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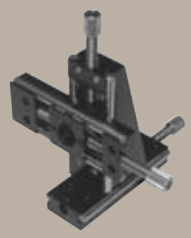
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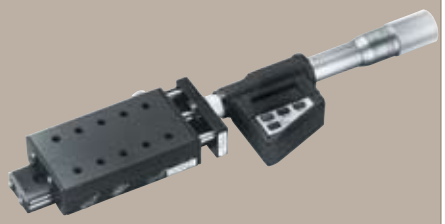
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Ball Bearing Positioners
miniature and standard







Parker Daedal precision linear stages provide controlled, precise point-to-point positioning along a linear axis. Stages are comprised of two basic components: a precision linear ball slide which serves as a linear bearing and guide, and a drive mechanism which accurately moves and positions the slide top along the linear axis.

Contents

62-63	Overview
64-67	1.25” (31,8 mm) Wide or Less
68-73	1.75” (44,5 mm) Wide
74-79	2.62” (66,5 mm) Wide
80-83	5.00” (127,0 mm) Wide
84-86	6.00” (152,4 mm) Wide
87-88	Performance Curves

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Miniature and Standard Size Ball Bearings Positioners



- Precision Quality
- Budget Friendly
- Largest Selection
- Easy multi-axis configuration
- No maintenance
- Vacuum preparation and custom options

Ball Bearing Positioner Design Principles

Parker Daedal precision linear stages provide controlled, precise point-to-point positioning along a linear axis. Stages are comprised of two basic components: a precision linear ball slide which serves as a linear bearing and guide, and a drive mechanism which accurately moves and positions the slide top along the linear axis.

Three types of drive mechanisms are available: a fine screw, a micrometer, and a differential screw. The fine screw is used for fine resolution positioning. The micrometer is used whenever a position readout is required. The differential screw is used for applications requiring extremely fine resolution positioning. Ball bearing positioning stages are available in a straight stage/drive configuration as well as a side-drive configuration.

The linear positioner operates in a simple manner: a bracket which supports the drive screw is attached to the slide base. The end of the drive screw rests against the end of the moveable top. There are two extended springs “pulling” the slide top toward the screw so that the top will always be held firmly against the screw end. When the screw is turned clockwise, it advances and pushes the slide top along the linear axis. When turned counter clockwise, the screw retracts and the slide top follows because of the spring pressure holding the top against the screw end. The result is a very smooth linear motion, accurately controlled by rotation of the drive mechanism.

Standard Features

Exacting manufacturing techniques, combined with demanding quality control standards, permit Parker Daedal to offer precision stages of unsurpassed quality. Selection can be made easily, based on required travel, load, and mounting surface requirements. Stages are available in single or multi-axis configurations (XY, XZ, and XYZ), and all have built-in quality features including:

- Aluminum top and base and stainless steel bearings
- Low friction linear adjustment with no backlash or side play
- Factory preloaded to provide dynamic stability and minimum runout
- Both top and bottom mounting surfaces are precision machined to provide flat mounting surfaces
- Locking screw to positively lock stage without affecting position (standard on most models)
- Straight line accuracy of 0.00008 in/in of travel
- Selectable drive mechanisms: Micrometer (Imperial or metric), Fine screw (64 pitch), Differential screw, Digital micrometers (Imperial and Metric)

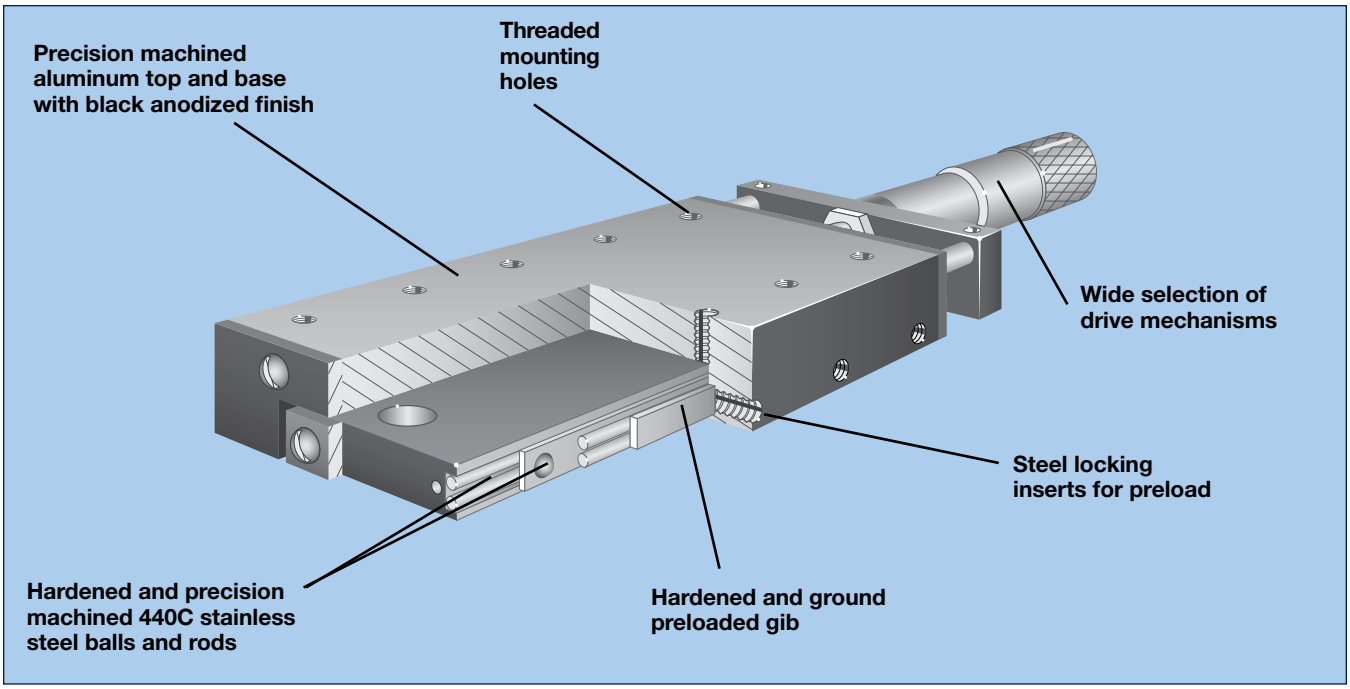
Digital Micrometers

The 1.0” (25 mm) travel micrometer provides an LCD readout to 0.00005 in (0,001 mm) resolution and features incremental and/or absolute positioning modes and automatic shutdown to conserve the integral battery. The battery will power the unit for 500 hours of use. The 2.0” (51 mm) micrometer is accurate to ±0.0001 in (±2 microns) with a resolution and LCD reading to 0.00005 in (1 micron). The batteries will power the unit up to 500 hours.

How to Order

Use the overview chart on the following page to select the appropriate ball bearing positioner. Refer to the individual specifications page for complete performance and mechanical specifications. To order ball bearing positioners, use the model number corresponding to the specific size and travel length selected. A variety of modifications to standard models are available to meet custom requirements. Contact our application engineering department with your design specifications.

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Selection

Series	Width in (mm)	Travel		Normal Load		Drive Orientation		Mounting		Page
		in	(mm)	lbs	(kg)	Center	Side	Imperial	Metric	
MM-1	**≤1.25 (≤31,8)**	0.125	(3,2)	0.5	(0,25)	•		•		64-65
MM-3		0.50	(12,7)	0.75	(0,34)	•		•		64-65
3900				6	(2,7)	•	•	•	•	66-67
4000	**1.75 (44,5)**	0.50 or 1.00	(12,7 or 25,4)	25	(11)	•	•	•	•	68-69,72
4100				30	(13)	•		•	•	70-71, 73
4200				42	(19)	•		•	•	70-71, 73
4300				55	(25)	•		•	•	70-71, 73
4500	**2.62 (66,5)**	1.00	(25,4)	62	(28)	•	•	•	•	74-75, 78
4600				88	(40)	•		•	•	76-77, 79
4700				106	(48)	•		•	•	76-77, 79
4800				123	(56)	•		•	•	76-77, 79
4400	**5.0 (127,0)**	1.0	(25,4)	105	(48)	•	•	•	•	80-83
		2.0	(50,8)	105	(48)	•	•	•	•	80-83
4900	**6.0 (152,4)**	1.0	(25,4)	100	(45)	•		•	•	84-85
		2.0	(50,8)	100	(45)	•		•	•	84-85
		4.0	(100,0)	100	(45)	•		•	•	86
		6.0	(150,0)	154	(70)	•		•	•	86
		8.0	(200,0)	205	(93)	•		•	•	86
		10.0	(250,0)	243	(110)	•		•	•	86
		12.0	(300,0)	294	(133)	•		•	•	86

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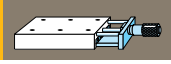
4000/M4000 Series

Specifications	Imperial	Metric
Travel:	0.5 – 1.0 in	12,7 – 25,4 mm
Size:		
Width	1.75 in	44,4 mm
Length (mid-travel)	2.63 – 6.03 in	68 – 153 mm
Height	0.75 in	19,0 mm
Load:		
Normal	25 lbs	11 kg
Thrust – T_a	10 lbs	4,5 kg
Thrust – T_b	5 lbs	2,3 kg
Moment – Yaw, Pitch, Roll	See page 87	See page 87
Straight line accuracy:	0.00008 in/in of travel	2 µm/25 mm of travel
Micrometer graduations:	0.001 in	0,01 mm
Differential screw:		
Coarse Adjustment	48 pitch	48 pitch
Fine Adjustment	336 pitch	336 pitch
Fine screw:	64 pitch	64 pitch
Weight:	0.5 lbs/axis	0,23 kg/axis
Z-Axis bracket options: (See page 124-127)		
Center drive low profile	4009	M4009
Center drive standard	4010	M4010
Side drive low profile	4059	M4059
Side drive standard	4060	M4060
Construction:	Aluminum top and base/ 440C stainless steel bearings	
Mounting surface:	Precision machined	
Finish:	Black anodize	



	Style	Drive Mechanism	Travel	Center Drive Models: Single Axis	Center Drive Models: Two Axis	Center Drive Models: Y-Y-Z Low Profile	Center Drive Models: Y-Y-Z Standard	Side Drive Models: Single Axis	Side Drive Models: Two Axis	Side Drive Models: Y-Y-Z Low Profile	Side Drive Models: Y-Y-Z Standard
Imperial	Solid Top	Imperial Micrometer	0.50 in	4002	4022	4032	4042	4052	4072	4082	4092
			1.0 in	4004	4024	4034	4044	4054	4074	4084	4094
		Metric Micrometer	13 mm	4002M	4022M	4032M	4042M	4052M	4072M	4082M	4092M
			25 mm	4004M	4024M	4034M	4044M	4054M	4074M	4084M	4094M
		Differential Screw	0.08/0.3 in	4002D	4022D	4032D	4042D	4052D	4072D	4082D	4092D
		Fine Screw	0.75 in	4003	4023	4033	4043	4053	4073	4083	4093
	Aperture (0.5 in)	Imperial Micrometer	0.50 in	4006	4026	4036	4046	4056	4076	4086	4096
		Metric Micrometer	13 mm	4006M	4026M	4036M	4046M	4056M	4076M	4086M	4096M
		Differential Screw	0.08/0.3 in	4006D	4026D	4036D	4046D	4056D	4076D	4086D	4096D
		Fine Screw	0.75 in	4007	4027	4037	4047	4057	4077	4087	4097
Metric	Solid Top	Metric Micrometer	13 mm	M4002M	M4022M	M4032M	M4042M	M4052M	M4072M	M4082M	M4092M
			25 mm	M4004M	M4024M	M4034M	M4044M	M4054M	M4074M	M4084M	M4094M
		Imperial Micrometer	0.50 in	M4002	M4022	M4032	M4042	M4052	M4072	M4082	M4092
			1.0 in	M4004	M4024	M4034	M4044	M4054	M4074	M4084	M4094
		Differential Screw	2/8 mm	M4002D	M4022D	M4032D	M4042D	M4052D	M4072D	M4082D	M4092D
		Fine Screw	19 mm	M4003	M4023	M4033	M4043	M4053	M4073	M4083	M4093
	Aperture (12,7 mm)	Metric Micrometer	13 mm	M4006M	M4026M	M4036M	M4046M	M4056M	M4076M	M4086M	M4096M
		Imperial Micrometer	0.50 in	M4006	M4026	M4036	M4046	M4056	M4076	M4086	M4096
		Differential Screw	2/8 mm	M4006D	M4026D	M4036D	M4046D	M4056D	M4076D	M4086D	M4096D
		Fine Screw	19 mm	M4007	M4027	M4037	M4047	M4057	M4077	M4087	M4097

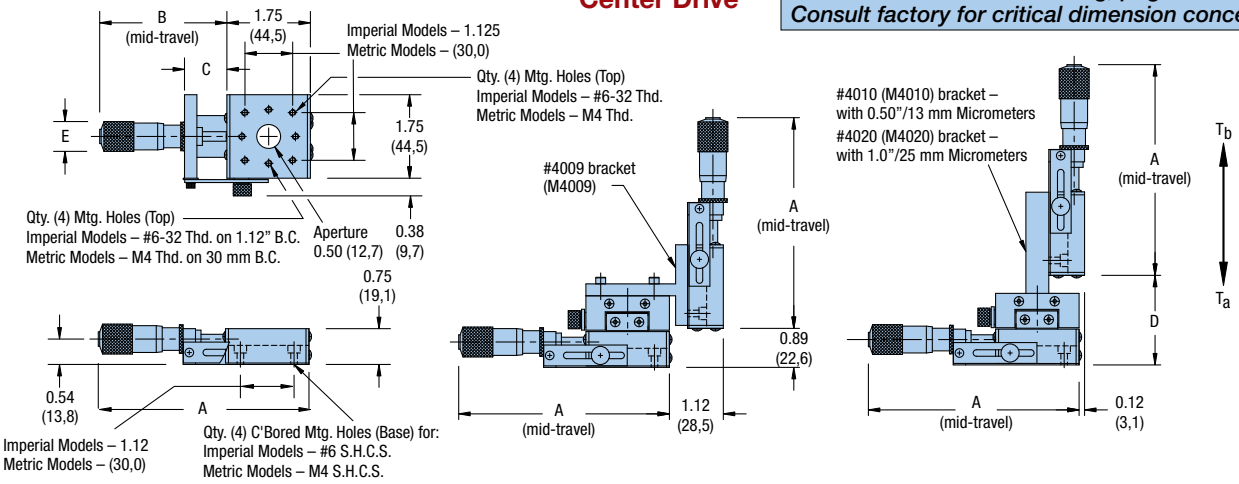
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Dimensions in (mm)

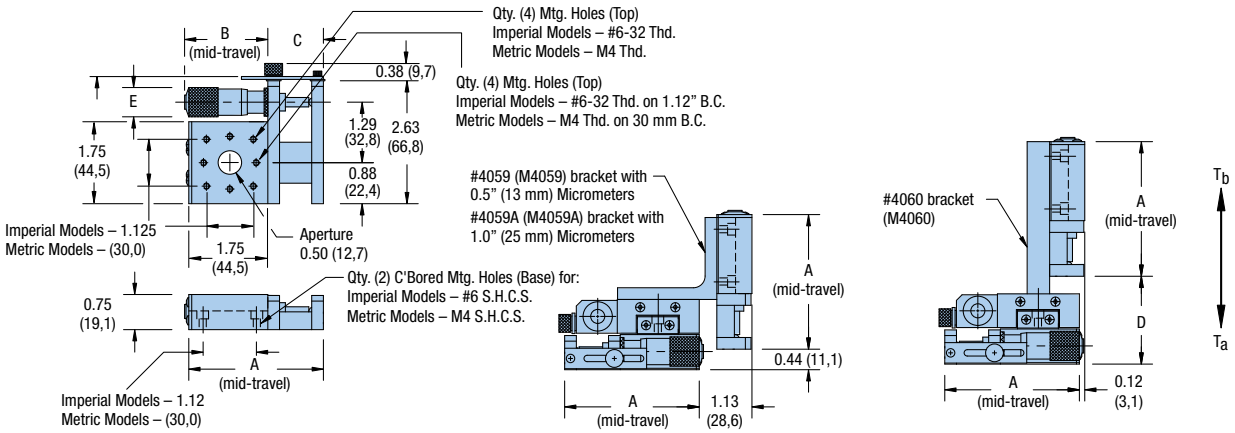
For additional end view dimensions, refer to the 4000/M4000 ball slide drawing, page 21. Consult factory for critical dimension concerns.

