



FIBER OPTIC TECHNOLOGY
CALIBRATION LABORATORY

Mini OTDR MOT-700

USER MANUAL



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1. INTRODUCTION

This user manual covers measuring devices of MOT-700 series and is intended to give the possibility to study their application, operation, maintenance rules and engineering service and storage.

Measuring devices of MOT-700, MOT-700 series belong to the class of Mini OTDR and are intended for testing the fiber parameters while installing and maintaining optical communication lines. OTDR allows defining the distance to reflecting and nonreflecting non-uniformities, measuring the line attenuation and evaluating the splice and optical connector quality.

1.1. Operation modes

OTDR versions are different in the sets of functions performed. Depending on a version the device can include addition power meter and visual fault locator. Functions are selected by switching the device operation mode using main menu (see 3.2).

1.2. Appearance

Fig. 1 and Fig. 2 show the device appearance.

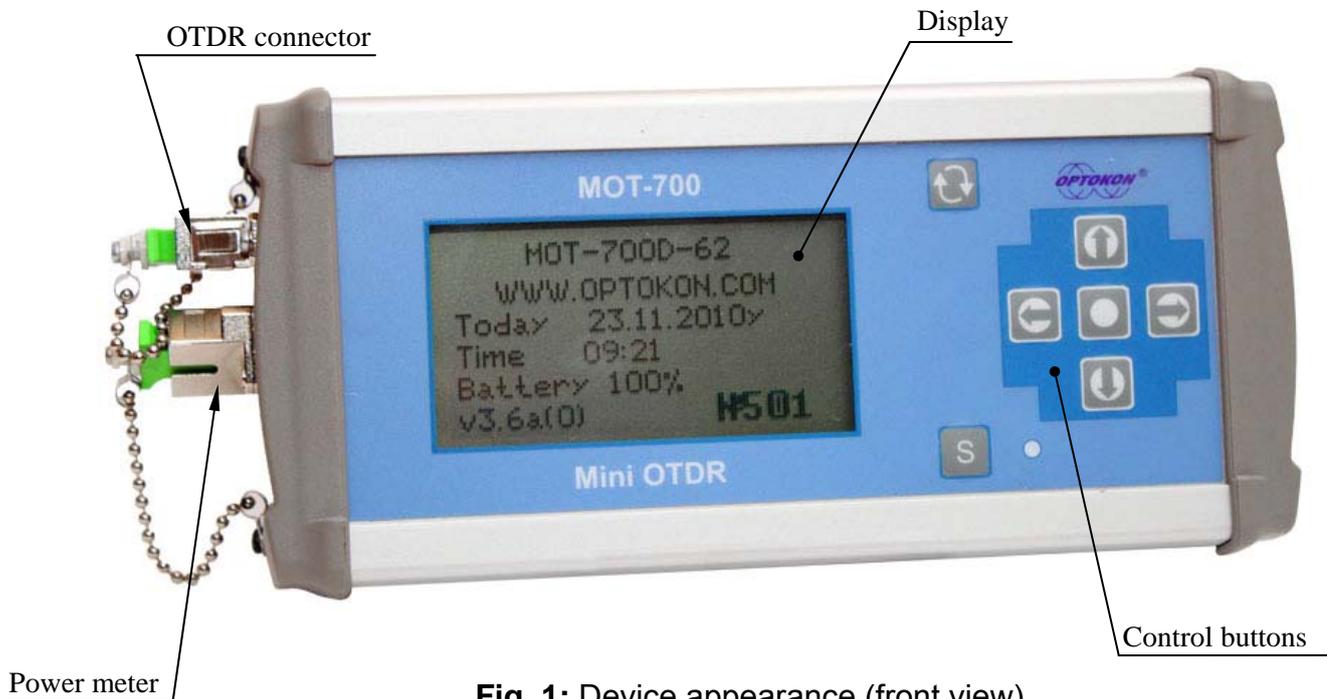


Fig. 1: Device appearance (front view).



Fig. 2: Device appearance (side view).

1.3. Power supplies

The device is powered by the following sources:

- Built-in rechargeable battery;
- External power unit from the mains of 220 V.

