ElectroCraft®
powering innovation™

Catalog EC03EN

Brushless

www.electrocraft.com

Motors

- RapidPower Series
- E-Series
- EXC-Series

Drives

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

ElectroCraft®
powering innovation™

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.

Designed by media & brands · www.media-brands.de

ElectroCraft®
powering innovation™

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 gearbox 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.

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

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.

ElectroCraft®
powering innovation™

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
Product Description																					
See on page	29	31	31	31	37	39	39	39	41	41	41	33	33	35	35	43	43	43	45	47	49
Power Features																					
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
Power Ratings																					
Peak Current (A_{rms})												18	36	20	60	7	10	20	11	14	21
Continuous Current (A_{rms})	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
Control Modes																					
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																●	●	●	●	●	●
Communication / Compliance																					
RS232 Serial																●	●	●	●	●	●
CAN Bus																●	●	●			
Field upgradeable firmware																●	●	●	●	●	●
Serial drive status/diagnostics																●	●	●	●	●	●
Windows set-up software																●	●	●	●	●	●
UL Recognized																			●	●	●
CE Compliance (LV Directive)	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●				●	●	●
RoHS	●	●	●	●		●	●	●				●	●	●	●	●	●	●	●		
Physical Enclosure																					
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 magntic 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. RP17 — 45 V 24 — 000 — X

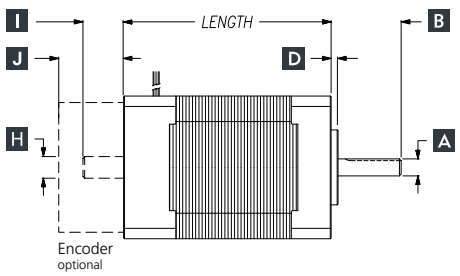
- RP: Product Name
- 17: Frame Size
- 45: Continuous Torque (oz-in)
- 24: Voltage
- 000: Rear Shaft / Front Shaft / Lead Option
- X: Encoder

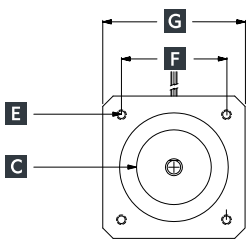
b. RP17M — 32 V 24 — 000 — X

- RP: Product Name
- 17: Frame Size
- M: Optional Metric
- 32: Continuous Torque (Ncm)
- 24: Voltage
- 000: Rear Shaft / Front Shaft / Lead Option
- X: Encoder

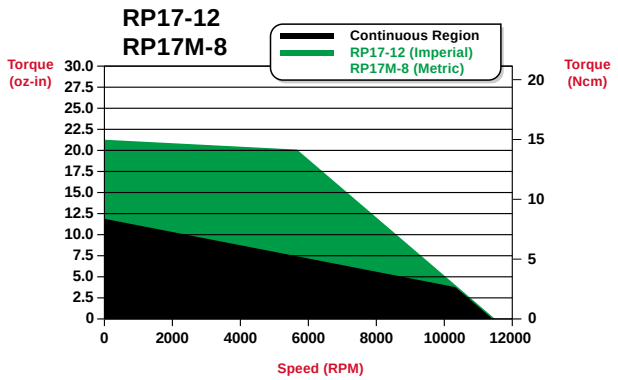
Step 1: RP17 & RP17M Frame Size Drawing Key

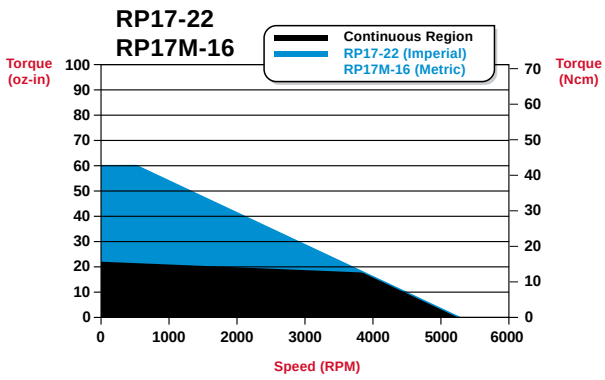
Model	MAX Length	A Front Shaft Diameter	B Front Shaft Length	C Pilot Diameter	D Pilot Length (Ref)	E Mount Hole Pattern (Ref)	F Mount Hole Spacing (Ref)	G Flange External Dimension SQ (Ref)	H Rear Shaft Diameter	I Rear Shaft Length	J Encoder Length (Ref) Single Ended / Differential
RP17-12	1.60 in	0.1968 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										
RP17M-8	41 mm	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-16	61 mm										
RP17M-25	81 mm										
RP17M-32	101 mm										

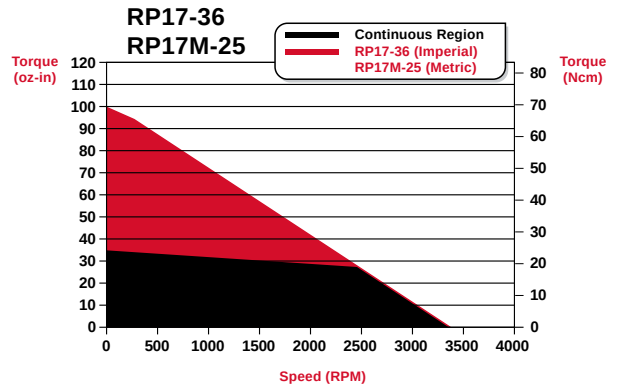


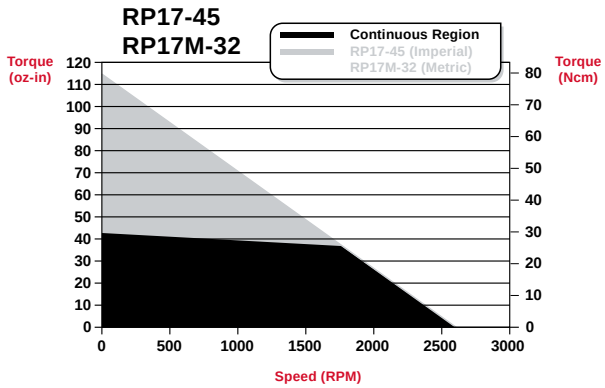


Step 2: RP17 Torque and Mechanical Data









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-sec² (g-cm²)	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. RP23 — 73 V 24 — 000 — X

b. RP23M — 52 V 24 — 000 — X

RP / RP23M: Product Name; 23: Frame Size; M: Optional Metric

73 / 52: Continuous Torque (oz-in) / (Ncm)

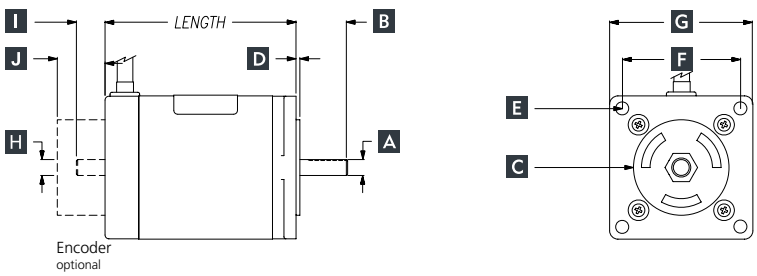
V 24: Voltage

000: Rear Shaft, Front Shaft, Lead Option

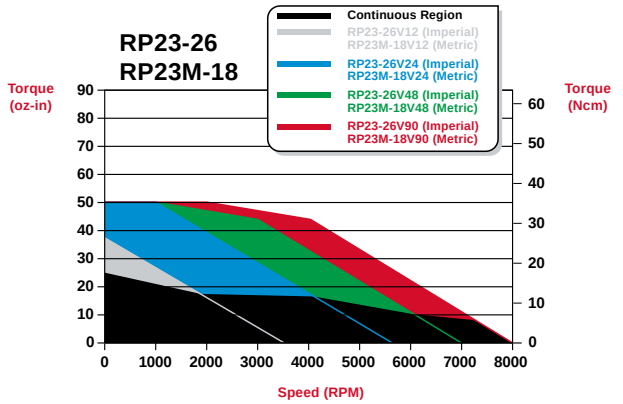
X: Encoder

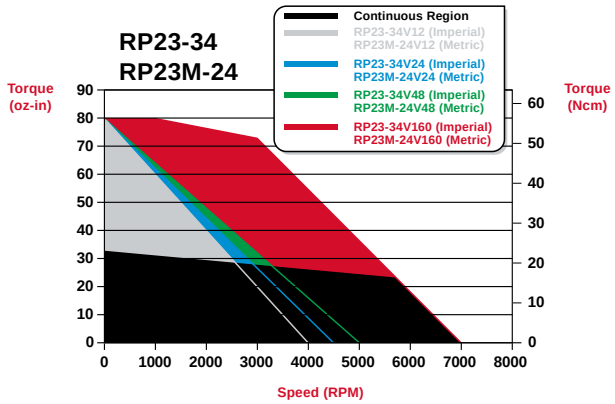
Step 1: RP23 & RP23M Frame Size Drawing Key

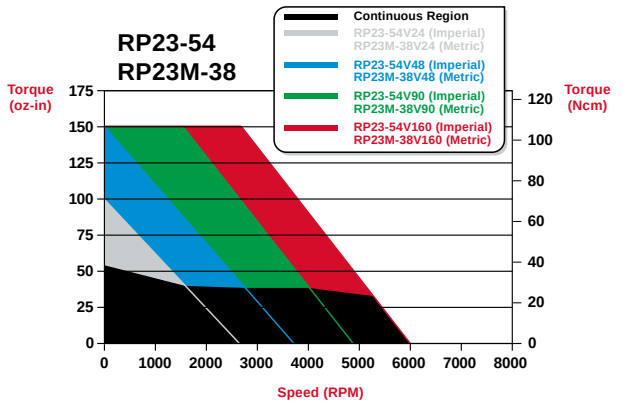
Model	MAX Length	A Front Shaft Diameter	B Front Shaft Length	C Pilot Diameter	D Pilot Length (Ref)	E Mount Hole Pattern (Ref)	F Mount Hole Spacing (Ref)	G Flange External Dimension (Ref)	H Rear Shaft Diameter	I Rear Shaft Length	J Encoder Length (Ref) Single Ended / Differential
RP23-26	1.60 in	0.2500 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										

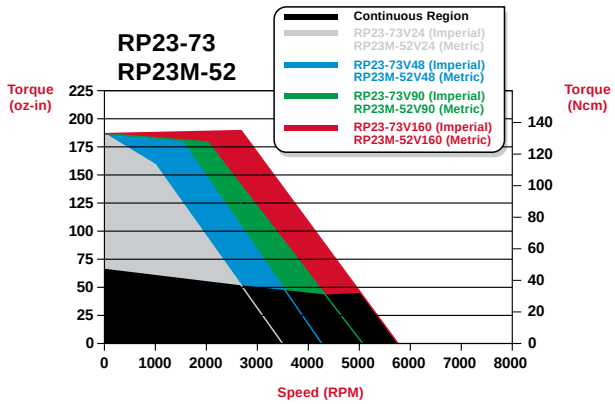


Step 2: RP23 Torque and Mechanical Data









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-sec² (g-cm²)	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

