

Ultra EC™ Brushless Motors 35ECS60 & 80



Ultra high speed without compromising on low voltage

Portescap has expanded the Ultra EC range of Brushless motors with the introduction of the 35ECS60 and 35ECS80 motors. Part of our Ultra EC platform of brushless slotless miniature motion solutions, these 2 pole motors offer similar performances than motors with battery cells operated at up to 400V without compromising on the smooth operation and long life you expect from Portescap's brushless slotless motors.

The 35ECS60 and 35ECS80 motors feature our patented Ultra coil technology which provides unparalleled torque and power density with limited core losses over a wide range of working speeds without friction and brush wear. They feature our patented high-speed rotor design and can sustain speeds up to 40,000rpm. Thanks to their rugged design, the 35ECS can sustain peak torque during 2s up to 1.1Nm (35ECS60) and 2.0Nm (35ECS80).

The Ultra EC range offers solutions in a 2 pole design for diameters of 16, 22 and 35mm. The new 35ECS feature a laser welded front flange to ensure the strongest housing to sustain high torque reaction. Available with hall sensors and a total of 6 different coils to match your speed and voltage requirements, these motors are an ideal choice for industrial applications such as battery-operated hand tools and for applications with length constraints. Upon request, Portescap can also provide options for customization including gearboxes, encoders, coil variations and mechanical interface modifications.

✓ Peak torque (2s) up to 2.0Nm

✓ Ø35mm with 60mm & 80mm lengths available

✓ Speed up to 40,000 RPM

Key Features

- The most powerful 2 pole motors in Ø35mm
- High peak torque optimized design
- Up to 193mNm continuously
- Max continuous speed: 40,000rpm
- Torque performances allow superior dynamics, harder work cycles, and cooler operation.
- Available in 2 lengths: 60mm & 80mm
- RoHS compliant

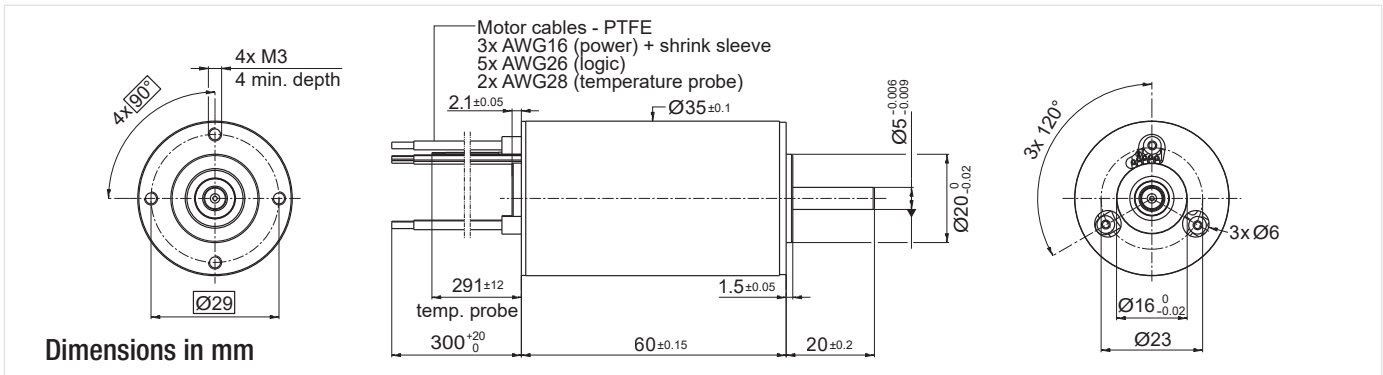
Applications

- Power battery-operated hand tools
- Nutrunners
- Drills
- Factory automation
- Vacuum pumps
- Industrial fans

Compatibility & Customization (*)

- Encoder: Absolute digital & Sine/Cosine encoder & M-sense magnetic encoder
- Gearboxes: R32, R40
- Customization: coil variations and mechanical interface modifications

