

PRO225SL/SLE Series

Mechanical Bearing, Ball-Screw Stage

Improved second-generation design

High-performance in a cost-effective package

Rugged mechanical construction

Optional linear encoder

20 models with travels from 100 mm to 1000 mm

Vacuum and cleanroom versions available

Available with built-in ThermoComp™ for high-performance in changing environments

The PRO225SL and PRO225SLE are Aerotech's second-generation PRO225 stage designs with many improvements and added features. Enhanced positioning specifications coupled with competitive pricing make the PRO225SL/SLE stage the ideal choice for both medium and high-performance applications. The design is similar to the PRO165SL/SLE series, providing additional load capacity and stiffness with larger bearings and a wider cross-section.

Rugged Mechanical Construction

A long-life recirculating linear guide bearing system and a low-friction sealing solution make the PRO225SL/SLE an attractive solution for industrial applications such as laser machining. The basic external construction of the PRO225SL/SLE 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.

Linear Encoder Option

For applications requiring direct-metrology of the output carriage, the PRO225SLE integrates a direct linear encoder that is protected by the stage sealing system. Amplified sine, digital TTL output, and absolute encoders are available as standard options for linear feedback.

Design and Integration Flexibility

The PRO225SL/SLE 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 PRO225SL/SLE is available in 20 different models with travels ranging from 100 mm to 1000 mm and speeds up to 220 mm/s.

PRO Series Gen II

Up to:

98% Higher Resolution
46% Better Repeatability
40% Reduction in Error Motions
33% Improved Accuracy

Available with
ThermoComp®



The PRO225SL-500 is one of 20 models in the PRO225SL/SLE series.

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, ADRT, ACS, CCS, ALAR, and AGR rotary stages are also available.

Aerotech BM or BMS series brushless servomotors are available with a variety of encoder options providing net electronic resolutions ranging from 0.5 μm down to sub-nm. A holding brake can be added to the motor for vertical applications. A motor foldback kit is available for space-constrained applications to reduce the overall stage length.

The PRO225SL/SLE series is also available with cleanroom preparation and vacuum versions.

Accurate Positioning with ThermoComp

Temperature changes and thermal effects are some of the largest error sources in precision machines, particularly in ball-screw-driven mechanics due to self-heating. All PRO series stages are available with Aerotech's ThermoComp feature, an embedded temperature compensation unit that guarantees accurate positioning not only in variable temperature environments, but during extended use of ball-screw-driven stages. Using ThermoComp protects your process from real-world positioning conditions even in extreme industrial settings.

