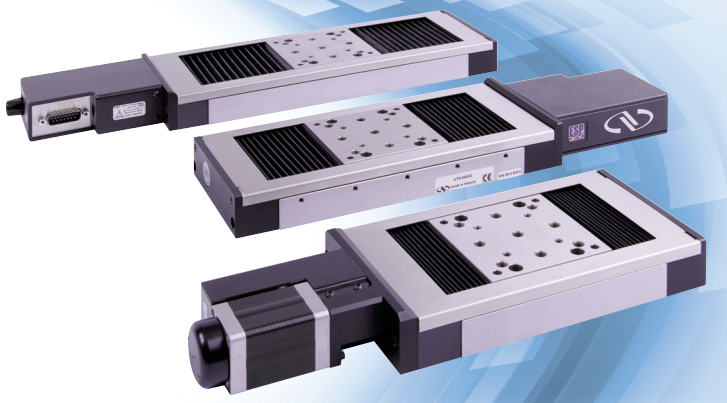
Mid-Travel Steel Linear Stages

UTS SERIES



UTS Series motorized linear stages offer 50-150 mm mid travel range with an all steel construction for exceptional stiffness and thermal stability.

- All-steel construction offers high stiffness and high thermal stability
- Ultra-low profile design with up to 150 mm travel
- Diamond-corrected lead screw with matched nut for high precision positioning
- DC motor and Stepper motor versions
- Plug and Play ESP compatible
- Vacuum compatible versions

All Steel Construction

UTS series linear stages feature all-steel construction with preloaded linear ball bearing slides. Steel has an almost 3-times greater stiffness than aluminum, and provides the UTS stages comparable stiffness to the popular ILS series, but in a much more compact and significantly lower profile package. The homogenous steel design minimizes thermal stress and eliminates bi-metal bending effects of aluminum stages. The result is more consistent performance than other aluminum stage designs.

Plug and Play ESP Motion Controller Compatible

The UTS 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 UTS. This Plug and Play feature is not only transparent to the use, but it also ensures the safe operation of the stage.

Vacuum Compatible Versions

UTS series stages are offered in vacuum compatible versions up to 10^{-6} hPa.

XY Stage Stacks and Table Mounting

For XY configurations of UTS stages, use the M-CAP-M41 captive screws. The same screws can also be used for bolting UTS stages directly to custom mounting surfaces via thru-holes at the carriage. For mounting UTS stages to optical tables, please use the M-PBN12 base plate.

DESIGN DETAILS

Base Material	Stainless steel
Bearings	Linear ball bearings
Drive Mechanism	Precision ground backlash-compensated leadscrew with decoupling nut
Drive Screw Pitch	2 mm
Feedback	CC: Screw mounted rotary encoder PP and PPV6: No feedback
Limit Switches	Optical
Origin	Optical, at center of travel
Drive Type	DC Servo, Micro Stepper
Cable Length	3 m (included)

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Diamond-Corrected Lead Screw Drive

Precision motion is provided by a diamond-corrected lead screw and a matched, lapped nut to enable high vertical load capacity and to ensure high position stability even at power-off. The precision nut includes anti-backlash preloading and a sophisticated decoupling system that prevents lead screw eccentricity errors from affecting stage movement.

Economical Stepper Motor Version

The stepper motor version is a cost-effective solution for less demanding applications. When used with our XPS, ESP301, or SMC100PP controllers with high micro-stepping capability, low-noise operation and very small incremental motions are guaranteed. Position is attained by the number of commanded steps and micro-steps. For this purpose, the stepper motor is directly attached to the lead screw with a proprietary bellow coupling with high-torsion stiffness and no gear or belt drive in between. The high output torque of the stepper motor also minimizes the risk of lost steps and provides optimum motion sensitivity with good linearity between commanded micro-steps and the actual motion of the stage.

DC Motor Version with Integrated Ultra-High Resolution Encoder

The DC motor version features an ultra-high resolution 20,000 cts/rev rotary encoder with index pulse for precision homing and is the recommended choice for applications requiring accurate bi-directional positioning. For tightest position control, the rotary encoder is directly mounted on the lead screw. This eliminates the majority of drive train error sources that affect other stages with indirect position read-out. The high-torque DC motor provides the highest dynamic speed control and allows for linear speeds up to 40 mm/s. An 11:4 belt reduction between the motor and the lead screw increases the available output torque, reduces the servo sensitivity and ensures 0.3 µm incremental motion capability with all Newport motion controllers and drivers.