RoHS

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. RP 34 — 313 V 24 — 000 — X

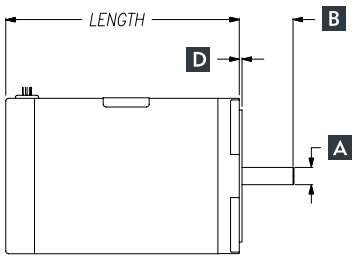
- RP: Product Name
- 34: Frame Size
- 313: Continuous Torque (oz-in)
- V 24: Voltage
- 000: Rear Shaft / Front Shaft / Lead Option
- X: Encoder

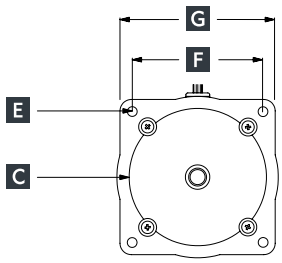
b. RP 34 M — 221 V 24 — 000 — X

- RP: Product Name
- 34: Frame Size
- M: Optional Metric
- 221: Continuous Torque (Ncm)
- V 24: Voltage
- 000: Rear Shaft / Front Shaft / Lead Option
- X: Encoder

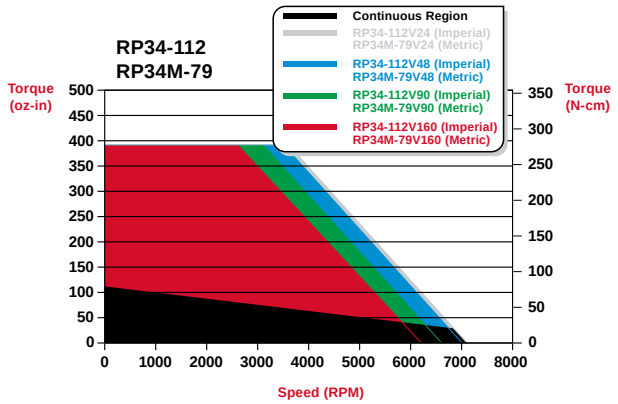
Step 1: RP34 & RP34M Frame Size Drawing Key

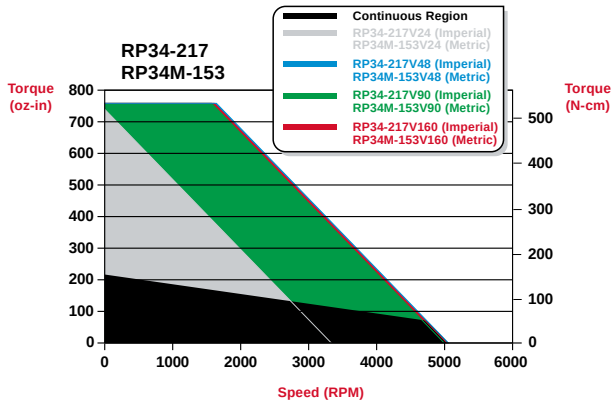
Model	MAX Length	A Front Shaft Diameter	B Front Shaft Length	C Pilot Diameter	D Pilot Length (Ref)	E Mount Hole Pattern (Ref)	F Mount Hole Spacing (Ref)	G Flange External Dimension (Ref)	H Rear Shaft Diameter	I Rear Shaft Length	J Encoder Length (Ref) Single Ended / Differential
RP34-112	2.84 in	0.3750 in 0.3745 in	1.25 in ±0.03	2.875 in 2.873 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 0.2495 in	0.500 in ±0.040	0.35 in 0.55 in
RP34-217	4.15 in										
RP34-313	5.47 in										
RP34M-79	72 mm	14.000 mm 13.989 mm	30 mm ±0.8	80.012 mm 79.993 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 6.3297 mm	12.7 mm ±1.016	8.89 mm 14.91 mm
RP34M-153	105 mm										
RP34M-221	139 mm										

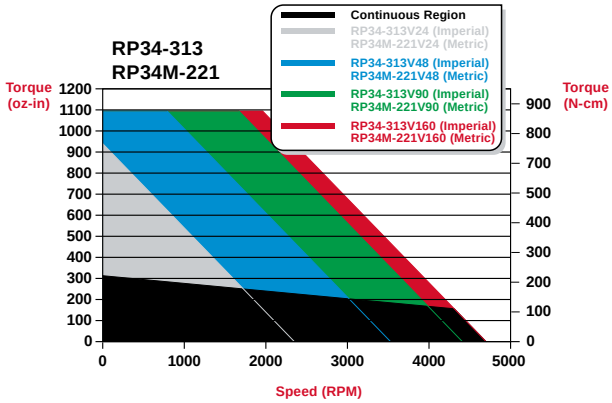




Step 2: RP34 Torque and Mechanical Data







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-sec² (g-cm²)	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 | 22 — 40 — V | 24 — 000 — X

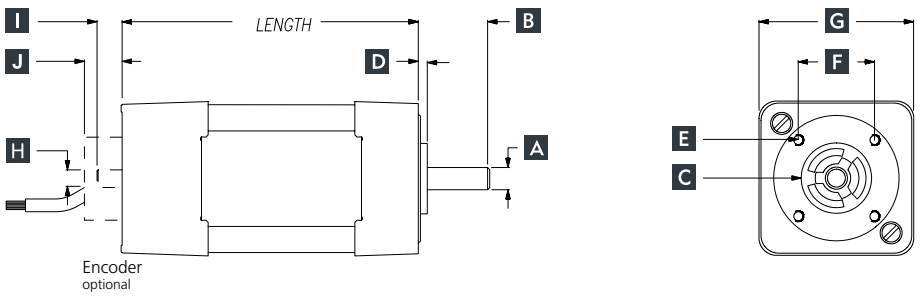
- E: Product Name
- 22: Frame Size
- 40: Continuous Torque (oz-in)
- V: Winding
- 24: Voltage
- 000: Rear Shaft | Front Shaft | Lead Option
- X: Encoder

b. E | 22 | M — 28 — V | 24 — 000 — X

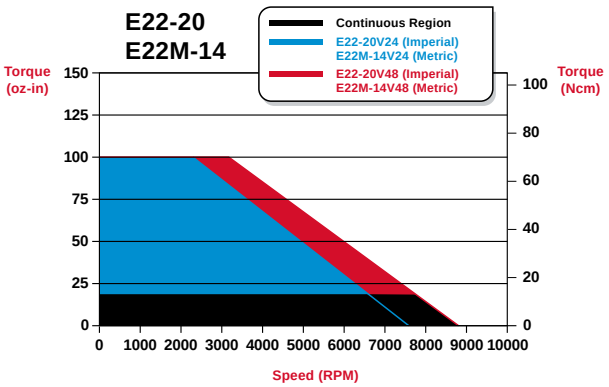
- E: Product Name
- 22: Frame Size
- M: Optional Metric
- 28: Continuous Torque (Ncm)
- V: Winding
- 24: Voltage
- 000: Rear Shaft | Front Shaft | Lead Option
- X: Encoder

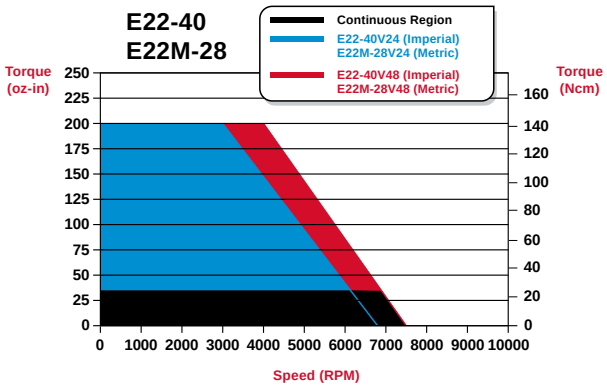
Step 1: E22 & E22M Frame Size Drawing Key

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 0.3140 in	1.000 in ±0.035	1.000 in 0.998 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 0.2492 in	0.500 in ±0.035	0.350 in / 0.587 in
E22-40	4.03 in										
E22M-14	77 mm	8.00 mm 7.99 mm	25 mm ±0.889	25.00 mm 24.95 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 6.3297 mm	12.7 mm ±0.889	8.89 mm / 14.91 mm
E22M-28	103 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-sec² (g-cm²)	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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Don't see exactly what you need?
Have ElectroCraft build you a custom winding, stack length or 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

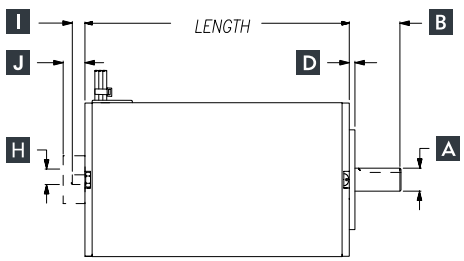
Product Name | Frame Size | Continuous Torque (oz-in) | Voltage | Rear Shaft | Front Shaft | Lead Option | Encoder

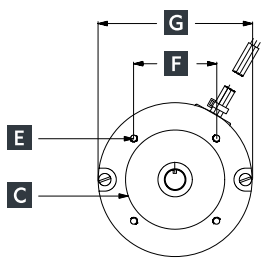
b. E | 30 | M — 54 — V | 48 — 000 — X

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

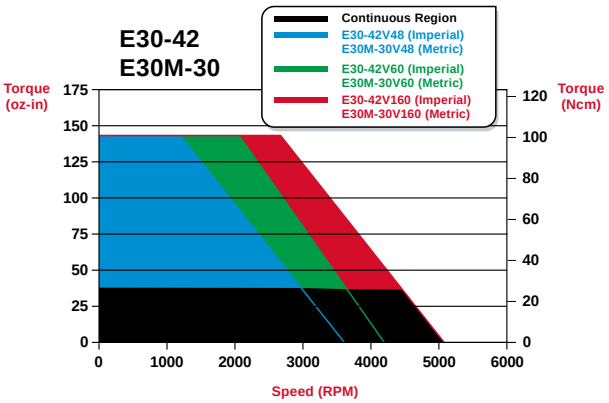
Step 1: E30 & E30M Frame Size Drawing Key

