm | 8000 |
| Ambient temperature | °C | -40 ... +100 |
| Bearing at output | | Ball bearing |

**Operating Range (output shaft)** — C Ceramic Version

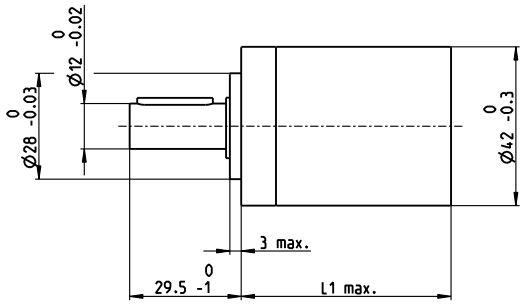



| Specifications | | C Ceramic Version | | | |
|---|---|---|---|---|---|
| Number of stages | | 1 | 2 | 3 | 4 |
| Max. transmittable power (continuous) | W | 580 | 240 | 100 | 20 |
| Max. transmittable power (intermittent) | W | 725 | 300 | 125 | 25 |
| Max. continuous torque | Nm | 3.0 | 7.5 | 15.0 | 15.0 |
| Max. intermittent torque | Nm | 4.5 | 11.3 | 22.5 | 22.5 |
| Max. continuous input speed | rpm | 8000 | 8000 | 8000 | 8000 |
| Max. intermittent input speed | rpm | 10000 | 10000 | 10000 | 10000 |
| Max. efficiency | % | 90 | 81 | 72 | 64 |
| Average backlash no load | ° | 0.6 | 0.8 | 1.0 | 1.0 |
| Max. axial load (dynamic) | N | 150 | 150 | 150 | 150 |
| Max. radial load, 12 mm from flange | N | 120 | 240 | 360 | 360 |
| Gearhead length L1 | mm | 37.4 | 51.9 | 66.4 | 80.9 |
| Weight | g | 260 | 360 | 460 | 560 |

| Configuration | | C Ceramic Version | | | |
|---|---|---|---|---|---|
| Number of stages | | 1 | 2 | 3 | 4 |
| Reduction | X:1 | 3.5, 4.3 | 12, 15, 19, 21, 26 | 43, 53, 66, 74, 81, 113, 126, 156 | 150, 186, 230, 257, 285, 319, 353, 394, 441, 488, 546, 676, 756, 936 |
| Version | | Ceramic Version | | | |
| Flange | | Standard flange/configurable flange | | | |
| Shaft | | Length/feather key | | | |

| maxon Modular System | | Page |
|---|---|---|
| **maxon DC motor** | Number of stages | |
| DCX 35 L | 1–4 | 31 |

**Dimensions** — M 1:2

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# maxon ENX

## Encoder
## maxon ENX

maxon ENX encoders make an impression with their robust design and high signal quality. The 3-channel encoder with differential signals guarantees interference-free function even under the highest loads. The resolution can be factory-set. EASY is an incremental or absolute encoder based on the Hall effect. With the QUAD you get a 1-count encoder for rotation direction and speed recognition.

maxon ENX encoders can be configured online and are ready for delivery within 11 working days.

**enx.maxonmotor.com**

maxon motor

driven by precision

# ENX 8

## Encoder Ø8 mm, 1…1024 CPT

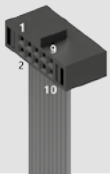
NEW

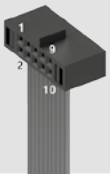
| Key Data | | EASY Incremental Differential | EASY Incremental, Commutation Signal |
|---|---|---|---|
| Number of channels | | 3 | 3 |
| Max. counts per turn | | 1024 | 1024 |
| Encoder length L max. | mm | (integrated into motor) | (integrated into motor) |
| Ambient temperature[2] | °C | -20…100 (-40…100) | -20…100 (-40…100) |
| Weight | g | <4 | <4 |

| Selection criteria | EASY Incremental Differential | EASY Incremental, Commutation Signal |
|---|---|---|
| Speed and rotation direction detection | ■ | ■ |
| Speed and position control | ■ | ■ |
| Compact and robust design | ■ | ■ |
| High resolution | ■ | ■ |
| Cost effective | ■ | ■ |

