SPEEDWODLF

Optical Time Domain Reflectometer

SP-OTDR32F-T4

USER'S GUIDE

PREFCE

Thank you for purchasing and using this series of handheld optical time domain reflectometer. This manual contains information about the operation and maintenance of the instrument, as well as common troubleshooting guidelines. In order to facilitate your use, please read this manual carefully before operating this instrument and follow the instructions in the book.

This document is restricted to the use of this instrument. No unit or individual may, without the authorization of the company, tamper with, copy and distribute the contents of this manual for commercial purposes.

The contents of this document are subject to change without notice. If you have any questions, please call the supplier, we will be happy to provide you with the best quality service!

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Chapter 1 Summary

1.1   Instrument Unpacking Inspection

The packaging and transportation of this instrument are strictly in accordance with the general technical conditions of GB/T 9174-2008 "general cargo transport packaging". When you receive this instrument, please check the product according to the packing list and check the quality of the product. If you find the packaging damage, please keep the original packaging materials at the same time, immediately notify the shipping company, and contact with the supplier of this product.

In the product packaging, along with the instrument, should also be equipped with a power cord, adapter, analysis software and user manuals, etc.. After you receive the instrument, please check the integrity of the packaging of the equipment for the first time. If you find that the material in the packing box is not complete, please contact with the supplier.

Form 1-1 Basic Composition of OTDR

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ITEM	NAME	QUANTITY
MASTER	SP-OTDR32F-T4	1
Accessory Options	Power Cord	1
	Power Adapter	1
	User's Guide	1
	U Disk （Including simulation analysis software）	1
	Touch Pen	1
	Soft Bag and Strap	1

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1.2 Summary

SP-OTDR32F-T4 series of optical time domain reflectometer (OTDR) is a new generation of intelligent optical fiber measuring instrument designed for the testing of optical fiber communication system. This product is mainly used to measure various types of optical fiber, optical cable length, loss, and other parameters of the quality of the connection; can quickly in the optical fiber link in the event points, fault location. It can be widely used in the construction, maintenance and emergency repair of optical fiber communication system. In the construction of fiber optic network installation, or follow-up rapid and efficient maintenance and troubleshooting test, this product can provide you with the highest performance solutions.

The appearance of this novel instrument; OTDR has the industry's most simple interface, intuitive operation; in similar products, buttons and touch screen dual mode of operation, greatly simplifies the user; analysis of a type unique, quick access to the test result, the event is displayed in a tabular form on the main interface, the relevant information including: event type, event location, loss,

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reflection, attenuation, event between total loss; machine adopts intelligent power management mode, large capacity lithium battery makes the machine work more than 10 hours, very suitable for the long-term field environment.

In addition to the OTDR function, the instrument can also be equipped with optical power meter, light source, visual fault location (VFL) and the end detection function.
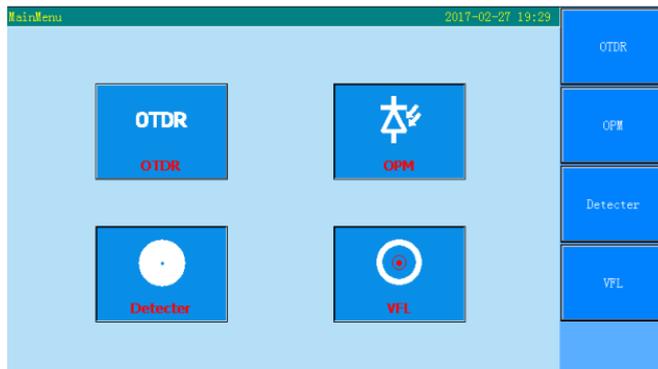

Figure 1-1　　Main Menu

1.3 Attentions

1.3.1 External Power Supply

Power adapter input meets the following requirements:100V～240V, 50/60Hz；@1.8A。

Power adapter output meets the following requirements:12V±1V, 2A, Polarity: Center is positive.

Please use the external power in strict accordance with the specification, otherwise it may cause damage to the equipment.

1.3.2 Internal Battery

Internal lithium battery. In order to give full play to the performance of the battery, in the beginning of the use of this instrument, please use the internal battery power, the battery power

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consumption, and then charge the battery, the first charging time should not be less than 12 hours. When the temperature is too high, the charging temperature of the battery in the battery is 0 DEG C to about 50 DEG C. The instrument is idle for more than 2 months or more, should be timely to keep charging the battery; not without removing the battery; please don't let the battery near the fire, strong heat; do not open or damage the battery; long-term storage equipment, the battery should be removed. When the battery is stored for a long time:-20℃～45℃。

1.3.3 Laser Safety

In the use of this instrument, please pay attention to avoid the eyes of laser output, but also not in the test, open end fiber; when the instrument after use, please cover the light output of the dust cap.

When the instrument is visible red light function is open, please don't use the output port eyes of

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red light, don't look at this time also connected to the output end of the optical fiber light.

1.3.4 Instrument Maintenance

1. The whole machine is guaranteed for 12 months, and the battery is guaranteed for 6 months。

2. Optical output connectors and other devices are vulnerable parts, such devices are not within the scope of warranty.

3. Because of the external factors can not resist the instrument damage or performance degradation, will not be within the scope of warranty.

4. Due to improper operation of the instrument damage or performance degradation, will not be within the scope of warranty.

5. **Without the permission of the company or the designated authorized unit, is strictly**

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prohibited to disassemble the instrument, otherwise it will lose the warranty!

1.3.5 Instrument Return

If you need to return the product for product calibration or other reasons, please contact your supplier in advance, and a brief description of the reasons for the return of the product, in order to provide you with more timely and effective service.

Please note that when the product returns:

- Using polyethylene thin soft pad instrument package, with perfect protection instrument housing;

- Please use a hard packing box to ensure that the instrument is filled with at least 3 cm thick;

- Fill in the product maintenance card correctly, including company name, address, contact

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person, telephone number, problem description and so on;

● Deliver the goods to your supplier in a reliable manner.

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Chapter 2 OTDR Introduction

2.1 OTDR Basic Knowledge Introduction

OTDR is a precision optical measuring instrument of Rayleigh scattering and Finel reflection transmission in fiber produced by laser backscatter principle is made, it is widely used in optical fiber, optical cable installation, maintenance and repair, monitoring applications. It can be used to measure the length, attenuation, quality and fault location of fiber optic cable.

