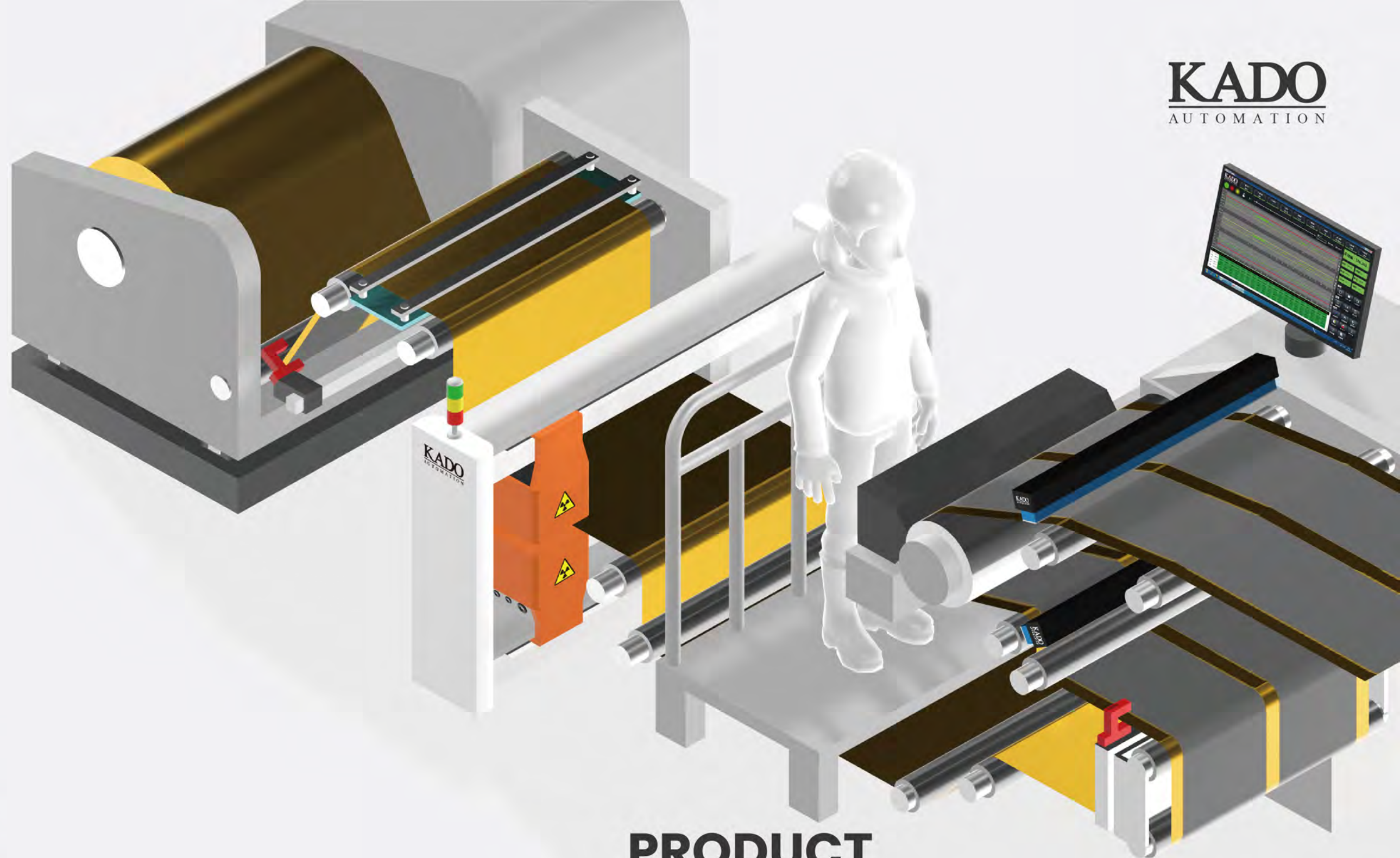




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PRODUCT SELECTION GUIDE

产品选型手册



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COMPANY PROFILE

公司简介

凯多智能科技（上海）有限公司是一家中德技术合作型企业，公司生产的纠偏系统、在线测厚 & 面密度检测系统、在线视觉检测系统和在线宽度检测系统具有工作稳定，反应灵敏，持久耐用及安装调试简单的特点，广泛应用于锂电池、橡胶轮胎、卫生用品等工业生产流水线中，并受到用户的一致好评和认可。

KADO Intelligent Technology (Shanghai) Co., Ltd. is a Sino-German technology cooperation company. The company's web guiding system, online thickness measurement & areal density detection system, online visual inspection system and online width detection system are stable, responsive and durable. Durable and easy to install and debug, it is widely used in production lines such as batteries, rubber tires, hygienic products etc. and have been well received and recognized by users.

KADO 已经从简单的设备配套供应商发展成为一家能够为客户提供系统解决方案的合作伙伴。公司以客户需求为导向，给特殊客户定制特殊需求的产品，力求满足客户的个性化需求，提升客户产品品质，不断吸收先进的生产技术和智造经验，提升产品的市场竞争力。

KADO has evolved from a simple equipment supplier to be a partner who can provide system solutions for customers. Guided by customer needs, the company customizes products with special needs for special customers, strives to meet the individual needs of customers, enhances the quality of customers' products, continuously absorbs advanced production technology and intellectual experience, and enhances the market competitiveness of products.

KADO 提供给客户的是百分之百的可靠性革新技术，大幅提高生产效率是我们所有的产品和服务的核心，基于对市场的深度了解，我们作为一个团队与客户一起关注未来新的应用和业务范围，以此，我们积极地用高效的服务和创新理念塑造市场。

KADO provides customers with 100% reliability innovation technology, and greatly improving production efficiency is the core of all our products and services. Based on the deep understanding of the market, we as a team with customers will pay attention to future new applications and business scope. In this way, we actively shape the market with efficient service and innovative ideas.

VISION

愿景

全球领先的
智能检测解决方案提供商

The world's leading provider of
intelligent inspection solutions

CORE VALUES

核心价值观

品质、创新、科技、诚信

Quality、Innovation、
Technology、Honesty

MISSION

使命

聚焦客户关注的挑战和压力；
提供有竞争力的智能检测解决方案和服务；
持续为客户创造最大价值

Focus on the challenges and
pressures of customer focus;
Provide competitive smart
detection solutions and services;
Continue to create maximum
value for our customers.

KADO
AUTOMATION

凯多智能科技（上海）有限公司
KADO INTELLIGENT TECHNOLOGY (SHANGHAI) CO., LTD

为客户提供专业的纠偏系统、测厚和视觉检测系统解决方案

KADO
AUTOMATION

为客户提供专业、高效、稳定、智能的纠偏系统、厚度 & 面密度检测系统、宽度检测系统、表面缺陷检测系统解决方案。

Provide professional, efficient, stable, intelligent Web guiding system thickness measurement and surface density detection system width measurement system defect detection system solution.

WEB GUIDING SYSTEM

纠偏系统

纠偏系统是一个闭环控制系统，由控制器、传感器、驱动器构成了闭环控制的基本部分。

Web guiding system is a closed-loop control system, the basic part of closed-loop control consisting of controller, sensor, and driver.

由传感器探测卷材的边缘或线条，读出材料的实际位置与设定位置的偏移量，并将偏移量转换成电信号，电信号经过控制器放大、校准后，输出信号给线性驱动器，驱动带动导正机构，将材料恢复至设定位置。

The sensor detects the edge or line of the coil, and reads the offset between the actual position of the material and the set position. The offset is converted into an electrical signal. After the electrical signal amplified and calibrated by the controller, the output signal is sent to the linear driver to drive the guiding mechanism to restore the material to the set position.

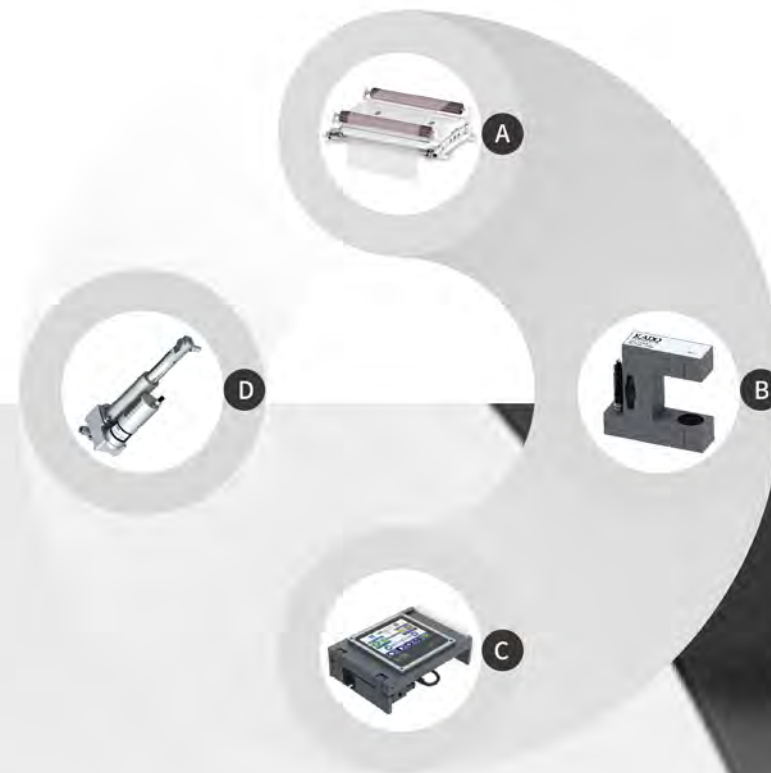
线性驱动器的信号只与卷材跑偏量成正比关系，这就使得对于各种不同的卷材、纠偏系统都能够提供精确的控制。

The linear drive's signal is only proportional to the deflection of the web. This enables the web guiding system to provide accurate control for various coils.



WEB GUIDING SYSTEM

纠偏系统



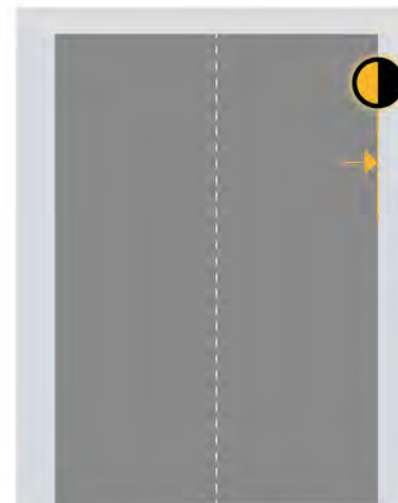
OPERATIONAL PRINCIPLE

工作原理

- 自动纠偏的触发点是材料的入料位置**
The current position of the material is the guiding trigger point.
- 一个或多个传感器扫描物料的实际位置，并将位置信号传输给控制器**
One or more sensors detect the actual position of the material and transmit the position signal to the controller.
- 控制器处理传感器信号并输出执行机构数据，形成闭环控制回路**
The controller processes the sensor signals and outputs actuator data to form a closed loop control loop.
- 纠偏执行机构对物料的位置进行精准纠偏**
The guiding organization immediately corrects the position of the material precisely.

