OLYMPUS®

INSTRUCTIONS

DP2-SAL

Standalone connection kit

This instruction manual is for the standalone connection kit for Olympus microscope digital camera.
To obtain optimum performance of this system and to ensure the safety, study this manual thoroughly before operating the system and keep it on hand during operation of this system.
Keep this instruction manual in a safe place.
For details of products included in the configuration of this system, see page 8 of this instruction manual.

Optical Microscope Accessory

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

- Immunity Applied to industrial and basic environment requirements.

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

NOTE: This equipment 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 equipment is operated in a commercial environment. This equipment 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 equipment 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 equipment.

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

B급 기기 (가정용 방송통신기자재)

이 기기는 가정용(B급) 전자파적합기기로서 주로 가정에서 사용하는 것을 목적으로 하며, 모든 지역에서 사용할 수 있습니다.

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Introduction

The standalone connection kit DP2-SAL is a product to use the microscope digital camera DP22/DP27 in standalone mode.
Connecting the Olympus microscope digital camera DP22/DP27 to this product allows you to use the microscope digital camera DP22/DP27 in standalone mode.

Contents in this instruction manual

This instruction manual covers only the contents concerning the standalone connection kit DP2-SAL. For procedures to use the microscope digital camera DP22/DP27, refer to the instruction manual of the microscope digital camera DP22/DP27.

Trademarks

Microsoft and Windows are registered trademarks of Microsoft Corporation in U.S. 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 included in F:\EULA of the product. Please 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 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 contained in F:\license of this product.

Safety precautions

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

The following symbols are used in this instruction manual.

⚠CAUTION : Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury.

(CAUTION) : Indicates a potentially hazardous situation which, if not avoided, may result in damage to the equipment or other property.

◎ : Indicates commentary (for ease of operation and maintenance).

⚠ CAUTION - Electric safety -

Always use the AC adapter and the power cord provided by Olympus.
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.

Always connect the ground terminal.
Connect the ground terminal of the power cord and that of the power outlet. If the device is not grounded, our intended electric safety and EMC performance of the device can not be assured.

Do not use the device in close proximity of the sources of strong electromagnetic radiation.
Proper operation may be interfered. The electromagnetic environment should be evaluated prior to operation of this device.

Remove the power cord in case of emergency.
In case of emergency, be sure to unplug the power cord from the power cord connector on the product or from the wall power outlet. Install the product at the location where you can reach the power cord connector or the wall power outlet at hand to remove the power cord quickly.

Be sure to turn OFF the power of the device before connecting /disconnecting cables and units.

Insert the cables completely to the end of the connector.
Before pressing the main switch, be sure to make sure that the cable which connects the control box D2-CB and each unit is inserted completely to the end of the connector.

⚠ CAUTION - Protection for electric shock -

Do not insert any tools or metal fragments in the air vents of the device.
Doing so could cause electric shock or failure of the product.

Keep the power cord and cables well away from devices generating heat.
If the power cord and cables contact a hot area, they could melt and cause electric shock.

⚠ CAUTION - Protection for burns -

Do not keep touching the AC adapter, the camera head or the control box D2-CB for long period of time.

The AC adapter, the camera head or the control box D2-CB generate heat after long hours of use. Be careful not to allow these devices to touch your skin for long period of time to avoid the low temperature burns. For details of USB devices to be connected to the control box D2-CB such as USB memory, etc., follow the instructions described in instruction manual of each device.

⚠ CAUTION - Safety symbols -

The following symbols are placed on the product.
Study the meaning of the symbols and always use the equipment 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.

Caution labels

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

Caution label position	Top surface of the control box D2-CB	⚠

When caution labels are dirty or peeled off, contact Olympus for replacement or inquiries.

Handling precautions

Intended use

This product is intended to be used as an ancillary component for use with Olympus DP22 and DP27 cameras for capture and storage of digital images, but not for clinical diagnostic purposes.

Cautions in use

1. This equipment is a precision instrument. Handle it with care and avoid subjecting it to a sudden or severe impact.
2. Never disassemble any part of the product. Otherwise, failure could be caused.
3. Do not use this equipment in areas where it may be subjected to direct sunlight, high temperature and humidity, dust or vibrations. For use environment, refer to 10 Specifications on p.94.
4. The cables are vulnerable to bend or twist. Do not apply excessive force. When connecting cables, make sure of the orientation to insert them.
5. 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.

Image data

1. The recorded image data may be lost (destroyed) in the following cases. Olympus is not liable for the loss (destruction) of recorded data.
    - When the user or a third party used the recording media such as USB memory, etc. incorrectly.
    - When the user or a third party carried out a repair to the product.
    - When the recording media such as USB memory, etc. is affected by static or electric noise.
    - When following actions were taken while Windows® or the control box is recording to the recording media such as USB memory, etc. or while deleting (initializing).
        - Disconnect the recording media or cables, etc.
        - Shutdown the system.
        - Set the main switch to OFF.
        - Unplug the AC adapter.
        - Unplug the power cord.
    - When the data have been kept saved in the recording media such as USB memory beyond data storage life (approx. from one to several years).
    - When the product failed.
2. If following phenomena occur even though the camera is working properly, images cannot be restored and the damages are not compensated.
    - The image is abnormal.
    - File properties such as file names, file time, etc. are abnormal.
    - The image was lost.

◎ In general, as there is a data storage lifetime in the recording media, such as USB memory, HDD, CD-R, DVD-R, etc., the saved files may be lost after several years.

◎ The image data may be lost (corrupted) unexpectedly, so make frequent backups of the data you acquired. OLYMPUS shall have no liability for any damage (including compensation for the corrupted image data) from the use or incapable use of this product.

◎ Make sure that there is no problem when acquiring the subjects before acquisition. Even though the problem may occur by the acquired images, Olympus is not liable for these problems.

Guarantee of operation

If the following has been done, Olympus does not guarantee the operation of this product.

- Writing to the system disk (Windows® OS)
- Installing the software not pre-installed into this product, for example, antivirus software

Computer virus note

To prevent from computer viruses, DP2-SAL does not allow the unauthorized writing in the system area of the control box D2-CB.

However, it cannot completely prevent the infection of computer viruses that evolve on a daily basis. To prevent the contamination of computer viruses to the control box D2-CB, take following actions.

- For the recording media connected to DP2-SAL such as USB memory, etc., check viruses in advance. (DP2-SAL 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 to which DP2-SAL is connected.
- If by any chance, the computer virus is mixed or if there is a suspicion of contamination, turn OFF the main switch of the control box D2-CB and unplug the power cord from the outlet. By doing this, the RAM memory is cleared and the foreign file is deleted.
- If malfunctions or infectious symptoms are still noticed even though the above actions were taken, contact Olympus.

Olympus is not liable for malfunctions of DP22/DP27 or defects and damages to your PC or network environments caused by the computer virus.

Battery life

The lithium ion coin battery (CR2032) to maintain the calendar function is built in the control box D2-CB. The battery lifetime is between 1 and 6 years. (If the AC adapter is connected to the control box D2-CB, the battery consumption is reduced. Therefore, the lifetime differs.)

The camera can be used even though the battery runs out, but the calendar is reset each time when the AC adapter is removed.

If you need to replace the battery, contact Olympus.

Control box (D2-CB) fan

The control box D2-CB is equipped with a ventilation fan. Do not close the vent. Install the control box D2-CB away from the obstacles such as walls, etc. by 10 cm or more to get the sufficient air.

Using the control box keeping the vent closed will cause malfunctions or failures. If any foreign substance is entered from the vent, the fan may be damaged.

The number of rotation of the fan of control box D2-CB varies depending on the temperature within the system. 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 after long hours of using.
- Approximately 10 seconds at the beginning of startup

System compatibility

Restrictions in use

◎ Please also confirm the restrictions described in the instruction manual of the microscope digital camera you will use.

1. The image of dark specimen under the reflected fluorescence observation or the darkfield observation (DP27: Specimen that needs the exposure of 1/2 second or more at ISO100 equivalent. DP22: Specimen that needs the exposure of 1/2 second or more at ISO200 equivalent) cannot be acquired. 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 noticeable, but they are not things by the failure of the equipment.
2. Specimens with intensity distribution that is not suitable for the metering require using spot metering or exposure compensation.
3. When digital zoom is used for enlarging the image during focusing, roughness of the image may become noticeable with certain specimens.
4. If the brightness or the color of the left half of the live image is significantly different from those of the right half, calibrate the camera. For details, refer to “Camera Calibration (P.54)“.
5. When attaching/detaching USB equipments or when accessing USB equipments, the frame rate may be decreased or the image may be blurred temporarily.
6. 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 as shown in the table.
   DP22-CU:

Resolution	Exposure time (sec)	Frame rate (fps)
1920 x 1440	1/27	25
960 x 720 (Draft)	1/27	25
960 x 720 (Binning)	1/27	25

   DP27-CU:

Resolution	Exposure time (sec)	Frame rate (fps)
2448 x 1920	1/16	15
1224 x 960 (Draft)	1/33	30
1224 x 960 (Binning)	1/33	30

7. If the scale imprinting function or the measuring function is selected, the time to acquire the image is longer than normal.
8. When observing a specimen which contains little white area, the traceability of auto white balance is deteriorated.
9. ”Format of recording media” usable with the control box D2-CB is FAT or FAT32. Other file systems are not supported. When using the recording media in an unsupported format, format it to FAT or FAT32 by using PC.
10. If you use the USB memory equipped with special functions including security function or password lock function, etc., enter the password using Windows® Explorer. For details, refer to ”Canceling password lock of USB recording media (P.88)”.
    Also, when connecting the USB equipped with security function, the destination to save files must be set manually. For details, refer to ”Setting save folders (P.46)”
11. When viewing the acquired images saved in the recording media in NTFS format such as USB-HDD (external hard disk for connecting USB), etc. with PC, the acquisition date/time may not be correct. Set the same time zone to DP2-SAL and PC, or format the recording media such as USB-HDD, etc. in FAT32 format.

12. Depending on the recording media's speed to write images, etc., the frame rate to record movies may be reduced or frames may be jumped. Connect the recording media (HDD/SSD) applicable for USB 3.0 to the USB 3.0 connector of the control box D2-CB for acquiring movies. If there is not sufficient space in the recording media (HDD/SSD), frames may be jumped frequently when you start recording the movie. If the frames are jumped, the movie is played as if fast-forwarded.

Devices connected to the control box.

1. USB devices other than described below do not work even though they are connected to the control box D2-CB.
   Connectable USB device : USB recording media such as USB memory, etc. USB mouse, USB keyboard
   When connecting equipment that need special drivers or equipment that need the Windows® Explorer function for operations, refer to "Installing special device driver (P.86)".
2. Requirements for network connection are described below.
   Applicable PC : DOS/V AT compatible
   Applicable OS : Microsoft® Windows® 8 (32-bit / 64-bit), Microsoft® Windows® 7 (32-bit / 64-bit)
   Standard : In accordance with IEEE802.3 (10BASE-T Ethernet), IEEE802.3u (100BASE-TX Fast Ethernet)
   Applicable protocol : In accordance with TCP/IP (IPv6 is not supported yet.)
   Connector shape : RJ-45 type 8-port connector
   Transmission speed : 10Mbps (10BASE-T Ethernet) / 100Mbps (100BASE-TX Fast Ethernet)
   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 available for full color view of 1024 x 768 or better

Maintenance and storage

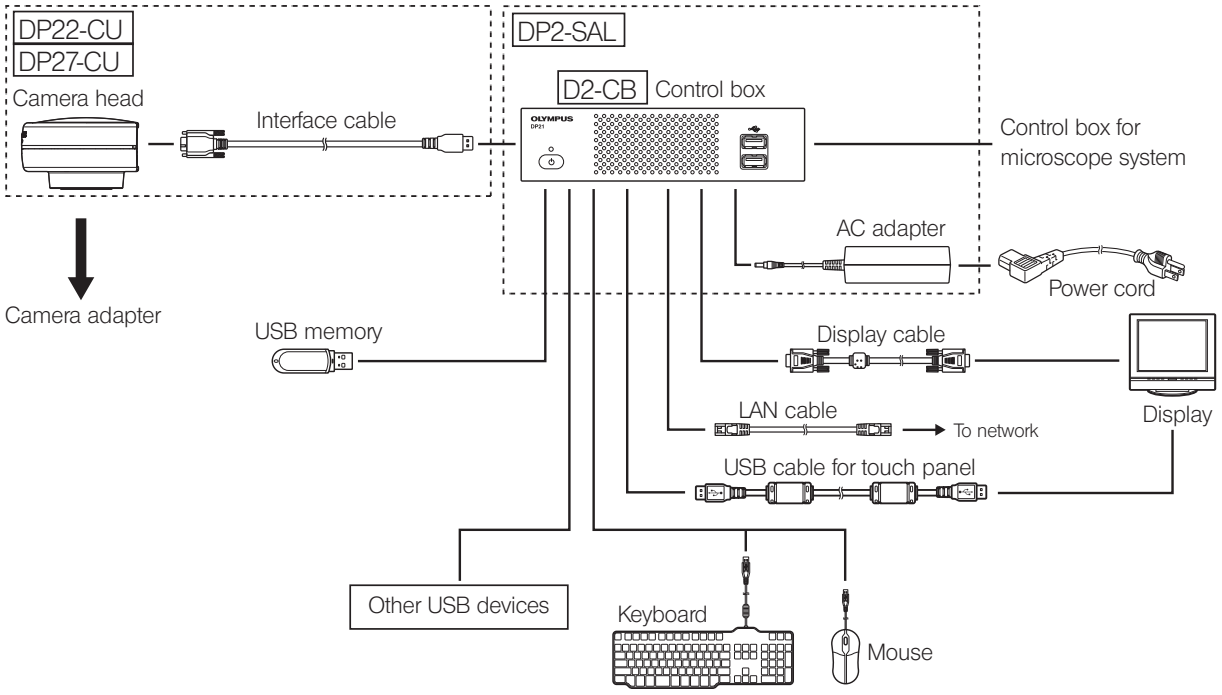
⚠ CAUTION **Since the absolute alcohol is highly flammable, it must be handled carefully. Be sure to keep it away from open flames or potential sources of electrical sparks – for example, electrical equipment that is being switched on or off, which could cause ignition of a fire.**
Also remember to always use absolute alcohol only in a well-ventilated room.

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

CAUTION **Do not use organic solvents to clean the parts since it deteriorates painted surfaces or plastic parts.**

2. When disposing of this product, be sure to follow the regulations and rules of your local government. Particularly, note that the lithium ion coin battery (CR2032) is built in the control box D2-CB. For any inquiry, contact Olympus.
3. When smoking the room for cleaning, etc., move the DP2-SAL to a place not exposed to smoke.
4. Be careful about generation of dew condensation, as this may cause failure of the product. Dew condensation is the phenomenon that the vapor in the air contacts the surface of a metallic plate, etc. and condensates to water drops. When the temperature suddenly changes, the dew condensation may be generated, for example when the control box D2-CB is suddenly brought from cold place to warm place.

1 System diagram



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

◎ The image color setup matching the microscope is required for faithful color reproduction. For details, refer to p.34.

◎ Consult Olympus for the compatible microscope and camera adapter.

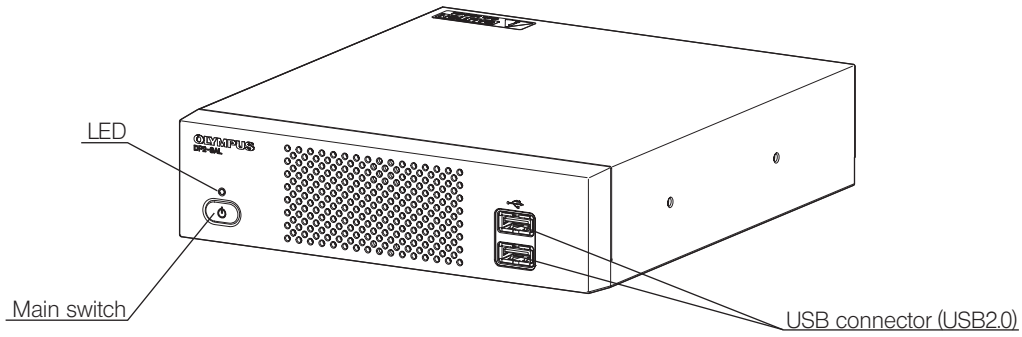
◎ Do not use the interface cable for the other purpose than intended use.

2 Nomenclature of respective portions

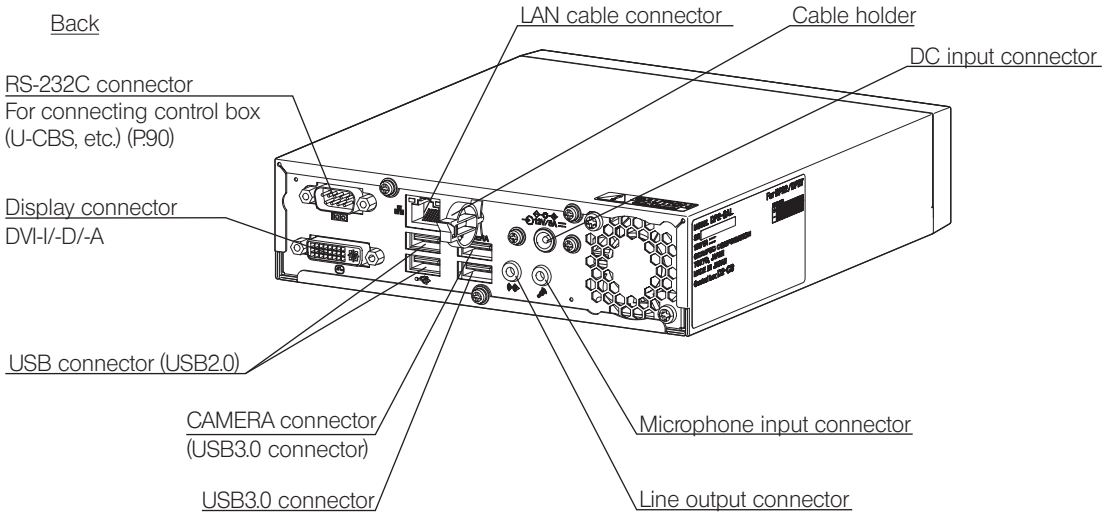
2-1 Hardware controls

Control box D2-CB

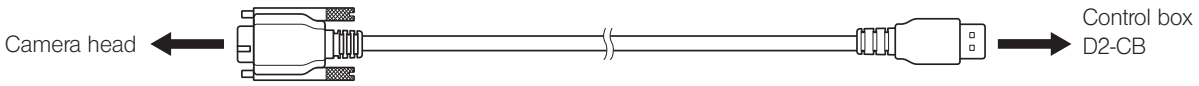
Front



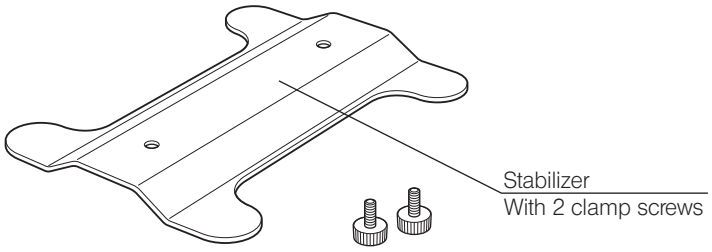
Back



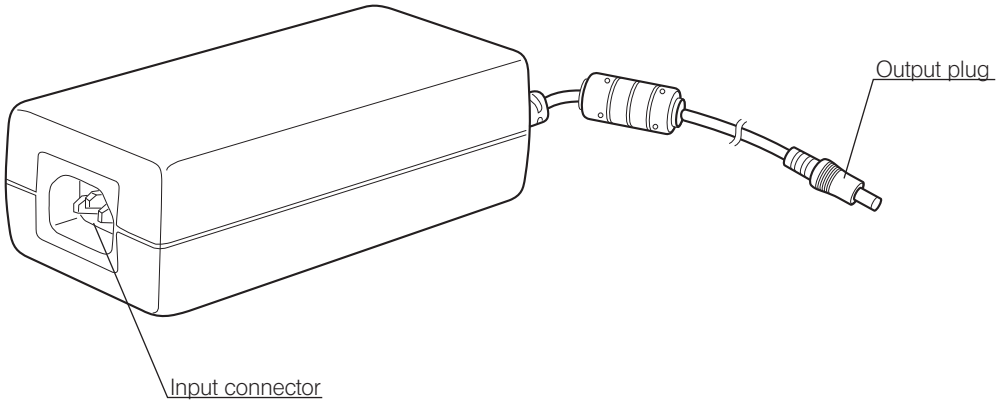
Interface cable



Upright stabilizer



AC adapter



2-2 Control window

Turn ON the main switch of the control box D2-CB to start the camera control software. The camera control software is displayed in the upper right area of the display window. In the Control window, Controller tab, Play tab, Info tab, and Menu tab are shown.

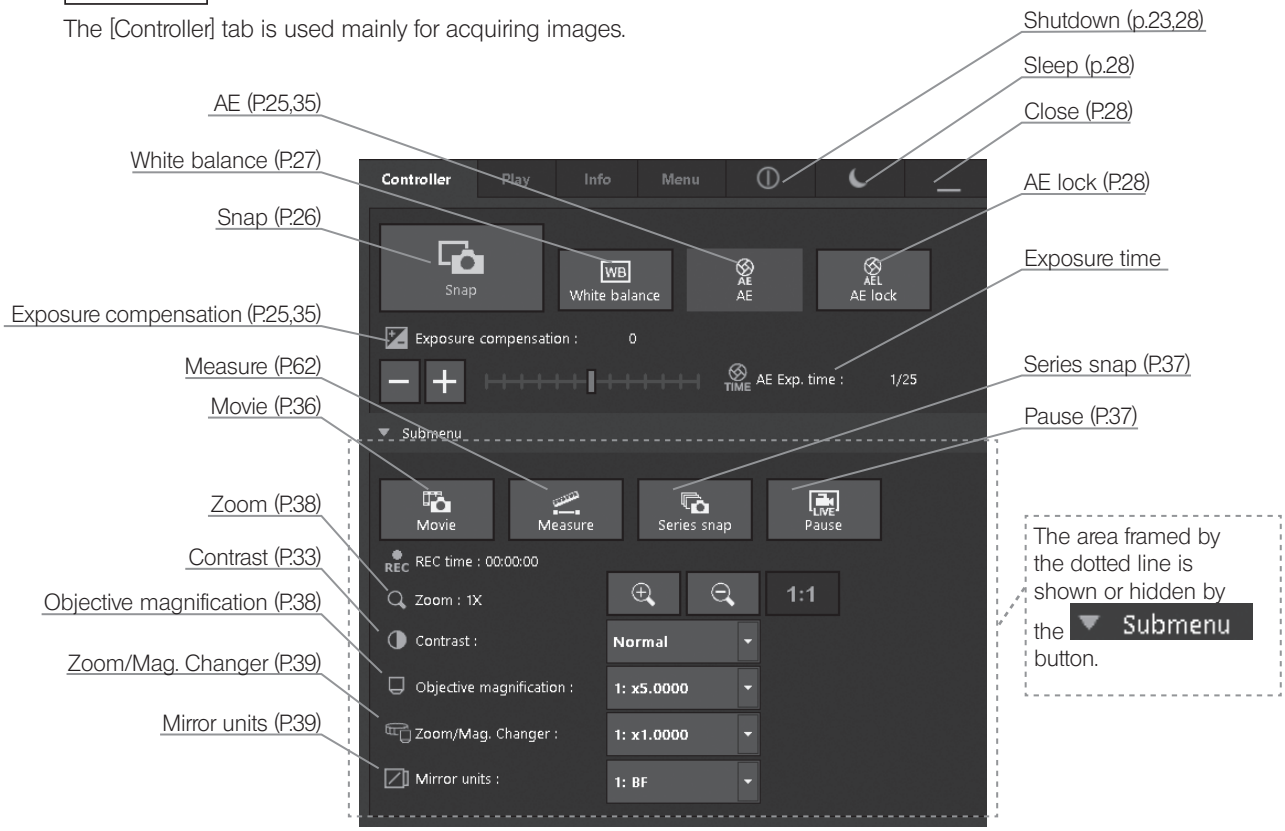
Status when the button is pressed

There are buttons which change the setting status with the same button. The setting status 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.

