OLYMPUS
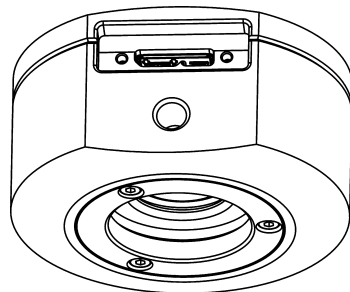
Installation Manual

SC180

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.

English

1   The SC180 color camera

1.1   Scope of supply

The camera's scope of supply comprises:
- Camera with protective cap
- USB 3.0 cable
- Manual: Safety and warning information

Camera

USB port type B

CMOS sensor

USB 3.0 cable   **Safety and warning information**

USB plug type B

USB plug type A

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 SC180

The SC180 is a CMOS color camera with a high frame rate. It was specially developed for acquisitions using light microscopy. The camera is of a compact design and can be connected to all common types of light microscopes by a C-mount. The ICC profile technology guarantees an optimal color mapping.

Technical data	SC180
Chip type	CMOS
Chip size	1/2.3 inch
Effective area (width x height)	6.140 mm x 4.605 mm
Pixel size	1.25 µm x 1.25 µm
Maximum resolution	4912 x 3684 pixels (4:3) 4912 x 2762 (16:9)
Bit depth	24 bit, 48 bit
Read-out speed	96 – 432 MHz
Interface	USB 3.0
Camera mount	Standard C-Mount

Binning modes

The SC180 has several 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.

Acquisition mode	Image format	Resolution	Max. frame rate	Exposure times
Maximum resolution	4:3	4912 x 3684 pixels	10 frames per second	0.025 ms - 1 s
Binning 2x2	4:3	2456 x 1842 pixels	23 frames per second	0.022 ms - 1 s
Binning 4x4	4:3	1224 x 920 pixels	45 frames per second	0.022 ms - 1 s
Maximum resolution	16:9	4912 x 2762 pixels	14 frames per second	0.025 ms - 1 s
4K	16:9	3840 x 2160 pixels	25 frames per second (8 bit)	0.02 ms - 0.7 s
Full HD	16:9	1920 x 1080 pixels	31 frames per second	0.02 ms - 1 s
Binning 4x4	16:9	1224 x 688 pixels	59 frames per second	0.02 ms - 1 s

1.4 Operating and storage conditions

Please operate and store your camera in 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 installation.

2.1 Explanation of the symbols used

Personal injuries

WARNING

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.

Device damage

ATTENTION

!

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

General notes

i

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 receiving an electric shock.

Shut off the hardware and replace the cable immediately!

WARNING   **Poisoning due to toxic gases**

In the event 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.

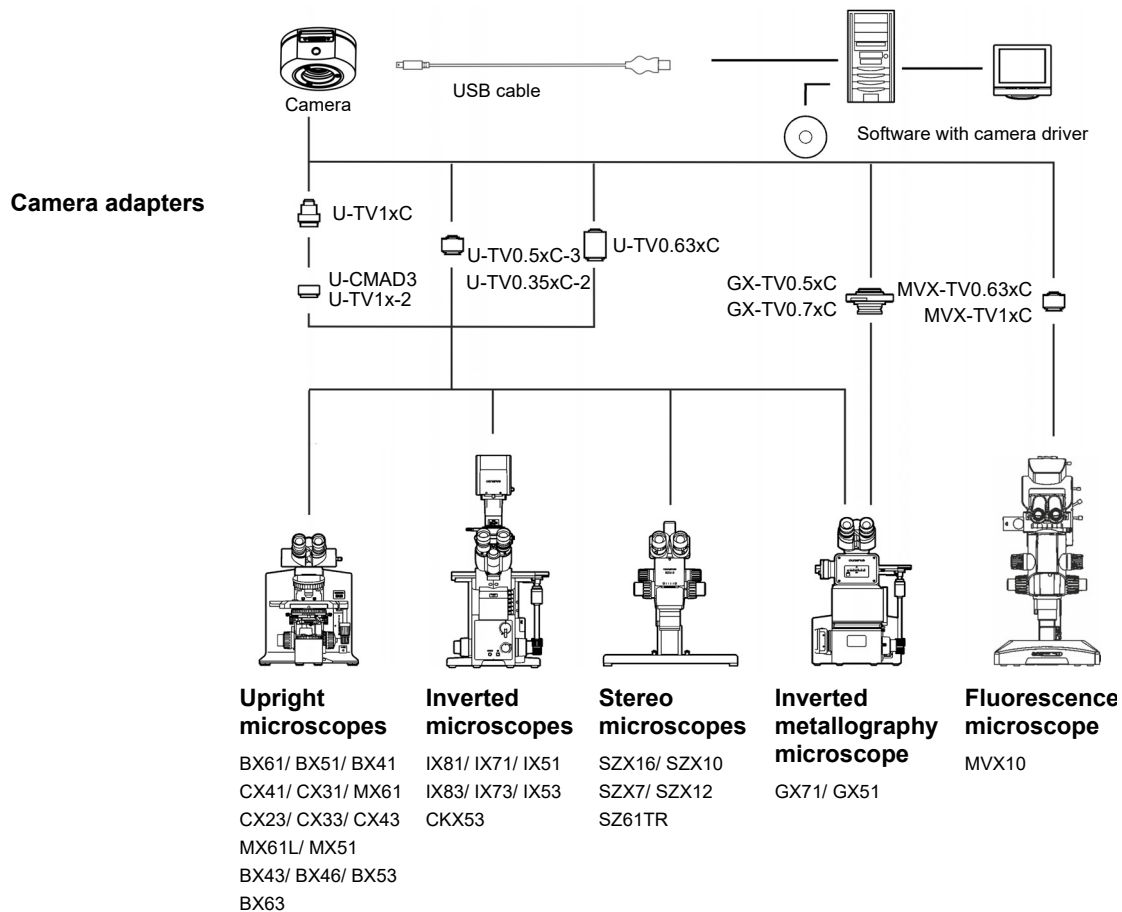| $\boxed{\mathbf{i}}$	**Not using the camera with Olympus microscopes**
	The SC180 can be used in combination with many available microscopes. The camera performance has only been tested in combination with Olympus microscopes.