WORKING MODE SELECTION

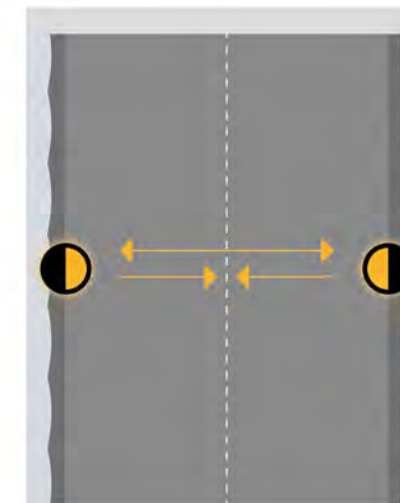
工作模式



跟边纠偏 (EPC)

使用一个传感器，依据物料的左右边缘进行纠偏适合边缘整齐的材料。

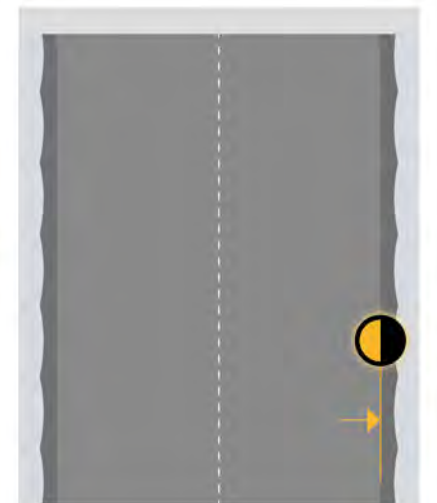
Use a sensor, according to the edge of the material for correction, suitable for the application of neat edge of the material.



对中纠偏 (CPC)

使用两个传感器，依据物料的中心线进行纠偏，适合边缘整齐和有规则的波浪边材料应用。

Two sensors are used to correct deviation according to the center line of the material. Neat edges and regular wavy edges can be applied.



跟线纠偏 (LPC)

依据一条连续或不连续的印刷线或规律的色差对比边进行纠偏。

Correction based on a continuous or discontinuous printed line or regular chromatic aberration contrast.

COMMAND STATION

AE500

AE500控制器



产品描述 PRODUCT DESCRIPTION

AE500 控制器是纠偏系统的核心，KADO 的纠偏控制器能够提供您所需要的有效并高效率的控制，可完美兼容 KADO 生产的各类纠偏传感器及驱动器，AE500 控制器能高动态的响应高精度比例的闭环控制系统，能有效帮助您的卷材运转的更快。

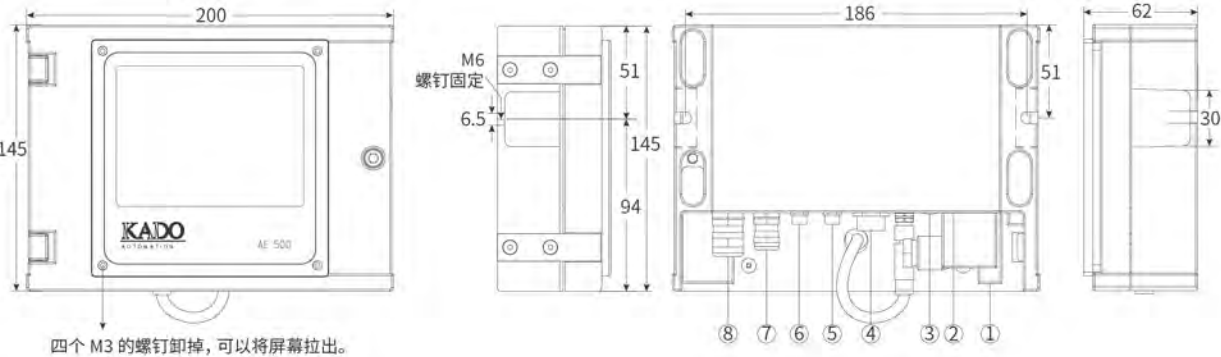
AE500 Commander station is the core of the web guiding system. KADO's Commander can provide you with effective and efficient control. It is perfectly compatible with all kinds of web guiding system sensors and drivers produced by KADO. The AE500 controller can respond with high dynamics and effectively make your production faster.

特点 FEATURES

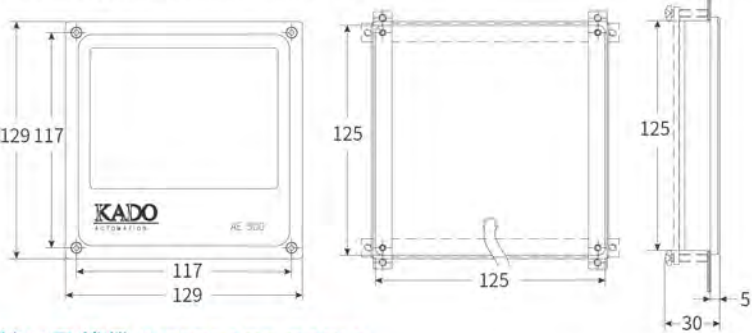
- 全触摸屏图形化显示
Full touch screen graphical display
- 传感器遮挡率、驱动器位置、增益及纠偏偏移量等信息一目了然
Sensor occlusion rate, drive position, gain and offset correction offset clear
- 操作便捷
Simple operation

产品尺寸 DIMMENSION

• 一体式安装 Integrated Installation



• 嵌入式安装 Embedded Installation



接口及线缆 INTERFACE CABLE

序号 No.	接口 Interface	适用配件 Applicable accessories	线缆规格 Cable specifications	订购编号 Order Code
1	24V DC	Power interface	SEN6P5M	1.01.2002
2	Sensor 4-PIN	Sensor CLS50/60	SEN4P3M	1.01.2008
3	Touch screen 4 - pin	屏幕 Screen	SEN4P5M	1.01.2009
4	Drive 8 - PIN	驱动器 Actuator	SEN8P5M SEN8P10M	1.01.2005 1.01.2006
5	Sensor L 6-PIN	Left Sensor US、IR	SEN6P5M	1.01.2002
6	Sensor R 6-PIN	Right Sensor US、IR	SEN6P5M	1.01.2002
7	CAN、I/O			
8	CAN, 485 reserved external communication interface			

技术参数 TECHNICAL PARAMETER

工作电压 Operating Voltage	24 V DC Max: 2.5A
功率 Power	80 W
触摸屏尺寸 Touch Screen Dimensions	129*129*22 mm (分体安装开孔尺寸 : 126*126mm)
外壳尺寸 Dimensions with Housing	200*145*62 mm (安装螺孔 M6, 螺丝中心距 186mm)
通讯接口 Communication Interface	CAN/ RS 485
显示分辨率 Display Resolution	320*240 pixel
环境温度 Ambient Temperature	10 ~ 50 °C
防护等级 Protection Level	IP54
订货编码 Order Code	1.01.50001

SENSOR

INFRARED SENSOR

边缘传感器

边缘传感器通过超声波或红外线探测材料边缘，超声波传感器对物料透明度变化不敏感，适合检测透明膜和光敏材料；红外线传感器不受外界光源干扰，适合检测透光性较低和不透光的材料。

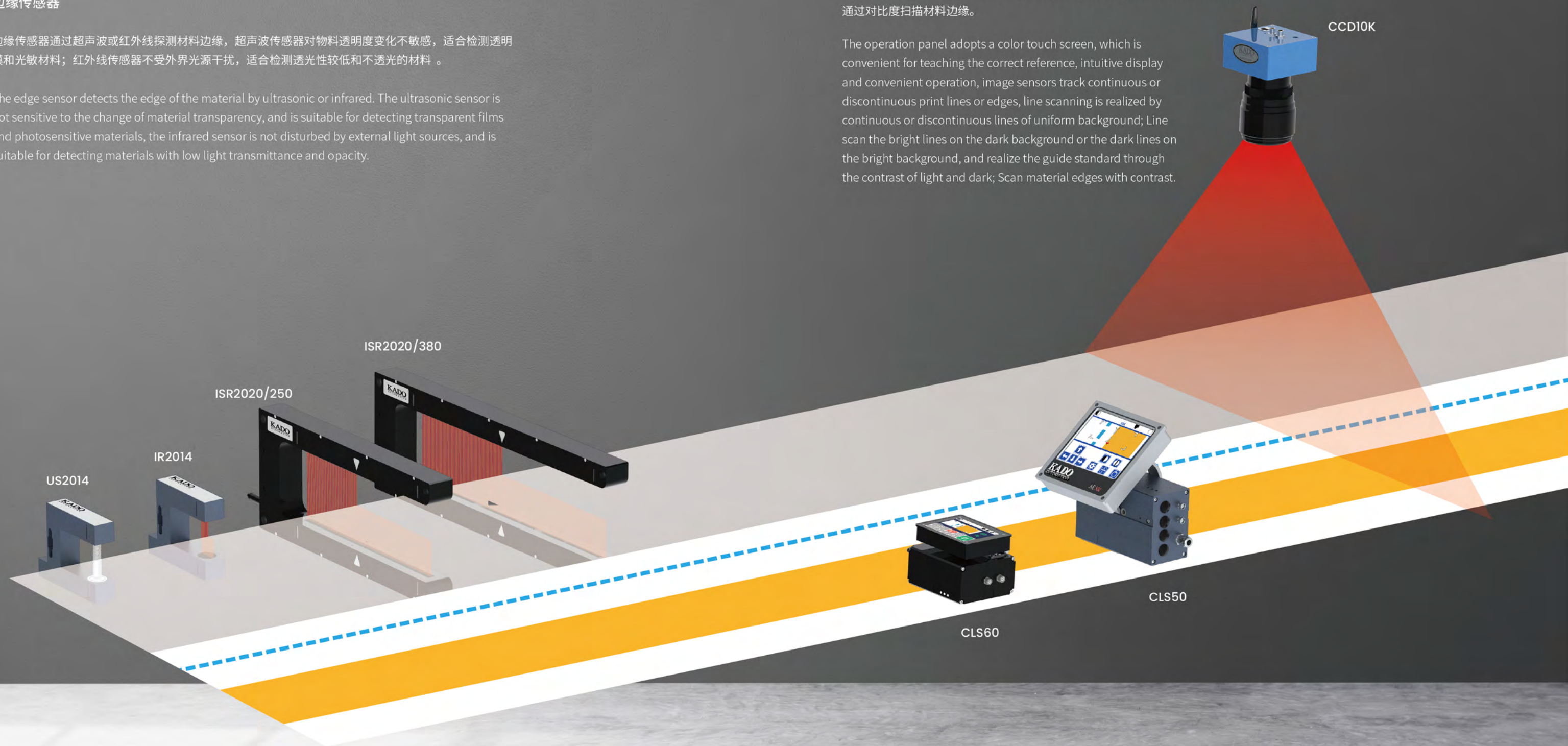
The edge sensor detects the edge of the material by ultrasonic or infrared. The ultrasonic sensor is not sensitive to the change of material transparency, and is suitable for detecting transparent films and photosensitive materials, the infrared sensor is not disturbed by external light sources, and is suitable for detecting materials with low light transmittance and opacity.

