

MAXPOS

Feature Chart

The MAXPOS is a fast and highly dynamic motion controller capable to efficiently control permanent magnet-activated brushed DC motors or brushless EC motors (BLDC) and is designed to support a multitude of feedbacks. It provides outstanding performance and unprecedented high dynamic features that are unique to the miniature motor drive world.

Field-oriented control offers the possibility to drive brushless EC motors with minimal torque ripple and low noise. A wide range of operating modes meet the highest requirements and allows flexible use in a variety of fields in industrial automation applications.

The MAXPOS is especially designed being commanded and controlled as a slave node in an EtherCAT network and is being configured via EtherCAT or USB using the graphical user interface «MAXPOS Studio» for Windows®.



Legend: = included / nnnnnn = order number / ** = available with upcoming firmware release

Feature	MAXPOS 50/5 (447293)
Product image	
Communication Interfaces	
EtherCAT	Slave
IEC 61158 Digital data communication for measurement and control Fieldbus for use in industrial control systems	Type 12 (EtherCAT)
IEC 61800-7 Generic interface and use of profiles for power drive systems	Profile type 1 (CiA 402) Device profile for drives and motion control
CAN Application Layer over EtherCAT (CoE)	<input type="checkbox"/>
File transfer over EtherCAT (FoE)	<input type="checkbox"/>
Distributed Clocks Support	<input type="checkbox"/>
Cyclic Modes (CSP, CSV, CST) support cycle time down to	100 µs (typically 200 µs)
Process data	PDO-Mapping (Variable)
USB 2.0 / USB 3.0 (full speed)	<input type="checkbox"/>
Motors	
Brushed DC motors up to	250 W / 750 W
Brushless EC motors (BLDC) up to	250 W / 750 W
Sensors (Feedback)	
Digital Hall Sensors (EC motors)	<input type="checkbox"/>
Digital Incremental Encoder (2 or 3 channel with Line Driver)	<input type="checkbox"/>
Analog Incremental Encoder (sin/cos, differential, 2 or 3 channel)	<input type="checkbox"/>
SSI Absolute Serial Encoder (configurable)	<input type="checkbox"/>
BiSS C Absolute Serial Encoder (configurable)	<input type="checkbox"/>
EnDat 2.2 Absolute Serial Encoder (configurable)**	<input type="checkbox"/>

Feature	MAXPOS 50/5 (447293)
Commutation EC Motors	
Digital Hall Sensors	□
Digital Hall Sensors + Digital Incremental Encoder	□
Digital Hall Sensors + Analog Incremental Encoder	□
Digital Hall Sensors + Absolute Serial Encoder	□
Absolute Serial Encoder**	□
Electrical Data	
Nominal power supply voltage (+V _{CC})	10...50 VDC
Nominal logic supply voltage (+V _C)	10...50 VDC
Absolute supply voltage limits (+V _{min} / +V _{max})	8 VDC / 56 VDC
Output voltage (max.)	0.95 x +V _{CC}
Output current (I _{cont} / I _{max} <1.5 s)	5 A / 15 A
Pulse width modulation frequency	100 kHz
Sampling rate PI – current controller	100 kHz (10 μs)
Sampling rate PID – speed controller	10 kHz (100 μs)
Sampling rate PID – positioning controller	10 kHz (100 μs)
Max. efficiency	96%
Max. speed DC motor	limited by max. permissible speed (motor) and max. output voltage (controller)
Max. speed EC motor (sinusoidal)	200'000 rpm (1 pole pair)
Built-in motor choke	3 x 10 μH; 5 A
Inputs / Outputs	
Hall sensor signals	H1, H2, H3 for Hall effect sensor ICs (Schmitt trigger with open collector output)
Digital incremental encoder signals	A, A\, B, B\, I, I\ (max. 5 MHz)
Sensor signals (digital incremental, analog incremental, absolute serial (SSI / BiSS / EnDat**))	A, A\, B, B\, I, I\ Clock+, Clock- Data+, Data-
Digital inputs	6 (galvanic isolated)
Digital outputs	4 (galvanic isolated)
Hall sensor supply voltage	+5 VDC (I _L ≤30 mA)
Encoder supply voltage	+5 VDC (I _L ≤70 mA)
Sensor supply voltage	+5 VDC (I _L ≤150 mA)
Auxiliary output voltage	+V _{cc} > 30 VDC: +V _{OUT} = +24 VDC (I _L ≤300 mA) +V _{cc} < 30 VDC: +V _{OUT} = +V _{CC} - 5 V (I _L ≤300 mA)
Status indicators «Axis Status»	Bicolor LED (red/green)
Status indicators «EtherCAT Status»	Bicolor LED (red/green)
Status indicators «EtherCAT Port Activity/Link State»	LED (green)

