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INSTRUCTION MANUAL

FOR

AQ4305 WHITE LIGHT SOURCE

YOKOGAWA ◆
Yokogawa Meters & Instruments Corporation

AS-62737E-01Y Rev. 1.0

Introduction

Thank you for purchasing this product.

Yokogawa Meters & Instruments Corporation designs and develops products using leading-edge technologies to meet the needs of today's users. All of our staffs are proactively involved in these efforts on a daily basis, and we look forward to providing you with quality products into the future. Product quality is a crucial focus at Yokogawa Meters & Instruments.
If you happen to experience any problems, please contact us at the telephone number or address shown below. Your product warranty is described in detail in this manual (see section 1.4 "Warranty").

This manual contains useful information about the functions, operating procedures, and handling precautions of the AQ4305 White Light Source. To ensure correct use, please read this manual thoroughly before operation.

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 functions.
- 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 as listed on the back cover of this manual.
- Copying or reproducing all or any part of the contents of this manual without Yokogawa's permission is strictly prohibited.
- This product's guarantee is limited to its performance and functions. Yokogawa shall not be responsible for any loss, damage, costs or expenses which may be incurred by the user in the rare event that the instrument malfunctions. Make sure to consider the effects of the instrument on your current system and be aware of any remedial measures that may need to be taken before using the instrument with your system.

Revisions

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1 Safety Marks and Labels

- **Before using this product, be sure to read the Safety Precautions.**
- **Be sure to follow the danger and caution labels shown below in order to ensure safe and proper use of this product while avoiding danger to yourself and others and preventing property damage.**

In order to ensure safe use of this product, the safety marks shown below are used with the meanings shown in the table. Areas where these marks appear in the document are extremely important in terms of safety. Be sure to read the meanings of these safety marks to ensure safe use of this product.

Safety mark	Meaning
⚠Danger	Ignoring this mark and performing an operation incorrectly could result in a hazardous situation involving personal injury or death.
⚠Warning	Ignoring this mark and performing an operation incorrectly could possibly result in serious personal injury or lead to hazardous situations in which minor injury or property damage frequently occur.
⚠Caution	Ignoring this mark and performing an operation incorrectly is not likely to result in serious personal injury, but could possibly lead to injury or simply result in property damage.
NOTE	This mark flags an explanatory note pertaining to exceptions, corrections, or limitations in the text. Such notes present information which is outside the scope of the Danger, Warning, and Caution safety marks.

The following icons are used in the text with the meanings shown below.

	A triangle with a picture inside it represents a *notification* which is a warning or caution. Handle this unit carefully in performing the action specified in the text pertaining to a warning or caution with this type of icon. The picture inside the triangle denotes the specific type of warning (a fire caution is presented in the example at left).
	A circle with a crossed-out picture inside it represents an action that is *prohibited*. You must never perform the action specified in the text pertaining to a warning or caution with this type of icon. The picture inside the circle denotes the specific type of prohibited action (in the example at left, disassembly is not allowed).
	A black circle with a picture inside it represents an action that *must be performed*. You must perform the action specified in the text pertaining to a warning or caution with this type of icon. The picture inside the circle denotes the specific type of required action (in the example at left, the AC adapter is to be removed from the power outlet).

Other labels

[LAMP] Square brackets denote a printed word on the panel and body. The word enclosed by square brackets is the name of the panel switch and the name of the functions.

.

(☛ See section 2.2 Rear Panel)

The words enclosed by parentheses indicate an associated item or an item to be referred to.

⚠Warning

Ignoring this mark and performing an operation incorrectly could possibly result in serious personal injury or lead to hazardous situations in which minor injury or property damage frequently occur.

Cautions related to power supply	
	This product is designed to operate at supply voltages of 100-120,200-240V AC. Do not use it at voltages outside these rated supply voltage ranges. □ Doing so may result in fire, electric shock, or equipment damage.
	Do not use an AC adapter other than the included adapter or one specified by the manufacturer. □ Doing so may result in fire, electric shock, or equipment damage.
	Do not connect the power cord to a multi-outlet power strip. □ Doing so may result in fire or overheating.
	If there is lightning nearby, quickly turn off the power and remove the power plug from the outlet. In addition, remove the interface cables from this product and refrain from using it. □ A lightning strike may result in fire, electric shock, or equipment damage.
	Securely insert the power plug in the power outlet. □ Touching the power plug terminals with metal or the like may result in fire, electric shock, or equipment damage.

Cautions related to handling	
	Do not insert or drop any metal objects through any opening. □ Doing so may result in fire, electric shock, or equipment damage.
	Do not take this product apart or attempt to modify it. □ Doing so may result in fire, electric shock, or equipment damage.
	Do not unplug or plug in the power plug with wet hands. □ Doing so may result in electric shock.
	If water enters this product, immediately remove the power plug from the power outlet and contact your dealer. □ Using this product in this condition may result in fire, electric shock, or equipment damage.
	If this product emits smoke or a strange odor, immediately remove the power plug from the power outlet, make sure the smoke stops coming out, and then ask your dealer for repair. □ Using this product in this condition may result in fire, electric shock, or equipment damage.

Cautions related to the installation environment and conditions	
	Do not place small metal objects or flower vases, cups, cosmetics, medicine, potted plants, or other containers holding liquids on top of or near this product. □ If they spill on or enter this product, fire, electric shock, or equipment damage may occur.
	Do not set heavy objects on the power cord or AC adapter, or yank on them or allow them to overheat. □ Doing so may damage the cord, resulting in fire or electric shock.
	If you drop this product or damage the cabinet, remove the power plug from the power outlet and contact your dealer. □ Using this product in this condition may result in fire, electric shock, or equipment damage.
	Ask your dealer to handle internal checks and repairs. □ For contact information, see section 1.4 Warranty. (☛ See section 1.4 Warranty)

⚠Caution

Ignoring this mark and performing an operation incorrectly is not likely to result in serious personal injury, but could possibly lead to injury or simply result in property damage.

Cautions related to installation environment and conditions	
	Do not install the unit in a location where it is exposed to smoke or steam, such as a kitchen table or near a humidifier, and do not place it in a dusty, dirty area. □ Doing so may result in fire, electric shock, or equipment damage.
	Do not install the unit in an unstable location, such as on an unsteady platform or a tilted surface. □ The unit may fall or tip over, resulting in injury.
	Do not install the unit in a location exposed to direct sunlight or high humidity. □ Doing so may increase the temperature inside the unit, resulting in fire or equipment damage.
	Do not block the air vents on the product. □ If the air vents are blocked, heat will build up inside the unit, possibly resulting in fire or equipment damage.
	Do not install the unit in a location with heavy vibrations. □ Doing so may result in fire, electric shock, or equipment damage, and may result in unstable operations.
	Install the unit away from strong magnetic fields and electromagnetic noise sources. □ Doing so may result in fire, electric shock, or equipment damage.
	This unit is designed to be installed horizontally. Do not install it vertically or upside down. □ Heat will build up inside the unit, possibly resulting in fire or equipment damage.

Cautions related to handling	
	Be sure to grasp the plug directly when removing the power plug from a power outlet. □ Yanking on the cord may damage the cord, resulting in fire or electric shock.
	Before moving the unit, first turn off the power switch (following the procedure for turning off the unit's power switch) and remove the power plug from the power outlet. Next, disconnect all external connector cables, such as communication cables. (☛ See section 3.1 Power ON/OFF) □ Turning the power switch off incorrectly may cause an abnormality in the unit. Make sure that all connector cables are disconnected before moving the unit. Yanking on the cord may damage the cord, resulting in fire, electric shock, or equipment damage.
	If water drips on the unit, wipe it off with a dry towel. □ If water drips inside the unit, it may cause a fire or damage the unit.
	As a safety precaution, remove the power plug from the power outlet prior to maintenance work. □ Doing so may result in fire, electric shock, or equipment damage.
	Be sure to ground the unit. □ Doing so may result in fire, electric shock, or equipment damage.

2 Halogen lamp

This unit has an halogen lamp. the specifications shown in Table 1.

Table 1 the specifications of halogen lamp

Characteristic	Type JC12V50W PHILIPS
Rated Lamp Wattage	50 W
Voltage	12 V
Color Temperature	3300 K
Life	50 hours
Cap-Base	GY6.35

Cautions related to handling	
	High pressure gas is sealed in the bulb. Pay attention to the handling. □ Doing so may result in injury, if the bulb breaks..
	Do not bring paper, cloth, and Inflammables close to the lamp in lighting. □ Doing so may result in fire.
	Never look at the optical output or the tip of the optical fiber connected to the unit in lighting. □ The light is extremely dazzling and is harmful to the eyes.
	Before replacing the lamp, turn off the power switch and remove the power plug from the power outlet. □ Doing so may result in electric shock.
	Do not take off the lamp cover and do not touch the lamp outskirts in lighting. □ Hot surfaces can cause scalding. When replacing the lamp, let it cool down after setting the [POWER] switch to [OFF]
	Do not touch the lamp by bare hand. □ Doing so may result in lamp damage when using the dirty lamp.
	Do not exposed to direct water drips or high humidity. □ If water drips on the lamp, it may cause a damage.
	Do not painting on the lamp. □ Heat the lamp up, it may cause a damage.
	Do not operate the lamp in the presence of flammable liquids or vapors. □ Doing so may result in fire, explosions.
	Securely insert the lamp in a socket. □ If the lamp falls out or contact defectiveness, doing so may result in heat up, smoke.
	Do not be vibrated or jarred. □ Doing so may result in short life, damage.
	Avoid directly looking at the lighted lamp. □ The light is extremely dazzling and is harmful to the eyes.
	Check that the lamp socket is distorted or oxidized when replacing the lamp. □ Doing so may result in heat up, non-lighting.
	Recommend to exchange the lamp when lighting time exceed the rated life time. □ Doing so may result in damage rarely.
	Do not break the bulb, when you dispose of the used lamp. □ Doing so may result in injury.

3 Usage Environment

3.1 Operating temperature range

The operating temperature range at which the AQ4305 operates normally is +5 to +40 °C.

