maxon

EPOS4 Feature Chart

maxon's EPOS4 products are small-sized, full digital, smart positioning control units. Their high power density allows flexible use for brushed DC and brushless EC (BLDC) motors up to approximately 1'050 Watts with various feedback options, such as Hall sensors, incremental encoders as well as absolute sensors in a multitude of drive applications.

EPOS4 controllers are specially designed to be commanded and controlled as a slave node in a CANopen or EtherCAT network. In addition, the units can be operated via any USB or RS232 communication port of a Windows or Linux workstation. Moreover, the integrated extension interface allows pooling with optionally available communication interfaces or other additional functionalities.

Latest technology, such as field-oriented control (FOC), acceleration/velocity feed forward and dual loop control in combination with highest control cycle rates allow sophisticated, ease-of-use motion control.

epos.maxongroup.com

Legend:
✓ = included / [✓] = on request / nnnnnn = order number / ** = available shortly / [a] requires an optionally available extension card (see "Accessories" on page 7 and page 15) / [b] requires an extension card available on request / [c] optional for separate logic supply / [d] mandatory for supply of power stage / [e] with suitable motherboard / [f] per axis

Product Overview

Modules (➔page 2)

Micro

CANopen EtherCAT

EPOS4 Micro 24/5 CAN

EPOS4 Micro 24/5 EtherCAT

Module

CANopen EtherCAT

EPOS4 Module 24/1.5

EPOS4 Module 50/5

EPOS4 Module 50/8

EPOS4 Module 50/15

Ready-to-connect Units (➔page 8)

Compact

CANopen EtherCAT

EPOS4 Compact 24/5 EtherCAT 3-axis

EPOS4 Compact 24/1.5 CAN

EPOS4 Compact 24/1.5 EtherCAT

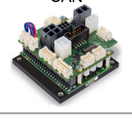
EPOS4 Compact 50/5 CAN

EPOS4 Compact 50/5 EtherCAT

EPOS4 Compact 50/8 CAN

EPOS4 Compact 50/8 EtherCAT

EPOS4 Compact 50/15 CAN



EPOS4 Compact 50/15 EtherCAT

Encased Housing

CANopen EtherCAT

EPOS4 50/5

EPOS4 70/15

High Integration Units (➔page 16)

Disk

CANopen

EPOS4 Disk 60/8 CAN

EtherCAT

EPOS4 Disk 60/8 EtherCAT

EPOS4 Disk 60/12 CAN

EPOS4 Disk 60/12 EtherCAT

EPOS4 Disk 60/12 CAN SSC

EPOS4 Disk 60/12 EtherCAT SSC

maxon

Modules	EPOS4 Micro 24/5 CAN (638328)	EPOS4 Micro 24/5 EtherCAT (654731)	EPOS4 Module 24/1.5 (536630)	EPOS4 Module 50/5 (534130)	EPOS4 Module 50/8 (504384)	EPOS4 Module 50/15 (504383)
 for comparison purposes: US Half Dollar coin (Ø30.6 mm)						
Communication Interfaces						
CANopen Slave	max. 1 Mbit/s	—	max. 1 Mbit/s	max. 1 Mbit/s	max. 1 Mbit/s	max. 1 Mbit/s
CANopen Application Layer and Communication Profile	CiA 301	—	CiA 301	CiA 301	CiA 301	CiA 301
CANopen Layer Setting Services and Protocol (LSS)	CiA 305	—	CiA 305	CiA 305	CiA 305	CiA 305
CANopen Device Profile Drives and Motion Control	CiA 402	—	CiA 402	CiA 402	CiA 402	CiA 402
USB 2.0 / USB 3.0	Full speed					
Gateway function USB-to-CAN	✓	—	✓	✓	✓	✓
RS232	max. 115'200 bit/s	—	max. 115'200 bit/s	max. 115'200 bit/s	max. 115'200 bit/s	max. 115'200 bit/s
Gateway function RS232-to-CAN	✓	—	✓	✓	✓	✓
EtherCAT Slave	—	✓	[✓] [a]	[✓] [a]	[✓] [a]	[✓] [a]
IEC 61158 Digital data communication for measurement and control Fieldbus for use in industrial control systems	—	Type 12 (EtherCAT) max. 100 Mbit/s (100 Base Tx)	Type 12 (EtherCAT) max. 100 Mbit/s (100 Base Tx)	Type 12 (EtherCAT) max. 100 Mbit/s (100 Base Tx)	Type 12 (EtherCAT) max. 100 Mbit/s (100 Base Tx)	Type 12 (EtherCAT) max. 100 Mbit/s (100 Base Tx)
IEC 61800-7 Generic interface and use of profiles for power drive systems	—	Profile type 1 (CiA 402)	Profile type 1 (CiA 402)	Profile type 1 (CiA 402)	Profile type 1 (CiA 402)	Profile type 1 (CiA 402)
CAN application layer over EtherCAT (CoE)	—	✓	✓	✓	✓	✓
File transfer over EtherCAT (FoE)	—	✓	✓	✓	✓	✓
Distributed clocks support	—	✓	✓	✓	✓	✓
Cyclic modes support cycle times down to…	—	1 ms	1 ms	1 ms	1 ms	1 ms
Process data	—	PDO mapping (Variable)	PDO mapping (Variable)	PDO mapping (Variable)	PDO mapping (Variable)	PDO mapping (Variable)
Motors						
Brushed DC motors up to (continuous / max.)	120 W / 360 W	120 W / 360 W	36 W / 108 W	250 W / 750 W	400 W / 1'500 W	750 W / 1'500 W
Brushless EC motors (BLDC) up to (continuous / max.)	120 W / 360 W	120 W / 360 W	36 W / 108 W	250 W / 750 W	400 W / 1'500 W	750 W / 1'500 W
Sensors (Feedback)						
Digital Hall sensors (EC motors)	✓					
Digital incremental encoder (2-/3-channel, single-ended or differential)	✓					
Analog incremental encoder (3-channel, SinCos, differential)	—	—	✓	✓	✓	✓
SSI absolute encoder (configurable)	✓					
BiSS C absolute encoder (configurable)	—	—	[✓] [b]	[✓] [b]	[✓] [b]	[✓] [b]
EnDat 2.2 absolute encoder (configurable)	—	—	[✓] [b]	[✓] [b]	[✓] [b]	[✓] [b]
Commutation						
Digital Hall sensors	✓					
Digital Hall sensors + digital incremental encoder	✓					
Digital Hall sensors + analog incremental encoder	—	—	✓	✓	✓	✓
Digital Hall sensors + absolute encoder	✓					
Absolute encoder	✓					

maxon

Modules	EPOS4 Micro 24/5 CAN (638328)	EPOS4 Micro 24/5 EtherCAT (654731)	EPOS4 Module 24/1.5 (536630)	EPOS4 Module 50/5 (534130)	EPOS4 Module 50/8 (504384)	EPOS4 Module 50/15 (504383)
Electrical Data						
Nominal power supply voltage ($+V_{CC}$)	10…24 VDC	10…24 VDC	10…24 VDC	10…50 VDC	10…50 VDC	10…50 VDC
Nominal logic supply voltage ($+V_C$)	10…24 VDC	10…24 VDC	10…24 VDC	10…50 VDC	10…50 VDC	10…50 VDC
Absolute supply voltage limits ($+V_{min}$ / $+V_{max}$)	8 VDC / 28 VDC	8 VDC / 28 VDC	8 VDC / 28 VDC	8 VDC / 56 VDC	8 VDC / 56 VDC	8 VDC / 56 VDC
Output voltage (max.)	0.9 x $+V_{CC}$					
Output current (I_{cont} / I_{max})	5 A / 15 A (<10 s)	5 A / 15 A (<10 s)	1.5 A / 4.5 A (<30 s)	5 A / 15 A (<3 s)	8 A / 30 A (<5 s)	15 A / 30 A (<60 s)
Pulse width modulation frequency	50 kHz	50 kHz	100 kHz	50 kHz	50 kHz	50 kHz
Sampling rate PI current controller	25 kHz (40 µs)					
Sampling rate PI speed controller	2.5 kHz (400 µs)					
Sampling rate PID positioning controller	2.5 kHz (400 µs)					
Sampling rate analog input	2.5 kHz (400 µs)					
Max. efficiency	98%	97%	89%	97%	98%	98%
Max. speed DC motor	limited by max. permissible speed (motor)					
Max. speed EC motor, block commutation	100'000 rpm (1 pole pair)					
Max. speed EC motor, sinusoidal commutation	50'000 rpm (1 pole pair)					
Built-in motor choke	—					
Inputs / Outputs						
Digital Hall sensor signals	H1, H2, H3 (+2…+24 VDC, internal pull-up)					
Digital incremental encoder signals	A, A\, B, B\, I, I\ (EIA RS422, 6.25 MHz)					
Sensor signals	✓					
Digital incremental	—	—	A, A\, B, B\, I, I\ (EIA RS422, 6.25 MHz)	A, A\, B, B\, I, I\ (EIA RS422, 6.25 MHz)	A, A\, B, B\, I, I\ (EIA RS422, 6.25 MHz)	A, A\, B, B\, I, I\ (EIA RS422, 6.25 MHz)
Analog incremental	—	—	A, A\, B, B\, I, I\ (±1.8 V differential, 10 kHz)	A, A\, B, B\, I, I\ (±1.8 V differential, 10 kHz)	A, A\, B, B\, I, I\ (±1.8 V differential, 10 kHz)	A, A\, B, B\, I, I\ (±1.8 V differential, 10 kHz)
Absolute serial SSI	Clock, Data (2.0…3.3 VDC, 0.4…2 MHz)	Clock, Data (2.0…3.3 VDC, 0.4…2 MHz)	Clock, Clock\, Data, Data\ (EIA RS422, 0.4…2 MHz)	Clock, Clock\, Data, Data\ (EIA RS422, 0.4…2 MHz)	Clock, Clock\, Data, Data\ (EIA RS422, 0.4…2 MHz)	Clock, Clock\, Data, Data\ (EIA RS422, 0.4…2 MHz)
Digital inputs	4 (+2.1…+36 VDC)					
Digital outputs	2 (open drain, max. 36 VDC / 500 mA, internal pull-up)					
High-speed digital inputs	1 (2.0…3.3 V, 6.25 MHz)	1 (2.0…3.3 V, 6.25 MHz)	4 (EIA RS422, 6.25 MHz)	4 (EIA RS422, 6.25 MHz)	4 (EIA RS422, 6.25 MHz)	4 (EIA RS422, 6.25 MHz)
High-speed digital outputs	1 (3.3 VDC/2 mA; 6.25 MHz)	1 (3.3 VDC/2 mA; 6.25 MHz)	1 (EIA RS422, 6.25 MHz)	1 (EIA RS422, 6.25 MHz)	1 (EIA RS422, 6.25 MHz)	1 (EIA RS422, 6.25 MHz)
Analog inputs (resolution 12-bit, −10…+10 V, 10 kHz, differential)	2					
Analog outputs (resolution 12-bit, −4…+4 V, 25 kHz)	1	1	2	2	2	2
STO inputs (optically isolated)	—	—	2 (+4.5…+30 VDC)	2 (+4.5…+30 VDC)	2 (+4.5…+30 VDC)	2 (+4.5…+30 VDC)
STO outputs (optically isolated with self-resetting short-circuit protection)	—	—	1 (max. 30 VDC / 15 mA)	1 (max. 30 VDC / 15 mA)	1 (max. 30 VDC / 15 mA)	1 (max. 30 VDC / 15 mA)
Sensor supply voltage	+5 VDC (I_L ≤150 mA)	+5 VDC (I_L ≤150 mA)	+5 VDC (I_L ≤100 mA)	+5 VDC (I_L ≤100 mA)	+5 VDC (I_L ≤100 mA)	+5 VDC (I_L ≤100 mA)
Auxiliary output voltage	—	—	+5 VDC (I_L ≤150 mA)	+5 VDC (I_L ≤150 mA)	+5 VDC (I_L ≤150 mA)	+5 VDC (I_L ≤150 mA)
Status indicators (LEDs or bi-color LEDs)	Device status					

