

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

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



ENGINEERING YOUR SUCCESS.

e-Series Closed Loop Steppers

Closed Loop System

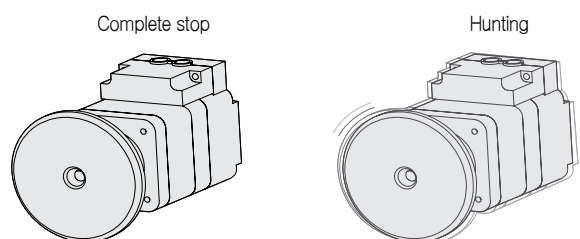
The eCL system is an innovative closed loop stepper motor and controller that utilizes motor mounted feedback to constantly monitor shaft position. Actual motor shaft position data is updated every 25 microseconds allowing the drive to compensate for sudden load changes ensuring accurate position control.

- **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

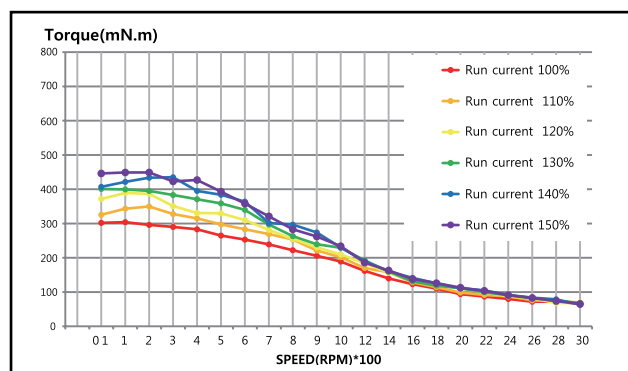
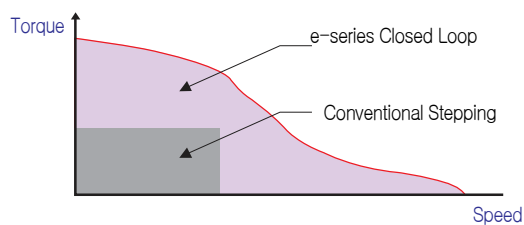
Unlike traditional closed loop servo systems, the eCL system requires no tuning. Gains have been optimized for the motor/drive combination to insure smooth and stable motion.

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

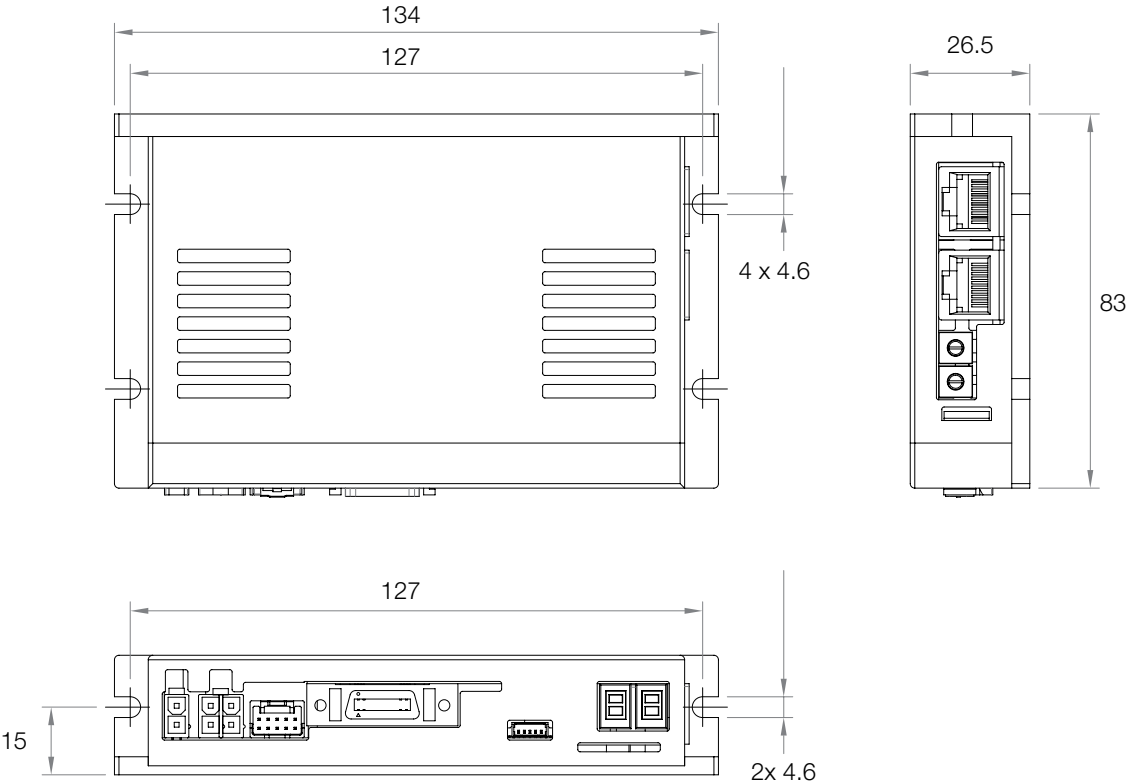
Synchronization errors and motor stalling that plague traditional stepper systems are eliminated with the eCL's closed loop control algorithm allowing for higher torque and speed performance.



