User's Manual

AQ1200A/AQ1200B/AQ1200C/ AQ1200E/AQ1205A/AQ1205E/ AQ1205F OTDR Multi Field Tester Operation Guide

YOKOGAWA
Yokogawa Test & Measurement Corporation

IM AQ1200-02EN
11th Edition

Thank you for purchasing the AQ1200A/AQ1200B/AQ1200C/AQ1200E/AQ1205A/AQ1205E/AQ1205F OTDR (Optical Time Domain Reflectometer) Multi Field Tester. (hereinafter, “AQ1200x/AQ1205x”will refer to these products) This operation guide focuses on the handling precautions, basic operations, and specifications of the AQ1200x/AQ1205x. In addition to this operation guide, the following additional user’s manuals for the AQ1200x/AQ1205x are provided on the included CD-ROM: the User’s Manual, IM AQ1200-01EN, that explains all the AQ1200x/AQ1205x features and how to use them and the Communication Interface User’s Manual, IM AQ1200-17EN, that explains the communication interface feature and how to use it. Use these manuals together with this operation guide.

List of Manuals

The AQ1200x/AQ1205x comes with the following manuals. Please keep them in a safe place.

Manual Title	Manual No.	Description
AQ1200A/AQ1200B/AQ1200C/AQ1200E/AQ1205A/AQ1205E/ AQ1205F OTDR Multi Field Tester Operation Guide	IM AQ1200-02EN	This manual.
AQ1200A/AQ1200B/AQ1200C/AQ1200E/AQ1205A/AQ1205E/ AQ1205F OTDR Multi Field Tester User’s Manual (included in CD)	IM AQ1200-01EN	Explains all AQ1200x/AQ1205x features, except for the communication features, and how to use them.
AQ1200A/AQ1200B/AQ1200C/AQ1200E/AQ1205A/AQ1205E/ AQ1205F OTDR Multi Field Tester Communication Interface User’s Manual (included in CD)	IM AQ1200-17EN	Explains the features related to using communication commands to control the AQ1200x/AQ1205x.
739874 AC Adapter User’s Manual	IM 739874-01EN	Explains the handlling precautions for AC adapter.
739874 Precauciones de seguridad Меры предосторожности 이 기기의 안전한 사용을 위해	IM 739874-02Z4	Explains the handlling precautions for AC adapter.
739874 本设备的安全使用注意事项 為了安全地使用本機器	IM 739874-02ZH	Explains the handlling precautions for AC adapter.
Model 739882 Battery Pack (MFT) Handling Precautions	IM 739882-01EN	Explains the handlling precautions for the battery pack.
AQ1200A/AQ1200B/AQ1200C/AQ1200E/AQ1205A/AQ1205E/ AQ1205F OTDR Multi Field Tester User’s Manual	IM AQ1200-92Z1	A manual for China.

* The “-EN” in the manual number is the language code.

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

Document No.	Description
PIM 113-01Z2	List of worldwide contacts

11th Edition: April 2019 (YMI)

Notes

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

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Revisions

February 2010	1st Edition
February 2011	2nd Edition
July 2012	3rd Edition
July 2013	4th Edition
October 2013	5th Edition
September 2015	6th Edition
December 2015	7th Edition
January 2017	8th Edition
October 2017	9th Edition
December 2017	10th Edition
April 2019	11th Edition

Product Registration

Thank you for purchasing YOKOGAWA products.

YOKOGAWA provides registered users with a variety of information and services.
Please allow us to serve you best by completing the product registration form accessible from our homepage.

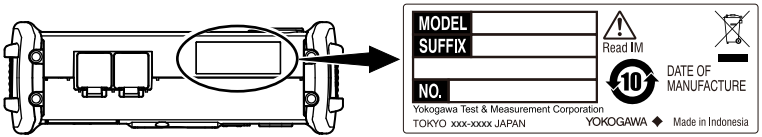
http://tmi.yokogawa.com/

Checking the Package Contents

After receiving the product and opening the package, check the items described below. If the wrong items have been delivered, if items are missing, or if there is a problem with the appearance of the items, contact your nearest YOKOGAWA dealer.

AQ1200x/AQ1205x

Check that the product that you have received is the same product that you ordered. For reference, the model name, suffix code, and specifications of the products are listed below.



Model	Suffix[6]	Description			
AQ1200A		Light source wavelength	SM 1310 nm	SM 1550 nm	
		Dynamic range	32 dB	30 dB	
AQ1200B		Light source wavelength	SM 1625 nm		
		Dynamic range	30 dB		
AQ1200C		Light source wavelength	SM 1650 nm		
		Dynamic range	30 dB		
AQ1200E		Light source wavelength	SM 1310 nm	SM 1550 nm	SM 1625 nm
		Dynamic range	32 dB	30 dB	30 dB
AQ1205A		Light source wavelength	SM 1310 nm	SM 1550 nm	
		Dynamic range	40 dB	38 dB	
AQ1205E		Light source wavelength	SM 1310 nm	SM 1550 nm	SM 1625 nm
		Dynamic range	40 dB	38 dB	36 dB
AQ1205F		Light source wavelength	SM 1310 nm	SM 1550 nm	SM 1650 nm
		Dynamic range	40 dB	38 dB	30 dB

Model	Suffix[6]		Description		
Language	-HE		English		
	-HC		Chinese/English		
	-HM		Chinese		
	-HK		Korean/English		
	-HR		Russian/English		
Power cord[5]			Compliant Standard	Maximum Rated Voltage	Part No.
	-D		UL/CSA Standard	125 V	A1068WD
	-F		VDE Standard	250 V	A1071WD
	-R		Australian Standard	250 V	A1070WD
	-P		Korean Standard	250 V	A1087WD
	-Q		BS/Singaporean Standard	250 V	A1069WD
	-H		Chinese Standard	250 V	A1076WD
	-T		Taiwanese Standard	125 V	A1083WD
	-N		Brazilian Standard	250 V	A1086WD
Optical connectors[1]	-USC		An optical power measurement (OPM) port with an SC connector and an OTDR port with an SC universal adapter		
	-UFC		An optical power measurement (OPM) port with an FC connector and an OTDR port with an FC universal adapter		
	-ASC		An optical power measurement (OPM) port with an SC connector and an OTDR port with an SC/APC connector (SC angled physical contact)		
Options					
Loss test				Optical Output Level	Optical Power Measurement Range
		/SLT	Loss test	–3 dBm	–70 dBm to +10 dBm (CW)
		/HLT	High-powered loss test	–3 dBm	–50 dBm to +27 dBm (CW)
PON power meter[4]		/PPM	Power range	–70 dBm to +10 dBm (1310 nm, 1490 nm) –50 dBm to +27 dBm (1550 nm)	
Visible light source		/VLS	2.5 mm ferrule connector.		
Standard optical power meter		/SPM	Power range	–70 dBm to +10 dBm (CW)	
Stabilized light source		/SLS	Optical output level	–3 dBm	
Ethernet interface		/LAN	100BASE-TX/10BASE-T		
Shoulder strap		/SB	—		

Model	Suffix[6]		Description	
PON OTDR(Applies to models with the AQ1200A)[4]		/PN	Dynamic ranges[2]	23 dB (1.31 μm), 21 dB (1.55 μm)
			Event dead zone	0.8m (Typical)[3]

1 The connectors that you select are attached to the AQ1200x/AQ1205x OPM and OTDR ports prior to shipping.
2 Pulse width 100 ns.
3 Typical value represents a typical or average value. It is not strictly warranted.
4 This features covers firmware versions 1.10 or later of the AQ1200A.
5 Make sure that the attached power cord meets the designated standards of the country and area that you are using it in.
6 For products whose suffix code contains "Z," an exclusive manual may be included. Please read it along with the standard manual.

No. (Instrument number)

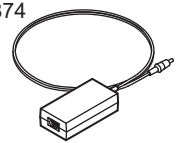
When contacting the dealer from which you purchased the instrument, please tell them the instrument number.

Accessories

The instrument is shipped with the following accessories. Make sure that all accessories are present and undamaged.

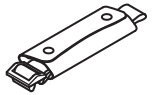
Power cord (one cord that matches the suffix code is included)[3]

AC adapter
739874

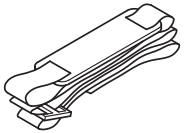


Battery pack
(lithium-ion)
739882

Hand strap
B8070CX

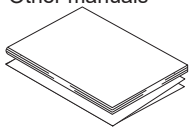


Shoulder strap
B8070CY[1]

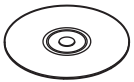


Manuals

- Operation Guide (this manual)
- Other manuals



- User's manuals B8078VB (CD-ROM)[2]



1 Included with models that have the /SB option installed.
2 You can purchase the printed IM AQ1200-01EN and IM AQ1200-17EN manuals separately. Contact your nearest YOKOGAWA dealer to purchase a copy.
3 Make sure that the attached power cord meets the designated standards of the country and area that you are using it in.

Optional Accessories (Sold separately)

The following optional accessories are available for purchase separately. For information about ordering accessories, contact your nearest YOKOGAWA dealer.

Name	Model or Component Number	Notes
Soft carrying case	SU2006A	—
AC adapter	739874	—
Battery pack	739882	—
Shoulder strap	B8070CY	—
SC universal adapter	SU2005A-SCC	For products with -USC or -ASC suffix codes. For products with the /PPM option.
FC universal adapter	SU2005A-FCC	For products with the -UFC suffix code. For products with the /PPM option.
SC connector adapter	735480-SCC	For optical power measurement (OPM) ports These accessories can be used with models that have the loss test option (/SLT or /HLT) or /SPM option.
FC connector adapter	735480-FCC	
Ferrule adapter (1.25φ)	735481-LMC	
Ferrule adapter (2.5φ)	735481-SFC	

Manual CD

The English folder of manual CD contains PDF files of the following manuals. The PDFs of the Japanese manuals are included in the manual CD.

File Name	Manual Title	Manual No.
Features and Operation Manual.pdf	AQ1200A/AQ1200B/AQ1200C/AQ1200E/AQ1205A/AQ1205F OTDR Multi Field Tester User's Manual	IM AQ1200-01EN
Communication Interface. pdf	AQ1200A/AQ1200B/AQ1200C/AQ1200E/AQ1205A/AQ1205F OTDR Multi Field Tester Communication Interface User's Manual	IM AQ1200-17EN

To view above manuals you need Adobe Reader 5.0 or later.

WARNING

Never play this CD-ROM on an audio CD player. Doing so may cause loss of hearing or speaker damage due to the large sounds that may be generated.

AVERTISSEMENT

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.

Safety Precautions

This product is designed to be used by a person with specialized knowledge. 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 guide, 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.

Warning: 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.

Hazard, radiation of laser apparatus.

French

Avertissement : 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

Danger : Appareil laser à rayonnement.

Direct current

Stand-by

Equipment protected throughout by double insulation or reinforced insulation

Courant direct

Veille

Équipement protégé par une double isolation ou une isolation renforcée

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

WARNING

Use the Instrument Only for Its Intended Purpose

This 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.

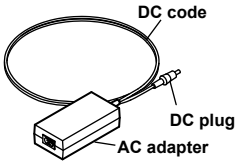
Check the Physical Appearance

Do not use the instrument if there is a problem with its physical appearance.

Power Supply

Make sure that the power supply voltage matches the AC adapter's rated supply voltage and that it does not exceed the maximum voltage range specified for the power cord.