The light in the optical fiber transmission, due to defects in doped fiber component inhomogeneity or fiber link itself, the optical pulse propagating in fiber Rayleigh scattering occurs, where a portion of the optical signal will be shot into the opposite direction along the veins are scattered back, so it is called the Rayleigh backscattering, through the observation of Rayleigh timing after the change of scattering light signal intensity, accurate measurement of the fiber optic cable to

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the loss distribution, the quality of the connection properties.

According to the theory of light transmission, when the light is in the process of communication, there are two kinds of transmission medium with different refractive index boundary (such as fracture or connector, fiber end), will Fresnel reflection, through the regular reception of this Fresnel reflection signal, can be accurately located along the length of the fiber discontinuous point. The size of the reflection depends on the refractive index difference and the smoothness of the boundary surface.

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2.2 OTDR Test Event Type

OTDR test event is an abnormal point that causes a sudden change in loss or reflected power. Including all kinds of connection points in the optical fiber link, melting contact and bending, crack or fracture and so on.

There are two main types of OTDR test events: reflection events and non reflective events.

2.2.1 Reflection Events

When measured along the optical fiber laser from the OTDR pulse, if the activity connection point, or the end of the fiber, the refractive index due to mutation causes will produce the phenomenon of reflection, will be part of the optical signal along the optical fiber. To return to the instrument, the instrument through the acceptance of the reflected signals, will detect the reflection event. In the OTDR test curve, it is shown that the peak width and amplitude are determined by the

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pulse width and the reflected intensity. As shown in figure 2-1.

Figure 2-1 Reflection Events Diagram

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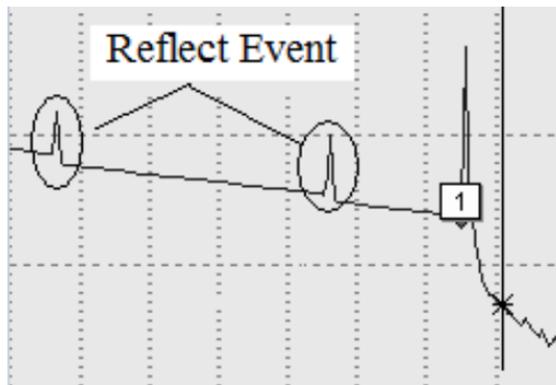**If you have any question,please contact us directly for help,Email: speedwolf@speedwolf.net**

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2.2.2 Non Reflective Events

When the laser emitted from the OTDR pulse to be measured along the optical fiber transmission, such as melting point or bending leads to some loss of energy when the location does not exist at this time due to mutations in the refractive index, so the reflection phenomenon will not occur, or can be ignored. OTDR detects the difference of the energy change of the receiving end of the OTDR, which can be used to detect the non reflection event parameters. Non reflection events declined as a signal energy in the test curve of OTDR, the decrease of said power loss situation. As shown in Figure 2-2.
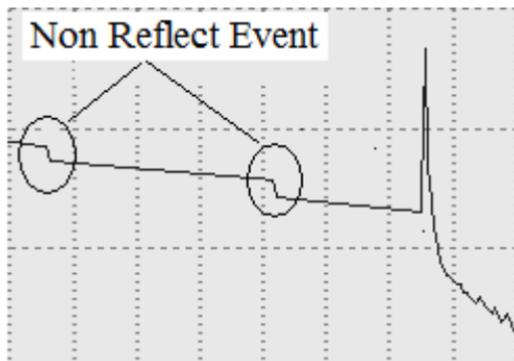
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Figure 2-2   Non Reflection Events Diagram

2.3   OTDR Dynamic Range

Dynamic range is an important parameter of optical time domain reflectometer (dB). This parameter is expressed as the maximum optical loss of OTDR that can be analyzed from the backscatter level of the instrument output port to a specific noise level. In the practical use of OTDR,

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the maximum distance between the fiber and the OTDR can be measured by measuring the maximum fiber link distance under the condition of the maximum test pulse width. Therefore, in the same link condition, the dynamic range (unit: dB) is bigger, the instrument can test the distance of the optical fiber link.

The maximum test distance of OTDR is different in different applications, because the loss of the measured link is different. Connectors, welding and splitter are also factors that reduce the OTDR test length.

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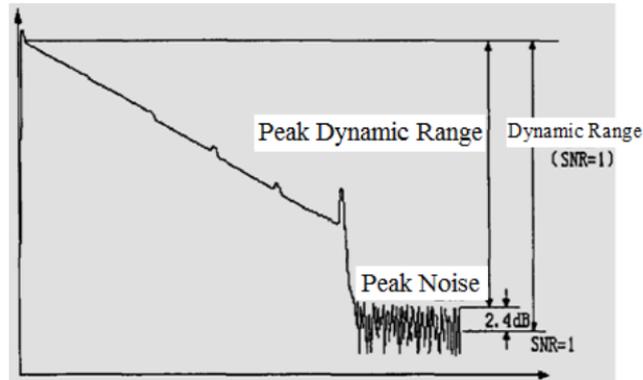
Figure 2-3 Dynamic Range Diagram

2.4 OTDR Dead Zone

OTDR dead zone is divided into event blind area and attenuation blind area. Two kinds of blind

areas are generated by the Fresnel reflection, in order to reflect the change in the power of the

different distance (meter) to express.

Event Dead Zone: Refers to the OTDR detected from the Fresnel reflection signal to distinguish the

shortest distance of a Fresnel reflection signal。

ATT Dead Zone: Refers to the OTDR signal detected from the Fresnel reflection to the shortest

distance to the normal test of Rayleigh backscattering signal.

Chapter 3 The basic operation and usage of this series OTDR

SP-OTDR32F-T4 series of OTDR with the industry's most simple and efficient operation, the main operating interface contains only 5 menu options. After optimizing the mode of operation, more in line with the user's daily habits; at the same time, unique in the industry of similar products in the key and touch screen full function mode of operation, making the operation more convenient, the tedious process of eliminating the frequent user moves the cursor.