!	Attention
	<p>DEVICE IS NOT TURNED OFF AUTOMATICALLY. When the battery charging level is lower than a permissible one the device is switched to the power-saving mode (Fig. 3). Further operation is impossible. Charge the battery or connect the external power unit!</p>

!	Important
	<p>When disconnecting the external power unit follow the rules: 1. Disconnect device and power supply unit. 2. Disconnect power supply unit from mains of 220V.</p>

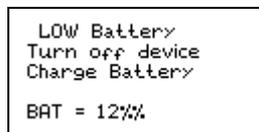


Fig. 3: Device display at the low battery charge level.

1.4. Application

OTDRs are used when:

- installing and maintaining the fiber optical communication lines;
- identifying failure;
- testing the quality of splices and detachable connections of fiber optical communication lines.

2. SAFETY INFORMATION

2.1. Electrical safety

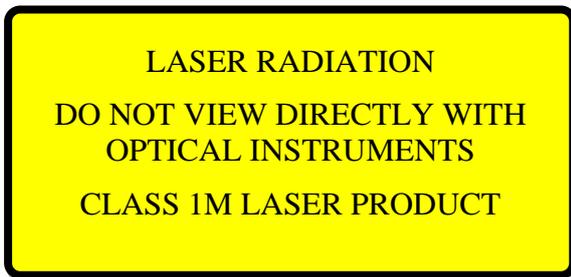
Never connect power supply unit to the mains with the voltage higher than that defined on the power supply unit. Power supply unit damage can occur when not meeting this requirement.

Please use only the power supply unit delivered with a device.

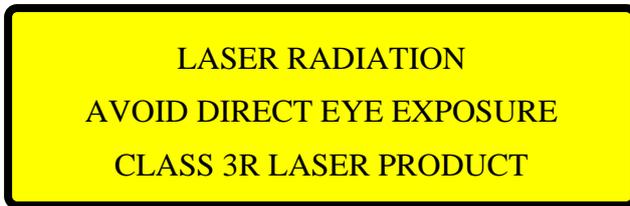
2.2. Laser safety

This instrument uses a laser light source. This instrument is a Class 1M laser product as defined by IEC60825-1 Safety of Laser Products-Part 1

CLASS 1M WITHOUT VFL OPTION:



CLASS 3R WITH VFL OPTION:



3. BASIC OPERATION

3.1. Device switch on/off

Switch on:

To switch on the device set the power switch to position **I**. After the brief sound signal the information about device version, current date and time and battery charge level (Fig. 4) will appear at the screen for several seconds, then the device will proceed the main menu mode.



Fig. 4: Welcome display.

Switch off:

To switch off the device set the power switch to position **O**.

3.2. Operation using menu

The main menu is intended to select the device operation modes (Fig. 5): OTDR, OLT, operation using memory and the device settings. The button  calls the main menu from any device mode unless stated otherwise.

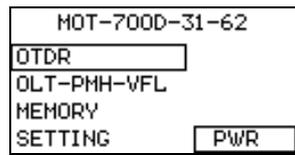


Fig. 5: Main menu.

Menu item movement is made using the button  and button . Press  to select a mode.

3.3. Display backlight turning on

When operating in low illumination conditions, please use backlight to make display data visibility better. Backlight turning on is made from the main menu or from menu «SETTINGS» (see 7.2).

In case the device with backlight being turned on is not used for 15 (30) seconds the backlight will turn off automatically, but turn on once again when pressing any key. When the power supply unit is connected the backlight is always turning on.

To turn on the backlight from the main menu:

1. Enter the main menu by pressing the button .
2. Press the button .

3.4. Cleaning and connecting the optical connectors

IMPORTANT	
	<p>In order to provide maximum output power and avoid wrong readings:</p> <ol style="list-style-type: none">1. Always clean connector before its connection to the device jack as described below. It is not a responsibility of a manufacture for damages or errors due to wrong treatment of the optical connectors or their bad cleanness.2. Be sure that your patch-cord is equipped with a proper type of connector. The attempt to combine different types of connectors can damage them.

To connect optical fiber you should fulfill the following:

1. Clean the connectors: wipe the connector top with special pileless material moisten with alcohol and check visually whether they are clean.
2. Put the connector exactly in front of the input jack. Remember that a fiber top should not touch or rub the other surfaces. Check the compatibility of the male and female connectors.
3. Press the connector and get sure that fiber optical cable is fixed (for LC-connectors).
4. Screw the connector to fix the fiber rigidly. Don't overtight the connection not to hurt the fiber and the connector (for FC-connectors)

NOTE: Wrong connection of a fiber optical cable to a device as well as rigid cable folding near the connection point will lead to erroneous measurement results.

