PTR-100

Operator's Manual

Version 1.2

Vytran Corporation

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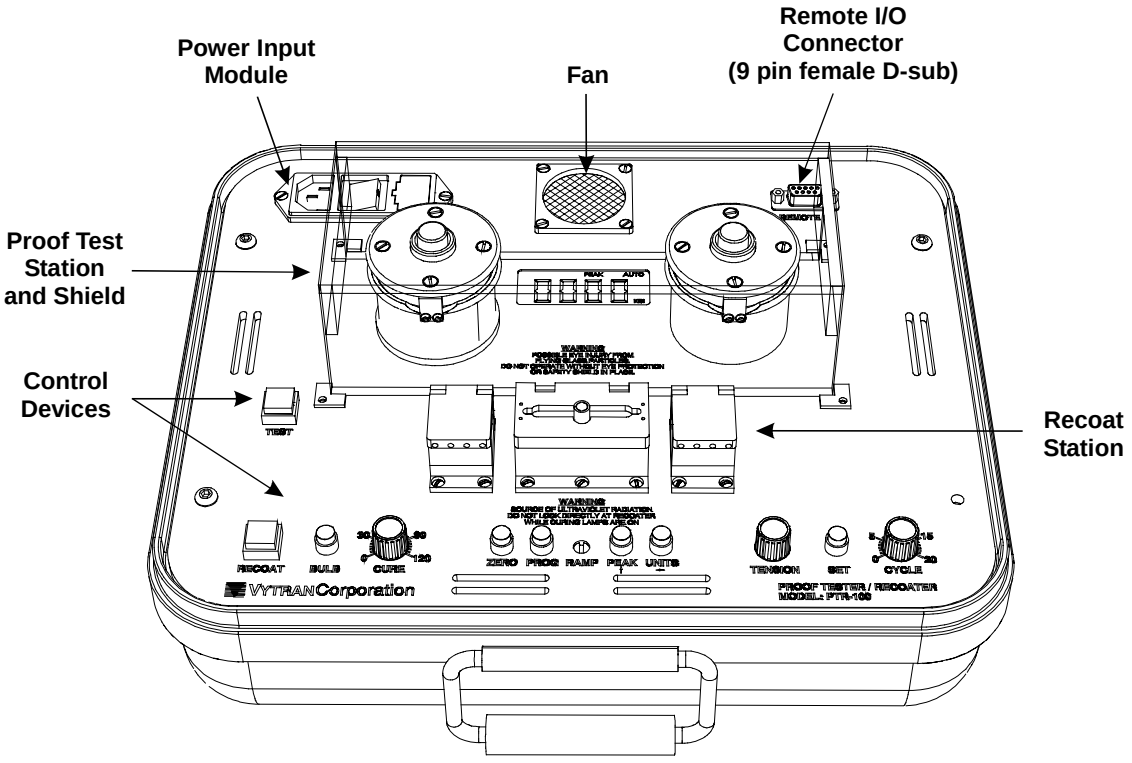
Introduction

The PTR-100 is a combination optical fiber recoater and proof tester/tension tester that provides a convenient, portable unit. The recoat station applies a flexible UV acrylate coating to a fusion spliced section of fiber, while the proof test/tension test station determines the breaking strength of a fiber or ensures that a fiber or fusion splice meets a minimum strength requirement.

The PTR-100 is shown in the figure below.



Accessory Parts Checklist

When unpacking the PTR-100 for the first time, check to make sure that you have the following accessories:

- AC power cord
- Proof test shield
- UV curable acrylate
- Injection syringes and caps
- Quartz mold cleaning brush
- Lens tissue
- Abrasive squares
- Two (2) replacement UV lamps

If you are missing any of the above or need replacements, please contact Vytran at (800)421-8847. (Outside the US call (908)972-2880, or fax (908)972-6229.)

Power Up

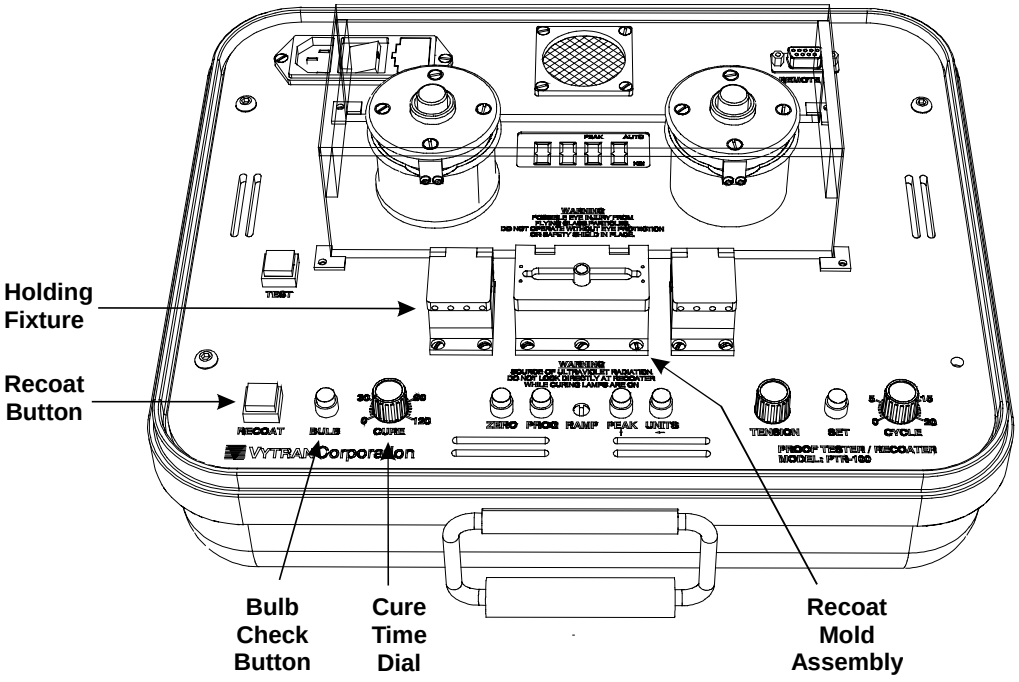
The PTR-100 accepts an AC input of 90-260 VAC; 47-63 Hz. Connect the power cord and turn the unit on by depressing the ON/OFF switch located on the power input module. After a momentary delay, the fan should turn on and the display meter become active.

Chapter One : Recoating

The purpose of the recoat is to maintain the strength and flexibility of the fiber or fusion splice by protecting the glass surface from damage. It should be noted that recoating a splice does not make the splice stronger.

