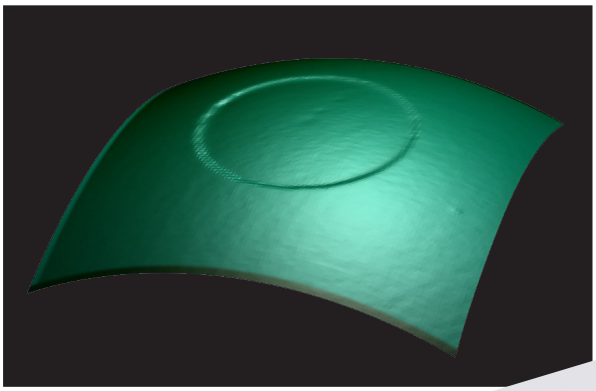
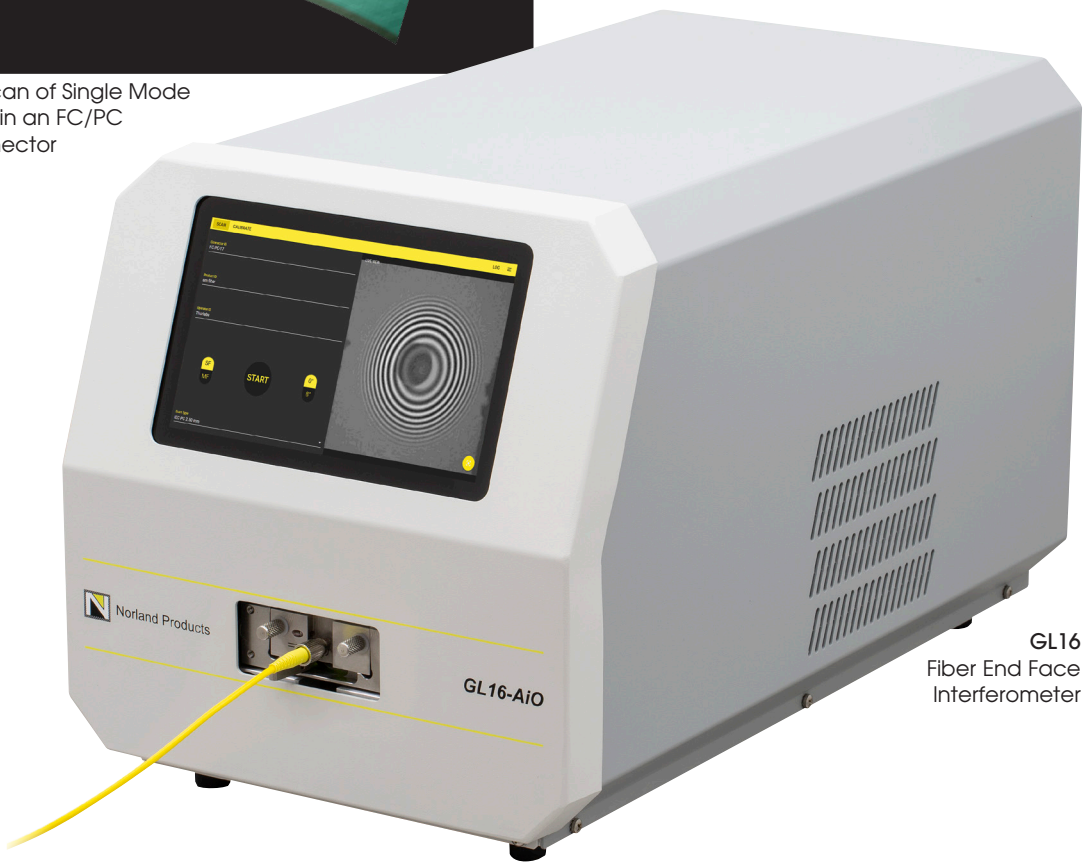
Fiber End Face Interferometer



3D Scan of Single Mode Fiber in an FC/PC Connector



GL16
Fiber End Face Interferometer

vytran® Fiber End Face Interferometer

Thorlabs' Vytran® GL16 Fiber End Face Geometry Measurement Instrument is an easy-to-use system for inspecting the end face geometry of single- and multi-fiber connectors. It uses a non-contact, scanning white-light interferometric (SWLI) technique to provide high-accuracy, repeatable, and reliable measurements for fiber connector testing, particularly for pass/fail testing using IEC or Telcordia requirements. All the system components, such as the interferometer, precision optics, high-speed cameras, and control system, are fully integrated within an enclosed 10.15" x 18.38" x 11.14" housing and can be controlled locally through the 7" capacitive touchscreen display or remotely through a browser-based application.

THORLABS

System Overview

Features

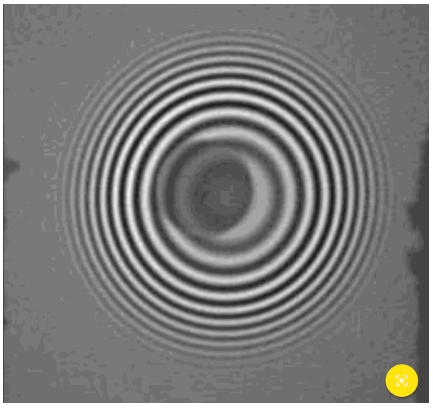
- Analyze Single- and Multi-Fiber Connector End Faces
- Accepts FC/PC, FC/APC, SC/PC, and LC/PC Connectors
- Built-In Test Parameters Based on IEC and Telcordia Standards
- Intuitive Touchscreen Controls
- Export Data, Scans, and 3D Images
- Fully Automated Operation

The GL16 Fiber End Face Interferometer measures step height changes on the surface of a fiber end face using a wide-bandwidth LED light source and a Michelson inteferometric objective lens. A piezoelectric stage moves the interferometric objective lens relative to the connector and collects the resultant interference patterns using a high-resolution camera.

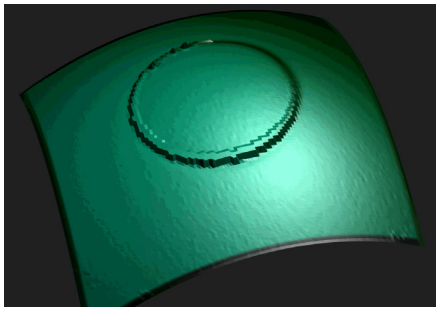
The interferometer accepts both single-fiber and multi-fiber connector types. The unit features an automated tilt stage designed to hold fiber connectors at either 0° or 8° in order to accommodate both flat and angle-polished connectors. The tilt stage is controlled by the software with no manual adjustment required.

Control the interferometer using the integrated touchscreen display and software that supports full programming of measurement and testing parameters, with features such as the built-in database of IEC and Telcordia requirements for pass/fail testing or custom, user-programmable test parameters. The intuitive controls and customization options ensure that the system is easy to use right out of the box while also providing sufficient flexibility to accommodate any user requirements during the measurement process. A USB 3.0 port in the rear allows for control via an external mouse, keyboard, or barcode scanner. An Ethernet port is also provided for remote operation, diagnosis, and software updates.

Results from a scan are stored in an internal SQL database. At the end of a scan, the result logs show the pass/fail status of each connector scanned and the causes of a failed device. Further details such as 3D scan images and a report of all measured parameters are available for each device scanned. Scan data reports can be exported in CSV or PDF format and can be viewed locally or through remote access. Exported measurements can be stored offline after downloading them via remote access.



Live Interferometric Scan of Single Fiber Connector



3D Image Based on Single-Fiber Interferometric Scan

Specifications

Accepted Fiber Diameters	Single Fiber	60 - 280 µm
	Multi-Fiber	60 - 250 µm
Accepted Connectors	Single Fiber	FC/PC, FC/APC, SC/PC, or LC/PC
	Multi-Fiber	MT-Style Ferrule (MT12 or MT16) MPO-Style Connector[a] (MPO12 or MPO16)
Measurement Lateral Resolution		2.2 µm
Measurement Height Resolution[b]		1.1 nm
Field of View (W x H)		4.2 mm x 2.4 mm
Depth Scan Range		70 µm
Total Measurement Time	Single Fiber	4 s (Typical)
	Multi-Fiber	8 s (Typical)
Hard Drive (SSD) Storage		250 GB
Weight		23 lbs. (10.4 Kg)
Electrical Power		120 / 240 VAC, 50 / 60 Hz at 1 A
Dimensions (L x W x H)		10.15" x 18.38" x 11.14" (257.8 mm x 466.9 mm x 238.0 mm)

a. MTP® connectors can also be mounted in the fixtures that are compatible with an MPO-style connector.
b. Defined as the measurable height difference on the connector surface using the interferometric fringes and camera bit depth.

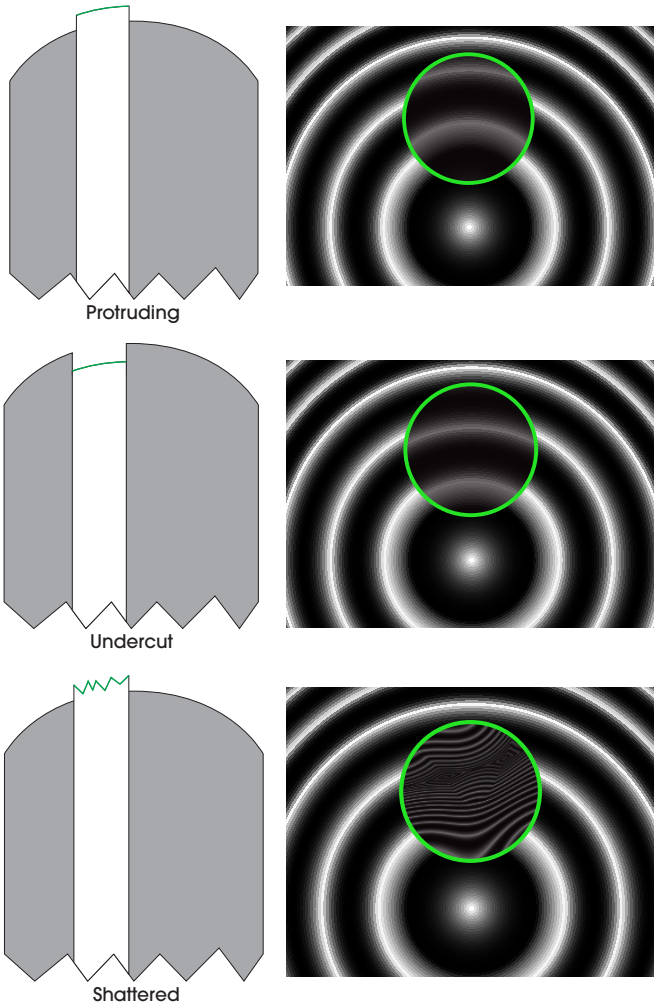
Operating Principle

The GL16 instrument uses a white-light LED, an objective lens optimized for Michelson interferometry, and a piezo-controlled stage to analyze connector surfaces. This method, called scanning white-light interferometry (SWLI), allows for a highly accurate measurement of a connector or fiber surface and can characterize imperfections that would be missed using a monochromatic interferometer.

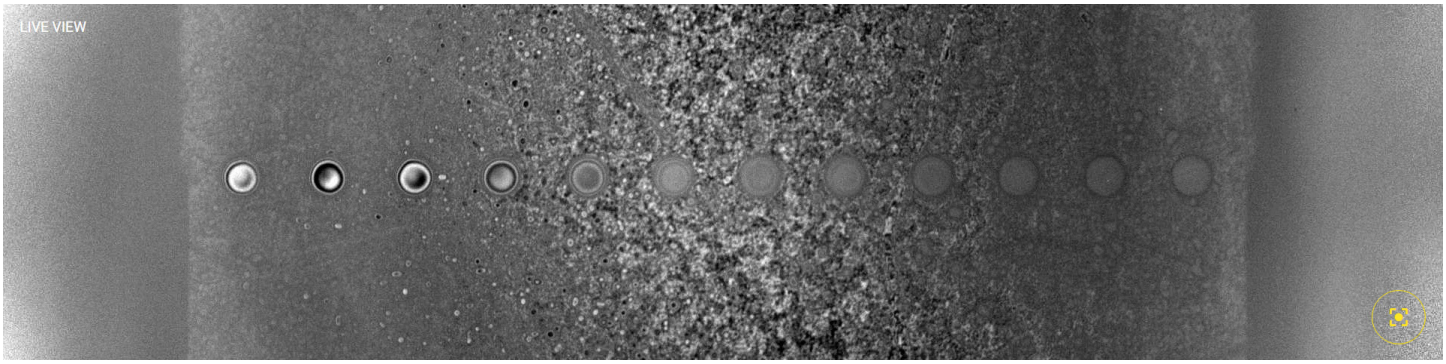
Constructive and destructive interference from the two beam paths created by the interferometric objective result in a bullseye interference pattern. The light and dark fringes of the pattern form a contour map of the connector surface.

An ideal fiber tip will produce a smooth bullseye pattern. A protruding or undercut fiber will result in a distortion where an area of the fringe pattern is shifted farther from or closer to the apex of curvature. An undercut fiber could collect dust, which will either absorb or scatter light, causing dots to appear in the interferogram. If a fiber end has shattered in the polishing process, the interferogram will be highly irregular.

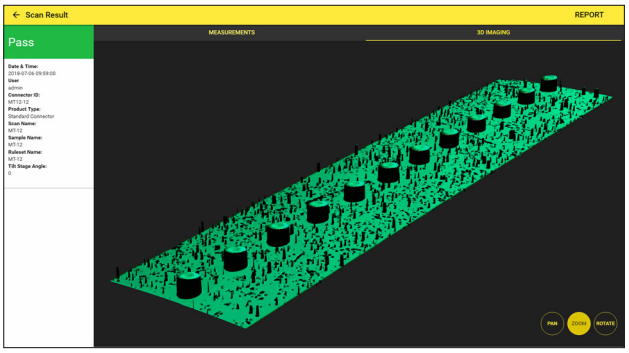
As the piezo stage moves the interferometric objective with respect to the connector surface, the fringe pattern moves across the ferrule surface. The system analyzes the collection of interference patterns, assigns a height value to each point on the surface, and creates a complete, 3D height map of the connector end face.