4. OTDR MODE

4.1. Mode description

The mode is intended to register the fiber optical link trace, to define the distance to reflecting and non-reflecting non-uniformities, to measure line attenuation, to evaluate splice and optical connector quality.

4.2. Measurement parameters

To set measurement parameters enter the OTDR mode (see 3.2). A table of current parameters will be displayed (Fig. 6). Item movement is made using buttons  and . Use buttons  and  to change a parameter of the selected item.

Wavelength	1310nm
Range	2km
Pulsewidth	10ns
Average	15s
Index	1.4681

Fig. 6: Measurement parameters.

OTDR has two modes: «auto» and «manual». In «auto» mode the device itself defines the range and set optimal pulse width. In «manual» mode the user is suggested to set these parameters by him.

Parameter «Range» is recommended to set larger by 30% of the real line length. If is the line length unknown, set maximum value.

The device allows real-time measuring mode or its displaying after data acquiring. Selection of the acquiring mode is made in the line «Average».

!	IMPORTANT
	The number of trace points is constant and equal to 2048. When range changing a sample step changes from 1m (for 2km) to 64m (for 128km).

4.3. Measuring

Measurement process start can be done in the mode of settings parameter or in the mode of trace review. Press the button  to start. During the measurement process the current device state is displayed (Fig. 7) and LED is flashing on the right of the button.

```

=== WAIT ===
Input Power: NO
Input: OK
Range: 2km
Pulse width: 10ns
Measuring... 15s

```

Fig. 7: Measurement.

If the device detects optical radiation at the input the measurement process will stop and the message shown on Fig. 8 will be displayed. Get sure that no signal goes into the line and repeat the measurement.



Fig. 8: Radiation at the input.

If the device detects out-of-quality input connector in the near field (up to 20m) then «Input: ???» will be indicated. You should get sure that the input jack and the cable connectors are clean (see 8.1 and 3.4) and repeat measurements.

!	NOTE
	Normalizing coil is recommended for line measurements especially if the line has connectors in the near field of OTDR.

If the device found that «Range» parameter had been set to be less than the real link length then symbol «(!)» displays and the device continues the measurements with new parameters.

When completing the process the device will come to the mode of reviewing the measured trace at the same cursor position and resolution which were at the measurement start.

To interrupt the measurement process and change parameters you should press once again the button **(S)**. At this the device will come to the mode of setting the parameters.

4.4. Trace review

In the mode of trace reviewing the device displays: trace, cursor and information line (Fig. 9). The information line includes: distance between the line beginning and cursor, relative attenuation (on the line interval up to cursor) and the range in kilometers.

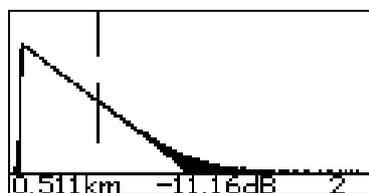


Fig. 9: Trace reviewing.

Use the buttons  and  to move cursor.

To enlarge the trace use the button , to reduce – the button . In enlarging mode the trace is disposed on horizontal up to maximum, cursor being in the middle of the screen. The device has four levels of vertical enlarging: 16dB, 8dB, 4dB and

2dB. In enlarging mode the vertical scale in dB is displayed in the right upper screen corner (Fig. 10). In this mode the cursor is displayed as more dense dashes.

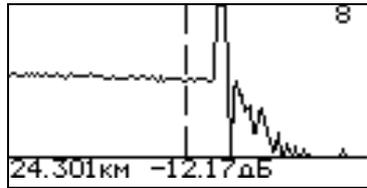


Fig. 10: Trace review in enlarging mode.

The following operation steps are recommended in enlarging mode:

1. Set the cursor on the trace section to be considered.
2. Set the necessary enlarging mode using buttons  and .
3. To go to the other section come back to the mode of the full trace displaying.
4. Move the cursor to a new section and use the button  once again to enlarge trace.

4.5. Measurement of line parameters

Device allows measuring attenuation coefficient and the losses in the line non-uniformities as well as the distance between the events. Press the button  to go to the mode of the line parameter measurement.

