Version: 1.1

VIEW400

User Manual

Optical Time Domain Reflectometer

Please read this manual before starting to use the equipment

Please keep this manual with the equipment

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Preface

Safety Symbols

In order to prevent personal injury and loss due to the misoperation of the instrument, **INNO Instrument** uses the following safety signs to indicate relevant safety information. Before using the instrument, be sure to clearly understand the meaning of these signs.
Some or all of the signs may not be found on the instrument. In addition, safety signs of the device may not be marked in the illustrations of this manual.

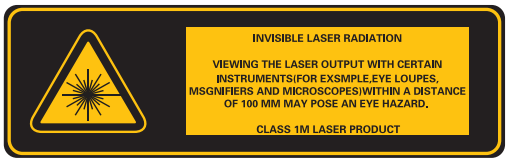
Safety Signs used in the Manual

Sign	Description
Dangerous ⚠	This sign indicates that this is a very dangerous operation, and improper operation will lead to serious injury and even death.
Warning ⚠	This sign indicates that this is a relatively dangerous operation, and improper operation will lead to serious injury and even death.
Caution ⚠	This sign indicates that this is a relatively dangerous operation, or has a certain harm and improper operation due to carelessness will lead to mild or serious injury and loss.

Safety Signs used in the Manual and Machine:

The following safety signs are marked in the device, near the operation position, or in the manual to provide relevant safety information and prompt the user to operate with care. Before using the instrument, be sure that you have clearly understood the meaning of these signs and take necessary precautionary measures.

Sign	Description
⊘	This sign indicates a forbidden operation. This circle with a slash is labeled on the operation position or near it.
○	This sign means that you must be careful when performing a certain operation. This circle sign is labeled on the operation position or near it.
△	This sign indicates a warning and caution. Relevant content appears inside the triangle or near it.
□	This sign indicates an explanation. Relevant content is listed in the box
♻	These signs indicate that the labeled components should be recycled.



Laser Safety Labels

Electrical Safety

In order to reduce damage to instrument and injury even death of human body, the following warnings are given:

- Do not use if the instrument or the external charger was damaged or ruptured
- Only the external power adapter provided by our company can be used. For other external power adapters, we cannot guarantee their performance and safety
- Do not use the power adapter outdoors or in humid places
- e sure that the external input voltage is within the allowable range

Precautions

⚠ Caution

Replace internal memory battery: This instrument uses a lithium battery as the power supply. If it exceeds the maximum service life and needs to be replaced, please contact specialized personnel for replacement.
External memory: This device uses USB as external memory to save data

INNO Instrument (China) Inc. is not responsible for data loss

Chapter 1 Overview

1.1 Introduction

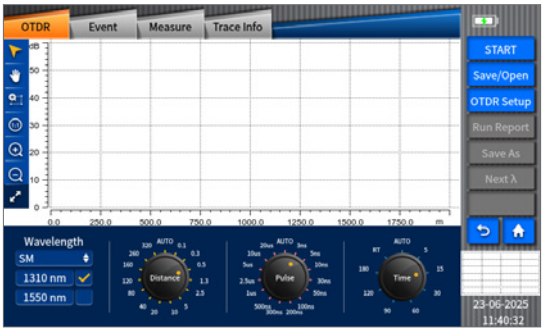
High-performance hardware and wieldy software used in VIEW400 can shorten the process of installation, debugging and fiber distance maintenance. This chapter will describe the features and basic operations of VIEW400 OTDR test unit.

1.2 Basic function

View400 is mainly used for fiber fault diagnosis, especially in FTTH application. Besides the basic OTDR function, optical power meter and light source function for fiber discriminating are also internally installed.In addition.

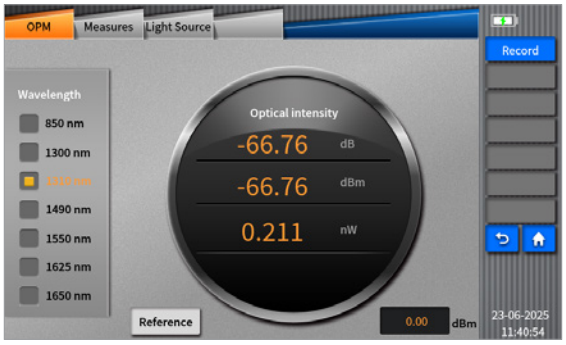
OTDR Test

Based on Rayleigh scattering and Fresnel Reflection principle, OTDR can realize the relevant measurement on optical fiber link. It can also carry out distance measurement to fiber connection loss and fault location, thus it can determine the any point loss on the optical fiber. OTDR auto analysis function can automatically analyze measured traces to find the events on fiber, such as the reflection loss or the splicing point over loss threshold limit. Besides, the detected data can be also displayed in the event table on OTDR.



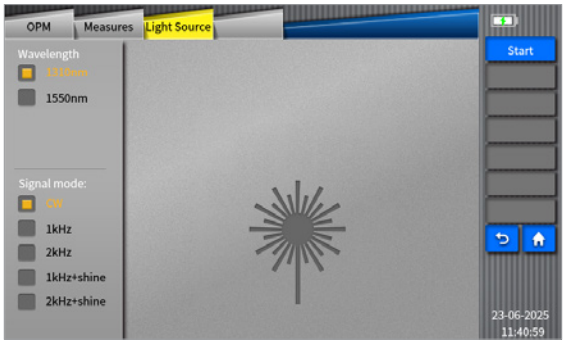
OPM/LS module

The optical power meter is used to measure absolute optical power meter or relative optical power loss through a span of optical fiber. This module can measure optical power of multi-wavelength.



LS (Stable light source)

Light source with different wavelengths (i.e. 1310/1550nm) and multiple signal modulation modes in-built in View400 are able to satisfy demands in actual applications, as shown in the following picture.



Fiber microscope (Fiber Inspection Probe) module

The grind quality and cleanliness of optical connector can be detected by being connected external fiber inspection device to USB port.

1.3 Standard Configuration

- Capacitive touch 5inch，800×480，color LCD
- AC adapter/charger, power cord
- Rechargeable lithium battery pack
- Basic menu operation
- Operation Manual
- Protective Case(Primarily used for transportation and storage, not for carrying during operation.)

1.4 Power supply

- AC/DC adapt：Input：100V~240V,50/60Hz,1.5A
- Input：19V,3.42A,lithium battery：7.4V，4300mAh

1.5 Dimensions and weight

- Size: 172mm×111mm×64mm
- Weight: ≤795g

1.6 Environmental conditions

- Operating environment: Temperature: --10°C~+50°C
- Storage environment: Temperature: -40°C~+70°C

Chapter 2 Installation

Usage Category and Installation:
This device is classified as a Mobile Device according to FCC radiation exposure regulations. It is designed to be operated on a stable horizontal surface (such as a desk or a specialized workbench) or fixed on a tripod.
It is NOT intended for handheld use or to be worn on the body during operation.

2.1 Safety reminder and precautionary measures

It is very important to keep in mind that VIEW400 is designed for fiber testing, not for any other purpose. OTDR is a high precision instrument and should be carried with great care. Therefore, please always observe the following safety rules and general specifications when using and carrying the VIEW400. Failure to take these safety measures or to comply with the warnings and precautions described elsewhere in this manual will violate the safety standards for the design, manufacturing and use of OTDR. Consequences due to violations of these requirements will be assumed by users!

2.2 Safety warnings for operation

① Do not operate the OTDR in a flammable or explosive environment.
② Do not disassemble or assemble any component of the OTDR without authorization except for the components stated in this manual that are allowed to be replaced by the user. Component replacement and internal adjustment can only be performed by authorized maintenance personnel.
③ Be careful when connecting the battery charging adapter cable. Do not pull the cable when removing it from the socket, but hold the plug. Be sure that the cable is in good condition to avoid the risk of fire or electric shock.
④ Do not expose the OTDR to fire, electric shock, rain, or humid environment.
⑤ When the OTDR encounters the following situations, please turn it off immediately and pull the adapter out of the power input port of OTDR. Otherwise, it may lead to serious consequences, such as the abnormal function of the OTDR or damage beyond repair.
★ Fumes, peculiar smell, or abnormal sound.
★ Liquid or foreign matters enter inside the OTDR.
★ OTDR suffers from strong vibration or impact.
Please contact the maintenance center immediately in case of the above faults. If the OTDR is in a fault state without taking timely measures, it may lead to device scrap, electric shock and fire, as well as personal injury (even death).
⑥ Please use the exclusive VIEW400 AC adapter only. Inappropriate AC power supply may lead to fumes, electric shock and device damage, and even fire, personal injury or even death.
⑦ Please use the exclusive AC power cord only. Do not place heavy objects on the power cord, and do not heat the power cord or change the power cord. An inappropriate or damaged power cord may lead to fumes, electric shock and device damage, and even fire, personal injury or even death.

2.3 Transportation and storage

① When the OTDR is transported to a warm environment from a cold environment, try to adopt the gradual heating mode, otherwise condensation will be produced inside the instrument, leading to adverse effects on the instrument.
② Please pack the device properly when OTDR is not in use.
③ Keep the OTDR clean and dry.
④ The OTDR has been precisely calibrated and adjusted. The instrument should be transported in its original case to prevent damage.
⑤ Please avoid direct sunlight or overheated environment.
⑥ Keep the minimum humidity when stored. Relative humidity should be less than 95%.

2.4 Appearance overview

Front Panel

Description of keys	
Power	Switch (on / off)
MENU	Back to main menu interface
START	Start/Stop measuring
ESC	Back to previous menu

The upper connect panel

Port description	
DC power connector	Connect the adapter.
SMF port	VIEW400 testing interface, applied in OTDR and light source modules of VIEW400.
OPM port	Optical power meter port.
USB port	Connect USB storage device with fiber end probe.

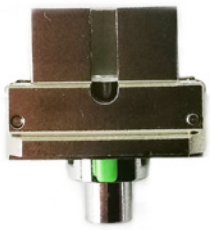
2.5 Charging method

Remaining battery capacity can be checked according to the battery status when VIEW400 is powered on.

2.6 Test port

The measurement port of VIEW400 is located on the upper panel of the host. There will be 1 or 2 measurement ports depending on the type of VIEW400. The measurement port connected to optical fiber depends on the testing application and measured wavelength. The following are mixed universal connectors FC/SC used in VIEW400:

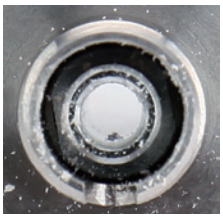
FC



SC

Steps for cleaning the universal connectors are as follows:

1. Open the cover of the measurement port which needs to be cleaned
2. Take down the universal connector
3. Blow compressed air toward the top of connecting bar
4. Use a special cleaning belt or dust-free belt dipped in alcohol to clean the top of connecting bar
5. Use compressed air to blow-dry the top of connecting bar
6. Options: turn off VIEW400, and observe the top of connecting bar by microscope or magnifying lens



Top of the contaminated connecting bar

Top of the cleaned connecting bar

2.7 Connection testing

Connect the test fiber

Measurement port is used to connect the tested fiber of OTDR/OPM/LS application.
Steps for connecting the tested fiber to the measurement port:

1. Clean the fiber jumper and connect it to the measurement port.
2. Clean the fiber to be tested
3. Connect the fiber jumper with the tested fiber.

Connect fiber inspection probe (fiber microscope)

Connect with external fiber end inspection probe from USB interface. Follows are the process to connect the visual light source:

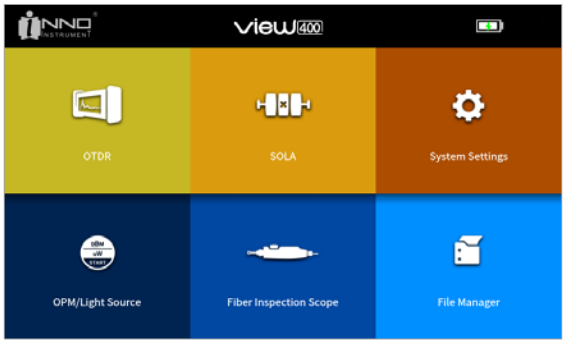
- Open the cover of USB port.
- Connect fiber jumper into the connector of microscope.

Chapter 3 Basic Operation

3.1 Power on/off

Power on:

Press the power key, the name of the device will appear on VIEW400 screen, and then the boot screen of INNO Instrument will appear. Later the following main menu screen will appear.



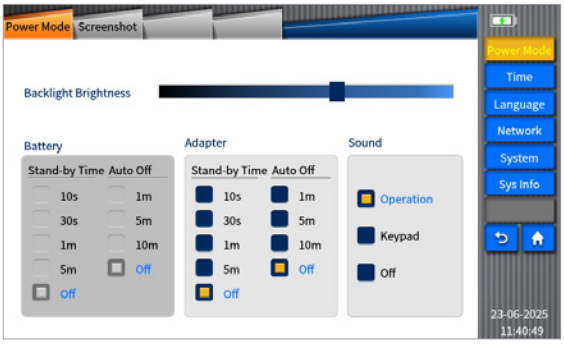
Power off:

Press and hold the power key until the screen of shutdown appears (grey logo).

Note: Under any circumstance can you press and hold the power key more than ten seconds to force shutdown.

3.2 Adjust the backlight brightness

Click the icon of backlight brightness to switch the backlight brightness. Different color icons represent different levels of the brightness. VIEW400 series supports eight levels of brightness switching.

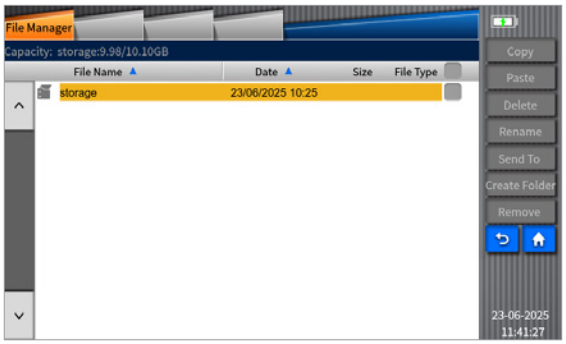


3.3 Software upgrade

Please refer to Section 10.3.5 for detailed information.

