CLARIOPTICS

工业镜头
产品手册

INDUSTRIAL LENS PRODUCT BROCHURE

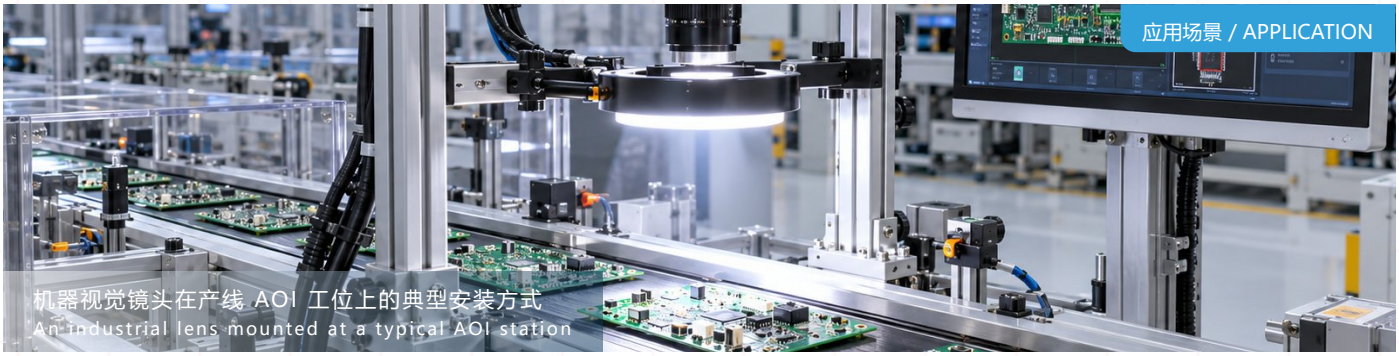
面向机器视觉系统的一次光学入口。
FA 定焦 / 微距 / 大靶面 / 线扫 / 电动变焦 / 360° 内外壁检测
六大产品族，覆盖 2/3″ 至 1.2″、1 亿像素全画幅的完整选型区间。

The first optical entry for machine vision systems.
FA fixed-focal · Macro · Large format · Line scan · Motorized zoom · 360° inner/outer wall.
Six product families spanning 2/3″ to 1.2″ and 100-megapixel full frame.

- 2/3″ FA 系列 · FA Series
- 1.1″ 20MP · FA Series
- 1.2″ 25MP 大靶面 · Large Format
- 4K / 8K / 16K 线扫 · Line Scan
- SAM 高性价比 · Value Series
- 电动变焦 DFA · Motorized
- 360° 内壁 · Inner Wall
- 360° 外壁 · Outer Wall

关于我们

ABOUT US



机器视觉镜头在产线 AOI 工位上的典型安装方式
An industrial lens mounted at a typical AOI station

CLARIOPTICS 专注机器视觉光学成像器件的设计、制造与选型服务。我们把「看得清、测得准、装得进」作为产品定义的第一性原则：从光学设计到结构公差、从镀膜工艺到批量一致性，每一支镜头都围绕真实产线工况打磨。

产品矩阵覆盖 2/3″、1/1.7″、1.1″、1.2″ 到 3.1μm 全画幅的完整像面区间，焦距自 4mm 延展至 100mm，并提供 4K / 8K / 16K 线扫与亿像素镜头，以及 360° 内壁、外壁等特殊光路产品。

CLARIOPTICS designs and manufactures optical imaging devices for machine vision. Every lens is built around three principles: sharp imaging, accurate measurement and easy mechanical integration — from optical design and tolerance control to coating consistency in volume production.

The portfolio spans 2/3″, 1/1.7″, 1.1″, 1.2″ and 3.1μm full-frame image circles from 4mm to 100mm focal length, including 4K / 8K / 16K line scan and 100MP lenses, plus special-path solutions such as 360° inner and outer wall inspection.

自主光学设计 • In-house Optics

从 EFL、后焦到 MTF 曲线的全链路自主设计迭代

Full in-house iteration on EFL, back focus and MTF

批量一致性 • Batch Consistency

逐支出厂 MTF / 畸变 / 后焦检测，附检测报告

Per-unit MTF, distortion and flange-back inspection

快速交付 • Fast Delivery

常规型号现货，定制周期短，支持接口改型

Stock models ready; short lead time; mount customization

为什么选择我们 • Why Choose Us

1. **全像面覆盖，一处选型**
   从入门 2/3″ 到 1 亿像素全画幅，六大产品族打通替换链路。
   Six families covering entry 2/3″ to 100MP full frame — one-stop sourcing
2. **低畸变 + 高相对照度**
   全系列 TV 畸变控制在 0.1%~1.5%，配合镀膜抑制鬼像。
   TV distortion within 0.1%–1.5% with ghost-suppressing coating
3. **结构化数据交付**
   规格书 + 3D 图纸 + 工作距离倍率对照表，直接用于设备设计。
   Datasheets, 3D models and WD/magnification tables ready for design
4. **特殊光路能力**
   360° 内壁 / 外壁，一支相机完成柱体全周向成像。
   360° inner / outer wall optics image a cylinder in one shot

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型号命名规则 • Naming Convention

线扫镜头 LS 系列 • Line Scan

以 **LS2540A-0.24X** 为例：**LS** 表示线扫镜头，**25** 代表焦距 25mm，**40** 表示光圈 F4.0，**0.24X** 表示该镜头的中心倍率为 0.24 倍。

LS2540A-0.24X: LS = line scan lens, 25 = 25mm focal length, 40 = F4.0 aperture, 0.24X = centre magnification.

定焦 / 微距 FA • MC 系列 • Fixed & Macro

FA1220A：12mm 焦距、1.1" 像面；**MC5010A**：1.1" 微距 50mm。后缀字母表示结构版本（A / B / C...），D 结尾通常为大光圈或改进版。

FA1220A: 12mm, 1.1" format. **MC5010A**: 1.1" macro 50mm. Letter suffix = mechanical revision; "D" usually marks a large-aperture / revised version.

