

# ECO165SL Series

## Mechanical Bearing, Ball Screw Stage

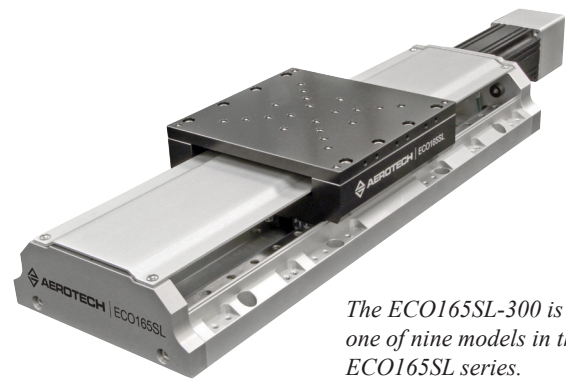
High-performance in a cost-effective, economic package

Rugged mechanical design

Available with servomotor or stepping motor

Nine models with travels from 50 mm to 600 mm

Vacuum and cleanroom versions available



*The ECO165SL-300 is one of nine models in the ECO165SL series.*

The ECO165SL is part of the ECO linear stage family, building upon Aerotech's long tradition of producing low total cost of ownership motion designs. Excellent positioning specifications, high stiffness, and a variety of options and features combined with economic pricing make the ECO165SL stage ideal for medium-performance production applications requiring ball-screw stage actuation.

### Quality Mechanical Construction

A long-life recirculating linear guide bearing system and quality construction make the ECO165SL an attractive solution for applications where up-time is critical. Unlike low-cost competitive motion stages, the ECO165SL can be integrated into complex machines with the assurance it will perform at a high level and outlast other machine components.

### Stepper Motor Option

For cost-sensitive applications, the ECO165SL series includes several NEMA 23 stepper motor options. With the ability to run on standard wall voltages, the ECO165SL provides plug-and-play capability with a minimal amount of supporting electrical equipment.

### Design and Integration Flexibility

The ECO165SL is designed with many standard features and options that make the design adaptable to specific applications. It is available in nine different models with travels ranging from 50 mm to 600 mm and speeds up to 300 mm/s.

The base mounting holes are accessible from the outside of the stage for easy mounting. Standard mounting holes for both English and metric optical tables are present in all travels. Each stage also mounts to another ECO165SL or ECO225SL for easy integration of multi-axis systems.

Optional tabletops are available with either English or metric mounting patterns. A third tabletop option features hole patterns to allow the direct attachment of several types of Aerotech rotary stages.

Aerotech BM or BMS series brushless servomotors are available with a variety of encoder options providing net resolutions ranging from 0.5  $\mu\text{m}$  down to sub-nm. A holding brake can be added to the motor for vertical applications. A motor fold-back kit is available for space-constrained applications to reduce the overall stage length.

The ECO165SL stage series offers many options to fit the exact requirements of numerous applications. Its flexible, cost-effective design easily makes it one of the best value linear ball-screw stage series available today.