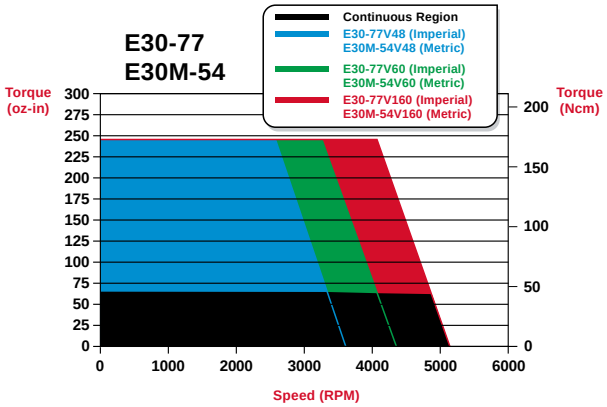
Model	MAX Length (with integrated halls)	MAX Length (without integrated halls)	A Front Shaft Diameter	B Front Shaft Length	C Pilot Diameter	D Pilot Length (Ref)	E Mount Hole Pattern (Ref)	F Mount Hole Spacing (Ref)	G Flange External Dimension (Ref)	H Rear Shaft Diameter	I Rear Shaft Length	J Encoder Length (Ref) Single Ended / Differential
E30-42	4.32 in	3.81 in	0.3145 in 0.3140 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 0.2492 in	0.500 in ±0.035	0.350 in / 0.587 in
E30-77	5.32 in	4.81 in										
E30M-30	110 mm	97 mm	9.00 mm 8.99 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 6.3297 mm	12.7 mm ±0.889	8.89 mm / 14.91 mm
E30M-54	136 mm	123 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-sec² (g-cm²)	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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Have ElectroCraft build you a 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)

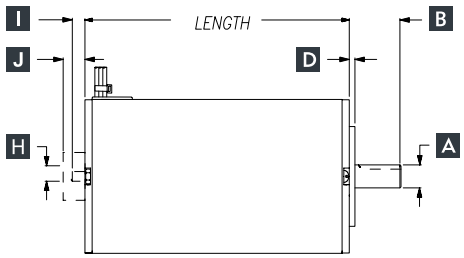
a. E (Product Name) 33 (Frame Size) — 120 (Continuous Torque (oz-in))

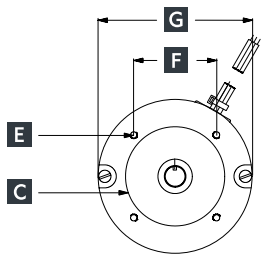
b. E (Product Name) 33 (Frame Size) M (Optional Metric) — 85 (Continuous Torque (Ncm))

V 48 (Voltage) — 000 (Rear Shaft, Front Shaft, Lead Option) — X (Encoder)

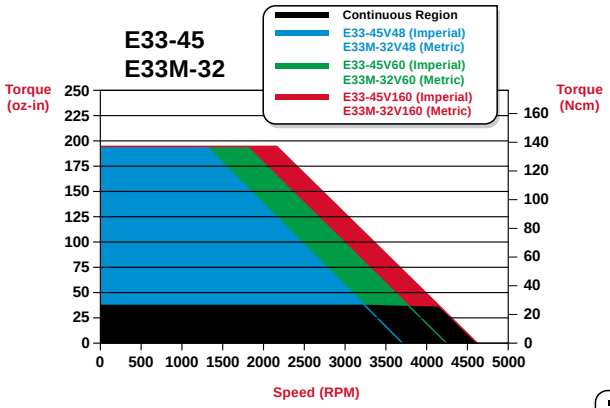
Step 1: E33 & E33M Frame Size Drawing Key

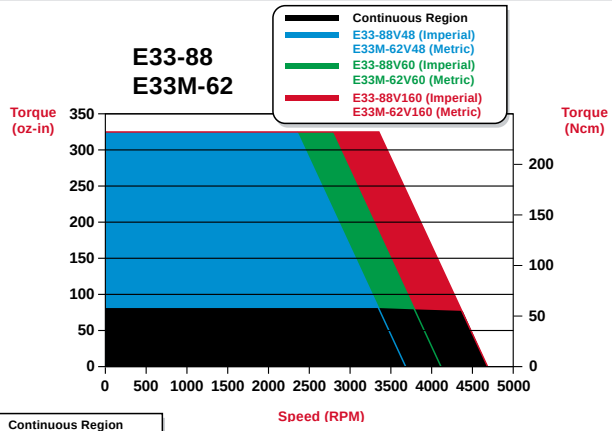
Model	MAX Length (with integrated halls)	MAX Length (without integrated halls)	A Front Shaft Diameter	B Front Shaft Length	C Pilot Diameter	D Pilot Length (Ref)	E Mount Hole Pattern (Ref)	F Mount Hole Spacing (Ref)	G Flange External Dimension (Ref)	H Rear Shaft Diameter	I Rear Shaft Length	J Encoder Length (Ref) Single Ended / Differential
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										

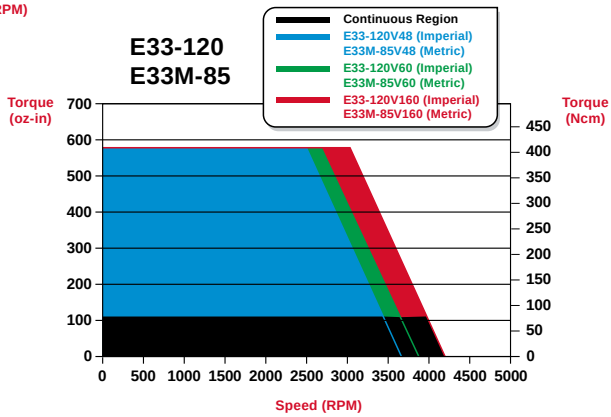




Step 2: E33 Torque and Mechanical Data







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-sec² (g-cm²)	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)

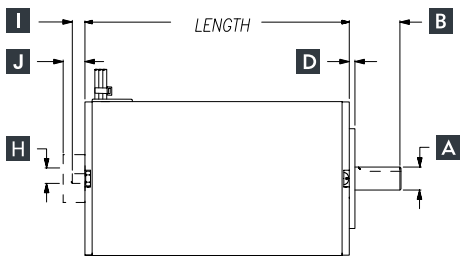
a. E (Product Name) 37 (Frame Size) — 161 (Continuous Torque (oz-in))

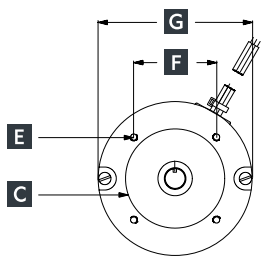
b. E (Product Name) 37 (Frame Size) M (Optional Metric) — 114 (Continuous Torque (Ncm))

V 48 (Voltage) — 000 (Rear Shaft, Front Shaft, Lead Option) — X (Encoder)

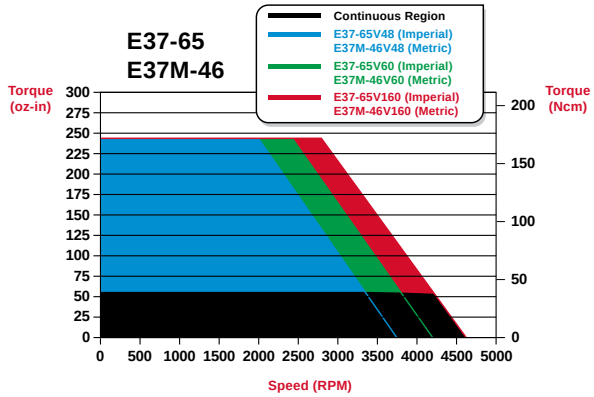
Step 1: E37 & E37M Frame Size Drawing Key

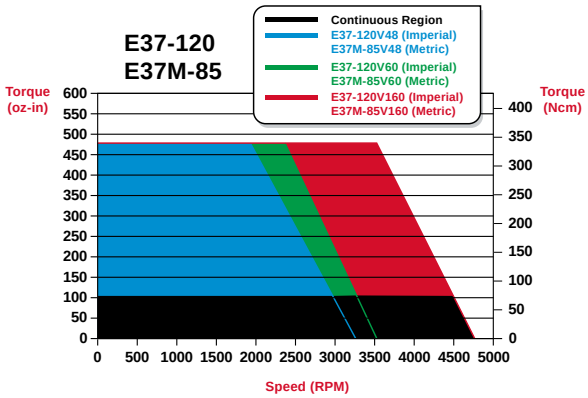
Model	MAX Length (with integrated halls)	MAX Length (without integrated halls)	A Front Shaft Diameter	B Front Shaft Length	C Pilot Diameter	D Pilot Length (Ref)	E Mount Hole Pattern (Ref)	F Mount Hole Spacing (Ref)	G Flange External Dimension (Ref)	H Rear Shaft Diameter	I Rear Shaft Length	J Encoder Length (Ref) Single Ended / Differential
E37-65	4.63 in	4.10 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
E37-120	5.63 in	5.10 in										
E37-161	6.63 in	6.10 in										
E37M-46	118 mm	105 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-85	143 mm	130 mm										
E37M-114	169 mm	155 mm										

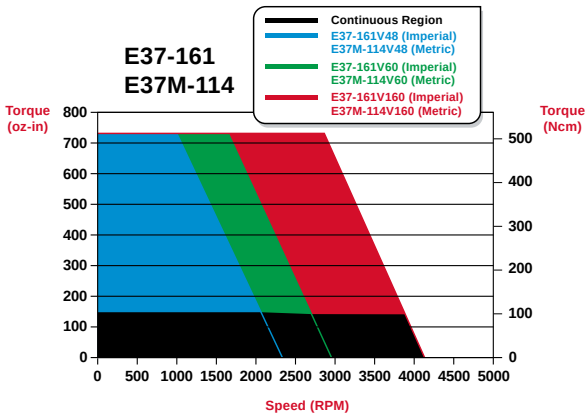




Step 2: E37 Torque and Mechanical Data







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-sec² (g-cm²)	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

RoHS

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:

1 - Frame Size (Imperial or Metric) | **2** - Torque | **3** - Winding | **4** - Features (see page 55)

a. EXC 23 — 67 V 60 — 100 — C

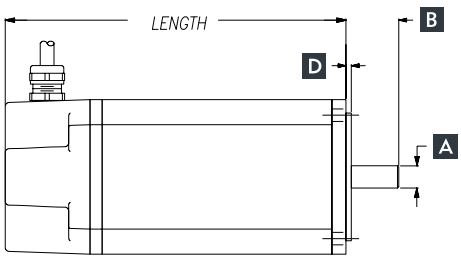
- EXC: Product Name
- 23: Frame Size
- 67: Continuous Torque (oz-in)
- V: Winding
- 60: Voltage
- 1: Rear Shaft
- 0: Front Shaft
- 0: Lead Option
- C: Encoder

