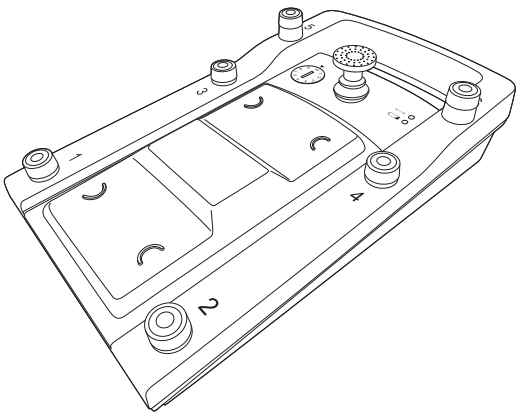
OLYMPUS®

INSTRUCTIONS

FOOT SWITCH

MAJ-2301



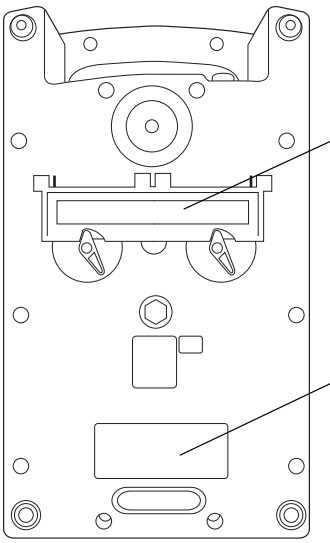
CE

Contents

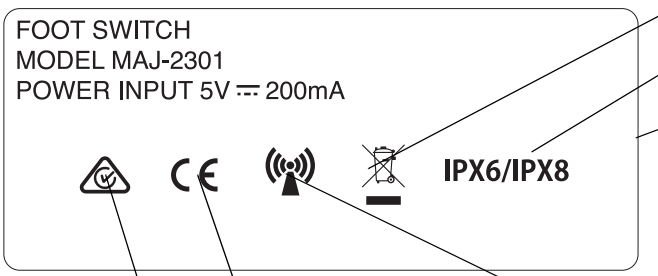
Labels and Symbols

Safety-related labels and symbols are attached on the locations shown below. If labels or symbols are missing or illegible, contact Olympus.

❍ Foot switch



Product plate details



Crossed-out wheeled bin' symbol

Ingress protection rating IPX6/IPX8

Product plate

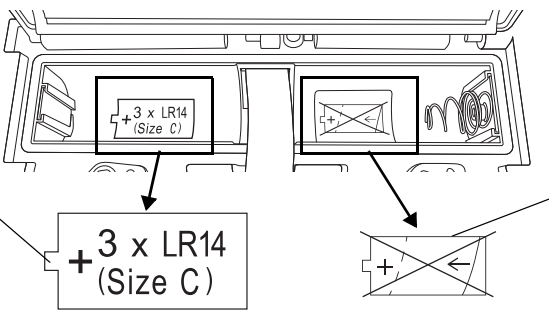
The product name, power rating, non-ionizing radiation marking, and Ingress protection rating are indicated.

RCM marking

CE marking CE

Non-ionizing radiation marking

Inside of battery compartment



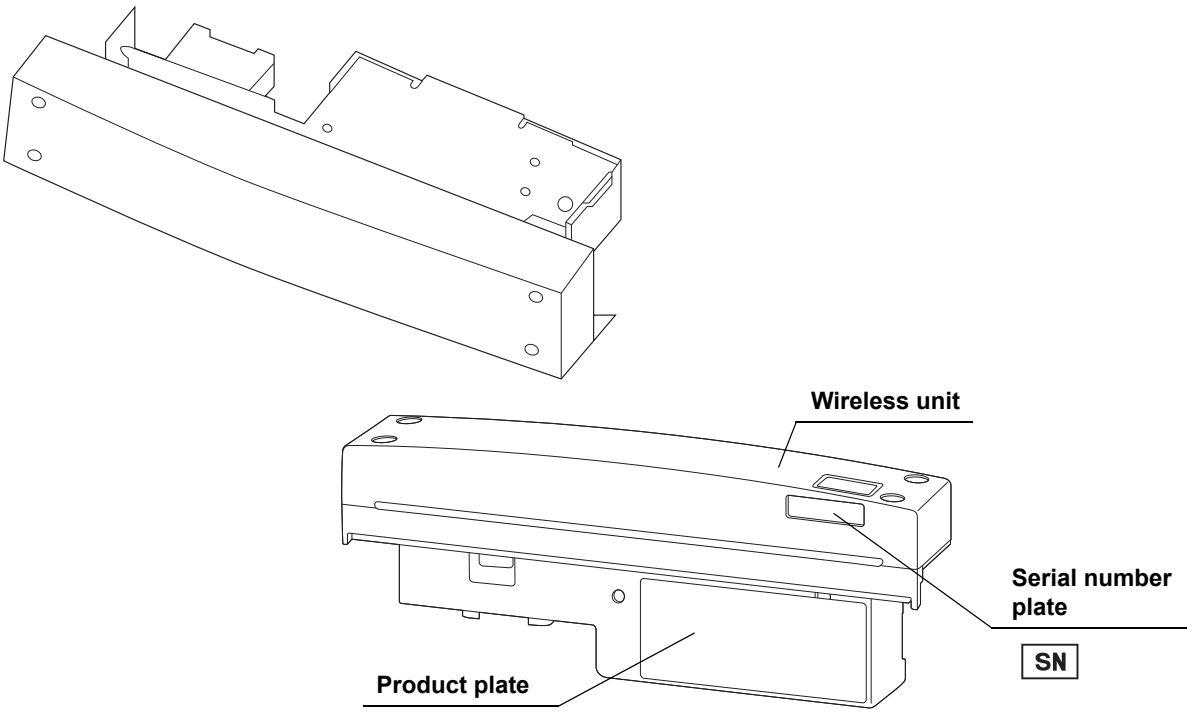
Battery insertion orientation indication

The applicable battery type and the orientation for inserting the batteries are indicated.

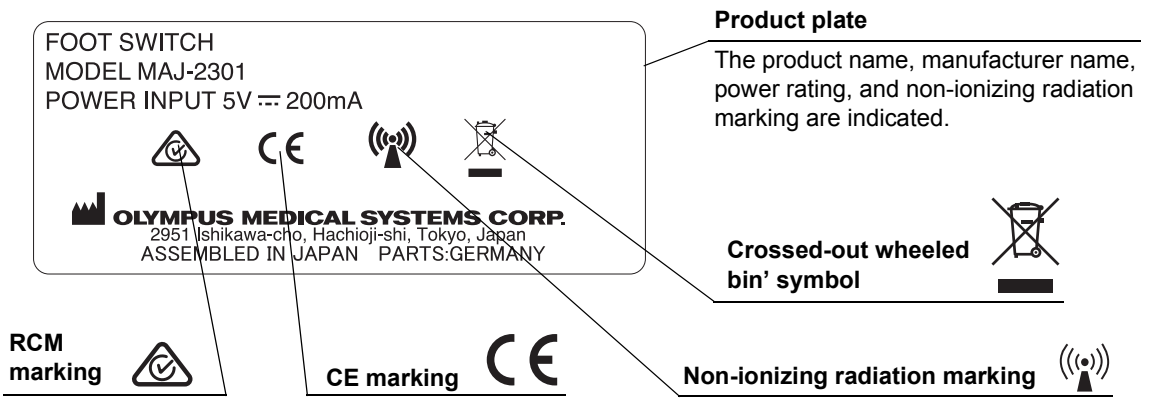
Rechargeable battery inhibition indication

This marking inhibits the use of rechargeable batteries.

Wireless unit



Product plate details



Back cover of this instruction manual

Symbol	Description	Symbol	Description
	Manufacturer	EC REP	Authorized representative in the European Community

Important Information — Please Read Before Use

■ Intended use

This instrument has been designed to be used with Olympus Surgical Microscope for use in controlling it.

■ Instruction manual

This instruction manual contains essential information on using this instrument safely and effectively. Before use, thoroughly review this manual and the manuals for ancillary equipment and use the equipment as instructed.
Keep this and all related instruction manuals in a safe, accessible location. If you have any questions about any information in this manual, contact Olympus.

❍ Terms used in this manual

Surgical microscope (OME-V200)

The surgical microscope designated by Olympus to be used in combination with this instrument.

Pairing

Action of giving one-to-one correspondence between the wireless unit connected to the surgical microscope and the foot switch for holding wireless communication between them.

View field movement

Function that moves the positioning of observation using the foot switch.

■ User qualifications

The operator of this instrument must be a physician or medical personnel under the supervision of a physician and must have received sufficient training in clinical procedures of microsurgery using surgical microscope. This manual, therefore, does not explain or discuss the details of microsurgery using surgical microscope.
For details of microsurgery using a surgical microscope, the physician and operator are requested to judge from their viewpoints as specialists.

■ *Instrument compatibility*

This instrument should be used in combination with the ancillary equipment shown in "■ System chart" on page 57. Using incompatible equipment can result in patient or operator injury and/or equipment damage as well as malfunction.
This instrument complies with EMC standard for medical electrical equipment edition 4 (IEC 60601-1-2: 2014).

■ *Prohibition of improper repair and modification*

Never allow a person other than Olympus-qualified personnel to disassemble or modify the instrument, as this may result in injury of the patient or operator as well as damage to the equipment. Olympus will not assume any liability for human accident or equipment damage occurred due to repair by a person other than Olympus-qualified personnel.

■ *Signal words*

The following signal words are used throughout this manual:

WARNING	Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.
CAUTION	Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury. It may also be used to alert against unsafe practices or potential equipment damage.
NOTE	Indicates additional helpful information.

■ *Precautions*

Follow the warnings and cautions given below when handling this instrument. This information is to be supplemented by the warnings and cautions given in each chapter.

WARNING

- Strictly observe the following precautions. Failure to do so may place the patient and medical personnel in danger of an electric shock.
  - Do not souse or spill a liquid such as water over the wireless unit. If a liquid is spilt on it, immediately wipe it. Should a liquid penetrate the wireless unit, immediately stop using it and contact Olympus.
  - Do not prepare, inspect, or use the foot switch with wet hands.
  - Should a liquid enter the foot switch during the battery replacement, for example, immediately remove the batteries to prevent a fire or electric shock hazard. Once a liquid has entered the foot switch, do not use it because the equipment may have been damaged.
- Never install and operate the foot switch in locations where:
  - The concentration of oxygen is high;
  - Oxidizing agents (such as nitrous oxide (N_2O)) are present in the atmosphere;
  - Flammable gases are present in the atmosphere;
  - Flammable liquids are near.

  Otherwise, explosion or a fire may result because the foot switch is not explosion-proof.
- Do not use for purposes other than those described in "■ Intended use" on page 3, as this may result in injury of the patient or operator as well as damage to the equipment.
- This instrument should be used under the conditions specified in "■ Environments" on page 59. Otherwise, imperilment of safety or failure of equipment may result as well as malfunction.

CAUTION

- Since this instrument has a wireless function, it may affect peripherals to be used at the same time.
- Handle batteries by strictly observing the following. Incorrect use of batteries may cause fluid leak, heat generation, which would lead to equipment damage.
  - Use batteries specified for this instrument.
  - Do not use charged or rechargeable batteries.
  - Insert batteries by observing the (+) and (–) polarity.
  - All batteries of the same brand name have to be used.
  - Do not use a battery with a broken coating.
  - Do not use a battery deformed by dropping or other impact.
  - Do not use a battery if any irregularity, including fluid leak, discoloration, and deformation, is observed.
- Do not use this instrument in any place where it may be subject to strong electromagnetic radiation (for example, in the vicinity of a microwave therapeutic equipment, MRI, wireless set, short-wave therapeutic equipment, cellular/portable phone, etc.). This may impair the performance of this instrument.
- Do not use this instrument in any place with strong magnetic force, or bring magnetized equipment or magnets closer. This may impair the performance of this instrument.
- Do not apply excessive force to a switch of this instrument or press it with a sharp or hard object. Otherwise, the switch damage may result.
- Connect various connectors in a dry state without contamination of electrical contacts. Also, do not touch the electrical contacts inside the connector directly. If the electrical contacts are dirty or used under wet conditions, the equipment may cause malfunction.
- Do not apply excessive force or strong impact to this instrument, ancillary equipment, and cables. Otherwise, equipment damage or failure may result.
- Remove batteries when they are exhausted or not to be used for a long period. If batteries are left inside the instrument, over-discharge may cause fluid leak, which may eventually lead to a failure of this instrument.
- Remove dust and dirt from batteries before use. If the (+) or (–) pole is dirty or dusty, a contact failure may result.

NOTE

Startup display icons are displayed on four corners of the observation monitor screen for ten to twenty seconds after the power is turned ON on the surgical microscope. Afterwards the icons will disappear. These icons are displayed until the setup of the surgical microscope has completed and does not mean malfunction.

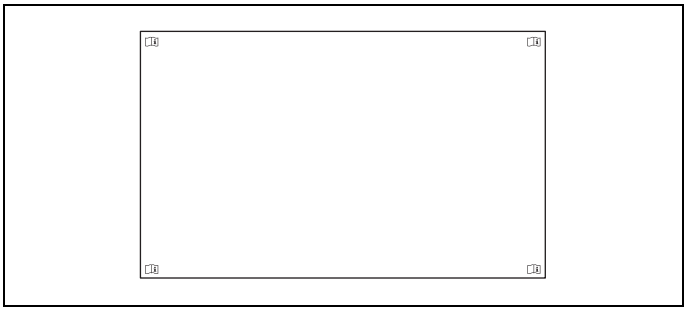


Figure 1

■ *EMC*

- For safety, always use this instrument in combination with equipment compliant to the EMC standard. Otherwise, interference from or to other equipment may result.
- The foot switch and wireless unit radiate RF energy to achieve their intended use (control of the surgical microscope). This means that they could produce electromagnetic interferences when they are placed in the proximity of equipment carrying the symbol marking below or mobile and portable RF communications equipment such as a cellphone. If an electromagnetic interference occurs, a relief measure such as displacement of interfered equipment will be required.

- The foot switch and wireless unit incorporate the radio communication function as shown in the following table. Consequently, they may be affected by electromagnetic interference from nearby equipment that uses the same frequency band as them. Before using them, make sure that there is no risk of electromagnetic interference from nearby equipment.

Frequency band with potential risk of extraneous interference	2400 – 2483.5 MHz
Modulation method	Primary modulation: FSK Secondary modulation: FHSS
Antenna power	≤ 1.0 mW

Table 1

Summary of Equipment Functions

This instrument is designed to be connected to the Olympus-designated surgical microscope. By pairing between the foot switch and wireless unit, the control signals of the surgical microscope can be transmitted with either wireless or wired connection. The function incorporated in this instrument is outlined below.
Note that only one foot switch can be pairing with a wireless unit.

