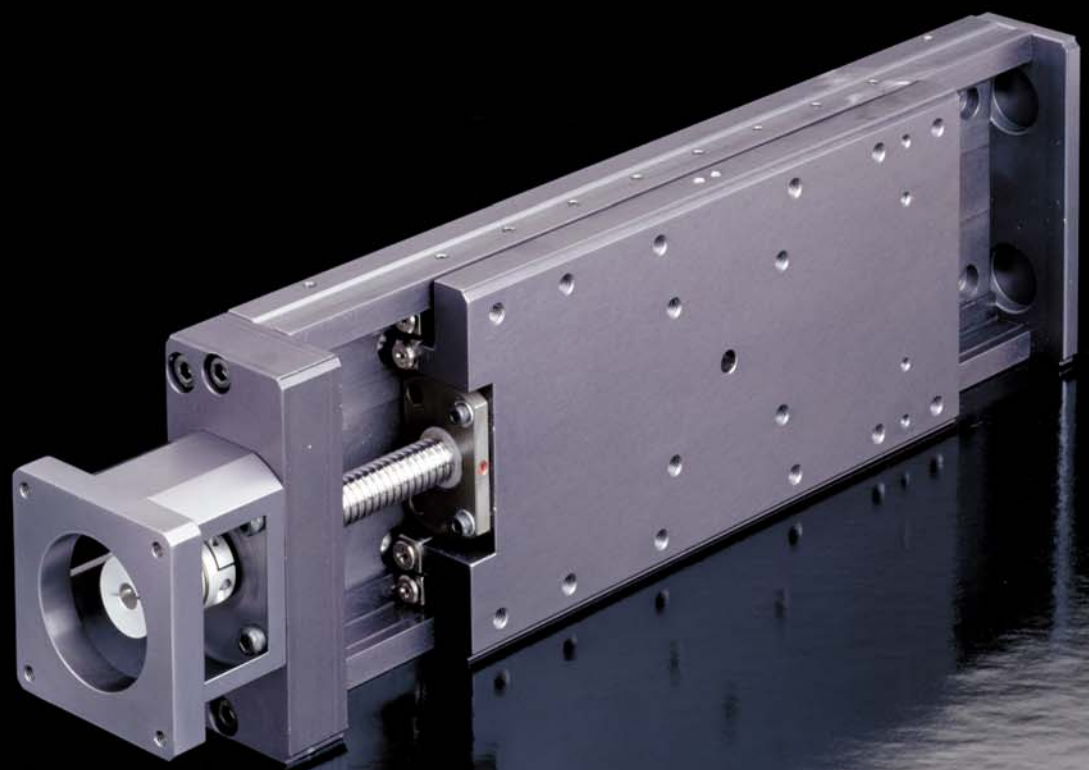
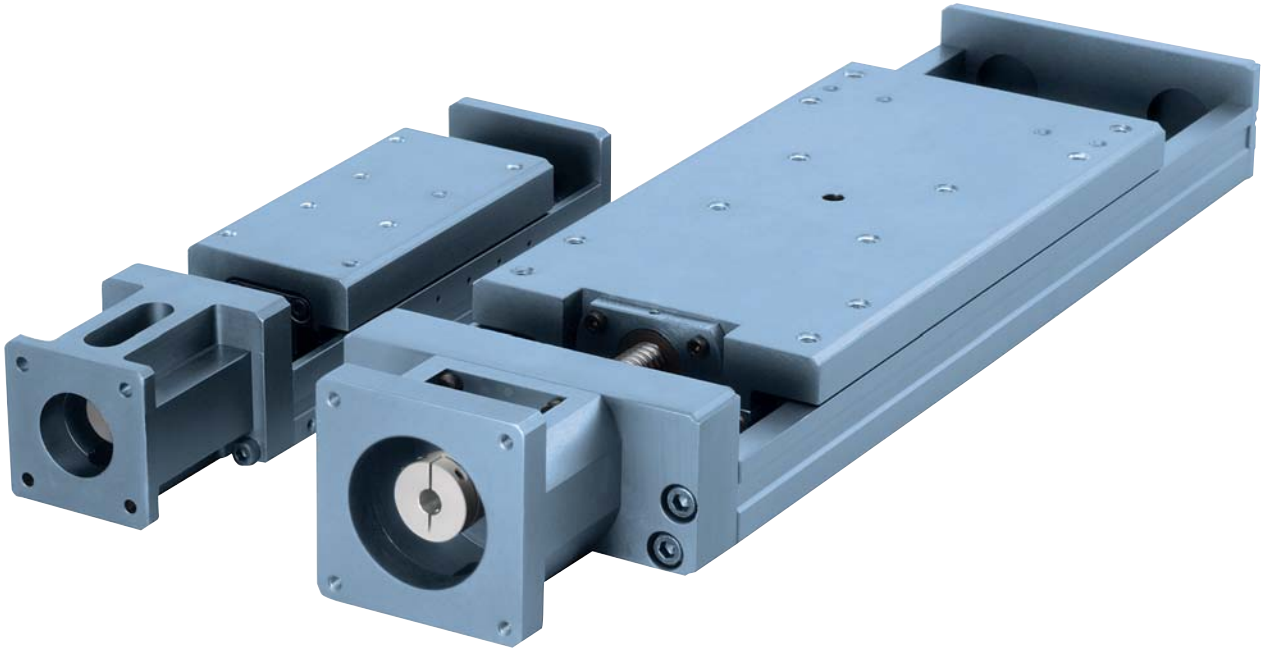
Micro Series:
Crossed Roller Precision Stages

Micro Positioning Stages feature a low-profile design for space sensitive applications and precision crossed roller bearings for high accuracies and exceptional repeatability. The stages come "ready-to-mount" to standard servomotors. Available in a variety of widths, travels, materials and ball screw or lead screw, Micro Positioning Stages offer system design flexibility, while providing superior performance.



