



# maxon compact drive

maxon's compact drives feature controllers, sensors and motors in a modern aluminium casing. The use of existing maxon products with an adapted design results in robust, space-saving drive solutions with high power density. The decentralised concept of these intelligent drives minimises the use of centralised controllers.

Summary  
MCD EPOS

310  
311 - 312

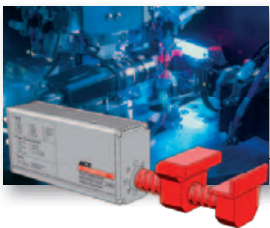
# MCD EPOS Intelligent compact drive

CANopen



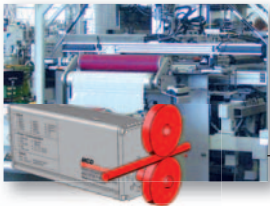
## Driving

A reliable drive solution is the key to production machinery with many years of maintenance-free operation in a variety of applications.



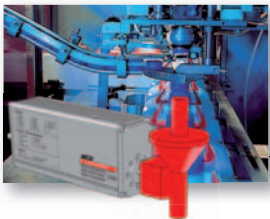
## Setting-up

The rapid set-up of processing machinery which offers both precision and long-term accuracy is the key to efficient production.



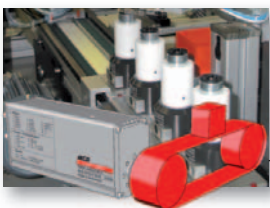
## Guiding

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 synchronised axes transport the product to the correct location with both high accuracy and sustained reproducibility.

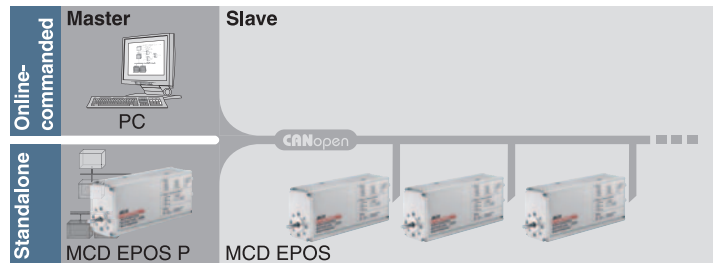


## Maintenance-free positioning drive with tried and trusted components

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 an PLC. Wiring errors are largely avoided and installation time is significantly reduced. The drive is controlled, parameterised and diagnosed via the CAN bus or the serial port (RS232).



## 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 PLCopen standard reduces program complexity and development costs.

## Everything integrated — also a question of price

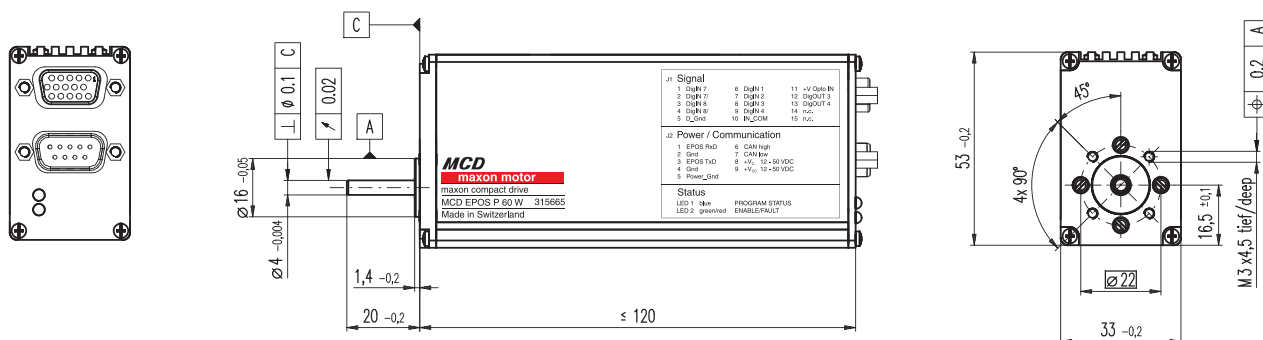
Substantial cost-savings have been made thanks to the careful selection and optimisation of components. The resulting drive is available at an unsurpassed price which is well below the cost of the individual parts. Simplified mounting results in further cost-savings.

## Drives with a broad application spectrum

The requirements of compact design and enhanced functionality have been completely realised 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

DIGITAL CANopen  
RS232 GUI



M 1:2

## Motor Data

Nominal torque (Max. continuous torque)	54 mNm
	( $T_U=25^\circ\text{C}$ , 5000 rpm)
Max. torque	218 mNm
Max. permissible 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 <sup>2</sup>
Axial play at axial load	< 6 N
(Preloaded ball bearings)	> 6 N
Radial play	preloaded
Max. axial load (dynamic)	5.5 N
Max. force for press fits (static)	100 N
Max. radial loading, 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 <sub>C</sub> 12-50 VDC
3 EPOS TxD	6 CAN high	9 +V <sub>CC</sub> 12-50 VDC

## Ambient temperature / Humidity range

Protection class	IP42 (optional IP54)
Operating	-20 ... +85°C
	power derating 1.4%/K from $T_U = 25^\circ\text{C}$
Storage	-40 ... +85°C
Non condensating	20 ... 80 %
Max. case temperature	< 100°C

## Mechanical data

Weight	approx. 495 g
Dimensions (L x W x H)	120x33x53 mm
Mounting plate	four M3x4.5 threaded holes

## Options

- Encoder MR with 500 counts per turn (account of the positioning precision 15000 rpm)
- Protection to IP54 (assembled and sealed connection cable)