# ECO165SL Series SPECIFICATIONS

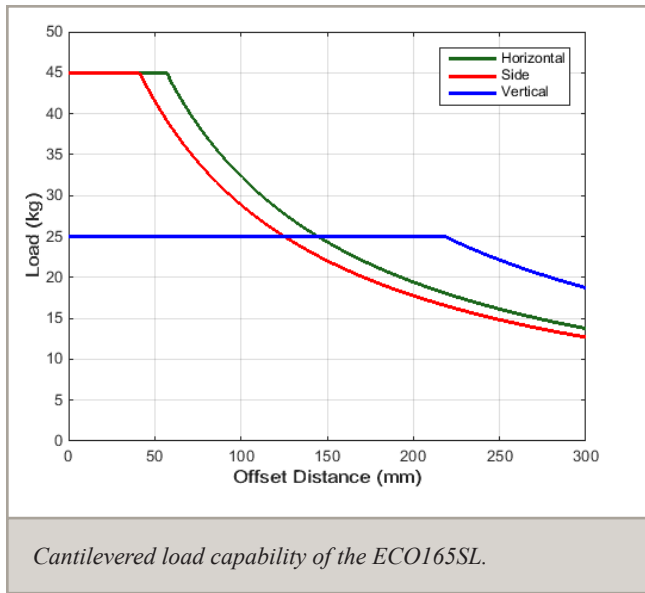
Mechanical Specifications		ECO165SL								
Travel		50	100	150	200	250	300	400	500	600
Accuracy <sup>(1)</sup>	Standard	±18 µm	±23 µm	±27 µm	±30 µm	±34 µm	±38 µm	±43 µm	±45 µm	±48 µm
	Calibrated	±5 µm	±5 µm	±5 µm	±5.5 µm	±5.5 µm	±5.5 µm	±6 µm	±6 µm	±7 µm
Resolution (Min. Incremental Motion)		0.2 µm <sup>(2)</sup> , 0.75 µm <sup>(3)</sup>								
Bidirectional Repeatability <sup>(1)</sup>		±4 µm	±4 µm	±4 µm	±4.5 µm	±4.5 µm	±4.5 µm	±5 µm	±5 µm	±5 µm
Straightness <sup>(4)</sup>		±2 µm	±3 µm	±4 µm	±5 µm	±6 µm	±7 µm	±9 µm	±11 µm	±13 µm
Flatness <sup>(4)</sup>		±2 µm	±3 µm	±4 µm	±5 µm	±6 µm	±7 µm	±9 µm	±11 µm	±13 µm
Pitch		35 µrad (7.2 arc sec)	40 µrad (8.3 arc sec)	40 µrad (8.3 arc sec)	50 µrad (10.3 arc sec)	60 µrad (12.4 arc sec)	65 µrad (13.4 arc sec)	80 µrad (16.5 arc sec)	95 µrad (19.6 arc sec)	110 µrad (22.7 arc sec)
Roll		35 µrad (7.2 arc sec)	40 µrad (8.3 arc sec)	40 µrad (8.3 arc sec)	50 µrad (10.3 arc sec)	60 µrad (12.4 arc sec)	65 µrad (13.4 arc sec)	80 µrad (16.5 arc sec)	95 µrad (19.6 arc sec)	110 µrad (22.7 arc sec)
Yaw		35 µrad (7.2 arc sec)	40 µrad (8.3 arc sec)	40 µrad (8.3 arc sec)	50 µrad (10.3 arc sec)	60 µrad (12.4 arc sec)	65 µrad (13.4 arc sec)	80 µrad (16.5 arc sec)	95 µrad (19.6 arc sec)	110 µrad (22.7 arc sec)
Maximum Speed <sup>(4)</sup>		300 mm/s								
Maximum Acceleration <sup>(4)</sup>		Function of motor, amplifier selection, payload, and maximum axial load								
Load Capacity <sup>(4)</sup>	Horizontal	45 kg								
	Vertical (Axial)	25 kg								
	Side	45 kg								
Moving Mass (w/tabletop)		2.8 kg								
Stage Mass (no motor)		5.4 kg	5.8 kg	6.3 kg	6.8 kg	7.3 kg	7.8 kg	8.7 kg	9.7 kg	10.6 kg
Material		Anodized Aluminum								
MTBF (Mean Time Between Failure)		20,000 Hours								