Micro Series:
Overview



M050
50mm wide
Maximum travel 100mm
Maximum load capacity 117kg
Standard NEMA 17 motor mounting and coupling

M075
75mm wide
Maximum travel 150mm
Maximum load capacity 339kg
Standard NEMA 17 motor mounting and coupling

M100
100mm wide
Maximum travel 150mm
Maximum load capacity 489kg
Standard NEMA 23 or 60mm BM servo motor mounting and coupling

M150
150mm wide
Maximum travel 200mm
Maximum load capacity 652kg
Standard NEMA 23 or 60mm BM servo motor mounting and coupling

Micro Series:
High Precision Compact Design

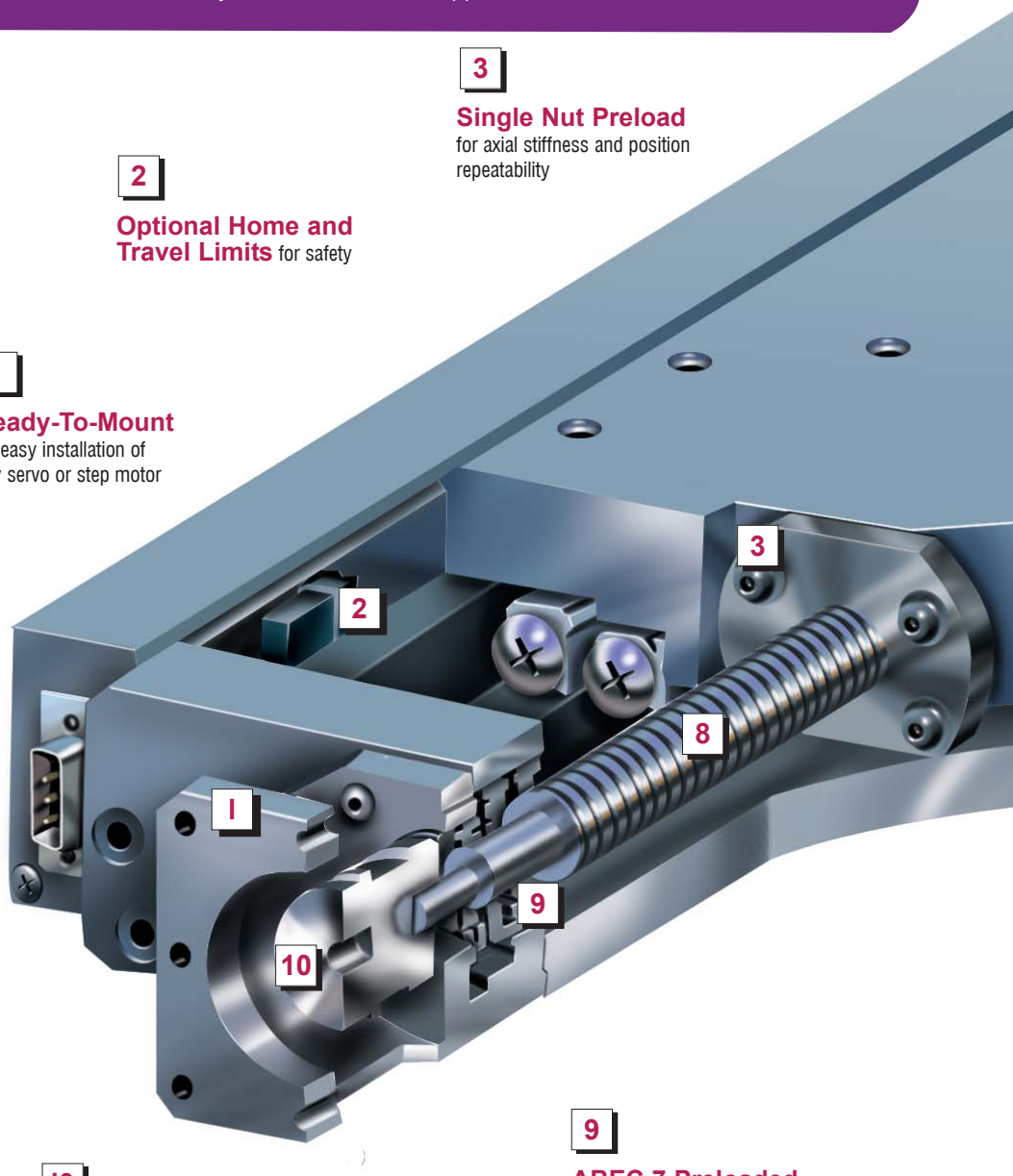
When to Use:

- High precision
- Compact design
- Constant velocity
- Short travel
- High axial load
- High duty cycle
- Rugged for high vibration and temperature

Applications:

- Custom tool manufacturing
- Disk Drive assembly and testing
- Electronics inspection
- Injection molding
- Non-destructive testing
- Small parts gauging
- Tool grinding

Precision Drive Screws
Micro Series Ball Screw Stages use a C3 Class Precision Ground ball screw. The ball nut is a single piece construction that uses ball compression to eliminate axial play and establish a preload. The Micro Series ball screw provides for very high axial loads and high duty-cycle capability. Micro Series Lead Screw Stages use a precision ground "V" thread screw, using a self-adjusting nut with a multi-flexured, self-aligning housing. This reduces the effects of lead screw errors and allows for uniform torque and smooth motion. The Micro Series lead screw provides for constant velocity without vibration or ripple.



