MPS75SLE

Miniature Mechanical-Bearing Screw-Driven Linear Stage with Linear Feedback

- **Compact stage with travels to 100 mm**

- **Low-thermal expansion glass-scale linear encoder**

- **Precision-ground ball-screw drive**

- **DC servo or stepper motor**

- **Anti-creep crossed-roller bearings**

- **High resolution (0.025 μm), repeatability (±0.1 μm) and accuracy (±0.75 μm)**

- **Optional bellows waycovers**

- **Compact multi-axis configurations**

The MPS75SLE shown with and without the optional bellows waycovers.

Aerotech's MPS75SLE is a compact, high-performance linear positioning stage offering the benefits of direct measurement feedback via a linear encoder. The MPS75SLE is the ideal high-accuracy stage for applications in optics positioning, z-axis positioning of sensors in surface metrology, or high-precision alignment. Multi-axis stage configurations can easily be assembled with other MPS linear and rotary stages using the multitude of adapter brackets and mounting compatibility inherent in the entire MPS stage family.

Ultra-Precise Design

The precision ground, preloaded ball-screw coupled with the linear encoder provide outstanding accuracy, repeatability and a positioning resolution capability to 25 nm. The anti-creep crossed-roller bearings provide exceptionally smooth travel and high-load capacity in a compact package.

Unlike competitive designs using steel (13 ppm/°C) or glass scales with 8 ppm/°C thermal expansion coefficients, the MPS75SLE is available with a low thermal expansion (3.3 ppm/°C) precision glass scale allowing for high-accuracy and repeatable positioning over long periods of time. The linear encoder is available with amplified sine (1 Vpp) or 50 nm TTL digital outputs allowing for easy integration with all standard controllers.

Highly Configurable

The MPS75SLE motor options include a DC servomotor with a high-resolution rotary encoder or a stepper motor. Just like the MPS75SL, the SLE is available with and without optional bellows waycovers.

An optional mounting plate provides direct mounting to both English and metric optical breadboards. The inherent mounting compatibility of all MPS stages allows for simple mounting in multi-axis arrangements.
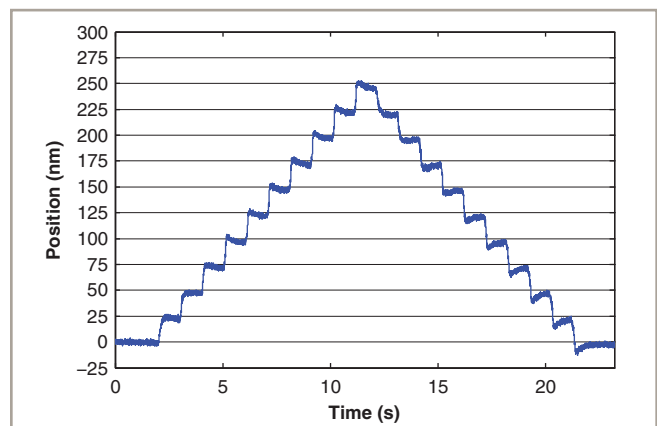
A 25 nm bidirectional step plot taken on an MPS75SLE-LTAS-DC with 25 nm electronic resolution on the linear encoder.

