



Cuvette Holders

89328, 89340 Cuvette Holders

INSTRUCTION MANUAL

Serial No. _____

043009

World Precision Instruments

www.wpiinc.com

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ABOUT THIS MANUAL

The following symbols are used in this guide:



This symbol indicates a **CAUTION**. Cautions warn against actions that can cause damage to equipment. Please read these carefully.



This symbol indicates a **WARNING**. Warnings alert you to actions that can cause personal injury or pose a physical threat. Please read these carefully.

NOTES and TIPS contain helpful information.



Fig. 1—Adjustable cuvette holder (WPI #89328), Four-way cuvette holder (WPI #89340)

INTRODUCTION

WPI's cuvette holders address the need for precision sampling with standard and specialty cuvettes in absorbance and fluorescence applications. WPI cuvette holders are crafted to high standards to ensure repeatability. A unique WPI positioning system guarantees that the cuvette is placed in the same position every time. Because it is secured at lens height, instead of at the bottom, you get a snug fit where it counts. Additionally, custom-designed spring fingers gently push the cuvette into position and hold it securely from two directions. This gives WPI cuvettes a more secure hold than the industry-standard set screw placed on only one side of the cuvette. WPI cuvette holders use high quality quartz lenses. WPI cuvette holders offer:

- High precision cuvette positioning, even with low volume cuvettes
- Quartz lenses for optimum light throughput

Two styles are available:

- **#89328** is adjustable and can hold a 1cm, 2cm, 3cm, 4cm, 5cm or 10cm standard or cylindrical cuvette.
- **#89340** is a four-way cuvette holder which can be used for both absorbance or fluorescence experiments.

With spacers, both cuvette holders will hold cuvettes as small as 1mm, 2mm and 5mm. Both cuvette holders are discussed in this manual.

Notes and Cautions



CAUTION: To avoid twisting and breaking delicate fiber optic cables, always connect the fiber optic cables to the cuvette holder first. Then, connect the other end to the light source or spectrometer.

INSTRUMENT DESCRIPTION

Parts List

After unpacking, verify that there is no visible damage to the instrument. Verify that all items are included:

- (1) Adjustable cuvette holder (WPI #89328) or 4-Way Absorbance/Fluorescence cuvette holder (WPI #89340)
- (1) 0.05" Hex wrench
- (1) 0.5" Deep socket driver
- (2) Screw plugs (WPI #89340 only)
- (1) Certificate of Compliance
- (1) Instruction Manual

Unpacking

Upon receipt of this instrument, make a thorough inspection of the contents and check for possible damage. Missing cartons or obvious damage to cartons should be noted on the delivery receipt before signing. Concealed damage should be reported at once to the carrier and an inspection requested. Please read the section entitled "Claims and Returns" on page 15 of this manual. Please contact WPI Customer Service if any parts are missing at 941.371.1003 or customerservice@wpiinc.com.

Returns: Do not return any goods to WPI without obtaining prior approval (RMA # required) and instructions from WPI's Returns Department. Goods returned (unauthorized) by collect freight may be refused. If a return shipment is necessary, use the original container, if possible. If the original container is not available, use a suitable substitute that is rigid and of adequate size. Wrap the instrument in paper or plastic surrounded with at least 100mm (4") of shock absorbing material. For further details, please read the section entitled "Claims and Returns" on page 15 of this manual.

Typical Cuvette Holder Setup

A typical setup for a cuvette holder (WPI #89328/89340) consists of a light source (WPI #FO-6000 or D2H), a spectrometer (WPI #TIDAS-I) and two fiber optic cables with a core diameter of 600 μ m (WPI #FO-600-SMA1M) (Fig. 2).