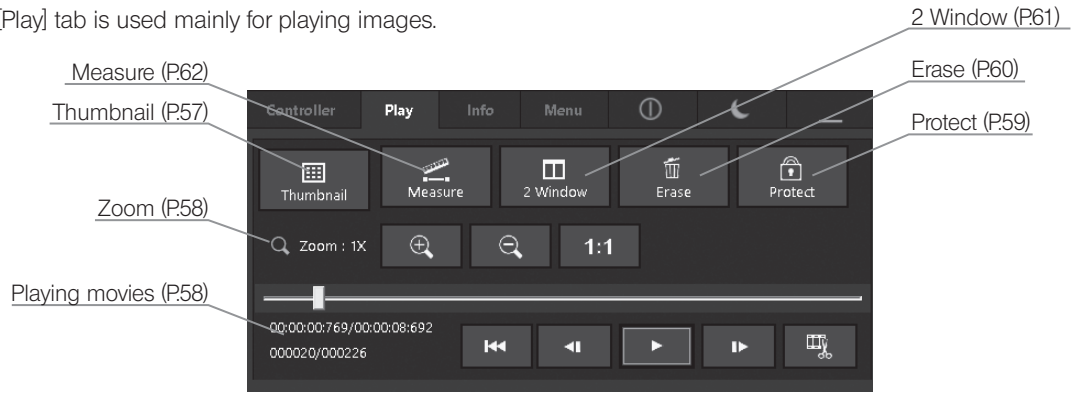
Controller tab

The [Controller] tab is used mainly for acquiring images.



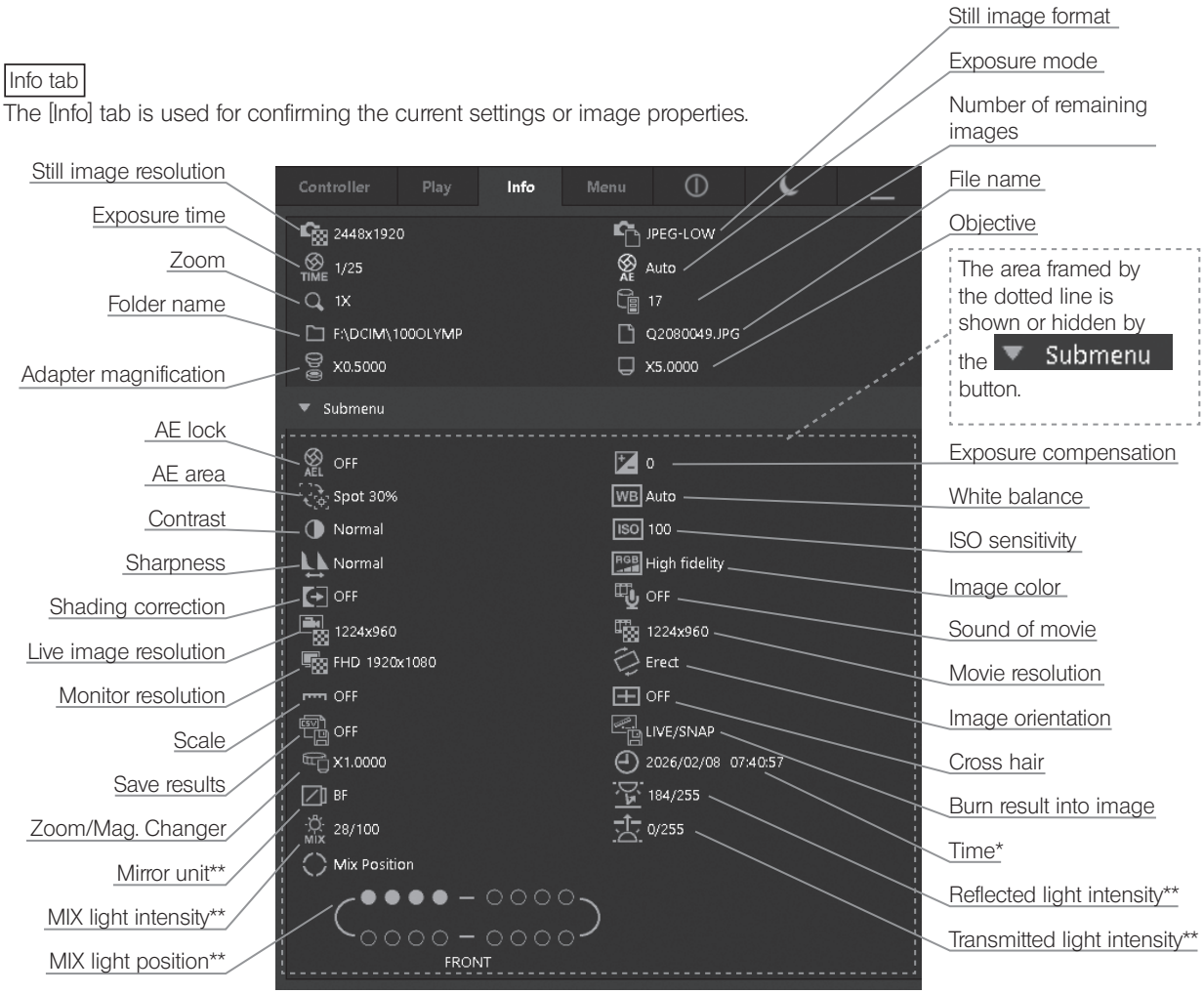
Play tab

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



Info tab

The [Info] tab is used for confirming the current settings or image properties.



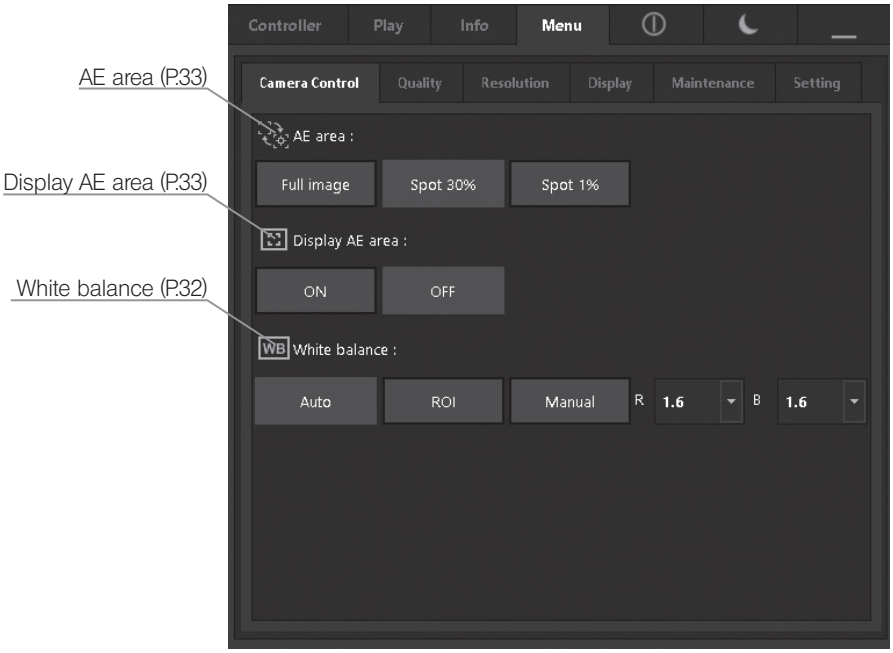
* If you change from the [Controller] tab to the [Info] tab, [Time] shows the current time. If you change from the [Play] tab to the [Info] tab, [Time] shows the acquisition time of the image selected in the [Play] tab.

** Displayed if the applicable product is combined.

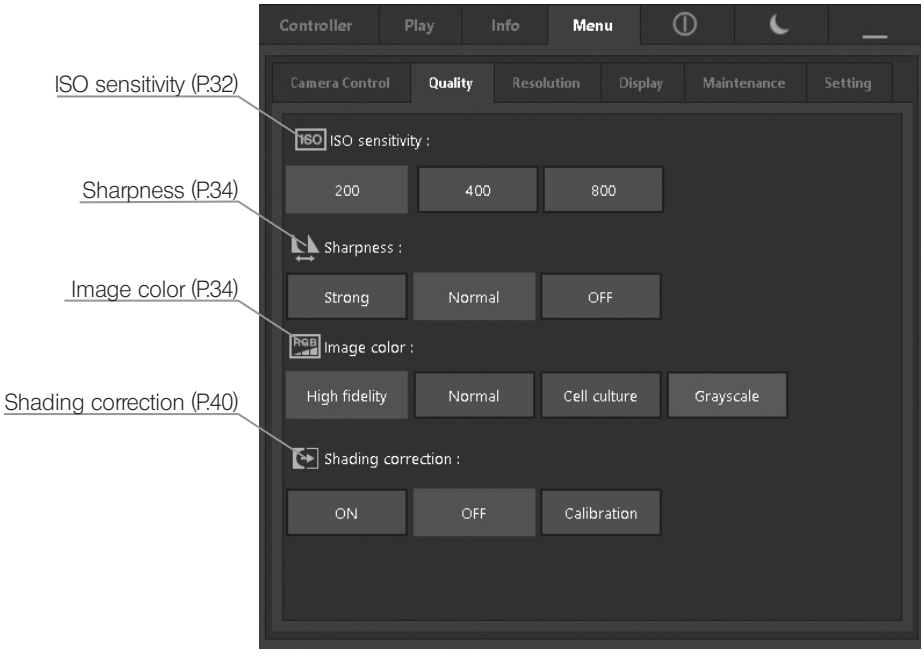
Menu tab

The [Menu] tab is used for changing the settings.
In [Menu] tab, there are [Camera control] tab, [Quality] tab, [Resolution] tab, [Display] tab, [Maintenance] tab and Setting tab.

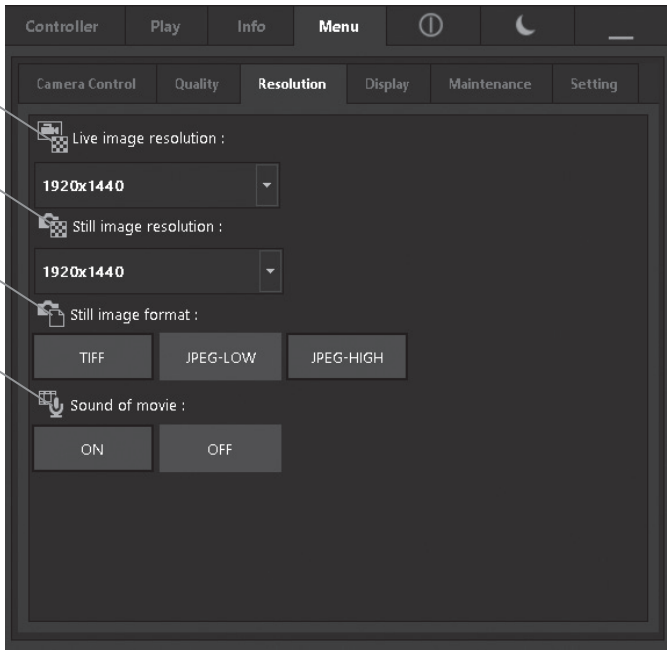
Camera control tab



Quality tab



Resolution tab



Live image resolution (P.29)

Still image resolution (P.30)

Still image format (P.31)

Sound of movie (P.42)

Display tab

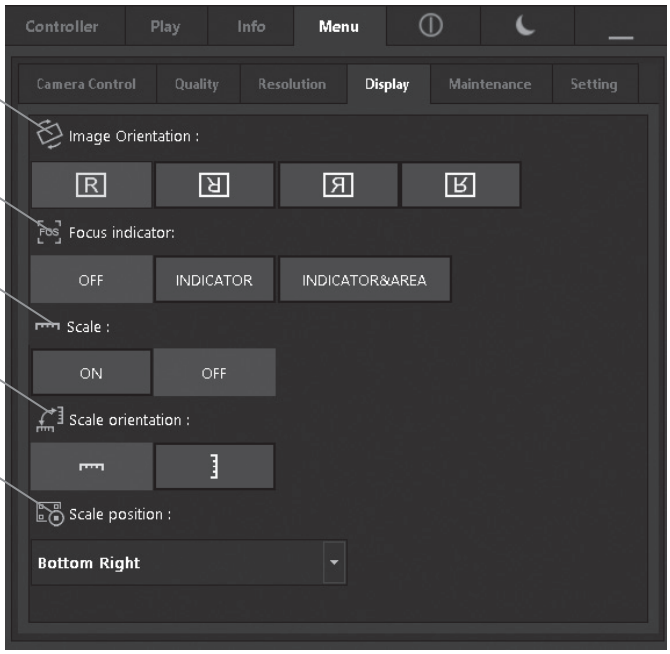


Image orientation (P.43)

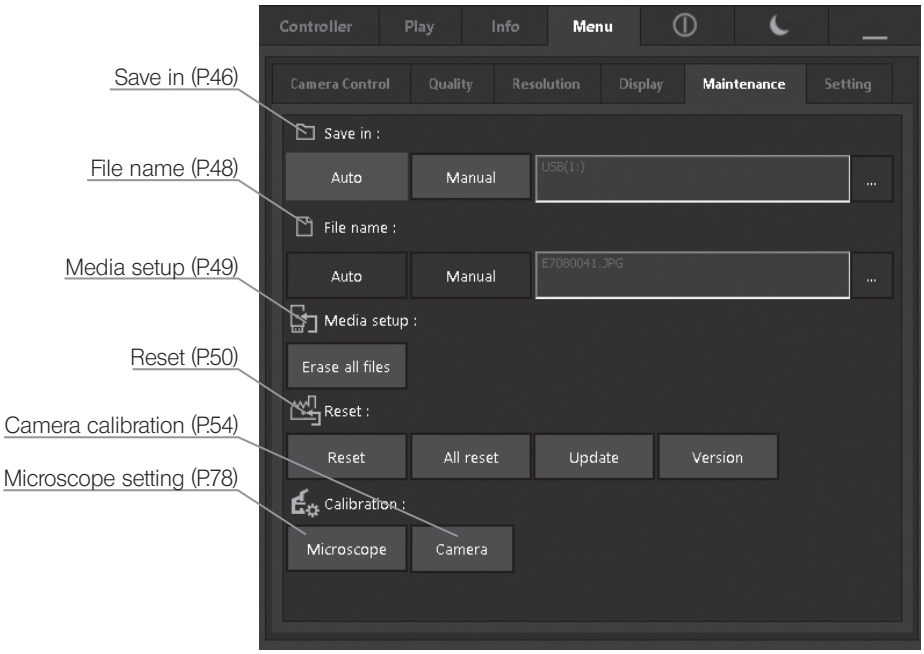
Focus indicator (P.43)

Scale (P.45)

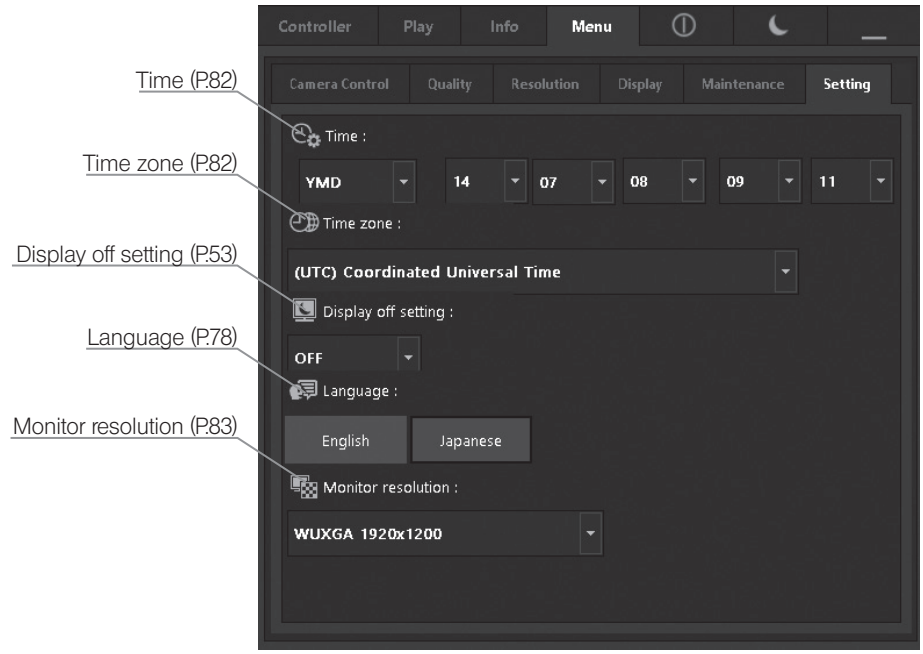
Scale orientation (P.45)

Scale position (P.45)

Maintenance tab



Setting tab

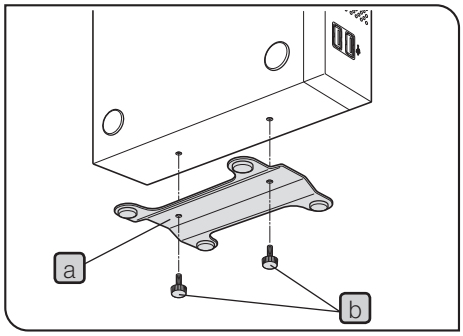


3 Assembly

This section describes only the procedures to assemble the control box (D2-CB). For detailed descriptions of the microscope, camera head and camera adapter, etc. to be used together, refer to the relevant instruction manual, and assemble them with careful attention.

⚠CAUTION **Be sure to turn OFF the main switch of the control box D2-CB during assembly.**

1 Installing the control box D2-CB



◎ The control box D2-CB can be installed whether horizontally or vertically.

◎ Do not place a heavy object weighing over 10 kg or an object that would make the installation unstable on the control box D2-CB.

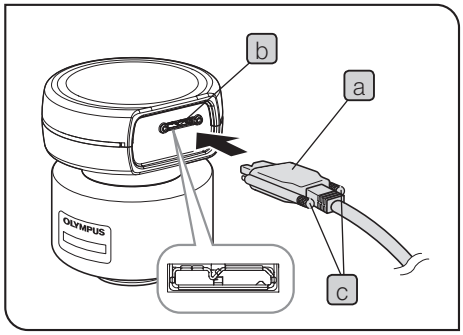
Horizontal installation

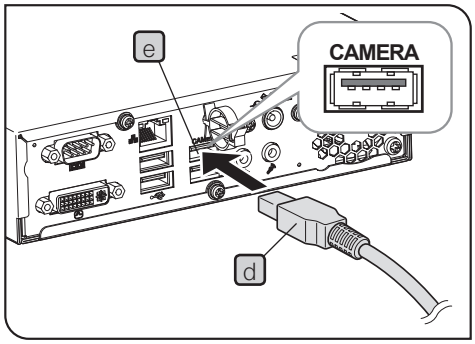
Place the rubber feet surface of the control box D2-CB on the table surface.

Vertical installation

Attach the stabilizer [a] provided with the control box D2-CB on the side of the control box D2-CB using the provided screws [b]. Always use the provided stabilizer for vertical installation.

2 Connecting the interface cable





CAUTION **• Always use the interface cable (USB 3.0 cable) provided by Olympus. Using commercially available USB 3.0 cables or hubs does not guarantee the operations of the equipment.**

• The interface cable is vulnerable to bend or twist.

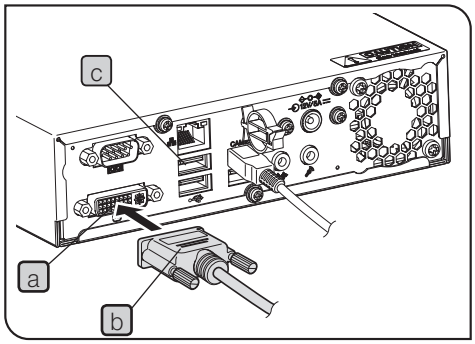
• Connect the interface cable in the correct orientation paying attention to the shape of the connector.

1 Connect the connector [a] of the interface cable to the connector [b] of the camera head, and tighten the lock screw [c] (2 positions). Make sure that the interface cable is secured completely.

CAUTION **Be sure to tighten the lock screws with your hand. If you use the tool to tighten the lock screws too firmly, the screw area 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 Camera connector [e] of the control box D2-CB.

◎ If the interface cable is connected to the USB 2.0 connector, the camera head does not work.



3 Connecting the display cable

1 Connect the connector [b] of the display cable to the connector [a] of the control box D2-CB, and tighten the fixing screws.

◎ Use a DVI cable matching the display as the display cable.

When using a touch panel display

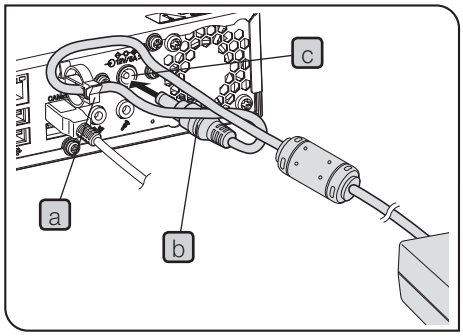
The USB cable for the touch panel must be connected in addition to the display cable. For details of connecting procedure, refer to “Connecting USB devices (P.20)“.

Depending on the display to be connected, it may be necessary to install the special driver. For installation procedures, refer to ”Installing special device driver (P.86)”.