参数图例 • Parameter Legend

EFL • 焦距
Effective Focal Length

F No • 光圈
F-number, aperture range

WD • 工作距离
Working Distance

Mag. • 倍率
Optical Magnification

O/I • 物像距
Object-to-Image Distance

Max Image Circle
最大像面 / Sensor Format

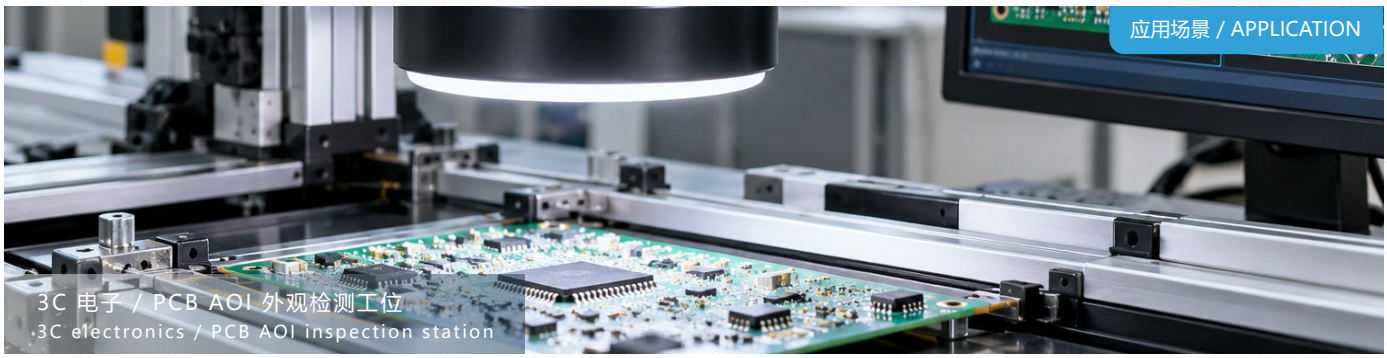
Distortion
TV 畸变 / TV Distortion

Mount • 接口
C · M42 · M58 · M72 · M90 · M95 · F

Rel. Illumination
相对照度 / RI

2/3" FA 系列

2/3" FA SERIES INDUSTRIAL LENSES



应用范围 • Applications

- **3C 电子制造** | PCB 焊点外观、元器件缺失与偏位检测
  3C Electronics — PCB solder joints, missing or misplaced components
- **尺寸测量** | 轮廓尺寸、间距与孔径的非接触式测量
  Dimensional Metrology — non-contact contour, pitch and hole size
- **包装与食品** | 标签检测、封口异物、瓶身外观缺陷
  Packaging & Food — label check, seal contamination, bottle defects
- **定位与引导** | 机械手抓取定位、贴合对位、Mark 点识别
  Alignment & Guidance — robot pick, bonding alignment, Mark ID
- **字符与条码** | OCR 字符识别、一维码与二维码读取
  OCR & Coding — character recognition, 1D / 2D code reading
- **通用工位** | 兼容 2/3"、1/2"、1/1.8" 多型号工业相机
  General Purpose — works with 2/3", 1/2" and 1/1.8" cameras

型号 / Model	焦距 / EFL	光圈 / F.No	像面 / Image	畸变 / Dist.	最近 WD / Min WD	滤镜 / Filter	接口 / Mount
FA0410A	4mm	F1.2-F16	2/3"	<3%	60mm	无	C口
FA0528C	5mm	F2.0-F16	2/3"	<0.3%	100mm	M12×P0.75	C口
FA0619A	6mm	F1.9	2/3"	1.17%	100mm	M37×P0.5-6H	C口
FA0805A	8mm	F2.0-F16	2/3"	<0.1%	80mm	M27×P0.5-6H	C口
FA0814A	8mm	F1.4-F16	2/3"	<0.5%	100mm	无	C口
FA1205D	12mm	F1.6-F16	2/3"	<0.1%	100mm	M27×P0.5-6g	C口
FA1605A	16mm	F1.6-F16	2/3"	<0.1%	100mm	M30.5×0.5	C口
FA2505A	25mm	F1.6-F16	2/3"	<0.12%	100mm	M30.5×0.5	C口
FA3505A	35mm	F1.6-F16	2/3"	<0.15%	150mm	M30.5×0.5	C口
FA5005A	50mm	F2.0-F16	2/3"	<0.3%	300mm	M30.5×0.5	C口
FA7505D	75mm	F2.8-F16	2/3"	<0.15%	500mm	M33.5×P0.5-6H	C口

※ 完整光学参数（MTF、后焦、尺寸图）请查阅对应型号规格书。
※ Full optical data (MTF, back focus, drawings) — see the datasheet of each model.

2/3" FA

2/3" FA

2/3" FA

2/3" FA

2/3" FA

2/3" FA

2/3" FA

2/3" FA

2/3" 特惠版 / 1/1.7" 系列

2/3" VALUE SERIES / 1/1.7" INDUSTRIAL LENSES

应用范围 • Applications

- **2/3" 特惠版** | 通用定位、读码、装配引导、固定成本型批量项目
  2/3" Value — positioning, code reading, assembly guide, cost-driven volume builds
- **小型设备集成** | 体积小、重量轻，适合紧凑型读码器、嵌入式视觉
  Compact Integration — small and light for handheld readers and embedded vision
- **工位替换** | 12 / 16 / 25 / 35 / 50mm 多焦段可选择
  Drop-in Replacement — 12 / 16 / 25 / 35 / 50mm focal lengths available
- **1/1.7" 系列** | 小像面高像素 12MP 相机，机器视觉中端通用工位
  1/1.7" Series — 12MP small-format cameras for mid-range vision cells
- **OEM 设备配套** | 配合设备需求交付固定焦段与接口组合
  OEM Matching — fixed focal-length / mount combinations per machine design
- **检测与外观** | 3C、电池极耳、电子标签的字符与外观检测
  Inspection — characters and appearance of 3C parts, battery tabs, electronic labels

2/3" 特惠版 • 2/3" Value Series

型号 / Model	焦距 / EFL	光圈 / F.No	像面 / Image	畸变 / Dist.	最近 WD / Min WD	滤镜 / Filter	接口 / Mount
FA1201A	12mm	F2.0-F16	2/3"	<0.1%	100mm	M25.5×P0.5	C口
FA1601A	16mm	F2.0-F16	2/3"	<0.1%	100mm	M25.5×P0.5	C口
FA2501A	25mm	F2.8(固定 / Fixed)	2/3"	<0.1%	100mm	M25.5×P0.5	C口
FA3501A	35mm	F2.2-F16	2/3"	<0.1%	100mm	M25.5×P0.5	C口
FA5001A	50mm	F2.8-F16	2/3"	<0.05%	300mm	M25.5×P0.5	C口

※ 2/3" 特惠版同系列兼容 1/2"、1/1.8" 芯片，性价比优先。
※ Value series also covers 1/2" and 1/1.8" sensors — optimized for cost.

