



# **Leica Microscope Camera K3C, K3M, K5C, K8 User Manual**

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# General Notes

# General Notes

## Cleaning

- Do not use any unsuitable cleaning agents, chemicals or techniques for cleaning.
- Never use chemicals to clean colored surfaces or accessories with rubberized parts. This could damage the surfaces, and specimens could be contaminated by abraded particles.
- Follow the notes regarding cleaning the filter glass.
- In most cases it is OK to use a wipe dampened with 70% ethanol in distilled water.

## Servicing

- Repairs may only be carried out by Leica Microsystems-trained service engineers. Only original Leica Microsystems spare parts may be used.

## Responsibilities of person in charge of camera

- Ensure that the Leica microscope camera is operated, maintained and repaired by authorized and trained personnel only.

# Important Safety Notes

## User manual

The Leica microscope camera can be configured in a variety of ways in the Leica product range. User manuals and updates are available for you to download and print from our web site at [www.leica-microsystems.com](http://www.leica-microsystems.com).

This user manual describes the special functions of the Leica microscope camera and contains important instructions for operating safety, maintenance and the accessory parts.

You can combine individual system articles with articles from external suppliers (e.g. light sources, etc.). Please read the user manual and the safety instructions from the supplier.

Before installing, operating or using the instruments, read the user manuals listed above. In particular, please follow all safety instructions.

To maintain the unit in its original condition and to ensure safe operation, the user must follow the instructions and warnings contained in these user manuals.

# Symbols Used



Read and understand this user manual before using this camera.

## Warning! Safety hazard!



This symbol indicates especially important information that is mandatory to read and observe. Failure to comply can cause the following:

- Personal injury!
- Instrument malfunctions and damage.

## Warning of hazardous electrical voltage



This symbol indicates especially important information. Failure to comply can cause the following:

- Personal injury!
- Instrument malfunctions and damage.

## Instrument malfunctions and damage



This symbol warns against touching hot surfaces, such as light bulbs.

## Important information



This symbol indicates additional information or explanations that are intended to provide clarity.

# Safety Instructions

## Intended use

This camera system is designed for use by engineers and scientists. It is a scientific measuring instrument, which provides images.

The camera may only be used according to the instructions of this user manual. The disclosures and operating conditions in this user manual must be respected. Unauthorized modifications and changes of the device are forbidden for safety reasons.

## Non-intended use

Never use the Leica microscope camera or its components for diagnostic procedures if it is not expressly intended for such use.

The instruments and accessories described in this user manual have been tested for safety and potential hazards.

The responsible Leica affiliate must be consulted whenever the instrument is altered, modified or used in conjunction with non-Leica components that are outside of the scope of this user manual!

Unauthorized alterations to the instrument or noncompliant use shall void all rights to any warranty claims.

## Place of use

- Electrical components must be placed at least 10 cm away from the wall and from flammable substances.
- Avoid large temperature fluctuations, direct sunlight and vibrations. These conditions can distort the functionality of the camera.

- In warm and damp climates, the individual components require special care in order to prevent the build-up of fungus.

## Responsibilities of person in charge of instrument

Ensure that:

- The Leica microscope camera and accessories are operated, maintained and repaired by authorized and trained personnel only.
- All operators have read, understood and observe this user manual, and particularly the safety regulations.

# Safety Instructions (Continued)

## Transport

- Use the original packaging for shipping or transporting the individual modules of the Leica microscope camera and the accessory components.

## EU Declaration of Conformity

To download the EU Declaration of Conformity use the link <http://www.leica-microsystems.com/products>.

## Health risks

Workplaces with microscopes facilitate and improve the viewing task, but they also impose high demands on the eyes and muscles of the user. Depending on the duration of uninterrupted work, asthenopia and musculoskeletal problems may occur. For this reason, appropriate measures for reduction of the workload must be taken:

- Optimal arrangement of workplace, work assignments and work flow (changing tasks frequently).
- Thorough training of the personnel, giving consideration to ergonomic and organizational aspects.

The ergonomic optical design and construction of Leica microscopes are intended to reduce the exertion of the user to a minimum.