3.4 File copy

As shown in the following figure, plug in the external storage device, view the path of the external storage device in "file management", and then execute operations of "copy", "paste", "delete", "rename", "send to USB", "new folder", "remove device" for the file;



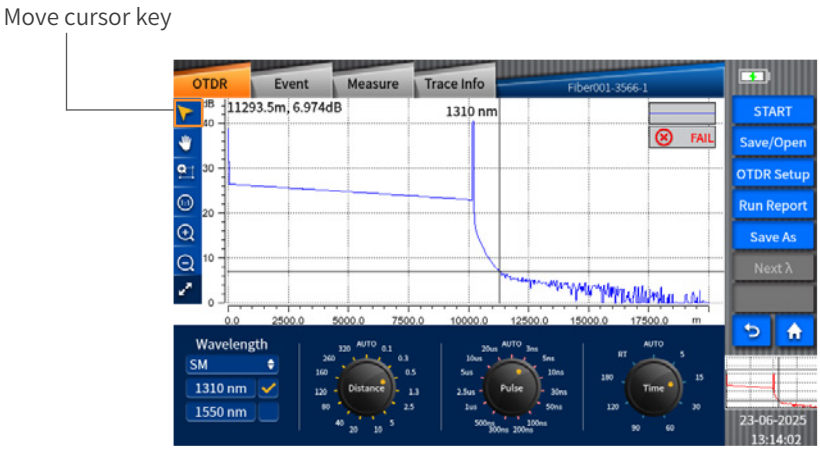
Chapter 4 OTDR Module

The modules used in this device are interchangeable as needed. The OTDR module should be loaded at first before OTDR function is enabled. If not, a pop-up message will appear on the screen, as shown in the following picture:

1. Move cursor key
2. Move trace key
3. Partial amplification key
4. “1:1” trace recovery key
5. Shortcut key for Trace amplification
6. Shortcut key for Trace shrink
7. Full screen display key
8. Boxes for selecting wavelength
9. Parameter setting key
10. Return key
11. Home key
12. Nextλ key
13. Save as key
14. Create report key
15. OTDR setting key
16. Save/Open key
17. Start/stop key
18. Trace information key
19. Measurement key
20. Event key
21. OTDR key

4.1 Move cursor key

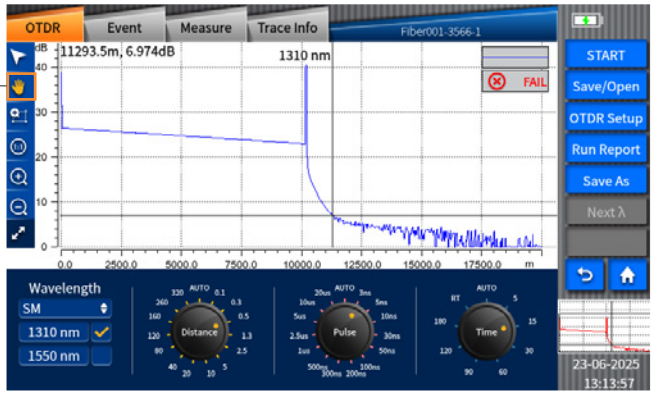
After Clicking the Move cursor key, you can change the position of the cursor on the screen by touching on the trace.



4.2 Move trace key

Click the key for trace moving; you can move the amplified trace by touching on the screen.

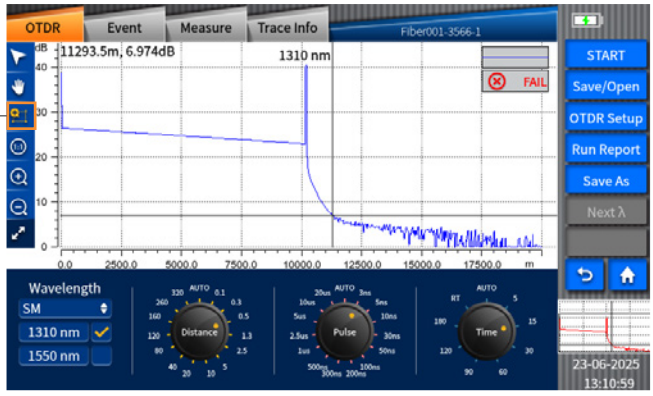
Move cursor key



4.3 Partial amplification key

Click “partial amplification” key and then click the screen to select the area of trace displayed. This area will be amplified and displayed on “trace display small screen interface”.

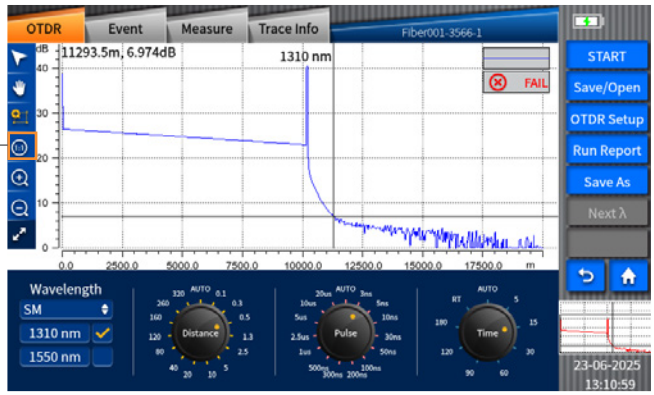
Partial amplification key



4.4 “1:1” trace recovery key

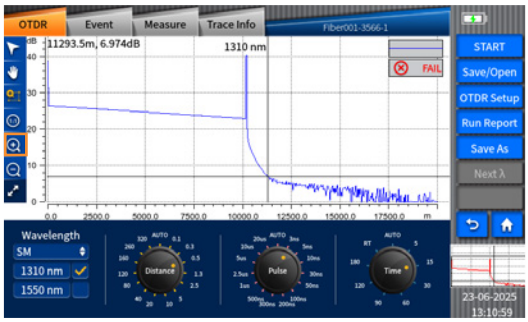
As shown in the following picture, after zooming in or out the trace, click “1:1” trace recovery key to reset the trace.

“1:1” trace recovery

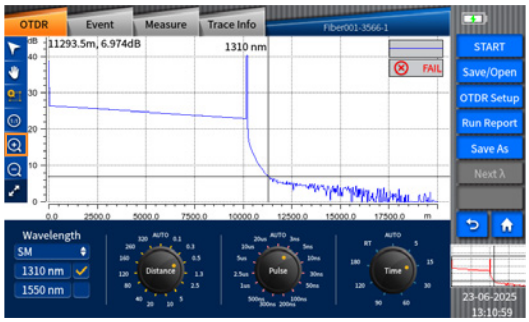


4.5 Shortcut key for trace amplification

Click the “Move cursor” key or “Move trace” key and then click the “Trace amplification” shortcut key to zoom in the trace horizontally. (Picture1) Click the “Partial amplification” key and then click the “Trace amplification” shortcut key to zoom in the trace vertically. (Picture2)



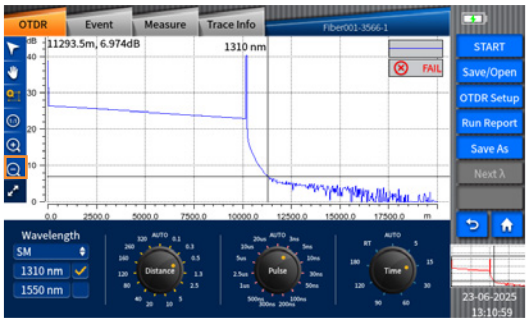
Picture 1



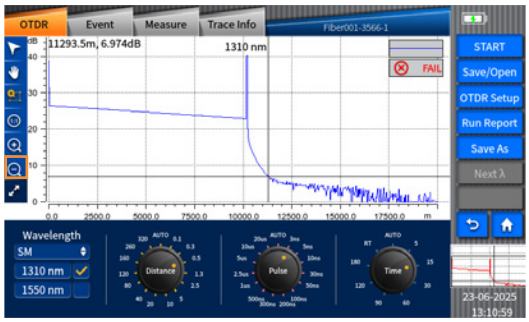
Picture 2

4.6 Shortcut key for trace shrink

Click the “Move cursor” key or “Move trace” key and then click the “Trace shrink” shortcut key to zoom out the trace horizontally. (Picture1) Click the “Partial ampli- fication” key and then click the “Trace shrink” shortcut key to zoom out the trace vertically. (Picture2)



Picture 1

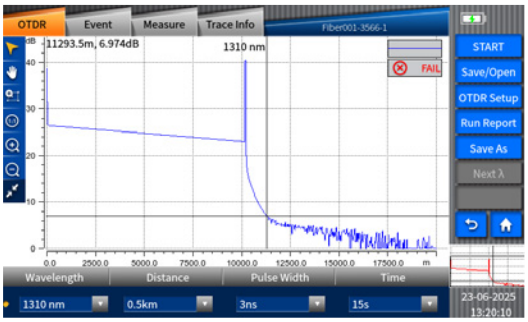


Picture 2

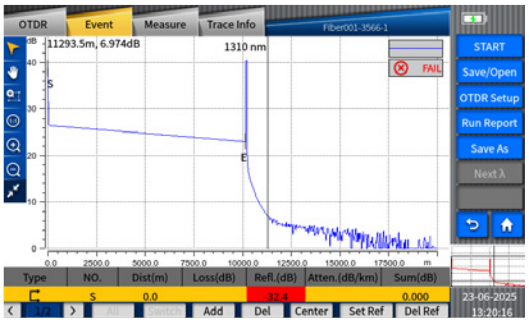
4.7 Full screen display key

Click the “Full screen display” key to display the trace in full screen, where the OTDR, event, measurement, and trace information are shown. Click this key again to revert the screen to the previous one.

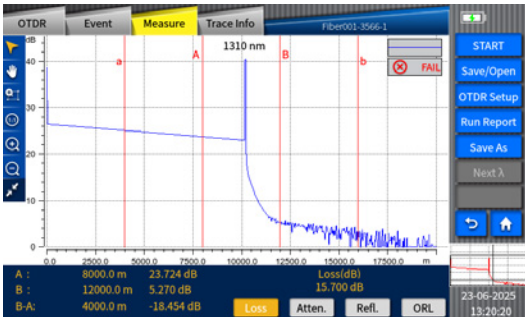
The OTDR menu is shown as follows:



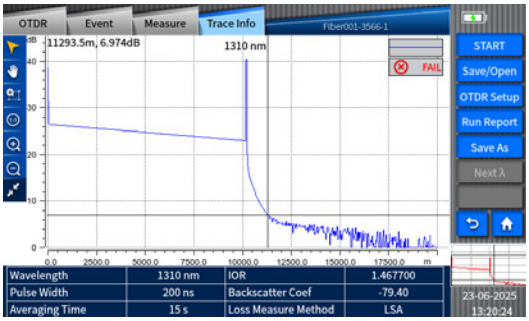
The Event menu is shown as follows:



The Measurement menu is shown as follows:

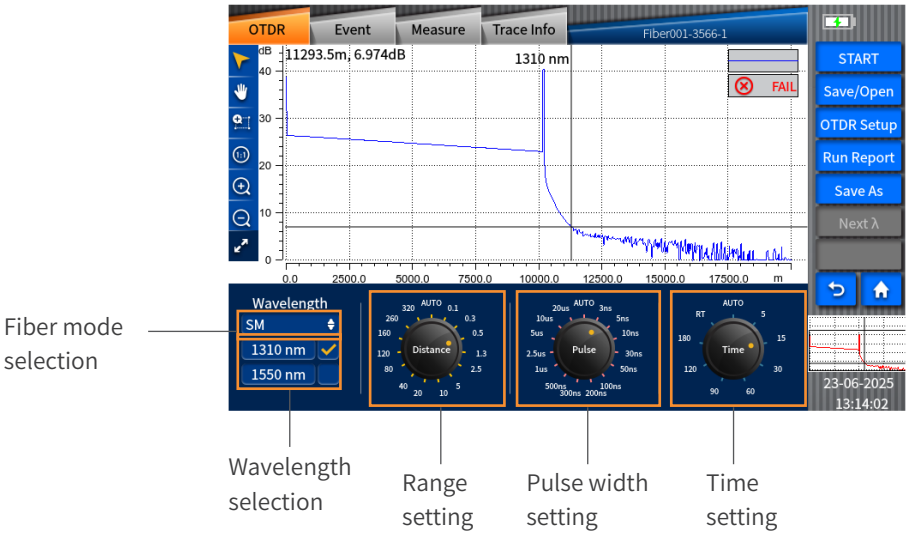


The Measurement menu is shown as follows:



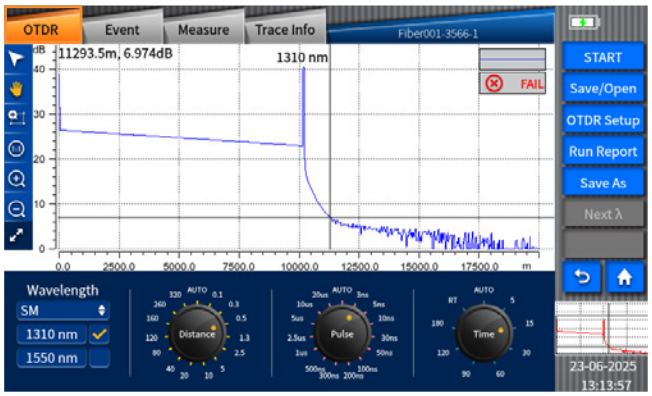
4.8 Parameter setting key

The wavelength, distance range, pulse width and average time can be set on the interface of measurement parameter setting.



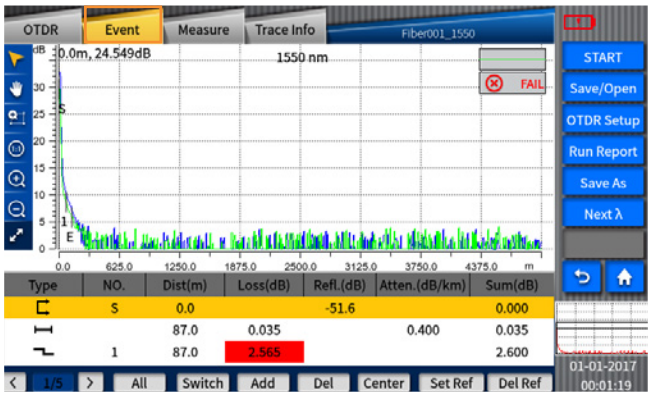
4.9 OTDR key

As shown in the picture, click “OTDR” to enter into OTDR measurement setting interface.



4.10 Event key

As shown in the picture, enter into the event interface by clicking “Event” key. The information of events such as Type, Number, Location, Loss, Reflectance, Attenuation and cumulative loss (Sum) can be shown.
Please refer to Section4.11.1 for “Loss”. Please refer to Section4.11.3 for “Reflectance”. Please refer to Section4.11.2 for “Attenuation”.
Cumulative Loss (Sum): It refers to the total loss from port of OTDR to a certain point.
Event loss+ fiber span loss= cumulative loss



In the “event” menu, there are some functions in it, such as “move the event point”, “change the event point”, “add”, “delete”, “maximize”, “set Ref”, “delete Ref” and so on.
1)The function of moving the event point is to move the mark line to a certain event point.
2)The purpose of changing the event point is to view the specified measured data in detail by taping the arrow keys left or right.

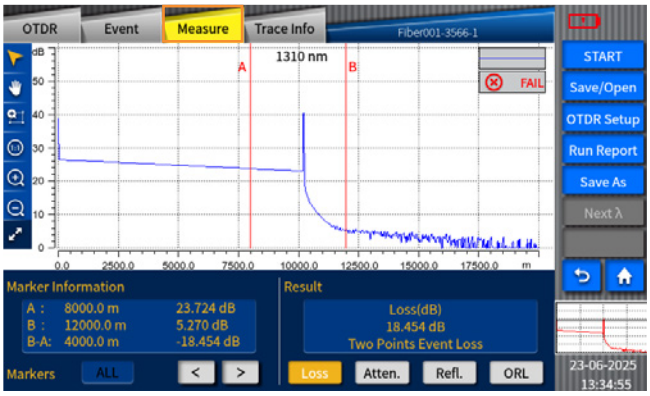
3)“Add” is used to insert event point in the selected position on the trace.
4)“Delete” is used to delete the inserted event point.
5)“Maximize” is used to amplify the event trace.
6)“Set Ref” is used to reset a starting point. All the data will be measured through the new set point. (“Reference starting point” can only be set between original point and event point. If there is no event point after original point, the starting point can’t be set.)
7)“Delete Ref” is used to delete the starting point that had been set.

