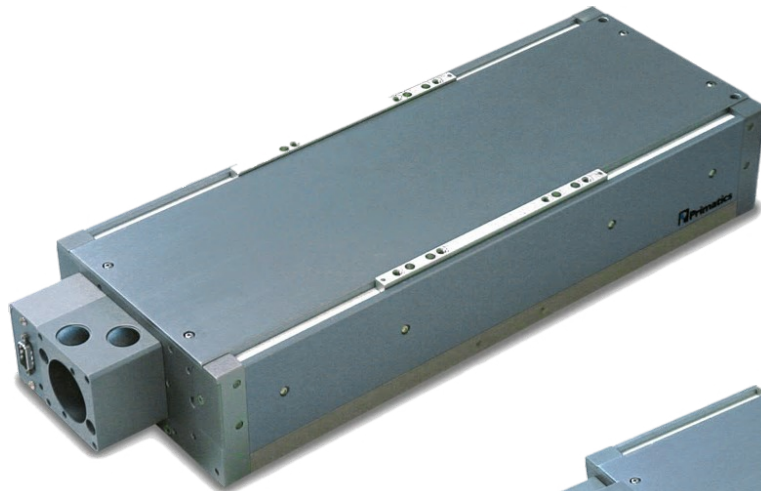
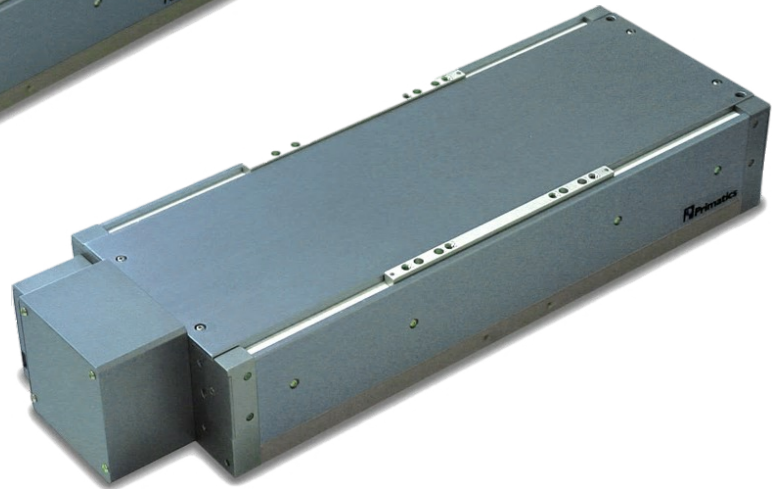


## 200mm Travel PLG160's



NEMA23 In-Line



Frameless Motor

### Features

- Travel to 600mm
- Loads up to 50kg
- Precision Ballscrew Drive
- Integrated Frameless Servo Motor or NEMA23 Motor Mount
- Internal Linear or Rotary encoder, resolution to 0.1um
- Direct XY stacking
- Failsafe Brake Option
- Protective Belt Option for dirty environments
- Clean Room Options

### Overview

Primatics PLG160 Series linear positioning stage is designed for fast integration into any system. Ideal for demanding applications such as inspection, assembly and material handling, the PLG160 offers a variety of configuration options to suit many requirements. The precision ballscrew drivetrain offers excellent repeatability and trust for many applications.

### Features

Standard features include adjustable forward and reverse limit sensors, a home sensor and a protective hard cover. Models cover travel from 50 to 600mm. Two PLG160's can be directly stacked for XY motion.

