THORLABS

PTR302
Rotary Proof Tester

User Guide



vytran®

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Chapter 1 Warning Symbol Definitions

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

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

Chapter 2 Safety

All statements regarding safety of operation and technical data in this instruction manual will only apply when the unit is operated correctly.

SHOCK WARNING

Unplug the power cord before servicing the unit. Do not operate the unit without all covers and items properly installed.

CAUTION

Before connecting the AC power cord, make sure the source voltage is between 85 and 265 VAC, 47-63 Hz. Input voltages outside these ranges may result in damage to the unit.

WARNING

Small transparent fiber shards may be present in and around the work area, and as such, the necessary measures should be taken to ensure the safety of the employee(s).

WARNING

This unit must not be operated in explosive environments. The equipment should be used in a standard laboratory environment with temperature and humidity control.

Fuses can be replaced by twisting it to release, and then pulling it out of the housing; it is replaced by pushing the fuse into the housing and then twisting it to lock in place. The fuse is 6.4 A, 250 V.

Chapter 3 Description

3.1. Introduction

The Vytran® PTR302 is a proof tester/tension tester. 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.

3.2. Parts Checklist

When unpacking the PTR302 for the first time, check to be sure that you have the following:

- PTR302 Rotary Proof Tester
- Proof Test Shield
- Power Supply
- AC Power Cord
- Tablet Controller
- Stand for Tablet Controller
- Canvas Bag containing:
  - Screw Driver
  - Two (2) USB Cables

If you are missing any of the above or need replacements, please contact Thorlabs.

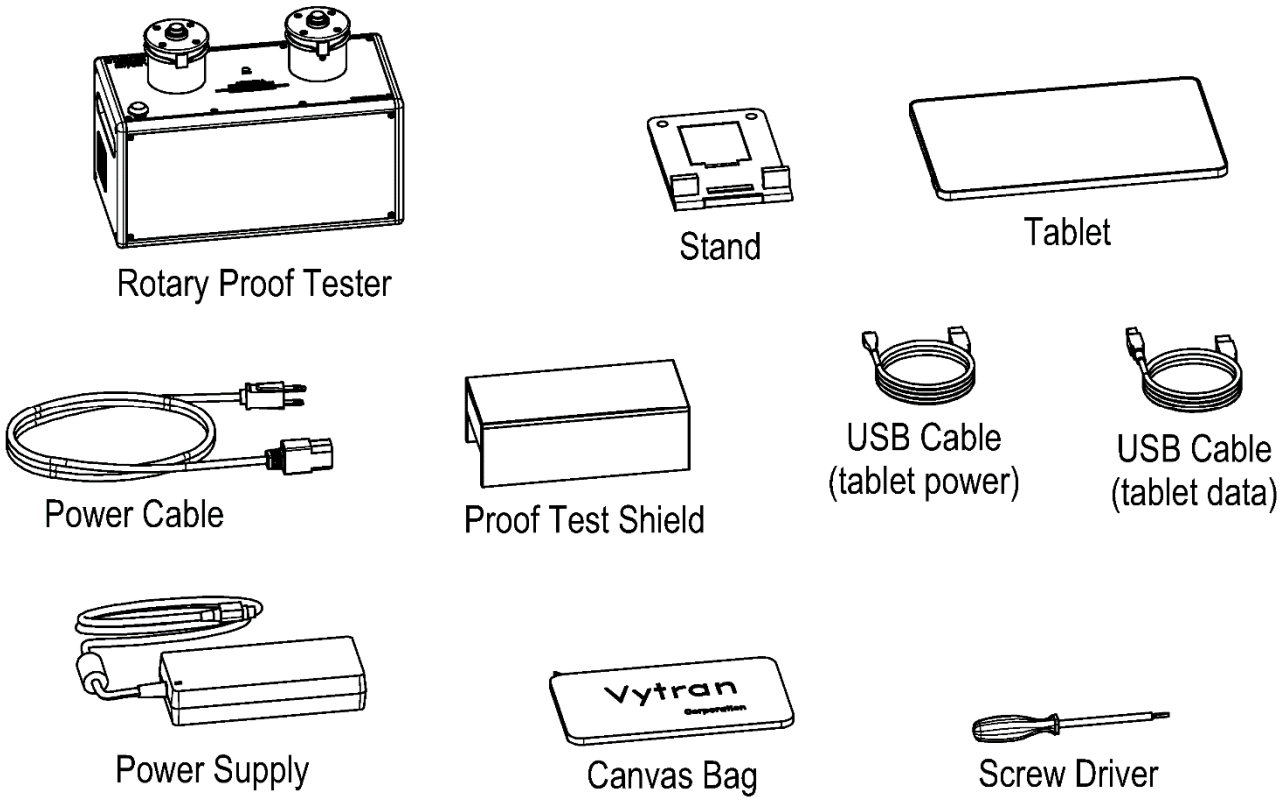


Figure 1 System Components

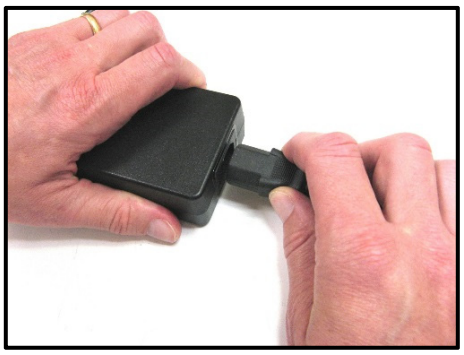
Chapter 4 Initialization and Control

4.1. Controlling the PTR302

1. Plug in the AC power cord. The power supply accepts an AC input of 100 - 240 VAC; 47 - 63 Hz.



2. Connect the AC power cord to the external power supply.



3. Connect the DC power cable to the unit.



4. Locate the USB cable that has a microUSB Type B plug. Plug it into the power socket of the tablet.



5. The other USB cable has one end that is USB Type A. Plug that end of that cable into the USB socket of the tablet.



6. Plug the USB Type B plug into its socket on the back of the unit.



7. Plug the USB Type A plug (on the first USB cable) into its socket on the back of the unit.



4.2. Controlling the PTR302

The PTR302 can be operated using either the Blue button on the top of the unit, or via the Tablet Controller, which is used to control the PTR302 or to reprogram process parameters. The Tablet Controller is the primary controlling option for controlling the device, for service, or for parameter changes.



Figure 2 Tablet Controller

4.2.1. Unit Control Buttons

The PTR302 has a Unit Control Button that enables the user to test the strength of a fusion splice. All parameters are preset and cannot be changed without an optional controller in conjunction with the Unit Control Buttons (see below for control options). A controller is also necessary for readout of the proof test values.

