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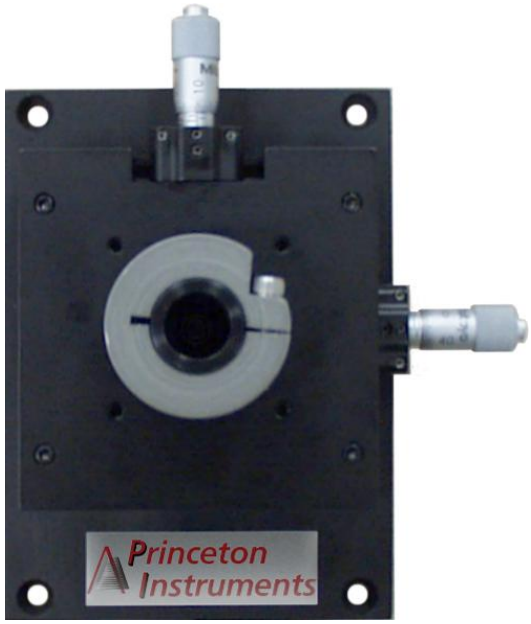
Model FC-446-021-U

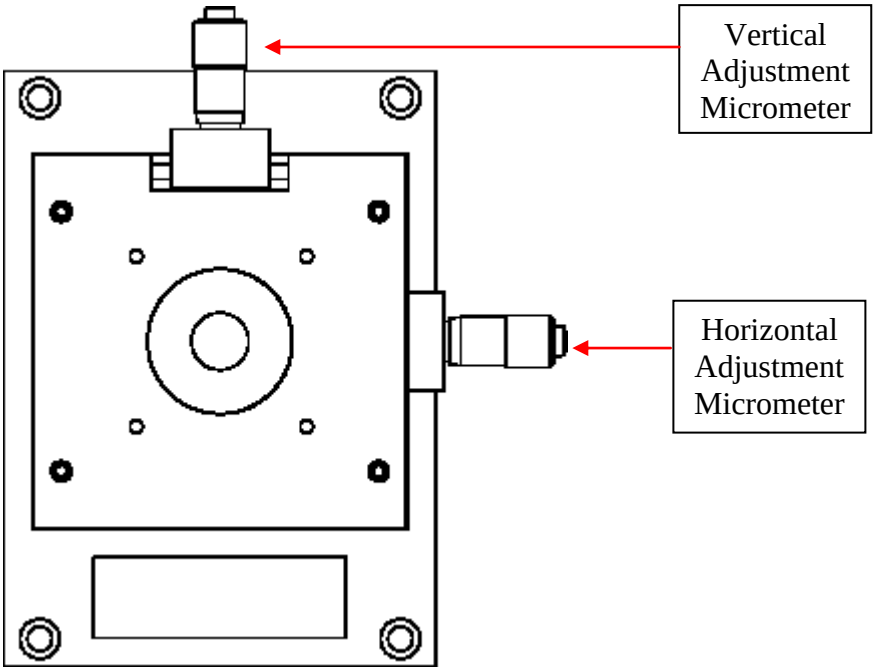


Adjustable Fiber Optic Adapter for SpectraPro® Monochromators and Spectrographs

Rev 24.07.09
FC-446-021-U.DOC

Description: The FC-446-021-U is an adjustable fiber optic adapter designed for use with SpectraPro series monochromators and spectrographs. It includes an integrated horizontal and vertical adjustment mechanism designed to position fibers at the slit opening.

The diagram below shows the FC-446-021-U:



