

Dear Valued Newport Motion Customer,

Welcome to our catalog addendum for Newport's Motion Control products, your single point source for high performance, mechanical and air bearing stages, controllers, custom and OEM solutions. In this addendum, you will find new products and updated specifications for products that we continue to improve on. If you do not find exactly what you need or need assistance for your demanding application, feel free to contact one of our motion experts.

Also please do not hesitate to visit our website at [www.newport.com/c/motion-control](http://www.newport.com/c/motion-control) for additional information and updates on all our capabilities.

We are always available to support you for your precision positioning and motion control needs.

*For Motion, Think Newport™*

*Sincerely,*  
Motion Team



## About Newport

Newport Corporation is a globally recognized leader in advanced technology products and solutions for fields such as Research, Life and Health Science, Aerospace and Defense, Industrial Manufacturing, Semiconductors and Microelectronics. With decades of experience in motion control, Newport has both the capability and the capacity to provide the optimum solution for your individual needs. Our product portfolio includes standard products, special adaptations, custom systems and OEM solutions.

MOTORIZED  
LINEAR STAGES



# Motorized Linear Stage Selection Guide

MOTORIZED  
VERTICAL STAGES



MOTORIZED  
ROTATION STAGES

Motorized Linear Stages from Newport and New Focus are designed and built with over 50 years of experience in providing solutions to many markets including research and academia, industrial, semiconductor, aerospace and defense. Starting from the XM family of direct drive ultra-precision stages to the compact Agilis piezomotor linear stage, there are over 200 models of stages to choose from. Many more linear positioning solutions can be created by matching our popular manual stages with the wide selection of compatible motorized actuators.

Linear motorized stages can be selected based on Travel, Minimum Incremental Motion, Repeatability, Accuracy, Speed, etc. To begin, use the selection guides below with more details in the following product family pages.

## Mid-Range Travel Linear Stage Selection

MOTORIZED  
ACTUATORS

Series	Travel Range (mm)	Minimum Incremental Motion (μm)	Bi-directional Repeatability (μm)	On-Axis Accuracy (μm)	Maximum Speed (mm/s)	Normal Load Capacity (Cz)(N)
 <b>XM Series</b> Ultra-Precision Linear Motor Stages see catalog page 34	50 - 350	0.01	0.08	1.5 - 3.0	300	100 - 300
 <b>GTS Series</b> High-Precision Linear Stages see catalog page 37	70, 150	0.1	0.2	2.0	50	100
 <b>ILS-LM Series</b> High-Performance Mid-Range Travel Linear Motor Stages see catalog page 39	100 - 300	0.01	0.6	3.0 - 5.0	500	250
 <b>ILS Series</b> High-Performance Mid-Range Travel Linear Stages see catalog page 39	50 - 250	0.3 - 1.0	0.7 - 2.0	2.0 - 5.0	50 - 100	250
 <b>FMS Series</b> Linear Metrology Stages see catalog page 48	100 - 300	0.1 - 0.5	0.5 - 4.5	1.0 - 13.0	20 - 100	150
 <b>MTN Series</b> Mid-Travel Steel Linear Stages see catalog page 10	100 - 300	0.3	3.0 - 6.5	7.0 - 9.0	20 - 100	1000
 <b>UTS Series</b> Mid-Travel Steel Linear Stages see catalog page 52	50 - 150	0.3	3.5 - 6.0	4.5 - 8.0	10 - 40	100 - 200
 <b>FCL Series</b> Intelligent Stepper Motor Linear Stages see catalog page 56	50 - 200	0.15	4.5 - 5.0	4.0 - 10.0	20	250
 <b>IDL-BL Series</b> Mid-Travel Industrial Grade Linear Stage see page 4	150-300	0.05	±1.0	±10.0*-±15.0	300	450
 <b>ONE-XY Series</b> Integrated XY Linear Stage see page 8	50 - 290	0.05	±0.09	±0.3*-±6.0	300-500	100 - 350

HEXAPODS



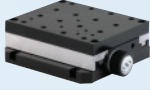


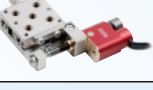

CONTROLLERS  
AND DRIVERS

MOTORIZED  
OPTICAL MOUNTS

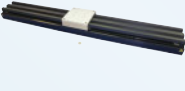


SPECIAL  
COLLECTIONS

\*Values represent Absolute Accuracy, Guaranteed

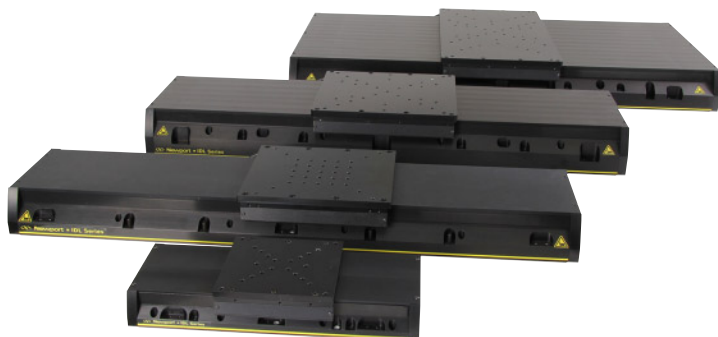
## Miniature Linear Stage Selection

Series		Travel Range (mm)	Minimum Incremental Motion(μm)	Bi-directional Repeatability (μm)	On-Axis Accuracy (μm)	Maximum Speed (mm/s)	Normal Load Capacity (Cz)(N)
	<b>NPX Series</b> NanoPositioning Linear Stages see catalog page 58	0.1 - 0.4	0.0002 - 0.008	NA	NA		10 - 100
	<b>Agilis™ Series</b> Piezo Motor Driven Linear Stages see catalog page 59	12, 27	0.05	NA	NA	0.5	3
	<b>VP-25X Precision</b> Compact Linear Stages see catalog page 45	25	0.01 - 0.1	0.14 - 0.2	2.0	25	40 - 60
	<b>MFA Series</b> Miniature Steel Linear Stages see catalog page 54	25	0.1	1.5	6.0	0.3 - 2.5	50
	<b>CONEX-MFACC</b> Miniature Steel Linear Stages see catalog page 53	25	0.1	1.5	6.0	0.3 - 2.5	50
	Linear Stages with <b>Integrated Picomotors</b> see page 13	10 - 25	< 0.3	NA	Depends on actuators and stages used		
	Linear Stages with <b>Motorized Actuators</b> see catalog page 109	6 - 50	0.03 - 0.2	NA	Depends on actuators and stages used		

## Long-Range Travel Linear Stage Selection

Series		Travel Range (mm)	Minimum Incremental Motion(μm)	Bi-directional Repeatability (μm)	On-Axis Accuracy (μm)	Maximum Speed (mm/s)	Normal Load Capacity (Cz)(N)
	<b>IMS-LM Series</b> High-Performance Long-Travel Linear Motor Stages, see catalog page 42	300 - 1200	0.02	0.5	9.0 - 30.0	1000	100 - 600
	<b>IMS Series</b> High-Performance Long-Travel Linear Stages see catalog page 42	300 - 600	0.2 - 1.25	1.0 - 2.5	9.0 - 15.0	100 - 200	600
	<b>IDL-LM Series</b> Industrial Grade Linear Stage, see page 4	100 - 1200	0.05	±0.75	±1.5 - ±2.5	2000	450 - 2000

# IDL Long-Travel Industrial Linear Stages



- Built for industrial environments with debris protection, high throughput & reliability
- High-efficiency, non-contact, ironless linear motor for fast motion & speed stability
- Designed for easy direct mounting of XY configurations on English or Metric tables
- Various sizes capable of high load capacities to fit different applications
- Compatible with many industrial controllers
- Quick and reliable delivery based on customers' production needs

The long-travel IDL industrial-grade linear stages boasts the highest load capacity and speed of all linear motor stages with a wide variety of sizes and travels to choose from, making it well-suited for demanding production environments. With IP50 level dust protection, the IDL stages protect themselves in these environments with its protective side-bands, hard cover, and air purge. They are driven with a high-efficiency, non-contact, and ironless linear motor. The linear motor ensures zero cogging for ultra-smooth velocity control and less heat generation. The design of the stage allows for various widths, travel range, and load capacities to fit numerous applications. Given the variety, these stages are directly stackable with each other; minimizing design and assembly time.

## Ordering Information

Model (Metric)	Description
<b>Width: 165 mm</b>	
IDL165-100LM (M-IDL165-100LM)	100 mm Travel, 165 mm Width
IDL165-200LM (M-IDL165-200LM)	200 mm Travel, 165 mm Width
IDL165-300LM (M-IDL165-300LM)	300 mm Travel, 165 mm Width
<b>Width: 225 mm</b>	
IDL225-200LM (M-IDL225-200LM)	200 mm Travel, 225 mm Width
IDL225-300LM (M-IDL225-300LM)	300 mm Travel, 225 mm Width
IDL225-400LM (M-IDL225-400LM)	400 mm Travel, 225 mm Width
IDL225-500LM (M-IDL225-500LM)	500 mm Travel, 225 mm Width
IDL225-1200LM (M-IDL225-1200LM)	1200 mm Travel, 225 mm Width
<b>Width: 280 mm</b>	
IDL280-300LM (M-IDL280-300LM)	300 mm Travel, 280 mm Width
IDL280-400LM (M-IDL280-400LM)	400 mm Travel, 280 mm Width
IDL280-500LM (M-IDL280-500LM)	500 mm Travel, 280 mm Width
IDL280-600LM (M-IDL280-600LM)	600 mm Travel, 280 mm Width
IDL280-700LM (M-IDL280-700LM)	700 mm Travel, 280 mm Width
IDL280-1000LM (M-IDL280-1000LM)	1000 mm Travel, 280 mm Width
IDL280-1200LM (M-IDL280-1200LM)	1200 mm Travel, 280 mm Width
<b>Width: 560 mm</b>	
IDL560-450LM (M-IDL560-450LM)	450 mm Travel, 560 mm Width
IDL560-600LM (M-IDL560-600LM)	600 mm Travel, 560 mm Width
IDL560-750LM (M-IDL560-750LM)	750 mm Travel, 560 mm Width
IDL560-1000LM (M-IDL560-1000LM)	1000 mm Travel, 560 mm Width

## Controllers

### Compatible Industrial Motion Controllers

#### Model

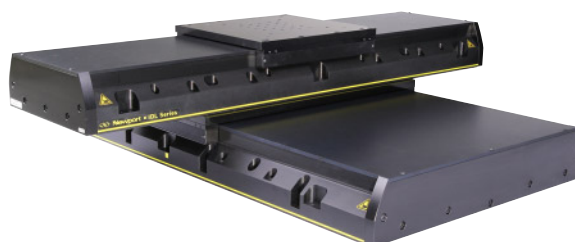
SP-EC-4-NP

CMhp-2-NP

Contact Newport for more information about compatibility with the XPS controllers.

## Design Details

Base Material	Aluminum
Bearings	Recirculating caged ball bearings
Drive Mechanism	Ironless Linear motor (Ballscrew for Z-axis)
Feedback	Linear steel scale with 20 $\mu$ m pitch
Limit Switches	Optical
Origin	Optical at center of travel
Cable (m)	5m. Connectorized, optional cable management.



## Specifications

Model	IDL165-100LM	IDL165-200LM	IDL165-300LM
Travel Range (mm)	100	200	300
Minimum Incremental Motion (μm)		0.05	
Bi-directional Repeatability <sup>1</sup> (μm)	±0.75	±0.75	±0.75
On-Axis Accuracy <sup>1</sup> (μm)	±1.5	±1.5	±2
Maximum Speed (mm/s)		2000	
Maximum Acceleration(G)		30000	
Pitch <sup>3</sup> (μrad)	30	45	60
Yaw <sup>3</sup> (μrad)	40	60	80
Straightness, Flatness <sup>2</sup> (μm)	±2.5/±2.5	±4.5/±4.5	±4.5/±4.5
Normal Load Capacity (Cz)		450	

Model	IDL225-100LM	IDL225-300LM	IDL225-400LM	IDL225-500LM	IDL225-600LM	IDL225-1000LM	IDL225-1200LM
Travel Range (mm)	200	300	400	500	600	1000	1200
Minimum Incremental Motion (μm)				0.05			
Bi-directional Repeatability <sup>1</sup> (μm)				± 0.75			
On-Axis Accuracy <sup>1</sup> (μm)	± 1.5	± 2	± 2	± 2.5	± 2.5	± 2.5	± 2.5
Maximum Speed (mm/s)				2000			
Maximum Acceleration(G)				30000			
Pitch <sup>3</sup> (μrad)	45	55	70	80	100	130	130
Yaw <sup>3</sup> (μrad)	55	70	90	105	120	165	165
Straightness, Flatness <sup>2</sup> (μm)	± 4.5/ ± 4.5	± 6/ ± 6	± 7/ ± 7	± 8/ ± 8	± 9/ ± 9	± 13/ ± 13	± 13/ ± 13
Normal Load Capacity (Cz)				1000			

Model	IDL280-300LM	IDL280-400LM	IDL280-500LM	IDL280-600LM	IDL280-700LM	IDL280-1000LM
Travel Range (mm)	300	400	500	600	700	1000
Minimum Incremental Motion (μm)				0.05		
Bi-directional Repeatability <sup>1</sup> (μm)				± 0.75		
On-Axis Accuracy <sup>1</sup> (μm)	± 2	± 2	± 2.5	± 2.5	± 2.5	± 2.5
Maximum Speed (mm/s)				2000		
Maximum Acceleration(G)				30000		
Pitch <sup>3</sup> (μrad)	50	65	75	90	105	120
Yaw <sup>3</sup> (μrad)	65	80	95	110	130	150
Straightness, Flatness <sup>2</sup> (μm)	± 5/ ± 5	± 7/ ± 7	± 7/ ± 7	± 8/ ± 8	± 10/ ± 10	± 11/ ± 11
Normal Load Capacity (Cz)				1500		

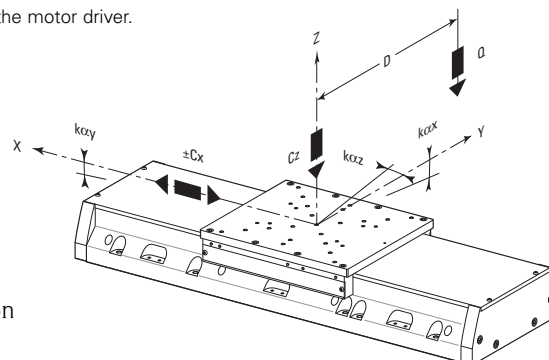
Model	IDL560-450LM	IDL560-600LM	IDL560-750LM	IDL560-1000LM
Travel Range (mm)	450	600	750	1000
Minimum Incremental Motion (μm)			0.05	
Bi-directional Repeatability <sup>1</sup> (μm)			± 0.75	
On-Axis Accuracy <sup>1</sup> (μm)	± 2	± 2.5	± 2.5	± 2.5
Maximum Speed (mm/s)			2000	
Maximum Acceleration(G)			30000	
Pitch <sup>3</sup> (μrad)	65	90	110	120
Yaw <sup>3</sup> (μrad)	80	110	135	150
Straightness, Flatness <sup>2</sup> (μm)	± 7 ± 7	± 8/ ± 8	± 10/ ± 10	± 11/ ± 11
Normal Load Capacity (Cz)			2000	

<sup>1</sup>To obtain arcsec units, divide μrad value by 4.8. <sup>2</sup>MIM value is dependent on the motor driver.