To recoat a fusion splice, the section of exposed fiber is placed in a quartz recoat mold assembly. External holding fixtures secure the fiber, centering it within the recoat assembly. To allow for tolerance variations from fiber manufacturers, the diameter of the recoat mold cavity is generally specified to be slightly larger than the nominal outside coating diameter (e.g. 260 µm for a nominal 250 µm coating). A liquid acrylate material is injected into the mold cavity and is cured by exposure to ultra-violet light from a built-in UV source. The recoat process maintains a near original fiber diameter and delivers a flexible fusion splice that can be handled or tightly coiled as if no splice were present. The integral fiber holding fixtures ensure that the fiber strength is not degraded by the recoat process.

The recoat station components and the associated control devices are shown in the figure below.



The recoat station components and associated control devices are as follows:

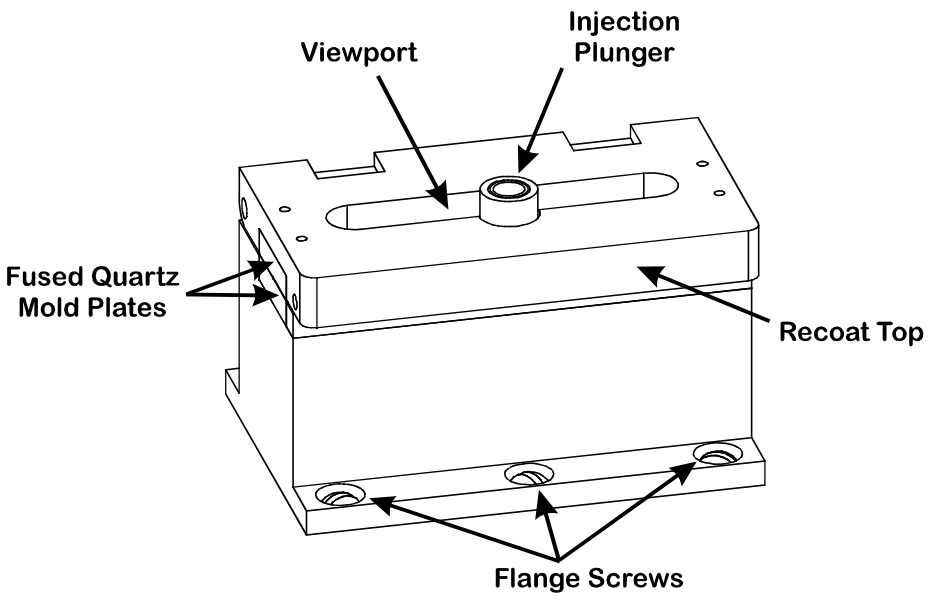
Holding Fixtures. Contain vacuum V-grooves which precisely position the fiber in the recoat mold channel.

Cure Time Dial. Used to set the UV curing time (in seconds).

Bulb Button. Depress to apply low power to the UV curing lamps for visual inspection.

Recoat Button. Depress to turn on the UV curing lamps.

Recoat Mold Assembly. The recoat mold assembly is shown in the figure below.



Injection Plunger. Used to inject the UV acrylate into the mold cavity.

Viewport. Allows the user to watch the UV acrylate as it flows into the mold cavity.

Fused Quartz Mold Plates. Form a mold cavity for the UV acrylate material.

Flange Screws. Used to secure the position of the recoat station assembly.

Cleaning the Recoat Mold

The recoat mold assembly contains two very flat quartz plates, each with a semi-circular channel running longitudinally down the center of their mating surfaces. One plate is mounted in the hinged top which, when closed, forms a circular mold cavity with the bottom plate. In order for the top and bottom plates to mate flush together, they must be cleaned of all dirt and/or coating particles.

The quartz mold plates can be cleaned with a soft lint-free lens tissue wetted with isopropyl alcohol. Wipe off any dirt particles from both the top and bottom plates. The soft brush provided can be used to clean the mold channels of any cured coating particles. Coating particles that adhere to the mold plates can be softened with acetone if necessary. **Do not rub any hard objects across the surface of the plates as this could scratch the optical coating and degrade the quality of the recoat.**

Loading the Injection Port

The top quartz plate contains an injection port which must be filled with UV acrylate material prior to placing the fiber in the recoat mold. The injection port can be filled by using a syringe (supplied) to dispense the UV material. Care must be taken to prevent the formation of bubbles in the UV material when loading both the syring and the injection port.

WARNING: Prior to handling the UV acrylate material, be sure to read the Material Safety Data Sheet provided in the Appendix.

To load the injection port, use the following procedures (see Figure 1):

1. Fill the syringe by inserting the tip into the bottle of UV material. Make sure that the tip is immersed in the material and slowly draw out the plunger.
2. If an air bubble gets trapped within the syringe, turn the syringe upsidedown for several minutes to allow the bubble to rise to the tip. Gently push in on the plunger to force out the air bubble.
3. Fill the injection port: Remove the threaded plunger from the port and slowly dispense 2 or 3 drops of the UV material into the port. Allow the material to flow slowly into the bottom of the port after each drop. It is not necessary to fill the port completely. Some room should be left at the top in order to insert the o-ring plunger.
4. If any bubbles are visible, let the material sit for several minutes until the bubbles escape.
5. Raise the recoat top slightly and press the o-ring of the injection plunger into the port.
6. Rotate the plunger clockwise until the threads just catch.
7. Raise the recoat top and wipe away any excess UV material that may have injected out through the top.

Once the recoat port has been filled, it should contain enough UV material for several recoats.

