User's Manual

AQ6373 Optical Spectrum Analyzer Getting Started Guide

YOKOGAWA
Yokogawa Meters & Instruments Corporation

IM AQ6373-02EN
3rd Edition

Product Registration

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Foreword

Thank you for purchasing the AQ6373 Optical Spectrum Analyzer. This instrument enables high speed measurement of the optical properties of LD and LED light sources, and other devices. To improve ease of use, it includes mouse-based user operation and a brand-new zoom function.
This getting started guide describes the instrument's functions, operating procedures, and handling precautions, and provides other important information for use of the instrument. For correct operation, please read this manual thoroughly before use. After reading this manual, keep it in a convenient location for quick reference in the event a question arises during operation. There are three manuals for the AQ6373 including this one. Read them along with this manual.

Manual Title	Manual No.	Description
AQ6373 Optical Spectrum Analyzer User's Manual	IM AQ6373-01EN	The manual is located on the CD included in your package (pdf format). Explains all functions and operating procedures of the AQ6373 except remote control and program functions.
AQ6370C/AQ6373/ AQ6375 Optical Spectrum Analyzer Remote Control User's Manual	IM AQ6370C-17EN	The manual is located on the CD included in your package (pdf format). Explains functions for controlling the instrument with communication commands and program functions.
AQ6373 Optical Spectrum Analyzer Getting Started Guide	IM AQ6373-02EN	This manual. Explains instrument handling precautions and basic operating procedures.

Notes

- The contents of this manual are subject to change without prior notice as a result of improvements in the instrument's performance and functions. Display contents illustrated in this manual may differ slightly from what actually appears 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.
- Copying or reproducing all or any part of the contents of this manual without the permission of Yokogawa Meters & Instruments Corporation is strictly prohibited.
- A warranty sheet is included. It cannot be reissued. After reading the sheet, keep it in a safe location.

Trademarks

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Revisions

- 1st Edition: January 2011
- 2nd Edition: November 2012
- 3rd Edition: August 2013

3rd Edition : August 2013 (YMI)

Checking the Contents of the Package

After opening the package, check the following items before beginning use. If any of the contents are incorrect, missing, or appear to be abnormal, please contact your Yokogawa dealer or representative.

AQ6373 Main Unit

Check that the model and suffix code on the name plate on the rear of the instrument match those of your order. When contacting the dealer from which you purchased the instrument, please give them the instrument number.

MODEL	Suffix Code	Description
AQ6373		Optical Spectrum Analyzer AQ6373
Specification	-10	Standard model
Power cord[1]	-D	UL/CSA standard power cord (part no.: A1006WD), maximum rated voltage: 125 V
	-F	VDE standard power cord (part no.: A1009WD), maximum rated voltage: 250 V
	-R	AS standard power cord (part no.: A1024WD), maximum rated voltage: 250 V
	-Q	BS standard power cord (part no.: A1054WD), maximum rated voltage: 250 V
	-H	GB standard power cord (complies with the CCC) (part no.: A1064WD), maximum rated voltage: 250 V
Options	/B5	Built-in thermal printer

1 Make sure that the attached power cord meets the designated standards of the country and area that you are using it in.

- **No. (Instrument Number)**
  Please contact your nearest Yokogawa representative.

Accessories

Part Name	Quantity
Power cord[1]	1
User's manual (CD)	1
Getting Start Guide	1
Rubber feet	2 pieces (1 A9088ZM sheet)
Printer roll paper (with /B5 option)	1

1 Make sure that the attached power cord meets the designated standards of the country and area that you are using it in.

Accessories (Sold Separately)

Part Name	Model/Part Number	Specifications
Printer roll paper	B9988AE	Lot size is 10 rolls, 10 meters each

Safety Precautions

This instrument is an IEC safety class I (provided with terminal for protective earth grounding). The general safety precautions described herein must be observed during all phases of operation. If the instrument is used in a manner not specified in this manual, the protection provided by the instrument may be impaired. Yokogawa Electric Corporation assumes no liability for the customer's failure to comply with these requirements.

The following symbols are used on this instrument.

Danger, Refer to the user's manual.

This symbol appears on dangerous locations on the instrument which require special instructions for proper handling or use. The same symbol appears in the corresponding place in the manual to identify those instructions.

Alternating current

ON(power)

OFF(power)

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

WARNING

- **Use the Instrument Only for Its Intended Purpose**
  The optical measuring instrument is designed to measure the optical characteristics of light sources and evaluate their performance. Do not use this instrument for anything other than as an optical measuring instrument.
- **Check the Physical Appearance**
  Do not use the instrument if there is a problem with its physical appearance.
- **Use the Correct Power Supply**
  Before connecting the power cord, ensure that the source voltage matches the rated supply voltage of the instrument and that it is within the maximum rated voltage of the provided power cord.
- **Use the Correct Power Cord and Plug**
  To prevent the possibility of electric shock or fire, be sure to use the power cord supplied by YOKOGAWA. The main power plug must be plugged into an outlet with a protective earth terminal. Do not disable this protection by using an extension cord without protective earth grounding.
  Also, do not use power cord that came with the instrument on any other device.
- **Connect the Protective Grounding Terminal**
  Make sure to connect the protective earth to prevent electric shock before turning ON the power. The power cord that comes with the instrument is a three-prong type power cord. Connect the power cord to a properly grounded three-prong outlet.
- **Do not Impair the Protective Grounding**
  Never cut off the internal or external protective earth wire or disconnect the wiring of the protective earth terminal. Doing so poses a potential shock hazerd.
- **Do not Operate with Defective Protective Grounding or Fuse**
  Do not operate the instrument if the protective earth or fuse might be defective. Make sure to check them before operation.
- **Reference light source output light**
  The instrument has a built-in reference light source for alignment adjustment, and infrared light is always being output from the optical output connector. Never look into the optical output connector. Infrared light entering the eyes can cause severe injury and loss of vision.
- **Do not Operate in an Explosive Atmosphere**
  Do not operate the instrument in the presence of flammable liquids or vapors. Operation in such environments constitutes a safety hazard.
- **Do Not Remove the Covers or Disassemble or Alter the Instrument**
  Only qualified YOKOGAWA personnel may remove the covers and disassemble or alter the instrument.
  Opening the cover is dangerous, because some areas inside the instrument have high voltages.
- **Installation Location**
  - This instrument is designed to be used indoors. Do not install or use it outdoors.
  - Install the instrument so that you can immediately remove the power cord if an abnormal or dangerous condition occurs.

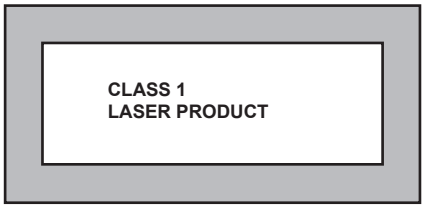
- **Laser Class 1**
  This instrument complies with “Class 1 laser product” defined in “IEC60825-1. Never look at the optical output connector or the top end of the optical fiber connected to the optical output connector while the infrared light is being output. If the infrared light output is observed at a distance of 100mm or less from the infrared light emitting part by means of optical method (loupe, magnifying glass, microscope, etc.), this may cause eye injury. The infrared light cannot be seen. However, if the infrared light enters your eye(s), this may cause eye injury and the eyesight to be ruined excessively.

Safety Precautions for Laser Products

This instrument uses a laser light source. This instrument is a Class 1 laser product as defined by IEC 60825-1 Safety of Laser Products-Part 1: Equipment Classification, Requirements and User’s Guide.

Laser Class 1 Label

If the laser output is observed at a distance of 100mm or less from the laser beam emitting part by means of optical method (loupe, magnifying glass, microscope, etc.), this may cause eye unjury.