Note：Types of events are shown in the following table.

Event type	Event icon	Brief description
Start point of cross segment		Start point of fiber (generally the first event point)
End point of cross segment		End point of fiber (generally the last event point)
Continuous fiber		It indicates that no fiber end is found at the sampling end, and the sampling points are insufficient
End of analysis		Impulse light intensity is inadequate, so the analysis stops halfway
Non-reflection event		Events such as "loss"
Reflection event		Reflection event
Gain event		Gain phenomenon appears, generally regarded as pseudo gain
Fiber span		Fiber span without any event
Combination of reflection events		Multiple reflection events appear together
Echo		Echo phenomenon appears
Reflection event (possible echo)		Possible echo phenomenon
Macrobending event		Attenuation due to fiber bending

4.11 Measurement

As shown in the figure, enter the measurement interface by clicking the "Measurement" key.

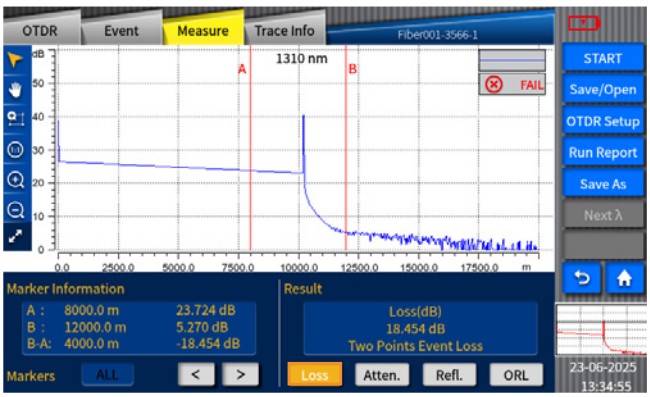


In the measurement interface, click on the letter to switch “Mark line”, which can be moved by pressing on “<”、“>”keys or touching manually. The loss and loca- tion of the Mark line will be displayed under the “Mark Line Information”, while the loss, attenuation, reflectance and ORL (Optical return loss) will be displayed under the “Result”.

Loss

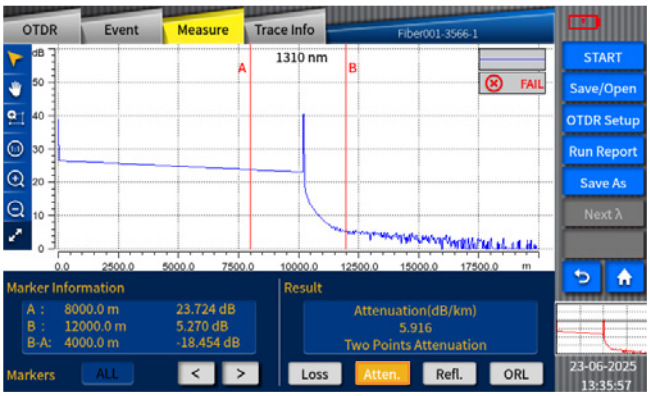
Event loss (expressed in dB) is calculated by measuring the reduced signal strength in Rayleigh backscattering (RBS) caused by this event. Both reflection and non-reflection events can cause event loss.
VIEW400 provides two loss calculation methods

1. Four-point event loss "LSA": The event loss is calculated by the least square approximation (LSA) method. The losses shown in the event list are measured using the four-point method. Set four points as "a", "A", "B" and "b". The area between "a" and "A" and the area between "b" and "B" are fitted with two straight lines, so that the event loss can be obtained according to the intercept between the two lines;
2. Two-point method for loss calculation "TPA": The loss between the two marker lines can be obtained by subtracting the Y-coordinates between the two marker lines.
3. The selected item in the marker line frame is the currently selected marker line and can be moved. The marker line information is updated synchronously while moving.



Attenuation

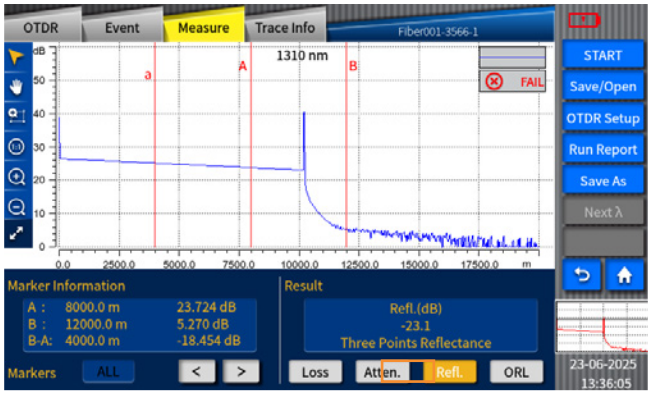
Click “Measurement” key and then select “Attenuation” key.



The attenuation measured in two points refers to the RBS attenuation given by the distance function between 2 points (as per the fiber standard, it is labeled as dB/km). Only use these 2 points to calculate but there is no need to gain average value.
LSA: the attenuation between 2 points (distance loss) can be measured according to the backscattering data between the marker line A and marker line B by linear fitting. The LSA attenuation corresponds to the difference of power (dB) between 2 points on the fiber.
Compared with TPA (Two-point analysis method), the average measurement value can be gained by LSA. The higher the noise level is, the more reliable the LSA will be. But when events such as ORL happen between two marker lines, LSA should not be adopted.

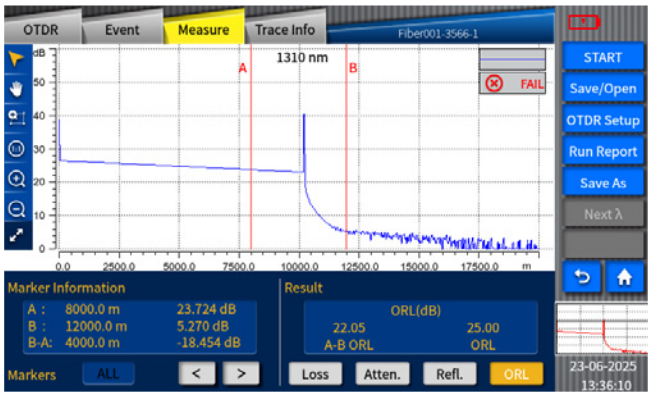
Reflectivity

Reflectance refers to the ratio between reflected light and incident light.
3- Point method for reflectance: 3 points refer to the points on the marker line a, marker line A and marker line B. The trace should be zoomed in and the marker line A should be located within the range of linearity before event to be tested; the marker line a should be located prior to the range of linearity before event to be tested; the marker line B should be located at the peak of wave of reflective event to be tested. All the reflectance of reflective events at the fault points on the fiber can be measured and merged.
(Note: in real-time mode, the value of the reflectance may not be always ac- curate.)



Optical return loss (ORL)

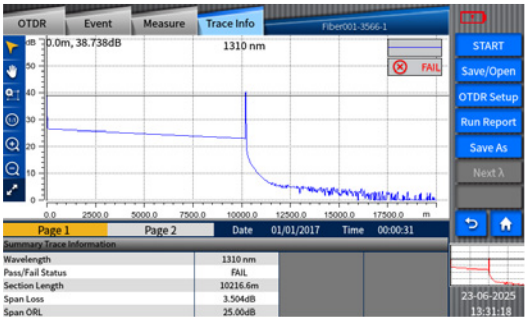
ORL calculation:
1)ORL between marker line A and marker line B.
Total ORL between start point of fiber span and the end point of fiber span.



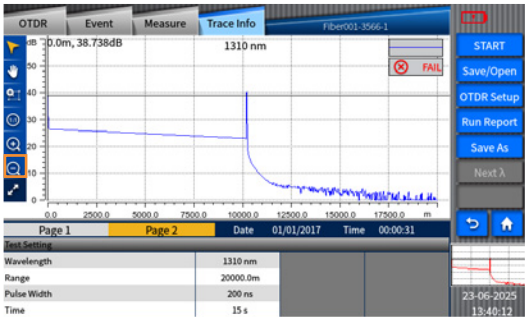
(Only the ORL of the single mode fiber can be calculated. In real-time mode, the value of the ORL may not be always accurate.)

4.12 Trace information key

As shown in the following pictures, enter the trace information interface by clicking “Trace info”. On page one display the measured data at a wavelength, while on page two display the measurement parameter setup at a wavelength.



Picture 1

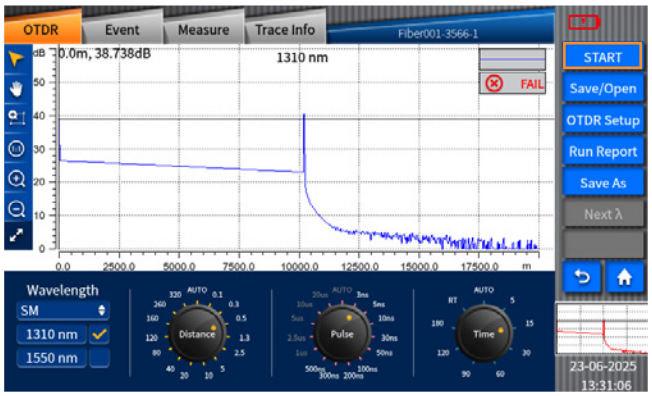


Picture 2

The interface of trace information will show basic information about the measured trace, such as：
file name, date, wavelength, pulse width, average time, refractive index, and backscattering and loss measurement method.

4.13 Start/Stop key

As shown in the picture, click “Start” key to begin measuring and click “Stop” to stop measuring.

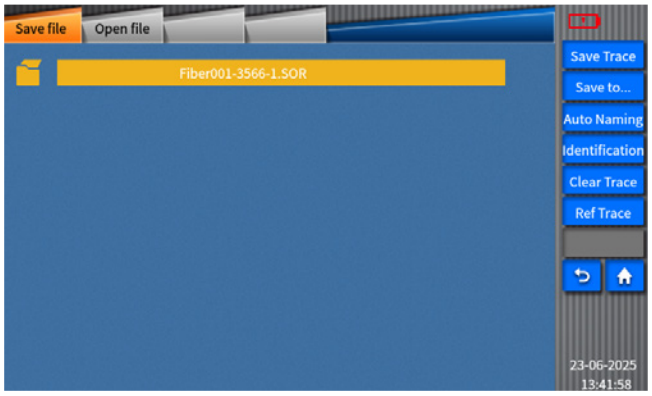


4.14 Save/Open key

On “Save/open” interface, you can carry out the operation of loading/reading, saving, or clearing the measured trace.

Save the file

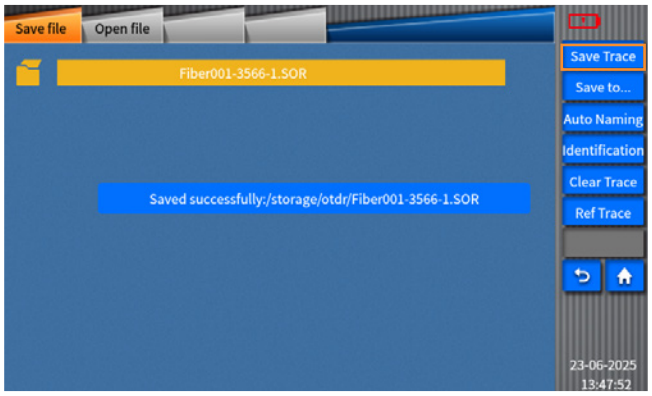
As shown in the figure, enter the "Save file" interface by clicking the "Save file" key.



There are functions such as “Save trace”, “Save to” “Auto naming” “Identification” and “Clear trace” in the “Save file” menu.

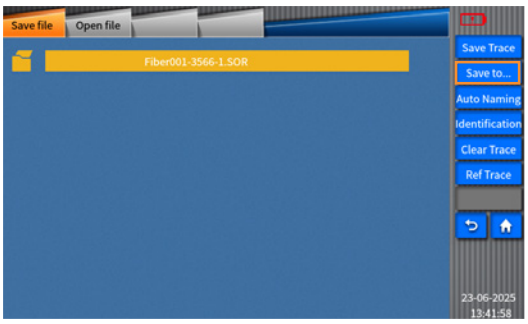
Save trace

As the following picture shows, the selected trace can be saved if “Save trace” icon is clicked.

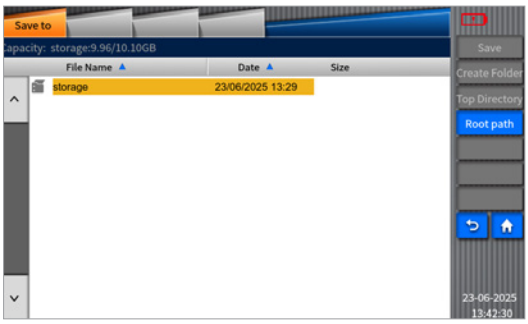


Save to

You can click “Save to” key to open the menu with saved directories, from which you can select one to save the file.



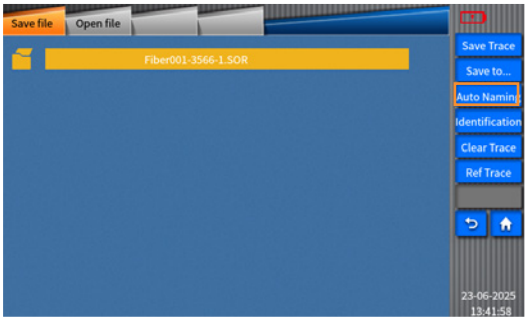
Picture 1



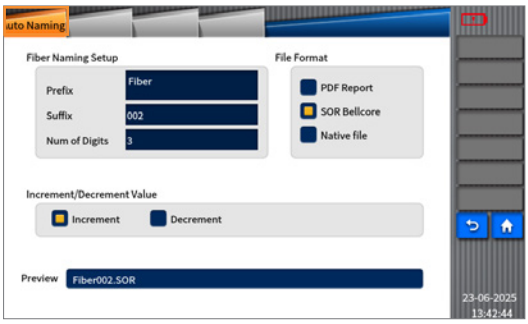
Picture 2

Auto naming

Enter the “Auto naming” menu from the “Save file” menu after selecting “Auto naming” key. And then you can set the file name, file format and the modes of sorting files.



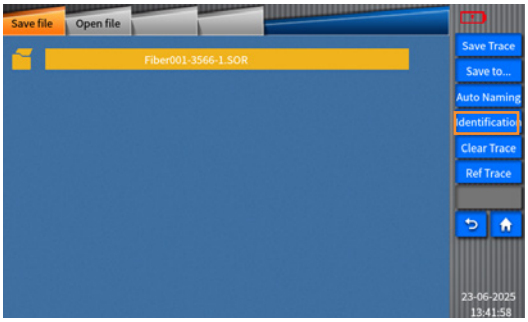
Picture 1



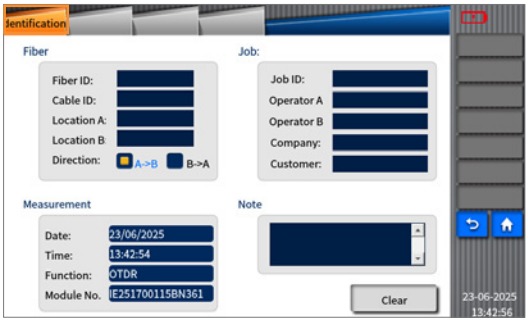
Picture 2

Identification

Enter the “Identification” menu from the “Save file” menu after selecting “Identification” key. And then you can set the items such as fiber ID, task ID and measurement ID.