COLOR LINE SENSOR

图像传感器

操作面板选用彩色触摸屏，方便示教导正基准，显示直观，操作便捷；
图像传感器跟踪连续或间断的印刷线或印刷边，
通过均匀背景连续线或间断线，实现对线扫描；
对线扫描暗色背景上的亮线或明亮背景上的暗线，通过明暗对比实现导正标准；
通过对比度扫描材料边缘。

The operation panel adopts a color touch screen, which is convenient for teaching the correct reference, intuitive display and convenient operation, image sensors track continuous or discontinuous print lines or edges, line scanning is realized by continuous or discontinuous lines of uniform background; Line scan the bright lines on the dark background or the dark lines on the bright background, and realize the guide standard through the contrast of light and dark; Scan material edges with contrast.

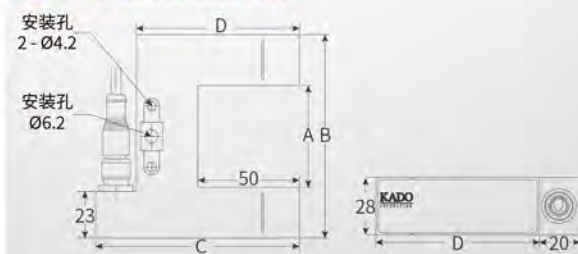


ULTRASONIC SENSOR

超声波传感器



产品尺寸 DIMMENSION



型号 Model	A[mm]	B[mm]	C[mm]	D[mm]
US2014/50	50	100	100	80
US2020/70	70	120	100	90

特点 FEATURES

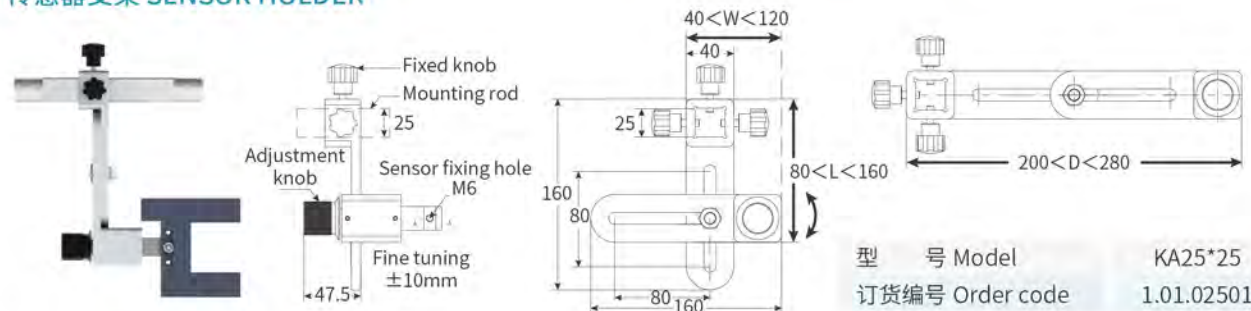
超声波传感器对物料的透明度变化不敏感，可实现透明膜和光敏材料的边缘检测。

Ultrasonic sensors are not sensitive to changes in transparency of materials, and can realize edge detection of transparent films and photosensitive materials.

技术参数 TECHNICAL PARAMETER

型 号 Model	US2014/50	US2020/70
工作温度 Operating temperature	+10 ~ +50°C	
测量范围 Measuring range	±3 mm	
工作电压 Operating voltage	DC 12~24V	
通 讯 Communication	模拟量 DC 0~12V	
接 口 Interface	6-Pin	
分 辨 率 Resolution	0.01 mm	
检测模式 Testing way	Edge	
采样频率 Scan rate	200 KHz	
重 量 Weight	0.215 kg	0.245 kg
订货编号 Order code	1.01.21450	1.01.22070

传感器支架 SENSOR HOLDER

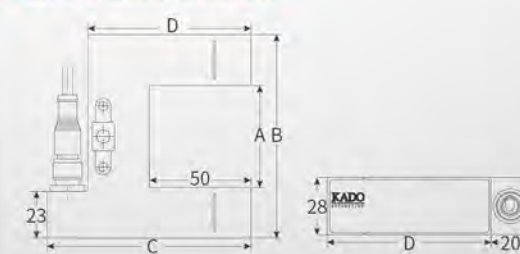


INFRARED SENSOR

红外线传感器



产品尺寸 DIMMENSION



型号 Model	A[mm]	B[mm]	C[mm]	D[mm]
IR2014/50	50	100	100	80
IR2014/100	100	150	110	90
IR2014/150	150	200	110	90

特点 FEATURES

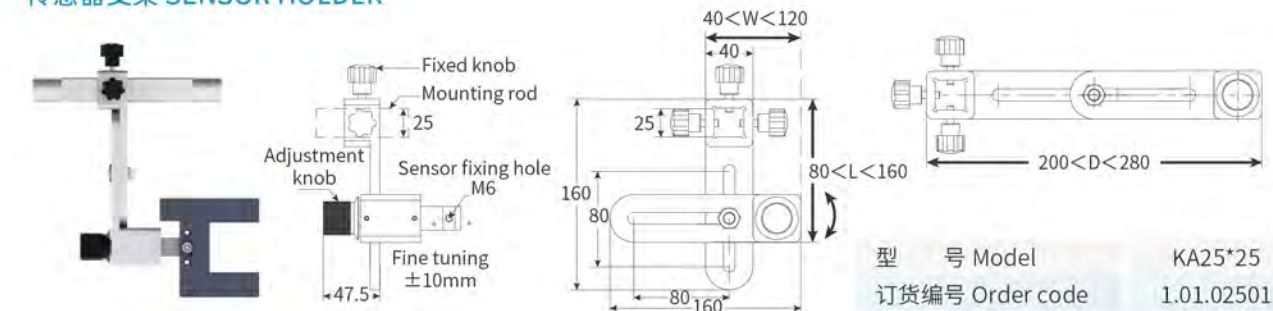
红外线传感器对环境光不敏感，可实现透明度低和非透明的材料边缘检测。

The infrared sensor is insensitive to ambient light and enables edge detection of materials with low transparency and non-transparency.

技术参数 TECHNICAL PARAMETER

型 号 Model	IR2014/50	IR2014/100	IR2014/150
工作温度 Operating temperature	+10 ~ +50°C		
测量范围 Measuring range	±10 mm		
工作电压 Operating voltage	DC 12~24V		
通 讯 Communication	模拟量 DC 0~12V		
接 口 Interface	6-Pin		
分 辨 率 Resolution	0.01 mm		
检测模式 Testing way	Edge		
采样频率 Scan rate	200 KHz		
重 量 Weight	0.200 kg	0.300 kg	0.430 kg
订货编号 Order number	1.01.11450	1.01.11451	1.01.11452

传感器支架 SENSOR HOLDER



WIDE INFRARED SENSOR

宽幅红外线传感器

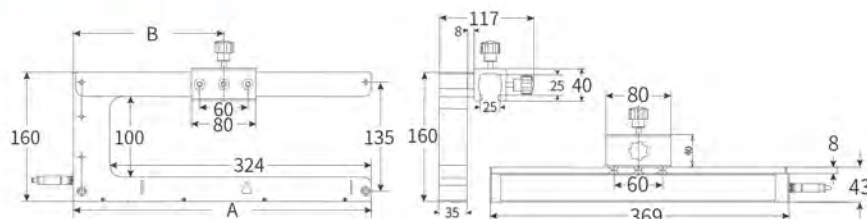


特点 FEATURES

宽幅红外线传感器对环境光不敏感，可同时检测多条材料边缘进行纠偏和宽度测量。

The wide infrared sensor is not sensitive to ambient light, and can simultaneously detect multiple material edges for deviation correction and width measurement.

产品尺寸 DIMENSION



型号 Model	A[mm]	B[mm]
ISR2020/250	369	186
ISR2020/380	490	248

技术参数 TECHNICAL PARAMETER

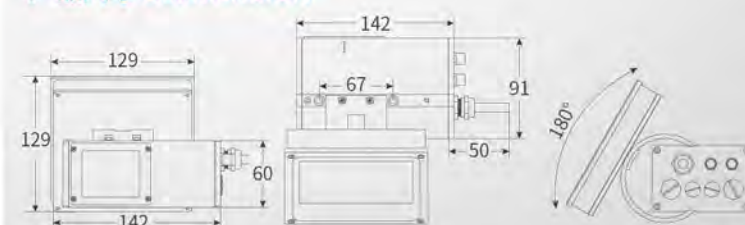
型号 Model	ISR2020/250	ISR2020/380
工作温度 Operating temperature	+10 ~ +50°C	
测量范围 Measuring range	±125 mm	±190 mm
工作电压 Operating voltage	DC 12~24 V	
通讯 Communication	模拟量 DC 0~12 V/CAN	
接口 Interface	4-Pin	
分辨率 Resolution	0.03 mm	
检测模式 Testing way	Edge	
采样频率 Scan rate	200 KHz	
重量 Weight	1.265 kg	0.450 kg
订货编号 Order code	1.01.12025	1.01.12038

COLOR LINE SENSOR

数字跟线传感器 CLS50



产品尺寸 DIMENSION



特点 FEATURES

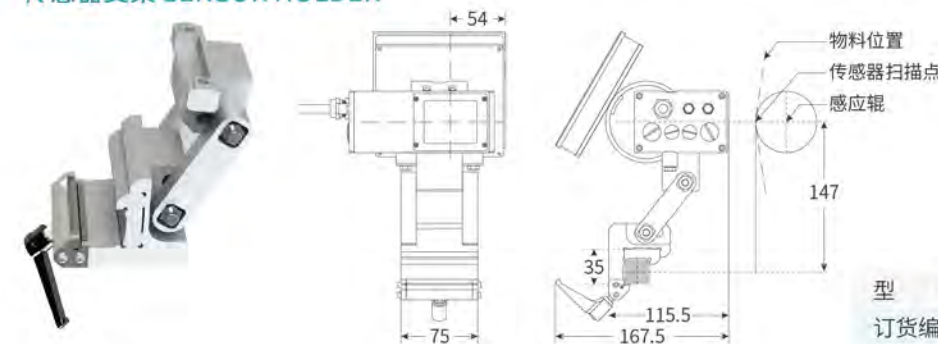
数字跟线传感器可以跟踪连续的或间断的印刷线或印刷边，并配备独立的触摸屏操作面板，操作便捷，显示直观。

Color line Sensor can track continuous or intermittent printed lines or printed edges, and is equipped with a separate touch screen operator panel for easy operation and intuitive display.

