

INSTRUCTIONS

DP23-AOU

DP23 Control Unit Set

DP28-AOU

DP28 Control Unit Set

Notes

This instruction manual is for the control unit set for the Evident microscope digital camera.

To ensure the safety, obtain optimum performance and to familiarize yourself fully with the use of this product, we recommend that you study this manual thoroughly before operating this product, and always keep this manual at hand when operating this product.

Retain this instruction manual in an easily accessible place near the work desk for future reference.

For details of products included in the configuration of this system, see page 9 of this instruction manual.

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

- Immunity Industrial and basic electromagnetic environment

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



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 Evident distributor in EU for return and/or collection systems available in your country.

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 Accessory

Model Number: DP23-AOU, DP28-AOU

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

CALIFORNIA USA ONLY

This product uses a Lithium Battery which contains Perchlorate Material -special handling may apply, See www.dtsc.ca.gov/hazardouswaste/perchlorate.

For Korea only

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

Precautions for the first startup

When you turn ON the power for the first time, the OS setup (initial processing) starts automatically.

Complete the OS setup according to instructions on the screens.

Do not turn OFF the power before all the settings are completed. (It takes a few minutes until all the settings are completed.)

If you turn OFF the power before all the settings are completed, you cannot start the camera control software next time.

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Concept of this instruction manual

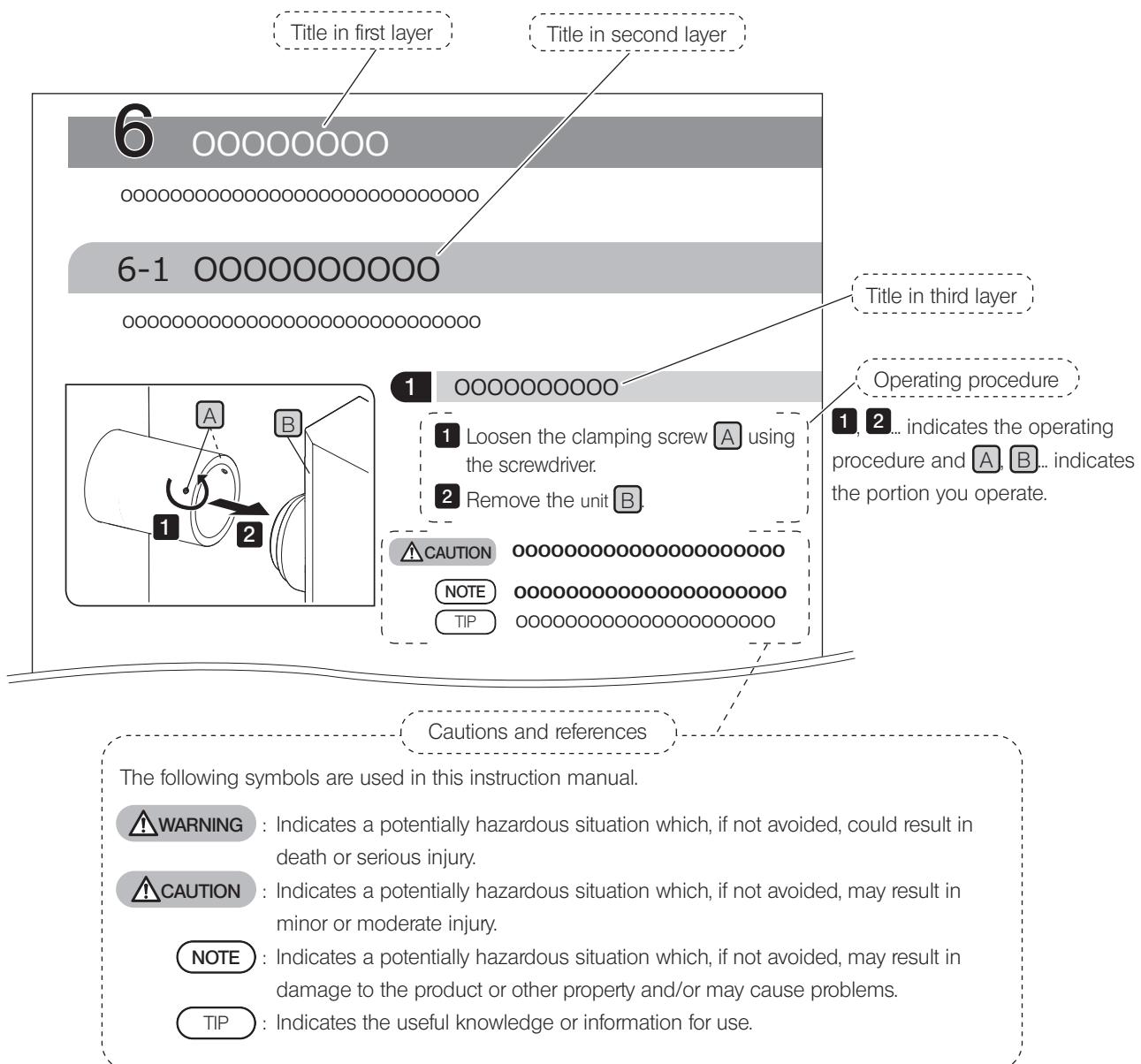
This instruction manual mainly describes the contents related to DP2-AOU. For procedures to use DP23-CU or DP28-CU, refer to the instruction manual for the microscope digital camera DP23-CU or DP28-CU.

Applicable user of this instruction manual

This instruction manual applies to users who use this product according to "Intended use" and Evident distributors.

How to read this instruction manual

This instruction manual is created as follows.



Product Concept

Product outline

DP23-AOU (DP23 Control Unit Set) is a product where DP23-CU (microscope digital camera) and DP2-AOU (control box) are combined. DP28-AOU (DP28 Control Unit Set) is a product where DP28-CU (microscope digital camera) and DP2-AOU (control box) are combined.

Combining with DP2-AOU allows you to use the microscope digital camera DP23-CU or DP28-CU in standalone mode.

Intended use

This product is intended to be used for capture and storage of digital images, but not for clinical diagnostic purposes.

Trademark

Microsoft and Windows are registered trademarks of Microsoft Corporation in U.S. The terms HDMI and HDMI High-Definition Multimedia Interface, and the HDMI Logo are trademarks or registered trademarks of HDMI Licensing Administrator, Inc. in the United States and other countries. The SuperSpeed USB 5Gbps Trident Logo is a registered trademark of USB Implementers Forum, Inc. All brand names or product names described in this instruction manual are trademarks or registered trademarks of relevant owners.



Software license agreement

If you use this product, you shall be deemed to have consented to the terms and conditions in "OLYMPUS END-USER LICENSE AGREEMENT". "OLYMPUS END-USER LICENSE AGREEMENT" is displayed at initial startup. Read it carefully before using the product.

Open Source Software

A part of this product contains the programs or codes of the open source software or the software that is disclosed intentionally (hereinafter called "OSS"). The programs and codes of OSS included in this product shall comply with license conditions applied to the said OSS. Also, any part of this agreement shall not restrict, limit or affect the rights owned by customers or conditions complied by customers based on the license conditions of the said OSS. The information of the programs and codes of OSS included in this product is described in [Software notice]. You can display [Software notice] in the following procedure.



- 1 Select the [Acquisition] tab **A**.
- 2 Press the [System Settings] button **B** to open the [Options] dialog box.
- 3 Select [Environment] > [About], and press the [Software notice] button.

Safety precautions

If the product is used in a manner not specified by this instruction manual, the safety of the user may be imperiled. In addition, the product may also be damaged. Always use the product according to this instruction manual.

Installation



Do not to block the air vents of DP2-AOU.

DP2-AOU is equipped with a ventilation fan. Be careful not to block the air vents. Install DP2-AOU away from the obstacles such as walls, etc. by 10 cm or more to get the sufficient air.

Using DP2-AOU keeping the air vents closed will cause malfunction or failure. If any foreign substance enters from the air vents, the fan may be damaged.

Prevention of electric shock



• Never disassemble any part of this product.

It could cause electric shock or failure of the product.

• 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, electric shock, ignition or failure of the product may be caused.

• Do not bend, pull or tie the power cord or cables in a bundle.

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

• Keep the power cord and cables well away from the lamp housing.

If the power cord and cables contact a hot area of the lamp housing, they could melt and cause electric shock.

• Do not insert any tools or metal fragments in the air vents of the device.

The electric shock or failure of the product may be caused.

Electric safety



• Always use the power cord provided by Evident.

If the proper AC adapter and the power cord are not used, our intended electric safety and EMC (Electromagnetic Compatibility) performance of the product 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 and that of the power outlet.

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

• Do not use the product in close proximity to the 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.

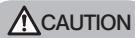
Install the product at the location where you can reach the power cord connector or the power outlet at hand to disconnect the power cord quickly.

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

• Insert the cables completely to the end of the connector.

Before pressing the main switch, make sure that the cable that connects DP2-AOU to each unit is inserted completely to the end of the connector.

Prevention of burn



Do not keep touching the AC adapter, camera head or DP2-AOU for long hours.

The AC adapter, camera head or DP2-AOU generate heat after long hours of use. Be careful not to allow these devices touch your skin for long hours to avoid the low temperature burn. For details of USB devices to be connected to DP2-AOU, follow the instructions described in instruction manual of respective device.

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.

Label position and instruction

In particular, cautions are displayed at the areas where special cautions are required when in use and operation. Be sure to follow the instructions.

Label	Label position	Instructions in instruction manual	Page
	Top surface of DP2-AOU	Cautions for electric safety and prevention of electric shock	3Page

If caution labels are dirty or peeled off, contact Evident for assistance.

Handling precautions

Lifetime

The lifetime of this product is approximately 5 years after purchase if the product is used properly according to this instruction manual. (*except consumables)

Cautions for use

- This equipment is a precision instrument. Handle it with care and avoid subjecting it to a sudden or severe impact.
- Never disassemble any part of the product. Otherwise, failure could be caused.
- Do not use this equipment in areas where it may be subjected to direct sunlight, high temperature and humidity, dust or vibrations. For operating environment, see "9 Specifications (p. 103)".
- The cables are vulnerable to bend or twist. Do not apply excessive force. When connecting cables, make sure of the orientation to insert them.
- If cables are connected incorrectly, it may cause a failure of the product. Make sure that the cables are connected to respective units correctly before operating the product.
- Do not touch the camera head while the power is ON. If you touch the camera head while the power is ON, the communication between the camera and DP2-AOU may be disconnected in rare cases. In this case, press the main switch of DP2-AOU to restart the system.
- Hold the camera adapter when adjusting the rotation and parfocality that are performed when attaching the camera.

Image data

- The recorded image data may be lost (destroyed) in the following cases. Evident is not liable for the loss (destruction) of recorded data.
 - When the user or a third party used the recording media such as USB flash drive, etc. incorrectly.
 - When the user or a third party repaired the product.
 - When the recording media such as USB flash drive, etc. is affected by static or electric noise.
 - When the following actions were taken while PC or DP2-AOU is recording data to the recording media such as USB flash drive, etc. or deleting data (initializing).
 - Disconnect the recording media such as USB flash drive or cables, etc.
 - Exit the system.
 - Set the main switch to OFF.
 - Unplug the AC adapter.
 - Unplug the power cord.
 - When data has been continuously saved in the recording media such as USB flash drive, etc. beyond the data storage lifetime (approx. one to several years).
 - When the product is broken.
- If the following phenomena occur even though the camera is working properly, the images cannot be restored and the damages are not compensated.
 - The image is abnormal.
 - File properties such as file names, file date, etc. are abnormal.
 - The image is lost.
- Be careful if you use the recording media such as USB flash drive, etc. that is not equipped with security function, a third party can easily refer to the data.

TIP

- In general, as the data storage lifetime is set on the recording media, such as USB flash drive, HDD, CD-R, DVD-R, etc., the saved files may be lost after several years.
- The image data may be lost (corrupted) unexpectedly. Be sure to make frequent backups of the data you acquired.

Evident shall have no liability for any damage (including compensation for the corrupted image data) from the use or failure of this product.

- Make sure that there is no problem in acquiring the observation objects before acquisition. Even though the problem may occur by the acquired images, Evident is not liable for these problems.

Guarantee of operation

If the following actions are taken, Evident does not guarantee the operation of this product.

- Write data into or edit data in the system disk (Windows® OS).
- Install software that is not pre-installed on this product such as antivirus software, etc.

OS setting

The factory default OS user is set as follows:

- Username: DP2-AOU
- Password: OlyDP123

Computer virus

To prevent computer viruses, DP23-AOU or DP28-AOU does not allow the unauthorized writing in the system area of DP2-AOU.

However, it cannot completely prevent the infection of computer viruses that evolve on a daily basis. Take the following actions to prevent the contamination of computer viruses to DP2-AOU.

- For the recording media connected to DP23-AOU or DP28-AOU such as USB flash drive, etc., check viruses in advance. (DP23-AOU or DP28-AOU does not have a function to check viruses. Use your PC to check viruses.)
- Make sure that there is no computer virus in the network or PC where DP23-AOU or DP28-AOU is connected.
- If, by any chance, they are infected by computer viruses or there is a suspicion of virus infection, set the main switch of DP2-AOU to OFF and unplug the power cord from the outlet. By doing this, the RAM memory is cleared and the foreign files are deleted.
- If malfunctions or infectious symptoms are still noticed even though the above actions were taken, contact Evident.

Evident is not liable for malfunctions of DP23-CU or DP28-CU or defects and damages occurred on your PC or network environments caused by the computer virus.

Connection to internet

It is not recommended to connect DP2-AOU to the internet except in the following cases.

- When unlocking (activating) the license of software (optional)

When connecting to the internet or handling the confidential information, it is strongly recommended to enable DP2-AVS (Antivirus Software License) (optional).

Updating software

The system may be updated to improve the performances or vulnerability. Check the latest update information on the Evident Website.

Battery lifetime

The lithium ion coin battery (CR2032) to maintain the calendar function is built in DP2-AOU. The battery lifetime is 1 to 6 years. (If the AC adapter is connected to DP2-AOU, the battery consumption is reduced. Therefore, the lifetime differs depending on whether the AC adapter is connected or not.)

The camera can be used even though the battery runs out, but the calendar is reset each time when the AC adapter is unplugged. If you need to replace the battery, contact Evident.

Fan of DP2-AOU

The number of rotations of the fan varies depending on the internal temperature of the device.

Therefore, the fan may make larger sound in the following cases, but they are not failures.

- When the temperature of the ambient environment is high, such as in summer time, etc.
- When the temperature of the system is high such as after long hours of use, etc.
- Approximately 10 seconds in the beginning of startup

System compatibility

Restrictions

TIP Confirm the restrictions described in the instruction manual of the microscope digital camera you will use as well.

- You cannot acquire the image of the dark specimen under the reflected fluorescence observation or the darkfield observation (DP28-CU: Specimen that needs the exposure of 1/2 seconds or more at ISO100 equivalent. DP23-CU: Specimen that needs the exposure of 1/2 seconds or more at ISO200 equivalent). When acquiring the image of the particularly dark specimen, the lack of pixels caused by the cosmic ray or the constant bright points may be noticed, but they are not phenomena caused by the failure of the instrument.
- Specimens with intensity distribution that is not suitable for the metering require the use of spot metering or the exposure compensation.
- When the electronic zoom is used for enlarging the image during focusing, the roughness of the image may be noticeable depending on specimens.
- When attaching or detaching USB equipments or when accessing USB equipments, the frame rate may be decreased or the image may be blurred temporarily.
- The maximum frame rate according to the resolution of the live image is shown in the table below. The maximum frame rate is given when the exposure time is set lower than values shown in the table below.

DP23-CU:

Resolution	Exposure time (sec)	Frame rate (fps)
3088 x 2076	1/30	30
2072 x 2072	1/43	43
1544 x 1038(high speed)	1/59	59
1544 x 1038(sensitivity)	1/59	59
1920 x 1080	1/60	60

DP28-CU

Resolution	Exposure time (sec)	Frame rate (fps)
4104 x 2174	1/30	30
3840 x 2160	1/30	30
2168 x 2168	1/30	30
2052 x 1086(high speed)	1/60	60
2052 x 1086(sensitivity)	1/30	30
1920 x 1080	1/60	60

- If the scale bar imprinting function or the measuring function is selected, the time to acquire the image is longer than normal.
- When observing a specimen that contains few white area, the traceability of auto white balance is deteriorated.
- “Format of recording media” usable with DP2-AOU is NTFS, FAT or FAT32. When using the USB recording media in unsupported format, it is necessary to format it in NTFS, FAT or FAT32 on your PC.
- When using the USB recording media for acquiring movies, it is necessary to format it in NTFS.
- Depending on the recording media's speed to write images, etc., the frame rate when acquiring the movie may be reduced or frames may be skipped. If frames are skipped, the movie is played as if fast-forwarded. Frames may also be skipped when the available space of the recording media is small. Therefore, when acquiring the movie, it is recommended to save the movie on the hard disk (E:\Images) in DP2-AOU.

Devices to be connected to DP2-AOU

- USB devices other than those described below do not work even though they are connected to DP2-AOU.
- Connectable USB device:

USB recording media
USB mouse
USB keyboard
USB Wi-Fi adapter

When connecting devices that need dedicated device drivers or devices that need the Windows® Explorer function for operations, see "Installing the dedicated device driver (page.93)".

- Requirements for network connection are described below.

Applicable PC: DOS/V AT compatible

Applicable OS: Microsoft® Windows® 10 (64-bit)

When connecting to wired LAN

Standards: 10BASE-T, 100BASE-TX, 1000BASE-T

Applicable protocol: In accordance with TCP/IP (IPv4/IPv6)

Connector shape: RJ-45 type 8-port connector

Transmission speed (logical value):

Max. 10 Mbps (10BASE-T),

Max. 100 Mbps (100BASE-TX), Max. 1000 Mbps (1000BASE-T)

When connecting to wireless LAN

Standards: IEEE 802.11b, IEEE 802.11g, IEEE 802.11n, IEEE 802.11ac

Applicable protocol: In accordance with TCP/IP (IPv4/IPv6)

Connector shape: RJ-45 type 8-port connector

Transmission speed (logical value):

Max. 11 Mbps (IEEE 802.11b), Max. 54 Mbps (IEEE 802.11g),

Max. 600 Mbps (IEEE 802.11n), Max. 6.9 Gbps (IEEE 802.11ac)

Encryption system / Encryption standards: WPA2 / AES

Even though the above mentioned connection requirements are satisfied, it does not necessarily guarantee the connection and operations in all network environments.

Display in use

Display capable for full color view of 1280 x 1024 SXGA or higher

Maintenance and storage



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, electrical equipment that is switched on and off may cause the ignition of a fire. Always use absolute alcohol only in a well-ventilated room.

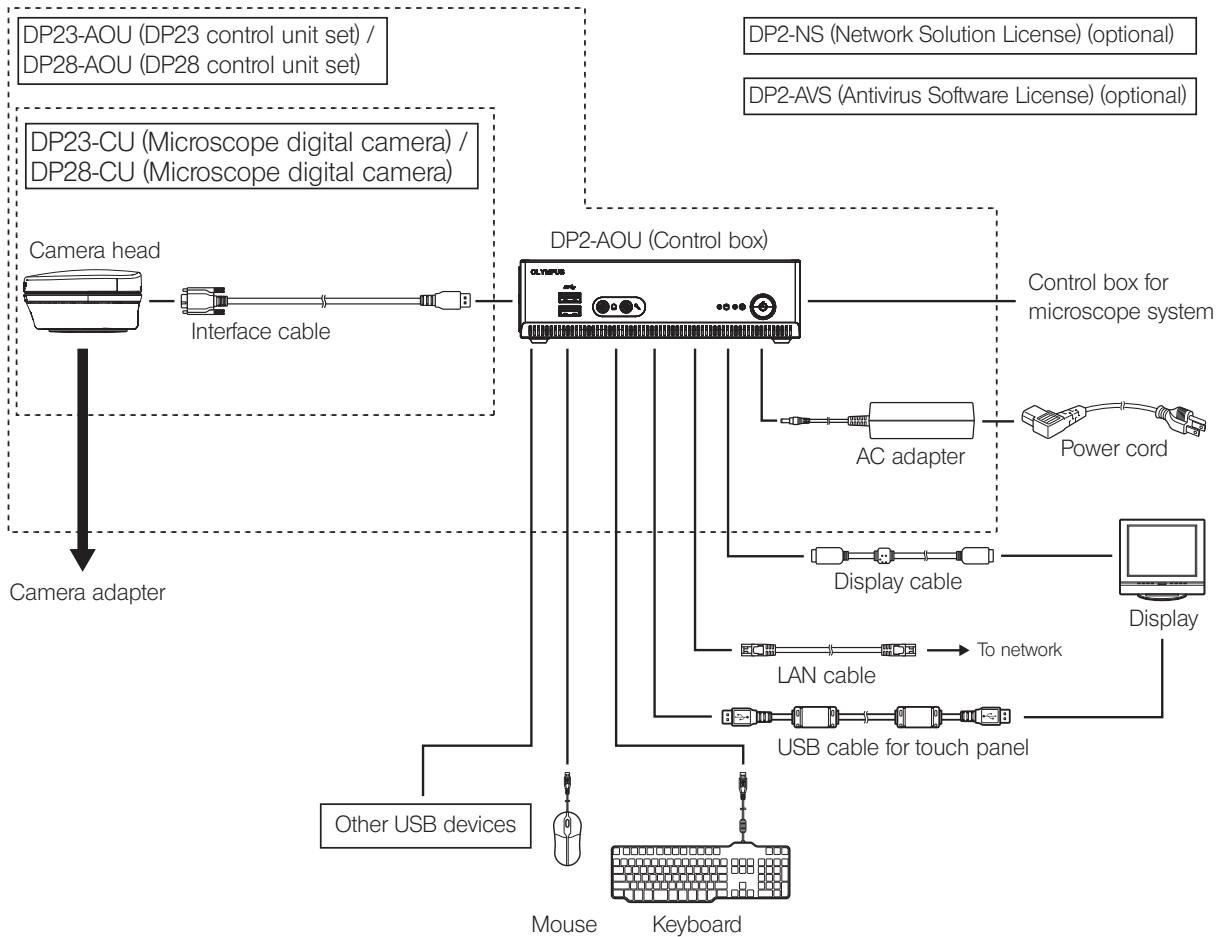
- Use a diluted neutral detergent to clean the parts. Moisten a soft cloth with diluted neutral detergent and wipe the surfaces of the parts.



Do not use organic solvents since it deteriorates coated surfaces or plastic parts.

- When disposing of this product, be sure to follow the regulations and rules of your local government. In particular, note that the lithium ion coin battery (CR2032) is built in DP2-AOU. For any inquiry, contact Evident.
- When smoking the room for cleaning, etc., move DP23-AOU or DP28-AOU to a place not exposed to smoke.
- Be careful for the generation of condensation, since it may cause failure of the product. Condensation is a phenomenon that the vapor in the air contacts the surface of a metallic plate, etc. and attaches as water drops. If the temperature suddenly changes, for example if DP2-AOU is suddenly moved from cold place to warm place, condensation may be generated.

1 System diagram



NOTE If the display is connected via a display switcher, malfunction may be caused. Do not use a display switcher.

TIP • The image color settings suitable for the microscope are necessary for faithful color reproduction. (For details, see page 37.)

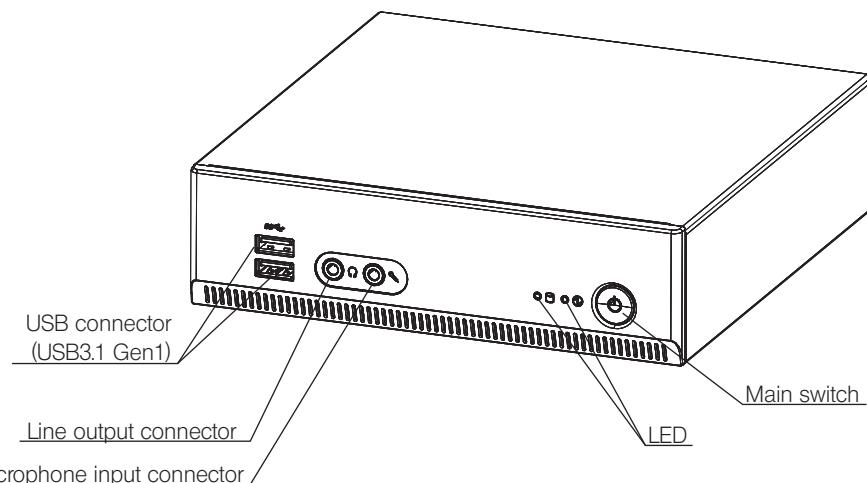
- For the compatible microscopes and camera adapters, contact Evident.
- Do not use the interface cable for any purpose other than its intended use.

