

## Nanomotion Motion Systems

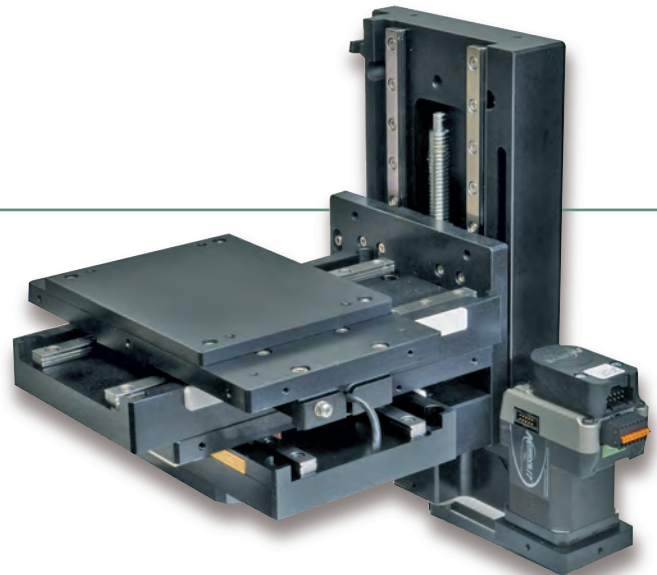
Nanomotion's XCD is an OEM Drive & Control board designed for applications using our Edge, ST, HR motors (up to HR4). This board level control product can replace a traditional drive & servo control for a single axis application with a very small form factor.

The XCD is intended for volume based applications as the communication and feedback connections are designed into the motherboard, based on customer requirements. The XCD supports, I<sup>2</sup>C, SPI and Uart communication interfaces and takes quadrature encoder input, acting as a complete drive and control.

For additional information on the XCD control boards, please contact Nanomotion.



When the standard stage doesn't quite fit, Nanomotion will design a custom motion system to meet specific application requirements. In some instances, where appropriate, traditional step motors or DC motors may be used to achieve specific performance.



## Features

- Compact design with low profile
- Direct drive Piezo motor with a simple, robust construction
- Optical encoders for high resolution
- Standard atmosphere and vacuum compatible configurations
- Wide range of sizes and travels

## Stage Configurations

series	width	motor options	standard travels
<b>FB050</b>	50mm	HR4	20mm, 50mm, 75mm
<b>FB075</b>	75mm	HR4 or HR8	40mm, 60mm, 100mm, 150mm
<b>FB100</b>	100mm	HR4 or HR8	60mm, 100mm, 150mm, 300mm
<b>FB150</b>	150mm	HR4 or HR8	100mm, 150mm, 200mm

**Note:** Travel lengths to 300mm available in the FB100 and FB150 configurations.

### Encoders

Standard encoder resolution is 0.1µm  
 Optional resolutions: 1µm, 0.5µm, 50nm, 10nm  
 Optional limits and home sensor  
 (FB050 is home only)

### Available Mountings

X/Y  
 X/Z using angle bracket  
 X/Y/Z using angle bracket

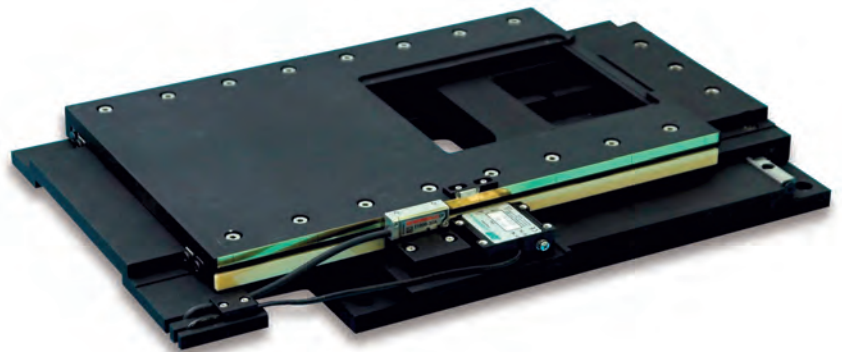
## Performance Specifications

	FB050 2.5µm/25mm travel	FB075 2.5µm/25mm travel	FB100 2.5µm/25mm travel	FB150 1.5µm/25mm travel
straightness & flatness				
maximum load capacity (in kg)				
20mm travel	2			
40mm travel		5		
50mm travel	5			
60mm travel		5	10	
75mm travel	7			
100mm travel		7	12	20
150mm travel		10	12	25
200mm travel				25