❍ Pairing of foot switch and wireless unit

Pairing of the foot switch and wireless unit enables wireless communication between them. Pairing can be set using the foot switch cable provided with this instrument. Wireless control of the functions of the surgical microscope is possible by controlling the foot switch.
→Refer to Section 3.6, “Pairing”.

❍ Wired connection of foot switch

In case the wireless signal is weak or the batteries are exhausted, the foot switch can be connected directly to the Olympus-designated surgical microscope using the provided foot switch cable. When the foot switch is connected through the foot switch cable, the functions of the surgical microscope can be controlled from the foot switch even when it contains no batteries in it.
→Refer to Section 5.3, “Wired control of foot switch”.

NOTE

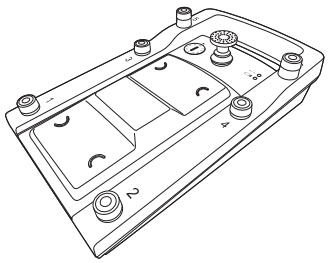
- The foot switch cannot control the microscope functions unless the provided wireless unit is connected to the microscope. Be sure to connect the wireless unit to the surgical microscope even before the wired control operation.
- Wireless communication is not performed when wired connection.

Chapter 1 Checking the Package Contents

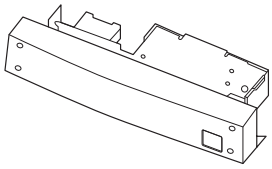
1.1 Checking the package contents

Match all items in the package, such as the foot switch, wireless unit, and accessories, with the components shown below. Inspect each item for damage. If the instrument is damaged, a component is missing, or you have any questions, do not use the instrument; immediately contact Olympus.

❍ Foot switch and Wireless unit

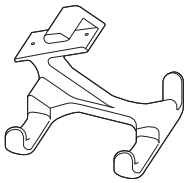


Foot switch (MAJ-2301)

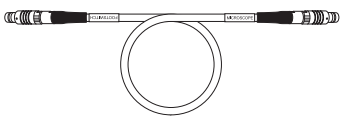


Wireless unit

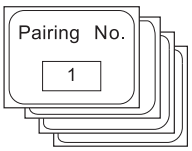
❍ Accessories



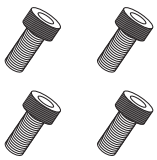
Foot switch hanger



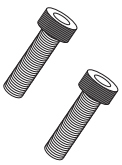
Foot switch cable



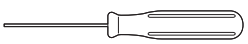
Pairing stickers (No.1 – No.10)



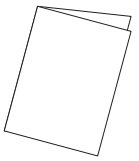
Retaining screws (M4 × 5 mm) (× 4)



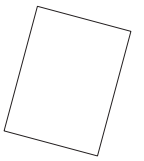
Retaining screws (M4 × 12 mm) (× 2)



Allen screwdriver
(3 mm width across flats)



Instruction manual (This book)



EU DECLARATION OF CONFORMITY

NOTE

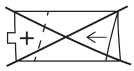
This instrument does not come with batteries. Before use, prepare three “C”-size 1.5 V alkaline batteries separately.

Chapter 2 Nomenclature and Functions

This chapter is intended to explain the names and functions of the parts of the foot switch.

2.1 Symbols and descriptions

Foot switch

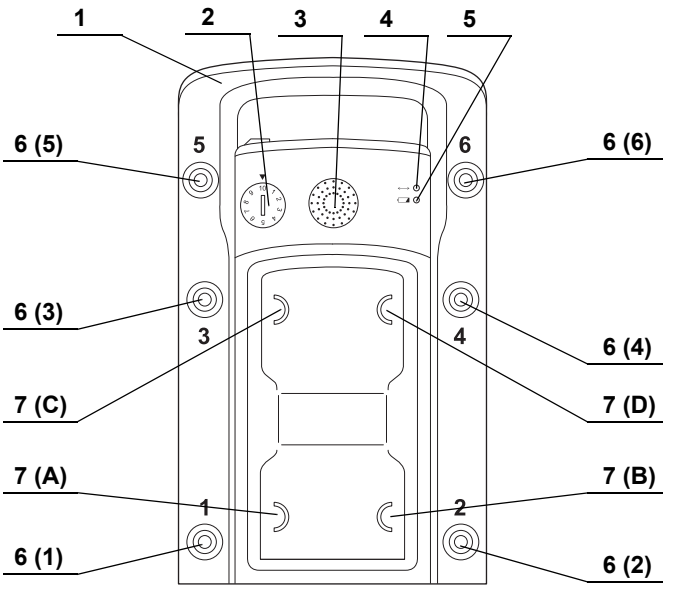
Symbol	Description	Symbol	Description
	Communication status marking		Battery power marking
	Battery insertion orientation indication		Rechargeable battery inhibition indication
1	Foot switch1	2	Foot switch2
3	Foot switch3	4	Foot switch4
5	Foot switch5	6	Foot switch6

Wireless unit

Symbol	Description	Symbol	Description
	Foot switch marking	SN	Serial number

2.2 Foot switch

Upper surface

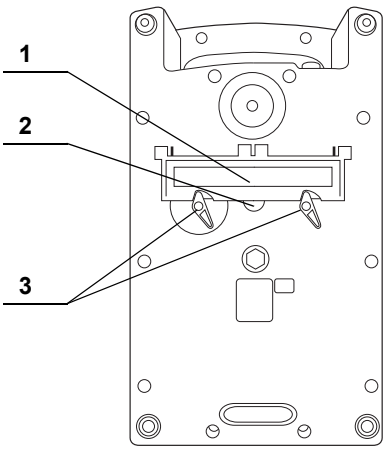


No.	Name	Description
1	Handle	To be held when carrying the foot switch. It can also be hooked on the foot switch hanger when storing the foot switch.
2	Pairing indicator	Indicates pairing with the combined wireless unit. →Refer to Section 3.6, “Pairing”.
3	Joystick	Used to control the movement by the joystick on the foot switch of the surgical microscope.
4	Communication status indicator	The green LED lights when the communication status is good and flashes when it deteriorates. →Refer to Section 5.2, “Wireless control of foot switch”.
5	Battery power indicator	The amber LED lights or flashes according to the remaining battery power level. →Refer to Section 3.5, “Insertion of batteries into the foot switch”.
6	Foot switches 1 – 6	The functions of the surgical microscope can be assigned to these switches. The function assignment is performed from the surgical microscope.
7	Foot switches A – D	Used to control the focusing and zooming functions of the surgical microscope. The functions of the four switches are assigned from the surgical microscope.

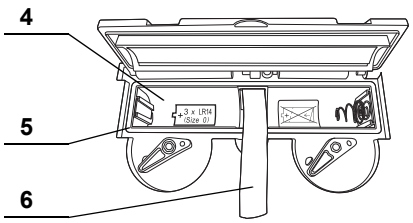
NOTE

For the function assignment of the switches, refer to the instruction manual for the surgical microscope.

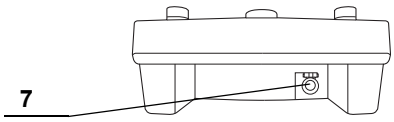
Rear and front surface



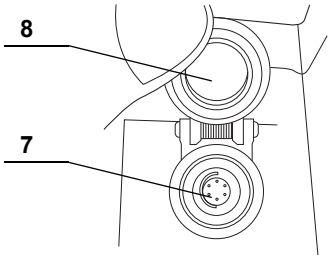
Rear surface



View when battery compartment cover is opened



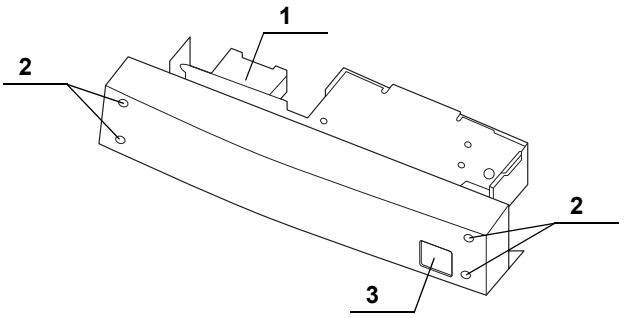
Terminal surface



Close-up view of connection terminal

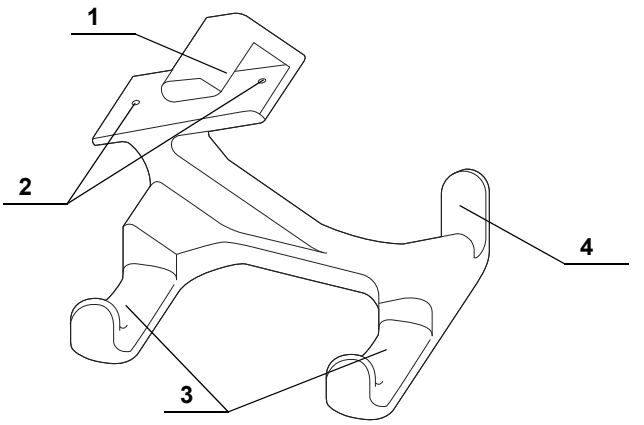
No.	Name	Description
1	Battery compartment cover	Opened or closed for inserting or removing batteries.
2	Finger hook	Insert your fingertip for opening the battery compartment cover.
3	Lock	Used to lock or unlock the battery compartment cover.
4	Battery compartment	Insert three “C”-size 1.5 V alkaline batteries.
5	Packing	Prevents water penetration inside the battery compartment.
6	Ribbon	To be pulled for removing batteries from the foot switch.
7	Connection terminal	Connect the FOOTSWITCH connector (on the side marked “FOOTSWITCH”) of the foot switch cable.
8	Terminal cover	Lid for protecting the connection terminal. To be opened when connecting the foot switch cable to the terminal.

2.3 Wireless unit



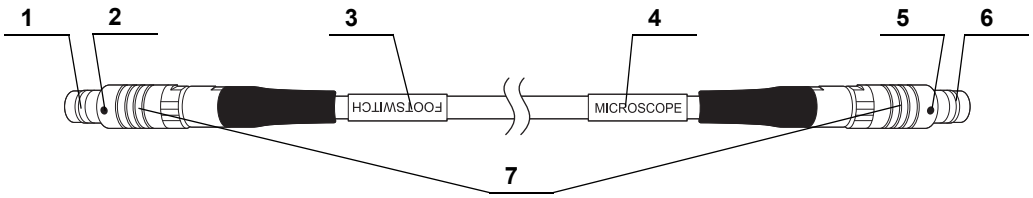
No.	Name	Description
1	Connection terminal	Means of electrical connection to the surgical microscope.
2	Attaching holes	Used to attach the wireless unit to the surgical microscope using the provided retaining screws (M4 × 5 mm).
3	Pairing sticker attaching part	Attach the pairing sticker.

2.4 Foot switch hanger



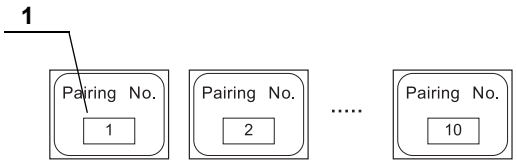
No.	Name	Description
1	Attaching section	Used when attaching to the movement handle of the surgical microscope.
2	Attaching holes	Used to attach the foot switch hanger to the surgical microscope using the provided retaining screws (M4 × 12 mm).
3	Hook	Used to hook the foot switch.
4	Cable hook	Used to hook the cable when storing it.

2.5 Foot switch cable



No.	Name	Description
1	FOOTSWITCH connector	Connect this connector to the connector on the foot switch when using it with wired connection.
2	Index	Connect the cable to the terminal on the foot switch so that this marking is visible on the top.
3	FOOTSWITCH marking	Indicates that the FOOTSWITCH connector is to be connected to the foot switch on this side.
4	MICROSCOPE marking	Indicates that the MICROSCOPE connector is to be connected to the surgical microscope on this side.
5	Index	Connect the cable to the footswitch terminal on the surgical microscope so that this marking is visible on the top.
6	MICROSCOPE connector	Connect this connector to the foot switch terminal on the surgical microscope.
7	Lock	Used for removing from a foot switch or surgical microscope.

2.6 Pairing stickers



No.	Name	Description
1	Pairing stickers No.1 – No.10	Attach the sticker matching the pairing indication on the paired foot switch onto the wireless unit. →Refer to Section 3.6, “Pairing”.

Chapter 3 Installation and Connection

Prepare this instrument and the ancillary equipment according to the purpose of use as shown in "■ System chart" on page 57.
Also, read the instruction manual for each piece of ancillary equipment and connect this instrument and the ancillary equipment in the order given in this chapter.

3.1 Precautions for installation and connection

WARNING

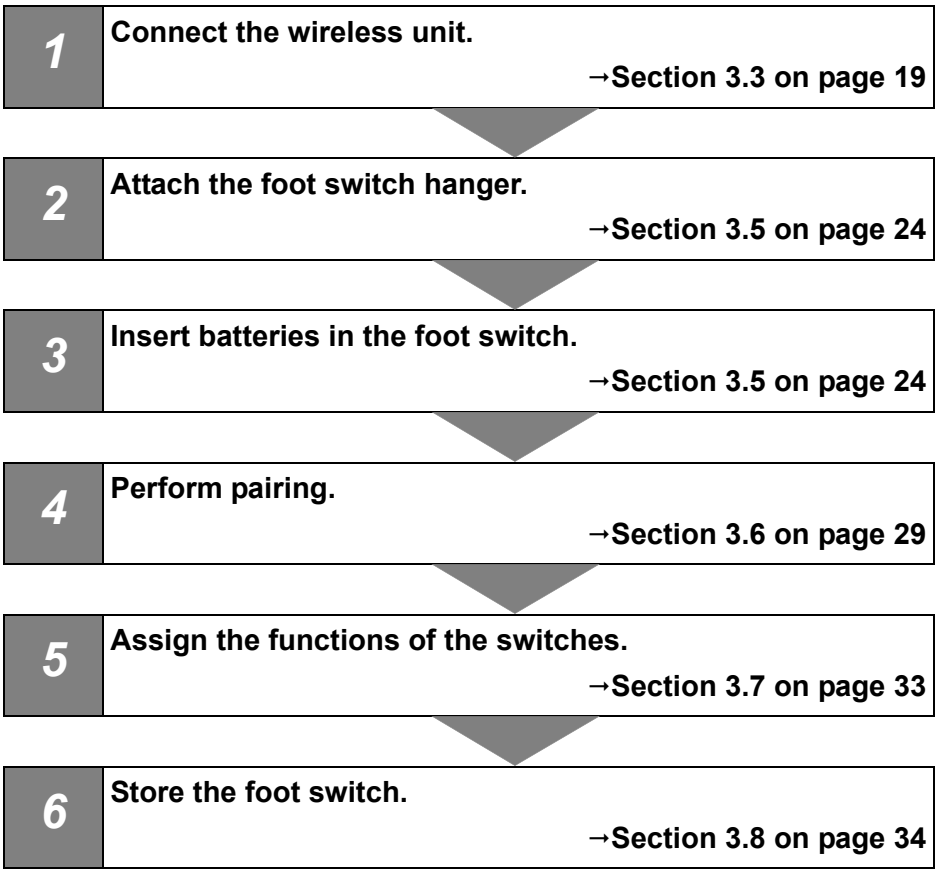
Before use, be sure to read this chapter and prepare the ancillary equipment optimally. Otherwise, patient or operator injury may result as well as malfunctions of the equipment.