MPS75SLE Series SPECIFICATIONS

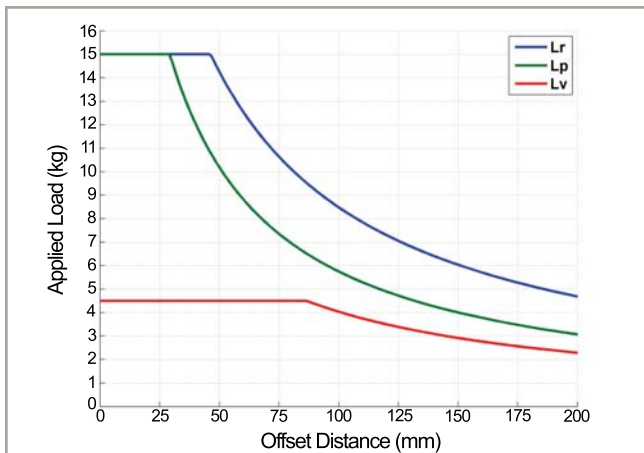| Mechanical Specifications			MPS75SLE-025	MPS75SLE-050	MPS75SLE-075	MPS75SLE-100
Travel			25 mm	50 mm	75 mm	100 mm
Accuracy	Uncalibrated		±1.75 µm	±2.25 µm	±2.75 µm	±3.25 µm
	Uncalibrated with Bellows		±2.75 µm	±3.25 µm	±3.75 µm	±4.25 µm
	Calibrated[1]		±0.75 µm	±0.75 µm	±1.0 µm	±1.0 µm
Resolution (Minimum Incremental Motion)[2]			0.025 µm			
Repeatability (Bidirectional)[2]			±0.1 µm (Standard); ±0.2 µm (with Bellows)			
Straightness			±2.0 µm	±2.0 µm	±3.0 µm	±3.0 µm
Flatness			±2.0 µm	±2.0 µm	±3.0 µm	±3.0 µm
Maximum Speed	1.0 mm/rev Ball Screw	DC Motor (-M1)	50 mm/s	50 mm/s	50 mm/s	35 mm/s
		Stepper Motor (-M2)	30 mm/s	30 mm/s	30 mm/s	30 mm/s
Load Capacity[3]	Horizontal		15 kg			
	Side		15 kg			
	Vertical		4 kg			
Stage Mass			2.3 kg	2.4 kg	2.5 kg	2.6 kg
Material			Anodized Aluminum Body			

Notes:
1. Available with Aerotech controllers.
2. Resolution and repeatability specifications are for systems running in dual-loop mode with feedback resolutions of 25 nm on both the rotary and linear encoders.
3. Payload specifications are single-axis.
4. Specifications are for single-axis systems, measured 25 mm above the tabletop.
5. Contact factory for specifications of stages with bellows option.

Electrical Specifications	DC Motor	Stepper Motor
Drive System	DC Brush Servomotor	24 VDC Bipolar Stepper Motor
Feedback (Linear Encoder)	Noncontact Linear Encoder; Amplified sine and TTL versions available	
Feedback (Rotary Motor Encoder)	10,000 lines/rev Rotary Encoder	N/A
Maximum Bus Voltage	48 VDC[1]	
Rotary Encoder Electronic Resolution	0.025 µm	0.025 µm @ 40,000 steps/rev Motor Resolution
Linear Encoder Electronic Resolution	20 µm fundamental, 0.05 µm with LTX100 option; Amplified Sine (-AS) option allows for electronic resolutions below 1 nm[2]	
Limit Switches	5V, Normally Closed	