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The operation interface of the instrument is divided into operation window area and menu display area. Instrument boot into the interface, the display screen displays the main operating window, as shown in figure 3-1. The main operating window contains all of the 5 OTDR main operating menu, each menu bar contains a different sub window, through the operation button will start a different sub window to achieve the corresponding functions. (detailed description of the use of methods)

3.1 This series of OTDR main operating window
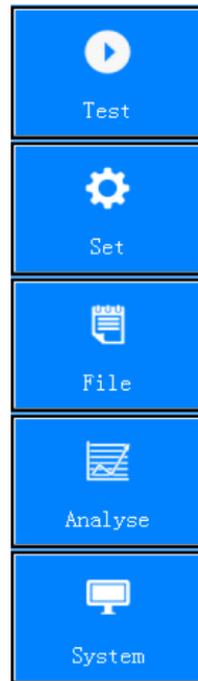
Figure 3-1 Main Operating Interface

Notes:

(1) For OTDR power indicator, system time, charging indicator display area.

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(2) Display the test curve for OTDR, modify the display area of each sub menu parameter. After the test is completed, the display area shows the distance between two points, the loss of two points, the average loss and other related information.

(3) OTDR test conditions, file information, test results, event list display area. The display area for the check function display window, in the initial state, the state of the display as shown in Figure 3-1, at this time the instrument set parameters, file information.

After testing the curve, the display window is displayed as an event analysis list for the entire link when the curve is analyzed.

(4) For the OTDR function menu, click on the menu to do related operations。

3.2 The Menu Structure and Function of OTDR

SP-OTDR32F-T4 series of optical time domain reflectometer with the industry's most simple

and efficient operation

Type, the main operation interface contains only 5 menu options, as shown on the right.

After optimizing the operation mode, more in line with the user's daily habits. In the same products in the industry, the unique touch screen plus button full function operation mode

The utility model has the advantages that the operation is more convenient, and the user's frequent movement of the cursor is omitted

Process.

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3.3 Key Function Introduction of OTDR

Figure 3-2   Key Introduction

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The key function of each button is under:

F1 F2 F3 F4 F5 :Function Selection Button, corresponding to the left menu.

:Power Button, press the key to open the instrument, long press this button to close the

instrument.

OTDR :OTDR Test Button, Press this button to open or stop the test of the optical fiber or cable.

A-B :A\B Cursor toggle Button, Press this button to achieve the cursor A and cursor B switching

function.

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:Zoom\Move Select Button, Press this button to achieve the zoom function or cursor movement function.

:Enter Button, Press this button to confirm the prompt information.

:ESC Button, Press this button to exit the test or the current test function or return to the main function.

: Navigation Button, Press this button can be select the function of cursor movement or zoom in or out.

3.4 The Setting Method of The Parameters of the OTDR

It is necessary to set the parameters of the instrument accurately before test. The test parameters of OTDR include the test wavelength, the range, the pulse width, the refractive index, the optical fiber correction coefficient and the event threshold.

In the parameter setting interface, click on the corresponding menu, you can select the corresponding function; or in the main interface, click on the touch screen parameters in the display area, will pop up the parameter setting interface (all test parameters can be the interface of the instrument complete set), as shown in figure 3-3.

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Fig 3-3 Parameter Setting Interface

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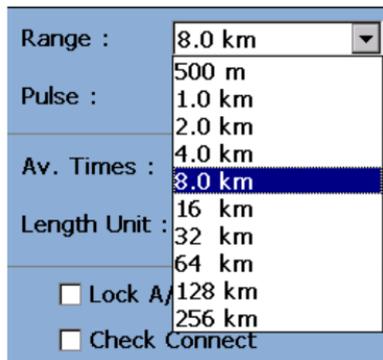
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3.5 Parameter Introduction and Setting Method

Wavelength（nm）:Set the OTDR test wavelength.

The setting method：In the parameter settings interface, by clicking [1310nm] or [1550nm] can choose the corresponding wavelength.

☑ 1310 nm   ☐ 1550 nm

Test range（km）: Set scan range.

The range is set according to the actual length of the fiber to select the appropriate predefined range, it must be greater than the length of the measured fiber, usually set to two times the length of the measured fiber.
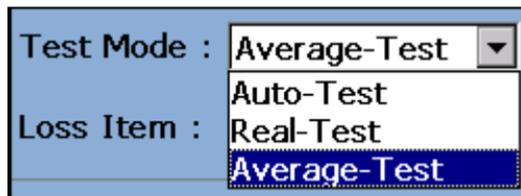
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The setting method: In the parameter settings interface, click the "Test range" menu, that is, 500m~256km options, click Select the appropriate range can be.

Pulse width（ns）：Setting the laser pulse width.

This series of OTDR for a variety of different length of the range, the pulse width of the test to do the corresponding streamlined processing, a great convenience to the operator's selection process. In actual operation, it is recommended to use the optional range of the maximum pulse width can be.

The setting method：In the parameter settings interface, click on the "pulse width" menu, that is, the 5ns~20000ns option, click Select the corresponding pulse width.
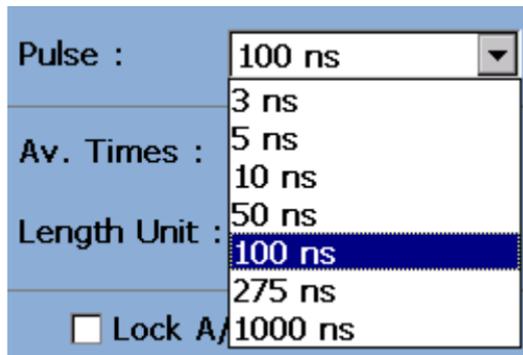
Test mode：Mode for selecting OTDR scan. Includes "real time testing", "average test" and "automatic test".

Real time testing: In order to scan the test link in real time and display the test results, it is convenient to monitor the link and the link dynamically.

Average test: The scanning results are accumulated and averaged to improve the quality and accuracy of the test curve.

Automatic test: Intelligent test method. In this way, the instrument will automatically enter the link according to the measured data, and Match the test conditions, without the user manually set parameters.

The setting method: Under the parameter setting interface, click on the "test mode", that is, "automatic test", "real-time test", "average test" option, click Select the appropriate test mode.