## Motor Performance Specifications

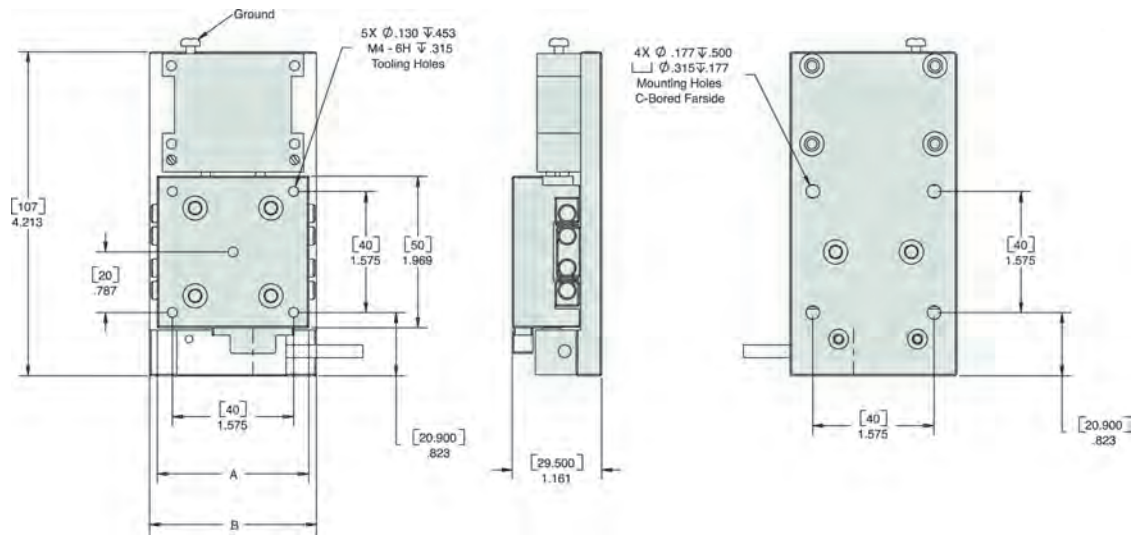
	FB050	FB075	FB100	FB150
Driving Force (in N)				
<b>HR4</b>	16	16	16	16
<b>HR8</b>		30	30	30
Static Holding Force (in N)				
<b>HR4</b>	12	12	12	12
<b>HR8</b>		25	25	25
Position Repeatability				
0.1µm standard		±0.5µm		
10nm optional		±50nm		
50nm optional		±200nm		
0.5µm optional		±2µm		
1.0µm optional		±3µm		

**Note:** All standard Nanomotion stages can be combined to create multi axis configurations. Hole pattern requirements vary based on the sizes of the stages to be mounted. Please contact Nanomotion for hole pattern details.



## Performance Specifications

- Compact stage design with low profile
- Direct drive motor with simple, robust construction
- Linear encoder mounted in the center for optimum positioning
- Easily configurable in multi-axis
- Wide range of slide size, travels and motor size



