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**CP90F-B - NOV 11, 2019**

Item # CP90F-B was discontinued on NOV 11, 2019. For informational purposes, this is a copy of the website content at that time and is valid only for the stated product.

**SM1 LENS TUBE COMPATIBLE CAGE PLATES**

- ▶ Integrate SM1 Lens Tubes and 30 mm Cage Systems
- ▶ Version with Ø1.2" Bore for Slide-In Lens Tube Mounting

**Application Idea**  
 Mount SM1 Lens Tubes to 30 mm Cage Systems



**OVERVIEW**

**Features**

- Integrate SM1 Series Lens Tubes with 30 mm Cage Systems
- Compatible with ER Series Cage Construction Rods

SM1-Threaded (1.035"-40) cage plates and cage cubes allow SM1 Lens Tubes to be integrated into 30 mm Cage Systems by threading the lens tube into the plate. Some of the cage plates below can also accept Ø1" optics, which can be secured with SM1-threaded retaining rings using a spanner wrench. Alternatively, the CP12 cage plate has a Ø1.2" bore through the part, which allows an SM1 lens tube to be slid into it and then locked in place.

Thorlabs introduced the SM Series Threading standards to ensure compatibility over a broad range of product lines. SM-Threaded components offer a simple and efficient solution for building optomechanical structures. The SM-Threaded products available, which include lens tubes and cage system components, fixed and kinematic mounts, irises and diaphragms, and mounted optics, provide flexibility when constructing complex optical systems.

This page contains our SM1-Compatible Cage Plates. For a full selection of available Cage Plates, please visit our Cage Systems navigation menu.

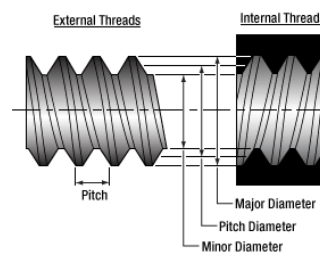
SM-Threaded Cage Plates
SM05 Threaded
SM1 Threaded
SM2 Threaded

Quick Links to SM1 Cage Plates	
Standard	Removable
Flexure	30 mm to 60 mm Cage Adapter
Thin	Quick Release
Ø1.2" Bore	Purge Connector
Round	Cylindrical Optic Mount
Rotating	1/2" Post Adapter
30 mm Cage Cube	

## THREADING SPECS

## Thorlabs' Threading Specifications

Thorlabs' lens tubes utilize a series of non-standard threadings. Threading specifications are given below for our SM threadings utilized in our lens tube and cage system components so that you can machine mating components to suit your application. We also offer products with C-Mount and RMS threadings, and the specifications for these threadings are also given below. Please note that other manufacturers may have different tolerances for these 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, M30.5x0.5		Internal Thread, M30.5x0.5	
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

SM30 Threading: Ø30 mm Lens Tubes			
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"

### SM1-Threaded Standard Cage Plates

- ▶ Directly Mounts Optical Components Within a 30 mm Cage System Assembly
- ▶ 2 Thicknesses Available: 0.35" and 0.50"
- ▶ Tapped with Our Standard SM1 Thread (1.035"-40)
- ▶ Post Mountable via 8-32 (M4) Tapped Hole



Click to Enlarge  
An 8-32 mounting hole allows the CP02T Cage Plate to be mounted to a Ø1/2" post.

The CP33(/M) cage plate is 0.35" thick and provides a center-located SM1 (1.035"-40) threaded bore that is compatible with our popular Ø1" lens tubes. The SM1-threaded bore can also directly accept a Ø1" optic up to 0.2" (5 mm) thick. Each cage rod through hole is accompanied by a side-located locking 4-40 setscrew, which can be secured using a 5/64" (2 mm) hex key or balldriver.

The CP02T and CP33T/M cage plates are 0.50" thick and have center-located SM1-threaded holes that directly accept optics up to 0.35" (8.9 mm) thick. They feature an extra-thick design with double locking setscrews that enables two extension rods to be inserted end-to-end and firmly locked into place, providing a rigid connection between two cage system subassemblies. The locking setscrews in the CP02T and CP33T/M cage plates can be tightened using a 0.05" (1.3 mm) or 2.0 mm (5/64") hex key, respectively.

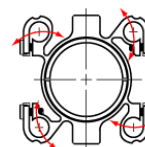
Each cage plate includes two SM1RR retaining rings and has an 8-32 (M4) tapped hole for post mounting.