SPECIFICATIONS

	UTS-CC			UTSPP & UTS-PPV6		
Travel Range (mm)	50	100	150	50	100	150
Minimum Incremental Motion (µm)		0.3			0.3 [1]	
Uni-directional Repeatability, Typical (Guaranteed) (µm)		±0.30 (±0.5)			±0.30 (±0.5)	
Bi-directional Repeatability, Typical (Guaranteed) [2] (µm)		±0.6 (±1.75)			±2.3 (±3.0)	
Accuracy, Typical (Guaranteed) [2] (µm)	±1.1 (±2.25)	±1.5 (±2.75)	±2.0 (±3.25)	±1.2 (±2.5)	±1.7 (±3.5)	±2.0 (±4.0)
Maximum Speed (mm/s)		40 [3]			20 [4]	
Pitch, Typical (Guaranteed) [2] (µrad) [5]	±17 (±37)	±25 (±50)	±25 (±60)	±17 (±37)	±25 (±55)	±25 (±60)
Yaw, Typical (Guaranteed) [2] (µrad) [5]	±12 (±25)	±20 (±35)	±30 (±45)	±12 (±25)	±20 (±35)	±30 (±45)
MTBF (h)	20,000 with 5 kg load and 30% duty cycle					

[1] 0.3 µm with XPS; 0.5 µm with SMC100PP or ESP301.

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

[3] With axial loads greater than 1 kg the maximum speed must be reduced to 20 mm/s.

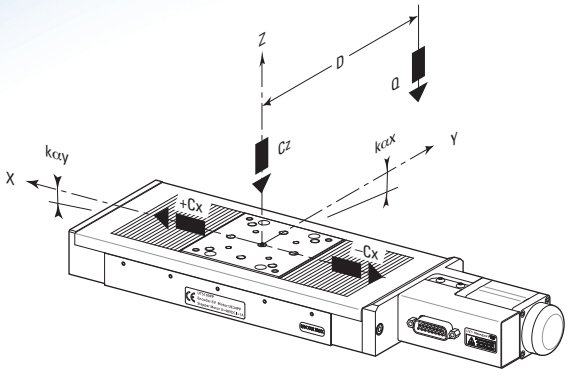
[4] 10 mm/s for UTS-PPV6; 4 mm/s for UTS-PPV6 when used with SMC100PP.

[5] To obtain arcsec units, divide µrad value by 4.8.

RECOMMENDED CONTROLLERS/DRIVERS

Model	Description
XPS-D	1- to 8-axis universal high-performance motion controller/driver
XPS-DRV11	Universal digital driver card for stepper, DC and direct motors
XPS-RL	1- to 4-axis universal high-performance motion controller/driver
XPS-DRV01	PWM drive module for DC brush and stepper motors, 3 A/43 V max.
ESP301	1- to 3-axis motion controller/driver
SMC100CC	Single-axis DC motor controller/driver
SMC100PP	Single-axis stepper motor controller/driver