Power Cord and AC Adapter



- Only use the power cord and AC adapter that were included with the instrument. Do not use the power cord and AC adapter with other instruments.
- Do not bend or twist the power cord or AC adapter's DC cord numerous times.
- Do not bend the base of the AC adapter's DC cord or the base of the DC plug.
- Do not wrap the power cord or the AC adapter's DC cord around the AC adapter.
- Do not bundle the power cord or the AC adapter's DC cord too tightly.
- Do not use the instrument with the power cord or the AC adapter's DC cord in a bundled condition.
- When the power cord or AC adapter's DC cord is connected to the outlet or the instrument, do not move the AC adapter or the instrument.
- Do not carry the AC adapter while pulling on the power cord or the AC adapter's DC cord.
- Do not allow the power cord or the AC adapter's DC cord to be caught in doors, shelf doors, and so on.
- Do not alter, process, or repair the power cord or the AC adapter's DC cord. If a cord is damaged, contact your nearest YOKOGAWA dealer.
- Do not use the instrument with the AC adapter hanging in the air.

Battery Pack

Only use the instrument battery pack. Do not use this battery pack with other instruments. Only use the instrument to charge the battery pack. If the battery pack is still charging after 5 hours, stop charging it immediately. Your clothing may be damaged or you may be injured if you come in contact with the electrolyte due to fluid leakage or the battery pack exploding. Because the electrolyte may cause loss of eyesight, if it comes in contact with your eyes, immediately wash the affected area with clean water, and consult a doctor as soon as possible. When you change the battery pack, be sure to turn the instrument off, and detach the AC adapter power supply from the instrument. Failure to do so may lead to electric shock or other accidents. Do not throw the battery pack into fire or heat it. Such actions are dangerous as they may cause the battery pack to explode or the electrolyte to be sprayed about. Follow the additional handling precautions that are included in the battery pack's user's manual.

Laser Beam

Do not look directly or indirectly into the laser beam or at a specular reflection of the beam without protective equipment. Do not aim the laser beam at the eye. The laser beam may cause blindness or damage to your eyes. Attach the cover to the optical connector when it is not in use.

Do Not Operate in an Explosive Atmosphere

Do not use the instrument in the presence of flammable gasses or vapors. Doing so is extremely dangerous.

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.

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.

Alimentation

S'assurer que la tension d'alimentation correspond à la tension d'alimentation nominale de l'adaptateur CA et qu'elle ne dépasse pas la plage de tension maximale spécifiée pour le cordon d'alimentation.

Cordon d’alimentation et adaptateur CA

Utiliser uniquement le cordon d’alimentation et l’adaptateur CA fournis avec AQ1200x/AQ1205x. Ne pas utiliser le cordon d’alimentation et l’adaptateur CA avec d’autres instruments.

- Ne pas plier la base du cordon CC ou la base de la fiche CC.
- Ne pas plier ou tordre plusieurs fois le cordon secteur ou le cordon CC.
- Ne pas entourer le cordon secteur ou le cordon CC autour de l’adaptateur CA.
- Pour ranger l’adaptateur CA, ne pas enrouler de manière trop serrée le cordon secteur ou le cordon CC.
- Ne pas utiliser l’adaptateur CA en enroulant le cordon secteur ou le cordon CC de manière serrée.
- Ne pas déplacer l’adaptateur CA ou l’instrument de mesure lorsque l’adaptateur est branché sur la prise de courant ou raccordé à l’instrument de mesure.
- Ne pas porter l’adaptateur CA tout en tirant sur le cordon CC.
- Veiller à ne pas coincer le cordon secteur ou le cordon CC dans une porte, une armoire, etc.
- Ne pas modifier, usiner ou réparer le cordon secteur ou le cordon CC. Si le cordon secteur ou le cordon CC est endommagé, contacter le revendeur YOKOGAWA le plus proche.
- Ne pas utiliser AQ1200x/AQ1205x avec l'adaptateur CA flottant dans l'air.

Pack de batteries

Utiliser exclusivement le pack de batteries de l’AQ1200x/AQ1205x. Ne pas utiliser ce pack de batteries avec d’autres instruments. Recharger le pack de batteries à l’aide de l’AQ1200x/AQ1205x uniquement. Si le pack de batteries est encore en charge au bout de 6 heures, interrompre la charge. Tout contact avec l’électrolyte échappé en raison d’une fuite ou d’une explosion du pack de batteries peut endommager les vêtements ou causer des blessures. L’électrolyte peut entraîner la cécité, par conséquent, en cas de contact avec les yeux, rincer immédiatement à l’eau et consulter un médecin dans les plus brefs délais. Lors du remplacement du pack de batteries, toujours mettre l’AQ1200x/AQ1205x hors tension et débrancher l’adaptateur c.a. de l’AQ1200x/AQ1205x. Le non-respect de cette consigne peut entraîner un choc électrique ou tout autre accident. Tenir le pack de batteries éloigné de toute source de chaleur et des flammes pour éviter le risque d’explosion du pack de batteries ou de déversement d’électrolyte. Respecter les consignes de manipulation supplémentaires fournies dans le manuel d’utilisation du pack de batteries.

Faisceau laser

Ne pas fixer directement ou indirectement le faisceau laser, ni la réflexion spéculaire du faisceau en l’absence d’équipement de protection. Ne pas orienter le faisceau laser en direction des yeux. Le faisceau laser peut entraîner la cécité ou causer des lésions oculaires. Recouvrir le connecteur optique à l’aide du cache pendant les périodes de non-utilisation.

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.

See below for operating environment limitations.

CAUTION

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

French

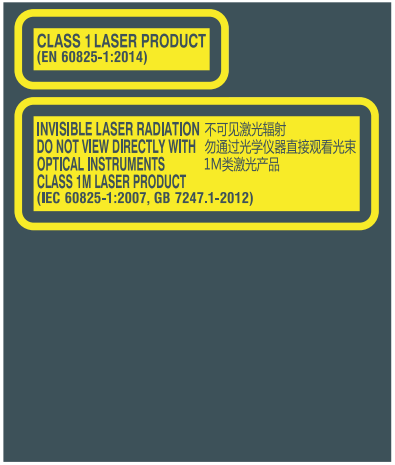
ATTENTION

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

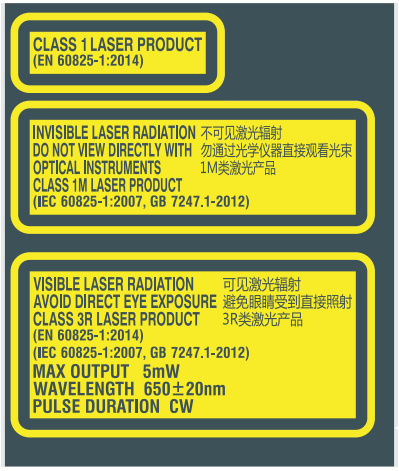
Safety Precautions for Laser Products

This instrument uses a laser light source. This instrument is a Class 1M and Class 3R laser product as defined by IEC 60825-1:2007 Safety of Laser Products—Part1: Equipment classification and requirements. In addition, this instrument complies with 21 CFR 1040.10 except for deviations pursuant to Laser Notice No. 50, dated June 24, 2007.

Non-/VLS option



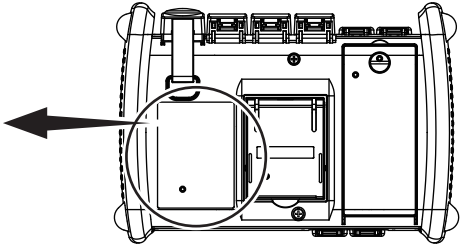
/VLS option



Laser Class 1 Label

Laser Class 1M Label
Using an optical instrument, such as a loupe, magnifying glass, or microscope, when observing the laser beam from a distance of less than 100 mm may cause eye injury.

Laser Class 3R Label
Avoid direct eye exposure.



Laser classes differ depending on the standard number and the year of the standard.
Take safety measures according to the laser class corresponding to standard number and year of the country or region that the instrument will be used in.

Model	Laser Type	Class[1]	Center Wavelength	Maximum Output Power[2]	Mode Field Diameter	Beam Divergency
AQ1200A	LD	1M or 1	1310 nm/1550 nm	CW: 10 mW PULSE: 200 mW PULSE width: 20 µs, duty cycle: ≤ 3.0%	9 µm	11.5°
	LD[3]	3R	650 nm	5 mW	9 µm	11.5°
AQ1200B	LD	1M or 1	1625 nm	CW: 10 mW PULSE: 200 mW PULSE width: 20 µs, duty cycle: ≤ 3.0%	9 µm	11.5°
	LD[3]	3R	650 nm	5 mW	9 µm	11.5°
AQ1200C	LD	1M or 1	1650 nm	CW: 10 mW PULSE: 200 mW PULSE width: 20 µs, duty cycle: ≤ 3.0%	9 µm	11.5°
	LD[3]	3R	650 nm	5 mW	9 µm	11.5°
AQ1200E	LD	1M or 1	1310 nm/1550 nm, 1625 nm	CW: 10 mW PULSE: 200 mW PULSE width: 20 µs, duty cycle: ≤ 3.0%	9 µm	11.5°
	LD[3]	3R	650 nm	5 mW	9 µm	11.5°
AQ1205A	LD	1M or 1	1310 nm/1550 nm	CW: 10 mW PULSE: 200 mW PULSE width: 20 µs, duty cycle: ≤ 3.0%	9 µm	11.5°
	LD[3]	3R	650 nm	5 mW	9 µm	11.5°
AQ1205E	LD	1M or 1	1310 nm/1550 nm, 1625 nm	CW: 10 mW PULSE: 200 mW PULSE width: 20 µs, duty cycle: ≤ 3.0%	9 µm	11.5°
	LD[3]	3R	650 nm	5 mW	9 µm	11.5°
AQ1205F	LD	1M or 1	1310 nm/1550 nm, 1650 nm	CW: 10 mW PULSE: 200 mW PULSE width: 20 µs, duty cycle: ≤ 3.0%	9 µm	11.5°
	LD[3]	3R	650 nm	5 mW	9 µm	11.5°

1 Class 1M: IEC 60825-1:2007, GB 7247.1-2012,
Class 1: EN 60825-1:2014
Class 3R: EN 60825-1:2014, IEC 60825-1:2007, GB 7247.1-2012
2 Under single fault conditions.
3 Applies to models with the /VLS option.

Waste Electrical and Electronic Equipment (WEEE), Directive

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

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:

1. Lithium battery
   You cannot replace batteries by yourself. When you need to replace batteries, contact your local Yokogawa Europe B.V.office.
2. lithium-ion battery
   When you remove batteries from this product and dispose them, discard them in accordance with domestic law concerning disposal.
   Take a right action on waste batteries, because the collection system in the EU on waste batteries are regulated.
   For instructions on how to remove the battery pack, see section 20.8 in the user’s manual (File Name: Features & Operation Manual.pdf).

Recycle Mark

Do not dispose together with normal garbage. To protect the environment, please dispose according to the recycling ordinances in your area.

Authorized Representative in the EEA

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

Conventions Used in This Guide

Notes

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

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

WARNING

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

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.

CAUTION

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

French

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.