Part Number	Description	Price	Availability
CP33/M	NEW! SM1-Threaded 30 mm Cage Plate, 0.35" Thick, 2 Retaining Rings, M4 Tap	\$16.89	Today
CP33T/M	NEW! SM1-Threaded 30 mm Cage Plate, 0.50" Thick, 2 Retaining Rings, M4 Tap	\$23.27	Today
CP33	NEW! SM1-Threaded 30 mm Cage Plate, 0.35" Thick, 2 Retainings, 8-32 Tap	\$16.89	Today
CP02T	SM1-Threaded 30 mm Cage Plate, 0.50" Thick, 2 Retaining Rings, 8-32 Tap	\$23.27	Today

### SM1-Threaded Dual Flexure Cage Plate

- ▶ Self-Aligning Cage Rod Arms Eliminate Cage Plate Binding
- ▶ Tapped with Our Standard SM1 Thread (1.035"-40)
- ▶ Directly Mounts Optical Components Within a 30 mm Cage System Assembly
- ▶ Post Mountable via 8-32 (M4) and 1/4"-20 (M6) Tapped Holes

The CP02F(/M) Flexure Cage Plate features a flexure arm design for locking onto 30 mm cage rods. This design compensates for the tolerance stacking effects common in cage systems, ensuring that the cage plate never binds or sticks within a constructed cage segment. The cage plate's orthogonal flexure arms remain rigid when handled, but will flex slightly to provide compensation for rod misalignment when installed within a constructed cage segment. This unique feature is illustrated in the diagram to the right. In contrast with the standard setscrew retention method of the CP33 Cage Plate, each CP02F arm clamps onto cage rods using a separate flexure clamp that increases holding force and cage plate rigidity.



Click to Enlarge  
Cage rod arms can flex to compensate for cage rod misalignment due to tolerance stacking.



Click to Enlarge  
The CP02F(/M) Cage Plate offers a 1/4"-20 (M6) tap for mounting on our Ø1" Posts.

Like our CP33(/M) cage plate, it is 0.35" thick and provides a center-located SM1 (1.035"-40) threaded bore that is compatible with our popular Ø1" lens tubes. The center-threaded bore of the CP02F(/M) can also directly accept a Ø1" optic up to 0.19" (4.8 mm) thick. Two SM1RR retaining rings are included. The cap screw on each flexure cage rod through hole can be tightened using a 5/64" (2.0 mm) hex key or Thorlabs' HKTS-5/64 Hex Key Thumbscrews.

For additional convenience, 8-32 (M4) and 1/4"-20 (M6) tapped holes are provided on opposite sides of the cage plate for post mounting applications. For Ø1" optics thicker than 0.125" (3.2 mm), we offer the CP06F(/M) Cage Plate with a Ø1" Double Bore.

Part Number	Description	Price	Availability
CP02F/M	SM1-Threaded 30 mm Flexure Cage Plate, 0.35" Thick, 2 Retaining Rings, Metric	\$21.20	Today
CP02F	SM1-Threaded 30 mm Flexure Cage Plate, 0.35" Thick, 2 Retaining Rings, Imperial	\$21.20	Today

### SM1-Threaded Cage Plate with Flexure Clamps

- ▶ Directly Mounts Bulk Optics Within a 30 mm Cage System Assembly
- ▶ Tapped with Our Standard SM1 Thread (1.035"-40)
- ▶ Post Mountable Via 8-32 (M4) Tapped Hole
- ▶ Thickness: 0.35"

The CP08(/M) Cage Plate provides a more stable clamping mechanism for cage rods than our popular CP33(/M) Cage Plate. It also offers a center-located SM1 (1.035"-40) threaded bore and 8-32 (M4) mounting hole. This cage plate uses a flexure clamping mechanism that increases the surface area in contact with the ER rods. The CP08(/M) uses four side-located 3/32" (2.5 mm) hex cap screws with for securing the cage rods. The central bore of the CP08(/M) can also directly accept a Ø1" optic up to 0.2" (5 mm) thick using two SM1RR retaining rings. One SM1RR retaining ring is included.



View of Clamping Mechanism  
Click to Enlarge

Thorlabs also offers the CP02F(/M) Flexure Cage Plate (sold above) with self-aligning cage rod arms that eliminate cage plate binding.

Part Number	Description	Price	Availability
CP08/M	SM1-Threaded 30 mm Cage Plate with Flexure Clamping, 1 Retaining Ring, M4 Tap	\$20.99	Today
CP08	SM1-Threaded 30 mm Cage Plate with Flexure Clamping, 1 Retaining Ring, 8-32 Tap	\$20.99	Today

### SM1-Threaded 30 mm Cage Plate, Not Post Mountable

- ▶ Directly Mounts Optical Components Within a 30 mm Cage System Assembly
- ▶ 3 Thicknesses Available: 4 mm, 6 mm, and 8 mm
- ▶ Tapped with Our Standard SM1 Thread (1.035"-40)
- ▶ Not Post Mountable



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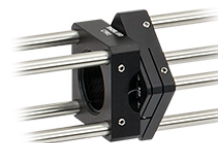
At 4 mm, 6 mm, and 8 mm thick, respectively, the CP4S, CP6S, and CP8S are the thinnest cage plates we offer. They have a center-located SM1 (1.035"-40) threaded bore that is compatible with our SM1 threaded optomechanical components. These plates allow the close spacing of optical components within a cage system. Each cage rod through hole is accompanied by a side-located locking 4-40 setscrew, which can be secured using a 0.05" (1.3mm) hex key. Unlike the standard cage plates sold above, these cage plates do not offer an 8-32 (M4) tapped hole for post mounting.