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

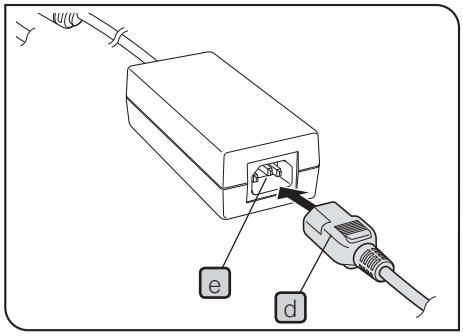
4 Connecting the AC adapter

⚠CAUTION
- **Always use the AC adapter and the power cord provided by Olympus. Use of any other AC adapter may cause a malfunction. 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.**
- **Make sure to connect 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.**

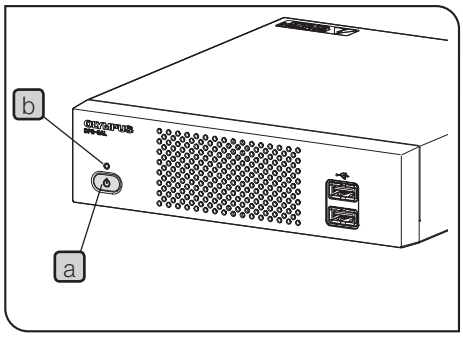


CAUTION **The cords are vulnerable to bend or twist.**

1. Pass the cable of the AC adapter through the cable holder [a] of the control box D2-CB and close the cable holder [a] securely. Passing the cable through the cable holder [a] will prevent the cable from easily disconnecting from the control box.
2. Insert the output plug [b] of the AC adapter into the DC input connector [c] of the control box D2-CB.
3. Insert the connector [d] of the power cord into the input connector [e] of the AC adapter securely.
4. Connect the power cord plug to a wall power outlet.



◎ The AC adapter or the control box D2-CB generate heat after long hours of use, but this is not malfunction.



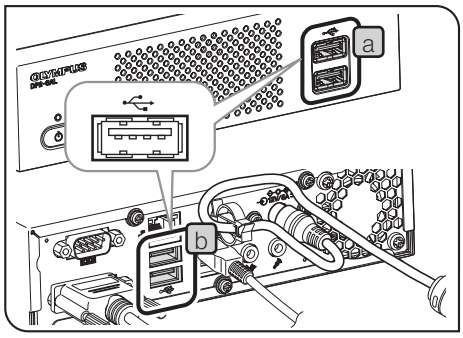
Disconnecting the AC adapter

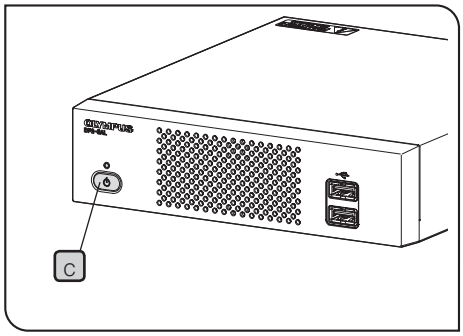
Press the main switch a of the control box D2-CB to terminate it. Make sure that the LED b is OFF completely (after approx. 10 seconds) and disconnect the AC adapter.

CAUTION **Disconnecting the connector while LED b is ON will cause a failure.**

⚠CAUTION

- **Do not use the AC adapter when the output plug is not inserted completely.**
- **Never remove 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, unplug the power cord immediately and stop using the AC adapter. Also contact Olympus immediately.**
- **Never use AC adapters which are not provided by Olympus. The control box D2-CB or the camera head may be damaged or an unexpected accident such as fire may occur. We are not liable for any damage caused by using an AC adapter which is not provided by Olympus.**
- **Never stretch out, bend or twist the cord of the AC adapter forcibly. Also never extend it by adding 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 Olympus immediately.**
- **If 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.**





5 Connecting USB devices

Connect recording media such as USB memory, etc., and USB devices such as USB cable for touch panel, USB mouse or USB keyboard, etc.

1 Insert the USB device to the USB connector (front a or back b) of the control box D2-CB.

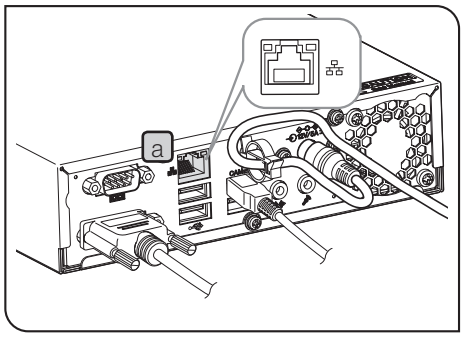
CAUTION
- **Be sure to turn OFF the main switch c of the control box D2-CB before connecting or disconnecting the recording media such as a USB memory, etc. or USB devices.**
- **The control box D2-CB cannot be connected to PC by using USB. For example, if you want to transfer the image in the USB memory connected to the control box D2-CB, connect the USB memory to the PC directly to transfer (copy, etc.) the image.**

◎ The control box D2-CB has two USB 2.0 connectors each on the front and the back and two USB 3.0 connectors (one of them is for camera) on the back. Be sure to connect devices applicable for USB 3.0 to the USB 3.0 connector.
For the USB 3.0 connector position, see “Hardware controls (P.9)”.

◎ If you use the USB memory equipped with special functions including security function or password lock function, etc., enter the password using Windows® Explorer. For details, refer to ”Canceling password lock of USB recording media (P.88)”.
Also, when connecting the USB equipped with security function, the destination to save files must be set manually. For details, refer to ”Setting save folders (P.46)”.

◎ When you use the USB mouse or the USB keyboard, prepare following devices satisfying compatibility standards or contact Olympus.
USB mouse: Applicable for Windows® 8 and USB 2.0
USB keyboard: Applicable for Windows® 8, USB 2.0 and the English keyboard

◎ When installing special device drivers such as the USB mouse or the USB keyboard, etc. to the control box D2-CB, use the Windows® function to install the special device drivers. For details, refer to “Installing special device driver (P.86)”.



6 LAN Connection

The LAN connection is necessary only when saving the acquired images by accessing the PC on the network from the control box D2-CB. When saving the acquired images to the recording media such as USB memory, etc., LAN connection is not necessary.

1 Insert the LAN cable to the LAN connector [a] on the back of the control box D2-CB.

◎ When connecting to the network, you need to set the network in addition to the connection of LAN cables. For network settings, refer to p.84.

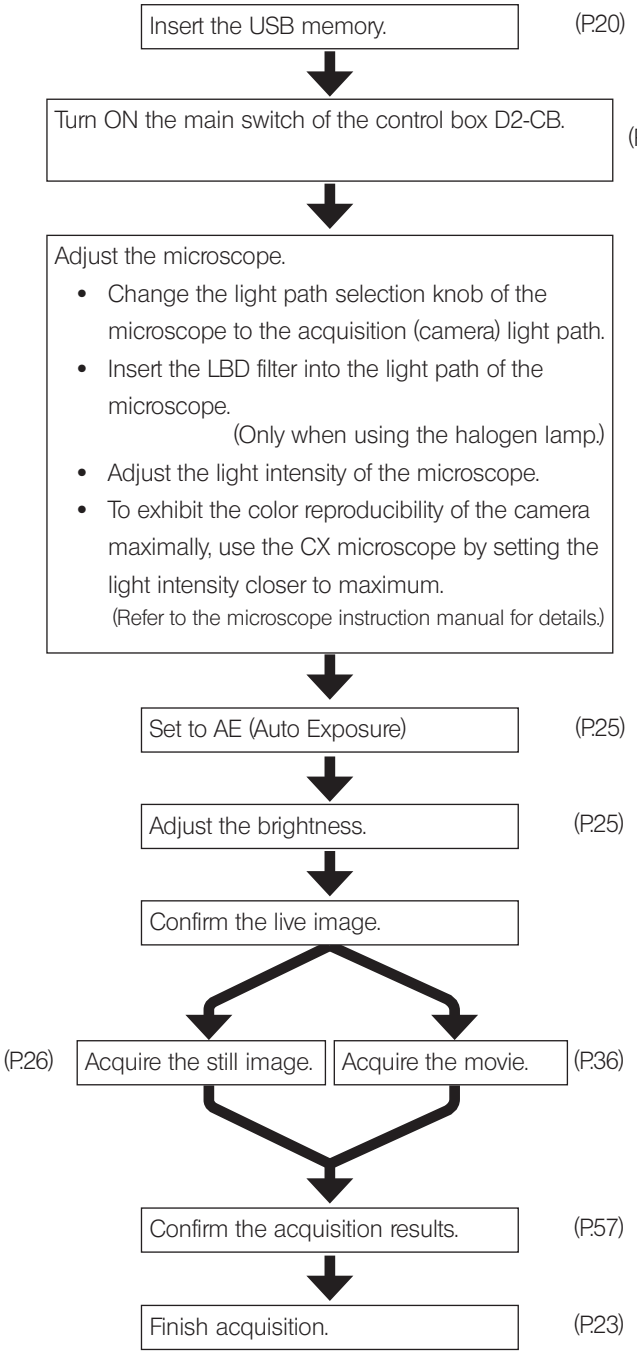
4 Acquisition

4-1 Basic operations

This section describes the basic operating procedures (from turning ON the power to acquisition).
You can acquire basic still images and movies only by descriptions in this section.

◎ Perform the optical adjustment of the microscope sufficiently.

◎ Use the camera adapter to perform the parfocal adjustment of the eyepiece of the microscope and the live image. (For parfocality adjustment procedures, refer to the instruction manual of the camera adapter.)



Cautions for initial settings

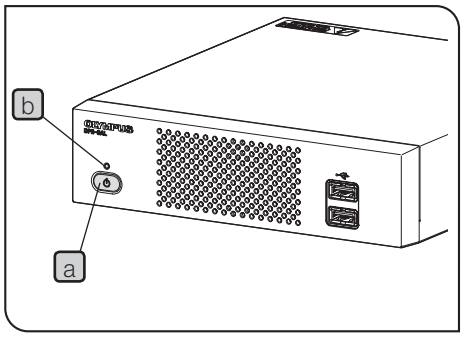
In the initial settings, disconnect the recording media connected to the control box D2-CB such as a USB memory, etc. until the restart (automatic) after settings is completed.

TIP (Adjusting the focus)

- The zoom of the live image can be changed from 1x -> 1:1 (actual size) -> 2x -> 4x. The focus can be adjusted easier with high magnification. (P.38)
- Showing the focus indicator on the display allows you to identify the best focus position easily. (P.43)
- If the light is too bright, reduce the light using the ND filter.

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

- Set the image quality (P.32 to P.34), AE area (P.33) or AE lock (P.28) as needed.
- The brightness or the tint of the live image shown on the display may be different from those actually acquired or recorded.

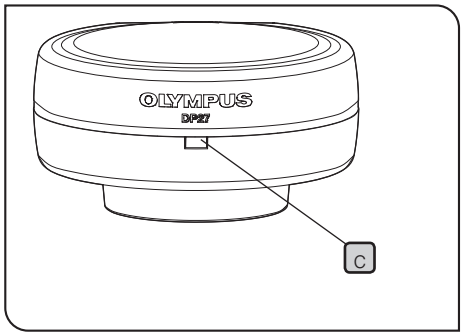


1 Start and exit system

Start system

1 Press the main switch a of the control box D2-CB to turn ON the power.
The system starts and the LED b of the control box D2-CB and the LED c of the camera head are turned ON. The control window is displayed on the display. (Time taken for start: approximately 30 sec.)

◎ If the system is used for long hours without terminating the system, the operation of the control box D2-CB may become unstable.
We recommend you to terminate the system once a week or so regularly to protect the system.



Exit system

1 Press the [Shutdown] button d in the upper right area of the control window. The system is terminated and the power of the control box of DP2-SAL is turned OFF. (Time taken for shutdown: approximately 10 sec.)
The LED b of the control box D2-CB and the LED c of the camera head are turned OFF.

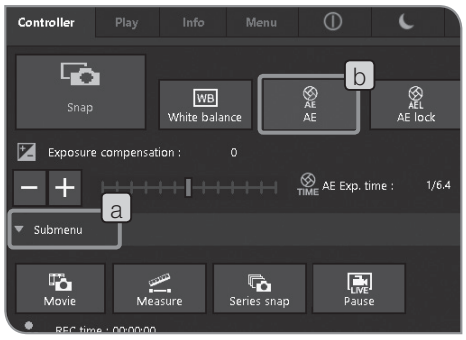
◎ You can also terminate the system by pressing the main switch a of the control box D2-CB.
In this case, be careful not to long-press (press continuously for 4 or more seconds) the main switch a.
If you long-press the main switch to turn OFF the power, the control box D2-CB will be terminated forcibly and the various settings or the scale function may not be saved.

◎ In order to protect the system, if you are not using the system, terminate the system as much as possible.

While operating the control box D2-CB,
if the power of the camera head is turned OFF:

Turn ON the main switch of the control box D2-CB to energize the camera head.

While operating the control box D2-CB, if the interface cable is disconnected by mistake, the power of the camera head is turned OFF and it becomes the status that the camera head is not connected, and an error message appears. In this case, press the main switch of the control box D2-CB to terminate the system. Then, connect the interface cable again and press the main switch of the control box D2-CB to restart the system.

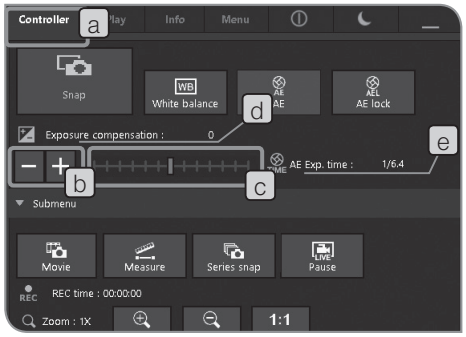


2 Selecting exposure mode

1 If the setting items of Submenu on the [Controller] tab are not displayed, Press [Submenu] [a] to open them.

2 Press the [AE] button [b] to select "Auto" or "Manual". For procedures to set the exposure when "Manual" is selected, refer to "Manual exposure acquisition (P. 35)".

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



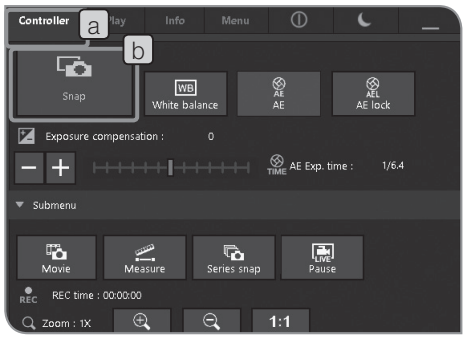
3 Exposure compensation

When Auto exposure mode is selected:

The exposure time specified by AE (Auto Exposure) can be compensated. ("+ compensation" is available up to 1/6EV step + 1EV and "- compensation" is available up to 1/3EV step -2EV.) 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 [Controller] tab [a].

2 Press the + or − button of [Exposure compensation] [b] or move the bar [c] to set the exposure compensation values. The exposure compensation value is displayed in [d] and the exposure time is in [e] respectively.



4 Acquiring still images

1 Select the [Controller] tab a.

2 Operate the microscope to frame the position you want to acquire and bring it into focus.

> TIP
> Performing "Zoom the live image (P.38)" or "Display the focus indicator (P.43)" allows you to bring images into focus easily.

3 Press the [Snap] button b to acquire and save images. The images are saved in the recording media attached to the control box D2-CB such as a USB memory, etc .

◎ The still images can also be acquired by operating ("double-clicking") the mouse. When the keyboard is connected, the image can also be acquired by pressing the [F8] key.

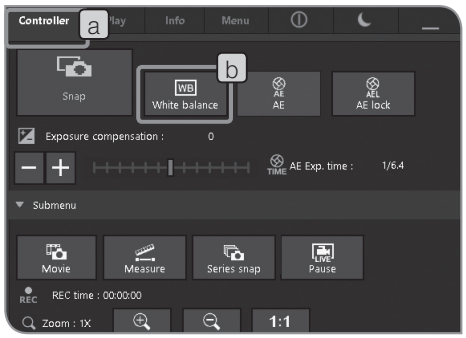
◎ The folder names and file names of acquired images are created automatically. For details, refer to "Folder names and file names (P.48)"

> TIP
> The save destination of images can be changed (P.46). If the save destination is specified in advance, images can be saved in PC on the network during acquisition.

◎ The number of remaining images is displayed on the [Info] tab.

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

CAUTION
- **After the still image is acquired, the image data is recorded in the recording media such as a USB memory, etc. Do not disconnect the recording media while recording.**
- **As the data volume differs depending on acquisition objects, you may be able to acquire more images than the number of remaining images. Also, the number of counts may not be decreased after acquisition or the number of remaining images may not be increased even though one frame is deleted.**
- **The number of remaining images differs depending on the recording media.**
- **The recording media have life time. Depending on the recording media status, the remaining capacity may be reduced.**



5 ROI White Balance

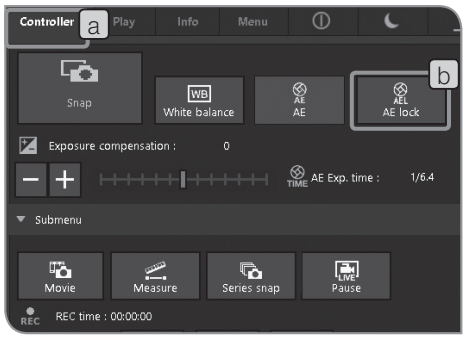
Adjusting the white balance before acquisition allows you to acquire images in appropriate colors.
This product is equipped with the function to adjust the white balance automatically. This function is enabled in the initial setting. However, depending on light source types or specimens, the white balance cannot be adjusted automatically.
In such a case, use ROI White Balance.

1. Select the [Controller] tab (a).
2. Press the [White balance] button (b).
3. Specify the white area in the live image.
   Start dragging to show the red area.
   When you finish dragging, the area is identified and the white balance is enabled.

◎ If you fail in settings, the message "The white balance settings failed." appears. Press the [OK] button to delete the message and 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.

◎ If you press the [White balance] button, the white balance mode is changed to ROI. There are Auto White Balance and Manual White Balance in addition to ROI White Balance. You can change the white balance mode using the [Camera Control] tab in the [Menu] tab. For details, refer to "Setting white balance (WB) mode (P.32)".



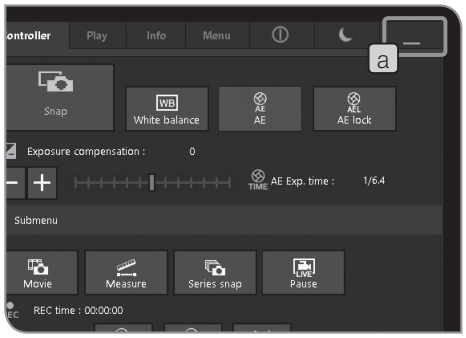
6 Setting AE lock

When Auto exposure mode is selected:

With AE (Auto Exposure), when observing the specimen where observation objects are scattered, the exposure time may be increased/decreased to allow the live image brighter or darker in association with stage operation. In this case, enable AE lock to observe specimens with the constant brightness.

1. Select the [Controller] tab [a].
2. Press the [AE lock] button [b] to select Fix or Cancel the exposure time.

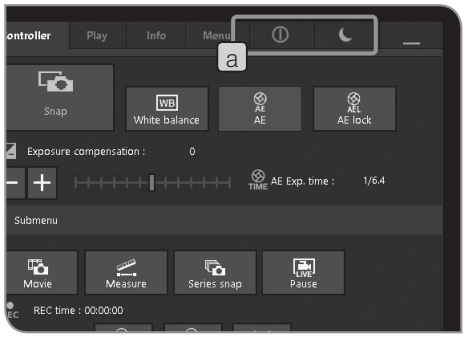
◎ When AE lock is enabled, the AE area and the ISO sensitivity cannot be changed and the exposure time cannot be compensated.



7 Show/Hide control window

1. Operate with the [a] button.

Button	Function
—	The control window is hidden.
⤢	The control window is shown again. (Upper right area of the display)



8 Shutdown and Sleep

1. Operate with the [a] button.

Button	Function
⏻	The system is terminated and the main switch of the control box of DP2-SAL is turned OFF.
☾	DP2-SAL is in sleep status (operations are paused). If you click the mouse or touch the touch panel display, DP2-SAL resumes operations immediately.

4-2 Basic settings

This section describes the settings related to acquisition.

1 Setting live image resolution

1 Select the [Menu] tab [a] and select the [Resolution] tab [b] in the tab displayed.

2 Press the ▼ button of [Live image resolution] [c] to select resolutions described below in the list.

	DP22	DP27
High resolution	1920 x 1440 Frame rate: 25 fps	2448 x 1920 Frame rate: 15 fps
Low resolution	960 x 720 Frame rate: 25 fps	1224 x 960 Frame rate: 30 fps
Binning	960 x 720 Binning Frame rate: 25 fps	1224 x 960 Binning Frame rate: 30 fps
Full HD	1920 x 1080 Frame rate: 30 fps	1920 x 1080 Frame rate: 22 fps

High resolution:

The high definition image observation and acquisition are available. This is suitable for displaying clear images on the large display.

Low resolution:

The image size can be smaller than the high resolution. When using DP27, the frame rate can be higher than the high resolution. The smooth live image can be displayed even though the observation objects are moving in the tests, etc.

Binning:

The sensitivity is higher comparing to other modes. This is suitable for observing the dark image at high frame rate.

Full HD:

The images can be observed and acquired in full high-vision size. This is suitable for observing with the full high-vision display.

◎ 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. 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 setting the display resolution, refer to (P.83).

2 Setting still image resolution

1 Select the [Menu] tab [a] and select the [Resolution] tab [b] in the tab displayed.

2 Press the ▼ button of [Still image resolution] [c] to select resolutions described below in the list.

	DP22	DP27
High resolution	1920 x 1440	2448 x 1920
Low resolution	960 x 720	1224 x 960
Binning	960 x 720 Binning	1224 x 960 Binning
Full HD	1920 x 1080	1920 x 1080

High resolution:

The high definition image observation and acquisition are available. This is suitable for displaying clear images on the large display.

Low resolution:

This is suitable if you want to make the image file size small.

Binning:

The sensitivity is higher comparing to other modes. This is suitable for acquiring the dark image in a short exposure time.

Full HD:

The images can be observed and acquired in full high-vision size. This is suitable for observing with the full high-vision display.

3 Setting still image format

1 Select the [Menu] tab [a] and select the [Resolution] tab [b] in the tab displayed.

2 Press the [Still image format] [c] button to select resolutions described below in the list.
The file size for the file type per resolution is described below.

DP22 :

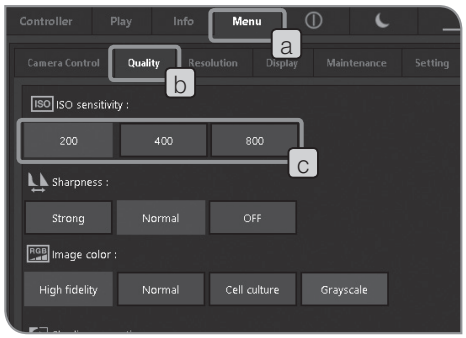
File type / Resolution	TIFF	JPEG-LOW	JPEG-HIGH
1920 x 1440	8300 KB or less	3100 KB or less	1100 KB or less
960 x 720	2300 KB or less	860 KB or less	290 KB or less
960 x 720 Binning	2300 KB or less	860 KB or less	290 KB or less
1920 x 1080	6220 KB or less	2330 KB or less	780 KB or less

DP27 :

File type / Resolution	TIFF	JPEG-LOW	JPEG-HIGH
2448 x 1920	14100 KB or less	5230 KB or less	1770 KB or less
1224 x 960	3530 KB or less	1310 KB or less	445 KB or less
1224 x 960 Binning	3530 KB or less	1310 KB or less	445 KB or less
1920 x 1080	6220 KB or less	2330 KB or less	780 KB or less

◎ Compression rate
TIFF: Uncompressed,
JPEG-LOW: 1/2.7 (Low compression),
JPEG-HIGH: 1/8 (High compression)

◎ The image quality is higher in the order from JPEG-HIGH, JPEG-LOW to TIFF (TIFF is the highest).