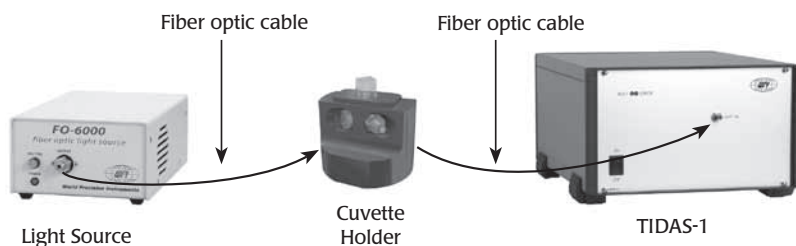


Fig. 2—Typical experimental setup

Optical Fibers

The cuvette holder connects to SMA-terminated optical fibers of 200-1,000 μ m core diameter.

Detector & Light Source Requirements

Cuvette holders require a matched light source/spectrometer system. WPI's **TIDAS I** in combination with WPI's **FO-6000** tungsten light source or **D2H** deuterium/halogen light source are ideal components for a high precision, low noise spectrometer system. The cuvette holders can also be interfaced with WPI's **SpectraUSB** CCD spectrometer line or with any other CCD, PDA or scanning type spectrometer that has fiber optic capabilities.

Collimators

WPI's Fiber Optic Collimator can be used for both collimating a light beam emitted by an optical fiber or coupling light from a collimated light beam into an optical fiber. The numerical aperture of the collimator is optimized for maximum coupling efficiency into typical fused silica fibers. The collimator can, for example, be used to guide a parallel light beam through a sample cuvette with little optical losses. In this application, one collimator collimates the light into a parallel beam 5mm in diameter, enabling it to pass a long distance with minimal energy loss. After the light passes the sample media, a second collimator can be used to collect the beam into the receiving fiber.

OPERATING INSTRUCTIONS

Configuring the Adjustable Cuvette Holder (#89328)

1. Turn the adjustable cuvette holder (WPI #89328) upside down (Fig. 3).

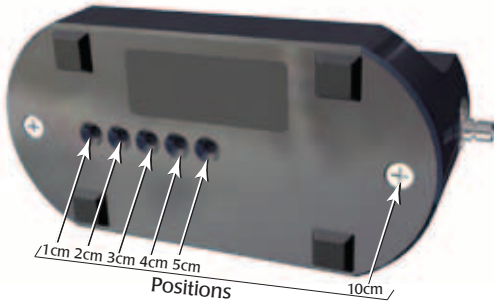


Fig. 3—Adjustable Cuvette Holder (bottom view) shown in the 10cm position

2. Using a Phillips head screw driver, remove the screw holding the adjustable wall in place.
3. Reposition the adjustable wall for the desired cuvette size.
4. Insert the screw, lining it up with the adjustable wall and tighten it.

Configuring a 4-Way Cuvette Holder (#89340)

The 4-way cuvette holder may be set up to perform either absorbance (absorbance, percent transmission or intensity) or fluorescence measurements, depending on the arrangement of the collimators and plugs. For fluorescence measurements, two optional mirror plugs (WPI #89339) which are sold separately may be used to increase light.

Absorbance Measurements

When the 4-way cuvette holder is configured for taking absorbance measurements, the two collimators are located directly across from each other, forming a straight light pathway through the center of the cuvette holder.

1. Using the 0.5" deep socket driver remove the necessary collimators and screw plugs.
2. Position the collimators and plugs as shown in **Fig. 4** so that the collimators alternate with the plugs.

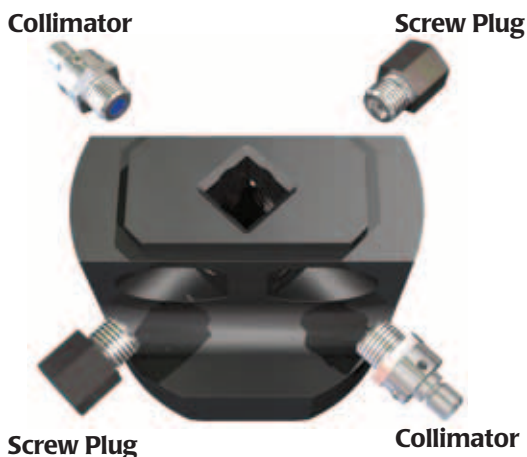


Fig. 5—4-Way Cuvette Holder set up for making absorbance measurements

Fluorescence Measurements

When the 4-way cuvette holder is configured for taking fluorescence measurements, the two collimators are located next to each other (forming a 90° angle) and two screw plugs are in the other two adjacent ports.

