
**User's
Manual**

**AQ6377
Optical Spectrum Analyzer
Getting Started Guide**

Thank you for purchasing the AQ6377 Optical Spectrum Analyzer. This instrument enables high speed measurement of the optical properties of LD and LED light sources, optical amps, and other devices.

This getting started guide primarily explains the handling precautions and basic operations of this 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.

List of Manuals

The following manuals, including this one, are provided as manuals for the AQ6377. Please read all manuals.

Manual Title	Manual No.	Description
AQ6377 Optical Spectrum Analyzer User's Manual	IM AQ6377-01EN	The manual is located on the CD included in your package (pdf format). Explains all functions and operating procedures of the AQ6377 except remote control and program functions.
AQ6377 Optical Spectrum Analyzer Getting Started Guide	IM AQ6377-02EN	This manual. This guide explains the handling precautions, installation procedure, basic operations, and specifications of this instrument.
AQ6377 Optical Spectrum Analyzer Remote Control User's Manual	IM AQ6377-17EN	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.
AQ6377 Optical Spectrum Analyzer	IM AQ6377-92Z1	A document for China.

The "EN" and "Z1" in the manual numbers are the language codes.

Contact information of Yokogawa offices worldwide is provided on the following sheet.

Document Description	Description
PIM 113-01Z2	List of worldwide contacts

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 is strictly prohibited.

Trademarks

- Microsoft and Windows are registered trademarks or trademarks of Microsoft Corporation in the United States and/or other countries.
- Adobe and Acrobat are registered trademarks or trademarks of Adobe Systems incorporated.
- In this manual, the ® and TM symbols do not accompany their respective registered trademark or trademark names.
- Other company and product names are registered trademarks or trademarks of their respective companies.

Revisions

- 1st Edition: February 2020

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.

AQ6377 Main Unit



Check that the model and suffix 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.

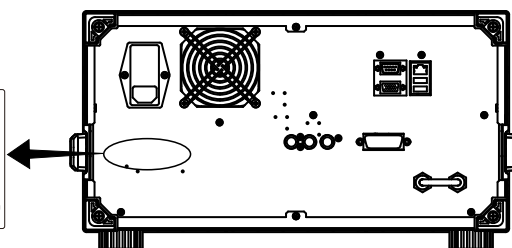
MODEL	Suffix ²	Description
AQ6377		AQ6377 Optical Spectrum Analyzer
Specification	-10	Standard Model
Built-in light source	-L1	Wavelength reference source
Power Cord ¹	-D	UL/CSA standard and PSE compliant, Rated Voltage: 125 V
	-F	VDE/Korean standard, Rated Voltage: 250 V
	-R	Australian standard, Rated Voltage: 250 V
	-Q	British standard, Rated Voltage: 250 V
	-H	Chinese standard, Rated Voltage: 250 V
	-N	Brazilian standard, Rated Voltage: 250 V
	-T	Taiwanese standard, Rated Voltage: 125 V
	-B	Indian standard, Rated Voltage: 250 V
	-U	IEC Plug Type B, Rated Voltage: 250 V
	-Y	No power cord included. ³

- 1 Make sure that the attached power cord meets the designated standards of the country and area that you are using it in.
- 2 For products whose suffix code contains "Z," an exclusive manual may be included. Please read it along with the standard manual.
- 3 Prepare a power cord that complies with the standard specified by the country or region that the instrument will be used in.

- **No. (Instrument Number)**

When contacting the dealer from which you purchased the instrument, please give them the instrument number.

MODEL	
SUFFIX	
NO.	
 Read / Libert	
YOKOGAWA	Trade Name / Manufacturer :
Yokogawa Test & Measurement Corporation	Yokogawa Test & Measurement Corporation
TOKYO 110-8750, JAPAN	Date of Manufacture :
Made in Japan	



Checking the Contents of the Package

Standard Accessories

Part Name	Model or Part No.	Quantity	Specifications and Notes
Power cord*	A1006WD	1	UL/CSA standard and PSE compliant
	A1009WD		VDE/Korean standard
	A1024WD		Australian standard
	A1054WD		British standard
	A1064WD		Chinese standard
	A1088WD		Brazilian standard
	A1100WD		Taiwanese standard
	A1101WD		Indian standard
	A1102WD		IEC Plug Type B
Rubber feet	A9088ZM	1	1 sheet (2 pcs.), attached to the rear feet.
Manuals			
Printed Manuals	IM AQ6377-02EN	1	Getting Started Guide
	IM AQ6377-92Z1	1	Document for China
	PIM 113-01Z2	1	List of worldwide contacts
Manual CD	A1032US	1	Contains PDFs of the user's manuals (For the types of manuals that CD contains, see Manual CD below.)

Standard accessories are not covered by warranty of this instrument.

* Make sure that the attached power cord meets the designated standards of the country and area that you are using it in. If the suffix code is -Y, a power cord is not included.

Manual CD

The English directory in the manual CD contains the PDF files shown below. The CD also contains Japanese manuals.

File Name	Manual Title	Manual No.
Features & Operation Manual.pdf	AQ6377 Optical Spectrum Analyzer User's Manual	IM AQ6377-01EN
Communication Interface.pdf	AQ6377 Optical Spectrum Analyzer Remote Control User's Manual	IM AQ6377-17EN

To view the PDF data, you need Adobe Acrobat Reader or a software application that can open PDF data.

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.

French

AVERTISSEMENT

Attire l'attention sur des gestes ou des conditions susceptibles de provoquer des blessures graves (voire mortelles), et sur les précautions de sécurité pouvant prévenir de tels accidents.

ATTENTION

Attire l'attention sur des gestes ou des conditions susceptibles de provoquer des blessures légères ou d'endommager l'instrument ou les données de l'utilisateur, et sur les précautions de sécurité susceptibles de prévenir de tels accidents.

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. The 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.

Characters and Terminology Used in Procedural Explanations

Bold alphanumeric characters in procedural explanations indicate characters appearing near panel controls and characters of the control menu items shown on the screen.

Prefixes k and K

Prefixes k and K used before units are distinguished as follows:

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

Safety Precautions

This product is designed to be used by a person with specialized knowledge. This instrument is an IEC protection class I instrument (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. This manual is an essential part of the product; keep it in a safe place for future reference. YOKOGAWA assumes no liability for the customer's failure to comply with these requirements.

The following symbols are used on this instrument.



Handle with care. Refer to the user's manual or service 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)

French



À manipuler délicatement. Toujours se reporter aux manuels d'utilisation et d'entretien. Ce symbole a été apposé aux endroits dangereux de l'instrument pour lesquels des consignes spéciales d'utilisation ou de manipulation ont été émises. Le même symbole apparaît à l'endroit correspondant du manuel pour identifier les consignes qui s'y rapportent.



Courant alternatif



Marche (alimentation)



Arrêt (alimentation)

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

Make sure that the power supply voltage matches the instrument's rated supply voltage and that it does not exceed the maximum voltage range of the power cord to use.

Use the Correct Power Cord and Plug

To prevent the possibility of electric shock or fire, be sure to use the power cord for the instrument. 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.

Further, do not use this power cord with other instruments.

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 you can use for the instrument is a three-prong 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 hazard.

Do Not Use When the Protection Functions Are Defective

Before using this instrument, check that the protection functions, such as the protective grounding and fuse, are working properly. If you suspect a defect, do not use the instrument.

Reference light source output light (when the built-in light source specification is -L1)

The instrument has a built-in reference light source for wavelength calibration, 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.

Manual CD

- Never play this manual CD, which contains the user's manuals, in an audio CD player. Doing so may cause loss of hearing or speaker damage due to the large sounds that may be produced.

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.

French

AVERTISSEMENT**Utiliser l'instrument aux seules fins prévues**

Cet instrument de mesure optique est prévu pour mesurer les caractéristiques optiques des sources lumineuses et évaluer leur performance. Ne pas utiliser cet instrument à d'autres fins que celles de mesure optique.

Inspecter l'apparence physique

Ne pas utiliser l'instrument si son intégrité physique semble être compromise.

Vérifier l'alimentation

Assurez-vous que la tension d'alimentation correspond à la tension d'alimentation nominale de l'appareil et qu'elle ne dépasse pas la plage de tension maximale du cordon d'alimentation à utiliser.

Utiliser le cordon d'alimentation et la fiche adaptés

Pour éviter tout risque de choc électrique, utiliser exclusivement le cordon d'alimentation prévu pour cet instrument. La fiche doit être branchée sur une prise secteur raccordée à la terre. En cas d'utilisation d'une rallonge, celle-ci doit être impérativement reliée à la terre. Par ailleurs, ne pas utiliser ce cordon d'alimentation avec d'autres instruments.

Brancher la prise de terre

Avant de mettre l'instrument sous tension, penser à brancher la prise de terre pour éviter tout choc électrique. Le cordon d'alimentation que vous utilisez pour l'instrument est un cordon à trois broches.

Brancher le cordon d'alimentation sur une prise de courant à trois plots et mise à la terre.

Ne pas entraver la mise à la terre de protection

Ne jamais neutraliser le fil de terre interne ou externe, ni débrancher la borne de mise à la terre. Cela pourrait entraîner un choc électrique ou endommager l'instrument.

Ne pas utiliser lorsque les fonctions de protection sont défectueuses

Avant d'utiliser l'instrument, vérifier que les fonctions de protection, telles que le raccordement à la terre et le fusible, fonctionnent correctement. En cas de dysfonctionnement possible, ne pas utiliser l'instrument.

Source de lumière de référence (Lorsque la spécification de source de lumière de référence intégrée est -L1)

Cet instrument dispose d'une source de lumière de référence intégrée pour les ajustements d'alignement. La lumière infrarouge est toujours émise depuis le connecteur de sortie optique. Ne regardez jamais directement dans le connecteur de sortie optique. La lumière infrarouge risquerait de gravement vous blesser ou de provoquer une perte de vision.

Ne pas utiliser dans un environnement explosif

Ne pas utiliser l'instrument en présence de gaz ou de vapeurs inflammables. Cela pourrait être extrêmement dangereux.

Ne pas retirer le capot, ni démonter ou modifier l'instrument

Seul le personnel YOKOGAWA qualifié est habilité à retirer le capot et à démonter ou modifier l'instrument. Certains composants à l'intérieur de l'instrument sont à haute tension et par conséquent, représentent un danger.

Installer et utiliser l'instrument aux emplacements appropriés

- Ne pas installer, ni utiliser l'instrument à l'extérieur ou dans des lieux exposés à la pluie ou à l'eau.
- Installer l'instrument de manière à pouvoir immédiatement le débrancher du secteur en cas de fonctionnement anormal ou dangereux.

Manuel CD

- Ce CD contient les manuels d'utilisation. Ne jamais insérer ce CD dans un lecteur de CD audio. Cela pourrait entraîner une perte d'audition ou l'endommagement des enceintes en raison du volume potentiellement élevé des sons produits.

ATTENTION

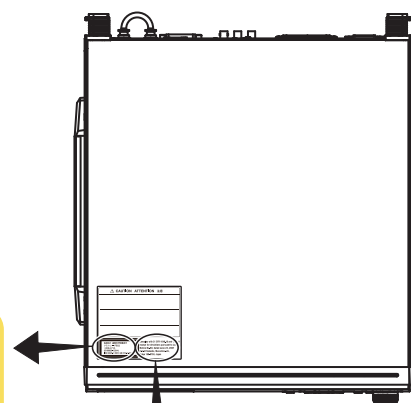
Limitations relatives à l'environnement opérationnel

Ce produit est un produit de classe A (pour environnements industriels). L'utilisation de ce produit dans une zone résidentielle peut entraîner une interférence radio que l'utilisateur sera tenu de rectifier.

Safety Precautions for Laser Products (when the built-in light source specification is -L1)

This instrument uses a laser light source. This instrument is a Class 1 laser product as defined by EN 60825-1:2014/IEC 60825-1:2007 Safety of Laser Products-Part 1: Equipment Classification, Requirements and User's Guide. In addition, this instrument complies with 21 CFR 1040.10 and 1040.11 except for deviations pursuant to Laser Notice No. 50, dated June 24, 2007.

Laser Class 1 Label



Complies with 21 CFR 1040.10 and 1040.11 except for deviations pursuant to Laser Notice No.50, dated June 24, 2007
2-9-32 Nakacho, Musashino-shi,
Tokyo 180-8750, Japan

Information about the Laser Light Source Used

Class	Laser Type	Wavelength	Maximum Output Power	Diameter of Mode Field	Repetition Rate	Numerical Aperture
1	EE-LED	1.53 μm	0.04 mW	9 μm	CW	0.1

Regulations and Sales in Each Country or Region

Waste Electrical and Electronic Equipment



Waste Electrical and Electronic Equipment (WEEE)

(This directive is valid only in the EU.)

■ This product complies with the WEEE Directive 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, this product is classified as a “Monitoring and control instruments” product.

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

EU Battery Directive



EU Battery Directive

(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 the EU battery directive.

Battery type: Lithium battery

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

Authorized Representative in the EEA

Yokogawa Europe B.V. is the authorized representative of Yokogawa Test & Measurement Corporation for this product in the EEA. To contact Yokogawa Europe B.V., see the separate list of worldwide contacts, PIM 113-01Z2.

關於在台灣銷售

This section is valid only in Taiwan.

關於在台灣所販賣的符合其相關規定的電源線 A1100WD 的限用物質含量信息，請至下麵的網址進行查詢

<https://tmi.yokogawa.com/support/service-warranty-quality/product-compliance/>

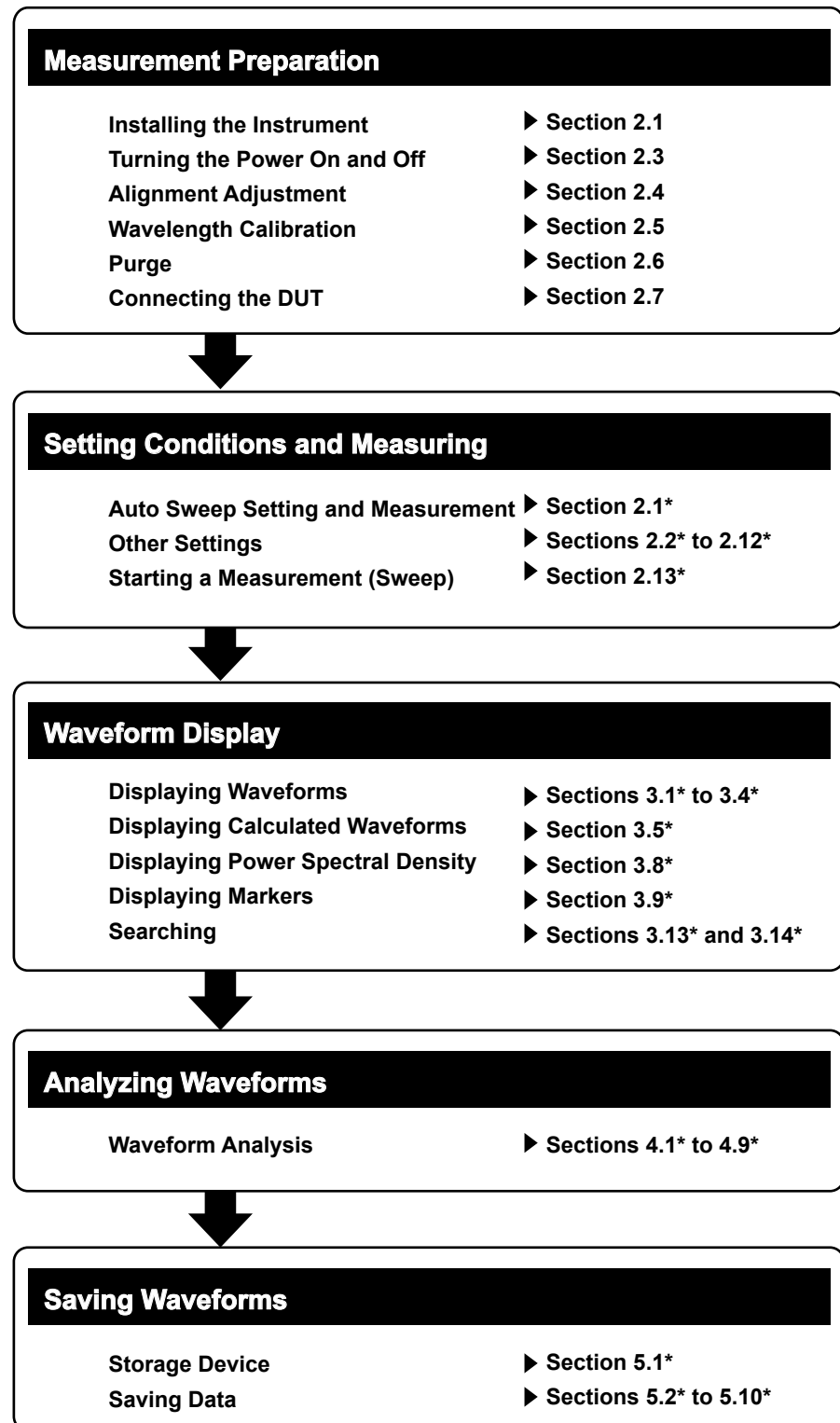
Contains mercury



Component inside this product contain mercury and must be recycled or disposed of according to the laws and ordinances of the country or region.

Flow of Operation

The figure below is provided to familiarize the first-time user with the general flow of this instrument operation. For the details of each item, see the relevant section in IM AQ6377-01EN or IM AQ6377-02EN.



* IM AQ6377-01EN

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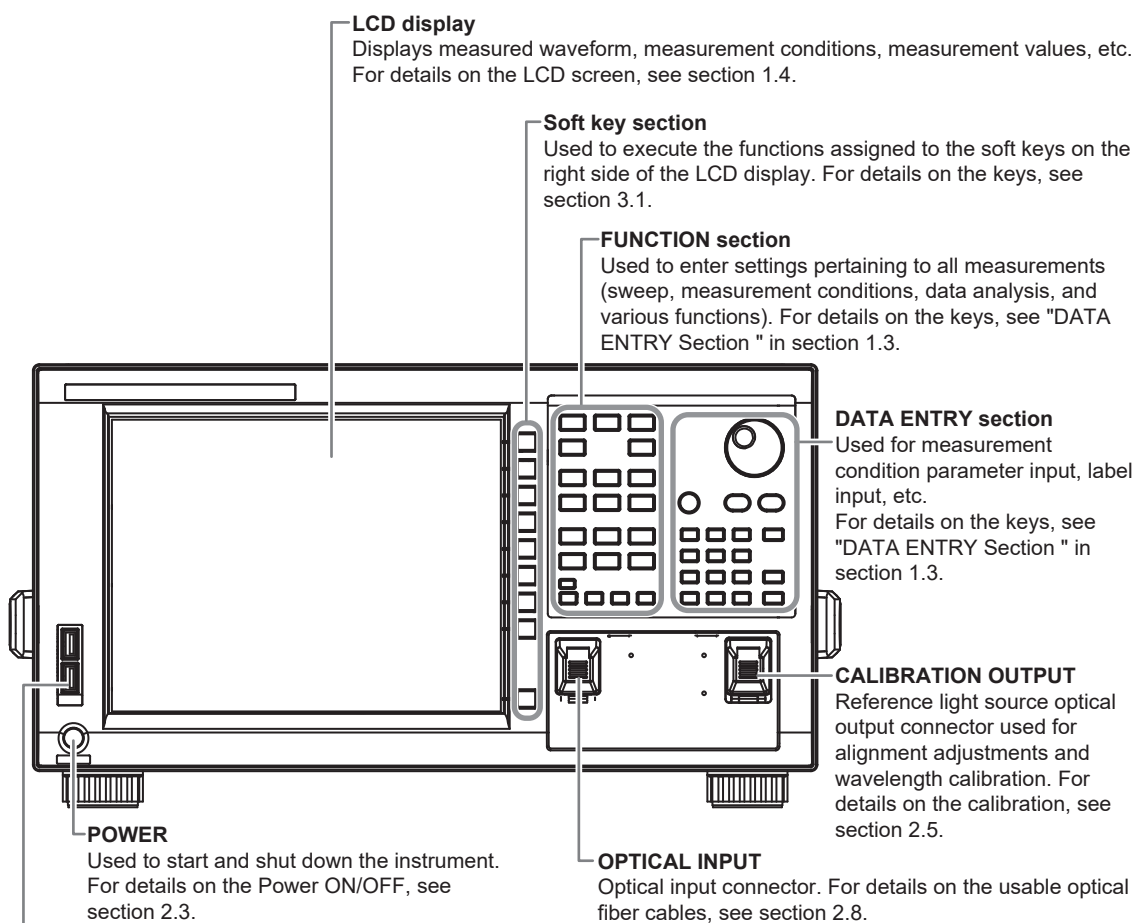
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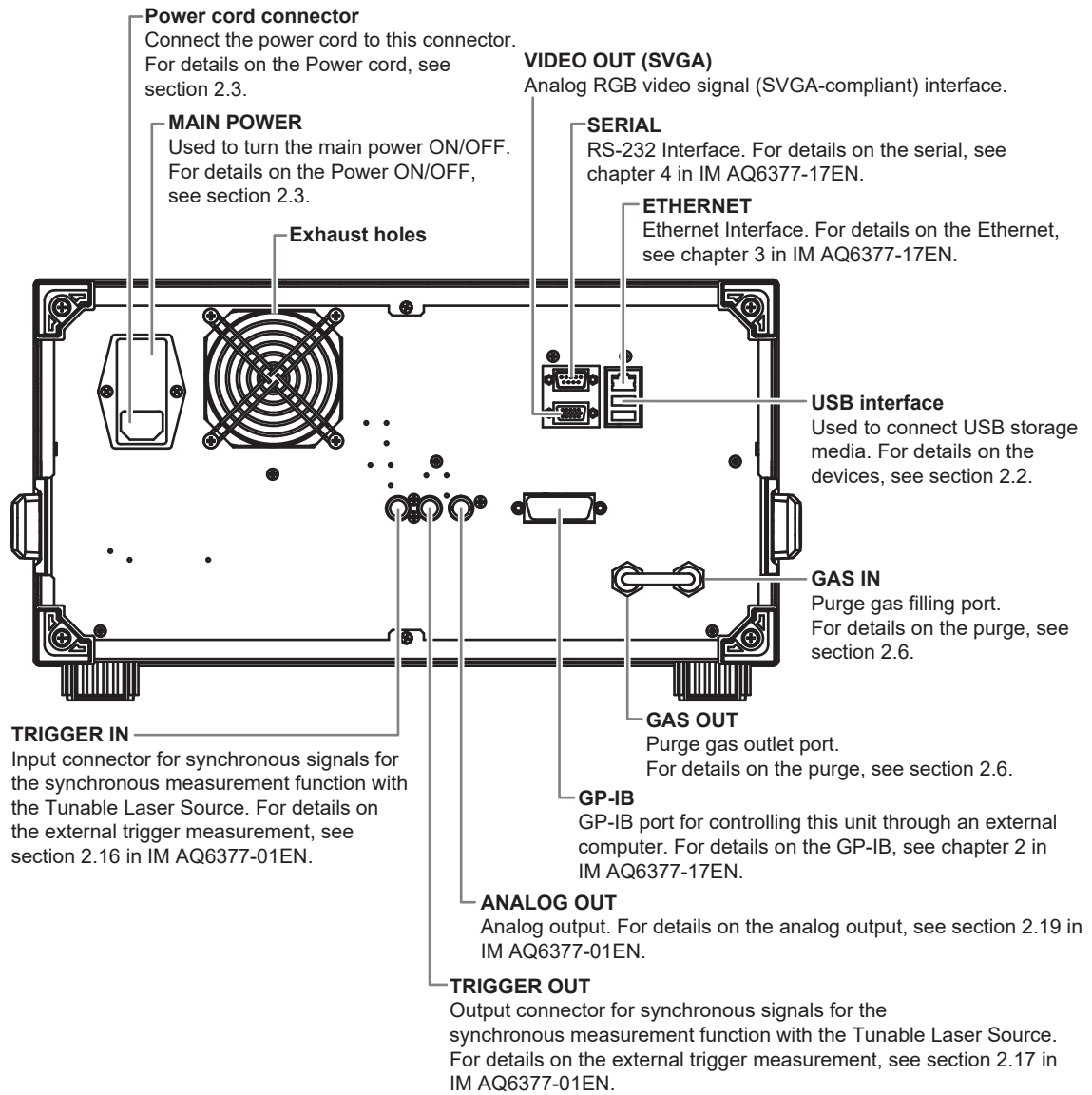
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1.1 Front Panel

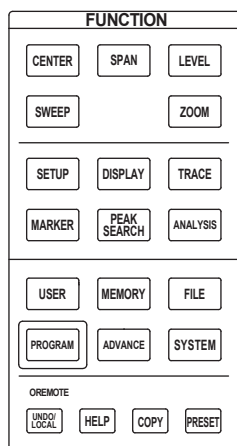


1.2 Rear Panel



1.3 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 for setting reference data used to make comparison judgments on measured data and for logging analysis data.

