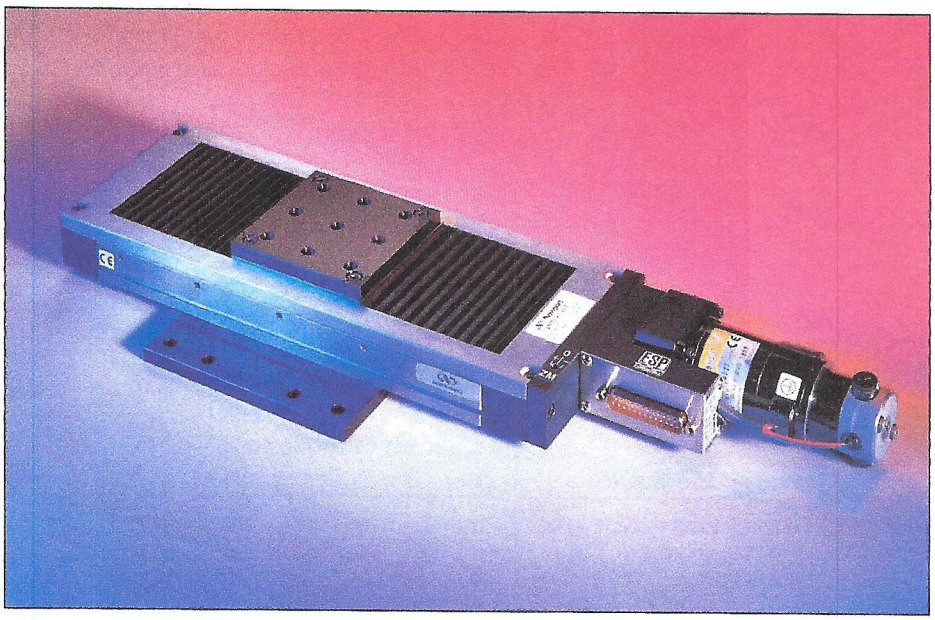
UTM Series

Mid-Range Travel Translation Stages



Key Features

- *Travel 25–150 mm*
- *Repeatability to 1.0 µm*
- *Optional linear glass-scale encoder*
- *Maximum speed 20 mm/sec*
- *Load capacity to 20 kg*
- *DC or stepper motor driven*
- *Steel construction*

The UTM Series translation stages feature steel construction with preloaded ball bearing slides and a backlash-compensated leadscrew for superior performance over medium travel ranges. These motorized stages are equipped with mechanical limit switches to prevent damage to the bearings from accidental overtravel. A center home position with encoder index allows the stage to be returned to a reference position in the middle of the stage's travel. The home position may also be set to either end of the stage's travel (except HA versions) via an external switch on the stage body.

For optimum positioning performance and seamless compatibility, we recommend our ESP and MotionMaster family of motion controllers for these devices. The UTM Series stages are supplied with a 3-meter cable for connection to the ESP and MotionMaster controllers. See page 4-28 for information on optional cables.

Stepper Drive Versions

Stepper-motor-driven stages are offered in four variants:

- Two mini-step drive versions with resolutions of 1µm (PP1HL) and 0.1µm (PP.1). These combine accurate positioning from stepper motor technology and smooth displacement from 10-step/encoder count driving mode. For ultra-smooth low-speed positioning, micro-stepping up to 250x is possible using ESP Series Controllers.

- Two full-step versions with resolutions of 1µm (PE1) and 0.1µm (PE.1). These are primarily designed for applications requiring the direct positioning accuracy to be maintained to within the stage's mechanical resolution when power is switched off, such as operation in vacuum (vacuum preparation on request).

Drive Specifications

	Resolution (µm)	Speed (mm/s)	Motor
UTMPP1HL	1	20	UE41PP
UTMPP.1	0.1	2	UE41PP
UTMPE1	1	2	UE31PP
UTMPE.1	0.1	0.2	UE31PP

Higher peak speeds are attainable with standard stage configurations. Please consult with the technical staff regarding your specific needs. See the Drives Section for specific motor information.

