

ESCON2 Feature Chart

The ESCON2 line of products from maxon are small-sized, powerful 4-quadrant PWM servo controllers. Their highpower density allows flexible use for brushed DC motors and brushless EC (BLDC) motors up to approximately 1'800 Watts with various feedback options, such as Hall sensors, incremental encoders as well as absolute sensors in a multitude of drive applications. The devices are specially designed to be commanded and controlled by analog and digital set values, as well as a slave node in a CANopen network. Additionally, the units can be operated via any USB or RS232 communication port of a Windows or Linux workstation. They also feature extensive analog and digital I/O functionality. Latest technology, such as field-oriented control (FOC), acceleration/velocity feed forward, in combination with highest control cycle rates allow sophisticated, ease-of-use motion control. The completely free Graphic User Interface «Motion Studio» enables convenient configuration, quick monitoring and diagnostics, and automated tuning of all drive systems.

Legend:

* = without use of sensor supply voltage

features in gray will follow in an upcoming release



Feature	ESCON2 Module 60/30 (P/N 783722)	ESCON2 Compact 60/30 (P/N 783734)
Product image		
Communication interfaces		
CANopen slave	max. 1 Mbit/s	max. 1 Mbit/s
CANopen Application Layer and Communication Profile	CiA 301	
CANopen Layer Setting Services (LSS) and Protocol	CiA 305	
CANopen Device Profile for Drives and Motion Control	CiA 402	
Serial communication interface (RS232)	max. 115'200 bit/s (external RS232-transceiver required)	-
Gateway function RS232-to-CAN	✓	-
USB	Full Speed	
Gateway function USB-to-CAN	✓	
Motors		
Brushed DC motor up to (cont. / max.)	1'800 W / 3'600 W	1'800 W / 3'600 W
Brushless EC motor (BLDC) up to (cont. / max.)		

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Sensors (feedback)		
Without sensor (DC motor)		✓
DC tachometer (DC motor)		✓
Digital Hall sensors (EC motor)		✓
Digital incremental encoder		✓
SSI absolute encoder		✓
BiSS C unidirectional absolute encoder		✓
Commutation		
Digital Hall sensors (FOC)		✓
Digital Hall sensors + digital incremental encoder (FOC)		✓
Digital Hall sensors + absolute encoder (FOC)		✓
Absolute encoder (FOC)		✓
Electrical data		
Nominal power supply voltage V_{CC}	10...60 VDC	10...60 VDC
Nominal logic supply voltage V_C	10...60 VDC	10...60 VDC
Absolute supply voltage limits V_{min} / V_{max}	8 VDC / 62 VDC	8 VDC / 62 VDC
Output voltage (max.)	$0.95 \times V_{CC}$	$0.95 \times V_{CC}$
Output current I_{cont} / I_{max}	30 A / 60 A (< 4 s)	30 A / 60 A (< 4 s)
Pulse width modulation (PWM) frequency	50 kHz	
Sampling rate PI current controller	50 kHz	
Sampling rate PI speed controller	10 kHz	
Sampling rate analog input	50 kHz	
Max. efficiency	98.5 %	98.5 %
Max. speed DC motor	limited by max. permissible motor speed	
Max. speed EC motor (FOC)	120'000 rpm (1 pole pair)	
Built-in motor choke per phase	-	470nH / 30A