PRO225SL/SLE Series SPECIFICATIONS

Mechanical Specifications		PRO225SL/SLE										
Travel		100	150	200	250	300	400	500	600	800	1000	
Accuracy ⁽¹⁾	SL	Standard	±6 µm	±7 µm	±8 µm	±9 µm	±9.5 µm	±11 µm	±13 µm	±15 µm	±17 µm	±18 µm
		Calibrated	±1 µm	±1 µm	±1 µm	±1.5 µm	±1.5 µm	±1.5 µm	±2 µm	±2 µm	±2.5 µm	±3 µm
	SLE	Standard	±4 µm	±6 µm	±8 µm	±9 µm	±10 µm	±12 µm	±14 µm	±15.5 µm	±17 µm	±18 µm
		Calibrated	±1 µm	±1 µm	±1 µm	±1 µm	±1 µm	±1 µm	±1 µm	±1.5 µm	±1.5 µm	±1.5 µm
Resolution (Min. Incremental Motion)	SL	0.1 µm ⁽²⁾ ; 1.0 µm ⁽³⁾										
	SLE	0.05 µm (-E1/-E3 Encoder); 0.2 µm (-E2 Encoder); 1.0 µm (-E4 Encoder)										
Bidirectional Repeatability ⁽¹⁾	SL	±1 µm	±1 µm	±1 µm	±1 µm	±1 µm	±1 µm	±1 µm	±1 µm	±1 µm	±1 µm	±1 µm
	SLE	±0.5 µm	±0.5 µm	±0.5 µm	±0.5 µm	±0.5 µm	±0.5 µm	±0.5 µm	±0.5 µm	±0.5 µm	±0.75 µm	±0.75 µm
Horizontal Straightness ⁽¹⁾		±2 µm	±2.5 µm	±2.5 µm	±3 µm	±3.5 µm	±4.5 µm	±5.5 µm	±6.5 µm	±8 µm	±9.5 µm	
Vertical Straightness ⁽¹⁾		±2 µm	±2.5 µm	±2.5 µm	±3 µm	±3.5 µm	±4.5 µm	±5.5 µm	±6.5 µm	±8 µm	±9.5 µm	
Pitch		29 µrad (6 arc sec)	29 µrad (6 arc sec)	39 µrad (8 arc sec)	49 µrad (10.1 arc sec)	50 µrad (10.3 arc sec)	60 µrad (12.4 arc sec)	70 µrad (14.4 arc sec)	80 µrad (16.5 arc sec)	90 µrad (18.6 arc sec)	110 µrad (22.7 arc sec)	
Roll		29 µrad (6 arc sec)	29 µrad (6 arc sec)	39 µrad (8 arc sec)	49 µrad (10.1 arc sec)	50 µrad (10.3 arc sec)	60 µrad (12.4 arc sec)	70 µrad (14.4 arc sec)	80 µrad (16.5 arc sec)	90 µrad (18.6 arc sec)	110 µrad (22.7 arc sec)	
Yaw		29 µrad (6 arc sec)	29 µrad (6 arc sec)	39 µrad (8 arc sec)	49 µrad (10.1 arc sec)	50 µrad (10.3 arc sec)	60 µrad (12.4 arc sec)	70 µrad (14.4 arc sec)	80 µrad (16.5 arc sec)	90 µrad (18.6 arc sec)	110 µrad (22.7 arc sec)	
Maximum Speed ⁽⁴⁾		220 mm/s										140 mm/s
Maximum Acceleration ⁽⁴⁾		Function of Motor, Amplifier Selection, Payload, and Maximum Axial Load										
Load Capacity ⁽⁵⁾	Horizontal	100 kg										
	Vertical (Axial)	60 kg										
	Side	100 kg										
Moving Mass (w/ Tabletop)	SL	7.3 kg										
	SLE	7.5 kg										
Stage Mass (No Motor)	SL	19.8 kg	21.0 kg	22.2 kg	23.3 kg	24.5 kg	26.9 kg	29.2 kg	31.5 kg	36.2 kg	40.9 kg	
	SLE	20.5 kg	21.7 kg	22.9 kg	24.1 kg	25.3 kg	27.8 kg	30.2 kg	32.6 kg	37.5 kg	42.3 kg	
Material		Anodized Aluminum										
MTBF (Mean Time Between Failure)		20,000 Hours										

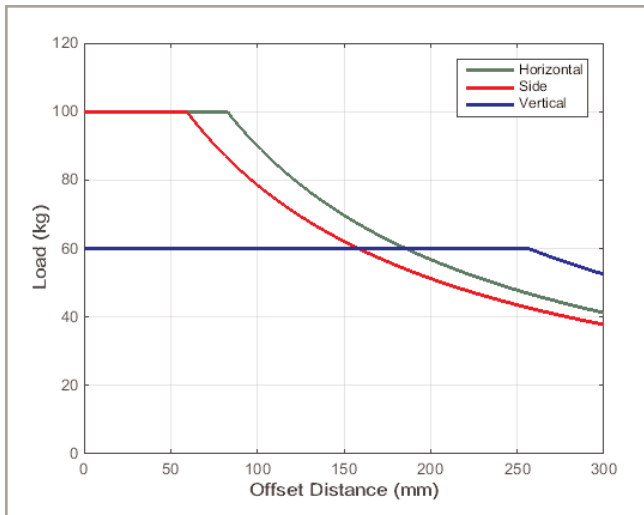
Notes:

1. Certified with -PL1/-PL2 options.
2. Achieved with Aerotech rotary motor with amplified sine encoder.
3. Achieved with Aerotech rotary motor with 2500 cnts/rev digital encoder.
4. Requires the selection of an appropriate amplifier with sufficient voltage and current.
5. Axis-orientation for on-axis loading is listed.
6. 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.
7. Specifications listed are non-foldback kit options. Contact factory for specifications when a foldback kit (-FBx) is used.

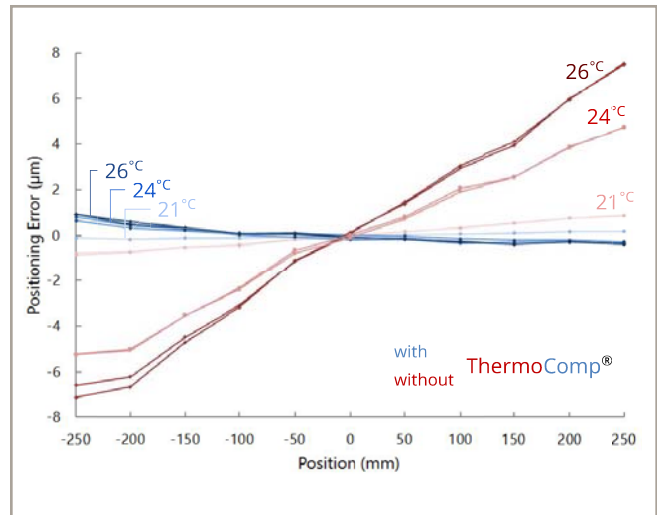
Electrical Specifications	
Drive System	Brushless Rotary Servomotor
Feedback (Linear Encoder – SLE Version Only)	Incremental – 1 Vpp and TTL (0.1 µm & 0.5 µm) Output Absolute - EnDat 2.2
Feedback (Rotary Encoder)	Incremental – 1000 lines/rev (1 Vpp) and 2500 lines/rev (TTL)
Maximum Bus Voltage	320 VDC
Limit Switches	5 V, Normally-Closed