Notes:
1. With Aerotech control system.
2. For optimum performance, Aerotech recommends using 0.025 µm as the highest-resolution when using the linear encoder as part of the servo feedback loop (e.g., dual-loop).
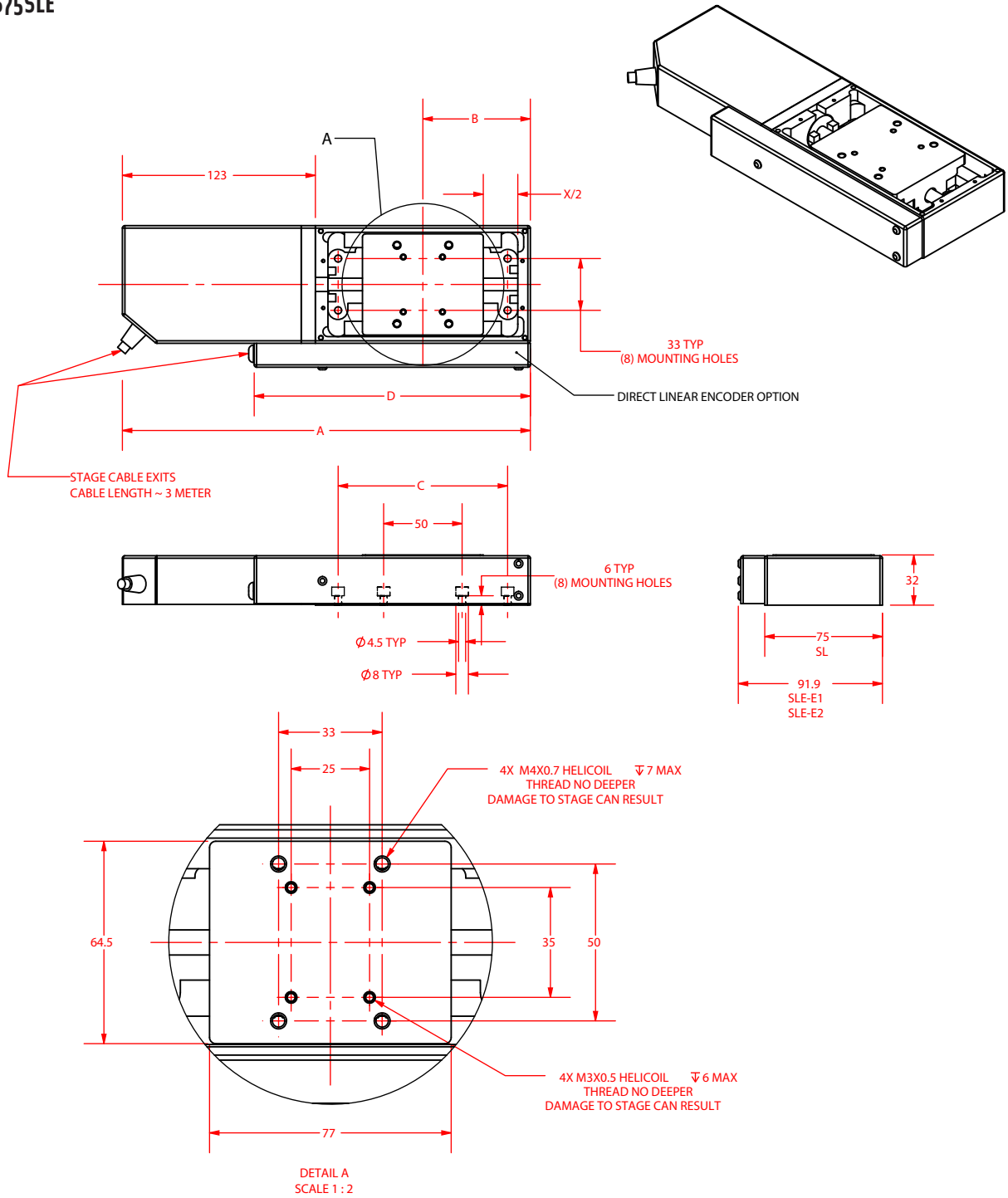
Recommended Controller		
Multi-Axis	A3200	Npaq/Npaq MR/Ndrive MP
	Ensemble	Ensemble LAB/Epaq/Epaq MR/Ensemble MP
Single Axis	Soloist	Soloist MP

