



微信公众账号



FACEBOOK

安徽长庚光学科技有限公司

www.laowalens.com

服务热线: 400-066-1316

Email: sales@laowalens.com

电话Tel: 0551-65669038

地址: 合肥市庐阳区天水路6号

Add: Tianshui Road, Luyang District, Hefei City, Anhui Province, China

Laowa Aksen 45mm f2.8 1-5x Ultra Macro APO
Laowa Aksen 17.5mm f1.7 5-10x Ultra Macro APO

使用手册
Instruction Manual

LAOWA 老蛙

本公司保留更改产品设计与规格的权利，届时恕不另行通知；
本公司保留对此《使用说明》的最终解释权。
Please note we reserve the right to change our product's
design and specifications at any time without notice and
to the final interpretation of the *Instruction Manual*.



前言

真诚地感谢您选购 Laowa Aksen 45mm f2.8 1-5x Ultra Macro APO以及Laowa Aksen 17.5mm f1.7 5-10x Ultra Macro APO显微镜头。此镜头拥有高亮度，衍射小，光线充足；长工作距离，易补光；高性能，高解析力等镜头特点。



为了操作上的安全,使用本产品前请务必详细阅读使用手册与注意事项,并将手册放在需要时容易取得的地方。如遇到不能解决的问题请通过售后电话获取技术支持。

主要特色

- 此系列显微镜最大NA值可达NA0.25 (5-10X) 和NA0.09 (1-5X), 带来的最大优势就是高亮度, 衍射小, 光线充足, 能够保证拍摄时, ISO数值较低, 画面更加纯净。
- 拥有较长的工作距离, 易补光, 操作方便, 能够在工业和科研方面进行普及。
- 采用先进的光学设计, 高性能, 解析力出众。能够拍摄出惊艳且震撼的作品。
- 可实现1-10X的放大倍率切换。
- 具备齐焦功能, 在改变放大倍率的过程中, 焦点始终保持, 适合视频素材拍摄。

注意事项

△ 安全注意事项

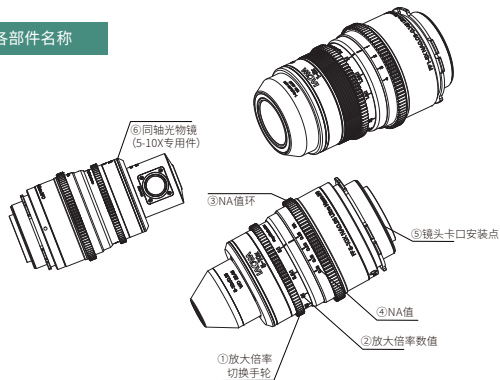
- 切勿自行拆解、修改或改装。当产品由于外力原因破损, 切勿触碰外露部分或破损边缘处。
- 切勿放置于直射阳光下、封闭车辆中或其余高温处, 否则过高的温度会使镜片和其他部件产生伸缩变形。
- 不使用镜头时, 请将镜头前盖盖上或置于没有阳光照射处。凸透镜反射出的光线可能会聚集在附近物体上, 导致发生火灾。
- 在逆光拍摄时, 切勿将太阳置于画面中心, 应该使太阳充分偏离画角, 否则阳光会在相机内部聚集并导致火灾或灼伤眼睛。
- 在使用相机内置闪光灯拍摄时, 由于镜头本身会遮挡光线而产生渐晕, 因此建议您使用外设闪光灯拍摄。

注意事项

长期使用保养注意事项

- 避免触摸镜头表面,应用专用镜头布或气吹去除镜头表面的尘埃,不使用镜头时,应将镜头盖盖上。
- 使用镜头纸或镜头布清洁时,以螺旋的方式从中间向外擦拭镜头上的污垢以及指印。
- 镜头从寒冷的环境突然转移至温暖的环境时,镜头的外部以及内部镜片将会凝结水雾,所以在转移时应采取防潮保护措施。