2 Nomenclature of respective portions

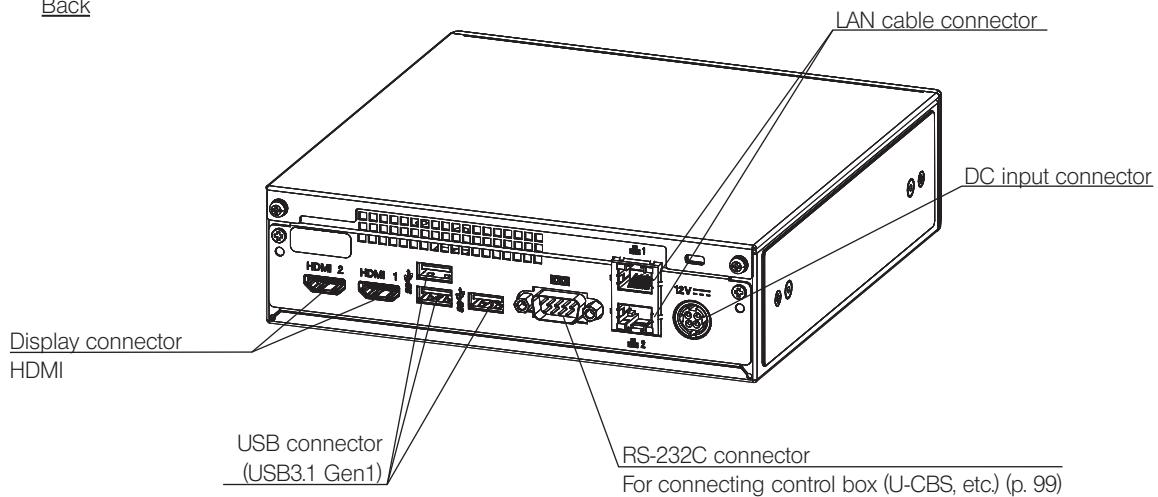
2-1 Hardware

DP2-AOU

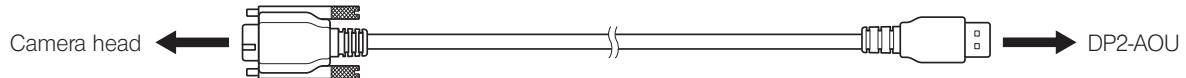
Front



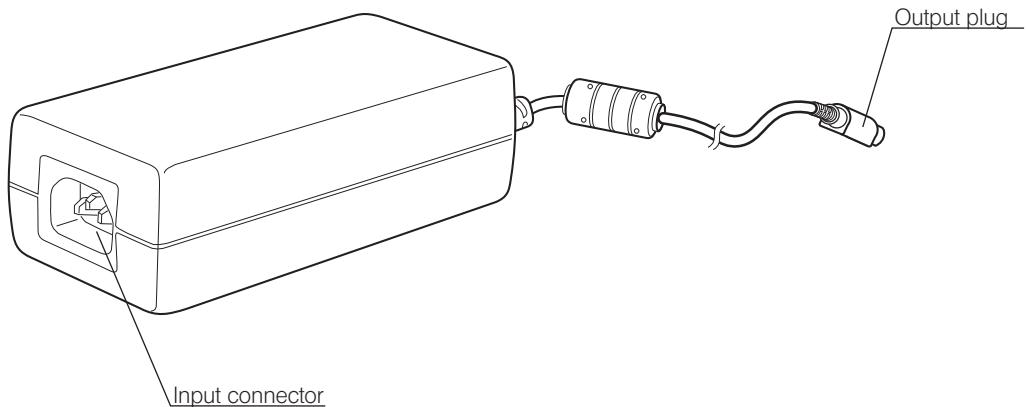
Back



Interface cable



AC adapter



2-2 Control window

Setting the main switch of DP2-AOU to ON allows you to start the camera control software. The camera control software is displayed in the upper right area of the display window. The [Acquisition] tab and the [Play] are are shown on the control window.

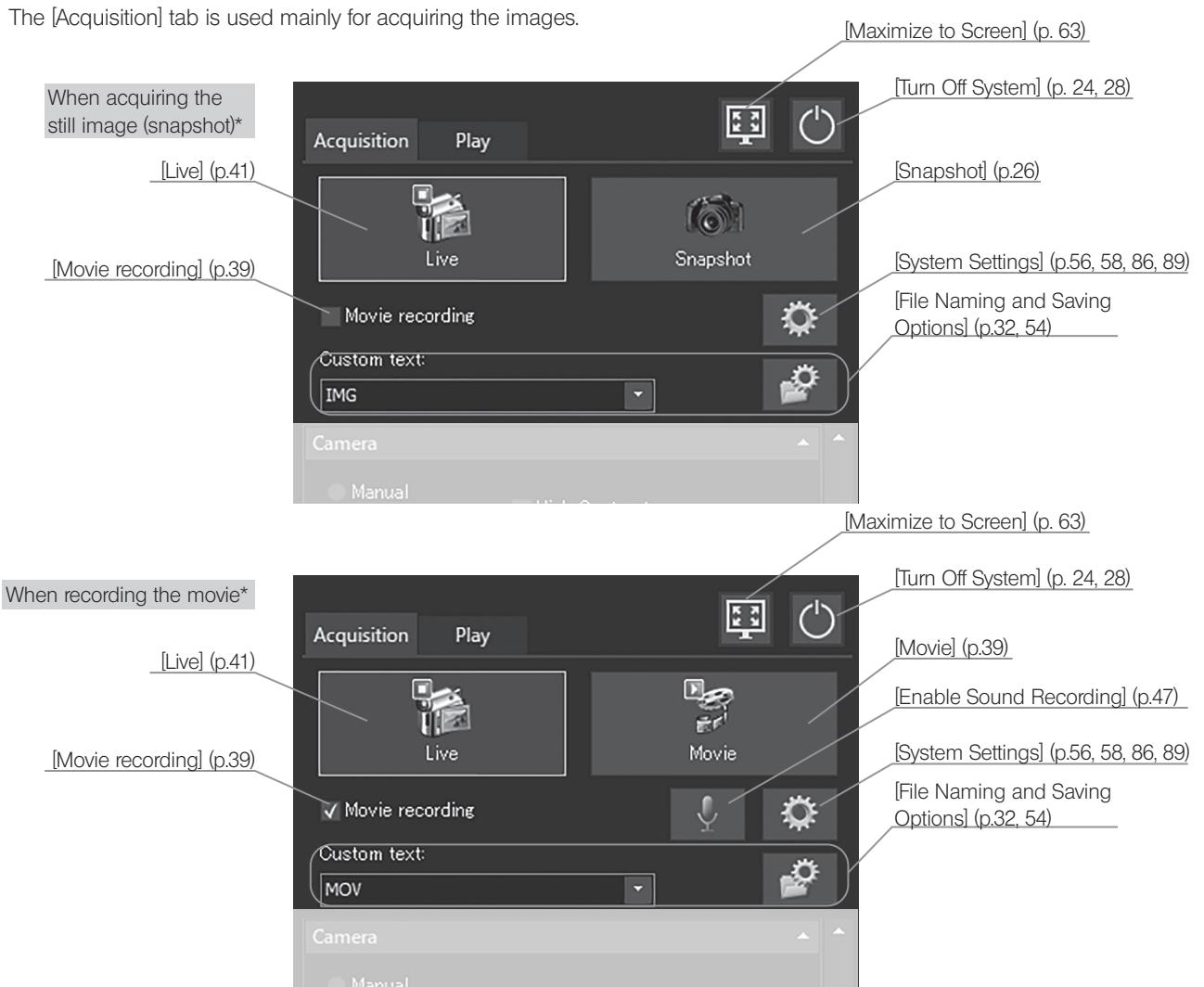
Status when the button is pressed

There are buttons which change the setting status using the same button. The setting statuses are described below.

Button color	Status
Blue	The settings displayed on the button are enabled or ON.
Gray	The settings displayed on the button are disabled or OFF.

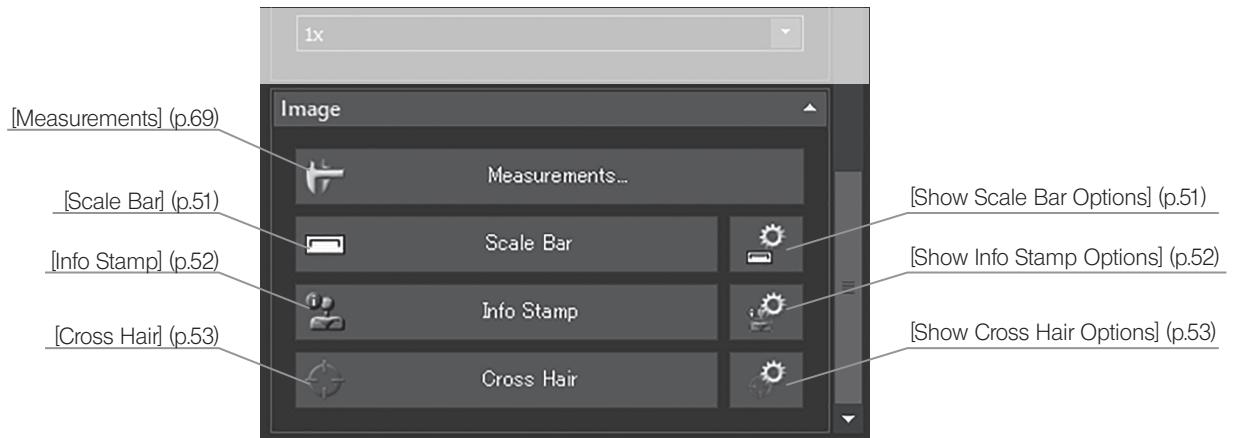
[Acquisition] tab

The [Acquisition] tab is used mainly for acquiring the images.



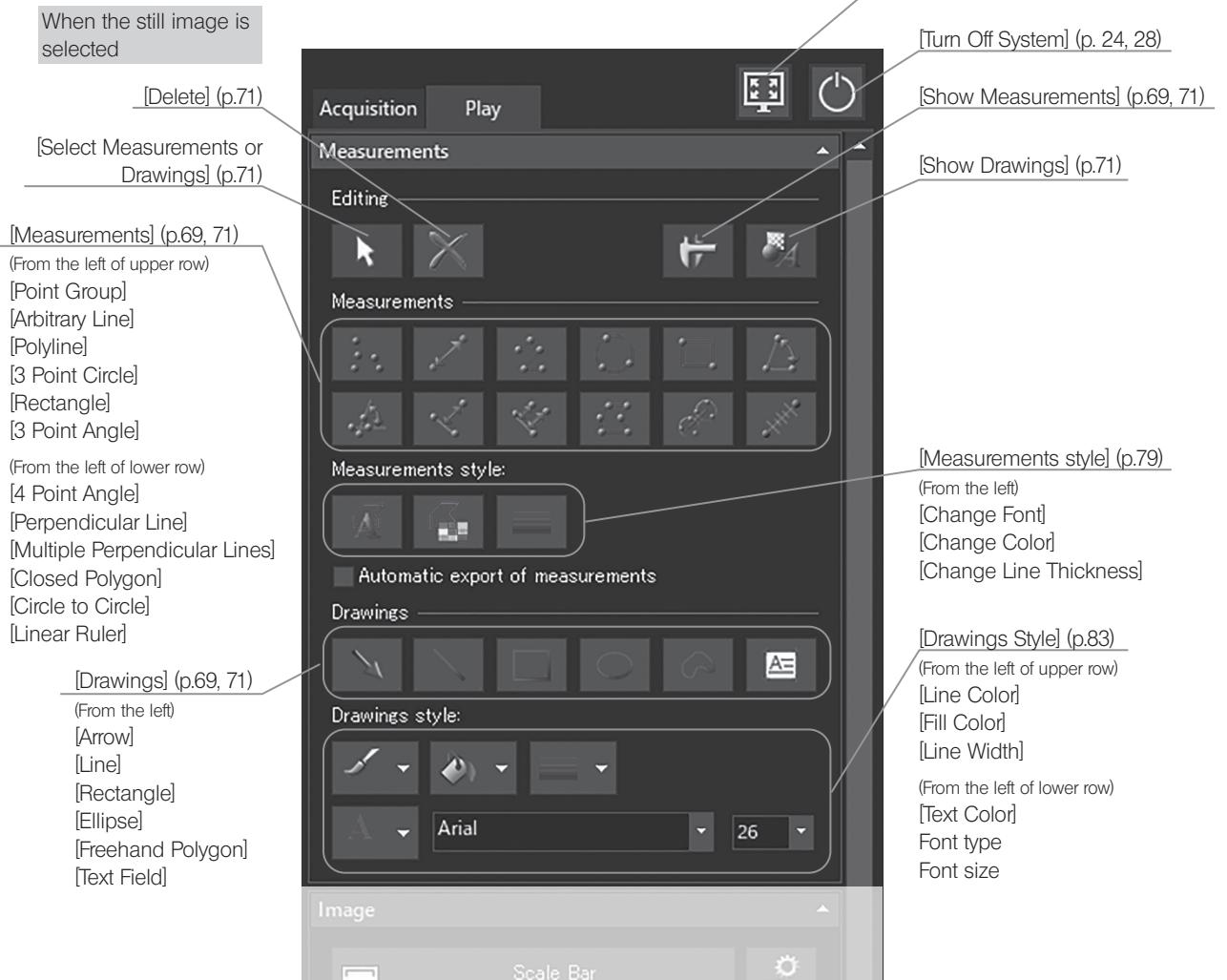
*Use the [Movie recording] check box for switching between acquiring the still image and recording the movie.

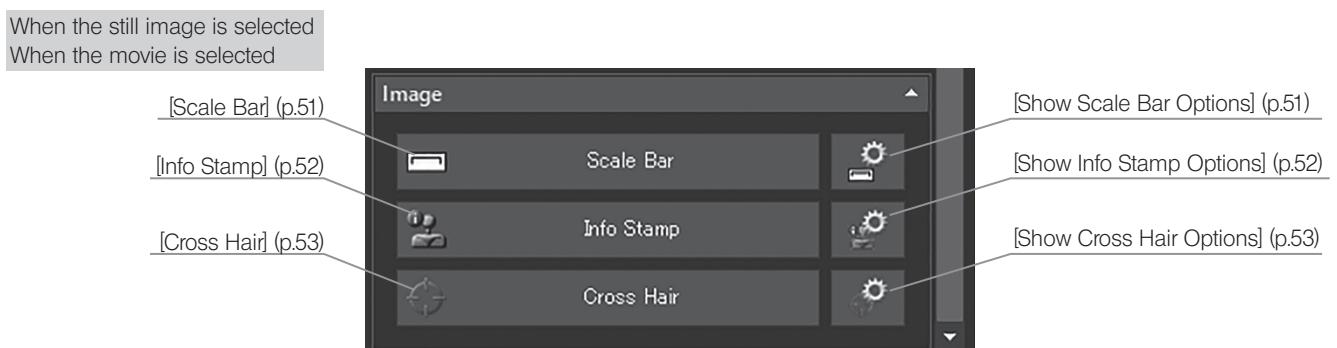
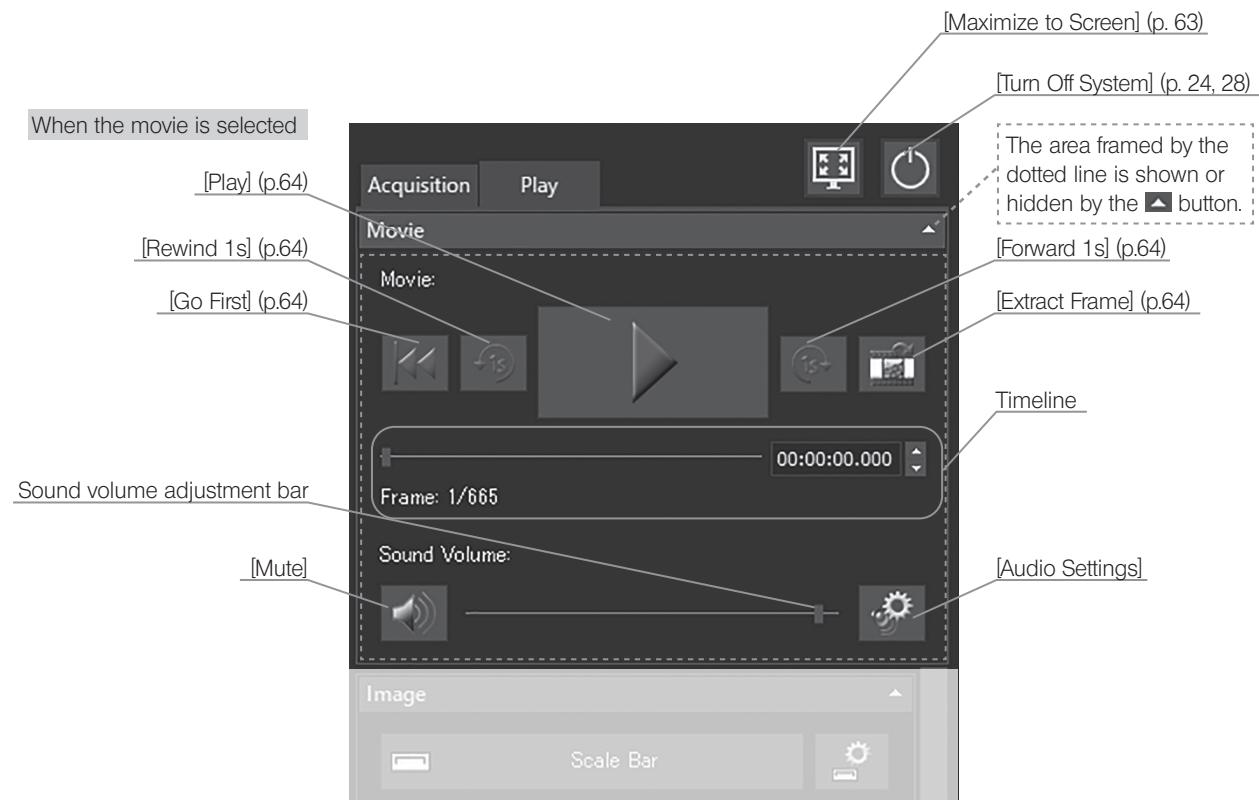




[Play] tab

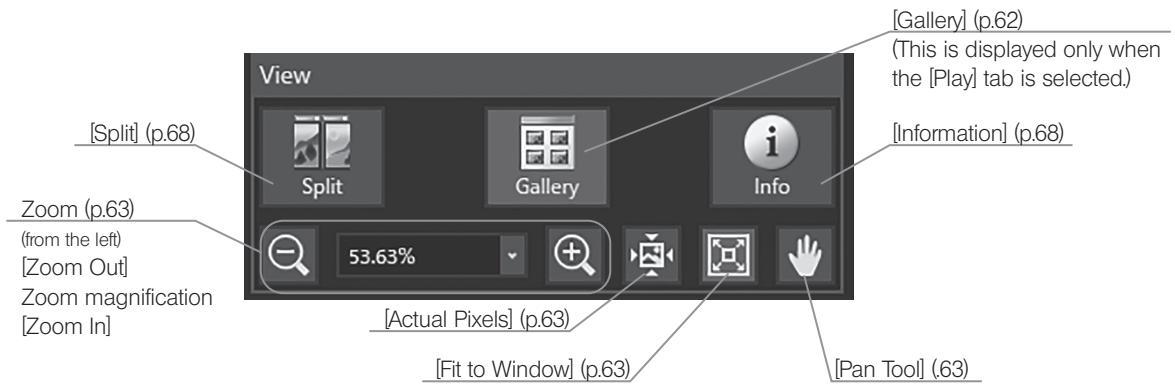
The [Play] tab is used mainly for playing images.





[View]

The [View] tab is used for changing the image view.

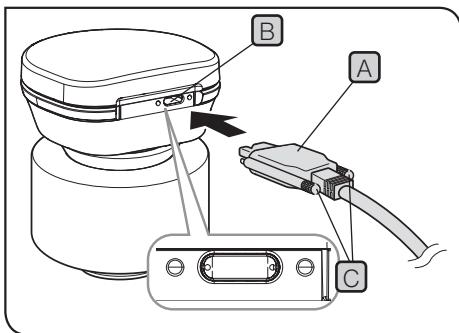


3 Assembly

This section describes only the procedure to assemble DP2-AOU. For the microscope, camera head, camera adapter, etc. to be used together with this product, assemble them with careful attention referring to the respective instruction manual.



Be sure to set the main switch of DP2-AOU to OFF during assembly.



1 Connecting the interface cable

NOTE

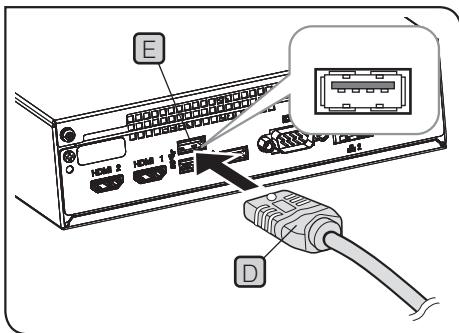
- Always use the interface cable provided by Evident. Using commercially available USB cables or hubs does not guarantee the operation of the equipment.
- The interface cable is vulnerable to bend or twist. Do not apply excessive force.
- Connect the interface cable in the correct orientation paying attention to the shape of the connector.

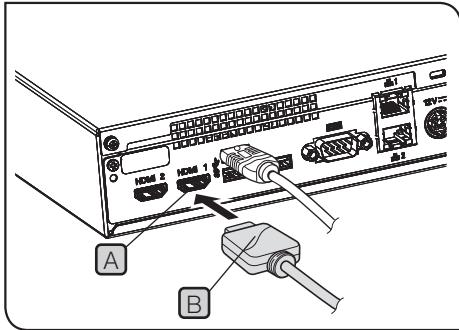
1 Connect the connector **A** of the interface cable to the connector **B** of the camera head, and tighten the lock screws **C** (2 positions). Make sure that the interface cable is secured completely.

NOTE

Be sure to tighten the lock screws with your hand. If you use the tool to tighten the lock screws too firmly, the screw thread of the connector of the camera head may be damaged.

2 Connect the connector **D** of the other end of the interface cable to the USB connector **E** of DP2-AOU.





2

Connecting the display cable

- 1 Connect the connector **B** of the display cable to the connector **A** of DP2-AOU.

TIP Use a HDMI cable applicable to the display as the display cable.

When using a touch panel display

The USB cable for the touch panel must be connected in addition to the display cable. For connection procedures, see "Connecting USB devices (p.21)".

Depending on the display to be connected, it may be necessary to install the dedicated device driver. For installation procedures, see "Installing the dedicated device driver (p.93)".

NOTE

If the display is connected via a display switcher, malfunction may be caused. Do not use a display switcher.

3 Connecting the AC adapter

⚠ CAUTION

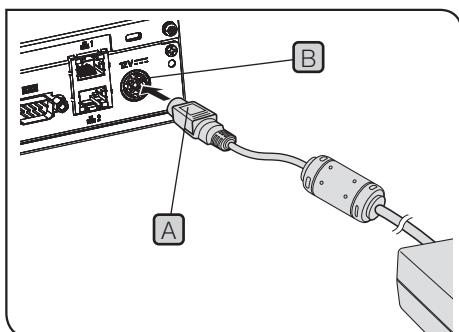
- Always use the AC adapter and the power cord provided by Evident. If the proper AC adapter and the power cord are not used, the electric safety and the EMC (Electro-Magnetic Compatibility) performance of the device cannot be assured.
- If the connector of the power cord is connected incorrectly, it may cause a failure of the product. Be sure to connect it correctly.
- Be sure to connect the grounding terminal of the power cord and the grounding terminal of the power outlet. If the device is not grounded, our intended electric safety and EMC performance of the device can not be assured.

NOTE

The cords are vulnerable to bend or twist. Do not apply excessive force.

1

Insert the output plug **A** of the AC adapter into the DC input connector **B** of DP2-AOU.



2

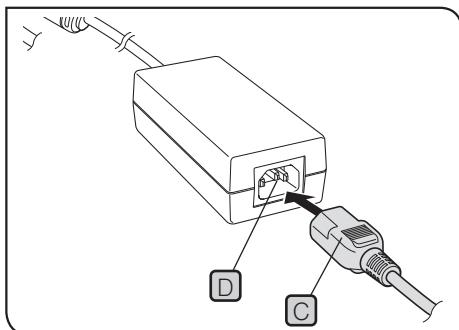
Insert the connector **C** of the power cord into the input connector **D** of the AC adapter securely.

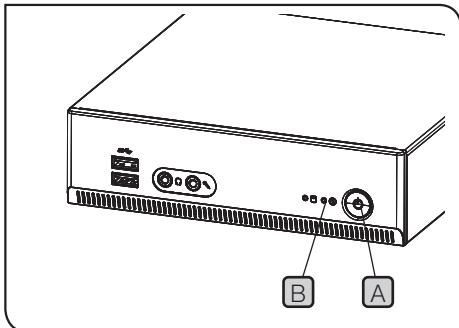
3

Connect the power cord plug to a power outlet with ground terminal.

TIP

The AC adapter or DP2-AOU generates heat after long hours of use, but this is not malfunction.





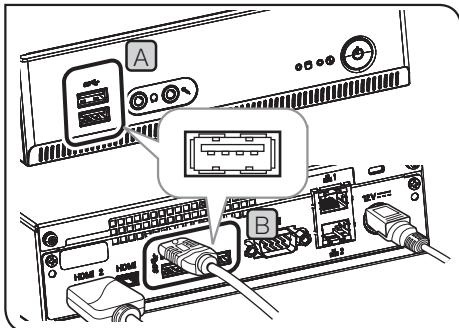
Disconnecting the AC adapter

Press the main switch **A** of DP2-AOU to exit the system. Make sure that the LED **B** is turned OFF completely (after approx. 10 seconds) and disconnect the connector of the AC adapter.

NOTE If you disconnect the connector while LED **B** is ON, a failure may be caused.

⚠ CAUTION

- Do not use the product if the output plug of the AC adapter is not inserted completely.
- Never unplug or insert the output plug of the AC adapter with wet hands.
- If, by any chance, the AC adapter or the cord is very hot, smells burnt or smokes, etc., unplug the power cord from the outlet immediately and stop using the product. Also contact Evident immediately.
- Never use the AC adapter which is not provided by Evident. Otherwise, DP2-AOU or the camera head may be damaged or an unexpected accident such as fire may occur. Evident is not liable for any damage caused by using an AC adapter which is not provided by Evident.
- Never stretch out, bend or twist the cord of the AC adapter forcibly. Also never extend it by connecting it to another cord.
- If you find any scratch or disconnection on the cord of the AC adapter or a bad connection is recognized on the output plug, contact Evident immediately.
- If the product is not in use, unplug the power cord from the outlet.
- Do not connect the power cord to the wall outlet by putting many plugs in one outlet or using a table tap extending to many plugs. It may cause fire.



4

Connecting USB devices

This section describes the procedures to connect recording media such as USB flash drive, etc. and USB devices such as USB cable for touch panel, USB mouse or USB keyboard, etc.

1 Insert the USB devices to the USB connector **(A)** on the front or **(B)** on the back of DP2-AOU.

NOTE

- Be sure to set the main switch **(C)** of DP2-AOU to OFF before connecting or disconnecting the recording media such as USB flash drive, etc. or USB devices.

- DP2-AOU cannot be connected to PC using USB devices. DP2-AOU must be connected to PC by network. For connection procedures, see p.22.

TIP

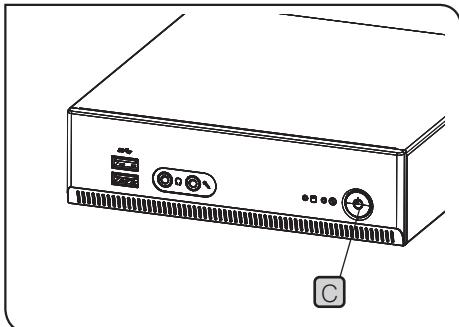
- DP2-AOU is equipped with two USB connectors on the front and three USB connectors (one of them is for connecting the camera) on the back. For the USB connector position, see "Hardware (p.10)".