Using the SC180 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 SC180 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 SC180 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. 5 pixels).	Use identical resolutions for Live and Snapshot when performing measurements.
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. > 300 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

Camera adapters

Upright microscopes

BX61/ BX51/ BX41
CX41/ CX31/ MX61
CX23/ CX33/ CX43
MX61L/ MX51
BX43/ BX46/ BX53
BX63

Inverted microscopes

IX81/ IX71/ IX51
IX83/ IX73/ IX53
CKX53

Stereo microscopes

SZX16/ SZX10
SZX7/ SZX12
SZ61TR

Inverted metallography microscope

GX71/ GX51

Fluorescence microscope

MVX10

Suitable camera adapters   The system table shows the camera adapters you can use to connect the SC180 to many available Olympus microscopes.

Please note that you can also use microscopes that are not listed there.

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® 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 1080 pixels recommended 3840 x 2160 pixels
Drive	DVD-ROM drive
Interfaces	USB 3.0
Operating systems*	Microsoft® Windows® 11 Professional (64 bit) Microsoft® Windows® 10 Professional (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:

- 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 one of these websites:

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

https://www.olympus-ims.com/en/service-and-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 for Windows OS Installer 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) Installing the software

2) Connect the camera

4.1   Step 1: Installing 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.
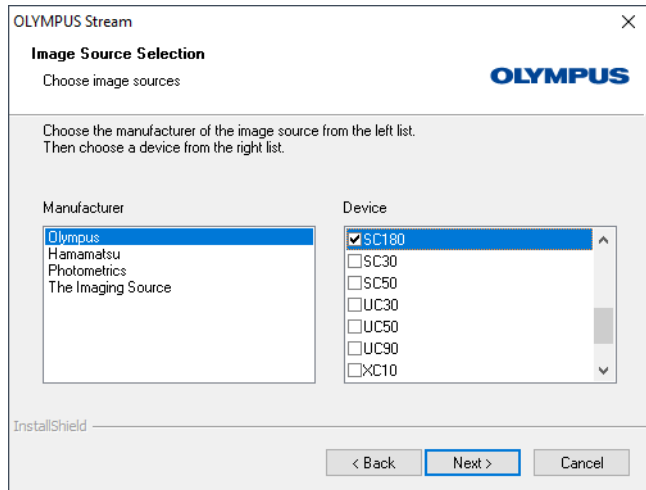
$\boxed{\mathbf{i}}$ **Log on as an administrator**

