

PRO115SL/SLE Series

Mechanical Bearing, Ball-Screw Stage

- Improved second-generation design
- High-performance in a cost-effective package
- Rugged mechanical construction
- Optional linear encoder
- 18 models with travels from 50 mm to 600 mm
- Vacuum and cleanroom versions available
- Available with built-in ThermoComp™ for high-performance in changing environments

The PRO115SL and PRO115SLE are Aerotech's second-generation PRO115 stage designs with many improvements and added features. Enhanced positioning specifications coupled with competitive pricing make the PRO115SL/SLE stage the ideal choice for both medium and high-performance applications.

Rugged Mechanical Construction

A long-life recirculating linear guide bearing system and a low-friction sealing solution make the PRO115SL/SLE an attractive solution for industrial applications such as laser machining. The basic external construction of the PRO115SL/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 PRO115SLE integrates a direct linear encoder that is protected by the stage sealing system. Amplified sine and digital TTL output are available as standard options for the linear encoder.

Design and Integration Flexibility

The PRO115SL/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 PRO115SL/SLE is available in 18 different models with travels ranging from 50 mm to 600 mm and speeds up to 300 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 PRO115SL-300 is one of 18 models in the PRO115SL/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, 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 PRO115SL/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.

PRO115SL/SLE Series SPECIFICATIONS

| Mechanical Specifications | | | PRO115SL/SLE | | | | | | | | |
|--|------------------|------------|---|------------------------|------------------------|------------------------|---------------------------|-------------------------|---------------------------|-------------------------|----------------------------|
| Travel | | | 50 | 100 | 150 | 200 | 250 | 300 | 400 | 500 | 600 |
| Accuracy ⁽¹⁾ | SL | Standard | ±6 µm | ±6 µm | ±8 µm | ±8 µm | ±9 µm | ±10 µm | ±12 µm | ±14 µm | ±16 µm |
| | | Calibrated | ±1 µm | ±1.25 µm | ±1.5 µm | ±1.75 µm | ±2 µm | ±2.5 µm | ±3 µm | ±3.5 µm | ±4 µm |
| | SLE | Standard | ±3 µm | ±4 µm | ±6 µm | ±8 µm | ±9 µm | ±10 µm | ±12 µm | ±14 µm | ±15.5 µm |
| | | Calibrated | ±1 µm | ±1 µm | ±1 µm | ±1.5 µm | ±1.5 µm | ±1.5 µm | ±1.5 µm | ±1.5 µm | ±2 µm |
| Resolution (Min. Incremental Motion) | | SL | 0.1 µm ⁽²⁾ ; 1.0 µm ⁽³⁾ | | | | | | | | |
| | | SLE | 0.05 µm (-E1 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 |
| | 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 | ±0.75 µm | ±0.75 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 ⁽⁴⁾ | | | 300 mm/s | | | | | | | | |
| Maximum Acceleration ⁽⁴⁾ | | | Function of Motor, Amplifier Selection, Payload, and Maximum Axial Load | | | | | | | | |
| Load Capacity ⁽⁵⁾ | Horizontal | | 40 kg | | | | | | | | |
| | Vertical (Axial) | | 18 kg | | | | | | | | |
| | Side | | 40 kg | | | | | | | | |
| Moving Mass (w/Tabletop) | SL | | 1.4 kg | | | | | | | | |
| | SLE | | 1.6 kg | | | | | | | | |
| Stage Mass (No Motor) | SL | 4.0 kg | 4.4 kg | 4.8 kg | 5.2 kg | 5.6 kg | 6.0 kg | 6.8 kg | 7.6 kg | 8.4 kg | |
| | SLE | 4.5 kg | 4.9 kg | 5.3 kg | 5.8 kg | 6.2 kg | 6.6 kg | 7.5 kg | 8.4 kg | 9.3 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.