1/1.7" 系列 • 1/1.7" Series

型号 / Model	焦距 / EFL	光圈 / F.No	像面 / Image	畸变 / Dist.	最近 WD / Min WD	滤镜 / Filter
FA1217A	12mm	F2.4-16	1/1.7英寸 (7.44×5.62mm)	<0.15%	0.1m	M28×0.5
FA1617A	16mm	F2.4-16	1/1.7英寸 (7.44×5.62mm)	<0.2%	0.08m	M27×P0.5
FA2517A	25mm	F2.4-16	1/1.7英寸 (7.44×5.62mm)	<0.13%	0.1m	M27×P0.5
FA3517A	35mm	F2.4-16	1/1.7英寸 (7.44×5.62mm)	<0.1%	0.15m	M27×P0.5
FA5017A	50mm	F2.4-16	1/1.7英寸 (7.44×5.62mm)	<0.1%	0.3m	M34×0.5

※ 1/1.7" 配主流 12MP 工业相机，焦段覆盖 12~50mm。
※ Pairs with mainstream 12MP industrial cameras; 12–50mm coverage.

1.1" FA 系列 • 20MP

1.1" 20MP FA SERIES INDUSTRIAL LENSES

应用范围 • Applications

- **半导体后段封测** | 晶圆 Mark 识别、Lead Frame 引脚对位
  Semiconductor Backend — wafer Mark ID, lead frame pin alignment
- **FPD 面板** | 中尺寸显示面板的缺陷与亮暗点扫描
  FPD Panels — defect and mura scan for mid-size displays
- **激光加工** | 低畸变为 3D 视觉引导提供精准成像
  Laser Processing — low distortion for accurate 3D guidance
- **高精度 20MP 检测** | 元器件尺寸与外观的细节成像
  20MP Precision — fine detail imaging of part size and surface
- **锂电外观** | 方形电池顶盖、极柱、防爆阀外观
  Lithium Battery — prismatic cap, terminal and safety vent appearance
- **3C 精密装配** | FPC 连接器、麦克风、振膜等微型组件
  Precision Assembly — FPC connectors, microphones, diaphragms

型号 / Model	焦距 / EFL	光圈 / F.No	像面 / Image	畸变 / Dist.	最近 WD / Min WD	滤镜 / Filter	接口 / Mount	像素 / Res.
FA0820A	8mm	F2.8-F16	1.1英寸	<1.5%	80mm	无	C口	20MP
FA0820B	8mm	F2.8-F16	1.1英寸	<1.5%	80mm	M40.5×P0.5	C口	20MP
FA1220A	12mm	F2.8-F16	1.1英寸	<0.5%	100mm	M40.5×P0.5	C口	20MP
FA1620A	16mm	F2.4-F16	1.1英寸	<0.3%	75mm	M40.5×P0.5	C口	20MP
FA2520A	25mm	F2.4-F16	1.1英寸	<0.4%	150mm	M35.5×P0.5	C口	20MP
FA3520A	35mm	F2.4-F16	1.1英寸	<0.1%	200mm	M35.5×P0.5	C口	20MP
FA5020A	50mm	F2.4-F16	1.1英寸	<0.1%	300mm	M40.5×P0.5	C口	20MP
FA7520D	75mm	F2.8-F16	1.1英寸	<0.5%	500mm	M40.5×P0.5	C口	20MP

※ 1.1" 系列一支型号可配 1.1" / 1" / 2/3" / 1/2" 多种相机。
※ Each model covers 1.1", 1", 2/3" and 1/2" sensor sizes.

1.1" FA

1.1" FA

1.1" FA

1.1" FA

1.1" 微距 / 1.2" 25MP 大靶面

MACRO & LARGE-FORMAT LENSES

应用范围 • Applications

- **微距 MC 系列** | 短物距大倍率成像：连接器 Pin 脚、弹簧、线圈
  Macro MC — high magnification at short WD: connector pins, springs, coils
- **医疗与生化** | 试剂卡、膜条、检验板的图案与色块识别
  Medical & Bio — reagent cards, test strips, microplate pattern ID
- **大靶面高像素** | 适配 25MP 工业相机，边缘像质保持一致
  High Pixel Count — edge-to-edge sharpness on 25MP cameras
- **螺纹与编码** | 精密螺纹、字符、二维码的微米级测量
  Thread & Coding — micron-level measurement of threads, characters, 2D codes
- **1.2" 25MP 大靶面** | 单工位替代多相机拼接：面板 / 玻璃 / 大工件
  1.2" 25MP — one station replaces multi-camera stitching
- **显微放大** | 可与光源、远心镜组搭配组成微米级视觉模块
  Micro Cell — combines with lighting / telecentric optics

1.1" 微距系列 • Macro Series

型号 / Model	焦距 / EFL	光圈 / F.No	倍率 / Mag.	最近 WD / Min WD	畸变 / Dist.	滤镜 / Filter	接口 / Mount
MC2510A	25mm	F2.8-F16	0.1X-0.4X	65mm	<0.07%	M40.5×P0.5	C口
MC3510A	35mm	F2.8-F16	0.35X-0.7X	59mm	<0.05%	M40.5×P0.5	C口
MC5010A	50mm	F2.8-F16	0.5X-0.8X	95mm	<0.05%	M40.5×P0.5	C口
MC5010B	50mm	F2.8-F16	0.5X-0.8X	95mm	<0.05%	M40.5×P0.5	C口
MC7510A	75mm	F1.8-F16	0.18X-0.36X	257mm	<0.05%	M40.5×P0.5	C口

※ MC 系列专门为短物距设计，可配 1.1" 芯片，超低畸变。
※ Macro series designed for short WD with 1.1" sensors and ultra-low distortion.

