

Motorized Linear Actuator Selection Guide












Series	Travel (mm)	Minimum Incremental Motion (μm)	Uni-directional Repeatability (μm)	Bi-directional Repeatability (μm)	Accuracy (μm)	Maximum Speed (mm/s)	Axial Load Capacity (+Cx)(N)
 VP-25AA High Performance Precision Motorized Actuator see page 122	25	0.1	0.1	0.6	2	25	40
 LTA Series Precision Motorized Actuators see page 123	25, 50	0.05 - 0.1	0.5 - 0.6	2	6 - 10	0.25- 5	40 - 120
 TRB Series Compact Motorized Actuators see page 125	6 - 25	0.1	0.5	1.5	6 - 10	0.3-2	90
 TRA Series Compact Motorized Actuator see page 127	6 - 25	0.1 - 0.2	1	2.5	6 - 10	0.2-0.4	60
 Picomotor Piezo Linear Actuators see page 129	12.7 - 50.8	0.03	NA	NA	NA	0.02	22
 TinyPicomotor Piezo Linear Actuators see page 131	12.7	0.03	NA	NA	NA	0.02	22
 Vacuum and Ultra-High Vacuum Picomotor™ Actuators see page 132	12.7-50.8	0.03	NA	NA	NA	0.02	22
 NanoPZ Series Ultra-High Resolution Actuators see page 135	12.5	0.03	NA	NA	NA	0.2	50
 NPA Series Nanopositioning Piezo Translators see page 136	25 - 100 (μm)	0.05 - 2 (nm)	NA	NA	NA	NA ²	1000/150 (push/pull)
 NPM Series Nanopositioning Piezoelectric Micrometer Adaptor see page 137	140 (μm)	0.1 - 1 (nm)	NA	NA	NA	NA ²	100
 CONEX-NSA12 Controller and Accessories see page 162	11	0.2	NA	± 5.0	NA	0.9	28

¹ Typical Value² Refer to the specific NanoPositioner product for more details about resonant frequency and stiffness.³ For TRB, axial loads over 60N, the max. speed must be reduced to 1 mm/s (CC) and 0.3 mm/s (PP). For TRA, axial loads over 45N, the max. speed must be reduced to 0.3 mm/s.





Motorized Actuator and Manual Positioner Compatibility

Many Newport manual positioning products can be motorized by using Newport motorized precision actuators. Once the manual positioner is chosen for the application, use the tables below to select the appropriate motorized actuator.

Manual Linear Stages










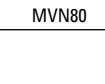
	NewStep	TRA & TRB			NanoPZ	LTA	
	NSA12	TRA6 TRB6	TRA12 TRB12	TRA25 TRB25	PZA12	LTA-HS	LTA-HL
 M-461 Series	i	●	i	●	i	i	●
 M-462 Series	●	●	●	●	●	i	●
 M-561 series	i	●	i	●	●	●	●
 M-562 Series	●	●	i	●	i	i	i
 UMR8.25	●	●	i	i	●	i	●
 UMR8.51	●	●	●	●	●	i	●
 UMR12.40	●	●	●	●	●	i	●
 UMR12.63	●	●	●	●	●	i	●
 423	●	●	●	●	●	i	●
 433	●	●	●	●	●	●	●
 443	●	●	●	●	●	●	●

Compatibility Key

	Fully Compatible ¹
	Compatible but may require standard interface adaptor and/or include small performance limitation (See website for details)
	² Call the local sales office or email tech@newport.com
	Not Compatible or Not Recommended

¹ In some cases, one must limit the travel range of actuators. See Newport website for details.

² 'Yellow' may require custom interface adaptor or may include significant performance limitations in terms of travel length, load capacity and etc. See Newport.com/motorize for details.

	NewStep	TRA & TRB			NanoPZ	LTA	
	NSA12	TRA6 TRB6	TRA12 TRB12	TRA25 TRB25	PZA12	LTA-HS	LTA-HL
 426	●	●	●	●	●	i	●
 436	●	●	●	●	●	i	●
 460P-05	i	●	i	●	●	i	●
 460P	●	●	●	●	●	i	●
 460A-X	●	●	●	●	●	i	●
 460A-XY	●	●	●	●	●	i	●
 460A-XZ	●	●	●	●	●	i	●
 460A-XYZ	●	●	●	●	●	i	●
 401 and 406	●	●	i	●	●	i	●
 MVN80	●	●	●	i	●	●	●

















MOTORIZED LINEAR STAGES
MOTORIZED VERTICAL STAGES
MOTORIZED ROTATION STAGES
MOTORIZED LINEAR ACTUATORS
HEXAPODS
CONTROLLERS AND DRIVERS
MOTORIZED OPTICAL MOUNTS
BEAM MANAGEMENT
SPECIAL COLLECTIONS

Manual Rotation Stages

	NewStep		TRA		NanoPZ		LTA	
	NSA12	TRA6 TRB6	TRA12 TRB12	TRA25 TRB25	PZA12	LTA-HS	LTA-HL	
MOTORIZED LINEAR STAGES RS65								
MOTORIZED VERTICAL STAGES 481-A								
MOTORIZED ROTATION STAGES GON40-U								
GON40-L								
MOTORIZED LINEAR ACTUATORS GON65-U								
GON65-L								
HEXAPODS 561-GON								
TGN80								
CONTROLLERS AND DRIVERS TGN120								
M-36								
MOTORIZED OPTICAL MOUNTS M-37								

Mirror Mounts

	NewStep		TRA		NanoPZ		LTA	
	NSA12	TRA6 TRB6	TRA12 TRB12	TRA25 TRB25	PZA12	LTA-HS	LTA-HL	
SN100								
U100-A								
U200-A								
U300-A								
U100-AC2K								
U200-AC2K								
U300-AC2K								
U400-AC2K								
U100-ACG								
U100-G								
U200-G								
VGM-1N								
VGM-2N								
600A-2R								
600A-4R								

	NewStep	TRA		NanoPZ		LTA	
	NSA12	TRA6 TRB6	TRA12 TRB12	TRA25 TRB25	PZA12	LTA-HS	LTA-HL
 625-RC2	●	i	i	●	●	●	●
 625-RC4	●	i	i	●	●	●	●
 625-RC6	●	i	i	●	●	●	●
 605-2	●	i	●	●	i	i	●
 605-4	i	i	i	●	i	i	●
 SL8A	i	i	●	●	i	i	i
 SL15A	i	i	●	●	i	i	i
 SL20A	i	i	●	●	i	●	i
 SL25.4	i	i	●	●	i	●	i
 SL50	i	i	●	●	i	●	i
 SL51	i	i	●	●	i	●	i
 SL76.2	i	i	●	●	i	●	i
 SL101.6	i	i	●	●	i	●	i
 SB18YZ	i	i	●	●	i	●	i
 BSD-2A	i	i	i	●	i	i	●
 ULM-TILT	●	i	●	●	●	●	●

MOTORIZED
LINEAR STAGES

MOTORIZED
VERTICAL STAGES

MOTORIZED
ROTATION STAGES

MOTORIZED
LINEAR ACTUATORS

HEXAPODS

CONTROLLERS
AND DRIVERS

MOTORIZED
OPTICAL MOUNTS

BEAM
MANAGEMENT

SPECIAL
COLLECTIONS

VP-25AA

High-Precision Motorized Actuators



- Integrated linear encoder for exceptional repeatability and accuracy
- Non-rotating tip eliminates periodic motion variations
- Can be used as a single rail linear stage
- Very low friction design provides high sensitivity with 0.1 μm MIM
- Convenient manual adjustment knob
- 20,000 hr MTBF



The VP-25AA actuators combine precise positioning with highly reliable performance. It is based on the same innovative design used in the VP-25XA linear stages (see page 45) and features a high-resolution linear scale for exceptional repeatability and accuracy. The scale is fixed on a moving rail to which the actuator's tip is permanently attached without any contact to the mounting shaft. This concept eliminates all drivetrain induced motion errors and minimizes hysteresis between the scale and the actuator tip. The non-rotating tip is essential to avoid undesirable periodic motion variations caused by the variable contact made between the actuator tip and the mating surface.