maxon

Modules		EPOS4 Micro 24/5 CAN (638328)	EPOS4 Micro 24/5 EtherCAT (654731)	EPOS4 Module 24/1.5 (536630)	EPOS4 Module 50/5 (534130)	EPOS4 Module 50/8 (504384)	EPOS4 Module 50/15 (504383)
Connections							
A1…A80	Power supply Logic supply Motor Hall sensor Encoder Sensor Digital I/O Analog I/O RS232 CAN USB	Terminal/socket header (0.5 mm) 2x40 poles	—	—	—	—	—
	Power supply Logic supply Motor Hall sensor Encoder Sensor Digital I/O Analog I/O TX/RX Data USB	—	Terminal/socket header (0.5 mm) 2x40 poles	—	—	—	—
A1…A46	Power supply Logic supply Motor Hall sensor Encoder	—	—	Box header (1.27 mm) 2x23 poles	Box header (1.27 mm) 2x23 poles	Pin header (2.54 mm) 2x16 poles	Pin header (2.54 mm) 2x16 poles
B1…B46	Sensor Digital I/O Analog I/O STO RS232 CAN	—	—	Box header (1.27 mm) 2x23 poles	Box header (1.27 mm) 2x23 poles	Pin header (2.54 mm) 2x23 poles	Pin header (2.54 mm) 2x23 poles
X13	USB	—	—	USB Type micro B, female	USB Type micro B, female	USB Type micro B, female	USB Type micro B, female
Mechanical Data							
Weight (approximate)		6 g	7 g	17 g	17 g	23 g	70 g
Dimensions (L x W x H)		32.0 x 22.0 x 7.0 mm	36.5 x 27.0 x 7.0 mm	53.8 x 38.8 x 11.1 mm	53.8 x 38.8 x 11.1 mm	59.5 x 46.0 x 14.1 mm	59.5 x 62.0 x 16.4 mm
Mounting		Pluggable (female header 0.5 mm) or M2 screws	Pluggable (female header 0.5 mm) or M2 screws	Pluggable (female headers 1.27 mm) or M2.5 screws	Pluggable (female headers 1.27 mm) or M2.5 screws	Pluggable (female headers 2.54 mm) or M2.5 screws	Pluggable (female headers 2.54 mm) or M3 screws
Environmental Conditions							
Temperature – Operation		−30…+45 °C	−30…+40 °C	−30…+60 °C	−30…+45 °C	−30…+45 °C	−30…+25 °C
Temperature – Extended range and derating		+45…68.8°C / −0.210 A/°C	+40…60°C / −0.250 A/°C	+60…+73 °C / −0.115 A/°C	+45…+75 °C / −0.167 A/°C	+45…+77 °C / −0.250 A/°C	+25…+77 °C / −0.288 A/°C
Temperature – Storage		−40…+85 °C					
Altitude – Operation		0...6'000 m MSL					
Altitude – Extended range		6'000…10'000 m MSL (for derating see «Hardware Reference»)					
Humidity (condensation not permitted)		5…90%					

maxon

Modules	EPOS4 Micro 24/5 CAN (638328)	EPOS4 Micro 24/5 EtherCAT (654731)	EPOS4 Module 24/1.5 (536630)	EPOS4 Module 50/5 (534130)	EPOS4 Module 50/8 (504384)	EPOS4 Module 50/15 (504383)
Directives & Standards						
Generic	IEC/EN 61000-6-2; IEC/EN 61000-6-3					
Applied	IEC/EN 55032 (CISPR32); IEC/EN 61000-4-3; IEC/EN 61000-4-4; IEC/EN 61000-4-6	IEC/EN 55032 (CISPR32); IEC/EN 61000-4-3; IEC/EN 61000-4-4; IEC/EN 61000-4-6	IEC/EN 55022 (CISPR22); IEC/EN 61000-4-3; IEC/EN 61000-4-4; IEC/EN 61000-4-6	IEC/EN 55022 (CISPR22); IEC/EN 61000-4-3; IEC/EN 61000-4-4; IEC/EN 61000-4-6	IEC/EN 55022 (CISPR22); IEC/EN 61000-4-3; IEC/EN 61000-4-4; IEC/EN 61000-4-6	IEC/EN 55022 (CISPR22); IEC/EN 61000-4-3; IEC/EN 61000-4-4; IEC/EN 61000-4-6
Environment	IEC/EN 60068-2-6; MIL-STD-810F					
Safety (UL File Number; unassembled PCB)	E207844	E207844	E207844	E207844	E76251; E133472; E207844; E337862	E76251; E133472; E207844; E337862
Reliability (MIL-HDBK-217F; MTBF)	945'031 hours	638'102 hours	611'610 hours	314'822 hours	245'451 hours	240'400 hours, with heat sink <3.1 K/W
Functionality						
Operating Modes						
CST Cyclic Synchronous Torque Mode	✓					
CSV Cyclic Synchronous Velocity Mode	✓					
CSP Cyclic Synchronous Position Mode	✓					
PVM Profile Velocity Mode	✓					
PPM Profile Position Mode	✓					
HMM Homing Mode	✓					
Master Encoder Functionality	[✓]					
Step/Direction Functionality	[✓]					
Analog Set Value Functionality	CST / CSV					
Features						
Feed forward (acceleration/velocity for inertia and friction compensation)	✓					
Field-oriented Control (FOC)	✓					
Velocity observer	✓					
Dual loop control	✓					
Custom persistent memory	✓					
Advanced automatic control settings (Auto Tuning)	✓					
Safe Torque Off (based on IEC/EN 61800-5-2, not certified)	—	—	✓	✓	✓	✓
Digital I/O Functionality						
Inputs (configurable)	✓					
Touch Probe	✓					
Reference switches	✓					
Limit switches	✓					
Quickstop	✓					
Drive Enable	✓					
General purpose	✓					
Outputs (configurable)	✓					
Position Compare	[✓]					
Holding Brake	✓					

maxon

Modules	EPOS4 Micro 24/5 CAN (638328)	EPOS4 Micro 24/5 EtherCAT (654731)	EPOS4 Module 24/1.5 (536630)	EPOS4 Module 50/5 (534130)	EPOS4 Module 50/8 (504384)	EPOS4 Module 50/15 (504383)
Ready/Fault	✓					
General purpose	✓					
Analog I/O Functionality						
Inputs (configurable)	✓					
Analog set value	✓					
General purpose	✓					
Outputs (configurable)	✓					
Current monitor	[✓]					
Velocity monitor	[✓]					
Position monitor	[✓]					
Temperature monitor	[✓]					
General purpose	✓					
Built-in Protection						
Current limiter (adjustable)	✓					
Overcurrent	✓					
Thermal motor protection	✓					
Thermal controller protection	✓					
Overvoltage	✓					
Undervoltage	✓					
Voltage transients	✓					
Short-circuit of motor winding	✓					
Loss of feedback signal	✓					
Following error	✓					
Status reporting	✓					
Firmware error handling	✓					

