

# PRO560LM Series

## Mechanical Bearing, Linear Motor Stage

- Improved second-generation design
- Rugged mechanical construction
- Direct-drive linear motor for ultra-precise motion
- Eight models with travels from 300 mm to 1500 mm
- Vacuum and cleanroom versions available
- Available with ThermoComp™ for high-performance in changing environments

The PRO560LM is part of Aerotech's second-generation PRO-LM stage series with many improvements and added features. Enhanced positioning specifications, improved stiffness, and competitive pricing make the PRO560LM stage the ideal choice for both medium and high-performance production applications. The PRO560LM was designed to be used primarily as the lower axis of a PRO560LM/PRO280LM XY stack. The design is also ideal for applications that benefit from a larger support carriage, increased roll stiffness, and higher motor force.

### Rugged Mechanical Construction

A long-life recirculating linear guide bearing system and a low-friction sealing solution make the PRO560LM an attractive solution for industrial applications such as laser machining. The basic external construction of the PRO560LM design provides protection from debris while the side-seals prevent dirt and particulates from entering the stage. The curved hard-cover design provides a natural shape that prevents excessive debris from collecting on the stage.

### Precision Motion Performance

The PRO560LM series stages are optimized with center-mounted, high-precision, noncontact linear encoders that are protected from debris by the stage sealing system. Precision recirculating linear bearings along with machining and assembly craftsmanship enable excellent geometric performance specifications.

Incremental and absolute encoders are available as standard options and enable minimum incremental motion down to 5 nm and sub-micrometer repeatability.

### Accurate Positioning with ThermoComp

Temperature changes and thermal effects are some of

## PRO Series Gen II

- Up to:
  - 98% Higher Resolution
  - 46% Better Repeatability
  - 40% Reduction in Error Motions
  - 33% Improved Accuracy

Available with  
**ThermoComp™**



*The PRO560LM-0600 is one of eight models in the PRO560LM series.*

the largest error sources in precision machines. All PRO series stages are available with Aerotech's ThermoComp feature, an embedded temperature compensation unit that guarantees accurate positioning in variable temperature environments. Using this feature protects your process from real-world conditions, even in extreme industrial settings.

### Direct-Drive Linear Motor

Two of Aerotech's high-power U-channel linear motors drive the PRO560LM. The ironless forcer coils provide high force through the center-of-stiffness and center-of-friction with zero cogging for super-smooth velocity and position control. This ironless design is ideal for applications requiring outstanding contour accuracy and smooth velocity profiling. As with all Aerotech linear motor stages, the linear motors have zero backlash, no windup, zero friction, and excellent dynamic responsiveness.

### Design and Integration Flexibility

The PRO560LM is designed with many standard features and options that make the design incredibly flexible and allow it to be easily tailored to a specific application. The PRO560LM is available in eight different models with travels ranging from 300 mm to 1500 mm and speeds up to 2 m/s. Configurable cable management solutions are available for single and multi-axis systems as standard options.

Standard mounting holes for both English and metric optical tables are present in all travels. The tabletop is available with both English and metric mounting patterns and can be ordered with brush attachments to clear any debris that may collect on the stage hard cover. Tabletops with hole patterns that allow the direct attachment of several Aerotech rotary stages are also available.

The PRO560LM series is also available with cleanroom preparation and vacuum versions.