3.1.2 Environmental conditions

This unit contains 3-linear guide stages for adjusting the position of lamp, so it is important to avoid extreme temperatures, shock impacts, and vibrations in storing and transporting the unit. In particular, if the following environmental conditions are exceeded, this unit's performance levels may not recover.

Environmental conditions

(1) Storage temperature range: −10 to +50 °C

(2) Vibration

Oscillation frequency:	10 Hz
Compound amplitude:	±0.25 mm
Vibration directions:	Up/down, left/right, forward/backward
Vibration duration:	Vibrations equivalent to 10 minutes in each vibration direction

(3) Shock impact: Shock impact equivalent to natural fall when the unit is resting on a hardwood floor and one side of bottom is lifted 5 cm

3.1.3 Usage precautions

(1) Halogen lamp

Halogen lamp must be handled carefully because a forceful shock impact could break the filament, or could damage the bulb.

(2) Handling problems

If you experience problems such as those listed below, there may be debris adhering to the end of the optical fiber cord which connects the instrument to this unit. In such cases, clean the end of the optical fiber cord with alcohol or the like.

(☛ See section 4.2 Handling the Optical Connectors)

- Output level down
- Output level instability

3.1.4 Installation

If this unit is left in a vertical or upside-down position for an extended period of time, the 3-linear guide stages will be adversely affected. Always use this unit in a horizontal position.

Install this unit in a stable location for use. If it is installed in a location with heavy vibrations or if it is vibrated or jarred during operations, output level will become unstable.

This unit must also be kept in a horizontal position during transport and storage.

⚠Caution

- The AQ4305 contains 3-linear guide stages. If this unit is installed in a location with heavy vibrations or if it is vibrated or jarred during operations, output level will become unstable. Therefore, be sure to install this unit in a stable location for use.
- If output level changes significantly, adjust xyz-axes. (☛ See section 4.3 Xyz-axes Adjustment.) If this unit's performance are not restored/improved as a result of adjusting by turning the power off and then back on, repairs will be necessary. In such cases, contact the sales department at our main office, or the nearest branch office or sales office. (☛ Contact information is located at the end of this document.)

4 Power supply and power cord

The AQ4305 is Class I safety class equipment which has a protective ground and is structured to provide sufficient protection against electric shock.
This unit can be grounded to protect against electric shocks from AC power supplies by connecting the ground pin of a three-prong power cord or the ground terminal of a 3-prong/2-prong adapter to a power outlet.

(1) Power supply

The AQ4305 works with 100-120,200-240V AC power supplies. The supply frequency should be in the range of 48–63 Hz. In addition, use a rated voltage cable that satisfies the operating voltage requirements.

(2) Power cable

The power cable is a 3-pin plug-type cable in which the pin in the center serves as the ground pin. To the extent possible, this unit should be connected to a 3-prong outlet. If you use a two-prong outlet, connect the power cable to the outlet through an adapter. The ground wire from the adapter must be connected to an external ground or the earth.

4.1 Safety measures related to power supply

The AQ4305 will operate normally with 100-120,200-240V AC/48–63 Hz power supplies. However, steps must be taken to protect against the following in supplying the AC power.

- Injury due to electric shock
- Damage to the unit's interior due to abnormal voltage
- Problems caused by ground current

(1) Power cord polarities

A 3-prong (or grounded-type 2-prong) power outlet with an earth terminal (E) is connected as shown in Fig. 1 to the live line (L), neutral line (N), and protective earth line (earth ground). Therefore, the included 3-wire power cord is designed so that the power supply polarities will match when the plug on the cord is simply inserted in a 3-prong (or grounded-type 2-prong) outlet.

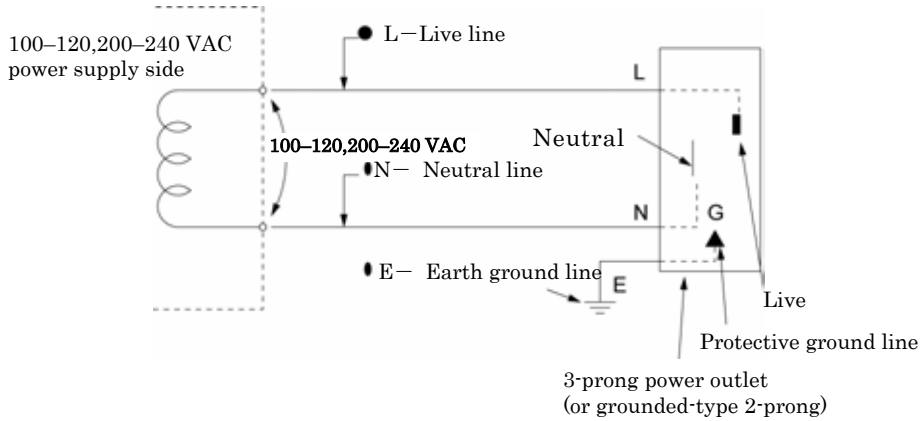


Fig. 1 3-Wire power cord plug and power outlet

(2) Protective ground

[Grounding with adapter]

If a 3-prong power outlet like that shown in Fig. 1 is not provided, ground the terminal coming out of the 3-prong/2-prong adapter shown in Fig. 2.

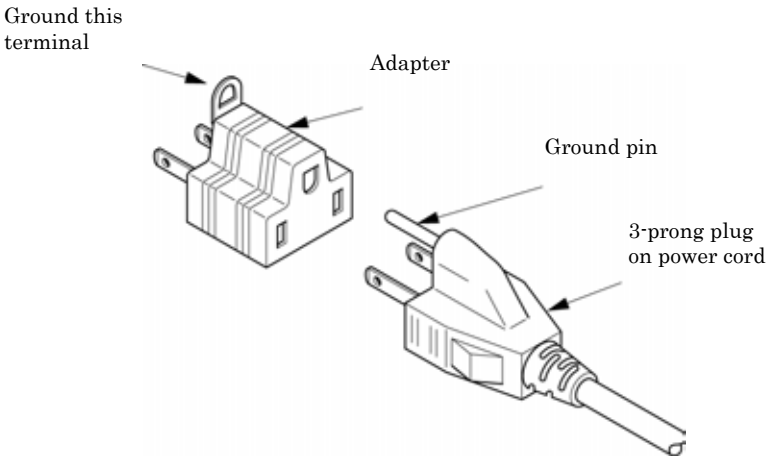


Fig. 2 Grounding from adapter

[Grounding with 3-prong power outlet]

In this case, as explained in section 4.1.(1), if a 3-prong (or grounded-type 2-prong) outlet is available, the plug on the 3-wire power cord will match the power supply's polarities, so the unit's casing will be connected to ground potential when the power cord is inserted in the power outlet. A 3-prong/2-prong adapter plug is not needed in this case.

5 Fuses

The AQ4305 uses time lag-type 3.15-amp fuses.

5.1 Replacing fuses

Under the standard configuration, the unit includes the fuses listed in the standard accessories list (☛ see section 1.3 Checking the Equipment and Accessories). If you need to replace a fuse due to an equipment failure, first determine the cause of the failure and solve the problem before replacing the fuse.

⚠Danger

- Turn off the power switch and unplug the power plug from the power outlet before replacing a fuse. Replacing a fuse while the power is on may result in injury due to electric shock.
- After replacing a fuse, perform one of the protective grounding procedures described in section 4.1 before turning the power back on. Make sure the AC supply voltage is at the proper level before turning the power switch on. Turning the power on without a protective ground may result in injury due to electric shock. If the AC supply voltage is not at the proper level, turning the power switch on may damage the inside of the unit.

An AC power connector is located on the back side of this unit. The AC power connector contains an inlet noise filter (made by Schaffner). The fuses are set in the inlet noise filter.
You can pull the fuse holder out.

Whenever you pull out the fuse holder and push it back in order to replace or check a fuse, be sure to push it in to the point where the filter body and fuse holder are flush with each other. As you push in the fuse holder, you will feel a click (there is some variation in the position at which this occurs) (see illustration below).
If you stop pushing in the fuse holder when you feel the click, the electrical contact may be incomplete or there may be no electrical contact. Using the equipment in this condition may cause overheating and blow the fuses.

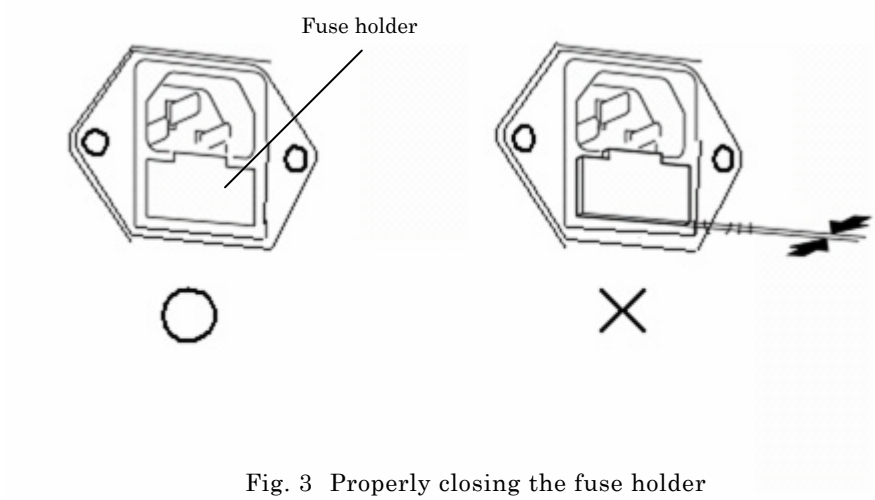


Fig. 3 Properly closing the fuse holder

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Chapter 1 Introduction

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1.1 Overview of the AQ4305

The AQ4305 is a white light source effective for loss-wavelength characteristics measurement of optical fibers and devices. The AQ4305 cover a band of 400 to 1800 nm and provide highly stable optical outputs with a deviation of ±0.05 dB. The typical optical output level characteristics of the AQ4305 is shown blow.

The AQ4305 can provide lighting and putting out the lamp, opening and shutting the mechanical shutter. The AQ4305 also includes GP-IB interface as standard features.