■ suitable ▲ suitable to a limited extent ● not suitable

| Specifications | | EASY Incremental Differential | EASY Incremental, Commutation Signal |
|---|---|---|---|
| Supply voltage Vcc | V | 5 ±0.5 | 5 ±0.5 |
| Max. operating frequency | kHz | 500 | 500 |
| Max. Speed | rpm | 80000 | 80000 |
| Connector[3] | | 10-pin 1.27 mm multipoint connector<br>e.g. Samtec FTSH series<br>Pin 1: Do not connect (BiSS-C Data)<br>Pin 2: $V_{CC}$ 4.5…5.5<br>Pin 3: GND<br>Pin 4: Do not connect (BiSS-C CLK)<br>Pin 5: Channel $\overline{A}$<br>Pin 6: Channel A<br>Pin 7: Channel $\overline{B}$<br>Pin 8: Channel B<br>Pin 9: Channel $\overline{I}$<br>Pin 10: Channel I<br>Output signal: EIA-Standard RS 422<br>Output current per channel: ± 20 mA | 10-pin 1.27 mm multipoint connector<br>e.g. Samtec FTSH series<br>Pin 1: Do not connect (BiSS-C Data)<br>Pin 2: $V_{CC}$ 4.5…5.5<br>Pin 3: GND<br>Pin 4: Do not connect (BiSS-C CLK)<br>Pin 5: H1<br>Pin 6: Channel A<br>Pin 7: H2<br>Pin 8: Channel B<br>Pin 9: H3<br>Pin 10: Channel I<br>Output signal: CMOS compatible<br>Output current per channel: + 20 mA |

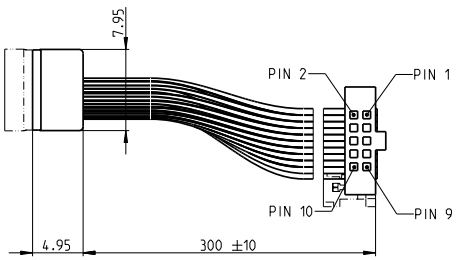



| Configuration | | EASY Incremental Differential | EASY Incremental, Commutation Signal |
|---|---|---|---|
| Counts per turn[1] | | 1…128, 256, 512, 1024 | 1…128, 256, 512, 1024 |
| Cable length | mm | 50, 100, 150, 200, 250, 300 | 50, 100, 150, 200, 250, 300 |
| Cable insulation[2] | | PVC/PO/FEP | PVC/PO/FEP |
| Alignment of cable outlet in relation to motor flange | ° | axial | axial |

| maxon Modular System | Page |
|---|---|
| **maxon EC motor** | |
| ECX 8 | 28 |

**Dimensions Standard Version** M 3:4




**Notes**

[1] maxon controllers require a resolution of at least 16 counts per turn and commutation signals.
[2] For PVC-cable (-20…100°C)
For PO- and FEP cable (-40…100°C)
[3] H1, index and angle zero are aligned with angle commutation zero (see p. 32).

Adapter Micromotor (Art.-Nr. 498157) required for all maxon controllers.

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# ENX 8 Absolute

Encoder Ø8 mm, 4096 steps

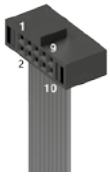
NEW

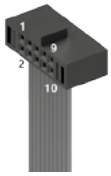
| Key Data | | EASY Absolute | EASY Absolute, Commutation Signal |
|---|---|---|---|
| Steps per turn | | 4096 | 4096 |
| Resolution (bit single turn) | | 12 | 12 |
| Encoder length L max. | mm | (integrated into motor) | (integrated into motor) |
| Ambient temperature[1] | °C | -20…100 (-40…100) | -20…100 (-40…100) |
| Weight | g | <4 | <4 |

| Selection criteria | EASY Absolute | EASY Absolute, Commutation Signal |
|---|---|---|
| Speed and rotation direction detection | ■ | ■ |
| Speed and position control | ■ | ■ |
| Compact and robust design | ■ | ■ |
| High resolution | ■ | ■ |
| Cost effective | ■ | ■ |

