LONG-TRAVEL LIFT STAGES **PRO-SV SERIES**

Available with
ThermoComp™

Aerotech's PRO-SV long-travel lift stage delivers ultra-precise vertical motion in a low-profile package.

Aerotech's PRO-SV series of lift stages provide long-travel, ultra-precise vertical motion in the shortest possible form factor. Three distinct models, each with a variety of configurable features and options, offer a diverse selection of travel range and payload capacity combinations, making the PRO-SV an excellent choice for all applications in which high-performance vertical motion is important.

Long Travel in a Low-Profile Package

Unlike other types of vertical motion stages, PRO-SV features a drive mechanism that impinges directly on the moving carriage. This provides an exceptionally long range of vertical travel and maintains the shortest height possible, granting free and clear access to the user's payload. Minimizing the work-point height is especially important in designing motion systems because it minimizes the Abbe offset, thus contributing to greater overall precision.

Precisely Engineered for Superior Performance

A major problem commonly associated with lift stages is subpar geometric performance (i.e., straightness, pitch, roll, and yaw). PRO-SV provides an innovative solution to this problem. Guided by anti-creep and crossed-roller bearings, the moving carriage is thoroughly supported in all directions, making PRO-SV the most precise commercially-available lift stage on the market. Additionally, a slotless, brushless torque motor is joined directly to a large-diameter, precision-ground ball-screw drive mechanism to position even the heaviest payloads with extremely smooth, cog-free motion. The lack of belts, gears, and flex-couplings contributes to PRO-SV's high reliability and eliminates sources of error from wind-up and excessive backlash.

Features for Design and Integration Flexibility

PRO-SV is engineered for seamless integration into multi-axis stage platforms, motion systems, and machines. It mounts directly to Aerotech's renowned PRO-SL and PRO-LM linear translation stages and is available with an optional accessory tabletop, to which a variety of Aerotech rotary stages or other process equipment can be integrated. Directly-coupled rotary encoder feedback is standard, and several optional high-resolution linear encoder additions exist for enhanced precision and high bandwidth when operating with dual-loop feedback. When payload management safety is critical, PRO-SV can be

PRO-SV with optional accessory tabletop, for easy mounting of Aerotech rotary stages or process equipment.

PRODUCT HIGHLIGHTS

Vertical motion with travel lengths up to 50 mm, overall heights as compact as 95 mm, speeds up to 20 mm/s, and payload capacities up to 60 kg

High-precision crossed-roller bearings result in excellent straightness and angular performance

Precision-ground ball-screw, slotless torque motor, and low-expansion linear encoder contribute to a 10 nm achievable step size

High-reliability drive mechanism contributes to the long service life

Available with ThermoComp® for consistent performance in changing environments

configured with an absolute linear encoder, as well as a holding brake, to provide extra levels of protection against inadvertent damage.

Mitigate Thermal Errors with ThermoComp

Temperature changes and thermal effects can be the most detrimental sources of error in precision machines, and screw drives are particularly susceptible. To combat this issue, PRO-SV stages are available with Aerotech's ThermoComp® feature, an integrated temperature compensation solution that delivers accurate and dependable positioning performance in the presence of thermal disturbances. It protects the stage from the effects of variable-temperature environments and friction-induced self-heating, ultimately providing stability to the user's process, even in extreme industrial environments.

