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**THORLABS**

## CP02 - OCT 25, 2019

Item # CP02 was discontinued on OCT 25, 2019. For informational purposes, this is a copy of the website content at that time and is valid only for the stated product.

### STANDARD 30 MM CAGE PLATES

- ▶ Compatible with 30 mm Cage Systems
- ▶ Designed for use with ER Construction Rods
- ▶ Mount Optics from Ø5 mm to Ø1" and Lens Tubes

The CP02F Cage Plate's flexure arm automatically compensates for cage rod misalignment to prevent cage plate binding.



**CP06**  
 Double Bore for  
 Ø1" Optics



**CP11**  
 Internal SM05 Threads



**CP12**  
 Ø1.2" Double Bore for  
 SM1 Lens Tubes



**CP02F**  
 SM1-Threaded  
 Dual Flexure Cage Plate



## OVERVIEW

The Cage Assembly System provides a convenient way to construct large optomechanical systems with an established line of precision-machined building blocks designed for high flexibility and quick, accurate alignment. The 30 mm cage plates featured below provide a means for mounting optical components with diameters ranging from 5 mm to 1" within a cage system. Many of the components are post mountable via an 8-32 (M4) tap in the cage plate (see below for details).

## Alternative Size Options

16 mm Cage Plates

30 mm Cage Plates

60 mm Cage Plates

**Cage System Compatibility:** Thorlabs offers 16 mm, 30 mm, and 60 mm cage systems primarily designed for  $\varnothing 1/2"$ ,  $\varnothing 1"$ , and  $\varnothing 2"$  optical components, respectively. The parts on this page are compatible with our 30 mm cage system and utilize  $\varnothing 6$  mm ER cage rods.

## Selection Guide

Item #	Inner Bore	Plate Thickness	Post Mounting	Cage Rod Locking Mechanism
CP11(/M)	SM05 Threaded <sup>a</sup>	0.35"	8-32 (M4)	Setscrew, 0.050" Hex
CP02(/M)	SM1 Threaded <sup>a</sup>	0.35"	8-32 (M4)	
CP02T	SM1 Threaded <sup>a</sup>	0.50"	8-32 (M4)	
CP33T/M	SM1 Threaded <sup>a</sup>	0.50"	8-32 (M4)	Setscrew, 2.0 mm (5/64") Hex
CP02F(/M)	SM1 Threaded <sup>a</sup>	0.35"	8-32 (M4) 1/4"-20 (M6)	Cap Screw Flexure, 5/64" (2.0 mm) Hex
CP08(/M)	SM1 Threaded <sup>a</sup>	0.35"	8-32 (M4)	Cap Screw Flexure, 3/32" (2.5 mm) Hex
CP4S	SM1 Threaded <sup>a</sup>	0.16" (4 mm)	N/A	Setscrew, 0.050" Hex
CP6S	SM1 Threaded <sup>a</sup>	0.24" (6 mm)	N/A	
CP8S	SM1 Threaded <sup>a</sup>	0.32" (8 mm)	N/A	
CP16	RMS (0.800"-36) Threaded	0.35"	Universal 8-32 / M4	Setscrew, 5/64" (2.0 mm) Hex
CP13(/M)	C-Mount (1.00"-32) Threaded	0.35"	8-32 (M4)	Setscrew, 5/64" (2.0 mm) Hex
CP14(/M)	$\varnothing 1/2"$ Double Bore with Setscrew	0.35"	8-32 (M4)	Setscrew, 5/64" (2.0 mm) Hex
CP06(/M)	$\varnothing 1"$ Double Bore with Setscrew	0.35"	8-32 (M4)	Setscrew, 0.050" Hex
CP06F(/M)	$\varnothing 1"$ Double Bore with Setscrew	0.35"	8-32 (M4)	Cap Screw Flexure, 5/64" (2.0 mm) Hex
CP12	$\varnothing 1.2"$ Double Bore <sup>b</sup> with Setscrew	0.35"	N/A	Setscrew, 0.050" Hex
CP03(/M)	$\varnothing 35$ mm Double Bore <sup>c</sup> with Setscrew	0.35"	8-32 (M4)	
CP07	SM1 Threaded <sup>a</sup>	0.35"	N/A	
CP07T	SM1 Threaded <sup>a</sup> with SM2-Threaded Outer Diameter	0.35"	N/A	
CP1Mxx or CP1TMxx	M6, M8, M9, M10, or M12 Threaded <sup>d</sup>	0.35"	8-32 (M4)	Setscrew, 0.050" or 5/64" (2.0 mm) Hex
CPMxx	M5.5, M6.5, M8.5, M9.5, M15.5, 0.750"-40, or M20.5 Threaded <sup>e</sup>	0.23" - 0.40"	N/A	Setscrew, 0.050" Hex
CP01(/M)	None	0.35"	8-32 (M4)	
CPG3	Cage Plate Gasket for Light-Tight Applications			
ERCPS	Cage Plate Stops for Precise Alignment			
VRC4CPT, CPA2, and CPA1	Alignment Guides for the 30 mm Cage System			

