ESCON

Feature Comparison Chart

The ESCON servo controllers are small-sized, powerful 4-quadrant PWM servo controller for the highly efficient control of permanent magnet-activated DC motors.

The featured operating modes – speed control (closed loop), speed control (open loop), and current control – meet the highest requirements. The ESCON servo controllers are designed being commanded by an analog set value and features extensive analog and digital I/O functionality and are being configured via USB interface using the graphical user interface «ESCON Studio» for Windows PCs.

Legend: (✓)* = only in use with DC Tacho or Encoder / nnnnnn = order number / O = optional / ** = details refer to the pin header allocation

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Feature	ESCON 36/2 DC (403112)	ESCON 36/3 EC (414533)	ESCON Module 50/4 EC-S (446925)	ESCON 50/5 (409510)	ESCON Module 50/5 (438725)	ESCON 70/10 (422969)
Product image						
Motors						
DC motors up to	72 W	—	—	250 W	250 W	700 W
EC motors up to	—	97 W	200 W	250 W	250 W	700 W
Sensors						
Digital Incremental Encoder (2 channel with or without Line Driver)	✓	—	—	✓	✓	✓
DC Tacho	✓	—	—	✓	✓	✓
Without sensor (DC motors)	✓	—	—	✓	✓	✓
Without sensor (EC motors, sensorless)	—	—	✓	—	—	—
Digital Hall Sensors (EC motors)	—	✓	—	✓	✓	✓
Electrical Data						
Nominal operating voltage +V_{CC}	10…36 VDC	10…36 VDC	10…50 VDC	10…50 VDC	10…50 VDC	10…70 VDC
Max. output voltage	0.98 x +V_{CC}	0.98 x +V_{CC}	0.96 x +V_{CC}	0.98 x +V_{CC}	0.98 x +V_{CC}	0.95 x +V_{CC}
Max. output current	4 A (<60 s)	9 A (<4 s)	12 A (<30 s)	15 A (<20 s)	15 A (<20 s)	30 A (<20 s)
Continuous output current	2 A	2.7 A	4 A	5 A	5 A	10 A

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Pulse Width Modulation frequency	53.6 kHz					
Sampling rate PI current controller	53.6 kHz	53.6 kHz	—	53.6 kHz	53.6 kHz	53.6 kHz
Sampling rate PI speed controller	5.36 kHz					
Max. efficiency	95%	95%	97%	95%	98%	98%
Max. speed (DC)	limited by max. permissible speed (motor) and max. output voltage (controller)	—	—	limited by max. permissible speed (motor) and max. output voltage (controller)	limited by max. permissible speed (motor) and max. output voltage (controller)	limited by max. permissible speed (motor) and max. output voltage (controller)
Max. speed (EC; 1 pole pair)	—	150'000 rpm	120'000 rpm	150'000 rpm	150'000 rpm	150'000 rpm
Built-in motor choke	300 μH; 2 A	3 x 47 μH; 2.7 A	—	3 x 30 μH; 5 A	—	3 x 15 μH; 10 A
Inputs / Outputs						
Hall sensor signals	—	H1, H2, H3	—	H1, H2, H3	H1, H2, H3	H1, H2, H3
Encoder signals	A, A\, B, B\	—	—	A, A\, B, B\	A, A\, B, B\	A, A\, B, B\
Max. encoder input frequency differential (single-ended)	1 MHz (100 kHz)	—	—	1 MHz (100 kHz)	1 MHz (100 kHz)	1 MHz (100 kHz)
Back-EMF signals	—	—	BEMF-W1, BEMF-W2, BEMF-W3	—	—	—
Potentiometers	1	1	1	2	1	2
Digital inputs	2					
Digital inputs/outputs	2					
Analog inputs	2					
Resolution	12-bit					
Range	–10…+10 V					
Circuit	differential					
Analog outputs	2					
Resolution	12-bit					
Range	–4…+4 V					
Auxiliary voltage output	+5 VDC (IL ≤40 mA)	+5 VDC (IL ≤80 mA)	+5 VDC (IL ≤110 mA)	+5 VDC (IL ≤10 mA)	+5 VDC (IL ≤10 mA)	+5 VDC (IL ≤10 mA)
Hall sensor supply voltage	—	+5 VDC (IL ≤30 mA)	—	+5 VDC (IL ≤30 mA)	+5 VDC (IL ≤30 mA)	+5 VDC (IL ≤30 mA)
Encoder supply voltage	+5 VDC (IL ≤70 mA)	—	—	+5 VDC (IL ≤70 mA)	+5 VDC (IL ≤70 mA)	+5 VDC (IL ≤70 mA)
Status Indicators	Operation: green LED / Error: red LED					