## Motor Performance Specifications

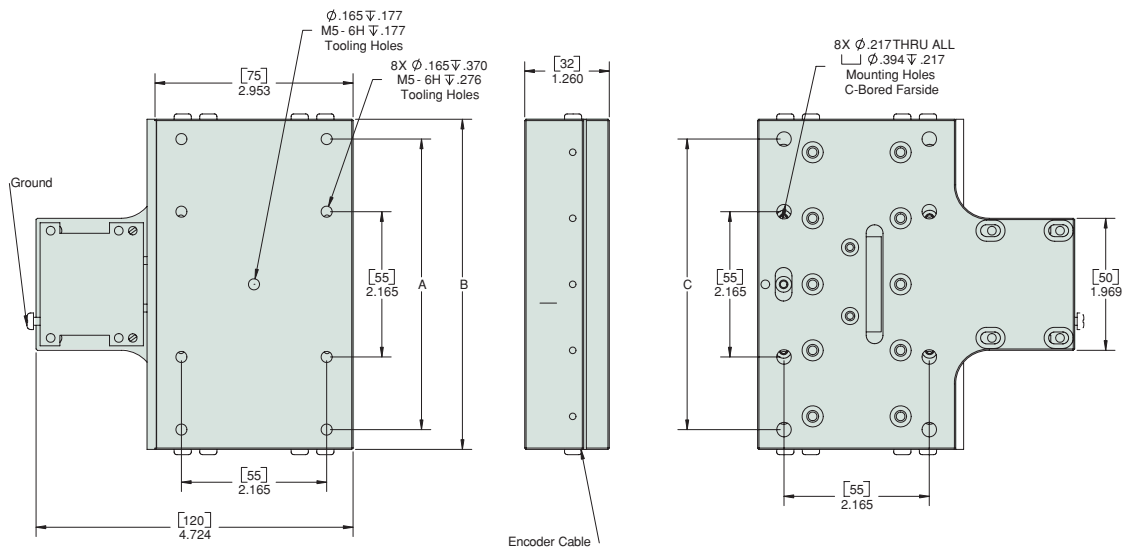
	travel (mm)	A (mm)	B (mm)	dynamic stall force (N)	stage mass (g)	moving mass (g)
<b>FB050-020-0.1M4</b>	20	50	55	16	400	150
<b>FB050-050-0.1M4</b>	50	75	80	16	610	226
<b>FB050-075-0.1M4</b>	75	100	105	16	700	400

**Note:** All standard FB stages are provided with .1µm resolution linear encoders.

Encoder Options part suffix	resolution
-1.0M	.1µm Optional
-0.5M	.5µm Optional
-50N	50nm Optional
-10N	10nm Optional

## Performance Specifications

- Compact stage design with low profile
- Direct drive motor with simple, robust construction
- Linear encoder mounted in the center for optimum positioning
- Easily configurable in multi-axis
- Wide range of slide size, travels and motor size