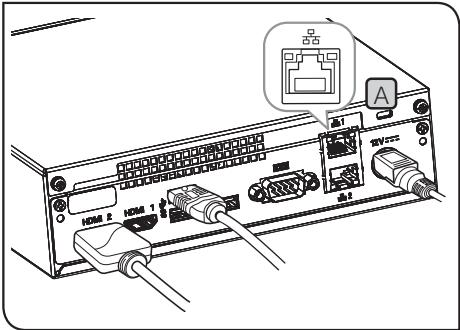
- When you use the USB mouse or the USB keyboard, prepare the following devices that meet compatibility standards or contact Evident.

USB mouse: Applicable to Windows® 10

USB keyboard: Applicable to Windows® 10 and English keyboard

- When installing the dedicated device drivers such as USB mouse or USB keyboard, etc. on DP2-AOU, use the Windows® function to install the dedicated device drivers. For details, see "Installing the dedicated device driver (p.93)".





5

Connecting the LAN cable

The LAN connection is necessary only when DP2-AOU accesses PC on the network to save the acquired images. When saving the acquired images to the recording media such as USB flash drive, etc., the LAN connection is not necessary.

- 1 Insert the LAN cable into the LAN connector **A** on the back of DP2-AOU.

TIP

When connecting to the network, you need to make the network settings in addition to the connection of LAN cables. For network settings, see p.91.

4 Acquisition

4-1 Basic operations

This section describes the basic operating procedures (from turning ON the power to acquiring images or movies) of the microscope digital camera.

You can understand the basic procedures to acquire still images and movies only by reading descriptions in this section.

TIP

- Adjust the optical systems of the microscope thoroughly in advance.
 - Use the camera adapter to perform the parfocal adjustment of the eyepiece of the microscope and the live image. When adjusting the parfocality, do not touch the camera head. (For parfocality adjustment procedures, refer to the instruction manual of the camera adapter.)

Set the main switch of DP2-AOU to ON. (p.24)



Adjust the microscope.

- Set the light path selection knob of the microscope to the acquisition (camera) light path.
- Insert the LBD filter into the light path of the microscope. (Only when using the halogen lamp)
- Adjust the light intensity of the microscope.
- To exhibit the color reproducibility of the camera maximally, use the CX microscope by setting the light intensity closer to maximum.

(For details, refer to the instruction manual of the microscope)

Set to the auto exposure. (p.25)



Adjust the brightness. (p.25)



Check the live image.

(p.26) Acquire the still image. (p.39) Acquire the movie. (p.39)

Hint (for adjusting the focus)

- The zoom magnification of the live image can be changed. The focus can be adjusted easier with high magnification. (p.41)
- Showing the focus indicator on the display allows you to identify the best focus position easily. (p.49)
- If the light is too bright, reduce the light using the ND filter.

NOTE

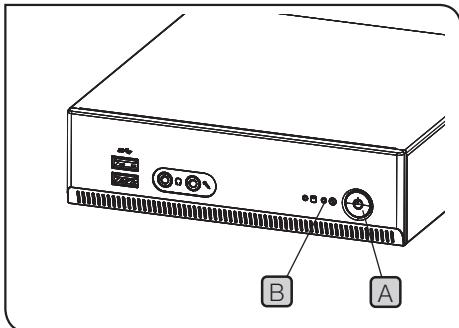
The light intensity control by adjusting the voltage of the halogen lamp may be affected by the change in the color temperature of the illumination light.

- Adjust the image quality (p.33 to 38), set the metering region (p.34), or lock the exposure time (p.28) if necessary.
- The brightness or the tint of the live image shown on the display may be different from those actually acquired or recorded.

Check the acquisition results. (p.62)



Finish the observation. (p.24)

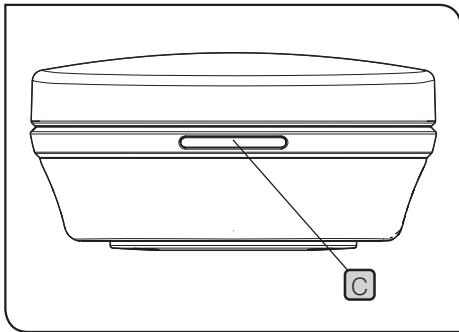


1 Starting and exiting the system

Starting the system

1 Press the main switch **A** of DP2-AOU to turn ON the power. The system starts and the LED **B** of DP2-AOU and the LED **C** of the camera head turn ON. The control window is displayed on the display. (Time taken to start the system: approximately 30 sec.)

TIP If the system is used for long hours without exiting the system, the operation of DP2-AOU may become unstable. It is recommended to exit the system approximately once a week to protect the system.



Exiting the system

1 Press the [Turn Off System] button **D** in the upper right area of the control window. The system is terminated and the power of DP2-AOU turns OFF. (Time taken to exit the system: approximately 10 sec.) The LED **B** of DP2-AOU and the LED **C** of the camera head turn OFF.

TIP • You can also exit the system by pressing the main switch **A** of DP2-AOU.
In this case, be careful not to long-press (press continuously for 4 or more seconds) the main switch **A**.
If you long-press the main switch to turn OFF the power, DP2-AOU will be terminated forcibly and the various settings or the scale function may not be saved.
• In order to protect the system, exit the system as much as possible when the system is not in use.

If the power of the camera head is turned OFF while operating DP2-AOU

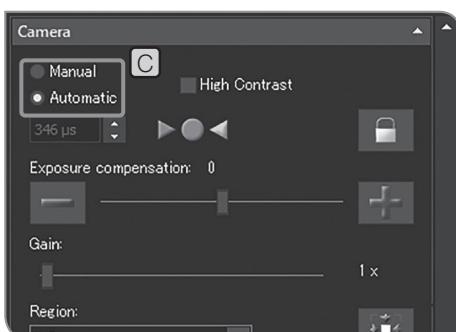
Set the main switch of DP2-AOU to ON to energize the camera head.

While operating DP2-AOU, if the interface cable is accidentally disconnected, the power of the camera head is turned OFF, the camera head becomes in the unconnected status and an error message appears. In this case, press the main switch of DP2-AOU to exit the system. Then, connect the interface cable again and press the main switch of DP2-AOU to restart the system.



2 Selecting the exposure mode

- 1 Select the [Acquisition] tab **A**.
- 2 If the setting items of [Camera] are not displayed, press **B** to open them.



- 3 Select [Manual] or [Auto] in **C** to change the exposure mode. For procedures to set the exposure when "Manual" is selected, see "Manual exposure acquisition (p.39)".

TIP The initial setting is [Auto]. From the next time, the system starts in the mode selected when the power was turned OFF.



3 Compensating the exposure

When the exposure mode [Auto] is selected

You can compensate the exposure time specified automatically. (The exposure can be compensated in the range between -2EV and +2EV in increments of 1/3EV)

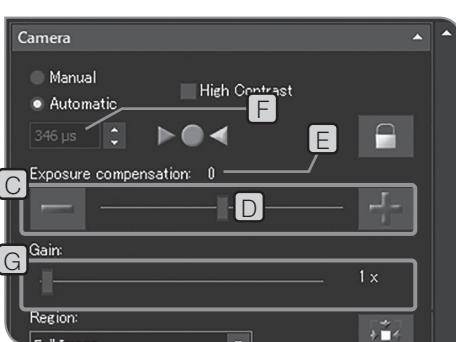
When acquiring a dark specimen, perform "+ compensation" to make the exposure time longer to bring the overexposed effect. When acquiring a bright specimen, perform "- compensation" to make the exposure time shorter to bring the underexposed effect.

- 1 Select the [Acquisition] tab **A**.
- 2 If the setting items of [Camera] are not displayed, press **B** to open them.

- 3 Press the [-] or [+] button of [Exposure compensation] **C** or move the bar in **D** to set the exposure compensation value. The exposure compensation value is displayed in **E** and the exposure time is displayed in **F**.

TIP • If you want to reduce the exposure time without darkening the image, use [Gain] **G**. The [Gain] value is multiplied by the intensity value. Using [Gain] allows you to brighten the entire image and reduce the exposure time, but the noise in the image is enhanced.

- When the exposure mode [Auto] is selected, you can change the metering region. For details, see "Setting the metering region (p.34)".





4 Acquiring the still image

- 1 Select the [Acquisition] tab **A**.
- 2 Operate the microscope to frame the area you want to acquire and bring it into focus.

Hint:

Zooming the live image (p.41) or displaying the focus indicator (p.49) allows you to bring the image into focus easily.

- 3 Press the [Snapshot] button **B** to acquire and save the image. The image is saved on the hard disk (E:\Images) in DP2-AOU.

TIP

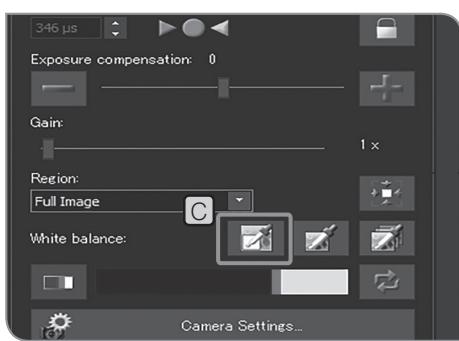
- When the keyboard is connected, you can acquire the image by pressing the [F8] key.
- You can acquire still images by “double-clicking” the mouse on the live image. This function is available when the service update 1.1.2 is applied. For details, see “Confirming the service update (p.58)”.
- The folder names and file names of acquired images are created automatically. For details, see “Setting the save folders and file names (p.54)”.

Hint:

You can change the save destination of the image. (p.54).

TIP

The acquired image is displayed for approximately 1 second after the still image is acquired.



5

White Balance on ROI

Adjusting the white balance before acquiring the image allows you to acquire the image in appropriate colors.

This product is equipped with the function to adjust the white balance automatically. This function is enabled in the initial setting. However, the white balance may not be adjusted automatically depending on the type of light source or the specimen.

In such a case, use the white balance on ROI.

- 1 Select the [Acquisition] tab **A**.
- 2 If the setting items of [Camera] are not displayed, press **B** to open them.
- 3 Press the [White Balance on ROI] button **C**.
- 4 Specify the white area in the live image.
If you start dragging, the red area is displayed.
When you finish dragging, the region is identified and the white balance is enabled.

TIP

- If you fail in setting the white balance, the message appears. Check the message and press the [OK] button to delete the message. Then, perform the white balance again.
- If the white area in the live image is not specified or the exposure is not appropriate (too bright or too dark), you may fail in setting the white balance.
- In addition to [White Balance on ROI], there are [One Touch White Balance] and [Automatic White Balance]. For details, see "Setting the white balance (WB) mode (p.33)".



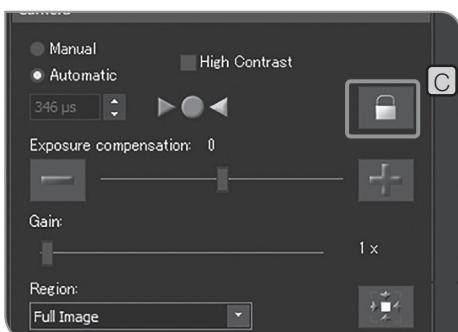
6 Locking and unlocking the exposure time

When the exposure mode [Auto] is selected

When observing the specimen where observation objects are scattered in auto exposure mode, the exposure time may be increased or decreased to allow the live image brighter or darker in association with stage operation. In this case, lock the exposure time to observe the specimen with the constant brightness.

- 1 Select the [Acquisition] tab **A**.
- 2 If the setting items of [Camera] are not displayed, press **B** to open them.
- 3 Press the [Lock Current Exposure Time] button **C** to switch between locking and unlocking the exposure time.

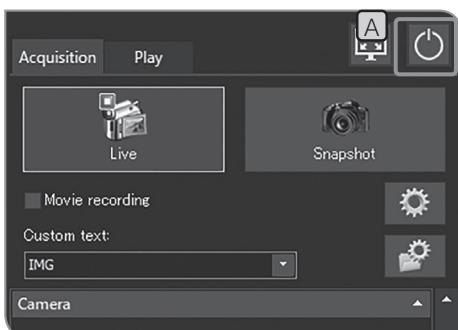
TIP When the exposure time is locked, the metering region and the ISO sensitivity cannot be changed and the exposure cannot be compensated.



7 Showing or hiding the control window

- 1 Operate with the **A** button.

Button	Function
	The control window is hidden.
Exit Maximized Screen (Upper right area of the screen)	The control window is shown again.



8 Exiting the system

- 1 Operate with the **A** button.

Button	Function
	The system shuts down and the main switch of DP2-AOU is turned OFF.

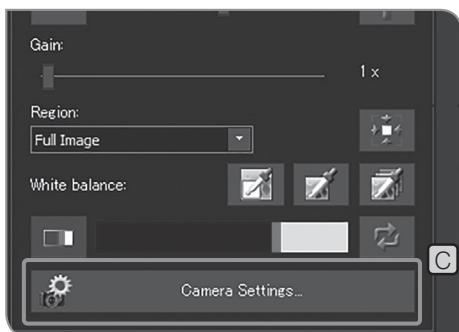
4-2 Basic settings

This section describes the settings related to acquisition.

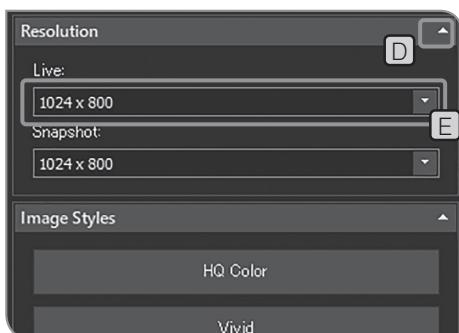


1 Setting the resolution of live image

- 1 Select the [Acquisition] tab **A**.
- 2 If the setting items of [Camera] are not displayed, press **B** to open them.



- 3 Press the [Camera Settings] button **C**.



- 4 If the setting items of [Resolution] are not displayed, press **D** to open them.
- 5 Press the **E** button of [Live] to select the following resolutions from the list.

	DP23-CU	DP28-CU
Full resolution	3088 x 2076 Frame rate: 30 fps	4104 x 2174 Frame rate: 30 fps
4K		3840 x 2160 Frame rate: 30 fps
Square	2072 x 2072 Frame rate: 45 fps	2168 x 2168 Frame rate: 30 fps
High speed	1544 x 1038 Frame rate: 59 fps	2052 x 1086 Frame rate: 60 fps
High sensitivity	1544 x 1038 Frame rate: 59 fps	2052 x 1086 Frame rate: 30fps
Full HD	1920 x 1080 Frame rate: 60 fps	1920 x 1080 Frame rate: 60 fps

Full resolution: You can observe and acquire the high definition images. This is suitable for displaying clear images on the large display.

4K: This is suitable for discussion or conference. You can observe and acquire the images acquired with the 4K resolution microscope in the actual pixel size on the display compatible with 4K.

Square: This is suitable for acquiring images for reports. You can observe and acquire the center of the observed image. It is not necessary to trim the images for reports.

High speed: This is suitable for screening the specimens. You can frame the same field of view as the one used in "Full resolution" at high speed.

High sensitivity: This is suitable for observing dark specimens (Ex: Polarization observation). You can observe and acquire the same field of view as the one used in "Full resolution" with high sensitivity and less noise.

Full HD: You can observe and acquire the images in full high-vision size. This is suitable for observing images with the full high-vision display.

TIP

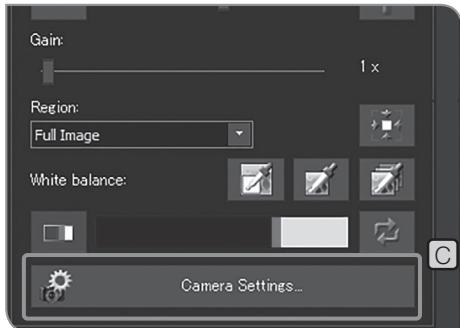
- If the resolution specified is different from the resolution of the display, the live image is zoomed in or zoomed out according to the display size. When the image is zoomed in, the noise in the image is also zoomed in, and, therefore, the noise may be noticeable.
- The live image is zoomed in according to the resolution of the display, but the aspect ratio may not be optimum. To display the image in the optimum aspect ratio, set the display resolution appropriately. For procedures to set the display resolution, see (p.90).

6 Press the [Close Camera Settings] button.

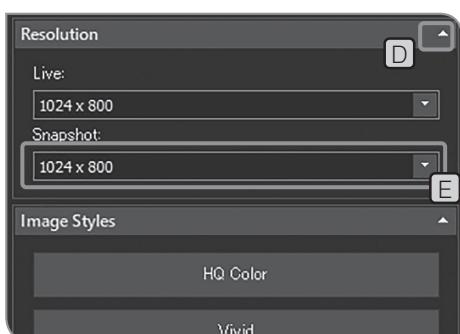


2 Setting the resolution of still image

- 1 Select the [Acquisition] tab **A**.
- 2 If the setting items of [Camera] are not displayed, press **B** to open them.



3 Press the [Camera Settings] button **C**



4 If the setting items of [Resolution] are not displayed, press **D** to open them.

5 Press the **E** button of [Snapshot] to select the following resolutions from the list.

TIP For the resolution of still image, you can select the resolution with same aspect ratio as the resolution of live image from the list below.

	DP23-CU	DP28-CU
Full resolution	3088 x 2076	4104 x 2174
4K		3840 x 2160
Square	2072 x 2072	2168 x 2168
High speed	1544 x 1038	2052 x 1086
High sensitivity	1544 x 1038	2052 x 1086
Full HD	1920 x 1080	1920 x 1080

Full resolution: You can observe and acquire the high definition images. This is suitable for displaying clear images on the large display.

4K: This is suitable for discussion or conference. You can observe and acquire the images acquired with the 4K resolution microscope in the actual pixel size on the display compatible with 4K.

Square: This is suitable for acquiring images for reports. You can observe and acquire the center of the observed image. It is not necessary to trim the images for reports.

High speed: This is suitable for screening the specimens. You can frame the same field of view as the one used in "Full resolution" at high speed.

High sensitivity: This is suitable for observing dark specimens (Ex: Polarization observation). You can observe and acquire the same field of view as the one used in "Full resolution" with high sensitivity and less noise.

Full HD: You can observe and acquire the images in full high-vision size. This is suitable for observing images with the full high-vision display.

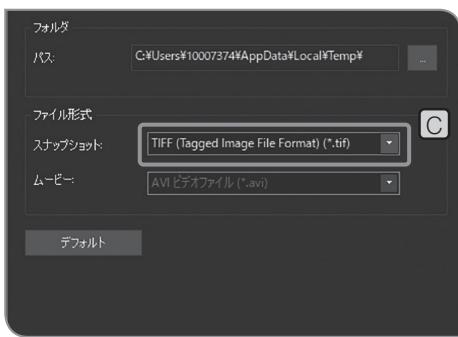
6 Press the [Close Camera Settings] button.



3 Setting the still image format

- 1 Select the [Acquisition] tab **A**.
- 2 Press the [File Naming and Saving Options] button **B** to open [Acquisition Settings] dialog box.
- 3 Select [Image file] > [Save], and select the following file formats from the list of [Snapshot] **C**.

The file size for the file format per resolution is listed in the table shown below.



DP23-CU:

File format Resolution	TIFF (Unit: MB) (Approximate Value)	JPEG-LOW (Unit: MB) (Approximate Value)	JPEG-HIGH (Unit: MB) (Approximate Value)
3088 x 2076	19.2	1.8	0.9
2072 x 2072	12.9	1.3	0.6
1544 x 1038 (high speed)	5	0.8	0.4
1544 x 1038 (high sensitivity)	5	0.7	0.4
1920 x 1080	6.2	0.8	0.4

DP28-CU:

File format Resolution	TIFF (Unit: MB) (Approximate Value)	JPEG-LOW (Unit: MB) (Approximate Value)	JPEG-HIGH (Unit: MB) (Approximate Value)
4104 x 2174	26.3	2.8	1.3
3840 x 2160	24.6	2.6	1.2
2168 x 2168	13.9	1.6	0.8
2052 x 1086 (high speed)	6.7	1.1	0.5
2052 x 1086 (high sensitivity)	6.7	0.9	0.5
1920 x 1080	6.2	1	0.5

TIP

- Compression rate
TIFF: Uncompressed
JPEG-LOW: Low compression
JPEG-HIGH: High compression
- The image quality becomes higher in the order from JPEG-HIGH, JPEG-LOW to TIFF (TIFF is the highest).
- The file size of JPEG-LOW or JPEG-HIGH is a guide. It differs depending on specimens to be observed.
- Selecting "TIFF + Burn-in of overlay" allows you to save the TIFF images overlaid with measurement results or drawings.

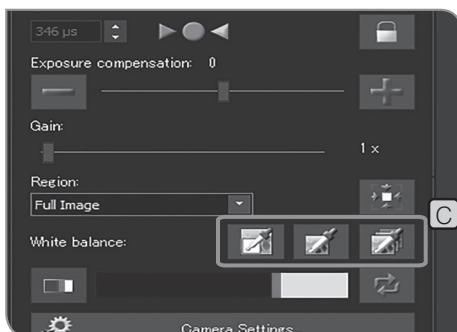
- 4 Press the [OK] button to close the [Acquisition Settings] dialog box.



4

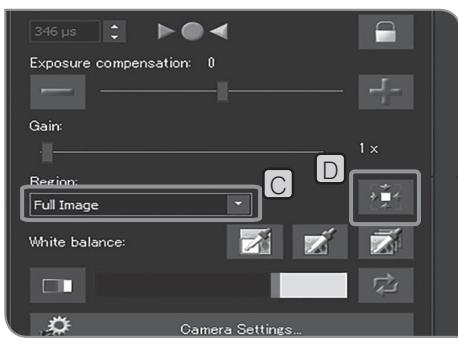
Setting the white balance (WB) mode

- 1 Select the [Acquisition] tab **A**.
- 2 If the setting items of [Camera] are not displayed, press **B** to open them.



- 3 Press the following buttons in [White balance] **C** to select the white balance mode.

Button	Function
White Balance on ROI	The white balance is adjusted so that the selected areas become white.
One Touch White Balance	The white balance of the entire image is adjusted. It is not necessary to select the area.
Automatic White Balance	The white areas in the live image are identified and the white balance is adjusted automatically. If the brightness of the illumination light changes, the white balance is adjusted automatically. However, depending on the specimen type or brightness, if there are only few white areas in the live image, the white balance is not applied appropriately and, therefore, the appropriate tint may not be obtained.



5

Setting the metering region

When the exposure mode [Auto] is selected

If the observation objects are scattered on the screen, the full screen may be too bright or too dark due to the influence from the background area excluding observation objects. This case may be improved by changing the metering region.

Normally, the metering region is 30% of the entire image.

- 1 Select the [Acquisition] tab **A**.
- 2 If the setting items of [Camera] are not displayed, press **B** to open them.
- 3 Select following items from the list of [Region] **C** to change the metering region.

Item	Function
[Spot 0.1%]	Metering is performed using the area of 0.1% of the entire image.
[Spot 1%]	Metering is performed using 1% of the entire image area.
[Spot 30%]	Metering is performed using the area of 30% of the entire image.
[Entire image]	Metering is performed using the entire image area.

TIP

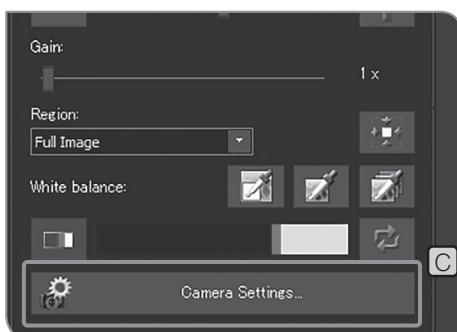
You can move the metering region position by placing the mouse pointer in the frame where [Exposure] is displayed on the live image and dragging the metering region. Pressing the [Center Spot on Image] button **D** allows you to return the metering region position to the center of the image.



6 Selecting the image style

You may be able to improve the color reproducibility of the live image and the acquired image by changing the color setting or contrast according to the observation method.

- 1 Select the [Acquisition] tab **A**.
- 2 If the setting items of [Camera] are not displayed, press **B** to open them.



- 3 Press the [Camera Settings] button **C**.



- 4 If the setting items of [Image Styles] are not displayed, press **D** to open them.
- 5 Press the following buttons in **E**.

Button	Function
[HQ Color]	The color of the specimen is reproduced faithfully. Use this color mode if you satisfy with this color.
[Vivid]	This is a color mode with less saturation comparing to the [HQ Color] mode. Select this mode if you want to acquire the clear color image.
[Linear]	This is an achromatic color mode. Select this mode if you want to acquire the monochrome image.
[Cell Culture]	This is a color mode with less saturation. If you use this mode for the cell culture observation, phase contrast observation or differential interference observation, you can acquire even more natural images.
[High Contrast]	The image with the high contrast can be acquired.

- 6 Press the [Close Camera Settings] button.

7

Saving the user-defined presetting

You can save the values of the following setting items as the user-defined presetting.

- Color space
- Saturation
- Sharpness
- Contrast
- Brightness
- Gamma
- Auto exposure mode

By setting the user-defined presetting, even though the values of the following setting items are changed, you can return them to the values you saved by pressing the [User defined] button.



1 Select the [Acquisition] tab **A**.

2 If the setting items of [Camera] are not displayed, press **B** to open them.

3 Press the [Camera Settings] button **C**.

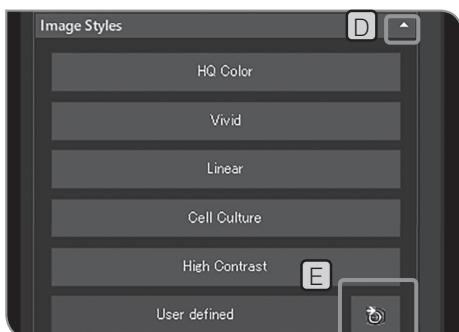
4 If the setting items of [Image Styles] are not displayed, press **D** to open them.

5 Press the **E** button. The current values of the following setting items are saved.

For each setting procedures, see the respective pages.