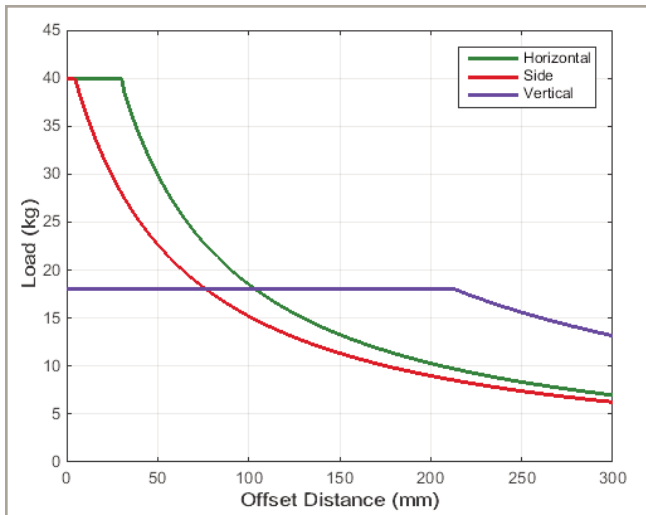
| Electrical Specifications | |
|--|---|
| Drive System | Brushless Rotary Servomotor |
| Feedback (Linear Encoder – SLE Version Only) | Incremental – 1 Vpp and TTL (0.1 µm & 0.5 µm) Output |
| Feedback (Rotary Encoder) | Incremental – 1000 lines/rev (1 Vpp) and 2500 lines/rev (TTL) |
| Maximum Bus Voltage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

Notes:

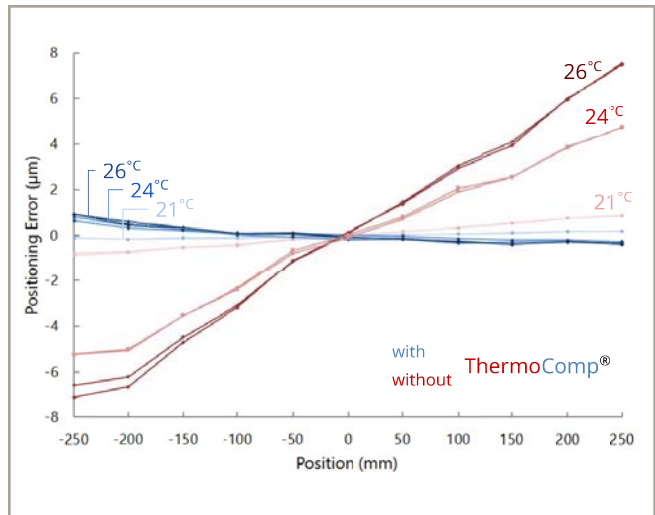
1. Certified with -PLOTS option.

| 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 |

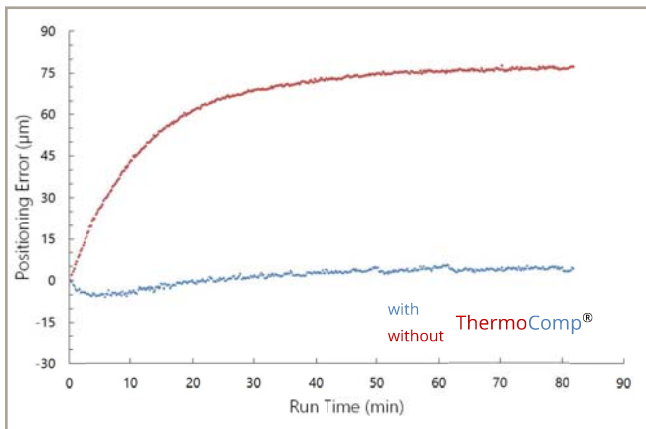
PRO115SL/SLE Series SPECIFICATIONS



Cantilevered load capability of the PRO115SL/SLE.



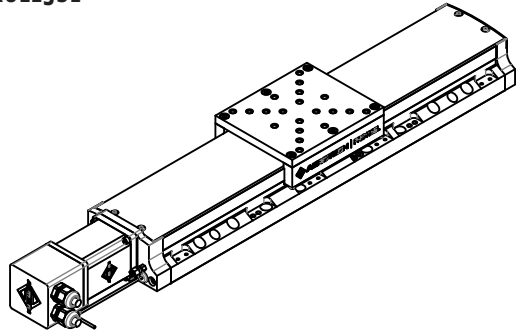
Measurement data showing successful compensation of thermal related positioning errors at several temperatures using the ThermoComp feature. Results are typical of stage performance with and without ThermoComp.