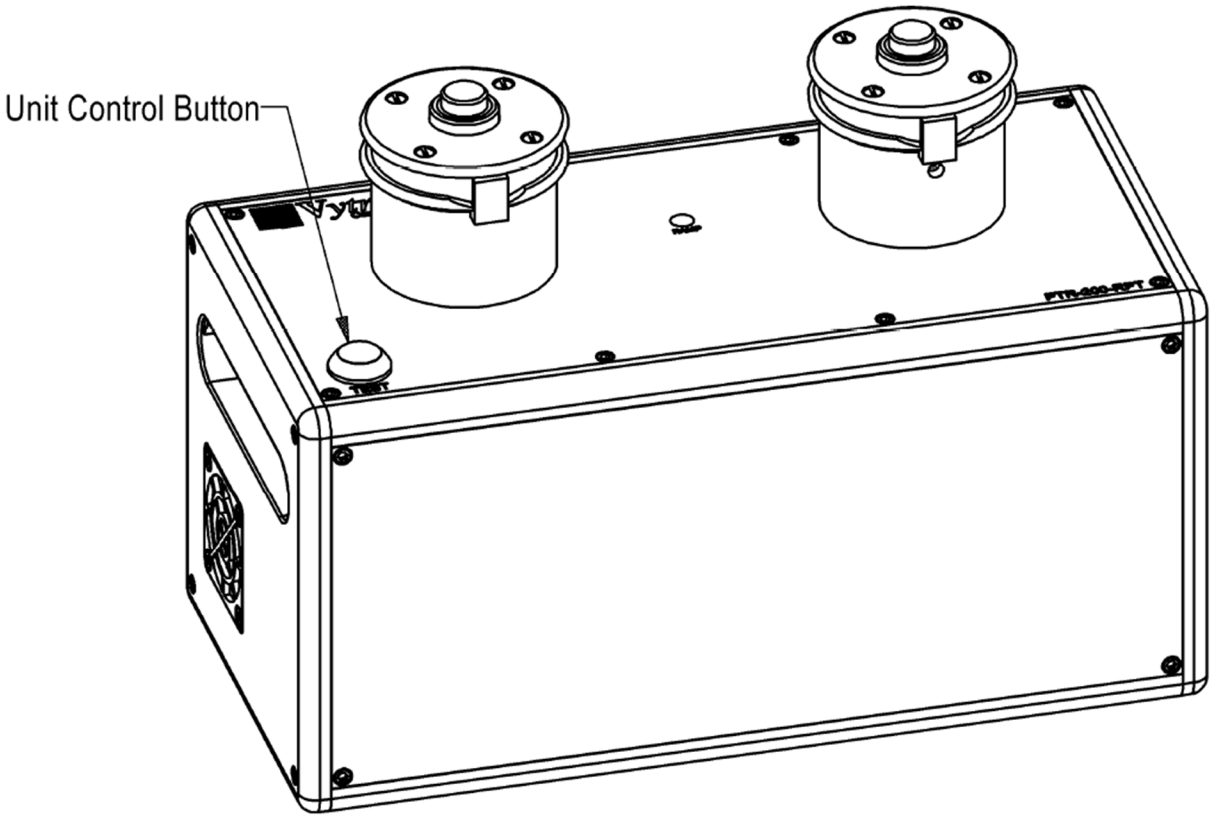


Figure 3 Unit Control Buttons

Test Button: Activates a Proof Test with the current parameter settings stored within the main unit. The right-hand mandrel will rotate to apply the set tension to the fiber.

4.3. Tablet Controller

4.3.1. Set-up

Make sure power to the unit is turned off. Connect the cable of the Tablet Controller to the connector on the back of the device labeled “Display/Serial”.

4.3.2. Power Up

With the Tablet Controller properly connected to the unit:

- Turn on the external power supply using the switch above the output cable.
- Turn on the PTR302 using the switch located at the back of the unit.

The system will go through an initialization process that takes a few seconds, during which time it will lock the right mandrel. During initialization the Tablet Controller will auto-detect the PTR302 and display the main screen. From here the User can start proof testing, view / edit parameters and select items on the toolbar

The Tablet Controller provides a simple, easy to use interface for configuring, controlling and monitoring. The following sections contain a quick start guide followed by a more detailed view of the features and capabilities of the Tablet Controller.

4.4. A Quick Start Guide to using the Tablet Controller

Once the Tablet Controller has recognized a PTR302, the Main Screen is displayed.



Figure 4 PTR302 Main Screen

A: Status Bar B: Widget C: Test Button D: Test Parameter View/Edit E: Toolbar

To start Testing, press ‘Test’ (C). This performs the same action as pressing the blue ‘Test’ button on the PTR302.

To view and/or edit Test Parameters, touch the view/edit button (D)

If the User has insufficient access permission to edit parameters, a view only icon  is displayed.

After pressing a view/edit button, the relevant parameters (along with the current value) will be shown on the Parameter Select screen. Swipe the list to scroll up / down, touch a parameter to select it for editing.

Note:  Yes, OK, Apply .  No, Cancel, Close



Figure 5 Parameter Select Screen (Test)

In the edit / viewing screen, touch the value to enable the On-Screen-Keyboard and edit the value. Touch ✓ or *X* to return to the Parameter Select Screen.

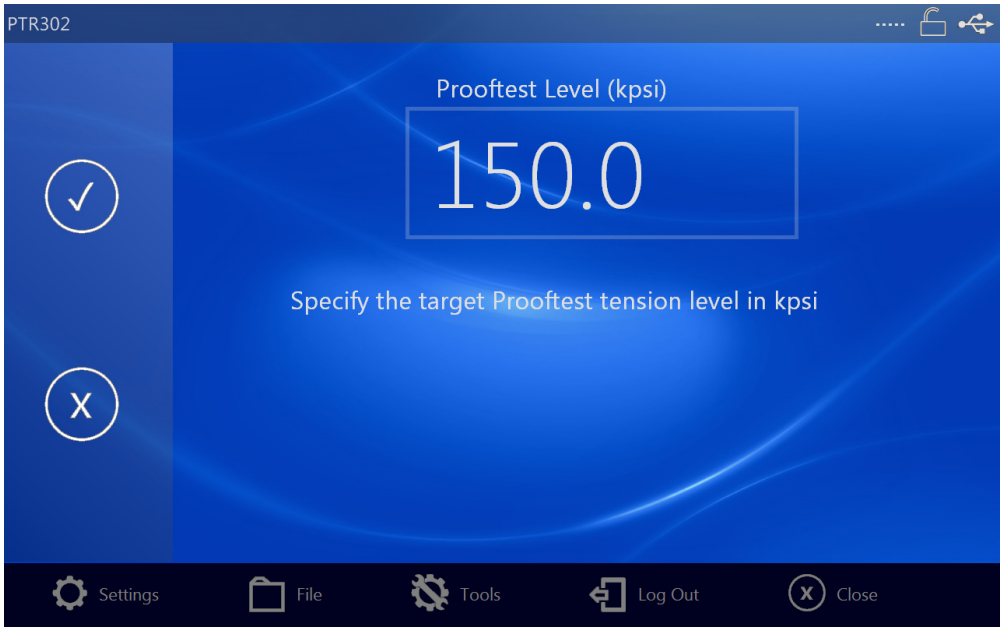


Figure 6 Parameter Edit Screen

The parameter list indicates that an item has been changed by displaying a different icon 

The User must select ✓ when leaving the Parameter Select Screen in order for all changes to be committed to the PTR302.

4.5. PTR302 Parameters

The following sections describe the parameters that control PTR302.

4.5.1. Proof Test Parameters

The proof test parameters are defined as follows:

Fiber Diameter: The diameter of the fiber in microns (µm). This diameter is required to calculate units of tension (kpsi & GPa). Note: Make sure to enter the diameter of the fiber, not the diameter of the coating.

Tension Units: The unit of measurement, this can be either grams (g), gigapascals (GPa), Kilo-pounds per square inch (kpsi), pounds (lb) or Newtons (N).

Peak Tension: The load or tension to which the fiber is to be proof tested in either grams, GPa, kpsi, lb, or N.

Proof Test Timeout: Time limit to abort the proof test process if the Peak Tension is not reached.

4.6. Proof Testing

The tablet will display the Proof Test Screen when either the button on the machine or the Test button on the tablet is pressed. This screen is common to all PTR class Proof Testers.

4.6.1. Test Screen

Once the Test sequence has started (either by pressing 'Test' on the Tablet or on the PTR302) the Test Screen is displayed.

