User's Manual

AQ1100A, AQ1100B, AQ1100D
OLTS
Multi Field Tester

YOKOGAWA
Yokogawa Test & Measurement Corporation

IM AQ1100-01EN
4th Edition

Thank you for purchasing the AQ1100A, AQ1100B, and AQ1100D OLTS (Optical Loss Test Set) Multi Field Tester.
This user's manual explains the features, operating procedures, and handling precautions of the AQ1100A, AQ1100B, and AQ1100D. To ensure correct use, please read this manual thoroughly before operation. Keep this manual in a safe place for quick reference in the event that a question arises.
This manual is one of three AQ1100A, AQ1100B, and AQ1100D manuals. Please read all the manuals.

Manual Title	Manual No.	Description
AQ1100A, AQ1100B, AQ1100D OLTS Multi Field Tester Operation Guide	IM AQ1100-02EN	This guide focuses on the handling precautions, basic operations, and specifications of the AQ1100A, AQ1100B, and AQ1100D.
AQ1100A, AQ1100B, AQ1100D OLTS Multi Field Tester User's Manual (included in CD)	IM AQ1100-01EN	This manual. Explains all AQ1100A, AQ1100B, and AQ1100D features, except for the communication features, and how to use them.
AQ1100A, AQ1100B, AQ1100D OLTS Multi Field Tester Communication Interface User's Manual (included in CD)	IM AQ1100-17EN	Explains the features related to using communication commands to control the AQ1100A, AQ1100B, and AQ1100D.

Notes

- The contents of this manual are subject to change without prior notice as a result of continuing improvements to the instrument's performance and functionality. The figures given in this manual may differ from those that actually appear on your screen.
- Every effort has been made in the preparation of this manual to ensure the accuracy of its contents. However, should you have any questions or find any errors, please contact your nearest YOKOGAWA dealer.
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Conventions Used in This Manual

Notes

The notes and cautions in this manual are categorized using the following symbols.

Improper handling or use can lead to injury to the user or damage to the instrument. This symbol appears on the instrument to indicate that the user must refer to the user's manual for special instructions. The same symbol appears in the corresponding place in the user's manual to identify those instructions. In the manual, the symbol is used in conjunction with the word "WARNING" or "CAUTION."

WARNING Calls attention to actions or conditions that could cause serious or fatal injury to the user, and precautions that can be taken to prevent such occurrences.

CAUTION Calls attention to actions or conditions that could cause light injury to the user or cause damage to the instrument or user's data, and precautions that can be taken to prevent such occurrences.

Note Calls attention to information that is important for proper operation of the instrument.

Symbols and Conventions Used in Procedural Explanations

The contents of the procedural explanations are indicated using the following symbols.

Procedure Carry out the procedure according to the step numbers. All procedures are written under the assumption that you are starting operation at the beginning of the procedure, so you may not need to carry out all the steps in a procedure when you are changing the settings.

Explanation This section describes the setup items and the limitations regarding the procedures. It may not give a detailed explanation of the feature. For a detailed explanation of the feature, see chapter 2.

Character Notations

Hard Key Names and Soft Key Names in Bold Characters
Indicate panel keys that are used in the procedure and soft keys and menu items that appear on the screen.

Unit

k	Denotes 1000. Example: 12 kg, 100 kHz

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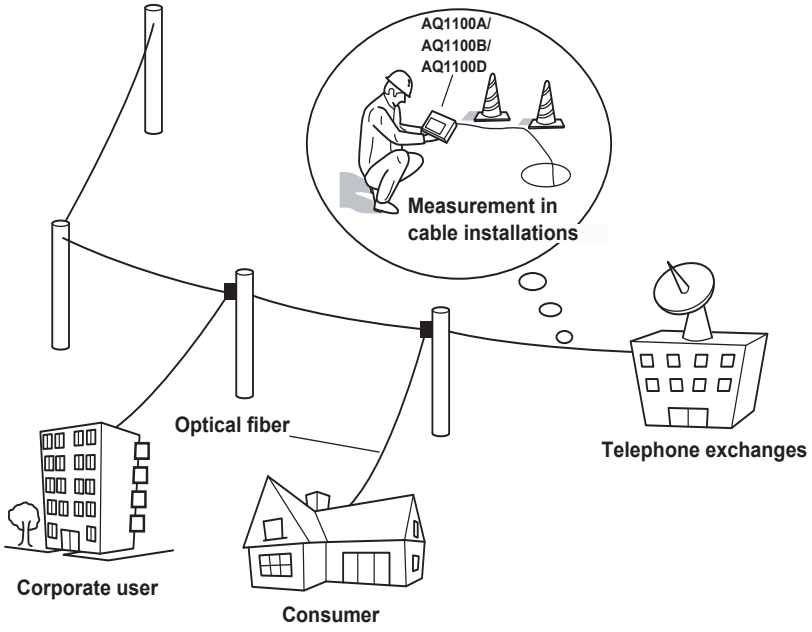
1.1 Overview

This instrument is an OLTS (Optical Loss Test Set) with the features listed below. It is used in the optical fiber and line installation and maintenance servicing of access networks, which link telephone exchanges and service providers with subscribers, and user networks, which enable communication within a corporation or building.

- Optical power meter
- Loss-measurement light source and visible light source
- Loss measurement that makes use of its light source and optical power meter features (loss test).
- Efficient multicore loss testing for measuring loss in multicore fibers
- Simple IP testing through pinging (option)



1.2 Optical Power Meter and Light Source

Optical Power Meter

The three instrument types listed below are available for measuring different types of optical power.

Suffix Code	Optical Power Type
-SPM	Standard
-HPM	High input
-PPM	PON (passive optical network)

If you are using this instrument to measure optical power, the various settings listed below can be configured.

Item	Models with -SPM or -HPM Suffix Codes	Models with -PPM Suffix Codes	
		Normal power meter selected	PON power meter selected
Wavelength	Yes	Fixed[10, 11]	Fixed[10, 11]
Wavelength mode[1]	Yes	—	—
Modulation mode[2]	Yes	—	—
Unit	Yes (dB, dBm, W)	Yes (dB, dBm, W)	Yes (dBm, W)
Reference[3]	Yes	Yes	—
Measured value display hold	Yes	Yes	Yes
Measured value logging	Yes	Yes	—
Zero set[4]	Yes	Yes	Yes
Average count[5]	Yes	Yes	Yes
Maximum and minimum value display[6]	Yes	Yes	—
Interlocking of light source and optical power meter settings[7]	Yes	Yes	—
Offset[8]	Yes	Yes	Yes
Threshold[9]	Yes	Yes	Yes
Measurement of the optical power from ONU to OLT for a particular signal wavelength[10]	—	—	Yes
Measurement of the optical power from OLT to ONU for a particular signal wavelength[11]	—	—	Yes

Yes: Can be set or executed, —: Not available

1 Wavelengths can be set with the wavelength mode set to Simple, Detail, or CWDM.
- Simple: You can select from a list of preset wavelengths.
- Detail: You can set the wavelength to a value from 800 to 1700 nm in 1 nm steps.
- CWDM: You can set the wavelength to a value from 1270 to 1610 nm in 20 nm steps along the CWDM wavelength grid.

2 You can select the modulation frequency of the incident rays from a list of presets. You can also select CW (continuous).

3 You can make the displayed measured value the reference and display subsequent measured values as relative values.

4 You can adjust the internal deviation of the optical power measurement section and obtain more accurate absolute optical power values.

5 You can display averaged measured values.

6 You can display the maximum and minimum measured values.

7 You can interlock the light source and optical power meter settings when you connect an optical fiber between the light source port of an AQ1100A, AQ1100B, or AQ1100D and the optical power measurement port of another AQ1100A, AQ1100B, or AQ1100D.

8 You can add a specified value (the offset value) to measured optical power values.

9 You can set upper and lower threshold values and determine whether or not the measured values fall within them.

10 You can measure the optical power of an upstream signal from the ONU (optical network unit: the user's optical terminal) to the OLT (optical line termination: the telephone exchange's optical terminal). The optical power of the 1310 nm (data wavelength) signal is measured.

11 You can measure the optical power of downstream signals from the OLT to the ONU. The optical power of the 1490 nm (data wavelength) and 1550 nm (video wavelength) signals is measured.

Loss Measurement Light Source

Three instrument models, with the measurement light wavelengths listed below, are available for different applications.

Model	Measurement Light Wavelength
AQ1100A	SM 1310 nm, SM 1550 nm
AQ1100B	SM 1310 nm, SM 1550 nm, SM 1625 nm
AQ1100D	GI 850 nm, GI 1300 nm, SM 1310 nm, SM 1550 nm

You can produce continuous light or light that has been modulated at the selected frequency (modulation mode).

Visible Light Source (Optional)

The visible light source is available on models with the /VLS option.
You can produce visible light to visually identify breaks in the optical fiber under test. You can turn the visible light on and off independently of the measurement light source.

1.3 Loss Testing

Optical fiber and optical line degradation can be measured easily.
You can measure optical loss with models with -SPM or -HPM suffix codes.

Auto Loss Testing (Using one AQ1100A, AQ1100B, or AQ1100D as the light source and another as the optical power meter)

Using this instrument as a light source and optical power meter, you can easily measure optical fiber and line degradation.

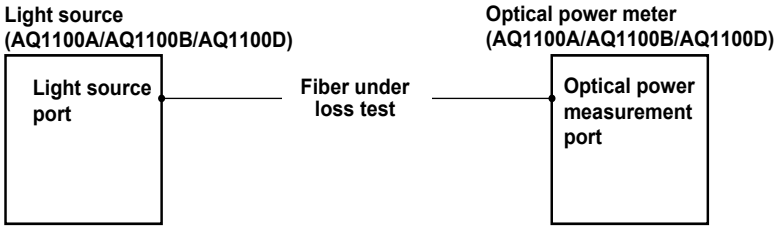
Light Source

You can set up to three measurement light wavelengths and produce them in order. You can produce a constant level of light if you use the optical power adjustment feature.

Optical Power Meter

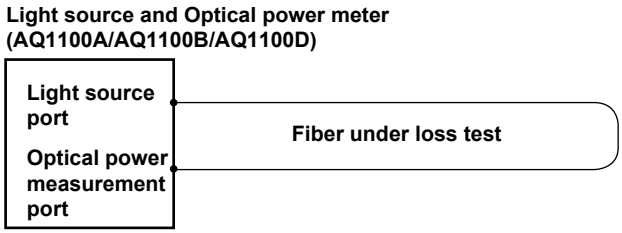
This instrument automatically identifies the measurement light from this instrument that it is connected to and measures the optical power.

- The following items can be specified or executed. For details about these items, see section 1.2.
  The unit, reference, offset, and threshold values can be specified.
  The zero set and measured value display hold operations can be executed.
- You can attach fiber information to the measured values and save them.*
  * Because this instrument is capable of identifying optical fiber and line cores, it is possible to number cores and tapes.



Loop-Back Loss Test (Using one AQ1100A, AQ1100B, or AQ1100D)

You can use the light source and optical power meter features on a single AQ1100A, AQ1100B, or AQ1100D to perform a loop-back loss test on an optical fiber or line. To perform loss testing, connect one end of the fiber that you need to perform loss testing on to this instrument light source port, and connect the other end to the optical power measurement port of the same AQ1100A, AQ1100B, or AQ1100D.



1.4 Multicore Loss Testing

Multicore optical fiber and optical line degradation can be measured efficiently.
You can measure optical loss with models with -SPM or -HPM suffix codes.

Master and Slave

Connect two AQ1100s and specify the optical power meter as the master and the light source as the slave. You can also use the AQ1200 multi-field tester series instead of this instrument as the master or slave.

Specifying the Optical Communication Fiber

To transfer, between the master and slave, project setup information and information about the fiber under loss test, you must specify a fiber from the multicore optical fiber to use for communication. Connect one end of the optical communication fiber to the master's light source port (optical port 2), and connect the other end to the slave's optical power measurement port (optical port 1).

Information That Is Transferred from Master to Slave

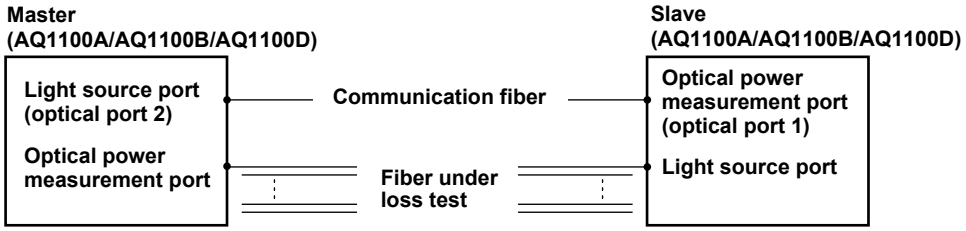
The following information can be transferred through the optical communication fiber from the master to the slave.

- Project information (see below for further details)
- Loss test results*

  * Each time that the selected fiber's loss test finishes, that fiber's loss test result is automatically transferred.

Connecting the Optical Fiber under Loss Test

All fibers other than the optical communication fiber can be tested. For each optical fiber under loss test, connect one end to the master's optical power measurement port, and connect the other end to the slave's light source port. The core and tape numbers of the fibers under loss test are transferred from the master to the slave.



Executing a Loss Test

Transmit light from the slave. The master will automatically identify up to three different wavelengths in the light from the slave and measure the optical power. Continue the loss test, switching the cores between the master and the slave in order.

Projects

You can create projects with the master. You can specify the following project information:

The project name, the number of the core to start loss testing at, the tape number type, the number of cores, and the transmitted or measured measurement light wavelengths (up to 3).

- You can transfer projects from the master to the slave and share information.
- When the master and the slave share a project and use that project to perform loss testing, if testing is stopped, the data up to the stop point is saved and you can begin testing again from the next core.
- You can save and load projects as CSV files.

1.5 IP Testing (Option)

You can check whether or not the network layer of an Ethernet LAN line is established. Before performing an IP test, make sure that the optical fiber or line is connected physically.
IP testing is available on models with the /LAN option.

Pinging

To ping an address (perform a simple IP test), specify the address and configure the Tx frame settings listed below. The results of pinging the address appear on the screen.

The frame length, Tx mode (continuation, number of frames to send, and transmission time), and measurement interval

1.6 Other Features

In addition to the features described so far, this instrument also has the following features.

- **Data saving and loading**
- **Language selection**
- **Beep on/off**
- **Startup menu selection**
- **USB function selection (storage/communication)**
- **Screen color selection**
- **Current date and time configuration (see the operation guide, IM AQ1100-02EN)**
- **Power save settings**
- **Network settings (on models with the /LAN option)**
- **Setup information initialization (to the factory default values)**
- **This instrument information display (model, serial no., suffix code, version, etc.)**
- **Self test execution**
- **Firmware version updating**

2.1 Key, Rotary Knob, and Arrow Key Operations

To make this manual easier to read, we have omitted or simplified explanations of the kinds of operations listed below.

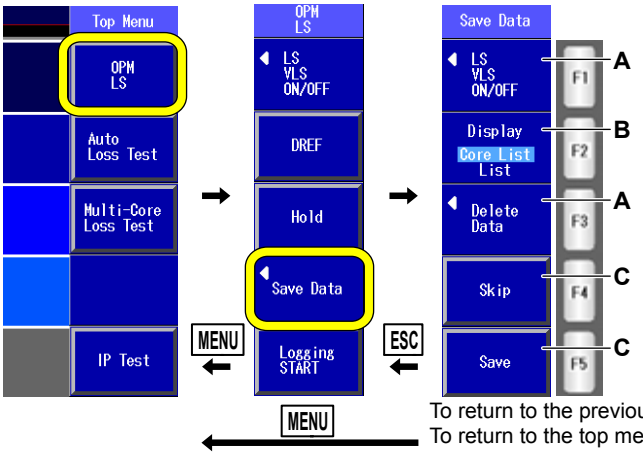
- Repetitive operations
- Detailed operations for proceeding to the desired setup menu or dialog box and information about the accompanying screen changes.
- Setup items that users can configure if they have a general understanding of them.

Below, we will compare examples of detailed setup operation explanations with explanations that have been omitted or simplified.

Key Operations

The examples below explain the process for turning on the power, waiting for the top menu to appear, and then opening the Save Data menu. The first menu in the figure below is the top menu for models with -SPM or -HPM suffix codes.

1. Press the **OPM LS** soft key (F1) to display the OPM LS menu.
2. Press the **Save Data** soft key (F4) to display the Save Data menu.



Menu operation types A through C are listed below.

A: A selection menu appears when you press the soft key. When you press a soft key that corresponds to an item on the menu, the selected item is confirmed, or the action that corresponds to it is performed.

B: The selected setting switches each time you press the soft key.

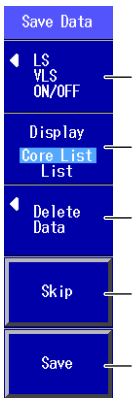
C: When you press the soft key, the item that corresponds to it is confirmed, or the action that corresponds to it is performed.

To return to the previous menu, press ESC.
To return to the top menu, press MENU.

In this manual, steps 1 and 2 listed above and the setup operations in the menu that follows them are written as shown below.

Setup Operation Example

Press the **OPM LS** soft key and then the **Data Save** soft key to display the following screen.



In the menu that appears, turn the light source or visible light source on or off.

Set the list to show (Core List, List).

In the menu that appears, execute the deletion of the selected data.

Executes skipping

Saves data

At this point, the soft key names are omitted, and the settings that the soft keys are used to configure and the actions that pressing them causes are explained. Options and ranges are listed afterwards.

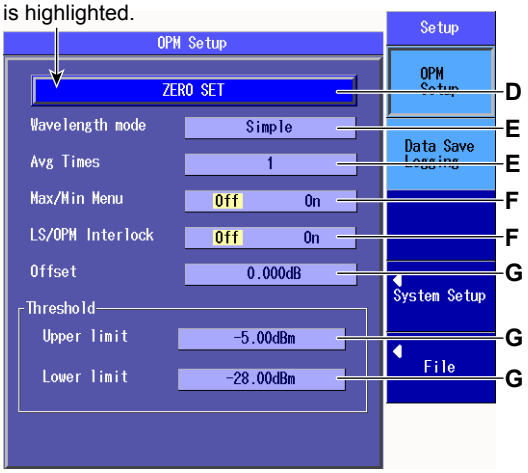
- Step numbers are used when there are many operations and when operations must be performed in different menus.
- The explanation for returning to the previous menu is omitted.

Rotary Knob and Arrow Key Operations

This section explains how to operate a menu and the operations to perform when a setup dialog box appears. We will use the dialog box that appears when you press the **OPM Setup** soft key as an example.

1. Press the **OPM Setup** soft key to display the OPM Setup dialog box.
2. Use the **rotary knob** or the **arrow** keys to move the cursor to the item that you need to configure or execute.
   The item at the cursor location is highlighted.
3. Press **ENTER**.
   - Next, follow the instructions in the figure below that correspond to the type of item that you are configuring or executing.
   - In this manual, steps 2 and 3 listed above are indicated using the expression "using the **rotary knob** and **ENTER**."

The item at the cursor location is highlighted.



For setup operation types E and G, to reset the selected item to its previous settings, press ESC.
To return to the top menu, press MENU.

Setup operation types D through G are listed below.

D: Press **ENTER** to confirm the item or execute its corresponding action.

E: Press **ENTER** to display a menu. Turn the **rotary knob** or press the **up** and **down arrow** keys to move the cursor to the item that you want to select. Then press **ENTER** to select the item.

Example of menu for **E**

F: The selected setting switches each time you press **ENTER**.

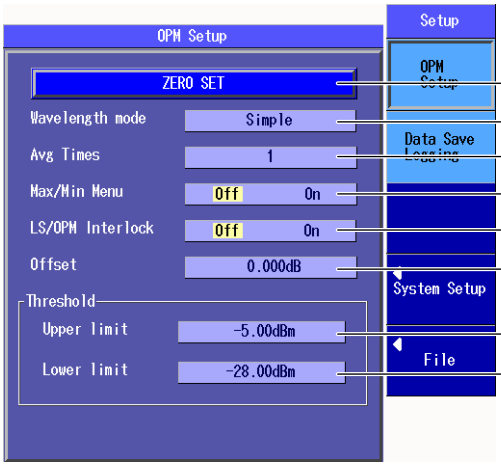
G: Press **ENTER** to display a text box. Turn the **rotary knob** or press the **up** and **down arrow** keys to increase or decrease a number. To move between digits, press the **left** and **right arrow** keys. After you have entered a number, press **ENTER** to set the value to that number.

Example of text box for **G**

In this manual, steps 1 through 3 listed above and the setup operations in the menu that follows them are written as shown below.

Setup Operation Example

Press the **OPM Setup** soft key to display the following screen.



Performs zero set
Set the wavelength mode (Simple, Detail, CWDM).
Set the average count (1, 10, 50, 100).
Turns the display of the max/min value menu on and off
Turns on and off the interlocking of the light source and optical power meter settings
Set the offset (–9.900 to 9.900 dB).
Set the upper threshold value (–80.00 to 40.00 dB).
Set the lower threshold value (–80.00 to 40.00 dB).

At this point, the settings that the items are used to configure and the actions that selecting them causes are explained. Options and ranges are listed afterwards.

- The explanations of rotary knob, arrow key, and ENTER key operations are omitted.
- The explanation of how to reset the selected item to its previous setting is omitted.
- The explanation for returning to the previous menu is omitted.

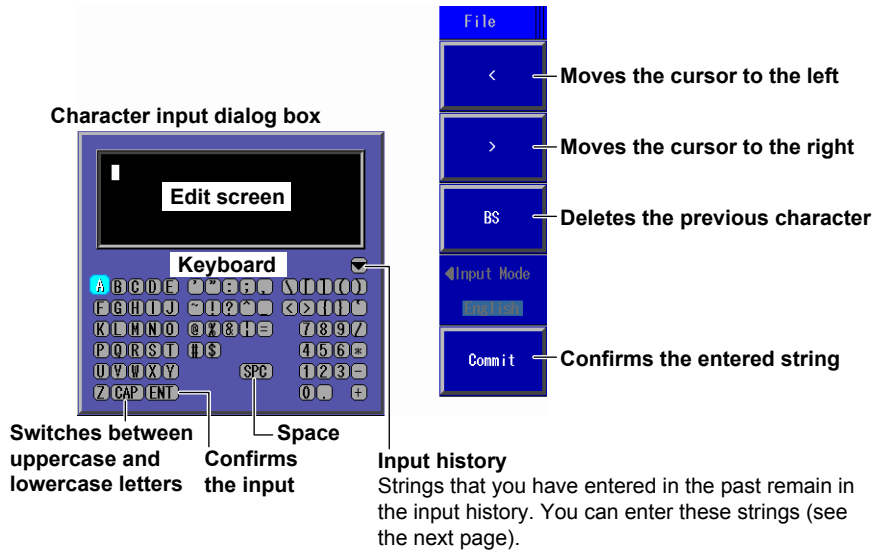
2.2 Entering Strings

After you have selected a setup item and pressed ENTER, a character input dialog box will appear if it is necessary. This section explains the operations that you can perform after the dialog box appears.

Entering Strings

1. Using the **rotary knob** and **ENTER**, enter a string. The string that you entered appears in the edit screen.
2. Press the various soft keys to edit the string as necessary.
3. After you have finished entering and editing the string, press the **OK** soft key to confirm the string that you entered and close the character input dialog box. The string be applied to the relevant item.

   You can also confirm the string by moving the cursor to **ENT** on the displayed keyboard and then pressing **ENTER**.