Class	Laser Type	Wavelength	Maximum Output Power	Diameter of Mode Field	Numerical Aperture
1	LED	850nm	0.1mW	50μm	0.275

CAUTION

Operating Environment Limitations

This product is a Class A (for industrial environment) product. Operation of this product in a residential area may cause radio interference in which case the user is required to correct the interference.

Waste Electrical and Electronic Equipment

Waste Electrical and Electronic Equipment (WEEE), Directive 2002/96/EC
(This directive is valid only in the EU.)
This product complies with the WEEE Directive (2002/96/EC) marking requirement. This marking indicates that you must not discard this electrical/ electronic product in domestic household waste.

Product Category
With reference to the equipment types in the WEEE directive Annex 1, this product is classified as a “Monitoring and Control instrumentation” product.

Do not dispose in domestic household waste. When disposing products in the EU, contact your local Yokogawa Europe B. V. office.

New EU Battery Directive

New EU Battery Directive, DIRECTIVE 2006/66/EC
(This directive is valid only in the EU.)
Batteries are included in this product. This marking indicates they shall be sorted out and collected as ordained in ANNEX II in DIRECTIVE 2006/66/EC.

Battery type
Lithium battery

You cannot replace batteries by yourself. When you need to replace batteries, contact your local Yokogawa Europe B.V.office.

Conventions Used in This Manual

Safety Markings

The following markings are used in this manual.

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 attentions to actions or conditions that could cause light injury to the user or 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.

Notations Used on Pages Describing Operating Procedures

On pages that describe the operating procedures, the following notations are used to distinguish the procedures from their explanations.

Procedure This subsection contains the operating procedure used to carry out the function described in the current chapter. All procedures are written with inexperienced users in mind; experienced users may not need to carry out all the steps.

Explanation This subsection describes the setup parameters and the limitations on the procedures.

Notations Used in the Procedures

Panel Keys and Soft keys

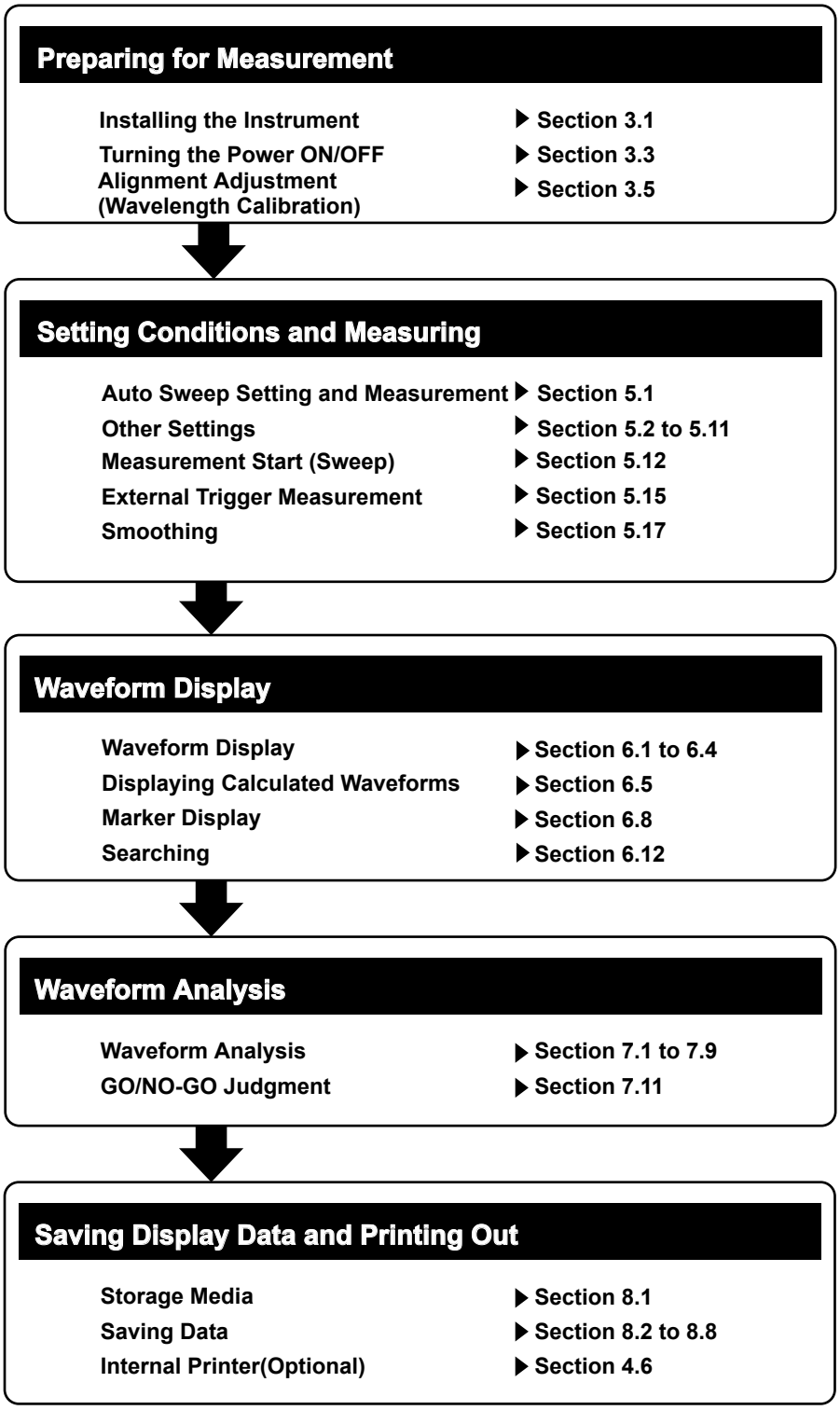
Bold characters used in the procedural explanations indicate characters that are marked on the panel keys or the characters of the soft keys displayed on the screen menu.

Unit

k: Denotes “1000.”	Example: 100kS/s
K: Denotes “1024.”	Example: 459KB (file data size)

Flow of Operation

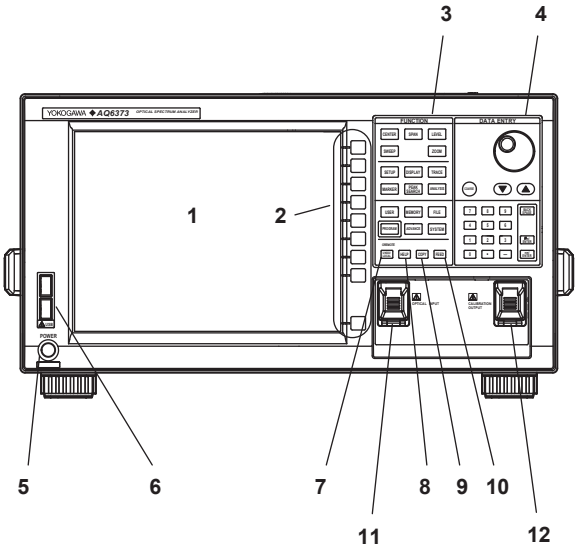
The figure below is provided to familarize the first-time user with the general flow of this instrument operation. For a description of each item, see the relevant section or chapter of IM AQ6373-01EN.



