

PRO115LM Series

Mechanical Bearing, Linear Motor Stage

- Aerotech's smallest sealed linear motor stage
- Rugged mechanical construction
- High-performance in a cost-effective package
- Direct-drive linear motor for ultra-precise motion
- Nine models with travels from 50 mm to 600 mm
- Vacuum and cleanroom versions available
- Available with ThermoComp™ for high-performance in changing environments

The PRO115LM is a latest addition to the second-generation PRO-LM stage series and is the smallest linear motor, sealed mechanical bearing stage in Aerotech's lineup. Building on the fundamental precision design of other PRO-LM series stages, the PRO115LM is the ideal choice for space-constrained medium and high-performance applications.

Rugged Mechanical Construction

A long-life recirculating linear guide bearing system and a low-friction sealing solution make the PRO115LM an attractive solution for industrial applications such as laser machining. The basic external construction of the PRO115LM 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 PRO115LM series stages are optimized with high-precision, noncontact linear encoders that are protected from debris by the stage sealing system. These encoders provide minimum incremental motion down to 5 nm and sub-micrometer positioning repeatability. Precision recirculating linear bearings along with machining and assembly craftsmanship enable excellent geometric performance specifications.

Accurate Positioning with ThermoComp

Temperature changes and thermal effects are some of the largest error sources in precision machines. All PRO series stages are available with Aerotech's ThermoComp feature,

PRO Series Gen II

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

Available with
ThermoComp™



The PRO115LM-300 is one of nine models in the PRO115LM series.

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

Aerotech's high-power U-channel linear motors drive the PRO115LM. The ironlessforcer coil provides high force 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 motor has zero backlash, no windup, zero friction, and excellent dynamic responsiveness.

Design and Integration Flexibility

The PRO115LM 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 PRO115LM is available in nine different models with travels ranging from 50 mm to 600 mm and speeds up to 2 m/s. Configurable cable management solutions are available for single and multi-axis systems as standard options.

The base mounting holes are accessible from the outside of the stage allowing for easy mounting. 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 Aerotech's ADRS, ACS-LP, and AGR rotary stages are also available.

The PRO115LM series is also available with cleanroom preparation and vacuum versions.

PRO115LM Series SPECIFICATIONS

Mechanical Specifications		PRO115LM								
		50	100	150	200	250	300	400	500	600
Travel	Standard	±3 µm	±4 µm	±6 µm	±8 µm	±9 µm	±10 µm	±12 µm	±14 µm	±15.5 µm
	Calibrated	±0.75 µm	±1 µm	±1 µm	±1.5 µm	±1.5 µm	±1.5 µm	±1.5 µm	±2 µm	±2 µm
Resolution (Min. Incremental Motion)		5 nm (-E1 Encoder)								
Bidirectional Repeatability ⁽¹⁾		±0.4 µm	±0.4 µm	±0.4 µm	±0.5 µm	±0.5 µm	±0.5 µm	±0.5 µm	±0.5 µm	±0.5 µm
Horizontal Straightness ⁽¹⁾		±1.5 µm	±2.5 µm	±3 µm	±4 µm	±5 µm	±6 µm	±8 µm	±9 µm	±10 µm
Vertical Straightness ⁽¹⁾		±1.5 µm	±2.5 µm	±3 µm	±4 µm	±5 µm	±6 µm	±8 µm	±9 µm	±10 µm
Pitch		19 µrad (3.9 arc sec)	29 µrad (6 arc sec)	29 µrad (6 arc sec)	39 µrad (8 arc sec)	49 µrad (10.1 arc sec)	58 µrad (12 arc sec)	78 µrad (16.1 arc sec)	97 µrad (20 arc sec)	116 µrad (23.9 arc sec)
Roll		19 µrad (3.9 arc sec)	29 µrad (6 arc sec)	29 µrad (6 arc sec)	39 µrad (8 arc sec)	49 µrad (10.1 arc sec)	58 µrad (12 arc sec)	78 µrad (16.1 arc sec)	97 µrad (20 arc sec)	116 µrad (23.9 arc sec)
Yaw		19 µrad (3.9 arc sec)	29 µrad (6 arc sec)	29 µrad (6 arc sec)	39 µrad (8 arc sec)	49 µrad (10.1 arc sec)	58 µrad (12 arc sec)	78 µrad (16.1 arc sec)	97 µrad (20 arc sec)	116 µrad (23.9 arc sec)
Maximum Speed ⁽²⁾		2 m/s								
Maximum Acceleration ⁽²⁾		3 g								
Maximum Force, Continuous		20.8 N								
Load Capacity ⁽³⁾	Horizontal	40 kg								
	Side	40 kg								
Moving Mass		1.9 kg								
Stage Mass		5.1 kg	5.7 kg	6.2 kg	6.8 kg	7.4 kg	7.9 kg	9.0 kg	10.2 kg	11.3 kg
Material		Anodized Aluminum								
MTBF (Mean Time Between Failure)		20,000 Hours								