**Notes:**

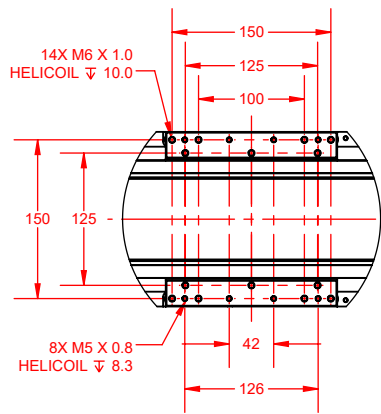
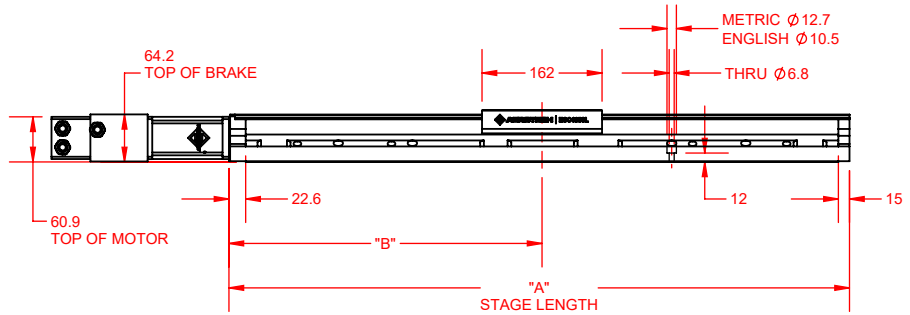
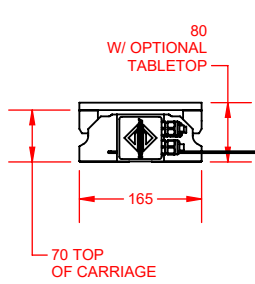
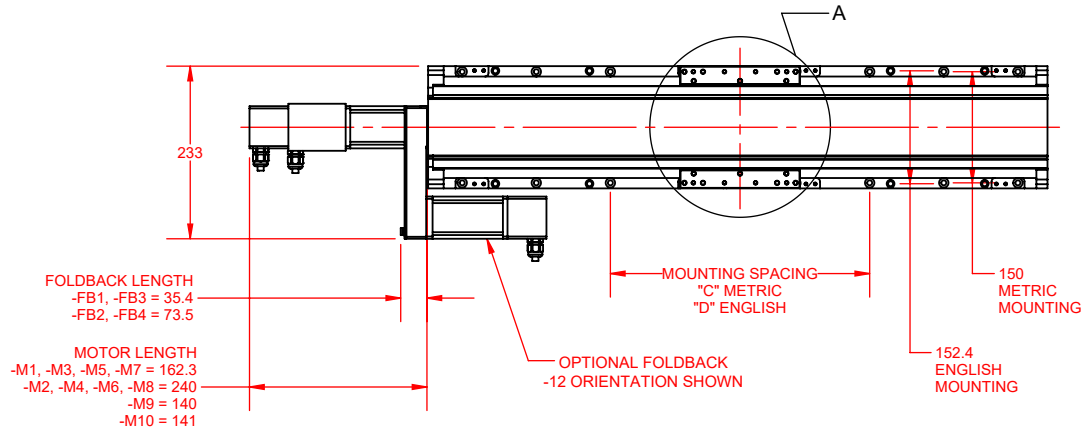
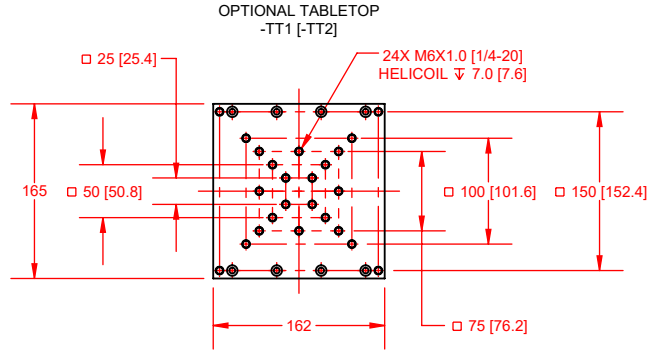
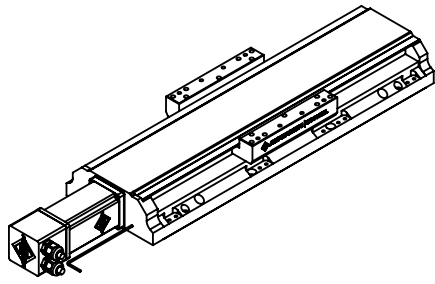
1. Certified with -PL1 option
2. Achieved with Aerotech rotary motor with amplified sine encoder
3. Achieved with Aerotech rotary motor with 2500 cnts/rev digital encoder
4. Requires the selection of an appropriate amplifier with sufficient voltage and current
5. Axis-orientation for on-axis loading 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 or Stepper Motor
Feedback	Incremental - 1000 lines/rev (-AS) and 2500 lines/rev (TTL)
Maximum Bus Voltage	340 VDC
Limit Switches	5 V, Normally-Closed