In a position where cursor was fixed a vertical solid line mark appears. In the upper left corner, between this mark and cursor, the link attenuation coefficient will be displayed. A distance between the solid line and cursor and attenuation between these two points will be displayed in the information line (Fig. 11).

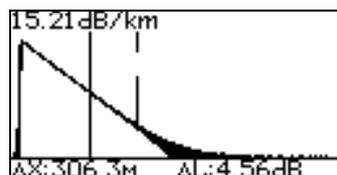


Fig. 11: Measurement of the line parameters.

If this line goes away of the screen then symbol «<» or symbol «>» will be displayed in the left or right screen side respectively depending on the line position (Fig. 12).

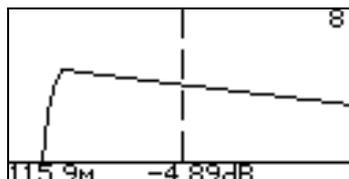


Fig. 12: The line is out of the screen (on the right).

4.6. Reviewing the events

A function of the event finding on the base of difference between two adjacent point levels is realized in this device. To enter this mode when displaying the full trace press and hold for 2 s the button .

A number of the event, distance to it and the difference value between two adjacent points are displayed (Fig. 13). To choose between the events use the buttons  and . Press the button  to enter the mode of trace reviewing at the event place.

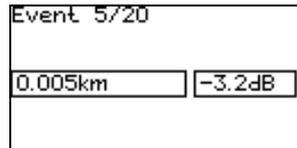


Fig. 13: Reviewing the events.

4.7. Trace storage

The device allows saving up to 200 traces. To save trace press and hold for about 2 seconds the button . A file name, comment line and screen keyboard will be displayed (Fig. 14). The file name is formed automatically and includes date (year, month and day), underline character and time (hour, minute, second dozens). The comment line includes the last comment and can be edited using the screen keyboard.



Fig. 14: Trace storage.

The edit can be done as follows:

Move cursor over the keyboard using the buttons , , , . The selection of a symbol is made using the button . To delete a symbol choose symbol «bs» on the screen keyboard. To cancel the saving chooses the «reverse arrow». Choose «ok» for saving. Trace is saved in the memory in Bellcore format.

After saving the information of the engaged cell quantity and the total memory cell number will be displayed (Fig. 15).

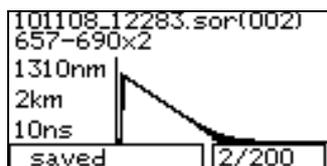


Fig. 15: Saved trace.

To come back to operation with trace press the button .

To continue the operation with memory press the button  or , in which case another saved trace will be displayed.

5. OLT MODE

5.1. Mode description

The device has two types of OLT which differs by meter operation mode: usual power meter and automatic loss tester. In both modes a choice of operation mode for optical radiation source and visual fault locator (visual optical radiation source) is provided. In the mode of «OLT manual» an average power of continuous and pulse modulated optical radiation at a device input (power meter input) is measured. A measured value can be displayed in linear (mW/μW/nW) units or logarithmic (dBm) units or losses in dB.

The mode «OLT automat» is intended for measuring fiber optical cable and optical component attenuation. Attenuation at three wavelengths per one measurement cycle can be measured in this mode. For this purpose the universal optical radiation source for three wavelengths is required. If the source has less number of wavelengths the measurements will be done at all wavelengths of the source.

The range of test functions depends on the device complete set. The main operation modes of an optical tester are listed in Tab. 1. Symbol «X» means that a proper device version has this mode.

Tester operation mode	MOT-700	MOT-700	MOT-700	MOT-700
Power meters			X	X
Laser source	X	X	X	X
Visual fault locator		X		X

Tab. 1: Equipment of the OTDR.

To choose the OLT operation mode select a proper item in the device main menu (see 3.2) then select the necessary mode (Fig. 16).

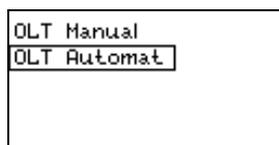


Fig. 16: OLT operation mode selection.

5.2. Operation using a power meter

5.2.1. Display description:

Display information of the tester with a power meter depends on the device complete set. A screen version for full device complete set is shown in Fig. 17.

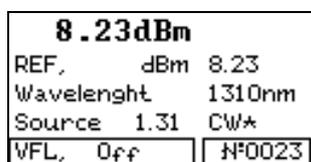


Fig. 17: OLT manual mode.