CAUTION

- Hold this instrument firmly so as not to drop it. Otherwise, this instrument will fall and equipment damage may result.
- Do not install this instrument in the proximity of a source of strong electromagnetic waves (microwave therapy equipment, shortwave therapy equipment, MRI, radio, cellphone, etc.). Otherwise, this instrument may fail.
- Be sure to turn the connected surgical microscope and the ancillary equipment OFF before proceeding to the connection work. Otherwise, equipment failure or malfunction may result.
- Use appropriate cables only. Otherwise, equipment damage or malfunction may result.
- Connect every cable correctly and completely, tighten them securely. If the equipment is used with incomplete connections, malfunction including disappearance and even equipment damage may result.
- The cables should not be sharply bent, pulled, twisted, or crushed. Cable damage may result.
- Install and connect this instrument on a level surface from which the surgical microscope will not move spontaneously and lock the brake by pushing the brake pedal. If the base moves spontaneously during work, personnel injury may result.

3.2 Installation procedure workflow

The following chart shows the order of installing this instrument and the related instrument.



3.3 Connection of wireless unit

1 After stopping the surgical microscope, check the position of the brake pedal, push it until it hits the back, apply the brake, and confirm that the surgical microscope is locked to the floor.

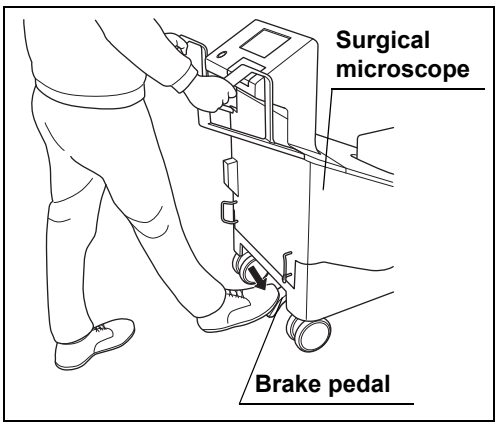


Figure 3.1

2 Using the Allen screwdriver (3 mm width across flats), loosen the screws (× 4) on the wireless unit attaching section of the surgical microscope and remove the cover.

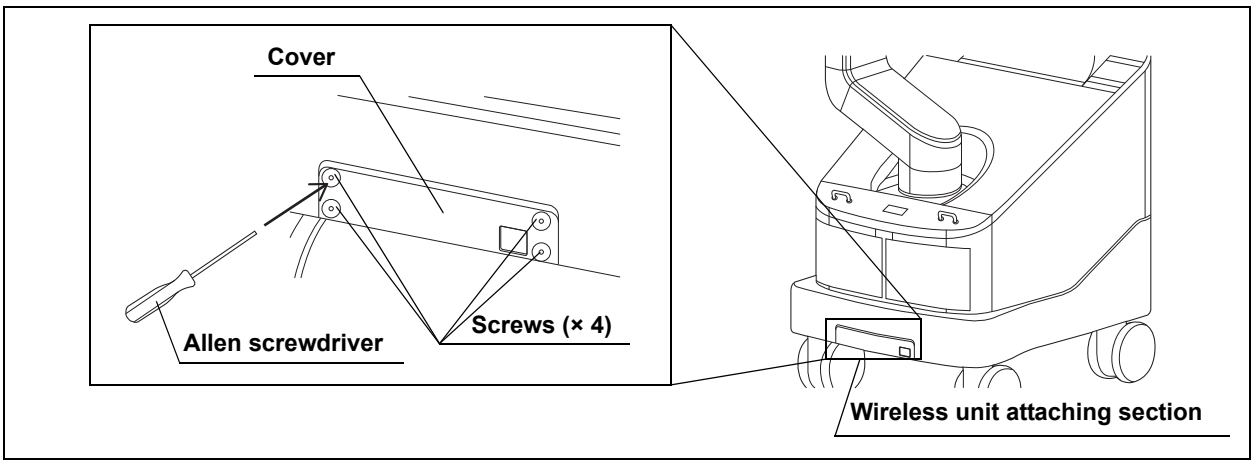


Figure 3.2

CAUTION

Be sure to use the Allen screwdriver (3 mm width across flats) provided with this instrument for work. Using a tool other than what is provided may cause equipment damage.

NOTE

Make sure not to lose the provided Allen screwdriver (3 mm width across flats), screws (× 4), and cover. It will be required when detaching the wireless unit from the surgical microscope for servicing, etc.

3 Remove the connector cover on the inside of the wireless unit attaching section.

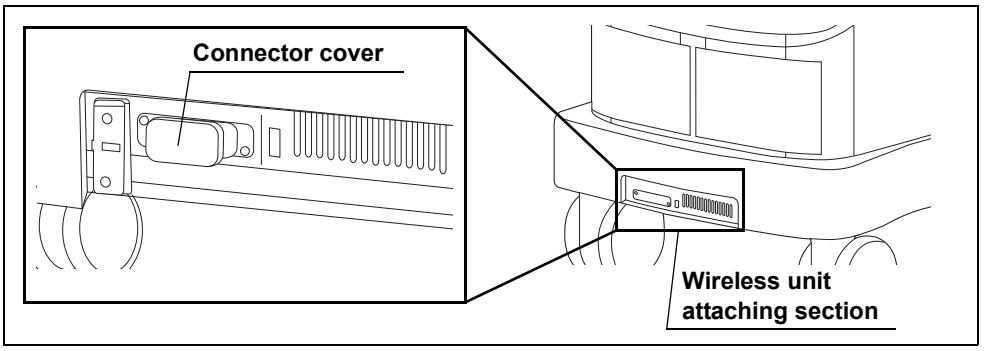


Figure 3.3

CAUTION

Be sure to remove the connector cover before installing the wireless unit. Otherwise, equipment failure may result.

NOTE

Store the removed connector cover and cover so as not to lose them. They will be used when detaching the wireless unit for servicing, etc.

4 Holding the wireless unit so that the connection terminal is pointed toward the surgical microscope and so that the product plate underneath, insert it all the way into the wireless unit attaching section of the surgical microscope.

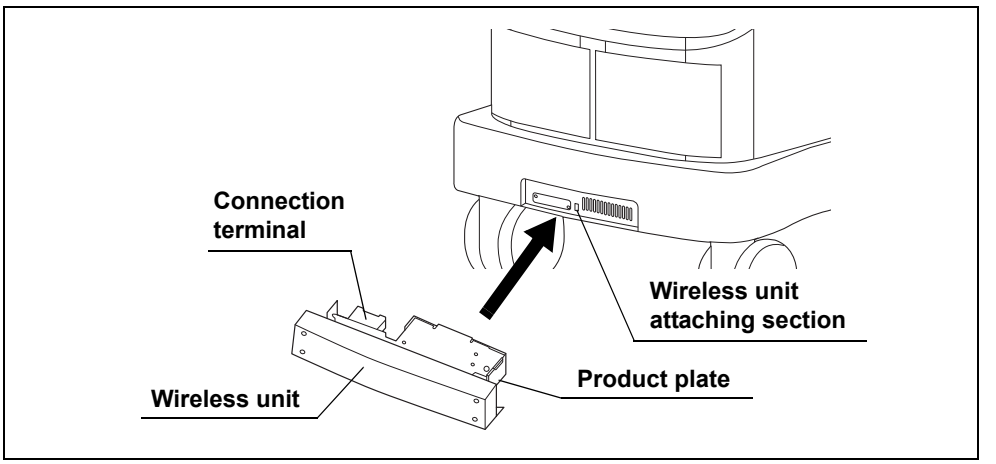


Figure 3.4

CAUTION

Be sure to attach the wireless unit to the wireless unit attaching section of the surgical microscope so that the product plate faces downward. Attaching it upside down by force may cause equipment damage.

5 Use the provided lock screws (M4 × 5 mm) (× 4) into the attaching holes (× 4) on the wireless unit and lock the wireless unit by tightening them using the Allen screwdriver (3 mm width across flats).

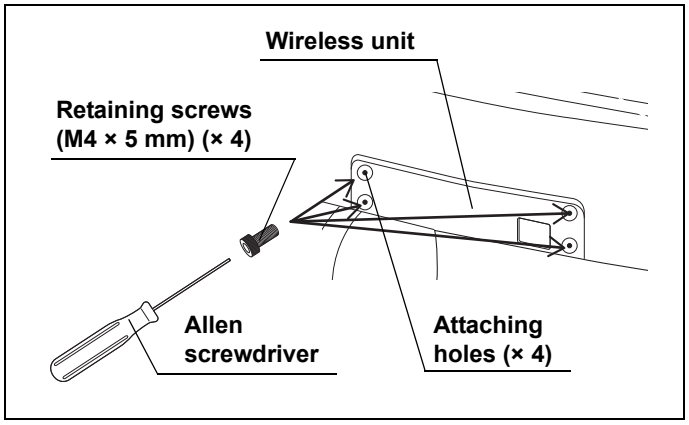


Figure 3.5

CAUTION

- Be sure to use the Allen screwdriver (3 mm width across flats) provided with this instrument for work. Using a tool other than what is provided may cause equipment damage.
- Be sure to use the provided lock screws (M4 × 5 mm) (× 4) when attaching the wireless unit. Otherwise, the wireless unit may become loose because of lack of sufficient locking force and malfunction may result.

3.4 Connection of foot switch hanger

1 If the LED light source is connected to the surgical microscope, remove the LED light source according to the instruction manual of the LED light source.

2 Fit the attaching section on the foot switch hanger into the foot switch hanger attaching section of the movement handle (left-side handle) of the surgical microscope. Position the foot switch hanger so that its folding holes (× 2) are aligned with the attaching holes on the movement handle.

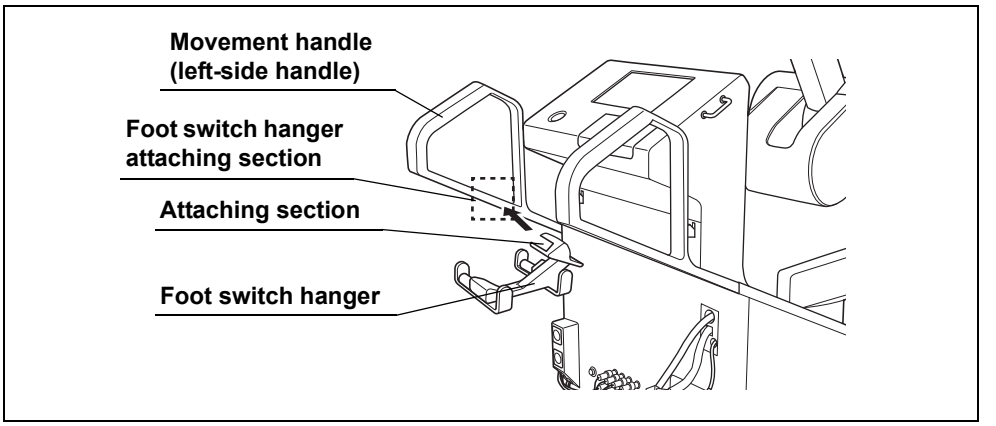


Figure 3.6

3 Using the Allen screwdriver (3 mm width across flats) and the provided lock screws (M4 × 12 mm) (× 2), fix the foot switch on the movement handle.

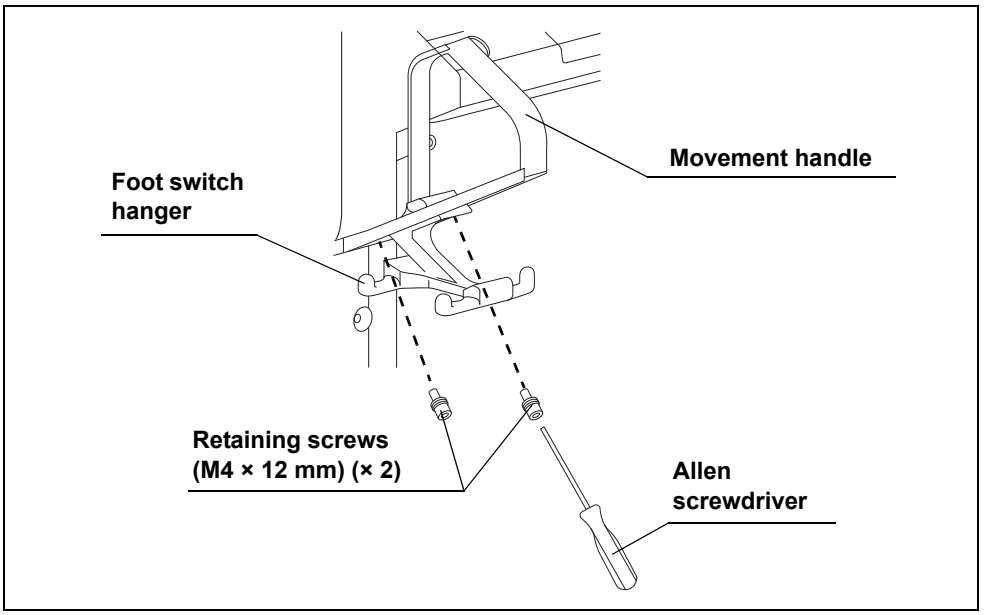


Figure 3.7

CAUTION

Be sure to use the provided Allen screwdriver (3 mm width across flats) and lock screws (M4 × 12 mm) (× 2) for work. Otherwise, insufficient locking may cause the foot switch hanger to rattle or the foot switch to unhook from the switch hanger and drop during use and cause equipment damage.