## ECO165SL Series SPECIFICATIONS



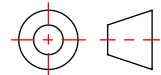
# ECO165SL Series DIMENSIONS



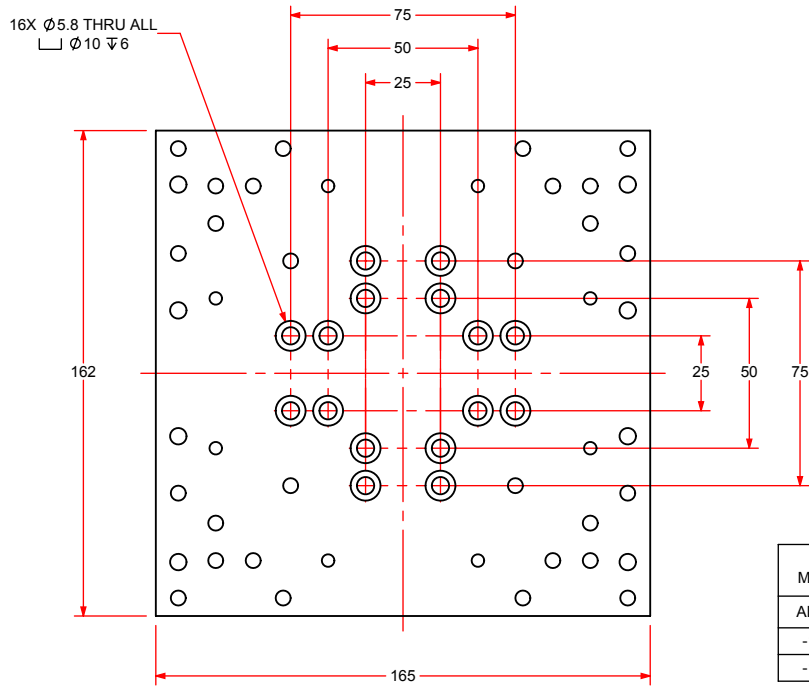
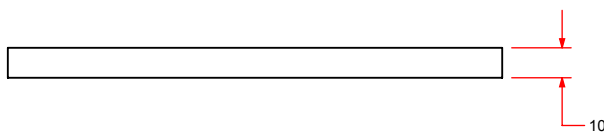
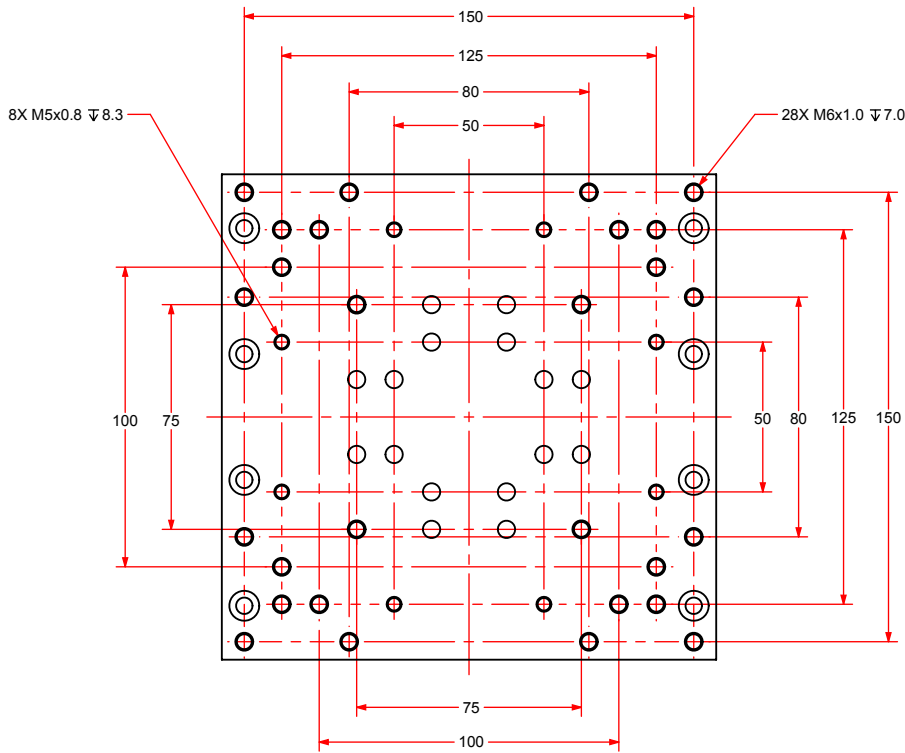
DETAIL A  
CARRIAGE MOUNTING HOLES