The first three lines characterize the optical power meter. The first line shows a measured power in absolute or relative units. The reference value in dBm is displayed in the second line (e.g., -79.14), and the third line displays information about the wavelength at which measurements are carried out (e.g., 1310nm).

The fourth line represents the operation mode of a source. The fifth line is intended to show the operation mode of visual fault locator and the number of the current memory cell.

Item movement is fulfilled using the buttons  and . To change the parameters of the item selected use the buttons  and .

5.2.2. Measurement unit choosing

The device provides a possibility to choose the following measurement units for an optical power: dBm, mW, dB. To select the necessary measurement unit you should go in the tester mode to the second display line and by sequential pressing the button  choose the necessary units.

5.2.3. Wavelength choosing

The device provides a possibility to choose any wavelength value within the ranges: 800nm — 900nm and 1210nm — 1650nm with the step of 1nm. To select the necessary wavelength for a power meter you should go in the tester mode (see Fig. 17) to the line «Wavelength». Quick select of the predetermined values within the set: 850nm/1310nm/1490nm/1550nm/1625nm is achieved by sequential pressing the button . A transfer to 1nm is fulfilled by pressing the buttons  and .

5.2.4. Setting reference value

The reference value setting is required when measuring the fiber optical line attenuation.

You should adjust the reference value for that wavelength at which you suppose to make the optical line attenuation measurement.

The device allows saving the reference levels for five predetermined wavelengths within a set: 850 nm/1310nm/1490nm/1550nm/1625nm and one current wavelength value out of this set.

To set the reference level you should fulfill the following:

1. Connect the light source which level should be further considered as reference point to the power meter input using 2 patch-cords.
2. Turn on the source at the necessary wavelength in the continuous radiation mode (CW).
3. Set the meter wavelength (third line) equal to the source wavelength (buttons ,  or .
4. Let the source get heated (about 5 minutes).
5. Select item «REF, dBm» (second line) and press the button . The device automatically saves the current value and goes to the mode of value displaying in respective logarithmic scale units «dB» using a new value of the reference level for measurement result conversion. The new device reading should be equal to «0.00dB». Power reference level will be displayed in the current line on the right.
6. Repeat these steps at other wavelengths.

5.2.5. Optical power measurement

To measure power you should fulfill the following:

1. Check and clean optical connectors (see 3.4).
2. Connect the fiber under test to the radiation source and power meter.
3. Turn on the source at the necessary wavelength.
4. Let the source get heated (not less than 5 minutes).
5. Set the meter wavelength equal to the source wavelength (using the buttons ,  or ).

6. Measurement unit selection is made by sequential pressing the button  at the chosen item «REF, dBm» (second line).
7. Repeat these steps at other wavelength if necessary.

5.2.6. Optical line loss measurement

To measure the line attenuation two devices are required, one of which will be used as optical light source with the necessary wavelength and the second one – as an optical power meter at the proper wavelength.

To measure line attenuation the following should be fulfilled:

1. Measure optical power level at the light source output (see above).
2. Set the measured value of the meter as a reference level (see above).
3. Connect the light source to the line input and power meter to its output.
4. Power meter values will be equal to the line attenuation when measurement units are set to: «dB».

5.2.7. Save result

The device allows saving up to 3000 measurement results. To save the results press the button . The information of file characteristics (Fig. 18): comments and fiber number will be displayed in the first line. Press the button  to confirm the saving. To cancel saving and come back to power meter mode press the button .

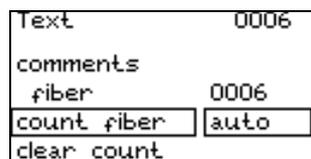


Fig. 18: Saving the measurement results.

In order to change the comments choose the line «Comments», press the button  and put new comments in using the screen keyboard.

File includes a fiber number that is always saved. The default value for this parameter is 0. Using the buttons  and  you can change a fiber number in the line «Fiber number». Maximum fiber number is 9999.

For automatic increasing the fiber number when saving choose «Auto» in the item «Fiber count». To reset the number to 0000 choose item «Counter reset» and press



!	IMPORTANT
	When achieving the fiber number 9999 the device will start the fiber counting from 0000.

5.3. Operation using OLT automat

5.3.1. Indicator description

Tester screen characteristics in the mode of attenuation meter depend on the device complete set. One of the screen versions is shown in Fig. 19.

