

## LC1A - February 20, 2024

Item # LC1A was discontinued on February 20, 2024. For informational purposes, this is a copy of the website content at that time and is valid only for the stated product.

### SM2-COMPATIBLE ROTATION MOUNTS

- ▶ Mount Ø2" (Ø50.8 mm) Optics or SM2 (Ø2.035"-40) Lens Tubes
- ▶ 360° Continuous Rotation



**LC1A**  
Swivel Mount for  
60 mm Cage Systems



**KS2RS**  
Ø2" Kinematic  
Rotation Mount



**RSP2**  
Ø2" Rotation Mount



**LCRM2**  
Ø2" Rotation Mount for  
60 mm Cage Systems

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#### OVERVIEW

##### Features

- Rotation Mounts with Internal SM2 (2.035"-40) Threads
- Compatible with SM2-Threaded Components
- Engraved Scale

This page has a compilation of rotation mounts that feature internal SM2 (2.035"-40) threads and can mount Ø2" (Ø50.8 mm) optics, SM2 lens tubes, or other SM2-threaded components. Each mount allows for 360° rotation of an optic, SM2-threaded component, or platform.

Thorlabs introduced the SM Thread Standards to ensure compatibility over a broad range of product lines. SM-threaded components offer a simple and efficient solution for building optomechanical structures. Our SM-threaded products, including lens tubes and cage system components, fixed and kinematic mounts, irises and diaphragms, provide flexibility when constructing complex optical systems. Please see the *Threading Specs* tab for more information on Thorlabs' SM thread standards.

Thorlabs also has similar compilations of SM-threaded rotation mounts for Ø1/2" (Ø12.7 mm) and Ø1" (Ø25.4 mm) optics. For our entire selection of rotation mounts, please see the *Rotation Mounts and Stages* tab.

##### Quick Links

High-Precision Rotation Mount	Continuous Rotation Mount
Continuous Rotation Mount with Adjustable Zero	Ø1" Nested Optic Mount
Ø2" Kinematic Rotation Mount	6-Axis Kinematic Optic Mount
60 mm Cage Rotation Mount	60 mm Cage Rotation Mount, ±8° Fine Rotation Adjustment
Swivel Mounts/Plates for 60 mm Cage Systems	

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## THREADING SPECS

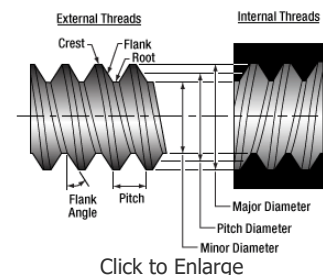
### Threading Specifications

The following is a general overview of screw threading. For more details regarding specifications and dimensions, please consult the *Machinery's Handbook*, available for purchase at many bookstores.

#### Features of a Thread

A thread consists of three repeating features: a crest, flank, and root (see drawing to the right). Except in special cases, threads have symmetrical sides inclined at equal angles when a vertical line is drawn through the center of a crest or root. The distance between corresponding points on adjacent threads is known as the pitch of the thread.

The flank angle is defined as the angle the flank makes with a perpendicular ray drawn from the screw axis. Unless otherwise stated, threads have a flank angle of 30°, resulting in a total angle between flanks of 60°. Each feature is shown in the diagram to the right.



The major diameter is taken from the crests of a thread while the minor diameter is taken from the roots. For most screws, crests and roots do not terminate at a sharp point, so crest and root truncation values are included in the definitions of major and minor diameter. The pitch diameter is approximately halfway between the major and minor diameters.

#### Thread Form

A thread form is a set of rules that define the features' scale relative to one another. Common thread forms include the Unified Screw Thread Form, used in the United States of America and measured in imperial units, and the ISO Metric Screw Thread Form, used in many parts of the world and measured with the International System of Units. There are many thread forms in the Unified screw thread standard designated by either UN, which defines a flat root contour, or UNR, which defines a round root contour. These can be further described by appending more letters. For example, an extremely fine thread with a flat root contour is designated UNEF. Those forms which are not standardized by the Unified screw thread system are designated UNS.

#### Thread Series

Most screws are identified by their thread series. Thread series are denoted by the major diameter and density of threads. Unified threads specify density in threads per inch, while Metric threads specify the thread pitch. For example, in the Unified nomenclature, a 1/4"-20 cap screw has a 1/4" diameter barrel and the pitch is 20 threads per inch (TPI). In metric nomenclature, an M4 x 0.7 cap screw has a 4 mm barrel and the pitch is 1 thread per 0.7 mm. The term M4 x 0.7 is often shortened to just M4.

#### Thread Class

The tolerances and allowances on a thread series are given by a thread class. Unified thread classes are alphanumeric identifiers starting with a number from 1 through 3, where 1 is the loosest tolerance and 3 is the tightest, and either A for external threading or B for internal threading.