- In addition to being able to secure components with complementary threads, our SM05 (0.535"-40) and SM1 (1.035"-40) thread standards are designed to hold 1/2" and  $\varnothing 1"$  optics, respectively.
- This double bore diameter is matched to the outer diameter of our SM1 lens tubes.
- This double bore diameter is matched to the outer diameter of our SM30 lens tubes and select free-space isolators.
- Thread standard for a premounted aspheric or achromatic lens.
- Thread standard for holding an unmounted aspheric, achromatic, or other small-diameter ( $\leq \varnothing 20$  mm) optic.



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Many of Our Cage Plates  
Have Internal SM1  
Threads



CP02 Cage Plate shown  
with HKTS-050 Hex Key  
Thumbscrews for Easy  
Adjustment

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The CP16 mounting an RMS-  
threaded objective into a 30 mm  
cage system.

## CAGE OVERVIEW

## Cage System Overview

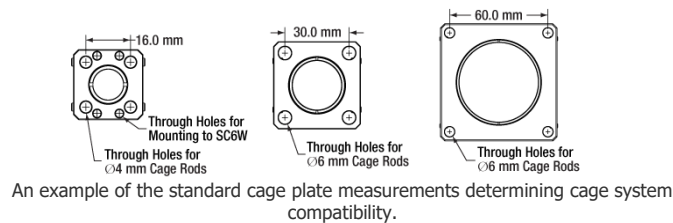
The Cage Assembly System provides a convenient way to construct large optomechanical systems with an established line of precision-machined building blocks designed for high flexibility and accurate alignment.

### 16 mm, 30 mm, and 60 mm Cage System Standards

Thorlabs offers three standards defined by the center-to-center spacing of the cage assembly rods (see image below). The 16 mm cage, 30 mm cage, and 60 mm cage standards are designed to accommodate  $\varnothing 1/2"$ ,  $\varnothing 1"$ , and  $\varnothing 2"$  optics, respectively. Specialized cage plates that allow smaller optics to be directly inserted into our larger cage systems are also available.

### Standard Threads

The flexibility of our Cage Assembly System stems from well-defined mounting and thread standards designed to directly interface with a wide range of specialized products. The three most prevalent thread standards are our SM05 Series (0.535"-40 thread), SM1 Series (1.035"-40 thread), and SM2 Series (2.035"-40 thread), all of which were defined to house the industry's most common optic sizes. Essential building blocks, such as our popular lens tubes, directly interface to these standards.



Standard Cage System Measurements			
Cage System	16 mm	30 mm	60 mm
Thread Series	SM05	SM1	SM2
Rod to Rod Spacing	16 mm (0.63")	30 mm (1.18")	60 mm (2.36")
Total Length	25 mm (0.98")	41 mm (1.60")	71.1 mm (2.8")