Pictured to the right is the CP4S cage plate being used to mount a SM1FC FC/PC Fiber Adapter Plate within a cage system.

Part Number	Description	Price	Availability
CP4S	Customer Inspired! SM1-Threaded 30 mm Cage Plate, 4 mm Thick	\$19.78	Today
CP6S	Customer Inspired! SM1-Threaded 30 mm Cage Plate, 6 mm Thick	\$20.32	Today
CP8S	Customer Inspired! SM1-Threaded 30 mm Cage Plate, 8 mm Thick	\$20.65	Today

### Rotating Cage Plate for 30 mm Cage Systems

- ▶ Rotates an Entire 30 mm Cage System Subassembly Around a Fixed SM1-Threaded Bore
- ▶ Post Mountable via 8-32 (M4) Tapped Hole
- ▶ Rotation Locked with Flexure Mechanism



Click to Enlarge  
Rotating 30 mm Cage System

Thorlabs' CPR1 30 mm Rotating Cage Segment Plate allows an entire 30 mm cage subsystem to be rotated about the optical axis. The CPR1 consists of two plates: one attaches to a fixed cage segment, while the other rotates all attached cage elements. To rotate a cage segment between two fixed cage segments, two CPR1 plates must be used as shown in the image to the right. The rotating cage segment is ideal for rotating multiple optical elements where the rotation of each element must be the same (e.g., using two cylindrical lenses to change the spatial profile of a laser diode or for multi-element polarization applications).

The rotating cage segment plate features a 1" deep, SM1-threaded (1.035"-40) central bore through the part that remains fixed as the plate is rotated. Two SM1RR retaining rings are provided for direct mounting of optics.

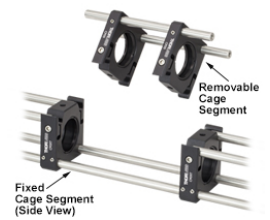
Each side of the cage plate has four blind holes for attaching cage rods, and thus, the cage rods must terminate at this cage plate. Each rod is held in place by a side-located locking 4-40 setscrew, which can be secured using a 0.05" hex key (Item # HK050). An engraved scale with 2° graduations allows for reliable manual positioning. After the rotation is adjusted, a flexure locking mechanism, which is engaged with a 3/32" hex key, secures the rotation. The fixed side of the cage plate is equipped with an 8-32 (M4) tapped hole for mounting with our Ø1/2" posts.

Part Number	Description	Price	Availability
CPR1/M	30 mm Rotating Cage Segment Plate, Two SM1RR Retaining Rings Included, Metric	\$165.56	Lead Time
CPR1	30 mm Rotating Cage Segment Plate, Two SM1RR Retaining Rings Included	\$165.56	5-8 Days

### Removable 30 mm Cage Segment

- ▶ Create Removable 30 mm Cage Segments
- ▶ SM1 (1.035"-40) Internal Thread
- ▶ Compatible with 30 mm Cage Systems
- ▶ Available in 0.35" or 0.50" Thick Versions

Thorlabs' 30 mm Removable Cage Segment Plates provide the means to extract a portion of a cage system and replace it with other pre-aligned segments, as illustrated in the photo to the right. These cage plates add versatility to a cage system without disturbing any pre-aligned components while maintaining the rigidity of the cage system. They are equipped with a flexure cam lock to hold the cage plate in position prior to final tightening via the included 4-40 (M3) cap screws. The cage plates may be mounted on our  $\varnothing 1/2$ " Posts via an 8-32 (M4) threaded mounting hole in the bottom of the parts; the CP09, CP09T, and CP09T/M have an additional 8-32 (M4) threaded mounting hole on their top face.



For additional information, please see the complete product presentation.

Part Number	Description	Price	Availability
CP09/M	Customer Inspired! 30 mm Removable Segment Cage Plate, 0.35" Thick, Metric	\$27.87	Today
CP09T/M	Customer Inspired! 30 mm Removable Segment Cage Plate, 0.50" Thick, Metric	\$29.23	Today
CP09	Customer Inspired! 30 mm Removable Segment Cage Plate, 0.35" Thick	\$27.87	Today
CP09T	Customer Inspired! 30 mm Removable Segment Cage Plate, 0.50" Thick	\$29.23	Today

### 30 mm to 60 mm Cage Plate Adapter

- ▶ Couples 30 mm and 60 mm Cage Systems
- ▶ Centered SM1 (1.035"-40) Tapped Hole Directly Accepts  $\varnothing 1$ " Optics up to 0.35" (9 mm) Thick
- ▶ 8-32 (M4) Tapped Hole for Mounting to  $\varnothing 1/2$ " Posts

The LCP02(/M) Cage Plate provides a convenient means for coupling 30 mm and 60 mm cage assemblies via our  $\varnothing 6$  mm ER Cage Rods. The centered SM1 (1.035"-40) tapped hole directly accepts optics up to 0.35" (9 mm) thick (SM1RR retaining rings sold separately). Each cage rod through hole is accompanied by a side-located locking 4-40 setscrew, which can be secured using a 0.05" (1.3 mm) hex key. The LCP02(/M) also has an 8-32 (M4) tapped hole for  $\varnothing 1/2$ " post mounting. The surface with the 8-32 (M4) tap is not wide enough to support  $\varnothing 1$ " posts.