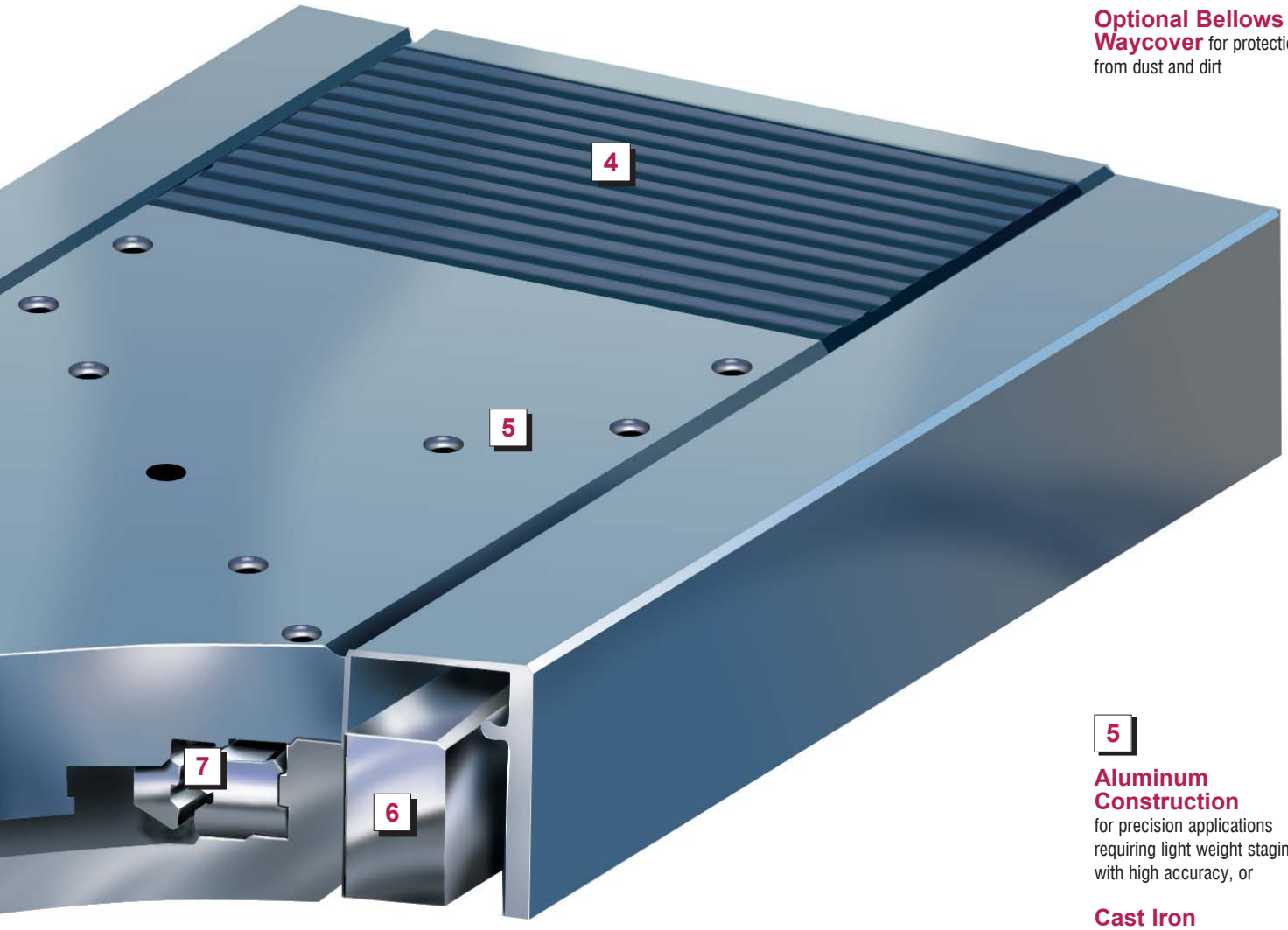
3 **Single Nut Preload** for axial stiffness and position repeatability

2 **Optional Home and Travel Limits** for safety

1 **Ready-To-Mount** for easy installation of any servo or step motor

10 **Servo Flex Coupling** for easy motor alignment without wind-up

9 **ABEC 7 Preloaded Angular Contact Bearings** for high loads and spindle stiffness



4

Optional Bellows Waycover for protection from dust and dirt

5

Aluminum Construction
for precision applications requiring light weight staging with high accuracy, or

Cast Iron Construction
for rugged applications with high vibration or varying temperature environments

6

Optional Linear Encoder
for direct position feedback

8

C3 Class Precision Ground Ball Screw or Ground "V" Thread Screw
for high positioning accuracy

7

Precision Crossed Roller Bearings
for high loads, low friction and straight line accuracy