The top rail of the VP-25AA can also be used as a single-rail linear stage to position optical fibers, micro-optics, sensors, or other small and lightweight parts. For added versatility, a mounting interface for a dovetail rail compatible with the popular ULTRAlign™ positioning system is provided. This system offers a wide selection of interchangeable mounts for optical fibers, fiber arrays, objectives, or GRIN lenses in a variety of fiber alignment applications..

Specifications

	VP-25AA
Axial Load Capacity (+Cx)	40 N
Inverse Axial Load Capacity (-Cx)	-40 N
Travel Range	25 mm
Minimum Incremental Motion	0.10 μm
Maximum Speed	25 mm/s
Accuracy, Typical	$\pm 0.5 \mu\text{m}$
Accuracy, Guaranteed	$\pm 1.0 \mu\text{m}$
Bi-directional Repeatability (Typical)	$\pm 0.2 \mu\text{m}$
Bi-directional Repeatability, Guaranteed	$\pm 0.30 \mu\text{m}$
Uni-directional Repeatability (Typical)	$\pm 0.04 \mu\text{m}$
Uni-directional Repeatability, Guaranteed	$\pm 0.05 \mu\text{m}$
Origin Repeatability	$\pm 0.05 \mu\text{m}$
Cable Length	1.5 m
Weight	1.0 kg
MTBF	20,000 h (25% load, 30% duty cycle)
CE	Compliant

For the definition of specifications visit Newport.com for the Motion Basics and Standards.

Ordering Information

Model	Description
VP-25AA (M-VP-25AA)	High-Precision Motorized Actuator, 25 mm Travel Range

Recommended Motion Controllers

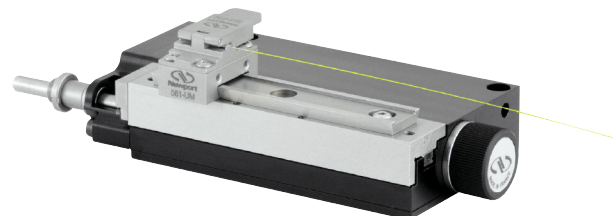
XPS-RL see page 153

XPS-D see page 148

ESP301 see page 157

SMC100CC see page 159

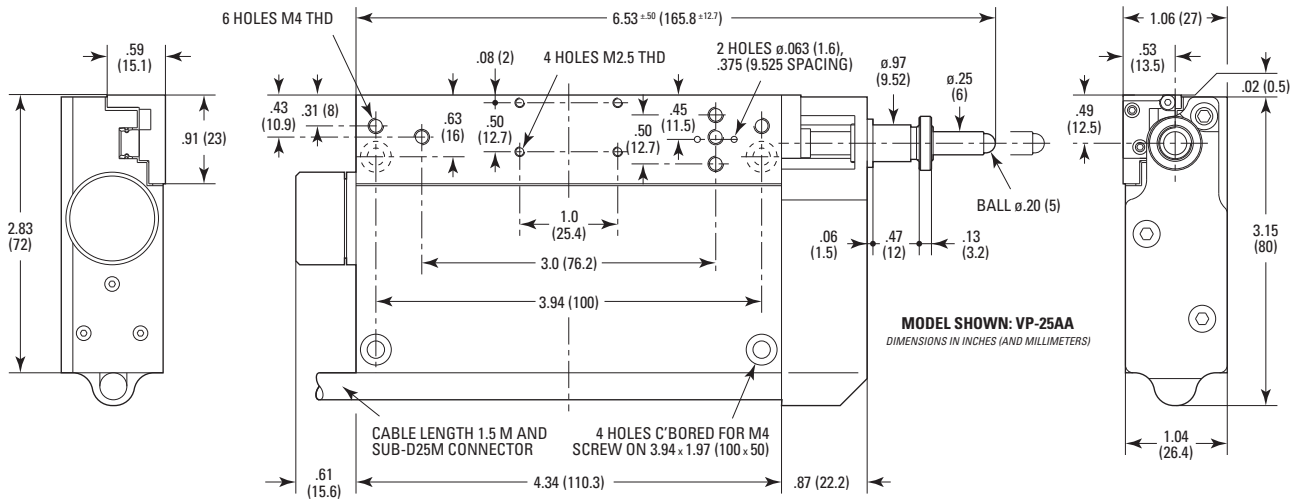
Driver cards to be ordered separately. Please refer to Stage to Controller compatibility chart on page 146. Motor cable included.



The VP-25AA actuator as a single-rail linear stage to position small and light weight parts with the optional 561-RAIL rails

Dimensions

Dimensions in millimeters



LTA Series

Precision Motorized Actuators



- Up to 50 mm travel in a space saving design
- Non-rotating tip improves motion smoothness and has no wear
- Exceptional Minimum Incremental Motion
- Adjustable limit switch prevents damage from over-travel
- Convenient manual positioning knob
- Vacuum versions with encoders



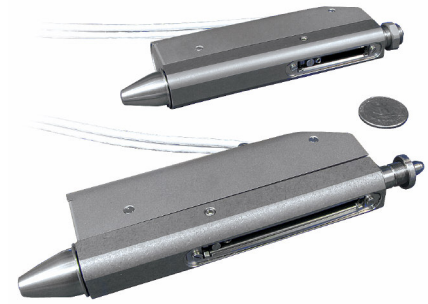
LTA actuators are designed to fit into existing manual stages and other opto-mechanical components directly replacing manual micrometers. The LTA series has a space-saving design that reduces the actuator length by 50% and minimizes the unwanted effects of cantilever loads on micro-positioning equipment. The series features two DC servo models with optimized output torque for faster motion (-HS) and higher load capacity (-HL). The LTA-HL is recommended for heavy load applications and the LTA-HS is optimized for high speed applications while providing a longer travel range. The LTAHSPV6 and LTAHLPPV6 are two stepper motor models specifically designed for vacuum applications down to 10⁻⁶hPa. Common features include: a non-rotating tip to prevent wear and avoid periodic motion variations, a movable limit switch to prevent over-travel, a manual adjustment knob which permits quick positioning of the actuator when the motor is off, and a scale to indicate coarse actuator position in both millimeters and inches.

The CONEX-LTA-HS (or -HL) is LTA actuator with the integrated CONEX-CC controller/driver and is pre-configured for the highest level of out-of-the-box control. The CONEX-CC is a very compact and inexpensive driver for Newport's low power DC servo motor driven devices.

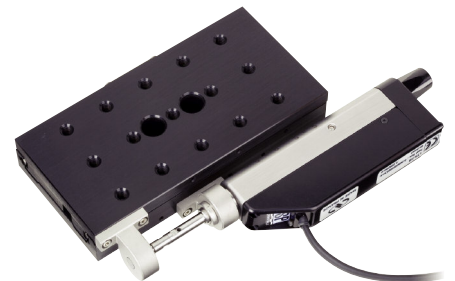
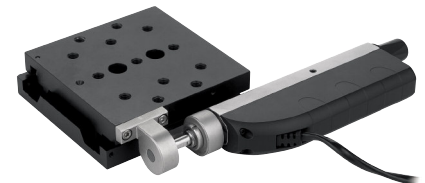


Specifications

	LTA-HL	LTA-HS	LTAHSPPV6	LTAHLPPV6
Travel Range	25 mm	50 mm		25 mm
Axial Load Capacity (+Cx)	100 N	40 N		100 N
Inverse Axial Load Capacity (-Cx)	-120 N	-50 N	-40 N	-100 N
Minimum Incremental Motion	0.05 µm	0.10 µm	0.08 µm	0.08 µm
Maximum Speed	1 mm/s	5 mm/s	0.5 mm/s	0.25 mm/s
Accuracy, Typical	±1.2 µm	±2.2 µm		±1.2 µm
Accuracy, Guaranteed	±3.0 µm	±5.0 µm		±3.0 µm
Uni-directional Repeatability (Typical)	±0.10 µm	±0.10 µm		±0.10 µm
Uni-directional Repeatability, Guaranteed	±0.25 µm	±0.25 µm		±0.30 µm
Bi-directional Repeatability (Typical)				±0.30 µm
Bi-directional Repeatability, Guaranteed				±1.0 µm
Origin Repeatability				±2 µm
Cable Length	3 m		1.5 m	
Vacuum Compatibility			10 ⁻⁶ hPa	
Weight	0.52 kg	0.48 kg	0.35 kg	0.35 kg
MTBF	10,000 h (25% load, 30% Duty cycle)			
CE	Compliant			



LTAxxPPV6 vacuum compatible actuator.