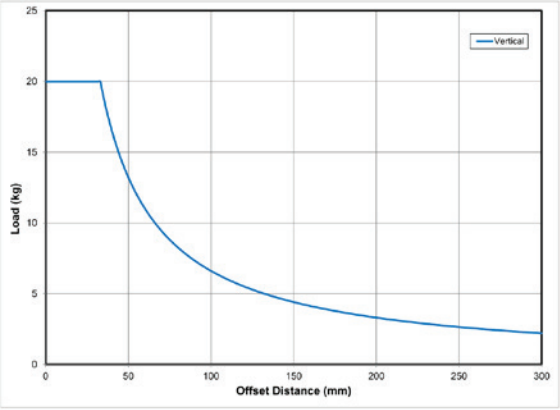
PRO-SV **Specifications**

Specifications		PRO165SV-020	PRO190SV-035	PRO225SV-050
Travel		20 mm	35 mm	50 mm
Accuracy[1]	**Standard**	±4 µm	±5 µm	±6 µm
	Calibrated	±0.75 µm		
	Calibrated, with Linear Encoder	±0.5 µm		
Resolution (Min. Incremental Motion)	**With Rotary Encoder**[2]	0.025 µm		
	With Linear and Rotary Encoder[3]	0.010 µm		
Bidirectional Repeatability[1]	**With Rotary Encoder**[2]	±0.5 µm		
	With Linear and Rotary Encoder[3]	±0.15 µm		
Straightness		±3 µm	±4 µm	±5 µm
Pitch		50 µrad (10 arc sec)		70 µrad (14 arc sec)
Roll		50 µrad (10 arc sec)		70 µrad (14 arc sec)
Yaw		25 µrad (5 arc sec)		30 µrad (6 arc sec)
Maximum Speed[4]		10 mm/s		20 mm/s
Load Capacity[5,6]		20 kg	40 kg	60 kg
Stage Mass[7]		5.4 kg	10.2 kg	17.8 kg
Material		Anodized aluminum		

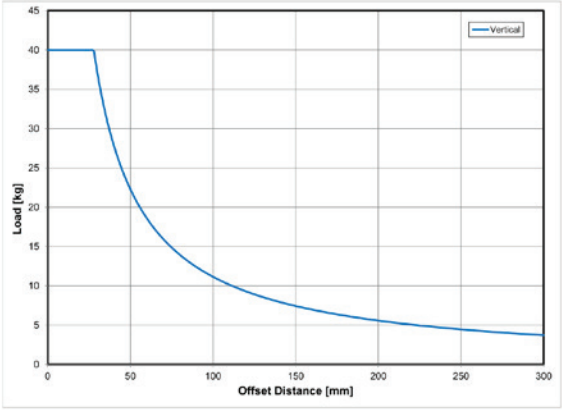
1 Certified with -PL1/-PL2 options.
2 With 1 Vpp amplified sine rotary encoder (-E1 feedback option) and linear amplifier.
3 With 1 Vpp amplified sine linear encoder (-E3, -E4 feedback options) and linear amplifier.
4 Requires the selection of an appropriate amplifier with sufficient voltage and current.
5 Axis orientation for on-axis loading is listed.
6 A holding brake (-BK option) is recommended when the payload exceeds 75% of the load capacity as a precaution in the event that power to the stage is unexpectedly lost.
7 Excludes tabletop and brake options.
8 Specifications are for single-axis systems measured 35 mm above the tabletop. Performance of multi-axis systems depends on payload and workpoint. Consult factory for details.

Electrical Specifications		PRO165SV-020	PRO190SV-035	PRO225SV-050
Drive System		Brushless torque motor		
Feedback	**Rotary**	Incremental encoder, 1 Vpp Digital encoder, RS422 10,052 lines/rev (PRO165SV, PRO190SV) or 14,452 lines/rev (PRO225SV)		
	Linear	Incremental encoder, 1 Vpp with 20 µm scale Digital encoder, RS422 with 0.25 µm resolution Absolute encoder, EnDat 2.2 with 0.001 µm resolution		
Maximum Bus Voltage		340 VDC		
Limit Switches		5 V, normally-closed		

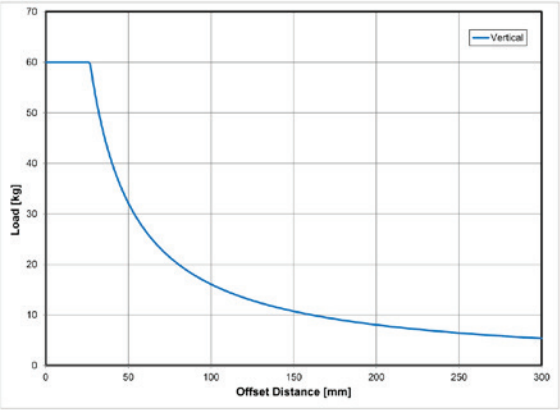
PRO-SV **Specifications**



Cantilevered load capability of PRO165SV-020.