The manufacturer assumes no liability for damage caused by, or any risks arising from using the device for other purposes than those for which they are intended or not using them within the specifications of Leica Microsystems CMS GmbH.

In the event of such, the declaration of conformity shall become null and void.

This device is not intended for use in the patient environment defined by DIN VDE 0100-710. Neither is it intended for combining with medical devices according to 93/42/EEG and/or IVD devices according to 98/78/EG (2107/746).

If this device is electrically connected to a medical device according to EN 60601-1, the requirements defined in EN 60601-1-1 shall apply.

# Safety Instructions (Continued)



This user manual is an essential component of the camera, and must be read carefully before the camera is assembled, put into operation or used, and must be kept for later references.

## Instrument safety and EMC

Our device has been designed, produced and tested in compliance with:

- Radio interference suppression in compliance with EN 55011 class B (Class A for K8 only)
- EN 61326-1/IEC 61326-1, Electrical equipment for measurement, control and laboratory use – EMC requirements

The device meets the requirements of EU directives:

- 2014/30/EU EMC directive
- 2014/35/EU low voltage directive
- 2011/65/EU RoHS directive
- 2009/125/EC + VO EU 1194/2012 Ecodesign requirements for energy-related products
- 2009/125/EC + VO EU 2019/1782 Ecodesign requirements for energy-related product

and carries the CE mark.

**K8 camera only:** This camera is constructed and tested in accordance with EN 61010-1 / IEC 61010-1, Safety requirements for electrical equipment for measurement, control and laboratory use and EN 61326-1 / IEC 61326-1, Electrical equipment for measurement, control and laboratory user – EMC requirements.



The device must be disposed of in accordance with 2012/19/EU WEEE directive.

Intended for indoor use only in all EU member states, EFTA states and Switzerland.



In order to maintain this condition and to ensure safe operation, the user must follow the instructions and warnings contained in this user manual.

Unauthorized alterations to the camera or noncompliant use shall void all rights to any warranty claims and product liability!

# Safety Instructions (Continued)

## Tolerable ambient conditions

- Temperature: +10 °C ... 40 °C
- Relative humidity: 10% ... 90 %, non-condensing



Do not use the device in altitudes exceeding 2000 m ASL/NL.

Transport and storage in a range of -10° – +60 °C and at a humidity not exceeding 70 % (non-condensing).

Make sure that a free air circulation is provided.



The electrical components are not protected against water. Water can cause electric shock.



Do not use this camera near sources of high electromagnetic radiation (for example, unshielded, intentionally operated ultra-high frequency sources), because these can disrupt proper operation.

We recommend assessing the electromagnetic environment before operation of this camera and then giving corresponding instructions.



This user manual is an essential component of the product; it must be read carefully before the camera is assembled, put into operation or used, and must be kept for later reference.

Only insert or unplug data and control circuits when the camera is switched off; otherwise, the camera may be damaged.



Illustrations, descriptions and technical data are not binding and may be changed without notice.

You will find the latest release of this user manual and other information on our web site at [www.leica-microsystems.com](http://www.leica-microsystems.com).

Electrical components must be assembled at least 10 cm from the wall and away from flammable substances.

This device is not intended for use in the patient environment defined by DIN VDE 0100-710. Neither is it intended for combining with medical advices according to EN 60601-1. If this device is electrically connected to a medical device according to EN 60601-1, the requirements defined in EN 60601-1-1 shall apply.

# Safety Instructions (Continued)

## Technical data external power supply for camera K8

Only use the power supply (LPS certified) provided by Leica Microsystems. In the event of a defect, contact the Leica Service.

- Supply voltage: 100-240 VAC
- Frequency: 50/60 Hz
- Power: max. 60 W
- Output voltage: 12 VDC
- Output power: max. 5 A

Electrical safety in accordance to IEC 62368-1.

## Cleaning



### Caution!

Acetone, xylene and nitro-containing thinner can harm the device and thus may not be used.

Test clean solutions of unknown composition first on a less visible area of the unit. Be sure that coated or plastic surfaces do not become matted or etched.

