

## CFH2 - February 21, 2022

Item # CFH2 was discontinued on February 21, 2022. For informational purposes, this is a copy of the website content at that time and is valid only for the stated product.

### REMOVABLE FILTER HOLDERS AND INSERTS FOR 30 mm CAGE SYSTEM

- ▶ **Spring-Loaded Dovetail Design Ensures Repeatable Positioning**
- ▶ **Mounts Ø1/2" or Ø1" Optics**
- ▶ **SM05 or SM1 Lens Tube Compatible**
- ▶ **Blank Plate and Variable Attenuator Inserts Available**



**CFH2**  
 (Cage Plate & Filter  
 Holder Included)



**CFH1R**  
 (Cage Plate & Filter  
 Holder Included)



**CFH1-F**  
 Extra Ø1/2"  
 Filter Holder



**CFH2-V**  
 Variable Attenuator Insert



**Stackable Design**

#### OVERVIEW

##### Features

- Two Filter Holder Mounts Available
  - Ø1/2" Optics up to 0.18" (5.0 mm) Thick
  - Ø1" Optics up to 0.31" (8.0 mm) Thick
- Easy, One-Hand Operation
- Dovetail Design Ensures Good Repeatability
- Stackable Design
- Extra Filter Holders, Blank Filter Holders, and Variable Attenuator Insert Available Separately

##### Alternative Size Options

- |                                |
|--------------------------------|
| 30 mm Removable Filter Holders |
| 60 mm Removable Filter Holders |



Click to Enlarge  
 Filter Holders Allow Quick  
 Swapping of Mounted Filters in  
 Cage System

The CFH1R and CFH2 (CFH2R/M) Removable Filter Holders are based upon a precision dovetail design, ensuring good position stability and repeatability. The CFH1R features an SM05-threaded (0.535"-40) bore that accepts Ø1/2" optics up to 0.18" (5.0 mm) thick, while the CFH2 (CFH2R/M) has an SM1-threaded (1.035"-40) bore that can accommodate Ø1" optics up to 0.31" (8.0 mm) thick. These mounts are designed for use with a wide variety of Thorlabs' optics such as our Dichroic or Neutral Density Filters, Economy or Concave Mirrors, or Frosted Glass Alignment Disks. The optic is secured in the mount using the included retaining ring.

Extra filter plates are available separately for both the CFH1R Ø1/2" filter mount and the CFH2 (CFH2R/M) Ø1" filter mount. In addition, blank plates for each mount, also purchased separately, can be used as a manual shutter or machined to suit your specific requirements. The CFH2-V Variable Attenuator Insert can be used in the CFH2 (CFH2R/M) to partially or completely block light from passing through the aperture.

## CAGE OVERVIEW

## Cage System Overview

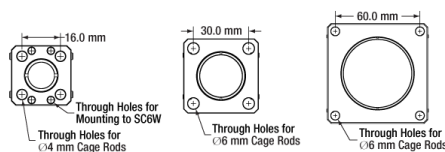
The Cage Assembly System provides a convenient way to construct large optomechanical systems with an established line of precision-machined building blocks designed for high flexibility and accurate alignment.

### 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.



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. |



- ▶ Mounts Ø1/2" Optics up to 0.18" (5.0 mm) Thick
- ▶ Compatible with 30 mm Cage Systems
- ▶ SM05-Threaded on One Side of the Insert
- ▶ Stackable Design
- ▶ Post Mountable via 8-32 and M4 Taps

The CFH1R Removable Filter Holder is based upon a precision spring-loaded dovetail design, ensuring good position stability and repeatability. The SM05 (0.535"-40) threaded bore accepts Ø1/2" optics up to 0.18" (5.0 mm) thick, fastened with the included SM05RR Retaining Ring.