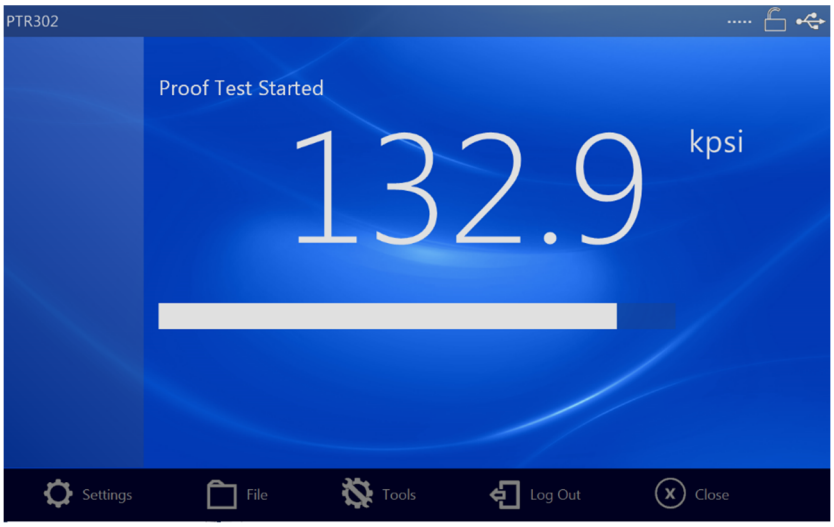


Figure 7 Test Screen

The Test screen displays the current tension reading as well as the status of the test (started, tension OK, failed to reach tension). The Test Screen remains visible after the test to allow the user to see the result.

4.7. Tablet Controller Reference

The Tablet Controller is a fully featured Windows 8 (and in due course, Windows 10) Tablet. The controller application (VytranCX.exe) is launched automatically on Windows startup. After a few seconds of displaying a

master Home Screen, a discovery process is launched which detects any Vytran modules connected. If a module is found and recognized, the controller configures itself for that module, in this case the PTR302.

It is recommended that the Tablet Controller remains connected to a single machine in order to benefit from machine status monitoring built into the controller. The PTR302 can, however, operate without the Tablet Controller attached, and through use of the blue buttons will carry out Proof Test using the last set of parameters that were uploaded to it.

At startup, Tablet Controller will always read parameters from the PTR302 meaning that the parameters that appear on the screen will always be the parameters that have been uploaded to the unit connected.

The Tablet Controller provides an 'offline' mode in which files can be modified and uploaded later.

4.7.1. PTR302 Main Screen

The PTR302 Main Screen, much like the Main Screen for any other Vytran module, shares a common theme. It has a status bar, one or more control (action) buttons, a view / edit button to access parameters related to that control or action, a Widget (for displaying the most relevant current parameters) and a toolbar. During operation, runtime messages are displayed.

From left to right, the status bar indicates the type of module detected (in this case PTR302 Rotary Proof Tester), the file currently open (blank if none) and three icons to indicate file status (unprotected or read-only), current user access status and USB connection.



Figure 8 PTR302 Main Screen – Status Bar

The control button on the PTR302 Main Screen will perform the same function as the Test button on the PTR302. The view / edit button will bring up the Parameter Select list that's relevant to the button.



Figure 9 PTR302 Main Screen – Action & Parameter View / Edit

PTR302: The Widget provides an instant overview of the most relevant current parameters. From left to right it shows:

- Proof Test level and units
- Hold Time (always 0.0 for PTR302)
- Proof Test Timeout.
- Fiber Diameter



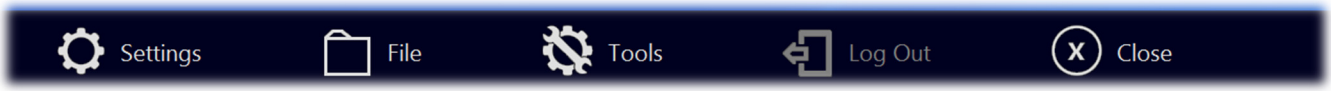
Figure 10 PTR302 Main Screen – Widget

Runtime messages (Toasts) are displayed on the PTR Home screen when something important is happening such as reading parameters from the PTR and uploading new parameters to the machine.



Figure 11 PTR Main Screen – Toast Messages

The toolbar provides access to Tablet Controller settings, the file system, PTR302 specific tools, a fast Log-Out feature and a close button to allow the user to exit the PTR302 Main Screen.



4.7.2. Settings

Touch the toolbar Settings button to bring up the Settings Screen. These options are for configuring the Tablet Controller and are generally not dependent on the connected unit.

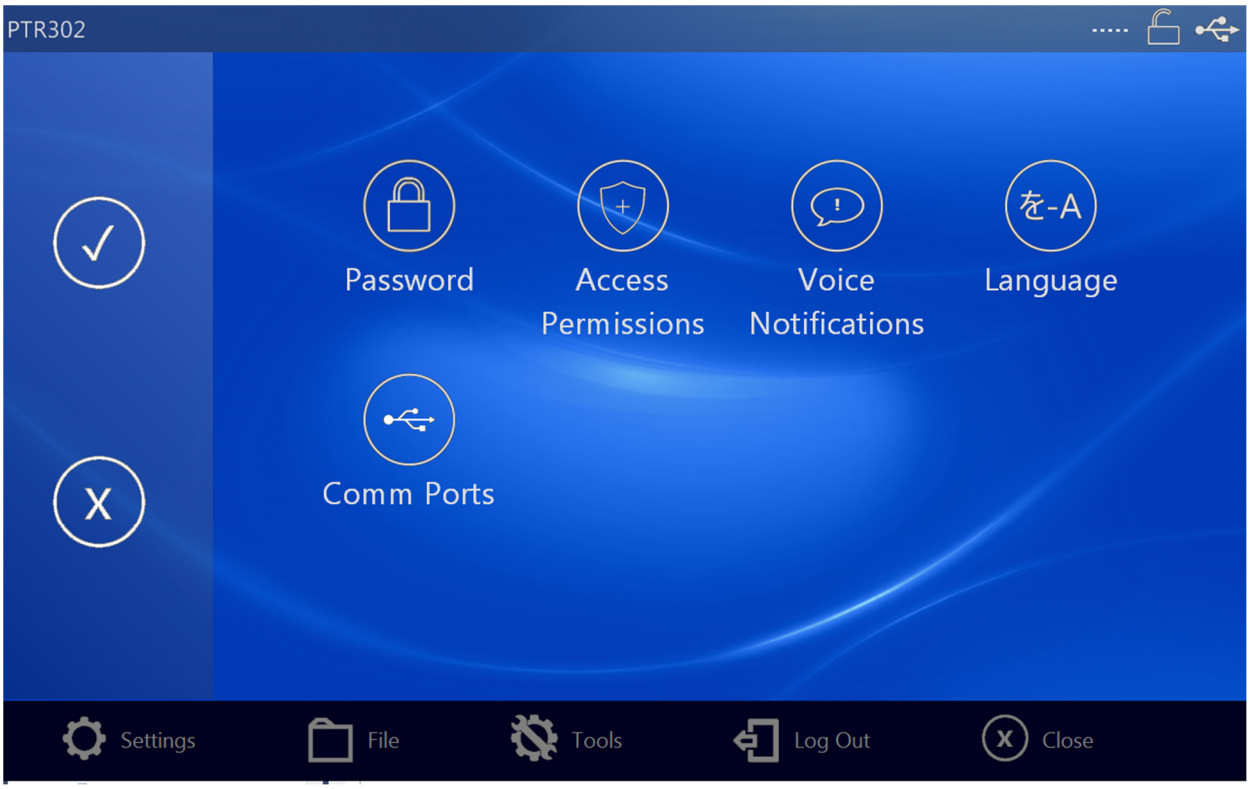


Figure 12 Toolbar – Settings Screen

From this screen the user can setup or enter a password, control user access permissions, enable or disable voice notifications, select the user interface language, view and manage communication ports.

4.7.3. Password

With a password, users can protect the controller and its files from unauthorized access / modification.

Passwords are recoverable from a configuration xml file so can be retrieved if lost or forgotten. The controller defaults to No Password, Full Permission enabled.

If a password has been setup and entered, the user can quickly log out using Log-Out from the toolbar.

A password is required (only if one has been set) to change Access Permissions. These permissions are the actual mechanism for protecting files and parameters.



Figure 13 Toolbar – Password Screen

If no password has been setup yet, the password is effectively an empty string. Touch the password box and press the enter key to continue. If a password has been setup, enter the password. Passwords can be any characters, any length and are case sensitive. Whenever an incorrect password is entered, a message appears to inform the user. The Password is in effect until the user touches Toolbar-Log-Out.

