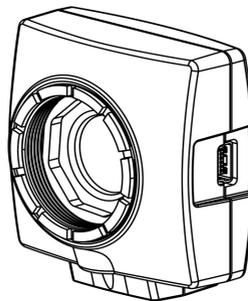


OLYMPUS



Installation Manual

OLYMPUS LC30

Microscope Digital Camera

Optical Microscope Accessory

To obtain optimum performance of this camera and to ensure the safety, study this manual thoroughly before operating the camera and keep it on hand during operation of the camera.
Keep this instruction manual in a safe place.

English

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The software that can be used in combination with the camera may contain 3rd party components, including open source software. The license information and the source code of open source software components can be retrieved separately. Please contact your local customer support for information on how to get the data.

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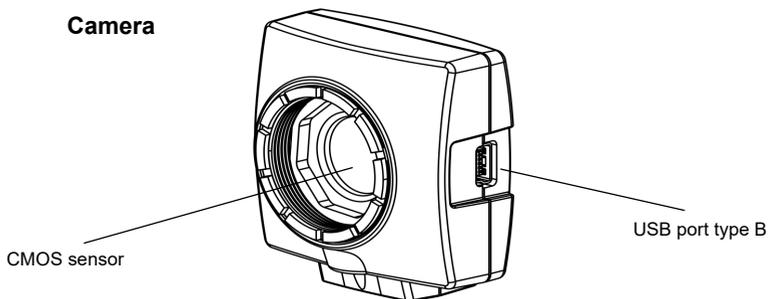
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1 The OLYMPUS LC30 color camera

1.1 Scope of supply

The camera's scope of supply comprises:

Item name: CAM-LC30 (E9700777) for America / Europe / Africa	Item name: CAM-LC30-CH (E9700798) for Japan / Asia / Australia
Camera with protective cap	Camera with protective cap
USB 2.0 cable	USB 2.0 cable
Installation Manual	Installation Manual
USB 3.0 PCI express card with driver on CD and power supply cable	not included in the scope of supply
1 adapter cable for the USB 3.0 PCI express card's power supply (SATA to IDE)	not included in the scope of supply



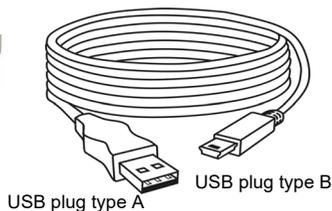
adapter cable



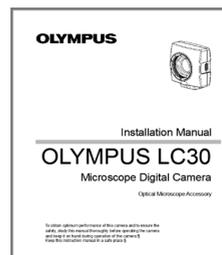
USB 3.0 PCI express card



USB 2.0 cable



Installation Manual



Other essential components To be able to use the camera, you'll also need the following components:

- Computer with MS-Windows operating system
- Light microscope with camera adapter or something similar, for example a macro stand
- Software to operate the camera (see chapter 3.4 on page 14).

1.2 Intended use

This camera is intended to be used for the acquisition of digital images, but not for clinical diagnostic purposes.

1.3 Specifications

Properties of the OLYMPUS LC30

The OLYMPUS LC30 is a CMOS color camera with a high frame rate. It was specially developed for acquisitions using light microscopy. The LC30 is of a compact design and can be connected to all common types of light microscope by a C-mount. The ICC profile technology guarantees an optimal color mapping.

Technical data	OLYMPUS LC30
Chip type	CMOS
Chip size	Type 1/2 Inch
Effective area (width x height)	6.55 mm x 4.92 mm
Pixel size	3.2 μm x 3.2 μm
Maximum resolution	2048 x 1532 pixels
Bit depth	24 bit (8 bit per color channel)
Read-out speed	5 – 40 MHz
Interface	USB 2.0
Camera mount	Standard C-Mount

Binning modes The OLYMPUS LC30 has three binning modes. In binning mode, the camera's CMOS sensor combines neighboring pixels into pixel blocks. This results in a higher sensitivity and a shorter processing time, but also in a lower resolution.

