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## SP05 - April 14, 2022

Item # SP05 was discontinued on April 14, 2022. For informational purposes, this is a copy of the website content at that time and is valid only for the stated product.

### CAGE SYSTEM ADAPTERS

- ▶ Adapters Allow Different Sizes of Cage Systems to be Integrated
- ▶ 16 mm to 30 mm and 30 mm to 60 mm Adapters Available

#### Application Idea



**SP05**  
30 mm to 16 mm  
Cage Adapter

**LCP6X**  
30 mm to 60 mm Cage Plate  
Adapter, 0.24" Thick

**LCP4S**  
30 mm to 60 mm Cage  
Plate Adapter, 0.16" Thick

**LCP33**  
30 mm to 60 mm Cage  
Plate Adapter, 0.5" Thick

#### OVERVIEW

##### Features

- Switch Between Cage Sizes with Adapters
- Options Available with 8-32 (M4) Tapped Holes for Post Mounting

The adapters sold below offer a way to switch between 16 mm and 30 mm cage systems or 30 mm and 60 mm cage systems. The SP05(M), LCP6X, and LCP33(M) adapters each have eight through holes for cage rods, which are secured in the plate using 4-40 or M4 x 0.7 setscrews. The LCP4S has four outer through holes for 60 mm cage rods, which are secured with 4-40 setscrews, and four inner counterbored holes for 30 mm cage compatibility. We also offer orthogonal cage system size adapters.

##### Cage System Size Adapters

In-Line Cage Plates
Orthogonal Adapters
Drop-In 30 mm to 60 mm

CAGE OVERVIEW

### Cage System Overview

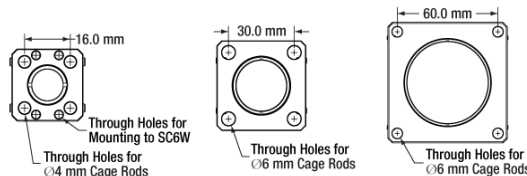
The Cage Assembly System provides a convenient way to construct large optomechanical systems with an established line of precision-machined building blocks designed for high flexibility and accurate alignment.

### 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 Ø1/2", Ø1", and Ø2" 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.



An example of the standard cage plate measurements determining cage system compatibility.

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.	

### 16 mm to 30 mm Cage Adapter



- ▶ Couples 16 mm to 30 mm Cage Systems
- ▶ Accepts ER and SR Series Rods
- ▶ Eight 4-40 Locking Screws
- ▶ Tapped with Our Standard SM05 Thread (0.535"-40)
- ▶ 8-32 (M4) Tapped Hole for Mounting to Ø1/2" Posts



Click to Enlarge  
[\[APPLIST\]](#)  
[\[APPLIST\]](#)

The SP05(/M) cage plate provides a convenient means for coupling 16 mm and 30 mm cage assemblies (see image to the right). The Ø4 mm SR rod and Ø6 mm ER rod holes are each accompanied by a side-located locking 4-40 setscrew, which can be secured using a 0.05" hex key. The SP05(/M) also has an 8-32 (M4) tapped hole for post-mounting and a centered SM05 (0.535"-40) tapped bore (SM05RR retaining rings sold separately). This cage plate offers tight tolerances on the cage rod holes to ensure that both the 30 mm and 16 mm cage segments are centered around the central SM05 bore.

Additionally, two of these cage plates can be used to straddle a 16 mm cage subassembly in such a way that the entire assembly [SP05(/M), 16 mm subsystem, and SP05(/M)] can slide along the 30 mm cage rods as a single optomechanical unit.

For users who do not need the tight tolerances necessary to accommodate both 16 mm and 30 mm cage rods, Thorlabs offers a 30 mm cage plate, the CP32(/M), for mounting a Ø1/2" optic or lens tube.

Part Number	Description	Price	Availability
SP05/M	30 mm to 16 mm Cage Adapter Plate, Metric	\$35.56	Today
SP05	30 mm to 16 mm Cage Adapter Plate	\$35.56	7-10 Days

#### Imperial Product List

Item #	Qty	Description
<b>Imperial Product List</b>		
SP15	1	
SRM05	1	16 mm Cage Rotation Mount for Ø0.5" Optics
SR2	4	Compact Cage Assembly Rod, 2" Long, Ø4 mm
ER1.5-P4	1	Cage Assembly Rod, 1.5" Long, Ø6 mm, 4 Pack
SM05L05	1	SM05 Lens Tube, 0.50" Thread Depth, One Retaining Ring Included
CP32T	1	SM1-Threaded 30 mm Cage Plate, 0.50" Thick, 2 Retaining Rings, 8-32 Tap
SM1D12D	1	SM1 Ring-Actuated Iris Diaphragm (Ø0.8 - Ø12 mm)

#### Metric Product List

Item #	Qty	Description
<b>Metric Product List</b>		
SP05/M	1	30 mm to 16 mm Cage Adapter Plate, Metric
SRM05	1	16 mm Cage Rotation Mount for Ø0.5" Optics
SR2	4	Compact Cage Assembly Rod, 2" Long, Ø4 mm
ER1.5-P4	1	Cage Assembly Rod, 1.5" Long, Ø6 mm, 4 Pack
SM05L05	1	SM05 Lens Tube, 0.50" Thread Depth, One Retaining Ring Included
CP32T/M	1	SM1-Threaded 30 mm Cage Plate, 0.50" Thick, 2 Retaining Rings, M4 Tap
SM1D12D	1	SM1 Ring-Actuated Iris Diaphragm (Ø0.8 - Ø12 mm)

