FPC200

Fiber Preparation Station

User Guide

Table of Contents

Chapter 1 Warning Symbol Definitions

Below is a list of warning symbols you may encounter in this manual or on your device.

Symbol	**Description**
	Direct Current
	Alternating Current
	Both Direct and Alternating Current
	Earth Ground Terminal
	Protective Conductor Terminal
	Frame or Chassis Terminal
	Equipotentiality
	On (Supply)
	Off (Supply)
	In Position of a Bi-Stable Push Control
	Out Position of a Bi-Stable Push Control
	Caution: Risk of Electric Shock
	Caution: Hot Surface
	Caution: Risk of Danger
	Warning: Laser Radiation
	Caution: Spinning Blades May Cause Harm

Chapter 2 Safety

CAUTION

Never pour acetone into the can while it is in the unit! If you do, you risk spilling acetone into the box, and causing a short circuit or other damage!

CAUTION

Before shipping the unit, be sure to empty the acetone out of the ultrasonic cleaning can.

CAUTION

When returning the product to Thorlabs, please use the original packaging and pink anti-static bag that the unit came in.

Chapter 3 Description

3.1. Introduction

Thank you for purchasing an FPC200 fiber prep station.

The FPC200 is designed for stripping, cleaning and cleaving optical fibers. It can handle fibers with cladding diameters ranging from 80-200 microns.

The fiber buffer is heated and then stripped off using a set of matched blades. The cladding is then immersed in a solvent (usually acetone) that is agitated by an ultrasonic transducer to remove debris from the cladding surface. The fiber is then tensioned and scribed with a diamond-coated cleave blade. This cleaves the fiber, resulting in a flat endface whose normal is parallel to the axis of the fiber. The fiber can then be spliced to another fiber using Thorlabs' FSX2000PM fusion splicer.

3.2. Parts Checklist

When unpacking the FPC200 for the first time, check to make sure that you have the following accessories in addition to the FPC200 base unit:

- 12.5V power supply
- AC power cord
- DC power cord
- 0.035" Allen key
- 0.050" Allen key
- Small screw driver
- PTR-400-CX-FPS Handset Controller
- Nylon brush
- Any extra sets of TMS inserts and guides that you purchased
- This manual