Example Diagrams and Corresponding Interferograms of Imperfect Ferrules



Live Interferometric Scan of MT-Style 12-Fiber Ferrule



3D Image Based on Interferometric Scan of 12-Fiber Ferrule

Contact Us

Contact Vytran for assistance in selecting components for your specific application.

1-732-972-2880 or
techsupport@thorlabs.com

Robert Walz
Vytran General Manager

CO_2 Fusion Splicer

GPX4000LZ
CO_2 Fiber Processing System

Capabilities

Splice

Taper/Combine

vytran® CO_2 Laser Fiber Processing System

Thorlabs' Vytran® Optical Fiber Glass Processors are versatile platforms designed for fabricating fiber splices, tapers, couplers, terminations, and combiners. These systems are ideal for applications involving single mode, multimode, polarization-maintaining, photonic crystal, multicore, soft glass, and other specialty fibers.

The GPX4000LZ is an integrated fiber processing platform equipped with a 40 W CO_2 laser and a graphite filament heater that offer controlled, precise heating of optical fibers. The uniform, high-temperature heating provided by the laser enables users to process glass fibers up to Ø2 mm and splice even larger end caps. The graphite filament heater allows users to splice fibers and fabricate tapers of varying sizes. The combination of a CO_2 laser and filament heater provides a universal fiber processing system for fused fiber component manufacturing and advanced fiber processing needs.

Just as with our other Vytran fiber processors, the GPX4000LZ employs True Core Imaging® technology to provide high-resolution images for fiber measurement and alignment. Precise control of process parameters via an integrated control system enables highly automated processing for high-volume manufacturing.

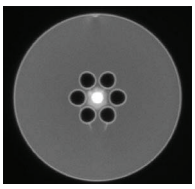
THORLABS

Fiber Processor Features

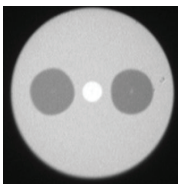
Integrated CO_2 Laser for Precise Fiber Processing

The primary heat source for the GPX4000LZ is a 40 W CO_2 laser with an annular beam output for uniform, residue-free heating of the fiber. The output power is adjustable for fine tuning of process parameters, and a feedback loop ensures power stability during heating. Unlike filament furnace heating, laser-based heating requires no purge gas or consumable filament for operation.

This all-in-one platform has two separate optical heads, optimized for CO_2 laser splicing and end capping, respectively. Additionally, the user can easily change out the CO_2 laser optical head for a filament furnace heat source, enabling use with existing manufacturing processes.



Photonic Crystal Fiber



PM Fiber

True Core Imaging® for Automated Fiber Measurement and Alignment

The GPX4000LZ utilizes our True Core Imaging® technology to provide high-resolution images for fiber measurement and alignment. An integrated digital CCD camera and mirror tower provide both side-view and end-view imaging of the fiber cladding and core. These features allow for automated measurement of fiber properties (core/cladding diameters, cleave quality evaluation, etc.).

Specifications

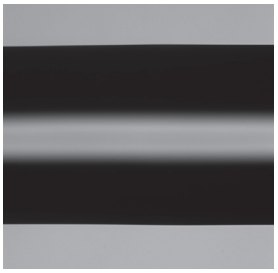
Item #	GPX4000LZ
Heat Source Specifications	
Primary Fiber Heating Source	CO_2 Laser
Laser Wavelength	10.55 µm (Minimum) 10.63 µm (Maximum)
Laser Output Power	40 W[a]
Laser Safety Features	Metal Cover with Interlock; Class 1 Enclosure Automatic Laser Power Cutoff Triple Redundancy Safety Measures CLASS 1 LASER PRODUCT
Laser Beam Control	Closed-Loop Feedback System
Secondary Fiber Heating Source	Filament Fusion Furnace
Splicing Specifications	
Splice Loss	0.02 dB (Typical) for Single Mode Fiber with Filament Fusion
Strength Enhancement Method	Fire Polish (Filament Fusion Only)
Fiber Alignment Method	Fully Automatic – True Core Imaging
Alignment Specifications	
XY Fiber Positioning Resolution	0.2 µm via Stepper Motor
Z Travel (CO_2 Laser Heating)	Furnace: 85 mm Fiber Holding Block: 105 mm
Z Travel (Filament Heating)	Furnace: 180 mm Fiber Holding Block: 180 mm
Z Positioning Resolution	0.25 µm via Stepper Motor
Rotational Alignment	Fully Automated – Can Align Stress Members
Rotation Travel	190° for Each Holding Block
Rotation Drive Resolution	0.02°
PC Control and Software	Control Software and Common Splice Application Files Included

a. Output Power Measured at 25 °C

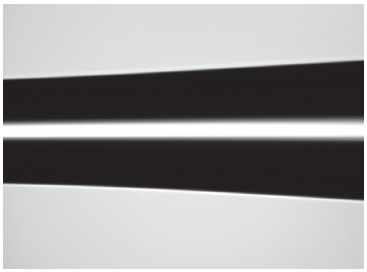
Fiber Splicing and Tapering

The combination of graphite filament heating and CO_2 laser heating allows our Vytran® Fiber Processing Systems to accurately splice fibers up to Ø2 mm. In addition, the filament furnace can also be used for creating tapers of various lengths by heating the fiber to its softening point and then applying a tensile force to elongate the fiber, reducing the cross section of the fiber.

Two Ø400 µm Fibers After Splice



Two Ø1 mm Fibers After Splice

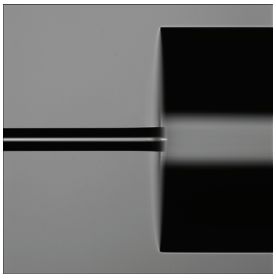


Ø1 mm Fiber Tapered to Ø400 µm

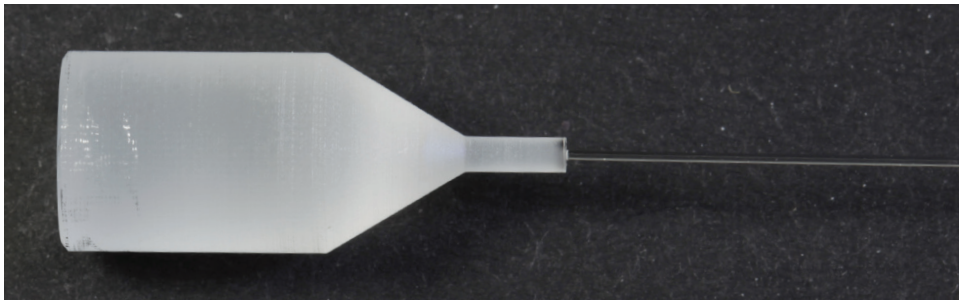
End Caps

Vytran® Fiber Processing Systems are well suited for fusing silica end caps (up to Ø5 mm) to high-power-beam-delivery fibers. End caps reduce the power density at the glass-to-air interface, which enables higher power handling.

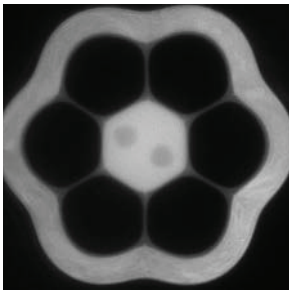
The 40 W CO_2 laser directly heats the fiber via absorption, and the adjustable annular ring of the laser enables precise heating of the targeted fusion area. This ensures higher quality splices by minimizing deformation of the fiber during heating and faster splice times by reducing the amount of mass heated during processing.



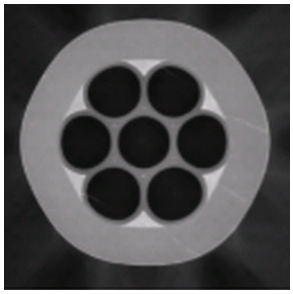
Ø1.25 mm Silica End Cap Fused Onto Ø125 µm Fiber



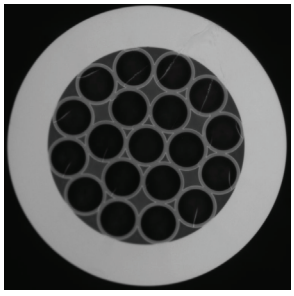
Ø 8mm End Cap with Ø1 mm Lead in Fused to Ø400 µm Core Fiber.



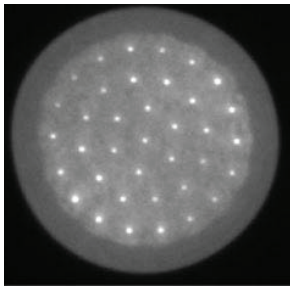
6 + 1 PM Combiner



7-to-1 Combiner



19-to-1 Combiner



37-to-1 Combiner

Fused Fiber Components

The GPX4000LZ fiber processor can be used to fuse fibers into side-by-side or bundle configurations for manufacturing fused tapered couplers or pump/output combiners. Through precise control of heating and tapering parameters, the user is able to fabricate devices with very low loss.

Contact Us

Contact Vytran for assistance in selecting components for your specific application.

1-732-972-2880 or
techsupport@thorlabs.com

Robert Walz
Vytran General Manager

CO_2 End-Cap Splicer

Capabilities

Splice

GLZ4001EC
CO_2 Laser End-Cap Splicer

vytran® CO_2 Laser End-Cap Splicer

The GLZ4001EC is an advanced splicer that is designed for splicing single mode, multimode, and specialty fiber directly to large-diameter end caps. Direct splices to end caps up to Ø5.0 mm are enabled by the use of a high-power CO_2 laser to precisely and uniformly heat the fiber and end cap during the fusion process. With a tapered lead-in, end caps up to Ø9.5 mm can be spliced.

This end-cap splicer system is equipped with a 40 W CO_2 laser that offers controlled, precise heating of optical fibers. The clean, high-temperature heating provided by the laser does not require purge gas or consumable filaments, which greatly reduces the maintenance needed.

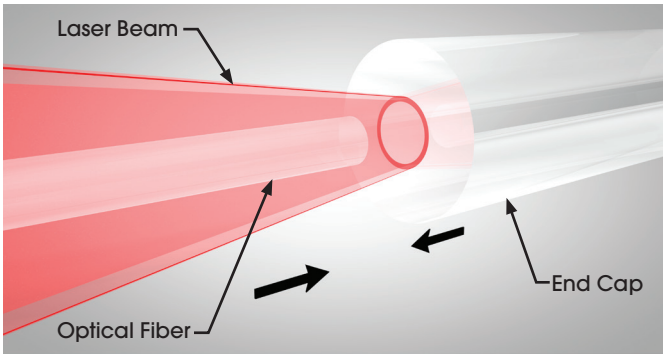
As with our other Vytran splicers and glass processors, the GLZ40001EC employs True Core Imaging® technology to provide high-resolution images for fiber measurement and alignment. Precise control of process parameters via an integrated control system enables highly automated processing for high-volume manufacturing.

THORLABS

Features

Integrated CO_2 Laser Platform

The primary heat source for the GLZ4001EC is a 40 W CO_2 laser with an annular beam output for uniform and clean heating of the fiber. The output power is adjustable and a feedback loop ensures stability during heating. Unlike filament furnace heating, laser-based heating does not require purge gas or a consumable filament for operation. This all-in-one platform has two separate optical heads; one is optimized for CO_2 laser splicing and the other is optimized for end capping.



When splicing, the laser forms an annular beam shape that uniformly heats the fiber end and end cap. When the temperature for splicing is reached, the fiber and the end cap are carefully pushed together.

True Core Imaging® for Automated Fiber Measurement and Alignment

The GLZ4001EC utilizes our True Core Imaging technology to provide high-resolution images for fiber measurement and alignment. An integrated digital CCD camera and mirror tower provide both side-view and end-view imaging of the fiber cladding and core. These features allow for automated measurement of fiber properties (core/cladding diameters, cleave quality evaluation, etc.) and precise alignment for splicing large end caps.

Specifications

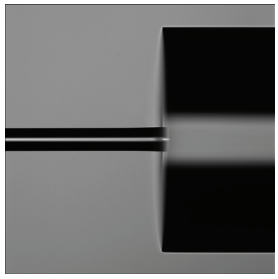
Heat Source	
Laser Wavelength	10.55 µm (Minimum) 10.63 µm (Maximum)
Laser Output Power	40 W[a]
Laser Safety Features	Metal Cover with Interlock; Class 1 Enclosure Automatic Laser Power Cutoff Double Redundancy Safety Measures CLASS 1 LASER PRODUCT
Laser Beam Control	Closed-Loop Feedback System
Splicing	
Accepted Fiber Diameters	Splice: 250 µm – 2 mm Coating End Caps: 250 µm – 5 mm Coating
Splice Loss (Typical)	0.02 dB for Ø125 µm Cladding Single Mode Fiber
Splice Strength (Typical)	>250 kpsi for Single Mode Fiber Prepared Using LDC401 Series Cleaver
Alignment	
Fiber Alignment Method	Fully Automatic – True Core Imaging
XY Fiber Positioning Resolution	0.2 µm via Stepper Motor
Z Travel	Furnace – 15 mm (Max) Fiber Holding Block – 10 mm (Max)
Z Positioning Resolution	0.25 µm via Stepper Motor
PC Control and Software	Control Software Pre-Installed on Included PC Common Splice Application Files Also Included

a. Output Power Measured at 25 °C

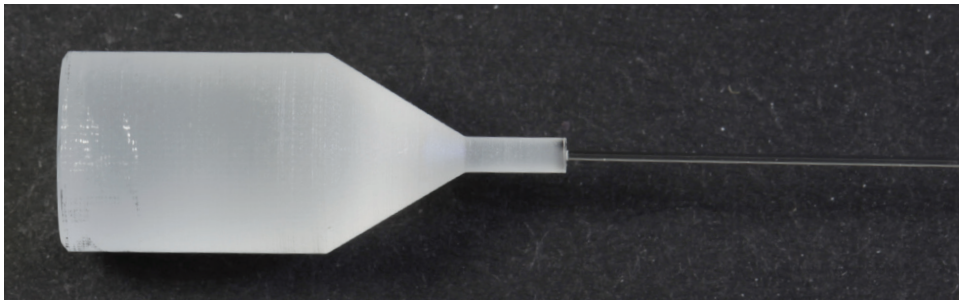
End-Cap Splicing

Vytran® Fiber Processing Systems are well suited for fusing silica end caps (up to Ø5 mm) to high-power-beam-delivery fibers. End caps reduce the power density at the glass-to-air interface, which enables higher power handling.