Contents

1 Front Panel

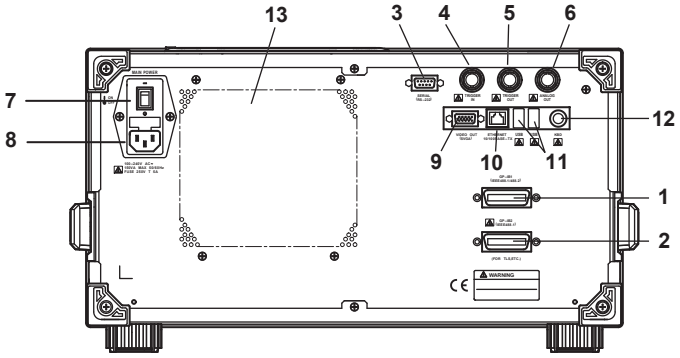
Front Panel



No.	Name	Function
1	LCD display	Displays measured waveform, measurement conditions, measurement values, etc.
2	Soft key section	Used to execute the functions assigned to the soft keys on the right side of the LCD display
3	FUNCTION section	Used to enter settings pertaining to all measurements (sweep, measurement conditions, data analysis, and various functions)
4	DATA ENTRY section	Used for measurement condition parameter input, label input, etc.
5	POWER	Used to start and shut down the instrument.
6	USB interface	Used to connect USB storage media
7	UNDO/LOCAL	See the following table (3 Panel keys and Knobs)
8	HELP	Used to check the contents of the soft key menu displayed on the screen.
9	COPY	Used to make hard copies of the screen through the internal printer (optional)
10	FEED	Used to feed recording paper
11	OPTICAL INPUT	Optical input connector
12	CALIBRATION OUTPUT	Reference light source optical output connector used for alignment adjustments

2 Rear Panel

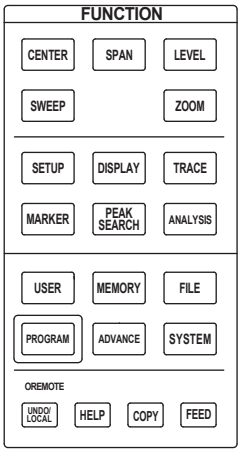
Rear Panel



No.	Name	Function
1	GP-IB1	GP-IB port for controlling this unit through an external computer
2	GP-IB2	GP-IB port that allows this unit to serve as a system controller on the GP-IB bus for controlling an external device
3	SERIAL	RS-232 interface
4	TRIGGER IN	Trigger input
5	TRIGGER OUT	Trigger output
6	ANALOG OUT	Analog output
7	MAIN POWER	Used to turn the main power ON/OFF
8	Power cord connector	Connect the power cord to this connector
9	VIDEO OUT (SVGA)	Analog RGB video signal (SVGA-compliant) interface
10	ETHERNET	Ethernet Interface (10/100BASE-TX)
11	USB interface	Used to connect USB storage media or USB mouse
12	KBD	External keyboard interface (PS/2)
13	Exhaust holes	

3 Panel Keys and Knobs

FUNCTION Section



The FUNCTION section contains 17 function keys and 4 auxiliary keys. When you press a function key, information about the function is displayed on the soft key menu located on the right side of the LCD display.

SWEEP

The SWEEP key contains functions related to sweeping. When you press the SWEEP key, the soft key menu for sweeping appears.

CENTER

The CENTER key contains functions related to setting the center wavelength and center frequency for measurements. The soft key functions change depending on whether the screen display mode is wavelength display mode or frequency display mode.

SPAN

The SPAN key contains functions pertaining to settings for the wavelength span or frequency span being measured. The soft key functions change according to whether the screen display mode is wavelength display mode or frequency display mode.

LEVEL

The LEVEL key contains functions related to level axis settings.When you press the LEVEL key, the soft key menu for setting reference level appears.

SETUP

The SETUP key contains functions related to measurement condition settings.

ZOOM

The ZOOM key contains the zoom function, which allows the user to freely enlarge or reduce a measured waveform in order to check a small area of the measured waveform, or to check the overall waveform.
This key is used to set the waveform enlarged/reduced display conditions.

DISPLAY

The DISPLAY key contains functions related to screen display.This key is used to set the screen to upper/lower 2-split display mode (split mode).

TRACE

The TRACE key contains functions related to trace mode settings.

MARKER

The MARKER key contains functions related to markers.

PEAK SEARCH

The PEAK SEARCH key contains functions for searching for peaks and bottoms in measured waveforms.

ANALYSIS

The ANALYSIS key contains functions related to measured waveform analysis.

MEMORY

The MEMORY key contains functions for writing the contents of the active trace to the unit's internal memory. When you press the MEMORY key, the traces and memory list screen (soft key menu) are displayed. A memory number may be entered in the DATA ENTRY section, or selected using the rotary knob or arrow keys.

FILE

The FILE key contains functions for saving and loading waveform data, program data, and the like to and from USB storage media (USB memory/HDD).

PROGRAM

The PROGRAM key contains the soft keys related to program functions for controlling measurements through a program.

SYSTEM

The SYSTEM key contains system-related functions such as monochromator adjusting optical alignment, wavelength adjustment, hardware setup, and setting initialization.

ADVANCE

The ADVANCE key contains functions related to template function settings.

USER

Frequently used soft keys can be registered on the soft key menu in the USER key. Registering frequently used soft keys in the USER key allows you to execute frequently used functions in a small number of steps.

COPY/FEED

The COPY key is used to output the measurement screen to the internal printer or a file. When you press the COPY key, the measured waveforms and lists displayed on the screen are output to the internal printer or a file.
The FEED key is used to feed printer paper. Paper feeding continues as long as you hold down the FEED key.

UNDO/LOCAL

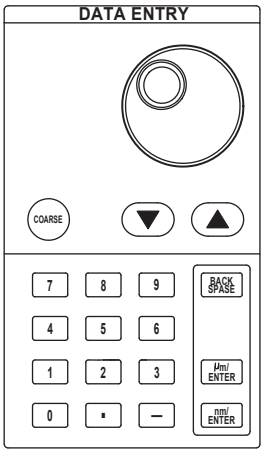
The key's function changes depending on the status of the instrument when the UNDO/LOCAL key is pressed. The following table shows the key's functions.

Status of Instrument	Function
UNDO action is allowed	If the UNDO key is pressed after changing parameter settings, changing or deleting data, etc., the previous action (change, deletion, etc.) is canceled and the state preceding that action is restored.
During user key registration	If the UNDO key is pressed during user key registration, registration mode is canceled and the soft key menu which appeared when the SYSTEM key was pressed is displayed again.
During remote control by external PC (Remote light is on)	Changes the state from the remote state back to the local state. The remote light turns off.

HELP

When you press the HELP key, a soft key menu of the currently displayed screen is displayed explanations.
Soft keys for selecting the "MORE INFO" which indicate additional information are displayed by some soft keys in HELP screen.

DATA ENTRY Section



This unit allows you to enter measurement conditions and various other parameters through the DATA ENTRY section. Three different entry methods can be used in the DATA ENTRY section, the rotary knob, the arrow keys, and the numeric keypad.

Rotary knob

When you press a soft key which has a parameter, the current setting is displayed in the parameter entry window. Turning the rotary knob raises or lowers the numeric value shown in the parameter entry window (turn clockwise to increase and counterclockwise to decrease), and the internal setting changes at the same time.
Note that if the COARSE key is on (lamp on), the numeric value increase/decrease step will be larger.

Arrow keys (▲, ▼)

Pressing the ▲ key has the same effect as turning the rotary knob clockwise. Likewise, pressing the ▼ key has the same effect as turning the rotary knob counterclockwise.
Holding an arrow key down for 0.5 second or longer activates auto-repeat.
If the multi-marker function has been selected, the arrow keys can be used to scroll the marker value display in the data area.

COARSE Key

You can raise the digit of settings being entered or the increase/decrease step for numerical values.
Each time you press this key the setting toggles between ON and OFF. When ON, the lamp lights.

Numeric keypad

You can enter numerical values directly into the parameter input window by pressing keys of the numeric keypad.
After you have pressed a parameter soft key to display the current setting in the parameter display area, you can press a numeric keypad key to display the numeric keypad input area including the entered numeric value.
If the value entered with the numeric keypad is not in the allowed value range, the nearest allowed value will be set.