■ suitable ▲ suitable to a limited extent ● not suitable

| Specifications | | EASY Absolute | EASY Absolute, Commutation Signal |
|---|---|---|---|
| Supply voltage Vcc | V | 5 ±0.5 | 5 ±0.5 |
| Max. operating frequency | kHz | 80000 | 80000 |
| Connector[2] | | 10-pin 1.27 mm multipoint connector<br>e.g. Samtec FTSH series<br>Pin 1: Data<br>Pin 2: $V_{CC}$ 4.5…5.5<br>Pin 3: GND<br>Pin 4: CLK<br>Pin 5: Do not connect ($\overline{A}$)<br>Pin 6: Do not connect (A)<br>Pin 7: Do not connect ($\overline{B}$)<br>Pin 8: Do not connect (B)<br>Pin 9: Do not connect ($\overline{I}$)<br>Pin 10: Do not connect (I)<br>Output signal: EIA-Standard RS 422<br>Output current per channel: ± 20 mA | 10-pin 1.27 mm multipoint connector<br>e.g. Samtec FTSH series<br>Pin 1: Data<br>Pin 2: $V_{CC}$ 4.5…5.5<br>Pin 3: GND<br>Pin 4: CLK<br>Pin 5: H1<br>Pin 6: Do not connect (A)<br>Pin 7: H2<br>Pin 8: Do not connect (B)<br>Pin 9: H3<br>Pin 10: Do not connect (I)<br>Output signal: CMOS compatible<br>Output current per channel: + 20 mA |

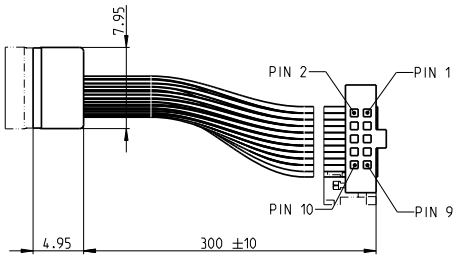



| Configuration | | EASY Absolute | EASY Absolute, Commutation Signal |
|---|---|---|---|
| Signal protocol | | BiSS-C, SSI | BiSS-C, SSI |
| Cable length | mm | 50, 100, 150, 200, 250, 300 | 50, 100, 150, 200, 250, 300 |
| Cable insulation[1] | | PVC/PO/FEP | PVC/PO/FEP |
| Alignment of cable outlet in relation to motor flange | ° | axial | axial |

| maxon Modular System | Page |
|---|---|
| **maxon EC motor** | |
| ECX 8 | 28 |

**Dimensions Standard Version** M 3:4




**Notes**

[1] For PVC-cable (-20…100°C)
For PO- and FEP cable (-40…100°C)
[2] H1, index and angle zero are aligned with angle commutation zero (see p. 32).

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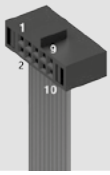
# ENX 10
## Encoder Ø10 mm

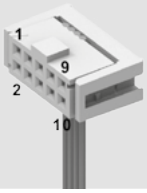
| Key Data | | EASY | QUAD |
|---|---|---|---|
| Number of channels | | 3 | 2 |
| Max. counts per turn | | 1024 | 1 |
| Encoder length L max. | mm | 8.5 | 9 |
| Ambient temperature | °C | -40 ... +100 | -40 ... +100 |
| Weight | g | <5 | <5 |

| Selection criteria | EASY | QUAD |
|---|---|---|
| Speed and rotation direction detection | ■ | ■ |
| Speed and position control | ■ | ▲ |
| Compact and robust design | ■ | ■ |
| High resolution | ■ | ● |
| Cost effective | ■ | ■ |

■ suitable ▲ suitable to a limited extent ● not suitable

| Specifications | | EASY | QUAD |
|---|---|---|---|
| Supply voltage Vcc | V | 5 ±0.5 | 5 ±0.5 |
| Max. operating frequency | kHz | 500 | 2 |
| Max. Speed | rpm | 30000 | 30000 |
| Connector | | 10-pin 1.27 mm multipoint connector<br>e.g. Samtec FTSH series<br><br>Pin 1: Do not connect[1]<br>Pin 2: $V_{CC}$<br>Pin 3: GND<br>Pin 4: Do not connect[1]<br>Pin 5: Channel $\overline{A}$<br>Pin 6: Channel A<br>Pin 7: Channel $\overline{B}$<br>Pin 8: Channel B<br>Pin 9: Channel $\overline{I}$<br>Pin 10: Channel I | 10-pin 2.54 mm multipoint connector[3]<br>(IEC/EN 60603-1-DIN41651)<br><br>Pin 1: Not connected<br>Pin 2: $V_{CC}$<br>Pin 3: Channel A<br>Pin 4: Channel B<br>Pin 5: GND<br>Pin 6: Not connected<br>Pin 7: Not connected<br>Pin 8: Not connected<br>Pin 9: Not connected<br>Pin 10: Not connected |