Unified Thread Class Tolerancing			
Location	Loose	Optimal	Strict
Internal	1B	2B	3B
External	1A	2A	3A

Metric Thread Tolerance Positions			
Location	Loose	Optimal	Strict
Internal	-	G	H
External	e or f	g	h

Metric Thread Tolerance Grades		
Dimension	Location	Tolerance Grades <sup>a</sup>
Minor Diameter	Internal	4, 5, <u>6</u> , 7, 8
Major Diameter	External	4, <u>6</u> , 8
Pitch Diameter	Internal	4, 5, <u>6</u> , 7, 8
	External	3, <u>4</u> , 5, <u>6</u> , 7, 8, 9

a. The tolerance becomes looser as the grade increases. The underlined grades are used with normal lengths of thread engagement.

Metric threads have a slightly more complex tolerancing method that uses tolerancing grades, designated by a number 3 through 9; and tolerancing positions, which use letters e through h.

Grades provide a measure of the tolerance itself: the smaller the number, the tighter the tolerance. Positions denote the distance of the tolerance from the pitch diameter. Uppercase positioning letters indicate internal threads while lowercase positioning letters indicate external threads.

Quoting from the *Machinery's Handbook, 29th Edition*, p. 1885: "To designate the tolerance class, the grade and position of the pitch diameter is shown first followed by that for the major diameter in the case of the external thread or that for the minor diameter in the case of the internal thread, thus 4g6g for an external thread and 5H6H for an internal thread. If the two grades and positions are identical, it is not necessary to repeat the symbols, thus 4g, alone, stands for 4g4g and 5H, alone, stands for 5H5H."

#### Thorlabs' SM Series Threads

Threading specifications for our SM threads, utilized in our lens tube and cage system components, are given below so that you can machine mating components to suit your application. Most SM series threads utilize a non-standard Unified thread form, indicated by the letters UNS, with a 30° flank angle and a thread class of 2A and 2B. The exception is our SM30 series thread, which is a Metric thread form with a 30° flank angle and a tolerance of 6H/6g. We also offer products with C-Mount and RMS threads, and the specifications for these threads are given below for reference. Please note that other manufacturers may have different tolerances for C-Mount and RMS threads. For other thread specifications that are not listed here, please contact Tech Support.

SM05 Threading: Ø1/2" Lens Tubes, 16 mm Cage Systems			
External Thread, 0.535"-40.0 UNS-2A		Internal Thread, 0.535"-40.0 UNS-2B	
Max Major Diameter	0.5340"	Min Major Diameter	0.5350"
Min Major Diameter	0.5289"	Min Pitch Diameter	0.5188"
Max Pitch Diameter	0.5178"	Max Pitch Diameter	0.5230"
Min Pitch Diameter	0.5146"	Min Minor Diameter (and 83.3% of Thread)	0.508"
Max Minor Diameter	0.5069"	Max Minor Diameter (and 64.9% of Thread)	0.514"

RMS Threading: Objective, Scan, and Tube Lenses			
External Thread, 0.800"-36.0 UNS-2A		Internal Thread, 0.800"-36.0 UNS-2B	
Max Major Diameter	0.7989"	Min Major Diameter	0.8000"
Min Major Diameter	0.7934"	Min Pitch Diameter	0.7820"
Max Pitch Diameter	0.7809"	Max Pitch Diameter	0.7866"
Min Pitch Diameter	0.7774"	Min Minor Diameter (and 83.3% of Thread)	0.770"
Max Minor Diameter	0.7688"	Max Minor Diameter (and 64.9% of Thread)	0.777"

C-Mount Threading: Machine Vision Lenses, CCD/CMOS Cameras			
External Thread, 1.000"-32.0 UN-2A		Internal Thread, 1.000"-32.0 UN-2B	
Max Major Diameter	0.9989"	Min Major Diameter	1.0000"
Min Major Diameter	0.9929"	Min Pitch Diameter	0.9797"
Max Pitch Diameter	0.9786"	Max Pitch Diameter	0.9846"
Min Pitch Diameter	0.9748"	Min Minor Diameter (and 83.3% of Thread)	0.966"
Max Minor Diameter	0.9651"	Max Minor Diameter (and 64.9% of Thread)	0.974"

SM1 Threading: Ø1" Lens Tubes, 30 mm Cage Systems			
External Thread, 1.035"-40.0 UNS-2A		Internal Thread, 1.035"-40.0 UNS-2B	
Max Major Diameter	1.0339"	Min Major Diameter	1.0350"
Min Major Diameter	1.0288"	Min Pitch Diameter	1.0188"
Max Pitch Diameter	1.0177"	Max Pitch Diameter	1.0234"
Min Pitch Diameter	1.0142"	Min Minor Diameter (and 83.3% of Thread)	1.008"
Max Minor Diameter	1.0068"	Max Minor Diameter (and 64.9% of Thread)	1.014"