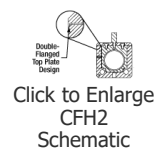
Extra SM05-threaded filter plates (CFH1-F) are available separately. In addition, the CFH1-B Blank Plate, also purchased separately, can be used as a manual shutter or machined to suit your specific requirements.

| Part Number | Description  | Price   | Availability |
|-------------|--|---------|--------------|
| CFH1R       | 30 mm Cage Plate with Removable Filter Holder for Ø1/2" Optics, 8-32 and M4 Taps | \$81.81 | Today        |
| CFH1-F      | Extra Filter Holder Insert for Ø1/2" Optics for use with CFH1R                   | \$47.43 | Today        |
| CFH1-B      | Blank Plate Insert for use with CFH1R  | \$42.15 | Today        |

## Ø1" Removable Light-Tight Filter Holder and Inserts



- ▶ Mounts Ø1" Optics up to 0.31" (8.0 mm) Thick
- ▶ Compatible with 30 mm Cage Systems
- ▶ SM1-Threaded on Both Sides
- ▶ Light-Tight Design
- ▶ Post Mountable via 8-32 (M4) Tap
- ▶ Extra Filter Holder, Blank Plate, or Variable Attenuator Insert Available Separately



Click to Enlarge Pushing the adjuster down on the CFH2-V quickly closes the shutter.



Click to Enlarge

The CFH2 (CFH2R/M) Removable Filter Holder is a light-tight, stackable filter block designed to integrate easily into our 30 mm cage system or to be post mounted on a breadboard. Unlike the CFH1R above, this light-tight design is achieved with a permanent O-ring mounted on the front face and a double-flanged top plate on the removable inner body.

### Filter Holder

The filter holder can accommodate Ø1" optics up to 0.31" (8.0 mm) thick and is equipped with SM1-threaded (1.035"-40) faces, making it compatible with any of Thorlabs' SM1-threaded components. The precision, spring-loaded, dovetail design of the removable inner body ensures reproducible positioning and eliminates unwanted movements to ensure repeatability. The spring-plunger tension of the CFH2 (CFH2R/M) can be adjusted via the slotted setscrew located on the side of the housing if necessary.

The top plate features two laser-engraved boxes for labeling and identification of the mounted optic. Multiple filter holders can be continually stacked in our 30 mm cage system provided an equivalent length of cage rods is available for support. The cage rods can pass through the cage rod clearance holes on the bottom of the CFH2 (CFH2R/M); however, they thread into the top. Extra SM1-threaded filter plates (CFH2-F) are available separately.

### Blank Plate

In addition, the CFH2-B Blank Plate, also purchased separately, can be used as a manual shutter or machined to suit your specific requirements. It features two top-located, laser-engraved boxes for labeling.

### Variable Attenuator Insert

The CFH2-V is a variable attenuator insert for the CFH2 (CFH2R/M) holder equipped with a black-oxide-coated variable single-blade shutter to partially or fully block light. The shutter moves vertically from the top across the Ø0.54" aperture and is intended for a maximum 0.50" beam diameter. Shutter position is controlled with a 3/16"-120 adjuster that provides 0.005" shutter translation per revolution; fine adjustments can be performed with the included 5/64" hex key. To quickly close the shutter, press the adjuster down (see photo above); letting go of the adjuster will return the shutter to the set position (within 0.0005"). For best performance, light after the attenuator insert should be coupled into a fiber optic patch cable as the output beam profile will not be circular.

| Part Number | Description   | Price    | Availability |
|-------------|---|----------|--------------|
| CFH2R/M     | NEW! 30 mm Cage Plate with Removable Filter Holder for Ø1" Optics, M4 Tap                     | \$130.54 | 7-10 Days    |
| CFH2-F      | Customer Inspired!&nbsp;Extra Filter Holder Insert for Ø1" Optics for use with CFH2 (CFH2R/M) | \$65.45  | Today        |
| CFH2-B      | Customer Inspired!&nbsp;Blank Plate Insert for use with CFH2 (CFH2R/M)                        | \$59.61  | Today        |
| CFH2-V      | Variable Attenuator Insert for use with CFH2 (CFH2R/M) and Fiber Optic Filter Mounts          | \$193.56 | Lead Time    |
| CFH2        | 30 mm Cage Plate with Removable Filter Holder for Ø1" Optics, 8-32 Tap                        | \$130.54 | Lead Time    |