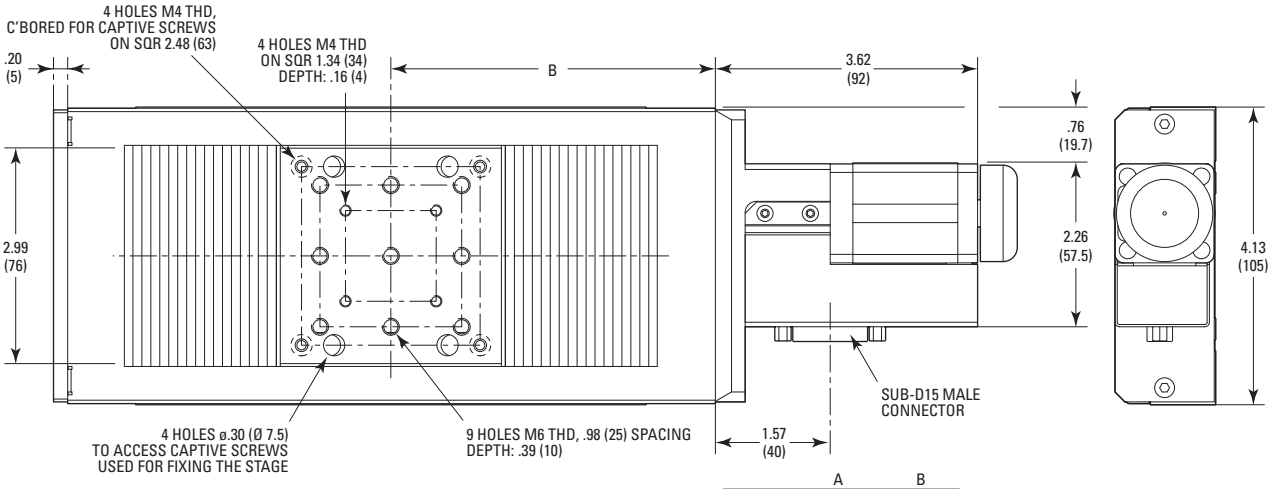
LOAD CHARACTERISTICS AND STIFFNESS



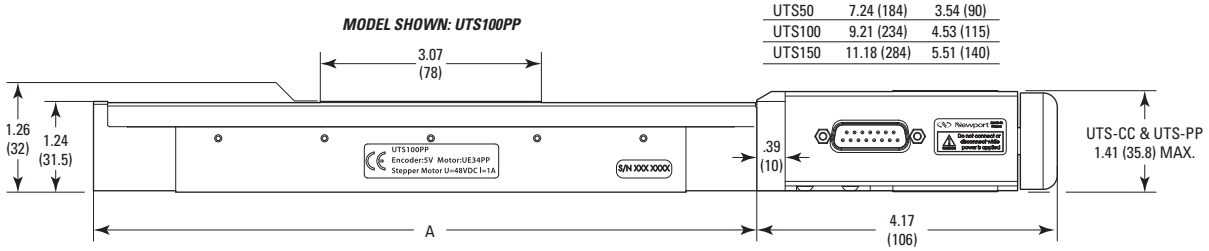
	UTS-CC UTS-PP	UTS-PPV6
Cz, Normal centered load capacity (N)	200	100
+Cx, Axial load capacity (N)	50	
-Cx, Inverse axial load capacity (N)	10	
Kαx, Compliance in roll (µrad/Nm)	10	
Kαy, Compliance in pitch (µrad/Nm)	15	
Kαz, Compliance in yaw (µrad/Nm)	15	
Q, Off-center load (N) Where D = Cantilever distance (mm)	Q ≤ Cz ÷ (1 + D/50)	