SM30 Threading: Ø30 mm Lens Tubes			
External Thread, M30.5 x 0.5 – 6H/6g		Internal Thread, M30.5 x 0.5 – 6H/6g	
Max Major Diameter	30.480 mm	Min Major Diameter	30.500 mm
Min Major Diameter	30.371 mm	Min Pitch Diameter	30.175 mm
Max Pitch Diameter	30.155 mm	Max Pitch Diameter	30.302 mm
Min Pitch Diameter	30.059 mm	Min Minor Diameter (and 83.3% of Thread)	29.959 mm
Max Minor Diameter	29.938 mm	Max Minor Diameter (and 64.9% of Thread)	30.094 mm

SM1.5 Threading: Ø1.5" Lens Tubes			
External Thread, 1.535"-40 UNS-2A		Internal Thread, 1.535"-40 UNS-2B	
Max Major Diameter	1.5339"	Min Major Diameter	1.535"
Min Major Diameter	1.5288"	Min Pitch Diameter	1.5188"
Max Pitch Diameter	1.5177"	Max Pitch Diameter	1.5236"
Min Pitch Diameter	1.5140"	Min Minor Diameter (and 83.3% of Thread)	1.508"
Max Minor Diameter	1.5068"	Max Minor Diameter (and 64.9% of Thread)	1.514"

SM2 Threading: Ø2" Lens Tubes, 60 mm Cage Systems			
External Thread, 2.035"-40.0 UNS-2A		Internal Thread, 2.035"-40.0 UNS-2B	

Max Major Diameter	2.0338"	Min Major Diameter	2.0350"
Min Major Diameter	2.0287"	Min Pitch Diameter	2.0188"
Max Pitch Diameter	2.0176"	Max Pitch Diameter	2.0239"
Min Pitch Diameter	2.0137"	Min Minor Diameter (and 83.3% of Thread)	2.008"
Max Minor Diameter	2.0067"	Max Minor Diameter (and 64.9% of Thread)	2.014"

SM3 Threading: Ø3" Lens Tubes			
External Thread, 3.035"-40.0 UNS-2A		Internal Thread, 3.035"-40.0 UNS-2B	
Max Major Diameter	3.0337"	Min Major Diameter	3.0350"
Min Major Diameter	3.0286"	Min Pitch Diameter	3.0188"
Max Pitch Diameter	3.0175"	Max Pitch Diameter	3.0242"
Min Pitch Diameter	3.0133"	Min Minor Diameter (and 83.3% of Thread)	3.008"
Max Minor Diameter	3.0066"	Max Minor Diameter (and 64.9% of Thread)	3.014"

SM4 Threading: Ø4" Lens Tubes			
External Thread, 4.035"-40 UNS-2A		Internal Thread, 4.035"-40.0 UNS-2B	
Max Major Diameter	4.0337"	Min Major Diameter	4.0350"
Min Major Diameter	4.0286"	Min Pitch Diameter	4.0188"
Max Pitch Diameter	4.0175"	Max Pitch Diameter	4.0245"
Min Pitch Diameter	4.0131"	Min Minor Diameter (and 83.3% of Thread)	4.008"
Max Minor Diameter	4.0066"	Max Minor Diameter (and 64.9% of Thread)	4.014"

[Hide Rotation Mounts and Stages](#)

## ROTATION MOUNTS AND STAGES

### Rotation Mount and Stage Selection Guide

Thorlabs offers a wide variety of manual and motorized rotation mounts and stages. Rotation mounts are designed with an inner bore to mount a Ø1/2", Ø1", or Ø2" optic, while rotation stages are designed with mounting taps to attach a variety of components or systems. Motorized options are powered by a DC Servo motor, 2 phase stepper motor, piezo inertia motor, or an Elliptec™ resonant piezo motor. Each offers 360° of continuous rotation.

### Manual Rotation Mounts

Rotation Mounts for Ø1/2" Optics							
Item #	MRM05(/M)	RSP05(/M)	CRM05	PRM05(/M) <sup>a</sup>	SRM05	KS05RS	CT104
Click Photo to Enlarge							
Features	Mini Series	Standard	External SM1 (1.035"-40) Threads	Micrometer	16 mm Cage-Compatible	±4° Kinematic Tip/Tilt Adjustment Plus Rotation	Compatible with 30 mm Cage Translation Stages and 1/4" Translation Stages <sup>b</sup>
Additional Details							

- a. This mount is available in the PRM05GL5 bundle, which includes the PRM05 rotation mount with the SM05PM5 polarizing prism mount.
- b. The CT104 is compatible with the 1/4" translation stages using our MS103(/M) adapter plate.
- c. The CT104 is compatible with the CT1A(/M) cage translation stage, which is designed for use with 30 mm cage systems.


