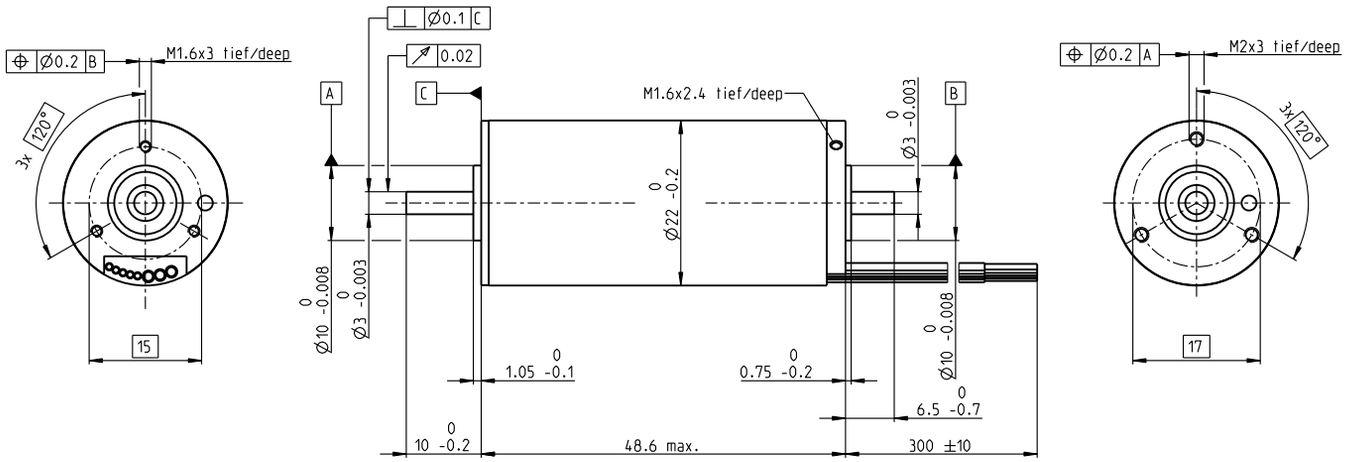
# *EC*-4pole 22 ∅22 mm, brushless, 90 Watt

High Power




**M 1:1**

Stock program
Standard program
Special program (on request)

## Part Numbers

| | | 323217 | 323218 | 323219 | 323220 | 327739 |
|---|---|---|---|---|---|---|
| **Motor Data** | | | | | | |
| | **Values at nominal voltage** | | | | | |
| 1 | Nominal voltage | V | 18 | 24 | 36 | 48 | 48 |
| 2 | No load speed | rpm | 16300 | 16300 | 16300 | 16300 | 6900 |
| 3 | No load current | mA | 221 | 166 | 110 | 82.8 | 21.1 |
| 4 | Nominal speed | rpm | 14900 | 15000 | 14900 | 14900 | 5550 |
| 5 | Nominal torque (max. continuous torque) | mNm | 43.7 | 45.1 | 43.7 | 42.6 | 43.9 |
| 6 | Nominal current (max. continuous current) | A | 4.32 | 3.34 | 2.16 | 1.58 | 0.679 |
| 7 | Stall torque | mNm | 588 | 639 | 612 | 586 | 234 |
| 8 | Stall current | A | 55.8 | 45.5 | 29.1 | 20.9 | 3.55 |
| 9 | Max. efficiency | % | 88 | 89 | 88 | 88 | 85 |
| | **Characteristics** | | | | | | |
| 10 | Terminal resistance phase to phase | Ω | 0.323 | 0.527 | 1.24 | 2.3 | 13.5 |
| 11 | Terminal inductance phase to phase | mH | 0.0283 | 0.0503 | 0.113 | 0.201 | 1.11 |
| 12 | Torque constant | mNm/A | 10.5 | 14 | 21.1 | 28.1 | 66 |
| 13 | Speed constant | rpm/V | 907 | 680 | 453 | 340 | 145 |
| 14 | Speed/torque gradient | rpm/mNm | 27.8 | 25.5 | 26.7 | 27.9 | 29.7 |
| 15 | Mechanical time constant | ms | 1.61 | 1.48 | 1.55 | 1.62 | 1.72 |
| 16 | Rotor inertia | gcm² | 5.54 | 5.54 | 5.54 | 5.54 | 5.54 |