4 Confirm that the foot switch hanger is fixed firmly to the movement handle without rattling.

3.5 Insertion of batteries into the foot switch

1 Prepare brand-new “C”-size 1.5 V alkaline batteries (× 3).

CAUTION

- Be sure to use “C”-size 1.5 V alkaline batteries (× 3). Otherwise, malfunction as well as equipment damage may result.
- Do not use rechargeable batteries. Otherwise, malfunction or short operating time may result.
- All batteries of the same brand name should be used. Using a different brand of batteries may damage this instrument.

NOTE

To prepare for battery exhaustion during use, it is recommended to prepare (× 3) “C”-size 1.5 V alkaline batteries as spare batteries and store them in an immediately accessible place.

2 Rotate the battery compartment cover locks (× 2) on the rear panel of the foot switch all the way clockwise to unlock the cover.

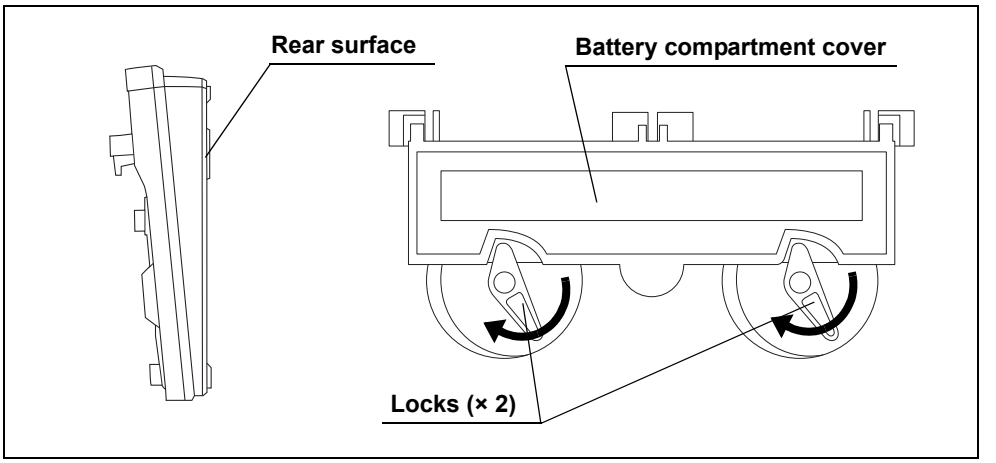


Figure 3.8

3 Insert your fingertip into the finger hook and pull up the battery compartment cover to open.

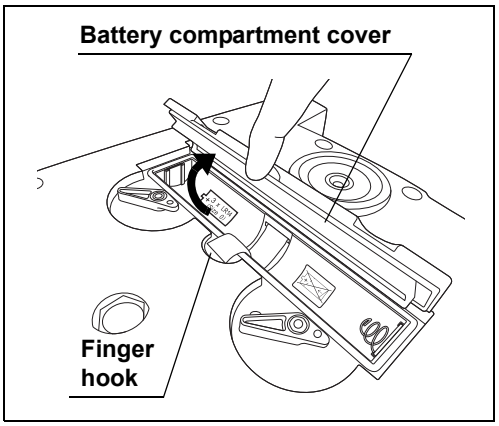


Figure 3.9

4 Following the battery polarity indication (of + orientation) and insert brand-new "C"-size 1.5 V alkaline batteries (× 3) above the ribbon.

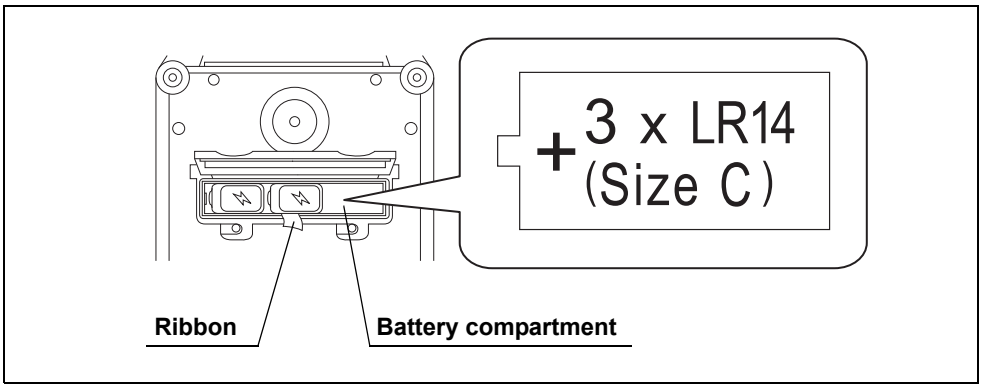


Figure 3.10

CAUTION

Be sure to insert batteries in accordance with the battery polarity indication marker on the bottom of the battery compartment. Otherwise, malfunction as well as equipment damage may result.

5 Confirm that the packing is free of dirt, dust, or other objects, Position the ribbon above the battery so that it does not come in the way of the packing, and close the battery compartment cover.

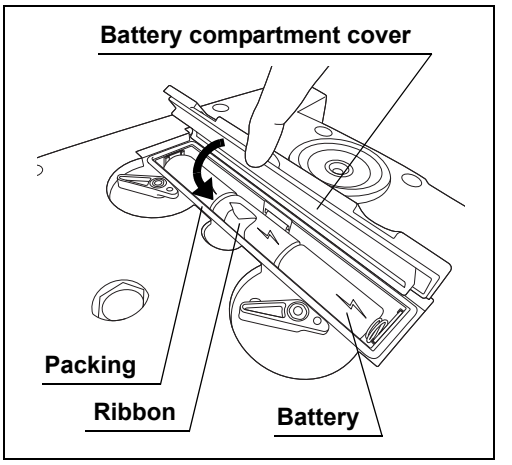


Figure 3.11

CAUTION

- Be careful not to catch the ribbon with the packing when closing the battery compartment cover. If the ribbon is protruded from the packing, the waterproofing becomes insufficient and water penetration inside the equipment may damage it.
- Remove dirt and dust before closing the battery compartment cover. If dirt or dust is attached to the packing placed all around the battery compartment, the waterproofing becomes insufficient and water penetration inside the equipment may damage it.

6 Rotate the battery compartment cover locks (× 2) all the way counterclockwise to lock the cover.

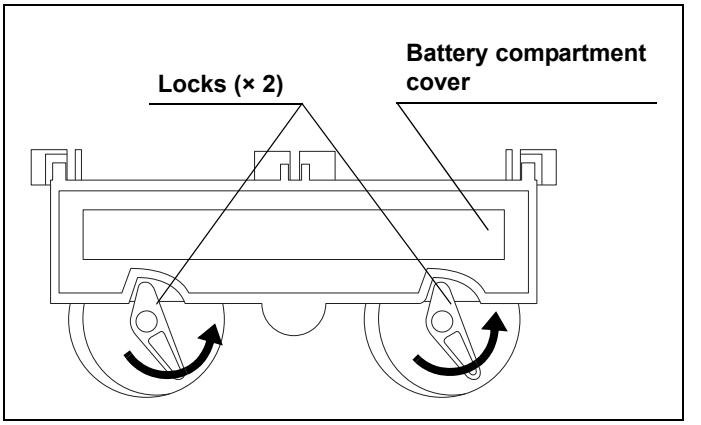


Figure 3.12

CAUTION

Be sure to rotate the battery compartment cover locks (× 2) all the way until it stops. If the cover is locked insufficiently, the waterproofing becomes insufficient and water penetration inside the equipment may damage it.

7 Press one of the switches on the foot switch until it clicks and check the battery power indicator and communication status indicator to confirm that sufficient battery power is remaining. These indicators light or flash according to the remaining battery power as shown in Table 3.1.

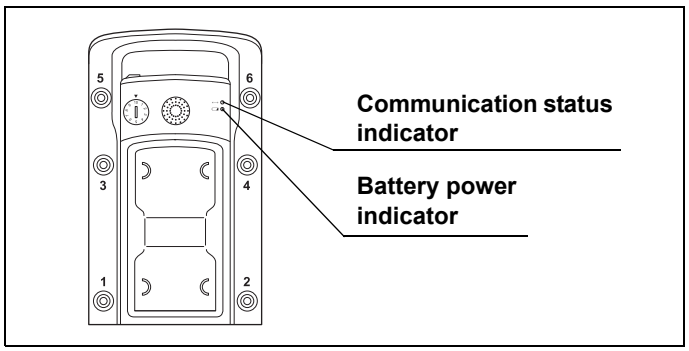


Figure 3.13

Battery power indicator (ON/flashing: Amber)	Communication status indicator (ON/flashing: Green)	Remaining battery power
OFF	ON or flashing (fast)	Battery power is sufficient.
ON	ON or flashing (fast)	Battery power is low. Replace batteries immediately.
Flashing (slow)	ON or flashing (fast)	Battery power is hardly remaining. Replace batteries immediately.
Flashing (fast)	OFF	Battery power is exhausting and normal operation is unavailable. Replace batteries immediately.
OFF	OFF	Battery power is exhausting and normal operation is unavailable. Replace batteries immediately.

Table 3.1

NOTE

- The ON and flashing conditions of the communication status indicator vary depending on the status of communication with the wireless unit.
  - ON: Communication with the wireless unit is established.
  - Flashing or OFF: Communication with the wireless unit is not established.
- Each indicator the ON / flashing (slow) automatically turns off in about 2 minutes and flashing (early) automatically turns off in about 3 seconds. To check again, press one of the switches of foot switch again.

8 If the remaining battery power is almost or completely exhausted, repeat Step 1 to 7 above again.

NOTE

- To facilitate removal of exhausted batteries from the battery compartment, pull up the ribbon.
- In general, the battery performance drops as the temperature decreases. This is important to note when using the instrument in a low-temperature environment. Even when the performance of batteries drops due to a low temperature, it may sometimes be restored when the instrument is brought back under a normal temperature.

3.6 Pairing

CAUTION

- Perform pairing before using foot switch. Without pairing, the foot switch becomes incapable of wireless control of the surgical microscope or there may even be a case in which a function of an unintended surgical microscope is activated.
- Be sure to turn off the surgical microscope before connecting the foot switch cable. Otherwise, equipment failure or malfunction may result.

NOTE

In the battery exchange after pairing, re-pairing is not necessary.

1 Confirm the power of the surgical microscope is off.

2 Open the terminal cover on the foot switch, hold the FOOTSWITCH connector (on the side marked “FOOTSWITCH”) of the foot switch cable so that the index faces upward and insert the connector into the terminal on the foot switch until it clicks.

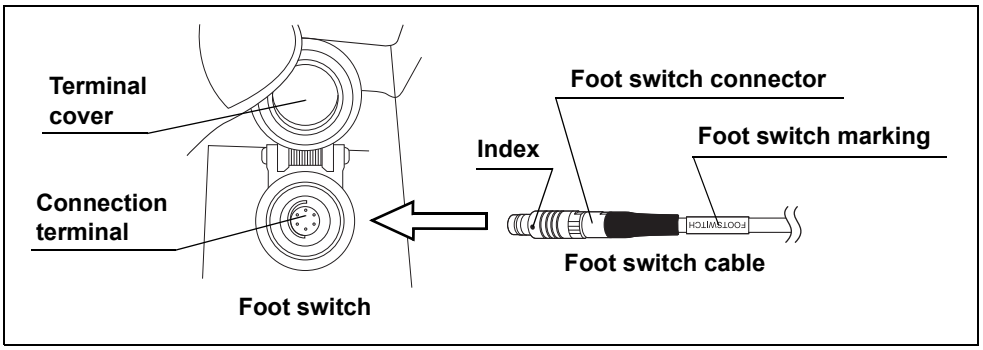


Figure 3.14

3 Hold the MICROSCOPE connector (on the side marked “MICROSCOPE”) of the foot switch cable so that the index faces upward and insert the connector into the foot switch terminal on the surgical microscope until it clicks.

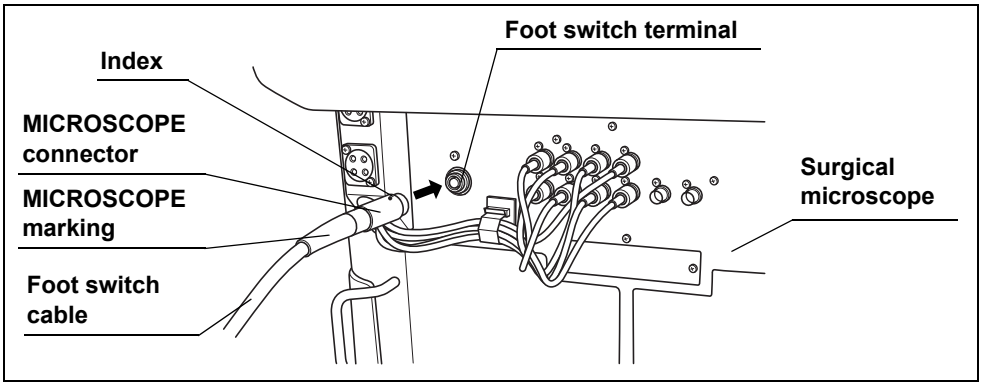


Figure 3.15

4 Turn on the surgical microscope by pressing the power switch. Pairing starts automatically when the surgical microscope is turned on. When the pairing completes successfully, the communication status indicator of the foot switch lights up (green).

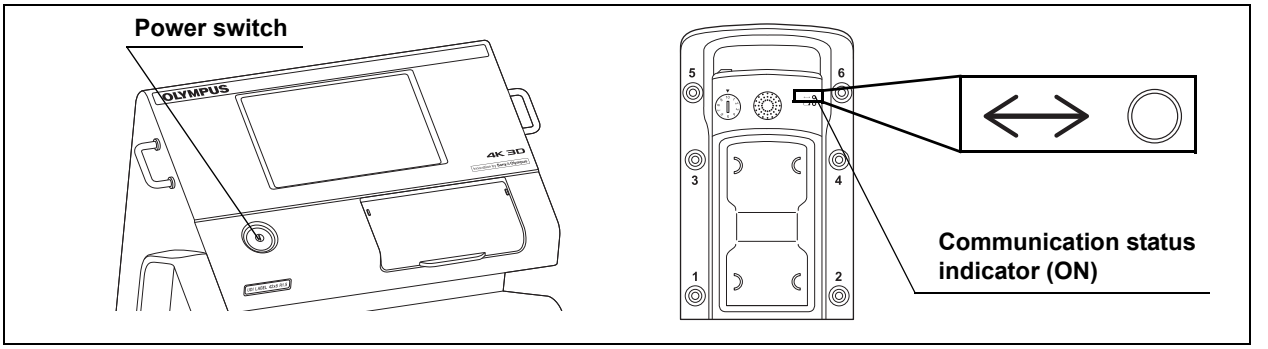


Figure 3.16

NOTE

Pairing may take a period of about 3 seconds.