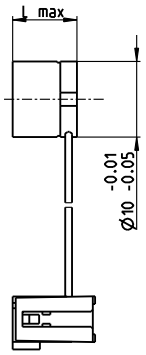



| Configuration | | EASY | QUAD |
|---|---|---|---|
| Counts per turn[2] | | 1 ... 1024 | 1 |
| Cable length | mm | 50, 100, 150, 200, 300, 500, 1000 | 50, 100, 150, 200, 300, 500, 1000 |
| Alignment of cable outlet in relation to motor flange | ° | 15 | 15 |

| maxon Modular System | | Page |
|---|---|---|
| **maxon DC motor** | | |
| DCX 10 S | EASY, QUAD | 12 |
| DCX 10 L | EASY, QUAD | 13 |
| DCX 12 S | EASY, QUAD | 14 |
| DCX 12 L | EASY, QUAD | 15 |
| DCX 14 L | EASY, QUAD | 16–17 |
| DCX 16 S | EASY, QUAD | 18–19 |
| DCX 16 L | EASY, QUAD | 20–21 |
| DCX 19 S | QUAD | 22–23 |
| DCX 22 S | QUAD | 24–25 |
| DCX 22 L | QUAD | 26–27 |
| DCX 26 L | QUAD | 28–29 |
| DCX 32 L | QUAD | 30 |
| DCX 35 L | QUAD | 31 |
| DC-max 16 S | EASY, QUAD | 34–35 |
| DC-max 22 S | EASY, QUAD | 36–37 |

**Dimensions Standard Configuration** M 1:1




**Notes**

[1] Applying voltage to these pins can destroy the encoder.
[2] maxon controllers require a resolution of at least 16 counts per turn.
[3] Option: 6-pol 2.54 mm pin header.

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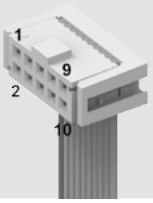
# ENX 16
## Encoder Ø16 mm

| Key Data | | EASY |
|---|---|---|
| Number of channels | | 3 |
| Max. counts per turn | | 1024 |
| Encoder length L max. | mm | 8.5 |
| Ambient temperature | °C | -40 ... +100 |
| Weight | g | 7 |

| Selection criteria | EASY |
|---|---|
| Speed and rotation direction detection | ■ |
| Speed and position control | ■ |
| Compact and robust design | ■ |
| High resolution | ■ |
| Cost effective | ■ |

■ suitable ▲ suitable to a limited extent ● not suitable

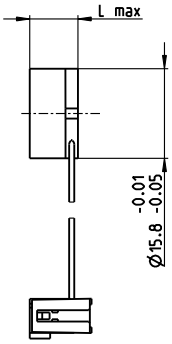
| Specifications | | EASY |
|---|---|---|
| Supply voltage Vcc | V | 5 ±0.5 |
| Max. operating frequency | kHz | 500 |
| Max. Speed | rpm | 30000 |
| Connector | | 10-pin 2.54 mm multipoint connector<br>(IEC/EN 60603-1-DIN41651)<br>Pin 1: N.C.<br>Pin 2: $V_{CC}$<br>Pin 3: GND<br>Pin 4: N.C.<br>Pin 5: Channel $\overline{A}$<br>Pin 6: Channel A<br>Pin 7: Channel $\overline{B}$<br>Pin 8: Channel B<br>Pin 9: Channel $\overline{I}$<br>Pin 10: Channel I |




| Configuration | | EASY |
|---|---|---|
| Counts per turn[1] | | 1 ... 1024 |
| Cable length | mm | 50, 100, 150, 200, 300, 500, 1000 |
| Alignment of cable outlet in relation to motor flange | ° | 15 |

| maxon Modular System | Page |
|---|---|
| **maxon DC motor** | |
| DCX 16 S | 18–19 |
| DCX 16 L | 20–21 |
| DCX 19 S | 22–23 |
| DCX 22 S | 24–25 |
| DCX 22 L | 26–27 |
| DCX 26 L | 28–29 |
| DCX 32 L | 30 |
| DCX 35 L | 31 |

**Dimensions Standard Version** M 3:4




**Notes**

[1] maxon controllers require a resolution of at least 16 counts per turn.