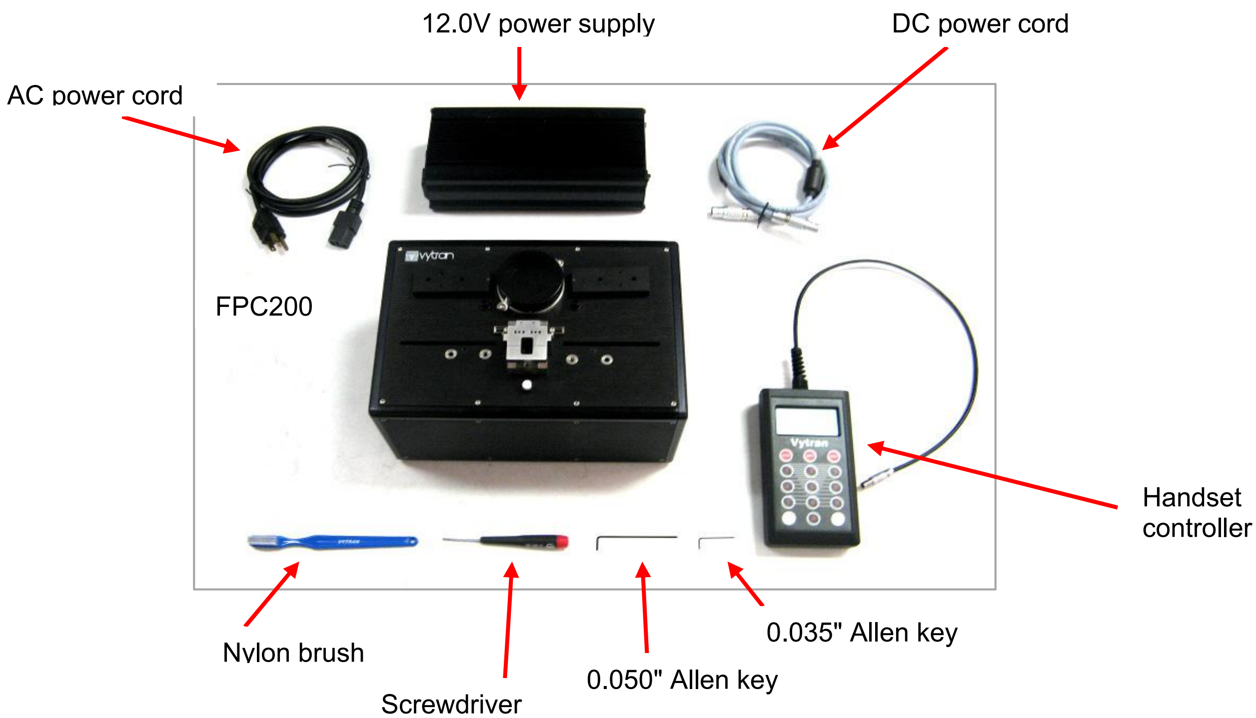


Figure 1 The FPC200 and its Accessories

If you are missing any of the accessories or need replacements, please contact Thorlabs. Visit **http://www.thorlabs.com/locations.cfm** for contact information.

Please save the packaging material and pink anti-static bag for returning the unit back to Thorlabs for service. This packaging will reduce the risk of damage during shipment.