# Introduction

# Standard Delivery and Optional Accessories

## Standard delivery

Standard delivery of the Leica microscope camera includes:

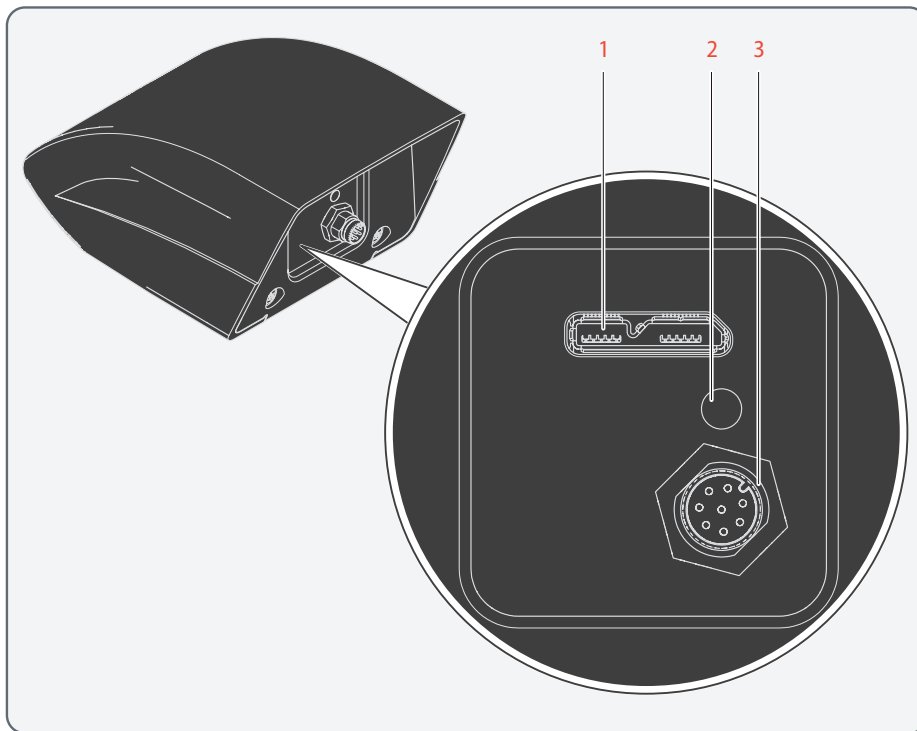
1. *Leica microscope camera*
2. *USB cable for connecting to a computer*
3. *PCIe USB card (K8 camera only)*
4. *Power supply unit (K8 camera only)*



The number and layout of ports will differ between camera models.

Additional information about working on the computer and with Leica Application Suite X (LAS X) is provided in the software's online help.

