EPOS2 Positioning Control Units Summary

Online commanded

EPOS2 24/2
- Several device variations allows the operation of various maxon DC and EC micromotors of up to 48 watts
- Point to point control (1 axis)
- Interpolated Position Mode (PVT)
- Combination of several drives via CAN Bus
- CANopen
- 6 digital inputs
- 2 digital outputs
- 2 analog inputs
- Miniaturised module design

Details pages 310–312

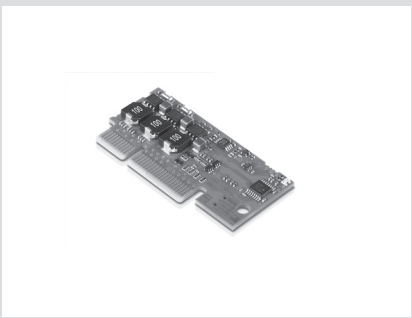
Slave version (online commanded) using CAN Master (EPOS2 P, PC, PLC, SoftPLC, etc.) or PC via USB or RS232 interface

Typical applications:
- Small apparatus/appliances
- System automation tasks
- Drive technology

Article numbers

EPOS2 24/2	**380264, 390003 390438**

Online commanded



EPOS2 Module 36/2
- DC and EC motors up to 72 W
- Point to point control unit (1 axis)
- Interpolated Position Mode (PVT)
- Combination of several drives via CAN Bus
- CANopen
- 6 digital inputs
- 3 digital outputs
- 2 analog inputs
- Miniaturized open electronics board (OEM)

Details pages 310–312

Slave version (online commanding) using CAN Master (EPOS2 P, PC, PLC, SoftPLC, µ-Prozessor, etc.) or PC via USB *) or RS232 interface

*) requires external transceiver

Typical applications:
- Small apparatus/appliances
- System automation tasks
- OEM customer

Article numbers

EPOS2 Module 36/2	**360665**

Online commanded

EPOS2 24/5
- DC and EC motors up to 120 W
- Point to point control unit (1 axis)
- Interpolated Position Mode (PVT)
- Combination of several drives via CAN Bus
- CANopen
- 6 digital inputs
- 4 digital outputs
- 2 analog inputs
- Compact module design

Details pages 310–313

Slave version (online commanding) using CAN Master (EPOS2 P, PC, PLC, SoftPLC, etc.) or PC via USB or RS232 interface

Typical applications:
- Tool building
- Production equipment
- System automation tasks

Article numbers

EPOS2 24/5	**367676**

Online commanded

EPOS2 50/5
- DC and EC motors up to 250 W
- Point to point control unit (1 axis)
- Interpolated Position Mode (PVT)
- Combination of several drives via CAN Bus
- CANopen
- 11 digital inputs
- 5 digital outputs
- 2 analog inputs
- 1 analog output
- Compact module design

Details pages 310–313

Slave version (online commanding) using CAN Master (EPOS2 P, PC, PLC, SoftPLC, etc.) or PC via USB or RS232 interface

Typical applications:
- Tool building
- Production equipment
- System automation tasks

Article numbers

EPOS2 50/5	**347717**

Online commanded

EPOS2 70/10
- DC and EC motors up to 700 W
- Point to point control unit (1 axis)
- Interpolated Position Mode (PVT)
- Combination of several drives via CAN Bus
- CANopen
- 10 digital inputs
- 5 digital outputs
- 2 analog inputs (12-bit ADC, differential)
- Robust design