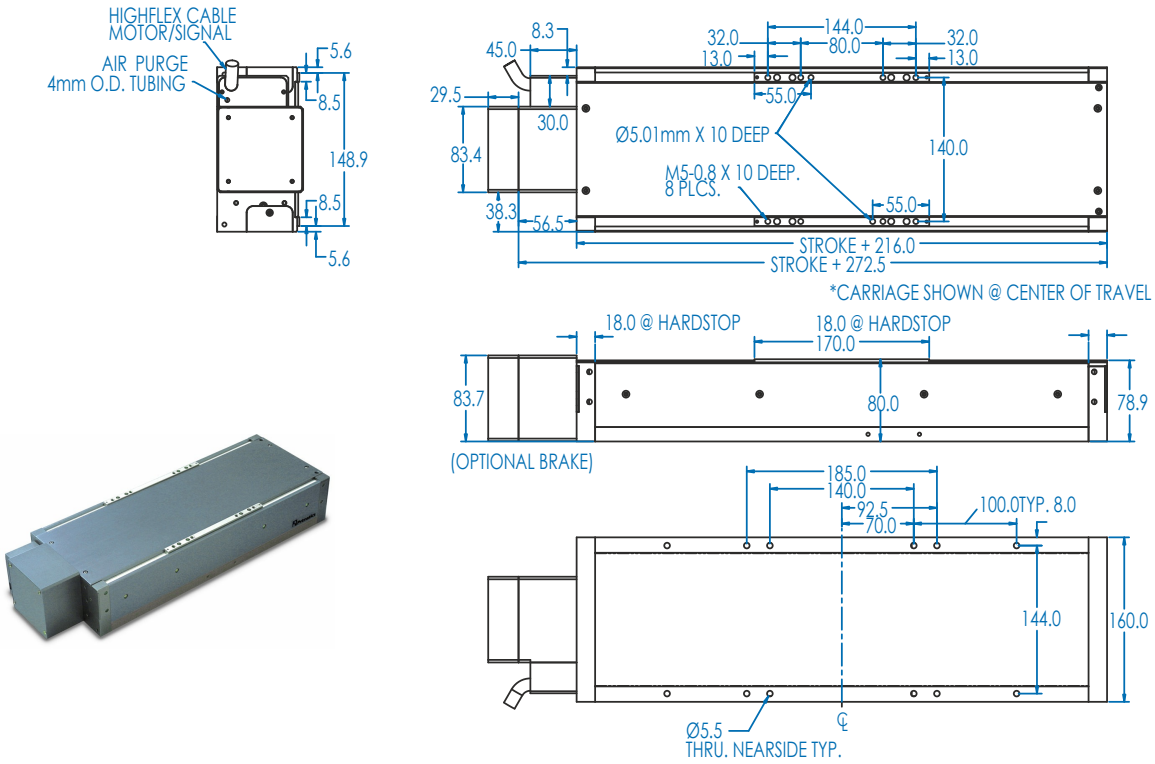
### Options

5mm lead ballscrew is standard and a 10mm lead is optional. A common configuration includes the integrated Frameless Motor option which is a brushless servo motor built directly on the ballscrew. This yields a compact stage relative to the in-line NEMA23 motor mount configuration. An internal rotary encoder or linear encoder (with internal cable management) are standard offerings as is an internal fail-safe brake.