For the definition of specifications visit Newport.com's section on the Motion Basics and Standards.

Ordering Information

Model	Description
LTA-HS	High Speed LTA Motorized Actuator, 50 mm travel, LTA, 3/8-40 thread
LTA-HL	High Load Motorized Actuator, 25 mm travel, LTA, M12 thread
LTAHSPPV6	Vacuum Compatible High Speed Motorized Actuator, 50 mm travel, LTA
LTAHLPPV6	Vacuum Compatible High Load Motorized Actuator, 25 mm travel, LTA
CONEX-LTA-HS ¹	LTA-HS actuator Integrated with CONEX Controller
CONEX-LTA-HL ¹	LTA-HL actuator Integrated with CONEX Controller
LTA-M12	Mounting Adapter, M12-0.5, LTA-HS to UMR8, MVN80 and SL products

¹Order CONEX-PS separately.

Recommended Motion Controllers

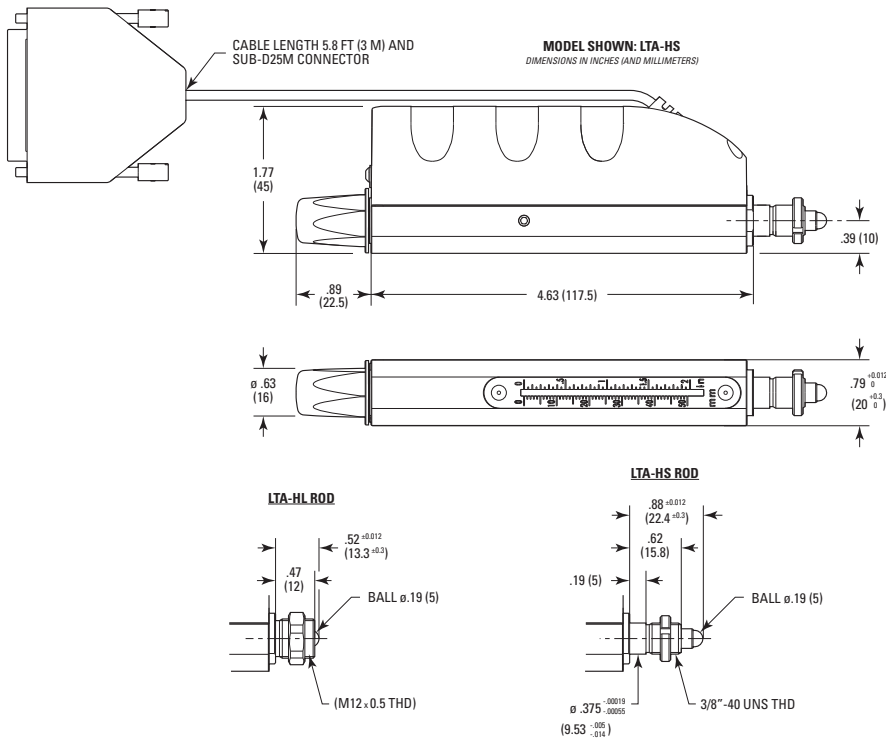
XPS-RL see page 153	
XPS-D see page 148	
ESP301 see page 157	
SMC100CC see page 159	LTA-HS and LTA-HL only
SMC100PP see page 159	LTAHLPPV6 and LTAHSPPV6 only
CONEX-CC see page 161	Included in CONEX-LTA-HS or CONEX-LTA-HL

Driver cards to be ordered separately. Please refer to Stage to Controller compatibility chart on page 146. Motor cable included.

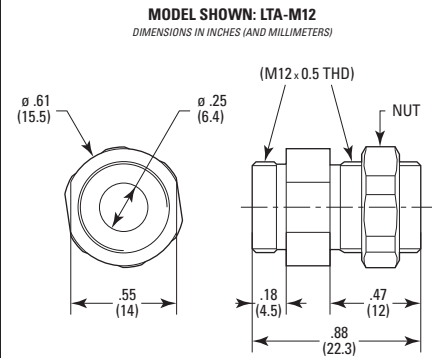
MOTORIZED LINEAR STAGES
MOTORIZED VERTICAL STAGES
MOTORIZED ROTATION STAGES
MOTORIZED LINEAR ACTUATORS
HEXAPODS
CONTROLLERS AND DRIVERS
MOTORIZED OPTICAL MOUNTS
BEAM MANAGEMENT
SPECIAL COLLECTIONS

Dimensions

Model LTA-HS



Model LTA-M12



TRB Series Compact Motorized Actuators



scan QR code to watch video



- Slim and lightweight design
- Flexible cable routing on the side
- Integrated optical limit switches
- Used to motorize manual stages and mounts



The TRB motorized actuator series provide reliable motorized linear motion in a lightweight and very compact package. Improvements compared to the TRA actuator include: higher speed, better repeatability and higher axial loading. The cable on the side provides more flexibility for cable routing. To provide the best fit to an application, the TRB actuators are available in open-loop stepper and closed-loop DC servo motor versions. The integrated optical limit switches of the TRB actuators provide a repeatable reference/home. TRB actuators are direct replacement of micrometers which are found in a wide variety of linear and rotation stages, and are ideal for OEM applications.

The CONEX-TRB series is TRB actuator with the integrated CONEX-CC controller/driver and is pre-configured for the highest level of out-of-the-box control. The CONEX-CC is a very compact and inexpensive driver for Newport's low power DC servo motor driven devices.

Specifications

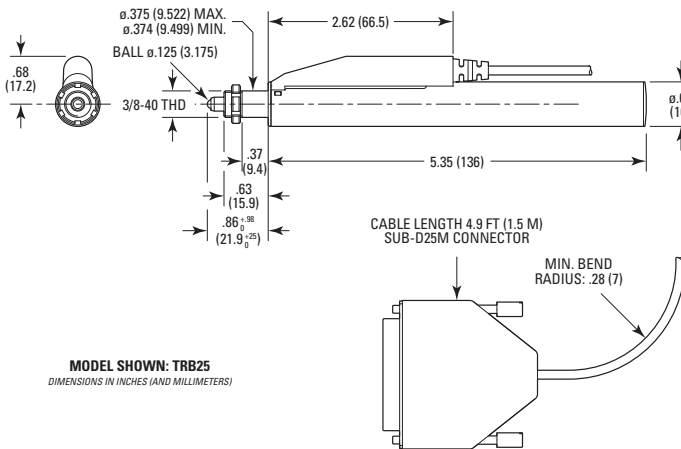
	TRB25CC	TRB12CC	TRB6CC	TRB12PP	TRB25PP	TRB6PP
Axial Load Capacity (+Cx)	0 N					
Inverse Axial Load Capacity (-Cx)	-90 N					
Travel Range	25 mm	12 mm	6 mm	12 mm	25 mm	6 mm
Minimum Incremental Motion	0.10 μ m					
Maximum Speed	2 mm/s			0.3 mm/s		
Accuracy, Typical	\pm 2.0 μ m			\pm 2.0 μ m		
Accuracy, Guaranteed	\pm 5.0 μ m	\pm 4.0 μ m	\pm 3.0 μ m	\pm 4.0 μ m	\pm 5.0 μ m	\pm 4.0 μ m
Bi-directional Repeatability, Typical	\pm 0.15 μ m	\pm 0.13 μ m		\pm 0.15 μ m		
Uni-directional Repeatability, Typical	\pm 0.08 μ m	\pm 0.08 μ m	\pm 0.08 μ m	\pm 0.08 μ m		
Bi-directional Repeatability, Guaranteed	\pm 0.15 μ m	\pm 0.13 μ m	\pm 0.75 μ m	\pm 0.75 μ m		
Uni-directional Repeatability, Guaranteed	\pm 0.25 μ m			\pm 0.25 μ m		
Origin Repeatability	\pm 2 μ m					
Cable Length	1.5 m					
Weight	0.23 kg					
MTBF	10000 h (25N load, 10% duty cycle)					
CE	Compliant					