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# ENX 16 Absolute

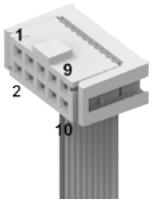
Encoder Ø16 mm

| Key Data | | EASY Absolute |
|---|---|---|
| Steps per turn | | 4096 |
| Resolution (bit single turn) | | 12 |
| Encoder length L max. | mm | 8.5 |
| Ambient temperature | °C | -40 ... +100 |
| Weight | g | 7 |

| Selection criteria | EASY Absolute |
|---|---|
| Speed and rotation direction detection | ■ |
| Speed and position control | ■ |
| Compact and robust design | ■ |
| High resolution | ■ |
| Cost effective | ■ |

■ suitable ▲ suitable to a limited extent ● not suitable

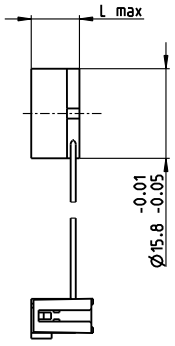
| Specifications | | EASY Absolute |
|---|---|---|
| Supply voltage Vcc | V | 5 ±0.5 |
| Max. Speed | rpm | 30000 |
| Connector | | 10-pin 2.54 mm multipoint connector<br>(IEC/EN 60603-1-DIN41651)<br>Pin 1: Data<br>Pin 2: $V_{CC}$<br>Pin 3: GND<br>Pin 4: CLK<br>Pin 5: Do not connect ($\overline{A}$)<br>Pin 6: Do not connect (A)<br>Pin 7: Do not connect ($\overline{B}$)<br>Pin 8: Do not connect (B)<br>Pin 9: Do not connect ($\overline{I}$)<br>Pin 10: Do not connect (I) |




| Configuration | | EASY Absolute |
|---|---|---|
| Signal protocol | | BiSS-C, SSI |
| Cable length | mm | 50, 100, 150, 200, 300, 500, 1000 |
| Alignment of cable outlet in relation to motor flange | ° | 15 |

| maxon Modular System | Page |
|---|---|
| **maxon DC motor** | |
| DCX 16 S | 18–19 |
| DCX 16 L | 20–21 |
| DCX 19 S | 22–23 |
| DCX 22 S | 24–25 |
| DCX 22 L | 26–27 |
| DCX 26 L | 28–29 |
| DCX 32 L | 30 |
| DCX 35 L | 31 |

**Dimensions Standard Version** M 3:4




**Notes**

Adapter EASY Absolute (Part number 488167) required for all maxon controllers.