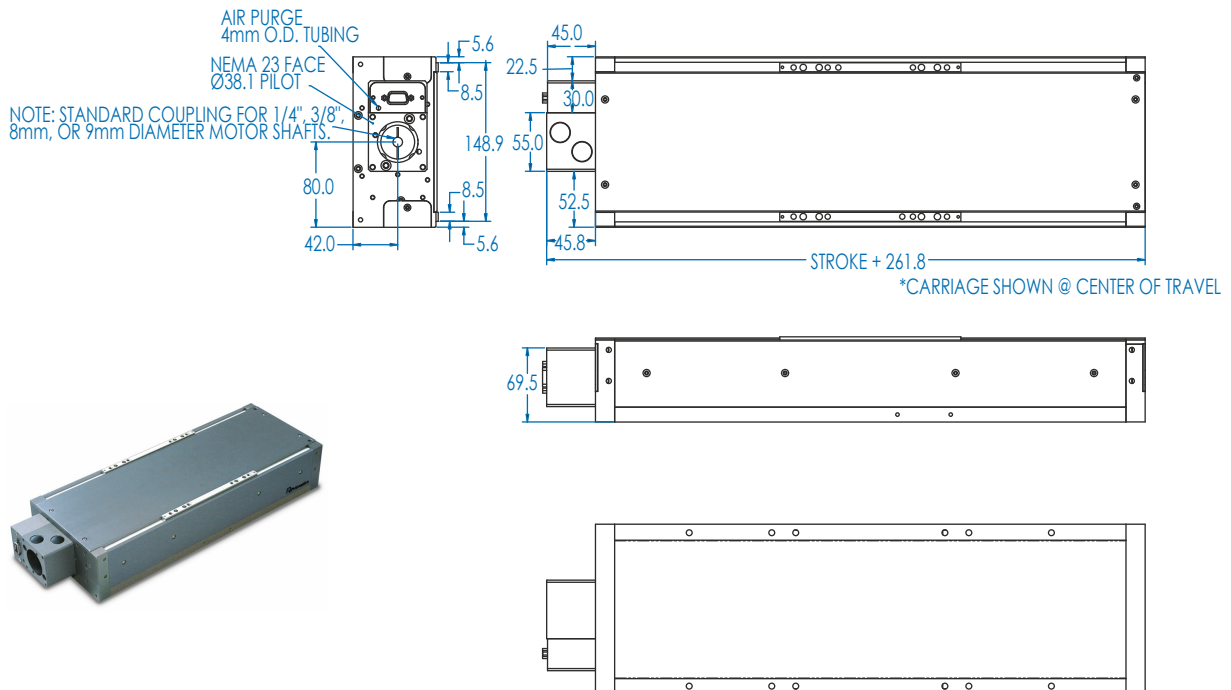
For special environments, models of the PLG160 can be prepared for clean room operation (up to Class 10), or vacuum operation (medium vacuum), or equipped with protective belts and seals for dirty environments.