Rotation Mounts for Ø1" Optics								
Item #	RSP1(/M)	LRM1	RSP1D(/M)	DLM1(/M)	CLR1(/M)	RSP1X15(/M)	RSP1X225(/M)	PRM1(/M) <sup>a</sup>

<a href="#">Click Photo to Enlarge</a>								
<b>Features</b>	Standard	External SM1 (1.035"-40) Threads	Adjustable Zero	Two Independently Rotating Carriages	Rotates Optic Within Fixed Lens Tube System	Continuous 360° Rotation or 15° Increments	Continuous 360° Rotation or 22.5° Increments	Micrometer
<b>Additional Details</b>								







a. This mount is available in the PRM1GL10 bundle, which includes the PRM1 rotation mount with the SM1PM10 polarizing prism mount.

Rotation Mounts for Ø1" Optics						
Item #	LM1-A & LM1-B(/M)	CRM1T(/M)	CRM1LT(/M)	CRM1PT(/M)	KS1RS	K6XS
<a href="#">Click Photo to Enlarge</a>						
<b>Features</b>	Optic Carriage Rotates Within Mounting Ring	30 mm Cage-Compatible <sup>a</sup>	30 mm Cage-Compatible for Thick Optics <sup>a</sup>	30 mm Cage-Compatible with Micrometer <sup>a</sup>	±4° Kinematic Tip/Tilt Adjustment Plus Rotation	Six-Axis Kinematic Mount <sup>a</sup>
<b>Additional Details</b>						







a. This mount also features four 4-40 (M3) holes on the rotation dial for use with the K6A1(/M) prism platform.

Rotation Mounts for Ø2" Optics							
Item #	RSP2(/M)	RSP2D(/M)	PRM2(/M)	LM2-A & LM2-B(/M)	LCRM2(/M)	KS2RS	K6X2
<a href="#">Click Photo to Enlarge</a>							
<b>Features</b>	Standard	Adjustable Zero	Micrometer	Optic Carriage Rotates Within Mounting Ring	60 mm Cage-Compatible	±4° Kinematic Tip/Tilt Adjustment Plus Rotation	Six-Axis Kinematic Mount
<b>Additional Details</b>							

### Manual Rotation Stages

Manual Rotation Stages						
Item #	RP005(/M)	PR005(/M)	MSRP01(/M)	RP01(/M)	RP03(/M)	QRP02(/M)
<a href="#">Click Photo to Enlarge</a>						
<b>Features</b>	Standard					Two Hard Stops

**Additional Details**

Manual Rotation Stages						
Item #	XRNR1(/M)	XRR1(/M)	PR01(/M)	CR1(/M)	XYR1(/M)	OCT-XYR1(/M)
Click Photo to Enlarge						
Features	Fine Rotation Adjuster and 2" Wide Dovetail Quick Connect	Fine Rotation Adjuster and 3" Wide Dovetail Quick Connect	Fine Rotation Adjuster and SM1-Threaded Central Aperture	Fine Pitch Worm Gear	Rotation and 1/2" Linear XY Translation	

**Additional Details**

- a. The stage profile is higher when it is mounted using the screw slots rather than stacked on another stage or accessory with mating dovetails.
- b. The OCT-XYR1(/M) stage includes the XYR1A solid sample plate. This plate can be detached from the stage to reveal the same mounting features present on the XYR1(/M) stage.

**Motorized Rotation Mounts and Stages**



Motorized Rotation Mounts and Stages with Central Clear Apertures					
Item #	DDR25(/M)	PDR1C(/M)	PDR1(/M)	PDR1V(/M)	PDXR1(/M)
Click Photo to Enlarge					
Features	Compatible with SM05 Lens Tubes, 16 mm Cage System, & 30 mm Cage System	Compatible with 16 mm Cage System	Compatible with SM05 Lens Tubes & 30 mm Cage System	Vacuum-Compatible; Also Compatible with SM05 Lens Tubes & 30 mm Cage System	Compatible with SM05 Lens Tubes & 30 mm Cage System

**Additional Details**

Motorized Rotation Mounts and Stages with Central Clear Apertures					
Item #	K10CR1(/M)	PRM1Z8(/M) <sup>a</sup>	DDR100(/M)	ELL14	HDR50(/M)
Click Photo to Enlarge					
Features	Compatible with SM1 Lens Tubes & 30 mm Cage System		Compatible with SM1 Lens Tubes, 16 mm Cage System, 30 mm Cage System	Compatible with SM1 Lens Tubes, Open Frame Design for OEM Applications	Compatible with SM2 Lens Tubes

**Additional Details**

- a. This stage is available in the KPRMTE(/M), which includes the PRMTZ8(/M) Motorized Rotation Stage with the KDC101 K-Cube DC Servo Motor Controller.