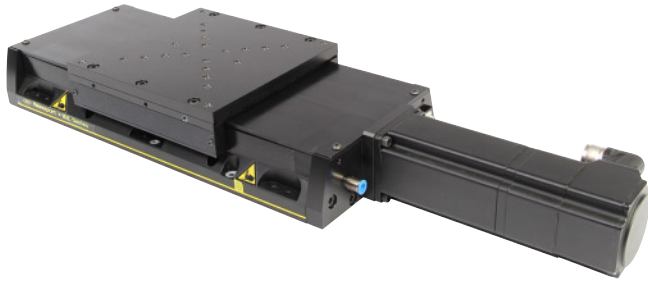
## Load Characteristics and Stiffness

Cz, Normal center load capacity on bearings	1000 N
k <sub>cx</sub> , Compliance in roll (μrad/Nm)	0.7
k <sub>cy</sub> , Compliance in pitch (μrad/Nm)	0.55
k <sub>cz</sub> , Compliance in yaw (μrad/Nm)	0.3
Q, Off-center load	QCz / (1 + D/100)
D, Cantilever distance in mm	

Note this section adds to the Motorized Linear Stages section in the Precision Motion Catalog pp.32-65.



# IDL-BL Mid-Travel Industrial Linear Stages

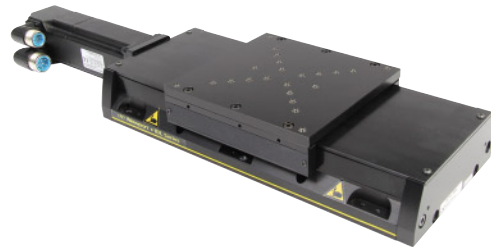


- Choose between 150 or 300mm travel
- High efficiency, brushless DC torque motor for speeds up to 300 mm/s
- Designed for easy direct mounting of XY or XYZ configurations on English or Metric tables
- Compatible with many industrial controllers
- Brake version available

The mid-travel IDL-BL industrial-grade linear stages feature a ballscrew and brushless motor drive for high duty cycle and high throughput applications. Similar to the IDL-LM family, the IDL165-BL includes debris-resistant features, making it well suited for demanding laser machining production environments. Configurable in XY or XYZ stacks. The brake option is recommended for reliable Z-axis stage capable of carrying 12kg laser heads or optical assemblies.

## Ordering Information

Model	Description
IDL165-150BL	Industrial linear stage with brushless DC motor, 150 mm travel
IDL165-150BLBK	Industrial linear stage with brushless DC motor and brake, 150 mm travel
IDL165-300BL	Industrial linear stage with brushless DC motor, 300 mm travel
IDL165-300BLBK	Industrial linear stage with brushless DC motor, 300 mm travel

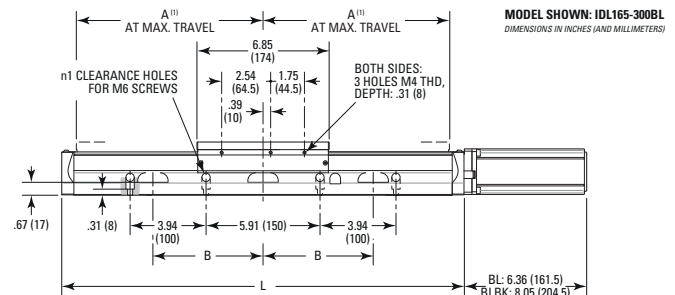
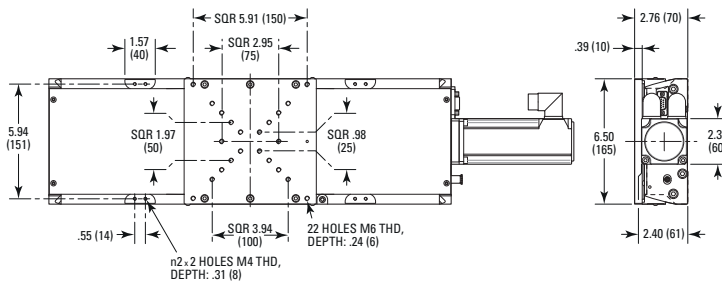


## Compatible Industrial Motion Controllers

Model
SP-EC-4-NP
CMhp-2-NP

Additional controller options are available. Contact Newport for more information about compatibility with the XPS controller.

## Dimensions



MODEL	TRAVEL	L	A <sup>(1)</sup>	n1	B	n2
IDL165-150BL	7.87 (200)	14.94 (379.5)	6.71 (170.3)	4	5.71 (145)	6
IDL165-300BL	11.81 (300)	20.85 (529.5)	9.66 (245.3)	8	5.71 (145)	6

<sup>(1)</sup> INCLUDING OVER-TRAVEL ALLOWED BY THE HARD STOP.

MOTORIZED  
LINEAR STAGES

MOTORIZED  
VERTICAL STAGES

MOTORIZED  
ROTATION STAGES

MOTORIZED  
ACTUATORS

HEXAPODS

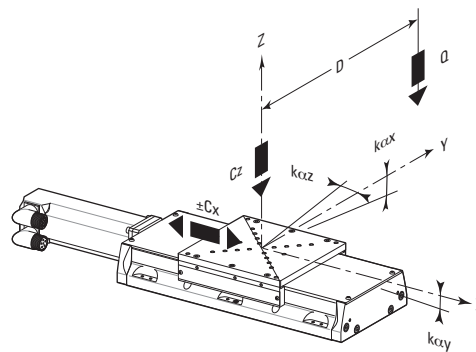
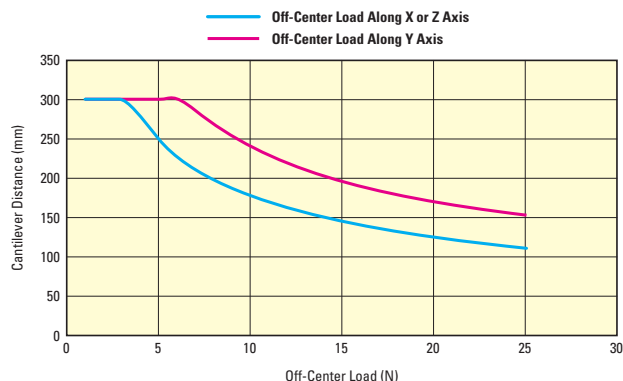
CONTROLLERS  
AND DRIVERS

MOTORIZED  
OPTICAL MOUNTS

SPECIAL  
COLLECTIONS

## Design Details

Base Material	Aluminum
Bearings	Recirculating caged ball bearings
Drive Mechanism	Ballscrew, 5mm
Feedback	Linear steel scale with 20 μm pitch
Limit Switches	Optical
Origin	Optical at center of travel
Cable (m)	4.5m. Connectorized, optional cable management.



$C_z$ , Normal center load capacity on bearings	450 N
$\pm C_x$ , Continuous axial load capacity	250 N
$k_{\alpha x}$ , Angular stiffness (Roll)	0.3 μrad/Nm
$k_{\alpha y}$ , Angular stiffness (Pitch)	0.4 μrad/Nm

## Specifications

Model	IDL165-150BL	IDL165-300BL
Travel Range (mm)	150	300
Width(mm)		165
Minimum Incremental Motion, Linear (μm) <sup>2</sup>		0.5
Bi-directional Repeatability (μm)		2.0 or ±1.0 μ
Maximum Speed (mm/s)		
Pitch (μrad) <sup>1</sup>	70	70
Yaw (μrad) <sup>1</sup>	50	50
Straightness, Flatness(μm)	±2.0/±4.0	±2.0/±4.0
Normal Load Capacity (Cz)(N)		450
Weight (kg)	9.3	11.1

<sup>1</sup>To obtain arcsec units, divide μrad value by 4.8

<sup>2</sup>MIM value is dependent on the motor driver.

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SPECIAL  
COLLECTIONS

# One-XY Mid-Travel Integrated XY Linear Stages



- Integrated XY stages with built-in orthogonality
- Excellent planarity with micron-level straightness and flatness
- Low profile three plate design reduces stacking errors and increases stiffness
- High efficiency, non-cogging linear motor
- Linear encoder for nano-scale MIM and repeatability

The ONE-XY uniquely integrates both the X and Y axes in a low-profile design with excellent positioning accuracy, flatness, straightness, stiffness, MIM, and repeatability. The ONE-XY's most distinguishing feature is its 3 plate design, allowing movement in both X and Y direction with a low profile relative to stacked stages. Orthogonality is built into the design, therefore enhancing the XY accuracy. Because of the ONE-XY's precision ground cross-roller bearings, it achieves micron-level straightness and flatness. For better stability, the wide separation of cross-roller bearings and a thick middle plate ensures higher stiffness against cantilevered loads. Lastly, the ONE-XY is driven by an ironless linear motor, providing higher speed, acceleration, and system responsiveness without wear.

## Ordering Information

Model	Description
ONE-XY60	Integrated XY Linear Stage, 50 mm Travel, Linear Motor
ONE-XY60HA	High Accuracy, Integrated XY Linear Stage, 50 mm Travel, Linear Motor
ONE-XY100	Integrated XY Linear Stage, 90 mm Travel, Linear Motor
ONE-XY100HA	High Accuracy, Integrated XY Linear Stage, 100 mm Travel, Linear Motor
ONE-XY200	Integrated XY Linear Stage, 190 mm Travel, Linear Motor
ONE-XY200HA	High Accuracy, Integrated XY Linear Stage, 190 mm Travel, Linear Motor
ONE-XY300	Integrated XY Linear Stage, 290 mm Travel, Linear Motor
ONE-XY300HA	High Accuracy, Integrated XY Linear Stage, 290 mm Travel, Linear Motor

## Specifications

Model	ONE-XY60	ONE-XY60HA	ONE-XY100	ONE-XY100HA	ONE-XY200	ONE-XY200HA	ONE-XY300	ONE-XY300HA
Travel Range (mm)	50		90		190		290	
Minimum Incremental Motion ( $\mu\text{m}$ )	0.05		0.05		0.05		0.05	
Bi-directional Repeatability <sup>1</sup> ( $\mu\text{m}$ )	$\pm 0.09$		$\pm 0.09$		$\pm 0.09$		$\pm 0.09$	
On-Axis Accuracy <sup>1</sup> ( $\mu\text{m}$ )	$\pm 3$	$\pm 0.3$	$\pm 3$	$\pm 0.3$	$\pm 4$	$\pm 0.4$	$\pm 6$	$\pm 0.6$
Maximum Speed (mm/s)	300		400		500		300	
Maximum Acceleration(G)	0.3		0.3		0.2		0.2	
Pitch <sup>2</sup> ( $\mu\text{rad}$ )	$\pm 58$		$\pm 58$		$\pm 72$		$\pm 86$	
Yaw <sup>2</sup> ( $\mu\text{rad}$ )	$\pm 58$		$\pm 58$		$\pm 72$		$\pm 86$	
Orthogonality <sup>2</sup> (mrad)	96 $\mu\text{rad}$	96 $\mu\text{rad}$	96 $\mu\text{rad}$	96 $\mu\text{rad}$	96 $\mu\text{rad}$	96 $\mu\text{rad}$	96 $\mu\text{rad}$	96 $\mu\text{rad}$
Straightness, Flatness <sup>2</sup> ( $\mu\text{m}$ )	$\pm 2 / \pm 2.5$		$\pm 2 / \pm 3$		$\pm 4 / \pm 4$		$\pm 10 / \pm 8$	
Normal Load Capacity (Cz)	100		120		150		350	
Weight (N)	28.42		56.84		117.6		676.2	

<sup>1</sup> Specifications measured on stage centerline, 50mm above mounting surface. Newport provides NIST traceable proof for all options/specs per quote.

<sup>2</sup> Flatness specifications dependent on system base. Contact Newport for more information.

<sup>3</sup> Stage limitation at no load. Does not account for drive or resolution limitations.

