
**User's
Manual**

**AQ7420
High-Resolution Reflectometer
Getting Started Guide**

User Registration

YOKOGAWA provides registered users with useful information and services. Please allow us to serve you best by completing the user registration form accessible from our website.

<https://tmi.yokogawa.com/support/>



Contact Us

If you want to resolve a technical support issue or need to contact YOKOGAWA, please fill out the inquiry form on our website.

<https://tmi.yokogawa.com/contact/>



Thank you for purchasing the AQ7420 High-Resolution Reflectometer. This instrument enables the measurement of optical insertion loss, optical return loss, and burnout detection of optical fiber cables and optical devices.

This user's manual explains the features, operating procedures, and handling precautions of the instrument. To ensure correct use, please read this manual thoroughly before beginning operation. Keep this manual in a safe place for quick reference.

The manuals for this instrument are listed on the next page. Please read all manuals.

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

Document No.	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 to the product's performance and functionality. Refer to our website to view our latest manuals.
- 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 contents of this manual without the permission of YOKOGAWA is strictly prohibited.

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- Other company and product names are registered trademarks or trademarks of their respective holders.

Revisions

- 1st Edition: December 2024

Manuals

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

Manuals included with the product

Manual Title	Manual No.	Description
AQ7420 High-Resolution Reflectometer Getting Started Guide	IM AQ7420-02EN	This document. Explains the handling precautions, installation procedure, and specifications of this instrument.
AQ7420 Request to Download Manuals	IM AQ7420-73Z2	Describes the manuals provided on the website.
AQ7420 High-Resolution Reflectometer	IM AQ7420-92Z1	Document for China
720921 AC Adapter User's Manual	IM 720921-01EN	Explains the handling precautions for AC adapter.
720921 Precauciones de seguridad 이 기기의 안전한 사용을 위해	IM 720921-02Z4	Explains the handling precautions for AC adapter.
720921 本设备的安全使用注意事项 為了安全地使用本機器	IM 720921-02ZH	Explains the handling precautions for AC adapter.
Safety Instruction Manual	IM 00C01C01-01Z1	Safety manual (European languages)

Manuals provided on the website

Download the following manuals from our website.

Manual Title	Manual No.	Description
AQ7420 High-Resolution Reflectometer User's Manual	IM AQ7420-01EN	Explains how to operate this instrument.

For details on downloading manuals, see Request to Download AQ7420 Manuals (IM AQ7420-73Z2).

The "EN," "Z1," and "Z2" in the manual numbers are the language codes.

Checking the Contents of the Package

Unpack the box, and check the following before operating the instrument. 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.

AQ7420 High-Resolution Reflectometer

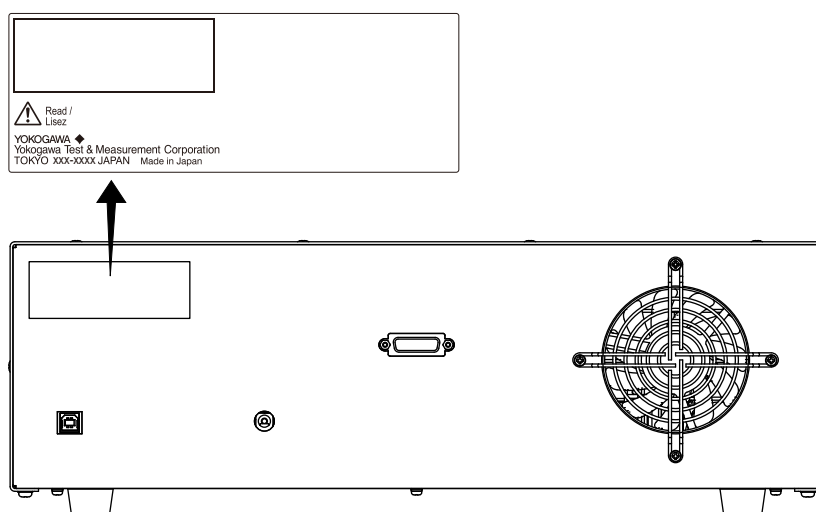
Check that the product that you received is what you ordered by referring to the model name and suffix code given on the name plate on the rear panel. When contacting the dealer from which you purchased the instrument, please give them the instrument number.

Model	Suffix Code ¹	Specifications
AQ7420		Measurement distance: 100 mm
Wavelength	-13NN	1310 nm
	-1315	1310 nm (main), 1550 nm (sub)
Master cord	-FCM	AQ740091(FC) Master cord
	-SCM	AQ740091(FC) Master cord

1 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 give them the instrument number.



Standard accessories

The standard accessories below are supplied with the instrument. Check that all contents are present and undamaged.

Item	Model or Part No.	Quantity	Specifications and Notes
AC Adapter	720921	(1)	—
Power cord ¹	A1090WD	(1)	PSE compliant rated voltage: 125 V
	A1091WD	(1)	UL/CSA standard rated voltage: 125 V
	A1095WD	(1)	VDE standard, Korean standard rated voltage: 250 V
	A1092WD	(1)	GB standard rated voltage: 250 V
	A1093WD	(1)	NBR standard rated voltage: 250 V
	A1096WD	(1)	BS standard, Singapore standard rated voltage: 250 V
	A1094WD	(1)	BSMI certification rated voltage: 125 V
Relay cord	—	1	SC/Angled PC-FC/Angled PC: 440 mm
Master cord	—	1	2000 mm
Distance adjustment cord	—	1	0 mm
FC/APC adapter	—	1	FC/Angled PC
CD	—	1	Control software
USB cord	—	1	Type A-Type B: 1 m
Manuals			
Printed manuals	IM AQ7420-02EN	1	Getting Started Guide (this guide)
	IM AQ7420-73Z2	1	Explanation of the manuals provided on the website
	IM AQ7420-92Z1	1	Document for China
	IM 720921-01EN	1	Explains the handling precautions for AC adapter.
	IM 720921-02Z4	1	Explains the handling precautions for AC adapter.
	IM 720921-02ZH	1	Explains the handling precautions for AC adapter.
	IM 00C01C01-01Z1	1	Safety manual (European languages)
	PIM 113-01Z2	1	List of worldwide contacts

* Standard accessories are not covered by warranty.

1 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.

AQ740023 Sensor Head (Sold separately)

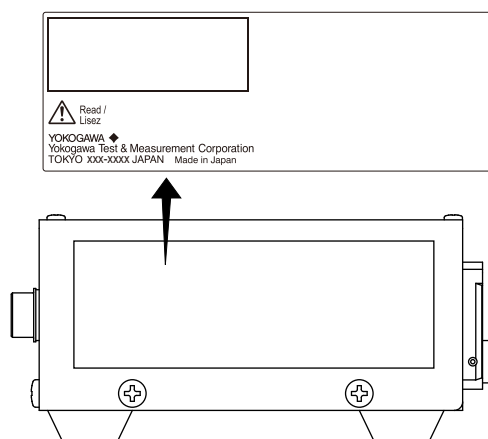
Check that the model name and suffix code given on the name plate on the side panel of the unit are the same as those on your order.

Model	Suffix Code ¹	Specifications
AQ740023		Sensor head for AQ7420
Connector	-FCC -SCC	AQ740081(FC) Connector Adapter, FC connector AQ740081(SC) Connector Adapter, SC connector
Connection cable	-L1 -L2	Length 1 m Length 2 m

¹ 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 give them the instrument number.



Standard accessories

The standard accessories below are supplied with the instrument.