技术参数 TECHNICAL PARAMETER

型号 Model	CLS50
工作温度 Operating temperature	+10 ~ +50°C
测量范围 Measuring range	±15 mm
工作电压 Operating voltage	DC 12~24 V
通讯 Communication	CAN
接口 Interface	4-Pin*2
分辨率 Resolution	0.02 mm
检测模式 Testing way	Edge/ Line
采样频率 Scan rate	200 KHz
重量 Weight	1.935 kg
订货编号 Order number	1.01.31550

传感器支架 SENSOR HOLDER



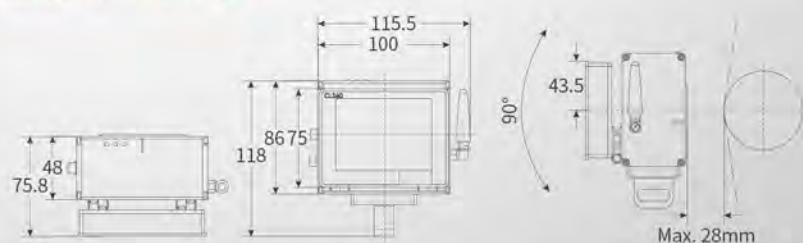
型号 Model	KH25*25
订货编号 Order code	1.01.03501

COLOR LINE SENSOR

数字跟线传感器 CLS60



产品尺寸 DIMMENSION



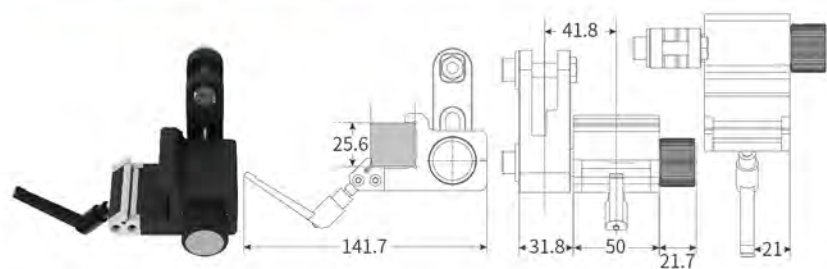
特点 FEATURES

数字跟线传感器可以跟踪连续的或间断的印刷线或印刷边，并配备独立的触摸屏操作面板，操作便捷，显示直观。
Color line Sensor can track continuous or intermittent printed lines or printed edges, and is equipped with a separate touch screen operator panel for easy operation and intuitive display.

技术参数 TECHNICAL PARAMETER

型 号 Model	CLS60
工作温度 Operating temperature	+10 ~ +50°C
测量范围 Measuring range	±15 mm
工作电压 Operating voltage	DC 12~24 V
通 讯 Communication	CAN/ Wifi
接 口 Interface	4-Pin*2
分 辨 率 Resolution	0.02 mm
检测模式 Testing way	Edge/ Line
采样频率 Scan rate	200 KHz
重 量 Weight	0.780 kg
订货编号 Order number	1.01.31560

传感器支架 SENSOR HOLDER



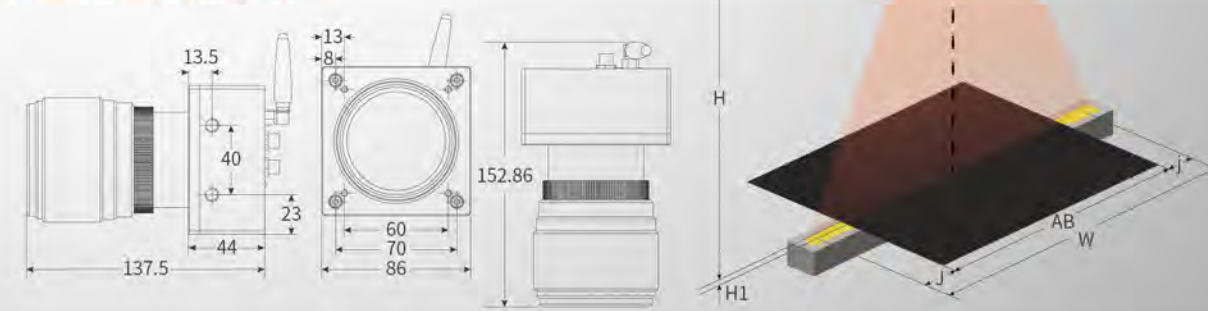
型 号 Model	KB25*25
订货编号 Order code	1.01.03502

CAMERA SENSOR

线阵相机传感器 CCD05K



产品尺寸 DIMMENSION



特点 FEATURES

KD-LC-05KA 是一款线扫描相机，配合专用 LED 光源对材料边缘和色差进行识别，应用于纠偏和宽度测量。
KD-LC-05KA is a line scan camera, used with special LED light source to identify material edge and color difference, used for deviation correction and width measurement.

要素 APPLICATION ELEMENT

- H: 根据检测幅宽和精度设计，并增加物料底面至光源表面距离，H1 物料特别宽的情况下可以采用两个相机进行检测。
H: According to the detection width and precision design, and the distance from the bottom of the material to the surface of the light source. When the H1 material is extremely wide, two cameras can be used for detection.
- W: 根据最大物料宽度 AB 设计，并预留 J 的检测余量。
W: According to the design of the maximum material width AB and reserve the detection margin of J.

技术参数 TECHNICAL PARAMETER

型 号 Model	KD-LC-05KA
工作温度 Operating temperature	+10 ~ +50°C
测量范围 Measuring range	定制
工作电压 Operating voltage	DC 12~24 V
通 讯 Communication	CAN
接 口 Interface	4-Pin*2
分 辨 率 Resolution	5000*1px
检测模式 Testing way	Edge/ Line
采样频率 Scan rate	200 KHz
重 量 Weight	1.365 kg
订货编号 Order number	1.01.41550

CAMERA SENSOR

线阵相机传感器 CCD10K

产品尺寸 DIMMENSION



特点 FEATURES

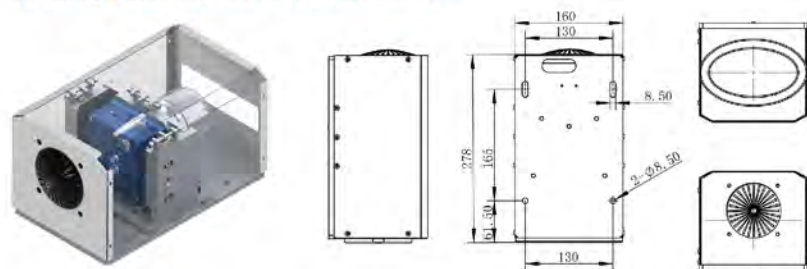
KD-LC-10KA 是一款线扫描相机，配合专用 LED 光源对材料表面图像特征进行识别，应用于纠偏和宽度测量；其特点是可通过 WIFI、局域网、CAN 等多种通讯方式实现远程调试。

KD-LC-10KA is a line scan camera, used with special LED light source to identify the image features of the material surface, used for deviation correction and width measurement; its feature is that it can realize remote debugging through WIFI, LAN, CAN and other communication methods.

技术参数 TECHNICAL PARAMETER

型 号 Model	KD-LC-10KA
工作温度 Operating temperature	+10 ~ +50°C
测量范围 Measuring range	定制
工作电压 Operating voltage	DC 12~24 V
通 讯 Communication	CAN/ Wifi/ Etherent
接 口 Interface	Etherent
分 辨 率 Resolution	10000*1px
检测模式 Testing way	Edge/ Line
采样频率 Scan rate	200 KHz
重 量 Weight	0.365kg (不含镜头)
订货编号 Order number	1.01.41100

传感器支架 SENSOR HOLDER



型 号 Model	KC130
订货编号 Order code	1.01.04502

SENSOR AUTOMATIC POSITIONING MODULE

传感器自动定位装置

FG-A

单边定位 Unilateral positioning

这种型号是电机驱动的传感器定位器的最基本型号，可以实现单个传感器的定位，适用于单边纠偏。

This type of FG is the most basic model of a motor-driven sensor positioner, enabling positioning of a single sensor for web guiding system EPC Mode.



FG-B

双边同步定位

Relative synchronous positioning

适用于固定中心线的物料的中心线纠偏。

两个传感器由一个共同的推动器推动，两个传感器相对物料中心对称地沿相反方向移动。

Applicable to web guiding system CPC Mode. Material correction of fixed center line.

The two sensors are pushed by the same pusher, and the two sensors move symmetrically in opposite directions with respect to the center of the material.



FG-C

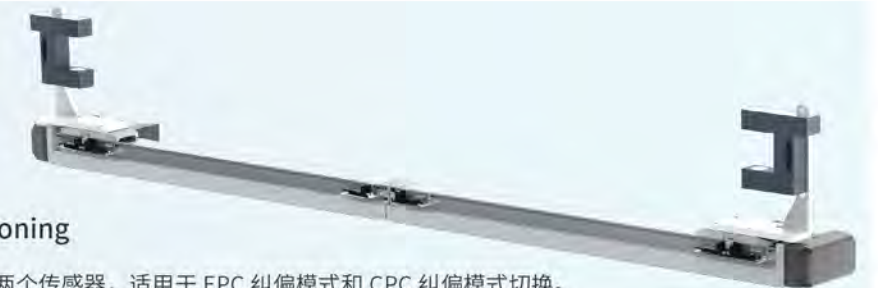
双边异步定位

Relatively asynchronous positioning

两个相互独立的推动器，可以独立调节两个传感器，适用于 EPC 纠偏模式和 CPC 纠偏模式切换。

CPC 模式下中心线可修改，传感器可以在物料整个幅宽上移动。

Two independent drivers that can independently adjust two sensors for web guiding system EPC mode and CPC mode switching. In the CPC mode, the center baseline can be modified and the sensor can move over the entire width of the material.