## Overview K3C, K3M, K5C

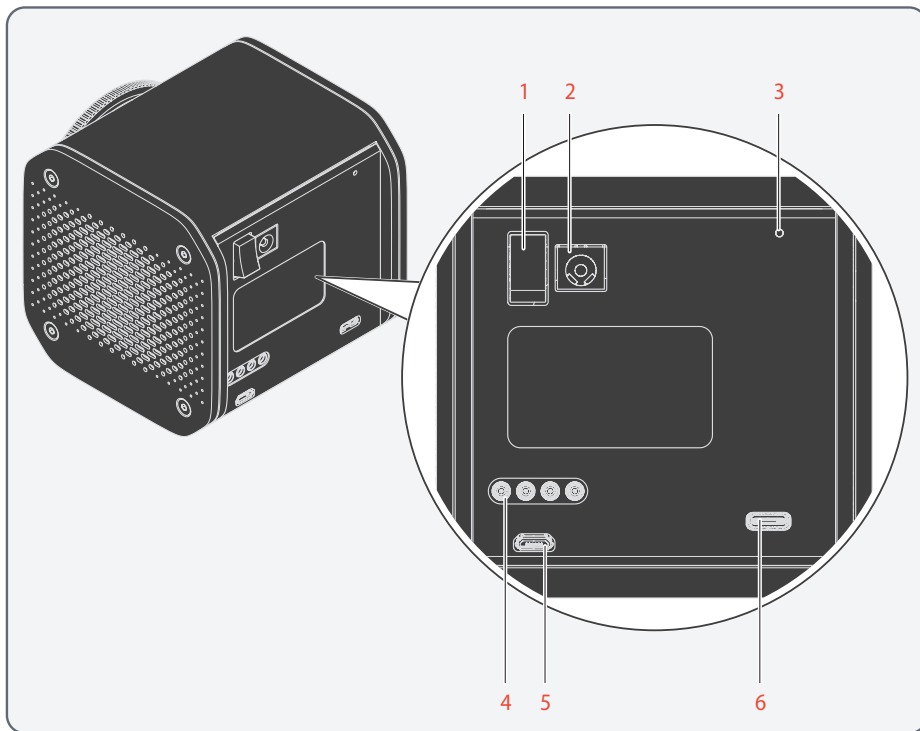


1. *USB 3 port for power supply and PC connection*
2. *LED light*
3. *Trigger port*

LED states:

- LED red: Check USB connection to the PC
- LED green / green blinking: Camera is ready to communicate / is working

# Overview K8



1. *ON/OFF switch*
2. *Power supply connection*
3. *LED light*
4. *Trigger port*
5. *Service port (Service only)*
6. *USB 3 port for PC connection*

LED states:

- LED blinking: Camera is initializing
- LED off: Camera is ready to communicate

# Assembly

# Assembling the Camera



The Leica microscope camera is mounted on a tube or on a microscope's photo port using a C-mount adapter.



The Leica microscope camera is compatible with most stereo, macro and light microscopes from Leica Microsystems.

## Mount adapter for your camera type:

| Camera | Mount adapter                                                                                                                                                                                     |
|--------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| K3     | <ul style="list-style-type: none"><li>For compounds use:<br/>Microscope c-mount: 0.55x (Art. No.: 11541544)</li><li>For stereo use:<br/>Microscope c-mount: 0.50x (Art. No.: 110450528)</li></ul> |

| Camera | Mount adapter                                                                                                                                                                                                                                                                                                             |
|--------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| K5C    | <ul style="list-style-type: none"><li>For compounds use:<br/>HC C-mount adapter 1x for sCMOS (Art. No.: 11541551)</li><li>For stereo use:<br/>Video Adapter 1x (Art. No.: 10450829)</li></ul>                                                                                                                             |
| K8     | <ul style="list-style-type: none"><li>For compounds use:<br/>HC C-mount adapter 1x for sCMOS (Art. No.: 11541551)</li><li>For compounds use with fast external filter wheels:<br/>C-Mount adapter HC 1x for filter wheel (Art. No.: 11541552)</li><li>For stereo use:<br/>Video Adapter 1x (Art. No.: 10450829)</li></ul> |

## Connecting the camera

1. Screw the camera onto a C-mount adapter for your camera type.
2. Place the camera on the microscope's photo port or the tube using the previously mounted C-mount adapter.
3. Connect the USB cable to the USB 3 port in the PC and fasten the screws (see "Overview K3C, K3M, K5C" on page 14 or "Overview K8" on page 15).
4. K8 only: Connect the power supply (see "Overview K8" on page 15).



In case of triggering the camera, connect the trigger cable to the trigger port and secure it. Then connect the trigger cable to a compatible triggering device of your choice.