Additionally, two of these cage plates can be used to straddle a 30 mm cage subassembly in such a way that the entire assembly [LCP02(/M), 30 mm subsystem, and LCP02(/M)] can slide along the 60 mm cage rods as a single optomechanical unit. A 16 mm cage assembly can also be easily integrated by utilizing the SP05 cage plate adapter (sold above).

Part Number	Description	Price	Availability
LCP02/M	Customer Inspired! 30 mm to 60 mm Cage Plate Adapter, M4 Tap	\$42.20	Today
LCP02	30 mm to 60 mm Cage Plate Adapter, 8-32 Tap	\$42.20	Today

### 30 mm Cage Plate with Quick-Release Magnetic Plate

- ▶ 30 mm Cage Compatible Back Plate
- ▶ Magnetically Coupled Mounting Carriage
- ▶ Accepts  $\varnothing 1"$  (25.4 mm) Optics up to 0.20" (5.1 mm) Thick
- ▶ Back Plate and Mounting Carriage Have Internal SM1 Threading
- ▶ One SM1RR Retaining Ring Included



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The front plate of the CP90F assembly is held in place using magnets.

The CP90F consists of a back plate compatible with the 30 mm cage system and a mounting carriage (front plate) that is magnetically coupled with pairs of rare earth magnets to the back plate. For stability, precision, and repeatability, the mounting carriage contacts the back plate at three points. Each point of contact is a ball bearing on the mounting carriage resting in the groove formed by two parallel steel pins. Since the axes defined by the three sets of pins share a common point of intersection, the system is properly constrained (kinematic). The mounting carriage can be easily inserted or removed from the fully assembled cage system by separating it from the back plate, rotating it sideways, and then extracting it from the cage.

The internal SM1 threading allows components up to 0.20" (5.1 mm) thick to be secured in the mounting carriage with the included SM1RR retaining ring. Components with external SM1 threading, like the SM1A7 alignment guide, can be threaded onto the mounting carriage. However, components mounted in this way (OD = 1.2" (30 mm)) cannot extend more than 3/16" (4.7 mm) beyond the face of the mounting carriage without sacrificing the ability to remove the mounting carriage and component from a closed cage system.

Both the CP90F and CP90F-B cage rod through holes have side-located locking 4-40 setscrew, which can be secured using a 0.05" hex key.

Part Number	Description	Price	Availability
CP90F	30 mm Removable Cage Plate, Front and Back Plate, Internal SM1 Threading	\$53.02	Lead Time
CP90F-B	30 mm Removable Cage Plate, Back Plate with ER Rod Holes, Internal SM1 Threading	\$31.12	Today
CP90F-F	30 mm Removable Cage Plate, Removable Front Plate, Internal SM1 Threading	\$31.12	Today

### 30 mm Cage Plate with $\varnothing 1.2"$ Bore

- ▶  $\varnothing 1.2"$  Bore Supports Outside Diameter of SM1 Lens Tubes and C-Mount Extension Tubes
- ▶ Compatible with 30 mm Cage Systems
- ▶ Nylon-Tipped Setscrew and Double Bore Securely Hold Lens Tubes
- ▶ Not Post Mountable



Click for Details  
[APPLIST]  
[APPLIST]

The CP12 cage plate is designed to allow our SM1 Lens Tubes or C-Mount Extension Tubes to slide into the cage plate and be locked in position with a nylon-tipped setscrew. This is ideal for situations where it is not desirable to thread the lens tube into one of our threaded cage plates. It will also allow our  $\varnothing 1.2"$  free-space isolator packages to be integrated into a 30 mm cage system. A double-bore design gives three points of contact for stable and secure mounting. Each cage rod through hole is accompanied by a side-located locking 4-40 setscrew, which can be secured using a 0.05" (1.3mm) hex key.

Please note that this cage plate does not feature a tapped mounting hole, unlike many of our other cage plates. Due to the bore size, there would be interference between the threaded stud on our  $\varnothing 1/2"$  posts and the clear aperture of the bore. Therefore, this cage plate cannot be used directly with  $\varnothing 1/2"$  Posts, and a cage system utilizing this plate must be supported using a different method. For a post-mountable solution, consider our SM1RC or SM1TC lens tube clamps, but note that these parts are not cage compatible.