Figure 2 These Packing Materials Should be Saved

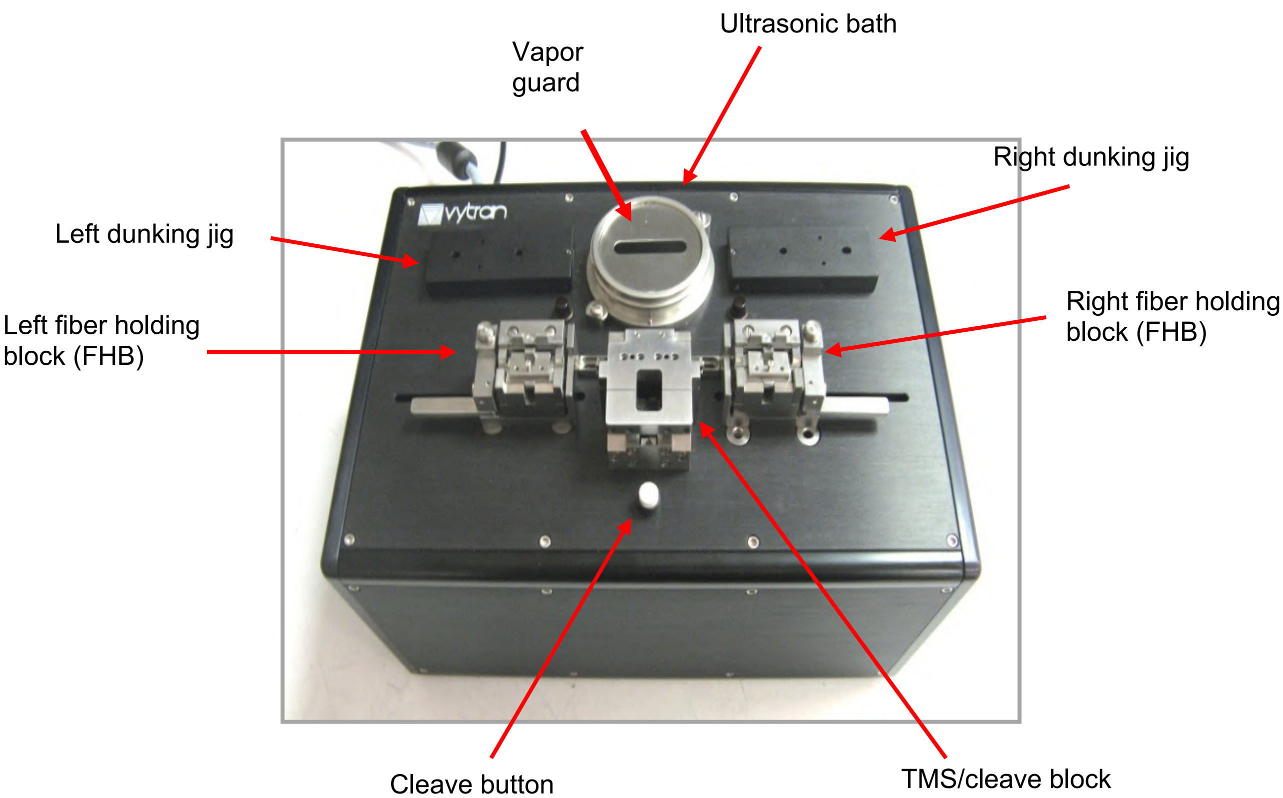


Figure 3 System Overview

3.3. The TMS Inserts

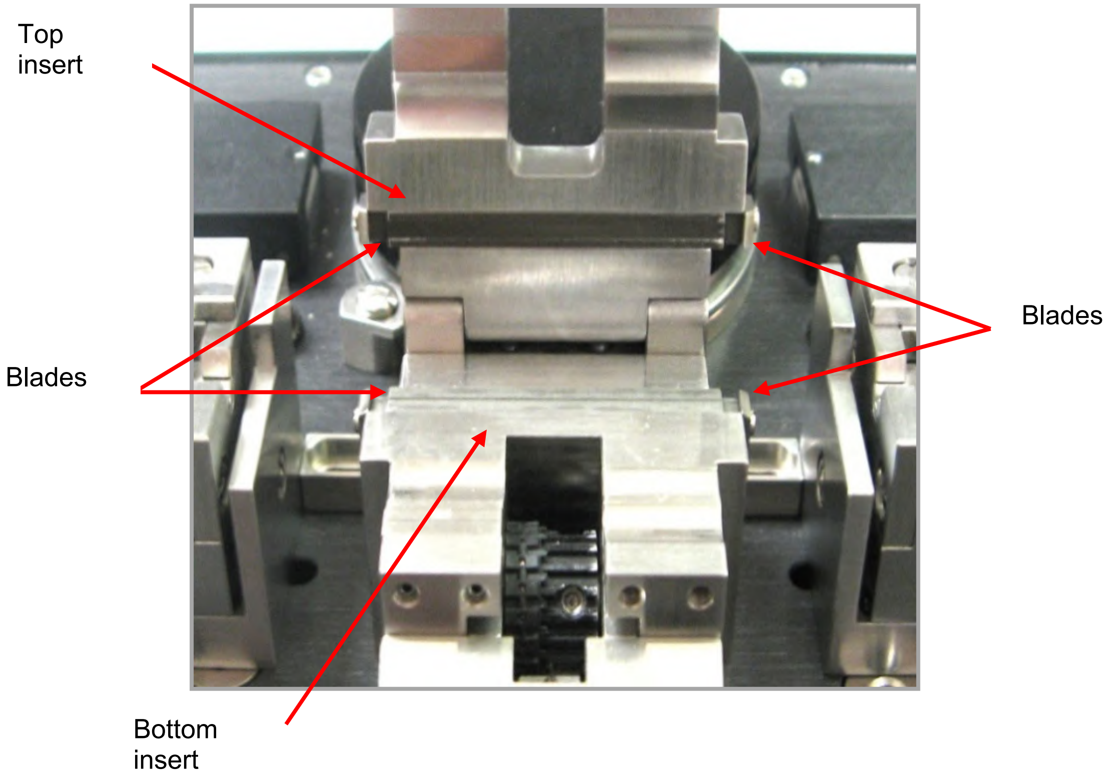


Figure 4 The TMS Inserts

The TMS is designed to accommodate a wide range of fiber buffer and cladding sizes through the use of changeable top and bottom inserts. Both top and bottom inserts have blades fixed to their sides for scraping the buffer from the fiber.

The bottom insert features a V-groove and incorporates vacuum to assist in loading the fiber. The top inserts are flat. When changing inserts, it is necessary to adjust the blade position. This will be discussed in greater detail in section 7.3.

Chapter 4 Setup

4.1. Initial Setup

1. Plug in the AC power cord. The power supply accepts an AC-input of 90-260 VAC; 47-63 Hz.

2. Connect both the AC power cord and the DC power cable to the external power supply. The end of the DC power cord without the ferrite is the one that should be plugged into the power supply (see illustration).

3. Connect the Handset Controller and the DC power cable to the FPC200.

4. Fill the ultrasonic cleaning can with acetone (See section 7.1 for detailed instructions).

4.2. Power-up

1. Turn on the power supply.
2. Turn on the FPC200 using the ON/OFF rocker switch located on the back of the unit.

4.3. Shut-down

1. Place the cap on the ultrasonic cleaning can and screw it on.
2. Turn off the FPC200 using the on/off rocker switch located on the back of the cleaver.
3. Turn off the power supply.