Micro Series
Crossed Roller Precision Stages

Performance Specifications

Model No.	Travel Range		Maximum Velocity				Maximum Load		Maximum Axial Load			
			Lead Screw[1]		Ball Screw[2]				Lead Screw		Ball Screw	
	(mm)	(in)	(mm/sec)	(in/sec)	(mm/sec)	(in/sec)	(kgf)	(lbf)	(kgf)	(lbf)	(kgf)	(lbf)
M050	25 to 100	0.98 to 3.93	12	0.5	—	—	117	260	2.3	5.2	—	—
M075	50 to 150	1.96 to 5.90	12	0.5	25	1	339	750	2.3	5.2	4.5	10.1
M100	25 to 150	0.98 to 5.90	75	3.0	150	6	489	1,080	4.5	10.1	31.7	71.3
M150	50 to 200	1.96 to 7.87	100	4.0	300	12	652	1,710	11.3	25.4	54.5	122.5

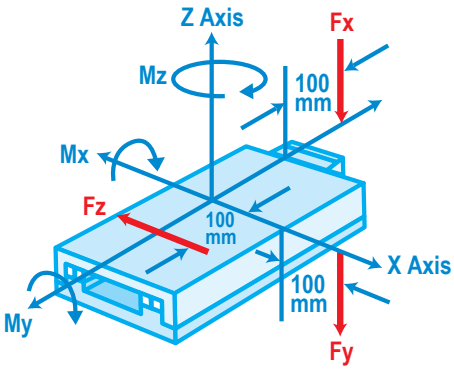
Accuracy Specifications[3]

Model No.	Straightness/Flatness		Pitch & Yaw		Accuracy[4]		Repeatability[4]	
	(microns/25mm)	(in/in)	(arc sec/25mm)	(in/in)	(microns)	(in/in)	(microns)	(in)
M050	±2.50	±0.00010	±3.0	±0.00011	±6.0	±0.0002	±1	±0.0004
M075	±2.50	±0.00010	±3.0	±0.00011	±6.0	±0.0002	±1	±0.0004
M100	±2.50	±0.00010	±2.5	±0.00010	±6.5	±0.0001	±1	±0.0004
M150	±1.25	±0.00005	±2.0	±0.00007	±6.5	±0.0001	±2	±0.0008

Screw Inertia

Model No.	Lead Screw		Ball Screw		Coupling Inertia		Moving Slide Weight			
							Aluminum		Cast Iron	
	(gm cm sec^2)	(oz in sec^2)	(gm cm sec^2)	(oz in sec^2)	(gm cm sec^2)	(oz in sec^2)	(kg)	(lb)	(kg)	(lb)
M050-025	0.00039	0.000006	—	—	0.0112	0.00016	0.39	0.86	1.1	2.42
M050-050	0.00065	0.000009	—	—	0.0112	0.00016	0.50	1.10	1.3	2.86
M050-100	0.00077	0.000011	—	—	0.0112	0.00016	0.77	1.70	2.0	4.40
M075-050	0.0033	0.000046	0.0049	0.00007	0.0112	0.00016	0.68	1.50	1.76	3.87
M075-100	0.0048	0.000067	0.0049	0.00007	0.0112	0.00016	1.04	2.29	2.70	5.94
M075-150	0.0066	0.000091	0.0073	0.0001	0.0112	0.00016	1.45	3.19	3.76	8.27
M100-025	0.0017	0.000023	0.0166	0.00023	0.0112	0.00016	0.95	2.09	2.46	5.41
M100-050	0.0021	0.000029	0.0196	0.00027	0.0112	0.00016	1.25	2.75	3.24	7.12
M100-075	0.0025	0.000034	0.0279	0.00039	0.0112	0.00016	1.50	3.30	3.89	8.55
M100-100	0.0025	0.000034	0.0279	0.00039	0.0112	0.00016	1.75	3.85	4.54	9.98
M100-150	0.0037	0.000052	0.0299	0.00042	0.0112	0.00016	2.00	4.40	5.19	11.41
M150-050	0.028	0.00039	0.095	0.0013	0.0112	0.00016	1.55	3.41	4.02	8.847
M150-100	0.032	0.00045	0.095	0.0013	0.0112	0.00016	1.55	3.41	4.02	8.84
M150-150	0.048	0.00067	0.135	0.0019	0.0112	0.00016	2.98	6.55	7.73	17.00
M150-200	0.080	0.00111	0.240	0.0033	0.0112	0.00016	2.98	6.55	7.73	17.00

(1) Based on 0.2in Lead Screw
(2) Based on 10mm Ball Screw
(3) Accuracy is based on stage mounted to a flat granite surface and measured at 25mm above the center of the stage.
(4) Accuracy and repeatability are based on open loop lead accuracy and can be enhanced with encoder feedback. Accuracy shown is over full range of travel.



Fx is the load applied in the Z Axis direction, 100mm off end, causing Mx rotation around the X Axis.

Fy is the load applied in the Z Axis direction, 100mm off side, causing My rotation around the Y Axis.

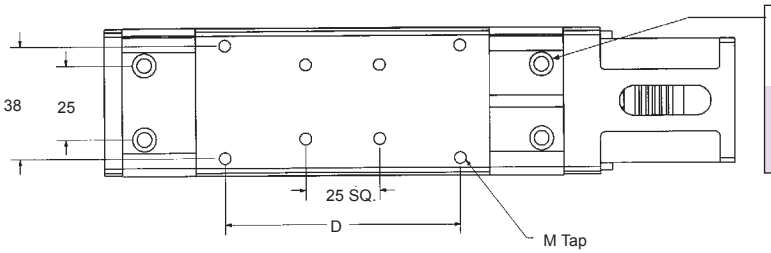
Fz is the load applied around the Z Axis at a 100mm radius from the center, causing Mz rotation around the Z Axis.

