

MLT Low Profile Cross Roller Bearing Linear Stage



The MLT stage family is a compact, low profile, high precision linear stage series. It bridges the ultra-precision performance of the XM family and the compact VP family of linear stages. The MLT showcases the latest innovations and expertise of MKS in precision stage design for various Industrial applications, while keeping the short setups expected of motion products when used with MKS motion controllers.

The MLT is ideal for typical scanning or point to point applications that are implemented in industrial, semiconductor or research markets for metrology, sensor test and calibration, alignment and pick and place assembly.

Each MLT stage is designed with FEA-optimized base for the highest rigidity and thermal performance, using a high strength and stable aluminum alloy. Select components like long life and high load recirculating ball bearings, high force linear motors and high precision linear encoders are added with not only performance, but also reliability in mind. Significant tests were conducted to ensure the high reliability performance of the MLT. Built in limit switches prevent over travel and collision. An affordably-priced, readily available, easy to setup, linear motor stage, with a low profile that provides high repeatability, straightness and flatness, translating to low cost of ownership for general automation needs.

XY and XYZ configuration

The MLT can be built into XY and XYZ stacks utilizing the available mounting holes. A magnetic shield is required between the X and Y stages. Pre-assembled XYZ stacks are available in the short travel ranges. Cable chains can also be supplied as needed. The Z-stage features a magnetic counterweight to accommodate a range of vertical loads, while maintaining excellent positioning performance.

Plug and Play ESP compatible

The MLT is compatible with XPS series standard MKS controllers that support plug and play ESP technology, making startup really easy without the need for complex driver configuration.

An added convenience is that the necessary cables are included with each MLT stage.



Features and Benefits

- Low profile
- Highly repeatable
- Plug and Play ESP compatible

Product Benefits

The MLT will utilize less space, operate with higher accelerations and speeds thereby reducing operating costs, require low initial investment and need less maintenance due to its high reliability design. The overall benefit of the MLT stage is its low cost of ownership.

Even for its size, the MLT's rigid structure enables excellent pitch and yaw characteristics. This reduces system-level errors in multi-axis configurations, thus increasing the confidence in the production process, while reducing process times.

Mechanical Specifications

	MLT25	MLT50	MLT100	MLT200	MLT250	MLT25-Z ⁽⁶⁾	MLT50-Z ⁽⁶⁾	MLT25-XYZL/R ⁽⁶⁾	MLT50-XYZL ⁽⁶⁾
Travel Range (mm)	25	50	100	200	250	25	50	25, 25, 25	50,50,50
MIM, linear ⁽⁴⁾ ⁽⁵⁾ (μm)	0.005								
Bi-directional repeatability, guaranteed ⁽¹⁾ ⁽²⁾ (±μm)	0.15								
Accuracy, guaranteed ⁽¹⁾ ⁽²⁾ (±μm)	0.5	0.7	1.25	2.5	3	0.5	0.7	0.5	0.7
Maximum speed ⁽⁵⁾ (no load) (m/s)	0.5								
Maximum acceleration ⁽⁵⁾ (no load) (G)	0.75	0.75	0.75	0.5	0.5	0.5	0.5	0.5	0.5
Max. force (cont.) ⁽⁵⁾ (N)	3								
Drag force (N)	0.5								
Load capacity stage horizontal (N)	50	70	70	70	70	5			
Straightness, guaranteed ⁽¹⁾ ⁽²⁾ (±μm)	1	2	3	5	5	1	2	1	2
Flatness, guaranteed ⁽¹⁾ ⁽²⁾ (±μm)	1	2	3	5	10	1	2	1	2
Yaw, guaranteed ⁽¹⁾ ⁽²⁾ ⁽⁴⁾ (±μm) ⁽³⁾	50	75	75	125	150	50	75	50	75
Pitch, guaranteed ⁽¹⁾ ⁽²⁾ (±μm) ⁽³⁾	50	75	75	150	200	50	75	50	75
MTBF (h) 100% load, 60% duty cycle	20,000								