-0.00 dB	1310 nm
0.06 dB	1490 nm
0.19 dB	1550 nm
Source 1.31	Off
	Nº0015

Fig. 19: OLT automat mode.

Losses measured are represented in three upper lines. The first column shows attenuation, the second one – wavelength in nm.

The fourth line represents the operation mode of a light source. The fifth line is intended to show the operation mode of visual fault locator and the number of the current memory cell.

Item movement is fulfilled using the buttons  and . To change the parameter of the item selected use the buttons  and .

5.3.2. Set of the reference value:

The reference value is used when measuring fiber optical link attenuation.

You should set the reference value for that wavelength at which you suppose to make the line loss measurement in power meter mode (see 5.2).

5.3.3. Optical line loss measurement:

To measure the link attenuation two devices are required, one of which will be used as optical light source able to transmit a code of the current wavelength value and the second one – as an optical power meter.

To measure link attenuation you should fulfill the following:

1. Measure an optical power level at the light source output at all wavelengths(see 5.2).
2. Connect the light source to the line input and power meter to its output.
3. Set the mode «OLT automat» at Power meter.
4. Set source mode -«CW*».
5. Let the source get heated (not less than 5 minutes).
6. Wait till the values at all wavelengths appear on the screen of power meter.

Note: one measurement cycle is equal to the quantity of the source operation wavelengths multiplied by 3 seconds, i.e. for the light source with three wavelengths the cycle is 9 seconds. Come to the other link if necessary and wait for the measurement results. So, several links can be sequentially tested without changing the devices operation modes.

	IMPORTANT
	<p>If the next wavelength code is not received within a waiting period (about 12 seconds) from the time of the last measurement then you'll hear a sound signal and the power meter readings will be reset: dashes will be displayed (Fig. 20).</p>

-----	---
-----	-----
-----	-----
Source 1.31	CW*
VFL, 1 Hz	N°0025

Fig. 20: OLT automat mode at the first moment after resetting the readings.

5.3.4. Result storage

The device allows saving up to 3000 measurement results. To save the results press the button . The information of file characteristics (Fig. 18): comments and fiber number will be displayed in the first line. Press the button  to confirm the saving. To cancel saving and come back to power meter press the button .

5.4. Operation using light source

Optical light sources are intended for radiation continuous stabilized and pulse-modulated optical power when defining attenuation of the optical single- and multi-mode fiber lines.

A device of MOT-700 series can have up to three sources at one output (OTDR connector). Only one light source can work at the moment. The light source wavelengths are displayed next to the word «Source» in the tester mode (for example, 1.31) (see Fig. 18). To select the light source wavelength enter the item

«Source» and press the button . Pressing the button you can sequentially change the installed laser sources.

Optical light source has the following operation modes:

1. «OFF» - switched off.
2. «CW» - continuous radiation.
3. «270Hz» - pulse-modulated radiation at the frequency of 270 Hz.
4. «2kHz» - pulse-modulated radiation at the frequency of 2 kHz.
5. «CW*» - radiation with periodical changing the wavelength. In this mode the device cyclically switches between the radiation sources and transfers the wavelength code to the compatible power meters.

The mode of a source radiation is switched by sequential pressing the button  or .

5.5. Operation using visual fault locator.

Visual fault locator is used to localize the local defects, fiber breaks in the OTDR dead zone as well as to identify a fiber in the optical cable.

The red laser has an independent output (see Fig. 1) and operates in the mode of continuous radiation («ON») or flashing («1 Hz»).

To select the laser operation mode choose the item «VFL» (see Fig. 17) and press

the button  or .

6. OPERATION USING MEMORY

The device has 200 memory cells to save traces and 3000 cells to save the power meter readings. The cells are filled sequentially. The first cell number is 1 and then it is increased by 1 when each result is being written in the memory.

6.1. Trace store

To save trace in the reviewing mode press the button  and hold it for about 2 seconds (see 4.7).

6.2. OLT value store

To save the results press the button . (see 5.2).

6.3. Trace review

To review the trace choose the item «MEMORY» in the device main menu (see 3.2), then select «OTDR» (Fig. 21). One saved trace will be displayed (Fig 22). The upper line includes the file name, the number of the memory cell being in brackets. The second line shows the comment. Information about parameters at which trace was registered is on the left of trace.