Item	Model or Part No.	Quantity	Specifications and Notes
Adapter cap for dust protection	—	1	—
Manuals			
Printed manuals	IM AQ740023-01EN	1	Read before using the instrument
	IM AQ740023-92Z1	1	Document for China
	PIM 113-01Z2	1	List of worldwide contacts

Optional accessories

Item	Model or Part No.	Specifications	Notes
AQ740023	AQ740023-FCC	FC connector	For the AQ7420
Sensor head	AQ740023-SCC	SC connector	Sensor head
AQ740081	AQ740081-FCC	FC connector	For the
Connector adapter	AQ740081-SCC	SC connector	AQ740023
	AQ740081-LCC	LC connector	Connector
	AQ740081-LMC	Ferrule (1.25 ϕ)	adapter
	AQ740081-SFC	Ferrule (2.5 ϕ)	
AQ740091	AQ740091-FCA-FCM-PCC	FC/Angled PC (IN), FC/PC (OUT)	For the AQ7420
Master cord	AQ740091-FCA-FCM-APC	FC/Angled PC (IN), FC/Angled PC (OUT) (single core),	
	AQ740091-FCA-SCM-PCC	FC/Angled PC (IN), SC/PC (OUT)	fiber length
	AQ740091-FCA-SCM-APC	FC/Angled PC (IN), LC/PC (OUT)	2000 mm
	AQ740091-FCA-LCM-PCC	FC/Angled PC (IN), LC/Angled PC (OUT)	
	AQ740091-FCA-LCM-APC	FC/Angled PC (IN), MU/PC (OUT)	
	AQ740091-FCA-MUM-PCC	FC/Angled PC (IN), MU/Angled PC (OUT)	
	AQ740091-FCA-MUM-PCC		
AQ740096	AQ740096-0000	0 mm	For the AQ7420,
Distance adjustment	AQ740096-0500	500 mm	Internal fiber
cord	AQ740096-1000	1000 mm	length
	AQ740096-1500	1500 mm	5000 mm
	AQ740096-2000	2000 mm	
AC Adapter	720921	—	—

Conventions Used in This Manual

Prefixes k and K

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

- | | | |
|----|---------------|-----------------------------|
| k: | Denotes 1000. | Example: 12 kg, 100 kHz |
| K: | Denotes 1024. | Example: 720 KB (file size) |

Displayed characters

Bold characters in procedural explanations are used to indicate panel keys and characters displayed in the on-screen menu, which correspond to the panel keys.

Notes

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



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

WARNING

Provides precautions to avoid the risk of fatal or serious injury to the user if the product is mishandled.

CAUTION

Provides precautions to avoid the risk of minor injury to the user or damage to property if the product is mishandled.

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

Provides important information for handling this instrument.

Safety Precautions

This instrument 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 manual, the protection provided by the instrument may be impaired.

This manual is part of the product and contains important information. Store this manual in a safe place close to the instrument so that you can refer to it immediately. Keep this manual until you dispose of the instrument.

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.



Direct current



Stand-by

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

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.

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. Doing so may cause blindness or damage to your eyes. Attach the cover to the optical connector when it is not in use. Be sure to turn off this instrument before you clean it.

Do not operate in an explosive atmosphere

Do not operate the instrument in the presence of flammable gases 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. The inside of the instrument is dangerous because parts of it have high voltages.

Accessories

Use the accessories specified in this manual. Moreover, use the accessories of this product only with Yokogawa products that specify them as accessories. Do not use faulty accessories.

Install or use the instrument in appropriate locations

- Do not install or use the instrument outdoors or in locations subject to rain or water.
- Install the instrument so that you can immediately remove the power cord if an abnormal or dangerous condition occurs.

AC adapter

Only use the dedicated AC adapter for the instrument. Follow the handling precautions that are included in the AC adapter's user's manual. Turn off the device under measurement and disconnect the measurement leads before connecting the DC plug. Connect the DC plug of the AC adapter to this instrument first and then the power plug to the power supply.

DC power supply

Before you connect the DC power cord, make sure that the power supply voltage matches the instrument's rated supply voltage.

CAUTION

Operating Environment Limitations

This product is classified as Class A (for use in industrial environments). 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

AVERTISSEMENT**Utilisez cet instrument uniquement pour l'usage prévu.**

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

N'utilisez pas l'instrument s'il y a un problème avec son apparence physique.

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 nonutilisation. Mettre cet instrument HORS tension pendant son nettoyage.

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.

Accessoires

Utiliser les accessoires spécifiés dans ce manuel. En outre, utiliser les accessoires de ce produit uniquement avec des produits Yokogawa pour lesquels ils sont spécifiés comme accessoires. Ne pas utiliser d'accessoires défectueux.

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.

Safety Precautions

Adaptateur CA

Utiliser uniquement l'adaptateur CA dédié pour l'instrument. Suivre les précautions de manipulation incluses dans le manuel de l'utilisateur de l'adaptateur CA. Éteindre l'appareil à mesurer et débrancher les fils de mesure avant de brancher la fiche CC. Brancher d'abord la fiche CC de l'adaptateur CA à cet instrument, puis la fiche secteur de l'alimentation secteur.

Alimentation en CC

Avant de brancher le cordon secteur CC, vérifier que la tension d'alimentation correspond à la tension d'alimentation nominale de l'instrument.

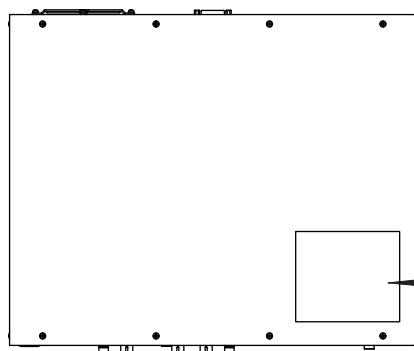
ATTENTION

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

This instrument uses a laser light source. This instrument is a class 1 laser product as defined by IEC 60825-1:2014 Safety of Laser Products—Part1: Equipment Classification, and Requirements. In addition, these modules comply with 21 CFR 1040.10 and 1040.11 except for conformance with IEC 60825-1 Ed. 3., as described in Laser Notice No. 56, dated May 8, 2019.



Laser Class 1 Label

Avoid direct eye exposure.



Complies with 21 CFR 1040.10 and 1040.11 except for conformance with IEC 60825-1 Ed. 3., as described in Laser Notice No. 56, dated May 8, 2019.
4-9-8 Myojin-cho, Hachioji-shi, Tokyo 192-8566, Japan

Information about the laser light source used

Class	Laser Type	Center Wavelength	Maximum Output Power	Mode Field Diameter	Repetition frequency	Numerical Aperture
1	SLD	1.31 μm	27.5 mW	8 μm	CW	0.08
1	SLD	1.55 μm	27.5 mW	8 μm	CW	0.07

Regulations and Sales in Various Countries and Regions

Waste Electrical and Electronic Equipment (WEEE)



(EU WEEE Directive valid only in the EEA* and UK WEEE Regulation in the UK)
This product complies with the WEEE marking requirement. This marking indicates that you must not discard this electrical/electronic product in domestic household waste. When disposing of products in the EEA or UK, contact your local Yokogawa office in the EEA or UK respectively.

* EEA: European Economic Area

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 AC 適配器 720921 和電源線 A1094WD 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/>

Disposal

When disposing of YOKOGAWA products, follow the laws and ordinances of the country or region where the products will be disposed of.