1) For the definition of Typical and Guaranteed specifications see "Motion Basics Terminology & Standards" Tutorial at www.newport.com

2) Middle 80% of travel

3) To obtain arcsec units, divide μrad value by 4.8

4) Requires operation in a controlled environment to achieve specification

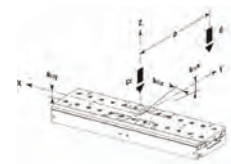
5) With XPS-DRV11, maximum value is driver dependent. Contact Newport for additional information

6) All the specs are per axis

Design Details

Base Material	High-strength 7075 Aluminum
Bearings	Anti-creep crossed roller bearings
Drive Mechanism	3-phase synchronous ironless linear motor with Hall effect sensors and thermistor
Motor initialization	Utilizes XPS controller patented feature that avoids large motions during initialization, without using Hall effect sensors
Motor communications	Done by the XPS controller using encoder signals
Feedback	Direct reading optical encoder on the translation plate, 20 μm signal period
Limit Switches	Magnets along encoder scale
Origin	Reference mark on encoder scale
Cables	Pigtails cables: 2.8 m MLT200 and MLT250 2.9 m MLT25 MLT50 and MLT250 2.9/2.5/2.1 m (X/Y/Z), MLT25-XYZ and MLT50-XYZ