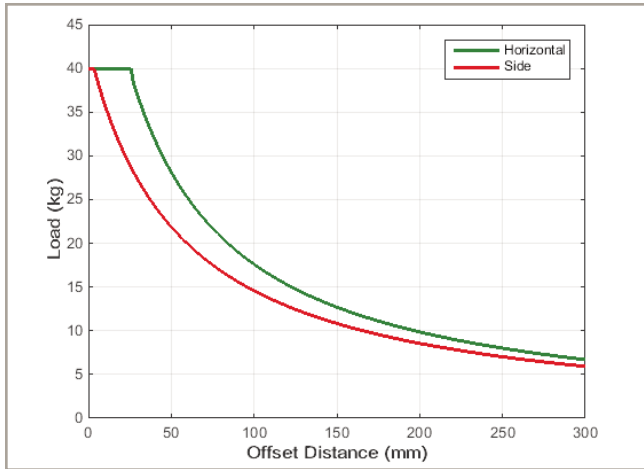
Notes:

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.

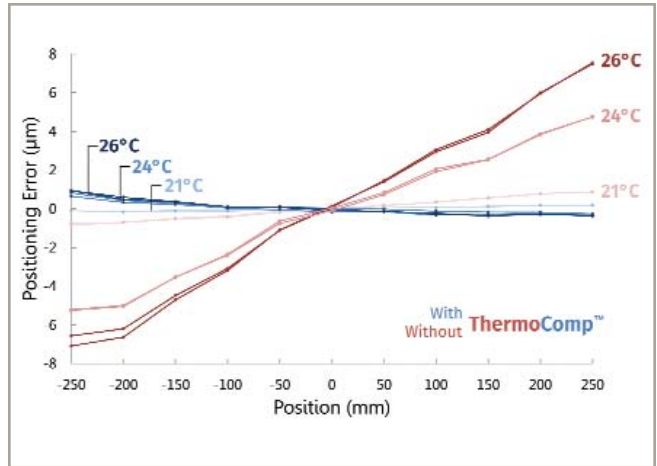
Electrical Specifications	
Drive System	Brushless Linear Servomotor
Feedback	Noncontact Encoder Incremental – 1 Vpp and TTL (0.1 µm) Output
Maximum Bus Voltage	320 VDC
Limit Switches	5 V, Normally-Closed
Home Switch	Near Center