Center Drive



Single-Axis **X-Y-Z Low-Profile** **X-Y-Z Standard**

Side Drive



Single-Axis **X-Y-Z Low-Profile** **X-Y-Z Standard**

	Style	Drive Mechanism	Travel	Center Drive Dimensions — in (mm) A	B	C	D	E	Side Drive Dimensions — in (mm) A	B	C	D	E
Imperial	Solid Top	Imperial Micrometer	0.50 in	4.42	2.68	0.90	1.88	0.54	2.97	1.78	1.19	1.88	0.54
			1.0 in	6.03	4.28	1.18	2.13	0.71	4.53	3.10	1.44	1.63	0.71
		Metric Micrometer	13 mm	4.42	2.68	0.90	1.88	0.54	2.97	1.78	1.19	1.88	0.54
			25 mm	6.03	4.28	1.18	2.13	0.71	4.53	3.10	1.44	1.63	0.71
		Differential Screw	0.08/0.3 in	4.12	2.37	0.88	1.88	0.62	2.97	1.44	1.19	1.88	0.62
		Fine Screw	0.75 in	4.33	2.57	0.88	1.88	0.58	2.69	1.62	1.19	1.88	0.58
	Aperture	Imperial Micrometer	0.50 in	4.42	2.68	0.90	1.88	0.54	2.97	1.78	1.19	1.88	0.54
		Metric Micrometer	13 mm	4.42	2.68	0.90	1.88	0.54	2.97	1.78	1.19	1.88	0.54
		Differential Screw	0.08/0.3 in	4.12	2.37	0.88	1.88	0.62	2.97	1.44	1.19	1.88	0.62
		Fine Screw	0.75 in	4.33	2.57	0.88	1.88	0.58	2.69	1.62	1.19	1.88	0.58
Metric	Solid Top	Metric Micrometer	13 mm	(112)	(68)	(23)	(47,8)	(13,6)	(75,5)	(45,2)	(30,2)	(47,8)	(13,6)
			25 mm	(153)	(109)	(30)	(54,1)	(17,9)	(115)	(79,0)	(36,5)	(40,8)	(17,9)
		Imperial Micrometer	0.50 in	(112)	(68)	(23)	(47,8)	(13,6)	(75,5)	(45,2)	(30,2)	(47,8)	(13,6)
			1.0 in	(153)	(109)	(30)	(54,1)	(17,9)	(115,0)	(79,0)	(36,5)	(40,8)	(17,9)
		Differential Screw	2/8 mm	(105)	(60)	(22)	(47,8)	(15,7)	(75,5)	(36,0)	(30,0)	(47,8)	(15,7)
		Fine Screw	19 mm	(110)	(65)	(22)	(47,8)	(14,7)	(68,0)	(41,0)	(25,0)	(47,8)	(14,7)
	Aperture	Metric Micrometer	13 mm	(112)	(68)	(23)	(47,8)	(13,6)	(75,5)	(45,2)	(30,0)	(47,8)	(13,6)
		Imperial Micrometer	0.50 in	(112)	(68)	(23)	(47,8)	(13,6)	(75,5)	(45,2)	(30,0)	(47,8)	(13,6)
		Differential Screw	2/8 mm	(105)	(60)	(22)	(47,8)	(15,7)	(75,5)	(36,0)	(30,0)	(47,8)	(15,7)
		Fine Screw	19 mm	(110)	(65)	(22)	(47,8)	(14,7)	(68,0)	(41,0)	(25,0)	(47,8)	(14,7)

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4100/M4100, 4200/M4200, 4300/M4300 Series

Specifications	Imperial	Metric
Travel:	0.5 – 1.0 in	13 – 25 mm
Size:		
Width	1.75 in	44,4 mm
Length (mid-travel)	4.60 – 8.28 in	114,3 – 210,3 mm
Height	0.75 in	19,0 mm
Load:		
Normal	30 – 55 lbs	13 – 25 kg
Thrust – T_a	10 lbs	4,5 kg
Thrust – T_b	3 lbs	1,4 kg
Moment – Yaw, Pitch, Roll	See page 87	See page 87
Straight line accuracy:	0.00008 in/in of travel	2 µm/25 mm of travel
Micrometer graduations:	0.001 in	0,01 mm
Fine screw:	64 pitch	64 pitch
Weight:	0.5 –0.8 lbs/axis	0,2 – 0,4 kg/axis
Construction:	Aluminum top and base/ 440C stainless steel bearings	
Mounting surface:	Precision machined	
Finish:	Black anodize	

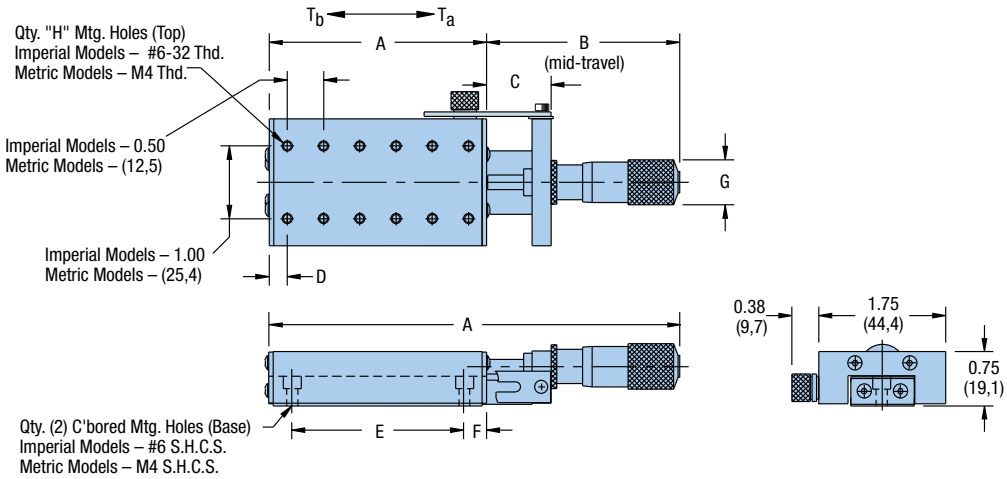


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Dimensions in (mm)

For additional end view dimensions, refer to the 4100-4300/M4100-4300 ball slide drawing, page 22. Consult factory for critical dimension concerns.



	Drive Mechanism	Travel	Model	Load	Weight	Dimensions — in (mm) A	B	C	D	E	F	G	Qty H
Imperial	Imperial Micrometer	0.50 in	**4102**				2.68	0.89				0.54	
		1.0 in	**4104**				4.28	1.18				0.71	
	Metric Micrometer	13 mm	**4102M**	30 lbs	0.5 lbs	2.00	2.68	0.89	0.25	1.38	0.31	0.54	8
		25 mm	**4104M**				4.28	1.18				0.71	
	Fine Screw	0.75 in	**4103**				2.60	0.89				0.58	
	Imperial Micrometer	0.50 in	**4202**				2.68	0.89				0.54	
		1.0 in	**4204**				4.28	1.18				0.71	
	Metric Micrometer	13 mm	**4202M**	42 lbs	0.6 lbs	3.00	2.68	0.89	0.25	2.38	0.31	0.54	12
		25 mm	**4204M**				4.28	1.18				0.71	
	Fine Screw	0.75 in	**4203**				2.60	0.89				0.58	
	Imperial Micrometer	0.50 in	**4302**				2.68	0.89				0.54	
		1.0 in	**4304**				4.28	1.18				0.71	
	Metric Micrometer	13 mm	**4302M**	55 lbs	0.8 lbs	4.00	2.68	0.89	0.25	3.38	0.31	0.54	16
		25 mm	**4304M**				4.28	1.18				0.71	
	Fine Screw	0.75 in	**4303**				2.60	0.89				0.58	
Metric	Metric Micrometer	13 mm	**M4102M**				(67,7)	(22,6)				(13,6)	
		25 mm	**M4104M**				(108,7)	(30,0)				(17,9)	
	Imperial Micrometer	0.50 in	**M4102**	13 kg	0,2 kg	(50,8)	(67,7)	(22,6)	(12,9)	(35,0)	(7,8)	(13,6)	6
		1.0 in	**M4104**				(108,7)	(30,0)				(17,9)	
	Fine Screw	0.75 in	**M4103**				(63,5)	(22,6)				(14,7)	
	Metric Micrometer	13 mm	**M4202M**				(67,7)	(22,6)				(13,6)	
		25 mm	**M4204M**				(108,7)	(30,0)				(17,9)	
	Imperial Micrometer	0.50 in	**M4202**	19 kg	0,3 kg	(76,2)	(67,7)	(22,6)	(13,1)	(60,0)	(8,1)	(13,6)	10
		1.0 in	**M4204**				(108,7)	(30,0)				(17,9)	
	Fine Screw	0.75 in	**M4203**				(63,5))	(22,6)				(14,7)	
	Metric Micrometer	13 mm	**M4302M**				(67,7)	(22,6)				(13,6)	
		25 mm	**M4304M**				(108,7)	(30,0)				(17,9)	
	Imperial Micrometer	0.50 in	**M4302**	25 kg	0,4 kg	(101,6)	(67,7)	(22,6)	(13,3)	(85,0)	(8,3)	(13,6)	14
		1.0 in	**M4304**				(108,7)	(30,0)				(17,9)	
	Fine Screw	0.75 in	**M4303**				(63,5)	(22,6)				(14,7)	

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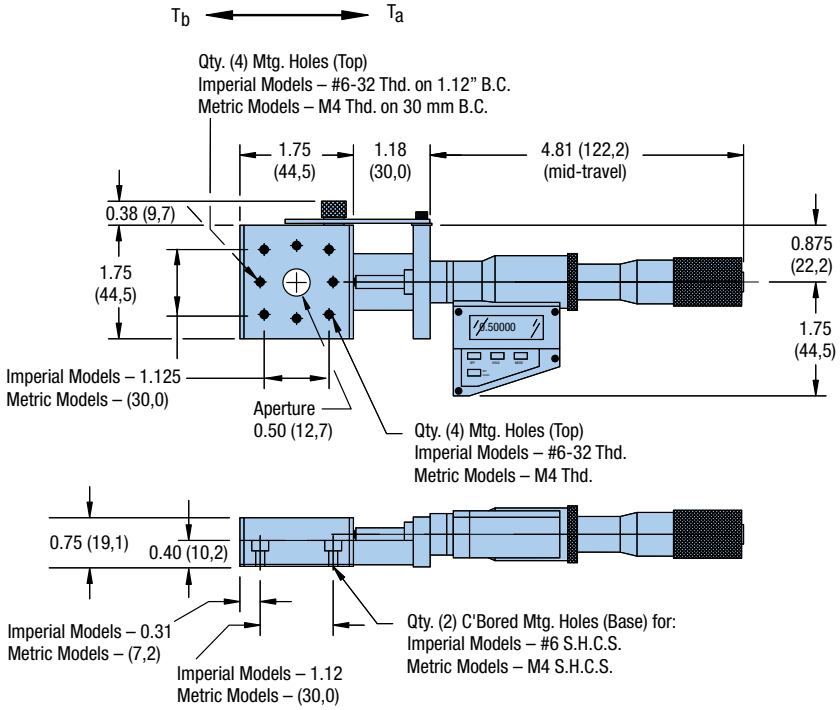
4000-DM/M4000-DM Series

Specifications	Imperial	Metric
Travel:	1.0 in	25,0 mm
Size:		
Width	1.75 in	44,4 mm
Length (mid-travel)	in	mm
Height	0.75 in	19,0 mm
Load:		
Normal	25 lbs	11 kg
Thrust – T_a	10 lbs	4,5 kg
Thrust – T_b	5 lbs	2,3 kg
Moment – Yaw, Pitch, Roll	See page 87	See page 87
Straight line accuracy:	0.00008 in/in of travel	2 µm/25 mm of travel
Micrometer graduations:	0.00005 in	0,001 mm
Weight:		
Solid Top	1.0 lb	0,45 kg
Aperture	0.8 lb	0,36 kg
Construction:	Aluminum top and base/ 440C stainless steel bearings	
Mounting surface:	Precision machined	
Finish:	Black anodize	

For additional end view dimensions, refer to the 4000/M4000 ball slide drawing, page 21. Consult factory for critical dimension concerns.



Dimensions in (mm)



	Style	Model
Imperial	Solid Top	4004-DM
	Aperture (0.50 in)	4008-DM
Metric	Solid Top	M4004-DM
	Aperture (12,7 mm)	M4008-DM

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4100-DM/M4100-DM, 4200-DM/M4200-DM, 4300-DM/M4300-DM Series

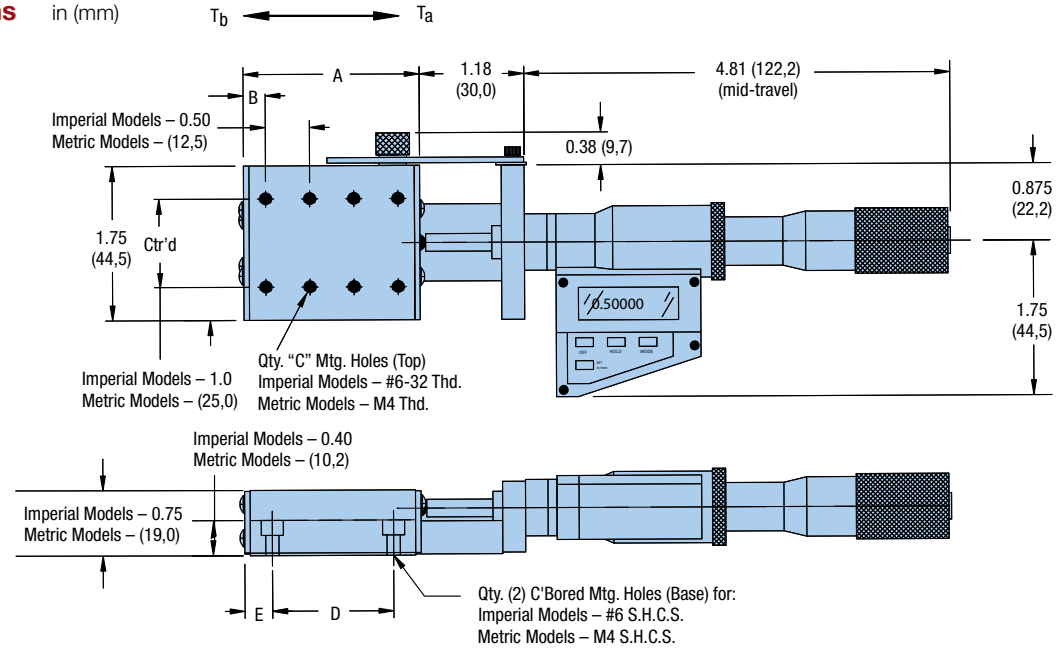
Specifications	Imperial	Metric
Travel:	1.0 in	25 mm
Size:		
Width	1.75 in	44,4 mm
Length (mid-travel)	7.99 – 9.99 in	202,9 – 253,7 mm
Height	0.75 in	19,0 mm
Load:		
Normal	28 – 55 lbs	13 – 25 kg
Thrust – T_a	10 lbs	4,5 kg
Thrust – T_b	3 lbs	1,4 kg
Moment – Yaw, Pitch, Roll	See page 87	See page 87
Straight line accuracy:	0.00008 in/in of travel	2 µm/25 mm of travel
Micrometer graduations:	0.00005 in	0,001 mm
Weight:	0.9 – 1.3 lbs/axis	0,4 – 0,6 kg/axis
Construction:	Aluminum top and base/ 440C stainless steel bearings	
Mounting surface:	Precision machined	
Finish:	Black anodize	

For additional end view dimensions, refer to the 4100-4300/M4100-4300 ball slide drawing, page 22. Consult factory for critical dimension concerns.