Cage Components		
Cage Rods	16 mm	These rods are used to connect cage plates, optic mounts, and other components in the cage system. The SR Series Cage Rods are compatible with our 16 mm cage systems, while the 30 mm and 60 mm cage systems use ER Series Cage Rods.
	30 mm	
	60 mm	
Cage Plates	16 mm	These serve as the basic building blocks for a cage system. They may have SM-threaded central bores, smooth bores sized for industry standard optics or to accommodate the outer profile of our SM Series Lens Tubes, or specialized bores for other components such as our FiberPorts.
	30 mm	
	60 mm	
Optic Mounts	16 mm	Thorlabs offers fixed, kinematic, rotation, and translation mounts specifically designed for our Cage Systems.
	30 mm	
	60 mm	
Cage Cubes	16 mm	These cubes are useful for housing larger optical components, such as prisms or mirrors, or optics that need to sit at an angle to the beam path, such as beamsplitters. Our cage cubes are available empty or with pre-mounted optics.
	30 mm	
	60 mm	
Post and Breadboard Mounts and Adapters		Mounting options for cage systems can be found on our Cage System Construction pages. Cage Systems can be mounted either parallel or perpendicular to the table surface.
Size Adapters		Cage System Size Adapters can be used to integrate components from different cage system and threading standards.
Specialized Components		Thorlabs also produces specialized cage components, such as Filter Wheels, a HeNe Laser Mount, and a FiberPort Cage Plate Adapter, allowing a wide range of our products to be integrated into cage-mounted optical systems. Explore our Cage Systems Visual Navigation Guide to see the full range of Thorlabs' cage components.

### SM05-Threaded Cage Plate

- ▶ Directly Mounts  $\varnothing 1/2$ " Optical Components Within a 30 mm Cage System Assembly
- ▶ 0.35" Thick
- ▶ Tapped with Our Standard SM05 Thread (0.535"-40)
- ▶ Post Mountable via 8-32 (M4) Tapped Hole



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The CP11(/M) is 0.35" thick with a center-located SM05 (0.535"-40) threaded bore that is compatible with our popular  $\varnothing 1/2$ " lens tubes. The bore can also directly accept a  $\varnothing 1/2$ " optic up to 0.2" (5 mm) thick. Two SM05RR retaining rings are included.

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. For additional convenience, an 8-32 (M4) tapped hole is provided for post mounting applications.

For those looking to convert from the 30 mm to the 16 mm cage system standard, Thorlabs offers a similar product, the SP05 cage plate.

Part Number	Description	Price	Availability
CP11/M	SM05-Threaded 30 mm Cage Plate, 0.35" Thick, Two Retaining Rings, M4 Tap	\$17.92	Today
CP11	SM05-Threaded 30 mm Cage Plate, 0.35" Thick, Two Retaining Rings, 8-32 Tap	\$17.92	Lead Time

### 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



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The CP02(/M) cage plate is 0.35" thick and provides a center-located SM1 (1.035"-40) threaded bore that is compatible with our popular  $\varnothing 1$ " lens tubes. The SM1-threaded bore can also directly accept a  $\varnothing 1$ " 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 0.05" (1.3 mm) hex key or balldriver.

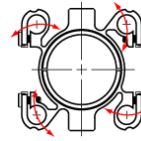
The CP02T and CP33T/M cage plates are 0.50" thick and have center-located SM1-threaded holes that directly accept optics up to 0.35" (8.9 mm) thick. They feature an extra-thick design with double locking setscrews that enables two extension rods to be inserted end-to-end and firmly locked into place, 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
CP02/M	SM1-Threaded 30 mm Cage Plate, 0.35" Thick, 2 Retaining Rings, M4 Tap	\$16.89	Lead Time
CP33T/M	NEW! SM1-Threaded 30 mm Cage Plate, 0.50" Thick, 2 Retaining Rings, M4 Tap	\$23.27	Today
CP02	SM1-Threaded 30 mm Cage Plate, 0.35" Thick, 2 Retaining Rings, 8-32 Tap	\$16.89	Lead Time
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



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.

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 CP02 Cage Plate, each CP02F arm clamps onto cage rods using a separate flexure clamp that increases holding force and cage plate rigidity.

Like our our CP02(/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"



View of Clamping Mechanism  
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The CP08(/M) Cage Plate provides a more stable clamping mechanism for cage rods than our popular CP02(/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.

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 CP02(/M) and the CP02T(/M) 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

### RMS-Threaded Cage Plate

- ▶ Integrates RMS Components with a 30 mm Cage System Assembly
- ▶ Tapped with RMS Threading (0.800"-36)
- ▶ Post Mountable via Universal Tap for 8-32 and M4
- ▶ Thickness: 0.35" (8.9 mm)

The CP16 Cage Plate allows for RMS-threaded components, including many of our microscope objectives, to be incorporated with our 30 mm cage system. Each cage rod through hole is accompanied by a side-located locking M4 setscrew, which can be secured using a 5/64" (2.0 mm) balldriver or hex key. The CP16 can also be post mounted using a universally-threaded bottom hole compatible with both 8-32 and M4 threads.