References

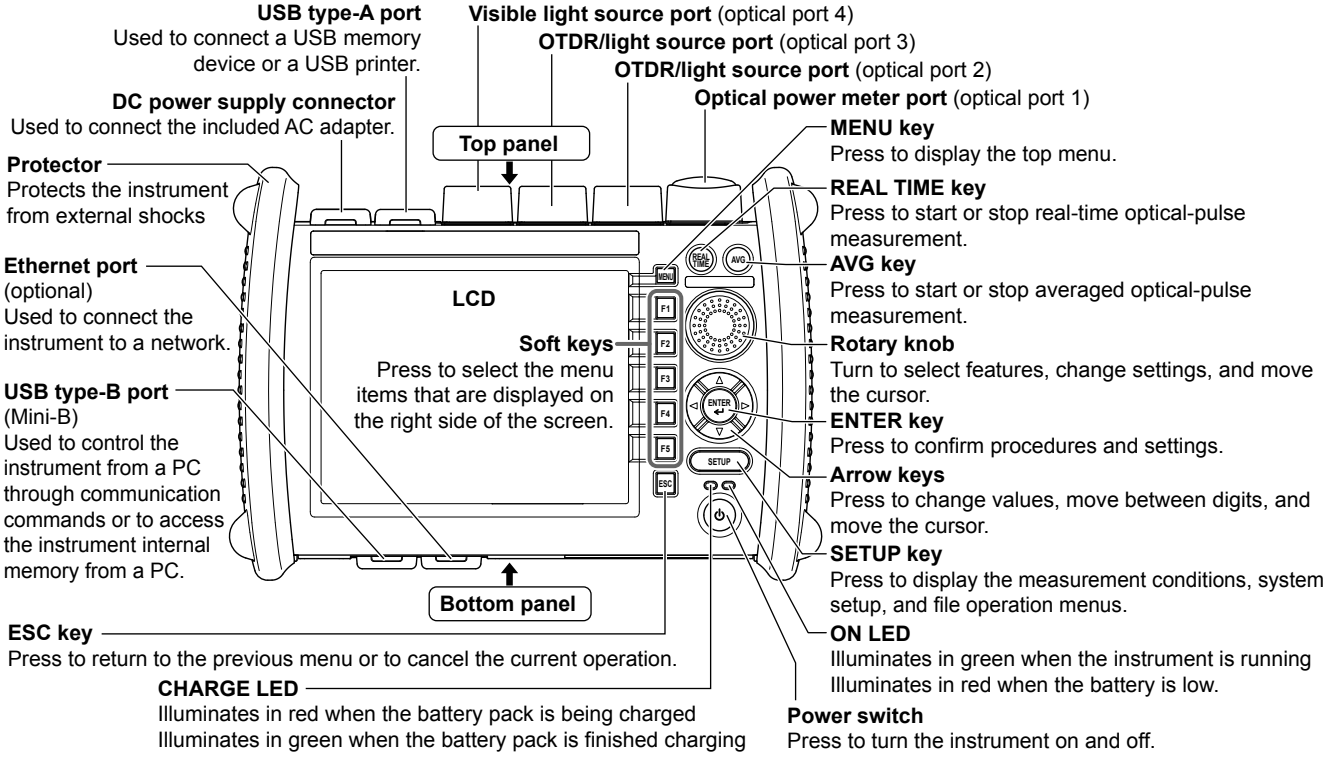
This mark signifies a reference to the user's manual.

Contents

Memo

Names and Functions of Parts

Front Panel



Making Preparations for Measurements

Operating Precautions

Safety Precautions

If you are using this instrument for the first time, make sure to thoroughly read “Safety Precautions,” on pages 8 to 14.

Do Not Remove the Case

Do not remove the case from the instrument. Doing so is extremely dangerous. For internal inspection and adjustment, contact your nearest YOKOGAWA dealer.

Unplug If Abnormal Behavior Occurs

If you notice smoke or unusual odors coming from the instrument, immediately turn off the power, unplug the power cord, and contact your nearest YOKOGAWA dealer.

Use the AC Adapter and Power Cord Correctly

Do not place objects on top of the AC adapter or power cord, and keep them away from heat sources. When removing the plug from the power outlet, do not pull on the cord. Pull from the plug. If the AC adapter or power cord is damaged, contact your nearest YOKOGAWA dealer. Refer to page 4 to 7 for the part number to use when placing an order.

General Handling Precautions

Do Not Place Objects on Top of the Instrument

Never place objects such as other instruments or objects that contain water on top of the instrument. Doing so may damage the instrument.

Do Not Subject the Inputs and Outputs to Mechanical Shock

If the I/O connectors or adapters are subjected to mechanical shock, they may be damaged. The instrument may not perform measurements correctly due to damage or deformation that is not visible to the naked eye.

Do Not Scratch the LCD

Because the LCD can be easily scratched, do not allow any sharp objects near it. Also, do not apply vibration or shock to it.

During Extended Periods of Non-Use

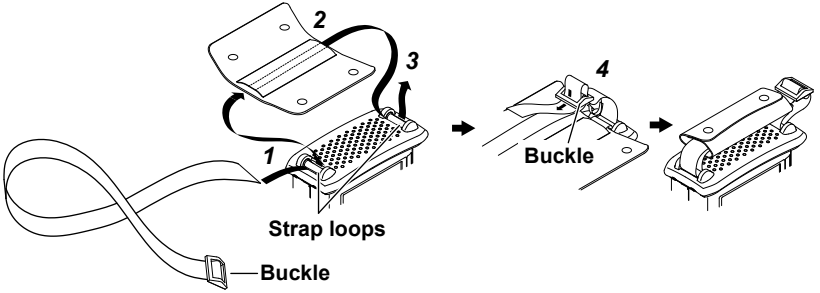
Unplug the power cord from the outlet. Remove the battery pack from the instrument.

When Carrying the Instrument

Remove the power cord and connecting cables. When carrying the instrument, grasp the protector or the attached strap firmly.

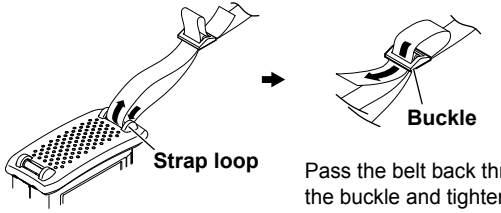
Attaching the Strap

Attaching the Hand Strap



1. Pass the hand strap through the loop on the lower-left side of the instrument.
2. Pass the hand strap through the hand strap cover.
3. Pass the hand strap through the loop on the upper-left side of the instrument.
4. Pass the strap through the buckle, and use the buttons to close the hand strap cover.

Attaching the Shoulder Strap



Pass the belt back through the buckle and tighten it.

Attach the strap to the loops on both the upper-left and upper-right sides of the instrument. These loops are also used when attaching the hand strap, but you cannot attach both the shoulder strap and the hand strap at the same time. Pass the shoulder strap through the loops and then the buckle as shown in the figure. In the same manner, attach the strap to the other side of the instrument.

Connecting the Power Supply

Using the AC Adapter

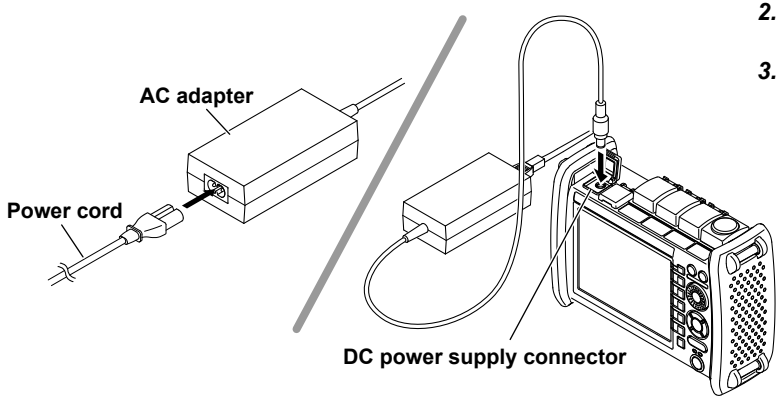
WARNING

- Confirm that the instrument is off before you connect the power supply.
- Make sure that the power supply voltage matches the AC adapter's rated supply voltage and that it does not exceed the maximum voltage range specified for the power cord.
- Only use the AC adapter that was included with the instrument.
- Do not connect or disconnect the AC adapter while the instrument is on.
- If you are using the instrument for a long time with the AC adapter connected, remove the battery pack from the instrument.
- If an appropriate AC outlet for the supplied power cord is unavailable, do not use the instrument.

French

AVERTISSEMENT

- Vérifier que l'AQ1200x/AQ1205x est hors tension avant de raccorder au secteur.
- Vérifier que la tension d'alimentation correspond à la tension d'alimentation nominale de l'adaptateur c.a. et qu'elle ne dépasse pas la plage de tension maximale spécifiée pour le cordon d'alimentation.
- Utiliser exclusivement l'adaptateur c.a. dédié pour l'instrument.
- Ne pas brancher, ni débrancher l'adaptateur c.a. pendant que l'AQ1200x/AQ1205x est sous tension.
- Si l'AQ1200x/AQ1205x est utilisé de manière prolongée avec l'adaptateur c.a., retirer le pack de batteries de l'AQ1200x/AQ1205x.
- N'utiliser l'instrument que si une prise secteur appropriée est disponible pour le branchement du cordon d'alimentation.



1. Connect the power cord to the AC adapter.
2. Connect the AC adapter's plug to DC power supply connector of the instrument.
3. Connect the power plug to an outlet.

If the DC power supply connector's cover comes off, bend the cover axle and reattach it.

Using the Battery Pack

WARNING

- Do not connect or disconnect the battery pack while electricity is being supplied by the AC adapter.
- To prevent problems before they occur, periodically inspect the battery pack exterior to confirm that there is no damage such as cracks or deformations and to confirm that there is no fluid leakage.
- Use the instrument to charge the battery pack. Maintain the correct environmental conditions when the battery pack is charging. Failure to do so can cause fluid leakage, heating, smoke, explosions, or fire.
- Follow the handling precautions that are included in the battery pack's user's manual.

French

AVERTISSEMENT

- Ne pas installer, ni déposer le pack de batteries lorsque l'électricité est alimentée par l'adaptateur c.a.
- À titre préventif, inspecter régulièrement le boîtier extérieur du pack de batteries afin de déceler tout signe d'endommagement, comme l'apparition de fissures ou de déformations, et vérifier qu'il n'y a aucune fuite.
- Recharger le pack de batteries à l'aide de l'AQ1200x/AQ1205x. Respecter les consignes environnementales prescrites pour la recharge du pack de batteries, afin d'éviter les risques de fuite, de surchauffe, de fumée, d'explosion ou d'incendie.
- Respecter les consignes de manipulation indiquées dans le manuel d'utilisation du pack de batteries.

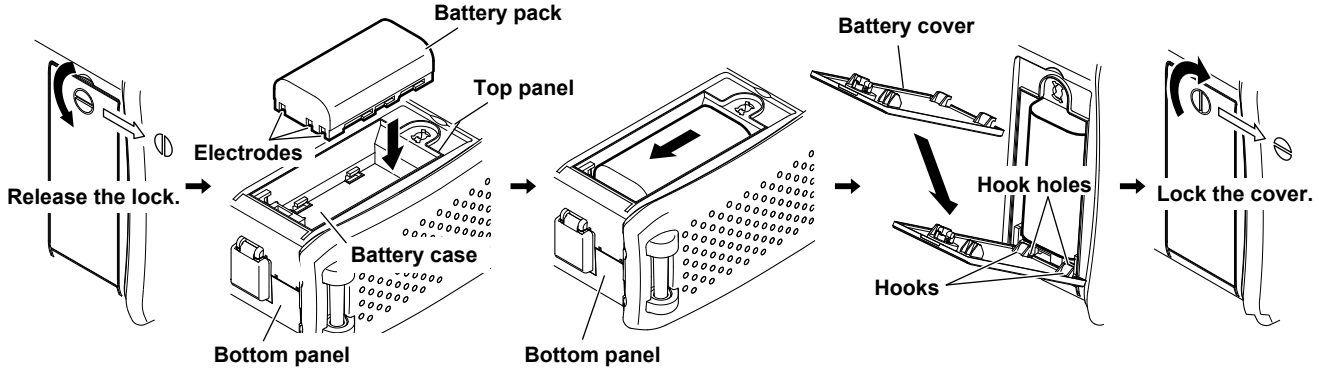
1. Unlock and remove the battery cover from the instrument rear panel.
Insert a coin or screwdriver with a thickness that will not damage the lock slot into the lock slot, and release the lock.

2. Insert the battery pack into the battery case, towards the top panel.
Insert the battery pack so that its electrodes are near the bottom panel facing down. Make sure that the entire battery pack is inserted into the case securely.

3. Pushing the battery pack towards the back of the case, pull it towards the bottom panel.

4. Close the battery cover.
Attach the battery cover from the bottom panel side, making sure that the hooks on the cover enter into their holes on the case.