DC-Servo Drive Versions

Five DC-motor-driven configurations are available:

- Two standard DC-servo versions with resolutions of 1 µm (CC1HL) and 0.1 µm (CC.1). The CC1HL features a built-in tachometer that provides the required motion control accuracy in higher dynamics applications.
- An increased dynamic range version (CC.5HA) with a resolution of 0.5 µm and travel speeds up to 20 mm/sec. In addition to a tachometer, these stages utilize a linear encoder mounted on the stage body for direct position feedback that eliminates any drivetrain-induced motion errors.
- Two low-power versions with resolutions of 1 µm (CC1DD) and 0.1 µm (CC.1DD), which may be directly connected to our ESP6000DCIB or ESP300 controllers, with no need for larger power/driver units. These stages offer a cost-effective performance alternative for those who have precision positioning needs with stringent budget requirements.

Drive Specifications

	Resolution (µm)	Speed (mm/s)	Motor
UTMCC.1	0.1	2	UE33CC
UTMCC1HL	1	20	UE404CC
UTMCC.5HA	0.5	20	UE404CC
UTMCC1DD	1	2.5	UE31CC
UTMCC.1DD	0.1	0.25	UE31CC

Higher peak speeds are attainable with standard stage configurations. Please consult with the technical staff regarding your specific needs. See the Drives Section for specific motor information.

Driver Module Options

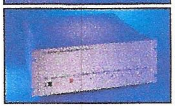
Driver modules for our ESP and MotionMaster (MM) Series controllers are available for each of the UTM Series stages. They are referenced as option codes to be used in the motion controller part number.

ESP7000
page 4-4

Module Option	01

ESP6000
page 4-12

UNIDRIV6000
page 4-16



Module Option	01

ESP6000DCIB
page 4-19

	Module Option
UTMCCDD	05
UTMCC.1	07

ESP300
page 4-22

Module Option	1

MM4005
page 4-8

	Module Option
UTMPP	12
UTMPE	05
UTMCC1HL	7G
UTMCC.5HA	7G
UTMCC.1	71
UTMCCDD	64

Manual Drive Versions

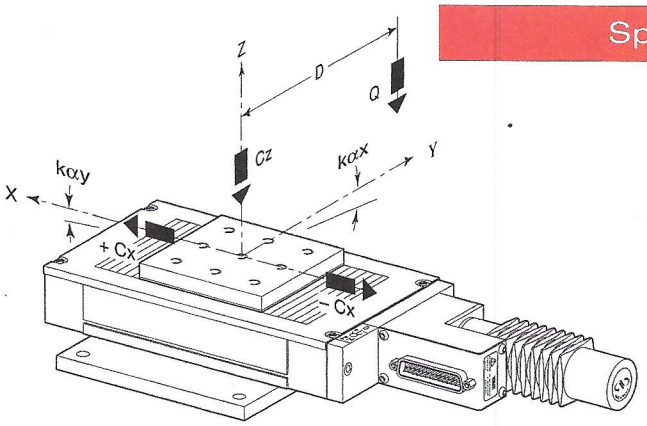
The UTM Series translation stages are also available with manual drive. These are offered with resolutions of 1 µm (MS1) and 0.1 µm (MS.1). In addition to the vernier scale on the manual drive, position may be determined using the output from the incremental shaft encoder. A connector for the CV1000 encoder display is provided.

Drive Specifications

	Resolution (µm)	mm/rev.
UTMMS1	1	2
UTMMS.1	0.1	0.2

Off-center Load Characteristics

Cz	(kg)	20
–Cx	(kg)	1
+Cx	(kg)	5
kαx	(µrad/N.m)	10
kαy	(µrad/N.m)	15



- Q : Off-center load, $Q \leq Cz / (1 + D/50)$
  D : Cantilever distance in mm
  Cz : Normal center load capacity on bearings
- +Cx : Direct load capacity on X axis
- –Cx : Inverse load capacity on X axis
- kαx : Angular stiffness (Roll)
- kαy : Angular stiffness (Pitch)