We also offer the RMSRR RMS Retaining Ring (not included) for positioning components within the cage plate.



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The CP16 mounting an RMS-threaded objective into a 30 mm cage system.

Part Number	Description	Price	Availability
CP16	Customer Inspired! RMS-Threaded 30 mm Cage Plate, 0.35" Thick, Universal 8-32 / M4 Tap	\$32.78	Today

### C-Mount-Threaded Cage Plate

- ▶ Integrates C-Mount Components with a 30 mm Cage System Assembly
- ▶ Tapped with C-Mount Threading (1.00"-32)
- ▶ Post Mountable via 8-32 (M4) Tapped Hole
- ▶ Thickness: 0.35" (8.9 mm)

The CP13(/M) Cage Plate allows for C-Mount-threaded components to be incorporated with our 30 mm cage system. Possible components include our line of C-Mount extension tubes, CMOS/CCD cameras, and camera lenses. Each cage rod through hole is accompanied by a side-located locking M4 setscrew, which can be secured using a 5/64" (2.0 mm) balldriver or hex key. The CP13(/M) can also be post mounted via an 8-32 (M4) tapped mounting hole.

We also offer the CMRR C-Mount Retaining Ring (not included) for positioning components within the cage plate. This cage plate has an inner diameter that is too small to accept  $\varnothing 1"$  ( $\varnothing 25.4$  mm) or  $\varnothing 25$  mm ( $\varnothing 0.98"$ ) optics. Optics of thickness less than 0.18" (4.5 mm) with diameters between 0.87" and 0.97" can be secured inside this cage plate using two retaining rings.



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The CP13(/M) Cage Plate can integrate cameras into a 30 mm cage system.

Part Number	Description	Price	Availability
CP13/M	Customer Inspired! C-Mount-Threaded 30 mm Cage Plate, 0.35" Thick, M4 Tap	\$32.78	Today
CP13	Customer Inspired! C-Mount-Threaded 30 mm Cage Plate, 0.35" Thick, 8-32 Tap	\$32.78	Today

### Standard Cage Plate for Ø1/2" Optics

- ▶ Double Bore for Ø1/2" Optics
- ▶ Directly Mounts Optical Components Within a 30 mm Cage System Assembly
- ▶ Post Mountable via 8-32 (M4) Tapped Hole
- ▶ Nylon-Tipped Locking Setscrew



Click to Enlarge CP14 mounting a Ø1/2" mirror in a cage system.

This CP14(/M) Cage Plate allows a Ø1/2" mirror or other optical component to be aligned in our 30 mm cage system. The double-bored mounting area provides two lines of stable contact to hold the optic. It features a top-located, nylon-tipped setscrew, which can be fastened with a 5/64" (2.0 mm) balldriver or hex key to secure the optic in place. The optic must be at least 0.15" (3.8 mm) thick in order to be properly mounted in the cage plate. The cage plate also has a bottom-located 8-32 (M4) tap for post mounting. Each cage rod through hole is accompanied by a side-located locking setscrew, which can be secured using a 5/64" (2.0 mm) balldriver or hex key.

Part Number	Description	Price	Availability
CP14/M	30 mm Cage Plate with Ø1/2" Double Bore, M4 Tap	\$23.34	Today
CP14	30 mm Cage Plate with Ø1/2" Double Bore, 8-32 Tap	\$23.34	Today

### Standard Cage Plate for Ø1" Optics

- ▶ Double Bore for Ø1" Optics
- ▶ Directly Mounts Optical Components Within a 30 mm Cage System Assembly
- ▶ Post Mountable via 8-32 (M4) Tapped Hole
- ▶ Nylon-Tipped Locking Setscrew



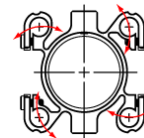
Click to Enlarge Fiber Focusing Application

This CP06(/M) Cage Plate allows a Ø1" mirror or other optical component to be aligned in our 30 mm cage system. The double-bored mounting area provides two lines of stable contact to hold the optic. It features a top-located, nylon-tipped setscrew, which can be fastened with a 5/64" (2.0 mm) balldriver or hex key to secure the optic in place. The optic must be at least 0.15" (3.8 mm) thick in order to be properly mounted in the cage plate. It also has a bottom-located 8-32 (M4) tap for post mounting. Each cage rod through hole is accompanied by a side-located locking 4-40 setscrew, which can be secured using a 0.05" (1.3 mm) balldriver or hex key.