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

The COPY key is used to output the measurement screen to a file. When you press the COPY key, the measured waveforms and lists displayed on the screen are output to a file.

PRESET

The PRESET key clears all internal settings of the AQ6377 except for the remote interface (ETHERNET, GP-IB, and RS232) settings.

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.

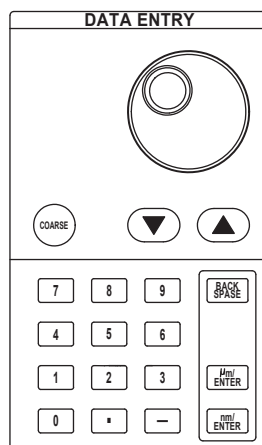
Status of Instrument	Function
UNDO action is allowed	If the UNDO key is pressed after changing parameter settings, changing or deleting data, etc., the previous action (change, deletion, etc.) is canceled and the state preceding that action is restored.
During user key registration	If the UNDO key is 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.

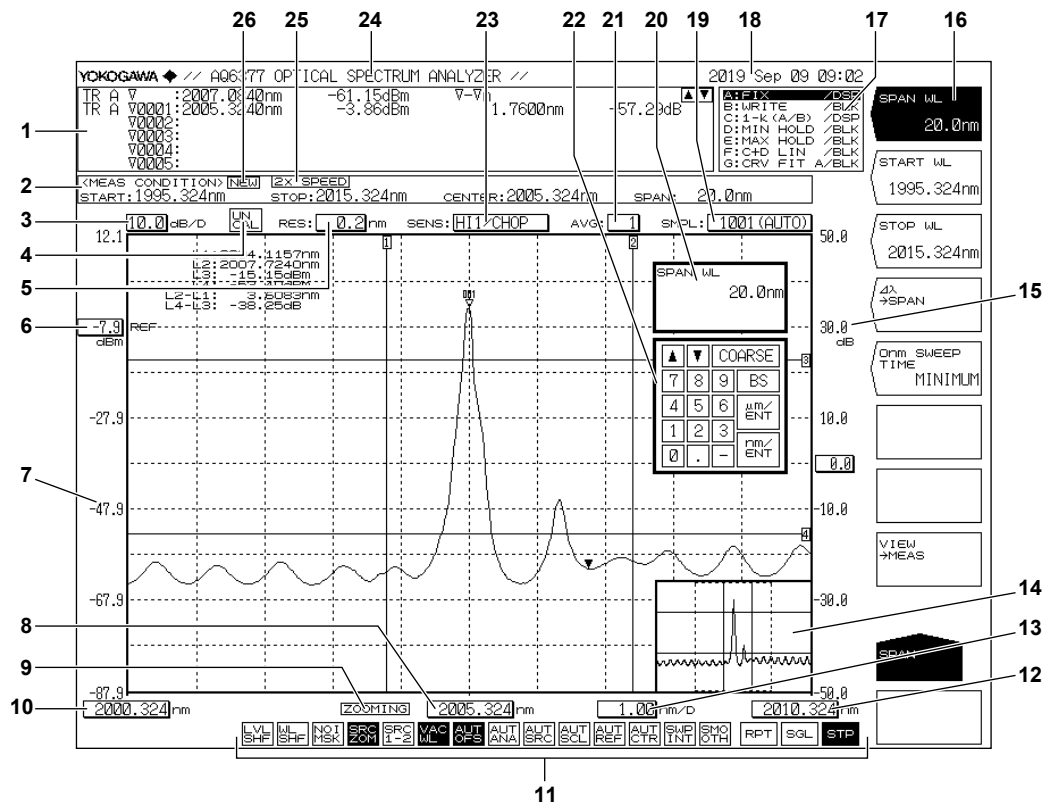
Use one or the other key if entering a parameter value with a particular unit.

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.

1.4 LCD Screen



No.	Name	Function	See
1	Data area	Displays marker values and analysis results. If there are five or more data values, you can scroll the data area with arrow key..	Chapter 3*, Chapter 4*
2	Measurement conditions area	You can set a parameter directly within the frame of the value.	Section 2.5*
	START	Displays and sets the start wavelength, start frequency, or start wavenumber	Section 2.5*
	STOP	Displays and sets the stop wavelength, stop frequency, or stop wavenumber	Section 2.5*
	CENTER	Displays and sets the center wavelength, center frequency, or center wavenumber	Section 2.5*
	SPAN	Displays and sets the sweep span	Section 2.5*
3	dB/D	Displays level axis scale per DIV	Section 2.2*
4	UN CAL	Displayed when the span, sample count, or resolution setting is inappropriate.	Section 2.6 to 2.8*
5	RES	Displays and sets the resolution	Section 2.7*
6	Reference level	Displays the reference level. You can change the vertical display position of the reference level. You can set it directly by clicking the value.	Section 2.4*
7	Level axis scale	Displays the level axis value.	Section 2.2*
8	Center wavelength	Displays and sets the center wavelength or center frequency	Section 2.5*
9	ZOOMING	Appears when the zoom feature is in use.	Section 3.1*
10	Start wavelength	Displays and sets the start wavelength or start frequency	Section 2.5*

1.4 LCD Screen

No.	Name	Function	See
11	Shortcut keys	Shortcuts to frequently used settings. You can quickly specify settings by simply clicking them. When a setting is on, the shortcut key is highlighted.	Section 3.1
12	Stop wavelength	Displays and sets the stop wavelength or stop frequency	Section 2.5*
13	Wavelength axis scale	Displays the wavelength axis scale per division. You can set it directly by clicking the value.	Section 2.2*
14	Overview screen	Appears only when the zoom feature is in use.	Section 3.1*
15	Subscale	Displays relative levels of differential waveforms and normalized waveforms.	Section 2.3*
16	Soft key menu	For configuring various settings.	Section 3.1
17	Trace setting area	Displays the status of each trace. Click to display the setup screen.	Chapter 3*
18	Year, month, day, time		Section 3.5
19	SMPL	Displays and sets the sample count.	Section 2.8*
20	Parameter display area	Displays the parameter entered numerical values.	Section 3.3
21	AVG	Displays and sets the average count.	Section 2.11*
22	Parameter input area	Enters numerical values using the numeric keypad.	Section 3.3
23	SENSE	Displays and sets the measurement sensitivity	Section 2.9*
24	Label area	Up to 56 characters	Section 3.3
25		Displayed when SWEEP SPEED is 2x	Section 2.10*
26		Appears when measurement conditions are changed.	Section 2.5, 2.6*

* See the relevant chapter or section in IM AQ6377-01EN.

2.1 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.
- This instrument has a built-in reference light source for wavelength calibration and transmits infrared light from the optical output connector at all times. 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.

French



AVERTISSEMENT

- L'instrument est prévu pour une utilisation en intérieur. Ne pas l'installer, ni l'utiliser à l'extérieur.
- Installer l'instrument de manière à pouvoir immédiatement le débrancher du secteur en cas de fonctionnement anormal ou dangereux.
- Cet instrument dispose d'une source de lumière de référence intégrée pour les ajustements d'alignement. La lumière infrarouge est toujours émise depuis le connecteur de sortie optique. Ne regardez jamais directement dans le connecteur de sortie optique. La lumière infrarouge risquerait de gravement vous blesser ou de provoquer une perte de vision.

ATTENTION

Ne pas heurter l'instrument

En position non horizontale et ne faites pas chuter l'instrument d'une hauteur de 2 cm ou plus. Cela risquerait d'endommager la précision du monochromateur interne et les performances de l'instrument.

Transportez l'instrument avec maintes précautions et utilisez un emballage d'une capacité d'absorption supérieure ou égale à celle de l'emballage utilisé pour la livraison depuis l'usine.

N'utilisez jamais de matériaux d'emballage de qualité inférieure, incapables d'absorber correctement les vibrations et les chocs survenant au cours du transport.

Cela risquerait d'endommager la précision du monochromateur interne et les performances de l'instrument.

Déballage

Lorsque l'instrument est emballé dans un carton et transporté, évitez toute condensation en le laissant s'adapter aux conditions environnementales suffisamment longtemps avant de le retirer du carton.

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.

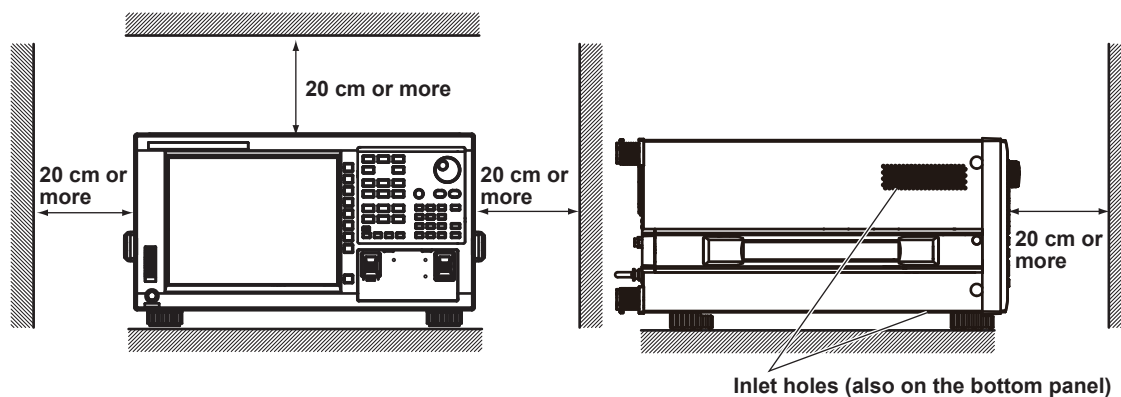
Location without Vibration

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.



Ambient Temperature and Humidity

Ambient temperature: 5 to 33°C

Ambient humidity: 20%RH to 80%RH (no condensation present)

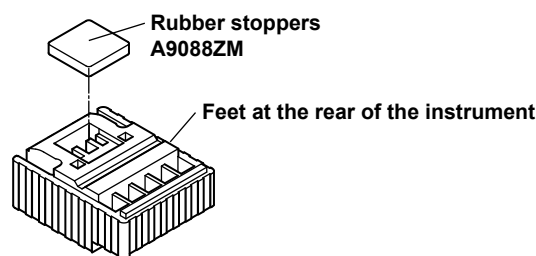
Note

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.

Flat, Even Surface

Install the instrument with the correct orientation on a stable, horizontal surface. If the instrument is installed in a horizontal position, rubber stoppers can be attached to the feet at the rear of the instrument to prevent the instrument from sliding. One set of rubber stoppers (two stoppers) are included with the instrument.

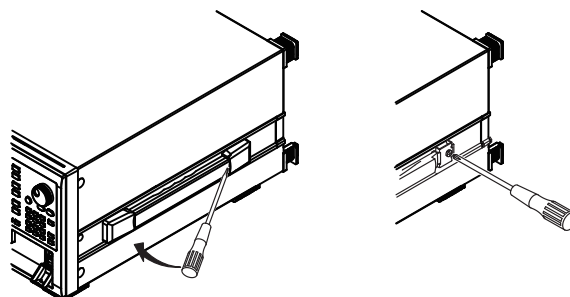
**Rack Mounting**

To rack-mount the instrument, use the separately sold rack mount kit.

Product Name	Model
Rack Mounting Kit for EIA Single	751535-E5
Rack Mounting Kit for JIS Single	751535-J5

An outline of the mounting procedure is given below. For detailed instructions, see the manual that is included with the rack mount kit.

1. Remove the handles from both sides of the instrument.
2. Remove the four feet from the bottom of the instrument.
3. Remove the four seals the rack mount attachment holes on each side of the instrument near the front.
4. Place seals over the feet and handle attachment holes.
5. Attach the rack mount kit to the instrument.
6. Mount the instrument on a rack.

**Note**

- When rack-mounting the instrument, allow at least 10 cm of space around the inlet and exhaust holes to prevent internal heating.
- Make sure to provide adequate support from the bottom of the instrument. The support should not block the inlet and exhaust holes.

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**
Hold the instrument by the handles on the sides of the case. The instrument weighs approximately 23 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 the 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.

2.2 Connecting the Device

Connecting the Mouse

You can use a USB mouse.

Supported USB Mouse

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

Connections

Connect a USB mouse to one of the USB interfaces on the front or rear panel of the instrument.

1. Confirm that **MAIN POWER** switch on the rear panel is OFF.
2. Orient the mouse connector so that it matches the orientation of the interface, then insert the connector.

Note

- There are 2 USB interfaces each on front and rear panels, but do not connect more than one mouse at a time.
- In addition to a USB mouse, the USB interfaces can be used to connect USB storage and keyboards.

For information on operations using the mouse, see section 3.2.

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 USB keyboard.

Connecting

Connect a USB keyboard to one of the USB interfaces on the front or rear panel of the instrument.

1. Confirm that the **MAIN POWER** switch on the rear panel is OFF.
2. Orient the mouse connector so that it matches the orientation of the interface, then insert the connector.

Note

- There are 2 USB interfaces each on front and rear panels, but do not connect more than one keyboard at a time.
- In addition to a USB keyboard, the USB interfaces can be used to connect USB storage and a USB mouse.

For information on operations using the keyboard, see section 3.2.

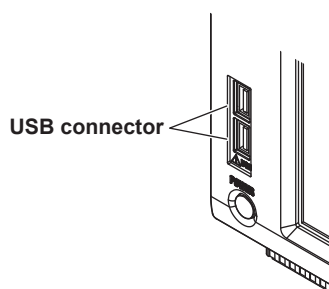
Connecting a USB Storage Device

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 5.1 in IM AQ6377-01EN. (You will use 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.

French



ATTENTION

Ne retirez pas le dispositif de stockage USB et ne coupez pas l'alimentation lorsque le voyant d'accès au dispositif de stockage USB clignote. Cela risquerait d'endommager le dispositif ou les données se trouvant sur ce dernier.

Connecting with Other Devices

The GP-IB, RS-232, or Ethernet interface can be used to connect external devices to this instrument. For details, see the *Remote Control User's Manual*, IM AQ6377-17EN.

Note

Before connecting a GP-IB instrument, such as an external computer, or a LCD monitor or other display to the instrument, check the wiring, and be sure to 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.

2.3 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

- Make sure that the power supply voltage matches the instrument's rated supply voltage and that it does not exceed the maximum voltage range of the power cord to use.
- Check that the instrument's power switch is OFF before connecting the power cord.
- To prevent electric shock or fire, use the power cord for the instrument.
- Make sure to connect protective earth grounding to prevent electric shock. Connect the power cord to a three-prong power outlet with a protective earth terminal.
- Do not use an extension cord without protective earth ground. Otherwise, the protection function will be compromised.
- If there is no AC outlet that is compatible with the power cord that you will be using and you cannot ground the instrument, do not use the instrument.

French



AVERTISSEMENT

- Assurez-vous que la tension d'alimentation correspond à la tension d'alimentation nominale de l'appareil et qu'elle ne dépasse pas la plage de tension maximale du cordon d'alimentation à utiliser.
- Vérifiez que l'interrupteur d'alimentation de l'instrument est sur OFF avant de brancher le cordon d'alimentation.
- Pour éviter tout risque de choc électrique, utiliser exclusivement le cordon d'alimentation prévu pour cet instrument.
- Relier l'instrument à la terre pour éviter tout risque de choc électrique. Brancher le cordon d'alimentation sur une prise de courant à trois plots reliée à la terre.
- N'utilisez pas de rallonge si celle-ci n'est pas reliée à la terre, car la fonction de protection serait compromise.
- Si une sortie CA conforme au câble d'alimentation fourni n'est pas disponible et que vous ne pouvez pas relier l'instrument à la terre, ne l'utilisez pas.

2.3 Turning the Power ON/OFF

Preparing to Turn ON the Power

The AQ6377 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. 100 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. Check that the voltage supplied to the instrument is less than or equal to the maximum rated voltage of the power cord that you will be using before use.

Power On and Screen Display



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.

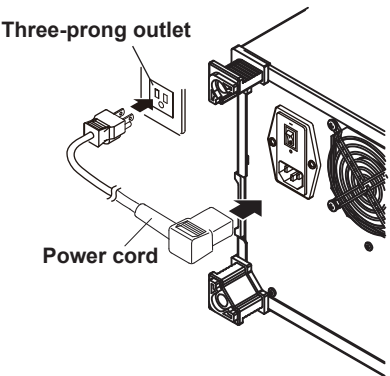
French



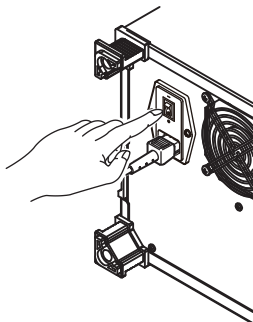
ATTENTION

Ne retirez pas le dispositif de stockage USB et ne coupez pas l'alimentation lorsque le voyant d'accès au dispositif de stockage USB clignote. Cela risquerait d'endommager le dispositif ou les données se trouvant sur ce dernier.

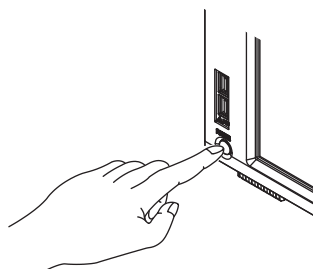
1. Connect the power cord to the power cord connector on the back side of the instrument.



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. Wait a few seconds after step 2, and then 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 instrument will not start for a few seconds immediately after step 2 even if you press the POWER switch.



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.

French



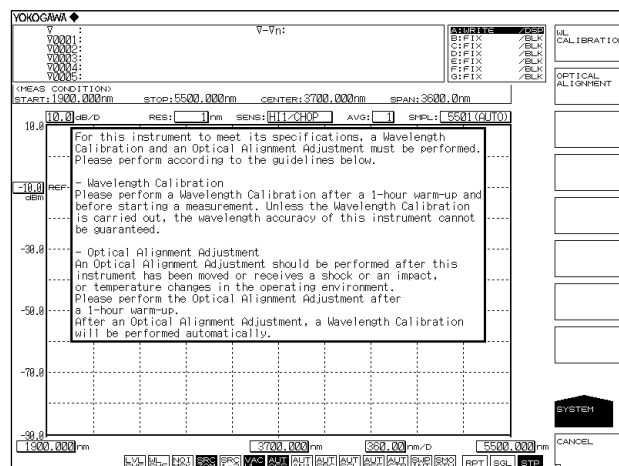
ATTENTION

N'appuyez pas sur les interrupteurs POWER ou MAIN POWER pendant l'initialisation. Cela pourrait provoquer des dysfonctionnements.

2.3 Turning the Power ON/OFF

Operations Performed When the power is Turned On

When the initialization finishes successfully, the following measurement screen appears.



A message prompting you to execute wavelength calibration and alignment adjustment appears. The message that appears is shown below.

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

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.

For details on alignment adjustment, see section 2.4.

Wavelength Calibration

Perform wavelength calibration 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.

For details on wavelength calibration, see section 2.5.

When the Power-on Operation Does Not Finish Normally

Turn off the power switch, and check that :

- The instrument is installed properly. See section 2.1, "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 a memory error or other errors occur during initialization, initialization is cancelled at the step in which the error occurs (STEP @/9, where @ is a number from 1 to 9). Then, the screen changes to the measurement screen, and a warning message is displayed. If this occurs, repairs are necessary. Contact your nearest YOKOGAWA dealer immediately.

Note

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.

Turning the Power OFF

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. Furthermore, since the monochromator will not be retracted, transporting or moving the instrument repeatedly in this condition may damage the monochromator. Be sure to follow the above procedure to shut down the instrument. Always use the above procedure to shut down.

French

ATTENTION

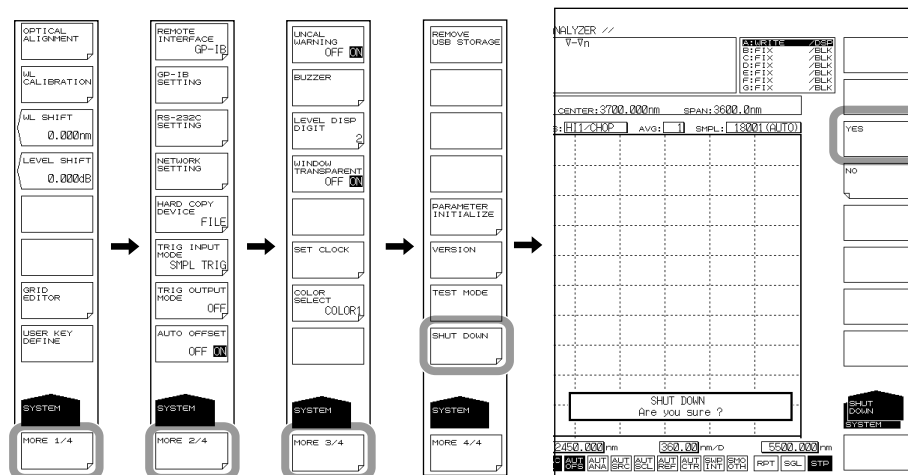
Lorsque l'instrument est en cours de fonctionnement, ne coupez pas son alimentation à l'aide de l'interrupteur MAIN POWER situé sur le panneau arrière. Le fichier de configuration du système d'exploitation ne serait pas sauvegardé, ce qui entraînerait probablement des dysfonctionnements à la prochaine mise sous tension de l'instrument. Suivez toujours la procédure ci-dessous. En outre, le monochromateur ne se rétractant pas, le transport ou le déplacement répété de l'instrument dans cet état risque de provoquer l'endommagement du monochromateur. Veiller à suivre la procédure ci-avant pour arrêter l'instrument.