Motorized Rotation Mounts and Stages with Tapped Platforms		
Item #	PRMTZ8(/M) <sup>a</sup>	ELL18(/M) <sup>b</sup>
Click Photo to Enlarge		
Features	Tapped Mounting Platform for Mounting Prisms or Other Optics	Tapped Mounting Platform, Open Frame Design for OEM

## Additional Details

- This stage is available in the KPRM1E(/M), which includes the PRMT1Z8(/M) Motorized Rotation Stage with the KDC101 K-Cube DC Servo Motor Controller.
- This stage is available in the ELL18K(/M), which includes an interface board, mounting brackets, and connectors for PC control.

[Hide High-Precision Rotation Mount for Ø2.00" Optics](#)

### High-Precision Rotation Mount for Ø2.00" Optics



- ▶ Accepts Ø2" (Ø50.8 mm) Optics up to 0.48" (12.2 mm) Thick
- ▶ 360° Continuous Coarse Rotation
- ▶ Direct Read 1° Graduations Engraved on Rotation Dial Face
- ▶ ±7° of Micrometer-Driven Fine Rotation when Locked
- ▶ Vernier Scale with 5 arcmin Resolution
- ▶ Compatible with our SM2 Lens Tubes and 60 mm Cage System
- ▶ One SM2RR Retaining Ring Included
- ▶ Bottom-Located 8-32 (M4) Tapped Hole for Post Mounting



The PRM2(/M) high-precision rotation mount for Ø2" optics combines 360° of continuous coarse manual rotation with precise, backlash-free micrometer adjustment. The SM2-threaded (2.035"-40) inner bore accepts Ø2" optics up to 0.48" (12.2 mm) thick as well as any of our SM2-threaded components. Optics are secured with one SM2RR retaining ring (included with each mount).

The rotation dial face features a laser-engraved scale marked at 1° increments and can be rotated manually using the knurled outer surface (see drawing to the right). The thumbscrew, located on the lower right side of the mount, locks the dial face and engages the micrometer for fine adjustment. When locked, the micrometer provides ±7° of rotation at approximately 2.4 arcmin per micrometer division. This rotation mount also features a 0.05" hex setscrew on both sides that can lock both the fine and coarse rotational movement. If replacement setscrews are needed, we offer SS4B025 brass setscrews, which use a 0.05" (1.3 mm) hex.

The PRM2(/M) is also compatible with our 60 mm cage system. The cage system can be mounted to the unit using ER cage assembly rods attached to the four 4-40 tapped holes located on the rotation dial face or the four 4-40 tapped holes located on the back side of the mount. The cage system attached to the back of the mount does not rotate.

Part Number	Description	Price	Availability
PRM2/M	High-Precision Rotation Mount for Ø2" (50.8 mm) Optics, Metric	\$447.85	Today
PRM2	High-Precision Rotation Mount for Ø2" (50.8 mm) Optics	\$447.85	Today

[Hide Continuous Rotation Mount for Ø2" Optics](#)

### Continuous Rotation Mount for Ø2" Optics



- ▶ Mount Ø2" Optics up to 0.51" (13 mm) Thick
- ▶ Compatible with SM2 Lens Tubes
- ▶ One SM2RR Retaining Ring Included
- ▶ Bottom-Located 8-32 (M4) Tapped Hole for Post Mounting

The RSP2(/M) Continuous Rotation Mount utilizes two precision bearings for smooth rotation. The aperture features internal SM2 (2.035"-40) threading and accepts Ø2" optics up to 0.51" (13 mm) thick as well as any SM2-threaded component. Secure the optic using the included SM2RR retaining ring.

The mount has a knurled edge for rotation. A 360° laser-engraved scale marked at 2° increments allows for precise, repeatable positioning and fine angular adjustment. A top-located setscrew can be tightened with a 5/64" (2.0 mm) hex key or balldriver to lock the rotation of the mount.

Part Number	Description	Price	Availability
RSP2/M	Rotation Mount for Ø2" (Ø50.8 mm) Optics, M4 Tap	\$187.68	7-10 Days
RSP2	Rotation Mount for Ø2" (Ø50.8 mm) Optics, 8-32 Tap	\$187.68	Today

[Hide Continuous Rotation Mount for Ø2" Optics with Adjustable Zero](#)

### Continuous Rotation Mount for Ø2" Optics with Adjustable Zero



- ▶ Mount Ø2" Optics up to 0.54" (13.7 mm) Thick
- ▶ Dial Face can be Rotated Independently of Mounted Optics
- ▶ 5 arcmin Vernier Scale
- ▶ Compatible with SM2 Lens Tubes
- ▶ One SM2RR Retaining Ring Included
- ▶ Bottom-Located 8-32 (M4) Tapped Hole for Post Mounting

The RSP2D(/M) Ø2" Continuous Rotation Mount offers the same features as the RSP2 featured above but also incorporates a rotatable dial that can be used, for example, to align a wave plate's optical axis after mounting. Like the RSP2(/M) above, this mount utilizes two precision bearings for smooth, backlash-free rotation. The aperture is threaded with our internal SM2 threading (2.035"-40) and accepts Ø2" optics up to 0.54" (13.7 mm) thick. Secure the optic's position using the included SM2RR retaining ring. The SM2 threading also provides a means to connect SM2 lens tubes and other Thorlabs components to the mount.