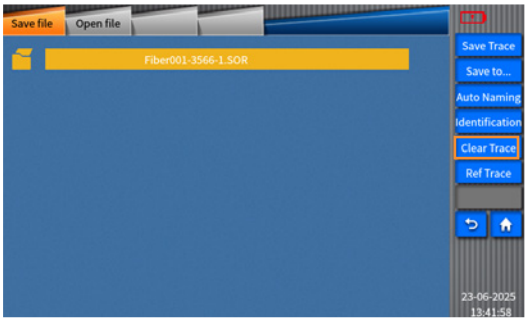
Picture 1



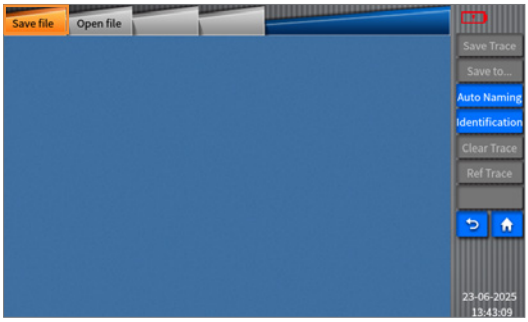
Picture 2

Clear trace

As shown in the following pictures, the trace can be cleared if “Clear trace” icon is clicked.



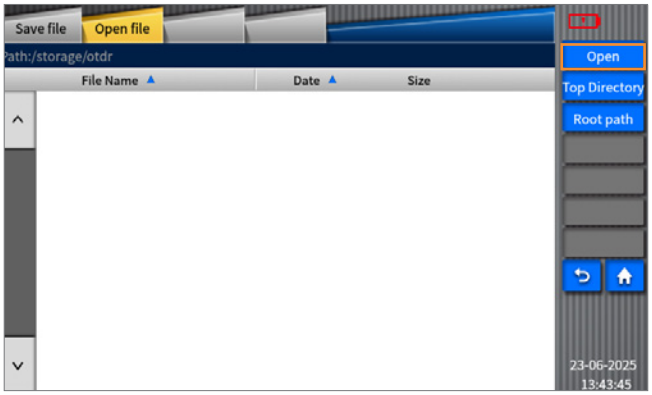
Picture 1



Picture 2

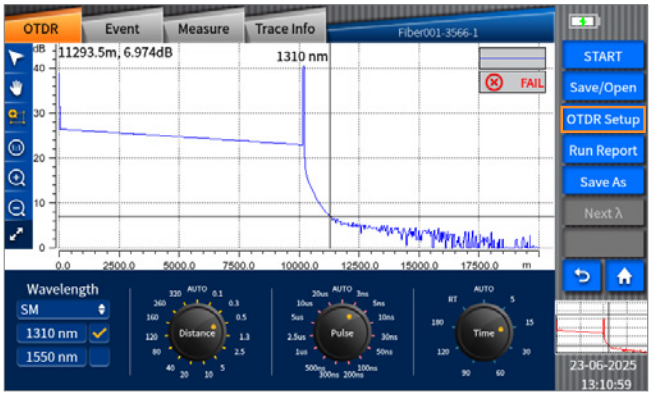
Open file

As shown in the picture, click “open file”, select the file and then click “Open” to open the file.



4.15 OTDR setting key

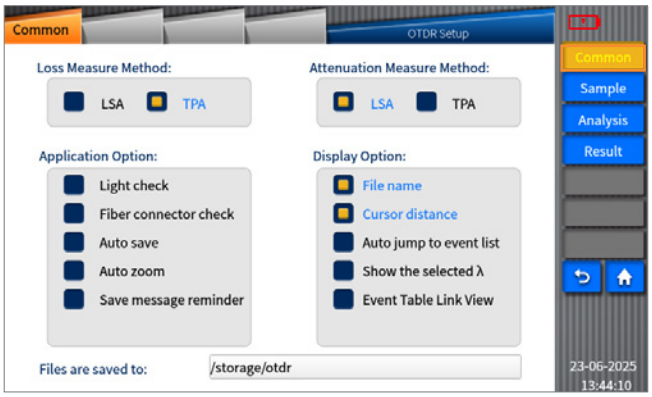
As shown in the picture, click “OTDR set “key to enter into OTDR setup interface.



There are “common setting”, “sample setting” and “analysis setting” “threshold setting” and “custom setting” options in OTDR settings.

4.16 Common Setting

“Common” is used to set “loss measure method”, “attenuation measure method”, “application option”, “display option” and “Path of the file to be saved”. Please refer to the following picture.



Introduction to the measuring methods:

TPA: Four points event loss：Event Loss can be computed by LSA. The loss displayed in event lists can be computed by 4 point method. Set the points as a,A,B and b：fitting 2 straight line from the areas of a point to A point and b point to B point：so as to produce event loss result from interception of the 2 lines.
LSA: TPA(Two-points Analysis method)：Difference between these 2 lines on the Y-axis can produce the loss between these 2 lines. (Loss A-loss B)

Introduction about application option:

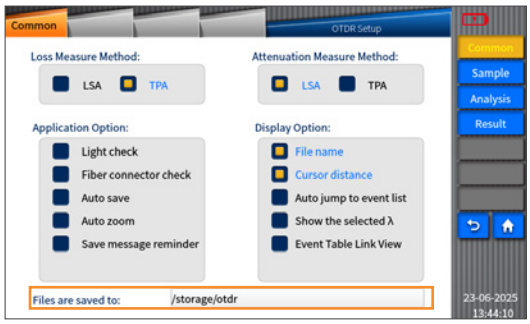
a) Light check: Before setting the measurement, please check if there is communication light (other light except the test light source) in the fiber under test. If communication light exists, then error message will be shown and the testing will be terminated.
b) Fiber connector check: Please check if the fibers under test are normally connected to the testing port. If connection problem exists, then error message will be shown on the screen.
c) Auto save: It is used to automatically save the measuring information after checking is completed.
d) Auto amplification: It is used to automatically amplify the point which has been selected as event point in measurement interface.
e) Save message reminder: It is used to set whether to inform you to save the active measured file before next measurement started.

Introduction of the display option:

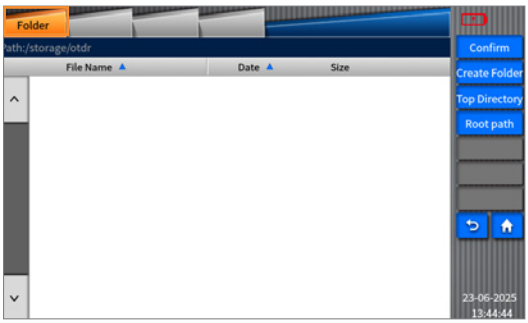
1) Screenshot button: Sets whether to display the screenshot button at the bottom right of the OTDR screen.
2) File name: Sets whether to display the file name for the active trace appearing on the OTDR menu.
3) Cursor distance: Sets whether to display the cursor locations at the upper left of the OTDR and Event menus where traces are displayed.
4) Auto jump to event list: Sets whether to switch to the Event menu after OTDR measurement and event analysis completed.
5) Show the selected λ: Sets whether to only display the active trace of the measured fiber at a selected wavelength.
6) Event Table Link View: Sets whether to display the measured data of a fiber span in the event table of the Event menu.

4.17 Save file by default:

Click the text box with directory name and then enter the default directory.



Picture 1

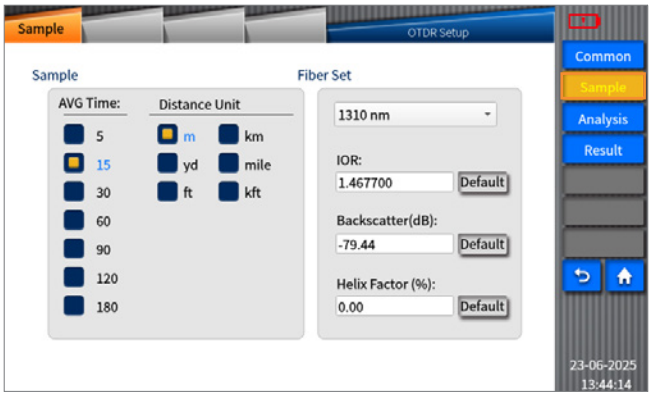


Picture 2

You can select other folder and then click confirmation key to change the default directory as needed. You can also click “Create folder” key and then click confirmation key to create a new default directory as needed.

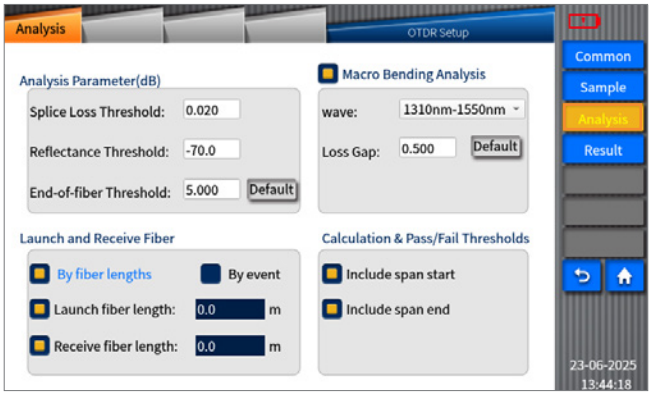
Sample Setting

1. “Sample”, including options of “Sample Set” and “Fiber Set”, is used to set sample parameter and fiber parameter.
2. Sample Set: to set the Averaging time, Sampling rate and convert the Units.
1)Averaging Time: to set the measurement time by default.
2)Distance Unit : 3 types of unit are available on VIEW400, i.e. m/km 、yd/ mile
ft/kft
3.Fiber Set: To set the IOR, Backscattering (dB), Excess Length (%). Different numerical results can be obtained after analysis according to different settings.(Note: Excess Length (%): in the process of fiber laying, part of optical fiber should be reserved, so in fact the length of fiber is longer.)
1)IOR: It refers to the Index of Refraction of the trace, i.e. group index. The distance of the trace will vary depending on this parameter. You can input IOR directly on this device.
2)Backscattering (dB): it refers to the RBS of the trace. The reflectance and ORL of the trace will vary depending on this parameter.
3)Excess Length (%): To set the Excess Length of the trace. The distance of the trace will vary depending on this parameter.



Analysis Set

“Analysis set” is used to set the parameter of analysis trace.
1) Splice Loss Threshold (dB): To analyze the small non-reflective event on trance.
2) Return Loss Threshold (dB): To analyze the small reflective event on trance.
3) Fiber End Loss Threshold (dB): To analyze the important even loss on trance.
All these types of loss will affect the signal Curve analysis.
“Launch fiber and receive fiber”:
The beginning of the link under test will be moved back according to the distance setup when launch fiber length is set.
The end of the link under test will be moved forward according to the distance setup when receive fiber length is set.
Macrobending, macrobending world judgment threshold for multi-wavelength detection.
Does the curve contain start/end events when it passes the threshold.

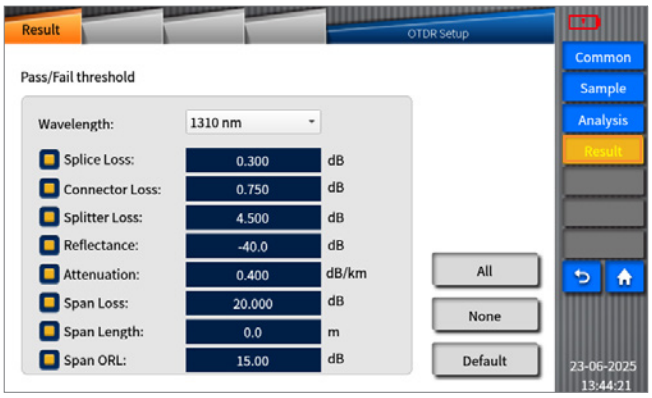


Threshold Setting

The thresholds are set in order to judge the “event point” and the results of “pass/fail” regarding the “fiber span” are also displayed.

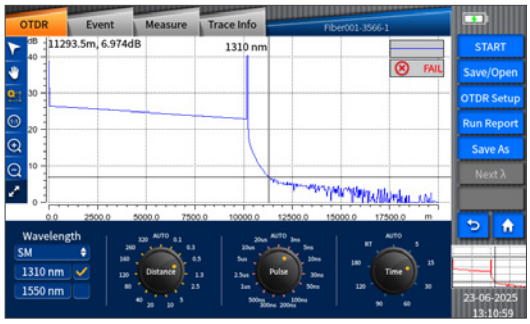
The results achieved after measurement are displayed with appropriate coloring based on the pass/fail status of each value.

The setup parameters will vary depending on different wavelengths.

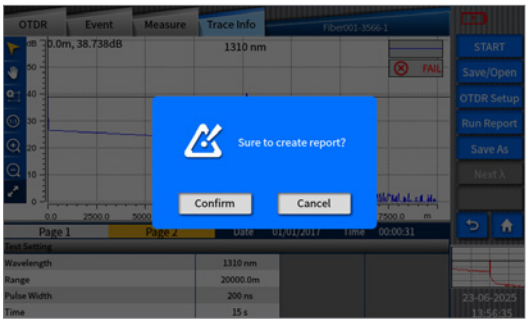


4.18 Run Report key

As shown in the following picture, click “Run Report” and then click the confirmation key in the popup message. Until message indicating file creating success pops up, you can find that a piece of PDF file has been created in the default directory.



Picture 1

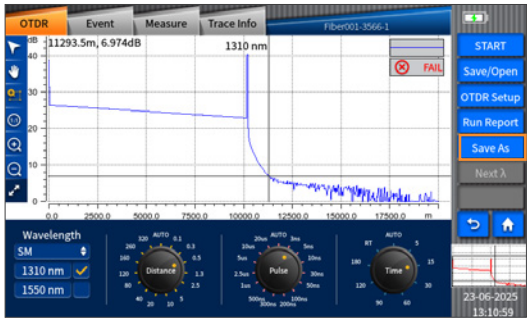


Picture 2

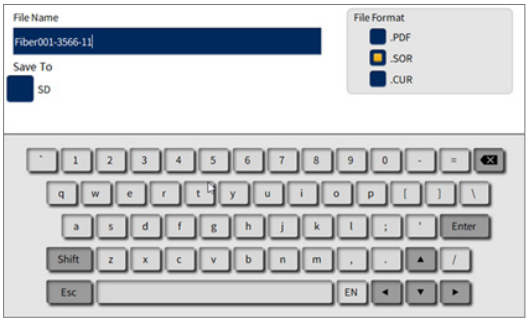
Note: This function can only be enabled if the trace exists, otherwise this function can’ t be used.

4.19 Save as key

You can click the “Save as” key to enter the “Save as” menu, where you can edit the file name, file format, or select the file to the USB.