1.2" 25MP 大靶面系列 • Large-Format Series

型号 / Model	焦距 / EFL	光圈 / F.No	像面 / Image	畸变 / Dist.	最近 WD / Min WD	滤镜 / Filter	接口 / Mount
FA1004A	100mm	F4.0-F16	1.2英寸	0.02%	450mm	M40.5×P0.5	C口
FA1825A	18.25mm	F4.0-F16	1.2英寸	<2.75%	150mm	无	C口
FA7025A	70mm	F4.0-F16	1.2英寸	<0.08%	300mm	M35.5×P0.5	C口

※ 适配 25MP 工业相机，单工位覆盖大视野，降低整体成本。
※ Built for 25MP cameras — wider coverage per station lowers total cost.

1.2" 25MP

1.2" 25MP

1.2" 25MP

SAM 系列 / 电动变焦 DFA 系列

SAM VALUE SERIES / MOTORIZED ZOOM DFA

应用范围 • Applications

- **SAM 系列** | 高性价比 1.1" 通用工位，与 FA 系列同源光学设计
  SAM Series — cost-effective 1.1" all-round optics shared with the FA line
- **物流分拣** | 多高度 SKU 抓拍、动态条码识别
  Logistics Sorting — multi-height SKU capture, dynamic barcode reading
- **包装检测** | 瓶身、纸箱、礼盒的快速换型检测
  Packaging Inspection — fast changeover for bottles, cartons and gift boxes
- **电动变焦 DFA** | 步进电机电动调焦 / 光圈，自动产线多品种切换
  Motorized DFA — stepper-driven focus / iris for mixed-model lines
- **3C 制造** | 不同产品在位拍照、变倍率定位
  3C Manufacturing — in-position imaging with variable magnification
- **集成控制** | 4 芯线控，与主流 PLC / 视觉控制器对接
  Integration — 4-wire control ready for PLC / vision controllers

SAM 系列 • SAM Series

型号 / Model	焦距 / EFL	光圈 / F.No	畸变 / Dist.	最近 WD / Min WD	滤镜 / Filter	像素 / Res.
SAM1612D	16mm	F1.2-16	-0.8%	0.1m	M40.5×P0.5	20MEGA
SAM2512D	25mm	F1.2-16	-0.2%	0.1m	M35.5×P0.5	20MEGA
SAM3512D	35mm	F1.2-16	-0.1%	0.1m	M35.5×P0.5	20MEGA
SAM5012D	50mm	F2.4-16	-0.1%	0.3m	M40.5×P0.5	20MEGA
SAM7510A	75mm	F3.8-16	-0.05%	351mm	M72×P0.5	-

※ SAM 系列 1.1" 像面，5 款焦段覆盖 16~75mm。
※ SAM series: 1.1" format, five focal lengths from 16 to 75mm.

电动变焦 DFA 系列 • Motorized Zoom

型号 / Model	焦距 / EFL	光圈 / F.No	像面 / Image	畸变 / Dist.	最近 WD / Min WD	接口 / Mount	电动 / Motor
DFA0820D	8mm	F2.8-16	1.1英寸 (14.1×10.6mm)	<1.5%	0.1m	C-Mount	电动
DFA1220D	12mm	F2.8-16	1.1英寸 (14.1×10.6mm)	<0.5%	0.1m	C-Mount	电动
DFA1605A	16mm	F1.6-16	2/3英寸 (8.8×6.6mm)	-0.1%	0.1m	C-Mount	电动
DFA1620D	16mm	F2.4-16	1.1英寸 (14.1×10.6mm)	<0.3%	0.1m	C-Mount	电动
DFA2505A	25mm	F1.6-16	2/3英寸 (8.8×6.6mm)	-0.12%	0.1m	C-Mount	电动
DFA2512D	25mm	F2.4-16	1.1英寸 (14.1×10.6mm)	<0.2%	0.1m	C-Mount	电动
DFA3505A	35mm	F1.6-16	2/3英寸 (8.8×6.6mm)	-0.15%	0.15m	C-Mount	电动
DFA3512D	35mm	F2.4-16	1.1英寸 (14.1×10.6mm)	<0.1%	0.1m	C-Mount	电动
DFA5005A	50mm	F2.0-16	2/3英寸 (8.8×6.6mm)	-0.3%	0.3m	C-Mount	电动
DFA5012D	50mm	F2.4-16	1.1英寸 (14.1×10.6mm)	<0.1%	0.3m	C-Mount	电动

※ DFA 系列采用步进电机电动调焦（2 相励磁、5~6V DC、4 芯接线），调焦与光圈带锁定机构。
※ DFA uses a stepper motor for focus (2-phase, 5–6V DC, 4 wires) with locking focus and iris rings.

4K 线扫镜头

4K LINE SCAN LENSES

应用范围 • Applications

- **小幅面卷材** | 标签、薄膜、纸带的连续检测
  Narrow Web — continuous inspection of labels, film and paper tape
- **金属表面** | 钢带、铝箔缺陷与异物识别
  Metal Surface — defect and inclusion detection on steel strip and foil
- **医疗器械** | 输液管、注射器针管在线缺陷检测
  Medical Devices — inline defects on tubing and syringe needles
- **2D 印刷质量** | 漏印、色差、套印偏差的实时监测
  Print Quality — missing print, colour shift, register error
- **小型零件分拣** | 自由落体或皮带上的小件外观
  Small Part Sorting — free-fall or on-belt appearance checks
- **替代面阵方案** | 高行频 + 大视野的 4K 入门线扫选型
  Area-scan Replacement — wide FOV entry-level 4K line scan