各部件名称



注意事项:如果您选购了5-10X微距镜头为同轴通光版,在棱镜的影响下,同等光照场景下,同轴通光版本会比常规版NA值或者光圈值小一档,请您按需求选购不同版本。

使用说明

镜头安装

取下镜头后盖,将镜头卡口⑤对准机身安装插槽,旋转卡口锁止轮进行安装,镜头安装完毕。装上镜头后,请尝试旋转镜头确认是否已将其固定在相机上。

镜头拆卸

关机后拧松卡口锁止轮,随后将镜头从座圈中拔出。

NA值手轮使用

使用时,可以根据需要,通过调节NA值的大小,来适配需要的景深。(注:NA值的大小不同,衍射程度也会不同,通常NA值越小,衍射越大,如果NA值过小,会因为衍射而导致解析力下降。)

工作距离,被摄物体到镜头前端的距离。

1-5X:40.35mm 5-10X:22.48mm

对焦

1-5X工作距离约为4cm,5-10X工作距离约为2.2cm,切换不同倍率镜头后,对焦需要通过移动机身,再次确定焦点。

为了达到拍摄的稳定性,建议用户选择专业的微距平台,使用电控或者手动方式进行前后或者上下移动机身,便于对焦。

对焦方法

峰值对焦(视所使用相机功能而定)

- 1、开启机身峰值对焦选项,峰值颜色选择为红色或常用颜色,峰值选项为低。
- 2、通过取景器或开启Live View (实时取景) 功能观察画面,通过峰值来观察对焦点。
- 3、移动机身对物体进行精确对焦。

放大对焦

先构定拍摄画面,在通过取景器或开启Live View (实时取景) 功能观察画面的同时,通过按键或者双击屏幕将对焦点放大,移动机身直至合焦。

同轴通光与非同轴通光的区别

1. 光路路径 (根本区别)

同轴通光: 光线通过分光镜后, 垂直照射物体表面, 反射光沿原路返回进入镜头 (光轴与照明光路重合)。

非同轴通光: 光线以一定倾斜角度 (如侧光、环形光) 照射物体, 反射光以非垂直角度进入镜头 (光轴与照明光路分离)。

2. 成像效果 (视觉区别)

同轴通光: “消除纹理”。能有效抑制物体表面的划痕、凹凸和粗糙纹理, 使平整区域呈现均匀的亮度, 特别适合检测镜面反射物体上的透明层、蚀刻标记或轮廓。

非同轴通光: “凸显缺陷”。通过倾斜照射产生明显的阴影, 能强烈突出物体表面的颗粒、凹坑、划伤或边缘毛刺, 使物体呈现强烈的立体感。

3. 适用场景 (应用区别)

同轴通光: 常用于检测晶圆表面电路、手机玻璃盖板下的油墨层、高反射金属表面的二维码读取。

非同轴通光: 常用于检测塑胶件表面的缩水、电路板焊点的爬锡形态, 或是物体边缘的定位测量。



非同轴通光

同轴通光

名称	Laowa Aksen 45mm f2.8 1-5x Ultra Macro APO	Laowa Aksen 17.5mm f1.7 5-10x Ultra Macro APO
画幅	全画幅	全画幅
焦距	45mm	17.5mm
NA范围	0.09-0.143	0.25-0.10
镜头结构	9组13片	12组17片
光阑叶片数	11片	11片
变倍环行程	180°	180°
变倍倍率	1x-5x	5x-10x
NA环行程	44°	43.2°
成像覆盖范围	36x24mm	36x24mm
跟焦齿模数	0.8 Mod	0.8 Mod
最近工作距离(微距专用)	40.35mm	22.48mm
最大放大倍率	5x	10x
合焦驱动方式	MF	MF
镜头前端尺寸	Ø56mm	Ø42mm
最大直径	Ø73.6mm	Ø73.6mm
镜头尺寸	Ø73.6mmx115.5mm	Ø73.6x122mm
共轭距离	207.2mm	193.8mm
重量	638.4g	608.6g
卡口	PL	PL