Ordering Information

Model	Description
TRB6CC	Compact Motorized Actuator, 6 mm Travel, DC Servo Motor, 90N
TRB6PP	Compact Motorized Actuator, 6 mm Travel, Stepper Motor
TRB12CC	Compact Motorized Actuator, 12 mm Travel, DC Servo Motor, 90N
TRB12PP	Compact Motorized Actuator, 12 mm Travel, Stepper Motor
TRB25CC	Compact Motorized Actuator, 25 mm Travel, DC Servo Motor, 90N
TRB25PP	Compact Motorized Actuator, 25 mm Travel, Stepper Motor
CONEX-TRB6CC ¹	TRA6CC Actuator Integrated with CONEX Controller
CONEX-TRB12CC ¹	TRA12CC Actuator Integrated with CONEX Controller
CONEX-TRB25CC ¹	TRB25CC Actuator Integrated with CONEX Controller
ADAPT-TRA25	TRA25 Actuator Adapter for Opto-Mechanics

¹Order CONEX-PS separately.

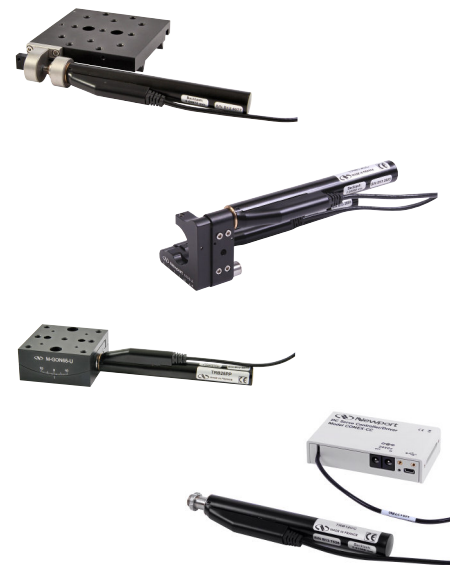
Dimensions



Recommended Motion Controllers

- XPS-RL see page 153
- XPS-D see page 148
- ESP301 see page 157
- SMC100CC see page 159 CC versions only
- SMC100PP see page 159 PP versions only
- CONEX-CC see page 161 Included in Conex-TRBXCC

Driver cards to be ordered separately. Please refer to Stage to Controller compatibility chart on page 146. Motor cable included.



TRA Series

Compact Motorized Actuators



- Low cost stepper & DC servo actuators
- Light and compact in-line design
- Vacuum compatible stepper motor versions
- Replaces manual micrometer drives with similar form-factor
- Integrated optical limit switches prevent component & motor damage
- Hard-coated steel actuator ball tip

The TRA series miniature motorized actuators provide reliable motorized motion in a small diameter, lightweight package. TRA actuators incorporate an excellent space saving design that allows them to be used with a wide variety of linear stages, mirror mounts, and OEM applications. The TRA6 is recommended for motorizing 561 series linear stages, 481 and RS65 rotation stages. The TRA12 is compatible with Ultima and Suprema mirror mounts, ULTRAlign, 460A series linear stages. The TRA25 is recommended for 25 mm travel in a slightly larger package and is the recommended choice for motorizing longer travel linear stages and other devices with long travel. To provide the best fit for your application, TRA actuators are available in stepper, stepper vacuum and closed-loop DC servo motor versions. All TRA actuators feature integrated optical limit switches, preventing over travel and providing a method for repeatable referencing. TRA actuators also feature a hard-coated steel ball tip that minimizes contact surface wear compared to other designs that use regular steel ball tips.

The CONEX-TRA series is TRA actuator with the integrated CONEX-CC controller/driver and is pre-configured for the highest level of out-of-the-box control. The CONEX-CC is a very compact and inexpensive driver for Newport's low power DC servo motor driven devices.

Specifications

	TRA12CC	TRA25CC	TRA6CC	TRA12PPD	TRA25PPD	TRA6PPD
Axial Load Capacity (+Cx)	0 N					
Inverse Axial Load Capacity (-Cx)	-60 N					
Travel Range	12 mm	25 mm	6 mm	12 mm	25 mm	6 mm
Minimum Incremental Motion	0.20 μm			0.10 μm		
Maximum Speed	0.4 mm/s			0.4 mm/s		
Accuracy, Typical	$\pm 2.2 \mu\text{m}$	$\pm 2.5 \mu\text{m}$	$\pm 1.5 \mu\text{m}$	$\pm 2.2 \mu\text{m}$	$\pm 2.5 \mu\text{m}$	$\pm 1.5 \mu\text{m}$
Accuracy, Guaranteed	$\pm 4.0 \mu\text{m}$	$\pm 5.0 \mu\text{m}$	$\pm 3.0 \mu\text{m}$	$\pm 4.0 \mu\text{m}$	$\pm 5.0 \mu\text{m}$	$\pm 3.0 \mu\text{m}$
Bi-directional Repeatability, Typical	$\pm 0.15 \mu\text{m}$	$\pm 0.18 \mu\text{m}$	$\pm 0.15 \mu\text{m}$		$\pm 0.18 \mu\text{m}$	$\pm 0.15 \mu\text{m}$
Uni-directional Repeatability, Typical	$\pm 0.10 \mu\text{m}$	$\pm 0.15 \mu\text{m}$	$\pm 0.10 \mu\text{m}$		$\pm 0.15 \mu\text{m}$	$\pm 0.10 \mu\text{m}$
Bi-directional Repeatability, Guaranteed	$\pm 1.25 \mu\text{m}$					
Uni-directional Repeatability, Guaranteed	$\pm 0.50 \mu\text{m}$					
Origin Repeatability	$\pm 2 \mu\text{m}$					
Cable Length	3 m					
Weight	0.25 kg	0.28 kg	0.23 kg	0.25 kg	0.28 kg	0.23 kg
MTBF	10000 h (25N load, 10% duty cycle)					
CE	Compliant					

1. Also available in a vacuum compatible version TRA-PPV6.
2. Inverse axial load capacity is reduced to -30 N for TRA-PPV6 versions.
3. Maximum speed is reduced to 0.2 mm/sec for TRA-PPV6 versions.



For compatible manual positioners see page 119

MOTORIZED LINEAR STAGES
MOTORIZED VERTICAL STAGES
MOTORIZED ROTATION STAGES
MOTORIZED LINEAR ACTUATORS
HEXAPODS
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BEAM MANAGEMENT
SPECIAL COLLECTIONS

Ordering Information

Model	Description
TRA6CC	Miniature Motorized Actuator, 6 mm Travel, DC Servo Motor
TRA6PPD	Miniature Motorized Actuator, 6 mm Travel, Stepper, 25-pin D-Sub
TRA6PPV6	Miniature Motorized Actuator, 6 mm Travel, Vacuum Compatible
TRA12CC	Miniature Motorized Actuator, 12 mm Travel, DC Servo motor
TRA12PPD	Miniature Motorized Actuator, 12 mm Travel, Stepper, 25-pin D-Sub
TRA12PPV6	Miniature Motorized Actuator, 12 mm Travel, Vacuum Compatible
TRA25CC	Miniature Motorized Actuator, 25 mm Travel, DC Servo Motor
TRA25PPD	Miniature Motorized Actuator, 25mm Travel, Stepper Motor, 25-pin D-Sub
TRA25PPV6	Miniature Motorized Actuator, 25 mm Travel, Vacuum Compatible
CONEX-TRA6CC ¹	TRA6CC Actuator Integrated with CONEX Controller
CONEX-TRA12CC ¹	TRA12CC Actuator Integrated with CONEX Controller
CONEX-TRA25CC ¹	TRA25CC Actuator Integrated with CONEX Controller
ADAPT-TRA25	TRA25 Actuator Adapter for Opto-Mechanics
ADAPT-TRA	TRA6 & TRA12 Actuator Adapter for Opto-Mechanics

