

EPOS2 Positioning Controllers Summary

Online commanded



EPOS2 24/2

- Several device variations allows the operation of various maxon DC and EC micromotors 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
- Miniaturized design

Details pages 458–460

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

Part Numbers

EPOS2 24/2 **380264, 390003**
 390438, 530239

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 458–460

Slave version (online commanding) using CAN Master (EPOS2 P, PC, PLC, SoftPLC, μ -Processor, etc.) or PC via USB ¹⁾ or RS232 interface ¹⁾ requires external transceiver

Typical applications:

- Small apparatus/appliances
- System automation tasks
- OEM customers

Part Number

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 design

Details pages 458–461

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

Part Number

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 design

Details pages 458–461

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

Part Number

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
- Robust design

Details pages 458–461

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

Part Number

EPOS2 70/10 **375711**

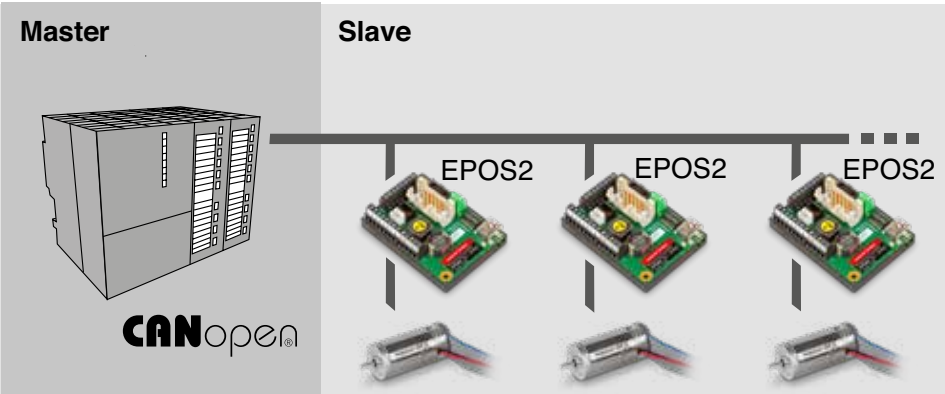
EPOS2 Positioning Controllers



CANopen Slave (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 to 700 watts continuous power. 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” moves 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)

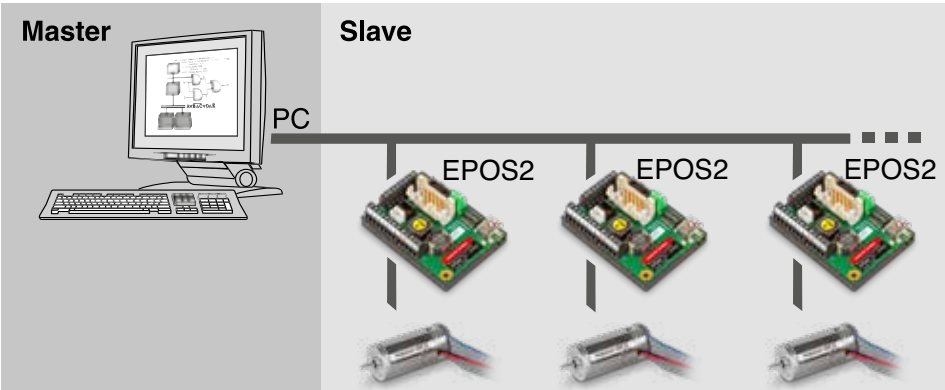
Thanks to Interpolated Position Mode, the EPOS2 is able to synchronously run a path specified by interpolating points. With a suitable master, coordinated multi-axis movements as well as any profile in a 1-axis system can be carried out. (PVT = Position and Velocity versus Time)

Position and Speed control with Feed Forward

The combination of feedback and feed forward control provides ideal motion behavior. 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 is a wide variety of methods for referencing.

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 synchronized 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 backlash 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. The delay times can be individually configured for switching on and off.

Additional information for technical data of page 460/461

Standardized, extendable

CANopen standard CiA 301, 402 and 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.