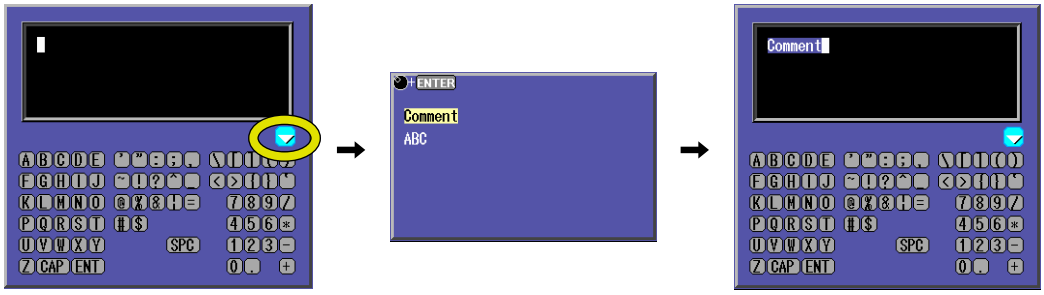


Note

- If there is a limit to the length of the string, you will not be able to enter characters after the limit is reached.
- You can also enter strings using a USB keyboard.

Entering Strings from the History

1. Using the **rotary knob** and **ENTER**, select ▼ to display the input history screen.
2. Using the **rotary knob** and **ENTER**, choose the string that you want to enter. The string appears in the edit screen.



Note

Entered strings are saved to the input history when you confirm them. Up to 50 strings can be saved. Newer strings appear at the top of the input history.

3.1 Making Preparations for Measurements

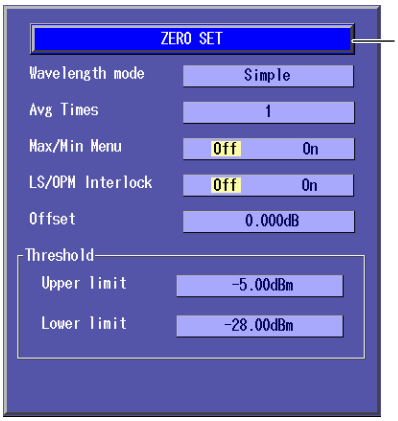
Remove the optical fiber cables from this instrument and close the optical connector covers, or make sure that the power meter is not receiving any light, and then start the optical power meter zero set procedure.

Procedure

Performing Zero Set

Press the **OPM LS** soft key, **SETUP**, and then the **OPM Setup** soft key to display the following screen.

The figure below shows the screen that appears on models with -SPM and -HPM suffix codes. On models with the -PPM suffix code, there is no “Wavelength mode” item.



Explanation

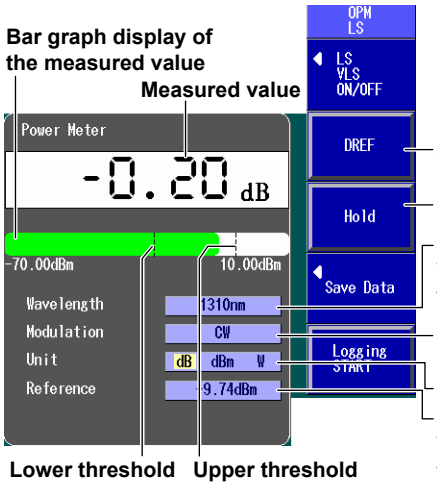
Perform zero set whenever necessary, such as after you have turned on the power or when the ambient temperature changes. Performing zero set adjusts the internal deviation of the optical power measurement section and enables you to obtain more accurate absolute optical power values.

3.2 Setting Optical Power Measurement Conditions and Holding the Display

Procedure

Power Meter Screen

Press the **OPM LS** soft key to display the following screen.



Bar graph display of the measured value

Measured value

Sets the reference to the currently displayed measured value

Holds the measured value display

Set the wavelength.
This setting varies depending on the model or the wavelength mode that you set in the detailed setup screen in the next section.

Set the modulation mode (CW, 270Hz, 1kHz, 2kHz).
Can be set on models with -SPM or -HPM suffix codes.

Set the unit (dB, dBm, W).

Set the reference manually (–80 to 40 dBm).
The Reference box appears if you press the DREF soft key or set the unit to dB.

Lower threshold line

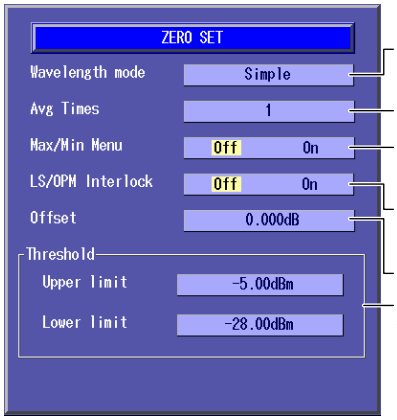
Upper threshold line

These lines indicate the upper and lower threshold values (see the detailed setup screen in section).

Detailed Setup Screen

Press **SETUP** and then the **OPM SETUP** soft key to display the following screen.

The figure below shows the screen that appears on models with -SPM and -HPM suffix codes. On models with the -PPM suffix code, there is no “Wavelength mode” item.



Set the wavelength mode (Simple, Detail, CWDM).
Can be set on models with -SPM or -HPM suffix codes.

Set the average count (1, 10, 50, 100).

Turns the display of the max/min value menu on and off

Turns the interlocking of the light source and optical power meter settings on and off

Set the offset (–9.900 to 9.900 dB).

Set the threshold values (–80 to 40 dBm).
You can set the upper and lower values.

Explanation

Wavelength

The light receiving element of the optical power measurement section has a wavelength sensitivity characteristic. This instrument measures optical power more accurately by adjusting the sensitivity according to the specified wavelength. The measurable wavelength range varies depending on the model.

Models with -SPM or -HPM Suffix Codes

The wavelength ranges and steps vary depending on the wavelength mode that you set in the detailed setup screen. You can set the wavelength within the following ranges.

Wavelength Mode	Range and Steps
Simple	You can select from 850 nm, 1300 nm, 1310 nm, 1490 nm, 1550 nm, 1625 nm, and 1650 nm.
Detail	You can set the wavelength to a value from 800 to 1700 nm in 1 nm steps.
CWDM	You can set the wavelength to a value from 1270 to 1610 nm in 20 nm steps.

Models with -PPM Suffix Codes

You can set the wavelength to one of the following values.
1310 nm, 1490 nm, 1550 nm

Modulation Mode

On models with -SPM or -HPM suffix codes, you can set the modulation mode for optical measurement to one of the following options.
CW (continuous light), 270 Hz, 1 kHz, 2 kHz

Unit

You can set the optical power display unit to one of the following options.
dB (relative value), dBm (absolute value), W (absolute value)

- The following prefixes are attached to W: m (10^{-3}), μ (10^{-6}), n (10^{-9}), and p (10^{-12}).
- The relationship between the absolute values dBm and W is indicated below.
  $P_{dBm} = 10 \times \log (P_w \times 10^3)$
  Where P_{dBm} is the optical power in units of dBm and P_w is the optical power in units of W.

Reference

You can set a reference and display measured values as relative values (display their difference from the reference).

- Press the DREF soft key to make the displayed measured value the reference and display subsequent measured values as relative values. The unit will change to dB.
- Press the DREF soft key or set the unit to dB to display the Reference box in the Power Meter screen.
- You can set the reference manually in the Reference box. The range is –80 to 40 dBm.
- If you set the unit to dBm or W, the Reference box disappears and the measured values are displayed as absolute values.

Wavelength Mode

On models with the -SPM and -HPM suffixes, you can set the mode to one of the following options.
Simple, Detail, CWDM

When you change the wavelength mode, the wavelength range and steps for the Wavelength item change as explained above.

Average Count

Averages of the measured values are displayed. You can set the number of values to average to one of the following options.
1, 10, 50, 100

Turning the Maximum and Minimum Value Menu On and Off

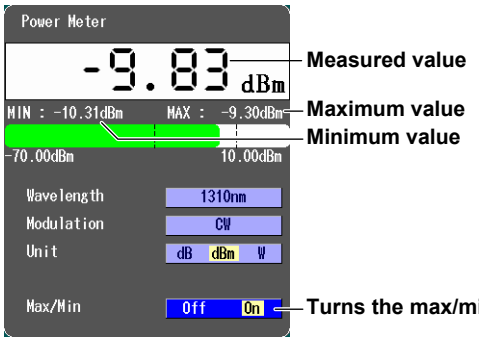
In the Power Meter screen, you can display a menu that shows the maximum (Max) and minimum (Min) measured values.

On	The menu is displayed.
Off	The menu is not displayed.

Turning the Maximum and Minimum Value Display On and Off

In the menu that appears in the Power Meter screen, you can start the display of the maximum and minimum measured values. The maximum and minimum value displays are constantly updated while measurement is being performed.

On	The maximum and minimum measured values from the time that you selected On are constantly updated and displayed.
Off	The maximum and minimum values are not displayed. The maximum and minimum values are reset when you select Off.



Turning the Interlocking of the Light Source and Optical Power Meter Settings On and Off

You can connect an optical fiber between the light source port of an AQ1100A, AQ1100B, or AQ1100D and the optical power measurement port of another AQ1100A, AQ1100B, or AQ1100D and use this setting so that the power meter settings are synchronized to the light source wavelength and modulation mode settings.

On	After On is selected, the power meter settings are synchronized to the light source settings.
Off	The power meter settings are not synchronized to the light source settings.

Offset

The value that you specify (the offset value) is added to the measured optical power values that are displayed.
The range is –9.900 to 9.900 dB.

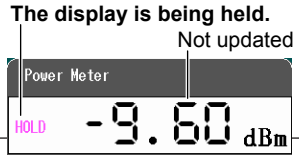
Threshold Value

You can set upper and lower threshold values and determine whether or not the measured values fall within them.

- The range for the upper and lower threshold values is –80 to 40 dBm. You must set the values so that the upper threshold value is greater than the lower threshold value.
- When a measured value is within the upper and lower thresholds, its bar graph is green.
- When a measured value exceeds the upper threshold or falls below the lower threshold, its bar graph is red.

Holding the Measured Value Display

When you press the HOLD soft key, the following actions are held: the updating of the measured values, bar graph, and maximum and minimum values and the showing or hiding of the maximum and minimum value display. The values at the time that you pressed the HOLD soft key remain displayed. To release the hold on the display, press the HOLD soft key again.



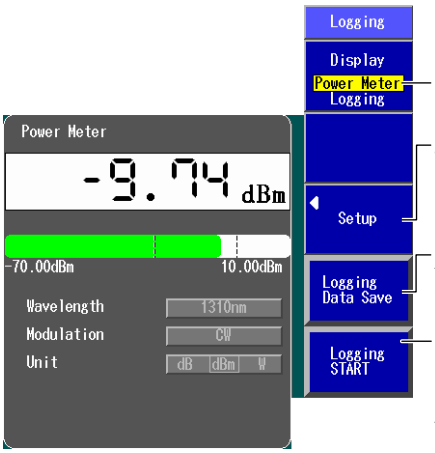
3.3 Logging Measured Values and Saving Logged Results

Procedure

Logging Screen

Screen display items: Power Meter

1. Press the **OPM LS** (the power meter light source).
2. Press the **Logging** soft key to display the following screen.P



Set Display to "Power Meter."

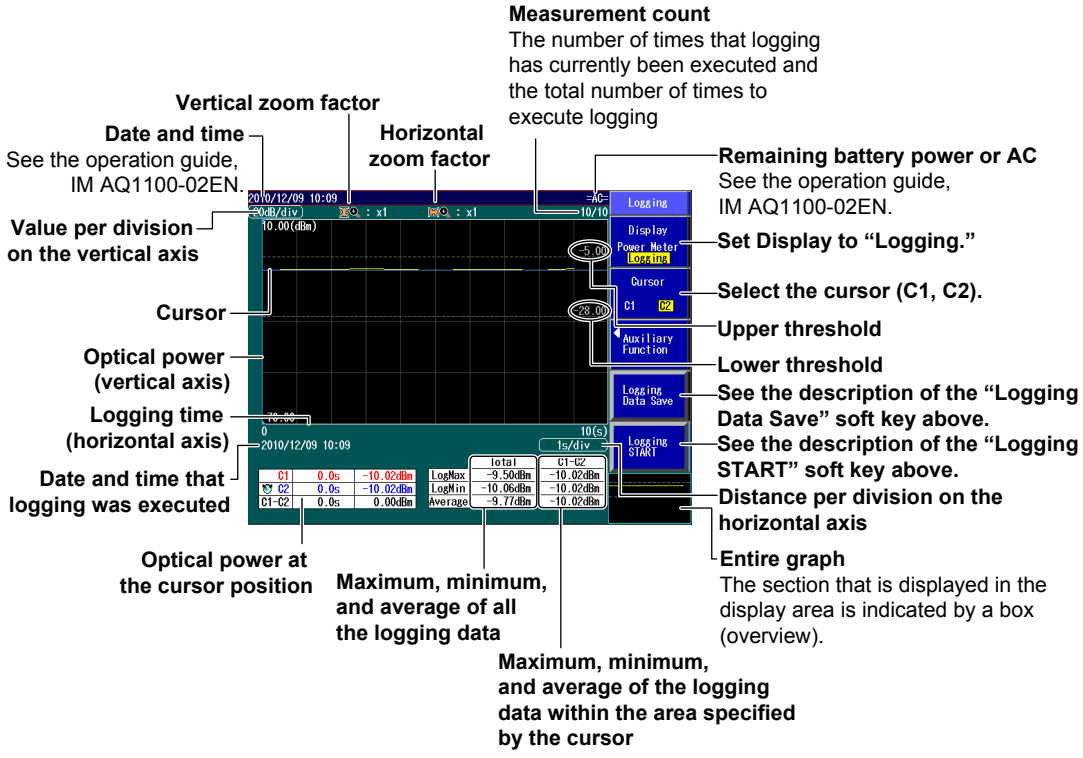
Displays the detailed setup screen
This performs the same operation as when you press SET UP.
See the Detailed Setup screen described below.

Saves log data
A screen for setting the file save destination and the file name appears. See the File Save screen described below.

Starts logging
Set the measurement interval and the logging count in the Detailed Setup screen described below.
After the specified number of logs are recorded, a screen for saving the logged results appears (see the File Save screen described below).

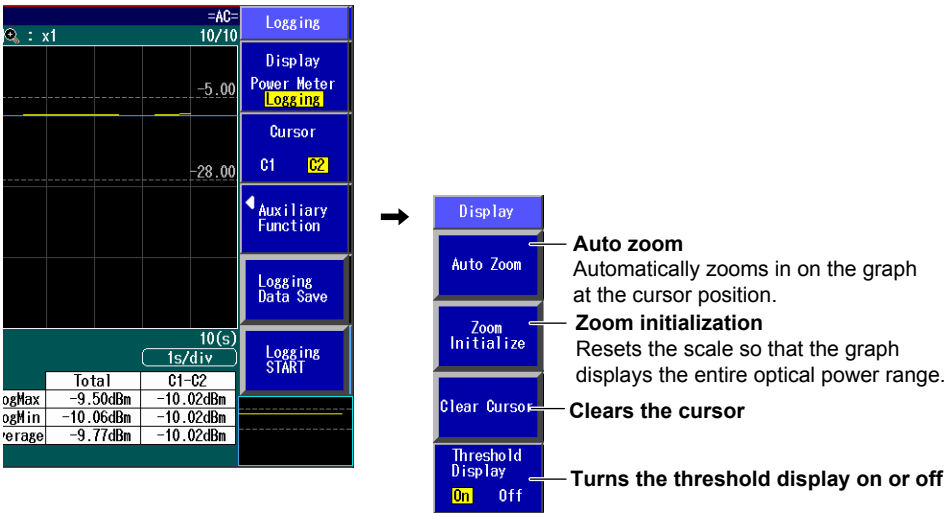
Screen display items: Logging

3. Press the Display soft key to select Logging. The following screen appears .



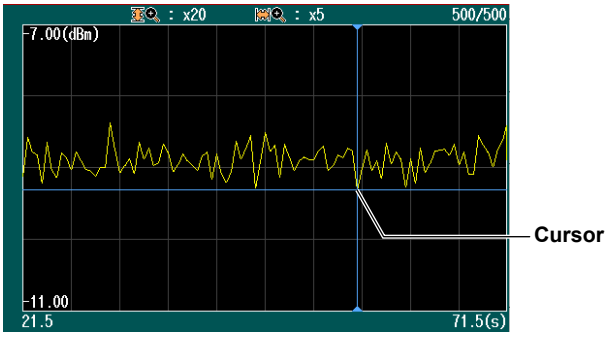
Display: Logging > Display

4. Press the Auxiliary Function soft key to show the display's setup screen.



Displaying and Moving the Cursor

5. Turn the rotary knob to display the cursor.



Note

The direction that the cursor moves differs depending on the direction that you rotate the rotary knob.

Clockwise:	The cursor moves to the right.
Counterclockwise:	The cursor moves to the left.

Zooming in on the Graph Display

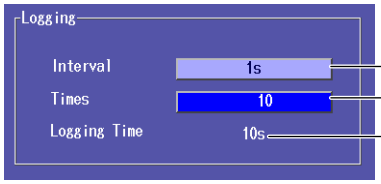
6. Press an arrow key to zoom the graph display in or out at the cursor position.

NOTE

You can zoom the graph display during measurement or when measurements are stopped.

Detailed Setup Screen

Press the **SETUP** soft key and then the Data Save Logging soft key to display the following screen.



Set the measurement interval (500ms, 1s, 2s, 5s, 10s).

Set the logging count (10 to 36000).

The time to perform logging measurements over is calculated automatically from the measurement interval and the logging count and displayed.

File Save Screen

The path of the destination folder

The number of folders and files in the destination folder

Set the destination drive (internal memory, USB memory).

Set the file name (see section 16.2).

Saves the data

The file name candidate for the next save operation

Explanation

Creating and Saving Logs

This instrument is always measuring power when the Power Meter screen is displayed. To save the measured values, you must log them.

- To start logging, press the Logging START soft key. During logging, on the menu, “Logging START” changes to “Logging STOP.”
- Logging stops when the specified number of logs are recorded or when you press the Logging STOP soft key. Then, on the menu, “Logging STOP” changes to “Logging START,” and the file save screen appears.
- You can save logged results in CSV format.

Measurement Interval

You can set the interval for logging measured values to one of the following values.

500 ms, 1 s, 2 s, 5 s, 10 s

Logging Count

You can set the number of values to log within the following range.

10 to 36000

Drive to Save To

You can set the destination drive to one of the following options.
Internal memory, USB memory

File Name

You can specify file names by combining comments and numbers. For details, see section 16.2.
For an example of the saved data being displayed using spreadsheet software, see appendix 1.

Graph Display of Logging Data

Set Display to “Logging” to display the measured values on a graph in real time during logging.
Logging results that have been saved in CSV format cannot be displayed on a graph.

Selecting the Cursors

You can switch between the two cursors (C1 and C2) that are displayed on the screen. If the selected cursor is outside of the display area, the cursor’s display position is automatically changed so that it is in the center of the screen. If the cursor is at the left or right edge of the screen, because the sections that are outside of the measurement range cannot be displayed, even if you switch to the other cursor, the selected cursor will not be displayed in the center of the screen.

Auto Zoom

The vertical zoom factor is set automatically so that all the data on the screen is displayed.
The median value between the maximum and minimum of the logging data is the center position on the screen.
If there is no logging data, auto zoom is not performed.

Zoom Initialization

Zoom initialization returns the vertical and horizontal zoom factors to ×1.

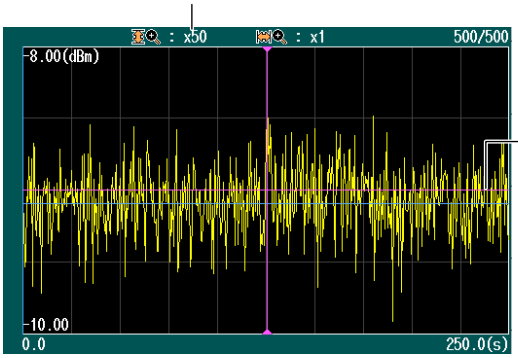
Zooming In and Out

You can press the arrow keys to zoom the displayed graph in or out. The graph is zoomed at the cursor position.

Up and down arrow keys: Zoom in and out vertically. The up arrow key zooms in, and the down arrow key zooms out. Zoom factors are ×1, ×2, ×5, ×10, ×20, and ×50.

Left and right arrow keys: Zoom in and out horizontally. The right arrow key zooms in, and the left arrow key zooms out. Zoom factors are ×1, ×2, ×5, ×10, ×20, and ×50. You cannot zoom in on the graph so much that there are less than 11 logging data points on the screen.

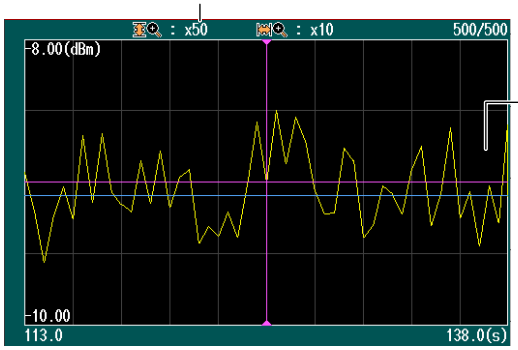
Vertical zoom factor: ×5



Cursor position

Press the down arrow key to zoom the graph display vertically.

Vertical zoom factor: ×50

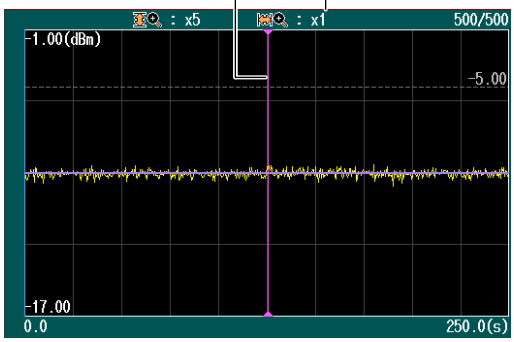


Cursor position

Press the left arrow key to zoom the graph display horizontally.

Cursor position

Horizontal zoom factor: ×10



3.4 Selecting and Saving Core and Tape Numbers

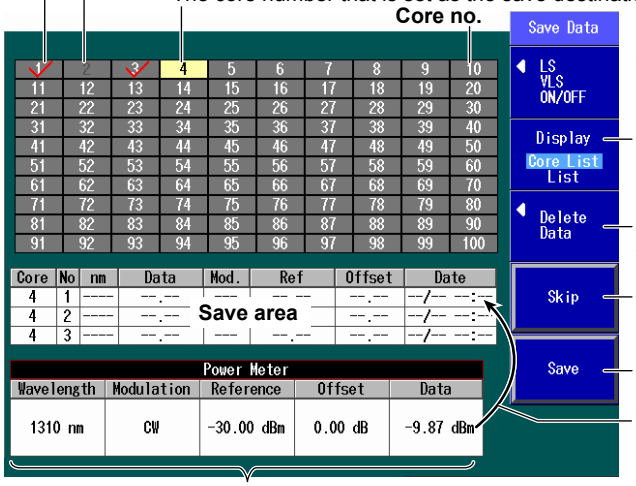
Procedure

Data Save Screen

Press the **OPM LS** soft key and then the **Data Save** soft key to display the following screen.

On the detailed setup screen on the next page, you can set the starting core number, tape number type, and number of fibers.

When "Display" is set to "Core List"



Use the rotary knob and the arrow keys to select a core number.

Set the list to show (Core List, List).

Delete data (see the Delete Data screen in the next section).

