MCD EPOS Intelligent compact drive

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).

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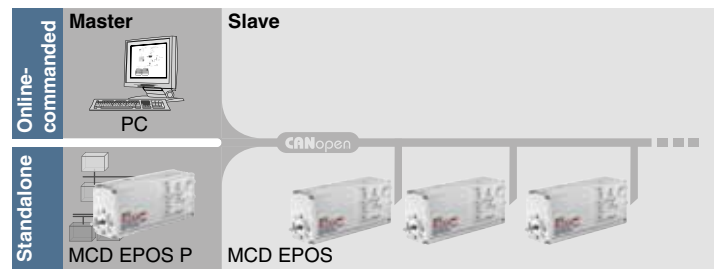
Intelligence at the right place
maxon's compact drives are fitted with several optically isolated inputs and outputs. Sensor signals and events can be evaluated directly in the drive. Cable lengths are shorter, thus reducing susceptibility to interference.

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

DIGITAL CANopen
RS232 GUI
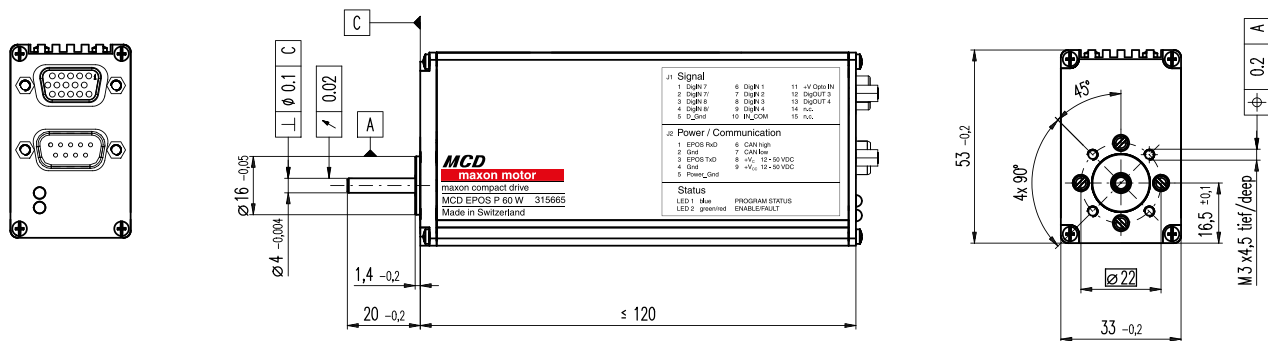
M 1:2

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 gcm²
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

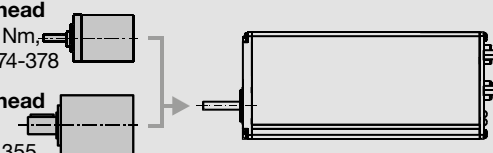## maxon Modular System

Planetary Gearhead
∅32 mm, 1.0-8.0 Nm,
P. 342/347/350/374-378

Planetary Gearhead
∅42 mm,
3.0 - 15.0 Nm, p. 355

Part Numbers

326343	MCD EPOS 60 W
315665	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
— Synchronizing (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.
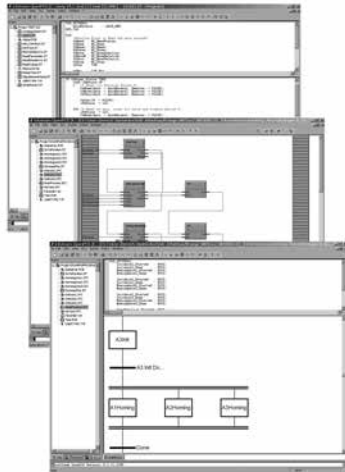
— Windows-based development environment
— IEC 61131-3 programming languages (ST, IL, FBD, LD, SFC)
— IEC 61131-3 standard libraries
— Motion control function blocks
— maxon Utility function block library
— CANopen function block library
— User libraries
— Network variables and data exchange
— Online 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 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.
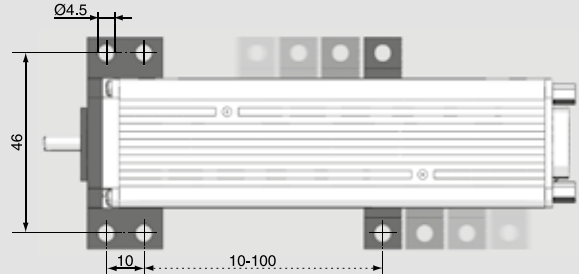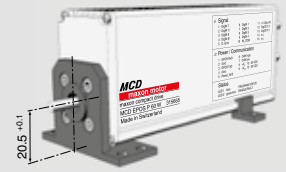
Part Number
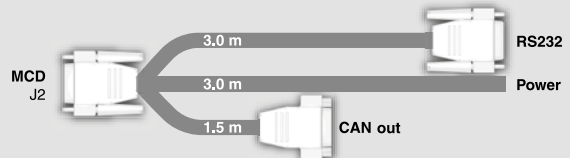**326930**   MCD EPOS 60 W Mounting-Kit

Cable

Signal cable

Part Number
326923   MCD EPOS Signal Cable
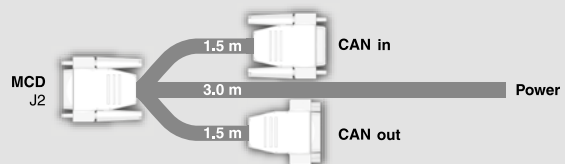
Power/RS232-CAN cable

Part Number
325939   MCD EPOS Power/RS232-CAN Cable

Power/CAN-CAN cable

Part Number
325235   MCD EPOS Power/CAN-CAN Cable

CAN Termination plug
Is required as line termination for the CAN-Network.

Part Number
326925   MCD EPOS CAN Termination Plug