Picture 1

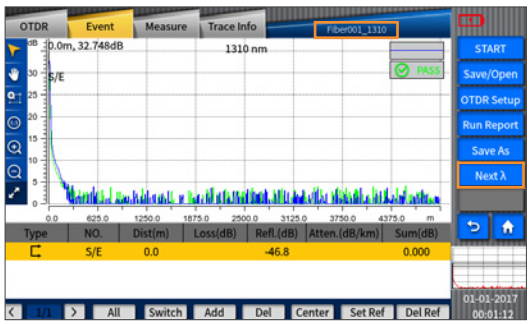


Picture 2

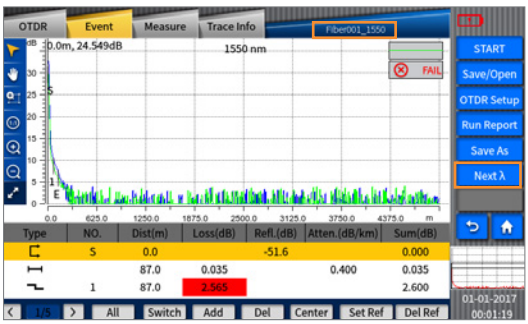
Note: This function can only be enabled if the trace exists, otherwise this function can’ t be used.

4.20 Next λ key

On the premise of obtaining two traces during dual-wavelength testing, as shown on the picture, you can click “Next λ” to switch the trace and its information.the file name, file format, or select the file to the USB.



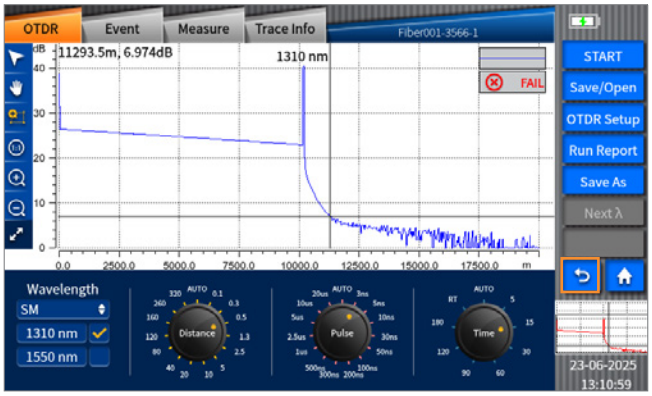
Picture 1



Picture 2

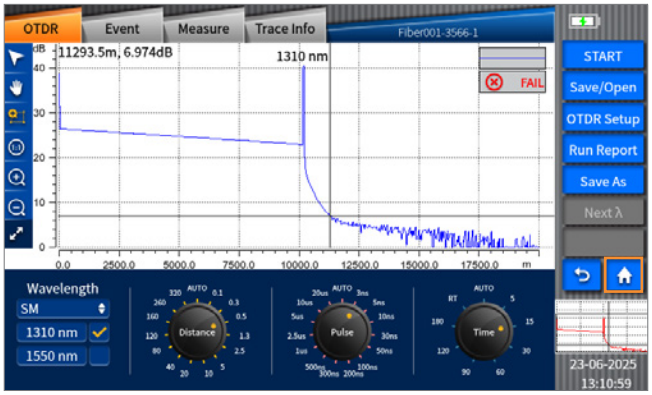
4.21 Return key

If you want to exit from the current operating interface on different operation interfaces, click “return” key to fast return to the previous operation interface.



4.22 Main menu key (Home)

If you want to return to the main menu interface in different function modules, click main “Home” key to fast return to the main menu interface, then operate other modules.

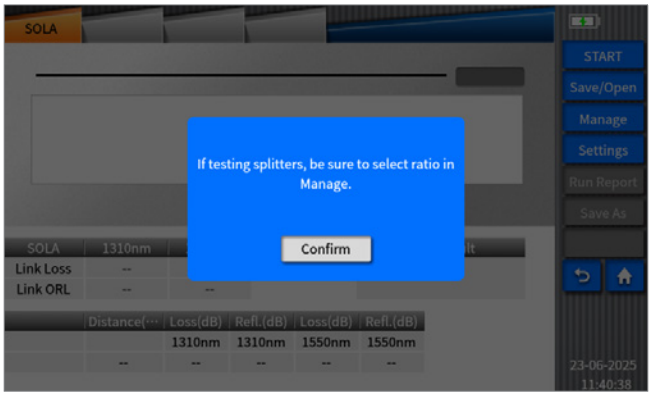


Chapter 5 SOLA

SOLA is based on an application program of OTDR. The design purpose of SOLA is to simplify OTDR test process: you don't need set parameters or start any other program for analyzing multiple and complicated ODTR traces because with its advanced algorithm, SOLA can define dynamic measuring parameters and determine right numbers of traces acquired according to the tested network, furthermore, it can associate multiple pulse widths of wavelengths to locate and recognize the fault of the link with high resolution. All these functions described above can be realized only by pressing one key.

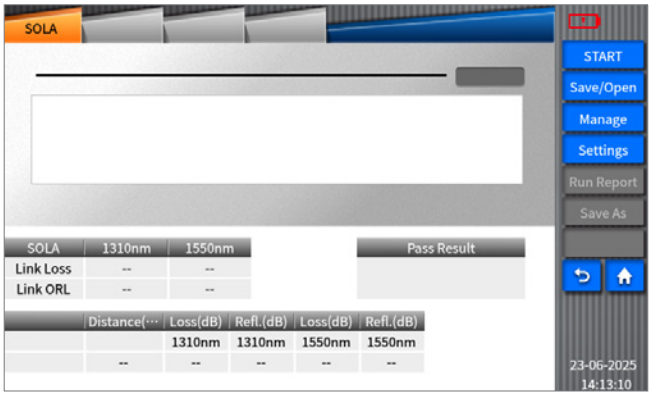
5.1 "SOLA" operation

After module is selected and loaded, turn on the device and then click "SOLA" icon on VIEW400 main interface to enable the SOLA function. (the SOLA performance will vary depending on the module changed)
Each time when you enter SOLA menu, pop-up message will appear: < Please specify SOLA Splitting Ratio before you use SOLA>. Then you can confirm to access to the SOLA menu.



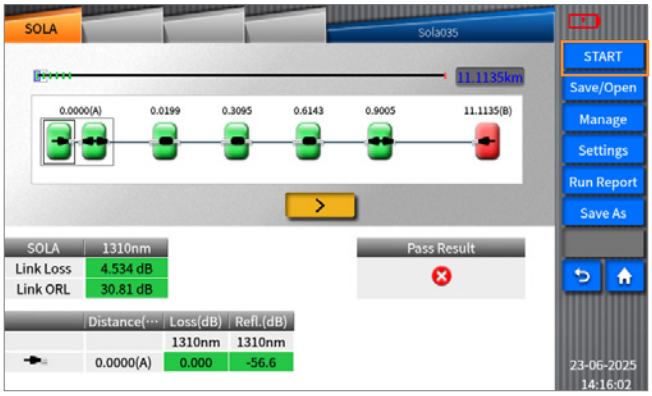
SOLA menu

The LinK Loss and Link ORL for each measurement with each wavelength on the optical fiber link will be shown on the SOLA interface.
LinK Loss: It refers to the total loss of the fiber link measured. Link ORL : it refers to the ORL on the whole fiber link.



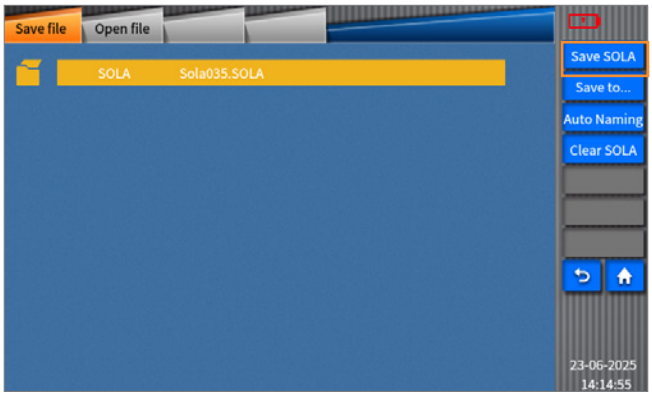
5.2 Start/ Stop

You can click “Start” to start measurement, or click “Stop” to stop measurement.



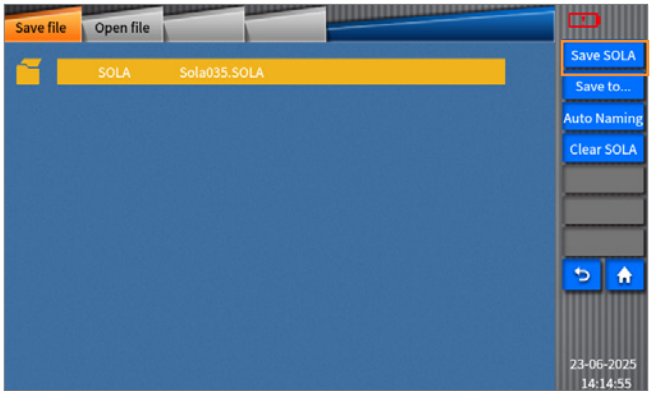
5.3 Save/Open

You can save and read the measured trace in the “Save/Open” menu.
Enter the “Save/Open” menu by clicking the “Save” key, as shown in the following picture.



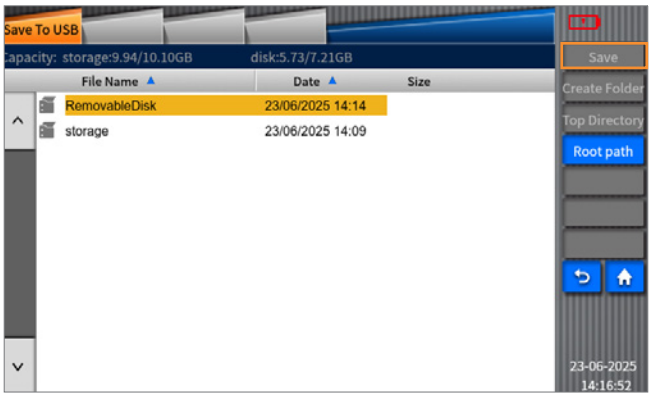
Save SOLA

Save the trace of SOLA file format to the default directory.

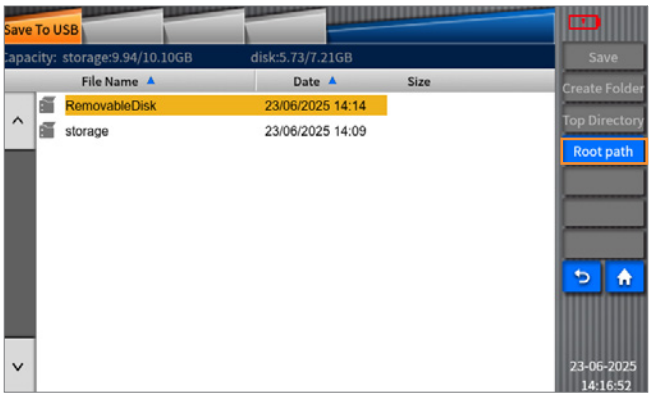


Save to

Save the file to the USB.
Click “Save” to save the file.
Click the Quit key to go back to the menu of file saved.

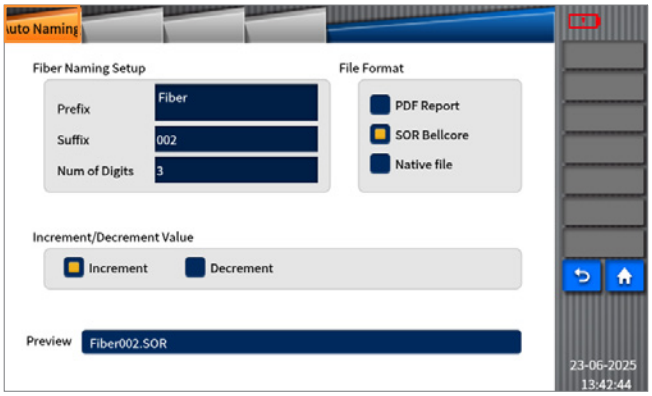


You can select the directory as needed by clicking “Top directory” or “Root path”.



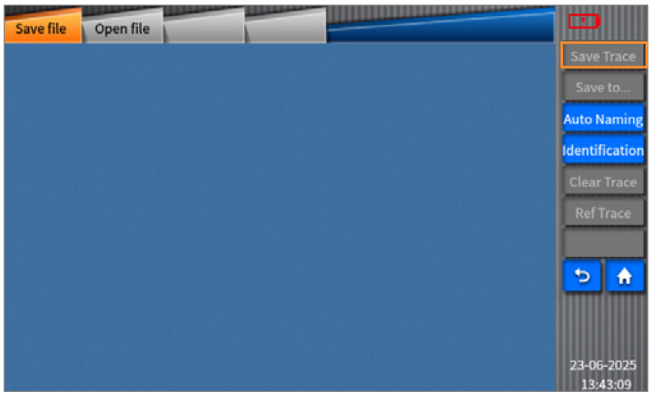
Auto Naming

You can change name of the file and select PDF report and SOLA as a file format.



Clear SOLA

If you click the “Clear SOLA”, the file name and trace displayed will be cleared together.

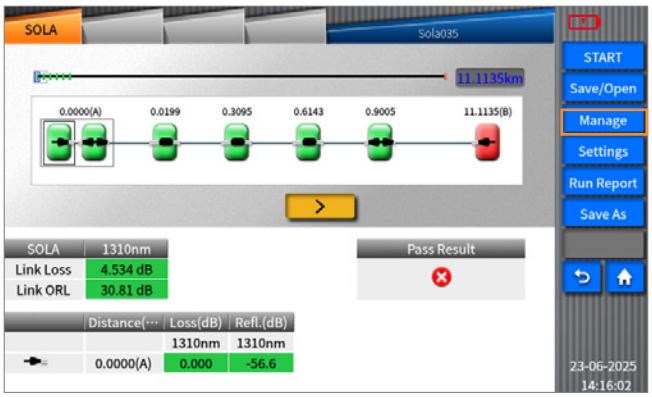


Open File

You can open the saved SOLA file in the default directory or in the USB. Select “open” to open the selected file; Select the Quit key to go back to the menu of files.

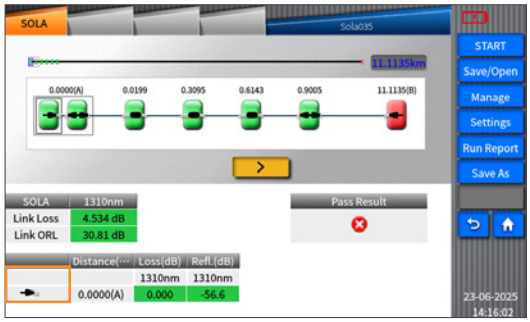
5.4 Management

As shown in the picture, you can enable “management” function by tapping on “setup” key to set related measuring parameters such as “identification(identify)”, “link definition(line define)”, “link pass(line pass)”, “element pass(item pass)”.

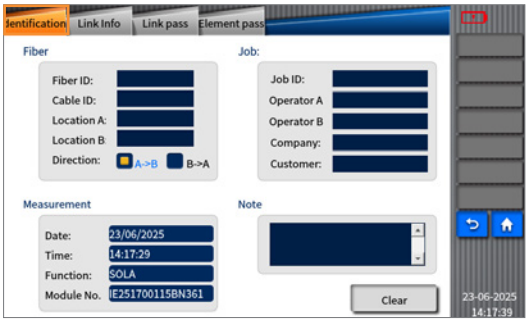


Identification

If you enter the Identification menu by clicking “Manage”, the corresponding records of the files saved after SOLA measurement can be shown.