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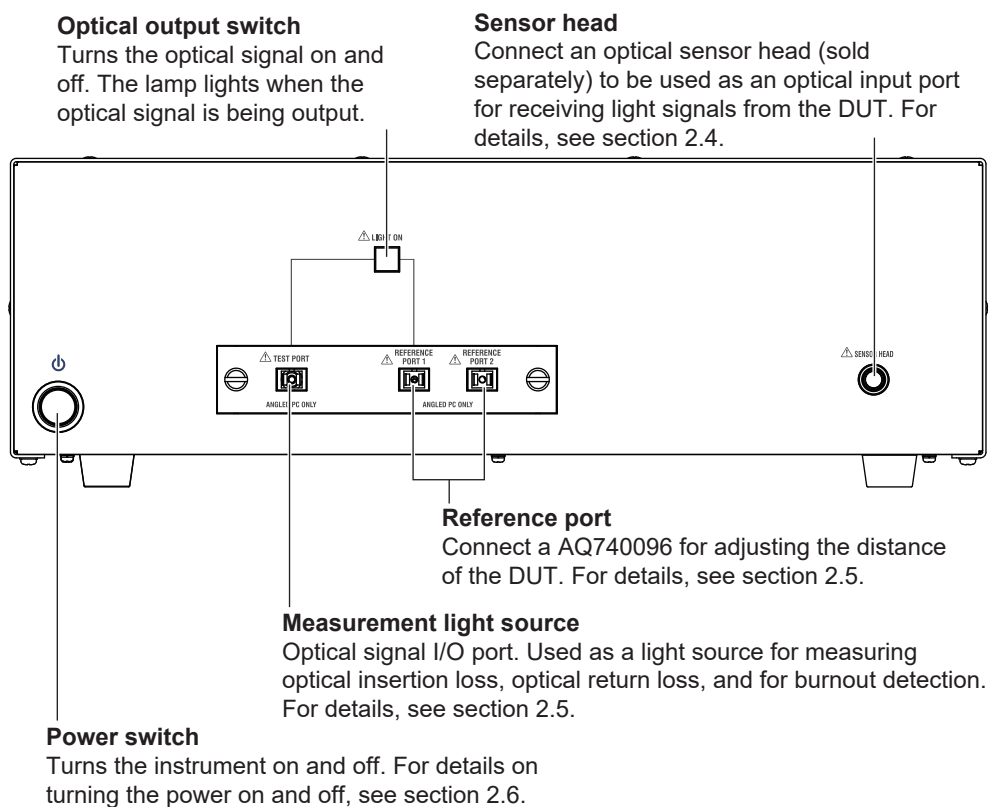
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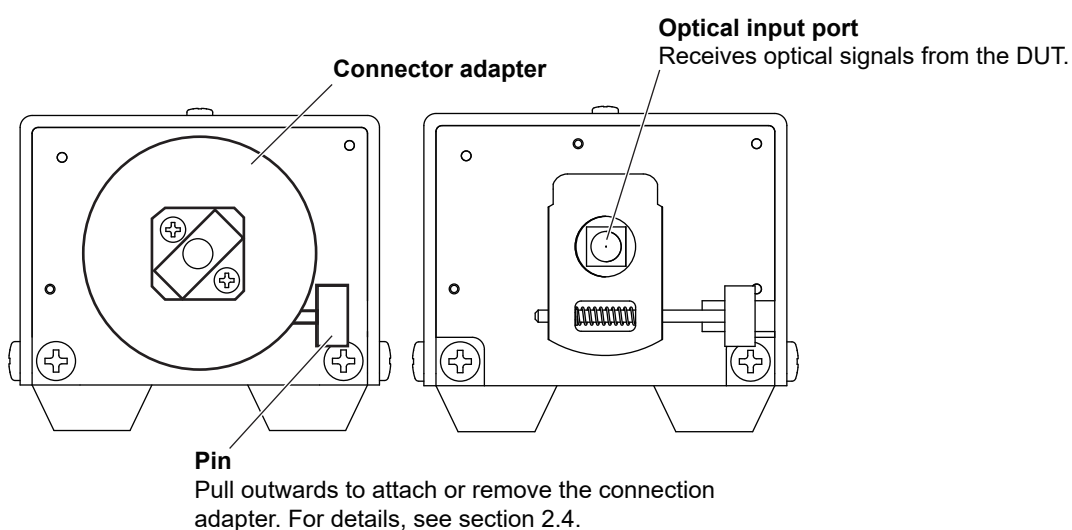
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1.1 Front Panel

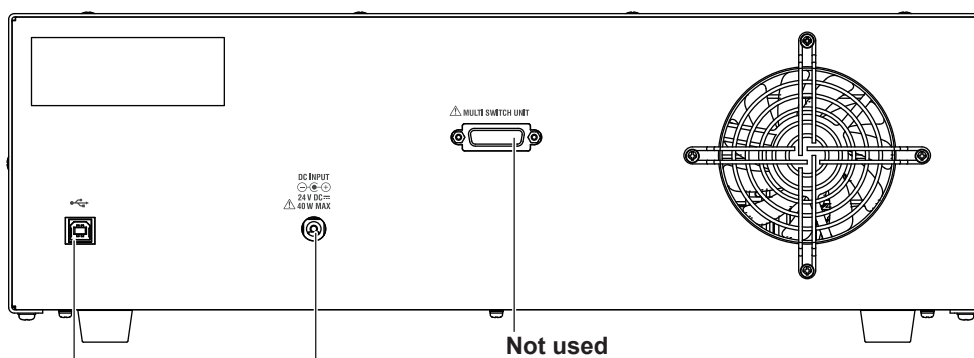
AQ7420 High-Resolution Reflectometer



AQ740023 Sensor Head



1.2 Rear Panel



DC input

Connect the DC end of the cable to the included or separately sold AC adapter. For details, see section 2.3.

USB port Type B

Connect a PC for controlling this instrument. For details, see section 2.6.

2.1 Handling Precautions

Safety precautions

If you are using this instrument for the first time, make sure to thoroughly read the safety precautions given on page ix.

Do not remove the case

Do not remove the case from the instrument. Some sections inside the instrument have high voltages and are 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 and unplug the power cord. Then, 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 unplugging the power cord from the outlet, do not pull on the cord. Pull from the plug.

Operating environment and conditions

This instrument complies with emission and immunity standards under specific operating environment and operating conditions. If the installation, wiring, and so on are not appropriate, the compliance conditions of the EMC standard may not be met. In such cases, the user will be required to take appropriate measures.

General handling precautions

Do not place objects on top of the instrument

Never place other instruments or objects containing water on top of the instrument, otherwise a breakdown may occur.

Do Not Apply Shock or Vibration

Do not apply shock or vibration. Doing so may damage the instrument. In addition, applying shock to the input/output terminal or the connected cables can cause electrical noise to enter or be generated from the instrument.

Unplug during extended non-use

Unplug the power cord of the AC adapter from the outlet.

2.1 Handling Precautions

When carrying the instrument

First, remove the measurement cables and then the other connected cables and power cord. When carrying the instrument, hold with both hands.

WARNING

When you carry the instrument, be careful not to get your hand caught between the wall, installation surface, or other objects and the instrument.

French

AVERTISSEMENT

Lorsque vous déplacez l'instrument, veillez à ne pas vous coincer la main entre l'instrument et le mur, la surface d'installation ou tout autre objet.

When cleaning the instrument

When cleaning the case or the operation panel, first remove the power cord from the outlet, and then wipe with a dry, soft, clean cloth. Do not use chemicals such as benzene or thinner. These can cause discoloring and deformation.

2.2 Installing the Instrument

WARNING

- Do not install the instrument outdoors or in locations subject to rain or water.
- Install the instrument so that you can immediately remove the power cord if an abnormal or dangerous condition occurs.

CAUTION

If you block the inlet or outlet ports on the instrument, it will become hot and may break down.

French

AVERTISSEMENT

- Ne pas installer l'instrument à l'extérieur ou dans des endroits 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.

ATTENTION

Ne pas boucher les orifices d'entrée ou de sortie de l'instrument pour éviter toute surchauffe et panne éventuelle.

Installation conditions

Install the instrument in a place that meets the following conditions.

Flat, even surface

Place the instrument on a flat, even surface. Do not place the instrument on an unstable or sloped surface.