Once the correct password has been entered (in this case 1234), it can be changed by touching the Change Password text to continue.



Figure 14 Toolbar – Change Password Option

Touch the Enter New Password box and enter the new password, repeat in the confirmation box.

The password is in effect until the user touches Toolbar-Log-Out.

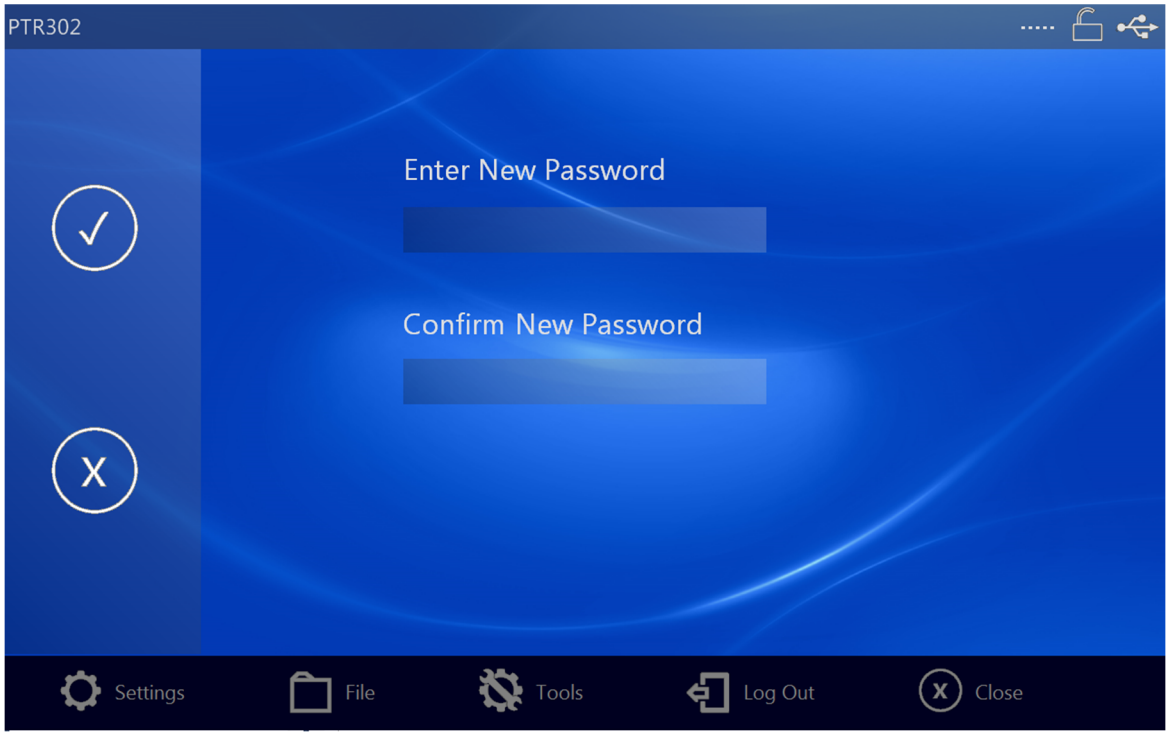


Figure 15 Toolbar – New Password Screen

4.7.4. Access Permissions

Tablet Controller can be setup to prevent unauthorized access of files and parameters which can be read-only or read-write in any combination. In addition, files can be saved as read-only and can only be overwritten by a user with Full Access Permission. Tablet Controller will warn the user when attempting to overwrite a read-only file. Tablet Controller defaults to No Password, Full Permission enabled. A password is required (if one has been set) to change Access Permissions.

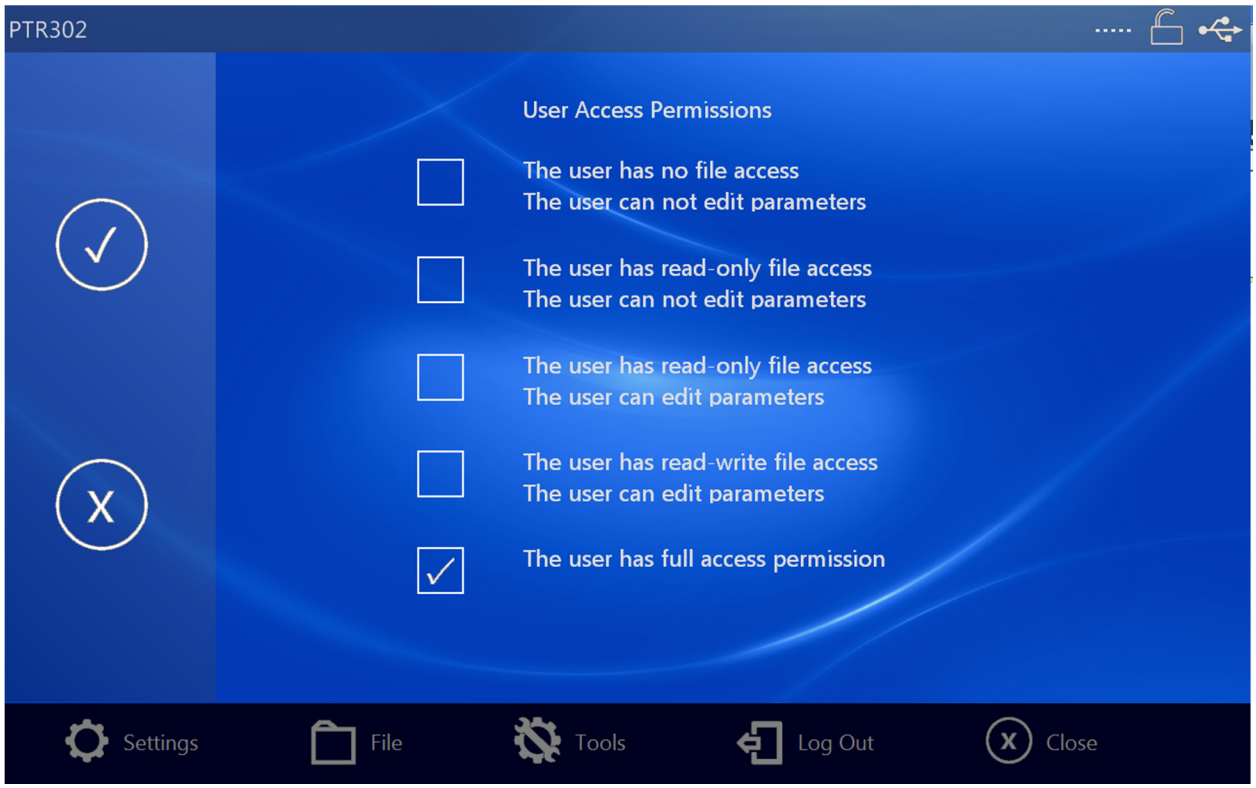


Figure 16 Toolbar – User Access Permissions Screen

The Access Permissions are self-explanatory except for Full Access Permission.

Full Access Permission allows full read-write access of parameters and files, the ability to change User Access Permissions and the ability to overwrite a file that has been saved as read-only. If a read-only file contains an error, it's possible to correct it. If a password has been setup, the user must enter it before being allowed to change User Access Permissions.

4.7.5. Voice Notifications

Enable audible notifications in spoken language when a process has begun and whether it completed successfully or failed. Voice notifications will attempt to load an appropriate Text-To-Speech (TTS) voice for the current language selection. This requires a suitable (TTS) Voice has been installed. Contact Thorlabs / Vytran for more details.

