

consists of:

**Planetary Gearhead GP 52 C Ø52 mm, 4 - 30 Nm, Ceramic Version**

Part number 223081

**EC 90 flat Ø90 mm, brushless, 90 Watt, with Hall sensors**

Part number 244879

**Encoder MILE, 6400 CPT, 2 Channels, with Line Driver RS 422**

Part number 411966

**EPOS4 Module 50/8, digital positioning controller, 8 A, 10 - 50 VDC**

Part number 504384

## Your Contact

maxon motor worldwide

[http://www.maxonmotorusa.com:80/maxon/view/content/contact\\_page](http://www.maxonmotorusa.com:80/maxon/view/content/contact_page)

E-Mail: info@maxonmotor.com

Internet: <http://www.maxonmotorusa.com:80>

retail price:

1-4 Pieces	\$1,237.39
5-19 Pieces	\$1,075.39
20-49 Pieces	\$909.26
from 50 Pieces	On Request

## Terms and conditions

# Planetary Gearhead GP 52 C Ø52 mm, 4 - 30 Nm, Ceramic Version

Part number 223081



## General information

Gearhead type	GP
Outer diameter	52 mm
Version	Ceramic version

## Gearhead Data

Reduction	4.3 : 1
Absolute reduction	13/3
Max. motor shaft diameter	8 mm
Number of stages	1
Max. continuous torque	4 Nm
Max. intermittent torque	6 Nm
Direction of rotation, drive to output	=
Max. efficiency	91 %
Average backlash no load	0.6 °
Mass inertia	12 gcm²
Gearhead length (L1)	49 mm
Max. transmittable power (continuous)	580 W
Max. transmittable power (intermittent)	880 W

## Technical Data

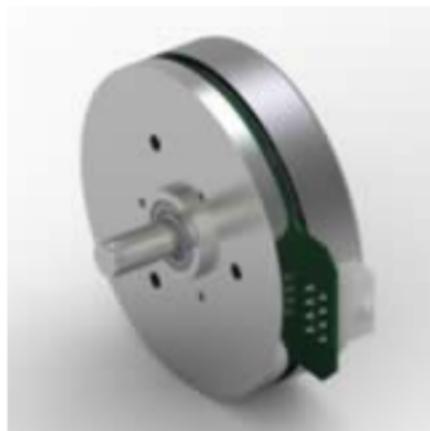
Radial play	max. 0.06 mm, 12 mm from flange
Axial play	0 - 0.3 mm
Max. radial load	420 N, 12 mm from flange
Max. axial load (dynamic)	200 N
Max. force for press fits	500 N
Max. continuous input speed	6000 rpm
Max. intermittent input speed	6000 rpm
Recommended temperature range	-15...+80 °C
Extended temperature range	-40...+100 °C
Number of autoclave cycles	0

## Product

Weight	460 g
--------	-------

# EC 90 flat Ø90 mm, brushless, 90 Watt, with Hall sensors

Part number 244879



## Values at nominal voltage

Nominal voltage	48 V
No load speed	2080 rpm
No load current	134 mA
Nominal speed	1610 rpm
Nominal torque (max. continuous torque)	533 mNm
Nominal current (max. continuous current)	2.27 A
Stall torque	4570 mNm
Stall current	21.1 A
Max. efficiency	85 %

## Characteristics

Terminal resistance	2.28 Ω
Terminal inductance	2.5 mH
Torque constant	217 mNm/A
Speed constant	44 rpm/V
Speed / torque gradient	0.462 rpm/mNm
Mechanical time constant	14.8 ms
Rotor inertia	3060 gcm²

## Thermal data

Thermal resistance housing-ambient	1.91 K/W
Thermal resistance winding-housing	2.6 K/W
Thermal time constant winding	46 s
Thermal time constant motor	283 s
Ambient temperature	-40...+100 °C
Max. winding temperature	+125 °C

## Mechanical data

Bearing type	ball bearings
Max. speed	5000 rpm
Axial play	0.14 mm
Max. axial load (dynamic)	12 N
Max. force for press fits (static) (static, shaft supported)	180 N
Max. radial load	8000 N
	68 N, 5 mm from flange

## Other specifications

Number of pole pairs	12
Number of phases	3
Number of autoclave cycles	0

## Product

Weight	600 g
--------	-------

## Encoder MILE, 6400 CPT, 2 Channels, with Line Driver RS 422

Part number 411966



### General information

Counts per turn	6400
Number of channels	2
Line Driver	AM26C31QD
Max. electrical speed	4650 rpm
Max. mechanical speed	5000 rpm

### Technical Data

Supply voltage Vcc	5.0V &plusmn; 10.0%
Output signal	Incremental
Driver used logic	Differential, EIA RS 422
Output current per channel	-20...20 mA
Signal rise time	20 ns
Measurement condition for signal rise time	CL=120pF, RL=100Ohm
Signal fall time	20 ns
Measurement condition for signal fall time	CL=120pF, RL=100Ohm
Min. state duration	125 ns
Direction of rotation	A before B CW
Typical current draw at standstill	15 mA
Max. moment of inertia of code wheel	65 gcm <sup>2</sup>
Operating temperature	-40...+100 °C