Binning	Resolution	Max. frame rate	Exposure times
Maximum resolution	2048 x 1532 pixels	10 frames per second	57 μs - 750 ms
Binning 2x	1024 x 768 pixels	28 frames per second	41 μs - 268 ms
Binning 3x	680 x 512 pixels	37 frames per second	46 μs - 200 ms
Binning 4x	508 x 384 pixels	49 frames per second	46 μs - 150 ms

1.4 Operating and storage conditions

Please operate and store your camera under the following conditions:

- The maximum permissible range for the ambient temperature during camera operation is +5°C to +40°C.
- The maximum permissible relative humidity during camera operation is 80 % (condensation free).
- When the camera is stored or transported, the ambient temperature must be kept between -20°C and +60°C.
- Indoor use only.
- Maximum altitude: 2000 m.

2 General safety instructions

The camera has been developed and produced in conformity with recognized safety regulations. However, it is not possible to entirely rule out possible hazards for the user, damage to the camera or microscope, or impairments of the camera's functionality. For this reason, always read and follow the general safety instructions and warnings before and during the installation.

2.1 Explanation of the symbols used

WARNING



Personal injuries

The warning sign and the word **WARNING** indicate dangerous situations that can lead to serious injuries or even death if ignored.

CAUTION



The warning sign and the word **CAUTION** indicate dangerous situations that can lead to light injuries if ignored.

ATTENTION



Device damage

The exclamation mark and the word **ATTENTION** indicate situations, where irreparable damage to the product can occur if ignored.



General notes

This symbol indicates useful advice, tips for the user and important information about the product.

2.2 Avoiding personal injuries

WARNING



Electric shock due to damaged cable!

When a cable is frayed or damaged, a person touching it risks the danger of an electric shock.

Shut off the hardware and replace the cable immediately!

WARNING



Poisoning due to toxic gases!

In the case of a fire, the material of the camera can give off toxic gases. When these are inhaled, it can cause irritation of the respiratory passages and damage to them.

Wear respiratory protection when fighting the fire!

CAUTION



Tripping hazard!

Cables laid across a room can be a dangerous tripping hazard. This can cause injuries to people and damage to equipment.

Wherever possible, lay cables along the wall or behind furniture. Fix cables that run across the room.

2.3 Avoiding device damage

ATTENTION**Never open the camera housing!**

The camera's CMOS chip is extremely sensitive. Electrostatic discharge can permanently damage the camera.

Therefore, never, under any circumstances, open the camera housing!

ATTENTION**Avoid vibration shocks!**

Mechanical shocks and strong vibrations can damage the camera.

Don't drop the camera during installation. Make sure it is securely mounted on the microscope. When it's not in use, store it in a safe place!

ATTENTION**Secure microscopes with additional components!**

A top-heavy microscope can tip over or fall down and result in damage to both the camera and the microscope.

If the microscope is top-heavy or otherwise unstable, fix it to the wall!

ATTENTION**Don't touch the protective glass!**

The protective glass over the CMOS chip is extremely sensitive and must not come into contact with bare hands or any other objects, otherwise the acquisitions will be impaired by fingerprints or scratches.

Remove dust from the protective glass carefully with compressed air. For the removal of dust stuck due to static electricity, ionized air is recommended.

ATTENTION**Observe the operating conditions!**

Exposure to high temperatures or humidity can damage component parts of the camera.

Always observe the operating and storage conditions (see chapter 1.4 on page 6).

ATTENTION**Don't expose the camera to strong light!**

Exposure to strong light can cause the camera to overheat, which may cause damage to its component parts.

Do not expose the camera to strong light (such as sunlight) for long periods of time.

ATTENTION**Only use the USB cable that is delivered with your camera**

Operate the camera only with the USB cable that is part of the camera's scope of supply. This ensures that the EMC basic standards are fulfilled.

3 System environment

3.1 General remarks

To acquire images with best possible quality, the microscope has to be configured correctly. The illumination for example must be set in a way to enable image acquisitions with appropriate exposure times.