5. Lock the battery cover.



Note

Over Discharge and Long Periods of Storage

- If you do not use the instrument for an extended period of time with the battery pack connected to it, the battery pack may become over discharged. This shortens the service life of the battery pack. To avoid over discharging, if you will not use the instrument for one week or longer, charge the battery pack, remove it from the instrument, and store the battery pack away from direct sunlight in a location that has an ambient temperature of 10°C to 30°C.
- When you store the battery pack for six months or longer, to replace the power that has been lost through self discharge, recharge the battery using the instrument once every six months.
- Avoid storing the battery pack for an extended period of time when it is fully charged (after it has just been charged) or when it has no power left (when the instrument will not turn on). Storing the battery pack under these conditions will degrade its performance and reduce its longevity. It is better to store the battery pack when it is 40% to 50% charged. This is equivalent to the state the battery is in after you turn off the instrument and charge an empty battery for an hour at room temperature.
- Use the instrument to charge the battery pack prior to its first use or if it has not been used for an extended period of time.

Turning On the Power

Press the power switch on the instrument front panel. When the instrument starts normally, the ON indicator illuminates, and the top screen appears. For details on the top screen, see section 2.1 in the user's manual.

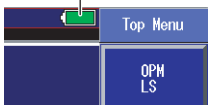
- If power is being supplied from the AC adapter and the battery pack is not connected, the CHARGE LED does not illuminate.
- When the battery is low, a warning message will appear.
- If the battery is low, use the AC adapter to connect the instrument to an electrical outlet, and charge the battery pack. The remaining battery power appears at the top of the screen.

Power switch

ON LED
Green: Running
Red: Battery low

CHARGE LED
Red: Charging
Green: Finished charging

Remaining battery power indicator



Green: Sufficiently full

Yellow: Half full

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

When the Power-on Operation Does Not Finish Normally

Turn off the power switch, and check the following items.

- Is the AC adapter connected correctly? See page 22.
- Is the battery pack loaded correctly? See page 23.
- Are you holding down the power switch for at least 2 seconds?

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

Warm Up

To enable more accurate measurements, allow the instrument to warm up for at least 5 minutes after it is turned on.

Connecting Optical Fiber Cables

WARNING

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

CAUTION

- Insert the optical fiber cable connectors slowly and straight into the optical ports. If you shake the connector to the left and right or force it into the port, the optical connector or optical port may be damaged.
- If you use optical connectors that do not meet the specifications, the instrument optical ports may be damaged. Use optical connectors that are approved or used by national or local telecom carriers and providers in your area.
- Use optical fiber cable connectors that conform to the included universal adapter and connector adapter (the universal adapter specified by the suffix code).

Using SC Angled Physical Contact Connectors (Suffix code -ASC)

- The SC angled physical contact connector's ferrule tip is angle-polished. Use optical fiber cables whose connectors are of the same type. Using a different type of connector may damage the connector end face.
- Only use SC-type (SU2005A-SCC) universal adapters on -ASC OTDR ports. Otherwise, the instrument optical ports or the optical fiber cable connectors may be damaged.

AVERTISSEMENT

- Lorsque l'AQ1200x/AQ1205x génère de la lumière, la lumière est émise à travers les ports de source lumineuse. Ne pas débrancher les câbles de fibre optique connectés. Des lésions oculaires peuvent être causées si le faisceau lumineux pénètre l'œil.
- Couvrir les caches des ports de source lumineuse libres. Sur les modèles dotés de deux ports de source lumineuse ou plus, protéger les yeux contre l'émission accidentelle de lumière depuis le mauvais port.

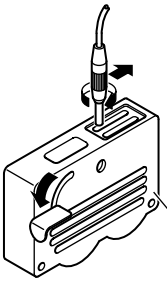
ATTENTION

- Insérer les connecteurs de câbles à fibre optique délicatement et sans les incliner dans les ports optiques. Éviter de faire pression sur le connecteur ou de forcer pour l'insérer dans le port, car cela pourrait endommager le connecteur optique ou le port optique.
- Toujours utiliser des connecteurs optiques conformes aux spécifications, à défaut de quoi les ports optiques de l'AQ1200x/AQ1205x pourraient être endommagés. Utiliser des connecteurs optiques homologués ou utilisés par les entreprises et les fournisseurs de services de télécommunications de votre région.
- Utiliser des connecteurs de câbles à fibre optique conformes à l'adaptateur universel et l'adaptateur de connecteur fournis (adaptateur universel indiqué par le suffixe).

Utilisation de connecteurs de contact physique incliné SC (suffixe - ASC de l'unité OTDR)

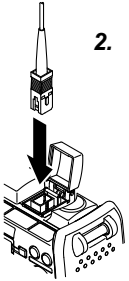
- L'embout à ferrule du connecteur de contact physique incliné SC est poli. Utiliser des câbles à fibre optique dont les connecteurs sont de même type. L'utilisation d'un autre type de connecteur peut endommager l'extrémité du connecteur.
- Utiliser exclusivement des adaptateurs universels de type SC (SU2005A-SCC) sur les ports ASC OTDR, pour éviter d'endommager les ports optiques ou les connecteurs à fibre optique de l'AQ1200x/AQ1205x.

Clean the connector end face of the optical fiber cable before connecting it to the instrument. If dust is adhered to the connector end face, it may damage the instrument's optical port. If this happens, the instrument will not be able to make correct measurements.



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

You can purchase an optical fiber connector cleaner from NTT-AT Corporation.

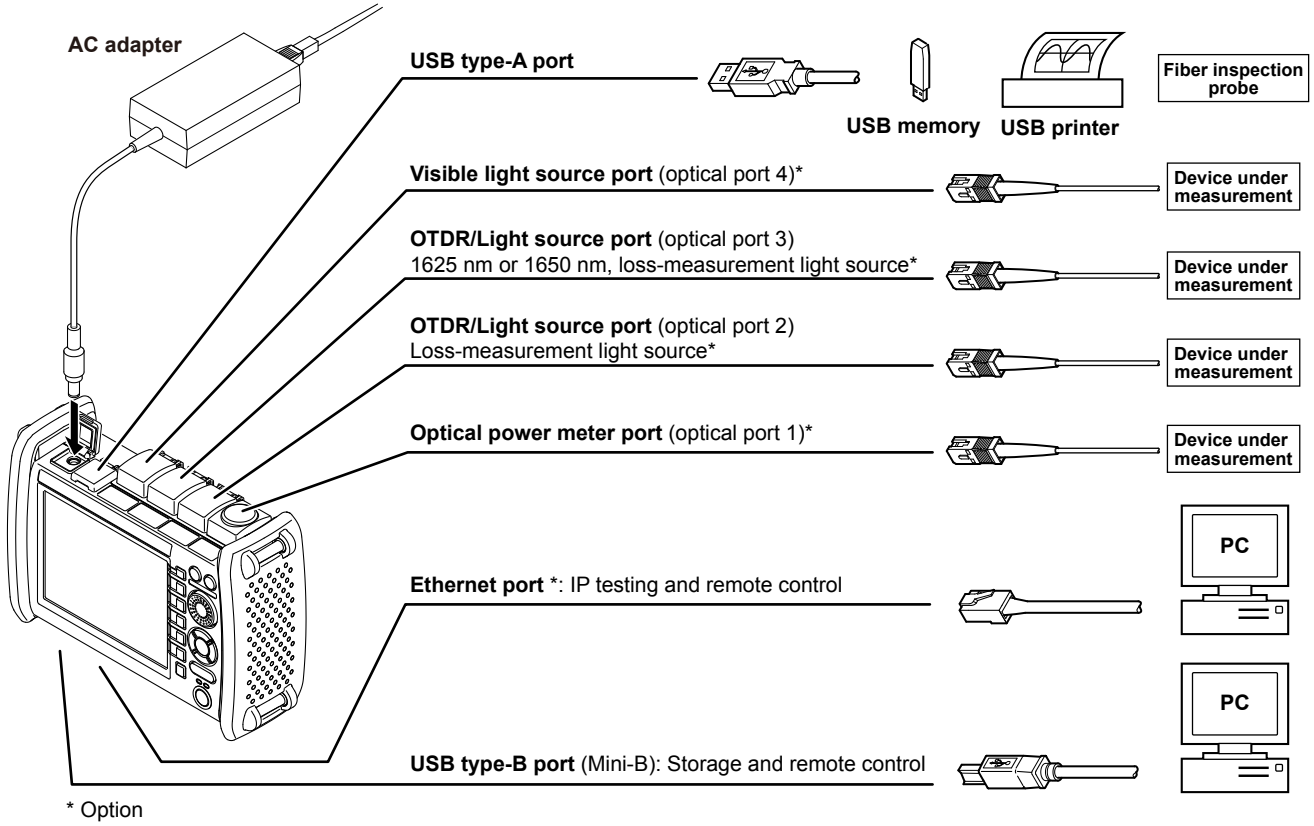


1. Open the optical port cover on the instrument top panel.
2. Properly align the optical fiber cable's connector with the optical port, and insert the connector.

Note

- The optical port that you have to connect to varies depending on how you intend to use the instrument. Confirm which port light will be transmitted from before you connect the optical fiber cable.
- On the AQ1200E, AQ1205E, and AQ1205F, light with a 1310 nm or 1550 nm wavelength is transmitted from optical port 2, and light with a 1625 nm or 1650 nm wavelength is transmitted from optical port 3.

Connecting Peripheral Devices



* Option

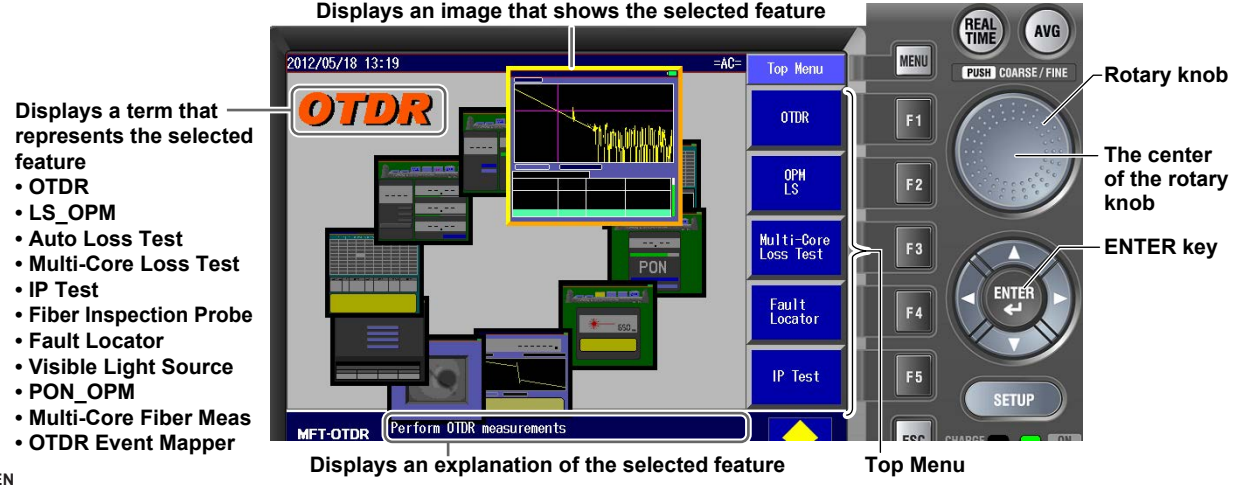
Top Screen

When you turn the instrument on and it starts, the top screen appears. First select a feature from this top screen, and then configure the feature or carry out the measurement that corresponds to the feature you have selected.

1. Turn on the instrument.
2. Use the **rotary knob** to select the feature.
   An image that shows the selected feature is displayed, and the feature name is displayed in the upper left of the screen.
3. Press the center of the **rotary knob** or **ENTER** to confirm your selection.
   The setup or measurement operation menu for the selected feature is displayed.

In this guide, steps 2 and 3 above are described as shown below.