This mount has a 360° laser-engraved scale marked at 2° increments to allow for precise, repeatable positioning and fine angular adjustment. The front dial scale can be unlocked and rotated using a 5/64" (2.0 mm) hex key so that the scale can be aligned to the axis of an optic for calibration purposes. A top-located setscrew can be tightened with a 5/64" (2.0 mm) hex key or balldriver to lock the rotation of the mount.

Part Number	Description	Price	Availability
RSP2D/M	Rotation Mount for Ø2" (Ø50.8 mm) Optics with Adjustable Zero, M4 Tap	\$168.70	7-10 Days
RSP2D	Rotation Mount for Ø2" (Ø50.8 mm) Optics with Adjustable Zero, 8-32 Tap	\$168.70	Lead Time

[Hide Nested Rotation Mount for Ø2" Optics](#)

### Nested Rotation Mount for Ø2" Optics



- ▶ Mount Ø2" Optics Up to 0.46" (11.7 mm) Thick
- ▶ Optic Carriage (LM2-A) and Mounting Ring (LM2-B or LM2-B/M) Sold Separately
- ▶ Rotating Optic Carriage is Interchangeable for Quick Swapping
- ▶ SM2-Threaded Optic Bore in Rotating Optic Carriage
- ▶ Post Mountable via 8-32 (M4) Tap
- ▶ Laser Engraved Scale with Graduations Every 2°, Labeled Every 20°

The LM2-A optic carriage can be nested inside of the LM2-B (LM2-B/M) mounting ring and offers 360° of continuous rotation for Ø2" optics. The optic bore of each carriage features internal SM2 (2.035"-40) threading and can hold an optic up to 0.46" (11.7 mm) thick with the included SM2RR retaining ring an optic in an SM2-threaded housing. The carriage attaches to the main body of the mount using a thumbscrew. To remove the carriage from the mount, simply loosen the thumbscrew. Extra LM2-A interchangeable rotating carriages are available to allow optics to be swapped out quickly and easily.

Each carriage has a 360° laser-engraved scale marked at 2° increments for precise, repeatable positioning. The top-located thumbscrew can be tightened to lock the rotation of the optic carriage and, along with the double bore on the mount, maintains a stable, three-point contact to hold the optic carriage. When the LM2-A is properly fastened in the LM2-B by the thumbscrew, the optic axis is 1.45" (36.8 mm for the LM2-B/M) above the top of the post.

Part Number	Description	Price	Availability
LM2-B/M	Rotation Mounting Ring for LM2-A Ø2" Optic Carriage, M4 Tap	\$35.64	Today
LM2-A	Rotating Inner Carriage for Ø2" Optics, One SM2RR Retaining Ring	\$32.08	Today
LM2-B	Rotation Mounting Ring for LM2-A Ø2" Optic Carriage, 8-32 Tap	\$35.64	Today

[Hide Ø2" Kinematic Rotation Mount](#)

### Ø2" Kinematic Rotation Mount

- ▶ Combines Kinematic Angular Adjustment with Rotation in One Mount
- ▶ Two 1/4"-80 Lockable Stainless Steel Adjusters with Removable Knobs and Brass Bushings for Smooth Adjustments
- ▶ Four #8 (M4) Counterbored Mounting Holes Allow Left-Handed or Right-Handed Orientations





- ▶ Engraved Rotation Scale with 2° Graduations Provides 360° Rotation
- ▶ SM2-Threaded (2.035"-40) Rotation Ring with Locking Screw

The KS2RS is designed to hold Ø2" (50.8 mm) optics in situations where it is necessary to control the tip/tilt position as well as the rotation of the optic. This mount is ideal for polarization optics such as linear polarizers or wave plates. In addition, our mounted dove prisms with SM2 threading may also be mounted in the KS2RS to change the orientation of the rotated image. The KS2RS features an SM2-threaded bore capable of mounting Ø2" optics up to 0.47" (12.0 mm) thick using the included SM2RR retaining ring. Additionally, SM2 lens tubes may be threaded onto the mount to accommodate thicker optics.

Thorlabs' Kinematic Rotation Mounts combine the features of our Precision Kinematic Mirror Mounts and Manual Rotation Mounts, providing continuous 360° rotational adjustment and ±4° kinematic tip/tilt adjustment. These mounts are therefore ideal for holding optics with rotational asymmetry, such as polarization optics or round cylindrical lenses.