Dimensions

in (mm)



	Model	Normal Load	Weight	Dimensions — in (mm) A	B	C	D	E
Imperial	**4104-DM**	30 lbs	0.9 lbs	2.0	0.25	8	1.38	0.31
	4204-DM	42 lbs	1.0 lbs	3.0	0.25	12	2.38	0.31
	4304-DM	50 lbs	1.3 lbs	4.0	0.25	16	3.38	0.31
Metric	**M4104-DM**	13 kg	0,4 kg	(50,8)	(12,9)	6	(35,0)	(7,8)
	M4204-DM	19 kg	0,5 kg	(76,2)	(13,1)	10	(60,0)	(8,1)
	M4304-DM	25 kg	0,6 kg	(101,6)	(13,3)	14	(85,0)	(8,3)

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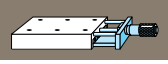
4500/M4500 Series

Specifications	Imperial	Metric
Travel:	0.5 – 1.0 in	13 – 25 mm
Size:		
Width	2.62 in	66,5 mm
Length (mid-travel)	3.75 – 6.88 in	95,5 – 174,4 mm
Height	1.00 in	25,4 mm
Load:		
Normal	62 lbs	28 kg
Thrust – T_a	10 lbs	4,5 kg
Thrust – T_b	2 lbs	0,9 kg
Moment – Yaw, Pitch, Roll	See page 87	See page 87
Straight line accuracy:	0.00008 in/in of travel	2 µm/25 mm of travel
Micrometer graduations:	0.001 in	0,01 mm
Differential screw:		
Coarse Adjustment	48 pitch	48 pitch
Fine Adjustment	336 pitch	336 pitch
Fine screw:	64 pitch	64 pitch
Weight:		
Center drive	0.72 lbs/axis	0,33 kg/axis
Side drive	0.92 lbs/axis	0,42 kg/axis
Z-Axis bracket options: (See page 124-127)		
Center drive low profile	4509	M4509
Center drive standard	4510	M4510
Side drive low profile	4559	M4559
Side drive standard	4560	M4560
Construction:	Aluminum top and base/ 440C stainless steel bearings	
Mounting surface:	Precision machined	
Finish:	Black anodize	



	Style	Drive Mechanism	Travel	Center Drive Models: Single Axis	Center Drive Models: Two Axis	Center Drive Models: Y-Y-Z Low Profile	Center Drive Models: Y-Y-Z Standard	Side Drive Models: Single Axis	Side Drive Models: Two Axis	Side Drive Models: Y-Y-Z Low Profile	Side Drive Models: Y-Y-Z Standard
Imperial	Solid Top	Imperial Micrometer	0.50 in	4502	4522	4532	4542	4552	4572	4582	4592
			1.0 in	4504	4524	4534	4544	4554	4574	4584	4594
		Metric Micrometer	13mm	4502M	4522M	4532M	4542M	4552M	4572M	4582M	4592M
			25 mm	4504M	4524M	4534M	4544M	4554M	4574M	4584M	4594M
		Differential Screw	0.08/0.3 in	4502D	4522D	4532D	4542D	4552D	4572D	4582D	4592D
		Fine Screw	0.75 in	4503	4523	4533	4543	4553	4573	4583	4593
	Aperture (1.0 in)	Imperial Micrometer	0.50 in	4506	4526	4536	4546	4556	4576	4586	4596
		Metric Micrometer	13 mm	4506M	4526M	4536M	4546M	4556M	4576M	4586M	4596M
		Differential Screw	0.08/0.3 in	4506D	4526D	4536D	4546D	4556D	4576D	4586D	4596D
		Fine Screw	0.75 in	4507	4527	4537	4547	4557	4577	4587	4597
Metric	Solid Top	Metric Micrometer	13 mm	M4502M	M4522M	M4532M	M4542M	M4552M	M4572M	M4582M	M4592M
			25 mm	M4504M	M4524M	M4534M	M4544M	M4554M	M4574M	M4584M	M4594M
		Imperial Micrometer	0.50 in	M4502	M4522	M4532	M4542	M4552	M4572	M4582	M4592
			1.0 in	M4504	M4524	M4534	M4544	M4554	M4574	M4584	M4594
		Differential Screw	2/8 mm	M4502D	M4522D	M4532D	M4542D	M4552D	M4572D	M4582D	M4592D
		Fine Screw	19 mm	M4503	M4523	M4533	M4543	M4553	M4573	M4583	M4593
	Aperture (25,4 mm)	Metric Micrometer	13 mm	M4506M	M4526M	M4536M	M4546M	M4556M	M4576M	M4586M	M4596M
		Imperial Micrometer	0.50 in	M4506	M4526	M4536	M4546	M4556	M4576	M4586	M4596
		Differential Screw	2/8 mm	M4506D	M4526D	M4536D	M4546D	M4556D	M4576D	M4586D	M4596D
		Fine Screw	19 mm	M4507	M4527	M4537	M4547	M4557	M4577	M4587	M4597

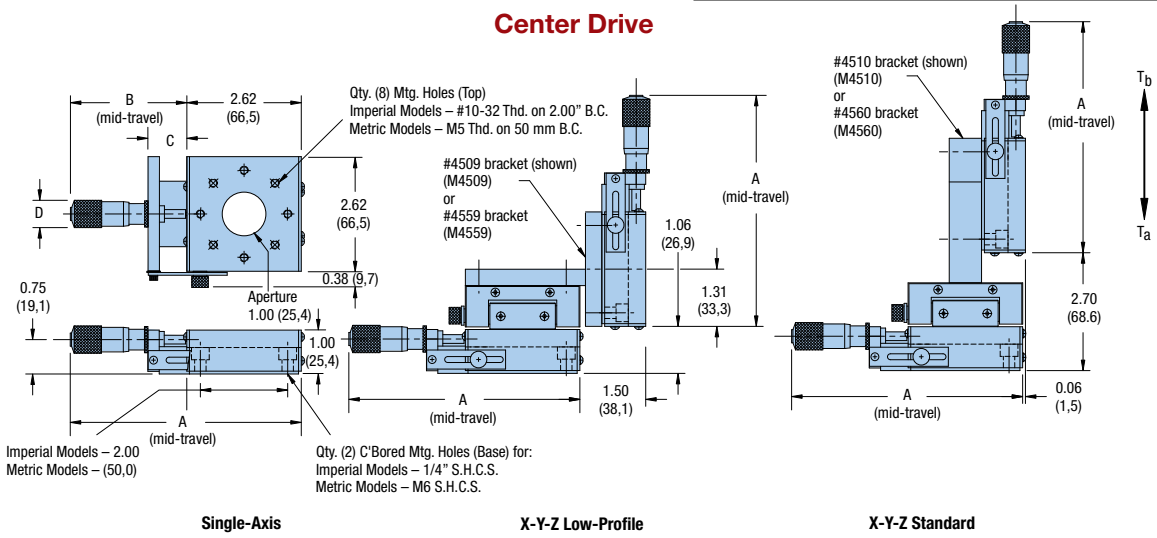
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Dimensions in (mm)

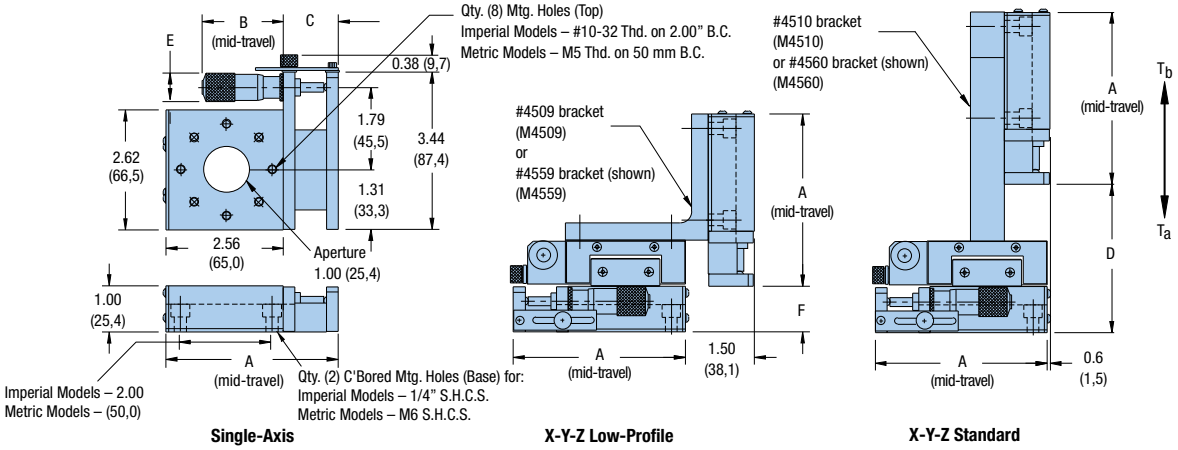
For additional end view dimensions, refer to the 4500/M4500 ball slide drawing, page 23. Consult factory for critical dimension concerns.

Center Drive



Single-Axis **X-Y-Z Low-Profile** **X-Y-Z Standard**

Side Drive



Single-Axis **X-Y-Z Low-Profile** **X-Y-Z Standard**

	Style	Drive Mechanism	Travel	Center Drive Dimensions in (mm) A	B	C	D	Side Drive Dimensions in (mm) A	B	C	D	E	F
Imperial	Solid Top	Imperial Micrometer	0.50 in	5.29	2.68	0.89	0.54	3.75	1.78	1.19	3.25	0.54	1.00
			1.0 in	6.88	4.24	1.15	0.71	4.03	3.10	1.47	3.00	0.71	0.75
		Metric Micrometer	13 mm	5.29	2.68	0.89	0.54	3.75	1.78	1.19	3.25	0.54	1.00
			25 mm	6.88	4.24	1.15	0.71	4.03	3.10	1.47	3.00	0.71	0.75
		Differential Screw	0.08/0.3 in	5.00	2.37	0.89	0.62	3.75	1.44	1.19	3.25	0.62	1.00
		Fine Screw	0.75 in	5.23	2.60	0.89	0.58	3.75	1.72	1.19	3.25	0.58	1.00
	Aperture	Imperial Micrometer	0.50 in	5.29	2.68	0.89	0.54	3.75	1.78	1.19	3.25	0.54	1.00
		Metric Micrometer	13 mm	5.29	2.68	0.89	0.54	3.75	1.78	1.19	3.25	0.54	1.00
		Differential Screw	0.08/0.3 in	5.00	2.37	0.89	0.62	3.75	1.44	1.19	3.25	0.62	1.00
		Fine Screw	0.75 in	5.23	2.60	0.89	0.58	3.75	1.72	1.19	3.25	0.58	1.00
Metric	Solid Top	Metric Micrometer	13 mm	(134,4)	(67,7)	(22,6)	(13,6)	(95,5)	(45,1)	(30,0)	(82,6)	(12,7)	(25,4)
			25 mm	(174,4)	(107,8)	(29,3)	(17,9)	(102,0)	(79,0)	(37,0)	(76,3)	(15.7)	(19,1)
		Imperial Micrometer	0.50 in	(134,4)	(67,7)	(22,6)	(13,6)	(95,5)	(45,1)	(30,0)	(82,6)	(12.7)	(25,4)
			1.0 in	(174,4)	(107,8)	(29,3)	(17,9)	(102,0)	(79.0)	(37,0)	(76,3)	(15,7)	(19,1)
		Differential Screw	2/8 mm	(127,0)	(60,0)	(22,0)	(15,7)	(95,5)	(36,0)	(30,0)	(82,6)	(15,7)	(25,4)
		Fine Screw	19 mm	(130,0)	(64,0)	(22,0)	(14,7)	(95,5)	(36,0)	(30,0)	(82,6)	(15,0)	(25,4)
	Aperture	Metric Micrometer	13 mm	(134,4)	(67,7)	(22,6)	(13,6)	(95,5)	(45,1)	(30,0)	(82,6)	(12,7)	(25,4)
		Imperial Micrometer	0.50 in	(134,4)	(67,7)	(22,6)	(13,6)	(95,5)	(45,1)	(30,0)	(82,6)	(12.7)	(25,4)
		Differential Screw	2/8 mm	(127,0)	(60,0)	(22,0)	(15,7)	(95,5)	(36,0)	(30,0)	(82,6)	(15,7)	(25,4)
		Fine Screw	19 mm	(130,0)	(64,0)	(22,0)	(14,7)	(95,5)	(36,0)	(30,0)	(82,6)	(15,0)	(25,4)

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4600/M4600, 4700/M4700, 4800/M4800 Series

Specifications	Imperial	Metric
Travel:	0.5 – 1.0 in	13 – 25 mm
Size:		
Width	2.62 in	66,5 mm
Length (mid-travel)	6.50 – 10.28 in	164,1 – 261,1 mm
Height	1.00 in	25,4 mm
Load:		
Normal	88 – 123 lbs	40 – 56 kg
Thrust – T_a	30 lbs	13,6 kg
Thrust – T_b	2 lbs	0,9 kg
Moment – Yaw, Pitch, Roll	See page 87	See page 87
Straight line accuracy:	0.00008 in/in of travel	2 µm/25 mm of travel
Micrometer graduations:	0.001 in	0,01 mm
Fine screw:	64 pitch	64 pitch
Weight:	1.1 – 1.5 lbs/axis	0,5 – 0,7 kg/axis
Construction:	Aluminum top and base/ 440C stainless steel bearings	
Mounting surface:	Precision machined	
Finish:	Black anodize	

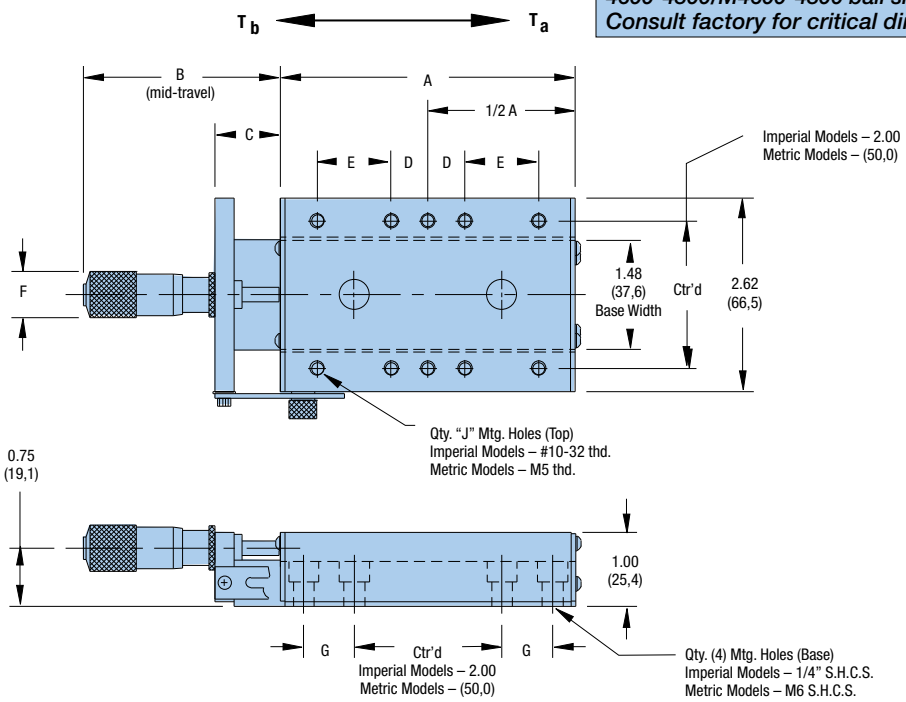


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Dimensions in (mm)

For additional end view dimensions, refer to the 4600-4800/M4600-4800 ball slide drawing, page 24. Consult factory for critical dimension concerns.