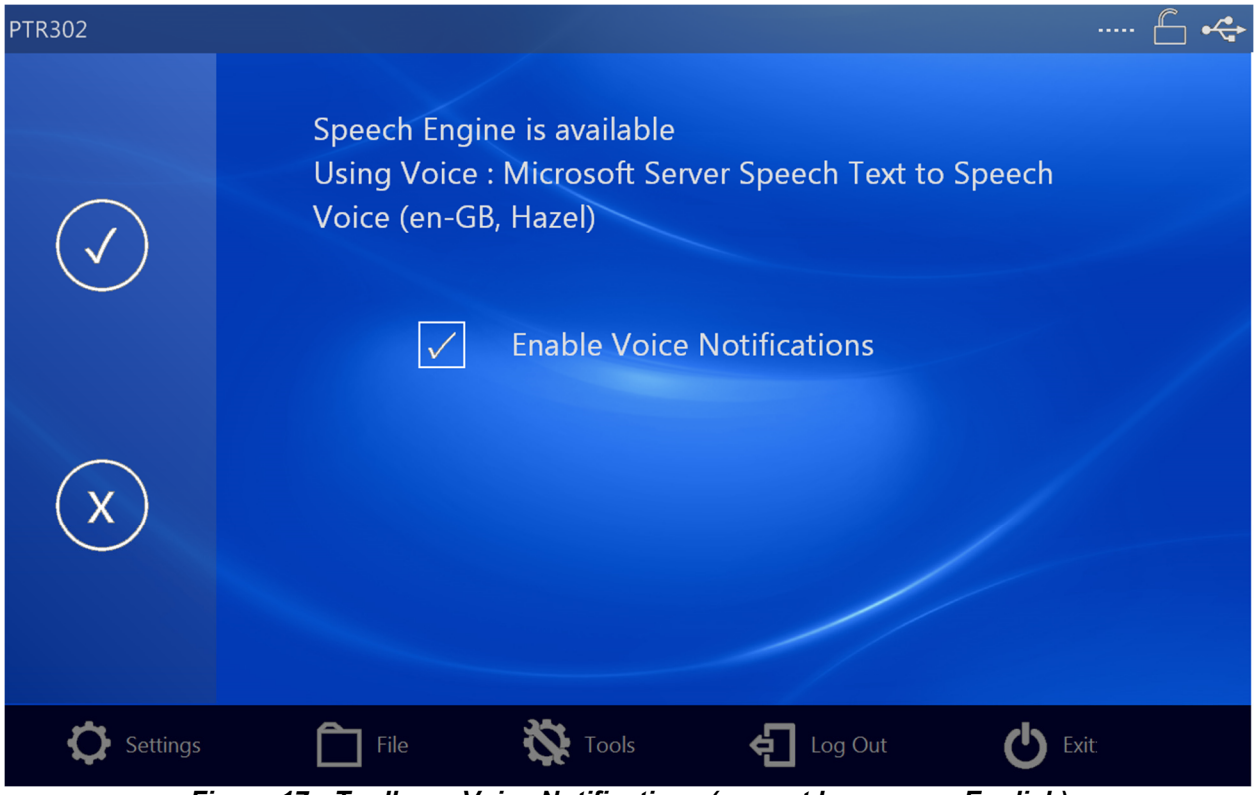


Figure 17 Toolbar – Voice Notifications (current language – English)



Figure 18 Toolbar – Voice Notifications (current language – Chinese)

4.7.6. Language

The user can select the preferred user-interface language. Language selection is independent of computer locale or computer language packs installed.

Complete translations are available in English, French and Russian and Chinese, more will be available in the future. In the event that a piece of translated text is missing, the controller will default to English for that text. Future translations are installed by simply copying a resource-only dll file into a sub-folder of VytranCX controller.



Figure 19 Toolbar – Language Selection

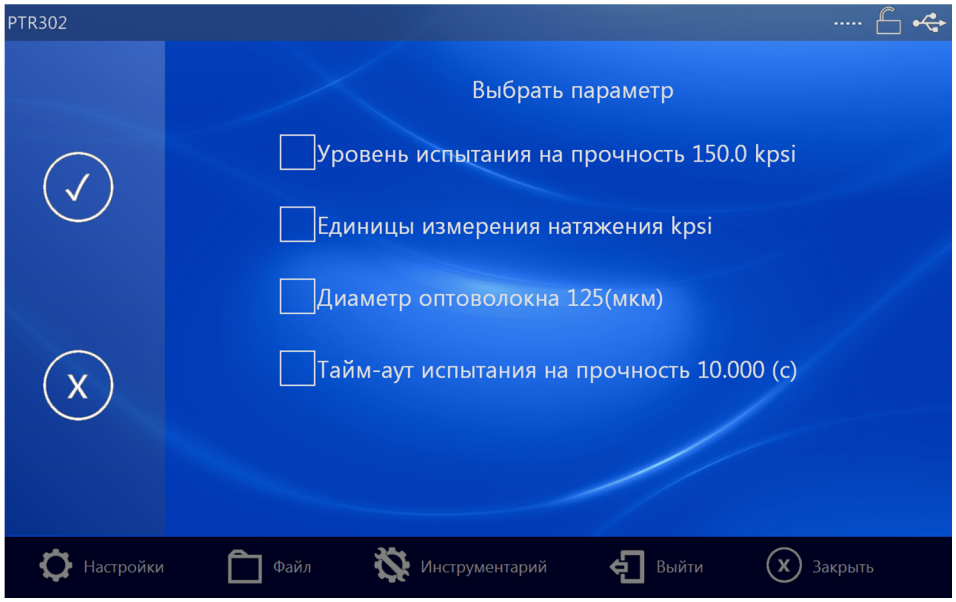


Figure 20 PTR Parameter Select in Russian

4.7.7. Comm Ports

The Comm Ports screen lists all communications ports detected by Tablet Controller which can be useful when fault-finding a missing connection. Tablet Controller will normally auto-detect the correct USB serial Comm Port to communicate with the module.

4.8. Files

Files are opened, saved or saved-as from Toolbar-File. The user is presented with those options. Note that if no file is open, selecting Save File will open the Save File As screen and the current machine parameters will be saved to the file specified. Open File and Save File As will open a file selection screen.