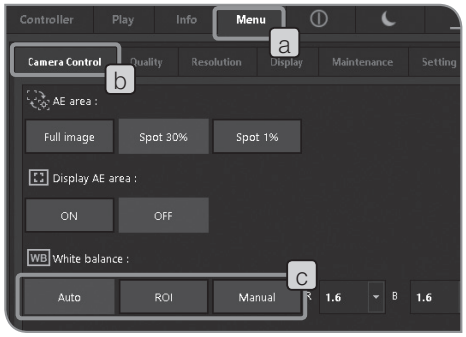
4 Setting ISO sensitivity

The ISO sensitivity can be set. The sensitivity is set based on the sensitivity of the photographic film. There are following types of sensitivity. The large the value is, the more it is suitable for acquiring dark specimens or fast-moving objects.

	DP22	DP27
ISO sensitivity	200, 400, 800	100, 200, 400

CAUTION **The larger the ISO value is, the more it is suitable for acquiring dark specimens, but more noises are noticeable. Select the appropriate ISO sensitivity according to the situation.**

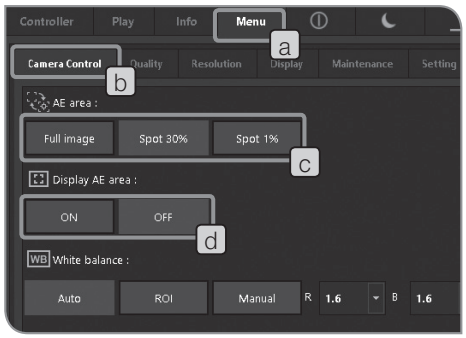
1. Select the [Menu] tab [a] and select the [Quality] tab [b] in the tab displayed.
2. Press the [ISO sensitivity] [c] button to select.



5 Setting white balance (WB) mode

1. Select the [Menu] tab [a] and select the [Camera Control] tab [b] in the tab displayed.
2. Press following buttons of [White balance] [c] to change the white balance mode.

Button	Function
Auto	The white areas in the live image are identified and the white balance is adjusted automatically. If the brightness of the illumination light is changed, the white balance is adjusted automatically. However, if there are only few white areas in the live image, the white balance is not applied appropriately depending on types or the brightness of specimens. Therefore, the appropriate tint may not be obtained.
ROI	The white balance is adjusted so that the selected areas become white.
Manual	R Gain and B Gain are set individually and the white balance is adjusted according to your preference.



6 Setting metering area

When Auto exposure mode is selected:

If the observation objects are scattered on the window, the full window 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 area.

Normally, 30% of the enter area of the image is the metering area.

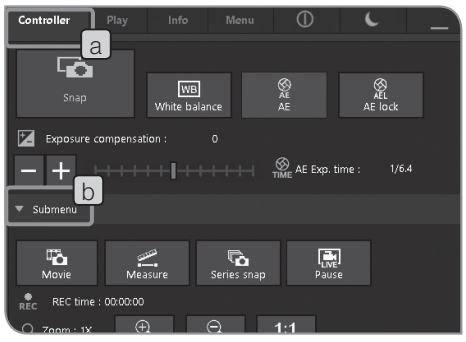
1 Select the [Menu] tab [a] and select the [Camera Control] tab [b] in the tab displayed.

2 Press the following buttons of [AE area] [c] to select the metering area.

Button	Function
Full image	Full window
Spot 30%	Spot photometry 30% at the center of window
Spot 1%	Spot photometry 1% at the center of window

◎ Press [ON] button or [OFF] button of [Display AE area] [d] to select Show or Hide metering area on the display. For selection procedures, refer to "Setting AE area (P. 40)". When the [Display AE area] is set to OFF, if the [Spot 30%] button or the [Spot 1%] button of [AE area] is pressed, the metering area is displayed on the display for 3 seconds and will be hidden.

◎ The metering area position cannot be changed.

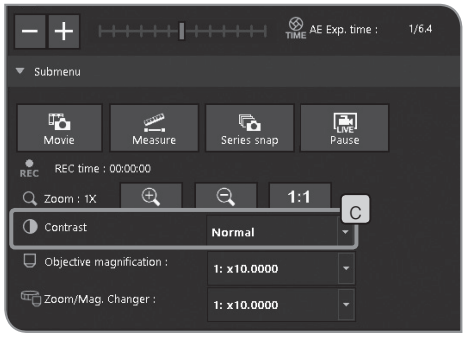


7 Adjusting contrast

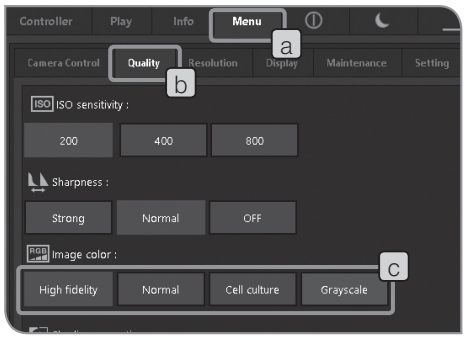
1 Select the [Controller] tab [a].

2 If the setting items of Submenu are not displayed, press [Submenu] [b] to open them.

3 Press the ▼ button of [Contrast] [c] to select the contrast level in the list.



Button	Function
Normal	The image with the standard contrast can be acquired.
Medium	The image with the medium contrast between "Normal" and "High" contrast can be acquired.
High	The image with the high contrast can be acquired.



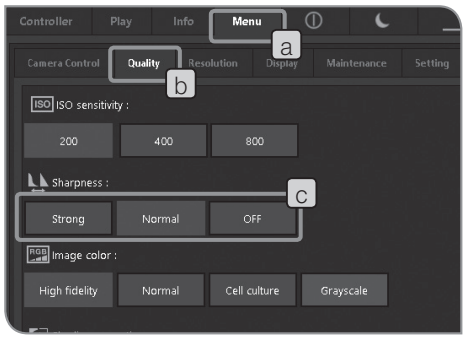
8 Setting image color

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

Button	Function
High fidelity	The color of the specimen is reproduced faithfully. Use this color mode if no problem.
Normal	This is a color mode with less chroma comparing to the high color reproduction mode. Select this level if you want to acquire the clear color image.
Cell culture	This is a color mode with less chroma. If you use this mode for the cell culture observation, phase contrast observation or differential interference observation, you can acquire even more natural images.
Grayscale	This is an achromatic color mode. Select this mode if you want to acquire the monochrome image.

1 Select the [Menu] tab [a] and select the [Quality] tab [b] in the tab displayed.

2 Press the [Image color] [c] button to select.



9 Setting sharpness

The sharpness is specified. The sharpness is a function to adjust the degree of emphasizing the outline of the image.

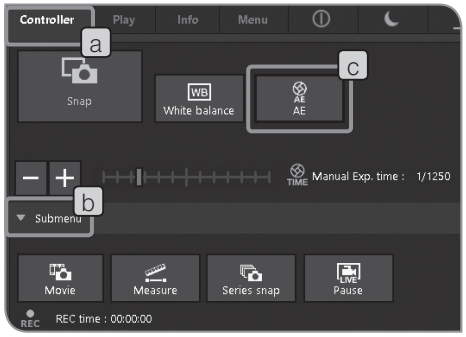
1 Select the [Menu] tab [a] and select the [Quality] tab [b] in the tab displayed.

2 Press following buttons of [Sharpness] [c] to change the emphasizing level of the outline. The emphasizing level of the outline is weaker in the order from Strong, Normal and OFF. Select the appropriate level depending on the situations.

Button	Function
Strong	The image is displayed with a clear outline. Suitable for observing print boards, etc.
Normal	The image is displayed with a natural outline.
OFF	The sharpness process is OFF. Use this mode when image noises are noticeable.

4-3 Advanced operations

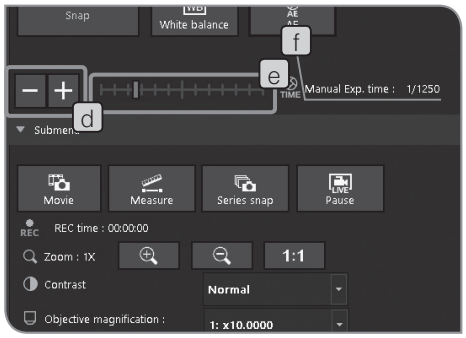
This section describes the advanced functions of DP2-SAL. With advanced functions, you can acquire the observed images suitable for your needs.



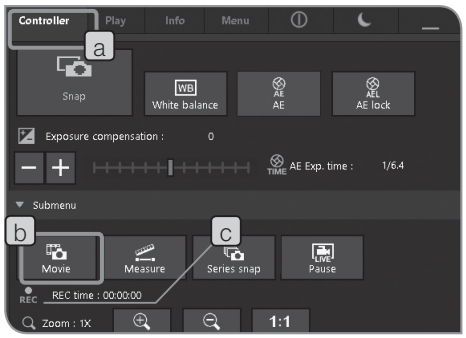
1 Manual exposure acquisition

The arbitrary exposure time is set manually to perform acquisition.

1. Select the [Controller] tab [a].
2. If the setting items of Submenu are not displayed, Press [Submenu] [b] to open them.
3. Press the [AE] button [c] to set AE to OFF (manually).



4. Press [+] or [−] button of [d] or move the bar [e] to set the exposure time. The exposure time is displayed in [f].



2 Recording Movie

1. Select the [Controller] tab [a].
2. Operate the microscope to frame the position you want to record and bring it into focus.
3. Press the [Movie] button [b] to start recording the movie. While recording the movie, ● REC blinks and the recording time [c] is displayed.
4. Press the [Movie] button [b] again to finish recording the movie. The movies are saved in the recording media (HDD/SSD), etc.

◎ The movie can also be acquired by using "Shift+F8" of the keyboard.

◎ The movie size and the movie format while recording are described below. They cannot be changed.

	DP22	DP27
Movie size	960 x 720	1224 x 960
Format	Compressed AVI	

◎ The folder names and file names of movies are created automatically. For details, refer to "Folder names and file names (P.48)" .

TIP
The save destination of movies can be changed (P.46). However, depending on the recording media's speed to write images or the specified exposure time, the frame rate to record movies may be reduced (as if movies are fast-forwarded) or frames may be skipped.
Use the recording media (HDD/SSD) applicable to USB3.0 for acquiring movies. Also, adjust the light intensity so that the exposure time is 1/30 s or less when DP27 is connected or 1/25 s or less when DP22 is connected.

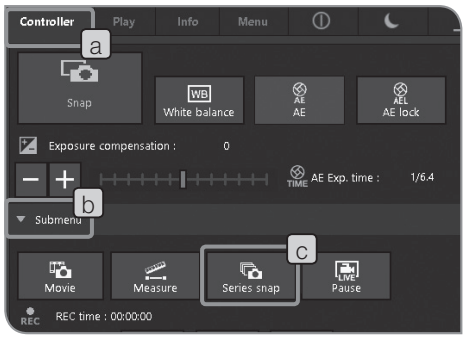
◎ When acquiring the movie of specimens with fine structure, the bit rate of the movie file may exceed the write speed of the recording media and that may cause skipping of frames.

◎ While recording movies, the shading correction is OFF.

◎ While recording movies, only Show/Hide of control window can be operated.
Change other settings after the recording is completed.

◎ The movie can be recorded for approximately 30 minutes.
However, while recording movies, if the movie file size reaches the maximum or if there is no remaining capacity in the recording media, the recording of the movie finishes automatically.

CAUTION **While recording movies, do not turn OFF the main switch of the control box D2-CB.**



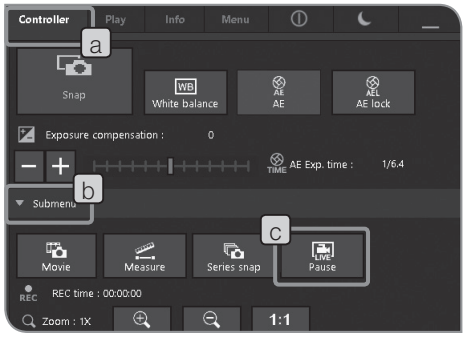
3 Series Snap

The image can be acquired by the series snap interval as first as possible. The series snap interval is the time from the start of acquisition to the next acquisition.

1. Select the [Controller] tab [a].
2. If the setting items of Submenu are not displayed, press [Submenu] [b] to open them.
3. Press the [Series snap] button [c].

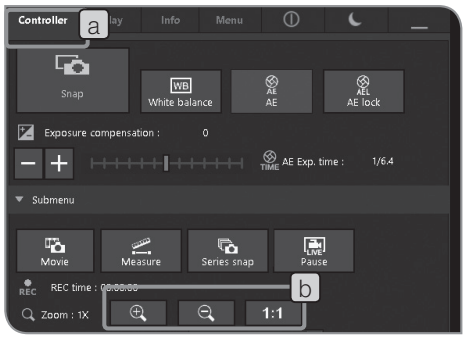
◎ Press the [Series snap] button again to stop the series snap.

◎ While acquiring the series snap, only Show/Hide of control window can be operated.
Change other settings after the acquisition is completed.



4 Pause/Resume Live

1. Select the [Controller] tab [a].
2. If the setting items of Submenu are not displayed, press [Submenu] [b] to open them.
3. Press the [Pause] button [c] to select Pause or Resume.

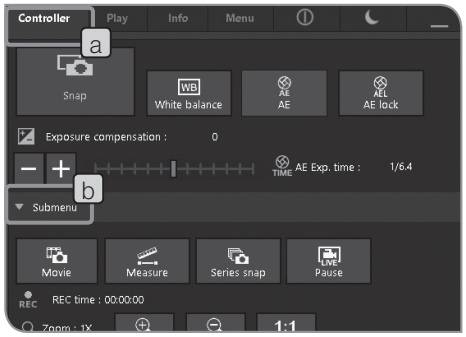


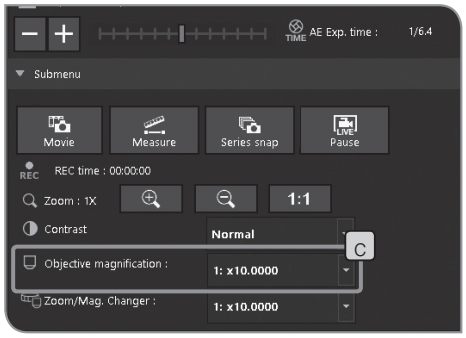
5 Display zoom/scroll

1. Select the [Controller] tab [a].
2. The digital zoom magnification changer can be changed by pressing button [b].

Button	Function
	The image is zoomed in from 1x, 2x to 4x.
	The image is zoomed out from 4x, 2x to 1x.
	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.)

◎ When the image is zoomed in, you can scroll the image by dragging the mouse on the window.

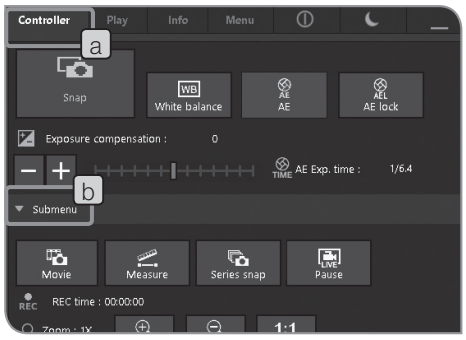


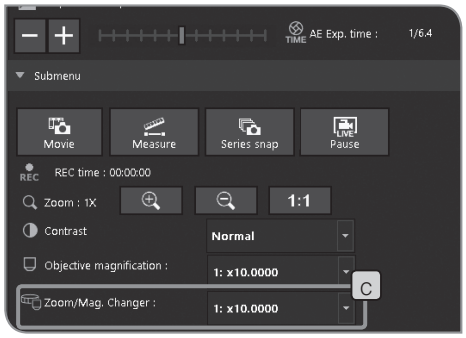


6 Selecting objective magnification

1. Select the [Controller] tab [a].
2. If the setting items of Submenu are not displayed, press [Submenu] [b] to open them.
3. Press the ▼ button of [Objective magnification] [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 objective magnification is set automatically according to the selected objective.) For details, refer to “8 Functions linked with microscope (P. 89)”.

◎ The contents in the selection list can be set according to the microscope in use. For setting procedures, refer to “Setting the microscope (P. 78)”.

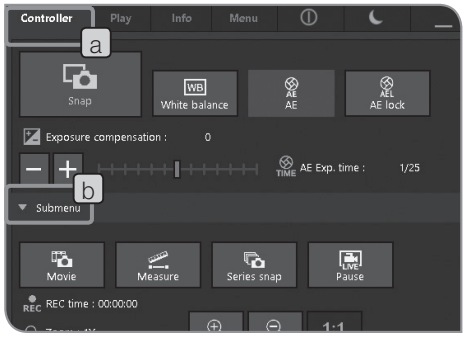




7 Selecting Zoom magnification / Magnification Changer

1. Select the [Controller] tab [a].
2. If the setting items of Submenu are not displayed, press [Submenu] [b] to open them.
3. Press the ▼ button of [Zoom/Mag. Changer] [c] to select the zoom magnification / magnification changer currently in the light path.

◎ The contents in the selection list can be set according to the microscope in use. For setting procedures, refer to “Setting the microscope (P. 78)”.



8 Selecting Mirror unit

1. Select the [Controller] tab [a].
2. If the setting items of Submenu are not displayed, press [Submenu] [b] to open them.
3. Press the ▼ button of [Mirror units] [c] to select the mirror unit currently in the light path from the list. (If the applicable coded illuminator is combined, the mirror unit is set automatically according to the selected mirror unit.)

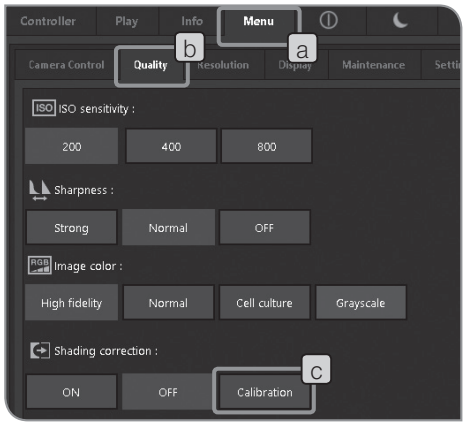
◎ The contents in the selection list can be set according to the microscope in use. For setting procedures, refer to “Setting the microscope (P. 78)”.

4-4 Advanced settings

1 Setting AE area

You can specify whether or not to display the metering area on the display. The metering area is shown with the yellow line on the display. For setting the metering area, refer to P.33.

1. Select the [Menu] tab [a] and select the [Camera Control] tab [b] in the tab displayed.
2. Press [ON] button or [OFF] button of [Display AE area] [c] to select Show or Hide.



2 Shading correction

The unevenness of brightness caused by the uneven illumination can be corrected to the even brightness.

CAUTION **To use the shading correction function, the objective magnification and the zoom/mag.changer magnification of the microscope must be specified in advance. For details, refer to "Setting the microscope (P.78)".**

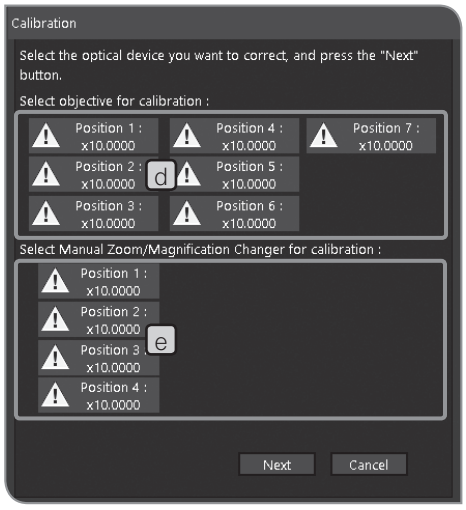
Acquisition of corrected image

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

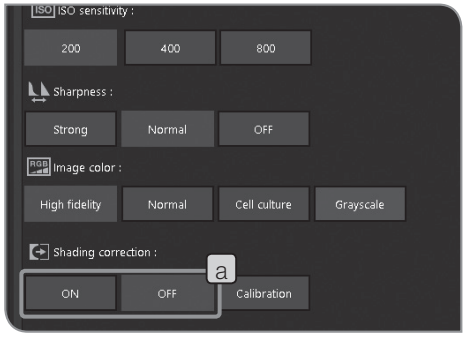
Before acquiring the corrected image, place the specimen to bring it into focus and remove the specimen in advance.

CAUTION
- **When acquiring the shading correction image, if there is dust or dirt in the acquisition area, the image may not be acquired properly. Be 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, refer to "Setting the microscope (P.78)".**

1. Select the [Menu] tab [a] and select the [Quality] tab [b] in the tab displayed.
2. Select the [Calibration] button [c]. The [Calibration] wizard is displayed.
3. Use [Select objective for calibration] [d] and [Select Manual Zoom/ Magnification Changer for calibration] [e] to select the objectives and the zoom/magnification changer you want to correct, and select [Next].



⚠: The corrected image is not acquired yet.
✓: The corrected image has been acquired.



4 When a message appears, set the objective to the light path of the microscope according to the message, and select [OK].

5 When a message appears, set the zoom/magnification changer to the light path of the microscope according to the message, and select [OK].

6 When the next window appears, adjust the microscope optically according to the message, and select [Next].

7 The next window appears to start acquiring the corrected image. When the acquisition is completed, select [Next].

8 Repeat 4 to 7 until the correction of all combinations of objectives and zoom/magnification changers selected in 3 is completed.

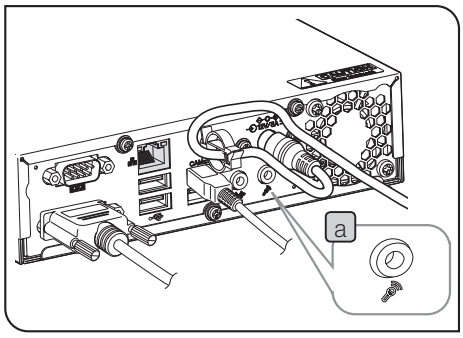
9 When the correction is completed, press the [Finish] button.

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

ON/OFF of shading correction while acquiring images

1 Use the a button to select ON or OFF.

◎ While recording movies, the shading correction is OFF.