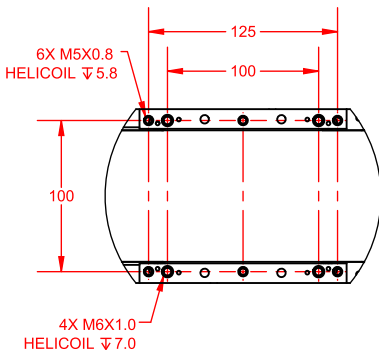
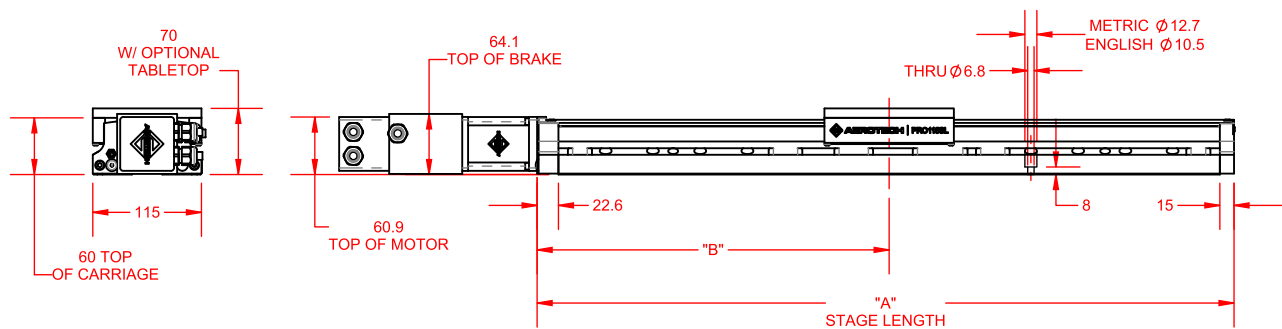
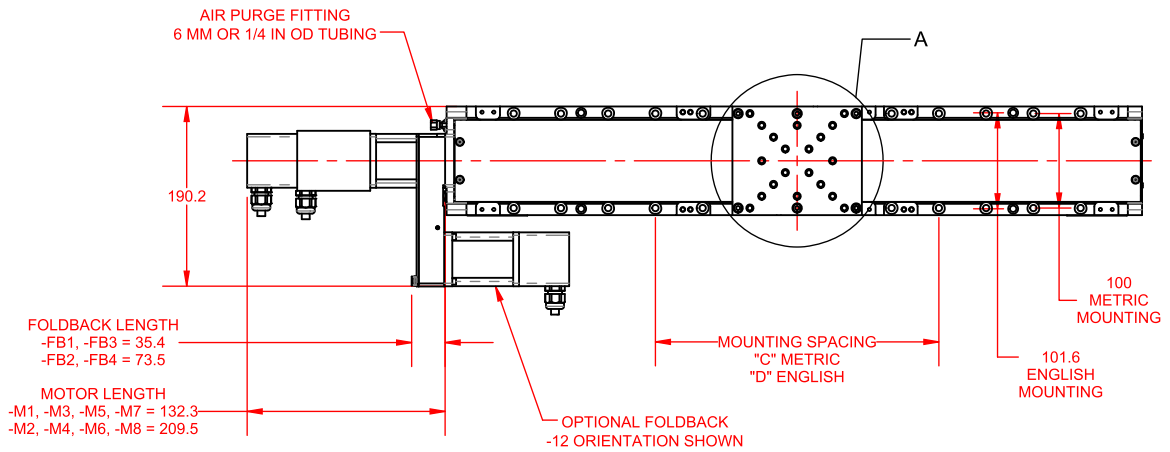
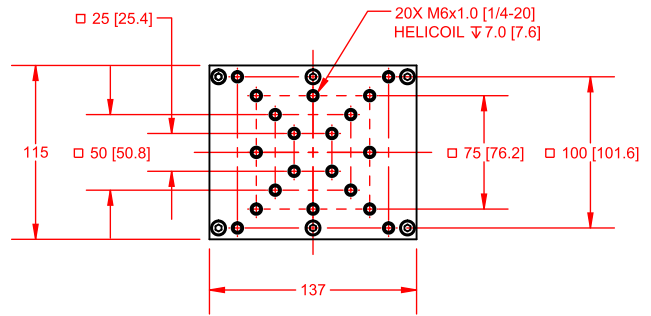
Measurement data showing successful compensation of internal heating related positioning errors during prolonged operation of a ball screw stage using the ThermoComp feature. Results are typical of ball screw stage performance with and without ThermoComp.