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

PRO115LM Series SPECIFICATIONS

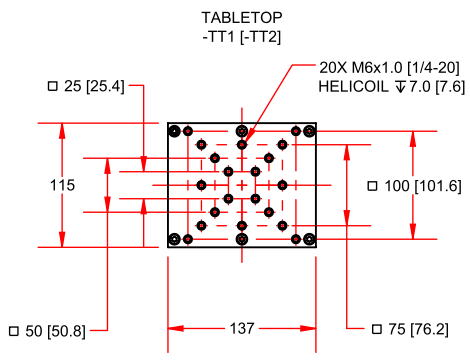
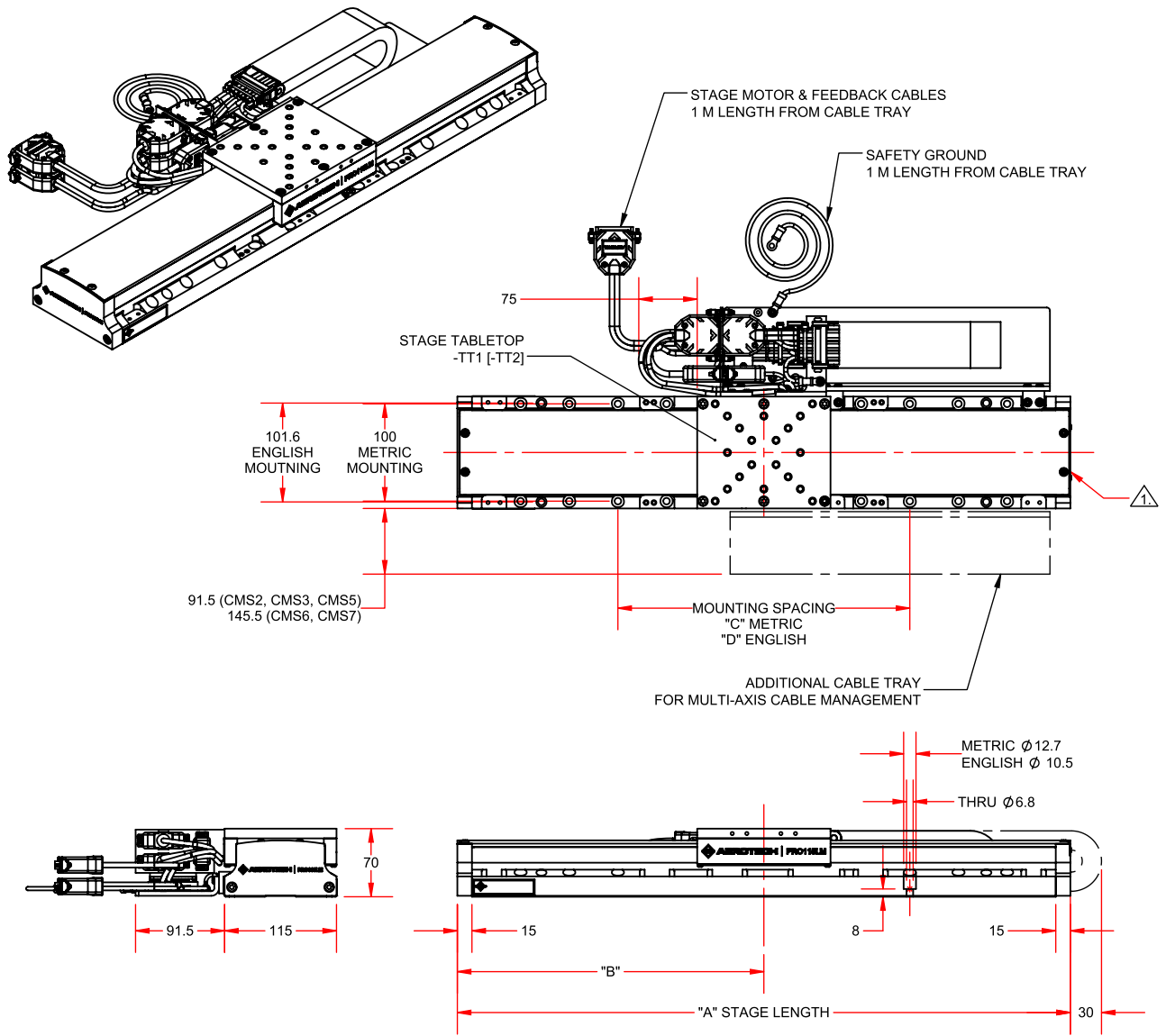


Cantilevered load capability of the PRO115LM.



