

# Instructions

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# SZX-AR1 System

**Note**

This instruction manual is for the Evident SZX-AR1 System.

To ensure safety, achieve optimum performance, and familiarize yourself fully with the use of this product, we recommend that you study this manual thoroughly before operating it and ensure it is available for reference during operations.

For details about the products included in the configuration of this system, see pages 16.

Optical Microscope and Accessory

This product is applied with the requirements of standard IEC/EN61326-1 concerning electromagnetic compatibility.

- Emission        Class A

- Immunity        Industrial electromagnetic environment

Emissions exceeding the level required by aforementioned standards may occur if this product is electrically connected to other equipment.

Some interference may occur if this product is used in residential environments.

**NOTE:** This product has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the product is operated in a commercial environment. This product generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications.

Operation of this product in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

**FCC WARNING:** Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the product.

**FCC Supplier's Declaration of Conformity**

Hereby declares that the product

Product name: Optical Microscope and Accessory

Model Number: SZX2-ARTTR

Conforms to the following specifications:

FCC Part 15, Subpart B, Section 15.107 and Section 15.109

Supplementary Information:

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Responsible Party Name: Evident Scientific, Inc.

Address:            48 Woerd Ave Waltham, MA 02453, USA

Phone Number: 781-419-3900



In accordance with European Directive 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 distributor in EU for return and/or collection systems available in your country.

**For Korea only**

이 기기는 업무용 환경에서 사용할 목적으로 적합성평가를 받은 기기로서 가정용 환경에서 사용하는 경우 전파간섭의 우려가 있습니다.

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# Concept of this instruction manual

This instruction manual describes the contents related to the whole SZX-AR1 system.

## Target group

This instruction manual is intended for users operating the product according to "Intended uses" on page 3, as well as for Evident distributors.

## Structure of instruction manuals

Read the instruction manual for the units you have purchased.

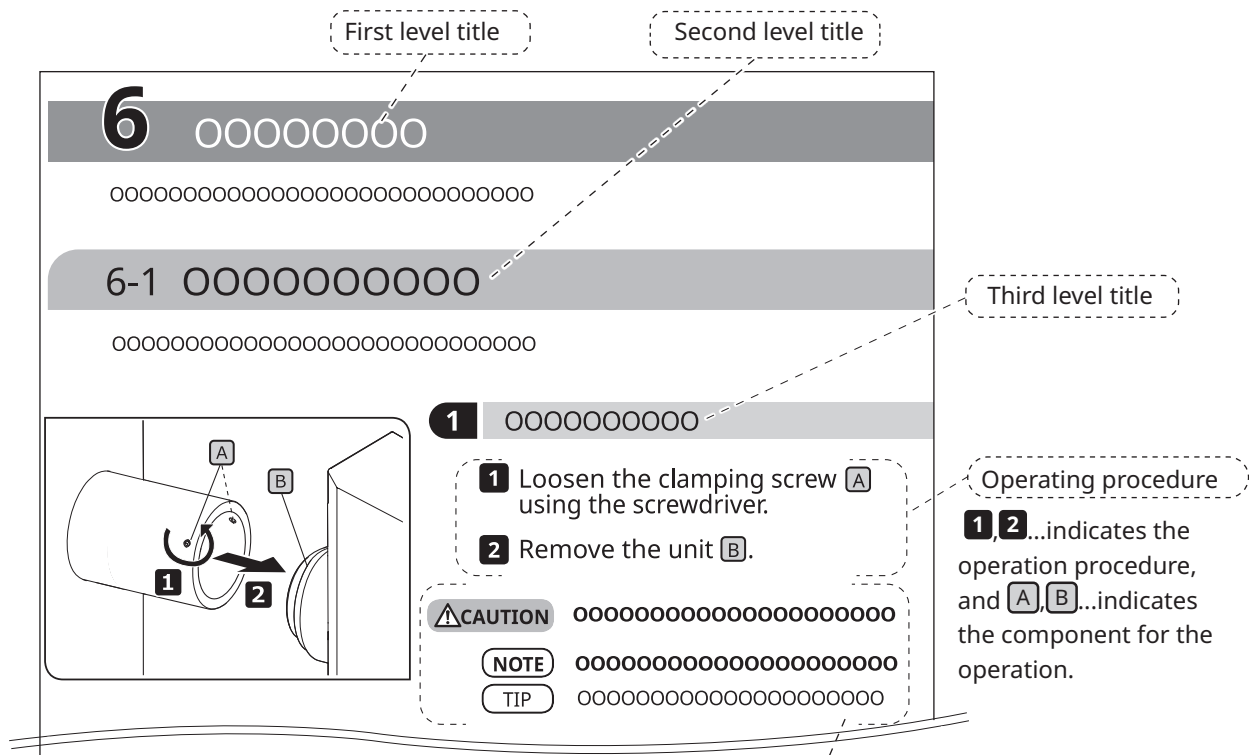
The following instruction manuals are prepared for the units used with this product. In addition to those listed below, there are also instruction manuals for the units indicated by an \*\* mark in "4 System diagram" on page 16.

Manual names	Main contents
SZX-AR1 system (this manual)	Explains how to operate the AR tilting trinocular tube SZX2-ARTTR
DP23/DP28	Explains how to connect the DP23/DP28 digital camera
DP27	Explains how to connect the digital camera DP27
SZX16	Explains how to operate the stereo microscope system SZX16
SZX10	Explains how to operate the stereo microscope system SZX10
SZX7	Explains how to operate the stereo microscope system SZX7
U-TV0.63XC	Explains how to connect the C-mount 0.63X camera adapter
U-TV0.5XC-3	Explains how to connect the C-mount 0.5X camera adapter
U-TV0.35XC-2	Explains how to connect the C-mount 0.35X camera adapter

In addition to the above, Online Help is provided on the software. These procedures are described using the screens of Windows 10.

## How to read this instruction manual

This instruction manual is structured as follows.



The following symbols are used in this instruction manual.

- ⚠ DANGER** : Indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.
- ⚠ 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 material damage.
- NOTE** : Indicates a potential situation which, if not avoided, may result in failure of this instrument.
- TIP** : Indicates useful knowledge or information for use.

# Product Concept

## Product outline

The SZX-AR1 system can superimpose the digital contents as Augmented Reality on the image observed through the eyepieces of the stereo microscope.

## Intended uses

Use cases for this product

- Assembly and inspection work in manufacturing processes
- Creation of assembly and inspection manuals
- Training related to basic skills and assembly/inspection skills

Suitable samples include semiconductors, electronic components, molded products, and mechanical parts.

Industrial applications include observation, inspection, and measurement.

Do not use this product for any purpose other than the intended use.

## Precautions and points for confirmation before use

When you unpack the package, check all the included items referring to the list of accessories. If any components are missing or damaged, contact an Evident distributor.

A list of the enclosed components can be downloaded from the same website as this instruction manual.

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## Safety precautions

If this product is used for any purpose other than those described in this instruction manual, this could cause safety issues or product failure. Always use the product according to this instruction manual.

### Prevention of electric shock



#### WARNING

- **Never disassemble any part of this product.**

It could cause electric shock or product failure.

- **Do not touch the product with wet hands.**

In particular, if you touch the main switch of the power unit or the power cord with wet hands, this could cause electric shock, fire, or product failure.

- **Do not bend, pull, or tie up the power cord or cables.**

Otherwise they could be damaged, causing a fire or an electric shock.

### Electric safety



#### CAUTION

- **Always use the power cord specified by us.**

If the proper AC adapter and the power cord are not used, the electric safety and the EMC (Electromagnetic Compatibility) performance of the product intended by us cannot be assured. If no power cord is provided, please select the proper power cord by referring to the section "Proper selection of the power cord" at the end of this instruction manual.

- **Always connect the ground terminal.**

Connect the ground terminal of the power cord to the ground terminal connection of your electrical socket.

If the product is not grounded, the intended electric safety and EMC performance of the product cannot be assured.

- **Do not use the product in close proximity to sources of strong electromagnetic radiation.**

Proper operation may be interfered. The electromagnetic environment should be evaluated prior to operation of the product.

- **Disconnect the power cord in case of emergency.**

In case of emergency, disconnect the power cord from the power cord connector on the product or from the power outlet.


Install the product at the location where you can reach the power cord connector or the power outlet at hand to disconnect the power cord quickly.

- **Do not connect or disconnect the power cord, cables, or units while the power is ON.**

## Safety symbols


The following symbols are placed on this product.

Study the meaning of the symbols and always use the product in the safest possible manner.

Symbol	Meaning
	Indicates a non-specific general hazard. Follow the cautions given after this symbol or in the instruction manual.
I	Indicates that the seesaw type main switch is ON. (Seesaw switches are a type of switch that selects ON or OFF by pressing it to the ON or OFF side.)
O	Indicates that the seesaw type main switch is OFF.

### Label position and instructions

Components which require particular care for usage and operations are marked with a caution indication. Always follow these instructions.

Label position	Label	Instructions in instruction manual	Page
Back side of AR tilting trinocular tube		Safety precautions - Electric safety	Page 4
		Safety precautions - Prevention of electric shock	

If caution labels get dirty or peel off, contact an Evident distributor for assistance.

## Handling precautions

### General precautions

- NOTE** • **This product is a precision instrument. Treat this product with care and avoid subjecting it to impacts.**
- **Disassembling the product could cause unexpected accidents or failure. Never disassemble the product.**
  - **Do not use the product in areas where it may be subjected to direct sunlight, high humidity, dust, vibrations or out of operating temperature range (10°C to 35°C). Otherwise the product may be damaged.**  
(For operating environment conditions, see "9 Specifications" on page 34.)
  - **For units which can be attached to this product, see pages 16, 17, and 18.**  
The use of this product in combination with other units not only creates the risk of abnormal operation, but may also damage the product.
  - **Before disposing of this product, be sure to follow the regulations and rules of your local government.**

### Restrictions

- When linking units of the SZX7 system, SZX10 system, or SZX16 system with this system, never use this system as a medical instrument, for diagnostics, or for similar purposes.
- Each focusing unit has a limit in load capacity. "Load capacity of focusing unit" on page 8 See "Load capacity of focusing unit" on page 7, and do not use a combination that exceeds the load capacity.
- This system displays dimensions and magnifications but their accuracy is not guaranteed. Therefore, these values should be used for reference only.
- This system is not dustproof or mold-proof.
- This system does not support ESD.
- If you move your line of sight while looking into the AR tilting trinocular tube, the AR image may shake.
- If the sample is not in focus, the AR image may appear doubled.
- If you change the zoom magnification, the depth perception of the AR image may change.
- If the focus adjustment knob is not in the click position, the AR image is not displayed.
- When acquiring images with the camera, the light (room light, etc.) through the eyepieces may appear on the image. In this case, put on the eyepiece cover provided with the AR tilting trinocular tube before conducting imaging.
- If you increase the exposure time of the camera when the observed image is dark and also the AR image brightness is set to maximum, flares or ghosts may appear on the acquired image.
- When observing highly reflective samples, flares or ghosts may appear on the image.
- For the observable ranges on sample surfaces through the eyepieces and the camera when using the objective lens at 1x magnification, see "7-4 Observation and Camera Imaging" on page 23.
- If you observe the image with the camera exceeding the observable range through the eyepieces, the peripheral light may be insufficient if the zoom magnification is set to the minimum.
- During observation, some areas around the field of view may appear darker than the center of the field of view.
- If the diopter of the eyepiece is not adjusted correctly, the camera image may not be focused even though the sample is in focus. If the camera image is still blurry even after adjusting the diopter, adjust focus and carry out imaging while checking the camera image on the monitor.
- Before adjusting the tension of the focusing unit, lower the focusing unit to the lowest position.

- When the zoom magnification sensor is attached, minor scratches may be made on the focus adjustment knob.
- The magnification indicated on the focus adjustment knob may differ from the total magnification shown in the software in the following cases. To avoid this confusion, remove the magnification indication sticker or the magnification ring attached to the focus adjustment knob before use.
  - (a) When the magnification ring provided with the objectives (DFPL0.75X-4, DFPLAPO1.25X, SZX-ACH1.25X-2, DFPL1.5X-4, or DFPL2X-4) is attached.
  - (b) When the magnification indication sticker provided with the ergonomic trinocular tube SZX2-LTTR is attached.
- Attach the extendable eyepoint adjuster, AS unit (SZX-XB7 only) and coaxial reflected light illumination unit between the AR tilting trinocular tube and the zoom microscope body in this order from top.
- With the SDFPLAPO1.6XPF or SDFPLAPO2XPFC objective, vignetting may occur when the zoom is set at low magnification.
- If you use the extendable eyepoint adjuster function to set the eyepoint height at 150 mm, set the zoom magnification to the minimum, and set the AS to a value other than maximum, vignetting occurs in the area around the field of view.
- Ghosting may appear on the edges of images captured with the camera if the extendable eyepoint adjuster function is being used at a height of 50 mm or more.
- This system does not support the location change of the PC. Therefore, use the OS keeping the language setting made at setup, i.e. Japanese or English. (The change of time zone is supported.)
- When connecting the camera via USB, connect directly to the device without a USB hub or other intermediary device.
- The AR tilting trinocular tube cannot be used if it is connected to SZX2-ARTTR via a VGA analog signal converter.
- The camera function cannot be used on the software without connecting the AR tilting trinocular tube. Confirm that the connection of the AR tilting trinocular tube and the camera is recognized.
- Tilting the zoom microscope body after mounting the zoom magnification sensor to it may cause the sensor to display incorrect values. To use it tilted, set up the zoom magnification sensor again.
- If the temperature increases or decreases by 25°C or more or the humidity increases or decreases by 30% or more after the product is set up, the zoom magnification sensor value may not be obtained correctly. Adjust the zoom magnification sensor again if necessary.
- On the AR image on the eyepiece side, the graphics and text that can be displayed on the AR image and the black areas of the image are displayed transparent when they are displayed on the software.
- When using the SZX-ZB7 zoom microscope body in combination with the AS unit, or when using the SZX2-ZB10 zoom microscope body or the SZX2-ZB16 zoom microscope body, if the aperture diaphragm is stopped down, vignetting may occur.
- Do not use a microscope instrument that is not registered in the software. The incorrect dimension information may be displayed.

## Load capacity of focusing unit

Load capacity of focusing unit	
Product name	Load capacity [kg]
Focusing unit SZX2-FO	10
Coarse and fine dynamic focusing unit SZX2-FOF	15
Standard stand SZ2-ST	7

Weight of each unit		
Category	Product name	Weight [kg]
AR tilting trinocular tube	AR tilting trinocular tube	3.7
	Zoom magnification sensor	0.4
Eyepiece	WHSZ10X-H (2 units)	0.22
	WHN10X-H (2 units)	0.27
Camera	DP23-CU/DP28-CU	0.38
	DP27-CU	0.16
Camera adapter	U-TV0.35XC-2	0.14
	U-TV0.5XC-3	0.27
	U-TV0.63XC	0.43
Extendable eyepoint adjuster	SZX2-EEPA	2.1
AS unit	SZX-AS	0.3
Coaxial reflected light illumination unit	SZX2-ILLC10	0.84
Zoom microscope body	SZX-ZB7	0.96
	SZX2-ZB10	1.3
	SZX2-ZB16	1.3

Weight of each unit		
Category	Product name	Weight [kg]
Focusing adapter	SZX-STF	0.5
Objective	DFPL0.5X +SZ2-ET	0.536
	DFPL0.75X	0.356
	DFPLAPO1X-4	0.418
	SZX-ACH1X	0.18
	DFPLAPO1.25X	0.54
	SZX-ACH1.25X	0.26
	DFPL1.5X	0.466
	DFPL2X	0.615
Ring light guide adapter	SZX-LGR66	0.097
4-part LED ring illumination unit	SZX2-ILR66	0.47
6-point ring light guide	SZ2-CLGR	0.29
Ring light guide	LG-R66	0.45
LED illumination unit	SZ-LW61	0.12

## Precautions for the PC

- The PC data may be lost (corrupted) unexpectedly. Be sure to back up the data frequently.
- We are not liable for any damage (including compensation for the corrupted PC data) caused by the use or the inability to use the product.

### NOTE

- **When themes other than standards are set on the Windows® desktop, the software window may not be displayed or printed properly.**
- **If you use the PC that does not meet the system requirements and operating environments, the correct operation of the product cannot be assured. Contact our distributors for the PC models where operations have been confirmed by us.**
- **If this product is used in connection with a network, the product may not work properly due to the following causes.**
  - Virus infection through the network
  - Malfunction caused by applying OS service pack, security patch, or updating third party software including runtime libraries
- **If this product is used in connection with a network, the use of security software is recommended.**
- **If the unexpected behavior occurs, disconnect the product from the network, restore to the factory defaults and check whether the product operates properly.**
- **The following tasks should be done by customers even if the PC was kitted by us. We are not responsible for any incidents that occur caused by your failure to perform these tasks.**
  - Change the password
  - Install security software
  - Comply with the security policy of the facilities where this system is used
- **The default settings of DP2-PC-M are as follows:**
  - Automatic login: Enabled
  - Account: olympus
  - Password: olympus
  - Olympus account authority: Administrator
- **If the instruction manual provided with DP2-PC-M lists an account and password, use these.**
- **The operation of this system cannot be guaranteed if the PC environment is changed as follows.**
  - Change in settings caused by applying OS service pack, security patch, or updating third party software including runtime libraries
  - Change in settings caused by installation of software other than SZX-AR1-APP or version upgrades
- **If a problem occurs in the system due to a change in the PC environment or inappropriate actions by a third party, we are not responsible for a full recovery to the environment before the event occurred.**
- **Please be aware that we are not responsible for indemnity or compensation for any loss of profit which may occur due to inappropriate actions (server attacks, virus infections, server damage, or hacking) by third parties via networks and that we make no guarantee that there will be no other risks related to other security infiltration.**
- **We are not responsible for the following phenomena in the event of a system overload occurring due to the use of anti-virus software, etc.**
  - Loss of data (loss of audio or images) or flickering images while recording video
  - Reduced processing speed of the this system
  - Flickering of observed live image or reduced FPS
  - Deteriorated operability, loss of acquired images, delay or stop of operations
- **Please be aware that we are not responsible for indemnity or compensation for loss of profit due to the occurrence of incidents such as the falsification or destruction of confidential information due to lost information in a PC or external memory device (HDD, SSD, etc.) or threats such as unauthorized direct or physical interference with the instrument by a third party.**
- **If this product is connected to the PC via a network, the use of security software is recommended.**

## System requirements for the PC

- The PC used with this system should be conformed to IEC/EN60950-1 or IEC/EN62368-1.
- The system requirements for the PC used with this system are listed below. Even if the system requirements below are met, we do not guarantee the operation of the systems in combination with all commercially-available PCs.