	Drive Mechanism	Travel	Model	Load lb (kg)	Weight lb (kg)	Dimensions — in (mm) A	B	C	D	E	F	G	Qty J
Imperial	Imperial Micrometer	0.50 in	**4602**				2.68	0.89			0.55		
		1.0 in	**4604**				4.28	1.18			0.62		
	Metric Micrometer	13 mm	**4602M**	88	1.1	4.00	2.68	0.89	0.50	—	0.55	0.69	6
		25 mm	**4604M**				4.28	1.18			0.62		
	Fine Screw	0.75 in	**4603**				2.50	0.88			0.59		
	Imperial Micrometer	0.50 in	**4702**				2.68	0.89			0.55		
		1.0 in	**4704**				4.28	1.18			0.62		
	Metric Micrometer	13 mm	**4702M**	106	1.2	5.00	2.68	0.89	1.00	—	0.55	1.19	6
		25 mm	**4704M**				4.28	1.18			0.62		
	Fine Screw	0.75 in	**4703**				2.50	0.88			0.59		
	Imperial Micrometer	0.50 in	**4802**				2.68	0.89			0.55		
		1.0 in	**4804**				4.28	1.18			0.62		
	Metric Micrometer	13 mm	**4802M**	123	1.5	6.00	2.68	0.89	0.50	1.00	0.55	1.69	10
		25 mm	**4804M**				4.28	1.18			0.62		
	Fine Screw	0.75 in	**4803**				2.50	0.88			0.59		
Metric	Metric Micrometer	13 mm	**M4602M**				(67,7)	(22,6)			(14,0)		
		25 mm	**M4604M**				(108,7)	(29,9)			(15,7)		
	Imperial Micrometer	0.50 in	**M4602**	(40)	(0,5)	(101,6)	(67,7)	(22,6)	(12,5)	—	(14,0)	(12,5)	6
		1.0 in	**M4604**				(108,7)	(29,9)			(15,7)		
	Fine Screw	0.75 in	**M4603**				(63,5)	(22,3)			(15,0)		
	Metric Micrometer	13 mm	**M4702M**				(67,7)	(22,6)			(14,0)		
		25 mm	**M4704M**				(108,7)	(29,9)			(15,7)		
	Imperial Micrometer	0.50 in	**M4702**	(48)	(0,6)	(127,0)	(67,7)	(22,6)	(25,0)	—	(14,0)	(25,0)	6
		1.0 in	**M4704**				(108,7)	(29,9)			(15,7)		
	Fine Screw	0.75 in	**M4703**				(63,5)	(22,3)			(15,0)		
	Metric Micrometer	13 mm	**M4802M**				(67,7)	(22,6)			(14,0)		
		25 mm	**M4804M**				(108,7)	(29,9)			(15,7)		
	Imperial Micrometer	0.50 in	**M4802**	(56)	(0,7)	(152,4)	(67,7)	(22,6)	(12,5)	(25,0)	(14,0)	(25,0)	10
		1.0 in	**M4804**				(108,7)	(29,9)			(15,7)		
	Fine Screw	0.75 in	**M4803**				(63,5)	(22,3)			(15,0)		

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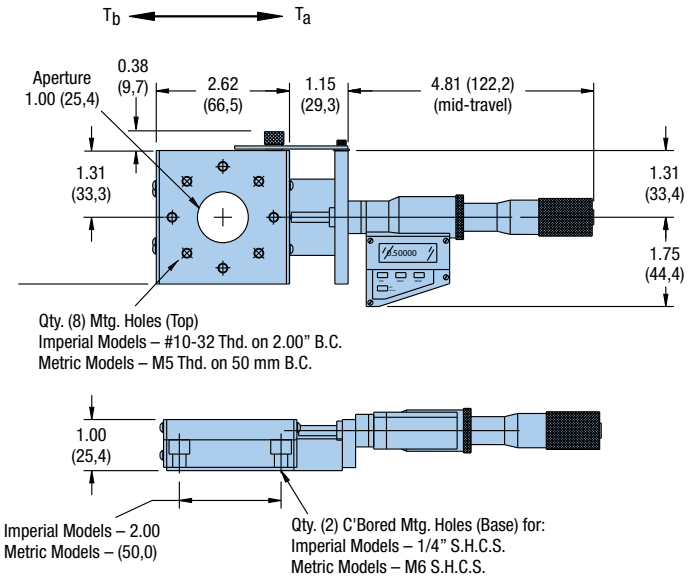
4500-DM/M4500-DM Series

Specifications	Imperial	Metric
Travel:	1.0 in	25 mm
Size:		
Width	2.62 in	66,5 mm
Length (mid-travel)	8.58 in	218,0 mm
Height	1.00 in	25,4 mm
Load:		
Normal	62 lbs	28 kg
Thrust – T_a	10 lbs	4,5 kg
Thrust – T_b	2 lbs	0,9 kg
Moment – Yaw, Pitch, Roll	See page 87	See page 87
Straight line accuracy:	0.00008 in/in of travel	2 µm/25 mm of travel
Micrometer graduations:	0.00005 in	0,001 mm
Weight:	1.4 lbs/axis	0,63 kg/axis
Construction:	Aluminum top and base/ 440C stainless steel bearings	
Mounting surface:	Precision machined	
Finish:	Black anodize	

For additional end view dimensions, refer to the 4500/M4500 ball slide drawing, page 23. Consult factory for critical dimension concerns.



Dimensions in (mm)



	Style	Model
Imperial	Solid Top	4504-DM
	Aperture (1.0 in)	4508-DM
Metric	Solid Top	M4504-DM
	Aperture (25,4 mm)	M4508-DM

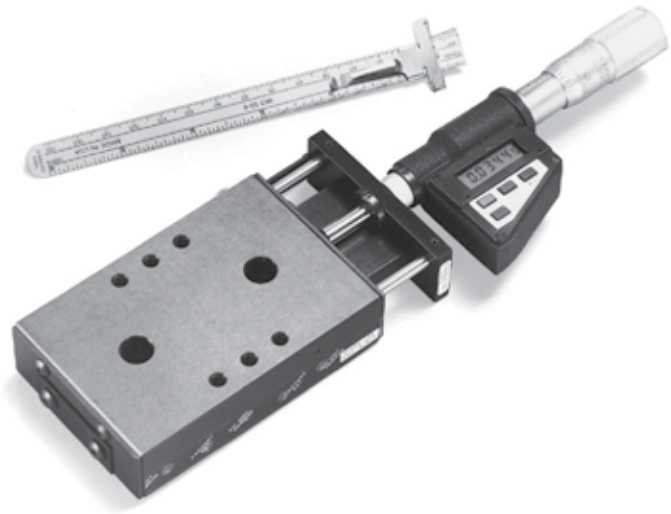
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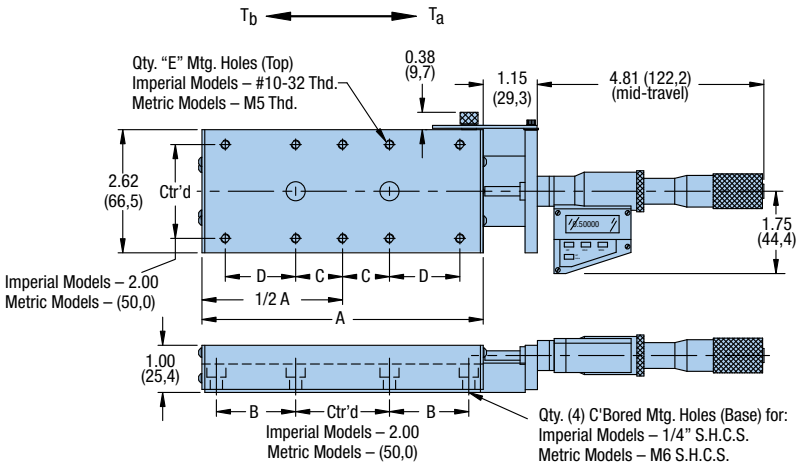
4600-DM/M4600-DM, 4700-DM/M4700-DM, 4800-DM/M4800-DM Series

For additional end view dimensions, refer to the 4600-4800/M4600-4800 ball slide drawing, page 24. Consult factory for critical dimension concerns.

Specifications	Imperial	Metric
Travel:	1.0 in	25 mm
Size:		
Width	2.62 in	66,5 mm
Length (mid-travel)	9.96 – 11.96 in	253,1 – 303,9 mm
Height	1.00 in	25,4 mm
Load:		
Normal	88 – 123 lbs	40 – 56 kg
Thrust – T_a	30 lbs	13,6 kg
Thrust – T_b	2 lbs	0,9 kg
Moment – Yaw, Pitch, Roll	See page 87	See page 87
Straight line accuracy:	0.00008 in/in of travel	2 µm/25 mm of travel
Micrometer graduations:	0.00005 in	0,001 mm
Weight:	1.6 – 2.0 lbs/axis	0,73 – 0,91 kg/axis
Construction:	Aluminum top and base/ 440C stainless steel bearings	
Mounting surface:	Precision machined	
Finish:	Black anodize	



Dimensions in (mm)



	Model	Load	Weight	Dimensions — in (mm) A	B	C	D	Qty E
Imperial	**4604-DM**	88 lbs	1.6 lbs	4.00	0.69	0.50	—	6
	4704-DM	106 lbs	1.8 lbs	5.00	1.19	1.00	—	6
	4804-DM	123 lbs	2.0 lbs	6.00	1.69	0.50	1.00	10
Metric	**M4604-DM**	40 kg	0,73 kg	(101,6)	(12,5)	(12,5)	—	6
	M4704-DM	48 kg	0,82 kg	(127,0)	(25,0)	(25,0)	—	6
	M4804-DM	56 kg	0,91 kg	(152,4)	(25,0)	(12,5)	(25,0)	10

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Width: 5.00” (127,0 mm) Mounting: Imperial & Metric

4400/M4400 Series

Specifications	Imperial	Metric
Travel:	1.0 – 2.0 in	25 – 50 mm
Size:		
Width	5.00 in	127,0 mm
Length (mid-travel)	6.0 – 11.28 in	152,4 – 286,0 mm
Height	1.00 in	25,4 mm
Load:		
Normal	105 lbs	48 kg
Thrust – T_a	30 lbs	13,6 kg
Thrust – T_b	2.5 lbs	1,1 kg
Moment – Yaw, Pitch, Roll	See page 88	See page 88
Straight line accuracy:	0.00008 in/in of travel	2 µm/25 mm of travel
Micrometer graduations:	0.001 in	0,01 mm
Weight:	2.7 lbs/axis	1,2 kg/axis
Z-Axis bracket options: (See page 124-127)	4499	M4499
Construction:	Aluminum top and base/ 440C stainless steel bearings	
Mounting surface:	Precision machined	
Finish:	Black anodize	



	Style	Drive Mechanism	Travel	Center Drive Models: Single Axis	Center Drive Models: Two Axis	Center Drive Models: Three Axis	Side Drive Models: Single Axis	Side Drive Models: Two Axis	Side Drive Models: Three Axis
Imperial	Solid Top	Imperial Micrometer	1.0 in	4411	4421	4431	4416	4426	4436
			2.0 in	4412	4422	4432	4417	4427	4437
		Metric Micrometer	25 mm	4413	4423	4433	4418	4428	4438
			50 mm	4414	4424	4434	4419	4429	4439
	Aperture (2.0 in)	Imperial Micrometer	1.0 in	4451	4461	4471	4456	4466	4476
			2.0 in	4452	4462	4472	4457	4467	4477
		Metric Micrometer	25 mm	4453	4463	4473	4458	4468	4478
			50 mm	4454	4464	4474	4459	4469	4479
Metric	Solid Top	Metric Micrometer	25 mm	M4413	M4423	M4433	M4418	M4428	M4438
			50 mm	M4414	M4424	M4434	M4419	M4429	M4439
		Imperial Micrometer	1.0 in	M4411	M4421	M4431	M4416	M4426	M4436
			2.0 in	M4412	M4422	M4432	M4417	M4427	M4437
	Aperture (50,8 mm)	Metric Micrometer	25 mm	M4453	M4463	M4473	M4458	M4468	M4478
			50 mm	M4454	M4464	M4474	M4459	M4469	M4479
		Imperial Micrometer	1.0 in	M4451	M4461	M4471	M4456	M4466	M4476
			2.0 in	M4452	M4462	M4472	M4457	M4467	M4477

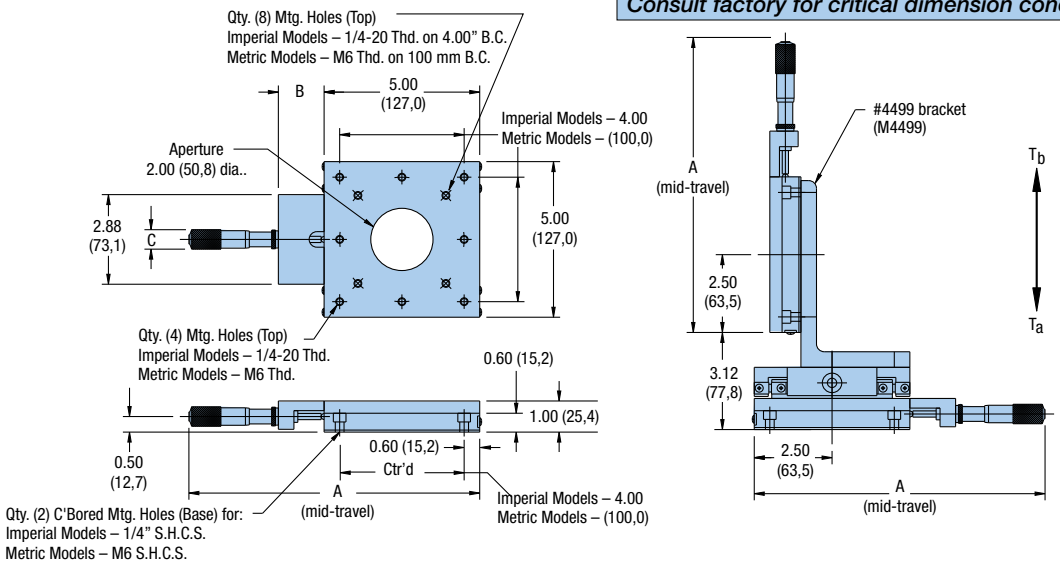
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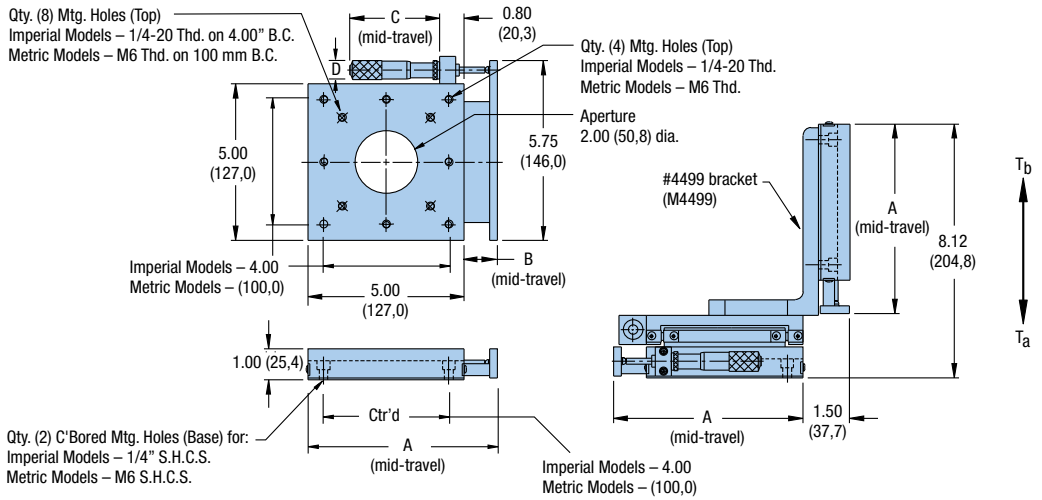
Dimensions in (mm)

For additional end view dimensions, refer to the 4400/M4400 ball slide drawing, page 26. Consult factory for critical dimension concerns.

Center Drive



Side Drive



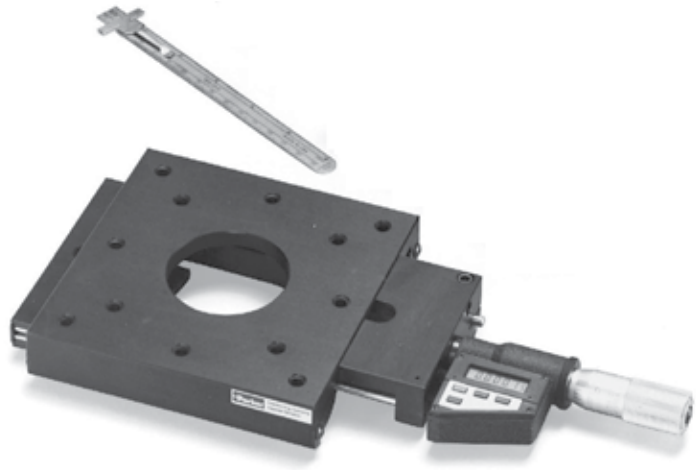
	Style	Drive Mechanism	Travel	Center Drive Dimensions – in (mm) A	B	C	Side Drive Dimensions – in (mm) A	B	C	D
Imperial	Solid Top	Imperial Micrometer	1.0 in	9.28	1.47	0.73	6.0	1.00	2.84	0.73
			2.0 in	11.26	1.98	0.63	6.5	1.53	4.36	0.63
		Metric Micrometer	25 mm	9.28	1.47	0.71	6.0	1.00	2.84	0.71
			50 mm	11.28	2.00	0.73	6.5	1.50	4.36	0.73
	Aperture	Imperial Micrometer	1.0 in	9.28	1.47	0.73	6.0	1.00	2.84	0.73
			2.0 in	11.28	2.00	0.63	6.5	1.50	4.36	0.63
		Metric Micrometer	25 mm	9.28	1.47	0.71	6.0	1.00	2.84	0.71
			50 mm	11.28	2.00	0.73	6.5	1.50	4.36	0.73
Metric	Solid Top	Metric Micrometer	25 mm	(236,0)	(37,4)	(18,5)	(152,4)	(25,4)	(72,0)	(18,5)
			50 mm	(286,0)	(50,3)	(16,0)	(166,0)	(38,9)	(110,8)	(16,0)
		Imperial Micrometer	1.0 in	(236,0)	(38,0)	(18,0)	(152,4)	(25,0)	(72,0)	(18,0)
			2.0 in	(286,0)	(50,0)	(18,5)	(166,0)	(38,0)	(110,8)	(18,5)
	Aperture	Metric Micrometer	25 mm	(236,0)	(38,0)	(18,5)	(152,4)	(25,0)	(72,0)	(18,5)
			50 mm	(286,0)	(50,0)	(16,0)	(166,0)	(38,0)	(110,8)	(16,0)
		Imperial Micrometer	1.0 in	(236,0)	(38,0)	(18,0)	(152,4)	(25,0)	(72,0)	(18,0)
			2.0 in	(286,0)	(50,0)	(18,5)	(166,0)	(38,0)	(110,8)	(18,5)