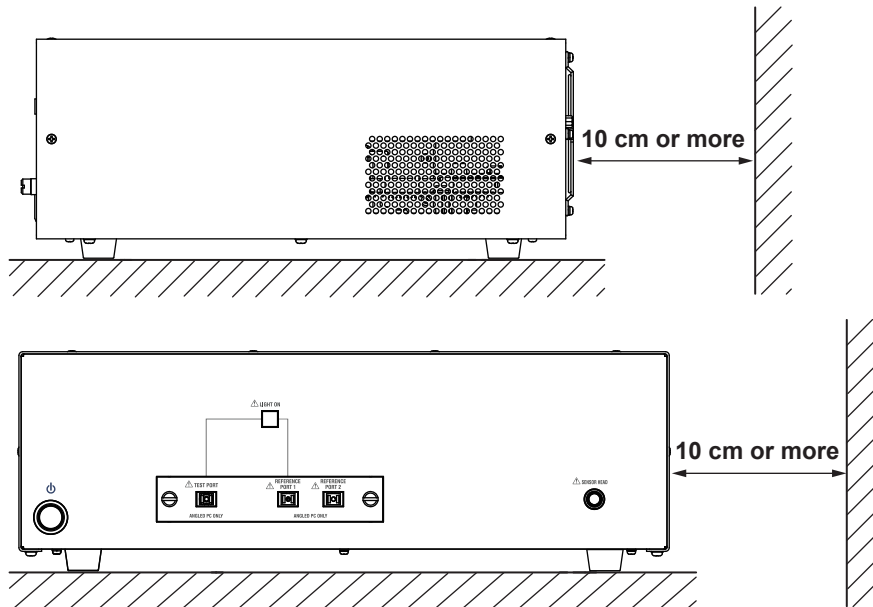
Vibration-free location

Install in a vibration-free location. Vibrations or other disturbances may cause the operation to become unstable, causing the measurement to stop prematurely.

2.2 Installing the Instrument

Well-ventilated location

Inlet ports are located on the right and bottom of the instrument. There are also outlet ports for the cooling fan on the rear side. To prevent internal overheating, allow for enough space around the instrument (see the figure below), and do not block the inlet and outlet ports.



2.3 Connecting the AC Adapter



WARNING

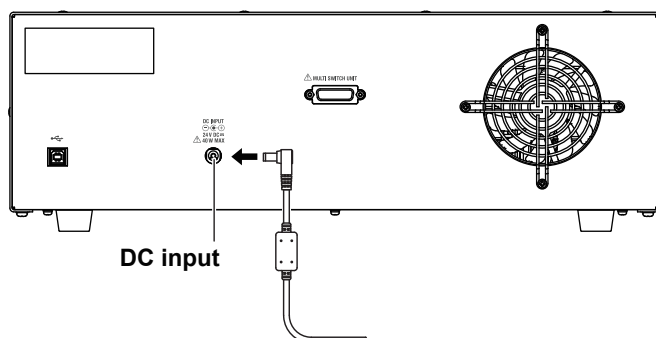
- Unplug the power plug of the AC adapter from the outlet before connecting or disconnecting the AC adapter.
- Make sure that the power supply voltage matches the AC adapter's rated supply voltage and that it does not exceed the maximum voltage range specified for the power cord.
- Only use the dedicated AC adapter for the instrument.
- If an appropriate AC outlet for the supplied power cord is unavailable, do not use the instrument.

French



AVERTISSEMENT

- Débrancher la fiche secteur de l'adaptateur CA de la prise avant de brancher ou de débrancher l'adaptateur CA.
- 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 uniquement l'adaptateur CA dédié pour l'instrument.
- N'utiliser l'instrument que si une prise secteur appropriée est disponible pour le branchement du cordon d'alimentation.



For details on handling the AC adapter, see the user's manual of the AC adapter.

Connecting the AC adapter

1. Connect the AC adapter's plug to the AQ1100's DC power supply connector.
2. Connect the power plug to an outlet.

Removing the AC adapter

Remove the AC adapter from the instrument by reversing the procedure for connecting the AC adapter.

2.4 Connecting the Sensor Head

CAUTION

- A photodetector is attached to the optical input port. Do not touch the light-detecting surface glass of the photodetector. If dust or other substances adhere to the glass of the light-detecting surface, clean it by blowing air. If air does not remove the dirt, wipe gently with a small amount of alcohol on optical cleaning paper.
- Keep the protective cap supplied with the optical connector adapter. The cap is used to protect the optical connector adapter and the photodetector of the instrument.
- Do not apply light that is +17 dBm or more to the optical connector of the optical sensor head. Doing so can damage the instrument.

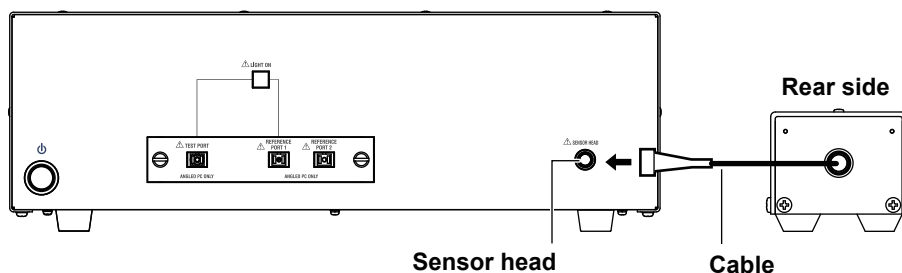
French

ATTENTION

- Un photodétecteur est connecté au port d'entrée optique. Ne touchez pas la surface en verre de détection de la lumière du photodétecteur. Si de la poussière ou d'autres substances adhèrent au verre de la surface de détection de la lumière, nettoyez-la en soufflant de l'air. Si l'air n'élimine pas la saleté, essuyez délicatement avec du papier de nettoyage optique humidifié avec quelques gouttes d'alcool.
- Gardez le capuchon de protection fourni avec l'adaptateur du connecteur optique. Le capuchon sert à protéger l'adaptateur du connecteur optique et le photodétecteur de l'instrument.
- N'appliquez pas de lumière de +17 dBm ou plus sur le connecteur optique de la tête du capteur optique. Cela pourrait endommager l'instrument.

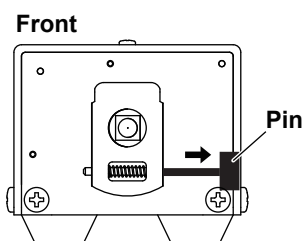
Connecting the sensor head

1. Connect the sensor head's plug to the instrument's SENSOR HEAD connector.

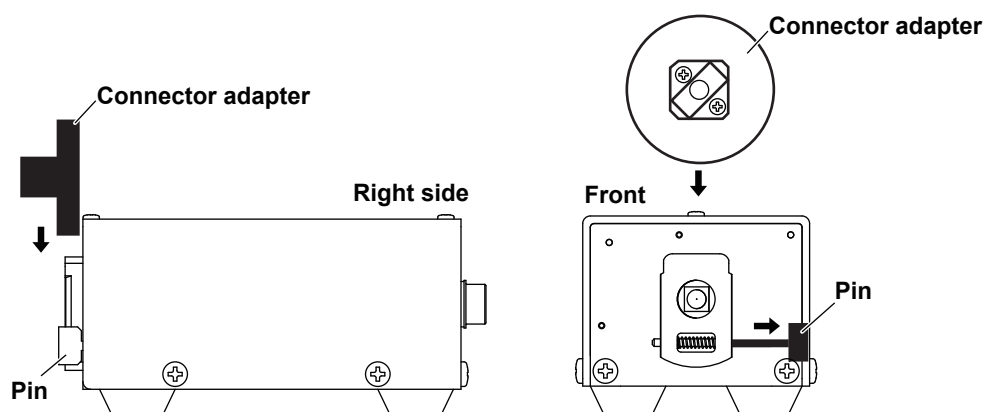


Connecting the connector adapter

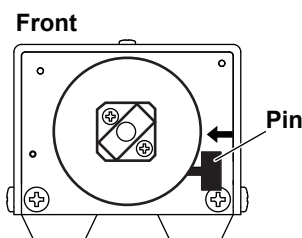
1. Pull the pin outwards. It can be pulled outwards by up to approx. 3 mm.