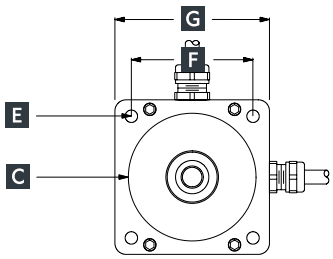
b. EXC 23 M — 47 V 60 — 100 — C

- EXC: Product Name
- 23: Frame Size
- M: Optional Metric
- 47: Continuous Torque (Ncm)
- V: Winding
- 60: Voltage
- 1: Rear Shaft
- 0: Front Shaft
- 0: Lead Option
- C: Encoder

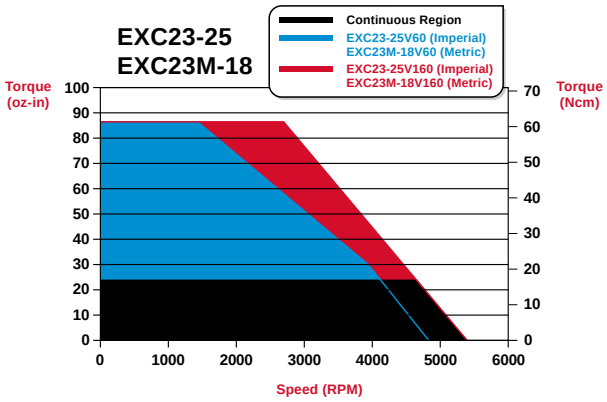
Step 1: EXC23 & EXC23M Frame Size Drawing Key

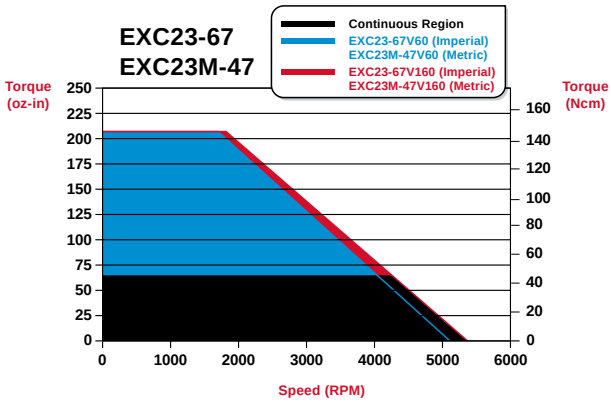
Model	MAX Length	A Front Shaft Diameter	B Front Shaft Length	C Pilot Diameter	D Pilot Length (Ref)	E Mount Hole Pattern (Ref)	F Mount Hole Spacing (Ref)	G Flange External Dimension (Ref)	H Rear Shaft Diameter	I Rear Shaft Length (Ref)	J Encoder Cover Length (Ref)
EXC23-25	4.66 in	0.2500 in 0.2495 in	0.81 in ±0.03	1.500 in 1.498 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										
EXC23M-18	119 mm	8.000 mm 7.987 mm	25 mm ±0.762	50.00 mm 49.95 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										





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-sec² (g-cm²)	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

Still need help?
Easily build your own motor at
www.configureamotor.com

Don't see exactly what you need?
Have ElectroCraft build you a 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:

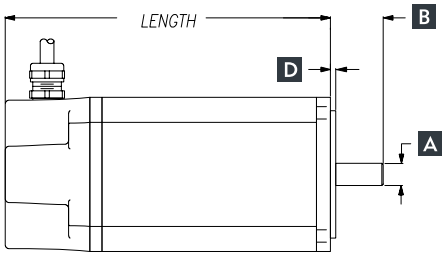
1 - Frame Size (Imperial or Metric)
2 - Torque
3 - Winding
4 - Features (see page 55)

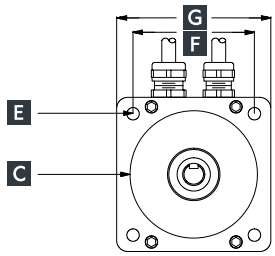
a. EXC 34 — 300 V 60 — 100 — C
- EXC: Product Name
- 34: Frame Size
- 300: Continuous Torque (oz-in)
- V 60: Voltage
- 100: Rear Shaft, Front Shaft, Lead Option
- C: Encoder

b. EXC 34 M — 212 V 60 — 100 — C
- EXC: Product Name
- 34: Frame Size
- M: Optional Metric
- 212: Continuous Torque (Ncm)
- V 60: Voltage
- 100: Rear Shaft, Front Shaft, Lead Option
- C: Encoder

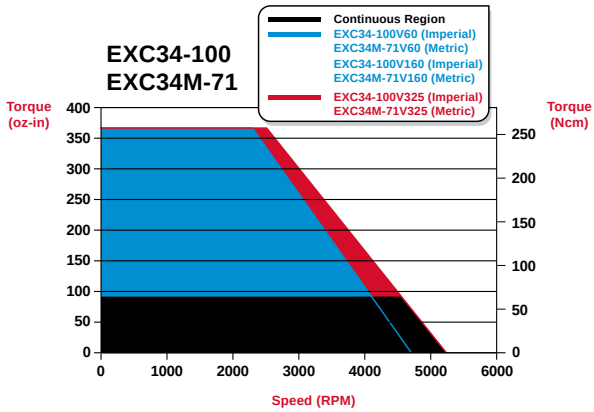
Step 1: EXC34 & EXC34M Frame Size Drawing Key

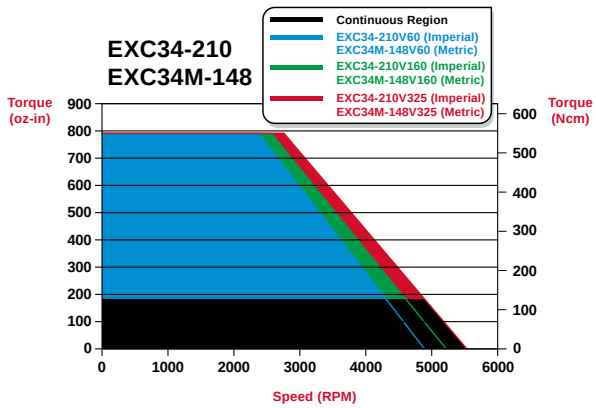
Model	MAX Length	A Front Shaft Diameter	B Front Shaft Length	C Pilot Diameter	D Pilot Length (Ref)	E Mount Hole Pattern (Ref)	F Mount Hole Spacing (Ref)	G Flange External Dimension (Ref)	H Rear Shaft Diameter	I Rear Shaft Length (Ref)	J Encoder Cover Length (Ref)
EXC34-100	5.70 in	0.5000 in 0.4995 in	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										

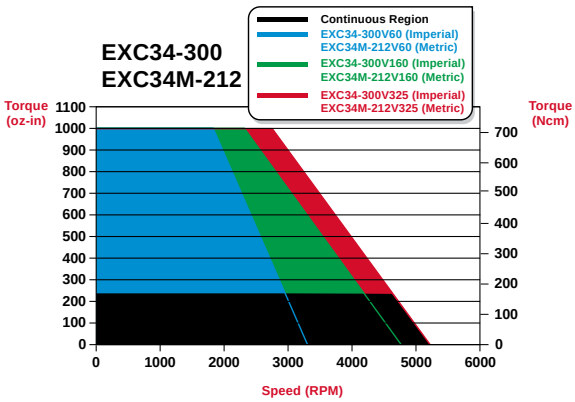




Step 2: EXC34 Torque and Mechanical Data







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-sec² (g-cm²)	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 V60 — 100 — C

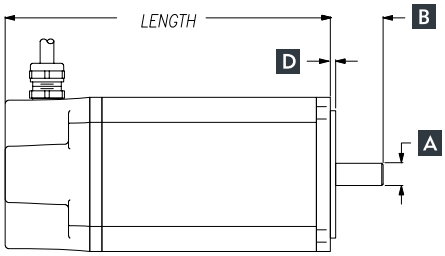
- EXC: Product Name
- 42: Frame Size
- 400: Continuous Torque (oz-in)
- V60: Voltage
- 100: Rear Shaft, Front Shaft, Lead Option
- C: Encoder

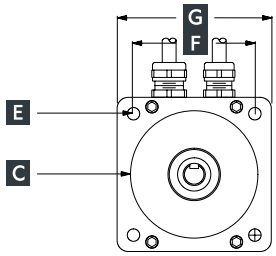
b. EXC42M — 282 V60 — 100 — C

- EXC: Product Name
- 42: Frame Size
- M: Optional Metric
- 282: Continuous Torque (Ncm)
- V60: Voltage
- 100: Rear Shaft, Front Shaft, Lead Option
- C: Encoder

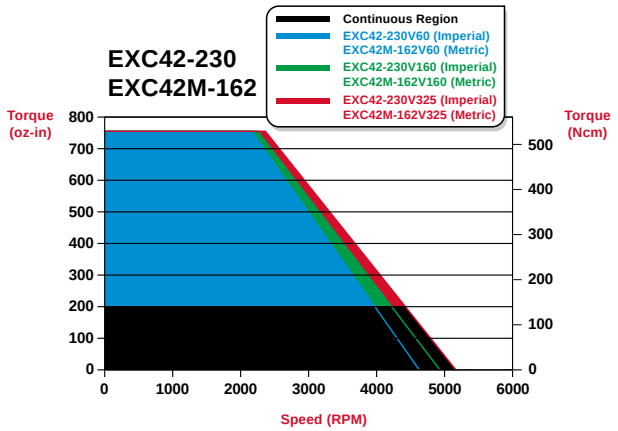
Step 1: EXC42 & EXC42M Frame Size Drawing Key

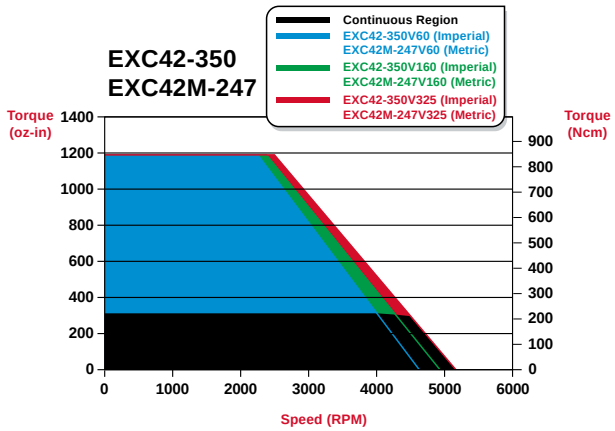
Model	MAX Length	A Front Shaft Diameter	B Front Shaft Length	C Pilot Diameter	D Pilot Length (Ref)	E Mount Hole Pattern (Ref)	F Mount Hole Spacing (Ref)	G Flange External Dimension (Ref)	H Rear Shaft Diameter	I Rear Shaft Length (Ref)	J Encoder Cover Length (Ref)
EXC42-230	6.86 in	0.6250 in 0.6245 in	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										

