



Catalog EC03EN

# Brushless



[www.electrocraft.com](http://www.electrocraft.com)

## Motors

- RapidPower Series
- E-Series
- EXC-Series

## Drives

- EA-Series
- SC-Series
- ACS-Series
- ACE-Series
- PFC-Series



For over 60 years, ElectroCraft has been helping engineers translate innovative ideas into reality – one reliable motor at a time. As a global specialist in custom motor and motion technology, we provide the engineering capabilities and worldwide resources you need to succeed.



This guide has been developed as a quick reference tool for ElectroCraft products. It is not intended to replace technical documentation or proper use of standards and codes in installation of product.

Because of the variety of uses for the products described in this publication, those responsible for the application and use of this product must satisfy themselves that all necessary steps have been taken to ensure that each application and use meets all performance and safety requirements, including all applicable laws, regulations, codes and standards.

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## Typical applications for ElectroCraft BLDC Motors:

- Custom OEM applications  
(Our Specialty)
- Packaging
- Semiconductor handling and testing
- Antenna positioning
- Laboratory equipment
- Rapid prototyping machines
- Medical equipment
- Dispensing



## Throttle Linkage Valve

**Situation:** A manufacturer of large diesel engines needed a motor to actuate a throttle linkage valve. The high acceleration torque requirement of the application made this existing brush motor customer consider ElectroCraft's brushless DC motor technology.

The motor had to meet very strict life requirements, demanding performance requirements, and be able to withstand the high temperatures involved in an under-the-hood environment.

**Solution:** ElectroCraft designed a custom output shaft with a hardened helical gear geometry to mate with customer's gear box. The stator had to be potted with a high temperature plastic, and high temperature grease and seals were required to protect the motor and reduce premature fatigue. Additionally, the hall device PC board had to be custom designed to fit through a special front mounting bracket which mated with the customer's control board.

**Results:** To date, 1000's of motors have shipped and are successfully working the field. The exceptional life and performance of the ElectroCraft solution has led to additional applications for the same type of motor with this customer.



*A highly customized brushless DC motor and gear-box fuels the motion requirements for this diesel engine throttle control.*

## Satellite Positioning System

**Situation:** A manufacturer of a stabilized antenna system needed a cost effective, sealed servo motor for their antenna control. Many satellite positioning systems incorporate stepper motor technology but since the point of reference for the satellite was on board a moving vessel, the brushless servo technology was used to provide real-time, closed loop control. The system had to function in a marine environment, which is highly corrosive and subject to large temperature variations.

**Solution:** ElectroCraft developed a motor featuring special paint, coatings, and fasteners to meet the performance, environmental, and commercial needs of the customer.

**Results:** The initial solution evolved into a family of related products, increasing sales for the customer and further developing the technical presence of the company in their industry.



*A highly reliable brushless DC motor keeps this satellite antenna on track in a harsh and demanding marine environment.*



## Automated Fluid Dispensing Equipment

**Situation:** A manufacturer of innovative dispensing equipment for a wide variety of automated assembly applications needed a cost effective, highly reliable servo motor to drive a Cartesian robot (XY-stage).

**Solution:** ElectroCraft developed a high performance solution in a compact package, along with integrating custom features, such as a custom cable assembly, to reduce the customer's assembly time.

**Results:** This customer has built over 2,000 machines with a 30% reduction in machine assembly time as a result of the ElectroCraft motor with custom cable assembly.

*An ElectroCraft motor with a custom cable assembly helps keep liquid and this business flowing*



Select your  
**Brushless DC Products!**



## ElectroCraft RapidPower™ Series Motor

Sizes: NEMA 17, 23 & 34

Continuous Torque: up to 313 oz-in or 221 Ncm

- Features:
- Standard mounting configuration
  - Designed for IP40 rating
  - High torque to volume ratio
  - Skewed magnetization, Neodymium magnet design
  - Metric and imperial configurations
  - Available with hall effect, single ended, or differential encoder

## ElectroCraft E-Series Motor

Sizes: 2.2, 3.0, 3.3 & 3.7 inches (56, 78, 84 & 96 mm)

Continuous Torque: up to 161 oz-in or 114 Ncm

- Features:
- Housed construction with open or closed shell designs available
  - Typically designed for IP30 rating
  - Metric and imperial configurations
  - Available with hall effect, single ended, or differential encoder


## ElectroCraft EXC-Series Motor

Sizes: NEMA 23, 34, 42 & 56

Continuous Torque: up to 740 oz-in or 543 Ncm

- Features:
- Rugged industrial housed construction
  - TENV enclosure design with optional O-rings for environmental sealing
  - Skewed magnetization, high energy Neodymium magnet design
  - Metric and imperial configurations
  - Differential optical encoder - standard configuration
  - Motor and encoder cables through liquid tight strain reliefs

## BLDC Drive Product Matrix

	CompletePower											CompletePower Plus										
	2 Quadrant						4 Quadrant					4 Quadrant										
	DC Input Power						DC Input Power					DC Input Power			AC Input Power							
	EA2506	EA2708	EA2716	EA2724	SCO-B1-40-05-01	SCO-B1-50-18	SCO-B1-50-40	SCO-B1-60-18	SCP-B1-40-05	SCP-B1-40-05-77	SCP-B1-50-10	EA4709	EA4718	SCA-B4-70-10	SCA-B4-70-30	ACS100	ACS200	ACS300	ACE500	ACE1200	ACE1300	
<b>Product Description</b>																						
See on page	29	31	31	31	37	39	39	39	41	41	41	33	33	35	35	43	43	43	45	47	49	
<b>Power Features</b>																						
AC Input (90 - 254VAC) 1ø																			●	●	●	
AC Input (90 - 254VAC) 3ø																				●	●	
Min. Voltage (VDC)	11	11	11	11	12	20	20	30	12	12	20	9	9	11	11	24	24	24	120	120	120	
Max. Voltage (VDC)	50	70	70	70	40	50	50	60	40	40	50	70	70	70	70	48	48	48	360	400	400	
PWM Output	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	
Trap Waveform	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	
Sine Waveform																●	●	●	●	●	●	
Output Frequency (kHz)	50	20	20	20	20	20	20	20	20	20	20	50	50	49	49	40	40	40	30	30	30	
<b>Power Ratings</b>																						
Peak Current (A <sub>rms</sub> )												18	36	20	60	7	10	20	11	14	21	
Continuous Current (A <sub>rms</sub> )	6	8	16	24	5	18	40	18	5	5	10	9	18	10	30	3.5	5	11	5	8	12	
Continuous Power (W)	300	560	1120	1680	175	900	2000	1080	150	150	475	630	1260	700	2100	168	240	528	1625	2275	4550	
<b>Control Modes</b>																						
Torque Control	●											●	●	●	●	●	●	●	●	●	●	
Speed Control using Halls	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	
Speed Control using Encoder												●	●	●	●	●	●	●	●	●	●	
Analog Command	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	
Analog Command (VDC)	+10	+5	+5	+5	+5	+5	+5	+5	+5	+10	+5	±10	±10	±10	±10	±10	±10	±10	±10	±10	±10	
Step / Direction																●	●	●	●	●	●	
PWM												●	●			●	●	●	●	●	●	
Position Control																●	●	●	●	●	●	
<b>Communication / Compliance</b>																						
RS232 Serial																●	●	●	●	●	●	
CAN Bus																●	●	●				
Field upgradeable firmware																●	●	●	●	●	●	
Serial drive status/diagnostics																●	●	●	●	●	●	
Windows set-up software																●	●	●	●	●	●	
UL Recognized																			●	●	●	
CE Compliance (LV Directive)	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●				●	●	●	
RoHS	●	●	●	●		●	●	●		●	●	●	●	●	●	●	●	●	●			
<b>Physical Enclosure</b>																						
Totally Enclosed	●	●	●	●						●	●	●	●	●	●	●	●	●	●	●	●	
Case Type	Book Shelf				Open Frame						Module			Book Shelf		Rack		Open			Book Shelf	

## RP17 : ElectroCraft RapidPower™ | BLDC Motor

Size	Peak Torque oz-in (Ncm)	Speeds up to RPM
NEMA 17	136 (96)	11000



### High-Performance. Good Price.

Our RapidPower Nema 17 is a compact, high-performance brushless motor incorporating ball bearing construction, a low cogging electro-magnetic design with both low audible and magnetic noise. It is available with a hall-effect commutation encoder or a variety of optical encoders for higher precision applications.

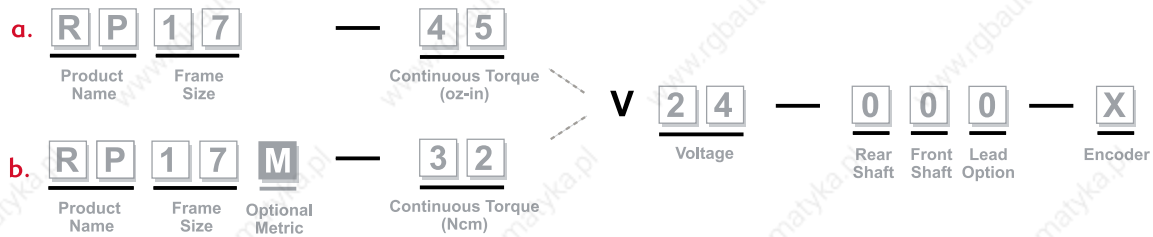
### To build your own motor, choose the:

**1 - Frame Size**  
(Imperial or Metric)

**2 - Torque**

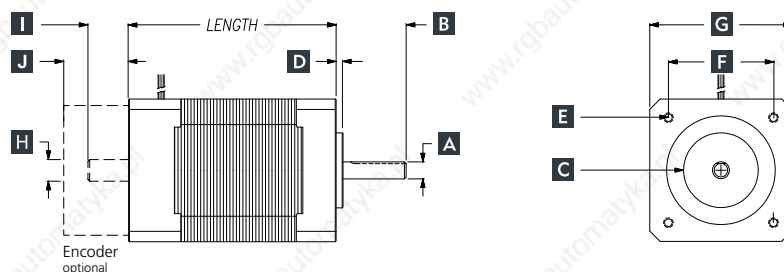
**3 - Winding**

**4 - Features**  
( see page 55 )



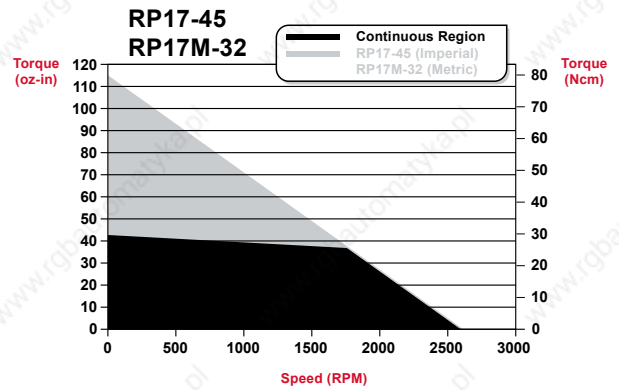
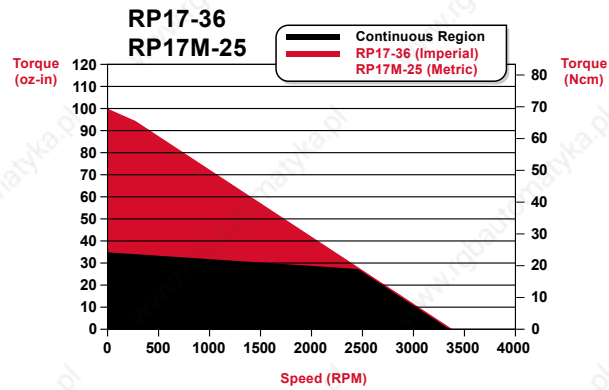
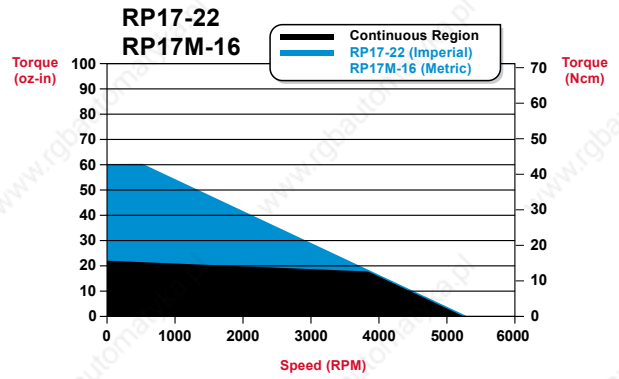
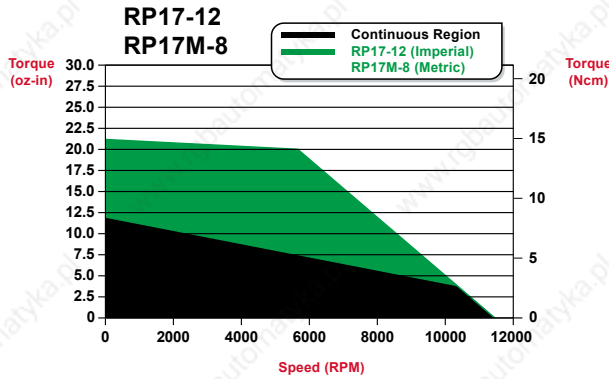
### Step 1: RP17 & RP17M Frame Size Drawing Key

Model	MAX Length	A Front Shaft Diameter	B Front Shaft Length	C Pilot Diameter	D Pilot Length (Ref)	E Mount Hole Pattern (Ref)	F Mount Hole Spacing (Ref)	G Flange External Dimension SQ (Ref)	H Rear Shaft Diameter	I Rear Shaft Length	J Encoder Length (Ref) Single Ended Differential
RP17-12	1.60 in	0.1968 in 0.1963 in	0.81 in ±0.03	0.8660 in 0.8648 in	0.08 in	[4] 4-40 in UNC-2B 0.17 in Deep Min	1.22 in	1.65 in	0.2500 in 0.2495 in	0.45 in ±0.040	0.35 in 0.55 in
RP17-22	2.40 in										
RP17-36	3.20 in										
RP17-45	4.00 in	5.000 mm 4.987 mm	20.6 mm ±0.76	22.00 mm 21.97 mm	2 mm	[4] M3 x 0.5 4.3 mm Deep Min	31 mm	42 mm	6.350 mm 6.337 mm	11.4 mm ±1.02	8.89 mm 13.97 mm
RP17M-8	41 mm										
RP17M-16	61 mm										
RP17M-25	81 mm										
RP17M-32	101 mm										





Step 2: RP17 Torque and Mechanical Data



Stack Size Models	RP17-12 / RP17M-8	RP17-22 / RP17M-16	RP17-36 / RP17M-25	RP17-45 / RP17M-32
Cont Stall Torque oz-in (Ncm)	12 (8)	22 (16)	36 (25)	45 (32)
Peak Torque oz-in (Ncm)	21 (15)	60 (42)	100 (71)	136 (96)
No Load Speed RPM	11400	5300	3400	2600
Inertia oz-in-sec <sup>2</sup> (g-cm <sup>2</sup> )	0.00076 (53.6)	0.00118 (83.3)	0.00159 (112.2)	0.00191 (134.8)
Motor Weight oz (kg)	9.0 (0.25)	17.0 (0.48)	23.5 (0.66)	31.0 (0.87)
Poles	4	4	4	4

Step 3: Available Windings

Imperial	12V24	12V48	12V60	22V24	22V48	22V60	36V24	36V48	36V60	45V24	45V48	45V60
Metric	8V24	8V48	8V60	16V24	16V48	16V60	25V24	25V48	25V60	32V24	32V48	32V60
Voltage (Vdc)	24	48	60	24	48	60	24	48	60	24	48	60
Voltage Constant V/kRPM	2.1	4.2	5.3	4.5	9.0	11.3	7.1	14.2	17.8	9.2	18.4	23.0
Torque Constant oz-in/A (Ncm/A)	2.8 (2.0)	5.7 (4.0)	7.2 (5.1)	6.1 (4.3)	12.2 (8.6)	15.2 (10.7)	9.6 (6.8)	19.2 (13.6)	24.1 (17.0)	12.4 (8.8)	24.9 (17.6)	31.1 (22.0)
Max Cont Current (A)	4.2	2.1	1.7	3.6	1.8	1.4	3.7	1.9	1.5	3.6	1.8	1.4
Peak Current (A)	7.6	3.8	3.0	9.9	4.9	3.9	10.4	5.2	4.2	10.9	5.5	4.4

## RP23 : ElectroCraft RapidPower™ | BLDC Motor

Size	Peak Torque oz-in (Ncm)	Speeds up to RPM
NEMA 23	190 (134)	8000



### High-Performance. Good Price.

Our RapidPower Nema 23 is a compact, high-performance brushless motor incorporating ball bearing construction, a low cogging electro-magnetic design with both low audible and magnetic noise. It is available with a hall-effect commutation encoder or a variety of optical encoders for higher precision applications.

### To build your own motor, choose the:

**1 - Frame Size**  
(Imperial or Metric)

**2 - Torque**

**3 - Winding**

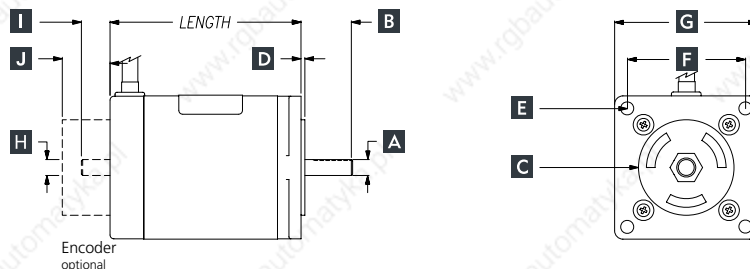
**4 - Features**  
( see page 55 )

a. **RP** **23** **73** **V** **24** **000** **X**  
 Product Name Frame Size Continuous Torque (oz-in) Voltage Rear Shaft Front Shaft Lead Option Encoder

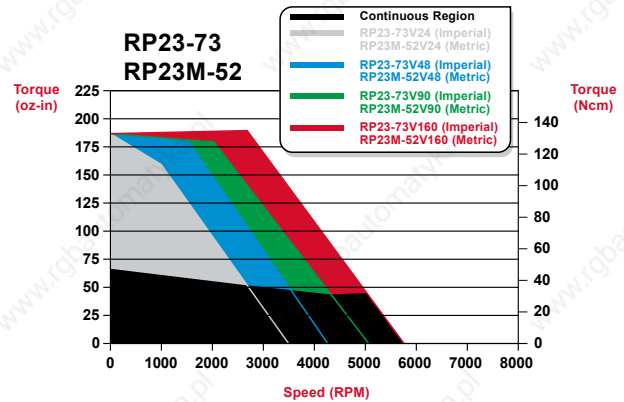
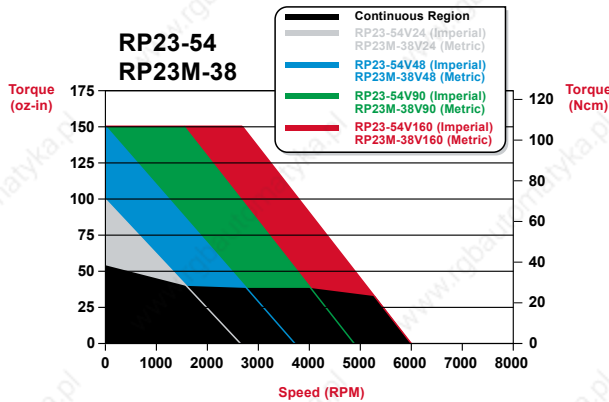
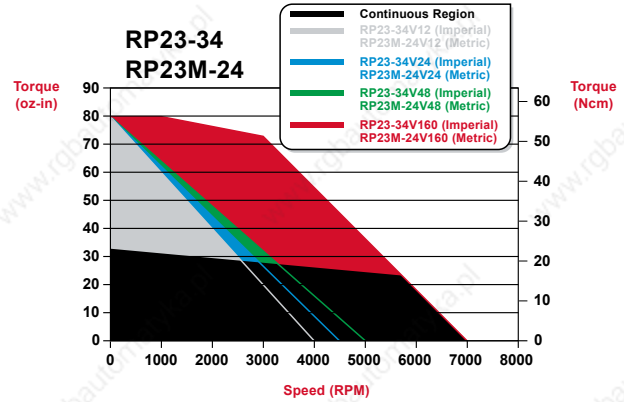
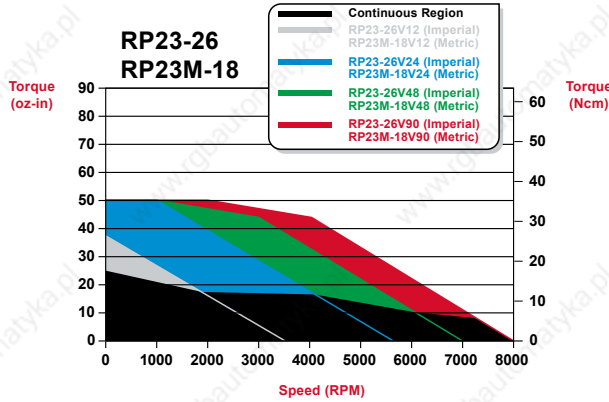
b. **RP** **23** **M** **52** **V** **24** **000** **X**  
 Product Name Frame Size Optional Metric Continuous Torque (Ncm) Voltage Rear Shaft Front Shaft Lead Option Encoder

