

# Mid-Travel Steel Linear Stages

## MTN Series



The MTN Series linear stages are durable, all-steel construction linear stages with excellent stiffness, load capacity and thermal stability. They are available in DC and Stepper motor versions and are ideal for applications that require moving heavy loads with sub-micron precision (MIM). Available up to 300 mm of travel, MTN stages can bear up to 100 kg with an axial load capacity of up to 200 N. Features include: opposing single-row bearings, a diamond-corrected lead screw, a matched, precision-lapped nut and a non-migrating ball cage design. The nut design includes anti-backlash preloading and a sophisticated decoupling system ensuring little to no carriage movement. The non-migrating ball cage design prevents any ball cage drift, particularly in vertical applications.

### XY /XYZ Stage Stacks and Table Mounting

For XY configurations of MTN stages, use the M-CAP-M61 captive screws. MTN-BP base plate is needed to mount XY stack to any surface.

For Z axis mounting on XY stack , use EQ160 bracket.

### Plug and Play ESP Compatible

The MTN is an ESP compatible stage. When connected to a Newport controller, it is quickly recognized and its operating parameters are configured without the need for user input, facilitating the startup and usability of the MTN. This Plug and Play feature is not only transparent to the use, but it also ensures the safe operation of the stage.



### Features and Benefits

- 100kg central and up to 200N axial load capacity
- All steel construction for high stiffness and thermal stability
- Backlash-compensated, diamond-corrected leadscrew produces accurate linear motion, even in vertical applications
- Non-migrating ball cage design for reliable performance
- Plug and Play - ESP compatible
- Vacuum compatible versions available

## Design Details

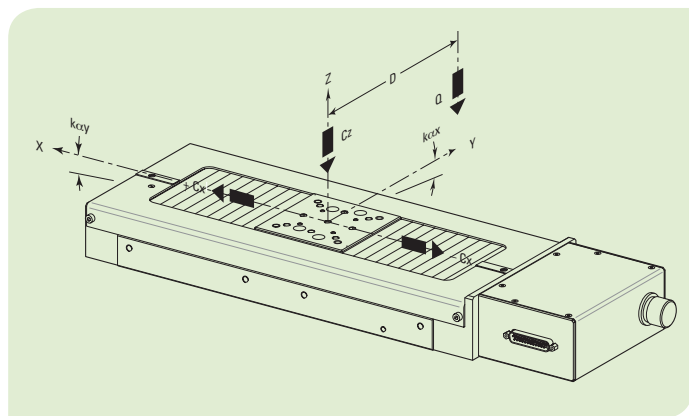
Base Material	Stainless Steel
Bearings	Linear ball bearings with anti- cage migration
Drive Mechanism	Backlash compensated leadscrew
Drive Screw Pitch	4 mm
Feedback	CC: 20,000 cts/rev. PP: No encoder
Limit Switches	Optical
Origin	Optical, centered
Vacuum Capability	MTN-PPV6 version to 10-6 hPa
Cable	3 m (included for ambient environment only)

## Specifications

	MTN-CC	MTN-PP	MTN-PPV6
Travel Range (mm)	100; 200; 300		
MIM ( $\mu\text{m}$ )	0.6	0.1	0.4
Uni-directional Repeatability, Typical (Guaranteed) (1) ( $\mu\text{m}$ )	MTN100: $\pm 0.30$ ( $\pm 0.75$ ) MTN200 & MTN300: $\pm 0.50$ ( $\pm 0.75$ )		
Bi-directional Repeatability Typical (Guaranteed) (1) ( $\mu\text{m}$ )	$\pm 0.75$ ( $\pm 1.5$ )	$\pm 1.75$ ( $\pm 2.75$ )	$\pm 2.25$ ( $\pm 2.75$ )
Accuracy, Typical (Guaranteed) (1) ( $\mu\text{m}$ )	MTN100: $\pm 1.5$ ( $\pm 2.5$ ) MTN200: $\pm 2.0$ ( $\pm 2.5$ ) MTN300: $\pm 2.5$ ( $\pm 3.0$ )		
Maximum Speed (mm/s)	100 (No load)	40	20 (4)
Pitch, Typical (Guaranteed) <sup>(1) (2)</sup> ( $\mu\text{rad}$ ) <sup>(3)</sup>	MTN100: $\pm 10$ ( $\pm 20$ ) MTN200: $\pm 20$ ( $\pm 40$ ) MTN300: $\pm 30$ ( $\pm 60$ )		
Yaw, Typical (Guaranteed) <sup>(1) (2)</sup> ( $\mu\text{rad}$ ) <sup>(3)</sup>	MTN100: $\pm 10$ ( $\pm 20$ ) MTN100: $\pm 10$ ( $\pm 20$ ) MTN100: $\pm 10$ ( $\pm 20$ )		