Chapter 5 Operation

5.1. Controlling the FPC200

The FPC200 is configured and controlled from the handset controller, which also provides feedback on the status of the unit. The CFG button is used to configure the unit, which means changing parameters such as strip temperature and clean time. The OPT button is used to upload parameters from the handset controller to the FPC200, and also to download parameters from the FPC200 to the handset controller. The ESC button brings users back to the main menu.

Figure 5 The Handset Controller

Here are the parameters that can be changed through the CFG menu:

Clean Left Time	This refers to a count-down that begins when the left FHB is dunked. The "Clean Left Time" is the time (in seconds) that will elapse before the left "ready" light will illuminate. It is entered as a three-digit number. When the "ready" light illuminates, it means that the fiber should be clean, and the user should feel free to remove the FHB.
Clean Right Time	This refers to a count-down that begins when the right FHB is dunked. The "Clean Right Time" is the time (in seconds) that will elapse before the right "ready" light will illuminate. It is entered as a three-digit number. Again, when the "ready" light illuminates, it means that the fiber should be clean, and the user should feel free to remove the FHB.
TMS Warm-up Time	This refers to a count-down that begins when a FHB is placed in strip position. The "TMS Warm-up Time" is the time (in seconds) that will elapse before the LED in the white button will stop blinking and turn solid red. It is entered as a two-digit number. The blinking light indicates that the TMS is heating up. The solid light indicates that the TMS should be hot enough to strip correctly.

TMS Boost Time	This refers to a count-down that begins once the button LED turns solid red. The "TMS Boost Time" is the time (in seconds) that will elapse before the current to the TMS is reduced from the relatively high "boost" current to the relatively low "background" current. When the time is up, the LED turns off. The TMS Boost Time is entered as a two-digit number. If you would like to strip with the TMS as hot as possible, do it right when the LED turns off, because the TMS temperature continues to climb higher through the "boost" phase of the strip cycle.
TMS Background Current	This is the current (measured in milliamps) that is passed through the TMS heater when there is not an FHB in either strip position. It is entered as a four-digit number. The maximum background current is 5000 milliamps.
TMS Boost Current	This is the current (measured in milliamps) that is passed through the TMS heater when an FHB is placed in strip position. It is entered as a four-digit number. The maximum boost current is 9999 milliamps.
Cleave Left Steps	This refers to the position in which the cleave blade initially goes to to begin pecking at the left fiber. It is measured in motor steps, and is entered as a four-digit number. If this number is too low, it will take a very long time for the blade to reach the fiber. If this number is too high, the blade will immediately crash into the fiber and move too far forwards. This can damage the cleave blade, and should be avoided scrupulously.
Cleave Right Steps	This refers to the position in which the cleave blade initially goes to to begin pecking at the right fiber. Again, it is measured in motor steps, and is entered as a four-digit number. The consequences of this number being too low or too high are the same as for "Cleave Left Steps."
Cleave Oscillations	This is the number of times the cleave blade will move back-and-forth near the fiber before returning back down to home position. It is measured in motor steps, and is entered as a three-digit number.
Blade Service Position	This refers to the place the cleave blade will go when the user request the unit to move it to "service position." Moving the cleave blade to "service position" makes it possible to rotate or replace it. "Blade Service Position" is measured in motor steps, and is entered as a four-digit number.

Here are the actions that can be taken using the OPT menu:

Upload to FPS	This sends the parameters stored in the handset controller to the FPC200.
Download from FPS	This retrieves the parameters stored in the FPC200.
Service Blade	This moves the cleave blade into "service position." When it is in "service position," it can be rotated or replaced.

5.2. Description of the Strip Process

Here is how to use the FPC200 to strip the buffer off the end of a fiber:

1. Open the lid of the TMS.
2. Place one FHB next to the TMS block so the pins on the bottom of the FHB go into the slot. If you slide the FHB up against the TMS block it will activate the vacuum and the white button will begin blinking red.
3. Place a fiber into the FHB. The vacuum should suck the fiber into the FHB insert and also help locate the fiber in the TMS insert correctly. The fiber will stay in the FHB throughout its journey from the TMS station to the FSX2000PM splicer. In this way, the location of the strip interface and cleave point with respect to the splicer furnace will be invariable.
4. Slide the fiber so that the end lies clear of the far pair of blades.
5. Close the FHB lid.
6. Close the TMS lid, and wait for the buffer to be softened by the heat of the TMS.
7. After a few seconds, the white button at the front of the unit will stop blinking and glow continuously, indicating that sufficient time has elapsed to soften the buffer. Once this happens, pull the FHB away from the TMS. The buffer will be stripped from the fiber.