## Motor Performance Specifications

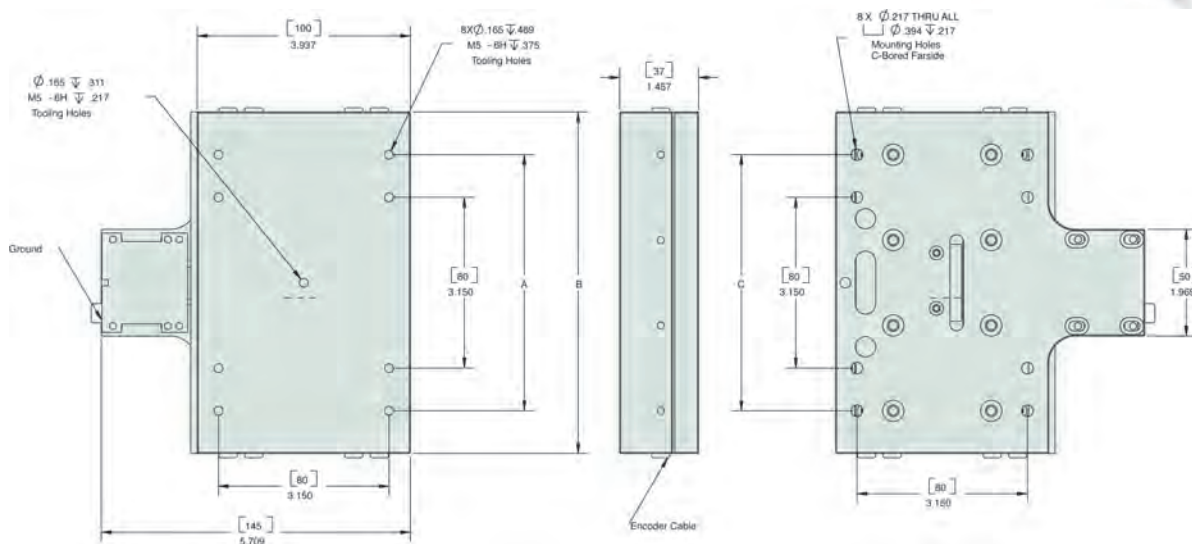
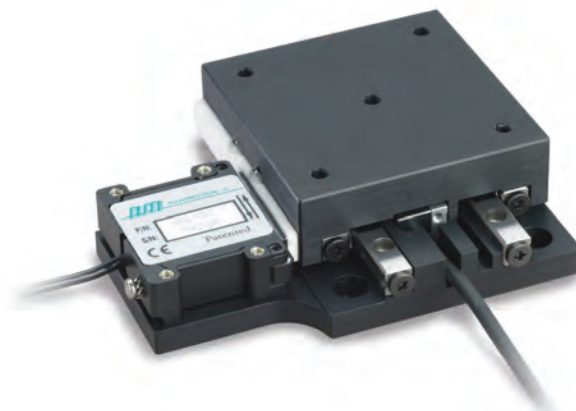
	travel (mm)	A (mm)	B (mm)	C (mm)	dynamic stall force (N)	stage mass (g)	moving mass (g)
<b>FB075-040-0.1M4</b>	40	n/a	75	n/a	16	650	302
<b>FB075-060-0.1M4</b>	60	n/a	100	n/a	16	920	405
<b>FB075-060-0.1M8</b>	60	n/a	100	n/a	32	1035	412
<b>FB075-100-0.1M4</b>	100	110	125	110	16	1125	505
<b>FB075-100-0.1M8</b>	100	110	125	110	32	1230	515
<b>FB075-150-0.1M4</b>	150	160	175	160	16	1515	710
<b>FB075-150-0.1M8</b>	150	160	175	160	32	1620	720

**Note:** All standard FB stages are provided with .1µm resolution linear encoders.

Encoder Options part suffix	resolution
-1.0M	.1µm Optional
-0.5M	.5µm Optional
-50N	50nm Optional
-10N	10nm Optional

## Features

- Compact stage design with low profile
- Direct drive motor with simple, robust construction
- Linear encoder mounted in the center for optimum positioning
- Easily configurable in multi-axis
- Wide range of slide size, travels and motor size



## Motor Performance Specifications

	travel (mm)	A (mm)	B (mm)	C (mm)	dynamic stall force (N)	stage mass (g)	moving mass (g)
<b>FB100-060-0.1M4</b>	60	n/a	120	n/a	16	1580	690
<b>FB100-060-0.1M8</b>	60	n/a	120	n/a	32	1690	700
<b>FB100-100-0.1M4</b>	100	120	160	120	16	2040	920
<b>FB100-100-0.1M8</b>	100	120	160	120	32	2145	930
<b>FB100-150-0.1M8</b>	150	160	200	160	32	2625	1160