The 40 W CO_2 laser directly heats the fiber via absorption, and the adjustable annular ring of the laser enables precise heating of the targeted fusion area. This ensures higher quality splices by minimizing deformation of the fiber during heating and faster splice times by reducing the amount of mass heated during processing.



Ø1.25 mm Silica End Cap
Fused Onto Ø125 µm Fiber



Ø 8mm End Cap with Ø1 mm Lead-In Fused to Ø400 µm Core Fiber.

End-Cap Holders

These holders secure and position large-diameter end caps in the splicer during the fusion process. Holders for end caps with outer diameters ranging from 1.8 mm to 9.50 mm are available with vacuum suction, flexure clamp, or magnetic lid mounting methods. The holders are compatible with the fiber holding blocks used in the splicer.

ECH2V
Ø2.0 mm End-Cap Holder with Vacuum Suction

Options

Item #	Type	Accepted Diameter
ECH18V	Vacuum	1.8 mm (Typ.)
ECH2V		2.0 mm (Typ.)
ECH4C	Flexure Clamp	3.8 – 4.08 mm
ECH5C		4.8 – 5.08 mm
ECH8C		7.8 – 8.08 mm
ECH8L	Magnetic Lid	7.6 – 9.50 mm

ECH5C
Ø5.0 mm End-Cap Holder with Flexure Clamp
Shown with End Cap (Not Included)

Contact Us

Contact Vytran for assistance in selecting components for your specific application.

1-732-972-2880 or
techsupport@thorlabs.com

Robert Walz
Vytran General Manager

ECH8L
Ø8.0 mm End-Cap Holder with Magnetic Lid

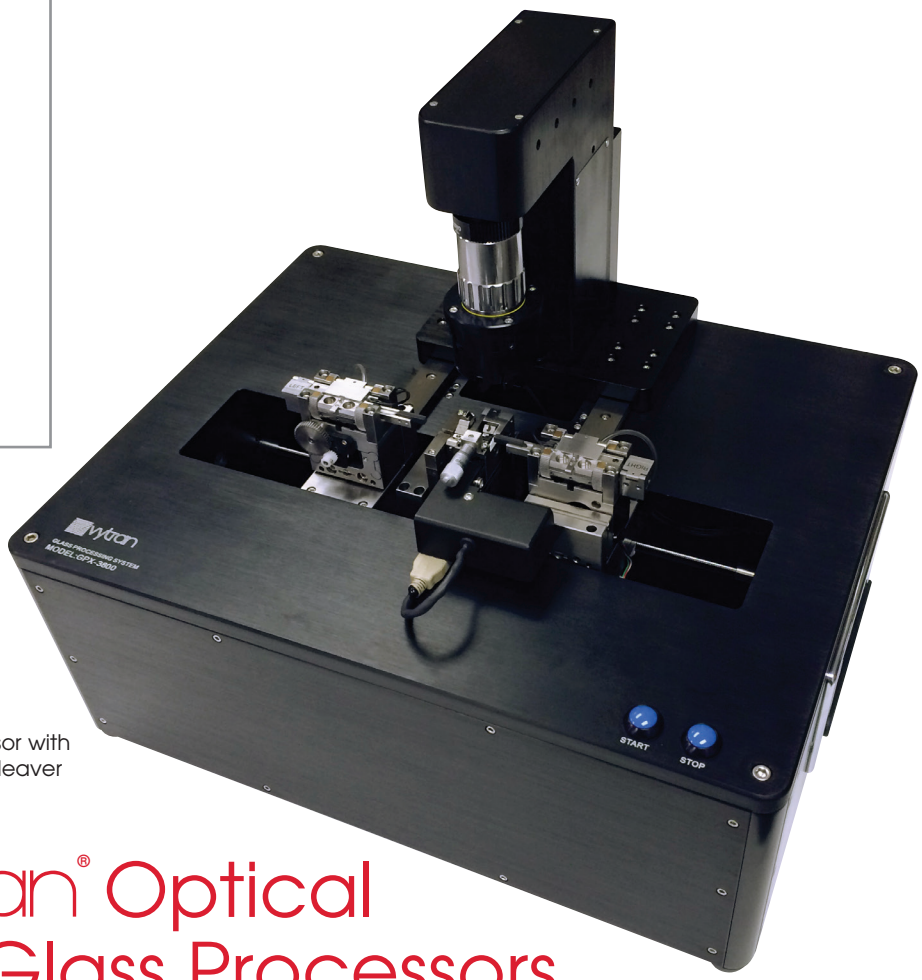
Glass Processors

Capabilities

Cleave

Splice

Taper



GPX3800
Glass Processor with
Integrated Cleaver

vytran® Optical Fiber Glass Processors

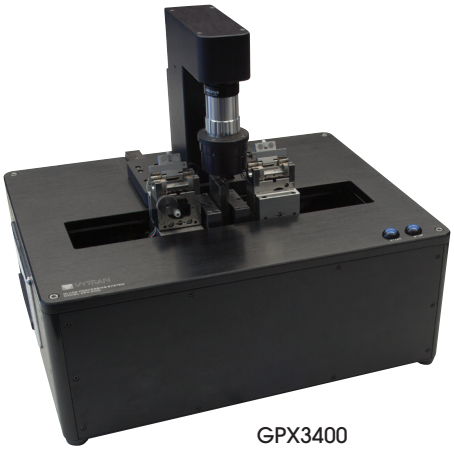
Thorlabs' Vytran® Optical Fiber Glass Processors are versatile platforms designed for fabricating splices, tapers, couplers, terminations, and combiners with optical fibers. These systems are ideal for applications involving single mode, multimode, polarization-maintaining, photonic crystal, multicore, and specialty fibers.

All our glass processors use a proven filament fusion heating process, which enables the stable, controlled, and precise heating of both standard and large-diameter optical fibers. High-resolution images for fiber measurement and automated alignment during the entire process are provided using our True Core Imaging® system.

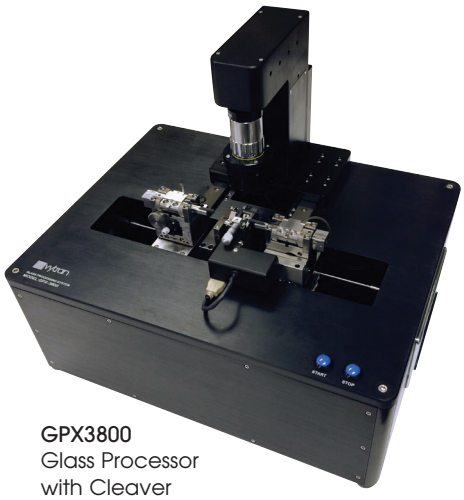
Four baseline GPX3000 Series Workstations are available which are capable of processing fibers with claddings up to Ø1.7 mm. The GPX3800 and GPX3850 additionally feature an integrated fiber cleaver and real-time hot imaging for process monitoring. Any GPX3000 Workstation can also be upgraded with a coupler / combiner manufacturing fixture and optional fused biconic tapering (FBT) software.

THORLABS

GPX Series Glass Processors



GPX3400
Glass Processor



GPX3800
Glass Processor
with Cleaver

Features

- Fabricate Splices, Tapers, Terminations, Couplers, and Combiners
- Automated XY and Rotation Alignment
- Compatible with Single Mode, Multimode, Polarization-Maintaining, and Specialty Fibers
- Side-View/End-View Imaging and Splice Loss Determination using True Core Imaging® Technology
- Software with Process Development GUI and Splice Process Library

Thorlabs offers four glass processing workstations (shown in the table below). Each workstation can be customized with several upgrades such as a liquid cooler or coupler/combiner manufacturing fixtures. Users can purchase the filament assembly and fiber holder inserts separately, allowing users to choose the most appropriate components for their process.

Selection Guide

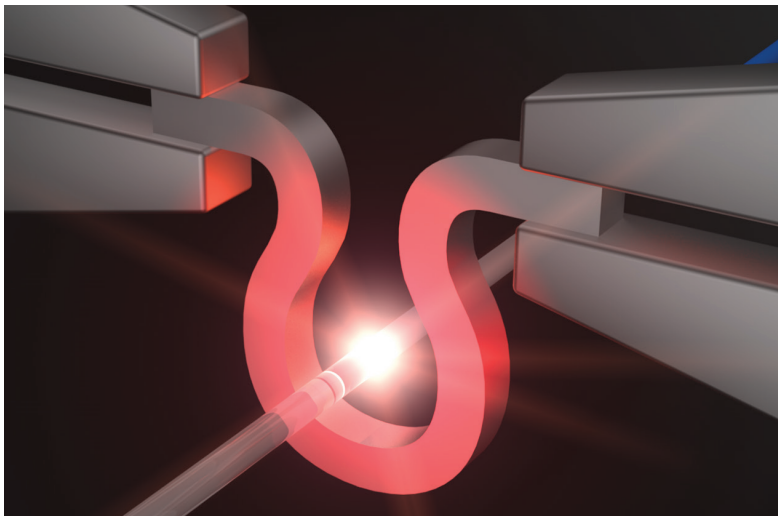
Item #	GPX3400	GPX3600	GPX3800	GPX3850
Accepted Fiber Cladding (Max)	Ø1.25 mm	Ø1.7 mm	Ø1.25 mm	Ø1.7 mm
Integrated Cleaver	No		Yes	
Hot Image Camera	No[a]		Yes	
Liquid Cooler	Optional	Included	Optional	Included

a. Hot image camera can be configured as a custom upon request. Please contact techsupport@thorlabs.com with requests.

Filament Fusion Technology

Our GPX3000 Series Glass Processors feature a furnace assembly with a filament-based fusion heater. Compared to conventional arc fusion heaters, filaments provide uniform and precisely controlled, high-temperature heating of large diameter fibers. The fusion heat source is isolated from the environment; therefore, filament fusion splicing is not dependent on ambient conditions.

The filament heater is an omega-shaped loop of graphite or iridium (shown to the right), which is contained within a protective shroud. Because filament material and size can be interchanged easily among 9 options, a wide range of fiber cladding diameters and specialty fiber types can be accommodated using the same system.



The filament uniformly heats the fiber which enables the fabrication of low-loss splices and adiabatic tapers.

Precise control over fiber position and orientation enables a number of advanced fiber processing applications from low-loss splicing in dissimilar fibers to the creation of adiabatic fiber tapers, fiber terminations, or fused fiber couplers. After fusion, a fire polishing process significantly increases splice strength through a rapid heat treatment of the splice region.

Tapering

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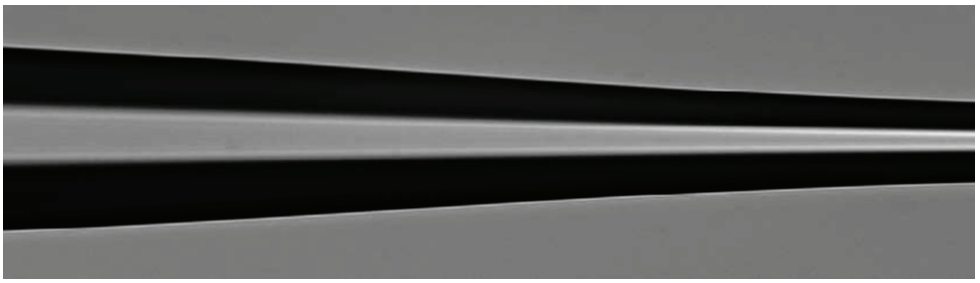
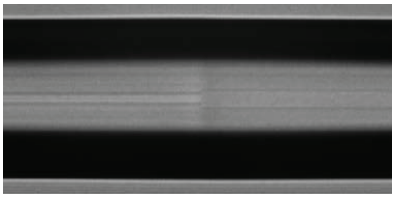
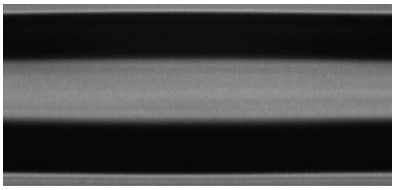


Ø20 µm Core, Ø400 µm Cladding Large-Mode-Area (LMA) Fiber Tapered to Ø125 µm Cladding

Before Splicing



After Splicing



Two fibers with dissimilar cores before and after splicing. The dissimilar cores are clearly visible before the cores are thermally expanded.

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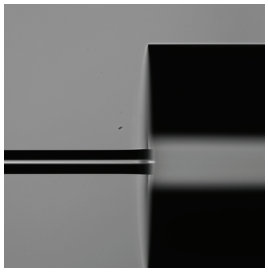
Fiber Terminations

The combination of a large range of processing temperatures, significant Z travel, and exact fiber positioning, make these glass processors ideal for use in developing advanced fiber terminations such as catheters, fiber probes, and ball lenses.



Ø1.25 mm Silica End Cap Fused onto Ø125 µm Fiber

End Caps

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Couplers, Output Combiners, and Power Combiners

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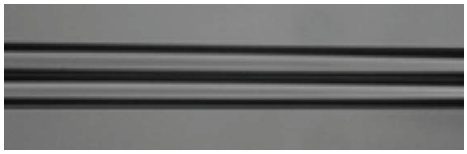

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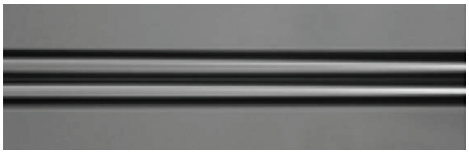


After Fuse (End View)

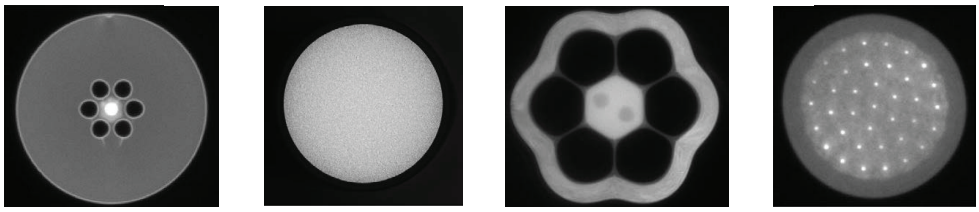
View from the glass processor of two single mode fibers tapered and fused together for 50:50 coupling. Spacing between the fiber cores is approximately 15 to 20 µm.