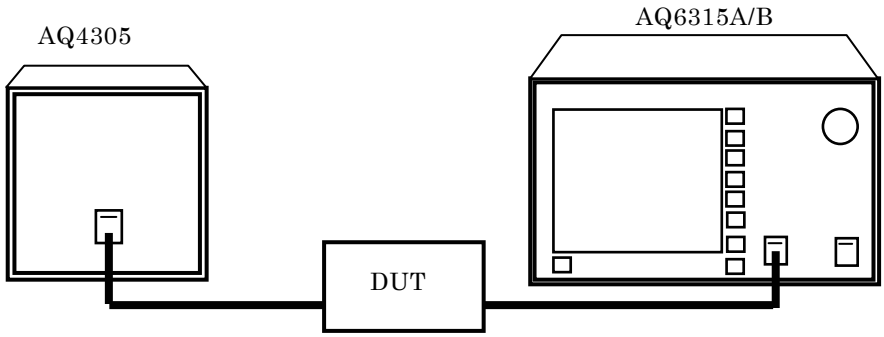


Fig.1-1 The loss-wavelength characteristics measurement system

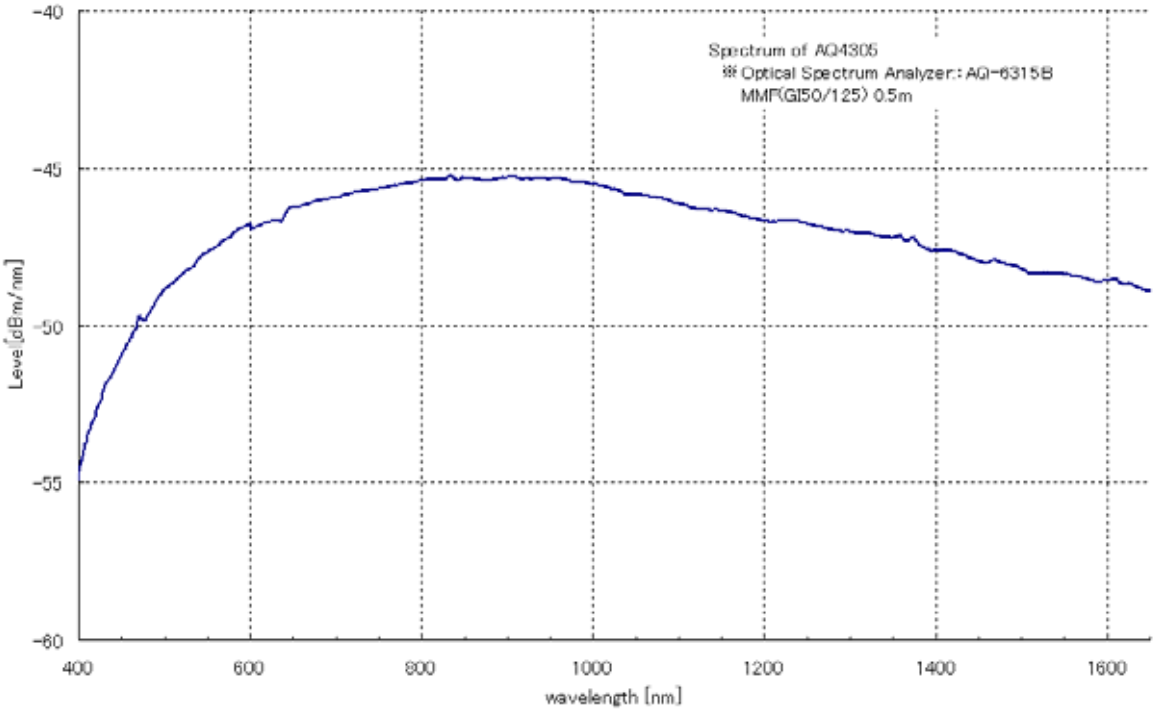


Fig.1-2 The typical optical output level characteristics of the AQ4305

1.2 Block Diagram

The block diagram of the optical system is shown below. The optical system employs a ball lens.
Optical axes adjustment is necessary in order to output light to fiber. In the unit, you can adjust the lamp socket.

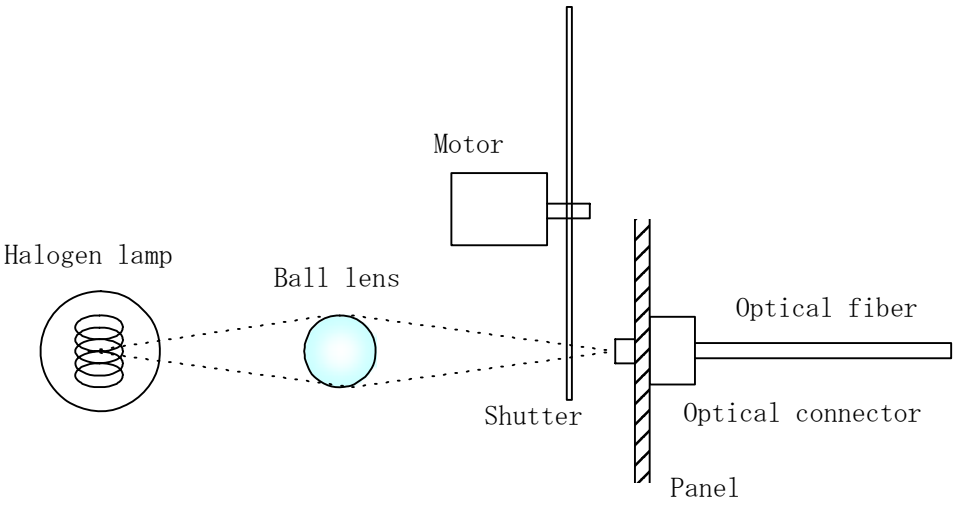


Fig.1-3 The Block Diagram of The Optical System

The block diagram of the AQ4305 is shown below. The switches on P1 control shutter and lamp switch. The AQ4305 enable remote control these.

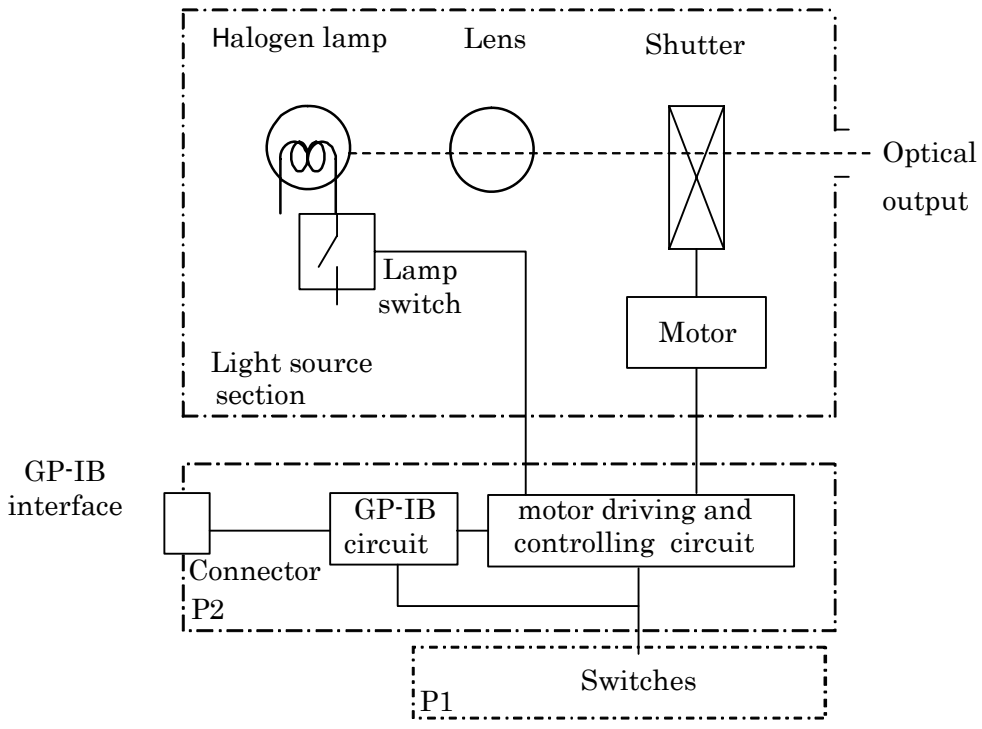


Fig.1-4 The Block Diagram of The AQ4305

1.3 Checking the Equipment and Accessories

When you first open the package, make sure that it contains all of the equipment and accessories listed below. (☛ Table 1-1 Standard Accessories List)

Also check to make sure the quantities in the package shown in the list. If there are missing parts or if the equipment is damaged, please contact our service department, the sales department at our main office, or the nearest branch office or sales office.

(☛ Contact information is located at the end of this document.)

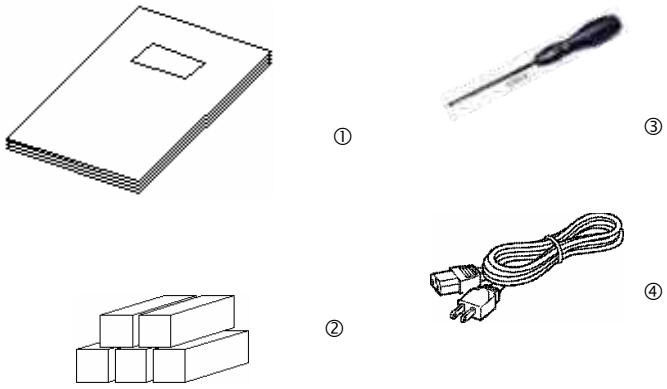


Fig. 1-5 Standard Accessories

Table 1-1 Standard Accessories List

Number	Part name	Quantity	Remarks
①	Instruction Manual	1 copy	This manual
②	Halogen lamps	6 pcs	12 V, 50 W, 5 spares , *1 Already installed in unit
③	Hexagon driver	1 pc.	2.5 mm, use for xyz-axis adjusting
④	Power cord	1 pc.	3 m
–	Fuses	2 pcs.	3.15A time lag-type * Already installed in unit

1.4 Warranty

■ Product warranty

(1) No-charge warranty period

The no-charge warranty period for a newly purchased measuring instrument is one year from the date of delivery. During this period, equipment which fails due to manufacturing or component problems which are our fault will be repaired free of charge. Contact our service department, the sales department at our main office, or the nearest branch office or sales office for details.

