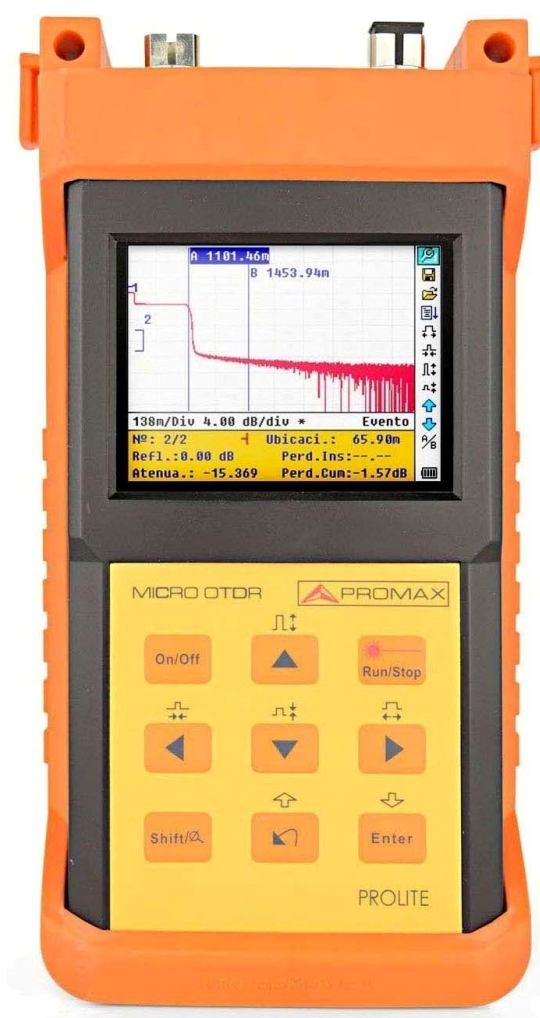



PROLITE-50/51/52

OPTICAL REFLECTOMETER (OTDR)



SAFETY NOTES

Read the user's manual before using the equipment, mainly **SAFETY RULES** paragraph.

The symbol  on the equipment means **SEE USER'S MANUAL**. In this manual may also appear as a Caution or Warning symbol.

WARNING AND CAUTION statements may appear in this manual to avoid injury hazard or damage to this product or other property.

USER'S MANUAL VERSION

Version	Date	Software Version
1.1	July 2016	v6.08

SAFETY RULES

- * **The safety could not be assured if the instructions for use are not closely followed.**
- * This is a **class I** equipment, for safety reasons plug it to a supply line with the corresponding **ground terminal**.
- * When using some of the following accessories **use only the specified ones** to ensure safety.

Mains power supply **AL-005**.

Clock Battery.

- * Observe all **specified rating** both of supply and measurement.
- * Remember that voltages higher than **70 V DC** or **33 V AC rms** are dangerous.
- * Use this instrument under the **specified environmental conditions**.
- * **The user is only authorised to** carry out the following maintenance operations:
Any other change on the equipment should be carried out by qualified personnel.
- * Follow the **cleaning instructions** described in the Maintenance paragraph.

Specific precautions

**CLASS 1
LASER PRODUCT**

CAUTION



It is recommended do not watch directly the laser beam.















The use of devices that are not the specified ones in this manual as well as internal manipulation of the equipment can be cause of dangerous radiation.

CAUTION



The battery used can present danger of fire or chemical burn if it is severely mistreat. Do not disassembly, cremate or heat the battery above 100 °C under no circumstances.

* Symbols related with safety:

	DIRECT CURRENT		ON (Supply)
	ALTERNATING CURRENT		OFF (Supply)
	DIRECT AND ALTERNATING		DOUBLE INSULATION (Class II protection)
	GROUND TERMINAL		CAUTION (Risk of electric shock)
	PROTECTIVE CONDUCTOR		CAUTION REFER TO MANUAL
	FRAME TERMINAL		FUSE
	EQUIPOTENTIALITY		EQUIPMENT OR COMPONENT TO BE RECYCLED

Descriptive Examples of Over-Voltage Categories


Cat I Low voltage installations isolated from the mains.

Cat II Portable domestic installations.

Cat III Fixed domestic installations.

Cat IV Industrial installations.

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OPTICAL REFLECTOMETER (OTDR)

PROLITE-50/51/52

1 GENERAL

1.1 Introduction

PROLITE-50/51/52 are the preferred choice for the measurement of optical fiber's specifications. With **PROLITE-50/51/52**, you can make assessment of one single optical fiber or a whole optical fibre chain. Especially, you can directly observe loss and events distribution of optical fibre chain.

PROLITE-50/51/52 check the transmission quality of optic fibre through measurement of backward scattered lights. Standard organizations like International Telecom Union (ITU) define backward scattered lights as effective analysis means of measurement of optical fibre loss. Backward scattering is also the only effective way of connector inspection, which can be applied to measure the length of optical fibre, too. Therefore, **PROLITE-50/51/52** is a useful tool for optical fibre manufacturing, installation and maintenance.

Therefore, the **PROLITE-50/51/52** is a very useful tool for the optical fibre manufacturing, installation and maintenance.

PROLITE-50/51/52 works through reviewing "events" in optical fibre (for example, irregularities and connectors), which is quite helpful for quality control for those who are in charge of optical fibre manufacturing, installation and maintenance. **PROLITE-50/51/52** can help identify the irregularities in optical fibre, locate them, and measure their attenuation, relevant loss and their homogeneity.

PROLITE-50/51/52 is more helpful for field operation. It can help to check the qualification of optical fibre chain circuit on a regular basis. For the purpose of future maintenance, transmission quality and condition of optical fibre need to be recorded and stored, which includes measurement of optical path, total loss, and loss of all tie-ins and connectors.

Besides, **PROLITE-50/51/52** is easy to use, small and compact. According to the ergonomics, they are designed to fully embody the user's convenience with its large LCD display and graphical interface. They can save and transfer the measurement curves data to a PC by the provided software for further analysing, reporting and printing.

**PROLITE-50/51/52** basic applications:

- Measure the length of optical fibre and cable.
- Measure the distance between two points on optical fibre and cable.
- Locate faults and ruptures of optical fibre and cable.
- Display distribution curve of optical fibre and cable loss.
- Measure attenuation coefficient of optical fibre and cable.
- Measure loss between two points on optical fibre and cable.
- Measure loss of tie-ins.
- Measure reflection of reflection events of optical fibre and cable.

For a specific event (transmission quality changed due to faults caused by welding, connector, bending etc.), the following measurements can be carried out with **PROLITE-50/51/52**:

- For each event: distance, loss and reflection;
- For each section of optical fibre: length and loss of dB or dB/Km;
- For the whole optical fibre chain: length and loss of dB;

PROLITE-50/51/52 features by:

- Large Colorful LCD display with auto or manual adjustment of contrast.
- Backlight LCD display supports night operation.
- Easy operation with trace graphic display.
- Trace storage function.
- USB Data upload port.
- PC analysis software-Trace Manager for analysing and reporting previously stored data.
- Auto off function conserving battery life.
- DC/AC power supply.
- Auto recharging, over 8 hours operation for one charge.



2 DESCRIPTION OF CONTROLS ELEMENTS

2.1 Patch panel



Figure 1.- Patch panel.

- 8 10 Power on and charge indicators.**
- 9 Connector for AC power supply adapter.**
- 11 Interface of connexion: USB** interface in order to connect the equipment to a **PC**. It allows transferring the traces stored to the **PC** to be analysed later.
- 12 13 Optical fibre connector:** Connector **SC/APC** and **VLS** (only **PROLITE-52**) used as optical interface.

CAUTION

Invisible laser radiation



Please always avoid looking directly at the optical output or stare at laser beam.



2.2 Keypad Functions

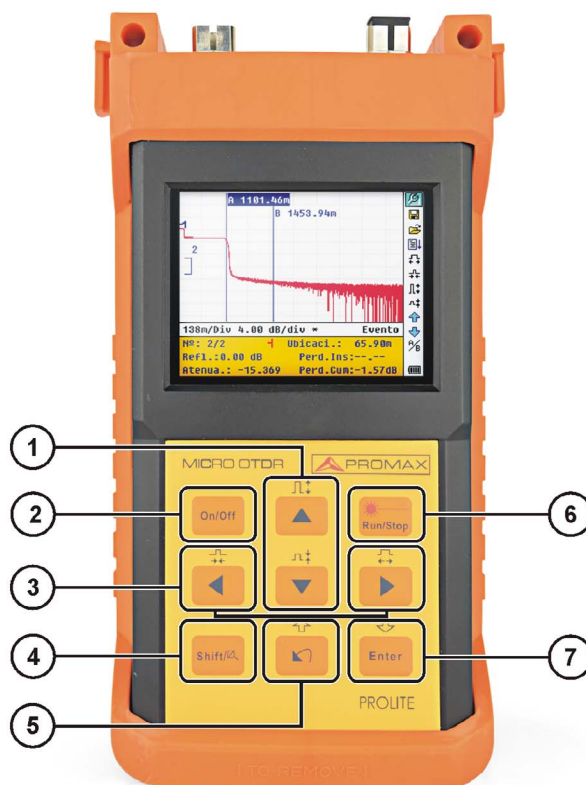




Figure 2.- Operation Interface of PROLITE-50/51/52.

- 1  On / Off for system.


- 2  Main functions:

They allow moving within the different menus as well as to increase/decrease the value of configuration parameters.


Pressing [] previously in the visualisation display of trace, allows to increase/decrease vertically the size of the trace.



- 3  Main functions:


They allow moving within the different menus as well as to move the cursors horizontally throughout the plan.


Pressing [] previously in the visualisation display of trace, allows to increase/decrease horizontally the size of the trace.





- 4  Pressing it previously allows executing the secondary functions. Also it serves to cancel the zoom in / zoom out actions for trace visualisation, which has been done.

- 5 
 Main functions:
 This key allows going forward through pages from Help, cancelling the selected operation, exiting from configuration menu and changing between information windows from visualised trace.

Press [] to review the previous trace events.

- 6  Key to start/stop the measurement process.

- 7  Press this key to confirm the operation selected.

Press [] to review the later trace events.



3 BASIC INFORMATION OF PROLITE-50/51/52

3.1 Principle of PROLITE-50/51/52

OTDR is a measurement instrument for identifying optic fiber transmission features. The instrument is mainly used to measure attenuation of a whole optic fiber chain and provide attenuation details relating to length, namely detect, locate and measure any event in optic fiber chain (events refer to faults caused by welding, connectors, and bending whose transmission change can be measured). Its non-destructive, one-end connection, and rapid measurement has made the **PROLITE-50/51/52** an indispensable tool for manufacture, construction, and maintenance of optic fiber.