- Color space (see p.37)
- Saturation (see p.37)
- Sharpness (see p.38)
- Contrast (see p.38)
- Brightness (see p.38)
- Gamma (see p.38)
- Auto exposure mode (see p.25)

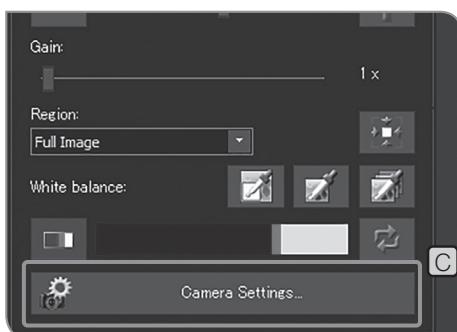
6 Press the [Close Camera Settings] button.



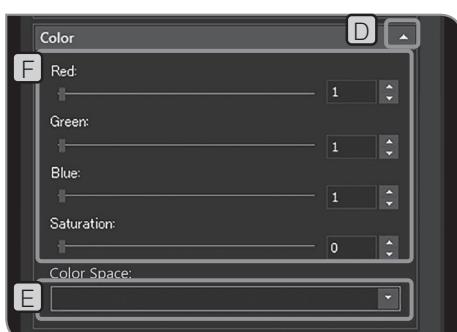


8 Adjusting the color of the live image

- 1 Select the [Acquisition] tab **A**.
- 2 If the setting items of [Camera] are not displayed, press **B** to open them.



- 3 Press the [Camera Settings] button **C**.



- 4 If the setting items of [Color] are not displayed, press **D** to open them.
- 5 Select the following items from the list in [Color Space] **E**.

Item	Function
[sRGB]	This is the best color space when using the monitor compatible with sRGB.
[AdobeRGB]	This is the best color space when using the monitor compatible with AdobeRGB. The color reproducibility is improved furthermore.
[Camera-specific]	This is the best color space for linear mode of image style.

- 6 Move the bar in **F** to adjust the color space.

Bar	Function
[Red]	R(Red) is adjusted.
[Green]	G(Green) is adjusted.
[Blue]	B(Blue) is adjusted.
[Saturation]	The saturation is adjusted.

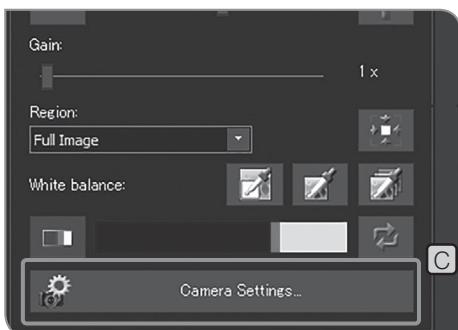
TIP When [Automatic White Balance] (p.33) or [Grayscale] (p.38) is selected, [Red], [Green] or [Blue] cannot be adjusted.

- 7 Press the [Close Camera Settings] button.

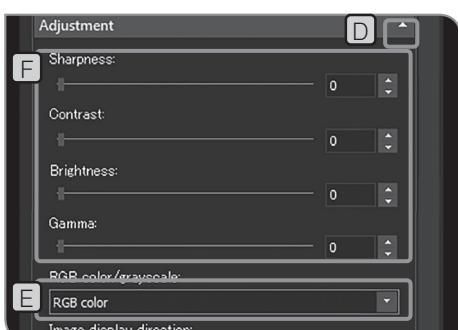


9 Adjusting the image quality

- 1 Select the [Acquisition] tab **A**.
- 2 If the setting items of [Camera] are not displayed, press **B** to open them.



- 3 Press the [Camera Settings] button **C**.



- 4 If the setting items of [Adjustment] are not displayed, press **D** to open them.
- 5 Select the following items from the list in [RGB color/grayscale] **E**.

Item	Function
[RGB color]	The true color image is acquired from the camera.
[Grayscale]	The grayscale image is acquired from the camera.

- 6 Move the bar in **F** to adjust the image quality.

Bar	Function
[Sharpness]	You can enhance the outline of the image. (When the value is increased, the edge is enhanced, but the image noise may be increased.)
[Contrast]	You can adjust the color depth of the image. (When the value is larger than 1, the image color becomes deeper and when the value is smaller than 1, the image color becomes lighter.)
[Brightness]	You can adjust the brightness of the image evenly. (When the value is smaller than 0, the entire image becomes darker evenly. When the value is larger than 0, the entire image becomes brighter evenly.)
[Gamma]	You can apply the brightness difference to the image. (When the value is larger than 1, you can apply the brightness difference to the dark area and the entire image becomes brighter. (When the value is smaller than 1, you can apply the brightness difference to the bright area and the entire image becomes darker.)

- 7 Press the [Close Camera Settings] button.

4-3 Advanced operations

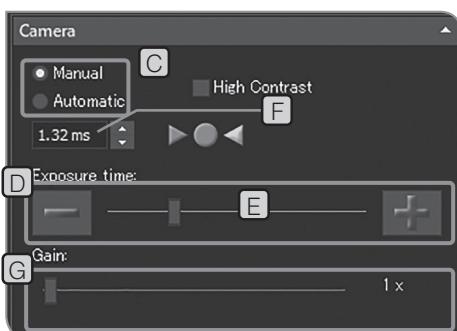
This section describes the advanced functions of DP23-AOU or DP28-AOU. With the advanced functions, you can acquire the observed images suitable for your needs.



1 Manual exposure acquisition

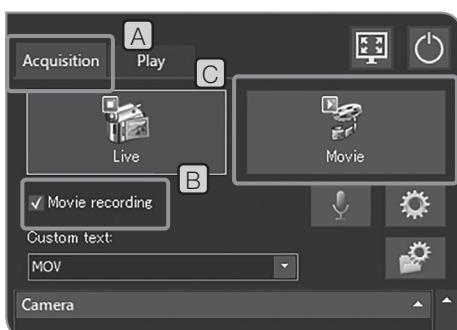
You can acquire images or movies by setting the arbitrary exposure time manually.

- 1 Select the [Acquisition] tab **A**.
- 2 If the setting items of [Camera] are not displayed, press **B** to open them.



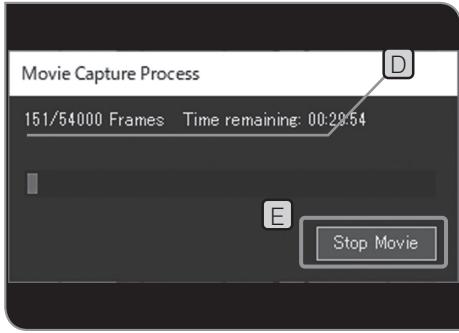
- 3 Select [Manual] in **C** to change the exposure mode.
- 4 Press [-] or [+] button in **D**, or move the bar in **E** to set the exposure time. The exposure time is displayed in **F**.

TIP If you want to reduce the exposure time without darkening the image, use [Gain] **G**. The [Gain] value is multiplied by the intensity value. Using [Gain] allows you to brighten the entire image and reduce the exposure time, but the noise in the image is enhanced.



2 Recording the movie

- 1 Select the [Acquisition] tab **A**.
- 2 Operate the microscope to frame the position you want to record, and bring it into focus.
- 3 Check the [Movie recording] checkbox **B**.
- 4 Press the [Movie] button **C** to start recording the movie. During recording, the number of recorded movies and the remaining time **D** are displayed in the [Movie Capture Process] dialog box.



5 Pressing the [Stop Movie] button **E** allows you to stop recording the movie. The movie is saved on the hard disk (E:\Images) in DP2-AOU.

TIP

- You can also start or stop recording the movie by pressing "F9" of the keyboard.
- The movie size and the movie format while recording are described below. They cannot be changed.

	DP23-CU	DP28-CU
Movie resolution	1563 x 1024	2048 x 1072
Format	Compressed AVI	Compressed AVI

TIP

The folder names and file names of movies are created automatically. For details, see "Setting the save folders and file names (p.54)".

Hint:

You can change the save destination of the movie (p.54). However, depending on the recording media's speed to write images or the specified exposure time, the frame rate when recording the movie may be reduced or frames may be skipped (movie is played as if fast-forwarded). Therefore, when acquiring the movie, it is recommended to save the movie on the hard disk (E:\Images) in DP2-AOU.

TIP

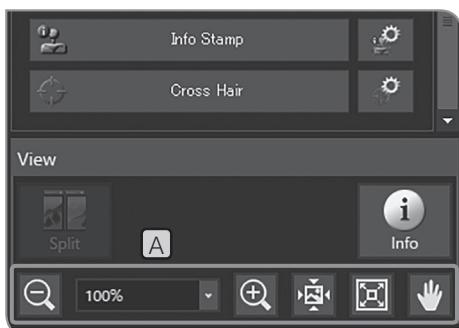
- When acquiring the specimen with fine structure, the bit rate of the movie file may exceed the image writing speed of the recording media, which may cause skipping of frames.
- While recording the movies, the shading correction is OFF.
- While recording the movies, you cannot perform other operations. Perform other operations after the recording is completed.
- The movie can be recorded for approximately 30 minutes. However, while recording the movie, if the movie file size reaches the maximum or if there is no remaining capacity in the recording media, the movie recording finishes automatically.

NOTE While recording movies, do not turn OFF the main switch of DP2-AOU.



3 Pausing and resuming the live view

- 1 Select the [Acquisition] tab **A**.
- 2 Press the [Live] button **B** to switch between pausing and resuming the live view.

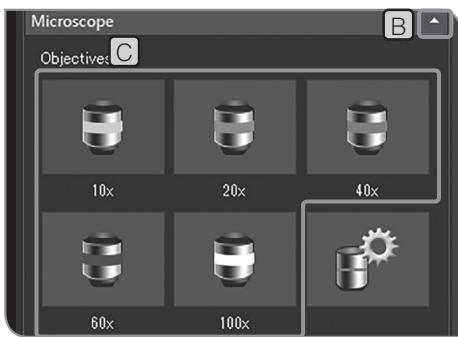


4 Zooming the image and displaying the scroll bar

- 1 You can change the digital zoom magnification by pressing buttons in **A** or selecting from the list on the [View] tab.

Button	Function
	The image is zoomed-out in stepwise.
100%	The zoom magnification is displayed. You can change the zoom magnification by selecting from the list or inputting the value directly.
	The image is zoomed-in in stepwise.
	The image is displayed so that one pixel of the image is equivalent to one pixel of the display. (This button cannot be used if the live resolution is smaller than the monitor resolution.)
	The zoom magnification is calculated so that the entire image is displayed to fit to the screen.
	When the entire image is not displayed completely on the screen, you can change the area you want to display on the screen by dragging the image with the mouse to move the image freely.*

* You can also move the image by moving the scroll bar regardless of whether the button is ON or OFF.



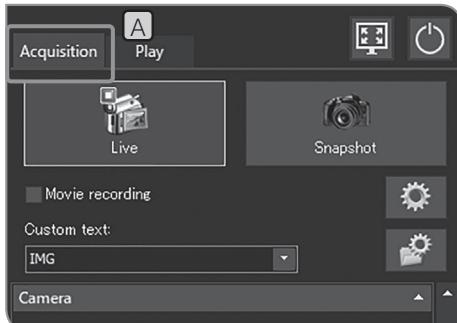
5

Selecting the objective magnification

- 1 Select the [Acquisition] tab **A**.
- 2 If the setting items of [Microscope] are not displayed, press **B** to open them.
- 3 Press the button in [Objectives] **C** to select the magnification of the objective currently in the light path. (If the objective magnification is linked with the microscope, you do not need to select the magnification. The objective magnification is set automatically according to the selected objective.) For details, see, "8 Functions linked with microscope (p.98)".

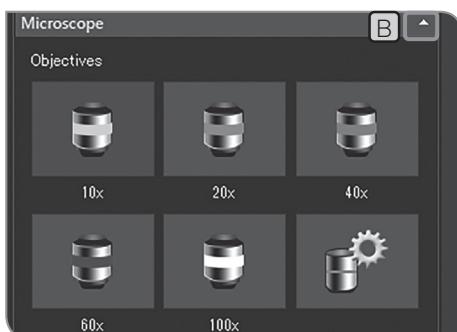
TIP

The buttons in [Objectives] **C** can be set according to the microscope you use. For setting procedures, see "Setting the microscope (p.87)".

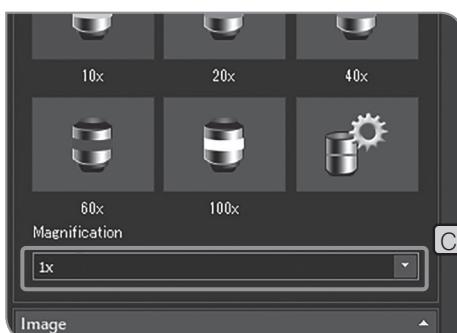


6 Selecting the intermediate magnification changer

1 Select the [Acquisition] tab **A**.



2 If the setting items of [Microscope] are not displayed, press **B** to open them.



3 Press the **C** button of [Magnification] **C** to select the intermediate magnification changer currently in the light path.

TIP You can set the contents of the selection list according to the microscope you use. For setting procedures, see "Setting the microscope (p.87)".

4-4 Advanced settings

1 Shading correction

You can correct the unevenness of brightness caused by the uneven illumination to the even brightness.

NOTE To use the shading correction function, the magnification of the objective of the microscope and the magnification of the intermediate magnification changer must be specified in advance. For details, see, "Setting the microscope (p.87)".

Acquiring the corrected image

The shading correction image is acquired per each combination of the objective magnification and the magnification of the intermediate magnification changer you specified. It takes approximately 1 minute to acquire one combination.

Before acquiring the corrected image, place the specimen to bring it into focus and then, remove the specimen in advance.

NOTE • When acquiring the shading correction image, if there is dust or dirt in the acquisition area, the image may not be acquired properly. Make sure to confirm that there is no dust or dirt in the acquisition area.

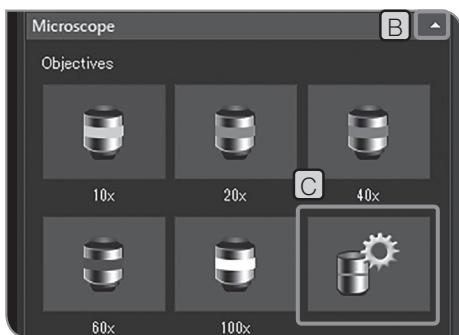
• Up to 28 combinations of corrected images can be acquired. If you attempt to acquire more than 28 combinations of corrected images, an error message appears. In this case, set the microscope again. For details, see, "Setting the microscope (p.87)".

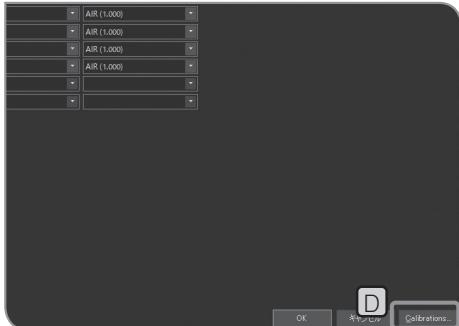
1 Select the [Acquisition] tab **A**.



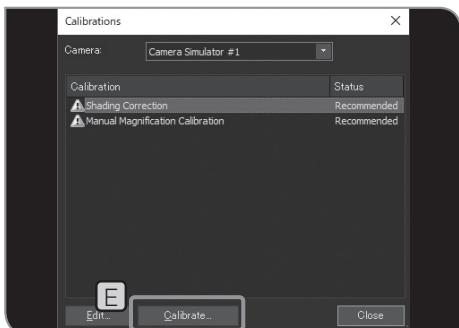
2 If the setting items of [Microscope] are not displayed, press **B** to open them.

3 Press the [Device Settings] button **C**. The [Device Settings] dialog box is displayed.

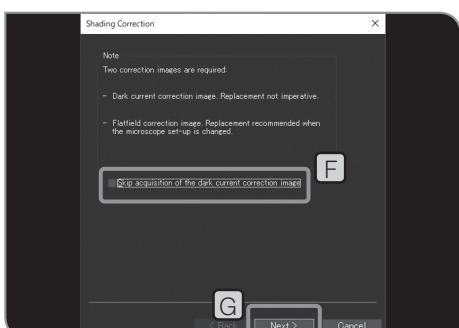




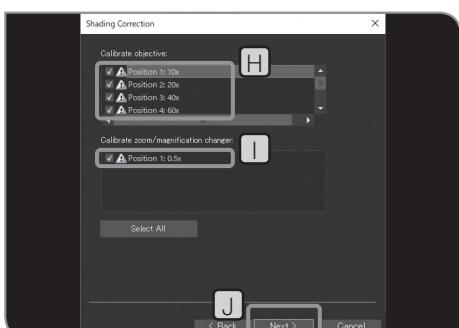
4 Press the [Calibrations] button **D**. The [Calibrations] dialog box is displayed.



5 Press the [Calibrations] button **E**. The [Shading Correction] wizard appears.



6 Uncheck the [Skip acquisition of the dark current correction image] checkbox **F**, and press [Next] **G**.



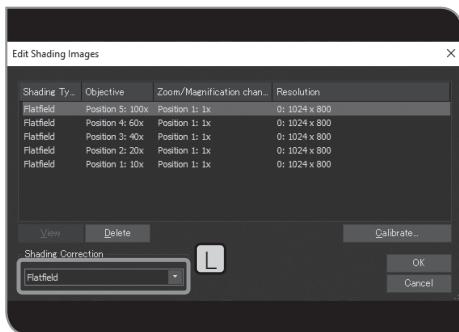
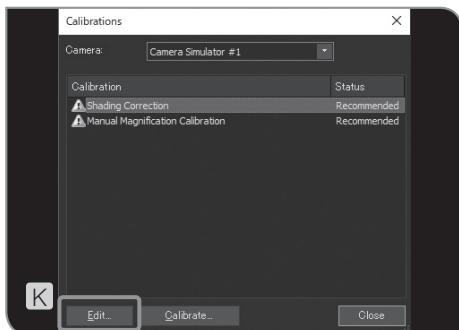
7 Select [Calibrate objective] **H** and [Calibrate zoom / magnification changer] **I**, and press [Next] **J**.

- 8 When a message appears, engage the objective into the light path of the microscope according to the message, and press [OK].
- 9 When the next screen appears, perform the optical adjustment of the microscope according to the message, and press [Next].
- 10 The next screen appears to start acquiring the corrected image. When the acquisition is completed, the message appears. Repeat 8 and 9.
- 11 When the correction is completed, press the [Finish] button.

TIP If the wizard is canceled in the middle, the corrected images acquired so far are enabled and they are used for shading correction during acquisition.

ON/OFF of shading correction during acquisition

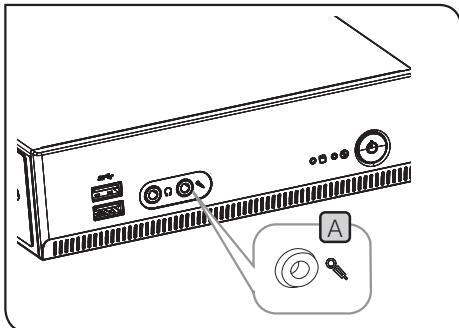
- 12 Press the [Edit] button **K** in the [Calibrations] dialog box. The [Edit Shading Images] dialog box is displayed.



- 13 Select [OFF] or [Flat field] in **L**.

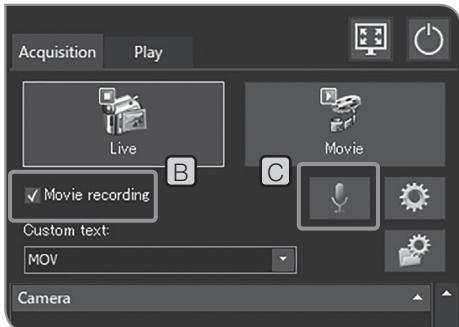
TIP While recording the movies, the shading correction is OFF.

- 14 Press the [OK] button to close the [Edit Shading Images] dialog box.
- 15 Press the [Close] button to close the [Calibrations] dialog box.
- 16 Press the [OK] button to close the [Device Settings] dialog box.



2 Setting the sound of movie

1 Connect the microphone purchased separately to the microphone input connector **A** of DP2-AOU.



2 Check the [Movie recording] checkbox **B**.

3 Press the [Enable Sound Recording] button **C** to set it ON.

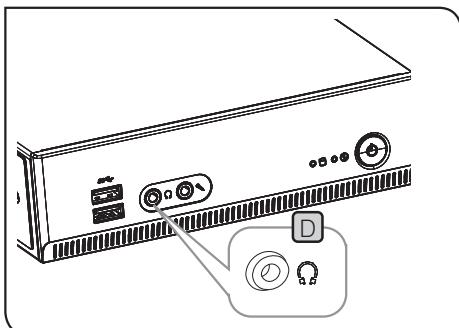
Button	Function
ON	The sound is included when recording the movie.
OFF	The sound is not included when recording the movie.

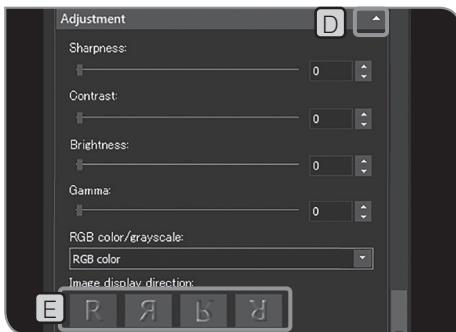
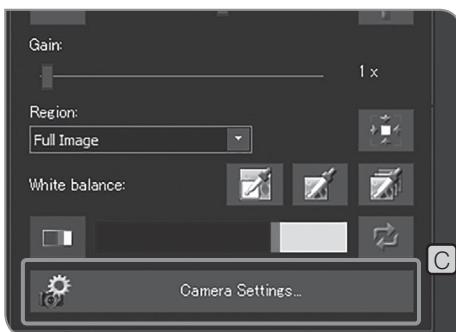
4 Record the movie. For recording procedures, see p.39.

While recording the movie, the sound from the microphone is recorded in the movie file.

Outputting the sound by DP2-AOU

To output the sound by DP2-AOU, connect the speaker purchased separately to the lineout connector **D**. (For setting the sound volume, refer to the instruction manual of the speaker.)



**3**

Setting the image orientation

The orientation of the image to be shown on the display can be set to either one of the followings. This operation is not available while saving the acquired image.

Button	Function
	Standard orientation
	Horizontal inversion
	Vertical inversion
	180° rotation

- 1 Select the [Acquisition] tab **A**.
- 2 If the setting items of [Camera] are not displayed, press **B** to open them.
- 3 Press the [Camera Settings] button **C**.
- 4 If the setting items of [Adjustment] are not displayed, press **D** to open them.
- 5 Press the [Image display direction] button **E** to select the orientation.
- 6 Press the [Close Camera Settings] button.

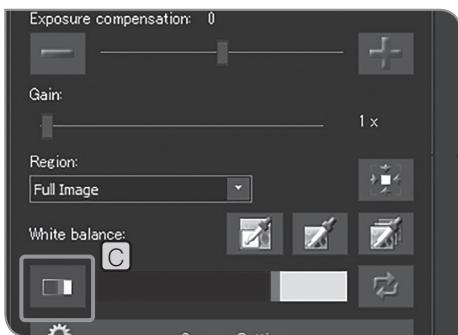


4

Setting the focus indicator

You can switch between showing and hiding the focus indicator and the focus area.

- 1 Select the [Acquisition] tab **A**.
- 2 If the setting items of [Camera] are not displayed, press **B** to open them.



- 3 Press the [Focus Indicator] button **C** to show or hide the focus indicator.

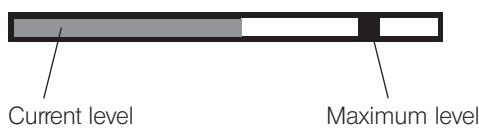
Focus indicator

You can show the focusing status of the live image on the display as a guide for focusing.

The focus indicator is displayed as a bar shown below in the lower area of the screen. The meter's maximum level is displayed automatically according to the contrast of the specimen.

Normal view

The current level is displayed by the blue bar. The maximum level is displayed in red.



When the image is focused, the blue bar moves closer to the maximum level. When the image is not focused, the blue bar becomes shorter and the maximum level range becomes wider.

As a guide for focusing, adjust the microscope so that the focusing level is closer to the maximum.

Level 0, unevaluable view



Maximum evaluation level view



TIP

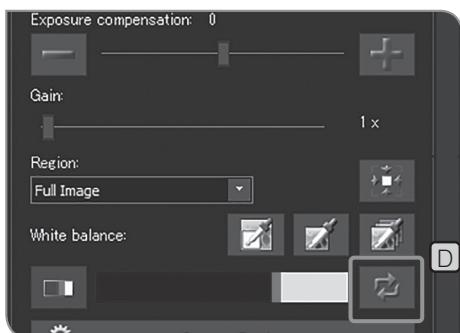
- The current level is updated approximately every 0.1 sec.
- The maximum level is updated when the higher maximum level is identified.

Focus area

You can specify whether to show the focus area on the display or not.

The level of the focus indicator is calculated on the image in this area.

Resetting the focus indicator



If the red bar or the blue bar reaches the right end even though the image is not focused yet, press the [Reset Focus Indicator] button **D**. You can set the relative value of the red bar or the blue bar to 75%.

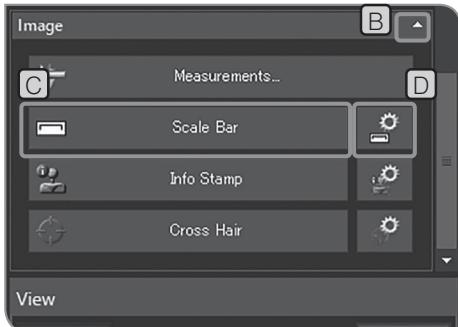


5 Setting the scale bar view

You can add the scale bar on the live image and the acquired image.

NOTE In order to display the appropriate scale bar, the adapter lens magnification, objective magnification and intermediate magnification changer must be specified. For setting procedures, see "Selecting the objective magnification (p.42)" and "Selecting the intermediate magnification changer (p.43)".

- 1 Select the [Acquisition] tab **A**.