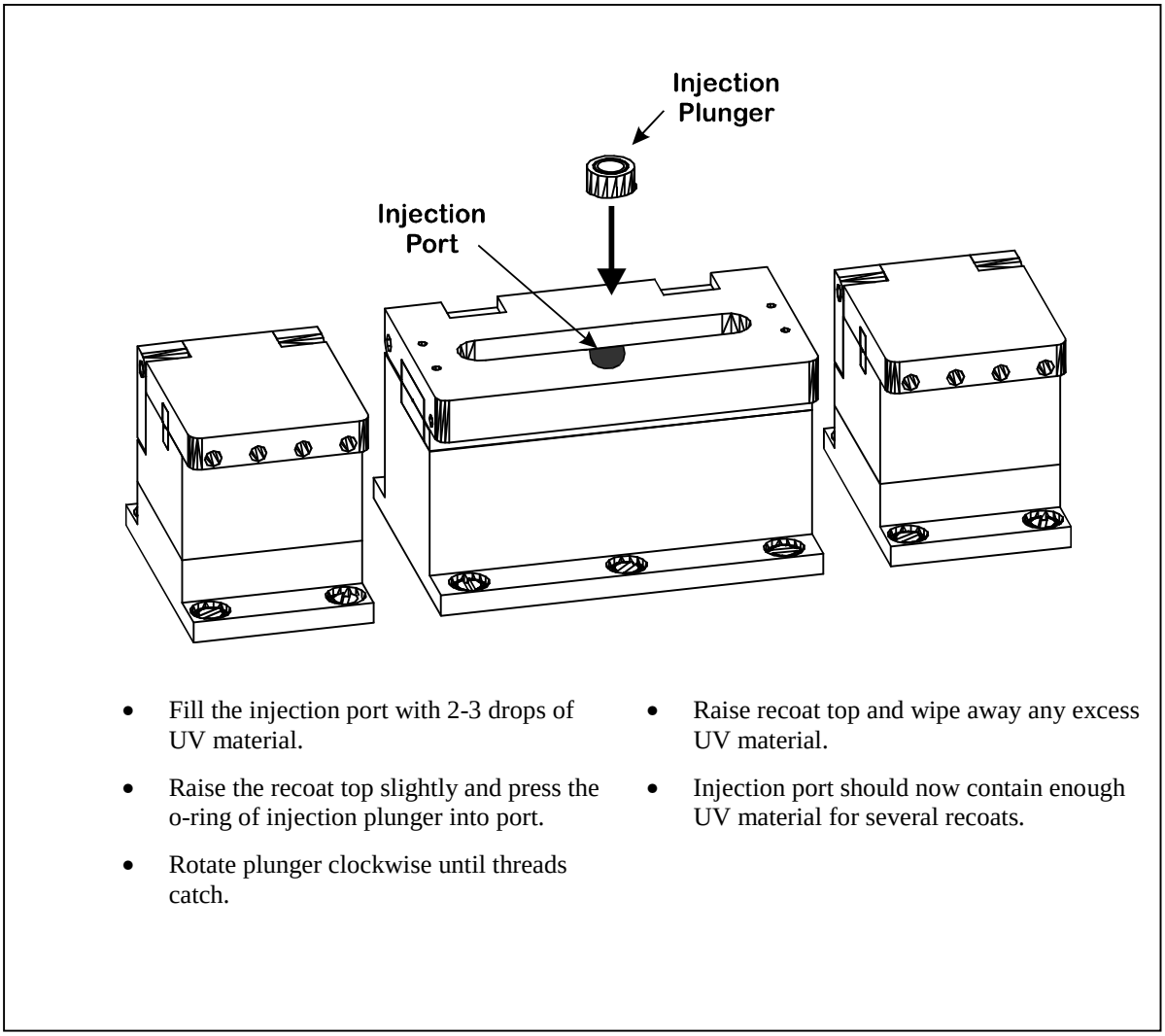


Figure 1. Operating Diagram - Loading the Injection Port.

Positioning the Fiber

A vacuum V-groove holding fixture is mounted on each side of the recoat mold assembly to position the fiber in the mold channel. Vacuum to the holding fixtures is automatically turned on when one of the holding tops is raised.

To position a fiber for recoating, use the following procedures:

1. Raise the recoat top and both holding fixture tops.
2. Make sure both quartz plates are clean and that the injection port has enough UV material for the recoat.
3. Hold the section of fiber to be recoated taught and lower it down over the holding fixtures such that the exposed section (fusion splice) is centered in the recoat mold. The fiber will be drawn by the vacuum into the V-grooves of the holding fixtures. (NOTE: Vacuum to the V-groove holding fixtures will automatically shut off if left on for more than 6 minutes. To re-start the vacuum, close both holding fixture tops and then raise one of the tops. It is good practice to keep both holding fixture tops closed when not in use.)
4. Double check that the exposed section of fiber is centered in the mold. Lower one of the holding fixture tops to clamp the fiber.
5. Make sure that the fiber is taut between the holding fixtures and lower the second holding top. The fiber should be held in line with the recoat mold channel.
6. Lower the recoat top gently to capture the fiber within the mold cavity.

It is important to keep the fiber taut between the holding fixtures to prevent the fiber from bowing at the recoat. It is also important to avoid touching the exposed glass surface as this could significantly lower the strength of the fiber. Care should therefore be taken when positioning the fiber in the holding fixtures to avoid rubbing the exposed section of fiber against the mold assembly. If proper care is taken when positioning the fiber, the recoat process will not degrade the strength of the fiber. It should be noted that recoating a splice does not make the splice stronger. The purpose of the recoat is to maintain the strength of the fiber or fusion splice by protecting the glass surface from damage.

Injecting the Acrylate

Once the fiber has been captured in the recoat mold assembly, the injection plunger should be turned clockwise to inject the UV acrylate material into the mold cavity. The material will flow from the injection port, down a shallow channel, into the recoat cavity. The plunger should be turned slowly to give the material time to flow smoothly along the injection path.

Use the viewport in the recoat top to watch the material flow into the mold. Continue turning the plunger until the acrylate material reaches both coating interfaces of the exposed section of fiber. A slight migration of the acrylate material outside of the injection path between the two mold plates can be expected. The bottom mold plate has a piezoelectric coating that prevents this material from curing and forming a characteristic mold flashing. Excessive flashing flow indicates that the plates did not mate flush together. This is generally caused by dirt particles on the mold plates and/or by trying to recoat a fiber that has a larger coating diameter than the recoat mold.

Curing the Coating

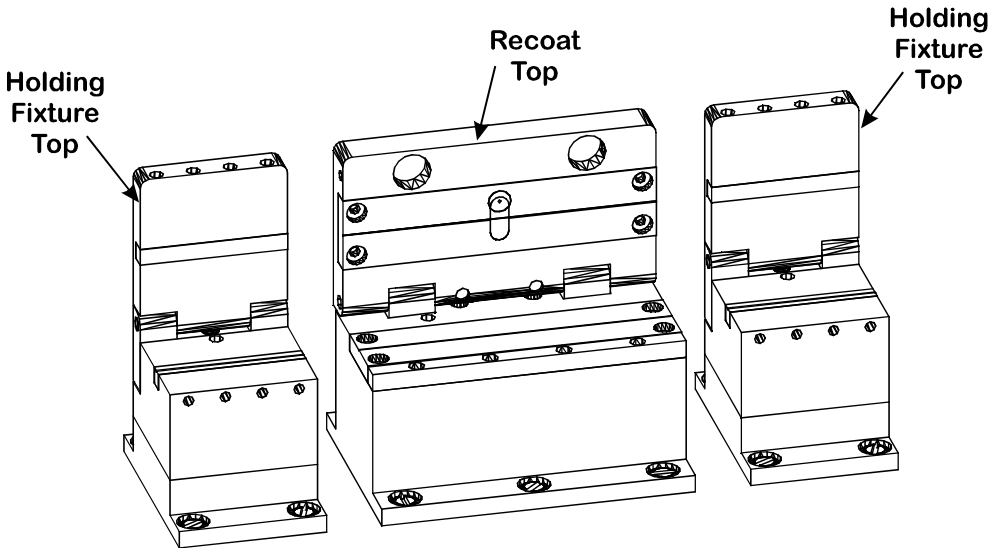
The liquid UV acrylate material cures to a solid state when exposed to ultra-violet light. The necessary UV radiation is provided by four tungsten-halogen lamps located below the bottom mold plate. The optical coating on the bottom plate ensures that any material which flows between the two plates will not cure and form a flashing on the recoated section of the fiber.