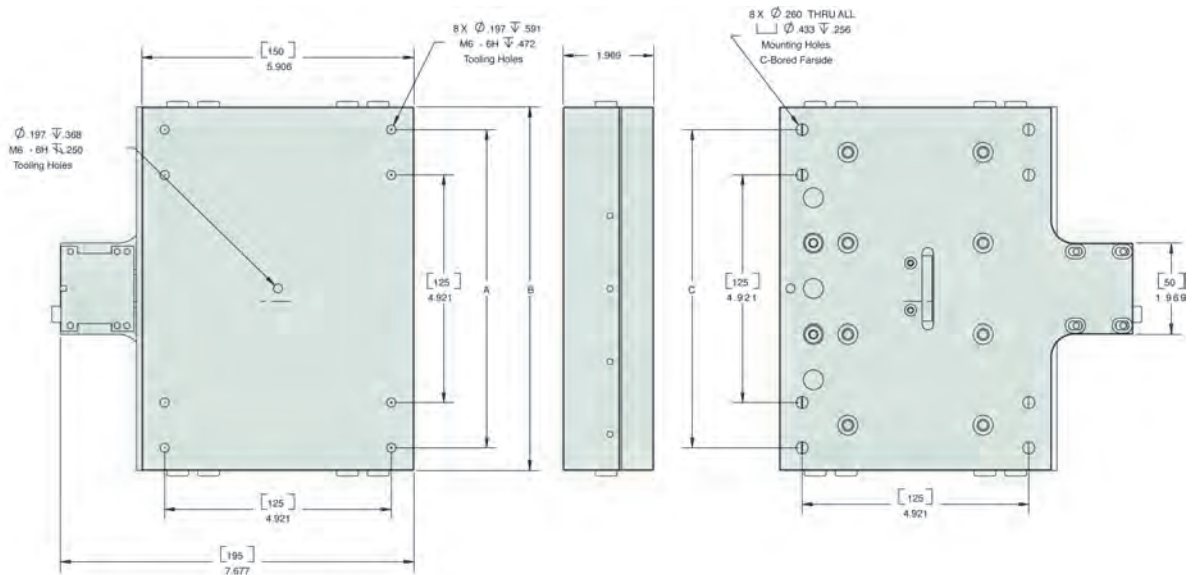
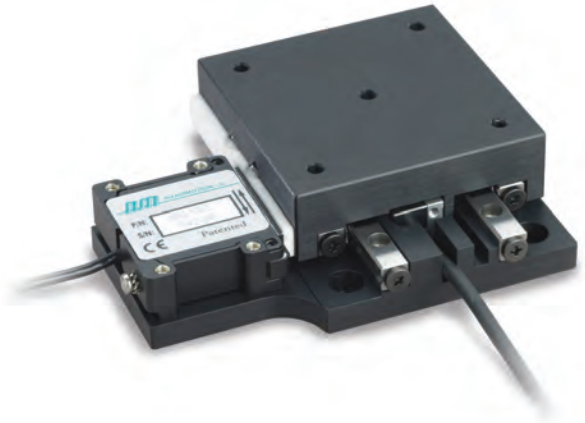
**Note:** All standard FB stages are provided with .1  $\mu$ m resolution linear encoders.

### Encoder Options

part suffix	resolution
-1.0M	.1 $\mu$ m Optional
-0.5M	.5 $\mu$ m Optional
-50N	50nm Optional
-10N	10nm Optional

## Features

- Compact stage design with low profile
- Direct drive motor with simple, robust construction
- Linear encoder mounted in the center for optimum positioning
- Easily configurable in multi-axis
- Wide range of slide size, travels and motor size



## Motor Performance Specifications

	Travel (mm)	A (mm)	B (mm)	C (mm)	Dynamic Stall Force (N)	Stage Mass (g)	Moving Mass (g)
<b>FB150-100-0.1M8</b>	100	n/a	150	n/a	32	3940	1600
<b>FB150-150-0.1M8</b>	150	175	200	175	32	5095	2125
<b>FB150-200-0.1M8</b>	200	225	250	225	32	6275	2660
<b>FB150-300-0.1M8</b>	300	325	350	325	32	8635	3730

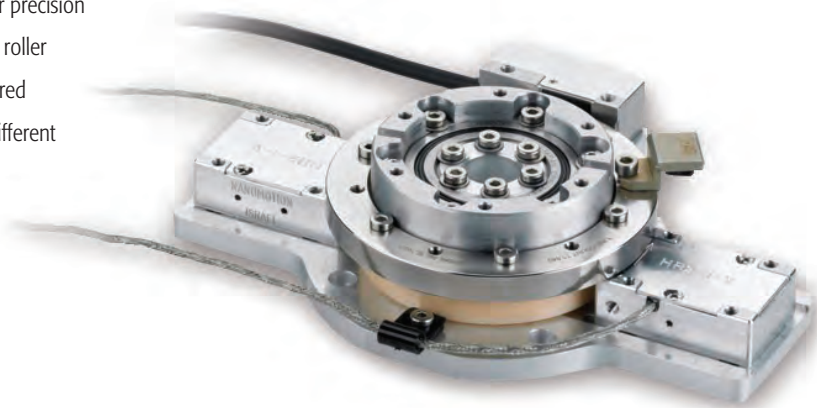
**Note:** All standard FB stages are provided with .1µm resolution linear encoders.