1-5X镜头在不同放大倍率下, NA值会有变化, 请参考下图

放大倍率 \ NA值	4	3	2	1
1:1	0.026	0.047	0.069	0.09
2:1	0.032	0.058	0.085	0.111
3:1	0.036	0.065	0.095	0.125
4:1	0.039	0.071	0.103	0.135
5:1	0.041	0.075	0.109	0.143



Preface

Thank you very much for purchasing Laowa Aksen 45mm f2.8 1-5x Ultra Macro APO and Laowa Aksen 17.5mm f1.7 5-10x Ultra Macro APO microscopic lens. This series has high brightness, small diffraction, sufficient light; Long working distance, easy to fill light; High performance, high resolution and other lens features.



 *For operational safety, please read the manual and precautions carefully before using this product, and keep the manual at a place that is easily accessible when needed. If you encounter a problem that cannot be solved, please ask for technical support through email.*

Features

- This series of microscopes has a maximum aperture value of f/1.7 (5-10X) and f/2.8 (1-5X), which brings significant advantages such as high brightness, low diffraction, and ample light, ensuring lower ISO values and cleaner images during shooting.
- The series has a long working distance, easy to fill light, easy to operate, can be popularized in industry and scientific research.
- The series adopts advanced optical design, having high performance and outstanding resolution. Therefore, it is able to shoot amazing and shocking works.
- It allows for magnification switching from 1X to 10X.
- The parfocal design maintains focus while changing the magnification, making it ideal for video recording.

Precautions

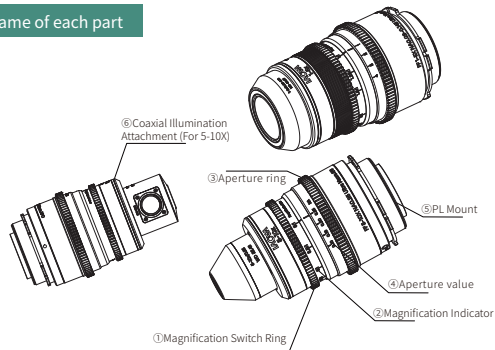
■ △ Safety Precautions

- Do not disassemble, modify the lens by yourself. Do not touch the internal parts that become exposed as the result of external force.
- Do not leave the lens where it will be exposed to high temperatures, such as in direct sunlight and an enclosed vehicle. Excessive heat may deform the glass elements and other parts of the lens.
- Whether it is attached to the camera or not, do not leave the lens under the sun without the lens cap attached. This is to prevent the lens from concentrating the sun's rays, which could cause a fire.
- Do not place the sun in the frame center when shooting with backlight. Doing so might cause a fire or harm your eyes.
- The camera's built-in flash will cause barrel shadow if used with this lens. For best results, please use an external flash unit.

Maintenance Precautions

- Do not touch the surface of the lens directly. Brush off any dust with a blower. Wipe the surface with a cleaning cloth or a lens tissue.
- Try a circular motion from the center outward to remove oil, fingerprints and grime on the lens surface.
- If your lens is brought directly from a cold place to a warm place, condensation may appear on the lens. To avoid this, be sure to take some action to protect the lens.

Name of each part



Note: If you choose the coaxial illumination version of the 5-10X macro lens, due to the influence of the prism, under the same lighting conditions, the coaxial illumination version will have a NA value or aperture value that is one stop smaller than the standard version. Please select the appropriate version according to your needs.

Instructions

■ To attach the Lens

Remove the lens cap, align lens mount ⑤ with the camera body mounting slot, and rotate the locking wheel to install the lens. The lens is now installed. After mounting the lens, try rotating it to confirm it is securely attached to the camera.

■ To remove the lens

After turning off the camera, loosen the locking wheel and then pull the lens out of the mount.

■ Aperture ring

When using it, you can adjust the aperture value to suit the required depth of field. (Note: Different aperture value result in different degrees of diffraction. Generally, the smaller the Aperture, the greater the diffraction. If the Aperture is too small, diffraction will reduce the resolution.)

Working Distance: The distance from the subject to the front of the lens.