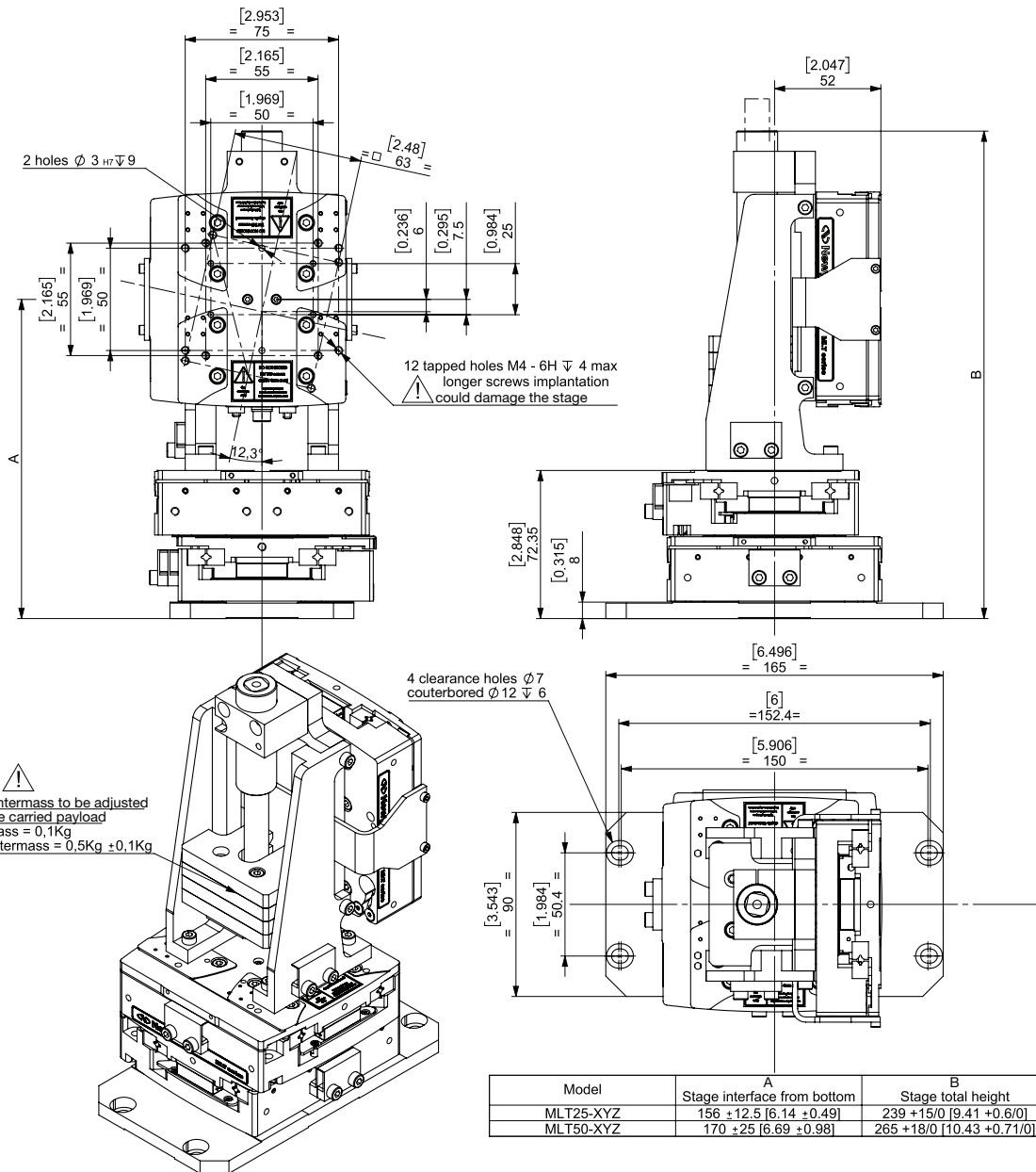
Load Characteristics and Stiffness



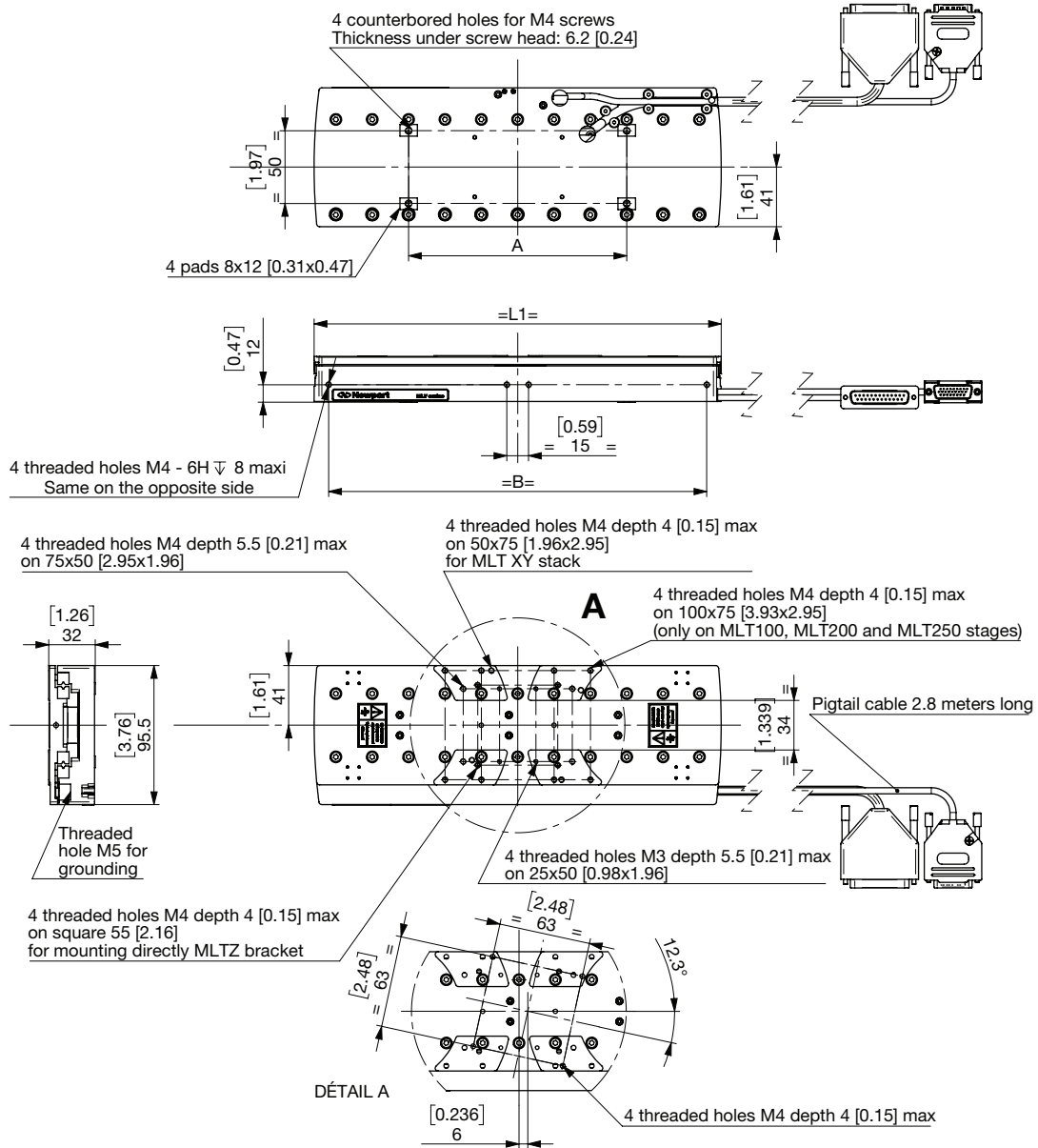
Load Characteristics and Stiffness

	MLT25	MLT50	MLT100	MLT200	MLT250
Ct, Normal centered load capacity (N)	50	70	70	70	70
k _{xx} , Compliance in roll (μrad/N/m)	11	12	21	24.6	30
k _{yy} , Compliance in pitch (μrad/N/m)	13	8.4	6.9	13.6	13.2
k _{zz} , Compliance in yaw (μrad/N/m)	12.3	5.8	3.9	3.3	2.3