The urethane acrylate material supplied with the PTR-100 (DSM splice compound 950-200) requires approximately 15 seconds for proper curing. The cure time may vary slightly depending upon the size (diameter) of the recoat mold or the age of the recoat material.

WARNING: Do not look directly at the recoat assembly while the recoat lamps are on. The recoat lamps emit ultra-violet radiation which can cause damage to the eyes. The mold top must be closed during recoat lamp operation.

To cure the fiber coating, use the following procedures:

1. Set the **Cure** time dial to the desired UV curing time.
2. Press the **Recoat** button to turn on the UV lamps. The recoat lamps will shut off automatically after the set cure time.
3. To remove the recoated splice, first raise both holding fixture tops. Next, raise the recoat top.
4. The fiber may remain tacked to either the top or bottom mold plate. In this case, it may be necessary to gently pull on the fiber to release it.



- After loading the injection port, raise the recoat top and both holding fixture tops.
- Make sure the quartz recoat plates are clean.
- Center the splice region within the recoat mold.
- Gently lower the holding fixture tops and then the recoat top.
- Turn the injection plunger clockwise to inject the UV material into the mold.
- Press the **Recoat** button to cure the injected material.
- When the curing lamps turn off, raise both holding fixture tops and then the recoat top.
- Gently remove the recoated fiber from the recoat mold.

Figure 2. Operating Diagram - Recoating.

Diagnostics

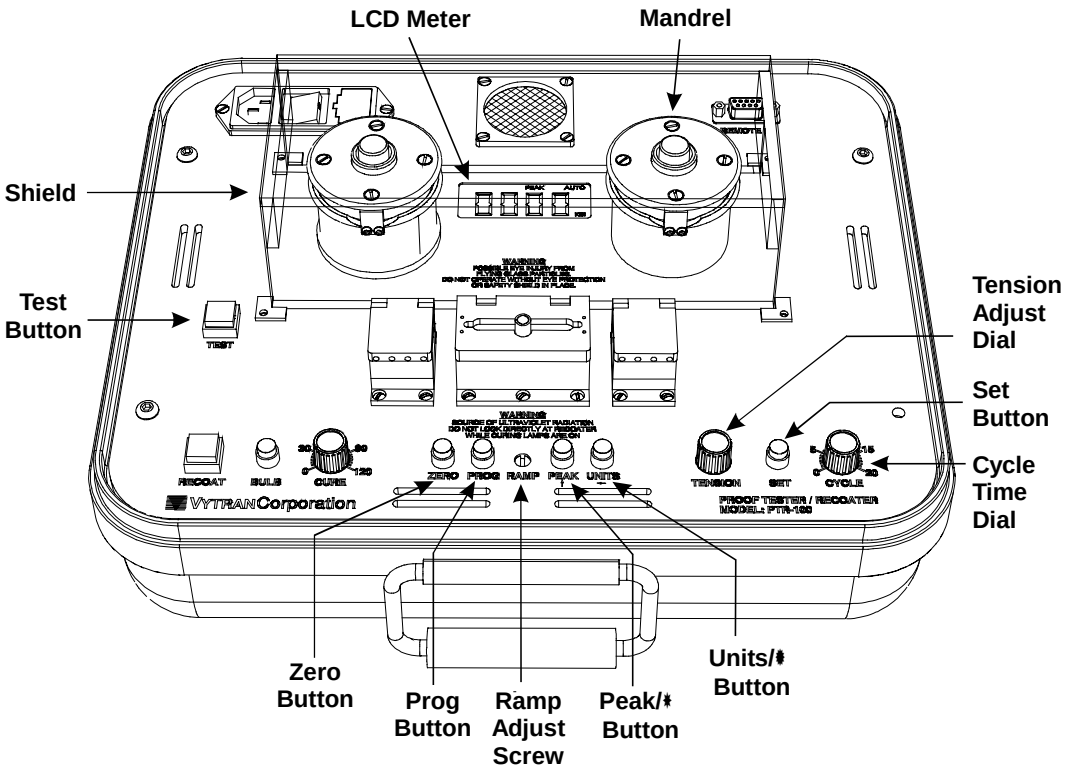
Problem	Possible Cause	Solution
Fiber snaps when mold top lowered.	Recoat mold not properly aligned to fiber.	Refer to the Maintenance section for instructions on realigning the recoat mold assembly.
	Grooves on recoat mold plate and cap do not line up.	Contact Vytran for recoater reservicing.
Material flows excessively outside of mold cavity or does not flow down mold cavity ("puddling").	Recoat mold plates are dirty.	Dirt between quartz mold plates will not allow them to lay flush, causing the acrylate to flow excessively outside the mold cavity. The recoat mold plates should be cleaned as described in the Cleaning the Recoat Mold section.
	Grooves on recoat mold plate and cap do not line up.	Contact Vytran for recoater reservicing.
Plunger turns excessively when injecting acrylate.	Bubbles in injector port.	Empty the recoat injector port (refer to the Maintenance section for instructions) and reload.
Flashing forms along the length of the recoat.	Cure time too long.	This will increase the modulus of the coating and make it stiffer. In the future, decrease the cure time. This flashing can generally be removed by wiping the recoated section with a dry lens tissue. For very tough flashing, it may be necessary to use the gray adhesive square (provided) to gently rub off the flashing material.
Recoat feels tacky or can be easily rubbed off by pulling the fiber between fingers.	Cure time too short.	Increase the cure time.
	One of the recoat bulbs is burned out.	Replace the recoat bulb (refer to the Maintenence section for instructions).
Recoat top does not lift easily or recoated section adheres tightly to mold plate.	Recoated fiber is adhering to recoat plate and/or top.	It may be necessary to coat the mold plates with a release agent prior to recoating. Contact Vytran for release agent recommendations and instructions.
Fiber sticks to recoat mold consistently.	Recoat mold plates are dirty.	Clean the recoat mold plates as described in the Cleaning the Recoat Mold section.

Problem	Possible Cause	Solution
Fiber snaps when lifting the recoat mold top.	Failed to first release the holding fixture tops before lifting the recoat mold top.	If the recoat mold top is lifted with the holding fixture tops closed, the fiber may stick to the recoat mold top and snap or degrade the strength of the fiber. Always open the holding fixtures before lifting the recoat mold top.