2. With the pin pulled outwards, connect the connector adapter by sliding it from above.



3. Return the pin to its original position.



Note

The ferrule type does not have a fixing function for the optical connector connection. During measurement, hold the optical connector lightly so that it does not come off.

2.5 Connecting the Optical Fiber Cable



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.



CAUTION

- Only connect an angled-physical-contact type optical fiber cable to the ANGLED PC ONLY optical connector. Other types of connectors can damage the connector's ferrule end.
- 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.
- Do not pull the cord with strong force.
- Do not twist the cord when pulling it.
- Take care not to apply excessive tension at any moment. Also, do not apply sudden tension when the cord is looped.
- Do not bend the cord beyond the allowable bend radius. (normal $\phi 2$, $\phi 3$ cords: R30 mm or more)
- Use an optical fiber cable connector that matches the connector adapter that is attached to the instrument's optical port. Visual impairment may occur if the light enters the eye.

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.



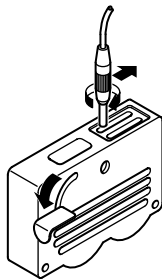
ATTENTION

- Ne brancher que des fibres optiques de type APC (contact physique avec angle) au connecteur optique ANGLED PC ONLY. D'autres types de connecteurs pourraient endommager l'embout du connecteur.
- Nettoyez la face d'extrémité du connecteur du câble de fibre optique avant de le connecter à l'instrument. Si de la poussière adhère à la face du connecteur, cela peut endommager le port optique de l'instrument. Si cela se produit, l'instrument ne pourra pas mesurer correctement.
- Ne tirez pas fortement sur le cordon.
- Ne tordez pas le cordon lorsque vous le tirez.
- Veillez à ne jamais appliquer de tension excessive. De plus, n'appliquez pas de tension soudaine lorsque le cordon est enroulé.
- Ne courbez pas le cordon au-delà du rayon de courbure autorisé. (cordons normaux $\phi 2$, $\phi 3$: R30 mm ou plus)

- Utilisez un connecteur de câble à fibre optique qui correspond à l'adaptateur branché au port optique de l'instrument. Des lésions oculaires peuvent être causées si le faisceau lumineux pénètre l'œil.

Cleaning the connector end face of the optical fiber cable

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



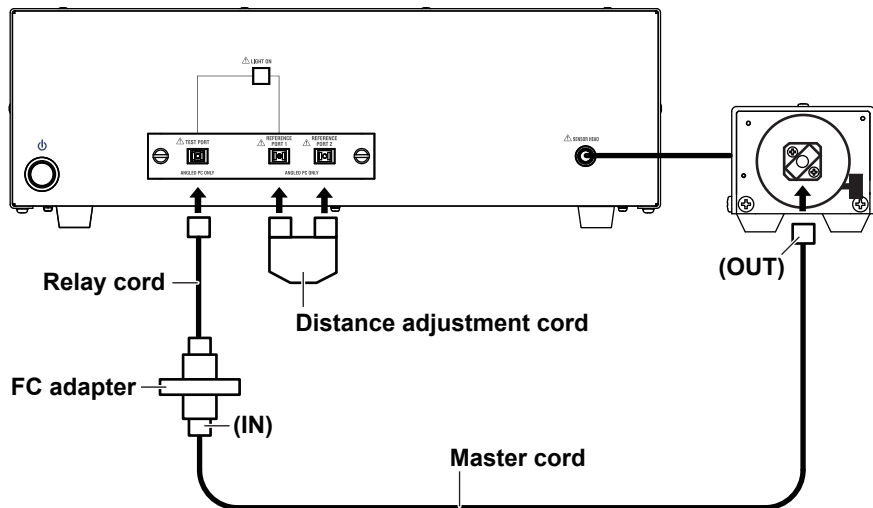
Note

- If you do not firmly press the connector end face of the optical fiber cable against the cleaner, the end face may not be cleaned completely.
- You can purchase an optical fiber cable cleaner from NTT-AT Corporation.
- Clean dust and dirt adhering to the inner surface of the split sleeve of the FC/APC adapter by using an optical connector cleaner (stick type) and inserting and removing it so that it penetrates the split sleeve.

Connecting the optical fiber cable

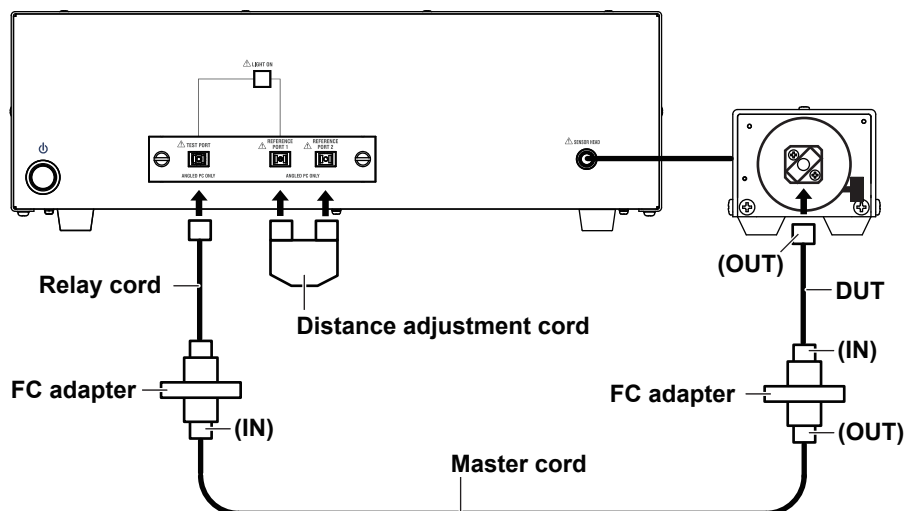
During reference measurement (IL measurement)

1. Connect the distance adjustment cord to the instrument's reference port.
2. Connect one end of the relay cord to the instrument's test port.
3. Connect the other end of the relay cord to one end of the FC/APC adapter.
4. Connect the other end of the FC/APC adapter to IN end of the master cord.
5. Connect the OUT end of the master cord to the optical input port of the sensor head.



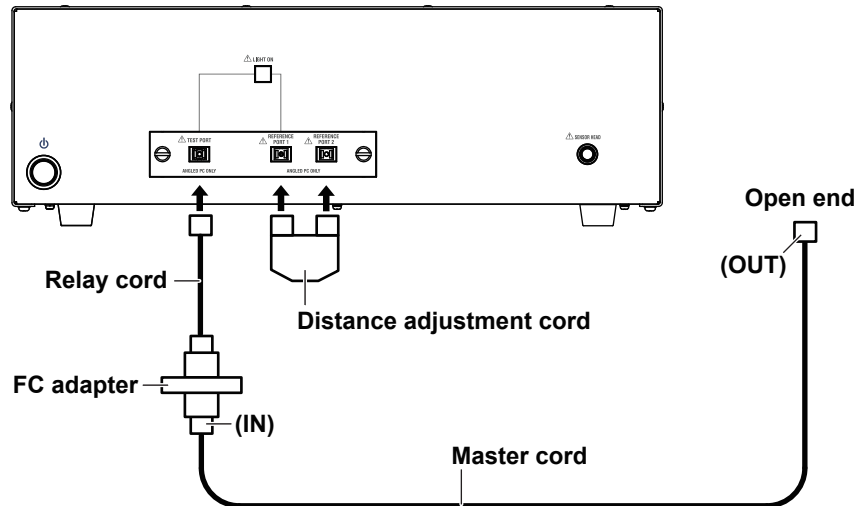
During DUT measurement (IL measurement)

6. Disconnect the OUT end of the master cord from the optical input port of the sensor head.
7. Connect the OUT end of the master cord to one end of another FC/APC adapter you prepared.
8. Connect the IN end of the DUT to the other end of the FC/APC adapter.
9. Connect the OUT end of the DUT to the optical input port of the sensor head.