Dimensional Drawings

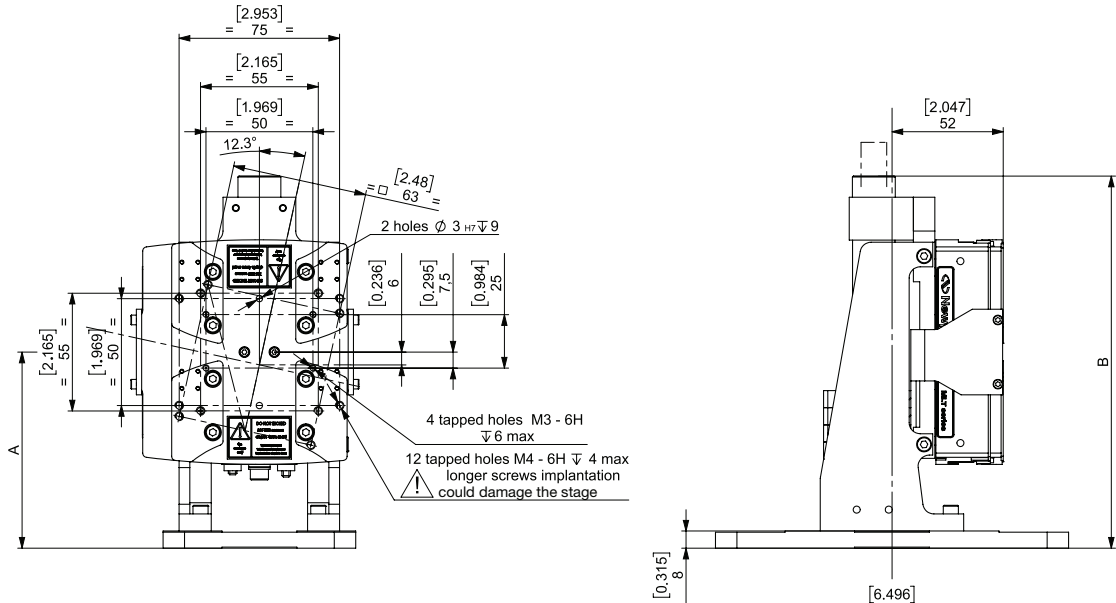


Dimensional Drawings

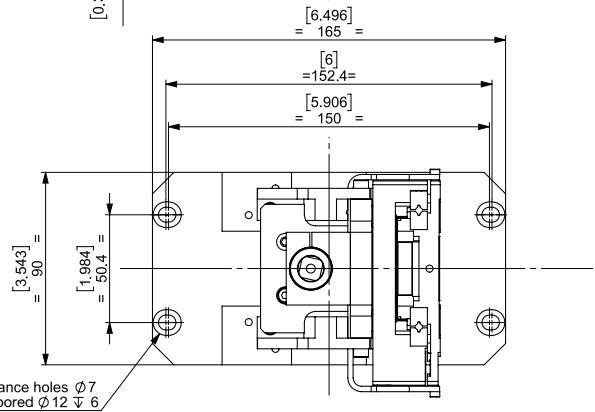
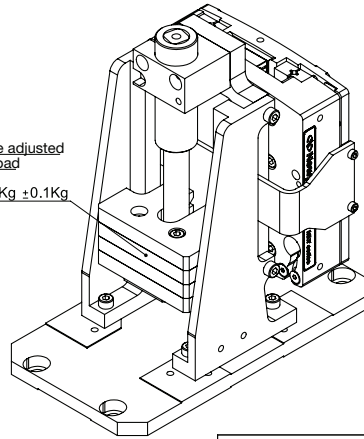


Model	A	B	L1
MLT25	75 [2.95]	85 [3.35]	105 [4.13]
MLT50	75 [2.95]	110 [4.33]	130 [5.12]
MLT100	75 [2.95]	160 [6.29]	180 [7.08]
MLT200	150 [5.9]	260 [10.2]	280 [11]
MLT250	200 [7.87]	310 [12.2]	330 [12.99]

Dimensional Drawing



⚠
 Number of countermass to be adjusted according to the carried payload
 Each countermass = 0.1Kg
 Payload + countermass = 0.5Kg ± 0.1 Kg



Model	A	B
	Stage interface from bottom	Stage total height
MLT25-Z	$91.5 \pm 12.5 [3.6 \pm 0.49]$	$174.5 \pm 15/0 [6.87 \pm 0.6/0]$
MLT50-Z	$106 \pm 25 [4.17 \pm 0.98]$	$201 \pm 18/0 [7.91 \pm 0.71/0]$

Recommended Controllers/Drivers

Model	Description
XPS-Dx	1- to 8-axis universal high-performance motion controller/driver
XPS-RLDx	1- to 4-axis universal high-performance motion controller/driver
XPS-DRV11	Universal digital driver card for stepper, DC and direct motors

Ordering Information

Model	Description
MLT25	Low profile linear stage, 25mm
MLT50	Low profile linear stage, 50mm
MLT100	Low profile linear stage, 100mm
MLT200	Low profile linear stage, 200mm
MLT250	Low profile linear stage, 250mm
MLT24-Z	Motorized linear stage, 25 mm, vertical
MLT50-Z	Motorized linear stage, 50 mm , vertical
MLT25-ZYZL	Motorized XYZ linear stage, 25 mm, left handed
MLT25-XYZR	Motorized XYZ linear stage, 25 mm, right handed
MLT50-XYZL	Motorized XYZ linear stage, 50 mm, left handed

Accessories

Model	Description
MLT-XYPLATE*	Magnetic barrier plate for XY
MLT-BP	Base plate, MLT
TR-M4M6	Inserts, set of 4
MLT-CMS**	Cable chain kit, MLT25, MLT50
MLT-CML**	Cable chain kit, MLT100, 200, 250

* Required for XY configuration to prevent upper to lower stage disturbance

** Magnetic barrier plate and 2 locating pins are included