The faults and heterogeneity of optic fiber it self cause Rayleigh scattering of light pulse transmitted in optic fiber. Part of light pulse is scattered in the reverse direction, and this is called Rayleigh backward scattering, which actually provides attenuation details relating to length.

Information relating to distance is obtained through time information (that's the reason why there is "**time Domain**" in the name of **OTDR**). Fresnel reflection occurs at the boundary between two media of different **IOR** (for example, connections of faults, connectors, or optic fiber end). This reflection is used to locate the discontinuous points on optic fiber. The magnitude of reflection depends on the difference between **IOR** and the smoothness of boundary.

PROLITE-50/51/52 sends out a light pulse into connected optic fiber, and receive reflections of events and backward scattering power of pulse in time. Locus will be displayed on LCD. The y-axis is dB value of backward scattering power, and the x-axis is the distance.

3.2 Basic definition and classification of events

3.2.1 Events

Events refer to any abnormal points causing attenuation or sudden change of scattering power besides the normal scattering of optic fiber, which include all kinds of losses like bending, connections and ruptures. Events points displayed on LCD are abnormal points that cause traces to deviate from straight line.

Events can be classified as reflection events and non-reflection events.



■ Reflection Events

When some pulse energy is scattered, reflection events happen. When reflection event occurs, peak shows on trace, as shown in figure 3.

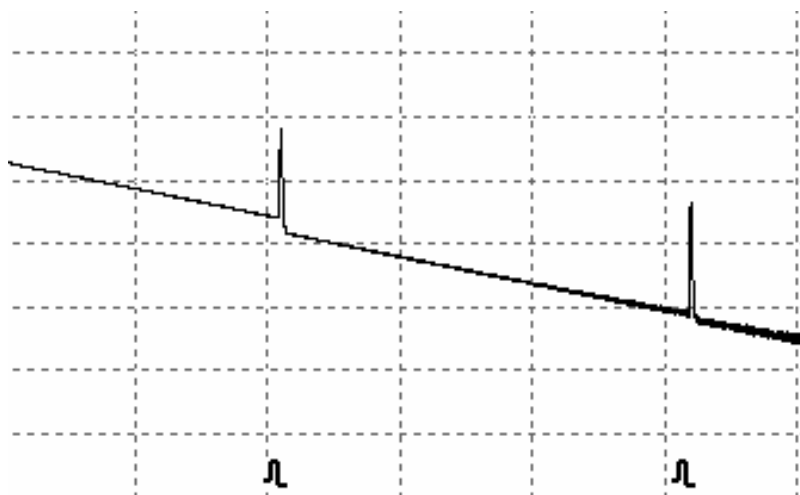


Figure 3.- Reflection Event.

■ Non-reflection Events

Non-reflection events happen at certain points where there is some optic loss but no light scattering. When non-reflection event occurs, a power decline shows on trace, as shown in figure 4.

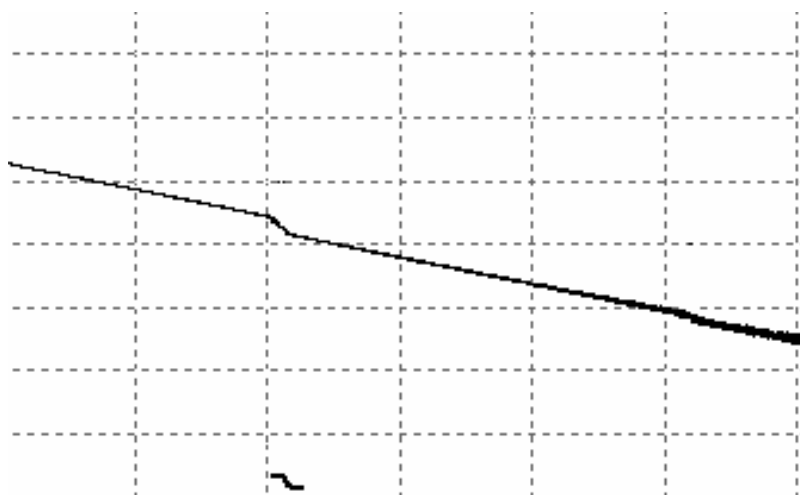


Figure 4.- Non-reflection Event.



■ Inspection Event

PROLITE-50/51/52 sends off a light pulse into the optic fiber to be inspected, and then receive returning light signals, and starts calculating the "event" distance. The farther the distance is, the longer time need for scattered light to be received by the instrument. Event distance can be calculated according to the time of receiving events signals.

Through inspection of scattered signals, properties of optic fiber, connectors, tie-ins can be identified.

3.3 **Measurement Application of PROLITE-50/51/52**

PROLITE-50/51/52 displays power relating to distance of returning signals. This information can be used to identify the main properties of an optic fiber chain.

3.3.1 **Measurement Contents of PROLITE-50/51/52**

- Event location (distance), end or rupture of optic fiber chain.
- Attenuation coefficient of fiber.
- Loss of a single event (for example, one optic tie-in), or total loss from upper end to end.
- Range of a single event like reflection of connectors (or grade of reflection).
- Auto measurement of cumulative loss of a single event.

3.3.2 **Trace Analysis of PROLITE-50/51/52**

The trace analysis of **PROLITE-50/51/52** is fully automatic. The trace locates:

- Reflection events of connections and mechanic tie-ins.
- Non-reflection events (usually at welding tie-ins).
- End of optic fiber (Through scanning the first loss event that is larger than end threshold, end of optic fiber can be identified).
- Events list: event type, loss, reflection and distance.



3.4 Trace Display Screen of PROLITE-50/51/52

Trace displays on **PROLITE-50/51/52** screen, as shown in figure 5.

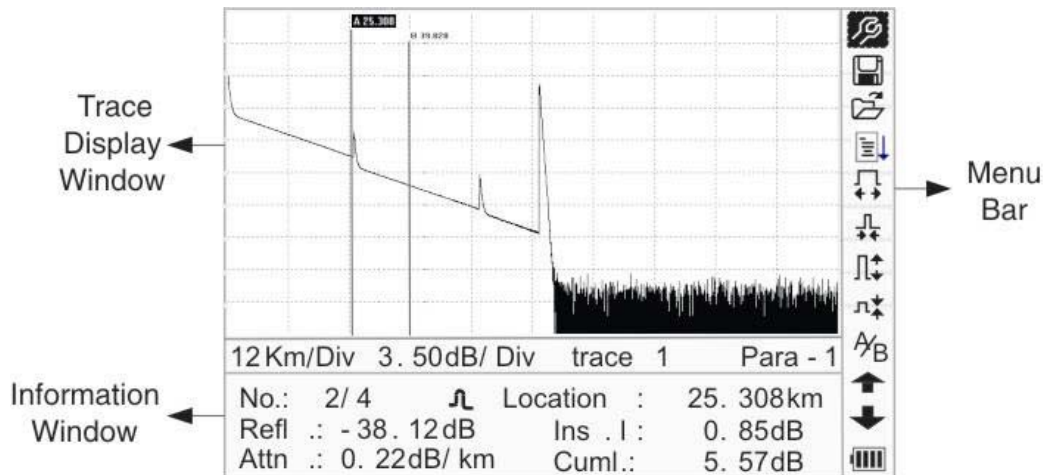


Figure 5.- Trace Display Screen

3.4.1 Trace Display of PROLITE-50/51/52

This window displays the trace after one measurement.

Definition of Trace: After one measurement, reflection power diagram will be displayed as distance function. This diagram is referred to as trace.

Trace of **PROLITE-50/51/52** displays measurement result in a graphic form. The y-axis stands for power, and the x-axis stands for distance, as shown in figure 6.

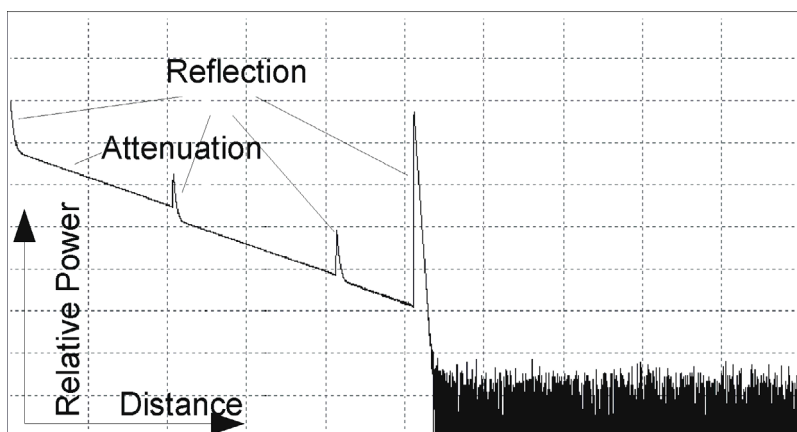


Figure 6.- Traces and Coordinates



3.4.2 Information Window of PROLITE-50/51/52

Contents of this window: measurement parameters, events list, marker A/B and analysis parameters.

■ Measurement Trace Parameters

Important measurement and analysis parameters always display in the information window, as shown in figure 7 and 8:

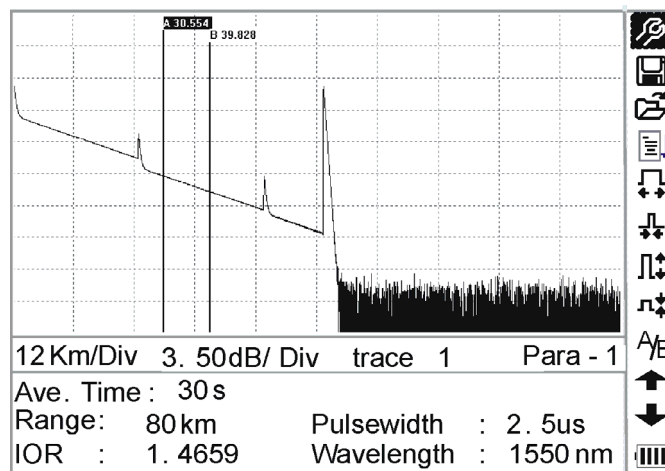


Figure 7.- Measurement Trace Parameters

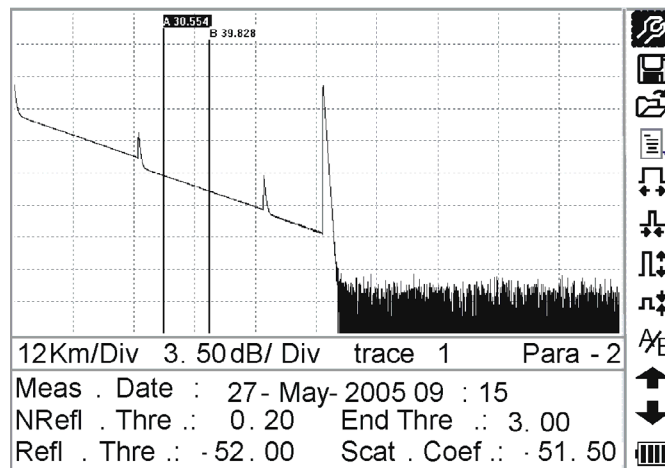


Figure 8.- Analysis Trace Parameters

For definitions and configurations of items in figure 7 (Avg. time, Range, IOR, wave length and pulse width), refer to parameter configuration.