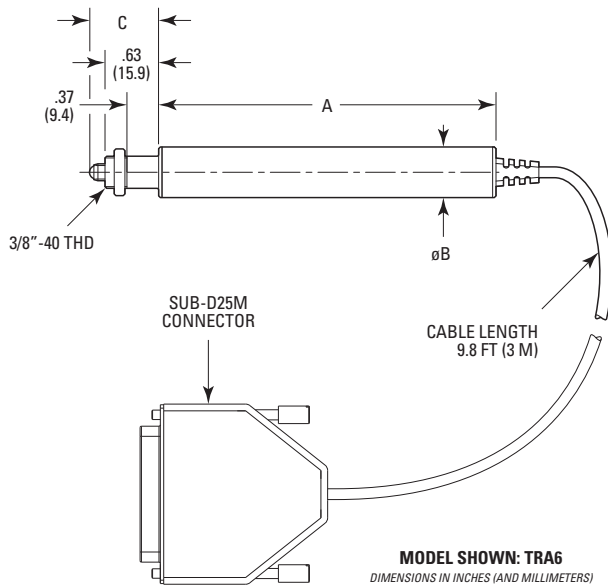
¹Order CONEX-PS separately.

Recommended Motion Controllers

XPS-RL see page 153	
XPS-D see page 148	
ESP301 see page 157	
SMC100CC see page 159	TRA-CC only
SMC100PP see page 159	TRA-PPD and TRA-PPV6 only
CONEX-CC see page 161	Included in CONEX-TRAXXCC

Driver cards to be ordered separately. Please refer to Stage to Controller compatibility chart on page 146. Motor cable included.

Dimensions



	A	B	C
TRA6	3.94 (100)	.59 (15)	.81 ⁺²⁴ ₀ (20.5 ⁺⁶ ₀)
TRA12	4.45 (113)	.59 (15)	.66 ⁺⁴⁹ ₀ (16.8 ^{+12.5} ₀)
TRA25	4.72 (120)	.71 (18)	.66 ⁺⁵⁸ ₀ (16.8 ⁺²⁵ ₀)



Compact XY module used for focus and cell-to-cell pitch adjustments in PV laser scribe systems.



CAD See our website for CAD files

Picomotor™ Piezo Linear Actuators



From left to right: Models 8341, 8301, 8302, and 8303.

- 30 nm positioning resolution
- Substantial 22 N axial load capacity
- Set-and-forget long-term stability
- Easy-to-use, flexible controller/drivers
- Manual adjustment knob
- Simple integration



New Focus Picomotor actuators are ideal devices for motorizing fine-positioning stages and mounts in optical or mechanical systems. Use them with optomechanical translation stages or custom devices. They have better than 30-nm resolution with minimal backlash, and can exert a 5-lb (22-N) force. Moreover, they have exceptional longterm stability and the ability to hold their position with no power applied. These last two features make the Picomotor actuators unique among motion-control devices and ideal for typical set-and-hold applications. Such applications include precision control of sample holders inside cold and/or vacuum chambers, hands-off adjustment of hard-to-reach mirror mounts, or adjustments of optical mounts that are sensitive to forces applied while twisting a knob (for instance optimizing the alignment of a laser cavity or adjusting the pointing of a beam over a long distance).

The standard sized shanks of the Models 830X and 12X0.5-mm threading of the Models 832X let them fit into standard micrometer mounting holes. The Tiny Model 8353 gives you a solution for even the smallest application. For rotation without translation, use the Model 8341NF rotating shaft.

Use these Picomotor actuators with our Model 8742 Open-Loop Picomotor Controller/Driver or Model 8743-CL Closed-Loop Picomotor Controller/Driver.

Contact us for custom configurations and volume pricing.

Specifications








	8301NF	8302	8303	8310	8321	8322NF
Travel Range	12.7 mm	25.4 mm	50.8 mm	12.7 mm	12.7 mm	25.4 mm
Maximum Speed	1.2 mm/min					
Axial Load Capacity	22 N					
Minimum Incremental Motion	<30 nm					
Drive Torque	0.018 Nm					
Frequency	2 kHz					
Mounting	9.5 mm Shank			M12 x 0.5 mm Thread		
Cable Length	2.1 m					
Connector Type	4-Pin RJ-22					
Rated Life	> 1 x 10 ⁹ steps					
Operating Temperature	10 ⁻⁴⁰ C					

Ordering Information

Model	Description
8301NF	Picomotor Actuator, 0.5 in. Travel, 30 nm Resolution, 9.5 mm Shank
8302	Picomotor Actuator, 1 in. Travel, 30 nm Resolution, 9.5 mm Shank
8303	Picomotor Actuator, 2 in. Travel, 30 nm Resolution, 9.5 mm Shank
8321	Picomotor Actuator, 0.5 in. Travel, 30 nm Res., M12 x 0.5 mm Thread
8322NF	Picomotor Actuator, 1 in. Travel, 30 nm Res., M12 x 0.5 mm Thread
8341NF	Rotating Picomotor Actuator, 3-4 RPM, 9.5 mm Shank
8310	Closed Loop Picomotor Actuator, 12.7 mm Travel

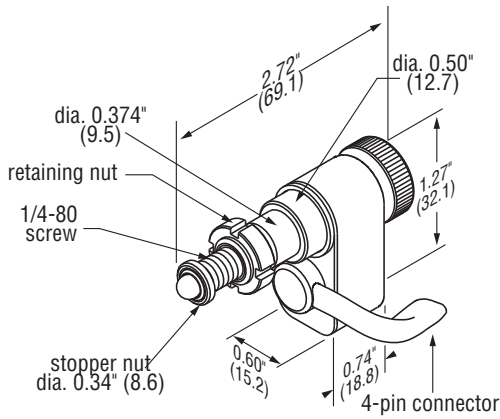
MOTORIZED LINEAR STAGES
 MOTORIZED VERTICAL STAGES
 MOTORIZED ROTATION STAGES
 MOTORIZED LINEAR ACTUATORS
 HEXAPODS
 CONTROLLERS AND DRIVERS
 MOTORIZED OPTICAL MOUNTS
 BEAM MANAGEMENT
 SPECIAL COLLECTIONS

Picomotor Piezo Linear Actuators

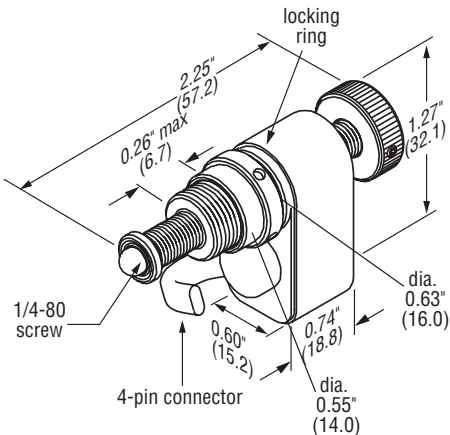
	Model	Travel Range(mm)	Mounting
	8301NF	12.7	0.375 in. (9.5 mm) Shank
	8302	25.4	0.375 in. (9.5 mm) Shank
	8303	50.8	0.375 in. (9.5 mm) Shank
	8321	12.7	M12 x 0.5 mm Thread
	8322NF	25.4	M12 x 0.5 mm Thread
	8341NF	NA	0.375 in. (9.5 mm) Shank
	8310	12.7	0.375 in. shank (9.5 mm shank)