Test Mode :	Average-Test ▼
	Auto-Test
Loss Item :	Real-Test
	Average-Test

Average times：In the "average test", "automatic test" mode, used to set the average number of times.
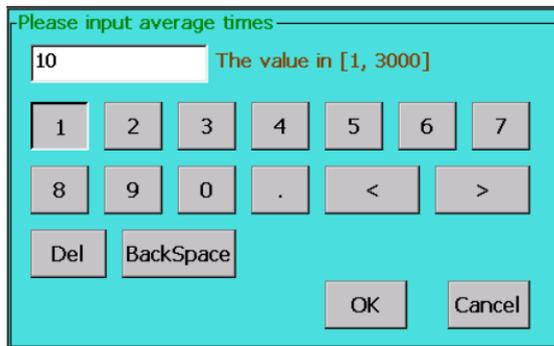
This option is not supported in the real time test mode.

The setting method: In the parameter settings interface, click on the average number of times, the average number of pop-up input interface, input the average number of times, click [OK] and exit window.

Loss display: The type used to select the OTDR test event. "Average loss", "Connection loss" and "Return loss".

Average loss：Used to test the loss, spacing and average loss between two points in the link. By

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moving the cursor position, the loss of two points in the link can be measured.

Connection loss: Used to test the loss characteristics of the connection point, melting point, or macro bend in the link.

Return loss: Used for testing the loss of reflection events in a link.

The setting method: Under the parameter setting interface, click on the "loss display", "average loss", "connection loss" and "return loss", click Select the corresponding loss.

Test Mode :	Average-Test ▼
	Auto-Test
Loss Item :	Real-Test
	Average-Test
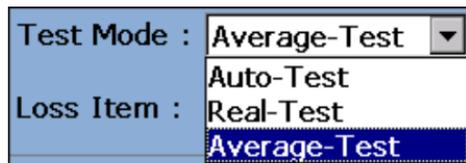
Group refractive index：The refractive index of the fiber affects the transmission speed of the laser in the optical fiber, so the accuracy of the refractive index is directly affected by the accuracy of the measurement. The refractive index of optical fiber is provided by optical fiber manufacturers.

The setting method：In the parameter settings interface, click on "group refractive index", pop

index input interface, enter the refractive index of the optical fiber is measured, click [OK] exit window.
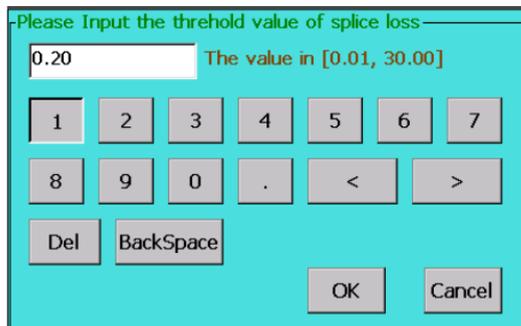

Cable correction：The placement of the correction factor is the change of fiber length and fiber length after the fiber optic cable is taken into account. This parameter can be obtained from the cable manufacturer. The default is set to "1".

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The setting method：In the parameter settings interface, click the [optical cable correction], pop optical cable to modify the input interface, the input optical fiber is the correction factor, click OK to exit the window.

Event threshold：The event threshold of curve analysis, divided into "splice loss threshold" and "return loss threshold" and "the end of the optical fiber threshold". Events greater than the event threshold will be listed in the event table, be ignored which is less than the event threshold.

The setting method：In the parameter settings interface, click on the corresponding threshold menu to pop up the threshold input interface, click on the input threshold "OK" to exit window.

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Please Input the threhold value of splice loss

0.20   The value in [0.01, 30.00]

| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 8 | 9 | 0 | . | < | > |

Del   BackSpace   OK   Cancel

3.6 Introduction of Loss Test

3.6.1. This series of OTDR test items are available: average loss, connection loss, return loss.

3.6.2. Average Loss Test

In the average loss test mode, OTDR will test the distance between the cursor A and B, the loss between the cursor A and B, the average loss between the cursor A and B. Click the panel buttons

[A-B] Can switch A and B cursor; ◆ or ◆ can move A or B cursor position，The utility model can satisfy the customer to observe the detailed loss of any distance between the optical fiber links. As shown in figure 3-4.

Fig.3-4 Average Loss Test

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3.6.3. Connection Loss Test

The connection loss test is used to accurately measure the loss characteristics of any reflection and non-reflection events in the link.

In the connection loss mode, OTDR main interface will display the cursors A and B. The test results show that the connection loss connection point position of the cursor A , and the connection point of a fiber and a fiber after the average loss at the same time.

In the connection loss test, as shown in Figure 3-7, Placed the cursor A and B before and after the event respectively, placed cursor A in measured the positions of left sides and close to the incident, placed cursor B in measured the positions of right sides and close to the incident,. As shown in figure 3-5.

Fig.3-5   Connection Loss Test

3.6.4. Reflection Loss Test

The return loss mode is mainly used to accurately measure the reflection loss characteristics of any reflection event in the link.

In the reflection loss mode, the OTDR main interface will appear A and B two cursors. When the reflection event loss is tested, the cursor A is placed in front of the reflection event to be measured, and closed to the take-off position, Place the cursor B at the top position of the reflection event. The return loss can be read by the return loss. As show in figure 3-6.

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Fig.3-6 Reflection loss test

3.7 Curve Analysis and Event List

After the OTDR test end and gets the test curve. Click "analysis" menu or click [F4] button,

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OTDR will analyze the obtained curves, According to the threshold of the event, the event points are selected and located. The length, loss and average loss of optical fiber link are obtained. the event list information is displayed in the list of events in the main operating window.

Click event list, Press the navigation key ▲ or ▼ can view the information of all events in the event list one by one。

In the event list window：

   Event type: Event type for current event point.

   Drop event: This event is a non-reflective event point in the fiber link, usually caused by melting contact, fiber bending or extrusion.

   Rising events: This event is a non-reflective event point in the fiber link, usually caused by testing of different types of optical fiber；

   Reflection event: This event is a reflection event. usually caused by an active connector in an optical fiber link.

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Fiber Splitter：Usually caused by fiber splitter in an optical fiber link.

Fiber end: Current event point is the end of the link.

Distance（**km**）：Current event point position.

Average loss（**dB/km**）：Current event point loss.

Splice loss: Loss of fusion contacts in optical fiber links.

Return loss：The return loss of current event point.

Link loss: The total loss of the link from the start point to the current point in the link.

Reflection loss: Reflection loss of reflection events caused by active connections in a link。

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Fig.3-7 Analysis Result

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3.8 Move or Switch Cursor

Press Navigation key ◆ or ◆, can move the cursor to the left or right. Click on the touch screen to

place the currently active cursor at the corresponding touch point. Press Navigation key [A-B], To

achieve the switch between the optical punctuation.