Moment Loading

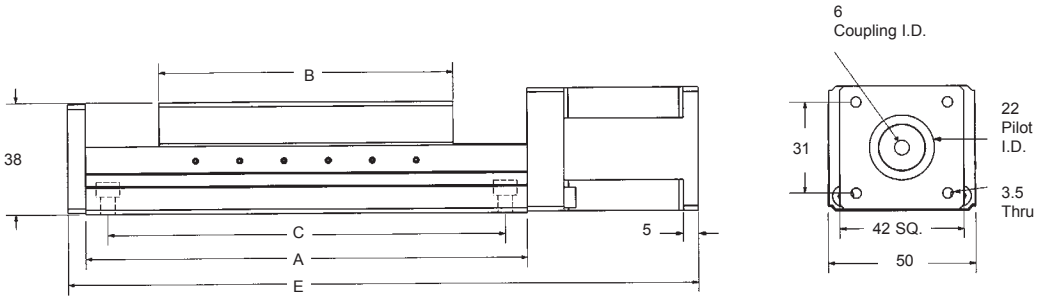
Model No.	F(Mx) (Load applied at 100mm off end)		F(My) (Load applied at 100mm off side)		F(Mz) (Load applied at 100mm off center)	
	(kg)	(lb)	**(kg)**	(lb)	**(kg)**	(lb)
M050-025	**4**	9	**3**	6	**1**	3
M050-050	**6**	13	**3**	8	**2**	4
M050-100	**9**	21	**4**	10	**2**	5
M075-050	**24**	52	**6**	36	**8**	18
M075-100	**32**	70	**19**	41	**9**	21
M075-150	**40**	89	**20**	45	**10**	22
M100-025	**42**	92	**23**	50	**11**	25
M100-050	**45**	100	**23**	51	**12**	26
M100-075	**51**	113	**24**	53	**12**	26
M100-100	**55**	121	**24**	53	**12**	27
M100-150	**65**	142	**25**	56	**13**	28
M150-050	**168**	369	**97**	213	**48**	107
M150-100	**132**	290	**77**	170	**39**	85
M150-150	**240**	528	**105**	231	**53**	116
M150-200	**204**	449	**90**	198	**45**	99

Micro Series:
M050

Dimensions



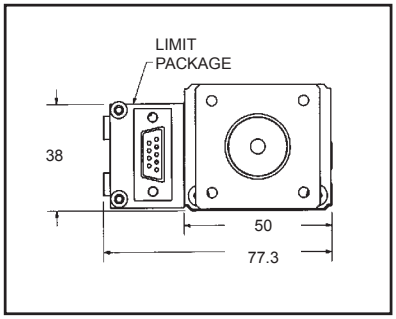
Model No.	H			
	Counterbore		Thru Hole	
	(mm)	(in)	**(mm)**	(in)
M050-025	**8 x 5 dp**	0.32 x 0.2 dp	**5**	0.2
M050-050				
M050-100				



Model No.	Travel		A		B		C		D	
	(mm)	(in)	**(mm)**	(in)	**(mm)**	(in)	**(mm)**	(in)	**(mm)**	(in)
M050-025	**25**	0.98	**100**	3.94	**75**	2.95	**80**	3.14	**50**	1.97
M050-050	**50**	1.97	**150**	5.91	**100**	3.94	**135**	5.31	**80**	3.15
M050-100	100	3.94	**250**	9.84	**150**	5.91	**240**	9.44	**135**	5.31

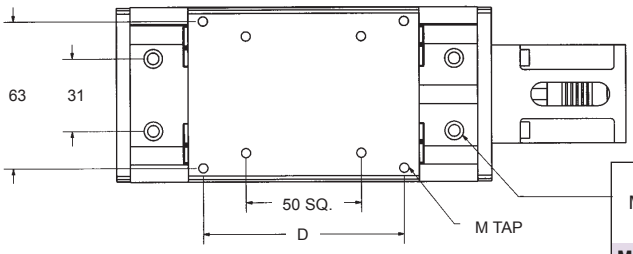
Model No.	E		M	Stage Weight		Maximum Load	
	(mm)	(in)	Tap	**(kg)**	(lb)	**(kg)**	(lb)
M050-025	**164**	6.45	M4x0.7	**0.90**	1.98	**58**	130
M050-050	**214**	8.42	M4x0.7	**1.14**	2.51	**72**	160
M050-100	**314**	12.36	M4x0.7	**1.59**	3.51	**117**	260

M050 Options

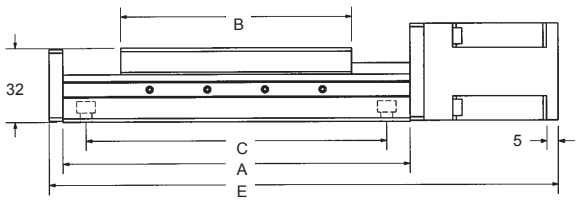


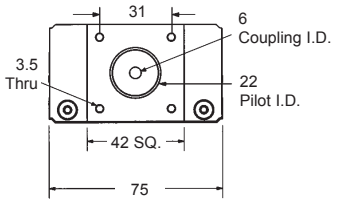
Micro Series:
M075

Dimensions



Model No.	H			
	Counterbore		Thru Hole	
	(mm)	(in)	(mm)	(in)
M075-050 **M075-100** **M075-150**	**8 x 5 dp**	0.32 x 0.2 dp	**5**	0.2