5.3. Description of the Cleaning Process

Here is how to use the FPC200 to clean the end of a fiber:

1. Remove the cap from the ultrasonic cleaning can.
2. Move the FHB from the TMS to the dunking station.
3. Tip the FHB so that the end of the fiber is immersed in the acetone. The unit will begin agitating the solvent.
4. After a few seconds, the light to the side of the dunking jig will light up, indicating that sufficient time has elapsed. Tip the FHB back down, and remove it from the dunking jig.
5. Replace the cap on the can to prevent the solvent from evaporating.

5.4. Description of the Cleave Process

Here is how to use the FPC200 to cleave a fiber. *The fiber must be stripped and cleaned prior to starting this process*. The instructions will begin with the right FHB. For the sake of brevity, the stripper/cleaver lid will be referred to here simply as the "cleave lid."

1. Make sure the cleave lever is in the forward position (and stays there).
2. Position the right-hand FHB at the right-hand cleave station, just forward of the stripper slot. When the FHB is properly seated, the vacuum will automatically activate.
3. Make sure the fiber is lying properly in the cleave insert V-groove.
4. Gently lower the cleave lid to clamp the stripped end of the fiber.
5. Move the cleave lever to the back position to apply tension to the fiber. The moving (center) part of the FHB will move away from the cleave block 1-2mm, but should then stop. Do not continue with the cleave operation if the moving part of the FHB continues to move. If this occurs, clean the mating surfaces of the cleave block and the FHB, and prepare new fibers. If this happens repeatedly, refer to the maintenance section for further advice or contact Thorlabs for assistance.
6. Press the cleave button to initiate the cleave process, which will quickly bring the cleave blade up towards the fiber, before starting a series of forward and backward moves in a "pecking" motion, slowly approaching the fiber to be cleaved. As soon as the fiber is cleaved, the center block of the FHB will move away from the cleave block.
7. Raise the cleave lid (it is not necessary to wait for the blade to return to home).
8. Remove the FHB.
9. Remove the off-cut from the v-groove and dispose of it safely.
10. The cleave process for the left FHB is the same as for the right, only the left-hand cleave station should be used.

Chapter 6 Troubleshooting

Problem	Possible Cause	Solution
Fiber does not cleave	Contamination under the FHB, under fiber in FHB insert, or in cleave insert resulting in a raised fiber line.	Scrub the bottom of the FHB, Cleave insert, or FHB insert with the supplied toothbrush and retry. This is by far the most common cause of cleave failure.
	Cleave blade positioned too far back from the fiber.	It is possible that repositioning the cleave blade may result in a situation where one fiber will cleave and another will not or neither fiber will cleave. Please contact Thorlabs for assistance.
Blade rubs along the fiber without cleaving.	FHB is slipping. FHB holding groove or top cap is dirty.	Clean the FHB holding grooves and top cap with isopropyl alcohol or acetone and a cotton swab. Warning: Do NOT clean the V-groove insert with solvent when the vacuum is turned ON. The solvent will be drawn into the vacuum system and will cause internal damage.
	Cleave blade is dirty.	Clean the blade with a cotton swab dipped in isopropanol.
	Cleave tension insufficient. (Check for FHB slippage).	Increase the cleave tension.
	Cleave blade height adjustment may be required.	Please contact Thorlabs for instructions.
The FHB cocks forward when the cleave lever is released.	Bottom of the FHB or the plate the FHB sits on is dirty.	Scrub insert with toothbrush provided.
	Cleave tension is too high.	Reduce cleave tension.
Fiber slips through or breaks in the V-groove.	Stripper/cleaver top or V-grooves are dirty, or FHB V-grooves are dirty.	Clean the top and V-grooves using the soft brush (provided) or cotton swab dipped in isopropanol. Note: If the fiber breaks in the stripper/cleaver block, and enough fiber remains in the V-groove, remove the broken piece and re-cleave.
Blade rubs along the fiber without cleaving.	FHB is slipping. FHB holding grooves or top cap are dirty.	Watch the strip shoulder to establish which end is slipping. If the strip shoulder is moving the fiber is slipping at the Cleave Insert. Scrub the Cleave Insert/Stripper blades with the toothbrush provided. Warning: Do NOT clean the V-groove insert with solvent when the vacuum is turned ON. The solvent will be drawn into the vacuum system and will cause internal damage.
	Cleave blade is dirty.	Clean the blade with a cotton swab dipped in isopropanol.
	Cleave tension insufficient. (Check for FHB slippage)	Increase the cleave tension.
	Cleave blade height adjustment may be required.	Please contact Thorlabs for instructions.
Blade not touching one or both fibers.	Fiber not in V-groove.	Ensure fiber is correctly located in the V-groove.
	Cleave blade height adjustment may be required.	Please contact Thorlabs for instructions.
Bad cleave.	FHB not sliding freely.	The FHBs must move smoothly and freely for the correct tension to be applied to the fiber. If the FHBs have become contaminated it may be necessary to strip down and rebuild them. Please contact Thorlabs for assistance. This is normally part of an annual service.
	Cleave tension needs adjustment.	Adjust the cleave tension.
	Cleave blade may be damaged	Inspect blade for chips/cracks. See Maintenance section for instructions to rotate blade 180 degrees to expose new blade edge