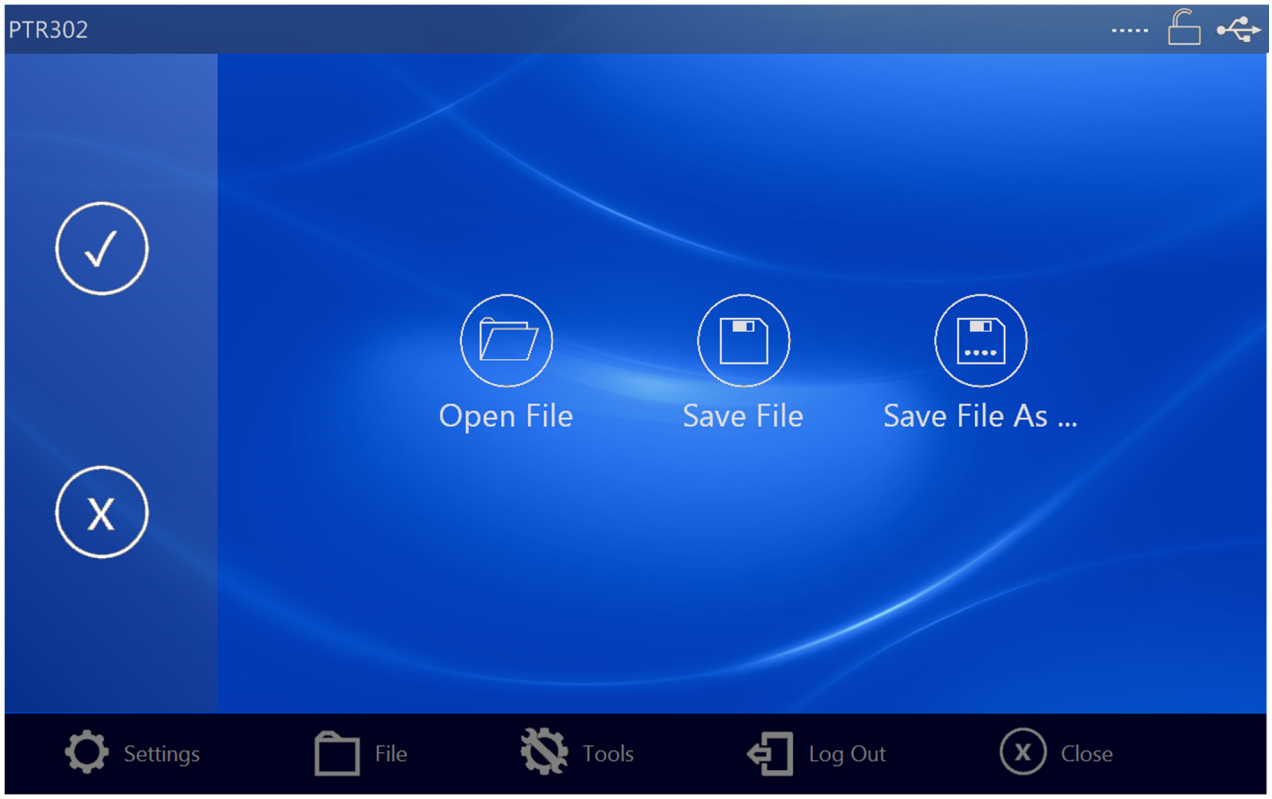


Figure 21 Toolbar – File Options Screen

4.8.1. Open File

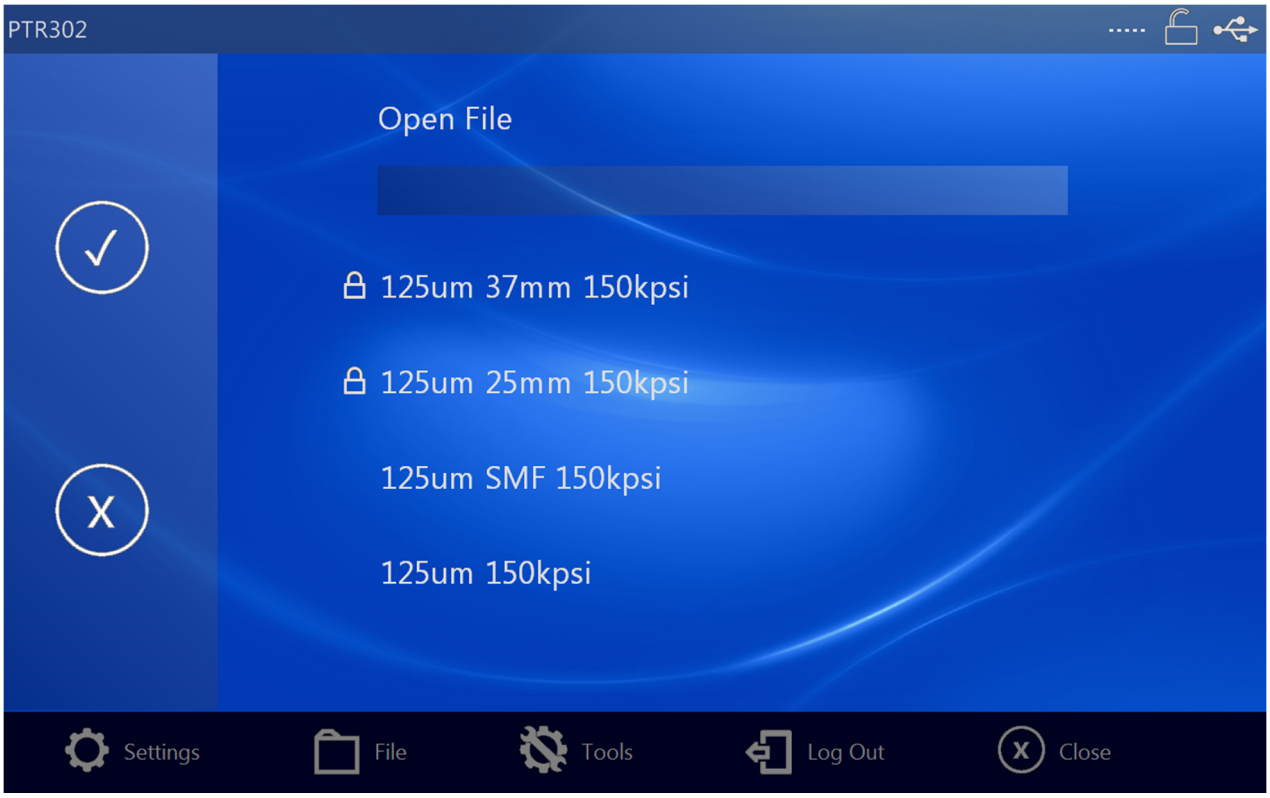


Figure 22 Toolbar – File Open Screen

In both File Open and Save File As screens, the existing files are listed in order of Most Recently Used (MRU). Any file that has been saved as a read-only file will display the small lock symbol next to the file name.

Only files specific to a particular type of Vytran equipment are displayed in the list. E.g., if the User is working with a PTR-RPT/203/302, only files suitable for that machine are accessible. Each machine type has its own dedicated folder and files can only be saved in that folder.

Touch the file in the list to select to it for opening. Swipe the list to scroll up or down.

4.8.2. Save File As

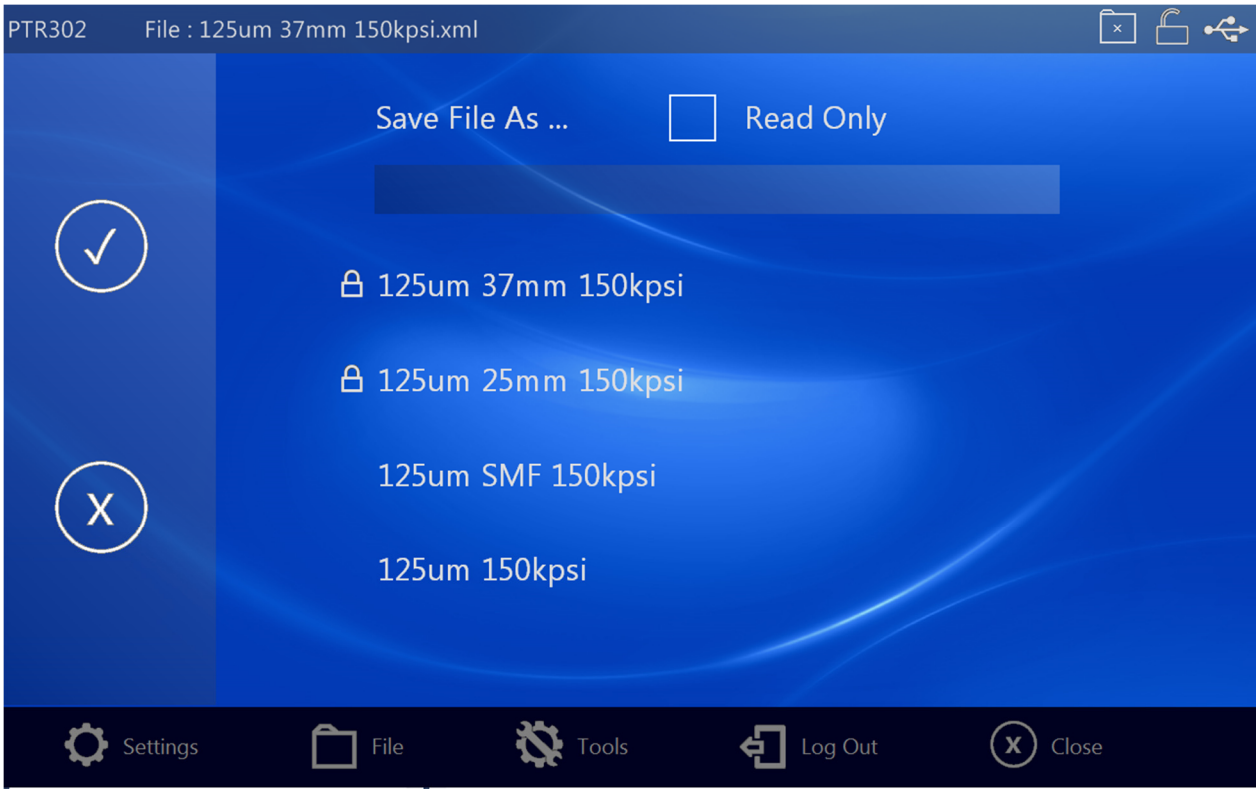


Figure 23 Toolbar – Save File As … Screen

To select an existing file to overwrite, select it by touching it in the list. Alternatively, type in a filename to create a new file. Files can be saved as read-only. A read-only file can be overwritten but only if the user has Full Access Permission. It might at first seem strange to be able to overwrite a read-only file, consider how frustrating it would be if files contained errors that were impossible to correct. The current machine parameters can always be saved to file using Save File As.