maxon

Modules		EPOS4 Micro 24/5 CAN (638328)	EPOS4 Micro 24/5 EtherCAT (654731)	EPOS4 Module 24/1.5 (536630)	EPOS4 Module 50/5 (534130)	EPOS4 Module 50/8 (504384)	EPOS4 Module 50/15 (504383)
Software							
Installation Program		EPOS Setup					
Graphical User Interface		EPOS Studio The EPOS video library features video tutorials that provide easy to follow instructions on how to get started with «EPOS Studio» and how to setup communication interfaces, motors and sensors, and so on. Explore on Vimeo: ➔https://vimeo.com/album/4646388					
Startup		✓					
Regulation Tuning		✓					
Firmware Update		✓					
Motion Commander		✓					
I/O Monitor		✓					
Parameters		✓					
Data Recording		✓					
Command Analyzer		✓					
CANopen Wizard		✓					
Online Help		✓					
Language		English					
Operating System		Windows 10, 8, 7					
Windows DLL for PC		32-bit / 64-bit					
CAN interfaces		IXXAT | National Instruments | Kvaser | Vector					
Programming examples		Microsoft Visual Basic, Visual Basic.NET, Visual C#, Visual C++ | Borland C++, Delphi | National Instruments LabView, LabWindows/CVI					
Linux Shared Object Library		X86 32-bit/64-bit, ARMv6/v7/v8 32-bit, ARMv8 64-bit					
CAN interfaces		IXXAT | Kvaser					
Programming examples		C++					
Accessories (not included in delivery)							
536997	EPOS4 CB 24/1.5 CAN (connector board)	—	—	✓	—	—	—
620048	EPOS4 CB 24/1.5 EtherCAT (connector board)	—	—	✓	—	—	—
534133	EPOS4 CB 50/5 CAN (connector board)	—	—	—	✓	—	—
620044	EPOS4 CB 50/5 EtherCAT (connector board)	—	—	—	✓	—	—
520884	EPOS4 CB Power CAN (connector board)	—	—	—	—	✓	✓
604594	EPOS4 CB Power EtherCAT (connector board)	—	—	—	—	✓	✓
638677	EPOS4 EB Micro (evaluation board)	✓	✓	—	—	—	—
659508	EPOS4 MB Micro EtherCAT 3-axes (motherboard)	—	✓	—	—	—	—
581245	EPOS4 EtherCAT Card	—	—	✓ [e]	✓ [e]	✓ [e]	✓ [e]
403968	USB Type A - micro B Cable	—	—	✓	✓	✓	✓

maxon

Ready-to-connect Units	EPOS4 Compact 24/5 EtherCAT 3-axes (684519)	EPOS4 Compact 24/1.5 CAN (546714)	EPOS4 Compact 24/1.5 EtherCAT (628092)	EPOS4 Compact 50/5 CAN (541718)	EPOS4 Compact 50/5 EtherCAT (628094)	EPOS4 Compact 50/8 CAN (520885)	EPOS4 Compact 50/8 EtherCAT (605298)	EPOS4 Compact 50/15 CAN (520886)	EPOS4 Compact 50/15 EtherCAT (605299)	EPOS4 50/5 (546047)	EPOS4 70/15 (594385)
for comparison purposes: US Half Dollar coin (Ø30.6 mm)											
Communication Interfaces											
CANopen Slave	—	max. 1 Mbit/s	—	max. 1 Mbit/s	—	max. 1 Mbit/s	—	max. 1 Mbit/s	—	max. 1 Mbit/s	max. 1 Mbit/s
CANopen Application Layer and Communication Profile	—	CiA 301	—	CiA 301	—	CiA 301	—	CiA 301	—	CiA 301	CiA 301
CANopen Layer Setting Services and Protocol (LSS)	—	CiA 305	—	CiA 305	—	CiA 305	—	CiA 305	—	CiA 305	CiA 305
CANopen Device Profile Drives and Motion Control	—	CiA 402	—	CiA 402	—	CiA 402	—	CiA 402	—	CiA 402	CiA 402
USB 2.0 / USB 3.0	Full speed										
Gateway function USB-to-CAN	—	✓	—	✓	—	✓	—	✓	—	✓	✓
RS232	—	max. 115'200 bit/s	—	max. 115'200 bit/s	—	max. 115'200 bit/s	—	max. 115'200 bit/s	—	max. 115'200 bit/s	max. 115'200 bit/s
Gateway function RS232-to-CAN	—	✓	—	✓	—	✓	—	✓	—	✓	✓
EtherCAT Slave	✓	—	✓	—	✓	—	✓	—	✓	✓ [a]	✓ [a]
IEC 61158 Digital data communication for measurement and control Fieldbus for use in industrial control systems	Type 12 (EtherCAT) max. 100 Mbit/s (100 Base Tx)	—	Type 12 (EtherCAT) max. 100 Mbit/s (100 Base Tx)	—	Type 12 (EtherCAT) max. 100 Mbit/s (100 Base Tx)	—	Type 12 (EtherCAT) max. 100 Mbit/s (100 Base Tx)	—	Type 12 (EtherCAT) max. 100 Mbit/s (100 Base Tx)	Type 12 (EtherCAT) max. 100 Mbit/s (100 Base Tx)	Type 12 (EtherCAT) max. 100 Mbit/s (100 Base Tx)
IEC 61800-7 Generic interface and use of profiles for power drive systems	Profile type 1 (CiA 402)	—	Profile type 1 (CiA 402)	—	Profile type 1 (CiA 402)	—	Profile type 1 (CiA 402)	—	Profile type 1 (CiA 402)	Profile type 1 (CiA 402)	Profile type 1 (CiA 402)
CAN application layer over EtherCAT (CoE)	✓	—	✓	—	✓	—	✓	—	✓	✓	✓
File transfer over EtherCAT (FoE)	✓	—	✓	—	✓	—	✓	—	✓	✓	✓
Distributed clocks support	✓	—	✓	—	✓	—	✓	—	✓	✓	✓
Cyclic modes support cycle times down to…	1 ms	—	1 ms	—	1 ms	—	1 ms	—	1 ms	1 ms	1 ms
Process data	PDO mapping (Variable)	—	PDO mapping (Variable)	—	PDO mapping (Variable)	—	PDO mapping (Variable)	—	PDO mapping (Variable)	PDO mapping (Variable)	PDO mapping (Variable)
Motors											
Brushed DC motors up to (continuous / max.)	120 W / 360 W [f]	36 W / 108 W	36 W / 108 W	250 W / 750 W	250 W / 750 W	400 W / 1'500 W	400 W / 1'500 W	750 W / 1'500 W	750 W / 1'500 W	250 W / 750 W	1'050 W / 2'100 W
Brushless EC motors (BLDC) up to (continuous / max.)	120 W / 360 W [f]	36 W / 108 W	36 W / 108 W	250 W / 750 W	250 W / 750 W	400 W / 1'500 W	400 W / 1'500 W	750 W / 1'500 W	750 W / 1'500 W	250 W / 750 W	1'050 W / 2'100 W
Sensors (Feedback)											
Digital Hall sensors (EC motors)	✓										
Digital incremental encoder (2-/3-channel, single-ended or differential)	✓										
Analog incremental encoder (3-channel, SinCos, differential)	—	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
SSI absolute encoder (configurable)	✓										
BiSS C absolute encoder (configurable)	—	—	—	—	—	—	—	—	—	[✓] [b]	[✓] [b]
EnDat 2.2 absolute encoder (configurable)	—	—	—	—	—	—	—	—	—	[✓] [b]	[✓] [b]