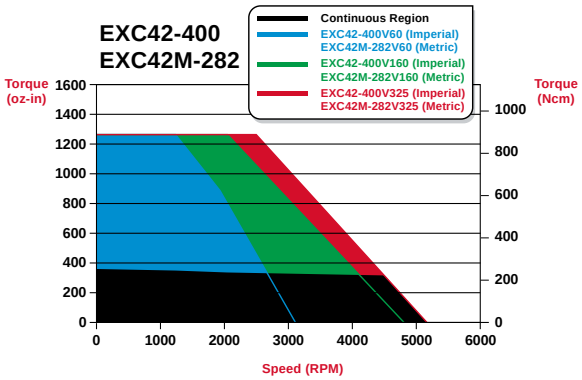




Step 2: EXC42 Torque and Mechanical Data







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-sec² (g-cm²)	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. E X C 5 6 — 7 4 0 V 6 0 — 1 0 0 — C

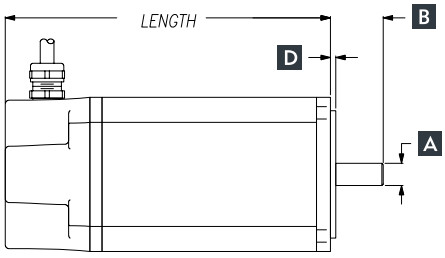
- E X C 5 6: Product Name, Frame Size
- 7 4 0: Continuous Torque (oz-in)
- V 6 0: Voltage
- 1: Rear Shaft; 0: Front Shaft; 0: Lead Option
- C: Encoder

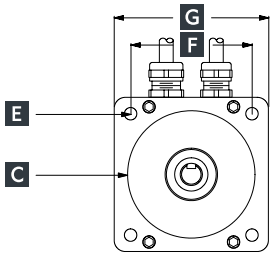
b. E X C 5 6 M — 5 2 3 V 6 0 — 1 0 0 — C

- E X C 5 6 M: Product Name, Frame Size, Optional Metric
- 5 2 3: Continuous Torque (Ncm)
- V 6 0: Voltage
- 1: Rear Shaft; 0: Front Shaft; 0: Lead Option
- C: Encoder

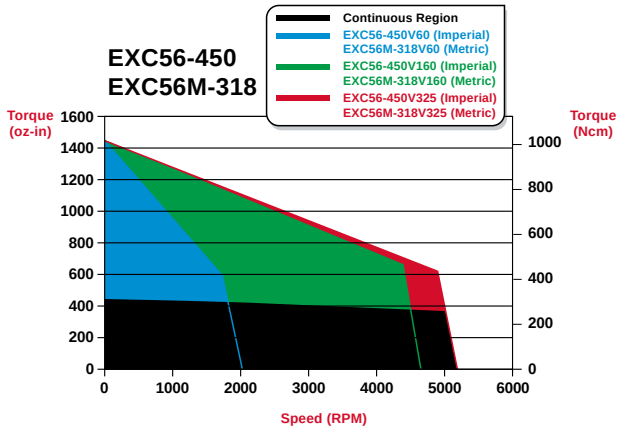
Step 1: EXC56 & EXC56M Frame Size Drawing Key

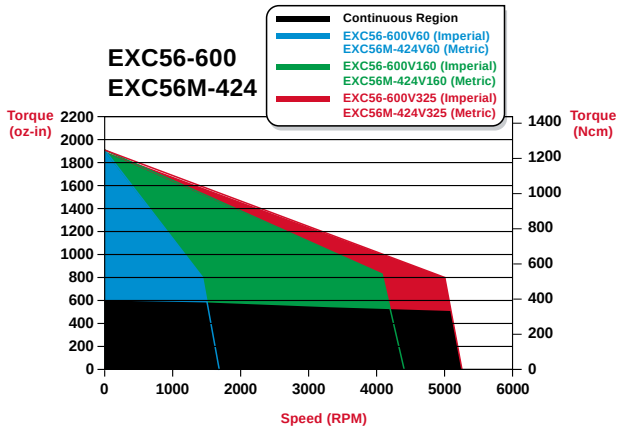
Model	MAX Length	A Front Shaft Diameter	B Front Shaft Length	C Pilot Diameter	D Pilot Length (Ref)	E Mount Hole Pattern (Ref)	F Mount Hole Spacing (Ref)	G Flange External Dimension (Ref)	H Rear Shaft Diameter	I Rear Shaft Length (Ref)	J Encoder Cover Length (Ref)
EXC56-450	7.85 in	0.7500 in 0.7495 in	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										

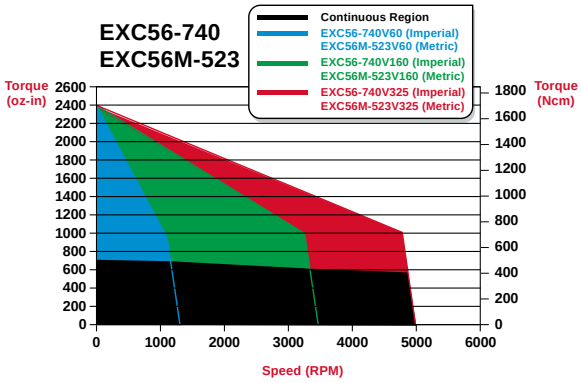




Step 2: EXC56 Torque and Mechanical Data







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-sec² (g-cm²)	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.

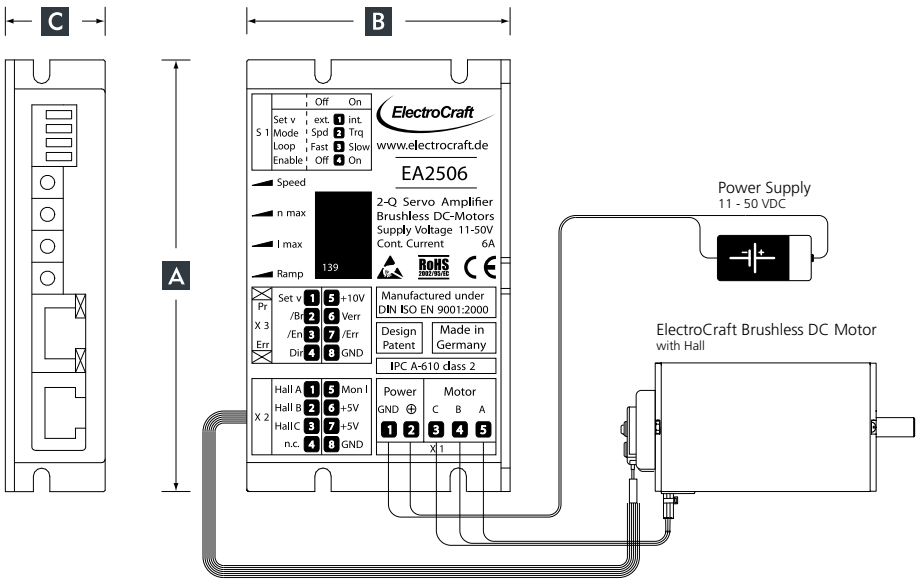
This two-quadrant brushless DC speed control is fully enclosed in an extremely small rugged aluminum case which can be DIN-rail mounted or panel mounted for easy integration. The drive includes an adjustable ramp generator for controlled acceleration and a torque mode. Mode of operation is set by simple 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

E	A	2	5	06
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; Imax; 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
			

EA

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.

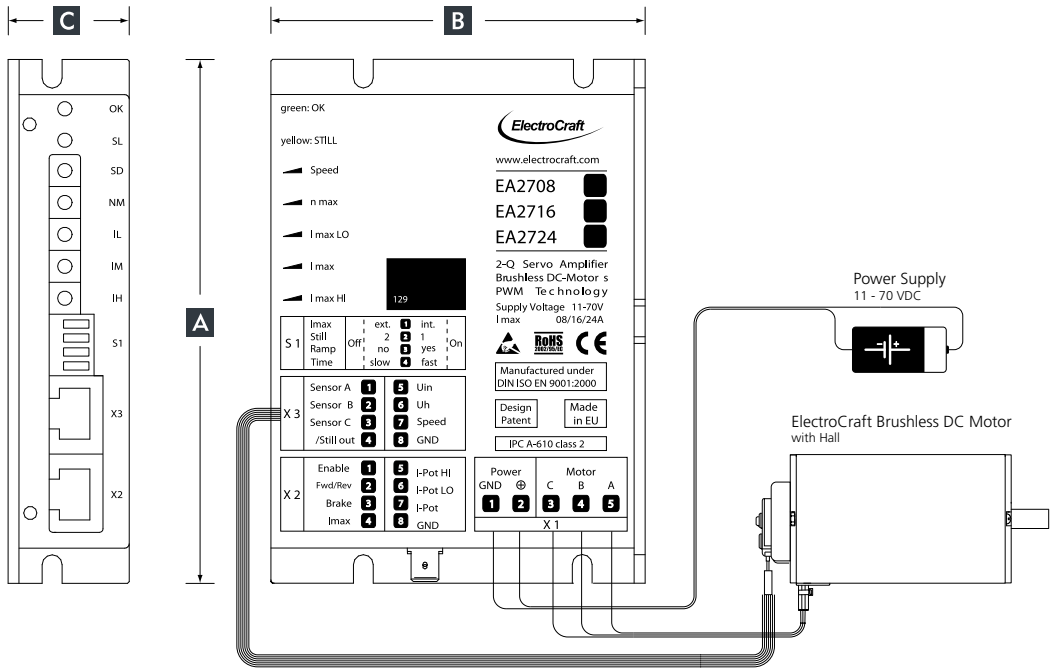
This two-quadrant brushless DC speed control is fully enclosed in a small rugged aluminum case which can be DIN-rail mounted or panel mounted for easy integration. The drive includes a ramp generator for controlled acceleration, braking function and external current control. Mode of operation is set 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

E	A	2	7	08
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 *Uh*	+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.