Item	Specifications
OS	Windows 10 Pro (64bit), Windows 10 Pro for Workstation (64bit) Windows 10 version: 2004, 21H1, 21H2, 22H2 Windows 10 IoT Enterprise LTSC 2019 (only when combined with DP23/DP28) Windows 11 Pro (64bit), Windows11 Pro for Workstation (64bit) Windows 11 version: 21H2, 22H2, 23H2
OS language	Japanese, English
Processor	10th generation Intel® Core™ i5 equivalent or better (Recommended core: 4 or more, clock frequency: 3.2 GHz)
Memory	8 GB or more (Recommended: 16 GB or more)
Storage capacity required to install software	1 GB or more free space
Graphic controller	Intel UHD Graphics 630 or more
Monitor resolution	1366 x 768 or more
USB interface	<ul style="list-style-type: none"> <li>• USB2.0 Type-A x 1 (for connection with AR tilting trinocular tube)</li> <li>• USB2.0 Type-A x 1 (for zoom magnification sensor)</li> <li>• USB3.1 Type-A x 1 (for use with DP23/DP28) / USB3.0 Type-A x 1 (for use with DP27)</li> </ul>
Monitor interface	<ul style="list-style-type: none"> <li>• HDMI x 1 (for connection with AR tilting trinocular tube)</li> <li>• HDMI 1.4 or more</li> <li>• HDMI connector: Type-A</li> </ul>

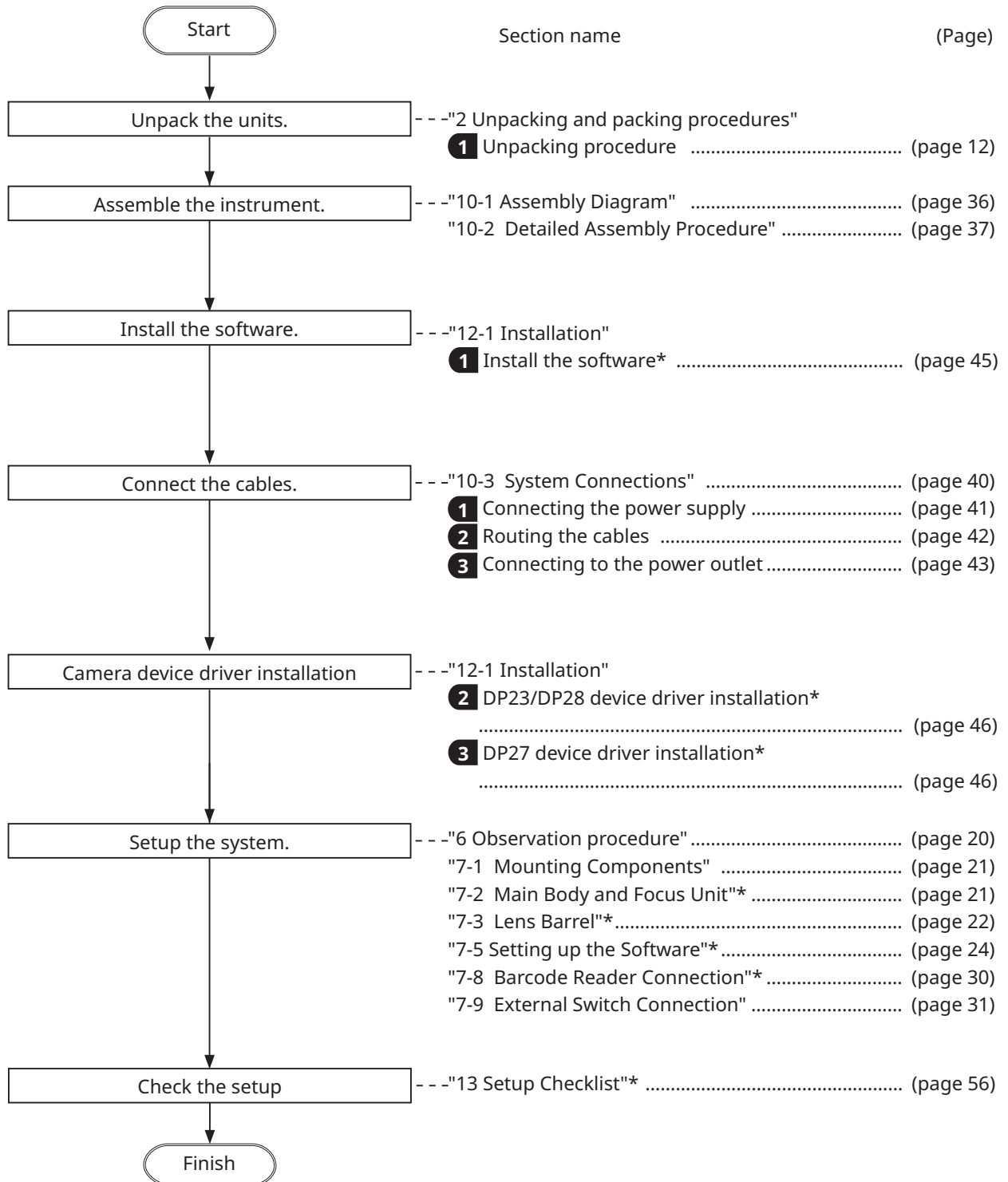
# 1 Setup workflow

This section lists the order of preparations and setup tasks to perform to get your SZX-AR1 system ready to use.

This section also describes the usage and adjustments related to the assembly procedure.

Be sure to operate the procedure in the order from the top.

When removing units, use the reverse order. (The procedures marked with an asterisk (\*) are not necessary for removal.)





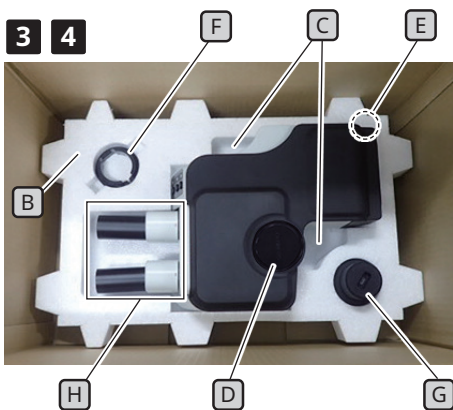
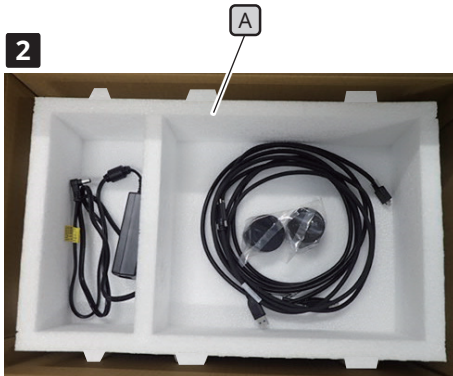
## 2 Unpacking and packing procedures

### 1 Unpacking procedure

**TIP** When unpacking, the product and component units will be packed in plastic bags. In this section, to make the explanation and illustration easy to understand, the photos showing the status where these items are taken out from the plastic bags are used.

**1** Take off the top lid to open the packing box and remove the internal pad cover while paying attention not to damage the product.

**2** The cables are packed as shown in the picture on the left. Remove them and pull out the top pad **A** from the packing box.



**3** Insert your fingers into the concave part for taking out the AR trinocular tube **C** on the bottom pad **B**, and scoop up the AR tilting trinocular tube **D** to remove it.

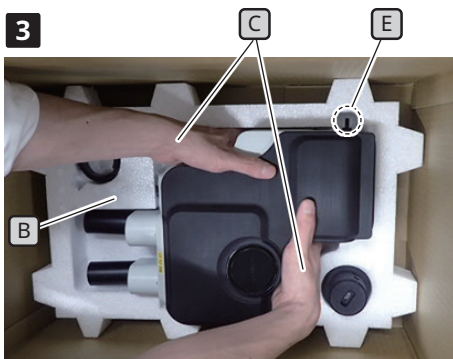
**NOTE** • When removing the AR tilting trinocular tube, be careful not to make the wiring clamp **E** caught by the pad or apply the impact on it.

• Do not hold the eyepiece mount **H** when taking out or carrying the AR tilting trinocular tube. Unexpected accidents or failure may be caused.

• The center of gravity of the AR tilting trinocular tube is on the eyepiece mount side. When taking out the AR tilting trinocular tube, be careful not to lose the balance.

**4** Remove the clamp **F** of the zoom magnification sensor and the zoom magnification sensor **G** from the bottom pad **B**.

**NOTE** If you need to pack this product, such as to ship to the distant location, you must use the packing box, pads and plastic bags. In this case, always contact an Evident distributor for assistance.



Insert fingers into the concave part to remove the AR tilting trinocular tube **B** on the bottom pad **C**.

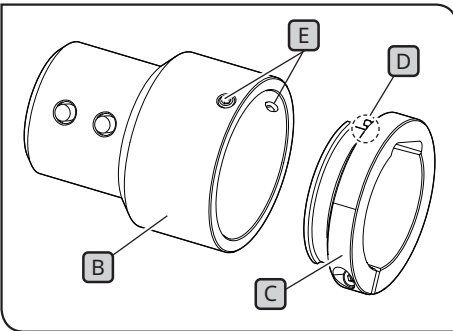
## 2 Packing procedure

2



A

3



5



Insert fingers into the concave part to take out the AR tilting trinocular tube **F** on the bottom pad **H**.

**1** Before performing procedures in this section, attach the eyepiece caps and the cap of the straight tube to mount the camera adapter.

**2** Before packing the AR tilting trinocular tube, minimize the interpupillary distance of the eyepiece mount **A** and set the tilting angle to the lowest point.

**TIP** To lower the tilting angle, hold the eyepiece mount **A** with one hand while holding the top surface of the observation tube with the other hand, and set the tilting angle to the lowest point.

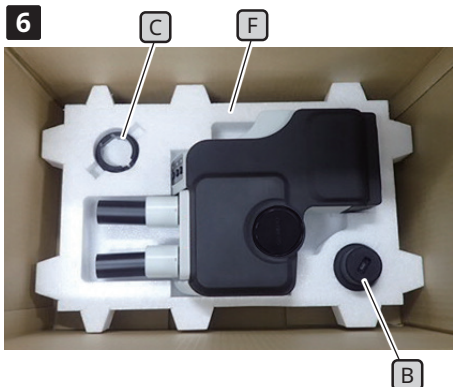
**3** Insert the zoom magnification sensor clamp **C** into the zoom magnification sensor **B** and tighten the two mounting screws **E** with the mark **D** on the clamp in position.

**4** Put the product and the units back into the plastic bags you retained after unpacking them.

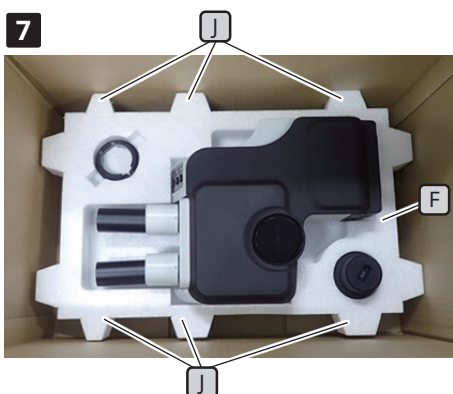
**TIP** When packing the product and the units, pack them kept in the plastic bags. In this section, to make the explanation and illustration easy to understand, the photos showing the status where these items are taken out from the plastic bags are used.

**5** Insert the bottom pad **F** into the bottom of the packing box. Put your finger on the bottom surface of the AR tilting trinocular tube and insert your hand into the concave part for taking out the AR tilting trinocular tube **G** on the bottom pad. Then, put the AR tilting trinocular tube into the pad.

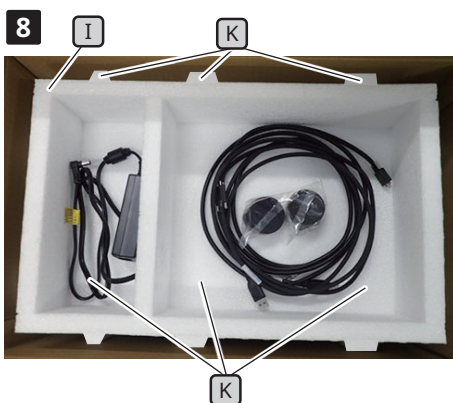
**NOTE** When removing the AR tilting trinocular tube, be careful not to get the wiring clamp **H** caught on the pad or subject it to impact.



- 6** Insert the clamp **C** of the zoom magnification sensor and the zoom magnification sensor **B** into their respective positions. At this time, insert the zoom magnification sensor **B** into the bottom pad **F** with the larger diameter side facing down.



- 7** Place the top pad **F** on the bottom pad **I**. At this time, place the top pad **J** so that the convex parts **K** (6 positions) of the bottom pad and the convex parts **I** (6 positions) of the top pad are aligned.



- 8** Put the AC adapter in the left hand space, and put the cables, eyepiece cover, instruction manual, and DVD (photos of the instruction manual and the DVD are omitted to simplify the explanation) in the right hand space of the top pad **I**.

- 9** Attach the internal pad cover and close the lid of the packing box.

- NOTE**
- Make sure that the internal pad cover is attached in the correct direction. If not, the top lid does not close. With the protrusion on the internal pad cover facing down, attach the internal pad cover so that the protrusion is housed in the right-side space of the top pad **I**.
  - Close the packing box and seal it securely so that it does not open during transportation.

# 3 Maintenance and Storage

## Lifetime

The lifetime of this system is approximately 5 years after purchase if the product is used properly according to this instruction manual.

When using SZX2-ARTTR with the unit you are using, follow the lifetime of the unit you are using. To clarify any of these points, contact the retailer where you purchased the system.

## Cleaning of each unit

### Lenses and filters

Be careful to avoid stains, fingerprints, and other impurities on the lenses and filters. If they get dirty, blow away dust with a commercially available blower and gently wipe the lenses or filters with a piece of cleaning paper (or washed clean gauze). Only when cleaning fingerprints and oil stains, slightly moisten a piece of cleaning paper with commercially available absolute alcohol and wipe them off with it.



**WARNING** Since absolute alcohol is highly flammable, it must be handled carefully. Be sure to keep it away from open flames or potential sources of electrical sparks.

For example, the electrical equipment that is switched ON and OFF may cause the ignition of a fire. Also, always use absolute alcohol only in a well-ventilated room.

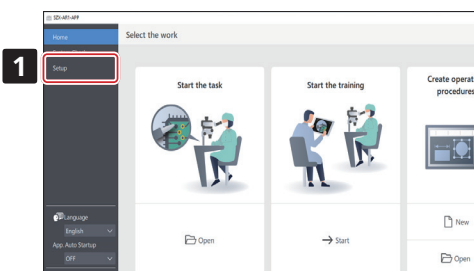
### Parts other than lenses

Wipe the parts other than lenses with a dry soft cloth. If dirt/dust cannot be removed by dry-wiping, moisten a soft cloth with diluted neutral detergent and wipe off dirt/dust with it.