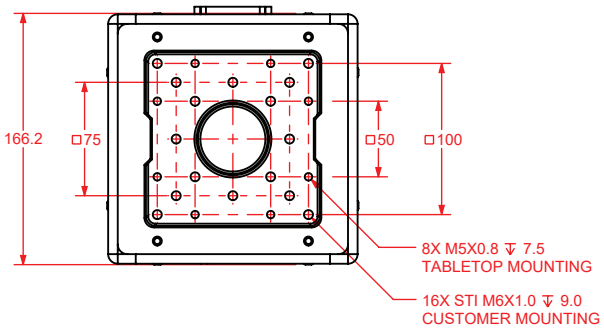
Cantilevered load capability of PRO190SV-035.

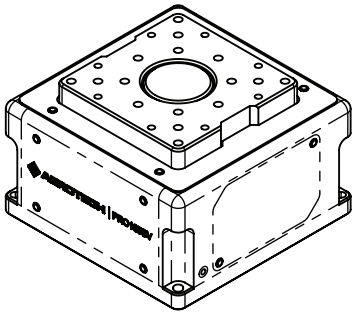


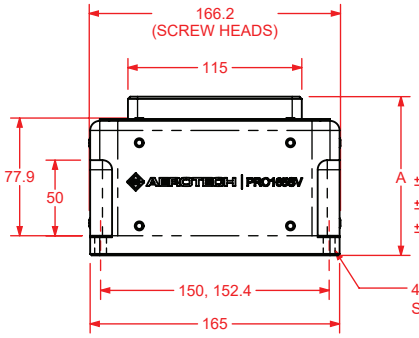
Cantilevered load capability of PRO225SV-050.

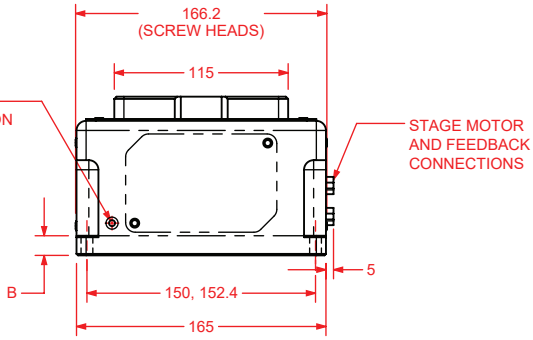
PRO-SV **Dimensions**

PRO165SV-020

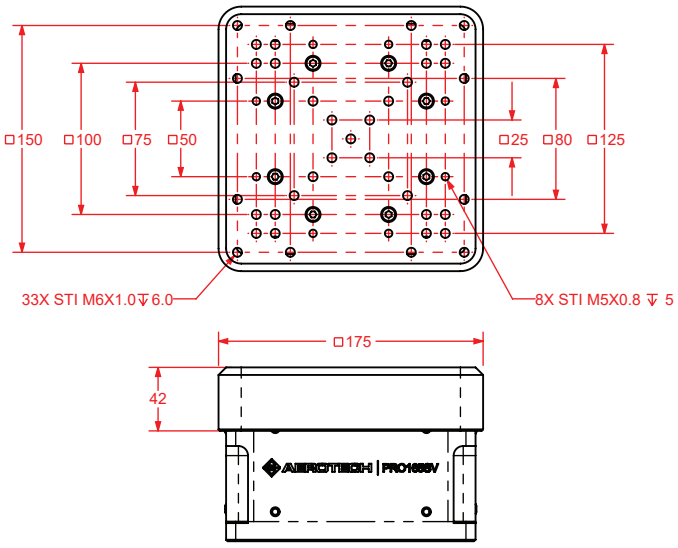








OPTIONAL ACCESSORY TABLETOP
-TT3



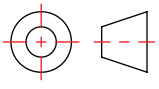
MODEL	A	B
PRO165SV-020	105	13
PRO165SV-020-TT3	115	13
PRO165SV-020-BK	120	28
PRO165SV-020-TT3-BK	130	28