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4400-DM/M4400-DM Series

Specifications	Imperial	Metric
Travel:	1.0 – 2.0 in	25 – 50 mm
Size:		
Width	5.00 in	127,0 mm
Length (mid-travel)		
1.0” (25 mm)	11.28 in	286.5 mm
2.0” (50 mm)	14.16 in	542.1 mm
Height	1.00 in	25,4 mm
Load:		
Normal	105 lbs	48 kg
Thrust – T_a	30 lbs	13,6 kg
Thrust – T_b	2.0 lbs	0,9 kg
Moment – Yaw, Pitch, Roll	See page 88	See page 88
Straight line accuracy:	0.00008 in/in of travel	2 µm/25 mm of travel
Micrometer graduations:	0.00005 in	0,001 mm
Weight:	3.1 lbs/axis	1,4 kg/axis
Construction:	Aluminum top and base/ 440C stainless steel bearings	
Mounting surface:	Precision machined	
Finish:	Black anodize	





	Style	Model	Travel
Imperial	**Solid Top**	4410-DM	1.0 in
		4412-DM	2.0 in
	Aperture (1.0 in)	4450-DM	1.0 in
		4452-DM	2.0 in
Metric	**Solid Top**	M4410-DM	25 mm
		M4412-DM	50 mm
	Aperture (25,4 mm)	M4450-DM	25 mm
		M4452-DM	50 mm

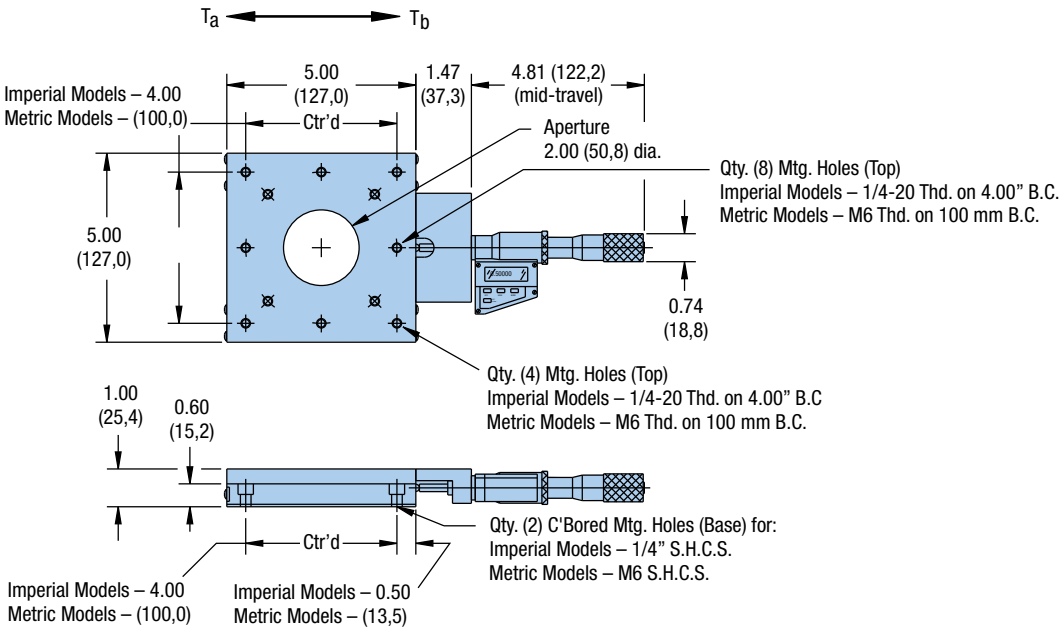
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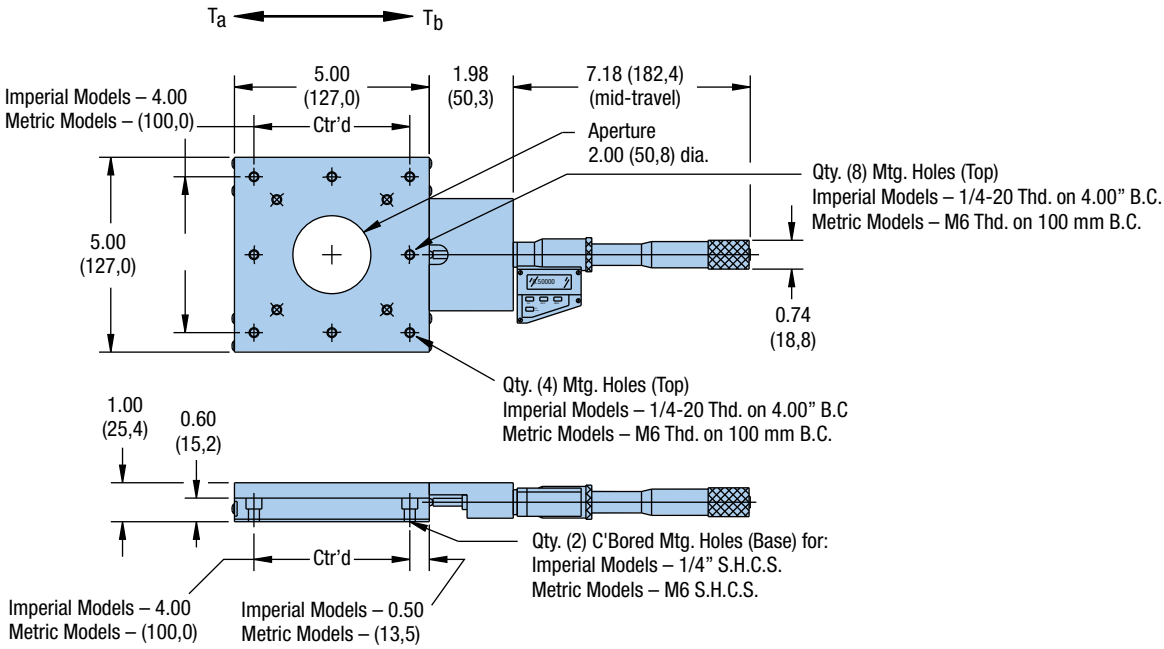
Dimensions in (mm)

For additional end view dimensions, refer to the 4400/M4400 ball slide drawing, page 26. Consult factory for critical dimension concerns.

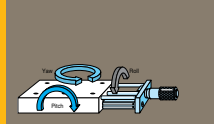
1.0 in (25 mm) Travel Models



2.0 in (50 mm) Travel Models

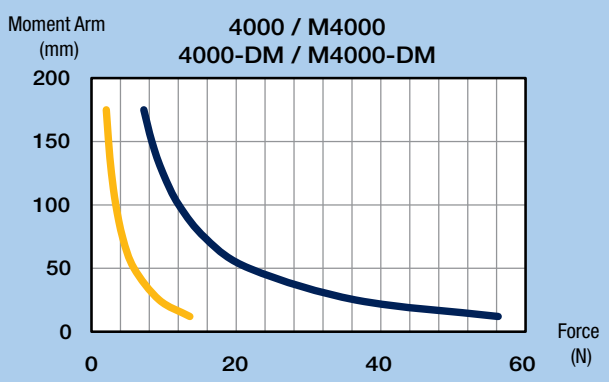


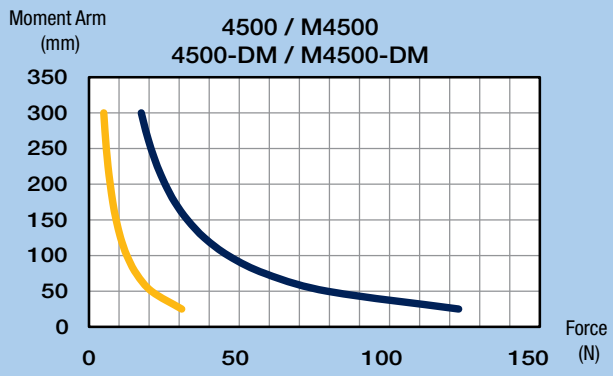
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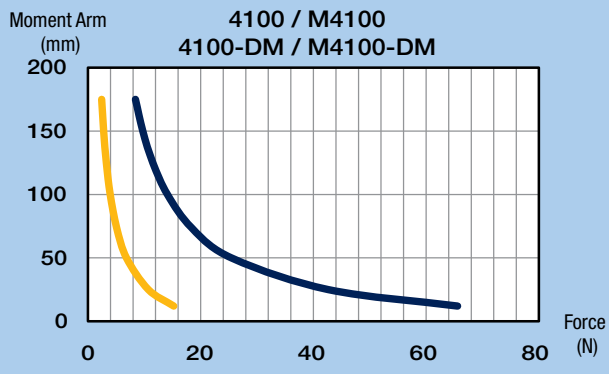


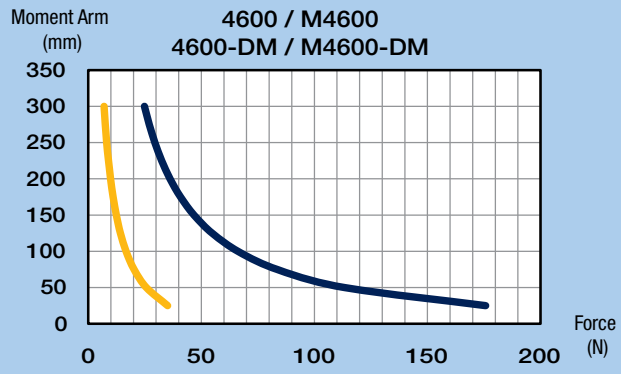
Yaw, Pitch, Roll

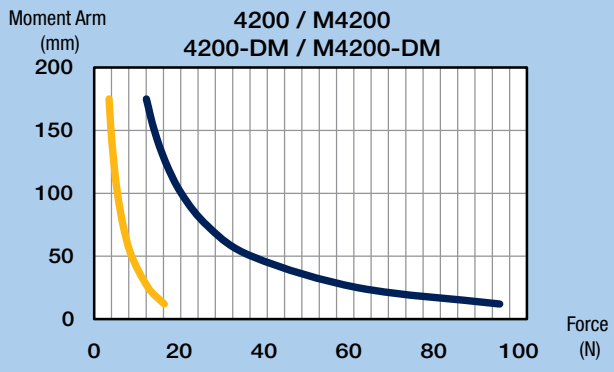
Yaw & Pitch Roll

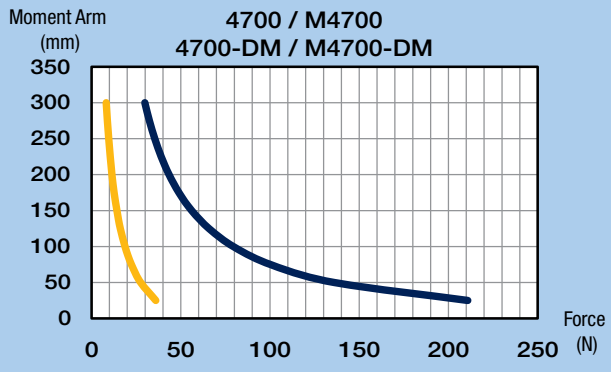


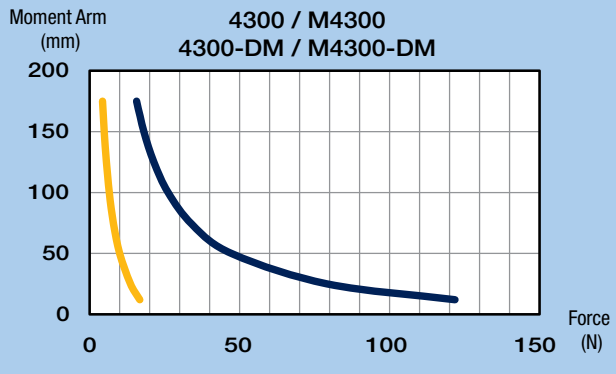


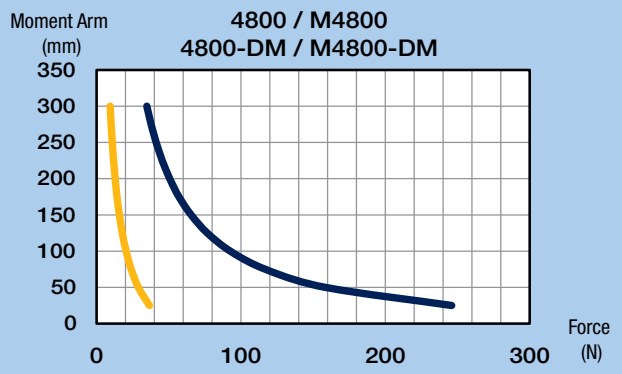












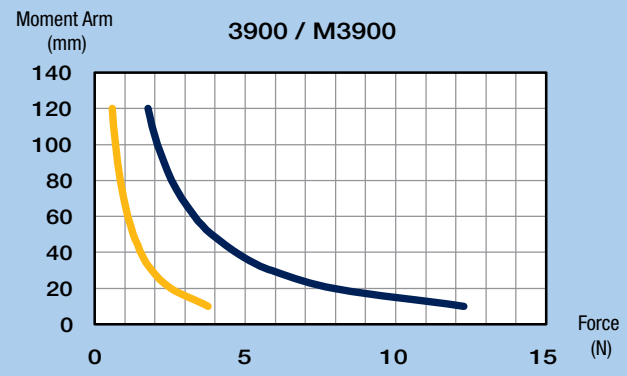
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Ball Bearing Positioner Performance

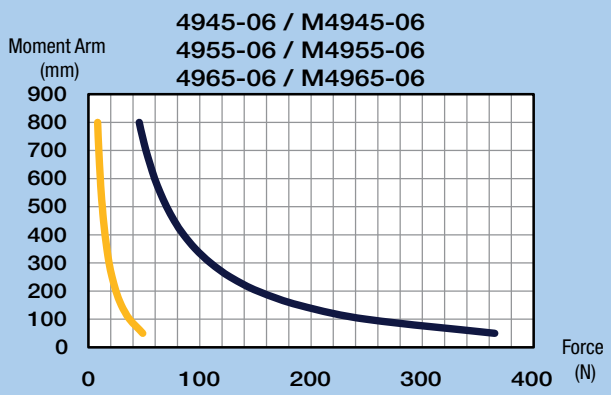
Yaw, Pitch, Roll

Yaw & Pitch Roll

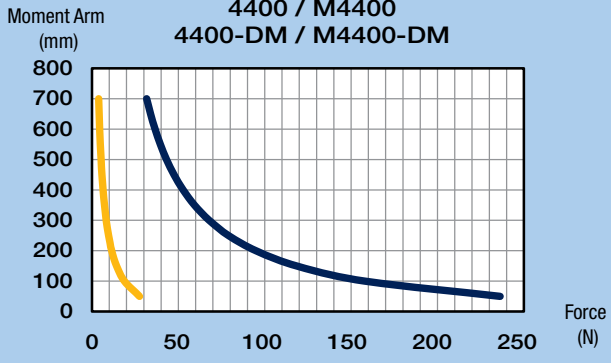
3900 / M3900



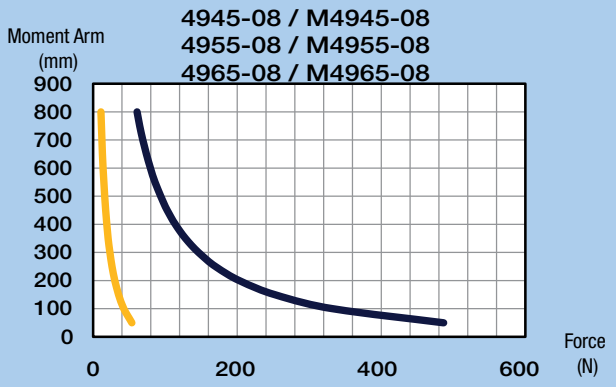
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4955-06 / M4955-06
4965-06 / M4965-06