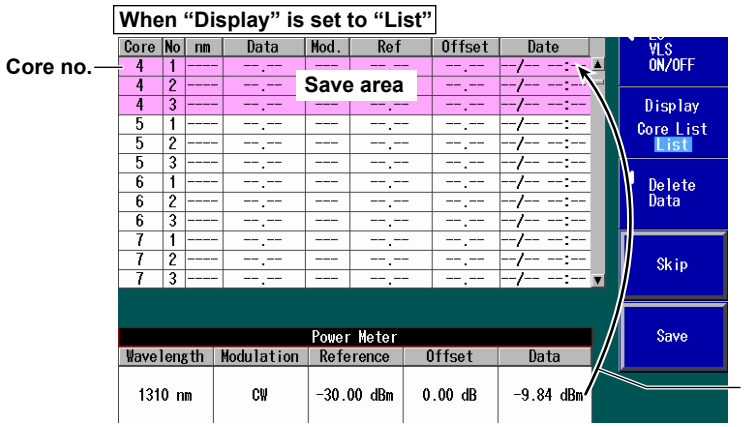
Specify skipping.
To cancel skipping, press this soft key again.

Saves the data

You can save up to three sets of data in the save area of the specified core.

Data (measurement conditions and measured values) The data set in section 3.2 is displayed.

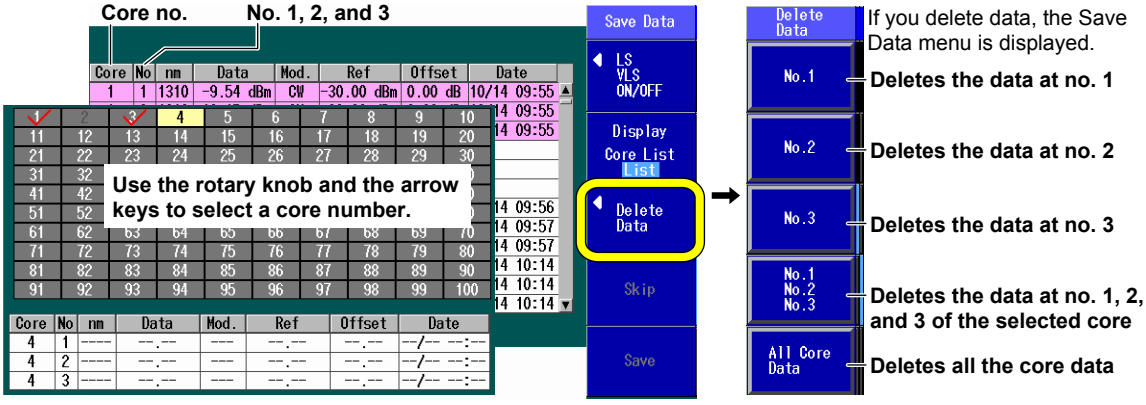
When "Display" is set to "List"



Use the rotary knob and the arrow keys to select a core number.

You can save up to three sets of data in the save area of the specified core.

Delete Data Screen



If you delete data, the Save Data menu is displayed.

Deletes the data at no. 1

Deletes the data at no. 2

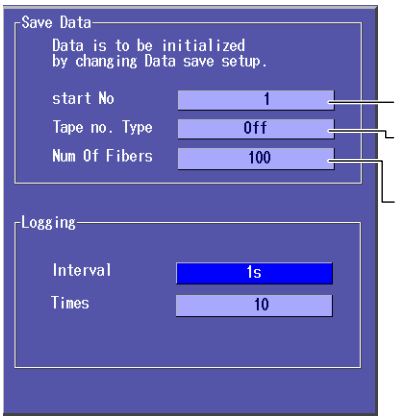
Deletes the data at no. 3

Deletes the data at no. 1, 2, and 3 of the selected core

Deletes all the core data

Detailed Setup Screen

Press **SETUP** and then the **Data Save Logging** soft key to display the following screen.



Set the starting core number (1 to 9900).

Set the tape number type (Off, a-b(2), a-c(3), a-d(4), a-e(5), a-f(6), a-g(7), a-h(8)).

Set the number of fibers or tapes (up to 100 fibers when Tape no. Type is set to Off, up to 50 tapes when Tape no. Type is set to a-b(2), ..., up to 12 tapes when Tape no. Type is set to a-h(8)).

Saving Data to a File

Press **SETUP** and then the **File** soft key to display the file save screen. Follow the procedure in section 9.2 to save the data.

Explanation

You can specify core numbers and tape number types and save data (measurement conditions and measured values) to this Instrument internal memory. You can also save the data to a file.

Displayed List

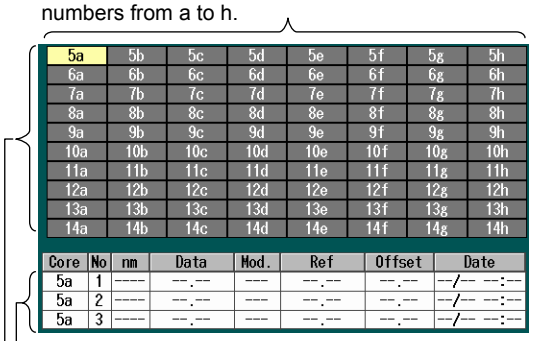
You can set the list to show to one of the following options. The list display format changes depending on the starting core number, tape number type, and number of fibers (or tapes) that you set in the detailed setup screen.

Core List	A list of core numbers and the saved data of the highlighted core number are displayed.
List	The core numbers and saved data are displayed.

Example When the Starting Core Number Is Set to “5,” the Tape Number Type Is Set to “a-h(8),” and the Number of Tapes Is Set to “10”

Core List

The list begins with the starting core number 5. Each core number is divided into eight tape numbers from a to h.

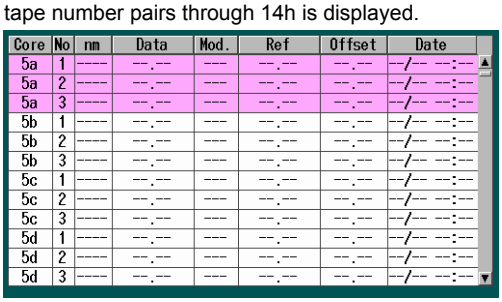


The data of the highlighted core and tape number pair (5a here) is displayed.

There are 10 tapes, so the cores are numbered 5a through 14h.

List

The list begins with the starting core number 5. Each core number is divided into eight tape numbers from a to h. The data for the core and tape number pairs through 14h is displayed.



Use the rotary knob and the arrow keys to scroll through the list.

Skipping

If you specify Skip for a core number that you don't need to measure, its data will not be saved. By setting which cores to skip beforehand, you can avoid accidentally saving unnecessary data.

Saving Data

You can save up to three sets of data in the save area of the specified core.
For details about saving the data to a file, see section 9.2.

Deleting Data

You can delete the data for individual core numbers in a save area or delete all the data at once.

Starting Core Number

You can set the starting core number to a value within the following range.
1 to 9900

Tape Number Type

You can set the tape number type to one of the following options.
Off, a-b(2), a-c(3), a-d(4), a-e(5), a-f(6), a-g(7), a-h(8)

Number of Fibers or Tapes

You can set the number of fibers or tapes to a value within one of the following ranges.

Tape Number Type	Number of Fibers or Tapes
Off	10 to 100 fibers
a-b(2)	10 to 50 tapes
a-c(3)	10 to 33 tapes
a-d(4)	10 to 25 tapes
a-e(5)	10 to 20 tapes
a-f(6)	10 to 16 tapes
a-g(7)	10 to 14 tapes
a-h(8)	10 to 12 tapes

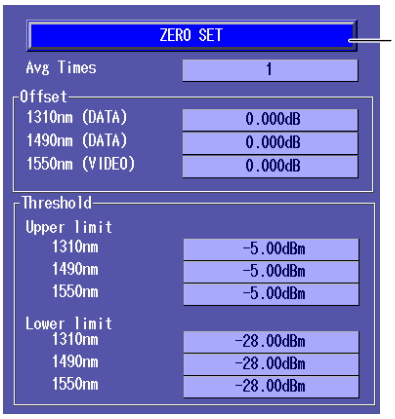
4.1 Making Preparations for Measurements

Remove the optical fiber cables from this instrument and close the optical connector covers, or make sure that the power meter is not receiving any light, and then start the PON power meter zero set procedure.

Procedure

Performing Zero Set

Press the **PON Power Meter** soft key, **SETUP**, and then the **OPM Setup** soft key to display the following screen.



Explanation

Perform zero set whenever necessary, such as after you have turned on the power or when the ambient temperature changes. Performing zero set adjusts the internal deviation of the optical power measurement section and enables you to obtain more accurate absolute optical power values.

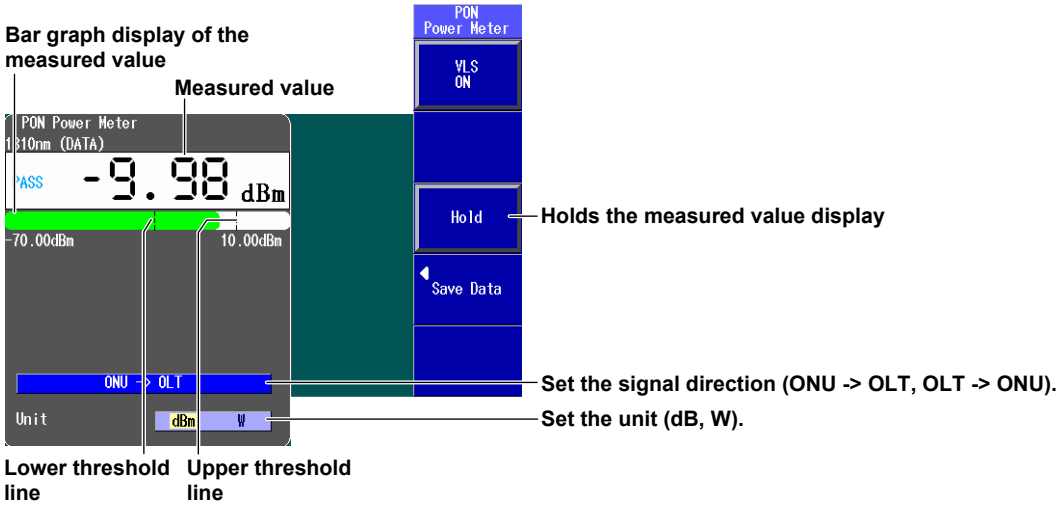
4.2 Setting PON System Optical Power Measurement Conditions and Holding the Display

Procedure

Power Meter Screen

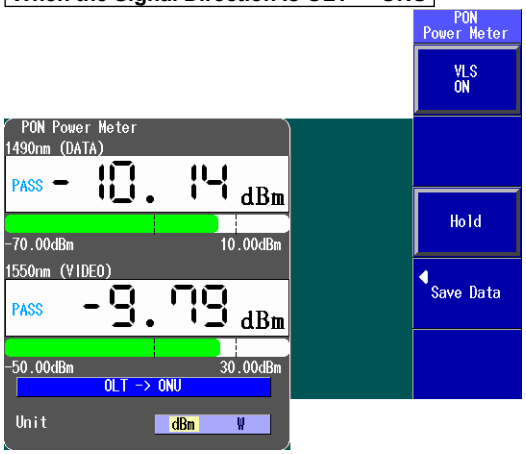
Press the **PON Power Meter** soft key to display the following screen.

When the Signal Direction Is ONU -> OLT



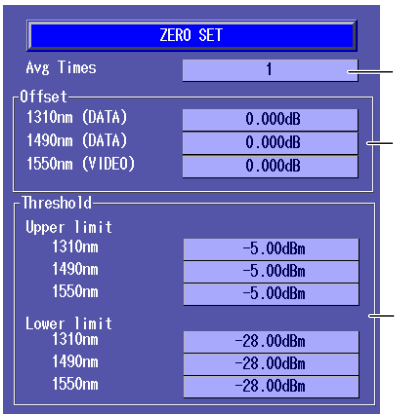
These lines indicate the upper and lower threshold values (see the detailed setup screen in section).

When the Signal Direction Is OLT -> ONU



Detailed Setup Screen

Press **SETUP** and then the **OPM SETUP** soft key to display the following screen.



Set the average count (1, 10, 50, 100).

Set the offset (–9.900 to 9.900 dB).
Set it for each PON system wavelength.

Set the threshold values (–80 to 40 dBm).
Set the upper and lower limits for each PON system wavelength.

Explanation

The PON power meter is only available on models with -PPM suffix codes.

Wavelength

The wavelengths that you can specify when measuring the optical power of a PON system are listed below. The wavelengths vary depending on the signal direction.

Signal Direction	Wavelength
ONU -> OLT[1]	1310 nm
OLT -> ONU[2]	1490 nm and 1550 nm

1 You can measure the optical power of the upstream signal wavelength from the ONU (optical network unit: the user's optical terminal) to the OLT (optical line termination: the telephone exchange's optical terminal). The optical power of the 1310 nm (data wavelength) signal is measured.

2 You can measure the optical power of the downstream signal wavelengths from the OLT to the ONU. The optical power of the 1490 nm (data wavelength) and 1550 nm (video wavelength) signals is measured.

Unit

You can set the optical power display unit to one of the following options.
dBm (absolute value), W (absolute value)

- The following prefixes are attached to W: m (10^{-3}), μ (10^{-6}), n (10^{-9}), and p (10^{-12}).
- The relationship between the absolute values dBm and W is indicated below.
  $P_{dBm} = 10 \times \log (P_w \times 10^3)$
  Where P_{dBm} is the optical power in units of dBm and P_w is the optical power in units of W.

Average Count

Averages of the measured values are displayed. You can set the number of values to average to one of the following options.
1, 10, 50, 100

Offset

For each wavelength, the value that you specify (the offset value) is added to the measured optical power values that are displayed.
The range is –9.900 to 9.900 dB.

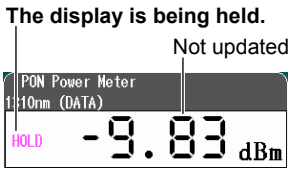
Threshold Value

For each wavelength, you can set upper and lower threshold values and determine whether or not the measured values fall within them.

- The range for the upper and lower threshold values is –80 to 40 dBm. You must set the values so that the upper threshold value is greater than the lower threshold value.
- When a measured value is within the upper and lower thresholds, its bar graph is green. “PASS” appears in the measured value area.
- When a measured value exceeds the upper threshold or falls below the lower threshold, its bar graph is red. “FAIL” appears in the measured value area.

Holding the Measured Value Display

When you press the HOLD soft key, the updating of the measured values and bar graph is held. The values at the time that you pressed the HOLD soft key remain displayed. To release the hold on the display, press the HOLD soft key again.



4.3 Selecting and Saving Core and Tape Numbers

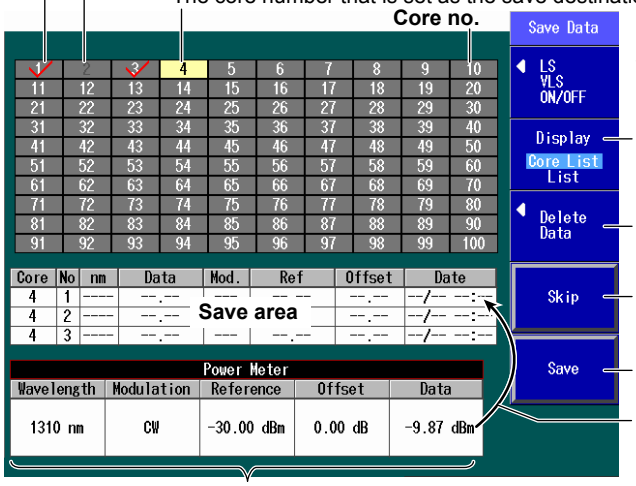
Procedure

Data Save Screen

Press the **PON Power Meter** soft key and then the **Data Save** soft key to display the following screen.

On the detailed setup screen on the next page, you can set the starting core number, the tape number type, and the number of fibers.

When "Display" is set to "Core List"



Use the rotary knob and the arrow keys to select a core number.

Set the list to show (Core List, List).

Delete data (see the Delete Data screen in the next section).

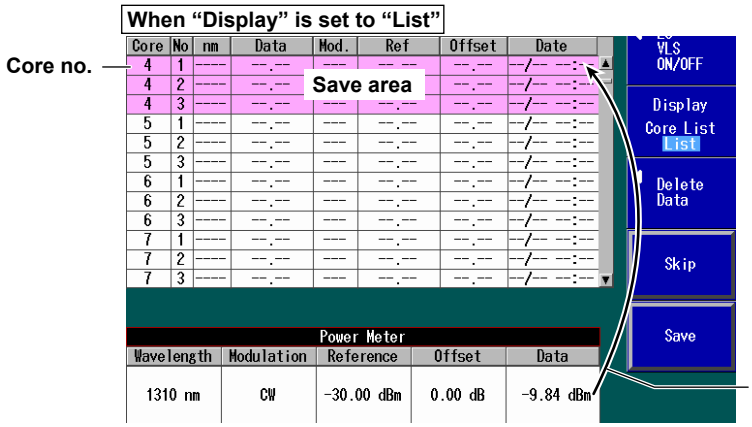
Specify skipping.
To cancel skipping, press this soft key again.

Saves the data

You can save up to three sets of data in the save area of the specified core.

Example of the data (measurement conditions and measured values) when the signal direction is ONU -> OLT
The data set in section 4.2 is displayed.

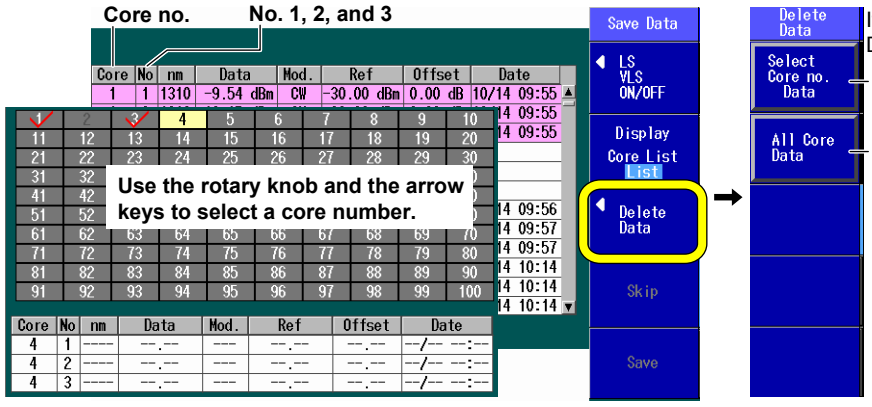
When "Display" is set to "List"



Use the rotary knob and the arrow keys to select a core number.

You can save up to three sets of data in the save area of the specified core.

Delete Data Screen



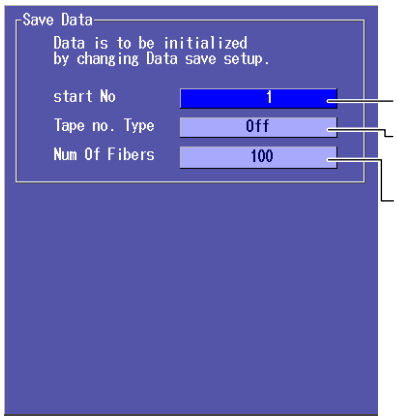
If you delete data, the Save Data menu is displayed.

Deletes the data of all the selected cores

Deletes all the core data

Detailed Setup Screen

Press **SETUP** and then the **Save Data** soft key to display the following screen.



Set the starting core number (1 to 9900).

Set the tape number type (Off, a-b(2), a-c(3), a-d(4), a-e(5), a-f(6), a-g(7), a-h(8)).

Set the number of fibers or tapes (up to 100 fibers when Tape no. Type is set to Off, up to 50 tapes when Tape no. Type is set to a-b(2), ..., up to 12 tapes when Tape no. Type is set to a-h(8)).

Saving Data to a File

Press **SETUP** and then the **File** soft key to display the file save screen. Follow the procedure in section 9.2 to save the data.

Explanation

The PON power meter is only available on models with -PPM suffix codes.

You can specify core numbers and tape number types and save data (measurement conditions and measured values) to this instrument internal memory. You can also save the data to a file.

Displayed List

You can set the list to show to one of the following options. The list display format changes depending on the starting core number, tape number type, and number of fibers (or tapes) that you set in the detailed setup screen.

Core List	A list of core numbers and the saved data of the highlighted core number are displayed.
List	The core numbers and saved data are displayed.

Example When the Starting Core Number Is Set to “5,” the Tape Number Type Is Set to “a-h(8),” and the Number of Tapes Is Set to “10”

Core List

The list begins with the starting core number 5. Each core number is divided into eight tape numbers from a to h.

5a	5b	5c	5d	5e	5f	5g	5h
6a	6b	6c	6d	6e	6f	6g	6h
7a	7b	7c	7d	7e	7f	7g	7h
8a	8b	8c	8d	8e	8f	8g	8h
9a	9b	9c	9d	9e	9f	9g	9h
10a	10b	10c	10d	10e	10f	10g	10h
11a	11b	11c	11d	11e	11f	11g	11h
12a	12b	12c	12d	12e	12f	12g	12h
13a	13b	13c	13d	13e	13f	13g	13h
14a	14b	14c	14d	14e	14f	14g	14h

Core	No	nm	Data	Mod.	Ref	Offset	Date
5a	1	----	--.--	---	--.--	--.--	--/-- --:--
5a	2	----	--.--	---	--.--	--.--	--/-- --:--
5a	3	----	--.--	---	--.--	--.--	--/-- --:--

The data of the highlighted core and tape number pair (5a here) is displayed.

There are 10 tapes, so the cores are numbered 5a through 14h.

List

The list begins with the starting core number 5. Each core number is divided into eight tape numbers from a to h. The data for the core and tape number pairs through 14h is displayed.

Core	No	nm	Data	Mod.	Ref	Offset	Date
5a	1	----	--.--	---	--.--	--.--	--/-- --:--
5a	2	----	--.--	---	--.--	--.--	--/-- --:--
5a	3	----	--.--	---	--.--	--.--	--/-- --:--
5b	1	----	--.--	---	--.--	--.--	--/-- --:--
5b	2	----	--.--	---	--.--	--.--	--/-- --:--
5b	3	----	--.--	---	--.--	--.--	--/-- --:--
5c	1	----	--.--	---	--.--	--.--	--/-- --:--
5c	2	----	--.--	---	--.--	--.--	--/-- --:--
5c	3	----	--.--	---	--.--	--.--	--/-- --:--
5d	1	----	--.--	---	--.--	--.--	--/-- --:--
5d	2	----	--.--	---	--.--	--.--	--/-- --:--
5d	3	----	--.--	---	--.--	--.--	--/-- --:--

Use the rotary knob and the arrow keys to scroll through the list.

Skipping

If you specify Skip for a core number that you don't need to measure, its data will not be saved. By setting which cores to skip beforehand, you can avoid accidentally saving unnecessary data.

Saving Data

You can save up to three sets of data in the save area of the specified core. When the signal direction is from the OLT to the ONU, you can save the data for two wavelengths at the same time.
For details about saving the data to a file, see section 9.2.

Deleting Data

You can delete the data for individual core numbers in a save area or delete all the data at once.

Starting Core Number

You can set the starting core number to a value within the following range.
1 to 9900

Tape Number Type

You can set the tape number type to one of the following options.
Off, a-b(2), a-c(3), a-d(4), a-e(5), a-f(6), a-g(7), a-h(8)

Number of Fibers or Tapes

You can set the number of fibers or tapes to a value within one of the following ranges.