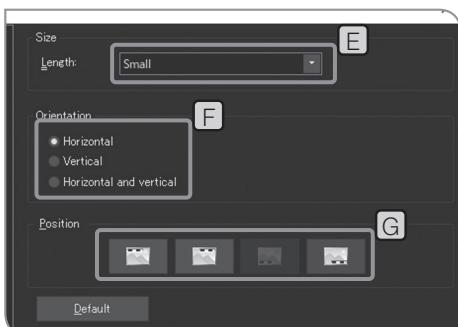


- 2 If the setting items of [Image] are not displayed, press **B** to open them.
- 3 Press [Scale Bar] button **C** to show or hide the scale bar.

Changing the scale bar view

You can change the size, orientation and position of the scale bar on the displayed screen.

- 1 Press the [Show Scale Bar Options] button **D** to open the [Options] dialog box.
- 2 Select [Scale Bar] > [Display], and change necessary settings in [Size] **E**, [Orientation] **F** or [Position] **G**.
- 3 Press the [OK] button to close the [Options] dialog box.



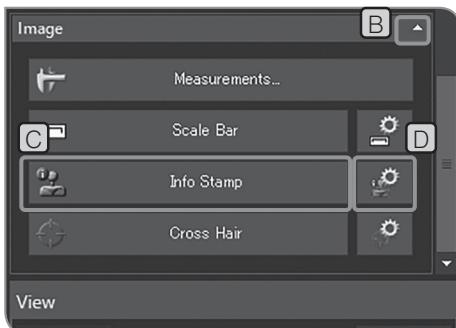


6

Setting the information stamp view

You can add the information stamp view on the live image and the acquired image.

- 1 Select the [Acquisition] tab A.



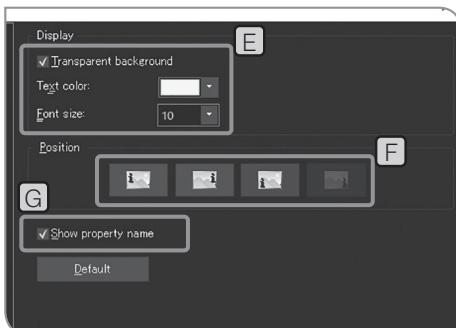
- 2 If the setting items of [Image] are not displayed, press B to open them.

- 3 Press the [Info Stamp] button C to show or hide the information stamp.

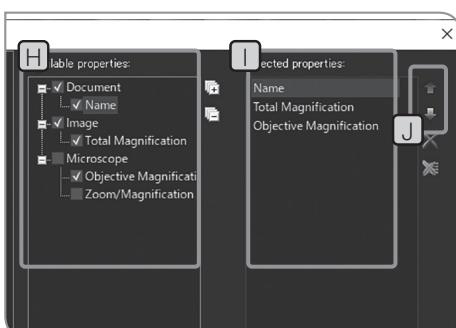
Changing the information stamp view

You can change the size or position of the information stamp, and the information to be included on the displayed screen.

- 1 Press the [Show Info Stamp Options] button D. The [Options] dialog box opens, and [Info Stamp] > [General] is displayed.



- 2 Change the required settings in [Display] E, [Position] F, and [Show property name] G.



- 3 Select [Info Stamp] > [Properties].

- 4 When you select the properties (information) to be displayed in the stamp in the [Available properties] H, the properties are displayed in [Selected properties] I. Select the properties in I, and press the [Move Up] or [Move Down] button J to change the order to display in the stamp.

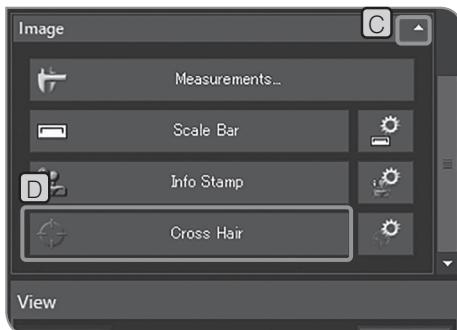
- 5 Press the [OK] button to close the [Options] dialog box.



7 Displaying the cross hair

You can display the cross hair in the center of the screen.

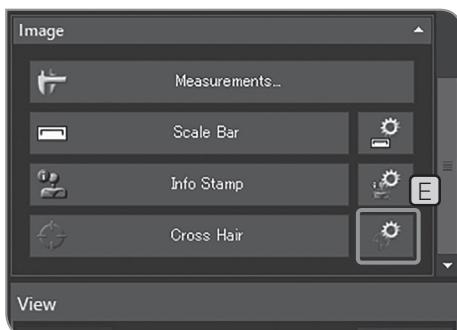
- 1 Select the [Acquisition] tab A or the [Play] tab B.



- 2 If the setting items of [Image] are not displayed, press C to open them.

- 3 Press [Cross Hair] button D to switch between showing and hiding the cross hair.

TIP The color of the cross hair may not be displayed properly due to the noise when the image is compressed. In this case, record it in TIFF to display the cross hair properly.



Changing the cross hair view

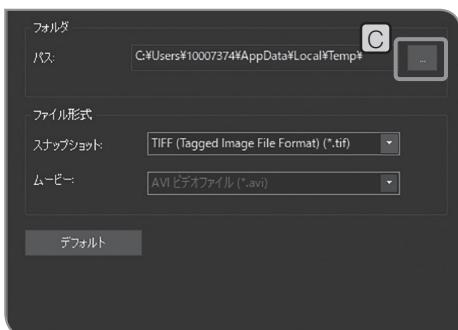
You can change the size or the line style of the cross hair.

- 1 Press the [Show Cross Hair Options] button E. The [Options] dialog box opens, and [Cross Hair] > [Format] is displayed.



- 2 Change the necessary settings in [Size] F, [Do not show circles on cross hair] G and [Line style] H.

- 3 Press the [OK] button to close the [Options] dialog box.



8

Setting the save folders and file names

You can set the save destination of the acquired image. The save destinations you can set are recording media such as a USB flash drive, etc. or PC connected to network.

If multiple microscope digital cameras specify the same folders as those in PC on the network and acquire images at the same time, an error that the acquired image cannot be saved may occur. If the error occurs, wait for a while and acquire the image again or save it to other folders.

- 1 Select the [Acquisition] tab **A**.

- 2 Press the [File Naming and Saving Options] button **B** to open [Acquisition Settings] dialog box.

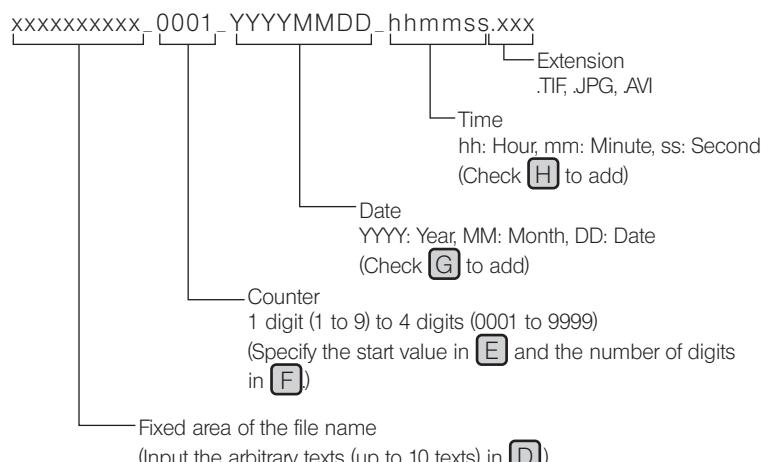
- 3 Select [Image file] > [Save], and press the [...] button **C** of [Path]. Specify the folder in the dialog box displayed.

NOTE When you specify PC on the network as the save folder, you may not be able to specify it. In this case, wait for a while and specify the folder again. The reason is that when searching the PC for specifying the folder, the results may differ each time you search.

- If you specify the USB recording media equipped with the password function as the save folder, press the [Unlock External Drive] button to cancel the password using the keyboard.
- If the save folder name is garbled due to special characters, a malfunction may be caused.

TIP

While the window to input password is displayed, if you place the mouse pointer on the camera control software and click it, the window to input password becomes invisible. In this case, press [Alt]+[Tab] of the keyboard to make it visible.



- 4 Select [Image file] > [Name], and specify the naming rule on the screen displayed.

- 5 Press the [OK] button to close the [Acquisition Settings] dialog box.

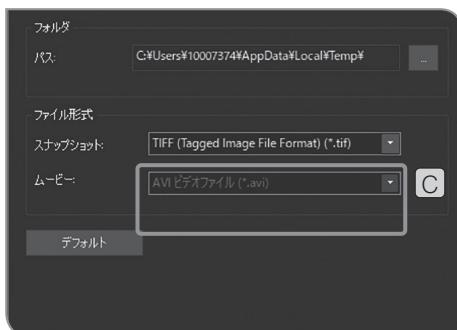


9

Setting the compression rate of video

You can select the compression rate of video when recording. This function is available when the service update 1.1.2 is applied. For details, see "Confirming the service update (p.58)".

- 1 Select the [Acquisition] tab **A**.
- 2 Press the [File Naming and Saving Options] button **B** to open [Acquisition Settings] dialog box.
- 3 Select [Image file] > [Save], and select [AVI video - low compression (*.avi)] or [AVI Video - high compression (*.avi)] from the list of [Movie] **C**.



10 Resetting

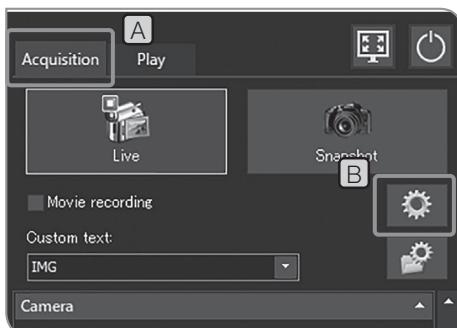
While using the system, if you are not sure what settings you have made, you can reset to the factory default settings if necessary.

Resetting software to initial settings

Except the following settings, you can return all other software settings to the factory default settings (set the setting values to default values or clear the setting values).

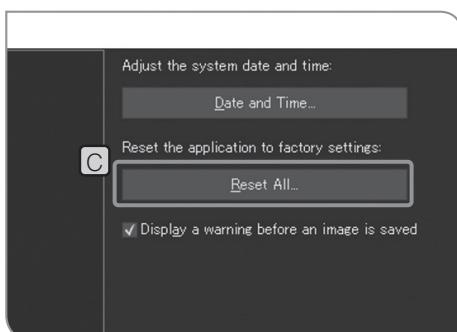
- Language (stays the same)
- Date and time (stays the same)
- Enabled license (cannot be disabled)

Also, you cannot return the Windows OS settings to the factory default settings. (device driver you installed, network connection or monitor resolution you have set, etc.)



1 Select the [Acquisition] tab **A**.

2 Press the [System Settings] button **B** to open the [Options] dialog box.



3 Select [System] > [General], and press the [Reset All] button **C** of [Reset the application to factory settings].

When the message appears for confirmation, press the [Yes] button.

4 Press the [OK] button to close the [Options] dialog box.

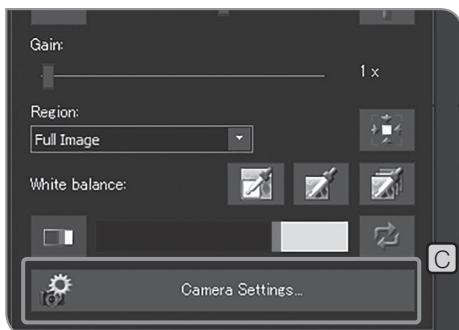
Resetting the camera settings

You can return the settings related to the camera to the factory default settings (set the setting values to default values or clear the setting values).



1 Select the [Acquisition] tab **A**.

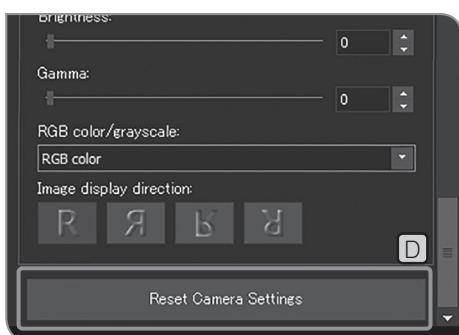
2 If the setting items of [Camera] are not displayed, press **B** to open them.



3 Press the [Camera Settings] button **C**.

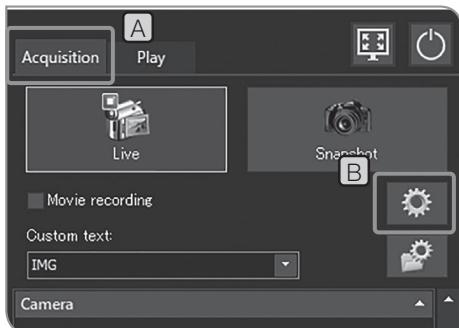
4 Press the [Reset Camera Settings] button **D**.

5 Press the [Close Camera Settings] button.



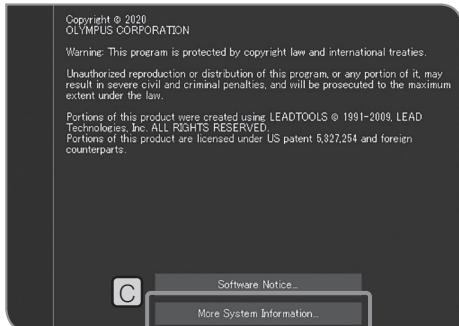
11 Updating software

The version information function is used for updating software or firmware. This function is not used normally. The system may be updated to improve the performances or vulnerability. Check the latest update information on the Evident Website.



Confirming the version information

- 1 Select the [Acquisition] tab **A**.
- 2 Press the [System Settings] button **B** to open the [Options] dialog box.



- 3 Select [Environment] > [About], and press the [More System Information] button **C**.

Check the following versions against the applicable versions on the Evident website to see if they need to be updated.

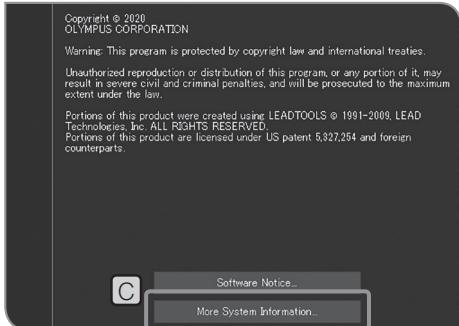
- [Product Version] in [Application] in [Category]
- [Firmware Version] in [Camera] in [Category]

- 4 When you confirmed the version information, press the [Close] button to close the [System Information] dialog box.
- 5 Press the [OK] button to close the [Options] dialog box.

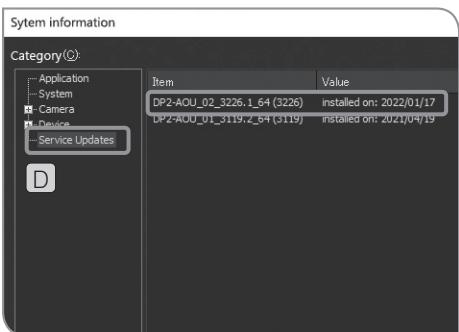
Confirming the service update

- 1 Select the [Acquisition] tab **A**.
- 2 Press the [System Settings] button **B** to open the [Options] dialog box.





3 Select [Environment] > [About], and press the [More System Information] button **C** to open the [System Information] dialog box.

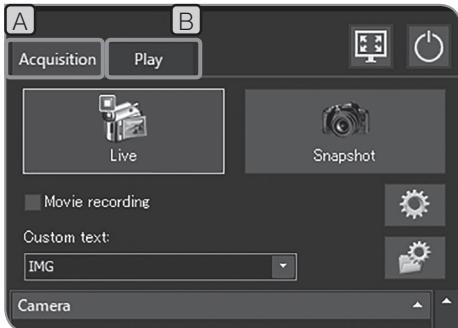


4 Select [Category] > [Service Updates] **D**, to confirm the service update.

TIP If the [DP2-AOU_02_3326.1_64(3326)] is displayed in the Item, the service update 1.1.2 is applied.

5 When you confirmed the service update, press the [Close] button to close the [System Information] dialog box.

6 Press the [OK] button to close the [Options] dialog box.

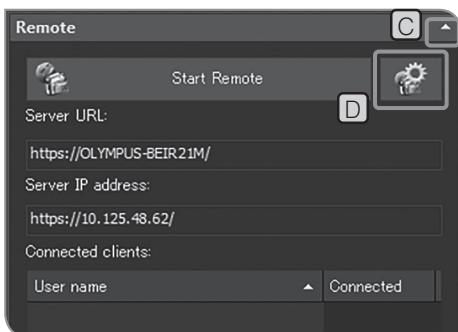


12 Sharing the image

When DP2-NS (Network Solution License) (optional) is enabled, the images can be viewed by sharing among multiple users (clients).

NOTE In order to reduce the risk of personal information leakage, be careful when handling the image data containing the personal information.

TIP • The keyboard must be connected for this setting.
• DP2-AOU must be connected to the client PC by network.
• Each client can connect up to two PCs.



1 Select the [Acquisition] tab **A** or the [Play] tab **B**.

2 If the setting items of [Remote] are not displayed, press **C** to open them.

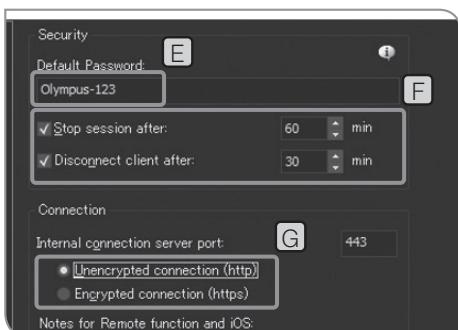
3 Press the [Remote Options] button **D**. The [Options] dialog box opens, and [Remote] > [Network Settings] is displayed.

4 Input the password in [Default Password] **E** so that only the person who knows the password can view it.

NOTE Make the password difficult for others to assume. Change it regularly and keep it unknown to others.

TIP • The factory default password is “Olympus-123”.

• In **F** you can set the connection time from starting to finishing the remote session and the time to allow clients to connect while disclosing the images.

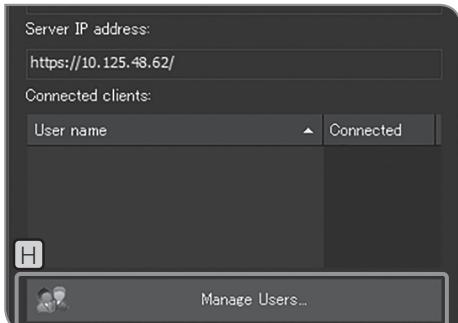


Checked	Description
[Stop session after]	After the remote session started, when the specified time passes, the remote session stops automatically.
[Disconnect client after]	After the client started connection, when the specified time passes, the connection is disconnected.

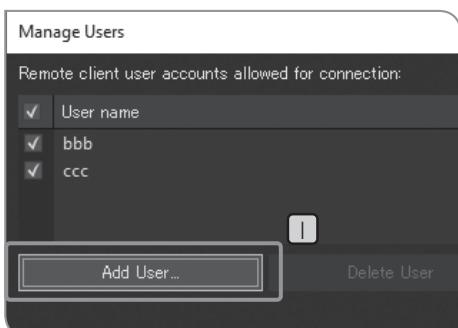
5 In **G**, set whether to disclose the images on the encrypted page or not.

The accessible status of https or http differs depending on the web browser of the client. For details, see the table below.

6 Press the [OK] button to close the [Options] dialog box.



7 If you selected [Encrypted connections] in **5**, press the [Manage Users] button **H** to register the users you want to disclose.
If you selected [Unencrypted connections] in **5**, go to **10**.



8 Press the [Add User] button **I** to register the user names you want to disclose.
9 When you finish registering the users, press the [Close] button to close the [Manage Users] dialog box.
10 Press the [Start Remote] button **J** to start sharing the images.

11 Notify the following information to clients.

- URL of disclosed server
- IP address of disclosed server
- User name (only when [Unencrypted connections] is selected)
- Password

TIP

- If images are shared by selecting [Encrypted connections] (https), the client is asked to change the password when accessing the image for the first time. (The password should be a string between 10 and 64 characters containing alphabets (upper case and lower case), numbers and symbols.)
- If the client uses iOS, notify the client of URL where .local is added to suffix.
- When the network connection is available with either wired LAN or wireless LAN, [Server IP address] acquired from the wired LAN is displayed preferentially.

12 Press the [Stop Remote] button to stop sharing the images.

Accessible status of https and http by browser

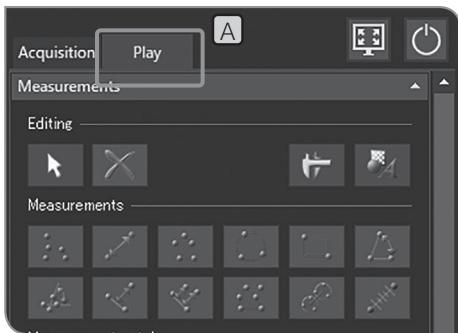
OS	Web browser	https	http
Windows	Google Chrome Microsoft Edge (Chromium version)	Accessible	Accessible
Android	Google Chrome	Accessible Note that the valid server information is IP address only(unaccessible by URL)	Accessible Note that the valid server information is IP address only(unaccessible by URL)
iOS	Safari	Unaccessible	Accessible

5 Play

This section describes the procedures to view the acquired images.

5-1 Basic operations

The functions used for playing images are placed on the [Play] tab.



1 Selecting the play image

You can change the image you want to play.

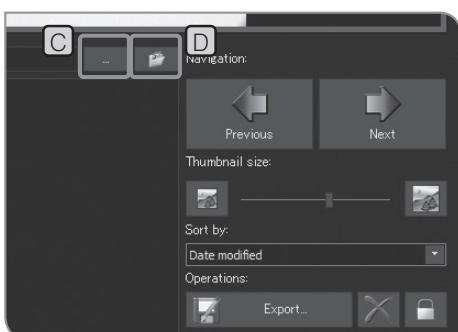
- 1 Select the [Play] tab **A** to display the image acquired last in the folder that is saved automatically.



- 2 Select the thumbnail in [Gallery] **B** to change the play image.

Icons displayed on the thumbnail

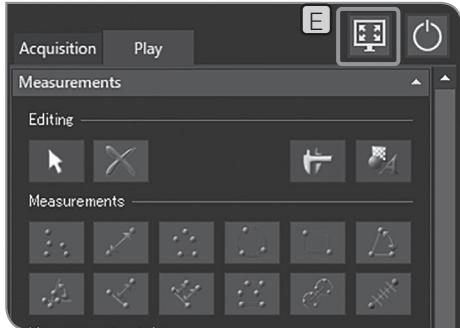
Icon	Function	Note
	The image is protected.	For details, see "Protecting the play image (p.65)".
	Movie file	For details, see Playing the movies (p.64)".
	JPEG file	For details see, "Setting the still image format (p.32)".



TIP To change the folder you want to view, press the [...] button **C**. Specify the folder in the dialog box displayed. (To return to the folder saved automatically, press the [Open Automatic Saving Location] button **D**.)

NOTE To view the folder in the USB recording media equipped with the password function, press the [Unlock External Drive] button to cancel the password using the keyboard.

TIP While the window to input password is displayed, if you place the mouse pointer on the camera control software and click it, the window to input password becomes invisible. In this case, press [Alt]+[Tab] of the keyboard to make it visible.



Full screen view

Press the [Maximize to Screen] button **E**. The played image is displayed in full screen view.

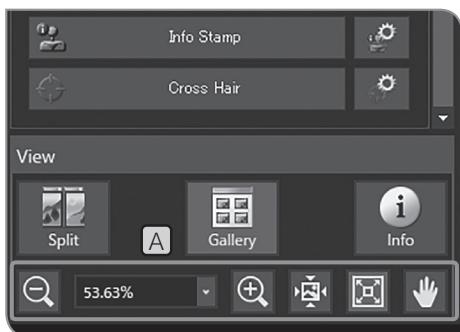
To change the image you want to play, press the **F** button in the upper right area of the screen.

Button	Function
	The previous image is played. (Thumbnail of the left next in thumbnail view)
	The next image is played. (Thumbnail of the right next in thumbnail view)



TIP

Press the [Maximize to Screen] button **G** to return to the original view.



2

Zooming the image and displaying the scroll bar

1

You can change the digital zoom magnification by pressing buttons in **A** or selecting from the list on the [View] tab.

Button	Function
	The image is zoomed-in in stepwise.
	The zoom magnification is displayed. You can change the zoom magnification by selecting from the list or inputting the value directly.
	The image is zoomed-out in stepwise.
	The image is displayed so that one pixel of the image is equivalent to one pixel of the display. (This button cannot be used if the live resolution is smaller than the monitor resolution.)
	The zoom magnification is calculated so that the entire image is displayed to fit to the screen.
	When the entire image is not displayed completely on the screen, you can change the area you want to display on the screen by dragging the image with the mouse to move the image freely.*

* You can also move the image by moving the scroll bar regardless of whether the button is ON or OFF.



3 Playing the movies

If the image selected in "Selecting the play image (p.62)" is a movie, press the  button to start playing.

Pressing the  button while playing the movie allows you to pause or resume playing.

- 1 Select the [Play] tab **A**.
- 2 Select the movie  you want to display from the thumbnail in [Gallery] **B**.
- 3 Operate with the button in **C**.

Button	Function
	Cueing
	The movie is rewinded for one second.
	The movie is played, paused, or resumed. The movie is paused.
	The movie is forwarded for one second.



4 Extracting the frame from the movie

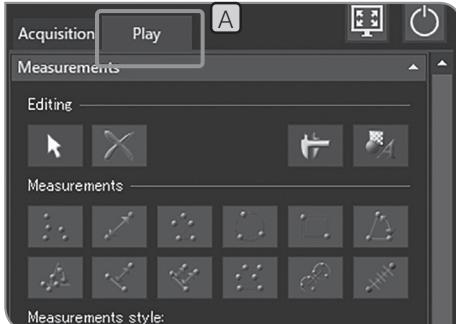
If the image selected in "Selecting the play image (p.62)" is a movie, the frame currently displayed can be extracted as an image.

- 1 Select the [Play] tab **A**.
- 2 Select the movie  you want to display from the thumbnail in [Gallery] **B**.
- 3 Press the  button in **C** to play the movie. When the frame you want to extract is displayed, press the  button to pause playing the movie.
- 4 If you press the  button in **D**, the frame currently displayed is extracted as the image.