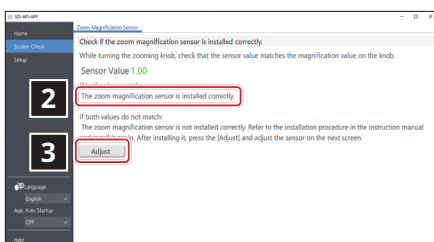


**NOTE** Do not use organic solvents because they may deteriorate the coated surface or plastic parts.

## Daily inspection of the zoom magnification sensor



**1** Click [Setup] on the Home screen.



**2** Rotate the focus adjustment knob and check whether the correct magnification is displayed.

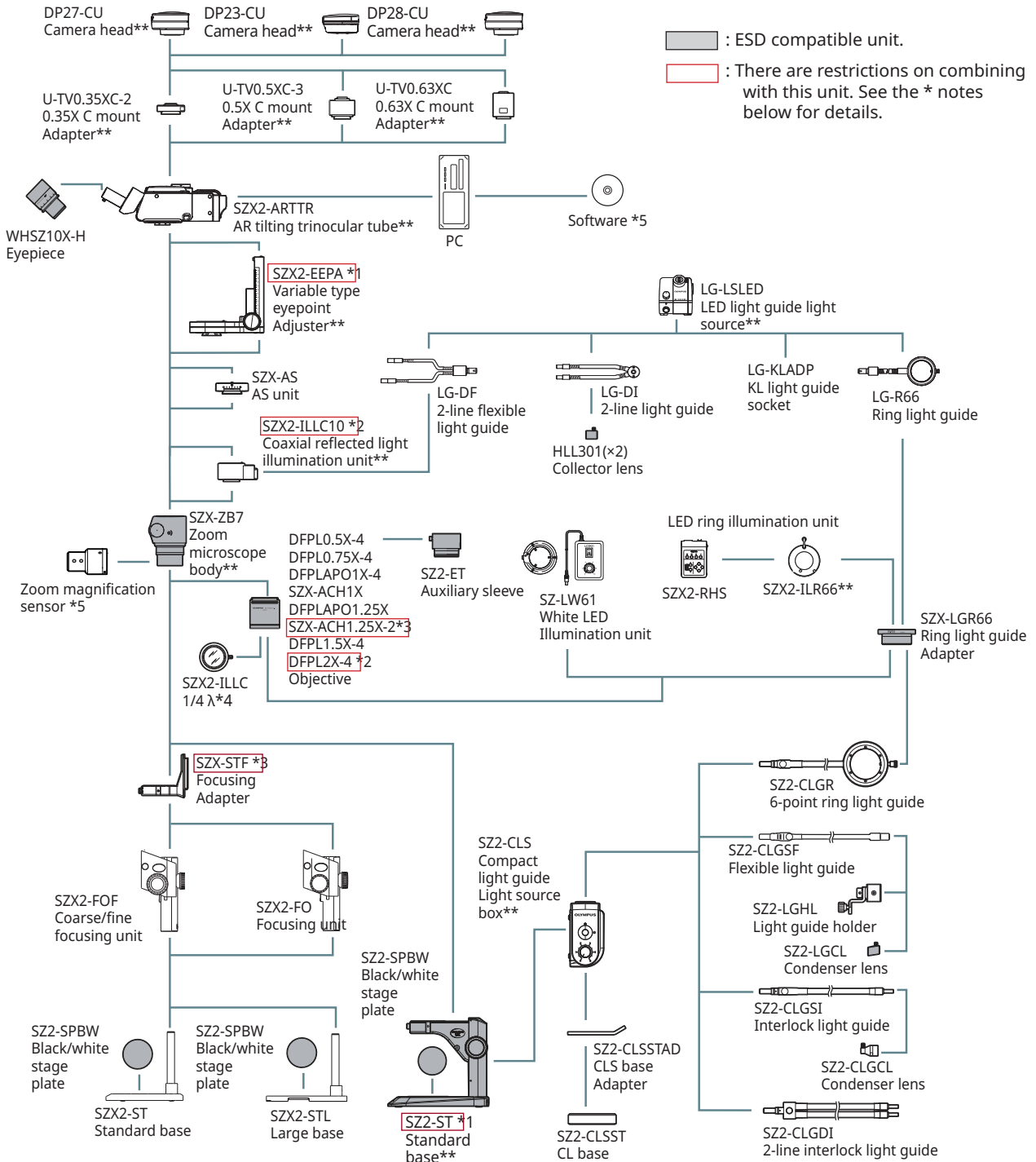
**3** If the correct magnification is not displayed, click the [Adjust] button to adjust the magnification. See page "Setting up the zoom magnification sensor" on page 28 for the adjustment method.

# 4 System diagram

This section shows the SZX-AR1 system diagram in combinations with the SZX-ZB7 zoom microscope body, SZX2-ZB10 zoom microscope body, and SZX2-ZB16 zoom microscope body. If you use this system in combination with any other units than those shown in this system diagram, the product performance cannot be assured.

Instruction manuals are available for units indicated by an \*\* mark. Be sure to read the instruction manuals.

## 1 Diagram of the system with the SZX-ZB7 zoom microscope body connected

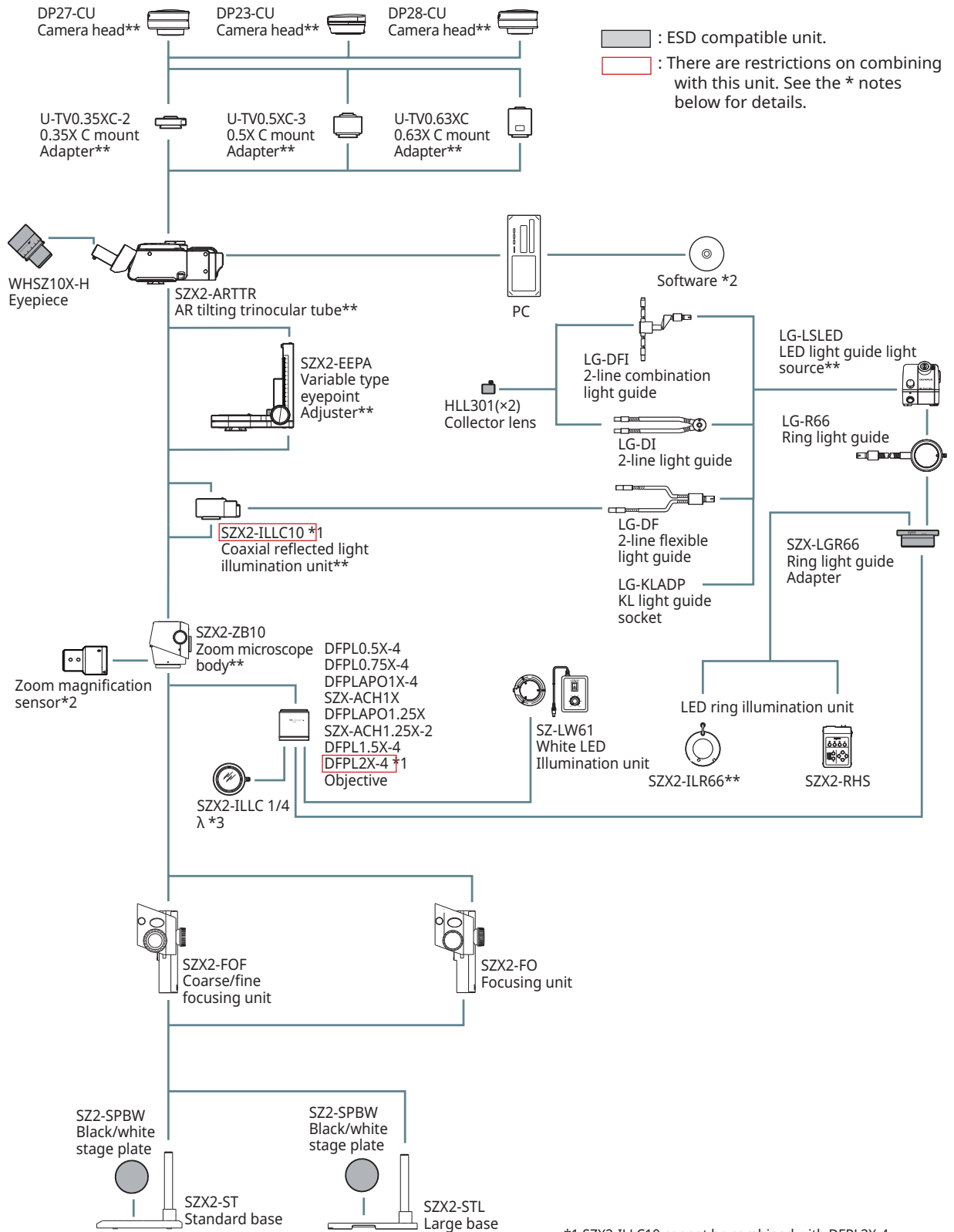


\*1 SZX2-EEPA cannot be combined with SZ2-ST.  
 \*2 SZX2-ILLC10 cannot be combined with DFPL2X-4.  
 \*3 SZX-ACH1.25X cannot be combined with SZX-STF.

\*4 Provided with SZX2-ILLC10.  
 \*5 Provided with SZX2-ARTTR.

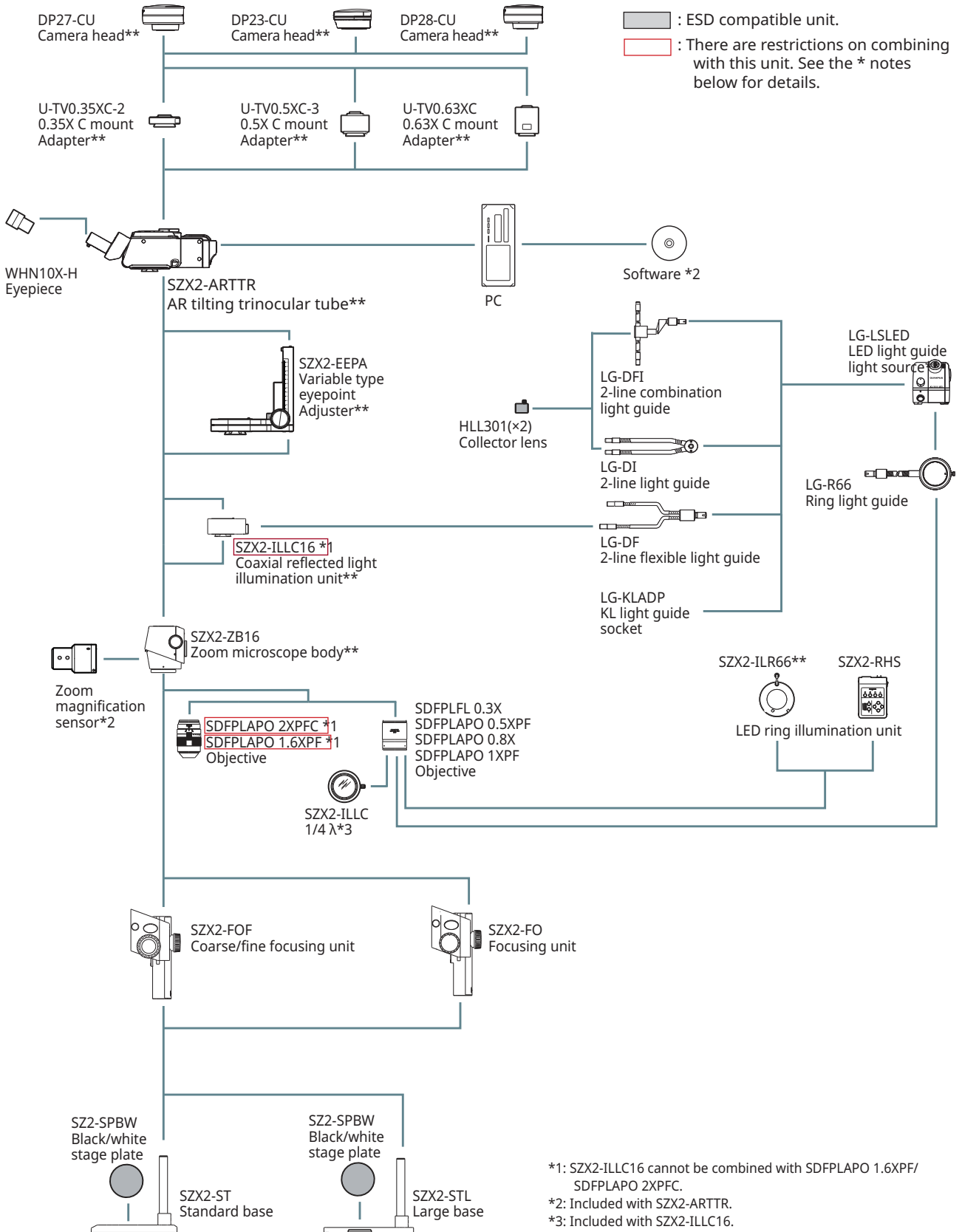
2

Diagram of the system with the SZX2-ZB10 zoom microscope body connected



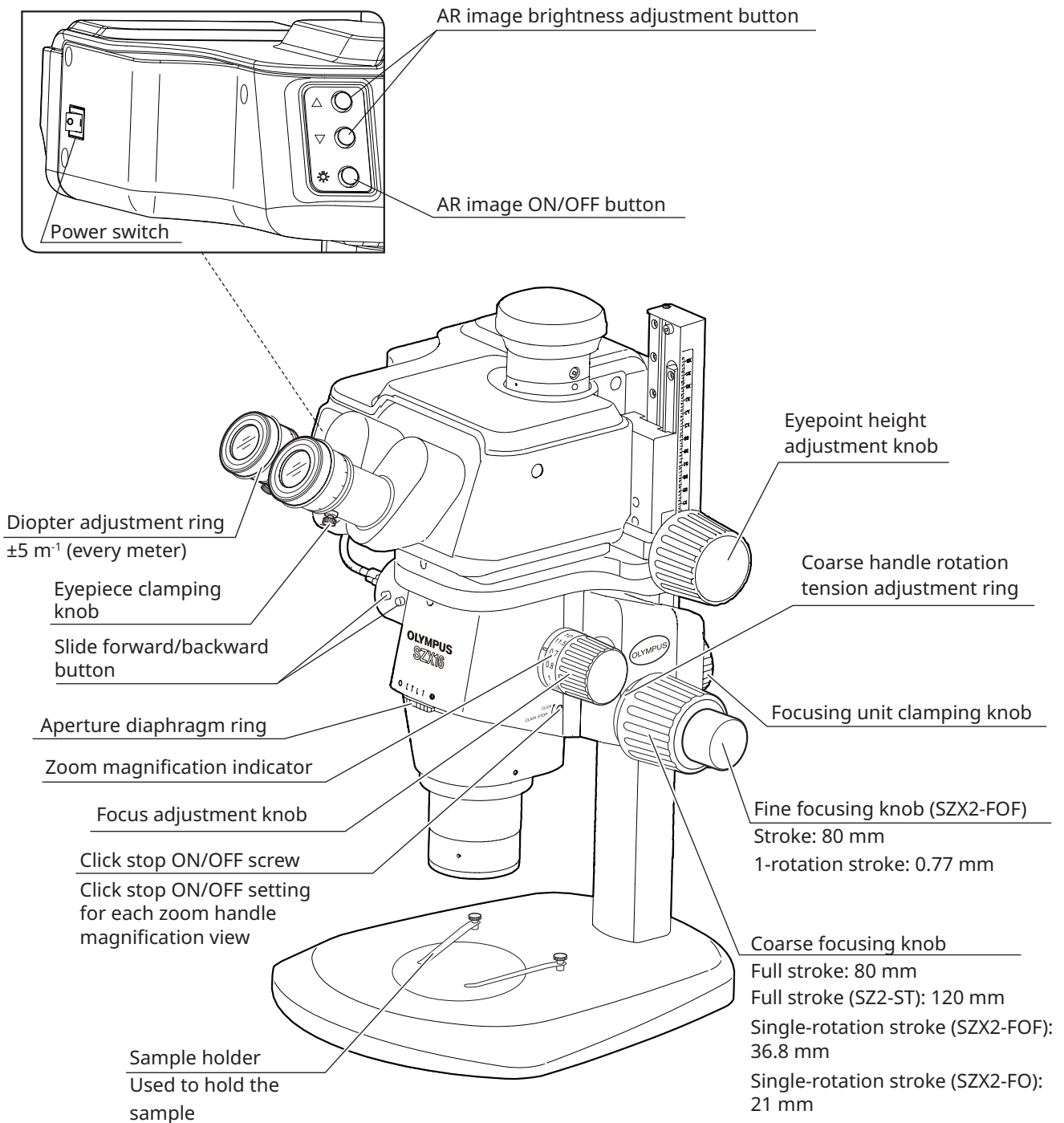
\*1 SZX2-ILLC10 cannot be combined with DFPL2X-4.  
 \*2 Provided with SZX2-ARTTR.  
 \*3 Provided with SZX2-ILLC10.

## 3 Diagram of the system with the SZX2-ZB16 zoom microscope body connected



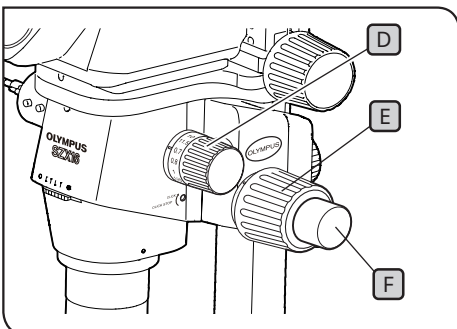
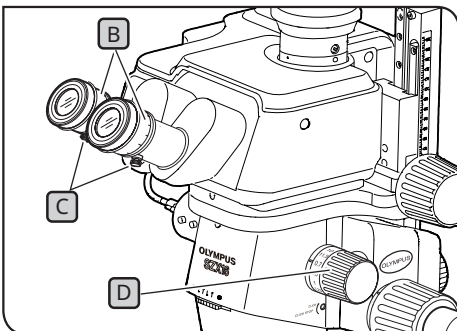
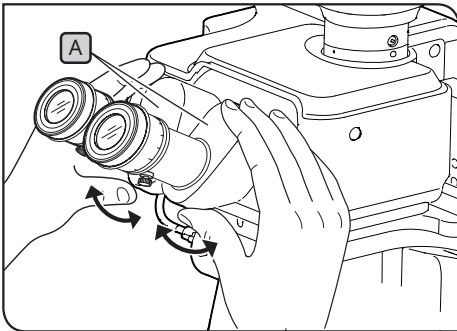
# 5 Nomenclature of main operation parts

This section explains the main parts and nomenclature of the units that constitute the product.





# 6 Observation procedure



**NOTE** Always hold the binocular section **A** with both hands to adjust the interpupillary distance. Applying excessive force further beyond the stop position could damage the binocular section.

- 1** Turn on power to the illumination unit you are using to turn on the light.
- 2** While looking into eyepieces, hold the binocular section **A** and open and close it to adjust the interpupillary distance **A** until the left and right fields of view coincide.
- 3** Rotate the diopter adjustment ring **B** on the left and right eyepieces to place the left and right scales at the "0" position.