Part Number	Description	Price	Availability
CP06/M	30 mm Cage Plate with Ø1" Double Bore, M4 Tap	\$18.68	5-8 Days
CP06	30 mm Cage Plate with Ø1" Double Bore, 8-32 Tap	\$18.68	Today

### Dual Flexure Cage Plate for Ø1" Optics

- ▶ Self-Aligning Cage Rod Arms Eliminate Cage Plate Binding
- ▶ Double Bore for Ø1" Optics
- ▶ Directly Mounts Optical Components Within a 30 mm Cage System Assembly
- ▶ Post Mountable via 8-32 (M4) Tapped Hole
- ▶ Nylon-Tipped Locking Setscrew



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



Click to Enlarge Two Flexure Cage Plates in a 30 mm Cage System

The CP06F(/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 CP06 Cage Plate, each CP06F arm clamps onto cage rods using a separate flexure clamp that increases holding force and cage plate rigidity.

Like our CP06(/M) cage plate, it is 0.35" thick and provides a center-located Ø1" double bore for mounting a Ø1" optic at least 0.125" (3.2 mm) thick. The optic is retained by a nylon-tipped setscrew with a 5/64" (2.0 mm) hex. 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.

The CP06(/M) cage plate can be post-mounted via the 8-32 (M4) tapped hole on the bottom. We also offer the CP02F(/M) Cage Plate with Internal SM1 Threads.

Part Number	Description	Price	Availability
CP06F/M	30 mm Flexure Cage Plate with Ø1" Double Bore, M4 Tap	\$22.07	Today
CP06F	30 mm Flexure Cage Plate with Ø1" Double Bore, 8-32 Tap	\$22.07	Today



### 30 mm Cage Plate with Ø1.2" Bore

- ▶ Ø1.2" 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



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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 Ø1.2" 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 Ø1/2" posts and the clear aperture of the bore. Therefore, this cage plate cannot be used directly with Ø1/2" 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, Ø1.2" Double Bore for SM1 and C-Mount Lens Tubes	\$22.07	Today

### 30 mm Cage Plate with 35 mm Clear Aperture

- ▶ 35 mm Bore Supports Outside Diameter of SM30 Lens Tubes and Ø1.38" Free-Space Isolators
- ▶ Designed with the Largest Possible Clear Aperture (Ø35 mm)
- ▶ Compatible with 30 mm Cage Systems
- ▶ Post Mountable with a 8-32 (M4) Tapped Hole

The CP03 cage plate is designed to allow our SM30 Lens Tubes or Ø1.38" Free-Space Isolators to be mounted in our 30 mm cage system. It also offers the largest clear aperture (Ø35 mm) possible within a 30 mm cage system assembly. This plate is also suited for supporting long cage assemblies, providing a greater degree of structural rigidity without interfering with the optical path.

The Ø35 mm hole is large enough to allow an SM1-series lens tube to pass through completely unobstructed. 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.

Part Number	Description	Price	Availability
CP03/M	Ø35 mm Aperture, 30 mm Cage Plate, 0.35" Thick, M4 Tap	\$19.91	Today
CP03	Ø35 mm Aperture, 30 mm Cage Plate, 0.35" Thick, 8-32 Tap	\$19.91	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

### 30 mm Cage Plates for Premounted Aspheric and Achromatic Lenses

- ▶ Internal Threads Compatible with our Premounted Aspheric and Achromatic Lenses
- ▶ 0.35" Thick Cage Plate
- ▶ 8-32 (M4) Tap for Post Mounting
- ▶ Compatible with 30 mm Cage Systems

These cage plates are ideal for mounting aspheric or small achromatic lenses in a 30 mm cage system without the use of adapters. They are available with M6, M8, M9, M10, or M12 internal threads. The cage plates with M12 internal threads are ideal for mounting our singlet and triplet fiber collimators with external M12 x 0.5 threading. Each cage rod through hole is accompanied by a side-located locking setscrew, which can be secured to a cage rod using a 5/64" or 0.05" hex key (see the table below).