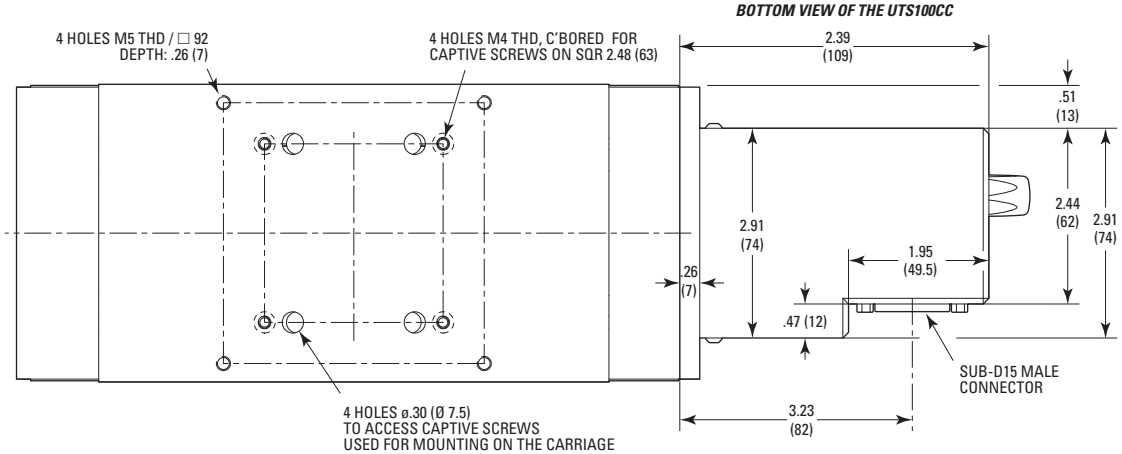
DIMENSIONS

UTS-CC and UTS-PP Stages

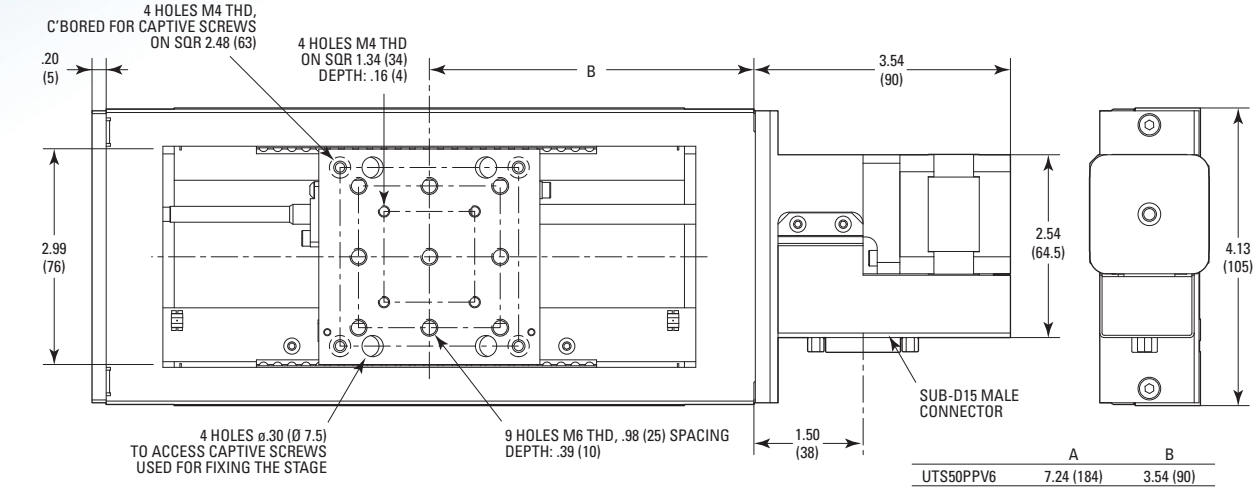


	A	B
UTS50	7.24 (184)	3.54 (90)
UTS100	9.21 (234)	4.53 (115)
UTS150	11.18 (284)	5.51 (140)



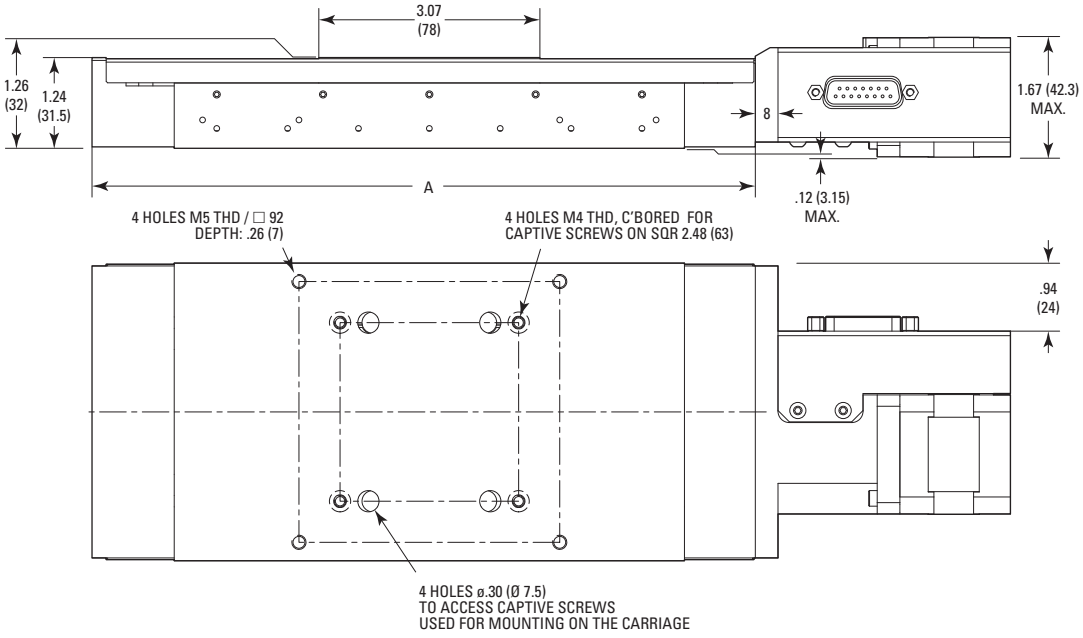


UTS-PPV6 Stages



	A	B
UTS50PPV6	7.24 (184)	3.54 (90)
UTS100PPV6	9.21 (234)	4.53 (115)
UTS150PPV6	11.18 (284)	5.51 (140

MODEL SHOWN: UTS100PPV6



ORDERING INFORMATION

Series	Travel (mm)	Drive	Vacuum Prep. [1]
UTS	50, 100, 150	CC, PP	V6

Example:
*The **UTS50CC** is a UTS stage with 50 mm travel and a DC motor drive.*

[1] Vacuum compatible to 10^{-6} hPa. In this case max. speed and load capacity are divided by two.

CC: DC motor
PP: Stepper motor

ACCESSORIES

Model	Description
EQ100-S	Right-Angle Bracket, UTS50
EQ100-L	Right-Angle Bracket, UTS100 and UTS150
EQ100-LV6	Right-Angle Bracket, UTS100PPV6 and UTS150PPV6
M-PBN12	Base Plate, Used with UMR12 Series, MVN120 & UTR120 Series
UTS-TP	Universal Base Plate, MFA Series Stages
M-CAP-M41	Captive Screws, Set of 4 , XY Assemblies

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