**TIP** Before making the adjustment, confirm that the eyepiece clamping knobs **C** are tightened.

- 4** Place a sample that is easy to observe on the stage plate.
- 5** Rotate the focus adjustment knob **D** to set it at a low magnification position and rotate the coarse focusing knob **E** and the fine focusing knob **F** to bring the sample into focus in the right eyepiece only.
- 6** Rotate the focus adjustment knob **D** to set it at the highest position and rotate the coarse focusing knob **E**, and the fine focusing knob **F** to bring the sample into focus in the right eyepiece only.
- 7** Rotate the zoom handle **D** to set it at the minimum magnification position, then, without adjusting the coarse or fine focus handles for the left and right eyepieces, rotate only the diopter ring **B** to bring the sample into focus.

**TIP** Rotate the focus adjustment knob **D** again to set it at the highest magnification position. If the sample is in focus, adjustment is complete.

If the sample is not in focus, repeat Steps **4** to **7**.

- 8** Rotate the focus adjustment knob **D** to set it at a low magnification position and rotate the coarse focusing knob **E** to bring the sample into focus.
- 9** Rotate the focus adjustment knob **D** to set the desired magnification and rotate the coarse focusing knob **E** and the fine focusing knob **F** (focusing unit SZX2-FO and standard base SZ2-ST are not equipped with fine focusing knobs) to bring the sample into focus accurately.

# 7 Operation procedure of each unit

## 7-1 Mounting Components

### 1 Using the stage plate

Set either the white surface or the black surface of the stage facing up based on your sample. Use whichever makes observation easier.

### 2 Placing the sample

- 1 Place the sample almost in the center of the stage plate. Hold the sample using the sample holder, if necessary.
- 2 Illuminate the sample using the illumination unit suitable for the observation sample.

## 7-2 Main Body and Focus Unit

### 1 Adjusting the tension of the coarse focusing knob and the focusing knob

**TIP** This operation is to prevent the zoom frame from falling spontaneously and adjusting the tension of the focusing knob for ease of use. For ease-of-use, set the tension to a little tighter than is needed to prevent the microscope frame from falling spontaneously.

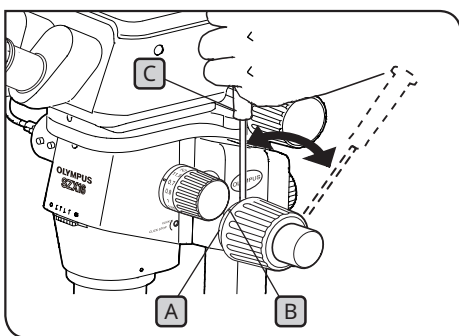
When using in combination with coarse/fine focusing assembly SZX2-FOF or focusing assembly SZX2-FO

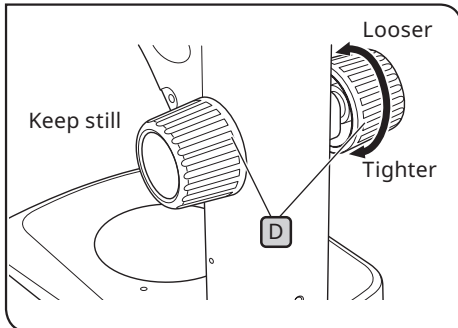
**NOTE** Adjust the tension of the coarse focusing knob using the tension adjustment ring **A**. Rotating the left and right coarse focusing knobs in opposite directions at the same time will damage the internal mechanism.

- 1 Lower the focusing unit to the lowest position.
- 2 Insert the Allen screwdriver **C** into the hole **B** on the outer circumference of the tension adjustment ring **A**, and rotate the ring to adjust the tension. Rotating the tension adjustment ring clockwise increases the tension of the coarse focusing knob and rotating it in the opposite direction reduces it.

**NOTE** • If the zoom frame spontaneously falls or the sample becomes blurry quickly even though the focus was corrected with the fine focusing knob, the tension is too loose. Rotate the tension adjustment ring clockwise to increase the tension.

• If you set the tension extremely tight, it becomes difficult to make a fine focusing and also may cause damage. Never rotate the fine focusing knob rapidly while the tension is set extremely tight. Otherwise the damage may be caused.





When using in combination with the standard base SZ2-ST

- 1** Lower the focusing unit to the lowest position.
- 2** Hold the left and right focusing knobs **D** with both hands. Rotating the right knob while fixing the left knob makes the tension heavier or lighter in the direction you rotate.
- 3** If you set the tension extremely tight, it becomes difficult to make a fine focusing and also may cause damage.

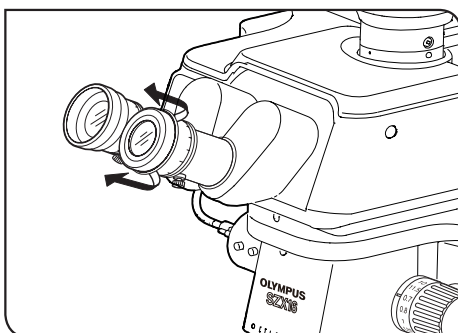
## 7-3 Lens Barrel

### 1 Interpupillary distance adjustment

Adjust the interpupillary distance referring to Step "6 Observation procedure" on page 20 in **2**.

### 2 Diopter adjustment (zoom parfocal adjustment)

Adjust the diopter, referring to Steps "6 Observation procedure" on page 20 to **3** in **7**.



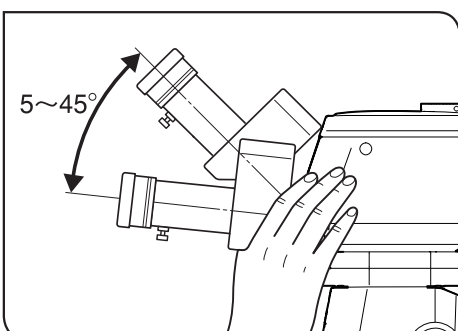
### 3 Using the eye shades

When wearing eyeglasses

Use the eye shades, keeping them folded. (If you observe the image with the eye shades pulled up, the eye shades will come into contact with your eyeglasses.)

When not wearing eyeglasses

Pulling up the folded eye shades in the arrow direction blocks the light from coming in from between the eyepieces and your eyes, which allows you to observe easier.



### 4 Tilting adjustment

TIP

You can adjust the height and angle of the eyepieces to the easy-to-see position using the binocular section, which allows you to observe the images in a comfortable posture. Hold the binocular section with both hands and move it up and down to the position easy to observe.

NOTE

**Be careful, applying excessive force further beyond the upper/lower limit positions may result in damage.**

## 7-4 Observation and Camera Imaging

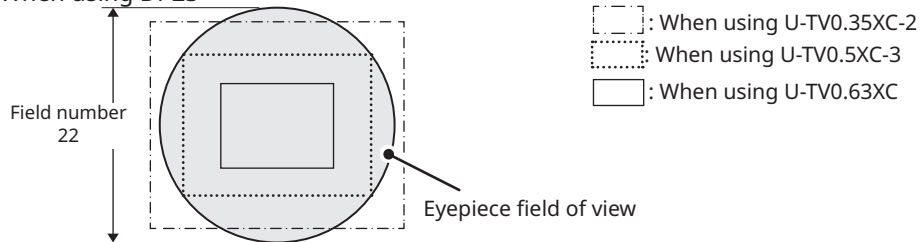
You can attach a digital camera to the observation tube using a camera adapter.  
 (Only the DP23, DP27, and DP28 digital cameras can be attached.)  
 For details, refer to the instruction manual for each camera.

- TIP** • The observation ranges on the sample surface through the eyepieces and with the camera when used with the combination of 1x objective lens, 1x zoom magnification, and the coaxial reflected light illumination unit are listed below.

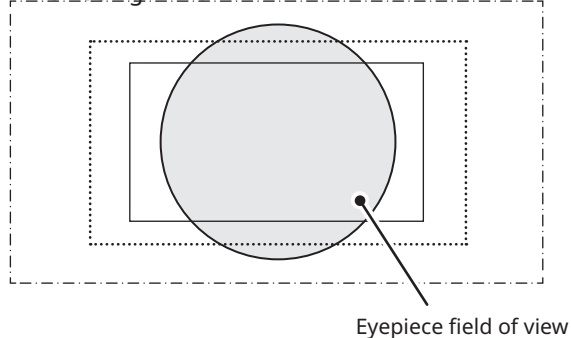
		Observation range on sample surface [mm]		
		U-TV0.35XC-2	U-TV0.5XC-3	U-TV0.63XC
Camera DP23	Vertical	14	9.9	7.9
	Horizontal	21	14	11
Camera DP27	Vertical	18	13	10
	Horizontal	24	16	13
Camera DP28	Vertical	21	15	11
	Horizontal	40	28	22
Eyepiece		Ø17		

- The figure below shows the range of the field of view through the eyepieces and the observation range with the camera when using DP23 and DP28 in combination with each camera adapter.
- When using the low-magnification camera adapter, the ambient light may be reduced or vignetting may occur in the field of view.

When using DP23

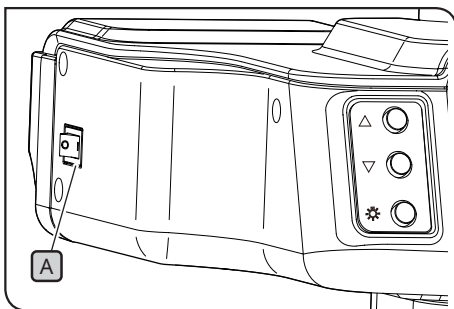


When using DP28



## 7-5 Setting up the Software

### 1 Starting the system



- 1 Turn ON the power of the PC in use and the display monitor.
- 2 Set the power switch of the AR tilting trinocular tube **A** to **I** (ON).

### 2 Setting up Windows

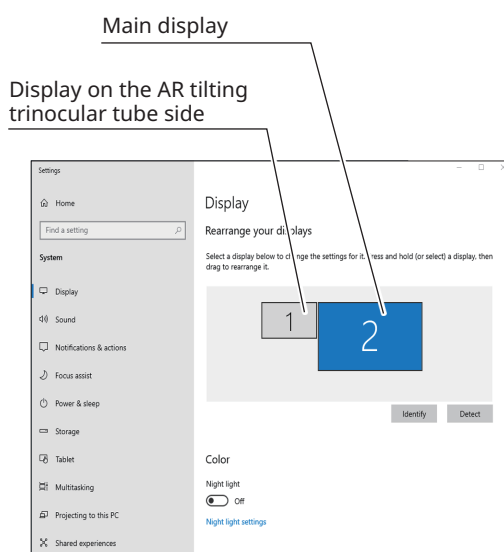
Display a list of programs.

- 1 From the [Start] button, select [Settings], [System], and [Display] in that order.
- 2 Click on [Display Advanced Settings].
- 3 Confirm that the name and number of the AR tilting trinocular tube is displayed under [Display Selection]. (The name will be displayed as "OLYMPUS\_ARM".)
- 4 Go back to the [Display] screen. Select the number of the display on the AR tilting trinocular tube side and change the settings to the following.
  - Display scale: 100%
  - Resolution: 1920 x 1080
  - Multi-monitor settings: Expand display area
  - [Set as main display] checkbox: Unchecked

**TIP** If this checkbox is checked, select a number other than that for the display on the AR tilting trinocular tube side. For example, if three monitors are used and the monitor on the AR tilting trinocular tube side is "1", select "2" and check the [Set as main monitor?] checkbox.

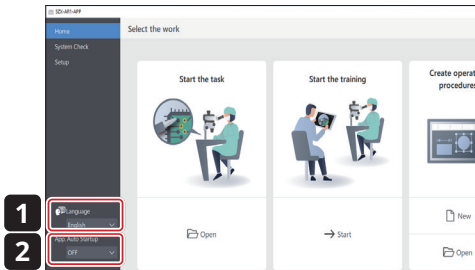
- 5 Select [Power & Sleep] on the left side, and set the sleep mode setting to "Never".
- 6 Go back to the [Settings] screen. Select [Individual Settings], then [Lock Screen], and select "Never" for the [Screensaver Settings].

**TIP** For details, refer to the instruction manual for the PC or the graphics controller you are using.



Setting example

### 3 Setting up the software



- 1 Click on the software icon to launch the software.



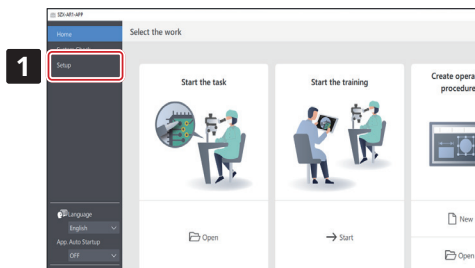
- 2 Select the language you would like to use from the [Language] drop-down list on the home screen. (The default language is English.)

**TIP** The selected language will be automatically applied from the next time you start the software.

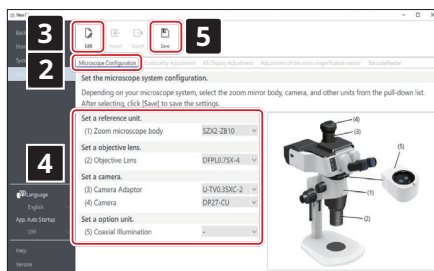
- 3 Select ON or OFF from the [App auto startup] pulldown list on the Home screen.

**TIP** If you select ON for [App Auto Startup], the software will start up automatically at startup from the next time you turn on your PC.

### 4 Configuring the microscope system



- 1 Click [Setup] on the Home screen.



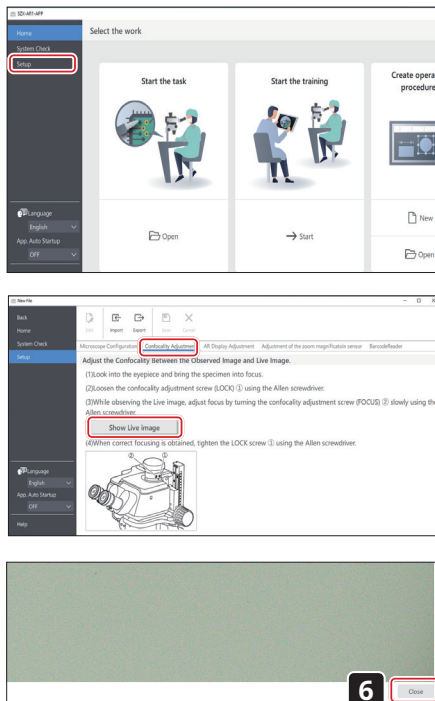
- 2 Select the [Microscope configuration] tab.

- 3 Click [Edit]. If the live image is being observed, stop live observation and then click [Edit]. If you click [Edit] during camera live observation, you cannot select the camera in the subsequent steps.

- 4 Select the units you are using such as the zoom body and camera from the dropdown list according to the microscope system you are using.

- 5 After you are done with the settings, click [Save] to save them.

## 5 Performing parfocal adjustment of the camera



- 1 Click [Setup] on the Home screen.
- 2 Place the sample, look through the eyepieces, and bring the sample into focus.  
For details, see "6 Observation procedure" on page 20 **4** to **8**.
- 3 Select the [Confocal Adjustment] tab.
- 4 Press [Show live image] to display the camera image window on the PC monitor screen.
- 5 Set the zoom to the minimum magnification and perform the parfocal adjustment by referring to the instruction manual for the camera adapter you are using.
- 6 Click the [Close] button at the bottom right of the camera imaging window to close the window.

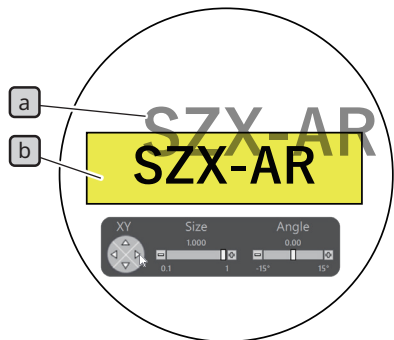
## 6 Adjusting the AR image view



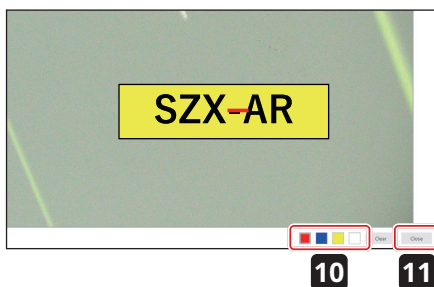
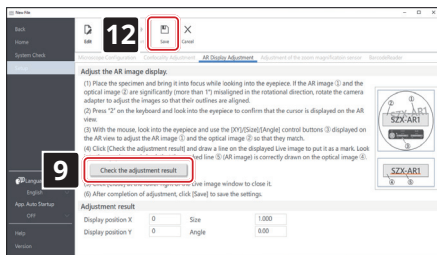
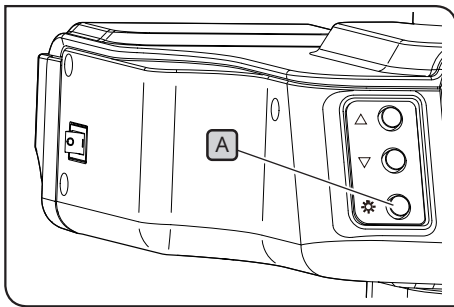
Make the display position of the camera image coincide with that of the AR image. Before making this adjustment, be sure to perform the diopter adjustment (page 22). Without performing the diopter adjustment, the AR image cannot be adjusted properly.