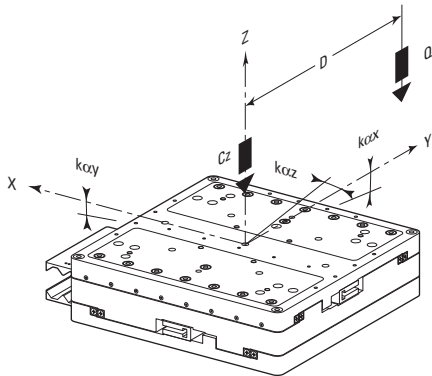
Notes: Actual travel depends on the location of the limit sensors, up to 10mm less. HA versions are error mapped in XY.



## Design Details

Base Material	Anodized aluminum
Bearings	High precision crossed roller bearings with anti-cage migration
Drive Mechanism	Ironless core linear motor
Feedback	Non-contact optical encoder
Limit Switches	Integrated home and end of travel limits
Cable (m)	3 (included)

## Load Characteristics



Cz, Normal center load capacity on bearings	100 N
Q, Off-center load	$QCz / (1 + D/100)$
D, Cantilever distance in mm	

## Accessories

Model	Description
ONE-CM	Cable Chain for ONE-XY Integrated Stage

## Motion Controllers and Driver Electronics

Model	Description
XPS-Q2	2-axis Universal Controller/Driver, ethernet
XPS-RL2	2-axis Universal Controller/Driver, ethernet, Basic GPIO and PCO
XPS-DRV02	PWM drive module for brushless motors, 5A/44Vpp max.

Note this section adds to the Motorized Linear Stages section in the Precision Motion Catalog pp.32-65.

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## MTN Series

# Mid-Travel Steel Linear Stages



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

The MTN Series is a long travel linear stage with an all steel construction for exceptional load capacity, stiffness and thermal stability. The non-backdrivable lead screw is also suitable for vertical applications. The all steel construction allows for extreme stiffness, thermal stability, and is impervious to bi-metallic bending. Among the all steel linear stages, the MTN has the highest load capacity at 100 kg. The non-migrating ball cage design eliminates cage drift, enhancing reliability.

## Ordering Information

Model	Description
MTN100PP	Steel Linear Stage, 100 mm, Stepper Motor
MTN100CC	Steel Linear Stage, 100 mm, DC Motor
MTN100PPV6	Steel Linear Stage, 100 mm, Stepper Motor, Vacuum version
MTN200PP	Steel Linear Stage, 200 mm, Stepper Motor
MTN200CC	Steel Linear Stage, 200 mm, DC Motor
MTN200PPV6	Steel Linear Stage, 200 mm, Stepper Motor, Vacuum version
MTN300PP	Steel Linear Stage, 300 mm, Stepper Motor
MTN300CC	Steel Linear Stage, 300 mm, DC Motor
MTN300PPV6	Steel Linear Stage, 300 mm, Stepper Motor, Vacuum version

## Accessories

### Compatible Controllers and Driver Electronics

Model
ESP301-1G
XPS-Q2
XPS-DRV03

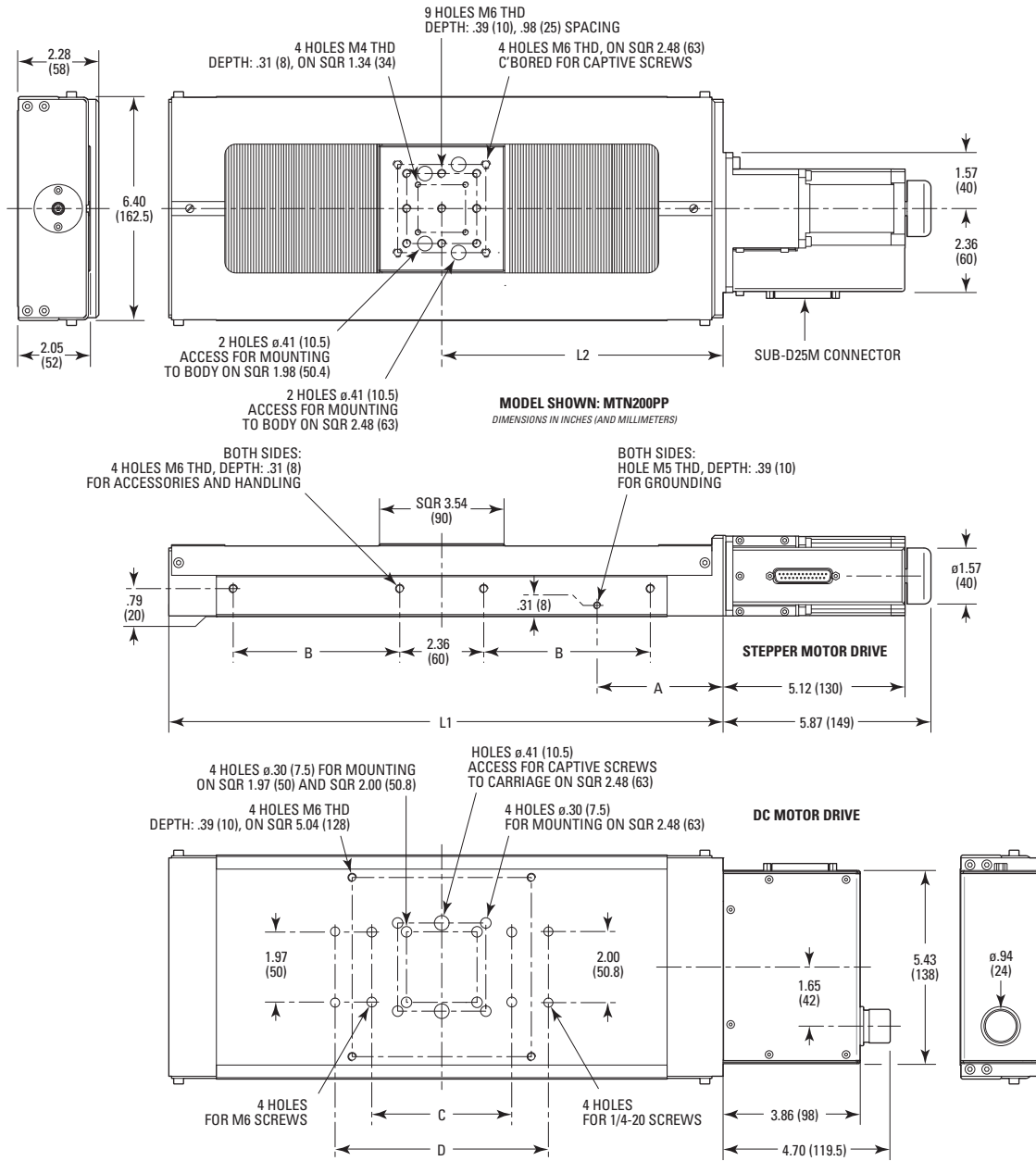
Note: Check the controller tab to see all compatible controller models.

### Mounting

Model
EQ160
M-CAP-M61
MTN-TP
MTN-BP



# Dimensions



MODEL	A	B	C	D	L1	L2
MTN100CC	2.95 (75)	-	-	-	11.69 (297)	5.94 (151)
MTN100PP	3.03 (77)	2.20 (56)	-	-	11.69 (297)	5.94 (151)
MTN200CC	3.54 (90)	4.69 (119)	3.94 (100)	6.00 (152.4)	15.63 (397)	7.91 (201)
MTN200PP	3.62 (92)	4.69 (119)	3.94 (100)	6.00 (152.4)	15.63 (397)	7.91 (201)
MTN300CC	3.54 (90)	6.14 (156)	9.84 (250)	8.00 (203.2)	19.57 (497)	9.88 (251)
MTN300PP	3.62 (92)	6.14 (156)	9.84 (250)	8.00 (203.2)	19.57 (497)	9.88 (251)

MOTORIZED  
LINEAR STAGES

MOTORIZED  
VERTICAL STAGES

MOTORIZED  
ROTATION STAGES

MOTORIZED  
ACTUATORS

HEAPPODS

CONTROLLERS  
AND DRIVERS

MOTORIZED  
OPTICAL MOUNTS

SPECIAL  
COLLECTIONS

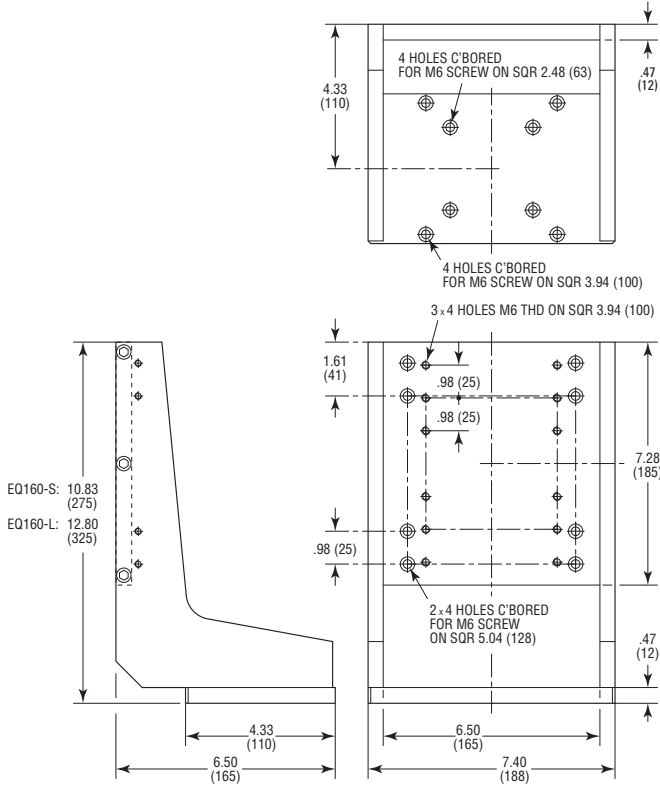
MOTORIZED  
LINEAR STAGES

## EQ160 Series

MOTORIZED  
VERTICAL STAGES

MOTORIZED  
ROTATION STAGES

MOTORIZED  
ACTUATORS



## Design Details

Base Material	Stainless Steel
Bearings	Linear ball bearings with anti-cage migration
Drive Mechanism	Backlash-compensated leadscrew
Drive Screw Pitch (mm)	4
Feedback	CC: 20,000 pts/rev. PP: No encoder
Limit Switches	Optical
Origin	Optical, Centered
Vacuum Compatibility	A vacuum compatible version up to 10 <sup>-6</sup> is available using full-step motor
Cable (m)	3 (included)

## Specifications

Model	MTN	
	CC	PP, PPV6
Travel Range (mm)	100, 200, 300	
Minimum Incremental Motion (μm)	0.6	0.1, 0.4
Uni-directional Repeatability (μm)	1.5	
Bi-directional Repeatability <sup>1</sup> (μm)	3.0 or ± 1.5	5.5 or ± 2.75
On-Axis Accuracy <sup>1</sup> (μm)	5 or ± 2.5	
Maximum Speed (mm/s)	100 (No Load)	40; 20 <sup>4</sup>
Pitch <sup>1,2</sup> (μrad) <sup>3</sup>	40 or ± 20	
Yaw <sup>1,2</sup> (μrad) <sup>3</sup>	35 or ± 17.5	

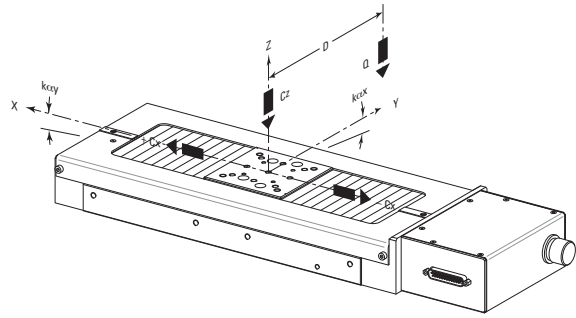
<sup>1</sup> Shown are peak to peak, guaranteed specifications or ± half the value as sometimes shown. For the definition of typical specifications which are about 2X better than the guaranteed values, visit Newport.com for the Motion Control Metrology Primer.

<sup>2</sup> For 100 mm travel

<sup>3</sup> To obtain arcsec units, divide μrad value by 4.8

<sup>4</sup> With the PPV6 version, the maximum speed is reduced by a factor of two

## Load Characteristics and Stiffness



Cz, Normal center load capacity on bearings	1000 N
+Cx, Direct load capacity on X axis	200 N
-Cx, Inverse load capacity on X axis	21 N
kcx, Compliance in roll	4 μrad/Nm
kcy, Compliance in pitch	6 μrad/Nm
kcz, Compliance in yaw	5 μrad/Nm
Q, Off-center load	QCz / (1 + D/100)
D, Cantilever distance in mm	

## Recommended Motion Controllers/Drivers:

Model	Description
XPS-Q2	2-axis Universal Controller/Driver, ethernet
XPS-RL2	2-axis Universal Controller/Driver, ethernet, Basic GPIO and PCO
XPS-DRV01	PWM drive module for DC brush and stepper motors, 3A/48V max.

Motor cables are included.

Note this section replaces the MTN Series in the Precision Motion Catalog pp.51-52.

HEXAPODS

CONTROLLERS  
AND DRIVERS

MOTORIZED  
OPTICAL MOUNTS

SPECIAL  
COLLECTIONS

# Picolis™ Integrated Picomotor Linear Stage



- Picomotor set and forget technology
- Configurable for XYZ stacking
- 15 mm travel compact linear stage
- 10 N push force

When you need fine control of your laser alignment, precise set and forget nozzle and optics adjustments on your flow cytometry instruments, or remote laser correction in your medical tools, our Picolis stage is the ideal solution due to its precision and stability. Our popular Picomotor with its set and forget technology, is directly coupled to the moving carriage with no intermediate mechanism, to offer the ultimate in stability and rigidity of a 37.5 x 37.5 x 13 mm platform. The Picolis™ stages feature a thermally matched stainless steel design and precision manufactured bearing surfaces to provide a ripple-free 15 mm of low friction linear travel.