Example: To select the OTDR feature and confirm it: “Using the **rotary knob** and **ENTER**, select **OTDR**.”



Procedural Explanations of Features

For explanations of the procedures to perform after you have selected and confirmed a feature, see the chapters or sections in the user's manual that correspond to the feature.

Selected Feature	Corresponding Chapter or Section in the User's Manual
OTDR (optical pulse measurement)	Chapters 3 to 7
LS_OPM (power meter and light source)	Chapters 8 and 9
Auto loss test (auto loss test and loopback loss test)	Chapter 11
Multi-core loss test	Chapter 12
IP test	Chapter 15
Fiber inspection probe (fiber end-face check)	Chapter 14
Fault locator	Chapter 13
Visible light source	Section 8.2
PON_OPM (PON power meter)[1]	Chapter 10
Multi-Core Fiber Meas (Multi-core fiber measurement)[2]	Chapter 16
OTDR Event Mapper[*3]	Chapter 17

1 This features covers firmware versions 1.10 or later of the instrument.
2 This features covers firmware versions 2.01 or later of the instrument.
3 This features covers firmware versions 2.03 or later of the instrument.

Top Menu

- You can also use the soft keys (F1 to F5) on the right side of the top menu to select a feature and display its setup or measurement operation menu.
- The feature that you have used the rotary knob and ENTER to select is displayed in the top position (soft key F1) of the top menu.
- If you use the rotary knob and ENTER to select a feature that is already displayed in the top menu, the feature will move to the top position of the top menu. If you press a soft key (F1 to F5), the feature that you have selected will also be moved to the top position.
- You can configure the top menu that is displayed when the instrument starts. For details, see section 18.1 in the User's Manual.

OTDR Top Menu

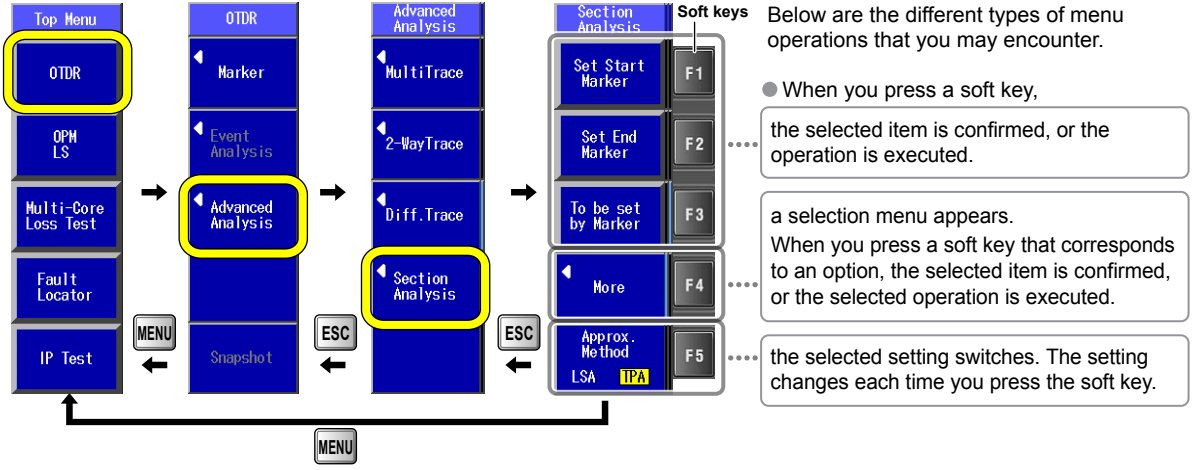
If you select the OTDR feature from the top menu, the OTDR menu (OTDR top menu) will appear. On the instrument with firmware version 2.03 and later, the OTDR top menu varies depending on the suffix code. For details, see section 2.1 in the user's manual.

Key Operations

Key operations are explained below using an example. Here we will examine the steps you would take to select the interval analysis menu from the top screen.

If the Suffix Code Is Not -HE (-HJ for example)

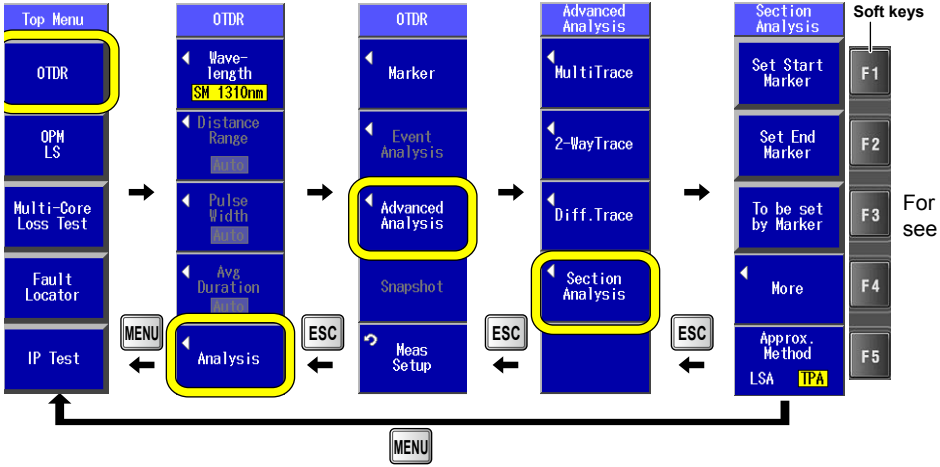
1. Using the **rotary knob** and **ENTER**, select **OTDR**. Or, press the **OTDR** soft key on the top menu.
   The OTDR menu appears.
2. Press the **Advanced Analysis** soft key.
   The advanced analysis menu appears.
3. Press the **Section Analysis** soft key.
   The section analysis menu appears.



In this manual, the above key operation is described as shown on page 29.

If the Suffix Code Is Not -HE

1. Using the **rotary knob** and **ENTER**, select **OTDR**. Or, press the **OTDR** soft key on the top menu.
   The OTDR menu appears.
2. Press the **Analysis** soft key.
   The analysis menu (OTDR) appears.
3. Press the **Advanced Analysis** soft key.
   The advanced analysis menu appears.
4. Press the **Section Analysis** soft key.
   The section analysis menu appears.



For types on the soft key menu, see previous page.

In this manual, the above key operation is described as shown on page 36.

Example of an Explanation in This Guide

1. Using the **rotary knob** and **ENTER**, select **OTDR**.
2. Press the **Advanced Analysis** soft key.
3. Press the **Section Analysis** soft key to display the following screen.

Or:

Press the **OTDR** soft key, the **Advanced Analysis** soft key, and then the **Section Analysis** soft key to display the following screen.

Set the start point.
Set the start point marker to the cursor position.

Set the end point.
Set the end point marker to the cursor position.

Set using markers.
When the ① and ② markers or the n and E markers are already present, change these markers to the start point and end point markers.

Press to configure more settings.
Change the reference point, or delete all the specified markers from the displayed menu.

Set the approximation method (LSA, TPA).

The settings that the soft keys are used to configure and the actions that pressing them cause are explained. Options and ranges are listed afterwards.

This guide explains procedures in accordance with the following guidelines.

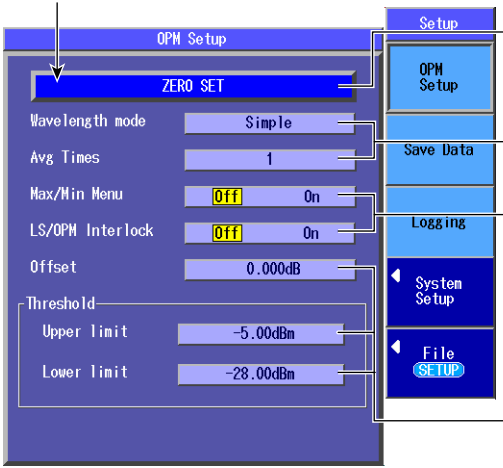
- The following types of procedures are simplified.
  - Repetitive operations.
  - Detailed operations for proceeding to the desired setup menu or dialog box and information about the accompanying screen changes.
- Step numbers are used in soft key explanations when there are many operations and when operations must be performed in different menus.
- The explanation for returning to the previous menu is omitted.

Rotary Knob and Arrow Key Operations

As an example of rotary knob and arrow key operations, we will use the dialog box that appears when you press the **OPM Setup** soft key.

1. Press the **OPM Setup** soft key
   The OPM Setup dialog box appears.
2. Use the **rotary knob** or the **arrow** keys to move the cursor to the item that you want to configure or execute.
   The item at the cursor location is highlighted.
3. Press **ENTER**.

The item at the cursor location is highlighted.



To return to the top menu, press MENU.

Below are the different types of setup operations that you may encounter.

Pressing **ENTER** confirms the selected item or executes its corresponding action.

Pressing **ENTER** display a menu.

- Using the **rotary knob** or the **up and down arrow** keys, move the cursor to the item you want to select.
- Press **ENTER** to confirm the selected item.
- To reset the selected item to its previous setting, press **ESC**.

Each time you press **ENTER**, the selected setting switches.

Pressing **ENTER** displays a text box.

- To increase or decrease a value, use the **rotary knob** or the **up and down arrow** keys.
  To move between digits, use the **left and right arrow** keys.
- Press **ENTER** to confirm the entered value.
- To reset the selected item to its previous setting, press **ESC**.

In this manual, the above rotary and arrow key operations are described as shown on the next page.

Example of an Explanation in This Guide

OPM Setup soft key to display the following screen.

Performs zero set

Set the wavelength mode (Simple, Detail, CWDM).

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

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

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

Set the offset (–9.900 to 9.900 dB).

Set the upper threshold value (–80.00 to 40.00 dB).

Set the lower threshold value (–80.00 to 40.00 dB).

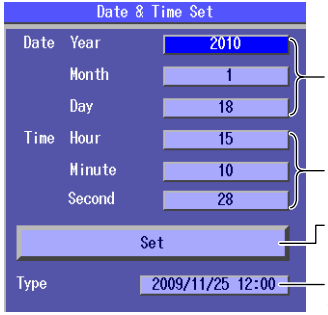
The settings that the items are used to configure and the actions that selecting them cause are explained. Options and ranges are listed afterwards.

This guide omits the following descriptions.

- How to operate the rotary knob, arrow key, and ENTER key
- How to reset the selected item to its previous setting
- How to return to the previous menu

Setting the Date and Time

1. Press **MENU** to display the top menu.
2. Press **SETUP**.
3. Using the **rotary knob and ENTER**, select **Date & Time Set** to display the following screen.



Set the year, month, and day.

Set the hour, minute, and second.

Set the date and time to the specified values.
The set date and time are displayed in the upper left of the screen.

Set the date and time display format (Off, Year/Month/Day Time, Day/Month/Year Time, Year. Month (name). Day Time).

Year, Month, and Date

The year is displayed according to the Gregorian calendar. The instrument supports leap years.

Hour, Minute, and Second

The hour can be set to a value from 0 to 23.

Note

A display example of the date and time is shown in the “Type” box. This is not the actual date and time.

Memo

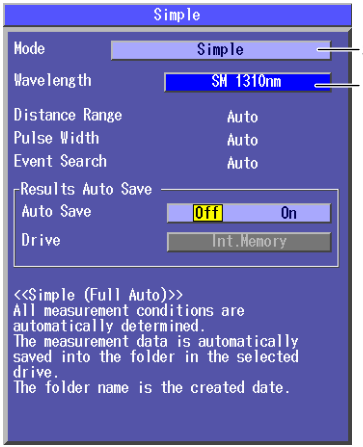
Optical Pulse Measurement Conditions

Configuring the Simple Mode Conditions

In the user's manual, see section 3.2, "Selecting the Wavelength," and section 3.3, "Automatically Saving Measured Data."

In this mode, the absolute minimum amount of measurement conditions are set manually. You only have to set the wavelength. Conditions such as Distance Range, Pulse Width, and Event Search are set automatically when measurement starts.