- 1 Click [Setup] on the Home screen.
- 2 Select the [AR display adjustment] tab.
- 3 Click [Edit].
- 4 Place the sample, look through the eyepieces, and bring the sample into focus. For details, see "6 Observation procedure" on page 20 **4** to **8**.  
If an AR image is displayed, press the AR image ON/OFF button for the AR tilting trinocular tube to hide the AR image before adjusting the focus.  
After adjusting the focus, change the AR image setting to [Display].

**TIP** Make adjustments using a sample with clear contrast and contours. It is easier to make adjustments by using an item on which texts are printed such as business card as a sample.



Reference value for AR image size		
Camera	Adapter	size
DP23	U-TV0.35XC-2	0.397
	U-TV0.5XC-3	0.278
	U-TV0.63XC	0.220
DP27/DP28	U-TV0.35XC-2	0.570
	U-TV0.5XC-3	0.399
	U-TV0.63XC	0.317



**5** Operate with the key board. Press "2" of the keyboard and look through the eyepieces to make sure that the cursor appears on the AR image.

**TIP** Make the zoom magnification displayed on the software match the magnification indicated on the focus adjustment knob.

**6** Adjust the brightness of the AR image and each illumination unit and the aperture of the AS unit so that both the AR image **a** and the optical image **b** are visible.

**7** Coincide the AR image **a** with the optical image **b**.

- 1) Operate with the mouse. Look through the eyepieces and click the [Angle] control button to set the value to 0. If the AR image is significantly deviated from the optical image in rotation direction, rotate the camera adapter to adjust so that the deviation is within  $\pm 1^\circ$ . (For the procedure to adjust the rotation direction of the camera adapter, refer to the instruction manual for the camera adapter.)
- 2) Click the [Size] control button displayed on the AR image to adjust the size of the AR image **a** so that it matches that of the optical image **b**. The recommended AR image [Size] value is determined based on the camera and camera adapter combination being used. Refer to the values in the table to the left when making adjustments.
- 3) Click the [XY] control button displayed on the AR image to adjust so that the position of the AR image **a** coincides with that of the optical image **b**.
- 4) Press the AR image ON/OFF button **A** to repeat showing and hiding the AR image to check whether the AR image coincides with the optical image. If they don't match, repeat steps 1) through 4) until they do.

**8** Operate with the key board. Press "1" of the the keyboard and make sure that the cursor appears on the software.

**9** Click [Check the adjustment results] in the [AR display adjustment] tab. The camera image window appears on the PC monitor screen.

**10** Click either one of the 4 color buttons shown at the bottom right of the camera image window, and left-click the mouse and drag it to draw a line at a position used as a mark. Look into the eyepieces to check that the optical image through the observation tube coincides with the line you drew as a mark in the camera image window.

**TIP** If the line used as a mark is misaligned, repeat Steps **7** to **9**.

**11** Click the [Close] button at the bottom right of the camera imaging window to close the window.

**12** After you have finished making adjustments, click [Save].

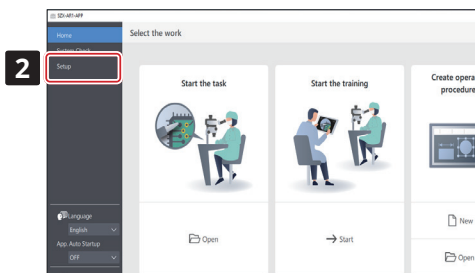
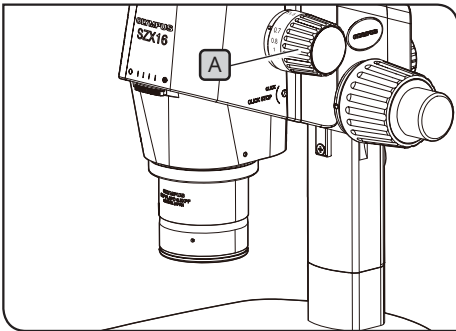
**13** When the confirmation screen appears, click the [OK] button to save the settings.



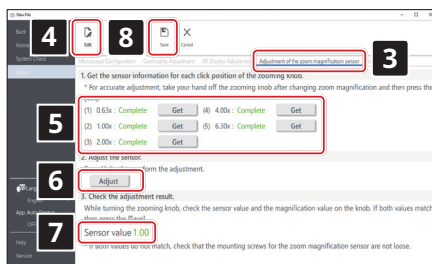
## 7 Setting up the zoom magnification sensor

Make the zoom magnification displayed on the software match the magnification indicated on the focus adjustment knob. To use these settings correctly, the click stop must be enabled. For details, see "Zoom magnification sensor attachment" on page 37.

- 1 Rotate the focus adjustment knob **A** and stop it at a click position.



- 2 Click [Setup] on the Home screen.



- 3 Select the [Adjustment of the zoom magnification sensor] tab.

- 4 Click [Edit].

- 5 Rotate the focus adjustment knob to the click position, and click the [Get] button for the relevant magnification.

**NOTE** To accurately get the magnification, do not touch the microscope when you press the [Get] button.

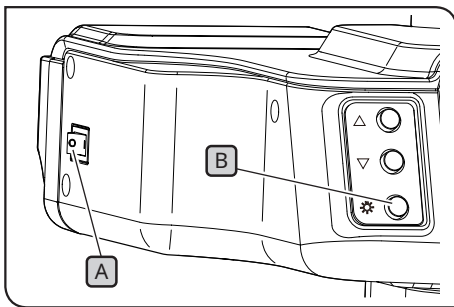
- 6 When you have finished acquiring the magnifications, click the [Adjust] button.

- 7 Rotate the focus adjustment knob and make sure that the magnification sensor value displayed on the screen matches the magnification indicated on this knob.

- 8 If there are no problems with the magnification sensor values, click [Save] to save the settings.

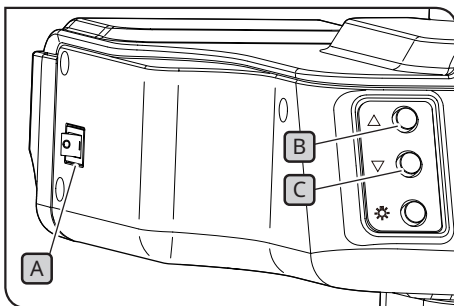
**NOTE** If you have difficulties in getting the magnification, the zoom magnification sensor may not have been attached securely. Check again for issues such as loose clamping screws on the zoom magnification sensor.

## 7-6 AR Trinocular Tube Operations



### 1 Showing or hiding the AR image

- 1 Set the power switch **A** of the AR tilting trinocular tube to **ON**. It takes a few seconds to display the AR image.
- 2 Press the AR image ON/OFF button **B** to hide the AR image. If you want to display the AR image, press the AR image ON/OFF button **B** again.



### 2 Adjusting the brightness of the displayed AR image

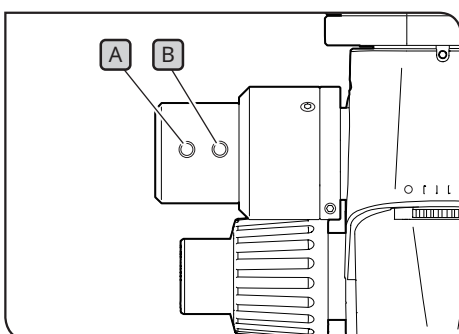
- 1 Set the power switch **A** of the AR tilting trinocular tube to **ON**.
- 2 To adjust the brightness of the displayed AR image, press the brightness adjustment button **B** to make it brighter, and press the brightness adjustment button **C** to make it darker.

**TIP**

The brightness can be adjusted in 7 levels. The brightness is reset to the default brightness setting (level 4 out of 7) every time the power switch is turned ON.

## 7-7 How to Use the Zoom Magnification Sensor

- NOTE**
- To use the zoom magnification sensor correctly, click stop must be enabled. See page 37 for the procedure.
  - When adjusting the zoom magnification, be sure to stop the focus adjustment knob at the click position. If you stop the focus adjustment knob at a position other than the click position, the zoom magnification cannot be acquired by the zoom magnification sensor.
  - Connect the zoom magnification sensor to the PC before starting the software. You cannot acquire the correct zoom magnification even if you perform the following operations before connecting it to the PC.
  - If the zoom magnification sensor is disconnected from the PC after starting the software, first reconnect the cable, then restart the software.



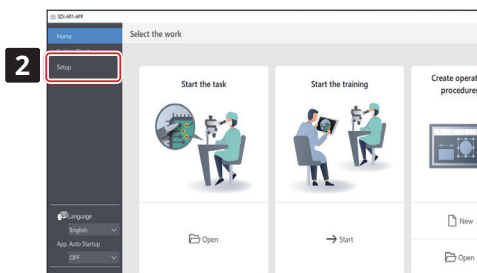
- 1 If you rotate the focus adjustment knob while the SZX2-AR1 system is running, the zoom magnification will be automatically detected and displayed in the software.
- 2 Pressing the slide backward button **A** of the zoom magnification sensor moves the slide you created on the software backward to the previous page and before.
- 3 Pressing the slide forward button **B** of the zoom magnification sensor moves the slide you created on the software forward to the next page and after.

## 7-8 Barcode Reader Connection

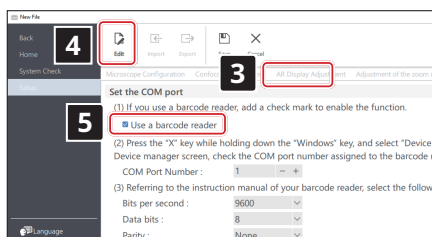
Perform this operation after the setup of the barcode reader (such as installation of drivers) has been completed.

**NOTE** For the barcode reader settings, use Enter (CR) as the data endpoint (suffix). For details, see the barcode reader instruction manual.

- 1 Connect the barcode reader to the PC.



- 2 Click [Setup].



- 3 Select the [BarcodeReader] tab.

- 4 Click [Edit].

- 5 Put a check in the [Use a barcode reader] checkbox.

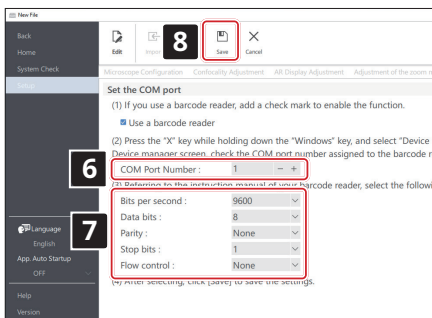
- 6 Press the Windows key and the X key on the keyboard at the same time, then select [Device Manager] from the displayed list. In the Device Manager screen, confirm the COM port number allocated to the barcode reader and set that COM port number in [COM Port Number].

- 7 Select the communication specifications by referring to the instruction manual for the barcode reader you are using.

- 8 Click [Save].

- 9 Read the QR code below.

If you can open the contents file of the sample, the barcode reader is connected without any problem.



SZX-ZB7  
Zoom microscope  
body

SZX2-ZB10  
Zoom microscope  
body

SZX2-ZB16  
Zoom microscope  
body



## 7-9 External Switch Connection

You can assign shortcut keys built in the software to external switches.

Perform this operation after the setup of external switches (such as installation of drivers) has been completed.

- 1 Connect the external switches to the PC.
- 2 Assign the necessary functions to external switches by referring to the list of shortcut keys shown below.

For the procedure to assign external switches, refer to the instruction manual for the external switch.

Shortcuts	
Commands	Shortcut keys
Slide backward	Number "4" key
	"PgDn" key
Slide forward	Number "6" key
	"PgUp" key
Move to the first slide	"Home" key
	"/" key
Move to the last slide	"End" key
	"*" key
PDF page forward	"+" key or "F" key
PDF page backward	"-" key or "B" key
Snap	Number "7" key
Start/stop recording video	Number "9" key
Move cursor to main display	Number "1" key
Move cursor to AR image	Number "2" key

# 8 Troubleshooting

This section describes the possible problems on this product and their countermeasures. If problems occur, please review the following list and take remedial action as needed.

Problem	Cause	Remedy	Page
1. The left and right fields of view do not match.	The interpupillary distance is not adjusted properly.	Correct the interpupillary width.	22
	The diopter difference is not corrected.	Correct the diopter adjustment.	22
	The different eyepieces are attached to the right and the left.	Replace eyepiece, reattaching the same eyepiece to the right and the left sides.	39
2. The field of view is vignetting or illuminated unevenly.	The aperture diaphragm is stopped down. (For SZX7, when using SZX-AS.)	Open the aperture diaphragm.	SZX7/10/16 Instructions
	The AR tilting trinocular tube, extendable eyepoint adjuster, coaxial reflected light illumination unit, and AS unit (SZX7 only) are not attached properly.	Ensure the AR tilting trinocular tube, extendable eyepoint adjuster, coaxial reflected light illumination unit, and AS unit are properly attached.	38
3. The camera image is vignetting.	A low-magnification camera adapter is used.	Replace with the high-magnification camera adapter.	39
	The eyepoint height can be set higher using the eyepoint adjustment function.	If you are using the extendable eyepoint adjuster, lower the eyepoint height.	SZX2-EEPA Instructions
4. Dirt or dust is visible in the field of view.	There is dirt or dust on the sample.	Clean the sample.	15
	There is dirt or dust on the eyepiece.	Clean the eyepiece.	15
5. Fine parts are crushed and difficult to see.	The aperture diaphragm is stopped down excessively. (For SZX7, when using SZX-AS.)	Adjust the aperture diaphragm appropriately by referring to the instruction manual for the microscope you are using.	SZX7/10/16 Instructions
6. Visibility is poor. · Image is not sharp. · Contrast is poor.	The tip of the objective is dirty.	Clean the objective or zoom microscope body lens.	15
	The upper and lower lenses of the zoom microscope body are dirty.		
7. Zooming causes the image to blur.	The diopter of the eyepiece is not adjusted correctly.	Adjust the diopter correctly.	22
	The focus is not adjusted sufficiently.	Adjust the focus correctly with the high magnification.	20
8. The zoom magnification sensor does not show the correct magnification.	The focus adjustment knob is not stopped at the click position.	Align the focus adjustment knob with the click position.	37
	The position of the zoom magnification sensor is shifted.	Set the zoom magnification sensor again.	15 28
9. The AR image is not displayed. The AR image disappears.	The AR image is hidden.	Turn on the power switch for the AR tilting trinocular tube and press the AR image ON/OFF button to show and hide the AR image.	29
	The focus adjustment knob is not in the click position.	Enable the click-stop and make sure that the focus adjustment knob is in the click position.	6 37
10. No magnification is displayed on the AR image.	The magnification display is disabled.	Enable the magnification display.	SZX-AR1 software help
11. The camera image is significantly tilted.	The AR image view angle adjusted in the setup is large.	Adjust the AR image view.	26

Problem	Cause	Remedy	Page
12. The tension of the coarse focusing knob is tight.	The tension adjustment ring of the coarse focusing knob is tightened excessively.	Loose the tension adjustment ring appropriately.	21
13. The zoom microscope body doesn't stay up and the image goes out of focus during observation.	The tension adjustment ring of the coarse focusing knob is loosened excessively.	Tighten the tension adjustment ring appropriately.	21
14. The camera operations are slow.	The USB is inserted in the incorrect port.	Connect DP27 to a USB 3.0 port and DP23/DP28 to a USB 3.1 port.	40
	The PC does not meet system requirements.	Use the PC that meets system requirements.	10
15. I can't find the mouse cursor.	The mouse cursor is out of the PC screen.	To move the cursor to the main display, press "1" on the keyboard. To move the cursor to the displayed AR image, press "2" on the keyboard.	31
16. Even when the slide background is set to camera view, no live camera image is displayed.	The camera is not set to live view.	Press the [Start] button on the microscope camera tab to set the camera to live viewing.	SZX-AR1 software help
17. Light appears on the live camera image.	Light (room light, etc.) through the eyepieces appears on the image.	Put on the eyepiece cover provided with the AR tilting trinocular tube.	-
18. The camera image does not appear in the software.	"Extend the display" is not selected in the Windows settings (multi-monitor settings).	Select "Extend the display" in the Windows settings (multi-monitor settings).	24
19. The display is black and nothing is visible.	The display is not set up correctly.	Use the primary monitor change tool to set up the display.	53

#### Repair request

If you cannot solve your problem even after taking the actions listed in the troubleshooting section, contact an Evident distributor for assistance. At that time, please tell them the following information as well.

- Product name and model name (Example: AR tilting trinocular tube (product name), SZX2-ARTTR (product name))
- Serial number
- Problem
- Software version

# 9 Specifications

This section describes the detail specifications such as the shape, functions, and performance of the product.

For details about the PC, see "System requirements for the PC" on page 10.

## Hardware specifications

Item	Specifications
AR tilting trinocular tube SZX2-ARTTR	Angle of observation tube: 5 to 45 degrees Interpupillary distance adjustment range: 57 to 80 mm Equipped with eyepiece clamping knob Light-path switching mechanism: None Magnification of eyepiece: 1.25 X, magnification of camera: 1 X Front panel button functions: Can be used to adjust AR image brightness (7 levels) and turn AR images ON/OFF Input connectors: HDMI x 1, USB2.0 (TypeC) x 1, DC jack x 1 Drive voltage: AC 100 to 240 V (AC adapter) Maximum power consumption: 10 W
Zoom magnification sensor	<b>Main Functions:</b> (a) Get the zoom magnification (at click position only). (B) Forward and backward the slides created on software. Output connector: USB 2.0 (Type-C)
Operating environment	<ul style="list-style-type: none"> <li>• Ambient temperature: 10 to 35°C (50 to 95°F)</li> <li>• Relative humidity: 20 to 85%</li> <li>• Supply voltage fluctuation: ±10%</li> <li>• Pollution degree 2 (in accordance with IEC60664-1)</li> <li>• Installation category (overvoltage category) : II (as defined by IEC60664-1)</li> <li>• Permissible base tilt at installation location: No more than ±3°</li> </ul>
Safety standard requirements	<ul style="list-style-type: none"> <li>• Indoor use</li> <li>• Altitude: Max. 2000 meters</li> <li>• Ambient temperature: 5 to 40°C (50 to 95°F)</li> <li>• Relative humidity: 20 to 80% (at temperatures up to 31°C (88°F)) (without condensation)</li> </ul> In environments over 31°C (88°F), the maximum acceptable relative humidity for the operating environment decreases linearly to 70% at 34°C (93°F), 60% at 37°C (99°F), and 50% at 40°C (104°F).
Operating method	Do not move the product while in use Storage after use is not assumed.
Relocation and transportation method	Repack the product with packing materials specialized for the product before transportation. Users are not authorized to relocate the instrument.