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Connections							
J1	Power	Pin header (2 mm), 2 poles	Pin header (2 mm), 2 poles	Pin header (2.54 mm), 4 poles**	Pluggable screw-type terminal block (3.5 mm), 2 poles	Pin header (2.54 mm), 4 poles**	Pluggable screw-type terminal block (5.0 mm), 2 poles
J2	Motor Motor / Hall sensors Motor / BEMF signals	Pin header (2 mm), 3 poles	Mini module pin header, 8 poles	Pin header (2.54 mm), 9 poles**	Pluggable screw-type terminal block (3.5 mm), 4 poles	Pin header (2.54 mm), 6 poles**	Pluggable screw-type terminal block (5.0 mm), 4 poles
J2A	Motor Motor / Hall sensors	Spring-loaded contacts, 2 poles	Spring-loaded contacts, 8 poles	—	—	—	—
J3	Hall sensors	—	—	—	Pluggable screw-type terminal block (3.5 mm), 5 poles	Pin header (2.54 mm), 5 poles**	Pluggable screw-type terminal block (3.5 mm), 5 poles
J4	Encoder	Pin header (2.54 mm), 5 x 2 poles	—	—	Pin header (2.54 mm), 5 x 2 poles	Pin header (2.54 mm), 4 poles**	Pin header (2.54 mm), 5 x 2 poles
J4A	Encoder	Pin header (1.27 mm), 5 x 2 poles	—	—	—	—	—
J5	Digital I/O	Pin header (2 mm), 6 poles	Pin header (2 mm), 6 poles	Pin header (2.54 mm), 5 poles**	Pluggable screw-type terminal block (3.5 mm), 6 poles	Pin header (2.54 mm), 5 poles**	Pluggable screw-type terminal block (3.5 mm), 6 poles
J6	Analog I/O	Pin header (2 mm), 7 poles	Pin header (2 mm), 7 poles	Pin header (2.54 mm), 6 poles**	Pluggable screw-type terminal block (3.5 mm), 7 poles	Pin header (2.54 mm), 6 poles**	Pluggable screw-type terminal block (3.5 mm), 7 poles
J7	USB	USB Type micro B female					
Mechanical Data							
Weight (approximate)		30 g	36 g	11 g	204 g	12 g	259 g
Dimensions (L x W x H)		55 x 40 x 16.1 mm	55 x 40 x 19.8 mm	43.2 x 31.8 x 12.7 mm	115 x 75.5 x 24 mm	43.2 x 31.8 x 12.7 mm	125 x 78.5 x 27 mm
Mounting		Screws M2.5	Screws M2.5	Pluggable (female headers RM 2.54 mm)	Screws M4	Pluggable (female headers RM 2.54 mm)	Screws M4
Environmental Conditions							
Temperature – Operation		–30…+45°C					
Temperature – Extended range		+45…+81°C; Derating: –0.056 A/°C	+45…+78°C; Derating: –0.082 A/°C	+45…+65°C; Derating: –0.2 A/°C	+45…+85°C; Derating: –0.113 A/°C	+45…+75°C; Derating: –0.167 A/°C	+45…+82°C; Derating: –0.270 A/°C
Temperature – Storage		–40…+85°C					
Humidity (condensation not permitted)		20…80%					

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Functionality						
Operating Mode						
Current controller (torque control)	✔	✔	—	✔	✔	✔
Speed controller (closed loop)	✔	✔	✔	✔	✔	✔
with encoder feedback	✔	—	—	✔	✔	✔
with DC Tacho feedback	✔	—	—	✔	✔	✔
with Hall sensor feedback	—	✔	—	✔	✔	✔
with BEMF feedback	—	—	✔	—	—	—
Speed controller (open loop)	✔	✔	✔	✔	✔	✔
with static IxR Compensation	✔	✔	✔	✔	✔	✔
with adaptive IxR Compensation	(✔)*	✔	✔	✔	✔	✔
Set Value						
Analog set value			✔			
PWM set value			✔			
Fixed set value			✔			
2 fixed set values			✔			
Digital I/O Functionality						
Enable			✔			
Enable CW			✔			
Enable CCW			✔			
Enable CW + CCW			✔			
Enable + Direction			✔			
Stop			✔			
Ready			✔			
Speed Comparator			✔			
Current Comparator			✔			
Commutation frequency	—	✔	✔	✔	✔	✔
Monitoring Outputs						
Monitor Current			✔			
Monitor Speed			✔			

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Analog Settings						
Set value			✓			
Current limit			✓			
Offset adjust set value			✓			
Speed ramp (using potentiometer)			✓			
Current gain (using potentiometer)	✓	✓	—	✓	✓	✓
Speed gain (using potentiometer)			✓			
IxR Factor (using potentiometer)			✓			
Protection						
Overcurrent			✓			
Current limiter (adjustable)			✓			
Thermal overload			✓			
Undervoltage			✓			
Overvoltage			✓			
Voltage transients			✓			
Short-circuit of motor winding			✓			
Software						
Installation Program			ESCON Setup			
Graphical User Interface			ESCON Studio			
Startup Wizard			✓			
Regulation Tuning			✓			
Diagnostics			✓			
Firmware Update			✓			
Controller Monitor			✓			
Parameters			✓			
Data Recording			✓			
Online Help			✓			
Language			German, English, French, Italian, Spanish, Japanese, Chinese			
Operating System			Windows 8, Windows 7, Windows XP SP3			
Communication interface			USB 2.0 (full speed)			

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Accessories (not included in delivery)							
418719	Adapter BLACK FPC11poles	—	✔	—	—	—	—
418723	Adapter BLUE FPC8poles	—	✔	—	—	—	—
418721	Adapter GREEN FPC8poles	—	✔	—	—	—	—
403962	DC Motor Cable	✔	—	—	—	—	—
275934	Encoder Cable	O	—	—	O	O	O
404404	ESCON 36/2 DC Connector Set	✔	—	—	—	—	—
425255	ESCON 36/3 EC Connector Set	—	✔	—	—	—	—
438779	ESCON Module Motherboard	—	—	—	—	✔	—
450237	ESCON Module Motherboard Sensorless	—	—	✔	—	—	—
409286	ESCON USB Stick	✔	✔	✔	✔	✔	✔
403964	I/O Cable 7core	✔	✔	—	—	—	—
403965	I/O Cable 8core	✔	✔	—	—	—	—
403957	Power Cable	✔	✔	—	—	—	—
403968	USB Type A - micro B Cable	✔	✔	✔	✔	✔	✔

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