For definitions of items in figure 8 (date, reflection threshold, non-reflection threshold, end threshold, scattering coefficient), please refer to parameter configuration.



Event List

To indicate the location of events inspected. Any defined posts will be displayed in event list, for example, non-reflection event like welding points and reflection event like connectors, as shown in figure 9.

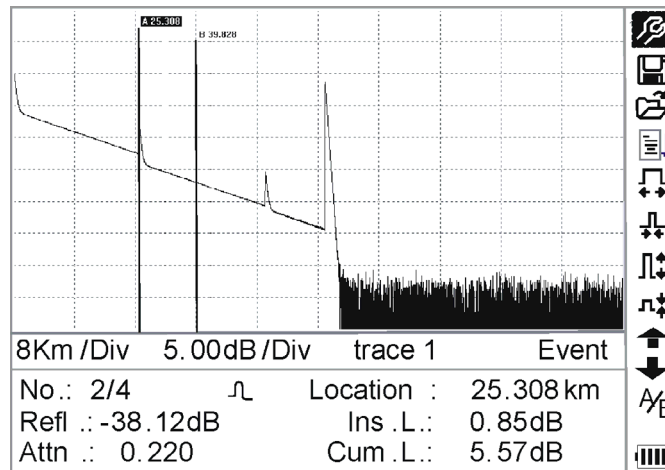


Figure 9.- Events List

No:	Event sequence No.
Four types of events:	└ Fiber beginning; ⌋ Reflection event └ Fiber end; └ Attenuation event.
Loc.:	Distance from beginning point to event.
Refl.:	Magnitude of reflection.
Insl.:	Loss of Inserted event.
Atn.:	Attenuation characteristic from one event point to the current event.
Cuml.:	Cumulative loss, calculating from beginning point to the current event.



Accuracy

Marker is used to mark and analyze a single event, trace section and distance.

Distance, attenuation, loss at marker or between markers will be displayed in information of markers, as shown in figure 10.

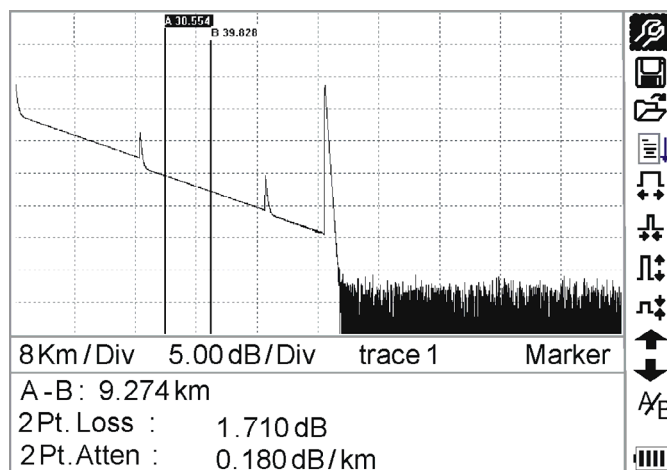


Figure 10.- Information of Marker A/B

The following parameters are measured between marker A and B. When you change either marker, record will change accordingly.

- "A-B": Distance between two markers.
- "2 points loss": Loss between two markers; power difference between two markers.
- "2 points attenuation": 2 points loss of unit length.

The specific operations of the above are to be elaborated afterwards.



4 TRACE MEASUREMENT PROCESS

4.1 Instructions on Graphic User Interface (GUI)

After power on, power on interface displays on the LCD, as shown in figure 11:

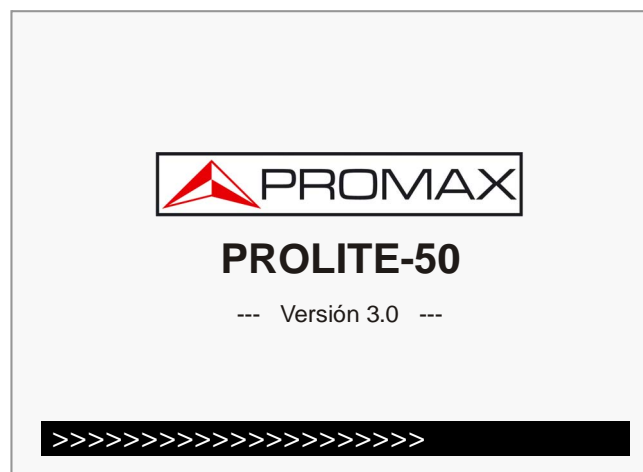


Figure 11.- Starting up screen

Three seconds after power on it appears a quick help screen, and the main menu bar on the right side of the screen.

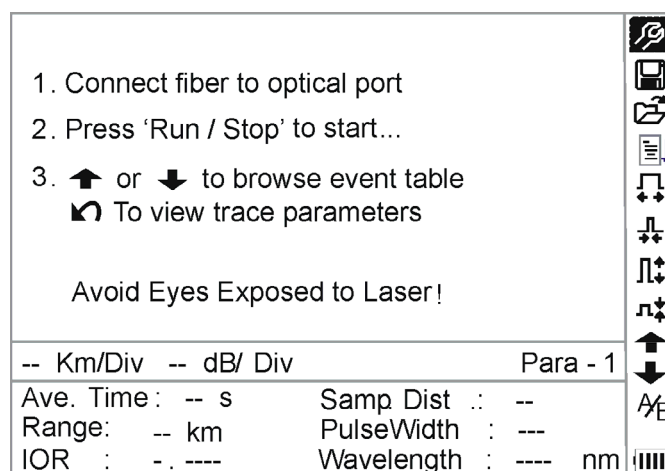

















Figure 12.- Help and main menu



4.1.1 Menu Bar of PROLITE-50/51/52

On the right side of **LCD** display is located vertically the menu bar of the **PROLITE-50/51/52** in form of icons. Press [] and [] in order to move the cursor along the menu of options. Select the function by pressing [].

No.	Icons	Meanings
1		Parameter configuration
2		Save file
3		Open file
4		Re-analyze the trace
5		Zoom in trace horizontally
6		Zoom out trace horizontally
7		Zoom in trace vertically
8		Zoom out trace vertically
9		Switching between markers
10		Go to the previous event
11		Go to the next event.
12		Battery power indicator



4.1.2 Battery Recharge Status

When the instrument is power on and powered through AC adapter, the inside batteries are automatically recharged. The meanings of signals are as follows:



The batteries are being recharged.



The batteries are fully recharged.

When the instrument is powered by inside rechargeable batteries, power volume of batteries is shown on the LCD.



No power.



Low power.



Half power.



More than half power.



Full power.

4.2 Trace Measurement

One complete trace can be obtained for each measurement. Also, **PROLITE-50/51/52** can load a saved trace.

NOTE: Before each measurement, if the operator is not familiar with the cautions, please do follow instructions in this manual for personal safety.

Make sure that the optical fiber or cable is not in use and there is no laser beam in the fiber before testing via **PROLITE-50/51/52**. Otherwise, it may result in imprecise test trave, even permanent damage for the **PROLITE-50/51/52**.

Connect optic fiber optic output directly, no tools needed:

- 1 Pre-cleaning of connectors and splices.
- 2 Fiber-optic measurement.
- 3 Configuration parameters.
- 4 Start of operation (Auto / Manual).
- 5 Analysis of the resulting trace.



4.2.1 Parameter Configuration on PROLITE-50/51/52 on Menu Bar

Correct parameter configuration is a necessity for accurate measurement; therefore, necessary configuration must be performed before using the instrument.

Use [▲] and [▼] to highlight , parameter configuration, then press [Enter], as shown in figure 13 and figure 14. Press [Exit] to exit.

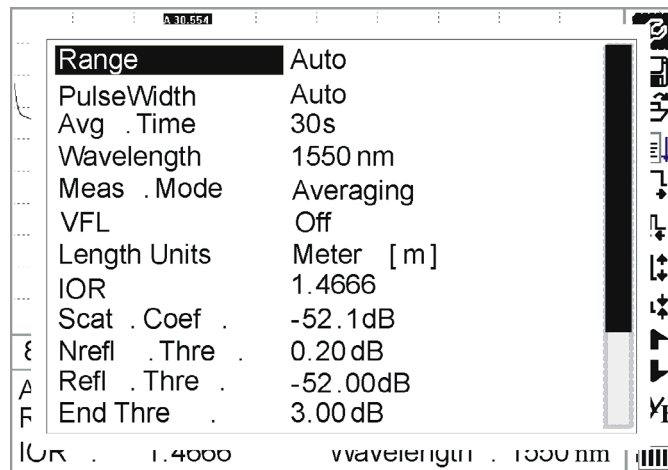


Figure 13.- Parameter Configuration (a)

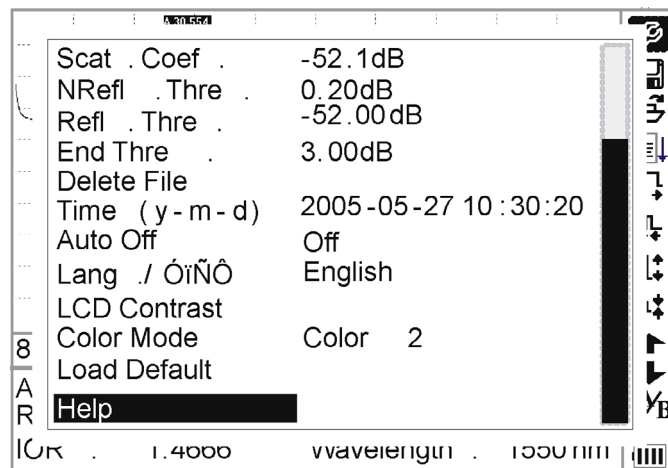


Figure 14.- Parameter Configuration (b)






Following screen shows a list of adjustable parameters:





Parameter	Definition of Parameter
Range	Length of optic fiber relevant to the trace.
Pulse Width	Width of laser pulse sending out from OTDR to optic fiber.
Average Time	To select suitable testing time.
Wavelength	To select laser wave length for measurement.
Measurement Mode	To select mode for measurement.
VFL	Power on or off visible laser (only PROLITE-52).
Length Units	To select length units.
IOR	IOR of optic fiber which affects the transmission speed of laser.
Scatter Coefficient	Which affects backward scatter power of laser in fiber.
Non-reflection Threshold	Events whose insertion loss is greater than the threshold displays here.
Reflection Threshold	Reflection events GE the threshold will be displayed.
End Threshold	The first event with insertion loss GE the threshold is considered the end of fiber, and all following events will be ignored.
Delete Files	Delete stored trace data in the instrument.
Time	Show current system time.
Auto Off	On or off of Auto off function.
Language	Choose the language.
LCD Contrast	Adjust the contrast of LCD to select.
Color mode setting	Select suitable displaying color setting.
Load Default	Set all parameters to factory setting.
Help	Show help files (Quick Reference).