Picolis stages can be easily configured into compact XY, XZ, or XYZ nanopositioning stage stacks. Z stacks require an optional 90 degree mounting bracket Model 8520. We offer single-box controller/driver solutions that can be computer controlled via USB or Ethernet using the Newport Motion Control Language (NMCL) command set.

## Ordering Information

Model (Metric)	Description
8525 (8525-M)	Picolis Piezo Linear Stage, 15 mm Travel, 37.5 x 37.5 mm Platform

## Specifications

	8525 (8525-M)
Motorized Axes	X
Travel Range (mm)	15
Minimum Incremental Motion, Linear (nm)	<30
Axial Load Capacity (+Cx) (N)	11
Operating Temperature Range (°C)	10-40
Cable Length [ft. (m)]	7 (2.1)
Thread Type	8-32 and 1/4-20

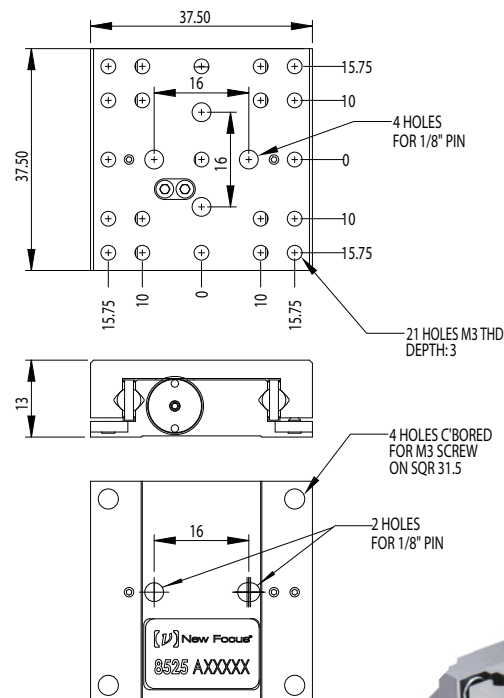
## Compatible With Picomotor Controller/Drivers

8742
8742-12-KIT
8742-4-KIT
8742-8-KIT

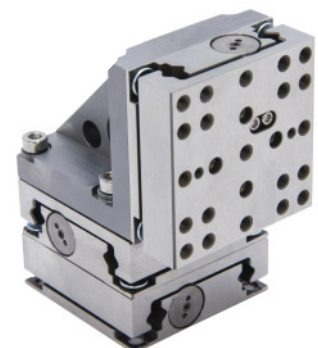
## Accessories

Model	Description
8520	90 Degree Angle Bracket, PICOLIS

## Dimensions



Note this section adds to the Motorized Linear Stages section in the Precision Motion Catalog pp.32-65.



# Motorized Vertical Stage Selection Guide

Motorized vertical stages add the 3rd dimension to orient objects in 3D space. Newport's precision vertical stages range from the high load, long travel IMS family to the high accuracy XMS100V. Typical applications include focusing and imaging, metrology, inspection, laser writing, etc. Vertical stages can be selected based on load capacity, travel, Minimum Incremental Motion and repeatability.

Series	Travel Range (mm)	Minimum Incremental Motion ( $\mu\text{m}$ )	Bi-directional Repeatability ( $\mu\text{m}$ )	On-Axis Accuracy ( $\mu\text{m}$ )	Maximum Speed (mm/s)	Normal Load Capacity (Cz)(N)
 <p><b>XMS100V</b> Ultra-high Precision Vertical Linear Stage see page 15</p>	50 - 100	0.05	0.1 or $\pm 0.05$	1.5 or $\pm 0.75$	300	100
 <p><b>VP-5ZA</b> Precision Vertical Linear Stage see catalog page 69</p>	4.8	0.06	0.5 or $\pm 0.25$	3.0 or $\pm 1.5$	5	50
 <p><b>GTS30V</b> High-Precision Vertical Linear Stage see catalog page 71</p>	30	0.1	0.2 or $\pm 0.1$	1.5 or $\pm 0.75$	10	40
 <p><b>IMS-V Series</b> High-Load Vertical Linear Stages see catalog page 73</p>	100, 300	0.3 - 0.6	1.0 or $\pm 0.5$	5.0 - 10.0	5 - 20	100 - 400
 <p><b>UZ Series</b> Vertical Linear Stages see catalog page 75</p>	4.5, 9	0.2	3.4 - 5.9	3.0 - 8.0	4 or $\pm 2$	30 - 300
 <p><b>ZVR Series</b> Integrated Vertical and Rotation Stage see catalog page 77</p>	10	0.05	4.0 or $\pm 2.0$	4.0 or $\pm 2.0$	10	100

## XMS-V Series

## Ultra-high Precision Direct Drive Vertical Linear Stage



XMS50V Ultra-high performance vertical stage.

XMS100V Ultra-high performance vertical stage.

- Ultra-high performance vertical stage with superior accuracy, repeatability and MIM
- Non-contact, direct-drive system with counterbalance for ultra-precision, high dynamic motion and reliable operation
- Extra-large, ironless, high-efficiency linear motor minimizes heat generation
- Ultra-quiet anti-creep crossed roller bearings assure ripple-free motion without cage migration
- Highest maximum speed at 300 mm/s
- Two types of counterbalances available: pneumatic or fail-safe, magnetic

The XMS-V family achieves ultra-precise vertical motion by adding a counterbalance mechanism to the proven XMS design. Of all of the vertical stages, the XMS-V has the best MIM and bi-directional repeatability and highest speed. The ironless direct drive technology allows highly dynamic motion with essentially no backlash, hysteresis, wind-up or stiction; leading to consistently lower and more repeatable run-out. Precision position feedback is supplied by a high accuracy, glass, linear encoder, allowing for outstanding MIM of 50 nm. The direct drive motor, aided by counterbalancing the load, negates the effect of gravity, alleviating work from the motor and gaining all of the benefits of a linear motor. The pneumatic counterbalance option is adjustable for different loads. The magnetic counterbalance option prevents the carriage from drifting down, even when the power to the motor is cut. The T-shaped carriage used on the XMS-V is optimized for stiffness and makes it more tolerant to cantilevered loads when compared to stages with a C-shaped carriage design. Compared to wedge designs, the direct vertical guide, composed of matched pairs of anti-creep crossed roller bearings, leads to outstanding ripple-free motion required in high-sensitivity applications while preventing cage migration.

## Ordering Information

Model	Description
XMS50V	Precision Vertical Linear Motor Stage, 50 mm Travel
XMS100V	Precision Vertical Linear Motor Stage, 100 mm Travel

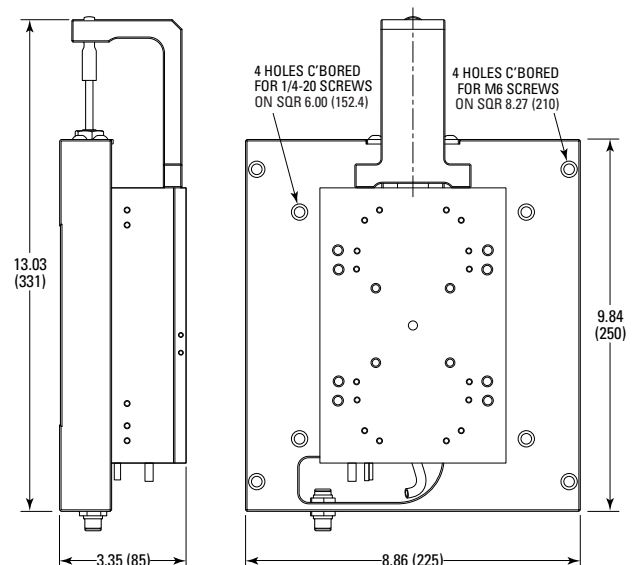
## Accessories

## Compatible Controllers and Driver Electronics

Model	Description
XPS-Q2	2-axis Universal Controller/Driver, ethernet
XPS-DRV02	PWM drive module for brushless motors, 5A/44Vpp max.
XPS-DRV02P	Low Noise drive module for brushless motors, 7A/44Vpp max.
XPS-RL2	2-axis Universal Controller/Driver, ethernet, Basic GPIO and PC0

For 1nm MIM order with the XPS-DRV02L. For 3nm MIM order with the XPS-DRV02P. Call Newport for additional details.

## Dimensions



MODEL SHOWN: XMS100V  
DIMENSIONS IN INCHES AND MILLIMETERS

NOTE:  
FOR DIMENSIONS AND HOLES PATTERN  
OF THE STAGE, SEE XMS100 DRAWING.

## Design Details

Base Material	High-strength 7075 Aluminum
Bearings	Anti-creep crossed roller bearings
Drive Mechanism	3-phase synchronous ironless linear motor
Feedback	Heidenhain LIF 481 scale, 1 Vpp, 4 μm signal period, 32768-fold signal subdivision when used with XPS controller.
Limit Switches	Optical, on encoder's fiducial track
Origin	Optical, at center of travel, including mechanical zero signal
Counterbalance	Low-friction air cylinder with regulator valve
Cable (m)	5 (included)

## Specifications

Model	XMS50V	XMS100V
Travel Range (mm)	50	100
Minimum Incremental Motion (μm)	0.05	0.05
Uni-directional Repeatability (μm)	0.05	0.05
Bi-directional Repeatability <sup>1</sup> (μm)	0.1 or ± 0.05	0.1 or ± 0.05
On-Axis Accuracy <sup>1</sup> (μm)	1.5 or ± 0.75	1.5 or ± 0.75
Maximum Speed (mm/s)	300	300
Straightness, Flatness, guaranteed <sup>1,2</sup> (μm)	1.5 or ± 0.75	1.5 or ± 0.75
Pitch <sup>1,2</sup> (μrad) <sup>3</sup>	75 or ± 37.5	75 or ± 37.5
Yaw <sup>1,2</sup> (μrad) <sup>3</sup>	50 or ± 25	50 or ± 25
MTBF (h)	20,000	20,000
Weight (kg)	8.8	8.8

<sup>1</sup> Shown are peak to peak, typical specifications or ± half the value as sometimes shown. For the definition of typical specifications which are about 2X better than the guaranteed values, visit Newport.com for the Motion Control Metrology Primer.

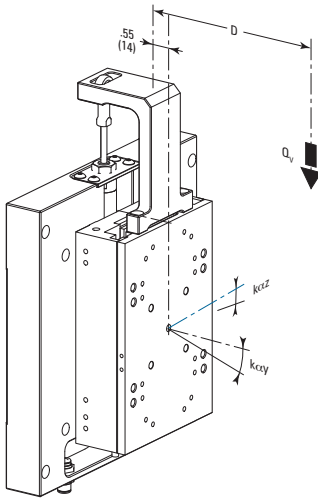
<sup>2</sup> Middle 80% of travel

<sup>3</sup> To obtain arcsec units, divide the μrad value by 4.8.

<sup>4</sup> Operating parameters to be determined after load and counterbalance pressure are set.

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

## Load Characteristics



$Q_v$	Off-center load, $Q_v \leq 100N / (1 + D/109)$
$D$	Cantilever distance in mm between the center of mass of the load and the bearing center
	Distance between top surface and the bearing center 14 mm

Model	XMS50V	XMS100V
$K_{\alpha x}$ , Compliance in roll (μrad/Nm)	2.0	2.0
$K_{\alpha y}$ , Compliance in pitch (μrad/Nm)	2.5	2.5
$K_{\alpha z}$ , Compliance in yaw (μrad/Nm)	3.5	3.5

Note this section replaces XMS-V Series in the Precision Motion Catalog pp.67-68.



## CONEX-NSR1

## Rotation Stages With Integrated Motion Controller



- Affordable Stepper motor controller/driver integrated with a miniature rotation stage
- Ultra-compact controller and driver
- Fast USB communication for Plug-and-Play
- Proportional and Integral control loop for stepper motor phase current
- Advanced Backlash or Hysteresis compensation mode

The CONEX-NSR1, with an integrated iPP stepper motor controller, is an economical and versatile rotary positioner for use as a filter wheel, a neutral density rotator, polarized optic rotator, flipper mount or basic rotation platform. It features a 1" threaded aperture, retaining ring and internal reference surface for 25.4 mm optics, a 1-° step resolution, and up to 120 °/s speed. The NSR1 serves as a base unit, and can be used as a rotator for 25.4 mm optics. Accessories are also available, including a filter wheel (NSFW-1) for up to 8 - 25.4 mm optics, a 127 mm diameter variable ND filter adapter (NSND), a tooling plate (NSTP-1) featuring an array of tapped holes, and a unique set of adapters to transform the rotator into a motorized flipper mount (NSFM-1).

## Ordering Information

Model	Description
CONEX-NSR1	NSR1 Rotation Stage Integrated with CONEX-PP Controller

## Accessories

## CONEX-PP Accessories

Power Supply and cables are sold separately.

Model	Description
CONEX-BP	Base Plate, Mounts Multiple CONEX Controllers
FC-PS40	Power supply, iPP step motor, RoHS
USB-RS422-1.8	Cable adapter, USB to RS422, 1.8m
FC-CB1	1m communication cable, daisy chain, RS422

## NSR1 Attachments

Model	Description
NSFM-1	Flip Mount Attachment, NewStep Universal Rotator
NSFW-1	Filter Wheel Attachment, NewStep Universal Rotator
NSND-3	ND Rotator Attachment, 50G02AV.1 ND Filter, NewStep Universal Rotator
NSND-4	ND Rotator Attachment, 50G02AV.2 ND Filter, NewStep Universal Rotator
NSND-5	ND Rotator Attachment, 50Q04AV.1 ND Filter, NewStep Universal Rotator
NSND-6	ND Rotator Attachment, 50Q04AV.2 ND Filter, NewStep Universal Rotator
NSTP-1	Tooling Plate Attachment, NewStep Universal Rotator, M4 and 1/4-20

Note this section adds to the Controllers and Drivers section in the Precision Motion Catalog pp.124-144.