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

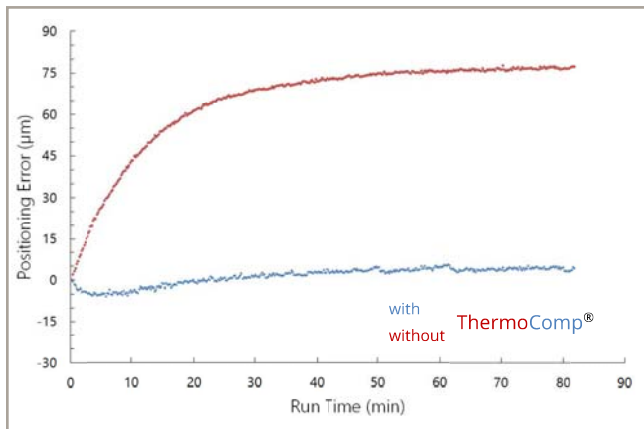
PRO225SL/SLE Series SPECIFICATIONS



Cantilevered load capability of the PRO225SL/SLE.



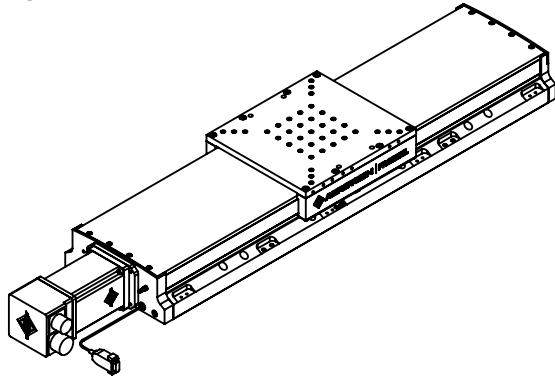
Measurement data showing successful compensation of thermal related positioning errors at several temperatures using the ThermoComp feature. Results are typical of stage performance with and without ThermoComp.