Range Configuration

Generally, range will be set according to actual length of optic fiber, so as to insure the accuracy of measurement.

Under the parameters configuration menu, use  and  to select "Range"; Press  to access.

Use  and  to select adequate range; Press  to confirm, or press  to exit, as shown in figure 15.

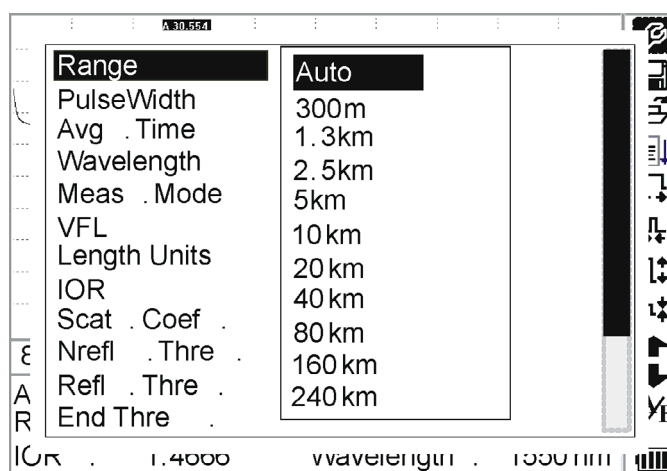


Figure 15.- Range Configuration

NOTE: There are 11 levels of predefined scales : Auto, 300 m, 1.3 Km, 2.5 Km, 5 Km, 10 Km, 20 Km, 40 Km, 80 Km, 160 Km and 240 Km.

«Auto» means the automatic measurement. When this function is selected, the instrument will automatically make an intelligent selection of adequate range and pulse width for measurement. The whole process of measurement does not need any intervention of the operator. This is the default settings.



Pulse Width Configuration

The selection of pulse width affects the dynamic range and resolution of measurement trace. With narrow pulse width, there will be higher resolution and smaller dead zone, however, the dynamic range will be decreased. On the contrary, wide pulse width can bring higher dynamic range and measure comparatively long distance, but resolution and dead zone will be affected. Therefore, users should make choice between dynamic range and dead zone.

There will be different pulse width options for reference according to different range of distance being chosen.

Under menu of parameter configuration, use [▲] and [▼] to highlight “**pulse width**”; Press [Enter] to select as shown in figure 16. Press [↩] to exit.

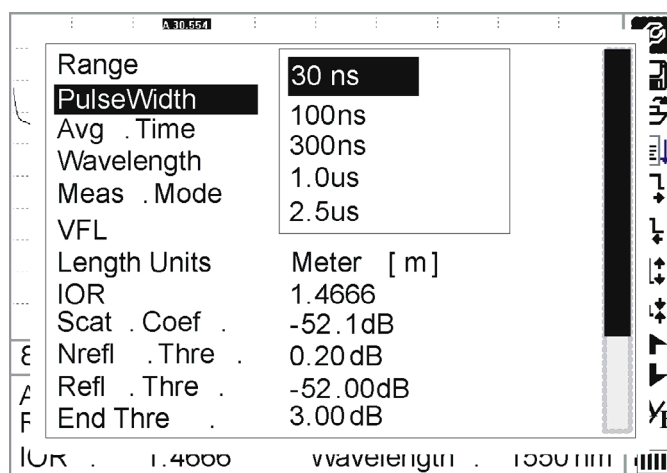


Figure 16- Average Time Configuration

Use [▲] and [▼] to highlight pulse width. Press [Enter] to confirm.

NOTE: Five are preset pulse width : 30 ns, 100 ns, 275 ns, 1.0 μ s and 2.5 μ s.

«**Auto**» means the default settings.

When Range is set to «**Auto**», pulse width will automatically become «**Auto**».



Average Time Configuration

Average time will affect the SNR directly. The longer the average time is, the higher SNR is, as well as dynamic range. Therefore, in case of measurement of long-distance optic fiber, long average time should be selected in order to review events at long-distance end.

Under parameter configuration, use [▲] and [▼] to highlight "**Average time**"; press [Enter] to confirm, as shown in figure 17. Press [Exit] to exit.

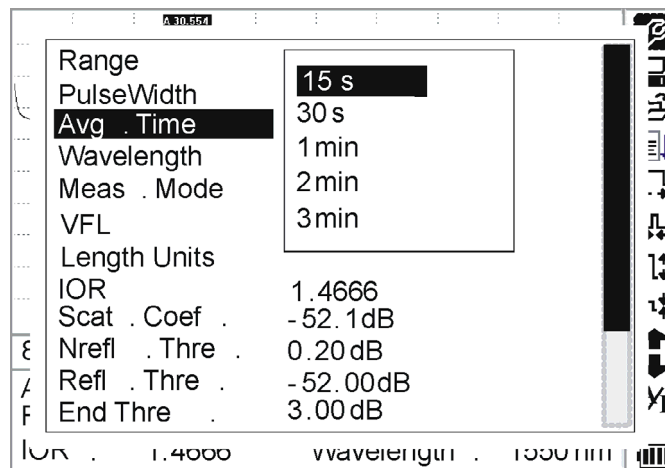


Figure 17- Average Time Configuration




Use [▲] and [▼] to highlight the desired time; and press [Enter] to confirm.

NOTE: There are 5 levels of predefined average time: 15 s, 30 s, 1 min, 2 min and 3 min. The default setting is 30 s.



■ Wavelength Configuration

The **PROLITE-50/51/52** works with different wavelengths (see specifications).

Under parameter configuration, use [] and [] to highlight "wavelength"; press [] to change wavelength, as shown in figure 18.

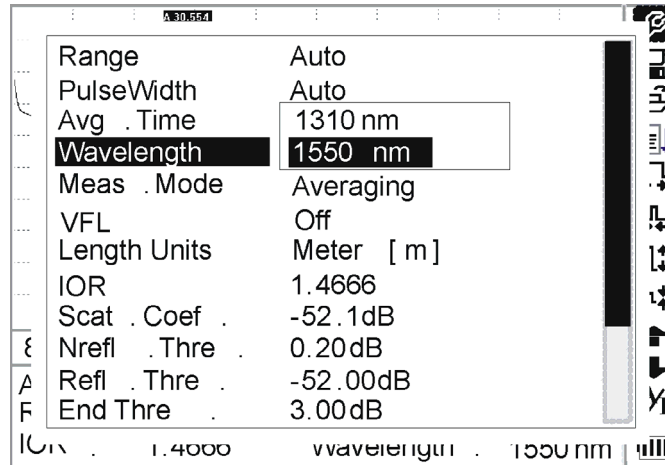







Figure 18- Wavelength Configuration



■ Measuring Mode Configuration

There are two kinds of measurement mode: Averaging and Real time mode. Under Real time Mode, **PROLITE-50/51/52** will undertake realtime measurement for the connector of exterior fiber and refurbish the measure trace. While under Real time Mode, press key [] to stop, otherwise it will measure all along. Under Averaging Mode, **PROLITE-50/51/52** will average the data within the measure time which is set by user. While exceeding the set time, it will stop automatically and display the result. Generally, we suggest **Averaging Mode**.

Under menu of parameter configuration, use [] and [] to highlight "Measurement Mode"; Press [] to choose **Averaging mode** or **Realtime mode**, as shown in figure 19. Press [] to exit.

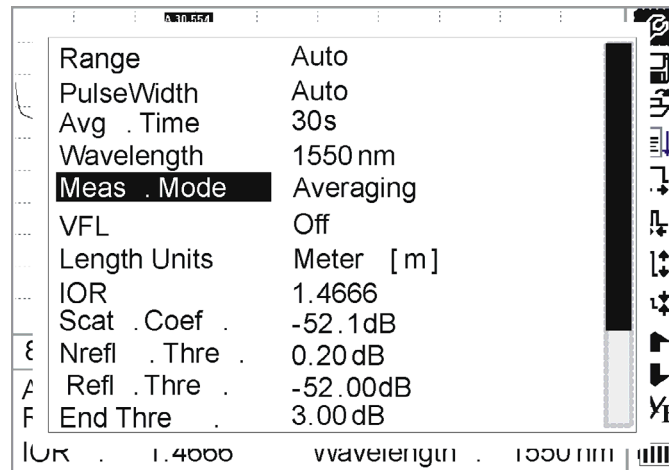


Figure 19- Measurement Mode Configuration



VFL- Visual Fault Locator (For PROLITE-52 only)

Under parameter configuration, use [▲] and [▼] to highlight “VFL”; according to different demand, press [Enter] to select CW, 1Hz or off, Press [↶] to exit. When VFL is on, [Run/Stop] icon will be displayed under A/B icon, which is in the right menu bar. As in figure 20.

