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## Operating Instructions for the IARC-446-070 Raman Filter Chamber



# Operating Instructions

## Raman Filter Chamber

### Description:

The Princeton Instruments Model IARC-446-070 is a filter chamber which permits use of Raman notch or edge filters with Acton series monochromators and spectrographs. The Raman Filter Chamber is designed to operate over the wavelength range of 633nm to 1100nm. Although the unit is used primarily to collect the output of fiber optics, it may also be used with other sources of Raman scatter (e.g., focused sample image or direct collection of scatter from a sample positioned close to the chamber).

The standard IARC-446-070 includes a lens chamber with a filter holder designed to accept a 1.750 inch outside diameter filter or a 1.750 inch outside diameter filter assembly. A 1 inch filter adapter is provided and installed in the Raman Filter Chamber. This adapter is designed to accept a 1 inch or 25mm outside diameter filter/ filter assembly. Other filter holders are available on a custom order basis. Filters can be rotated up to 10° by an external set screw in order to tilt-tune the rejection band of the filter.

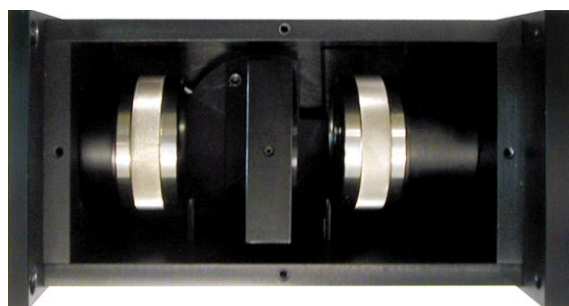


*Figure 1. Raman Notch/Edge Filter Chamber*

### Principle of Operation:

The IARC-446-070 is designed to provide a collimated beam for operation with notch or edge filters. The first lens collects and collimates the beam through the filter. The second lens collects the collimated beam and focuses it to the entrance slit of the monochromator or spectrograph. The light is then dispersed to a detection system.

The integrated tilt adjustment capabilities of the IARC-446-070 enable fine tuning of notch or edge filters to achieve the best combination of laser light blocking and Raman scatter transmission.



*Figure 2. Inside View of Chamber Showing the Filter Holder between the Focusing and Collimating Lenses*

## Mounting the IARC-446-070 to Acton Series Monochromators or Spectrographs:

Refer to Figure 3 when mounting the IARC-446-070 to Acton series monochromators or spectrographs.

1. Unpack the IARC-446-070 Raman Filter Chamber.
2. Using the 3/32" Hex wrench provided, remove the cover of the IARC-446-070.
3. Position the IARC-446-070 against the ENTRANCE SLIT of the Acton Series monochromator or spectrograph as shown Figure 3. Align the mounting holes of the IARC-446-070 with the tapped holes in the slit assembly.
4. Insert the four (4) 8-32 screws provided through the mounting holes and into the tapped holes of the slit assembly. Tighten to secure the IARC-446-070 to the entrance slit.
5. The IARC-446-070 is now mounted to the Acton Series monochromator or spectrograph.
6. If there is a filter already mounted in the filter holder, re-install the cover. If a filter installation is necessary, continue to Step 2 of the next procedure and make the installation before closing up the chamber.

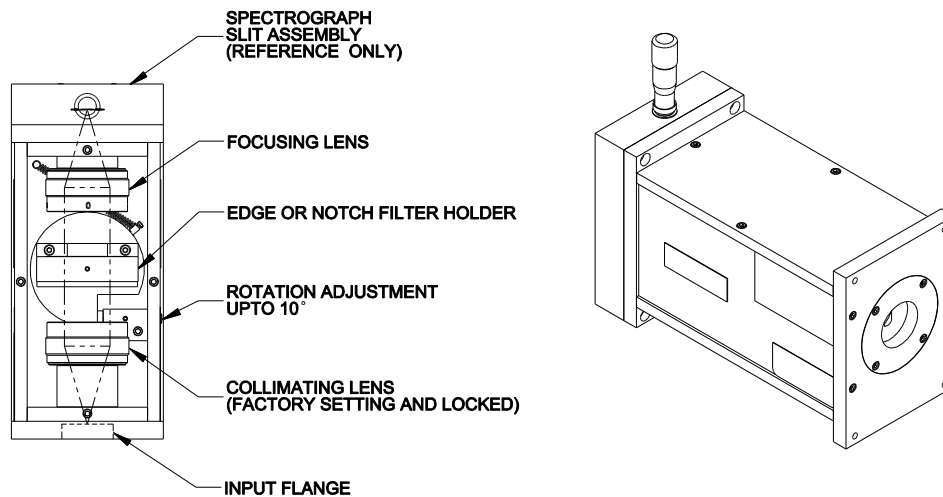


Figure 3. IARC-446-070 Layout (Top View)

## Mounting a Filter inside the IARC-446-070:

Refer to Figure 4 on page 3 and the Filter Holder Assembly drawing on page 4 when completing these steps.