3.9 Zoom or move the curve

After the end of the OTDR test, Press the horizontal zoom function

button in the curve menu [↻], as show in figure(1),

Press Navigation key ◆、◆or ▲、▼can move the curve at

Horizontal or vertical translation.
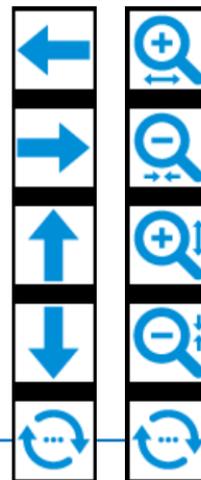
Press the horizontal zoom function button in the curve menu

, as show in figure(2), Press Navigation key , or , can zoom in or out of the curve

at Horizontal or vertical translation.

3.10 Manual measurement of average loss between two points in an optical fiber link

The setting method:

● In the OTDR test parameter setting window，Set test items to average loss test. The main operating window will appear 2 cursors, cursor A and cursor B.

● Place the cursor A and B at any two points on the linear region of the measured fiber segment.

● The average value of the average loss displayed on the operating window is the average loss of the fiber segment to be tested.

As show in figure 3-8.

Fig.3-8 Average Loss Measurement

3.11　Manual measurement of the loss of connection points and fusion contacts in optical fiber links

Manually test the connection loss of a connection point:

● In the OTDR settings window, set the test item to the connection loss test. At this time the main operating window will appear in 4 cursors (followed by the cursor a, cursor A, cursor B, cursor B).

● Zoom waveform, Position the cursor A in front of the jump edge near the connection point event, near the location of the connection event.

● The small cursor before the cursor A is placed at the beginning of the linear segment of the fiber before the event of the connection.

● Position the cursor B near the jump edge of the connection point event, near the location of the connection event.

● The small cursor at the end of the cursor B is placed at the end of the segment of the optical

fiber before the event of the connection.

● The connection loss of the measured connection point is displayed on the operation window.

As shown in Fig. 3-9.
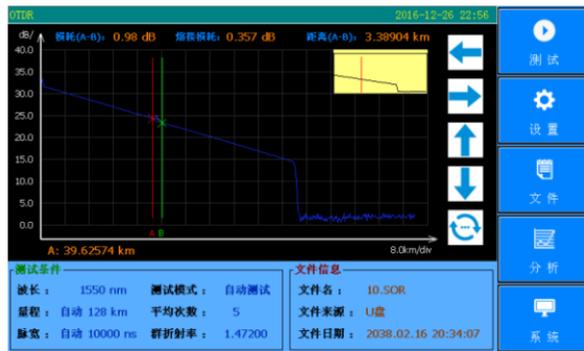
Fig.3-9 Connection Loss Measurement
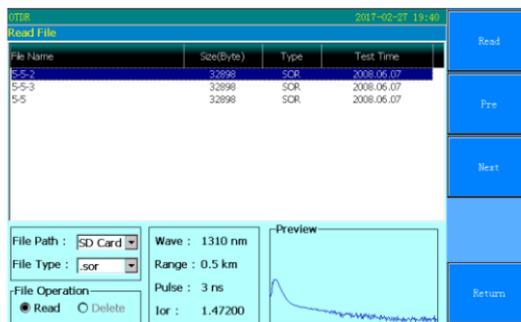
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3.12 Measure Echo Loss Manually

If you want to manually test the return loss of a connection point, the steps are as follows:

In the OTDR settings window, set the test item to **echo loss** test. At this time, there will be 2 cursors, cursor A and cursor B.

The test point is extended, and the mark point A is positioned at the rising edge of the measured reflection event.

Mark point B is located at the top of the measured reflection event.

At this time, the value of the return loss displayed on the operation window is the return loss of the measured connection point.

As shown in Figure 3-10.

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Fig.3-10   Return loss measurement

3.13 File Management Class

The following is the introduction of this series of OTDR file management operations, including file read, save, copy, delete, etc.. When measuring, the measurement curve can be saved. The contents of the preservation curve include: the curve and the curve of the relevant information.

3.13.1 File Read

In the test of the main interface, click on the **[file]** - **[read]**, pop-up file read interface, click on the **[file path]**, the path of the file list, select the corresponding file, click **[read]**, as shown in figure 3-11.

Fig.3-11 File Read

3.13.2 File Save

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In the test main interface, click **[file]** - **[save]**, pop-up file save interface, enter the file name, select the file to save the path and format, click **[OK]**, as shown in Figure 3-12.
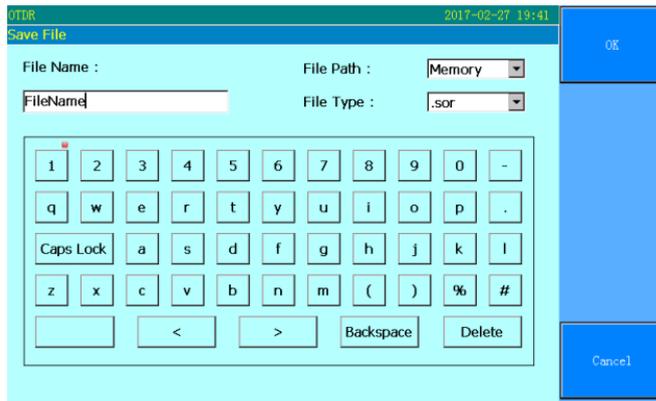
Fig.3-12 File Save

3.13.3 File Copy

In the test main interface, click **[file]** - **[save]**, pop-up file copy interface, you can choose to copy

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the file to the U disk memory.
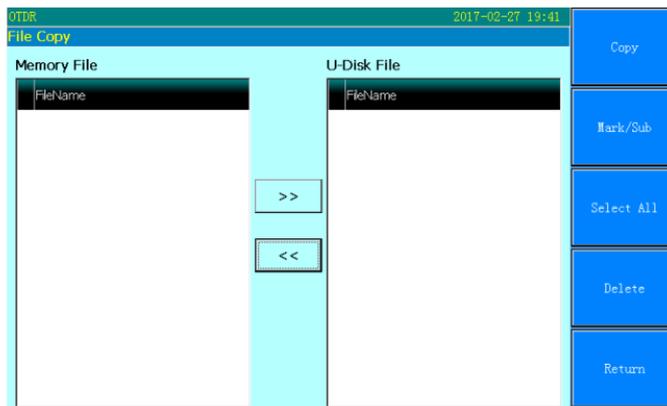
Fig.3-13　File Copy