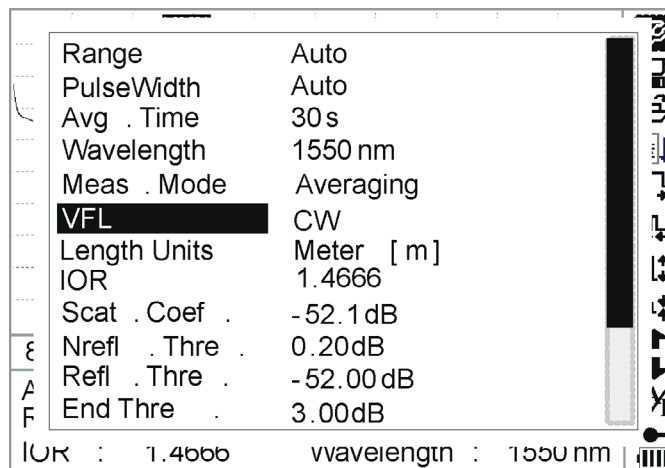


Figure 20- VFL Configuration

Setting the units of length

Under the parameter configuration menu use [▲] and [▼] to highlight “Length Units”; press [Enter] to select the desired units of measurement, as in figure 21. Press [↶] to exit.

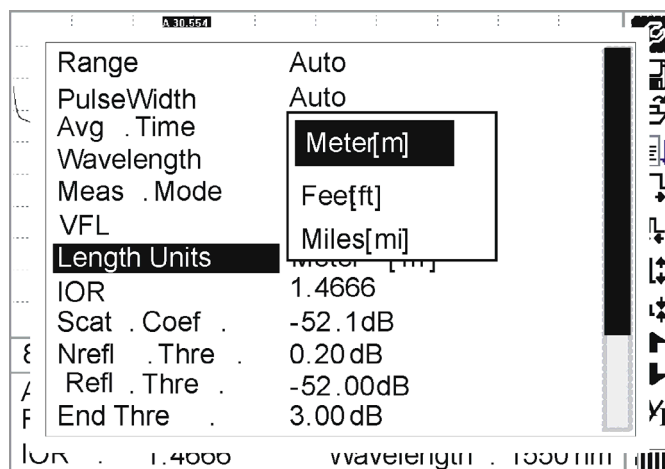






Figure 21- Length Units Configuration



■ Refractive index setting (IOR)

IOR is a key factor to affect the speed of laser transmission in optic fiber; and in this case, **IOR** configuration has direct impact on the accuracy of measurement. Generally speaking, the **IOR** parameter is provided by optic fiber manufacturer, and it can be set to the accuracy of four digits after decimal point between 1.0 - 2.0.

Under parameter configuration, use [] and [] to highlight "**IOR**"; and press [] to enter, as shown in figure 22. Press [] to exit.

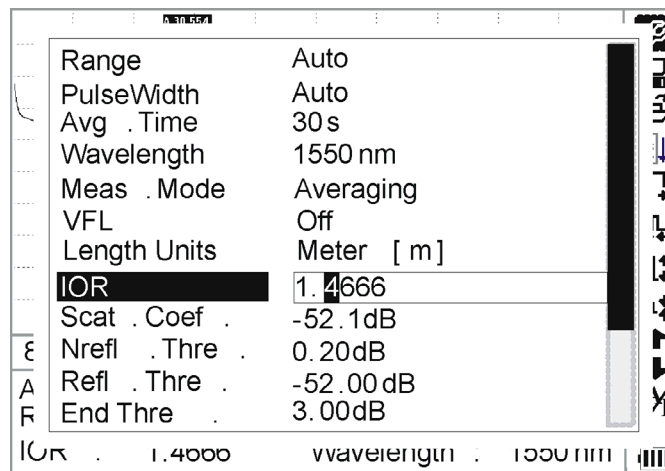







Figure 22- Configuration **IOR**

Use [] and [] to adjust the position of highlights; use [] and [] to change the digits. After setting, press [] to confirm.

NOTE: The default is 1.4666.



■ Scattering Coefficient Configuration

Scatter coefficient determines the value of backward scatter power. The configuration affects the calculation of reflection value.

Under parameter configuration, use [▲] and [▼] to highlight "**Scatter Coefficient**"; press [Enter] to enter, as shown in figure 23. Press [Exit] to exit.

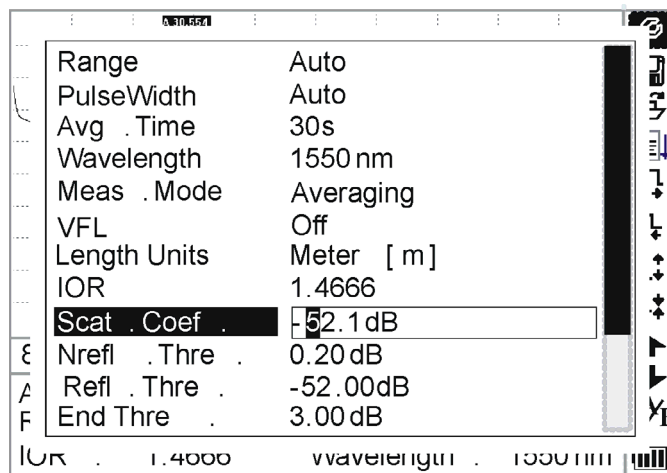






Figure 23- Scatter Coefficient Configuration

Use [◀] and [▶] to adjust the position of highlights; use [▲] and [▼] to change the digits. After setting, press [Enter] to confirm.



Non Reflection Threshold Configuration

This configuration has direct impact on the listing of insertion loss events. Only events GE this threshold will be listed.

Under parameter configuration, use  and  to highlight "**Non reflection threshold**"; press  to enter, as shown in figure 24. Pres  to exit.

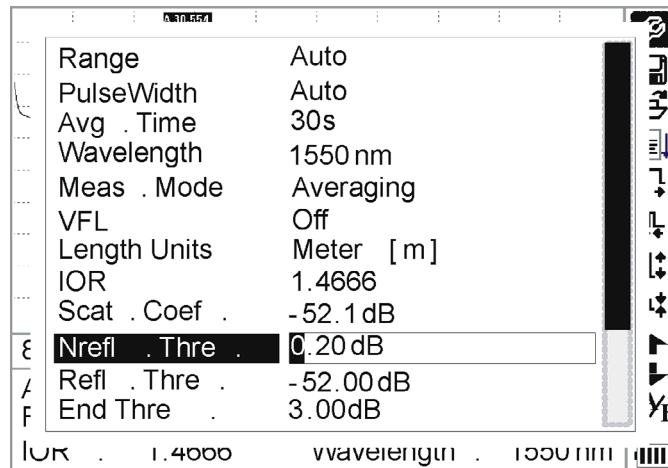







Figure 24- Non Reflection Threshold Configuration





Use  and  to adjust the position of highlights; use  and  to change the digits. After setting, press  to confirm.

NOTE: The default setting is 0.20 dB.



Reflection Threshold Configuration

This configuration has direct impact on reflection events listing. Only reflection events GE this threshold will be displayed in events list.

Under parameter configuration, use  and  to highlight “**Reflection Threshold**”; press  to enter, as shown in figure 25. Press  to exit.

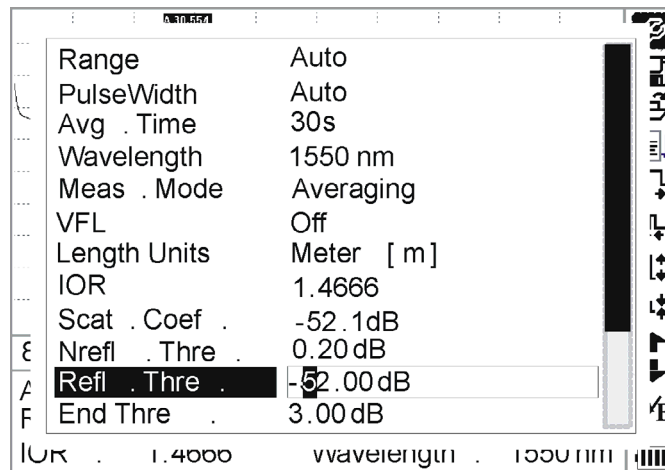







Figure 25- Reflection Threshold Configuration





Use  and  to adjust the position of highlights; use  and  to change the digits. After setting, press  to confirm.

NOTE: The default setting is -52.00 dB.



■ End Threshold Configuration

This threshold is the end threshold of optic fiber. If the end threshold equals 3.0 dB, then the first event with insertion loss GE 3 dB will be considered as the end of the optic fiber. If the value is set to 0 dB, there will be no end threshold.

Under parameter configuration, use  and  to highlight "End threshold"; press  to enter, as shown in figure 26. Press  to exit.

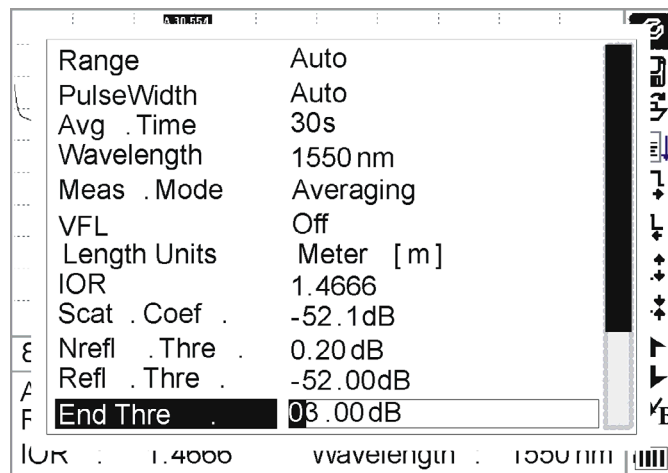







Figure 26.- End Threshold Configuration

Use  and  to adjust the position of highlights; use  and  to change the digits. After setting, press  to confirm.

NOTE: The default setting is 3.00 dB.



Delete File

This function is designed to delete saved traces.

Under parameter configuration, use [▲] and [▼] to highlight "Delete file" press [Enter] to enter, as shown in figure 27. Press [Exit] to exit.

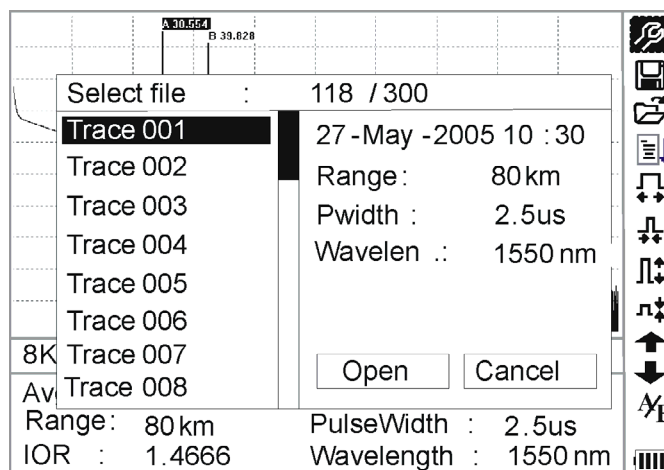





Figure 27.- Delete File

Press [▲] and [▼] to choose the files to be deleted, then press [Enter] to confirm. Users can delete one or several files by one time. Press [Left] and [Right] to choose "Delete". Press [Enter] according to the instruction, choose "Yes" to delete; choose "No" to not delete. If choose "Cancel", it will exit the file delete menu.