MPS75SLE load curves.
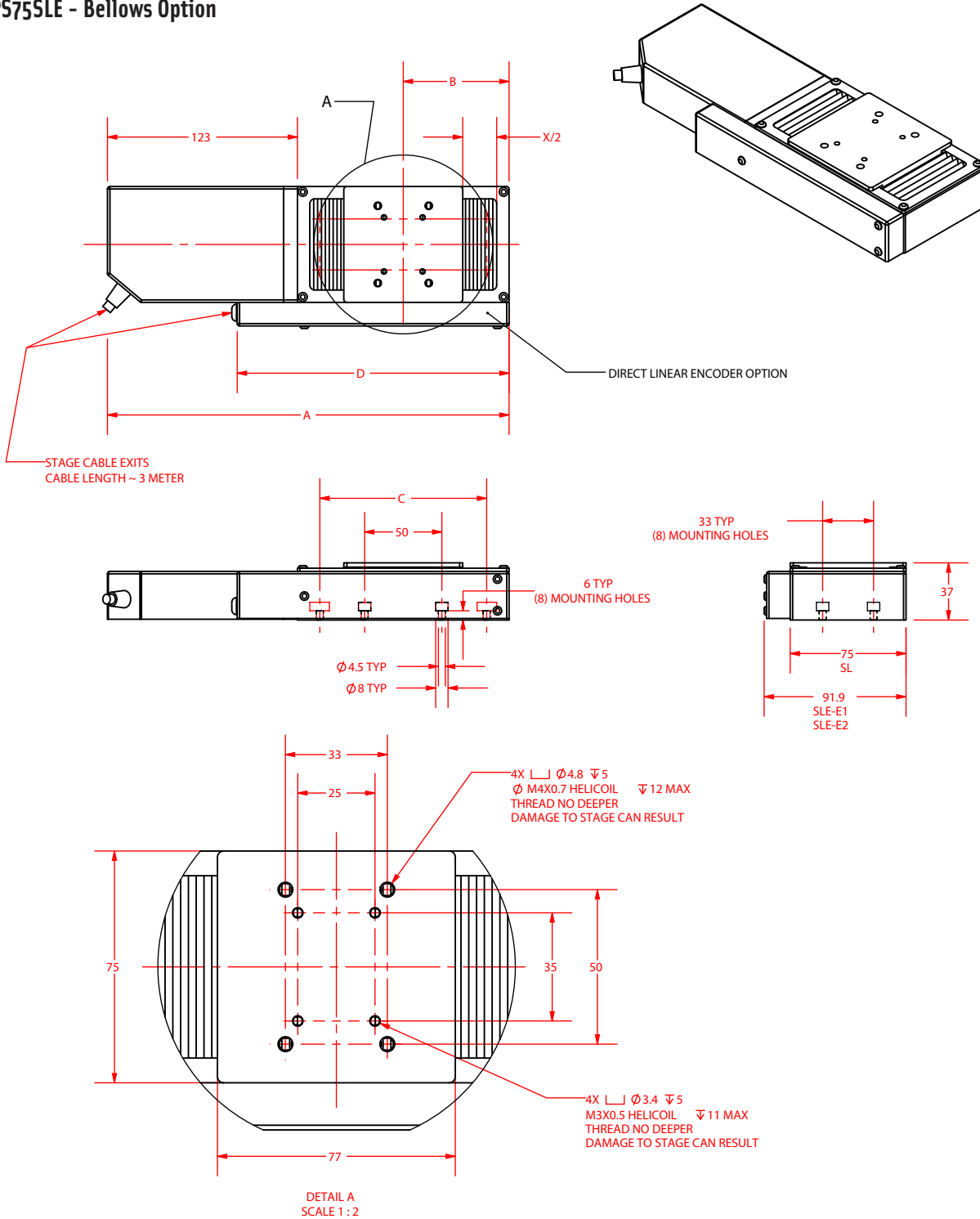
MPS75SLE Series DIMENSIONS

MPS75SLE

123

B

X/2

A

33 TYP
(8) MOUNTING HOLES

DIRECT LINEAR ENCODER OPTION

D

A

STAGE CABLE EXITS
CABLE LENGTH ~ 3 METER

C

50

6 TYP
(8) MOUNTING HOLES

Ø4.5 TYP

Ø8 TYP

32

75
SL

91.9
SLE-E1
SLE-E2

33

25

4X M4X0.7 HELICOIL ↧7 MAX
THREAD NO DEEPER
DAMAGE TO STAGE CAN RESULT

64.5

35   50

77

4X M3X0.5 HELICOIL ↧6 MAX
THREAD NO DEEPER
DAMAGE TO STAGE CAN RESULT

DETAIL A
SCALE 1 : 2

BASIC MODEL	A	B	C	D	X NOMINAL TRAVEL	X ELECTRICAL LIMIT TRAVEL	X MECHANICAL LIMIT TRAVEL
MPS75SL-025	260	68.5	108	176	25	29	34
MPS75SL-050	290	83.5	138	176	50	54	58
MPS75SL-075	320	98.5	125	260	75	79	84
MPS75SL-100	350	113.5	150	260	100	104	108