# PRO560LM Series SPECIFICATIONS

Mechanical Specifications		PRO560LM							
		300	400	500	600	800	1000	1200	1500
Accuracy <sup>(1)</sup>	Standard	±10 µm	±12 µm	±14 µm	±15.5 µm	±17 µm	±18 µm	±21 µm	±22 µm
	Calibrated	±1 µm	±1 µm	±1 µm	±1 µm	±1.5 µm	±1.5 µm	±2 µm	±2 µm
Resolution (Min. Incremental Motion)		5 nm (-E1 Encoder), 10 nm (-E3 Encoder)							
Bidirectional Repeatability <sup>(1)</sup>		±0.4 µm	±0.4 µm	±0.4 µm	±0.4 µm	±0.5 µm	±0.5 µm	±0.5 µm	±0.5 µm
Horizontal Straightness <sup>(1)</sup>		±3 µm	±4 µm	±5 µm	±6 µm	±7 µm	±8 µm	±8.5 µm	±9.5 µm
Vertical Straightness <sup>(1)</sup>		±3 µm	±4 µm	±5 µm	±6 µm	±7 µm	±8 µm	±8.5 µm	±9.5 µm
Pitch		49 µrad (10.1 arc sec)	60 µrad (12.4 arc sec)	70 µrad (14.4 arc sec)	78 µrad (16.1 arc sec)	90 µrad (18.6 arc sec)	110 µrad (22.7 arc sec)	120 µrad (24.7 arc sec)	130 µrad (26.8 arc sec)
Roll		39 µrad (8.0 arc sec)	44 µrad (9.1 arc sec)	53 µrad (10.9 arc sec)	58 µrad (12.0 arc sec)	73 µrad (15.1 arc sec)	87 µrad (17.9 arc sec)	97 µrad (20.0 arc sec)	107 µrad (22.1 arc sec)
Yaw		49 µrad (10.1 arc sec)	60 µrad (12.4 arc sec)	70 µrad (14.4 arc sec)	78 µrad (16.1 arc sec)	90 µrad (18.6 arc sec)	110 µrad (22.7 arc sec)	120 µrad (24.7 arc sec)	130 µrad (26.8 arc sec)
Maximum Speed <sup>(2)</sup>		2 m/s							
Maximum Acceleration <sup>(2)</sup>		3 g							
Maximum Force, Continuous		532.4 N – Standard 792.6 N – With Air Cooling (20 psig)							
Load Capacity <sup>(3)</sup>	Horizontal	150 kg							
	Side	150 kg							
Moving Mass		25.0 kg							
Stage Mass		90.4 kg	99.5 kg	108.6 kg	117.7 kg	135.9 kg	154.1 kg	172.3 kg	199.6 kg
Material		Anodized Aluminum							
MTBF (Mean Time Between Failure)		20,000 Hours							

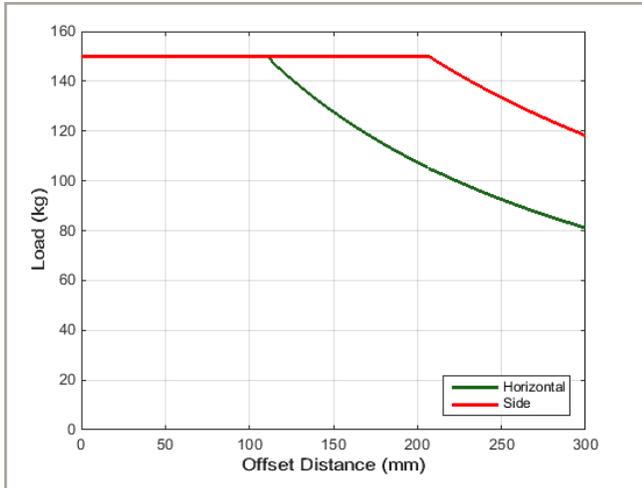
Notes:

1. Certified with -PL1 option.
2. Requires the selection of an appropriate amplifier with sufficient voltage and current.
3. Axis-orientation for on-axis loading is listed.
4. Specifications are for single-axis systems measured 25 mm above the tabletop. Performance of multi-axis systems is payload and workpoint dependent. Contact factory for multi-axis applications.

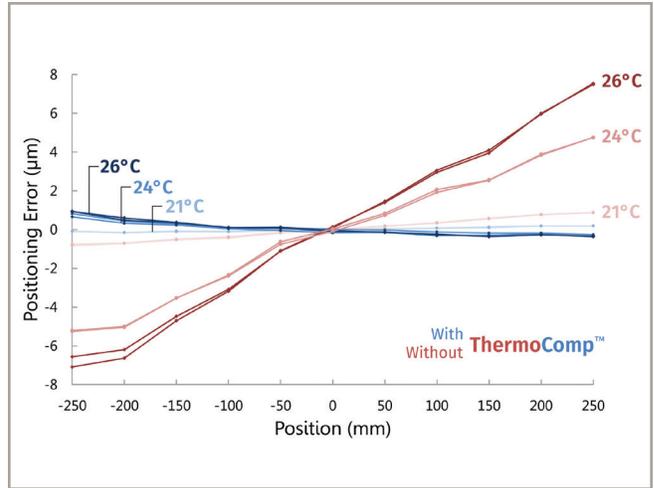
Electrical Specifications	
Drive System	Brushless Linear Servomotor
Feedback	Noncontact Encoder Incremental – 1 Vpp and TTL (0.1 µm) Output Absolute – EnDat 2.2
Maximum Bus Voltage	340 VDC
Limit Switches	5 V, Normally-Closed
Home Switch	Near Center