Chapter 7 Maintenance

The FPC200 is designed for a production environment to give trouble-free operation provided the planned maintenance is performed as described below.

7.1. Planned Maintenance Schedule

- Brush away debris from the blades after every strip.
- Inspect and clean the insert nests every shift.
- Clean the cleave blade every shift.
- Adjust the cleave blade height if it becomes damaged at the cleave point.
- Add acetone to the ultrasonic can when the surface drops too low as explained in Section 7.2 Adding Acetone to the Can.

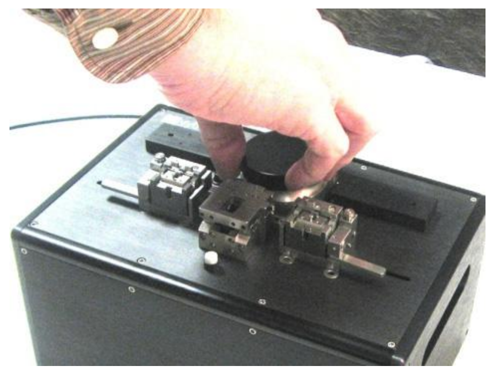
7.2. Adding Acetone to the Can

CAUTION

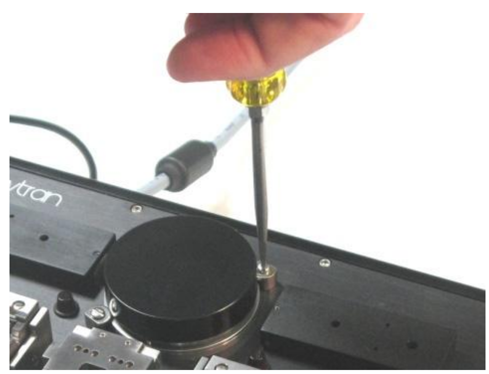
Never pour acetone into the can while it is in the unit! If you do, you risk spilling acetone into the box, and causing a short circuit or other damage.

Follow this procedure for adding acetone:

1. Turn off the power to instrument and screw the cap onto the can.

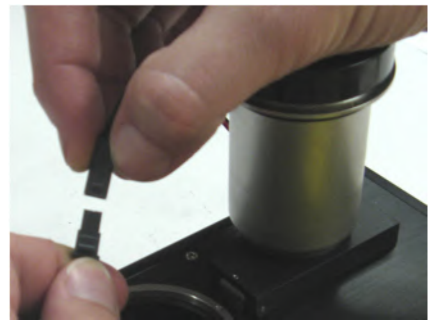


2. Loosen the clamps using a flat-head screw driver.



3. Lift the can out of the unit. Place the can on one of the dunking jigs.

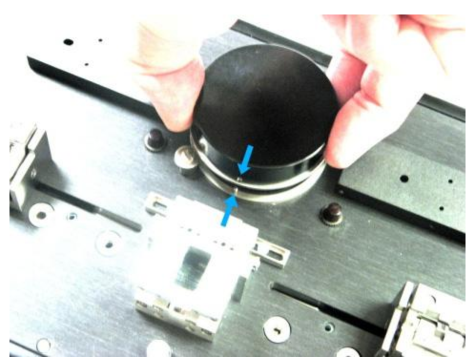
4. Unplug the transducer pigtail. Gently lay down the wires emerging from the hole so that the connector remains out of the hole. Bring the can to a place where you can easily pour acetone accurately and safely.