## Electrical data

Power supply voltage +V <sub>CC</sub> (Ripple < 10%)	+12...+50 VDC
Logic supply voltage +V <sub>C</sub> (Ripple < 10%)	(optional) +12...+50 VDC
Max. output voltage	0.9 · V <sub>CC</sub>
Max. output current I <sub>max</sub>	9 A
Continuous output current I <sub>cont</sub>	2.6 A ( $T_U = 25^\circ\text{C}$ , 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 <sub>L</sub> < 350 mA)
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## 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 DSP-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

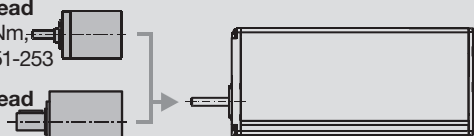
## Performance features MCD EPOS P

- 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**  
Ø32 mm, 1.0-8.0 Nm,  
S. 232/236/237/251-253

**Planetary Gearhead**  
Ø42 mm,  
3.0 - 15.0 Nm, p. 241



## Order numbers

326343  
315665

MCD EPOS 60 W  
MCD EPOS P 60 W

# Programming

## EPOS operating modes

### Point to point

- Positioning the motor axis from point A to point B (absolute and relative)

### Position control with feed forward

- Reducing control error through acceleration and speed feed forward

### Speed control

- Rotating the motor axis at a pre-defined set value speed

### Torque control (current control)

- Controlling a constant torque on the motor shaft. Minimum torque ripple through sinusoidal commutation

### Homing mode

- Referencing onto a special mechanical position with more than 30 different methods

### Electronic gearing

- Synchronising (also with intermediate factor) with an externally produced reference variable

### Step/Direction

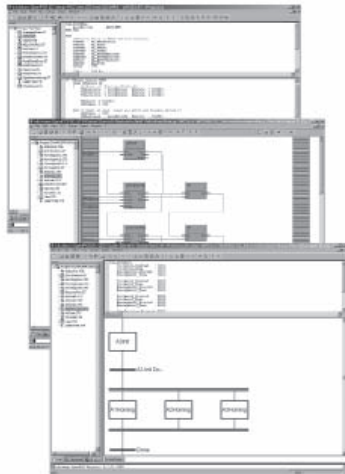
- Step-by-step movement of the motor axis

### Capture inputs (position marker)

- Saving positions when a positive and/or negative edge of an input signal appears

## EPOS Studio

Editors (ST, IL, FBD, LD, SFC) of the powerful "EPOS Studio" tool are available for programming according to IEC 61131-3. The integrated project browser shows all network resources. Complex programs with a large number of decentralized controls can be optimally managed with it. Drive systems are configured and networked quickly using intelligent step-by-step wizards.



- Windows-based development environment
- IEC 61131-3 programming languages (ST, IL, FBD, LD, SFC)
- IEC 61131-3 standard libraries
- Motion control function blocks according to PLCopen standard
- maxon Utility function block library
- CANopen function block library
- User libraries
- Network variables and data exchange
- Online debugger with break points and watch variables
- Axis configuration and parameterization
- Online help

## Motion Control Library

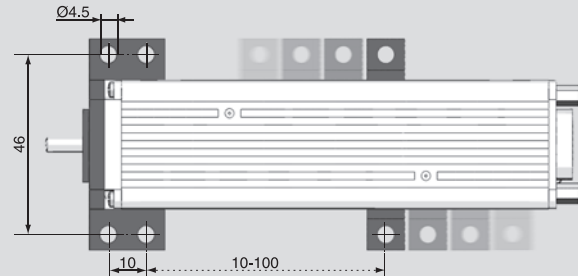
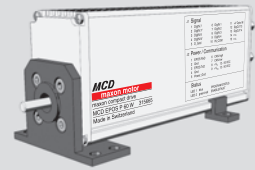
The complexity and development costs of drive systems are substantially reduced. The Motion Firmware Library was implemented according to the widely-used PLCopen Motion Control Standard. Standardized function blocks make implementation easy.

- Drive control
- Referencing (Homing)
- Speed control
- Positioning absolute and relative
- Error management
- Parameter handling

# Accessories MCD EPOS 60 W

## Mounting Kit

Brackets for mounting the optional the MCD EPOS 60 W. The brackets provided can be placed in any position along the length of the MCD. Fixing screws are included.

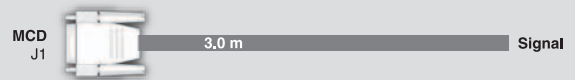


**Order Number**  
326930

MCD EPOS 60 W Mounting-Kit

## Cable

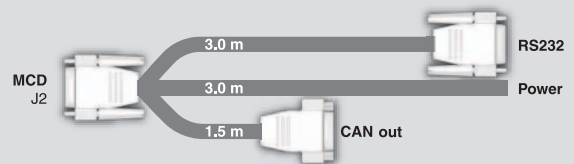
### Signal cable



**Order Number**  
326923

MCD EPOS Signal Cable

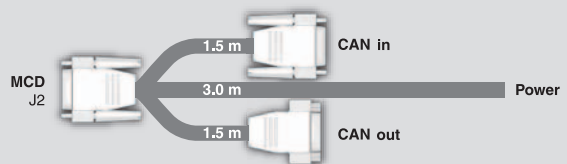
### Power / RS232-CAN cable



**Order Number**  
325939

MCD EPOS Power / RS232-CAN Cable

### Power / CAN-CAN cable



**Order Number**  
325235

MCD EPOS Power / CAN-CAN Cable

## CAN Termination plug

Is required as line termination for the CAN-Network.



**Order Number**  
326925

MCD EPOS CAN Termination Plug