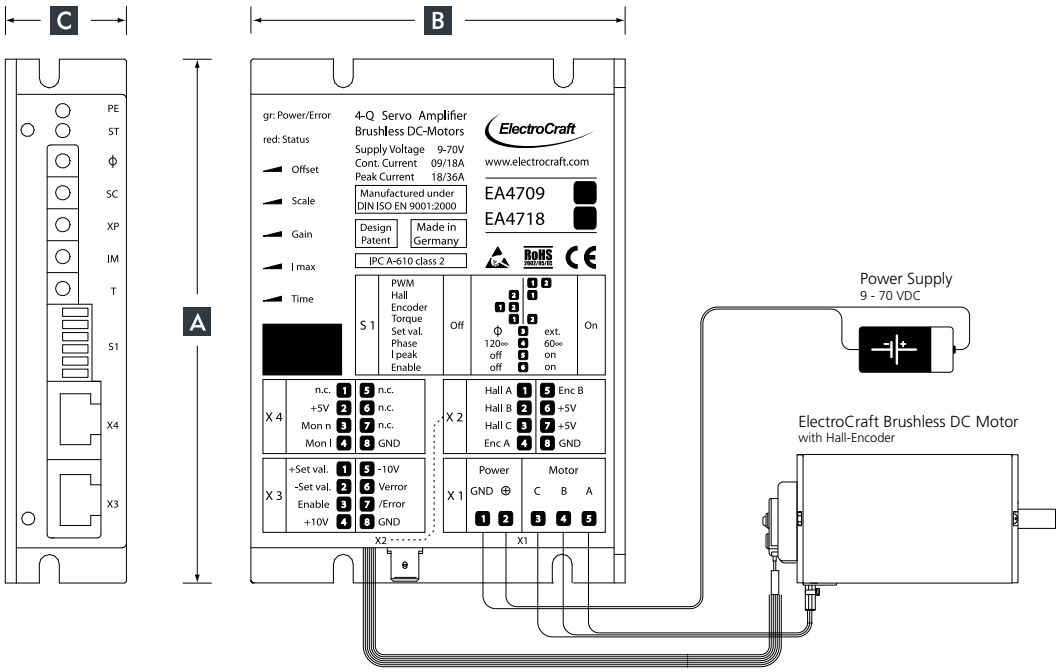
This four-quadrant brushless DC servo amplifier is fully enclosed in a small rugged aluminum case which can be DIN-rail mounted or panel mounted for easy integration. The drive can be configured in a variety of torque and speed control modes with the mode of operation being set by simple DIP switches. 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

E	A	4	7	09
Drive Technology	Version	# Quadrants	Voltage 10x VDC	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 Verror (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 *Mon I*	1 / 0.5 (V/A); Ri = 200 Ohm
Speed Monitor *Mon n*	max.10 V at n max
Error	Open Collector / Push Pull / TTL / +24 V

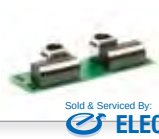
Display	
LEDs	green = Power / red = Error

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.

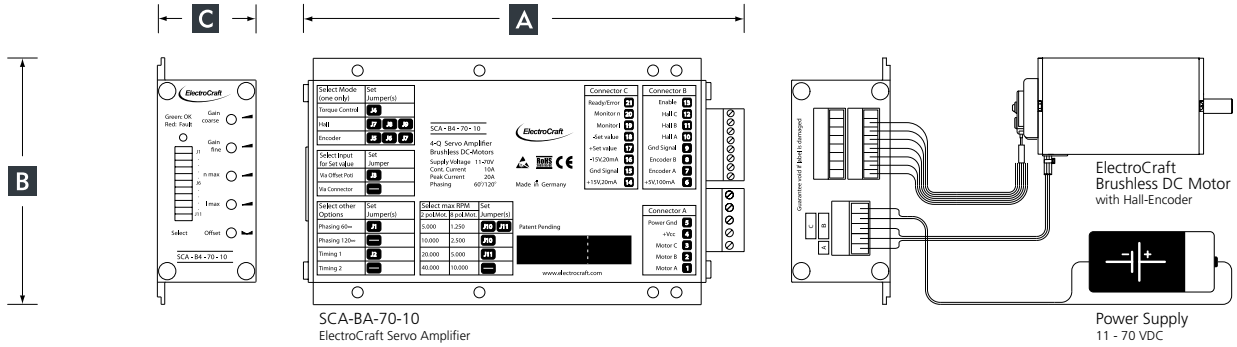
This four-quadrant brushless DC servo amplifier is fully enclosed in a rugged aluminum case which can be panel mounted or DIN-rail mounted for easy integration. The drive can be configured in a variety of torque and speed control modes with the mode of operation being set by simple jumpers. Both the 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

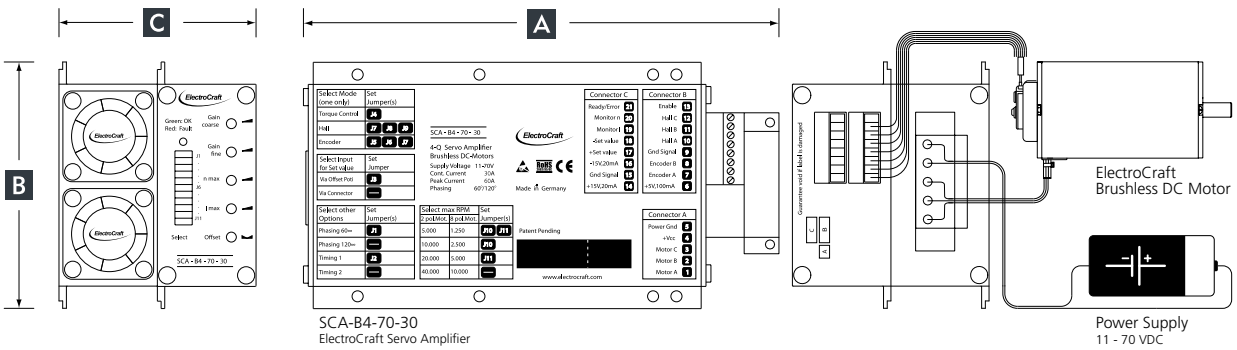
SC	A	B4	70	10
Drive Technology	Case Type	# Quadrants	Voltage VDC	Current Amps

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-BA-70-10
ElectroCraft Servo Amplifier



SCA-B4-70-30
ElectroCraft Servo Amplifier

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
		

SC

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.

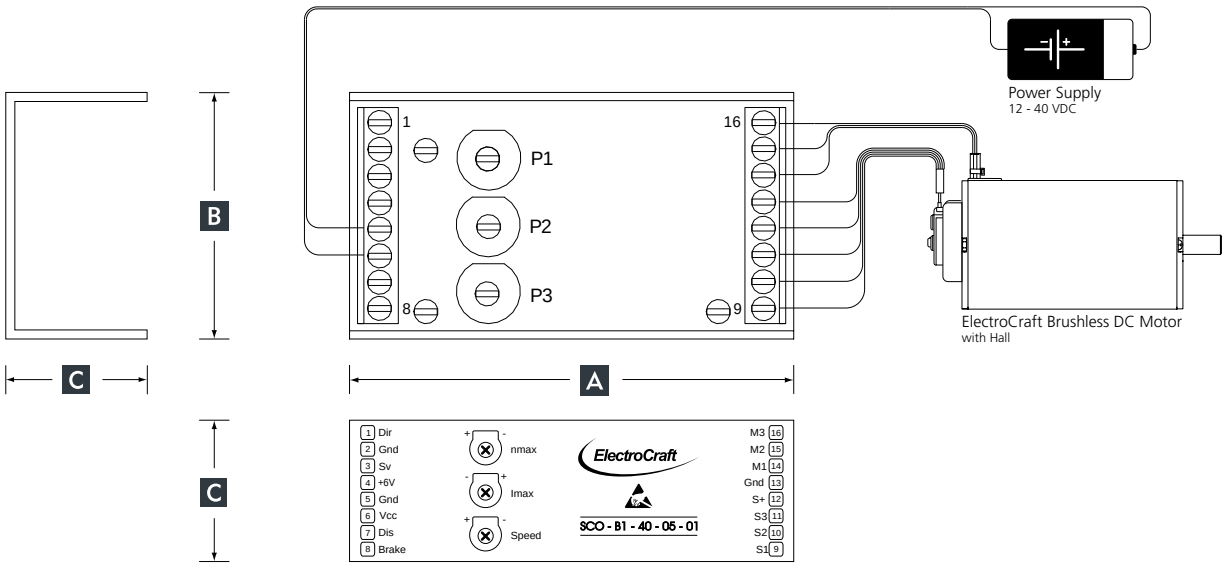
This two-quadrant brushless DC speed control is housed in a small compact open-frame aluminum module which can be panel mounted for easy integration. The drive includes a control enable/disable, direction, brake and set value inputs. The drive has an adjustable current limit up to 5 A and can be powered 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

SC	O	B1	40	05	01
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.

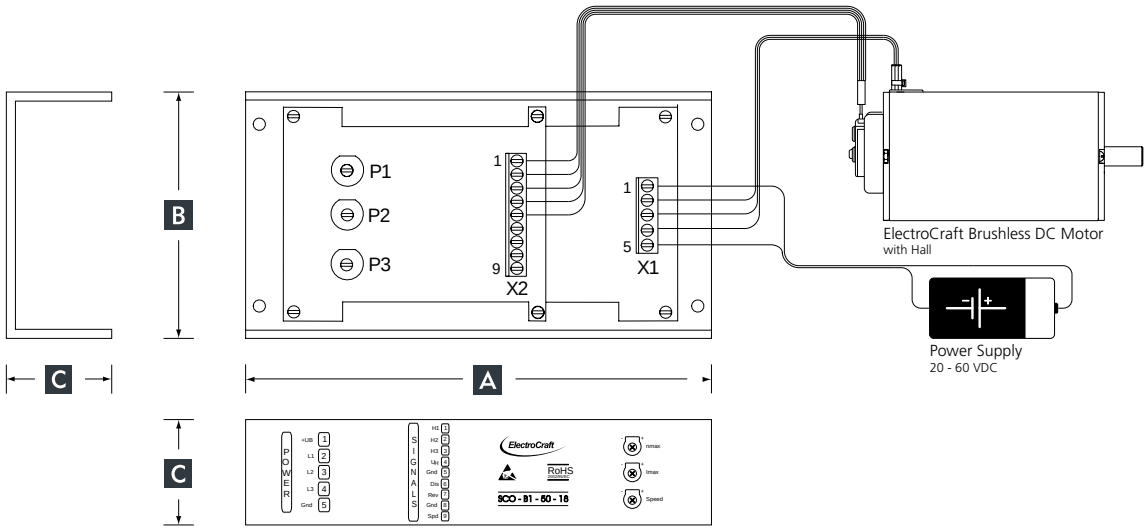
This two-quadrant brushless DC speed control is housed in a compact open-frame aluminum module which can be panel mounted for easy integration. The drive includes a control enable/disable, direction and set value inputs. Both the 18 A and the 40 A versions of this drive have an adjustable current limit 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

SC	O	B1	50	18
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	

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.