Please note that even during the no-charge warranty period, you will be charged for any repairs, calibration, and testing done in response to equipment failures that occur due to incorrect user operation or acts of God such as natural disasters. Furthermore, Yokogawa Meter & Instruments may refuse to repair or calibrate equipment in the following cases:

- If the equipment has been disassembled or modified, or its circuitry has been changed without consulting Yokogawa Meters & Instruments
- If the equipment is not a properly purchased product

2

Chapter 2
Part Names and Functions

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2.1 Front Panel

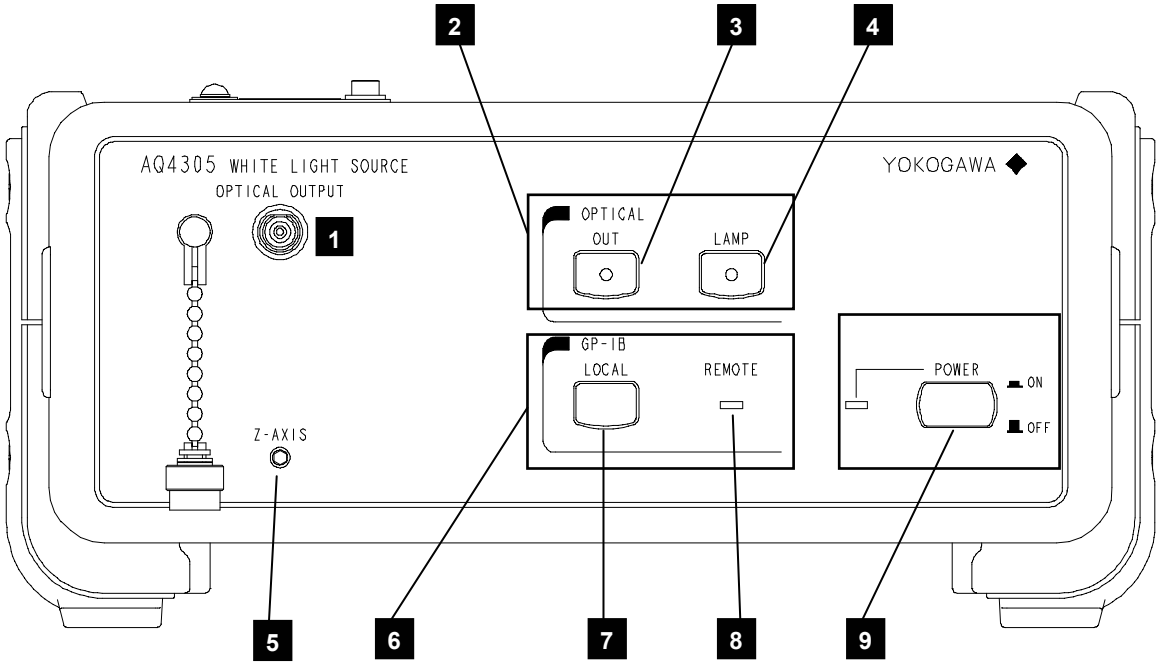


Fig. 2-1 Front panel

No.	Name	Function
1	[OPTICAL OUTPUT]	Optical output connector
2	[OPTICAL] section	Used for optical output
3	[OUT] switch	Mechanical Shutter switch LED turns on with output enable
4	[LAMP] switch	Lamp switch LED turns on with lighting
5	[Z-AXIS]	Used to adjust z-axis of the lamp position
6	[GP-IB] section	Used for GP-IB interface
7	[LOCAL] switch	Return To Local switch Return to local in the remote state
8	[REMOTE] LED	Turns on when the unit is in the remote state
9	[POWER] switch	Power switch(☛section 3.1 Turning the Power ON/OFF) LED turns on with [ON] and turns off with [OFF]

2.2 Rear Panel

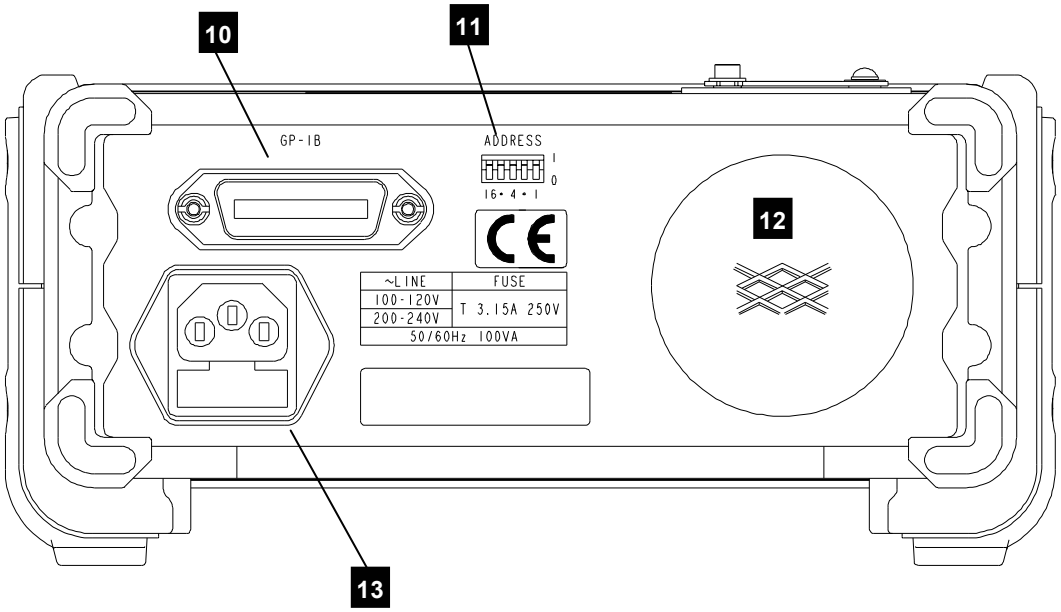


Fig. 2-2 Rear panel

No.	Name	Function
10	[GP-IB]	GP-IB port for controlling this unit through an external computer
11	[ADDRESS] switch	GP-IB address switch
12	Fan	Heat vent fan (make sure the fan vent is not blocked)
13	Power cord connector	Connect the power cord to this connector

2.3 Left Side Plate and Top Plate

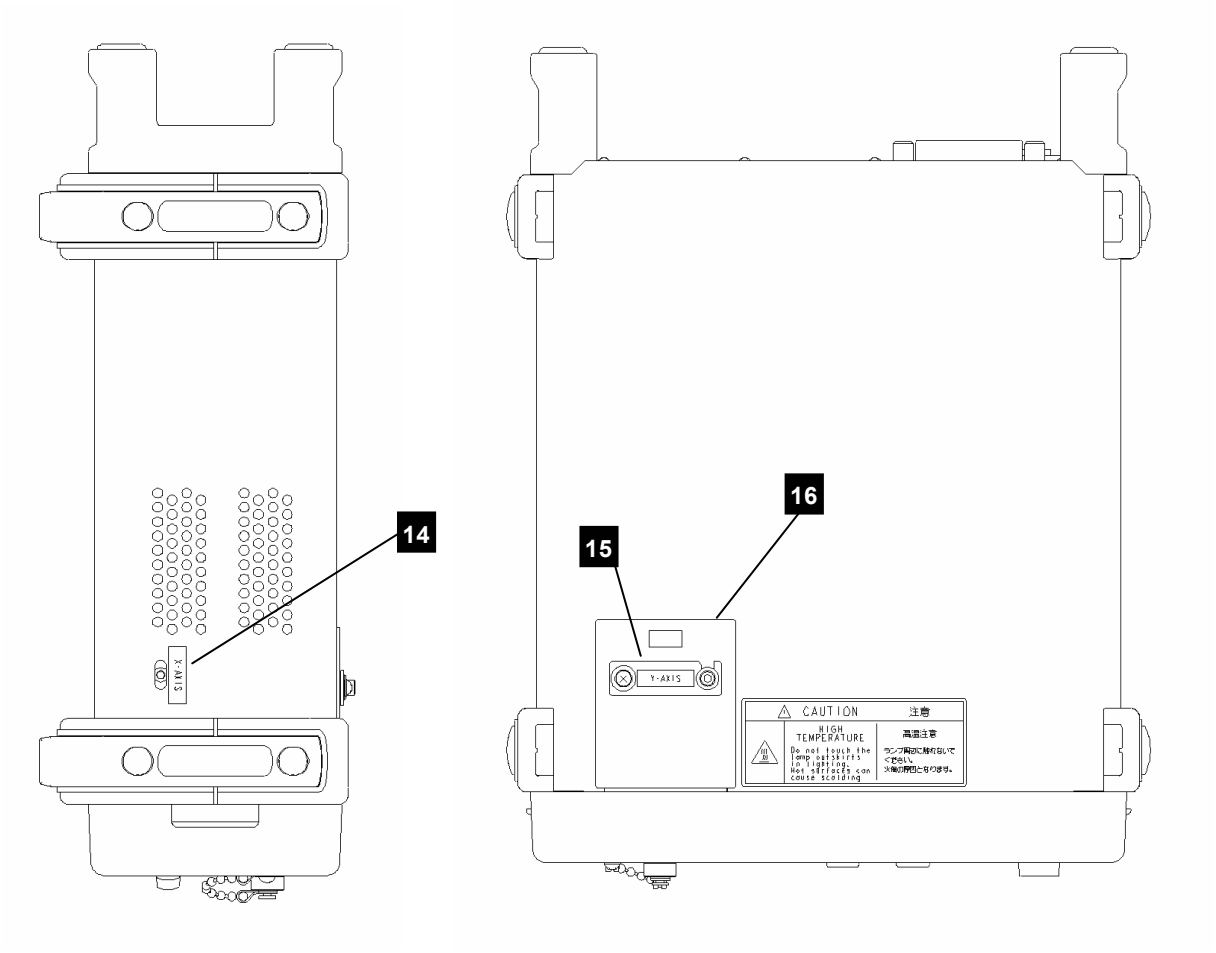


Fig. 2-3 Left side plate and top plate

No.	Name	Function
14	[X-AXIS]	Used to adjust x-axis of the lamp position
15	[Y-AXIS] plate	Slide to adjust y-axis of the lamp position Then, do not look the lamp in lighting.
16	Lamp cover	take off only when replacing a lamp then, let it cool down after setting the [POWER] switch to [OFF]. Hot surfaces can cause scalding.