1. Using the **rotary knob** and **ENTER**, select **OTDR**.
2. Press **SETUP** and then the **Meas Setup** soft key.
3. Using the **rotary knob** and **ENTER**, set Mode to **Simple**. The following screen appears.



Set Mode to "Simple."

Set the wavelength (1310nm, 1550nm, 1625nm,[1] 1650nm,[2] Multi WL).
If you specify Multi WL, you can measure with both the 1310 nm wavelength and 1550 nm wavelength at the same time.
This is fixed to 1625 nm on the AQ1200B.
This is fixed to 1650 nm on the AQ1200C.

1 Only on the AQ1200E and AQ1205E
2 Only on the AQ1205F

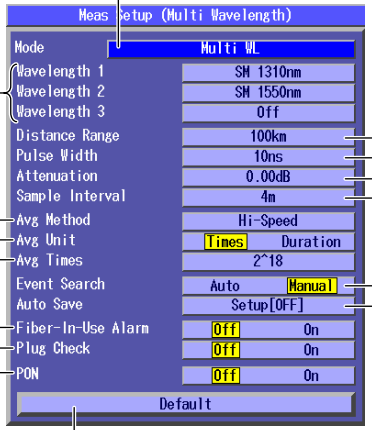
Press **ESC** to return to the previous screen. The measurement conditions appear in the bottom left of the screen.

Configuring the Detail Mode and Multi WL Mode Conditions

Section 3.5, “Setting Measurement Conditions” in the user’s manual

Set all the measurement conditions in Detail mode. In Multi WL mode, you can measure multiple wavelengths consecutively.

1. Using the **rotary knob** and **ENTER**, select **OTDR**.
2. Press **SETUP** and then the **Meas Setup** soft key.
3. Using the **rotary knob** and **ENTER**, set Mode to **Detail** or **Multi WL** to display the following screen.
   (This is an example on the AQ1200A.) The Multi WL mode is not available on the AQ1200B and AQ1200C.



Set Mode to “Detail” or “Multi WL.”

Set the wavelength.
You can specify Wavelength 2 and Wavelength 3 when Mode is set to Multi WL. The available settings vary depending on the model.

Set the average method (Hi-Speed, Hi-Reflection).

Set the average unit (Times, Duration).

Set the number of times to average over or the duration to average over.
- When the unit is times:
  Auto, 2^10, 2^11, 2^12, 2^13, 2^14, 2^15, 2^16, 2^17, 2^18, 2^19, 2^20
- When the unit is duration:
  Auto, 5sec, 10sec, 20sec, 30sec, 1min, 3min, 5min, 10min, 20min, 30min

Turns the fiber-in-use alarm on or off

Turns the plug check on or off

Turns the PON on or off

Initializes the settings
Press to reset the settings to their factory defaults.

Set the distance range (Auto, 500m, 1km, 2km, 5km, 10km, 20km, 50km, 100km, 200km, 300km, 400km, 512km).

Set the pulse width (Auto, 3ns, 10ns, 20ns, 50ns, 100ns, 200ns, 500ns, 1µs, 2µs, 5µs, 10µs, 20µs).

Set the attenuation (Auto, 0.00dB, 2.50dB, 5.00dB, 7.50dB, 10.00dB, 12.50dB, 15.00dB, 17.50dB, 20.00dB, 22.50dB, 25.00dB, 27.50dB, 30.00dB).

Set the sample interval (Normal, High Resolution, 5cm, 10cm, 20cm, 50cm, 1m, 2m, 4m, 8m, 16m, 32m).

Set the event search (Auto, Manual).
If Auto is selected, splices, connectors, and other events are automatically detected after the averaged measurement finishes (see pages 43 and 45).

Select to specify whether measured results are saved automatically or not.
In the File Setup screen that appears, you can turn automatic saving on and off and configure save destination and file name settings.

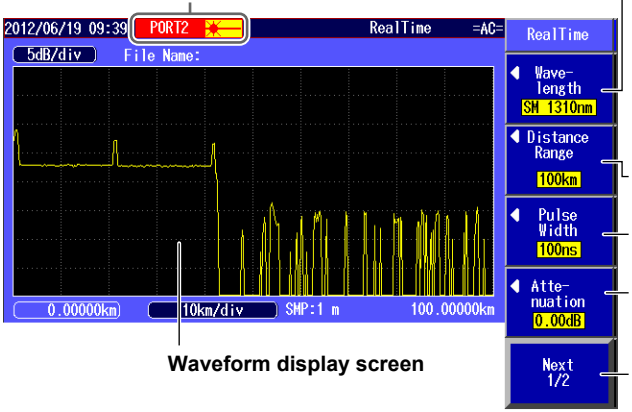
Performing Optical Pulse Measurement

Performing Real-time Measurement

Section 4.1, “Performing Real-time Measurement” in the user’s manual

In real-time measurement, you can view waveform changes in real time. You can change the conditions from the menu while measurement is being performed. When the measurement mode is “Simple,” you can only change the wavelength setting.

1. Using the **rotary knob** and **ENTER**, select **OTDR**.
2. Press **REAL TIME** to start the measurement and display the measured waveform on the screen.
   Additionally, the soft key menu switches to the real-time menu. A mark appears on the display to indicate that the laser light is on.
3. During real-time measurement, press **REAL TIME** to stop the measurement.
   The soft key menu switches to the OTDR menu. The mark that indicates that the laser light is on disappears from the display.



Set the wavelength (1310nm, 1550nm).
This is fixed to 1625 nm on the AQ1200B. This is fixed to 1650 nm on the AQ1200C.
If you set the wavelength to 1625 nm or 1650 nm in the measurement conditions on the AQ1200E, AQ1205E, or AQ1205F, you cannot select the wavelength to 1310 nm or 1550 nm, which are emitted from a different output port.

Set the distance range (Auto, 500m, 1km, 2km, 5km, 10km, 20km, 50km, 100km, 200km, 300km, 400km, 512km).

Set the pulse width (Auto, 3ns, 10ns, 20ns, 50ns, 100ns, 200ns, 500ns, 1µs, 2µs, 5µs, 10µs, 20µs).

Set the attenuation (Auto, 0.00dB, 2.50dB, 5.00dB, 7.50dB, 10.00dB, 12.50dB, 15.00dB, 17.50dB, 20.00dB, 22.50dB, 25.00dB, 27.50dB, 30.00dB).

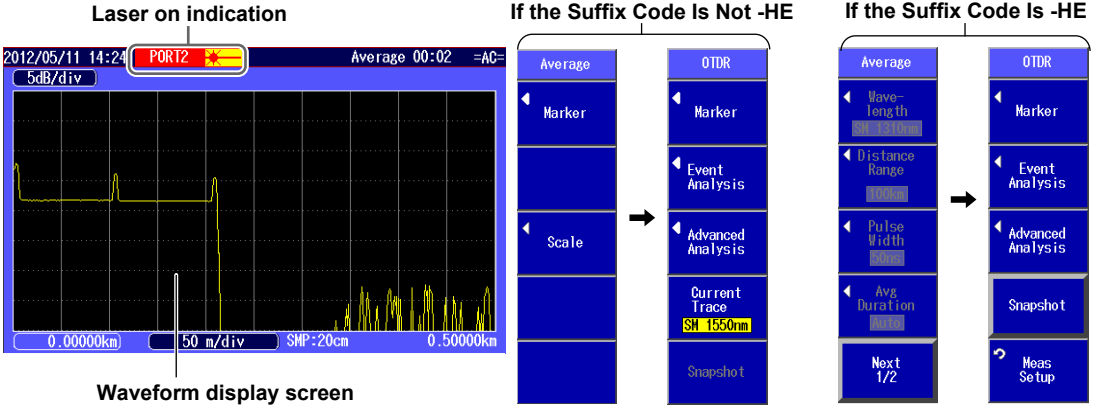
Switches to the menu that is used to operate markers and scale.
See section 5.2 or 6.1 in the user’s manual.

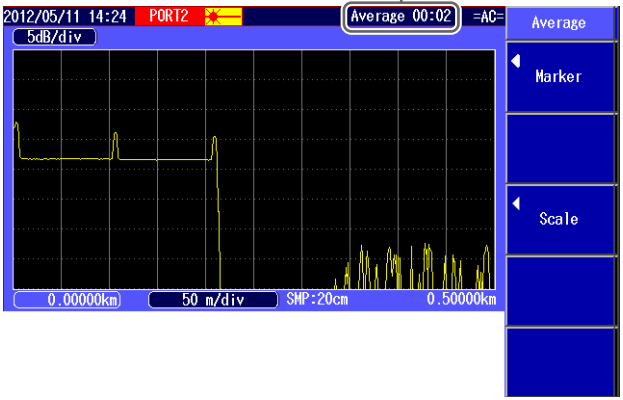
Performing Averaged Measurements

Section 4.2, “Performing Averaged Measurements” in the user’s manual

In an averaged measurement, the data that is acquired from each pulse is averaged and displayed. When averaged measurement is performed, the signal-to-noise ratio rises. Averaged measurement is useful when you want to detect faint events that would normally be obscured by noise.

1. Using the **rotary knob** and **ENTER**, select **OTDR**.
2. Press **AVG** to start the measurement and display the measured waveform on the screen.
   The menu switches to the averaged measurement menu. During measurement, the averaging duration and the progress appear in the upper right of the screen.
   During measurement, a mark appears on the display to indicate that the laser light is on.
3. When averaging finishes, measurement stops automatically. To stop averaged measurement before it finishes, press **AVG** again during measurement.
   The soft key menu switches to the OTDR menu. The mark that indicates that the laser light is on disappears from the display.





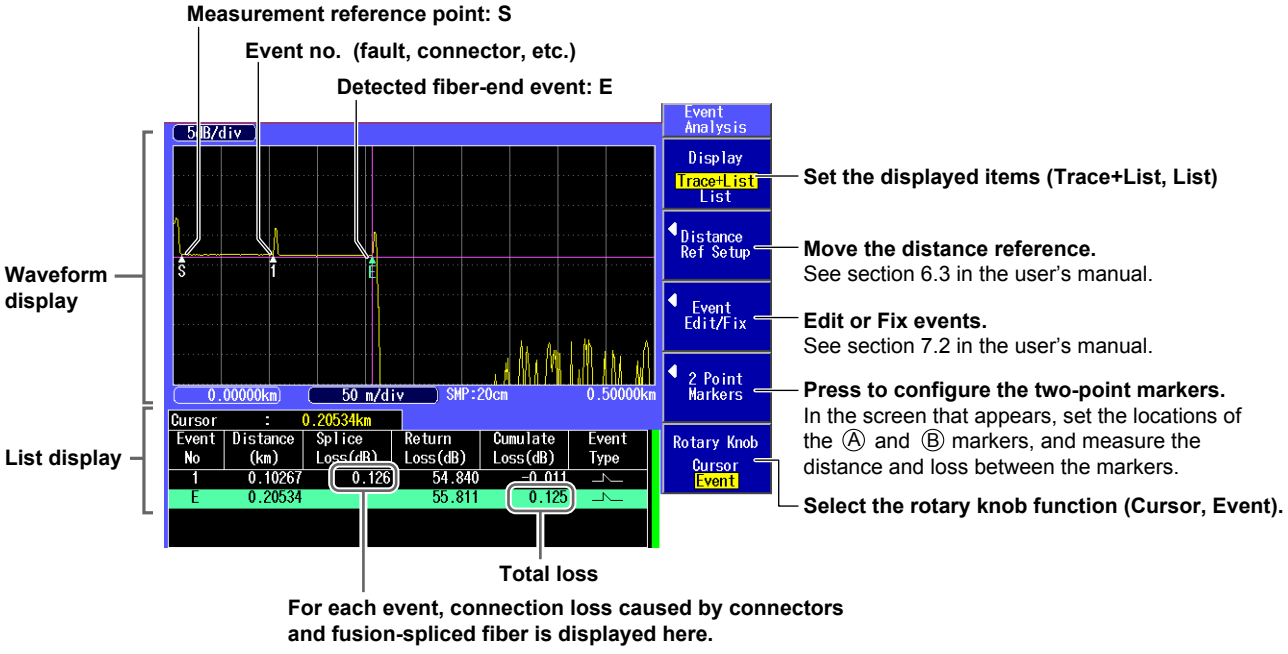
Averaging duration or progress
If “the duration to average over” (see page 41) is set to Auto, the averaging duration is displayed. If set to any other value, the progress is displayed. When the measurement completes successfully, 100% is displayed.