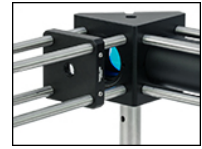
Alternatively, aspheric lenses can be mounted within a cage system using our aspheric lens adapters and a standard SM1-threaded cage plate.

Item #	Internal Thread	Setscrew Hex Size	Base Item # of Compatible Mounted Lenses	Mount Thickness
CP1TM06	M6 x 0.5	0.05"	A414TM, C140TME, C151TMD, C392TME, C430TME, C710TME Aspheric Lenses	0.35" (8.9 mm)
CP1M06/M	M6 x 0.5	5/64"		
CP1TM08(/M)	M8 x 0.5	0.05"	C021TME, C170TME, C350TMD, C390TME, C440TME, C660TME Aspheric Lenses	
CP1M09(/M)	M9 x 0.5	5/64"	A110TM, A220TM, A230TM, A375TM, A390TM, A397TM, C036TME, C037TME, C110TME, C220TME, C230TME, C260TMD, C280TME, C330TMD, C340TMD, C560TME, C610TME, C671TME Aspheric Lenses; Ø5 mm, Ø6 mm, and Ø6.35 mm Mounted Achromatic Doublets	
CP1TM10	M10 x 0.5	0.05"	C028TME Aspheric Lenses	
CP1M10/M	M10 x 0.5	5/64"		
CP1TM12(/M)	M12 x 0.5	0.05"	A240TM, C240TME Aspheric Lenses; Ø8 mm Mounted Achromatic Doublets	

Part Number	Description	Price	Availability
CP1M06/M	NEW! 30 mm Cage Plate with M6 x 0.5 Internal Threads, M4 Tap	\$40.04	Today
CP1TM08/M	30 mm Cage Plate with M8 x 0.5 Internal Threads, M4 Tap	\$40.04	5-8 Days
CP1M09/M	NEW! 30 mm Cage Plate with M9 x 0.5 Internal Threads, M4 Tap	\$40.04	Today
CP1M10/M	NEW! 30 mm Cage Plate with M10 x 0.5 Internal Threads, M4 Tap	\$40.04	Today
CP1TM12/M	30 mm Cage Plate with M12 x 0.5 Internal Threads, M4 Tap	\$40.04	Today
CP1TM06	30 mm Cage Plate with M6 x 0.5 Internal Threads, 8-32 Tap	\$40.04	Today
CP1TM08	30 mm Cage Plate with M8 x 0.5 Internal Threads, 8-32 Tap	\$40.04	Today
CP1M09	NEW! 30 mm Cage Plate with M9 x 0.5 Internal Threads, 8-32 Tap	\$40.04	Today
CP1TM10	30 mm Cage Plate with M10 x 0.5 Internal Threads, 8-32 Tap	\$40.04	Today
CP1TM12	30 mm Cage Plate with M12 x 0.5 Internal Threads, 8-32 Tap	\$40.04	Today

### 30 mm Cage Plates for Unmounted Optics from Ø5 mm to Ø20 mm

- ▶ Mount Ø5 mm to Ø20 mm Optics
- ▶ Two Retaining Rings Included for Mounting Optic
- ▶ Compatible with 30 mm Cage Systems
- ▶ Ideal for Use with Unmounted Aspheric and Achromatic Lenses
- ▶ Not Post Mountable



Click to Enlarge  
CPM08 Used to Mount an  
AC080-020-A Unmounted Ø8  
mm Achromatic Doublet in a  
30 mm Cage System with a  
KCB1 Mount

These cage plates are designed for mounting optics that have diameters up to 20 mm, such as our unmounted aspheric and achromatic lenses, into a 30 mm cage system. They have M5.5, M6.5, M8.5, M9.5, M15.5, 0.750"-40, or M20.5 internal threads and include two retaining rings of the appropriate size to secure the optic. The SPW801 spanner wrench is recommended when threading the retaining rings into place. Each cage rod through hole is accompanied by a side-located locking 4-40 setscrew, which can be secured to a cage rod using a 0.05" hex key.

Thorlabs also offers internally threaded, post-mountable fixed mounts, which are not cage compatible, for mounting optics from Ø5 mm to Ø4".