Recommended Controller		
Multi-Axis	A3200	Ndrive HLe/Ndrive CP/Ndrive HPe/Npaq
	Ensemble	Ensemble HLe/Ensemble CP/Ensemble HPe
Single Axis	Soloist	Soloist CP/Soloist HPe

### PRO560LM Series SPECIFICATIONS

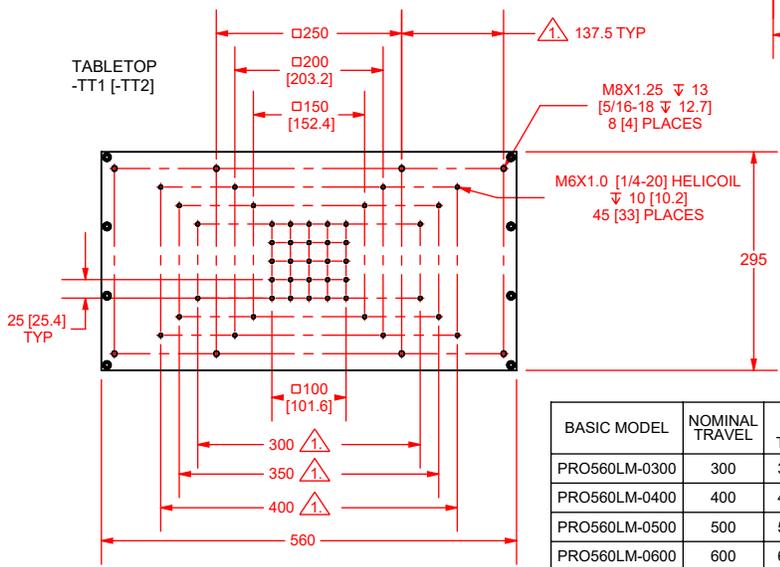
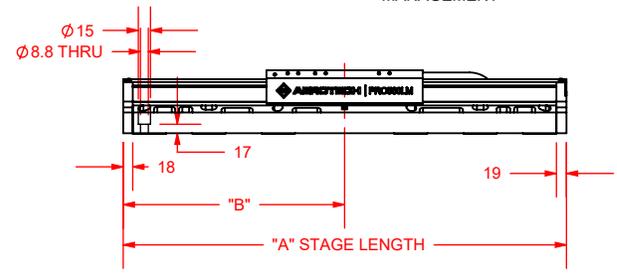
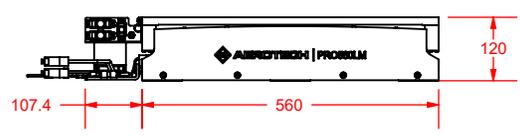
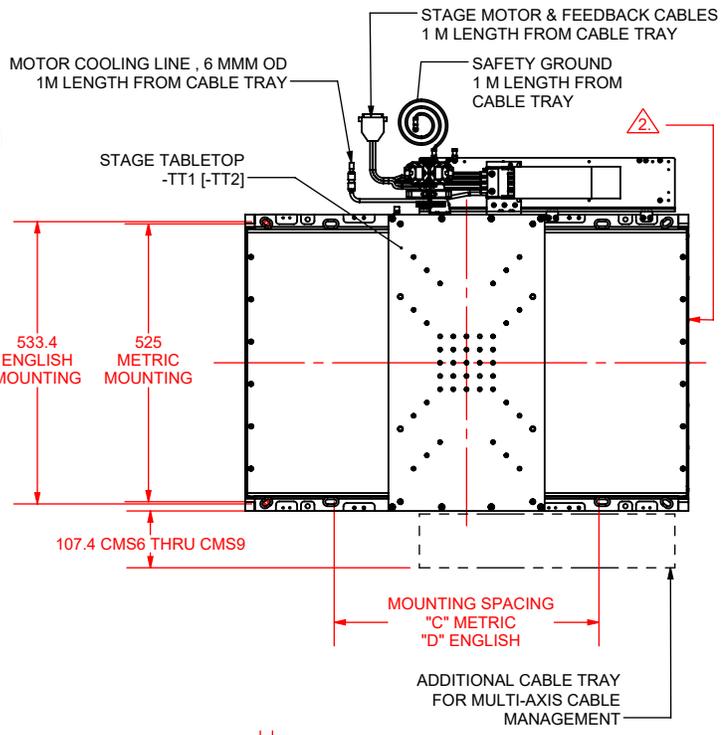
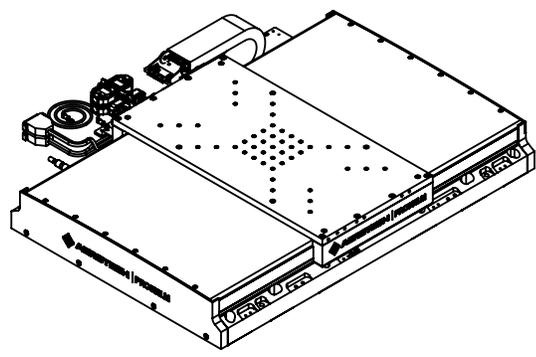