5. Unscrew the cap from the can, then remove the vapor shield.

6. Pour acetone into the can until the top is an eighth of an inch below the ridge the vapor shield sits on. Replace the vapor shield, then replace the cap. Carry the can back to the unit and plug the pigtail back into the mating connector.

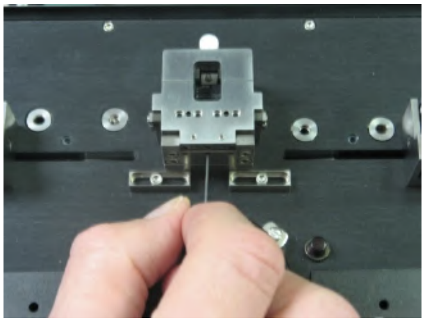
7. Lower the can back into the unit. Rotate the can so that the alignment pins go into the holes in the lip of the can (blue arrows in picture). Secure the can with the clamps using a flat-head screw driver. If planning on using the unit immediately, remove the cap.



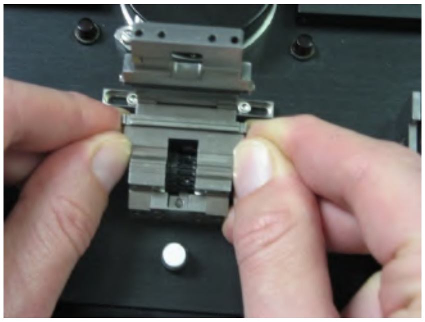
7.3. Changing the TMS Inserts

If you decide to strip a different diameter fiber, you will have to change the TMS inserts to accommodate the new fiber diameter.

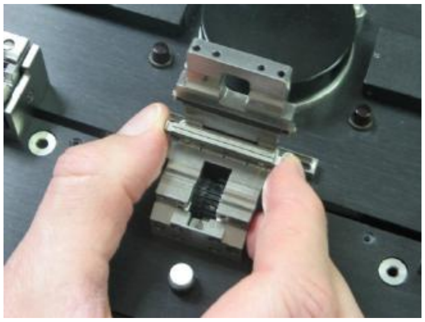
1. Loosen the six set screws holding the inserts in place using the 0.035" Allen key. These set screws are located in the back of the TMS block. There are three in the lid and three in the body of the block.



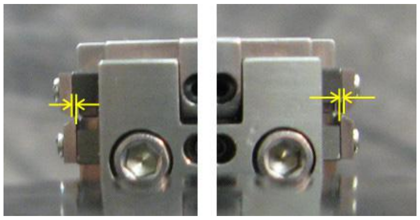
2. Remove the bottom insert by pulling up on it as shown. Remove the top insert, and replace it with the new one.



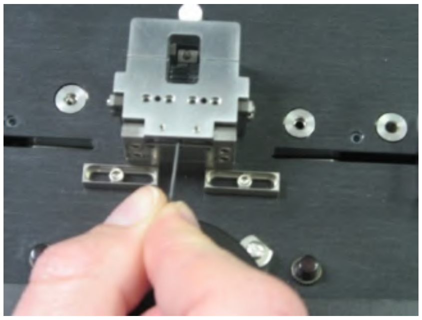
3. Slide in the new bottom insert and tighten the three set screws in the back to capture it (using the 0.035" Allen key). Do not tighten the set screws for the top insert yet.



4. Using an eye loupe, make sure the offset between top and bottom blade on the left is the same as the spacing on the right.



5. Tighten the set screws in the back of the lid to capture the top insert in the correct position.



7.4. RMA Process

To return the unit for service, contact Thorlabs. Visit **https://www.thorlabs.com/locations.cfm** for contact information.

CAUTION

Before shipping the unit, be sure to empty the acetone out of the ultrasonic cleaning can.

CAUTION

When returning the product to Thorlabs, please use the original packaging and pink anti-static bag that the unit came in.

The illustrations below show the correct way to re-pack the FPC200. Please ensure that the bottom of the box is taped securely before re-packing the unit. If returning a malfunctioning unit for repair, we ask that you return the accessories with the unit in case one of the accessories happens to be the source of the problems.