Features

True Core Imaging® for Automated Fiber Measurement and Alignment

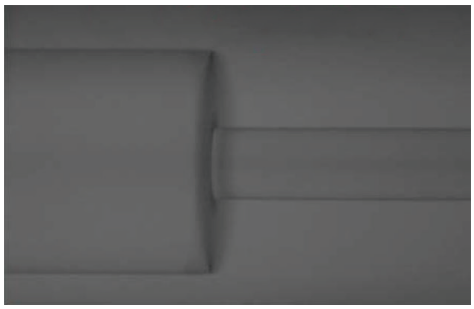
These GPX Glass Processors utilize our True Core Imaging technology to provide high-resolution images for fiber measurement and alignment. A digital CCD camera and mirror tower are integrated into the fiber processing workstation incorporating both side-view and end-view imaging of the fiber cladding and core. These features allow for automated measurement of fiber properties (core/cladding diameters, cleave quality evaluation, etc.) and enable calculation of an accurate splice loss for splices with similar or dissimilar fiber types.

Example of End-View Illumination with Specialty Fibers

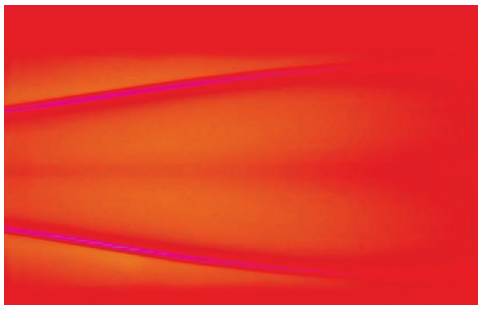


Photonic Crystal Fiber | Image Guide | 6 + 1 PM Combiner | 37-to-1 Combiner

Hot Imaging Camera (Included with GPX3800 and GPX3850)



Hot Image of End Cap Splicing



False Color Overlay of Tapering

- Obtain Real-Time Images of Fibers During the Splicing/Tapering Process
- Integrated ND Filters Block Heating Light
- False Color Overlay Available
- Quickly Develop Processes And Optimize Parameters

Integrated Fiber Cleaver (GPX3800 and GPX3850 Only)

Select glass processors feature a fiber cleaver integrated into the splice head that is compatible with fiber claddings up to Ø400 µm. The cleaver uses a "tension-and-scribe" process. As seen in the image below, tension is applied along the length of the fiber followed by an automatic scribing process utilizing a diamond cleave blade. After the blade scribes the fiber, tension is maintained, causing the scribe to propagate across the fiber width and complete the cleave.

Replacement Cleave Blade

- 0.08" (2.0 mm) Long Diamond Blade
- User Installable on Compatible Systems
- Approximately 5000 Cleaves at One Location (About 10 Locations Over Blade Lifetime)

ACL83

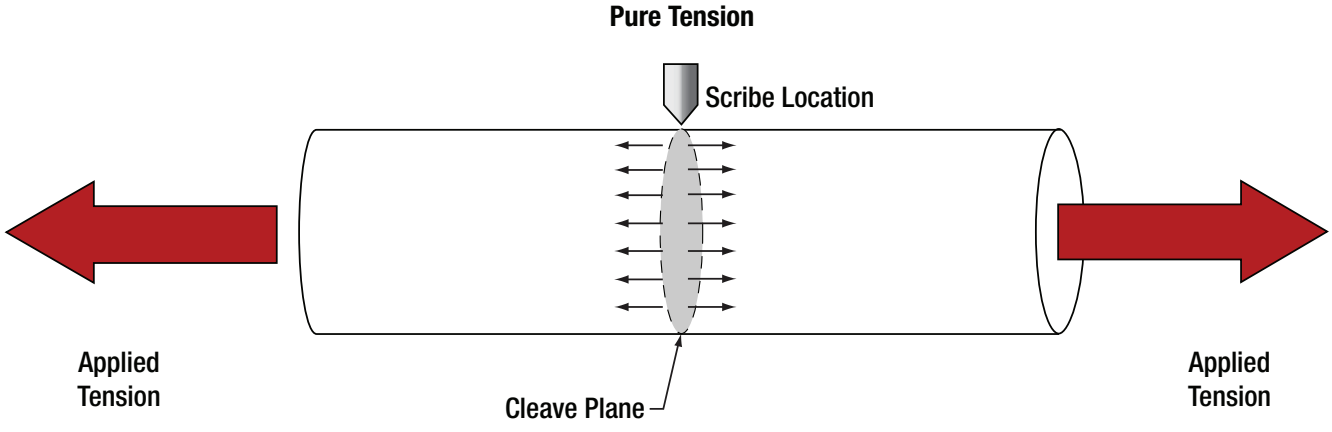
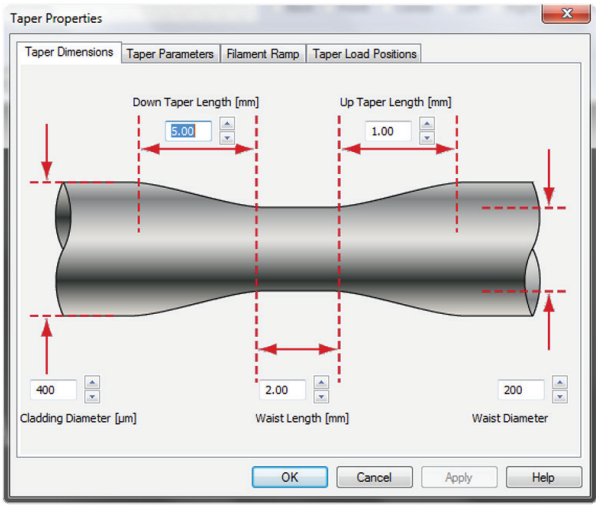


Illustration of Tension-and-Scribe Procedure Used to Create a Flat Cleave

Process Software and Splice Library

- Included with Each Glass Processor Workstation
- Core Library of Popular Process Files for Common Splicing and Tapering Procedures
- Create Splice Files for New Processes or Customize Existing Files
- Tension Monitor and Control System Provides Feedback During Tapering Process



Screenshot of Taper Manufacturing Parameters Window

Selected Specifications

Item #	GPX3400	GPX3600	GPX3800	GPX3850
Splicing				
Accepted Fiber Cladding	Up to Ø1.25 mm	Up to Ø1.7 mm	Up to Ø1.25 mm	Up to Ø1.7 mm
Splice Loss	0.02 dB (Typical)[a]			
Splice Strength	>250 kpsi[b]			
Polarization Cross Talk	PANDA: >35 dB; Other Fiber Types: >30 dB			
Alignment				
Fiber Z-Axis Movement	180 mm (Max)			
Z-Axis Movment Resolution	0.25 µm via Stepper Motor			
XY Axis Positioning Resolution	0.02 µm via Stepper Motor			
Rotation Travel	200°			
Rotation Drive Resolution	0.02°			
Tapering				
Tapering Length	~2 mm (Min); Up to 150 mm (Max)[c]			
Tapering Ratio (Max)	Adiabatic Tapers up to 1:10 (Ratios Up to 1:100 Possible)			
Tapering Speed	1 mm/s (Typical)[d]			
Adiabatic Tapering Loss	<0.01 dB (Typical)			
General				
Size	16.0" x 12.5" x 6.3" (410 mm x 320 mm x 160 mm)			
Weight	45 lbs (20 kg)			
External Power Supply	Universal Input: 96 - 260 VAC, 47 - 63 Hz, Single Phase; Glass Processor Input: 12 V and 48 V DC, 10 A; PC Input: 115 or 230 VAC, 47 - 63 Hz, Single Phase			
Gas Supply	Argon, >99.999% Purity at 12 psig (Not Included)			
Operating Temperature	15 to 40 °C			

a. For Ø125 µm Single Mode Fiber
b. Measured for a single mode fiber prepared using an LDC401 Cleaver or other appropriate fiber preparation equipment.
c. Dependent on Taper Geometry
d. Tapering speed depends highly on the type of process used. 1 mm/s is a typical speed for a standard tapering process.

Optional Upgrades

Liquid Cooling System (Included with GPX3600 and GPX3850)

GPXWCS

Specifications

Item #	GPXWCS
Cooling Capacity	590 W[a]
Reservoir Capacity	10 Speed Levels up to 4 L/min
Reservoir Capacity	157 mL (5.3 fl oz)
Radiator	Aluminum; 2 x 120 mm Fans
Power Consumption	20 W (Max)
Power Supply	12 VDC (via Molex Connector) 110/120 VAC with Power Adapter
Weight	8.00 lbs (3.63 kg)

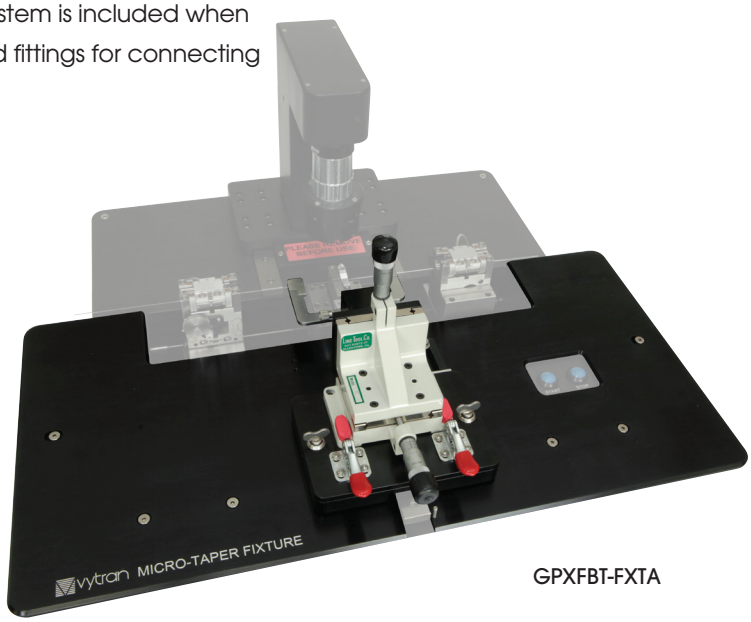
a. At 25 °C Ambient Temperature and 4 L/min Coolant Flow Rate

The GPXWCS Liquid Cooling System is an optional add-on for our Vytran Glass Processors that helps keep the furnace assembly cooled during extended heating operations. It is highly recommended for customers interested in fiber tapering, mode adapter, or fiber termination applications. This cooling system is included when purchasing the GPX3600 and GPX3850 workstations. Tubing and fittings for connecting to a Vytran Glass Processor are included.

Micro-Taper / Coupler Fixtures and Software Add-Ons

Features

- GPXFBT-FXTA Fixture with Adjustable Fiber Gripper for Transporting Tapers and Couplers
- GPXFBT-FXTB Fixture with Removable Fiber Holder for *In Situ* Packaging
- GPXFBT-SFT Software Add-On Enables Fused Biconic Taper (FBT) Processing
- Purchase Separately or Together as a Kit



GPXFBT-FXTA

These optional add-ons for the Vytran Glass Processors are designed to aid microtaper and fused fiber coupler processing. The software package enables finer control over heating and fiber pulling parameters during active FBT processes, resulting in improved yields and high repeatability between runs.

The fiber gripper on the GPXFBT-FXTA Adjustable Fixture can accomodate taper lengths from 0 to 3.15" (0 to 80 mm). The GPXFBT-FXTB Removable Taper Holder Fiber Fixture option acts as a pick-up and removal apparatus for the user to safely and securely transport the fabricated taper or coupler for secondary processing or *in situ* packaging.

Large-Diameter Cleavers

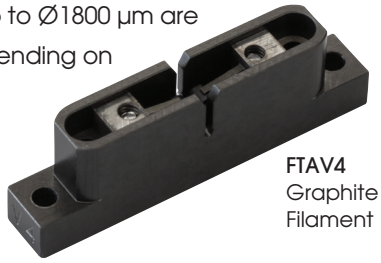
LDC401A
Large-Diameter
Fiber Cleaver,
Flat or Angled Cleaves

Features

- Cleave Glass Fibers with Claddings from Ø80 µm to Ø1.25 mm
- Flat Cleaves or Angled Cleaves up to 15°
- Programmable via Tablet Controller
- Holding Blocks and inserts are Compatible with GPX Glass Processors

Furnace Assemblies

A selection of six graphite and three iridium filament assemblies for fibers with claddings up to Ø1800 µm are available. The approximate lifetime of a filament is 40 minutes; however, this can vary depending on factors such as argon quality, splice/taper duration, and fiber glass quality.



FTAV4
Graphite Filament

- Graphite or Iridium Filament with Protective Shroud
  - Graphite: Higher Temperatures with Less Outgassing
  - Iridium: Lower Temperatures Ideal for Soft-Glass Fibers (e.g., Chalcogenide or Fluoride)
- Multiple Size Options to Accommodate Claddings from 80 µm to 1.8 µm

Fiber Holding Block Inserts

Each glass processor is equipped with two fiber holding blocks that secure the fiber during fusion or tapering. A fiber holding block can fit two inserts (one top and one bottom) that are designed to accept a range of fiber diameters. Two top and two bottom inserts are required to operate a glass processor. The types of inserts that are available for purchase are shown below.

Contact Us

Contact Vytran for assistance in selecting components for your specific application.