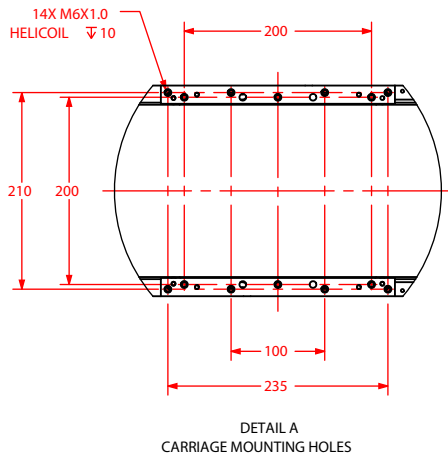
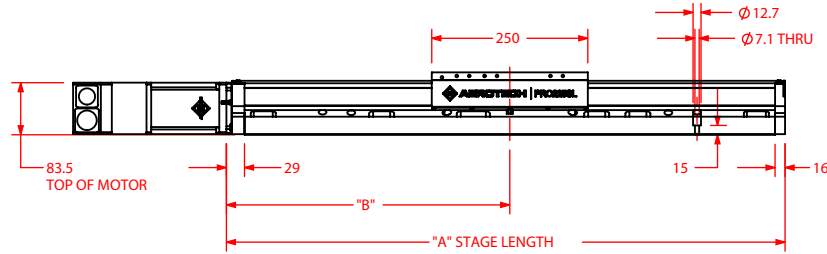
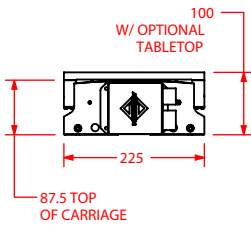
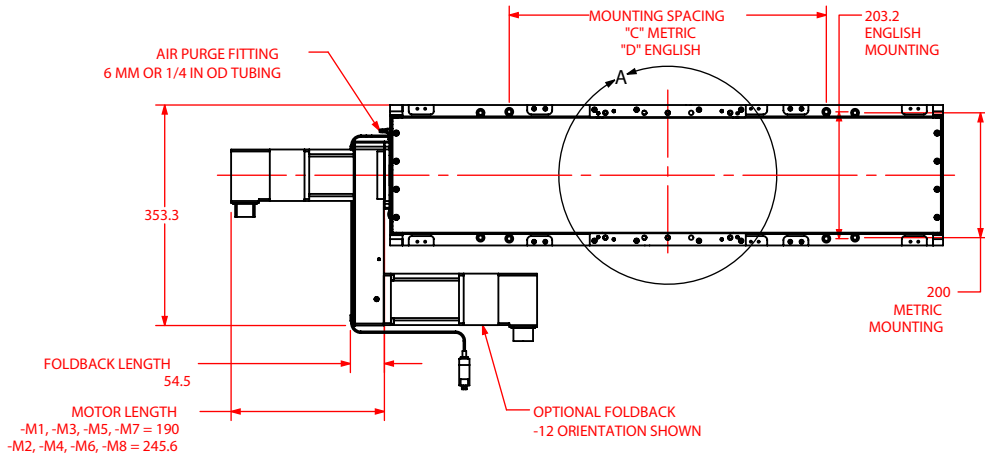
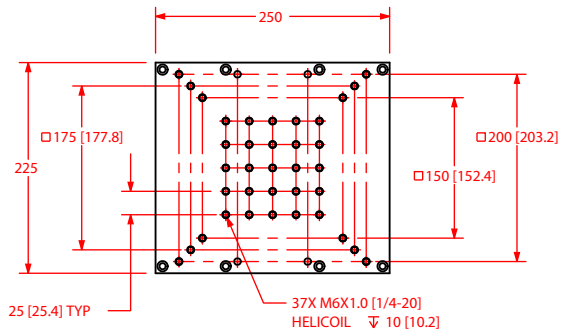
Measurement data showing successful compensation of internal heating related positioning errors during prolonged operation of a ball screw stage using the ThermoComp feature. Results are typical of ball screw stage performance with and without ThermoComp.