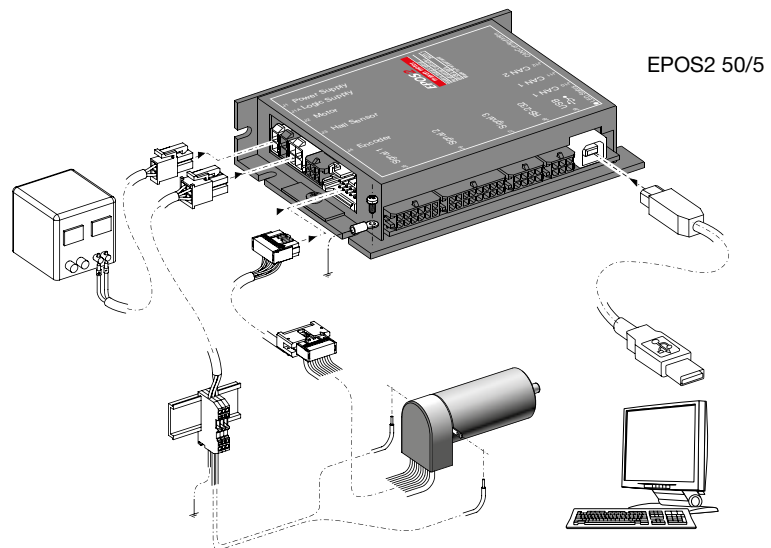
Easy programming

IEC 61131-3 libraries for CAN master units from industry leading manufacturers (Beckhoff, Siemens/Helmholz, VIPA) as well as 32/64-bit Windows DLLs for PC master units (IXXAT, Vector, National Instruments and Kvaser) are available. Programming examples for MS Visual C#, MS Visual C++, MS Visual Basic, Borland C++, Borland Delphi, National Instruments LabVIEW and National Instruments LabWindows/CVI are available at no charge.

Also available: The 32/64-bit Linux Shared Object Library with programming examples for Eclipse C++/QT as well as ARMv7 support for a wide variety of platforms (Raspberry Pi, BeagleBone). In addition, the maxon library for NI SoftMotion makes integration of EPOS2 in the National Instruments Compact Rio system easy.

Operating modes

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



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 2.0/3.0 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/Linux Shared Object Library

IEC 61131-3 Libraries

Firmware

Available documentation

Feature Chart

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 470.

EPOS2 Positioning Controllers Data



EPOS2 24/2

Matched with DC brush motors with encoder or brushless EC motors with Hall sensors and encoder up to 48/96 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 72/144 watts.

Controller versions	CANopen Slave	CANopen Slave
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	$0.9 \times V_{CC}$	$0.9 \times V_{CC}$
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)	25000 rpm (sinusoidal); 100000 rpm (block)	25000 rpm (sinusoidal); 100000 rpm (block)
Built-in motor choke per phase	47 μ H / 2 A	10 μ H / 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 2.0/3.0	Data+; Data- (full speed)	external USB transceiver required
Indicator		
LED green = READY, red = ERROR	green LED, red LED	green LED, red LED
Environmental conditions		
Temperature – Operation	-10...+55°C	-10...+45°C
Temperature – Extended range	+55...+74°C; Derating: -0.105 A/°C	+45...+75°C; Derating: -0.067 A/°C
Temperature – Storage	-40...+85°C	-40...+85°C
Humidity (condensation not permitted)	5...90%	5...90%
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	Flange for M2.5-screws	PCB edge connector with locking mechanism
Part numbers		
	390438 EPOS2 24/2 for DC motors	360665 EPOS2 Module 36/2
	380264 EPOS2 24/2 for EC motors	
	390003 EPOS2 24/2 for DC/EC motors	
	530239 EPOS2 24/2 for DC(X) motors	
Accessories		
	309687 DSR 50/5 Shunt regulator	363407 EPOS2 Module Starter-Kit
	Order accessories separately, see page 470	Order accessories separately, see page 470