## Dimensions - Frameless Motor



## Dimensions - In-Line NEMA 23 Mount



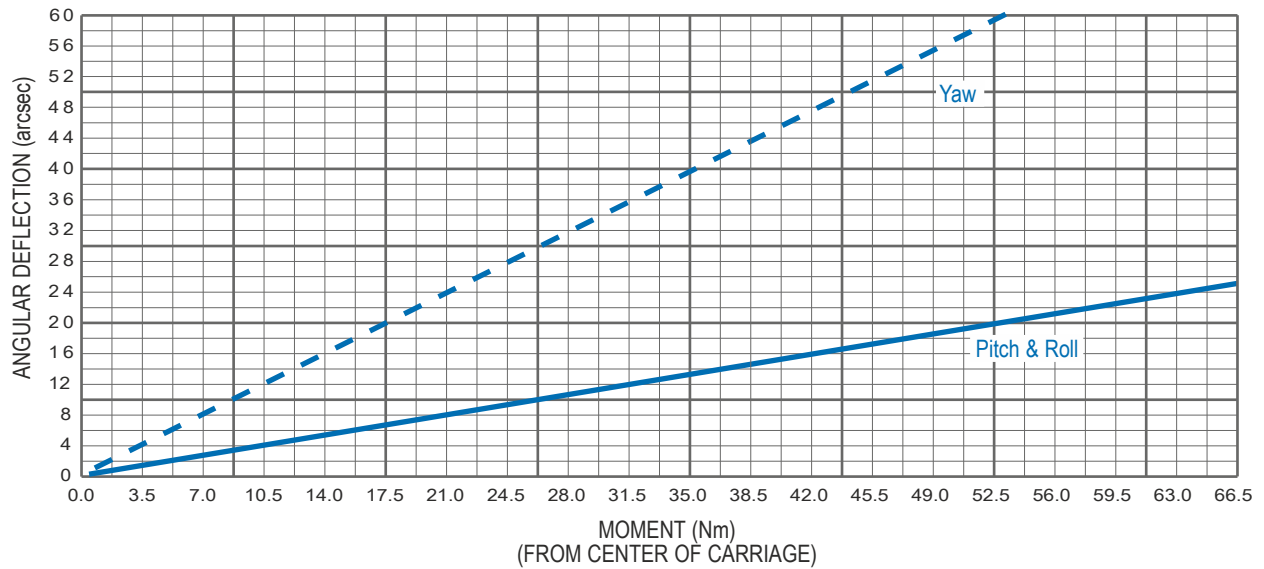
## Specifications

| Specifications   | Notes   | -50  | -100     | -150    | -200     | -300    | -400    | -500    | -600    |
|--|---------|--|----------|---------|----------|---------|---------|---------|---------|
| Travel (mm)  |         | 50   | 100      | 150     | 200      | 300     | 400     | 500     | 600     |
| Positional Accuracy Over Total Travel ( $\mu\text{m}$ )            | 1, 2, 3 | +/- 6  | +/- 6    | +/- 7   | +/- 9    | +/- 12  | +/- 14  | +/- 16  | +/- 18  |
| Positional Accuracy with Linear Encoder ( $\mu\text{m}$ )          | 2       | +/- 2.5  | +/- 3    | +/- 4   | +/- 5    | +/- 6   | +/- 7   | +/- 9   | +/- 10  |
| Error Mapped Accuracy with E6 Encoder ( $\mu\text{m}$ )            |         | +/- 1.4  |          |         |          |         |         | +/- 2.0 |         |
| Error Mapped Accuracy with E4 Encoder ( $\mu\text{m}$ )            |         | +/- 1.0  |          |         |          |         |         | +/- 1.5 |         |
| Bi-directional Repeatability ( $\mu\text{m}$ )                     | 1, 2,3  | +/- 2.0  |          |         |          |         |         |         |         |
| Bi-directional Repeatability with Linear Encoder ( $\mu\text{m}$ ) | 2       | +/- 0.5 (E4 encoder); +/- 1.0 (E6 encoder); +/- 2.0 (E2 encoder) |          |         |          |         |         |         |         |
| Straightness of Travel Over Total Travel ( $\mu\text{m}$ )         | 2       | +/- 1.75   | +/- 2.5  | +/- 3   | +/- 3    | +/- 3.5 | +/- 4.5 | +/- 6   | +/- 7   |
| Flatness of Travel Over Total Travel ( $\mu\text{m}$ )             | 2       | +/- 1  | +/- 1.25 | +/- 1.5 | +/- 1.75 | +/- 2.5 | +/- 3.5 | +/- 4.5 | +/- 5   |
| Max Speed (mm/sec)   | 3       | 300  |          |         |          |         |         | 200     |         |
| Direct Loading Capacity (kg)                                       |         | 50   |          |         |          |         |         |         |         |
| Axial Loading Capacity (kg)  |         | 25   |          |         |          |         |         |         |         |
| In-Line Rotational Inertia ( $\text{kg}\cdot\text{m}^2$ )          |         | 2.60E-5  | 2.87E-5  | 3.14E-5 | 3.41E-5  | 3.95E-5 | 4.49E-5 | 5.03E-5 | 5.57E-5 |
| Frameless Motor Rotational Inertia ( $\text{kg}\cdot\text{m}^2$ )  |         | 8.02E-5  | 8.29E-5  | 8.57E-5 | 8.83E-5  | 9.37E-5 | 9.91E-5 | 1.05E-4 | 1.21E-4 |
| Minimum Resolution with Linear Encoder ( $\mu\text{m}$ )           |         | 0.1  |          |         |          |         |         |         |         |
| Pitch Moment Capacity (N-m)  |         | 55   |          |         |          |         |         |         |         |
| Roll Moment Capacity (N-m)   |         | 63   |          |         |          |         |         |         |         |
| Yaw Moment Capacity (N-m)  |         | 55   |          |         |          |         |         |         |         |
| In-Line Stage Weight (kg)  |         | 5.7  | 6.5      | 7.3     | 8.2      | 9.9     | 11.5    | 13.2    | 14.9    |
| Frameless Motor Stage Weight (kg)                                  |         | 6.6  | 7.4      | 8.3     | 9.1      | 10.8    | 12.5    | 14.1    | 15.8    |