型号 / Model	焦距 / FL	光圈 / F.No	像面 / Image	倍率 / Mag.	中心 WD / C.WD	倍率范围 / Mag. R.	WD 范围 / WD R.	接口 / Mount
LS2040A-0.02X	20	4	32	0.02	1000	0.01-0.04	520-2000	M42
LS2040A-0.065X	20	4	32	0.065	314	0.04-0.1	200-520	M42
LS2540A-0.15X	25	4	32	0.15	160	0.125-0.175	130-187	M42
LS2540A-0.08X	25	4	32	0.085	300	0.05-0.12	206-520	M42
LS2540A-0.03X	25	4	32	0.03	870	0.015-0.05	520-1740	M42
LS3528A-0.5X	35	2.8	32	0.5	84	0.3-0.7	63-123	M42
LS3528A-0.2X	35	2.8	32	0.2	190	0.15-0.25	152-245	M42
LS3528A-0.1X	35	2.8	32	0.1	350	0.05-0.15	240-700	M42
LS3528A-0.05X	35	2.8	32	0.05	700	0.02-0.12	298-1750	M42

※ 适配 4K×7μm 线扫相机，像面 φ32mm，M42 / M58 接口可选。
※ Built for 4K×7μm line scan cameras, φ32mm image circle, M42 / M58 mounts.

4K Line Scan

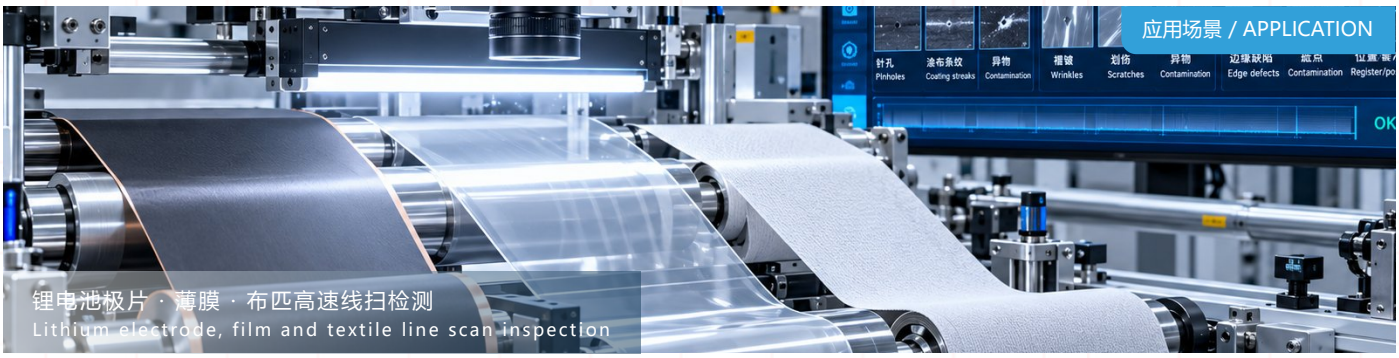
4K Line Scan

4K Line Scan

4K Line Scan

8K 线扫镜头（一）· 8K5μm / 8K7μm

8K LINE SCAN LENSES (I)



应用范围 · Applications

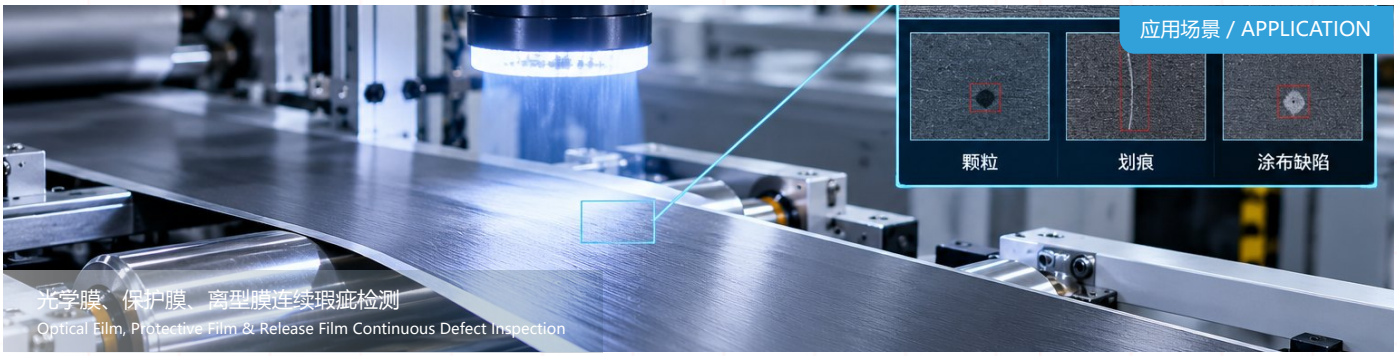
- **锂电池极片** | 正负极浆料涂布的表面缺陷、漏箔、颗粒检测
  Lithium Electrode — coating defects, bare foil and particles
- **纺织 / 布匹** | 疵点、色差、织造瑕疵在线监测
  Textile — defects, colour deviation and weaving flaws online
- **高行频产线** | 适配 8K5μm / 8K7μm 线扫相机
  High Line Rate — designed for 8K5μm / 8K7μm cameras
- **光学薄膜 / 偏光片** | 异物、气泡、折痕、刮伤的连续成像
  Optical Film & Polarizer — inclusions, bubbles, creases and scratches
- **无尘玻璃** | 3C 盖板玻璃带连续缺陷扫描
  Cover Glass — continuous defect scan on 3C cover glass
- **多接口灵活** | 支持 F / M42 / M58 / M72 多种接口
  Mount Flexibility — F / M42 / M58 / M72 available