Ready-to-connect Units	EPOS4 Compact 24/5	EPOS4 Compact 24/1.5		EPOS4 Compact 50/5		EPOS4 Compact 50/8		EPOS4 Compact 50/15		EPOS4 50/5 (546047)	EPOS4 70/15 (594385)
	EtherCAT 3-axes (684519)	CAN (546714)	EtherCAT (628092)	CAN (541718)	EtherCAT (628094)	CAN (520885)	EtherCAT (605298)	CAN (520886)	EtherCAT (605299)		
Commutation											
Digital Hall sensors	✓										
Digital Hall sensors + digital incremental encoder	✓										
Digital Hall sensors + analog incremental encoder	—	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Digital Hall sensors + absolute encoder	✓										
Absolute encoder	✓										
Electrical Data											
Nominal power supply voltage ($+V_{CC}$)	10…24 VDC	10…24 VDC	10…24 VDC	10…50 VDC	10…50 VDC	10…50 VDC	10…50 VDC	10…50 VDC	10…50 VDC	10…50 VDC	10…70 VDC
Nominal logic supply voltage ($+V_C$)	10…24 VDC	10…24 VDC	10…24 VDC	10…50 VDC	10…50 VDC	10…50 VDC	10…50 VDC	10…50 VDC	10…50 VDC	10…50 VDC	10…70 VDC
Absolute supply voltage limits ($+V_{min}$ / $+V_{max}$)	8 VDC / 28 VDC	8 VDC / 28 VDC	8 VDC / 28 VDC	8 VDC / 56 VDC	8 VDC / 56 VDC	8 VDC / 56 VDC	8 VDC / 56 VDC	8 VDC / 56 VDC	8 VDC / 56 VDC	8 VDC / 56 VDC	8 VDC / 75 VDC
Output voltage (max.)	0.9 x $+V_{CC}$										
Output current (I_{cont} / I_{max})	5 A / 15 A (<10 s) [f]	1.5 A / 4.5 A (<30 s)	1.5 A / 4.5 A (<30 s)	5 A / 15 A (<3 s)	5 A / 15 A (<3 s)	8 A / 30 A (<5 s)	8 A / 30 A (<5 s)	15 A / 30 A (<60 s)	15 A / 30 A (<60 s)	5 A / 15 A (<15s)	15 A / 30 A (<60 s)
Pulse width modulation frequency	50 kHz	100 kHz	100 kHz	50 kHz	50 kHz	50 kHz	50 kHz	50 kHz	50 kHz	50 kHz	50 kHz
Sampling rate PI current controller	25 kHz (40 µs)										
Sampling rate PI speed controller	2.5 kHz (400 µs)										
Sampling rate PID positioning controller	2.5 kHz (400 µs)										
Sampling rate analog input	2.5 kHz (400 µs)										
Max. efficiency	97%	89%	88%	97%	97%	98%	98%	98%	98%	98%	98%
Max. speed DC motor	limited by max. permissible speed (motor)										
Max. speed EC motor, block commutation	100'000 rpm (1 pole pair)										
Max. speed EC motor, sinusoidal commutation	50'000 rpm (1 pole pair)										
Built-in motor choke	9 x 1 µH; 5 A	3 x 94 µH; 1.5 A	3 x 100 µH; 1.5 A	3 x 9.4 µH; 5 A	3 x 10 µH; 5 A	3 x 2.2 µH; 15 A	3 x 2.2 µH; 15 A	3 x 2.2 µH; 15 A	3 x 2.2 µH; 15 A	3 x 15 µH; 5 A	3 x 15 µH; 15 A
Inputs / Outputs											
Digital Hall sensor signals	H1, H2, H3 (+2…+24 VDC, internal pull-up)										
Digital incremental encoder signals	A, A\, B, B\, I, I\ (EIA RS422, 6.25 MHz)										
Sensor signals	✓										
Digital incremental	—	A, A\, B, B\, I, I\ (EIA RS422, 6.25 MHz)	A, A\, B, B\, I, I\ (EIA RS422, 6.25 MHz)	A, A\, B, B\, I, I\ (EIA RS422, 6.25 MHz)	A, A\, B, B\, I, I\ (EIA RS422, 6.25 MHz)	A, A\, B, B\, I, I\ (EIA RS422, 6.25 MHz)	A, A\, B, B\, I, I\ (EIA RS422, 6.25 MHz)	A, A\, B, B\, I, I\ (EIA RS422, 6.25 MHz)	A, A\, B, B\, I, I\ (EIA RS422, 6.25 MHz)	A, A\, B, B\, I, I\ (EIA RS422, 6.25 MHz)	A, A\, B, B\, I, I\ (EIA RS422, 6.25 MHz)
Analog incremental	—	A, A\, B, B\, I, I\ (±1.8 V differential, 10 kHz)	A, A\, B, B\, I, I\ (±1.8 V differential, 10 kHz)	A, A\, B, B\, I, I\ (±1.8 V differential, 10 kHz)	A, A\, B, B\, I, I\ (±1.8 V differential, 10 kHz)	A, A\, B, B\, I, I\ (±1.8 V differential, 10 kHz)	A, A\, B, B\, I, I\ (±1.8 V differential, 10 kHz)	A, A\, B, B\, I, I\ (±1.8 V differential, 10 kHz)	A, A\, B, B\, I, I\ (±1.8 V differential, 10 kHz)	A, A\, B, B\, I, I\ (±1.8 V differential, 10 kHz)	A, A\, B, B\, I, I\ (±1.8 V differential, 10 kHz)
Absolute serial SSI	Clock, Clock\, Data, Data\ (EIA RS422, 0.4…2 MHz)										
Digital inputs	4; level selectable by DIP switch: (Logic level: +2.0…+30 VDC) or (PLC level: +9.0…+30 VDC)										
Digital outputs	2 (open drain, max. 36 VDC / 500 mA, internal pull-up)										
High-speed digital inputs	1 (EIA RS422, 6.25 MHz)	4 (EIA RS422, 6.25 MHz)	4 (EIA RS422, 6.25 MHz)	4 (EIA RS422, 6.25 MHz)	4 (EIA RS422, 6.25 MHz)	4 (EIA RS422, 6.25 MHz)	4 (EIA RS422, 6.25 MHz)	4 (EIA RS422, 6.25 MHz)	4 (EIA RS422, 6.25 MHz)	4 (EIA RS422, 6.25 MHz)	4 (EIA RS422, 6.25 MHz)
High-speed digital outputs	1 (EIA RS422, 6.25 MHz)										
Analog inputs	2 (resolution 12-bit, −10…+10 V, 10 kHz, differential)										

Ready-to-connect Units	EPOS4 Compact 24/5	EPOS4 Compact 24/1.5		EPOS4 Compact 50/5		EPOS4 Compact 50/8		EPOS4 Compact 50/15		EPOS4 50/5 (546047)	EPOS4 70/15 (594385)
	EtherCAT 3-axes (684519)	CAN (546714)	EtherCAT (628092)	CAN (541718)	EtherCAT (628094)	CAN (520885)	EtherCAT (605298)	CAN (520886)	EtherCAT (605299)		
Analog outputs	1 (resolution 12-bit, −4…+4 V, 25 kHz)	2 (resolution 12-bit, −4…+4 V, 25 kHz)	2 (resolution 12-bit, −4…+4 V, 25 kHz)	2 (resolution 12-bit, −4…+4 V, 25 kHz)	2 (resolution 12-bit, −4…+4 V, 25 kHz)	2 (resolution 12-bit, −4…+4 V, 25 kHz)	2 (resolution 12-bit, −4…+4 V, 25 kHz)	2 (resolution 12-bit, −4…+4 V, 25 kHz)	2 (resolution 12-bit, −4…+4 V, 25 kHz)	2 (resolution 12-bit, −4…+4 V, 25 kHz)	2 (resolution 12-bit, −4…+4 V, 25 kHz)
STO inputs	—	2 (+4.5…+30 VDC, optically isolated)	2 (+4.5…+30 VDC, optically isolated)	2 (+4.5…+30 VDC, optically isolated)	2 (+4.5…+30 VDC, optically isolated)	2 (+4.5…+30 VDC, optically isolated)	2 (+4.5…+30 VDC, optically isolated)	2 (+4.5…+30 VDC, optically isolated)	2 (+4.5…+30 VDC, optically isolated)	2 (+4.5…+30 VDC, optically isolated)	2 (+4.5…+30 VDC, optically isolated)
STO outputs	—	1 (max. 30 VDC / 15 mA, optically isolated with self-resetting short-circuit protection)	1 (max. 30 VDC / 15 mA, optically isolated with self-resetting short-circuit protection)	1 (max. 30 VDC / 15 mA, optically isolated with self-resetting short-circuit protection)	1 (max. 30 VDC / 15 mA, optically isolated with self-resetting short-circuit protection)	1 (max. 30 VDC / 15 mA, optically isolated with self-resetting short-circuit protection)	1 (max. 30 VDC / 15 mA, optically isolated with self-resetting short-circuit protection)	1 (max. 30 VDC / 15 mA, optically isolated with self-resetting short-circuit protection)	1 (max. 30 VDC / 15 mA, optically isolated with self-resetting short-circuit protection)	1 (max. 30 VDC / 15 mA, optically isolated with self-resetting short-circuit protection)	1 (max. 30 VDC / 15 mA, optically isolated with self-resetting short-circuit protection)
Sensor supply voltage	+5 VDC (I_L ≤120 mA)	+5 VDC (I_L ≤100 mA)	+5 VDC (I_L ≤100 mA)	+5 VDC (I_L ≤100 mA)	+5 VDC (I_L ≤100 mA)	+5 VDC (I_L ≤100 mA)	+5 VDC (I_L ≤100 mA)	+5 VDC (I_L ≤100 mA)	+5 VDC (I_L ≤100 mA)	+5 VDC (I_L ≤100 mA)	+5 VDC (I_L ≤100 mA)
Auxiliary output voltage	—	+5 VDC (I_L ≤150 mA)	+5 VDC (I_L ≤150 mA)	+5 VDC (I_L ≤150 mA)	+5 VDC (I_L ≤150 mA)	+5 VDC (I_L ≤150 mA)	+5 VDC (I_L ≤150 mA)	+5 VDC (I_L ≤150 mA)	+5 VDC (I_L ≤150 mA)	+5 VDC (I_L ≤150 mA)	+5 VDC (I_L ≤150 mA)
Status indicators (LEDs or bi-color LEDs)	Device status										
	NET status	—	NET status	—	NET status	—	NET status	—	NET status	NET status	NET status
	NET port	—	NET port	—	NET port	—	NET port	—	NET port	NET port	NET port
Connections											
X1/X2 Power & logic Supply	—	HARTING har-flexicon 3 poles	HARTING har-flexicon 3 poles	HARTING har-flexicon 3 poles	HARTING har-flexicon 3 poles	—	—	—	—	—	—
X1 Power supply	Molex Mega-Fit 2 poles	—	—	—	—	Molex Mega-Fit 2 poles	Molex Mega-Fit 2 poles	Molex Mega-Fit 2 poles	Molex Mega-Fit 2 poles	Molex Mini-Fit Jr. 2 poles	Molex Mega-Fit 2 poles
X2 Logic supply	Molex Mini-Fit Jr. 2 poles	—	—	—	—	Molex Mini-Fit Jr. 2 poles	Molex Mini-Fit Jr. 2 poles	Molex Mini-Fit Jr. 2 poles	Molex Mini-Fit Jr. 2 poles	Molex Mini-Fit Jr., 2 poles	Molex Mini-Fit Jr. 2 poles
X3 Motor	Molex Mini-Fit Jr. 4 poles [f]	—	—	Molex Mini-Fit Jr. 4 poles	Molex Mini-Fit Jr. 4 poles	—	—	—	—	Molex Mini-Fit Jr. 4 poles	—
X3a/X4a Motor & Hall sensor	—	HARTING har-flexicon 8 poles	HARTING har-flexicon 8 poles	—	—	—	—	—	—	—	—
X3a Motor (I_{cont} ≤11 A)	—	—	—	—	—	Molex Mini-Fit Jr. 4 poles	Molex Mini-Fit Jr. 4 poles	Molex Mini-Fit Jr. 4 poles	Molex Mini-Fit Jr. 4 poles	—	Molex Mini-Fit Jr. 4 poles
X3b/X4b Motor & Hall sensor	—	Lumberg Minimodul 8 poles	Lumberg Minimodul 8 poles	—	—	—	—	—	—	—	—
X3b Motor (I_{cont} ≤15 A)	—	—	—	—	—	—	—	Molex Mega-Fit 4 poles	Molex Mega-Fit 4 poles	—	Molex Mega-Fit 4 poles
X3c Motor	—	Hirose DF3DZ 3 poles	Hirose DF3DZ 3 poles	—	—	—	—	—	—	—	—
X4 Hall sensor	Molex Micro-Fit 3.0 6 poles [f]	—	—	Molex Micro-Fit 3.0 6 poles	Molex Micro-Fit 3.0 6 poles	Molex Micro-Fit 3.0 6 poles	Molex Micro-Fit 3.0 6 poles	Molex Micro-Fit 3.0 6 poles	Molex Micro-Fit 3.0 6 poles	Molex Micro-Fit 3.0 6 poles	Molex Micro-Fit 3.0 6 poles
X5/X6 Encoder/Sensor	Molex CLIK-Mate 2x5 poles [f]	—	—	—	—	—	—	—	—	—	—
X5 Encoder	—	Pin header 2.54 mm 2x5 poles	Pin header 2.54 mm 2x5 poles	Pin header 2.54 mm 2x5 poles	Pin header 2.54 mm 2x5 poles	Pin header 2.54 mm 2x5 poles	Pin header 2.54 mm 2x5 poles	Pin header 2.54 mm 2x5 poles	Pin header 2.54 mm 2x5 poles	Pin header 2.54 mm 2x5 poles	Pin header 2.54 mm 2x5 poles
X6 Sensor	—	Molex CLIK-Mate 2x5 poles	Molex CLIK-Mate 2x5 poles	Molex CLIK-Mate 2x5 poles	Molex CLIK-Mate 2x5 poles	Molex CLIK-Mate 2x5 poles	Molex CLIK-Mate 2x5 poles	Molex CLIK-Mate 2x5 poles	Molex CLIK-Mate 2x5 poles	Molex CLIK-Mate 2x5 poles	Molex CLIK-Mate 2x5 poles
X7 Digital I/O	Molex CLIK-Mate 8 poles [f]	Molex CLIK-Mate 8 poles	Molex CLIK-Mate 8 poles	Molex CLIK-Mate 8 poles	Molex CLIK-Mate 8 poles	Molex CLIK-Mate 8 poles	Molex CLIK-Mate 8 poles	Molex CLIK-Mate 8 poles	Molex CLIK-Mate 8 poles	Molex CLIK-Mate 8 poles	Molex CLIK-Mate 8 poles