3.13.4 File Deletion

In the test main interface, click **[file]** - **[delete]**, pop-up file delete interface, select the name of

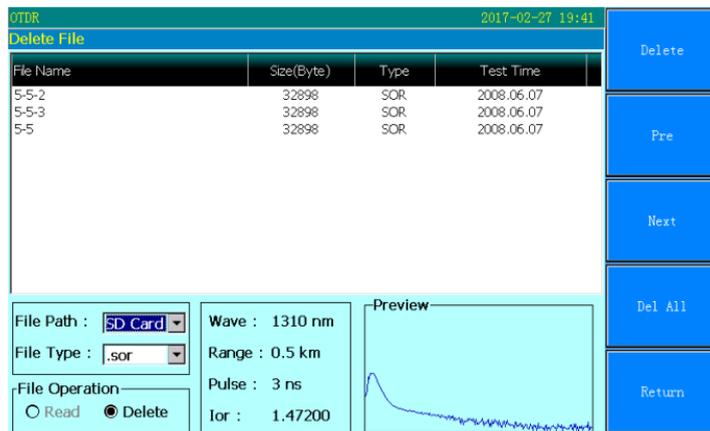the file you want to delete, click Delete to delete the appropriate file.

Fig.3-14 File Deletion

3.14.5 System Time, Language Settings, System Upgrades and View System Information

In the OTDR test interface, click on the menu button **[system]**, enter the system menu interface,

click the system **[settings/upgrade]** to enter the system information settings window.

In the system **[settings/upgrade]** interface, the system time, the system language settings, the touch screen can be calibrated, the software can be upgraded. As shown in Figure 3-15.
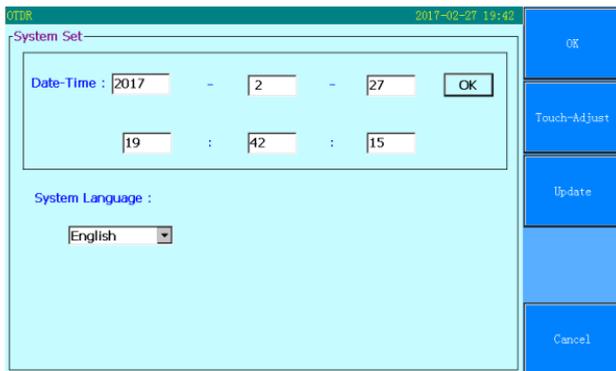

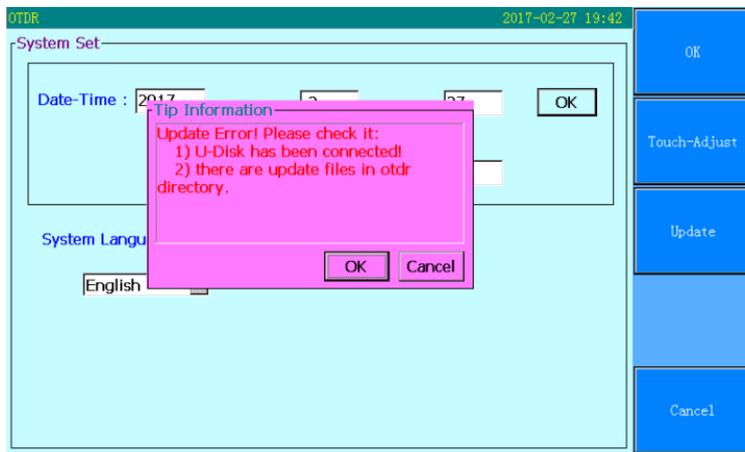Fig.3-15 System Settings/Upgrade Interface

Fig.3-16 System Settings/Upgrade Interface

Note: the [system time], [language] and [Brightness]option in the page can be set up by the user,

the rest is the inherent parameters of the system.

3.14.6 Help Information

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In the OTDR test interface, the menu button, click on the **[system]**, enter the system interface, click on the **[help]** to help file system interface, you can view the instrument operating instructions, test notes and optical power function introduction, face detection function, OTDR file operation. Guide to the rapid operation of this test instrument.

By the navigation keys on the left and right buttons to turn pages. Press the return key to exit the window. As shown in Figure 3-17.
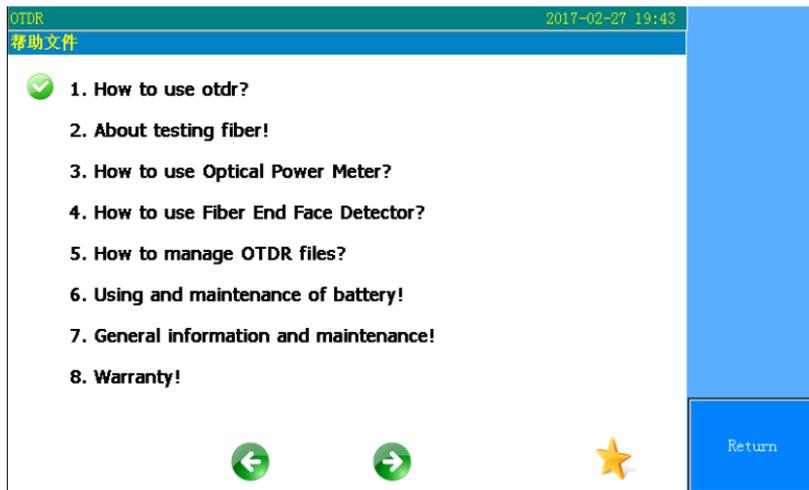
Fig.3-17 Help Information Interface

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Chapter 4 Basic Operation and Use Method of Optical Power Meter

If you buy the instrument equipped with optical power meter function, click on the main menu of the optical power meter button, will enter the optical power meter operating interface, as shown in Figure 4-1.

Fig.4-1 Optical power meter test interface

The menu button function and operating instructions are as follows:

[start]: start or stop power meter test. The following three methods can achieve this function。

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Click this button to start the power meter module to be tested, and the button is changed to **[stop]**, and then click the button again, then stop the power meter test, and the button content becomes **[start]**.