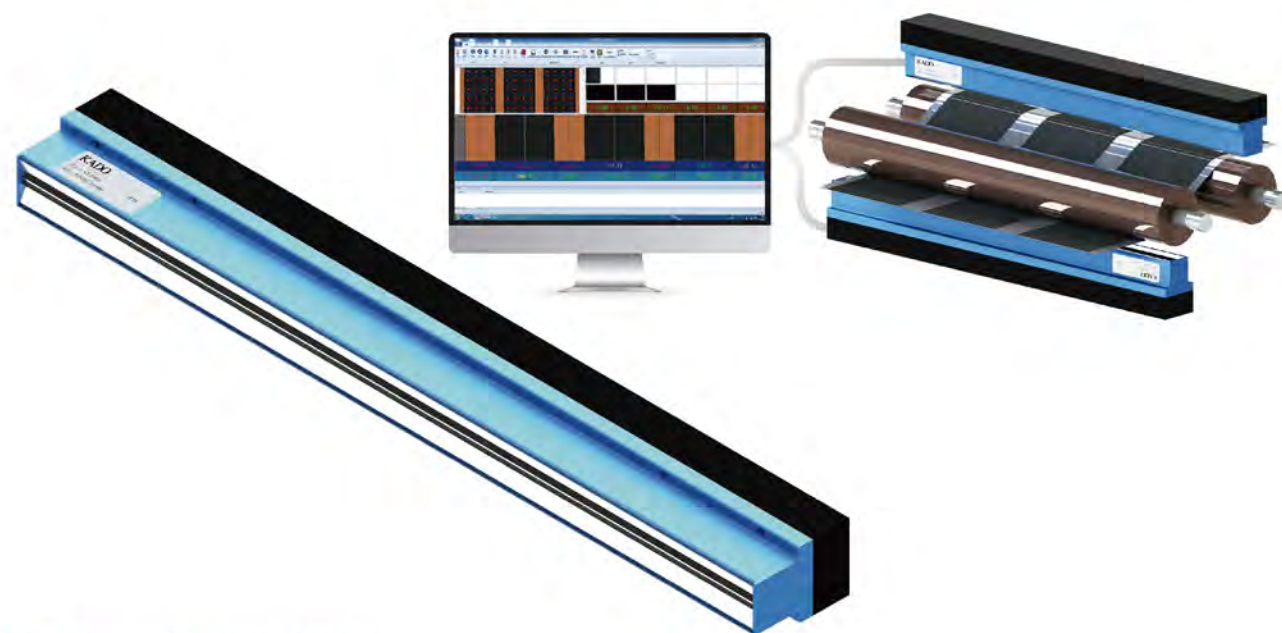


技术参数 TECHNICAL PARAMETER

系 列 Series	同步带 Belt	丝杆 Screw
定位精度 Positioning accuracy	0.3 mm	0.05 mm
响应速度 Responding speed	1~300 mm/s	1~60 mm/s
扫描范围 Scanning range	≤3M	≤1.5M

CMOS LINEAR SENSOR

线性图像传感器CLS900



产品描述 PRODUCT DESCRIPTION

CLS900 系列传感器需搭载 PC 控制平台提供可靠稳定的数据处理平台,灵活多样的配置方式满足不同的工业检测需求。

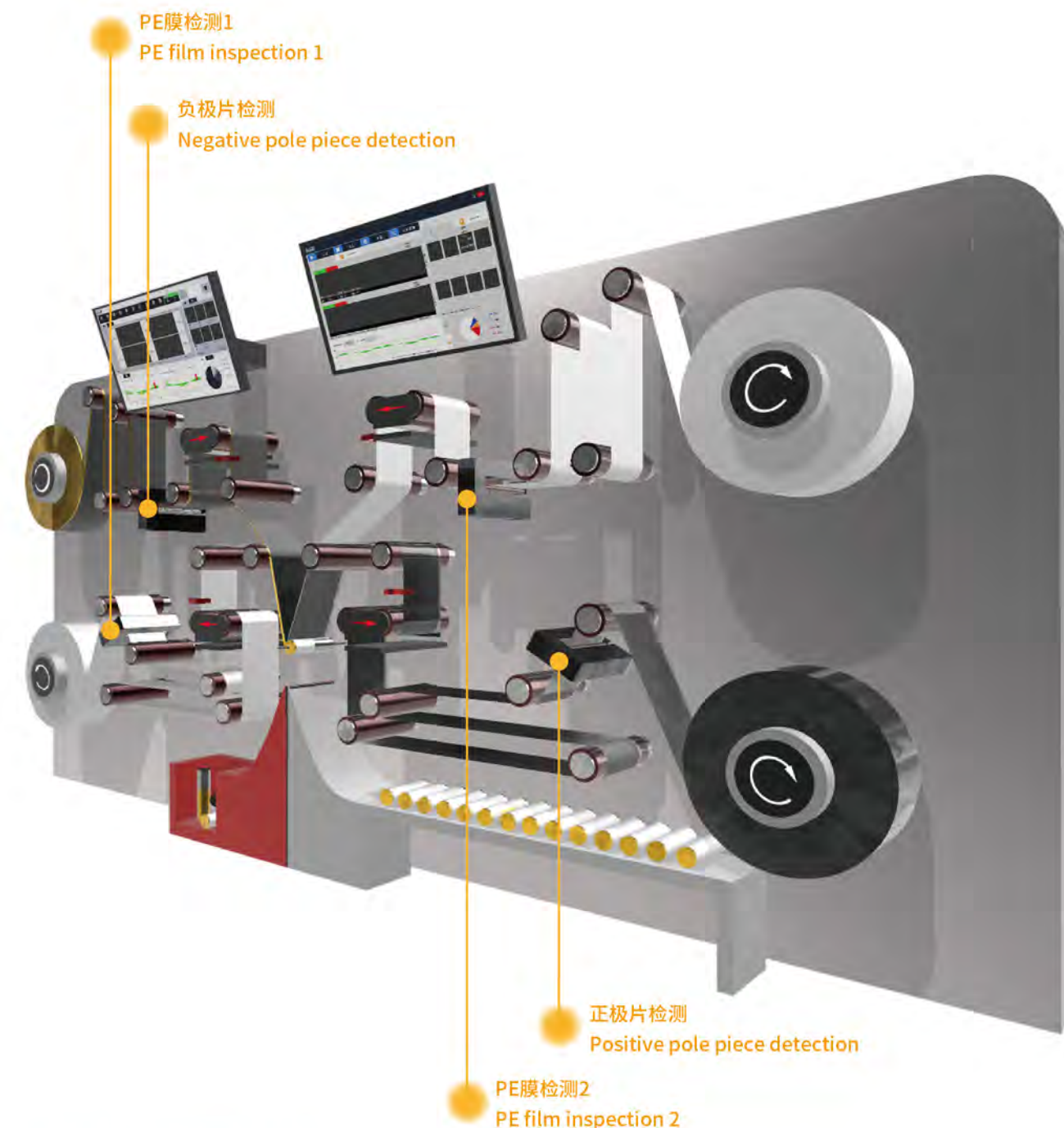
The CLS900 series sensors need to be equipped with IPC control platform to provide a reliable and stable data processing platform, flexible and diverse configuration to meet different industrial testing needs.

特点 FEATURES

- 结构紧凑、重量轻,便于安装
Simple and compact structure, small size, light weight, easy installation
- 全副宽检测,最大限度贴近材料表面
Full width detection, the maximum close to the material surface
- 无镜头成像,景深很小
No lens imaging, the depth of field is very small
- 陶瓷基底,良好的温度特性
Ceramic substrate, good temperature characteristics
- 单时钟驱动,控制简单
Single clock drive, simple control
- 没有光学镜头,抗震性能强
No optical lens, strong seismic performance

技术参数 TECHNICAL PARAMETER

可选分辨率 Resolution Optional	0.02 mm/ 0.04 mm/ 0.08mm
采集频率 Acquisition frequency	30 KHz
检测物距 Object distance	≤15 mm
检测范围 Effective range	50 ~ 2000 (可定制)
适用环境 Applicable environment	0~45℃, 5%~95% (无凝露)
供电需求 Powered by	DC 24V (功率视检测范围而定)
配套线缆 Supporting cable	5M/ 10M



电池卷绕 BATTERY WINDING



卷绕前对极片和 PE 膜涂层缺陷进行 100% 在线检测,定制化 CLS 传感器方案安装空间小,与卷绕设备 PLC 通讯实现不良品自动排出。

100% on-line inspection of the pole piece and PE film coating defects before winding, the customized CLS sensor solution has a small installation space, and communicates with the winding equipment PLC to realize the automatic discharge of defective products.

ACTUATORS

驱动器



KADO 提供的纠偏驱动器根据客户使用环境和工位不同进行选择,推力范围从 500N-30000N 之间,行程范围从 50mm-300mm 之间,行程可以自由设定,直线运动和弧型行动可以选择不同的安装结构,驱动器采用直流无刷电机或伺服电机,研磨丝杆保证了驱动器的精度和寿命。

The correction drive provided by KADO is selected according to the customer's environment and work station. The thrust range is from 500N to 30000N, the stroke range is from 50mm to 300mm, the stroke can be set freely, the linear motion and the arc motion can be selected differently installation structure, the drive uses DC brushless motor or servo motor, grinding screw to ensure the accuracy and life of the drive.