### Encoder Options

part suffix	resolution
-1.0M	.1µm Optional
-0.5M	.5µm Optional
-50N	50nm Optional
-10N	10nm Optional

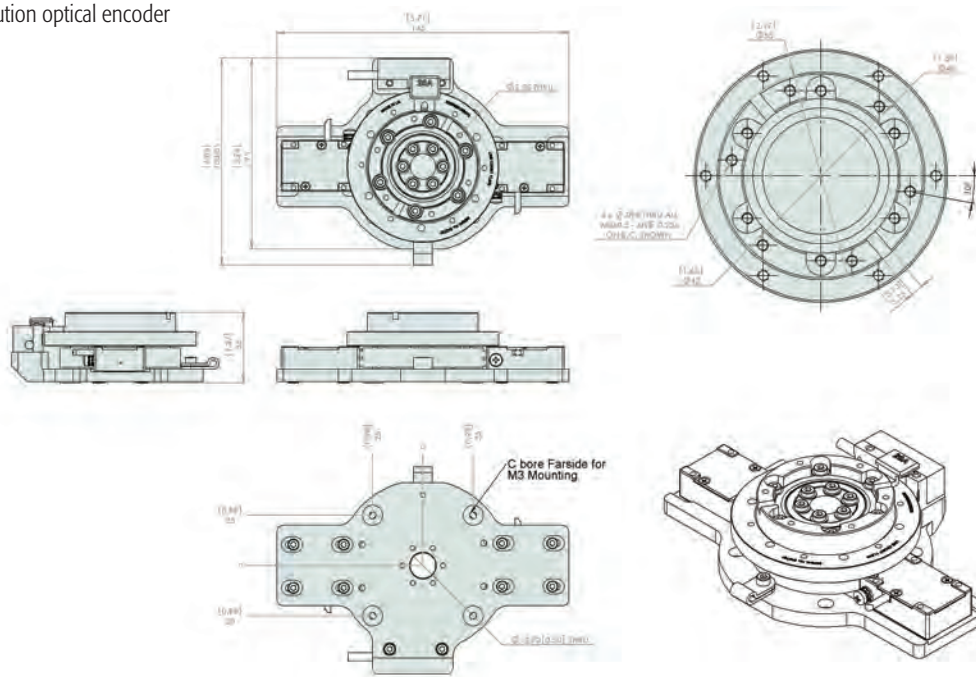
Nanomotion's FBR Rotary stage provides the most compact footprint for precision rotary motion. A 60mm diameter ceramic ring surrounds a precision crossed roller bearing with a non-contact optical encoder. The FBR60 can be configured with encoder resolutions to 0.5 arc seconds and one or multiple motors for different speed/torque requirements.

FBR60 Rotary Stages are available in standard, Vacuum and UHV configurations and are provided with a through hole in the center to allow for wires or other devices that require a center feed.



### Features

- Extremely compact footprint & low profile
- High stiffness crossed roller bearing
- Standard and vacuum configurations
- Easily configurable in multi-axis
- High resolution optical encoder



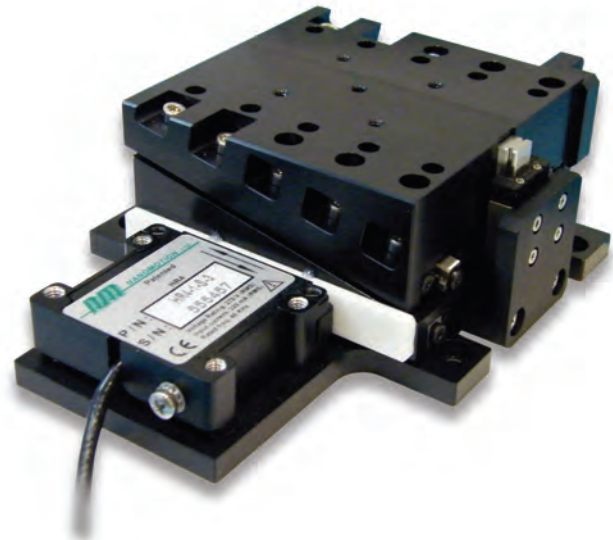
### Performance Specifications

Nanomotion also configures the FBR60 with (1) HR2 motor, to reduce footprint with lighter loads. Contact factory for more details.