Item #	Optic Diameter	CA <sup>a</sup>	Optic Thickness (Max) <sup>b</sup>	Internal Threads	Retaining Ring	Mount Thickness	Spanner Wrench
CPM05	5 mm	Ø0.15" (Ø3.8 mm)	0.09" (2.2 mm)	M5.5 x 0.5	SM5RR	0.23" (5.7 mm)	SPW801
CPM06	6 mm	Ø0.19" (Ø4.8 mm)	0.11" (2.8 mm)	M6.5 x 0.5	SM6RR	0.25" (6.4 mm)	
CPM08	8 mm	Ø0.27" (Ø6.9 mm)	0.16" (4.0 mm)	M8.5 x 0.5	SM8RR	0.30" (7.6 mm)	
CPM09	9 mm	Ø0.31" (Ø7.9 mm)	0.16" (4.0 mm)	M9.5 x 0.5	SM9RR	0.30" (7.6 mm)	
CPM15	15 mm	Ø0.50" (Ø12.7 mm)	0.21" (5.3 mm)	M15.5 x 0.5	SM15RR	0.35" (8.9 mm)	
CPM18	18 mm	Ø0.62" (Ø15.7 mm)	0.24" (6.1 mm)	0.750"-40	SM18RR	0.40" (10.2 mm)	
CPM20	20 mm	Ø0.68" (Ø17.3 mm)	0.24" (6.1 mm)	M20.5 x 0.5	SM20RR	0.40" (10.2 mm)	

- Clear Aperture of Retaining Ring
- Maximum Optical Thickness: This specification is true for thin lenses. For lenses with small focal lengths, and hence large lens curvatures, please contact Tech Support to ensure a proper fit.

Part Number	Description	Price	Availability
CPM05	30 mm Cage Plate for Ø5 mm Optic, 2 SM5RR Retaining Rings Included	\$30.60	Today
CPM06	30 mm Cage Plate for Ø6 mm Optic, 2 SM6RR Retaining Rings Included	\$30.60	Today
CPM08	30 mm Cage Plate for Ø8 mm Optic, 2 SM8RR Retaining Rings Included	\$30.60	Today
CPM09	30 mm Cage Plate for Ø9 mm Optic, 2 SM9RR Retaining Rings Included	\$30.60	5-8 Days
CPM15	30 mm Cage Plate for Ø15 mm Optic, 2 SM15RR Retaining Rings Included	\$31.83	Today
CPM18	30 mm Cage Plate for Ø18 mm Optic, 2 SM18RR Retaining Rings Included	\$31.83	5-8 Days
CPM20	30 mm Cage Plate for Ø20 mm Optic, 2 SM20RR Retaining Rings Included	\$33.95	Today

### Blank Cage Plate

- ▶ Ideal for Custom Machining to Mount Non-Standard Components
- ▶ Designed for 30 mm Cage System
- ▶ Post-Mountable via 8-32 (M4) Tapped Hole
- ▶ Black-Anodized Aluminum

Blank cage plates are ideal when standard threads and hole sizes are insufficient for custom mounting and OEM-level requirements. Custom hole sizes and threads can be machined using any size drill bits and taps. Each cage rod through hole is accompanied by a side-located locking setscrew. For additional convenience, an 8-32 (M4) tapped hole is provided for post mounting and OEM-mounting applications. 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.

Thorlabs also offers 16 mm and 60 mm blank cage plates.

Part Number	Description	Price	Availability
CP01/M	Blank 30 mm Cage Plate, 0.35" Thick, M4 Tap	\$17.21	Today
CP01	Blank 30 mm Cage Plate, 0.35" Thick, 8-32 Tap	\$17.21	Today

### Optical Cage Plate Gasket

- ▶ Highly Compressible Material Blocks Light Between Mating Optical Mounts
- ▶ Perfect for use with Light-Sensitive Instrumentation
- ▶ Typically used in a 30 mm Cage Assembly

This optical gasket is used to create a light-tight interface between two mating optical mounts. The highly compressible foam, measuring 0.25" (6 mm) thick in an uncompressed state, can easily adapt to uneven surfaces to maintain a light-tight seal between mating parts.

Most commonly used in cage assemblies, these gaskets are perfect for highly sensitive instrumentation such as CCD cameras and amplified photodiodes where ambient lighting is sufficient to saturate detection equipment or degrade signal-to-noise ratios.