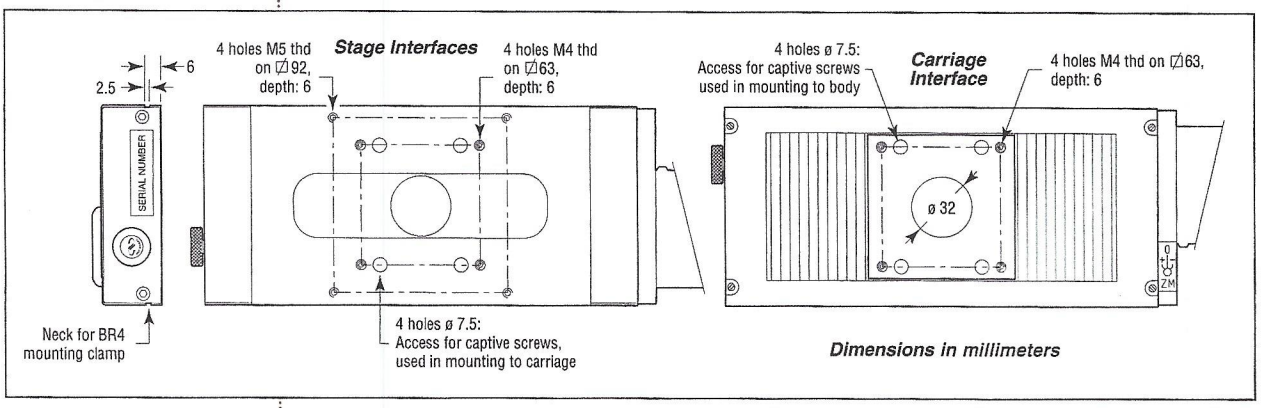
Specifications

Travel Range	25; 50; 100 and 150 mm	
On-Axis	5 µm	
Accuracy [1]	3 µm	(HA)
Repeatability	1.5 µm	
	1.0 µm	(HA)
Hysteresis	3 µm	(PP1, PE1, CC1HL, CC1DD)
	3.5 µm	(PP.1, PE.1, CC.1, CC.1DD)
	1.5 µm	(HA)
αy Pitch [1]	110 µrad	
αz Yaw [1]	70 µrad	

1) For 100 mm travel.

Assembly Pattern

Stacking UTM Series stages either together or with other Newport stages is easily accomplished using optional Captive Screws (M-CAP-M41). Shown below are the assembly patterns used. These interfaces are accessed by removing the upper and lower plates of the stages. For assemblies requiring precise orthogonality (<50 µrad), please consult our technical staff.



Ordering Information

The UTM Series translation stages are numbered as follows:

Model	Series	Travel Range (mm)	Drive	Resolution (µm)
M-	UTM	25, 50, 100, 150	PP	1HL, .1
			PE	1, .1
			CC	1HL, .1, .5HA (1), 1DD, .1DD
			MS	1, .1

Example

The **M-UTM100PP.1** *is a* UTM *translation stage, metric version, with 100 mm travel range and 0.1 µm resolution (mini-step) stepper motor drive.*

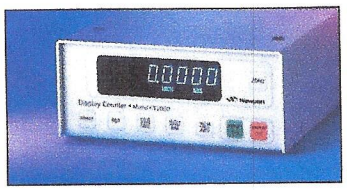
M-: *Metric version* PP: *Mini-step* PE: *Full-step* CC: DC MS: *Manual*

1) *Note: The CC.5HA version is only available with travel ranges of 50 mm, 100 mm and 150 mm.*

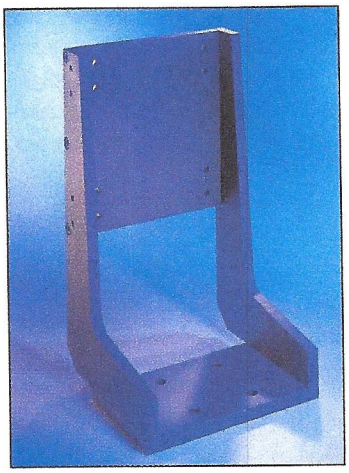
Accessories

CV1000	Encoder Display
EQ100-S	Right-Angle Bracket for UTM25/50
EQ100-L	Right-Angle Bracket for UTM100/150
M-CAP-M41	Captive Screws for UTM/UTM Mounting
M-CAP-M42	Captive Screws for URM/UTM Mounting

Accessories



Use the CV1000 to display encoder pulses when manually driving UTM stages (page 4-27).



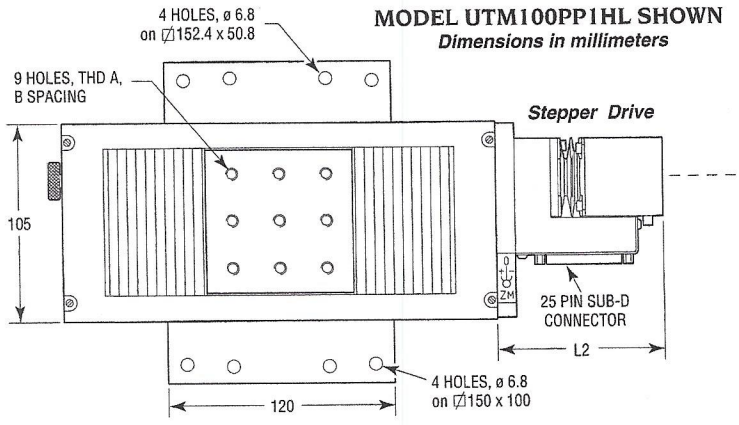
Use EQ100 Series right-angle brackets (page 2-50) for vertical mounting configurations.