## Specifications

**Thermal data**

| | | |
|---|---|---|
| 17 | Thermal resistance housing-ambient | 12.2 K/W |
| 18 | Thermal resistance winding-housing | 1.19 K/W |
| 19 | Thermal time constant winding | 5.12 s |
| 20 | Thermal time constant motor | 482 s |
| 21 | Ambient temperature | -20…+100°C |
| 22 | Max. winding temperature | +155°C |

**Mechanical data (preloaded ball bearings)**

| | | | |
|---|---|---|---|
| 23 | Max. speed | | 25000 rpm |
| 24 | Axial play at axial load | < 5.0 N | 0 mm |
| | | > 5.0 N | 0.14 mm |
| 25 | Radial play | | preloaded |
| 26 | Max. axial load (dynamic) | | 4 N |
| 27 | Max. force for press fits (static) | | 53 N |
| | (static, shaft supported) | | 1000 N |
| 28 | Max. radial load, 5 mm from flange | | 16 N |

**Other specifications**

| | | |
|---|---|---|
| 29 | Number of pole pairs | 2 |
| 30 | Number of phases | 3 |
| 31 | Weight of motor | 120 g |

Values listed in the table are nominal.

**Connection motor** (Cable AWG 20)

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

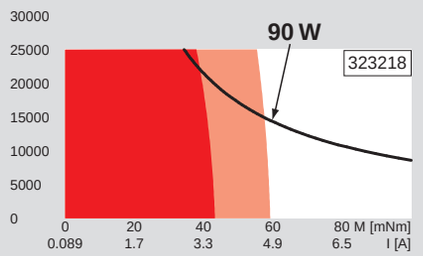
**Connection sensors** (Cable AWG 26)

| | |
|---|---|
| red/grey | Hall sensor 1 |
| black/grey | Hall sensor 2 |
| white/grey | Hall sensor 3 |
| green | $V_{Hall}$ 3…24 VDC |
| blue | GND |

Wiring diagram for Hall sensors see p. 35

## Operating Range

Comments




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

**Assigned power rating**

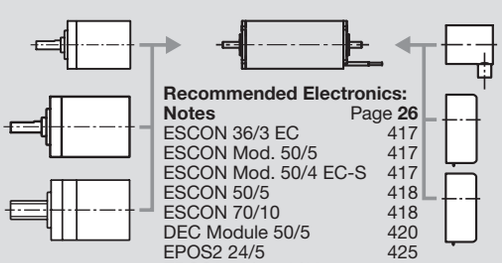
## maxon Modular System

Overview on page 20–27

**Planetary Gearhead**
∅22 mm
2.0 - 3.4 Nm
Page 333

**Planetary Gearhead**
∅32 mm
1.0 - 6.0 Nm
Page 343

**Spindle Drive**
∅32 mm
Page 370–372



**Recommended Electronics:**

| Notes | Page **26** |
|---|---|
| ESCON 36/3 EC | 417 |
| ESCON Mod. 50/5 | 417 |
| ESCON Mod. 50/4 EC-S | 417 |
| ESCON 50/5 | 418 |
| ESCON 70/10 | 418 |
| DEC Module 50/5 | 420 |
| EPOS2 24/5 | 425 |
| EPOS2 50/5, 70/10 | 425 |
| EPOS2 P 24/5 | 428 |
| EPOS4 Module 50/8 | 431 |
| EPOS4 Comp. 50/8 CAN | 431 |
| MAXPOS 50/5 | 435 |

**Encoder SCH16F**
2000 - 3600 CPT,
3 channels
Page 396

**Encoder HEDL 5540**
500 CPT,
3 channels
Page 404

**Encoder AEDL 5810**
1024 - 5000 CPT,
3 channels
Page 407