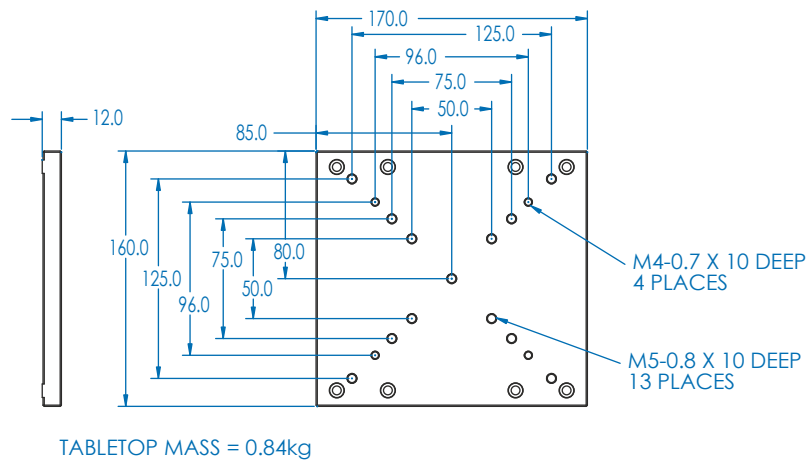
Notes: 1 - For In-Line / Frameless motor mounts, 1250 line rotary encoder; 2 - Measured 50mm above center of carriage; 3 - 5mm lead ballscrew.  
All specifications subject to change without notice.

| Stage Information                    | PLG160...D1 | PLG160...D2 |
|--------------------------------------|-------------|-------------|
| Carriage Mass (kg)                   | 1.6         |             |
| Maximum Acceleration, unloaded (G's) | 1.0         |             |
| Maximum Breakaway Torque (N-m)       | 0.15        | 0.23        |
| Maximum Running Torque (N-m)         | 0.13        | 0.20        |
| Maximum Motor Bus Voltage (VDC)      | 170         |             |
| Length of Cable (mm)                 | 350         |             |
| Life at Listed Specification (km)    | 5000        |             |

Carriage Stiffness



Tabletop Accessory



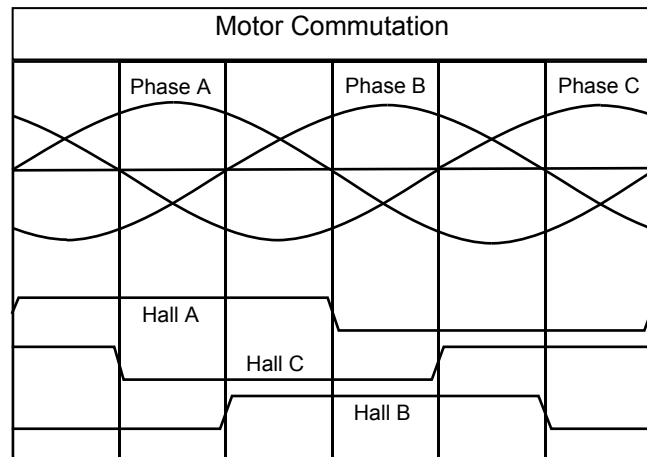
Motor Data

| Parameter                          | Notes | M1-2 (NEMA 23 Rotary)                                    | M4-4 (Frameless)       |
|------------------------------------|-------|--|------------------------|
| Motor Type                         |       | Brushless Servo  |                        |
| Continuous Torque (N-m)            | 1     | 0.46   | 0.56                   |
| Continuous Current (Arms)          | 1     | 3.9  | 5.1                    |
| Peak Torque (N-m)                  | 2     | 0.9  | 5.69                   |
| Peak Current (Arms)                | 2     | 7.5  | 52                     |
| Torque Constant (N-m/Arms)         |       | 0.12   | 0.11                   |
| Back EMF Constant (V/Krpm)         |       | 11.7   | 11.5                   |
| Winding Resistance (ohms)          |       | 0.62   | 0.5                    |
| Winding Inductance (mH)            |       | 0.92   | 1.1                    |
| Thermal Resistance (C/W)           |       | 1.7  | 1.9                    |
| Poles                              |       | 8  | 6                      |
| Rotor Inertia (kg-m <sup>2</sup> ) |       | 1.41E-5  | 5.57E-5                |
| Hall Sensor Power                  |       | 5 to 24VDC, 50mA   |                        |
| Hall Outputs                       |       | Open collector, current sinking, 20mA max                |                        |
| Weight (kg)                        |       | 0.93   | 0.6                    |
| Encoder power                      |       | 5VDC +/- 5%, 150mA                                       |                        |
| Output                             |       | Square wave differential line driver<br>4000 lines/rev   | See Encoder Data below |
| Index                              |       | Synchronized pulse, duration equal to one resolution bit |                        |

Notes: 1 - At 25°C maximum temperature rise; 2 - At 10% duty cycle and 1 second maximum. All specifications subject to change without notice.