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, "AQ6377 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.

2.3 Turning the Power ON/OFF

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

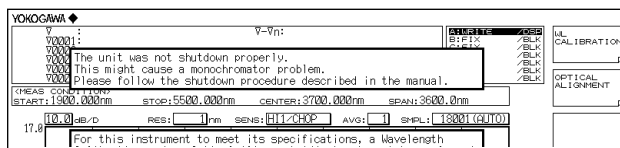
If for some reason the instrument fails to shut down normally, hold down the **POWER** switch for approximately four seconds or longer to force standby mode. Note that the operating system configuration file will not be backed up, possibly resulting in malfunctions upon start up the next time the instrument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

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.



2.4 Alignment Adjustment



WARNING

The instrument has a built-in reference light source for wavelength calibration, 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.

French

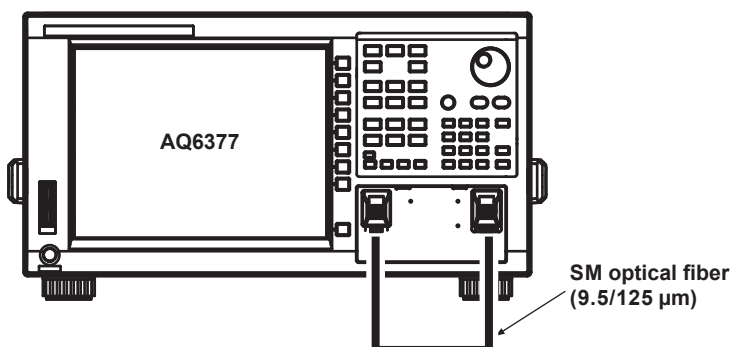


AVERTISSEMENT

Cet instrument dispose d'une source de lumière de référence intégrée pour les ajustements d'alignement. La lumière infrarouge est toujours émise depuis le connecteur de sortie optique. Ne regardez jamais directement dans le connecteur de sortie optique. La lumière infrarouge risquerait de gravement vous blesser ou de provoquer une perte de vision.

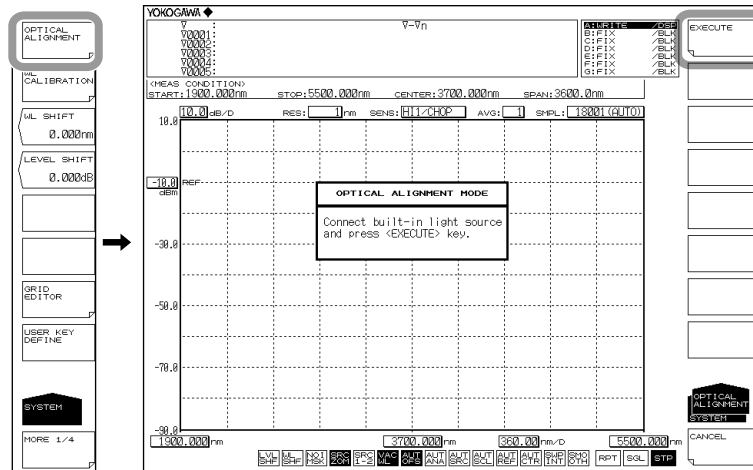
Procedure

1. Turn the power to the instrument ON. Turn ON the **MAIN POWER** switch and press the **POWER** switch. For instructions on turning the power ON and OFF, see section 2.3.
2. Use a 9.5/125 μm SM optical fiber to connect the instrument's optical input connector with the optical output connector.



3. Press **SYSTEM**. The soft key menu is displayed.
4. Press the **OPTICAL ALIGNMENT** soft key.

2.4 Alignment Adjustment



5. Press the **EXECUTE** soft key. Alignment adjustment is automatically executed. Adjustment finishes a few minutes thereafter, and you are returned to the original screen.
6. Press the **CANCEL** soft key to cancel alignment adjustment partway through the process.

Note

- After alignment has been executed, wavelength calibration is also performed automatically inside the instrument.
- The alignment adjustment has no effect if the process is stopped. The instrument remains in the state prior to execution of the alignment adjustment.

2.5 Wavelength Calibration



WARNING

The instrument has a built-in reference light source for wavelength calibration, 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.

French



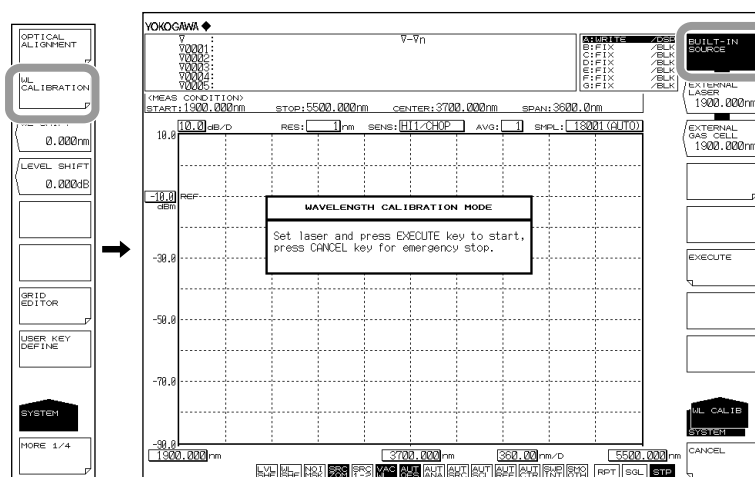
AVERTISSEMENT

Cet instrument dispose d'une source de lumière de référence intégrée pour les ajustements d'alignement. La lumière infrarouge est toujours émise depuis le connecteur de sortie optique. Ne regardez jamais directement dans le connecteur de sortie optique. La lumière infrarouge risquerait de gravement vous blesser ou de provoquer une perte de vision.

Procedure

Wavelength Calibration Using the Internal Reference Light Source

1. Turn the power to the instrument ON.
Turn ON the **MAIN POWER** switch and press the **POWER** switch.
For instructions on turning the power ON and OFF, see section 2.3.
2. Use a 9.5/125 μm SM optical fiber to connect the instrument's optical input connector with the optical output connector.
3. Press the **SYSTEM** key. The soft key menu is displayed.
4. Press the **WL CALIBRATION** soft key.



5. Press the **BUILT-IN SOURCE** soft key.
6. Press the **EXECUTE** soft key. Wavelength calibration is executed for several minutes. The previous screen is displayed again after the calibration process ends.

7. Press the **CANCEL** soft key during wavelength calibration to cancel the wavelength calibration process.

Note

- Always perform wavelength calibration after turning ON the power to the instrument and allowing the warm-up to finish.
- If you are using this instrument for the first time or using it after it has been severely shaken while being moved, you must perform the alignment adjustment procedure after warm-up ends.
- If the wavelength error of the instrument is outside of ± 20 nm, you cannot perform wavelength calibration with the internal reference light source.
(Readjustment required. Contact your nearest Yokogawa dealer.)

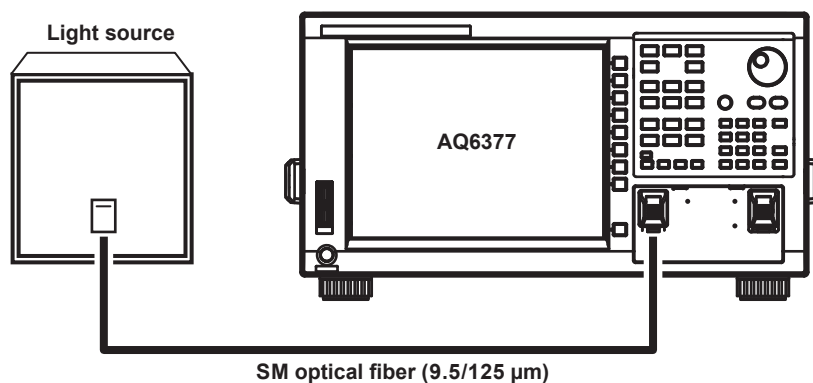
Wavelength Calibration Using and External Light Source

Instead of using the internal reference light source, it is also possible to calibrate the instrument using an external light source. However, the following light sources cannot be used for wavelength calibration.

- If the set wavelength is not the same as that of the calibration light source.
- If the wavelength error of the instrument is outside of ± 0.5 nm.
(Readjustment required. Please contact your nearest Yokogawa representative.)
- If you are using a reference light source with multiple absorption lines, and the instrument's wavelength shift is greater than the wavelength interval of the absorption lines (with the result that an adjacent absorption line is used as the reference wavelength).

Connecting the External Light Source

1. Turn the power to the instrument ON.
Press the MAIN POWER switch and press the POWER switch.
For instructions on turning the power ON and OFF, see section 2.3.
2. Use a 9.5/125 μm SM optical fiber to connect the external light source's optical output connector with the optical input connector.



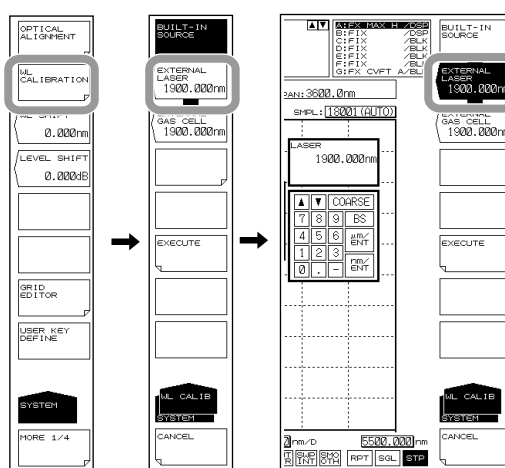
Setting the Type of External Light Source and Calibration Wavelength Value

3. Press **SYSTEM**. The soft key menu is displayed.
4. Press the **WL CALIBRATION** soft key.

Select the type of external light source (laser-type external light source or gas cell absorption line type external light source) and set the calibration wavelength value. There are three different ways to set the wavelength value.

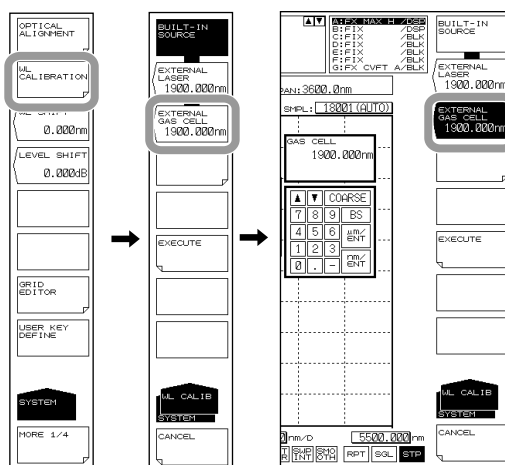
For Laser Type Light Sources

- Press the **EXECUTE LASER** soft key. A screen for specifying the wavelength of the external light source is displayed.
- Select the laser wavelength value using the rotary knob or the arrow keys. The allowed wavelength range is 1900–5500 nm.
- Press **nm/ENTER**. The wavelength value is set.
- Press the **EXECUTE** soft key. Wavelength calibration is executed. The previous screen is displayed again after the calibration process ends.
- Press the **CANCEL** soft key during wavelength calibration to cancel the wavelength calibration process.



For Gas Cell Absorption Line Type Light Sources

- Press the **EXECUTE GAS CELL** soft key. A screen for specifying the wavelength of the external light source is displayed.
- Select the gas cell absorption line wavelength value using the rotary knob or the arrow keys. The allowed wavelength range is 1900–5500 nm.
- Press **nm/ENTER**. The wavelength value is set.
- Press the **EXECUTE** soft key. Wavelength calibration is executed. The previous screen is displayed again after the calibration process ends.
- Press the **CANCEL** soft key during wavelength calibration to cancel the wavelength calibration process.



2.6 Purge



CAUTION

- NEVER use a flammable gas to purge the AQ6377.
- The purge gas must be free of moisture, oil, carbon dioxide and other reactive or infrared-absorbing materials.

French



ATTENTION

- N'utilisez JAMAIS de gaz inflammable pour purger le AQ6377.
- Le gaz de purge doit être exempt d'humidité, d'huile, de dioxyde de carbone et d'autres matériaux absorbant le rayonnement infrarouge.

Principles and objectives

Water vapor present in the monochromator absorb light in the 1800–1950 and 2450–2950 nm area, carbon dioxide present in the monochromator absorb light in the 4150–4500 nm area, resulting in ripples in the measurement waveform.

The AQ6377 can be purged with high purity nitrogen or purge gas in order to reduce water vapor and carbon dioxide absorption lines in the measurement results. Nitrogen gas is recommended for AQ6377 which has hygroscopic optical components and ambient water vapor may interfere with measurements.



CAUTION

The instrument warranty will be void if damage is caused by the use of inappropriate facilities.

French



ATTENTION

La garantie de l'instrument est nulle si les dommages sont causés par l'utilisation de locaux inadaptés.

Nitrogen purge equipment

The nitrogen purge equipment is NOT supplied by YOKOGAWA, but the required hardware is available from appropriate commercial suppliers.

The on/off valve, the pressure regulator, the flowmeter and the tubing must be dry, oil-free and uncontaminated.

Supply tubing

The AQ6377 has 1/4" outer diameter quick connectors on the back panel. Use clean flexible 1/4" outer diameter nylon tubing (6mm inner diameter) and never use rubber tubing.



CAUTION

- Before purge with nitrogen, ensure that there is adequate ventilation in the room.
- The instrument warranty will be void if damage is caused by the use of inappropriate nitrogen and purge gas.

French



ATTENTION

- Avant toute purge à l'azote, vérifiez que la pièce est correctement ventilée.
- La garantie de l'instrument est nulle si les dommages sont causés par l'utilisation d'azote ou d'air sec inadaptés.

Purge gas

Use ultra-high purity liquid nitrogen which must be 99.9999% pure grade with the heat exchanger is recommended. The gas temperature must be $23\pm 5^{\circ}\text{C}$.

If compressed nitrogen must be used, the gas must be dry, oil-free and uncontaminated. Never use compressed nitrogen from a supplier who uses oil or water in the compression process.

Maximum rating

Pressure and flow rate of purge gas must be lower than the following maximum rating.

Pressure: 1.5 psig (0.01 MPaG)

Flow rate: 25 SCFH (12 L/min)

Purge Gas Temperature Specifications

Gas temperature: $23\pm 5^{\circ}\text{C}$

Note

- A pressure regulator and precision flowmeter must be used.
- A precision flowmeter with an adjustable needle valve is recommended.



CAUTION

The instrument warranty will be void if damage is caused by incorrect setting of pressure and flow rate.

French



ATTENTION

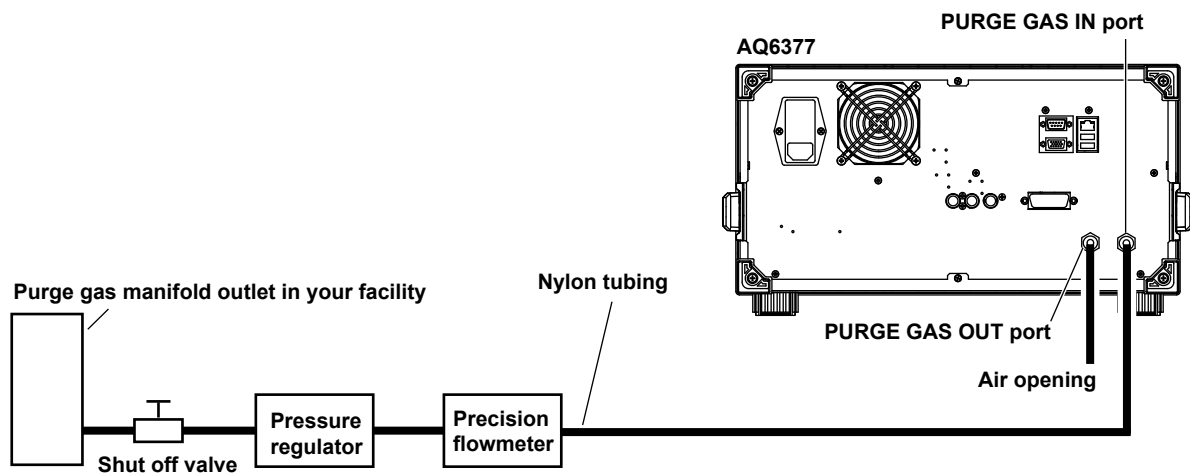
La garantie de l'instrument est nulle si les dommages sont causés par un paramètre incorrect de pression ou de débit.

Installation and operation

The pressure regulator and the precision flowmeter must be inserted in the system between the purge gas manifold outlet in your facility and the AQ6377.

Moreover, gas out port of the AQ6377 must not be blocked and be sure there is adequate ventilation in the room.

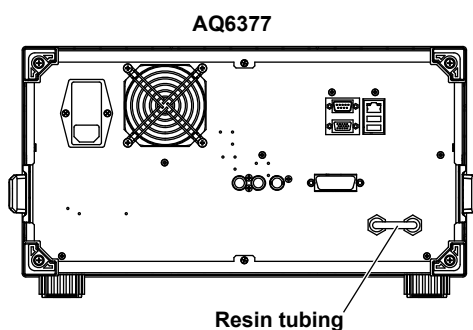
Recommended Equipments for Purge	QTY.	Comments
Shut off valve for 1/4" tubing	1	Must be free of oil
Adjustable pressure regulator	1	To regulate up to: 75 psig (0.5 MPaG)
Flowmeter with needle valve	1	To control up to: 25 SCFH (12 L/min)
1/4" outer diameter nylon tubing	As Required	Must not be rubber
Purge gas	As Required	99.9999% pure grade nitrogen gas recommended



1. Open the purge gas shut off valve then adjust the pressure regulator to provide an appropriate supply pressure below the maximum rating of the precision flowmeter.
2. Adjust the needle valve of the precision flowmeter slowly to provide an appropriate purge gas flow rate.
The internal moisture of the AQ6377 can be displaced by the purge gas within approx. 60 minutes using a flow rate of 20 SCFH (9.5 L/min).
3. To use the AQ6377 in a purged condition, perform alignment adjustment and wavelength calibration with the internal air replaced with purge gas.
See section 2.4 for details on the alignment adjustment operation, and 2.5 for wavelength calibration.

Note

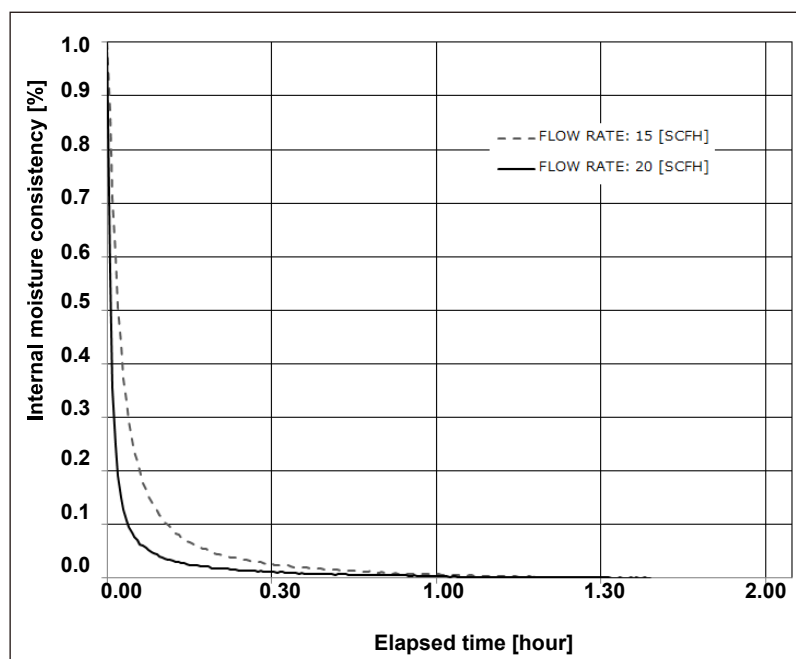
When the AQ6377 is shipped from the factory, a resin tube is attached to the PURGE GAS IN and PURGE GAS OUT terminals to prevent dust from entering the inside.
When installing required equipment and components, remove this resin tube.



The recommended purge gas flow rate into the AQ6377 is 15 to 20 SCFH (7 to 9.5 L/min).

The figure below shows the purge efficiency by 15 and 20 SCFH pure nitrogen gas flow rate.

Purge efficiency of the AQ6377



2.7 Connecting the DUT



WARNING

Do not look at the optical fiber laser light that you are measuring or point the laser at another person's eye. Doing so may cause eye damage or impair one's health. The instrument has a built-in reference light source for alignment, 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

- 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.
- As there may be dust adhering to calibration output, be sure to clean it before connecting optical fiber.
- 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 AQ6377's maximum rated level. If input light exceeding the maximum rated level is introduced, the optical section may be damaged.
- 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.
- 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.

French



AVERTISSEMENT

Ne regardez pas directement la lumière du laser à fibre optique et ne pointez pas le laser vers le yeux d'une tierce personne, pour ne pas provoquer de blessures ou de dommages oculaires.

Cet instrument dispose d'une source de lumière de référence intégrée pour les ajustements d'alignement. La lumière infrarouge est toujours émise depuis le connecteur de sortie optique. Ne regardez jamais directement dans le connecteur de sortie optique. La lumière infrarouge risquerait de gravement vous blesser ou de provoquer une perte de vision.

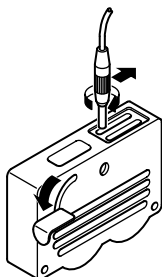


ATTENTION

- Avant de connecter l'instrument à une fibre optique, vérifiez que la procédure d'initialisation de démarrage est terminée. Si vous connectez une source de lumière puissante au démarrage, la section optique risque d'être endommagée.
- Veillez à nettoyer l'extrémité du connecteur de la fibre optique avant le raccordement.
- Comme il peut y avoir de la poussière adhérant à la sortie d'étalonnage, assurez-vous de le nettoyer avant de fixer l'adaptateur de connecteur.
- Ne forcez pas le connecteur de la fibre optique dans la fiche en l'insérant de manière inclinée. Vous risqueriez de l'endommager ou d'endommager ses composants.
- Avant de connecter la lumière d'entrée, vérifiez qu'elle ne dépasse la valeur nominale maximale de l'analyseur AQ6377, car si tel était le cas, la section optique pourrait être endommagée.
- Ne pas expirer ou souffler de l'air comprimé dans le monochromateur de l'entrée optique. Cela pourrait permettre à la poussière ou d'autres matériaux pour entrer dans le monochromateur, nuire à ses performances optiques. En outre, si des débris adhère aux composants optiques à l'intérieur du monochromateur quand une forte source de lumière est entrée, le monochromateur peut être endommagé.
- Appuyez fermement le connecteur optique sur la surface nettoyante du nettoyeur. Si vous n'appuyez pas fermement, le connecteur optique risque de ne pas être correctement nettoyé.