PRO115SL/SLE Series DIMENSIONS

PRO115SL



OPTIONAL TABLETOP
-TT1 [-TT2]



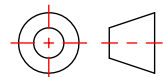
DETAIL A
CARRIAGE MOUNTING HOLES

| BASIC MODEL | NOMINAL TRAVEL | ELEC LIMIT TRAVEL | MECH LIMIT TRAVEL | A | B | C | D |
|--------------|----------------|-------------------|-------------------|-------|-------|-----------------------------------|---------------------|
| PRO115SL-050 | 50.8 | 58.4-63.2 | 75 | 287.6 | 147.6 | 100 | 101.6 |
| PRO115SL-100 | 101.6 | 109.2-114 | 125 | 337.6 | 172.6 | 100, 200 | 101.6 |
| PRO115SL-150 | 152.4 | 160-164.8 | 175 | 387.6 | 197.6 | 100, 200 | 101.6 |
| PRO115SL-200 | 203.2 | 210.8-215.6 | 225 | 437.6 | 222.6 | 100, 200, 300 | 101.6 |
| PRO115SL-250 | 254 | 261.8-266.4 | 275 | 487.6 | 247.6 | 100, 200, 300 | 101.6, 355.6 |
| PRO115SL-300 | 304.8 | 312.4-317.2 | 325 | 537.6 | 272.6 | 100, 200, 300, 400 | 101.6, 355.6 |
| PRO115SL-400 | 406.4 | 414-418.8 | 425 | 637.6 | 322.6 | 100, 200, 300, 400, 500 | 101.6, 457.2 |
| PRO115SL-500 | 508 | 515.6-519 | 525 | 737.6 | 372.6 | 100, 200, 300, 400, 500, 600 | 101.6, 457.2 |
| PRO115SL-600 | 609.6 | 617.2-619 | 625 | 837.6 | 422.6 | 100, 200, 300, 400, 500, 600, 700 | 101.6, 457.2, 660.4 |

NOTES :

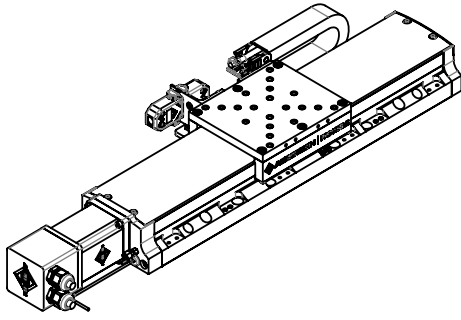
OPTIONAL TABLETOP -TT1 TABLETOP OPTION REQUIRED FOR LOWER AXIS OF XY ASSEMBLIES WHEN FOLDBACK OPTION IS CHOSEN.