■ Time Configuration

Time configuration is used to change system time.

Under parameter configuration, use [] and [] to highlight "Time"; press [] to change, as shown in figure 28. Press [] to exit.

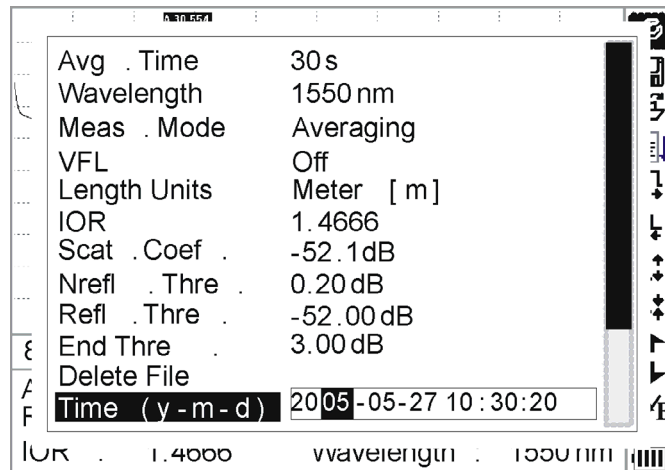







Figure 28.- Time Configuration

Use [] and [] to adjust the position of highlights; use [] and [] to change the digits. After setting, press [] to confirm.



Auto Off Configuration

This function is designed for conserving battery power. If auto off is on, the instrument will auto power off within 5 minutes of idleness.

Under parameter configuration, use [▲] and [▼] to highlight "Auto off"; press [Enter] to switch, as shown in figure 29. Press [↩] to exit.

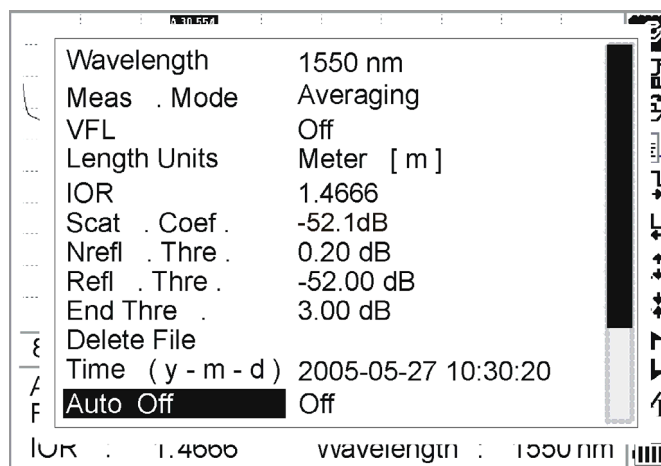


Figure 29.- Auto Off configuration

NOTE: The default setting is «auto off» on.

Language Configuration

Under parameter configuration, use [▲] and [▼] to highlight "Language"; press [Enter] to switch, as shown in figure 30. Press [↩] to exit.

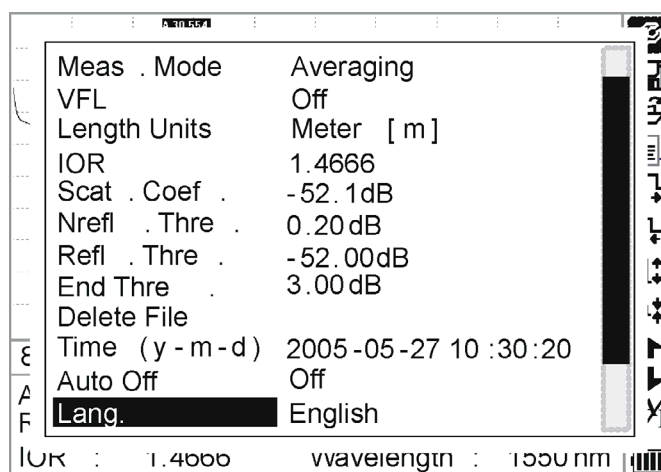






Figure 30.- Language Configuration



Contrast Adjustment of LCD display

The contrast of LCD has been adjusted. And users can adjust the contrast according to their own visual habits.

Under parameter configuration, use  and  to highlight "LCD Contrast"; press  to adjust, as shown in figure 31. Press  to exit.

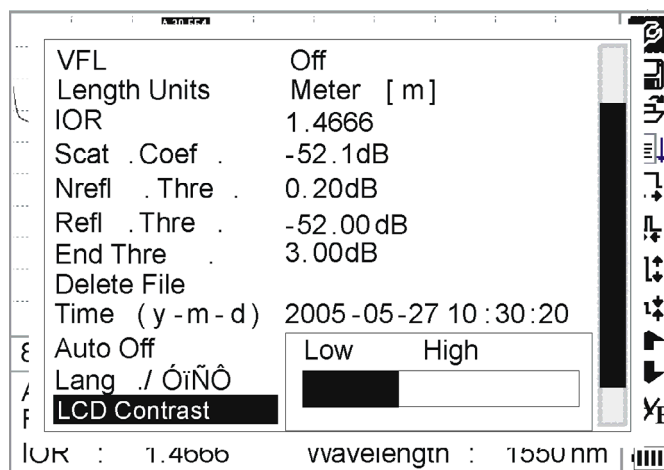






Figure 31.-. Contrast adjustment of LCD display

Use  and  to adjust contrast, and press  to confirm.



■ Color Mode Setting

This configuration allows choosing between four combinations of different colours. Use  and  to select "**Colour mode**", press  to choose between the different combinations of colour. Press  to quit.

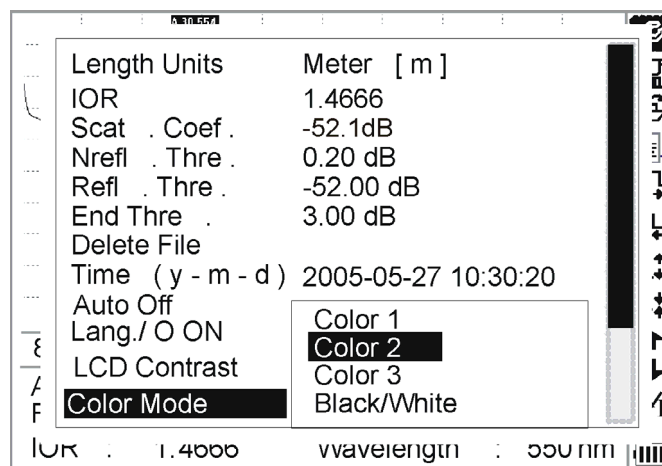





Figure 32.-. Color Mode Setting

Use  and  to highlight suitable color mode setting; press  to confirm the selection.



Defaults Set

This function is used to set **PROLITE-50/51/52** parameters to factory settings. Those parameters include: range, pulse width, average time, **IOR**, non reflection threshold, reflection threshold, end threshold, and scatter coefficient. Under parameter configuration, use [▲] and [▼] to highlight "**Load defaults**"; press [Enter] to enter, as shown in figure 33. Press [Exit] to exit.

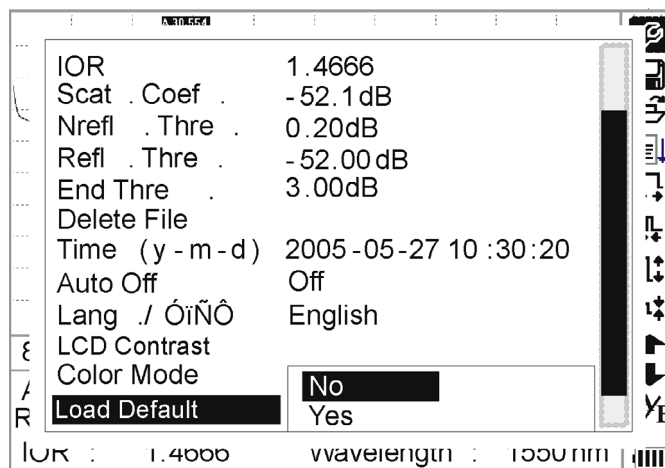






Figure 33.- Load Defaults

Use [▲] and [▼] to highlight "**yes**" or "**no**"; press [Enter] to confirm.



■ Help

Users can get the quick reference via **"Help"** menu.

Under parameter configuration, Use [] and [] to highlight **"Help"**; Press [] to enter, as shown in figure 34. Press [] to exit.

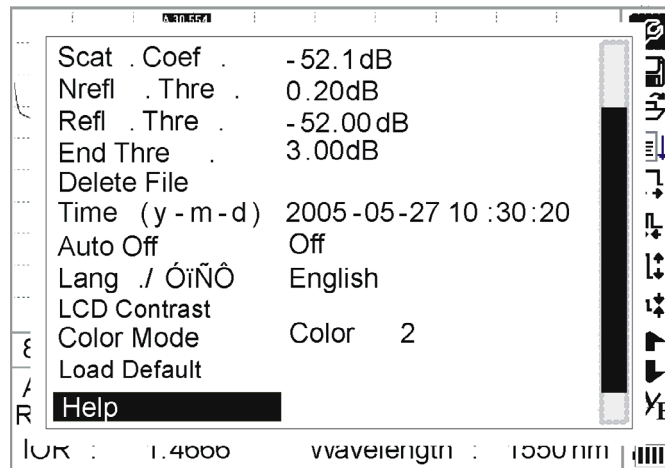



Figure 34.- Help



4.2.2 Trace Measurement - Auto

Auto measurement can be applied in case that the length of optic fiber is unidentifiable. **PROLITE-50/51/52** auto select adequate range for measurement.

Steps for Auto measurement:

- 1 Parameter configuration: for detailed operations, please refer to "Parameter Configuration on Prolite-50 Menu Bar". Set range to "AUTO".
- 2 Measure: press [] to start measurement, and the interface is as shown in figures 35 and 36.