PRO225SL/SLE Series DIMENSIONS

PRO225SL



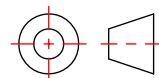
OPTIONAL TABLETOP
-TT1 [-TT2]



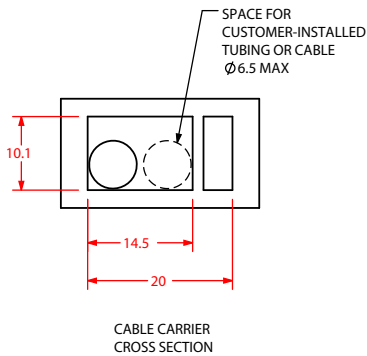
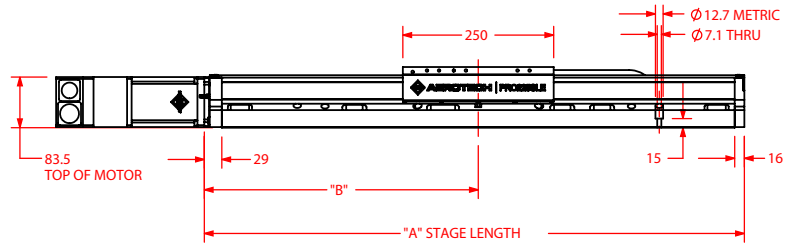
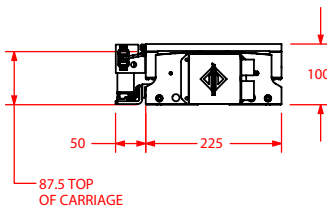
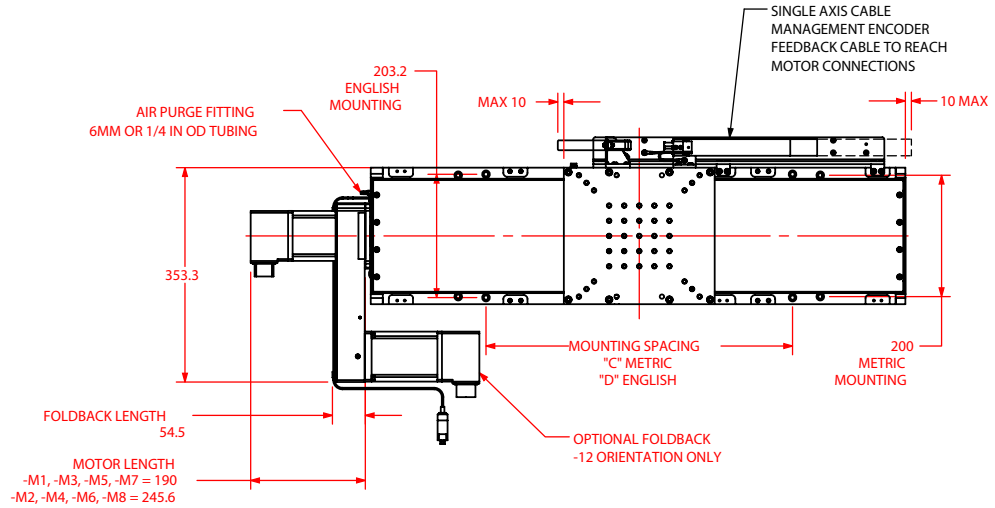
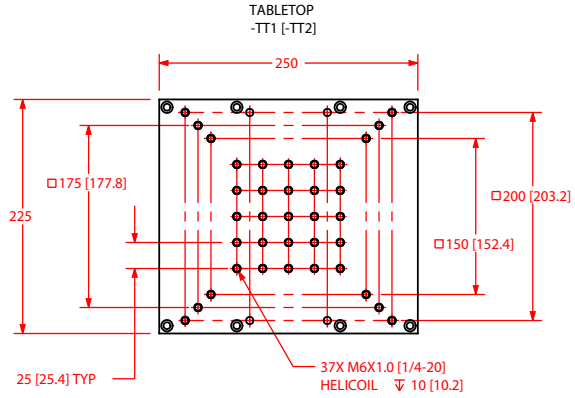
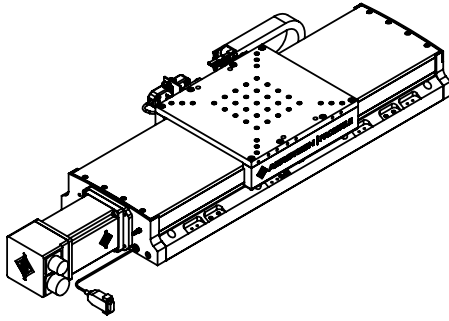
DETAIL A
CARRIAGE MOUNTING HOLES