Dimensions

Model 8302

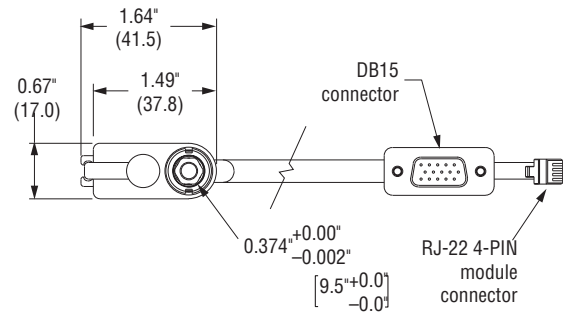
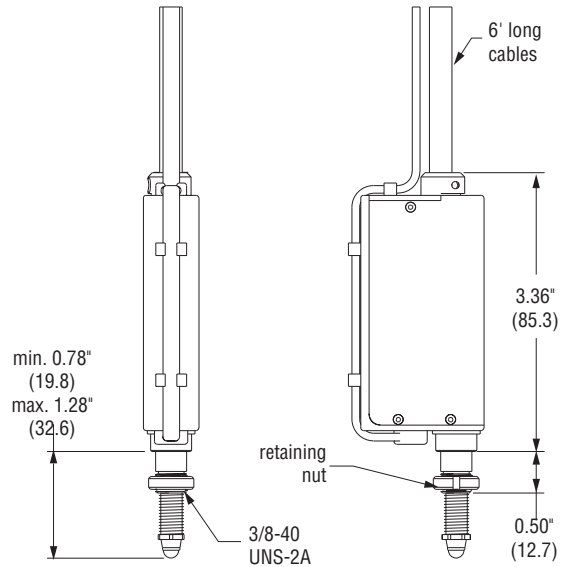


Model 8321

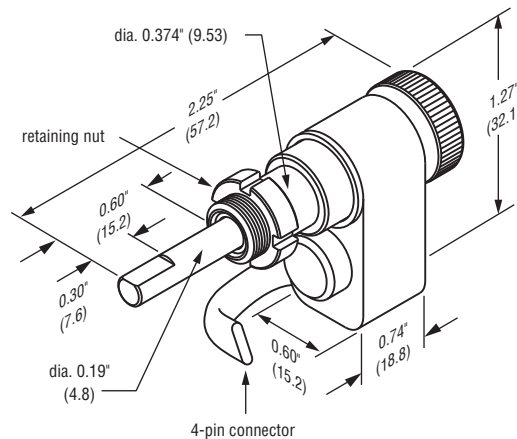


Model 8310

U.S. Patent #5,394,049 & #5,410,206



Model 8341



Recommended Motion Controllers

8742 see page 166

8743 see page 166

Tiny Picomotor™ Actuators



- 30 nm positioning resolution
- Ultra-compact design
- Set-and-forget long-term stability
- Simple integration
- Substantial force
- Easy-to-use, flexible controller/drivers

Our Tiny Picomotor actuator is a smaller-sized version of our standard Picomotor actuators. We have improved the design so that it will meet even more of your compact-area needs.

The Tiny Picomotor actuator is ideal for moving small linear stages, like our Compact Gothic-Arch-Bearing stage. It is also integrated with some of our Pint-Sized mounts. The overall footprint is even smaller now; the cable exits from the side, similarly to our standard Picomotor actuators. For such a small device, it has an impressive pushing force. The maximum load for the Tiny Picomotor actuator is now 3 lbs (13 N).

With two mounting options, a standard 0.25" shank and a 1/4-40 thread version, it is straight-forward to incorporate it into your design. The Tiny Picomotor Actuator should be used with the 8742 Intelligent Picomotor controller/driver or our 8712 TTL/Analog Picomotor driver.

Specifications

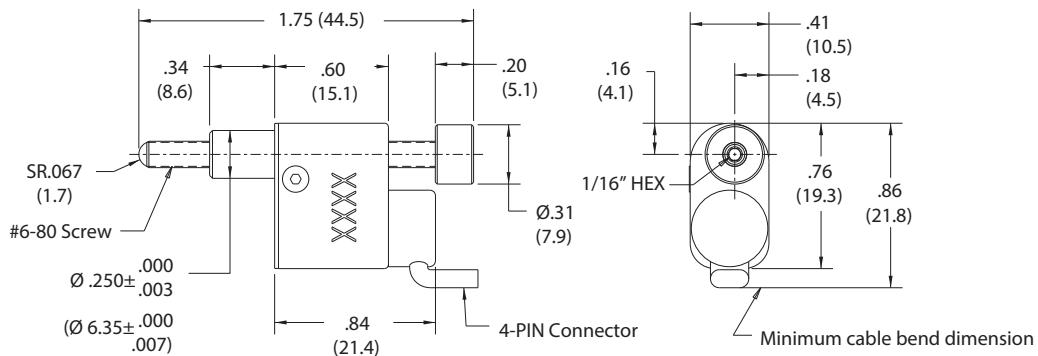
	8353	8354
Travel Range		12.7 mm
Minimum Incremental Motion		<30 nm
Maximum Speed		1.0 mm/min
Axial Load Capacity		13 N
Mounting	6.35 mm Shank	1/4-40 Thread with Retaining Nut
Frequency		1.75 kHz
Drive Torque		0.014 Nm
Cable Length		2.1 m
Connector Type		4-Pin RJ-22
Rated Life		>1.5x10 ⁸ steps
Operating Temperature		10 ⁻⁴⁰ C

Ordering Information

Model	Description
8353	Tiny Picomotor Actuator, 12.7mm Travel, 30 nm Resolution, 6.35 mm Shank
8354	Tiny Picomotor Actuator, 12.7mm Travel, 30 nm Resolution, 1/4-40 Thread with Retaining Nut

Recommended Motion Controller

8742 see page 166



Vacuum and Ultra-High Vacuum Picomotor™ Actuators



- Vacuum and ultra-high vacuum versions
- <30 nm linear resolution
- Set-and-forget long-term stability
- Teflon or Kapton wires

All New Focus vacuum compatible and ultra-high vacuum compatible Picomotor actuators come with short, Teflon®-coated leads so you can make connections to your vacuum-chamber feedthrough. Working with x-rays or other high-radiation applications can require ordering a custom version with Kapton®-coated wire extensions. While Teflon is compatible for use in high-vacuum environments, it is not recommended for use in high-radiation applications where, with repeated exposure to X-rays and other radiation, it can degrade and fall off, possibly causing electrical shorts. Contact New Focus tech support for ordering these customized Picomotor version actuators for use in high-radiation applications.

Specifications

	8301-V 8301-UHV 8301-UHV-KAP 8301-UHV-NM	8302-V 8302-UHV 8302-UHV-KAP 8302-UHV-NM	8303-V	8321-V 8321-UHV 8321-UHV-KAP 8321-UHV-NM	8322-V	8341-V 8341-UHV	8310-V	8353-V 8353-UHV
Travel Range	12.7 mm	25.4 mm	50.8	12.7 mm	25.4 mm	360°	12.7 mm	12.7 mm
Minimum Incremental Motion	30 nm							
Maximum Speed	1.2 mm/min							
Axial Load Capacity	22 N							
Mounting	9.5 mm Shank			M12 x 0.5 mm Thread		9.5 mm Shank	9.5 mm Shank	6.35 mm Shank (-V) 5.08 mm Shank (-UHV)
Frequency	2 kHz							
Drive Torque	0.018 Nm							
Cable Length	2.1 m							
Connector Type	4-pin RJ-22 (non-vacuum-rated)							
Environment	Ultra High Vacuum							
Vacuum Compatibility	10 ⁻⁹ Torr							
Vacuum Wire Material	Kapton							
Wire Length	152 mm							
Operating Temperature	10-40 C							

Closed Loop Vacuum Picomotor Actuators



Model 8310-V

- Compatible to 10^{-6} Torr
- Calibrated highly accurate positioning with all the benefits of our traditional Picomotor actuators
- Completely compatible with our modular iPico™ network controllers