1-732-972-2880 or
techsupport@thorlabs.com

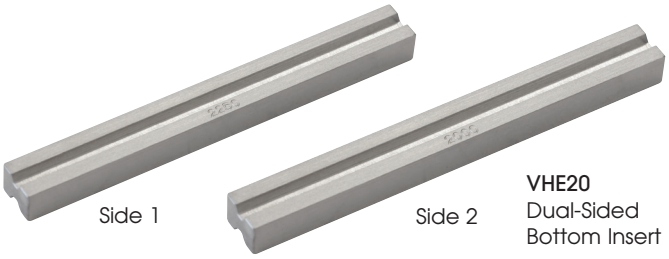
Robert Walz
Vytran General Manager

Top Inserts

- Multiple Size Options for Fiber Outer Diameters from 57 µm to 3198 µm
- Single-Sided and Dual-Sided Versions Available
- Inserts with Indent for LED Light Illumination of Fiber End Face Available

VHB00
Top Insert with LED Indent

Standard Bottom Inserts



VHE20
Dual-Sided Bottom Insert

- Multiple Size Options Over Ø773 µm to Ø3198 µm Range
- Single-Sided and Dual-Sided Versions Available
- Use to Hold Large-Diameter Fibers

Transfer Bottom Inserts

VHF400
Transfer Bottom Insert

- Multiple Size Options for Fiber Outer Diameters from 112 µm to 1047 µm
- Use to Transfer Fibers Between Vytran Systems
- VHT1 Transfer Clamp and Graphite V-Groove Required for Operation

Multi-Fiber Bottom Inserts

- Designed to Hold 2 or 3 Fibers in Close Proximity Using the Same Insert
- Multiple Sizes and Slot Options Available (Side-by-Side, Double-V, and Triple-V Slots)

VHD320P
Double-V-Slot Bottom Insert with Alignment Pins

- Use When Making Fused Couplers or Fiber Combiners
- Vacuum Holes for Aligning Fibers Within Grooves or Slots

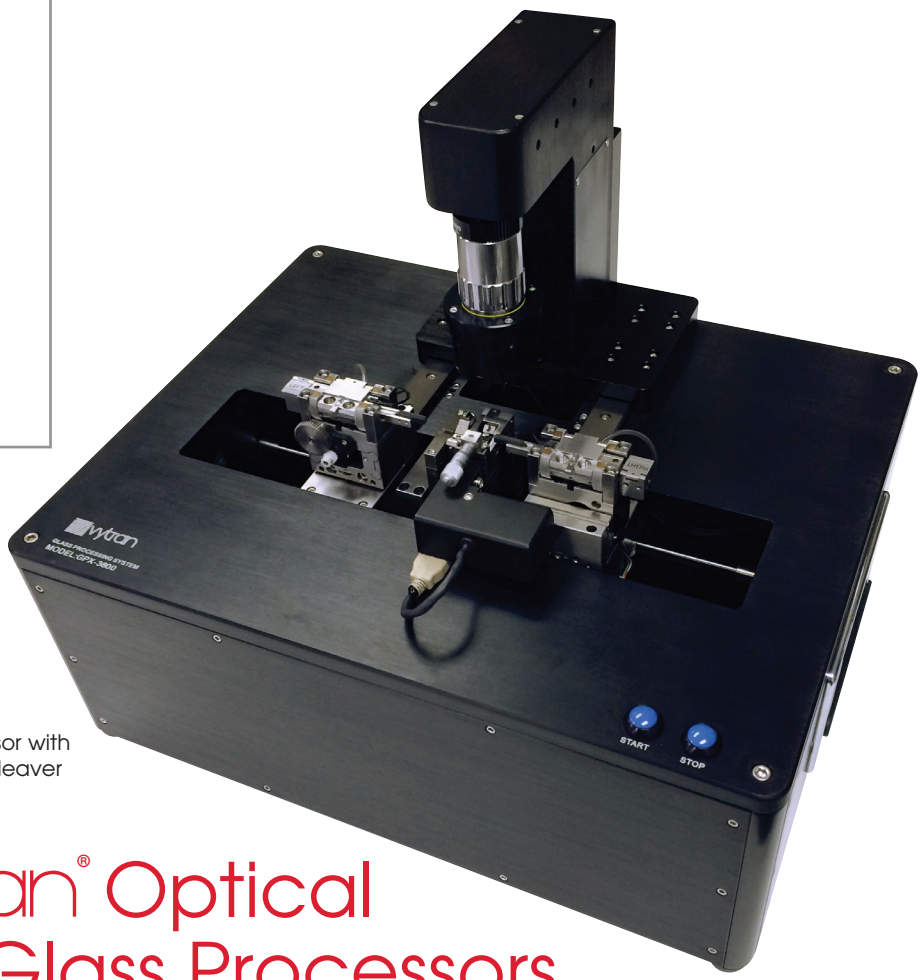
Glass Processors

Capabilities

Cleave

Splice

Taper



GPX3800
Glass Processor with
Integrated Cleaver

vytran® Optical Fiber Glass Processors

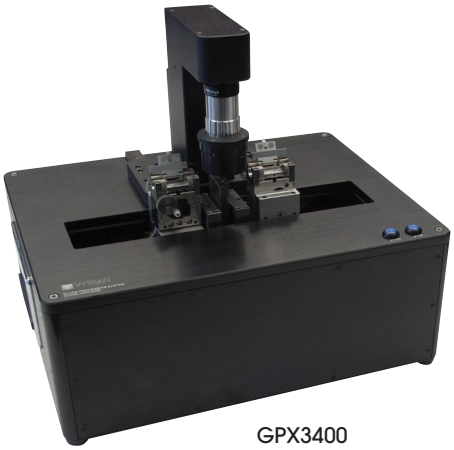
Thorlabs' Vytran® Optical Fiber Glass Processors are versatile platforms designed for fabricating splices, tapers, couplers, terminations, and combiners with optical fibers. These systems are ideal for applications involving single mode, multimode, polarization-maintaining, photonic crystal, multicore, and specialty fibers.

All our glass processors use a proven filament fusion heating process, which enables the stable, controlled, and precise heating of both standard and large-diameter optical fibers. High-resolution images for fiber measurement and automated alignment during the entire process are provided using our True Core Imaging® system.

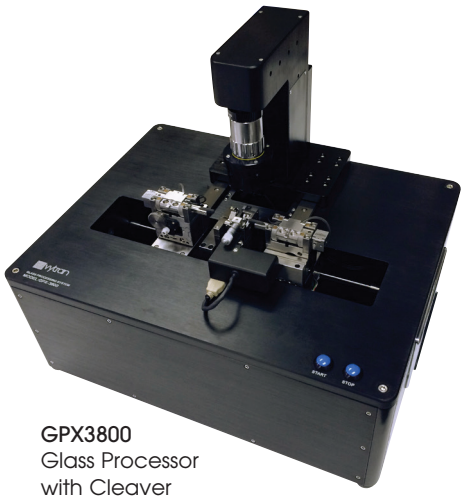
Four baseline GPX3000 Series Workstations are available which are capable of processing fibers with claddings up to Ø1.7 mm. The GPX3800 and GPX3850 additionally feature an integrated fiber cleaver and real-time hot imaging for process monitoring. Any GPX3000 Workstation can also be upgraded with a coupler / combiner manufacturing fixture and optional fused biconic tapering (FBT) software.

THORLABS

GPX Series Glass Processors



GPX3400
Glass Processor



GPX3800
Glass Processor
with Cleaver

Features

- Fabricate Splices, Tapers, Terminations, Couplers, and Combiners
- Automated XY and Rotation Alignment
- Compatible with Single Mode, Multimode, Polarization-Maintaining, and Specialty Fibers
- Side-View/End-View Imaging and Splice Loss Determination using True Core Imaging® Technology
- Software with Process Development GUI and Splice Process Library

Thorlabs offers four glass processing workstations (shown in the table below). Each workstation can be customized with several upgrades such as a liquid cooler or coupler/combiner manufacturing fixtures. Users can purchase the filament assembly and fiber holder inserts separately, allowing users to choose the most appropriate components for their process.

Selection Guide

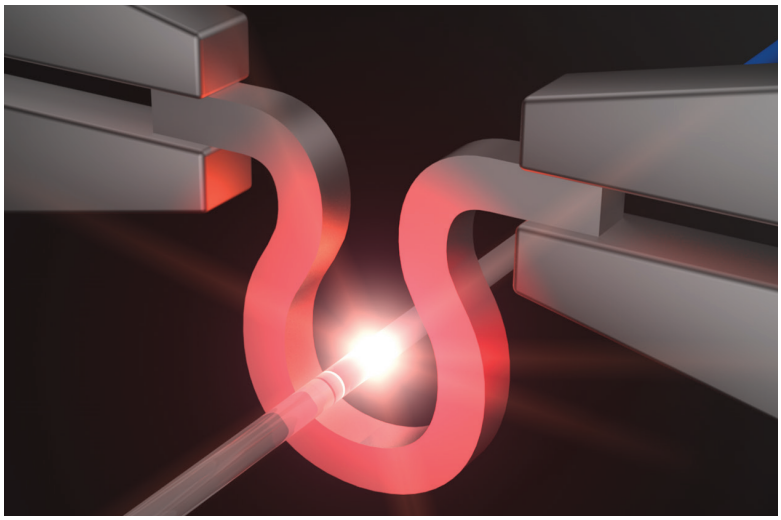
Item #	GPX3400	GPX3600	GPX3800	GPX3850
Accepted Fiber Cladding (Max)	Ø1.25 mm	Ø1.7 mm	Ø1.25 mm	Ø1.7 mm
Integrated Cleaver	No		Yes	
Hot Image Camera	No[a]		Yes	
Liquid Cooler	Optional	Included	Optional	Included

a. Hot image camera can be configured as a custom upon request. Please contact techsupport@thorlabs.com with requests.

Filament Fusion Technology

Our GPX3000 Series Glass Processors feature a furnace assembly with a filament-based fusion heater. Compared to conventional arc fusion heaters, filaments provide uniform and precisely controlled, high-temperature heating of large diameter fibers. The fusion heat source is isolated from the environment; therefore, filament fusion splicing is not dependent on ambient conditions.

The filament heater is an omega-shaped loop of graphite or iridium (shown to the right), which is contained within a protective shroud. Because filament material and size can be interchanged easily among 9 options, a wide range of fiber cladding diameters and specialty fiber types can be accommodated using the same system.



The filament uniformly heats the fiber which enables the fabrication of low-loss splices and adiabatic tapers.

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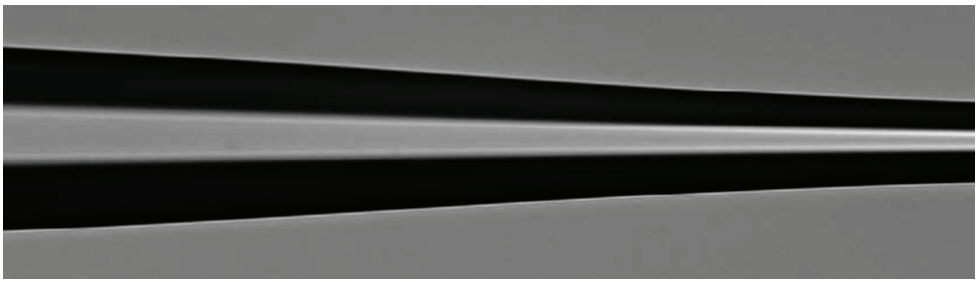

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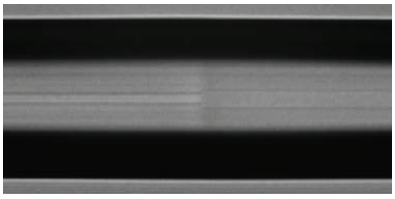

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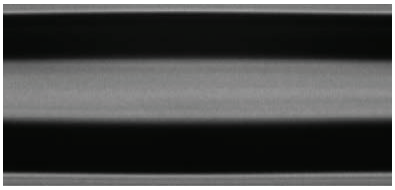

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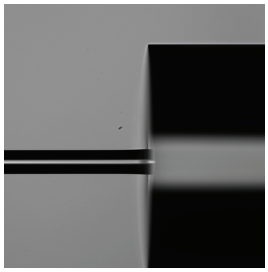

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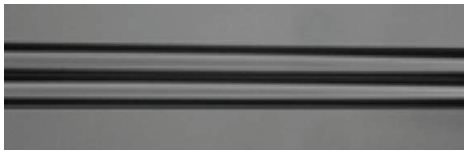

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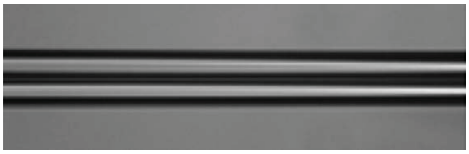

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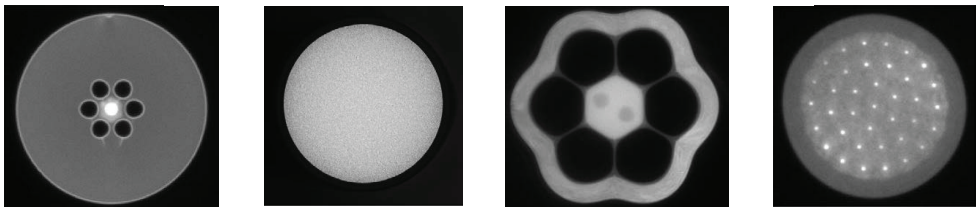
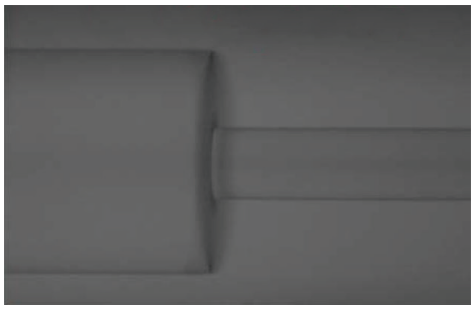
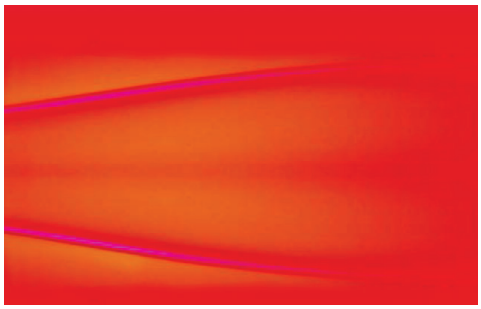


Photonic Crystal Fiber | Image Guide | 6 + 1 PM Combiner | 37-to-1 Combiner

Hot Imaging Camera (Included with GPX3800 and GPX3850)



Hot Image of End Cap Splicing



False Color Overlay of Tapering

- Obtain Real-Time Images of Fibers During the Splicing/Tapering Process
- Integrated ND Filters Block Heating Light
- False Color Overlay Available
- Quickly Develop Processes And Optimize Parameters

Integrated Fiber Cleaver (GPX3800 and GPX3850 Only)

Select glass processors feature a fiber cleaver integrated into the splice head that is compatible with fiber claddings up to Ø400 µm. The cleaver uses a "tension-and-scribe" process. As seen in the image below, tension is applied along the length of the fiber followed by an automatic scribing process utilizing a diamond cleave blade. After the blade scribes the fiber, tension is maintained, causing the scribe to propagate across the fiber width and complete the cleave.