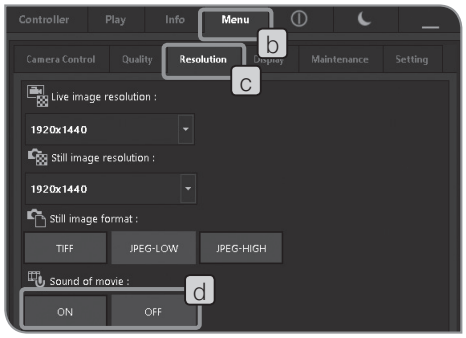


3 Setting sound of movie

1 Connect the microphone purchased separately to the microphone input terminal [a] of the control box D2-CB.

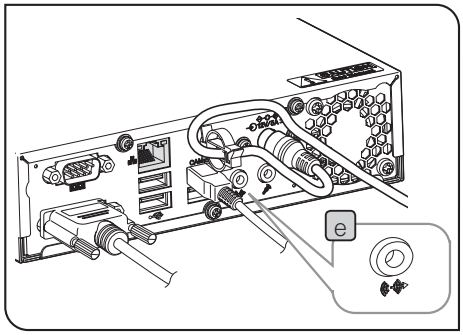
2 Select the [Menu] tab [b] and select the [Resolution] tab [c] in the tab displayed.

3 Press ON of [Sound of movie] [d].



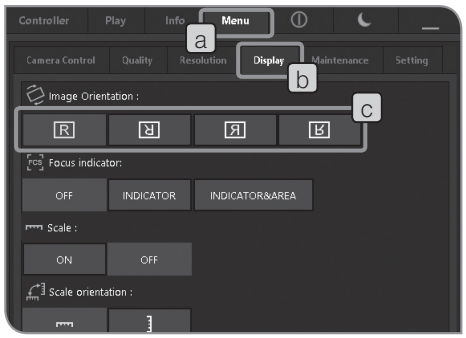
Button	Function
ON	The sound is included when recording the movie.
OFF	The sound is not included when recording the movie.

4 Record the movie. For recording procedures, refer to P.36. While recording the movie, the sound from the microphone is recorded in the movie file.



Outputting the sound by the control box

To output the sound by the control box, connect the speaker purchased separately to the lineout terminal [e]. (For setting the sound volume, refer to the instruction manual of the speaker.)



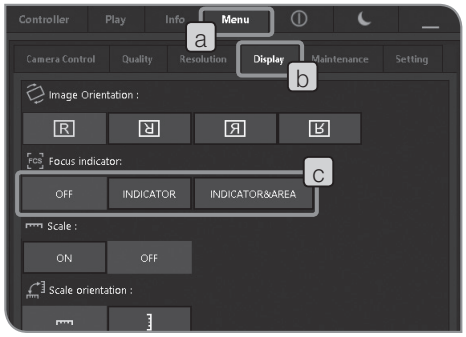
4 Setting image orientation

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
R	Erect
R	180° rotated
R	Left/Right inverted
R	Up/Down inverted

1 Select the [Menu] tab [a] and select the [Display] tab [b] in the tab displayed.

2 Press the [Image orientation] [c] button to select.



5 Setting focus indicator

You can select to Show or Hide the focus indicator and the focus area.

1 Select the [Menu] tab [a] and select the [Display] tab [b] in the tab displayed.

2 Press following buttons of [Focus Indicator] [c] to select Show or Hide.

Button	Function
OFF	The focus indicator and the focus area are not displayed.
INDICATOR	Only the focus indicator is displayed.
INDICATOR & AREA	Both the focus indicator and the focus area are displayed.

Focus Indicator

As a guide for focusing, the focused live image can be shown on the display.

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

Normal view

The current level is displayed in a 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 will be short.

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

Level 0, unevaluable view

Maximum evaluation level view

◎ The current level is updated every approx. 0.1 sec.
◎ The maximum level is updated when the higher maximum level is identified.

Focus area

You can specify whether or not to show the focus area on the display.
The level of the focus indicator is calculated on the image in this area.

6 Setting scale display

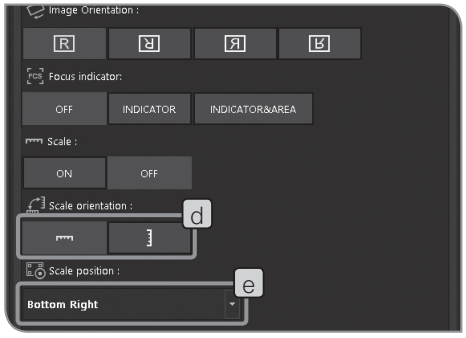
The scales can be added to the live image and the acquired image.

CAUTION **In order to display the appropriate scale, the adapter lens magnification, objective magnification and zoom/ magnification changer must be specified. Use the [Controller] tab for settings. To set the scale display, refer to "Selecting objective magnification" (P.38) and "Selecting Zoom magnification / Magnification Changer" (P.39).**

1 Select the [Menu] tab [a] and select the [Display] tab [b] in the tab displayed.

2 Press [ON] button or [OFF] button of [Scale] [c] to select Show or Hide.

◎ You can select displaying the scale only on the live image or on both the live image and the acquired image. For selection procedures, refer to "Setting display target of scales and cross lines (P.76)".



Setting scale orientation

You can select displaying the scale in vertical orientation or horizontal orientation facing display window.

1 Press the [Scale orientation] [d] button to select the scale orientation.

Setting scale position

The scale position can be selected from Upper left, Upper right, Lower left or Lower right.

1 Press the ▼ button of [Scale position] [e] to select the scale position in the list.

7 Setting save folders and file names

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

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

1 Select the [Menu] tab [a] and select the [Maintenance] tab [b] in the tab displayed.

2 Press the [Auto] button or the [Manual] button of [Save in] [c] to select.

Button	Function
Auto	The acquired images are saved in the folders automatically created in the recording media connected to the control box D2-CB, e.g. USB memory. etc. (For folders, refer to P. 48.)
Manual	The acquired images are saved in the specified folder.

3 When the [Manual] button is selected in [Save in] [c], press the [Select] button [d] to specify the folder in the dialog displayed.

Specify save folders from the address

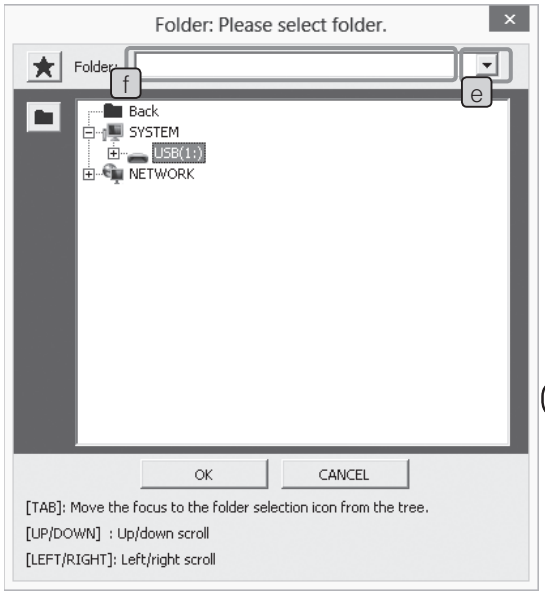
The save destination can be specified from the folder address. Press the [e] button to display addresses specified previously (up to 10 addresses can be saved) and specify the save destination from them.

◎ When inputting the address directly, select the [f] area with the mouse and input with keys. Therefore, the keyboard must be connected. Also, when specifying the PC on the network, input the PC name and the full path including the folder name.

Specify the save destination from the folder tree

Press the button to display the folder tree and specify the save destination. If the path of the selected folder is too long, the scroll bar appears.

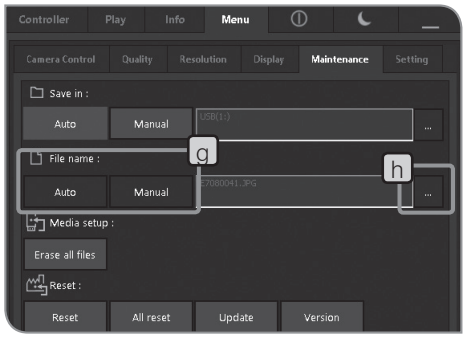
Dialog box to specify folders



CAUTION **If the PC on the network is specified as the save folder, it may not be specified. In this case, wait some time and specify the folder again. This is due to that when searching the PC for specifying the folder, the results may be different at each search.**

CAUTION
- **If the USB is protected with a password and also the save folder is protected by a password, the password protection must be disabled by the keyboard. For procedures to disable the password, refer to "Canceling password lock of USB recording media (P. 88)". If a password protected USB is connected, the save destination of files must be specified manually.**
- **If the save folder name is garbled due to special characters, a malfunction may be caused.**

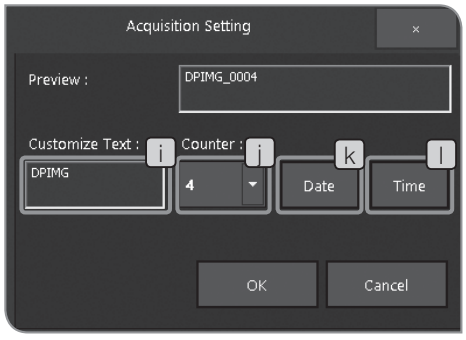
[File name] described below can be set when the [Manual] button of [Save in] is selected.



4 Press the [Auto] button or the [Manual] button of [File name] g to select.

Button	Function
Auto	The acquired images are saved to the save destination with file names automatically attached. (For file names, refer to P. 48.)
Manual	The acquired images are saved with file names in accordance with the naming rules specified.

5 When the [Manual] button is selected in [File name] g, press the [Select] button h. Specify the naming rule in the window displayed.

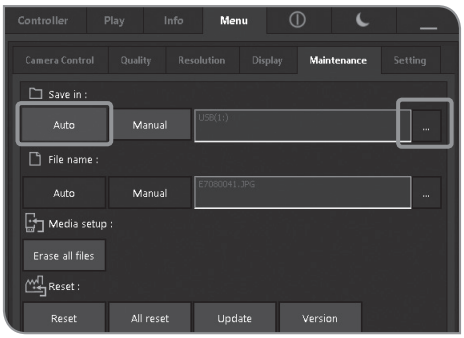


xxxxxxxxxx_0001_yyyymmdd_hhmmss.xxx

- Extension: .TIF, .JPG, .AVI
- Time: hh: Hour, mm: Minute, ss: Second (Set l to ON to add.)
- Date: yyyy: Year, mm: Month, dd: Date (Set k to ON to add.)
- Counter: 1 digit (1 to 9) to 4 digits (0001 to 9999) (Use j to select the number of digits.)
- Fixed area of the file name (Input the arbitrary texts (up to 10 texts) in i.)

* The extension differs depending on the still image, the movie or the still image format.
TIFF: .TIF
JPEG-LOW, JPEG-HIGH: .JPG
Movie: .AVI

◎ The file name can be set by [Manual] only when there is a save folder enabled for saving the acquired image.

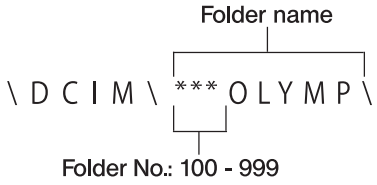


8 Auto save folders and auto file names

When the save destination is Auto:

The acquired images are saved in the recording media connected to the control box D2-CB, e.g. USB memory, etc. If multiple recording media are connected, images are saved in the recording media connected first. If one recording medium is divided into multiple partitions, images are saved in the first drive.

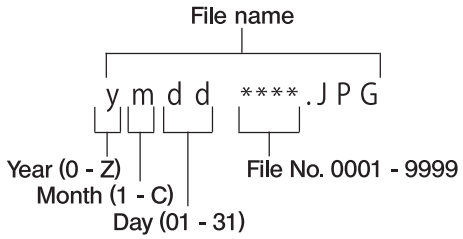
The save folders are created as follows automatically.



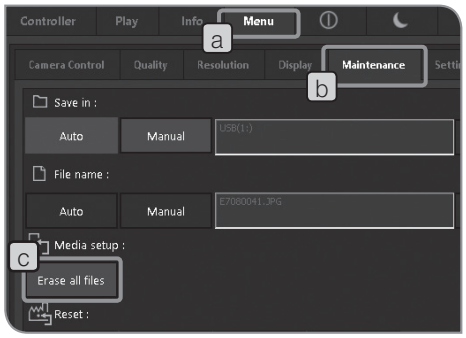
* The File No. in the file name is counted from "0001" to "9999" at each acquisition. When the File No. reaches "9999", the folder is created with the new folder name where the Folder No. in the folder name is increased by one in the next acquisition.

When the file name is Auto:

The acquired images are saved to the save destination with the file names attached automatically as follows.



* The notation of "Year" in the file name is only the last digit.
Years from 2000 to 2009 are displayed as from 0 to 9, and years after 2010 are displayed as A, B, C ... .
The notation of "Month" in the file name is as follows: Months from Jan. to Sept. are displayed as from 1 to 9. October is displayed as A, November is B and December is C respectively.



9 Media setup

All images in the save folder are deleted.

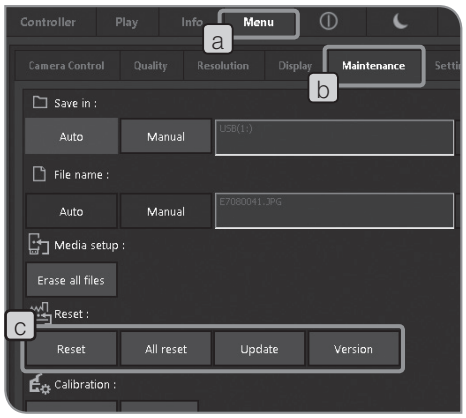
When deleting images in a specified folder

1. Select the [Menu] tab [a] and select the [Maintenance] tab [b] in the tab displayed.
2. Press the [Erase all files] button [c].
3. When the confirmation message appears, select [YES] if you want to delete.

CAUTION **After [YES] is selected, you cannot cancel deleting all files in between. Be sure to confirm carefully before deleting all files.**

◎ If a protected image (refer to P.59) is in the specified folder, the protected image is not deleted.

◎ Format the recording media with the PC.



10 Reset

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

1 Select the [Menu] tab [a] and select the [Maintenance] tab [b] in the tab displayed.

2 Operate with the [Reset] [c] buttons.

Button	Function
Reset	Only settings related to acquisition are returned to the factory default settings.
All Reset	The camera control software is returned to the factory default settings.
Update	The software of DP2-SAL and DP22/DP27-CU are updated.
Version	The version information of DP2-SAL and DP22/DP27-CU is confirmed.

CAUTION **Do not turn OFF the main switch or unplug the AC adapter until the restart completes.**

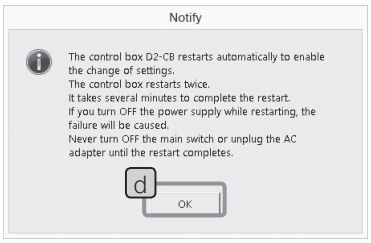
Reset settings related to acquisition. Reset

Reset items and setting values after reset are shown in the table below.

Returning the system to factory default settings. All Reset

CAUTION **Be careful, all settings including scale (including objective magnification settings), language, display resolution are returned to factory default settings.**

If you press the button, the message shown on the left appears. Confirm the content and press the [OK] button [d].



CAUTION **When the system is reset, the control box D2-CB restarts automatically. It takes several minutes because the control box restarts twice. Do not turn OFF the main switch or unplug the AC adapter until the restart completes.**

If the recording media such as a USB memory, etc. are connected to the control box D2-CB, the message shown on the left appears. Disconnect the recording media and press the [OK] button [e].

CAUTION **When resetting, disconnect the recording media connected to the control box D2-CB such as a USB memory, etc. until the restart (automatic) after resetting is completed.**

Reset items and setting values after reset are shown in the table below.

Update the software. Update

This function is used for updating DP2-SAL such as the firmware of the camera (items described in "Confirm the version information."). This function is not used normally. The system may be updated to improve the performances or vulnerability.

Confirm the latest update information on the Olympus Website.

Confirm the version information. Version

The version information described below are displayed.
Camera control software value (DPE-BSW)
Various library values (CamDriver.dll, DPEOSif.dll)
Camera firm value (Camera Firm)
Camera FPGA value (Camera FPGA)
Camera driver value (Camera Driver)
System value (OS)
BIOS value (BIOS)
System setting values (UNIT MODE, RESULT MODE)
Connected camera information (CAMERA HEAD)

Reset items and setting values after reset.

	Controller tab						
	Exposure time	Exposure compensation	AE lock	Mode AE	Objective magnification	Zoom/Mag. Changer	Contrast
Reset	1/1250	±0	OFF	ON	–	–	Normal
All Reset	1/1250	±0	OFF	ON	Objective magnification set to #1 when setting the microscope	Zoom/Mag. Changer set to #1 when setting the microscope	Normal

	Menu tab - Camera control tab			
	AE area	Display AE area	White balance	White balance gain
Reset	Spot 30%	OFF	Auto	R: 1.6, B: 1.6
All Reset	Spot 30%	OFF	Auto	R: 1.6, B: 1.6

	Menu tab - Quality tab			
	ISO sensitivity	Sharpness	Image color	Shading correction (include shading data delete)
Reset	200 (DP22), 100 (DP27)	Normal	High fidelity	OFF
All Reset	200 (DP22), 100 (DP27)	Normal	High fidelity	OFF

	Menu tab - Resolution tab			
	Live image resolution	Still image resolution	Still image format	Sound of movie
Reset	1920 x 1440 (DP22), 1224 x 960 (DP27)	1920 x 1440 (DP22), 2448 x 1920 (DP27)	JPEG-LOW	OFF
All Reset	1920 x 1440 (DP22), 1224 x 960 (DP27)	1920 x 1440 (DP22), 2448 x 1920 (DP27)	JPEG-LOW	OFF

	Menu tab - Display tab				
	Image orientation	Focus indicator	Scale	Scale orientation	Scale position
Reset	Erect	OFF	–	–	–
All Reset	Erect	OFF	OFF	Horizontal	Bottom Right

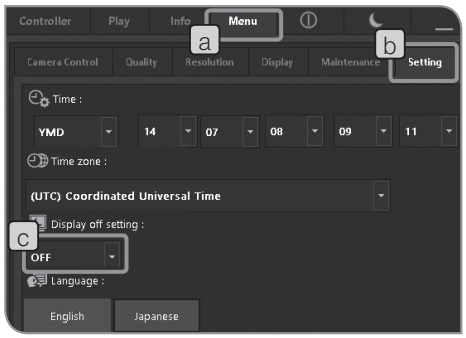
	Menu tab - Maintenance tab		
	Save in (include folder history)	File name (include customize text ,counter, date, time)	Microscope setting (include magnification of adapter lens, number of objectives, number of manual zoom, magnification of objectives, magnification of manual zoom)
Reset	–	–	–
All Reset	Auto	Auto	Not set yet

	Menu tab - Setting tab			
	Time zone	Display off setting	Language	Monitor resolution
Reset	–	–	–	–
All Reset	(UTC) Coordinated Universal Time	OFF	English	Auto recognition[*1]

[*1] If the display is not recognized automatically, while pressing the [Alt] + [M] key of the keyboard, press the main switch of the control box D2-CB. The control box starts at the resolution XGA(1024 x 768).

	Measure window							
	Cross Line	Save Result	Display on	Text color	Text size	Text font	Line color	Line width
Reset	OFF	OFF	Live	Blue	28	Araial	Red	3
All Reset	OFF	OFF	Live	Blue	28	Araial	Red	3

◎ The network settings and the device driver settings are not returned to factory default settings.



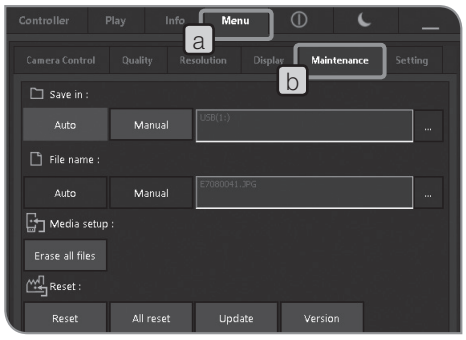
11 Display Off setting

When DP2-SAL is not used for some time continuously, you can set the view on the display disappear temporarily. If you move the mouse when there is no view on the display, the view appears on the display again. (If the touch panel display is connected, the view appears again by tapping on the display.)

1 Select the [Menu] tab [a] and select the [Setting] tab [b] in the tab displayed.

2 Press the ▼ button of [Display Off setting] [c] to select the non-operation time in the list.

◎ It may take some time to change the settings.

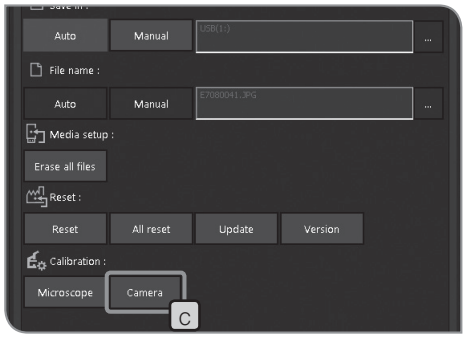


12 Camera Calibration

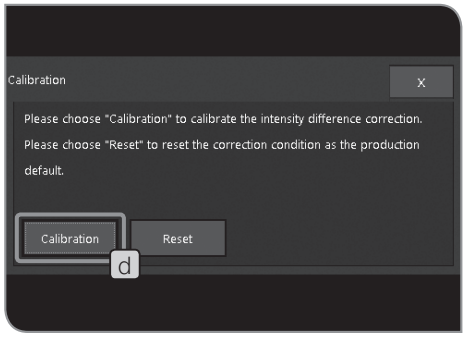
If the brightness or the color of the left half of the live image is significantly different from those of the right half, the camera can be calibrated.

Before calibrating the camera, place the specimen to bring it into focus in advance and remove the specimen.

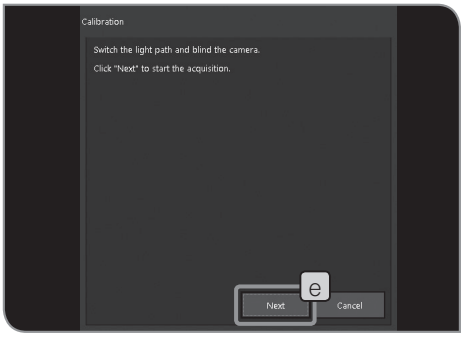
1 Select the [Menu] tab [a] and select the [Maintenance] tab [b] in the tab displayed.