1-5X: 40.35 mm 5-10X: 22.48 mm

■ Focusing

At 1-5x magnification, the minimum working distance is approximately 4cm; at 5-10x magnification, the minimum working distance is approximately 2.2cm.

For stable shooting, it is recommended that users choose a professional macro platform and use electronic or manual controls to move the camera body forward/backward or up/down for easier focusing.

■ Focusing methods

Method 1 Focus Peaking (depending on the camera function)

1. Turn on the Focus Peaking on the camera. Choose the red color or other commonly used colors. Set the Peaking Level to low.
2. Check the frame by the viewfinder or [Live View] on the camera and try to get focus by Focus Peaking.
3. Move the camera body to achieve precise focus.

Method 2 Focus Magnification

Set the frame first. While viewing the image through the viewfinder or [Live View], magnify the focus by pressing the button or double click the screen and move the camera until it is in focus.

■ Difference between coaxial illumination and non coaxial illumination

1. Optical Path (Fundamental Distinction)

Coaxial illumination: Light passes through a beam splitter and strikes the object perpendicularly (normally). The reflected light travels back along the same path into the lens – the optical axis coincides with the illumination path.

Non-coaxial illumination: Light hits the object at a certain oblique angle (e.g. side light, ring light). The reflected light enters the lens at a non-perpendicular angle – the optical axis and the illumination path are separated.

2. Imaging Effect (Visual Distinction)

Coaxial illumination: “Flattens” texture. It effectively suppresses scratches, bumps, and rough textures on the surface, making flat areas appear uniformly bright. It is particularly suitable for inspecting specular (mirror-like) surfaces to reveal transparent layers, etched markings, or outlines.

Non-coaxial illumination: “Highlights defects”. The oblique light produces pronounced shadows, strongly emphasising particles, pits, scratches, or burrs on the surface, giving the object a distinct three-dimensional appearance.

3. Typical Applications

Coaxial illumination: Used for inspecting wafer surface circuits, ink layers under mobile phone glass covers, and reading QR codes on highly reflective metal surfaces.

Non-coaxial illumination: Used for detecting sink marks on plastic parts, solder wetting morphology on PCB solder joints, or edge positioning and measurement of objects.

In summary: Coaxial light “finds flat areas” – it highlights smooth, even regions; non-coaxial light “finds defects” – it uses shadows to accentuate height variations and surface irregularities.

If the object surface is smooth and reflective, coaxial light is the priority; if you need to see texture, details, or stereoscopic features, non-coaxial illumination is essential.



Non-coaxial illumination

Coaxial illumination

Specifications

Product Name	Laowa Aksen 45mm f2.8 1-5x Ultra Macro APO	Laowa Aksen 17.5mm f1.7 5-10x Ultra Macro APO
Format	FF	FF
Focal Length	45mm	17.5mm
Aperture Range	f/2.8-f/11	f/1.7-f/5.6
Lens Structure	13 elements in 9 groups	17 elements in 12 groups
Aperture Blades	11	11
Magnification Throw	180°	180°
Magnification	1x-5x	5x-10x
Aperture Throw	44°	43.2°
Sensor Coverage	36x24mm	36x24mm
Gear Mod	0.8 Mod	0.8 Mod
Min. Working Distance	40.35mm	22.48mm
Max. Magnification	5x	10x
Focus Type	MF	MF
Front Diameter	Ø56mm	Ø42mm
Largest Diameter	Ø73.6mm	Ø73.6mm
Dimensions	Ø73.6mmx115.5mm	Ø73.6x122mm
Conjugate Distance	207.2mm	193.8mm
Weight	638.4g	608.6g
Mount	PL	PL

For the 1-5X lens, the NA value will vary depending on the magnification. Please refer to the diagram below.

NA value Magnification	4	3	2	1
1:1	0.026	0.047	0.069	0.09
2:1	0.032	0.058	0.085	0.111
3:1	0.036	0.065	0.095	0.125
4:1	0.039	0.071	0.103	0.135
5:1	0.041	0.075	0.109	0.143