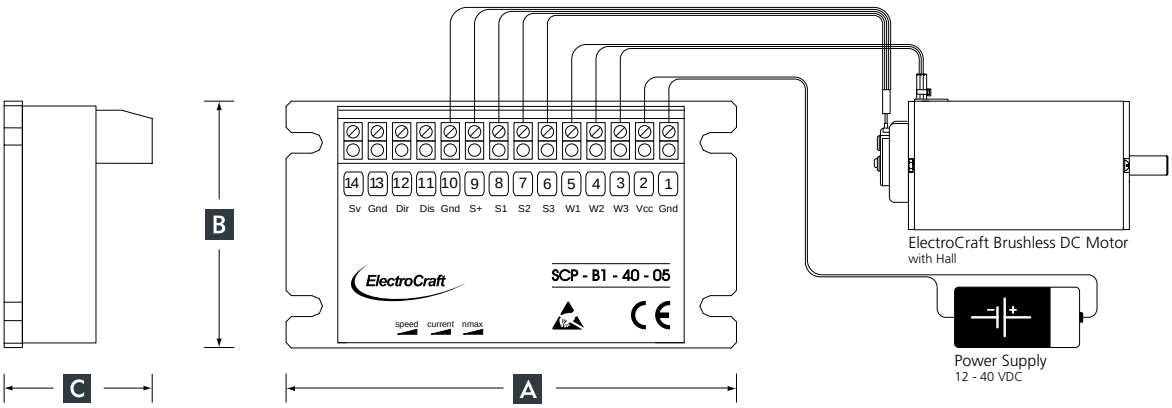
This two-quadrant brushless DC speed control is housed in a compact closed-frame aluminum module which can be panel mounted for easy integration. The drive includes a control enable/disable, direction and set value inputs. The drive incorporated an adjustable current limit and is available in a variety 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

SC	P	B1	40	05
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_{rms})	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

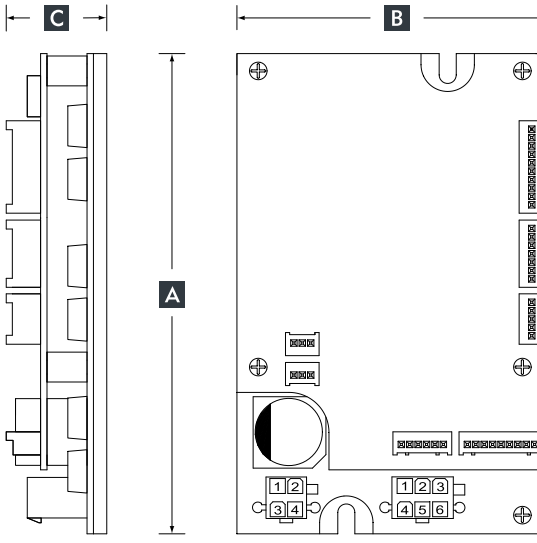
The ACS-Series is the newest addition to ElectroCraft's "Plus" series of all digital servo-amplifiers designed to provide today's OEM with maximum brushless servo performance at the lowest possible cost. The ACS-Series utilizes the latest in DSP-based digital drive design architecture to provide software 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

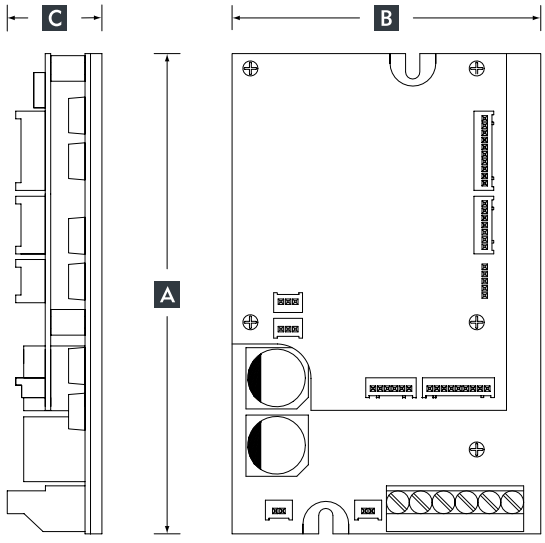
ACS — Drive Technology
100 — Power Rating
0599 — Configuration

ACS100/200/300 Outline Drawing

Model	A Length in (mm)	B Width in (mm)	C Height in (mm)	Weight oz (g)
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

Mating connector kit not included with unit. Cable/interface kits sold separately.

ACS-Series Specifications

Model Number	Power Supply Voltage (VDC)	Logic Supply Voltage (VDC)	Nominal Current (A_{rms})	Peak Current (A_{rms})	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_{rms})	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

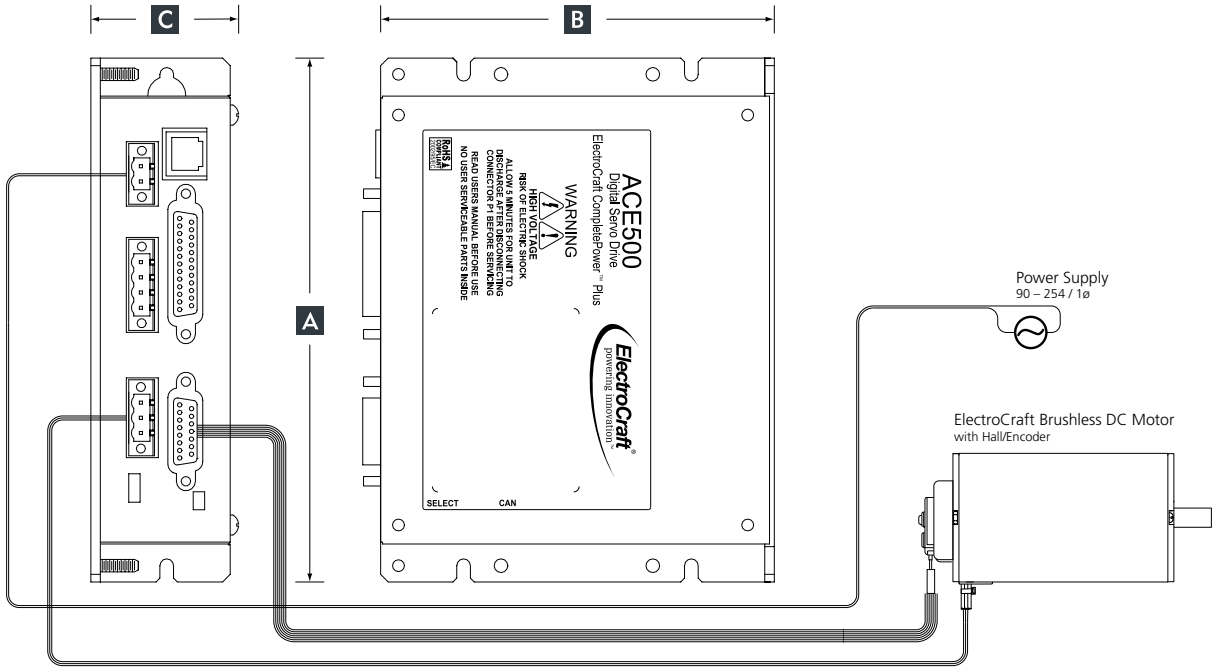
The line powered ACE500 is the newest addition to ElectroCraft's "Plus" series of all digital servo-amplifiers designed to provide today's OEM with maximum brushless servo performance at the lowest possible cost. The ACE500 series utilizes the latest in DSP-based drive design architecture to provide 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_{rms})	Peak Current (A_{rms})	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_{rms})	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

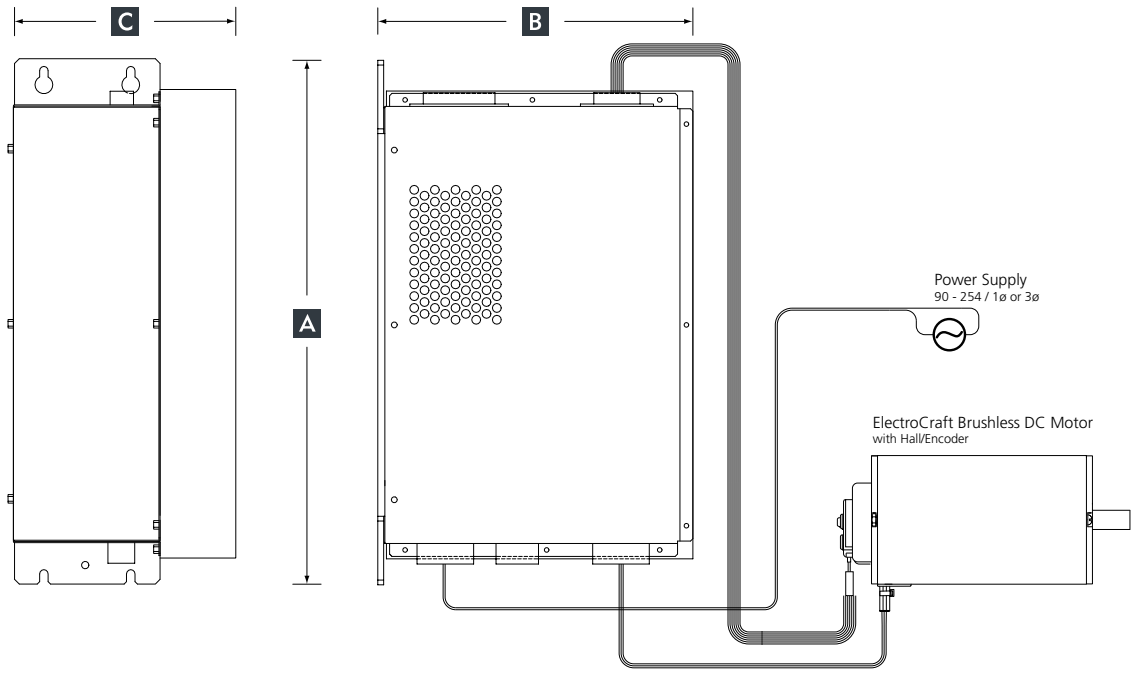
The line powered ACE1000 Series is the newest addition to ElectroCraft's "Plus" series of all digital servo-amplifiers designed to provide today's OEM with maximum brushless servo performance at the lowest possible cost. The ACE1000 Series utilizes the latest in DSP-based drive design architecture to provide software select-able 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	120	0
Drive Technology	Power Rating	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_{rms})	Peak Current (A_{rms})	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.