DIMENSIONS: MILLIMETERS

MPS75SLE Series Bellows Option DIMENSIONS

MPS75SLE – Bellows Option

123

B

X/2

A

DIRECT LINEAR ENCODER OPTION

D

A

STAGE CABLE EXITS
CABLE LENGTH ~ 3 METER

C

50

6 TYP
(8) MOUNTING HOLES

Ø 4.5 TYP

Ø 8 TYP

33 TYP
(8) MOUNTING HOLES

37

75
SL

91.9
SLE-E1
SLE-E2

33

25

75

35

50

77

4X ⌴ Ø4.8 ▽5
Ø M4X0.7 HELICOIL ▽12 MAX
THREAD NO DEEPER
DAMAGE TO STAGE CAN RESULT

4X ⌴ Ø3.4 ▽5
M3X0.5 HELICOIL ▽11 MAX
THREAD NO DEEPER
DAMAGE TO STAGE CAN RESULT

DETAIL A
SCALE 1 : 2

BASIC MODEL	A	B	C	D	X NOMINAL TRAVEL	X ELECTRICAL LIMIT TRAVEL	X MECHANICAL LIMIT TRAVEL
MPS75SL-025	260	68.5	108	176	25	29	34
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MPS75SL-100	350	113.5	150	260	100	104	108