Chapter Two : Proof Testing

The proof test station of the PTR-100 can be used to determine the breaking strength of a fiber or to ensure that a fusion spliced fiber meets a minimum strength requirement. To proof or tension test a fiber, the section of fiber to be tested is located between two mandrels. The ends of the fibers are wrapped once around each mandrel and held in place by an integral clamping mechanism. A load is automatically applied to the fiber by the rotation of one of the mandrels. The load can be taken up to a predetermined level and released (proof test) or it can be taken up to the breaking strength of the fiber (tension test). The peak tension is recorded and can be displayed in either pounds, kilograms, or kpsi.

The proof test station components and the associated control devices are shown in the figure below.



The proof test station components and associated control devices are as follows:

LCD Meter. A digital display of proof test data. Refer to the Data Display section for further details.

Test Button. Zeros the meter and initiates the proof test/tension test cycle.

Set Button. Used to enter tension adjustment mode. Must be depressed while adjusting the peak tension with the **Tension** adjust dial.

Tension Adjust Dial. Sets the maximum applied load (peak tension) when in tension adjust mode. To adjust the peak tension, first place the display in Normal mode ("PEAK" indicator not displayed). Depress the **Set** button while turning the dial clockwise to increase maximum load, or counterclockwise to decrease. The tension can be monitored on the LCD display as the dial is adjusted.

Cycle Time Dial. Sets the lenth of time (in seconds) over which the load is applied.

Ramp Screw. Used to adjust the ramp rate. Turn counter-clockwise to decrease the ramp rate, clockwise to increase.

Zero Button. Zeros the meter and clears memory of the last peak tension.

Prog Button. Used to enter program mode. The program mode is used to set up the Auto Proof Test level and to enter the fiber diameter for kpsi conversion.

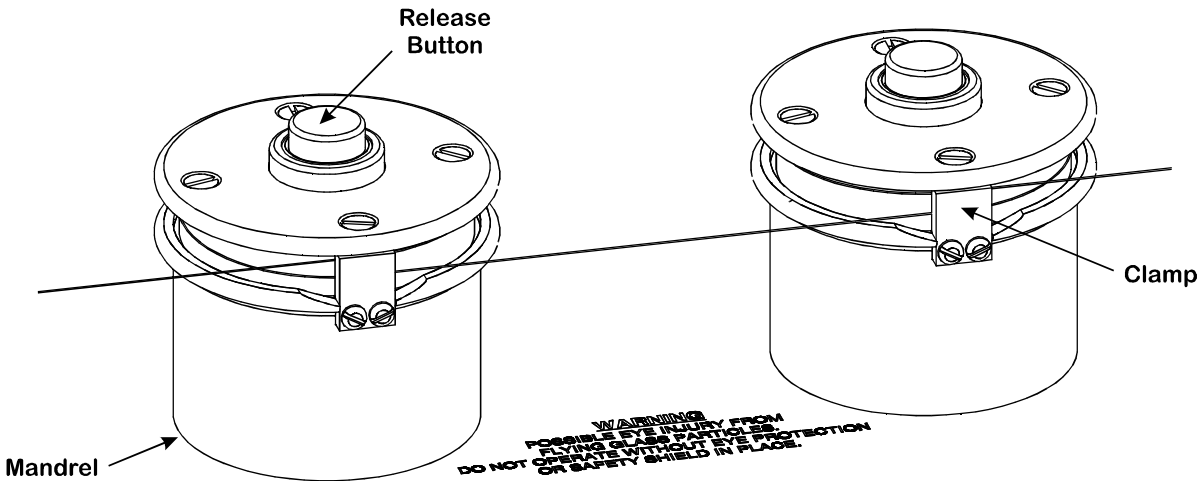
Peak / ↑ Button. A dual function button:

- In normal operation mode, toggles between Peak display mode and Normal display mode.
- When in program mode, increments a display value.

Units / ← Button. A dual function button:

- In normal operation mode, toggles between a load reading of pounds, a load reading of kilograms, and a tension reading of kpsi.
- When in program mode, moves the adjustable digit of a display parameter to the left.

Proof Test Mandrels. The proof test mandrels are shown in the figure below.



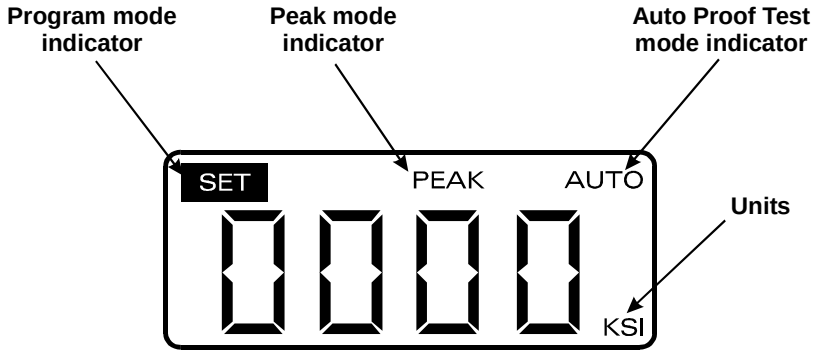
Mandrels. During the proof/tension test a fiber is wrapped around the mandrels. The right mandrel will rotate, applying tension to the fiber.

Clamps. Hold the fiber taut between the mandrels and keep it from slipping during the proof/tension test.

Releasing Buttons. Used to release the tension on the clamps, allowing the fibers to be inserted or removed from the mandrels.

Data Display

Data from the PTR-100 is displayed in the Proof Test LCD meter positioned above the mandrels. The Proof Test LCD meter is shown below.



The PTR-100 has a sampling rate of 4,500 samples per second. All displayed data is averaged over 100 samples to eliminate false readings from electrical noise or mechanical vibration. The data can be displayed in two different modes:

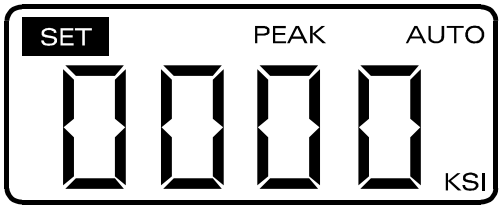
Normal: A real-time reading of the current load is displayed

Peak: The peak tension recorded is held and displayed

The display mode is set using the **Peak / ↑** button to toggle between the two selections. When Peak mode is selected the "PEAK" indicator will be displayed. When Normal mode is selected the "PEAK" indicator will not be displayed. Note: In both display modes the most recent peak tension is stored in memory; it can be recalled after a proof test or tension test cycle by toggling the display mode to Peak.

Programmable Functions

The program mode is entered by depressing the **Prog** button. This mode is used to set up the Automatic Proof Test or to enter a fiber diameter (necessary for calculation of tensile strength in kpsi). The "SET" indicator will appear in the upper left-hand corner of the display when the program mode is active.