Cantilevered load capability of the PRO560LM.



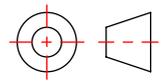
Measurement data showing successful compensation of thermal related positioning errors at several temperatures using the ThermoComp feature. Results are typical of stage performance with and without ThermoComp.

# PRO560LM Series DIMENSIONS

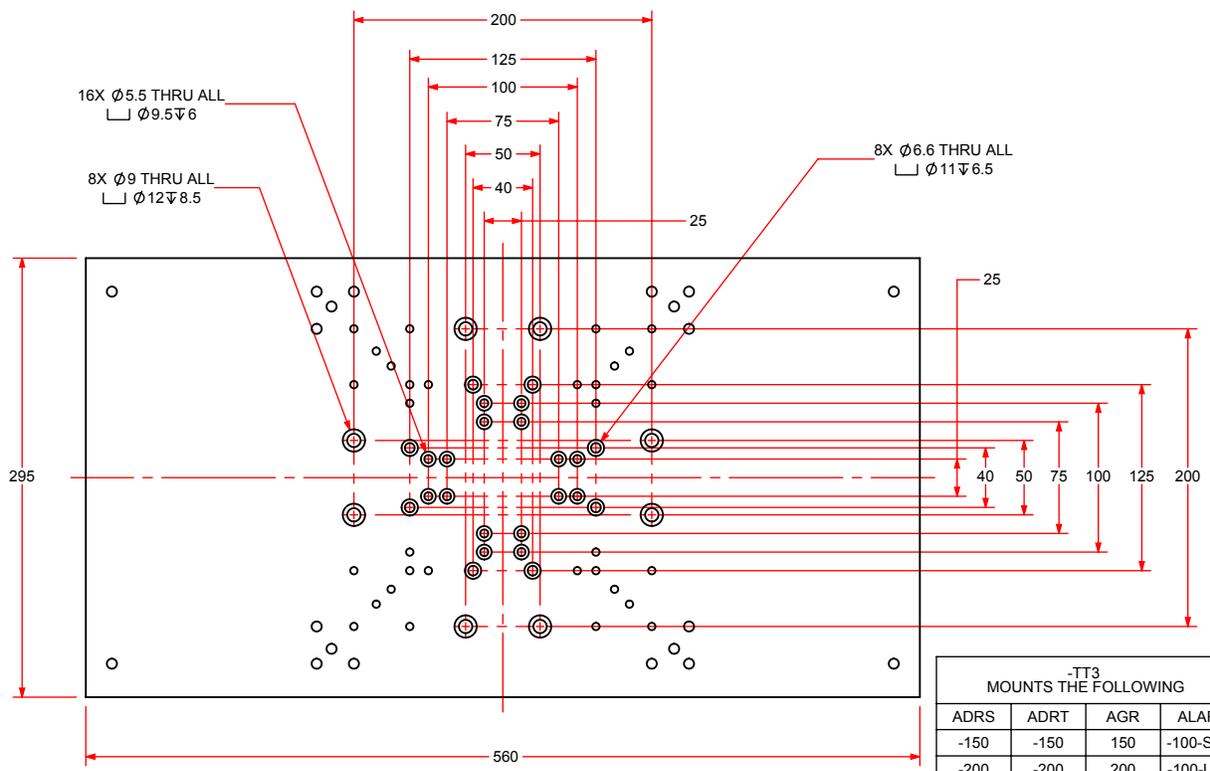
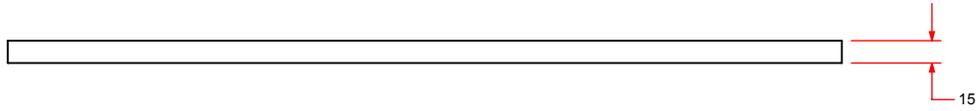
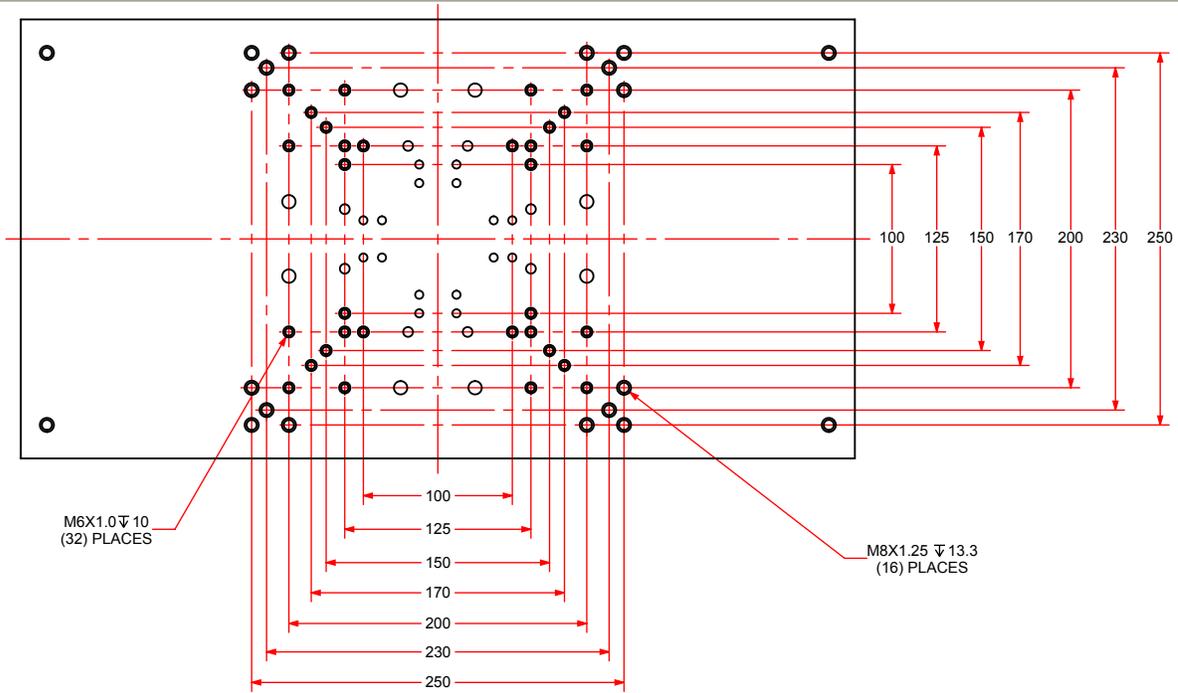


BASIC MODEL	NOMINAL TRAVEL	ELEC LIMIT TRAVEL	MECH LIMIT TRAVEL	A	B	C	D
PRO560LM-0300	300	302-308	334.4	737	368	250, 500-525	254
PRO560LM-0400	400	402-408	434.4	837	418	250, 500-525, 750	254, 762
PRO560LM-0500	500	502-508	534.4	937	468	250, 500-525, 750	254, 762
PRO560LM-0600	600	602-608	634.4	1037	518	250, 500-525, 750	254, 762
PRO560LM-0800	800	802-808	834.4	1237	618	250, 500-525, 750	254, 762
PRO560LM-1000	1000	1002-1008	1034.4	1437	718	250, 500-525, 750, 1250	254, 762, 1193.8
PRO560LM-1200	1200	1202-1208	1234.4	1637	818	250, 500-525, 750, 1250	254, 762, 1193.8
PRO560LM-1500	1500	1502-1508	1534.4	1937	968	250, 500-525, 750, 1250, 1750	254, 762, 1193.8, 1625.6