2. DIMENSIONS: MILLIMETERS.

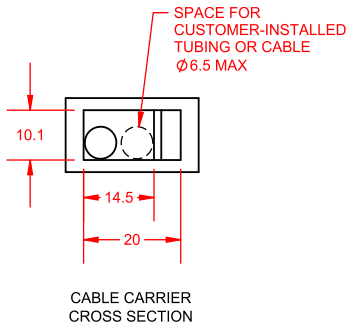
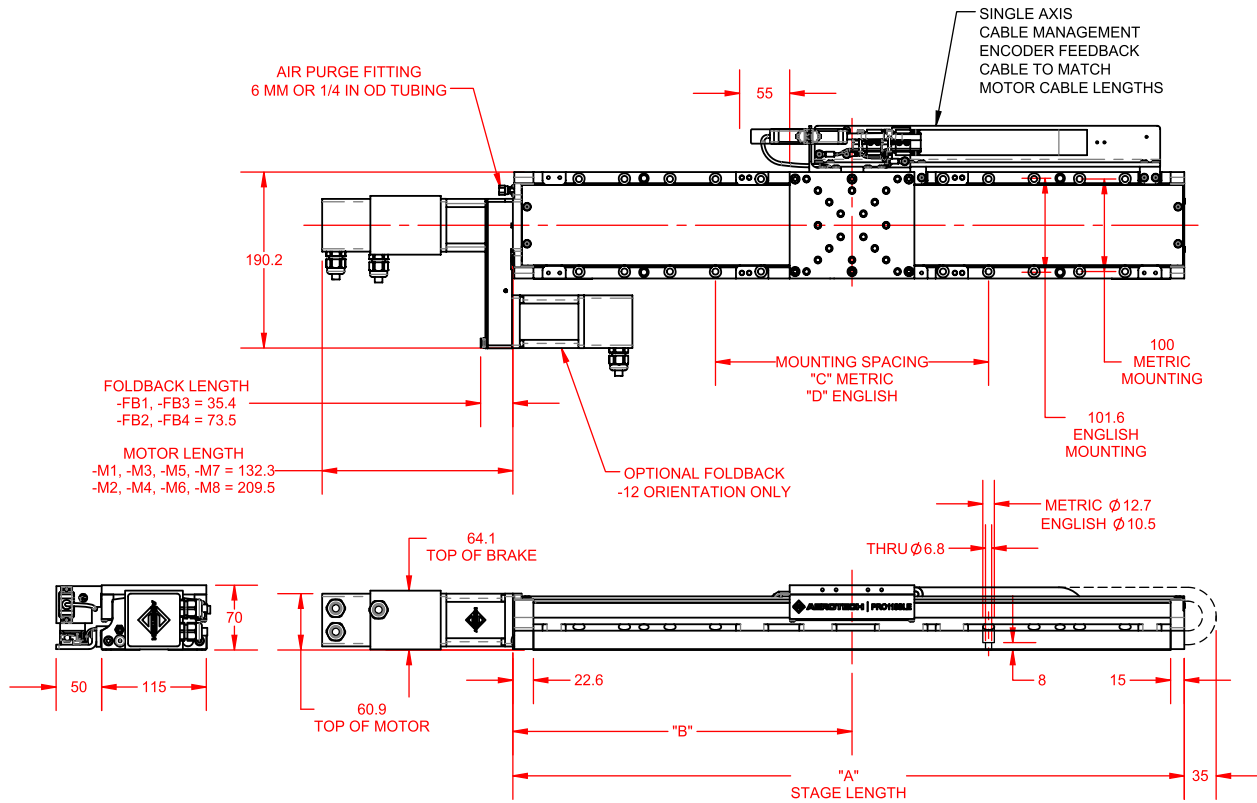
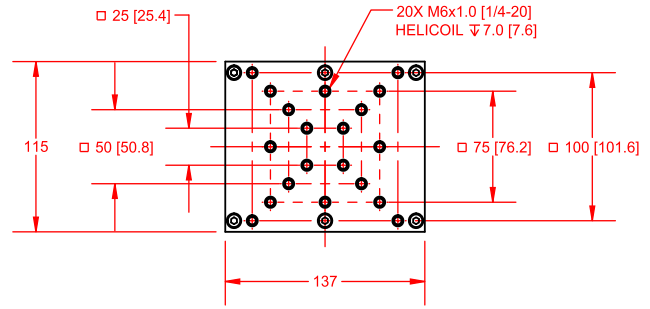


PRO115SL/SLE Series DIMENSIONS

PRO115SLE



TABLETOP
-TT1 [-TT2]

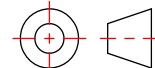


| BASIC MODEL | NOMINAL TRAVEL | ELEC LIMIT TRAVEL | MECH LIMIT TRAVEL | A | B | C | D |
|---------------|----------------|-------------------|-------------------|-------|-------|-----------------------------------|---------------------|
| PRO115SLE-050 | 50.8 | 58.4-63.2 | 75 | 287.6 | 147.6 | 100 | 101.6 |
| PRO115SLE-100 | 101.6 | 109.2-114 | 125 | 337.6 | 172.6 | 100, 200 | 101.6 |
| PRO115SLE-150 | 152.4 | 160-164.8 | 175 | 387.6 | 197.6 | 100, 200 | 101.6 |
| PRO115SLE-200 | 203.2 | 210.8-215.6 | 225 | 437.6 | 222.6 | 100, 200, 300 | 101.6 |
| PRO115SLE-250 | 254 | 261.8-266.4 | 275 | 487.6 | 247.6 | 100, 200, 300 | 101.6, 355.6 |
| PRO115SLE-300 | 304.8 | 312.4-317.2 | 325 | 537.6 | 272.6 | 100, 200, 300, 400 | 101.6, 355.6 |
| PRO115SLE-400 | 406.4 | 414-418.8 | 425 | 637.6 | 322.6 | 100, 200, 300, 400, 500 | 101.6, 457.2 |
| PRO115SLE-500 | 508 | 515.6-519 | 525 | 737.6 | 372.6 | 100, 200, 300, 400, 500, 600 | 101.6, 457.2 |
| PRO115SLE-600 | 609.6 | 617.2-619 | 625 | 837.6 | 422.6 | 100, 200, 300, 400, 500, 600, 700 | 101.6, 457.2, 660.4 |