Automatic Proof Test. The PTR-100 can be set to terminate the proof test when the fiber load reaches a predetermined level. This is called the Automatic Proof Test mode, or Auto mode, and is set up as follows:

1. To turn the Auto mode on or off, and to set the Automatic Proof Test level, depress and release the **Prog** button. The last entered Automatic Proof Test level will be displayed and the least significant digit will flash indicating that it can now be changed.
2. To increment the digit, depress and hold the **Peak / ↑** button until the digit stops flashing. When the **Peak / ↑** button is released the digit will increment. Continue to press and release the button in this manner to increment the digit upward until the desired value is obtained.
3. Once this digit is set, depress and hold the **Units / ←** button until the display stops flashing. When the button is released the active digit will move one place to the left. This digit can now be set using the **Peak / ↑** button as described in step 2.
4. Repeat steps 2 and 3 until the Automatic Proof Test level is set as desired.
5. Press the **Units / ←** button again to access the Auto Proof Test mode on/off status. If "AUTO" is flashing in the upper right hand corner of the display, the Auto Proof Test mode is activated. If the upper right corner of the display is blank, the Auto mode is shut off. The **Peak / ↑** button toggles the status of the Auto Proof Test mode on/off.
6. Once the Auto mode status is set, press the **Units / ←** button again to exit the program mode and return the display to normal operation. If the Auto mode was turned on, "AUTO" will appear in the upper right hand corner of the display.

To correct any errors made during this process, you must exit and then re-enter program mode.

NOTE: The Automatic Proof Test level will be set and displayed in the units that are currently active when the **Prog** button is pressed.

Fiber Diameter. In order for the PTR-100 to calculate the tensile strength (in kpsi) of a fiber under test (tensile strength equals load divided by cross sectional area), the diameter of the fiber (in µm) must be entered into memory, as follows:

1. Depress and hold the **Prog** button for 3 seconds to display the current fiber diameter stored in memory. (Factory set for 125 µm.) The least significant digit will be flashing to indicate that it can now be changed.
2. To increment the digit, depress and hold the **Peak / ↑** button until the digit stops flashing. When the **Peak / ↑** button is released, the digit will increment. Continue to press and release the button in this manner to increment the digit upward until the desired value is obtained.
3. Once this digit is set, depress and hold the **Units / ←** button until the display stops flashing. When the button is released the active digit will move one place to the left. This digit can now be set using the **Peak / ↑** button as described in step 2.
4. Repeat steps 2 and 3 until the fiber diameter (in µm) is set as desired.
5. Press the **Units / ←** button to exit the program mode and return the display to normal operation.

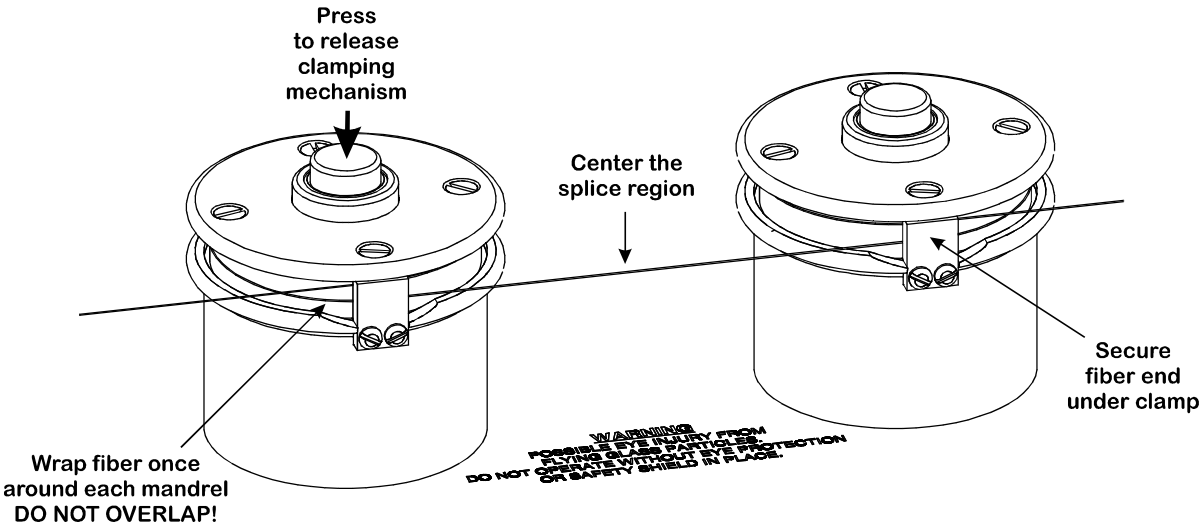
To correct any errors made during this process, you must exit and then re-enter program mode.

NOTE: Changing the fiber diameter also changes the kpsi setting of the Auto Proof Test level.

Loading the Fiber

Before beginning the proof or tension test procedure, make sure that both recoat holding fixture tops are closed. Both tops must be closed for proper operation of the Proof Tester/Tension Tester. ***Do not use the Proof Tester/Tension Tester while curing a recoated splice.***

Position the fiber so that the splice region or portion of fiber to be tested is centered between the mandrels. Press and hold the button on top of one mandrel to release its clamp. Wrap the fiber around the mandrel once, centering it on the rubber grips. Make sure the wrapped fiber is not overlapped. Release the button on top of the mandrel, securing the fiber end under the clamp. Repeat with the other mandrel. The fiber should be taut (no slack) between the mandrels.



Adjusting the Proof Test Cycle

The ramp rate, cycle time, and/or peak tension setting may need to be adjusted to obtain the desired proof test cyce. It is recommended that a test piece of fiber be used when first adjusting the proof test cycle.

CAUTION: Always use the safety shield or wear safety glasses when proof or tension testing fiber. The fiber under test can shatter and send glass particles flying.

The procedures for adjusting the proof test cycle are as follows:

1. Set the parameters (peak tension, display mode, cycle time) to the values that are desired for the actual proof test.
2. Load the test fiber on the mandrels. (Refer to the Loading the Fiber section for instructions).
3. Press the **Zero** button to zero the meter and clear memory.
4. Make sure the safety shield is in place and you are wearing safety glasses. (Note: Anyone observing the test should also take precautions against flying glass particles.)
5. Press the **Test** button to initiate the proof test cycle.
6. Adjust the ramp rate, cycle time, and/or peak tension setting as follows:

   Proof Test: The proof test cycle should be adjusted such that the peak tension is reached slowly and held briefly (less than 1/2 second). If the peak tension is not reached, increase the cycle time or the ramp rate (turn the **Ramp** adjust screw counterclockwise). If the peak tension is reached too quickly, decrease the cycle time or the ramp rate (turn the **Ramp** adjust screw clockwise). Some iteration between the ramp rate and peak tension setting may be required in order to achieve the desired proof test cycle.

   Automatic Proof Test: The load will ramp up to the Automatic Proof Test level and then release. Adjust the ramp rate to achieve the desired cycle time. A slight overshoot of the Automatic Proof Test level may occur depending upon the ramp rate. If necessary, this can be compensated for by setting the Automatic Proof Test level slightly below the desired peak level.