The rotation of the mount may be locked in position with a locking screw. The locking screw is activated using a 5/64" (2 mm) hex key. The kinematic adjustment is provided by two 1/4"-80 adjusters with brass bushings to provide smooth adjustment. Each adjuster may be locked with a locking screw using a 5/64" (2 mm) hex key.

Please note that while this mount is designed to hold Ø2" optics, the mount uses the same form factor as the KS3 Ø3" mirror mount in order to incorporate the rotation ring.

If higher adjustment resolution or control is desired, the 1/4"-80 adjusters used in these mounts can be switched with DAS110 or DM22 Differential Adjusters.

Part Number	Description	Price	Availability
KS2RS	Kinematic Rotation Mount for Ø2" Optics	\$327.26	Today

[Hide 6-Axis Kinematic Mount for Ø2" Optics](#)

### 6-Axis Kinematic Mount for Ø2" Optics



- ▶ Six Adjustment Axes with Locks
  - Kinematic Pitch/Yaw: ±2° at 3.6 mrad/rev
  - X and Y Translation: ±2 mm at 254 µm/rev
  - Z Translation<sup>a</sup>: ±0.13" (±3.2 mm) at 318 µm/rev
  - Continuous 360° Roll Control with 1° Graduations
- ▶ Independent X, Y, and Roll Adjustment
- ▶ SM2-Threaded Bore for Ø2" (50 mm) Optics up to 0.53" (13.4 mm) Thick
- ▶ Six #8 (M4) Counterbores for Post Mounting

The K6X2 6-Axis Kinematic Optic Mount is designed as a general-purpose, high-precision positioner. The optic cell can be translated along or rotated about 6 axes, and each axis has a locking screw for stability. The mount uses 1/4"-80 adjuster screws for pitch, yaw, and z-axis adjustment, and 3/16"-100 adjuster screws for x- and y-axis adjustment.

The translating cell has SM2 (2.035"-40) threading for attaching Ø2" lens tubes or mounting Ø2" (50 mm) optics up to 0.53" (13.4 mm) thick using the included SM2RR Retaining Ring, which can be tightened using an SPW604 Spanner Wrench (sold separately). In testing, the X and Y axes of the K6X2 caused less than ±35 µm of crosstalk. If higher adjustment resolution is desired for pitch, yaw, or z-translation, the three 1/4"-80 adjusters can be replaced with DAS110 Differential Adjusters.

For more information on our 6-axis kinematic mounts, including versions for Ø1/2" and Ø1" optics, see our full web presentation.

- Z-axis translation is accomplished by turning all three tip/tilt adjusters equally in the same direction.

Part Number	Description	Price	Availability
K6X2	Customer Inspired! 6-Axis Locking Kinematic Mount for Ø2" Optics	\$546.69	Lead Time

[Hide 60 mm Cage Rotation Mount](#)

### 60 mm Cage Rotation Mount



- ▶ Mounts Ø2" (Ø50.8 mm) Optics up to 13 mm (0.51") Thick
- ▶ Ø48 mm Clear Aperture
- ▶ 360° of Continuous Rotation
- ▶ 1° Engraved Graduations on Dial, Labeled Every 10°
- ▶ Setscrew Locking Mechanism
- ▶ Compatible with 60 mm Cage System
- ▶ 8-32 (M4) Tapped Hole for Post Mounting

The LCRM2 rotation mount is designed to mount Ø2" (Ø50.8 mm) optics up to 13 mm (0.51") thick in a 60 mm cage system. The optic is secured using the included SM2RR retaining ring (the SPW604 spanner wrench is ideal for tightening this retaining ring). For thicker optics, any of our SM2 lens tubes can be threaded into the carriage. The smooth rotation mechanism allows for precise positioning of the rotation carriage. The mount features a bottom-located 8-32 (M4) tapped mounting hole for post mounting, making it compatible with our Ø1/2" posts.

Part Number	Description	Price	Availability
LCRM2/M	Customer Inspired! 60 mm Cage Rotation Mount for Ø2" Optics, M4 x 0.7 Tap	\$155.62	Lead Time
LCRM2	Customer Inspired! 60 mm Cage Rotation Mount for Ø2" Optics, 8-32 Tap	\$155.62	Lead Time

[Hide 60 mm Cage Rotation Mount, ±8° Fine Rotation Adjustment](#)

