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## Mechanical Bearing, Direct-Drive Linear Stage

# PRO165LM

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### Precise, Reliable & Adaptable

The PRO165LM offers a desirable balance of compact form factor and high load-carrying capability, making it ideal to use in medium- and high performance industrial applications. Combining superior craftsmanship and the highest quality components, PRO165LM stages consistently and reliably deliver best-in-class positioning performance. Thoughtfully engineered features and options, coupled with competitive pricing, make PRO165LM stages the ideal choice for streamlined integration into a wide variety of precision systems.

### Key Applications

PRO165LM mechanical bearing, direct-drive linear stages are extremely versatile, trusted and proven in medium- and high-performance applications, such as:

- ◆ Laser material processing
- ◆ Precision metrology, inspection & microscopy
- ◆ Electronics & circuit board manufacturing & inspection
- ◆ Display processing
- ◆ Synchrotron & light source experiments
- ◆ Medical device manufacturing
- ◆ Semiconductor fabrication
- ◆ Fiber optics & silicon photonics processing
- ◆ Additive manufacturing & precision assembly

### KEY FEATURES:

- ◆ **SUPERIOR PAYLOAD CAPACITY** in a compact form-factor provides maximum utility
- ◆ Ironless, cogless linear motor delivers **SMOOTH, ULTRA-PRECISE MOTION**
- ◆ **EXCELLENT POSITIONING & DYNAMIC CAPABILITIES** in a cost-effective package
- ◆ **BEST-IN-CLASS GEOMETRIC PERFORMANCE** ensures superior workpoint accuracy
- ◆ Rugged, reliable construction is ideal for **VERSATILE INDUSTRIAL USE**
- ◆ Hardcover & side seals offer **PROTECTION AGAINST CONTAMINATION & PARTICULATES**
- ◆ ThermoComp® option automatically **COMPENSATES FOR THERMAL DISTURBANCES**
- ◆ **VACUUM- & CLEANROOM-COMPATIBLE** versions available

## PR0165LM SPECIFICATIONS

Mechanical Specifications		PR0165LM						
<b>Travel</b>		100	150	200	300	400	500	600
<b>Accuracy<sup>(1)</sup></b>	<b>Standard</b>	±4 µm	±6 µm	±8 µm	±10 µm	±12 µm	±14 µm	±15.5 µm
	<b>Calibrated</b>	±1 µm	±1 µm	±1.5 µm	±1.5 µm	±1.5 µm	±2 µm	±2 µm
<b>Resolution (Min. Incremental Motion)</b>		5 nm (-E1 Encoder)						
<b>Bidirectional Repeatability<sup>(1)</sup></b>		±0.4 µm	±0.4 µm	±0.5 µm	±0.5 µm	±0.5 µm	±0.5 µm	±0.5 µm
<b>Horizontal Straightness<sup>(1)</sup></b>		±2.5 µm	±3 µm	±4 µm	±6 µm	±8 µm	±9 µm	±10 µm
<b>Vertical Straightness<sup>(1)</sup></b>		±2.5 µm	±3 µm	±4 µm	±6 µm	±8 µm	±9 µm	±10 µm
<b>Pitch</b>		29 µrad	29 µrad	40 µrad	58 µrad	70 µrad	80 µrad	90 µrad
<b>Roll</b>		29 µrad	29 µrad	40 µrad	58 µrad	70 µrad	80 µrad	90 µrad
<b>Yaw</b>		29 µrad	29 µrad	40 µrad	58 µrad	70 µrad	80 µrad	90 µrad
<b>Maximum Speed<sup>(2)</sup></b>		2 m/s						
<b>Maximum Acceleration<sup>(2)</sup></b>		3 g						
<b>Maximum Force, Continuous</b>		77.7 N						
<b>Load Capacity<sup>(3)</sup></b>	<b>Horizontal</b>	45 kg						
	<b>Side</b>	45 kg						
<b>Moving Mass</b>		2.6 kg						
<b>Stage Mass</b>		8.2 kg	9.1 kg	9.9 kg	11.6 kg	13.3 kg	14.9 kg	16.6 kg
<b>Material</b>		Anodized Aluminum						
<b>MTBF (Mean Time Between Failure)</b>		20,000 Hours						

**Notes:**

1. Certified with -PL1/-PL2 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	
<b>Drive System</b>	Brushless Linear Servomotor
<b>Feedback</b>	Non-contact Linear Encoder -E1: 1 Vpp, 20 µm signal period -E2: Digital RS422, 0.1 µm electrical resolution
<b>Maximum Bus Voltage</b>	340 VDC
<b>Limit Switches</b>	5 V, Normally-Closed
<b>Home Switch</b>	Near Center