Feature	MAXPOS 50/5 (447293)
Connections	
X1 Power Supply	Molex Mini-Fit Jr. header, dual row (4.2 mm), 2 poles, right angle
X2 Logic Supply	Molex Mini-Fit Jr. header, dual row (4.2 mm), 2 poles, right angle
X3 Motor	Molex Mini-Fit Jr. header, dual row (4.2 mm), 4 poles, right angle
X4 Hall Sensor	Molex Micro-Fit 3.0 header, dual row (3.0 mm), 6 poles, right angle
X5 Encoder	Pin header (2.54 mm), 5 x 2 poles
X6 Sensor	Molex Micro-Fit 3.0 header, dual row (3.0 mm), 10 poles, right angle
X7 Signal Input	Molex Micro-Fit 3.0 header, dual row (3.0 mm), 12 poles, right angle
X8 Signal Output	Molex Micro-Fit 3.0 header, dual row (3.0 mm), 8 poles, right angle
X9 EtherCAT IN	RJ45 10/100-BASE-TX
X10 EtherCAT OUT	RJ45 10/100-BASE-TX
X11 USB	USB Type micro B, female
Mechanical Data	
Weight (approximate)	302 g
Dimensions (L x W x H)	140 x 103.5 x 27 mm
Mounting holes	for screws M4
Environmental Conditions	
Temperature – Operation	–30...+45°C
Temperature – Extended range	+45...+56°C Derating: –0.455 A/°C
Temperature – Storage	–40...+85°C
Altitude – Operation	0...6'000 m MSL
Altitude – Extended range	6'000...10'000 m MSL Derating: see Hardware Reference for details
Humidity (condensation not permitted)	20...80%
Directives & Standards	
Generic	IEC/EN 61000-6-2; IEC/EN 61000-6-3
Applied	IEC/EN 55022 (CISPR22); 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 E243951 and E207844; unassembled printed circuit board
Reliability	MIL-HDBK-217F (MTBF 149'081 hours)

Feature	MAXPOS 50/5 (447293)
Functionality	
<i>Operating Modes</i>	
Cyclic Synchronous Position Mode (CSP)	<input type="checkbox"/>
Cyclic Synchronous Velocity Mode (CSV)	<input type="checkbox"/>
Cyclic Synchronous Torque Mode (CST)	<input type="checkbox"/>
Profile Position Mode	<input type="checkbox"/>
Profile Velocity Mode	<input type="checkbox"/>
Homing Mode	<input type="checkbox"/>
Features	
Feed Forward (acceleration/velocity for inertia and friction compensation)	<input type="checkbox"/>
Field-oriented Motor Control (FOC)	<input type="checkbox"/>
Advanced automatic control settings (Auto Tuning)	<input type="checkbox"/>
Safe Torque Off (STO) (based on IEC/EN 61800-5-2, without certification)	<input type="checkbox"/>
Digital I/O Functionality	
Inputs (configurable)	<input type="checkbox"/>
Touch Probe	<input type="checkbox"/>
Reference switches	<input type="checkbox"/>
Limit switches	<input type="checkbox"/>
Safe Torque Off (STO) inputs	<input type="checkbox"/>
General purpose	<input type="checkbox"/>
Outputs (configurable)	<input type="checkbox"/>
Position Compare**	<input type="checkbox"/>
Control of holding brakes	<input type="checkbox"/>
Safe Torque Off (STO) output	<input type="checkbox"/>
General purpose	<input type="checkbox"/>
Built-in Protection	
Current limit	<input type="checkbox"/>
Overcurrent	<input type="checkbox"/>
Excess temperature	<input type="checkbox"/>
Overvoltage	<input type="checkbox"/>
Undervoltage	<input type="checkbox"/>
Voltage transients	<input type="checkbox"/>
Short-circuits of motor cable	<input type="checkbox"/>
Loss of feedback	<input type="checkbox"/>
Following error	<input type="checkbox"/>
Status reporting	<input type="checkbox"/>
Firmware error handling	<input type="checkbox"/>

Feature	MAXPOS 50/5 (447293)
Software	
Installation Program	MAXPOS Setup
Graphical User Interface	MAXPOS Studio
Startup	<input type="checkbox"/>
Regulation Tuning	<input type="checkbox"/>
Diagnostics**	<input type="checkbox"/>
Firmware Update	<input type="checkbox"/>
Motion Commander	<input type="checkbox"/>
I/O Monitor	<input type="checkbox"/>
Parameters	<input type="checkbox"/>
Data Recording	<input type="checkbox"/>
Online Help	<input type="checkbox"/>
Language	English
Operating System	Windows 8, Windows 7, Windows XP SP3
Accessories (not included in delivery)	
275934 Encoder Cable	<input type="checkbox"/>
422827 Ethernet Cable	<input type="checkbox"/>
275878 Hall Sensor Cable	<input type="checkbox"/>
451746 MAXPOS 50/5 Connector Set	<input type="checkbox"/>
459639 MAXPOS USB Stick	<input type="checkbox"/>
275851 Motor Cable	<input type="checkbox"/>
275829 Power Cable	<input type="checkbox"/>
451290 Sensor Cable 5x2core	<input type="checkbox"/>
451291 Signal Cable 12core	<input type="checkbox"/>
451292 Signal Cable 8core	<input type="checkbox"/>
403968 USB Type A - micro B Cable	<input type="checkbox"/>