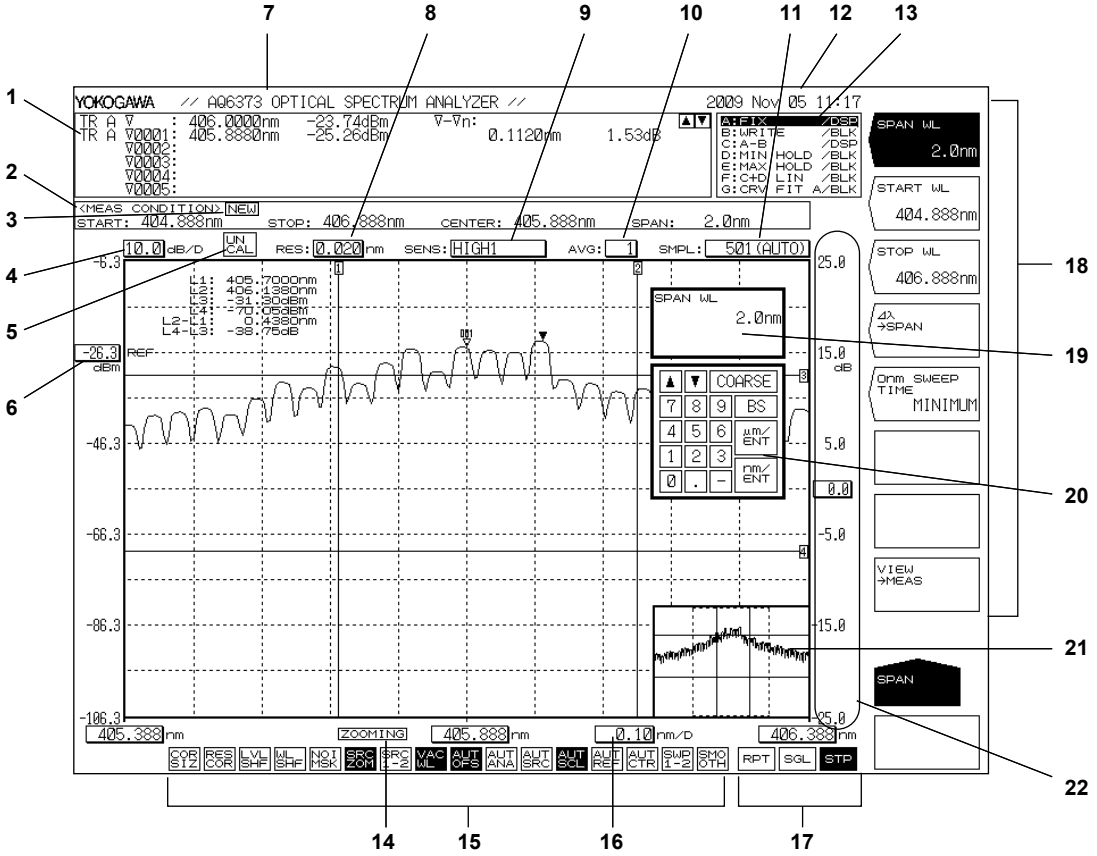
µm/ENTER Key and nm/ENTER Key

Enters values input using the numeric keypad or the parameter input window.
Use one or the other key if entering a parameter value with a particular unit.
If a parameter does not have a unit associated with it, you can use either the µm/ENTER key or the nm/ENTER key.

BACK SPACE Key

Use this key if you make an error when inputting values with the numeric keypad. The last entered (right-most) character is removed, allowing entry of the correct character.
By holding the BACK SPACE key down, you can erase the entire entry in the numeric keypad input area and make the numeric keypad input area disappear, returning it to the condition preceding numeric keypad input.

4 LCD Screen



No.	Function
1	Data area
2	Measurement conditions area
3	NEW (Displayed when any of the measurement conditions are changed.)
4	Displays level axis scale per DIV
5	UNCAL (Displayed when the settings for span, the number of sampling points, and the resolution are inappropriate.)
6	Displays reference level
7	Label area (56 characters)
8	Displays wavelength resolution
9	Displays measurement sensitivity
10	Displays averaging times
11	Displays the number of measurement samples
12	Displays date and time
13	Displays each trace status
14	ZOOMING (Only displayed when ZOOM function is used)
15	Displays the statuses of main settings (When a setting is ON, its display is depressed, or is displayed with white on black background if the display colors are black and white.)
16	Displays wavelength axis scale per DIV
17	Displays sweep status (RPT=Repeat; SGL=Single; STP=Stop)
18	Displays soft key menu (Displays markers and data analysis results.)

19 Parameter display area
20 Parameter input area
21 OVERVIEW display screen
(Only displayed when ZOOM function is used.)
22 Displays sub-scale

5 Installing the Instrument

WARNING

- This instrument is designed to be used indoors. Do not install or use it outdoors.
- Install the instrument so that you can immediately remove the power cord if an abnormal or dangerous condition occurs.
- The instrument has a built-in reference light source for alignment adjustments, and infrared light is always being output from the optical output connector. Never look into the optical output connector. Infrared light entering the eyes can cause severe injury and loss of vision.

CAUTION

• Do Not Apply Shock to the Instrument

non-horizontal orientation, and do not drop the instrument from a height of 2 cm or more. This can adversely affect the accuracy of the internal monochromator and inhibit performance. Take great care when transporting the instrument, and use packaging with a shock absorbing capacity that is greater than or equal to the packaging used upon shipment from the factory.

Never use inferior packaging materials that are unable to sufficiently absorb vibrations and shocks occurring during transport. This can adversely affect the accuracy of the internal monochromator and inhibit performance.

• When unpacking

When the instrument is packaged in a box and moved, prevent condensation by allowing sufficient time for the instrument to acclimatize before removing it from the box.

Installation Conditions

Install the instrument so that the following conditions are met.

Flat Horizontal Location

Place the instrument in a stable location that is flat in all directions. If the instrument is used in an unstable or angled surface, the accuracy of the internal monochromator can be compromised.

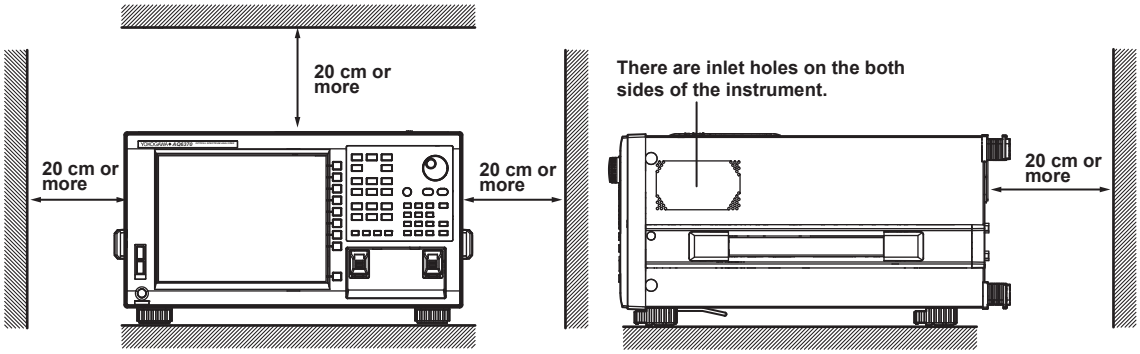
Location without Vibration

Do not install the instrument in a location subject to vibration. Use in a location that experiences large vibrations can lead to instability of operation, measurement stopping before completion, or notable decreases in accuracy of the wavelength and level axes.

Well Ventilated Location

Ventilation holes are present at the sides and rear of the instrument. To keep the internal temperature from rising, always maintain a gap of 200 mm or more between the ventilation holes and the installation surfaces.

Also be sure to maintain sufficient clearance for connecting measurement cables, and opening and closing the cover of the built in printer.



Ambient Temperature and Humidity

Ambient temperature: 5–35°C

Ambient humidity: 80% RH or lower (no condensation present)

Note

Condensation may occur if the instrument is moved to another place where the ambient temperature is higher, or if the temperature changes rapidly. In such cases, allow sufficient time for the instrument to adjust to the ambient temperature before use.