## PRO165LM ORDERING OPTIONS

### Travel (Required)

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- 0100 100 mm travel stage
- 0150 150 mm travel stage
- 0200 200 mm travel stage
- 0300 300 mm travel stage
- 0400 400 mm travel stage
- 0500 500 mm travel stage
- 0600 600 mm travel stage

*Other travel options are available upon request. Contact Aerotech for more information.*

### Tabletop (Required)

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- TT1 Tabletop with metric dimension mounting

*NOTE: -TT1 option required for lower axis of XY.*

*Other tabletop options are available upon request. Contact Aerotech for more information.*

### Feedback (Required)

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- E1 Incremental linear encoder, 1 Vpp
- E2 Incremental linear encoder, digital RS422, 0.1  $\mu\text{m}$  electrical resolution

*Other feedback options are available upon request. Contact Aerotech for more information.*

### Cable Management (Required)

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- 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

### Lifting Hardware (Optional)

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- LF Lifting hardware

*NOTE: Lifting option only available on travels 400 mm and greater. Lifting should never be ordered on the upper-axis of an XY set (only order on lower-axis).*

### ThermoComp (Optional)

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- TCMP ThermoComp integrated thermal compensation, single or lower axis

### Metrology (Required)

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

## PRO165LM ORDERING OPTIONS

### 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**

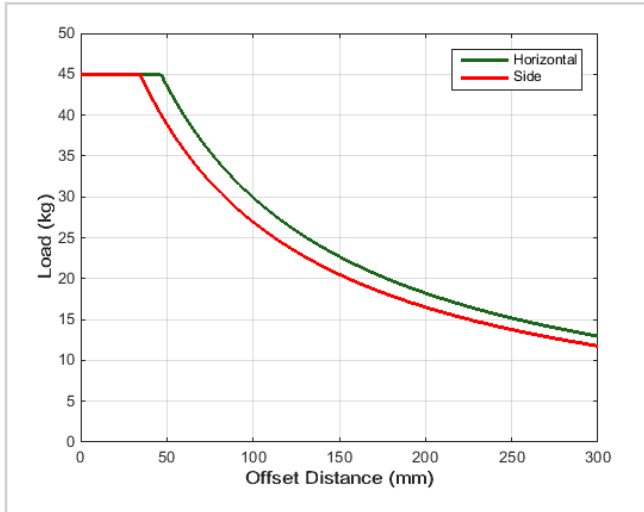
Testing and integration of individual items as discrete components. This is typically used for spare parts, replacement parts or items that will not be used or shipped together (ex: stage only). These components may or may not be part of a larger system.

### Accessories (To Be Ordered As Separate Line Item)

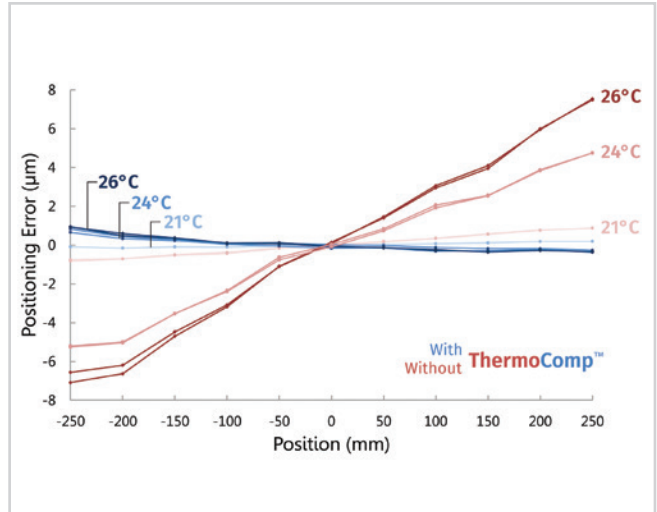
<b>ALIGN-NPA</b>	Non-precision XY assembly
<b>ALIGN-NPAZ</b>	Non-precision XZ or YZ assembly
<b>ALIGN-PA10</b>	XY assembly; 10 arc sec orthogonality. Alignment to within 7 microns orthogonality for short travel stages.
<b>ALIGN-PA10Z</b>	XZ or YZ assembly with L-bracket; 10 arc second orthogonality.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