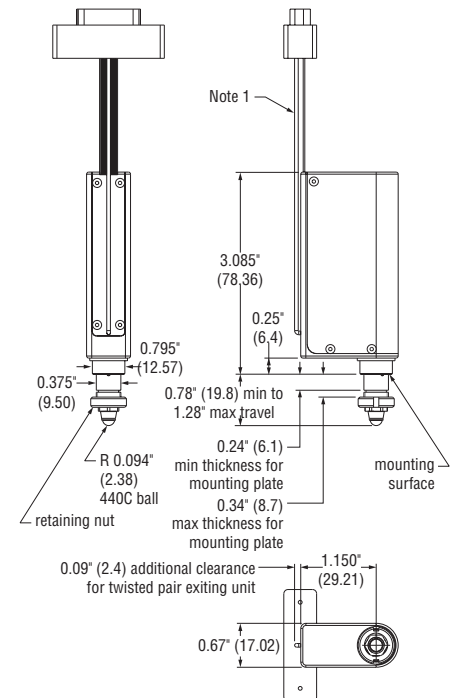
The 8310-V Vacuum-Compatible Closed-Loop Picomotor™ Actuator is ideal for applications where closed-loop control and absolute position calibration is required in a clean environment. Just like the Model 8310 closed-loop Picomotor actuator, the Model 8310-V offers an integrated rotary encoder and forward and reverse limit switches. It offers the best attributes of the standard Picomotor™ actuator including <30-nm resolution, >5 lbs (22 N) of force along with set-and-forget long-term stability with the added benefits of exceptional accuracy and $\pm 1\text{-}\mu\text{m}$ bi-directional repeatability over the entire half-inch travel range.

Specifications

	8310-V
Travel Range	12.7 mm
Minimum Incremental Motion	30 nm
Maximum Speed	1.2 mm/min
Axial Load Capacity	22 N
Mounting	9.5 mm Shank
Bi-directional Repeatability, Guaranteed	$\pm 1\ \mu\text{m}$
Frequency	2 kHz
Drive Torque	0.018 Nm
Limit Switches	2
Cable Length	1.8 m
Connector Type	15-Pin D and 4-Pin RJ-22
Encoder Type	Optical
Rated Life	$>1 \times 10^8$ steps
Closed Loop Resolution	63.5 nm
Operating Temperature	10-40° C

Model 8310-V

U.S. Patent #5,394,049, #6,911,763, & #5,410,206

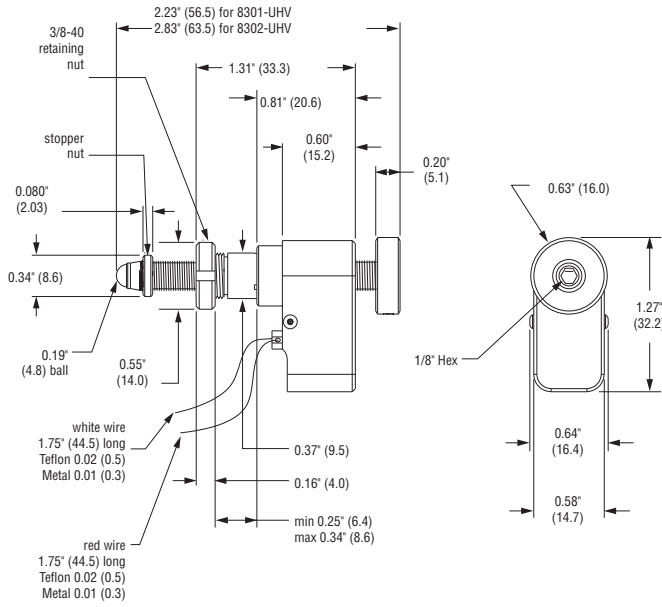


1. Cables shown are 19' long with a PEEK 15 PIN miniature Sub-D Connector. Sensor wire is a 11 Conductor Teflon Ribbon Cable and Picomotor wire is a shielded 2 wire twisted pair.

MOTORIZED LINEAR STAGES
 MOTORIZED VERTICAL STAGES
 MOTORIZED ROTATION STAGES
 MOTORIZED LINEAR ACTUATORS
 HEXAPODS
 CONTROLLERS AND DRIVERS
 MOTORIZED OPTICAL MOUNTS
 BEAM MANAGEMENT
 SPECIAL COLLECTIONS

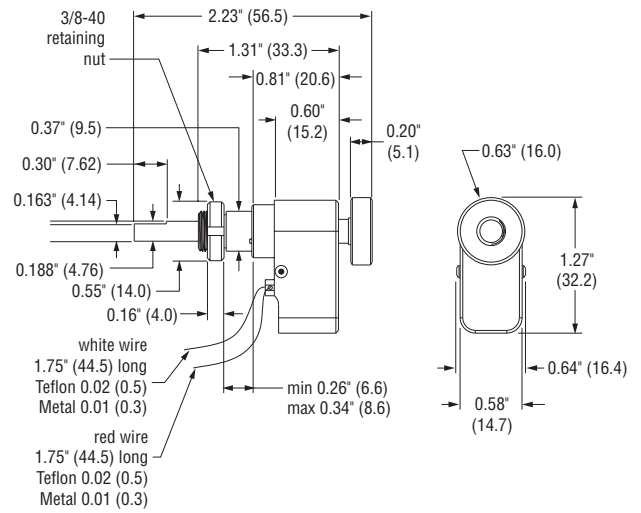
Model 830x

U.S. Patent #5,394,049 & #5,410,206



Model 8321

U.S. Patent #5,394,049 & #5,410,206



Ordering Information

Model	Description
8301-V	Vacuum Compatible Picomotor Actuator, 0.5 in. Travel, 0.375 in. Shank
8302-V	Vacuum Compatible Picomotor Actuator, 1.0 in. Travel, 0.375 in. Shank
8303-V	Vacuum Compatible Picomotor Actuator, 2.0 in. Travel, 0.375 in. Shank
8321-V	Vacuum Compatible Picomotor Actuator, 12.7 mm Travel, 12x0.5 mm Thread
8322-V	Vacuum Compatible Picomotor Actuator, 25.4 mm Travel, 12x0.5 mm Thread
8341-V	Vacuum-Compatible Picomotor Actuator, Rotating Shaft
8310-V	Vacuum-Compatible Closed-Loop Picomotor Actuator, 12.7 mm Travel
8353-V	Vacuum-Compatible Tiny Picomotor Actuator, 0.5 in. Travel

Recommended Motion Controller

- 8742 see page 166
- 8743 see page 166

NanoPZ

Ultra-High Resolution Actuators



- Ultra-high resolution
- 50 N load capacity
- 0.2mm/s max speed
- Non-rotating tip
- Ideal for set-and-forget applications



The NanoPZ Ultra-High Resolution Actuator provides exceptional nanometer-scale remote control of manual-positioning stages and optomechanical components over large distances, in hard to reach spaces and in hazardous hands-off applications, like high-power laser experiments. The NanoPZ's non-rotating tip prevents contact surface wear and allows for direct load attachments. Newport's exclusive design and innovative piezo motor ensures 30 nm incremental motion capabilities with no loss of position when power is removed. The NanoPZ incorporates the exclusive piezo micro stepping motor and, with ergonomic controls, provides consistent results and superior reliability. The NanoPZ is compatible with an array of Newport products including ULTIMA® Series optical mounts, GON Series goniometers, and ULTRAlign™ Series of linear stages.