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.

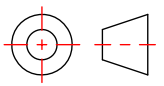
PRO115LM Series DIMENSIONS



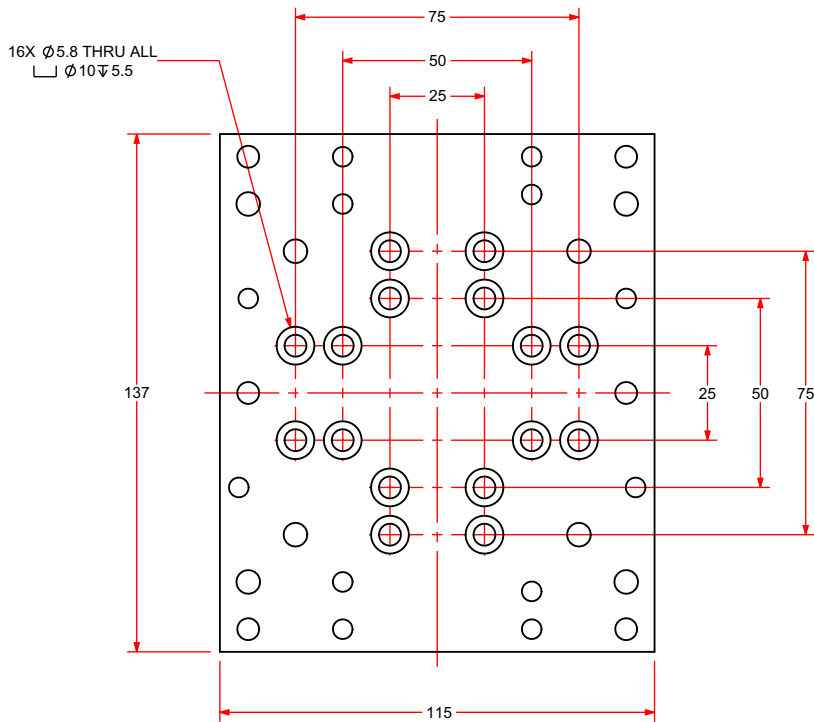
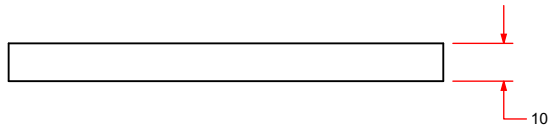
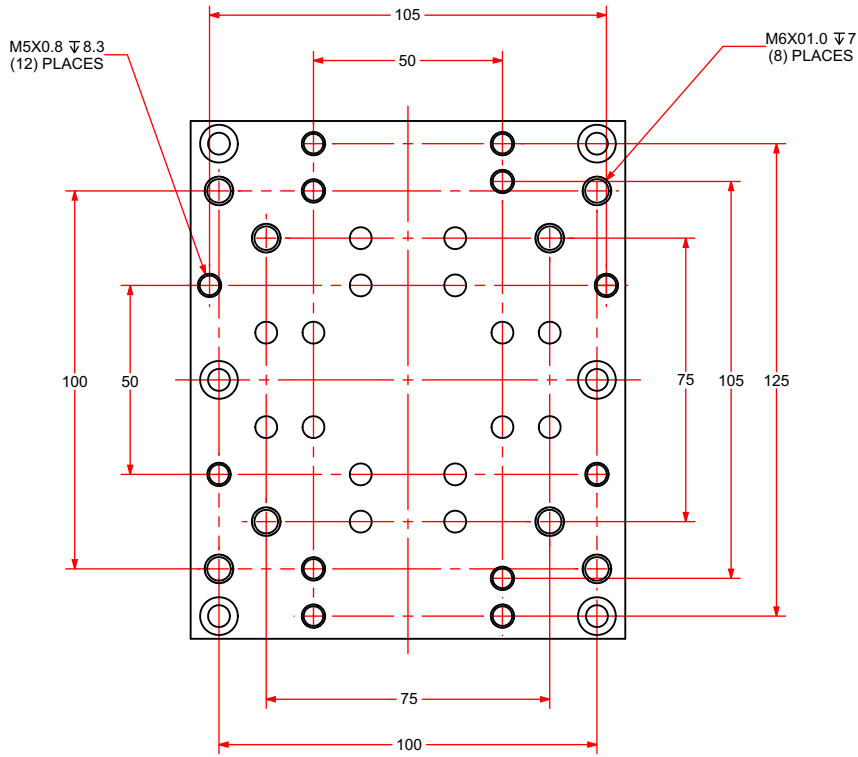
BASIC MODEL	NOMINAL TRAVEL	ELEC LIMIT TRAVEL	MECH LIMIT TRAVEL	A	B	C	D
PRO115LM-050	50	57-63	75	280	140	100	101.6
PRO115LM-100	100	107-113	125	330	165	100, 200	101.6
PRO115LM-150	150	157-163	175	380	190	100, 200	101.6
PRO115LM-200	200	207-213	225	430	215	100, 200, 300	101.6
PRO115LM-250	250	257-263	275	480	240	100, 200, 300	101.6, 355.6
PRO115LM-300	300	307-313	325	530	265	100, 200, 300, 400	101.6, 355.6
PRO115LM-400	400	407-413	425	630	315	100, 200, 300, 400, 500	101.6, 457.2
PRO115LM-500	500	507-513	525	730	365	100, 200, 300, 400, 500, 600	101.6, 457.2
PRO115LM-600	600	607-613	625	830	415	100, 200, 300, 400, 500, 600, 700	101.6, 457.2, 660.4