	velocity	resolution	accuracy	torque	radial runout	flatness of rotation	load capacity
<b>FBR60-360-5.0</b>	360°/sec	5 arc sec	10 arc sec	0.22Nm to 0.44Nm	5µm	5µm	5kg (horz)
<b>FBR60-360-0.5</b>	360°/sec	0.5 arc sec	10 arc sec	0.22Nm to 0.44Nm	5µm	5µm	5kg (horz)

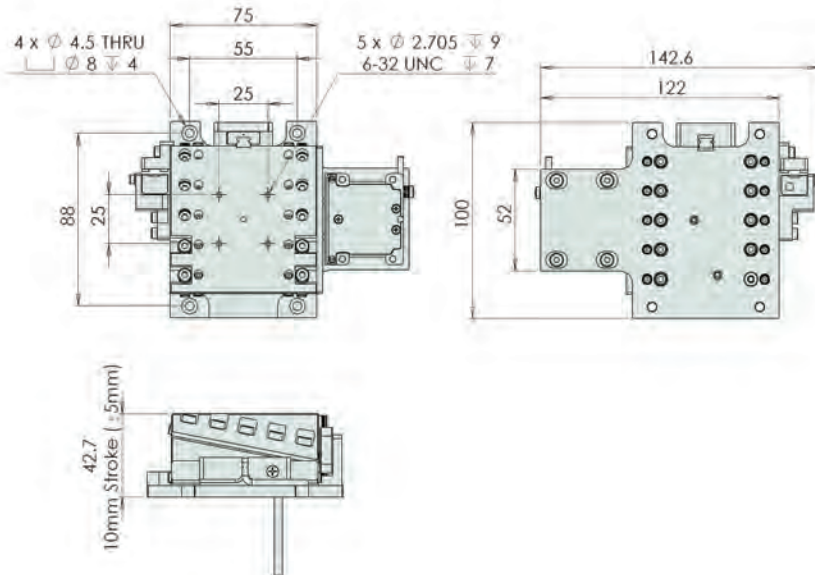
Nanomotion's Z-wedge stage utilizes crossed roller bearings on an incline to drive a center wedge through a top and bottom plate that coupled together. This horizontal motion results in pure vertical translation of the top surface of the stage.

Using a Z-wedge configuration facilitates easy access over the entire surface and from all sides. Linear position encoding is done directly on the vertical translation eliminating any errors from the angle of the wedge.



### Features

- Horizontal drive for vertical translation
- Direct position feedback with resolution from 100nm to 5 nm
- Capacity to 2kg
- Unobstructed work surface
- Larger Z wedge stages available