When the instrument is packaged in a box and moved, prevent condensation by allowing sufficient time for the instrument to acclimatize before removing it from the box.

Do Not Install the Instrument in the Following Places

- Outdoors.
- Dangerous locations where flammable or explosive gasses, vapors, or dust is present, or where the possibility of explosions or fires exists.
- In direct sunlight or near heat sources.
- Where an excessive amount of soot, steam, dust, or corrosive gas is present.
- Location where mechanical vibration is high.
- In an unstable place.
- Where the instrument is exposed to water or other liquids.

General Handling Precautions

- **Take Proper Care When Carrying the Instrument**

  The instrument should always be carried by two people. Hold the instrument by the handles on the sides of the case. The instrument weighs approximately 20 kg. Take precautions against injuries when carrying it. Also, always turn the power switch OFF, remove the power cable, and confirm that no other cables are connected before carrying the instrument.
- **Do Not Place Anything on Top of the Instrument**

  Never stack instruments or place any other objects on top of the instrument, especially those containing water. Doing so can lead to malfunction.
- **Clean the Instrument Properly**

  When removing dirt from the case or operation panel, disconnect the power to the circuits under test and the instrument, remove the instrument's power cord from the power outlet, then wipe gently with a clean, dry cloth. Do not use volatile chemicals since this might cause discoloring and deformation.

6 Connecting a Communication Interface

Connecting the Mouse

You can use a USB or PS/2 mouse.

Supported USB Mouse

The instrument can support a USB HID Class Ver. 1.1 compliant mouse (with wheel).

Connections

The USB mouse is connected to the USB interface on the front panel of the instrument.

1. Confirm that **MAIN POWER** switch on the rear panel is OFF.
2. Orient the USB mouse connector in the proper direction so that it is perpendicular to the USB port on the front panel, and insert it into the port.

Note

- There are two USB ports, but do not connect a mouse to each port at the same time.
- In addition to a mouse, you can connect a USB storage device.

Supported PS/2 Mouse

The PS/2 wheel mouse by Microsoft® Corporation is recommended for this instrument.

Connections

The PS/2 mouse is connected to the KBD interface (PS/2 terminal) on the rear panel of the instrument through the keyboard.

1. Confirm that the **MAIN POWER** switch on the rear panel is OFF.
2. Orient the keyboard with the PS/2 mouse terminal to match the direction of the connector, then connect to the KBD interface on the rear panel.
3. Connect the PS/2 mouse to the PS/2 terminal on the keyboard.

Note

The default for the PS/2 terminal is the keyboard. To attach a PS/2 mouse directly without going through the keyboard requires a splitter cable.

For instructions on using the mouse, see section 4.2 of IM AQ6373-01EN.

Connecting a Keyboard

You can connect a keyboard for entering file names, comments, and other items. Also, the functions and settings of the instrument are assigned to keyboard keys, allowing you to manipulate them with a keyboard just as you would by using the instrument's panel keys.

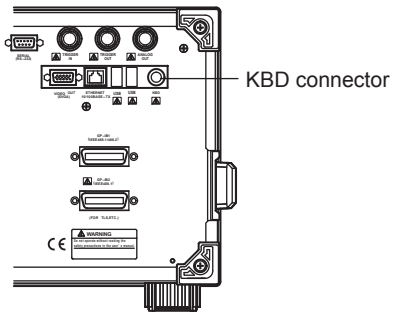
Supported Keyboards

The instrument supports any 101 English keyboard.

Connections

Connect the keyboard to the KBD connector (PS/2 terminal) on the rear panel of the instrument.

1. Confirm that the **MAIN POWER** switch on the rear panel is OFF.
2. Orient the PS/2 keyboard to match the direction of the connector, then connect to the KBD connector on the rear panel.



For information on operations using the keyboard, see section 4.2 of IM AQ6373-01EN.

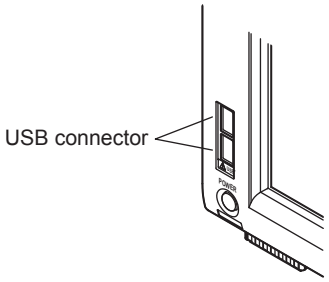
Connecting a USB Storage Device

Supported USB Storage Devices

The instrument supports USB memory (USB card adapters).
You cannot use a USB storage device not recognized by the instrument. If the USB storage device's drive is partitioned, only the primary partition (F:) is recognized. If there are two or more USB storage devices, only the first connected device is recognized.
If you restart the instrument, it the USB storage devices that were connected will still be recognized.

Connections

Connect the USB storage device to the USB connector on the front panel of the instrument.



Removing

See section 8.1 of IM AQ6373-01EN. (Using the **REMOVE USB STORAGE** soft key.)

CAUTION

Do not remove the USB storage device or turn the power OFF while the USB storage device access indicator is blinking. This can damage the data on the device or the device itself.

Connecting with Other Devices

You can use the GP-IB, RS-232C, or Ethernet interface to connect other external instruments to the AQ6373. For details, see the user's manual of the relevant instrument.

Note

When connecting a GP-IB instrument such as an external computer, or a CRT or other display to the instrument, always turn OFF the power to the instrument and the instruments to be connected first. Leaving the power ON while making connections can damage the equipment.

7 Turning the Power ON/OFF

Before Connecting the Power

Take the following precautions before turning on the power supply. Failure to do so can result in electric shock or damage to instruments.

WARNING

- Before connecting the power cord, ensure that the power supply source voltage matches the rated supply voltage of the instrument and that it is within the maximum rated voltage of the provided power cord.
- Check that the instrument's power switch is OFF before connecting the power cord.
- To prevent the possibility of electric shock or fire, always be sure to use the power cord supplied for the instrument by YOKOGAWA.
- Make sure to implement protective earth grounding to prevent electric shock. Connect the instrument's power cord into a three-prong electrical outlet with a protective grounding terminal. The AC outlet must be of a three-prong type with a protective earth ground terminal.
- Do not use an extension cord without protective earth ground. Otherwise, the protection function will be compromised.
- Use an outlet that is compatible with the accessory power cord, and be sure to connect protective grounding. Do not use the instrument if the power outlet does not provide appropriate protective grounding.

Preparing to Turn ON the Power

The AQ6373 has a **MAIN POWER** switch for turning the main power ON/OFF, and a **POWER** switch for starting and shutting down the instrument. **The POWER** switch is a push-button switch; press once to turn it ON and press again to turn it OFF.

- Confirm that the **MAIN POWER** switch on the rear panel of the instrument is OFF.
- Connect the power cord plug to the power connector on the rear panel.
- Connect the other end of the cord to an outlet that meets the following conditions. Use a grounded three-prong outlet.

Item	
Rated supply voltage*	100 VAC to 240 VAC
Permitted supply voltage range	90 VAC to 264 VAC
Rated power supply frequency	50/60 Hz
Permitted supply frequency range	48 Hz to 63 Hz
Maximum power consumption	Approx. 150 VA

* This instrument can use a 100 V or a 200 V power supply. The maximum rated voltage differs according to the type of power cord. Before you use the instrument, check that the voltage supplied to it is less than or equal to the maximum rated voltage of the power cord provided with it (see page ii for the maximum voltage rating).