NOTE: To improve sensitivity, two mirror plugs (sold separately) may be used in place of the screw plugs in the adjacent ports. Mirrors significantly increase the light.

1. Using the 0.5" deep socket driver remove the necessary collimators and plugs.
2. Position the collimators and screw plugs or mirror plugs (WPI #89339) as shown in **Fig. 5** so that the collimators are in two adjacent openings and the two plugs are in the opposite ports.

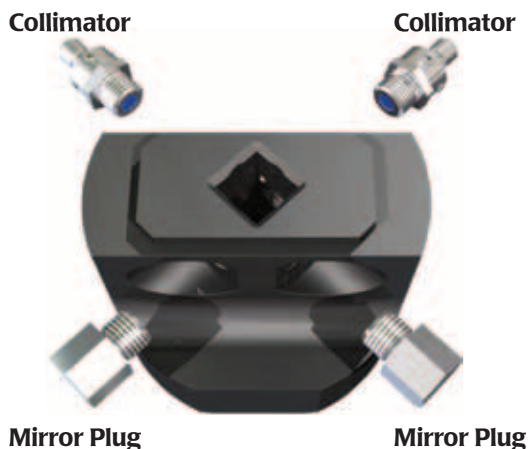


Fig. 5–4-Way Cuvette Holder set up for making fluorescence measurements

Inserting an Optical Filter into the Pathlength

If desired, an optical filter (sold separately) may be inserted in the light pathway to filter the light traveling through the system. An optical filter could be a low pass, a high pass or a band pass filter. The Inline Filter Holder Assembly (WPI #89400) is shown in the **Fig. 6** inset. An exploded view of the cuvette holder, Inline Filter Holder Assembly and collimator is shown in **Fig. 6**. WPI's Inline Filter Holder Assembly will hold any standard, optical filter that is 1.27cm (0.5") in diameter and up to 7.5mm (0.3") thick.

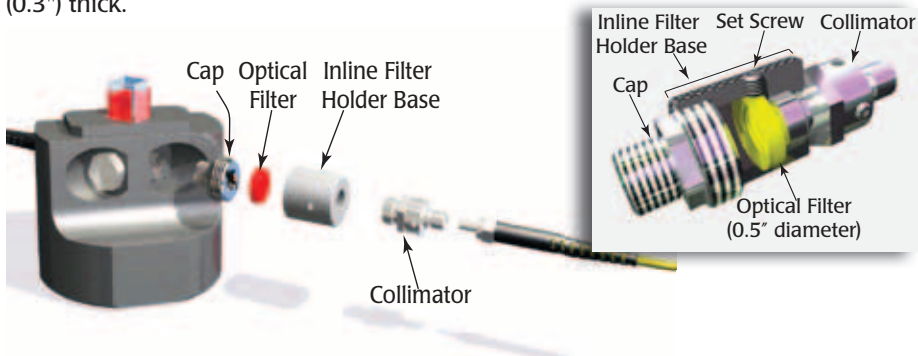


Fig. 6–Exploded view showing the 4-way Cuvette holder with collimator and Inline Filter Holder Assembly in an absorbance configuration

1. Unscrew the cap from the Inline Filter Holder Assembly (WPI #89400).
2. Insert the desired optical filter into the Inline Filter Holder Base.
3. Using a 0.05" hex wrench, tighten the three nylon-tipped set screws on the Inline Filter Holder Base. These screws should only be tight enough to secure the optical filter.



CAUTION: If the set screws are too tight, the optical filter could crack.

4. Reinsert the cap of the Inline Filter Holder and screw it in finger tight.
5. Using the 0.5" deep socket driver remove the selected collimator (from the cuvette holder).
6. Carefully insert the cap end of the Inline Filter Holder Assembly into the cuvette holder opening and finger tighten it.
7. Insert the collimator into the Inline Filter Holder Base and finger tighten it.
8. Insert the fiber optic cable into the collimator and finger tighten it.