### 60 mm Cage Rotation Mount, ±8° Fine Rotation Adjustment



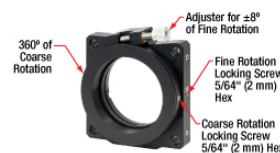
- ▶ Mount Ø2" (Ø50.8 mm) Optics or SM2-Threaded Components
- ▶ Ø1.90" (Ø48.3 mm) Clear Aperture
- ▶ ±8° of Fine Rotation; 360° of Manual Coarse Rotation
- ▶ 1° Engraved Graduations, Labeled Every 2° up to ±8°
- ▶ Setscrew Locking Mechanism
- ▶ Suitable for Cantilevered Loads up to 0.5 ft-lbs (0.68 N•m) Torque
- ▶ Included LCP16RP2 Removable Rotation Ring
- ▶ One 8-32 (M4 x 0.7) Hole for Post Mounting

Thorlabs' LCP16R2(/M) 60 mm Cage System Rotation Mount with SM2 Threads provides ±8° of fine and 360° of coarse rotation angle adjustment for SM2-threaded components integrated with a 60 mm cage system. A nylon-tipped setscrew secures the included LCP16RP2 rotation ring; this setscrew can be loosened using a 5/64" (2 mm) hex key to allow for 360° of manual rotation (see the image to the right). Once this screw is tightened, fine rotation adjustment is achieved via a 3/16"-100 threaded adjuster. A fine adjustment scale engraved on the top of the mount has graduations every 1° with a range of ±8°.

This mount features four through holes for ER cage rods that are compatible with Thorlabs' 60 mm cage system or cameras that use this hole pattern, such as our scientific CCD cameras. The removable rotation ring on the front of the mount has 0.40" (10.1 mm) deep internal SM2 (2.035"-40) threads, allowing Ø2" (Ø50.8 mm) optics, Ø2" lens tubes, or other externally SM2-threaded components to be integrated with the rotation mount. Internally C-mount threaded components, such as Thorlabs' USB C-Mount CCD, Quantalux® sCMOS, or Kiralux™ CMOS cameras, can be attached to the rotation ring using an SM2A55 adapter.

Users can switch out the included SM2-threaded LCP16RP2 rotation ring with the SM1-threaded LCP16RP1 rotation ring to integrate SM1-threaded components into the LCP16R2(/M) mount; see the image to the right. We also offer the LCP16RP2 rotation ring separately in case a replacement is needed. To switch the rotation ring in a mount, loosen the side-located setscrew using a 5/64" (2 mm) hex key and replace the rotation ring with the desired one.

We also have available an SM1-threaded 60 mm cage system rotation mount.



Click to Enlarge  
This mount offers 360° of coarse rotation via the rotation ring and ±8° of fine rotation via the threaded adjuster. The coarse and fine rotation are independent of each other and both positions can be locked using the respective 5/64" (2 mm) hex locking screws.



Click to Enlarge  
The LCP16R2 rotation mount in a 60 mm cage system with two LCP34 cage plates.



Click to Enlarge

The LCP16R2 mount includes an LCP16RP2 SM2-threaded rotation ring that can be removed (left) and replaced with an LCP16RP1 SM1-threaded rotation ring (right).



Click to Enlarge

Part Number	Description	Price	Availability
LCP16R2/M	60 mm Cage System Rotation Mount with SM2-Threaded Bore, M4 x 0.7 Tap	\$411.67	Lead Time
LCP16RP2	Rotation Ring for LCP16R Series Rotation Mounts, SM2-Threaded Bore	\$82.33	Today
LCP16R2	60 mm Cage System Rotation Mount with SM2-Threaded Bore, 8-32 Tap	\$411.67	Today

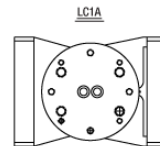
[Hide Swivel Mounts/Plates for 60 mm Cage Systems](#)

## Swivel Mounts/Plates for 60 mm Cage Systems



- ▶  $\pm 90^\circ$  Angular Displacement Between Two 60 mm Cage Plates
- ▶ Platform with 0.93" (23.6 mm) Vertical Height Adjustment
- ▶ Independently Lockable Plates and Mounting Platform
- ▶ Generous Array of Mounting Holes on Platform

The LC1A(/M) Swivel Mount is ideal for building spectrometers or other prism- and grating-based systems that require arbitrary angular alignment. The swivel plates are internally threaded for compatibility with our SM2 (2.035"-40) Series of Lens Tubes. In addition, the plates and mounting platform of the LC1A(/M) are independently lockable.



[Click for Details](#)

The pedestal can rotate through a full  $360^\circ$  and provides 0.93" (23.6 mm) of vertical height adjustment. To aid in alignment, there is an engraved scale with  $2^\circ$  increments below the pedestal. The platform has an array of threaded holes, making it easy to mount a variety of optical elements, such as prisms and gratings, using our PM3(/M) or PM4(/M) clamping arms. See the drawing to the right for more details.

Part Number	Description	Price	Availability
LC1A/M	Swivel Mount for 60 mm Cage System, Metric Taps	\$275.60	Today
LC1A	Swivel Mount for 60 mm Cage System, Imperial Taps	\$275.60	Today