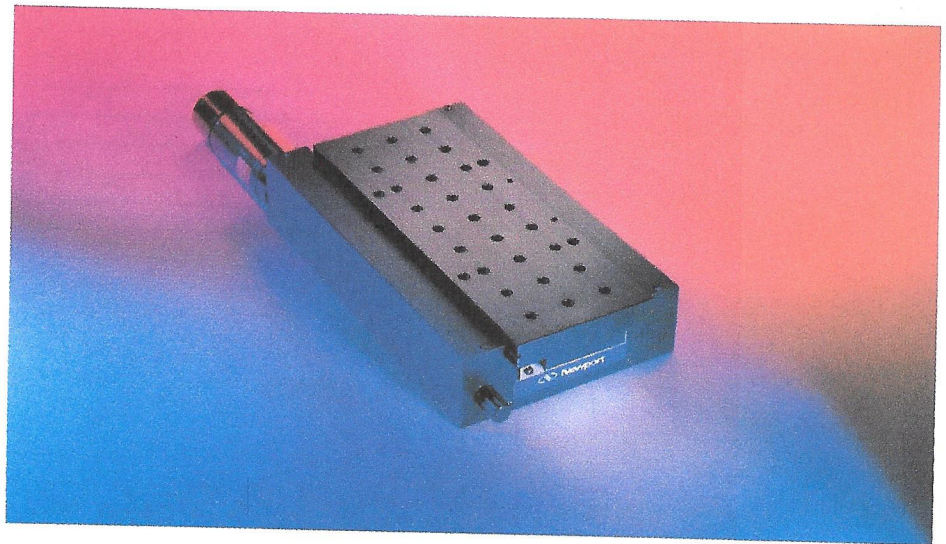


PM500-L Series Ultra-Precision Linear Stages

Key Features

- Highest design and quality standards guarantee unmatched performance with 20,000 hours MTBF reliability
- High-quality, large area crossed-roller bearings ensure highly accurate linear motion over 200 mm maximum travel range
- Precision mounted, low-thermal expansion glass scale warrants 1 μm accuracy with repeatability as good as 0.05 μm
- Very low friction lead screw provides exceptional smooth motion with high damping



The PM500-L Series is our highest performing linear stage family, combining highly repeatable trajectory with ultra-precise positioning. These stages are manufactured to the highest standards to ensure precision and quality. All critical reference surfaces are precision-ground to maintain superior flatness and straightness of travel. The result is a motion system with unmatched laboratory-grade quality and performance with production line reliability. And like all PM500 Series stages, the PM500-L Series incorporates direct-output metrology to deliver outstanding dynamic performance.

A linear glass scale attached to the moving table eliminates all of the drivetrain errors not measurable when the encoder is attached to the motor. The scale is mounted on a precision-ground reference surface to ensure alignment with the stage's axis of motion, eliminating possible cosine errors and providing better than 1 μm accuracy over 100 mm.

The scale incorporates a fiducial track for reading absolute origin position. A proprietary non-contacting head eliminates hysteresis and wear.

The stages are built from high-strength stress-relieved aircraft 7075 aluminum and incorporate high-quality crossed-roller bearings for excellent stiffness, load capacity and lifetime. Combining this with a very low friction preloaded lead screw assembly and cool running DC motor drive provides reliability better than 20,000 hour MTBF.

For optimum positioning performance and seamless compatibility, these stages must be used with our PM500-C6 Series Controllers.

MANUAL LINEAR
TRANSLATION STAGESMANUAL ROTATION
STAGES

MANUAL ACTUATORS

MOTORIZED LINEAR
TRANSLATION STAGESMOTORIZED ROTATION
STAGES

MOTORIZED ACTUATORS

CONTROLLERS &
AMPLIFIERS

TECHNICAL REFERENCE

Design Details

Base Material	Stress-relieved 7075 Aluminum
Bearings	Crossed-roller bearings
Drive Mechanism	Very low friction lead screw
Drive Screw Pitch (mm)	4
Feedback	Proprietary glass scale encoder
Limit Switches	Optical, on encoder's fiducial track
Origin	Optical, on fiducial track, located at center of travel
Motor	Cool running DC servo motor with Tachometer
Cable	4.8 m long cable included
Driver Module	Driver module with on-board processing power for PM500-C6 included
MTBF@ 30% rated load (h)	20,000
Weight	see page 1085