### Step 1: RP23 & RP23M Frame Size Drawing Key

Model	MAX Length	A	B	C	D	E	F	G	H	I	J
		Front Shaft Diameter	Front Shaft Length	Pilot Diameter	Pilot Length (Ref)	Mount Hole Pattern (Ref)	Mount Hole Spacing (Ref)	Flange External Dimension (Ref)	Rear Shaft Diameter	Rear Shaft Length	Encoder Length (Ref) Single Ended Differential
RP23-26	1.60 in	0.2500 in 0.2495 in	0.81 in ±0.03	1.500 in 1.498 in	0.06 in	[4] 0.205 in ± 0.010 on 2.625 in D.B.C.	1.86 in	2.25 in	0.2500 in 0.2495 in	0.45 in ±0.030	0.35 in 0.55 in
RP23-34	2.00 in										
RP23-54	3.00 in										
RP23-73	4.00 in										
RP23M-18	41 mm	8.000 mm 7.987 mm	25 mm ±0.8	36 mm ±0.05	1.5 mm	[4] 4.5 mm ± 0.25 on 65 mm D.B.C.	46 mm	57 mm	6.350 mm 6.337 mm	11.4 mm ±0.762	8.89 mm 13.97 mm
RP23M-24	51 mm										
RP23M-38	77 mm										
RP23M-52	102 mm										



Step 2: RP23 Torque and Mechanical Data



Stack Size Models	RP23-26 / RP23M-18	RP23-34 / RP23M-24	RP23-54 / RP23M-38	RP23-73 / RP23M-52
Cont Stall Torque oz-in (Ncm)	26 (18)	34 (24)	54 (38)	73 (52)
Peak Torque oz-in (Ncm)	50 (35)	80 (56)	150 (106)	190 (134)
No Load Speed RPM	8000	7000	6000	5750
Inertia oz-in-sec <sup>2</sup> (g-cm <sup>2</sup> )	0.00152 (107.3)	0.00286 (202.0)	0.00470 (331.9)	0.007151 (505.0)
Motor Weight oz (kg)	15 (0.43)	21 (0.59)	31 (0.87)	47 (1.32)
Poles	4	4	4	4

Step 3: Available Windings

Imperial	26V12	26V24	26V48	26V90	34V12	34V24	34V48	34V160	54V12	54V24	54V48	54V160	73V24	73V48	73V90	73V160
Metric	18V12	18V24	18V48	18V90	24V12	24V24	24V48	24V160	38V12	38V24	38V48	38V160	52V24	52V48	52V90	52V160
Voltage (Vdc)	12	24	48	90	12	24	48	160	12	24	48	160	24	48	90	160
Voltage Constant V/kRPM	3.4	4.2	6.7	11.3	3.0	5.5	9.6	22.9	4.9	6.5	10.0	26.7	6.7	11.2	18.0	28.1
Torque Constant oz-in/A (Ncm/A)	4.6 (3.2)	5.7 (4.0)	9.1 (6.4)	15.2 (10.7)	4.1 (2.9)	7.5 (5.3)	13.0 (9.2)	30.9 (21.8)	6.6 (4.7)	8.8 (6.2)	13.5 (9.5)	36.1 (25.5)	9.0 (6.4)	15.1 (10.7)	24.3 (17.2)	38.0 (26.8)
Max Cont Current (A)	5.3	4.6	2.6	1.6	8.6	4.5	2.5	1.1	8.7	5.7	4.2	1.5	8.3	4.7	3.1	1.9
Peak Current (A)	11.0	8.8	6.5	3.5	17.5	10.0	7.0	2.6	15.9	18.5	11.1	4.2	25.3	14.4	8.5	5.4

## RP34 : ElectroCraft RP Series | BLDC Motor

Size	Peak Torque oz-in (Ncm)	Speeds up to RPM
NEMA 34	1096 (774)	7000



### Good-Performance. Good Price.

Our RapidPower Nema 34 is a compact, high-performance brushless motor incorporating ball bearing construction, a low cogging electro-magnetic design with both low audible and magnetic noise. It is available with a hall-effect commutation encoder or a variety of optical encoders for higher precision applications.

### To build your own motor, choose the:

**1 - Frame Size**  
(Imperial or Metric)

**2 - Torque**

**3 - Winding**

**4 - Features**  
(see page 55)

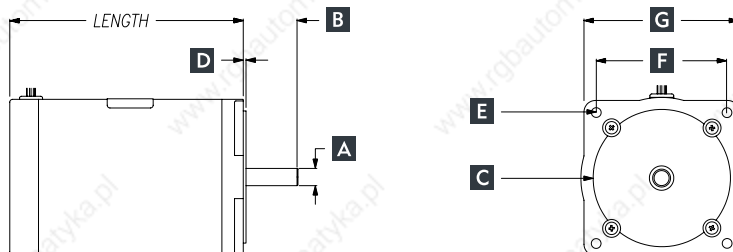
a. **RP34** — **313**  
Product Name Frame Size Continuous Torque (oz-in)

b. **RP34M** — **221**  
Product Name Frame Size Optional Metric Continuous Torque (Ncm)

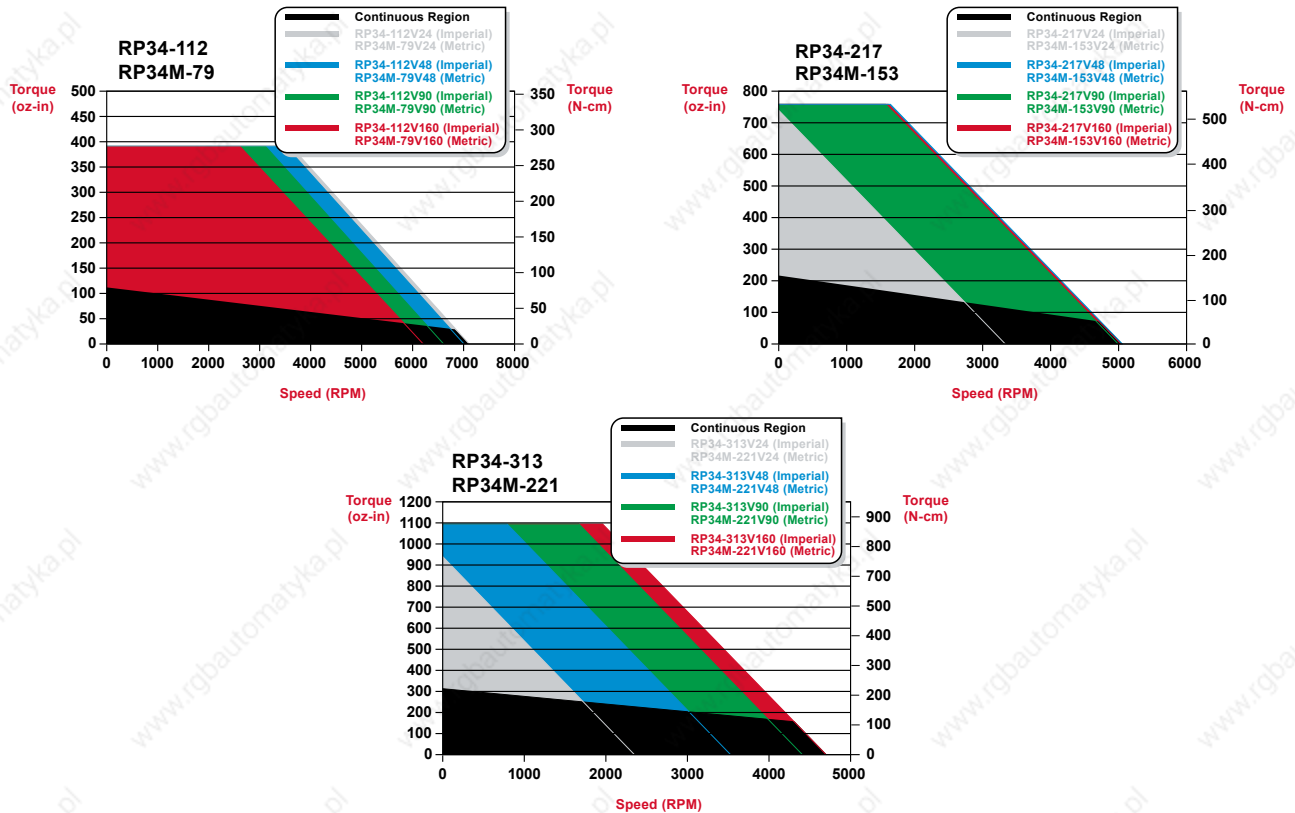
**V** **24** — **000** — **X**  
Voltage Rear Shaft Front Shaft Lead Option Encoder

### Step 1: RP34 & RP34M Frame Size Drawing Key

Model	MAX Length	A	B	C	D	E	F	G	H	I	J
		Front Shaft Diameter	Front Shaft Length	Pilot Diameter	Pilot Length (Ref)	Mount Hole Pattern (Ref)	Mount Hole Spacing (Ref)	Flange External Dimension (Ref)	Rear Shaft Diameter	Rear Shaft Length	Encoder Length (Ref) Single Ended Differential
RP34-112	2.84 in										
RP34-217	4.15 in	0.3750 in	1.25 in ±0.03	2.875 in	0.06 in	[4] 0.220 in ± 0.010 on 3.875 in D.B.C.	2.74 in	3.38 in	0.2500 in	0.500 in ±0.040	0.35 in
RP34-313	5.47 in	0.3745 in		2.873 in					0.2495 in		0.55 in
RP34M-79	72 mm										
RP34M-153	105 mm	14.000 mm	30 mm ±0.8	80.012 mm	1.5 mm	[4] 7 mm +0.36/-0.00 on 100 mm D.B.C.	71.27 mm	85.85 mm	6.3424 mm	12.7 mm ±1.016	8.89 mm
RP34M-221	139 mm	13.989 mm		79.993 mm					6.3297 mm		14.91 mm



Step 2: RP34 Torque and Mechanical Data



Stack Size Models	RP34-112 / RP34M-79	RP34-217 / RP34M-153	RP34-313 / RP34M-221
Cont Stall Torque oz-in (Ncm)	112 (79)	217 (153)	313 (221)
Peak Torque oz-in (Ncm)	392 (277)	759 (536)	1096 (774)
No Load Speed RPM	7500	6500	5000
Inertia oz-in-sec <sup>2</sup> (g-cm <sup>2</sup> )	0.0149 (1053.4)	0.0258 (1824.3)	0.0385 (2715.3)
Motor Weight oz (kg)	64 (1.79)	100 (2.8)	143 (4.0)
Poles	4	4	4

Step 3: Available Windings

Imperial	112V24	112V48	112V90	112V160	217V24	217V48	217V90	217V160	313V24	313V48	313V90	313V160
Metric	79V24	79V48	79V90	79V160	153V24	153V48	153V90	153V160	221V24	221V48	221V90	221V160
Voltage (Vdc)	24	48	90	160	24	48	90	160	24	48	90	160
Voltage Constant V/kRPM	3.4	6.8	13.7	25.9	7.2	9.5	18.1	31.8	10.2	13.6	20.4	34.0
Torque Constant oz-in/A (Ncm/A)	4.6	9.2	18.5	35.0	9.7	12.8	24.4	43.0	13.8	18.4	27.6	46.0
Max Cont Current (A)	24.4	12.1	6.1	3.2	22.3	16.9	8.9	5.0	22.7	17.0	11.3	4.7
Peak Current (A)	85.5	42.4	21.2	11.2	78.0	59.1	31.1	17.6	79.3	59.6	39.7	16.5

## E22 : ElectroCraft E-Series | BLDC Motor

Size in (mm)	Peak Torque oz-in (Ncm)	Speeds up to RPM
2.2 (56)	200 (141)	15000



### High-Performance. High Torque-to-Weight.

The E22 series offers reliable performance in a small package for your low voltage, lower torque range applications. This series utilizes integrated hall effects or encoders to provide consistent speed in either rotation in a small envelope. The E22 series supports application speeds up to 15000 RPM while providing reliable performance.

### To build your own motor, choose the:

**1 - Frame Size**  
(Imperial or Metric)

**2 - Torque**

**3 - Winding**

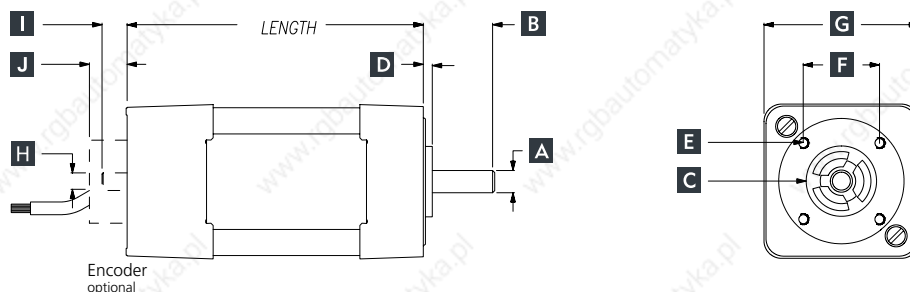
**4 - Features**  
( see page 55 )

a. **E** **2 2** **4 0** **V** **2 4** **0 0 0** **X**  
 Product Name Frame Size Continuous Torque (oz-in) Voltage Rear Shaft Front Shaft Lead Option Encoder

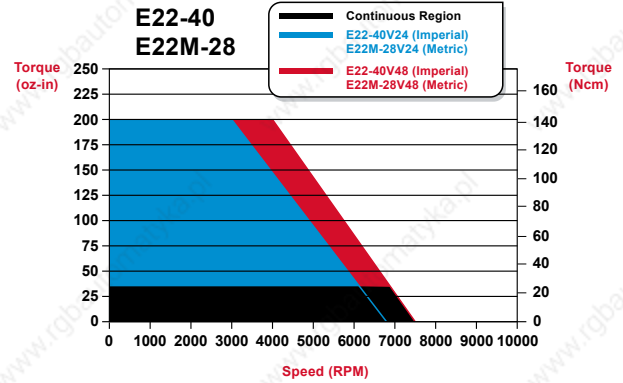
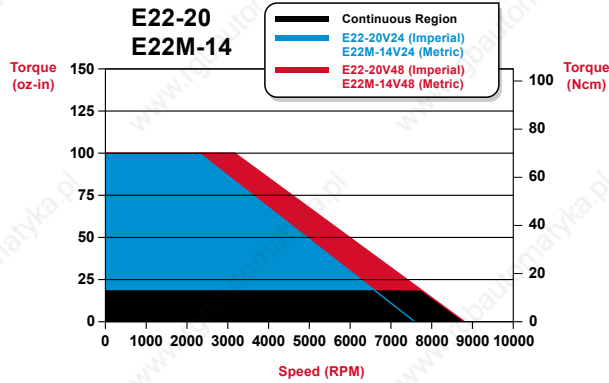
b. **E** **2 2** **M** **2 8** **V** **2 4** **0 0 0** **X**  
 Product Name Frame Size Optional Metric Continuous Torque (Ncm) Voltage Rear Shaft Front Shaft Lead Option Encoder

### Step 1: E22 & E22M Frame Size Drawing Key

Model	MAX Length	A Front Shaft Diameter	B Front Shaft Length	C Pilot Diameter	D Pilot Length (Ref)	E Mount Hole Pattern (Ref)	F Mount Hole Spacing (Ref)	G Flange External Dimension (Ref)	H Rear Shaft Diameter	I Rear Shaft Length	J Encoder Length (Ref) Single Ended Differential
E22-20	3.02 in	0.3145 in	1.000 in	1.000 in	0.100 in	[4] 6-32 UNC-2B THRU EQ SP on 1.531 in D.B.C.	1.08 in	2.2 in	0.2497 in	0.500 in	0.350 in
E22-40	4.03 in	0.3140 in	±0.035	0.998 in	0.100 in				0.2492 in	±0.035	0.587 in
E22M-14	77 mm	8.00 mm	25 mm	25.00 mm	2.54 mm	[4] M4 X 0.7-6H THRU EQ SP on 38.9 mm D.B.C.	27.51 mm	56 mm	6.3424 mm	12.7 mm	8.89 mm
E22M-28	103 mm	7.99 mm	±0.889	24.95 mm	2.54 mm				6.3297 mm	±0.889	14.91 mm



Step 2: E22 Torque and Mechanical Data



Stack Size Models	E22-20 / E22M-14	E22-40 / E22M-28
Cont Stall Torque oz-in (Ncm)	20 (14)	40 (28)
Peak Torque oz-in (Ncm)	100 (71)	200 (141)
No Load Speed RPM	8800	7420
Inertia oz-in-sec <sup>2</sup> (g-cm <sup>2</sup> )	0.0014 (98.86)	0.0019 (134.17)
Motor Weight oz (kg)	28 (0.794)	32 (0.907)
Poles	4	4

Step 3: Available Windings

Imperial	20V24	20V48	40V24	40V48
Metric	14V24	14V48	28V24	28V48
Voltage (Vdc)	24	48	24	48
Voltage Constant V/kRPM	2.7	5.0	3.1	6.0
Torque Constant oz-in/A (Ncm/A)	3.6 (2.6)	6.8 (4.8)	4.1 (2.9)	8.1 (5.7)
Max Cont Current (A)	8.7	4.5	13.7	7.3
Peak Current (A)	30.7	16.5	54.0	27.5



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fully customized motor... that's  
our specialty!

## E30 : ElectroCraft E-Series | BLDC Motor

Size in (mm)	Peak Torque oz-in (Ncm)	Speeds up to RPM
3.0 (78)	245 (173)	7500



### High-Performance. High Torque-to-Weight.

The E30 series offers reliable performance in a small package for your low to mid voltage, lower torque range applications. This series features an economic design available in both closed and open shell configurations.

The E30 series supports application speeds up to 7500 RPM while providing long reliable performance.