BASIC MODEL	NOMINAL TRAVEL	ELEC LIMIT TRAVEL	MECH LIMIT TRAVEL	A	B	C	D
ECO165SL-050	50	58.4-63.2	75.3	287.6	147.6	150	152.4
ECO165SL-100	100	109.2-114	125.3	337.6	172.6	150	152.4
ECO165SL-150	150	160-164.8	175.3	387.6	197.6	150, 350	152.4
ECO165SL-200	200	210.8-215.6	225.3	437.6	222.6	150, 350	152.4
ECO165SL-250	250	261.6-266.4	275.3	487.6	247.6	150, 350	152.4, 406.4
ECO165SL-300	300	312.4-317.2	325.3	537.6	272.6	150, 350	152.4, 406.4
ECO165SL-400	400	414-418.8	425.3	637.6	322.6	150, 350, 550	152.4, 406.4
ECO165SL-500	500	515.6-519	525.3	737.6	372.6	150, 350, 550	152.4, 406.4
ECO165SL-600	600	617.2-619	625.3	837.6	422.6	150, 350, 550, 750	152.4, 406.4, 660.4

DIMENSIONS: MILLIMETERS



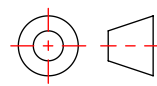
# EC0165SL Series Accessory Tabletop DIMENSIONS