## Software specifications

Item	Specifications
Camera control function	Exposure control: Switching between Auto and Manual ISO sensitivity adjustment: ISO100, 200, 400 White balance adjustment function: Equipped. (one-touch adjustment)
Acquisition function	<p><b>Snap imaging</b> Save format: BMP, JPEG, PNG Resolution: DP23: 3088 x 2076 DP27: 2448 x 1920 DP28: 4104 x 1920 The camera image can be saved with the AR image simultaneously.</p> <p><b>Recording</b> Save format: mp4, mov Video codec: H.264 Audio codec: MP3 Resolution: DP23: 1920 x 1080 (Camera image resolution: 1600 x 1080) DP27: 1920 x 1080 (Camera image resolution: 1377 x 1080) DP28: 1920 x 1080 (Camera image resolution: 1920 x 1080) The video cannot be recorded out of the camera image range. The camera image can be saved with the AR image simultaneously. *The recording time is expected to be approx. one hour.</p>
Barcode specifications	<p><b>Compatible barcode reader</b> The COM communication is available. QR code can be loaded. Output barcode: QR code</p>
Software language	Japanese, English, Chinese, German, Spanish, Portuguese, French

### Resolution of the live image displayed on software

Camera	Adapter	Resolution of live imaging (W) [pixels]	Resolution of live imaging (H) [pixels]
DP23	U-TV0.35XC-2	1225	824
	U-TV0.5XC-3	858	577
	U-TV0.63XC	681	458
DP27	U-TV0.35XC-2	1396	1095
	U-TV0.5XC-3	978	767
	U-TV0.63XC	776	608
DP28	U-TV0.35XC-2	2341	1240
	U-TV0.5XC-3	1639	868
	U-TV0.63XC	1301	689



# 10 Assembly procedures

This section describes the procedure for assembling various units and attaching them to the microscope frame.

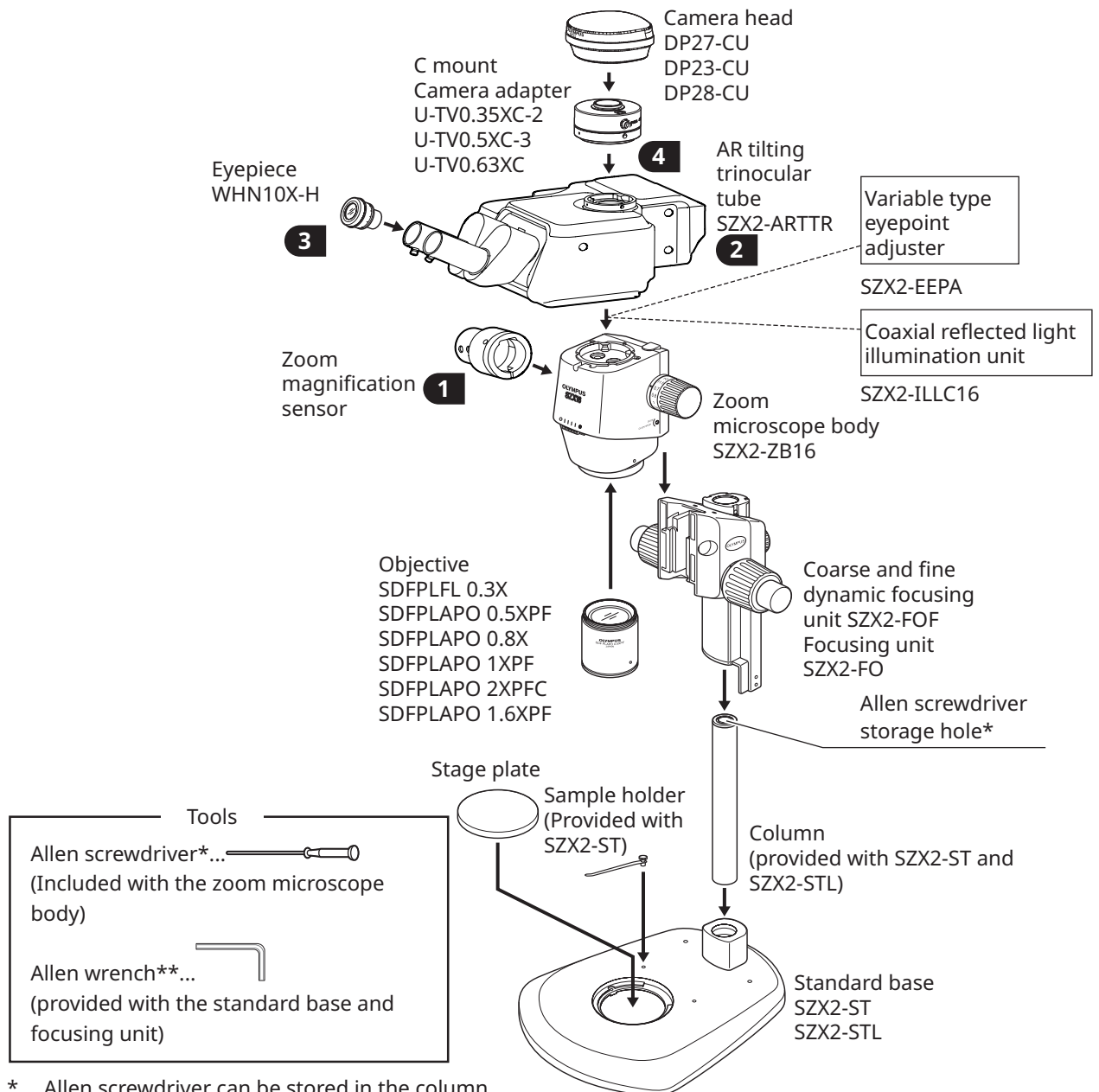
## 10-1 Assembly Diagram

This section describes which units to attach where to the microscope frame and in what order.

The diagram below shows the main units. For combinable units not shown in the diagram below, see "4 System diagram". For the assembly procedure for units not shown below, refer to the instruction manual of the respective unit.

**NOTE** When assembling the microscope, remove any dust or dirt from the mounts of each unit and assemble them carefully without making scratches.

For the **1** numbers, detailed assembly instructions are provided on the next page and following pages. For other products, complete assembly by referring to the instruction manual of the respective product.



\* Allen screwdriver can be stored in the column.

\*\* : Do not use the Allen wrench for any purpose other than attaching the column.

## 10-2 Detailed Assembly Procedure

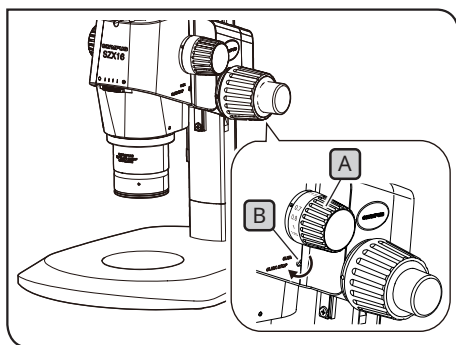
This section explains the assembly procedures for the microscope frame and various units in detail. For procedures such as attaching the columns and focusing units, refer to the respective instruction manual (for SZX7, SZX10, or SZX16) provided separately.

The procedure for removing each unit is the same as for assembly, just carried out in reverse order.

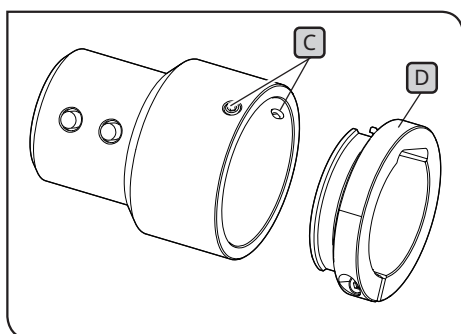


**For the extendable eyepoint adjuster SZX2-EEPA, standard base SZ2-ST, coarse/fine focusing unit SZX2-FOF and focusing unit SZX2-FO, rotate the knob to lower them to the lowest position before assembly.**

### 1 Attaching the zoom magnification sensor



The illustration shows the SZX2-ZB16 Zoom Microscope Body. The click stop position differs on the SZX-ZB7 and SZX2-ZB10 Zoom Microscope Bodies.



- 1 To enable the clip-stop for the focus adjustment knob (A), rotate the click-stop screw (B) clockwise (in the arrow direction) using the Allen screwdriver provided with the zoom microscope body until it stops.

**NOTE**

- Be careful not to rotate the click stop screw further than necessary, as this may cause damage to the cover and the internal mechanism. Be careful of this when rotating the click stop screw counterclockwise to disable the click stop as well.
- Remove the magnification indication sticker and magnification ring on the focus adjustment knob if they are attached.

- 2 Rotate the focus adjustment knob (A) to set the zoom magnification that is most frequently used and stop at the click position.

- 3 Loosen the zoom magnification sensor clamping screws (C) (two) and remove the clamp (D).

**TIP** There are two types of clamps. Use the clamp suitable for the zoom microscope body used for observation.

#### **SZX7 zoom microscope body:**

Use the clamp removed in Step 3. (Internal diameter: Small)

#### **SZX10 or SZX16 zoom microscope body:**

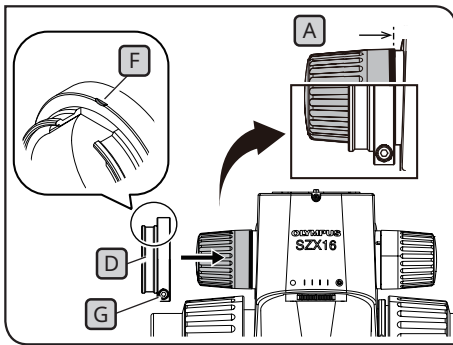
Do not use the removed clamp. Instead, use the one provided with the AR tilting trinocular tube. (Internal diameter: Large)



For SZX7



For SZX10 or SZX16



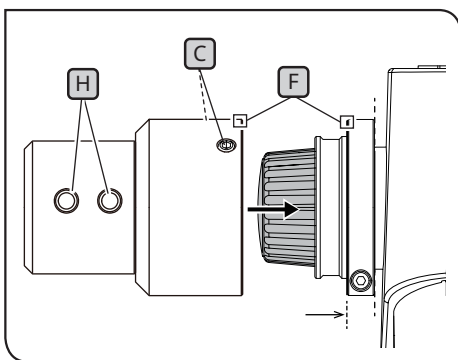
- 4 Attach the clamp **D** to the focus adjustment knob **A** (on the left-hand side when facing the microscope). Insert the clamp until the position where the end surfaces of the clamp and the focus adjustment knob **A** are aligned when viewed from the front.

**NOTE** Be careful not to insert the clamp too deeply, as this may get in the way of the zoom microscope body and cause damage.

- 5 Tighten the clamping screw **G** at the position where the mark **F** on the clamp comes to the top surface.

- 6 Insert the zoom magnification sensor until it contacts the clamp.

- 7 Align the zoom magnification sensor with the mark **F** on the clamp, and tighten the clamping screws **C** (2 positions) at the position where the slide forward button and the backward button **H** come to the front.



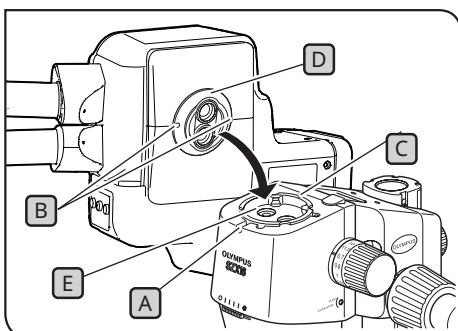
## 2 Attaching the AR tilting trinocular tube



**CAUTION** The center of gravity of the AR tilting trinocular tube is on the eyepiece mount side. When attaching the AR tilting trinocular tube, be careful not to drop the AR tilting trinocular tube while balancing it. Otherwise, you may get injured when it drops.

For details about handling the AR tilting trinocular tube, see "2 Unpacking and packing procedures" on page 12.

**NOTE** If you are using the variable eyepoint adjuster, coaxial reflected light illumination unit, and AS unit (SX7 only), mount these components prior to carrying out this procedure. For attaching procedures, refer to the applicable instruction manuals.

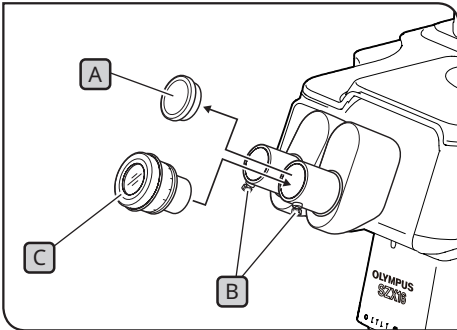


- 1 Loosen the observation tube clamping screw **A** sufficiently with the Allen screwdriver.

- 2 Align the positioning groove **B** on the AR tilting trinocular tube with the positioning pin **C** on the zoom microscope body, and insert the dovetail **D** on the bottom surface of the observation tube into the dovetail mount **E** on the zoom microscope body.

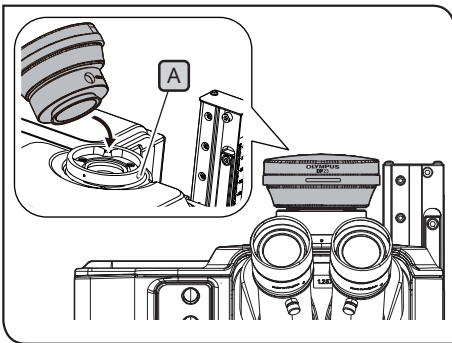
- 3 Tighten the observation tube clamping screw **A** securely with the Allen screwdriver.

### 3 Attaching the eyepieces



- 1 Remove the eyepiece caps **A** and sufficiently loosen the eyepiece clamping knobs **B**.
- 2 Insert the eyepieces **C** with the same magnification carefully all the way into the left and right eyepiece sleeves.
- 3 With the standard scale of the diopter correction ring on the eyepiece facing up, tighten the eyepiece clamping knob **B** on both eyepieces.

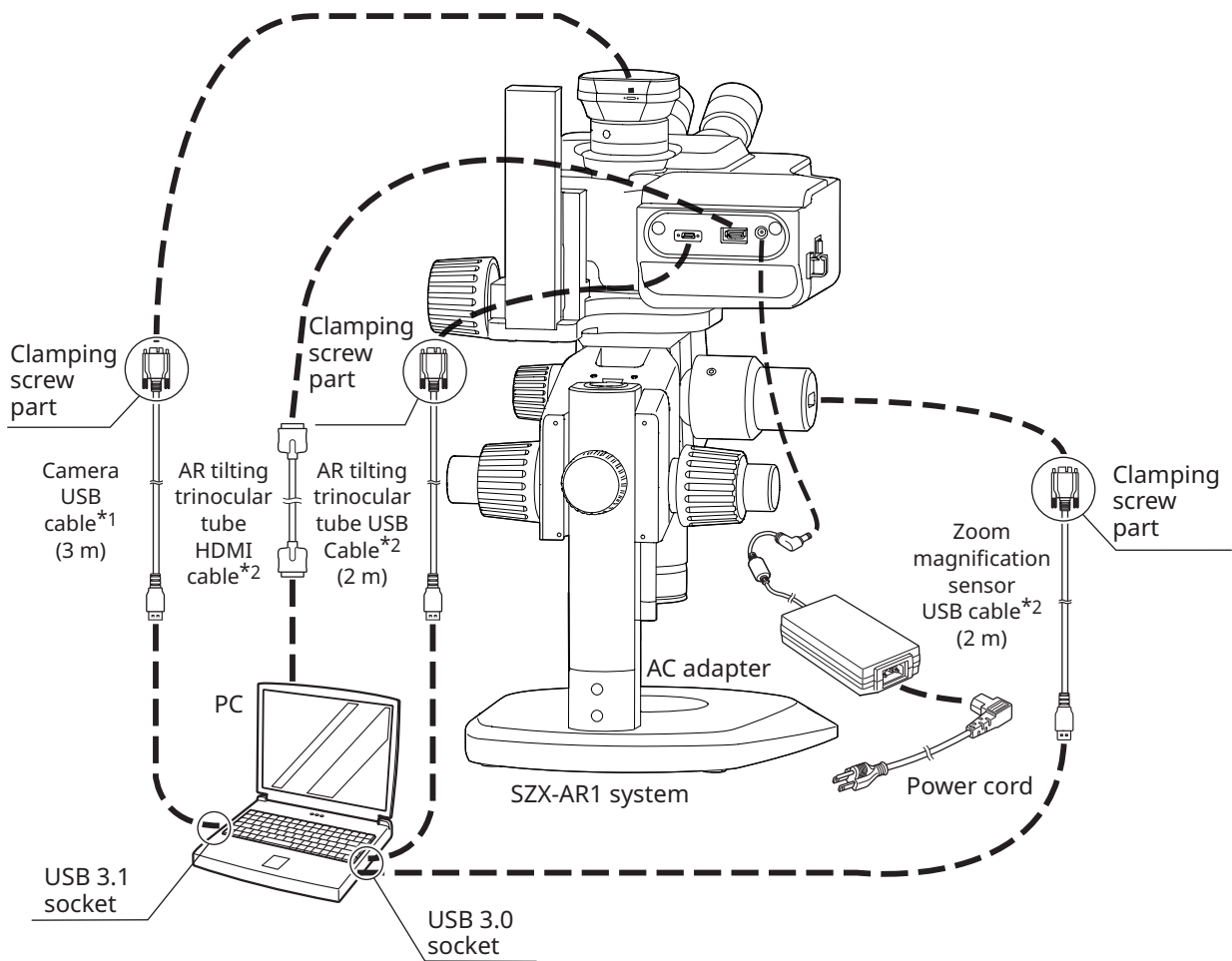
### 4 Attaching the camera and camera adapter



- 1 Attach the camera adapter to the camera. For attaching procedures, refer to the applicable instruction manuals.
- 2 Remove the cap of the straight tube to mount the camera adapter.
- 3 Loosen the clamping screw **A** of the straight tube to mount the camera adapter sufficiently with the Allen screwdriver.
- 4 Insert the camera adapter attached with the camera into the straight tube to mount the camera adapter, and tighten the clamping screw **A** with the product name of the camera facing front.