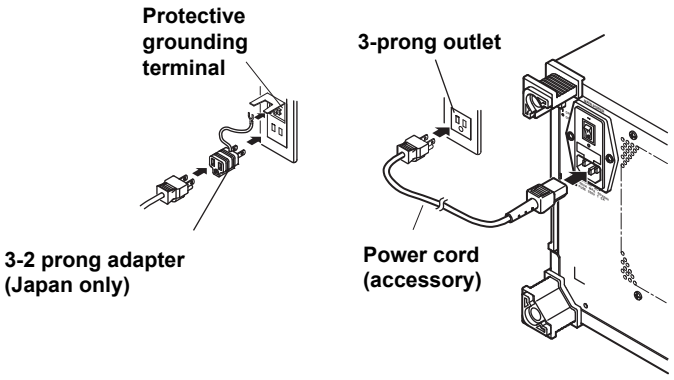
- Before replacing a fuse, always turn the **MAIN POWER** switch OFF and remove the power cord from the power outlet.

CAUTION

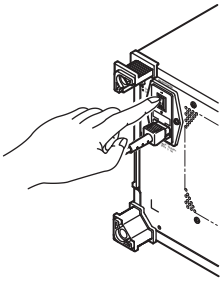
Do not input a strong light source to the instrument when turning the power ON. If a strong light source is input, the optical section can be damaged.

Power On and Screen Display

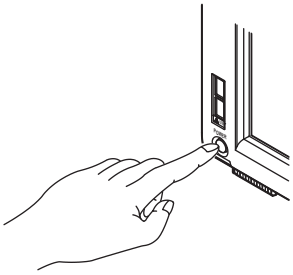
1. Connect the power cord to the power cord connector on the back side of the instrument.



2. Turn ON the **MAIN POWER** switch on the rear panel of the instrument. The **POWER** switch on the front panel of the instrument lights orange.



3. Press the **POWER** switch on the front panel of the instrument. The color of the switch turns from orange to green. The operating system starts up, and initialization of the instrument begins.



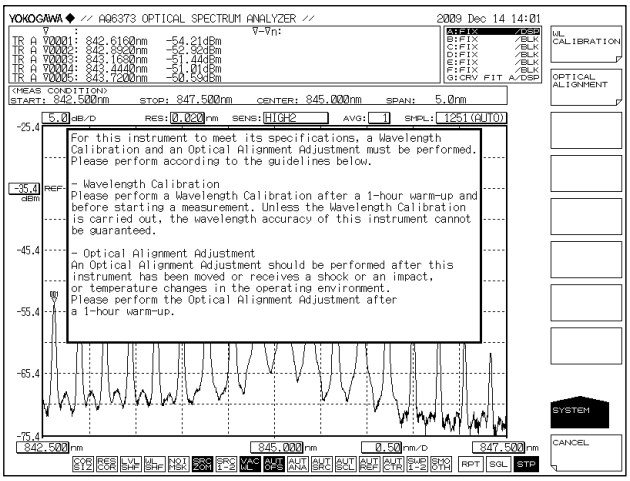
The initialization screen appears, and the internal initialization process starts. STEP 1/9 through STEP 9/9 are displayed in the lower right part of the screen to indicate the progress of initialization.

CAUTION

Do not press the POWER or MAIN POWER switches while initialization is in progress.
Doing so can cause malfunction.

Operations Performed When the Power Is Turned On

If initialization finishes successfully, a message appears prompting you to execute wavelength calibration and alignment adjustment.



The contents of the message are as follows.

For this instrument to meet its specification, a Wavelength Calibration and an Optical Alignment Adjustment must be performed. Please perform these operations according to the guidelines below.

Wavelength Calibration

Be sure to perform a wavelength calibration using an external light source before starting measurement (a warm-up of one hour is also required prior to measurement). Unless the Wavelength Calibration is carried out, the wavelength accuracy of the instrument cannot be guaranteed.

Alignment Adjustment

Always perform alignment adjustment the first time you use the instrument, if the instrument was vibrated when being moved, or if the temperature in the operating environment has changed. Perform the alignment adjustment after a one-hour warm-up.

When the Power-on Operation Does Not Finish Normally

Turn off the power switch, and check that :

- The instrument is installed properly. See section 3.1, "installing the instrument."
- The power cord is connected properly. See the previous page.

If the instrument still does not work properly, contact your nearest YOKOGAWA dealer for repairs.

If an error occurs in the memory or some other part of the instrument during initialization, the AQ6370C will stop running with "STEP @ / 9" showing on the screen (where @ is a number between I and 9).

If this occurs, repairs are necessary. Contact your nearest YOKOGAWA dealer immediately.

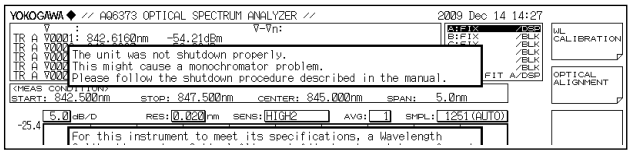
Note

- See section 3.5 of IM AQ6373-01EN for details on the alignment adjustment operation, and 3.6 of IM AQ6373-01EN for wavelength calibration.
- The instrument “remembers” measurement conditions, selected soft keys, waveforms being displayed, and other information. When the power is turned ON, the state of the instrument prior to the last shut down is restored. When the power is turned ON for the first time, the instrument starts up in the factory default state.

Explanation

Screen when the instrument was not shut down

If the shutdown procedure was not performed after the previous session, the following message appears after start up.
Failure to properly shut down the instrument can result in damage to the monochromator.
When turning OFF the power, always perform the shut down procedure.
Press any key to clear this message.



Turning the Power OFF

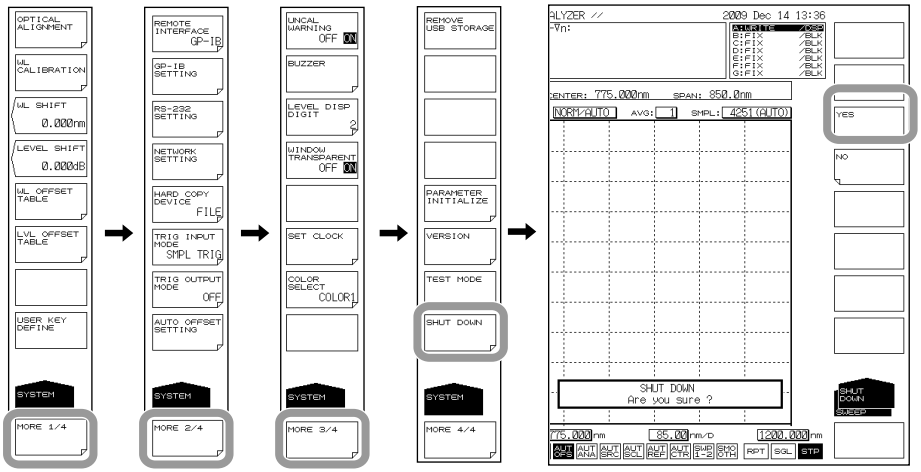
1. Press the **POWER** switch on the front panel of the instrument. A shut down confirmation message is displayed along with the **YES** and **NO** soft keys.
2. Press the **YES** soft key. The message, “AQ6373 is shutting down. Please wait...” appears, and shut-down begins. If you do not wish to shut down, press the **NO** soft key. The screen returns to the original soft key menu.
3. After the **POWER** switch changes from green to orange, turn OFF the **MAIN POWER** switch on the rear panel of the instrument.

CAUTION

Do not cut the power to the instrument with the **MAIN POWER** switch on the rear panel when an operation is in progress. The operating system configuration file will not be backed up, possibly resulting in malfunctions upon start up the next time the instrument is turned ON. Always use the above procedure to shut down.

You can also shut down the instrument using panel keys and soft keys.

1. Press **SYSTEM**.
2. Press the **MORE** soft key three times. **The SYSTEM** 4/4 screen is displayed.
3. Press the **SHUT DOWN** soft key.
4. Press the **YES** soft key. Shut down begins.
5. After the **POWER** switch changes from green to orange, turn OFF the **MAIN POWER** switch on the rear panel of the instrument.