This camera installation manual does not contain explanations on how to setup the microscope. Please refer to the microscope manual for this information. Additionally, the online help of OLYMPUS Stream and cellSens contains detailed information on image acquisition.



Using the camera with non-Olympus microscopes

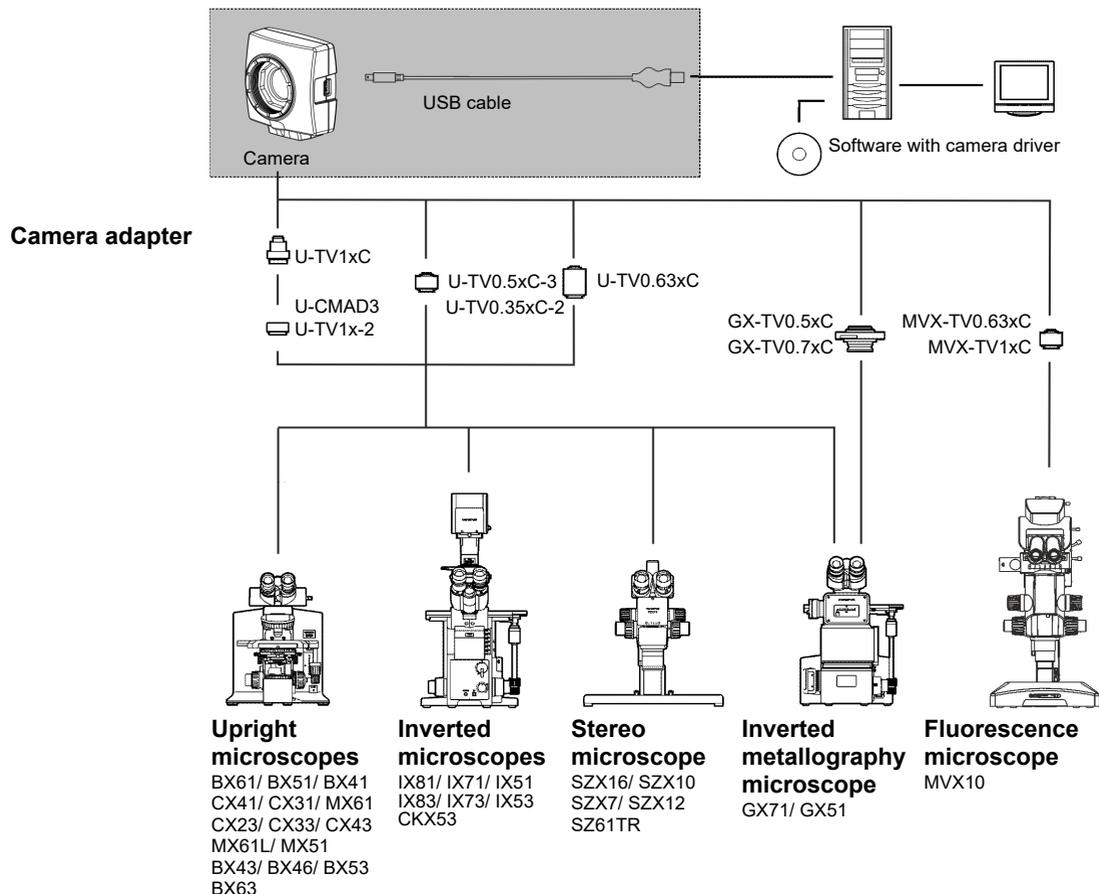
The OLYMPUS LC30 can be used in combination with many available microscopes. However, its performance in combination with non-Olympus microscopes has not been tested.

Using the OLYMPUS LC30 in special application contexts

Application context	Explanation	Countermeasure
Using objectives with low magnification (< 10x)	Depending on the microscope configuration, vignetting might occur in the image if objectives with a magnification of less than 10x are used.	Switch on the shading correction or use a camera adapter with a higher magnification.
Using objectives with high magnification (> 40x)	The maximum exposure time might not be sufficient to acquire a correctly exposed image.	Increase illumination intensity or use a camera adapter with a lower magnification.
Darkfield and fluorescence microscopy	The OLYMPUS LC30 is not suitable for darkfield or fluorescence microscopy due to its limited exposure range.	No countermeasure available.