### 30 mm to 60 mm Cage Adapter, 0.16" Thick



- ▶ Couples 30 mm and 60 mm Cage Systems
- ▶ Accepts ER Series Rods
- ▶ Four 4-40 Locking Screws for Securing 60 mm Cage Assemblies
- ▶ Counterbore Holes for 30 mm Cage Mounting
- ▶ Tapped with Our Standard SM1 Thread (1.035"-40)
- ▶ Not Post Mountable



Click to Enlarge  
 LCP4S Adapter Mounted to Quantalux® sCMOS Camera for Compatibility with 60 mm Cage Components. Note the LCP4S adapter has counterbored holes for 30 mm cage compatibility and through holes for 60 mm cage compatibility.

The LCP4S Cage Plate Adapter provides a convenient means for coupling 30 mm and 60 mm cage assemblies via our Ø6 mm ER cage rods. The thin 4 mm (0.16") profile of this adapter is ideal for situations where axial space is limited. The centered SM1 (1.035"-40) tapped hole is compatible with our SM1-threaded lens tubes. Each of the outer through holes for 60 mm cage compatibility is accompanied by a side-located locking 4-40 setscrew, which can be secured using a 0.05" (1.3 mm) hex key. The four inner holes for 30 mm cage compatibility are counterbored for use with 4-40 x 3/16" cap screws which are sold separately (SH4S019 recommended). Unlike the LCP33(/M) cage plate adapters, this adapter does not have a tapped hole for post mounting due to the thin profile.

Additionally, this cage plate adapter facilitates the mounting of our compact scientific cameras on 60 mm cage components (see image to the right). For example, our 2CM2 Two-Camera Mount for Microscopes incorporates two LCP4S adapters. The thin profile of the adapter is required to position the image plane of the cameras within the adjustable focus range of the mount.

Part Number	Description	Price	Availability
LCP4S	Customer Inspired! 30 mm to 60 mm Cage Plate Adapter, 4 mm Thick	\$41.00	Today

### 30 mm to 60 mm Cage Adapter, 0.24" Thick



- ▶ Couples 30 mm and 60 mm Cage Systems
- ▶ Accepts ER Series Rods
- ▶ M4 x 0.7 Locking Screws for Securing 30 mm and 60 mm Cage Assemblies
- ▶ Tapped with Our Standard SM1 Thread (1.035"-40)
- ▶ Directly Accepts Ø1" Optics up to 0.08" (2 mm) Thick
- ▶ Not Post Mountable



Click to Enlarge  
LCP6X Adapter Mounted to a  
Zelux<sup>®</sup> CMOS Compact Camera  
for  
Compatibility with 60 mm Cage  
Components

The LCP6X Cage Plate Adapter provides a convenient means for coupling 30 mm and 60 mm cage assemblies via our Ø6 mm ER cage rods. The centered SM1-threaded (1.035"-40) hole is compatible with SM1-threaded lens tubes or Ø1" optics up to 0.08" (2 mm) thick (SM1RR retaining rings sold separately). Each cage rod through hole is accompanied by a side-located locking M4 x 0.7 setscrew that can be adjusted using a 5/64" (2 mm) hex key. These setscrews provide improved stability for attaching cage rods compared to the 4-40 setscrews used in the LCP4S cage plate adapter (sold above). Unlike the LCP33(/M) cage plate adapter, this cage plate adapter does not have a tapped hole for post mounting due to the thin profile.

Similar to the LCP4S adapter, the LCP6X adapter can facilitate the mounting of our compact scientific cameras on 60 mm cage components, as seen in the image to the right.

Part Number	Description	Price	Availability
LCP6X	30 mm to 60 mm Cage Plate Adapter, 6 mm Thick	\$41.00	Today

### 30 mm to 60 mm Cage Adapter, 0.5" Thick



- ▶ Couples 30 mm and 60 mm Cage Systems
- ▶ Accepts ER Series Rods
- ▶ M4 x 0.7 Locking Setscrews
- ▶ Tapped with Our Standard SM1 Thread (1.035"-40)
- ▶ Directly Accepts Ø1" Optics up to 0.35" (9 mm) Thick
- ▶ 8-32 (M4) Tapped Hole for Mounting to Ø1/2" Posts

The LCP33(/M) Cage Plate provides a convenient means for coupling 30 mm and 60 mm cage assemblies via our Ø6 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 in this cage adapter is accompanied by one side-located M4 x 0.7 locking setscrew which can be secured with a 5/64" (2.0 mm) hex key. The LCP33(/M) cage adapter also has an 8-32 (M4) tapped hole for Ø1/2" post mounting. The surface with the 8-32 (M4) tap is not wide enough to support Ø1" 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 [LCP33(/M), 30 mm subsystem, and LCP33(/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
LCP33/M	30 mm to 60 mm Cage Plate Adapter, M4 Tap	\$43.26	Lead Time
LCP33	30 mm to 60 mm Cage Plate Adapter, 8-32 Tap	\$43.26	7-10 Days