Specifications

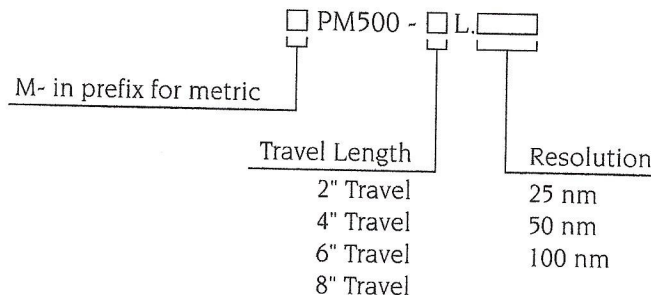
Travel Range [in. (mm)]	2 (50); 4 (100); 6 (150); 8 (200)
Resolution (µm)	0.1 (L.100); 0.05 (L.50); 0.025 (L.25)
Minimum Incremental Motion (µm)	0.1 (L.100); 0.05 (L.50); 0.025 (L.25)
Bi-directional Repeatability (µm)	0.2 (L.100); 0.1 (L.50); 0.05 (L.25), typical
Absolute Accuracy	±0.5 µm per 100 mm, typical
Speed Range	0.01 µm/s to 100 mm/s
Speed Regulation	±1% RMS typical above 10 µm/s
Acceleration Range (g)	0.001–0.25
Normal Load Capacity (N)	340
Axial Load Capacity	Not recommended ¹⁾
Straightness/Flatness (over center 80% travel) (µm)	
PM500-2L.100 (M-PM500-2L.100)	1.5
PM500-4L.100 (M-PM500-4L.100)	1.5
PM500-6L.100 (M-PM500-6L.100)	2.0
PM500-8L.100 (M-PM500-8L.100)	2.5

1) Counter-balance required for vertical stage orientation. Available upon special request.
 Note: At the high level of precision in which this stage operates, there are many factors that can impact performance in a specific application, including: temperature and humidity control, seismic vibration control, flatness of mounting surface, and stage stack configuration. As such, it may be difficult to verify specifications such as bi-directional repeatability and minimum incremental motion in every application. Please contact your local Newport representative for assistance with product selection to meet the specific needs of your application.

See the Metrology Tutorial section for more information on typical and guaranteed specifications

Configuration Information

How to configure PM500-L Series stages:



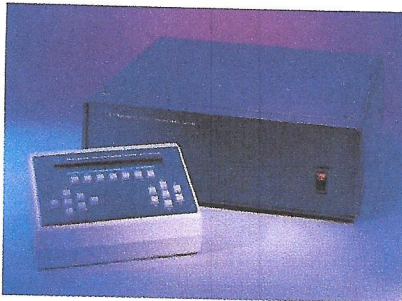
How to order

PM500 systems are ordered pre-configured with the **PM500-C6 Series controller**. Please see page 1048 for ordering information.

The PM500 Series stages are configured by first specifying English or metric threaded holes, and then specifying the travel in inches and the resolution in nanometers. For example, the **M-PM500-4L.100** is a metric linear stage with 4 in. (100 mm) of travel and 0.1 µm (100 nm) resolution.

Motion Controller Options

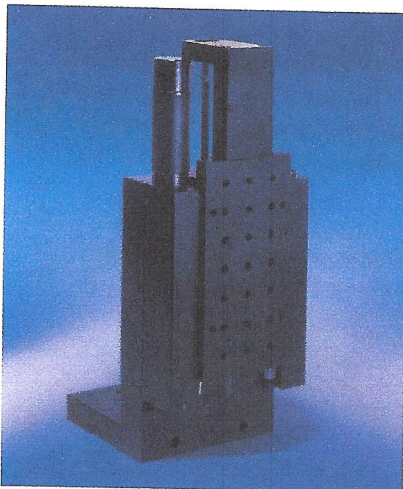
For optimum positioning performance and seamless compatibility, the PM500-L stages must be used with our PM500-C6 Series Controllers (see page 1048).