Note

If for some reason the instrument fails to shut down normally, hold down the **POWER** switch for approximately four seconds or longer to force standby mode. Note that the operating system configuration file will not be backed up, possibly resulting in malfunctions upon start up the next time the instrument is turned on.

8 Connecting the DUT

Procedure

Connecting Optical Fibers

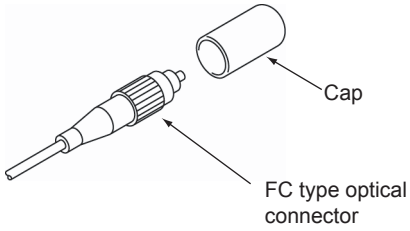
1. Clean the tip of the optical fiber with a fiber cleaner.
2. Open the instrument's optical input connector cover.
3. Connect the optical fiber's optical connector to the optical input connector on the instrument.

CAUTION

- Before connecting an optical fiber to the instrument, make sure that the start-up initialization process has finished. If a strong light source is input during start-up, the optical section can be damaged.
- Be sure to clean the tip of the optical fiber's optical connector before connecting.
- Do not try to forcefully attach the optical fiber's optical connector with the plug inserted at a slanted angle. Doing so may damage the instrument's optical connector's components or the connector itself.
- Before connecting the input light, make sure that it does not exceed the AQ6373's maximum rated level. If input light exceeding the maximum rated level is introduced, the optical section may be damaged.
- Press the optical connector hard against the cleaning surface of the special cleaner to clean it. If it is not pressed hard against the cleaning surface, it may not be possible to properly clean the optical connector.
- Do not exhale or blow compressed air into the monochromator from the optical input. Doing so may allow dust or other materials to enter the monochromator, adversely affecting its optical performance. Also, if debris is adhering to the optical components inside the monochromator when a strong light source is input, the monochromator may be damaged.

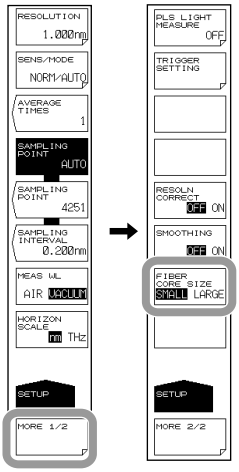
Optical Connectors Types

The instrument can use FC (PC) type optical connectors.



Setting the optical fiber core size

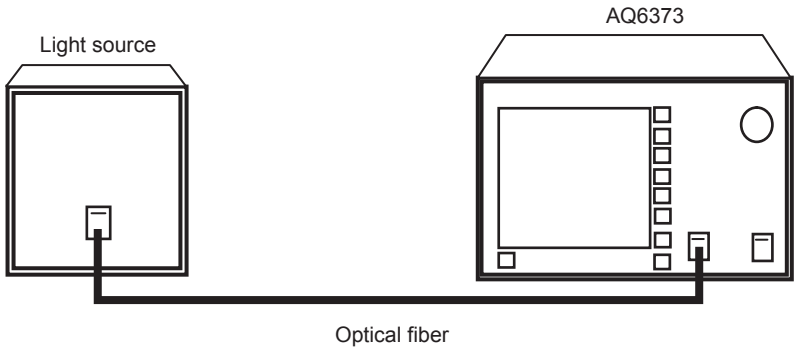
4. Press **SETUP**. The soft key menu is displayed.
5. Press the **MORE 1/2** soft key. The soft key menu switches.
6. Press the **FIBER CORE SIZE** soft key. Pressing the key repeatedly toggles between SMALL and LARGE. If the core diameter of the fiber under test is 100 μm or less, choose SMALL. If larger than 100 μm, choose LARGE.



Connecting the DUT (Light Source)

7. Clean the top of the optical connector on the other end of the optical fiber with a fiber cleaner.
8. Connect the optical connector on the other end of the optical fiber to the optical connector on the DUT.

Measuring System



9 Specifications

Item	Specifications
Applicable fiber	SM, GI (50/125 µm, 62.5/125 µm), Large core size fibers (core diameter of up to 800 µm)
Measurement wavelength range[1]	350 to 1200 nm
Span[1]	0.5 nm to 850 nm (entire wavelength range), 0 nm
Wavelength accuracy[1, 2]	±0.2 nm (400 to 1100 nm) ±0.05 nm (633 nm)
Wavelength resolution setting[1, 3]	0.02, 0.05, 0.1, 0.2, 0.5, 1.0, 2.0, 5.0, 10.0 nm, and 0.01 nm (at a measured wavelength range of 400 to 470 nm)
Measurement data point (Wavelength sampling points)	101 to 50001, AUTO
Wavelength sampling resolution	0.001 nm minimum
Level sensitivity setting	NORM_HOLD, NORM_AUTO, NORMAL, MID, HIGH1, HIGH2 and HIGH3
High dynamic range mode	SWITCH (Sensitivity: MID, HIGH1, HIGH2, HIGH3)
Level sensitivity [4, 5]	-80 dBm (500 to 1000 nm, resolution: 0.2 nm or more, measuring sensitivity: HIGH3) -60 dBm (400 to 500 nm, resolution: 0.2 nm or more, measurement sensitivity: HIGH3) -60 dBm (1000 to 1100 nm, resolution: 0.2 nm or more, measurement sensitivity:HIGH3)
Level accuracy [4]	±1.0 dB (850 nm, -20 dBm, resolution: 0.2 nm or more, sensitivity setting: MID, HIGH1, HIGH2, HIGH3) (when using an (MFD 5 µm @850 nm, NA 0.14 (typ.) SMF)
Leval linearity [4]	±0.2 dB (input level: -40 to +0 dBm, measuring sensitivity: HIGH1, HIGH2, HIGH3)
Safe max. input power [4]	+20 dBm (total light input power at 550 to 1100 nm) +10 dBm (total light input power at 400 to 550 nm)
Dynamic range[1]	60 dB or more (633 nm, ±0.5 nm of peak wavelength, resolution: 0.02 nm)
Sweep time[1, 6]	0.5 s (NORM_AUTO), 1 s (NORMAL) 2 s (MID) 5 s (HIGH1), 20 s (HIGH2), 75 s (HIGH3)
Function	
Automatic measurement	Program function (64 programs, 200 steps)
Setting of measuring conditions	Center wavelength, span, wavelength sampling points, wavelength resolution, measurement sensitivity, high dynamic mode, averaging times (1 to 999), sweep (single, repeat, AUTO: automatically sets measuring conditions), sweep between marker function, pulse light measurement function, smoothing function, external trigger measurement function, sweep status output function, analog output function, air/vacuum wavelength measurement function, template-based Pass/Fail judgment function
Display	Level scale (0.1 to 10 dB/div., linear scale), level subscale (0.1 to 10 dB/div., linear scale), reference level display, vertical axis DIV display (8, 10, 12), horizontal axis wavelength/ frequency display, horizontal axis scale zoom in/out display, measuring conditions display, noise mask display, data table display, label display, split screen display, percent display, power density (dB/nm) display, dB/km display, template display
Traces	Simultaneous display of 7 independent traces, write mode fixed mode setting, show/hide setting, max/min value detection display, calculation between traces display, roll averaging display (sweep average) (2 to 100 times), normalized display, curve fit display (peak curve fit, marker curve fit), trace copy function, trace clear function, saving/loading all trace function
Marker/Search	Delta markers (1024 points maximum), vertical/horizontal line markers, peak search, bottom search, auto search (ON/OFF), search between vertical axis line markers, search within zoom area
Analysis	Spectral width analysis (threshold, envelope, RMS, Peak RMS, notch), OSNR (WDM) analysis, chromaticity coordinate analysis (COLOR analysis), filter peak/bottom analysis, DFB-LD analysis, FP-LD analysis, LED analysis, SMSR analysis, power analysis, PMD analysis, Pass/Fail judgment from template, auto analysis, analysis between vertical axis line markers, analysis within the zoom area
Other	Auto alignment function with built-in reference light source