Tape Number Type	Number of Fibers or Tapes
Off	10 to 100 fibers
a-b(2)	10 to 50 tapes
a-c(3)	10 to 33 tapes
a-d(4)	10 to 25 tapes
a-e(5)	10 to 20 tapes
a-f(6)	10 to 16 tapes
a-g(7)	10 to 14 tapes
a-h(8)	10 to 12 tapes

5.1 Producing Measurement Light

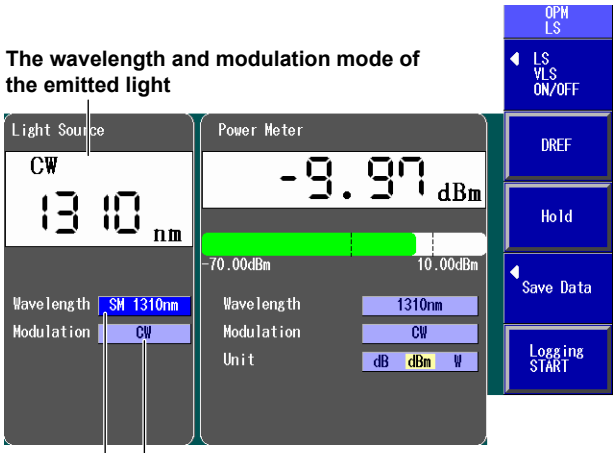
WARNING

- While this instrument is producing light, do not remove the optical fiber cable, because light is emitted from the light source port. Visual impairment may occur if the light enters the eye.
- Close the covers of any light source ports that do not have optical fiber cables connected to them. On models with two or more light source ports, visual impairment may occur if light that is mistakenly emitted from the wrong port enters the eye.

Procedure

Light Source Screen

Press the **OPM LS** soft key to display the following screen.



The wavelength and modulation mode of the emitted light

Set the modulation mode (CW, 270Hz, 1kHz, 2kHz).
The available settings vary depending on the model. For details, see the explanation later in this section.

Set the wavelength.
The available settings vary depending on the model. For details, see the explanation later in this section.

Turning the Light Source On and Off

Turn the light source on after you set the wavelength and the modulation mode.

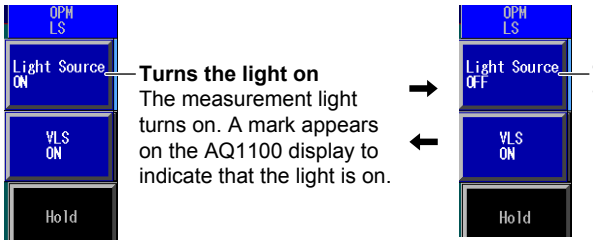
Pressing the LS Key

Press **LS** to turn on the measurement light. A mark appears on this instrument display to indicate that the light is on.

Press **LS** while the light is on. The light turns off. The light mark disappears.

Pressing the Soft Key

Press the **LS VLS ON/OFF** soft key to display the following menu.



Turns the light on
The measurement light turns on. A mark appears on the AQ1100 display to indicate that the light is on.

Turns the light off
The light turns off. The light mark disappears.

While the above menu is displayed, you can also turn the light on and off by pressing **LS**.

Explanation

Measurement Light Wavelength

There are three instrument types, with the measurement light wavelengths listed below. Select a wavelength from the available settings on this instrument that you are using.

Model	Measurement Light Wavelength
AQ1100A	SM 1310 nm, SM 1550 nm
AQ1100B	SM 1310 nm, SM 1550 nm, SM 1625 nm
AQ1100D	GI 850 nm, GI 1300 nm, SM 1310 nm, SM 1550 nm

The light for single mode (SM) optical fiber is emitted from optical port 2. The light for graded-index (GI) multi-mode optical fiber is emitted from optical port 3. Firmly connect the optical fiber to the port from which the light with the selected wavelength will be transmitted.

Modulation Mode

You can set the frequency of the light to one of the following options.
CW (continuous light), 270 Hz, 1 kHz, 2 kHz
On the AQ1100D, when the wavelength is GI 850 nm or GI 1300 nm, you can set the modulation mode to CW or 270 Hz.

5.2 Turning On the Visible Light (Option)

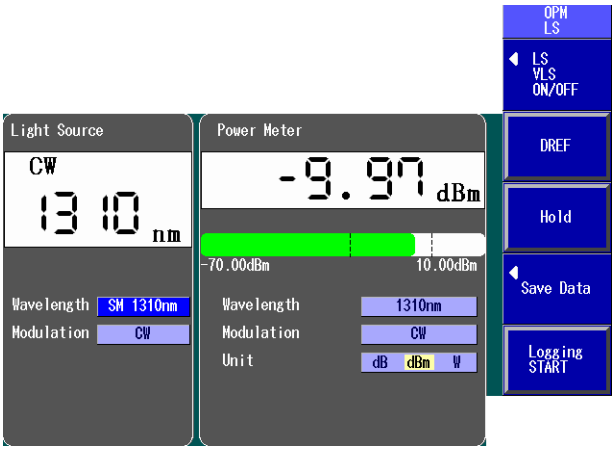
WARNING

- While this instrument is producing light, light is emitted from the light source port. Do not look directly at this light. Visual impairment may occur if the light enters the eye.
- Close the covers of any light source ports that do not have optical fiber cables connected to them. On models with two or more light source ports, visual impairment may occur if light that is mistakenly emitted from the wrong port enters the eye.

Procedure

Light Source Screen

Press the **OPM LS** soft key to display the following screen.



Turning the Light Source On and Off

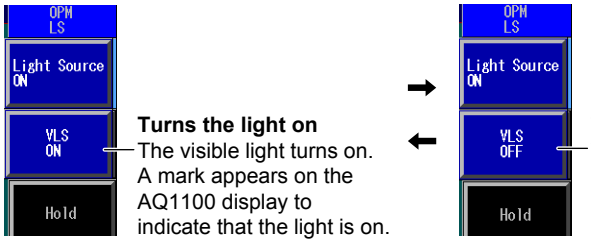
Pressing the VLS Key

Press **VLS** to turn on the visible light. A mark appears on this instrument display to indicate that the light is on.

Press **VLS** while the light is on. The light turns off. The light mark disappears.

Pressing the Soft Key

Press the **LS VLS ON/OFF** soft key to display the following menu.



Turns the light on
The visible light turns on. A mark appears on the AQ1100 display to indicate that the light is on.

Turns the light off
The light turns off. The light mark disappears.

While the above menu is displayed, you can also turn the light on and off by pressing **VLS**.

Explanation

The visible light source is available on models with the /VLS option.
Visible light is emitted from the visible light source port (optical port 4).

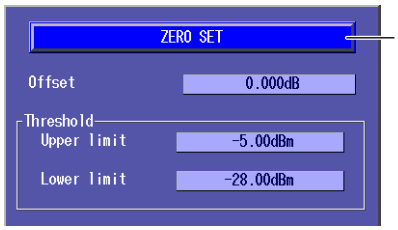
6.1 Making Preparations and Adjustments for Loss Testing

Procedure

Performing Zero Set

Remove the optical fiber cables from this instrument and close the optical connector covers, or make sure that the power meter is not receiving any light, and then start the optical power meter zero set procedure.

Press the **Auto Loss Test** soft key, **SETUP**, and then the **OPM Setup** soft key to display the following screen.



Performs zero set

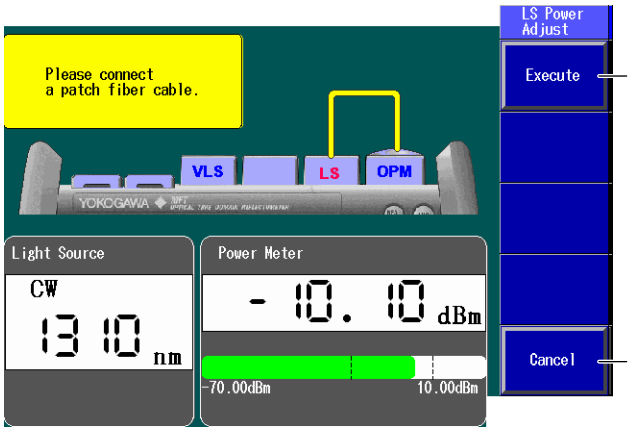
Adjusting the Optical Power

WARNING

- While this instrument is producing light, do not remove the optical fiber cable, because light is emitted from the light source port. Visual impairment may occur if the light enters the eye.
- Close the covers of any light source ports that do not have optical fiber cables connected to them. On models with two or more light source ports, visual impairment may occur if light that is mistakenly emitted from the wrong port enters the eye.

Use a short optical fiber to connect an AQ1100A, AQ1100B, or AQ1100D light source port to an AQ1100A, AQ1100B, or AQ1100D optical power measurement port, and then perform optical power adjustment.

1. Press the **Auto Loss Test** soft key, the **Function Select** soft key, and then the **Light Source** or **Loop Back** soft key.
2. Using the **rotary knob** and **ENTER**, select the **Wavelength** at which you need to perform loss testing.
3. Using the **rotary knob** and **ENTER**, select **LS Power Adjust** to display the following screen.



Starts optical power adjustment
The measurement light turns on. When adjustment ends normally, the AQ1100 returns to the previous screen.

Cancels optical power adjustment
The AQ1100 returns to the previous screen.

Explanation

Zero Set

Perform zero set whenever necessary, such as after you have turned on the power or when the ambient temperature changes. Performing zero set adjusts the internal deviation of the optical power measurement section and enables you to obtain more accurate absolute optical power values. Perform zero set on the optical power meter.

Optical Power Adjustment

Adjust the optical power of the light source as necessary.

When you execute optical power adjustment, this instrument automatically identifies the optical power level and adjusts itself accordingly. Perform optical power adjustment on the light source.

- Optical power adjustment begins when you press the Execute soft key. When it ends normally, this instrument returns to the previous screen. During adjustment, “Execute” changes to “Abort.” All soft keys other than the Abort soft key are unavailable.
- Press the Abort soft key to stop optical power adjustment. “Abort” will change to “Execute.” The adjustment value will return to the value that it was at before adjustment was executed.
- Connect a short optical fiber of a few meters or less in length. Make sure that the fiber is free from dirt, scratches, bends, and other potential causes of optical degradation.
- The initial adjustment value is the factory default setting.

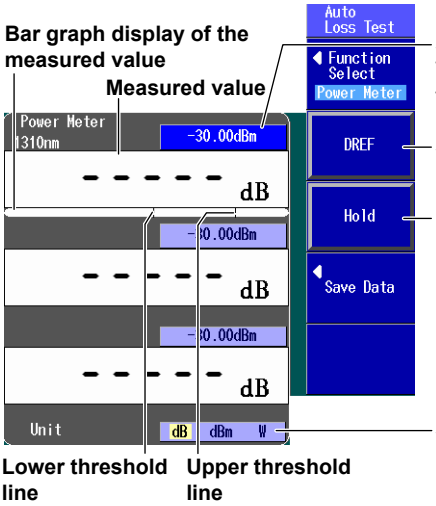
6.2 Performing an Auto Loss Test

Procedure

Configuring the Optical Power Meter

Power Meter Screen

Press the **Auto Loss Test** soft key, the **Function Select** soft key, and then the **Power Meter** soft key to display the following screen.



Set the reference manually (–80 to 40 dBm).
The Reference box appears if you press the DREF soft key or set the unit to dB.

Sets the reference to the currently displayed measured value

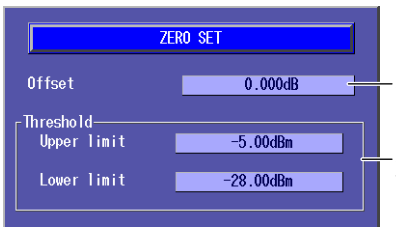
Holds the measured value display

Set the unit (dB, dBm, W).

These lines indicate the upper and lower threshold values (see the detailed setup screen in section).

Detailed Setup Screen

Press **SETUP** and then the **OPM SETUP** soft key to display the following screen.



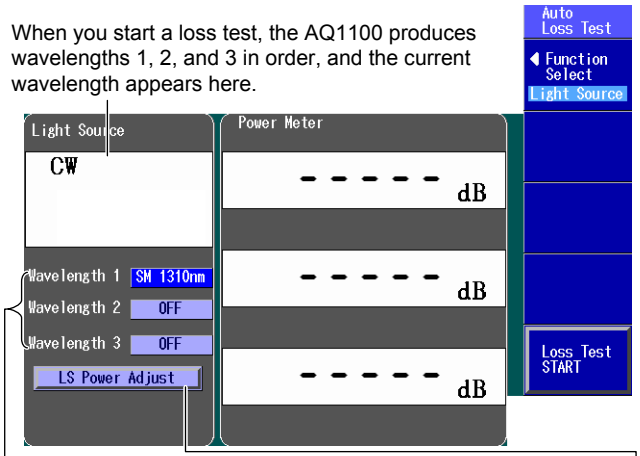
Set the offset (–9.900 to 9.900 dB).

Set the threshold values (–80 to 40 dBm).
You can set the upper and lower values.

Configuring the Light Source and Executing an Auto Loss Test

Light Source Screen

Press the **Auto Loss Test** soft key, the **Function Select** soft key, and then the **Light Source** soft key to display the following screen.

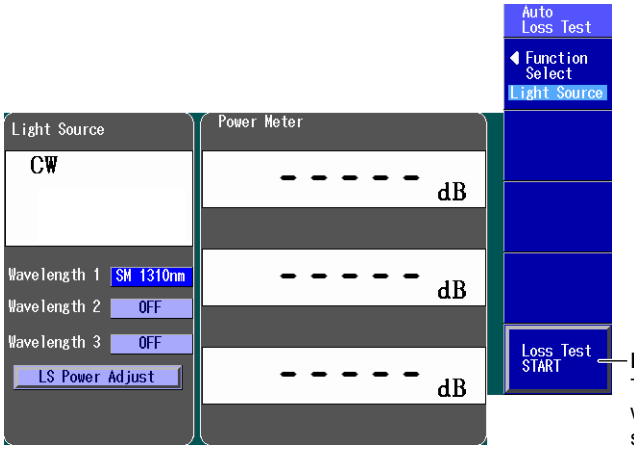


Executing an Auto Loss Test

WARNING

- While this instrument is producing light, do not remove the optical fiber cable, because light is emitted from the light source port. Visual impairment may occur if the light enters the eye.
- Close the covers of any light source ports that do not have optical fiber cables connected to them. On models with two or more light source ports, visual impairment may occur if light that is mistakenly emitted from the wrong port enters the eye.

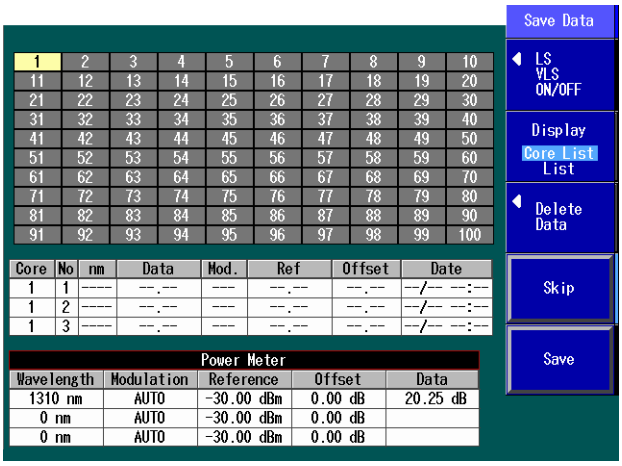
Connect one end of the optical fiber or line that you need to perform loss testing on to the optical power measurement port of the power meter, and connect the other end to the light source port of the light source.



Saving Data

Data Save Screen

In the Power Meter screen of the optical power meter, press the **Save Data** soft key to display the following screen. Follow the procedure in section 4.3 to save the data.



Saving Data to a File

Press **SETUP** and then the **File** soft key to display the file save screen. Follow the procedure in section 9.2 to save the data.

Explanation

You can use this instrument as a light source and as an optical power meter to perform loss testing for up to three wavelengths on an optical fiber or line. You can measure optical loss with models with -SPM or -HPM suffix codes.

Optical Power Meter

Unit, Reference, Offset, Threshold Values, and Holding of the Display of Measured Values

For information about the unit, reference, offset, threshold values, and the holding of the display of measured values, see “Explanation” in section 3.2.

Light Source

Measurement Light Wavelength

There are three instrument types, with the measurement light wavelengths listed below. Select a wavelength from the available settings on this instrument that you are using.

Model	Measurement Light Wavelength
AQ1100A	SM 1310 nm, SM 1550 nm
AQ1100B	SM 1310 nm, SM 1550 nm, SM 1625 nm
AQ1100D	GI 850 nm, GI 1300 nm, SM 1310 nm, SM 1550 nm

- The light for single mode (SM) optical fiber is emitted from optical port 2. The light for graded-index (GI) multi-mode optical fiber is emitted from optical port 3. Firmly connect the optical fiber to the port from which the light with the selected wavelength will be transmitted.
- You can specify up to three wavelengths in this instrument setup screen.
- This instrument cannot produce SM and GI wavelengths at the same time.

Executing an Auto Loss Test

To perform loss testing, configure the settings for the optical power meter and the light source, connect one end of the optical fiber or line that you need to perform loss testing on to the optical power measurement port of the power meter, and connect the other end to the light source port of the light source.

The optical power meter measures the power of the light that passes through the optical fiber or line under loss test.

Saving Data

You can save up to three sets of data in the save area of the specified core. For details about saving the data to a file, see section 9.2.

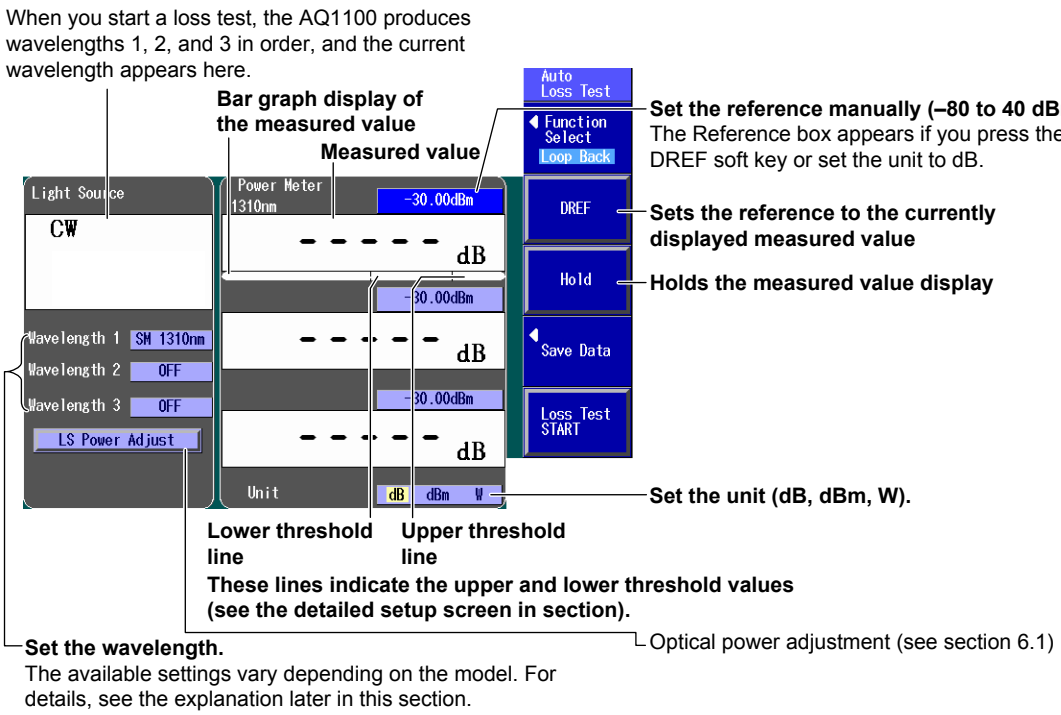
6.3 Performing a Loop-Back Loss Test

Procedure

Configuring the Optical Power Meter and Light Source

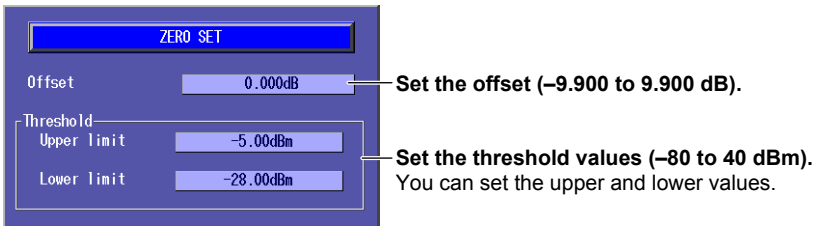
Power Meter and Light Source Screens

Press the **Auto Loss Test** soft key, the **Function Select** soft key, and then the **Loop Back** soft key to display the following screen.



Detailed Setup Screen

Press **SETUP** and then the **OPM SETUP** soft key to display the following screen.

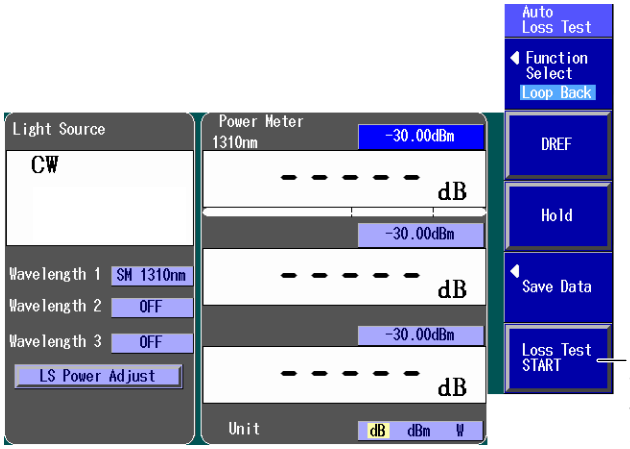


Executing a Loop-Back Loss Test

WARNING

- While this instrument is producing light, do not remove the optical fiber cable, because light is emitted from the light source port. Visual impairment may occur if the light enters the eye.
- Close the covers of any light source ports that do not have optical fiber cables connected to them. On models with two or more light source ports, visual impairment may occur if light that is mistakenly emitted from the wrong port enters the eye.

Connect one end of the optical fiber or line that you need to perform loss testing on to this instrument optical power measurement port, and connect the other end to the light source port of the same AQ1100A, AQ1100B, or AQ1100D.

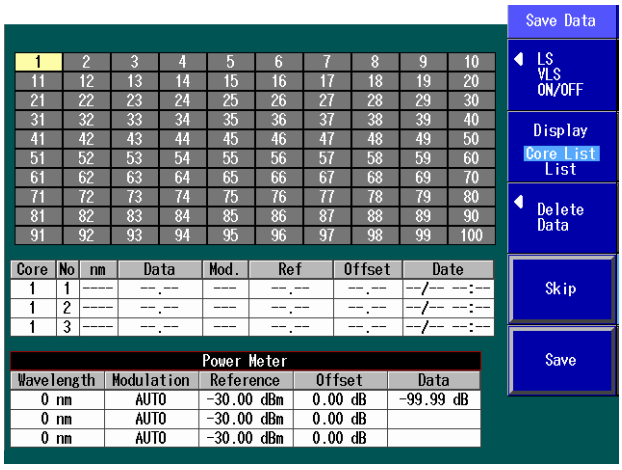


Executes a loop-back loss test
The light source produces, in order, the wavelengths of measurement light that you specified for 1, 2, and 3.
The optical power meter measures the optical power of the light that it receives.

Saving Data

Data Save Screen

In the Power Meter screen of the optical power meter, press the **Save Data** soft key to display the following screen. Follow the procedure in section 4.3 to save the data.



Saving Data to a File

Press **SETUP** and then the **File** soft key to display the file save screen. Follow the procedure in section 9.2 to save the data.

Explanation

You can use the light source and optical power meter features on a single AQ1100A, AQ1100B, or AQ1100D to perform a loop-back loss test on an optical fiber or line. You can measure optical loss with models with -SPM or -HPM suffix codes.

Optical Power Meter

Unit, Reference, Offset, Threshold Values, and Holding of the Display of Measured Values

For information about the unit, reference, offset, threshold values, and the holding of the display of measured values, see “Explanation” in section 3.2.

Light Source

Light is emitted at the measurement light wavelength. For details, see “Explanation” in section 6.2.