PM500-C6 6-axis Controller



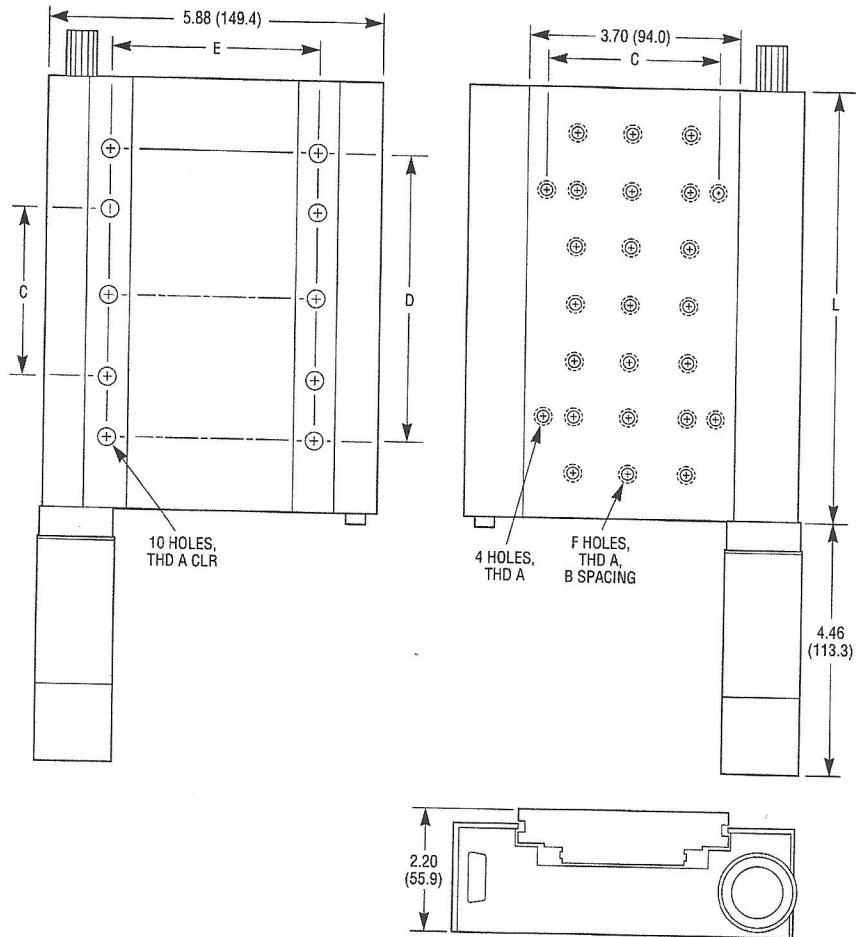
For XY stacked assemblies with 50 μ rad orthogonality, please call for the appropriate ordering information.



PM500-4ZAB.100 can be ordered for vertical applications. This unit uses a Z bracket and counterbalance to maintain PM500-L performance in vertical orientation.

Dimensions

MODEL PM500-4L SHOWN



Model (Metric)	Thread		Dimension [in. (mm)]					No. Holes
	A	B	C	D	E	L	F	
PM500-2L (M-PM500-2L)	1/4-20 (M6)	1.000 (25.0)	3.0 (75.0)		4.00 (100)	5.6	15	
PM500-4L (M-PM500-4L)	1/4-20 (M6)	1.000 (25.0)	3.0 (75.0)	5.00 (125)	4.00 (100)	7.6	21	
PM500-6L (M-PM500-6L)	1/4-20 (M6)	1.000 (25.0)	3.0 (75.0)	7.00 (175)	4.00 (100)	9.6	27	
PM500-8L (M-PM500-8L)	1/4-20 (M6)	1.000 (25.0)	3.0 (75.0)	9.00 (225)	4.00 (100)	11.6	33	