Encoder Data

| Parameter         | Value  |
|-------------------|--|
| Input Power (VDC) | 5VDC +/- 5%, 150mA   |
| Output            | Square wave differential line driver   |
| Index             | Synchronized pulse, duration equal to one resolution bit                             |
| Max Speed (m/sec) | 2.6 (E2 encoder)<br>1.0 (E5, E9, E0 encoder)<br>0.6 (E6 encoder)<br>0.3 (E4 encoder) |



Brake Data

| Parameter                    | Value       |
|------------------------------|-------------|
| Input Power (VDC)            | 24VDC, 0.5A |
| Holding Force, 5mm lead (kg) | 12.0        |

## Connectors

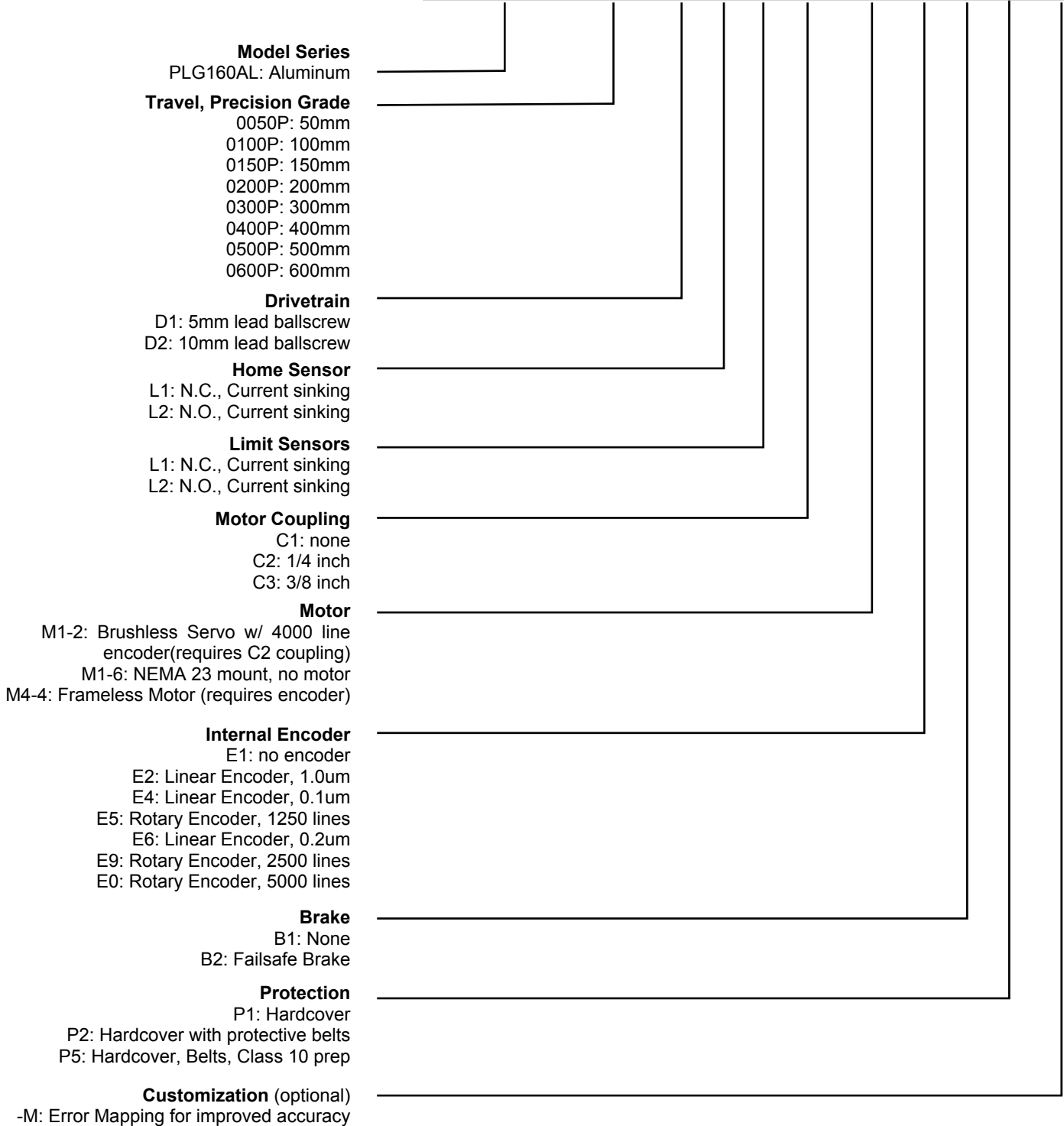
| In-Line, no internal encoder                               |  |
|--|--|
| Connector Type: Dsub, 9 pins<br>Mates with Dsub, 9 sockets |  |
| Pin  | Function   |
| 1  | Limit Power (12-24VDC)                           |
| 2  | Limit Power Return and Signal Common             |
| 3  | Forward Limit - Activates at Full Forward Travel |
| 4  | Reverse Limit - Activates at Full Reverse Travel |
| 5  | Home   |
| 6  | Brake+ (with optional brake)                     |
| 7  | Brake- (with optional brake)                     |
| 8  | No connection                                    |
| 9  | No connection                                    |

