

# Closed Loop Stepper Systems

E -Series



## High Performance Steppers

The new eCL series introduces simple and precise closed loop control to Parker's microstepping product platform. Available in two driver form factors, standard (4Arms) and mini (2Arms), the eCL system optimizes performance with a wide array of stepper motors with integrated encoder feedback (Nema8, 11, 14, 17, 23, 60mm).

The eCL system maintains the inherent advantages of stepper control (high torque, stiffness, responsiveness, stability, no dither, simplicity) while eliminating common disadvantages (stalling, energy usage, motor temp, high speed operation, positional accuracy) through the addition of an innovative closed loop control algorithm.

## Contact Information:

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## Drive Specifications

<b>Part Number</b>	<b>eCLD-4DC-PC</b>	
<b>Output Current, amps</b>	4	
<b>Drive Input Voltage</b>	24VDC +/-10%	
<b>Current Consumption</b>	500mA (excluding motor current)	
<b>Control Method</b>	Closed Loop Control	
<b>EtherCAT</b>	<b>Modes</b>	Cyclic Synchronous Position, Position Profile, Homing
	<b>Protocols</b>	CoE (CiA 402 Drive Profile), FoE (firmware download)
	<b>Sync</b>	Free Run, SM Event, DC SYNC Event
<b>Resolution</b>	10000 ppr	
<b>I/O</b>	<b>Inputs</b>	3 dedicated (Limits/Home) 7 user defined 5-24VDC opto-isolated
	<b>Outputs</b>	2 dedicated (Brake +, Brake-), 6 user outputs 5-24VDC opto-isolated
<b>Protective Functions</b>	Overcurrent, Over speed, Position Tracking Error, Over Load, Over Temperature, Over Voltage, Motor Connection Error, Encoder Connection Error, Motor Voltage Error, In-Position Error, ROM Error, Position Overflow Error	
<b>LED Display</b>	Power status, In-Position status, Enable status, Alarm status	
<b>Environmental</b>	0 - 50 °C ( 32 - 122 °F ) 35 -85% non-condensing	
<b>Standards</b>	CE (EMC) RoHS	



ENGINEERING YOUR SUCCESS.

# e-Series Closed Loop Steppers

## Closed Loop System

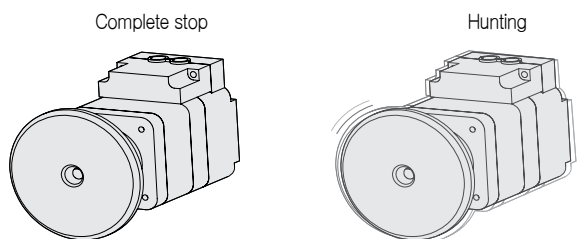
The eCL system is an innovative closed loop stepper motor and controller that utilizes motor mounted feedback to constantly monitor shaft position. Actual motor shaft position data is updated every 25 microseconds allowing the drive to compensate for sudden load changes ensuring accurate position control.

- **In-position output signals controller that move is complete**
- **Prevents stalls thru position monitoring**
- **Alarm signal to controller if overload results in motor stalling**
- **Reduced motor heating and energy usage**

## No Tuning, no hunting

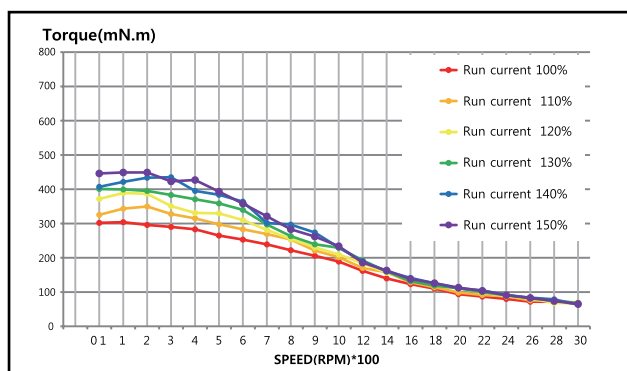
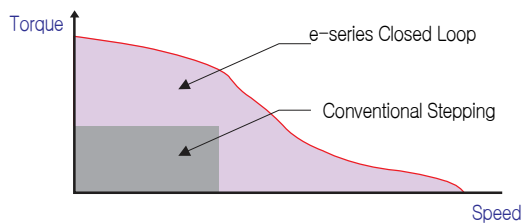
Unlike traditional closed loop servo systems, the eCL system requires no tuning. Gains have been optimized for the motor/drive combination to insure smooth and stable motion.