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:
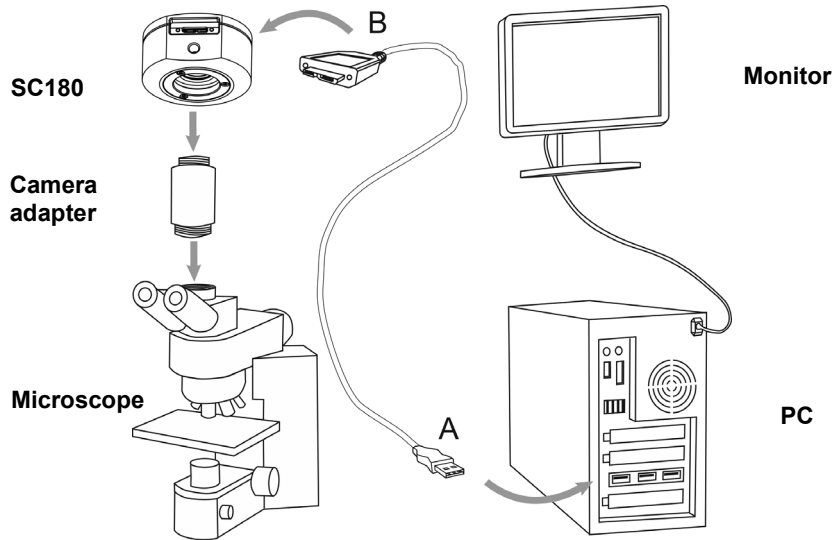
1) Close all running application programs, including the application programs that run in the background, for example, antivirus software.

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 SC180 check box.

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

$\Rightarrow$ The software and the camera driver have now been installed on your PC.

4.2   Step 2: Connecting 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 and tighten the knurled screws. 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 camera's USB cable with the type A plug into a free USB 3.0 port of your PC. If possible, use a USB 3.0 port that is located on the back side of your PC.

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.

$\Rightarrow$ 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.

$\Rightarrow$ The camera has now been registered as a device and is ready for use.

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.	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. In the next dialog boxes, select the options Install or maintain imaging software > Maintain imaging software > Provide licenses, update installation. When the Image source selection dialog box is displayed, select the Olympus manufacturer and select the check box next to the camera you want to use for image acquisition. Follow the further instructions of the installation wizard and finish the installation.
A faulty image appears	A power saving mode in the BIOS prevents image acquisition.	If possible, ask your system administrator to switch off all power saving modes in the BIOS of your PC. **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.
When starting the live-image, the "Camera time-out "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 Evident support if you have any questions about the product.

technical-support-emea@evidentscientific.com

7 Declarations of 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 EVIDENT Technology Center Europe GmbH camera conforms with the European Union directives on the restriction of the use of certain hazardous substances in electrical and electronic equipment 2011/65/EU and (EU) 2015/863.

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 distance 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.

FCC Supplier's Declaration of Conformity
The supplier hereby declares that the product
  Product name: Optical Microscope Accessory
  Model Number: SC180
Conforms to the following specifications:
  FCC Part 15, Subpart B, Section 15.107 and Section 15.109
Supplementary Information:
  This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.
Responsible Party Name: Evident Scientific Inc.
Address: 48 Woerd Ave Waltham, MA 02453, U.S.A.
Phone Number: 781-419-3900

7.5   For Korea only

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

Trade Name or Registrant: Equipment Name:	EVIDENT Technology Center Europe GmbH Optical Microscope Accessory
Model:	SC180
Basic Model Number: Registration No.:	SC180 MSIP-REM-OIS-66000000
Manufacturer/Country of Origin	EVIDENT Technology Center Europe GmbH, Germany

7.6 　　　　China RoHS conformity (China)

 电器电子产品有害物质限制使用标志	本标志是根据 " 电器电子产品有害物质限制使用管理办法 " 以及 " 电子电气产品有害物质限制使用标识要求 " 的规定，适用于在中国销售的电器电子产品上的电器电子产品有害物质使用限制标志。 （注意）电器电子产品有害物质限制使用标志内的数字为在正常的使用条件下有害物质等不泄漏的期限，不是保证产品功能性能的期间。

产品中有害物质的名称及含量

部件名称		有害物质					
		铅及其化合物 (Pb)	汞及其化合物 (Hg)	镉及其化合物 (Cd)	六价铬及其化合物 (Cr(VI))	多溴联苯 (PBB)	多溴二苯醚 (PBDE)
主体	机构部件	X	○	○	○	○	○
	光学部件 X	X	○	○	○	○	○
	电气部件	X	○	○	○	○	○
附件		○	○	○	○	○	○
本表格依据 SJ/T 11364 的规定编制。 ○：表示该有害物质在该部件所有均质材料中的含量均在 GB/T26572 规定的限量要求以下。 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/T26572 规定的限量要求。							

──────── Manufacturer / **製造元** / 制造商 ────────

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