### To build your own motor, choose the:

**1 - Frame Size**  
(Imperial or Metric)

**2 - Torque**

**3 - Winding**

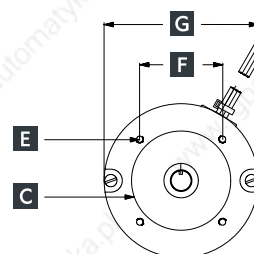
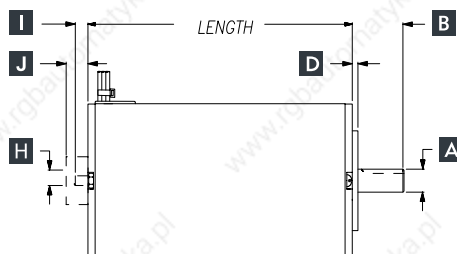
**4 - Features**  
( see page 55 )

a. **E** **30** — **77** — **V** **48** — **000** — **X**  
 Product Name Frame Size Continuous Torque (oz-in) Voltage Rear Shaft Front Shaft Lead Option Encoder

b. **E** **30** **M** — **54** — **V** **48** — **000** — **X**  
 Product Name Frame Size Optional Metric Continuous Torque (Ncm) Voltage Rear Shaft Front Shaft Lead Option Encoder

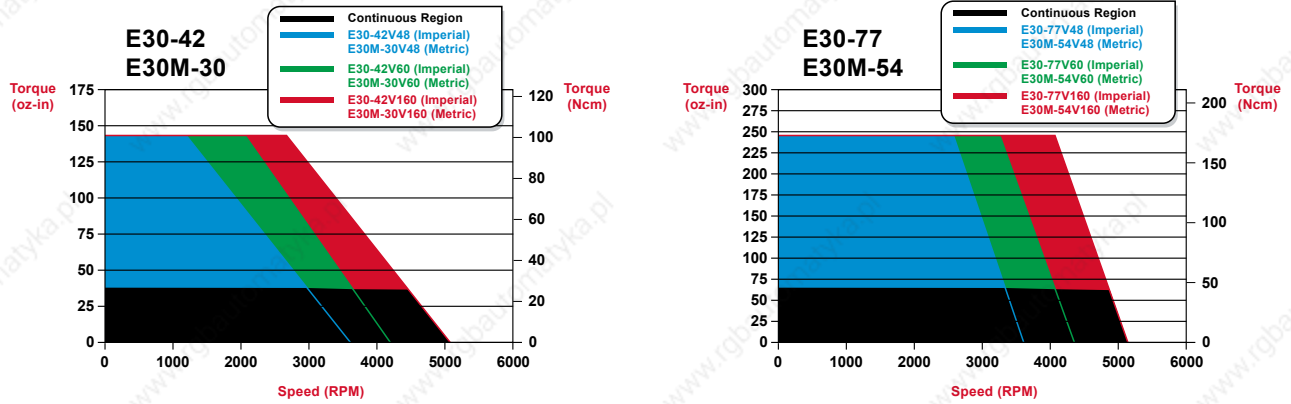
### Step 1: E30 & E30M Frame Size Drawing Key

Model	MAX Length (with integrated halls)	MAX Length (without integrated halls)	A	B	C	D	E	F	G	H	I	J
			Front Shaft Diameter	Front Shaft Length	Pilot Diameter	Pilot Length (Ref)	Mount Hole Pattern (Ref)	Mount Hole Spacing (Ref)	Flange External Dimension (Ref)	Rear Shaft Diameter	Rear Shaft Length	Encoder Length (Ref) Single Ended Differential
E30-42	4.32 in	3.81 in	0.3145 in	1.000 in ±0.035	N/A	N/A	[4] 6-32 UNC-2B THRU EQ SP on 2.781 D.B.C.	1.97 in	3.0 in	0.2497 in	0.500 in ±0.035	0.350 in
E30-77	5.32 in	4.81 in	0.3140 in							0.2492 in		0.587 in
E30M-30	110 mm	97 mm	9.00 mm	20 mm ±0.889	50 mm ±0.889	2.5 mm	[4] M5 X 0.8-6H THRU EQ SP on 65 mm D.B.C.	45.96 mm	78 mm	6.3424 mm	12.7 mm ±0.889	8.89 mm
E30M-54	136 mm	123 mm	8.99 mm							6.3297 mm		14.91 mm





Step 2: E30 Torque and Mechanical Data



Stack Size Models	E30-42 / E30M-30	E30-77 / E30M-54
Cont Stall Torque oz-in (Ncm)	42 (30)	77 (54)
Peak Torque oz-in (Ncm)	145 (102)	245 (173)
No Load Speed RPM	5045	5145
Inertia oz-in-sec <sup>2</sup> (g-cm <sup>2</sup> )	0.0090 (635.54)	0.0170 (1200.46)
Motor Weight oz (kg)	49.6 (1.406)	80.0 (2.268)
Poles	4	4

Step 3: Available Windings

Imperial	42V48	42V60	42V160	77V48	77V60	77V160
Metric	30V48	30V60	30V160	54V48	54V60	54V160
Voltage (Vdc)	48	60	160	48	60	160
Voltage Constant V/kRPM	12.0	13.1	30.0	12.0	12.9	30.1
Torque Constant oz-in/A (Ncm/A)	16.2 (11.5)	17.7 (12.5)	40.6 (28.7)	16.2 (11.5)	17.4 (12.3)	40.7 (28.7)
Max Cont Current (A)	3.5	3.4	1.4	6.9	6.2	2.7
Peak Current (A)	9.9	9.1	4.0	16.8	15.6	6.7



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custom winding, stack length or  
fully customized motor... that's  
our specialty!

## E33 : ElectroCraft E-Series | BLDC Motor

Size in (mm)	Peak Torque oz-in (Ncm)	Speeds up to RPM
3.3 (84)	575 (406)	7500



### High-Performance. High Torque-to-Weight.

The E33 series offers high output in a highly efficient package for low to mid voltage, mid-level to high torque applications. This series features an economic design available in both closed and open shell configurations.

The E33 series supports application speeds up to 7500 RPM while providing long reliable performance.

### To build your own motor, choose the:

**1 - Frame Size**  
(Imperial or Metric)

**2 - Torque**

**3 - Winding**

**4 - Features**  
(see page 55)

a. **E** **3 3** — **1 2 0** → **V** **4 8** — **0 0 0** — **X**

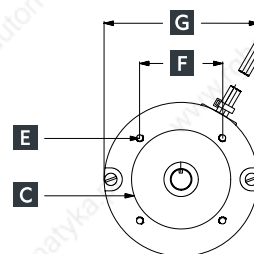
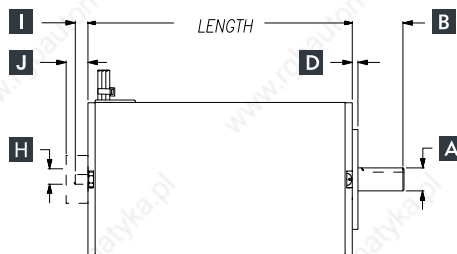
b. **E** **3 3** **M** — **8 5** → **V** **4 8** — **0 0 0** — **X**

Product Name    Frame Size    Continuous Torque (oz-in)    Voltage    Rear Shaft    Front Shaft    Lead Option    Encoder

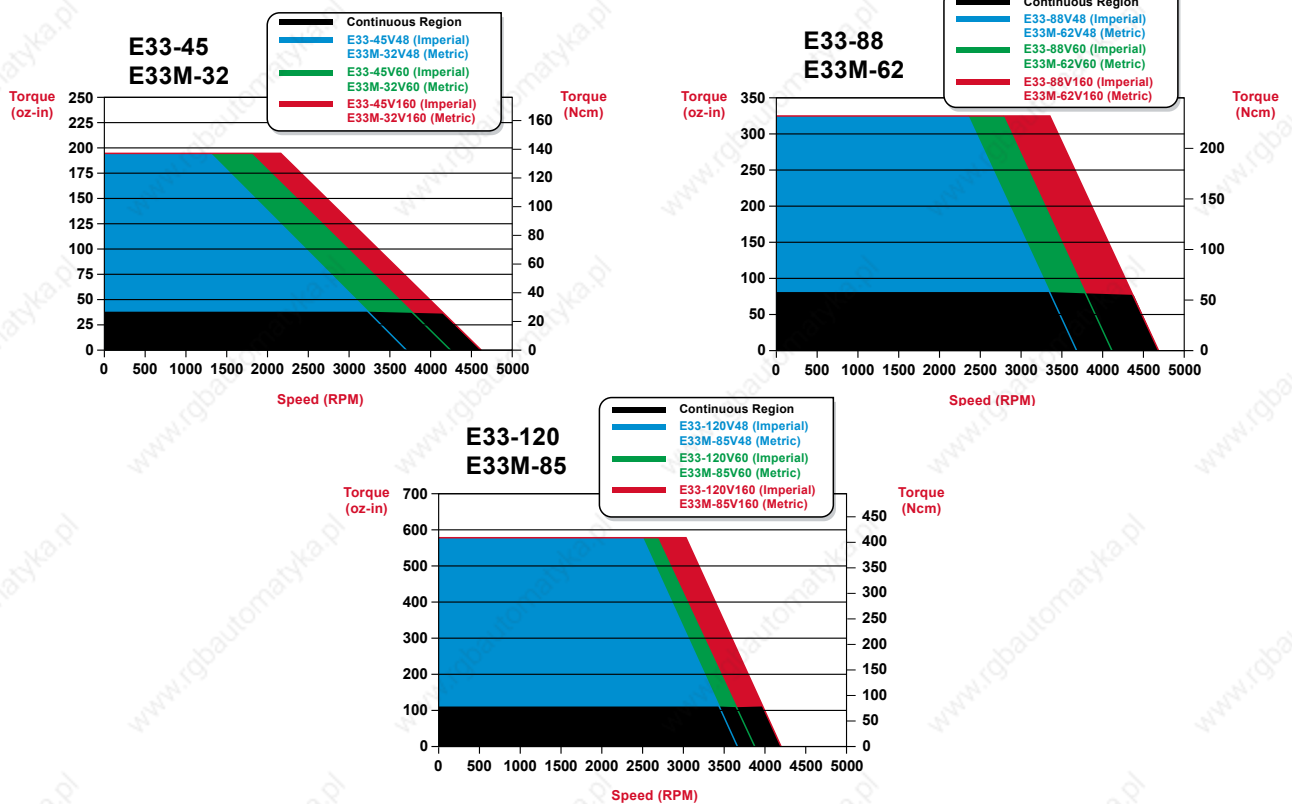
Product Name    Frame Size    Optional Metric    Continuous Torque (Ncm)

### Step 1: E33 & E33M Frame Size Drawing Key

Model	MAX Length (with integrated halls)	MAX Length (without integrated halls)	A	B	C	D	E	F	G	H	I	J
			Front Shaft Diameter	Front Shaft Length	Pilot Diameter	Pilot Length (Ref)	Mount Hole Pattern (Ref)	Mount Hole Spacing (Ref)	Flange External Dimension (Ref)	Rear Shaft Diameter	Rear Shaft Length	Encoder Length (Ref) Single Ended Differential
E33-45	4.14 in	3.63 in	0.4995 in 0.4990 in	1.000 in ±0.035	N/A	N/A	[4] 8-32 UNC-2B THRU EQ SP on 2.625 in D.B.C.	1.86 in	3.3 in	0.2497 in 0.2492 in	0.500 in ±0.035	0.350 in 0.587 in
E33-88	5.14 in	4.63 in										
E33-120	6.14 in	5.63 in										
E33M-32	106 mm	93 mm	12.00 mm 11.99 mm	40 mm ±0.889	55.00 mm 54.95 mm	2.5 mm	[4] M5 X 0.8-6H THRU EQ SP on 65 mm D.B.C.	45.96 mm	84 mm	6.3424 mm 6.3297 mm	12.7 mm ±0.889	8.89 mm 14.91 mm
E33M-62	131 mm	118 mm										
E33M-85	156 mm	143 mm										



Step 2: E33 Torque and Mechanical Data



Stack Size Models	E33-45 / E33M-32	E33-88 / E33M-62	E33-120 / E33M-85
Cont Stall Torque oz-in (Ncm)	45 (32)	88 (62)	120 (85)
Peak Torque oz-in (Ncm)	195 (138)	325 (230)	575 (406)
No Load Speed RPM	4610	4700	4215
Inertia oz-in-sec <sup>2</sup> (g-cm <sup>2</sup> )	0.0090 (635.54)	0.0170 (1200.46)	0.0250 (1765.39)
Motor Weight oz (kg)	52.8 (1.497)	92.8 (2.631)	216.0 (6.124)
Poles	4	4	4

Step 3: Available Windings

Imperial	45V48	45V60	45V160	88V48	88V60	88V160	120V48	120V60	120V160
Metric	32V48	32V60	32V160	62V48	62V60	62V160	85V48	85V60	85V160
Voltage (Vdc)	48	60	160	48	60	160	48	60	160
Voltage Constant V/kRPM	11.7	13.0	33.0	12.0	13.7	33.0	12.0	15.0	37.0
Torque Constant oz-in/A (Ncm/A)	15.8 (11.2)	17.6 (12.4)	44.6 (31.5)	16.2 (11.4)	18.5 (13.1)	44.6 (31.5)	16.2 (11.4)	20.3 (14.3)	50.0 (35.3)
Max Cont Current (A)	4.1	3.7	1.5	7.6	6.7	2.8	11.5	9.1	3.8
Peak Current (A)	13.7	12.3	4.9	22.3	19.5	8.1	39.4	31.5	12.8

## E37 : ElectroCraft E-Series | BLDC Motor

Size in (mm)	Peak Torque oz-in (Ncm)	Speeds up to RPM
3.7 (96)	725 (512)	7500



### High-Performance. High Torque-to-Weight.

The E37 series offers high output in a highly efficient package for low to mid voltage, mid-level to high torque applications. This series features an economic design available in both closed and open shell configurations.

The E37 series supports application speeds up to 7500 RPM while providing long reliable performance.

### To build your own motor, choose the:

**1 - Frame Size**  
(Imperial or Metric)

**2 - Torque**

**3 - Winding**

**4 - Features**  
(see page 55)

a. **E** **3 7** — **1 6 1** → **V** **4 8** — **0 0 0** — **X**

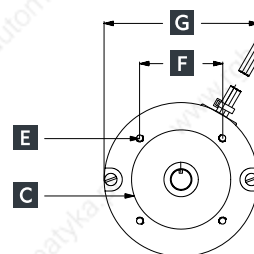
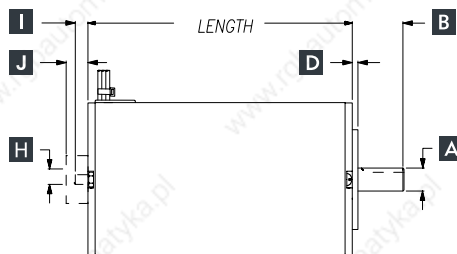
Product Name    Frame Size    Continuous Torque (oz-in)    Voltage    Rear Shaft    Front Shaft    Lead Option    Encoder

b. **E** **3 7** **M** — **1 1 4** → **V** **4 8** — **0 0 0** — **X**

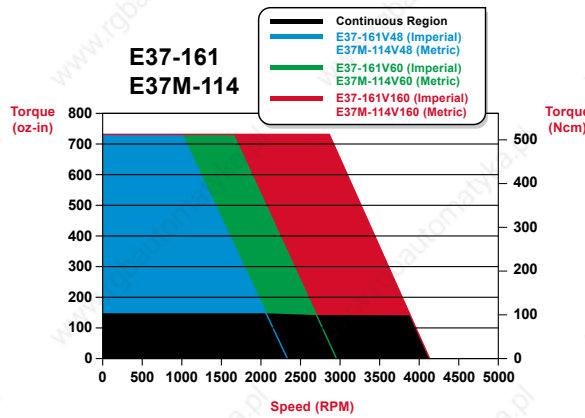
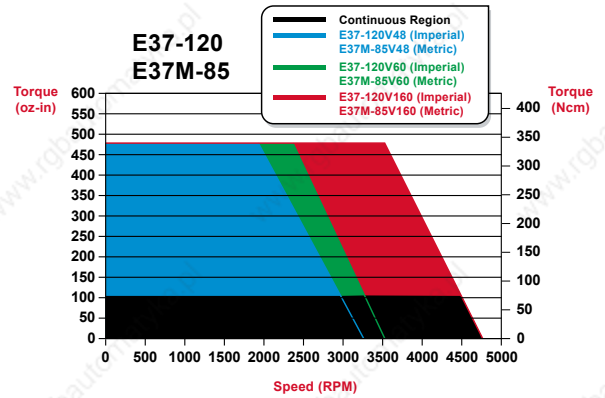
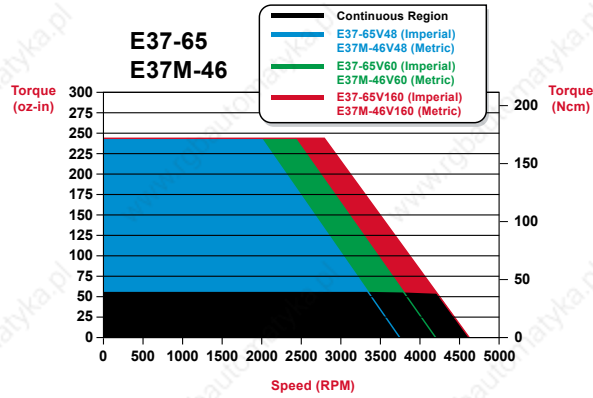
Product Name    Frame Size    Optional Metric    Continuous Torque (Ncm)    Voltage    Rear Shaft    Front Shaft    Lead Option    Encoder

### Step 1: E37 & E37M Frame Size Drawing Key

Model	MAX Length (with integrated halls)	MAX Length (without integrated halls)	A	B	C	D	E	F	G	H	I	J
			Front Shaft Diameter	Front Shaft Length	Pilot Diameter	Pilot Length (Ref)	Mount Hole Pattern (Ref)	Mount Hole Spacing (Ref)	Flange External Dimension (Ref)	Rear Shaft Diameter	Rear Shaft Length	Encoder Length (Ref) Single Ended Differential
E37-65	4.63 in	4.10 in										
E37-120	5.63 in	5.10 in	0.4995 in 0.4990 in	1.000 in ±0.035	N/A	N/A	[4] 8-32 UNC-2B THRU EQ SP on 3.125 D.B.C.	2.21 in	3.7 in	0.2497 in 0.2492 in	0.500 in ±0.035	0.350 in 0.587 in
E37-161	6.63 in	6.10 in										
E37M-46	118 mm	105 mm										
E37M-85	143 mm	130 mm	12.00 mm 11.99 mm	40 mm ±0.889	60.00 mm 59.95 mm	1.524 mm	[4] M5 mm x 0.8-6H THRU EQ SP on 75 mm D.B.C.	53.03 mm	96 mm	6.3424 mm 6.3297 mm	12.7 mm ±0.889	8.89 mm 14.91 mm
E37M-114	169 mm	155 mm										



Step 2: E37 Torque and Mechanical Data



Stack Size Models	E37-65 / E37M-46	E37-120 / E37M-85	E37-161 / E37M-114
Cont Stall Torque oz-in (Ncm)	65 (46)	120 (85)	161 (114)
Peak Torque oz-in (Ncm)	245 (173)	475 (335)	725 (512)
No Load Speed RPM	4620	4745	4110
Inertia oz-in-sec <sup>2</sup> (g-cm <sup>2</sup> )	0.0170 (1200.46)	0.0310 (2189.08)	0.0450 (3177.70)
Motor Weight oz (kg)	78.4 (2.22)	118.4 (3.36)	158.4 (4.49)
Poles	4	4	4

Step 3: Available Windings

Imperial	65V48	65V60	65V160	120V48	120V60	120V160	161V48	161V60	161V160
Metric	46V48	46V60	46V160	85V48	85V60	85V160	114V48	114V60	114V160
Voltage (Vdc)	48	60	160	48	60	160	48	60	160
Voltage Constant V/kRPM	11.6	13.2	33.2	13.6	16.0	32.8	19.0	19.0	38.0
Torque Constant oz-in/A (Ncm/A)	15.7 (11.1)	17.9 (12.6)	44.9 (31.7)	18.4 (13.0)	21.6 (15.3)	44.4 (31.3)	25.7 (18.1)	25.7 (18.1)	51.4 (36.2)
Max Cont Current (A)	6.0	5.3	2.1	9.4	8.4	4.0	8.7	8.7	4.5
Peak Current (A)	17.4	15.2	6.1	28.7	24.4	11.9	31.4	31.4	15.7

## EXC23 : ElectroCraft EXC-Series | BLDC Motor

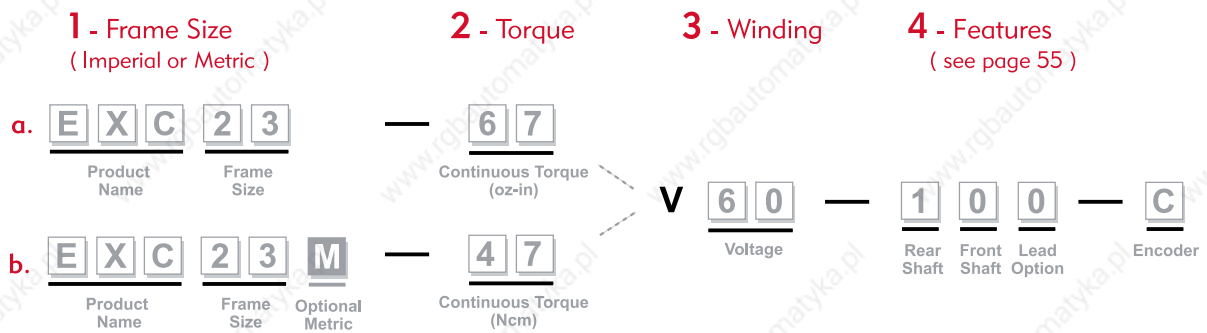
Size	Peak Torque oz-in (Ncm)	Speeds up to RPM
NEMA 23	200 (141)	5000



### High-Performance. Servo.

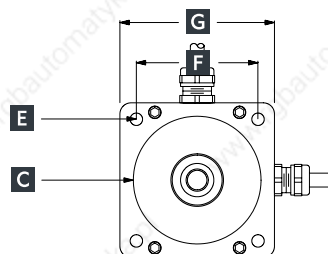
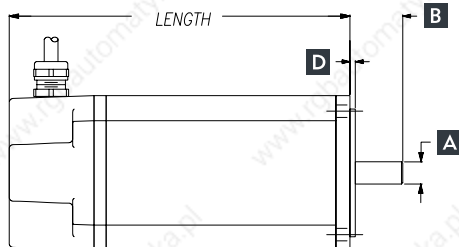
The EXC-Series Nema 23 AC Servo motor offers customers high economic value and superior reliability. The EXC-Series is a cost-improved version of the popular N-Series family of AC Servo motors sold under the brand Rockwell Automation. This product provides considerable cost improvements for a variety of light industrial, commercial, and medical applications.