⚠ Caution

- Avoid directly looking at the lighted lamp. The light is extremely dazzling and is harmful to the eyes.
- Do not take off the lamp cover and do not touch the lamp outskirts in lighting. Hot surfaces can cause scalding. When replacing a lamp, let it cool down after setting the [POWER] switch to [OFF].

2.4 Halogen Lamp

This unit contains a halogen lamp. The lamp is articles of consumption.

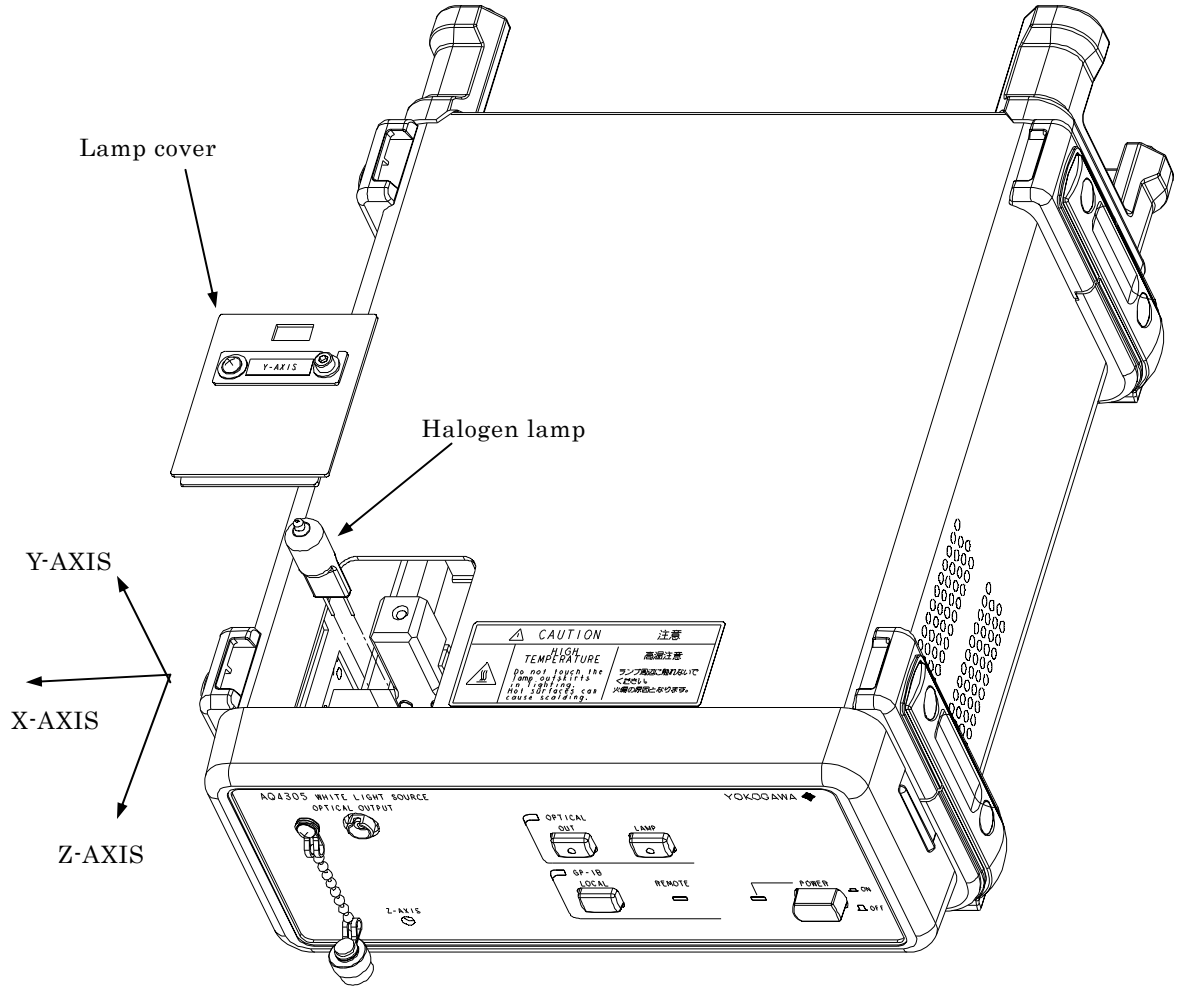


Fig. 2-4 Replace halogen lamp

2.4.1 Replace

When replacing a lamp, let it cool down after setting the [POWER] switch to [OFF]. Hot surfaces can cause scalding.

① Take off the lamp cover and pull the used lamp up.

② Insert a new lamp in the lamp socket surely. Do not touch the lamp by bare hand. Doing so may result in lamp damage when using the dirty lamp.

③ Set the lamp cover.

⚠ Caution

- Do not take off the lamp cover and do not touch the lamp outskirts in lighting. Hot surfaces can cause scalding. When replacing a lamp, let it cool down after setting the [POWER] switch to [OFF].
- Insert a new lamp in the lamp socket surely.
- Do not touch the lamp by bare hand. Doing so may result in lamp damage when using the dirty lamp.
- Smoke may occur due to a dust adhesion of the lamp,but this is not a malfunction.Smoke will stop within 30 seconds.

2.4.2 Specifications

The lamp is articles of consumption. When purchasing it, select type JC12V50W and cap-base type GY6.35 (made by Philips). We guarantee the specifications only using the designated type of lamp.



NOTE

- Only use the designated type of lamp.(☛ See section 6.5 Spare Parts List)
- Do not break the bulb, when you dispose of the used lamp. Doing so may result in injury.

- Be sure to turn off the power before replacing the lamp. The unit is designed so that electricity will not flow to the lamp socket when turn off [LAMP] LED, but if the lamp socket becomes electrified during replacing it could heat and light, which would be very dangerous.

Chapter 3 Before You Start

3

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3.1.1 Preparations for Power-On 3-2
3.1.2 Power-On 3-2
3.1.3 Shutdown procedure 3-2
3.2 Interface Connection Procedures 3-3
Connecting with Other Devices 3-3

3.1 Turning the Power ON/OFF

The AQ4305 has a [POWER] switch for turning the power ON/OFF. Follow the procedures shown below to use ensure proper use.

3.1.1 Preparations for Power-On

Check the following before plugging the power cord into a power cord connector of this unit.

- Make sure the [POWER] switch on the front side of this unit is set to the [OFF] position.
- Make sure the voltage of the power outlet matches this unit's supply voltage.
- Before replacing a fuse, always move the [POWER] switch to the [OFF] position and remove the power cord from the power outlet.

  (☛ See section Safety precaution; "5.1 Replacing Fuses")
- Make sure the location is not subject to heavy vibrations, high humidity or dust levels, or direct sunlight. Also make sure there is no risk of exposure to activated gas, and that this unit will not tilt or tip over.
- Make sure the lamp cover is setting.

3.1.2 Power-On

After performing the power supply and connection checks as described in subsection 3.2.1, follow the procedure shown below to turn on the power.

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

② Move the [POWER] switch on the front side of this unit to the [ON] position. The LED next to the [POWER] switch on the front side turns on.

③ Please perform xyz-axis adjustment if needed.
For details of xyz-axis adjustment, see Chapter 4 Usage Preparations.
(☛ 4.3 Xyz-axes Adjustment)

When the power is turned on, [OUT] LED turns on (shutter open) and [LAMP] LED turns on (lighting).

3.1.3 Shutdown procedure

① Move the [POWER] switch on the front side of the unit to the [OFF] position.

② Remove the optical fiber cord from the [OPTICAL OUTPUT] connector, then screw the connector cap to the connector.

③ Remove the power cord from the power outlet.

⚠ Caution

- If this is the first time you are using the AQ4305, or if this unit has been moved and was shaken considerably during the moving process, or after replacing a lamp, execute the xyz-axis adjustment after the warmup period before proceeding. See Chapter 4 for information on the adjustment. (☛ See Chapter 4, Usage Preparations)

3.2 Interface Connection Procedures

Connecting with Other Devices

An external device can be connected to this unit through the GP-IB port or another port to remotely control this unit. This function requires a special connector cable for connecting with the external device.
For details, please refer to subsections 5.2 "GP-IB Interface" .

⚠ Caution

- Before connecting a GP-IB device (e.g., external computer) to the unit, check the wiring and always move the [POWER] switches on the AQ4305 and the other device to their [OFF] positions. Connecting them while the power is on may damage the equipment.

Chapter 4 Usage Preparations

4.1 Overview 4-2
4.2 Handling the Optical Connectors 4-2
4.2.1 Usage the Protective Connector Caps 4-2
4.2.2 Connecting Optical Fibers 4-2
4.3 Xyz-axes Adjustment 4-3

4.1 Overview

To ensure proper use of this unit, preparations such as xyz-axes adjustment are required.
Be sure to perform xyz-axes adjustment in the following cases:

- The first time you use this unit
- After replacing a lamp
- If it seems likely that this unit has been shaken (e.g., during shipping)
- If this unit has not been used for an extended period of time
- If output level errors depend on difference of operating temperature are at problematic levels.

4.2 Handling the Optical Connectors

4.2.1 Usage the Protective Connector Caps

Connections are always made through optical connectors when using this unit, and they must be handled very carefully. Put the screw cap on the optical output connector and cover optical fiber connectors with caps usually.
Be sure to clean the connector contacts with alcohol before using them so that dust or the like does not adhere to them. (☛ See subsection 6.2.4 Daily maintenance and 4.2.2 Connecting Optical Fibers)
Fig. 4-1 shows the shape of typical FC-type optical fiber connector.