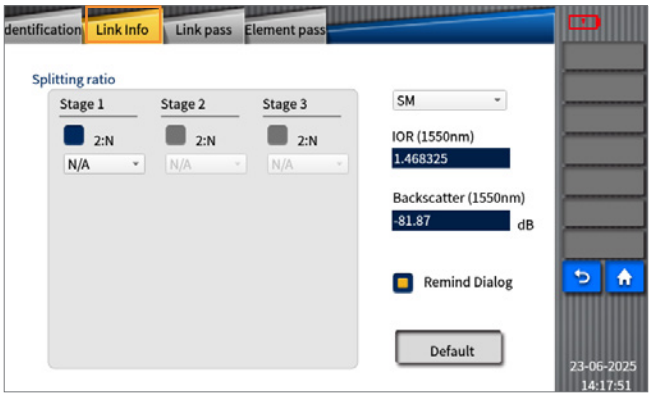
Picture 1



Picture 2

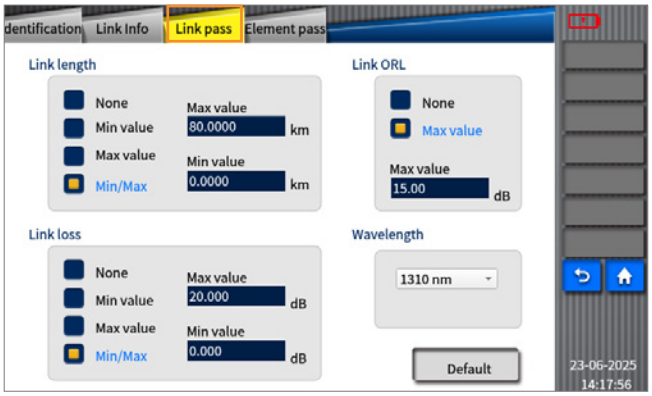
Line definition (Link info)

You can manually set fiber link definition, including selecting levels of splitting ratio, adjusting related measuring parameters.
IOR: It refers to the Index of Refraction of the trace, i.e. group index. The distance of the trace will vary depending on this parameter. You can input IOR directly on this device.
Backscattering (dB): it refers to the RBS of the trace. The reflectance and ORL of the trace will vary depending on this parameter.



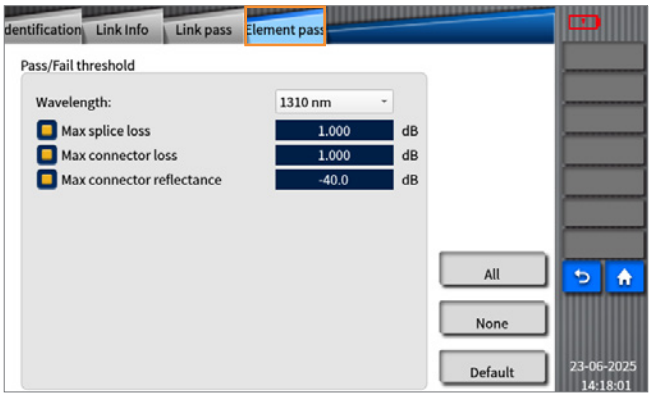
Line Pass

You can modify related numeric, including adjusting the conditions of measurement link and the thresholds of pass/failed.



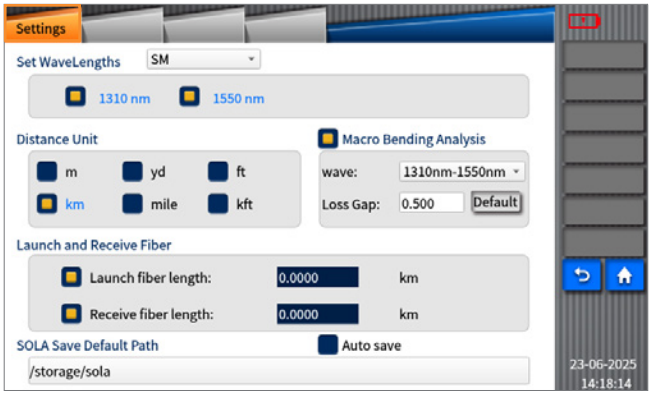
Element Pass

You can modify the related thresholds to judge whether the elements are passed or failed.
For example: When you want to modify max splice loss, directly click the value in intersection, and then you will see a pop-up box for value input on the screen (Relative message will be shown when the value entered exceeds the limit.)
Click all to enable all thresholds; click none to disable all thresholds; click default to return to the default value.



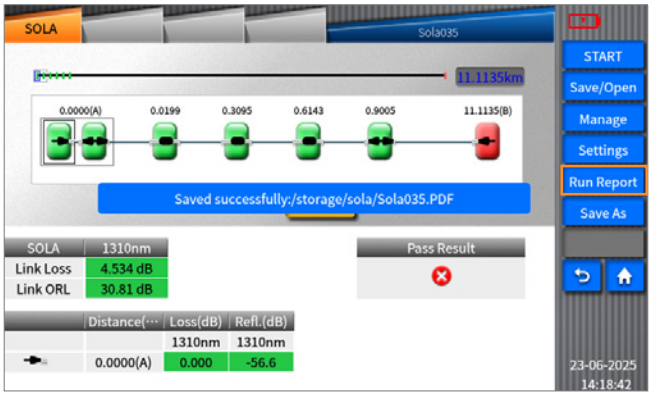
5.5 Settings

In the Settings menu of SOLA, you can select the wavelength, and set the lengths of Launch Fiber and Receive Fiber, as shown in the following picture.



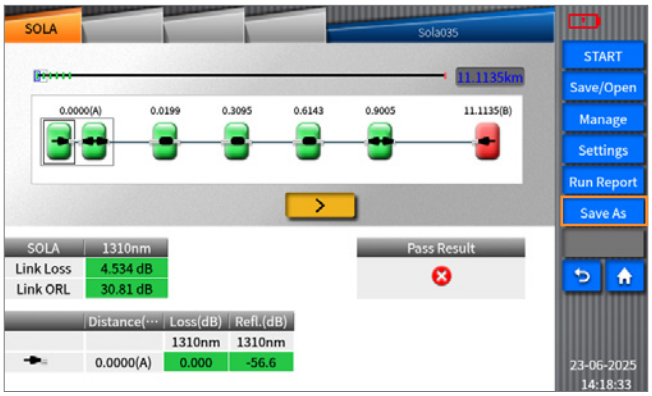
5.6 Run Report

Select the “Run Report” tab to save the current SOLA file in PDF format.



5.7 Save as

You can click the “Save as” key to enter the “Save as” menu, where you can edit the file name, file format, or select the file to the USB.



Chapter 6 Optical Power Meter

6.1 Overview

The optical power meter of high accuracy is used to measure absolute optical power meter or relative optical power loss through a span of optical fiber. This module can measure optical power of multi-wavelength. It can be operated easily.

6.2 OPM Operation

- Connect the light source to OPM port with a fiber jumper connector.
- Click “OPM” in home menu to enter optical power meter interface, as picture shows.

Reference value (OPM onVIEW400): you can set the reference value in the OPM interface. (You can set a value as a reference to calculate the current value of optical power which will be displayed at the first line in the circle.)

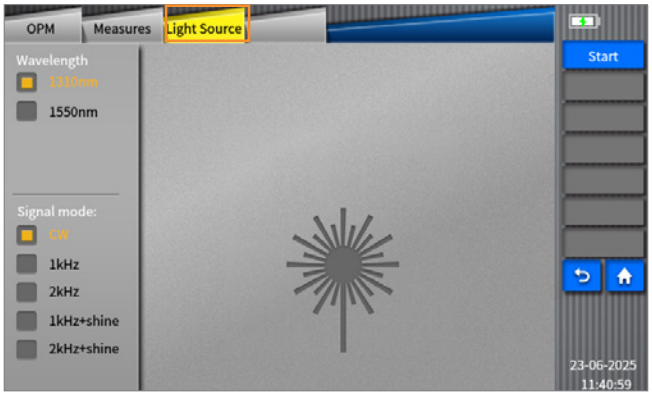
Chapter 7 Light Source

7.1 Overview

The types of source of VIEW400 include visual light source and light source.

Stable Light source (LS)

You can click “Light Source” to enable the light source function.

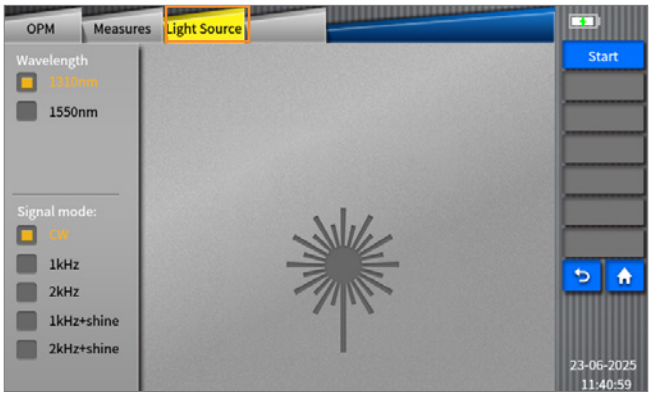


The light source module can provide invisible light source(the wavelength and power depend on the type of module selected) and the types of light include CW light, 1KHZ light, 2KHZ light , 1KHZ blink light , 2KHZ blink light.

7.2 light source operation

· Connect the fiber to be tested to the light source port.

· Tap the light source icon on the main interface and then select “light source” to enter into the invisible light source interface; please refer to the following picture.



· Select wavelength of light source (1310/1550 nm) by tapping on the upper left side of the screen; select emitting light source modes (CW/1KHZ/2KHZ/1KHZ
+blink/2KHZ+blink) by tapping on the lower left side of the screen; after that, tap “open” key to open the invisible light source.

· Turn off “light source”: please tap on “close” key on the right side.

Warning: The eyes’ focusing on VIEW400 light source or the fiber end connected to light source is forbidden, which may cause damage to eyes.

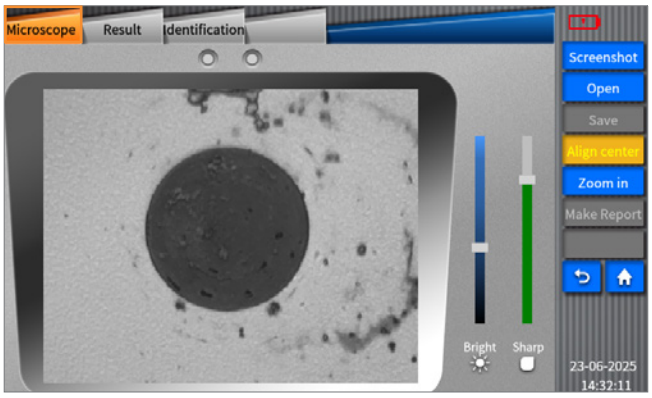
Chapter 8 Fiber Microscope

8.1 Overview

The grind quality and cleanliness of the fiber connecting end face can be inspected with the aid of the magnified surface view displayed on the screen of VIEW400.

8.2 Start fiber end inspection

After connecting the fiber inspection probe, click “Fiber Microscope” on VIEW400 main interface to enter into the inspection interface. Please refer to picture

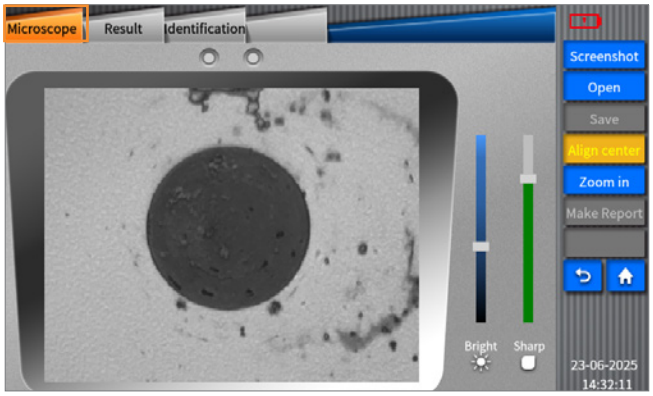


Notice: If the fiber inspection probe has not been connected successfully to the View400, the message of “Please connect fiber inspection probe.” will appear. However, the GDM file can still be opened.

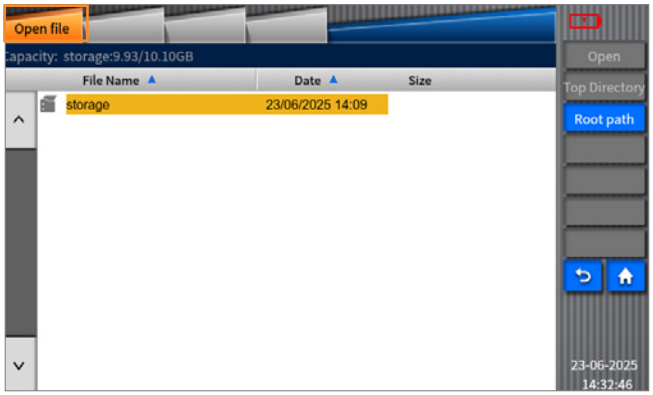
8.3 The function of fiber microscope

The functions of the fiber inspection probe (fiber microscope) include “screenshot/ real time (video)”, “open”, “save”, “Align center”, “Zoom”, “Make Report”, “Result” and “identification”.

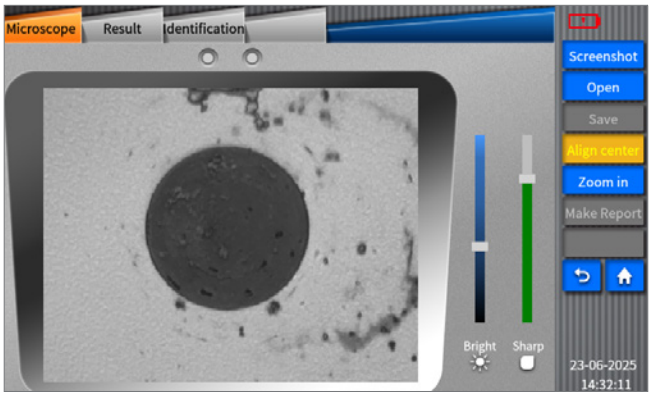
· “screenshot/real time (video)” function is a premise of “save”. After connecting successfully the device, you cannot enable “save” function until “screenshot/real time” soft key changes to “real time”.



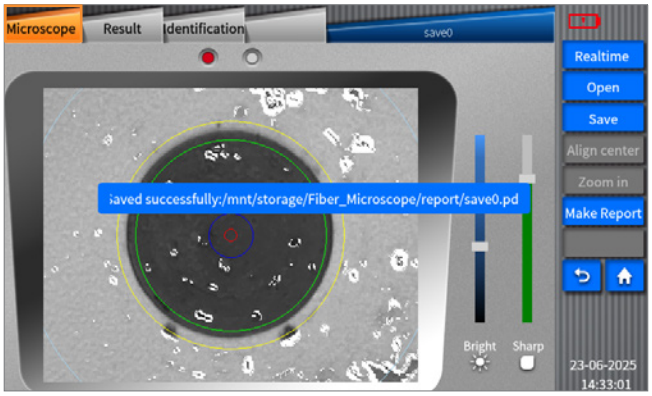
· “Open” function is used to open the files already saved.