## 10-3 System Connections

- NOTE**
- When wiring cables, set the main switch of the AR tilting trinocular tube to **○ (OFF)**.
  - Ensure the cable specified by Evident is always used to connect each connector.
  - When connecting each connector, align the orientation of the connector correctly and insert it securely. Also, stop tightening the clamping when it contacts the end surface. Tightening it too firmly may damage the screw thread.
  - For the procedures for connecting DP23, DP27, and DP28, refer to the applicable instruction manuals.



\*1 The USB cable necessary for connection is provided with the camera. Connect the USB cable for the camera directly to the PC without going through the USB hub.

\*2 The HDMI cable and two USB cables necessary for connections are provided with the AR tilting trinocular tube.

## 1 Connecting the power supply

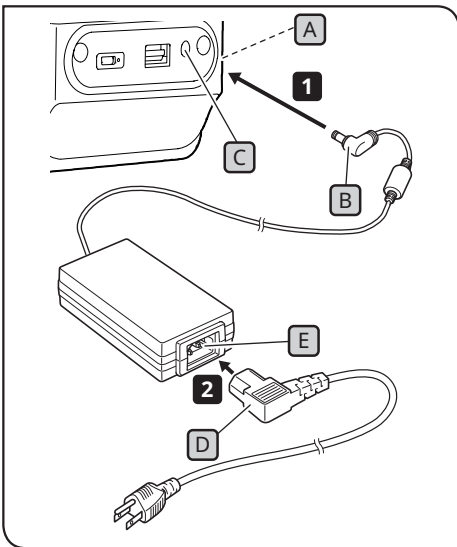
### ⚠ CAUTION

- Always use the AC adapter and power cord provided by us. If the proper AC adapter and the power cord are not used, the electric safety and the EMC (Electromagnetic Compatibility) performance of the product cannot be assured.
- Connect the power plug to a grounded 3-core outlet. If the power outlet is not grounded, our intended electric safety performance cannot be assured.

### NOTE

- The power cord and the AC adapter cord are vulnerable to bend or twist. Do not apply excessive force to them.
- Set the power switch **A** to **○** (OFF) before connecting the AC adapter and the power cord.

- 1** Connect the connector **B** of the provided AC adapter to the connector **C** on the AR tilting trinocular tube.
- 2** Connect the connector **D** of the power cord to the connector **E** on the AC adapter.

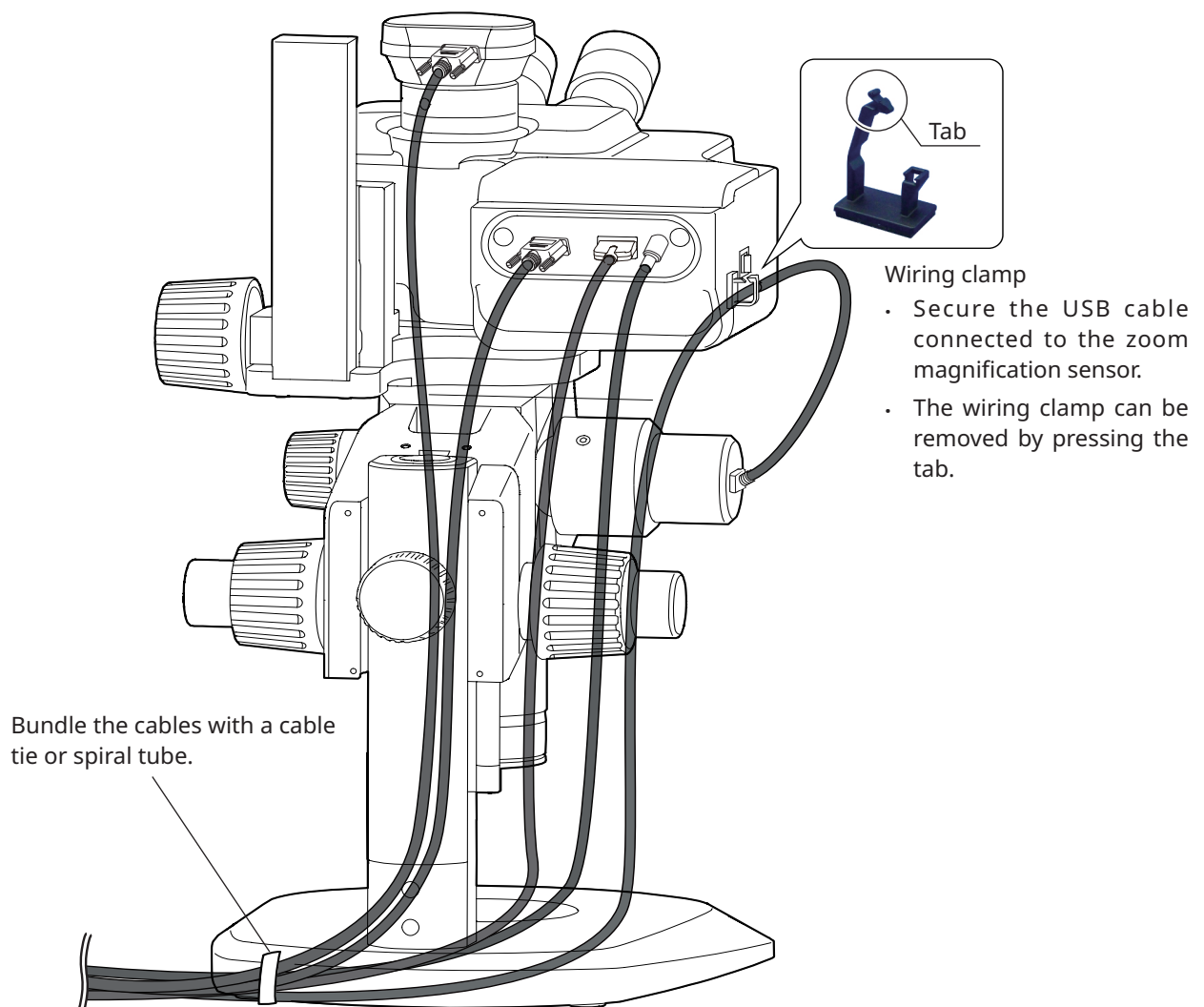


## 2 Routing the cables

The basic cable routing is shown below. Route the cables as illustrated below.

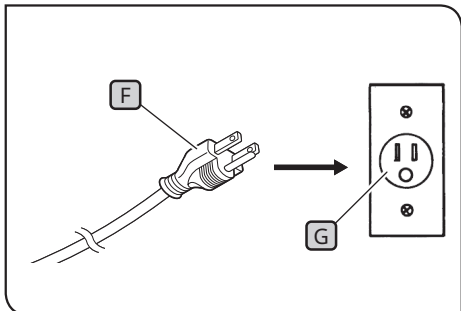
- TIP**
- If necessary, bundle the three cables connected to the back of the AR tilting trinocular tube, the one USB cable connected to the zoom magnification sensor, and the one USB cable connected to the camera at the lower back of the stand using either the cable ties or the spiral tube included with the AR tilting trinocular tube. As a guide for the position to bundle the cables, they should be bundled so that all five cables come into contact with the stand when the AR tilting trinocular tube is placed at the top position.
  - Bundle the cables after making the space to slide the USB cable connected to the zoom magnification sensor.
  - With appropriately loosening the USB cable connected to the zoom magnification sensor so that it won't be stretched, secure it with the wiring clamp on the side of the AR tilting trinocular tube and then bundle it.

**CAUTION** Bundle the cables giving enough margin so that they are not stretched when the movable parts move.



### 3 Connecting to the power outlet

- 1 Insert the power plug **F** into the power outlet **G**.



The illustrations are examples for Japan.  
Plug shapes and other aspects may vary in  
different regions and countries.



## 11

## List of observation magnifications and observation ranges

The observation magnifications and observation ranges when using this system are shown below.

Combination with SZX-ZB7 zoom microscope body (zoom magnification of zoom microscope body: 0.8 to 5.6x)

Objective lens magnification	Eyepiece magnification (field number)	
	10x (Field number 22)	
	Observation magnification (x)	Observation range (mm)
0.5x	5.00-35.0	44.0-6.29
0.75x	7.50-52.5	29.3-4.19
1x	10.0-70.0	22.0-3.14
1.25x	12.5-87.5	17.6-2.51
1.5x	15.0-105	14.7-2.10
2x	20.0-140	11.0-1.57

Combination with SZX2-ZB10 zoom microscope body (zoom magnification of zoom microscope body: 0.63 to 6.3x)

Objective lens magnification	Eyepiece magnification (field number)	
	10x (Field number 22)	
	Observation magnification (x)	Observation range (mm)
0.5x	3.94-39.4	55.9-5.59
0.75x	5.91-59.1	37.2-3.72
1x	7.88-78.8	27.9-2.79
1.25x	9.84-98.4	22.3-2.23
1.5x	11.8-118	18.6-1.86
2x	15.8-158	14.0-1.40

Combination with SZX2-ZB16 zoom microscope body (zoom magnification of zoom microscope body: 0.7 to 11.5x)

Objective lens magnification	Eyepiece magnification (field number)	
	10x (Field number 22)	
	Observation magnification (x)	Observation range (mm)
0.3x	2.62-43.1	83.8-5.10
0.5x	4.38-71.9	50.3-3.06
0.8x	7.00-115	31.4-1.91
1x	8.75-144	25.1-1.53
1.6x	14.0-230	15.7-0.96
2x	17.5-288	12.6-0.77

**TIP**

The observation magnification when using this system in combination with the coaxial reflected light illumination unit will be 1.5 times the observation magnification values listed above.

## 12-1 Installation

- NOTE**
- Log in to Windows with Administrator authority.
  - If a window regarding execution authority is displayed, select the Approve all option.
  - Before installing device drivers, close all open applications.
  - If a later version than the version of your software is available on the website, it is recommended to download it from the URL below:  
<https://www.olympus-ims.com/service-and-support/downloads/>
  - If the display is black with nothing visible, the display settings need to be adjusted.  
See “12-4 Using the Primary Monitor Change Tool to Set Up a Display” on page 53 for more information.

### 1 Install the software

When installing SZX-AR1-APP using the installation medium

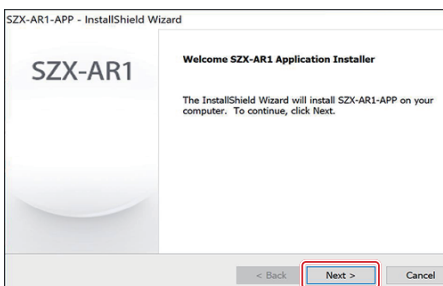
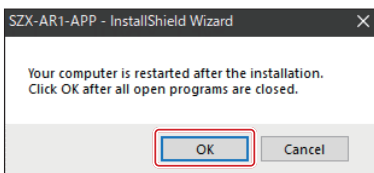
- 1 Insert the installation media into the disk drive of your PC.
- 2 Double-click setup.exe (or setup) in the following folder on the installation media.  
D:\SZX-AR1-APP\  
(If your PC's D: is not a DVD drive, change the "D:" in this line to your DVD drive letter.)

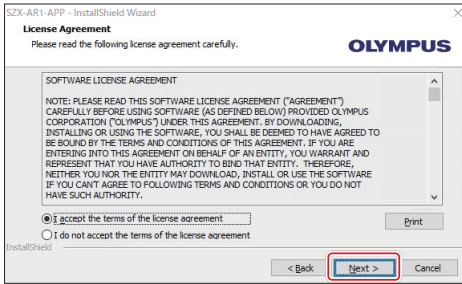
When installing SZX-AR1-APP by downloading it from the website

- 1 Go to the URL below to download the files for this software.  
<https://www.olympus-ims.com/service-and-support/downloads/>
- 2 Double-click on the downloaded file, then double-click on setup.exe (or setup) in the following folder.  
[Mount destination folder]: \SZX-AR1-APP\  
  
3 When the screen requesting you restart the computer is displayed after the installation has been completed, click the [OK] button.

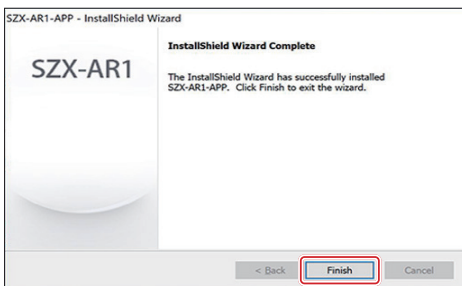
**NOTE** Exit all running software.

- 4 When the installation start screen appears, click the [Next] button.

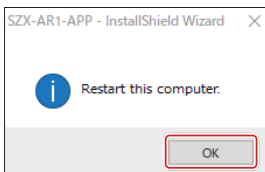




- 5 Select the [I accept all the terms of the license agreement (A)] radio button and click the [Next (N)] button.



- 6 When the completion screen appears, installation is completed. Click the [Finish] button.



- 7 When the restart confirmation screen appears, click the [OK] button to restart the PC.

## 2 Installing the device drivers for DP23/DP28

- NOTE** To install the device drivers for DP23/DP28, you need to connect DP23/DP28 to your PC. Driver installation cannot be completed properly unless you connect DP23/DP28 to your PC before starting the process.

When installing SZX-AR1-APP using the installation medium

- 1 Insert the installation media into the disk drive of your PC.
- 2 Right-click on the bat file in the folder shown below on the installation medium and select [Run as administrator].

D:DPDriver\DP23\_28\install.bat  
(If "D:" is not the DVD drive, replace the "D:" in the address above with the DVD drive letter.)

When installing SZX-AR1-APP by downloading it from the website

- 1 Go to the URL below to download the files for this software.  
<https://www.olympus-ims.com/service-and-support/downloads/>
- 2 Double-click the downloaded file, then right-click on the bat file in the folder shown below on the installation medium and select [Run as administrator].

[Mounting folder name]: DPDriver\DP23\_28\install.bat

- 3 A command prompt window will be displayed, and the device driver installation will start.
- 4 Follow the instructions on the command prompt window and press any key after the device driver installation is completed to close the window.
- 5 Restart the PC.

### 3 DP27 device driver installation

**NOTE** The DP27 unit must be connected to your PC when installing the device drivers. Driver installation cannot be properly completed unless you connect DP27 to your PC before starting the process.

When installing SZX-AR1-APP using the installation medium

- 1 Insert the installation media into the disk drive of your PC.
- 2 Double-click the bat file in the following folder in the installation medium:

D: DPDriver\DP27\DriverInstall64.bat

(If your PC's D: is not a DVD drive, change the "D:" in this line to your DVD drive letter.)

The black screen appears and the installation of the device driver starts.

When the black screen disappears, the installation of the device driver is completed.

When installing SZX-AR1-APP by downloading it from the website

- 1 Go to the URL below to download the files for this software.  
<https://www.olympus-ims.com/service-and-support/downloads/>
- 2 Double-click the downloaded file and then double-click the bat file in the following folder:  
[Mount destination folder]: DPDriver\DP27\DriverInstall64.bat  
A command prompt window will be displayed, and the device driver installation will start.  
When the command prompt window disappears, device driver installation is complete.
- 3 Restart the PC.

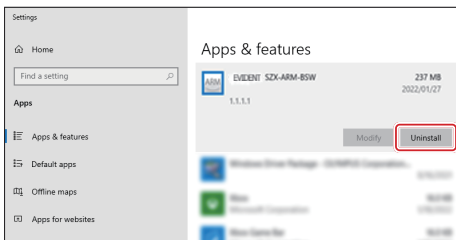
## 12-2 Uninstalling Software

Uninstall the software, device driver for the AR tilting trinocular tube, and device driver for the camera in this order.

- NOTE**
- Log in to Windows with Administrator authority.
  - If a window regarding execution authority is displayed, select the Approve all option.
  - After uninstallation, be sure to restart the PC.

### 1 Uninstalling the software

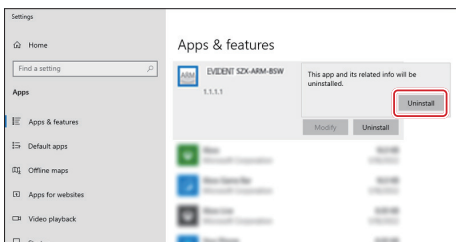
Display a list of programs.