[settings]: enter the settings interface, changing the wavelength, unit, the average number of times, the range of parameters. As shown in figure 4-2.
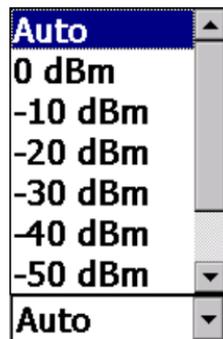

Fig.4-2　Power meter setting interface

[Wavelength]Wavelength switching can be achieved, selectable wavelengths of 850nm, 1300nm, 1310nm, 1550nm, 1625nm, this button will change the power meter test wavelength.

[unit]can achieve dB, dBm, mW switch between.

[verage number of times] Modify the average number of optical power meter, the average number of times, the higher the accuracy of the measurement, the average number of options from 16 to 1024.

[range]: Click on the menu item button to pop up the range selection drop-down box. Click on the touch screen or ▲▼ key select range. Select <automatic> the instrument will automatically determine the test range. Select the appropriate range for testing. The measuring range will be locked when the instrument is tested.

[zero]: the implementation of the adjustment of power meter zero point.

[reference] relative measurement of optical power mode, dB mode.

Auto
0 dBm
-10 dBm
-20 dBm
-30 dBm
-40 dBm
-50 dBm
Auto

[return]: exit the Optical power interface, return to the main operating interface.

Chapter 5 Introduce of The Function of Face Detection

Access equipment selection of USB end detector, boot into the test main interface, press the

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button ![F3], or click on the [end detection] module, into the end of the test interface.

Detect the optical fiber connector access to the end detector to see whether the end surface is clean. As shown in figure 5-1.

Fig.5-1   End detection interface

Chapter 6   Visual Fault Location（VFL）

Click on the figure 6-1 **[VFL]**, will enter the visual fault locator operating interface, as shown in

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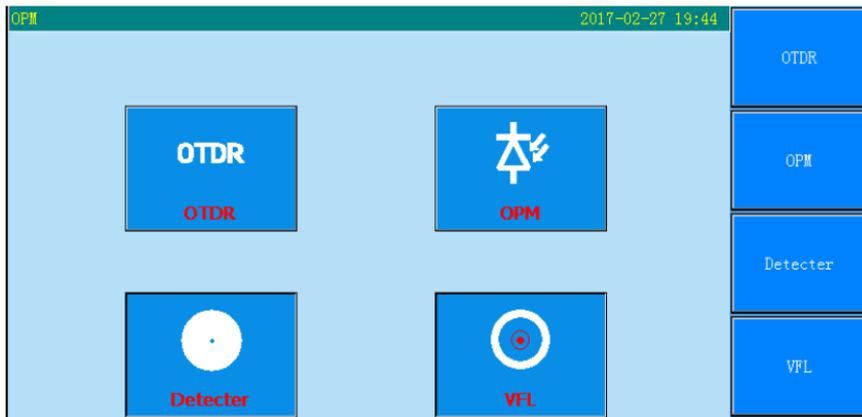
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Figure 6-1。

Fig.6-1 VFL Operation interface

VFL operating instructions are as follows:

Click [VFL], visual fault location mode for 1Hz modulation light output;

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Click [VFL], visual fault location mode continuous light output;

Click [VFL], visual fault location function off.

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Chapter 7 Instrument Maintenance and Troubleshooting

7.1 Daily Use and Maintenance of Instrument

7.1.1 Connector Cleaning

SP-OTDR32F-T4 series of OTDR optical output interface for the replacement of the universal optical interface, the use of the process must be maintained in the end of the cleaning. When the instrument is unable to test the normal curve, or the test result is not accurate, the connector should be considered first.

When cleaning, make sure that the OTDR and the visual red fault location function are stopped. Unscrew the output interface, use a special paper towel or cotton swab moistened with alcohol to wipe the connecting end face.

At the same time, in the normal use of the instrument, after the completion of the dust cap on the

cover, but also must keep the dust clean.

7.1.2 Internal Battery Maintenance

The battery series OTDR machine for lithium battery in the instrument for the first time, please first use of battery power, the battery discharge completely, and then for the first time to charge the battery, charging time should be more than 8 hours. For the sake of your safe use, the internal charging circuit of the instrument set up multiple protection measures for the battery voltage, charging current, charging temperature and so on. The charging temperature range of the internal battery is 0 DEG C to about 50 DEG C, and when the environment temperature is too high, the charging is automatically terminated. When the instrument is not used for a long time, please charge the battery on a regular basis, it is recommended that every 2 to 3 months for the battery charging operation to ensure the best performance of the battery.

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7.1.3 Instrument Screen Cleaning and Calibration

SP-OTDR32F-T4 series of OTDR display for the touch screen with 7 inch color LCD, in the use of sharp objects can not be used to click on the LCD screen, otherwise it may lead to damage to the LCD screen.

When cleaning, use a soft cloth to clean the LCD screen. Do not use organic solvents to clean the LCD screen, otherwise it may cause damage to the LCD screen.

7.1.4 Instrument Calibration

In the normal use of the instrument, it is recommended that the optical time domain reflectometer calibration every two years. Please contact the instrument supplier for specific calibration.

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7.2 Fault and Treatment Method

Form 7-1   Fault phenomena and treatment methods

Fault Description	Failure Cause	Resolvent
Instrument can't start properly	Battery without electricity	Charge the battery, and observe the switch key light, if the red light, then continue to charge, otherwise, contact the supplier.
Instrument can not charge	Use the environment to meet the charging conditions	The instrument is placed in the environment of 0℃～50℃.
	Poor battery contact	Open the battery compartment cover, check the battery contacts, and re install the battery
	Battery problems, or internal	Contact suppliers to replace

	circuit problems	batteries
Unable to measure normal curve	Instrument parameter setting error	Resetting the correct test parameters
	The output end of the optical fiber is polluted	Clean light output face
	Optical output connector damage	Replace output connector
	Optical output connector mismatch	Replace matching connector.
Test curve burr, Waveform is not smooth	Incorrect output interface connection	Reconnect the appropriate output interface
	Pulse setting small	Increase test pulse width
	Incorrect channel settings	Modify test channel parameters

Saturation of the front end of the test curve	Pulse width setting	Reduce test pulse width parameters
	Incorrect channel settings	Modify test channel parameters
Slow down the test curve starting end reflection peak, trailing phenomenon	The output end of the optical fiber is polluted	Clean light output face
	Optical output connector damage	Replace output connector
	Optical output connector mismatch	Replace matching connector
Optical fiber end reflection peak	Range setting small	Increase test range
	Pulse setting small	Increase test pulse width parameters
False positives in curve analysis	Poor quality of test curve. Event threshold setting.	Increase test pulse width parameters. Add event threshold.