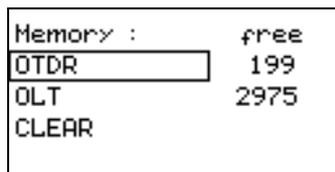


Fig. 21: Device memory selection.



Fig. 22: Operation with memory.

Use the button  and  to change the cell. To work with trace press the button . The device comes to the mode of trace reviewing (see 4.4).

6.4. OLT memory review

To review the saved measurement results choose the item «MEMORY» in the device main menu (see 3.2), then select «OLT» (Fig. 23). Saved measurement result will be displayed (Fig. 23). The upper line includes the file name, the number of the memory cell being in brackets. The second line shows the comment and the fiber number. Information about parameters is on the left, and the values of these parameters are on the right.

10.11.08_12:35:23 (0000)	
Cable 8	0005
Wavelength	1310nm
Level , dBm	8.23
REF, dBm	8.23
Loss , dB	0.00

Fig. 23: Saved measurement result review.

6.5. Trace loading into computer

To analyze the results and prepare the reports you can load the trace saved in the device memory into computer.

To load the data you should fulfill the following:

1. Using cable with USB connector (supplied with the device) connected the device to the computer.
2. Be sure that the battery charge level is enough to operate with a computer for all time period or connect the external power supply unit from the mains of 220 V.
3. To load the results start the program «TopOTDRViewer».

The program description can be found in the user manual «TopOTDRViewer».

!	IMPORTANT
	Data loaded into computer are not automatically deleted from the device memory.

6.6. Trace deletion

The device is able to delete trace in order to clean the memory. To delete trace choose the item «MEMORY» and trace which you want to delete (see 6.5). Then press the button twice (Fig. 24).

100408_05395.sor(001)	
657-690x2	
1310nm	
2km	
10ns	
Delete?	Ok

Fig. 24: Operation with memory.

6.7. Memory clean

You can completely reset the OTDR memory and OLT memory. To do it chooses the item «Clear» from memory menu (Fig. 25). Select the necessary memory to be reset

and press the button . To cancel the operation and come back to the previous menu choose the item «CANCEL».

Clear MEMORY :
OTDR
OLT
CANCEL

Fig. 25: Memory clear.

7. DEVICE SETTINGS

Using menu «SETTING» (Fig. 26) the current date and time are installed, display backlight mode. Menu «SETTINGS» is selected from the main menu (see 3.2)

Date/Time	
Backlight	Off
Language	English
OTDR Params	
Contrast	50

Fig. 26: Menu «SETTINGS».

7.1. Date and time settings

The device has built-in clock and calendar that are used in the file name. To change time and/or date fulfill the following:

1. Select the item «Date/Time» (Fig. 27)
2. Using the button  and  choose the field where the changes should be done.
3. Using the button  and  adjust the necessary value.
4. To save the new values press the button .
5. To come back to the main menu press the button .
- 6.

Data	10 / 11 / 08
Time	12:19:18

Fig. 27: Date and time settings.

7.2. Backlight operation mode selection

The device has several modes of backlight operation: off, 15s and 30s. Don't use the backlight without the necessity, this will save the battery charge level.

When choosing the mode of 15s or 30s the display backlight turns on. If the device was not used for 15 or 30 seconds the backlight turns off but when pressing any button will turn on again.

To change the backlight operation mode choose the menu item «Backlight» and press the buttons  or .

NOTES	
!	<ol style="list-style-type: none">1. When measuring trace the backlight is turned off automatically.2. When charge unit is connected the backlight is always turned on.

7.3. Language choice

The OTDR can be provided with several languages. To change the language choose the menu item «Language» and press the buttons  or .

7.4. OTDR Params – ANALYZE OF EVENTS

In this tab it is possible to analyze of events. Commands YES or NO are started this function. In software is view value distance and attenuation. Next opportunity is setting value of the threshold events.

7.5. Contrast

This function is for view of the display. For the setting is necessary press the buttons  or .

8. MAINTENANCE

8.1. Connector cleaning

To clean the connectors fulfill the following (Fig. 28):

1. Screw out the connector cover.
2. Moisten slightly the end of the cleaning stick with alcohol (only one drop).
3. Correctly put the cleaning end into the connector.
4. Slightly turn the stick in the connector.
5. Take the stick away from the connector.
6. Repeat items 3 – 5 with a dry stick.
7. Cleaning agents and materials should be used only once.