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Inputs & outputs		
Sensor 1		
Digital Hall sensor	H1, H2, H3 (0...24 VDC, internal pull-up)	H1, H2, H3 (0...24 VDC, internal pull-up)
Sensor 2 (choice between multiple functions)		
Digital incremental encoder	2-channel (EIA/RS422, max. 6.67 MHz)	2-channel (EIA/RS422, max. 6.67 MHz)
SSI absolute encoder	Configurable (single-ended, 0...12 VDC, 0.1...2 MHz)	
BiSS C absolute encoder	Configurable (single-ended, 0...12 VDC, 0.1...4 MHz)	
High-speed digital inputs 1...2	EIA/RS422, max. 6.67 MHz	EIA/RS422, max. 6.67 MHz
High-speed digital inputs 3...4	0...12 VDC, max. 6.25 MHz	
High-speed digital output 1	3.3 VDC / $R_i = 270 \Omega$	3.3 VDC / $I_L \leq 24 \text{ mA}$ / $R_i = 75 \Omega$
Digital inputs 1...4	0...30 VDC, inputs 1...2 PWM capable 10 kHz	0...30 VDC, inputs 1...2 PWM capable 10 kHz
Digital outputs 1...2	3.3 VDC / $R_i = 270 \Omega$, PWM capable 25 kHz	open drain, max. 30 VDC / $I_L \leq 500 \text{ mA}$, internal pull-up, PWM capable 25 kHz
Analog inputs 1...2	resolution 12-bit, $\pm 10 \text{ VDC}$ (differential), 10 kHz	resolution 12-bit, $\pm 10 \text{ VDC}$ (differential), 10 kHz
Analog outputs 1...2	resolution 12-bit, $\pm 4 \text{ VDC}$ (referenced to GND), 25 kHz	resolution 12-bit, $\pm 4 \text{ VDC}$ (referenced to GND), 25 kHz
Motor temperature sensor	Resolution 12-bit, 0...3.3 VDC (internal pull-up)	
Sensor supply voltage V_{Sensor}	5 VDC / $I_L \leq 145 \text{ mA}$	
Peripheral supply voltage $V_{\text{Peripheral}}$	3.3 VDC / $I_L \leq 20 \text{ mA}$	-
Status indicators (LEDs)	- (external LEDs required)	green (operation) / red (error)
Connections		
X1 Power supply	Socket 6 poles 2.00 mm (Pins A1...A6) Samtec UMPS	Header 2 poles 10.00 mm Molex Mini-Fit Sr.
X2 Logic supply	Socket 2x25 poles 0.80 mm (Pin C1) Samtec ERF8	Header 2 poles 4.20 mm Molex Mini-Fit Jr.
X3a Motor	Socket 10 poles 2.00 mm (Pins B1...B10) Samtec UMPS	Header 3 poles 10.00 mm Molex Mini-Fit Sr.
X3b		Header 2x2 poles 5.70 mm Molex Mega-Fit
X4 Hall sensor (Sensor 1)	Socket 2x25 poles 0.80 mm (Pins C2...C50) Samtec ERF8	Header 2x3 poles 3.00 mm Molex Micro-Fit 3.0
X5 Sensor (Sensor 2)		Header 2x5 poles 2.54 mm DIN 41651
X7 Digital I/Os		Receptacle 8 poles 1.50 mm Molex CLIK-Mate
X8 Analog I/Os		Receptacle 7 poles 1.50 mm Molex CLIK-Mate
X10 SCI (RS232)		-
X11 CAN 1		Receptacle 4 poles 1.50 mm Molex CLIK-Mate
X12 CAN 2		Receptacle 4 poles 1.50 mm Molex CLIK-Mate
X13 USB		USB Type C
X16 Motor temperature sensor		Header 2 poles 3.00 mm Molex Micro-Fit 3.0

Feature	ESCON2 Module 60/30 (P/N 783722)	ESCON2 Compact 60/30 (P/N 783734)
Mechanical data		
Dimensions (L x W x H)	67 x 43 x 7.8 mm	93.5 x 46 x 41 mm
Weight (approx.)	19 g	128 g
Mounting	Pluggable (using sockets) and M2.5 screws	M3 screws
Environmental conditions		
Temperature		
Operation	-30 °C...+25 °C	-30 °C...+25 °C
Extended range and derating	+25°C...75°C (for derating check «Hardware Reference»)	+25°C...75°C (for derating check «Hardware Reference»)
Storage	-40...+85 °C	
Altitude		
Operation	0...500 m MSL	
Extended range	500...10'000 m MSL (for derating check «Hardware Reference»)	
Humidity	5...90 % (condensation not permitted)	
Directives & standards		
EMC Generic	IEC/EN 61000-6-2; IEC/EN 61000-6-3	
EMC Applied	IEC/EN 55032 (CISPR32); 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 94 V-0, unassembled PCB)	✓	✓
Reliability (MIL-HDBK-217F, MTBF)	317'416 hours	225'850 hours
Operating modes		
IOCM	I/O current mode (analog & digital commanding)	✓
IOVM	I/O velocity mode open loop with IxR compensation (analog & digital commanding)	✓
IOVM	I/O velocity mode closed loop (analog & digital commanding)	✓
CST	Cyclic Synchronous Torque Mode	✓
CSV	Cyclic Synchronous Velocity Mode	✓
PVM	Profile Velocity Mode	✓
Features		
Advanced automatic control settings (Auto Tuning)		✓
Custom persistent memory		✓
Feed forward (acceleration/velocity for inertia and friction compensation)		✓
Field-oriented Control (FOC) sinusoidal commutation		✓