Details pages 310–313

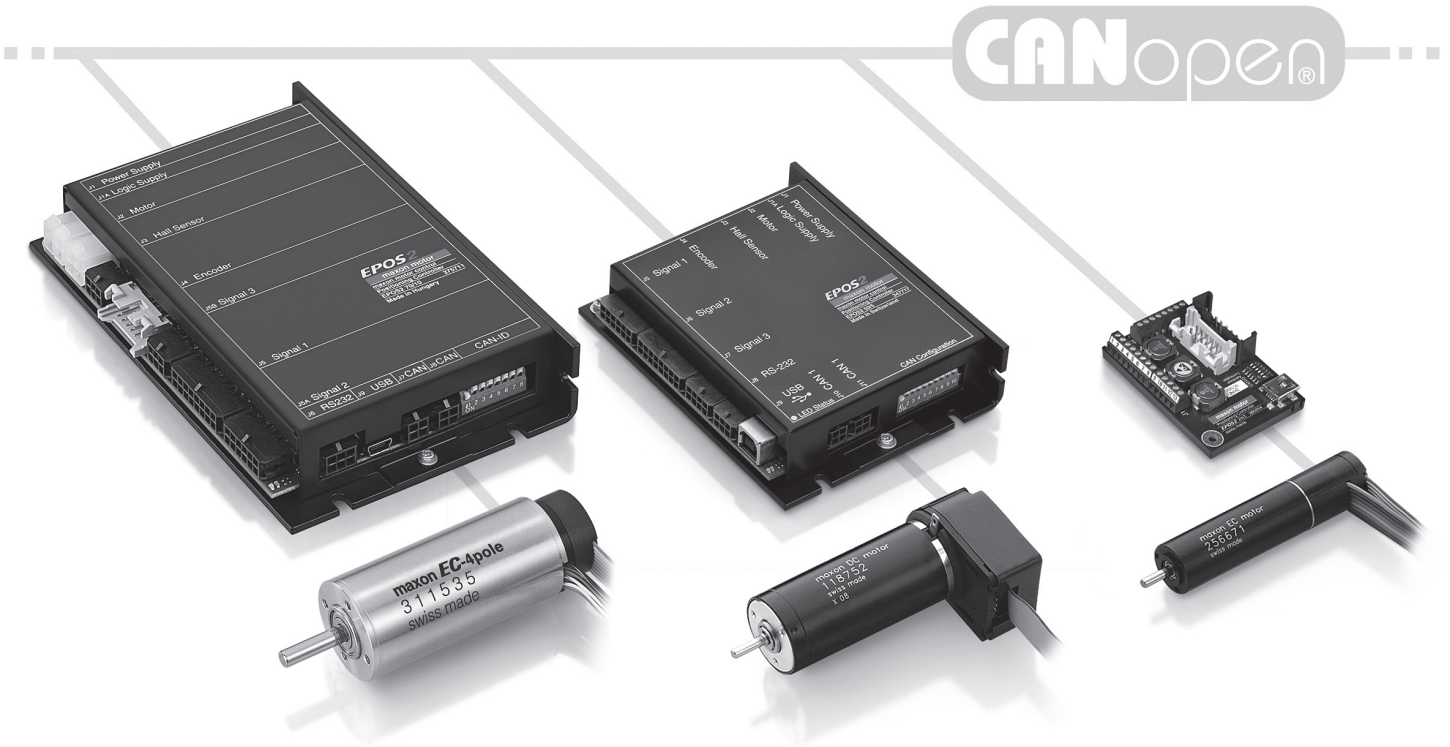
Slave version (online commanding) using CAN Master (EPOS2 P, PC, PLC, SoftPLC, etc.) or PC via USB or RS232 interface

Typical applications:
- Production equipment
- System automation tasks
- Plant construction