BASIC MODEL	NOMINAL TRAVEL	ELEC LIMIT TRAVEL	MECH LIMIT TRAVEL	A	B	C	D
PRO225SL-0100	101.6	104.2-109	129.4	495	254	200, 350	203.2
PRO225SL-0150	152.4	155-159.8	179.4	545	279	200, 350	203.2
PRO225SL-0200	203.2	205.8-210.6	229.4	595	304	200, 350	203.2
PRO225SL-0250	254	256.6-261.4	279.4	645	329	200, 350	203.2
PRO225SL-0300	304.8	307.4-312.2	329.4	695	354	200, 600	203.2
PRO225SL-0400	406.4	409-413.8	429.4	795	404	200, 600	203.2, 508
PRO225SL-0500	508	510.6-515.4	529.4	895	454	200, 600	203.2, 508
PRO225SL-0600	609.6	612.2-617	629.4	995	504	200, 600	203.2, 508
PRO225SL-0800	812.8	815.4-820.2	829.4	1195	604	200, 600, 1000	203.2, 711.2
PRO225SL-1000	1016	1018.6-1023.4	1029.4	1395	704	200, 600, 1000	203.2, 711.2, 990.6

DIMENSIONS: MILLIMETERS

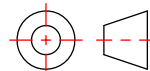


PRO225SLE

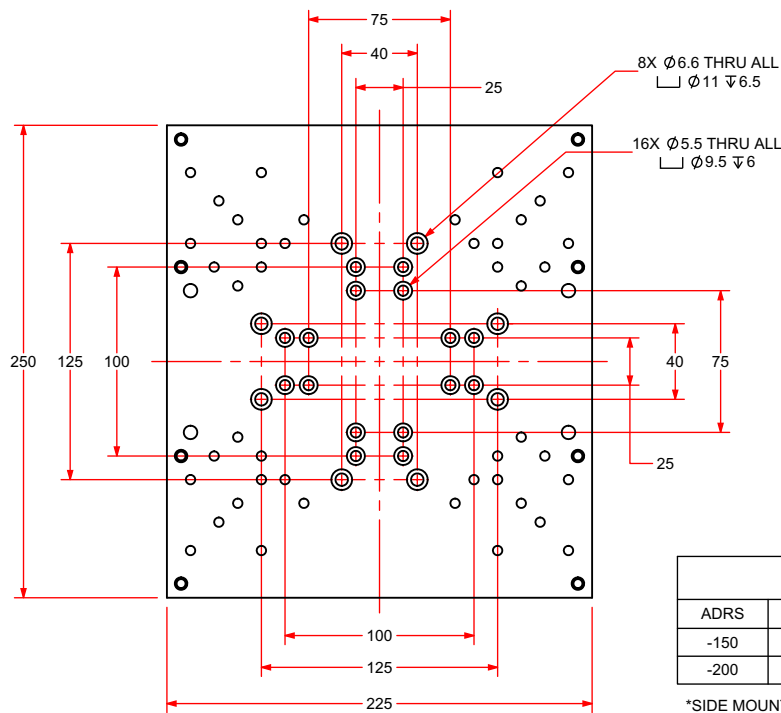
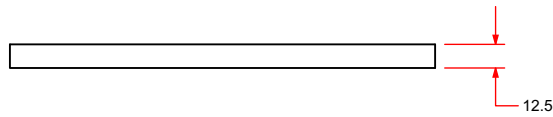
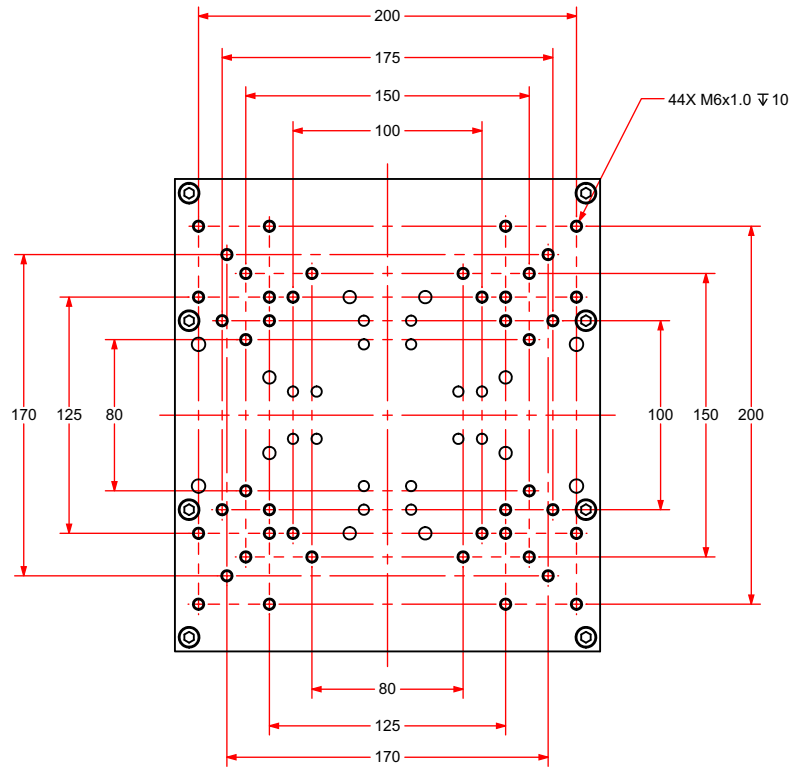


BASIC MODEL	NOMINAL TRAVEL	ELEC LIMIT TRAVEL	MECH LIMIT TRAVEL	A	B	C	D
PRO225SL-0100	101.6	104.2-109	129.4	495	254	200, 350	203.2
PRO225SL-0150	152.4	155-159.8	179.4	545	279	200, 350	203.2
PRO225SL-0200	203.2	205.8-210.6	229.4	595	304	200, 350	203.2
PRO225SL-0250	254	256.6-261.4	279.4	645	329	200, 350	203.2
PRO225SL-0300	304.8	307.4-312.2	329.4	695	354	200, 600	203.2
PRO225SL-0400	406.4	409-413.8	429.4	795	404	200, 600	203.2, 508
PRO225SL-0500	508	510.6-515.4	529.4	895	454	200, 600	203.2, 508
PRO225SL-0600	609.6	612.2-617	629.4	995	504	200, 600	203.2, 508
PRO225SL-0800	812.8	815.4-820.2	829.4	1195	604	200, 600, 1000	203.2, 711.2
PRO225SL-1000	1016	1018.6-1023.4	1029.4	1395	704	200, 600, 1000	203.2, 711.2, 990.6

DIMENSIONS: MILLIMETERS



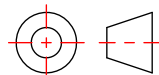
PRO225SL/SLE Series Accessory Tabletop DIMENSIONS