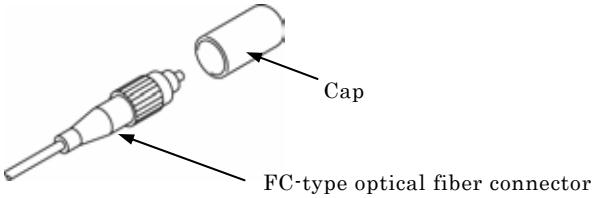


Fig. 4-1 Shape of FC-type fiber connector

4.2.2 Connecting Optical Fibers

This section describes how to connect an optical fiber to the optical output connector on the unit.

① Clean the end of the optical plug with a fiber cleaner.
①-1 Push the tip of the optical plug against the cleaning surface of the fiber cleaner so that it is perpendicular to the cleaning surface.
①-2 With the tip of the optical plug pressing against the cleaning surface, turn it one full rotation, then slide it horizontally.
①-3 Now perform this process again.
② Clean the optical output connector.
③ Connect the optical plug to the unit.
③-1 Insert the optical plug so that its key engages with the guide on the optical output connector.
③-2. Turn the plug housing clockwise to fasten the optical plug.

⚠ Caution

- Be sure to clean the end of the optical fiber being used before connecting it.
- Do not try to forcefully attach the optical fiber plug with the plug inserted at a slanted angle.
  Doing so may damage the optical fiber plug or the optical output connector.
- Press the optical plug hard against the cleaning surface of the special cleaner to clean it.
  If it is not pressed hard against the cleaning surface, it may not be possible to properly clean the optical plug.

4.3 Xyz-axes Adjustment

If you are using this unit for the first time or using it after it has been severely shaken while being moved or after replacing a lamp, perform the xyz-axes adjustment procedure after warmup ends. The xyz-axes adjustment procedure is performed as follows.

① Turn this unit's power on.
Press the power switch on the front side to enter the POWER-ON state.

② Use a 50/125 μm MM optical fiber to connect the unit's optical output connector with the optical input connector of optical spectrum analyzer (for example type AQ-6315A/B). (☛ See subsection 4.2.2 Connecting Optical Fibers and Fig. 4-2 Measurement System During xyz-axes Adjustment) See the instruction manual about Usage of optical spectrum analyzer.

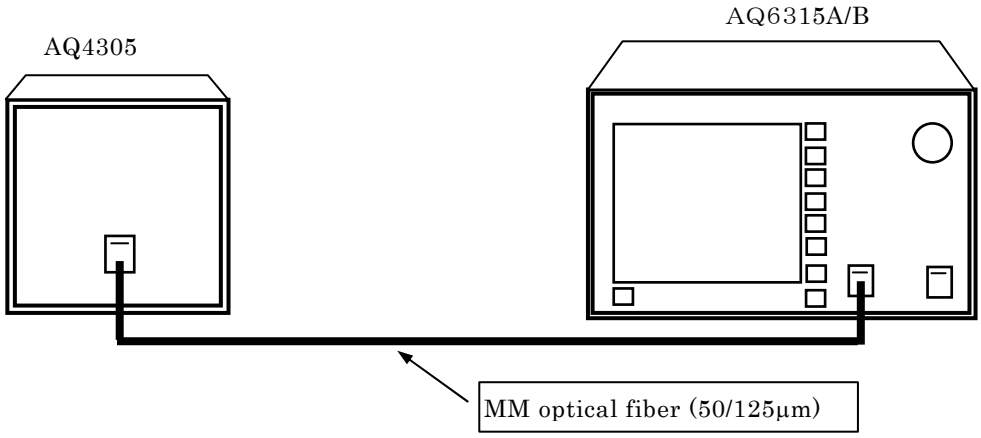


Fig. 4-2 Measurement system during xyz-axes adjustment

⚠ Caution

Halogen lamp xyz-axes adjustments

- Since 3-linear guide stages are incorporated in this unit, the halogen lamp xyz-axes adjustment may have shifted due to vibrations while being moved, or to temperature variations in the operating environment, or replacing a lamp.
  If you are using the unit for the first time, or using it after it has been subjected to extreme vibrations while being moved, or after replacing a lamp, be sure to perform the xyz-axes adjustment procedure following warmup.
  Unless xyz-axes adjustments are carried out, the optical performance of this unit cannot be guaranteed.
- Be very careful in handling the optical connectors during the connection process.
  (☛ For details, see section 4.2 Handling the Optical Connectors)

③ Set optical spectrum analyzer, center wavelength 1300 nm, wavelength span 0 nm, wavelength resolution 10 nm, reference level -40 dBm, and start repeat measurements.

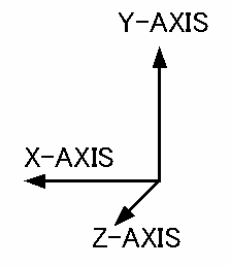
④ Adjust [X-AXIS] and [Y-AXIS] alternately with a 2.5 mm hexagon driver to raise the optical output level of the unit. As [X-AXIS] is most sensitive for output level. Adjust [X-AXIS] more fine than [Y-AXIS]. (☛ See Fig. 4-3 and Fig. 4-4)

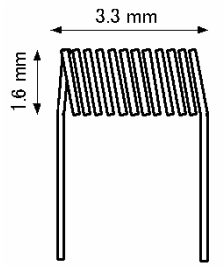
⑤ Adjust [Z-AXIS]. [Z-AXIS] is most insensitive for output level. (☛ See Fig. 4-5)

⑥ Repeat ④ and ⑤, until the deviation of maximum values of output level this time and last time under 0.1 dBm.

NOTE
● Each linear guide stage is ±3 mm strokes and 0.4 mm pitch hexagon screw. So that stage move 0.4 mm /driver rotation.

Annex (informative)