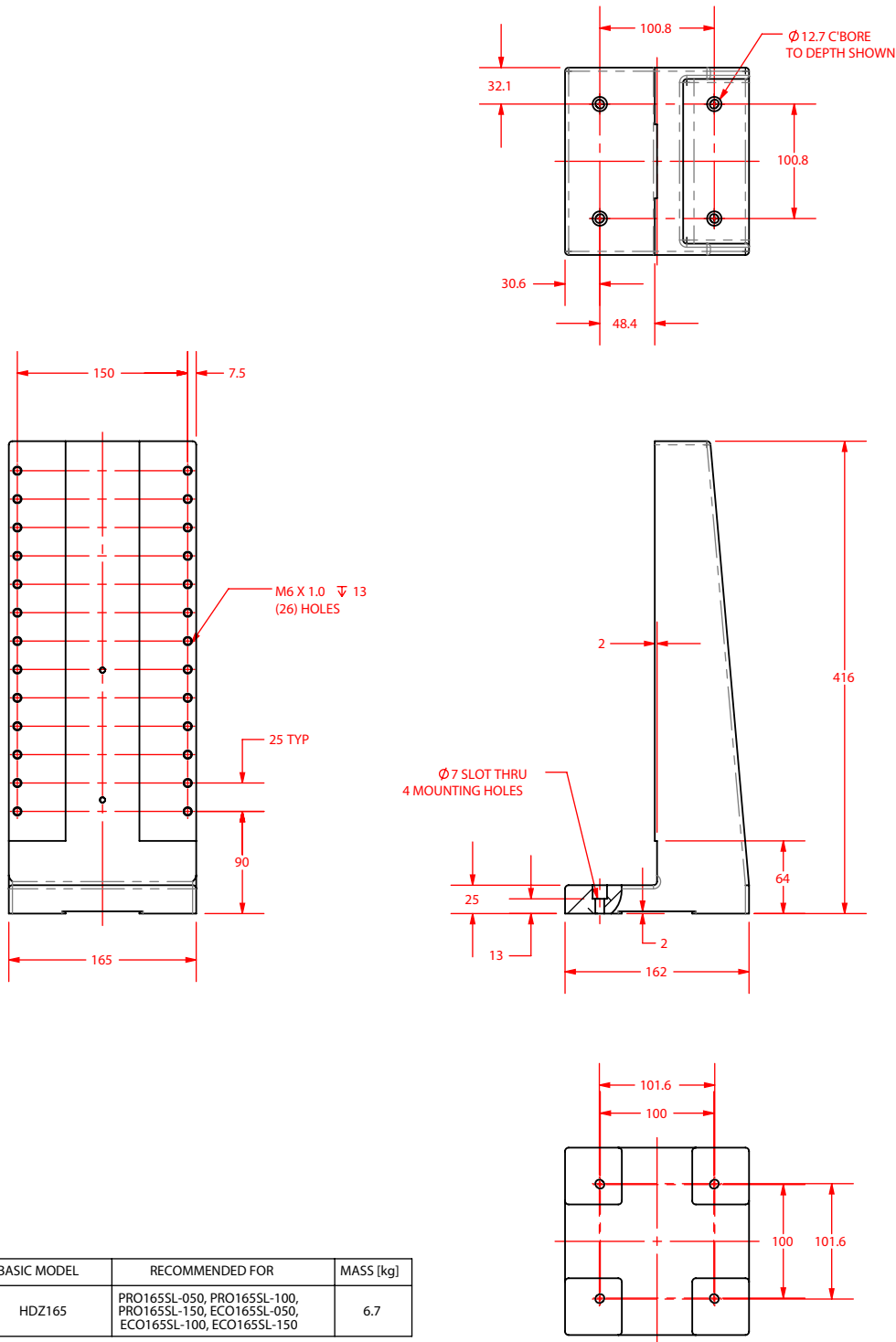
-TT3 MOUNTS THE FOLLOWING		
ADRS	ADRT	AGR
-100		75
-150	-150	100*

\*SIDE MOUNT NOT AVAILABLE

DIMENSIONS: MILLIMETERS

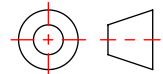


# EC0165SL Series Bracket DIMENSIONS



BASIC MODEL	RECOMMENDED FOR	MASS [kg]
HDZ165	PRO165SL-050, PRO165SL-100, PRO165SL-150, ECO165SL-050, ECO165SL-100, ECO165SL-150	6.7

DIMENSIONS: MILLIMETERS



## EC0165SL Series ORDERING INFORMATION

### EC0165SL 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

#### Motor (Optional)

-M1	BMS100 brushless servomotor and 2500-line TTL encoder
-M2	BMS100 brushless servomotor, 2500-line TTL encoder, and brake
-M3	BMS100 brushless servomotor and 1000-line 1 Vpp encoder
-M4	BMS100 brushless servomotor, 1000-line 1 Vpp encoder, and brake
-M5	BM130 brushless servomotor and 2500-line TTL encoder
-M6	BM130 brushless servomotor, 2500-line TTL encoder, and brake
-M7	BM130 brushless servomotor and 1000-line 1 Vpp encoder
-M8	BM130 brushless servomotor, 1000-line 1 Vpp encoder, and brake
-M9	SM100 high voltage stepper motor
-M10	SM100 high voltage stepper motor and brake

#### Foldback Kit (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

#### Coupling (Optional)

-CP1	Coupling for 0.250 inch diameter shaft
-CP2	Coupling for 0.375 inch diameter shaft

#### Lifting Hardware (Optional)

-LF	Lifting hardware
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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).

## ECO165SL Series ORDERING INFORMATION

### Metrology (Required)

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-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 that ship together. This is typically used for spare parts, replacement parts, or items that will not be used together. These components may or may not be part of a larger system.

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

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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.
HDZ165	Right angle L-bracket for ECO165SL-050, ECO165SL-100, and ECO165SL-150 only.

Note: HDZ165 bracket requires -TT1 or -TT2 option to mount to ECO165SL.