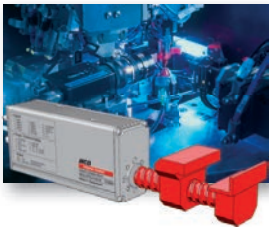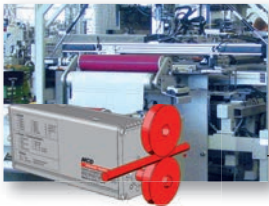# MCD EPOS Intelligent compact drive

CANopen

Driving
A reliable drive solution is the key to production machinery with many years of maintenance-free operation in a variety of applications.
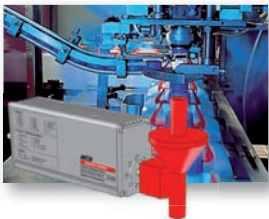
Setting-up
The rapid set-up of processing machinery which offers both precision and long-term accuracy is the key to efficient production.
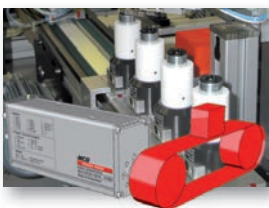
Guiding
Products that are dynamically guided throughout the entire process ensure consistent product quality.

Dispensing
The precise set-up of dispensing systems provides maximum flexibility through the accurate dosing of individual component quantities.

Positioning
Several synchronized axes transport the product to the correct location with both high accuracy and sustained reproducibility.

Maintenance-free positioning drive with tried and trusted components
The combination of the brushless maxon EC motor, digital MR encoder and the fully digital EPOS positioning controller results in a highly dynamic, maintenance-free positioning drive with excellent functionality and high efficiency. The programmable version MCD EPOS P is equipped with a processor and memory for standalone operation.

A complete system – easy start-up procedure
The compact drive's controller-motor combination is optimally tuned and ready for use. Wiring is kept to a minimum through direct connection to the CANopen bus or a PLC. Wiring errors are largely avoided and installation time is significantly reduced. The drive is controlled, parameterized and diagnosed via the CAN bus or the serial port (RS232).

Online-commanded	Master	Slave
	PC	CANopen
Standalone	MCD EPOS P	MCD EPOS
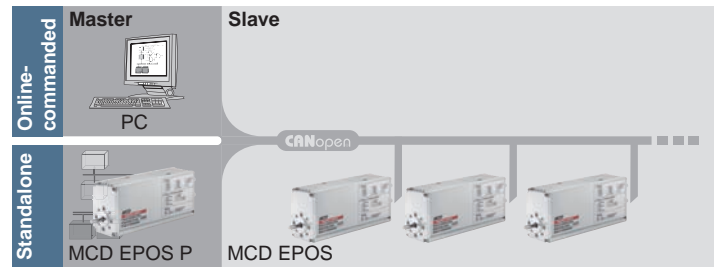
Intelligence at the right place
maxon's compact drives are fitted with several optically isolated inputs and outputs. Sensor signals and events can be evaluated directly in the drive. Cable lengths are shorter, thus reducing susceptibility to interference.

CANopen, IEC 61131-3 and Motion Control Library – key to standardized operation
The MCD can be connected according to the CANopen standard, allowing communication with other CANopen devices.
Drive programming complies with the IEC 61131-3 standard using the powerful "EPOS Studio" tool.
The integration of the Motion Control Library under the widely used standards reduces program complexity and development costs.

**Everything integrated – also a question of price**
Substantial cost-savings have been made thanks to the careful selection and optimization of components. The resulting drive is available at an unsurpassed price which is well below the cost of the individual parts. Simplified mounting results in further cost-savings.

Drives with a broad application spectrum
The requirements of compact design and enhanced functionality have been completely realized with maxon's compact drives. Their supreme flexibility ensures use in a wide range of industrial applications.

MCD EPOS and EPOS P 60 W Compact Drive
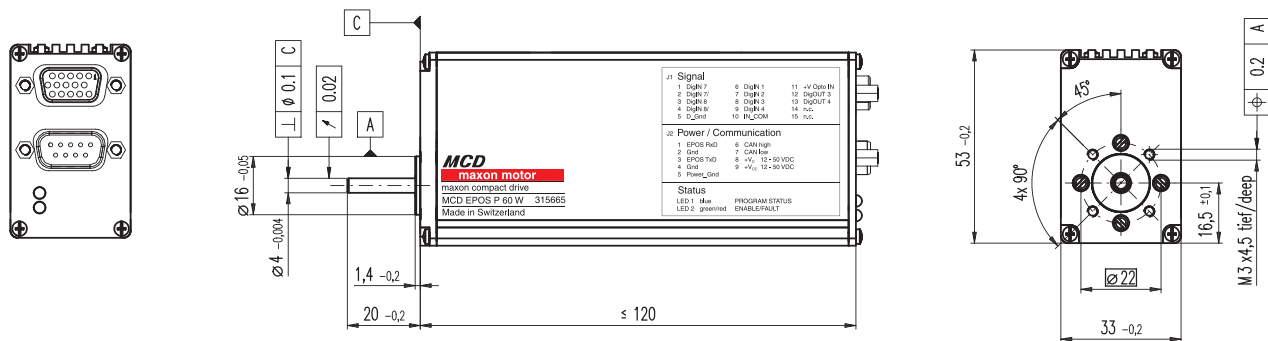
M 1:2