-TT3 MOUNTS THE FOLLOWING △1.		
ADRS	ADRT	AGR
100	150	75
150		100

NOTE:

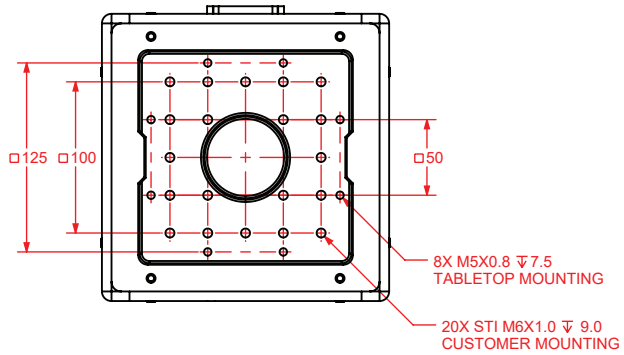
△1. SIDE MOUNTING NOT SUPPORTED.

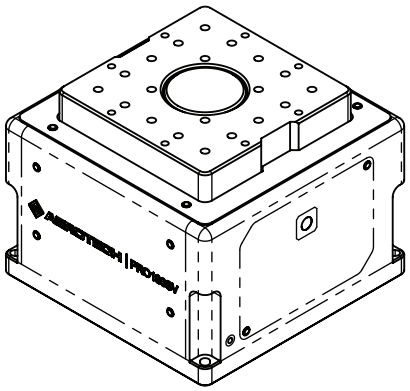
DIMENSIONS: MILLIMETERS

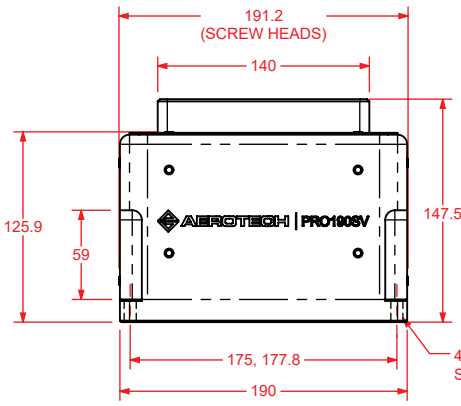


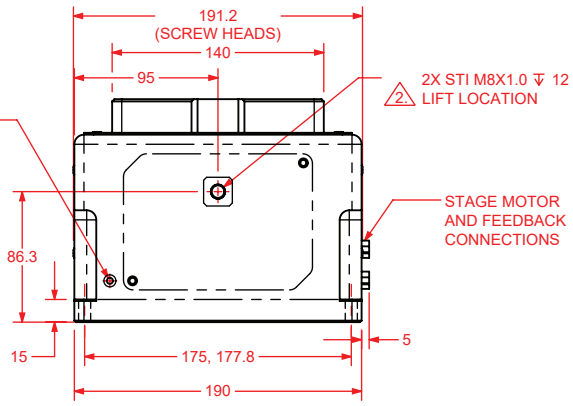
PRO-SV **Dimensions**

PRO190SV-035

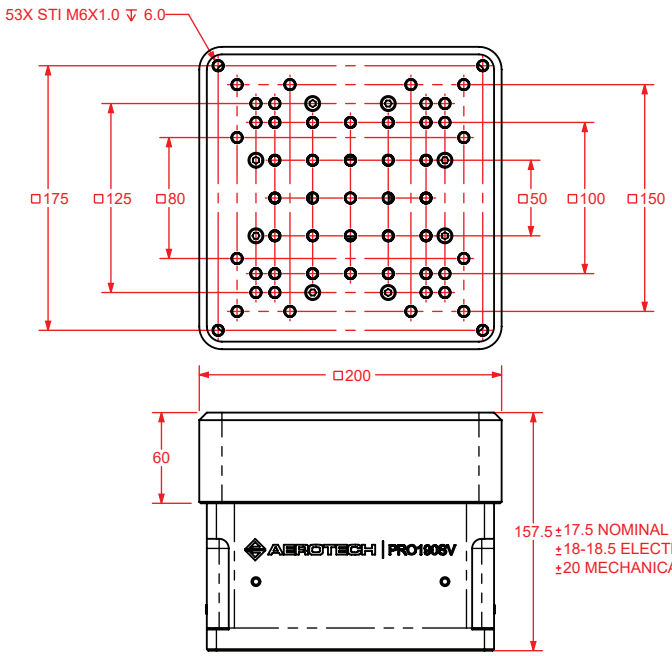








OPTIONAL ACCESSORY TABLETOP
-TT3



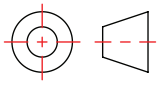
-TT3 MOUNTS THE FOLLOWING 1.		
ADRS	ADRT	AGR
150	150	100
200		

NOTE:

1. SIDE MOUNTING NOT SUPPORTED.

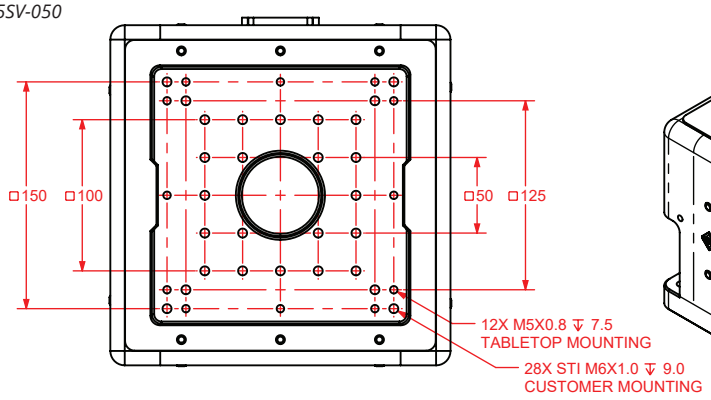
2. IF -TT3 AND -LF OPTIONS ARE SELECTED, TABLETOP MUST BE REMOVED TO ACCESS LIFT LOCATIONS.