The standard filter holder inside the IARC-446-070 accepts 1.0" (25.4 mm) diameter filters. Use the following procedure to mount filters:

1. Remove the IARC-446-070 access cover.
2. After loosening the two captive screws securing the filter holder, remove the filter holder from the chamber.
3. Using the .050" Hex Wrench provided, loosen the set screw on the top of the filter holder and slide the filter adapter out.
4. If installing a 1.750" outside diameter filter/filter assembly, proceed to Step 6. If installing a 1.0" outside diameter filter proceed to Step 5.
5. Remove one of the retaining rings from the adapter. Install the filter/filter assembly. Replace the retaining ring and tighten. Use care not to cause any damage to the filter when tightening the set screw.
6. Install the filter/filter assembly into the filter holder and tighten with the set screw.
7. Re-install the filter holder tightening the two captive screws.
8. Replace the access cover.

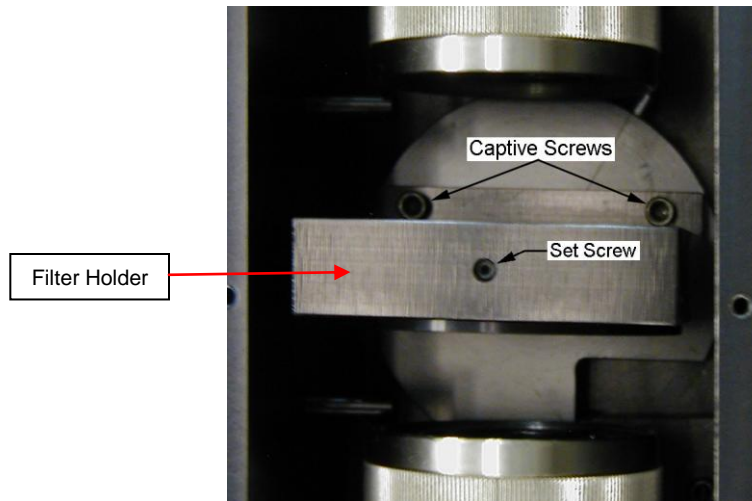


Figure 4. Close up view of the Sample Holder inside the IARC-446-070

## Optimizing the IARC-446-070 for Best Performance

### Lens Focus:

The IARC-446-070 is optimized for best performance when the light source image is in sharp focus on the monochromator or spectrograph entrance slit. This can be accomplished using the following procedure:

1. Make sure that the IARC-446-070 is correctly mounted to the monochromator or spectrograph.
2. Mount the detection system to the monochromator or spectrograph. Verify that the detection system is operating.
3. Position the edge or notch filter to normal incidence and illuminate the system with the laser line the filter is designed to block. Visually inspect that the filter is blocking the laser line to a point which is undetectable by the unaided eye before proceeding. Adjust the angle of the filter if needed.
4. Set the monochromator or spectrograph to a central wavelength corresponding to that of the laser line.
5. Operate the system and continuously monitor for intensity. Adjust the angle of the filter until the intensity of the laser line is observable yet **below** the detector saturation level. Slowly adjust the focusing lens until highest intensity is achieved.
6. When operating the IARC-446-070 with multiple light source inputs (a multi-leg fiber optic bundle, for example), an imaging spectrograph, and a CCD detection system, it is recommended that the detection system be operated in an imaging mode and the focus be adjusted until the best image quality of the source(s) is achieved.
7. Finally, adjust the angle of the filter until a minimum in laser intensity is observed.

\*NOTE: The collimating lens position is set at the factory and no further adjustment is necessary.

REV	DESCRIPTION	DATE	DRAWN
A	RELEASE PER ECN 4329	04-22-09	DFN

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**EDGE FILTER ASSY**  
P/N 9000-108-01

**EDGE FILTER ASSEMBLY NOTES:**

- INSTALL EDGE FILTER (PER SALES ORDER) INTO FILTER HOLDER (ITEM 2) AND SECURE WITH (2) RETAINING RINGS (P/O LENS TUBES P/N 9000-101-01 & -02) ON EACH SIDE AS SHOWN.
- INSTALL FILTER HOLDER ASSY (EDGE FILTER, (2) RETAINING RINGS, FILTER HOLDER) INTO FILTER HOLDER BRACKET (ITEM 1) AND SECURE WITH #4-40 SET SCREW (ITEM 3) AS SHOWN.
- INSTALL (2) #5-40 SS CAPTIVE SCREWS (ITEM 4) AS SHOWN.

**NOTCH FILTER ASSY**  
P/N 9000-108-02

**NOTCH FILTER ASSEMBLY NOTES:**

- INSTALL NOTCH FILTER (PER SALES ORDER) INTO FILTER HOLDER BRACKET (ITEM 1) AND SECURE WITH #4-40 SET SCREW (ITEM 3) AS SHOWN.
- INSTALL (2) #5-40 SS CAPTIVE SCREWS (ITEM 4) AS SHOWN.