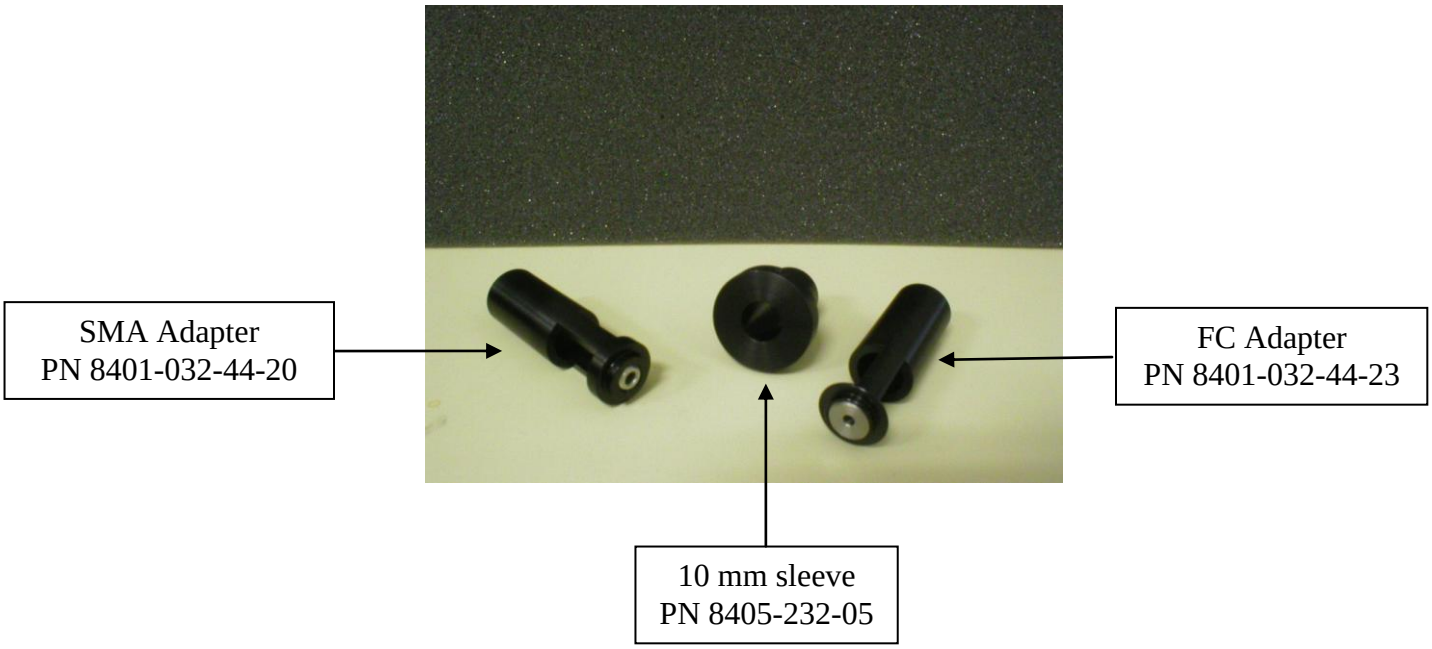
Fiber Optic Bundle Requirements:
The standard FC-0446-021-U adapter does not include a fiber optic bundle. These are available from Princeton Instruments.

Mounting the FC-446-021-U to standard SpectraPro Slit Assemblies:

Before mounting the fiber optic adapter to the slit assembly, mount the CCD detector to the SpectraPro and adjust the detector for best focus.

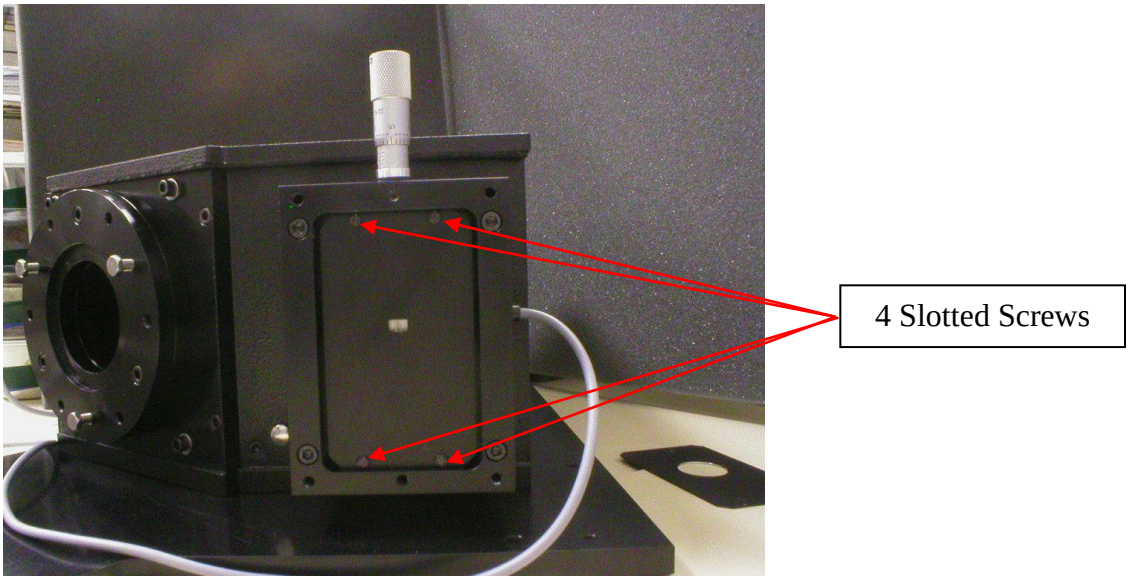
Fiber Cable Adaptability:

The assembly is compatible with 10 mm diameter fiber optic bundles, SMA connectors, and FC connectors. See below.



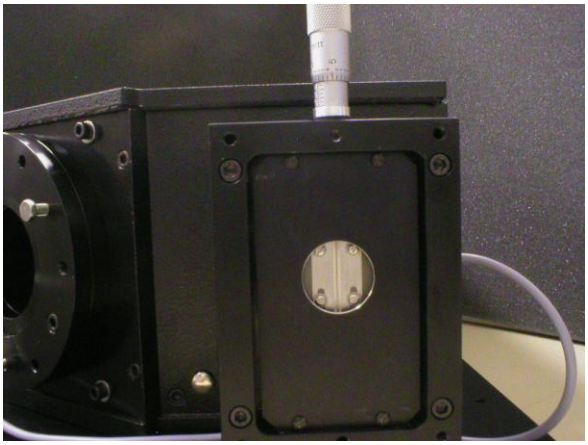
The following procedure is recommended for installing and aligning the FC-446-021-U and fiber optic bundles.

1. Remove the entrance slit shipping cover to expose the slit baffle as shown below.

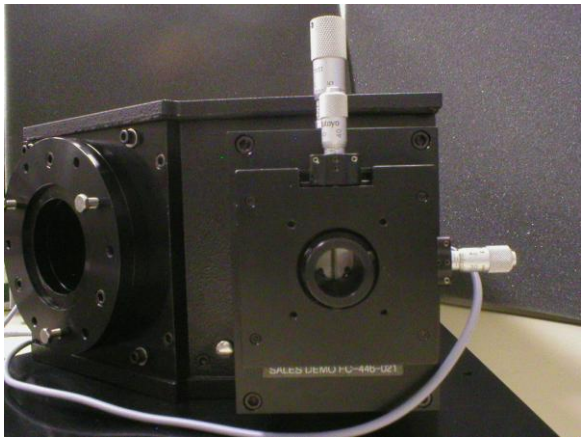


2. Using a flat-bladed screwdriver, remove the 4 slotted screws from the slit assembly.

3. Remove the existing baffle from the slit assembly and install the 7/8” round baffle. See photograph below. Open the slit to approximately .5 mm.



4. Mount the fiber optic input assembly with the 4 X 8-32 X 3/8” socket head cap screws provided.

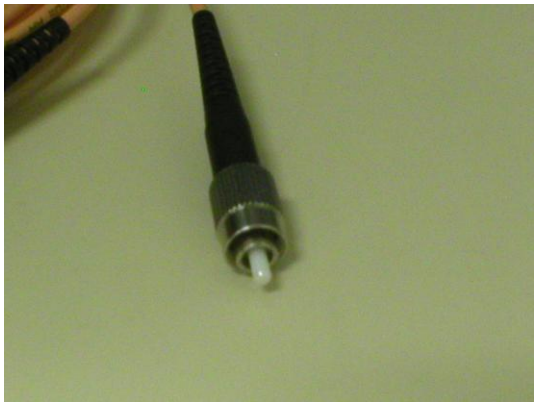


Fiber Cable and adapters:

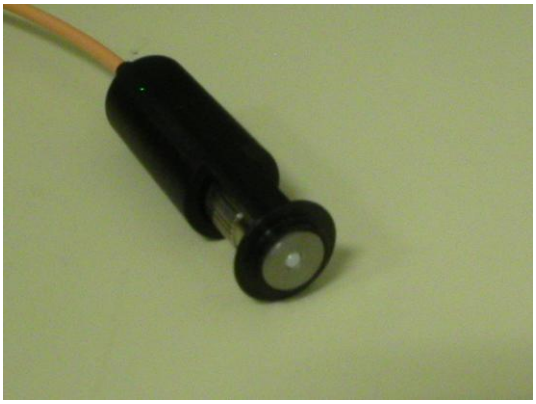
There are 4 different fiber cable/adapter set up configurations available for the input of the FC-446-021-U adapter assembly. Determine the type of fiber bundle to be installed. Install the desired fiber bundle as described in Set Up 1, 2, 3 or 4. After the installation, proceed to the **Alignment Procedure** on page 8.