5 Turn off the surgical microscope by pressing the power switch. (See Figure 3.16)

6 Unlock the FOOTSWITCH connector (on the side marked “FOOTSWITCH”) on the foot switch cable by pulling the lock toward you, and then disconnect the connector from the terminal on the foot switch.

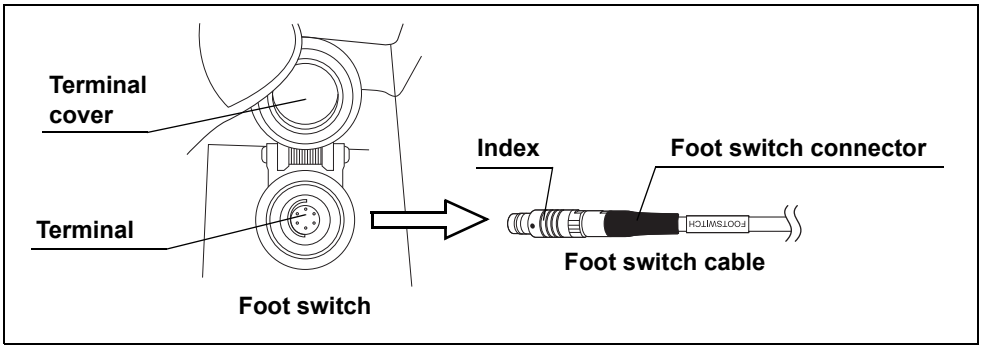


Figure 3.17

7 Unlock MICROSCOPE connector (on the side marked “MICROSCOPE”) on the foot switch cable by pulling the lock toward you, and then disconnect the connector from the foot switch terminal on the surgical microscope.

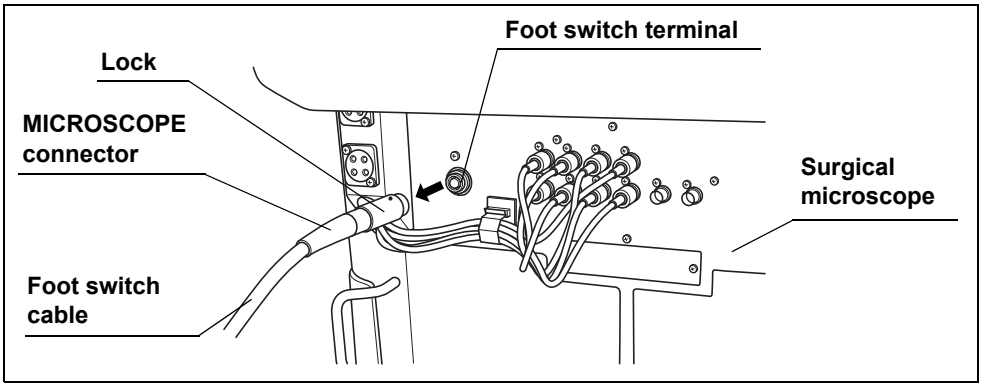


Figure 3.18

8 Turn on the surgical microscope again by pressing the power switch. When the surgical microscope is turned on, press one of the switches on the foot switch until it clicks. Then confirm that the communication status indicator lights up (green).

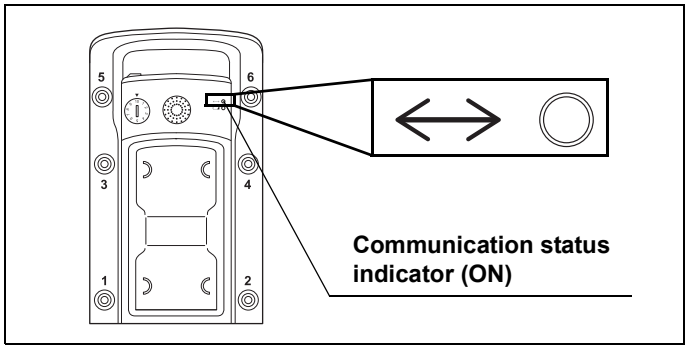


Figure 3.19

9 If the communication status indicator flashes, there is a potential that the pairing is not completed successfully. In this case, restart the procedure from Step 1 above.

NOTE

The communication status indicator is OFF after 2 minutes of ON. And it is OFF after 3 seconds of flashing. To check the pairing status one more time, press a switch on the foot switch again.

10 Using a coin or a thin object, set the pairing indicator on the foot switch to a desired number.

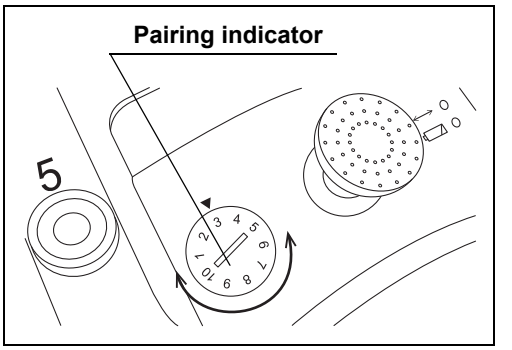


Figure 3.20

11 Attach the pairing sticker to the pairing sticker attaching section of the wireless unit.

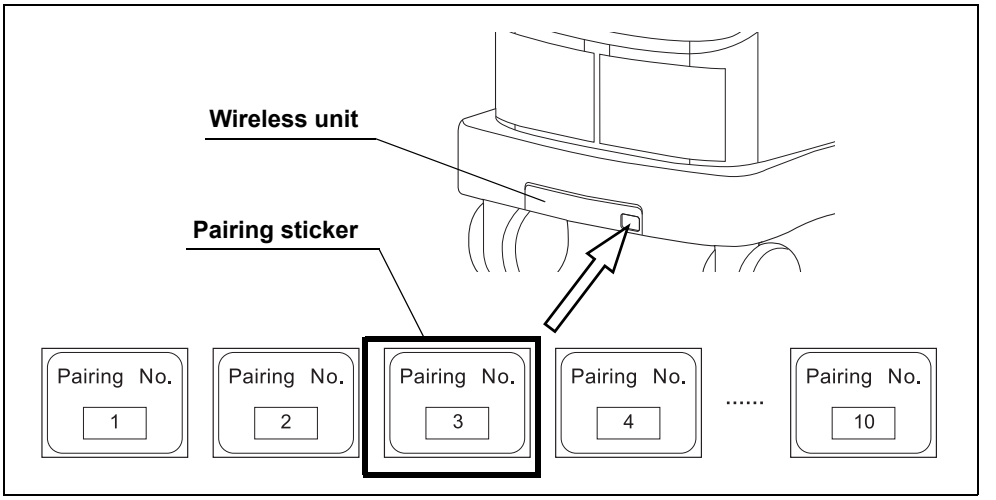


Figure 3.21

CAUTION

After pairing, be sure to set the pairing indicator on the foot switch and attach the corresponding pairing sticker on the wireless unit. If you have more than one foot switch instrument, set different pairing indicator numbers to each of them. If it is not set correctly, unexpected functions of the surgical microscope may be activated.

NOTE

Retain the unused pairing stickers carefully so as not to lose them. They may be necessary in case you change the pairing number.

3.7 Assign the functions of the switches

By referring to the instruction manual for the surgical microscope, set the functions to be assigned to the switches of the foot switch by using the touch panel of the surgical microscope.

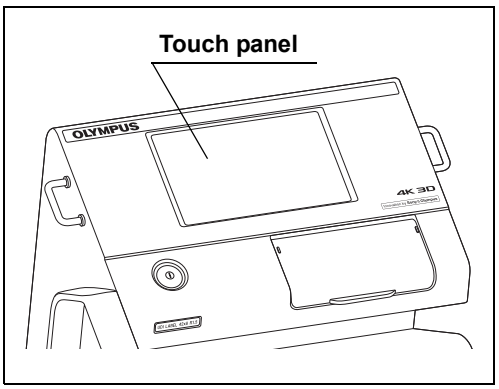


Figure 3.22

NOTE

- Set the foot switch setting to “ON” according to instruction manual of surgical microscope. If you do not set the setting to “ON”, foot switch setting and surgical microscope operation cannot be performed.
- The default settings of Foot switches 1 to 6 of the foot switch are “Not configured”, which means that the surgical microscope cannot be controlled unless functions are assigned to the switches. Be sure to assign functions to the switches by referring to the instruction manual for the surgical microscope.

3.8 Storage of foot switch

1 Turn off the surgical microscope by pressing the power switch.

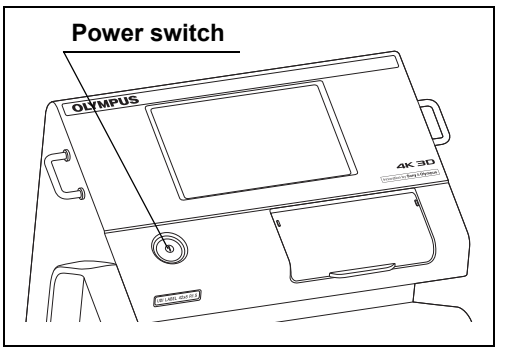


Figure 3.23

2 When the foot switch cable is used, disconnect it from the foot switch and surgical microscope.

3 Hang the handle of the foot switch to the hook of the foot switch hanger with the upper surface of the foot switch facing outward. And hook the foot switch cable around the cable hook.

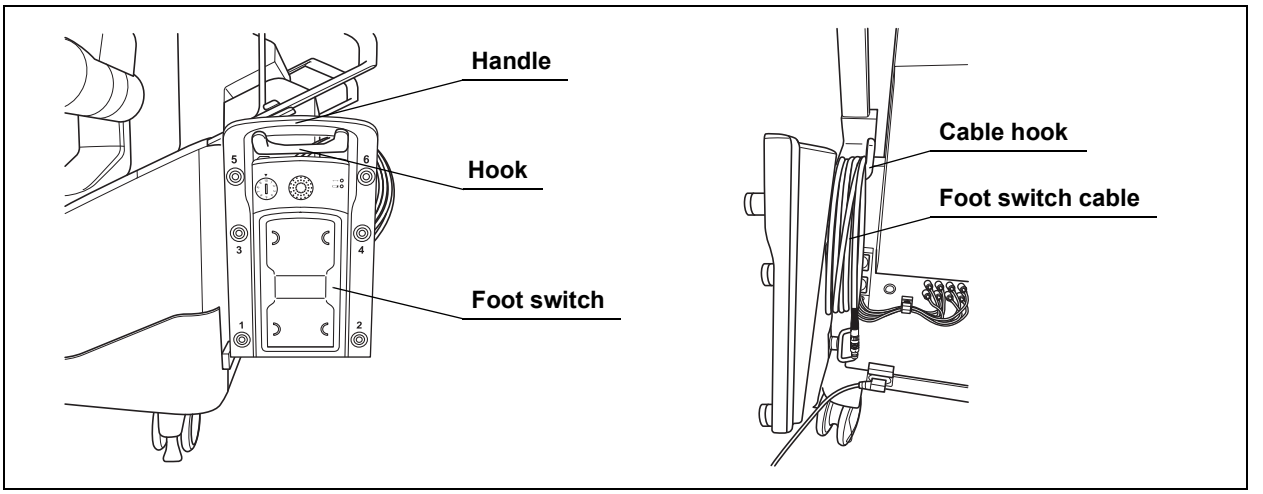


Figure 3.24

CAUTION

When the foot switch is not to be used for a long period, remove batteries from the foot switch and store them separately. Otherwise, over-discharge of batteries may cause fluid leak, which may eventually lead to equipment damage.

4 When the foot switch cable is not used, disconnect it from the foot switch and surgical microscope and store in an immediately accessible place.

Chapter 4 Inspection

Prepare this instrument and other ancillary equipment before each particular case. Refer to the instruction manuals for each piece of equipment.

4.1 Precautions of workflow

WARNING

- Before inspection, be sure to read Chapter 3, “Installation and Connection” and prepare the ancillary equipment optimally. Otherwise, malfunction as well as the risks of patient and operator injury may result.
- Before use, be sure to inspect this instrument as instructed below. Inspect other ancillary equipment to be used with this instrument as instructed in their respective attached documents and instruction manuals. If any irregularities are suspected after inspection, do not use the equipment and follow the instructions given in Chapter 7, “Troubleshooting”. If the trouble still persists after troubleshooting, please contact Olympus. Using this instrument while irregularities are suspected does not result only in malfunction but there are also the injury risks of patient or operator.

NOTE

Set the foot switch setting “ON” by referring to the instruction manual for the surgical microscope. Otherwise, the foot switch cannot be set and the surgical microscope cannot be controlled.

4.2 Inspection workflow

Refer to the inspection workflow below. Follow each step of the workflow for inspection of this instrument before use.

1	**Check the power status of the foot switch (for wireless control).** **→Section 4.3 on page 36**
2	**Check the foot switch cable (for wired control).** **→Section 4.4 on page 39**
3	**Check that the foot switch is operable.** **→Section 4.5 on page 41**

4.3 Inspection of remaining battery power (for wireless control)

NOTE

The remaining battery power can be inspected only when the foot switch is in the wireless status. Disconnect the foot switch cable before proceeding to the inspection.

1 Remove the foot switch from the foot switch hanger and place it on a level, stable surface near the surgical microscope.

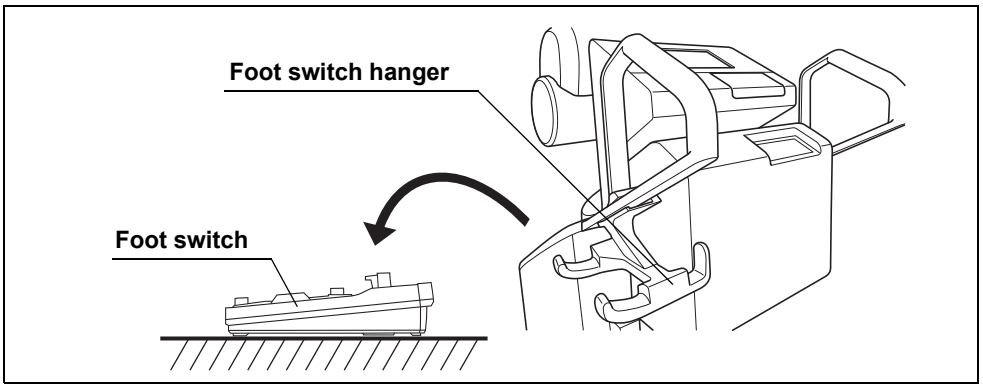


Figure 4.1

NOTE

To prevent erroneous inputs, the foot switch is designed not to function when it is tilted.