### To build your own motor, choose the:

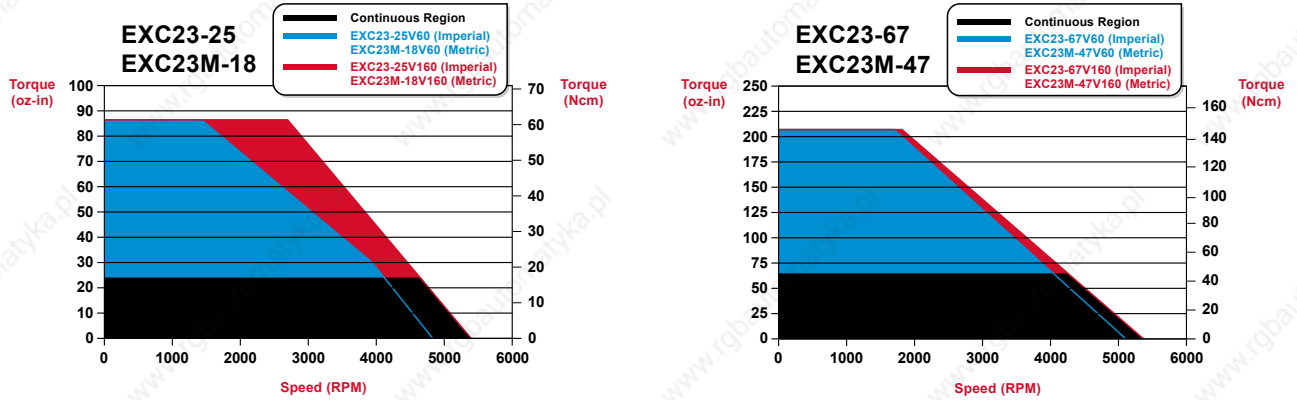


### Step 1: EXC23 & EXC23M Frame Size Drawing Key

Model	MAX Length	A	B	C	D	E	F	G	H	I	J
		Front Shaft Diameter	Front Shaft Length	Pilot Diameter	Pilot Length (Ref)	Mount Hole Pattern (Ref)	Mount Hole Spacing (Ref)	Flange External Dimension (Ref)	Rear Shaft Diameter	Rear Shaft Length (Ref)	Encoder Cover Length (Ref)
EXC23-25	4.66 in	0.2500 in	0.81 in	1.500 in	0.090 in	[4] 0.205 in DIA THRU on 2.625 in D.B.C.	1.86 in	2.3 in	N/A	N/A	N/A
EXC23-67	6.16 in	0.2495 in	±0.03	1.498 in							
EXC23M-18	119 mm	8.000 mm	25 mm	50.00 mm	2.50 mm	[4] M5 mm DIA THRU on 65 mm D.B.C.	45.96 mm	58 mm	N/A	N/A	N/A
EXC23M-47	157 mm	7.987 mm	±0.762	49.95 mm							



Step 2: EXC23 Torque and Mechanical Data



Stack Size Models	EXC23-25 / EXC23M-18	EXC23-67 / EXC23M-47
Cont Stall Torque oz-in (Ncm)	25 (18)	67 (47)
Peak Torque oz-in (Ncm)	100 (71)	200 (141)
No Load Speed RPM	5340	5310
Inertia oz-in-sec <sup>2</sup> (g-cm <sup>2</sup> )	0.0011 (77.67)	0.0024 (169.47)
Motor Weight oz (kg)	36 (1.02)	54 (1.54)
Poles	4	4

Step 3: Available Windings

Imperial	25V60	25V160	67V60	67V160
Metric	18V60	18V160	47V60	47V160
Voltage (Vdc)	60	160	60	160
Voltage Constant V/kRPM	12.0	30.0	12.0	30.0
Torque Constant oz-in/A (Ncm/A)	16.2 (11.4)	40.6 (28.7)	16.2 (11.4)	40.6 (28.7)
Max Cont Current (A)	2.4	0.9	6.0	2.4
Peak Current (A)	6.9	2.7	13.7	5.5



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custom winding, stack length or  
fully customized motor... that's  
our specialty!

## EXC34 : ElectroCraft EXC-Series | BLDC Motor

Size	Peak Torque oz-in (Ncm)	Speeds up to RPM
NEMA 34	810 (572)	5000



### High-Performance. Servo.

The EXC-Series Nema 34 AC Servo motor offers customers high economic value and superior reliability. The EXC-Series is a cost-improved version of the popular N-Series family of AC Servo motors sold under the Rockwell Automation brand. This product provides considerable cost improvements for a variety of light industrial, commercial, and medical applications.

### To build your own motor, choose the:

**1 - Frame Size**  
(Imperial or Metric)

**2 - Torque**

**3 - Winding**

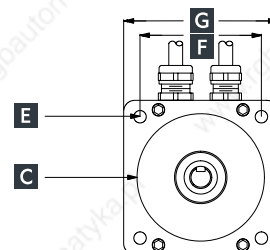
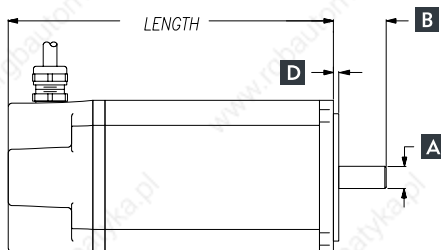
**4 - Features**  
(see page 55)

a. **EXC34** — **300**      V **60** — **100** — **C**  
Product Name      Frame Size      Continuous Torque (oz-in)      Voltage      Rear Shaft      Front Shaft      Lead Option      Encoder

b. **EXC34M** — **212**      V **60** — **100** — **C**  
Product Name      Frame Size      Optional Metric      Continuous Torque (Ncm)      Voltage      Rear Shaft      Front Shaft      Lead Option      Encoder

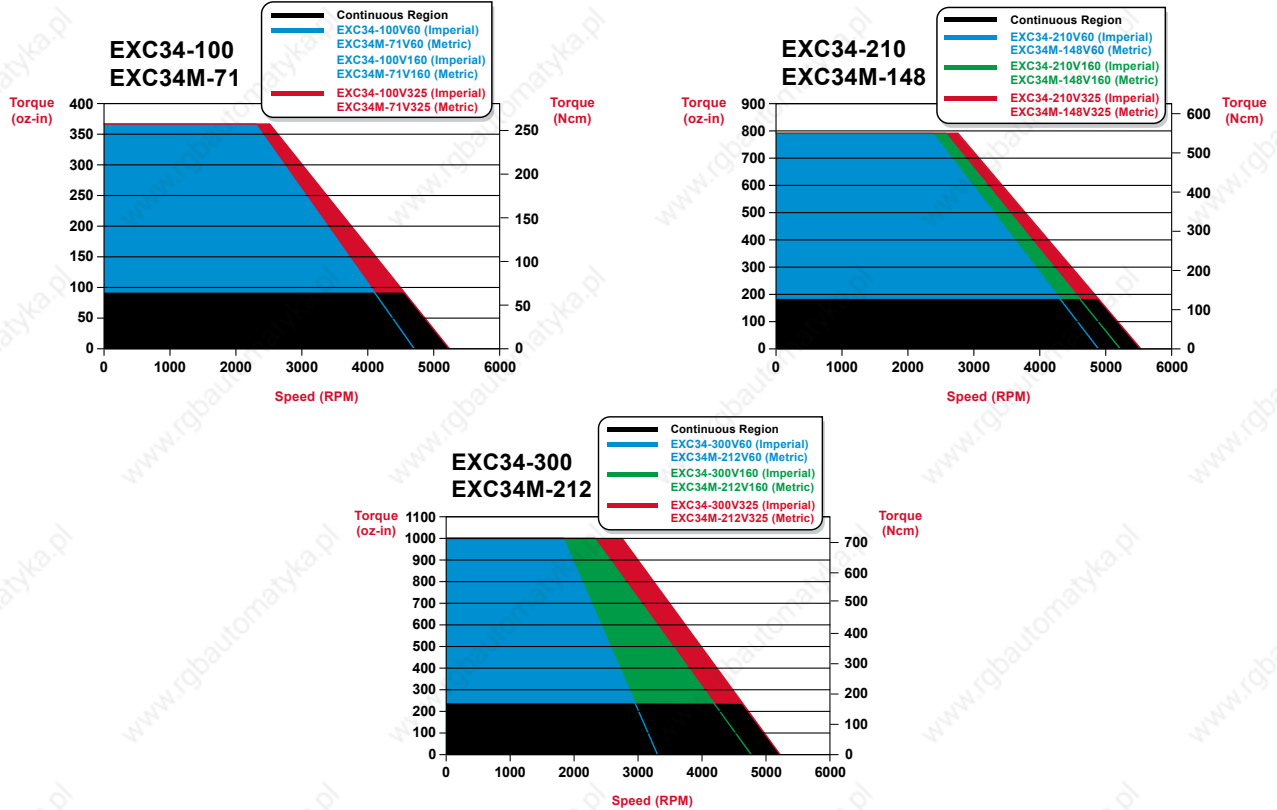
### Step 1: EXC34 & EXC34M Frame Size Drawing Key

Model	MAX Length	A	B	C	D	E	F	G	H	I	J
		Front Shaft Diameter	Front Shaft Length	Pilot Diameter	Pilot Length (Ref)	Mount Hole Pattern (Ref)	Mount Hole Spacing (Ref)	Flange External Dimension (Ref)	Rear Shaft Diameter	Rear Shaft Length (Ref)	Encoder Cover Length (Ref)
EXC34-100	5.70 in	0.5000 in 0.4995 in	1.19 in ±0.03	2.875 in 2.873 in	0.120 in	[4] 0.220 in DIA THRU on 3.875 in D.B.C.	2.74 in	3.48 in	N/A	N/A	N/A
EXC34-210	6.70 in										
EXC34-300	7.70 in										
EXC34M-71	145 mm	14.000 mm 13.987 mm	30 mm ±0.762	80.00 mm 79.95 mm	3.0 mm	[4] 7 mm DIA THRU on 100 mm D.B.C.	70.71 mm	88 mm	N/A	N/A	N/A
EXC34M-148	171 mm										
EXC34M-212	196 mm										





Step 2: EXC34 Torque and Mechanical Data



Stack Size Models	EXC34-100 / EXC34M-71	EXC34-210 / EXC34M-148	EXC34-300 / EXC34M-212
Cont Stall Torque oz-in (Ncm)	100 (71)	210 (148)	300 (212)
Peak Torque oz-in (Ncm)	300 (212)	600 (424)	810 (572)
No Load Speed RPM	5230	5420	5220
Inertia oz-in-sec <sup>2</sup> (g-cm <sup>2</sup> )	0.0101 (713.21)	0.0194 (1369.99)	0.0287 (2026.66)
Motor Weight oz (kg)	99.2 (2.81)	121.6 (3.45)	158.4 (4.49)
Poles	4	4	4

Step 3: Available Windings

Imperial	100V60	100V160	100V325	210V60	210V160	210V325	300V60	300V160	300V325
Metric	71V60	71V160	71V325	148V60	148V160	148V325	212V60	212V160	212V325
Voltage (Vdc)	60	160	325	60	160	325	60	160	325
Voltage Constant V/kRPM	12.9	33.5	62.1	12.2	31.0	59.9	14.1	33.4	62.2
Torque Constant oz-in/A (Ncm/A)	17.4 (12.3)	45.3 (32.0)	84.0 (59.3)	16.5 (11.7)	41.9 (29.6)	81.0 (57.2)	19.1 (13.5)	45.2 (31.9)	84.1 (59.4)
Max Cont Current (A)	8.1	3.1	1.6	18.3	7.0	3.8	21.8	9.4	5.0
Peak Current (A)	19.1	7.4	4.0	40.5	15.9	8.2	47.3	20.0	10.7

## EXC42 : ElectroCraft EXC-Series | BLDC Motor

Size	Peak Torque oz-in (Ncm)	Speeds up to RPM
NEMA 42	1250 (883)	5000



### High-Performance. Servo.

The EXC-Series Nema 42 AC Servo motor offers customers high economic value and superior reliability. The EXC-Series is a cost-improved version of the popular N-Series family of AC Servo motors sold under the Rockwell Automation brand. This product provides considerable cost improvements for a variety of light industrial, commercial, and medical applications.

### To build your own motor, choose the:

**1 - Frame Size**  
(Imperial or Metric)

**2 - Torque**

**3 - Winding**

**4 - Features**  
(see page 55)

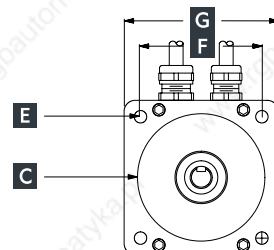
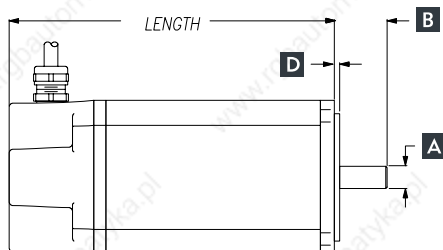
a. **EXC42** — **400**  
Product Name Frame Size Continuous Torque (oz-in)

b. **EXC42M** — **282**  
Product Name Frame Size Optional Metric Continuous Torque (Ncm)

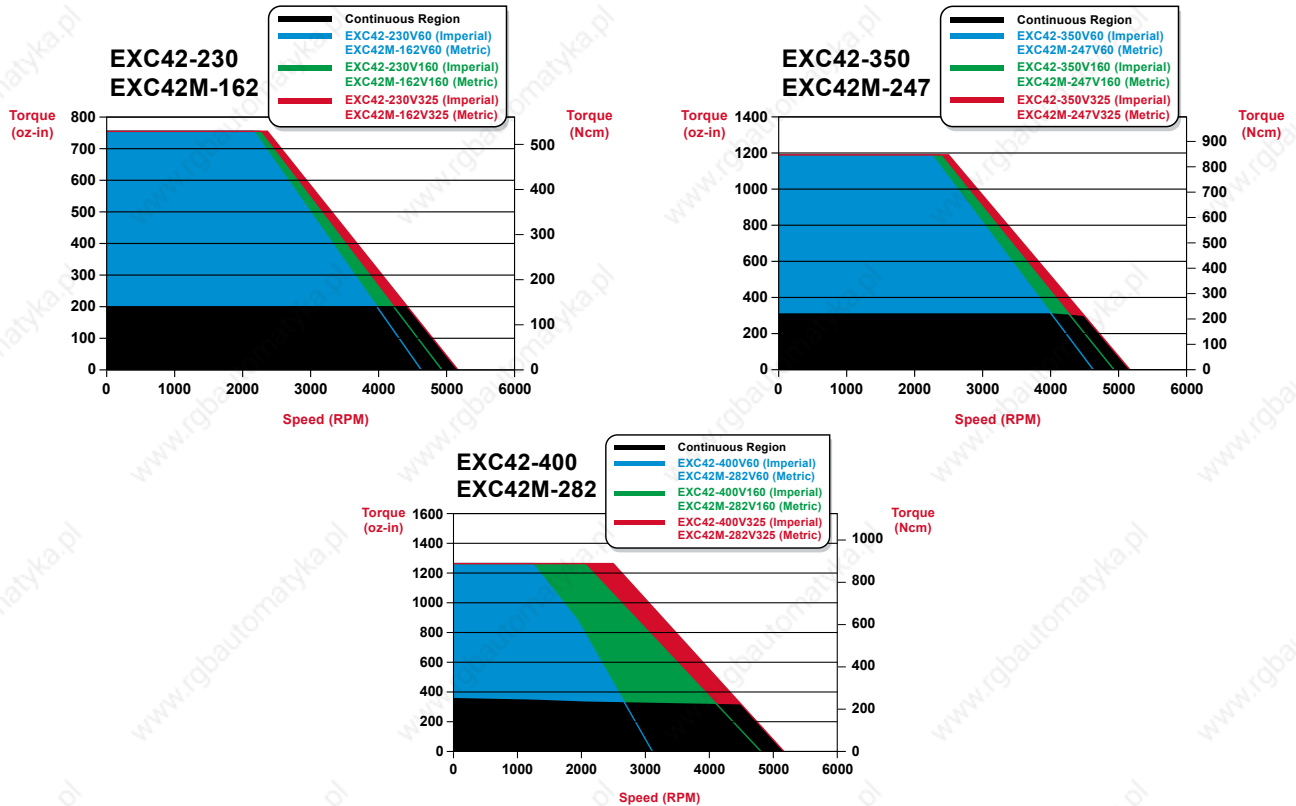
**V 60** — **100** — **C**  
Voltage Rear Shaft Front Shaft Lead Option Encoder

### Step 1: EXC42 & EXC42M Frame Size Drawing Key

Model	MAX Length	A	B	C	D	E	F	G	H	I	J
		Front Shaft Diameter	Front Shaft Length	Pilot Diameter	Pilot Length (Ref)	Mount Hole Pattern (Ref)	Mount Hole Spacing (Ref)	Flange External Dimension (Ref)	Rear Shaft Diameter	Rear Shaft Length (Ref)	Encoder Cover Length (Ref)
EXC42-230	6.86 in	0.6250 in 0.6245 in	1.38 in ±0.03	2.187 in 2.186 in	0.120 in	[4] 0.280 in DIA THRU on 4.950 in D.B.C.	3.50 in	4.00 in	N/A	N/A	N/A
EXC42-350	7.86 in										
EXC42-400	8.86 in										
EXC42M-162	174 mm	16.002 mm 15.989 mm	30 mm ±0.762	110.00 mm 109.97 mm	3.0 mm	[4] 9 mm DIA THRU on 130 mm D.B.C.	91.92 mm	102 mm	N/A	N/A	N/A
EXC42M-247	200 mm										
EXC42M-282	225 mm										



Step 2: EXC42 Torque and Mechanical Data



Stack Size Models	EXC42-230 / EXC42M-162	EXC42-350 / EXC42M-247	EXC42-400 / EXC42M-282
Cont Stall Torque oz-in (Ncm)	230 (162)	350 (247)	400 (282)
Peak Torque oz-in (Ncm)	750 (530)	1000 (706)	1250 (883)
No Load Speed RPM	5130	5200	5220
Inertia oz-in-sec <sup>2</sup> (g-cm <sup>2</sup> )	0.0329 (2323.25)	0.0489 (3453.10)	0.0650 (4590.00)
Motor Weight oz (kg)	160 (4.53)	224 (6.35)	288 (8.16)
Poles	4	4	4

Step 3: Available Windings

Imperial	230V60	230V160	230V325	350V60	350V160	350V325	400V60	400V160	400V325
Metric	162V60	162V160	162V325	247V60	247V160	247V325	282V60	282V160	282V325
Voltage (Vdc)	60	160	325	60	160	325	60	160	325
Voltage Constant V/kRPM	12.8	32.2	63.3	18.2	32.3	62.5	20.0	33.3	62.2
Torque Constant oz-in/A (Ncm/A)	17.3 (12.2)	43.6 (30.8)	85.6 (60.4)	24.6 (17.4)	43.7 (30.9)	84.5 (59.7)	27.1 (19.1)	45.0 (31.8)	84.1 (59.4)
Max Cont Current (A)	19.6	7.5	3.8	19.6	11.2	5.8	20.4	13.2	7.3
Peak Current (A)	48.2	19.1	9.7	45.1	24.9	13.1	51.4	30.8	16.5

## EXC56 : ElectroCraft EXC-Series | BLDC Motor

Size	Peak Torque oz-in (Ncm)	Speeds up to RPM
NEMA 56	2400 (1695)	5000



### High-Performance. Servo.

The EXC-Series Nema 56 AC Servo motor offers customers high economic value and superior reliability. The EXC-Series is a cost-improved version of the popular N-Series family of AC Servo motors sold under the Rockwell Automation brand. This product provides considerable cost improvements for a variety of light industrial, commercial, and medical applications.