The extracted image is saved to the specified save destination in the following file name format. For details, see "Setting the save folders and file names (p.54)".

File name: <File name of the selected movie>_<Counter>.Extension (JPG, TIF)





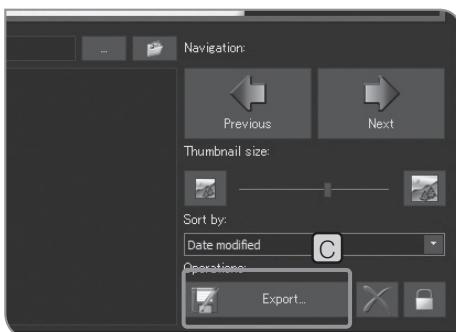
5 Exporting the selected image

The selected image can be exported.

- 1 Select the [Play] tab **A**.



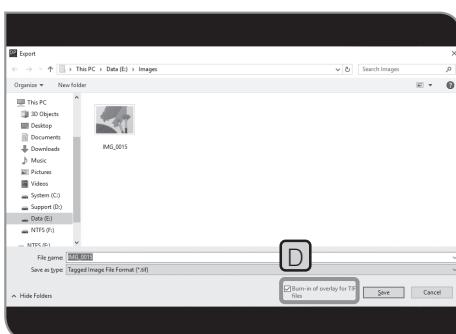
- 2 Select the image you want to export from the thumbnail in [Gallery] **B**.

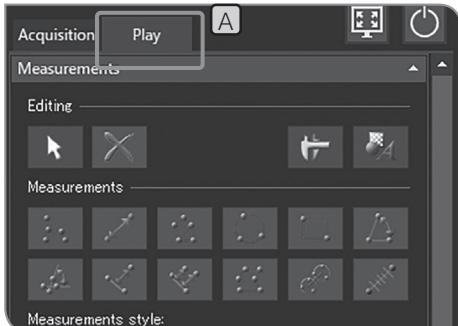


- 3 Press the [Export...] button **C**. Specify the folder in the dialog box displayed.

TIP

- Exported image cannot be saved in the folder where the selected image is stored, so specify another folder.
- When you check the [TIFF + Burn-in of overlay] checkbox **D**, the TIFF image overlaid with measurement results or drawings is exported.





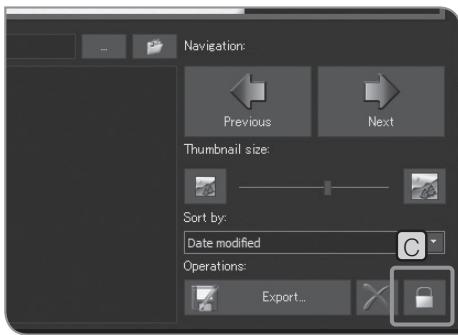
6 Protecting the play image

The image can be protected (prohibited to delete) to avoid deleting the necessary images accidentally.

- 1 Select the [Play] tab A.

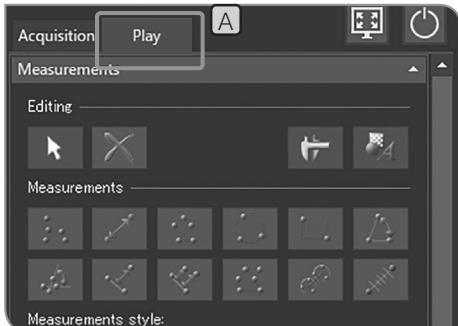


- 2 Select the image you want to protect from the thumbnail in [Gallery] B.



- 3 Press the [Protect] button C. The  icon is displayed on the thumbnail.

TIP You can cancel the protection by selecting the protected image and pressing the [Protect] button C again.



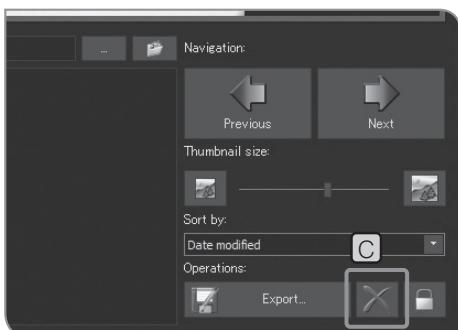
7 Deleting the image

You can delete unnecessary images.

- 1 Select the [Play] tab **A**.



- 2 Select the image you want to delete from the thumbnail in [Gallery] **B**.

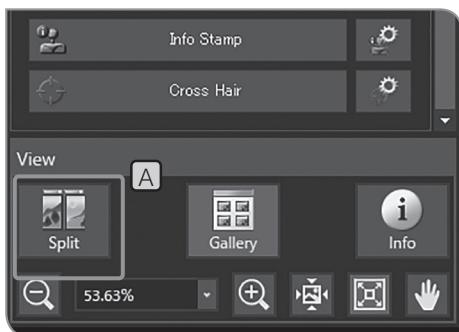


- 3 Press the [Delete] button **C**.

- 4 When the confirmation message appears, select [Yes] if you want to delete.

NOTE You cannot delete the protected image. (See p.65.)

5-2 Advanced operations



1 Split view

You can display the live image and the acquired image or the acquired multiple images side by side.

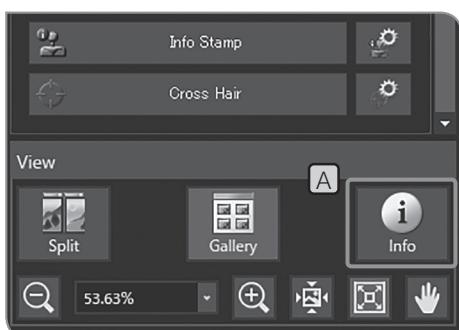
- 1 Display the live image or the acquired image. For procedures to display the images, see "Pausing and resuming the live view (p.41)" and "Selecting the play image (p.62)".
- 2 Press the [Split] button **A** on [View]. The image currently displayed is displayed in the left side frame and the right side frame is being selected.
- 3 Select the image you want to display side by side from the thumbnail in [Gallery] **B**. The selected image is displayed in the right side frame. (The image is displayed in the selected frame. In this procedure, the image is displayed in the right side frame.)
TIP • To acquire the still image in the split view, press the [F8] key of the keyboard. The acquired image is displayed in the selected frame and saved to the specified save destination.
• To cancel the split view, press the [Split] button again



2 Displaying the image information

The information (settings for acquisition, etc.) of the image currently displayed is displayed.

- 1 Press the [Information] button **A**. The image information is displayed on the left side of the image.
TIP To cancel displaying the image information, press the [Information] button again



6 Measurement

This section describes the operations using the mouse. If the touch panel display is connected, read the following operations as those on the right side.

- "Click with mouse" (Left button) ⇒ "Tap with finger" (Touch with finger and release)
- "Double-click with mouse" (Left button) ⇒ "Double-tap with finger" (Touch with finger twice and release)
- "Right-click with mouse" (Right button) ⇒ "Hold with finger" (Long-press with finger)
- "Drag with mouse" (Left button) ⇒ "Swipe with finger" (Slide finger while touching)

1

Measurement functions

You can measure the distance or the area of the object on the image.

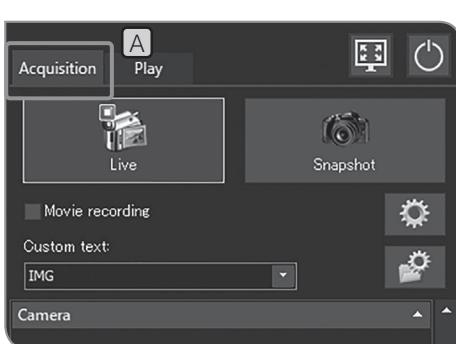
There are two measurement methods: measurement method on the live image and the measurement method on the played image.

NOTE

Before measurement, the scale must be set in advance. When measuring on the played image, if the scale display is not set (setting of acquisition magnifications, etc.), the measurement data is not displayed correctly. For setting procedures, see "Setting the microscope (p.87)".

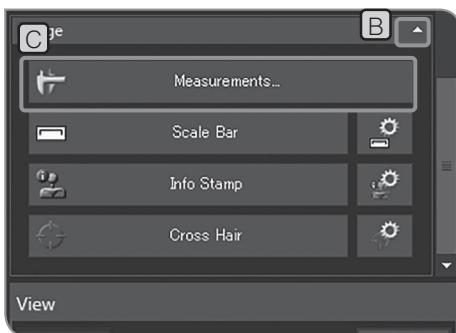
TIP

- When you measure on the live image, the frame rate may be reduced.
- The played images listed below cannot be measured.
 - Movie
 - Image edited by PC
 - Image acquired by a camera other than DP23-CU or DP28-CU.
- When using the measurement function, it is recommended to set the same resolution to the live image and the image to be acquired. If the resolution of the live image is different from that of the image to be acquired, the position to display the measurement results of the live image may shift from that of the acquired image.
- To input texts, the keyboard must be connected to DP2-AOU.
- This measurement function is a simple measurement method using CMOS pixel pitch. This is not suitable for the precise measurement. Use the measuring equipment for the precision measurement.
- The measurement results are displayed with 4 effective digits for distance, 5 digits for angle and 7 digits for area respectively. Note, the unit of measurement results cannot be changed.
- The measurement results are displayed near the lines or circles drawn. The display position or display digits cannot be changed.

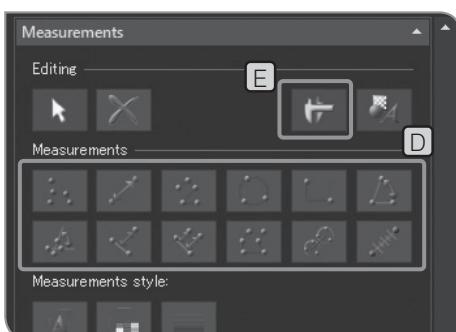


Measuring on the live image

1 Select the [Acquisition] tab **A**.



2 If the setting items of [Image] are not displayed, press **B** to open them.
 3 Press the [Measurements] button **C**.



4 Press the arbitrary measurement method button in [Measurements] **D** to perform measurement on the live image. For measurement procedures, see the table below.
 The measurement results are displayed on the measurement layer * on the image.
 You can switch between showing and hiding the measurement layer by pressing the [Show Measurements] button **E**.

5 To finish the measurement, press the [Close Measurements] button.

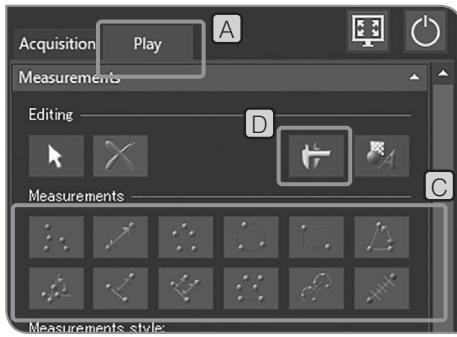
Adding measurement results on the image during acquisition

If you press the [Snapshot] button after measurement, the image is acquired, measurement results are added to the image, and the image is saved. The method to add measurement results differs depending on the file format

- JPEG, TIFF + Burn-in of overlay: The measurement results are imprinted on the image. (There is no measurement layer.)
- TIFF: The image is saved keeping the measurement layer.

For procedures to set the file format to be saved, see "Setting the still image format (p.32)".

* The measurement layer is like an transparent sheet overlaid on the image. The measurement results are displayed on the measurement layer.



Measuring on the acquired image

- 1 Select the [Play] tab **A**.
- 2 Select the image you want to measure from the thumbnail in [Gallery] **B**.
- 3 Press the arbitrary measurement method button in [Measurement] **C** to perform the measurement on the image. For measurement procedures, see the table below.

The measurement results are displayed on the measurement layer * on the image.

You can switch between showing and hiding the measurement layer by pressing the [Show Measurements] button **D**.



Adding measurement results to the acquired image (played image)

After performing the measurement on the acquired image, if you change to the live image (change from the [Play] tab to the [Acquisition] tab), the message regarding how to save the image appears. Save the image according to the message.

NOTE

- The measurement results cannot be added to the protected image. Cancel the protection in advance.
- When measurement results are added to the image, the image data is saved by overwriting. When the image is in JPEG format, the measurement results are imprinted on the image. Be careful, once the measurement results are imprinted on the image, they will not be restored.

* The measurement layer is like an transparent sheet overlaid on the image. The measurement results are displayed on the measurement layer.

List of measurement functions

Button	Function	Outline of functions	Page
	[Point Group]	By drawing the marks at multiple locations on the image, the number of mark locations can be counted.	p.73
	[Arbitrary Line]	The length between specified 2 points is measured.	p.73
	[Polyline]	By specifying multiple points, the sum of the length between points is measured.	p.74
	[3 Point Circle]	By creating the circle (by inputting 3 points), the area, perimeter, and average (diameter) are measured.	p.74
	[Rectangle]	By creating the rectangle (by dragging the diagonal point), the area, perimeter, width, and height are measured.	p.75

Button	Function	Outline of functions	Page
	[3 Point Angle]	By specifying 3 points, the angle is measured.	p.75
	[4 Point Angle]	By specifying 4 points, 2 lines were created, and the angle between 2 lines are measured.	p.76
	[Perpendicular Line]	By creating the line and then specifying one point, the perpendicular line is drawn from the specified point to the created line, and its length is measured.	p.76
	[Multiple Perpendicular Lines]	By creating the line and then specifying multiple points, the perpendicular lines are drawn from the specified points to the created line, and their lengths are measured.	p.77
	[Closed Polygon]	By creating the polygon, its area and perimeter are measured.	p.77
	[Circle to Circle]	By creating 2 circles, the length between centers of 2 circles is measured.	p.78
	[Linear Ruler]	A ruler is drawn.	p.78

List of drawing functions

Button	Function	Outline of functions	Page
	[Arrow]	An arrow is drawn.	p.80
	[Line]	A line is drawn.	p.80
	[Rectangle]	A rectangle is drawn.	p.81
	[Ellipse]	An ellipse is drawn.	p.81
	[Freehand Polygon]	A free hand graphic is drawn.	p.82
	[Text Field]	A text is drawn.	p.82

List of editing functions

The following functions are used for editing measurements and drawings.

Button	Function	Outline of functions	Page
	[Select Measurements or Drawings]	The measurement results or drawings on the screen are selected.	-
	[Delete]	The selected measurement results or drawings are deleted.	p.83
	[Show Measurements]	The measurement layer is shown or hidden.	-
	[Show Drawings]	The drawing layer is shown or hidden.	-

2 | Details of measurement functions

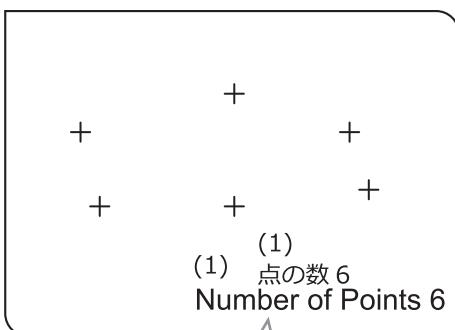
[Point Group]



The marks are drawn at multiple locations on the image, and you can count the number of mark locations.

TIP

Even after the measurement is finished or other measurements are performed, marks can be displayed in sequential number if marks are not deleted.



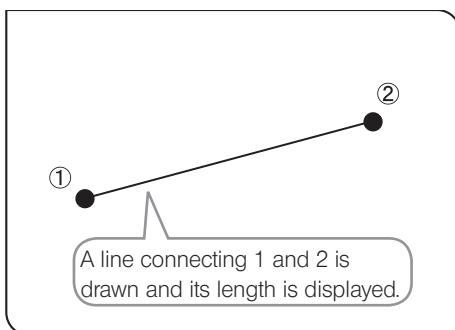
- 1 Press the  button.
- 2 Click the mouse at positions you want to count.
- 3 Right-click the mouse on the screen to finish counting.

The number of points is displayed next to the first mark.

[Arbitrary Line]



You can measure the length between the specified 2 points.

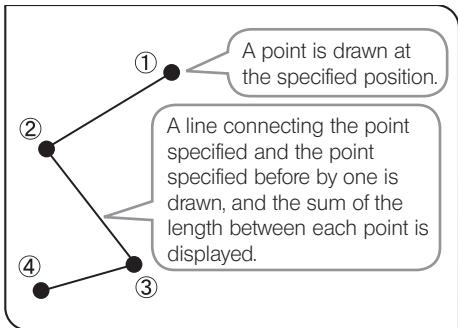


- 1 Press the  button.
- 2 Click the mouse to specify the start point and the end point of the position you want to measure.
- 3 You can measure another position continuously. Right-click the mouse on the screen to finish measurement.

[Polyline]



A line connecting each point of multiple points specified on the image is drawn, and you can measure the sum of the length between each point.

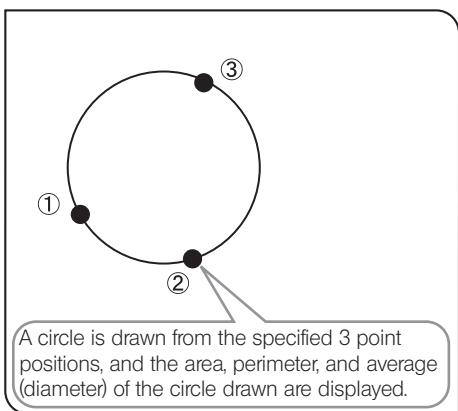


- 1** Press the  button.
- 2** Click the mouse on arbitrary positions to draw the line.
- 3** The position you right-click the mouse is set as the end point.
- 4** You can measure another position continuously. Right-click the mouse on the screen to finish measurement.

[3 Point Circle]



A circle is created (by inputting 3 points) on the image, and you can measure the diameter and the area of the circle.

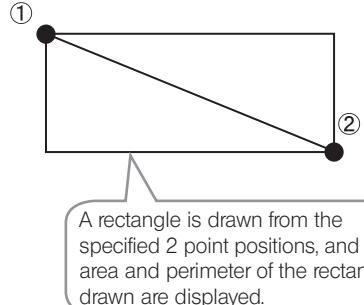


- 1** Press the  button.
- 2** Specify the position you want to measure using the circle. Click the mouse to specify 3 points that will be the circumference.
- 3** You can measure another position continuously. Right-click the mouse on the screen to finish measurement.

[Rectangle]



The rectangle is created on the image, and you can measure the area and perimeter of the rectangle.

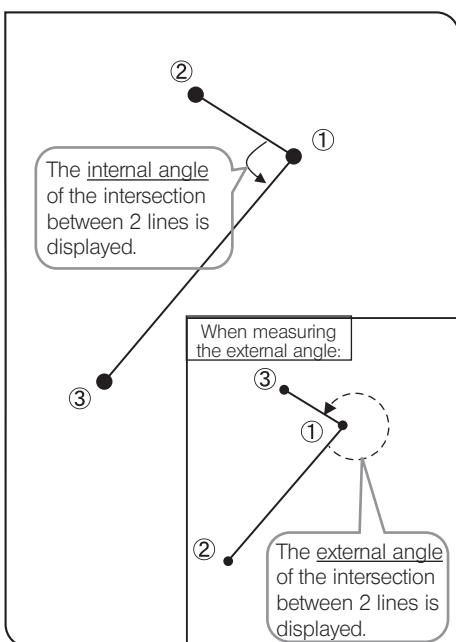


- 1 Press the
- 2 Specify the position you want to measure using the rectangle. Click the mouse to specify 2 diagonal points of the rectangle.
- 3 You can measure another position continuously. Right-click the mouse on the screen to finish measurement.

[3 Point Angle]



The 3 points are specified on the image, and you can measure the angle.



- 1 Press the
- 2 Click the mouse to specify 3 points to create the angle you want to measure.
- 3 You can measure another position continuously. Right-click the mouse on the screen to finish measurement.

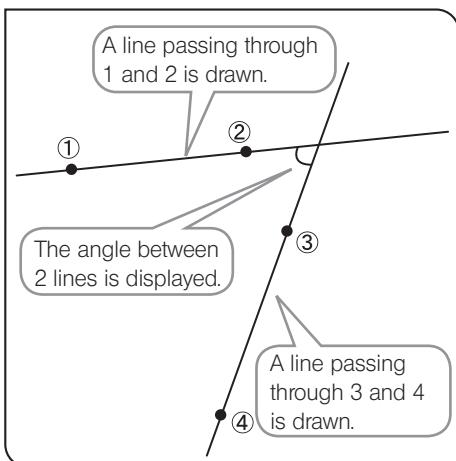
Internal angle and external angle:

The angles of the arc drawn counterclockwise from the first line to the second line are displayed.

[4 Point Angle]



The 2 lines are drawn on the image, and you can measure the angle of the intersection between 2 lines.



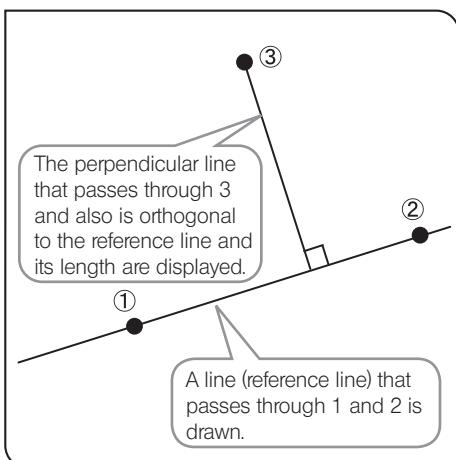
- 1 Press the  button.
- 2 Click the mouse on 2 arbitrary points to draw the reference line (line passing through 1 and 2 shown in the left picture).
- 3 In the same way as 2, draw the measurement line (line passing through 3 and 4 shown in the left picture).
- 4 You can measure another position continuously. Right-click the mouse on the screen to finish measurement.

Moving the mouse to 4 corners created by 2 lines will display the respective angle.

[Perpendicular Line]



By creating the line on the image and specifying one point, the perpendicular line is drawn from the specified point to the created line, and you can measure the length of the perpendicular line drawn.

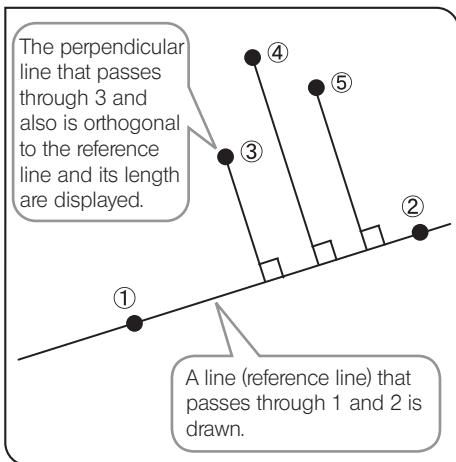


- 1 Press the  button.
- 2 Click the mouse on 2 arbitrary points to create the reference line (line passing through 1 and 2 shown in the left picture).
- 3 Left-click the mouse on the position you want to measure. The perpendicular line is drawn.
- 4 You can measure another position continuously. Right-click the mouse on the screen to finish measurement.

[Multiple Perpendicular Lines]



By creating the line on the image and then specifying multiple points, the perpendicular line is drawn from the specified points to the created line, and you can measure the lengths of the perpendicular lines drawn.

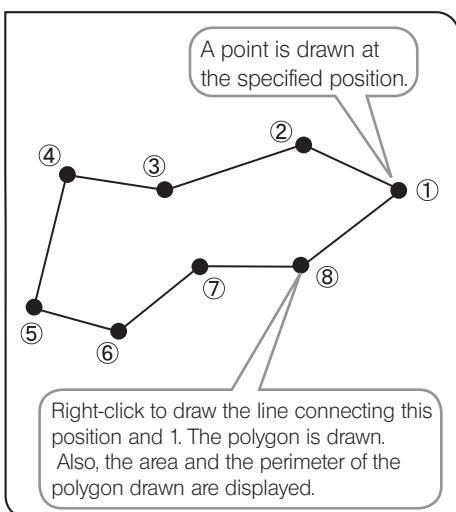


- 1 Press the
- 2 Click the mouse on 2 arbitrary points to create the reference line (line passing through 1 and 2 shown in the left picture).
- 3 Left-click the mouse on the position you want to measure. The perpendicular line is drawn.
- 4 Repeat 3 to draw multiple perpendicular lines. Note, right-click the mouse to draw the last perpendicular line.
- 5 You can measure another position continuously. Right-click the mouse on the screen to finish measurement.

[Closed Polygon]



The polygon is drawn on the image, and you can measure the area and the perimeter. The polygon you can create is up to the hectagon.

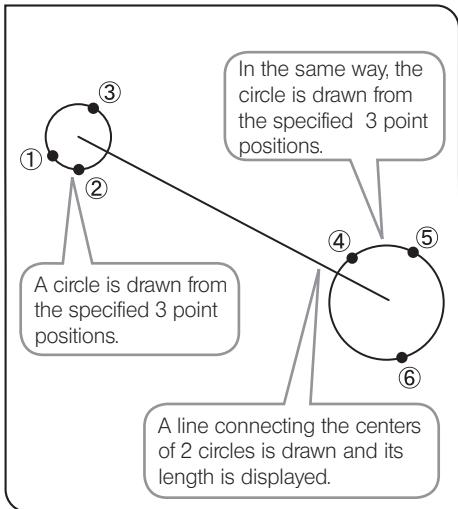


- 1 Press the
- 2 Click the mouse on arbitrary positions to draw the polygon.
- 3 Right-click the mouse to connect this position and the start point. The polygon is drawn.
- 4 You can measure another position continuously. Right-click the mouse on the screen to finish measurement.

[Circle to Circle]



2 circles are created (by inputting 3 points) on the image, and you can measure the length between centers of 2 circles.



1 Press the button.

2 Specify the start point of the position you want to measure using the circle. Click the mouse to specify 3 points that will be the circumference.

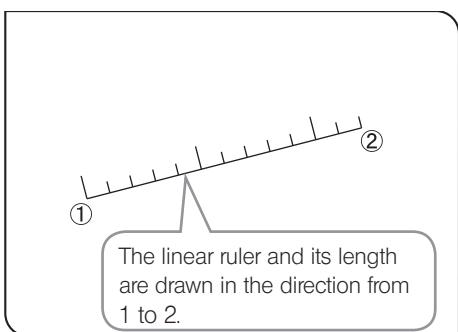
3 In the same way as 2, specify the end point of the position you want to measure using the circle.

4 You can measure another position continuously. Right-click the mouse on the screen to finish measurement.

[Linear Ruler]



You can draw the linear ruler on the image.