## PRO165LM SPECIFICATIONS

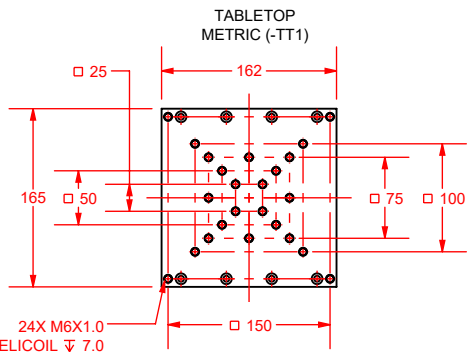
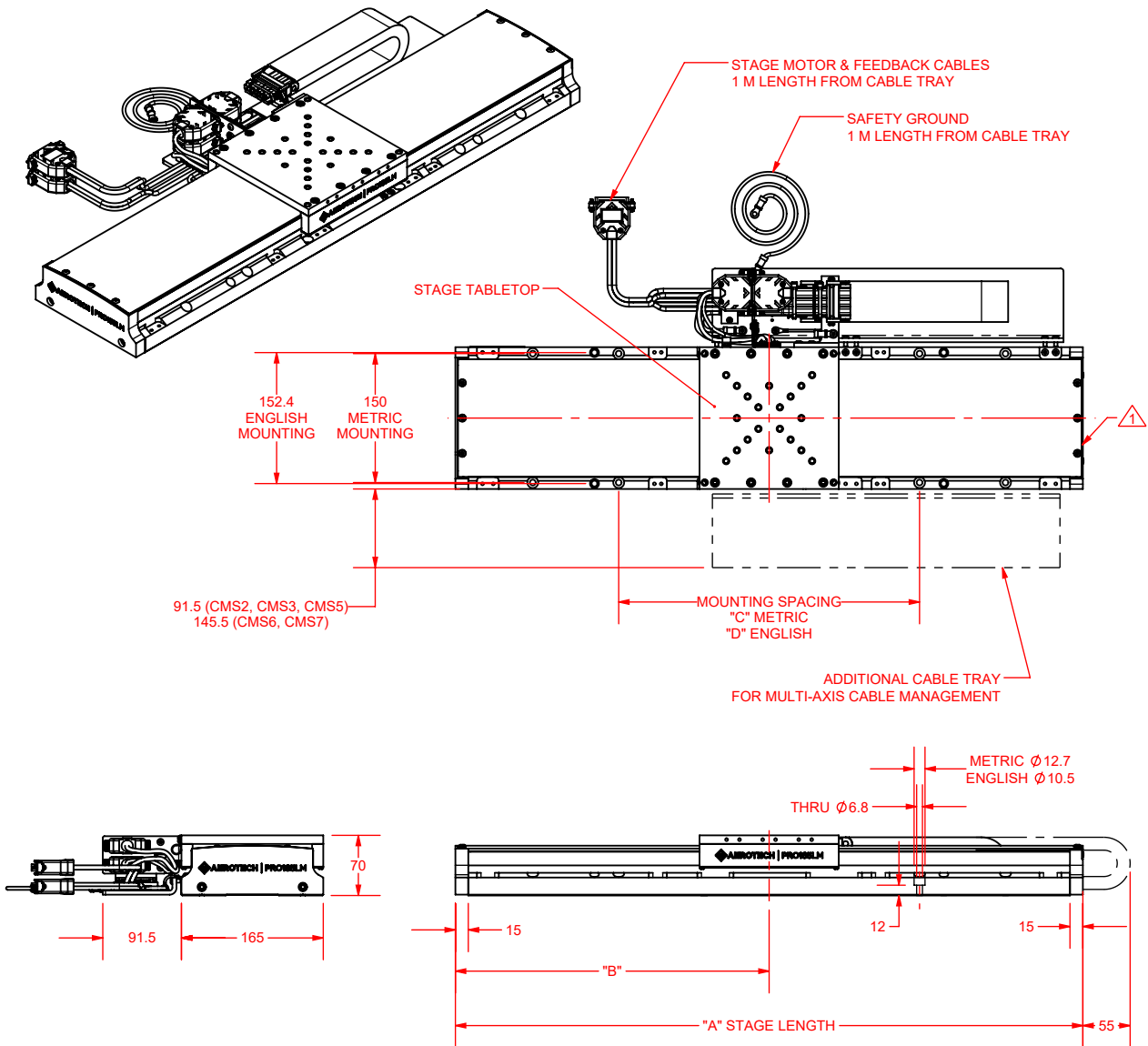


Cantilevered load capability of the PRO165LM.



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.