Executing a Loop-Back Loss Test

To perform loop-back loss testing, configure the optical power meter and light source settings, connect one end of the optical fiber or line that you need to perform loss testing on to this instrument optical power measurement port, and connect the other end to the light source port of the same AQ1100A, AQ1100B, or AQ1100D.

The optical power meter measures the power of the light that passes through the optical fiber or line under loss test.

Saving Data

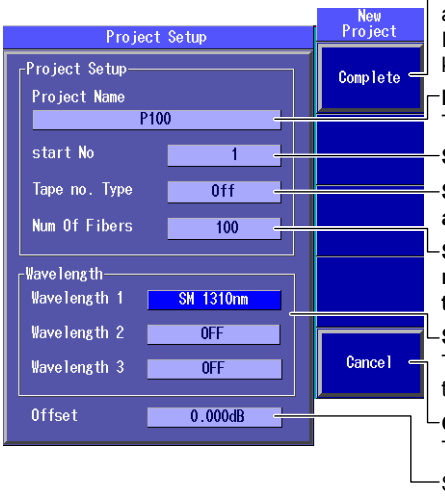
You can save up to three sets of data in the save area of the specified core. For details about saving the data to a file, see section 9.2.

7.1 Creating New Projects

Procedure

New Project Screen

1. Press the **Multi-Core Loss Test** soft key.
2. Press the **Master/Slave** soft key to select **Master**.
3. Press the **New Project** soft key to display the following screen.



Complete
Press this soft key after you have configured the project, wavelength, and offset settings. The loss test screen shown in the next section appears.
If you enter a project name and specify at least one wavelength, this key becomes available.

Project Name
To set the project name, follow the procedure in section 2.2.

Set the starting core number (1 to 9900).

Set the tape number type (Off, a-b(2), a-c(3), a-d(4), a-e(5), a-f(6), a-g(7), a-h(8)).

Set the number of fibers or tapes (up to 100 fibers when Tape no. Type is set to Off, up to 50 tapes when Tape no. Type is set to a-b(2), ..., up to 12 tapes when Tape no. Type is set to a-h(8)).

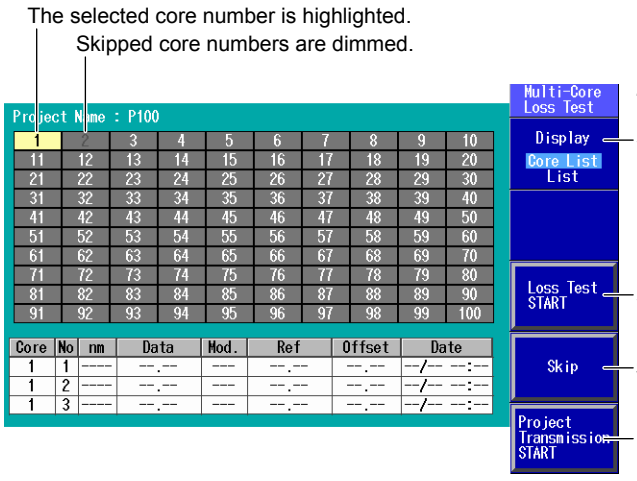
Set the wavelength.
The available settings vary depending on the model. For details, see the explanation later in this section.

Cancels the project settings.
The AQ1100 returns to the previous screen.

Set the offset (–9.900 to 9.900 dB).

Loss Test Screen

Press the **Complete** soft key to display the following screen.



Use the rotary knob and the arrow keys to select a core number.

Set the list to show (Core List, List).
For list examples, see section 3.4.

Starts loss testing (see section 7.3)

Specify skipping.

Starts the transmission of project information (see section 7.2)

Saving Project Information

Press **SETUP** and then the **File** soft key to display the file save screen. Follow the procedure in section 9.2 to save the project information that you configured.

Explanation

You can create a new project. You can measure optical loss with models with -SPM or -HPM suffix codes.

Creating a New Project

Only the master can create a new project. You can specify the following project information.

Project Name

You can set the name using up to 30 characters.

Starting Core Number

You can set the starting core number to a value within the following range.
1 to 9900

Tape Number Type

Off, a-b(2), a-c(3), a-d(4), a-e(5), a-f(6), a-g(7), a-h(8)

Number of Fibers or Tapes

You can set the number of fibers or tapes to a value within one of the following ranges.

Tape Number Type	Number of Fibers or Tapes
Off	10 to 100 fibers
a-b(2)	10 to 50 tapes
a-c(3)	10 to 33 tapes
a-d(4)	10 to 25 tapes
a-e(5)	10 to 20 tapes
a-f(6)	10 to 16 tapes
a-g(7)	10 to 14 tapes
a-h(8)	10 to 12 tapes

Measurement Light Wavelength

There are three instrument types, with the measurement light wavelengths listed below. Select a wavelength from the available settings on this instrument that you are using.

Model	Measurement Light Wavelength
AQ1100A	SM 1310 nm, SM 1550 nm
AQ1100B	SM 1310 nm, SM 1550 nm, SM 1625 nm
AQ1100D	GI 850 nm, GI 1300 nm, SM 1310 nm, SM 1550 nm

- The light for single mode (SM) optical fiber is emitted from optical port 2. The light for graded-index (GI) multi-mode optical fiber is emitted from optical port 3. Firmly connect the optical fiber to the port from which the light with the selected wavelength will be transmitted.
- You can specify up to three wavelengths in this instrument setup screen.
- This instrument cannot produce SM and GI wavelengths at the same time.

Offset

See “Explanation” in section 3.2.

Skipping

If you specify Skip for a core number that you don’t need to measure, its data will not be saved. By setting which cores to skip beforehand, you can avoid accidentally saving unnecessary data.

Saving Project Information

You can save project information to a file. For the procedure for saving project information to a file, see section 9.2. You can load saved files to both the master and the slave (see section 7.2).

7.2 Sharing Projects

The three different methods for sharing project information are listed below.

Procedure

Sending a Project

WARNING

- While this instrument is producing light, do not remove the optical fiber cable, because light is emitted from the light source port. Visual impairment may occur if the light enters the eye.
- Close the covers of any light source ports that do not have optical fiber cables connected to them. On models with two or more light source ports, visual impairment may occur if light that is mistakenly emitted from the wrong port enters the eye.

Connect one end of the communication fiber that you specified to the master's light source port, and connect the other end to the slave's optical power measurement port. Then transfer the project information.

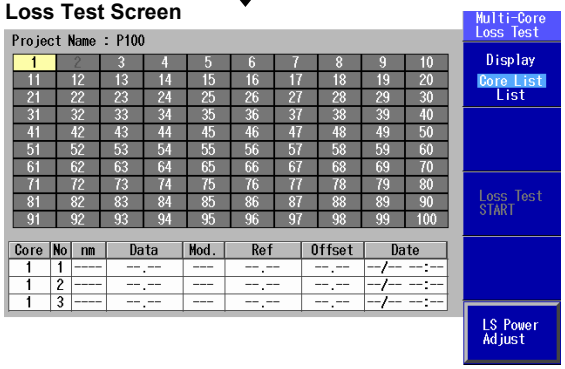
Slave

1. Press the **Multi-Core Loss Test** soft key.
2. Press the **Master/Slave** soft key to select **Slave**. The following menu appears.

3. Press the **Receive Project from Master** soft key.

On the menu, "Receive Project from Master" changes to "Abort."
After reception finishes, "Abort" changes back to "Receive Project from Master" and the following screen appears.

Loss Test Screen



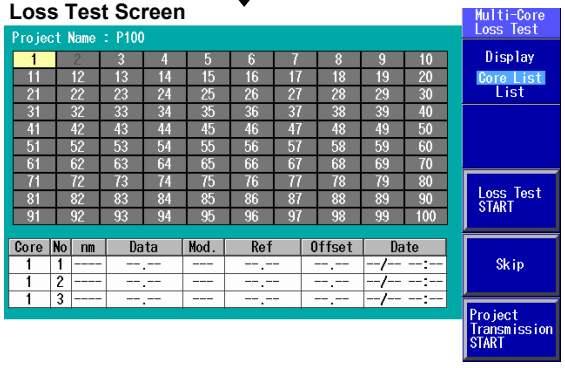
Master

1. Press the **Multi-Core Loss Test** soft key.
2. Press the **Master/Slave** soft key to select **Master**.
3. Create a new project (see section 7.1), or load a project file (see the next page). The following menu appears.

4. Press the **Project Transmission START** soft key to generate the optical signal used to transmit the project information.

On the menu, "Project Transmission START" changes to "Project Transmission STOP."
After transmission finishes, "Project Transmission STOP" changes back to "Project Transmission START" and the following screen appears.

Loss Test Screen

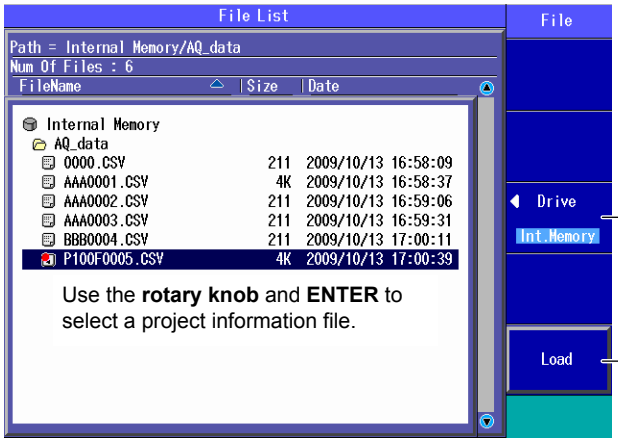


Now the master and slave share the same project information.

Loading a Project File

Load the same project file onto the master and the slave.

Press the **Multi-Core Loss Test** soft key and then the **File** soft key to display the following screen.



Set the drive to load from (internal memory, USB memory)

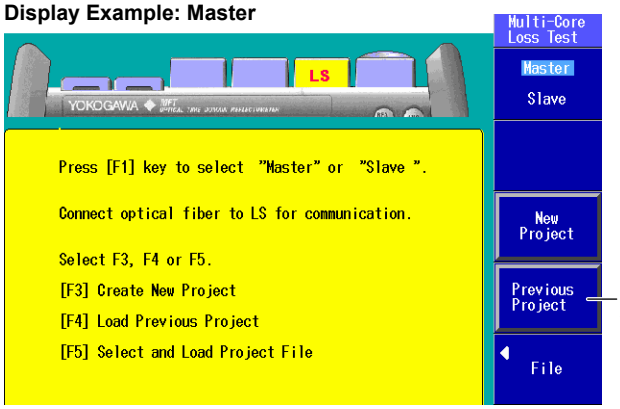
Loads the file
The project information is loaded from the selected file, and the loss test screen appears.

Restarting an Interrupted Loss Test

When the loss test for a shared project is interrupted, you can restart it where it left off, retaining the results of the test so far.
The operation for restarting the test is the same for both the master and the slave.

Press the **Multi-Core Loss Test** soft key and then the **Previous Project** soft key to display the following screen.

Display Example: Master



Loads the previous project
The lost test screen appears with the previous lost test data retained.

Explanation

The master and slave must share the same project information. The methods for sharing project information are listed below. Models with -SPM or -HPM suffix codes can share project information.

Sending a Project

You can send project information from the master to the slave.
First, you must specify a fiber for communicating the project information from the master to the slave. Before you transfer the project information, connect one end of the communication fiber that you specified to the master's light source port, and connect the other end to the slave's optical power measurement port.

- Prepare the slave to receive the project information.
- After you have confirmed that the slave is ready to receive the information, send it from the master.

Loading a Project File

Load the same project file onto the master and the slave. Use a project file that you have saved to internal or USB memory.

Restarting an Interrupted Loss Test

A multicore fiber loss test may be stopped before all the cores have been tested. When the test for a shared project is interrupted, you can restart it where it left off, retaining the results of the test so far. Data is maintained even when you turn the AQ1200 off.

- You must be performing the loss test with the same project.
- If you reload a project file, the loss test data up to that point is deleted and cannot be recovered.
- If you set Start Menu to Last Function, the loss test measurement screen is displayed when you restart a loss test. Select master or slave on the displayed screen, and restart the loss test. For instructions on how to set Start Menu, see section 10.1

7.3 Performing a Multicore Loss Test

Connect one end of the communication fiber that you specified to the master's light source port (optical port 2), and connect the other end to the slave's optical power measurement port (optical port 1). Then perform the multicore loss test.

Procedure

After the settings in sections 7.1 to 7.2 have been completed, open the loss test screen, and perform the multicore loss test procedure.

Executing a Multicore Loss Test

WARNING

- While this instrument is producing light, do not remove the optical fiber cable, because light is emitted from the light source port. Visual impairment may occur if the light enters the eye.
- Close the covers of any light source ports that do not have optical fiber cables connected to them. On models with two or more light source ports, visual impairment may occur if light that is mistakenly emitted from the wrong port enters the eye.

Slave

4. Connect to the light source port the optical fiber that corresponds to the core number transmitted from the master.

It may take time to receive the core number from the master.

When the core number is received, the Loss Test START soft key is enabled.

5. Press the **Loss Test START** soft key.
The light turns on.

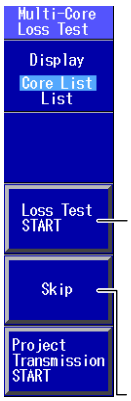
On the menu, "Loss Test START" changes to "Loss Test STOP."
After loss testing stops, "Loss Test STOP" changes back to "Loss Test START."

Optical Power Adjustment
Adjust as necessary (see section 7.4).

Master

1. Connect the optical fiber under loss test to the optical power measurement port.

2. Use the **rotary knob** and the **arrow keys** to select the core number of the connected fiber.



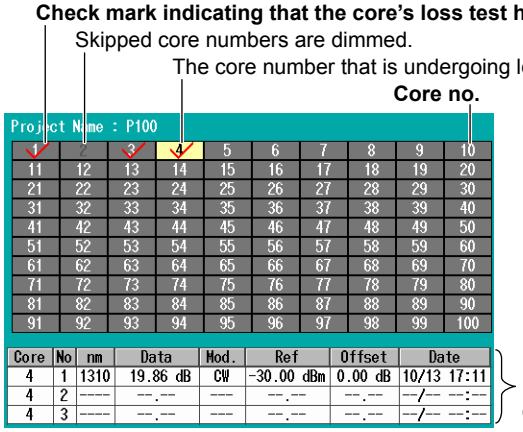
3. Press the **Loss Test START** soft key.
The optical signal used to transmit the core number is sent to the slave.

On the menu, "Loss Test START" changes to "Loss Test STOP."
After loss testing stops, "Loss Test STOP" changes back to "Loss Test START."

Specify skipping as necessary.

Follow steps 1 to 5 to perform a multicore loss test.
Check marks appear over core numbers whose loss tests have been completed.

Displayed List



Saving Multicore Loss Test Results

Press **SETUP** and then the **File** soft key to display the file save screen. Follow the procedure in section 9.2 to save the data.

Explanation

Multicore loss testing is performed while information such as project, core number, loss test result, and device information is transferred between the master and slave. Execute a multicore loss test in the loss test screen after the settings in sections 7.1 to 7.2 have been completed.
You can measure optical loss with models with -SPM or -HPM suffix codes.

Displayed List

For list examples, see section 3.4.

Saving Multicore Loss Test Results

You can save multicore loss test results to a file. For the procedure for saving project information to a file, see section 9.2.

7.4 Optical Power Adjustment

Procedure

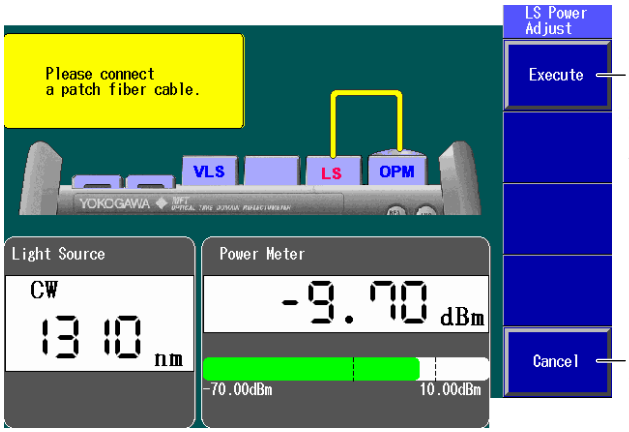
Optical Power Adjustment

WARNING

- While this instrument is producing light, do not remove the optical fiber cable, because light is emitted from the light source port. Visual impairment may occur if the light enters the eye.
- Close the covers of any light source ports that do not have optical fiber cables connected to them. On models with two or more light source ports, visual impairment may occur if light that is mistakenly emitted from the wrong port enters the eye.

Use a short optical fiber to connect an AQ1100A, AQ1100B, or AQ1100D light source port to an AQ1100A, AQ1100B, or AQ1100D optical power measurement port, and then perform optical power adjustment.

In the loss test screen (see section 7.3) of the slave, press the **LS Power Adjust** soft key to display the following screen.



Starts optical power adjustment
The measurement light turns on.
When adjustment ends normally, the AQ1100 returns to the previous screen.

Cancels optical power adjustment
The AQ1100 returns to the previous screen.

Explanation

Optical Power Adjustment

Adjust the optical power of the light source as necessary.
When you execute optical power adjustment, this instrument automatically identifies the optical power level and adjusts itself accordingly. Perform optical power adjustment on the light source (slave).

- Optical power adjustment begins when you press the Execute soft key. When it ends normally, this instrument returns to the previous screen. During adjustment, “Execute” changes to “Abort.” All soft keys other than the Abort soft key are unavailable.
- Press the Abort soft key to stop optical power adjustment. “Abort” will change to “Execute.” The adjustment value will return to the value that it was at before adjustment was executed.
- Connect a short optical fiber of a few meters or less in length. Make sure that the fiber is free from dirt, scratches, bends, and other potential causes of optical degradation.
- The initial adjustment value is the factory default setting.

8.1 Using Fiber Inspection Probes to View the Status of Optical Fiber End Faces

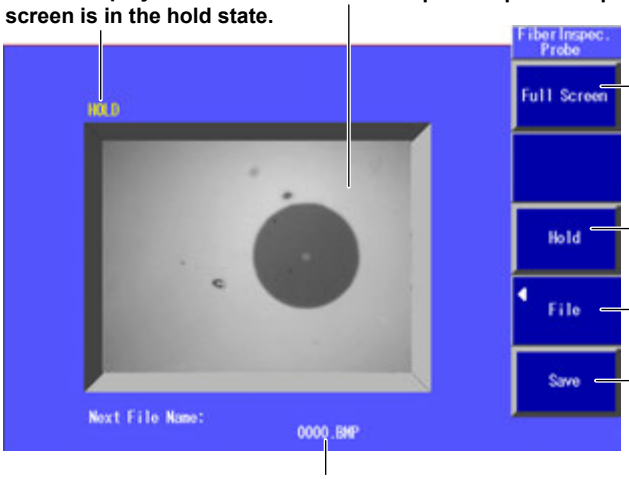
By connecting a commercially available fiber inspection probe that has a USB interface, to an AQ1100A, AQ1100B, or AQ1100D USB port, you can show photographs of optical fiber end faces on this instrument display. These pictures can be saved as data.

Procedure

Fiber End Face Checking Screen

1. Using the rotary knob and ENTER, select Fiber Inspection Probe to display the following screen.
2. Connect the fiber inspection probe's USB cable to the USB Type A port on this instrument.

   Just connecting the probe to this instrument will display the picture on the screen. If you disconnect the USB cable, the picture will disappear.



The next file name that will be saved
For details on file names, see section 9.2.

Switches the full-screen display
Press this soft key to switch to the full-screen display. Press a soft key or an operation key to return to the previous screen.

Holds the screen
Press this soft key to put the screen into the hold state. When in the hold state, "HOLD" is displayed at the top of the screen. If you press this soft key again, the hold state will be cleared.

File
See section 9.2. The only file operation that you can perform is saving files. You can save the file as one of the following three file types.
- BMP
- PNG
- JPG

You can set the file type when the screen is in the hold state.

Starts saving
Press this soft key to save the screen that is displayed.

Explanation

Connecting Fiber Inspection Probes

Hot-plugging is supported; you can connect or disconnect the USB device at any time, regardless of whether this instrument is on or off. If you connect the USB fiber inspection probe while this instrument is on, this instrument will automatically recognize the probe. For cautions regarding connecting the probe, see Note in section 9.1.

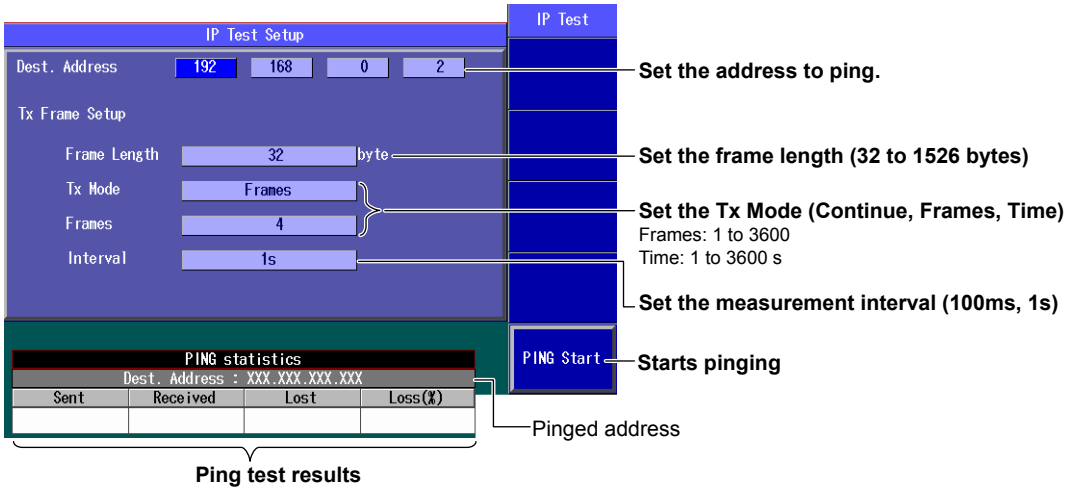
For information about compatible fiber inspection probes, contact your nearest YOKOGAWA dealer.

9.1 Performing an IP Test

Procedure

Ping Test Setup Screen

Press the **IP Test** soft key to display the following screen.



Explanation

IP testing is available on models with the /LAN option.
Use the Ethernet port to execute a ping test.

Pinging

Target Address

Specify the address that you want to ping.

Tx Frame

Set the conditions of the frame you will use for pinging.

- **Frame Length**
  You can set the length of the frame that will be sent in a single ping to a value within the following range.
  32 to 1526 bytes

- **Tx Mode**
  You can set the Tx mode to one of the following options. Depending on the Tx mode that you set, you may set the number of frames and the time in the next menu.

Continue	Frames are sent continuously, regardless of the set number of frames and time.
Frames	1 to 3600
Time	1 to 3600 s

Measurement Interval

Set the interval at which to measure the ping test items (see the next page) to one of the following values.
100 ms, 1 s

Pinging

Pinging is executed according to the Tx mode that you set.

- When it ends normally, this instrument returns to the previous screen. During pinging, “PING Start” changes to “PING Stop.” All soft keys other than the PING Stop soft key are unavailable.
- To stop pinging, press the PING Stop soft key. “PING Stop” will change to “PING Start.”

Ping Test Results

The ping test results are listed below. The pinged IP address and the ping test results are indicated in the PING statistics table.

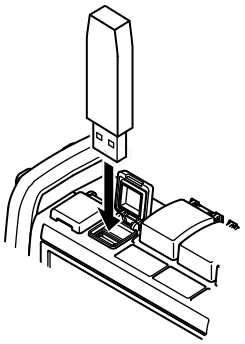
Sent frames, received frames, lost frames (reception failed), loss rate

10.1 Connecting a USB Storage Medium to the USB Port

CAUTION

Do not remove USB memory or turn off the power when the USB memory access indicator is blinking or when data is being saved or loaded from internal memory. Doing so may damage the storage medium (USB memory or internal memory) or corrupt its data.