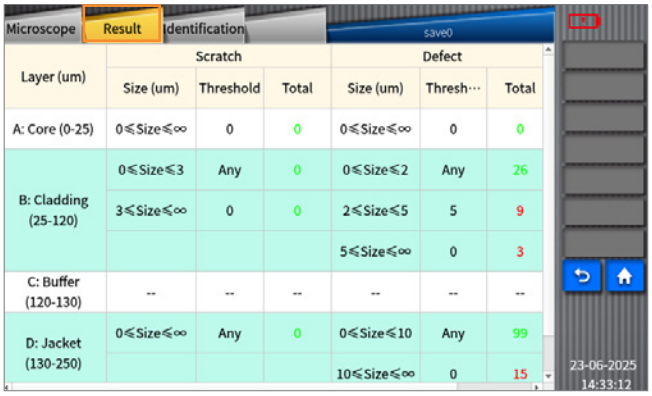
· “Align center” function is used to place the image in the middle of the screen. “Zoom in” function is used to amplify the active displayed image.



· “Make report” function is used to save an analysis report of file.

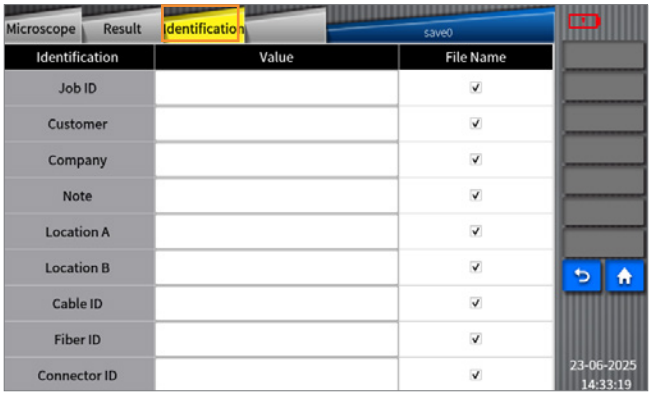


· “Result” function is used to analyze the active image and show the results in the form of tables.



Layer (um)	Scratch			Defect		
	Size (um)	Threshold	Total	Size (um)	Thresh···	Total
A: Core (0-25)	0≤Size≤∞	0	0	0≤Size≤∞	0	0
B: Cladding (25-120)	0≤Size≤3	Any	0	0≤Size≤2	Any	26
	3≤Size≤∞	0	0	2≤Size≤5	5	9
				5≤Size≤∞	0	3
C: Buffer (120-130)	--	--	--	--	--	--
D: Jacket (130-250)	0≤Size≤∞	Any	0	0≤Size≤10	Any	99
				10≤Size≤∞	0	15

· “Identify” function is used to set related information displayed, the contents of which are user-definable.



Identification	Value	File Name
Job ID		☑
Customer		☑
Company		☑
Note		☑
Location A		☑
Location B		☑
Cable ID		☑
Fiber ID		☑
Connector ID		☑

8.4 Check the preserved image

· Click the file management icon on the main interface.
· Select the image saved path (the saving path for VIEW400 is set to be: storage\ Fiber_Microscope).

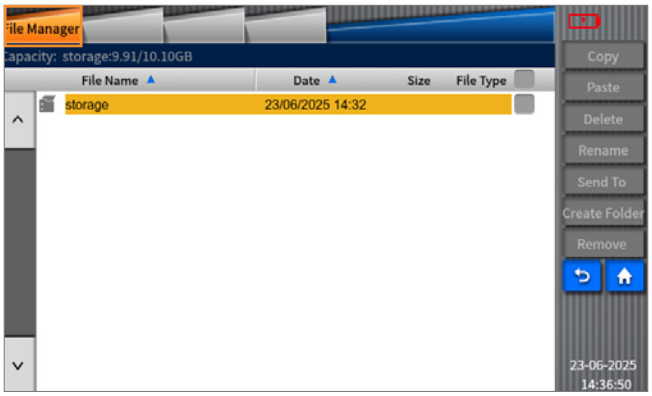
Chapter 9 File Management

9.1 Overview

"File management" is used to view the saved data and carry out operations like "copy, delete, rename, create folder". All the operations to the files should be car- ried out in directories of the internal storage and USB storage (The directories of VIEW400 are sdcar and usb).

9.2 Start file management

Click "File Manager" on main interface of VIEW400 to enter into the file menu.



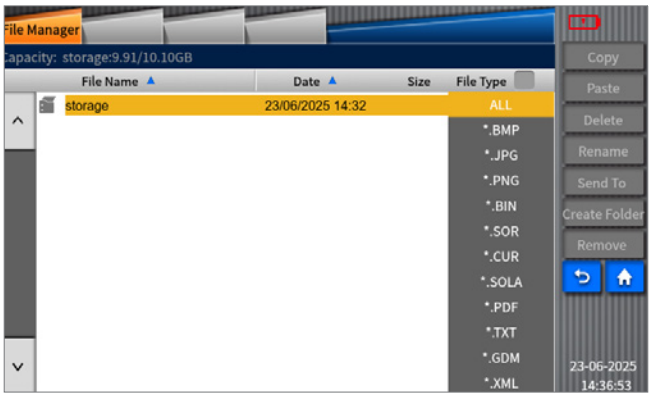
9.3 File manager function

There are following items in this menu, such as File Name, Date, and Types of File. File Name: Click the File Name to sort the files by name.

Date: Click the Date to sort the files by date.

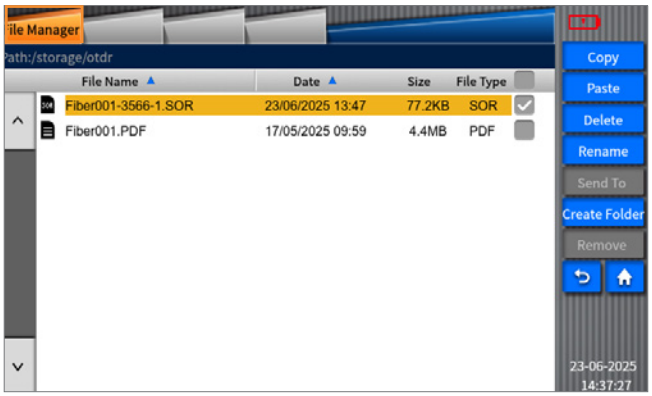
File Type: Click the File Type to sort the files by their types.

The types of the file include: SOR, BMP, JPG,SOLA,HTML,TXT,GDM,PDF,CUR, BIN



9.4 “Operate” Function

There are functions of “copy”, “paste”, “delete”, “rename”, “Send to USB”, and “create folder” and “remove USB” included in operation interface.



· COPY/PASTE key

Select one file and then click Copy to copy one file. Or, if users need to select all the files to copy all of them, just select the box after the File Type.

Operating Steps:

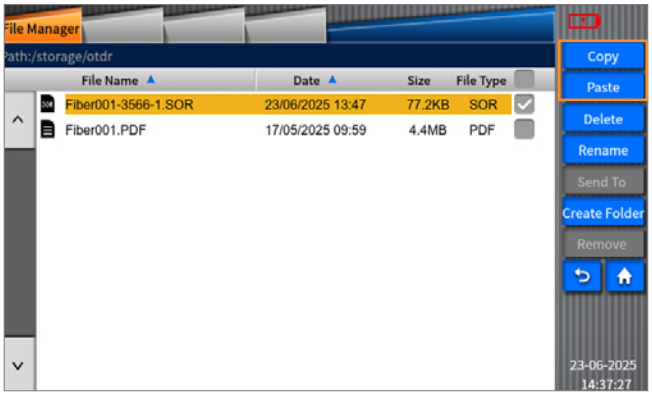
a)Click FILE TYPE to select the file type needed to be copied

b)Click and access to the root directory (sdcard /usb directory)

c)Click Copy after selecting subdirectory or file (PASTE cannot be executed if no subdirectory or file being selected)

d)Select the target directory needed to be copied

e)Click PASTE. However, PASTE cannot be executed under the same directory. The notice “You can’ t copy file to the same directory!” will appears on the screen.



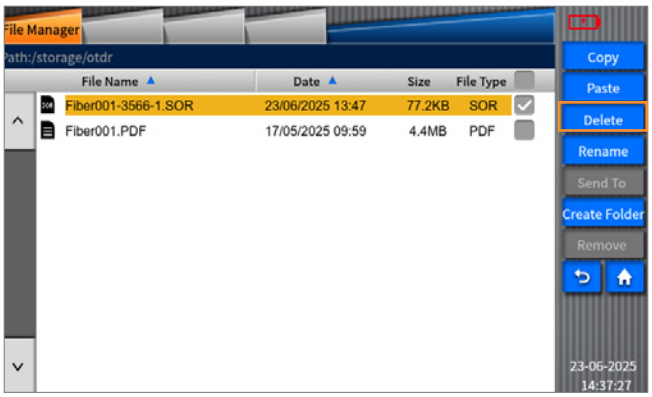
· DELETE key

It can delete the files or subdirectory in the directory. Operation steps:

a.Click FILE TYPE to select the file type needed to be deleted

b.Click and access to the root directory (sdcard /usb)

c.Select folder or files to execute DELETE



· RENAME key

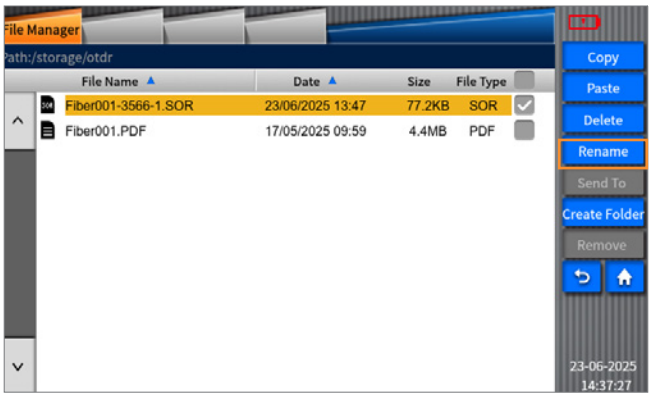
It can rename folder, file and file format. Operating steps:

a.Click FILE TYPE to select the file type needed to be renamed.

b.Click and access to the root directory (sdcard /usb)

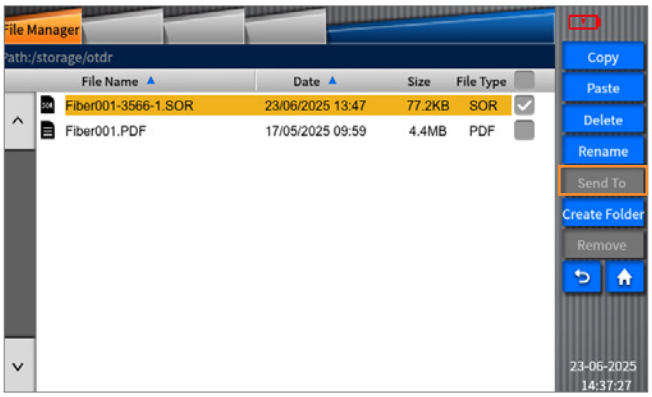
c.Select folder or file to click RENAME, access to the input interface to edit the name.

d.Press “ENTER”



· SEND TO FOLDER

The key of Send To USB is used to send the files or folders selected to the folder.

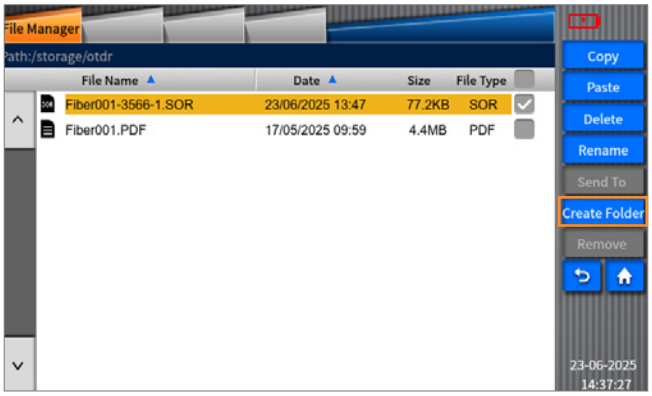


· CREATE FOLDER key

It can create a subfolder under the current folder. Operation steps:

a.click and access to the root directory (sdcard /USB directory)

b.Click NEW FOLDER to enter into the input interface, and then input the folder name then press ENTER to create a folder successfully.

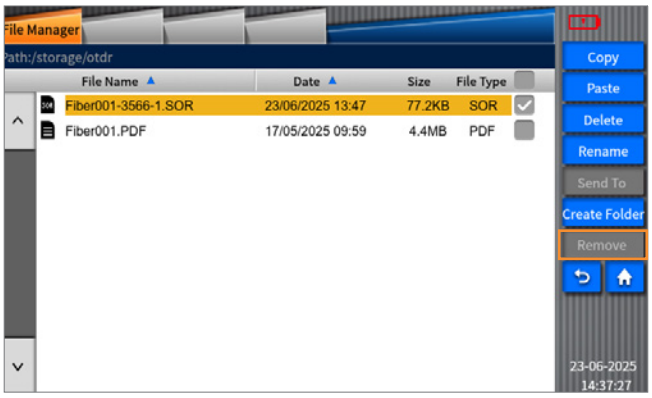


· REMOVE DEVICE key

Users can use this key to remove the USB. Operating steps:

a.Click Remove USB key.

b.The function of the key of Remove USB is disabled.



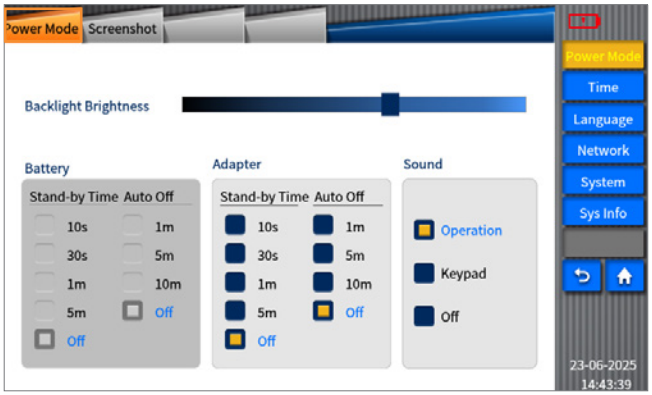
Chapter 10 System setting

10.1 Overview

The system setup function that VIEW400 has offered can let the user modify the system parameters as required.

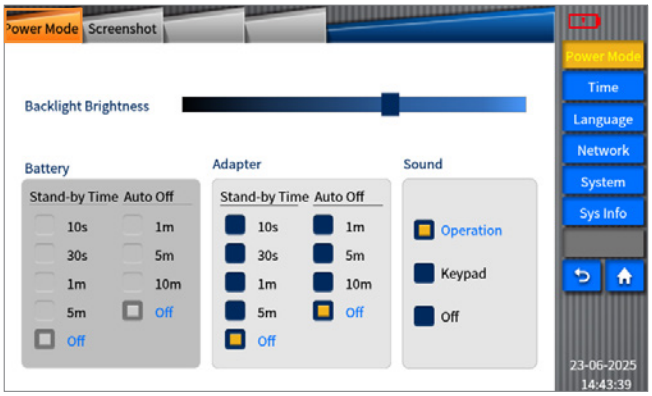
10.2 System setting

Click “Setting” on the main interface of VIEW400 to enter into the “system setup” interface.