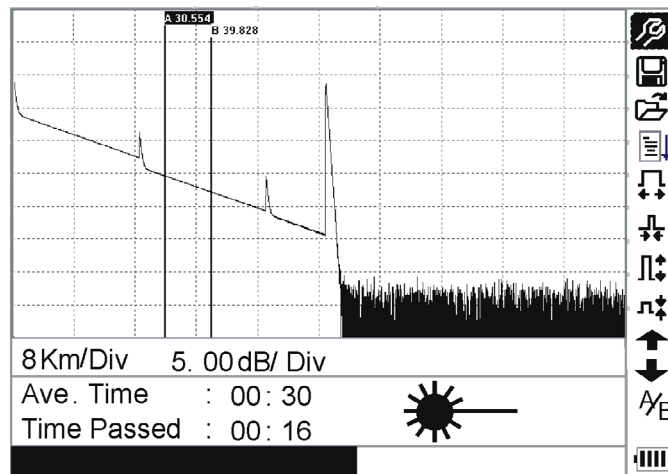


Figure 35.- Measuring

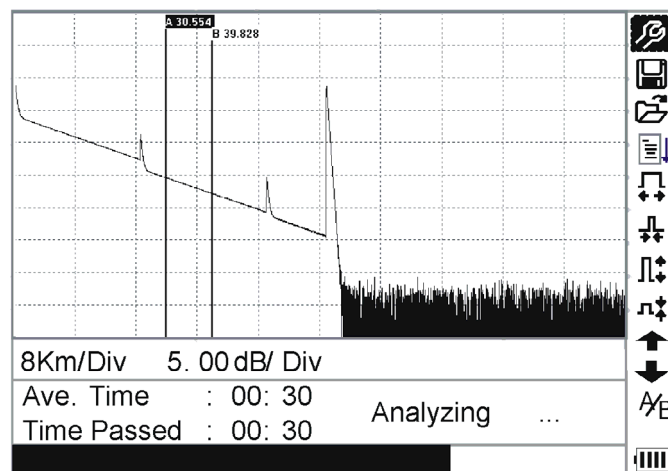



Figure 36.- Measuring






While the measurement is done, it appears the following information on screen.

"Total: 00:30" Measure time which is set by user is 30 seconds.

"Passed: 00:16" . Total measurement time has passed 16 seconds.

" " Flickering of this sign means laser is active.

NOTE:

When measurement is in progress, all keys are disabled except [], [] and [].

- 3 After a certain period of time, the trace displays on the **GUI**. The trace in the Figure below is a trace during measurement, which will be refreshed for every certain period of time to demonstrate the whole process to users in real time. But at the end of measurement, the trace will be final, as shown in figure 37.

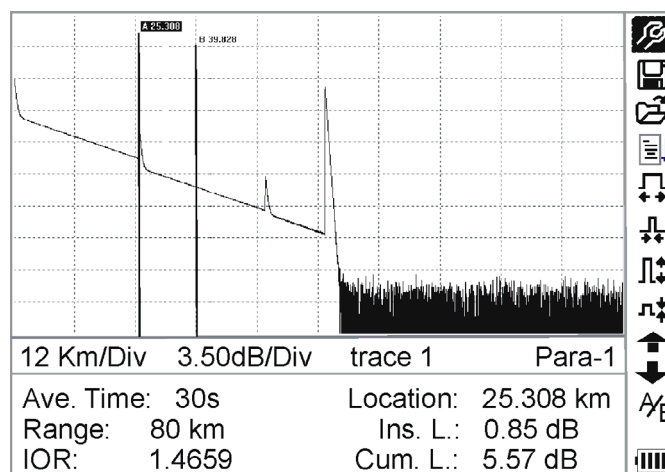



Figure 37.- Trace Measurement of PROLITE-50/51/52

4.2.3 Trace Measurement - Manual

If the operators have full knowledge of measured optic fiber, they can set accurate parameters, and achieve optimal measurement results.

- Set the parameters: Refer to the section; Configuration of parameters.
- Measure: Press [] to start measurement. The process is the same with Auto measurement.



4.2.4 Trace Measurement – Reasons of Measurement Failures

If measurement failures occur, reasons may be one of the following:


- Events may be too close to each other.
Shorten the pulse width, and make another try. If failure still occurs, please try to measure at the other end of the optic fiber.
- Low **SNR**.
Try to use wider pulse or increase average time, and make another try.
- Incorrect parameter configuration.
Check parameter configuration, and make another try.

4.3 Information Window


Items of information window: measurement parameters, analysis parameters, and information regarding marker A/B.












For details regarding information window, please refer to 4.4.2 **Prolite-50/51/52** information window.

4.3.1 Switch between Information Window Items

Under **GUI** of figure 37, press  and the items of information window will display in circulation: measurement parameter → analysis information → Event list → information of marker A/B → measurement parameter




4.3.2 Review Event List



Under **GUI** of figure 37, press , items in information window will switch to event list information.

Use  and  too highlight  or , then press  to review events list:  is to browse upwards and  downwards; or to browse events list upwards and downwards by the combining hot key  +  and  +  in the keyboard.





4.3.3 Cursors

The **PROLITE-50/51/52** has two cursors (A and B) available which can be displaced throughout the trace in order to provide specific information about each point. In order to exchange the active cursor to use [] and [] to select the A/B icon, later press [] to switch between marker A/B.





Use [] and [] to move the A or B marker.




Press [] to change the information window to A or B marker.

Press [] or [] to change the position of the marker A or B, and the information of A/B marker will change in agreement with the information window.

4.4 Increasing and decreasing of the trace visualization



In order to be able to visualize the events more accurately, the equipment incorporates the increasing and decreasing functions of trace visualization.

- The function indicated with [] icon in menu, serves to increase the trace horizontally, whereas the [] icon serves to diminish it.
- The function indicated with the [] icon in menu serves to increase the trace vertically, whereas the [] icon serves to diminish it.

Use [] and [] to select the function desired and press [].

The visualisation of the plan can be increased up to 10 times. In the case of the horizontal increase, the zone of plan of the cursor will be centred in display that is active.

Use [] and [] to move cursors more accurately through the trace.


The cursor (A/B) switching function as well as movement through events [] and [] does not modify the visualization of the plan and automatically it centres on screen the cursor or event selected with these functions. The increasing / decreasing function, also can be executed by means of a combination of hotkeys for quick access.



- In order to increase the trace horizontally to keep pressed [Shift/↔] and later [▶].
- In order to decrease the trace horizontally to keep pressed [Shift/↔] and later [◀].
- In order to increase the trace vertically to keep pressed [Shift/↕] and later [▲].
- In order to decrease the trace vertically to keep pressed [Shift/↕] and later [▼].

4.5 Save Trace

When auto or manual measurement is finished, the measurement trace can be saved. Contents of trace saved include: Trace curve, related information of trace.

- 1 Under **GUI** of figure 38, use [▲] and [▼] to highlight , and press [Enter] to enter, as shown in figure 38.

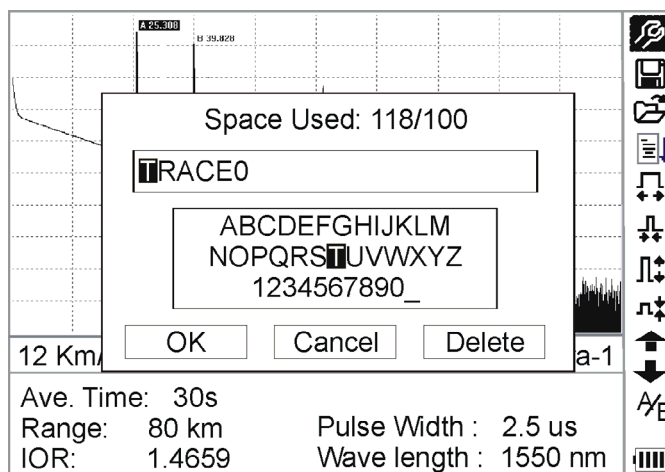


Figure 38.- Save Trace

- 2 Input filename: use [▲], [▼], [◀] and [▶] to choose the alphanumeric character one by one, and press [Enter] to confirm. The length of filename will not exceed 8 characters alphanumeric.



- 3 Save file: use [▲], [▼], [◀] and [▶] to highlight "OK", press [Enter] to save.
 - 4 Cancel saving file: use [▲], [▼], [◀] and [▶] to highlight "cancel", press [Enter] to cancel the operation of "save file".
 - 5 Delete alphanumeric character: use [▲], [▼], [◀] and [▶] to highlight "Delete", press [Enter] to delete the alphanumeric character.
- Memory space: 118/300 means that total memory space is 300 files; it has already saved 118 files so far.

4.5.1 Browse Saved Traces

Use [▲] and [▼] to highlight , press [Enter] to confirm.

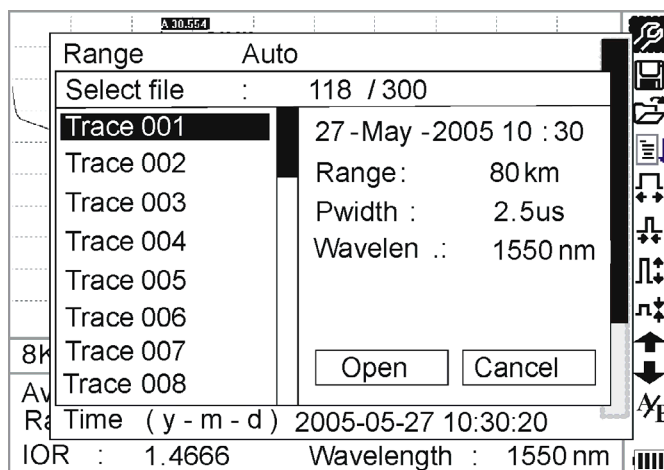


Figure 39.- Browse Saved Traces

- 1 Use [▲] and [▼] to select a certain trace, in the right part of the screen appears general information about the trace selected. Use [◀] and [▶]. Press [Enter] to confirm.
- 2 Memory space: 118/300 means that total memory space is 300 files; it has already saved 118 files so far.



4.5.2 Upload Saved Traces

Saved traces can be uploaded to PC through the associated software of trace manager, with which traces can be further processed on PC.

- 1 Install the software, and run.
- 2 Power off **PROLITE-50/51/52**.
- 3 Connect **PROLITE-50/51/52** to PC through USB interface cable.
- 4 Power on **PROLITE-50/51/52**, and upload data with the software.