GR12/C

行程范围 Actuating force : 50~200mm
额定推力 Actuating travel: 500/1000N



GR12/CX

行程范围 Actuating force : 50~200mm
额定推力 Actuating travel: 500/1000N



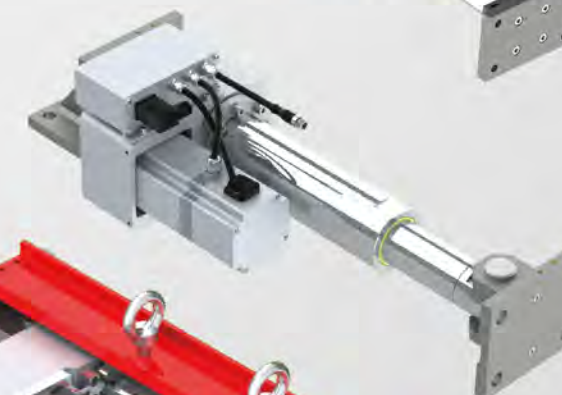
GR13/C

行程范围 Actuating force : 200mm
额定推力 Actuating travel: 3000N



GR13/CX

行程范围 Actuating force : 200mm
额定推力 Actuating travel: 3000N



GR14/CX

行程范围 Actuating force : 200~300mm
额定推力 Actuating travel: 9000N



GR15/CX

行程范围 Actuating force : 200~300mm
额定推力 Actuating travel: 30000N

ACTUATORS GR12/C



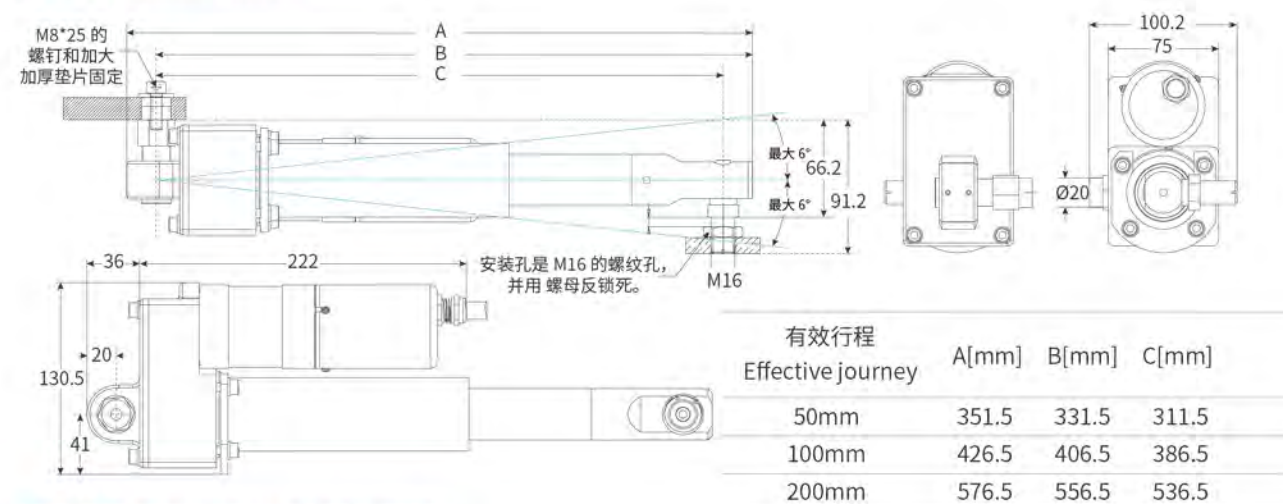
额定推力 ACTUATING TRAVEL

500/1000N

特点 FEATURES

- DC 24 V (由控制器供电 Powered by controller)
- 免维护 Maintenance free
- 推荐使用工位: 过程纠偏框架。Use station: Process guiding frame

产品尺寸 DIMMENSION



技术参数 TECHNICAL PARAMETER

型号 Model	额定推力 Rated thrust	响应速度 Responding speed	有效行程 Effective journey	订购编号 Order Code
GR12/50/2.5/20*4/C	500 N	20 mm/s	50 mm	1.01.01209
GR12/100/5/20*4/C	1000 N	10 mm/s	50 mm	1.01.01210
GR12/100/2.5/20*4/C	500 N	20 mm/s	100 mm	1.01.01201
GR12/100/5/20*4/C	1000 N	10 mm/s	100 mm	1.01.01202
GR12/200/2.5/20*4/C	500 N	20 mm/s	200 mm	1.01.01205
GR12/200/5/20*4/C	1000 N	10 mm/s	200 mm	1.01.01206

ACTUATORS GR12/CX



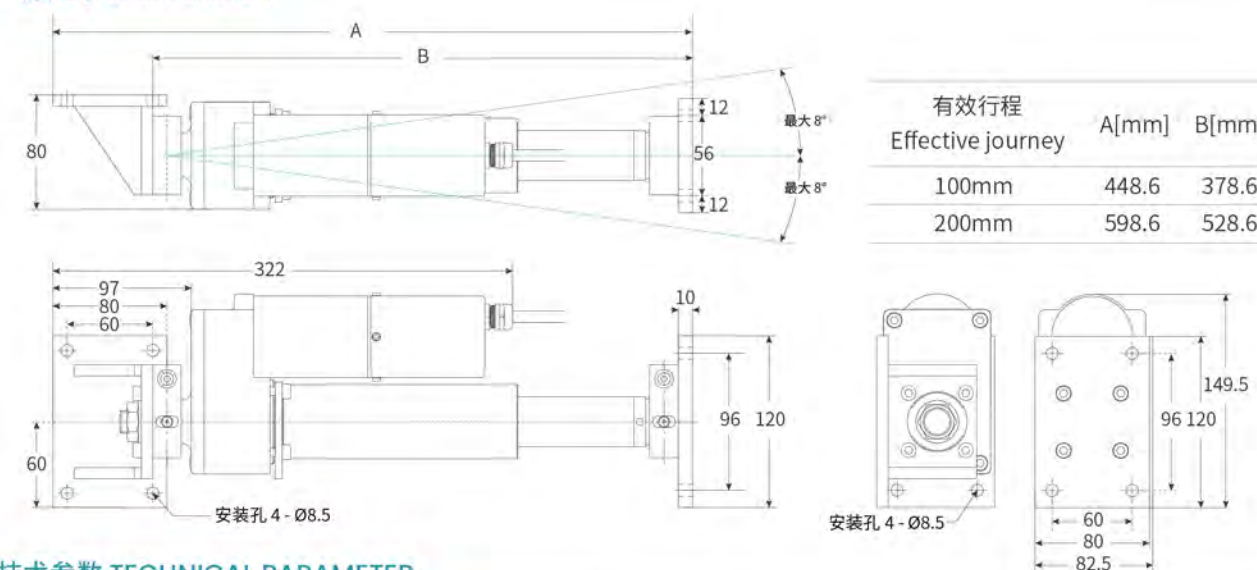
额定推力 ACTUATING TRAVEL

500/1000N

特点 FEATURES

- DC 24 V (由控制器供电 Powered by controller)
- 免维护 Maintenance free
- 推荐使用工位: 收、放卷。Use station: take-up and unwind station

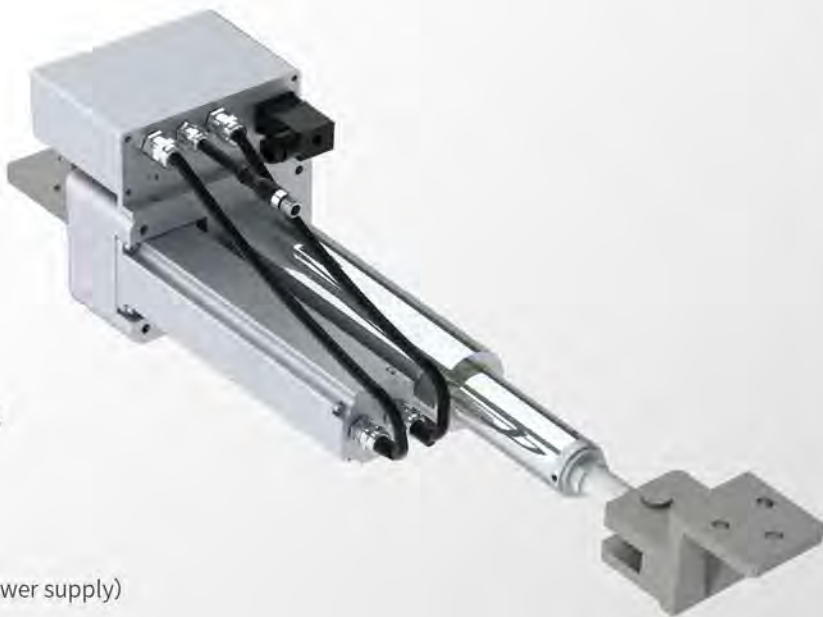
产品尺寸 DIMMENSION



技术参数 TECHNICAL PARAMETER

型号 Model	额定推力 Rated thrust	响应速度 Responding speed	有效行程 Effective journey	订购编号 Order Code
GR12/100/2.5/20*4/CX	500 N	20 mm/s	100 mm	1.01.01203
GR12/100/5/20*4/CX	1000 N	10 mm/s	100 mm	1.01.01214
GR12/200/2.5/20*4/CX	500 N	20 mm/s	200 mm	1.01.01207
GR12/200/5/20*4/CX	1000 N	10 mm/s	200 mm	1.01.01208

ACTUATORS GR13/C

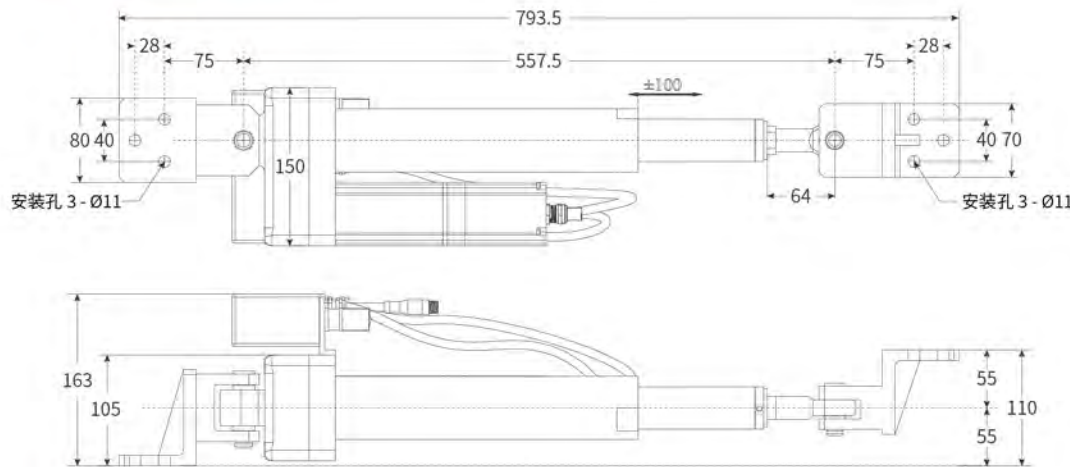


额定推力 ACTUATING TRAVEL
3000N

特点 FEATURES

- DC 24 V (独立供电 Independent power supply)
- 免维护 Maintenance free
- 推荐使用工位：过程纠偏框架。Use station: Process guiding frame