2 Press the [Camera] button [c] in [Calibration]. The [Calibration] wizard is displayed.

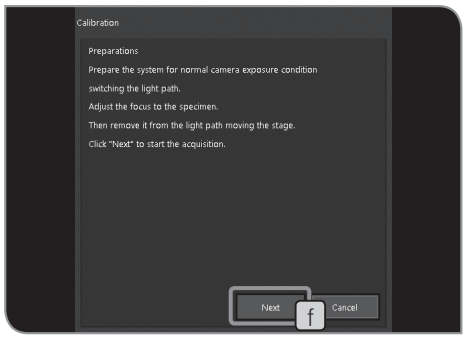


3 Press the [Calibration] button [d] of the [Calibration] wizard.



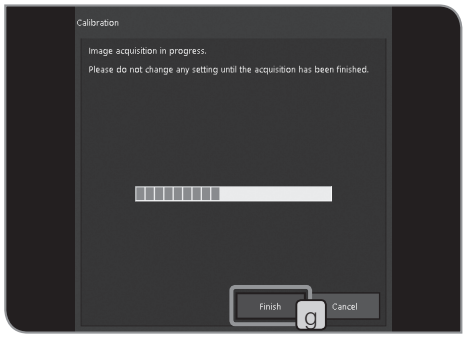
4 Avoid the light from entering the camera and press the [Next] button [e]. The calibration starts.

◎ If the light enters the camera, a confirmation message appears. Follow the message and press the [OK] button.



5 Change the light path to the standard exposure status when using the camera, and press the [Next] button [f]. The calibration starts.

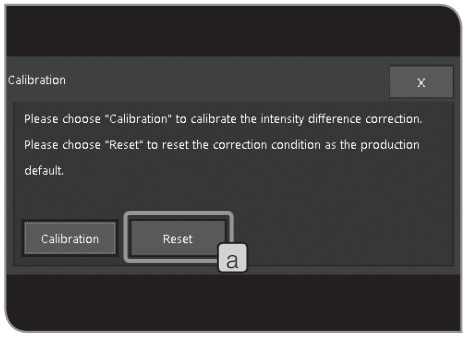
◎ If the image is too bright or too dark, the message for urging you to take remedial action appears. Follow the message and press the [OK] button.



6 It takes several minutes to calibrate. When the calibration is completed, press the [Finish] button [g].

◎ If the wizard is cancelled in the middle, the camera is returned to the status before starting the calibration.

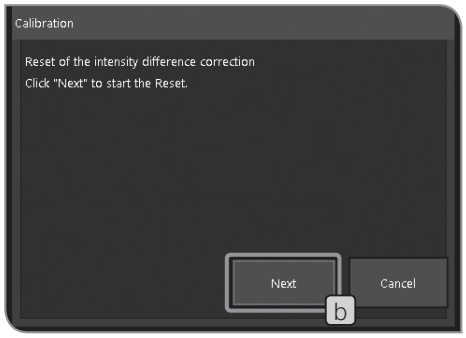
◎ When an error message appears during camera calibration and the calibration ends in failure, adjust the illumination intensity so that the automatic exposure time without exposure compensation is between 1.4 and 100 ms.



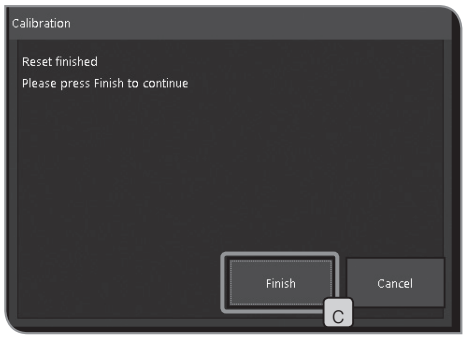
Returning calibration to factory default status

The camera can be returned to the calibration of the factory default status.

1 Press the [Reset] button [a] of the [Calibration] wizard.



2 Press the [Next] button [b].



3 When the calibration is reset, the wizard window changes. Press the [Finish] button C.

5 Play

5-1 Basic operations

The functions used for playing images are aligned on the [Play] tab. You can view acquired images.

1 Selecting play images

The image to be played can be selected.

1. Press the [Play] tab [a] to display the image which was acquired last in the folder specified as the save destination.
2. Press the [Thumbnail] button [b]. The thumbnail view is displayed.
3. Select the thumbnail in the lower area of the window to select the play image.

Icons displayed on the thumbnail

Icon	Function	Note
	Protect image	For details, refer to "Protect play image (P.59)".
	Movie file	For details, refer to "Playing movies (P.58)".

◎ The folder names and file names of movies are displayed on the [Info] tab.

◎ To change the folder you want to view, refer to "Setting save folders (P.46)". When the folder is changed, the image acquired first in the folder is displayed.

◎ If DP22 is connected, the image with resolution 2448 x 1920 (acquirable with DP27) cannot be played.

Full screen view

When you double-click the thumbnail, only the double-clicked image is displayed in full screen view.
To change the image you want to play in this full screen view, double-click the left half or the right half of the screen.

Operation	Function
Double-click the left half [c] of the screen.	The previous image is played. (Thumbnail of the left next in thumbnail view)
Double-click the right half [d] of the screen.	The next image is played. (Thumbnail of the right next in thumbnail view)

◎ To return to the thumbnail view, press the [Thumbnail] button [b].

2 Display zoom/scroll

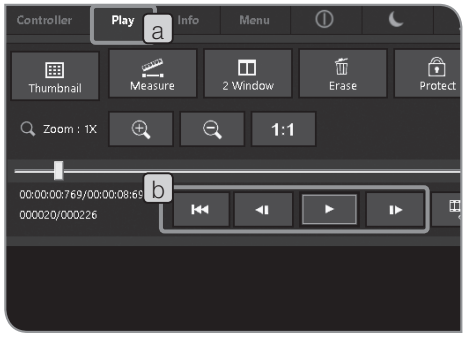
The play image can be zoomed in. Also, arbitrary areas of the image can be displayed by scrolling.

1. Select the [Play] tab [a].
2. Operate with the [b] button.

Button	Function
	The image is zoomed in from 1x, 2x to 4x.
	The image is zoomed out from 4x, 2x to 1x.
	The image is displayed so that one pixel of the image is equivalent to one pixel of the display.

◎ When the image is zoomed in, you can scroll the image by dragging the mouse on the window.

◎ The movie cannot be zoomed or scrolled.



3 Playing movies

If the image selected in "Selecting play images (P.57)" is a movie, press the button to start playing.

Press the button again while playing to Pause or Resume.

1. Select the [Play] tab [a].
2. Select the movie ( ) you want to display from the thumbnail in the lower area of the display.
3. Operate with the [b] button.

Button	Function
	Cueing
	Return the frame being displayed by one while pausing.
	Play/Pause/Resume
	Forward the frame being displayed by one while pausing.

◎ While playing the movie, operations other than playing the movie, such as changing the tab, etc. cannot be performed.

4 Extracting frames from movies

If the image selected in “Selecting play images (P.57)” 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 the lower area of the display.
3. Press the ▶ button of b to play the image. When the frame you want to extract is displayed, press the ▶ button again to pause.
4. Press the button of c to extract the frame currently displayed as the image.
   The extracted image is saved to the specified save destination in the following file name format. For details, refer to ”Setting save folders (P.46)”.

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

◎ While recording movies, no other operations are available except showing /hiding the control window and recording movies.
Be sure to stop playing movies before performing other operations.

5 Protect play image

The image can be protected (prohibit to delete) to avoid deleting necessary images by mistake.

1. Select the [Play] tab a.
2. Select the image you want to protect from the thumbnail in the lower area of the window.
3. Press the [Protect] button b. The icon is displayed in the thumbnail.

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

6 Deleting images

Unnecessary images can be deleted.

1. Select the [Play] tab [a].
2. Select the image you want to delete from the thumbnail in the lower area of the window.
3. Press the [Erase] button [b].
4. When the confirmation message appears, select [YES] if you want to delete.

CAUTION **Protected images cannot be deleted. (Refer to P.59.)**

5-2 Advanced operations

1 2 Window

The selected still image and the live image are displayed side by side.

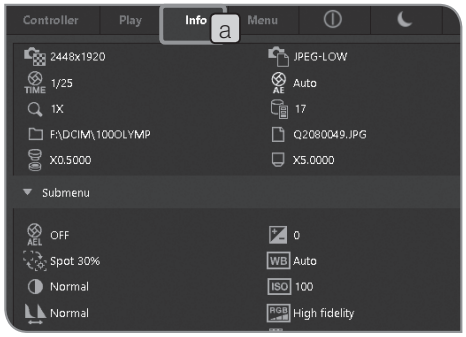
1. Select the [Play] tab a.
2. Press the [2 Window] button b. The selected still image is displayed on the right and the live image is displayed on the left.

◎ To acquire the still image in 2 Window, operate the mouse "Double-click" or press the [F8] key of the keyboard. The acquired image is saved to the specified save destination. (The still image displayed on the right side will not be updated.)

◎ Press the [2 Window] button again to return from "2 Window" to Thumbnail view.

◎ When a movie is selected, you cannot use "2 Window".

◎ While recording movies, no other operations are available except showing /hiding the control window and recording movies.
Be sure to stop playing movies before performing other operations.



2 Display Info tab

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

1. Select the [Info] tab a.

◎ The number of remaining images displayed on the [Info] tab is the number of remaining still images. The recordable time is not displayed.

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

The distance or the area of the object on the image can be measured. There are two measurement methods: measurement method on the live image and the measurement method on the played image.

◎ Before measurement, the scale must be set in advance.
When measuring on the played image, if the scale display is not set (the acquisition magnifications are inputted, etc.), the measurement data is not displayed correctly.
For setting procedures, refer to "Setting scale display (P.45)" .

◎ When measuring on the live image, the frame rate may be reduced.

◎ If the replayed images are as follows, the measurement cannot be performed.
- Movie
- Image edited by PC
- Image acquired by a camera other than DP22 or DP27.

◎ You can select displaying the measurement data only on the live image or on both the live image and the acquired image. For selection procedures, refer to "Setting display target of scales and cross lines (P.76)".

◎ When you use 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.

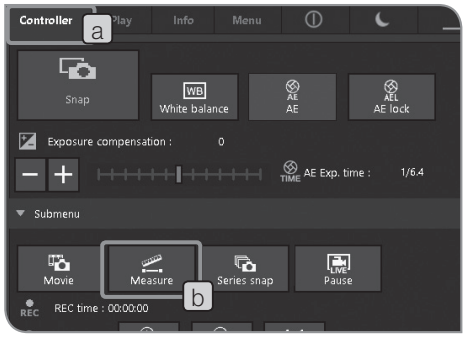
◎ To input texts, the keyboard must be connected to the control box D2-CB.

◎ This measurement function is a simple measurement method using CCD pixel pitch. This is not suitable for the precise measurement. Use the measuring equipment for the precision measurement.

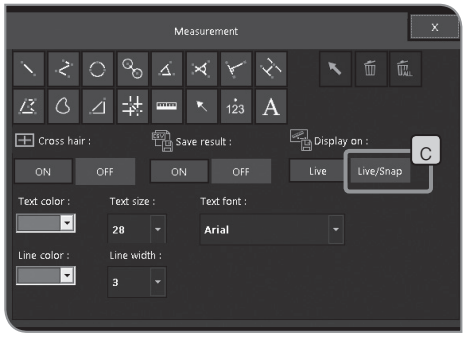
◎ The measurement results are displayed with 4 effective digits for distance, 5 digits for angle and 7 digits for area respectively. Note, the unit of measurement results cannot be changed.

◎ The measurement results are displayed near the lines or circles drawn. The display position or display digits cannot be changed.

When measuring on the live image



When measuring on the acquired image



1 When measuring on the live image

Select the [Controller] tab [a].

When measuring on the acquired image

Select the [Play] tab [a]. The thumbnail is displayed. Select the image you want to measure.

2 Press the [Measure] button [b]. The window changes to the [Measurement] window.

3 Select the arbitrary measurement method in the [Measurement] window.

4 To finish the measurement, right-click the mouse on the window to return to the [Measurement] window.

5 To return to the Control window, select the × button in the [Measurement] window.

Imprinting measurement results on the image during acquisition.

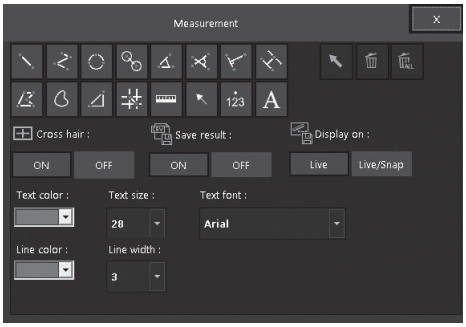
While the [Live/Snap] [c] button is selected, measure on the live image and then, press the [Snap] button to acquire the image. The measurement results are imprinted on the image.

Imprinting measurement results on 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 [Controller] tab), the message indicating "The measurement is not imprints. Do you want to imprint the measurement in the image?" appears. If the [Yes] button is pressed, measurement results are imprinted on the image.

CAUTION
- **The measurement results cannot be imprinted to the protected image. Cancel the protection in advance.**
- **When measurement results are imprinted on the image, the image data is overwritten and saved. Be careful, once the measurement data is imprinted on the image, they won't be restored.**

[Measurement] window



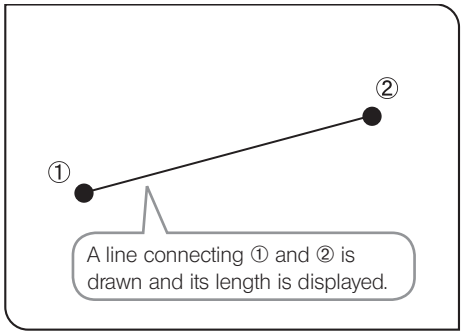
List of measurement functions

Button	Function	Outline of functions	Notes (Restrictions)	Page
	Distance between 2 points	The distance between specified 2 points are measured.	Up to 20 measurement functions in total excluding Free line and Count can be performed. (Text and Arrow are included.) Up to 50 Free lines and Counts can be drawn respectively. The number of characters describable as tests is up to 100 one-byte characters or 50 two-byte characters.	P.66
	Polyline	By specifying multiple points, the sum of the distance between points are measured.	Up to 100 points can be specified per measurement.	P.66
	3 points circle	By creating the circle (by inputting 3 points), the diameter and the area are measured.		P.67
	Distance between 2 centers	By creating 2 circles, the distance between 2 centers are measured.		P.67
	3 points angle	By specifying 3 points, the angle is measured.		P.68
	4 points angle	By specifying 4 points, 2 lines were created and the angle between 2 lines are measured.		P.68
	Perpendicular	By creating the line and then specifying one point, the perpendicular line is drawn from the specified point to the created line and its distance is measured.	Up to 10 perpendicular lines can be drawn for the reference line.	P.69
	Parallel line distance	By creating the parallel line, its distance is measured.	Up to 10 parallel lines can be drawn for the reference line.	P.69

Button	Function	Outline of functions	Notes (Restrictions)	Page
	Polygon area	By creating the polygon, its area and circumference length are measured.	Up to 100 angles can be specified per polygon.	P.70
	Free line	The free lines can be drawn.	Up to 50 free lines can be drawn.	P.70
	XY distance	The XY distance between specified 2 points and the R distance are measured.		P.71
	Distance between 2 cross lines	The distance between the specified position and the center of the image (origin) is measured.		P.71
	Ruler	A ruler can be inserted.		P.72
	Arrow	An arrow can be inserted.		P.72
	Count	By drawing the marks at multiple locations on the image, the number of mark locations can be counted.	Up to 50 marks can be counted.	P.73
	Text	A text can be inserted.	Up to 100 one-byte characters or 50 two-byte characters can be inputted. The keyboard must be connected to use this function. When "¥" mark is inputted, "＼" is shown.	P.73
	Select	The measurement results on the window are selected.		–
	Delete	The selected measurement results are deleted.		P.74
	Delete all	All measurement results on the window are deleted.		P.74

Distance between 2 points

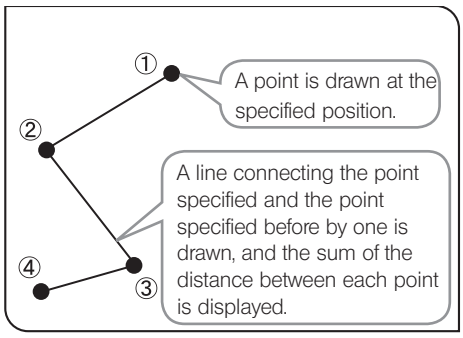
The distance between specified 2 points is measured.



1. Select 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 window to finish.

Polyline

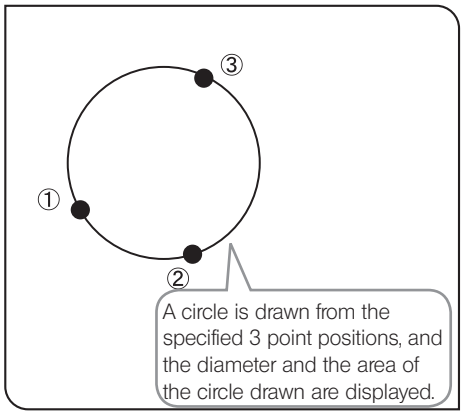
A line connecting each point of multiple points specified on the image is drawn, and the sum of the distance between each point is measured. Up to 100 points can be measured in one measurement.



1. Select button.
2. Click the mouse on arbitrary positions to draw the line.
3. If you right-click the mouse, that position is set to the end point.
4. You can measure another position continuously. Right-click the mouse on the window to finish.

3 points circle

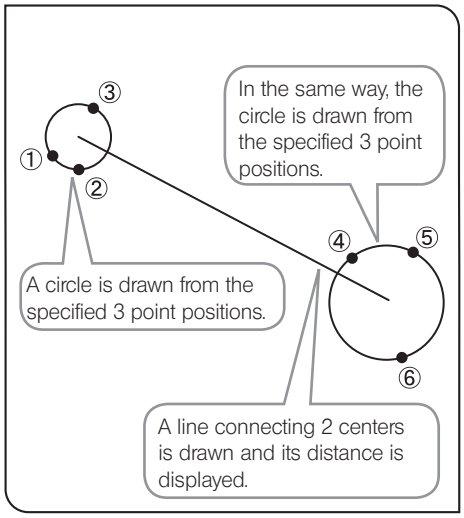
A circle is created (by inputting 3 points) on the image and the diameter and the area of the circle can be measured.



1. Select 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 window to finish.

Distance between 2 centers

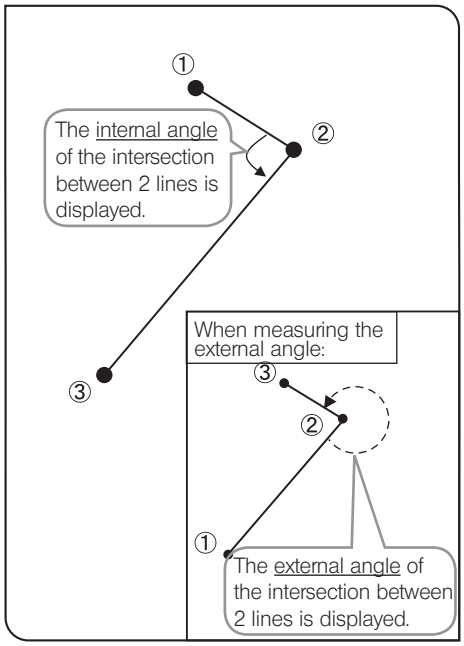
2 circles are created (by inputting 3 points) on the image, and the distance between 2 centers can be measured.



1. Select 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 window to finish.

3 points angle

Specify 3 points on the image and measure the angle.

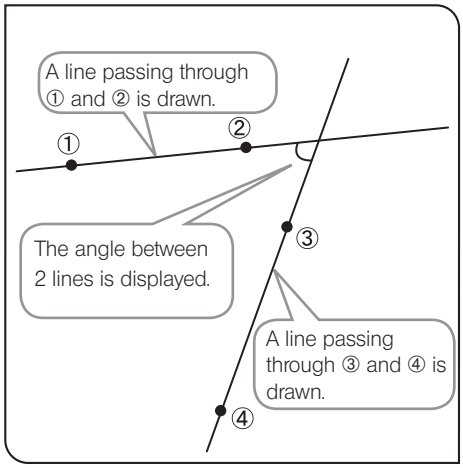


1. Select button.
2. Click the mouse to specify 3 points to create the angle you want to measure.
3. You can measure another position continuously. Right-click the mouse on the window to finish.

> Internal angle and External angle
> The angles of the circular arc drawn counterclockwise from the first line to the second line are displayed.

4 points angle

2 lines are drawn on the image and the angle of the intersection between 2 lines is measured.

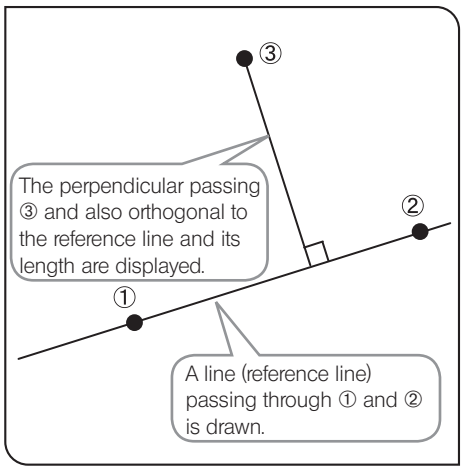


1. Select button.
2. Click the mouse on 2 arbitrary points to draw the reference line (line passing ① and ② shown in the left picture).
3. In the same way as **2**, draw the measurement line (line passing through ③ and ④ shown in the left picture).
4. You can measure another position continuously. Right-click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

> Internal angle and External angle
> The angles of the circular arc drawn counterclockwise from the first line to the second line are displayed.

Perpendicular

By creating the line and then specifying one point, the perpendicular line is drawn from the specified point to the created line, and the length of the perpendicular line drawn is measured.



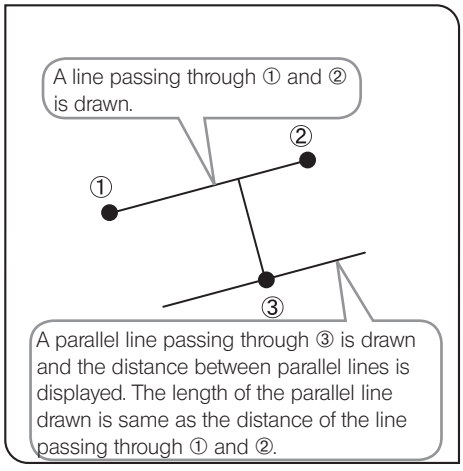
1. Select button.
2. Click the mouse on 2 arbitrary points to create the reference line (line passing ① and ② shown in the left picture).
3. Right-click the mouse on the position you want to measure. The perpendicular is drawn.

   When drawing multiple perpendiculars on the reference line, left-click the mouse to draw the perpendicular. Note, at the last position, right-click the mouse to draw the perpendicular.

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

Parallel line distance

A pair of the parallel lines is created on the image and its distance is measured.