### To build your own motor, choose the:

**1 - Frame Size**  
(Imperial or Metric)

**2 - Torque**

**3 - Winding**

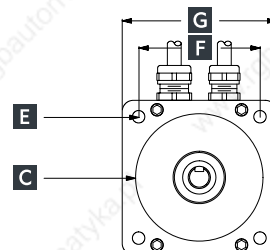
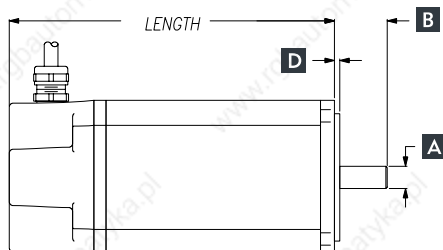
**4 - Features**  
( see page 55 )

a. **EXC56** — **740** → V **60** — **100** — **C**  
 Product Name Frame Size Continuous Torque (oz-in) Voltage Rear Shaft Front Shaft Lead Option Encoder

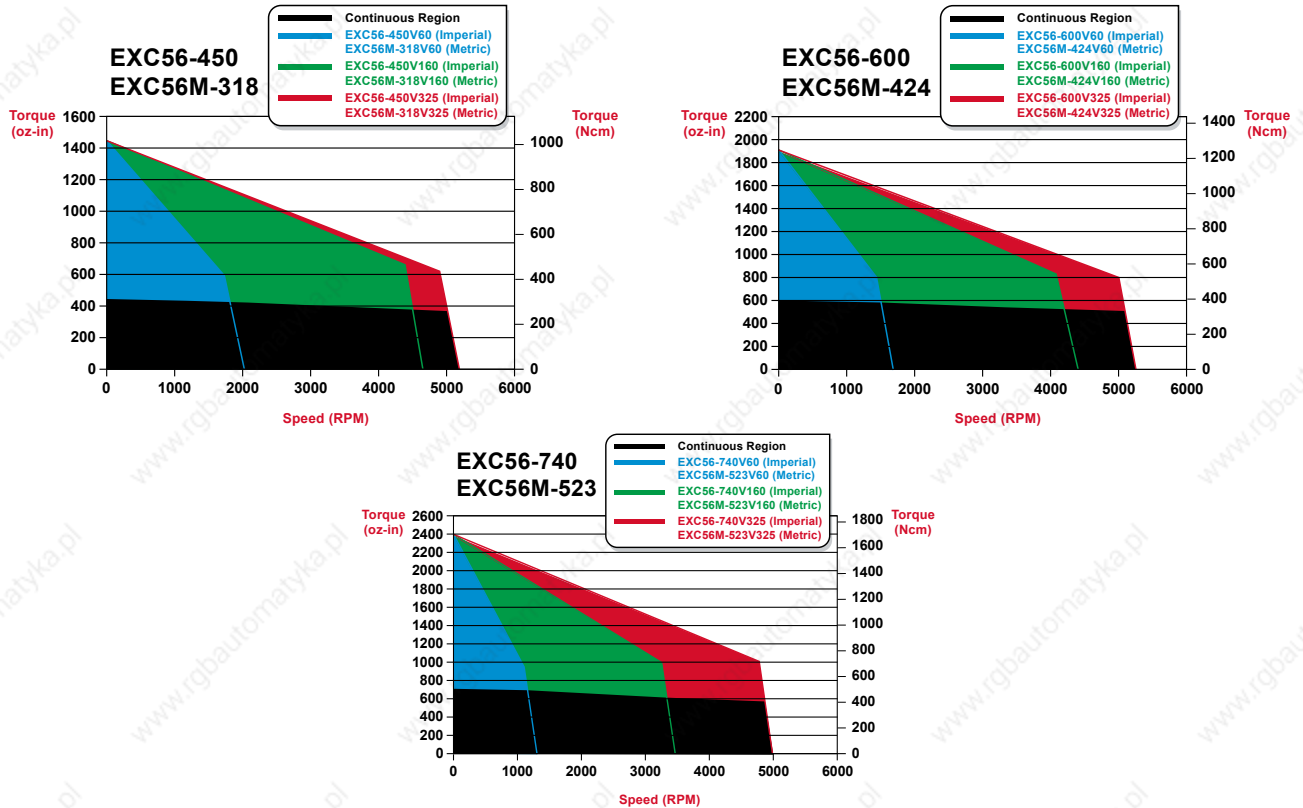
b. **EXC56M** — **523** → V **60** — **100** — **C**  
 Product Name Frame Size Optional Metric Continuous Torque (Ncm) Voltage Rear Shaft Front Shaft Lead Option Encoder

### Step 1: EXC56 & EXC56M Frame Size Drawing Key

Model	MAX Length	A	B	C	D	E	F	G	H	I	J
		Front Shaft Diameter	Front Shaft Length	Pilot Diameter	Pilot Length (Ref)	Mount Hole Pattern (Ref)	Mount Hole Spacing (Ref)	Flange External Dimension (Ref)	Rear Shaft Diameter	Rear Shaft Length (Ref)	Encoder Cover Length (Ref)
EXC56-450	7.85 in	0.7500 in 0.7495 in	1.97 in ±0.03	4.500 in 4.497 in	0.120 in	[4] 0.400 in DIA THRU on 5.875 in D.B.C.	4.154 in	5.00 in	N/A	N/A	N/A
EXC56-600	8.85 in										
EXC56-740	9.85 in										
EXC56M-318	200 mm	19.002 mm 18.989 mm	40 mm ±0.762	110.00 mm 109.97 mm	3.0 mm	[4] 10 mm DIA THRU on 145 mm D.B.C.	102.53 mm	127 mm	N/A	N/A	N/A
EXC56M-424	225 mm										
EXC56M-523	251 mm										



Step 2: EXC56 Torque and Mechanical Data



Stack Size Models	EXC56-450 / EXC56M-318	EXC56-600 / EXC56M-424	EXC56-740 / EXC56M-523
Cont Stall Torque oz-in (Ncm)	450 (318)	600 (424)	740 (523)
Peak Torque oz-in (Ncm)	1440 (1017)	1920 (1356)	2400 (1695)
No Load Speed RPM	5185	5270	5000
Inertia oz-in-sec <sup>2</sup> (g-cm <sup>2</sup> )	0.1225 (8650.31)	0.1626 (11481.96)	0.2026 (14306.65)
Motor Weight oz (kg)	336 (9.52)	400 (11.33)	464 (13.15)
Poles	4	4	4

Step 3: Available Windings

Imperial	450V60	450V160	450V325	600V60	600V160	600V325	740V60	740V160	740V325
Metric	318V60	318V160	318V325	424V60	424V160	424V325	523V60	523V160	523V325
Voltage (Vdc)	60	160	325	60	160	325	60	160	325
Voltage Constant V/kRPM	28.3	33.7	62.0	33.3	36.1	61.0	43.4	45.2	64.3
Torque Constant oz-in/A (Ncm/A)	38.3 (27.0)	45.6 (32.2)	83.9 (59.2)	45.0 (31.8)	48.8 (34.5)	82.5 (58.3)	58.7 (41.5)	61.1 (43.1)	87.0 (61.4)
Max Cont Current (A)	16.4	15.0	7.8	18.5	17.8	10.2	17.6	17.3	12.1
Peak Current (A)	41.8	35.1	19.1	47.4	43.8	25.9	45.4	43.6	30.7

## EA25 : Electrocraft CompletePower™ | Speed or Torque Control

Power Supply Voltage (VDC)	Nominal Current (Amps)	Quadrants	Operation Mode		
			Torque Control	Speed Control by Hall Sensor	Speed Control by Digital Encoder
11 - 50	6	2	●	●	



### For BLDC Motors. Up to 300W.

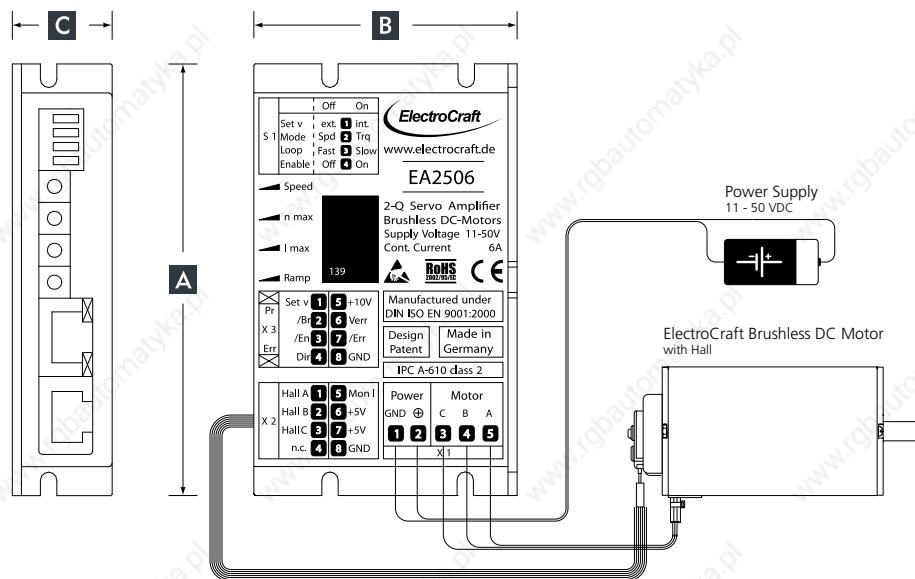
This two-quadrant brushless DC speed control is fully enclosed in an extremely small rugged aluminum case which can be DIN-rail mounted or panel mounted for easy integration. The drive includes an adjustable ramp generator for controlled acceleration and a torque mode. Mode of operation is set by simple DIP switches. This drive can provide 6 A of nominal current and can be powered by an 11-50 VDC range of supply voltage. The drive is protected against reversing, over-current, over-temperature and incorporates state of the art MOSFET technology for maximum efficiency. Connectivity is tool-free with RJ-45-CATs connectors for control/feedback inputs and push-type terminals for supply power and motor connections.

### Drive Model Example

<b>E</b>	<b>A</b>	<b>2</b>	<b>5</b>	<b>06</b>
Drive Technology	Version	# Quadrants	Voltage 10x VDC	Current Amps

### EA25 Outline Drawing

Model	A	B	C	Weight oz (g)
	Length in (mm)	Width in (mm)	Height in (mm)	
EA2506	3.66 (93)	2.19 (55.5)	0.89 (22.5)	4.23 (120)



EA25 Specifications						
Model Number	Power Supply Voltage (VDC)	Aux. Voltage Verror (VDC)	Nominal Current (Amps)	Max. Power with Heatsink (Watts)	Frequency of power output stage (kHz)	Efficiency (%)
EA2506	11 – 50	5 – 30	6	300	50	97
Control Inputs						
Hall input signals A, B, C			TTL / +5 VDC; Ri = 1 kOhm			
Set v (Set value)			0 to +10 VDC; Ri = 100 kOhm			
/En (/Enable)			TTL / +24 VDC; Ri >= 4.7 kOhm			
Dir (Direction)			TTL / +24 VDC; Ri >= 4.7 kOhm			
/Br (/Brake)			TTL / +24 VDC; Ri >= 4.7 kOhm			
Switches						
Set value			Extern / Intern			
Operation mode			Speed / Torque			
Speed loop time			Fast / Slow			
Enable intern			Off / On			
Outputs						
Auxiliary voltage sources +5V			+5 VDC / 20 mA each			
Auxiliary voltage source			+10 VDC / 10 mA			
Current Monitor			0.75 V / A; Ri = 1 kOhm			
Error Output /Err			Open Collector / Push Pull / TTL / 24 VDC; Ri = 50 Ohm			
Display						
LEDs			green = Power / red = Error			
Potentiometers						
Function of Potentiometer			Speed; n max; lmax; Ramp			
Ambient conditions						
Operation temperature (°C)			-10 to +45			
Storage temperature (°C)			-40 to +85			
Humidity Range Not Condensing (%rel)			20 to 80 % rel.			
Mode of Operation						
Speed-control by hall			Torque-control			

Available Accessories for EA25 (details see page 56)			
Patch Cable	Choke Module	DIN Rail mounting kit	Break Out Board
			

## EA27 : Electrocraft CompletePower™ | Speed Control

Power Supply Voltage (VDC)	Nominal Current (Amps)	Quadrants	Operation Mode		
			Torque Control	Speed Control by Hall Sensor	Speed Control by Digital Encoder
11 – 70	8 / 16 / 24	2		●	



### For BLDC Motors. Up to 1680W.

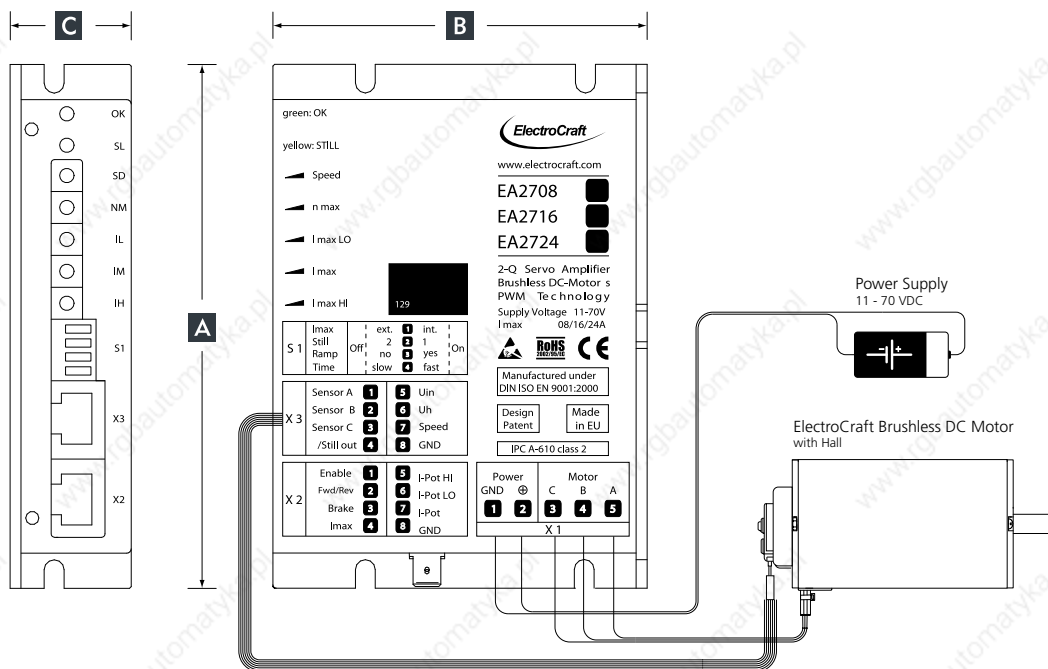
This two-quadrant brushless DC speed control is fully enclosed in a small rugged aluminum case which can be DIN-rail mounted or panel mounted for easy integration. The drive includes a ramp generator for controlled acceleration, braking function and external current control. Mode of operation is set by simple DIP switches. Either the 8 A, 16 A or 24 A versions of this drive can be powered by the same 11 – 70 VDC range of supply voltage. The drive is protected against over-current, over-temperature and motor short-circuit and incorporates state of the art MOSFET technology for maximum efficiency. Connectivity is tool-free with RJ-45-CATS connectors for control/feedback inputs and push-type terminals for supply power and motor connections.