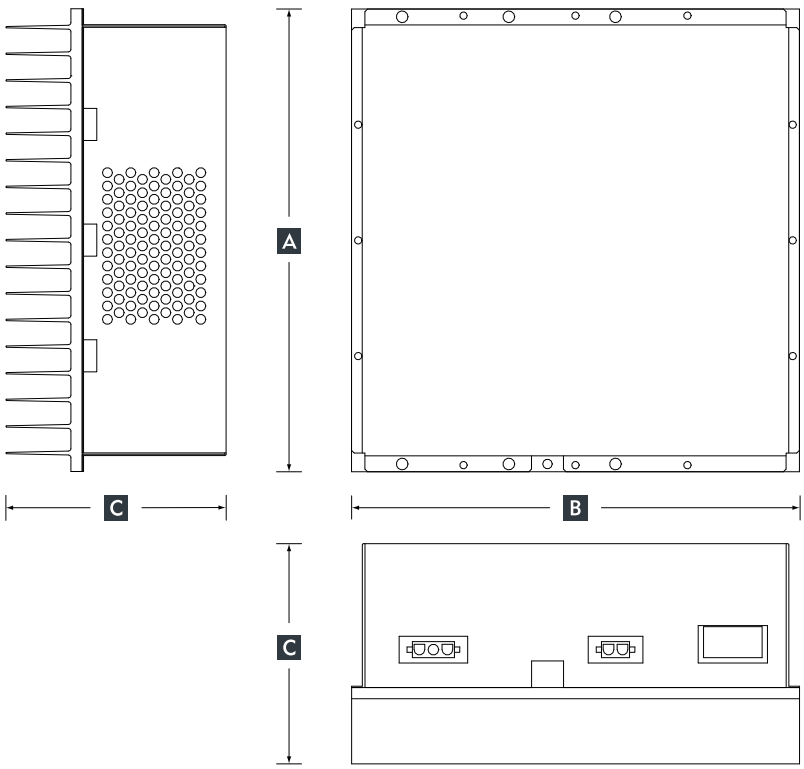
PFC Model Number Example

PFC 3001 — 400 — 1 01 2

- 400: Voltage Output
- 1: Cover
- 01: Connector
- 2: Configuration

PFC3000 Outline Drawing

Model	A Length in (mm)	B Width in (mm)	C Height in (mm)	Weight oz (g)
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^2C						
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			

Still need help?
Easily build your own motor at
www.configureamotor.com

Don't see exactly what you need?
Have ElectroCraft build you a custom winding, stack length or fully customized motor… that's our specialty!

System Matrix - Matching Motor and Drive Combinations

Motor Series			BLDC Drive Models																			
	Motor P/N		CompletePower														CompletePower Plus					
			2 Quadrant										4 Quadrant				4 Quadrant					
			DC Input Power										DC Input Power				DC Input Power			AC Input Power		
	Imperial	Metric	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
RapidPower - RP	RP17-12V24	RP17M-8V24	●	●			●				●	●		●		●			●					
	RP17-12V48	RP17M-8V48	●	●				●					●	●		●			●					
	RP17-12V60	RP17M-8V60		●						●				●		●								
	RP17-22V24	RP17M-16V24	●	●			●				●	●		●		●			●					
	RP17-22V48	RP17M-16V48	●	●				●					●	●		●			●					
	RP17-22V60	RP17M-16V60		●						●				●		●								
	RP17-36V24	RP17M-25V24	●	●			●				●	●		●		●			●					
	RP17-36V48	RP17M-25V48	●	●				●					●	●		●			●					
	RP17-36V60	RP17M-25V60		●						●				●		●								
	RP17-45V24	RP17M-32V24	●	●			●				●	●		●		●			●					
	RP17-45V48	RP17M-32V48	●	●				●					●	●		●			●					
	RP17-45V60	RP17M-32V60		●						●				●		●								
	RP23-26V12	RP23M-18V12	●	●				●					●	●		●								
	RP23-26V24	RP23M-18V24	●	●			●				●	●		●		●			●					
	RP23-26V48	RP23M-18V48	●	●				●					●	●		●			●					
	RP23-26V90	RP23M-18V90																						
	RP23-34V12	RP23M-24V12			●			●					●	●		●								
	RP23-34V24	RP23M-24V24																			●			
	RP23-34V48	RP23M-24V48	●	●			●				●	●		●		●			●					
	RP23-34V160	RP23M-24V160	●	●				●					●	●		●			●					
	RP23-54V12	RP23M-38V12			●			●					●	●		●								
	RP23-54V160	RP23M-38V160																			●			
	RP23-54V24	RP23M-38V24	●	●				●					●		●	●				●				
	RP23-54V48	RP23M-38V48	●	●				●					●	●		●			●					
	RP23-73V160	RP23M-52V160																			●			
	RP23-73V24	RP23M-52V24			●			●					●		●		●							
	RP23-73V48	RP23M-52V48	●	●				●					●	●		●				●				
	RP23-73V90	RP23M-52V90																			○			
	RP34-112V24	RP34M-79V24			●			●									●							
	RP34-112V48	RP34M-79V48		●				●					●		●		●			●				
	RP34-112V90	RP34M-79V90																			○			
	RP34-112V160	RP34M-79V160																			●			
	RP34-217V24	RP34M-153V24			●			●									●							
	RP34-217V48	RP34M-153V48		●				●					●		●		●			●				
	RP34-217V90	RP34M-153V90																			○			
	RP34-217V160	RP34M-153V160																			●			
	RP34-313V24	RP34M-221V24			●			●									●							
	RP34-313V48	RP34M-221V48		●				●					●		●	●				●				
	RP34-313V90	RP34M-221V90																			○			
	RP34-313V160	RP34M-221V160																			●			
E-Series	E22-20V24	E22M-14V24			●			●					●		●		●							
	E22-20V48	E22M-14V48	●	●				●					●	●		●								
	E22-40V24	E22M-28V24			●			●									●			●				
	E22-40V48	E22M-28V48		●				●					●		●		●							
	E30-42V48	E30M-30V48	●	●				●					●	●		●								
	E30-42V60	E30M-30V60		●						●				●		●			●					
	E30-42V160	E30M-30V160																						
	E30-77V48	E30M-54V48		●				●					●	●		●					●			
	E30-77V60	E30M-54V60		●						●				●		●				●				
	E30-77V160	E30M-54V160																						

Motor Series			BLDC Drive Models																			
	Motor P/N		CompletePower														CompletePower Plus					
			2 Quadrant										4 Quadrant				4 Quadrant					
			DC Input Power										DC Input Power				DC Input Power			AC Input Power		
	Imperial	Metric	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
E-Series	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																			●		
EXC-Series	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

ElectroCraft®
powering innovation™

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™ I Steppers

With non-cumulative position accuracies as low as ±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™ I 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™ I 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™ I 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 I 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™ I 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

Braking module

Braking module in a
rugged aluminium case.

P/N ASO-BM-70-30

Aluminium Din Rail kit

Aluminium Din Rail kit with
L-shaped bracket for units:

SCA-B4-70-10 P/N ASX-RM-01-01

Patch Cable

P/N	50cm	100cm	200cm	300cm
Red	CA2005	CA2010	CA2020	CA2030
Yellow	CA4005	CA4010	CA4020	CA4030
Gray	CA8005	CA8010	CA8020	CA8030

Passive heatsink

Passive heatsink optimized for drives:

EA27 / EA47 P/N HA3008

fanned heatsink

One fan heatsink optimized for drives
(fan is 1 x 24 VDC, .8 W):

EA27 / EA47 P/N HA3018

fanned heatsink

Two fan heatsink optimized for drives
(fans are 2 x 24 VDC, .8 W):

EA27 / EA47 P/N HA3028

Choke module

Choke module optimized for brushless drives.
Inductance: IA3100 = 3x50 µH;
IA3101 = 3x100 µH
Nominal current: 10 A P/N IA310x

DIN Rail mounting kit

DIN Rail mounting kit for units:

EA25 / EA27 / EA47 P/N MA0025

DIN Rail mounting kit

DIN Rail mounting kit for:

ASO-BM-70-30 P/N MA3050

Break Out Board

Break Out Board for:

for EA-Series P/N WA2509

CompletePower Plus Drive Accessories

ACS External Shunt Kits

External Shunt Kit (110 W, 50 Ohm) for drives:

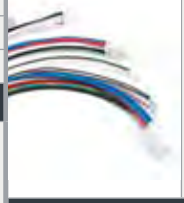
ACS100 / 200 P/N 1002991
ACS300 P/N 1002992

ACS Connector Interface Board

Connector Interface Board for drives
(not needed when using Quick Start I/O Kit):

ACS100 / 200 / 300 P/N 1001203

ACS Cable Kit



ACS Cable Kit including:

- J1 I/O Cable
- J2 Analog Cable
- J3 RS-232 Cable
- J4 Encoder Cable
- J5 Halls Input Cable
- P1 Power Input Cable*
- P2 Power Input Cable*

ACS100 / 200 P/N 1002115
ACS300 P/N 1002997

ACS Covers

Cover for drives
(cannot be used with Interface Board):
ACS100 / 200 P/N 330232
ACS300 P/N 330143

ACS Quick Start I/O Kit

Quick Start I/O Kit including:

- Quick Start I/O Board
- Quick-Start I/O to Drive Harness
- RS232 Interface Cable
- Motor Interface Board
- J4-Encoder cable
- J5-Hall cable
- P1-Power Input Cable*
- P2-Motor Input Cable*

ACS100 / 200 P/N 1002999
ACS300 P/N 1003001

ACE Quick Start I/O Kit

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

ACE External Shunt Kit

External Shunt Kit (300W, 50 Ohm) for drives:
ACE500, ACE1200/1300 P/N 1001502

Dual Encoder Out Board

Dual Encoder Out Board / DIN Rail Mount
(Not required with ACE100-Series) P/N 2000658

Resolver Convertor Board

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. RP23 — 73 — V 24 — 100 — C

- RP: Product Name
- 23: Frame Size
- 73: Continuous Torque (oz-in)
- 24: Voltage
- 1: Rear Shaft
- 0: Front Shaft
- 0: Lead Option
- C: Encoder

b. RP23M — 52 — V 24 — 100 — C

- RP: Product Name
- 23: Frame Size
- M: Optional Metric
- 52: Continuous Torque (Ncm)
- 24: Voltage
- 1: Rear Shaft
- 0: Front Shaft
- 0: Lead Option
- C: Encoder

Step 4: Brushless Motor Features

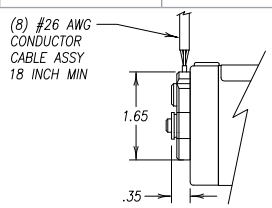
Rear Shaft	Front Shaft	Lead Option	Encoder Options (X = none)	
			Single Ended Encoder	Differential Encoder
0 = No	0 = round	0 = flying leads	J = 500 Line	C = 500 Line
1 = Yes	1 = standard flat	1 = standard connector	K = 1000 Line	D = 1000 Line
	2 = key seat		L = 2000 Line	E = 2000 Line

Encoder Signals

Encoder Specifications for Single Ended Encoder

RP Series, E-Series

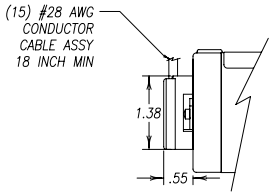
+5 VDC	GND	CH A	CH B	CH Z	Hall S1	Hall S2	Hall S3



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.