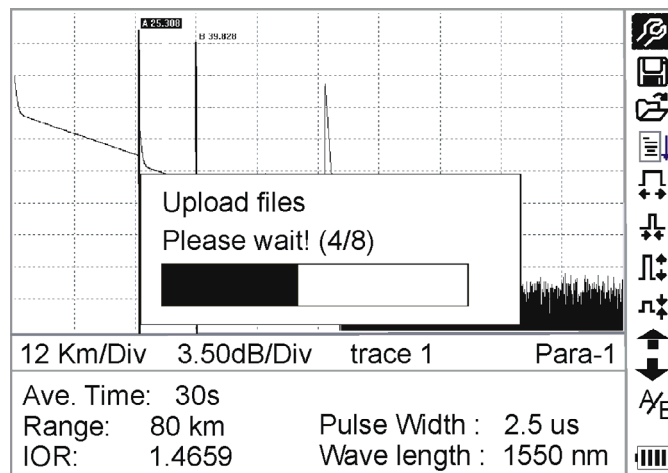


Figure 40.- Upload Saved Traces

NOTE: Make sure the instrument is power off when connecting to PC through USB data cable; Make sure it's fastened, then power on.



5 SPECIFICATIONS

Wavelength (nm)

PROLITE-50	1310/1550 nm.
PROLITE-51	1310/1550/1625 nm.
PROLITE-52	1625 nm.

Dynamic Range (dB)¹

PROLITE-50	24 dB.
PROLITE-51	38/37/37 dB.
PROLITE-52	37 dB.

Event Dead Zone

PROLITE-50	10 m.
PROLITE-51	1.5 m.
PROLITE-52	1.5 m.

Attenuation Dead Zone²

PROLITE-50	25 m.
PROLITE-51	10 m.
PROLITE-52	10 m.

Connector Type

SC / APC (intercambiabile FC, ST).

Fibre Type

Monomode.

Pulse Widths

5 nS / 10 nS / 12 nS / 30 nS / 100 nS / 275 nS / 300 nS / 1 µS / 2.5 µS / 10 µS / 20 µS.

Selectable Ranges

0.3 / 1.3 / 2.5 / 5 / 10 / 20 / 40 / 80 / 120 / 160 / 240 km.

Distance Measure Accuracy

± (1 m + 5 x 10⁻⁵ x Distance + reference space).

Reflection Measure Accuracy

± 4 dB.

Attenuation Measure Accuracy

± 0.05 dB / dB.

Memory Capacity

PROLITE-50	300 curves of test.
PROLITE-51	1000 curves of test.
PROLITE-52	1000 curves of test.

¹ The dynamic range is measured at maximum pulse width within average time of 3 minutes.

² As conditions for the Blind: The reflection phenomena occur within a distance of 4 km, the reflected intensity is less than - 35 dB, and the blind zone is measured on the minimum pulse width.

**Visible Fault Locator (VLS)****Output Power****PROLITE-52** ≥ -3 dBm.**Max Measurement Range****PROLITE-52** 5 Km.**Connectivity** USB.**Internal Power** Rechargeable Battery NI MH.**Power Supply** External 13.8 V / DC 1.2 A.**Battery Life** 8 hours continuous operation; 20 hours standby (on one charge).**OPERATING ENVIRONMENTAL CONDITIONS****Altitude** Up to 2000 m.**Temperature range** 0 °C a +40 °C (Automatic disconnection by excess of temperature).**Max. relative humidity** Max 80%, without condensation.**MECHANICAL FEATURES****Dimensions** 220 (H) x 110 (W) x 70 (T) mm.**Weight** 1 kg.**ACCESORIES****AL005** Power Supply AC 100 V / 240 V 50 / 60 Hz.
Carrying Bag.**O DG0226** Quick User's Guide.
Communication software. (Latest version of software available on the download PROMAX website area).
Communication with PC Cable.**AD500** Adapter ST (Optional).**RECOMMENDATIONS ABOUT THE PACKING**

It is recommended to keep all the packing material in order to return the equipment, if necessary, to the Technical Service.



6 MAINTENANCE

6.1 Instructions for returning by mail

Instruments returned for repair or calibration, either within or out of the warranty period, should be sent with the following information: Name of the Company, name of the contact person, address, telephone number, receipt (in the case of coverage under warranty) and a description of the problem or the service required.

6.2 Maintenance of Batteries

Battery for this instrument is rechargeable NiMH battery. All the NiMH batteries have been correctly installed and gone thorough precise debugging. Please do not open the instrument to replace batteries at discretion.

Cautions during Operation:

The following may bring auto power off of the instrument:

- 1 The instrument will be auto power off when there is insufficient power during operation and low power will be shown on the LCD.
- 2 If unused for a long time and cause insufficient power, the instrument will be power off several seconds after powering on so as to protect the batteries in case of excessive discharging. The inside batteries should be recharged immediately through adapter.

NOTES FOR MAINTENANCE OF BATTERIES IN THE INSTRUMENT:

In order for the **PROLITE-50/51/52** (including the batteries) to meet specifications, the storage temperature should be within 0 °C to 40 °C. And the instruments should be stored in low humidity environments.

One rechargeable NiMH battery is inside the instrument. Do not replace the battery by yourself.

If the instrument is left unused for a long time (idle for over 2 months), it is recommended to recharge the battery every other month.



Procedure of replacing the clock battery

- 1 To take off cover of the battery cell.
- 2 To remove the battery NiMH to the equip.
- 3 Under the battery is the backup battery for internal cloack. Replace if necessary it must be of type. Button cell 3V Li CR1220.
- 4 Connect and replace the NiMH battery.

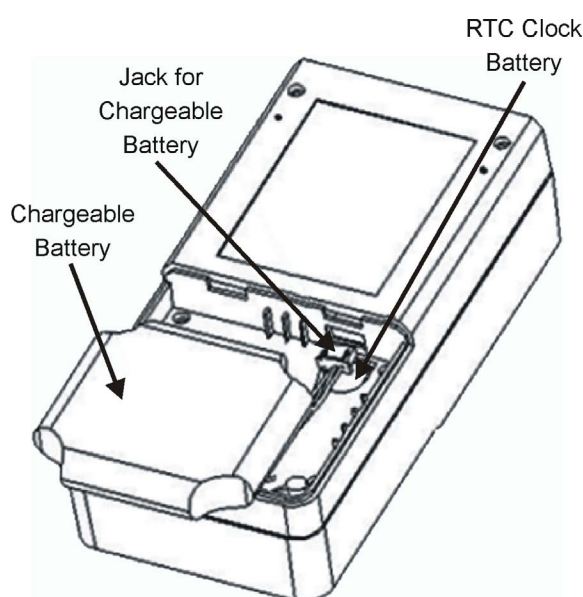


Figure 39.- Replacing the clock Battery

6.3 Cleaning of Interfaces

Interfaces must be kept clean. Special alcohol may be used to clean optic output. Always replace protective dust caps when the unit is not being used, and keep the protective dust caps clean.

In addition, flanges must be kept clean periodically.

Effects of Clearing Interfaces and Connectors

The diameter of optic core is $9\mu\text{m}$, and diameter of dust and other particulates ranges from $1/100$ to $1/1/10\mu\text{m}$. Comparatively speaking, the size of dust and other particulates can cover part of optic end and therefore degrade the performance of the instrument.

In addition, power density may burn dust into optic fiver and induce further damage (for example, 0 dBm optic power may produce about $16000000\text{ W/m}^2\text{m}$ power density in single mode fiber). In this case, measurement will be inaccurate and irreversible.



■ Safety Instructions to be Followed before Cleaning

- 1 Make sure the instrument is power off when cleaning.
- 2 Any operations contradict to the instructions may result in dangerous laser injuries.
- 3 Make sure laser source is off, when clean any optic connectors.
- 4 When the instrument is in operation, please always avoid looking directly into optic output. Although laser radiation is invisible, it may do serious injury to eyesight.
- 5 Be cautious of electric shock and make sure AC power is disconnected with the instrument before cleaning. Always use dry or moistest soft cloth to clean the outside of the instrument, and never clean the inside.
- 6 Please do not add any accessory to optic instrument or adjust the instrument at discretion.
- 7 For maintenance, always go to qualified or certified professionals.

■ Tools for Cleaning Interfaces and Connectors

- Optic fiber cleaner (for cleaning of optic connectors).
- Optic fiber cleaning rod (for cleaning of optic outputs).
- Optic fiber cleaning tissue (for cleaning optic interfaces).
- Isopropyl alcohol.
- Cotton ball.
- Paper tissue.
- Cleaning brush.
- Condensed air.

■ Preferred Procedure for Cleaning Interfaces and Connectors

- 1 Screw off the cap of flange.
- 2 Pinch the ceramics core between the thumb and the forefinger, rotate meanwhile pull it out slowly.
- 3 Clean the laser head carefully.
- 4 Mount the ceramics core.
- 5 Screw on the cap of flange.

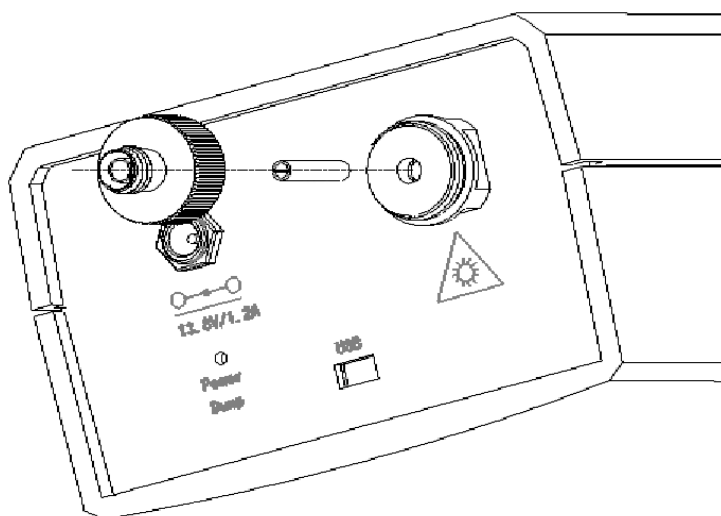


Figure 40.- Structure of Flange

6.4 Calibration Requeriments

Calibration of the instrument is recommended every two years. Please contact our representatives or nearby customer service centers for proper calibration.

6.5 Clearing Recommendations

CAUTION

To clean the cover, take care the instrument is disconnected.

CAUTION

Do not use scented hydrocarbons or chlorized solvents. Such products may attack the plastics used in the construction of the cover.

The cover should be cleaned by means of a light solution of detergent and water applied with a soft cloth.

Dry thoroughly before using the system again.