产品尺寸 DIMMENSION



技术参数 TECHNICAL PARAMETER

型号 Model	额定推力 Rated thrust	响应速度 Responding speed	有效行程 Effective journey	订购编号 Order Code
GR13/200/2.5/25*5/C	1500 N	30mm/s	200mm	1.01.01305
GR13/200/5/25*5/C	3000 N	15mm/s	200mm	1.01.01306

ACTUATORS GR13/CX

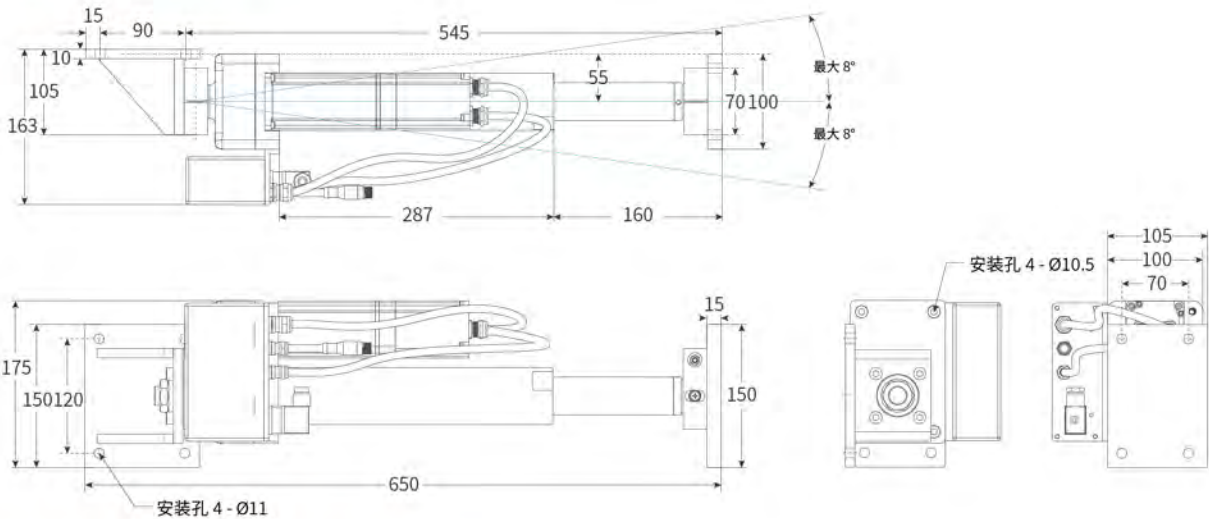


额定推力 ACTUATING TRAVEL
3000N

特点 FEATURES

- DC 24 V (独立供电 Independent power supply)
- 免维护 Maintenance free
- 推荐使用工位：收、放卷。Use station: take-up and unwind station

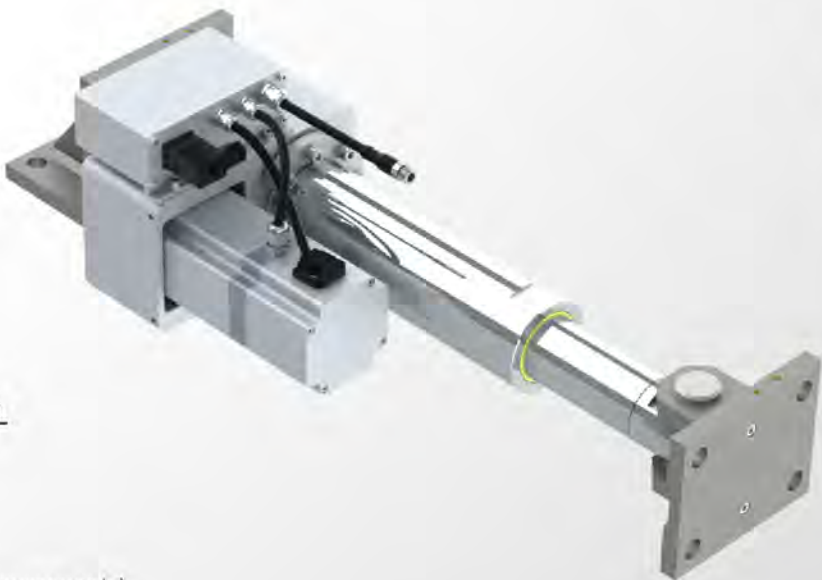
产品尺寸 DIMMENSION



技术参数 TECHNICAL PARAMETER

型号 Model	额定推力 Rated thrust	响应速度 Responding speed	有效行程 Effective journey	订购编号 Order Code
GR13/200/2.5/25*5/CX	1500 N	30mm/s	200mm	1.01.01301
GR13/200/5/25*5/CX	3000 N	15mm/s	200mm	1.01.01302

ACTUATORS GR14/CX

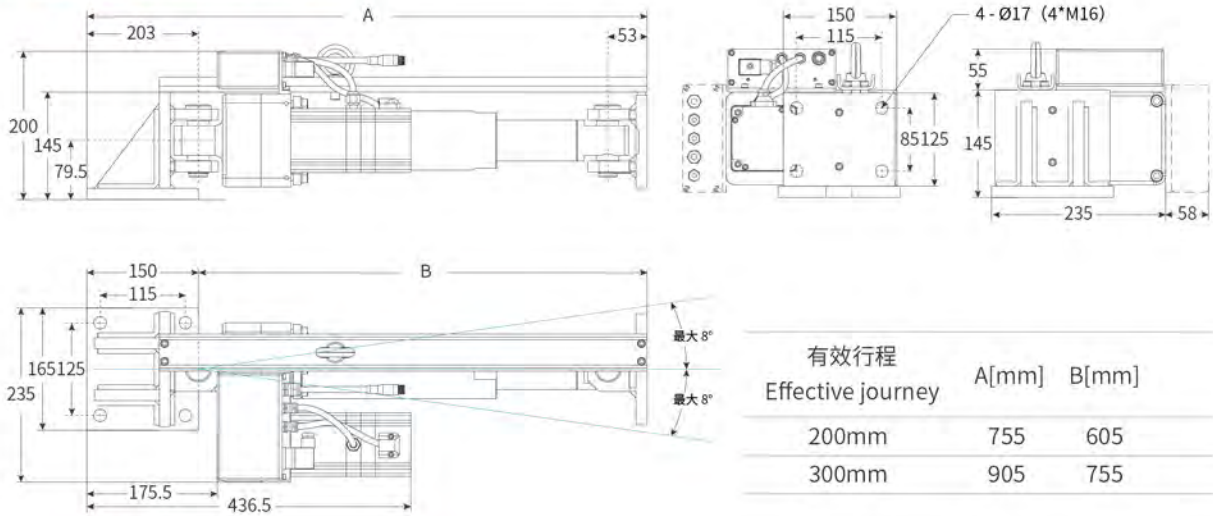


额定推力 ACTUATING TRAVEL
9000N

特点 FEATURES

- DC 48 V (独立供电 Independent power supply)
- 免维护 Maintenance free
- 推荐使用工位：收、放卷。Use station: take-up and unwind station

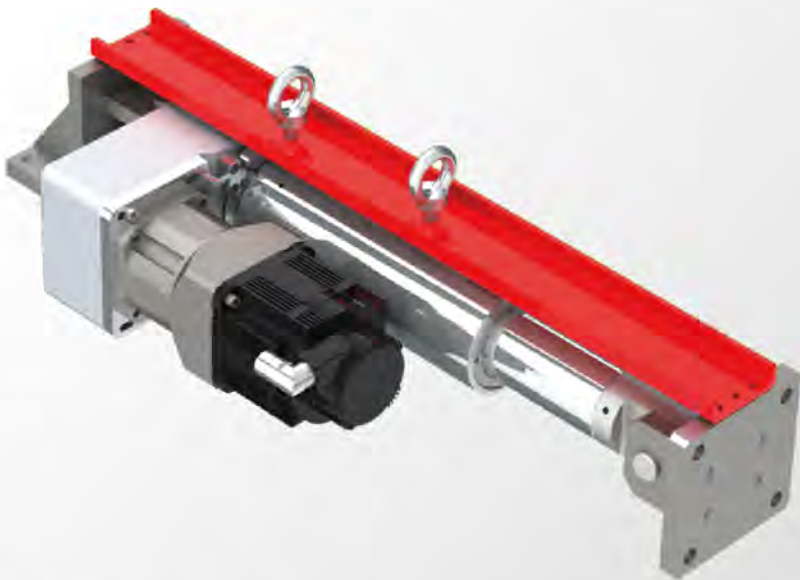
产品尺寸 DIMMENSION



技术参数 TECHNICAL PARAMETER

型号 Model	额定推力 Rated thrust	响应速度 Responding speed	有效行程 Effective journey	订购编号 Order Code
GR14/200/5/25*5/CX	9000 N	15 mm/s	200 mm	1.01.01402
GR14/300/5/25*5/CX	9000 N	15 mm/s	300 mm	1.01.01404

ACTUATORS GR15/CX

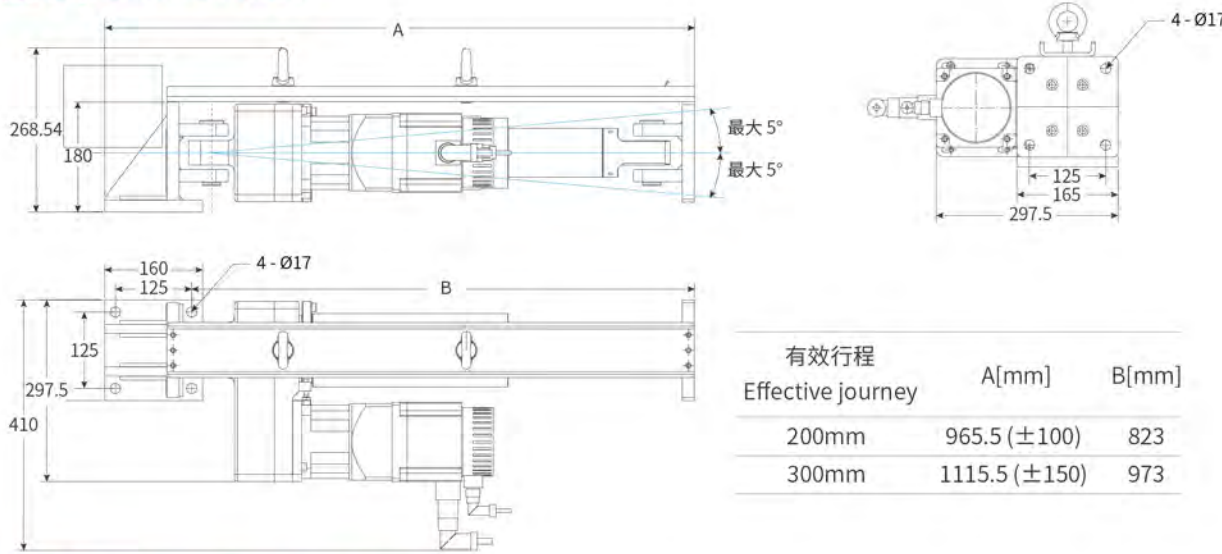


额定推力 ACTUATING TRAVEL
30000N

特点 FEATURES

- 伺服电机控制 Servo motor control
- AC 220 V (独立供电 Independent power supply)
- 免维护 Maintenance free
- 推荐使用工位：收、放卷。Use station: take-up and unwind station