2 Turn on the surgical microscope by pressing the power switch.

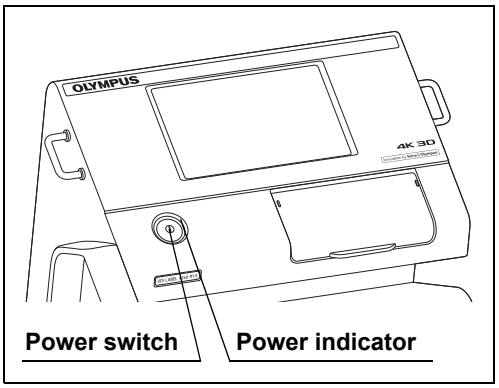


Figure 4.2

3 Press one of the switches on the foot switch until it clicks and check the battery power indicator and communication status indicator to confirm that sufficient battery power is remaining.
These indicators function as shown in Table 4.1. If the remaining battery power is low, replace batteries with new ones by referring to Section 3.5, “Insertion of batteries into the foot switch”.

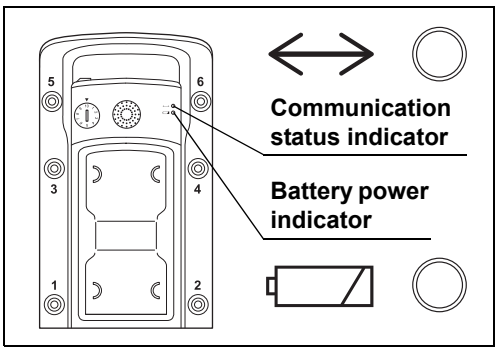


Figure 4.3

Battery power indicator (ON/flashing: Amber)	Communication status indicator (ON/flashing: Green)	Communication status indicator (ON/flashing: Green)
OFF	ON or flashing (fast)	Battery power is sufficient.
ON	ON or flashing (fast)	Battery power is low. Replace batteries immediately.
Flashing (slow)	ON or flashing (fast)	Battery power is hardly remaining. Replace batteries immediately.
Flashing (fast)	OFF	Battery power is exhausting and normal operation is unavailable. Replace batteries immediately.
OFF	OFF	The battery power has exhausted and normal operation is unavailable. Replace batteries immediately.

Table 4.1

CAUTION

- If the communication status indicator flashes when any switch on the foot switch is pressed, the wireless communication is not established normally. If there is an obstacle between the foot switch and the surgical microscope (wireless unit), remove the obstacle before use. If the foot switch is too distant from the surgical microscope, reduce the distance between them. If the problem is still not solved, there is a potential that the pairing is not completed successfully. In this case, re-set the pairing by referring to Section 3.6, “Pairing”.
- Exhausted batteries should not be left inside the foot switch but must be removed from it. Otherwise, the fluid leak may damage the foot switch.

NOTE

- Each indicator is OFF after 2 minutes of ON or flashing (slow). And it is OFF after 3 seconds of flashing (fast). To check one more time, press a switch on the foot switch again.
- Even when the batteries are exhausted, the foot switch can control the surgical microscope through the foot switch cable. When the foot switch cable is connected, the battery power indicator is permanently extinguished and the communication status indicator is permanently lit steadily.

4.4 Inspection of foot switch cable (for wired control)

1 When batteries are in the foot switch, remove the batteries.

2 Check the appearance of the foot switch cable visually to confirm it is free of irregularities including scratches, deformation, or peeled coating.

3 Open the terminal cover of the foot switch with your finger, hold the FOOTSWITCH connector (on the side marked “FOOTSWITCH”) of the foot switch cable so that the index faces upward and insert the connector into the Connection terminal on the foot switch all the way until it clicks.

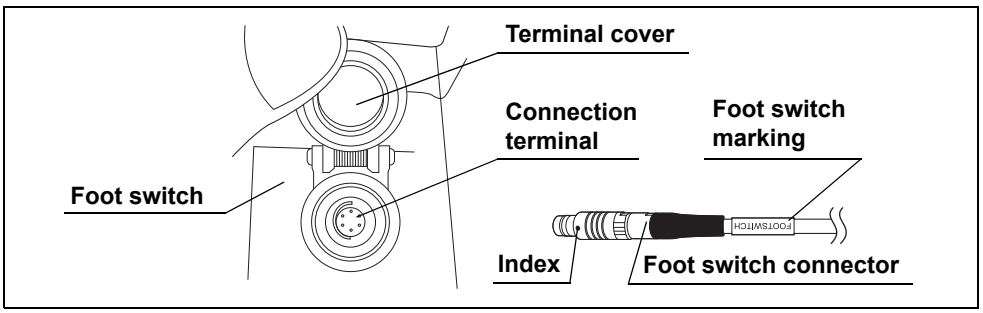


Figure 4.4

CAUTION

Be sure to turn off the surgical microscope before connecting or disconnecting the foot switch cable. Otherwise, equipment failure or malfunction may result.

4 Hold the MICROSCOPE connector (on the side marked “MICROSCOPE”) of the foot switch cable so that the index faces upward and insert the connector into the foot switch terminal of the surgical microscope all the way until it clicks.

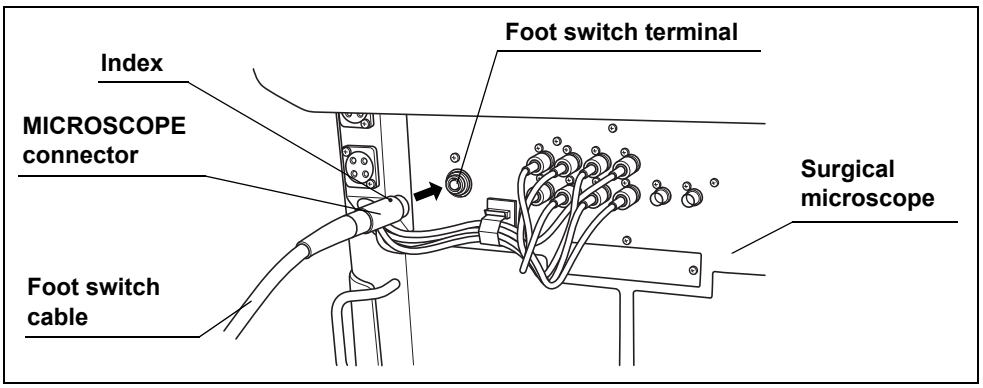


Figure 4.5

5 Turn on the surgical microscope by pressing the power switch.

6 Confirm that the switches function normally by performing the procedure in Section 4.5, “Inspection of foot switch operation”.

4.5 Inspection of foot switch operation

Inspecting the function of Foot switches A to D

Check that the focusing and zooming functions of the surgical microscope can be controlled normally from the switches.

Press each of switches A to D on the foot switch until it clicks. Observe the observation monitor and confirm that the focusing and zooming functions are controllable.

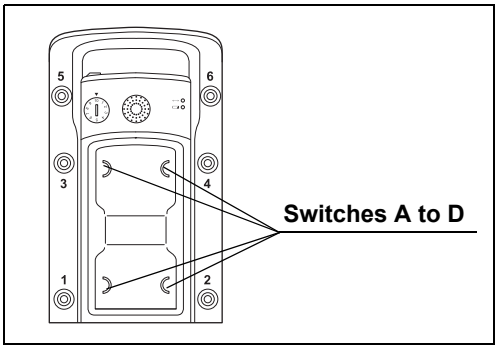


Figure 4.6

NOTE

- The assignment function of foot switches A to D can be changed. For details, refer to the instruction manual for the surgical microscope.
- For details on the focusing and zooming functions, refer to the instruction manual for the surgical microscope.

Inspecting the function of joystick

Check that the movement by the joystick on the foot switch of the surgical microscope can be controlled normally.

Tilt the joystick on the foot switch all the way in a direction.
Observe the observation monitor and confirm that the joystick is controllable.

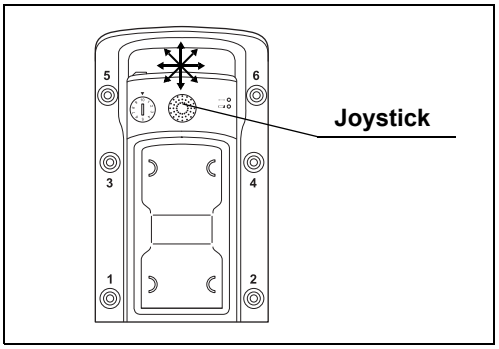


Figure 4.7

NOTE

- The movement by the joystick is possible in one of eight directions.
- For details on the joystick operation of the foot switch, refer to the instruction manual for the surgical microscope.

❍ Inspecting the function of Foot switches 1 to 6

Check that the functions of the surgical microscope that are assigned to Foot switches 1 to 6 can be controlled normally.

NOTE

The default settings of Foot switches 1 to 6 of the foot switch are “Not configured”, which means that the surgical microscope cannot be controlled unless functions are assigned to the switches. Be sure to assign functions to the switches by referring to the instruction manual for the surgical microscope.

Press one of the switches on the foot switch until it clicks and confirm that the surgical microscope function assigned to the switch is activated normally.

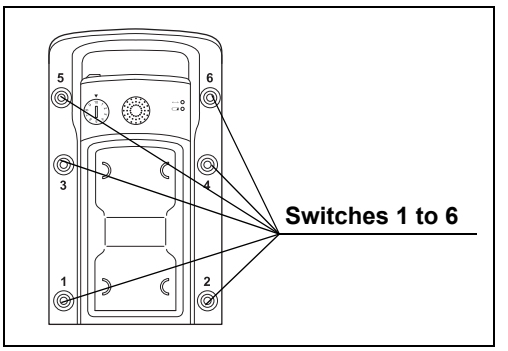


Figure 4.8

Chapter 5 Operation

The operator of this instrument must be a physician or medical personnel under the supervision of a physician and must have received sufficient training in microsurgery using surgical microscopes. This manual, therefore, does not explain or discuss the detailed microsurgical operation procedures. This chapter pertains to the basic operating procedures, warnings and cautions to be used in the operation of the surgical microscope.

5.1 Operating precautions

WARNING

- Always wear appropriate protection gear. Otherwise, contact with hazardous substances such as chemicals and infective matters such as blood and mucus of the patient may cause health damage to the operator and/or assistant.
- If any irregularity is suspected during use, immediately stop using the equipment and take proper measures by referring to Chapter 7, “Troubleshooting” as well as the instruction manuals for the ancillary equipment used in combination with this instrument. If this instrument continues to be used while an irregularity is suspected, damage to the patient’s health may result.

CAUTION

- Combined use with other equipment.
  - Do not install this instrument in the proximity of a source of strong electromagnetic waves (microwave therapy equipment, shortwave therapy equipment, MRI, radio, cellphone, etc.). Otherwise, this instrument may malfunction.
  - When using an electrosurgical unit in combination with this instrument, confirm that the high-frequency noise is at a level that does not affect the operation of this instrument in advance. Otherwise, malfunction may result.
- Do not approach a cord connected to the electrosurgical unit to this instrument and the ancillary equipment combined with it. Otherwise, malfunction may be caused during the high-frequency output.
- Do not press any of the switches on the foot switch with a sharp object. Otherwise, the switch may be damaged or the coating may be broken, making it impossible to maintain the waterproofing.

5.2 Wireless control of foot switch

CAUTION

- If a piece of ancillary equipment installed in proximity of this instrument uses the same 2.4 GHz band radio as this instrument or it is vulnerable to radio wave, confirm that both this instrument and the ancillary equipment are free of irregularity. Without this confirmation, malfunction may cause.
- If there is an obstacle between the foot switch and the surgical microscope (wireless unit), remove the obstacle before use. Otherwise, the instrument cannot manifest the performance fully, which may result in slow response or impossibility of operation. If the problem is still not solved, use the wired control.
- The radio wave of this instrument has a directivity. The foot switch should be used within the recommended operation range below (see Figure 5.1). Otherwise, it may result in slow response or impossibility of operation. In such a case, use the wired control.

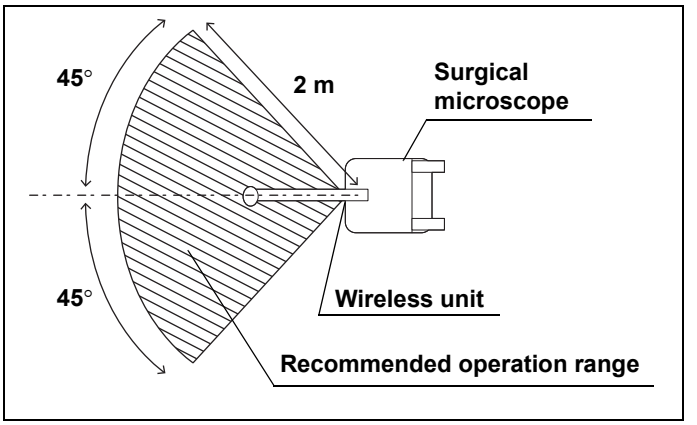


Figure 5.1

1 Remove the foot switch from the foot switch hanger and place the unit on a level, stable floor surface.

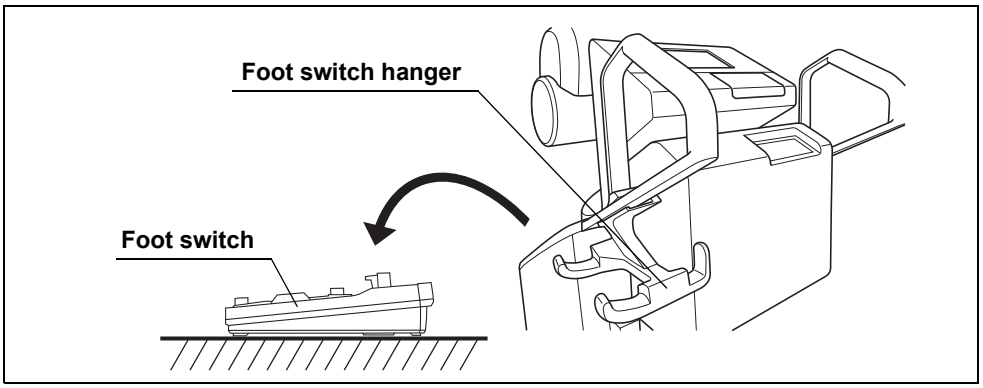


Figure 5.2

NOTE

To prevent erroneous inputs, the foot switch is designed not to function when it is tilted.