The time it takes to complete a measurement varies depending on settings such as the distance range and the average count.

Event Screen

Section 7.1, “Displaying the Event Screen” in the user’s manual

When Event Analysis is set to Auto (see page 41), the event screen appears after averaged measurement ends normally.
In the event screen, you can display the distance to each event and each event’s loss.



Analysis Using the Emulation Software

The waveform data that is measured by the AQ1200x/AQ1205x can be analyzed on your PC using the AQ7932 OTDR emulation software (version 4.01 or later). The software comes with a report creation wizard that is convenient in creating construction reports.

Specifications

Display

Item	Specification
Display	5.7-inch color TFT LCD* Display resolution: 640×480
LED indicators	ON LED, CHARGE LED

* The LCD may include a few defective pixels.
The LCD may contain some pixels that are always illuminated or that never illuminate. Please be aware that these are not defects.

Optical Pulse Measurement (OTDR)

AQ1200A, AQ1200B, AQ1200C, AQ1200E

Item	Specifications			
	AQ1200A	**AQ1200B**	**AQ1200C**	**AQ1200E**
Center wavelength	1310 nm ± 25 nm 1550 nm ± 25 nm	1625 nm ± 10 nm	1650 nm ± 5 nm,[7] 1650 nm ± 10 nm[8]	1310 nm ± 25 nm 1550 nm ± 25 nm 1625 nm ± 10 nm
Event dead zone[1, 2]	0.8 m or less			
Attenuation dead zone[3, 4, 5]	5 m (typical value)	7 m (typical value)		4m/5m/7m (typical value)
Dynamic range[5]	32 dB (1310 nm) 30 dB (1550 nm)	30 dB		32 dB (1310 nm) 30 dB (1550 nm) 30 dB (1625 nm)
Optical connectors	Select from the -USC, -UFC, and -ASC options			
Compliant fiber	SM (ITU-T G.652)			
Laser class	1M: IEC 60825-1:2007, GB 7247.1-2012 1: EN 60825-1:2014			
Measuring pulse optical output	—	+15 dBm or less		+15 dBm or less (1625 nm)

AQ1205A, AQ1205E, AQ1205F

Item	Specifications		
	AQ1205A	AQ1205E	AQ1205F
Center wavelength	1310 nm ± 25 nm 1550 nm ± 25 nm	1310 nm ± 25 nm 1550 nm ± 25 nm 1625 nm ± 25 nm	1310 nm ± 25 nm, 1550 nm ± 25 nm 1650 nm ± 5 nm,[7] 1650 nm ± 10 nm[8]
Event dead zone[1, 2]	0.8 m or less		
Attenuation dead zone[3, 4, 5]	4m/5 m (typical value)	4m/5m/7m (typical value)	
Dynamic range[6]	40 dB (1310 nm) 38 dB (1550 nm)	40 dB (1310 nm) 38 dB (1550 nm) 36 dB (1625 nm)	40 dB (1310 nm) 38 dB (1550 nm) 30 dB (1650 nm)
Optical connectors	Select from the -USC, -UFC, and -ASC options		
Compliant fiber	SM (ITU-T G.652)		
Laser class	1M: IEC 60825-1:2007, GB 7247.1-2012 1: EN 60825-1:2014		
Measuring pulse optical output	—		+15 dBm or less (1650 nm)

1 When the pulse width is 3 ns and the return loss is 55 dB or more
2 At the point 1.5 dB below the unsaturated peak value
3 When the pulse width is 10 ns and the return loss is 55 dB or more
4 Typical values represent typical or average values. They are not strictly warranted.
5 At the point where the backscattering light level is within ±0.5 dB of the steady-state value
6 When the averaging duration is 3 minutes and SNR = 1
7 ±5 nm: 20 dB point from the peak value of the pulse optical output.
8 ±10 nm: 60 dB point from the peak value of the pulse optical output.

Loss Test (/SLT and /HLT options)

Item	Specifications	
	/SLT Option	/HLT Option
Optical Power Meter Wavelength	Simple: 850 nm, 1300 nm, 1310 nm, 1490 nm, 1550 nm, 1625 nm, 1650 nm Detail: Range: 800 nm to 1700 nm in 1 nm steps CWDM: Range: 1270 nm to 1610 nm in 20 nm steps (the CWDM wavelength grid spacing)	

Item		Specifications	
		/SLT Option	/HLT Option
	Power range	–70 dBm to +10 dBm (CW) –70 dBm to +7 dBm (CHOP)	–50 dBm to +27 dBm (CW) –50 dBm to +24 dBm (CHOP)[1]
	Noise level[2]	0.5 nW or less (–63 dBm, 1310 nm)	50 nW or less (–43 dBm, 1310 nm)
	Uncertainty at reference conditions[3]	±5%	±5%
	Display resolution	0.01 dB	
	Modulation mode	CW, CHOP (270 Hz, 1 kHz, 2 kHz)	
Light source			
	Optical connectors	Same port as that of the OTDR	
	Center wavelength[4]	Same as the specifications for optical pulse measurement (OTDR)	
	Light emitter	LD	
	Spectral width[4, 5]	AQ1200A, AQ1200B, AQ1200E: < 5 nm (1310 nm, 1625 nm), < 10 nm (1550 nm) AQ1205A, AQ1205E, AQ1205F: <20 nm (1310 nm, 1550 nm, 1625 nm)	
	Optical output level	–3 dBm ± 1 dB	
	Level stability[6]	±0.05 dB (1310 nm, 1550 nm), ±0.15 dB (1625 nm, 1650 nm)	
	Modulation mode	CW, CHOP (270 Hz, 1 kHz, 2 kHz)	
	Compliant fiber	SM (ITU-T G.652)	
	Laser class	1M: IEC 60825-1:2007, GB 7247.1-2012 1: EN 60825-1:2014	

1 Excluding 850 nm and 1650 nm.

2 Under the following conditions: the wavelength is 1310 nm, the temperature is constant, and the average count is 10.

3 Under the following conditions: the ambient temperature is 23°C ± 2° C, the modulation mode is CW, the wavelength is 1310 nm ± 20 nm (with a spectral width of 10 nm or less), the optical input power is 100 µW, and an SM fiber is used (ITU-T G.652). Changes to the measuring instrument due to the passage of time are not included.

4 Under the following conditions: the ambient temperature is 23°C ± 2°C and the modulation mode is CW.

5 Under the following conditions: Rms 2σ and –20 dB.

6 The level is stable for 5 minutes when the ambient temperature is kept at a constant temperature within 23°C ± 2°C.
The ambient temperature is 23°C ± 2°C unless otherwise stated.

PON Power Meter and Light Source (/PPM option)

This features covers firmware versions 1.10 or later of the AQ1200x/AQ1205x.

Power Meter

Item	Specification
Wavelength	1310 nm, 1490 nm, 1550 nm 1490 nm and 1550 nm are measured separately at the same time.
Power range	–70 dBm to +10 dBm (1310 nm, 1490 nm), –50 dBm to +27 dBm (1550 nm)
Noise level	0.5 nW (–63 dBm, 1310 nm), 50 nW (–43 dBm, 1550 nm)
Uncertainty at reference conditions[1]	±0.5 dB(10%)
Display resolution	0.01 dB
Modulation mode	CW

1 Under the following conditions: the ambient temperature is 23°C ± 2° C, the modulation mode is CW, the wavelength is 1310 nm and 1550 nm, the optical input power is 100 µW, and SM fiber optic cables are being used.

The ambient temperature is 23°C ± 2°C unless otherwise stated.

Light Source

Item	Specification
Optical connector	Same port as that of the OTDR
Center wavelength	Same as the specifications for optical pulse measurement (OTDR)
Light emitter	LD
Spectral width[1, 2]	AQ1200A, AQ1200B, AQ1200E: < 5 nm (1310 nm, 1625 nm), < 10 nm (1550 nm) AQ1205A, AQ1205E, AQ1205F: <20 nm (1310 nm, 1550 nm, 1625 nm)
Optical output level	–3 dBm ± 1 dB
Level stability[3]	±0.05 dB (1310 nm, 1550 nm), ±0.15 dB (1625 nm, 1650 nm)
Modulation mode	CW, CHOP (270 Hz, 1 kHz, 2 kHz)
Compliant fiber	SM (ITU-T G.652)
Laser class	1M: IEC 60825-1:2007, GB 7247.1-2012 1: EN 60825-1:2014

1 Under the following conditions: the ambient temperature is 23°C ± 2°C and the modulation mode is CW.
2 Under the following conditions: Rms 2σ and –20 dB.
3 The level is stable for 5 minutes when the ambient temperature is kept at a constant temperature within 23°C ± 2°C.

The ambient temperature is 23°C ± 2°C unless otherwise stated.

Visible Light Source (/VLS option)

Item	Specification
Optical connector	2.5 mm ferrule type
Center wavelength	650 nm ± 20 nm
Optical output level	(Peak value – 3 dBm) or more
Modulation mode	CHOP (2 Hz)
Compliant fiber	SM (ITU-T G.652)
Laser class	3R: EN 60825-1:2014, IEC 60825-1:2007, GB 7247.1-2012

The ambient temperature is 23°C ± 2°C unless otherwise stated.

Standard Power Meter (/SPM option)

This features covers firmware versions 3.01 or later of the AQ1200x/AQ1205x.

Item	Specification
Wavelength	Simple: 850 nm, 1300 nm, 1310 nm, 1490 nm, 1550 nm, 1625 nm, 1650 nm Detail: Range: 800 nm to 1700 nm in 1 nm steps CWDM: Range: 1270 nm to 1610 nm in 20 nm steps (the CWDM wavelength grid spacing)
Power range	–70 dBm to +10 dBm (CW), –70 dBm to +7 dBm (CHOP)
Noise level[1]	0.5 nW or less (–63 dBm, 1310 nm)
Uncertainty at reference conditions[2]	±5%
Display resolution	0.01 dB
Modulation mode	CW, CHOP (270 Hz, 1 kHz, 2 kHz)

1 Under the following conditions: the wavelength is 1310 nm, the temperature is constant, and the average count is 10.

2 Under the following conditions: the ambient temperature is 23°C ± 2° C, the modulation mode is CW, the wavelength is 1310 nm ± 20 nm (with a spectral width of 10 nm or less), the optical input power is 100 µW, and an SM fiber is used (ITU-T G.652). Changes to the measuring instrument due to the passage of time are not included.

The ambient temperature is 23°C ± 2°C unless otherwise stated.

Stabilized Light Source (/SLS option)

This features covers firmware versions 3.01 or later of the AQ1200x/AQ1205x.

Item	Specification
Optical connector	Same port as that of the OTDR
Center wavelength[1]	Same as the specifications for optical pulse measurement (OTDR)
Light emitter	LD
Spectral width[1, 2]	AQ1200A, AQ1200B, AQ1200E: < 5 nm (1310 nm, 1625 nm), < 10 nm (1550 nm) AQ1205A, AQ1205E, AQ1205F: <20 nm (1310 nm, 1550 nm, 1625 nm)
Optical output level	–3 dBm ± 1 dB
Level stability[3]	±0.05 dB (1310 nm, 1550 nm), ±0.15 dB (1625 nm, 1650 nm)
Modulation mode	CW, CHOP (270 Hz, 1 kHz, 2 kHz)
Compliant fiber	SM (ITU-T G.652)
Laser class	1M: IEC 60825-1:2007, GB 7247.1-2012 1: EN 60825-1:2014

1 Under the following conditions: the ambient temperature is 23°C ± 2°C and the modulation mode is CW.

2 Under the following conditions: Rms 2σ and –20 dB.

3 The level is stable for 5 minutes when the ambient temperature is kept at a constant temperature within 23°C ± 2°C.

The ambient temperature is 23°C ± 2°C unless otherwise stated.