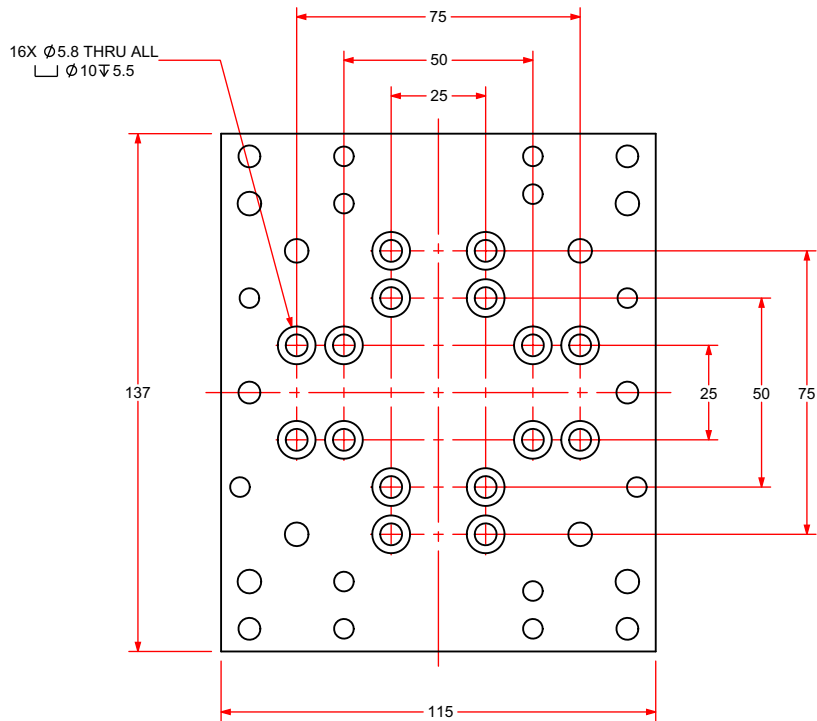
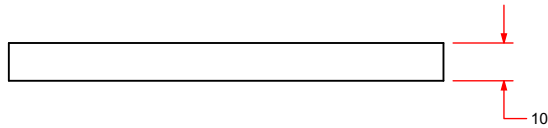
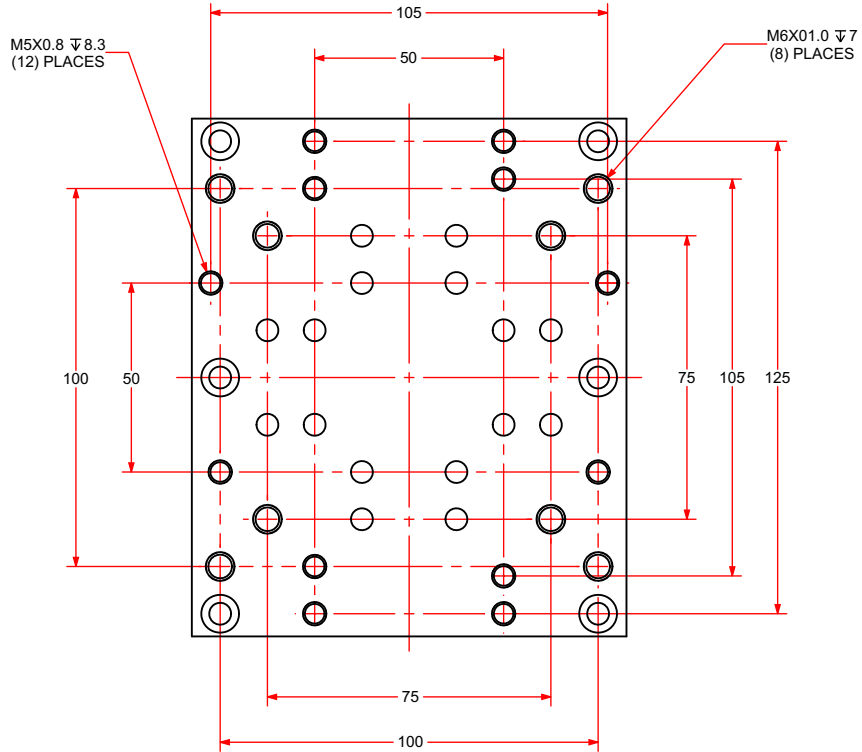
NOTES :