Article numbers

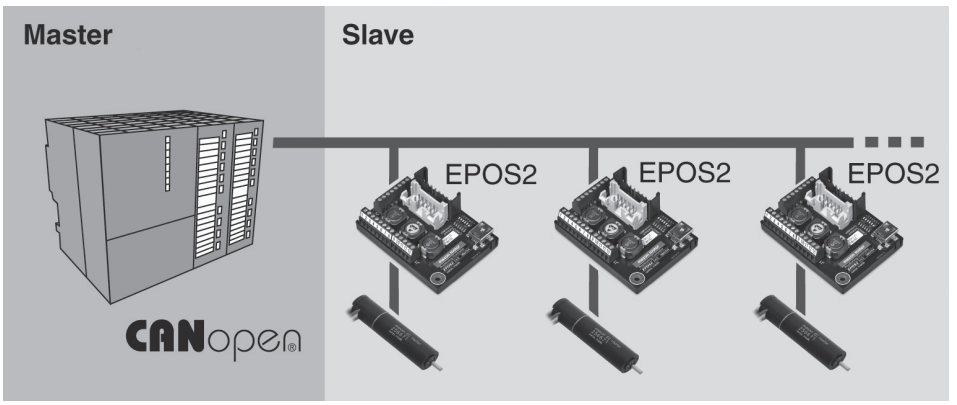
EPOS2 70/10	**375711**

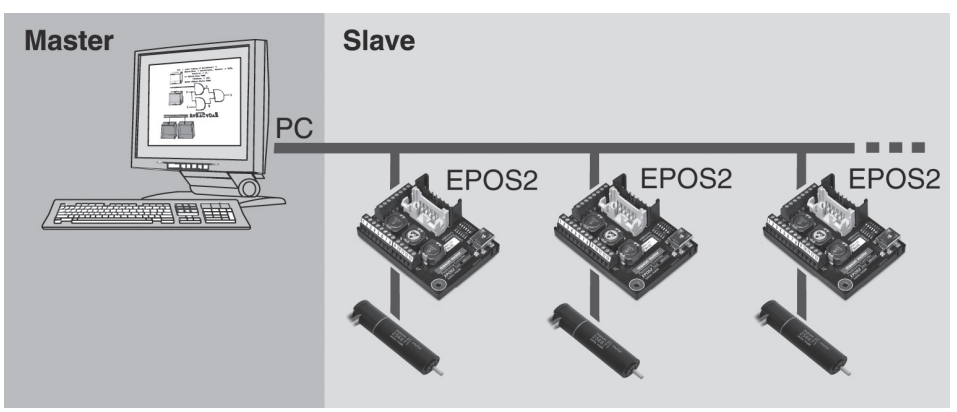
EPOS2 Positioning Control Units



Slave version (online commanded)

Single motion and I/O commands from the process control are transmitted to the positioning control unit by a superior system (Master). For that purpose product specific commands are available.





EPOS2 is a modular constructed digital positioning controller. It is suitable for DC and EC motors with incremental encoder with a power range from 1 - 700 watts.
A number of operating modes provides flexible application in a wide range of drive systems in automation technology and mechatronics.

Point to point
The “CANopen Profile Position Mode” move the position of the motor axis from point A to point B. Positioning is in relation to the axis Home position (absolute) or the actual axis position (relative).

Interpolated Position Mode (PVT)
Thanks to Interpolated Position Mode, the EPOS2 is able to synchronously run a path specified by interpolating points. With a suitable master, coordinated multi-axis movements as well as any profile in a 1-axis system can be carried out. (PVT = Position and Velocity versus Time)

Position and Speed control with Feed Forward
The combination of feedback and feed forward control provides ideal motion behaviour. Feed forward control reduces control error. EPOS2 supports feed forward acceleration and speed control.

Speed control
In “CANopen Profile Velocity Mode”, the motor axis is moved with a set speed. The motor axis retains speed until a new speed is set.

Torque control
In “Current Mode”, a controlled torque can be produced on the motor shaft. The sinusoidal commutation used produces minimum torque ripple.

Homing
The “CANopen Homing Mode” is for referencing to a special mechanical position. There are more than 30 methods available for finding the reference position.

Electronic gearhead
In “Master Encoder Mode”, the motor follows a reference input produced by an external encoder. A gearing factor can also be defined using software parameters. Two motors can be very easily synchronised using this method.

Step/Direction
In “Step/Direction Mode” the motor axis follows a digital signal step-by-step. This mode can replace stepper motors. It can also be used to control the EPOS2 by a PLC without CAN interface.

Analog Commands
In the position, speed and current mode it is possible to give commands via an external analog set value. This function offers further possibilities to operate the EPOS2 without serial on-line commanding.

Capture inputs (Position Marker)
Digital inputs can be configured so that the actual position value is saved when a positive and/or negative edge of an input appears.

Trigger output (Position Compare)
Digital outputs can be configured so that a digital signal is emitted at a set position value.