Once the eCL motor reaches its target position, the rotor locks into place at a perfect standstill. Traditional servo motors typically hunt between encoder pulses at standstill which could adversely affect applications requiring zero vibration.



## Better Performance

Synchronization errors and motor stalling that plague traditional stepper systems are eliminated with the eCL's closed loop control algorithm allowing for higher torque and speed performance.



The eCL also incorporates a “Peak Torque Boost” feature that increases available torque for starting and stopping by as much as 50%.

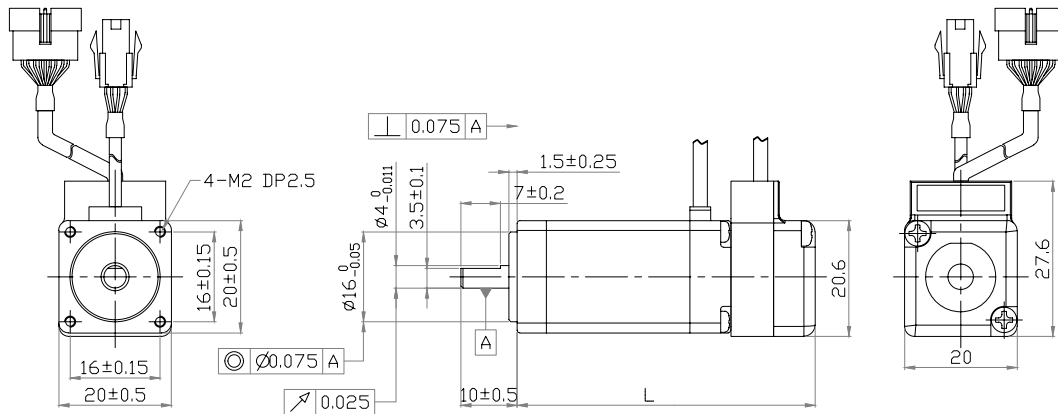


# e-Series Stepper Motors

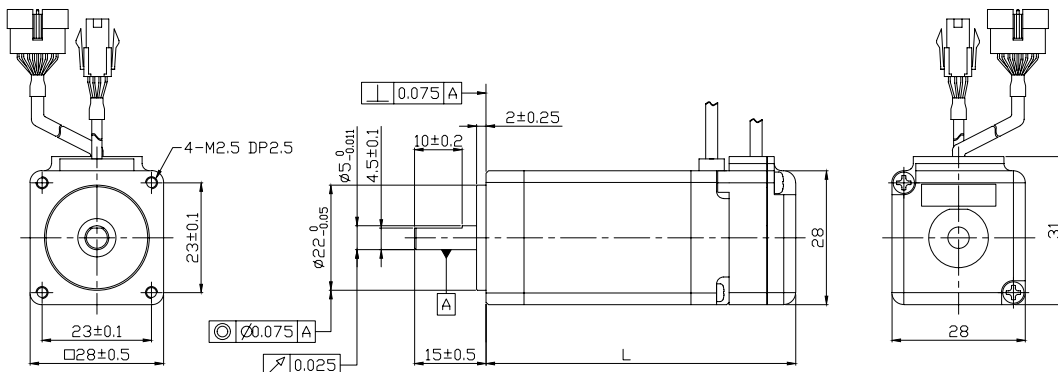
## Specifications

		eCLM-P082F	eCLM-P083F	eCLM-P111D	eCLM-P112D	eCLM-P113D
Motor Frame Size		NEMA8			NEMA11	
Static Torque	N-m	0.016	0.025	0.069	0.10	0.12
	oz-in	2.3	3.5	9.8	14.2	17.0
Rated Current*	Arms	0.5	0.5	0.95	0.95	0.95
Resistance*	ohms	5.5	6.0	3.2	3.2	3.2
Inductance*	mH	2.0	2.6	2.0	2.7	3.2
Encoder Resolution	ppr	4000	4000	16000	16000	16000
Rotor Inertia	kg-cm <sup>2</sup>	0.0025	0.0033	0.009	0.013	0.018
	oz-in <sup>2</sup>	0.01	0.02	0.05	0.07	0.10
Weight	kg	0.070	0.080	0.11	0.14	0.20
	lb	0.15	0.18	0.24	0.31	0.44
Motor Length (L)	mm	48	53	46	59	65
	in	1.30	1.50	1.26	1.77	2.01