PZA12 Specifications

	PZA12
Travel Range	12.5 mm
Minimum Incremental Motion	30 nm
Maximum Speed	0.2 mm/s
Axial Load Capacity	50 N
Cable Length	3 m
Weight	0.13 kg
Motor	Non-resonant piezo micro-stepping

Recommended Motion Controller

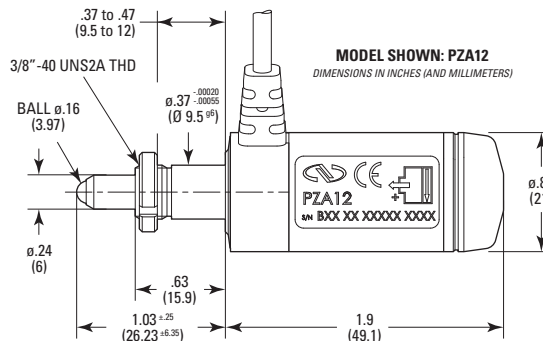
PZC200 see page 172

Ordering Information

Model	Description
PZA12	NanoPZ Ultra-High Resolution Actuator, 12.5mm Travel
PZC200	Hand-held controller for PZA12
PZC200-KT	PZA12 Actuator Kit, PZC200 Cont. NSC-PS25 Power Supply, NSC-PSC3 Cable
PZC-SB	PZC200 Switchbox, Includes Power, Driver & Controller Cables Switchbox allows one PZC200 to drive up to 8 actuators. Included cables: P/N 417971-01 1.8 m (6 ft) power cable to controller, P/N 44415-01 6 pin Mini DIN motor cable (6 ft), P/N NSC-CB2 1.8 m (6 ft) RS-485 cable to controller

- Notes:
1. For high duty applications, please consult with Newport applications engineering.
 2. The PZC200 must be used with the PZA12.

Dimensions



MOTORIZED LINEAR STAGES
MOTORIZED VERTICAL STAGES
MOTORIZED ROTATION STAGES
MOTORIZED LINEAR ACTUATORS
HEXAPODS
CONTROLLERS AND DRIVERS
MOTORIZED OPTICAL MOUNTS
BEAM MANAGEMENT
SPECIAL COLLECTIONS

NPA Series

NanoPositioning Piezo Translators



- Sub-nanometer positioning resolution
- Ultra-high load capacity
- Optional strain-gauge position feedback
- Vacuum compatible versions



The NPA Series Piezo Translators are ideally suited for integration into custom motion devices and provide nanometer resolution, up to 100 mm travel range, and micro-second response time in a very compact housing. NPA translators are equipped with a highly reliable, multi-layer, low-voltage, piezoelectric transducer (PZT) stack protected by a cylindrical stainless steel housing. The high internal mechanical preload simplifies handling allowing for high load, dynamic applications. NPA translators can generate large forces up to 1000 N making them particularly useful for machine tools, active vibration isolation, or adaptive mechanics. Their small size and high resonant frequency are suitable for scanning microscopy, laser tuning, beam steering, patch clamping, or micro lithography applications. NPA actuators are available as open-loop (no position feedback) or closed-loop devices with integrated position feedback. In open-loop, the resolution is limited by the noise of the control electronics, but repeatability and stability are compromised due to the hysteresis and creep of the piezo ceramic material.

Fastening is accomplished by M3 threads at the top and the base of the translator. Like all piezoelectric devices, moment loads and side forces should be avoided. Spanner flats are provided and should be used when securing screws.

Specifications

	NPA100	NPA100SG	NPA100SGV6	NPA100V6	NPA25	NPA25SG
Travel Range	100 μm				25 μm	
Axial Load Capacity	1000 N					
Load Capacity, Pull	150 N					
Axial Stiffness	10 N/ μm				40 N/ μm	
Capacitance	9				2.5	
Resonant Frequency	3000				12000	
Cable Length	1 m	2 m	2 m	1 m	1 m	2 m
Closed Loop Repeatability		28 nm	28 nm			16 nm
Closed Loop Resolution		2.0 nm	2.0 nm			0.5 nm
Open Loop Resolution	0.2 nm	0.2 nm	0.2 nm	0.2 nm	0.05 nm	0.05 nm
Closed Loop Travel Range		80 μm	80 μm			20 μm
Vacuum Compatibility			10^{-6} hPa	10^{-6} hPa		

D-Versions Available

Ordering Information

Model	Description
NPA25	Nano-Positioning Open-loop Piezo Actuator, 25 μm
NPA25SG	Nano-Positioning Piezo Actuator, 25 μm , Strain-gauge
NPA50	Nano-Positioning Open-loop Piezo Actuator, 50 μm
NPA50SG	Nano-Positioning Piezo Actuator, 50 μm , Strain-gauge
NPA100	Nano-Positioning Open-loop Piezo Actuator, 100 μm
NPA100SG	Nano-Positioning Piezo Actuator, 100 μm , Strain-gauge

Add -D for XPS compatible models
Add V6 for vacuum compatible models

Recommended Motion Controllers

NPC3 see page 173	
NPC3SG see page 173	
XPS-D see page 148	For -D version only
XPS-RL see page 153	For -D version only
NPC1USB see page 174	For -D version only

Note: NPM140 is compatible with NPC3. NPM140SG is compatible with NPC3SG.

NPM Series

NanoPositioning Piezoelectric Micrometer Adapter



NPM140SG shown with AJS100-2. Order actuators separately.

- Sub-nanometer positioning resolution
- Large piezoelectric travel range
- 100 N axial load capacity
- Nanometer scale automated positioning of manual products
- Optional strain-gauge position feedback



The New Focus NPM140 Piezoelectric micrometer adapter provides nanometer positioning capability for manual products. This adapter mounts to the actuator seat on the stage and is mechanically compatible with all Newport stages, mounts and actuators with .375" (Ø 9.5mm) mounting flange.

Specifications

	NPM140	NPM140SG
Travel Range	140 µm	
Axial Load Capacity	100 N	
Load Capacity, Pull	150 N	
Axial Stiffness	0.4 N/µm	
Capacitance	1.7	
Resonant Frequency	670	
Cable Length	1 m	2 m
Closed Loop Repeatability	35 nm	
Closed Loop Resolution	1 nm	
Open Loop Resolution	0.1 nm	
Closed Loop Travel Range	90 µm	
Weight	0.125 kg	

Ordering Information

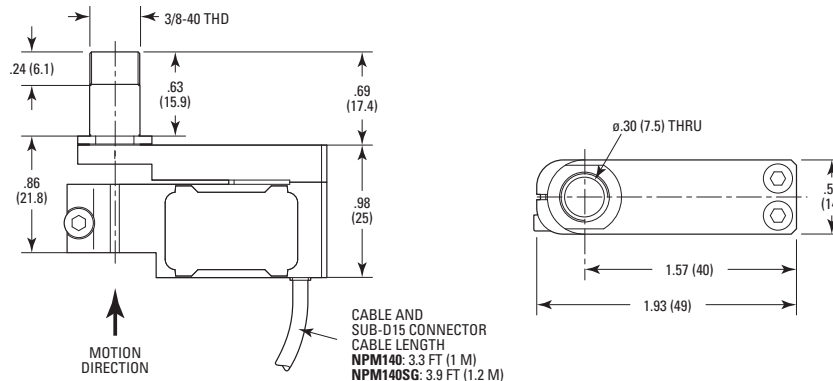
Model	Description
NPM140	Piezo-electric Open-loop Micrometer Adapter, 140 µm
NPM140SG	Piezoelectric Micrometer Adapter, 140 µm, Strain-gauge
NPM140-D	Piezoelectric Open-loop Micrometer Adapter, 140 µm, XPS
NPM140SG-D	Piezoelectric Micrometer Adapter, 140 µm, Strain-gauge, XPS
NPC3	3-channel piezo stack amplifier, open-loop control
NPC3SG	3-channel piezo amplifier, strain-gauge position control

Recommended Motion Controllers

NPC3 see page 173	
NPC3SG see page 173	
XPS-D see page 148	For -D version only
XPS-RL see page 153	For -D version only
NPC1USB see page 174	For -D version only

Note: NPM140 is compatible with NPC3. NPM140SG is compatible with NPC3SG.

Dimensions



MODEL SHOWN: NPM140
DIMENSIONS IN INCHES (AND MILLIMETERS)

CABLE AND SUB-D15 CONNECTOR
CABLE LENGTH
NPM140: 3.3 FT (1 M)
NPM140SG: 3.9 FT (1.2 M)

MOTORIZED LINEAR STAGES
MOTORIZED VERTICAL STAGES
MOTORIZED ROTATION STAGES
MOTORIZED LINEAR ACTUATORS
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CONTROLLERS AND DRIVERS
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BEAM MANAGEMENT
SPECIAL COLLECTIONS