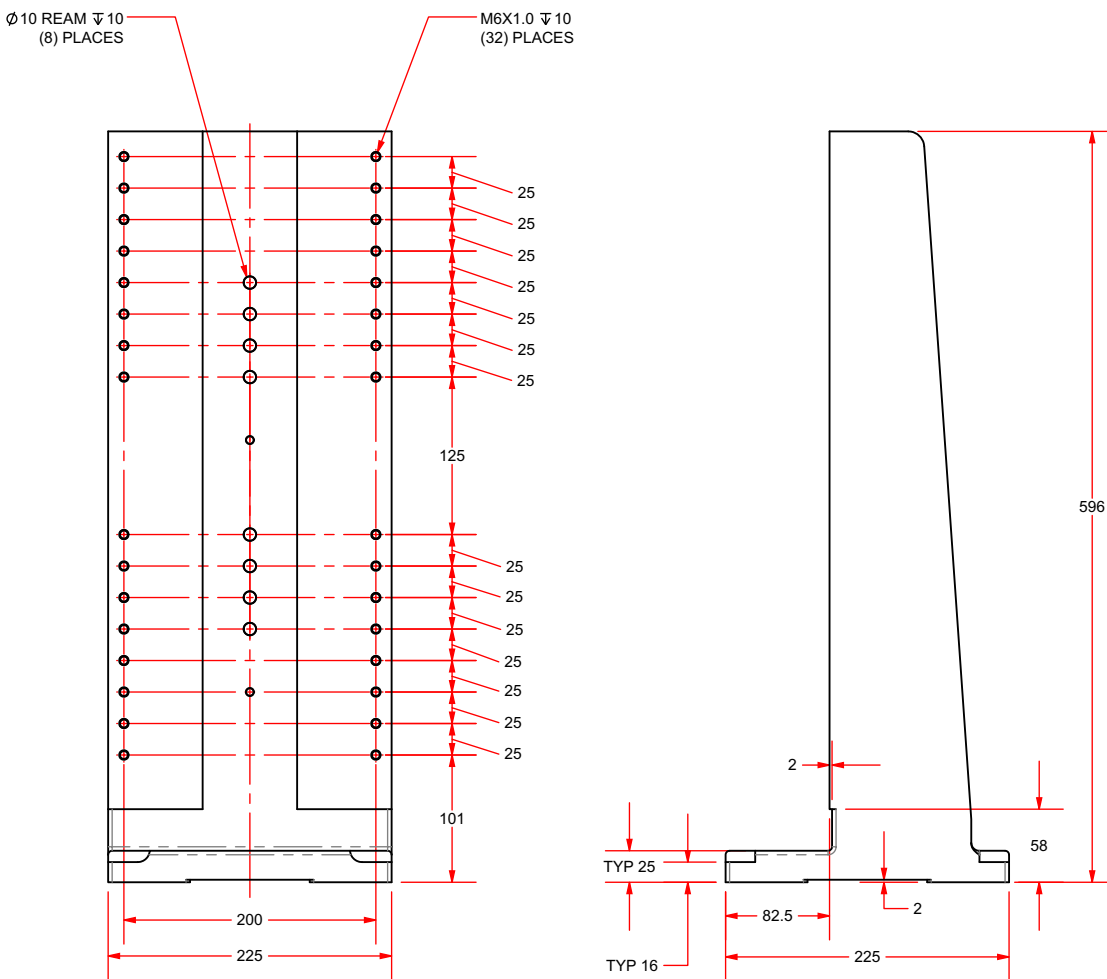
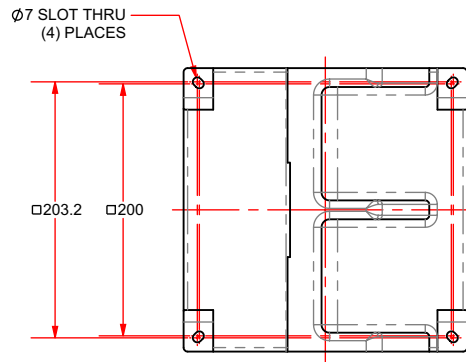
-TT3 MOUNTS THE FOLLOWING				
ADRS	ADRT	AGR	ALAR	CCS190DR
-150	-150	100	-100-SP*	-240
-200	-200	150	-100-LP*	-260

*SIDE MOUNT NOT AVAILABLE

DIMENSIONS: MILLIMETERS

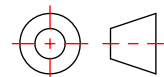


PRO225SL/SLE Series HDZ Bracket DIMENSIONS



BASIC MODEL	RECOMMENDED FOR	MASS [kg]
HDZ225	PRO225SL-0100, PRO225SL-0150, PRO225SL-0200	16.9

DIMENSIONS: MILLIMETERS



PRO225SL/SLE Series ORDERING INFORMATION

PRO225SL Series Linear, Ball-Screw Stage

Travel (Required)

-0100	100 mm travel stage
-0150	150 mm travel stage
-0200	200 mm travel stage
-0250	250 mm travel stage
-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