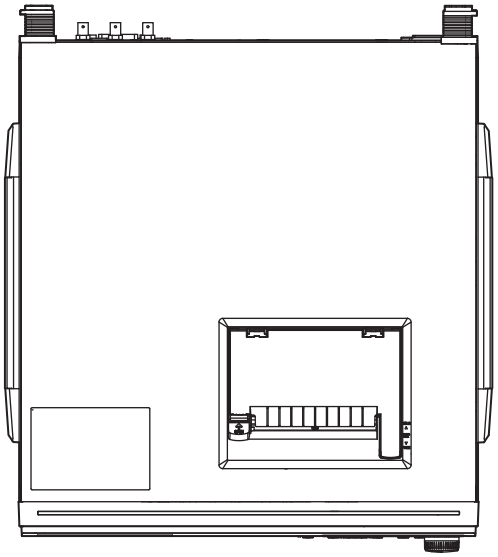
Item	Specifications	
Data storage		
Internal memory	64 traces, 64 programs, 3 templates	
Internal storage	128 MB max	
External storage	USB storage media (USB memory/HDD), format: FAT32	
File types	CSV (text), binary, bitmap, TIFF	
Interfaces		
Remote control	GP-IB, RS-232, Ethernet (TCP/IP) AQ6317 series compliant commands (IEEE488.1) and IEEE488.2	
Categories	GP-IB x 2 (for standard and external control), RS-232, Ethernet, USB1.1 x 2, PS/2 (for keyboard), SVGA output, analog output port, trigger input port, trigger output port	
Optical connectors	Fixed to FC type	
Printer	Built-in thermal printer (factory option)	
Display [8]	10.4" color LCD (resolution: 800 x 600 pixels)	
Power requirement	100 to 240 VAC, 50/60 Hz, approximately 150 VA	
Environment conditions	Operating temperature range: +5 to +35°C Operating humidity range: -10 to +50°C Ambient humidity: 80% RH or less (no condensation)	
Recommended calibration period	1 year	
External dimensions [7]	Approximately 426 (W) x 221 (H) x 459 (D) mm	
Mass	Approximately 20 kg (excluding built-in printer)	
Safety standards	Conforming standards	EN61010-1 EN60825-1 Pollution degree 2 [9]
Emissions	Conforming standards	EN61326-1 Class A EN55011 Class A, Group 1 EN61000-3-2 EN61000-3-3 EMC Regulatory Arrangement in Australia and New Zealand EN 55011 Class A, Group 1 Korea Electromagnetic Conformity Standard (한국 전자파적합성기준) This is a class A instrument (industrial use). Wireless interference may occur in home environments. If so, the user must take appropriate countermeasures.
	Cable conditions	• TRIGGER IN, TRIGGER OUT, ANALOG OUT terminal. Use a BNC cable[10] • Use a serial (RS-232) interface connectorand RS-232 shielded cable.[10] • Use an Ethernet connector and a category 5 or higher Ethernet cable.[11] • Use a VIDEO OUT connector and a D-sub 15pin VGA shielded cable[10] • Use a USB peripheral (such as a mouse) that uses a USB port and shielded cable[10] • Use a keyboard connector and PS/2 shielded cable[10] • Use the GP-IB1 or GP-IB2 interface connector and a GP-IB shielded cable[10]

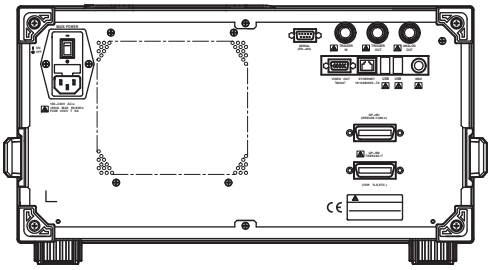
Item	Specifications		
Immunity	Conforming standards	EN61326-1 Table 2 (For use in industrial locations)	
	Effect in immunity environment		
		Wavelength measurement sensitivity:	Within ±0.1 nm
	Cable conditions	Same as above emission cable conditions.	

1: Horizontal axis scale: In wavelength display mode
2: After user wavelength calibration with a 633 nm HeNe laser
3: The actual power value of the wavelength resolution differs depending on the measured wavelength. The widest is approximately 8 nm, when set to 10 nm.
4: Vertical scale: absolute value level display mode
5: Typical value. AVR: 10 times
6: High dynamic range mode: OFF, pulse light measurement mode: OFF, no. of sampling points: 1001, averaging count: 1, and span of 100 nm or less (excludes the wavelength at which the order of diffraction switches, and the wavelength at which the optical filter switches).
7: Note that this excludes the protector and handle
8: The LDC display may contain defective pixels (always ON or always OFF).
(0.002% or fewer of all pixels including RGB). Does not indicate a general malfunction.
9: Pollution degree refers to the degree of adherence by a solid, liquid, or vapor that reduces the withstand voltage or surface resistance factor. Pollution degree 1 applies to closed atmospheres (no pollution, or only dry, non-conductive pollution). Pollution degree 2 applies to normal indoor atmospheres (with only non-conductive pollution).
10: Use a cable of 3 m in length or less.
11: Use a cable of 30 m in length or less.

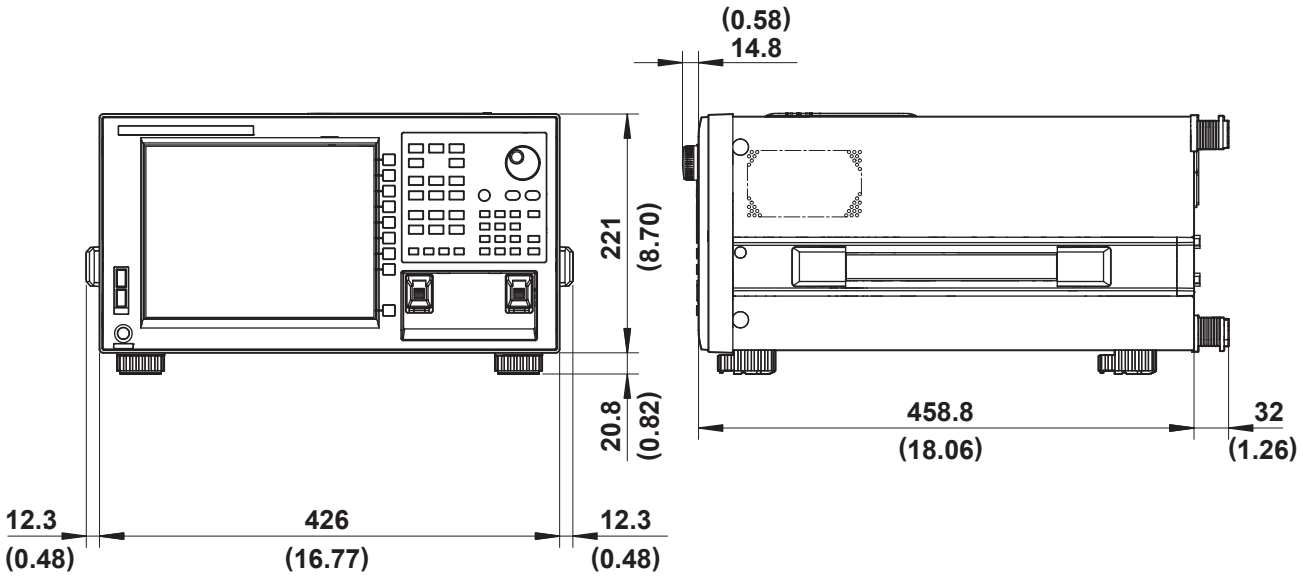
10 External Dimensions

Unit : mm
(approx. inch)





REAR VIEW



If not specified, the tolerance is ±3%. However, in cases of less than 10 mm, the tolerance is ±0.3 mm.