△ -TT1 TABLETOP OPTION REQUIRED FOR LOWER AXIS OF XY ASSEMBLIES WHEN FOLDBACK OPTION IS CHOSEN.

2. DIMENSIONS: MILLIMETERS.

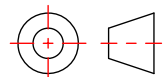


PR0115SL/SLE Series Accessory Tabletop DIMENSIONS

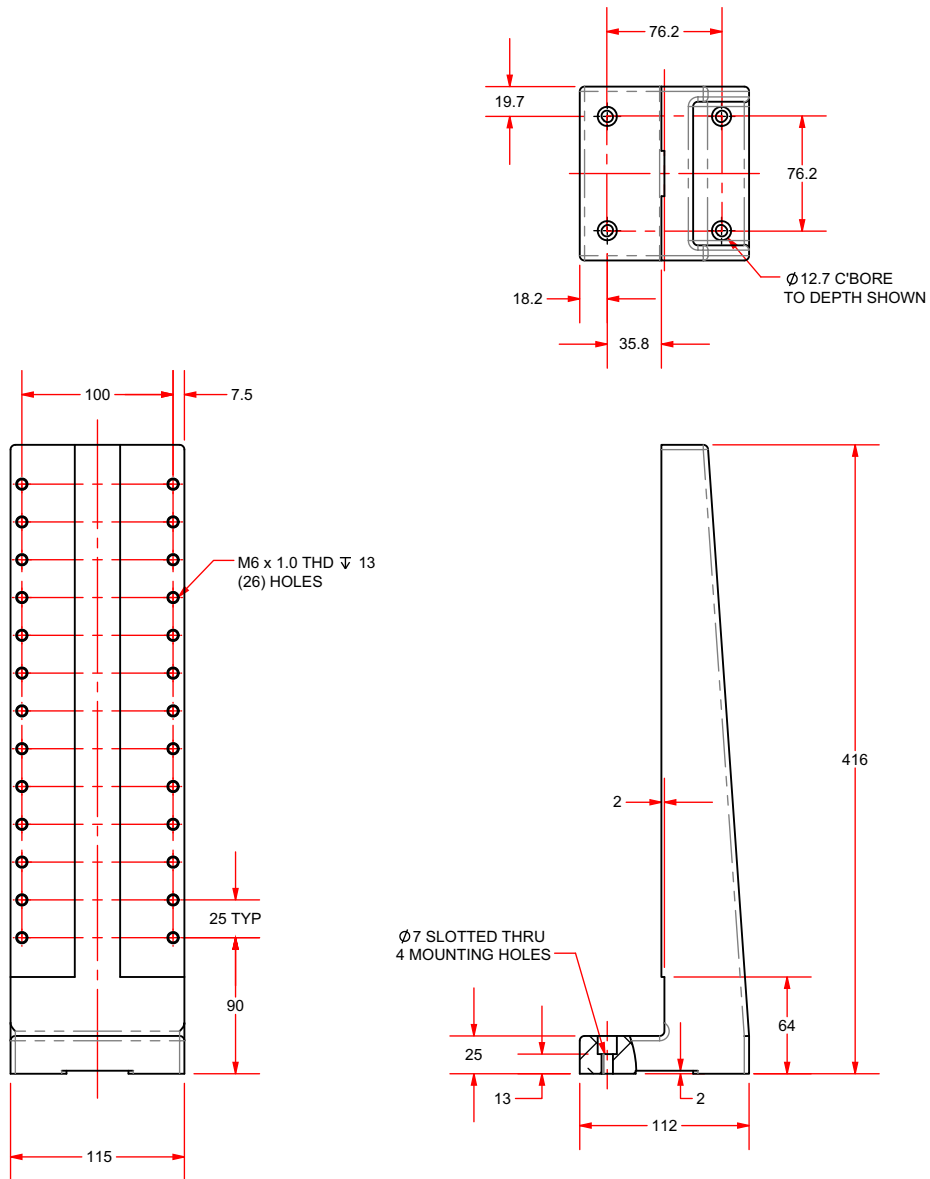


| -TT3 MOUNTS THE FOLLOWING | |
|------------------------------|-----|
| ADRS | AGR |
| -100 | 50 |
| | 75 |

DIMENSIONS: MILLIMETERS

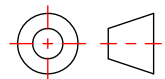


PRO115SL/SLE Series HDZ Bracket DIMENSIONS



| BASIC MODEL | RECOMMENDED FOR | MASS [kg] |
|-------------|--|-----------|
| HDZ115 | PRO115SL-050, PRO115SL-100, PRO115SL-150 | 3.7 |

DIMENSIONS: MILLIMETERS



PRO115SL/SLE Series ORDERING INFORMATION

PRO115SL Series Linear, Ball-Screw Stage

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 (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 | BMS60 brushless servomotor and 2500-line TTL encoder |
| -M2 | BMS60 brushless servomotor, 2500-line TTL encoder, and brake |
| -M3 | BMS60 brushless servomotor and 1000-line 1 Vpp encoder |
| -M4 | BMS60 brushless servomotor, 1000-line 1 Vpp encoder, and brake |
| -M5 | BM75 brushless servomotor and 2500-line TTL encoder |
| -M6 | BM75 brushless servomotor, 2500-line TTL encoder, and brake |
| -M7 | BM75 brushless servomotor and 1000-line 1 Vpp encoder |
| -M8 | BM75 brushless servomotor, 1000-line 1 Vpp encoder, and brake |

Foldback (Optional)

| | |
|------|---|
| -FB1 | Foldback kit for 0.250 inch diameter shaft NEMA 23 motor |
| -FB2 | Foldback kit with brake for 0.250 inch diameter shaft NEMA 23 motor |
| -FB3 | Foldback kit for 0.375 inch diameter shaft NEMA 23 motor |
| -FB4 | Foldback kit with brake for 0.375 inch diameter shaft NEMA 23 motor |

Note: TT option required for lower axis of XY when a foldback kit is used.

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 0.250 inch diameter shaft |