# **PC Operation - Installation / Setup / Application**

# Connecting a Computer, Installing LAS X Software

## Installation and connection

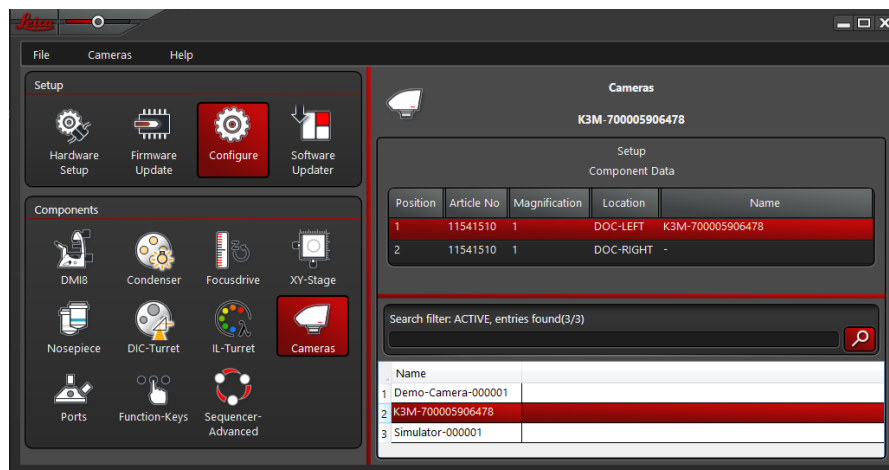


For instructions on installing and using the LAS X software for PC mode, refer to the "Quick Installation Guide".

## Prerequisite:

- The camera is connected to the power supply and the USB connection to the PC is established (camera-dependent, see "Overview K3C, K3M, K5C" on page 14 or "Overview K8" on page 15).
1. After downloading the LAS X software, follow the instructions for installing the software. (The computer also has to have sufficient free hard drive space).
  2. Connect the Leica microscope camera to a USB 3 port of the computer using the USB cable.

3. In the Leica Hardware Controller, select [Configure] and [Cameras] to enable the camera within LAS-X by selecting the available camera attached to a chosen C-mount adapter.



4. Close the Leica hardware configurator.

# Using the Camera in LAS-X

## Starting the camera in LAS X

1. Start Leica Application Suite X (LAS X).
2. Follow the instructions in the software for adjusting and acquiring an image.



For additional information on Leica Application Suite X, please refer to "LAS X Help".



You may be asked to specify your microscope's current instrument configuration when starting LAS X for the first time.

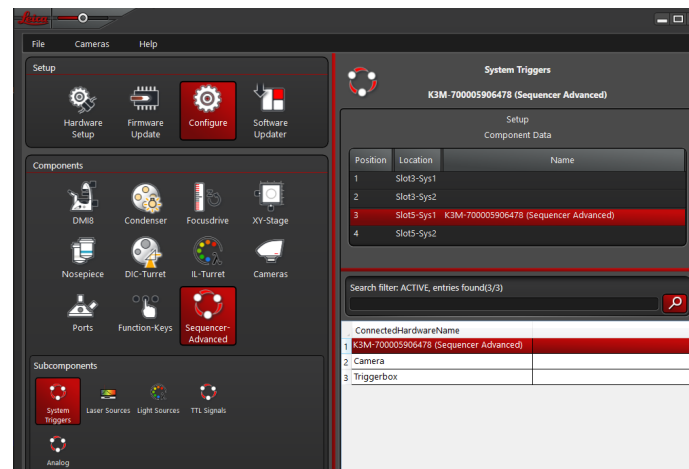
# Triggering the Camera

To control triggering of the camera, the following elements are needed:

- Hardware: camera, Advanced CTR box
- LAS X software
- Hardware Configurator in LAS X shown below

1. Start the Leica Hardware Configurator.
2. With sequencer: In the Hardware Configurator, select [Configure > Sequencer > System Triggers].

3. Select [Camera] for the terminal ([Sys 1] or [Sys 2]) of the sequencer plug-in module to which the trigger cable is connected.



4. Close the Leica Hardware Configurator.

# Filter Replacement

A filter is installed in color cameras. This filter can lead to limitations in the applicability of the sensor for specific applications.



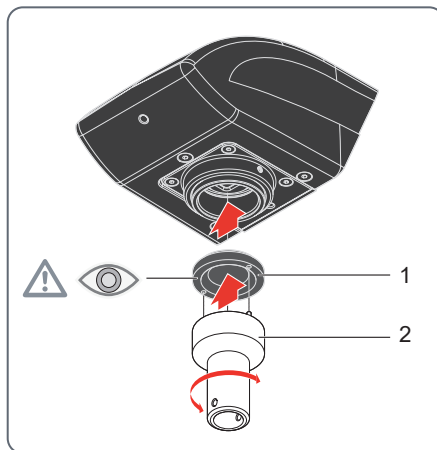
## Notice!