DIMENSIONS: MILLIMETERS

MPS75SLE Mounting Plate DIMENSIONS

MP-MPS75SLE-100

M4x0.7 HELICOIL ∇ 8
(8) PLACES

Ø11.3 ∇ 6.8 SLOT
Ø7.1 THRU
(4) PLACES

203.2
200
33
50
50.8
50
150
227
75
10

MP-MPS75SLE-075

152.4
150

M4x0.7 HELICOIL ∇ 8
(8) PLACES

Ø11.3 ∇ 6.8 SLOT
Ø7.1 THRU
(4) PLACES

33
50
50.8
50
125
197
75
10

MP-MPS75SLE-050

127
125

M4x0.7 HELICOIL ∇ 8
(8) PLACES

Ø11.3 ∇ 6.8 SLOT
Ø7.1 THRU
(4) PLACES

33
50
50.8
50
138
167
75
10

MP-MPS75SLE-025

101.6
100

M4x0.7 HELICOIL ∇ 8
(8) PLACES

Ø11.3 ∇ 6.8 SLOT
Ø7.1 THRU
(4) PLACES

33
50
50.8
50
108
137
75
10
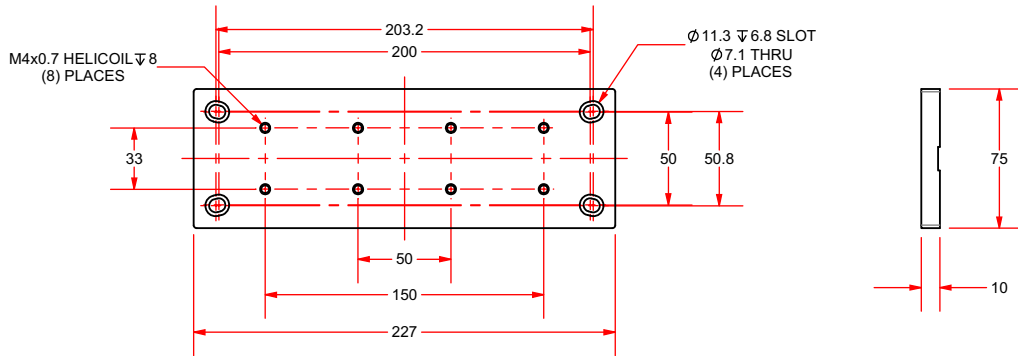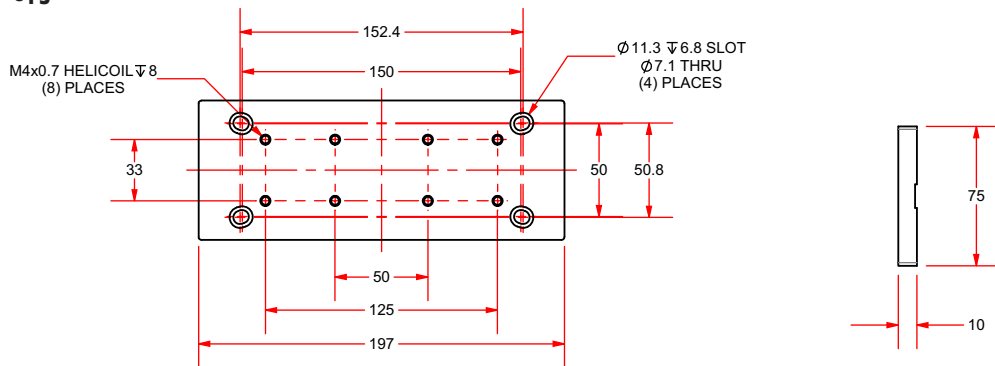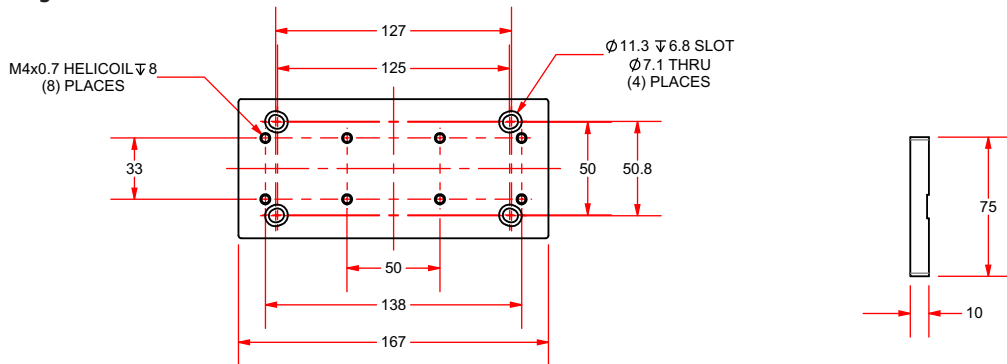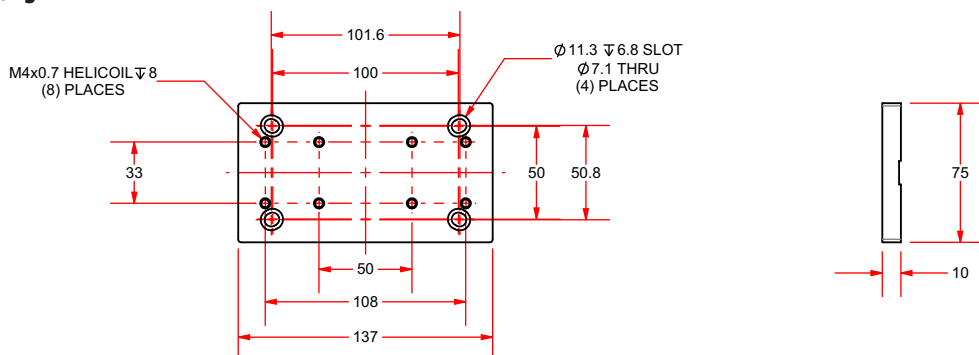
DIMENSIONS: MILLIMETERS