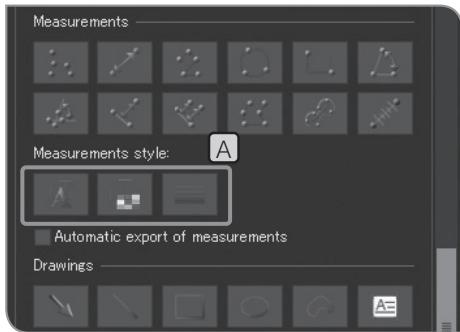


1 Press the button.

2 Click the mouse to specify the start point and the end point of the position you want to draw.

3 You can draw another line ruler continuously. Right-click the mouse on the screen to finish measurement.

Changing the style of measurement results



You can change the lines and texts (measurement values) of measurement results to arbitrary colors, line thickness or fonts.

- 1 Click the following buttons in [Measurements style] A to display the dialog box, and change to your desired settings.

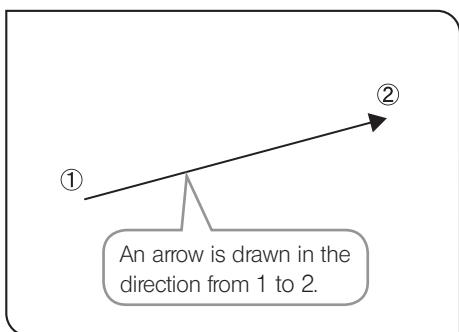
Style	Function
	[Change Font]
	[Change Color]
	[Change Line Thickness]

3 | Details of drawing functions

[Arrow]



You can draw an arrow on the image.



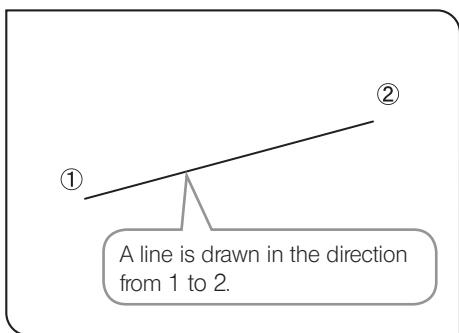
1 Press the  button.

2 Click the mouse to specify the start point and the end point of the position you want to draw.

[Line]



You can draw a line on the image.



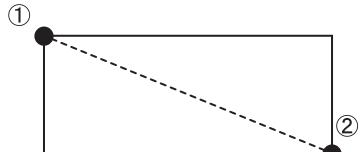
1 Press the  button.

2 Click the mouse to specify the start point and the end point of the position you want to draw.

[Rectangle]



You can draw a rectangle on the image.



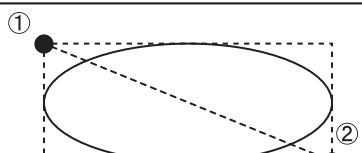
1 Press the button.

2 Drag the mouse to specify 2 diagonal points of the rectangle you want to draw.

[Ellipse]



You can draw an ellipse on the image.



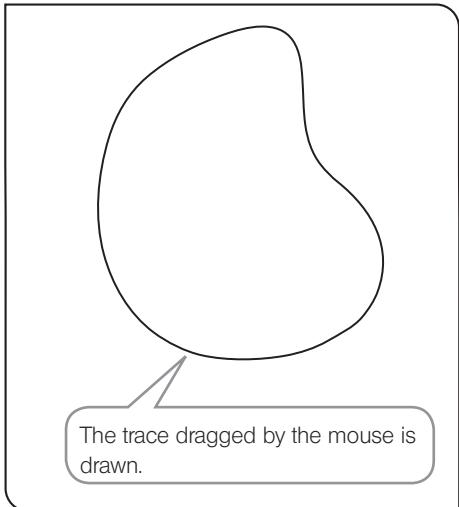
1 Press the button.

2 Drag the mouse to specify 2 diagonal points of the rectangle that circumscribes the ellipse you want to draw.

[Freehand Polygon]



You can draw a free hand drawing on the image.



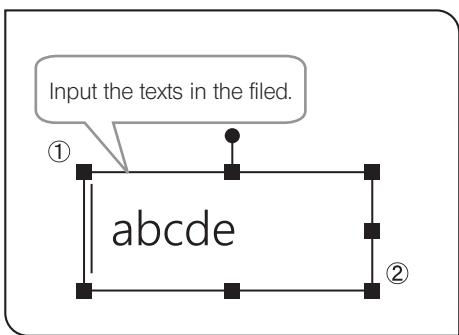
1 Press the button.

2 Drag the area you want to draw with the mouse to draw the freehand drawing.

[Text Field]



You can draw the texts on the image. The keyboard and the mouse are necessary for drawing the texts.



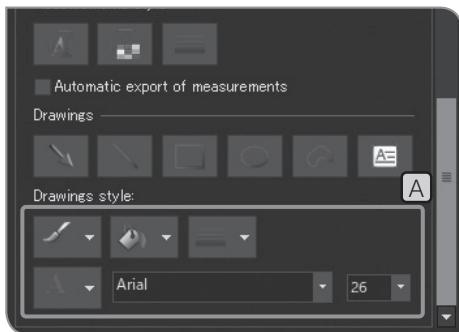
1 Press the button.

2 Drag the position you want to draw the texts with the mouse.

3 When the field appears, input the texts using the keyboard.



Changing the style of drawings



You can change the drawings and texts to arbitrary colors, line thickness or fonts.

1 Click the following buttons in [Drawings Style] A to select your favorites from the list.

Style	Function
	[Line Color]
	[Fill Color]
	[Line Width]
	[Text Color]
Arial	Font type
26	Font size

4 Details of editing functions

[Delete]



You can delete the measurement results or drawings on the screen.

- 1 Press the button.
- 2 Click the mouse to specify the measurement results or drawings you want to delete.
- 3 Press the button to delete the measurement results or drawings you specified.

TIP You can specify multiple measurement results or drawings by dragging.

Note that the measurement results and drawings cannot be specified at the same time.

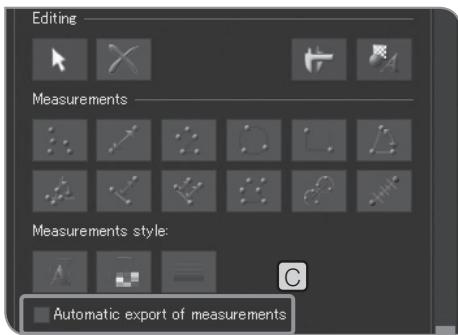


5

Outputting measurement results in CSV file

You can output the measurement results to files in CSV format. When acquiring or saving the images, the files in CSV format are saved to the same save destination as the images with the same file names as the images.

- 1 Select the [Acquisition] tab A or the [Play] tab B.



2

- 2 Check the [Automatic export of measurements] checkbox C in [Measurement]. For procedures to display [Measurement], see p.69.

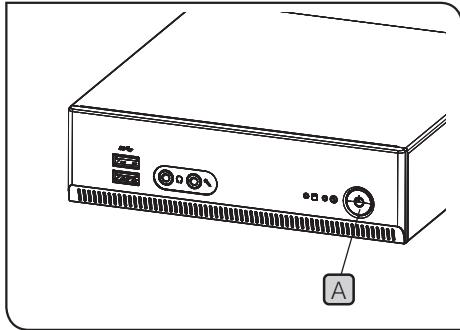
7

Initial Settings

For proper operations, you must set the language and the scale magnification at first.

Set them according to the screen (Setup wizard) displayed when the power is turned ON for the first time.

TIP The Setup wizard is displayed only when the power is turned ON for the first time, but you can also change the settings later. For details, see this section.



1 Press the main switch **A** of DP2-AOU to turn ON the power. The Setup wizard appears on the display.

2 Set the language according to the wizard. When the settings are completed, DP2-AOU restarts.

3 In a same way, set the scale magnification (magnification of camera adapter or objective you use).

TIP • If the settings on the wizard are canceled in the middle, all settings made so far are canceled.

- For setting the language, see p.86, and for setting the scale magnification, see p.87.

- The date and time setting screen and the display resolution setting screen are not displayed automatically. For setting procedures, see "Setting the date and time (p.89)" and "Setting display resolution (p.90)".

- You can acquire images without setting the date and time, but we recommend you to set the date and time in advance to save the file name of the acquired image with the correct date and time.

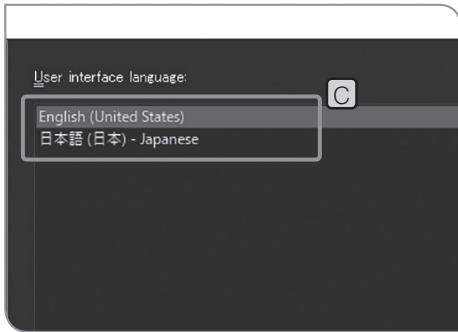
- The display resolution can be set automatically, but it may not be set automatically depending on the display you use. It is recommended to set the display resolution in advance.



1 Setting the language

You can set the language you use. The language can be selected from 2 languages: Japanese or English.

- 1 Select the [Acquisition] tab **A**.
- 2 Press the [System Settings] button **B** to open the [Options] dialog box.



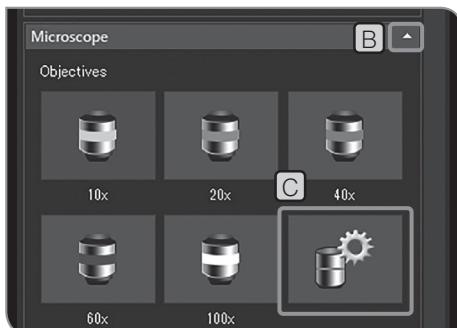
- 3 Select [Environment] > [Language], and select the language in [User interface language] **C**.
- 4 Press the [OK] button to close the [Options] dialog box. When the message for confirmation appears, confirm the content and press the [OK] button.



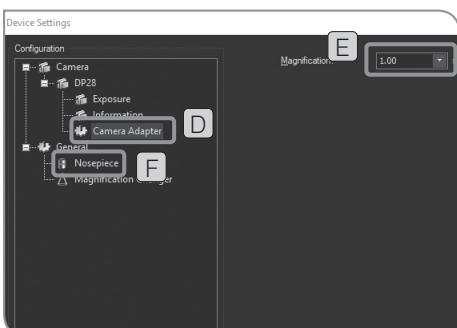
2 Setting the microscope

You can set the magnification of adapter lens, magnification of objective and magnification of intermediate magnification changer that are required for displaying the scale bar and measurement results in the original size of the specimen.

TIP When the control box (U-CBS, etc.) is connected, the setting procedures will be different. See "Automatic scale bar change (p.101)".



- 1 Select the [Acquisition] tab **A**.
- 2 If the setting items of [Microscope] are not displayed, press **B** to open them.
- 3 Press the [Device Settings] button **C**. The [Device Settings] dialog box opens, and [General] > [Nosepiece] is displayed.

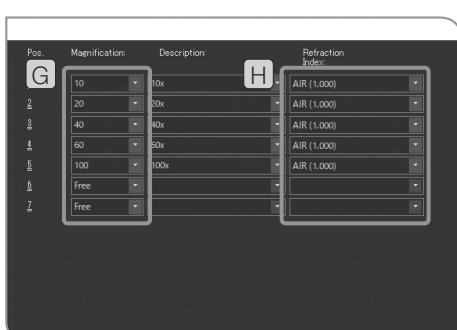


The magnification settings for the camera adapter

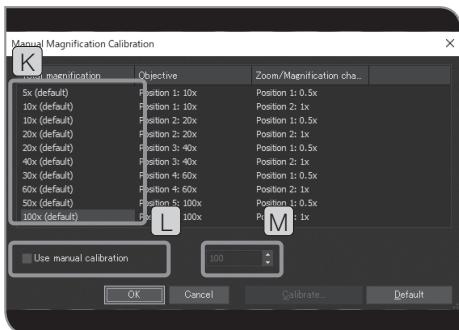
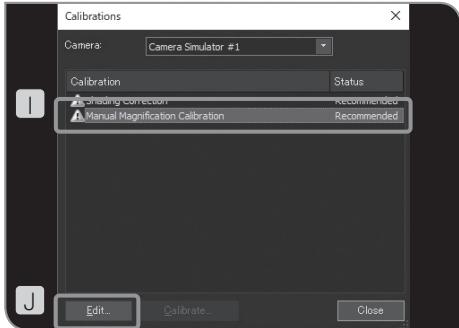
- 4 Select the [Camera Adapter] **D** from the [Camera] in [Configuration].
- 5 Set [Magnification] **E**.

The magnification settings for the nosepiece

- 6 Select the [Nosepiece] **F** from the [General] in [Configuration].



- 7 Set [Magnification] **G** and [Refraction Index] **H** of the objective attached to each nosepiece. (The number of [Position] fields displayed in the dialog box differs depending on the nosepiece combined with the microscope.)
- 8 Press the [OK] button to close the [Device Settings] dialog box. When the message asking "Do you want to confirm the calibration?" appears, press the [Yes] button. The [Calibrations] dialog box is displayed.



9 Select [Manual Magnification Calibration] **I** and press the [Edit] button **J**. The [Manual Magnification Calibration] dialog box is displayed.

10 When the intermediate magnification changer is in the light path, if you want to change the total magnification, select [Total magnification] **K**. Check the [Use manual calibration] checkbox **L**, and set the total magnification you want to change in **M**.

TIP Pressing the [Default] button brings all the total magnifications back to default values.

11 Press the [OK] button to close the [Manual Magnification Calibration] dialog box.

12 Press the [Close] button to close the [Calibrations] dialog box.

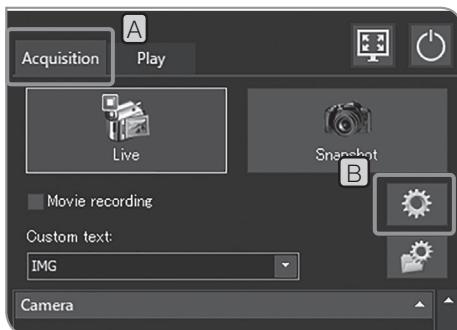
TIP If the microscope is equipped with the magnification changer, input the magnification in [Magnification] of [Magnification Changer], and press the [Add] button.

3 Setting date, time and time zone

You can set the date, time and time zone of DP2-AOU.

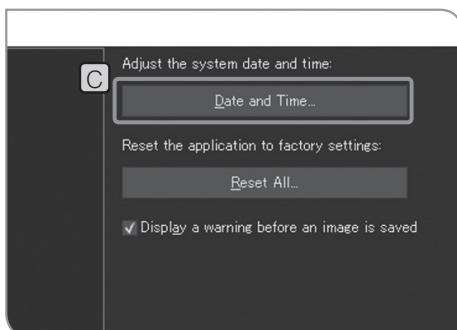
The acquisition date and time are recorded on the acquired image.

When you view the acquired images saved in the recording media in NTFS format such as USB-HDD (external hard disk for connecting USB), etc. on PC, the acquisition date and time may not be displayed correctly. If you set the time zone of DP2-AOU same as the time zone of PC, the acquisition date and time are displayed correctly.



1 Select the [Acquisition] tab **A**.

2 Press the [System Settings] button **B** to open the [Options] dialog box.



3 Select [System] > [General], and press the [Date and Time] button **C**. When the [Date and Time] dialog box appears, set the date, time and time zone, and press the [OK] button.

4 When the message asking you whether to restart the system appears, press the [Yes] button.

NOTE When the settings are changed, DP2-AOU restarts automatically. Do not turn OFF the main switch or unplug the AC adapter until the restart completes.

4 Setting the display resolution

You can set the resolution suitable for the display you use.

The resolutions that cannot be displayed on your display are not shown in the list.

The display resolutions you can set are listed as follows.

1920 x 1200 WUXGA

1920 x 1080 Full HD

1680 x 1050 WSXGA+

1280 x 854

1280 x 768 WXGA

1024 x 600 WSVGA

1600 x 1200 UXGA

1280 x 1024 SXGA

1280 x 960 QVGA

1024 x 768 XGA

TIP The keyboard and the mouse must be connected for setting the display resolution.

1 While the camera control software is running and the live image or the acquired image is displayed, press [Ctrl]+[Alt]+[Insert] of the keyboard. The Windows® desktop is displayed.

2 Open the control panel and set the display resolution.

TIP • When using the 4K display, it is recommended to set the display scale to 200%.
• The functions of Windows® installed on DP2-AOU are limited only for this system.

3 When the settings are completed, double-click the [Camera] icon on the desktop.

Icon	Function
 Camera	The camera control software starts.

5 Setting the network

DP23-AOU or DP28-AOU can access PC on the network by connecting DP2-AOU to LAN.

NOTE

The settings changed by this operation cannot be returned to factory default settings. The malfunctions or damages caused by changing the settings are subject to the paid repair.

TIP

- The network must be set by the network administrator.
- The keyboard and the mouse must be connected for setting the network.

Setting the network allows the following operations.

- The acquired images can be saved directly to PC on the network.
- The acquired images saved to PC on the network can be played with DP23-AOU or DP28-AOU. (The images you can play are only those acquired with DP23-CU or DP28-CU. However, if DP23-CU is connected, you cannot play the image with resolution 2448 x 1920 (acquirable with DP28-CU). Also, you may not be able to play images acquired with DP23-CU or DP28-CU if they are edited by PC, etc.)

1

Connect the LAN cable to DP2-AOU. For procedures to connect the LAN cable, see "Connecting the LAN cable (p.22)".

TIP

If the LAN cable is not connected, the settings of the network are not applied to DP2-AOU.

2

While the camera control software is running and the live image or the acquired image is displayed, press [Ctrl]+[Alt]+[Insert] of the keyboard. The Windows® desktop is displayed.

3

Open the control panel and make the settings of network connection, file sharing, etc. Make the settings according to your connection environment. For details, contact the network administrator for assistance.

TIP

The functions of Windows® installed on DP2-AOU are limited only for this system.

4

When the settling of the network connection is completed, double-click the [Camera] icon on the desktop.

Icon	Function
 Camera	The camera control software starts.

TIP

- When the main switch of DP2-AOU is turned ON (including the restart when setting the network, etc), you may not be able to access the network for a few minutes. This is because the DP2-AOU continues setting the network-related systems after it starts.
In this case, start DP2-AOU and wait for a few minutes.
- For system requirements for network connection, see (p.8).

6 Installing the dedicated device driver

If the dedicated device driver is required for the USB device connected to DP2-AOU, you can install the device driver of that USB device on DP2-AOU.

NOTE The settings changed by this operation cannot be returned to factory default settings. The malfunctions or damages caused by changing the settings are subject to the paid repair.

TIP • The device driver must be installed by the network administrator.
• The keyboard and the mouse must be connected for installing the device driver.

1 While the camera control software is running and the live image or the acquired image is displayed, press [Ctrl]+[Alt]+[Insert] of the keyboard. The Windows® desktop is displayed.

TIP If DP2-AVS (Antivirus software license) (optional) is enabled, you must permit starting the installation program of the device driver before performing the following procedures. For details, see, "Permitting to run programs that install driver and update software (p.95)".

2 Double-click the icon on the desktop to install the device driver according to the instruction manual provided with the USB device to be connected.

Icon	Function
	Explorer starts. Explorer

TIP The functions of Windows® installed on DP2-AOU are limited only for this system.

3 When the installation is completed, double-click the [Camera] icon on the desktop.

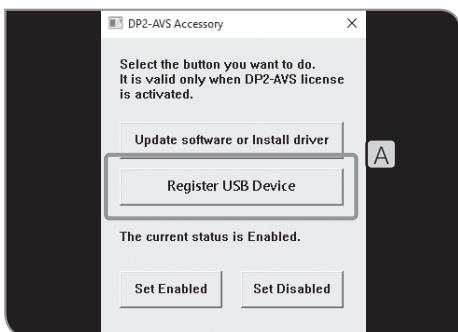
Icon	Function
	The camera control software starts. Camera

If DP2-AVS (Antivirus software license) (optional) is enabled, it is restricted to run the executable program (file with the extension ".exe") on DP2-AOU. The program to unlock the password of the recording media equipped with the password function such as USB flash drive, etc. does not run. Therefore, when using the recording media for the first time, you need to register the program to unlock the password in DP2-AVS as a self certificate.

Prior to performing the procedures described below, connect the recording media equipped with the password function to the USB connector of DP2-AOU.

TIP The keyboard and the mouse must be connected for registering the executable program.

- 1 While the camera control software is running and the live image or the acquired image is displayed, press [Ctrl]+[Alt]+[Insert] of the keyboard. The Windows® desktop is displayed.
- 2 Double-click the [DP2-AVS-Accessory] icon on the desktop.



Icon	Function
	DP2-AVS-Accessory starts.

TIP The functions of Windows® installed on DP2-AOU are limited only for this system.

- 3 Press the [Register USB Device] button A to display the dialog box, select the drive where the recording media equipped with password function inserted to the USB connector of DP2-AOU is connected, and select the program that unlocks the password (file with the extension ".exe") from the recording media equipped with password function.
- 4 When the settings are completed, double-click the [Camera] icon on the desktop.

Icon	Function
	The camera control software starts.

8

Preparing to run programs that install the driver and update software

If DP2-AVS (Antivirus software license) (optional) is enabled, it is restricted to run the executable program (file with the extension ".exe") on DP2-AOU. Therefore, when installing the dedicated device driver or updating software, you need to permit running the programs that execute these operations.

TIP

The keyboard and the mouse must be connected for setting the permission to run the program.

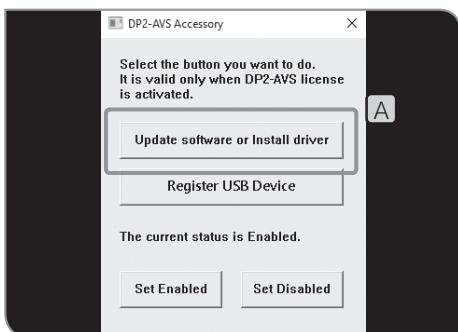
1

Double-click the [DP2-AVS-Accessory] icon on the desktop.

Icon	Function
	DP2-AVS-Accessory starts.

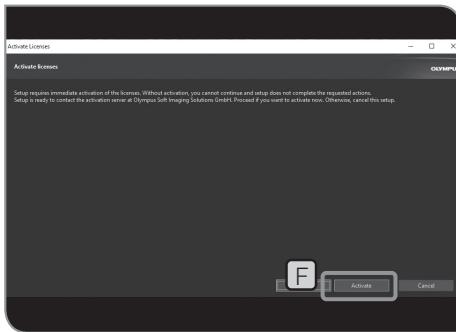
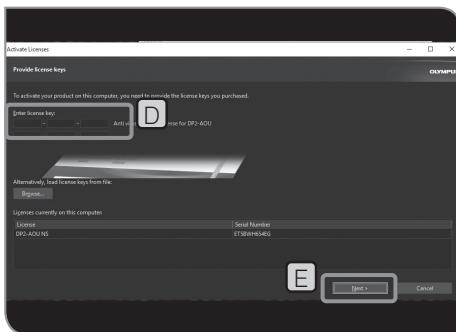
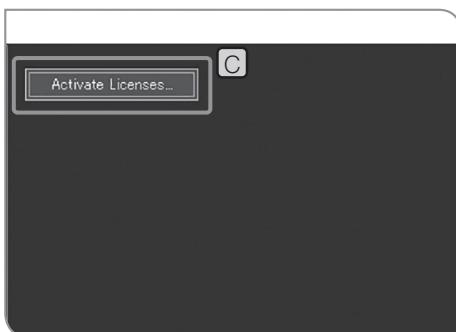
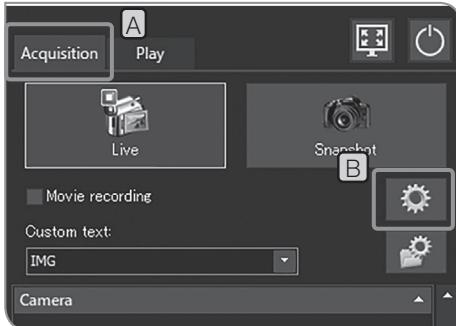
TIP

The functions of Windows® installed on DP2-AOU are limited only for this system.



2

Press the [Update software or Install driver] button **A** to display the dialog box, and select the installation program or update program (file with the extension ".exe").

**9**

Activating the license (optional)

The “Activation” means to unlock software so that you can use the software with the license you purchased.

This section describes the procedures to activate the license when DP2-AOU is connected to the internet. When DP2-AOU is not connected to the internet, the operation **6** is different. Follow the message displayed. When following the message, it is necessary to prepare a PC connected to the Internet.

TIP • The keyboard and the mouse must be connected for the activation.

• The licenses must be activated by the network administrator.

1 Select the [Acquisition] tab **A**.

2 Press the [System Settings] button **B** to open the [Options] dialog box.

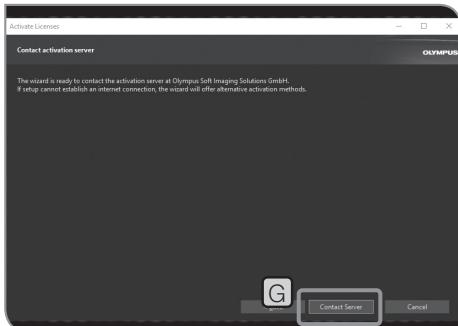
3 Select [Environment] > [Licenses], and press the [Activate Licenses] button **C**.

4 Input the license key you purchased in [Enter license key] **D**, and press the [Next] button **E**.

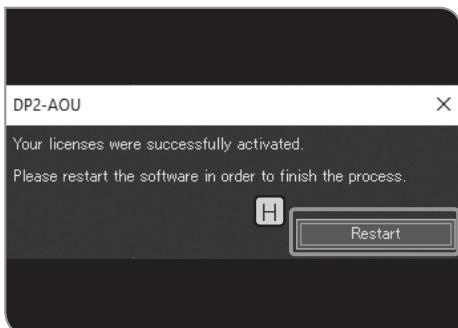
TIP • If you have multiple license keys, input all.

• When DP2-AOU comes back from repair, be sure to activate it again. (You can use the same license key.)