Part Number	Description	Price	Availability
CPG3	30 mm Cage Plate Gasket	\$6.87	Today

### Cage Plate Stops for ER Rods

- ▶ Marks the Position of Cage Components
- ▶ Flexure Clamping Mechanism
- ▶ Sold in Packs of Four

ERCPS Cage Plate Stops mark the position of a cage plate, allowing it to be reliably moved and repositioned in a cage system. These clamps are 0.14" thick and are compatible with our Ø6 mm cage rods for 30 mm and 60 mm cage systems. Utilizing a flexure design, the clamps are secured in place using a 0.05" (1.3mm) hex key. They can be easily clamped onto the middle of a cage rod without removing other components.



Click to Enlarge  
ERCPS Cage Rod Stops can mark the position of cage components.



Click to Enlarge  
ERCPS Cage Plate Stops snap onto cage rods without any disassembly of the cage system.

Part Number	Description	Price	Availability
ERCPS	Customer Inspired! Cage Plate Stops for ER Rods, 4 Pack	\$44.64	Today

### Alignment Plates for 30 mm Cage Systems

- ▶ Quick, Drop-In Beam Alignment Tool
- ▶ Small Through Hole Aligned at Center of 30 mm Cage Assembly

The CPA1 and CPA2 Alignment Plates are convenient tools for aligning cage-based optical systems. These drop-in plates feature a small through hole at the exact center of the 30 mm cage assembly that is used for aligning visible beams. For easy alignment, the through hole is surrounded by engraved rings, which indicate Ø4 mm, Ø7 mm, Ø10 mm, and Ø13 mm. The CPA1 provides a Ø0.9 mm through hole, while the CPA2 provides a Ø5 mm through hole.



Back View of VRC4CPT

The VRC4CPT and VRC6SCPT Alignment Plates are specifically designed to align IR or MIR beams in a cage-based optical assembly. Both plates are identical to the CPA1 (shown to the left) on the front. The back (shown to the right) of the VRC4CPT includes a Ø1/2" (Ø12.7 mm), non-rotating IR-sensitive fluorescing alignment disk made of the same material used in our VRC4 Viewing Card. Alternatively, the back of the VRC6SCPT includes a Ø0.39" (Ø10.0 mm), non-rotating MIR alignment disk is made of the same thermochromic liquid crystal material used in our VRC6S Viewing Card, which reacts to laser sources over the 1.5 to 13.2 µm wavelength range, and has a minimum detectable power density of 0.05 mW/mm<sup>2</sup> at 1550 nm (22 °C). The VRC4CPT plate has a Ø1.5 mm hole centered on the plate's Ø0.9 mm hole, and the VRC6SCPT has a Ø2.0 mm hole centered on the plate's Ø0.9 mm hole.

Item #	Wavelength Range	Emission Band	Minimum Detectable Power Density	Active Region Diameter	Alignment Features
VRC4CPT	790 - 840 nm, 870 - 1070 nm, 1500 - 1590 nm	~520 to 580 nm	N/A	1/2" (12.7 mm)	Ø0.9 mm Hole in Plate Ø1.5 mm Hole in Disk Center
VRC6SCPT	1.5 to >13.2 µm	N/A	0.05 mW/mm <sup>2</sup> @ 1550 nm (22 °C)	0.39" (10.0 mm)	Ø0.9 mm Hole in Plate Ø2.0 mm Hole in Disk Center

Part Number	Description	Price	Availability
CPA1	30 mm Cage System Alignment Plate with Ø0.9 mm Hole	\$13.52	Today
CPA2	30 mm Cage System Alignment Plate with Ø5 mm Hole	\$13.52	Today
VRC4CPT	30 mm Cage System Alignment Plate with IR Disk (790 - 840 nm, 870 - 1070 nm, 1500 - 1590 nm)	\$32.74	Today
VRC6SCPT	30 mm Cage System Alignment Plate with MIR Disk, 1.5 to >13.2 µm	\$38.19	Today

Visit the *Standard 30 mm Cage Plates* page for pricing and availability information:

[https://www.thorlabs.com/newgrouppage9.cfm?objectgroup\\_id=2273](https://www.thorlabs.com/newgrouppage9.cfm?objectgroup_id=2273)