HDZ-MPS75SLE L-Bracket DIMENSIONS

HDZ L-Bracket

Ø 4.5 THRU ALL
⌴ Ø 8 TO DEPTH SHOWN
(8) PLACES

50
33
33
50

M4X0.7 HELICOIL THRU ALL
(22) PLACES

33

25
7.5
17.5
12.5
14
23.5
12.5
14
23.5
20.5
43

75

253

28

13

8 TYP

75
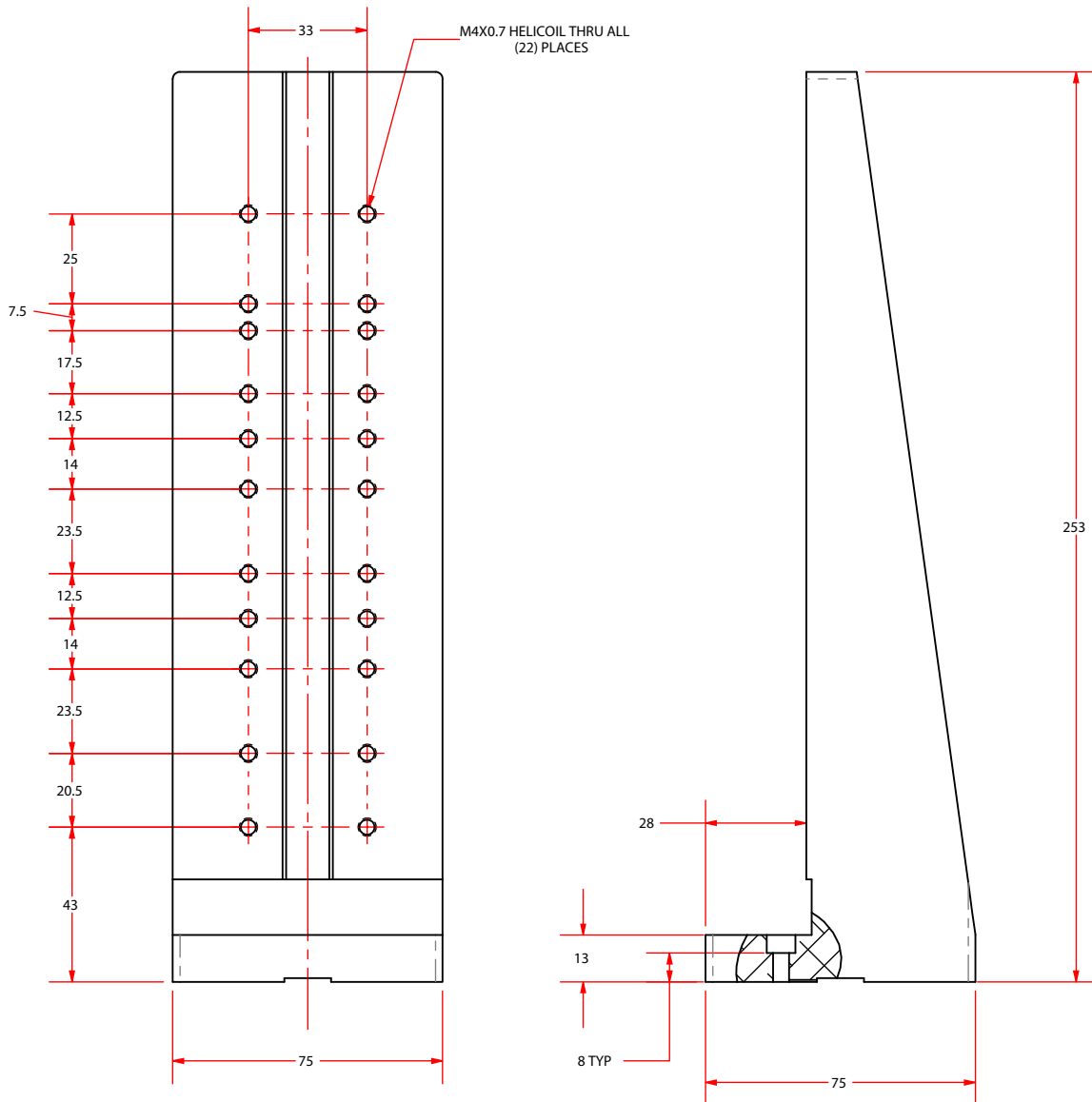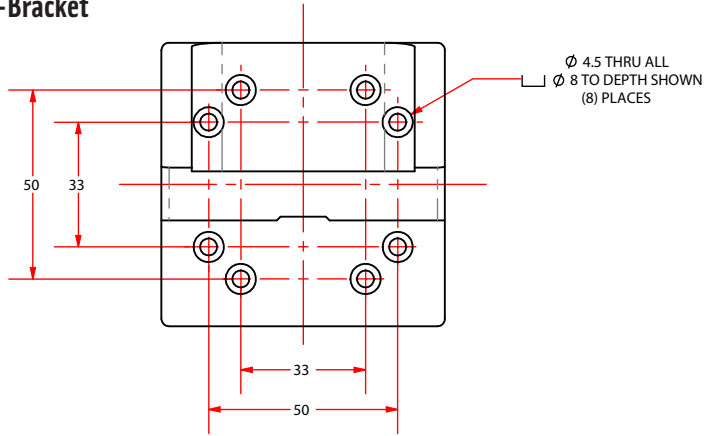
DIMENSIONS: MILLIMETERS

MPS75SLE Series ORDERING INFORMATION

MPS75SLE Miniature Mechanical-Bearing Screw-Driven Linear Stage with Linear Feedback

Direct Linear Feedback (Required)
-E1	Incremental linear encoder; 1 Vpp
-E2	Incremental linear encoder; 0.05 μm digital TTL output

Travel (Required)
-025	25 mm travel stage
-050	50 mm travel stage
-075	75 mm travel stage
-100	100 mm travel stage

Motor (Required)
-M1	DC servomotor
-M2	Stepper motor

Bellows (Optional)
-BL	Bellows waycover

Mounting Plate (Optional)
-MP	Optical table mounting plate

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)
HDZ-MPS75SL	Right angle bracket, MPS75SL