10.3 Functions of system settings

There are functions such as “standby and brightness”, “time”, “language”, “WIFI”, “ printer”, and“system maintain” in VIEW400 system setting menu.

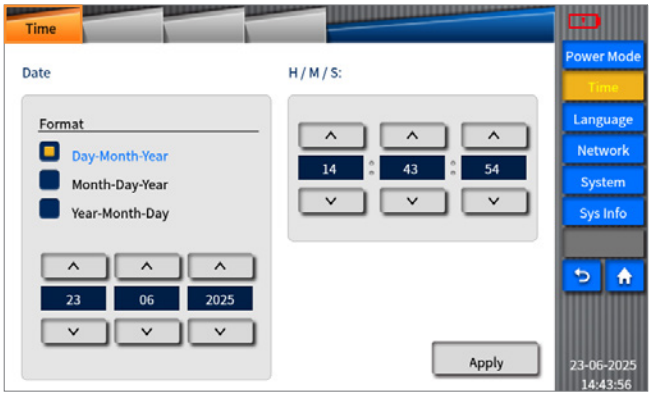


Standby and Brightness

1)Backlight brightness	Set the background brightness for the screen.
2)Battery and adapter	Set the stand-by time and auto power –off time when using battery or adapter.
3)sound	Set the measurement warning sound and key warning sound.

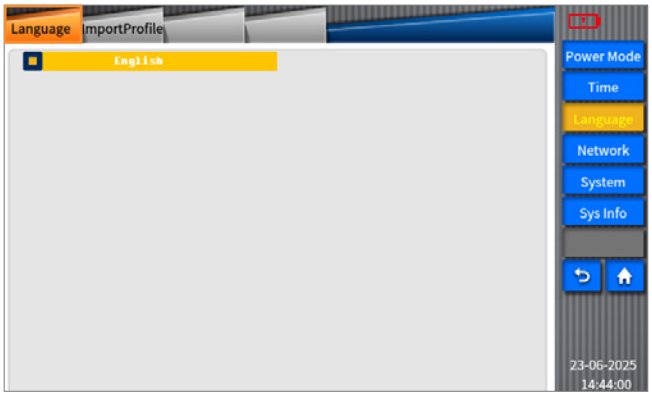
Time

You can use “time” function to set the time that is displayed on the device.

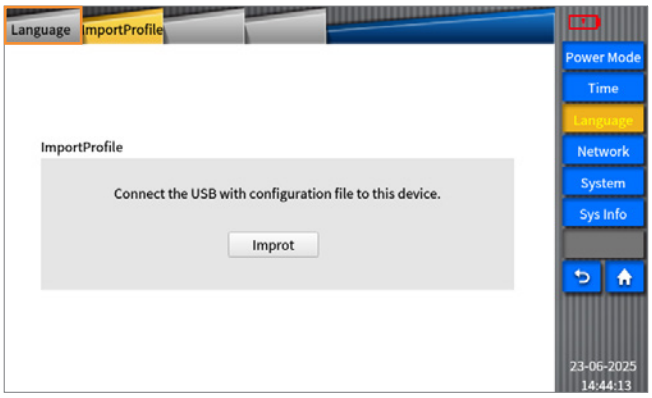


Language

The “language” function is used to set the languages displayed on the screen.



You can select “Import Profile” to configure the multi-languages by the PC.

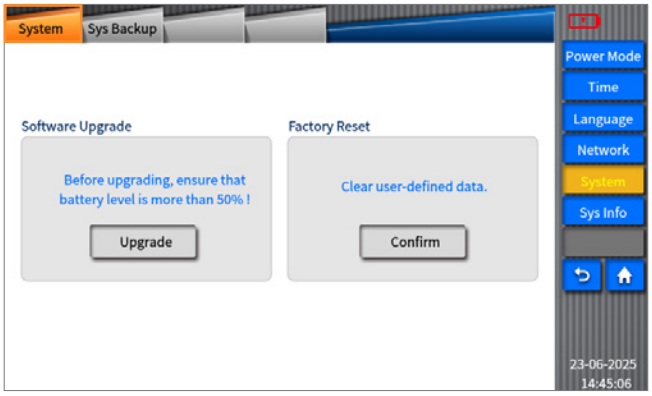


WI-FI

"Wi-Fi" function can be used to connect the device to local area network (LAN), realizing wireless internet. Under this function, along with upper computer, wireless file transmission can be realized. (Please refer to the Wi-Fi Instruction for the usage in detail.)

System maintenance

There are two functions in "system maintenance", which are "software upgrade" and "factory reset". Please refer to picture.



· "Software upgrade" can be used for the software upgrade and degradation. Operation steps:
· Insert the USB with file to be updated and power adapter to VIEW400 port respectively.
· Click "System maintain" on system setup interface.
· Click "Upgrade".then it will show upgrade notice; and then click "confirm" to carry out upgrade operation.

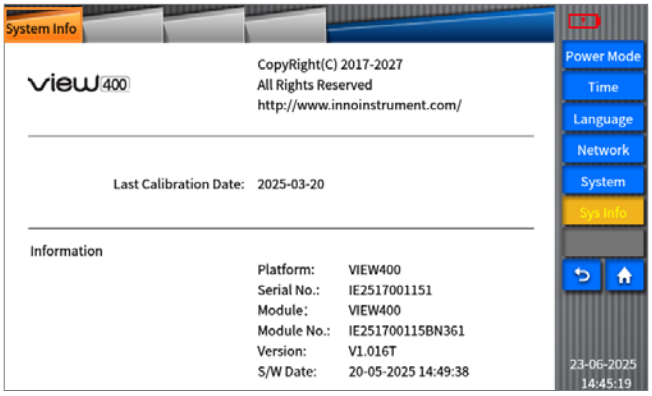
Note: Before upgrading, ensure that battery level is more than 50%!

· "Factory reset" is used to restore the system parameters to the original.

Chapter 11 System Information

11.1 System information

As shown in picture, this interface displays the information about the products and manufacturer.



Attachment

1. Structure requirement

1) Display screen: 5inch (800 x 480)
2) Indicator light (2 pieces)

Indicator light	State	Function
Charge light (Red)	Normally on	Battery full
	Flashing 2Hz	Adapter power supply
	Flashing 1Hz	Battery charge
	OFF	Remove the adapter, and use battery power supply
Power light (Green)	Normally on	Starting up
	Flashing	Low battery
	OFF	OFF

3) Keys (4)

Names of buttons	Quantity
POWER	1
MENU	1
START	1
ESC	1

4) Operating time>8h, charging time<4h

2. Hardware interface requirement

- DC INPUT: Power port
- USB port (1 piece): Save data and connect the fiber inspection probe
- Optical interface: interchangeable port (FC, SC)
- OPM port: FC2.5mm universal interface

3. Software interface requirement

- Interface mode: button input or touch screen input
- Operating platform: Linux

4. Operating environment requirement

- Temperature requirement:
  Working temperature: -10°C ~ 50°C Storage temperature: -20°C ~ 60°C
- Humidity requirement: (general standard)
  Operating humidity: 0% ~ 45%, non -condensation
  Storage humidity: 0% ~ 95%, non -condensation

5. Performance requirement

Module	Technical index	Value
OTDR module	Please refer to the parameters of OTDR module purchased.	
Sola	Please refer to the parameters of OTDR module purchased.	
Fiber Microscope	Interchangeable port	(FC,SC) / PC (FC,SC) / APC
OPM	Detector type	InGaAs / GeGeX
	Type of fiber interface	Support 2.5mm universal interface
	Wavelength calibration	850 / 1300 / 1310/ 1490 / 1550 / 1625 /1650 nm
	Measurement range	-70 to +6dbm
	Accuracy	0.01dB
	Units displayed	dB, dBm, nW, uW, mW

Module	Parameter	
OTDR	Fiber Type	G.652 fiber
	Wave Length	1310nm±20nm、1550nm±20nm
	Max Dynamic Range	36dB (1310nm)、35dB (1550nm)
	Event Dead Zone	0.8m
	Attenuation Dead Zone	3m
	Test Range	100m/300m/500m/1.3km/2.5km/5km/10km/20km/40km/80km/120km/ 160km/260km/320km
	Pulse Width	3ns/5ns/10ns/30ns/50ns/100ns/200ns/300ns/500ns/1us/2.5us/5us/10us/20us
	Distance Uncertainty	±(0.75m+Sampling Resolution+0.0025%×Test Distance)
	Linearity	±0.05dB/dB
	Sampling Points	150000
	Sampling Resolution	0.04m~10.24m
	Loss Resolution	0.001dB
	Loss Threshold	0.02dB
	Distance Resolution	0.01m
	Refractive Index	1.000000~2.00000
	Format	SOR,PDF,CUR,SOLA
	Loss Measurement Mode	TPA / LSA
	Laser Safety Level	Class II
	Optical Connector	SC/APC(Interchangeable FC、LC)
SOLA	Wavelength	1310 / 1550nm
	Measuring Range	0~150km
	Max. Splitting Ratio	1:128 splitter
Light source	Export Wavelength	Consistent with OTDR export wavelengths
	Laser Type	Consistent with OTDR type
	Export Power	⩾-5dBm
	Stability	CW,±0.5dB/15min(After15min of preheating)
	Optical Connector	SC/APC(Interchangeable FC、LC)
	Output Mode	CW/1kHz/2kHz/1kHz+shine/2kHz+shine

OPM	Wavelength Range	800nm~1700nm
	Calibration Wavelength	850/1300/1310/1490/1550/1625/1650nm
	Measurement Range	-70~+6dBm
	Resolution	0.01dB
	Uncertainty	±5%
	Optical Connector	Universal FC/SC/ST
Common index	Display	5inch,800×480,TFT-LCD,Multi touch capacitive touch screen
	Power Supply	AC/DC adapt：Input：100V~240V,50/60Hz,1.5A Input：19V,3.42A,lithium battery：7.4V，4300mAh
	Battery Life	standby＞10h，continuous test＞7h
	Save Data	Internal：16GB EMMC，External: Supports USB flash drive
	Charging Interface	DC 2.5mm
	Other Connector	USB2.0
	Wireless Network	WIFI
	Working Environment	-10°C~+50°C
	Storage Temperature	-40°C~+70°C
	Relative Humidity	0~95% Non Condensing
	Weight	≤795g
	Size	172mm×111mm×64mm

Term list

This term list gives explanations about fiber and related devices.

B

• Backscattering: The scattered light which opposes to the previous direction of propagation.
• Bandwidth: The function size transmitted by waveguide drop 3db below the zero frequency. The lowest frequency bandwidth is the function of waveguide length, but it is not in direct proportion to the length.

C

• Coating layer: A kind of material coated on the optical fiber in wire drawing pro- cess to prevent fiber damaged from environment or improper operation.
• Cladding: Insulating materials coated on the fiber cores.
• Cable pipelines: The pipeline for cable to pave or from it the pipe can be pull.
• Cable bending radius: Cable bending radius refers to the stress load that cable suffered, free bend refers to the admissible diameter for it lies under no burdened state.
• Cable module: The kind of cable installed by connectors on one end or both ends, this kind of cable often used as the interconnection by cable system and optoelectronic devices. If there is only one end installed by the connector, we call it “tail end fiber”. If both ends installed, we call it “bridging cable or wire jumper”.

D

• Decibel (dB): Standard unit used to describe the optical power gain or loss.
• Dielectric: It belongs to nonmetal type, so it is non-conducting, glass optical fiber is deemed as a kind of dielectric. Medium cable contains no metal parts.

F

• Fiber core: The central area where light propagates through it. Fiber core ec- centricity ratio: The core center displacement measurement relative to the cladding center.

F

• Fiber core: The central area where light propagates through it. Fiber core ec- centricity ratio: The core center displacement measurement relative to the cladding center.

• Fiber core ellipticity: The deflected measurement for aspheric fiber core and perfect circle.

I

• Insertion loss: Due to the insertion of optical module (the connector or coupler in optical transmission system) that result in attenuation.

M

• Material dispersion: The dispersion resulted from material refractive index or the correlation with light speed and wavelength in this material.
• Module (1): Used to describe the terms about the independent light path which penetrate the fibers, such as multimode and single mode.
• Module (2): Scattered light wave can transmitted in optical waveguide, it is the differential equation eigenvalue featured in waveguide. There is only one module which can transmit in single mode optical fiber called “basic mode”. But there are hundreds of modules in multimode fibers; they are different in graph and propaga- tion speed, the upper limit of module quantity determined by fiber core diameter and waveguide value.

• Monochrome:Composed by single wavelength, in fact radiation is not the ideal monochrome. The best situation is to display wavelength in narrow-band range.
• Multi optical fiber and cable: The cable contains two or more pieces of optical fiber.
• Multimode fiber: A kind of optical waveguide. Through it, light can be transmited by multimode. Typical fiber core or covering size is measured in micrometers. (62.5
/ 125).

N

• Nanometer: A kind of measurement unit, equal to nm, often used to describe wavelength, such as 1300nm.

O

• OTDR: OTDR transmit impulse to fiber to measure backscattering. Through analysis the track can determine the event.
• Optical Time Domain Reflectometer (OTDR): A kind of device used to measure the optical features in optical pulse transmission, and make measurement of the back scattering light and reflected light as the time function. This device can also be used as the function relationship to estimate damping coefficient and distance, determine the flaw and other part loss.
• Optical fiber: A kind of threadlet or fiber made by any derivative light dielectric.
• Optical fiber link: Optical fiber transmission channel designed to connect either terminals or tandem with other channels.
• Optical cable: The module constituted by the materials which can protect the optical fiber and resist to machine or environment damage.

P

• Plug-in board: Network devices in the bracket, such as OTDR or the switches.
• Photoelectric device: A kind of device can response to fiber power, send or adjust optical radiation, or used in internal work. It can also be used as any device in photoelectric conversion.
• Port: Located at the port of the plug-in device to connect the wire jumper or the fiber.
• Peak wavelength: The wavelength when the source optical power meter maxi- mizing.

S

• Single mode optical fiber: The fiber with small size core diameter called “single mode optical fiber, usually it is 9um. Among them only the single mode and basic mode can transmit this kind of fiber. This kind of optical fiber is particularly applied to long-distance bandwidth transmission, for the bandwidth is only restricted by dispersion.

T

• Transmitter: A kind of driver can switch electric signal to optical signal.
• Transmission loss: Total loss in system when transmission happens.
• Telecom cabinet (TC): It is an enclosure space placed by cross-linked fiber terminal and telecom settings. Equipment cabinet is regarded ascross-link by main wiring and horizontal wiring.

W

• WDM: Transmit several signals in optical waveguide with different wavelengths at the same time.

FCC RF Radiation Exposure Statement:

1. This Transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.
2. This equipment complies with RF radiation exposure limits set forth for an uncontrolled environment.
3. This equipment is a non-portable device. It should be installed and operated with a minimum distance of 20cm between the radiator and your body at all times during operation. The use of accessories like shoulder straps or belt clips is strictly prohibited for this device to maintain compliance.

FCC Warning

15.19 Labeling requirements.

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

15.21 Information to user.

Any Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

15.105 Information to the user.

Note: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

-Reorient or relocate the receiving antenna.
-Increase the separation between the equipment and receiver.
-Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
-Consult the dealer or an experienced radio/TV technician for help.

The End

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