## CONEX-PP Controller Specifications

Description	Single-axis motion controller and driver for Intelligent Stepper Motors
Motor Output Power	24 VDC peak, 2.5 A peak PWM amplifier
Control Loop	- PI control of motor phase current with programmable idle state - 2kHz servo rate - Backlash compensation
Motion	Point-to-point motion with S-gamma profile and jerk time control
Computer Interface	USB +5V (USB): <0.5 A, Windows Compatible
Programming	- Natural user defined units - 40+ intuitive, 2-letter ASCII commands - Command set includes: software limits, user units, synchronized motion start, stop all, ...
Safety Feature	- End of range checks - Power limit checks - Watchdog timer
Power Requirements	+24 V (FC-PS40): <1.67 A
Dimensions [in. (mm)]	4.33 x 2.06 x 0.98 (110 x 52.2 x 25)
Cable Length [ (m)]	9.8 (3)

## Stage Specifications

	CONEX-NSR1
Travel Range (°)	360
Minimum Incremental Motion (°)	1
Uni-directional Repeatability, Guaranteed <sup>1</sup> (°)	1
Bi-directional Repeatability, Guaranteed <sup>1</sup> (°)	3
Absolute Accuracy, Guaranteed (°)	
Maximum Speed (°/s)	120
Wobble, Guaranteed (μrad)	600
MTBF (h)	
Weight [lb (kg)]	0.9 (0.4)

<sup>1</sup> Shown are peak to peak, guaranteed specifications or ± half the value as sometimes shown. For the definition of typical specifications which are about 2X better than the guaranteed value, visit Newport.com for the Motion Control Metrology Primer.

## CONEX

# Motorized Actuator and Controller Kits



- Affordable DC or Stepper motor controller/driver integrated with an motorized actuator (TRA, TRB, LTA, NSA12)
- Ultra-compact controller and driver
- Low noise linear amplifier technology for DC servo motor drives. Proportional and Integral control loop for stepper motor phase current
- Advanced Backlash or Hysteresis compensation mode
- Fast USB communication for Plug-and-Play

The CONEX-NSA12 miniature motorized linear actuator is integrated with an iPP intelligent stepper motor controller and capable of 11 mm travel, is an economical solution for motorizing mirror mounts, rotation stages, linear stages and other manual motion devices. They are ideal for remote adjustment of sensitive, hard-to-reach optical components which can be influenced by the compressive and torsional forces imposed by traditional manual adjustment micrometers. Typical applications include optimizing the alignment of a laser cavity, zeroing in on coherence lengths or just adjusting the pointing of a beam over a long distance.

Model	Description
CONEX-NSA12	NSA12 Actuator Integrated with CONEX-PP Controller

## Accessories

### CONEX-PP Accessories

For models CONEX-NSA12, CONEX-NSA12V6 and CONEX-NSR1. Power Supply and cables are sold separately.

Model	Description
CONEX-BP	Base Plate, Mounts Multiple CONEX Controllers
FC-PS40	Power supply, iPP step motor, RoHS
USB-RS422-1.8	Cable adapter, USB to RS422, 1.8m
FC-CB1	1m communication cable, daisy chain, RS422

### CONEX-PP Controller Specifications

Description	Single-axis motion controller and driver for Intelligent Stepper Motors
Motor Output Power	24 VDC peak, 2.5 A peak PWM amplifier
Control Loop	- PI control of motor phase current with programmable idle state - 2kHz servo rate - Backlash compensation
Motion	Point-to-point motion with S-gamma profile and jerk time control
Computer Interface	USB +5V (USB): <0.5 A, Windows Compatible
Programming	- Natural user defined units - 40+ intuitive, 2-letter ASCII commands - Command set includes: software limits, user units, synchronized motion start, stop all, ...
Safety Feature	- End of range checks - Power limit checks - Watchdog timer
Power Requirements	+24 V (FC-PS40): <1.67 A
Dimensions [in. (mm)]	4.33" x 2.06" x 0.98" (110 x 52.2 x 25 mm)
Cable Length [ft. (m)]	9.8 (3)

### Actuator Specifications

	CONEX-NSA12
Drive Type	Micro Step Drive Stepper
Travel (mm)	11
Minimum Incremental Motion (μm)	0.2
Uni-directional Repeatability, Guaranteed <sup>(1)</sup> (μm)	2.2 <sup>(3)</sup>
Bi-directional Repeatability, Guaranteed <sup>(1),(2)</sup> (μm)	10 or ± 5 <sup>(3)</sup>
On-Axis Accuracy, Guaranteed <sup>(1)</sup> (μm)	N/A
Maximum Speed (mm/s)	0.9
Axial Load Capacity (+Cx) (N)	28

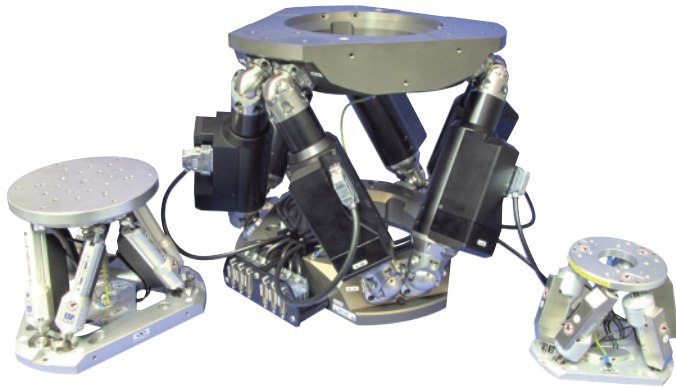
<sup>1)</sup> Shown are peak to peak, guaranteed specifications or ± half the value as sometimes shown. For the definition of typical specifications which are about 2X better than the guaranteed values, visit [www.newport.com](http://www.newport.com).

<sup>2)</sup> After backlash compensation

<sup>3)</sup> Shown are peak to peak, typical specifications or ± half the value as sometimes shown.

Note this section adds to the Controllers and Drivers section in the Precision Motion Catalog pp.124-144.

# HXP Series Hexapods

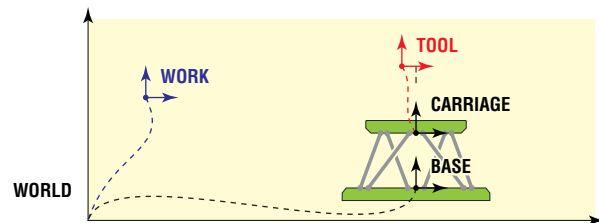


- Single device integrated with 6 independent axes of motion
- Light and compact design, with high stiffness
- No accumulation of motion errors
- No moving cables
- RightPath trajectory control
- Two virtual centers of rotation set by software

In comparison to stacked stages, HXP Hexapods offer an easy, elegant solution to complex, multi-axis motion in a compact construction. Its dedicated firmware simplifies the programming of complex motion through the use of two coordinate systems and automatically computes coordinate transformations for straightforward programming of motion. The two virtual pivot points are origins of the two definable coordinates systems: Tool, which moves with the top plate, and Work, which is a stationary reference. This allows the user to conceptualize how the sample and tool are manipulated. RightPath™ Trajectory Control is a firmware feature that enables scanning motion along a defined trajectory, line, arc or rotation, with minimal runout and at a constant, definable speed. Upgrade the HXP-ELEC controller to from running six axes motion of a hexapod to running six axes motion of a hexapod and an additional two motorized axes. Along with the 6 Newport actuators, each Newport Hexapod model is differentiated with its own unique joint system, which improves position stability under load. When compared to other hexapods of similar size, Newport hexapods have more than five-times the rigidity and twice the load capacity provided by either the spherical or cardan joint design. The new High Accuracy -HA are now available to order and provide the same standard build with higher accuracy motion.

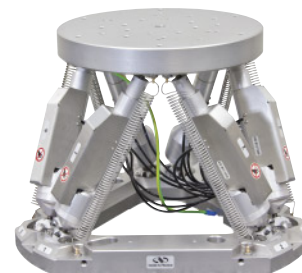
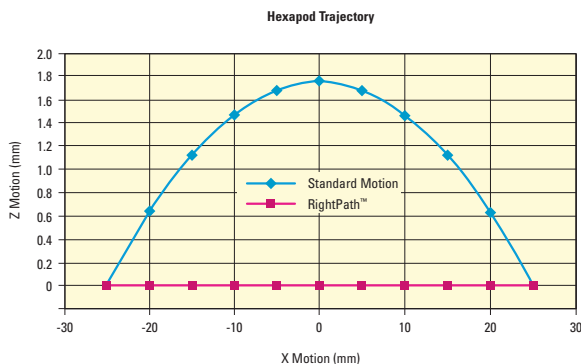
## Ordering Information

Model	Description
HXP50-MECA	6-Axis Hexapod, 5 kg Load Capacity
HXP50HA-MECA	6-Axis, High Accuracy Hexapod, 5 kg Load Capacity
HXP50V6-MECA	6-Axis Hexapod, 5 kg Capacity, Vacuum
HXP100-MECA	6-Axis Hexapod, 20 kg Load Capacity
HXP100HA-MECA	6-Axis, High Accuracy Hexapod, 20 kg Load Capacity
HXP100V6-MECA	6-Axis Hexapod, 20 kg Load Capacity, Vacuum
HXP100P-MECA	6-Axis Hexapod, 6 kg Load Capacity
HXP100PHA-MECA	6-Axis, High Accuracy Hexapod, 6 kg Load Capacity
HXP1000-MECA	6-Axis Hexapod, 450 kg Load Capacity



Two virtual centers of rotation

Absolute moves and positions are defined in the work coordinate system. Incremental moves can be done in the tool or in the work coordinate systems.



# Specifications

	HXP50-MECA & HXP50HA-MECA						HXP50V6-MECA <sup>(5)</sup>					
	X	Y	Z	Θ <sub>x</sub>	Θ <sub>y</sub>	Θ <sub>z</sub>	X	Y	Z	Θ <sub>x</sub>	Θ <sub>y</sub>	Θ <sub>z</sub>
Travel range <sup>(1)</sup>	±17 mm	±15 mm	±7 mm	±9°	±8.5°	±18°	±17 mm	±15 mm	±7 mm	±9°	±8.5°	±18°
MIM, Minimum incremental motion	0.1 μm	0.1 μm	0.05 μm	0.05 mdeg	0.05 mdeg	0.1 mdeg	0.2/0.8 μm <sup>(6)</sup>	0.2/0.8 μm <sup>(6)</sup>	0.1/0.4 μm <sup>(6)</sup>	0.1/0.4 mdeg <sup>(6)</sup>	0.1/0.4 mdeg <sup>(6)</sup>	0.2/0.8 mdeg <sup>(6)</sup>
Uni-directional repeatability, typical	0.2 μm	0.2 μm	0.1 μm	0.1 mdeg	0.1 mdeg	0.2 mdeg	0.4 μm	0.4 μm	0.2 μm	0.8 mdeg	0.8 mdeg	0.4 mdeg
Bi-directional repeatability, typical <sup>(2)</sup>	1.2 μm (0.4 μm)	1.2 μm (0.4 μm)	0.6 μm (0.2 μm)	0.6 mdeg (0.2 mdeg)	0.6 mdeg (0.2 mdeg)	1.2 mdeg (0.4 mdeg)	2 μm	2 μm	1 μm	1 mdeg	1 mdeg	2 mdeg
Max. speed	14 mm/s	12 mm/s	5 mm/s	6 °/s	6 °/s	15 °/s	2 mm/s	1.9 mm/s	0.8 mm/s	2.4 °/s	2.4 °/s	6 °/s
Stiffness <sup>(3)</sup>	2 N/μm	2 N/μm	25 N/μm	–	–	–	2 N/μm	2 N/μm	25 N/μm	–	–	–
Centered load capacity [Horizontal/Any position] <sup>(4)</sup>							5 kg/0.3 kg					

<sup>1)</sup> Travel ranges are interdependent. The listed values are max. travels per axis when all other axis are in their centered position.

<sup>2)</sup> With standard setting (with hysteresis compensation).

<sup>3)</sup> Stiffness depends on Hexapod position. Values are given for all axis in their centered position.

<sup>4)</sup> See graphs on next page for maximum payload height and cantilever distance.

<sup>5)</sup> Vacuum version to 10<sup>-6</sup> hPa.

<sup>6)</sup> Values in Open-loop/Closed-loop.