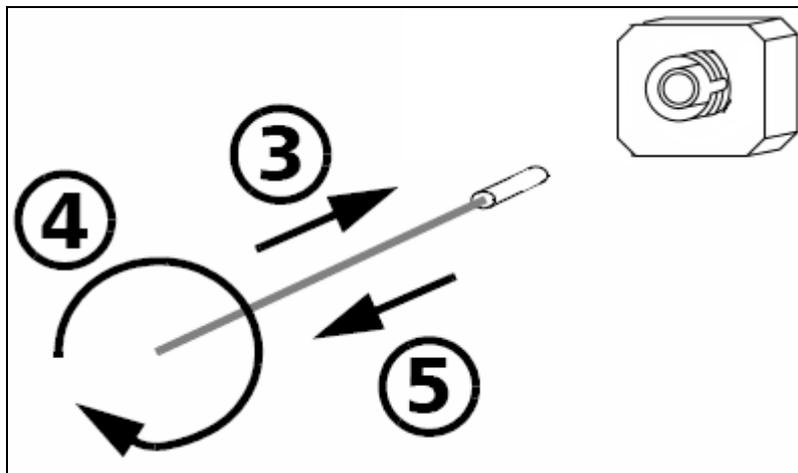


Fig. 28: Connector cleaning.

!	IMPORTANT
	Over alcohol can leave signs or stains. Therefore use only one drop of alcohol.

8.2. Battery charging

The device provides continuous operation with completely charged batteries in the standard application conditions for at least 10 hours.

Battery discharging indication is provided in the device: the tracing power supply image is in the lower right part of the display in the main menu (Fig. 5).

The battery is considered completely charged if this mark is completely full at the power supply unit switching off. When connecting a power supply unit the message «PWR» is displayed instead of battery image.

!	IMPORTANT
	The device is delivered with uncharged battery. Before the first usage the devices should be charged for at least 14 hours!

The installed battery is charged when connecting a mains power supply unit to the device. At the completely discharge batteries the standard charging time is 14 hours. The charging is carrying out independent on the device being on or off.

!	IMPORTANT
■	When operating from the external power supply unit a correct work and technical tester characteristics are ensured only for the external power supply unit supplied with the device.

8.3. Changing the optical adapter of power meter connector

The structure of power meter optical connector (Fig. 1) allows connecting to it the optical cables with connectors of different types. To change the type of an optical connector connected to power meter you should change the external connector part (so called adapter). The complete set of the optical tester delivered can include the adapters for connection of the following types of connectors: FC, SC, ST, LC.

To change the adapter you need the screwdriver with a flat end.

Before adapter changing take off the protective cover from the power meter connector, then screw away its screws.

To install the socket you should do everything in the reverse order.

Change the protective cover it necessary.

8.4. Upgrading software

The manufacturer of these devices takes care of their updating: the errors and misunderstanding revealed when maintaining are corrected, new functional features appear. The devices are provided with a possibility to renew the entire software version using especial computer program (see the user manual to the program TopFWLoader).

To upgrade the software you should fulfill the following:

1. Connect the device to a computer using interface USB cable supplied with the device.

2. Press and hold the button  on the front device panel. When holding the button switch on the device.

In the upper display line a message: «Loader v1.1», representing information that the device is ready to work in the mode of loading the entire software, should appear.

3. Start the program «TopFWLoader.exe».

4. Execute program connection with the device and load new software.

5. After completing software upgrading switch off the device and then switch it on to work in the main mode.

!	ATTENTION
■	<ol style="list-style-type: none"> 1. Don't switch the device off when upgrading the software. 2. The device software upgrading is recommended to be done at the fully charged battery or when supplying from the external power supply unit.

9. COMPLETE SET

Tab. 2 shows the complete set of the device supplied.

Item	Quantity	Note
Optical tester «MOT-700»	1	
Optical cable	1	Optionally
AC/DC Adapter 220 V/5 V	1	
Device carrying case	1	
User manual	1	
USB connecting cable	1	
Software CD	1	

Tab. 2: Supplied sets of the device.

Calibration service:

The recommended period of calibration services performed by accredited Calibration Laboratory is 2 years.

10. CALIBRATION, SERVICE CENTER

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