型号 / Model	焦距 / FL	光圈 / F.No	像面 / Image	倍率 / Mag.	中心 WD / C.WD	倍率范围 / Mag. R.	WD 范围 / WD R.	接口 / Mount
LS4032A-0.1X	40	3.2	46	0.1	400	0.04-0.3	155-1050	M42,M58,M72,F
LS5028A-0.1X	50	2.8	46	0.1	500	0.04-0.3	180-1265	M42,M58,M72,F
LS4056A-0.16X	40	5.6	62	0.16	270	0.04-0.3	155-1050	M42,M58,M72,F
LS4056B-0.05X	40	5.6	62	0.05	860	0.02-0.1	450-2140	M42,M58,M72,F
LS4056B-0.13X	40	5.6	62	0.13	340	0.1-0.18	250-435	M42,M58,M72,F
LS408K-0.045X	40	4	62	0.045	912	0.03-0.05	820-1367	M42,M58,M72,F
LS408K-0.063X	40	4	62	0.063	650	0.05-0.07	586-820	M42,M58,M72,F
LS408K-0.08X	40	4	62	0.08	524	0.07-0.1	419-586	M42,M58,M72,F
LS5056A-0.13X	50	5.6	62	0.13	408	0.03-0.3	190-1685	-
LS6040A-0.1X	60	4	62	0.1	635	0.03-0.18	370-2050	M42,M58,M72,F
LS6040B-0.1X	60	4.5	62	0.1	635	0.03-0.18	370-2050	M42,M58,M72,F
LS8040B-0.1X	80	4.5	62	0.1	820	0.05-0.25	357-1600	M42,M58,M72
LS8040B-0.3X	80	4.5	62	0.35	267	0.25-0.5	200-357	M42,M58,M72

※ 8K5μm 组像面 φ46mm，8K7μm 组像面 φ62mm。
※ 8K5μm group: φ46mm image circle; 8K7μm group: φ62mm.

8K 线扫镜头（二）· 12K5μm 兼容款

8K LINE SCAN LENSES (II)



应用范围 · Applications

- **大光圈高速线扫** | 12K5μm 向下兼容 8K7μm，轴向照度更足
  Large Aperture — 12K5μm compatible with 8K7μm, higher illuminance
- **大幅面薄膜** | 光学膜、保护膜、离型膜连续瑕疵监测
  Wide Film — optical, protective and release film monitoring
- **高照度场景** | 相对照度 0.7，边缘衰减更小
  High Illumination — 0.7 relative illumination, low edge fall-off
- **锂电宽幅极片** | 一次覆盖更宽幅面，减少相机数量
  Wide Electrode — wider coverage per unit, fewer cameras needed
- **替代 12K 方案** | 以 8K 相机成本覆盖接近 12K 的幅面能力
  12K Alternative — near-12K coverage at 8K camera cost
- **多倍率覆盖** | 0.05X ~ 0.25X 中心倍率区间可选
  Magnification Range — 0.05X to 0.25X selectable

型号 / Model	焦距 / FL	光圈 / F.No	像面 / Image	倍率 / Mag.	中心 WD / C.WD	倍率范围 / Mag. R.	WD 范围 / WD R.	接口 / Mount
LS5040A-0.05X	50	4	62	0.05	1000	0.025-0.07	735-2000	M42,M58,M72
LS5040A-0.1X	50	4	62	0.1	500	0.07-0.15	355-735	M42,M58,M72
LS5040A-0.15X	50	4	62	0.15	350	0.1-0.2	270-500	M42,M58,M72
LS5040A-0.2X	50	4	62	0.2	270	0.15-0.25	220-350	M42,M58,M72
LS8040A-0.067X	80	4	62	0.067	1300	0.03-0.1	890-2830	M42,M58,M72,F
LS8040A-0.13X	80	4	62	0.13	690	0.1-0.18	520-880	M42,M58,M72
LS8040A-0.25X	80	4	62	0.25	385	0.2-0.375	276-460	M42,M58,M72
LS8040A-0.5X	80	4	62	0.5	225	0.375-0.625	188-273	M42,M58,M72
LS8040A-0.75X	80	4	62	0.75	170	0.625-0.9	147-185	M42,M58,M72
LS8040A-1.0X	80	4	62	1	140	0.9-1.2	125-147	M42,M58,M72

※ 大光圈系列相对照度 0.7，像面 φ62mm。
※ Large-aperture series: 0.7 relative illumination, φ62mm image circle.

8K Line Scan

8K Line Scan

8K Line Scan

8K Line Scan

16K 线扫镜头（一）· 16K5μm

16K LINE SCAN LENSES (I)

应用范围 · Applications

- **大幅面 PCB AOI**｜替代多台拼接，一支镜头完成 16K 扫描宽度
  Large PCB AOI — one lens covers the full 16K scan width
- **大型 LCD / OLED**｜高世代线面板的极小亮点识别
  Large LCD / OLED — tiny bright and dark points on Gen lines
- **高分辨成像**｜200LP/mm 中心分辨率、3.1μm 像素级解析力
  High Resolution — 200LP/mm centre, 3.1μm pixel resolving power
- **光伏玻璃面板**｜电池片、玻璃带表面缺陷 100% 检测
  PV Glass — 100% surface inspection of solar cells and ribbon
- **超宽幅卷材**｜土工膜、铝箔、特种纸张的连续检测
  Ultra-wide Web — geomembrane, foil and specialty paper
- **大靶面多接口**｜φ82~φ90 像面，M42 / M58 / M72 / M90 / M95
  Large Image Circle — φ82–φ90mm across five mounts

型号 / Model	焦距 / FL	光圈 / F.No	像面 / Image	倍率 / Mag.	中心 WD / C.WD	倍率范围 / Mag. R.	WD 范围 / WD R.	接口 / Mount
LS1602B	116	3.2	82	0.26	509	022-0.3	450-589	-
LS1603B	116	3.2	82	0.33	415	0.3-0.37	378-450	-
LS1605B	116	3.2	82	0.5	298	0.46-0.54	281-318	M42,M58,M72,M90,M95
LS1607B	116	3.2	82	0.75	224	0.7-0.85	206-235	M42,M58,M72,M90,M95
LS1620B	116	3.2	82	2	131	1.75-2.5	120-139	-
LS1630B	116	3.8	82	3	112	2.7-3.5	107-116	-
LS1602A	146	3.8	90	0.26	645	0.22-0.3	571-752	M42,M58,M72,M90,M95
LS1633A	146	3.8	90	0.33	533	0.3-0.37	482-571	M42,M58,M72,M90,M95
LS1605A	146	3.8	90	0.5	384	0.46-0.54	357-417	M42,M58,M72,M90,M95
LS1605A	146	3.8	90	0.75	286	0.7-0.85	268-305	M42,M58,M72,M90,M95
LS1610A	116	3.8	90	1	188	0.92-1.08	180-198	M42,M58,M72,M90,M95
LS1613A	146	3.8	90	1.33	204	1.2-1.5	192-216	M42,M58,M72,M90,M95
LS1620A	146	3.8	90	2	169	1.75-2.5	154-179	M42,M58,M72,M90,M95
LS1630A	146	3.8	90	3	150	2.7-3.5	144-157	M42,M58,M72,M90,M95