### Product

Weight	10 g
--------	------

# EPOS4 Module 50/8, digital positioning controller, 8 A, 10 - 50 VDC

Part number 504384



## Product

Weight	21 g
--------	------

## Motor

DC motors up to	400 W
EC motors up to	400 W

## Sensor

Without sensor (DC motors)	Yes
Digital incremental encoder (2-channel, single-ended)	Yes
Digital incremental encoder (2-channel, differential)	Yes
Digital incremental encoder (3-channel, differential)	Yes
Digital Hall sensors (EC Motors)	Yes
Absolute encoder (SSI)	Yes

## Operating modes

Current controller	yes (Torque)
Speed controller (closed loop)	Yes
Position controller	Yes

## Electrical data

Operating voltage Vcc (min.)	10 V
Operating voltage Vcc (max.)	50 V
Logic supply voltage Vc (min.) optional	10 V
Logic supply voltage Vc (max.) optional	50 V
Max. output voltage (factor * Vcc )	0.9
Max. output current Imax	30 A
Max. time of peak output current Imax	5 s
Continuous output current Icont	8 A
PWM clock frequency of power stage	50 kHz
Sampling rate PI current controller	25 kHz
Sampling rate PI speed controller	2.5 kHz
Sampling rate PID positioning controller	2.5 kHz
Max. efficiency	98 %
Max. speed (DC)	100000 rpm
Max. speed (EC; 1 pole pair) block commutation	100000 rpm
Max. speed (EC; 1 pole pair) sinusoidal commutation	50000 rpm
Built-in motor choke per phase	2 $\mu$ H

## Inputs

Hall sensor signals	H1, H2, H3
Encoder signals	A, A\, B, B\, I, I\
Max. encoder input frequency	6.2 MHz
Sensor signals	A, A\, B, B\, I, I\, Clock, Clock\, Data, Data\
Digital inputs	8
Functionality of digital inputs	limit switch, reference switch, general purpose
Analog inputs	2
Resolution, range, circuit	12-bit, -10...+10V, differential
Functionality of analog inputs	general purpose

## Outputs

Digital outputs	3
Functionality of digital outputs	holding brake, general purpose
Analog outputs	2
Resolution, range	12-bit, -4...+4V
Functionality of analog outputs	coming soon

## Voltage outputs

Hall sensor supply voltage	see "Sensor supply voltage"
Encoder supply voltage	see "Sensor supply voltage"
Sensor supply voltage	+5 VDC, max. 100 mA
Auxiliary output voltage	+5 VDC, max. 150 mA

## Interface

RS232	yes
USB 2.0 (full speed)	Yes
CAN	Yes
CANopen	Slave
CANopen application layer	CiA 301
CANopen frameworks	CiA 305
CANopen profiles motion control	CiA 402
Gateway function RS232-to-CAN	yes
Gateway function USB-to-CAN	yes
EtherCAT	IEC 61158 Type 12 Slave
CoE (CAN application layer over EtherCAT)	CiA 402
FoE (File transfer over EtherCAT)	coming soon (optional)
Distributed Clocks Support	Yes
Variable PDO mapping	Yes

## Display

Status indicator "Ready"	green LED
Status indicator "Error"	red LED

## Protective functions

Protective functions	current limit, overcurrent, excess temperature, undervoltage, overvoltage, voltage transients, short-circuits in the motor cable, loss of feedback signal
----------------------	---

## Ambient conditions

Temperature – Operation (min.)	-30 °C
Temperature – Operation (max.)	45 °C
Temperature – Extended Range	+45...+77 °C, Derating: -0.250 A/°C
Temperature – Storage (min.)	-40 °C
Temperature – Storage (max.)	85 °C
Humidity (non-condensing) (min.)	5 %
Humidity (non-condensing) (max.)	90 %

## Mechanical data

Weight	21 g
Dimension (length)	59.5 mm
Dimension (width)	46 mm
Dimension (height)	14.1 mm
Mounting	mountable on socket terminal strips pitch 2.54 mm, mounting holes for M2.5 screws

## Software

Installation program	EPOS Setup
Graphical User Interface	EPOS Studio
Operating system	Windows 10, 8, 7
Windows DLL for PC	32-/64-bit
PC master	IXXAT, Vector, National Instruments, Kvaser
Programming examples	MS Visual C#, MS Visual C++, MS Visual Basic, MS Visual Basic.NET, Borland C++, Borland Delphi, NI LabView, NI LabWindows/CVI
Linux Shared Object Library	X86 32-/64-bit, ARMv7/v8 32-bit
CAN Interfaces	IXXAT, Kvaser
Programming example	C++

## Functions

CANopen Profile Position Mode	Yes
CANopen Profile Velocity Mode	Yes
CANopen Homing Mode	Yes

CANopen Cyclic Synchronous Position	Yes
CANopen Cyclic Synchronous Torque	Yes
Position Control Feed Forward	Yes
Velocity Control (Feed Forward)	Yes
Quickstop	Yes
Enable	Yes
Control of holding brakes	Yes
STO (Safe Torque Off)	based on IEC61800-5-2
Advanced automatic control settings	Yes