Dual Loop Position and Speed Control
With an additional sensor the load can be controlled directly and with high precision; the motor control is subordinated. The mechanical play and the elasticity can be compensated.
Wide range of sensors can be handled: digital incremental encoder, SSI absolute encoder, analog incremental encoder (sin/cos). (Only in use with EPOS2 50/5 and EPOS2 70/10.)

Control of Holding Brakes
The control of the holding brake can be implemented in the device state management. There the delay times can be individually configured for switching on and off.

Additional information for technical data of page 312/313

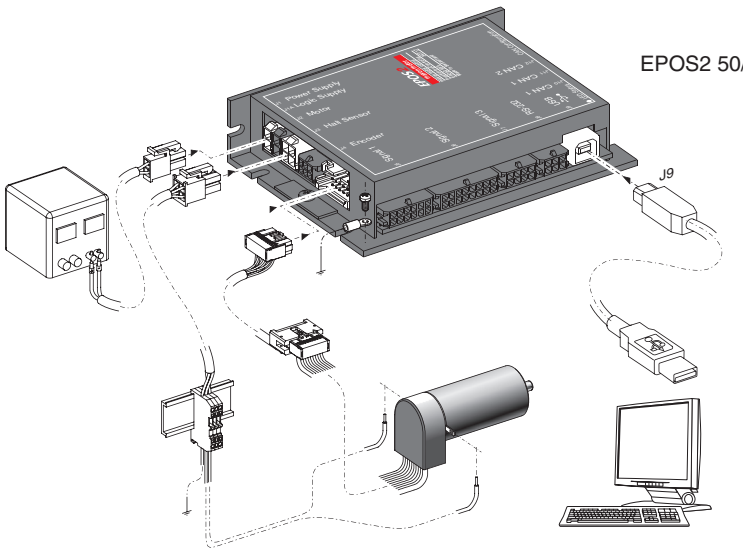
Standardised, extendable
CANopen standard CiA DS-301, DSP-402 and DSP-305. Can easily be integrated into existing CANopen systems. Networks with other CANopen modules. Alternatively controllable by serial interface (USB and RS232).

Flexible, modular
The same technology for DC and EC motors. Configurable inputs and outputs for limit switches, reference switches, brakes and for other sensors and indicators near the drive.

Easy start-up procedure
Graphic user interface with many functions and wizards for start-up procedure, automatic control settings, I/O configuration, tests.

Easy programming
Numerous IEC 61131-3 libraries free available for CAN-Master units of several PLC manufacturers providers (Beckhoff, Siemens/Helmholz, VIPA) and 32-/64-bit Windows-DLLs for PC Master (IXXAT, Vector and National Instruments). Various programming examples free available for MS Visual C#, MS Visual C++, MS Visual Basic, Borland C++, Borland Delphi, National Instruments LabVIEW and National Instruments LabWindows/CVI.
Also available is the 32-bit Linux Shared Object Library with the programming example for Eclipse C++/QT. In addition, the integration of the EPOS2 into the National Instruments Compact Rio System is easy to handle thanks to the available maxon library for NI SoftMotion.

State-of-the-art
Digital position, speed and current/torque control. Sinusoidal commutation for smooth operation of EC motors.

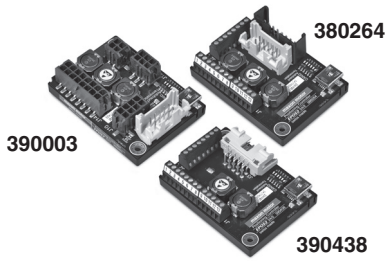


EPOS2 50/5

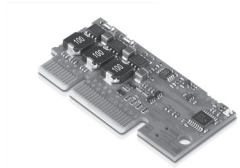
Operating modes
CANopen Profile Position-, Profile Velocity- and Homing Mode
Position, Velocity and Current Mode
Alternative set value setting via Step/Direction, Master Encoder or external analog commanding
Path generating with trapezoidal or sinusoidal profiles
Feed forward for velocity and acceleration
Interpolated Position Mode (PVT)
Sinusoidal or block commutation for EC motors
Dual loop position and speed controller
Communication
Communication via CANopen and/or USB 2.0 and/or RS232
Gateway function USB-to-CAN and RS232-to-CAN