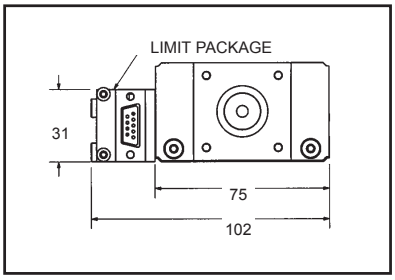




Model No.	Travel		A				B		C	
			Without Waycover		With Waycover					
	(mm)	(in)	(mm)	(in)	(mm)	(in)	(mm)	(in)	(mm)	(in)
M075-050	**50**	1.97	**150**	5.91	180	7.09	**100**	3.94	**130**	5.12
M075-100	**100**	3.94	**250**	9.84	300	11.81	**150**	5.91	**225**	8.86
M075-150	**150**	5.91	**350**	13.78	400	15.75	**200**	7.87	**300**	11.81

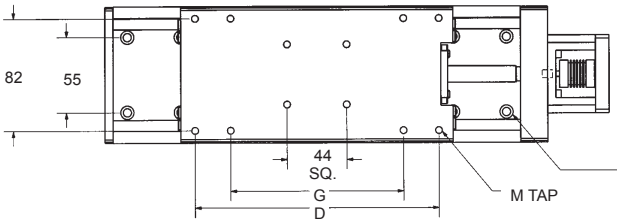
Model No.	D		E		M		Stage Weight	Maximum Load	
	(mm)	(in)	(mm)	(in)	Tap	(kg)	(lb)	(kg)	(lb)
M075-050	**87**	3.43	**220**	8.66	M4x.7	**1.59**	3.51	**190**	420
M075-100	**138**	5.43	**320**	12.60	M4x.7	**2.05**	4.52	**258**	570
M075-150	**188**	7.40	**420**	16.53	M4x.7	**2.50**	5.51	**339**	750

M075 Options

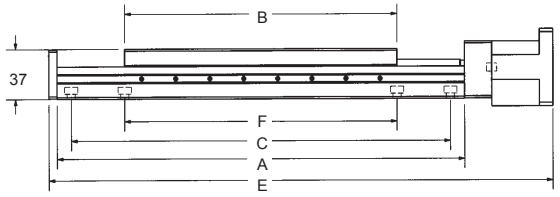


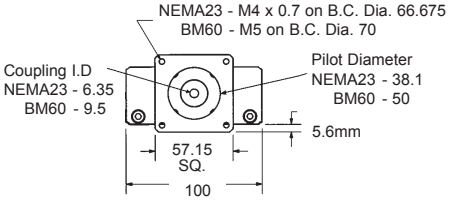
Micro Series:
M100

Dimensions



Model No.	H Counterbore (mm)	H Counterbore (in)	H Thru Hole (mm)	H Thru Hole (in)
M100-025	9.75 x 5 dp	0.38 x 0.2 dp	6	0.24
M100-050				
M100-075				
M100-100				
M100-150				

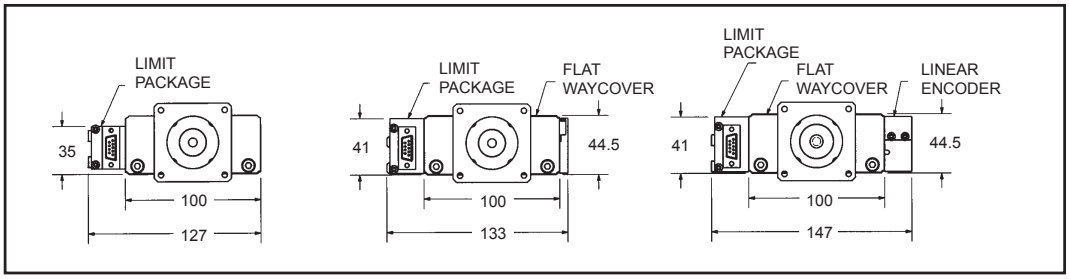




Model No.	Travel (mm)	Travel (in)	A Without Waycover (mm)	A Without Waycover (in)	A With Waycover (mm)	A With Waycover (in)	B (mm)	B (in)	C Without Waycover (mm)	C Without Waycover (in)	C With Waycover (mm)	C With Waycover (in)	D (mm)	D (in)
M100-025	25	0.98	150	5.91	175	6.89	125	4.92	127	4.99	127	4.99	—	—
M100-050	50	1.97	200	7.87	230	9.05	150	5.91	178	7.00	178	7.00	—	—
M100-075	75	2.95	250	9.84	280	11.02	175	6.89	229	9.01	229	9.01—	—	
M100-100	100	3.94	300	11.81	350	13.78	200	7.87	279	10.98	279	10.98	179	7.05
M100-150	150	5.91	400	15.75	450	17.72	250	9.84	381	14.99	431	16.97	229	9.02