Part Number	Description	Price	Availability
CP12	Customer Inspired! 30 mm Cage Plate, $\varnothing 1.2"$ Double Bore for SM1 and C-Mount Lens Tubes	\$22.07	Today

### Drop-In 30 mm Cage Mount with Flexure Lock

- ▶ Easy Insertion and Removal of a Ø1" Optic Within an Assembled 30 mm Cage System
- ▶ Flexure Lock Securely Clamps to Cage Rods
- ▶ Internal SM1 (1.035"-40) Threads Accept Optics Up to 0.24" (6.1 mm) Thick
- ▶ Drop-In Compatibility with SM1L03 Lens Tubes
- ▶ Two SM1RR Retaining Rings Included



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The DCP1 Cage Mount Snapping into an Existing 30 mm Cage Segment (Shown Here with ND Filter and CP02F Flexure Plates)

The DCP1 Drop-In Cage Mount allows Ø1" optics to be easily inserted into or removed from an assembled 30 mm cage structure. The cage mount features two flexure locks with cap screws that can be tightened using a 5/64" (2 mm) hex key or balldriver. The SM1-threaded (1.035"-40) bore can hold Ø1" optics up to 0.24" (6.1 mm) thick using the included two SM1RR retaining rings. Unlike our other quick-release cage mounts, the DCP1 can be used with optics mounted inside SM1L03 lens tubes. For example, all of our SM1-threaded ND filters can be used with this cage mount. Longer lens tubes will block the cage mount from fitting into the cage system.

The DCP1 cage mount clamps to 30 mm cage rods across a diagonal, rather than to adjacent cage rods. To insert into a cage system, hold the mount diagonally and slide it below one cage rod, as illustrated in the photo to the right. Then twist the mount and snap it onto the cage rods before tightening the flexure clamp cap screws.

Part Number	Description	Price	Availability
DCP1	Drop-In 30 mm Cage Mount, Flexure Lock, SM1 Threaded, 0.40" Thick, 2 Retaining Rings	\$23.34	Today

### Drop-In 30 mm Cage Mount with Spring-Loaded Clamp

- ▶ One-Handed Installation of a Ø1" Optic Within an Assembled 30 mm Cage System
- ▶ Dovetail Design with Spring-Loaded Release Provides Smooth Clamping Action
- ▶ Internal SM1 (1.035"-40) Threads Accept Optics Up to 0.14" (3.6 mm) Thick
- ▶ Two SM1RR Retaining Rings Included



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QRC1A Quick-Release Clamp Mounted Within a 30 mm Cage System

The QRC1A cage mount is equipped with a spring-loaded dovetail clamp that secures or releases the cage mount to two of the four ER rods in the cage structure. The cage mount has internal SM1 threading that allows for optics up to 0.14" (3.6 mm) thick to be secured with the two included SM1RR retaining rings.

Part Number	Description	Price	Availability
QRC1A	Drop-In 30 mm Cage Mount, Spring-Loaded Clamp, 0.30" Thick, 2 Retaining Rings	\$68.45	Today

### Drop-In 30 mm Cage Mount with Swing Latches

- ▶ Easy Placement and Removal of a Ø1" Optic Within an Assembled 30 mm Cage System
- ▶ Two Swing Latches Quickly Attach to Cage Rods
- ▶ SM1 (1.035"-40) Tapped Hole Accepts Optics Up to 0.19" (4.9 mm) Thick
- ▶ Two SM1RR Retaining Rings Included



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STK01 Removable 30 mm Cage Mount Being Mounted Within a 30 mm Cage System

The STK01 cage mount allows Ø1" optics to be inserted or removed from a closed 30 mm cage structure. The cage mount uses two swinging latches that are locked in place with four 5/64" (2 mm) hex locking screws. Optics 1" in diameter and up to 0.19" (4.9 mm) thick can be secured in the cage plate using the included two SM1RR retaining rings.

Part Number	Description	Price	Availability
STK01	Drop-In 30 mm Cage Mount, Swing Latch, 0.35" Thick, 2 Retaining Rings	\$40.86	Today



### Ø2" Round Cage Plates (30 mm Cage and SM1 Compatible)

- ▶ Compatible with 30 mm Cage Systems
- ▶ CP07 Offers SM1 (1.035"-40) Internal Threading and Smooth Ø2" Outer Diameter
- ▶ CP07T Offers SM1 (1.035"-40) Internal Threading and SM2 (2.035"-40) External Threads
- ▶ Ideal for Mounting Cage Assemblies in Optomechanical Mounts Designed for Ø2" Optics
- ▶ Not Post Mountable



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The CP07 and CP07T are ideal for mounting small cage subassemblies into optomechanical mounts designed for Ø2" optics (such as our KS2 Ø2" kinematic mirror mount) or SM2-series threads (such as our SM2-series lens tubes). Both plates feature an SM1 (1.035"-40) tapped hole for mounting Ø1" optics up to 0.2" (5 mm) thick. Each cage rod through hole is accompanied by a side-located locking 4-40 setscrew, which can be secured using a 0.05" (1.3mm) hex key. One SM1RR retaining ring is included. Pictured to the right is the CP07T cage plate being used in a 4-axis alignment system that can be used with laser diode modules and fiber collimators.