Working with subarrays	Acquiring only a part of the image (subarray) does not increase the frame rate, because the OLYMPUS LC30 does not support the so-called hardware clipping.	No countermeasure available.
Using different Live and Snapshot resolutions	If Live and Snapshot resolutions differ, measurements performed on the Live image may be slightly displaced on the Snapshot image (max. 2 pixels).	Use identical resolutions for Live and Snapshot when performing measurements.
Observing low contrast samples Observing highly reflecting samples	When observing a low contrast sample or alternatively a highly reflecting one, a so-called spot flare may be noticeable, if the AS diaphragm is almost completely closed.	Switch on the shading correction or decrease illumination intensity and open the AS diaphragm.
Observing high contrast samples	High contrast samples may cause the auto exposure to fail, resulting in an underexposed image.	In the Camera Control of the software, define an exposure compensation. Alternatively, switch to manual exposure mode.
Acquiring images with a long exposure time	When acquiring images with a long exposure time (e.g. > 200 ms), an increasing amount of hot pixels may become visible.	No countermeasure available. This phenomenon is common to all camera sensors and not caused by a failure of the equipment.
Accessing USB data storage devices	When attaching, removing or accessing USB data storage devices, for example an external hard drive, while the image acquisition is in progress, a temporary drop in frame rate might be observed.	Only use or access USB devices when no image acquisition is in progress.

3.2 Microscopes and camera adapters



Suitable camera adapters

The system table shows the camera adapters you can use to connect the OLYMPUS LC30 to many available Olympus microscopes.

Please note that you can also use microscopes that are not listed there. Basically, all of the camera adapters with the magnification factor 0.35 or larger are suitable.

3.3 PC

3.3.1 System requirements for the computer

For optimal use, the system requirements listed in the table must be fulfilled. Depending on the software used to operate the camera, there may be additional or more extensive system requirements. Therefore, also check the system requirements for the camera you want to use.

	System requirements
Processor (CPU)	Intel® Core 2 Quad or better, Intel® i5 or higher, Intel® XEON, compatible AMD processors
Hard disk	at least 30 GB free storage space
RAM	8 GB
Screen resolution	at least 1920 x 1200 pixels
Drive	DVD-ROM drive
Interfaces	USB 2.0
Operating systems*	MS-Windows 10 (32 bit or 64 bit) MS-Windows 8.1 (32 bit or 64 bit) MS-Windows 7 (32 bit or 64 bit)
Computer power supply	> 300 W

* Make sure that the software you want to operate the camera with supports one of the operating systems listed here.

3.3.2 Operating the camera with a laptop

Generally speaking, it is possible to operate the camera with a laptop. If the power supply is not sufficient to operate the camera when an integrated USB interface is used, connect the camera to the laptop via an external USB hub with its own power supply.

3.4 Software

You'll need the appropriate software to acquire images with the camera. The camera is operated optimally with this paid software from Olympus:

- cellSens (software for Life Science applications)
- OLYMPUS Stream (software for industry applications)

You can also operate the camera with the free software DP2-TWAIN. TWAIN is a standardized software interface between software programs and image acquisition hardware, such as digital cameras or scanners.

You can download the DP2-TWAIN software from this Olympus website:

<https://www.olympus-lifescience.com/en/support/downloads>

When the [Software Downloads](#) website is displayed, click the [Camera Software Interface](#) entry.

A subdirectory opens. Click the [Details](#) button, next to the [DP2-TWAIN Ver8.2](#) entry. A file is displayed that contains further information and the download link. Click this link.

You have to log in or register before the download can begin.

4 Installation

Follow the order below when installing the camera and software.

- 1) Insert USB 3.0 PCI express card This card can also be used for USB 2.0 cameras.