Ready-to-connect Units	EPOS4 Compact 24/5	EPOS4 Compact 24/1.5		EPOS4 Compact 50/5		EPOS4 Compact 50/8		EPOS4 Compact 50/15		EPOS4 50/5 (546047)	EPOS4 70/15 (594385)
	EtherCAT 3-axes (684519)	CAN (546714)	EtherCAT (628092)	CAN (541718)	EtherCAT (628094)	CAN (520885)	EtherCAT (605298)	CAN (520886)	EtherCAT (605299)		
X8 Analog I/O	Molex CLIK-Mate 7 poles [f]	Molex CLIK-Mate 7 poles	Molex CLIK-Mate 7 poles	Molex CLIK-Mate 7 poles	Molex CLIK-Mate 7 poles	Molex CLIK-Mate 7 poles	Molex CLIK-Mate 7 poles	Molex CLIK-Mate 7 poles	Molex CLIK-Mate 7 poles	Molex CLIK-Mate 7 poles	Molex CLIK-Mate 7 poles
X9 STO	—	Molex CLIK-Mate 8 poles	Molex CLIK-Mate 8 poles	Molex CLIK-Mate 8 poles	Molex CLIK-Mate 8 poles	Molex CLIK-Mate 8 poles	Molex CLIK-Mate 8 poles	Molex CLIK-Mate 8 poles	Molex CLIK-Mate 8 poles	Molex CLIK-Mate 8 poles	Molex CLIK-Mate 8 poles
X10 RS232	—	Molex CLIK-Mate 5 poles	—	Molex CLIK-Mate 5 poles	—	Molex CLIK-Mate 5 poles	—	Molex CLIK-Mate 5 poles	—	Molex CLIK-Mate 5 poles	Molex CLIK-Mate 5 poles
X11 CAN 1	—	Molex CLIK-Mate 4 poles	—	Molex CLIK-Mate 4 poles	—	Molex CLIK-Mate 4 poles	—	Molex CLIK-Mate 4 poles	—	Molex CLIK-Mate 4 poles	Molex CLIK-Mate 4 poles
X12 CAN 2	—	Molex CLIK-Mate 4 poles	—	Molex CLIK-Mate 4 poles	—	Molex CLIK-Mate 4 poles	—	Molex CLIK-Mate 4 poles	—	Molex CLIK-Mate 4 poles	Molex CLIK-Mate 4 poles
X13 USB	USB Type micro B, female										
X14 Extension IN	RJ45 10/100-BASE-TX	—	RJ45 10/100-BASE-TX	—	RJ45 10/100-BASE-TX	—	RJ45 10/100-BASE-TX	—	RJ45 10/100-BASE-TX	RJ45 10/100-BASE-TX [a]	RJ45 10/100-BASE-TX [a]
X15 Extension OUT	RJ45 10/100-BASE-TX	—	RJ45 10/100-BASE-TX	—	RJ45 10/100-BASE-TX	—	RJ45 10/100-BASE-TX	—	RJ45 10/100-BASE-TX	RJ45 10/100-BASE-TX [a]	RJ45 10/100-BASE-TX [a]
X16 Extension signal [a]	—	—	—	—	—	—	—	—	—	Molex CLIK-Mate 2x5 poles	Molex CLIK-Mate, 2x5 poles
Mechanical Data											
Weight (approximate)	85 g	58 g	78 g	58 g	76 g	86 g	100 g	126 g	140 g	206 g	372 g
Dimensions (L x W x H) [mm]	90.0 x 56.0 x 29.1	55.0 x 40.0 x 31.1	56.5 x 55.0 x 31.7	55.0 x 40.0 x 31.1	56.5 x 55.0 x 31.7	59.5 x 58.5 x 33.0	59.5 x 79.5 x 35.7	59.5 x 65.5 x 35.1	59.5 x 79.5 x 37.0	105.0 x 83.0 x 38.7	125.0 x 94.5 x 38.7
Mounting	M3 screws	M2.5 screws	M2.5 screws	M2.5 screws	M2.5 screws	M2.5 screws	M2.5 screws	M3 screws	M3 screws	M4 screws	M4 screws
Environmental Conditions											
Temperature – Operation	−30…+25 °C	−30…+45 °C	−30…+45 °C	−30…+25 °C	−30…+25 °C	−30…+45 °C	−30…+45 °C	−30…+25 °C	−30…+25 °C	−30…+50 °C	−30…+50 °C
Temperature – Extended range and derating	+25…+50 °C −0.2 A/°C [f]	+45…+70 °C −0.060 A/°C	+45…+70 °C −0.060 A/°C	+25…+70 °C −0.111 A/°C	+25…+70 °C −0.111 A/°C	+45…+77 °C −0.250 A/°C	+45…+77 °C −0.250 A/°C	+25…+77 °C −0.288 A/°C	+25…+77 °C −0.288 A/°C	+50…+80 °C −0.167 A/°C	+50…+85 °C −0.429 A/°C
Temperature – Storage	−40…+85 °C										
Altitude – Operation	0...6'000 m MSL										
Altitude – Extended range	6'000…10'000 m MSL (for derating see «Hardware Reference»)										
Humidity (condensation not permitted)	5…90%										
Directives & Standards											
Generic	IEC/EN 61000-6-2; IEC/EN 61000-6-3										
Applied	IEC/EN 55032 (CISPR32); IEC/EN 61000-4-3; IEC/EN 61000-4-4; IEC/EN 61000-4-6	IEC/EN 55022 (CISPR22); IEC/EN 61000-4-3; IEC/EN 61000-4-4; IEC/EN 61000-4-6	IEC/EN 55022 (CISPR22); IEC/EN 61000-4-3; IEC/EN 61000-4-4; IEC/EN 61000-4-6	IEC/EN 55022 (CISPR22); IEC/EN 61000-4-3; IEC/EN 61000-4-4; IEC/EN 61000-4-6	IEC/EN 55022 (CISPR22); IEC/EN 61000-4-3; IEC/EN 61000-4-4; IEC/EN 61000-4-6	IEC/EN 55022 (CISPR22); IEC/EN 61000-4-3; IEC/EN 61000-4-4; IEC/EN 61000-4-6	IEC/EN 55022 (CISPR22); IEC/EN 61000-4-3; IEC/EN 61000-4-4; IEC/EN 61000-4-6	IEC/EN 55022 (CISPR22); IEC/EN 61000-4-3; IEC/EN 61000-4-4; IEC/EN 61000-4-6	IEC/EN 55022 (CISPR22); IEC/EN 61000-4-3; IEC/EN 61000-4-4; IEC/EN 61000-4-6	IEC/EN 55022 (CISPR22); IEC/EN 61000-4-3; IEC/EN 61000-4-4; IEC/EN 61000-4-6	IEC/EN 55022 (CISPR22); IEC/EN 61000-4-3; IEC/EN 61000-4-4; IEC/EN 61000-4-6
Environment	IEC/EN 60068-2-6; MIL-STD-810F										
Safety (UL File Number; unassembled PCB)	E207844	E207844	E207844	E207844	E207844	E76251; E116354; E133472; E207844; E337862	E76251; E133472; E207844; E337862	E76251; E116354; E133472; E207844; E337862	E76251; E133472; E207844; E337862	E229342	E207844
Reliability (MIL-HDBK-217F; MTBF)	146'032 hours	326'977 hours	279'388 hours	253'865 hours	238'623 hours	210'109 hours	197'129 hours	199'049 hours, with heat sink <3.1 K/W	179'777 hours, with heat sink <3.1 K/W	296'741 hours	254'446 hours