- NOTES:
- 1. FEATURE AVAILABLE ONLY ON -TT1, -TT4 TABLETOP
  - 2. M5X0.8 FOR CUSTOMER-INSTALLED AIR PURGE FITTING.
  - 3. DIMENSIONS: MILLIMETERS



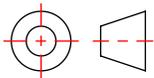
# PRO560LM Series Accessory Tabletop DIMENSIONS



-TT3 MOUNTS THE FOLLOWING			
ADRS	ADRT	AGR	ALAR
-150	-150	150	-100-SP*
-200	-200	200	-100-LP*
	-260		

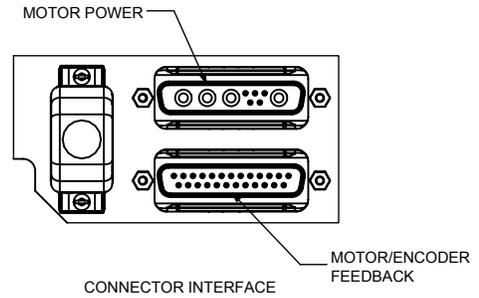
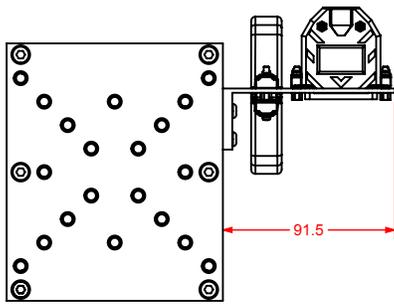
\*SIDE MOUNT NOT AVAILABLE

DIMENSIONS: MILLIMETERS

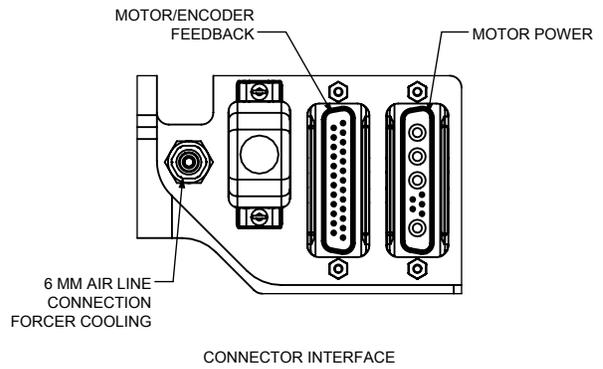
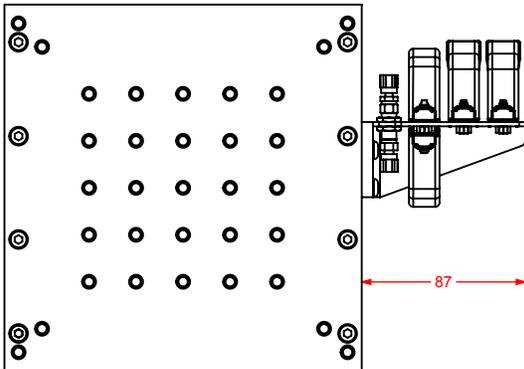


# PRO560LM Series Cable Management (-CMS0) DIMENSIONS

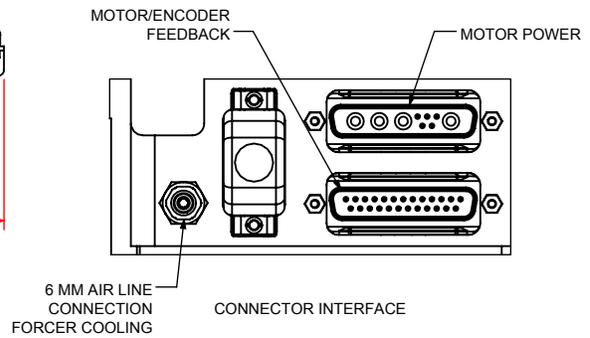
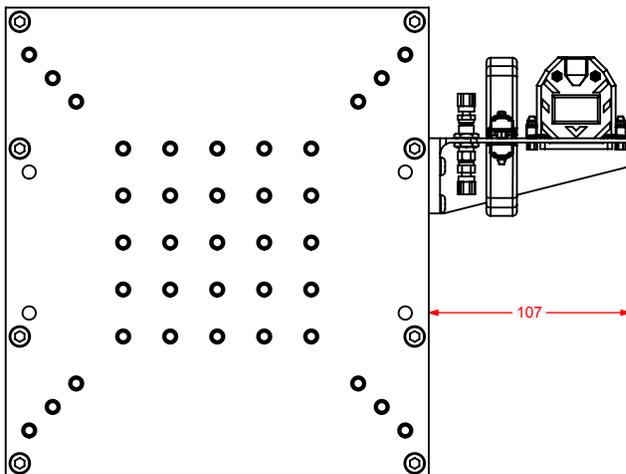
PRO115LM/PRO165LM -CMS0