**available upon request*



35ECS60 10B-xxx.01

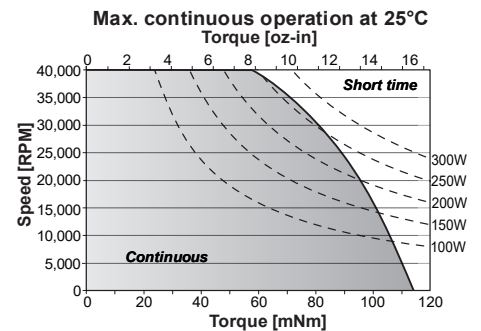
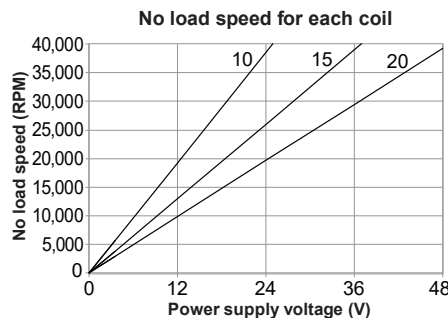
Electrical Data	Symbol	10	15	20	Unit
1 Nominal Voltage	U_N	24	36	48	Volt
2 Optimization Direction	-	Symetrical	Symetrical	Symetrical	-
3 No Load Speed	n_0	38,500	39,000	39,300	rpm
4 Typical No Load Current	I_0	900	500	360	mA
5 Max. Continuous Mechanical Power (@25°C)	P_{max}	262	262	262	W
6 Max. Continuous Current	$I_{e max}$	20.1	13.2	9.8	A
7 Max. Continuous Torque	$M_{e max}$	120.6 (17.1)	117.9 (16.7)	115.8 (16.4)	mNm (oz-in)
8 Back EMF Constant	k_E	0.63	0.94	1.24	V/1000 rpm
9 Torque Constant	k_M	6.01	8.94	11.83	mNm/A
10 Motor Regulation	R/k^2	0.886	0.928	0.961	$10^3/Nms$
11 Motor Regulation	$k/R^{1/2}$	33.6 (4.76)	32.8 (4.65)	32.3 (4.57)	$mNm/W^{1/2}$ (oz-in/ $W^{1/2}$)
12 Internal Resistance - phase to phase	R_i	0.032	0.074	0.135	ohms
13 Line to Line Resistance at Connectors	R_L	0.044	0.086	0.147	ohms
14 Inductance Phase to Phase	L	0.017	0.037	0.064	mH
15 Mechanical Time Constant	t_m	1.8	1.9	2.0	ms
16 Electrical Time Constant	t_e	0.5	0.5	0.5	ms

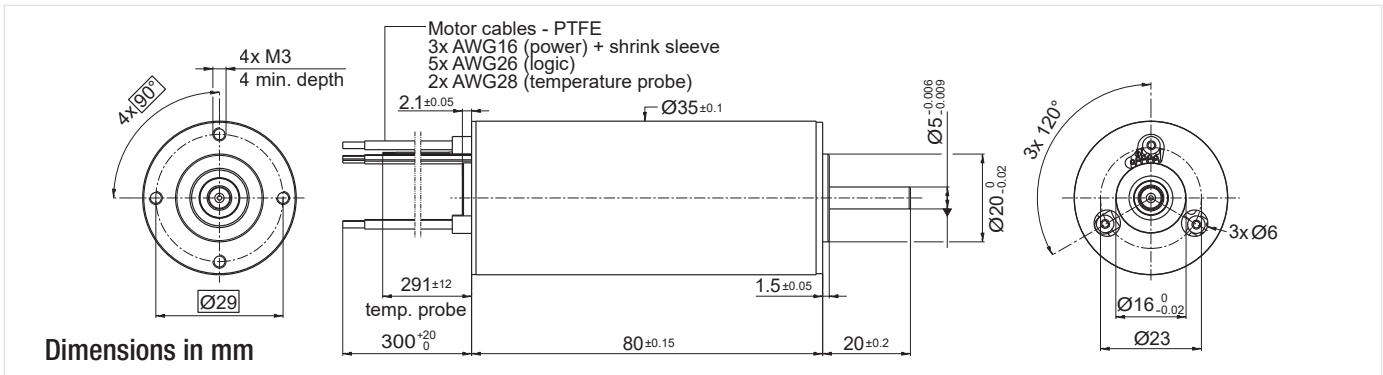
General Data

1 Nominal Voltage	U_N	4000	rpm
18 Ambient Working Temperature Range	-	-30 to + 100 (-22 to + 212)	°C (°F)
19 Ambient Storage Temperature Range	-	-40 to + 100 (-40 to + 212)	°C (°F)
20 Ball Bearings Preload	-	9	N
21 Axial Static Force w/o Shaft Support (max)	-	134	N
22 Maximum Winding Temperature	-	150 (302)	°C (°F)
23 Thermal Resistance	R_{th}	0.8/5.7	°C/W
24 Thermal Time Constant	t_w	1,618	s
25 Weight	-	315 (11.11)	g (oz)
26 Rotor Inertia	J	20.4	g-cm ²
27 Hall Sensor Electrical Phasing	-	120	Electrical °