Tension Test

The tension test is used to determine the breaking strength of a fiber or fusion splice. When setting up a tension test, the following parameters should be used:

Parameter	Setting
Peak Tension	Greater than the known breaking strength of fiber
Display Mode	Peak
Auto Proof Test	Off **OR** set the Auto Proof Test level above the known breaking strength of the fiber
Cycle Time	5 to 10 seconds recommended

CAUTION: Always use the safety shield or wear safety glasses when proof or tension testing fiber. The fiber under test can shatter and send glass particles flying.

The tension test procedures are as follows:

1. Set the parameters as shown above.
2. Load the fiber to be tested. (Refer to the Loading the Fiber section for instructions). For very high tension test levels it may be necessary to wrap a second loop of fiber around the mandrels.
3. Press the **Zero** button to zero the meter and clear memory.
4. Make sure the safety shield is in place or that you are wearing safety glasses. (Note: Anyone observing the test should also take precautions against flying glass particles.)
5. Depress the **Test** button to initiate the tension test. The right mandrel will rotate to apply tension to the fiber.
6. The maximum tension applied (breaking strength) will be recorded and displayed on the meter. The **Units / ←** button can be used to display the maximum reading in alternate units.
7. When finished, zero the meter to clear the maximum reading from memory.

If the fiber does not break during the tension test cycle, increase the cycle time and/or the ramp rate (turn the **Ramp** adjust screw counterclockwise). It is recommended that the breaking strength be reached in approximately a five (5) second interval. If the fiber is breaking too quickly, decrease the ramp rate by turning the **Ramp** adjust screw clockwise.

Proof Test

The proof test is used to determine whether a fiber or fusion splice meets a minimum strength requirement. During the proof test, the peak load is applied to the fiber and held for the desired cycle time.

When setting up for the proof test, the following parameters should be used:

Parameter	Setting
Peak Tension	Set to the desired peak tension level
Display Mode	Peak
Auto Proof Test	Off **OR** set the Auto Proof Test level higher than the peak tension setting
Cycle Time	Set to the desired cycle time (5 seconds recommended)

CAUTION: Always use the safety shield or wear safety glasses when proof or tension testing fiber. The fiber under test can shatter and send glass particles flying.

The procedures for proof testing are as follows:

1. Set the parameters as shown above.
2. Adjust the proof test cycle if necessary. (Refer to the Adjusting the Proof Test Cycle section for instructions).
3. Load the fiber to be tested. (Refer to the Loading the Fiber section for instructions).
4. Press the **Zero** button to zero the meter and clear memory.
5. Make sure the safety shield is in place or that you are wearing safety glasses. (Note: Anyone observing the test should also take precautions against flying glass particles.)
6. Initiate the proof test by pressing the **Test** button on the splicer.
7. The maximum tension applied to the fiber will be recorded and displayed. If the fiber breaks prior to reaching the proof test level, the breaking strength will be displayed. The maximum reading can be displayed in alternate units after the proof test cycle is completed.
8. When finished, zero the meter to clear the maximum reading from memory.

Automatic Proof Test

If the PTR-100 is set in Auto mode ("AUTO" is displayed in upper right hand corner of the display), the fiber loading cycle will be automatically shut off and reset when the Auto Proof Test level is reached.

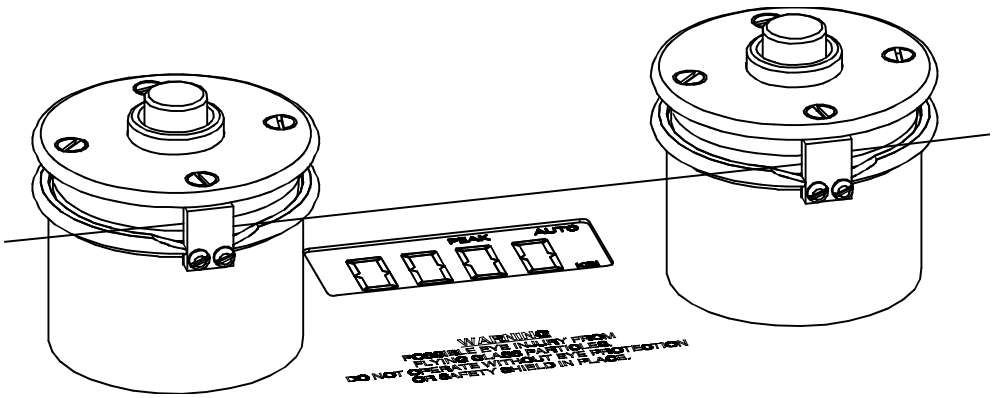
When setting up an automatic proof test, the following parameters should be used:

Parameter	Setting
Peak Tension	Greater than the Automatic Proof Test level used
Display Mode	Peak
Auto Proof Test	On with Automatic Proof Test level set as desired
Cycle Time	Greater than the actual desired cycle time. This value is only used to reset the proof tester when the fiber breaks before the peak tension is reached.

CAUTION: Always use the safety shield or wear safety glasses when proof or tension testing fiber. The fiber under test can shatter and send glass particles flying.

The procedures for the automatic proof test are as follows:

1. Set the parameters as shown above.
2. Adjust the proof test cycle if necessary. (Refer to the Adjusting the Proof Test Cycle section for instructions).
3. Load the fiber to be tested. (Refer to the Loading the Fiber section for instructions).
4. Press the **Zero** button to zero the meter and clear memory.
5. Make sure the safety shield is in place or that you are wearing safety glasses. (Note: anyone observing the test should also take precautions against flying glass particles).
6. Press the **Test** button to initiate the proof test cycle.
7. The maximum tension applied to the fiber will be recorded and displayed. If the fiber breaks prior to reaching the Automatic Proof Test level, the breaking strength will be displayed. The maximum reading can be displayed in alternate units after the proof test cycle is completed.
8. When finished, zero the meter to clear the maximum reading from memory.



- **Caution! Always use the safety shield or wear safety glasses when proof or tension testing fiber. The fiber under test can shatter and send glass particles flying.**
- Center the splice region between the mandrels.
- Wrap one loop of fiber around each mandrel.
- Zero the proof test meter.
- Press the **Test** button to initiate the cycle.

Figure 3. Operating Diagram - Proof Testing.

Diagnostics

Problem	Possible Cause	Solution
Fiber slips at very high tension levels.	Proof test grips are dirty.	Clean proof test grips with a cotton swab dipped in alcohol.
	Proof test grips are worn out.	Call Vytran for replacement proof test grips.
Tension levels seen extraordinarily high or low for the particular fiber being tested.	Wrong fiber diameter entered.	The fiber diameter is used in the tension level calculation. Check the current fiber diameter using the program mode (refer to the Programmable Functions section).