PRO190LM -CMS0



PRO225LM/PRO280LM/PRO560LM -CMS0



DIMENSIONS: MILLIMETERS

## PRO560LM Series ORDERING INFORMATION

### Travel (Required)

-0300	300 mm travel stage
-0400	400 mm travel stage
-0500	500 mm travel stage
-0600	600 mm travel stage
-0800	800 mm travel stage
-1000	1000 mm travel stage
-1200	1200 mm travel stage
-1500	1500 mm travel stage

### Mounting Orientation (Required)

	Normal mounting orientation
-MT1	Side-mounted or vertical orientation
-MT2	Inverted mounting orientation

### Tabletop (Required)

-TT1	Tabletop with metric dimension mounting
-TT2	Tabletop with English dimension mounting
-TT3	Accessory tabletop with mounting for select rotary stages
-TT4	Tabletop with metric dimension mounting and wiper brushes
-TT5	Tabletop with English dimension mounting and wiper brushes
-TT6	Accessory tabletop with mounting for select rotary stages and wipers

NOTE: -TT1 or -TT4 tabletop option required for lower axis of XY.

### Feedback (Required)

-E1	Incremental linear encoder, 1 Vpp
-E2	Incremental linear encoder, 0.1 $\mu$ m digital TTL output
-E3	Absolute linear encoder, EnDat 2.2

### Cable Management (Required)

-CMS0	No external CMS, motor/feedback connector bracket on carriage
-CMS1	External CMS for single axis
-CMS2	External CMS for lower-axis of two-axis PRO (XY) assembly
-CMS3	External CMS for lower-axis of two-axis (XZ or XT) assembly
-CMS6	External CMS for lower-axis of three-axis (XYZ or XYT) assembly
-CMS7	External CMS for lower-axis of three-axis (XZT) assembly
-CMS9	External CMS for lower-axis of four-axis (XYZT) assembly

### Lifting Hardware (Optional)

-LF	Lifting hardware
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NOTE: Lifting option available on all travels.

### ThermoComp (Optional)

-TCMP	ThermoComp integrated thermal compensation, single or lower axis
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NOTE: An A3200 controller must be used with the -TCMP option.

## PRO560LM Series ORDERING INFORMATION

### Metrology (Required)

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-PL0	No metrology performance plots
-PL1	Metrology, uncalibrated with performance plots
-PL2	Metrology, calibrated (HALAR) with performance plots

### Integration (Required)

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Aerotech offers both standard and custom integration services to help you get your system fully operational as quickly as possible. The following standard integration options are available for this system. Please consult Aerotech if you are unsure what level of integration is required, or if you desire custom integration support with your system.

-TAS	Integration - Test as system Testing, integration, and documentation of a group of components as a complete system that will be used together (ex: drive, controller, and stage). This includes parameter file generation, system tuning, and documentation of the system configuration.
-TAC	Integration - Test as components Testing and integration of individual items as discrete components that ship together. This is typically used for spare parts, replacement parts, or items that will not be used together. These components may or may not be part of a larger system.

### Accessories (to be ordered as a separate line item)

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ALIGN-NPA	Non-precision XY assembly
ALIGN-NPAZ	Non-precision XZ or YZ assembly
ALIGN-PA10	XY assembly; 10 arc sec orthogonality. Alignment to within 7 microns orthogonality for short travel stages.
ALIGN-PA10Z	XZ or YZ assembly with L-bracket; 10 arc second orthogonality. Alignment to within 10 microns orthogonality for short travel stages.
ALIGN-PA5	XY assembly; 5 arc sec orthogonality. Alignment to within 3 microns orthogonality for short travel stages.
ALIGN-PA5Z	XZ or YZ assembly with L-bracket; 5 arc second orthogonality. Alignment to within 5 microns orthogonality for short travel stages.