| -CP2 | Coupling for 0.375 inch diameter shaft |

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 |

PRO115SL/SLE 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 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. |
| HDZ115 | Right angle L-bracket for PRO115SL/SLE-050, PRO115SL/SLE-100, and PRO115SL/SLE-150 only. |

Note: HDZ bracket requires a tabletop when mounting to a PRO stage.

PRO115SLE 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 |
| -E4 | Incremental linear encoder, 0.5 μ m digital TTL output |

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 |

Motor (Optional)

| | |
|-----|--|
| -M1 | BMS60 brushless servomotor and 2500-line TTL encoder |
| -M2 | BMS60 brushless servomotor, 2500-line TTL encoder, and brake |
| -M3 | BMS60 brushless servomotor and 1000-line 1 Vpp encoder |
| -M4 | BMS60 brushless servomotor, 1000-line 1 Vpp encoder, and brake |
| -M5 | BM75 brushless servomotor and 2500-line TTL encoder |
| -M6 | BM75 brushless servomotor, 2500-line TTL encoder, and brake |
| -M7 | BM75 brushless servomotor and 1000-line 1 Vpp encoder |
| -M8 | BM75 brushless servomotor, 1000-line 1 Vpp encoder, and brake |

PRO115SL/SLE Series ORDERING INFORMATION

Foldback (Optional)

| | |
|------|---|
| -FB1 | Foldback kit for 0.250 inch diameter shaft NEMA 23 motor |
| -FB2 | Foldback kit with brake for 0.250 inch diameter shaft NEMA 23 motor |
| -FB3 | Foldback kit for 0.375 inch diameter shaft NEMA 23 motor |
| -FB4 | Foldback kit with brake for 0.375 inch diameter shaft NEMA 23 motor |

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 0.250 inch diameter shaft |
| -CP2 | Coupling for 0.375 inch diameter shaft |

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. |
| HDZ115 | Right angle L-bracket for PRO115SL/SLE-050, PRO115SL/SLE-100, and PRO115SL/SLE-150 only. |

Note: HDZ bracket requires a tabletop when mounting to a PRO stage.