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Digital I/O functionalities		
Inputs (configurable)		✓
Direction		✓
Drive enable		✓
Enable CW / CCW		✓
General purpose		✓
Limit switch		✓
Mode switch (between IOCM & IOVM)		✓
PWM current limit		✓
PWM set value		✓
PWM set value offset		✓
PWM velocity limit		✓
PWM velocity ramp		✓
Quick stop		✓
RC servo current limit		✓
RC servo set value		✓
RC servo set value offset		✓
RC servo velocity limit		✓
RC servo velocity ramp		✓
Set value switch (between up to 4 fixed set values)		✓
Outputs (configurable)		✓
Current compare		✓
Fault		✓
Hall sensor frequency (commutation / rotation)		✓
Holding brake		✓
Limitation		✓
Set brake		✓
Velocity compare		✓
Analog I/O functionalities		
Inputs (configurable)		✓
Analog current limit		✓
Analog set value		✓
Analog set value offset		✓
Analog velocity limit		✓
Analog velocity ramp		✓
General purpose		✓
Outputs (configurable)		✓
Current monitor		✓
General purpose		✓
Temperature monitor		✓
Velocity monitor		✓

Feature	ESCON2 Module 60/30 (P/N 783722)	ESCON2 Compact 60/30 (P/N 783734)
Built-in limitations & protections		
Current limiter (adjustable)		✓
Overcurrent		✓
Short-circuit of motor winding		✓
Thermal motor protection with sensor (adjustable)		✓
Thermal motor protection model based (adjustable)		✓
Thermal controller protection logic & power stage (adjustable)		✓
Overvoltage (adjustable)		✓
Undervoltage (adjustable)		✓
Voltage transients		✓
Velocity limiter (adjustable)		✓
Loss of feedback signal		✓
System monitoring		✓
Error & warning behavior management		✓
Software (en)		
Installation program		Motion Installer
Graphical user interface		Motion Studio
Startup		✓
Regulation tuning		✓
Firmware update		✓
Parameter upload / download		✓
Motion commander		✓
I/O monitor		✓
Parameters (Object dictionary)		✓
Status monitor		✓
Data recorder		✓
Command analyzer		✓
CANopen wizard		✓
Online help		✓
Operating system		Windows 11, 10, 7
Windows DLL for PC		✓
Linux shared object library		✓

Feature	ESCON2 Module 60/30 (P/N 783722)	ESCON2 Compact 60/30 (P/N 783734)
Accessories (not included in delivery)		
783729 ESCON2 CB 60/30	✓	-
802197 ESCON2 Module 60/30 Thermal Pad	✓	-
816161 ESCON2 Module 60/30 Heat Spreader	✓	-
520858 CAN-CAN Cable	-	✓
520857 CAN-COM Cable	-	✓
275934 Encoder Cable	-	✓
275878 Hall Sensor Cable	-	✓
846645 Motion Connector Set Highest Current	-	✓
520851 Motor Cable High Current	-	✓
838460 Motor Cable Highest Current	-	✓
847301 NTC Cable	-	✓
275829 Power Cable	-	✓
838459 Power Cable Highest Current	-	✓
520854 Signal Cable 7core	-	✓
520853 Signal Cable 8core	-	✓
838461 USB Type A-Type C cable	-	✓
845854 USB Type C-Type C cable	-	✓

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