2 Turn on the surgical microscope by pressing the power switch.

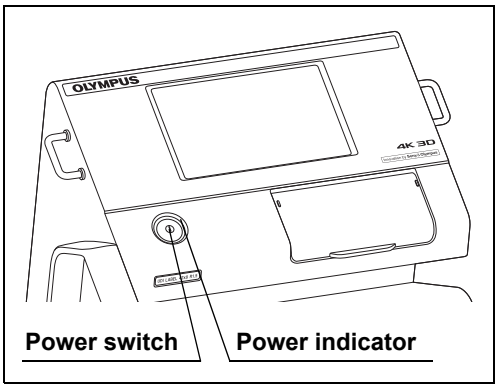


Figure 5.3

3 Press the switches on the foot switch to control the functions of the surgical microscope. For the operating precautions and functions of the surgical microscope, refer to the instruction manual for the surgical microscope.

NOTE

During wireless control, the foot switch enters the sleep mode automatically to reduce battery consumption when no switch has been pressed for about 2 minutes. The foot switch returns from the sleep mode automatically when any switch on it is pressed. After returning from the sleep mode, the response time of functions with respect to the switch operations may sometimes be extended compared to normal status.

5.3 Wired control of foot switch

1 Remove the foot switch from the foot switch hanger and place the unit on a level, stable floor surface.

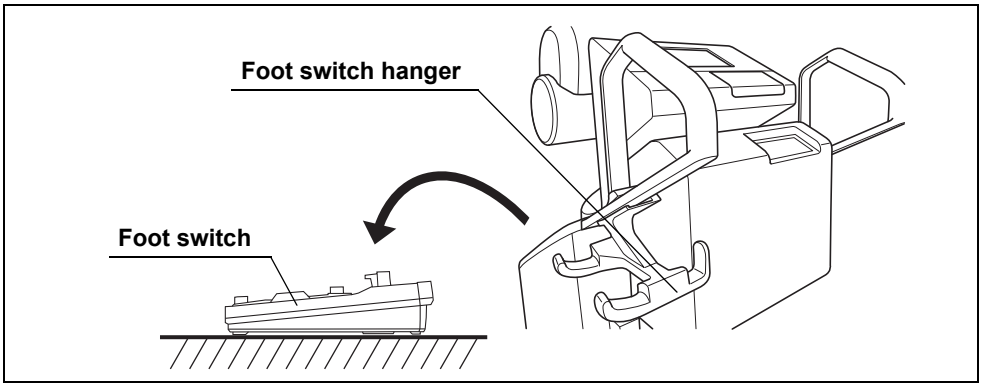


Figure 5.4

NOTE

To prevent erroneous inputs, the foot switch is designed not to function when it is tilted.

2 Connect the foot switch cable to the foot switch and the foot switch terminal on the surgical microscope by referring to Section 4.4, “Inspection of foot switch cable (for wired control)”.

3 Turn on the surgical microscope by pressing the power switch.

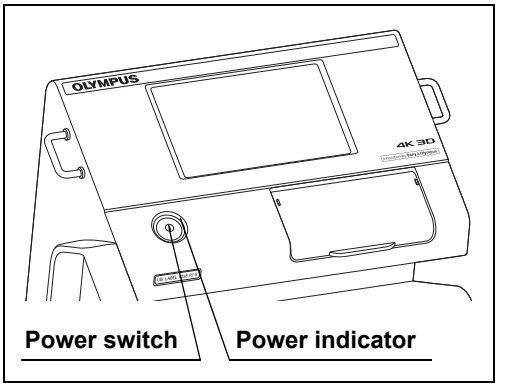


Figure 5.5

4 Press the switches on the foot switch to control the functions of the surgical microscope. For the operating precautions and functions of the surgical microscope, refer to the instruction manual for the surgical microscope.

CAUTION

- Do not apply an excessive force (pulling, sharp bending, or twisting) to the foot switch cable and connectors. Otherwise, the foot switch cable, foot switch and/or the surgical microscope may be damaged.
- Do not bring the foot switch cable in contact with a sharp object or step on the cable. Otherwise, the wire inside the foot switch cable may be disconnected.

NOTE

As far as the foot switch cable is connected, the foot switch does not enter the sleep mode even when no switch has been pressed for a long period. This condition can be checked by steady lighting of the communication status indicator.

Chapter 6 Care, Storage, and Disposal

6.1 Care

WARNING

When cleaning this instrument, always wear appropriate personal protection equipment such as eye wear, face mask, moisture-resistant clothing, and chemical-resistant gloves that fit properly and are long enough so that your skin is not exposed. Blood, mucus, and other potentially infectious material adhering to this instrument could pose an infection control risk.

CAUTION

- After wiping with a piece of lint-free cloth moistened with neutral detergent, dry the instrument thoroughly before using it again. Using the instrument while it is wet may cause equipment damage.
- Do not attempt to clean any electrical connection part (such as a connector or contact) of power and video cables using moistened lint-free cloth. Otherwise, damage or corrosion may cause equipment failure.
- Do not autoclave, or gas sterilize this instrument and ancillary equipment. These methods will damage it.
- If bioburden or infectious debris enters an area of the instrument that cannot be cleaned, such as an opening, do not use the instrument and contact Olympus.

After using this instrument and ancillary equipment, immediately perform the following cleaning procedures. If cleaning is delayed, residual organic debris will begin to dry, and it may be difficult to effectively clean this instrument and ancillary equipment. Always remove debris immediately after every use.

1. Disconnect the foot switch cable from the surgical microscope and remove batteries from the foot switch.
2. When this instrument and ancillary equipment are soiled with blood or other potentially infectious materials, wipe off all debris using a piece of lint-free cloth moistened with neutral detergent.
3. Remove dust, dirt, and other stains on the surface by wiping with a piece of gauze moistened with 70% ethyl or 70% isopropyl alcohol.

4 Make sure to dry this instrument and ancillary equipment after wiping with 70% ethyl or 70% isopropyl alcohol.

6.2 Storage

When this instrument is not to be used for a certain period, store it as instructed below. Be sure to complete all instructions in Section 6.1, “Care” before storing this instrument.

CAUTION

- Do not store this instrument in a location exposed to direct sunlight, X-rays, radio activity, or strong electromagnetic radiation (e.g., microwave medical treatment equipment, short-wave medical treatment equipment, MRI, radio equipment, or cellular phones). Damage to this instrument may result.
- When the foot switch is not to be used continuously for a long time, remove batteries from the foot switch. Otherwise, unintended battery power consumption or fluid leak may result.
- Before storing this instrument, confirm that its switches are not depressed. Otherwise, the batteries will be consumed and fluid leak may also result.

1 Remove batteries from the foot switch.

2 Store the foot switch by hanging it from the hook of the foot switch hanger or placing it on a level, stable surface in a clean and dry place.

3 When the foot switch cable is not in use, disconnect it from the foot switch and the foot switch terminal of the surgical microscope and store it in an immediately accessible, clean, and dry place.

6.3 Disposal

1 Complete all instructions in Section 6.1, “Care”.

2 Dispose of this instrument and/or accessories by observing your national and local laws and guidelines.

Chapter 7 Troubleshooting

7.1 Troubleshooting

If this instrument is clearly found to have failed during the inspection described in Chapter 4, “Inspection”, or the use described in Chapter 5, “Operation”, do not use the instrument and take a proper measure by referring to Section 7.2, “Troubleshooting guide”. If the normal operation cannot be restored, do not use the instrument and contact Olympus.

WARNING

Never use this instrument if any irregularity is suspected. Otherwise, patient and operator injury may result as well as malfunction.

NOTE

If an accessory of this instrument needs to be replaced, contact Olympus.

7.2 Troubleshooting guide

The following table shows the possible causes of and countermeasures against troubles that may occur due to equipment setting errors or deterioration of consumables. If the irregularity cannot be solved after checking the following table, have this instrument repaired by following Section 7.3, “Returning this instrument for repair”.

Irregularity description	Possible cause	Solution
Wireless control of surgical microscope functions is unavailable.	The wireless unit is connected improperly	Connect the wireless unit properly to the surgical microscope by referring to Section 3.3, “Connection of wireless unit”.
	Pairing is incorrect.	Perform pairing by referring to Section 3.6, “Pairing”.
	The foot switch setting of surgical microscope is set to OFF.	Set the foot switch setting to ON by referring to the instruction manual for the surgical microscope.
	The foot switch is tilted.	Install it on a level, stable surface.
	No function is assigned to the pressed switch	Assign a function to the switch by referring to the instruction manual for the surgical microscope.
	The switch is pressed for a short period while it needs to be held depressed for a certain period.	Press and hold the switch for the required period.
	The distance between the surgical microscope and foot switch is too long or there is an obstacle between them.	Decrease the distance between the surgical microscope and foot switch (to within 2 meters) or remove the obstacle.
	The foot switch is located outside the recommended use range.	Use within recommended use range by referring to Section 5.2, “Wireless control of foot switch”.
	Radio waves from another piece of radio equipment are interfering.	Install the equipment that is suspected to interfering farther apart. If the problem is still not solved, use the wired control.
	Batteries are exhausted.	If the battery level is low, replace with a new battery by referring to Section 4.3, “Inspection of remaining battery power (for wireless control)”.
	The type of battery and how to put it in are incorrect.	Insert the battery in the correct orientation by referring to Section 3.5, “Insertion of batteries into the foot switch”.

Irregularity description	Possible cause	Solution
Wired control of the surgical microscope is unavailable.	The wireless unit is connected improperly.	Connect the wireless unit to the surgical microscope properly by referring to Section 3.3, “Connection of wireless unit”.
	The foot switch cable is connected improperly.	Connect the foot switch cable properly by referring to Section 4.4, “Inspection of foot switch cable (for wired control)”.
	The foot switch setting of surgical microscope is set to OFF.	Set the foot switch setting to ON by referring to the instruction manual for the surgical microscope.
	The foot switch is tilted.	Install it on a level, stable surface.
	No function is assigned to the pressed switch	Assign a function to the switch by referring to the instruction manual for the surgical microscope.
	The switch is pressed for a short period while it needs to be held depressed for a certain period.	Press and hold the switch for the required period.
Functions of the surgical microscope are activated unexpectedly.	A foot switch that is not being used is paired and its switch is pressed.	Store the unused foot switch so that its switches are not pressed by referring to Section 6.2, “Storage”.
Batteries consume quickly.	Batteries in use are other than specified.	Use brand-new “C”-size 1.5 V alkaline batteries.
The indicators will not light or flash.	Batteries are not inserted.	Insert batteries by referring to Section 3.5, “Insertion of batteries into the foot switch”.
	Batteries are inserted in wrong orientation.	Insert batteries in the correct orientations by referring to Section 3.5, “Insertion of batteries into the foot switch”.
	The foot switch failed.	Set the foot switch setting of the surgical microscope to OFF by referring to the instruction manuals for the surgical microscope and then contact Olympus.

❍ Measure to be taken when an error code is displayed on the monitor or the touch panel of the surgical microscope

If a code other than the error codes listed below is displayed, take an optimum measure by referring to the instruction manual for the equipment used in combination with this instrument. If an optimum measure cannot be taken contact Olympus.

Code	Error message	Possible case	Solution
E226	Foot switch error	The foot switch is activated improperly. Its circuitry may have failed.	Set the foot switch setting of the surgical microscope to OFF by referring to the instruction manuals for the surgical microscope and then contact Olympus.
E314	Foot switch error	The remaining battery power is low.	Replace all the batteries with brand-new specified ones by referring to Section 3.5, “Insertion of batteries into the foot switch”. In case the battery replacement is impossible, the instrument can be used in wired control.
E315	Foot switch error	Quality of wireless communication is low.	If the distance between the foot switch and surgical microscope is too large, decrease the distance. If there is an obstacle between them, remove it. If there is a piece of equipment emitting radio waves in the proximity, place it apart. If the problem is still not solved, use the wired control.
		The foot switch is located outside the recommended use range.	Use within recommended use range by referring to Section 5.2, “Wireless control of foot switch”.
E338	Foot switch error	A switch on the foot switch has been depressed since the surgical microscope was turned on or a switch is failed.	Check that any of the switches on the foot switch is not pressed unintentionally and that all of the switches function correctly. If any switch is pressed, release it. If there is a switch that does not work even when a function is assigned to it, stop using the foot switch and contact Olympus.

7.3 Returning this instrument for repair

When returning this instrument for repair, contact Olympus. With this instrument, include a description of the malfunction or damage and the name and telephone number of the individual at your location who is the most familiar with the problem. Also, include a repair purchase order.

CAUTION

Olympus is not liable for any injury or damage that occurs because of repairs attempted by non-Olympus personnel.