The CP07 has a smooth Ø2" outer diameter, which works well with Ø2" mounts with a setscrew, while the CP07T has SM2 (2.035"-40) external threads.

Part Number	Description	Price	Availability
CP07	Ø2" Outer Diameter Round Cage Plate with SM1 Internal Thread (SM1RR Inc.)	\$31.12	Today
CP07T	SM2-Threaded Round Cage Plate with SM1 Internal Thread (SM1RR Inc.)	\$32.20	Today

### Drop-In, Pivoting 30 mm Cage Mount with Flexure Lock, 360° Rotation

- ▶ Flexure Clamping Mechanism for Secure Cage Mounting without Disassembly
- ▶ 360° Rotation for On- and Off-Axis Optic Alignment
- ▶ SM1-Threaded (1.035"-40) Optic Cell Accepts Optics up to 7 mm Thick
- ▶ Two SM1RR Retaining Rings Included



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The CP360R snaps into pre-assembled cage systems, and can be used to mount optics both off-axis (such as a mirror mounted at 45°, shown on the right above) or on-axis.

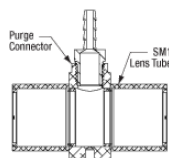
The CP360R(/M) drop-in cage mount allows for 360° rotation of a Ø1" optic within a 30 mm cage system. To insert one of these mounts into a cage system, turn the optic perpendicular to the optical axis, and snap the mount onto adjacent cage rods before tightening the setscrew in each flexure clamp using a 0.05" (1.3 mm) hex key (not included).

The optic can be rotated via the knurled knob or 3/16" (5.0 mm) hex, and the optic mount's pivot position can then be locked via a 0.05" (1.3 mm) hex. An engraved scale indicates the angle of the optic, with tick marks every 5°. Please note that when using with beamsplitters, the clear aperture will be an ellipse with a minor axis of approximately 0.315" (8 mm) when used at 45° AOI.

Part Number	Description	Price	Availability
CP360R/M	Customer Inspired! Pivoting, Quick-Release, Ø1" Optic Mount for 30 mm Cage System (Metric)	\$101.46	Today
CP360R	Customer Inspired! Pivoting, Quick-Release, Ø1" Optic Mount for 30 mm Cage System	\$101.46	5-8 Days

### Purge Connector for 30 mm Cage Systems

- ▶ Cage Plate with Integrated Purge Port for Connecting Two SM1 Lens Tubes
- ▶ Compatible with Thorlabs' PACU™ Pure Air Circulator Unit and 30 mm Cage Systems
- ▶ Cage Plate Thickness: 0.75" (19 mm)
- ▶ Max Pressure: 30 psi (200 kPa)
- ▶ Two 8-32 (M4) Mounting Holes at 90° Positions for Ø1/2" Post Mounting



Click to Enlarge  
Cross-Section View of  
CPPC Purge Connector  
with Two SM1L10 Lens  
Tubes



Click to Enlarge  
[APPLIST]  
[APPLIST]

Two CPPC Purge Connectors can be used with our PACU Pure Air Circulator Unit, which operates ideally in a closed-loop configuration.

The CPPC Cage Plate Purge Connector for SM1 Lens Tubes makes enclosed SM1 lens tube systems compatible with our PACU Pure Air Filtration System via the hose barb. The barb is compatible with 3/16" internal diameter tubing, such as that included with the PACU Pure Air Filtration System or our replacement tubing. The purge connector has SM1 (1.035"-40) internal thread to use with SM1 Lens Tubes or accessories. It also features four Ø6 mm bores for compatibility with our 30 mm cage system and is 0.75" (19 mm) thick. Each cage locking set screw has a 5/64" (2 mm) hex. The bottom and side of the cage plate also offer 8-32 (M4) mounting holes for post mounting.

We recommend using two or more CPPC Purge Connectors with our PACU Pure Air Circulator Unit, which has two connections: one for supply and one for return. This device incorporates dessicant and particulate filters in series and excels at providing an extremely clean, dry atmosphere for closed-loop experimental setups.

**Note:** The CPPC Purge Connector is strictly intended for purging or purifying the air in a lens-tube-enclosed beam path. Our lens tubes are not air tight and the SM1 thread is not suitable for pressurized or vacuum applications. Please do not apply sealant or tape to the thread.

Part Number	Description	Price	Availability
CPPC/M	Customer Inspired! Ø1" Lens Tube Purge Connector, M4 Taps	\$47.74	Today
CPPC	Customer Inspired! Ø1" Lens Tube Purge Connector, 8-32 Taps	\$47.74	Today

### Cylindrical Lens Mount for 30 mm Cage Systems

- ▶ Rectangular Optic Mount for 30 mm Cage Systems
- ▶ Two Manually Positioned Arms Hold Optics up to 0.66" (16.8 mm) Tall Within the Cage System
- ▶ Internal SM1 (1.035"-40) Threads Compatible with Ø1" Lens Tubes
- ▶ Graduations at 1 mm Intervals Help with Centration and Repeatability

This animation depicts various mounting options of the CYCP Cylindrical Lens Mount.