This step is only necessary when a USB PCI express card is included in the scope of supply (Item name: CAM-LC30 (E9700777)).

- 2) Install the software
- 3) Connect the camera

4.1 Step 1: Insert USB 3.0 PCI express card

The camera is connected to the computer via a USB 3.0 PCI express card. Even if your computer already has a USB 3.0 PCI express card, we strongly recommend inserting the supplied PCI express card. When you do so, it ensures the camera's full functionality and avoids any traffic bottlenecks.

When inserting the PCI express card, please follow the instructions given by the manufacturer. Also pay attention to the safety instructions given below:

WARNING



Danger of electric shock from a plugged-in computer!

When installing hardware on a PC, there is a risk of electric shock.

Be sure to disconnect the power supply before you open the PC!

WARNING



Injuries caused by sharp metal edges!

The metal edges of the computer and the PCI express card are sharp. You can injure yourself on them.

Therefore, take care when you open the computer and install the PCI express card. It's a good idea to wear thin gloves when you do so.

After you have inserted the card, make sure to note the following point.

ATTENTION



Use the supplied power supply cable

Use the power supply cable supplied with the USB 3.0 PCI express card.

4.2 Step 2: Install the software

In the following, you'll find a short overview of how to install the paid software OLYMPUS Stream. The installation of the cellSens software is almost the same. Detailed information on software installation can be found in the installation manual that is delivered with the software.

It is important that you select the camera you are using when installing the software. The correct camera driver will then be automatically installed.



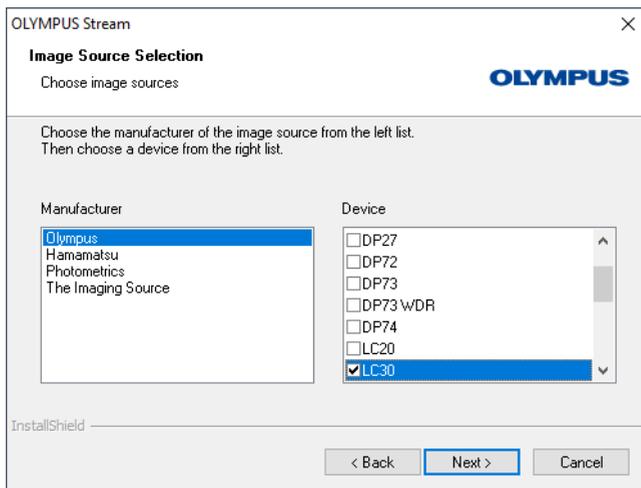
Log on as an administrator

To be able to install software, you must log on to your computer as an administrator. If you don't have administrator rights, contact your company's authorized IT specialist.

Do the following:

- 1) Close all running application programs, including the application programs that run in the background, for example, antivirus software.
- 2) Browse to the directory that contains the software and double-click the `setup.exe` file.
 - ▶ The installation wizard starts.
- 3) Follow the instructions of the installation wizard, provide the requested information, then click the **Next** button to continue.
- 4) In the **Image Source Selection** dialog box, select the **Olympus** manufacturer. Select the **LC30** check box.

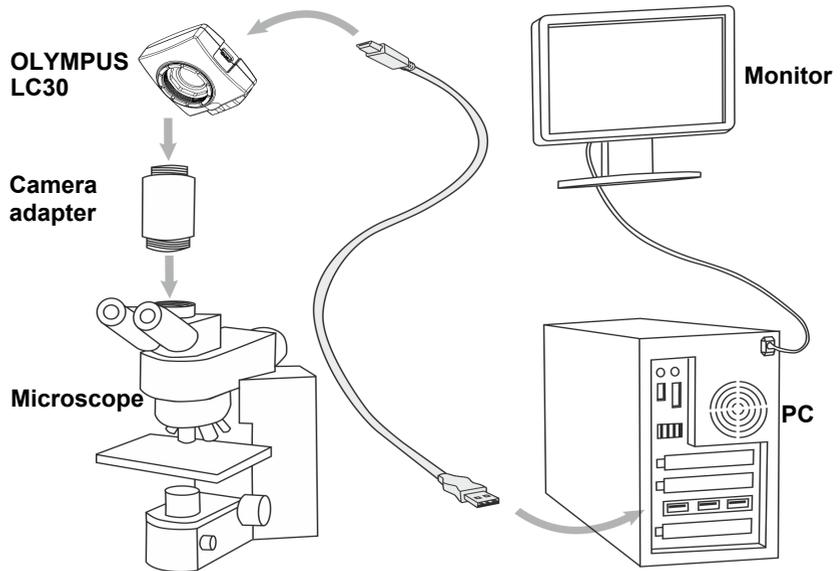
Follow the instructions of the installation wizard.