Set Up 1: FC Fiber Cable

If the fiber cable has a single FC fiber, attach the FC adapter as shown below.

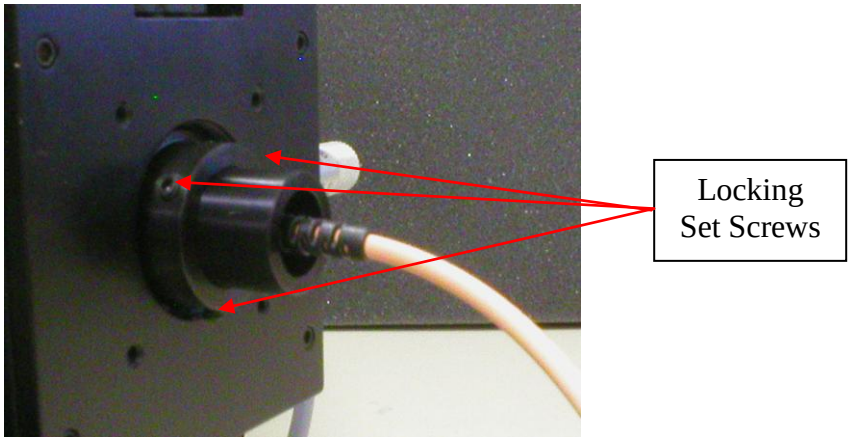


Single fiber FC Cable



FC Cable attached to FC Adapter

Gently slide the cable/fiber assembly into the fiber optic input assembly so the end of the fiber adapter contacts the slits. Now pull the adapter back approximately .1 mm so it is no longer contacting the slits. Lock the fiber into place by tightening down the 3 set screws on the fiber optic input assembly. Do not move the cable so it contacts the slits while you are locking it into place. Contact with the slits can make them inoperable.



Lock the Cable/Adapter into place with the 3 set screws.

CAUTION: Never force the fiber optic bundle against the slits or permanent damage may result.

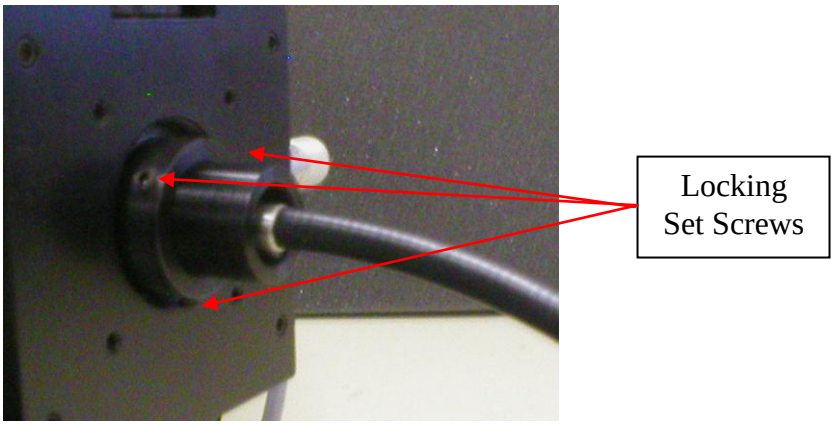
Set Up 2: SMA Fiber Cable

If the fiber cable has a single SMA fiber, attach the SMA adapter as shown below.

Single Fiber SMA Cable

SMA Cable attached to SMA Adapter

Gently slide the cable/fiber assembly into the fiber optic input assembly so the end of the fiber adapter contacts the slits. Now pull the adapter back approximately .1 mm so it is no longer contacting the slits. Lock the fiber into place by tightening down the 3 set screws on the fiber optic input assembly. Do not move the cable so that it contacts the slits while you are locking it into place. Contact with the slits can make them inoperable.