5 When the message like “You need to activate the license now.” appears, press the [Activate] button **F**.

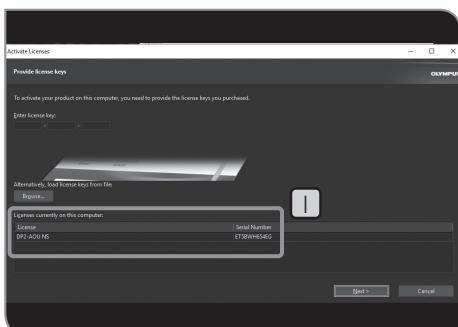


6 When the message like "Do you want to connect to the activated server?" appears, press the [Contact Server] button **G**.



7 When the message "The license is activated successfully." appears, press the [Restart] button **H**.

NOTE • DP2-AOU connects to the activated server and data is exchanged. This process is performed background. This process takes several minutes. This process takes several minutes. (It takes more than 10 minutes in case of DP2-AVS.)
• If this process is interrupted for some reason, contact Evident.



TIP You can confirm that the license is activated in **I** on the [Activate Licenses] window.

8

Functions linked with microscope

By connecting DP23-AOU or DP28-AOU to the control box for microscope or the microscope frame, you can use functions linked with the microscope described below.

Linked function	Explanation
Automatic scale bar change	When the objective magnification is changed by changing the coded revolving nosepiece or the motorized revolving nosepiece, the size of the scale bar is changed automatically according to the magnification changed. *The objective magnification must be set in advance. For setting procedures, see "Setting the microscope (p.87)".
Shutter switch	By attaching the hand switch for exposure (U-HSEXP) to the microscope frame, you can acquire images while observing with the microscope.

8-1 Application conditions

You can use the linked functions when the following control box or the microscope frame is combined.

- U-CBS
- U-CBM
- BX3-CBM
- BX3-CBH
- BX3M-CB
- BX3M-CBFM
- STM7-CB
- STM7-CBA
- MX63-F
- MX63L-F

TIP

- You can also connect the camera to the microscope without connecting the hand switch for exposure U-HSEXP. In this case, you cannot use the shutter switch function.
- You can also connect the camera to the microscope without connecting the revolving nosepiece with coded functions. In this case, you cannot use the automatic scale bar change function.

8-2 Connecting procedures

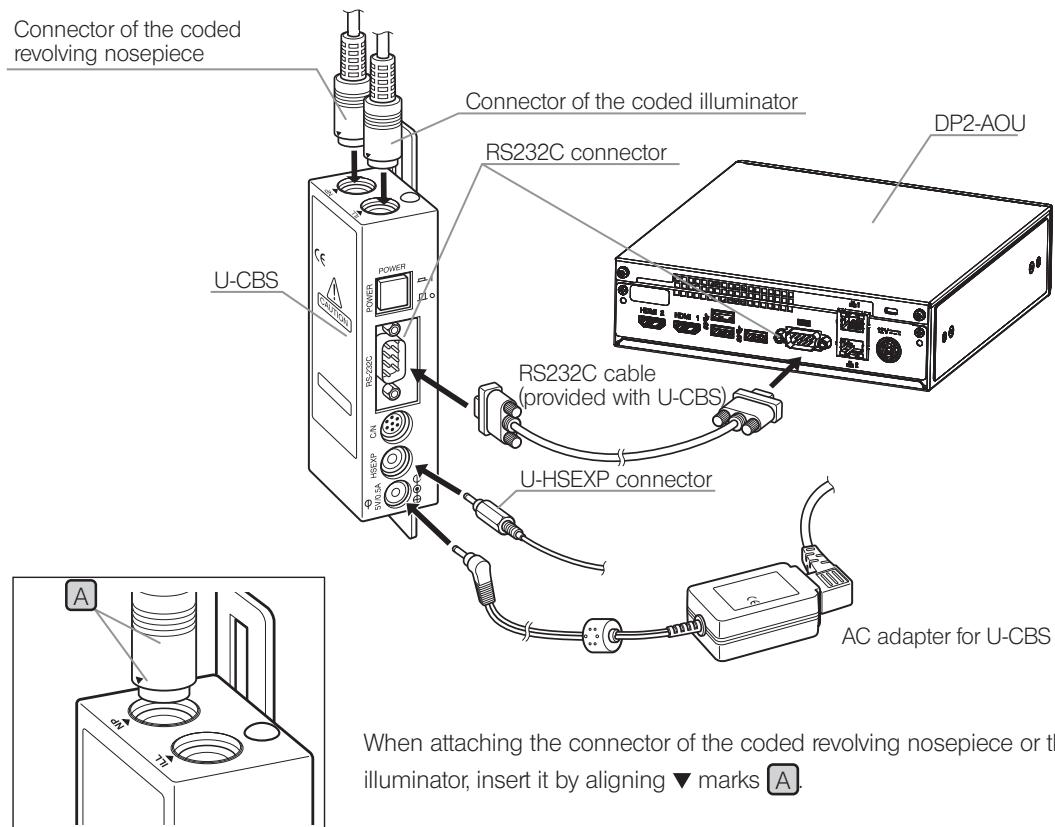
For procedures to connect the microscope to the control box, refer to the instruction manual of the relevant control box or the microscope.

NOTE

- Remove only the covers or stickers of necessary connectors on the control box.
- Be sure to connect only units specified by Evident to each connector. If units which are not specified by Evident are connected, the full performance is not ensured.
- Use the RS232C cable for connecting DP2-AOU to the control box for microscope.
- Be sure to set the main switch of each unit to OFF before connecting the cables.
- Align the orientation of the connector and insert it completely to the end. If the connector has clamping screws, be sure to secure them.
- Inserting the connectors which are not specified by Evident may damage them.

The connecting procedures are described below by using U-CBS as an example. For other connecting procedures, refer to instruction manuals of devices to be connected.

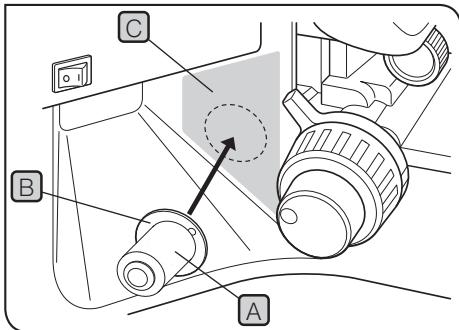
Connecting to U-CBS



Attaching the hand switch for exposure U-HSEXP

TIP

This switch is composed of U-HSEXP (magnet system) and a circular iron plate (adhesive system). Two circular plates are provided and one of them is a spare.



1 Secure U-HSEXP **A** at the center of the circular plate **B** with the magnet. Do not remove the backing sheet of the circular plate until you decide the position to attach the circular plate.

2 Decide the attaching position near the right or the left coarse adjusting knob and also in the area for you to operate the switch easily **C** (■ area).

NOTE Be careful, if the attaching position is too close to the coarse adjustment knob, it may collide with the coarse adjustment knob.

3 Clean the position to attach the circular plate with absolute alcohol, remove the backing sheet of the circular plate and attach it by pressing toward the microscope frame firmly.

NOTE Magnetic objects placed near U-HSEXP may cause malfunctions or damages. Do not place magnetic objects near U-HSEXP.

- PC
- Cellular phone
- Watch
- Credit card
- ATM card
- Floppy disks, etc.

TIP

You cannot record movies with U-HSEXP. Use the [Movie] button in the [Acquisition] tab. (p.39)

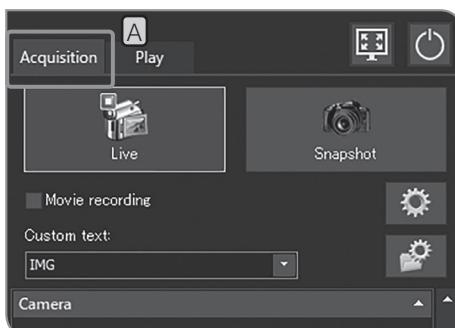
8-3 Operating procedures

TIP Be sure to turn ON the power of the control box for microscope or that of the microscope frame before turning ON the power of DP2-AOU. If you turn ON the power in the wrong order, DP2-AOU does not recognize the control box for microscope or the microscope frame properly.

Automatic scale bar change

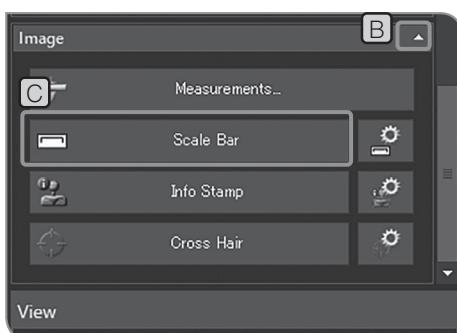
When the objective magnification is changed by changing the revolving nosepiece of the microscope, the size of the scale bar is changed automatically according to the magnification changed.

To use this function, the objective magnification must be set to DP23-AOU or DP28-AOU in advance. Set the objective magnification according to the microscope setting wizard displayed when the power is turned ON for the first time. If DP23-AOU or DP28-AOU is running, see "Setting the microscope (p.87)" and set the objective magnification.



Displaying the scale bar

1 Select the [Acquisition] tab **A**.



2 If the setting items of [Image] are not displayed, press **B** to open them.

3 Press [Scale Bar] button **C** to show or hide the scale bar.

TIP For procedures to display the scale bar, see "Setting the scale bar view (p.51)".

Hand switch for exposure U-HSEXP

U-HSEXP can be attached to the microscope by connecting U-HSEXP to U-CBS with the cable. With this operation, you can acquire images while operating the microscope.

U-HSEXP works same as the [Snapshot] button in the [Acquisition] tab. Pressing the switch U-HSEXP allows you to acquire and save the images.

TIP

- For procedures to connect U-HSEXP to U-CBS, see p.99.
- For procedure to attach U-HSEXP to the microscope, see p.100.
- You cannot record movies with U-HSEXP. Use the [Movie] button in the [Acquisition] tab. (p.39)

9 Specifications

Item		Specifications	
		DP23-AOU	DP28-AOU
Still image	Image Size (pixels)	3088 (H) x 2076 (V)	4104 (H) x 2174 (V)
		2072 (H) x 2072 (V)	2168 (H) x 2168 (V)
		1544 (H) x 1038 (V)	2052 (H) x 1086 (V)
		1920 (H) x 1080 (V)	3840 (H) x 2160 (V)
			1920 (H) x 1080 (V)
Movie	File Format	TIFF, JPEG	
	Image Size (pixels)	1563 (H) x 1024 (V)	2048 (H) x 1072 (V)
	File Format	AVI (compression)	
	Recordable time	Up to 30 min	
Color space	With Sound	Supported	
Image Style		sRGB, AdobeRGB, Camera-specific	
Frame Rate		HQ color, Vivid, Linear, cell culture, High contrast, Camera-specific, User defined	
Frame Rate	Live	Up to 30fps 3088 (H) x 2076 (V) (Full resolution)	Up to 30fps 4104 (H) x 2174 (V) (Full resolution)
		Up to 43fps 2072 (H) x 2072 (V) (Square)	Up to 30fps 2168 (H) x 2168 (V) (Square)
		Up to 59fps 1544 (H) x 1038 (V) (High speed)	Up to 60fps 2052 (H) x 1086 (V) (High speed)
		Up to 59fps 1544 (H) x 1038 (V) (High sensitivity)	Up to 30fps 2052 (H) x 1086 (V) (High sensitivity)
		Up to 60fps 1920 (H) x 1080 (V) (Full HD)	Up to 30fps 3840 (H) x 2160 (V) (4K)
			Up to 60fps 1920 (H) x 1080 (V) (Full HD)
Number of pixel for display	Movie	30fps 1563 (H) x 1024 (V)	30fps 2048 (H) x 1072 (V)
Exposure Control		3840 x 2160 4K UHDTV 2560 x 1440 WQHD 1920 x 1200 WUXGA 1920 x 1080 FHD 1680 x 1050 WSXGA+ 1440 x 900 WXGA+ 1366 x 768 FWXGA 1280 x 854 HDTV(720p) 1600 x 1200 UXGA 1280 x 1024 SXGA	
Exposure Control	Exposure mode	Manual, Auto(Peak), Auto(Average)	
	Exposure spot size	0.1% / 1% / 30% / full image	
	Exposure adjustment	±2.0EV 1/6EV step	
	Lock of exposure time	Supported	
	Exposure Time	Manual Exposure mode: 29µs – 15s Auto Exposure mode: 29µs – 15s	Manual Exposure mode: 27µs – 15s Auto Exposure mode: 27µs – 15s
Balance Mode	White Balance Mode	Automatic (AWB), One touch, ROI	
Binning		Supported	

Item		Specifications	
		DP23-AOU	DP28-AOU
Image display	Live image / Played image (Zooming magnification)	10% to 1600%	
	Thumbnail	Changeable with 5 step, detailed display	
	Full screen mode for conference	Supported	
Calibration	Shading	Supported	
	Magnification calibration	Supported	
	White balance	Supported	
System	language	English / Japanese	
	Link microscope	Supported	
Interfaces	Image transfer	USB3.1 Gen1	
	Network	LAN x2 (1000BASE-T / 100BASE-TX / 10BASE-T)	
	Video	HDMI x2	
	Peripheral I/F	USB3.1 Gen1 x4	
	Audio	Mic. input (monaural) Phone jack	
	Serial port	RS-232C	
	Storage Media	Integrated storage device(Writable capacity:60 [GB]) External USB storage device PC connected to network	
Operating System Requirements	PC	Windows10 IoT Enterprise 2019 LTSC(64bit)	
	Mobile devices(in case with Remote function)	Windows10 pro 64bit Android 9.0 or high iOS 12.0 or high	
Client Computer Requirements (minimum) (in case with Remote function)	Processor	Intel core i5 and high	
	RAM	4GB	
	Web Browser	Microsoft Edge(chromium) Google Chrome Safari	
Supporting function	Focus indicator	Supported	
	Scale bar	Supported	
	Info Stamp	Supported (Document name, total magnification, Objective Magnification, Zoom Magnification)	
	Cross hair	Supported(Small cross hair, Large cross hair)	
	Split displayed	Supported(Synchronized image is available) <ul style="list-style-type: none">• Live image and Still image• Still image and Still image• Live image and Movie• Still image and Movie• Movie and Movie	
	Measurement function	Count, Distance between 2 points, Polyline, 3 point circle, Rectangle, 3 point angle, 4 point angle, Perpendicular, Area and perimeter of polygon Distance between 2 centers, Ruler	

Item	Specifications	
	DP23-AOU	DP28-AOU
Items to prepare separately	USB mouse	
	USB Keyboard	
	U-TV1XC, U-TV0.63XC, U-TV0.5XC or U-TV0.35XC Camera adapter	U-TV1XC, U-TV0.63XC Camera adapter
	Power cord	
Weight	Camera head	0.4kg
	DP2-AOU	3.3kg (including AC adapter)
Dimension	Camera head	Diameter: 76.3 mm Height: 36.6 mm
	DP2-AOU	180(W) x 180(D) x 53(H) mm (excluding AC adapter)
Network connection	Wired LAN	10BASE-T 100BASE-TX 1000BASE-T
	IP	IPv4, IPv6
	Wireless LAN (Theoretical Maximum transfer rate)	IEEE 802.11b (11Mbps / 2.4GHz) IEEE 802.11g (54Mbps / 2.4GHz) IEEE 802.11n (600Mbps / 2.4GHz / 5GHz) IEEE 802.11ac (6.9Gbps / 5GHz) (The rate depends on the USB Wi-Fi adapter you use.)
	Security	WPA2/AES(depending on WLAN router)
	Communication protocol	http(Supported by Windows OS, Android OS and iOS) https(Supported by Windows OS and Android OS)
Remote function (Optional license)	User Authorization	Supported(https)
	Resolution / frame rate	30fps FHD(1920 x 1080) 30fps HD(1280 x 720)
	License type	Activation
	Type	White List Type
Anti virus SW (Optional license)	License type	Activation
	Rating (AC adapter)	Output: 12 V ≈ 10 A Input: 100-240 V ~ 50/60 Hz 2 A
Power consumption		Max. power consumption: 120 W
Operating environment		
Indoor use		
Altitude: Max. 2000 meters		
Ambient temperature: 10 to 35 °C (50 to 95 °F)		
Relative humidity: 80% for temperatures up to 31 °C (88 °F) (without condensation) In case of over 31°C (88 °F), the relative humidity is decreased linearly through 70% at 34 °C (93 °F), 60% at 37 °C (99 °F), to 50% at 40 °C (104 °F).		
Supply voltage fluctuations ±10%		
Pollution degree: 2 (in accordance with IEC60664-1)		
Installation category (Overvoltage category): II (in accordance with IEC60664-1)		

10 Troubleshooting

This section describes the possible problems of this product and their remedies.

If problems occur, please review the following list and take remedial action as needed.

If you cannot solve the problem after checking the entire list, contact Evident for assistance.

Phenomena	Cause	Remedy	Page
The power of DP2-AOU does not turn ON.	DP2-AOU, AC adapter and power cord are not connected properly.	Connect DP2-AOU, AC adapter and power cord properly.	19
The image cannot be acquired by pressing the [Snapshot] button. The movie cannot be recorded by pressing the [Movie] button.	Images or movies are being written in the memory. The capacity of the recording media such as a USB flash drive, etc. is full.	Wait one or more seconds, and press the [Snapshot] button or the [Movie] button again. Replace the recording media or delete unnecessary images. Or delete images from the recording media after transferring them to PC, etc.	26, 39 67, 44
	Recording media such as a USB flash drive, etc. are not connected properly.	Connect the recording media such as a USB flash drive, etc. to the connector properly.	21
	The LAN cable is not connected properly. (Only when PC on the network is specified as the save destination of acquired images.)	Connect the LAN cable to the connector properly.	22
	Due to the network problem, PC that is specified as the save destination cannot be accessed. (Only when PC on the network is specified as the save destination of acquired images.)	Consult with the network administrator of PC that is specified as the save destination.	8, 91
	The save folder is protected by the password. (Only when PC on the network is specified as the save destination of acquired images.)	Connect the keyboard to DP2-AOU and input the password. Or consult with the network administrator of PC that is specified as the save destination.	21
	Due to the problems of connected USB devices or the network, the adverse effect is caused to the camera operation.	Disconnect the USB device and the LAN cable.	21
The play images are not shown on the display.	The main switch is set to OFF.	Set the main switch of DP2-AOU to ON.	24
	The [Play] tab is not selected.	Select the [Play] tab.	62
	No image is recorded in the save destination.	Acquire the still image.	26
	Recording media such as USB flash drive, etc. are not connected properly.	Connect the recording media such as USB flash drive, etc. to the connector properly.	21
Nothing is shown on the display.	The power of DP2-AOU is turned OFF.	Press the main switch of DP2-AOU to turn ON the power of DP2-AOU.	24
	The power of the display is not turned ON.	Turn ON the power.	—
	The display cable is not connected properly.	Connect the display cable to the connector properly.	18
	The display resolution is not set properly.	Set the display resolution properly.	90

Phenomena	Cause	Remedy	Page
An error message appears and the image is not displayed.	As the interface cable is disconnected, the power is not supplied to the camera head.	Press the main switch of DP2-AOU to exit the system. Then, connect the interface cable again and press the main switch of DP2-AOU to restart the system.	17, 24
The unfocused image is displayed.	The image is not focused correctly using the microscope.	Use the fine adjustment knob to focus correctly.	—
	The parfocality of the eyepiece and that of the camera are not matched.	Adjust the parfocality using the camera adapter.	—
	The aperture stop of the condenser is open too widely.	Narrow down the aperture stop to adjust it.	—
	The field stop is not appropriate.	Narrow down the field stop until the image is circumscribed to the field of view.	—
	Lens systems of the microscope or the cover glass on the bottom of the camera head are dirty.	Clean the objective, photo lens, condenser, window lens, etc of the microscope. And clean the cover glass on the bottom of the camera head.	—
The acquired image is too dark or too bright.	The lock of exposure time, exposure compensation or metering regions are not set properly.	Set them properly again.	25, 34
	The light intensity is not sufficient.	Adjust the light intensity again.	—
	The fluorescent lamp is used.	Use the light sources other than the fluorescent lamp.	—
The colors of the image are strange.	The reference area for white balance is not selected appropriately.	Select the area where nothing is shown on the background as the reference area for white balance.	33
	The color setting is not correct.	Adjust to the appropriate color setting.	37
	The light source of the microscope is too bright.	Reduce the brightness of the light source of the microscope.	—
The play movie is fast-forwarded.	Since the folder on the network is specified as the save destination, the frame rate is slower.	Save the movie file in the recording media connected to DP2-AOU.	54
	The recording media applicable to USB2.0 is specified as the save destination.	Connect the recording media (HDD or SSD) applicable to USB3.1 Gen1 to the USB connector.	21
	As the specified exposure time is long, the frame rate is slower.	Adjust the brightness of the light source so that the exposure time is 1/ 30s or less when DP28-CU is connected or 1/ 25s or less when DP23-CU is connected.	—
The calendar is reset every time.	The battery built in DP2-AOU is dead.	The replacement must be performed by the manufacturer (paid), contact Evident.	6
Functions linked with microscope are not working.	Cables are not connected properly.	Connect cables of the microscope, control box for microscope (BX3-CBH, etc.) and DP2-AOU properly.	99
	The control box (BX3-CBH, etc.) is not recognized.	Turn OFF the main switches of the control box for microscope (BX3-CBH, etc.) and DP2-AOU. Then, turn ON in the order of 1 Control box for microscope (BX3-CBH, etc.) and 2 DP2-AOU.	101

Phenomena	Cause	Remedy	Page
The automatic scale bar change function does not work.	The objective magnification is not specified. Or it is not set properly.	Specify the magnification of the objective in use.	101
When the main switch of DP2-AOU is turned OFF, various settings or the scale function are returned to the status before setting.	When turning OFF the main switch, the system is shutdown forcibly (long-press the main switch)	When turning OFF the main switch, do not long-press the main switch. You can turn OFF the power by pressing the main switch lightly.	24
The USB devices are not recognized.	The USB devices are not connected to DP2-AOU properly.	Connect the USB devices to the connectors properly.	21
	The dedicated device driver is not installed.	Install the device driver according to the instruction manual provided with the USB device.	–
The PC on the network is not recognized.	The LAN cable is not connected properly.	Connect the LAN cable to the connector properly.	22
	The network is not set properly.	Consult the network administrator and set the network according to your connection environment.	–

Repair request

If the phenomena are not improved even after you took the above remedial action, contact Evident.

Please provide us the following information at that time.

- Product name and abbreviated name (example: Control box DP2-AOU)
- Product number

The repair parts are kept for the period of five years after purchase.

As OS will be reinstalled during the repair, all data in DP2-AOU will be deleted. Be sure to make a backup of necessary data in advance.

■ Proper selection of the power supply cord

If no power supply cord is provided, please select the proper power supply cord for the equipment by referring to "Specifications" and "Certified Cord" below:

Caution : In case you use a non-approved power supply cord for Evident products, Evident can no longer warrant the electrical safety of the equipment.

Specifications

Voltage rating	125 V AC (for 100-120 V AC area) or, 250 V AC (for 220-240 V AC area)
Current rating	6 A minimum
Temperature rating	60 °C minimum
Length	3.05 m maximum
Fittings configuration	Grounding type attachment plug cap. Opposite terminates in molded-on IEC configuration appliance coupling.

Table 1 Certified cord

A power supply cord should be certified by one of the agencies listed in Table 1, or comprised of cordage marked with an agency marking per Table 1 or marked per Table 2. The fittings are to be marked with at least one of the agencies listed in Table 1. In case you are unable to buy locally the power supply cord which is approved by one of the agencies mentioned in Table 1, please use replacements approved by any other equivalent and authorized agencies in your country.

Country	Agency	Certification mark	Country	Agency	Certification mark
Argentina	IRAM		Italy	IMQ	
Australia	SAA		Japan	JET	
Austria	ÖVE		Netherlands	KEMA	
Belgium	CEBEC		Norway	NEMKO	
Canada	CSA		Spain	AEE	
Denmark	DEMKO		Sweden	SEMKO	
Finland	FEI		Switzerland	SEV	
France	UTE		United Kingdom	ASTA BSI	
Germany	VDE		USA	UL	
Ireland	NSAI				

Table 2 HAR flexible cord

Approval organizations and cordage harmonization marking methods

Approval organization	Printed or embossed harmonization marking (May be located on jacket or insulation of internal wiring)	Alternative marking utilizing black-red-yellow thread (Length of color section in mm)			
		Black	Red	Yellow	
Comite Electrotechnique Belge (CEBEC)	CEBEC	«HAR»	10	30	10
Verband Deutscher Elektrotechniker (VDE) e.V. Prüfstelle	«VDE»	«HAR»	30	10	10
Union Technique de l'Electricite' (UTE)	USE	«HAR»	30	10	30
Instituto Italiano del Marchio di Qualita' (IMQ)	IEMMEQU	«HAR»	10	30	50
British Approvals Service for Electric Cables (BASEC)	BASEC	«HAR»	10	10	30
N.V. KEMA	KEMA-KEUR	«HAR»	10	30	30
SEMKO AB Svenska Elektriska Materielkontrollanstalter	SEMKO	«HAR»	10	10	50
Oesterreichischer Verband für Elektrotechnik (ÖVE)	«ÖVE»	«HAR»	30	10	50
Danmarks Elektriske Materialkontroll (DEMKO)	«DEMKO»	«HAR»	30	10	30
National Standards Authority of Ireland (NSA)	«NSAI»	«HAR»	30	30	50
Norges Elektriske Materiellkontroll (NEMKO)	NEMKO	«HAR»	10	10	70
Asociacion Electrotecnica Y Electronica Espanola (AEE)	«UNED»	«HAR»	30	10	70
Hellenic Organization for Standardization (ELOT)	ELOT	«HAR»	30	30	70
Instituto Portages da Qualidade (IPQ)	np	«HAR»	10	10	90
Schweizerischer Elektro Technischer Verein (SEV)	SEV	«HAR»	10	30	90
Elektriska Inspektoratet	SETI	«HAR»	10	30	90
Underwriters Laboratories Inc. (UL) Canadian Standards Association (CSA)		SV, SVT, SJ or SJT, 3 X 18AWG SV, SVT, SJ or SJT, 3 X 18AWG			

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Life science solutions

Service Center



[https://www.olympus-lifescience.com/
support/service/](https://www.olympus-lifescience.com/support/service/)

Industrial solutions

Service Center



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