Use a portable USB storage medium. Connect it directly to the USB Type A port on this instrument. Hot-plugging is supported: you can connect or disconnect the USB device at any time, regardless of whether this instrument is on or off. When the power is on, this instrument automatically detects the USB storage medium after it is connected.



Note

- Connect USB storage devices to this instrument directly, not through a USB hub.
- Use a portable USB storage medium. Do not connect an incompatible USB storage medium.
- You cannot use protected USB storage devices (such as those that contain encrypted content).
- Do not connect and disconnect a USB device repetitively. Provide a 10-second interval between removal and connection.
- Do not connect or disconnect a USB device during the time from when this instrument is turned on until key operation becomes available.
- You can use USB storage devices that comply with USB 1.1.

10.2 Saving and Loading Data

CAUTION

Do not remove USB memory or turn off the power when the USB memory access indicator is blinking or when data is being saved or loaded from internal memory. Doing so may damage the storage medium (USB memory or internal memory) or corrupt its data.

Procedure

File Operation Screen

Models with -SPM or -HPM Suffix Codes

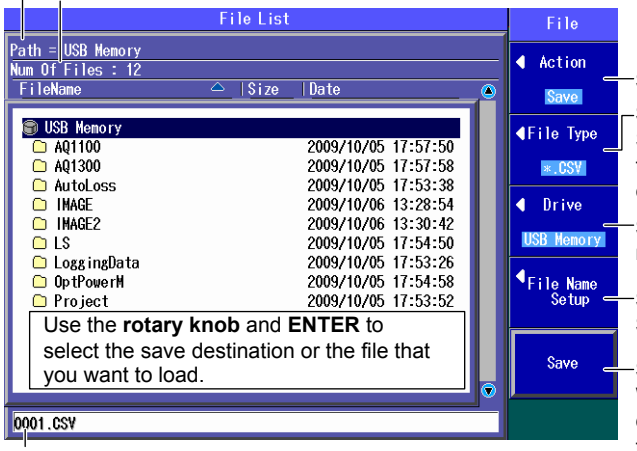
Press the **OPM LS** or **Auto Loss Test** soft key, **SETUP**, and then the **File** soft key to display the following screen (which is the same as the one for models with -PPM suffix codes).

Models with -PPM Suffix Codes

Press the **OPM LS** or PON Power Meter **soft key, SETUP**, and then the **File** soft key to display the following screen.

Folder path

The number of folders and files in the selected folder



Set the action (Save, Load).

Set the file type.
Set the extension of the file type you want to save or load. For details, see the explanation later in this section.

Set the destination drive (internal memory, USB memory).

Set the file name (see the File Name Setup screen in the next section).

Saves or loads the file
Whether "Save" or "Load" is displayed depends on which option you choose for the Action setting.

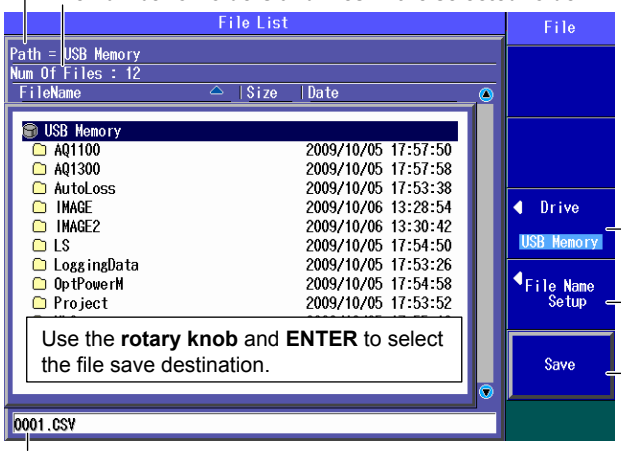
The file name candidate for the next save operation
This indication appears when you set the action to "Save."

When Multicore Loss Testing Is Selected on Models with -SPM or -HPM Suffix Codes

Press the **Multi-Core Loss Test** soft key, **SETUP**, and then the **File** soft key to display the following screen.

Folder path

The number of folders and files in the selected folder



Set the destination drive (internal memory, USB memory).

Set the file name (see the File Name Setup screen in the next section).

Saves the file
For the procedure to load files, see section 7.2.

The file name candidate for the next save operation

File Name Setup Screen

Set the file name format (No., Comment, Comment + No., No. + Comment).

Set the ID number (0 to 9999).

Specify a comment (up to 30 characters).
To enter a comment, follow the procedure in section 2.2.

File Name
The file name that is produced by the above settings is displayed.

Explanation

Action

Select “Save” or “Load.”

The types of files that you can save are listed below.

File Type

Set the extension depending on the type of file that you want to save or load.

Saving

The types of files that you can save are listed below.

.CSV	A CSV format measurement data file[1] The measurement data (including measurement conditions such as the wavelength and offset) for the specified core and tape numbers is saved. • Optical power meter measurement data (see section 3.4) • PON power meter measurement data (see section 4.3) • Loss test results (see section 6.2) • Loop-back loss test results (see section 6.3) • Multicore loss test results (see section 7.3), project information (see section 7.1)	
.LTS	File containing optical power meter measurement conditions, PON power meter measurement conditions, and optical output conditions	
.CFG	System setup data file	
.BMP	BMP screen image data file	When you select “Save,” the screen image from immediately before you switched to the file operation screen is saved.[2]
.PNG	PNG screen image data file	
.JPG	JPG screen image data file	

1 Logging results are also saved to CSV files. Logging results are saved in the file save screen that appears after logging stops (see section 3.3).

2 “Screen Image Save” may appear on the menu. Press this soft key to save the image displayed by “Screen Image Save” to the root directory of the internal memory with the file name SystemInfo.BMP.

Loading

The types of files that you can load are listed below.

.CSV	
.LTS	For details, see “Saving.”
.CFG	

Drive to Save To

You can set the destination drive to one of the following options.

Internal memory	This instrument internal memory
USB memory	The USB storage medium connected to the USB Type A port on this instrument.

Note

- Do not save files directly to the root directory. Create a folder, and save files to that folder. If there are many folders in the root directory, it will take some time to save files to a folder that is at a lower level in the folder hierarchy.
- You can create or save up to 256 files and folders in the root directory.

File Name

File Name Format

You can set the file name format to one of the following options. For all formats, the maximum number of characters is 36.

No., Comment, Comment + No., No. + Comment

Comment	Up to 30 characters
ID No.	Four characters The range is 0 to 9999. Four characters are used in the file name. For example, if you set the number to “1,” “0001” will be used in the file name.
Extension	Four characters, including the period.

If the whole file name is longer than 36 characters, characters will be deleted from the end of the comment item so that the file name is 36 characters long.

String and Character Types That Can Be Used in File and Folder Names

There are limitations on the types of strings and characters that you can use in file and folder names.

- The following character strings cannot be used as file or folder names due to MS-DOS limitations.
  AUX, CON, PRN, NUL, CLOCK, CLOCK$, LPT0, LPT1, LPT2, LPT3, LPT4, LPT5, LPT6, LPT7, LPT8, LPT9, COM0, COM1, COM2, COM3, COM4, COM5, COM6, COM7, COM8, COM9
- The following types of characters can be used: 0 to 9, A to Z, a to z, _, –, =, (,), {, }, [,], #, $, %, &, ~, !, `,and @.
  @ cannot be entered consecutively.
- Make sure that the full file path (absolute path from the root folder) is less than or equal to 200 characters in length. If it exceeds 200 characters, an error occurs when you perform a file operation (such as saving, copying, renaming, or creating a folder).

  Full file path: When an operation is being performed on a folder, the full path is up to the name of the folder.
  When an operation is being performed on a file, the full path is up to the name of the file.

File List

You can set items that are displayed in the file list. For details, see section 10.9.

The total number of files and folders that can be displayed in the file list is 1000 (256 for the root directory). If there are more than a total of 1000 files and folders in a given folder, the file list for that folder will only display 1000 files and folders. There is no way to set which files and folders are displayed.

About the File Operation Screen

Depending on the model and the selected feature, the operations for opening the file operation screen and the screens that appear vary.

- When multicore loss testing is selected on models with -SPM or -HPM suffix codes, a screen for saving the project information and core loss test results in CSV format appears.
- For information about loading files when multicore loss testing is selected on models with -SPM or -HPM suffix codes, see section 7.2. Select a file that contains project information and multicore loss test results and load it.

10.3 Deleting and Copying Files

CAUTION

Do not remove USB memory or turn off the power when the USB memory access indicator is blinking or when data is being saved or loaded from internal memory. Doing so may damage the storage medium (USB memory or internal memory) or corrupt its data.

Procedure

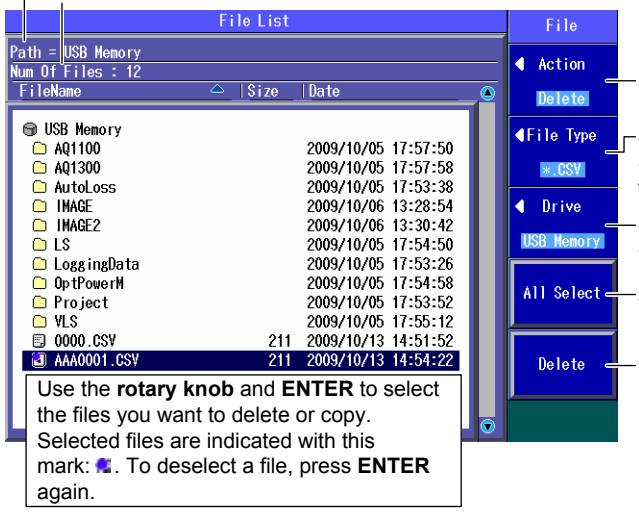
File Operation Screen

Models with -SPM or -HPM Suffix Codes

Press the **OPM LS** or **Auto Loss Test** soft key, **SETUP**, and then the **File** soft key to display the following screen (which is the same as the one for models with -PPM suffix codes).

Models with -PPM Suffix Codes

Press the **OPM LS** or PON Power Meter **soft key, SETUP**, and then the **File** soft key to display the following screen.



Set the action (Delete, Copy).

Set the file type.
Set the extension of the file type you want to delete or copy.

Set the destination drive (internal memory, USB memory).

Selecting All Files

Deletes the selected files or displays a screen for selecting the copy destination.
Whether “Delete” or “Dest. Folder” is displayed depends on which option you choose for the Action setting.

When you press the **Dest. Folder** soft key, a screen for selecting the copy destination folder appears.
In that screen, select the destination folder and press the **Execute** soft key to copy the files.

Explanation

Action
Select “Delete” or “Copy.”

File Type
The files of the type that you selected appear in the File List screen.
- For details about file types, see “Explanation” in section 10.2.
- To display all the files in the current folder, set the file type to “*.*”.

Drive to Save To
See “Explanation” in section 10.2.

Selecting All Files
All the files in the current folder will be deleted or copied.
- When you press the All Select soft key, “All Select” changes to “All Deselect.”
- When you press the All Deselect soft key, “All Deselect” changes to “All Select.” All the files in the current folder are deselected.

Deleting
The selected files are deleted.

Setting the Copy Destination and Copying
After selecting the files to copy, set the destination folder and copy the files.

About the File Operation Screen
Depending on the model and the selected feature, the operations for opening the file operation screen and the screens that appear vary.
On models with -SPM or -HPM suffix codes, you cannot delete or copy files when multicore loss testing is selected.

Note

Using the mini B USB port on this instrument, you can send the files and folders in this instrument internal memory to a PC. To do this, set this instrument mini B USB port function to Storage (see section 10.1). When the PC accesses this instrument and downloads the files, the download speed depends on the performance of the PC.

10.4 Changing File Names

CAUTION

Do not remove USB memory or turn off the power when the USB memory access indicator is blinking or when data is being saved or loaded from internal memory. Doing so may damage the storage medium (USB memory or internal memory) or corrupt its data.

Procedure

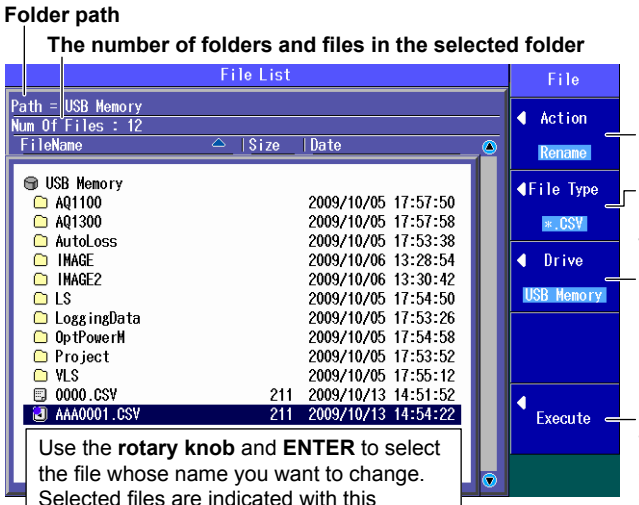
File Operation Screen

Models with -SPM or -HPM Suffix Codes

Press the **OPM LS** or **Auto Loss Test** soft key, **SETUP**, and then the **File** soft key to display the following screen (which is the same as the one for models with -PPM suffix codes).

Models with -PPM Suffix Codes

Press the **OPM LS** or PON Power Meter **soft key, SETUP**, and then the **File** soft key to display the following screen.



Set the action (Rename).

Set the file type.
Set the extension of the file type of the file whose name you want to change.

Set the destination drive (internal memory, USB memory).

Enter a new file name.
The character input dialog box appears. To set the file name, follow the procedure in section 2.2. Enter the extension as well. After you have entered the file name, press the **Commit** soft key in the character input dialog box to change the file name to the name that you entered.

Explanation

Action
Select “Rename.”

File Type
The files of the type that you selected appear in the File List screen.
- For details about file types, see “Explanation” in section 10.2.
- To display all the files in the current folder, set the file type to “*.*”.

Drive to Save To
See “Explanation” in section 10.2.

Entering a File Name
Enter a file name into the character input dialog box that appears. Follow the procedure in section 2.2.
- Use the character input dialog box to enter the extension as well.
- When you press the Commit soft key in the character input dialog box, the file name changes to the name that you entered.

About the File Operation Screen
Depending on the model and the selected feature, the operations for opening the file operation screen and the screens that appear vary.
On models with -SPM or -HPM suffix codes, you cannot change file names when multicore loss testing is selected.

10.5 Creating Folders

CAUTION

Do not remove USB memory or turn off the power when the USB memory access indicator is blinking or when data is being saved or loaded from internal memory. Doing so may damage the storage medium (USB memory or internal memory) or corrupt its data.

Procedure

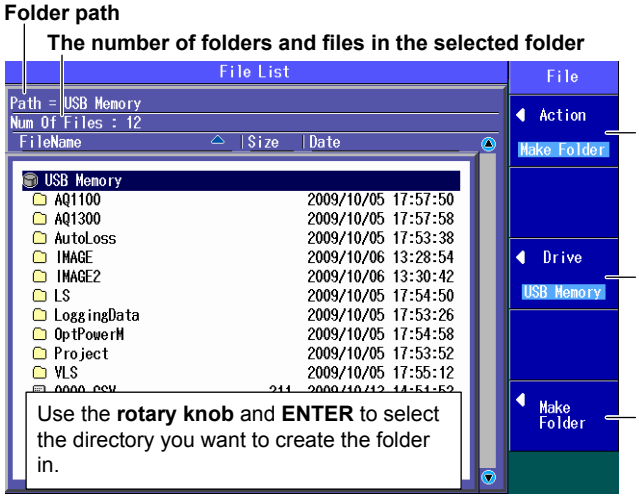
File Operation Screen

Models with -SPM or -HPM Suffix Codes

Press the **OPM LS** or **Auto Loss Test** soft key, **SETUP**, and then the **File** soft key to display the following screen (which is the same as the one for models with -PPM suffix codes).

Models with -PPM Suffix Codes

Press the **OPM LS** or PON Power Meter **soft key, SETUP**, and then the **File** soft key to display the following screen.



Set the action (Make Folder).

Set the destination drive (internal memory, USB memory).

Create a folder.
The character input dialog box appears.
To set the folder name, follow the procedure in section 2.2.
After you have entered the folder name, press the **Commit** soft key in the character input dialog box to create the folder.

Explanation

Action

Select “Make Folder.”

Drive to Save To

See “Explanation” in section 10.2.

Entering a Folder Name

Enter a folder name into the character input dialog box that appears. You can use up to 20 characters. Follow the procedure in section 2.2. When you press the Commit soft key in the character input dialog box, a folder with the name that you specified is created.

About the File Operation Screen

Depending on the model and the selected feature, the operations for opening the file operation screen and the screens that appear vary.
On models with -SPM or -HPM suffix codes, you cannot create folders when multicore loss testing is selected.

10.6 Deleting and Copying Folders

CAUTION

Do not remove USB memory or turn off the power when the USB memory access indicator is blinking or when data is being saved or loaded from internal memory. Doing so may damage the storage medium (USB memory or internal memory) or corrupt its data.

Procedure

File Operation Screen

Models with -SPM or -HPM Suffix Codes

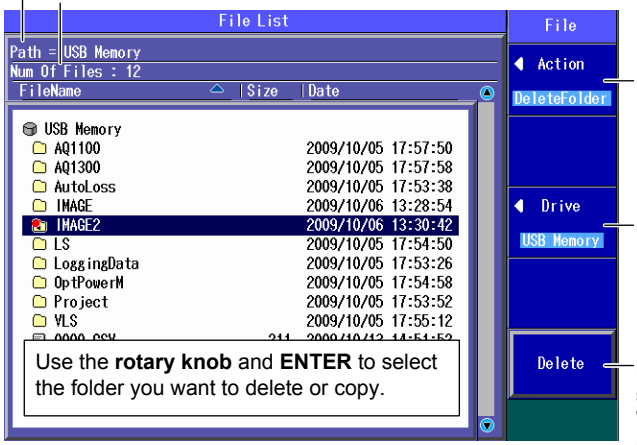
Press the **OPM LS** or **Auto Loss Test** soft key, **SETUP**, and then the **File** soft key to display the following screen (which is the same as the one for models with -PPM suffix codes).

Models with -PPM Suffix Codes

Press the **OPM LS** or PON Power Meter **soft key, SETUP**, and then the **File** soft key to display the following screen.

Folder path

The number of folders and files in the selected folder



Set the action (DeleteFolder, Copy Folder).

Set the destination drive (internal memory, USB memory).

Deletes the selected files or displays a screen for selecting the copy destination.
Whether "Delete" or "Dest. Folder" is displayed depends on which option you choose for the Action setting.

When you press the **Dest. Folder** soft key, a screen for selecting the copy destination folder appears.
Make sure that the copy destination and source drives are different (see the explanation later in this section).
In the screen that appears, select the destination folder and press the **Execute** soft key to copy the files.

Explanation

Action
Select “DeleteFolder” or “Copy Folder.”

Drive to Save To
See “Explanation” in section 10.2.

Deleting
The selected folders are deleted.

Setting the Copy Destination and Copying
After selecting the folders to copy, set the destination folder and copy the selected folders to it.
You cannot copy from the internal memory to the internal memory or from the USB memory to the USB memory. Copy folders from the internal memory to the USB memory or from the USB memory to the internal memory.

About the File Operation Screen
Depending on the model and the selected feature, the operations for opening the file operation screen and the screens that appear vary.
On models with -SPM or -HPM suffix codes, you cannot delete or copy folders when multicore loss testing is selected.

Note

- You may not be able to copy or delete the selected folder if it contains many levels of folders.
- Using the mini B USB port on this instrument, you can send the files and folders in this instrument internal memory to a PC. To do this, set this instrument mini B USB port function to Storage (see section 10.1). When the PC accesses this instrument and downloads the files, the download speed depends on the performance of the PC.

10.7 Initializing the Internal Memory

CAUTION

Do not remove USB memory or turn off the power when the USB memory access indicator is blinking or when data is being saved or loaded from internal memory. Doing so may damage the storage medium (USB memory or internal memory) or corrupt its data.

Procedure

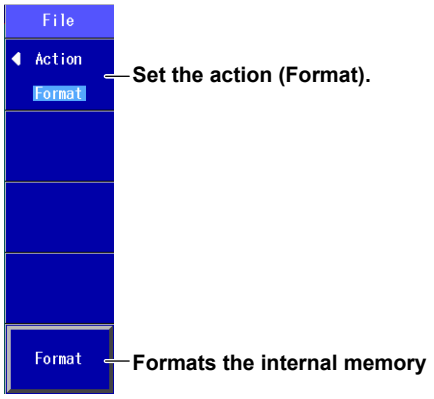
File Operation Screen

Models with -SPM or -HPM Suffix Codes

Press the **OPM LS** or **Auto Loss Test** soft key, **SETUP**, and then the **File** soft key to display the following screen (which is the same as the one for models with -PPM suffix codes).

Models with -PPM Suffix Codes

Press the **OPM LS** or PON Power Meter **soft key, SETUP**, and then the **File** soft key to display the following screen.



Explanation

Action

Select “Format.”

Formatting

The internal memory is initialized. All the data in the internal memory is deleted. Before you initialize the internal memory, backup the data as necessary.

Note

Using the mini B USB port on this instrument, you can send the files and folders in this instrument internal memory to a PC. To do this, set this instrument mini B USB port function to Storage (see section 10.1). When the PC accesses this instrument and downloads the files, the download speed depends on the performance of the PC.

10.8 Printing

Procedure

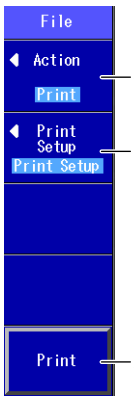
File Operation Screen

Models with -SPM or -HPM Suffix Codes

Press the **OPM LS** or **Auto Loss Test** soft key, **SETUP**, and then the **File** soft key to display the following screen (which is the same as the one for models with -PPM suffix codes).

Models with -PPM Suffix Codes

Press the **OPM LS** or PON Power Meter **soft key, SETUP**, and then the **File** soft key to display the following screen.



Set the action (Print).

Configure printing.
Specify the maker and the print color.

Starts printing

Explanation

Action

Select “Print.”

Print Setup

Specify the maker of the printer connected to this instrument and the print color.

- Connect the printer to the USB Type A port on this instrument.
- You can use printers that comply with USB Printer Class Ver 1.1.

Printing

An image of the screen is printed.

About the File Operation Screen

Depending on the model and the selected feature, the operations for opening the file operation screen and the screens that appear vary.

On models with -SPM or -HPM suffix codes, you cannot print when multicore loss testing is selected.

Note

- Do not connect incompatible printers.
- For USB printers that have been tested for compatibility, contact your nearest YOKOGAWA dealer.

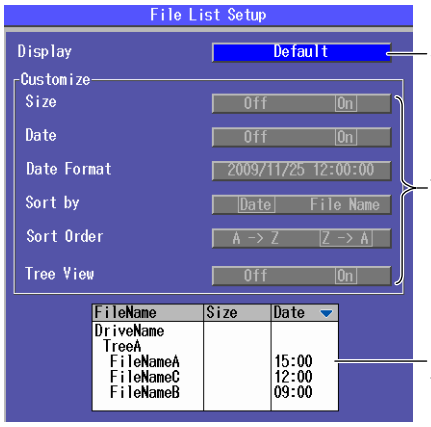
10.9 Specifying the Items That Are Displayed in the File List

Procedure

File List Setup Screen

1. Press **SETUP**.
2. Using the **rotary knob** and **ENTER**, select **File List Setup** to display the following screen.