### Drive Model Example

<b>E</b>	<b>A</b>	<b>2</b>	<b>7</b>	<b>08</b>
Drive Technology	Version	# Quadrants	Voltage 10x VDC	Current Amps

### EA27 Outline Drawing

Model	A	B	C	Weight oz (g)
	Length in (mm)	Width in (mm)	Height in (mm)	
EA2708	4.69 (120)	3.35 (85)	1.08 (27.5)	7.40 (210)
EA2716				
EA2724				





EA27 Specifications						
Model Number	Power Supply Voltage (VDC)	Aux. Voltage Uin (VDC)	Nominal Current (Amps)	Max. Power with Heatsink (Watts)	Frequency of power output stage (kHz)	Efficiency (%)
EA2708	11 – 70	5 – 30	8	560	20	95
EA2716			16	1120		
EA2724			24	1680		
Control Inputs						
Enable			TTL / +24 VDC; Ri = 4.7 kOhm			
Fwd/Rev			TTL / +24 VDC; Ri = 4.7 kOhm			
Brake			TTL / +24 VDC; Ri = 4.7 kOhm			
Hall input signals A, B, C			TTL / +6 VDC; Ri = 22 kOhm			
Speed			0 to +5 VDC; Ri = 100 kOhm			
Imax			Analog 0 to +10 VDC; Ri = 100 kOhm			
I-Pot HI; I-Pot; I-Pot LO			100 kOhm potentiometer			
Switches						
Imax			Extern / Intern			
Still			High / Low			
Ramp			No / Yes			
Time			Slow / Fast			
Outputs						
Auxiliary Voltage Source $U_h$			+6 VDC / 20 mA			
Rotate / Still			Open Collector / Push Pull / TTL / +24 VDC / Ri = 50 kOhm			
Display						
LEDs			green= OK / yellow = Still			
Potentiometers						
Function of Potentiometer's			Speed; n max; I max LO; I max; I max HI;			
Ambient conditions						
Operation temperature (°C)			-10 to +45			
Storage temperature (°C)			-40 to +85			
Humidity Range Not Condensing (%rel)			20 to 80 % rel.			
Mode of Operation						
Speed-control by hall sensors						

Available Accessories for EA27 (details see page 56)

Patch Cable	Passive heatsink	Active heatsink	Active heatsink	Choke module	DIN Rail mounting kit	Break Out Board
						

## EA47 : Electrocraft CompletePower™ | Servo Amplifier

Power Supply Voltage (VDC)	Nominal Current (Amps)	Quadrants	Operation Mode		
			Torque Control	Speed Control by Hall Sensor	Speed Control by Digital Encoder
9 – 70	9 / 18	4	●	●	●



### For BLDC Motors. Up to 1260W.

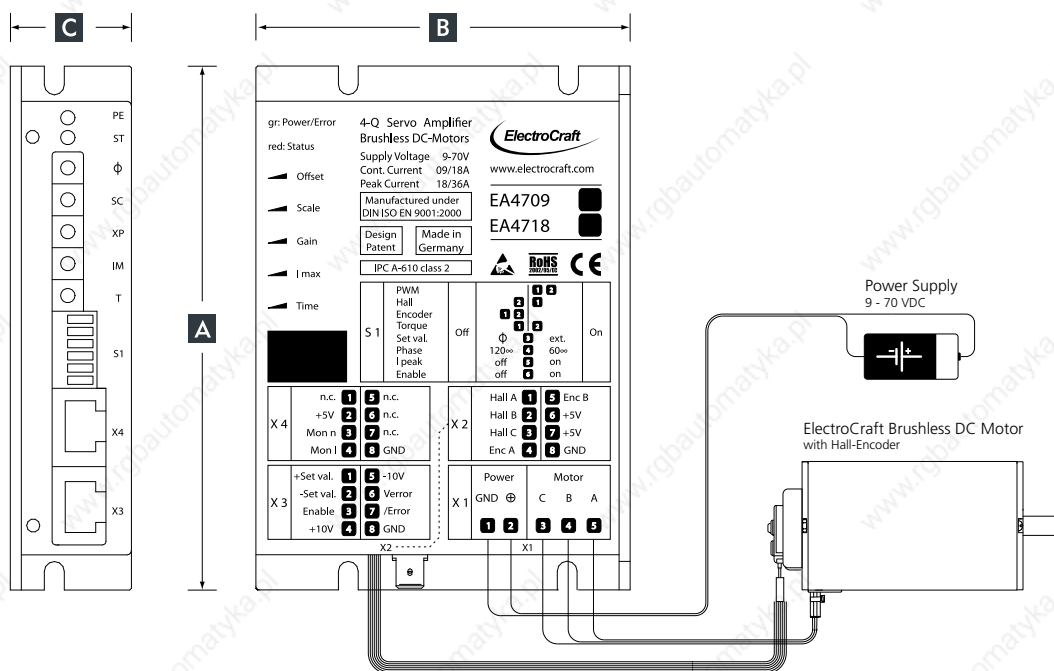
This four-quadrant brushless DC servo amplifier is fully enclosed in a small rugged aluminum case which can be DIN-rail mounted or panel mounted for easy integration. The drive can be configured in a variety of torque and speed control modes with the mode of operation being set by simple DIP switches. Both the 9 A and 18 A versions of this drive have an adjustable current limit, peak current time and ramp function and can be powered by the same 9 – 70 VDC range of supply voltage. The drive is protected against over-current and over-temperature and motor short-circuit and incorporates state of the art MOSFET technology for maximum efficiency. Connectivity is tool-free with RJ-45-CATs connectors for control/feedback inputs and push-type terminals for supply power and motor connections.

### Drive Model Example

<b>E</b> Drive Technology	<b>A</b> Version	<b>4</b> # Quadrants	<b>7</b> Voltage 10x VDC	<b>09</b> Current Amps
------------------------------	---------------------	-------------------------	-----------------------------	---------------------------

### EA47 Outline Drawing

Model	A	B	C	Weight oz (g)
	Length in (mm)	Width in (mm)	Height in (mm)	
EA4709	4.69 (120)	3.35 (85)	1.08 (27.5)	7.40 (210)
EA4718				



EA47 Specifications							
Model Number	Power Supply Voltage (VDC)	Aux. Voltage Error (VDC)	Nominal Current (Amps)	Peak current (Amps)	Max. Power with Heatsink (Watts)	Frequency of power output stage (kHz)	Efficiency (%)
EA4709	9 – 70	5 – 30	9	18	630	50	97
EA4718			18	36	1260		
Control Inputs							
Encoder input signals				Channel A, B; TTL / +5 VDC; max. 78 kHz; Ri = 1 kOhm			
Hall input signals A, B, C				TTL / +5 VDC; Ri = 1 kOhm			
Set value				-10 to +10 VDC; Ri = 20 kOhm			
Enable				TTL / +24 VDC; Ri = 10 kOhm			
Switches							
PWM-, Hall-, Enc.-, Torque-Mode				Not set / Set			
Set value via Offset				Offset / ext			
Phase				120° / 60°			
Ipeak				on / off			
Enable				on / off			
Outputs							
Auxiliary voltage sources +5V				+5 VDC / 50 mA each			
Auxiliary voltage sources				±10 VDC / 10 mA			
Current Monitor <i>Mon I</i>				1 / 0.5 (V/A); Ri = 200 Ohm			
Speed Monitor <i>Mon n</i>				max.10 V at n max			
Error				Open Collector / Push Pull / TTL / +24 V			
Display							
LEDs				green = Power / red = Error			
Potentiometer							
Function of Potentiometer				Offset; Scale; Gain; I max; Time			
Ambient conditions							
Operation temperature (°C)				-10 to +45			
Storage temperature (°C)				-40 to +85			
Humidity Range Not Condensing (%rel)				20 to 80 % rel.			
Mode of Operation							
PWM-commutation amplifier		Speed-control by hall		Speed-control by encoder		Torque-control	

Available Accessories for EA47 (details see page 56)							
Braking module	Patch Cable	Passive heatsink	Active heatsink	Active heatsink	Choke module	DIN Rail mounting kit	Break Out Board
							

## SCA-B4 : Electrocraft CompletePower™ | Servo Amplifier

Power Supply Voltage (VDC)	Nominal Current (Amps)	Quadrants	Operation Mode		
			Torque Control	Speed Control by Hall Sensor	Speed Control by Digital Encoder
11 – 70	10 / 30	4	●	●	●



### For BLDC Motors. Up to 2100W.

This four-quadrant brushless DC servo amplifier is fully enclosed in a rugged aluminum case which can be panel mounted or DIN-rail mounted for easy integration. The drive can be configured in a variety of torque and speed control modes with the mode of operation being set by simple jumpers. Both the 10 A and 30 A versions of this drive have an adjustable current limit and can be powered by the same 11 – 70 VDC range of supply voltage. The drive is protected against over-current and over-temperature and motor short-circuit and incorporates state of the art MOSFET technology for maximum efficiency. Connectivity is achieved with simple screw-terminals for control/feedback inputs, supply power and motor connections.

### Drive Model Example

SC

Drive Technology

A

Case Type

B4

# Quadrants

70

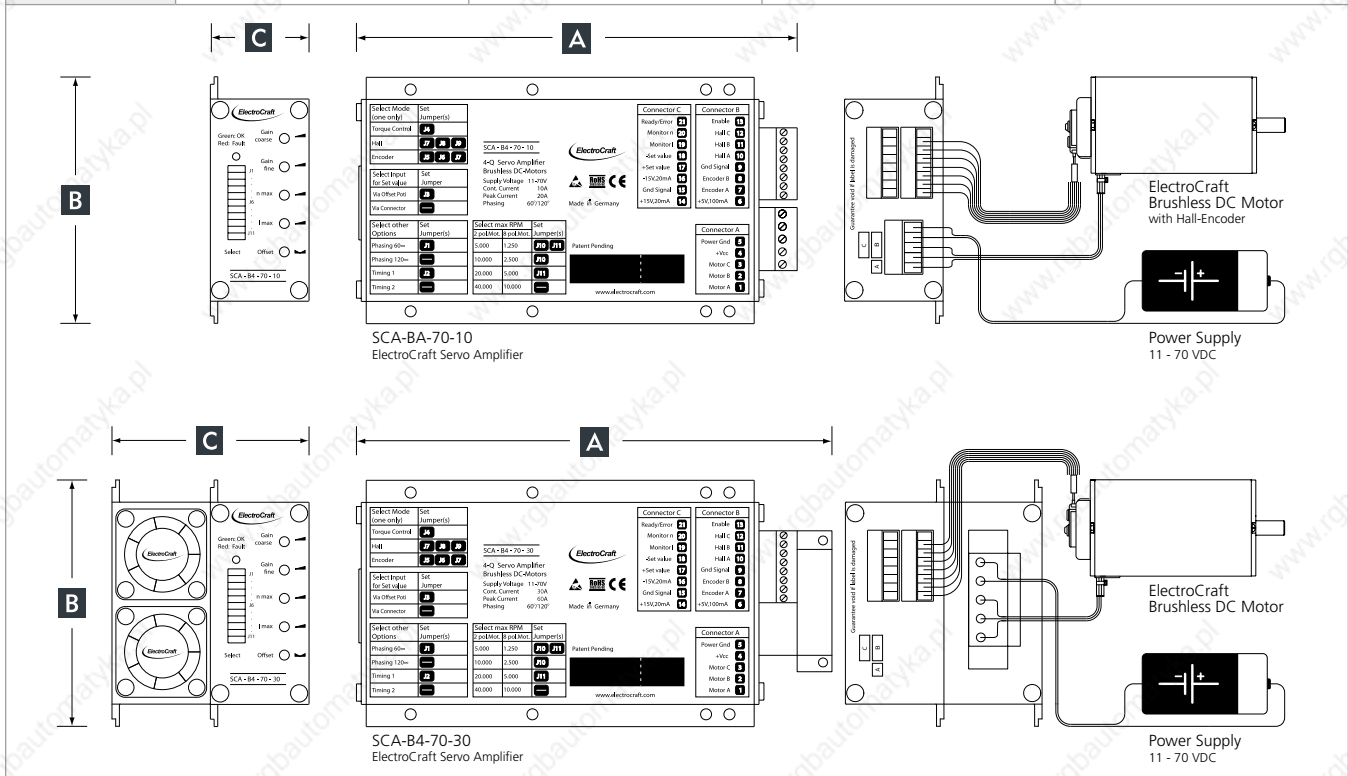
Voltage VDC

10

Current Amps

### SCA-B4 Outline Drawing

Model	A	B	C	Weight oz (g)
	Length in (mm)	Width in (mm)	Height in (mm)	
SCA-B4-70-10	7.09 (180)	3.94 (100)	1.57 (40)	20.46 (580)
SCA-B4-70-30	7.87 (200)		3.14 (80)	40.57 (1150)



SCA-B4 Specifications						
Model Number	Power Supply Voltage (VDC)	Nominal Current (Amps)	Peak Current (Amps)	Max. Power with Heatsink (Watts)	Frequency of power output stage (kHz)	Efficiency (%)
SCA-B4-70-10	11 – 70	10	20	700	49	95
SCA-B4-70-30		30	60	2100		
Control Inputs						
Encoder input signals			Channel A, B; TTL / +5 VDC; max. 100 kHz; Ri = 1 kOhm			
Hall input signals A, B, C			TLL / +5 VDC; Ri = 1 kOhm			
Set value			-10 to +10 VDC; Ri = 200 kOhm			
Enable			8 to 30 VDC; Ri = 4.7 kOhm			
Jumpers						
Hall-, Enc.-, Torque mode			Not set / Set			
Set value via Offset			Offset / Ext			
Phase			60° / 120°			
Commutation Timing			1 / 2			
Max Speed Range			1/8, 1/4, 1/2, Full			
Outputs						
Auxiliary voltage source +5V			+5 VDC / 100 mA			
Auxiliary voltage sources			±15 VDC / 20 mA			
Current monitor Monitor I			0.5 / 0.16 (V/A); Ri = 10 kOhm			
Speed monitor Monitor n			10 VDC at max. speed; Ri = 10 kOhm			
Error			Open Collector max. +30 VDC; 20 mA			
Display						
2-colour-LED			green = OK / red = Fault			
Potentiometer						
Function of Potentiometer			Gain coarse; Gain fine; n max; I max; Offset			
Ambient conditions						
Operation temperature (°C)			-10 to +45			
Storage temperature (°C)			-40 to +85			
Humidity Range Not Condensing (%rel)			20 to 80 % rel.			
Mode of Operation						
Speed-control by hall sensors		Speed-control by encoder		Torque-control		

Available Accessories for SCA-B4 (details see page 56)

Braking module	Aluminium Din Rail kit	Choke module
		

## SCO-B1 : Electrocraft CompletePower™ | Speed Control

Power Supply Voltage (VDC)	Nominal Current (Amps)	Quadrants	Operation Mode		
			Torque Control	Speed Control by Hall Sensor	Speed Control by Digital Encoder
12 - 40	5	2		●	



### For BLDC Motors. Up to 175W.

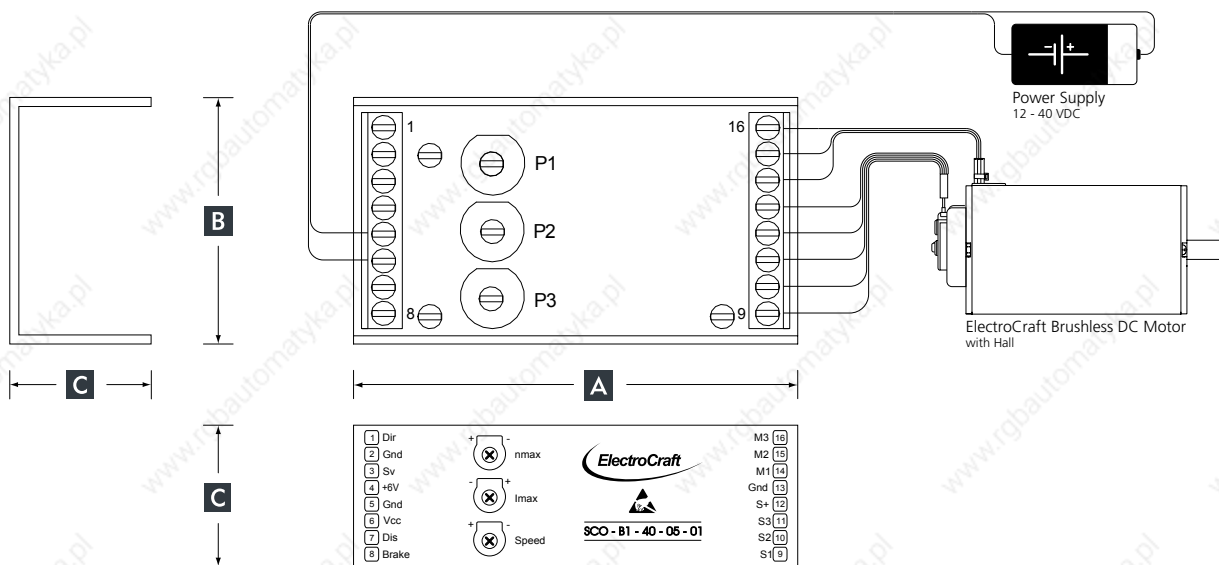
This two-quadrant brushless DC speed control is housed in a small compact open-frame aluminum module which can be panel mounted for easy integration. The drive includes a control enable/disable, direction, brake and set value inputs. The drive has an adjustable current limit up to 5 A and can be powered by 12 – 40 VDC range of supply voltage. The drive is protected against over-current and over-temperature and incorporates state of the art MOSFET technology for maximum efficiency. Connectivity is achieved with simple screw-terminals for control/feedback inputs, supply power and motor connections.

### Drive Model Example

<b>SC</b>	<b>O</b>	<b>B1</b>	<b>40</b>	<b>05</b>	<b>01</b>
Drive Technology	Case Type	# Quadrants	Voltage VDC	Current Amps	Version

### SCO-B1 Outline Drawing

Model	A	B	C	Weight oz (g)
	Length in (mm)	Width in (mm)	Height in (mm)	
SCO-B1-40-05-01	3.54 (90)	1.97 (50)	1.18 (30)	4.41 (125)



SCO-B1 Specifications					
Model Number	Power Supply Voltage (VDC)	Nominal Current (Amps)	Max. Power with Heatsink (Watts)	Frequency of power output stage (kHz)	Efficiency (%)
SCO-B1-40-05-01	12 – 40	5	175	20	95
Control Inputs					
Hall input signals S1, S2, S3			TTL / +6 VDC; Ri = 1kOhm		
Set value			0 to +5 VDC; Ri > 100 kOhm		
Disable			Open Collector / TTL / CMOS / Switch		
Direction			Open Collector / TTL / CMOS / Switch		
Brake			Open Collector / TTL / CMOS / Switch		
Outputs					
Auxiliary voltage source for hall sensors			+6 VDC / 20 mA		
Function of Potentiometer					
Motor Speed			Speed		
Current maximum			Imax		
Speed maximum			nmax		
Ambient conditions					
Operation temperature (°C)			-10 to +45		
Storage temperature (°C)			-40 to +85		
Humidity Range Not Condensing (%rel)			20 to 80 % rel.		
Mode of Operation					
Speed-control by hall sensors					

**Available Accessories for SCO-B1 (details see page 56)**

Choke module





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## SCO-B1 : Electrocraft CompletePower™ | Speed Control

Power Supply Voltage (VDC)	Nominal Current (Amps)	Quadrants	Operation Mode		
			Torque Control	Speed Control by Hall Sensor	Speed Control by Digital Encoder
20 - 60	18 / 40	2		●	



### For BLDC Motors. Up to 2000W.

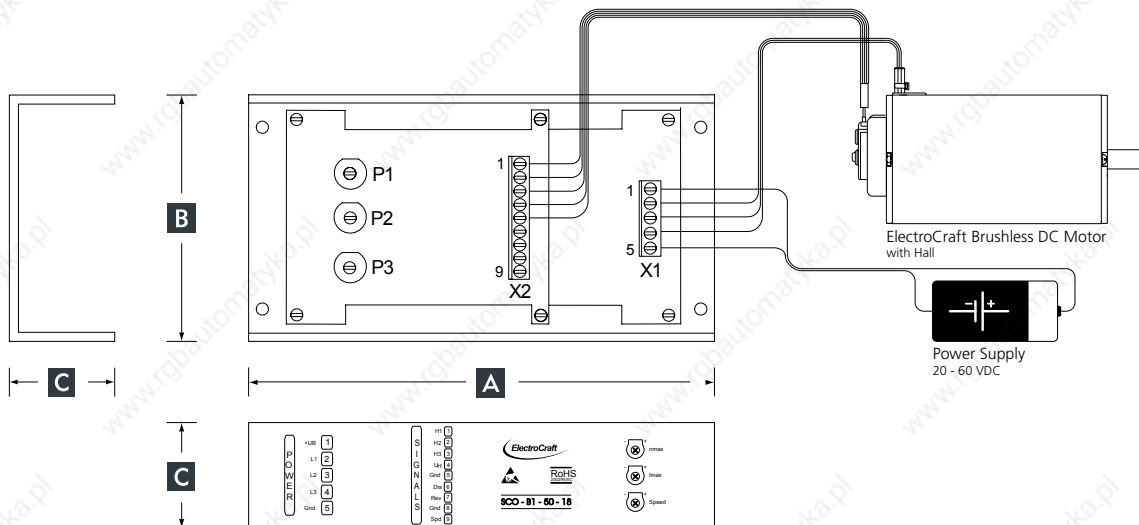
This two-quadrant brushless DC speed control is housed in a compact open-frame aluminum module which can be panel mounted for easy integration. The drive includes a control enable/disable, direction and set value inputs. Both the 18 A and the 40 A versions of this drive have an adjustable current limit and can be powered by the same 20 – 50 VDC range of supply voltage. The 18 A version of this drive is also available for supply voltages range from 30 - 60 VDC. The drive is protected against over-current and over-temperature and incorporates state of the art MOSFET technology for maximum efficiency. Connectivity is achieved with simple screw-terminals for control/feedback inputs, supply power and motor connections.