maxon

Ready-to-connect Units	EPOS4 Compact 24/5 EtherCAT 3-axes (684519)	EPOS4 Compact 24/1.5 CAN (546714)	EPOS4 Compact 24/1.5 EtherCAT (628092)	EPOS4 Compact 50/5 CAN (541718)	EPOS4 Compact 50/5 EtherCAT (628094)	EPOS4 Compact 50/8 CAN (520885)	EPOS4 Compact 50/8 EtherCAT (605298)	EPOS4 Compact 50/15 CAN (520886)	EPOS4 Compact 50/15 EtherCAT (605299)	EPOS4 50/5 (546047)	EPOS4 70/15 (594385)
Functionality											
Operating Modes											
CST Cyclic Synchronous Torque Mode	✓										
CSV Cyclic Synchronous Velocity Mode	✓										
CSP Cyclic Synchronous Position Mode	✓										
PVM Profile Velocity Mode	✓										
PPM Profile Position Mode	✓										
HMM Homing Mode	✓										
Master Encoder Functionality	[✓]										
Step/Direction Functionality	[✓]										
Analog Set Value Functionality	CST / CSV										
Features											
Feed forward (acceleration/velocity for inertia and friction compensation)	✓										
Field-oriented Control (FOC)	✓										
Velocity observer	✓										
Dual loop control	✓										
Custom persistent memory	✓										
Advanced automatic control settings (Auto Tuning)	✓										
Safe Torque Off (based on IEC/EN 61800-5-2, not certified)	—	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Digital I/O Functionality											
Inputs (configurable)	✓										
Touch Probe	✓										
Reference switches	✓										
Limit switches	✓										
Quickstop	✓										
Drive Enable	✓										
General purpose	✓										
Outputs (configurable)	✓										
Position Compare	[✓]										
Holding Brake	✓										
Ready/Fault	✓										
General purpose	✓										

maxon

Ready-to-connect Units	EPOS4 Compact 24/5	EPOS4 Compact 24/1.5		EPOS4 Compact 50/5		EPOS4 Compact 50/8		EPOS4 Compact 50/15		EPOS4 50/5	EPOS4 70/15
	EtherCAT 3-axes (684519)	CAN (546714)	EtherCAT (628092)	CAN (541718)	EtherCAT (628094)	CAN (520885)	EtherCAT (605298)	CAN (520886)	EtherCAT (605299)	(546047)	(594385)
Analog I/O Functionality											
Inputs (configurable)	✓										
Analog set value	✓										
General purpose	✓										
Outputs (configurable)	✓										
Current monitor	[✓]										
Velocity monitor	[✓]										
Position monitor	[✓]										
Temperature monitor	[✓]										
General purpose	✓										
Built-in Protection											
Current limiter (adjustable)	✓										
Overcurrent	✓										
Thermal motor protection	✓										
Thermal controller protection	✓										
Overvoltage	✓										
Undervoltage	✓										
Voltage transients	✓										
Short-circuit of motor winding	✓										
Loss of feedback signal	✓										
Following error	✓										
Status reporting	✓										
Firmware error handling	✓										

Ready-to-connect Units	EPOS4 Compact 24/5	EPOS4 Compact 24/1.5		EPOS4 Compact 50/5		EPOS4 Compact 50/8		EPOS4 Compact 50/15		EPOS4 50/5	EPOS4 70/15
	EtherCAT 3-axes (684519)	CAN (546714)	EtherCAT (628092)	CAN (541718)	EtherCAT (628094)	CAN (520885)	EtherCAT (605298)	CAN (520886)	EtherCAT (605299)	(546047)	(594385)
Software											
Installation Program	EPOS Setup										
Graphical User Interface	EPOS Studio The EPOS video library features video tutorials that provide easy to follow instructions on how to get started with «EPOS Studio» and how to setup communication interfaces, motors and sensors, and so on. Explore on Vimeo: ➔https://vimeo.com/album/4646388										
Startup	✓										
Regulation Tuning	✓										
Firmware Update	✓										
Motion Commander	✓										
I/O Monitor	✓										
Parameters	✓										
Data Recording	✓										
Command Analyzer	✓										
CANopen Wizard	✓										
Online Help	✓										
Language	English										
Operating System	Windows 10, 8, 7										
Windows DLL for PC	32-bit / 64-bit										
CAN interfaces	IXXAT | National Instruments | Kvaser | Vector										
Programming examples	Microsoft Visual Basic, Visual Basic.NET, Visual C# , Visual C++ | Borland C++, Delphi | National Instruments LabView, LabWindows/CVI										
Linux Shared Object Library	X86 32-bit/64-bit, ARMv6/v7/v8 32-bit, ARMv8 64-bit										
CAN interfaces	IXXAT | Kvaser										
Programming examples	C++										

maxon

Ready-to-connect Units		EPOS4 Compact 24/5	EPOS4 Compact 24/1.5		EPOS4 Compact 50/5		EPOS4 Compact 50/8		EPOS4 Compact 50/15		EPOS4 50/5 (546047)	EPOS4 70/15 (594385)
		EtherCAT 3-axes (684519)	CAN (546714)	EtherCAT (628092)	CAN (541718)	EtherCAT (628094)	CAN (520885)	EtherCAT (605298)	CAN (520886)	EtherCAT (605299)		
Accessories (not included in delivery)												
520858	CAN-CAN Cable	—	✓	—	✓	—	✓	—	✓	—	✓	✓
520857	CAN-COM Cable	—	✓	—	✓	—	✓	—	✓	—	✓	✓
275934	Encoder Cable	—	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
693573	Adapter Cable Encoder CLICK-Mate to DIN41651	✓	—	—	—	—	—	—	—	—	—	—
422827	Ethernet Cable	✓	—	✓	—	✓	—	✓	—	✓	✓	✓
275878	Hall Sensor Cable	✓	—	—	✓	✓	✓	✓	✓	✓	✓	✓
275851	Motor Cable	✓	—	—	✓	✓	✓	✓	✓	✓	✓	✓
520851	Motor Cable High Current	—	—	—	—	—	—	—	✓	✓	—	✓
275829	Power Cable	✓ [c]	—	—	—	—	✓ [c]	✓ [c]	✓ [c]	✓ [c]	✓	✓ [c]
520850	Power Cable High Current	✓ [d]	—	—	—	—	✓ [d]	✓ [d]	✓ [d]	✓ [d]	—	✓ [d]
520856	RS232-COM Cable	—	✓	—	✓	—	✓	—	✓	—	✓	✓
520852	Sensor Cable 5x2core	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
520854	Signal Cable 7core	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
520853	Signal Cable 8core	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
403968	USB Type A - micro B Cable	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
520860	STO Idle Connector	—	✓ (included)	✓ (included)	✓ (included)	✓ (included)	✓ (included)	✓ (included)	✓ (included)	✓ (included)	✓ (included)	✓ (included)
520859	EPOS4 Connector Set	—	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
691408	EPOS4 MB Micro EtherCAT 3-axes Connector Set	✓	—	—	—	—	—	—	—	—	—	—
581245	EPOS4 EtherCAT Card	—	—	—	—	—	—	—	—	—	✓	✓