NOTES:

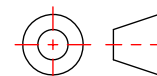
- 1. M5X0.8 FOR CUSTOMER-INSTALLED AIR PURGE FITTING
- 2. DIMENSIONS: MILLIMETERS.



PRO115LM Series Accessory Tabletop DIMENSIONS



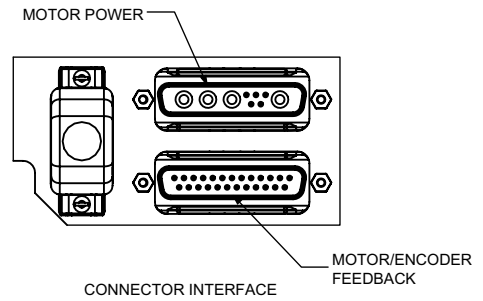
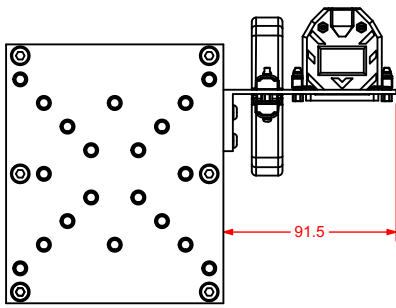
-TT3 MOUNTS THE FOLLOWING	
ADRS	AGR
-100	50
	75