※ 16K5μm 向下兼容 16K3.5μm，焦距 116 / 146mm 大靶面系列。
※ 16K5μm backward-compatible with 3.5μm; 116mm and 146mm large-format series.

16K Line Scan

16K Line Scan

16K Line Scan

16K Line Scan

16K 线扫镜头（二）• 16K3.5μm

16K LINE SCAN LENSES (II)

应用范围 • Applications

- **超高像素精检**｜细节要求极高的面板 / 晶圆检测
  Ultra-high Resolution — detail-critical panel and wafer inspection
- **显示面板亮点**｜极小暗点 / 亮点的一次性全幅捕捉
  Panel Mura — single-pass capture of tiny bright / dark points
- **替代多相机拼扫**｜一次成像取代拼接，统一标定
  Stitching Replacement — single-shot imaging with one calibration
- **精密卷材**｜高附加值薄膜、铜箔的表面缺陷判级
  Precision Web — defect grading of high-value film and copper foil
- **160LP/mm 解析**｜与 16K5μm 系列组合覆盖多倍率需求
  160LP/mm — combines with the 16K5μm range across magnifications
- **标准接口**｜M42 / M58 / M72 / F 口，集成方便
  Standard Mounts — M42 / M58 / M72 / F for easy integration

型号 / Model	焦距 / FL	光圈 / F.No	像面 / Image	倍率 / Mag.	中心 WD / C.WD	倍率范围 / Mag. R.	WD 范围 / WD R.	接口 / Mount
LS4016K-0.0446X	40	4	62	0.0446	1049	0.03-0.05	791-1324	M42,M58,M72,F
LS4016K-0.063X	40	4	62	0.063	787	0.05-0.07	557-791	M42,M58,M72,F
LS4016K-0.08X)	40	4	62	0.08	650	0.07-0.1	387-486	M42,M58,M72,F
LS4016K-0.11X	40	4	62	0.11	514	0.1-0.13	297-382	M42,M58,M72,F
LS4016K-0.15X	40	4	62	0.15	419	0.13-0.17	225-295	M42,M58,M72,F
LS16006A-unifoc	60	4	62	0.05	1200	0.02-0.075	834-3050	M42,M58,M72,F
LS16010A-unifoc	60	4	62	0.1	630	0.075-0.16	405-834	M42,M58,M72,F

※ 16K3.5μm 系列 160LP/mm 高分辨率，40mm 焦距为主。
※ 16K3.5μm series: 160LP/mm resolution, mainly 40mm focal length.

16K Line Scan

16K Line Scan

16K Line Scan

1 亿像素全画幅镜头

100MP FULL FRAME LD SERIES

应用范围 • Applications

- **FPD 平板显示** | G6~G8.5 代线面板的整面微观缺陷检查
  FPD — full-surface micro defect inspection up to Gen 8.5
- **锂电池整面** | 极片、隔膜外观一次成像取代拼接
  Full-width Battery — single-shot electrode and separator imaging
- **低畸变需求** | 3.1μm 像素下的几何校正，测量级精度
  Low Distortion — metrology-grade geometry at 3.1μm pixels
- **半导体后段** | 晶圆宏观成像 + 高分辨细检组合方案
  Semiconductor — macro plus high-resolution wafer inspection
- **大幅面替换** | 单工位 1 亿像素取代多相机阵列
  Cost Restructure — one station replaces an array of cameras
- **多接口灵活** | M42 / M58 / M72 / F 多种接口可选
  Mount Options — M42 / M58 / M72 / F selectable

型号 / Model	焦距 / EFL	光圈 / F.No	像面 / Image	工作距离 / WD	分辨率 / Res.	接口 / Mount
LD3528-100MP	35mm 1亿像素	2.8	46(3.1u) (3.1μm)	100--无穷远~∞	160LP/mm	M42,M58,M72,F
LD5028-100MP	50mm 1亿像素	2.8	46(3.1u) (3.1μm)	150--无穷远~∞	160LP/mm	M42,M58,M72,F
LD8035-100MP	80mm 1亿像素	2.8	46(3.1u) (3.1μm)	250--无穷远~∞	160LP/mm	M42,M58,M72,F

※ LD 系列全画幅 1 亿像素镜头，对应 3.1μm 像素、φ46mm 像面。
※ LD series full-frame 100MP lenses: 3.1μm pixels, φ46mm image circle.

360° 外壁检测镜头

360° OUTER WALL INSPECTION LENSES

应用范围 • Applications

- **圆柱体 360° 侧视** | 药瓶、化妆品瓶、饮料瓶外壁周向一次性成像
  Full Circumference — single-shot side view of pharma, cosmetic and beverage bottles
- **机械零件** | 轴类、套筒、轴承外圈的外观与字符
  Machine Parts — shafts, sleeves and bearing outer rings
- **替代旋转台** | 省去电机旋转机构与节拍时间
  No Rotary Stage — saves the rotation mechanism and cycle time
- **瓶盖 / 螺丝** | 瓶口螺纹、密封圈、螺钉全周向缺陷识别
  Caps & Screws — thread, sealing ring and screw defects around the full circle
- **带光源款** | 集成 LED 环形光源，密闭环境均匀照明
  With LED — integrated ring light for confined spaces
- **支持多尺寸** | 覆盖 Φ3~Φ200mm 直径，配 2/3" / 1/1.8" 相机
  Wide Range — Φ3 to Φ200mm with 2/3" and 1/1.8" cameras