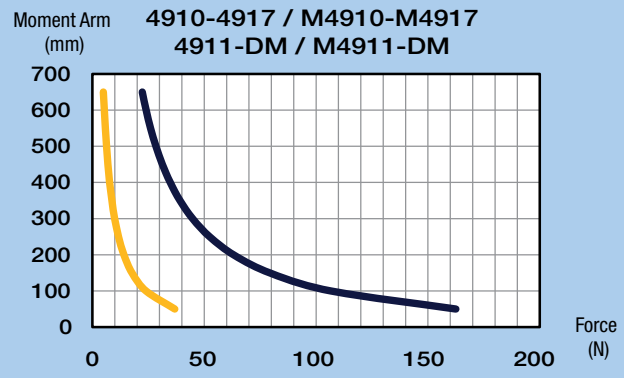
4400 / M4400
4400-DM / M4400-DM



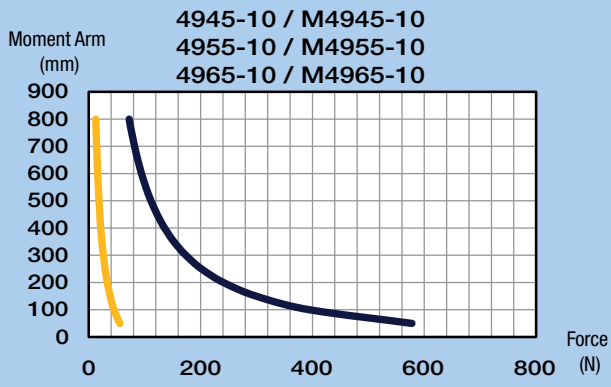
4945-08 / M4945-08
4955-08 / M4955-08
4965-08 / M4965-08



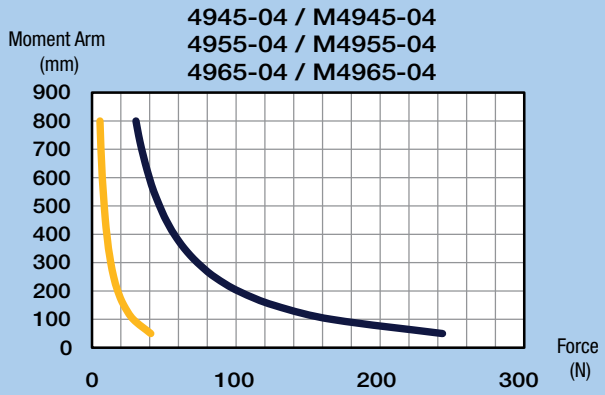
4910-4917 / M4910-M4917
4911-DM / M4911-DM



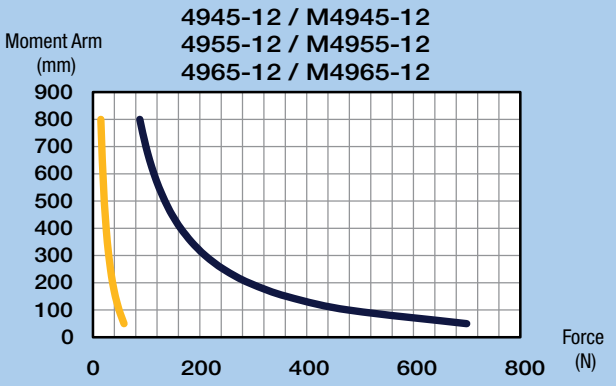
4945-10 / M4945-10
4955-10 / M4955-10
4965-10 / M4965-10



4945-04 / M4945-04
4955-04 / M4955-04
4965-04 / M4965-04



4945-12 / M4945-12
4955-12 / M4955-12
4965-12 / M4965-12



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Accessories
for linear and rotary positioners

Parker Daedal offers a complete line of Z-axis brackets to combine ball bearing and cross roller stages into three axis positioning systems. We also offer drive mechanisms in an assortment of standard and digital micrometer heads, fine adjustment screws, and differential screws. Optical components including beam directors, optical mounts, mirror mounts and optical cells are also available.

Contents

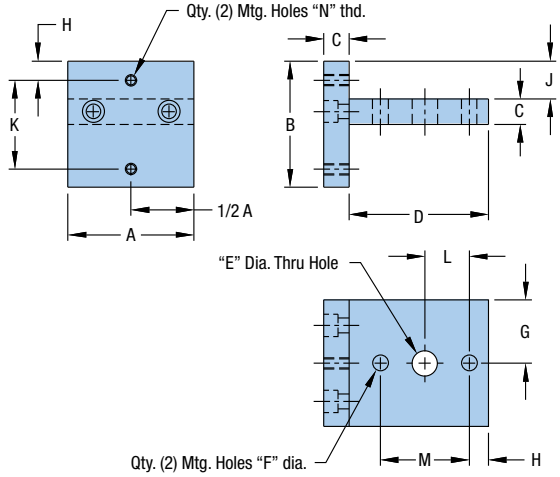
124-127	Z-Axis Brackets
128-129	Micrometer Heads
130-132	Optical Mounts

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Z-Axis Brackets

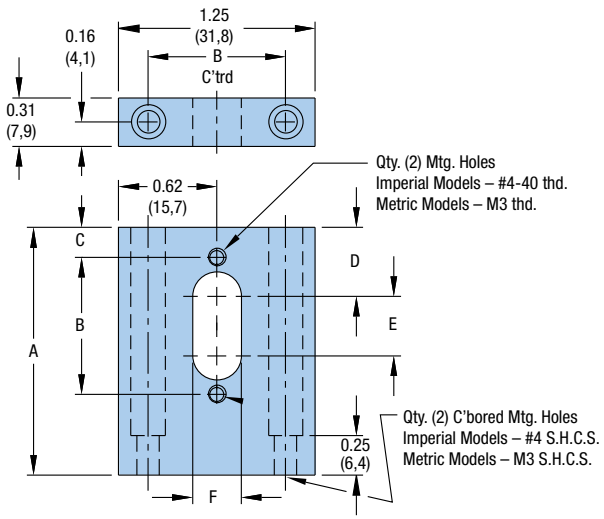


3909, 3959, 4009, 4509
M3909, M3959, M4009, M4509



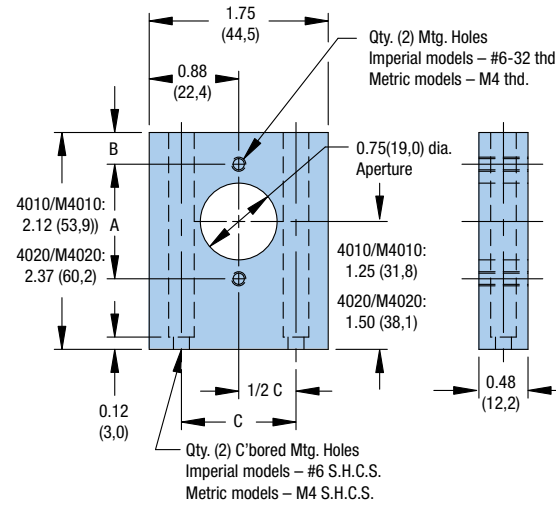
	Model	Dimensions – in (mm) A	B	C	D	E	F	G	H	J	K	L	M	Thd. N
Imperial	3909	1.25	1.25	0.25	1.38	0.25	0.156	0.62	0.19	0.38	0.88	0.44	0.88	#4-40
	3959	1.25	1.25	0.25	1.38	0.25	0.156	0.62	0.19	0.04	0.88	0.44	0.88	#4-40
	4009	1.75	1.69	0.25	1.88	—	0.156	0.88	0.31	0.63	1.12	—	1.12	#6-32
	4509	2.44	2.62	0.38	2.75	—	0.218	1.22	0.31	0.93	2.00	—	2.00	#10-32
Metric	M3909	(31,8)	(31,8)	(6,4)	(35,1)	(6,4)	(4,0)	(15,7)	(5,9)	(9,7)	(20,0)	(10,0)	(20,0)	M3
	M3959	(31,8)	(31,8)	(6,4)	(35,1)	(6,4)	(4,0)	(15,7)	(5,9)	(1,0)	(20,0)	(10,0)	(20,0)	M3
	M4009	(44,5)	(42,9)	(6,4)	(47,8)	—	(4,8)	(22,4)	(7,3)	(16,0)	(30,0)	—	(30,0)	M4
	M4509	(62,0)	(66,5)	(9,7)	(69,9)	—	(7,3)	(31,0)	(8,4)	(23,6)	(50,0)	—	(50,0)	M6

3910, 3960
M3910, M3960



	Model	Dimensions – in (mm) A	B	C	D	E	F
Imperial	3910	1.58	0.88	0.19	0.44	0.38	0.31
	3960	2.33					
Metric	M3910	(40,1)	(20,0)	(5,9)	(12,3)	(7,1)	(6,4)
	M3960	(59,2)					

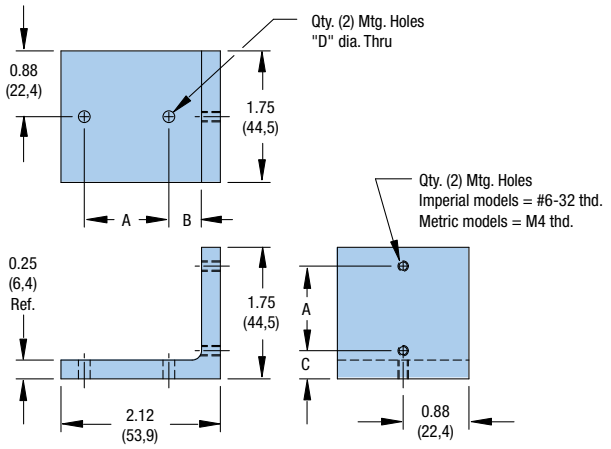
4010, 4020
M4010, M4020



	Model	Dimensions – in (mm) A	B	C
Imperial	4010	1.12	0.31	1.12
Metric	M4010	(30,0)	(7,1)	(30,0)

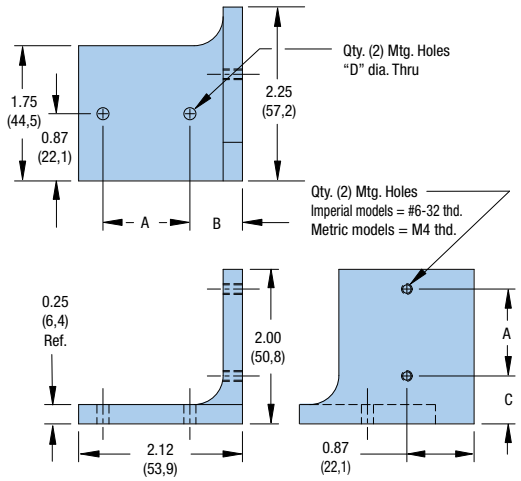
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4059
M4059



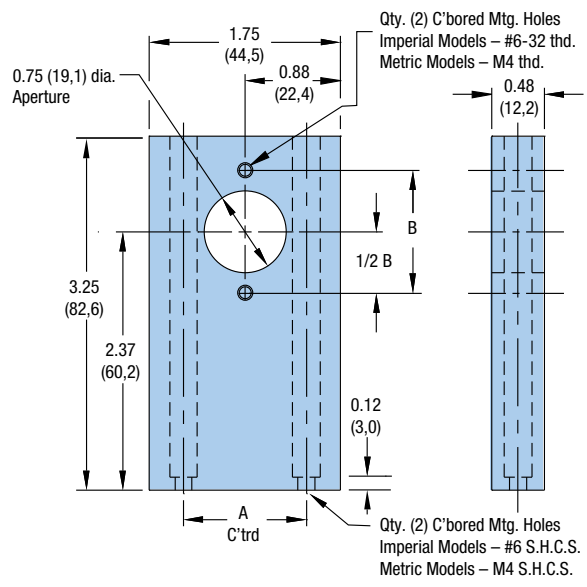
	Model	Dimensions – in (mm) A	B	C	D
Imperial	4059	1.12	0.68	0.38	0.16
Metric	M4059	(30,0)	(16,8)	(8,8)	(4,8)

4059A
M4059A
For 1.00 inch (25,0 mm) Travel Micrometer Option



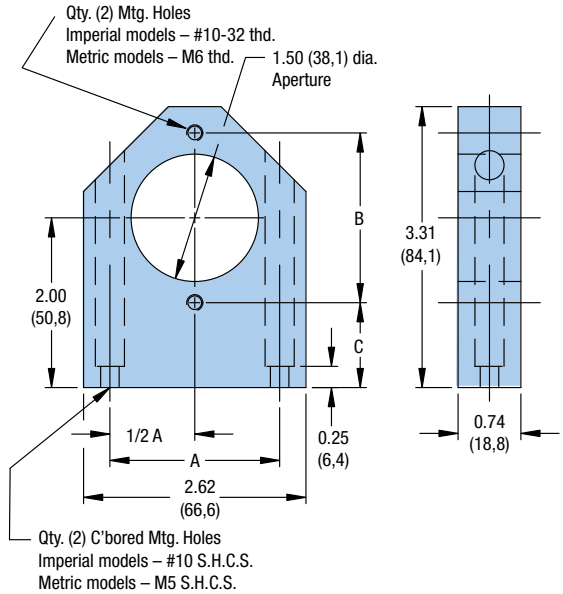
	Model	Dimensions – in (mm) A	B	C	D
Imperial	4059A	1.12	0.68	0.62	0.16
Metric	M4059A	(30,0)	(16,8)	(15,2)	(4,8)

4060
M4060



	Model	Dimensions – in (mm) A	B
Imperial	4060	1.13	1.13
Metric	M4060	(30,0)	(30,0)

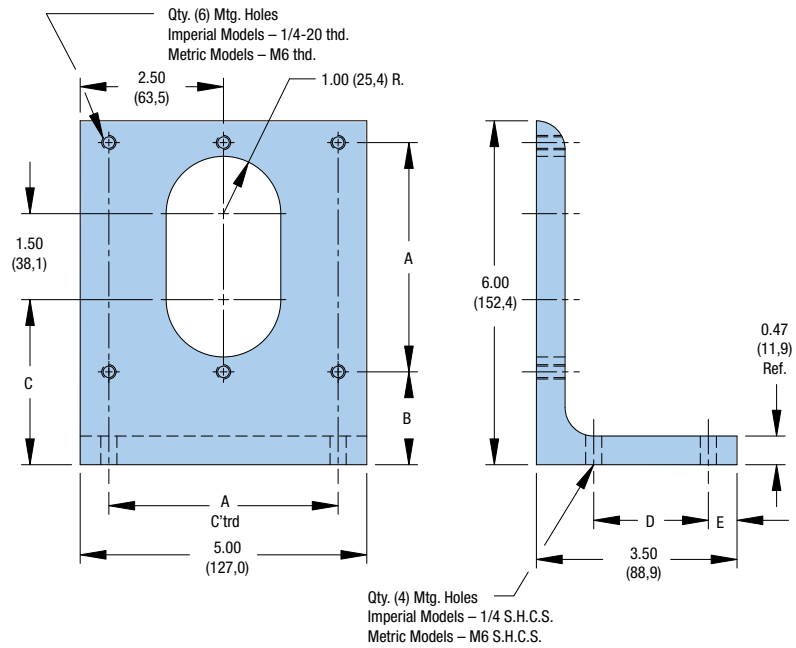
4510
M4510



	Model	Dimensions – in (mm) A	B	C
Imperial	4510	2.00	2.00	1.00
Metric	M4510	(50,0)	(50,0)	(25,8)

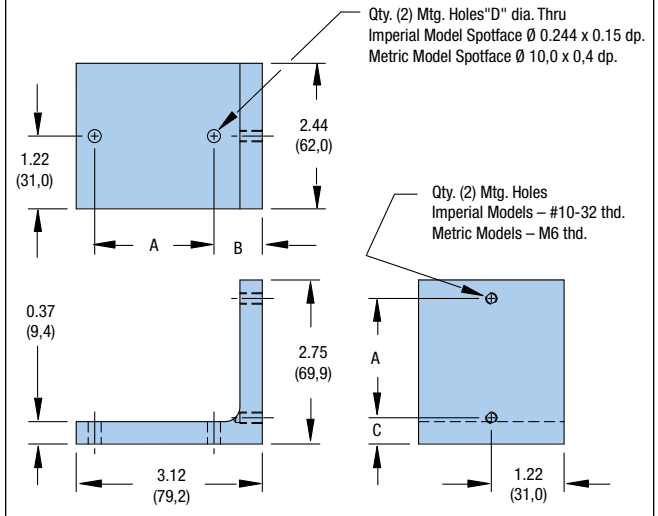
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4499
M4499