| In-Line, with internal encoder   |  |                   |
|--|--|-------------------|
| Connector Type: High Density Dsub, 15 pins<br>Mates with High Density Dsub, 15 sockets |  |                   |
|  | Without Brake                                    | With Brake Option |
| Pin  | Function   |                   |
| 1  | Limit Power (12-24VDC)                           |                   |
| 2  | Limit Power Return and Signal Common             |                   |
| 3  | Forward Limit - Activates at Full Forward Travel |                   |
| 4  | Reverse Limit - Activates at Full Reverse Travel |                   |
| 5  | Home   |                   |
| 6  | Not used   | Brake+            |
| 7  | Encoder Shield                                   | Brake-            |
| 8  | Encoder 5V                                       |                   |
| 9  | Encoder Power Return                             |                   |
| 10   | Encoder A+                                       |                   |
| 11   | Encoder A-                                       |                   |
| 12   | Encoder B+                                       |                   |
| 13   | Encoder B-                                       |                   |
| 14   | Encoder I+                                       |                   |
| 15   | Encoder I-                                       |                   |

| Servo Motor (NEMA23 or Frameless)                 |  |
|---|--|
| Connector: Cannon 192926-0480<br>Size 20, 28 pins |  |
| Pin   | Function   |
| A   | Motor Phase A                                    |
| B   | Motor Phase B                                    |
| C   | Motor Phase C                                    |
| D   | Motor Shield                                     |
| E   | Encoder 5V                                       |
| F   | Encoder A+                                       |
| G   | Encoder A-                                       |
| H   | Encoder B+                                       |
| J   | Encoder B-                                       |
| K   | Encoder Shield                                   |
| L   | Limit Power (12-24VDC)                           |
| M   | Limit Return and Signal Common                   |
| N   | Home   |
| P   | Brake+ (with optional brake)                     |
| R   | Brake- (with optional brake)                     |
| S   | Signal Shield                                    |
| T   | Hall V+  |
| U   | Hall V-  |
| V   | Encoder Power Return                             |
| W   | Encoder I+                                       |
| X   | Encoder I-                                       |
| Y   | Forward Limit - Activates at Full Forward Travel |
| Z   | Reverse Limit - Activates at Full Reverse Travel |
| a   | KEY  |
| b   | Hall A   |
| c   | Hall B   |
| d   | Temp switch (Frameless only)                     |
| e   | Hall C   |

## PLG160 Model Configuration

Example: **PLG160AL 0200P D1 H1 L1 C1 M4-4 E2 B1 P2 - M**



Not all configurations are valid - consult factory for assistance