Thorlabs' Cylindrical Lens Mount for 30 mm Cage Systems is designed to orient a cylindrical lens or another rectangular optic horizontally or vertically within a 30 mm cage system. The lens is effectively clamped between the two sliding arms, each of which is lined with a 1.51" (38.3 mm) long rubber pad and has a lip for resting the plano side of the lens against. The manually positioned arms can hold optics from 0.16" to 0.66" tall (4.0 mm to 16.8 mm) before the arms begin to obscure the through holes for the cage system.

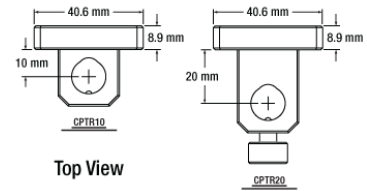
Each arm is secured to the side-mounted 2" long cage rods (Item # ER2) using two 4-40 setscrews that accept a 0.05" (1.3 mm) hex key. The cage plate is tightened to these cage rods by two additional 4-40 setscrews. The cage plate and arms can be moved and locked independently. Hence, by loosening the cage plate while keeping the arms tightened, the user may translate a lens parallel to the cage rods (i.e., in a transverse direction) without disturbing the rest of the cage system. The arms can also be relocated from the front of the cage plate to the back of the cage plate.

For additional information, please see the complete product presentation.

Part Number	Description	Price	Availability
CYCP/M	30 mm Cage Mount for Cylindrical Lenses, M4 Tap	\$88.47	Today
CYCP	30 mm Cage Mount for Cylindrical Lenses, 8-32 Tap	\$88.47	Today

### 30 mm Cage to Ø1/2" Post Adapters

- ▶ Mounts Ø1/2" TR Post and Components in a 30 mm Cage System
- ▶ Double-Bored Hole and Locking Thumbscrew Securely Locks Post in Position
- ▶ CP33(M) Cage-Plate-Style Front Face with SM1-Threaded Through-Hole



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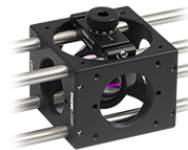
Thorlabs' 30 mm cage to Ø1/2" post adapters allow the integration of our post-mounted components into our 30 mm cage system. The front face of this clamp is similar to the CP33(M) cage plate and accommodates our Ø6 mm ER cage rods which are secured using the side-located locking setscrews and are 30 mm apart. The center-located SM1 (1.035"-40) threaded bore, which is compatible with our popular Ø1" lens tubes, directly accepts a Ø1" optic up to 0.19" (4.8 mm) thick. Two SM1RR retaining rings are included.

The tail stock of this adapter has a double-bored through-hole and a spring-loaded thumbscrew that provide three-point contact for Ø1/2" posts for secure placement. Two versions are available, providing either 10 mm [CPTR10(M)] or 20 mm [CPTR20(M)] separation between the post center and the back of the cage plate.

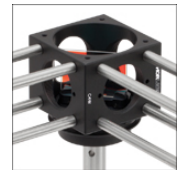
Part Number	Description	Price	Availability
CPTR10/M	Cage Plate to Ø1/2" Post Adapter, 10 mm Post Offset, Metric Thumbscrew	\$38.80	Today
CPTR20/M	Cage Plate to Ø1/2" Post Adapter, 20 mm Post Offset, Metric Thumbscrew	\$38.80	Today
CPTR10	Cage Plate to Ø1/2" Post Adapter, 10 mm Post Offset, Imperial Thumbscrew	\$38.80	Today
CPTR20	Cage Plate to Ø1/2" Post Adapter, 20 mm Post Offset, Imperial Thumbscrew	\$38.80	Today

### 30 mm Cubes

- ▶ Two Models for 30 mm Cage Systems
- ▶ Two Sides with Ø1.75" (44.5 mm) Through Holes
- ▶ C4W: Four Sides with Four 4-40 Tapped Holes Around an SM1-Threaded Hole
- ▶ C6W: Two Sides with Four 4-40 Tapped Holes and Two Sides with Ø6 mm Clearance Through Holes Around an SM1-Threaded Hole
- ▶ Compatible with Ø6 mm ER Series Cage Rods
- ▶ Compatible with all Accessories Sold on this Page



[Click to Enlarge](#)  
The CP360R Quick-Release Mount for Ø1" Optics Being Used Within the C6W Cube



[Click to Enlarge](#)  
B4C Platform and the FFM1 Filter Holder Mounted Within the C4W Cube

The C4W offers four planar cube faces with 4-40 tapped holes for mounting cage system rods centered on an SM1 (1.035"-40) threaded hole. The "top" and "bottom" faces of the cube are machined with Ø1.75" (44.5 mm) holes and tapped holes designed for mounting our Cage Cube Plates (featured below).