- 5) At the end of the installation, the files are copied to the PC. You can then finalize the installation procedure.

- ▶ The software and the camera driver have now been installed on your PC.

4.3 Step 3: Connect the camera



You can connect the camera to the microscope and computer as soon as you've installed the software. Do the following:

- 1) Remove the camera's protective cap.
- 2) Mount the camera onto the microscope's camera adapter.
- 3) Plug the end of the USB cable with the type B plug into the camera socket. Make sure that you only use the USB cable that is delivered with your camera. The proper functioning of the camera can only be guaranteed when this cable is used.
- 4) Plug the end of the USB cable with the type A plug into a slot of the USB 3.0 PCI express card inserted with step 1.



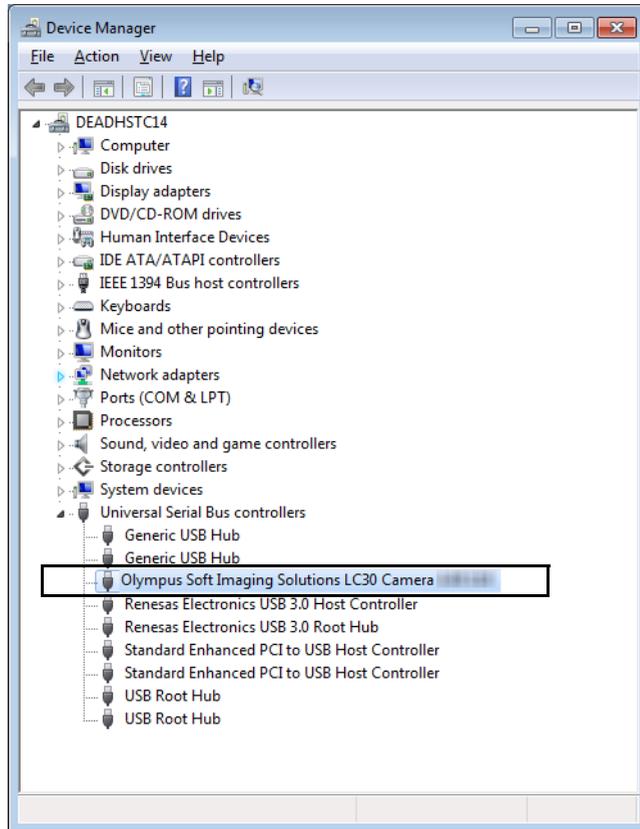
ATTENTION



Make sure that the plug is the right way round

The USB plugs are not symmetrical. Make sure that the plugs are the right way round when you plug them into the ports.

- ▶ After connecting the camera to your PC, the camera driver is automatically installed. As a rule, this installation only takes a few seconds. Please pay attention to the icons displayed in the status bar.
- 5) Wait until the installation of the camera driver has been finished.
- ▶ The camera has now been registered as a device and is ready for use. Now the camera driver appears in the Device Manager.



- 6) Start the software that has already been installed.

5 Care and maintenance

When correctly handled, the camera has a long life span and is to a large extent maintenance-free. The full functionality is assured when you observe the care instructions.

Cleaning the protective glass

To clean the camera's protective glass, use a common blower bulb to blow dust away and wipe it gently with cleaning paper (or clean gauze).