maxon

High Integration Units	EPOS4 Disk 60/8		EPOS4 Disk 60/12			
	CAN (688770)	EtherCAT (688772)	CAN (688775)	CAN SSC (709859)	EtherCAT (688777)	EtherCAT SSC (709862)
for comparison purposes: US Half Dollar coin (Ø30.6 mm)						
Communication Interfaces						
CANopen Slave	max. 1 Mbit/s	—	max. 1 Mbit/s	max. 1 Mbit/s	—	—
CANopen Application Layer and Communication Profile	CiA 301	—	CiA 301	CiA 301	—	—
CANopen Layer Setting Services and Protocol (LSS)	CiA 305	—	CiA 305	CiA 305	—	—
CANopen Device Profile Drives and Motion Control	CiA 402	—	CiA 402	CiA 402	—	—
USB 2.0 / USB 3.0	Full speed					
Gateway function USB-to-CAN	✓	—	✓	✓	—	—
EtherCAT Slave	—	✓	—	—	✓	✓
IEC 61158 Digital data communication for measurement and control Fieldbus for use in industrial control systems	—	Type 12 (EtherCAT) max. 100 Mbit/s (100 Base Tx)	—	—	Type 12 (EtherCAT) max. 100 Mbit/s (100 Base Tx)	Type 12 (EtherCAT) max. 100 Mbit/s (100 Base Tx)
IEC 61800-7 Generic interface and use of profiles for power drive systems	—	Profile type 1 (CiA 402)	—	—	Profile type 1 (CiA 402)	Profile type 1 (CiA 402)
CAN application layer over EtherCAT (CoE)	—	✓	—	—	✓	✓
File transfer over EtherCAT (FoE)	—	✓	—	—	✓	✓
Distributed clocks support	—	✓	—	—	✓	✓
Cyclic modes support cycle times down to…	—	1 ms	—	—	1 ms	1 ms
Process data	—	PDO mapping (Variable)	—	—	PDO mapping (Variable)	PDO mapping (Variable)
Motors						
Brushed DC motors up to (continuous / max.)	480 W / 1'440 W	480 W / 1'440 W	720 W / 2'160 W	720 W / 2'160 W	720 W / 2'160 W	720 W / 2'160 W
Brushless EC motors (BLDC) up to (continuous / max.)	480 W / 1'440 W	480 W / 1'440 W	720 W / 2'160 W	720 W / 2'160 W	720 W / 2'160 W	720 W / 2'160 W
Sensors (Feedback)						
Digital Hall sensors (EC motors)	✓					
Digital incremental encoder (2-/3-channel, single-ended or differential)	✓					
Analog incremental encoder (3-channel, SinCos, differential)	—					
SSI absolute encoder (configurable)	✓					
BiSS C absolute encoder (configurable)	—					
EnDat 2.2 absolute encoder (configurable)	—					

High Integration Units	EPOS4 Disk 60/8		EPOS4 Disk 60/12			
	CAN (688770)	EtherCAT (688772)	CAN (688775)	CAN SSC (709859)	EtherCAT (688777)	EtherCAT SSC (709862)
Communication						
Digital Hall sensors	✓					
Digital Hall sensors + digital incremental encoder	✓					
Digital Hall sensors + analog incremental encoder	—					
Digital Hall sensors + absolute encoder	✓					
Absolute encoder	✓					
Electrical Data						
Nominal power supply voltage ($+V_{CC}$)	12…60 VDC					
Nominal logic supply voltage ($+V_C$)	12…60 VDC					
Absolute supply voltage limits ($+V_{min}$ / $+V_{max}$)	10 VDC / 61 VDC					
Output voltage (max.)	0.9 x $+V_{CC}$					
Output current (I_{cont} / I_{max})	8 A / 24 A (<10 s)	8 A / 24 A (<10 s)	12 A / 36 A (<5 s)	12 A / 36 A (<5 s)	12 A / 36 A (<5 s)	12 A / 36 A (<5 s)
Pulse width modulation frequency	50 kHz					
Sampling rate PI current controller	25 kHz (40 µs)					
Sampling rate PI speed controller	2.5 kHz (400 µs)					
Sampling rate PID positioning controller	2.5 kHz (400 µs)					
Sampling rate analog input	2.5 kHz (400 µs)					
Max. efficiency	98%					
Max. speed DC motor	limited by max. permissible speed (motor)					
Max. speed EC motor, block commutation	100'000 rpm (1 pole pair)					
Max. speed EC motor, sinusoidal commutation	50'000 rpm (1 pole pair)					
Built-in motor choke	—					
Inputs / Outputs						
Digital Hall sensor signals	H1, H2, H3 (+2…+24 VDC, internal pull-up)					
Digital incremental encoder signals	A, A\, B, B\, I, I\ (EIA RS422, 6.25 MHz)					
Sensor signals	✓					
Absolute serial SSI	Clock, Clock\, Data, Data\ (EIA RS422, 0.4…2 MHz)					
Digital inputs	4 (+2.1…+36 VDC)					
Digital outputs	2 (open drain, max. 36 VDC / 500 mA, internal pull-up)					
High-speed digital inputs	1 (EIA RS422, 6.25 MHz)					
High-speed digital outputs	1 (EIA RS422, 6.25 MHz) 1 (Holding Brake only, configurable voltage, PWM frequency 25 kHz)					
Analog inputs	2 (resolution 12-bit, −10…+10 V, 10 kHz, differential)					
Analog outputs	1 (resolution 12-bit, −4… +4 V, 25 kHz)					
Sensor supply voltage	+5 VDC (I_L ≤100 mA)					
Auxiliary output voltage	+5 VDC (I_L ≤150 mA)					
Status indicators (LEDs or bi-color LEDs)	Device status					
	—	NET status	—	—	NET status	NET status
	—	NET port	—	—	NET port	NET port

maxon

High Integration Units		EPOS4 Disk 60/8		EPOS4 Disk 60/12			
		CAN (688770)	EtherCAT (688772)	CAN (688775)	CAN SSC (709859)	EtherCAT (688777)	EtherCAT SSC (709862)
Connections							
X1/X2	Power & logic Supply	Molex Micro-Fit 3 poles	Molex Micro-Fit 3 poles	—	—	—	—
X1	Power supply	—	—	Molex Micro-Fit Plus 2 poles	—	Molex Micro-Fit Plus 2 poles	—
X1a	Power supply	—	—	—	Molex Micro-Fit Plus 2 poles	—	Molex Micro-Fit Plus 2 poles
X2	Logic supply	—	—	Molex Micro-Fit Plus 2 poles	—	Molex Micro-Fit Plus 2 poles	—
X2a	Logic supply	—	—	—	Molex Micro-Fit Plus 2 poles	—	Molex Micro-Fit Plus 2 poles
X3	Motor	Molex Micro-Fit 3 poles	Molex Micro-Fit 3 poles	Molex Mini-Fit Plus 4 poles	Molex Mini-Fit Plus 4 poles	Molex Mini-Fit Plus 4 poles	Molex Mini-Fit Plus 4 poles
X4	Hall sensor	Molex Micro-Lock 5 poles	Molex Micro-Lock 5 poles	Molex Micro-Fit 6 poles	Molex Micro-Fit 6 poles	Molex Micro-Fit 6 poles	Molex Micro-Fit 6 poles
X4a	Hall sensor	—	—	Molex Micro-Lock 5 poles	Molex Micro-Lock 5 poles	Molex Micro-Lock 5 poles	Molex Micro-Lock 5 poles
X5/X6	Encoder/Sensor	—	—	Molex CLIK-Mate 2x5 poles	Molex CLIK-Mate 2x5 poles	Molex CLIK-Mate 2x5 poles	Molex CLIK-Mate 2x5 poles
X5	Encoder	Molex Micro-Lock 2x4 poles	Molex Micro-Lock 2x4 poles	Molex Micro-Lock 2x4 poles	Molex Micro-Lock 2x4 poles	Molex Micro-Lock 2x4 poles	Molex Micro-Lock 2x4 poles
X6	SSI	Molex Micro-Lock 6 poles	Molex Micro-Lock 6 poles	Molex Micro-Lock 6 poles	Molex Micro-Lock 6 poles	Molex Micro-Lock 6 poles	Molex Micro-Lock 6 poles
X7	Digital I/O	Molex Micro-Lock 8 poles	Molex Micro-Lock 8 poles	Molex Micro-Lock 8 poles	—	Molex Micro-Lock 8 poles	—
X7a	Digital I/O	—	—	—	Molex Micro-Lock 8 poles	—	Molex Micro-Lock 8 poles
X8	Analog I/O	Molex Micro-Lock 7 poles	Molex Micro-Lock 7 poles	Molex Micro-Lock 7 poles	—	Molex Micro-Lock 7 poles	—
X8a	Analog I/O	—	—	—	Molex Micro-Lock 7 poles	—	Molex Micro-Lock 7 poles
X13	USB	Molex Micro-Lock 4 poles	Molex Micro-Lock 4 poles	Molex Micro-Lock 4 poles	—	Molex Micro-Lock 4 poles	—
X13a	USB	—	—	—	Molex Micro-Lock 4 poles	—	Molex Micro-Lock 4 poles
X14	CAN IN	HARTING ix Industrial, Type B	—	HARTING ix Industrial, Type B	—	—	—
	EtherCAT IN	—	HARTING ix Industrial, Type A	—	—	HARTING ix Industrial, Type A	—
X14a	CAN IN	—	—	—	HARTING ix Industrial, Type B	—	—
	EtherCAT IN	—	—	—	—	—	HARTING ix Industrial, Type A
X15	CAN OUT	HARTING ix Industrial, Type B	—	HARTING ix Industrial, Type B	—	—	—
	EtherCAT OUT	—	HARTING ix Industrial, Type A	—	—	HARTING ix Industrial, Type A	—
X15a	CAN OUT	—	—	—	HARTING ix Industrial, Type B	—	—
	EtherCAT OUT	—	—	—	—	—	HARTING ix Industrial, Type A
X16	Brake	Molex Micro-Fit 2 poles	Molex Micro-Fit 2 poles	Molex Micro-Fit 2 poles	Molex Micro-Fit 2 poles	Molex Micro-Fit 2 poles	Molex Micro-Fit 2 poles