Appendix

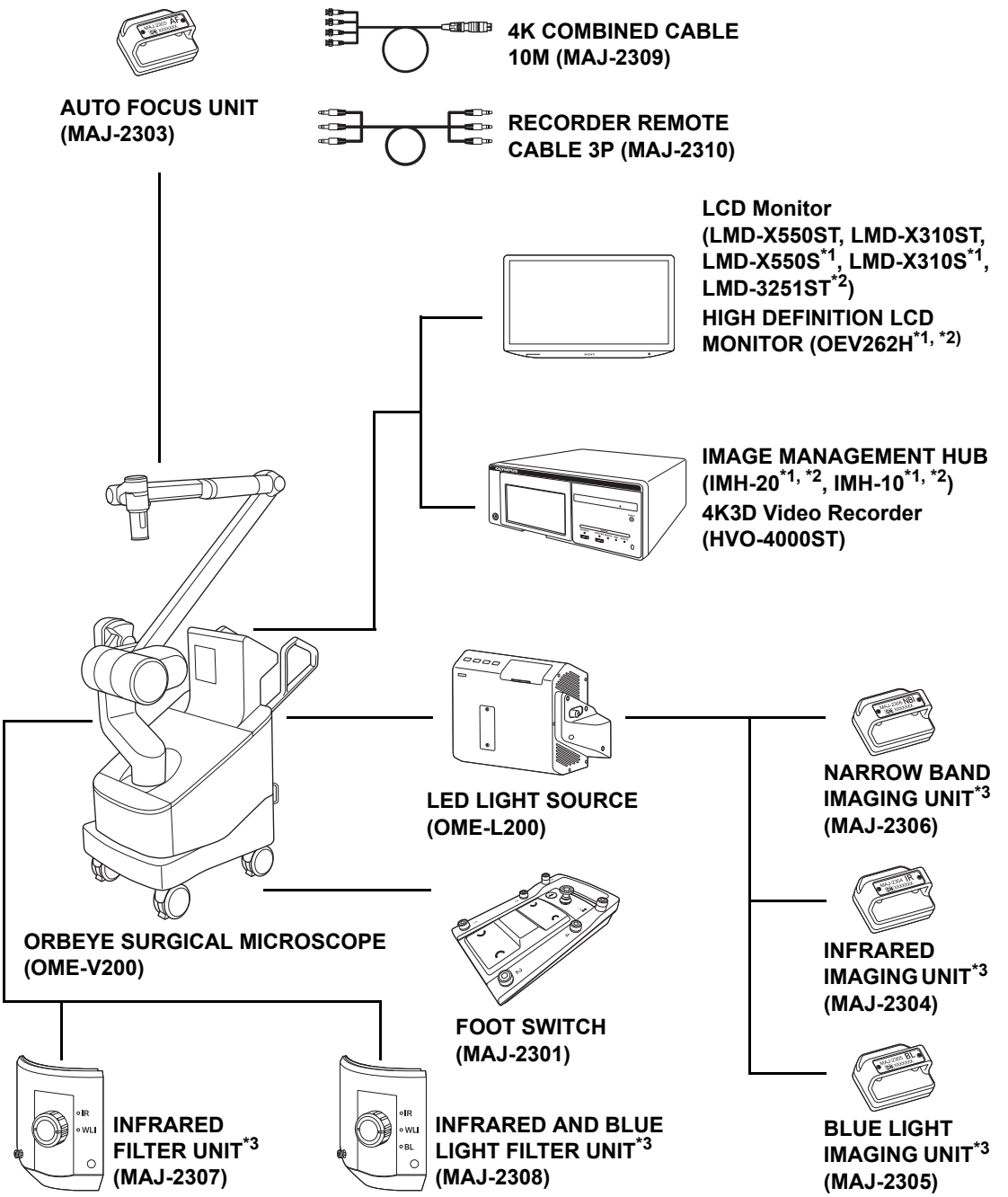
Combination equipment

■ System chart

The recommended combinations of equipment that can be used with this instrument are listed next page. New products released after the introduction of this instrument may also be compatible for use in combination with it. For further details, contact Olympus.

WARNING

Be sure to use the equipment in one of the recommended combinations. If combinations of equipment other than those shown below are used, the full responsibility should be assumed by the medical treatment facility. Such combinations do not only allow the equipment to manifest their full functionality but may also imperil the safety of the patient and medical personnel. In addition, the endurance of this instrument and ancillary equipment is not guaranteed. Troubles caused in this case are not covered by free-of-charge repair.



*1 3D incompatible.

*2 4K incompatible.

*3 These products may not be available in some areas.

Specifications

■ Environments

Operating environment	**Ambient temperature**	10 – 35°C (50 – 95°F)
	Relative humidity	30 – 75% (without condensation)
	Atmospheric pressure	700 – 1060 hPa (0.7 – 1.1 kgf/cm^2) (10.2 – 15.4 psia)
Standard storage environment (e.g. within the hospital)	**Ambient temperature**	5 – 40°C (41 – 104°F)
	Relative humidity	10 – 95% (without condensation)
	Atmospheric pressure	700 – 1060 hPa (0.7 – 1.1 kgf/cm^2) (10.2 – 15.4 psia)
Transportation environment (conditions during transportation and short-term storage)	**Ambient temperature**	–20 to +70°C (–4 to +158°F)
	Relative humidity	10 – 95%
	Atmospheric pressure	700 – 1060 hPa (0.7 – 1.1 kgf/cm^2) (10.2 – 15.4 psia)

■ Specifications

Item		Specifications
Foot switch	**Dimensions**	242 (W) × 420 (H) × 94 (D) mm
	Weight	2320 g (Battery not included)
	Waterproof performance	IPX6 and IPX8
	Power source	Wired connection: 5 V – 200 mA Wireless connection: “C”-size (LR14) 1.5 V Alkaline battery (× 3)
	Connection system	Wired connection and wireless connection
	Wireless specification	Antenna power: ≤1.0 mW
Wireless unit	**Wireless specification**	Antenna power: ≤1.0 mW
Foot switch cable	**Length**	4650 mm

Medical Devices Directive		CE This device complies with the requirements of Directive 93/42/EEC concerning medical devices. Classification: Class I
RoHS Directive		CE This device complies with the requirements of Directive 2011/65/EU concerning electrical and electronic equipment.
RE Directive		CE This device complies with the requirements of DIRECTIVE 2014/53/EU OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 16 April 2014 (RED).
WEEE Directive		 In accordance with European Directive 2002/96/EC on Waste Electrical and Electronic Equipment, this symbol indicates that the product must not be disposed of as unsorted municipal waste, but should be collected separately. Refer to your local Olympus distributor for return and/or collection systems available in your country.
EMC	**Applicable standard**	IEC 60601-1-2:2014 • Compliant to the EMC requirements for medical equipment edition 4 (IEC 60601-1-2: 2014). • Classification by emission standard CISPR 11 Group 1, Class A
Year of manufacture		The last digit of the year of manufacture is the second digit of the serial number. In this example, the year is 2017. Ex. 1701234 (serial number)

EMC information

Guidance and manufacturer's declaration — Electromagnetic emissions

This model is intended for use by medical personnel in hospitals and for use in the electromagnetic environment specified below.
The customer or the user of this model should assure that it is used in such an environment.

Emissions test	Compliance	Electromagnetic environment - Guidance
RF emissions CISPR 11	Group 1	This instrument uses RF (Radio Frequency) energy only for its internal function. Therefore, its RF emissions are very low and are not likely to cause any interference in nearby electronic equipment.
Radiated emissions CISPR 11	Class B	This instrument's RF emissions are very low and are not likely to cause any interference in nearby electronic equipment.
Main terminal conducted emissions CISPR 11		
Harmonic emissions IEC 61000-3-2	Class A	This instrument's harmonic emissions are low and are not likely to cause any problem in the typical commercial power supply connected to this instrument.
Voltage fluctuations/flicker emissions IEC 61000-3-3	Complies	This instrument stabilizes its own radio variability and has no effect such as flicker in lighting apparatus.

❍ Guidance and manufacturer's declaration — Electromagnetic immunity

This model is intended for use by medical personnel in hospitals and for use in the electromagnetic environment specified below.
The customer or the user of this model should assure that it is used in such an environment.

Immunity test	IEC 60601-1-2 (2014) test level	Compliance level	Electromagnetic environment - Guidance
Electrostatic discharge (ESD) IEC 61000-4-2	Contact: ±8 kV Air: ±2, ±4, ±8, ±15 kV	Same as left	Floors should be made of wood, concrete, or ceramic tile that hardly produces static. If floors are covered with synthetic material that tends to produce static, the relative humidity should be at least 30%.
Electrical fast transient/burst IEC 61000-4-4	±2 kV for power supply lines ±1 kV for input/output lines	Same as left	Mains power quality should be that of a typical commercial (original condition feeding the facilities) or hospital environment.
Surge IEC 61000-4-5	Differential mode: ±0.5, ±1 kV Common mode: ±0.5, ±1, ±2 kV	Same as left	Mains power quality should be that of a typical commercial or hospital environment.
Voltage dips, short interruptions, and voltage variations on power supply input lines IEC 61000-4-11	0% U_T (100% dip in U_T) for 0.5 cycle/1 cycle	Same as left	Mains power quality should be that of a typical commercial or hospital environment. If the user of this instrument requires continued operation during power mains interruptions, it is recommended that this instrument be powered from an uninterruptible power supply or a battery.
	70% U_T (30% dip in U_T) for 25 cycle (50 Hz)/ 30 cycle (60 Hz)		
	0% U_T (100% dip in U_T) for 250 cycle (50 Hz)/ 300 cycle (60 Hz)		
	–		
Power frequency (50/60 Hz) magnetic field IEC 61000-4-8	30 A/m (50 Hz, 60 Hz)	Same as left	It is recommended to use this instrument by maintaining enough distance from any equipment that operates with high current.
Definition	U_T is the a.c. mains voltage prior to application of the test level.		

Guidance and manufacturer's declaration — Electromagnetic immunity

WARNING

- This model is intended for use by medical personnel in hospitals and for use in the electromagnetic environment specified below.
  The customer or the user of this model should assure that it is used in such an environment.
- Portable and mobile RF communications equipment should be used no closer than 30 cm (12 inches) to any part of this model, including cables specified by Olympus.

Immunity test	IEC 60601-1-2 (2014) test level	Compliance level	Electromagnetic environment - Guidance
Conducted RF IEC 61000-4-6	3V (150 kHz – 80 MHz)	Same as left	Refer to the guidance in the left column.
	6V (ISM band of 150 kHz – 80 MHz)	Same as left	Refer to the guidance in the left column.
	ISM (industry, science, and medical care) band of 6.765 MHz – 6.795 MHz, 13.553 MHz – 13.567 MHz, 26.957 MHz – 27.283 MHz, and 40.66 MHz – 40.70 MHz between 0.15 MHz and 80 MHz		
Radiated RF IEC 61000-4-3	3V/m (80 MHz – 2.7 GHz)	Same as left	Refer to the guidance in the left column.
Proximity magnetic field from RF communication equipment IEC 61000-4-3	Refer to the table of the next page.	Same as left	Refer to the guidance in the left column.

Test frequency [MHz]	Band [MHz]	Modulation*1	Maximum power (W)	IMMUNITY TEST LEVEL [V/m]
385	380 – 390	Pulse modulation*1 18 Hz	1.8	27
450	430 – 470	FM*2 ±5 kHz deviation 1 kHz sine	2	28
710	704 – 787	Pulse modulation*1 217 Hz	0.2	9
745				
780				
810	800 – 960	Pulse modulation*1 18 Hz	2	28
870				
930				
1720	1700 – 1990	Pulse modulation*1 217 Hz	2	28
1845				
1970				
2450	2400 – 2570	Pulse modulation*1 217 Hz	2	28
5240	5100 – 5800	Pulse modulation*1 217 Hz	0.2	9
5500				
5785				

*1 The carrier shall be modulated using a 50% duty cycle square wave signal.

*2 As an alternative to FM modulation, 50% pulse modulation at 18 Hz may be used because while it does not represent actual modulation, it would be worst case.

Guidance and manufacturer's declaration — Cables used for EMC compliance testing

This model has passed the EMC compliance testing with the cables below.

Product Name	Description	Cable (Shield)	Length [m]	Location	Classification	Test Included
MAJ-2301	Foot Switch cable	Yes	4.65	Rear panel	SIP/SOP	Emission/ Immunity
MAJ-2313	POWER CORD EU	No	4.5	Rear panel	AC	Emission/ Immunity
MAJ-2309	4K COMBINED CABLE 10M	Yes	10	Rear panel	SIP/SOP	Emission/ Immunity
MAJ-1912	HD-SDI cable 8.5M	Yes	8.5	Rear panel	SIP/SOP	Emission/ Immunity
MAJ-2016	3G-SDI cable 8.5M	Yes	8.5	Rear panel	SIP/SOP	Emission/ Immunity
MAJ-2310	RECORDER REMOTE CABLE 3P	Yes	10	Rear panel	SIP/SOP	Emission/ Immunity

Refer to the instruction manuals for each piece of equipment.

Cautions on 2.4 GHz band radio wave equipment

- This instrument employs the 2.4 GHz frequency band. This band is used by industrial and scientific equipment such as medical instruments and microwave ovens, as well as by premises radio stations for mobile object identification (radio stations with license requirement) used in factory manufacturing lines, the specified low-power radio stations (stations without license requirement) and amateur radio stations (stations with license requirement).
  Before using this instrument, confirm that there is no mobile object identification premises radio station, specified low-power radio station or amateur radio station operated in the proximity.
  Should harmful radio interference occur between this instrument and another radio station, use the wireless control or stop using the instrument.
  Also, the communication may be interrupted or become slow when this instrument is used near a microwave oven, digital cordless telephone or other equipment using the 2.4 GHz band radio wave (wireless LAN, Bluetooth® device, wireless audio equipment, game machine, etc.). If this happens, use the wired control or turn off the equipment causing the interference.
- The Japanese Radio Law prohibits modification of this instrument. Do not peel off the labels with certification markings, etc., attached to this instrument.

OLYMPUS®

Manufactured by

OLYMPUS MEDICAL SYSTEMS CORP.
2951 Ishikawa-cho, Hachioji-shi, Tokyo 192-8507, Japan
Fax: (042)646-2429 Telephone: (042)642-2111

Distributed by

OLYMPUS AMERICA INC.
3500 Corporate Parkway, P.O. Box 610, Center Valley, PA
18034-0610, U.S.A.
Fax: (484)896-7128 Telephone: (484)896-5000

OLYMPUS LATIN AMERICA, INC.
5301 Blue Lagoon Drive, Suite 290 Miami, FL 33126-2097, U.S.A.
Fax: (305)261-4421 Telephone: (305)266-2332

EC REP **OLYMPUS EUROPA SE & CO. KG**
(Premises/Goods delivery) Wendenstrasse 14-18, 20097 Hamburg, Germany
(Letters) Postfach 10 49 08, 20034 Hamburg, Germany
Fax: (040)23773-4656 Telephone: (040)23773-0

KEYMED (MEDICAL & INDUSTRIAL EQUIPMENT) LTD.
KeyMed House, Stock Road, Southend-on-Sea, Essex SS2 5QH, United Kingdom
Fax: (01702)465677 Telephone: (01702)616333

OLYMPUS MOSCOW LIMITED LIABILITY COMPANY
Elektrozavodskaya str. 27 bld.8, 107023 Moscow, Russia
Fax: (7)495-663-8486 Telephone: (7)495-926-7077

OLYMPUS (BEIJING) SALES & SERVICE CO., LTD.
A8F, Ping An International Financial Center, No. 1-3, Xinyuan South Road,
Chaoyang District, Beijing, 100027 P.R.C.
Fax: (86)10-5976-1299 Telephone: (86)10-5819-9000

OLYMPUS KOREA CO., LTD.
2F-3F Majestar City Tower One, 12, Seocho-daero 38-gil, Seocho-gu, Seoul, 06655, Korea
Fax: (02)6255-3210 Telephone: 1544-3202

OLYMPUS SINGAPORE PTE LTD
491B, River Valley Road #12-01/04, Valley Point Office Tower, Singapore 248373
Fax: 6834-2438 Telephone: 6834-0010

OLYMPUS AUSTRALIA PTY LTD
3 Acacia Place, Notting Hill, VIC 3168, Australia
Fax: (03)9543-1350 Telephone: (03)9265-5400

RA2483 01

Printed in Japan 20171024 *0000