Motor Data

Nominal torque (Max. continuous torque)		54 mNm
		(T_U=25°C, 5000 rpm)
Max. torque		218 mNm
Max. speed (restricted by econder)		12000 rpm
Max. efficiency		70%
Torque constant		24.3 mNm/A
Speed constant		393 rpm/V
Speed/torque gradient		20.6 rpm/mNm
Rotor inertia		21.9 gcm^2
Axial play at axial load	< 6 N	0 mm
(Preloaded ball bearings)	> 6 N	0.14 mm
Radial play		preloaded
Max. axial load (dynamic)		5.5 N
Max. force for press fits (static)		100 N
Max. radial load, 5 mm from flange		25 N

Pin layout

Connector J1: Signal
D Sub connector High Density 15 poles (female)

1 DigIN 7	6 DigIN 1	11 +V Opto IN
2 DigIN 7/	7 DigIN 2	12 DigOUT 3
3 DigIN 8	8 DigIN 3	13 DigOUT 4
4 DigIN 8/	9 DigIN 4	14 not connected
5 D_Gnd	10 IN_COM	15 not connected

Connector J2: Power/Communication
D Sub connector 9 poles (male)

1 EPOS RxD	4 Gnd	7 CAN low
2 Gnd	5 Power_Gnd	8 +V$_C$ 12-50 VDC
3 EPOS TxD	6 CAN high	9 +V$_{CC}$ 12-50 VDC

Ambient temperature/Humidity range

Protection class	IP42
Operating	-20 ... +85°C
	power derating 1.4%/K from T_U = 25°C
Storage	-40 … +85°C
Non condensating	20 … 80 %
Max. case temperature	< 100°C

Mechanical data

Weight	approx. 528 g
Dimensions (L x W x H)	120x33x53 mm
Mounting plate	four M3x4.5 threaded holes

Electrical data

Power supply voltage +V$_{CC}$	+12….+50 VDC
Logic supply voltage +V$_C$ (optional)	+12….+50 VDC
Max. output voltage	0.9 x V$_{CC}$
Max. output current I$_{max}$	9 A
Continuous output current I$_{cont}$	2.6 A (T_U = 25°C, 5000 rpm)
Switching frequency	50 kHz

Controller

Sample rate PI-current controller	10 kHz
Sample rate PI-speed controller	1 kHz
Sample rate PID-positioning controller	1 kHz
Position resolution	0.09°
Position accuracy	± 1°
Position reproducibility	± 0.09°
Encoder	1000 Imp./3 channels

Inputs

4 digital inputs (optically isolated)	+9…+24 VDC
2 digital inputs (differential)	EIA-standard RS-422

Outputs

2 digital outputs (optically isolated)	max. +24 VDC (I$_L$<350 mA)

Interfaces

RS-232 (EIA-standard RS-232)	max. 115 200 bit/s
CAN (high-speed; ISO 11898 compatible)	max. 1 MBit/s
CAN ID	LSS CiA 305
Protective functions	Current Limit (adjustable), Under-/over-voltage limitation, Temperature monitoring

LED indicator

Bi-colour LED	green = Enable, red = Fault blink pattern = Operating status
Blue LED (only master version)	program status

Performance features MCD EPOS P

32 bit host processor, 60 MHz

512 KB memory, with 256 KB free user program memory

Typical 2.5 ms/5000 lines AWL

512 Byte non-volatile memory
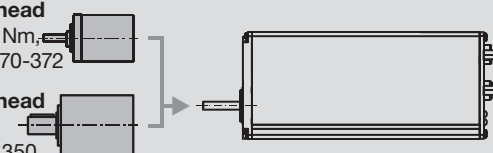
Digital motion control signal processor

maxon Modular System

Planetary Gearhead
⌀32 mm, 1.0-8.0 Nm,
P. 338/343/345/370-372

Planetary Gearhead
⌀42 mm,
3.0 - 15.0 Nm, p. 350

Part Numbers

|	
326343	MCD EPOS 60 W
315665	MCD EPOS P 60 W

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.
A number of operating modes provides flexible application in a wide range of drive systems in automation technology and mechatronics.
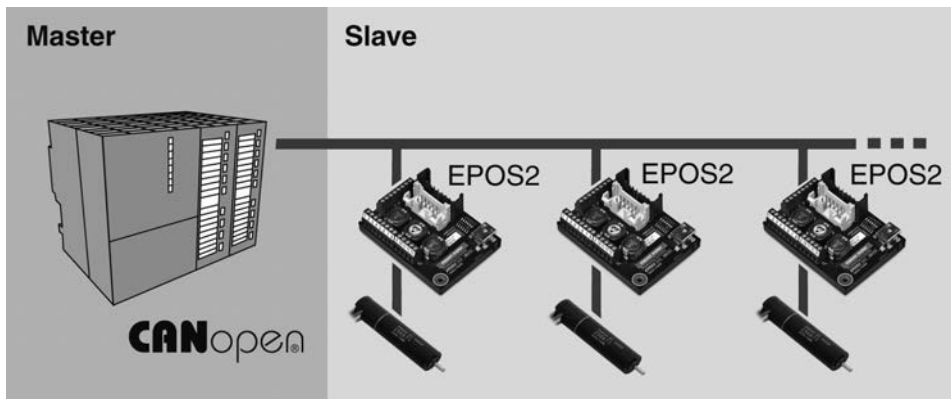
Point to point
The "CANopen Profile Position Mode" moves the position of the motor axis from point A to point B. Positioning is in relation to the axis Home position (absolute) or the actual axis position (relative).

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.