Functions

Item	Specification	
Optical pulse measurement (OTDR)	Distance range	500 m, 1 km, 2 km, 5 km, 10 km, 20 km, 50 km, 100 km, 200 km, 300 km,[1] 400 km,[1] 512 km[1]
	Pulse Width	3 ns, 10 ns, 20 ns, 50 ns, 100 ns, 200 ns, 500 ns, 1 µs, 2 µs, 5 µs, 10 µs, 20 µs[1]
	Distance measurement accuracy	±1 m + measured distance × 2 × 10^{-5} ± the sampling resolution
	Loss measurement accuracy	±0.05 dB/dB. However, the accuracy is within ±0.05 dB when the measured loss is 1 dB or less.
	Sampling resolution	5 cm, 10 cm, 20 cm, 50 cm, 1 m, 2 m, 4 m, 8 m, 16 m, 32 m
	Reading resolution	Horizontal axis: Minimum 1 cm Vertical axis: Minimum 0.001 dB
	Sample data points	128000 points max.[1]
	IOR (index of refraction)	1.30000 to 1.79999 (in 0.00001 steps)
	Distance unit	km mile, kf (not included in the Japanese display)
	Measurement	Distance, loss, return loss, return loss for a specified interval
	Analysis	Automatic event detection, Pass/Fail judgment, section analysis, macro bending,[1] event fix,[1] multi trace analysis,[1] 2 way trace anaylsis,[1] and differential trace analysis[1]

Item	Specification	
Optical power meter (only on models with the /SLT, /HLT,or /SPM option)	Relative value display (DREF)	The reference is the displayed measured or a manually entered value.
	Units	Absolute value: dBm, mW, µW, nW, pW Relative value: dB
	Average count	1, 10, 50, 100
	Offset	Range: –9.900 dB to 9.900 dB
	Threshold value	Range for the upper and lower limits: –80 dB to 40 dB
	Max/min value display	Show/hide
	Interlocking of light source and optical power meter settings	Interlock/do not interlock
	Hold	Holds the displayed measured values.
	Zero set	Adjusts the internal deviation of the optical power measurement section.
	Logging	Measurement interval: 500 ms, 1 s, 2 s, 5 s, 10 s. Measurement count: 10 to 36000
PON power meter (only on models with the /PPM option[2]	Measures the optical power of each signal wavelength in the upstream direction from ONU to OLT and in the downstream direction from OLT to ONU.	
	The relative value display, average count, offset, threshold value, hold, and zero set functions are the same functions as those that are used with the optical power meter.	
Light source	Generates measurement light (only on models with the /SLT, /HLT, /PPM[2] or /SLS option)	
	Generates visible light (only on models with the /VLS option)	
Optical power adjustment (only on models with the /SLT or /HLT option)	Use a short optical fiber to connect an AQ1200x/AQ1205x light source port to an AQ1200x/AQ1205x optical power measurement port on the same instrument, and the AQ1200x/AQ1205x automatically adjusts the optical power output level to its preset value.	
Loss test (only on models with the /SLT or /HLT option)	Auto loss testing	Uses the AQ1200x/AQ1205x as light source and optical power meter to measure optical degradation.
	Loop-back loss testing	Performs a loss test that uses both the light source and optical power meter functions on one AQ1200x/AQ1205x.

Item	Specification
Multi-core loss testing (only on models with the /SLT or /HLT option)	Uses one AQ1200x/AQ1205x as an optical power meter master and another as a light source slave to measure the optical degradation of a multicore optical fiber. • Use communication fiber to connect the master's light source port (port 2) and the slave's optical power measurement port (optical port 1). • Connect one end of the optical fiber that you want to measure for optical degradation to the master's optical power measurement port, connect the other end to the slave's light source port, and measure the optical power on the master. • By creating projects, you can enable the master and slave to share information.
Fault locator	Automatically executes the event analysis of the OTDR function after measurement finishes, searches for breaks in the optical fiber, and displays the results of the search
Multi-core fiber measurement[1]	Lists, measures, and analyses up to 100 cores. Simultaneous measurement of multiple wavelengths is possible on the same port.
Fiber end face checking	Displays on the screen the image taken by a commercial fiber inspection probe[3]
IP test (only on models with the /LAN option)	Performs a ping test to check the whether or not the network layer of an Ethernet LAN line is established.
Event mapper[5]	Automatically executes OTDR event analysis when a measurement finishes and displays detected events as icons
Saving and loading data	Measured data, setup data, and screen image data can be saved to the internal memory or to an external USB memory device. • Saved measured data and setup data can be loaded. • File operations such as copying, deleting, and renaming and folder operations such as creating, copying, and deleting can be performed.
Printing	Screen images can be printed to a USB printer.[4]
Other functions	Functions such as the display language, beep, the start menu, the Mini-B USB port function, the screen color, power save mode, the network connection (/LAN option), and self-tests can be set up and executed.

1 This features covers firmware versions 2.01 or later of the AQ1200x/AQ1205x.
2 This features covers firmware versions 1.10 or later of the AQ1200x/AQ1205x.
3 For information about supported fiber inspection probes, contact your nearest YOKOGAWA dealer.
4 For information on compatible USB printers, contact your nearest YOKOGAWA dealer.
5 This features covers firmware versions 2.03 or later of the AQ1200x/AQ1205x.

Storage

Item	Specification	
Internal memory	Memory size[1]	110 MB[2]
USB port for connecting peripheral devices	Connector type	Type A connector (receptacle)
	Electrical and mechanical specifications	USB Rev. 1.1 compliant
	Supported transfer mode	Low speed mode (1.5 Mbps)
	Supported devices[3]	Inkjet printers compatible with USB Printer Class Ver. 1.1 Mass storage devices compatible with USB Mass Storage Class Ver. 1.1
	Number of ports	1
	Power supply	5 V, Max 500 mA

1 The memory size may be changed.

2 This is the part of the memory in which the user can load and save data through file operations.

3 For information on devices that are supported, contact your nearest YOKOGAWA dealer.

PC Interface

Item	Specification	
USB port for PC connection	Connector type	Type B connector (Mini-B, receptacle)
	Electrical and mechanical specifications	USB Rev. 1.1 compliant
	Supported transfer mode	Low speed mode (1.5 Mbps)
	PC system requirements	PC must be running Windows8, Windows7, Windows Vista or Windows XP and must be equipped with USB ports.
	Number of ports	1
Ethernet interface (/LAN option)	Connector type	RJ-45 connector
	Electrical and mechanical specifications	IEEE 802.3 compliant
	Transmission system	Ethernet (100BASE-TX/10BASE-T)
	Communication protocol	TCP/IP
	Supported services	DHCP and FTP server
	Number of ports	1

General Specifications

Item	Specification	
Storage environment	Ambient temperature	–20 to 60°C
	Ambient humidity	20 to 85%RH (no condensation)
	Elevation	3000 m or less
Operating environment	Ambient temperature	0 to 45°C (0 to 40°C when the AC adapter is in use); 0 to 35°C when charging the battery
	Ambient humidity	20 to 85%RH (no condensation)
	Elevation	2000 m or less
Warm-up time	5 minutes or more[1]	
Recommended calibration period	One year	
AC power supply	Rated supply voltage	100 to 240 VAC
	Permitted supply voltage range	90 to 264 VAC
	Rated supply frequency	50/60 Hz
	Permitted supply voltage freq uency range	48 to 63 Hz
Battery pack	Run time: 6 hours[2]. Charge time: 5 hours (at an ambient temperature of 23°C and when the AQ1200x/AQ1205x is off).	
External dimensions	217.5 (W) × 157 (H) × 74 (D) mm, excluding protrusions	
Weight	Approx. 1.2 kg, including the battery pack	
Installation position	Hand-held, horizontally or vertically oriented, and oriented on a slant with a stand. Stacking prohibited.	
Environmental Standard	Compliant Standard EN50581 monitoring and control Instruments	

1 Excludes the optical output level stability.

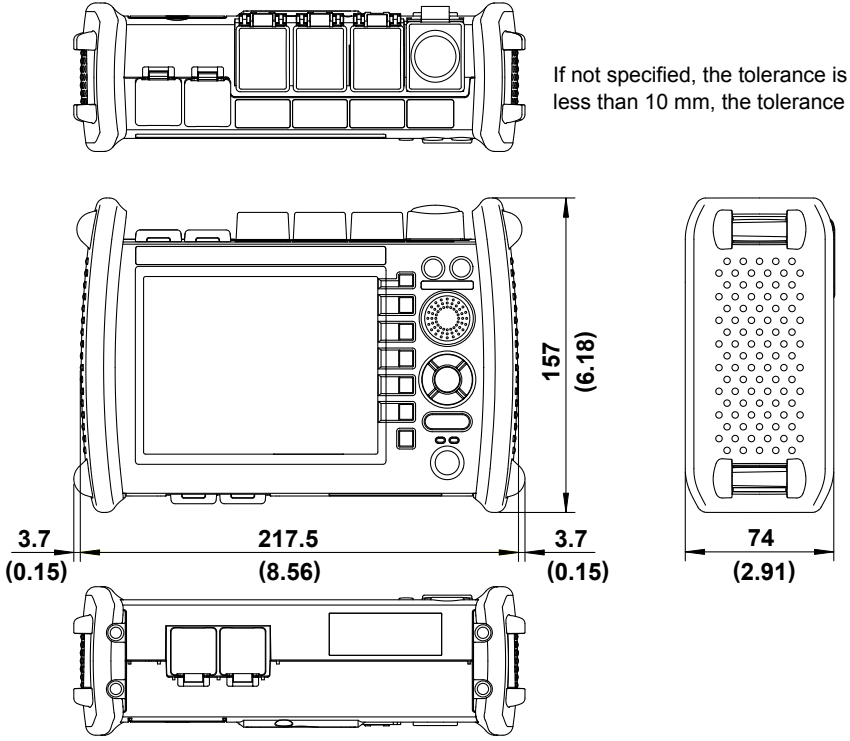
2 When measurement is performed for 30 seconds every 3 minutes, with no options installed, in power save mode (LCD brightness: Power save, Screen saving: ON).

Item	Specification
Environmental protection	Uses lead-free soldering
Safety standard	Compliant standards EN61010-1 OTDR, light source: Class 1M IEC 60825-1:2007, GB 7247.1-2012 (laser safety) Class 1 EN 60825-1:2014 (laser safety) VLS: Class 3R EN 60825-1:2014, IEC 60825-1:2007, GB 7247.1-2012 FDA 21CFR1040.10 and 1040.11 (laser safety)
Emissions	Compliant standards EN61326-1 class A EN55011 class A, group 1 EMC Regulatory Arrangement in Australia and New Zealand EN 55011 Class A, Group 1 Korea Electromagnetic Conformity Standard (한국 전자파적합성기준) EN61000-3-2 EN61000-3-3 This product is a Class A (for industrial environments) product. Operation of this product in a residential area may cause radio interference in which case the user will be required to correct the interference. Cable conditions USB ports Use shielded cables. Use cables that are 3 m or less in length. Ethernet port Use Ethernet cables that are 30 m or less in length. DC power supply connector Use the power cord and AC adapter that were included with the AQ1200x/AQ1205x.
Immunity	Compliant standards EN61326-1 Table 2 (for use in industrial locations) Cable conditions Same as the emission cable conditions.

External Dimensions

Unit : mm
(approx. inch)

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



Memo