4.8.3. Save File

Save File instantly saves the current open file to disk. There is no Save File screen.

4.9. Tools

Each Vytran machine type has its own suite of tools, designed to simplify certain tasks. Some of the tools are common to multiple machine types, others are unique to just one. Touching Toolbar – Tools brings up the Tool Selection Screen.



Figure 24 Toolbar – Tool Selection Screen

The set of tools currently available for PTR302 include:

- Proof Test History
- Terminal Client (direct command language communication with PTR302)
- Version Information

4.9.1. Proof Test History

Whenever the PTR302 carries out a proof test, the Tablet Controller records when the test was carried out, the target tension and, if unsuccessful, the tension at which the fiber broke. Note that the tablet must be connected to the PTR for the proof test data to be recorded.

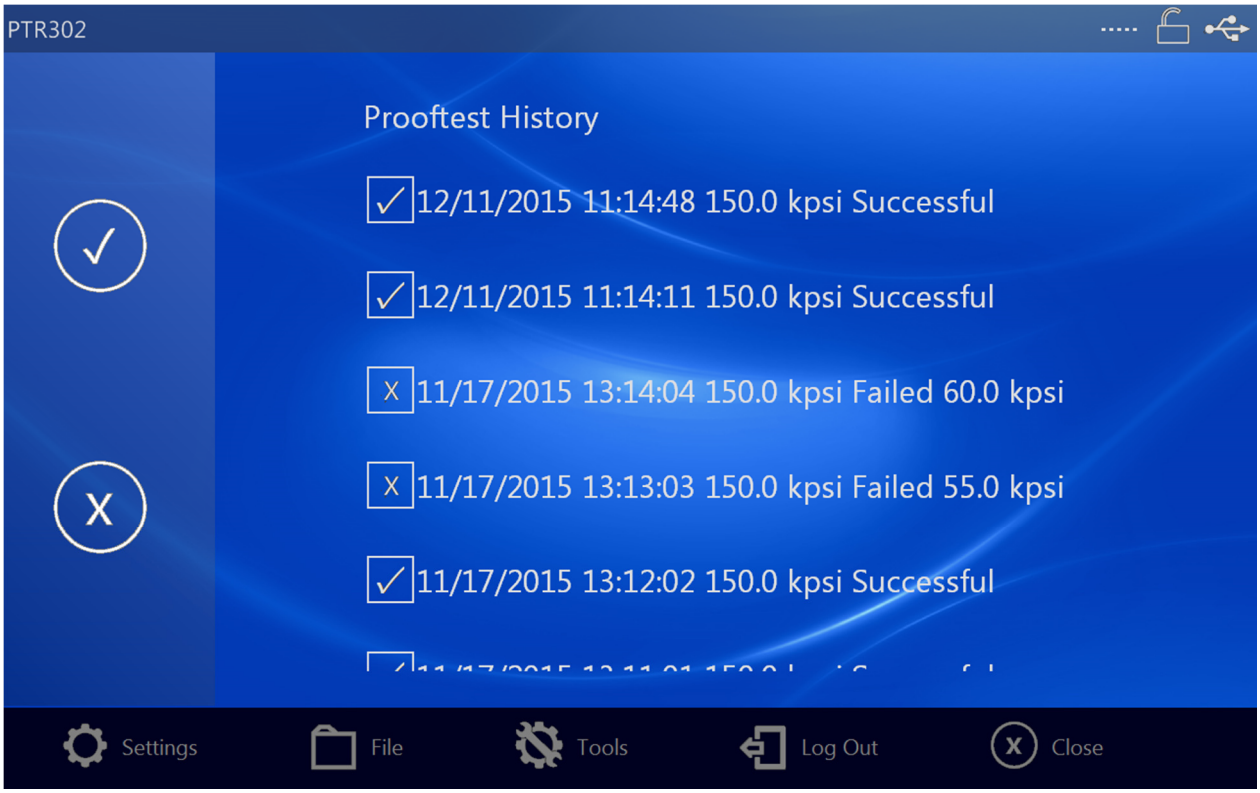


Figure 25 Tools – Proof Test History Screen

4.9.2. Terminal

The Terminal Screen provides a box (top left) where a command can be entered for transmission. Below that is a list of the most recent commands sent. Touch a command in the list to select it for re-transmission. On the right is the received communications traffic.

Terminal is available for all module types.



Figure 26 Tools – Terminal Screen

4.9.3. Version

The Version Screen provides information regarding the firmware and, if applicable, the macro and setup version installed in the module.

4.10. Log Out

When the user enters a password, the user is considered 'logged in' with full access permission. The Log Out button provides a quick method of returning to the normal access permission level. If no password has been setup, the Toolbar-Log Out button is permanently greyed. If a password has been setup, the Toolbar-Log Out button is enabled whenever the user has 'logged in' by entering the password.

4.11. Exit / Close

In the default Home Screen, the final toolbar button displays Exit. This will close the Application. When the Tablet is connected to a Vytran module, the button displays Close, this allows the user to return to the default Main Screen so the Tablet can be connected to a different Vytran module.

Chapter 5 Proof Test Process

The proof test station of the PTR302 can be used to determine the breaking strength of an optical fiber or to ensure that a fiber or fusion splice 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 the right hand mandrel. 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 units of load or tension.

5.1. Position the Fiber for Proof Test

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.

Note: Do not use the Proof Tester/Tension Tester while curing a recoated splice.

Press and hold down the buttons on top of the mandrels to open the mandrel clamps. Position the fiber under the clamps such that the splice region or section of fiber to be tested is centered between the mandrels. Release the buttons to hold the fiber in position. Re-check that the splice is centered between the mandrels. Wrap the fiber once around each mandrel, ideally near the center of the rubber grip. Make sure not to overlap the fiber under the clamp as this could cause local stresses that may weaken or break the fiber during the proof test. When properly loaded the fiber should be taut with minimal slack between the mandrels. Note: The proof test reading will not be affected by any residual tension left in the fiber after loading.