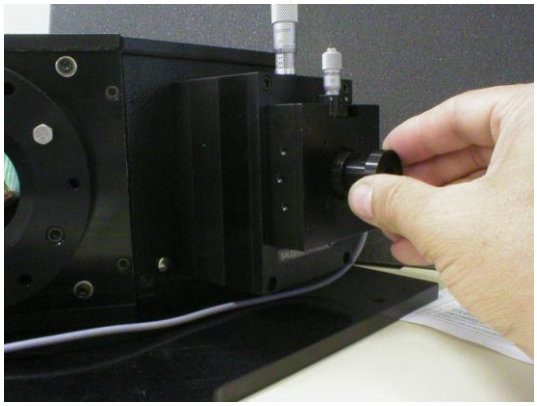


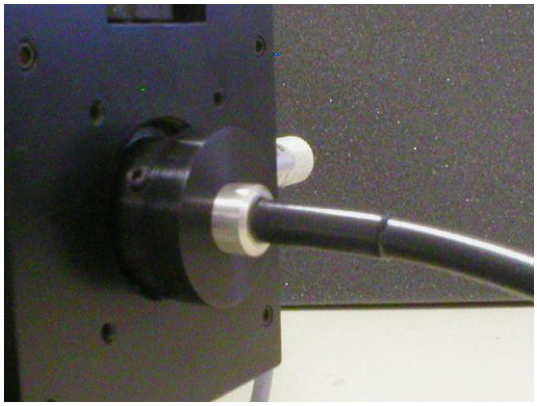
Lock the Cable/Adapter into place with the 3 set screws.

CAUTION: Never force the fiber optic bundle against the slits or permanent damage may result.

Set Up 3: 10 mm Diameter Sleeve with a single fiber

Install the 10 mm sleeve to the X-Y adapter and lock it into place by tightening down the 3 set screws surrounding the adapter. Now gently slide the cable/fiber into the entrance of the fiber optic input assembly so the end of the fiber adapter contacts the slits. Now pull the adapter back approximately .1 mm so it is no longer contacting the slits. Lock the fiber into place by tightening down the set screw on the 10 mm sleeve. See below.





CAUTION: Never force the fiber optic bundle against the slits or permanent damage may result.

Set Up 4: 10 mm Diameter Sleeve with multiple fibers aligned in a row

Install the 10 mm sleeve to the X-Y adapter and lock it into place by tightening down the 3 set screws surrounding the adapter. Note the orientation of the fibers in the sleeve of the fiber cable. Orient the fibers vertically and gently slide the cable/fiber into the entrance of the fiber optic input assembly so the end of the fiber adapter contacts the slits. Now pull the adapter back approximately .1 mm so it is no longer contacting the slits. Verify that the fibers are aligned vertically and then tighten down the set screw.

Alignment Procedure:

1. Adjust the vertical adjustment micrometer until the image of the fiber is centered in the height of the CCD or the center of the exit slit.
2. Slowly reduce the entrance slit width to approximately the fiber core diameter of the fiber while adjusting the horizontal adjustment micrometer to center the fiber on the entrance slit for maximum signal.

   Note: If the fiber bundle consists of a series of fibers aligned vertically, it may be necessary to rotate the fiber to vertically align the fibers with the slit during this procedure.
3. The fiber is now properly aligned.

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RECOMMENDED MINIMUM BEND RADIUS FOR FUSED SILICA FIBERS:

Fiber Diameters	Momentary Min. Bend Radius		Long Term Min. Bend Radius	
MICRONS	INCHES	MILLIMETERS	INCHES	MILLIMETERS
50	0.20	5	0.59	15
100	0.39	10	1.18	30
150	0.59	15	1.77	45
200	0.79	20	2.36	60
250	0.98	25	2.95	75
300	1.18	30	3.54	90
350	1.38	35	4.13	105
400	1.58	40	4.72	120
450	1.77	45	5.31	135
500	1.97	50	5.90	150
550	2.16	55	6.50	165
600	2.35	60	7.09	180
650	2.55	65	7.98	195
700	2.75	70	8.27	210
750	2.95	75	8.86	225
800	3.15	80	9.45	240
900	3.54	90	10.63	270
1000	3.94	100	11.81	300
1100	4.33	110	12.99	330
1200	4.72	120	14.17	360
1300	5.12	130	15.35	390
1400	5.51	140	16.54	420
1500	5.90	150	17.72	450
1600	6.30	160	18.90	480

Minimum bend DIAMETER is equal to the radius X2.
Momentary means minutes.