### Drive Model Example

<b>SC</b>	<b>O</b>	<b>B1</b>	<b>50</b>	<b>18</b>
Drive Technology	Case Type	# Quadrants	Voltage VDC	Current Amps

### SCO-B1 Outline Drawing

Model	A	B	C	Weight oz (g)
	Length in (mm)	Width in (mm)	Height in (mm)	
SCO-B1-50-18	6.69 (170)	3.54 (90)	1.77 (45)	13.40 (380)
SCO-B1-50-40				14.11 (400)
SCO-B1-60-18				13.40 (380)





SCO-B1 Specifications					
Model Number	Power Supply Voltage (VDC)	Nominal Current (Amps)	Max. Power with Heatsink (Watts)	Frequency of power output stage (kHz)	Efficiency (%)
SCO-B1-50-18	20 – 50	18	900	20	95
SCO-B1-50-40	20 – 50	40	2000		
SCO-B1-60-18	30 – 60	18	1080		
Control Inputs					
Hall input signals H1, H2, H3			TTL / +6 VDC; Ri = 1kOhm		
Set value			0 to +5 VDC; Ri > 100 kOhm		
Disable			Open Collector / TTL / CMOS / Switch		
Reverse			Open Collector / TTL / CMOS / Switch		
Outputs					
Auxiliary voltage source for hall sensors			+6 VDC / 20 mA		
Function of Potentiometers					
Motor Speed			Speed		
Current maximum			Imax		
Speed maximum			nmax		
Ambient conditions					
Operation temperature (°C)			-10 to +45		
Storage temperature (°C)			-40 to +85		
Humidity Range Not Condensing (%rel)			20 to 80 % rel.		
Mode of Operation					
Speed-control by hall sensors					

SC

**Available Accessories for SCO-B1 (details see page 56)**

Choke module





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## SCP-B1 : Electrocraft CompletePower™ | Speed Control

Power Supply Voltage (VDC)	Nominal Current (Amps)	Quadrants	Operation Mode		
			Torque Control	Speed Control by Hall Sensor	Speed Control by Digital Encoder
12 - 40	5 / 10	2		●	



### For BLDC Motors. Up to 475W.

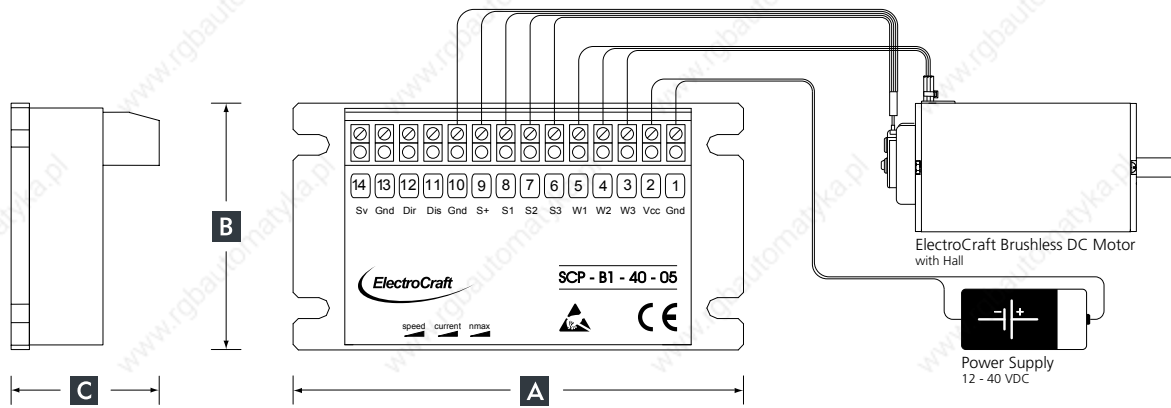
This two-quadrant brushless DC speed control is housed in a compact closed-frame aluminum module which can be panel mounted for easy integration. The drive includes a control enable/disable, direction and set value inputs. The drive incorporated an adjustable current limit and is available in a variety of voltage up to 50 V and two current configurations with 5 A and 10 A to meet the exact needs of your application. The drive is protected against over-current and over-temperature and incorporates state of the art MOSFET technology for maximum efficiency. Connectivity is achieved with simple screw-terminals for control/feedback inputs, supply power and motor connections.

### Drive Model Example

<b>SC</b>	<b>P</b>	<b>B1</b>	<b>40</b>	<b>05</b>
Drive Technology	Case Type	# Quadrants	Voltage VDC	Current Amps

### SCP-B1 Outline Drawing

Model	A	B	C	Weight oz (g)
	Length in (mm)	Width in (mm)	Height in (mm)	
SCP-B1-40-05	3.70 (94)	2.16 (55)	1.30 (33)	3.88 (110)
SCP-B1-40-05-77			1.30 (33)	3.88 (110)
SCP-B1-50-10			1.54 (39)	4.94 (140)



SCP-B1 Specifications					
Model Number	Power Supply Voltage (VDC)	Nominal Current (Amps)	Max. Power with Heatsink (Watts)	Frequency of power output stage (kHz)	Efficiency (%)
SCP-B1-40-05	12 – 40	5	150	20	95
SCP-B1-40-05-77	12 – 40	5	150		
SCP-B1-50-10	20 – 50	10	475		
Control Inputs					
Hall input signals S1, S2, S3			TTL / +6 VDC; Ri = 1kOhm		
Set value (SCP-B1-40-05 / SCP-B1-50-10)			0 to +5 VDC; Ri > 100 kOhm		
Set value (SCP-B1-40-05-77)			0 to +10 VDC; Ri > 100 kOhm		
Disable			Open Collector / TTL / CMOS / Switch		
Direction			Open Collector / TTL / CMOS / Switch		
Outputs					
Auxiliary voltage source for hall sensors			+6 VDC / 20 mA		
Function of Potentiometers					
Motor Speed			speed		
Current maximum			current		
Speed maximum			nmax		
Ambient conditions					
Operation temperature (°C)			-10 to +45		
Storage temperature (°C)			-40 to +85		
Humidity Range Not Condensing (%rel)			20 to 80% rel.		
Mode of Operation					
Speed-control by hall sensors					

### Available Accessories for SCP-B1 (details see page 56)

#### Choke module



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## ACS-Series : ElectroCraft CompletePower™ Plus | Digital Servo Amplifier

Power Supply Voltage (VDC)	Nominal Current (A <sub>rms</sub> )	Quadrants	Operation Mode					
			Torque Control	Speed Control by Hall Sensor	Speed Control by Encoder	Step and Direction	PWM	Position
24 – 48	3.5 / 5 / 10.6	4	●	●	●	●	●	●



### Low Voltage, Small Package ... World Class Intelligence

The ACS-Series is the newest addition to ElectroCraft's "Plus" series of all digital servo-amplifiers designed to provide today's OEM with maximum brushless servo performance at the lowest possible cost. The ACS-Series utilizes the latest in DSP-based digital drive design architecture to provide software selectable torque, velocity, and position mode operation. Sine wave commutation using encoder feedback provides smooth torque at low speed for demanding motion control requirements found in robotic, direct drive, and linear motor applications. Sine wave commutation is also available on motors operating with only hall commutation feedback, providing smooth performance over the entire speed and torque range.

### Drive Model Example

**ACS**

Drive Technology

**100**

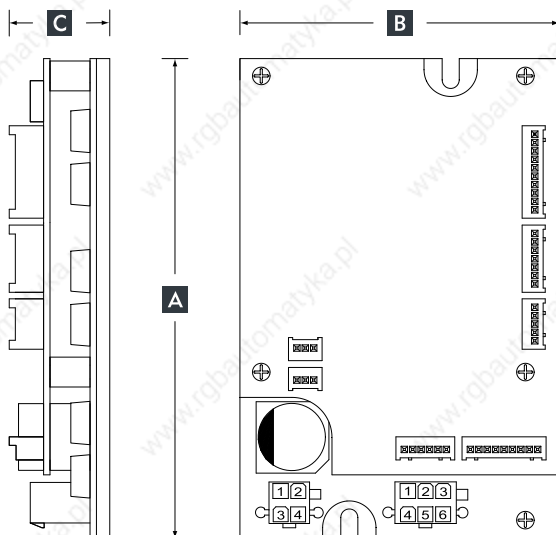
Power Rating

**0599**

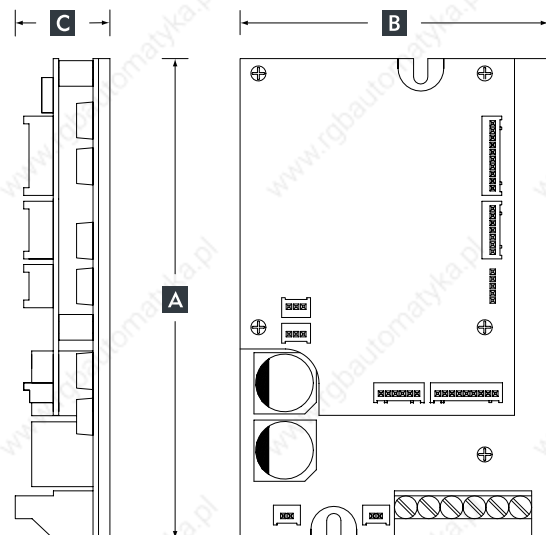
Configuration

### ACS100/200/300 Outline Drawing

Model	A	B	C	Weight oz (g)
	Length in (mm)	Width in (mm)	Height in (mm)	
ACS100-0599	4.5 (114)	3.0 (76)	0.942 (24)	6.5 (184)
ACS200-0610	4.5 (114)	3.0 (76)	0.942 (24)	6.5 (184)
ACS300-0605	5.25 (133)	3.38 (86)	1.03 (26)	7.8 (222)



ACS100 & ACS200



ACS300

ACS-Series Specifications						
Model Number	Power Supply Voltage (VDC)	Logic Supply Voltage (VDC)	Nominal Current (A <sub>rms</sub> )	Peak Current (A <sub>rms</sub> )	Max. Power (Watts)	Frequency of power output stage (kHz)
ACS100-0599	24 – 48	24 – 48	3.5	7	168	40
ACS200-0610			5	10	240	
ACS300-0605			10.6	20	510	
Control Inputs						
Encoder Input Signals			Differential / TTL / +5 VDC / 2MHz			
Hall Input Signals			TTL / +5 VDC			
Velocity / Torque Reference (Command)			Differential / ±10 VDC			
Aux. Analog Input			Differential / ±10 VDC			
Step and Direction			TTL / 5 VDC / 2 MHz			
Enable /Reset			TTL / +5 VDC			
Run / Standby			TTL / +5 VDC			
Outputs						
+5 VDC Interface Power			+5 VDC / 250 mA			
Enabled			TTL / +5 VDC			
Ready / Fault			TTL / +5 VDC			
Performance						
Current Loop			10 bit / Digitally adjustabel up to 5 kHz			
Velocity PID Loop			32 bit / Digitally adjustabel up to 10 kHz			
Position PID Loop			32 bit / Digitally adjustabel up to 10 kHz			
Display						
Status / Fault LED			Yellow - Flash Code Sequence			
Power LED			Green - Logic supply On			
Communications						
Serial			RS232 ElectroCraft CompletePower™ Plus Windows® Set-up Utility			
CAN Bus			CAN Read / Write			
Ambient conditions						
Operation temperature (°C)			0 to +50 Standard Extended temperature range available			
Storage temperature (°C)			-20 to +85			
Humidity Range Not Condensing (%rel)			5 to 95% rel.			
Regulatory Compliance						
CE			RoHS			

Available Accessories for ACS-Series (details see page 56)				
Connector Interface Board	Cover	External Shunt Kit	Quick Start I/O Kit	Cable Kit
				

## ACE500 : ElectroCraft CompletePower™ Plus | Digital Servo Amplifier

Power Supply Voltage (VAC)	Nominal Current (A <sub>rms</sub> )	Quadrants	Operation Mode					
			Torque Control	Speed Control by Hall Sensor	Speed Control by Encoder	Step and Direction	PWM	Position
90 – 254	5	4	●	●	●	●	●	●



### High Voltage, Small Package ... World Class Intelligence

The line powered ACE500 is the newest addition to ElectroCraft's "Plus" series of all digital servo-amplifiers designed to provide today's OEM with maximum brushless servo performance at the lowest possible cost. The ACE500 series utilizes the latest in DSP-based drive design architecture to provide software selectable torque, velocity, and position mode (Step & Direction) operation. Sine wave commutation using encoder feedback provides smooth torque at low speeds for demanding motion control requirements found in robotic, direct drive, and linear motor applications. Sine wave commutation is also available on motors operating with only hall commutation feedback, providing smooth performance over the entire speed and torque range.

### Drive Model Example

**ACE**

Drive Technology

**50**

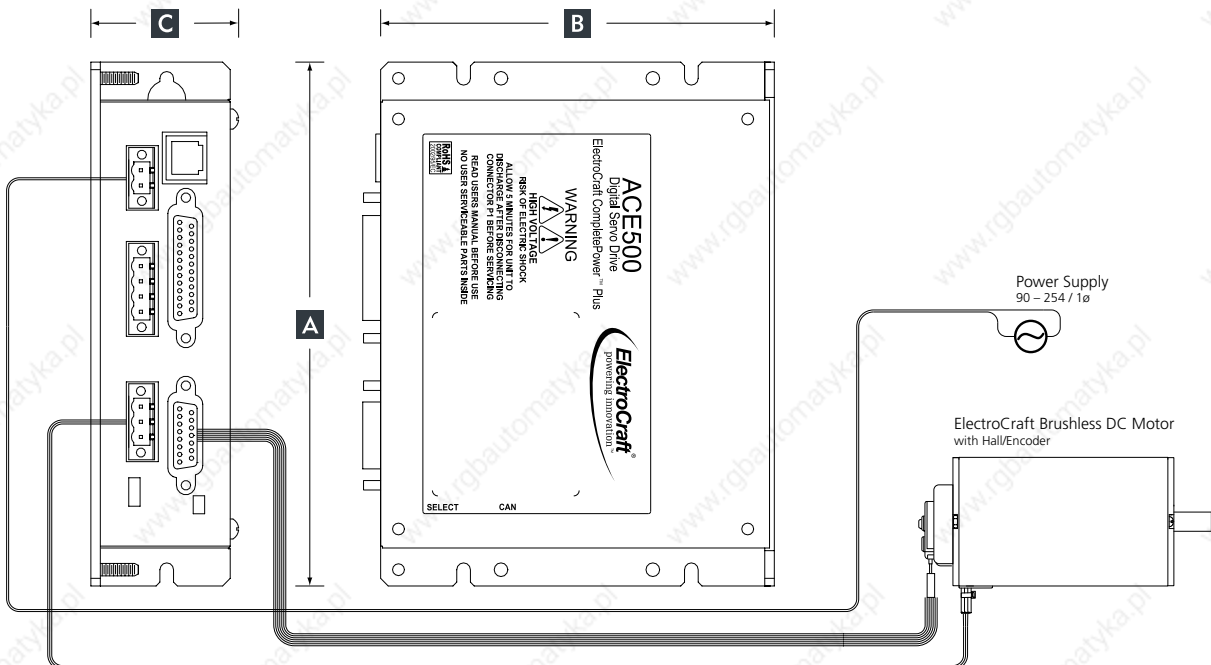
Power Rating

**0**

Configuration

### ACE500 Outline Drawing





Model	A	B	C	Weight oz (g)
	Length in (mm)	Width in (mm)	Height in (mm)	
ACE500-010-0000	6.9 (175)	5.2 (132)	1.945 (50)	30 (862)



Mating connector kit included with unit. Cable/interface kits sold separately.

ACE500 Specifications						
Model Number	Power Supply Voltage (VAC)	Logic Supply Voltage (VDC)	Nominal Current (A <sub>rms</sub> )	Peak Current (A <sub>rms</sub> )	Max. Power w/o Heatsink (Watts)	Frequency of power output stage (kHz)
ACE500-010-0000	90 – 254 / 1ø	+5 VDC (User Supplied)	5	11	1625	30
Control Inputs						
Encoder Input Signals			Differential / TTL / +5 VDC / 2MHz			
Hall Input Signals			TTL / +5 VDC			
Velocity / Torque Reference (Command)			Differential / ±10 VDC			
Aux. Analog Input			Differential / ±10 VDC			
Step and Direction			TTL / 5 VDC / 2 MHz			
Enable / Reset			TTL / +5 VDC			
Run / Standby			TTL / +5 VDC			
Dynamic Brake			TTL / +5 VDC			
Outputs						
+5 VDC Interface Power			+5 VDC / (User Supplied)			
Enabled			TTL / +5 VDC			
Fault			TTL / +5 VDC			
Tachometer (Digital)			Hall Edge Transition - Pulse Generator / TTL +5VDC			
Performance						
Current Loop			10 bit / Digitally adjustable up to 5 kHz			
Velocity PID Loop			32 bit / Digitally adjustable up to 10 kHz			
Position PID Loop			32 bit / Digitally adjustable up to 10 kHz			
Display						
Power-Motor LED			Green - On / Off			
Power-Logic LED			Green - On / Off			
Shunt Status LED			Yellow - On / Off			
Current Limit LED			Red - On / Off			
Status / Fault LED			Yellow / Flash Code Sequence			
Communications						
Serial			RS232 ElectroCraft CompletePower™ Plus Windows® Set-up Utility			
Ambient conditions						
Operation temperature (°C)			0 to +50			
Storage temperature (°C)			-20 to +85			
Humidity Range Not Condensing (%rel)			5 to 95% rel.			
Regulatory Compliance						
Safety			EN60950 / UL1950 / CSA22.2.14			
CE			Low Voltage Directive / RoHS			

Available Accessories for ACE500 (details see page 56)

Dual Encoder Out Board	Resolver Convertor Board	Quick-Start I/O Kit	External Shunt Kit
			

## ACE1000 : ElectroCraft CompletePower™ Plus | Digital Servo Amplifier

Power Supply Voltage (VAC)	Nominal Current (A <sub>rms</sub> )	Quadrants	Operation Mode					
			Torque Control	Speed Control by Hall Sensor	Speed Control by Encoder	Step and Direction	PWM	Position
90 – 254	8 / 12	4	●	●	●		●	●



### High Voltage, Small Package ... World Class Intelligence

The line powered ACE1000 Series is the newest addition to ElectroCraft's "Plus" series of all digital servo-amplifiers designed to provide today's OEM with maximum brushless servo performance at the lowest possible cost. The ACE1000 Series utilizes the latest in DSP-based drive design architecture to provide software selectable torque, velocity, and position mode (optional) operation. Sine wave commutation using encoder feedback provides smooth torque at low speeds for demanding motion control requirements found in robotic, direct drive, and linear motor applications. Sine wave commutation is also available on motors operating with only hall commutation feedback, providing smooth performance over the entire speed and torque range.