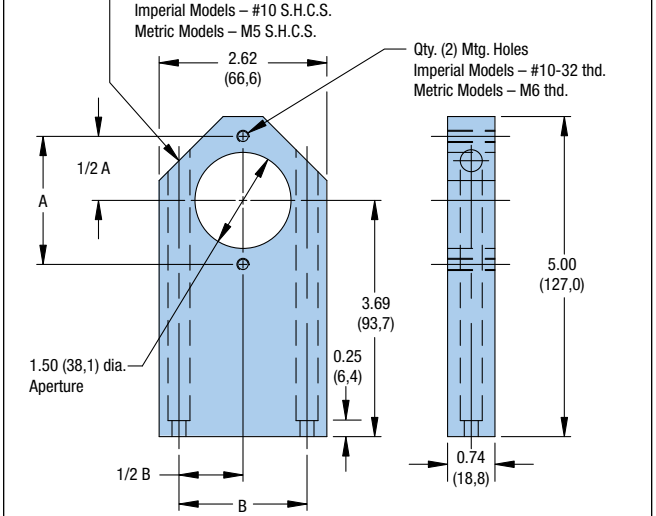
		Dimensions – in (mm)				
	Model	A	B	C	D	E
Imperial	4499	4.00	1.62	2.88	2.00	0.50
Metric	M4499	(100,0)	(40,5)	(71,4)	(50,0)	(13,1)

4559
M4559



		Dimensions – in (mm)			
	Model	A	B	C	D
Imperial	4559	2.00	0.81	0.44	0.22
Metric	M4559	(50,0)	(20,9)	(11,5)	(5,5)

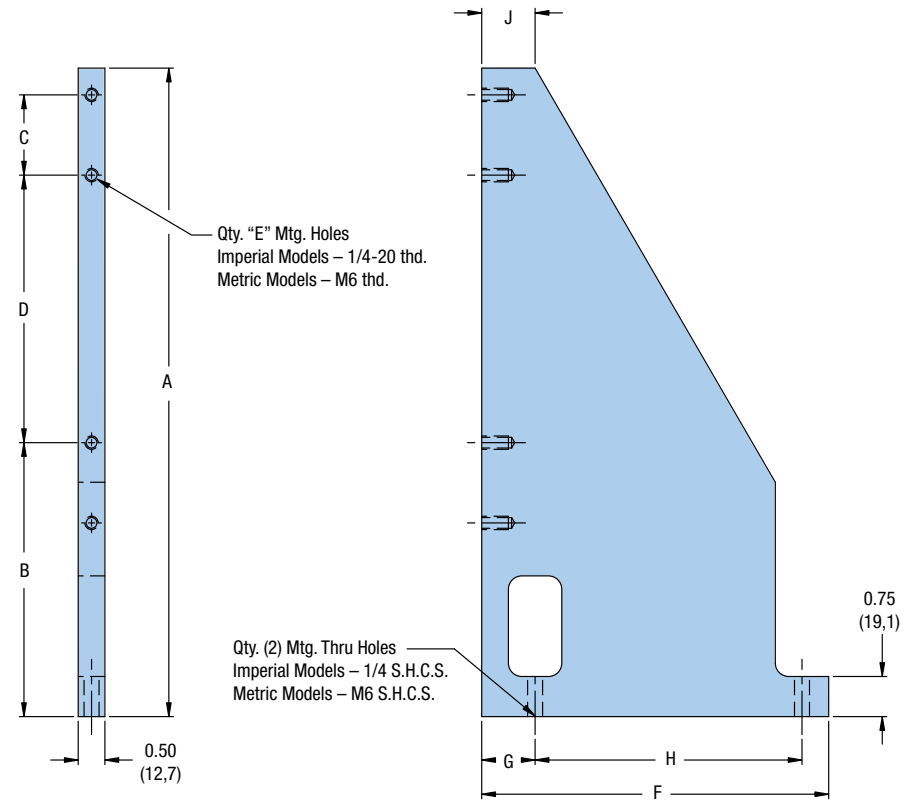
4560
M4560



		Dimensions – in (mm)	
	Model	A	B
Imperial	4560	2.00	2.00
Metric	M4560	(50,0)	(50,0)

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4990-02 – 4990-12
M4990-02 – M4990-12



	Dimensions – in (mm)								
	Model	A	B	C	D	E	F	G	H	J
Imperial	**4990-02**	6.00	1.50	–	4.00	2	5.50	1.00	4.00	1.00
	4990-04	8.12	2.62	–	5.00	2	6.50	1.00	5.00	1.00
	4990-06	12.12	5.12	1.5	5.00	4	6.50	1.00	5.00	1.00
	4990-08	17.12	8.62	3.0	5.00	4	6.75	1.25	5.00	1.50
	4990-10	20.50	10.00	4.0	6.00	4	6.75	1.25	5.00	1.50
	4990-12	24.12	11.62	5.0	7.00	4	6.50	1.00	5.00	1.00
Metric	**M4990-02**	(152,4)	(38,9)	–	(100,0)	2	(139,7)	(26,2)	(100,0)	(25,4)
	M4990-04	(206,2)	(67,6)	–	(125,0)	2	(165,1)	(26,4)	(125,0)	(25,4)
	M4990-06	(307,8)	(131,2)	(37,5)	(125,0)	4	(165,1)	(26,4)	(125,0)	(25,4)
	M4990-08	(434,8)	(220,0)	(75,0)	(125,0)	4	(171,5)	(32,8)	(125,0)	(38,1)
	M4990-10	(520,7)	(255,2)	(100,0)	(150,0)	4	(171,5)	(32,8)	(125,0)	(38,1)
	M4990-12	(612,6)	(296,6)	(125,0)	(175,0)	4	(171,5)	(32,8)	(125,0)	(38,1)

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9510-9530 Series Micrometer Heads

Parker Daedal micrometer heads are recommended for any application requiring micrometer accuracy in settings and adjustment. These units feature a hardened and ground spindle, easy-to-read graduations, and an attractive non-glare satin chrome finish.



9511E
9511M

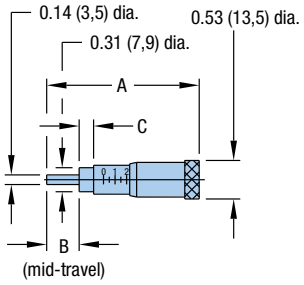


Figure A
Mini Thimble MIcrometer Head

9512E, 9524E, 9526E
9512M, 9524M, 9526M

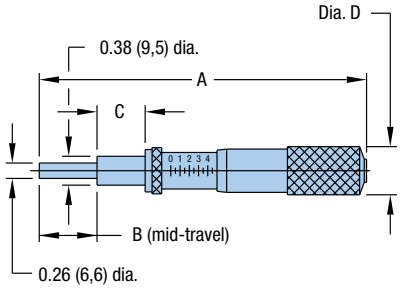


Figure B
Standard Thimble MIcrometer Head

9531E, 9532E
9531M, 9532M

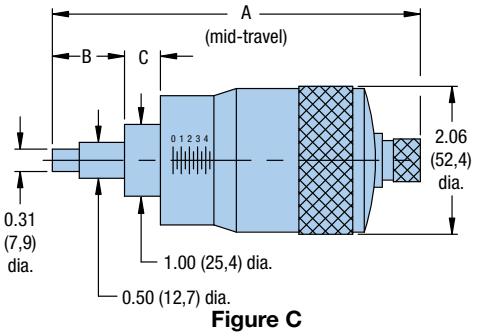


Figure C
Large Thimble MIcrometer Head

	Model Number	Figure	Travel in (mm)	Graduations in (mm)	Dimensions – in (mm) A	B	C	D
Imperial	9511E	A	0.50	0.001	2.03	0.50	0.187	—
	9512E	B	0.50	0.001	2.63	0.50	0.375	0.54
	9524E	B	1.00	0.001	4,23	0.75	0.625	0.73
	9526E	B	2.00	0.001	6.16	1.25	0.625	0.73
	9531E	C	1.00	0.0001	5.18	0.94	0.56	—
	9532E	C	2.00	0.0001	7.18	1.44	0.56	—
Metric	9511M	A	(13)	(0,01)	(51,6)	(13,0)	(4,7)	—
	9512M	B	(13)	(0,01)	(66,8)	(13,0)	(9,5)	(13,7)
	9524M	B	(25)	(0,01)	(107,4)	(19,0)	(15,9)	(18,5)
	9526M	B	(50)	(0,01)	(156,5)	(32,0)	(15,9)	(18,5)
	9531M	C	(25)	(0,002)	(131,6)	(23,9)	(14,2)	—
	9532M	C	(50)	(0,002)	(182,4)	(36,6)	(14,2)	—

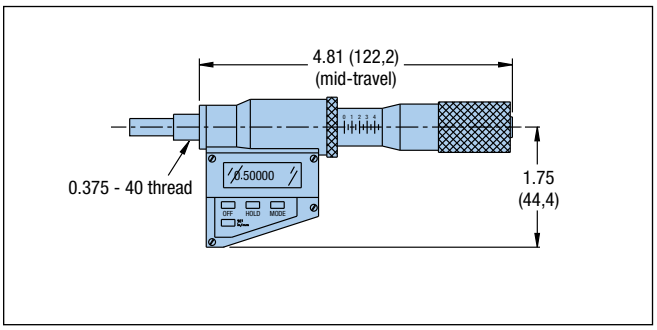
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9550 Series Digital Micrometer Heads

Model 9551

The 9551 precision electronic digital micrometer head provides an LCD readout to 0.00005 inch resolution. The micrometer features:

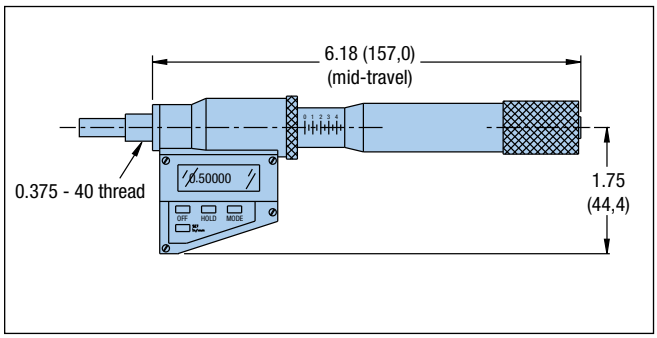
- Incremental and/or absolute positioning modes
- Zero set at any position, inch and millimeter readout (0.001 mm resolution), display hold, and automatic shutdown after two hours to conserve the integral battery
- 1.00 inch micrometer travel
- Battery powered for 500 hours of use



Model 9552

The 9552 precision electronic digital micrometer offers a 0 – 2 inch travel range with a 0.00005 inch resolution. Features include:

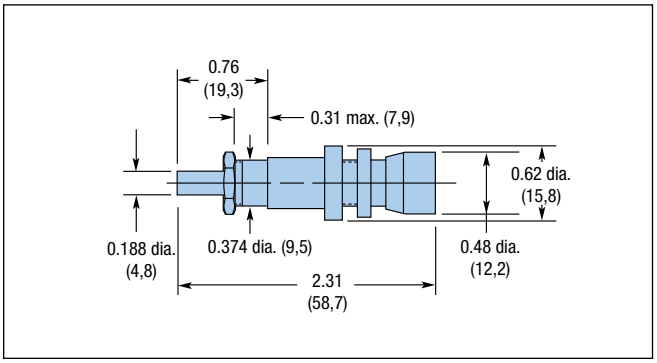
- 2 inch spindle
- Display face swivels for easy reading at various angles
- Non-rotating spindle
- Pre-set, zero, and inch/mm
- Carbide tipped measuring face
- Battery powered for 5,000 hours of use



9560 Series Differential Screws

Model 9560: 0.75 in Range

The 9560 differential screw offers two linear adjustment ranges in one unit: a coarse adjustment range of 0.31 in (8 mm) with a 48-pitch thread and a fine adjustment range of 0.078 in (2 mm) with a pitch equal to 336 threads per inch. The 9560 is interchangeable with 9511 – 9532 series micrometer heads.

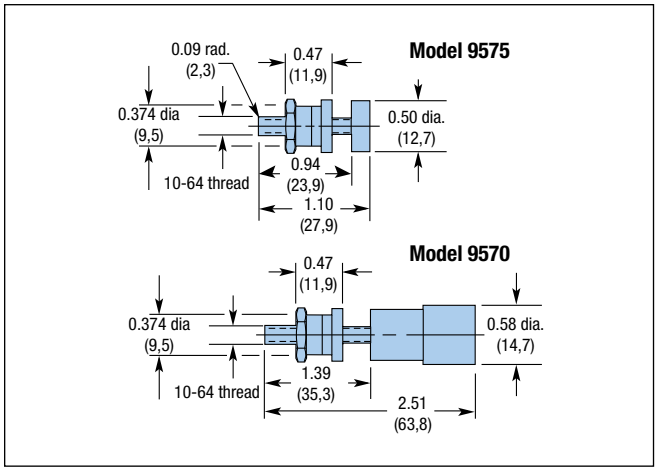


9570 Series Fine Adjsutment Screws

Model 9570: 0.75 in Range

Model 9575: 0.50 in Range

These steel adjustment screws feature a 64-pitch thread, making them ideal for applications where finer resolution is required, but positional readout is not. These screws are easily interchanged with the 9511 – 9532 series micrometer heads.



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Optical Cell Mounts

Model 2350: 6.0” Diameter

Model 2355: 7.0” Diameter

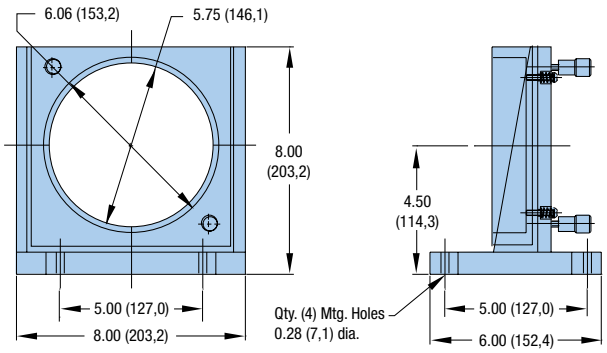
Model 2360: 8.0” Diameter

Model 2365: 9.0” Diameter

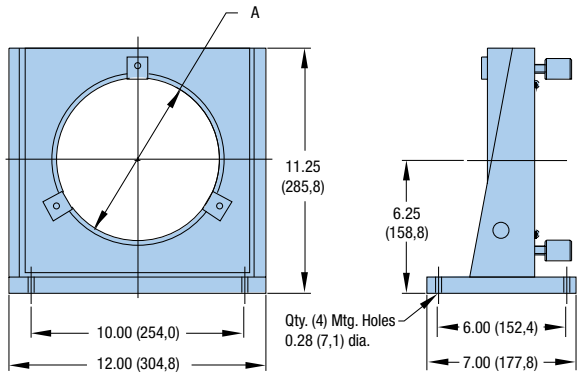
Parker Daedal optical mounts are highly stable, adjustable mounts for optics up to 9” in diameter and 1.25” thick. These mounts feature precise kinematic ball pivot adjustment on two axes, with orthogonal three-point suspension.



Model 2350



Models 2355, 2360, 2365



Specifications	2350	2355	2360	2365
Optic Size Opening – in (mm)				
Dimension “A” Dia. max.:	6.03 (153,1)	7.06 (179,3)	8.06 (204,7)	9.06 (230,1)
Thickness:	1.00 (25,4)	1.25 (31,75)	1.25 (31,7)	1.25 (31,7)
Optic Retention:	Threaded retainer	3 mounting clips	3 mounting clips	3 mounting clips
Range:	5°	5°	5°	5°
Resolution:	0.5 arc-sec	0.5 arc-sec	0.5 arc-sec	0.5 arc-sec
Adjustment:	2 – 64-pitch screws	3 – 32-pitch screws	3 – 32-pitch screws	3 – 32-pitch screws
Weight:	7.5 lb (16,5 kg)	20 lb (44 kg)	20 lb (44 kg)	20 lb (44 kg)
Construction:	Aluminum/stainless steel			
Finish:	Black anodize			

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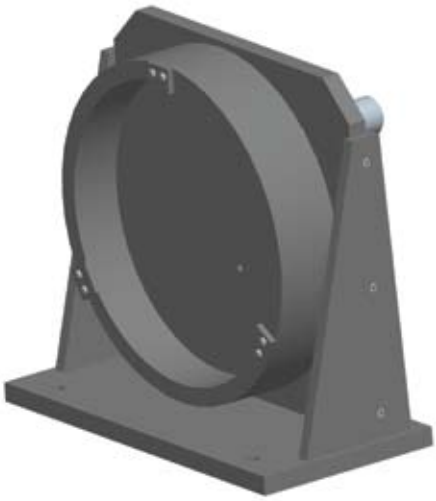
Optical Cell Mounts

Model 2370/2371: 10.0” Diameter

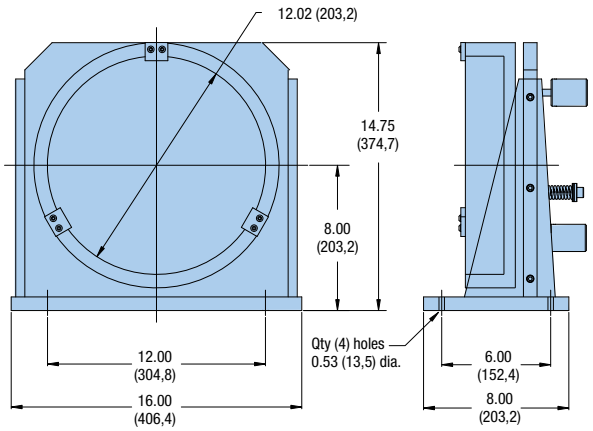
Model 2375/2376: 11.0” Diameter

Model 2380/2381: 12.0” Diameter

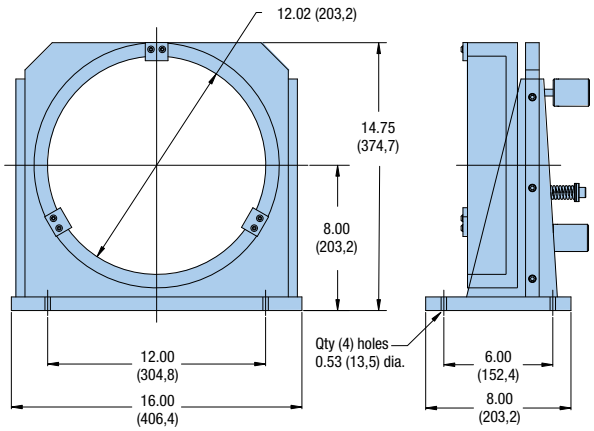
Parker Daedal optical mounts are highly stable, adjustable mounts for optics up to 12” in diameter and 2.0” thick. These mounts feature precise kinematic ball pivot adjustment on two axes, with orthogonal three-point suspension. Solid back models are designed to support reflective optics.