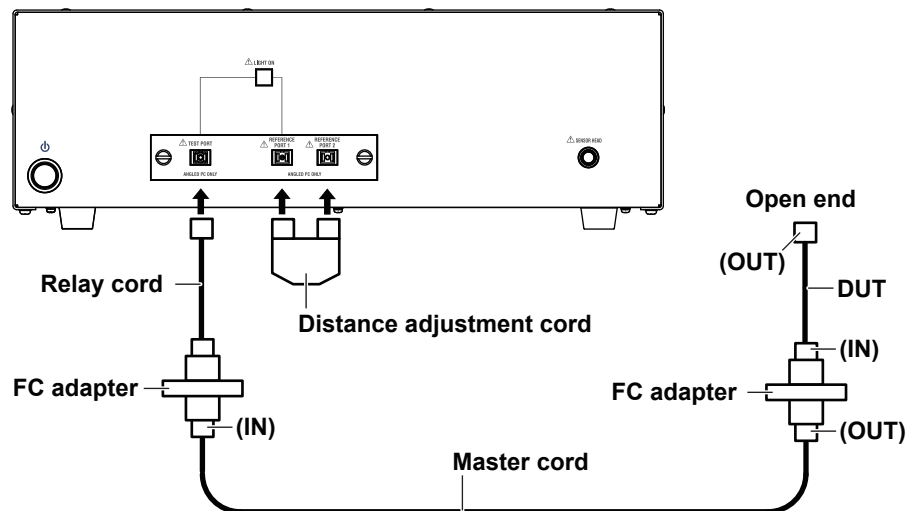


During reference measurement (RL measurement, burnout detection)

1. Connect the distance adjustment cord to the instrument's reference port.
2. Connect one end of the relay cord to the instrument's test port.
3. Connect the other end of the relay cord to one end of the FC/APC adapter.
4. Connect the other end of the FC/APC adapter to IN end of the master cord.

**During DUT measurement (RL measurement, burnout detection)**

5. Disconnect the OUT end of the master cord from the optical input port of the sensor head.
6. Connect the OUT end of the master cord to one end of another FC/APC adapter you prepared.
7. Connect the IN end of the DUT to the other end of the FC/APC adapter.



2.5 Connecting the Optical Fiber Cable

Note

- If the DUT is an angled PC optical fiber cable, prepare two types of master cords and perform the reference measurement twice.
First, use a master cord with a PC polished (PCC) OUT end to perform a reference measurement.
Next, change the master cord to a master cord with an APC polished (APC) OUT end to perform another reference measurement.
For details on reference measurement, see section 4.3 in the User's Manual, IM AQ7420-01EN.
 - After connecting the optical fiber cable, fix the cable to the workbench using fixings or adhesive tape to prevent changes in the laying condition.
 - Use the FC adapter supplied with the instrument for connecting the IN end of the master cord.
Connecting a common PC-type FC adapter to the IN end of the master cord may cause high splice losses and therefore may not give correct measurement results.
-

2.6 Connecting the PC

CAUTION

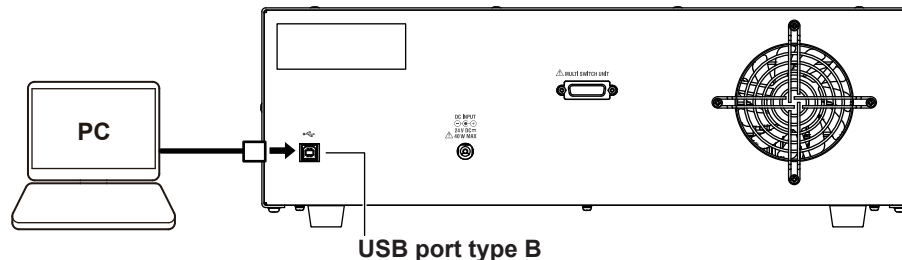
Before connecting or disconnecting the USB cable, ensure the power is off or use the Safely Remove Hardware option on your PC. If the USB connection is disconnected while the software is running, an error will occur and the software will not work properly. If this happens, reconnect the USB cable and restart the instrument and the software.

French

ATTENTION

Avant de connecter ou de déconnecter le câble USB, assurez-vous que l'alimentation est coupée ou utilisez l'option Retirer le périphérique en toute sécurité sur votre PC. Si la connexion USB est déconnectée pendant l'exécution du logiciel, une erreur se produira et le logiciel ne fonctionnera pas correctement. Si cela se produit, rebranchez le câble USB et redémarrez l'instrument et le logiciel.

Connect the USB terminal (Type B) of the instrument to the USB (Type A) terminal of the PC using the supplied USB cable.



Connecting the PC

1. Turn off the instrument.
2. Connect the PC to the instrument.
3. Turn on the instrument.

Note

- Follow the operating procedure. If the operating procedure not followed, the instrument may not start or an error message may be displayed when the instrument starts.
- Use the USB cable supplied with the instrument.

2.6 Connecting the PC

Removing the PC

1. Use the Safely Remove Hardware option on your PC.
2. Turn off the instrument.
3. Remove the PC from the instrument.

Note

For instructions on how to control the instrument from a PC, see chapter 2 in the *User's Manual*, IM AQ7420-01EN.

3.1 Troubleshooting

Dealing with problems

If a message appears on the screen, see the following pages for reference.

If servicing is necessary, or if the instrument does not operate properly even after you have attempted to deal with the problem according to the instructions in this section, contact your nearest YOKOGAWA dealer.

Description	Probable cause		Corrective action	
The instrument does not turn on.	AC power connection error	Is AC power coming to the outlet?	If there is a problem, reconnect properly.	
	AC adapter connection error	Is the power cord connected to the outlet?	If there is a problem, reconnect properly.	
		Is the AC adapter connected to the power cord?	If there is a problem, reconnect properly.	
		Is the AC adapter connected to the instrument?	If there is a problem, reconnect properly.	
Measurement error	Reference measurement execution error	Measurements became normal after reference measurement completion.	The previous reference measurement had failed.	You can continue use.
		Measurements remain abnormal and unchanged after reference measurement completion.	If the master code has been verified and is correct, the instrument is malfunctioning.	Repair is necessary.
		Reference measurement does not finish.		
Fluctuating measurements	Is the ambient temperature constant?	It's fluctuating.	Normal operation. Measurement results may fluctuate in conjunction with the ambient temperature.	Use in a constant temperature environment.
		Constant temperature (within 1 to 2 °C and not exposed to air conditioning breezes)	If the measured value fluctuates significantly even when the ambient temperature is constant, there may be some abnormality.	Repair is necessary.
Long measurement time	Measurement status	Measurement does not finish.	Something may be wrong.	Repair is necessary.

3.2 Error Messages

Messages may appear on the screen during operation. This section describes the error messages and how to respond to them.

If servicing is necessary to solve the problem indicated by a message, contact your nearest YOKOGAWA dealer.

Information

Code	Message	Error description	Corrective action
1	Device not found. Error Code: 1 Detail Code: -	Connection error	Check the USB connection and restart. If the error persists, servicing is required.
2	Unexpected Response Error Code: 2 Detail Code: -	Connection error	Servicing is required.
3	Hardware Error. Error Code: 3 Detail Code: *****	Error flag raised by firmware ("1" indicates the error) ****1: Fan stop ***1*: Stage motor error **1**: Polarization motor error 1****: Internal component error	Check that the fan is not obstructed by any foreign objects. If the fan is not stopped, servicing is required.
4	Hardware Error. IL Realtime Mode is suspended. Set up again or reboot for activation. Error Code: 4 Detail Code: -	Specific errors in IL processing	Check that the fan is not obstructed by any foreign objects. If the fan is not stopped, servicing is required.
5	File save failed. Please check the serial number and the folder to save. Error Code: 5 Detail Code: -	File save error	• Check that the character '(' or ')' is not used in the file name. • Check that there is enough free space on the PC.
6	Reference Error. Error Code: 6 Detail Code: -	REF error	Make sure that nothing is connected beyond the measurement master. Remove the cap. If the error persists, servicing is required.
7	Light source power is out of range Error Code: 7 Detail Code: 000*	REF error (light source) 0001: 1.31 μ m output less than threshold 0002: 1.31 μ m output greater than threshold 0003: 1.55 μ m output less than threshold 0004: 1.55 μ m output greater than threshold	The optical fiber cable may be improperly connected. Check the connection. If the error persists, servicing is required.