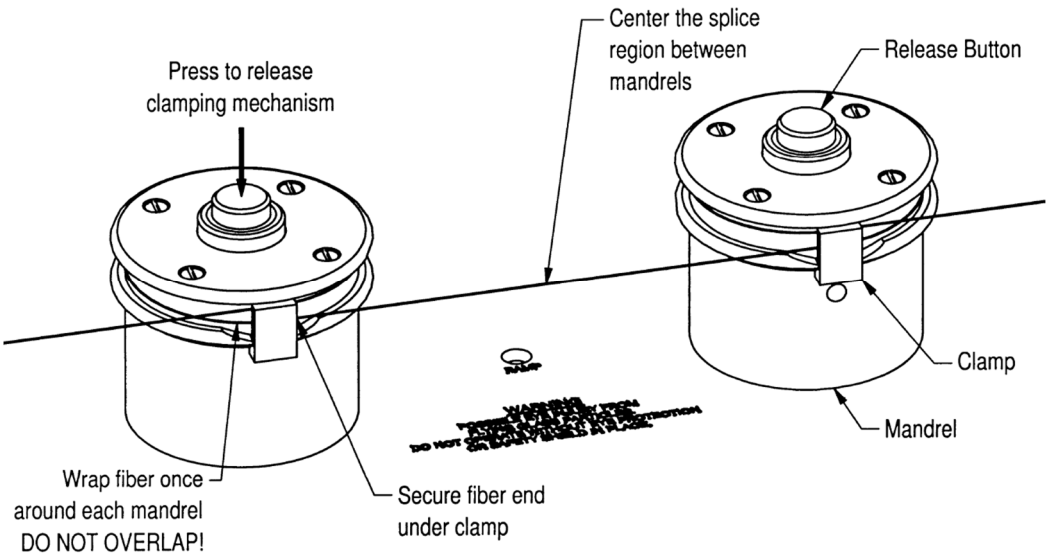


Figure 27 Load Fiber for Proof Testing

5.2. Proof Testing

Configure the PTR302 to proof test to the desired level as described in 4.2.

WARNING

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 Proof Test parameters.
2. Load the fiber to be tested.
3. Make sure the safety shield is in place and that you are wearing safety glasses.
   Note: Anyone observing the test should also take precautions against flying glass particles.
4. Press the **Test** button to initiate the proof test cycle.

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.

5.3. Adjusting Ramp Rate

The Ramp Rate is the rate at which tension to the fiber is applied during a Proof Test / Tension Test. This rate can be adjusted through the Ramp Screw as shown in Figure 28. To decrease the Ramp Rate turn the Ramp Screw clockwise; to increase the Ramp Rate turn it counterclockwise.

WARNING

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.

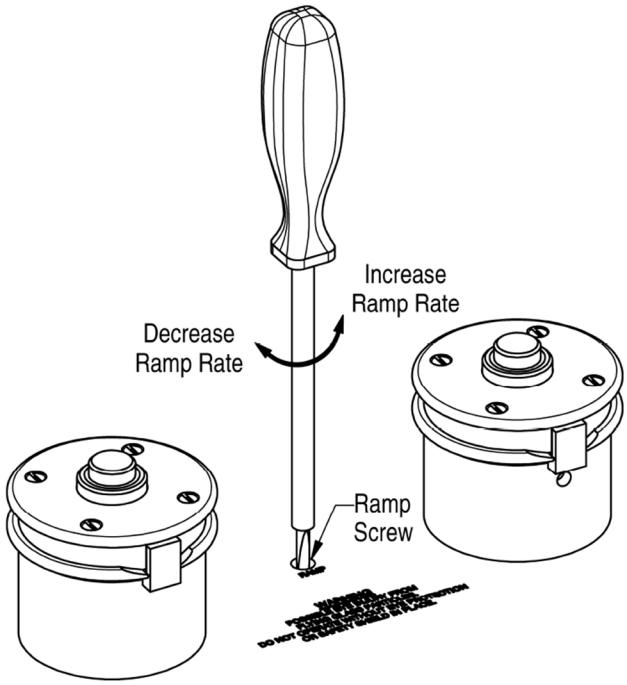


Figure 28 Adjust the Ramp Rate

The procedures for adjusting the Ramp Rate are as follows:

1. Set the desired proof test level Peak Tension (see 4.2).
2. Make sure the proof test timeout is set for 10 seconds or greater.
3. Load a piece of test fiber onto the proof test mandrels (see 5.1).
4. Make sure the safety shield is in place or wear safety glasses.
5. Initiate the Proof Test by pressing the Test button.
6. Note the time it takes for the desired proof test Peak Tension level will be reached starting from when the right hand mandrel just starts to rotate. The Peak Tension should be reached in approximately 5 seconds. Adjust as necessary.

Chapter 6 Maintenance

The purpose of the maintenance section is to define the planned maintenance requirements of the PTR302. Where appropriate maintenance procedures are included.

6.1. Planned Maintenance

The PTR302 proof tester is designed for a production environment to give trouble free operation provided normal planned maintenance is adhered to. Maintenance and repair procedures should only be performed by trained personnel. Improper service and/or repair could result in the safety features being disabled and can also lead to damage that will not be covered under warranty.

Planned Maintenance Schedule

Maintenance	Every Cycle	Every Shift	Daily	Monthly	3 Months	12 Months
Replace Proof Test Grips						✓
Check Proof Test Calibration / Recalibrate						✓

6.2. Replace 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. After replacing the proof test grips, a calibration check should be performed.

6.3. Check Proof Test Calibration / Re-Cal

It is recommended that the PTR302 be returned to Thorlabs annually for calibration check and/or recalibration. A calibration fixture is available for customers who prefer to perform this function in-house.

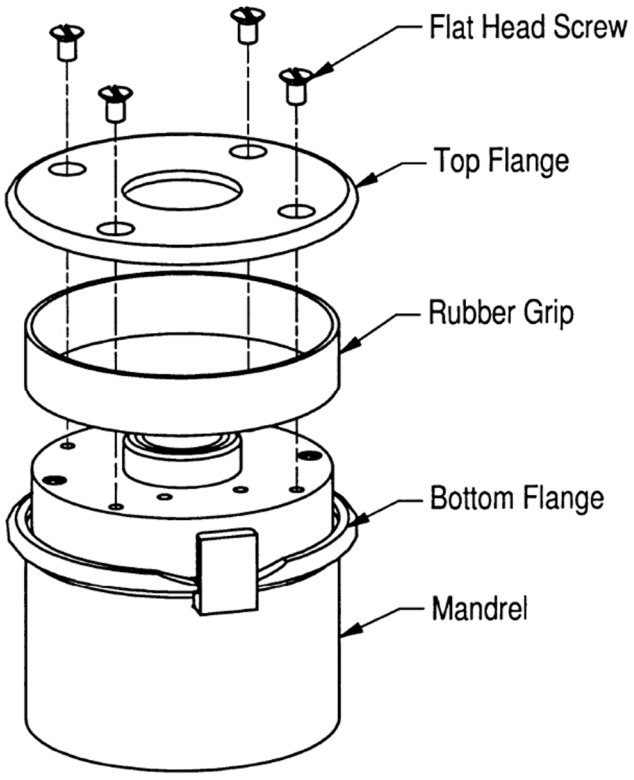


Figure 29 Replace Proof Test Grip

Chapter 7 Trouble Shooting

7.1. Proof Test 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 Thorlabs for replacement proof test grips and replace as described in “6.2 Replace Proof Test Grips.”
Tension levels appear unusually 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 setting for the current fiber diameter. (See “4.2 Controlling the PTR302”.)

Chapter 8 Specifications

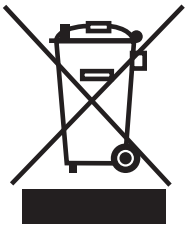
Specifications	
Proof Tester Type	Rotary
Load Mechanism	Ø2" (50.8 mm) Rotating Mandrel[1]
Fiber Spacing	5" (127 mm)
Minimum Fiber Length	17" (432 mm)
Maximum Load	89 N (20 lbs) >800 kpsi (5.5 GPa) for a Ø125 µm Fiber
Accuracy	±2%
Ramp Rate[2]	Manual, ≤22.2 N/s (5 lbs/s)
Display Units	lbs, kg, N, kpsi, and GPa
Dimensions (L x W x H)	10.14" × 5.85" × 7.27" (257.4 mm × 148.5 mm × 184.5 mm)

[1] Check the minimum short-term bend radius of the fiber to be tested to ensure its compatibility with the Ø2" mandrel.
[2] The ramp rate is the rate at which the load is applied to the fiber.

Chapter 9 Regulatory

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

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



Wheelie Bin Logo

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

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

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

9.1. Waste Treatment is Your Own Responsibility

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

9.2. Ecological Background

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

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

Chapter 10 Thorlabs Worldwide Contacts

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