## Guaranteed Specifications

	HXP50HA-MECA		
	X	Y	Z
Uni-directional repeatability	0.3 μm	0.3 μm	0.15 μm
Bi-directional repeatability	3 μm	3 μm	1.5 μm
Absolute Accuracy	10 μm	10 μm	5 μm
Pitch	100 μrad	100 μrad	100 μrad
Yaw	100 μrad	100 μrad	100 μrad

	HXP100-MECA & HXP100HA-MECA						HXP100V6-MECA <sup>(4)</sup>					
	X	Y	Z	Θ <sub>x</sub>	Θ <sub>y</sub>	Θ <sub>z</sub>	X	Y	Z	Θ <sub>x</sub>	Θ <sub>y</sub>	Θ <sub>z</sub>
Travel range <sup>(1)</sup>	±27.5 mm	±25 mm	±14 mm	±11.5°	±10.5°	±19°	±27.5 mm	±25 mm	±14 mm	±11.5°	±10.5°	±19°
MIM, Minimum incremental motion	0.5 μm	0.5 μm	0.25 μm	0.25 mdeg	0.25 mdeg	0.5 mdeg	0.5 μm	0.5 μm	0.25 μm	0.25 mdeg	0.25 mdeg	0.5 mdeg
Uni-directional repeatability, typical	0.5 μm	0.5 μm	0.25 μm	0.25 mdeg	0.25 mdeg	0.5 mdeg	1 μm	1 μm	0.5 μm	0.5 mdeg	0.5 mdeg	1 mdeg
Bi-directional repeatability <sup>(2)</sup> , typical	4 μm (1 μm)	4 μm (1 μm)	2 μm (0.5 μm)	2 mdeg (0.5 mdeg)	2 mdeg (0.5 mdeg)	4 mdeg (0.4 mdeg)	5 μm (1.5 μm)	5 μm (1.5 μm)	3 μm (1 μm)	2.5 mdeg (1 mdeg)	2.5 mdeg (1 mdeg)	5 mdeg (1 mdeg)
Max. speed	2.5 mm/s	2 mm/s	1 mm/s	1.8 °/s	1.7 °/s	3 °/s	0.5 mm/s	0.5 mm/s	0.25 mm/s	0.2 °/s	0.2 °/s	0.4 °/s
Stiffness	5 N/μm	5 N/μm	40 N/μm	–	–	–	2 N/μm	2 N/μm	25 N/μm	–	–	–
Centered load capacity <sup>(3)</sup>	200 N						200 N					

	HXP100P-MECA & HXP100PHA-MECA					
	X	Y	Z	Θ <sub>x</sub>	Θ <sub>y</sub>	Θ <sub>z</sub>
Travel range <sup>(1)</sup>	±27.5 mm	±25 mm	±14 mm	±11.5°	±10.5°	±19°
MIM, Minimum incremental motion	0.1 μm	0.1 μm	0.05 μm	0.05 mdeg	0.05 mdeg	0.1 mdeg
Uni-directional repeatability, typical	0.2 μm	0.2 μm	0.1 μm	0.1 mdeg	0.1 mdeg	0.2 mdeg
Bi-directional repeatability <sup>(2)</sup> , typical	0.5 μm	0.5 μm	0.25 μm	0.25 mdeg	0.25 mdeg	0.5 mdeg
Max. speed	12 mm/s	10 mm/s	5 mm/s	8 °/s	8 °/s	16 °/s
Stiffness	3 N/μm	3 N/μm	24 N/μm	–	–	–
Centered load capacity <sup>(3)</sup>	60 N					

<sup>1)</sup> Travel ranges are interdependent. The listed values are max. travels per axis when all other axis are in their centered position.

<sup>2)</sup> With standard compensation (with hysteresis compensation).

<sup>3)</sup> For allowable cantilevered loads, see Max. Cantilever Distance of the Load below.

<sup>4)</sup> Vacuum version to 10<sup>-6</sup> hPa.

## Guaranteed Specifications



	HXP100HA-MECA			HXP100PHA-MECA		
	X	Y	Z	X	Y	Z
Uni-directional repeatability	0.5 μm	0.5 μm	0.25 μm	0.3 μm	0.3 μm	0.15 μm
Bi-directional repeatability	6 μm	6 μm	4 μm	1 μm	1 μm	0.5 μm
Absolute Accuracy	20 μm	20 μm	10 μm	10 μm	10 μm	5 μm
Pitch	150 μrad	150 μrad	150 μrad	75 μrad	75 μrad	75 μrad
Yaw	150 μrad	150 μrad	150 μrad	75 μrad	75 μrad	75 μrad



Spherical joint to enhance stiffness in a compact, low-profile design.

## Applications

- Optics and satellite assembly and testing
- AED simulation
- Astronomy
- Biotechnology, surgery
- X-Ray diffraction
- Micromachining, micro-manipulation

MOTORIZED  
LINEAR STAGES

MOTORIZED  
VERTICAL STAGES

MOTORIZED  
ROTATION STAGES

MOTORIZED  
ACTUATORS

HEXAPODS

CONTROLLERS  
AND DRIVERS

MOTORIZED  
OPTICAL MOUNTS

SPECIAL  
COLLECTIONS

**HXP1000-MECA**

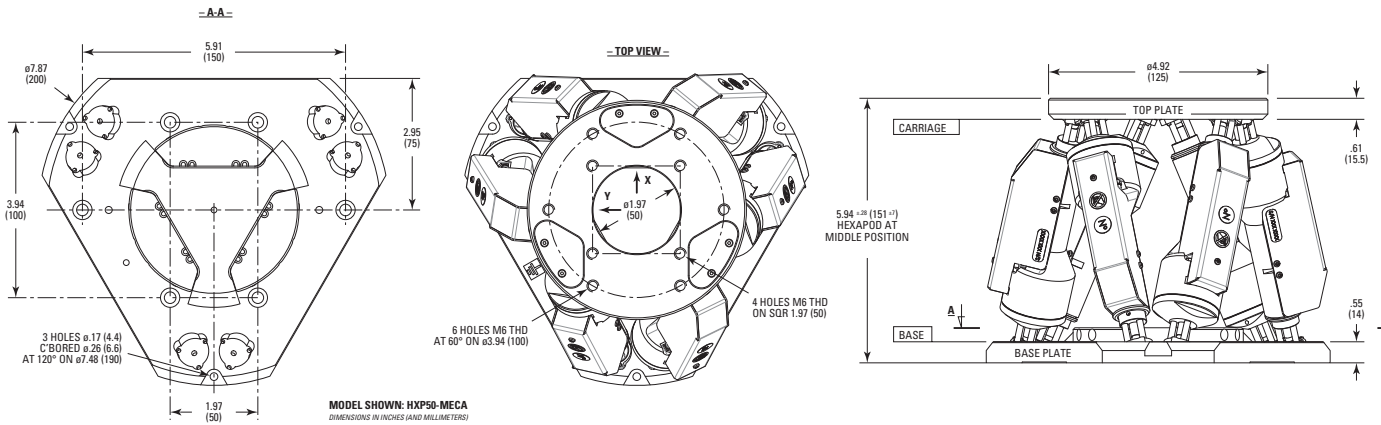
	X	Y	Z	$\Theta_x$	$\Theta_y$
Travel range <sup>(1)</sup>	-62; +93 mm	±69 mm	±39.5 mm	±11°	±10°
MIM, Minimum incremental motion	0.3 μm	0.3 μm	0.16 μm	0.06 mdeg	0.06 mdeg
Uni-directional repeatability, typical	0.3 μm	0.3 μm	0.16 μm	0.06 mdeg	0.06 mdeg
Max. speed	9 mm/s	9 mm/s	4 mm/s	1.4 °/s	1.4 °/s
Stiffness	10 N/μm	10 N/μm	100 N/μm	-	-

<sup>1)</sup> Travel ranges are interdependent. The listed values are max. travels per axis when all other axis are in their centered position (Height = 395 mm for Z).

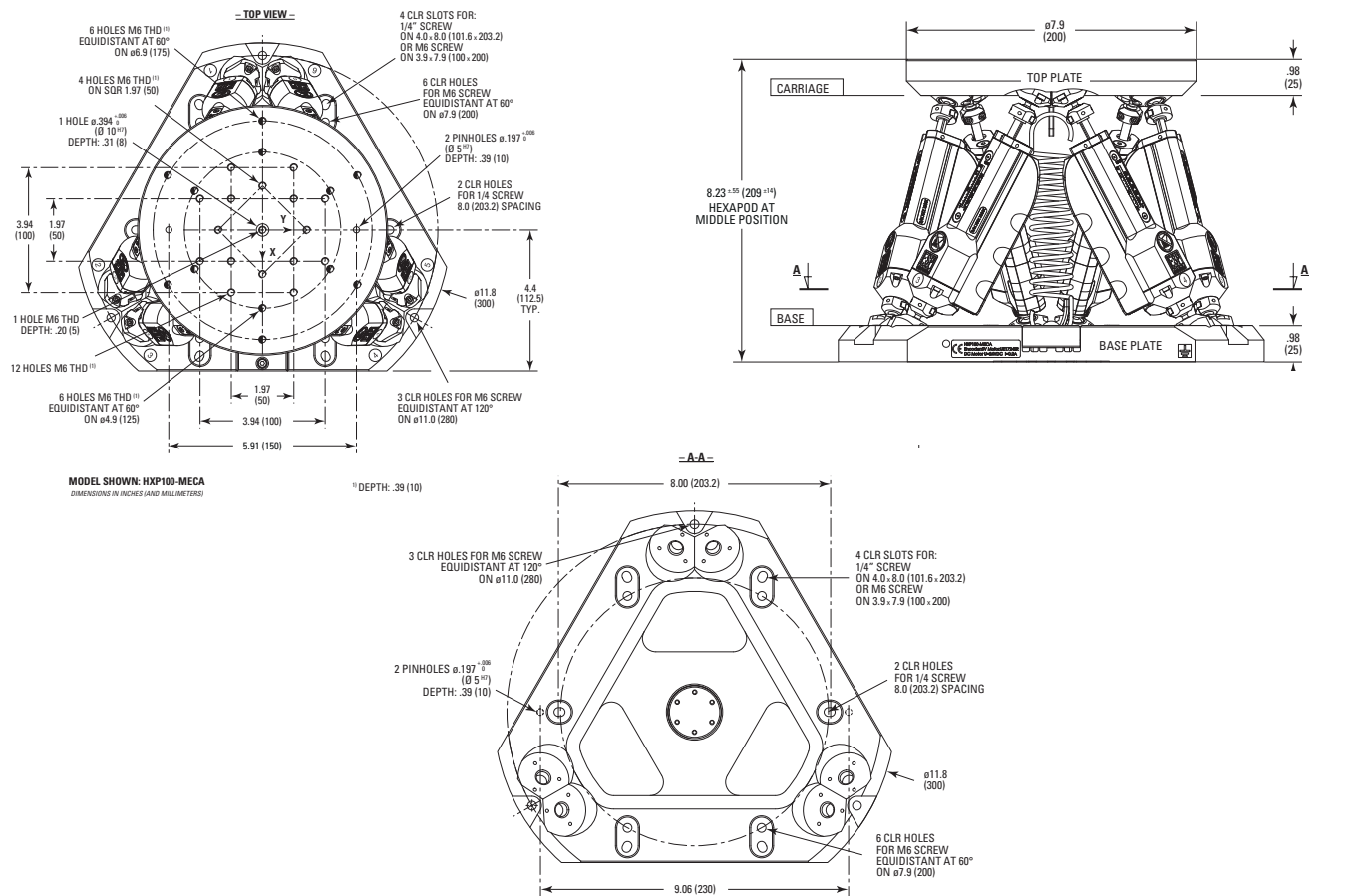
<sup>2)</sup> Stiffness depends on Hexapod position. Values are given for all axis in their centered position.

## Dimensions

### HXP50-MECA



### HXP100-MECA



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

MOTORIZED  
LINEAR STAGES

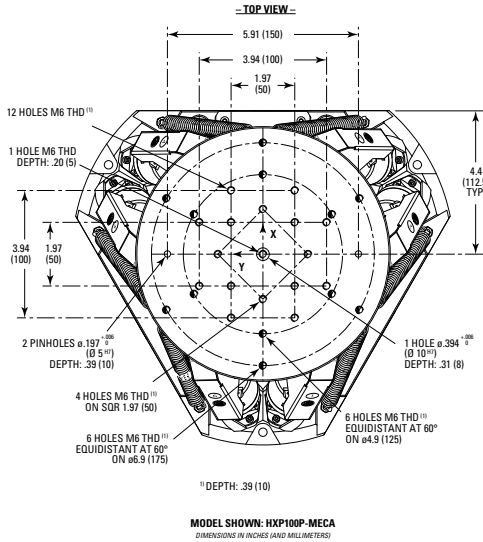
# Hexapod Controllers

Hexapods require -ELEC controller that can be ordered below. The two additional driver slots can be enabled to drive up to two SingleAxis motion devices.