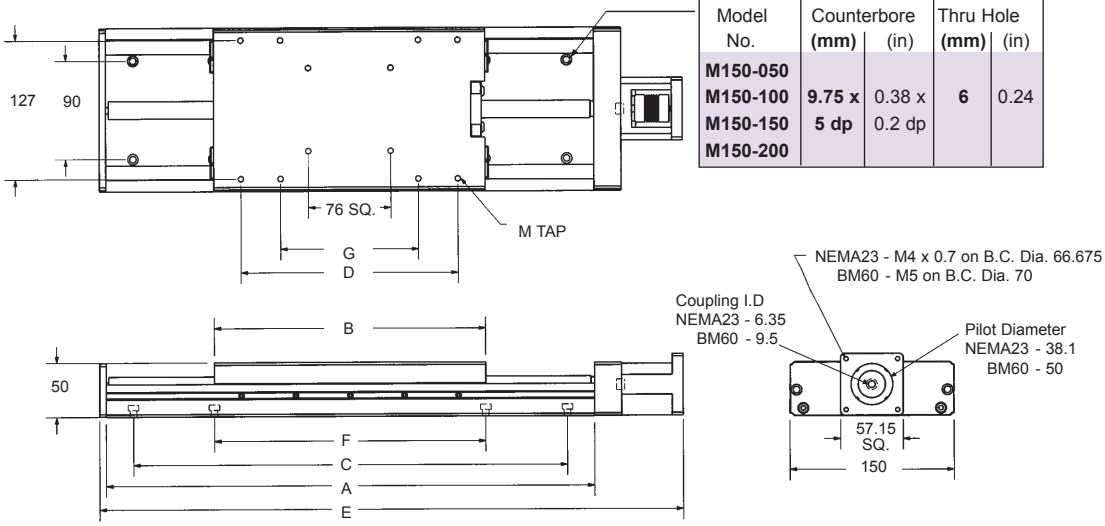
Model No.	E (mm)	E (in)	F Without Waycover (mm)	F Without Waycover (in)	F With Waycover (mm)	F With Waycover (in)	G (mm)	G (in)	M Tap	Stage Weight (kg)	Stage Weight (lb)	Maximum Load (kg)	Maximum Load (lb)
M100-025	221	8.7	—	—	—	—	100	3.94	M5x0.8	1.90	4.19	298	660
M100-050	266	10.5	—	—	—	—	127	4.99	M5x0.8	2.25	4.96	326	720
M100-075	321	12.6	179	7.05	179	7.05	150	5.91	M5x0.8	2.93	6.46	353	780
M100-100	371	14.6	200	7.87	200	7.87	127	4.99	M5x0.8	3.40	7.50	353	780
M100-150	471	18.4	330	12.99	370	14.57	127	4.99	M5x0.8	4.48	9.88	489	1080

M100 Options



Micro Series:
M150

Dimensions

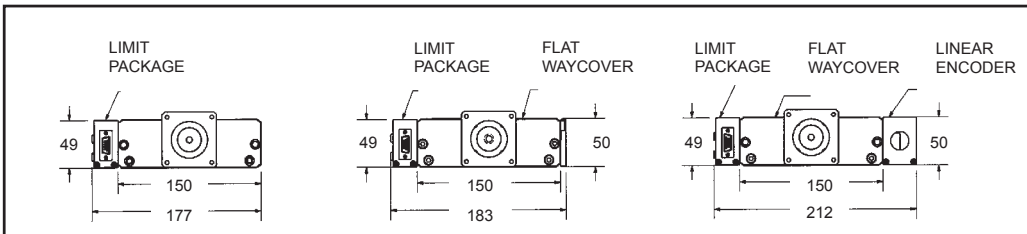


Model No.	H			
	Counterbore		Thru Hole	
	(mm)	(in)	(mm)	(in)
M150-050				
M150-100	9.75 x	0.38 x	6	0.24
M150-150	5 dp	0.2 dp		
M150-200				

Model No.	Travel		A				B		C		D	
			Without Waycover		With Waycover							
	(mm)	(in)	(mm)	(in)	(mm)	(in)	(mm)	(in)	(mm)	(in)	(mm)	(in)
M150-050	50	1.97	200	7.87	250	9.84	150	5.91	150	5.91	—	—
M150-100	100	3.94	250	9.84	300	11.81	150	5.91	200	7.87	—	—
M150-150	150	5.91	400	15.75	450	17.72	250	9.84	350	13.78	200	7.87
M150-200	200	7.87	450	17.72	500	19.68	250	9.84	400	15.75	200	7.87

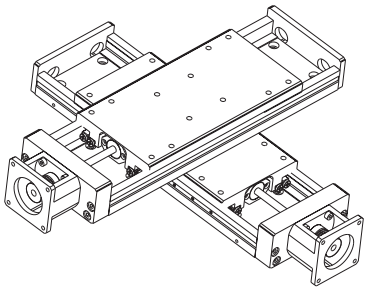
Model No.	E		F		G		M	Stage Weight		Maximum Load	
	(mm)	(in)	(mm)	(in)	(mm)	(in)	Tap	(kg)	(lb)	(kg)	(lb)
M150-050	228	8.98	—	—	—	—	M5 x 0.8	4.00	8.82	407	900
M150-100	338	13.3	—	—	—	—	M5 x 0.8	5.00	11.03	570	1,260
M150-150	488	19.2	250	9.84	127	4.99	M5 x 0.8	7.90	17.42	652	1,440
M150-200	538	21.2	250	9.84	127	4.99	M5 x 0.8	8.99	19.82	774	1,710