Inputs/Outputs
Free configurable digital inputs e.g. for limit switches and reference switches
Free configurable digital outputs e.g. for holding brakes
Free analog inputs
Available software
EPOS Studio
Windows DLL
IEC 61131-3 Libraries
Firmware
Available documentation
Getting Started
Cable Starting Set
Hardware Reference
Firmware Specification
Communication Guide
Application Notes
Cable
A comprehensive range of cables is available as an option. Details can be found on page 321.

EPOS2 Positioning control unit Data



EPOS2 24/2
Matched with DC brush motors with encoder or brushless EC motors with Hall sensors and encoder up to 48 watts.



EPOS2 Module 36/2
The EPOS2 is an OEM positioning controller plug-in module for brushed DC motors with encoder or brushless EC motors with Hall sensors and encoder up to 72 watts.

Controller versions		
	Slave version	**Slave version**
Electrical Data		
Operating voltage V_{CC}	9 - 24 VDC	11 - 36 VDC (optional 0 - 36 VDC)
Logic supply voltage V_C (optional)		11 - 36 VDC (optional 5.0 VDC)
Max. output voltage	0.9 x V_{CC}	0.9 x V_{CC}
Max. output current I_{max} (<1 s)	4 A	4 A
Continuous output current I_{cont}	2 A	2 A
Switching frequency of power stage	100 kHz	50 kHz
Sample rate of PI - current controller	10 kHz	10 kHz
Sample rate of PI - speed controller	1 kHz	1 kHz
Sample rate of PID - positioning control	1 kHz	1 kHz
Max. speed (1 pole pair)	25 000 rpm (sinusoidal); 100 000 rpm (block)	25 000 rpm (sinusoidal); 100 000 rpm (block)
Built-in motor choke per phase	47 µH / 2 A	10 µH / 2 A
Input		
Hall sensor signals	H1, H2, H3	H1, H2, H3
Encoder signals	A, A\, B, B\, I, I\ (max. 5 MHz)	A, A\, B, B\, I, I\ (max. 5 MHz)
Digital inputs	6 (TTL level)	6 (TTL level)
Analog inputs	2 12-bit resolution, 0…+5 V	2 11-bit resolution, 0…+5 V
CAN-ID (CAN node identification)	configurable with DIP switch 1…4	set by external wiring
Output		
Digital outputs	2	3
Analog outputs		
Encoder voltage output	+5 VDC, max. 100 mA	+5 VDC, max. 100 mA
Hall sensor voltage output	+5 VDC, max. 30 mA	+5 VDC, max. 30 mA
Auxiliary voltage output	+5 VDC, max. 10 mA	
Interface		
RS232	RxD; TxD (max. 115 200 bit/s)	RxD; TxD (max. 115 200 bit/s)
CAN	high; low (max. 1 Mbit/s)	high; low (max. 1 Mbit/s)
USB 2.0	Data+; Data- (max. 12 Mbit/s)	external USB transceiver required
Indicator		
LED green = READY, red = ERROR	green LED, red LED	green LED, red LED
Ambient temperature and humidity range		
Operation	-10…+45°C	-10…+45°C
Storage	-40…+85°C	-40…+85°C
No condensation	20…80%	20…80%
Mechanical data		
Weight	Approx. 30 g	Approx. 10 g
Dimensions (L x W x H)	55 x 40 x 19.6 mm	54.5 x 28.2 x 9 mm
Mounting threads	Flange for M2.5-screws	PCB edge connector with locking mechanism
Article numbers		
	390438 EPOS2 24/2 for DC motors **380264** EPOS2 24/2 for EC motors **390003** EPOS2 24/2 for DC/EC motors	**360665** EPOS2 Module 36/2
Accessories		
	309687 DSR 50/5 Shunt regulator	**363407** EPOS2 Module Starter-Kit
	Order accessories separately, see page 321	Order accessories separately, see page 321