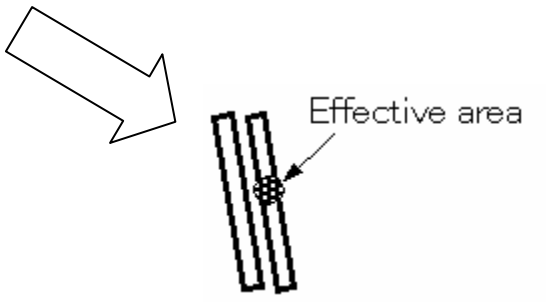




Filament size



Halogen lamp



Main output source of filament

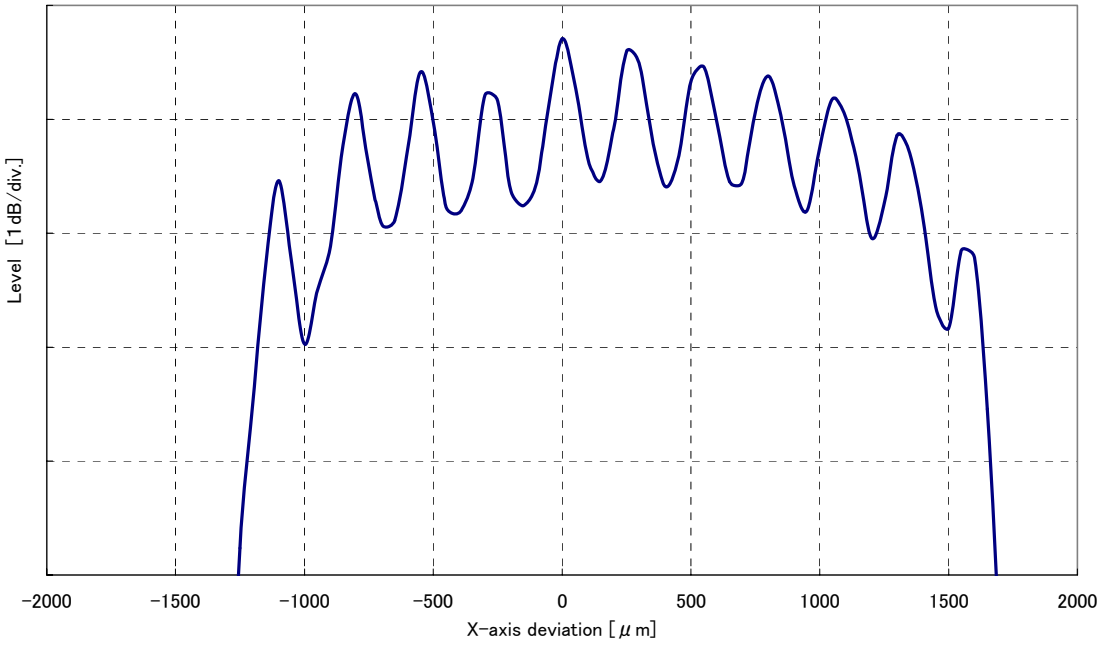


Fig 4-3 The optical output level vs. X-axis deviation

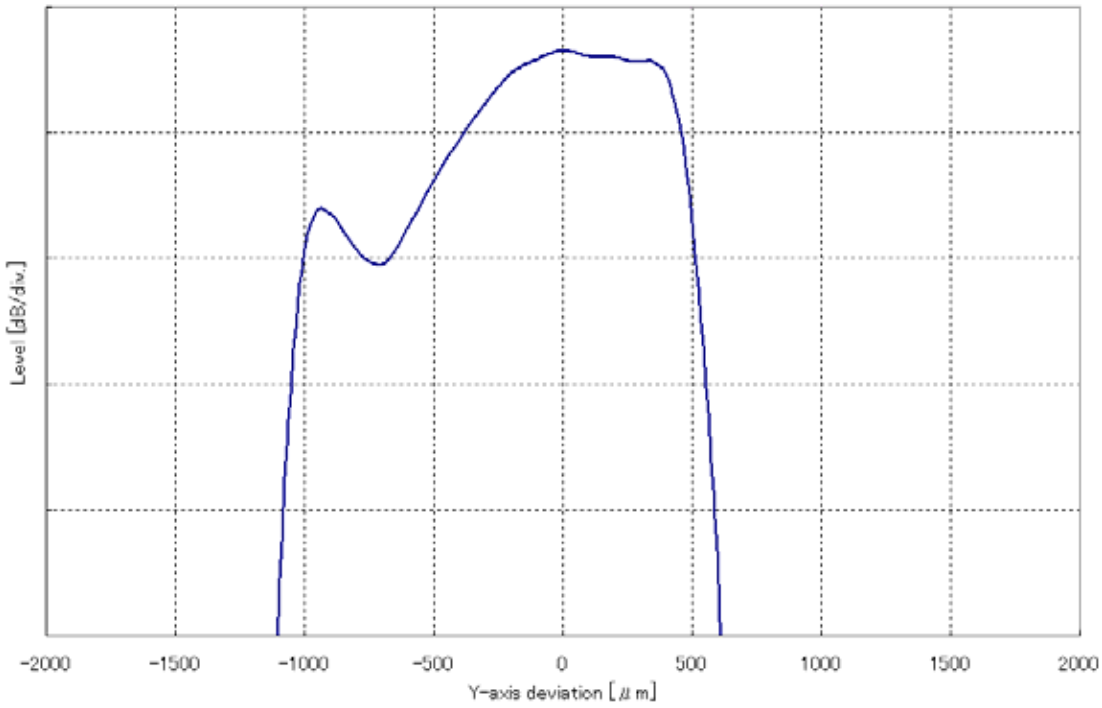


Fig 4-4 The optical output level vs. Y-axis deviation

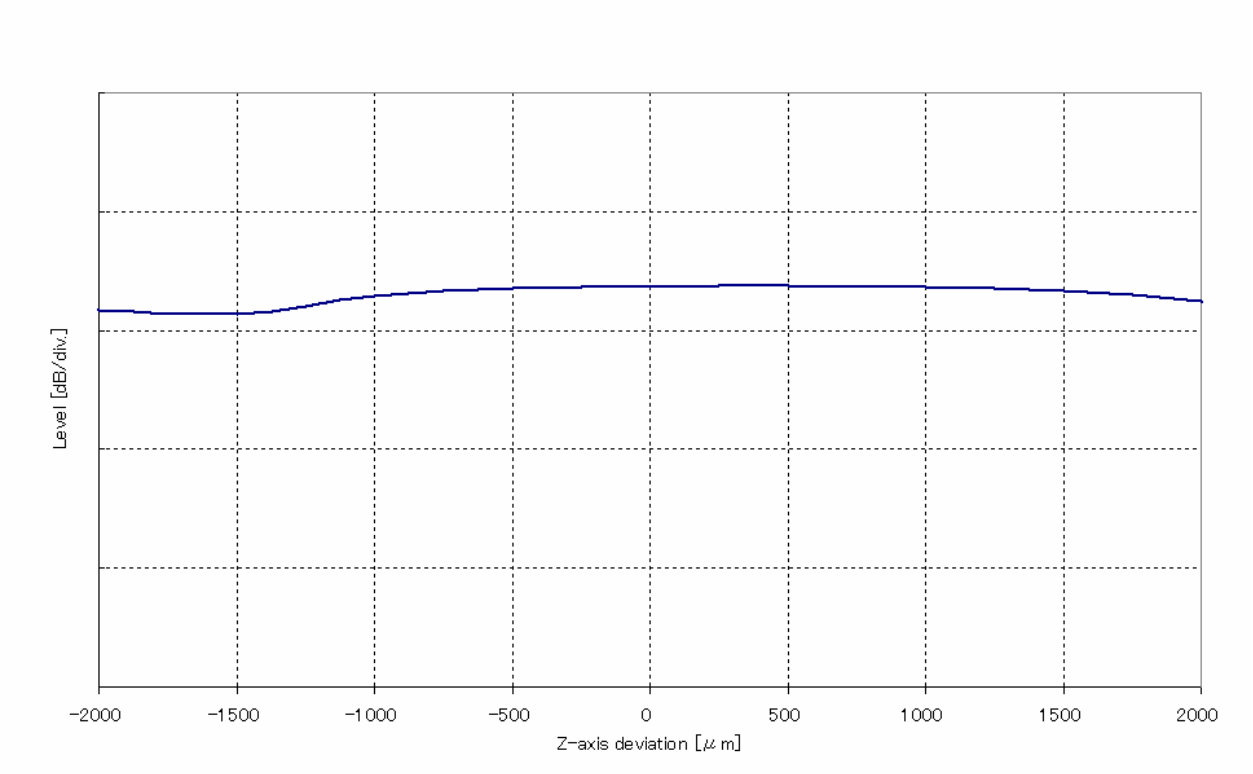


Fig 4-5 The optical output level vs. Z-axis deviation

Chapter 5 Operating Procedures

5.1 operating procedures 5-2
5.2 GP-IB interface 5-3

5.1 operating procedures

Turning [POWER] on, then [POWER] LED puts on, [OUT], [LAMP] switches LED put on, and FAN operating.

> **⚠Caution**
>
> If any abnormal situation occurs in the hardware during initialization processing, LED in switches are not lighting.
> If the fan does not work, lamp continue on and off. In this case, turn [POWER] off.
> If these situations occur, the unit must be repaired. Contact our Service Dept., Sales Dept., or nearest office immediately.
> (☛ Contact information is described at the end of the document.)

Optical output control

[OUT] switch control on/off the shutter. The shutter open and [OUT] LED put on ,turning [POWER] on. Then push [OUT] switch, the shutter close and [OUT] LED put out.

[LAMP] switch control on/off the lamp currents. The lamp lighting and [LAMP] LED put on ,turning [POWER] on. Then push [LAMP] switch, the light out and [LAMP] LED put out.

5.2 GP-IB interface

The AQ4305 has GP-IB ports , allowing remote control using an external PC.
Table 5-1 shows the interface functions of the GP-IB port.

Table 5-1 GP-IB Port's Interface Functions

Code	Interface Function
Code	Interface Function
SH0	Send function not provided
AH1	All capabilities of receive function
T0	Talker function not provided
L2	Basic listener listen function
SR0	Service request function not provided
RL1	Full local lockout functions
PP0	Parallel polling function not provided
DC0	Device clear function not provided
DT0	Device trigger function not provided
C0	Controller function not provided

Turn OFF all the power switches of this unit and devices (such as the controller).
Using the GP-IB cable, connect the GP-IB connector on the rear of this unit to another device. Make sure to tighten the connector-fixing screws firmly.

⚠Caution

Connecting/disconnecting the GP-IB cable with the power switch turned ON may cause the AQ4305 to malfuction or fail.

Set the GP-IB port address of the AQ4305, by the [ADDRESS] switch on the rear panel. The default of port address is 6.

Local → Remote

When a listen address is sent from the controller with REN, ATN set to"True," this unit enters remote status.
In remote status, all panel switches other than the [LOCAL] switch are overridden. Also, the [REMOTE] LED put on, indicating that this unit is in remote status.
When an LLO (Local Lock Out) message is sent from the controller, this unit enters local lockout status. In this status, the [LOCAL] switch is disabled and does not return this unit to the local status even when pressed.
To cancel the local lockout status, set REN to "False" from the controller.

Remote → Local

When the [LOCAL] switch is pressed, this unit returns to the local status, allowing input of the switches on the panel. Also, the [REMOTE] lamp put out. To return this unit to local status, send a GTL (Go To Local) message or set REN to "False" from the controller.

Table 5-2 shows the GP-IB remote commands corresponding to the switches used in the unit.

Table 5-2 Correspondence between the switches and the remote commands.

Switch	Remote Command	Function	State of switch's LED
[OUT]	F	The shutter open	Lighting
	G	The shutter close	turn off
[LAMP]	H	The lamp lighting	Lighting
	J	The light out	turn off

This unit is case-sensitive. Control commands must be upper-case letters.

Chapter 6
Maintenance, Inspection and Storage

6.1 Mechanical Inspection 6-2
6.2 Operational Inspection..... 6-3
6.2.1 Inspection when the unit is turned on 6-3
6.2.2 Operational inspection of each switch..... 6-3
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6.6.1 Repackaging..... 6-6
6.6.2 Transportation 6-6

6.1 Mechanical Inspection

For external views, visually check that there are no deformities or damage. Also check that switches, connectors, and other assembled parts are firmly in place and that switches can be operated smoothly.

⚠Caution

- Before conducting the mechanical inspection, be sure to turn off the power supply on the front panel and remove the power supply cables.
- Do not disassemble the unit or remove case covers or other portions.

● Check external views:

- ✓ Visually check that there are no deformities or damage.
- ✓ In particular, check the internal terminals of the connectors on the rear panel.
- ✓ In particular, take off the lamp cover and check the lamp socket.

⚠Caution

- Any foreign debris inside the connectors may cause abnormal operations or failures.
- It is necessary to exchange the distorted or oxidized lamp socket. If any abnormal situation of the lamp socket is discovered, contact our office immediately.

● Check mechanical operations:

- ✓ Check that switches can be operated smoothly.
- ✓ Check that connectors are correctly connected.
- ✓ Check that there is no looseness in other assembled parts.

⚠Caution

- Looseness in connectors may cause improper operations of the unit.
- If any abnormal situation is discovered, contact our office immediately.

6.2 Operational Inspection

6.2.1 Inspection when the unit is turned on

The unit performs the initialization processing from the time when it is turned on until the time when it becomes operable. It takes about a few seconds for the process to be completed.
For starting up the unit, refer to Chapter 3.
(☛ Section 3.1 Turning the Power ON/OFF)

After a few second when the unit is turned on, check that LED in switches are lighting.

⚠Caution

- If any abnormal situation occurs in the hardware during initialization processing, LED in switches are not lighting.
- If the fan does not work, lamp continue on and off. In this case, turn [POWER] off.
  If these situations occur, the unit must be repaired. Contact our Service Dept., Sales Dept., or nearest office immediately.
  (☛ Contact information is described at the end of the document.)

6.2.2 Operational inspection of each switch

- Check the operations of each switch.

  Operate each switch once briefly to check that the unit functions properly.

6.2.3 Inspection of output level

- Measurement procedures
  Check the output level following xyz-axes adjustment procedures.

⚠Caution

- If abnormal situation occurs, the unit must be repaired. Contact our Service Dept., Sales Dept., or nearest office immediately.
  (☛ Contact information is described at the end of the document.)

6.2.4 Daily maintenance

● Clean the exterior of the unit.

Use a cloth dampened with cold or lukewarm water to clean the exterior of the unit, followed by wiping with a dry cloth.