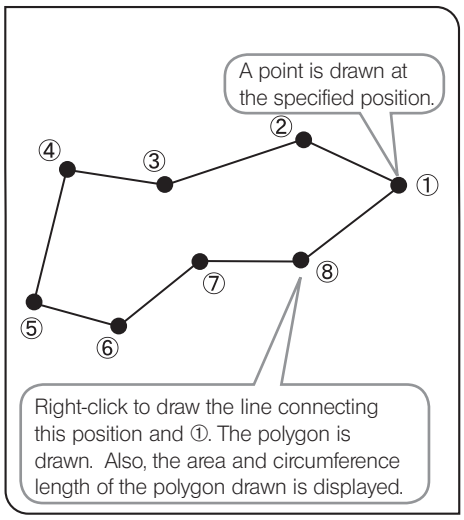
1. Select button.
2. Click the mouse on 2 arbitrary points to create the reference line (line passing ① and ② shown in the left picture).
3. Right-click the mouse on the position you want to measure. A parallel line is drawn.

   When drawing multiple parallel lines for the reference line, left-click the mouse to draw the parallel lines. Note, at the last position, right-click the mouse to draw the parallel line.

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

Polygon area

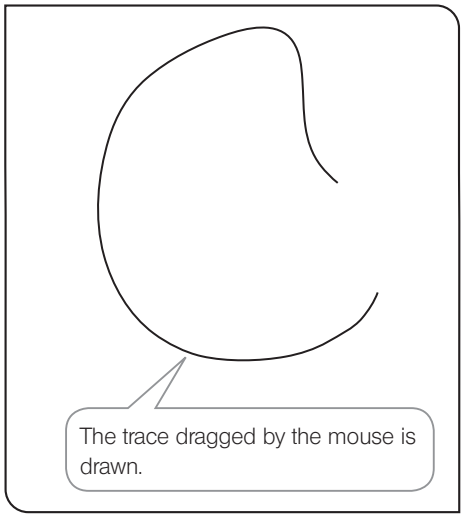
The polygon is created on the image and area and circumference length is measured. The polygon that can be created is up to the hectogon.



1. Select button.
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 window to finish.

Free line

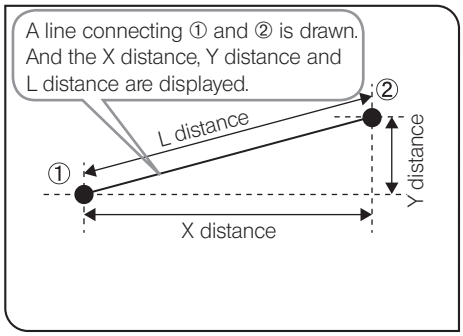
A free line is drawn on the image.



1. Select button.
2. Draw the free line by dragging the mouse from the start point to the end point of the area you want to draw.
3. You can draw another free line continuously. Right-click the mouse on the window to finish.

XY distance

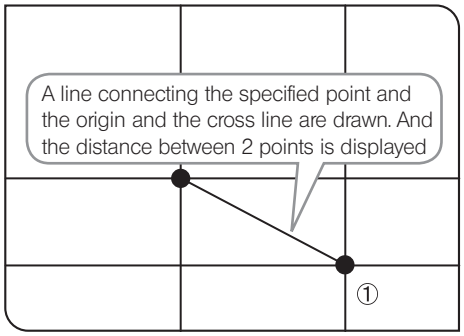
The X distance, Y distance and L distance between specified 2 points are measured.



1. Select 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 window to finish.

Distance between 2 cross lines

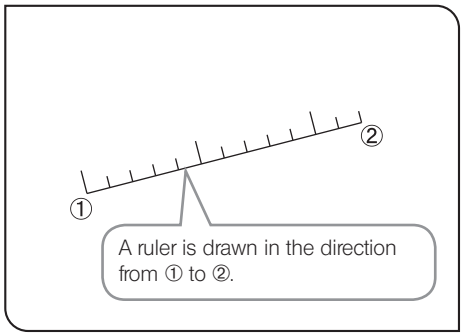
The distance between the specified point and the origin (center of the image) can be measured.



1. Select button.
2. Click the mouse on the position you want to measure.
3. You can measure another position continuously. Right-click the mouse on the window to finish.

Ruler

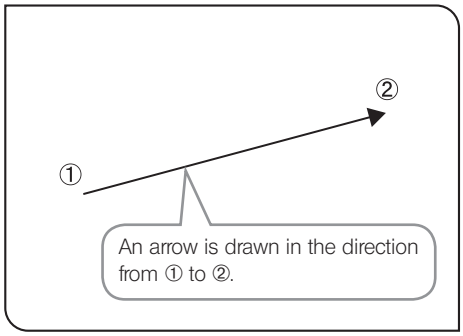
A ruler can be drawn on the image.



1. Select 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 ruler continuously. Right-click the mouse on the window to finish.

Arrow

An arrow can be drawn on the image.

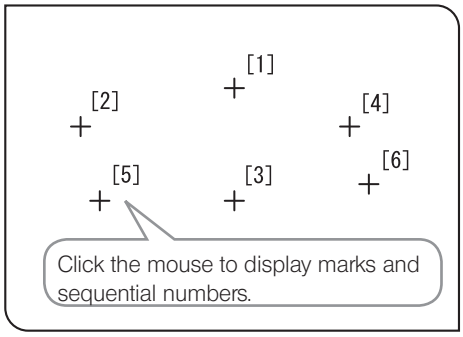


1. Select button.
2. Click the mouse to specify the start point and the end point of the position you want to draw.
3. You can draw another arrow continuously. Right-click the mouse on the window to finish.

Count

By drawing the marks at multiple locations on the image, the number of mark locations can be counted. Up to 50 marks can be drawn at the same time.

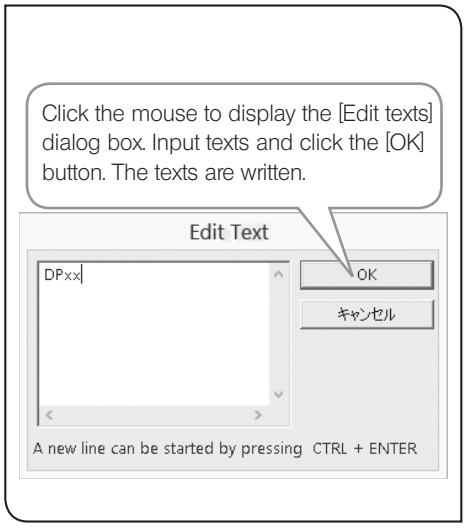
◎ Even after the measurement is finished or other measurements are performed, marks can be displayed in sequential number if marks are not deleted.



1. Select button.
2. Click the positions you want to count.
3. Right-click the mouse on the window to finish counting.

Text

The texts can be drawn on the image. The keyboard and the mouse are necessary for drawing texts.



1. Select button.
2. Click the mouse on the position you want to draw texts.
3. When the [Edit texts] dialog box appears, input texts from the keyboard.
4. Click the mouse on the [OK] button of the [Edit texts] dialog box. The texts are drawn at the position specified in 2.
5. You can draw another texts continuously. Right-click the mouse on the window to finish.

Delete

The measurement results on the window can be deleted.

1. Select button.
2. Click the mouse to specify measurement results you want to delete.
3. If you select , the specified measurement results are deleted.

◎ Multiple measurement results cannot be deleted at the same time.

Delete all

All measurement results on the window can be deleted at a time.

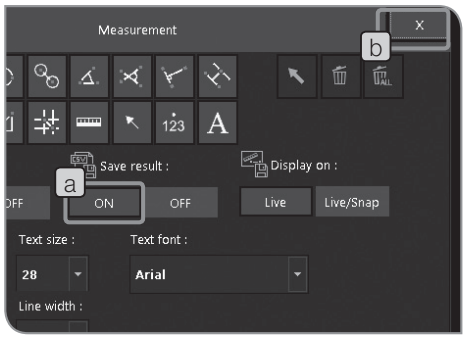
1. If you select , all measurement results are deleted.

Changing text and line styles

The lines and texts (measurement values) of measurement results can be displayed in arbitrary colors or fonts.

1. Click the button of the following styles you want to change, and select your favorite in the list.
   - [Text color] : Text color
   - [Text size] : Font size
   - [Text font] : Font type
   - [Line color] : Line color
   - [Line width] : Line width

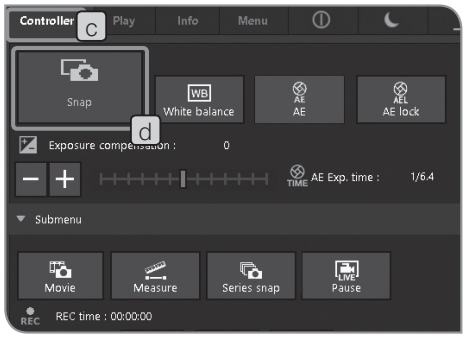
◎ The style of the measurement results which are already drawn on the image cannot be changed. Set your favorite style in advance before measurement.



2 Outputting measurement results in CSV file

The measurement results can be outputted to files in CSV format.

1. Select the [ON] button [a] of [Save results].
2. Select the [×] button [b] to close the [Measurement] window.
3. Select the [Controller] tab [c].
4. Press the [Snap] button [d]. The file in CSV format is saved with the same file name to the same save destination of the image.

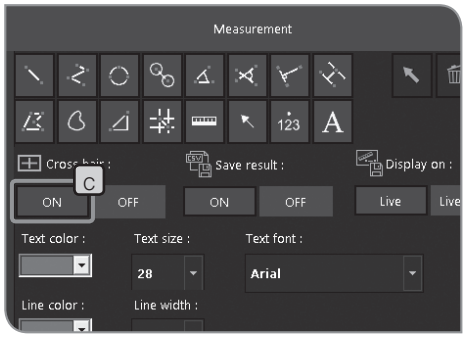


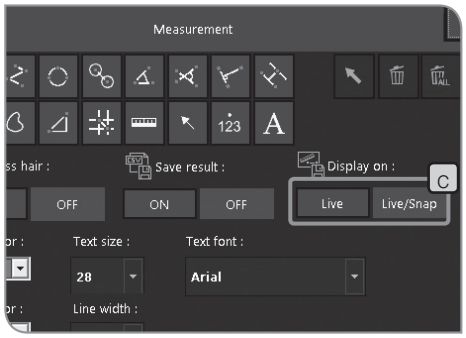
3 Displaying cross lines

The cross lines can be displayed in the center of the window.

1. Select the [Play] tab [a].
2. Press the [Measure] button [b]. The window changes to the [Measurement] window.
3. Select the [ON] button [c] of [Cross hair]. The cross lines are displayed on the window.

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





4 Setting display target of scales and cross lines

When the display of scales or cross lines is set to ON, you can select from 2 types described below.

Button	Function
Live	Scales and cross lines are displayed only on the live image. (Scales or cross lines are not drawn on the acquired image.)
Live/Snap	Scales and cross lines are displayed on the live image and also on the still image.

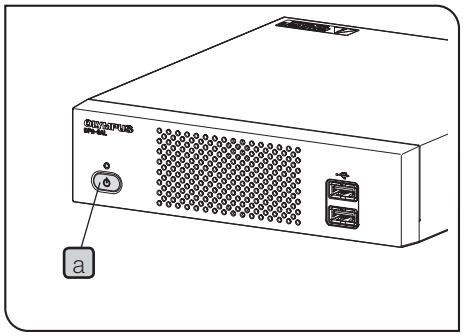
◎ These settings are also used for displaying measurements.

1. Select the [Play] tab [a].
2. Press the [Measure] button [b]. The window changes to the [Measurement] window.
3. Select the [Display on] button [c].

7 Initial Settings

For proper operations, the language and the scale magnification must be set at first.
Set according to the window (Setup wizard) displayed when the power is turned ON at first.

◎ The Setup wizard is not displayed when the power is turned ON next time.
If settings are not made when the power is turned ON at first, you can also change settings in the [Menu] tab later.



1 Press the main switch [a] of the control box D2-CB to turn ON the power. The Setup wizard appears on the display.

CAUTION **In the initial settings, do not connect the recording media such as a USB memory, etc. to the control box D2-CB until the restart (automatic) after settings is completed.**
For initial settings when the control box (U-CBS, etc.) is connected, refer to "8 Functions linked with microscope" on P.89.

2 Set the language according to the wizard.

3 In a same say, set the scale magnification (magnification of camera adapter or objective you are using). When settings are completed, Control box D2-CB restarts.

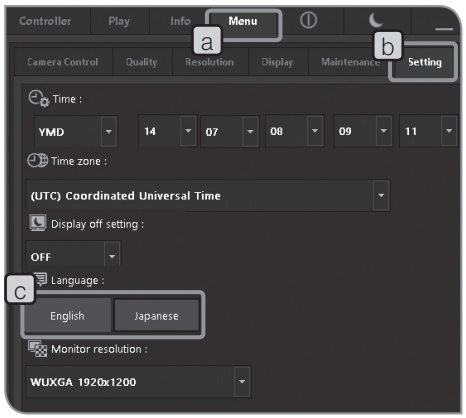
◎ If the settings on the wizard are canceled in the middle, all settings so far are canceled.

◎ For setting the language, refer to P.78 and for setting the scale magnification, refer to P.78.

◎ The date/time setting window and the display resolution setting window are not displayed automatically. For setting procedures, refer to "Setting Date/Time (P.82)" and "Setting display resolution (P.83)".

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

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

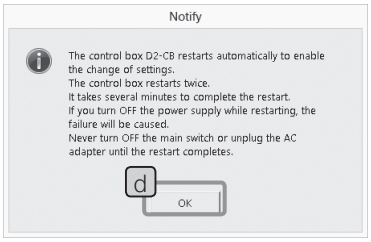


1 Setting the language

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

1 Select the [Menu] tab [a] and select the [Setting] tab [b] in the tab displayed.

2 Use the [Language] [c] button to select.

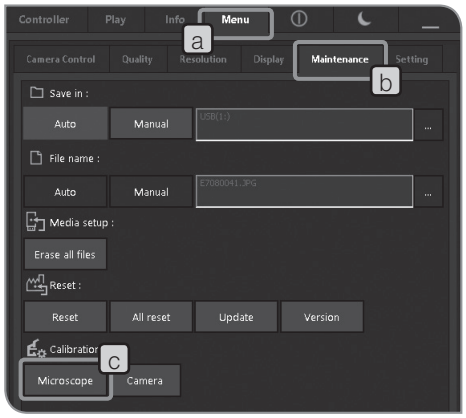


3 The message shown on the left appears. Confirm the content and press the [OK] button [d].

CAUTION **When settings are changed, the control box D2-CB restarts automatically. It takes several minutes because the control box restarts twice. Do not turn OFF the main switch or unplug the AC adapter until the restart completes.**

4 If the recording media such as a USB memory, etc. are connected to the control box D2-CB, the message shown on the left appears. Disconnect the recording media and press the [OK] button [e].

CAUTION **When setting the language, disconnect the recording media connected to the control box D2-CB such as a USB memory, etc. until the restart (automatic) after settings is completed.**



2 Setting the microscope

You can set the adapter lens magnification, the objective magnification and the zoom/magnification changer which are required for displaying the scale in an appropriate length.

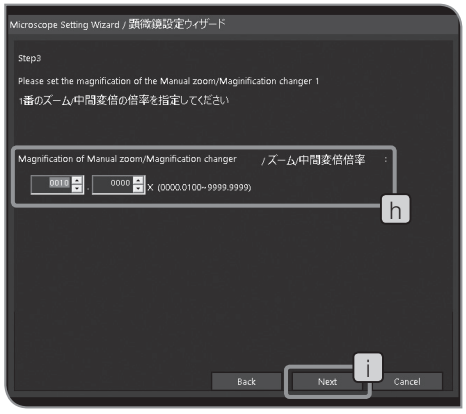
◎ When the control box (U-CBS, etc.) is connected, the setting procedures will be different. Refer to "Automatic scale change (P. 92)".

1 Select the [Menu] tab [a] and select the [Maintenance] tab [b] in the tab displayed.

2 Press the [Microscope] button [c] of [Calibration]. The [Microscope setting] wizard is displayed.

3 Set the adapter lens magnification [d], and press the [Next] button [e].

4 Set the number of zoom/magnification changer [f], and press the [Next] button [g].



5 Set the zoom/magnification changer [h] and press the [Next] button [i].

6 Set the number of revolving nosepiece holes [j], and press the [Next] button [k].

◎ This step is not displayed if the revolving nosepiece with coded functions is combined.
If this step is displayed, go to “When the revolving nosepiece without coded functions is combined” described below.
If this step is not displayed, go to “When the revolving nosepiece with coded functions is combined” described below.

When the revolving nosepiece without coded functions is combined

7 Set the magnification of the objective in the light path to [l] and press the [Next] button [m].

8 Rotate the revolving nosepiece of the microscope and engage the adjacent objective into the light path.

9 Repeat 7 and 8 to set the objective magnification of each revolving nosepiece hole.
You do not need to set the magnification of the hole where no objective is inserted. Rotate the revolving nosepiece to set the magnifications of other objectives.

When the revolving nosepiece with coded functions is combined

7 Set the magnification of the objective in the light path to [n].

8 Rotate the revolving nosepiece of the microscope and engage the adjacent objective into the light path. The information of the revolving nosepiece hole position is acquired automatically and is displayed in [o] in the left picture.

9 Repeat 7 and 8 to set the objective magnification of each revolving nosepiece hole.
You do not need to set the magnification of the hole where no objective is inserted. Rotate the revolving nosepiece to set the magnifications of other objectives.
When the settings are completed, press the [Next] button [p].

◎ If no magnification is set to the hole, the initial value (10x) is set. If you add the objective, set the magnification again.

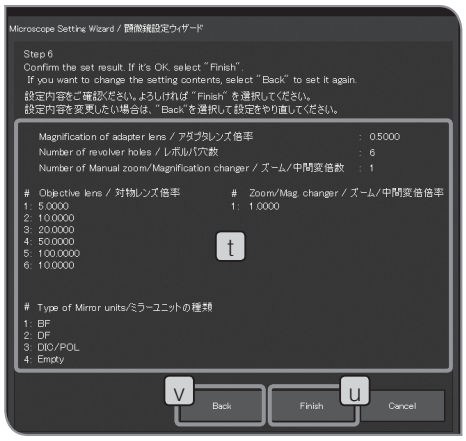
When the coded illuminator is combined

◎ This step is displayed when the applicable coded illuminator is combined.
If this step is not displayed, go to **13**.

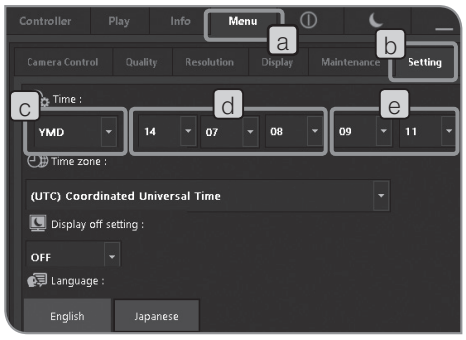
10 Set the type of the mirror unit in the light path to [q].
If the mirror unit is not engaged in the light path, select [Empty].

11 Rotate the mirror unit cassette and engage the adjacent mirror unit into the light path. The information of the mirror unit position is acquired automatically and is displayed in [r] in the left picture.

12 Repeat **10** and **11** to set the type of each mirror unit.
When the settings are completed, press the [Next] button [s].



13 Confirm the settings [t]. Press the [Finish] button [u] if it is OK with you.
If you change the settings, press the [Back] button [v] and set again.



3 Setting Date/Time

You can set the date and time of the camera.
The acquisition date/time is recorded on the acquired image.

1 Select the [Menu] tab [a] and select the [Setting] tab [b] in the tab displayed.

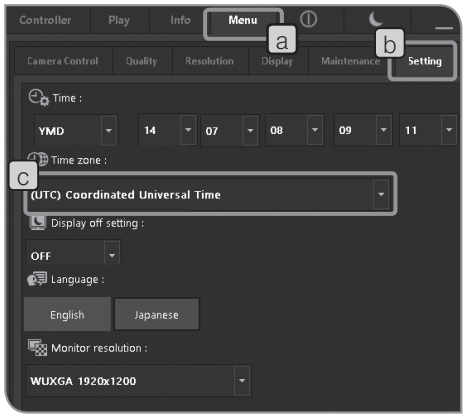
2 Press the ▼ button of [c] of [Time:] to select the order of "Year/Month/Date" in the list.

List item	Order
DMY	Date/Month/Year
MDY	Month/Date/Year
YMD	Year/Month/Date

3 Press the ▼ button of [d] of [Time:] to select "Year", "Month" and "Date" in the respective list. (The order of the list in [d] is same as the order selected in [c].)

4 Press the ▼ button of [e] of [Time:] to select "Hour" and "Minute" in the respective list.

◎ The date and time are reflected to the system when they are changed, but the view on the [Setting] tab is not updated automatically. To confirm the latest date and time, change to the other tab once and change to the [Setting] tab again. The view is updated.

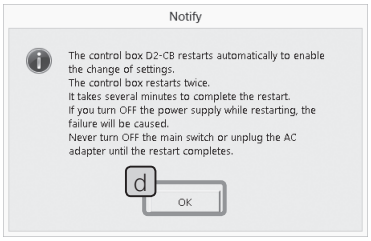


4 Setting time zone

The time zone can be set.
When viewing the acquired images saved in the recording media in NTFS format such as USB-HDD (external hard disk for connecting USB), etc. with PC, the acquisition date/time may not be correct. Setting the time zone of DP2-CB same as the time zone of PC will display the correct acquisition date/time.

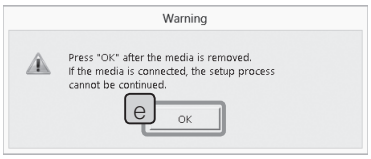
1 Select the [Menu] tab [a] and select the [Setting] tab [b] in the tab displayed.

2 Press the ▼ button of [Time zone] [c] to select the time zone of your area in the list.



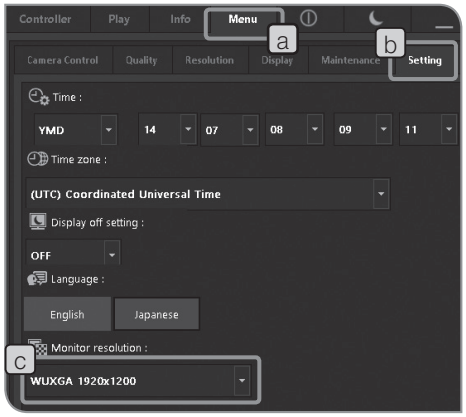
3 The message shown on the left appears. Confirm the content and press the [OK] button [d].

CAUTION **When settings are changed, the control box D2-CB restarts automatically. It takes several minutes because the control box restarts twice. Do not turn OFF the main switch or unplug the AC adapter until the restart completes.**



4 If the recording media such as a USB memory, etc. are connected to the control box D2-CB, the message shown on the left appears. Disconnect the recording media and press the [OK] button [e].

CAUTION **When setting the time zone, disconnect the recording media connected to the control box D2-CB such as a USB memory, etc. until the restart (automatic) after settings is completed.**



5 Setting display resolution

The resolution according to the display you are using can be set. The resolutions which cannot be displayed on your display are not shown in the list.