Cleaning the Optical Fiber End Face

1. Firmly press the connector end face of the optical fiber against the cleaning surface of the cleaner.
2. While pressing the end face against the cleaner, turn it once.
3. While pressing the end face against the cleaner, move it.
4. Repeat steps 1 to 3.



Note

- If you do not firmly press the connector end face of the optical fiber against the cleaner, the end face may not be cleaned completely.
- You can purchase an optical fiber connector cleaner from NTT-AT Corporation.

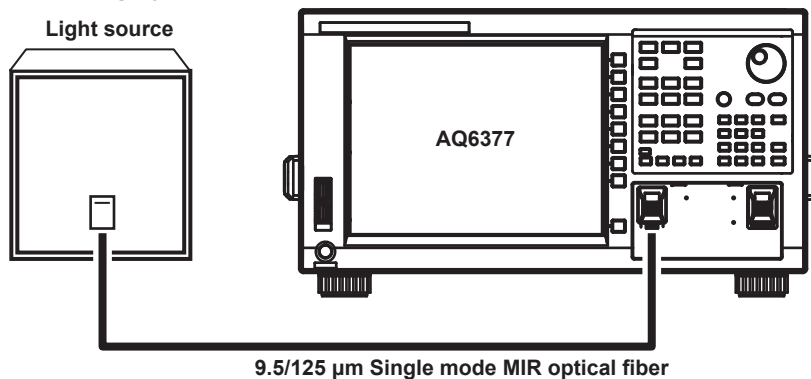
Connecting Optical Fibers

5. Open the instrument's optical input connector cover.
6. Connect the optical fiber's optical connector to the optical input connector on the instrument.

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



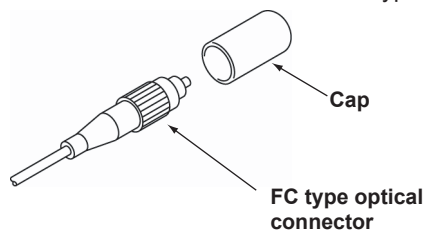
Note

When measuring wavelengths of 2000 nm or greater, use a mid infrared optical fiber.

Explanation

Optical Connectors Types

The instrument can use FC or SC type optical connectors.



2.8 Important Points During Measurement

Types of Optical Fibers That Can Be Used with This Instrument

In the measurement wavelength range of this instrument (1900 to 5500 nm), quartz optical fibers absorb a lot of light and may affect the measurement results.

When making measurements, use an optical fiber (e.g., fluoride fiber) with small infrared absorption.

Limitations on Wavelength Resolution

The maximum wavelength resolution for the instrument is 0.2 nm, which is only obtainable when using a single-mode optical fiber with a core diameter of 9.5 μm or less. As shown in Table, the maximum wavelength resolution decreases when optical fibers with thicker core diameters are used.

Setting a resolution value finer than those shown in the table below will simply result in an inaccurate measurement level without improving resolution.

Optical fibers with a thick core diameter are especially useful for inputting spatial light for measurement, but they have poor resolution.

Choose the best type of optical fiber for your particular application.

Note that the instrument is designed for input through optical fiber only. It will not work with inputs that do not pass through optical fiber, such as direct input of a gas laser beam to the optical input connector, or bonding an LED to the optical input connector. It is important to note that optical spectrum measurements taken through such inputs are completely unreliable.

For spatial light measurements, input the spatial light to the optical fiber and from the optical fiber to the instrument. A variety of adapters are available for this purpose.

Summary of usable optical fiber types and usage limitations

Optical Fiber Type		Obtained Wavelength Resolution (in nm)
Type	Core Diameter	
SMF	5	0.20
SMF	9.5	0.20
SMF	13	0.20
MMF	50	0.50
MMF	80	1.00
MMF	100	1.00
MMF	200	2.00
MMF	400	5.00

2.8 Important Points During Measurement

Level Accuracy

The absolute level of this instrument is assigned based on the difference from the original standard instrument using a single-mode fiber for the 2 μm band.*

This value is a typical value and is not guaranteed.

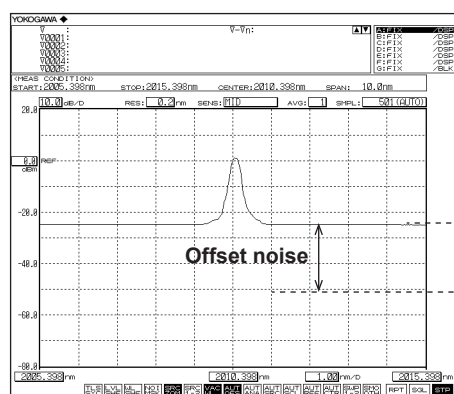
* Mode field diameter: 13 μm @2000 nm, NA: 0.12

Measurement Sensitivity

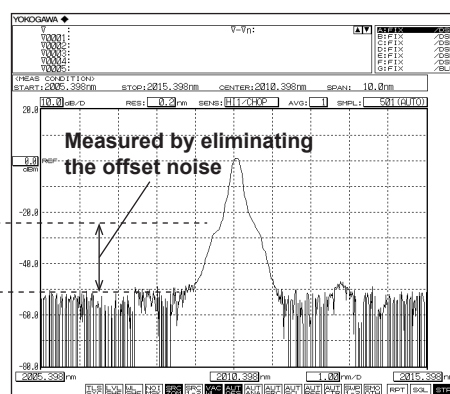
When the measurement sensitivity is set to HIGH1/CHOP to HIGH3/CHOP, the offset noise from the photodetector and analog circuit is eliminated allowing measurements over a wide level range.

When the measurement sensitivity is set to NORM/HOLD, NORMAL/AUTO, NORMAL, or MID, optical spectrum at -20 dBm or higher can be measured at high speeds.

In this case, a low-level optical spectrum may be buried in offset noise, preventing it from being measured.



When the measurement sensitivity is MID

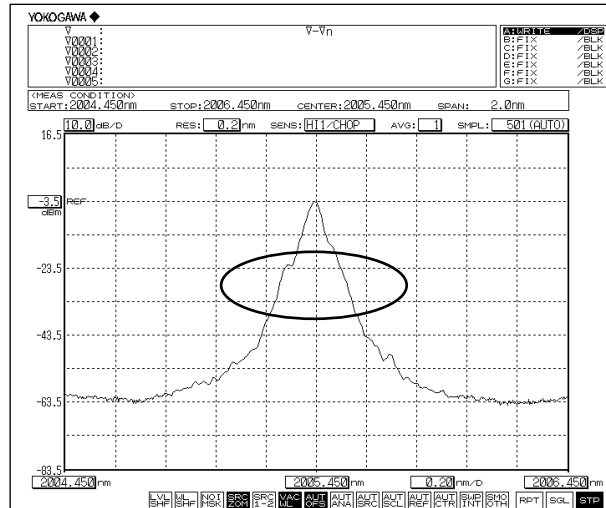


When the measurement sensitivity is HIGH1/CHOP

The measurement sensitivity is higher using the HIGH2/CHOP setting than using HIGH1/CHOP and higher using HIGH3/CHOP than using HIGH2/CHOP. Measurement with higher sensitivity becomes possible with a higher setting. However, the higher the measurement sensitivity, the longer it takes to make a measurement. Therefore, select the appropriate sensitivity as necessary.

Waveforms with Resolutions of 0.2 nm

When the resolution is set to 0.2 nm for measurements of a light source such as a DFB laser in which the spectral width is narrower than the instrument's resolution, very small spikes may occur at the skirts of the waveform. This type of spike occurs due to characteristics of the optical block and is not an indication of any problem. Even if such spikes occur, satisfactory performance in terms of resolution, dynamic range, and the like can be ensured. These spikes will disappear if the resolution is set to a coarser value.

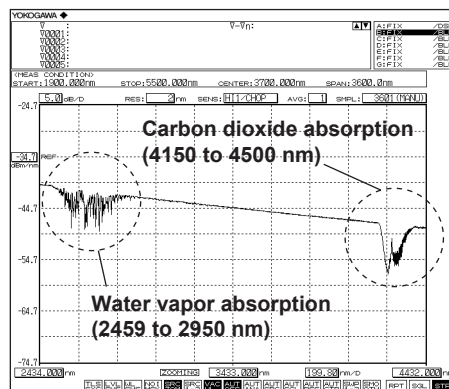


Absorption near the 1900 to 1950 nm and 2450 to 2950 nm Areas

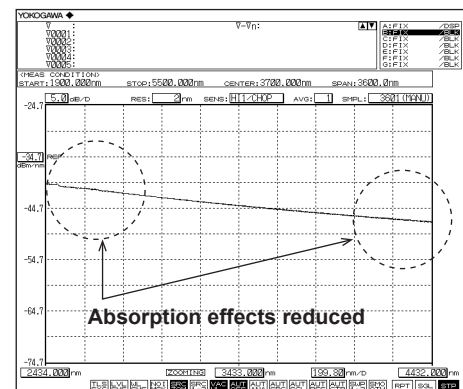
Water vapor present in the monochromator absorbs light in the 1900 to 1950 nm and 2450 to 2950 nm area, which affects measurement waveforms. In such a case, set the instrument's resolution to a wider setting, or install the instrument in a low-humidity environment. Note that the effects of water vapor on measurement waveforms can be reduced by performing a purge described in section 2.6.

Absorption near the 4150 to 4500 nm Area

Carbon dioxide present in the monochromator absorbs light in the 4150 to 4500 nm area, which affects measurement waveforms. The effects of carbon dioxide can be reduced by performing a purge described in section 2.6.



Waveform before purging

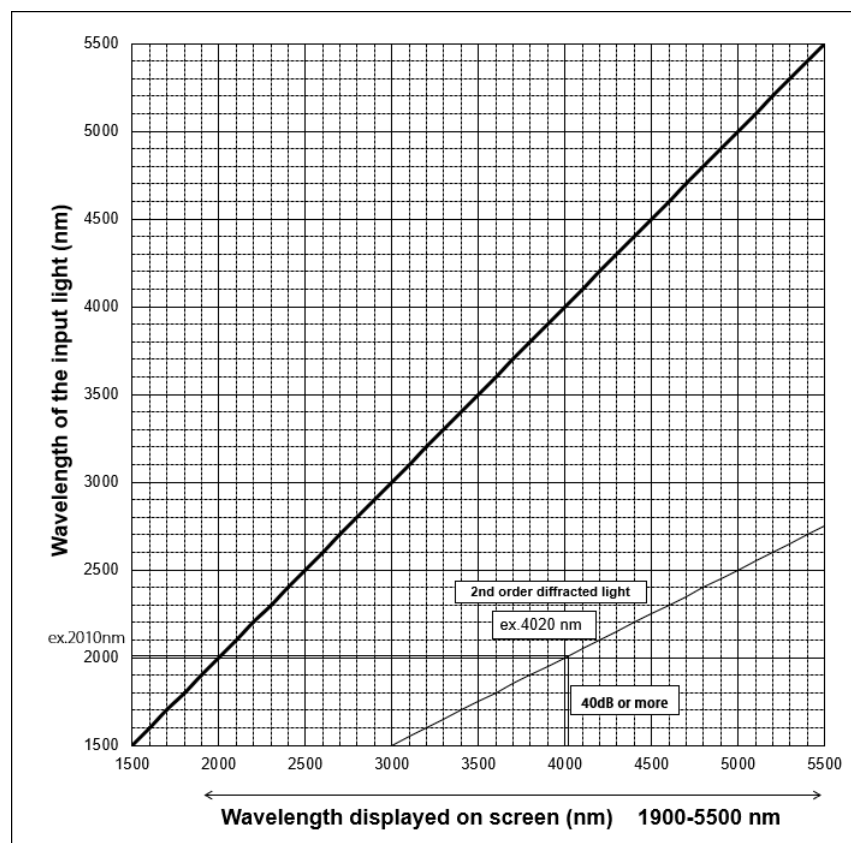


Waveform after purging

High-Order Diffracted Light

In principle, the monochromator generates ghosts due to high-order diffracted light that is an integer multiple of the input light. This instrument is equipped with a monochromator containing an optical filter that suppresses input light with wavelengths other than those under measurement to suppress the ghost effect caused by the high-order diffracted light. However, the optical filter cannot completely remove the unnecessary high-order diffracted light. Therefore, it is important to know how the high-order diffracted light will appear.

The following figure is a graph of the wavelengths displayed on the screen versus the actual wavelengths. The horizontal axis is the wavelengths displayed on the screen, and the vertical axis is the actual wavelengths. In addition, the solid lines on the graph indicate the correspondence between the displayed wavelengths and actual wavelengths. The thick solid line displays the correct optical spectral correspondence (obviously the displayed wavelengths match the actual wavelengths), and the thin solid line displays the correspondence with the ghost caused by the high-order diffracted light. The numbers written next to the thin solid line indicate the level of suppression of the ghost caused by the high-order diffracted light relative to the correct optical spectrum. However, the values are rough estimates; they are not guaranteed. For example, if a 2010 nm light is input to this instrument, the intersections of a horizontal line drawn from 2010 nm on the vertical axis and the lines on the graph correspond to the displayed wavelengths. As a result, we can see that in addition to 2010 nm, a ghost appears at the 4020 nm position. We also see that the level of the ghost is suppressed by more than 40 dB relative to the correct optical spectrum. In other words, at the measurement wavelength around 4000 nm, even if light around 2000 nm is input simultaneously, this light is suppressed by more than 40 dB due to the effect of the internal optical filter, making measurements around 4000 nm possible.



3.1 Description of Soft Keys

When you press a function key, the soft key menu (inside the screen) located on the right side of the screen changes.

The soft key menus are designed to provide a certain level intuitiveness, with the individual soft keys having particular forms which make them easy to understand.

Forms and Behavior



This is a normal soft key.
Press to execute its function immediately.



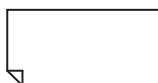
Contains a submenu.
Indicates that there is a submenu of additional items related to the current item.
Press to display the submenu.



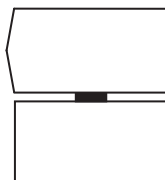
A separate window will be displayed.
Press to display a separate window in the screen for entry of numerical parameters.
A submenu and separate window will be displayed.



Press to move to the submenu and display a separate window.
This softkey returns to the previous menu.

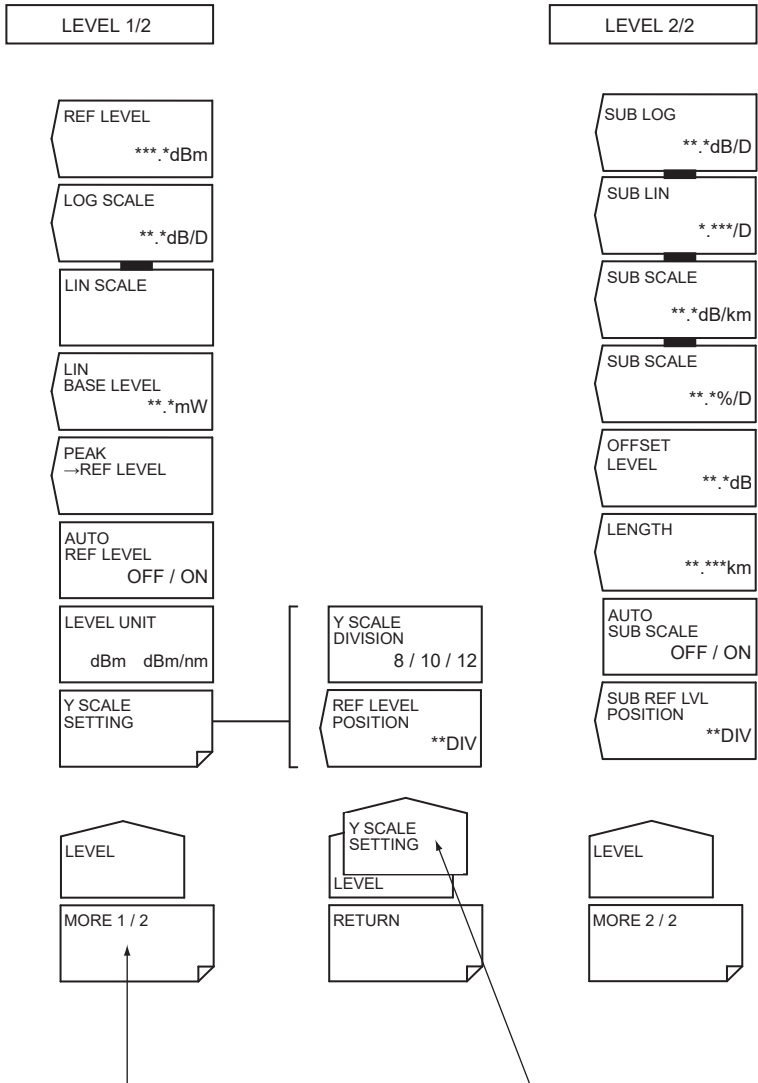


Press to display the previous soft key menu.
This is a selection soft key.



Select one of the soft keys connected with the black band.
When selected, the soft key is displayed in reverse video.
Several soft keys can be connected.

Display Examples



The LEVEL soft key menu is split into two parts. This key switches between the menus. In addition, in some cases this may change to a function that closes the window. For example, when the MORE 1/2 soft key is pressed, the menu changes to the LEVEL 2/2 soft key menu, and the key display changes to MORE 2/2.

Shows the submenu of the soft key menu. In this example, the soft key menu is within the Y SCALE SETTING submenu (for display only, no keys are available).

3.2 Using the Mouse and External Keyboard

Using the Mouse

With a connected mouse you can perform the same operations as with the instrument's panel keys. Also, if you move the mouse pointer over the item in the menu screen that you wish to select and click it, the instrument responds exactly as if you had pressed the corresponding soft key. The USB mouse is connected to the USB interface on the front panel of the instrument.

For instructions on connecting the mouse, see section 2.2.

Operations the Same as the Panel Keys

Displaying the Top Menu

Right-click the mouse in the screen. The names of the front panel keys in the instrument's FUNCTION section are displayed.

CENTER SPAN LEVEL
SWEEP ZOOM
SETUP TRACE DISPLAY
MARKER PEAK SEARCH ANALYSIS
USER MEMORY FILE PROGRAM ADVANCE SYSTEM
UNDO/LOCAL COPY PRESET HELP

Selecting Items

Move the pointer to the item you wish to select and click. A setting menu for the selected item appears. The list of front panel key names disappears.

Clearing the List of Front Panel Keys

Move the pointer away from the list of front panel keys and click.

Operations the Same as the Soft Keys

Selecting Functions from the Soft Key Menu

Move the pointer to the soft key you wish to select and click. A screen corresponding to the action of the soft key appears.

Using the External Keyboard

The functions of each of the front panel keys 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.

The panel key correspondence table below shows the correspondences between the panel keys and the keys on the keyboard. Also, you can directly enter labels, file names, and numbers.

Panel Key Correspondence Table

Type		Function	External Keyboard	Description
FUNCTION	Sweep	SWEEP	[SHIFT]+[F1]	Executes/sets sweep
	Meas. settings	CENTER	[SHIFT]+[F2]	Sets measurement center wavelength
		SPAN	[SHIFT]+[F3]	Sets measurement span
		LEVEL	[SHIFT]+[F4]	Sets level axis
		SETUP	[SHIFT]+[F5]	Sets resolution, sensitivity, etc.
	Display settings	TRACE	[SHIFT]+[F6]	Sets trace
		ZOOM	[SHIFT]+[F7]	Sets display scale
		DISPLAY	[SHIFT]+[F8]	Sets screen display
	Analysis functions	MARKER	[SHIFT]+[F9]	Sets marker
		SEARCH	[SHIFT]+[F10]	PEAK/BOTTOM search function
		ANALYSIS	[SHIFT]+[F11]	Sets analysis function
	Other	USER	[ALT]+[F1]	User settings menu
		MEMORY	[ALT]+[F2]	Memory
		FILE	[ALT]+[F3]	Saves/opens files, file actions
PROGRAM		[ALT]+[F4]	Program Functions	
ADVANCE		[ALT]+[F5]	Advanced functions	
SYSTEM	[ALT]+[F6]	System settings		
Soft keys		F1 to F9	F1 to F9	Depends on FUNCTION menu
Auxiliary keys		UNDO/LOCAL	[ALT]+[F9]	Local: UNDO function Remote: Returns to the local state.
		COPY	[ALT]+[F10]	Screen copy
		PRESET	[ALT]+[F11]	Clears settings except remote settings
		HELP	[ALT]+[F12]	Displays Help (use UNDO/LOCAL to exit Help)
DATA ENTRY		Numeric keypad	0123456789.-	Numeric value input
		BACK SPACE	Back Space	Deletes one character from input value
		um/ENTER	None	Confirms entry
		nm/ENTER	ENTER	Confirms entry
		Rotary knob	[→],[←]	Changes numeric values/items
		Arrow keys ([UP] [DOWN])	[↑],[↓]	Numeric value one-step change, item change, table scrolling
		COARSE	[ALT]+[N]	Switches between fine and coarse encoder

3.3 Entering Numerical Values and Strings

Entering Numerical Values

You can use the numeric keypad, rotary knob, or arrow keys in the DATA ENTRY section.

1. Press the soft key of a parameter. The currently set value is shown in the parameter input window.

Direct Entry Using the Numeric Keypad

2. Press a numeric keypad key. The numeric keypad input area appears, and the number of the pressed key is displayed.
3. After entering a numerical value, press the μm /ENTER or nm/ENTER key depending on the unit of the input parameter. The value in the numeric keypad input area appears in the parameter input window, and is set internally. If a parameter does not have a unit associated with it, you can use either the μm /ENTER or nm/ENTER key.

If you make an error when inputting values with the numeric keypad:

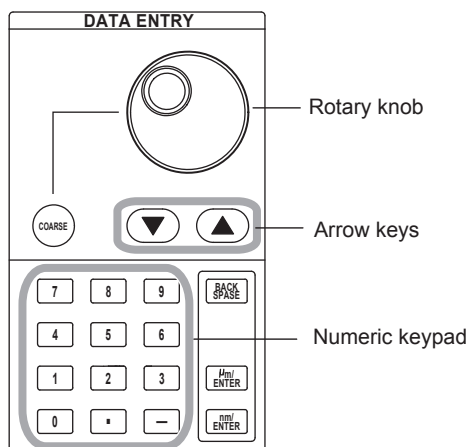
4. Press **BACK SPACE**. The last (right-most) entered character in the numeric keypad input area is removed, allowing entry of the correct character.