When Display is set to Default or File List

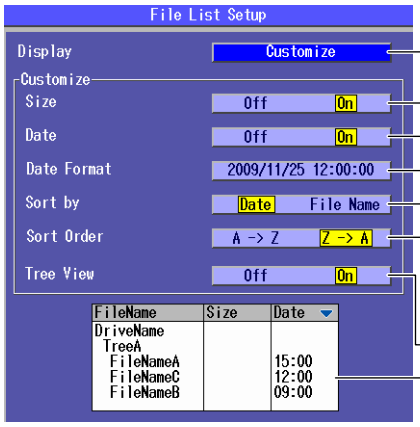


Set Display to "Default" or "File List."

You cannot perform these operations.

File list preview
You can use this preview to check the way that the File List is displayed on the file operation screen (see section 9.2).

When Display is set to Customize



Set Display to "Customize."

Turns the file size display on or off

Turns the display of the date when the file was saved on or off

Set the date format (Year/month/day hour:minute:second, year/month/day hour:minute, year (short form)/month/day hour:minute, month/day hour:minute, hour:minute).

Set what to sort by (Date, File Name).

Set the sort order (A -> Z, Z -> A).

Turns the tree view on or off

Preview
You can use this preview to check the way that the File List is displayed on the file operation screen (see section 9.2).

Explanation

You can select the items that are displayed in the internal memory and USB memory file lists. You can also display a preview of the file list display.

Default

File names, file sizes, and dates are displayed.

File List

Only file names are shown in a list. File names can be displayed up to their first 36 characters.

Customize

You can specify the items you want to display in the file list.

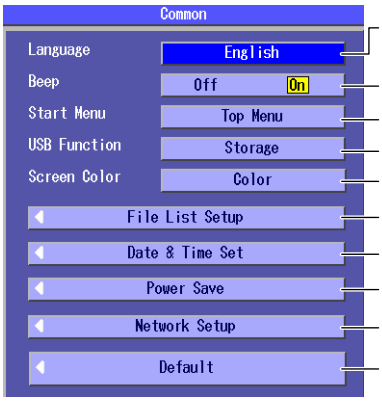
- File size, date the file was saved, and tree view on or off
- Date format, what to sort by, and the sort order

11.1 Configuring the Language, Beep, Start Menu, USB Function, and Screen Color

Procedure

System Setup Screen

Press **SETUP** to display the following menu.



Set the display language.
The options that appear vary depending on the language specification.

Turns the beep on and off

Set the start menu (Top Menu, Last Function).

Set the USB function (Storage, Control I/O)

Set the screen colors (Color, B&W)

Configure the file list display (see section 9.9).

Set the date and time (see the operation guide, IM AQ1100-02EN).

Configure the power-save feature (see section 10.2).

Configure the network settings (see section 10.4).

Initialize (see section 10.3).

Explanation

Display Language

Set the language to display on this instrument screen. The options that appear vary depending on the product's language specification.

Turning the Beep On and Off

You can make this instrument beep whenever an operation error occurs or an error message is displayed.

On	This instrument beeps.
Off	This instrument does not beep.

Start Menu

You can choose which screen will appear first when you turn on this instrument.

Top Menu	The menu that appears when you press the MENU key on the front panel.
Last Function	The menu of the last function that you were using before this instrument was turned off appears. The first menu that appears is one of the menus that appears after you press a soft key in the Top Menu.

USB Function

You can set the function of the mini B USB port on this instrument.

Storage	You can access this instrument internal memory from a PC and load and save data.
Control I/O	You can use communication commands to control this instrument from a PC.

Screen Color

Set the screen display colors.

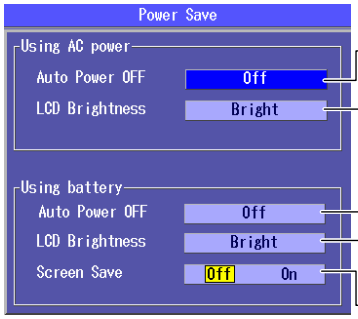
Color, B&W

11.2 Configuring Power Save Settings

Procedure

Power Save Screen

1. Press **SETUP**.
2. Using the **rotary knob** and **ENTER**, select **Power Save** to display the following screen.



Using AC power

Configure the auto power off feature (Off, AutoPowerOff 1m, AutoPowerOff 5m, AutoPowerOff 10m, AutoPowerOff 30m).

Set the LCD brightness (Bright, Normal, Power save, Off)

Using battery

Configure the auto power off feature (Off, AutoPowerOff 1m, AutoPowerOff 5m, AutoPowerOff 10m, AutoPowerOff 30m).

Set the LCD brightness (Bright, Normal, Power save, Off)

Set the screen save feature.

Explanation

To reduce power consumption, you can set separate power save settings for when this instrument is using an AC adapter and for when it is using a battery.

Auto Power Off

When this instrument is on, it can turn itself off automatically after it has not been used for awhile.

Off	The power does not turn off automatically.
AutoPowerOff 1m	The power turns off automatically after one minute.
AutoPowerOff 5m	The power turns off automatically after 5 minutes.
AutoPowerOff 10m	The power turns off automatically after 10 minutes.
AutoPowerOff 30m	The power turns off automatically after 30 minutes.

LCD Brightness

You can set the LCD brightness.

Bright	The screen is bright. Choose this setting when you are in a bright area. Because this setting uses a great deal of power, pay close attention to the remaining battery power when you are using a battery.
Normal	Normal brightness.
Power save	The screen is less bright than it is when you select Normal. You can view the screen at this brightness when you are in a dark area. You can use the battery longer than you can when you select Bright.
Off	The LCD backlight is turned off. When you are viewing the screen beneath the sun or in another bright area, the screen will be difficult to view even if you select Bright. In this kind of situation, you can make the screen easier to view by selecting Off. You can use the battery even longer than you can when you select Power save. Even when you set LCD Brightness to Off, if you press a panel key, the backlight lights at the "Power save" brightness level. If you do not perform any operations for 5 seconds, the backlight turns off again. This feature is useful when you move this instrument to a dark place after setting LCD Brightness to Off.

Screen Save

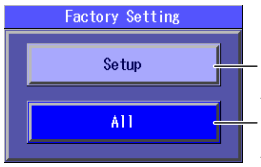
When this instrument is on and is using the battery, this instrument can turn its display off automatically after it has not been used for 15 seconds.

11.3 Resetting This Instrument to Its Factory Default Settings

Procedure

Initialization Screen

1. Press **SETUP**.
2. Using the **rotary knob** and **ENTER**, select **Default** to display the following screen.



Initializes the measurement settings
All measurement settings are returned to their factory defaults.

Initializes all settings
All settings are returned to their factory defaults, and the internal memory is formatted.

Explanation

You can reset this instrument to its factory default settings.

Initializing the Measurement Settings

All the settings are reset to their factory defaults, but the internal memory and the day and time settings (excluding the type) are not initialized.

Initializing All Settings

All the settings are reset to their factory defaults, and the internal memory is initialized. All the data in the internal memory is deleted. Before you initialize the internal memory, backup the data as necessary. The day and time settings (excluding the type) are not initialized.

Note

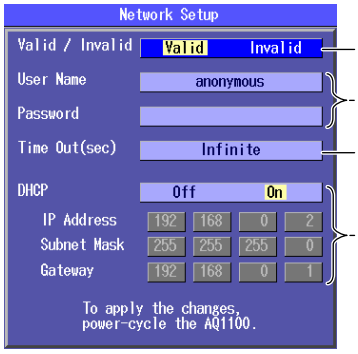
Using the mini B USB port on this instrument, you can send the files and folders in this instrument internal memory to a PC. To do this, set this instrument mini B USB port function to Storage (see section 11.1). When the PC accesses this instrument and downloads the files, the download speed depends on the performance of the PC.

11.4 Configuring Network Settings (Option)

Procedure

Network Setup Screen

1. Press **SETUP**.
2. Using the **rotary knob** and **ENTER**, select **Network Setup** to display the following screen.



Enables or disables the network setup

Set the user name and password.
To set the user name and password, follow the procedure in section 2.2.

Set the timeout value.

Configure the TCP/IP settings.

Note

You must restart this instrument after you have changed the network settings. Before you restart this instrument, the settings from before you changed the settings are used.

Explanation

IP testing is available on models with the /LAN option.
You can use communication commands through the Ethernet port to control this instrument or access this instrument from a PC that has an FTP client and download the data that is stored on this instrument internal memory.
For details about the network that you intend to connect this instrument to, contact your network administrator.

Enabling or Disabling the Network Setup

After you have set the user name, password, timeout value, and TCP/IP parameters, select Valid and restart this instrument to use the network connection.

Valid	This instrument can communicate over the network.
Invalid	This instrument cannot communicate over the network.

If Valid is selected and this instrument is not connected to a network, it will require more time to start.

User Name and Password

Set the user name and password to use for user authentication when this instrument is accessed by a PC.

User Name

You can use up to 15 characters. The default setting is “anonymous.”

Password

You can use up to 15 characters.

Note

- This instrument terminates the connection if there is an error in the user authentication process.
- You do not need to enter a password when the user name is set to “anonymous.”

Timeout Value

The connection to the network is automatically disconnected if there is no access to this instrument for the specified time.

Range: 1 to 3600 s or Infinite

This instrument will not time out if you set the timeout value to Infinite. If this instrument is connected to a network and the connection between this instrument and another device is broken abnormally due to an external cause, this instrument will remain connected to the network until the power is turned off. To avoid this kind of situation, we recommend that you set a finite timeout value.

TCP/IP

DHCP

If you are connecting this instrument to a network with a DHCP server and you want to use the server, set DHCP to “On.”

On	The IP address, subnet mask, and gateway information is assigned automatically.
Off	You must enter the IP address, netmask, and gateway information.

- Ask your network administrator whether or not DHCP is available.
- When DHCP is set to On, the information can change whenever you restart this instrument or enable or disable the network setup as described in the previous section. Check the information when you access this instrument from a PC.

IP Address

You can set the IP address assigned to this instrument. The IP address is an ID that is assigned to each device on a network such as the Internet or an intranet. Obtain an IP address from your network administrator. In a network that supports DHCP, this parameter is set automatically when DHCP is set to On.

Subnet Mask

You can set the mask value used to determine the subnet network address from the IP address. Networks such as the Internet are often divided up into smaller networks called subnetworks. The subnet mask is a value that specifies the number of bits of the IP address that are used to identify the network address. Consult your network administrator for the subnet mask value. In a network that supports DHCP, this parameter is set automatically when DHCP is set to On.

Gateway

You can set the IP address of the default gateway (which is a gateway used to communicate with other networks). The default gateway handles data exchange between multiple networks so that data transmission proceeds smoothly. Consult your network administrator for the default gateway value. In a network that supports DHCP, this parameter is set automatically when DHCP is set to On.

11.5 Restricting Operations

Procedure

1. In the top screen, press **SETUP**.

Set operation restrictions.

2. Using the **rotary knob** and **ENTER**, select **Operation Lock Setup** to display the following screen.

Displays the Operation Lock Setup screen (see step 4)

Displays the Change Administrator PIN screen

Changing the Administrator PIN

3. Using the **rotary knob** and **ENTER**, select **Change Administrator PIN** to display the following screen.

Enter the old PIN (the default number is 0000).

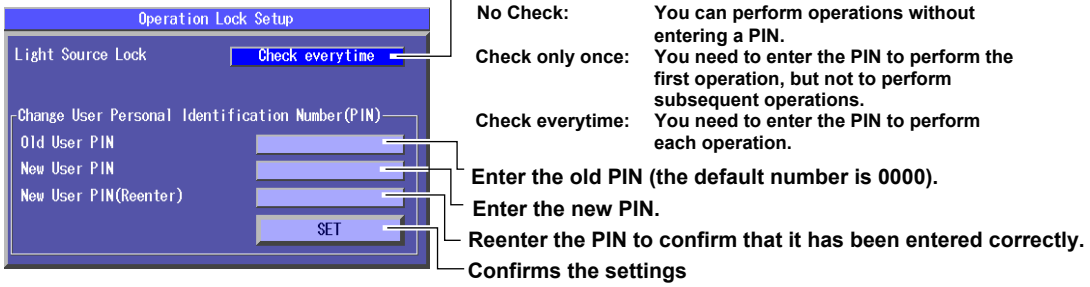
Enter the new PIN.

Reenter the PIN to confirm that it has been entered correctly.

Confirms the settings

Changing the User PIN and Setting Operation Restrictions

4. After you perform step 2, use the **rotary knob** and **ENTER** to select **Administrator PIN**. A screen for entering the PIN appears.
5. Using the **rotary knob** and **ENTER**, enter the administrator PIN that you set, and then press **SET** to display the following screen.



6. Press **ESC** to return to the screen that appeared in step 2. Press **ESC** again to return to the top screen.

Initializing the PIN

When you initialize the settings, the administrator and user PINs are also initialized. For details, see IM AQ1100-01EN, which is contained in the included CD.

Explanation

You can restrict the following operations by requiring a PIN (password) to be entered before they can be performed.

Operations That Can Be Restricted

- The generation of light by this instrument
- When the power meter or light source (OPM/LS) feature is enabled and the LS or VLS key is pressed
- When the LS ON or VLS ON soft key is pressed
- During auto loss testing, when the Execute soft key for optical power adjustment is pressed (light source, loop-back test)
- During multicore loss testing, when the Execute soft key for optical power adjustment is pressed (light source, loop-back test)
- While this instrument is being used as a light source for auto loss testing, when the Loss Test START soft key for executing loop-back testing is pressed
- When the Loss Test START soft key for executing multicore loss testing is pressed

PINs

The two types of PINs are described below.

- User PIN
  This PIN is required to perform the operations listed above.
  The default number is 0000.
- Administrator PIN
  This PIN is necessary for setting the user PIN and applying restrictions to the operations listed above.
  The default number is 0000.

12.1 If a Problem Occurs

Dealing with Unusual Circumstances

- If a message appears on the screen, see the following pages for reference.
- If servicing is necessary or this instrument does not operate properly even after you have attempted to deal with the problem according to the instructions in this section, contact your nearest YOKOGAWA dealer.

Symptom	Solution	Reference
Even when the power is on, nothing appears on the screen.	If you are using an AC adapter, make sure that the plug is connected firmly to the outlet, the power cord is connected firmly to the AC adapter, and the AC adapter's DC plug is connected firmly to this instrument.	—[1]
	If you are using a battery pack, make sure that it is attached firmly.	—[1]
	Charge the battery pack, and make sure that the ON lamp is illuminated.	12.7
	The LCD turns black at high temperatures. At low temperatures, its display speed becomes slower. Make sure that the temperature of the area where you are using this instrument is within the operating temperature range.	—[1]
The display disappears after time passes.	This instrument turns off automatically when its battery is low. Check the remaining battery power.	12.7
	If you have specified a time for the Power Save setting, this instrument will turn off automatically if no operations have been performed for the specified time. Check the settings.	11.2
The screen is dark.	The screen is dark when the LCD Brightness setting is set to "Power save." Check the settings.	11.2
	The LCD may be worn out. Servicing is required.	12.11
	When the temperature of this instrument or its battery pack is high, this instrument lowers the LCD brightness automatically to prevent damage. Make sure that the temperature of the area where you are using this instrument is within the operating temperature range.	—[1]
The power turns off automatically while this instrument is being used.	This instrument turns off automatically when it detects an error. A warning message will appear when this happens. Read the message. Fix the problem indicated in the message, and then turn on this instrument.	12.2[2]
The battery pack cannot be charged.	The battery pack temperature may be too low or too high. Make sure that the temperature of the area where you are using this instrument is within the operating temperature range. Remove the battery pack from this instrument and let it sit for awhile in a room temperature environment.	—[1]
	The battery pack may be reaching the end of its life expectancy. Replace it with a new one.	12.11
The power turns off automatically while this instrument is starting.	You may have accidentally pressed the power switch twice.	—

1 See the operation guide, IM This instrument-02EN.

2 When it is likely that the usage limitations of this instrument will be exceeded, this instrument will display a warning message and turn off automatically to prevent damage. For the conditions under which messages appear, see section 12.2.

12.2 Error Messages

Error Messages

Messages may appear on the screen while you are using this instrument. This section explains the meanings of the error messages and how to respond to them. You can display the error messages in English or Japanese (see section 10.1). If servicing is necessary to solve the problem indicated by a message, contact your nearest YOKOGAWA dealer.

Other communication-related error messages may also appear. These error messages are described in the *Communication Interface User's Manual*, IM This instrument-17EN.

Error in Execution

Code	Message
20	Network Option is not installed.
24	One or more conditions in this file are not supported by this product.
29	In remote control mode, all keys are locked except F1 key. Please hit F1 key to exit the remote control mode.
33	File operation is cancelled.
64	Failed to adjust LS power. Please check whether the patch fiber cable is properly connected between LS port and OPM port.
65	Project Information doesn't match between Master and Slave.
66	The project sent from master includes an unsuitable wavelength.
503	The measurement cannot be started during the file operation. Please either interrupt the file operation or wait until the end of the file operation.
505	Hardware failed, and needs to be repaired. Please contact Yokogawa's representatives.
506	Hardware failed, and needs to be repaired. Please contact Yokogawa's representatives.
507	Hardware failed, and needs to be repaired. Please contact Yokogawa's representatives.
508	Hardware failed, and needs to be repaired. Please contact Yokogawa's representatives.
509	Hardware failed, and needs to be repaired. Please contact Yokogawa's representatives.
512	ZERO SET ERROR
513	ZERO SET ERROR
514	Exceeding limit. It may cause damage of the instrument. Please disconnect the plug.
515	ZERO SET ERROR
601	Cannot save onto the media. This media is for read-only.
602, 603	Can not recognize file system. - Internal memory:Contact Yokogawa's representatives. - USB memory:Try the other media or format again with FAT.
604	Storage media has been disconnected while the media is being accessed.
605	Same file name or folder name exists.
606, 607	Can not recognize file system. - Internal memory:Contact Yokogawa's representatives. - USB memory:Try the other media or format again with FAT.
608	Invalid file name or folder name
609	Invalid file format
610, 611	Can not recognize file system. - Internal memory:Contact Yokogawa's representatives. - USB memory:Try the other media or format again with FAT.
612	Invalid path name
613	Can not recognize file system. - Internal memory:Contact Yokogawa's representatives. - USB memory:Try the other media or format again with FAT.
614	Unknown file or folder
615	Can not recognize file system. - Internal memory:Contact Yokogawa's representatives. - USB memory:Try the other media or format again with FAT.
616	Cannot save onto the media. This media is for read-only.
617 to 619	Can not recognize file system. - Internal memory:Contact Yokogawa's representatives. - USB memory:Try the other media or format again with FAT.
620	Free space is not enough
621	Can not recognize file system. - Internal memory:Contact Yokogawa's representatives. - USB memory:Try the other media or format again with FAT.
622	Unknown folder
623	Folder is not empty.
624 to 628	Can not recognize file system. - Internal memory:Contact Yokogawa's representatives. - USB memory:Try the other media or format again with FAT.

Code	Message
629	Writing to USB memory is not allowed.
630 to 633	Can not recognize file system. - Internal memory:Contact Yokogawa's representatives. - USB memory:Try the other media or format again with FAT.
634	Folder cannot be deleted. Please confirm the following. - Media is correctly installed. - Media is formatted. - Media is not read-only.
635	Folder cannot be deleted. The path name or the file name is too long.
636	Folder cannot be deleted. The hierarchy below the specified folder is too deep.
637	Folder cannot be deleted. The path name is invalid.
638	Folder cannot be deleted. It failed in the deletion of the file. Please confirm the following. - Media is correctly installed. - Media is formatted. - Media is not read-only.
639	Folder cannot be copied. Please confirm the following. - Media is correctly installed. - Media is formatted. - Media is not read-only.
640	Folder cannot be copied. The path name or the file name is too long.
641	Folder cannot be copied. The hierarchy below the specified folder is too deep.
642	Failed to copy the folder. The path name is invalid.
643	Folder cannot be copied. It failed in the creation of the destination folder. Please confirm the following. - Media is correctly installed. - Media is formatted. - Media is not read-only.
644	Folder cannot be copied. It failed in the creation of the destination file. Please confirm the following. - Media is correctly installed. - Media is formatted. - Media is not read-only.
645	The path name is too long.
646	USB memory can not be recognized
647	Can not make file or folder in this folder.
690	Cannot save the measurement data. Please confirm the following. - Media is correctly installed. - Media is formatted. - Media is not read-only.
691	There is **** files in the destination folder. Please use other folder.
692	Media is full. Please install new media.
693	Cannot make a folder. Please change the folder name.
694	Cannot open the file. Please confirm the following. - Media is correctly inserted.- Media is not changed.
695	One or more conditions in this file cannot be restored. The instrument automatically determines those conditions.
696	Folder cannot be deleted. Please confirm the following. -There is no file or folder in this folder.
697	Folder can't be copied. The destination folder is a subfolder of the source folder.
698	Folder can not be copied. Please confirm the following. -There is no file or folder in this folder. - Media is correctly inserted. - Media is formatted. - Media is not read-only.
700	Failed to open the file.
701	Failed to close the file.
702	Failed to read the file.
703	Irregular file format.
704	Failed to write the file.
707	One or more measurement conditions are not specified. Please confirm the measurement conditions.
708	Cannot be saved. This data is not taken with this instrument.
710	File cannot be retrieved. Invalid wavelength.
717	Duplicate file name.
718	File is damaged. Check the file.
719	File name too long. Maximum length is 36 letters.
720	File is now being accessed. Execute after access is released.

12.2 Error Messages

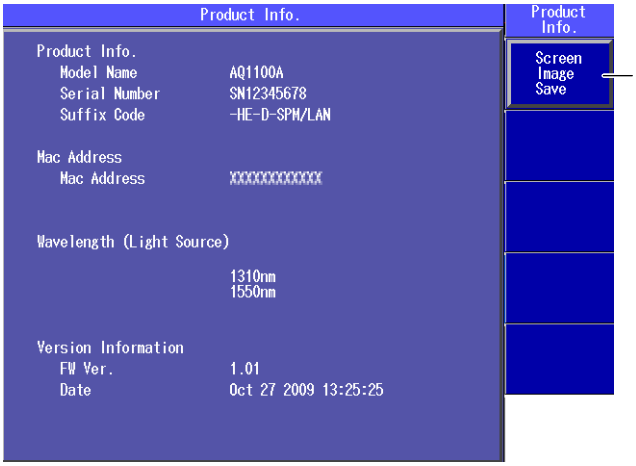
Code	Message
721	Cannot load this file. Invalid file format or this firmware version is old.
752	Print Error. Printer cannot be found.
754	USB printer error Perform the power cycle.
755	USB printer is offline.
756	No paper (USB printer)
757	USB printer cannot be found. Perform the power cycle.
758	The printer is out of order, and needs to be repaired. Please contact Yokogawa's representatives.
760	Cannot execute it while printing.
761	This operation is not excuted while light is emitting. Stop emitting the light then excute the operation.
800	This function is not supported.
814	Failed network initialize. Please confirm network connection and setting.
817	Test Error occurred.
818	Test succeeded.
854	In USB Storage mode, all keys are locked. Please disconnect the USB Cable.
900	Backup data is damaged. this instrument starts up with the factory setting.
902	Battery is low Please power it off, and charge the battery or replace the battery. Or, please use the AC power supply.
903	Backup battery failed, and needs to be repaired. Please contact Yokogawa's representatives.
904	Hardware failed, and needs to be repaired. Please contact Yokogawa's representatives.
906	Battery is low. The instrument will be powered off in 10 sec.
909	The temperature inside the instrument is too high. The instrument may be damaged if it is kept using in this condition. The instrument will be powered off in 10 sec. Please do not power it on till the battery is cooled down.
910	The temperature inside the instrument is too low. The instrument may be damaged if it is kept using in this condition. The instrument will be powered off in 10 sec. Please do not power it on till the battery is cooled down.
913	Battery is low. The instrument may be damaged if it is kept using in this condition. The instrument will be powered off in 10 sec. Please use AC adapter.
914	Errors in the battery or in the charging circuit. The instrument may be damaged if it is kept using in this condition. The instrument will be powered off in 10 sec. Please remove the battery and use AC adapter.
917	The temperature inside the instrument is increasing. Please stop measuring, and wait for a while.
918	The temperature inside the instrument is too high. The measurement was aborted. Please power it off.
921	There is incoming light. Or, optical module may be damaged.
922	Incorrect date and time setting. Set the correct date and time.
925	Please use AC adapter.