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 Drives

eCLD-4DC-PC EtherCAT Drive Dimensions

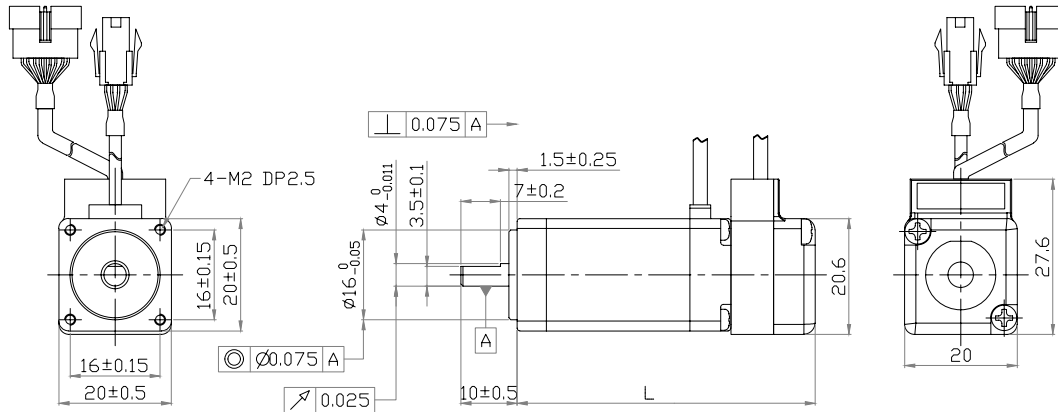


e-Series Stepper Motors

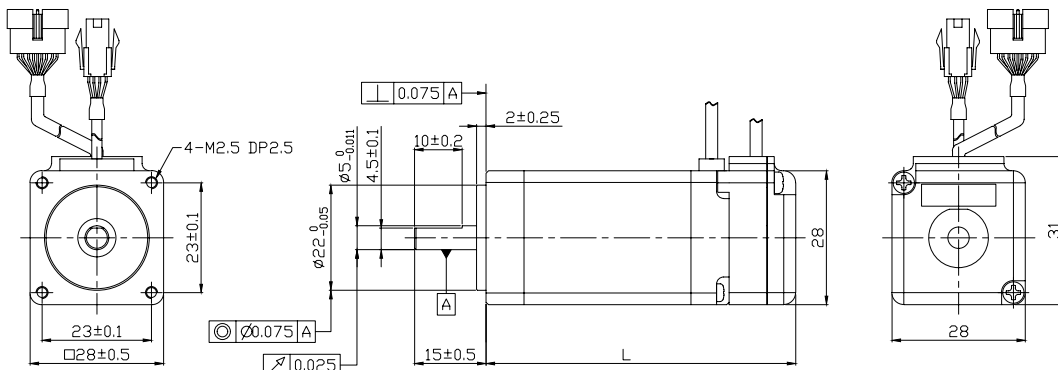
Specifications

| | | 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 ² | 0.0025 | 0.0033 | 0.009 | 0.013 | 0.018 |
| | oz-in ² | 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