NOTE: The fiber optic cable is always attached last to avoid cracking the delicate glass fiber inside it.

Taking Measurements

1. Prepare your reference and sample cuvettes.
2. Insert the reference cuvette into the cuvette holder and cover with the lid.

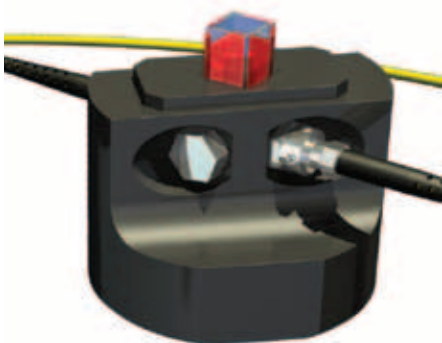


Fig. 4—Cuvette holder with cuvette installed

3. Follow instructions in the spectrometer manual to take a reference measurement with the reference cuvette.
4. Remove the reference cuvette and insert a sample cuvette into the holder. Cover with the lid.
5. Follow instructions in the spectrometer manual to take a sample reading.

INSTRUMENT MAINTENANCE

Cleaning the Collimators

1. Remove the collimator from the cuvette holder with the included 0.5" deep socket driver.
2. Wet a fiber optic swab with methanol and gently clean the lens of the collimator.
3. If the lens is still not clear, use the 0.05" hex wrench to loosen the set screws and remove the SMA connector. Then, use the fiber optic swab to clean the inside of the lens. The inside of the lens rarely needs to be cleaned, because it is not exposed to liquids.
4. Reassemble the collimator and carefully reinsert it into the cuvette holder. Tighten with the 0.5" deep socket driver.



CAUTION: The cuvette holder is easily cross-threaded. Use caution when installing collimators.

Cleaning the Cuvette Holder

1. Remove the collimators, mirrors and plugs from the cuvette holder with the included 0.5" deep socket driver.
2. Immerse the cuvette holder in an ultrasonic cleaner with soapy water.



CAUTION: DO NOT CLEAN THE CUVETTE HOLDER WITH ACIDS.



CAUTION: DO NOT PUT THE COLLIMATORS IN THE ULTRASONIC BATH.

3. Rinse with tap water or deionized water to remove the soap.

ACCESSORIES

Table 1: Accessory Parts

WPI Part No.	Item
300051	Fiber Optic Collimator for connecting to an SMA-terminated optical fiber
89339	Mirrored screw plugs
89341	Cuvette spacer for 1mm cuvette
89342	Cuvette spacer for 2mm cuvette
89337	Cuvette spacer for 5mm cuvette
89400	Inline Filter Holder Assembly
D2H	Deuterium Halogen Light Source
LEDspec	BioPhotometric Detection System
TIDAS-I	High Performance Fiber Optic Spectrometer system
FO-6000	Fiber Optic Light Source
FO-400-SMA1M	Fiber Optic cable, 1m, SMA, 400 m core, UV-enhanced
FO-600-SMA1M	Fiber Optic cable, 1m, SMA, 600 m core, UV-enhanced
FO-1000-SMA1M	Fiber Optic cable, 1m, SMA, 1000 m core, UV-enhanced

See www.wpiinc.com or email info@wpiinc.com for specifications on the complete line of cuvettes, including synthetic quartz and optical glass, self-masking, continuous flow-through cells, micro cell, fluorescence, long path and standard cuvettes.

TROUBLESHOOTING

Diminished Transmission

1. Compare the transmission intensity to the standard listed on the Certificate of Compliance.
2. If the intensity has diminished, clean the collimators. See "Cleaning the Collimators" on page 9.
3. Clean the cuvette holder. See "Cleaning the Cuvette Holder" on page 9.