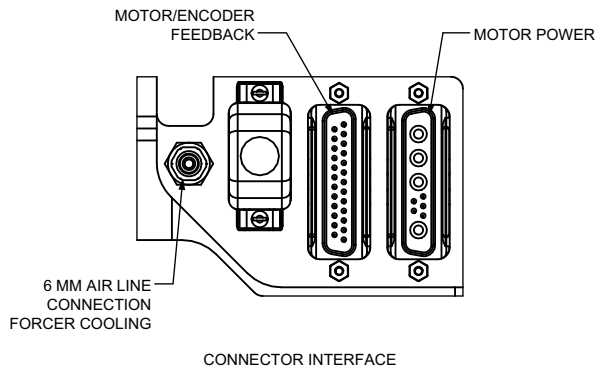
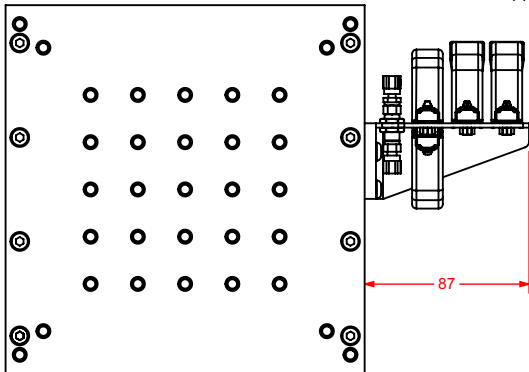
DIMENSIONS: MILLIMETERS

PRO115LM Series Cable Management (-CMS0) DIMENSIONS

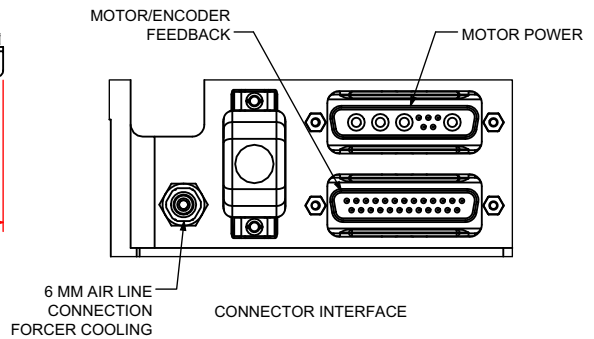
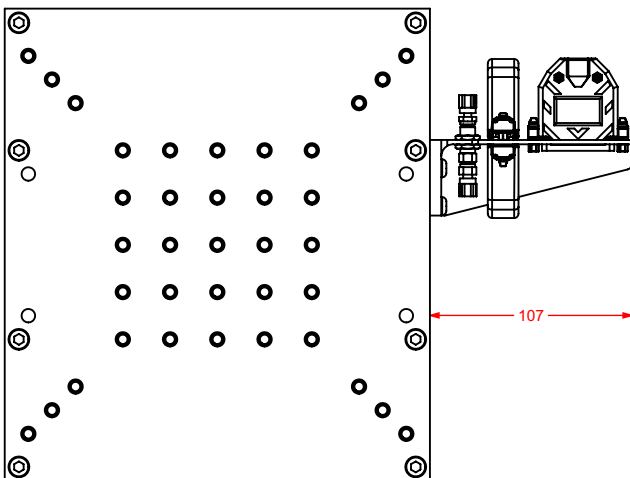
PRO115LM/PRO165LM -CMS0



PRO190LM -CMS0



PRO225LM/PRO280LM/PRO560LM -CMS0



DIMENSIONS: MILLIMETERS

PRO115LM Series ORDERING INFORMATION

Travel (Required)

-050	50 mm travel stage
-100	100 mm travel stage
-150	150 mm travel stage
-200	200 mm travel stage
-250	250 mm travel stage
-300	300 mm travel stage
-400	400 mm travel stage
-500	500 mm travel stage
-600	600 mm travel stage

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 μ m digital TTL output

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
-CMS4	External CMS for upper-axis of two-axis PRO (XY) assembly
-CMS5	External CMS for upper-axis of two-axis (YZ or YT) 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
-CMS11	External CMS for upper-axis of three-axis PRO165LM XYZ/T assembly

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.

Metrology (Required)

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

PRO115LM Series ORDERING INFORMATION

Integration (Required)

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. This is typically used for spare parts, replacement parts, or items that will not be used or shipped together (ex: stage only). These components may or may not be part of a larger system.

Accessories (to be ordered as a separate line item)

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.