⚠Caution

- For daily maintenance, be sure to turn the [POWER] switch off and also remove the power supply cables.
- Do not use chemicals such as thinner, benzine, or alcohol, which may cause deterioration or discoloration of the exterior of the unit.

● Clean the optical output

(1) How to clean the optical connector

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

Recommended cleaner: "CLETOP" stick type cleaner (made by NTT-ME)

<Procedure>

① Take off the optical cap from optical output connector at the front of the unit.

② Use the cleaner to clean the optical connector.

Grasp it as close to the cleaner support (base) as possible. Insert the cleaner straight into the optical connector and rotate it.

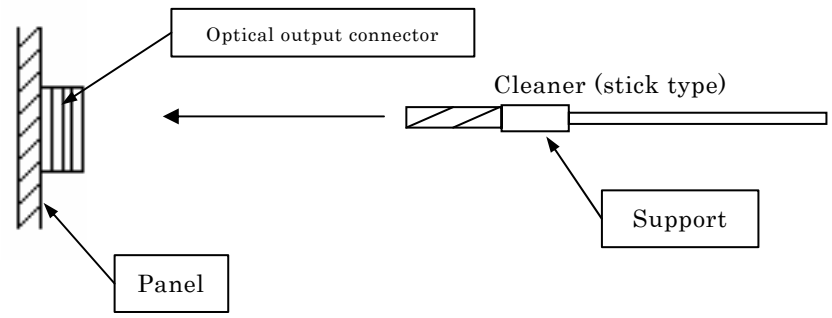


Figure 6-1 How to clean the optical connector

⚠Caution

- If a dirty cleaner is used for cleaning, the optical output section may be damaged.

6.3 Troubleshooting

Problem	Probable Cause	Corrective Action	Reference Page
The power does not turn ON.	Using power supply outside the ratings.	Use a proper supply.	3-2 7-2
	Connector wiring is not correct.	Check that the wiring is correct.	viii
	Fuses are not set.	Set fuses.	x
The output level is not correct.	Shutter is closed.	Push [OUT] switch.	2-2
	Fiber is disconnected.	Exchange the fiber.	4-2
	Lamp is damaged.	Replace the lamp.	2-5
The output level is instability.	Dust adhere to the fiber.	Clean the fiber.	4-2 6-4
	Lamp is damaged.	Replace the lamp.	2-5
	Environmental conditions are no good.	Check the environmental conditions.	7-2
Cannot control the instrument via the GP-IB interface.	Parameter settings are not matched.	Match the parameters.	5-3
	Make a mistake in GP-IB address	Check GP-IB address.	2-3 5-3

6.4 Care during Storage

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

① Ensure that the unit has been wiped clean of fingerprints, dust, etc.

② Perform instructions given in Section 6.2 Operational Inspection to check that the unit operates properly.

③ Do not store the unit in the following locations:

- ✓ where it would be exposed to direct sunlight or excessive dust
- ✓ where there is high humidity that could result in the formation of water droplets or exposure to them
- ✓ where it would be exposed to activated gas or the possibility of oxidization
- ✓ where temperature and humidity conditions are as shown below:
  - ・Temperature >50℃, <-10℃
  - ・Humidity >80%

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

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

⚠Caution

- When the unit is used again after storage, perform instructions given in Section 6.2 "Operational Inspection" to check that it operates properly. (☛ Section 6.2 Operational Inspection)
- To resume usage, xyz-axes adjustment procedures must be performed. (☛ Sections 4.3 Xyz-axes Adjustment)

6.5 Spare Parts List

Table 6-2 Spare Parts List

Type	Product name	Specifications	Manufacturers	Notes
JC 12V 50 W	Halogen lamp	12 V 50 W Life 50 hours Color temperature 3300 K Cap-base G6.35	Philips	
218 3.15	Cartridge Fuse	3.15A 250VAC Time lag fuse 5×20 mm	Littelfuse	Two use

6.6 Repackaging and Transportation

6.6.1 Repackaging

To repack the unit for transportation, re-use the original packing materials. If these have been discarded or destroyed, pack it in the following manner:

① For protection, apply cushioning to projecting portions of the front and rear panels of the unit.

② Wrap the unit with, for example, vinyl.

③ Prepare a corrugated cardboard, wooden, or aluminum box larger than the unit by about 10 - 15 cm in each direction.

④ Place the unit in the center of the box. Then, pack sufficient shock absorbing material into the 10 - 15 cm space surrounding the unit.

⑤ Fasten the outside of the box firmly with packing string, adhesive tape, bands or other materials.

NOTE

- It is recommended that you retain the unit's original packing materials to use for repackaging.

6.6.2 Transportation

When the unit is transported, avoid shocks as much as possible. At the same time, the requirements described in Chapter 3 Usage Environment in "Safety Precautions" must be satisfied.

⚠Caution

- If during transportation the unit is exposed to temperatures, impacts, or shocks exceeding specified environmental conditions, its performance may be irreparably damaged.

Chapter 7 Specifications

7.1 Summary of Specifications 7-2
7.2 External Dimensions 7-3

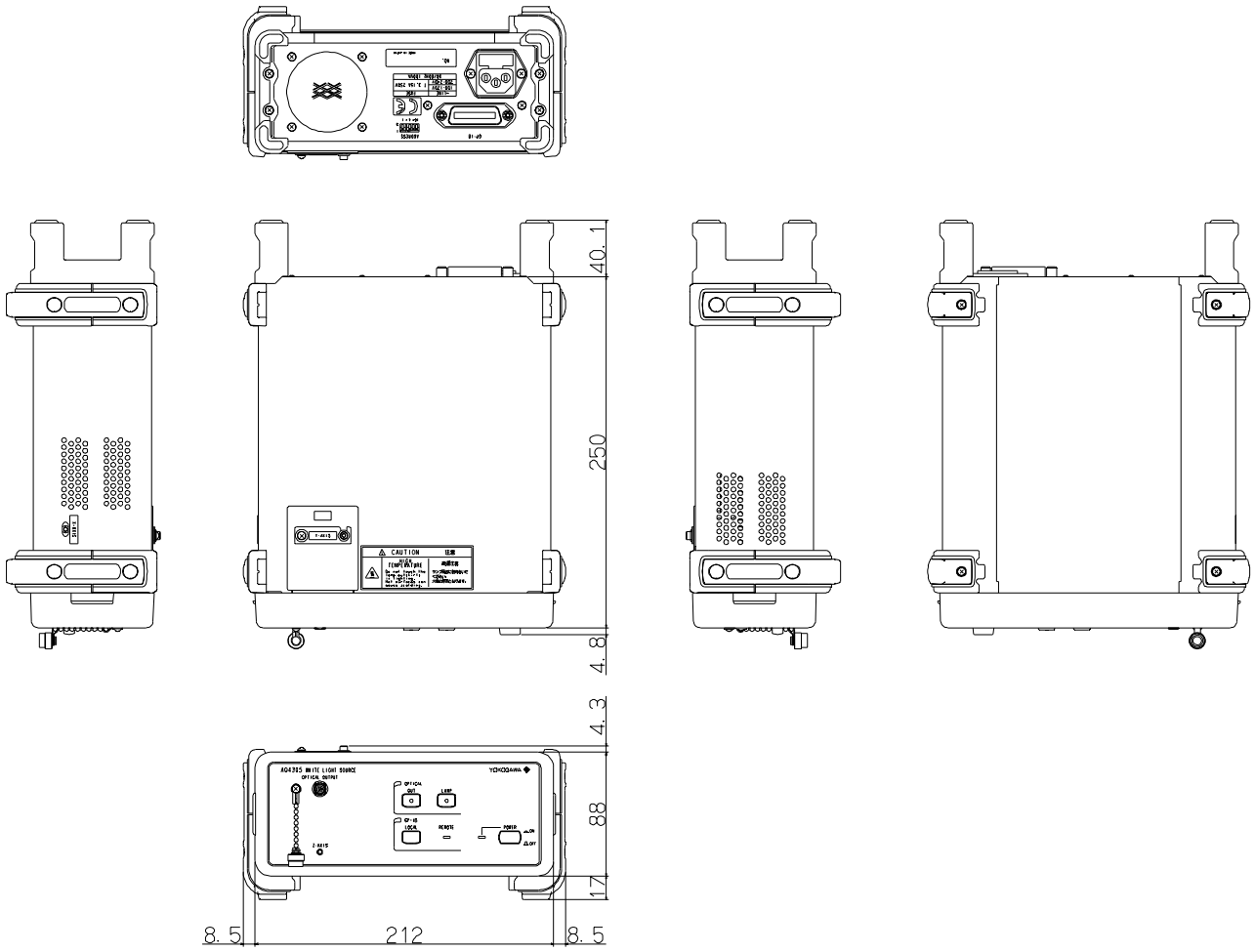
7.1 Summary of Specifications

Table 7-1: Specifications

Item	Specifications
Wavelength range	400 to 1800 nm
Optical output 1)	-40 dBm or more (50/125 µm MMF 2 m, wavelength 850 nm and 1300 nm, spectrum bandwidth 10 nm) -55 dBm or more (10/125 µm SMF 2 m, wavelength 1550 nm, spectrum bandwidth 10 nm)
Level stability 1)	±0.05 dB (at 1hour, 23 ℃±2 ℃)
Function	Optical output ON/OFF Lamp ON/OFF
Interface	GP-IB
Optical connector	FC connector
Power requirement	AC100 to 120 V (±10%), 200 to 240 V (±10%), 50/60 Hz, approx. 100 VA
Environmental conditions	Operating temperature : +5 to +40 ℃ Storage temperature : -10 to +50 ℃ Humidity : 80 %RH or less (no condensation)
EMC,EMI	Conforms to EN61326:A2:2001, EN61010-1:2001
Dimensions and mass	Approx. 212 (W)×88 (H)×250 (D) mm, approx. 3 kg
Accessories	Instruction manual: 1, Halogen lamps:5 spares 1 use, Hexagon driver:1, Power cord: 1, Fuses: 2 use

1) After 1 hour warm-up, after optical-axes adjustment

7.2 External Dimensions



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

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