Note

- If the value entered with the numeric keypad is not in the allowed value range, the nearest allowed value will be set.
- 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 to the condition preceding numeric keypad input.

Entry Using the Rotary Knob and Arrow Keys

2. Continuing on from step 1, turn the rotary knob, or press an arrow key. The currently set value is changed.
3. When you press the **COARSE** key the digit of the setting to be changed rises, or the numeric value increase/decrease step increases. Press the **COARSE** key again to restore the previous digit/step.
When COARSE is selected, the COARSE key lights.



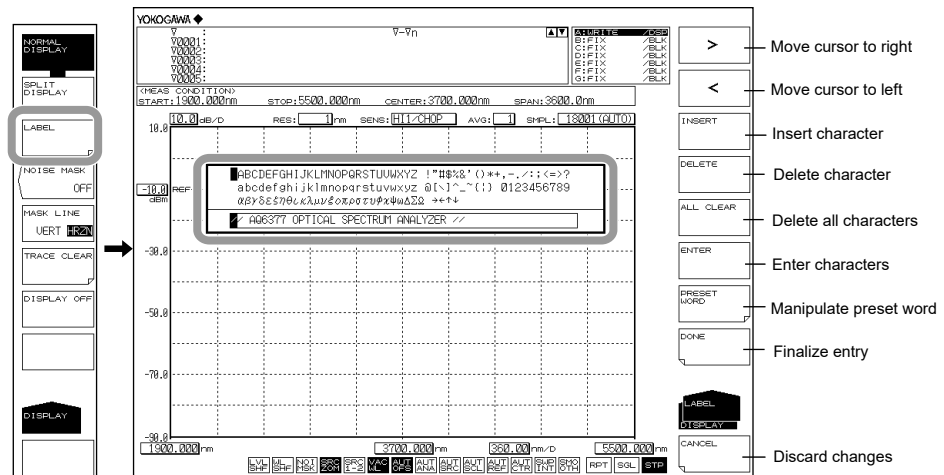
Entering Strings

Character strings can be entered from the character selection area displayed on screen using the rotary knob and soft keys.

Entry Procedure

The following is an example of entering a label.

1. Press **DISPLAY**. The soft key menu for the screen display appears.
2. Press the **LABEL** soft key. The text selection area and label entry area are displayed.



3. Move the cursor to the character in the character selection area that you wish to enter. Use the rotary knob or arrow keys to move the cursor in the character selection area.
4. Press the **ENTER** soft key. The character selected at the cursor position in the label input area is displayed.
5. To move the cursor, or insert or delete a character in the label input area, press the corresponding soft key.
6. When the character string is entered, press the **DONE** soft key. The input character string is entered.

Note

- In addition to when pressing **DISPLAY**, the character input screen appears whenever a string must be entered on the instrument, such as when entering a file name for saving a file.
- Numerical input can be performed directly from the numeric key pad.

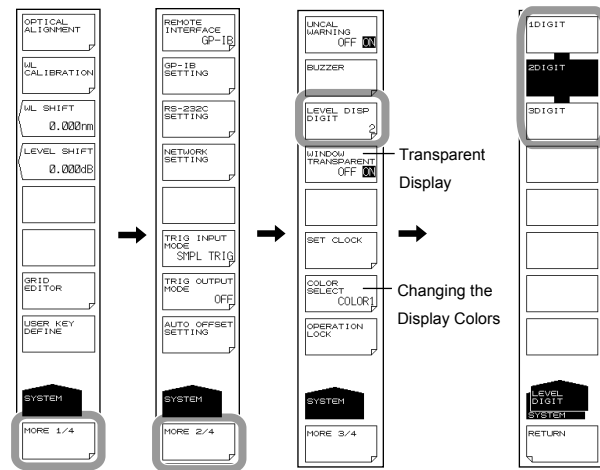
3.4 Screen Display

Procedure

1. Press **SYSTEM**. The soft key menu is displayed.
2. Press the **MORE 1/4** soft key two times. The soft key menu switches to the MORE 3/4 screen.

Setting the Number of Displayed Digits for Level Data

3. Press the **LEVEL DISP DIGIT** soft key. The digit setting menu is displayed.
4. Press the soft key corresponding to the desired number of digits.
 - 1DIGIT** Sets the number of level data display digits (below the decimal point) to 1 digit.
 - 2DIGIT** Sets the number of level data display digits (below the decimal point) to 2 digits.
 - 3DIGIT** Sets the number of level data display digits (below the decimal point) to 3 digits.



Transparent Display

3. Continuing on from step 2, press the **WINDOW TRANSPARENT OFF ON** soft key. Transparent display turns ON or OFF. When ON, the parameter input window and overview display window are displayed transparently.

Changing the Display Colors

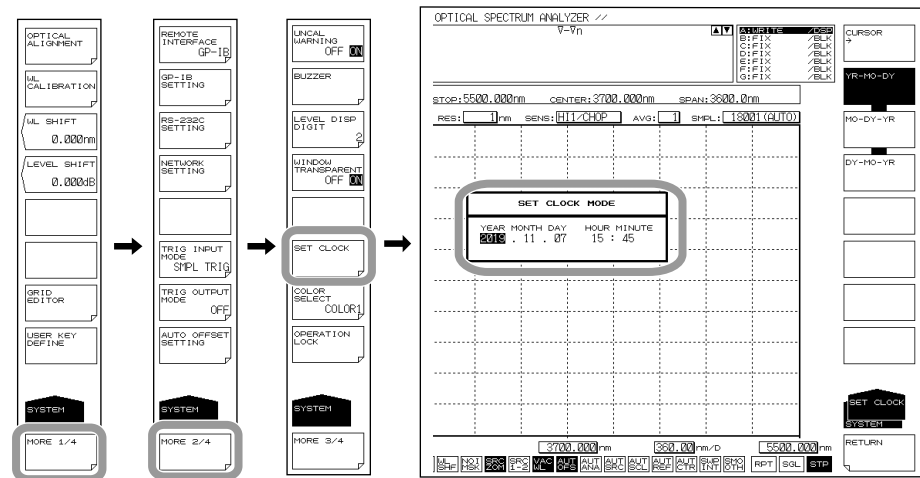
3. Continuing on from step 2, press the **COLOR SELECT** soft key. The display color setting menu is displayed.
4. Press the soft key corresponding to the desired display color.
 - COLOR1** Sets the screen display color to "COLOR 1".
 - COLOR2** Sets the screen display color to "COLOR 2".
 - COLOR3** Sets the screen display color to "COLOR 3".
 - COLOR4** Sets the screen display color to "COLOR 4".
 - COLOR5** Sets the screen display color to "COLOR 5".
 - B&W** Sets the screen display color to black-and-white.

3.5 Setting the Date and Time

The AQ6377 displays the date and time in the upper right corner of the screen. This information is used for a time stamp when recording data.

Displaying the Date and Time Dialog Box

1. Press **SYSTEM**. The soft key menu is displayed.
2. Press the **MORE** soft key two times. The soft key menu switches to the MORE 3/4 screen.
3. Press the **SET CLOCK** soft key. The internal clock setting screen is displayed.



Entering the Date and Time

4. Press the **CURSOR ->** soft key, then move the cursor to the item you wish to input. The cursor moves each time you press the soft key.
5. Press a numeric key button to enter a number.
6. Press **ENTER**. The input number is entered.

Changing the Display Format

7. Press the **MO-DY-YR** soft key.
The date is displayed in the order Month, Day, Year.
Press the DY-MO-YR soft key.
The date is displayed in the order Day, Month, Year.
Press the YR-MO-DY soft key.
The date is displayed in the order Year, Month, Day.

Concluding the Settings

8. Press the **RETURN** soft key. The settings are concluded, and the screen returns to the previous stage.

4.1 Updating the Firmware

When there is a firmware update, such as when new functions are added, you can update the firmware in the AQ6377. Download the update firmware from the YOKOGAWA website.

<http://www.yokogawa.com/yml/>

CAUTION

- When the firmware is being updated, do not manually turn the power off. If you do, you may not be able to start the AQ6377.
- If there are multiple update firmware files in the USB memory device, the AQ6377 will not be updated.

French

ATTENTION

- Lorsque le micrologiciel est en cours de mise à jour, ne pas mettre manuellement l'instrument hors tension. Le cas échéant, l'AQ6377 risque de ne pas démarrer.
- L'AQ6376 ne sera pas mis à jour en cas de présence de plusieurs fichiers de mise à jour micrologicielle sur la clé USB, l'AQ6377 n'est pas mis à jour.

Preparing to Update the Firmware

The AQ6377 can read the update firmware (.UPD extension) in one of two ways. Prepare the update firmware according to your environment.

- **Reading the Firmware from a USB Memory Device**
Create a directory named "UPDATE" in the USB memory device, and save the update firmware (.upd extension) in that directory.
Check that the AQ6377 is not connected to a network. If it is, you will not be able to update.
- **Reading the Firmware from an External PC**
Save the update firmware (.upd extension) in the external PC, and connect the PC to the AQ6377 over a network.

Procedure

Reading the Firmware from a USB Memory Device

1. Press **SYSTEM**. A system menu appears.
2. Press the **MORE** soft key repeatedly until the MORE 4/4 menu is displayed.
3. Press the **VERSION** soft key. The firmware version is displayed.
4. Press the **UPDATE(USB)** soft key. The "Insert Update Files" message appears.
5. Connect a USB memory device containing the update firmware to the AQ6377.
6. Press the **CONTINUE** soft key. A list of update firmware is displayed.
7. The message "Please disconnect LAN CABLE and remove USB storage device" appears. Remove the USB memory device.

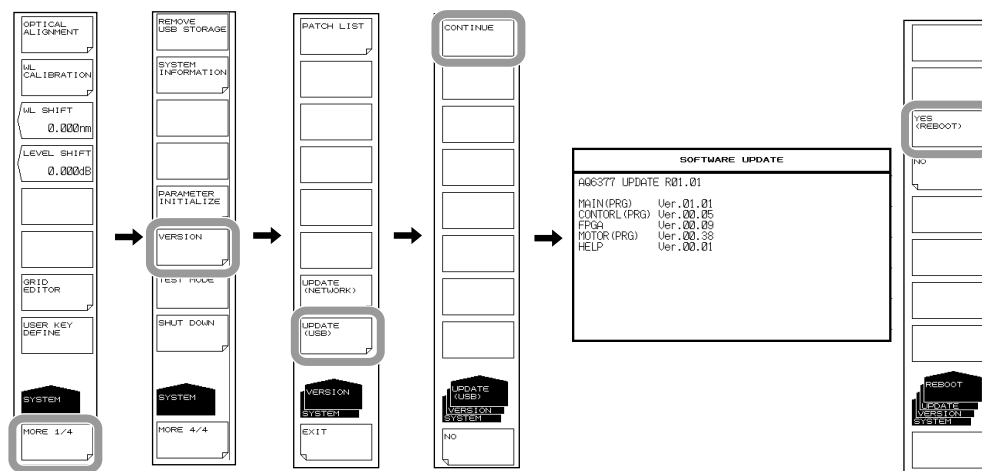
4.1 Updating the Firmware

Note

Do not reconnect the network cable that you removed from the ETHERNET port until the updating is complete.

8. Press the YES(REBOOT) soft key.

The AQ6377 automatically restarts and starts updating. A update-in-progress screen appears while the firmware is being updated. When updating is complete, the AQ6377 automatically shuts down. This completes the update procedure. Turn the power on, and the AQ6377 will start normally.



Note

- If the AQ6377 is connected to a network, you will not be able to update the firmware. If it is connected to a network, the message "Please disconnect LAN CABLE and remove USB storage device" will appear, and the YES soft key will be unavailable. When you remove the cable from the ETHERNET port, the message "Please remove USB storage device" will appear, and the YES soft key will become available.
- Once updating starts, you cannot abort the process until it is complete. You can cancel using the NO soft key or another key in any of the steps before step 7.

Now Updating..

DO NOT turn off the instrument.

When the update is completed, the instrument will be turned off automatically.

- The screen that appears while updating

Reading the Firmware from a PC

1. Press **SYSTEM**. A system setup menu appears.
2. Press the **MORE** soft key repeatedly until the MORE 4/4 menu is displayed.
3. Press the **VERSION** soft key. The firmware version is displayed.
4. Press the **UPDATE(NETWORK)** soft key. The "Insert Update Files (NETWORK)" message appears.
5. Connect the PC containing the update firmware to the AQ6377 over a network.
6. Use a file management software on the PC to copy the update software (.upd extension) to the UPDATE directory of the AQ6377 internal memory.
7. For the remaining of the procedure, follow the steps from step 6 in "Reading the Firmware from a USB Memory Device."

Note

When you update the firmware, the setup data will be initialized.

If necessary, save the setup data. For the operating procedure, see section 5.5 in IM AQ6377-01EN .

4.2 Mechanical Inspection

WARNING

When performing inspection, turn OFF the MAIN POWER switch on the rear panel and remove the power cable.

CAUTION

- If any foreign particles become trapped in the various connectors, malfunction or damage can result.
- If any of the various types of connectors do not fit snugly, the instrument may not operate normally.
- If any abnormalities occur, please contact your nearest Yokogawa representative.

French

AVERTISSEMENT

Lors de la réalisation d'une inspection, mettre l'instrument hors tension en plaçant l'interrupteur MAIN POWER sur OFF sur le panneau arrière, puis débrancher le cordon d'alimentation.

ATTENTION

- Si des corps étrangers se retrouvent emprisonnés dans les différents connecteurs, un dysfonctionnement ou un endommagement risque de se produire.
- Si l'ajustement de l'un des différents types de connecteurs n'est pas parfait, l'instrument risque de ne pas fonctionner normalement.
- En cas d'anomalie, contacter le représentant Yokogawa le plus proche.

Check the following:

- That the instrument's exterior is not damaged or deformed.
- That all switches, connectors, and other assembled parts are not loose.
- That switches can be operated smoothly.

4.3 Operational Inspection

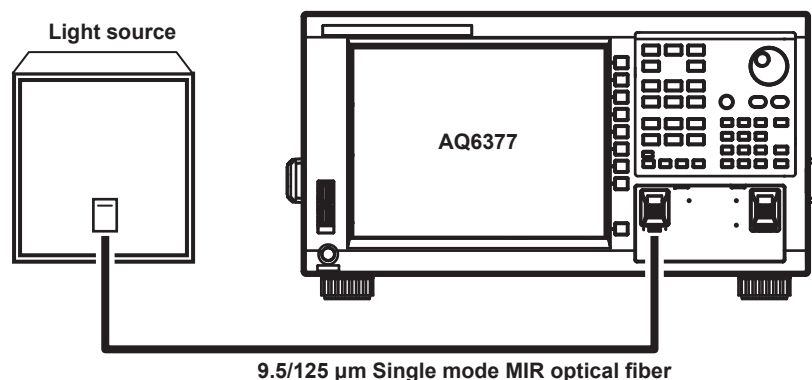
Checking the Operations of Each Switch

With the power to the instrument turned ON, operate each switch once briefly to check that the unit functions properly.

4.4 Inspection of Wavelength Accuracy

Perform a check of the instrument's wavelength accuracy.

Use a light source such as a gas laser whose wavelength accuracy is known.



Note

When measuring wavelengths of 2000 nm or greater, use a mid infrared optical fiber.

Procedure

1. Connect a light source to the instrument as shown in the figure above, then measure spectrums of the light source.
Confirm that the THRESH 3 dB center wavelength of the measured spectrum matches the wavelength of the light source (is within the wavelength accuracy standard).
For more information, see section 4.1, "Spectrum Width Measurement," in IM AQ6377-01EN.
2. If the wavelength error is large, use the internal reference light source to calibrate wavelengths.
For the calibration procedure, see section 2.5.
3. For performing wavelength calibration, check wavelength accuracy again according to procedure.

Note

If the wavelength error of the instrument is outside of $[+/-] 20$ nm, you cannot perform wavelength calibration with the internal reference light source. In this case, readjustment is necessary. Please contact your nearest Yokogawa representative.

4.5 Replacing Fuses

There is a fuse inside the instrument. However, you should not replace the fuse yourself. It could indicate additional internal damage.
If you believe the fuse is blown, please contact your nearest YOKOGAWA dealer.

4.6 Daily Maintenance

Cleaning the Exterior of the Instrument

When removing dirt from the case or operation panel, remove the 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.

Cleaning the output connector of the alignment light source



WARNING

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.

French



AVERTISSEMENT

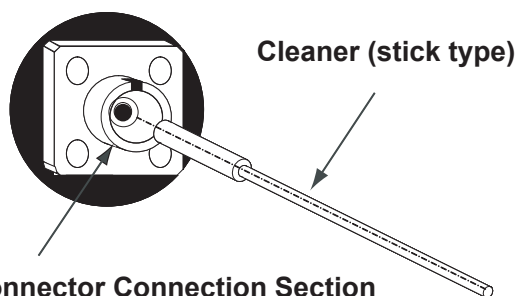
Cet instrument dispose d'une source de lumière de référence intégrée pour les ajustements d'alignement. La lumière infrarouge est toujours émise depuis le connecteur de sortie optique. Ne regardez jamais directement dans le connecteur de sortie optique. La lumière infrarouge risquerait de gravement vous blesser ou de provoquer une perte de vision.

Cleaning the Optical Connector Connection Section

It is recommended that the following cleaner be used for this procedure.

Recommended cleaner: "Cletop Stick Type" (NTT-AT)

Open the optical connector cover at the front of the unit. Use the cleaner to clean the optical connector connection section. Insert the cleaner straight into the optical connector connection section and rotate it.



Wiping with a soiled cleaner can damage the optical outputs.

4.7 Care during Storage

If the instrument is stored for a long time, sufficient care should be taken of the following:

- Wipe off any dust, fingerprints, or other dirt that has adhered to the instrument.
- Perform the inspections given in section 4.3, "Operational Inspection" to check that the instrument operates properly.
- Do not store the unit in the following locations:
 - Where it would be exposed to direct sunlight or excessive dust
 - Where water droplets can contact the instrument, or where high humidity can cause them to form on the instrument
 - Where active gas is present, or where the instrument may be subject to corrosion
 - Where the humidity indicated below can occur
 - Where temperatures can exceed 50°C
 - Where the temperature can fall below -10°C
 - Where the humidity can exceed 80% (no condensation)

For extended storage, it is recommended that the instrument be stored within the range of the following environmental conditions while, at the same time, the above conditions are met.

- Temperature 5 to 30°C
- Humidity 40 to 70%
- Daily fluctuations of temperature/humidity are small.

4.8 Recommended Replacement Parts

The life and replacement period for expendable items varies depending on the conditions of use. Refer to the table below as a general guideline.

For part replacement and purchase, contact your nearest YOKOGAWA dealer.

Parts with Limited Service Life

Part Name	Replacement Period
LCD backlight	At normal operating conditions, approximately 70000 hours

Consumable Parts

Part Name	Replacement Period
Cooling fan	3 years
Backup battery (lithium)	5 years

4.9 Warning Display Function

No.	Message	Cause of Warning
No.1 - 49: Message generation after the execution of functions		
1	Unsuitable Resolution	Data may not be extracted completely, because the resolution setting is not appropriate for the span and the sampling number.
2	Unsuitable Level Scale	A level scale larger than 5 dB/DIV has been set in the range fixed mode (SENS:NORM HOLD). If a level scale is set to 5 dB/DIV or more in the range fixed mode, data from the top and bottom of the screen may not be properly displayed.
3	Unsuitable Ref Level	Although an attempt was made to set the peak level of a waveform to the reference level, the nearest value within the range was chosen because the peak level value was outside the setting range of the reference level values.
4	Unsuitable Marker Value	Although an attempt was made to set a marker value to the reference level, the nearest value within the range was chosen because the marker value was outside the setting range of the reference level values.
5	<AUTO ANALYSIS> off	Selection of the <AUTO ANALYSIS> key was canceled.
6	<AUTO SEARCH> off	Selection of the <AUTO SEARCH> key was canceled.
7	Each Trace resolution mismatch	When the calculation between traces was performed, resolutions of traces were set differently.
8	<HOLD> off	HOLD was canceled because the allocation of traces to the divided screen was changed.
9	Trace * state changed	The HOLD state was canceled because the state of traces under HOLD was changed from FIX to another state.
10	<AUTO REF LEVEL> off	Selection of the <AUTO REF LEVEL> key was canceled.
11	<AUTO SUB SCALE> off	Selection of the <AUTO SUB SCALE> key was canceled.
12	Input light power is too high	Since the intensity of input light is too high, measuring waveforms may be saturated.
13	Level scale changed <dBm>	The horizontal scale was changed to wavenumber mode with the level scale set to dBm/nm or dBm/THz.
14	Unsuitable sampling point	Sample point setting for using the smoothing function is missing.
15	ADVANCED MARKER off	An assigned advanced marker was set to off.
16	<ADVANCED MARKER> off	The advanced marker function was turned off.
17	<LEVEL UNIT> changed	The <LEVEL UNIT> key setting was changed.
18	<POWER/NBW> trace state changed	The <POWER/NBW> trace setting in trace settings was changed to FIX mode.
19	Analysis result is not correct	Because analysis was performed on a POWER/NBW trace, a correct analysis result may not be displayed.
No.50 - 199: Generation of a reason why a function cannot be executed		
54	Unsuitable logging item setting	Logging item setting is not correct.
101	All traces in FIXEd state	Waveforms cannot be re-written, because all traces have been set to FIX.
102	Sweep stopped	Sweep was stopped, because all traces were set to FIX during the sweep.
103	No data in active trace	An attempt was made to execute analysis functions when there was no data in an active trace. An attempt was made to execute the EDFA-NF analysis function or the WDM analysis function (DUAL TRACE = ON) when there was no data in traces A and B.
107	Unsuitable memory number	A number other than 0 - 99 was specified when the memory was saved or recalled. Or, an attempt was made to recall data from a memory where waveforms have not been saved.
108	Marker setting out of range	An attempt was made to execute the analysis function between markers in the state where both line marker 1 and line marker 2 were set outside the measurement range.
109	Auto sweep failed	Although the AUTO sweep started, the sweep stopped because optimum conditions were not found.