### Drive Model Example

**ACE**

Drive Technology

**120**

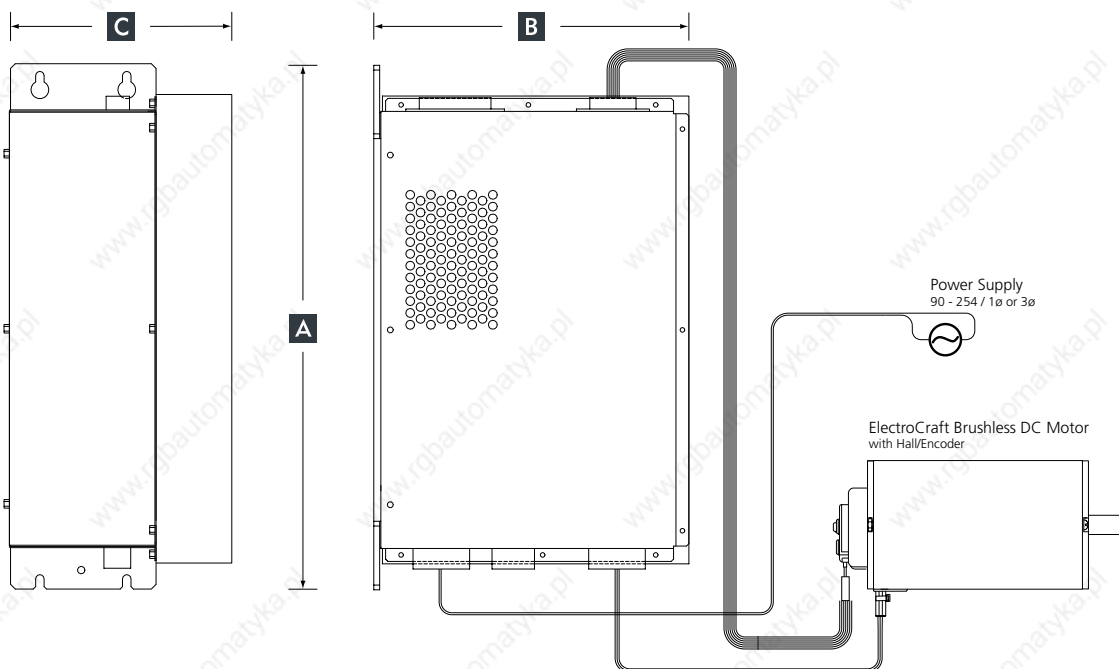
Power Rating

**0**

Line Phase

### ACE1000 Outline Drawing

Model	A	B	C	Weight oz (g)
	Length in (mm)	Width in (mm)	Height in (mm)	
ACE1200	11.1 (282)	6.68 (170)	4.70 (119)	94 (2,676)
ACE1300				



Mating connector kit included with unit. Cable/interface kits sold separately.



ACE1000-Series Specifications						
Model Number	Motor Supply Voltage (VAC)	Logic Supply Voltage (VDC)	Nominal Current (A <sub>rms</sub> )	Peak Current (A <sub>rms</sub> )	Max. Power with Heatsink (Watts)	Frequency of power output stage (kHz)
ACE1200-111-2221*	90 – 254 / 1ø	+5 VDC (User Supplied)	8	14	2275	30
ACE1300-111-2221*			12	21	4550	
ACE1202-111-2221*	90 – 254 / 3ø		8	14	2275	
ACE1302-111-2221*			12	21	4550	
Control Inputs						
Encoder Input Signals			Differential / TTL / +5 VDC / 2MHz			
Hall Input Signals			TTL / +5 VDC			
Velocity / Torque Reference (Command)			Differential / ±10 VDC			
Aux. Analog Input			0 to +10 VDC			
Enable /Reset			TTL / +5 VDC			
Run / Standby			TTL / +5 VDC			
Dynamic Brake			TTL / +5 VDC			
Outputs						
+5 VDC Interface Power			+5 VDC / (User Supplied)			
Fault			TTL / +5 VDC			
Motor Over Temperature			TTL / +5 VDC			
Tachometer (Digital)			Hall Edge Transition - Pulse Generator / TTL +5VDC			
Performance						
Current Loop			10 bit / Digitally adjustable up to 5 kHz			
Velocity PID Loop			32 bit / Digitally adjustable up to 10 kHz			
Position PID Loop			32 bit / Digitally adjustable up to 10 kHz			
Display						
Power-Motor LED			Green - On / Off			
Power-Logic LED			Green - On / Off			
Shunt Status LED			Yellow - On / Off			
Current Limit LED			Red - On / Off			
Status / Fault LED			Yellow / Flash Code Sequence			
Communications						
Serial			RS232 ElectroCraft CompletePower™ Plus Windows® Set-up Utility			
Ambient conditions						
Operation temperature (°C)			0 to +50			
Storage temperature (°C)			-20 to +85			
Humidity Range Not Condensing (%rel)			5 to 95% rel.			
Regulatory Compliance						
Safety			EN60950 / UL1950 / CSA22.2.14			
CE			Low Voltage Directive			

Available Accessories for ACE1000-Series (details see page 56)	Resolver Convertor Board	Quick Start I/O Kit	External Shunt Kit
			

\* Velocity control using encoder feedback. Contact your ElectroCraft representative for order information using hall only operation.

## PFC3000 | Power Factor Correction Module

Power Supply Voltage (VAC)	Nominal Power (kW)
185 – 240	2.4



### Power Correction for High Power Applications

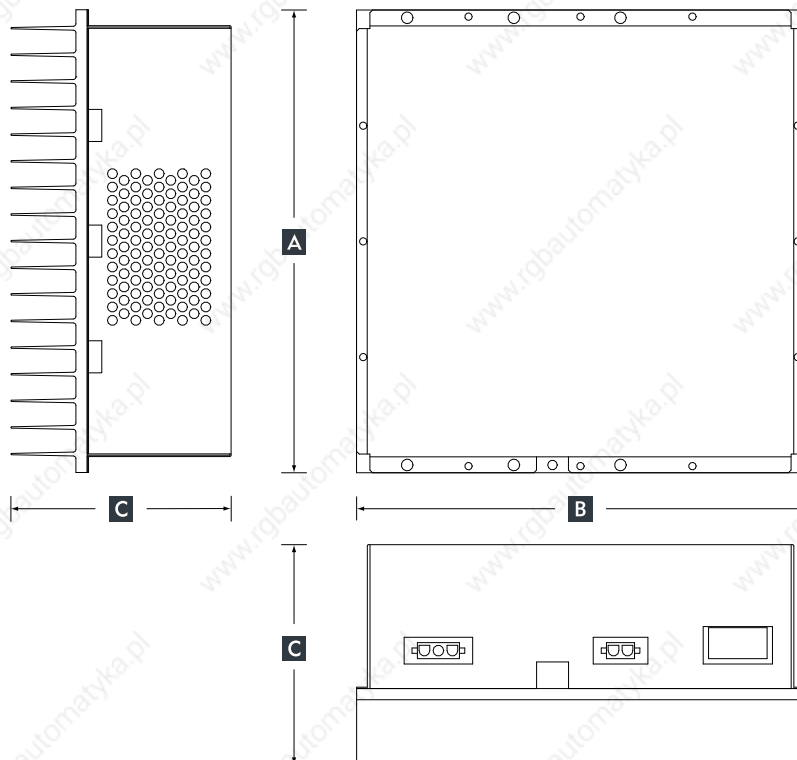
Power Factor Correction (PFC) is required in any motion control application demanding optimum utilization of available line currents and/or minimum line current distortion. Power factor correction (PFC) is required in any motion control application demanding optimum utilization of available line currents and/or minimum line current distortion. An ElectroCraft PFC3000 module can give the system more power without increasing line capacity and offers reliable operation while reducing peak AC current input needs. The ElectroCraft module attenuates AC line harmonics induced by switching power amplifiers and prevents overloading of neutral conductors and transformers.

### PFC Model Number Example

PFC 3001 — **400** — **1** — **01** — **2**  
 Voltage Output      Cover      Connector      Configuration

### PFC3000 Outline Drawing

Model	A	B	C	Weight oz (g)
	Length in (mm)	Width in (mm)	Height in (mm)	
PFC3001-400	11.1 (282)	8.40 (213)	4.13 (105)	121 (3,429)



Mating connector kit included with unit.

PFC3000 Specifications						
Model Number	Input Voltage (VAC)	Output Voltage (VDC)	Logic Supply Voltage (VDC)	Nominal Current (Amps)	Peak Current (Amps)	Max Power (kW)
PFC3001-400-1012	185 – 240 / 1ø	395 – 420 (Regulated)	+5 VDC (User Supplied)	6	8.5	3.5
Performance						
Power Factor				> .99 at full load		
Efficiency				100 Watts loss at full load		
Fault Conditions						
Loss of Regulation						
Loss of Logic Power						
Over / Under Voltage						
Communications						
I <sup>2</sup> C						
Ambient conditions						
Operation temperature (°C)				0 to +50		
Storage temperature (°C)				-20 to +85		
Humidity Range Not Condensing (%rel)				5 to 95% rel.		
Regulatory Compliance						
Safety				EN60950 / IEC950 / UL1950 / CSA234		
Power Harmonics				EN61000-3-2		



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	Motor Series		BLDC Drive Models																					
	Motor P/N		CompletePower										CompletePower Plus											
	Imperial	Metric	2 Quadrant					4 Quadrant					4 Quadrant											
			DC Input Power										DC Input Power		DC Input Power		AC Input Power							
		EA2506	EA2708	EA2716	EA2724	SCO-B1-40-05-01	SCO-B1-50-18	SCO-B1-50-40	SCO-B1-60-18	SCP-B1-40-05	SCP-B1-40-05-77	SCP-B1-50-10	EA4709	EA4718	SCA-B4-70-10	SCA-B4-70-30	ACS100	ACS200	ACS300	ACE500	ACE1200	ACE1300		
<b>E-Series</b>	E33-45V48	E33M-32V48			●		●				●		●	●	●									
	E33-45V60	E33M-32V60		●					●				●	●	●									
	E33-45V160	E33M-32V160																				●		
	E33-88V48	E33M-62V48	●	●			●				●		●		●				●					
	E33-88V60	E33M-62V60		●					●				●	●	●									
	E33-88V160	E33M-62V160																			●			
	E33-120V48	E33M-85V48		●			●					●		●	●									
	E33-120V60	E33M-85V60		●					●					●	●									
	E33-120V160	E33M-85V160																			●			
	E37-65V48	E37M-46V48			●		●					●		●	●									
	E37-65V60	E37M-46V60		●										●	●									
	E37-65V160	E37M-46V160																				●		
	E37-120V48	E37M-85V48			●		●					●		●	●									
	E37-120V60	E37M-85V60			●				●					●	●									
	E37-120V160	E37M-85V160																					●	
	E37-161V48	E37M-114V48		●			●					●		●	●					●				
	E37-161V60	E37M-114V60		●										●	●									
E37-161V160	E37M-114V160																				●			
<b>EXC-Series</b>	EXC23-25V60	EXC23M-18V60		●									●	●										
	EXC23-25V160	EXC23M-18V160																						
	EXC23-67V60	EXC23M-47V60		●									●		●						●			
	EXC23-67V160	EXC23M-47V160																				●		
	EXC34-100V60	EXC34M-71V60			●									●	●							●		
	EXC34-100V160	EXC34M-71V160																						
	EXC34-100V325	EXC34M-71V325																				●		
	EXC34-210V60	EXC34M-148V60				●										●						●		
	EXC34-210V160	EXC34M-148V160																						
	EXC34-210V325	EXC34M-148V325																					●	
	EXC34-300V60	EXC34M-212V60				●										●						●		
	EXC34-300V160	EXC34M-212V160																						
	EXC34-300V325	EXC34M-212V325																					●	
	EXC42-230V60	EXC42M-162V60				●										●						●		
	EXC42-230V160	EXC42M-162V160																						
	EXC42-230V325	EXC42M-162V325																					●	
	EXC42-350V60	EXC42M-247V60				●										●						●		
	EXC42-350V160	EXC42M-247V160																						
	EXC42-350V325	EXC42M-247V325																						
	EXC42-400V60	EXC42M-282V60				●										●							●	
	EXC42-400V160*	EXC42M-282V160*																						
	EXC42-400V325	EXC42M-282V325																						
	EXC56-450V60	EXC56M-318V60				●			●							●							●	
	EXC56-450V160*	EXC56M-318V160*																						
	EXC56-450V325	EXC56M-318V325																						
	EXC56-600V60	EXC56M-424V60				●										●							●	
	EXC56-600V160*	EXC56M-424V160																						
	EXC56-600V325	EXC56M-424V325																						
EXC56-740V60	EXC56M-523V60				●			●							●									
EXC56-740V160*	EXC56M-523V160																							
EXC56-740V325*	EXC56M-523V325																							

● Requires amplifier to be operated with DC input source

\* Motor requires more current than the existing ElectroCraft drive offering can deliver.



## Other Products available from ElectroCraft:

- CompletePower I Motion Control
- TorquePower I Steppers
- AxialPower I Linear Actuator
- DirectPower I PMDC
- MobilePower I Transmissions
- SolidPower Plus I Housed AC
- SurePower I C-Frame AC

### CompletePower™ I Drives



With meticulous engineering and advanced electronics, our CompletePower speed controls and servo drives offer reliability and precision servo motion control. From sensitive medical dosing systems to rugged professional power tools, our CompletePower devices can handle a wide variety of applications.

### RapidPower™ I BLDC



Our BLDC motors provide the rapid acceleration and consistent speed needed for applications from centrifuges to x-y positioning systems. The RapidPower product line ensures a steady operation at any speed by utilizing sealed ball bearings and reduced torque ripple from skewed magnetization.



### TorquePower™ | Steppers



With non-cumulative position accuracies as low as  $\pm 3\%$ , the precision of our TorquePower motor is matched only by the dependability of its performance. Bi-directional operation and enclosed, permanently lubricated ball bearings provide long-lasting, smooth operation.

### AxialPower™ | Linear Actuator



Based on modified hybrid steppers, PMDC, and BLDC motors, our family of AxialPower linear actuators are built to last. Our unique approach to linear motion with low-friction, polymer rotating nuts and stainless steel leadscrews provides high force and linear precision in the smallest packages available.

### DirectPower™ | PMDC



Dynamically balanced armatures and precision ball bearings ensure that the DirectPower line maintains its characteristically smooth performance. This durable, totally enclosed, non-ventilated (TENV) motor is available in a broad product line from lower cost, general purpose options to high performance PMDC servo motors.

### MobilePower™ | Transmissions



With a choice of output ratios, our MobilePower line of products helps power battery-operated vehicles from wheelchairs to lift trucks. And, to increase durability and decrease noise levels, the robust all metallic gears are hobbed to a precision AGMA 9-Class.

### SolidPower™ Plus | Housed AC



High starting torques and stator windings matched to your application ensure the SolidPower product provides lasting performance. The dynamically balanced, skewed rotor bars and precision-machined fits keep vibration levels at a minimum.

### SurePower™ | C-Frame AC



Our AC shaded-pole motor, the SurePower product, can be utilized for a wide range of air-moving applications - perfect for the rigors of refrigeration and commercial food equipment applications.

CompletePower Drive Accessories						CompletePower Plus Drive Accessories	
<b>Braking module</b>						<b>ACS External Shunt Kits</b>	
	Braking module in a rugged aluminium case. P/N ASO-BM-70-30						External Shunt Kit (110 W, 50 Ohm) for drives: ACS100 / 200 P/N 1002991 ACS300 P/N 1002992
<b>Aluminium Din Rail kit</b>						<b>ACS Connector Interface Board</b>	
	Aluminium Din Rail kit with L-shaped bracket for units: SCA-B4-70-10 P/N ASX-RM-01-01						Connector Interface Board for drives (not needed when using Quick Start I/O Kit): ACS100 / 200 / 300 P/N 1001203
<b>Patch Cable</b>						<b>ACS Cable Kit</b>	
	P/N	50cm	100cm	200cm	300cm	ACS Cable Kit including: · J1 I/O Cable · J5 Halls Input Cable · J2 Analog Cable · P1 Power Input Cable* · J3 RS-232 Cable · P2 Power Input Cable* · J4 Encoder Cable ACS100 / 200 P/N 1002115 ACS300 P/N 1002997	
	Red	CA2005	CA2010	CA2020	CA2030		
	Yellow	CA4005	CA4010	CA4020	CA4030		
	Gray	CA8005	CA8010	CA8020	CA8030		
<b>Passive heatsink</b>						<b>ACS Covers</b>	
	Passive heatsink optimized for drives: EA27 / EA47 P/N HA3008						Cover for drives (cannot be used with Interface Board): ACS100 / 200 P/N 330232 ACS300 P/N 330143
<b>fanned heatsink</b>						<b>ACS Quick Start I/O Kit</b>	
	One fan heatsink optimized for drives (fan is 1 x 24 VDC, .8 W): EA27 / EA47 P/N HA3018					Quick Start I/O Kit including: · Quick Start I/O Board · J4-Encoder cable · Quick-Start I/O to Drive Harness · J5-Hall cable · RS232 Interface Cable · P1-Power Input Cable* · Motor Interface Board · P2-Motor Input Cable* ACS100 / 200 P/N 1002999 ACS300 P/N 1003001	
	Two fan heatsink optimized for drives (fans are 2 x 24 VDC, .8 W): EA27 / EA47 P/N HA3028						
<b>Choke module</b>						<b>ACE Quick Start I/O Kit</b>	
	Choke module optimized for brushless drives. Inductance: IA3100 = 3x50 µH; IA3101 = 3x100 µH Nominal current: 10 A P/N IA310x					Quick Start I/O Kit including: · Quick Start I/O Board · RS232 Interface Cable · Quick Start I/O to Drive Harness ACE500 P/N 1002995 ACE1000 P/N 1002994	
<b>DIN Rail mounting kit</b>							
	DIN Rail mounting kit for units: EA25 / EA27 / EA47 P/N MA0025					<b>ACE External Shunt Kit</b>	
	DIN Rail mounting kit for: ASO-BM-70-30 P/N MA3050						External Shunt Kit (300W, 50 Ohm) for drives: ACE500, ACE1200/1300 P/N 1001502
<b>Break Out Board</b>						<b>Dual Encoder Out Board</b>	
	Break Out Board for: for EA-Series P/N WA2509						Dual Encoder Out Board / DIN Rail Mount (Not required with ACE100-Series) P/N 2000658
						<b>Resolver Convertor Board</b>	
							Resolver Convertor Board / DIN Rail Mount (Contact factory for details)

\* (ACS100/200 only)



## To build your own motor, choose the:

**1 - Frame Size**  
(Imperial or Metric)

**2 - Torque**

**3 - Winding**

**4 - Features**

a. **R P 2 3**  
Product Name Frame Size

**7 3**  
Continuous Torque (oz-in)

V

**2 4**  
Voltage

**1 0 0 C**  
Rear Shaft Front Shaft Lead Option Encoder

b. **R P 2 3 M**  
Product Name Frame Size Optional Metric

**5 2**  
Continuous Torque (Ncm)

### Step 4:

### Brushless Motor Features

Rear Shaft	Front Shaft	Lead Option	Encoder Options (X = none)	
			Single Ended Encoder	Differential Encoder
0 = No	0 = round	0 = flying leads	J = 500 Line	C = 500 Line
1 = Yes	1 = standard flat	1 = standard connector	K = 1000 Line	D = 1000 Line
	2 = key seat		L = 2000 Line	E = 2000 Line

#### Encoder Signals

#### Encoder Specifications for Single Ended Encoder

##### RP Series, E-Series

+5 VDC	GND	CH A	CH B	CH Z	Hall S1	Hall S2	Hall S3

#### Encoder Specifications for Differential Encoder

##### RP Series, E-Series

+ 5 VDC	GND	CH A +	CH A -	CH B +	CH B -	CH Z +	CH Z -	Hall S1	Hall S2	Hall S3

#### EXC23\*

+5 VDC	CH A +	CH A -	CH B +	CH B -	CH Z +	CH Z -
GND	Hall S1 +	Hall S1 -	Hall S2 +	Hall S2 -	Hall S3 +	Hall S3 -

#### EXC34, EXC42 and EXC56\*

+5 VDC	+5 VCC Comm	CH A +	CH A -	CH B +	CH B -	CH Z +	CH Z -	Motor TC1
GND Data	GND Comm	Hall S1 +	Hall S1 -	Hall S2 +	Hall S2 -	Hall S3 +	Hall S3 -	Motor TC2

\*Encoder drawing not shown as encoder is under a motor cover.



*Your Genius.  
Our Drive.*

To learn more about our products and services, please visit [www.electrocrafter.com](http://www.electrocrafter.com) or contact ElectroCraft today and see how we can help power your innovation.

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