SPECIFICATIONS

Cuvette Holder Specifications

	WPI #89328	WPI #89340
Description	Adjustable Cuvette Holder	ABS/FL Cuvette Holder
Functionality	Absorbance	Absorbance & Fluorescence
Cover	Included	Included
Base Material	Black Delrin	Black Delrin/Stainless Steel
Pathlength	1, 2, 3, 4, 5, 10cm 1, 2, 5mm with spacer	1 cm, 1, 2, 5mm with spacer
Wavelength Range	200 – 1000nm	200 – 1000nm
Fiber Connection	50 – 1000µm (SMA)	50 – 1000µm (SMA)
Beam Diameter	5mm	5mm
Baseline Repeatability	< 2mAU peak to peak	< 2mAU peak to peak
WPI Cuvette Types	A, B, C, D, E, F, G, H, J	A, B, C, D, E, F, H, J
Z – height	15mm	15mm

Collimator Specifications

Lens Material	Ultraviolet grade synthetic quartz (KU-1)
Lens Diameter	5mm
Lens Focal Distance	10mm
Fiber Termination	SMA
Wavelength Range	170nm - 2 m
Mounting Threads	0.375-24 UNF
Divergence	<0.1 rad for 1mm core fiber

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WARRANTY

WPI (World Precision Instruments, Inc.) warrants to the original purchaser that this equipment, including its components and parts, shall be free from defects in material and workmanship for a period of one year* from the date of receipt. WPI's obligation under this warranty shall be limited to repair or replacement, at WPI's option, of the equipment or defective components or parts upon receipt thereof f.o.b. WPI, Sarasota, Florida U.S.A. Return of a repaired instrument shall be f.o.b. Sarasota.

The above warranty is contingent upon normal usage and does not cover products which have been modified without WPI's approval or which have been subjected to unusual physical or electrical stress or on which the original identification marks have been removed or altered. The above warranty will not apply if adjustment, repair or parts replacement is required because of accident, neglect, misuse, failure of electric power, air conditioning, humidity control, or causes other than normal and ordinary usage.

To the extent that any of its equipment is furnished by a manufacturer other than WPI, the foregoing warranty shall be applicable only to the extent of the warranty furnished by such other manufacturer. This warranty will not apply to appearance terms, such as knobs, handles, dials or the like.

WPI makes no warranty of any kind, express or implied or statutory, including without limitation any warranties of merchantability and/or fitness for a particular purpose. WPI shall not be liable for any damages, whether direct, indirect, special or consequential arising from a failure of this product to operate in the manner desired by the user. WPI shall not be liable for any damage to data or property that may be caused directly or indirectly by use of this product.

Claims and Returns

- Inspect all shipments upon receipt. Missing cartons or obvious damage to cartons should be noted on the delivery receipt before signing. Concealed loss or damage should be reported at once to the carrier and an inspection requested. All claims for shortage or damage must be made within 10 days after receipt of shipment. Claims for lost shipments must be made within 30 days of invoice or other notification of shipment. Please save damaged or pilfered cartons until claim settles. In some instances, photographic documentation may be required. Some items are time sensitive; WPI assumes no extended warranty or any liability for use beyond the date specified on the container.
- WPI cannot be held responsible for items damaged in shipment en route to us. Please enclose merchandise in its original shipping container to avoid damage from handling. We recommend that you insure merchandise when shipping. The customer is responsible for paying shipping expenses including adequate insurance on all items returned.
- Do not return any goods to WPI without obtaining prior approval and instructions (RMA#) from our returns department. Goods returned unauthorized or by collect freight may be refused. The RMA# must be clearly displayed on the outside of the box, or the package will not be accepted. Please contact the RMA department for a request form.
- Goods returned for repair must be reasonably clean and free of hazardous materials.
- A handling fee is charged for goods returned for exchange or credit. This fee may add up to 25% of the sale price depending on the condition of the item. Goods ordered in error are also subject to the handling fee.
- Equipment which was built as a special order cannot be returned.
- Always refer to the RMA# when contacting WPI to obtain a status of your returned item.
- For any other issues regarding a claim or return, please contact the RMA department.

Warning: This equipment is not designed or intended for use on humans.

** Electrodes, batteries and other consumable parts are warranted for 30 days only from the date on which the customer receives these items.*



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