型号 / Model	像面 / Sensor	测量直径 / Dia.	测量高度 / Height	物距 / WD	接口 / Mount	光源 / Light
WBHX3602302A	1/1.8"	7.5-30mm	5.3-25mm	9-45.4mm	C口	外接 External
WBHX3602303A	2/3"	7.5-30mm	4-25mm	13-19mm	C口	外接 External
WBHX3602305A	1/3"	7.5-30mm	6.4-25.6mm	9-46.5mm	C口	外接 External
WBHX3602308A	2/3"	0.8-30mm	4.6-17mm	2-5mm	C口	外接 External
WBHX3609A	1/1.8"	0.2-15mm	10-12mm	44.3mm	C口	外接 External
WBHX3610A	1/2"	5-40mm	5-13mm	12-66mm	C口	外接 External
WBHX3602307	>1/2"	30-80mm	26.5-46.6mm	10-43mm	C口	外接 External
WBHX0004A	>1/3"	3-12mm	2.8-12.3mm	8-23mm	C口	外接 External
LX1025A	Φ34(>1/3")	25-100mm	14-66mm	-	C口	内置光源

※ 一次成像完成圆柱体全周向外观检查，大幅缩短节拍。
※ One shot images the full circumference, cutting cycle time.

360° Outer Wall

360° Outer Wall

360° Outer Wall

360° Outer Wall

360° 内壁检测镜头

360° INNER WALL INSPECTION LENSES

应用范围 • Applications

- **管件内壁** | 金属管、塑料管、注射器针管内壁缺陷 360° 检测
  Tube Inner Wall — 360° defects in metal, plastic and syringe tubes
- **机械孔洞** | 深孔、阶梯孔、盲孔内壁的尺寸与表面检测
  Bore Inspection — dimensions and surface of deep, stepped and blind holes
- **带光源款** | 内置照明，无外部光路遮挡，结构紧凑
  Integrated Light — built-in illumination with no external glare path
- **瓶体内壁** | 透明 / 不透明容器内部清洁度与异物识别
  Container Interior — cleanliness and foreign objects in transparent or opaque vessels
- **孔径覆盖** | 最小 Φ3mm、最大 Φ200mm 多款型号
  Diameter Range — models from Φ3mm up to Φ200mm
- **替代内窥镜** | C 口直连工业相机，无缝接入视觉系统
  Borescope Alternative — direct C-mount to industrial cameras

型号 / Model	像面 / Sensor	测量直径 / Dia.	测量高度 / Height	物距 / WD	接口 / Mount	光源 / Light
RB3606C	2/3"	3-150mm	3.2-125mm	-	C口	内置光源
RBHX3602306A	2/3"	5-120mm	5-123mm	2.7-70mm	C口	外接 External
RBHX3602308C	2/3"	66-200mm	7.2-36mm	0-31mm	C口	外接 External
RBHX3608B	2/3"	5-70mm	7.1-31.9mm	12.6-22mm	C口	外接 External

※ 孔洞内壁 360° 侧视成像，适配工业相机 C 口直连。
※ 360° side-view imaging of bores; direct C-mount industrial cameras.

360° Inner Wall

360° Inner Wall

360° Inner Wall

选型指南与服务支持

SELECTION GUIDE & SUPPORT

行业应用矩阵 • Industry Application Matrix

3C 电子 • Consumer Electronics

PCB AOI、SMT、连接器检测、字符与二维码、零件测量

PCB AOI, SMT, connector check, OCR & codes, part metrology

半导体 • Semiconductor

晶圆 Mark、引线框架、Bonding、宏观与微观成像

Wafer Mark, lead frame, bonding, macro & micro imaging

锂电池 • Lithium Battery

极片涂布、隔膜、顶盖外观、注液孔、防爆阀

Electrode coating, separator, cap appearance, vent

光伏 • Solar PV

电池片、组件 EL 与外观检测、玻璃带缺陷

Cells, module EL & appearance, glass ribbon defects

汽车零部件 • Auto Parts

刹车片、轴承、连接器、密封圈尺寸与字符

Brake pads, bearings, connectors, seals, markings

医药包装 • Pharma & Packaging

药瓶、安瓿瓶、输液管、泡罩板、标签喷码

Vials, ampoules, tubing, blister packs, label coding

食品饮料 • Food & Beverage

罐装与瓶装产线、封口、外包装高速线扫

Canning & bottling lines, seals, high-speed packaging scan

纺织薄膜 • Textile & Film

布匹、薄膜、纸张、卷材瑕疵连续成像

Continuous defect imaging of fabric, film, paper, web

物流仓储 • Logistics

多面读码、动态体积测量、AGV 视觉

Multi-side code reading, dimensioning, AGV vision

选型四步法 • Four-Step Selection

1. **确定相机芯片 • Pick the sensor format**
   根据传感器选型面 mos 尺寸，镜头像面需匹配或更大。
   Match or exceed the sensor diagonal with the lens image circle
2. **确定视野，计算倍率 • Compute magnification**
   倍率 = 芯片长度 / 视野；线扫按横向像素与扫描宽度。
   Magnification = sensor width / FOV; line scan uses scan width
3. **选定镜头，确定工作距离 • Set working distance**
   结合机械空间，在倍率与工作距离范围表中反查。
   Cross-check the magnification and WD range table against machine space
4. **确认接口与机械 • Confirm mount & mechanics**
   C / M42 / M58 / M72 / M90 / M95 / F，核对法兰距与干涉。
   C / M42 / M58 / M72 / M90 / M95 / F — verify flange back and clearance

服务承诺 • Our Commitment

24h

选型响应 • Selection Reply

1 个工作日内给出完整选型方案与试拍建议

Full proposal and sample-shooting advice within one business day

10+

定制改型 • Customization

焦距、光圈范围、接口结构可按设备空间定制

Focal length, aperture range and mechanics tailored to your machine

3D

结构交付 • CAD Delivery

规格书 + 3D 图纸（STP / IGS）随型号提供

Datasheets plus STP / IGS models shipped with every model

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