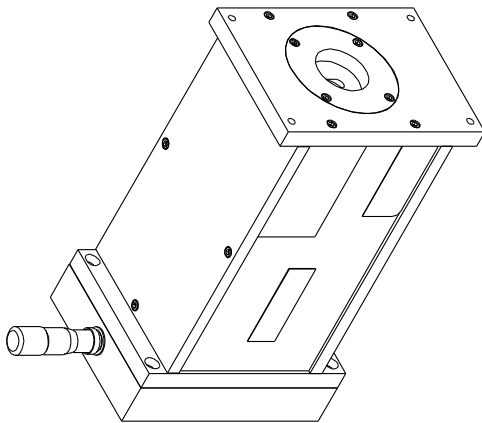
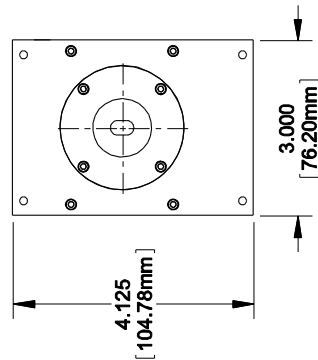
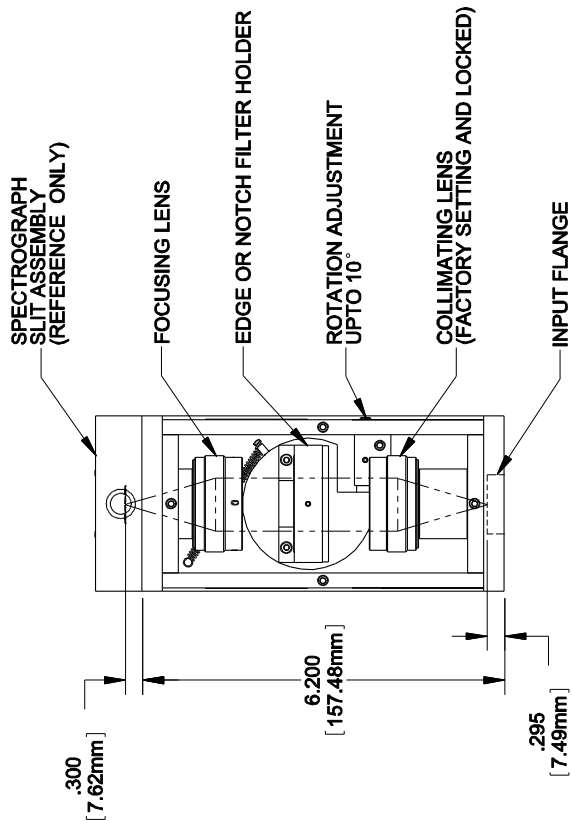
PARTS LIST			
ITEM	DESCRIPTION		
4	8430-007-10		
2	2 CAPTIVE SCREW, SS #5-40 SCH		
1	100-133-001		
1	1 SET SCREW, #4040 UNC-2B X 1/8 HEX SKT BRASS TP		
2	9000-100		
1	1 FILTER HOLDER		
1	9000-099		
1	1 FILTER HOLDER BRACKET		
ITEM	QTY	QTY	DESCRIPTION
	-01	-02	

PARTS LIST	
MATERIAL	FINISH
UNLESS OTHERWISE SPECIFIED	SEE PART LIST
DIMENSIONS ARE IN INCHES	N/A
TOLERANCE ON:	
DECIMALS	D-132
FRACTIONS	
ANGLES	
± 15 MIN	
± 1/64	
HOLE LOCATIONS	
± 0.02	
MAX. SURFACE FINISH	
REMOVE ALL BURRS & BREAK SHARP EDGES R.010 MAX	
SCALE: 1:1	
DATE: 04-15-08	
SHEET NUMBER: 1	
NUMBER OF SHEETS: 1	
DRW TITLE	
<b>FILTER HOLDER ASSY</b>	<b>9000-108-XX</b>
SIZE	REV
B	A

REV	DESCRIPTION	DATE	DRAWN
-	SEE SHEET 1	-	-

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MATERIAL		SEE BOM	FINISH
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON: DECIMALS .XX ±.010 .XXX ±.005 FRACTIONS 1/16		D-132	N/A
SCALE: 1:2	DATE: 03-16-09	NEXT ASSY:	DRAWN BY: DFN
SHEET NUMBER: 2	NUMBER OF SHEETS: 5	16 DISCOVERY WAY ACTON, MA 01720	QTY: 1
HOLE LOCATIONS: ±.002 MACHINE SURFACES 32/ MAX REMOVE ALL BURRS & BREAK SHARP EDGES R.010 MAX		Princeton Instruments	REV
DWG TITLE		SIZE	REV
RAMAN FILTER CHAMBER		B	A
9000-090			