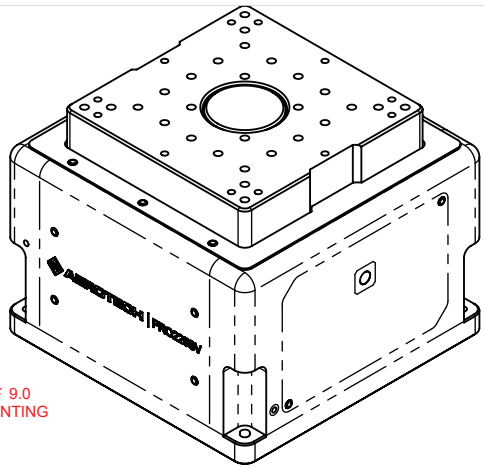
DIMENSIONS: MILLIMETERS

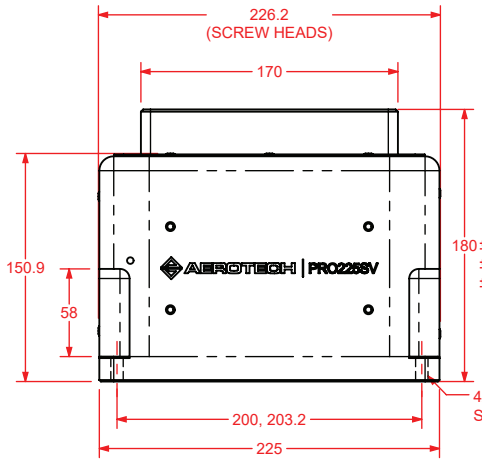


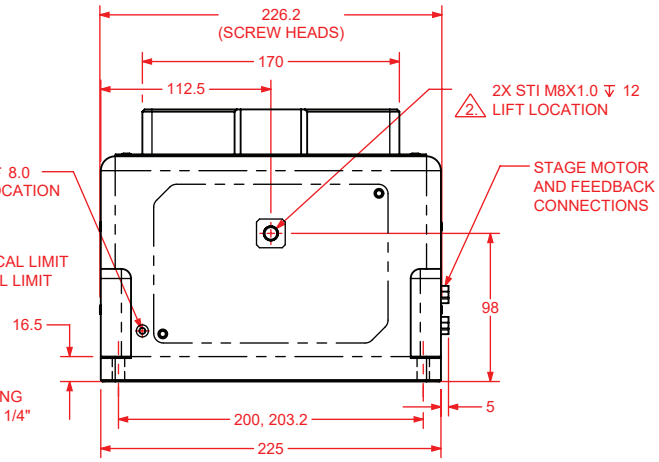
PRO-SV **Dimensions**

PRO225SV-050

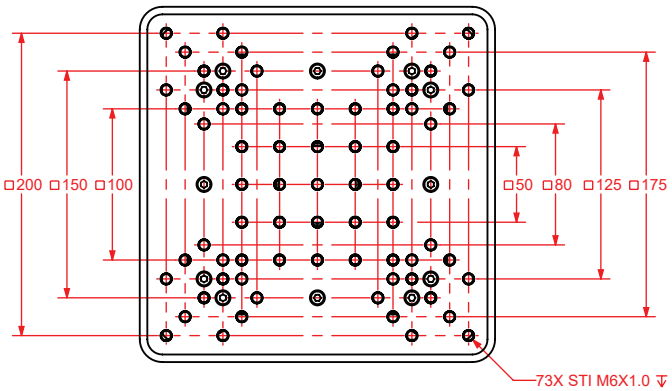


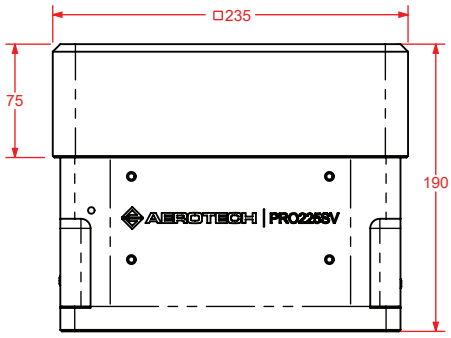






OPTIONAL ACCESSORY TABLETOP
-TT3





-TT3 MOUNTS THE FOLLOWING 1.				
ADRS	ADRT	AGR	ALAR	CCS190DR
-150	-150	100	-100-SP	-240
-200		150	-100-LP	-260

NOTE:

1. SIDE MOUNTING NOT SUPPORTED.

2. IF -TT3 AND -LF OPTIONS ARE SELECTED, TABLETOP MUST BE REMOVED TO ACCESS LIFT LOCATIONS.

DIMENSIONS: MILLIMETERS

PRO-SV **Ordering Information**

PRO-SV Long-Travel Lift Stage

PRO165SV-020	PRO165SV mechanical-bearing, ball-screw lift stage, 20 mm travel
PRO190SV-035	PRO190SV mechanical-bearing, ball-screw lift stage, 35 mm travel
PRO225SV-050	PRO225SV mechanical-bearing, ball-screw lift stage, 50 mm travel

Feedback (Required)

-E1	Rotary incremental encoder, 1 Vpp
-E2	Rotary incremental encoder, digital RS-422
-E3	Direct linear encoder, 1 Vpp + rotary encoder, 1 Vpp (dual-loop)
-E4	Direct linear encoder, 1 Vpp + rotary encoder, digital RS-422 (dual-loop)
-E5	Direct linear encoder, digital RS-422 + rotary encoder, 1 Vpp (dual-loop)
-E6	Direct linear encoder, digital RS-422 + rotary encoder, digital RS-422 (dual-loop)
-E7	Absolute linear encoder + rotary encoder, 1 Vpp (dual-loop)

Tabletop (Optional)

-TT3	Accessory tabletop with mounting for select rotary stages

Brake (Optional)

-BK	Holding brake

Note: The holding brake option is recommended when the payload exceeds 75% of the load capacity as a precaution in the event that power to the stage is unexpectedly lost.

ThermoComp (Optional)

-TCMP	ThermoComp integrated thermal compensation

Lifting Hardware (Optional)

-LF	Hoist rings

Note: Only available with PRO190SV and PRO225SV.

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.