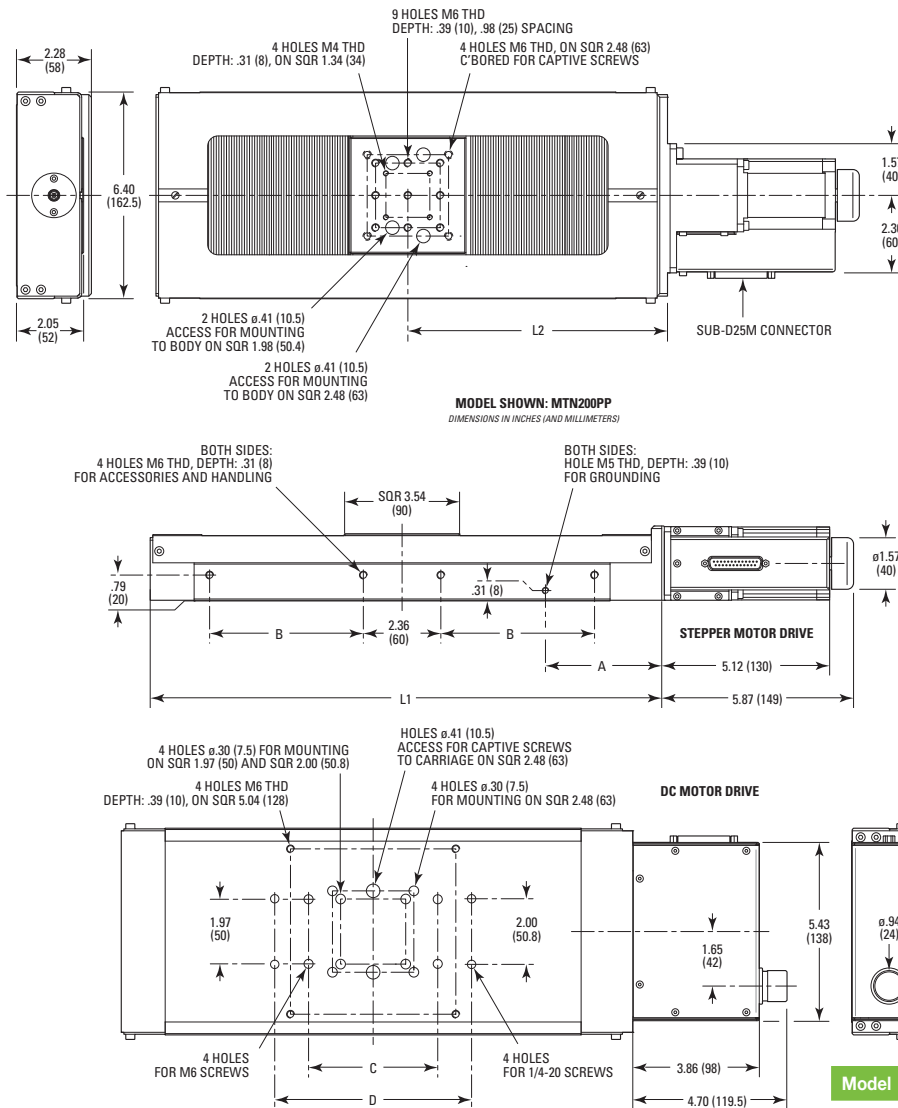
- 1) Shown are peak to peak, guaranteed specifications or  $\pm$  half the value as sometimes shown. For the definition of typical specifications which are about 2X better than the guaranteed values.  
 2) For 100 mm travel.  
 3) To obtain arcsec units, divide mrad value by 4.8.  
 4) With the PPV6 version the maximum speed is reduced by a factor of two.

## Load Characteristics and Stiffness



Cz, Normal centered load capacity on bearings	1000 N
Cx, Direct load capacity on X axis	MTN-CC & MTN-PP: 200N MTN-PPV6: 50N
-Cx, Inverse load capacity on X axis	21 N
$k_{\alpha x}$ , Compliance in roll	4 $\mu\text{rad}/\text{Nm}$
$k_{\alpha y}$ , Compliance in pitch	6 $\mu\text{rad}/\text{Nm}$
$k_{\alpha z}$ , Compliance in yaw	5 $\mu\text{rad}/\text{Nm}$
Q, Off-center load where: D = Cantilever distance in mm	$Q \leq C_z \div (1 + D/100)$

## Dimensional Drawing



Model	A	B	C	D	L1	L2
MTN100CC	2.95 (75)	2.20 (56)	-	-	11.65 (296)	5.94 (151)
MTN100PP	3.03 (77)					
MTN200CC	3.54 (90)	4.69 (119)	3.94 (100)	6.00 (152.4)	15.59 (396)	7.91 (201)
MTN200PP	3.62(92)					
MTN300CC	3.54 (90)	6.14 (156)	8.0 (203.2)	9.84 (250)	19.57 (497)	9.88 (251)
MTN300PP	3.62 (92)					

## Recommended Controllers/Drivers

Model	Description
XPS-Dx	1- to 8-axis universal high-performance motion controller/driver
XPS-DRV11	Universal digital driver card for stepper, DC and direct motors
XPS-RLDx	1- to 4-axis universal high-performance motion controller/driver
ESP301-xN	1- to 3-axis motion controller/driver

## Ordering Information

Series	Travel (mm)	Drive	Vacuum Prep. <sup>(1)</sup>
MTN	100	CC PP	V6
	200		
	300		

*Example:  
The **MTN200PP** is an MTN stage with 200 mm travel and a stepper motor drive.*

<sup>1)</sup> Vacuum compatible to 10<sup>-6</sup> hPa. In this case max. speed and load capacity are divided by two.

CC: DC motor  
PP: Stepper motor

## Accessories



MODEL	DESCRIPTION
EQ160	Right-Angle Bracket
MTN-BP	Base Plate
MTN-TP	Top Plate with Imperial Hole Pattern
M-CAP-M61	Captive Screws for MTN XY Mounting

Note: A base plate comes with MTN-PPV6 versions.