The C6W offers the same machined face options as the C4W with the exception of two opposing faces machined with Ø6 mm through-holes rather than 4-40 tapped holes. This allows cage rods to pass through the cube, rather than be fastened to it. This unique feature allows the cube to be translated along the cage rods, and then locked in place with the included setscrews.

These cage cubes are compatible with a range of 30 mm Cage Components, including port hole covers and cage cube platforms.

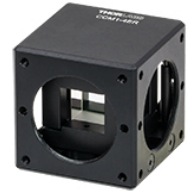
Part Number	Description	Price	Availability
C4W	30 mm Cage Cube	\$64.12	Today
C6W	30 mm Cage Cube, Ø6 mm Through Holes	\$67.63	Today

### Compact 30 mm Cage Cube for Prisms and Beamsplitter Cubes

- ▶ Compatible with 30 mm Cage System and SM1 Lens Tubes
- ▶ Directly Accepts 1" Cubes and 25 mm Right-Angle Prisms
- ▶ Mounting Adapters Available for Thorlabs' Beamsplitter Cubes Smaller than 25 mm
- ▶ Four SM1-Threaded Ports
- ▶ Base is Post Mountable via 8-32 (M4) Tap
- ▶ 3 Prism Alignment Stops Provide Accuracy of  $\pm 20$  arcmin



Click to Enlarge  
CCM1-4ER with Penta Prism (Optic Sold Separately)



Click to Enlarge  
BS127CAM Beamsplitter Cube Adapter Mounted in the CCM1-4ER Cage Cube (Optic and Adapter Sold Separately)

These 1.5" wide cage cubes directly accept a 1" or 25 mm square optic, such as a beamsplitter cube or right-angle prism, with adapters available here for mounting a 5 mm (0.20"), 10 mm (0.39"), 12.7 mm (0.50"), or 20 mm (0.79") beamsplitter cube. The base of the cube has an 8-32 (M4) tap to attach to  $\varnothing 1/2$ " Posts. Shown to the far right is a 12.7 mm (0.50") beamsplitter cube being mounted in the CCM1-4ER using the BS127CAM Beamsplitter Cube Adapter. Two cage cubes can be connected using ER rods and ERSCA Cage Rod Adapters.

The optic is clamped within the cube by tightening three 1.5 mm hex screws of a tension plate (see image to the right), allowing the user to replace the optic with any other compatible optic when necessary. The optic must sit flush against the three corners of the cube base. Do not overtighten the tension plate, this could damage the optic. The image to the right shows a penta prism mounted in a CCM1-4ER with the outer housing removed.

Part Number	Description	Price	Availability
CCM1-4ER/M	Customer Inspired! Compact Clamping 4-Port Prism/Mirror 30 mm Cage Cube, M4 Tap	\$141.76	Today
CCM1-4ER	Customer Inspired! Compact Clamping 4-Port Prism/Mirror 30 mm Cage Cube, 8-32 Tap	\$141.76	Today

### 30 mm Cage Cube Connector

- ▶ Connect Two 2" Wide Cage Cubes Side by Side
- ▶ Connect a 2" Wide Cage Cube to a 1.5" Wide Cage Cube
- ▶ Compatible with C4W and C6W Cage Cubes

The C4W-CC allows our 2" wide 30 mm cage cubes to be connected together as shown in the image to the right. Our C4W and C6W cubes are both compatible with this connector. This connector can also be used to connect one 2" wide 30 mm cage cube, such as our C4W or C6W, with a 1.5" wide 30 mm cage cube. The C4W-CC includes four 4-40 button-head screws, two 4-40 flat-head screws, four washers, and 1/16" hex key.

We also offer the CM1-CC to connect two 1.5" wide cage cubes.

#### Alignment Pins

Please note that this connector requires drilled holes on the cube face next to the SM1-threaded ports, as the cube connector has alignment pins. If you have an older cube and would like it updated for free, please contact Technical Support. Alternatively, the alignment pins are press-fit inside their mounting holes and can be pressed out for use with un-drilled cubes.



Click to Enlarge  
[APPLIST]  
[APPLIST]  
C4W-CC Connecting Two 2" Wide Cage Cubes



Click to Enlarge  
[APPLIST]  
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A C4W and C6W Cage Cube connected to a 1.5" wide CCM1-4ER Compact Cage Cube using the C4W-CC and CM1-CC Cube Connectors, respectively.

Part Number	Description	Price	Availability
C4W-CC	Customer Inspired! 30 mm Cage Cube Connector for C4W and C6W Series Cubes	\$54.65	Today

Visit the *SM1 Lens Tube Compatible Cage Plates* page for pricing and availability information:

[https://www.thorlabs.com/newgroupage9.cfm?objectgroup\\_id=4114](https://www.thorlabs.com/newgroupage9.cfm?objectgroup_id=4114)