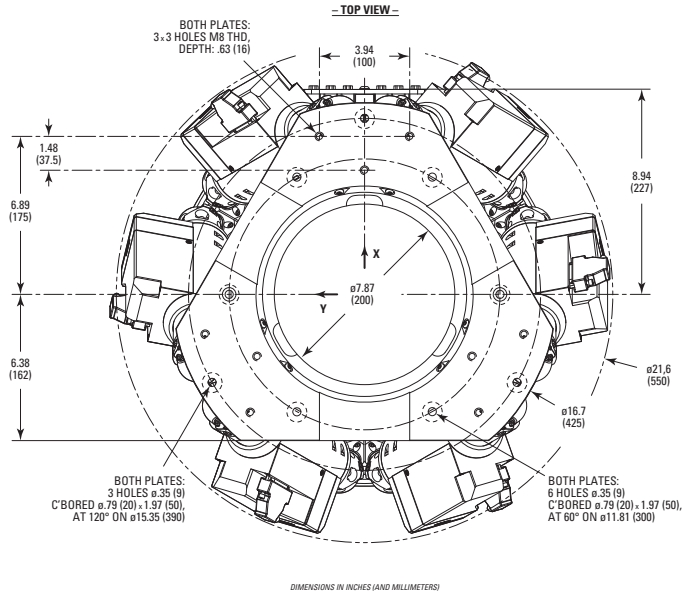
Model (Metric)	Description	HXP100HA-ELEC	Controller/Driver, For HXP100HA-MECA
HXP50-ELEC	Controller/Driver, For HXP50-MECA	HXP100V6-ELEC	Controller/Driver, For HXP100V6-MECA
HXP50HA-ELEC	Controller/Driver, For HXP50HA-MECA	HXP100P-ELEC	Controller/Driver, For HXP100P-MECA
HXP50V6-ELEC	Controller/Driver, HXP50V6-MECA	HXP100PHA-ELEC	Controller/Driver, For HXP100PHA-MECA
HXP100-ELEC	Controller/Driver, For HXP100-MECA	HXP1000-ELEC	Controller/Driver, For HXP1000-MECA

MOTORIZED  
VERTICAL STAGES

## HXP100P-MECA



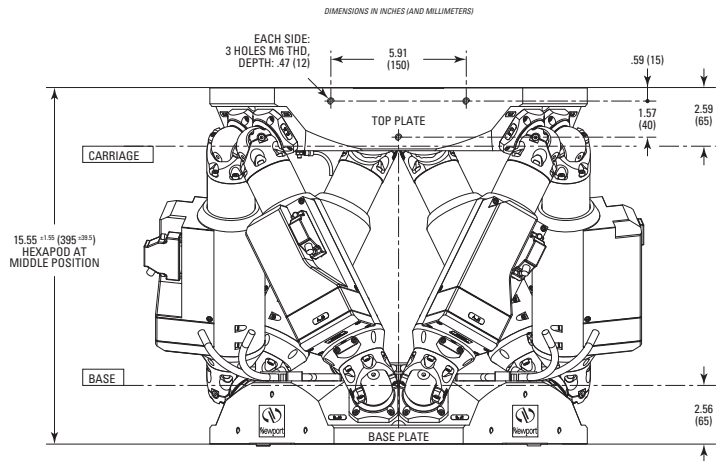
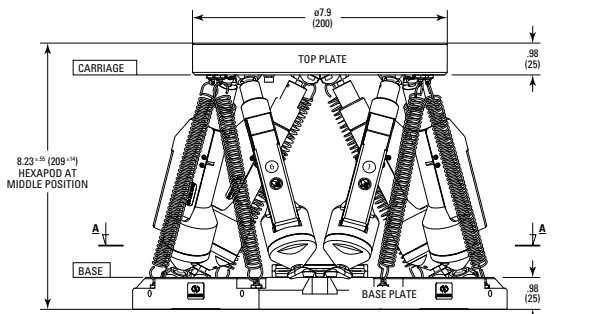
## HXP1000-MECA



MOTORIZED  
ROTATION STAGES

MOTORIZED  
ACTUATORS

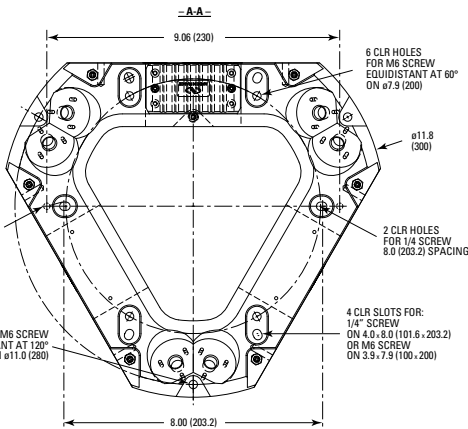
HEXAPODS



CONTROLLERS  
AND DRIVERS

MOTORIZED  
OPTICAL MOUNTS

SPECIAL  
COLLECTIONS





Note this section replaces the hexapod section in the Precision Motion Catalog pp.121-123.

# Motion Controller Selection Guide

Series	Series	Number of Axis	ESP Stage Detection	Display	Compatible Motors	Communications	I/O
	<b>HXP</b> 6-Axis Hexapod Controller see page catalog 121	6 to 8	Yes	GUI	HXP-MECA	Ethernet	4 Analog In, 4 Analog Out 30 TTL In, 30 TTL Out
	<b>XPS-Q</b> High-Performance Motion Controller/Driver see catalog page 127	1 to 8	Yes	Remote, GUI	*DC, Brushless DC, Stepper, Peizo, Galvo and Voice coil	Ethernet	4 Analog In, 4 Analog Out 30 TTL In, 30 TTL Out
	<b>XPS-RL</b> High-Performance Motion Controller/Driver see page 24	1 to 4	Yes	GUI	*DC, Brushless DC, Stepper, Peizo, Galvo and Voice coil	Ethernet	Up to 8 Analog In, 4 Analog Out 40 TTL In, 40 TTL Out
	<b>ESP301</b> 3-Axis Motion Controller/Driver see catalog page 131	1 to 3	Yes	Front Panel, GUI	DC and Stepper	USB, RS232, IEEE-488.1	16 TTL I/O
	<b>SMC</b> Single-Axis Motion Controller/Driver see catalog page 133	1	Yes	GUI	DC or Stepper	USB, RS232	1 Analog In 4 TTL In, 4 TTL Out
	<b>Agilis™ Series</b> Controllers see catalog page 138	2 (up to 8 on AG-UC8)	Preconfigured	GUI	Agilis Piezo Motor	USB	No
	<b>NanoPZ</b> Controller see catalog page 139	1 (up to 8 with PZC-SB)	Preconfigured	GUI	PZA12 Piezo Motor	USB, RS232	No
	<b>Open-Loop</b> Picomotor Controller/Driver see catalog page 140	4	Yes	Remote, GUI	Open-Loop Picomotor	Ethernet, USB, RS-485	No
	<b>Closed-Loop</b> Picomotor Controller/Driver see catalog page 142	2	Yes	Remote, GUI	Closed-Loop Picomotor	Ethernet, USB, RS-485	No
	<b>NPC</b> 3-Channel Piezo Amplifier see catalog page 144	3	No	Front Panel	NPx Series Piezo Stack	USB, RS232	1 Analog In 1 Analog Out

\* Drivers for each motor type must be purchased separately. The XPS-DRV00P is required to control the drivers of 3rd-party galvos and voice coil motors.

## Controllers with Integrated Stages

Series	Series	Number of Axis	ESP Stage Detection	Display	Compatible Motors	Communications	I/O
	<b>CONEX</b> Integrated Controller and Stage see catalog page 137	1	Preconfigured	GUI	DC	USB	No
	<b>FC Series</b> Intelligent Stepper Motor Stages see catalog page 56, 91	1	Preconfigured	GUI	Stepper	USB, RS422	No

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

# XPS-RL Universal High-Performance Motion Controller/Driver



- 1-4 axes universal motion controller
- ESP Plug and Play
- User-friendly interface
- Single-click stage configuration
- Accessible documentation - errors, API's, etc.
- A complete library of LabVIEW, Python and Matlab drivers and .NET assemblies

The more user friendly, 4-axis, XPS-RL universal motion controller drives a variety of motor types and execute complex motion through high speed Ethernet TCP/IP interface. From its outstanding servo rate and triggering, to its intuitive GUI and Plug-and-Play ESP technology, the lower cost XPS-RL is an excellent choice for both research and OEM applications. Aside from its easy to use GUI, the XPS-RL also offers a smaller and lighter package when compared to the XPS-Q.

## Ordering Information

Model	Description
XPS-RL2	2-axis Universal Controller/Driver, ethernet, Basic GPIO and PCO
XPS-RL2X	2-axis Universal Controller/Driver, ethernet, Extended GPIO and PCO
XPS-RL4	4-axis Universal Controller/Driver, ethernet, Basic GPIO and PCO
XPS-RL4X	4-axis Universal Controller/Driver, ethernet, Extended GPIO and PCO
XPS-RLM	1-axis Universal Controller/Driver, ethernet, Extended GPIO and PCO

Refer to the [ESP301 controller](#) for a list of stages and the compatible controller and driver cards.

### Single-click Configuration

The new web interface now allows a quick configuration of the XPS, as simple as that in the ESP301 controller.

### ESP Plug-and-Play Compatibility

When an ESP-compatible stage is connected to the XPS, the stage is quickly recognized and operating parameters are configured without the need for user inputs. This Plug and Play feature is not only transparent to the user, but it also ensures the safe operation of the stage.

### Intuitive File Management

The system files stored in the XPS-RL are now easily accessible, much like a Windows environment. At the same time, these files can be edited and saved in situ, without having to pull them from the folders and opening them with notepad or other text editor.

### Meaningful error messages

Moving away from numerical error codes, a new set of more descriptive error codes is now available and visible in the XPS-RL.

## Optimum Position Grouping

The XPS incorporates pre-configured motion groups and user-definable motion groups to optimize the performance and simplify the use of advanced features like line-arc trajectories, splines, contouring, and complex PVT trajectories. These motion groups can be single axis positioners, spindles, gantry groups, XY groups, XYZ groups or multiple axis groups. The flexibility of grouping stages greatly improves process flow and error handling and provides a uniform structure for easy application development.

## Compensation for Maximum Accuracy

An extensive set of compensation features are available to the user including backlash, linear error and error mapping in single, 2D, or 3D. All compensations are corrected dynamically at each servo cycle, default 8 kHz. This broad selection of options transforms the most basic positioner into a high performance device; thus increasing the accuracy and performance of any motion application culminating in more reliable results.

## Real-time Processing and Multitasking

Based on QNX real-time operating system and multi-tasking functionality, the XPS is capable of executing complex, internally stored, user-generated applications using TCL scripts. The motion processor supports TCL program execution without adversely impacting higher-priority tasks. With this advanced real-time multi-tasking functionality, the XPS not only manages the most complex motion requirements but also serve as a powerful, standalone process controller to concurrently support multiple applications.



## Command Motion With an External Analog Device

The XPS features two or eight channels of 12-Bit analog-to-digital converters which can be integrated with a motion process using a TCL script. The analog inputs can be converted to directly control the position or speed of a motion axis via external analog inputs. This is critical in precision alignment or auto-focusing routines which require real-time feedback from other devices such as power meters, vision systems, or other sensors. Besides higher communication speed, the A-to-D conversion is internal to the XPS, therefore no processing burden is added to the host PC or the communication link. Consequently, this feature can improve process development and throughput.

## Line-Arc, Spline and PVT Trajectories Motion Paths

The Line-arc trajectory is a motion path defined by a combination of straight and curved segments (available only for positioners in XY groups) such that constant speed is maintained throughout the entire region of interest. Sequential execution of the lines-arc trajectories eliminates discontinuities. A dedicated function performs a precheck of the trajectory to ensure optimized and safe execution within the positioners' parameters.

The spline trajectory executes a Catmull-Rom spline on an XYZ group, passing through user-specified points with 3rd order polynomial segments at a constant speed. Similar to Line-arc trajectory, spline trajectory has functions for trajectory prechecking.

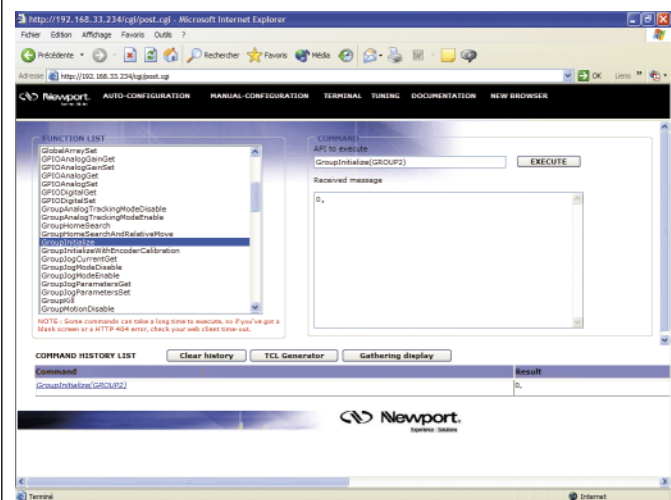
The PVT-mode is the most flexible mode for creating complex trajectories. In PVT, a trajectory element is defined by the end position (P) and end speed (V) of each positioner plus the duration for the element (T). The controller then calculates the cubic function trajectory that will pass through all defined positions at the defined times and velocities. PVT is a powerful tool for any kind of trajectory with varying speeds and for trajectories with nonlinear motion devices.

## Inputs and Outputs for Integrating External Devices



The XPS-RL offers two GPIO options. The Basic GPIO has a total of 8 digital I/O's and 2 analog I/Os while power users have the Extended GPIO option which has a total of 40 digital I/Os and 8 analog I/Os. These GPIOs can be used to read external switches, control valves or other digital devices. The analog outputs can be used to precisely monitor any motion axis (such as position, velocity or acceleration). To synchronize external devices during a motion process, the XPS has dedicated "event and action" API's which users can use to trigger an action upon the occurrence of an event. Typical examples include sending a digital output when constant velocity is reached or initiating a TCL script when the motion is done. Once defined, the XPS autonomously monitors the status of the event to trigger the action with a latency of less than 125  $\mu$ s! This powerful feature does not require any complex programming by the user and does not consume any time of the host PC or communication link since processing is done at the controller level. The XPS can be used as a master controller for a complete application.

## Native Tool Command Language (TCL)



The command screen lists all XPS functions including the necessary or available parameters. Once familiar with the XPS syntax, it is a convenient tool which allows for simple programming, code testing and debugging.

TCL scripts can be quickly generated then executed directly from the XPS GUI Terminal for rapid development for motion programs. TCL stands for Tool Command Language and is an open-source string-based command language. TCL is field-proven, very well documented and has many tutorials, applications, tools and books publicly available ([www.tcl.tk](http://www.tcl.tk)).

MOTORIZED  
LINEAR STAGES

# Accessories

## Driver Cards

The XPS controller is capable of driving up to 4 axes of most Newport positioners with internal drivers that slide into the back of the mainframe. These factory-tested modules are powered by an internal 300 W power supply that is independent of the controller power supply. To view compatible Newport stages and actuators, refer to the .