Replacement Cleave Blade

- 0.08" (2.0 mm) Long Diamond Blade
- User Installable on Compatible Systems
- Approximately 5000 Cleaves at One Location (About 10 Locations Over Blade Lifetime)

ACL83

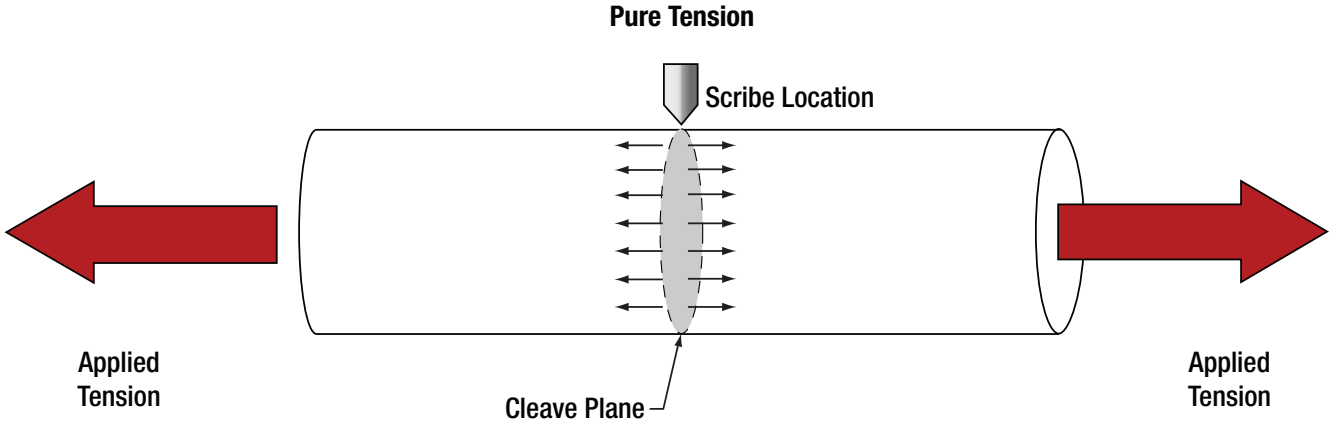
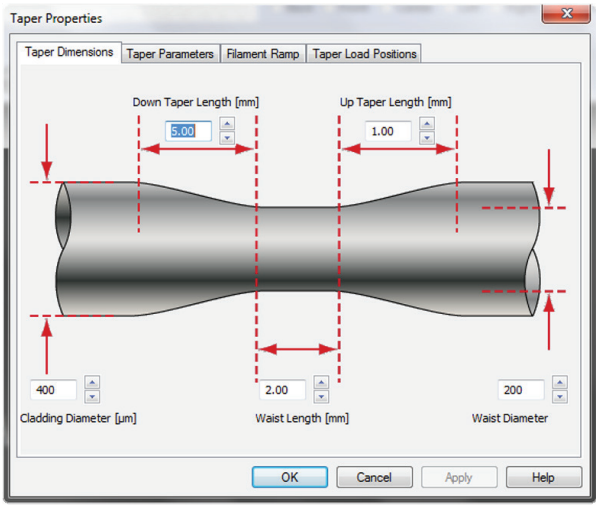


Illustration of Tension-and-Scribe Procedure Used to Create a Flat Cleave

Process Software and Splice Library

- Included with Each Glass Processor Workstation
- Core Library of Popular Process Files for Common Splicing and Tapering Procedures
- Create Splice Files for New Processes or Customize Existing Files
- Tension Monitor and Control System Provides Feedback During Tapering Process



Screenshot of Taper Manufacturing Parameters Window

Selected Specifications

Item #	GPX3400	GPX3600	GPX3800	GPX3850
Splicing				
Accepted Fiber Cladding	Up to Ø1.25 mm	Up to Ø1.7 mm	Up to Ø1.25 mm	Up to Ø1.7 mm
Splice Loss	0.02 dB (Typical)[a]			
Splice Strength	>250 kpsi[b]			
Polarization Cross Talk	PANDA: >35 dB; Other Fiber Types: >30 dB			
Alignment				
Fiber Z-Axis Movement	180 mm (Max)			
Z-Axis Movment Resolution	0.25 µm via Stepper Motor			
XY Axis Positioning Resolution	0.02 µm via Stepper Motor			
Rotation Travel	200°			
Rotation Drive Resolution	0.02°			
Tapering				
Tapering Length	~2 mm (Min); Up to 150 mm (Max)[c]			
Tapering Ratio (Max)	Adiabatic Tapers up to 1:10 (Ratios Up to 1:100 Possible)			
Tapering Speed	1 mm/s (Typical)[d]			
Adiabatic Tapering Loss	<0.01 dB (Typical)			
General				
Size	16.0" x 12.5" x 6.3" (410 mm x 320 mm x 160 mm)			
Weight	45 lbs (20 kg)			
External Power Supply	Universal Input: 96 - 260 VAC, 47 - 63 Hz, Single Phase; Glass Processor Input: 12 V and 48 V DC, 10 A; PC Input: 115 or 230 VAC, 47 - 63 Hz, Single Phase			
Gas Supply	Argon, >99.999% Purity at 12 psig (Not Included)			
Operating Temperature	15 to 40 °C			

a. For Ø125 µm Single Mode Fiber
b. Measured for a single mode fiber prepared using an LDC401 Cleaver or other appropriate fiber preparation equipment.
c. Dependent on Taper Geometry
d. Tapering speed depends highly on the type of process used. 1 mm/s is a typical speed for a standard tapering process.

Optional Upgrades

Liquid Cooling System (Included with GPX3600 and GPX3850)

GPXWCS

Specifications

Item #	GPXWCS
Cooling Capacity	590 W[a]
Reservoir Capacity	10 Speed Levels up to 4 L/min
Reservoir Capacity	157 mL (5.3 fl oz)
Radiator	Aluminum; 2 x 120 mm Fans
Power Consumption	20 W (Max)
Power Supply	12 VDC (via Molex Connector) 110/120 VAC with Power Adapter
Weight	8.00 lbs (3.63 kg)

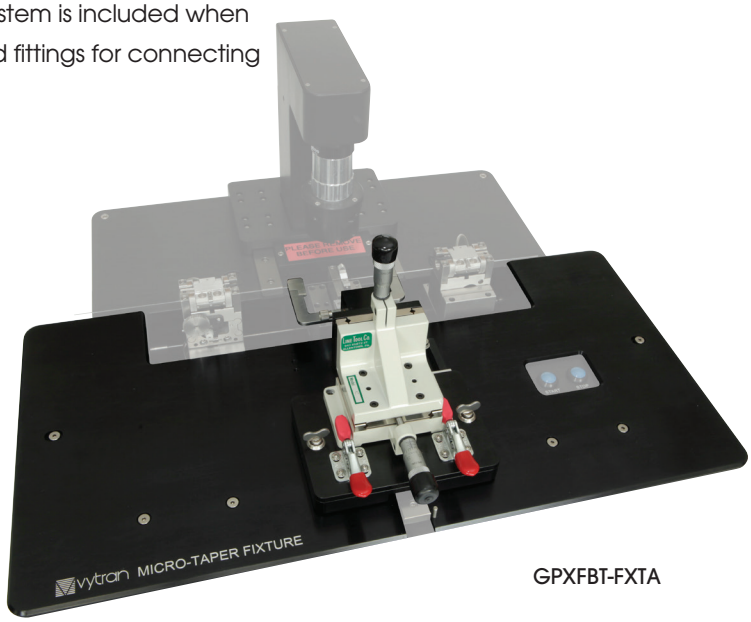
a. At 25 °C Ambient Temperature and 4 L/min Coolant Flow Rate

The GPXWCS Liquid Cooling System is an optional add-on for our Vytran Glass Processors that helps keep the furnace assembly cooled during extended heating operations. It is highly recommended for customers interested in fiber tapering, mode adapter, or fiber termination applications. This cooling system is included when purchasing the GPX3600 and GPX3850 workstations. Tubing and fittings for connecting to a Vytran Glass Processor are included.

Micro-Taper / Coupler Fixtures and Software Add-Ons

Features

- GPXFBT-FXTA Fixture with Adjustable Fiber Gripper for Transporting Tapers and Couplers
- GPXFBT-FXTB Fixture with Removable Fiber Holder for *In Situ* Packaging
- GPXFBT-SFT Software Add-On Enables Fused Biconic Taper (FBT) Processing
- Purchase Separately or Together as a Kit



GPXFBT-FXTA

These optional add-ons for the Vytran Glass Processors are designed to aid microtaper and fused fiber coupler processing. The software package enables finer control over heating and fiber pulling parameters during active FBT processes, resulting in improved yields and high repeatability between runs.

The fiber gripper on the GPXFBT-FXTA Adjustable Fixture can accomodate taper lengths from 0 to 3.15" (0 to 80 mm). The GPXFBT-FXTB Removable Taper Holder Fiber Fixture option acts as a pick-up and removal apparatus for the user to safely and securely transport the fabricated taper or coupler for secondary processing or *in situ* packaging.

Large-Diameter Cleavers

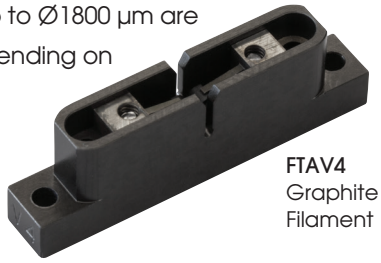
LDC401A
Large-Diameter
Fiber Cleaver,
Flat or Angled Cleaves

Features

- Cleave Glass Fibers with Claddings from Ø80 µm to Ø1.25 mm
- Flat Cleaves or Angled Cleaves up to 15°
- Programmable via Tablet Controller
- Holding Blocks and inserts are Compatible with GPX Glass Processors

Furnace Assemblies

A selection of six graphite and three iridium filament assemblies for fibers with claddings up to Ø1800 µm are available. The approximate lifetime of a filament is 40 minutes; however, this can vary depending on factors such as argon quality, splice/taper duration, and fiber glass quality.



FTAV4
Graphite Filament

- Graphite or Iridium Filament with Protective Shroud
  - Graphite: Higher Temperatures with Less Outgassing
  - Iridium: Lower Temperatures Ideal for Soft-Glass Fibers (e.g., Chalcogenide or Fluoride)
- Multiple Size Options to Accommodate Claddings from 80 µm to 1.8 µm

Fiber Holding Block Inserts

Each glass processor is equipped with two fiber holding blocks that secure the fiber during fusion or tapering. A fiber holding block can fit two inserts (one top and one bottom) that are designed to accept a range of fiber diameters. Two top and two bottom inserts are required to operate a glass processor. The types of inserts that are available for purchase are shown below.

Contact Us

Contact Vytran for assistance in selecting components for your specific application.

1-732-972-2880 or
techsupport@thorlabs.com

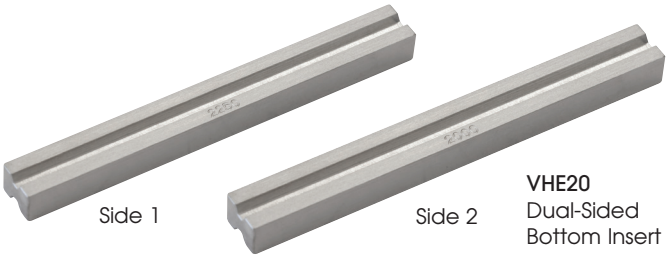
Robert Walz
Vytran General Manager

Top Inserts

- Multiple Size Options for Fiber Outer Diameters from 57 µm to 3198 µm
- Single-Sided and Dual-Sided Versions Available
- Inserts with Indent for LED Light Illumination of Fiber End Face Available

VHB00
Top Insert with LED Indent

Standard Bottom Inserts



VHE20
Dual-Sided Bottom Insert

- Multiple Size Options Over Ø773 µm to Ø3198 µm Range
- Single-Sided and Dual-Sided Versions Available
- Use to Hold Large-Diameter Fibers

Transfer Bottom Inserts

VHF400
Transfer Bottom Insert

- Multiple Size Options for Fiber Outer Diameters from 112 µm to 1047 µm
- Use to Transfer Fibers Between Vytran Systems
- VHT1 Transfer Clamp and Graphite V-Groove Required for Operation

Multi-Fiber Bottom Inserts

- Designed to Hold 2 or 3 Fibers in Close Proximity Using the Same Insert
- Multiple Sizes and Slot Options Available (Side-by-Side, Double-V, and Triple-V Slots)

VHD320P
Double-V-Slot Bottom Insert with Alignment Pins

- Use When Making Fused Couplers or Fiber Combiners
- Vacuum Holes for Aligning Fibers Within Grooves or Slots

Fiber Cleavers

CAC400
Compact Cleaver

Capabilities

Cleave

LDC401
Standard Cleaver

vytran® Fiber Cleavers

Thorlabs' lines of Vytran® Fiber Cleavers can cleave standard and specialty fibers with claddings from Ø60 µm up to Ø1.25 mm. Flat cleave only or flat/angled cleave units give you the flexibility to choose the best fit for your application.

These fiber cleavers feature a diamond cleave blade for industry leading longevity and precision. Each unit uses the tension-and-scribe method to achieve high-quality cleaves.

Thorlabs carries two lines of basic fiber cleavers: Standard and Compact. The Compact line of cleavers can cleave fibers with claddings from Ø60 µm to Ø600 µm while the Standard line can handle fibers with claddings from Ø80 µm up to Ø1.25 mm. Both lines offer flat cleave only or flat/angled cleave units.