M150 Options

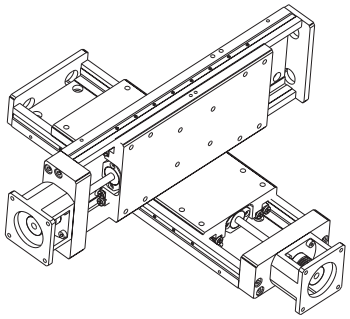


Micro Series:
Configuration & Options

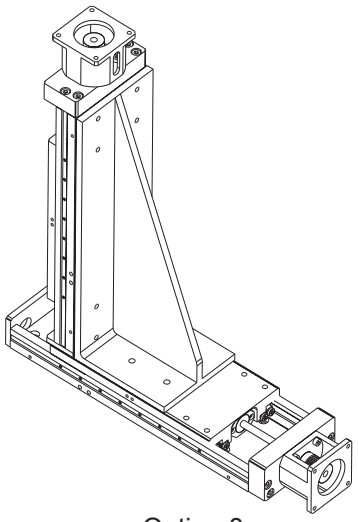
Suggested Orientations:



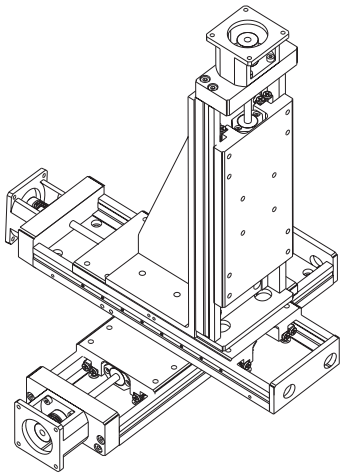
Option 1



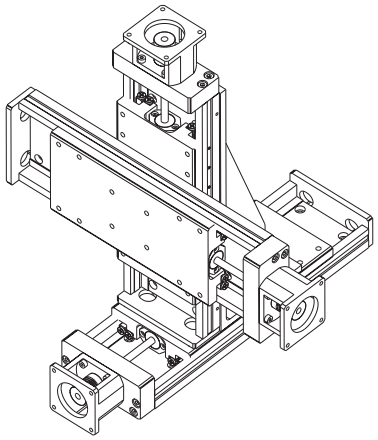
Option 2



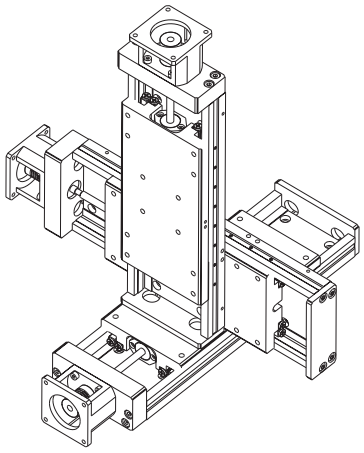
Option 3



Option 4



Option 5



Option 6

Options:

Multi-Axis Configurations
Various Multi-Axis configurations with brackets are available (see examples).

Calibration Option
Bayside provides laser calibrated and/or matched roller options to optimize your stage for the most demanding applications.

P.A.C.T.
Prevents crossed roller bearing creep in vertical and/or high speed applications.

Special Environment Option
Bayside can prepare your stage for a variety of environments including:

- Vacuum
- Clean Room
- Radiation
- Food Grade

Special Lubricants
Dry lubricant suitable for environments that need a dry, permanent lubrication (e.g. vacuum rated applications).

Micro Series:
How to Order

Order Numbering Example:

M	100	A	3	6	4	2	A	3
A	B	C	D	E	F	G	H	I

A — Stage Series

M	Micro Series

B — Model

050	50 mm
075	75 mm
100	100 mm
150	150 mm

C — Material

A	Aluminum
C	Cast Iron

D — Travel

	Width			
	050 (mm)	075 (mm)	100 (mm)	150 (mm)
1	25	—	25	—
2	50	50	50	50
3	—	—	75	—
4	100	100	100	100
5	—	150	150	150
6	—	—	—	200

E — Drive Variations

	050	075	100	150
Lead Screw Options (Lead)				
1	0.025 in	0.025 in	—	—
2	—	—	0.1 in	0.1 in
3	—	—	0.2 in	0.2 in
4	1 mm	1 mm	1 mm	1 mm
Ball Screw Options (Lead)				
5	—	2.5 mm	—	—
6	—	—	10 mm	10 mm
7	—	—	2 mm	3 mm
8	—	—	—	5 mm

Specifications are subject to change without notice.

F — Limits & Bellows (1, 2)

1	None
2	None with Bellows
3	End of Travel
4	End of Travel with Bellows
5	End of Travel and Home
6	End of Travel and Home with Bellows

G — Linear Encoder (2)

	Width			
	050	075	100	150
1	None	None	None	None
2	—	—	0.1 µm	0.1 µm
3	—	0.5 µm	0.5 µm	0.5 µm

H — Motor Mounting

A	NEMA 17	(050, 075)
B	NEMA 23	(100, 150)
C	BM60	(100, 150)

I — PACT / Environment

1	None (Standard)
2	Standard with PACT
3	Clean Room (Anodized)
4	Clean Room (Anodized)(Class 10,000) w/ PACT
5	Vacuum (No Finish)

NOTES:

(1) Not available on M050.

(2) End-of-Travel and Home Limits integral to linear encoder will be provided, when a linear encoder is selected.

How to Order

Micro positioning stages are supported by a worldwide network of offices and local distributors.
Call **1-800-305-4555** for application engineering assistance or for the name of your local distributor.
Information can also be obtained at **www.baysidemotion.com**.