3.2 Error Messages

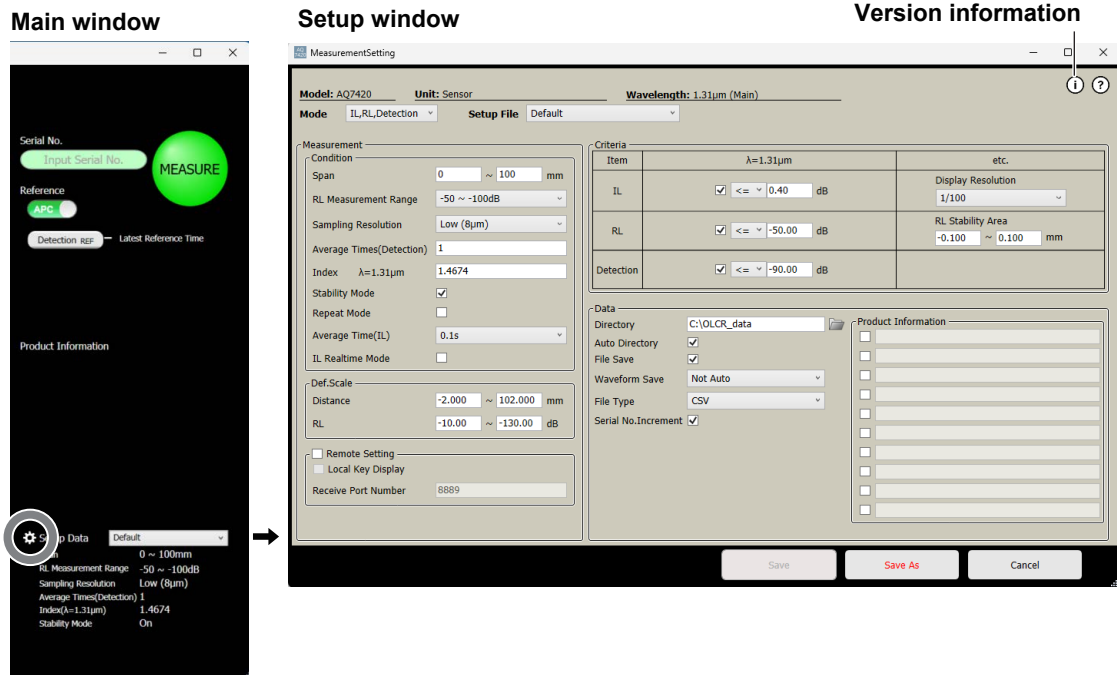
Code	Message	Error description	Corrective action
9999	A system error occurred during processing. Error Code: 9999 Detail Code: -	Exception error	An unexpected error occurred while communicating with the instrument. Restart the instrument. If the error persists, servicing is required.

3.3 Checking the Version of the PC Application

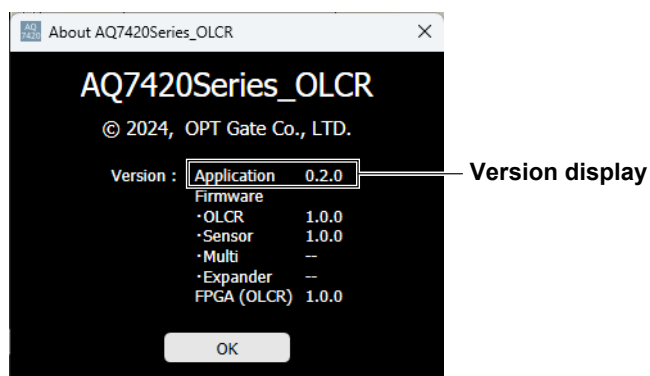
Procedure

Checking the version

1. On the main window, click the Setup Data icon . A setup window appears.



2. On the setup window, click the version information icon . A version information window appears.



3.4 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	Service life
Cooling fan	5 years

Consumable parts

We recommend replacement at the following cycles.

Part name	Recommended replacement cycle	Notes
Master cord	As needed	Cleaning the connector end face may significantly change the service life.
Relay cord	As needed	Cleaning the connector end face may significantly change the service life.
Distance adjustment cord	As needed	Cleaning the connector end face may significantly change the service life.

4.1 Specifications

AQ7420 High-Resolution Reflectometer

Item	Specifications
Measurement wavelength	–13NN: 1310 nm, –1315: 1310 nm/1550 nm
Measurement distance range ¹	100 mm
Distance sampling resolution ¹	1, 4, 8 μ m
Spatial resolution ^{2, 3}	40 μ m or less
Distance measurement repeatability ^{4, 6}	50 μ m or less
Back reflection measurement range	Normal range: –14.7 to –85 dB, High sensitivity range: –50 to –100 dB
Back reflection measurement uncertainty ^{2, 5, 6, 7}	Normal range: ± 3 dB (–14.7 to –85 dB) High sensitivity range: ± 3 dB (–50 to –90 dB), ± 5 dB (–90 to –100 dB)
Spurious noise ⁸	Normal range: –85 dB or less ⁹ High sensitivity range: –100 dB or less ¹⁰
Measurement time ¹¹	Approx. 6 seconds or more
Applicable Optical fiber	SMF (ITU-T G.652)
Master cord	SMF (ITU-T G.652), FC/PC or SC/PC connector
Functions	By control software
Performance guarantee environment ^{12, 13}	18 to 28°C, $\pm 2^\circ\text{C}$ after reference, 20 to 70%RH, no condensation
Operating environment	10 to 40°C, 20 to 70%RH (Below 28°C), 20 to 50%RH (Below 35°C), 20 to 35%RH or less (Below 40°C), no condensation, Installation location: indoor use, altitude: 2000 m or less
Storage environment	–10 to 50°C, 20 to 80%RH (Below 40°C), 20 to 40%RH (Below 50°C), no condensation
Power requirements	AC adapter: 100 to 240 VAC, 50/60 Hz, 1.3 A AQ7420: 24 VDC, 40 W Max (AC input: 120 VA).
Permitted supply voltage range	90 VAC to 264 VAC, 47 Hz to 63 Hz
Dimensions and Mass ¹⁴	430 (W) $\times$ 132 (H) $\times$ 350 (D) mm (Excluding protector and handle), approx. 8 kg
Safety standards	EN 61010-1, EN60825-1, Overvoltage category II ¹⁶ , Pollution degree 2 ¹⁷
Laser	EN 60825-1:2014+A11:2021, IEC 60825-1:2014, GB/T 7247.1-2024 Class 1
Recommended calibration period	1 year
Standard accessories	Master cord, Relay cord, FC/APC adapter, Distance Adjustment cord, USB cable, Control software (CD), AC Adapter, Power code ¹⁸
Control software main functions	Back reflection waveform, The location of the reflection point, Optical reflection loss display, Judgement waveform scaling, Marker function, etc
Recommended PC ¹⁵	CPU: CORE i5, 2 GHz or more, 64 bit, OS: Windows11, RAM: 8 GB or more, Storage space: 1 GB or more, Display resolution: 1920 $\times$ 1080 dots or more, USB2.0 or higher
Emissions	Compliant standards
	EN 61326-1: Class A Group 1 ¹⁹ , EN 61000-3-2, EN 61000-3-3 Korea Electromagnetic Conformity Standard (한국 전자파적합성기준) This product is classified as Class A (for use in industrial environments). 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
	Use the included cable.