Models 2370, 2375, 2380



Models 2371, 2376, 2381



Specifications	Solid Back Models			Aperture Models		
	2370	2375	2380	2371	2376	2381
Optic Size Opening – in (mm)						
Dimension “A” Dia. max.:	10.02 (254,5)	11.02 (379,9)	12.02 (305,3)	10.06 (255,5)	11.06 (280,9)	12.06 (306,3)
Thickness:	2.00 (50,8)	2.00 (50,8)	2.00 (50,8)	2.00 (50,8	2.00 (50,8	2.00 (50,8
Optic Retention:	3 mounting clips			3 mounting clips		
Range:	7°			7°		
Resolution:	0.5 arc-sec			0.5 arc-sec		
Adjustment:	3 – 32-pitch screws			3 – 32-pitch screws		
Weight:	45 lb (99 kg)			41 lb (90 kg)		
Construction:	Aluminum/stainless steel			Aluminum/stainless steel		
Finish:	Black anodize			Black anodize		

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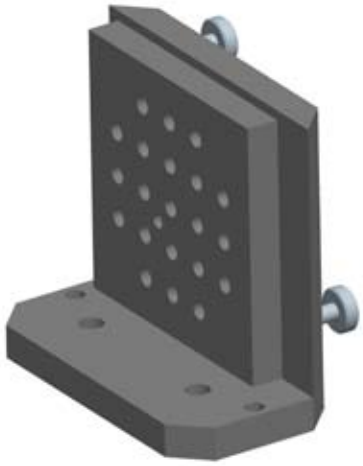
Mirror Mounts

Model 5000/5100: 3.0” Square Mounting Surface

Model 5300/5700: 4.5” Square Mounting Surface

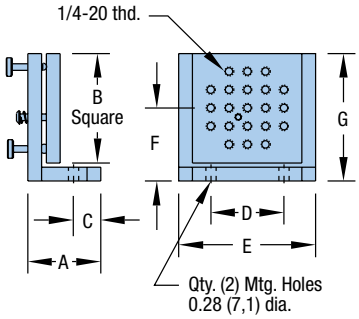
Model 5800/5900: 6.0” Square Mounting Surface

Parker Daedal mirror mounts are patterned with 1/4-20 holes on 0.5” or 1.0” centers to mount mirrors and other hardware. All models except the 5800 have two fine resolution 64-pitch adjustment screws to provide precise tilting of the mounting surface in two axes. The 5800 is equipped with three adjustment screws to provide precise tilting in two axes.

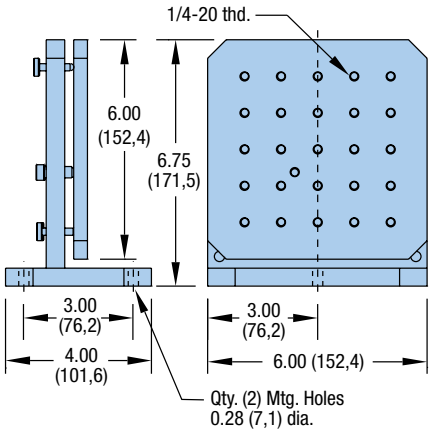


Specifications	Angled Base Models			Flat Base Models		
	5000	5300	5800	5100	5700	5900
Mounting Surface Size (Square) – in (mm) Holes – (Qty. x Center)	3.0 (76,2) 21 x 0.50”	4.5 (114,3) 49 x 0.50”	6.0 (152,4) 25 x 1.0”	3.0 (76,2) 21 x 0.50”	4.5 (114,3) 49 x 0.50”	6.0 (152,4) 25 x 1.0”
Range:	12°	8°	4°	12°	8°	4°
Resolution:	1.0 arc-sec	0.75 arc-sec	0.5 arc-sec	1.0 arc-sec	0.75 arc-sec	0.5 arc-sec
Weight – lb (kg)	1 (2,2)	2 (4,4)	4.1 (9)	0.7 (1,5)	1.6 (3,5)	3 (6,6)
Adjustment:	2 – 64-pitch screws (3 screws on 5800)			2 – 64-pitch screws		
Construction:	Aluminum/stainless steel			Aluminum/stainless steel		
Finish:	Black anodize			Black anodize		

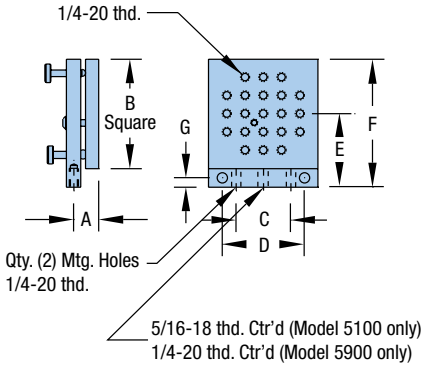
Models 5000, 5300



Models 5800



Models 5100, 5700, 5900



Model	Dimensions – in (mm)						
	A	B	D	D	E	F	G
5000	2.00 (50,8)	3.00 (76,2)	0.75 (19,1)	2.00 (50,8)	3.75 (95,3)	2.00 (50,8)	3.50 (88,9)
5300	3.00 (76,2)	4.50 (114,3)	1.25 (31,8)	4.00 (101,6)	4.50 (114,3)	2.88 (73,2)	5.12 (130,1)
5100	0.69 (17,5)	3.00 (76,2)	1.50 (38,1)	2.25 (57,2)	2.00 (50,8)	3.50 (88,9)	0.25 (6,4)
5700	0.69 (17,5)	4.50 (114,3)	3.00 (76,2)	3.75 (95,3)	2.88 (73,2)	5.12 (130,1)	0.25 (6,4)
5900	0.88 (2,4)	6.00 (152,4)	4.00 (101,6)	5.38 (136,7)	3.25 (82,6)	6.25 (158,8)	0.31 (7,9)

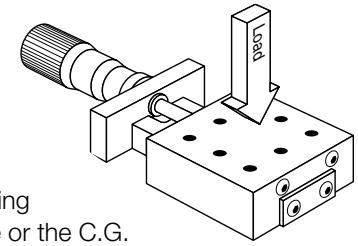
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Travel

The travel listed is the total travel of the positioner from hard stop to hard stop.

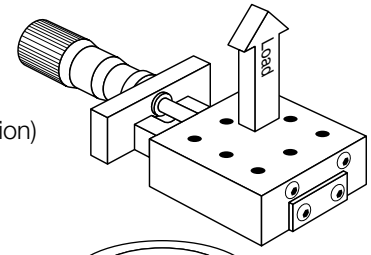
Bearing Load Capacity

Normal Load



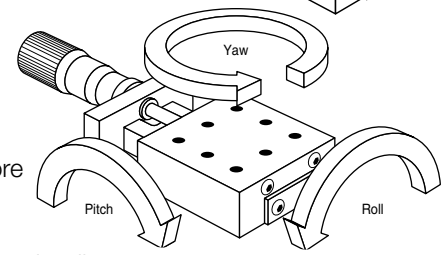
This is the maximum downward (compression) load or force which can be applied to the positioner perpendicular to the mounting surface. The center of force or the C.G. of the load must be located in the center of the mounting surface. For loads which are offset from this position, refer to moment loads.

Inverted Load



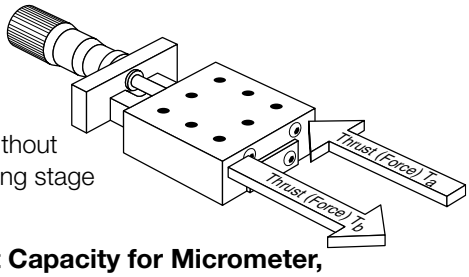
Same as a normal load except in an upward (tension) direction.

Moment Load



This refers to forces which are offset (cantilevered) from the bearing centers and therefore producing uneven loading on the bearings. This uneven loading means that some bearings are supporting more of the load than others. For this reason it is very important to determine if the moment loading for a given positioner is within acceptable limits. These moment forces are categorized by the direction they act in Pitch, Roll or Yaw; see diagram at left. When loading results in moments acting in only one of the moment directions (pitch, roll or yaw) it is called a single direction moment. Examples of this type of loading are shown below. How to calculate the maximum allowable moment load is discussed on the following page.

Thrust Capacity



Thrust capacity is the maximum force or load which can be applied in the direction of travel without damage to positioning stage components.

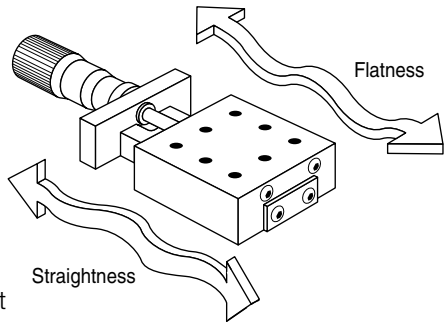
T_a and T_b Thrust Capacity for Micrometer, Fine Screw and Differential Screw Drives

With these types of drives the mounting surface or stage carriage is pressed against the drive mechanism by means of a spring. Because of this the maximum thrust which the stage assembly can maintain is different when pressing toward the spring or away from it. When pressing toward the spring, the force is taken up by the drive mechanism (i.e. micrometer). While pulling away, the force is being held in place by the spring. Stages with this type of mechanism have two thrust capacity specifications (T_a and T_b). Ta refers to the load capacity against the micrometer and Tb is the spring load capacity. Refer to specific product drawings for load direction.

Screw Drive Thrust Capacity

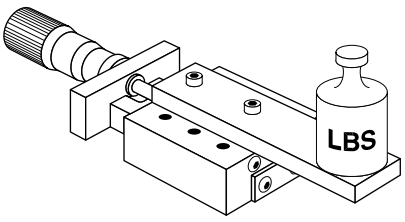
Stages which use screw drive assemblies will only have one thrust capacity rating. This rating is for either direction of travel.

Straight Line and Flatness Accuracy

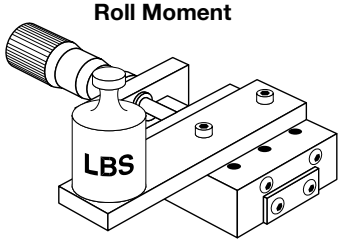


This is the amount of error a linear positioner deviates from an ideal straight line. The straight line accuracy is the error in the horizontal plane while flatness is the error in the vertical plane. Both the straight line and the flatness accuracy are measured at the moving carriage surface center.

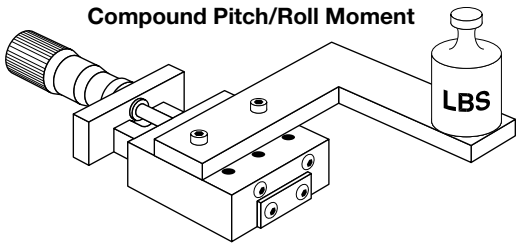
Pitch Moment



Roll Moment



Compound Pitch/Roll Moment

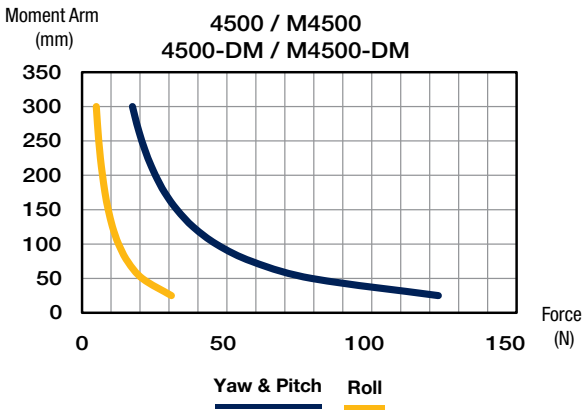


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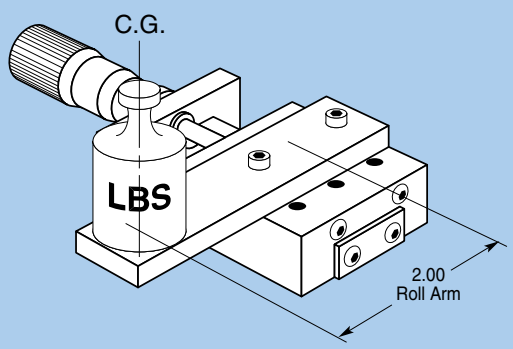
Calculating Maximum Allowable Moment Loads on Linear Slides and Stages

To determine if a load or force is within acceptable moment load ranges follow the steps below:

1. Calculate maximum load and or force which will be applied to the positioner. Include brackets and other axes which are mounted to the positioner.
2. Locate the center of gravity of the load.
3. Determine if there is a single or compound moment.
4. Measure the distance from the center of force or C.G. to the center of the linear stage carriage. This is the moment arm length and is designated A_S for single direction moments and A_C for compound moments.
5. Locate the moment load graph for the positioner you are interested in (located in back of individual product section, esee example below). The X axis of the graph is the Force, the Y axis is the allowable moment arm A_S for single direction moments.
6. Locate the moment curve(s) which your load is acting in (pitch, roll or yaw).
7. Locate your load force on the X axis of the graph.
8. Draw a vertical line from the Force location on the X axis parallel with the Y axis.
9. Find the moment arm distance on the Y axis. Draw a horizontal line from this point parallel with the X axis until the vertical and horizontal lines intersect.
10. If the intersection point is below the moment curve in question then the stage is within acceptable limits. If the intersection point is above the moment curve, a positioner with a larger normal load capacity should be selected and the above steps repeated.



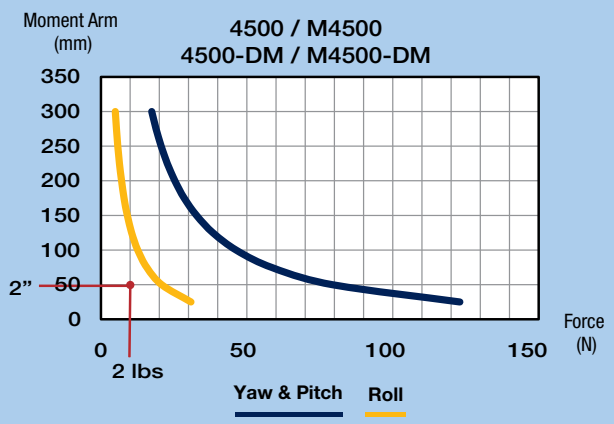
Example #1: Single Direction Moment Load



A 2 pound load is mounted to a single axis linear stage. The diagram shows the load's position in reference to the positioner carriage center. This shows that the load is offset 2 inches from the carriage center creating a roll moment.

The selected positioner is a 4502 ball stage. (The moment load curve for the 4502 is shown below.) First, find 2 pounds on the X axis and draw a vertical line. Next, draw a horizontal line starting at the 2 inches position on the A_S axis (single direction moment). Mark the intersection point.

In this example the intersection point is below the roll moment curve, indicating that the stage is acceptable for this application.



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