### eCLM-P08x NEMA8 Motor Dimensions



### eCLM-P1xx NEMA11 Motor Dimensions

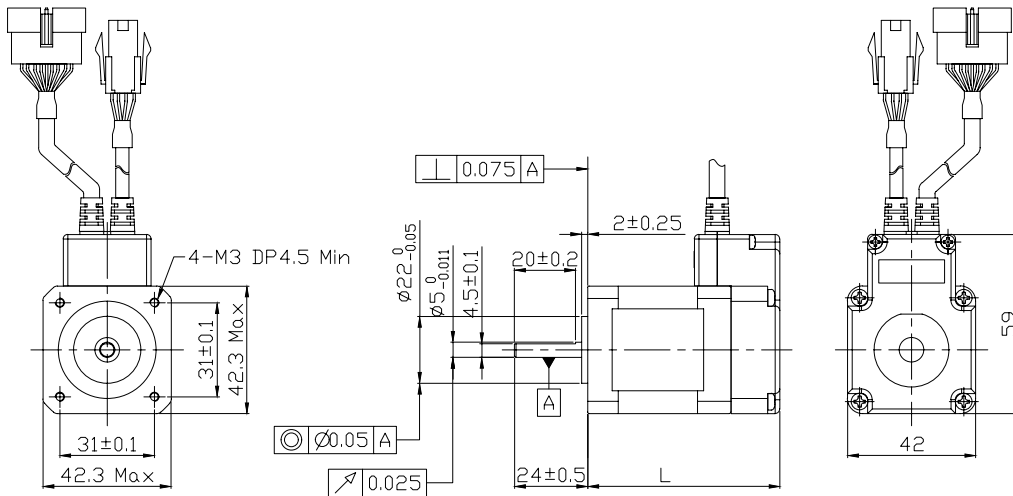


# e-Series Stepper Motors

## Specifications

		eCLM-P171A	eCLM-P172A	eCLM-P173A	eCLM-P174A
Motor Frame Size		NEMA17			
Static Torque	N-m	0.32	0.44	0.5	0.65
	oz-in	45	62	71	92
Rated Current	Arms	1.2	1.2	1.2	1.2
Resistance*	ohms	2.8	3.6	3.8	6.0
Inductance*	mH	5.4	7.2	8.0	15.6
Encoder Resolution	ppr	10000	10000	10000	10000
Rotor Inertia	kg-cm <sup>2</sup>	0.035	0.054	0.077	0.114
	oz-in <sup>2</sup>	0.19	0.30	0.42	0.62
Weight	kg	0.22	0.28	0.35	0.5
	lb	0.49	0.62	0.77	1.10
Motor Length (L)	mm	50	56	64	76
	in	1.97	2.2	2.52	2.99