THORLABS

Fiber Cleaving

Standard Cleavers

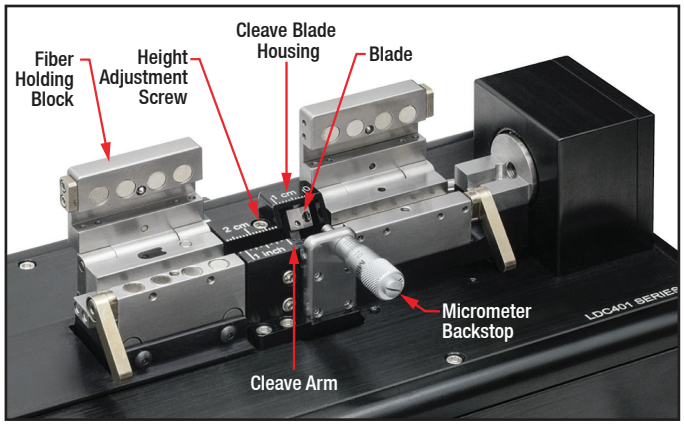
Our standard cleaver line can cleave fibers with claddings from Ø80 µm to Ø1.25 mm. Each unit comes with a touch-screen tablet controller for setting cleave parameters and a built-in micrometer backstop to support specialty fibers during low-tension cleaves. These cleavers use standard Vytran fiber holder inserts, making these units easy to integrate with other Vytran workstations.

Compact Cleavers

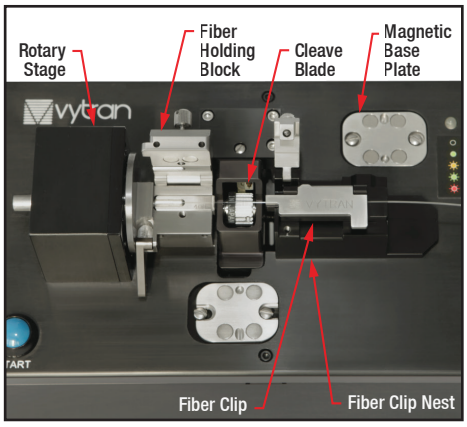
The compact cleaver line cleaves fibers with claddings from Ø60 µm to Ø600 µm. These cleavers are configured and controlled from a web interface that can be accessed from any web browser. An ethernet cable is included for communication.

Features

- Flat (0°) or Angled Cleaves (up to 15°)
- Cleave Fibers of Various Sizes
  - Standard Cleaver: Claddings from Ø80 µm to Ø1.25 mm
  - Compact Cleaver: Claddings from Ø60 µm to Ø600 µm
- Programs for Cleaving Standard or Specialty Fiber:
  - Single Mode, Multimode, and Polarization-Maintaining Fiber
  - Photonic Crystal Fiber
  - Soft Glass Fiber
  - Capillary Tubes
- Mirror-Quality End Face Finishes for High-Performance Splicing
- Robust Diamond Scribe for Longevity and High-Volume Fiber Processing
- Industry Preferred Unit for Production Line Environments



Standard Cleaver, Flat/Angled Cleave Unit

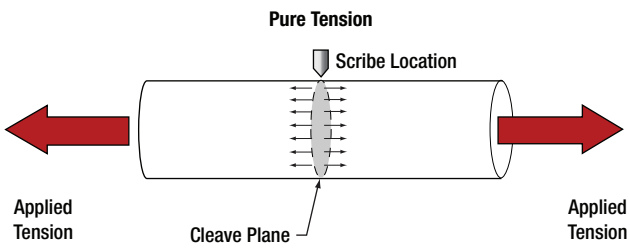


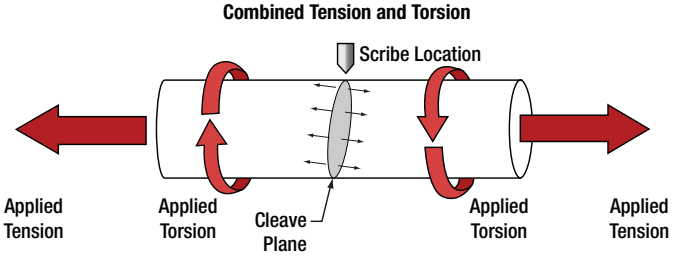
Compact Cleaver, Flat/Angled Cleave Unit

Tension-and-Scribe Cleave Process

Thorlabs' fiber cleavers use the "tension-and-scribe" cleaving process, where tension is applied along the length of the fiber followed by an automatic scribing process using a diamond blade. Tension is maintained, causing the scribe to propagate across the fiber width and complete the cleave. Angled cleaves are accomplished by using the rotation stage to apply torsion to the fiber prior to commencing the "tension-and-scribe" process.

Certain specialty fibers, such as photonic crystal fiber, microstructured fibers, or highly stressed fibers, such as polarization-maintaining fiber, may require special parameters in order to create clean cleaves at the desired angle. For these cleaves, the initial tension applied to the fiber is lower and is slowly increased after the scribe to propagate it across the fiber and complete the cleave.





Build Your System

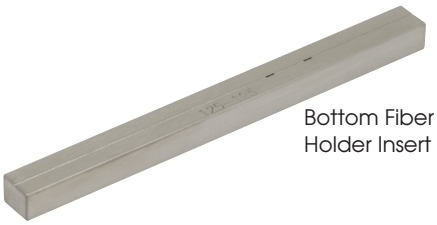
Specifications

Item #	CAC400	CAC400A	LDC401	LDC401A
Fiber Cladding	Ø60 µm to Ø600 µm		Ø80 µm to Ø1.25 mm	
Fiber Buffer/Coating	Ø67 µm to Ø1200 µm		Ø80 µm to Ø3.198 mm	
Cleave Angle	0°	0° to 15°	0°	0° to 15°
Cleave Angle Accuracy	±1.0°	±1.0°	±0.5°	±0.5° (Flat); ±1.0° (Angled)
Cleave Method	Tension and Scribe			

Standard Cleavers

Required Items for Basic Setup

- One LDC401 (Flat Cleave Only) or
  One LDC401A (Flat/Angled Cleave)
- Two Fiber Holder Top Inserts
- Two Fiber Holder Bottom Inserts



Bottom Fiber Holder Insert

Top Fiber Holder Insert, Dual Sided

Additional Customization

- Top and Bottom Inserts for Fiber Holding Blocks
- Transfer Bottom Inserts for Fiber Outer Diameters ≤1047 µm
  - Corresponding Clamp for Transferring Fiber Between Processing Stations in Assembly
  - Graphite Tips for Supporting Cladding or Buffer During Transfer
- LDCCK Digital Microscope Kit
- LDCCM Digital Microscope Kit with Tablet Mount
- Replacement Diamond Blade

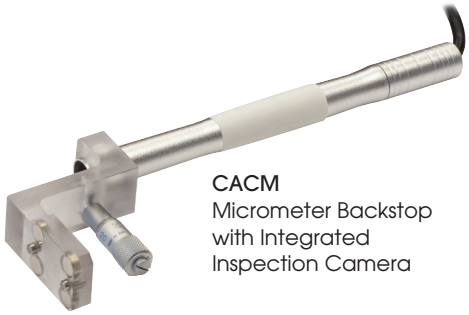
ACL83
Replacement Diamond Blade

Our digital microscope kits allow the user to image the fiber, cleave blade, and micrometer position during the cleaving process. The LDCCM kit also includes a mount with an integrated USB hub that allows the microscope to be controlled with the tablet included with each standard cleaver.

Compact Cleavers

Required Items for Basic Setup

- One CAC400 (Flat Cleave Only) or
  One CAC400A (Flat/Angled Cleave)
- One V-Groove Fiber Clip
- One Top V-Groove Fiber Holder Insert
- One Bottom V-Groove Fiber Holder Insert



CACM
Micrometer Backstop with Integrated Inspection Camera

VHM165
V-Groove Clip

Additional Customization

- Eight Sizes of V-Groove Fiber Clips
- Six Top and Bottom V-Groove Insert Options
- Micrometer Backstop and Camera Assembly
  - Supports Large-Diameter or Specialty Cleaves
  - Provides 200X Magnification of Cleave Process
- Replacement Diamond Blade

Contact Us

Contact Vytran for assistance in selecting components for your specific application.

1-732-972-2880 or
techsupport@thorlabs.com

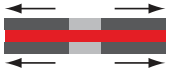
Robert Walz
Vytran General Manager

Recoat / Proof Test

PTR302
Rotary Proof Tester

Capabilities

Recoat



Proof Test

PTR308
Recoater with Automatic Mold Assembly and Linear Proof Tester

PTR304
Recoater for Manual Mold Assembly, 100 mm Recoat Length (Shown with Manual Mold Assembly)

vytran® Fiber Recoaters and Proof Testers

Thorlabs offers recoating and proof testing solutions for R&D and manufacturing applications. Our fiber recoaters apply a protective coating to fusion-spliced optical fiber, offering more flexibility than a splice sleeve. Proof testers are designed to apply a set load to a fusion-spliced optical fiber in order to test the strength of the spliced fiber. We also offer combination workstations that combine recoaters and proof testers in order to minimize transport of fiber across multiple stations.

These workstations are available from stock with a variety of options such as automatic or manual mold assemblies and rotary or linear proof testers. The recoaters and proof testers can be used with single mode, multimode, polarization-maintaining, or other specialty fibers.

THORLABS

Product Line at a Glance

Recoaters

PTR303B
50 mm Manual Recoater with Manual Recoat Injector
(Shown with Mold Assembly)

PTR304B
100 mm Manual Recoater with Manual Recoat Injector
(Shown with Mold Assembly)

Features

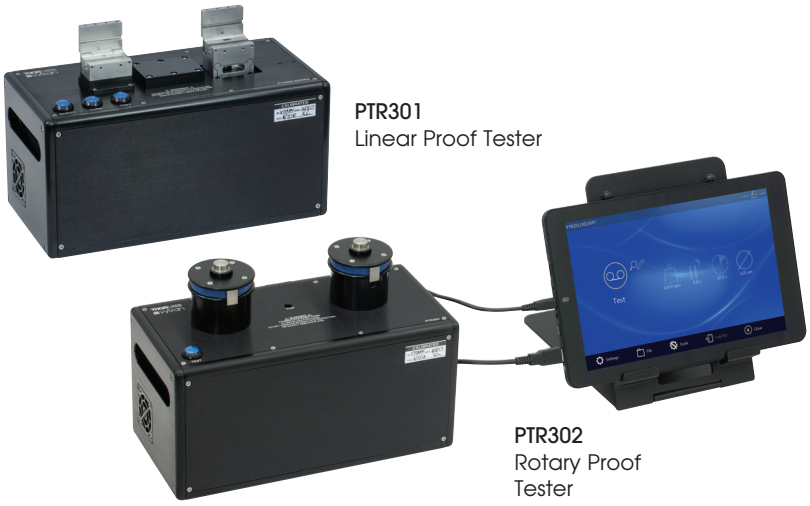
- Mechanically Protect Spliced Fibers
- Offers Greater Flexibility Than Splice Sleeve
- Can Restore Spliced Fiber to Near-Original Condition
- Recoat with UV-Curable Acrylate Coating
- Quartz Mold Plates Support >10,000 Recoats
- Fully Programmable with Push-Button Operation and Tablet Controller

Fiber Recoaters restore the coating of a fusion-spliced fiber by UV curing an acrylate coating over the spliced region. Compared to using a splice sleeve, recoating the fiber offers increased flexibility and durability that nearly matches the performance of the original fiber. Because of this, fiber recoaters are ideal for manufacturing high-stress or sensitive fibers such as undersea optical fiber cables, submarine communication cabling, fiber lasers or distributed Bragg reflector (DBR) lasers. Five models of recoaters are available as seen in the table below.

Recoater Selection Guide

Item #	Mold Assembly	Recoat Injector	Recoat Length
PTR303	Manual	Automatic	50 mm
PTR303B		Manual	
PTR304		Automatic	100 mm
PTR304B		Manual	
PTR305	Automatic	Automatic	50 mm

Proof Testers



PTR301
Linear Proof Tester

PTR302
Rotary Proof Tester

Features

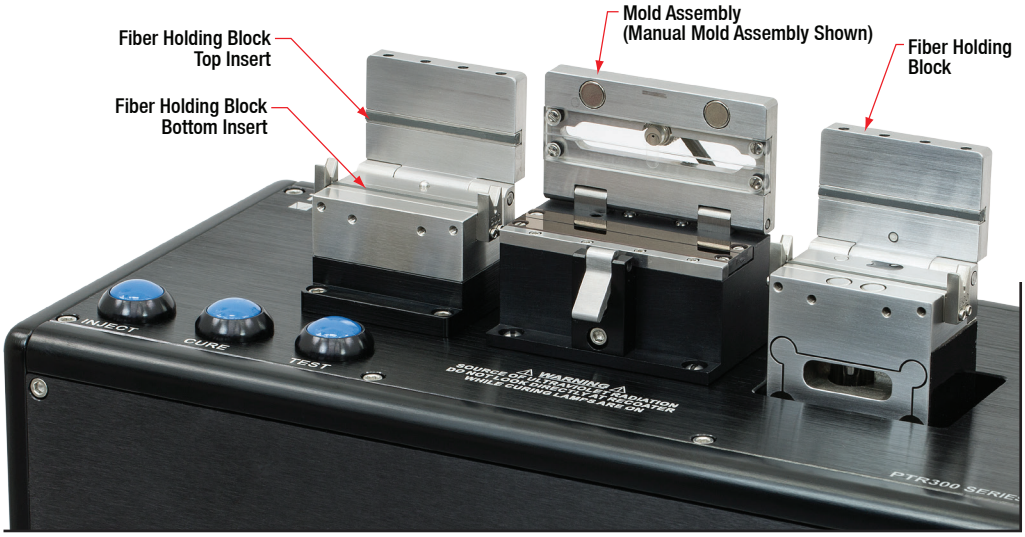
- Test Strength and Durability of a Fusion-Spliced Fiber
- Ensures Long-Term Reliability of the Fiber Splice
- Linear and Rotary Tester Versions Available
- Fully Programmable with Push-Button Operation and Tablet Controller

Proof Testers apply a set load to a fusion-spliced fiber at a controlled rate in order to test the spliced fiber's strength. During proof or tension testing, the load is taken up to a predetermined level and released. The PTR301 Linear Proof Tester can perform simple proof tests for loads up to 20 N (4.5 lbs). The PTR302 Rotary Tester can perform both proof testing and tension testing for loads up to 89 N (20 lbs), making it ideal for process qualifications that require very high proof test or tension test levels.