The display resolutions you can set are 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 WSXGA
1600 x 1200 UXGA
1280 x 1024 SXGA
1280 x 960 QVGA
1024 x 768 XGA

1 Select the [Menu] tab [a] and select the [Setting] tab [b] in the tab displayed.

2 Press the ▼ button of [Monitor resolution] [c] to select the display resolution in the list.

◎ If nothing appears on the display due to the inappropriate resolution, turn OFF the main switch once. Then, connect the keyboard to the control box D2-CB and while pressing the [Alt] + [M] keys, press the main switch of the control box D2-CB. The live display starts at resolution XGA (1024 x 768).

6 Setting network

DP2-SAL can access to PC on the network by connecting control box D2-CB to LAN.

CAUTION **The settings changed by this operation won't be returned to factory default settings. The malfunctions or damages caused by changing the settings are subject to the paid repair.**

◎ The network must be set by the network administrator.

◎ The keyboard and the mouse must be connected for setting the network.

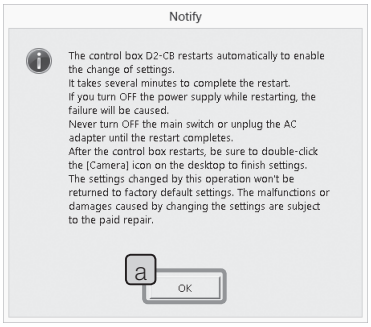
Following operations are available by setting the network.

- The acquired images can be saved directly to PC on the network.
- The acquired images saved to PC on the network can be played by DP2-SAL. (The images you can play are only those acquired with DP22/DP27 However, if DP22 is connected, the 2448 x 1920 image (acquirable with DP27) cannot be played. Also, you may not be able to play images acquired with DP22/DP27 if they are edited by the PC, etc.)

1 Connect the LAN cable to the control box D2-CB. For procedures to connect LAN cables, refer to "LAN Connection (P. 21)".

◎ If the LAN cable is not connected, settings of the network are not reflected to the control box DP2-CB.

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



3 The message shown on the left appears. Confirm the content and press the [OK] button a.

CAUTION **When settings are changed, the control box D2-CB restarts automatically. It takes several minutes until the restart completes. Do not turn OFF the main switch or unplug the AC adapter until the restart completes.**

The control box D2-CB restarts and the Windows® desktop is displayed.

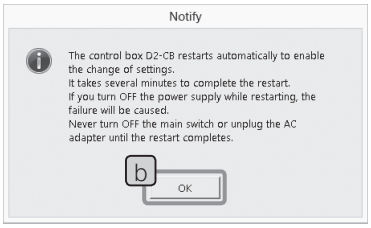
4 Double-click the icon on the desktop to set the network or the file sharing, etc. Set items according to your connection environment. For details, consult with the network administrator.

Icon	Function
control - Shortcut	The control panel starts.
cmd - Shortcut	The command prompt starts.

◎ The functions of Windows® installed on the control box D2-CB are limited specially for this system.

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

Icon	Function
Camera	The camera control software starts.



6 The message shown on the left appears. Confirm the content and press the [OK] button b.

CAUTION **When settings are changed, the control box D2-CB restarts automatically. It takes several minutes until the restart completes. Do not turn OFF the main switch or unplug the AC adapter until the restart completes.**

◎ When the main switch of the control box D2-CB is turned ON (including restarting when the network is set, etc.), you may not be able to access to the network for first few minutes.
This is due to that the control box D2-CB continues setting the network-related systems after it started.
In this case, start the control box D2-CB and wait for 2-3 minutes.

◎ For system requirements for network connection, refer to (P.7).

7 Installing special device driver

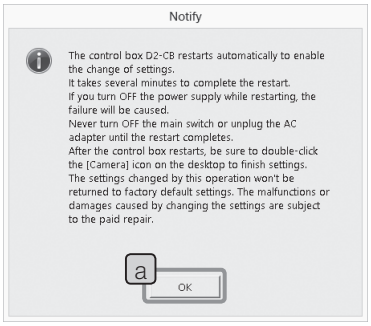
If the special device driver is required for the USB device connected to the control box D2-CB, you can install the device driver of that USB device on the control box D2-CB.

CAUTION **The settings changed by this operation won't be returned to factory default settings. The malfunctions or damages caused by changing the settings are subject to the paid repair.**

◎ 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 also the live image or the acquired image is displayed, press [Ctrl]+[Alt]+[Insert] of the keyboard.



2 The message shown on the left appears. Confirm the content and press the [OK] button [a].

CAUTION **When settings are changed, the control box D2-CB restarts automatically. It takes several minutes until the restart completes. Do not turn OFF the main switch or unplug the AC adapter until the restart completes.**

The control box D2-CB restarts and the Windows® desktop is displayed.

3 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.

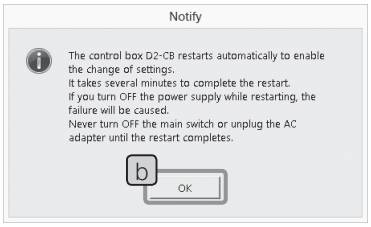
Icon	Function
explorer - Shortcut	Explorer starts.

◎ The functions of Windows® installed on the control box D2-CB are limited specially for this the system.

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

Icon	Function
DP Camera	The camera control software starts.

5 The message shown on the left appears. Confirm the content and press the [OK] button b.



CAUTION **When settings are changed, the control box D2-CB restarts automatically. It takes several minutes until the restart completes. Do not turn OFF the main switch or unplug the AC adapter until the restart completes.**

8 Canceling password lock of USB recording media

When the control box D2-CB is connected to the recording media such as a USB memory equipped with the password function, etc., you can cancel the password lock of that recording media.

◎ The keyboard and the mouse must be connected for canceling the password lock.

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

Icon	Function
explorer - Shortcut	Explorer starts.

◎ The functions of Windows® installed on the control box D2-CB are limited specially for this the system.

2 Cancel the password lock For the procedures to cancel the password lock, follow the instruction manual provided with the USB recoding media connected.

3 After the password lock is canceled, double-click the [Camera] icon on the desktop to start the camera control software. The camera control software starts.

Icon	Function
Camera	The camera control software starts.

CAUTION **If the main switch of the control box D2-CB is turned OFF or recording media such as a password protected USB memory, etc. are attached/detached after above operations, the above operations must be performed again.**

◎ If you start the camera control software while Explorer is running, Explorer may be displayed in front of the camera control software. In this case, click the camera control software.

8 Functions linked with microscope

By connecting DP2-SAL with the control box for microscope or the microscope frame, you can use the linked functions described below.

Linked function	Explanation
Automatic scale change	When the objective magnification is changed by changing the coded revolving nosepiece or the motorized revolving nosepiece, the scale size is changed automatically according to the magnification changed. ◎ The objective magnification must be inputted in advance. For inputting procedures, refer to "Setting the microscope (P.78)".
Shutter switch	Attach 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

◎ The camera can also be connected to the microscope without connecting the hand switch for exposure U-HSEXP. In such a case, the shutter switch function is not available.

◎ The camera can also be connected to the microscope without connecting the revolving nosepiece with coded functions. In such a case, the automatic scale change function is not available.

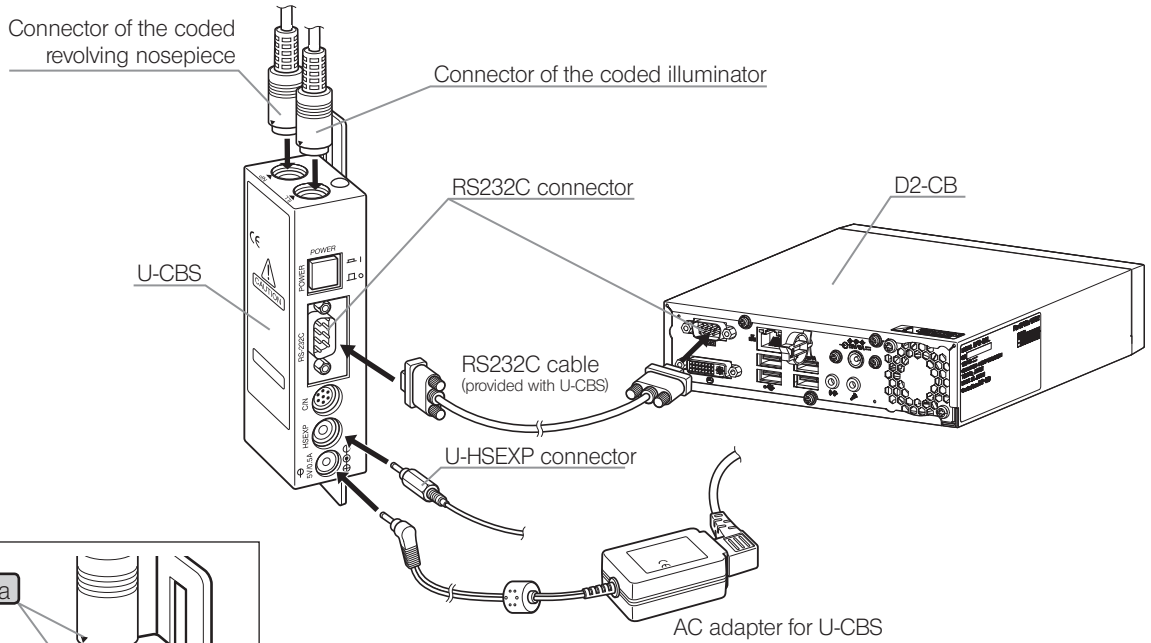
8-2 Connecting procedures

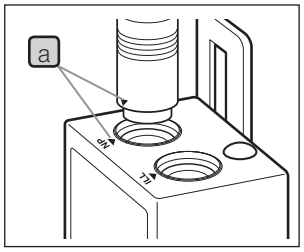
For procedures to connect the microscope to the control box, refer to the instruction manual of the relevant control box or microscope.

CAUTION
- **Remove only the cover/seal of necessary connectors on the control box.**
- **Be sure to connect only units specified by Olympus to each connector. If units which are not specified by Olympus are connected, the full performance is not ensured.**
- **Use RS232C cable for connecting the control box for microscope and the D2-CB.**
- **Be sure to turn OFF the main switch of each unit when connecting the cable.**
- **Align the connector orientation and insert it completely to the end. If the connector has fixing screws, be sure to fix them.**
- **Inserting the connectors which are not specified by Olympus 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

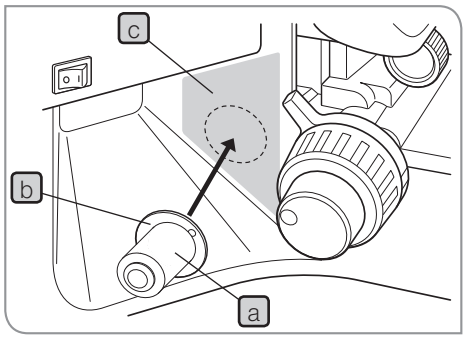




When attaching the connector of the coded revolving nosepiece or the coded illuminator, insert it by aligning the ▼ mark. a

Attaching the hand switch for exposure U-HSEXP

◎ 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).

CAUTION **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.

CAUTION **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

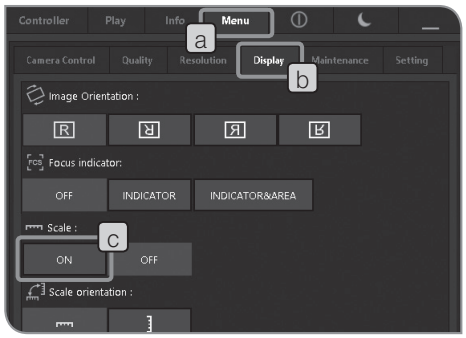
◎ You cannot record movies with U-HSEXP. Use the [Movie] button in the control window. (P.36)

8-3 Operating procedures

◎ 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 D2-CB. If you turn ON the power in the wrong order, D2-CB does not recognize the control box for microscope or the microscope frame correctly.

Automatic scale change

When the objective magnification is changed by changing the revolving nosepiece of the microscope, the scale size is changed automatically according to the magnification changed.
To use this function, the objective magnification must be set to DP2-SAL in advance. Set the objective magnification according to the microscope setting wizard displayed when the power is turned ON for the first time. If DP2-SAL has already been started, refer to "Setting the microscope (P.78)" and set the objective magnification.



Displaying scale

1 Select the [Menu] tab [a] and select the [Display] tab [b] in the tab displayed.

2 Press the [ON] button of [Scale] [c] to display the scale.

◎ For procedures to display scales, refer to "Setting scale display (P.45)".

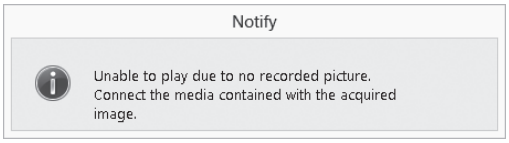
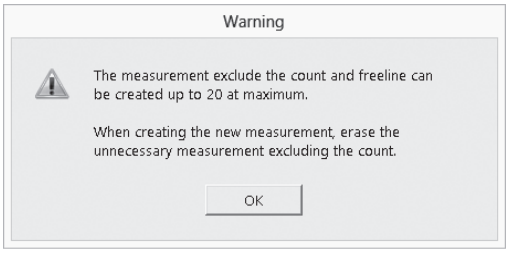
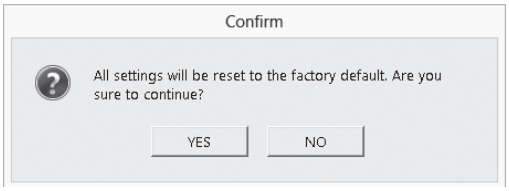
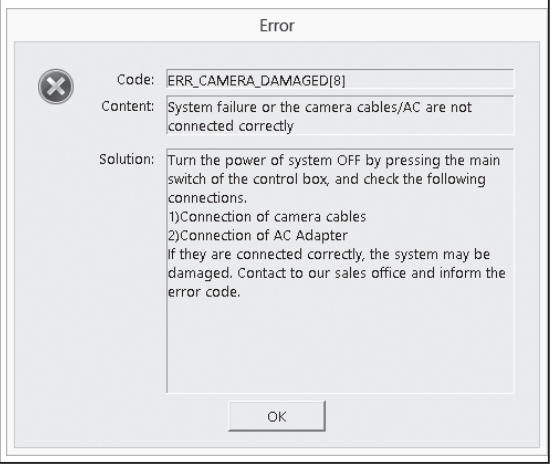
Hand switch for exposure U-HSEXP

U-HSEXP can be attached to the microscope by connecting U-CBS to U-HSEXP with the cable. With this operation, you can acquire images while operating the microscope.
U-HSEXP is a same function as the [Snap] button on the control window. Pressing the U-HSEXP switch allows you to acquire and save images.

◎ For procedures to connect to U-CBS, refer to P. 90.
◎ For procedure to attach to the microscope, refer to P. 91.
◎ You cannot record movies with U-HSEXP. Use the [Movie] button in the control window . (P.36)

9 Warning list

In DP2-SAL, messages may appear depending on the camera status or operations.

Category	Description	Example
Notification	The camera status or the information, e.g. exiting of processing, etc. are notified. The message disappears when passing 3 seconds after it was displayed or when any key is pressed.	
Warning	This message appears when a less serious error (such as an error where you can continue operating by redoing) occurs. This message is kept displayed until the [OK] button of the message is pressed.	
Confirmation	This message appears to confirm whether you truly want to execute, e.g. when deleting images, etc. Press the [Yes] button or the [No] button.	
Error	This message appears when a highly serious error occurs. The error contents and the countermeasures are displayed. Operate the camera according to the message.	

10 Specifications

Item		Specifications	
		DP22	DP27
Image size		1920 x 1440 (1 x 1) 960 x 720 (1 x 1) 960 x 720 (2 x 2) Cutout of any size at any position	2448 x 1920 (1 x 1) 1224 x 960 (1 x 1) 1224 x 960 (2 x 2) Cutout of any size at any position
File format		TIFF (no compression) JPEG-LOW (compression rate: 1/2.7) JPEG-HIGH (compression rate: 1/8)	
Number of pixel for display		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	
Live image display speed (frame rate)		Displayed pixels 1920 x 1440 (1 x 1) : 25 fps Displayed pixels 960 x 720 (1 x 1) : 25 fps Displayed pixels 960 x 720 (2 x 2) : 25 fps Displayed pixels 1920 x 1080 : 30 fps	Displayed pixels 2448 x 1920 (1 x 1) : 15 fps Displayed pixels 1224 x 960 (1 x 1) : 30 fps Displayed pixels 1224 x 960 (2 x 2) : 30 fps Displayed pixels 1920 x 1080 : 22 fps
Image display (zooming magnification)	Live image display	1x, 2x (digital zoom), 4x (digital zoom), 1:1	
	Played image	Thumbnail view 1x, 2x, 4x, 1:1	
Scale display		Scale imprint function : View scale / Hide scale Available microscope total magnification : 00.01 - 9999.99 x ◎ Up to 28 types of total magnifications can be set.	
Measurement functions		Distance between 2 points, Polyline, 3 points circle, Distance between 2 centers, 3 points angle, 4 points angle, Perpendicular, Parallel line distance, Polygon area, Free line, XY distance, Distance between 2 cross lines, Ruler, Arrow, Count, Text ◎ To display measurement results more accurately, followings must be set. • Scale display : ON • Scale setting : Entry of objective power • Image file format : TIFF (applicable for still image measurement in PLAY mode)	
Recording media		USB storage device, PC connected to network	
Input/output connectors		DC input : Main power supply Camera : USB3.0 TypeA Interface : USB2.0, USB3.0 Monitor output : DVI-I (Digital / Analog RGB) Wired LAN : 100Base-TX /10Base-T Serial ports : RS-232C, D-SUB9pin Microphone input connector : stereo mini jack Line output connector : stereo mini jack	
Dimensions and weight		180 (W) x 47 (H) x 215 (D) mm 1600 g	

Item	Specifications	
	DP22	DP27
Rating (AC adapter)	Output : 12 V ⎓ 4 A Input : 100-240 V ∿ 50/60 Hz 2 A	
Power consumption	Max. power consumption: 23.0 W During shutdown : 0 W (apparent power : approx. 16.0 VA) Standby mode : 7.0 W or less (apparent power : approx. 41.2 VA)	

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)

11 Troubleshooting

Depending on use, the performance of DP2-SAL may not be exhibited fully even though there are no failures. If problems occur, review the following list and take remedial actions as needed.
If the phenomena are not improved, contact Olympus for assistance.

Problem	Cause	Remedy	Page
The image cannot be acquired by pressing the [Snap] button.	Images are being written in the memory.	Press the [Snap] button again after 1 or more seconds.	26
	The capacity of the recording media such as a USB memory, etc. is full.	Replace the recording media or delete unnecessary images. Or delete images from the recording media after transferring them to PC, etc.	60,40
	Recording media such as a USB memory, etc. are not connected properly.	Connect the recording media such as a USB memory, etc. to the connector properly.	20
	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.	21
	Due to the network problem, PC of 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 of the save destination.	7,84
	The save folder is password protected. (Only when PC on the network is specified as the save destination of acquired images.)	Connect the keyboard to the control box D2-CB and input the password. Or consult with the network administrator of PC of the save destination.	20
	Due to the problem of connected USB devices or the network, the adverse effect is caused to the camera operation.	Remove the USB device and the LAN cable.	20
The play images are not shown on the display.	The main switch is turned OFF or the system is in the sleep mode.	Press the main switch of the control box D2-CB.	23,53
	The [Play] tab is not selected.	Select the [Play] tab.	57
	No image is recorded in the save destination.	Acquire the still image.	26
	Recording media such as a USB memory, etc. are not connected properly.	Connect the recording media such as a USB memory, etc. to the connector properly.	20
Nothing is shown on the display.	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.	17
	The display resolution is not set properly.	Set the display resolution properly.	83
	The system is in the sleep mode.	Operate the mouse or the keyboard.	53
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 the control box D2-CB to terminate the system. Then, connect the interface cable again and press the main switch of the control box D2-CB to restart the system.	16,23

Problem	Cause	Remedy	Page
The unfocused image is displayed.	The microscope is not focused correctly.	Use the fine adjustment knob to focus correctly.	–
	The parfocality of the eyepiece and the camera is not matched.	Adjust the parfocality with the camera adapter.	–
	The aperture stop of the condenser is open too widely.	Adjust by narrowing down the aperture stop.	–
	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. Or clean the cover glass on the bottom of the camera head.	–
The acquired image is dark. Or it is too bright.	The AE lock, exposure compensation or metering areas are not set properly.	Set them properly again.	25,33
	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.	32
	The image color is not correct.	Adjust to the appropriate image color.	34
	The light source of the microscope is too bright.	Reduce the brightness of the light source of the microscope.	–
There is a difference in the brightness or color between the left half and the right half of the image.	The 2-channel multi-CD is in use.	Make the observation object brighter and set the ISO sensitivity minimum (DP27-CU: ISO100, DP22-CU: ISO200). Also, use the camera calibration.	54
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 attached to the control box D2-CB such as a USB memory, etc .	46
	The recording media applicable to USB2.0 is specified as the save destination. Or the recording media applicable to USB3.0 connected to the USB2.0 connector is specified as the save destination.	Connect the recording media (HDD/SSD) applicable to USB3.0 to the USB3.0 connector. Also, save the movie file in the recording media (HDD/SSD) applicable to USB3.0.	20
	As the specified exposure time is long, the frame rate is slower.	Adjust the light intensity so that the exposure time is 1/30 s or less when DP27 is connected or 1/25 s or less when DP22 is connected.	–
The calendar is reset every time.	The battery built in the control box D2-CB is dead.	The replacement must be performed by the manufacturer (paid). Consult with Olympus.	5

Problem	Cause	Remedy	Page
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 control box D2-CB properly.	90
	The control box (BX3-CBH, etc.) is not recognized.	Turn OFF the main switches of the control box for microscope (BX3-CBH, etc.) and control box D2-CB. Then, turn ON in the order of 1 Control box for microscope (BX3-CBH, etc.) and 2 Control box D2-CB.	92
The automatic scale change function does not work.	The objective magnification is not specified. Or it is not set properly.	Specify the magnification of the objective you are using.	92
When the main switch of the control box D2-CB 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 terminated forcibly (the main switch is long-pressed.)	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.	23

Repair request

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

Please provide us the following information at that time. If this product is combined with PC, please provide us the PC model name, OS, free space in HDD, memory, and CPU.

- Product name and abbreviated name (example: Control box D2-CB)
- Product number
- Problem: If the error code (4-digit number) is displayed, please inform us as well.

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

■ 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 Olympus products, Olympus 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, JQA,	
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		U.S.A.	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
Österreichischer Verband für Elektrotechnik (ÖVE)	‹ÖVE›	‹HAR›	30	10	50
Danmarks Elektriske Materialkontroll (DEMKO)	‹DEMKO›	‹HAR›	30	10	30
National Standards Authority of Ireland (NSAI)	‹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)	SV, SVT, SJ or SJT, 3 X 18AWG
Canadian Standards Association (CSA)	SV, SVT, SJ or SJT, 3 X 18AWG

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