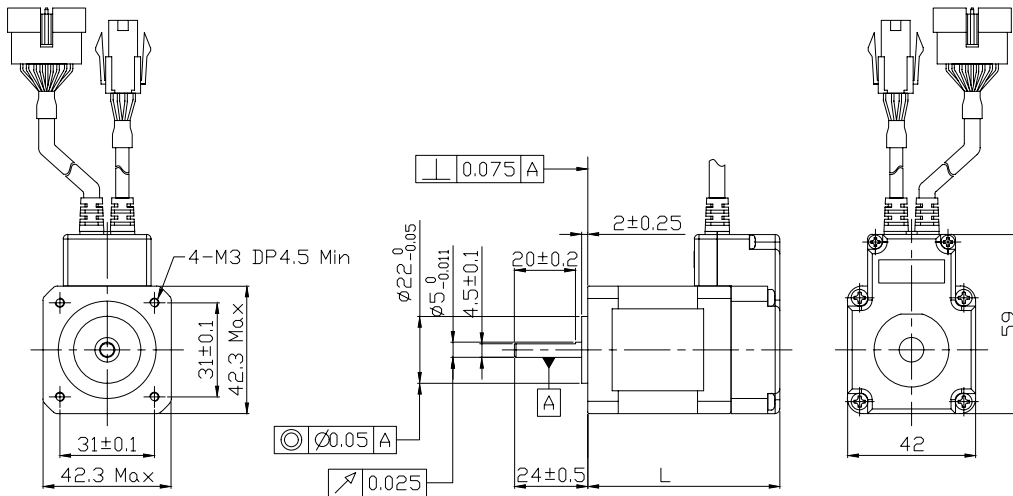


e-Series Stepper Motors

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 ² | 0.035 | 0.054 | 0.077 | 0.114 |
| | oz-in ² | 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 |

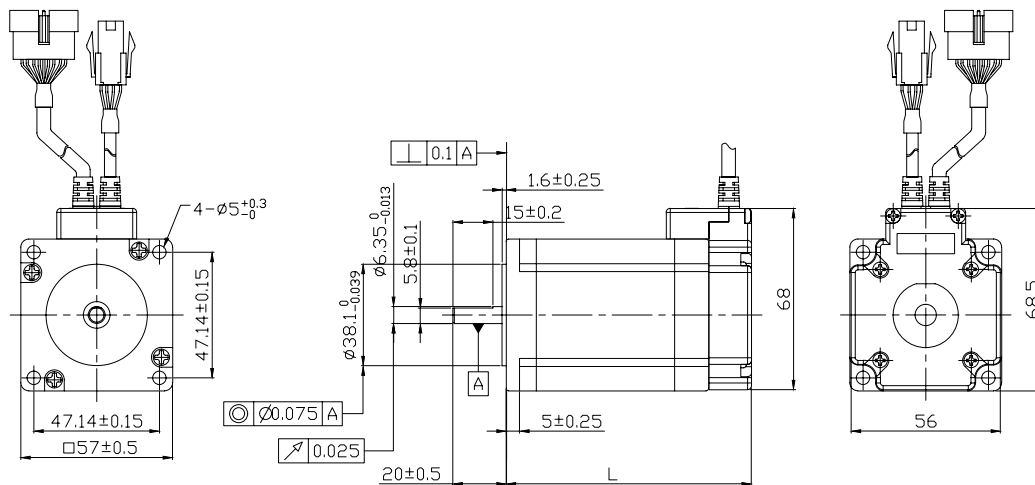
eCLM-P17x NEMA17 Motor Dimensions



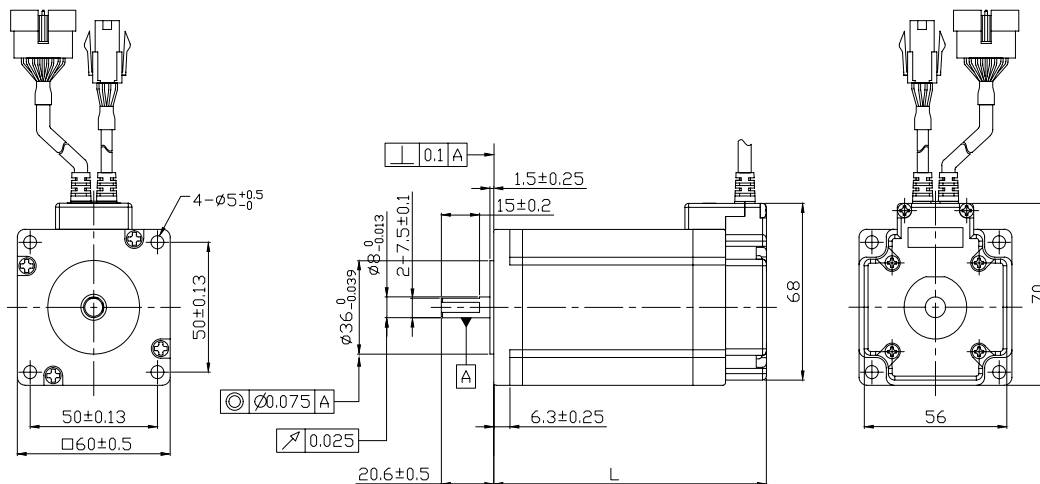
e-Series Stepper Motors

| | | 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 ² | 0.18 | 0.28 | 0.52 | 0.24 | 0.49 | 0.69 |
| | oz-in ² | 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 |
|--|------|---|-----|----|----|---|---|

| 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 |
|--|------|---|---|----|---|---|

| 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 | |