Figure 6 Initial Placement of Foam

Figure 7 The Unit and its Accessories

Figure 8 Foam Support

Figure 9 One Final Sheet of Foam on Top of Everything

Chapter 8 Specifications

Fiber Specifications	
Accepted Fiber Cladding Diameters	80 to 200 µm
Fiber Type	SM, MM, or PM

Thermo-Mechanical Stripper	
Accepted Coating Materials	Single or Dual Acrylate
Maximum Stripping Temperature	~130 °F (54 °C)

Ultrasonic Cleaner	
Accepted Cleaning Solvents	Acetone or Isopropyl Alcohol
Cleaning Time	1 to 120 s

Cleaver	
Cleave Method	Tension and Scribe
Cleave Type	Flat (0°)
Maximum Tension[1]	2.45 N (0.55 lbs)

General	
Operating Temperature	0 to 40 °C (Non-Condensing)
Storage Temperature	-20 to 70 °C
Power	90 to 250 VAC (47 - 63 Hz)
Size (L x W x H)	10.12" x 7" x 6.25" (257 mm x 178 mm x 158 mm)
Weight	11 lbs (5 kg)

[1] Tension can be adjusted manually by the user for different fiber sizes. These cleavers are calibrated using standard weights that are hung off a pulley, so the tension settings are programmed into the handset in grams. This maximum tension corresponds to 250 g.

Chapter 9 Compliance

THORLABS
www.thorlabs.com

EU Declaration of Conformity

in accordance with EN ISO 17050-1:2010

We: Thorlabs Inc.

Of: 56 Sparta Avenue, Newton, New Jersey, 07860, USA

in accordance with the following Directive(s):

2006/42/EC	Machinery Directive (MD)
2004/108/EC	Electromagnetic Compatibility (EMC) Directive
2011/65/EU	Restriction of Use of Certain Hazardous Substances (RoHS)
1999/5/EC	Radio & Telcoms Terminal Equipment (R&TTE) Directive

hereby declare that:

Model: **FPC200**

Equipment: **Stand-Alone Fiber Stripper**

is in conformity with the applicable requirements of the following documents:

EN ISO 12100	Safety of Machinery. General Principles for Design. Risk Assessment and Risk Reduction	2010
EN 61326-1	Electrical Equipment for Measurement, Control and Laboratory Use - EMC Requirements	2013

and which, issued under the sole responsibility of Thorlabs, is in conformity with Directive 2011/65/EU of the European Parliament and of the Council of 8th June 2011 on the restriction of the use of certain hazardous substances in electrical and electronic equipment, for the reason stated below:

does not contain substances in excess of the maximum concentration values tolerated by weight in homogenous materials as listed in Annex II of the Directive

I hereby declare that the equipment named has been designed to comply with the relevant sections of the above referenced specifications, and complies with all applicable Essential Requirements of the Directives.

Signed: *On:* 18 February 2016

Name: Ann Strachan

Position: Compliance Manager

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CE

Chapter 10 Regulatory

As required by the WEEE (Waste Electrical and Electronic Equipment Directive) of the European Community and the corresponding national laws, Thorlabs offers all end users in the EC the possibility to return "end of life" units without incurring disposal charges.

- This offer is valid for Thorlabs electrical and electronic equipment:
- Sold after August 13, 2005
- Marked correspondingly with the crossed out "wheelie bin" logo (see right)
- Sold to a company or institute within the EC
- Currently owned by a company or institute within the EC
- Still complete, not disassembled and not contaminated

Wheelie Bin Logo

As the WEEE directive applies to self-contained operational electrical and electronic products, this end of life take back service does not refer to other Thorlabs products, such as:

- Pure OEM products, that means assemblies to be built into a unit by the user (e. g. OEM laser driver cards)
- Components
- Mechanics and optics
- Left over parts of units disassembled by the user (PCB's, housings etc.).

If you wish to return a Thorlabs unit for waste recovery, please contact Thorlabs or your nearest dealer for further information.

Waste Treatment is Your Own Responsibility

If you do not return an "end of life" unit to Thorlabs, you must hand it to a company specialized in waste recovery. Do not dispose of the unit in a litter bin or at a public waste disposal site.

Ecological Background

It is well known that WEEE pollutes the environment by releasing toxic products during decomposition. The aim of the European RoHS directive is to reduce the content of toxic substances in electronic products in the future.

The intent of the WEEE directive is to enforce the recycling of WEEE. A controlled recycling of end of life products will thereby avoid negative impacts on the environment.

Chapter 11 Thorlabs Worldwide Contacts

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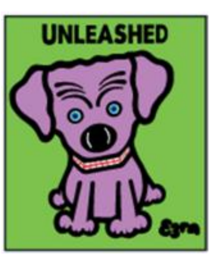

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