Mounting Orientation (Required)

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

Tabletop (Optional)

-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

Motor (Optional)

-M1	BMS280 brushless servomotor and 2500-line TTL encoder
-M2	BMS280 brushless servomotor, 2500-line TTL encoder, and brake
-M3	BMS280 brushless servomotor and 1000-line 1 Vpp encoder
-M4	BMS280 brushless servomotor, 1000-line 1 Vpp encoder, and brake
-M5	BM250 brushless servomotor and 2500-line TTL encoder
-M6	BM250 brushless servomotor, 2500-line TTL encoder, and brake
-M7	BM250 brushless servomotor and 1000-line 1 Vpp encoder
-M8	BM250 brushless servomotor, 1000-line 1 Vpp encoder, and brake

Foldback (Optional)

-FB1	Foldback kit for 0.500 inch diameter shaft NEMA 34 motor
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Motor Orientation (Optional)

-2	Bottom cable exit, optional orientation
-3	Left-side cable exit, standard orientation
-4	Top cable exit, optional orientation
-5	Right-side cable exit, optional orientation
-8	Right-side foldback, standard orientation
-12	Left-side foldback, optional orientation

Limits (Required)

-LI1	Normally-closed limit switches; 5 VDC with 9-Pin D connector
-LI2	Normally-open limit switches; 5 VDC with 9-Pin D connector
-LI3	Normally-closed limit switches; 24 VDC with 9-Pin D connector

Coupling (Optional)

-CP1	Coupling for 0.500 inch diameter shaft
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Lifting Hardware (Optional)

-LF	Lifting hardware
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Note: Lifting option only available on travels 300 mm and greater. Lifting should never be ordered on the upper-axis of an XY set (only order on lower-axis).

PRO225 SeriesSL/SLE ORDERING INFORMATION

ThermoComp (Optional)

-TCMP ThermoComp integrated thermal compensation, single or lower axis
 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

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)

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.
 HDZ225 Right angle L-bracket for PRO225SL/SLE-100, PRO225SL/SLE-150, and PRO225SL/SLE-200 only

PRO225SLE Series Linear, Ball-Screw Stage with Direct Linear Feedback

Direct Linear Feedback (Required)

-E1 Incremental linear encoder; 1 Vpp
 -E2 Incremental linear encoder; 0.1 μ m digital TTL output
 -E3 Absolute linear encoder; EnDat 2.2
 -E4 Incremental linear encoder, 0.5 μ m digital TTL output

Travel (Required)

-0100 100 mm travel stage
 -0150 150 mm travel stage
 -0200 200 mm travel stage
 -0250 250 mm travel stage
 -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

Mounting Orientation (Required)

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

PRO225 SeriesSL/SLE ORDERING INFORMATION

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

Motor (Optional)

-M1	BMS465 brushless servomotor and 2500-line TTL encoder
-M2	BMS465 brushless servomotor, 2500-line TTL encoder, and brake
-M3	BMS465 brushless servomotor and 1000-line 1 Vpp encoder
-M4	BMS465 brushless servomotor, 1000-line 1 Vpp encoder, and brake
-M5	BM500 brushless servomotor and 2500-line TTL encoder
-M6	BM500 brushless servomotor, 2500-line TTL encoder, and brake
-M7	BM500 brushless servomotor and 1000-line 1 Vpp encoder
-M8	BM500 brushless servomotor, 1000-line 1 Vpp encoder, and brake

Foldback (Optional)

-FB1	Foldback kit for 0.500 inch diameter shaft NEMA 34 motor
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Motor Orientation (Optional)

-2	Bottom cable exit, optional orientation
-3	Left-side cable exit, standard orientation
-4	Top cable exit, optional orientation
-5	Right-side cable exit, optional orientation
-8	Right-side foldback, standard orientation
-12	Left-side foldback, optional orientation

Limits (Required)

-LI1	Normally-closed limit switches; 5 VDC with 9-Pin D connector
-LI2	Normally-open limit switches; 5 VDC with 9-Pin D connector
-LI3	Normally-closed limit switches; 24 VDC with 9-Pin D connector

Coupling (Optional)

-CP1	Coupling for 0.500 inch diameter shaft
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Lifting Hardware (Optional)

-LF	Lifting hardware
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Note: Lifting option only available on travels 300 mm and greater. Lifting should never be ordered on the upper-axis of an XY set (only order on lower-axis).

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

PRO225 SeriesSL/SLE 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 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.
HDZ225	Right angle L-bracket for PRO225SL/SLE-100, PRO225SL/SLE-150, and PRO225SL/SLE-200 only.