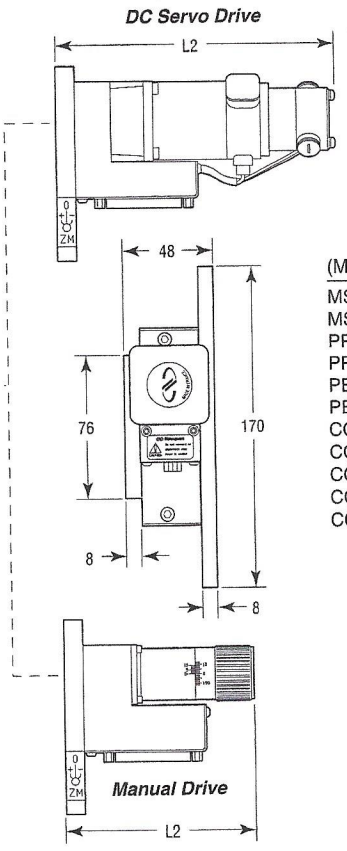
Dimensions

MODEL	THREAD A	DIMENSION B
ENGLISH		
UTM	1/4-20	25.4
METRIC		
M-UTM	M6	25

TRAVEL:	25	50	100	150
L1:	155	180	230	280

MODEL UTM100PP1HL SHOWN
Dimensions in millimeters





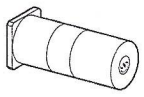
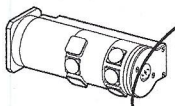
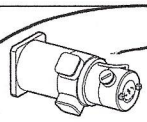
(M-)UTM	L2	H
MS1	100.5	—
MS.1	141.5	—
PP1HL	90.5	42
PP.1	131.5	42
PE1	139	32
PE.1	180	32
CC.1	133	48.5
CC1HL	148	48.5
CC.5HA	144	48.5
CC1DD	116.5	32
CC.1DD	157.5	32

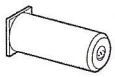
DC Motor Technical Information

All DC motor driven Newport stages are optimized for use with Newport's motion controllers and motor drivers to ensure plug-and-play compatibility, long-life and the ability to meet stated stage performance specifications. Occasionally, however, our controllers may not be appropriate for your specific application. In cases like these, we're happy to provide the technical information listed below to assist you in using your own electronics.

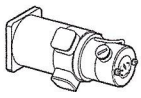
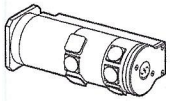
In doing so, of course, we cannot guarantee system performance specifications or reliability and caution you to be sure that your motion requirements are well understood before proceeding. To avoid accidental damage to Newport stages and motors, **we do not recommend** using this information unless you are very familiar with motion controller electronics and motor driver design. Please consult our technical staff for more information.

Specifications




	UE611CC	UE511CC	UE404CC	UE33CC	UE31CC	UE16CC
Rated Voltage* (V)	60	75	75	36	24	12
Armature Resistance (Ω)	5	5.1	18.6	14	57	115
Armature Inductance (mH)	3.5	3.2	6.6	1.45	1.6	1.2
Gear Ratio	1:1	1:1	1:1	1:1	1:54.6	1:141
Tachometer	yes	yes	yes	no	no	no
Stage Reference	TS TST TSW TSV	MTMCC1 BGM120–200CC	MTMCC.1 UTMCC1HL UTMCC.5HA UZM160CC URMCCHL	UTMCC.1	UTMCCDD UZM80CC RV80CCHL URMCC BGM50 & 80CC	MFNCC SR50

	UE404-S	UE511-S
Rated Voltage* (V)	24	48
Armature Resistance (Ω)	1.96	1.57
Armature Inductance (mH)	.43	1.04
Gear Ratio	1:1	1:1
Tachometer	no	no
Stage Reference	RV80CC RV120HAHL RV120CCHL	RV120–350CC RV120–350HA RV160–350CCHL RV160–350HAHL

* Actual driver voltages must be lower than rated motor voltage when driving Newport stages to avoid damage to the stage.