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	Instrument parameter setting error	Resetting appropriate parameters
Measurement of fiber length is not accurate	The refractive index of optical fiber is not accurate	Fiber refractive index
	Optical cable correction factor is not accurate	Reset optical cable correction factor
The average value of optical fiber loss is not accurate	The front tail test curve is too long	Clean light output face
	Improper cursor location	Reset cursor position

● The above description is only for reference, please refer to the instructions for use. In the use of

the instrument, if in doubt, can contact with the instrument supplier.

● The instrument in use, without permission, the user must not arbitrarily disassemble, otherwise

it will lose the warranty!

Chapter 8 Technical Parameters

8.1 Technical Parameters of OTDR

Specification

Dimension	253×168×73.6mm 1.5kg (battery included)
Display	7 inch TFT-LCD with LED backlight (touch screen function is optional)
Interface	1×RJ45 port, 3×USB port (USB 2.0, Type A USB×2, Type B USB×1)
Power Supply	10V(dc), 100V(ac) to 240V(ac), 50~60Hz
Battery	7.4V(dc)/4.4Ah lithium battery (with air traffic certification)
	Operating time: 12 hours, Telcordia GR-196-CORE
	Charging time: <4 hours (power off)
Power Saving	Backlight off: Disable/1 to 99 minutes

	Auto shutdown: Disable/1 to 99 minutes
Data Storage	Internal memory: 4GB (about 40,000 groups of curves)
Environmental Conditions	Operating temperature and humidity: -10℃~+50℃, ≤95% (non-condensation)
	Storage temperature and humidity: -20℃~+75℃, ≤95% (non-condensation)
	Proof: IP65 (IEC60529)
Accessories	Standard: Main unit, power adapter, Lithium battery, FC adapter, USB cord, User guide, CD disk, carrying case
	Optional: SC/ST/LC adapter, Bare fiber adapter

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Technical parameter

Type	Testing Wavelength (SM: ±10nm)	Dynamic Range (dB)	Event Dead-zone (m)	Attenuation Dead-zone (m)
SP-OTDR32F-T4-21	1310/1550	32/30	1	8/8
SP-OTDR32F-T4-22	1310/1550	37/35	1	8/8
SP-OTDR32F-T4-23	1310/1550	42/40	0.8	8/8

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SP-OTDR32F-T4-24	1310/1550	45/42	0.8	8/8
SP-OTDR32F-T4-31	1310/1490/1550	30/28/28	1.5	8/8/8
SP-OTDR32F-T4-32	1310/1550/1625	30/28/28	1.5	8/8/8
SP-OTDR32F-T4-33	1310/1490/1550	37/36/36	0.8	8/8/8
SP-OTDR32F-T4-34	1310/1550/1625	37/36/36	0.8	8/8/8

Test parameter

Pulse Width	Single mode: 5ns, 10ns, 20ns, 50ns, 100ns, 200ns, 500ns, 1μs, 2μs, 5μs, 10μs, 20μs
Testing Distance	Single mode: 100m, 500m, 2km, 5km, 10km, 20km, 40km, 80km, 120km, 160km, 240km
Sampling Resolution	Minimum 5cm
Sampling Point	Maximum 128,000 points
Linearity	≤0.05dB/dB
scale Indication	X axis: 4m~70m/div, Y axis: Minimum 0.09dB/div
Distance Resolution	0.01m
Distance Accuracy	$\pm$(1m+measuring distance$\times3\times10\text{-}5$+sampling resolution) (excluding IOR uncertainty)

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Reflectance Accuracy	Single mode: ±2dB
IOR Setting	1.4000~1.7000, 0.0001 step
Units	Km, miles, feet
OTDR Trace Format	Telcordia universal, SOR, issue 2 (SR-4731)
	OTDR: User selectable automatic or manual set-up
Testing Modes	Visual fault locator: Visible red light for fiber identification and troubleshooting
	Light source: Stabilized Light Source (CW, 270Hz, 1kHz, 2kHz output)
	Field microscope probe
Fiber Event Analysis	-Reflective and non-reflective events: 0.01 to 1.99dB (0.01dB steps)
	-Reflective: 0.01 to 32dB (0.01dB steps)
	-Fiber end/break: 3 to 20dB (1dB steps)

Other Functions	Real time sweep: 1Hz
	Averaging modes: Timed (1 to 3600 sec.)
	Live Fiber detect: Verifies presence communication light in optical fiber
	Trace overlay and comparison

VFL Module (Visual Fault Locator, as standard function):

Wavelength (±20nm)	650nm
Power	10mw,CLASSIII B
Range	12km
Connector	FC/UPC
Launching Mode	CW/2Hz

PM Module (Power Meter, as optional function):

Wavelength Range (±20nm)	800~1700nm
Calibrated Wavelength	850/1300/1310/1490/1550/1625/1650nm
Test Range	Type A: -65~+5dBm (standard); Type B: -40~+23dBm (optional)
Resolution	0.01dB
Accuracy	±0.35dB ±1nW
Modulation Identification	270/1k/2kHz,Pinput≥-40dBm
Connector	FC/UPC

LS Module (Laser Source, as optional function):

Working Wavelength (±20nm)	1310/1550/1625nm
Output Power	Adjustable -25~0dBm

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Accuracy	±0.5dB
Connector	FC/UPC

FM Module (Fiber Microscope, as optional function):

Magnification	400X
Resolution	1.0μm
View of Field	0.40×0.31mm
Storage/working Condition	-18℃~35℃
Dimension	235×95×30mm
Sensor	1/3 inch 2 million of pixel
Weight	150g
USB	1.1/2.0
Adapter	SC-PC-F (For SC/PC adapter)

	FC-PC-F (For FC/PC adapter)
	LC-PC-F (For LC/PC adapter)
	2.5PC-M (For 2.5mm connector, SC/PC, FC/PC, ST/PC)

Note: the above contents are subject to change without prior notice due to the need for design improvement.

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