In the case of fingerprints or oil smudges on the protective glass, wipe it with clean gauze moistened with pure alcohol.

WARNING



Danger of fire when using alcohol!

Alcohol is highly flammable and can cause fires.

Make absolutely sure that the alcohol doesn't come into contact with open flames or electric components.

Cleaning the housing

Parts other than the glass components should be cleaned by wiping with a clean cloth. Do not use organic solvents to remove major stains. Use a soft cloth moistened with a neutral detergent solution.

ATTENTION



Do not dismantle any parts!

The camera is made up of parts that are easily damaged and their disassembly can quickly cause a malfunction or reduced performance.

Therefore, do not dismantle any parts of the camera.

6 Troubleshooting

The following text describes typical errors that may occur when using the camera.

Error	Possible causes	Solution
The camera can't be found	The camera was not selected during the installation of your software.	<p>The camera driver has to be installed. To do so, start the installation wizard for the software again. Browse to the directory that contains the cellSens or OLYMPUS Stream software and double click the setup.exe file. The installation wizard starts.</p> <p>In the next dialog boxes, select the options <i>Install or maintain imaging software > Maintain imaging software > Provide licenses, update installation.</i></p> <p>When the <i>Image source selection</i> dialog box is displayed, select the <i>Olympus</i> manufacturer and select the check box next to the camera you want to use for image acquisition.</p> <p>Follow the further instructions of the installation wizard and finish the installation.</p>
A faulty image appears	A power saving mode in the BIOS prevents image acquisition.	<p>If possible, ask your system administrator to switch off all power saving modes in the BIOS of your PC.</p> <p>Please note: Changes in the BIOS (Basic Input Output System) can have a negative effect on the way your computer operates. Make sure that only qualified personnel make changes to the settings in the BIOS.</p>
When starting the live-image, the "Camera timeout" error message appears.	The USB cable you are using is too long.	Use the supplied USB cable.
	Other processes that require a lot of processing power are running at the same time.	Check which other processes are running and end those that are not required.

6.1 Contacting Customer Service

Please contact your local OLYMPUS support if you have any questions about the product. The addresses can be found on the following websites:

Life Science Solutions <https://www.olympus-lifescience.com/en/contact-us/>

Industrial Solutions <https://www.olympus-ims.com/en/contact-us/>

7 Notes on conformity and disposal

7.1 CE Conformity (Europe)

This product complies with the requirements of Directive 2014/30/EU concerning electromagnetic compatibility according to Standard IEC/EN61326-1.

- Emission: Class B
- Immunity: Applied to industrial and basic environment requirements.

7.2 WEEE declaration (Europe)



In accordance with the European directive on Waste of 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 authority in the EU for return and/or collection systems available in your country.

7.3 RoHS Conformity (Europe)

This Olympus Soft Imaging Solutions camera conforms with the European Union directive on the restriction of the use of certain hazardous substances in electrical and electronic equipment 2011/65/EU.

7.4 FCC conformity (USA)

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

This device has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules.

These limits are designed to provide reasonable protection against harmful interference in a residential installation. This device generates, uses, and can radiate radio frequency energy. If not installed and used in accordance with the instructions, it may cause harmful interference to radio communications.

However, there is no guarantee that interference will not occur in a particular installation.

If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- 1) Reorient or relocate the receiving antenna.
- 2) Increase the separation between the equipment and receiver.
- 3) Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- 4) Consult the dealer or an experienced radio/TV technician for help.

FCC warning

Changes or modifications not expressly approved by the party responsible for compliance could void user's authority to operate the equipment.

7.5

For Korea only - item name CAM-LC30-CH (E9700798)

A급 기기 (업무용 방송통신기자재)

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7.6 China RoHS conformity (China)



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部件名称		有害物质					
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主体	机构部件	○	○	○	○	○	○
	光学部件	○	○	○	○	○	○
	电气部件	○	○	○	○	○	○
附件		○	○	○	○	○	○

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