### Dimensions & Specifications

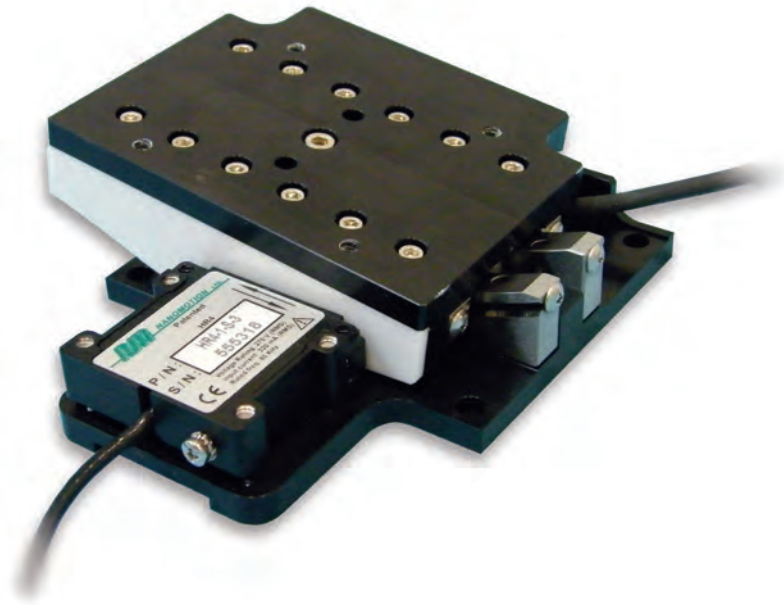
	motor	vertical straightness	position sensor	height	max. load capacity
<b>FBR-075-10-10N</b>	HR4	2.5 $\mu$ m/25mm	10 nanometer	Min: 38.0mm Max:48.0mm	2kg
<b>FBR-075-10-0.1M</b>	HR4	2.5 $\mu$ m/25mm	0.1 micron	Min: 38.0mm Max: 38.0mm	2kg



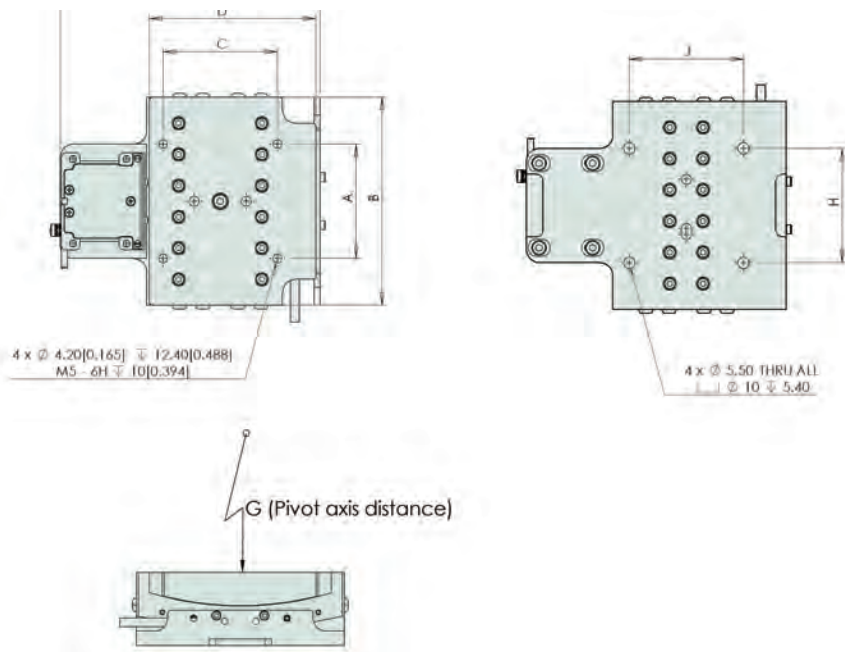
Nanomotion's FGB Series goniometer stages provide tilting motion about a pivot axis above the stage. The stage design provides the ability to couple two axes together to tip and tilt around a common pivot axis. The goniometer stages use a direct optical encoder with a tape scale on the curved surface, providing resolution down to 1 arc second.

## Features

- 4 available pivot axes to combine tip/tilt around a common point
- Range of encoder resolutions available
- Easily configured with any "FB" Series axes



## Dimensions & Specifications



	travel	A mm	B mm	C mm	D mm	E mm	F mm	pivot axis (G) mm	H mm	J mm	dynamic stall force (N)	stage mass (g)	moving mass (g)	load capacity (kg)
<b>85 HR2 Goniometer</b>	+/-10°	50	70	50	73	123	25	71	50	50	8	480	260	2
<b>110 HR2 Goniometer</b>	+/-10°	50	70	50	73	123	25	96	50	50	8	480	260	2
<b>125 HR4 Goniometer</b>	+/-10°	55	100	55	76	129	35	102	55	55	16	940	500	2
<b>160 HR2 Goniometer</b>	+/-10°	55	100	55	76	129	35	137	55	55	16	940	500	2