Chapter Three : Remote Input/Output

A 9 pin female D-sub connector is provided for remote communication with the PTR-100. The pin assignments are as follows:

Pin	Function	Description
1	Remote TEST	Provides the same function as the front panel **Test** button. Apply input voltage of +5 to +12 VDC to trigger.
2	Remote ground	
3	Analog output (-20 mV/pound)	Provides an output for a chart recorder or other analog recording device. Output is -20 mV/pound. The polarity can be reversed for positive output.
4	Analog output (ground)	
5	RS-232 output	Communication parameters are as follows: Baud 9600 Word length 7 bits Stop bits 2 Parity No parity Data is transferred as follows: -XXXXX_YY <CR><LF> where XXXXX = force value (5 digits plus decimal pt) YY = units of measure (2 characters)
6	RS-232 input	The following ASCII characters can be sent to control the PTR-100: R Reset (clear memory & zero meter) ? or X Request data on display to be transmitted U Change units P Change Peak mode A Send unit (e.g. LB, KG, N [=kpsi]) S Send operating mode (N=Normal, TP= peak)
7	Factory use only	
8	Factory use only	
9	Factory use only	

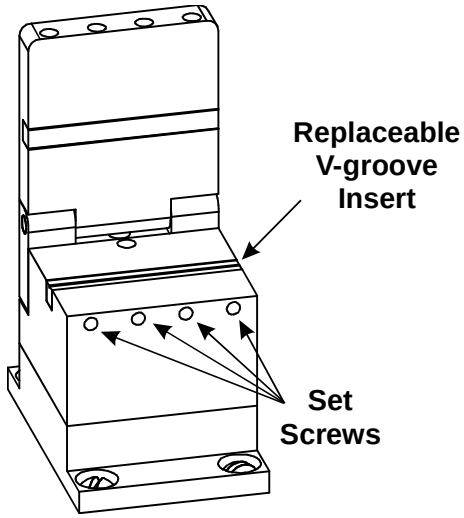
Chapter Four : Maintenance

Recoat Bulb Check/Replacement

Initiate a bulb check by depressing and holding the **Bulb** button. This applies low power to the UV lamps for visual inspection. Look through the bottom recoat plate and check to make sure that all four recoat lamps are visibly illuminated. Because the lamps are powered in two series pairs, if one lamp burns out only two will remain illuminated. If a lamp is burned out, remove the recoat assembly (see below) and replace the burned out lamp. Avoid handling the glass envelope. Fingerprints left on the envelope could shorten the lamp life. If you do touch the lamp, be sure to clean it with a soft lens tissue wetted with alcohol or acetone. Make sure all of the bulbs are positioned in a straight line and that they illuminate when the **Bulb** button is depressed. Replace the recoat assembly.

Changing the Vacuum V-Groove Inserts

The side holding fixtures contain replaceable V-groove inserts which are designed to hold a specific coating size. To change the inserts, loosen the four (4) set screws (using a .035″ Allen wrench) in the base of each holding fixture and remove the inserts. Install the new insert (V-groove side up) and gently tighten the four set screws. When clamping large diameter coatings, it may also be necessary to change the inserts located in the top of each holding fixture using the above procedure. Recheck the recoat assembly alignment (see Removing/Aligning the Recoat Assembly) after changing the inserts.

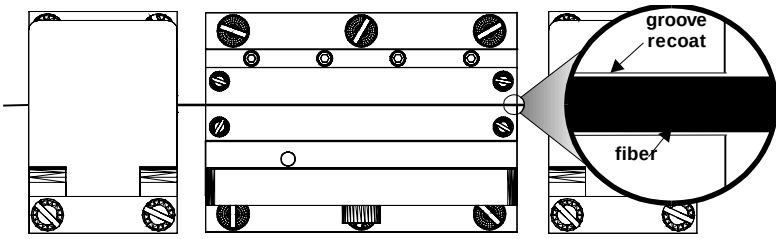


Removing/Aligning the Recoat Assembly

To remove the recoat assembly, remove the six (6) flange screws at the base of the assembly. Lift the recoat assembly straight up until it clears the recoat lamps. Keep track of the microswitch actuating post which may slide free of the assembly.

Before replacing the recoat assembly, make sure that the base plate and bottom of the assembly are cleaned of any dirt particles. Replace the microswitch actuating post by inserting the long end into the recoat assembly.

Lower the assembly straight down over the recoat lamps and replace the six (6) flange screws. Lightly tighten two diagonal screws only to allow for adjustment of the recoat assembly. Open the recoat station top and the tops of the holding fixtures. Clamp a length of coated fiber between the holding fixtures such that the fiber is under slight tension. (A fiber of the same diameter as the recoat mold should be used). Using a 10X magnifying loupe, view the fiber straight down at the right-hand edge of the recoat station, as shown in the figure below. Adjust the recoat assembly such that the fiber is centered in the bottom recoat groove. Repeat this procedure while viewing the fiber at the left edge of the recoat station. Tighten the recoat flange screws and recheck the fiber alignment.



Emptying the Recoat Injector Port

When the recoat mold assembly is stored for any length of time, the acrylate injector port must be emptied, particularly if it is stored near a fluorescent light source. If it is stored when not empty, the material may cure (harden) in the port. To empty the injector, open the recoat mold top. Turn the injection plunger clockwise to force the UV acrylate material out of the injection port and onto the recoat mold plate. Wipe up the acrylate as it is ejected with a soft lint-free cloth.

Replacing the Proof Test Grips

Remove the 4 flat head screws on top of the proof test mandrel and lift off the flanged top. Depress the mandrel clamp button and remove the rubber grip. Install a new grip making sure that the grip is uniformly positioned around the mandrel and seated below the bottom flange. Replace the top flange and 4 flat head screws. Make sure that the mandrel clamp operates freely and that the rubber grip does not rub against the clamping arm.

Calibration Check

The calibration can be checked by applying a known weight (10 pounds recommended) to the rotating mandrel and initiating a tension test cycle. This is best accomplished by setting up a pulley system that allows the weight to be hung over the edge of a table. (A calibration fixture - part no. CF-25 - is available from Vytran Corp.)

Fishing line or other high tension cord can be used to connect the weight to the mandrel. Wrap the line around the right mandrel several times as if loading a fiber. Set the peak tension to a level above that of the weight. Zero the meter and switch to Normal display mode. Before proceeding make sure you are wearing safety glasses in the event that the cord breaks. Allow the weight to hang freely. Press the **Test** button. Note the display reading just after the right mandrel begins to rotate. If the mandrel does not rotate, increase the load time, ramp rate and/or peak tension. The noted reading should be within 2% of the applied load. If the unit is out of specification it must be re-calibrated by a factory trained representative.

Appendix A