Model	Description
XPS-DRV00P	Pass-through driver module with pulse and direction capability
XPS-DRV01	PWM drive module for DC brush and stepper motors, 3A/48V max.
XPS-DRV02	PWM drive module for brushless motors, 5A/44Vpp max.
XPS-DRV02P	Low Noise drive module for brushless motors, 7A/44Vpp max.
XPS-DRV01	NanoPositioning drive module for piezo-stack based products
XPS-EDBL	High-power, 3-phase, sinusoidal DC brushless motor driver

MOTORIZED  
VERTICAL STAGES

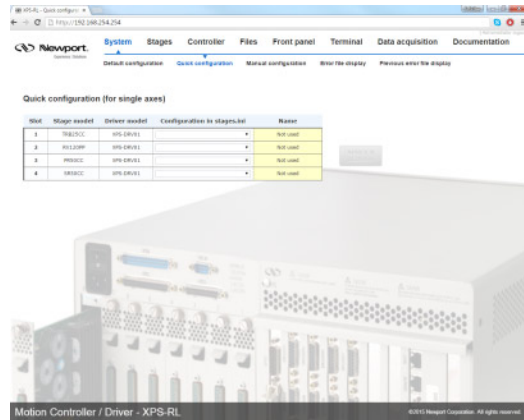
## Controller Cables

Model	Description
EDBCABLE-E1	EDBCABLE-E1 is a Limits Cable for the XPS-EDBL, 5m
EDBCABLE-M1	EDBCABLE-M1 is a Motor cable for the XPS-EDBL, 5m
EDBCABLE-M2	EDBCABLE-M2 is a Motor and Limits cable for the XPS-EDBL, 5m
XPS-TG5	Trigger output cable, LEMO/flying leads, 5m

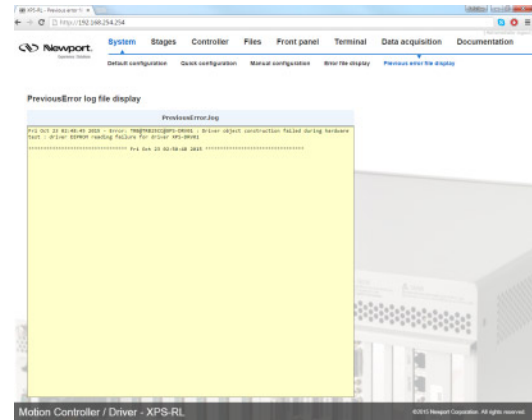
MOTORIZED  
ROTATION STAGES

MOTORIZED  
ACTUATORS

## Graphical User Interface (XPS-RL)



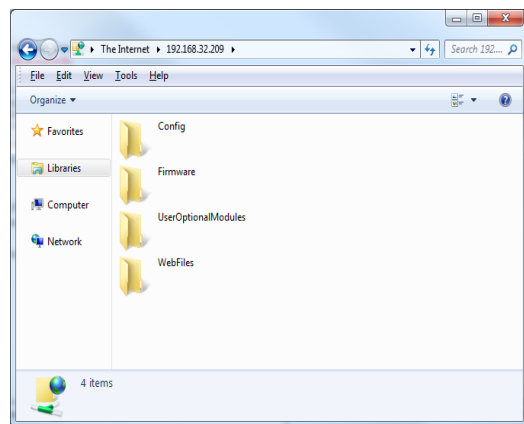
Single Click Configuration



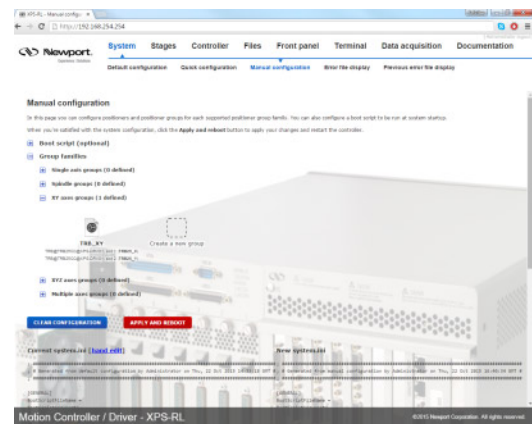
Meaningful Error Message

HEXAPODS

CONTROLLERS  
AND DRIVERS



Intuitive File Management



Optimum Positioner Grouping

MOTORIZED  
OPTICAL MOUNTS

SPECIAL  
COLLECTIONS

## Specifications

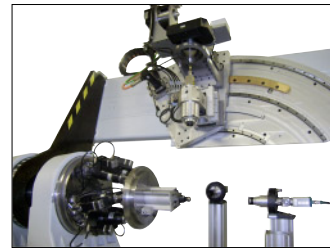
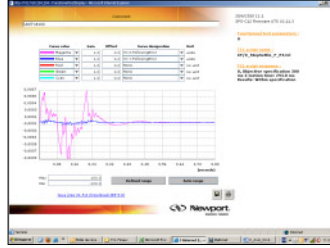
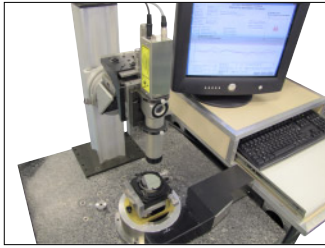
Number of Axes	1, 2, 4 axes of stepper, DC brush, DC brushless motors or piezoelectric stacks using internal drives. Other devices using external third-party drives	MOTORIZED LINEAR STAGES
Communication Interfaces	Internet protocol TCP/IP Two Ethernet 10/100/1000 Base-T (RJ45 connector). One with fixed IP address and DHCP server for local communication and one for networking, dynamic addressing with DHCP and DNS Typically 0.3 ms from sending a tell position command to receive the answer Remote control via Tablet	MOTORIZED VERTICAL STAGES
Firmware Features	Powerful and intuitive, object-oriented command language Natural user defined units (no need to program in encoder counts) Real time execution of custom tasks using TCL scripts Multi-user capability using the concept of sockets for parallel processes Distance spaced trigger output pulses, less than 5 ns latency between position crossing and trigger pulse; max. 5 MHz rate Time spaced trigger output pulses, 0.02 to 2.5 MHz rate, 5 ns accuracy Trigger output on trajectories with 125 $\mu$ s resolution Data gathering at up to 8 kHz rate and up to 1,000,000 data entries User-defined "actions at events" monitored by the controller independently at the servo rate User-definable system referencing with hardware position latch of reference signal transition and "set current position to value" capability Axis position or speed controlled by analog input Axis position, speed or acceleration copied to analog output Trajectory pre-check function that returns travel requirement and max. possible speed Automatic newport stage configuration, Auto-tuning and auto-scaling	MOTORIZED ROTATION STAGES
Motion	Jogging mode including on-the fly changes of speed and acceleration Synchronized point-to-point motion Spindle motion (continuous motion with periodic position reset) Line-arc mode (linear and circular interpolation incl. continuous path contouring) Splines (Catmull-Rom type) PVT (complex trajectories based on position, velocity and time coordinates) PT (complex trajectories based on position and time coordinates) Master-slave incl. single master-multiple slaves and custom gear ratio	MOTORIZED ACTUATORS
Compensation	Linear error, Backlash, 1D positioner error mapping 2D and 3D error mapping All corrections are taken into account on the servo loop	HEXAPODS
Servo Rate	Adjustable with default value 8 kHz, can be set higher.	
Control Loop	Open loop, PI position, PIDFF velocity, PIDFF acceleration, PIDDualFF voltage Variable PID's (PID values depending on distance to target position) Deadband threshold; Integration limit and integration time	
I/O	Basic GPIO:- 8 TTL inputs and 8 TTL outputs (open-collector) - 2 analog inputs and 2 analog outputs, $\pm 10$ V, 12 Bit Extended GPIO: - 40 TTL inputs and 40 TTL outputs (open-collector) - 8 analog inputs, $\pm 10$ V, 16 Bit - 8 analog outputs, configurable $\pm 5$ V, $\pm 10$ V or $\pm 12.288$ V, 16 bit	CONTROLLERS AND DRIVERS
Trigger In	Hardware latch of all positions and all I/O's; at servo rate. < 50 ns latency on positions < 125 $\mu$ s time jitter on analog I/Os	
Trigger Out	One high-speed position compare output (for axes 1 and 2) configurable for position synchronized pulses or for time synchronized pulses : <5 ns accuracy, <700 ns latency (from real stage position to pulse generation), 5 MHz max. rate	
Dedicated Inputs Per Axis	RS-422 differential inputs for A, B and I, Max. 25 MHz, over-velocity and quadrature error detection 1 Vpp analog encoder input up to x65536 interpolation used for servo; amplitude, phase and offset correction and synchronization Forward and reverse limit, home, error input	MOTORIZED OPTICAL MOUNTS
Dedicated outputs per axis (when using external drives)	2 channel 16-bit, $\pm 10$ V D/A Drive enable, error output	
Drive capability	Analog voltage, analog velocity, and analog acceleration (used with XPS-DRV01 and XPS-DRV03 for DC brush motor control) Analog position (used with XPS-DRV01 for stepper motor control) Analog position (used with external drives for example for piezo control) Analog acceleration, sine acceleration and dual sine acceleration (used with XPS-DRV02 for brushless motor control) Step and direction and $\pm$ pulse mode for stepper motors (XPS-DRV00P and external stepper motor driver)	
Dimensions (W x D x H)	300 W drive power 12.6 x 13.4 x 6.94 in. 320 x 340 x 176(4U) mm	SPECIAL COLLECTIONS
Weight	16.5 lb 7.5 kg	

(1) Advanced Trigger In/Out is for OEM orders only. For more information see features.

Note this section adds to the Controllers and Drivers section in the Precision Motion Catalog pp.124-144.

## Motion Control Services

# Metrology, Training and Maintenance Services



- Service for Newport motion products: linear, rotary stages, actuators, controllers and systems
- Advanced metrology for guaranteed stage and system performance
- On-site installation, maintenance and training
- Stage maintenance services to extend operating life
- Global organization support and resources

Newport recently recommissioned its full service Motion Control Service and Repair center in Irvine, Ca. The MCSR center now boasts updated metrology tools and capabilities to service and repair standard or custom motion products. The Irvine facility supports the Americas and Asia with the goal of fast turnaround and increasing equipment uptime.

### Global Service Network

For over 50 years, Newport commits to providing quality services for our motion products. Newport shows a worldwide presence with 11 manufacturing facilities located in the United States, China, France, Germany and the United Kingdom. The facility in France provides manufacturing, design and after-sales service for all the ultra-high precision positioning products and systems. In the US, the Motion Control Service and Repair (MCSR) center in Irvine has dedicated fixtures, tools and a healthy inventory of spare parts needed to repair almost all the linear and rotary stages that Newport offers. In addition to US and French facilities, we provide support through direct sales offices located in China, Germany, and the United Kingdom through a vast network of independent distributors and sales representatives throughout the rest of the world.

### Newport's Guaranteed Specifications



The usual selection of calibrated interferometers, autocollimators and rotary encoders is housed in a temperature controlled room to ensure test and metrology results that are consistent with national standards. Each

stage that is serviced or repaired goes through the same rigorous test process as when it was newly manufactured. As expected, a test report is included in the return of the stage at no additional charge.

## Metrology Service

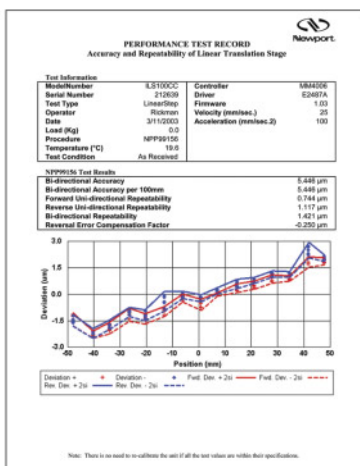
Extensive metrology capabilities and resources test, analyze, and measure critical system specifications to achieve excellence in quality, precision, and performance. The best available metrology tools are used to provide customers with real performance data. The engineering staff supporting precision motion products can tailor tests that are relevant to your application to ensure that the performance of motion systems meet the application requirements. Examples of these are orthogonality of axes, intersection of axes, repeatability of combined moves, Sphere of Confusion, error mapping and etc. See the Metrology tab for details of our metrology service offering.

The Newport technical team proposes 5 distinct and complementary levels of metrology for custom motion solutions depending on need. We provide calibration data with our advanced products clearly stating the guaranteed specifications. At Newport, we want to ensure that we deliver on our promises and that your purchase performs as expected.

For an Assembly, Newport demonstrates system performance using two complementary methods: Global Accuracy measurement and theoretical error analysis. Global Accuracy measurement consists of metrology performed on a combination of multiple linear and rotation axes measured as a group. This method is augmented with a theoretical error analysis of stack up tolerances for the remaining axis that could not be physically measured. In our extensive systems experience, both methods closely characterize the performance of the completed system.

For more demanding applications, Newport can perform dynamic performance verification, as well as single or multi axis error mapping.

No matter the need, Newport will work with you to develop a metrology plan tailored to your needs and representative of your application. We use simulated loads, measure performance at the points of interest on assembled sub-systems, or follow your system's motion range.



Newport offers services on stages, controllers and integrated systems. Services include error mapping, metrology, maintenance, calibrations, tuning and optimization for loads as well as on-site installation, training and support.

Examples of typical services provided in each local US and European service facilities.

## Service Offered

<b>Upgrade</b>
Increase XPS controller number of axes or upgrade CPU
<b>Optimization and Regular Maintenance</b>
PID Tuning, Load Configuration Optimization, Error Mapping, Cleaning and Inspection, Stage Lubrication
<b>Additional Services</b>
On-site Installation, Metrology services both at the factory and customer sites, Training, Diagnostics, Repair and Guaranteed Stage Performance Specifications
<b>System Level Optimization</b>
Alignment of Multiple Axes: Orthogonality, Intersection, Sphere-of-confusion (SOC)
Calibration: Error Mapping (Single Axis, 2-D or 3-D), Linear Error Compensation, Analog Encoder Calibration
Preload Adjustment, PID Tuning, Scaling and Configuration Optimization

For service of systems, it is recommended to return a complete system including stages and controllers.

Newport will repair obsolete motion products as long as it is economically feasible.

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

## Notes

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