Avoid contamination of the filter, sensor and the lens by dust and airborne particles.

Perform the filter replacement in a dust-free room with clean tools.

Proceed as follows to replace the filter.

1. Hold the camera during the change of the filter with the lens downward to prevent dust from falling onto the sensor window



2. Insert the assembly tool (2) into the sensor opening.
3. Place the two pins at the front end into the locator holes of the filter.
4. Unscrew the existing filter.

5. Place the two pins of the assembly tool at the front end (to the lens) into the locator holes of the new filter (see warning symbol in the image).
6. Screw the new filter into the sensor opening. Do not touch the sensor!

## Gain (K8 Camera Only)

The K8 has three modes:

1. 8/11-bit - Full well, Balanced, Sensitivity (11-bit for higher frame rates)
2. 12-bit - Correlated Multi-Sampling (CMS, for highest sensitivity)
3. 16-bit - HDR Combined Gain (for highest dynamic range)

The HDR Combined Gain 16-bit mode provides the best balance between full-well capacity and noise performance. However, it provides lower frame rates than the single gain outputs.

The CMS mode provides the lowest read noise performance, achieving approximately 1e- of read noise. The signal is sampled twice by configuring both the amplifiers to have high sensitivity. CMS modes trades off dynamic range for lower read noise. It has the same frame rate as the 16-bit HDR mode.

The 8/11-bit mode provides the highest frame rates.

# Triggering (K8 Camera Only)

## TTL trigger interface

The K8 offers several methods of integrating with external hardware devices. Each camera has four MMCX connectors on the back of the camera for trigger input/output operations. The signals provided to the user are:

| Signal                       | Description                                                |
|------------------------------|------------------------------------------------------------|
| Trigger In (TRIG IN)         | Inputs initiate an exposure or sequence                    |
| Trigger Ready Out (TRIG RDY) | Status indicating if the camera can accept another trigger |
| Read Out (RD OUT)            | Status indicating the camera is currently digitizing       |
| Expose Out (EXP OUT)         | Output for controlling illumination source                 |

For K8 triggering, please use trigger cable MMXC connector for K8 (Leica article no. 11547117).

## Camera Fan Control (K8 Camera Only)

The fan in the K8 camera has variable speed control.

The K8 provides three fan speeds and on the highest setting the sensor will reach in excess of -5 °C at max. 30° ambient.

Fan speed can be set to one of these values in LAS X:

1. High
2. Medium
3. Low

# Care and Maintenance

# Care, Maintenance, Contact Persons

## General

We hope you enjoy using your high-performance camera. Leica microscope cameras are renowned for their robustness and long service life. Observing the following care and cleaning tips will ensure that even after years and decades, your Leica microscope camera will continue to work as well as it did on the very first day.

## Warranty benefits

The guarantee covers all faults in materials and manufacture. It does not, however, cover damage resulting from careless or improper handling.

## Contact address

If your instrument no longer works perfectly, contact your Leica representative. You can find information on worldwide Leica representatives on the Leica web site: [www.leica-microsystems.com](http://www.leica-microsystems.com).

## Care, Maintenance, Contact Persons (Continued)

### Care

- Keeping all optical components clean is important for maintaining good optical performance.
- If any optical surface becomes badly coated with dust or dirt brush it off with a camel hair brush before attempting to wipe it clean.
- Optical surfaces should be cleaned using a lint-free cloth, lens cloth or cotton swab soaked in 70% ethanol or a commercially available glass cleaner. Do not use pure alcohol.
- Avoid excessive use of solvents. The lint-free cloth, lens cloth or cotton swab should only be lightly moistened with solvent.
- Protect your camera from moisture, fumes and acids and from alkaline, caustic and corrosive materials and keep chemicals away from the instruments.
- Plugs, optical systems and mechanical parts must not be disassembled or replaced, unless doing so is specifically permitted and described in this user manual.
- Protect your camera from oil and grease.
- Do not grease guide surfaces or mechanical parts.