maxon

High Integration Units	EPOS4 Disk 60/8		EPOS4 Disk 60/12			
	CAN (688770)	EtherCAT (688772)	CAN (688775)	CAN SSC (709859)	EtherCAT (688777)	EtherCAT SSC (709862)
Mechanical Data						
Weight (approximate)	24 g	26 g	43 g	43 g	45 g	45 g
Dimensions (D outside/center hole x H)	Ø60/14 x 22 mm	Ø60/14 x 22 mm	Ø90/24 x 27.6 mm	Ø90/24 x 17.6 mm	Ø90/24 x 27.6 mm	Ø90/24 x 17.6 mm
Mounting	M2 screws	M2 screws	M3 screws	M3 screws	M3 screws	M3 screws
Environmental Conditions						
Temperature – Operation	−30…+45 °C	−30…+35 °C	−30…+50 °C	−30…+50 °C	−30…+45 °C	−30…+45 °C
Temperature – Extended range and derating	+45…+75 °C −0.267 A/°C	+35…+65 °C −0.267 A/°C	+50…+75 °C −0.480 A/°C	+50…+75 °C −0.480 A/°C	+45…+70 °C −0.480 A/°C	+45…+70 °C −0.480 A/°C
Temperature – Storage	−40…+85 °C					
Altitude – Operation	0...6'000 m MSL	0...6'000 m MSL	0...10'000 m MSL	0...10'000 m MSL	0...6'000 m MSL	0...6'000 m MSL
Altitude – Extended range	6'000…10'000 m MSL (for derating see «Hardware Reference»)					
Humidity (condensation not permitted)	5…90%					
Directives & Standards						
Generic	IEC/EN 61000-6-2; IEC/EN 61000-6-3					
Applied	IEC/EN 55032 (CISPR32); IEC/EN 61000-4-2; IEC/EN 61000-4-3; IEC/EN 61000-4-4; IEC/EN 61000-4-6; IEC/EN 61000-4-8					
Environment	IEC/EN 60068-2-6; MIL-STD-810F					
Safety (UL File Number; unassembled PCB)	E229342	E229342	E207844	E207844	E207844	E207844
Reliability (MIL-HDBK-217F; MTBF)	395'482 hours	277'794 hours	459'979 hours	459'979 hours	288'239 hours	288'239 hours
Functionality						
Operating Modes						
CST Cyclic Synchronous Torque Mode	✓					
CSV Cyclic Synchronous Velocity Mode	✓					
CSP Cyclic Synchronous Position Mode	✓					
PVM Profile Velocity Mode	✓					
PPM Profile Position Mode	✓					
HMM Homing Mode	✓					
Master Encoder Functionality	[✓]					
Step/Direction Functionality	[✓]					
Analog Set Value Functionality	CST / CSV					
Features						
Feed forward (acceleration/velocity for inertia and friction compensation)	✓					
Field-oriented Control (FOC)	✓					
Velocity observer	✓					
Dual loop control	✓					
Custom persistent memory	✓					
Advanced automatic control settings (Auto Tuning)	✓					

High Integration Units	EPOS4 Disk 60/8		EPOS4 Disk 60/12			
	CAN (688770)	EtherCAT (688772)	CAN (688775)	CAN SSC (709859)	EtherCAT (688777)	EtherCAT SSC (709862)
Digital I/O Functionality						
Inputs (configurable)	✓					
Touch Probe	✓					
Reference switches	✓					
Limit switches	✓					
Quickstop	✓					
Drive Enable	✓					
General purpose	✓					
Outputs (configurable)	✓					
Position Compare	[✓]					
Holding Brake	✓					
Ready/Fault	✓					
General purpose	✓					
Analog I/O Functionality						
Inputs (configurable)	✓					
Analog set value	✓					
General purpose	✓					
Outputs (configurable)	✓					
General purpose	✓					
Current monitor	[✓]					
Velocity monitor	[✓]					
Position monitor	[✓]					
Temperature monitor	[✓]					
General purpose	✓					
Built-in Protection						
Current limiter (adjustable)	✓					
Overcurrent	✓					
Thermal motor protection	✓					
Thermal controller protection	✓					
Overvoltage	✓					
Undervoltage	✓					
Voltage transients	✓					
Short-circuit of motor winding	✓					
Loss of feedback signal	✓					
Following error	✓					
Status reporting	✓					
Firmware error handling	✓					

maxon

High Integration Units	EPOS4 Disk 60/8		EPOS4 Disk 60/12			
	CAN (688770)	EtherCAT (688772)	CAN (688775)	CAN SSC (709859)	EtherCAT (688777)	EtherCAT SSC (709862)
Software						
Installation Program	EPOS Setup					
Graphical User Interface	EPOS Studio The EPOS video library features video tutorials that provide easy to follow instructions on how to get started with «EPOS Studio» and how to setup communication interfaces, motors and sensors, and so on. Explore on Vimeo: ➔https://vimeo.com/album/4646388					
Startup	✓					
Regulation Tuning	✓					
Firmware Update	✓					
Motion Commander	✓					
I/O Monitor	✓					
Parameters	✓					
Data Recording	✓					
Command Analyzer	✓					
CANopen Wizard	✓					
Online Help	✓					
Language	English					
Operating System	Windows 10, 8, 7					
Windows DLL for PC	32-bit / 64-bit					
CAN interfaces	IXXAT | National Instruments | Kvaser | Vector					
Programming examples	Microsoft Visual Basic, Visual Basic.NET, Visual C#, Visual C++ | Borland C++, Delphi | National Instruments LabView, LabWindows/CVI					
Linux Shared Object Library	X86 32-bit/64-bit, ARMv6/v7/v8 32-bit, ARMv8 64-bit					
CAN interfaces	IXXAT | Kvaser					
Programming examples	C++					

maxon

High Integration Units		EPOS4 Disk 60/8		EPOS4 Disk 60/12			
		CAN (688770)	EtherCAT (688772)	CAN (688775)	CAN SSC (709859)	EtherCAT (688777)	EtherCAT SSC (709862)
Accessories (not included in delivery)							
710928	Brake Cable	✓	✓	✓	✓	✓	✓
710931	CAN-CAN Cable	✓	—	✓	✓	—	—
710932	CAN-COM Cable	✓	—	✓	✓	—	—
751388	CAN ix Industrial Type B plug	✓	—	✓	✓	—	—
696285	Encoder Cable	✓	✓	✓	✓	✓	✓
710934	EtherCAT-COM Cable	—	✓	—	—	✓	✓
710933	EtherCAT-EtherCAT Cable	—	✓	—	—	✓	✓
748166	EtherCAT ix Industrial Type A plug	—	✓	—	—	✓	✓
275878	Hall Sensor Cable	—	—	✓	✓	✓	✓
696284	Hall Sensor Cable	✓	✓	✓	✓	✓	✓
710930	Motor Cable High Current	—	—	✓	✓	✓	✓
696283	Power & Motor Cable	✓	✓	—	—	—	—
275829	Power Cable	—	—	✓ [c]	✓ [c]	✓ [c]	✓ [c]
710929	Power Cable High Current	—	—	✓ [d]	✓ [d]	✓ [d]	✓ [d]
696286	Sensor Cable 3x2core	✓	✓	✓	✓	✓	✓
520852	Sensor Cable 5x2core	—	—	✓	✓	✓	✓
696288	Sensor Cable 7core	✓	✓	✓	✓	✓	✓
696287	Sensor Cable 8core	✓	✓	✓	✓	✓	✓
696289	USB Type A-Micro-Lock Cable	✓	✓	✓	✓	✓	✓
710926	EPOS4 Disk Connector Set	✓	✓	✓	✓	✓	✓

maxon

Copyright

In the present document, registered brand names are not tagged with their respective trademark. It must be understood that the brands (below list is not necessarily concluding) are protected by copyright and/or other intellectual property rights even if their legal trademarks are omitted.

BiSS	© iC-Haus GmbH, DE-Bodenheim
Borland®, Borland C++	© Borland Software Corporation, USA-Rockville MD
CANopen®, CiA®	© CiA CAN in Automation e.V, DE-Nuremberg
CLIK-Mate™, Micro-Fit™, Micro-Lock™, Mini-Fit Jr.™, Mini-Fit Plus™, Mega-Fit®	© Molex, USA-Lisle, IL
Eclipse™	© Eclipse Foundation, Inc., CDN-Ottawa ON
EnDat	© DR. JOHANNES HEIDENHAIN GmbH, DE-Traunreut
EtherCAT®	© EtherCAT Technology Group, DE-Nuremberg, licensed by Beckhoff Automation GmbH, DE-Verl
har-flexicon®, ix Industrial®	© HARTING AG & Co. KG, DE-Espelkamp
LabVIEW™, LabWindows™, NI SoftMotion™, NI-XNET™	© National Instruments Corporation, USA-Austin TX
Linux®	© Linus Torvalds (The Linux Foundation, USA-San Francisco CA)
Minimodul	© Lumberg Holding GmbH & Co. KG, DE-Schalksmühle
PCI Express®, PCIe®	© PCI-SIG, USA-Beaverton, OR
Visual Basic®, Visual C#®, Visual C++®, Windows®	© Microsoft Corporation, USA-Redmond WA

CCMC | EPOS4 Feature Chart | Edition 2021-10 | DocID rel10302

maxon motor ag
Brünigstrasse 220 +41 41 666 15 00
CH-6072 Sachseln www.maxongroup.com