4.9 Warning Display Function

No.	Message	Cause of Warning
110	No data between line markers	An attempt was made to execute the analysis function in a state where there was no data in the line markers of an active trace.
111	<G=MKR FIT> failed	Trace G cannot write fitting curve because numbers of data is not sufficient during <G=MKR FIT>.
120	USB Storage not inserted	USB storage medium not inserted.
121	USB Storage not initialized	SUB storage not initialized.
122	USB Storage is write protected	The USB storage device is write protected.
123	File not found	The specified file cannot be read because it has not been found. Or, the file does not exist on the disk.
124	Illegal directory name	Directory cannot be created because the name is not valid.
125	Illegal file name	A file cannot be saved due to an incorrect file name.
126	Directory already exists	Directory cannot be created because a directory of the same name already exists.
128	File is write protected	The file cannot be re-written or deleted because its property has been set to READ ONLY.
129	USB Storage full	The file cannot be saved, because the hard disk or the USB storage device is full.
130	Directory full	No files can be created because the directory area is full.
131	No data	There was no data to be saved, although an attempt was made to save the file.
132	File is not a trace file	The file cannot be read because it is not a waveform file.
133	File is not a program file	The file cannot be read because it is not a program file.
134	File is not a data file	The file cannot be read because it is not a data file.
135	File is not a settings file	The file cannot be read because it is not a settings file.
137	File is not a template file	File cannot be loaded since it is not a template file or there is a problem with the format of the template data.
138	Cannot copy	The file copy cannot be executed because the "copy from" file and the "copy to" file have the same name.
140	No paste possible	The paste operation cannot be executed during the editing of programs because the number of blank rows is not sufficient.
141	No merge possible	It is not possible to execute a merge during the editing of programs because the merged result would exceed the maximum number of rows.
142	WL calibration failed	Calibration cannot be executed because the level of a light source is not sufficient during the wavelength calibration or because wavelength deviations exceed the calibration range.
143	Optical Alignment failed	Alignment adjustment cannot be executed because the level of a light source is not sufficient during the alignment adjustment.
144	Go/No go judgment stopped	Go/No go judgment stopped because template data reading or AUTO sweep was carried out with Go/No go judgment function set to ON.
145	No template data	Go/No go judgment or template data display was attempted to be made with no template data provided.
150	File is not a logging file	The file cannot be loaded because it is not a logging file.
151	Disk space is not enough for logging	Logging cannot be started because there is not enough space for saving waveform files with the logging function.
152	Logging was skipped for Auto zeroing	Unable to log at the specified interval because auto offset was in progress at the time logging would have occurred (displayed only the first time after logging is started).
153	Sweep time exceeds the set interval	Unable to log at the specified interval because the sweep time is longer than the interval (displayed only the first time after logging is started).
154	This file is not compatible	The file could not be loaded because the model does not support it.

No.	Message	Cause of Warning
170	Illegal character	An illegal character was entered for a network name.
171	Illegal address	An illegal address was set to an IP address.
172	This version is not compatible	Attempted to load an incompatible update file.
173	Update file read error	An incorrect number of files or file corruption was found when attempting to load the update file.
174	Invalid password	The password entered for the key lock is not correct.
175	Re-entered password is not matched	The two passwords entered for the key lock do not match.
176	Password needs to be 4-digit number	The password entered for the key lock is not a 4-digit number.
No. 200 - 299: Warnings for hardware failures		
200	Fan motor stopped!	The fan motor (main unit) stopped. Automatically shuts down after 10 seconds from occurrence.
201	Calibration data failed!	Started up in emulation mode because there was a problem with the instrument's calibration data.
202	Fan motor stopped	The CPU fan stopped.
205	Internal communication error!	An abnormality occurred during instrument-internal communication.
206	Internal communication error!	An abnormality occurred during instrument-internal communication.
207	Internal Temperature Over!	Internal temperature is abnormally high. Automatically shuts down after 10 seconds from occurrence.
208	Monochromator fan motor stopped!	The monochromator fan stopped.
209	PD temperature over!	Entered emulation mode because there was a problem with the light detector temperature.
210	Internal Temperature warning!	Warning for rising internal temperature.
211	Auto offset error!	Obtained an abnormal value during AUTO OFFSET operation.
212	Auto offset error!	Obtained an abnormal value during AUTO OFFSET operation.
213	Auto temperature control error!	Problem with the light detector temperature control.
214	Measurement sequence error!	The sweep stopped because measurement sequence fell into disorder during the sweep.
220	Boot sequence error!	Started up in emulation mode because an abnormality occurred upon start-up
221	Boot sequence error!	Started up in emulation mode because an abnormality occurred upon start-up
222	Emulation Mode.	Entered emulation mode because an abnormality occurred.
223	Boot sequence error!	Started up in emulation mode because an abnormality occurred upon start-up
224	Internal communication error!	An abnormality occurred during instrument-internal communication.
225	Internal communication error!	An abnormality occurred during instrument-internal communication.
226	Internal communication error!	An abnormality occurred during instrument-internal communication.
227	Internal communication error!	An abnormality occurred during instrument-internal communication.
228	Memory allocation error!	Data memory initialization failed.
230	Monochromator error!	Entered emulation mode because an abnormality with the operation of the monochromator occurred.
231	Monochromator error!	Entered emulation mode because an abnormality with the operation of the monochromator occurred.
232	Monochromator error!	Entered emulation mode because an abnormality with the operation of the monochromator occurred.
233	Monochromator error!	Entered emulation mode because an abnormality with the operation of the monochromator occurred.
234	Monochromator error!	Entered emulation mode because an abnormality with the operation of the monochromator occurred.
235	Monochromator error!	Entered emulation mode because an abnormality with the operation of the monochromator occurred.
236	Monochromator error!	Entered emulation mode because an abnormality with the operation of the monochromator occurred.

4.9 Warning Display Function

No.	Message	Cause of Warning
No.300 - 399: Errors during the execution of program functions		
300	Parameter out of range	A variable value is out of range or is not defined for a command that sets a parameter using variables.
302	Scale unit mismatch	There is a difference between the Y-axis scale of the active trace and the unit of a parameter in the "LINE MKR 3 or 4" command.
303	No data in Active trace	Setting of the moving marker, a peak (or bottom) search, or activation of the analysis function was made with no data in the active trace.
304	Marker value out of range	Specified wavelength was out of the sweep range in the moving marker or line wavelength marker setting command.
305	No data in trace A or B	No waveform data in traces A or B when executing the "EDFA NF" command
306	Invalid data	Trace had no data when attempting to save it to memory or to write it to FD/HDD.
307	Unsuitable Write item	All data items were OFF at execution of "WRITE DATA".
320	Undefined variable	A command containing an undefined variable was executed.
321	Variable unit mismatch	The unit of each variable does not agree within a command containing two or more variables.
322	Overflow	An overflow occurred in an arithmetic operation.
323	Undefined marker variable	A command containing a marker-value variable was executed when no marker had been displayed.
324	Invalid marker variable	A command containing the corresponding variable was executed at a time other than immediately after execution of a spectrum width search, peak search, etc.
325	Undefined line number	GOTO command's jumping destination is a number other than 1 to 200.
326	F1 greater than F2	$F1 > F2$ when the "IF $F1 \leq @@@@ \leq F2$ " command was executed.
345	Option does not respond	No response from an external device.
346	Option is not connected	No external device is connected.
360	Disk full	No file can be created due to insufficient free space on the USB storage medium.
361	USB Storage not inserted	USB storage medium not inserted.
362	USB Storage is write protected	The USB storage device is write protected.
363	USB Storage not initialized	USB storage not initialized. Or, it has been formatted in a format not supported by this instrument.
364	Directory full	Directory is full, therefore no file can be created.
365	File not found	The specified file cannot be read because it has not been found. Or, the file does not exist on the disk.
366	File is write protected	The file is specified to be read only, so that it cannot be rewritten or deleted.
367	No data	No data to store.
368	File is not a trace file	A file cannot be read because it is not a trace file.
369	Illegal file name	A file cannot be saved due to an incorrect file name.
370	File type mismatch	Loading or saving the file is not possible because the specified type of file does not match that of the command.
380	Undefined program	An attempt was made to run a program that is not defined.
381	Syntax error	Command incorrect (a program has been rewritten for some reason).

4.10 Disposal

When disposing of this instrument, follow the laws and ordinances of the country or region where the product will be disposed of.

Contains mercury

Component inside this product contain mercury and must be recycled or disposed of according to the laws and ordinances of the country or region.

5.1 Specifications

Items	Specifications
Wavelength range ¹	1900 to 5500 nm
Span ¹	1.0 nm to 3600 nm (entire wavelength range), and 0 nm
Wavelength accuracy ^{1, 2}	±0.5 nm (entire wavelength range)
Wavelength resolution setting ¹	0.2, 0.5, 1, 2 and 5 nm
Minimum sampling resolution ¹	0.010 nm
Wavelength sampling points	101 to 50001, AUTO
Level sensitivity setting	NORM_HOLD, NORM_AUTO, NORMAL, MID, HIGH1, HIGH2 and HIGH3 (It is set to High dynamic range mode (chop) when the measurement sensitivity is set to HIGH1–HIGH3.)
Level sensitivity ^{3, 4, 5, 6}	–40 dBm (1900 to 2200 nm) –50 dBm (2200 to 2900 nm) –60 dBm (2900 to 4500 nm) (measurement sensitivity: HIGH3)
Maximum input power ^{3, 4, 5}	+13 dBm (per channel, full span)
Maximum safe input power ^{3, 4, 5}	+20 dBm (Total input power)
Level accuracy ^{3, 4, 5}	±2.0 dB (2000 nm, Input level: –10 dBm, measurement sensitivity: HIGH1–HIGH3, single mode fiber)
Dynamic range ^{1, 2, 3}	50 dB (Peak ± 5 nm) (resolution: 0.2 nm, measurement sensitivity: HIGH1–HIGH3)
Applicable fiber	SMF, MMF (core diameter of up to 400 μm)
Optical input connector	Fixed to FC type
Built-in calibration light source	Wavelength reference source (For alignment and wavelength calibration)
Electrical interfaces	GP-IB RS-232, Ethernet, USB, SVGA output, analog output port, trigger input port, trigger output port
Remote control ⁷	GP-IB, RS-232, Ethernet (TCP/IP) AQ6317 series compliant commands (IEEE488.1) and IEEE488.2
Purge gas I/O port	1/4" outer diameter nylon tube
Data storage	Internal storage: 512 MB or more Internal memory: 64 traces, 64 programs, 3 templates External storage: USB storage (memory/HDD) Format: FAT32 File types: CSV (text), Binary, BMP, TIFF
Display ⁸	10.4" color LCD (resolution: 800 × 600 pixels)
Environmental conditions	Performance guarantee temperature: +18 to +26°C Operating temperature: +5 to +33°C Storage temperature: –10 to +50°C Humidity: 20 to 80%RH (no condensation)
Warm-up	Warm-up time: 1 hour After warm-up ends, alignment adjustment with the internal reference light source required.
Power requirement	100 to 240 VAC, 50/60 Hz, approximately 100 VA
External dimensions	Approximately 426 (W) x 221 (H) x 459 (D) mm (Note that this excludes the protector and handle)
Mass	Approximately 23 kg
Recommended calibration period	1 year
Safety standards	Compliant standards EN 61010-1 Pollution degree 2 ⁹
	Laser EN 60825-1: 2014/IEC 60825-1: 2007/GB 7247.1-2012, Class 1

5.1 Specifications

Items	Specifications	
Emission	Conforming standards	EN 61326-1 Class A EN 55011 Class A, Group 1 EN 61000-3-2 EN 61000-3-3 EMC standards of 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	<ul style="list-style-type: none"> • TRIGGER IN, TRIGGER OUT, ANALOG OUT terminal. Use a BNC cable⁶ • Use a serial (RS-232) interface connector and RS-232 shielded cable.⁶ • Use an Ethernet connector and a category 5 or higher Ethernet cable.⁷ • Use a VIDEO OUT connector and a D-sub 15pin VGA shielded cable.⁶ • Use a USB peripheral (such as a mouse) that uses a USB port and shielded cable.⁶ • Use the GP-IB interface connector and a GP-IB shielded cable.⁶
Immunity	Conforming standards	EN 61326-1 Table 2 (For use in industrial locations)
	Influence in the immunity environment (criteria A)	Wavelength measurement sensitivity: Within ± 0.1 nm
	Test items	1. Electrostatic discharge Air discharge: ± 8 kV. Contact discharge: ± 4 kV. Criteria B. 2. Radiated immunity 80 M to 1 GHz, 10 V/m, 1.4 G to 2 GHz, 3 V/m, 2 GHz to 2.7 GHz, 1 V/m, criteria A 3. Conducted immunity 3 V, criteria A 4. Fast transient/burst Power line: ± 2 kV. Signal line: ± 1 kV, criteria B 5. Power frequency magnetic field Omitted, because the device does not exert considerable influence on the magnetic field 6. Surge immunity ± 1 kV between lines, ± 2 kV common, criteria B 7. Voltage dip and interruption 1 cycle, 100%, criteria B Other tests, criteria C
	Definitions of criteria	Criteria A: During testing, "influence in the immunity environment" described above is met. Criteria B: The instrument continues to function and is controllable throughout testing. The instrument does not change operation modes, and data changes do not persist. Criteria C: Temporary losses of functionality (such as measurement stopping, etc.) are recovered from through the intervention of the operator.
	Cable conditions	Same as above emission cable conditions.
Environmental standard	Compliant standards	EN 50581 Monitoring and control instruments including industrial monitoring and control instruments.

"Typical" in this document means "Typical value", which is for reference, not guaranteed specification.

- 1: Horizontal axis scale: In wavelength display mode
- 2: After warm-up of 2 hours, after alignment adjustment with built-in wavelength reference light source, when the purge gas is not used.
- 3: Typical (depending on the using optical fiber cables, the measured values may have the property difference.)
- 4: Vertical scale: Absolute power display mode, resolution setting: ≥ 0.2 nm
- 5: Pulse light measurement mode: OFF.
- 6: Wavelength range 4500 to 5500 nm is not included because the level sensitivity is not specified.
- 7: Some of AQ6317 series commands may not be compatible due to changes in specifications or functions.
- 8: There may be some pixels on the LCD that never light or are always lit (0.002% or less of the total number of pixels including RGB). These pixels are not defects."

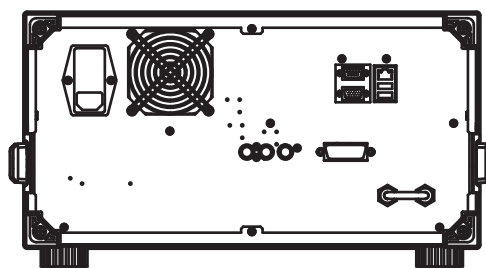
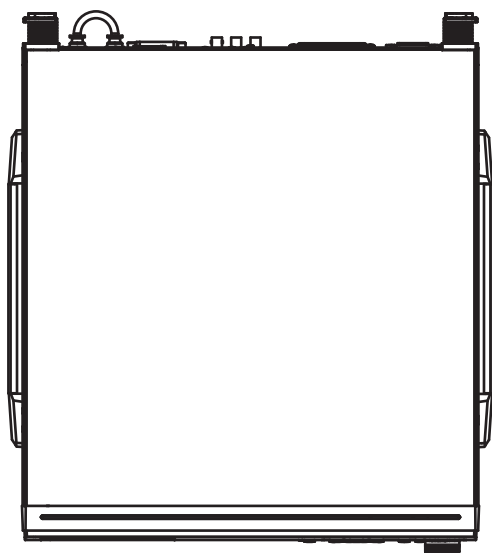
- 9: Pollution degree refers to the degree of adherence by a solid, liquid, or vapor that reduces the withstand voltage or surface resistance factor. Pollution degree 1 applies to closed atmospheres (no pollution, or only dry, non-conductive pollution). Pollution degree 2 applies to normal indoor atmospheres (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.

Function

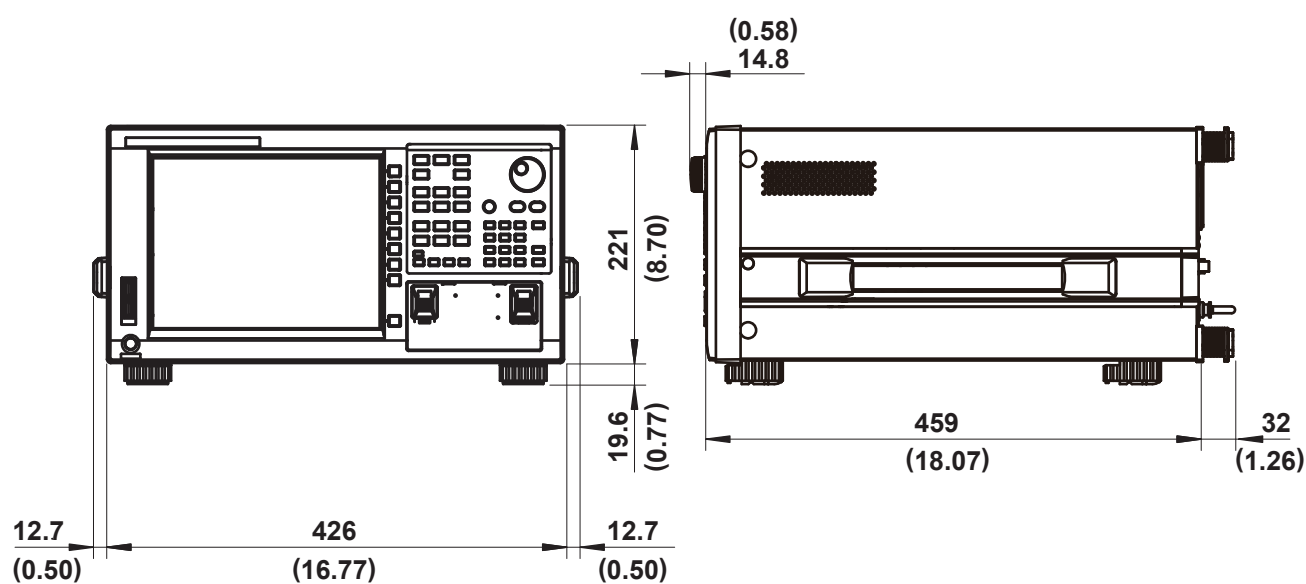
Items	Functions
Measurement	
Setting of measuring conditions	Center wavelength, span, wavelength sampling points, wavelength resolution, measurement sensitivity, high dynamic mode, average count (1 to 999), double-speed measurement mode, smoothing
Sweep settings	Single sweep, repeat sweep, AUTO (automatically sets measuring conditions), sweep between markers, data logging
Measurement function	CW measurement, pulse light measurement, external trigger measurement, gate measurement, air/vacuum wavelength measurement
Others	Sweep status output, analog output
Display	
Vertical scale	Level scale (0.1 to 10 dB/div, linear), level subscale (0.1 to 10 dB/div, linear), reference level display, DIV display (8, 10, 12), percentage display, dB/km display, power spectral density (dB/nm) display, noise mask
Horizontal scale	Horizontal wavelength (nm) display, frequency (THz) display, wave number (cm ⁻¹) display, zoom in/zoom out display
Display mode and items	Single waveform display, split screen display, data table display, label display, template display, measurement condition display
Trace	
Display functions	Simultaneous display of 7 independent traces, max/min value detection display, calculation between traces display, normalized display, roll averaging (sweep average) display (2 to 100 times), curve fit display, peak curve fit display, marker curve fit display
Others	Trace copy, trace clear, write mode fixed mode setting, show/hide setting
Marker and search	
Marker	Delta markers (Max. 1024 points), vertical/horizontal line markers, advanced markers
Search	Peak search, bottom search, auto search (ON/OFF), search between vertical axis line markers, search within zoom area
Data analysis	
Analysis functions	Spectral width analysis (threshold, envelope, RMS, Peak-RMS, notch), WDM (OSNR) analysis, EDFA-NF analysis, filter peak/bottom analysis, WDM filter peak/bottom analysis, DFB-LD analysis, FP-LD analysis, LED analysis, SMSR analysis, power analysis, PMD analysis, Pass/ Fail judgment from template
Others	Auto analysis execution setting, analysis between vertical axis line markers, analysis within the zoom area
Auto measurement	
Program function	64 programs, 200 steps per program
Others	
Alignment	Auto alignment using built-in calibration light source
Wavelength calibration	Auto wavelength calibration using built-in calibration light source or an external light source

5.2 External Dimensions

Unit : mm
(approx. inch)



REAR VIEW

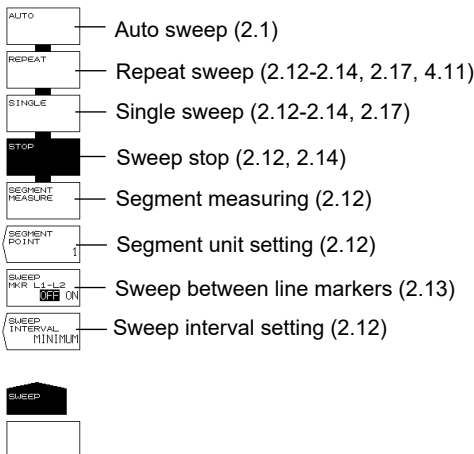


If not specified, the tolerance is $\pm 3\%$. However, in cases of less than 10 mm, the tolerance is ± 0.3 mm.

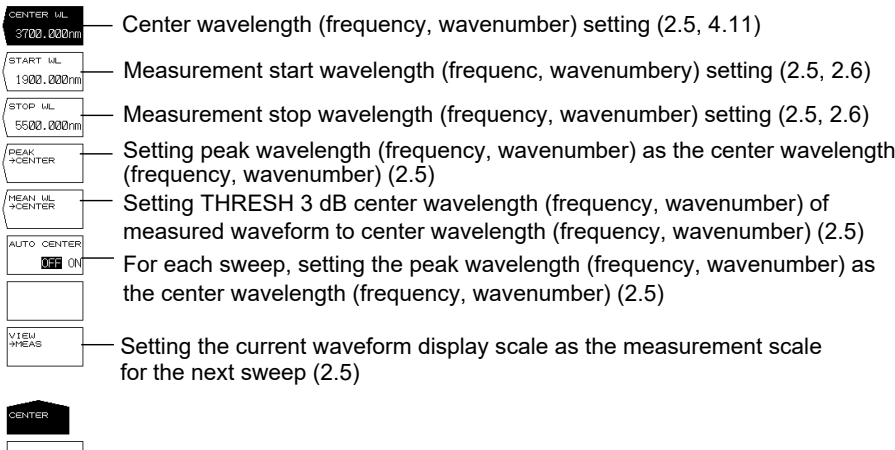
Appendix 1 Soft Key Tree Diagram

The following is an overview of the instrument's menus.
See the relevant section in IM AQ6377-01EN. Some menus are omitted.