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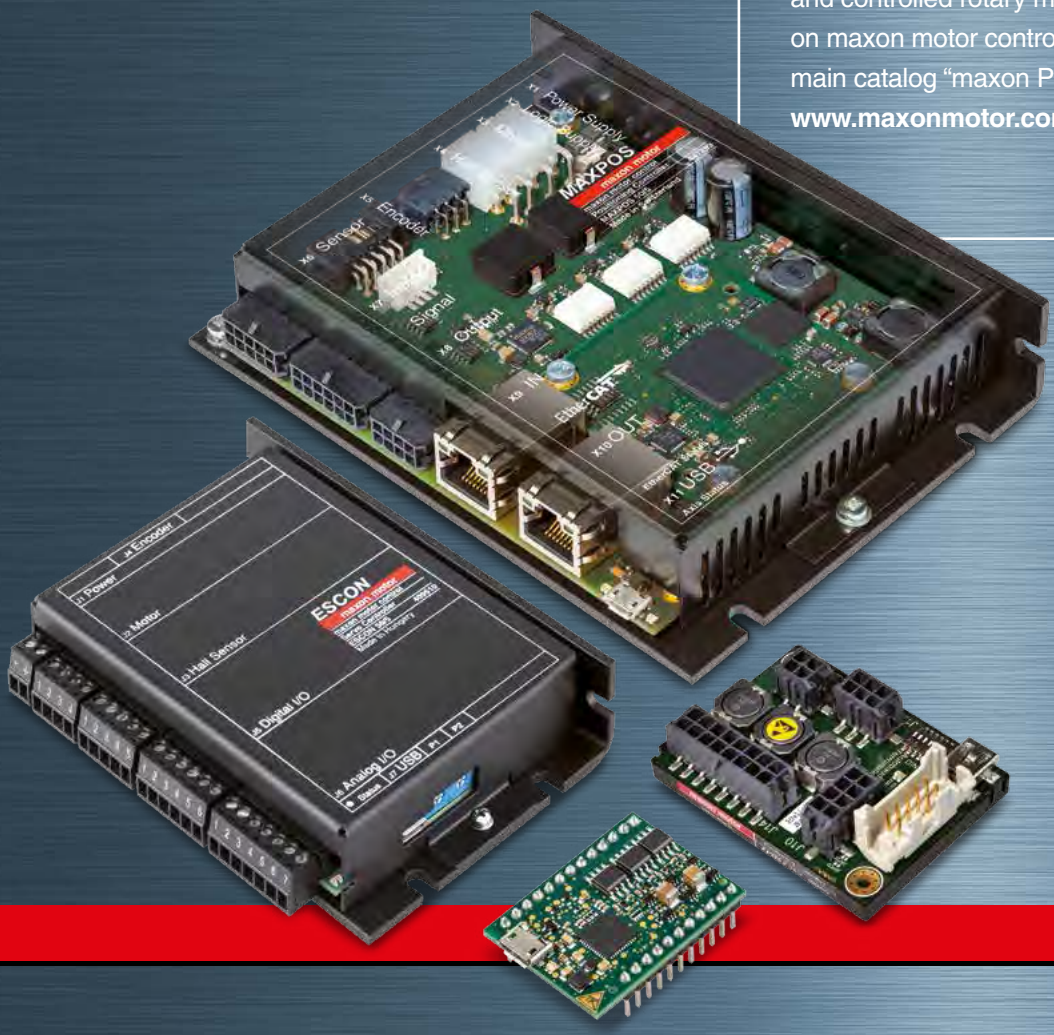
# maxon motor control

## Electronics

## maxon motor control

These control electronics have been designed for optimum compatibility with maxon motors.
A range of 4-quadrant servo amplifiers and position controllers cover all requirements related to power, speed precision, positioning accuracy and controlled rotary motion. More information on maxon motor control can be found in our main catalog “maxon Program”, as well as at **www.maxonmotor.com.**




maxon motor

driven by precision

# ESCON Servo Controller

The ESCON servo controllers are compact, powerful 4-quadrant PWM servo controllers for efficient control of permanent magnet-activated DC motors. The available operating modes – speed controller (closed loop), speed controller (open loop) and current controller – satisfy the most demanding requirements. The ESCON servo controllers are designed to be controlled using an analog set value.

| ESCON Servokontroller | Beschreibung |
|---|---|
| ESCON Module 24/2 | For DC and EC motors up to 48 W |
| ESCON 36/2 DC | For DC motors up to 72 W |
| ESCON 36/3 EC | For EC motors up to 97 W |
| ESCON Module 50/4 EC-S | For sensorless EC motors up to 200 W |
| ESCON Module 50/5 | For DC and EC motors up to 250 W |
| ESCON 50/5 | For DC and EC motors up to 250 W |
| ESCON 70/10 | For DC and EC motors up to 700 W |

# 1-Q-EC Amplifier

The basic function of EC motors electronics is the electronic commutation of the motor winding. Simple speed controls are possible with Hall sensors. A further distinction is made between open or closed loop speed control. 1-Q amplifier functions in motor operation. Direction reverse via digital signal.

| 1-Q-EC Amplifier | Description |
|---|---|
| DEC Module 24/2 | For EC motors up to 48 W |
| DEC Module 50/5 | For EC motors up to 250 W |

# EPOS2 P Programmable Positioning Controller

EPOS2 P is a freely programmable positioning controller with an integrated power stage, based on the EPOS2 slave version. It is suitable for brushless and brush DC motors with incremental encoder and up to 120 watt output.