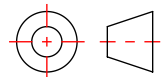
# PRO165LM DIMENSIONS



BASIC MODEL	NOMINAL TRAVEL	ELEC LIMIT TRAVEL	MECH LIMIT TRAVEL	A	B	C	D
PRO165LM-0100	100	102-108	116	330	165	150	152.4
PRO165LM-0150	150	152-158	166	380	190	150	152.4
PRO165LM-0200	200	202-208	216	430	215	150, 350	152.4
PRO165LM-0300	300	302-308	316	530	265	150, 350	152.4, 406.4
PRO165LM-0400	400	402-408	416	630	315	150, 350, 550	152.4, 406.4
PRO165LM-0500	500	502-508	516	730	365	150, 350, 550	152.4, 406.4
PRO165LM-0600	600	602-608	616	830	415	150, 350, 550, 750	152.4, 406.4, 660.4

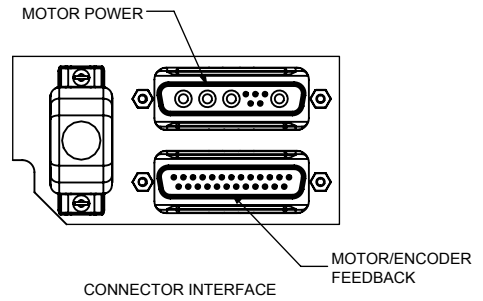
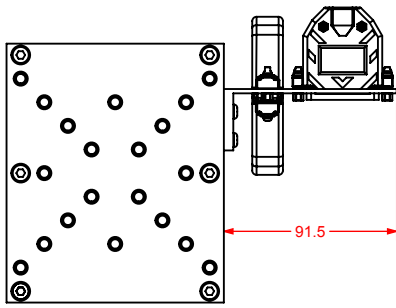
**NOTES:**

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

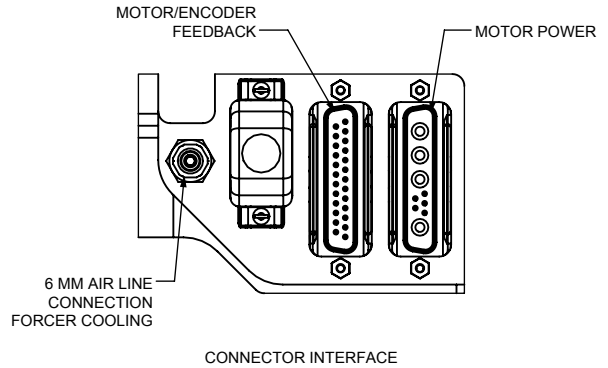
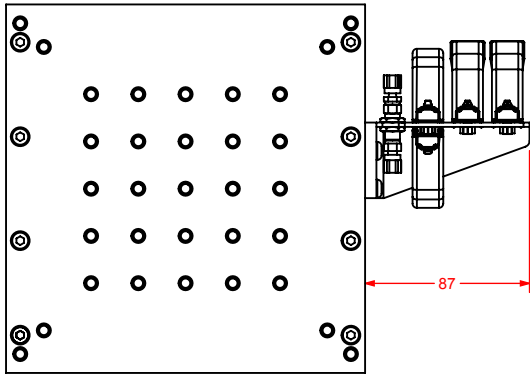


# PRO165LM SERIES CABLE MANAGEMENT (-CMS0) DIMENSIONS

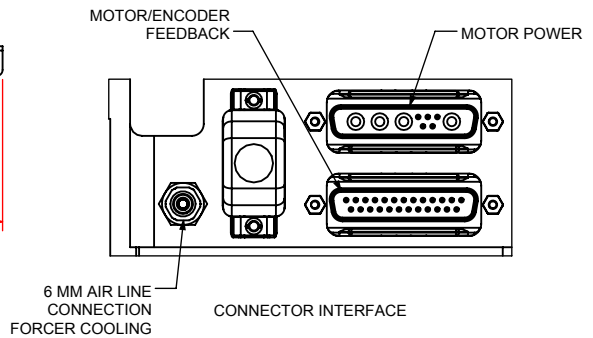
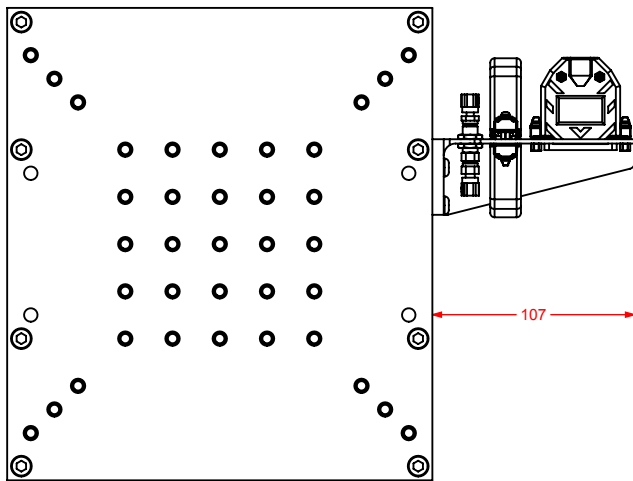
PRO115LM/PRO165LM -CMS0



PRO190LM -CMS0



PRO225LM/PRO280LM/PRO560LM -CMS0



DIMENSIONS: MILLIMETERS