### Protection from dirt

Dust and dirt will affect the quality of your results.

- Put an optionally available dust cover over the camera when it will not be used for a long time.
- Keep accessories in a dust-free place when not in use.

## Care, Maintenance, Contact Persons (Continued)

### Cleaning polymer components

Some components are made of polymer or are polymer-coated. They are, therefore, pleasant and convenient to handle. The use of unsuitable cleaning agents and techniques can damage polymers.

### Permitted measures

- Remove dust on the filter glass with a bellows and a soft paintbrush.
- Your local Leica Service or an appropriately trained user can replace a dirty or scratched glass filter in front of the camera sensor.
- Clean the objectives with special optics cleaning cloths and pure alcohol.

### Servicing

- Repairs may only be carried out by Leica Microsystems-trained service engineers. Only original Leica Microsystems spare parts may be used.

## Optional Sales Item

| Item | Leica article number | Designation                                     |
|------|----------------------|-------------------------------------------------|
| 1    | 12730495             | USB 3 PCI-express board<br>(for K3 camera only) |
| 2    | 11547115             | Trigger cable for K3M                           |
| 3    | 11547117             | Trigger cable MMXC connector for K8             |
| 4    | 12730487             | Filter tool for filter assembly                 |
| 5    | 33000100             | Leica IR / UV blocking filter                   |

有害物质标记表  
Hazardous Substance Marking Table

| 部件名称<br>Part Name                       | 有害物质<br>Hazardous Substances |           |           |                 |               |                 |
|-----------------------------------------|------------------------------|-----------|-----------|-----------------|---------------|-----------------|
|                                         | 铅<br>(Pb)                    | 汞<br>(Hg) | 镉<br>(Cd) | 六价铬<br>(Cr(VI)) | 多溴联苯<br>(PBB) | 多溴二苯醚<br>(PBDE) |
| 印刷电路板<br>Printed circuit boards         | x                            | o         | o         | o               | o             | o               |
| 电子元器件<br>Electronic components          | x                            | o         | o         | o               | o             | o               |
| 机械部件<br>Mechanical parts                | x                            | o         | o         | o               | o             | o               |
| 电缆和电缆配件<br>Cables and cable accessories | x                            | o         | o         | o               | o             | o               |
| 显示屏<br>Displays                         | x                            | o         | o         | o               | o             | o               |
| 光源<br>Light sources                     | x                            | x         | o         | o               | o             | o               |
| 光学<br>Optics                            | x                            | o         | x         | o               | o             | o               |

这些表是按照 SJ/T 11364的规定编制。

This table is prepared in accordance with the provisions of SJ/T 11364.

o: 表示该有害物质在该部件所有均质材料中的含量均在 GB/T 26572规定的限量要求以下。

Indicates that said hazardous substance contained in all of the homogeneous materials for this part is below the limit requirement of GB/T 26572.

x: 表示该有害物质至少在该部件的某一均质材料中的含量超出 GB/T 26572规定的限量要求。

Indicates that said hazardous substance contained in at least one of the homogeneous materials used for this part is above the limit requirement of GB/T 26572.

害物质标记表涵盖了这里列出的产品。

The “Hazardous Substance Marking Table” covers the here listed products.

|             |          |               |                    |                                  |
|-------------|----------|---------------|--------------------|----------------------------------|
| 微镜微         | 控制       | 光源            | 光学和照相机             | 电源和服务模块                          |
| Microscopes | Controls | Light Sources | Optics and Cameras | Power Supply and Service Modules |

环保使用期限标签（EFUP）（请参阅铭牌）

Label for Environmentally Friendly Use Period (EFUP) (see type plate)

|                                                                                   |                                                                                                                                                                 |
|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  | 管制物质的限值符合SJ / T 11364的规定，且低于0.1%重量<br>The limit values of the regulated substances comply with the specifications of SJ / T 11364 and are below 0.1% by weight. |
|  | 管制物质的限值符合SJ / T 11364的规定，但超过0.1%重量<br>The limit values of the regulated substances comply with the specifications of SJ / T 11364 but are above 0.1% by weight. |



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