| EPOS2 P Programmable Positioning Controller | Description |
|---|---|
| EPOS2 P 24/5 | For DC and EC motors bis 120 W |
| | |

# EPOS2 Positioning Control Units

If a drive system's control requirements go beyond just speed and torque controls and if repeated positioning processes are required in complex paths of motion, positioning controls can be used. The EPOS2 (Easy to use Positioning System) provides a modular product range for DC and EC motors.

| EPOS2 Positioning Control Units | Description |
|---|---|
| EPOS2 24/2 (DC/EC) | For DC and EC motors up to 48 W |
| EPOS2 Module 36/2 | For DC and EC motors up to 72 W |
| EPOS2 24/5 | For DC and EC motors up to 120 W |
| EPOS2 50/5 | For DC and EC motors up to 250 W |
| EPOS2 70/10 | For DC and EC motors up to 700 W |

# MAXPOS Positioning Control Unit

The MAXPOS 50/5 is a motion controller for highly dynamic applications and receives motion and I/O commands from the higher-level EtherCAT master controlling the process.

| MAXPOS Positioning Control Unit | Beschreibung |
|---|---|
| MAXPOS 50/5 | For DC- and EC motors up to 250 W |
| | |

**More information: www.maxonmotor.com**

# When it really matters.

## maxon motor – Precise drives ince 1961.

More than 50 years of experience, nonstop innovation and superior product quality combine with outstanding customer service and sales offices in over 40 countries to make maxon motor a most reliable partner in drive technology. Your specific needs determine our way of doing business: individual, customized drive solutions are our greatest strength. The maxon motor range of products, manufactured by using our unique modular system, is comprehensive and encompasses:

- Brushless and brushed DC motors with ironless rotors and assigned outputs of up to 500 watts
- Brushless flat motors with iron cores and outputs of up to 100 watts
- Spur and planetary gearheads and customized special gears
- Feedback devices
- Servoamplifiers and positioning control units
- Innovative CIM and MIM components
- Customer-specific drives

maxon motor

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# maxon Markets

**Medical science**
**Industrial automation**
**Instrumentation and Inspection**
**Communication**
**Robotics**
**Security**
**Automotive**
**Aerospace**
**Consumer applications**

# maxon drives set the world in motion.

Precision drives from maxon motor are used in a multitude of application fields. The most famous example comes is from astronautics. NASA's Mars rovers prove that maxon drives can perform their work with absolute reliability, even under the harshest conditions. Therefore, it should come as no surprise that high-precision drive systems from maxon motor are in wide use on Earth.

# Quality assurance.

## Quality with no compromise.

Consistent standards on quality, safety, and procedures ensure that only premium products leave our factories. The business and production processes fulfill international standards such as ISO 9001 and ISO 14001. maxon medical has ISO 13485 certification and products for the aerospace industry have ISO 9100 certification.

# A global network.

Everywhere in the world, maxon motor's sales engineers collaborate with customers to develop tailor-made drive solutions.

- **maxon Manufacturing Companies**
  Switzerland (headquarters), Germany, Hungary, South Korea.

- **maxon Sales Companies**
  Australia, Belgium/Luxembourg, China, Denmark, Germany, Finland, France, Great Britain, India, Italy, Japan, South Korea, the Netherlands, Norway, Austria / Hungary / Slovenia / Romania, Sweden, Switzerland, Spain, Taiwan, Czech Republic / Slovakia / Poland, USA.

- **maxon Sales Agents**
  Brazil, Hong Kong, Israel, Canada, Malaysia, Russia, Singapore, South Africa, Thailand, Turkey.

For detailed contact information please visit **contact.maxonmotor.com**

# maxon motor at a glance.

maxon motor is the worldwide leading provider of high-precision drives and systems up to 500 W. We develop and manufacture brushed and brushless DC motors with a unique ironless core winding as well as motors with iron cores. maxon motor's modular system includes planetary, spur and special gearheads, as well as encoders and control electronics. High-tech CIM and MIM components are manufactured in a specialized facility. maxon motor stands for top quality, innovation, competitive pricing, and a worldwide distribution network. What matters most, however, is the high quality of the customer-specific solution that we create with you and for you.


www.maxonmotor.com

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