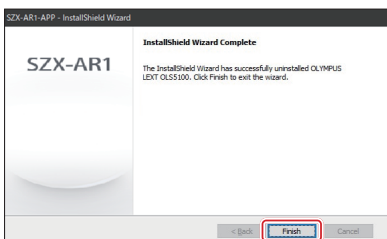
- 1 From the [Start] button, select [Settings], [Apps], and [Apps & Features] in that order.

- 2 Select [EVIDENT SZX-ARM-BSW] from the program list and click the [Uninstall] button.

- 3 Click the [Uninstall] button once more when it is displayed again.



- 4 When the uninstall completion screen is displayed, the software has been successfully uninstalled. Click the [Finish] button.

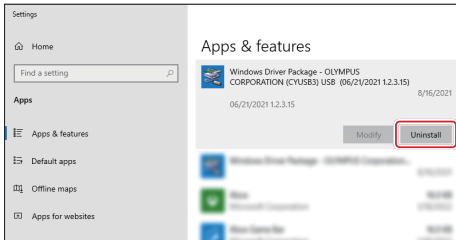


## 2 Uninstalling the device driver for the AR trinocular tube device driver

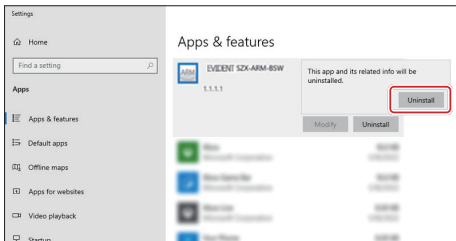
Display a list of programs.

1 From the [Start] button, select [Settings], [Apps], and [Apps & Features] in that order.

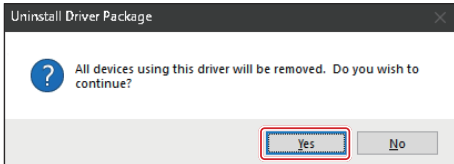
2 From the program list, select [Windows Driver Package - OLYMPUS CORPORATION (CYUSB3) USB] and click the [Uninstall] button.



3 Click the [Uninstall] button once more when it is displayed again.



4 The uninstallation start screen for the driver package appears. Confirm the message and then click the [Yes] button.



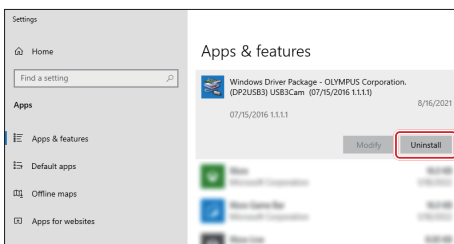
## 3 Uninstalling the device driver for the camera

Display a list of programs.

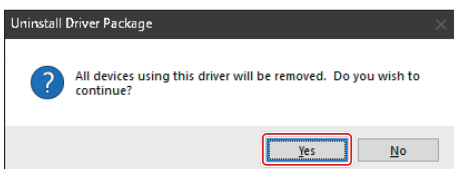
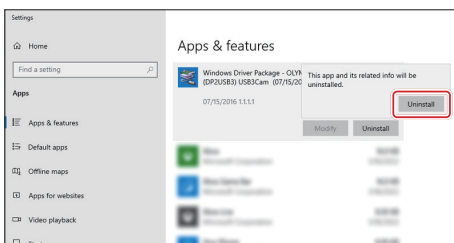
- 1 From the [Start] button, select [Settings], [Apps], and [Apps & Features] in that order.

For DP27

- 2 Select [Windows Driver Package (DP2USB3) USB3Cam] from the program list and click the [Uninstall] button.



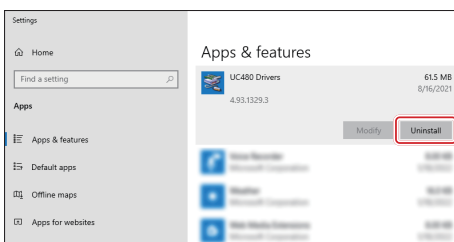
- 3 Click the [Uninstall] button once more when it is displayed again.



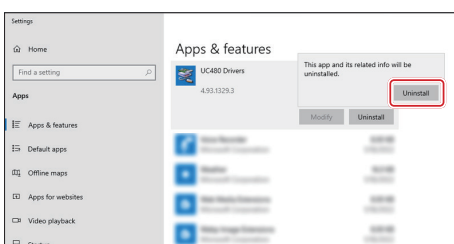
- 4 The uninstallation start screen for the driver package appears. Confirm the message and then click the [Yes] button.

For DP23/DP28

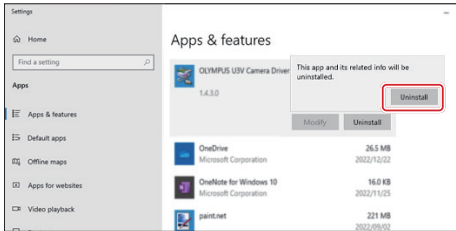
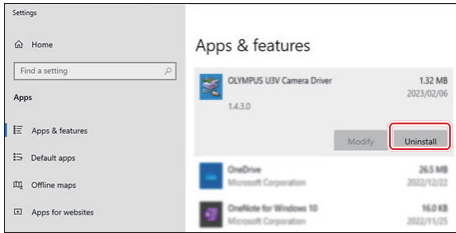
- 2 Select [UC480 Drivers] from the program list and click the [Uninstall] button.



- 3 Click the [Uninstall] button once more when it is displayed again.



- 4 When uninstallation starts, the progress screen appears.



- 5** Select [OLYMPUS U3V Camera Driver] from the program list and click the [Uninstall] button.
- 6** Click the [Uninstall] button once more when it is displayed again.
- 7** When uninstallation starts, the progress screen appears.
- 8** Restart the PC.

## 12-3 Updating the Software

- NOTE**
- Log in to Windows with Administrator authority.
  - If a window regarding execution authority is displayed, select the Approve all option.
  - If a later version than the current version of your software is available on the website, we recommend downloading it from the URL below and updating your software.

<https://www.olympus-ims.com/service-and-support/downloads/>

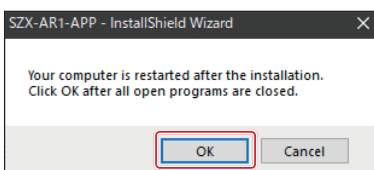
### When installing updates using installation media

- 1** Insert the installation media into the disk drive of your PC.
- 2** Double-click setup.exe (or setup) in the following folder on the installation media.  
D:\SZX-AR1-APP\  
(If your PC's D: is not a DVD drive, change the "D:" in this line to your DVD drive letter.)

### When installing updates by downloading them from the website

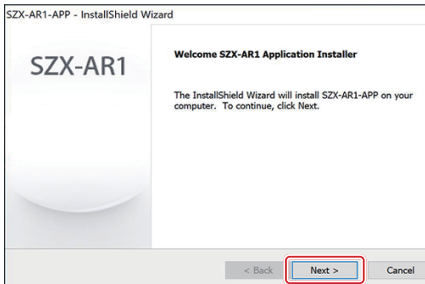
- 1** Go to the URL below to download the files for this software.  
<https://www.olympus-ims.com/service-and-support/downloads/>
- 2** Double-click on the downloaded file, then double-click on setup.exe (or setup) in the following folder.  
[Mount destination folder]: \SZX-AR1-APP\
- 3** When the screen requesting you restart the computer is displayed after the update is completed, click the [OK] button.

- NOTE** Exit all running software.

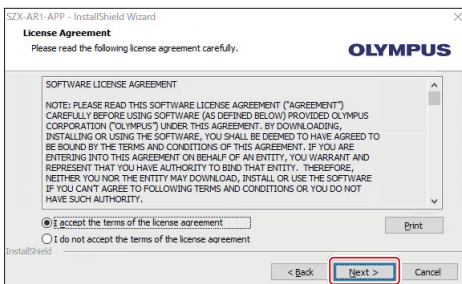




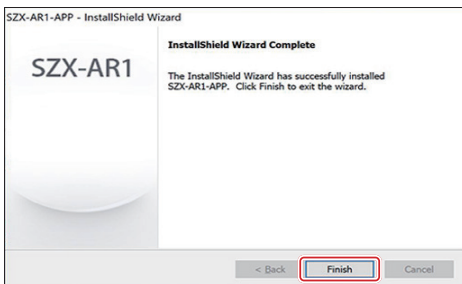
- 4 When the update start screen is displayed, click the [Next (N)] button.



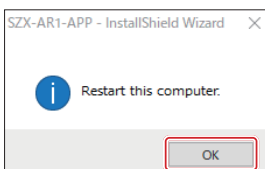
- 5 Select the [I accept all the terms of the license agreement (A)] radio button and click the [Next (N)] button.



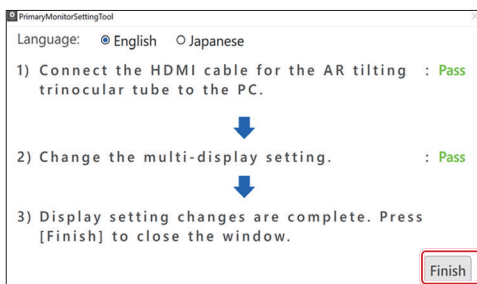
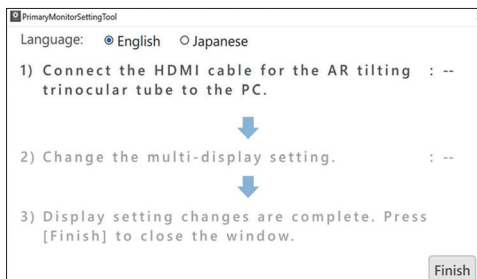
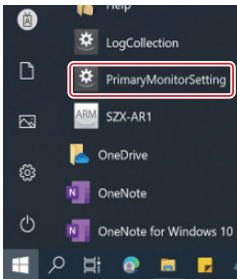
- 6 When the completion screen is displayed, the update is complete. Click the [Finish] button.



- 7 When the restart confirmation screen appears, click the [OK] button to restart the PC.



## 12-4 Using the Primary Monitor Change Tool to Set Up a Display



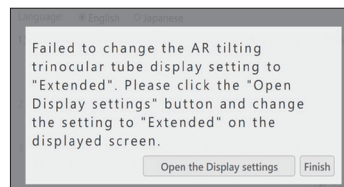
**NOTE** To resolve a black display screen issue, first disconnect the AR trinocular tube HDMI cable from the PC.

**1** Select [PrimaryMonitorSetting] from the [Start] button.

**2** Follow the procedure on the [Multi-Monitor Settings] window to set up the display.

- Connect the AR trinocular tube HDMI cable to the PC.
- The multi-monitor setting will be automatically changed to "Extend display".

**TIP** If the setting does not change to "Extend display", the window below will be displayed. Click on the [Open the Display settings] button and change the multi-monitor setting to [Extend display].



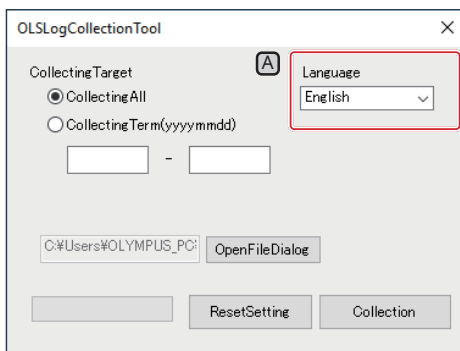
**3** When the setting has been changed, the text [Pass] will be displayed as shown in the figure to the left. Click the [Finish] button.

## 12-5 Collecting Log Files

This section describes how to collect information (log file) of the PC. We may request the submission of collected log files in situations such as when you submit inquiries to us.

- 1 Press the Windows key of the keyboard or use the mouse to click the [Start] button in the Taskbar.
- 2 Select [SZX-AR1] from the program list and right-click [LogCollection].
- 3 Select [Other], then [Run as Administrator] from the displayed menus.

The [Log Collection Tool] screen appears.



- TIP**
- To change the display language, select a language from the [Language] dropdown list **A**.
  - You can choose either [Japanese] or [English].

- 4 Set an interval for collecting information.

### **Collecting all information from the time you started using the PC**

- (1) Select the [All Log files] radio button **B**.

### **Collecting information for a specified time period**

- (1) Select the [CollectingTerm(yyyymmdd)] radio button **C**.
- (2) Input a start date of the term you want to collect information in the text box (left side) **D** below the radio button.
- (3) Input an end date of the term you want to collect information in the text box (right side) **E** below the radio button.

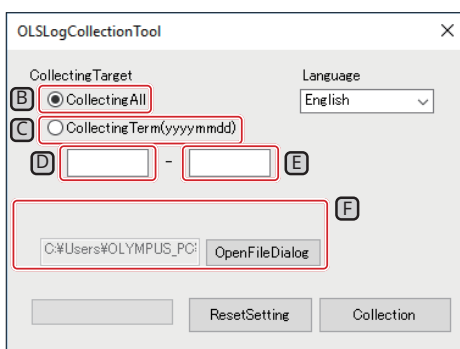
- TIP**
- Only half-width numeric characters may be used.
  - Input in the order of Year (4 digits), Month (2 digits), and Date (2 digits).

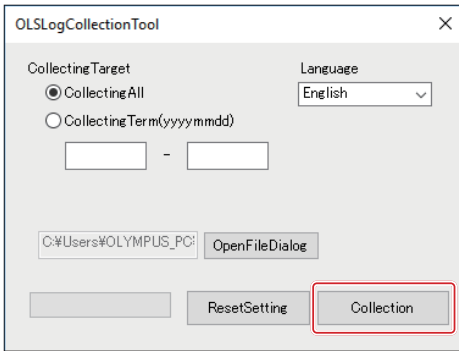
- 5 Click the [Browse] button.

The [Browse folders] screen will be displayed.

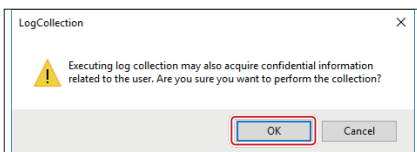
- 6 Specify the information files save location and click the [OK] button.

The specified save location will be displayed as [Export target] **F**.





**7** Click the [Collection] button.



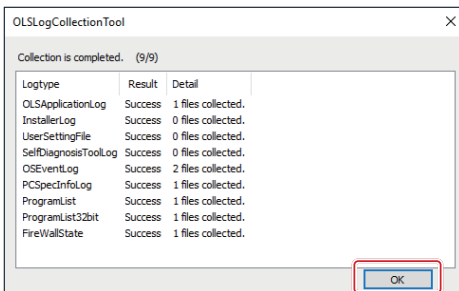
**8** When the message to start collecting information is displayed, click the [OK] button if you agree to take part in information collection.

The information collection process will start.

The information to be collected is listed below.

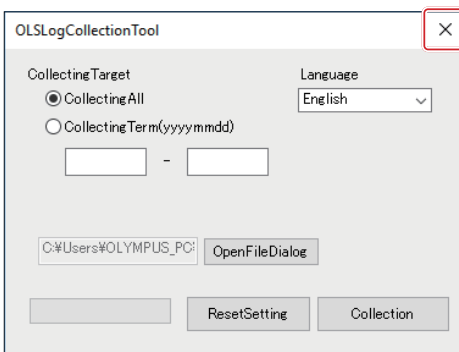
- Software-related logs and configuration file
- OS event log
- Windows Update log
- PC specifications information
- Program list

**TIP** We recommend not using your PC while information is being collected.



**9** When the information collection is completed, the [Collection is completed] screen appears. Click the [OK] button to close the [Collection is completed] screen.

You are back to the [LogCollectionTool] screen.



**10** Click the [Close] button at the top right of the [LogCollectionTool] screen to close the [LogCollectionTool] screen.

# 13 Setup Checklist

Be sure to check the following items after setting up the product.

If you do not check the following items, the instrument may not exhibit full performance.

Check item	Impact caused by not checking	Check	Page
1. The magnification indication sticker and the magnification ring are removed.	There will be discrepancy between the zoom magnification shown on software and the zoom magnification shown on the focus adjustment knob.		7 37
2. The rotation direction of the camera is adjusted correctly.	There will be discrepancy in rotation between the eyepiece field of view and the camera field of view due to rotation of the camera image.		39
3. The camera is connected to the correct USB port.	The camera will not work.		40
4. The cables connected to this system are properly wired and in good condition.	The cable will be broken.		40
5. Installation was completed without errors.	The software will not start.		45
6. The tension of the coarse focusing knob is adjusted appropriately.	The microscope frame won't stay up. The image will not be in focus during observation.		21
7. The click-stop on the zoom microscope body is enabled.	The zoom magnification will not be acquired correctly.		37
8. The diopter of the eyepiece is adjusted correctly.	The image will easily be defocused when zooming. The focus position of the observed image and that of the camera image will be misaligned. The AR image will appear blurred. This will lead to eye fatigue.		20
9. Microscope information is registered in the software correctly.	Calculation functions and zoom magnification acquisition cannot function correctly.		25
10. The parfocal adjustment of the camera mount is performed correctly.	The focused image cannot be acquired with the camera.		26
11. The display position of the AR image matches that of the optical image.	When giving instructions using the AR image while viewing the camera image on the software, the position of the AR image displayed in the field of the of view will be shifted.		26
12. The initial adjustment of the zoom magnification sensor is performed accurately.	The zoom magnification at the click position will not be acquired correctly.		28
13. Was there any resistance when you rotated the focus adjustment knob once?	The focus adjustment knob does not rotate smoothly with some resistance.		37

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**Life science solutions**

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