12.3 Viewing the Product Information

Procedure

Product Information Screen

Press **SETUP** and then the **Product Info.** soft key to display the following screen.



Explanation

The following information about this instrument is displayed.
Model Name, Serial Number, Suffix Code, Mac Address, Version Information, etc.

Executing Screen Image Save

When you execute Screen Image Save, an image of the screen is saved to SystemInfo.BMP in the root directory of the internal memory.

12.4 Performing a Self Test

Procedure

System Setup Menu

Press **SETUP** to display the following menu.

Executes a self test

Explanation

This instrument checks the operation of the:

- Internal memory.
- RTC (real time clock) battery.

If the results of the self test are normal, “Test succeeded” appears. If an error occurs, “Test Error occurred” appears.

When an Error Occurs during a Self Test

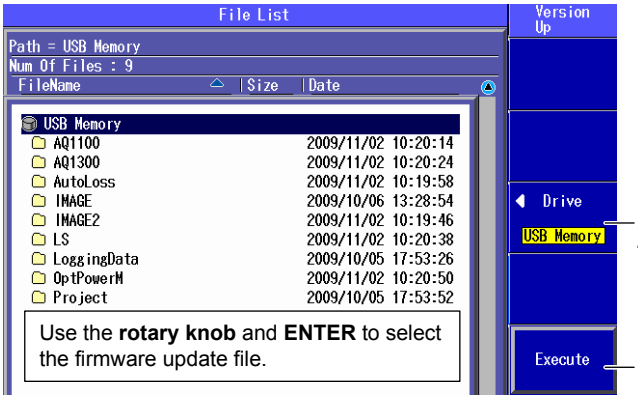
If an error occurs, contact your nearest YOKOGAWA dealer.

12.5 Updating the Firmware

Procedure

Version Up Screen

Press **SETUP** and then the **Version Up** soft key to display the following screen.



Select the drive that contains the firmware update file (internal memory, USB memory).

Executes the firmware update

Explanation

To update the firmware, select a firmware update file (.YMC extension).

- You can change file names, except for the extension, as necessary. For instructions on how to change the file name, see section 9.4.
- When the firmware update ends successfully, this instrument restarts automatically.
- When the firmware update fails, “Cannot load this file. Invalid file ·····” appears. Make sure that there are no problems with the firmware update file.
- For instructions on how to view the version of your AQ1100A, AQ1100B, or AQ1100D, see section 12.3.

12.6 Performing a Mechanical Inspection and Checking Operations

Mechanical Inspection

WARNING

Make sure that the power is off while you are inspecting this instrument.

CAUTION

- If foreign objects are stuck in the connectors, malfunction and damage may occur.
- This instrument may not operate properly if its connectors are loose.

Make sure that:

- There is no external damage or deformation on the outside of this instrument.
- There are no switches, connectors, or other components that are loose.
- All switches and moving parts can be operated smoothly.

If there are any problems, contact your nearest YOKOGAWA dealer.

Checking Operations

Turn on this instrument, perform the typical operations, and make sure that this instrument performs normally.

12.7 Replacing the Battery Pack

Handling Precautions

Failure to comply with the precautions below could lead to damage to the instrument, injury, or death.

WARNING

Prohibitions against Actions That Cause Leaking, Heating, Ignition, and Explosion

- Do not charge the battery pack or leave it in a location that is exposed to direct sunlight, such as on a car dashboard or by a window, or in a location that is subject to high temperatures, such as in a car parked under the scorching sun.
- Do not throw the battery pack into fire or heat it.
- Do not expose the battery pack to strong mechanical shock.
- Do not allow the battery pack to be covered in water or other liquids.
- Do not disassemble or modify the battery pack.
- Do not short the positive and negative battery pack terminals. Also, do not move the battery or store it with metal items such as necklaces, hair pins, coins, or keys.
- Do not place combustible material on top of the battery pack or cover it with anything other than its case while it is providing electricity or being charged.
- Leakage from the battery pack can cause blindness if it comes into contact with your eyes. If you get leakage from the battery in your eyes, do not rub them; clean them thoroughly with clean water and then see a doctor immediately.
- Do not use or charge battery packs with this instrument that are not made by YOKOGAWA.
- When you attach the battery pack to this instrument, attach it properly.

Prohibitions against Careless Use

- Keep the battery pack away from infants so that they do not lick it, put it in their mouths, bite it, or do other dangerous things with it.
- Leakage from the battery pack may cause damage to clothing and skin.

Prohibition against Use under Abnormal Conditions

If you notice that the battery pack is leaking, smells strange, is becoming hot, has changed color or shape, or exhibits some other abnormality, stop charging or using it, and turn off the power. If the battery pack is leaking, move it away from sources of fire.

Changing the Battery Pack

- To prevent electric shock, turn this instrument off, and disconnect the AC adapter power supply from it.
- When you remove the battery pack cover, do not do so with the back of this instrument facing down. Also, after you attach the battery pack, be sure to close the battery cover completely. Otherwise, the battery pack may fall out and cause injury or be damaged.

CAUTION

Replacement Procedure

- Do not touch the battery pack electrodes. Doing so may damage the battery pack.
- When you put the battery pack in the battery case, make sure that the battery pack is facing the right direction.
- When you place this instrument so that its LCD is facing down, be careful not to damage the LCD.

Storage Precautions

- If you will not be using the battery pack for an extended period of time, remove it from this instrument and store it in a dry place.
- Avoid storing the battery pack for an extended period of time when it is fully charged (after it has just been charged) or when it has no power left (when this instrument will not turn on). Storing the battery pack under these conditions will degrade its performance and reduce its longevity. It is better to store the battery pack when it is 40 to 50% charged. This is equivalent to the state the battery is in after you turn off this instrument and charge an empty battery for an hour at room temperature.

Disposal

- When disposing of the batteries, follow the proper disposal regulations as specified by the relevant ordinance in your area.
- When disposing of the batteries in the EU, follow the Waste Electrical and Electronic Equipment (WEEE) Directive.

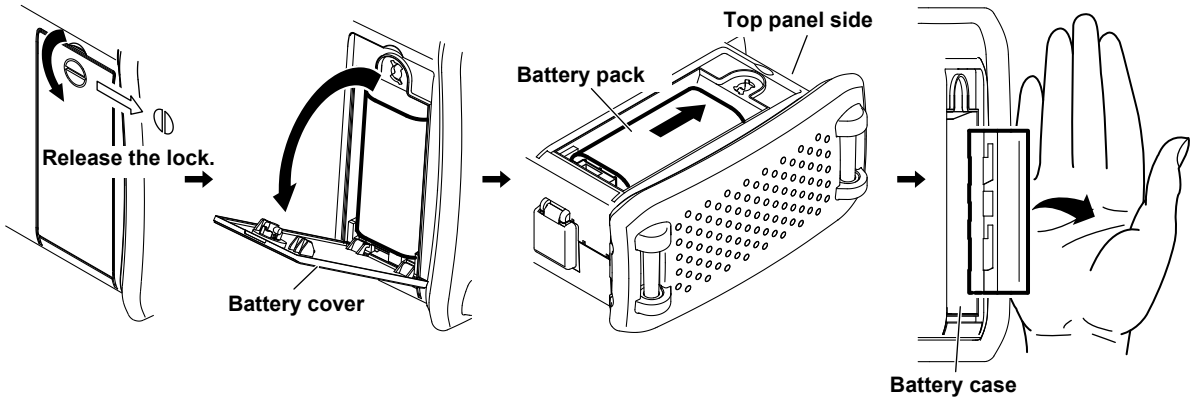
Contact your nearest YOKOGAWA dealer under the following circumstances.

- When the battery pack is broken or behaves strangely.
- When the battery run time becomes short and the battery pack needs to be replaced (the battery pack is a consumable item).

Removing the Battery Pack

Before you remove the battery, turn off the power and unplug the AC adapter from this instrument.

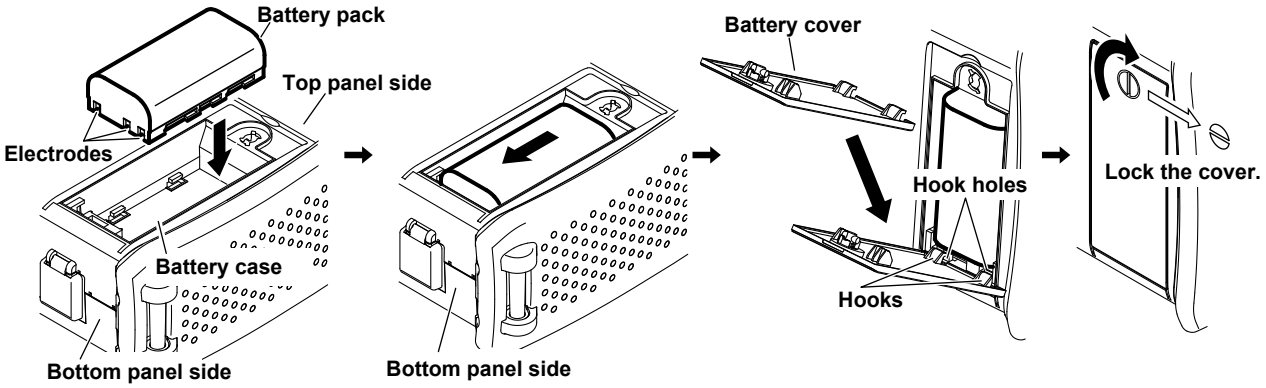
1. Release the battery cover lock.
   Insert a coin or screwdriver with a thickness that will not damage the lock slot into the lock slot, and release the lock.
2. Remove the battery cover.
3. Slide the battery pack towards the top panel.
4. Turn this instrument so that it is facing you, and remove the battery pack from the case.
   Put your hand next to the battery case so that the battery pack does not fall out.



Attaching a Battery Pack

Before you attach the battery, turn off the power, and unplug the AC adapter from this instrument.

1. Remove the battery cover by following the first two steps in the previous section.
2. Insert the battery pack into the battery case, towards the top panel.
   - Insert the battery pack so that its electrodes are near the bottom panel facing down.
   - Make sure that the entire battery pack is inserted into the case securely.
3. Pushing the battery pack towards the back of the case, pull it towards the bottom panel.
4. Close the battery cover.
   Attach the battery cover from the bottom panel side, making sure that the hooks on the cover enter into their holes on the case.
5. Lock the battery cover.
   Insert a coin or screwdriver with a thickness that will not damage the lock slot into the lock slot, and lock the battery cover.

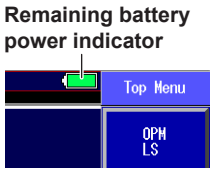


Charging a Battery Pack

When the battery is low, a warning message will appear. When this happens, charge the battery.

1. Connect the power cord to the AC adapter.
2. Connect the AC adapter plug to this instrument.
3. Connect the power plug to an outlet.

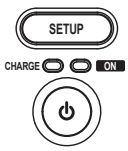
The remaining battery pack power appears at the top of the screen.



Green: **Sufficiently full**

Yellow: **Half full**

Red: **Almost empty**
When the ON LED lights in red, a warning message appears on the screen.



CHARGE LED
Red: **Charging**
Green: **Finished charging**

ON LED
Green: **Running**
Red: **Battery low**

Note

- This instrument will turn off automatically a few minutes after the warning message about the remaining battery power appears.
- If the battery pack is hot, wait for it to return to room temperature before you charge it.
- The battery run time depends on how you use this instrument: whether or not you make the screen bright, use the printer, etc.
- If battery charging does not start, the CHARGE lamp turns off. Check that the battery pack is properly installed. If the battery pack is properly installed but fails to be charged, contact your nearest Yokogawa dealer.

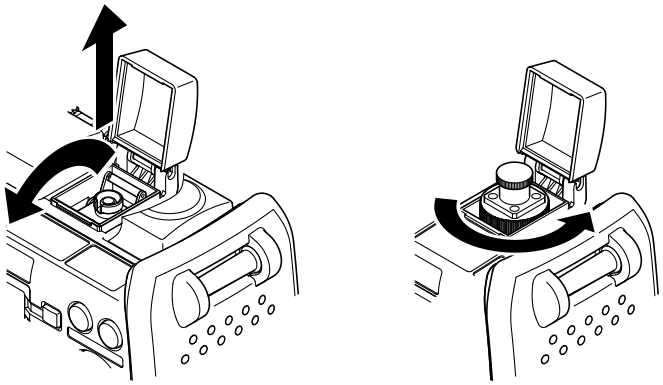
12.8 Replacing an Optical Adapter

WARNING

When you replace an optical adapter, turn this instrument power off so that you do not accidentally emit light from the light source port. If you replace an optical adapter (universal or connector adapter) while the power is on, you may accidentally get light in your eyes, damage them, and impair your vision.

Removal

1. Make sure that this instrument power is off.
2. Open the optical port cover.
3. Pull the optical adapter lock lever down and inwards to release it. If the adapter is screwed in, turn the knob to the left to loosen it.
4. Pull out the optical adapter.



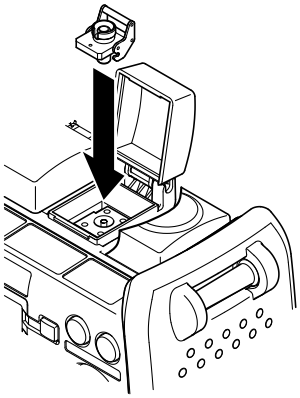
Note

If the optical port cover comes off, bend the cover axle with your finger, and reattach it.

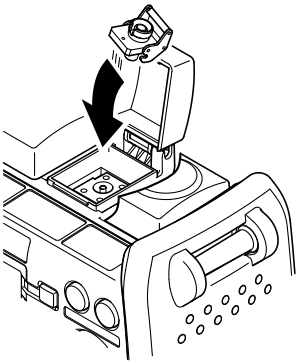
Attachment

1. Make sure that this instrument power is off.
2. Open the optical port cover.
3. Insert the optical adapter directly into the rear shell.
4. Pull the optical adapter lock lever down and outwards to lock it. If the adapter is screwed in, turn the knob to the right to tighten it.

Good example



Bad example



Note

Insert the optical adapter carefully and straight. If the adapter shakes to the left and right or is forced in or out, it may be damaged, and the optical port ferrule may also be damaged.

12.9 Routine Maintenance

Cleaning the Outside of This Instrument

To clean the LCD and the outside of this instrument, turn off the power; remove the power cord from the outlet; use a damp, well-wrung cloth to wipe the LCD and the outside of this instrument; and then wipe them off with a dry cloth.

Note

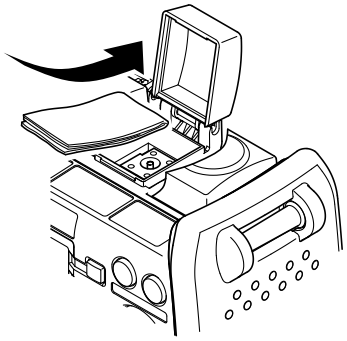
- Turn the power off when you clean this instrument.
- Do not use chemicals such as thinner, benzene, or alcohol. Doing so may cause deformation and discoloring.
- Use a well-wrung cloth. Otherwise, water may get inside this instrument.

Cleaning an Optical Adapter

WARNING

When you clean the optical components of this instrument, turn this instrument power off so that you do not accidentally emit light from the light source port. If you clean the optical components while the power is on, you may accidentally get light in your eyes, damage them, and impair your vision.

1. Make sure that this instrument power is off.
2. Open the optical port cover.
3. If the optical adapter is connected, follow the steps in section 12.8 to remove it.
4. Use a lens cleaner to clean the optical components.



When the End of the Optical Fiber Is Slanted
If the end of the optical fiber is slanted, as with /ASC option models, while being careful not to tear the cleaner on the top edge of the fiber or get lint on the fiber, clean from the bottom of the fiber end to the top.

Note

- Clean the optical components using a smooth lens cleaner that will not leave lint or dust on the lenses.
- You can clean the light source ports without removing the optical adapters by using a stick-shaped cleaning tool, but we recommend that you remove the optical adapters when you clean.

12.10 Storage Precautions

Before You Store This Instrument

Clean this instrument before you store it. For information about cleaning, see section 12.9.

Storage Conditions

Store this instrument in a place that meets the following conditions.

- Within the storage temperature and humidity ranges
- Subject to very little change in temperature and humidity within a single day
- Not subject to direct sunlight
- Not dusty
- Free from activated gas

Note

- To prevent against over discharge, if you will not be using this instrument for a week or more, charge the battery pack, remove it from this instrument, and place it in a location where it will not be exposed to direct sunlight and where the temperature is 10 to 30°C.
- When you store the battery pack for six months or longer, to replace the power that has been lost through self discharge, recharge the battery using this instrument once every six months. For instructions on how to remove the battery pack, see section 12.7.
- Avoid storing the battery pack for an extended period of time when it is fully charged (after it has just been charged) or when it has no power left (when the instrument will not turn on). Storing the battery pack under these conditions will degrade its performance and reduce its longevity. It is best to store the battery pack when it is 40 to 50% charged. This is equivalent to the state the battery is in after you turn off this instrument and charge an empty battery for an hour at room temperature.

Reuse

When you use this instrument after storing it for a long period of time, make sure that it is functioning properly.

Packaging

To package this instrument, follow the steps listed below.

1. Wrap this instrument in thick plastic so that it does not get dust inside of it.
2. Use cushioning to protect the LCD.
3. Prepare a box that is 10 to 15 cm larger than this instrument on all sides.
4. Insert cushioning in the bottom of the box.
5. Insert cushioning between this instrument and the box.
6. Close the box securely using adhesive tape or some other method.

Shipping

- When you ship this instrument, avoid exposing it to vibrations.
- Ship this instrument in an environment that meets the storage conditions.
- When you ship multiple battery packs by plane, follow all relevant regulations, such as the airline regulations and UN transportation regulations. For details about the regulations, contact your airline in advance.

12.11 Recommended Replacement Parts

YOKOGAWA guarantees this instrument for the period and under the conditions of the product warranty.
Under the conditions of the one-year warranty, the following consumable parts and parts with limited service lives are excluded. For part replacement, contact your nearest YOKOGAWA dealer.

Parts with Limited Service Lives

Part Name	Service Life	Notes
Battery pack	Approx. 300 charges	The service life varies depending on the environment in which the battery pack is used.

Consumables

We recommend that you replace the following parts at the intervals listed below.

Part Name	Recommended Replacement Interval*	Notes
Backup battery (lithium battery)	5 years	Send to factory to replace
LCD backlight	Approx. 50,000 hours	Send to factory to replace
Measurement connector ferrule	One year	Send to factory to replace
Universal and connector adapters	One year	Purchase and replace
DC power supply connector	5000 times	Send to factory to replace
USB connector	1500 times	Send to factory to replace
RJ-45 connector	200 times	Send to factory to replace

* The recommended replacement interval can vary greatly depending on the operating environment and the frequency of use. The above intervals are estimates.

12.12 Calibration

Periodic calibration is an effective means of keeping the instrument performing correctly for a long time and of detecting malfunctions at an early stage. We recommend that you have this instrument calibrated once a year.

Appendix 1 Data File Formats

CSV File Formats

The following examples show the saved data being displayed in a spreadsheet program.

Logged Results

	A	B	C	D	E
1	Company	Yokogawa Electric Corporation			
2	Model	AQ1100A			
3	Function	Logging			
4	Start Date	Tue Oct 27 15:23:14 2009			
5					
6	Wavelength	1310			
7	Modulation	CW			
8	Offset	0			
9	Unit	dBm			
10	Interval(ms)	1000			
11	Measurement Number	10			
12	Logging Count	11			
13					
14					
15	-9752				
16	-10112				
17	-9718				
18	-9868				
19	-9841				
20	-9727				
21	-10338				
22	-9913				
23	-9660				
24	-9875				
25	-9705				

Measured Data from the Optical Power Meter

	A	B	C	D	E	F	G	H	I	J	K
1	Company	Yokogawa Electric Corporation									
2	Model	AQ1100A									
3	Function	PowerMeter									
4	Start No	1									
5	Tape No Type	off									
6	Number Of Fibers	100									
7											
8	Data	Ver1.00									
9	Core	No	nm	Data	Unit	Modulation	Reference(dBm)	Offset(dB)	Date	SKIP	
10	1	1	1310	-9.629	dBm	CW	-3	0	2009/10/27 15:42		
11	1	2	1310	-9.474	dBm	CW	-3	0	2009/10/27 15:42		
12	1	3									
13	2	1								SKIP	
14	2	2								SKIP	
15	2	3								SKIP	
16	3	1	1550	-10.06	dBm	CW	-3	0	2009/10/27 15:42		
17	3	2	1550	-9.695	dBm	CW	-3	0	2009/10/27 15:42		
18	3	3									
19	4	1	1550	-10.07	dBm	CW	-3	0	2009/10/27 15:43		
20	4	2	1310	-9.829	dBm	CW	-3	0	2009/10/27 15:43		
21	4	3	1310	-9.601	dBm	CW	-3	0	2009/10/27 15:43		
22	5	1									
23	5	2									

Loss Test Results

	A	B	C	D	E	F	G	H	I	J	K
1	Company	Yokogawa Electric Corporation									
2	Model	AQ1100A									
3	Function	PowerMeter									
4	Start No	1									
5	Tape No Type	a-d									
6	Number Of Fibers	25									
7											
8	Data	Ver1.00									
9	Core	No	nm	Data	Unit	Modulation	Reference(dBm)	Offset(dB)	Date	SKIP	
10	1a	1	1310	-9.608	dBm	CW	-3	0	2009/10/27 16:19		
11	1a	2	1550	-9.831	dBm	CW	-3	0	2009/10/27 16:19		
12	1a	3									
13	1b	1								SKIP	
14	1b	2								SKIP	
15	1b	3								SKIP	
16	1c	1	1310	-10.14	dBm	CW	-3	0	2009/10/27 16:21		
17	1c	2	1550	-9.924	dBm	CW	-3	0	2009/10/27 16:21		
18	1c	3									
19	1d	1	1310	-9.738	dBm	CW	-3	0	2009/10/27 16:22		
20	1d	2	1550	-9.75	dBm	CW	-3	0	2009/10/27 16:22		
21	1d	3									
22	2a	1									
23	2a	2									

Project Information

	A	B	C	D	E	F	G	H	I	J	K
1	Company	Yokogawa Electric Corporation									
2	Model	AQ1100A									
3	Function	Multi Fiber LossTest									
4	Project Name	P100									
5	Wavelength1	850									
6	Wavelength2	1300									
7	Wavelength3	0									
8	Offset	0									
9	Start No	10									
10	Tape No Type	a-e									
11	Number Of Fibers	20									
12											
13	Data	Ver1.00									
14	Core	No	nm	Data	Unit	Modulation	Reference(dBm)	Offset(dB)	Date	SKIP	
15	10a	1									
16	10a	2									
17	10a	3									
18	10b	1								SKIP	
19	10b	2								SKIP	
20	10b	3								SKIP	
21	10c	1									
22	10c	2									
23	10c	3									
24	10d	1								SKIP	
25	10d	2								SKIP	
26	10d	3								SKIP	
27	10e	1									
28	10e	2									
29	10e	3									
30	11a	1									
31	11a	2									

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