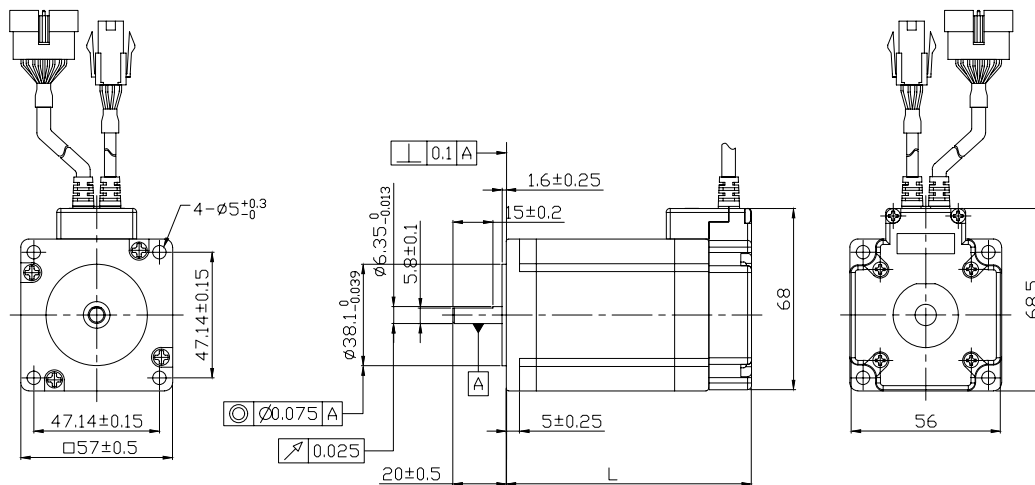
eCLM-P17x NEMA17 Motor Dimensions



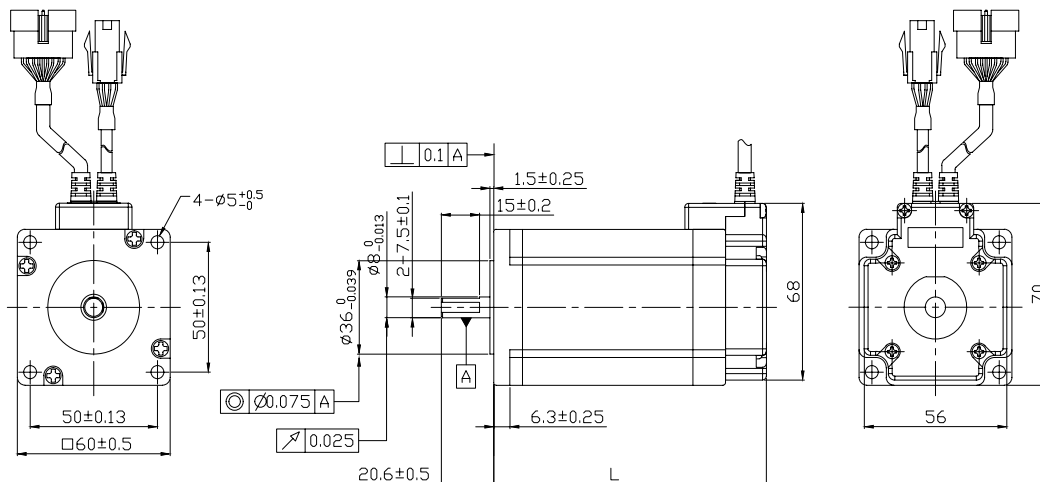
# e-Series Stepper Motors

		eCLM-P231A	eCLM-P232A	eCLM-P233A	eCLM-P601A	eCLM-P602A	eCLM-P603A
Motor Frame Size		NEMA23			60mm		
Static Torque	N-m	0.64	1.0	1.5	0.88	1.28	2.4
	oz-in	91	142	212	125	181	340
Rated Current	Arms	3	3	3	4	4	4
Resistance	ohms	0.52	0.54	0.88	0.33	0.37	0.55
Inductance	mH	1.2	2.0	4.0	0.75	1.1	2.7
Encoder Resolution	ppr	10000	10000	10000	10000	10000	10000
Rotor Inertia	kg-cm <sup>2</sup>	0.18	0.28	0.52	0.24	0.49	0.69
	oz-in <sup>2</sup>	0.98	1.53	2.84	1.31	2.68	3.77
Weight	kg	0.47	0.7	1.0	0.6	1.0	1.3
	lb	1.04	1.54	2.21	1.32	2.21	2.87
Motor Length (L)	mm	57	72	92	63	72	101
	in	2.24	2.83	3.62	2.48	2.83	3.98

eCLM-P23x NEMA23 Motor Dimensions



eCLM-P60x 60mm Motor Dimensions



# e Series Ordering Information

Select an option from each numbered field to create a complete model order code.

## Drive

Order Example : ① ② ③ ④ ⑤ ⑥

	eCLD	-	4DC	PC	23	1	A
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①	②	③	④	⑤	⑥
Series	Form Factor	Control	Motor Frame	Motor Length	Encoder Resolution
eCLD	4DC - 4Amp, 24VDC	PC- EtherCAT	08 - NEMA8	2 3	F - 4000
			11 - NEMA11	1 2 3	D - 16000
			17 - NEMA17	1 2 3 4	A - 10000
			23 - NEMA23 60 - 60mm	1 2 3	

## Motor

Order Example : ① ② ③ ④ ⑤

	eCLM	-	S	23	1	F
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①	②	③	④	⑤
Series	Drive Type	Frame Size	Motor Length	Feedback
eCLD	P- EtherCAT	08 - NEMA8	2 3	F - 4000
		11 - NEMA11	1 2 3	D - 16000
		17 - NEMA17	1 2 3 4	A - 10000
		23 - NEMA23 60 - 60mm	1 2 3	