*Available without hall sensor

With hall effect sensors	
Wire	Discription
Grey	Phase 1
Violet	Phase 2
Blue	Phase 3
Green	4 to 24V DC
Yellow	GND
Orange	Sensor 1
Red	Sensor 2
Brown	Sensor 3
White	NTC 10 kohm
White	NTC 10 kohm





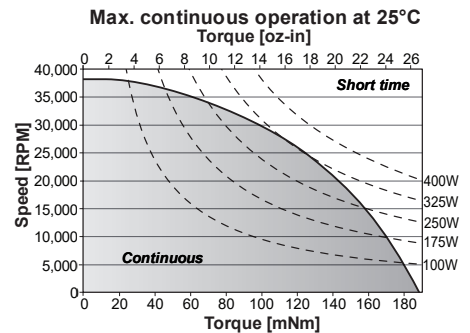
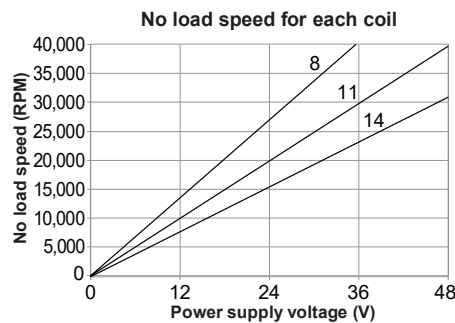
35ECS80 10B-xxx.01

Electrical Data	Symbol	8	11	14	Unit
1 Nominal Voltage	U_N	24	36	48	Volt
2 Optimization Direction	-	Symetrical	Symetrical	Symetrical	-
3 No Load Speed	n_0	27,000	29,500	31,100	rpm
4 Typical No Load Current	I_0	700	550	430	mA
5 Max. Continuous Mechanical Power (@25°C)	P_{max}	330	330	330	W
6 Max. Continuous Current	$I_{e,max}$	22.6	16.4	12.9	A
7 Max. Continuous Torque	$M_{e,max}$	193.4 (27.3)	193.1 (27.3)	193.1 (27.3)	mNm (oz-in)
8 Back EMF Constant	k_E	0.9	1.23	1.57	V/1000 rpm
9 Torque Constant	k_M	8.56	11.78	14.98	mNm/A
10 Motor Regulation	R/k^2	0.367	0.368	0.369	10 ³ /Nms
11 Motor Regulation	$k/R^{1/2}$	52.2 (7.37)	52.1 (7.37)	52.1 (7.37)	mNm/W ^{1/2} (oz-in/W ^{1/2})
12 Internal Resistance - phase to phase	R_i	0.027	0.051	0.083	ohms
13 Line to Line Resistance at Connectors	R_L	0.039	0.063	0.095	ohms
14 Inductance Phase to Phase	L	0.017	0.03	0.047	mH
15 Mechanical Time Constant	t_m	1.2	1.2	1.2	ms
16 Electrical Time Constant	t_e	0.4	0.6	0.5	ms

General Data					
17 Maximum Motor Speed	n_{max}	-	40000	-	rpm
18 Ambient Working Temperature Range	-	-	-30 to + 100 (-22 to + 212)	-	°C (°F)
19 Ambient Storage Temperature Range	-	-	-40 to + 100 (-40 to + 212)	-	°C (°F)
20 Ball Bearings Preload	-	-	9	-	N
21 Axial Static Force w/o Shaft Support (max)	-	-	134	-	N
22 Maximum Winding Temperature	-	-	150 (302)	-	°C (°F)
23 Thermal Resistance	R_{th}	-	0.7/5.4	-	°C/W
24 Thermal Time Constant	t_w	-	1,822	-	s
25 Weight	-	-	440 (15.52)	-	g (oz)
26 Rotor Inertia	J	-	33	-	g-cm ²
27 Hall Sensor Electrical Phasing	-	-	120	-	Electrical °

*Available without hall sensor

With hall effect sensors	
Wire	Discription
Grey	Phase 1
Violet	Phase 2
Blue	Phase 3
Green	4 to 24V DC
Yellow	GND
Orange	Sensor 1
Red	Sensor 2
Brown	Sensor 3
White	NTC 10 kohm
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Ultra EC™

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