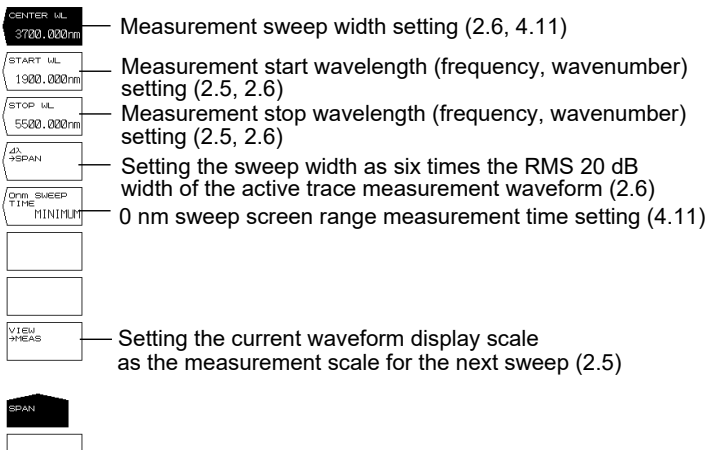
SWEEP



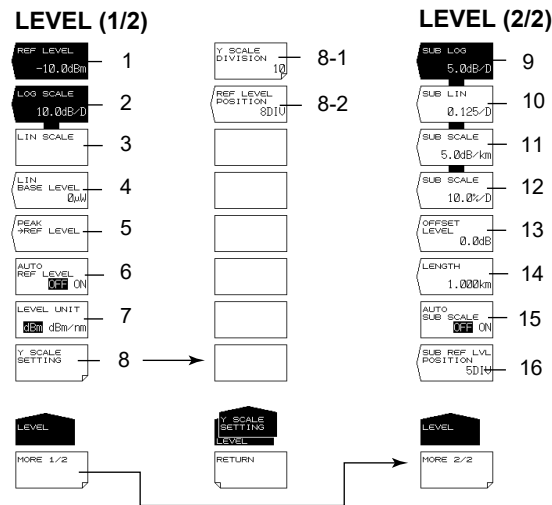
CENTER



SPAN

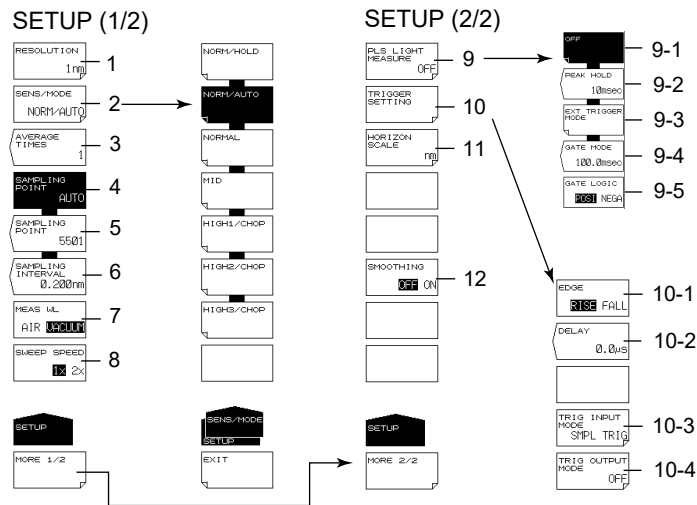


LEVEL



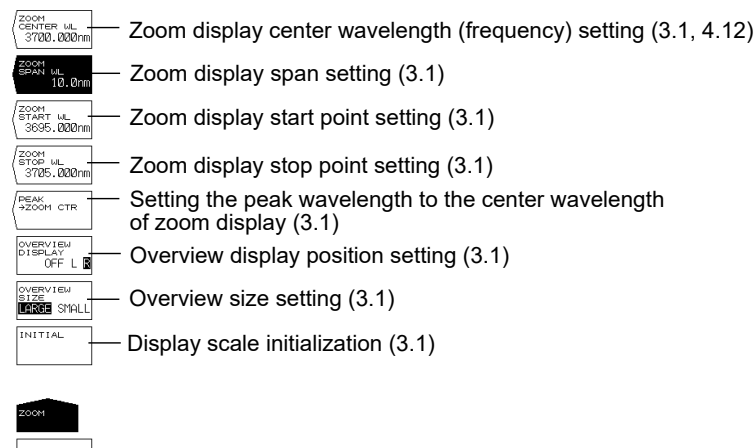
- 1 Reference level setting (2.1, 2.4, 4.12)
- 2 LOG scale setting (2.2, 2.4)
- 3 Linear scale setting (2.2, 2.4)
- 4 Linear scale bottom settings (2.2)
- 5 Setting the peak level to the reference level (2.4)
- 6 Automatic setting of reference level (2.4)
- 7 Vertical axis units setting (2.2)
- 8 Vertical axis setting (2.2)
 - 8-1 Setting the number of vertical axis divisions (2.2)
 - 8-2 Reference level screen position setting (2.2)
- 9 Setting subscale to LOG (2.3)
- 10 Setting subscale to LINEAR (2.3)
- 11 Setting subscale to dB/km (2.3)
- 12 Setting subscale to % (2.3)
- 13 Linear subscale bottom setting or offset level setting for LOG (2.3)
- 14 Optical fiber length setting (2.3)
- 15 Automatic scaling of subscale (2.3)
- 16 Position settings in the reference level subscale (2.3)

SETUP

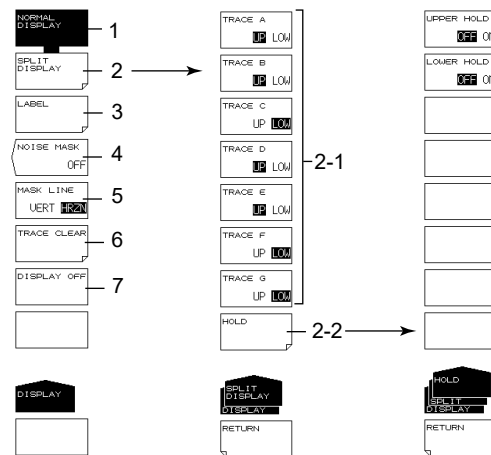


- 1 Measurement resolution setting (2.7, 4.10)
- 2 Measurement sensitivity, CHOP mode settings (2.9)
 - 2.1 CHOP mode setting (2.9)
- 3 Averaging times setting (2.10)
- 4 Automatic sampling points setting (2.7, 2.8)
- 5 Manual sampling points setting (2.8)
- 6 Sampling interval setting (2.8)
- 7 Setting the measured wavelength to air/vacuum (2.2)
- 8 Sweep speed setting (2.10)
- 9 Pulse light measurement settings (2.14, 2.15)
 - 9-1 Pulse light measurement OFF (2.14)
 - 9-2 Peak hold time setting (2.14)
 - 9-3 External trigger mode setting (2.15)
 - 9-4 Gate mode setting (2.15)
 - 9-5 Gate signal logic setting (2.15)
- 10 Trigger condition settings (2.15)
 - 10-1 Edge setting (2.15)
 - 10-2 Delay setting (2.15)
 - 10-3 Trigger input mode setting (2.16)
 - 10-4 Trigger output mode setting (2.17)
- 11 Horizontal axis units setting (2.2)
- 12 Smoothing (2.18)

ZOOM

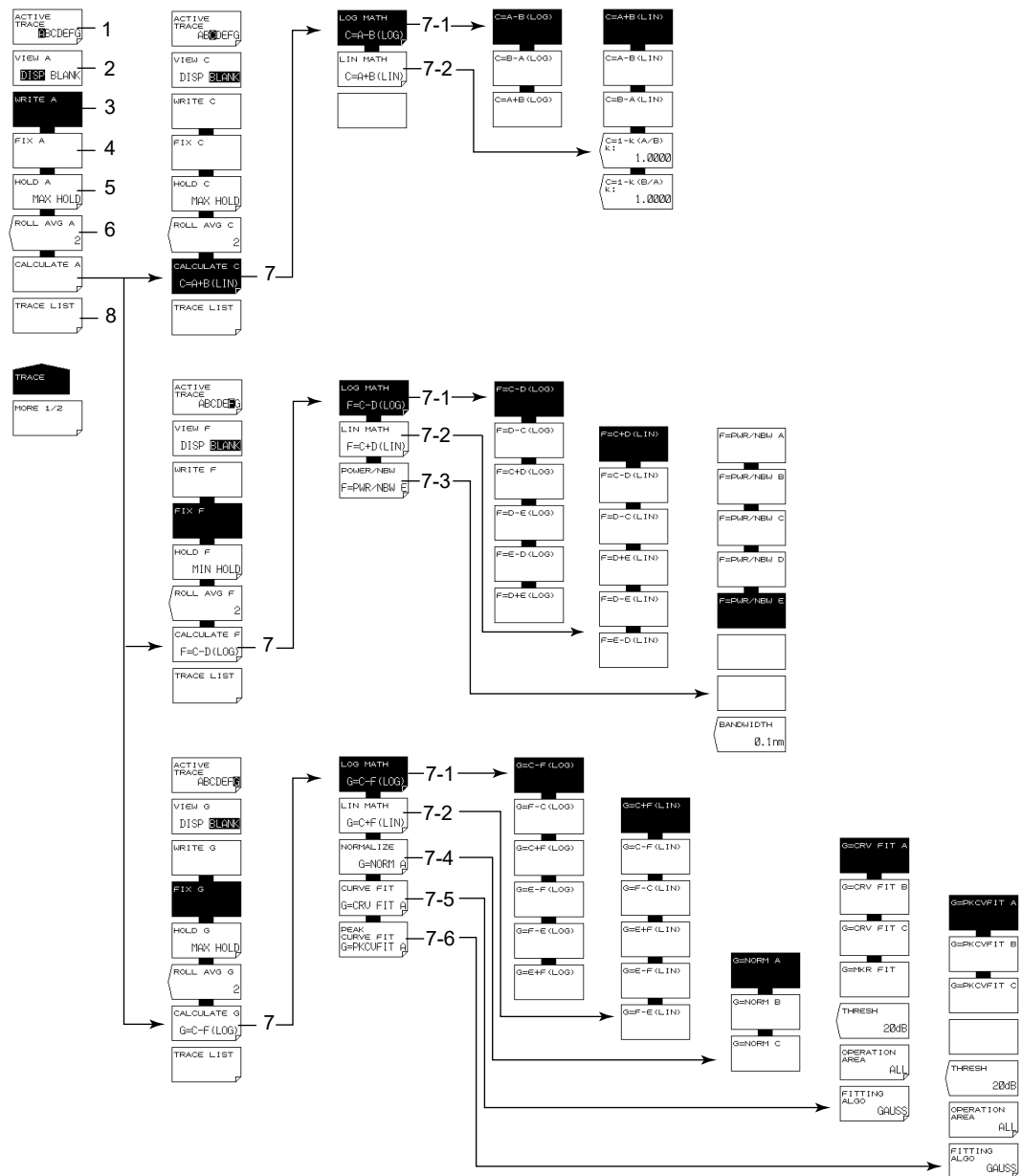


DISPLAY



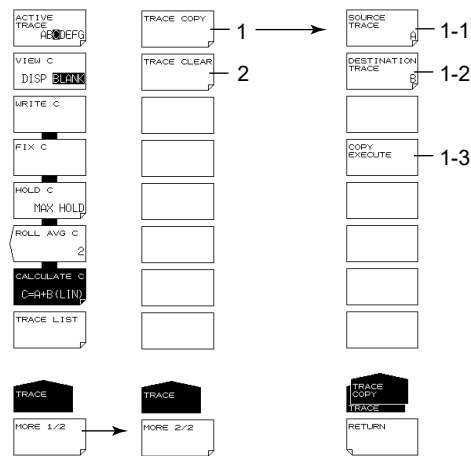
- 1 Normal display (3.10)
- 2 Split display (3.10)
 - 2-1 Display position setting
 - 2-2 Display position fixing
- 3 Label setting (See page 3-6)
- 4 Noise mask setting (3.11)
- 5 Mask method setting (3.11)
- 6 Trace clearing (3.12)
- 7 Turning the display OFF (6.6)

TRACE (MORE 1/2)



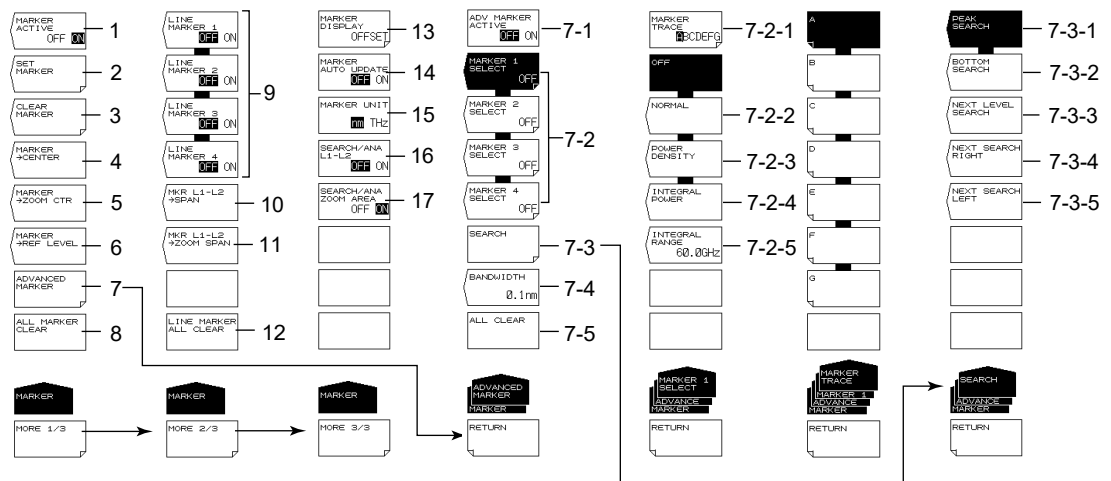
- 1 Active trace setting (2.11, 3.2-3.7, 4.8, 4.9)
- 2 Show/hide active trace setting (2.11, 3.2-3.7, 4.8, 4.9)
- 3 Setting write mode on the active trace (2.11, 3.2, 4.8, 4.9)
- 4 Setting fixed mode on the active trace (3.2, 4.8, 4.9)
- 5 Setting MAX/MIN hold mode on the active trace (3.3)
- 6 Active trace sweep average setting (3.4)
- 7 Trace-to-trace calculation settings (trace C, F, G only) (3.5-3.7, 4.9)
 - 7-1 LOG based between-trace calculation (3.5, 4.9)
 - 7-2 LIN based between-trace calculation (3.5)
 - 7-3 Power spectral density display (trace F only) (3.5, 3.8)
 - 7-4 Trace normalization (trace G only) (3.5, 3.6)
 - 7-5 Trace curve fitting (trace G only) (3.5, 3.7)
 - 7-6 Trace peak curve fitting (trace G only) (3.5, 3.7)
- 8 Trace conditions list display (3.12)

TRACE (MORE 2/2)



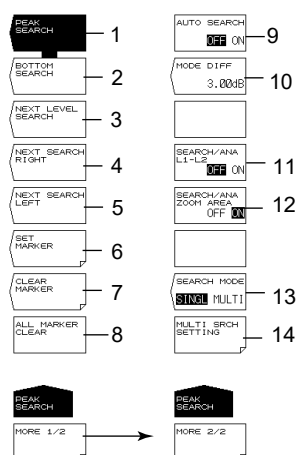
- 1 Copy trace (3.12)
 - 1-1 Copy source trace setting (3.12)
 - 1-2 Copy target trace setting (3.12)
 - 1-3 Execute copy (3.12)
- 2 Trace clearing (3.12)

MARKER



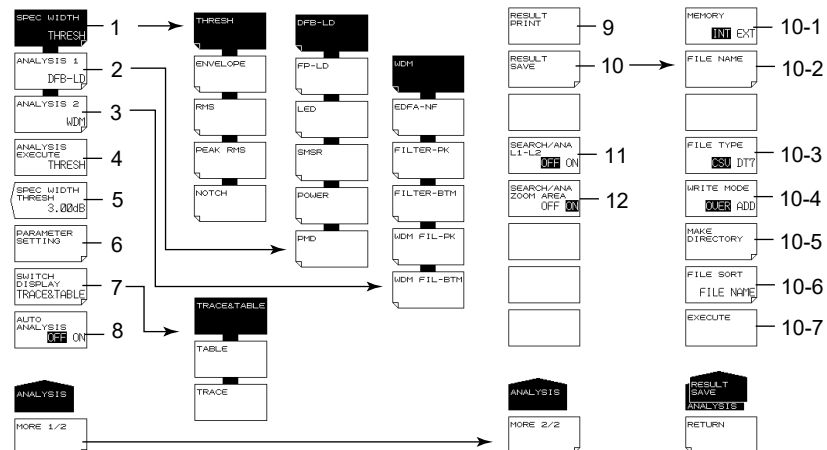
- 1 Moving marker display ON/OFF (3.9)
- 2 Setting moving markers to fixed markers (3.9, 3.13)
- 3 Clearing fixed markers (3.9, 3.13)
- 4 Setting the moving marker wavelength (frequency) to measurement center (2.5, 3.9)
- 5 Setting the moving marker wavelength (frequency) to display scale center (3.9)
- 6 Setting the moving marker level to reference level (2.4, 3.9)
- 7 Displays advanced markers (3.9)
 - 7-1 Turns on or off the advanced marker display (3.9)
 - 7-2 Sets advanced markers (3.9)
 - 7-2-1 Selects the trace to assign the marker to (3.9)
 - 7-2-2 Sets moving markers (3.9)
 - 7-2-3 Sets power spectral density markers (3.9)
 - 7-2-4 Sets integrated power markers (3.9)
 - 7-2-5 Sets integration wavelength range (3.9)
 - 7-3 Executes a search based on advanced markers (3.9)
 - 7-3-1 Executes a peak search (3.9)
 - 7-3-2 Executes a bottom search (3.9)
 - 7-3-3 Sets the advanced marker from the current position to the next peak or bottom value (3.9)
 - 7-3-4 Sets the advanced marker from the current position to the next local peak or bottom value on the right (3.9)
 - 7-3-5 Sets the advanced marker from the current position to the next local peak or bottom value on the left (3.9)
- 8 Clear all displayed moving and fixed markers (3.9, 3.13)
- 9 Line markers ON/OFF (3.9)
- 10 Setting the measurement span to between line markers 1 and 2 (2.6, 3.9)
- 11 Setting the zoom span to between line markers 1 and 2 (3.9)
- 12 Clear all displayed line markers (3.9)
- 13 Marker display settings (3.9)
- 14 Setting whether to automatically update the fixed marker's level values when updating active trace (3.9)
- 15 Marker value units setting (3.9, 4.10)
- 16 Setting the peak search, bottom search, and analysis function ranges to between line markers L1 and L2 (3.13, 4.13) (For both the PEAK SEARCH and ANALYSIS menus)
- 17 Setting the peak search, bottom search, and analysis function ranges to within the zoom range (3.13, 4.13) (For both the PEAK SEARCH and ANALYSIS menus)

PEAK SERCH



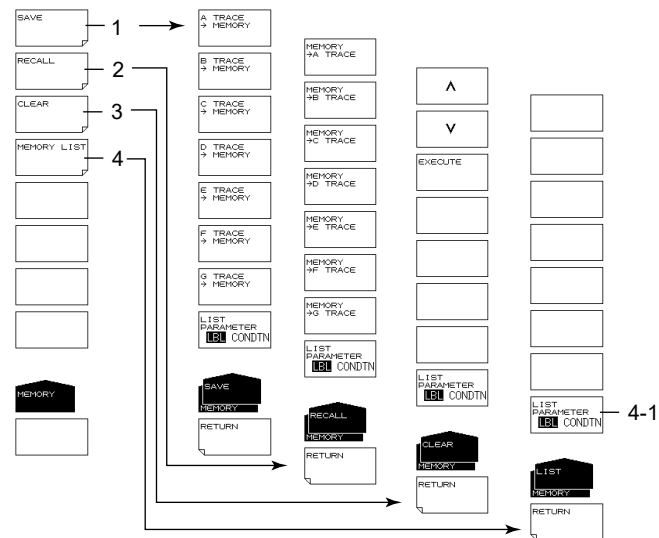
- 1 Executing peak search (3.13)
- 2 Executing bottom search (3.13)
- 3 Moving the moving marker from the current position to the next peak/bottom value (3.13)
- 4 Moving the moving marker from the current position to the next peak/bottom value to the right (3.13)
- 5 Moving the moving marker from the current position to the next peak/bottom value to the left (3.13)
- 6 Setting the moving marker to the fixed marker (3.9, 3.13)
- 7 Clearing fixed markers (3.9, 3.13)
- 8 Clearing all displayed moving and fixed markers (3.9, 3.13)
- 9 Turning ON/OFF peak/bottom search each sweep (3.13)
- 10 Setting the minimum peak/bottom difference of the mode judgment reference (3.13, 4.6, 4.8)
- 11 Setting the peak search, bottom search, and analysis function ranges to between line markers L1 and L2 (3.13, 4.12) (For both the MARKER and ANALYSIS menus)
- 12 Setting the peak search, bottom search, and analysis function ranges to within the zoom range (3.13, 4.12) (For both the MARKER and ANALYSIS menus)
- 13 Switching between the single and multi peak/bottom searches (3.13, 3.14)
- 14 Setting the threshold and sort order of the multi search (3.14)

ANALYSIS



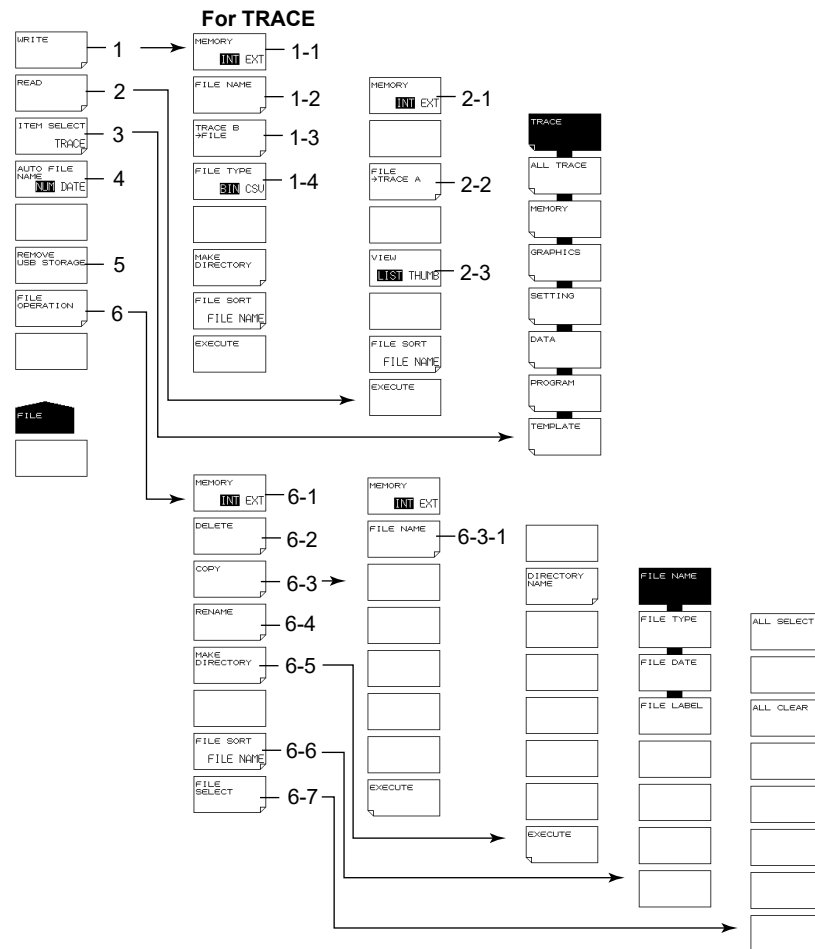
- 1 Spectrum width analysis algorithm settings/execution (4.1, 4.2)
- 2 Analysis function settings (4.3–4.6, 4.13)
(DFB-LD, FP-LD, LED, SMSR, POWER, PMD)
- 3 Analysis function settings (4.7–4.9)
(WDM, FILTER-PK, FILTER-BTM, WDM FIL-PK, WDM FIL-BTM)
- 4 Executing the specified analysis (chapter 4)
- 5 Spectrum width analysis threshold setting (4.1)
- 6 Analysis parameter settings (4.1–4.9)
- 7 Editing the ANALYSIS2 analysis results display screen (4.7–4.9)
- 8 Turning ON/OFF automatic analysis each sweep (4.1)
- 9 Printing analysis results (4.1)
- 10 Saving analysis results (4.1)
 - 10-1 Setting the save destination (5.6)
 - 10-2 Entering a file name (5.6)
 - 10-3 Setting the data format (5.6)
 - 10-4 Setting overwrite or add (5.6)
 - 10-5 Creating a directory (5.6)
 - 10-6 Sorting a file (5.6)
 - 10-7 Executing saving (5.6)
- 11 Setting the peak search, bottom search, and analysis function ranges to between line markers L1 and L2 (3.13, 4.13)
(For both the MARKER and PEAK SEARCH menus)
- 12 Setting the peak search, bottom search, and analysis function ranges to within the zoom range (3.13, 4.13) (For both the MARKER and PEAK SEARCH menus)