Integrated Recoater and Proof Testers

Features

- Combine Recoater and Proof Tester in a Single Unit
- Minimize Transport of Fiber Between Multiple Stations
- 50 mm Recoat Length
- Available Recoater and Proof Tester Combinations Shown in Table Below
- Fully Programmable with Push-Button Operation and Tablet Controller



Recoater with Integrated Linear Proof Tester

These integrated recoating and proof testing platforms provide a compact solution combining the function of both into a single unit. This offers several advantages such as minimizing the transport of a fusion-spliced fiber between multiple workstations, optimizing process flow in manufacturing, and reducing the space required for fiber manufacturing. As seen in the photo above, workstations with an integrated linear proof tester share the same fiber holding blocks between recoater and proof tester; therefore, the fiber does not need to be moved at all between recoating and proof testing.

Integrated Recoater and Proof Tester Selection Guide

Item #	Mold Assembly	Recoat Injector	Proof Tester
PTR306	Manual (Acrylate Coating)	Automatic	Linear (20 N)
PTR306B		Manual	
PTR307		Automatic	Rotary (89 N)
PTR307B		Manual	
PTR308	Automatic (Acrylate Coating)	Automatic	Linear (20 N)

Applications

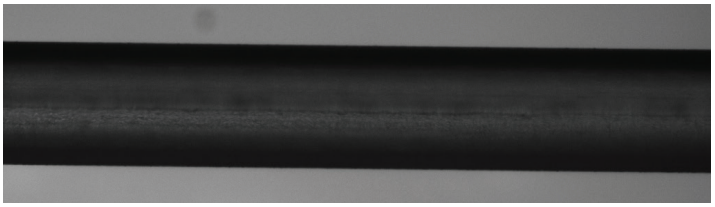


Image of Ø125 µm cladding / Ø250 µm coating fiber after recoat with a seamless interface between the original coating and the recoated splice region.

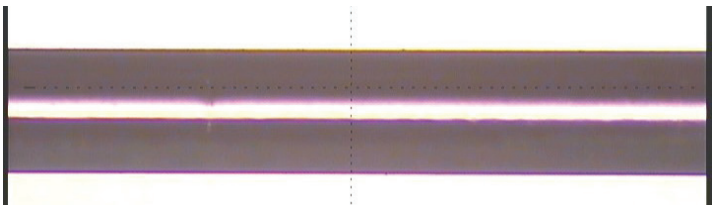


Image of Ø450 µm fiber after recoat with the core illuminated.

Recoating a splice with an acrylate coating material enables restoration of a fiber to nearly original condition. Unlike splices that are protected in a rigid splice protector, recoated fibers retain high flexibility and can be easily coiled or spooled. Because the recoat diameter accurately matches the original coating diameter, these fibers can be used in situations with tight packaging requirements.

As a result, recoating is ideal for applications where fibers that are spliced require high reliability and a high splice strength. Example applications include undersea fiber optic cabling and optical networks within submarines.

Features

Mold Assembly

Automatic Mold Assembly
(PTR305 and PTR308 Only)

- Pneumatic Mechanism Controls Mold Plates
- Direct Injection of Recoat Material into Mold Cavity
- Optimized for Ø430 µm Cladding Fiber Designed for High-Volume Manufacturing Applications
- Reduced Cleaning Requirements Compared to a Manual Mold Assembly

An automatic mold assembly greatly reduces the time needed for each recoat operation.


RM430L

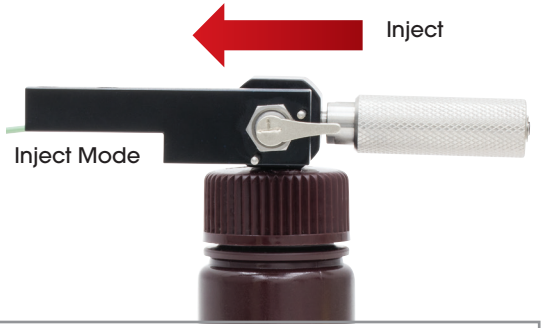

RM280A

Manual Mold Assemblies
(All Other Recoat-Capable Workstations)

- Split Quartz Mold Plates with Hinge
- Multiple Mold Sizes Offer Process Flexibility Ideal for R&D Applications
- Mold Assemblies for Ø280 µm, Ø430 µm, and Ø600 µm Available from Stock; Custom Mold Sizes Up to Ø900 µm Possible
- 50 mm or 100 mm Recoat Length

When purchasing a manual fiber recoater for the first time, it is necessary to choose a mold assembly that is appropriate for the desired fiber coating diameter. Additional mold assemblies may also be purchased and swapped out by the user. The assembly simply screws to the top of the device, making the removal and installation simple and easy. Because of this, our manual recoaters are adaptable and flexible in the field and can be quickly modified for a variety of fiber diameters.

Manual recoat injectors use a two-position valve to direct the flow of recoat material.



Recoat Injector

Two recoat injector configurations are available. For systems with automatic injectors, the amount of material dispensed by the automatic injector is controlled by hand via the top-mounted "Inject" button or programmed into the machine using the tablet controller.

Systems with a manual injector come with a reservoir to hold recoat material and a two-position distribution valve to direct the flow (see image to the right). A knurled dispensing screw with an internal plunger acts as a syringe for the recoat material.

Injector Type	Automatic	Manual
Recoat Volume Control	Programmable via Tablet Controller	Manual Control
Recoat Injection Rate	≤1.8 µL/s (Programmable)	Manual Control
Compatible Recoat Material	AB9050200 High-Index Acrylate	AB9050200 High-Index Acrylate or PC373 Low-Index Acrylate

Proof Tester Features

- Linear and Rotary Testing Methods Available
- Linear Testing Uses Fiber Holding Blocks to Pull Fiber
- Rotary Towers Offer Higher Loads and Tension Testing
- Fully Programmable with Included Tablet Controller

During proof or tension testing, the load is taken up to a predetermined level and released. Proof testing is employed in manufacturing applications to ensure the fiber can support the necessary service load. To ensure the long-term reliability of the spliced fiber, the proof test level should be about three times higher than the intended service load. For tension testing using a rotary tower, the load is typically increased to the breaking point of the fiber and is best suited for engineering and development applications. Both testing processes are fully programmable, allowing the user to select parameters such as the load, the rate at which the load is applied, and the hold time.

Linear Proof Tester

Rotary Proof Tester

Specifications

Proof Tester Type	Linear	Rotary
Load Mechanism	1.5" (38 mm) Linear Fiber Clamp	Ø2" (50.8 mm) Rotating Mandrel
Fiber Length (Min)	6" (150 mm)	17" (432 mm)
Load (Max)	20 N (4.5 lbs)	89 N (20 lbs)
Accuracy	±2%	
Ramp Rate	Programmable, ≤22.2 N/s (5 lbs/s)	Manual, ≤22.2 N/s (5 lbs/s)

Tablet Controller

All workstations include a tablet controller running Windows® 10 (shown to the right) that allows the user to program and control process parameters. Adjustable settings include the inject rate, inject amount, cure time, lamp power, and proof test level. The tablet is shipped preloaded with files for common recoat and proof test parameters, but can store a virtually unlimited number of files.

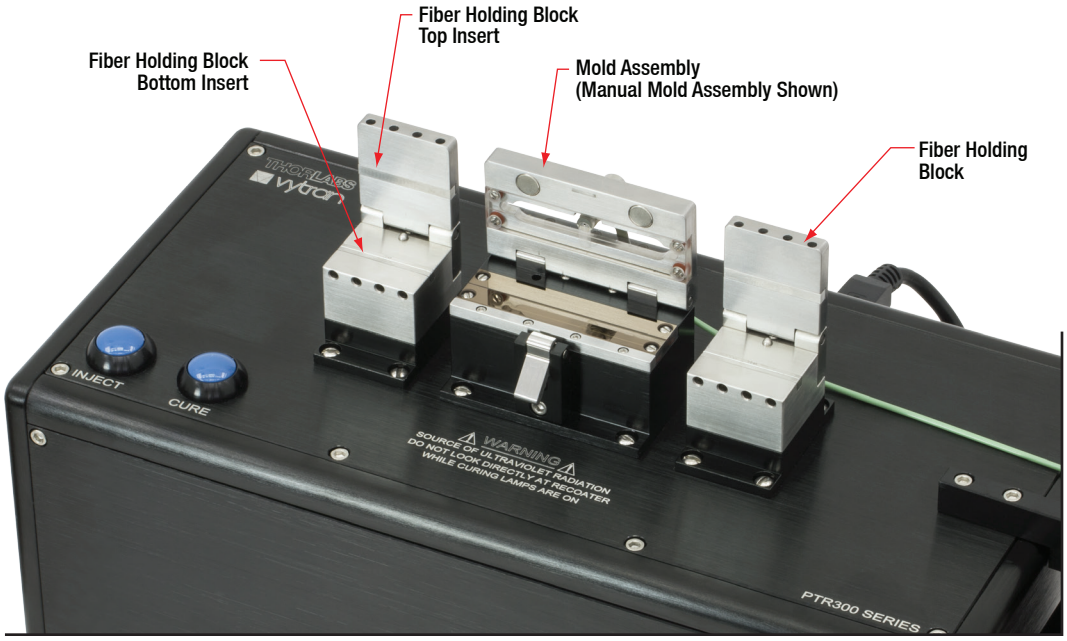
The tablet controller includes a stand for easy viewing and use.

Main Screen Showing Inject / Cure / Test Functions

The injection calculator assists in determining the appropriate amount of recoat material needed for any process.

Build Your System

Our Vytran® Recoaters and Proof Testers are fully customizable with modular components such as manual mold assemblies and fiber holding block inserts for a wide range of fiber sizes. Use the guide below to determine the right set of components for the intended application.



PTR303B Recoater Configured with Mold Assembly and Fiber Holding Block Inserts

Step 1: Choose a Recoater or Proof Tester Workstation

Choose among the many configurations available below. Workstations with item #s that end with a B (e.g., PTR303B or PTR306B) use a manual recoat injector while others use an automatic recoat injection system.

Recoater Workstation

- PTR305: Automatic Mold Assembly
- PTR303 or PTR303B: Manual Mold Assembly, 50 mm Recoat Length
- PTR304 or PTR304B: Manual Mold Assembly, 100 mm Recoat Length

Proof Tester Workstation

- PTR301: Linear Proof Tester
- PTR302: Rotary Proof Tester

Integrated Recoater and Proof Tester Workstation

- PTR308: Automatic Mold Assembly with Linear Proof Tester
- PTR306 or PTR306B: Manual Mold Assembly with Linear Proof Tester
- PTR307 or PTR307B: Manual Mold Assembly with Rotary Proof Tester

Step 1a: Choose a Mold Assembly (For Manual Recoaters Only)

If a recoater configured for a manual mold assembly was chosen in Step 1, the mold needs to be purchased separately. The table below outlines the recoat lengths and diameters available from stock. Custom molds with recoat diameters up to Ø900 µm are available upon request by contacting techsupport@thorlabs.com

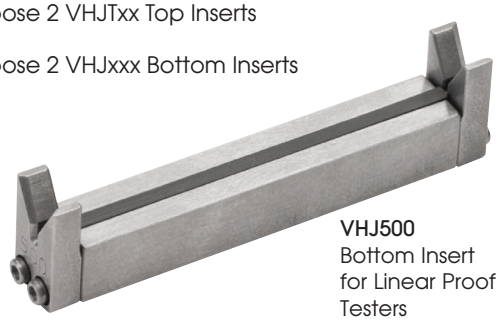
Manual Mold Assembly Item #	RM280A	RM430A	RM600A	RM280L	RM430L	RM600L
Recoat Diameter	280 µm	430 µm	600 µm	280 µm	430 µm	600 µm
Recoat Length	50 mm			100 mm		
Compatible Workstations	PTR303, PTR303B, PTR306, PTR306B, PTR307, PTR307B			PTR304 and PTR304B		

Step 2: Choose Fiber Holding Block Inserts (All Workstations Except PTR302)

Fiber holding block inserts are placed within the fiber holding blocks of recoaters and linear proof testers. For every workstation except the PTR302, two top and two bottom inserts should be selected. These support a wide range of fiber outer diameters (from Ø80 µm to Ø1000 µm). For a full list of options, please visit the website.

If purchasing a workstation with a linear proof tester (e.g., PTR301, PTR306, PTR306B, or PTR308)

- Choose 2 VHJTxx Top Inserts
- Choose 2 VHJxxx Bottom Inserts



VHJ500
Bottom Insert for Linear Proof Testers

If purchasing a workstation with a recoater, but no linear proof tester (e.g., PTR303, PTR303B, PTR304, PTR304B, PTR305, PTR307, or PTR307B)

- Choose 2 VHHxxx Top Inserts (Item #s VHH000 or VHH900)
- Choose 2 VHHxxx Bottom Inserts (Item #s VHH100 through VHH900S)

VHH600
Bottom Insert

Consumables and Replacement Items

Regular consumables such as recoat material and replacement items for worn and used components of a recoater or proof tester workstation are described below.

Recoat Material

- UV-Curable Acrylate Recoat Material (1 oz Bottle)
  - AB950200 High-Index Material Compatible with All Standard Recoaters
  - PC373 Low-Index Material Compatible with Recoaters Using Manual Injectors

AB950200
High-Index Recoat Material

Replacement Bulb

- Replacement Bulb for Recoaters with Manual Mold Assembly
- Four Bulbs Needed for 50 mm Recoat Length; Eight Bulbs for 100 mm Recoat Length
- Bulb Replacement Recommended After 2000 Recoats (15 s per Recoat)

UVRB
UV Bulb

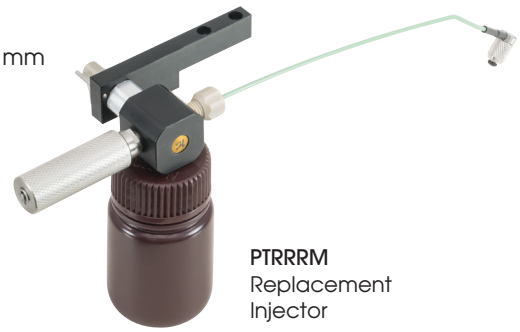
Replacement Proof Tester Grips

- Replacement Grips for Rotary Proof Testers
- Pack of 10

PG200
Proof Tester Grips

Replacement Manual Injector

- Replacement Manual Injector for Dispensing Recoat Material into the Mold
- Compatible with 50 mm Length Manual Recoaters



PTRRRM
Replacement Injector

Contact Us

Contact Vytran for assistance in selecting components for your specific application.

1-732-972-2880 or
techsupport@thorlabs.com

Robert Walz
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