4.1 Specifications

Immunity	Compliant standards	EN61326-1 Table 2 (for use in industrial locations)
	Influence in the immunity environment (criteria A)	RL: ± 5 dB, IL: ± 0.1 dB
	Cable conditions	Use the included cable.
Environmental standard ²⁰	EU RoHS Directive compliant	

- * All specifications are after 1 hour of warm-up and REF under the measurement condition.
- * The product specification is when the wavelength is set to 1310 nm.
- 1 For a refractive index of 1.467 (from the tip of the attached optical fiber)
- 2 Measurement distance 0 mm
- 3 Half value width of reflected light pulse waveform.
- 4 In the case of an air-conditioned room at a temperature of 23°C to 24°C, excluding the effect of optical fiber expansion due to temperature, when stability mode is ON.
- 5 The return loss value may fluctuate by up to about 3 dB by moving the fiber.
- 6 2σ
- 7 Averaging 1 time (-14.7 dB to -90 dB), 5 times averaging if smaller than -90 dB.
- 8 Pseudo reflected waveform due to device-specific characteristics.
- 9 When measuring pseudo reflected light amount -20 dB (0 mm position), averaging 5 times.
- 10 When measuring pseudo reflected light amount -50 dB (0 mm position), averaging 5 times.
- 11 Measurement distance 100 mm, distance measurement sample resolution 8 μm , high sensitivity range: -50 to -100 dB, averaging 1 time, varies depending on PC operating environment.
- 12 No abrupt temperature change ($\pm 10^\circ\text{C/h}$).
- 13 Specifications covered: Back reflection measurement uncertainty, distance measurement repeatability, spurious noise.
- 14 Excluding accessories.
- 15 A personal computer for control is not included. Please prepare a personal computer with recommended specifications or higher.
- 16 The overvoltage category is a value used to define the transient overvoltage condition and includes the rated impulse withstand voltage. Category II applies to electrical equipment that is powered through a fixed installation, such as a wall outlet wired to a distribution board.
- 17 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 2 applies to normal indoor atmospheres (with only non-conductive pollution).
- 18 If the suffix code is -Y, a power cord is not included.
- 19 Group1: Equipment that does not intentionally generate or use radio-frequency (RF) energy
- 20 For conformity to environmental regulations and/or standards other than EU, contact your nearest YOKOGAWA office (PIM 113-01Z2).

AQ740023 Sensor Head

Item	Specifications
Measurement wavelength	1310 nm/1550 nm ¹
Insertion loss measurement range ¹	0 to 10 dB
Insertion loss measurement uncertainty ^{2, 3}	±0.02 dB
Applicable optical fiber	SMF (ITU-T G.652)
Connector adapter	FC or SC *LC connector, 2.5 dia. ferrule, and 1.25 dia. ferrule sold separately
Performance guarantee environment ⁴	18 to 28°C, ±2°C after reference, 20 to 70%RH, no condensation
Back reflection measurement uncertainty ^{2, 5, 6, 7}	Normal range: ±3 dB (–14.7 to –85 dB) High sensitivity range: ±3 dB (–50 to –90 dB), ±5 dB (–90 to –100 dB)
Operating environment	10 to 40°C, 20 to 70%RH (Below 28°C), 20 to 50%RH (Below 35°C), 20 to 35%RH (Below +40°C), no condensation
Storage environment	10 to 50°C, 20 to 80%RH (Below 40°C), 20 to 40%RH (Below 50°C), no condensation
Power	Supplied by AQ7420 high-resolution reflectometer
Dimensions and Mass ⁵	60 (W) × 45 (H) × 100 (D) mm (excluding protrusions), Approx. 0.4 kg
Recommended calibration period	1 year
Standard accessories	Connector Adapter FC or SC, Adapter Cap, Cable (Special cable for AQ7420 connection)

* This instrument is a dedicated sensor head that is driven and controlled by the AQ7420 high-resolution reflectometer.

* All specifications are after 1 hour of warm-up and REF under the measurement condition.

1 Same as measurement wavelength of AQ7420.

2 2σ

3 Within 5 minutes after reference temperature change ±1°C or less.

4 No abrupt temperature change (±10°C/h).

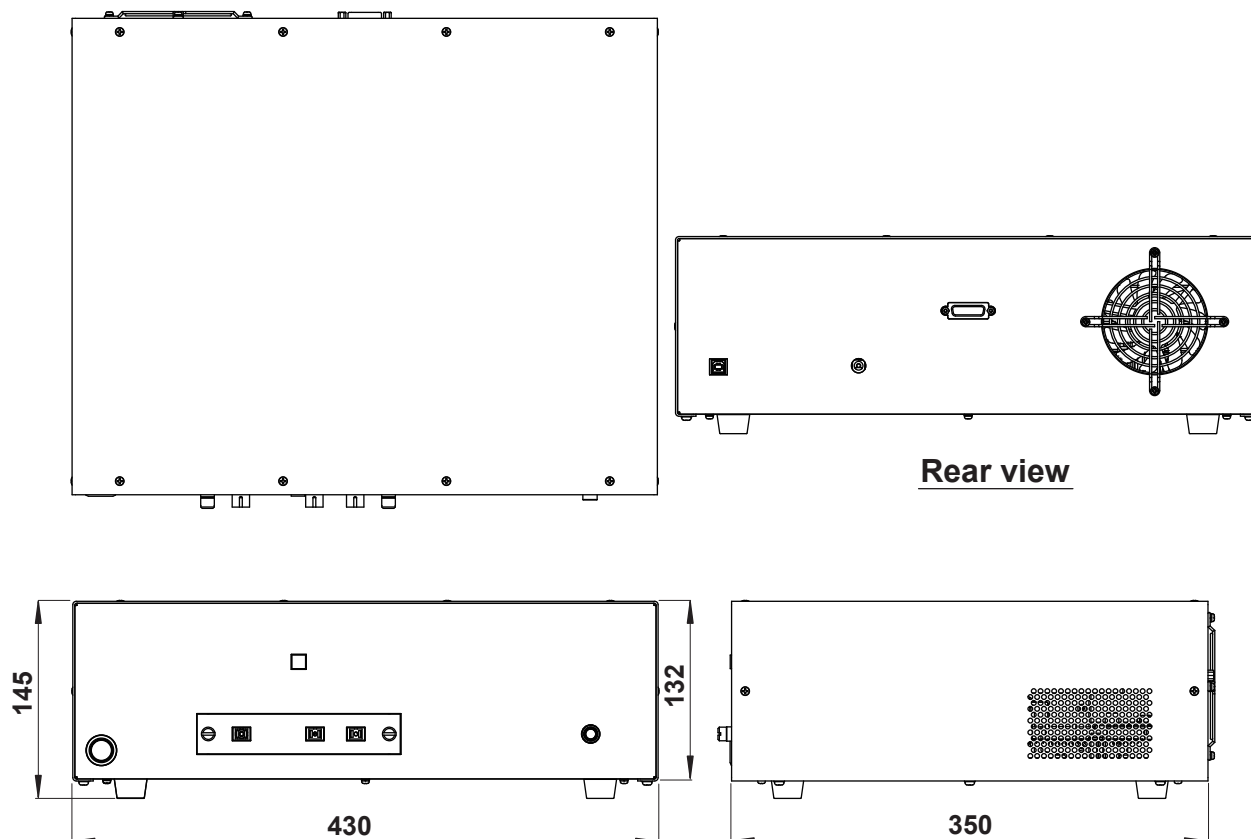
5 Excluding accessories.

4.2 External Dimensions

Unit: mm

Unless otherwise specified, tolerances are $\pm 3\%$ (however, tolerances are ± 0.3 mm when below 10 mm).

AQ7420 High-Resolution Reflectometer



AQ740023 Sensor Head