MEMORY



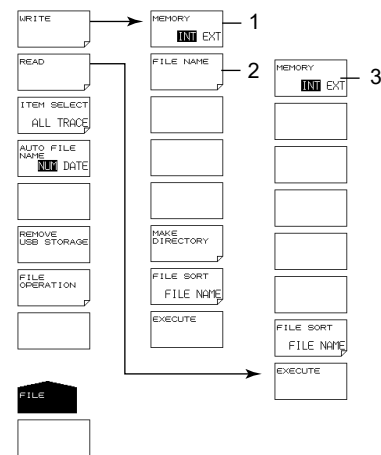
- 1 Temporarily saving a trace (5.2)
- 2 Loading temporarily saved trace (5.2)
- 3 Clearing temporarily saved traces (5.2)
- 4 Displaying temporarily saved traces in a list (5.2)
- 4-1 Changing list display contents (5.2)

FILE



- 1 Saving data (chapter 5)
 - 1-1 Setting the save destination for trace data (5.3)
 - 1-2 Entering a file name (5.3)
 - 1-3 Setting the trace to save (5.3)
 - 1-4 Setting the data format (5.3)
- 2 Loading data (4.12, chapter 5)
 - 2-1 Setting the loading source for trace data (5.3)
 - 2-2 Setting the loading destination trace (5.3)
 - 2-3 Switching list/thumbnail display (5.3)
- 3 Setting the target item (4.12, chapter 5)
- 4 Assigning the filename automatically (5.12)
- 5 Removing the USB storage medium (5.1)
- 6 File manipulation (5.11)
 - 6-1 Setting the target storage device (5.11)
 - 6-2 Deleting a file (5.11)
 - 6-3 Copying a file (5.11)
 - 6-3-1 Setting the paste destination (5.11)
 - 6-3-2 File name when saving to separate name (5.11)
 - 6-4 Renaming (5.11)
 - 6-5 Creating a directory (5.11)
 - 6-6 Sorting a file (5.11)
 - 6-7 File selection (5.11)

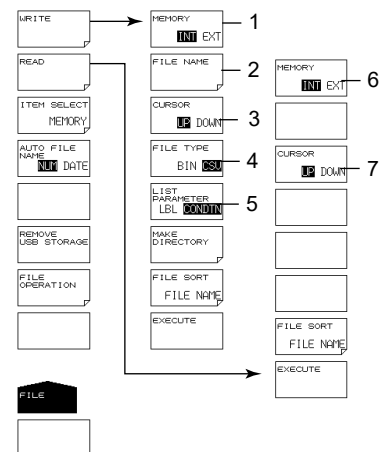
For ALL TRACE



ALL TRACE

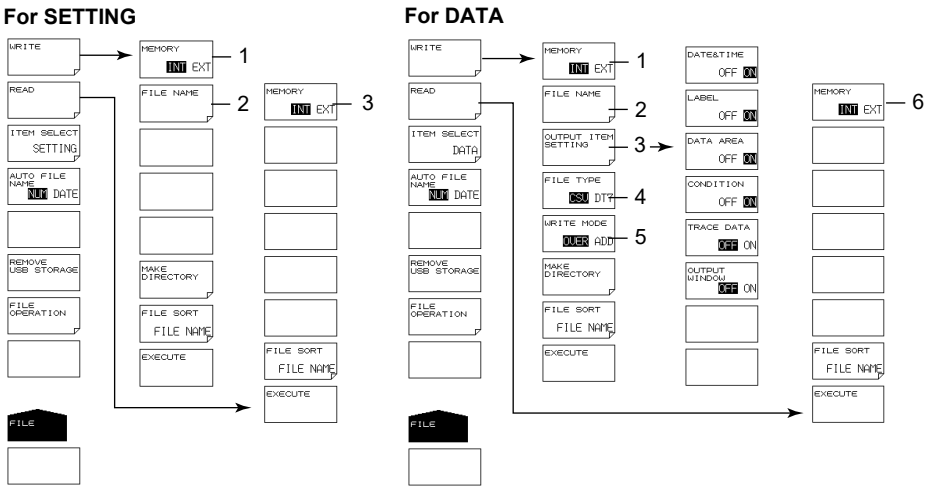
- 1 Save destination setting for all trace data (5.4)
- 2 File name setting (5.4)
- 3 Load source setting for all trace data (5.4)

For MEMORY



MEMORY

- 1 Setting the MEMORY data save destination (5.3)
- 2 Entering a file name (5.3)
- 3 Switching the cursor target window (5.3)
(setting the source/destination memory number)
- 4 Setting the data format (5.3)
- 5 Switching the MEMORY list display contents (5.3)
- 6 Setting the MEMORY data loading source (5.3)
- 7 Switching the cursor target window (5.3) (setting the source/destination load file)

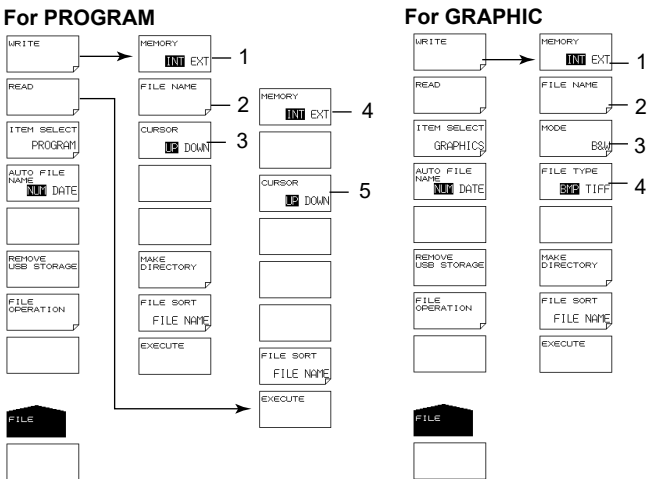


SETTING

- 1 Setting the save destination for settings (5.5)
- 2 Entering a file name (5.5)
- 3 Setting the loading source for settings (5.5)

DATA

- 1 Setting the save destination for analysis results data (5.6)
- 2 Entering a file name (5.6)
- 3 Setting the items to save (5.6)
- 4 Data format setting (5.6)
- 5 Setting overwrite or add (5.6)
- 6 Setting the loading source for analysis results data (5.6)

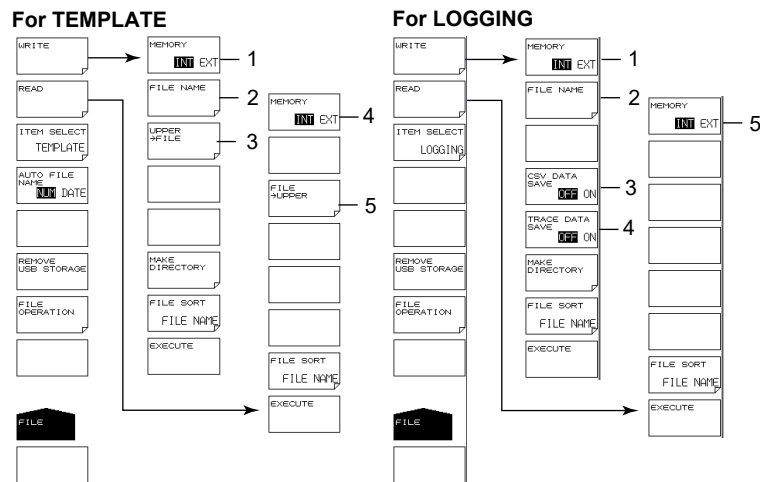


PROGRAM

- 1 Setting the save destination for program data (5.7)
- 2 Entering a file name (5.7)
- 3 Switching the cursor target window (5.7) (setting the source/destination program number)
- 4 Setting the loading source for program data (5.7)
- 5 Switching the cursor target window (5.7) (setting the source/destination load file)

GRAPHIC

- 1 Setting the save destination for image data (5.8)
- 2 Entering a file name (5.8)
- 3 Color mode setting (5.8)
- 4 Data format setting (5.8)



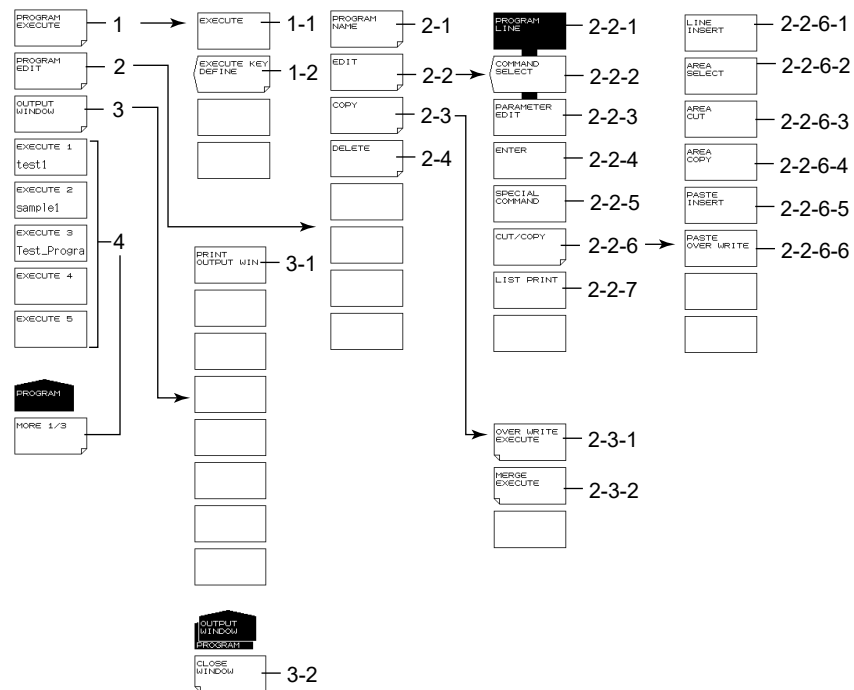
TEMPLATE

- 1 Setting the save destination for template data (5.9)
- 2 Entering a file name (5.9)
- 3 Setting a template to save (5.9)
- 4 Setting the loading source for template data (5.9)
- 5 Setting the loading destination for template data (4.12, 5.9)

LOGGING

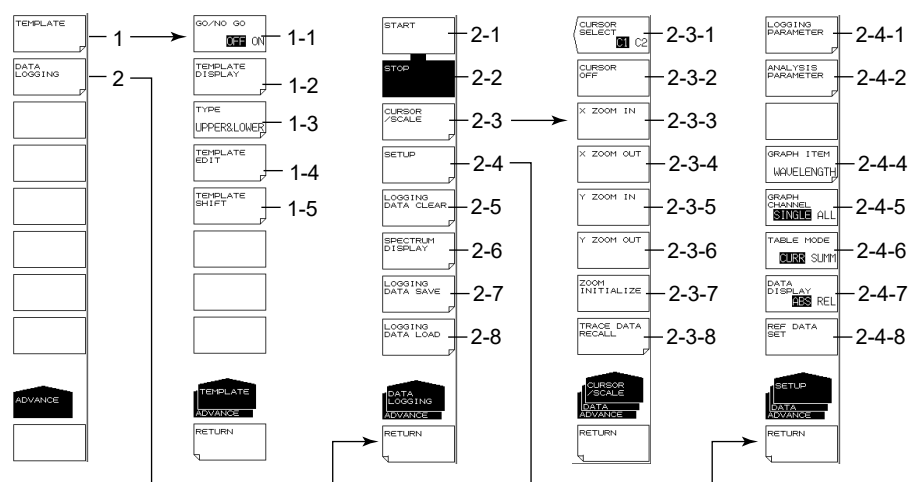
- 1 Setting the logging data save destination (5.10)
- 2 Setting the file name (5.10)
- 3 Setting the logging data to save (5.10)
- 4 Setting the temporarily saved waveform data (5.10)
- 5 Setting the logging data load source (5.10)

PROGRAM (See IM AQ6377-17EN)



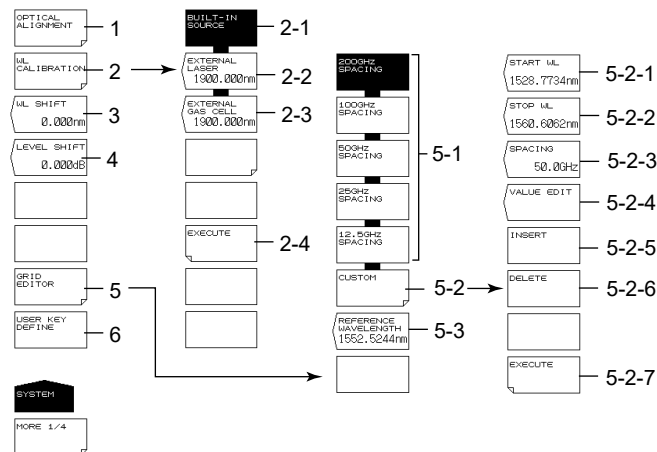
- 1 Program execution
 - 1-1 Program execution
 - 1-2 Registering programs to soft keys
- 2 Editing programs
 - 2-1 Entering program names
 - 2-2 Editing lines
 - 2-2-1 Setting program lines
 - 2-2-2 Setting function commands
 - 2-2-3 Editing parameters
 - 2-2-4 Finalizing input values
 - 2-2-5 Special command settings
 - 2-2-6 Cutting/pasting lines
 - 2-2-6-1 Inserting lines
 - 2-2-6-2 Setting the target area
 - 2-2-6-3 Deleting an area
 - 2-2-6-4 Copying an area
 - 2-2-6-5 Pasting (inserting)
 - 2-2-6-2 Pasting (overwriting)
 - 2-2-7 Printing program lists
 - 2-3 Copying programs
 - 2-3-1 Overwriting
 - 2-3-2 Copying and adding contents (merge)
 - 2-4 Deleting programs
- 3 OUTPUT WINDOW display
 - 3-1 OUTPUT WINDOW print out
 - 3-2 Closing the OUTPUT WINDOW
- 4 Executing programs registered to soft keys

ADVANCE



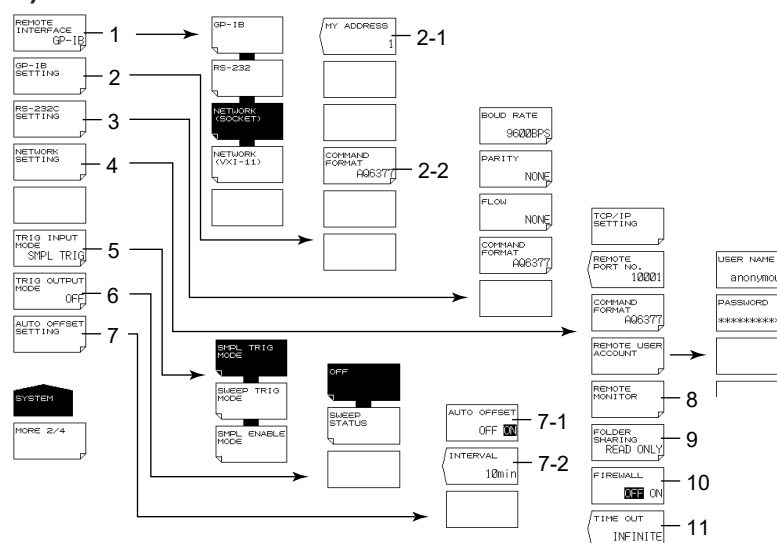
- 1 Template settings (4.12)
 - 1-1 GO/NO GO ON/OFF (4.12)
 - 1-2 Displaying templates (4.12)
 - 1-3 Setting the template type (4.12)
 - 1-4 Editing templates (4.12)
 - 1-5 Setting the template shift amount (4.12)
- 2 Sets data logging (4.15)
 - 2-1 Executes data logging (4.15)
 - 2-2 Stops data logging (4.15)
 - 2-3 Displays cursors and scales (4.15)
 - 2-3-1 Selects the cursor display (4.15)
 - 2-3-2 Turns off the cursor display (4.15)
 - 2-3-3 Expands the horizontal scale at the current cursor position (4.15)
 - 2-3-4 Reduces the horizontal scale at the current cursor position (4.15)
 - 2-3-5 Expands the vertical scale at the center of the measured values (4.15)
 - 2-3-6 Reduces the vertical scale at the center of the measured values (4.15)
 - 2-3-7 Initializes the display scale (4.15)
 - 2-3-8 Loads the waveform data of the logging data into the specified trace (4.15)
 - 2-4 Sets data logging conditions (4.15)
 - 2-4-1 Sets logging parameters (4.15)
 - 2-4-2 Sets analysis conditions (4.15)
 - 2-4-4 Selects the data to display a graph of (4.15)
 - 2-4-5 Selects the number of channels to display on the graph (4.15)
 - 2-4-6 Sets the table data display mode (4.15)
 - 2-4-7 Sets the table data value display mode (4.15)
 - 2-4-8 Sets the reference value for displaying relative values of the table data (4.15)
 - 2-5 Deletes logging data (4.15)
 - 2-6 Displays waveform data while data logging is in progress (4.15)
 - 2-7 Saves logging data (4.15)
 - 2-8 Loads logging data (4.15)

SYSTEM (MORE 1/4)



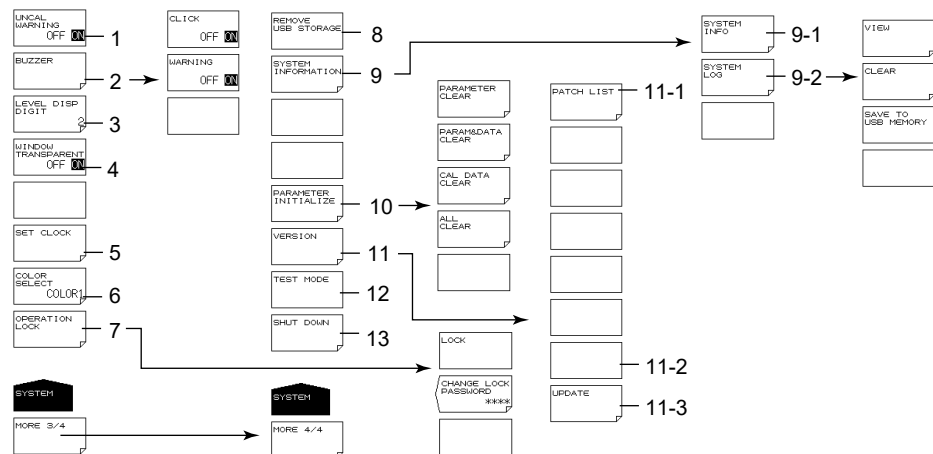
- 1 Executing monochromator alignment adjustment (See page 2-16)
- 2 Wavelength calibration (See page 2-16)
 - 2-1 Wavelength calibration using the internal light source
 - 2-2 Wavelength calibration using a laser type external reference light source
 - 2-3 Wavelength calibration using a gas cell type external reference light source
 - 2-4 Executing wavelength calibration
- 3 Setting the wavelength shift amount (value specified for the wavelength axis display value is added) (4.14)
- 4 Setting the level shift amount (value specified for the level axis display value is added) (4.14)
- 5 Editing the grid table (4.10)
 - 5-1 Creating a grid table with predetermined grid spacing (4.10)
 - 5-2-1 Setting the start wavelength (4.10)
 - 5-2-2 Setting the stop wavelength (4.10)
 - 5-2-3 Setting the frequency Spacing (4.10)
 - 5-2-4 Setting channel point wavelength (4.10)
 - 5-2-5 Inserting channel points (4.10)
 - 5-2-6 Deleting channel points (4.10)
 - 5-2-7 Finalizing input values (4.10)
 - 5-3 Setting the grid table reference wavelength (4.10)
- 6 Registering user keys (6.1)

SYSTEM (MORE 2/4)



- 1 Communication interface settings (see IM AQ6377-17EN)
- 2 GP-IB interface settings (see IM AQ6377-17EN)
 - 2-1 Setting the GP-IB port address
 - 2-2 Command format setting
- 3 RS-232C interface settings (see IM AQ6377-17EN)
- 4 Ethernet interface settings (see IM AQ6377-17EN)
- 5 Setting the trigger input mode (2.16)
- 6 Setting the trigger output mode (2.17)
- 7 Setting the auto offset (6.6)
 - 7-1 Auto offset ON/OFF (6.6)
 - 7-2 Setting the offset interval (6.6)
- 8 Remote monitor (6.6)
- 9 Sets directory sharing (6.6)
- 10 Setting the firewall (6.6)
- 11 Setting the Remote Timeout (see IM AQ6377-17EN)

SYSTEM (MORE 3/4, MORE 4/4)



- 1 UNCAL, warning display ON/OFF (6.6)
- 2 Buzzer settings (6.6)
- 3 Setting the number of level data digits (See page 3-7)
- 4 Semitransparent display ON/OFF (See page 3-7)
- 5 Date/time setting (See page 3-8)
- 6 Setting the display color (See page 3-7)
- 7 Locking the operation key and changing the password for operation lock (6.5)
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Appendix 2

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WINDOWS EMBEDDED STANDARD 7

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Appendix 2 MICROSOFT SOFTWARE LICENSE TERMS

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