产品尺寸 DIMMENSION



技术参数 TECHNICAL PARAMETER

型号 Model	额定推力 Rated thrust	响应速度 Responding speed	有效行程 Effective journey	订购编号 Order Code
GR15/200/32*10/10/CX	30000 N	15 mm/s	200 mm	1.01.01501
GR15/300/32*10/10/CX	30000 N	15 mm/s	300 mm	1.01.01503

DF TYPE PIVOTING GUIDING FRAME

DF 纠偏框架



产品描述 PRODUCT DESCRIPTION

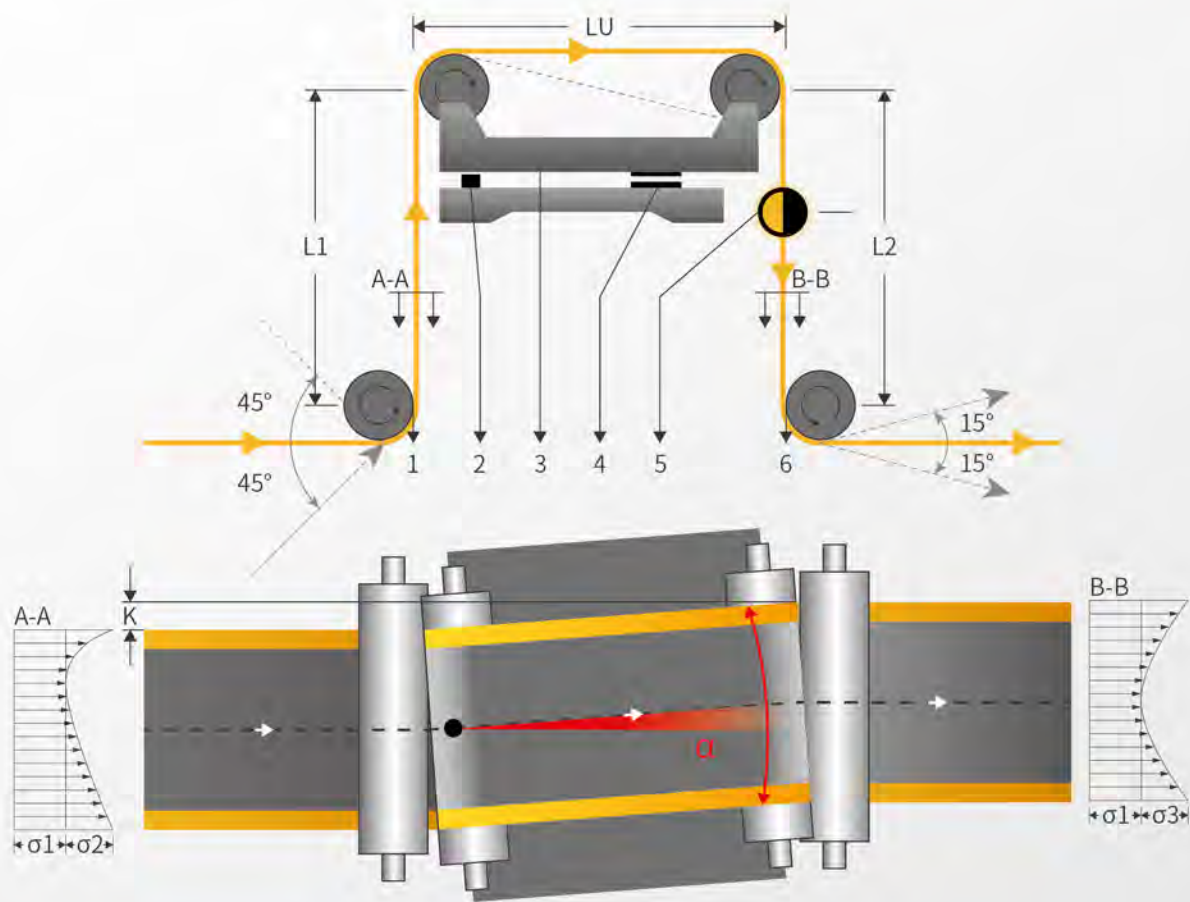
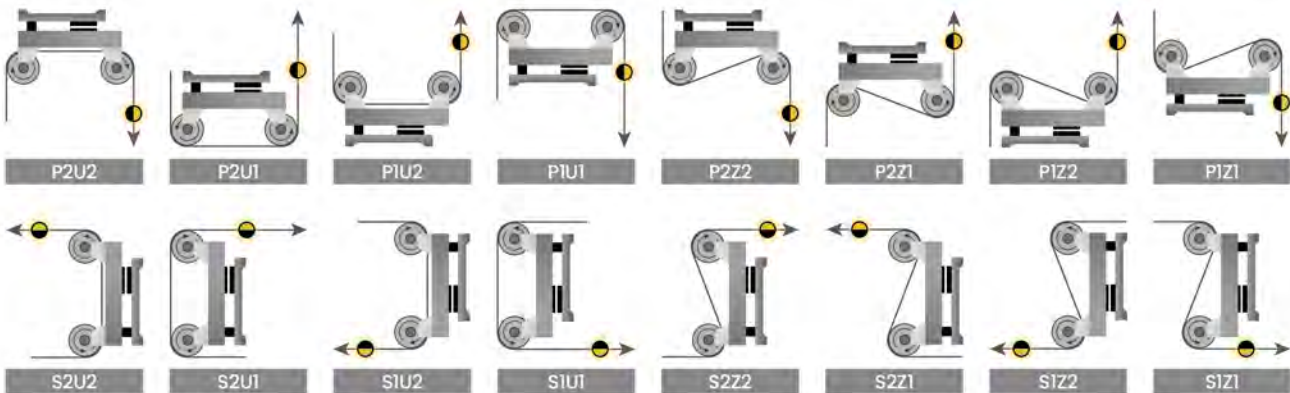
DF 型过程纠偏框架是由一个固定的下架和一个可旋转的上支架组成。上支架旋转支点位于物料的进料端，纠偏传感器位于物料的出料端。当纠偏传感器检测到物料偏差超过设定值时，驱动器推动上支架旋转，旋转方向与材料偏差方向相反，使物料处在传感器设定值范围内。DF 型纠偏框架安装方式灵活，适用于物料行进过程纠偏。

The DF type process correction frame consists of a fixed lower frame and a rotatable upper bracket. The rotating support point of the upper bracket is located at the feeding end of the material, and the correcting sensor is located at the discharging end of the material. When the deviation sensor detects that the material deviation exceeds the set value, the motor pushes the upper bracket to rotate, and the rotation direction is opposite to the material deviation direction, so that the material is within the set value of the sensor. The DF type correction frame is flexible in installation and suitable for material deviation during the material travel process.

技术参数 TECHNICAL PARAMETER

纠偏精度 Guiding accuracy	± 0.1 mm (depending on material)
辊面长度 Roller face length	500~6000 mm (>6 meters can be customized)
辊筒直径 Roller diameter D	100/120/160/200 mm (standard)
工作电压 Operating voltage	24 V DC
推 力 Force	500/1000/3000 N
温度环境 Ambient temperature	10 ~ 50 °C

DF纠偏框架安装示意图 DF TYPE PIVOTING GUIDING FRAME INSTALLATION DIAGRAM



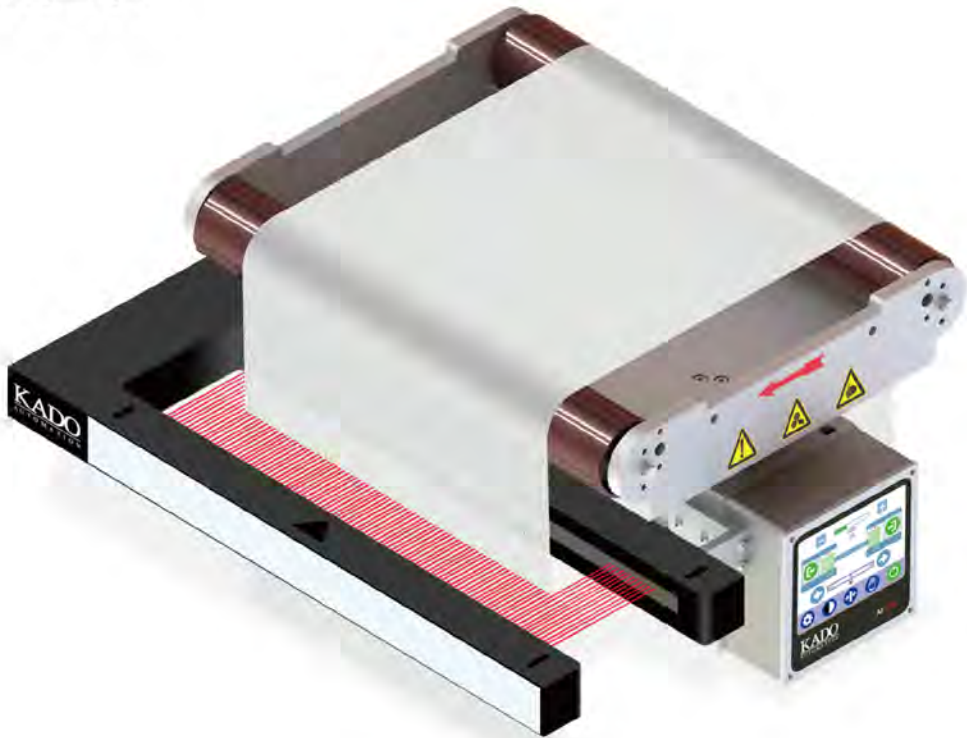
设计与布局要求 DESIGN LAYOUT REQUIREMENTS

A-A	入料端材料表面张力分布 Web tension distribution at infeed	1	进料辊 Infeed roller
B-B	出料端材料表面张力分布 Web tension distribution at outfeed	2	旋转支点 Pivot point
K	纠偏量 Correction amount	K	纠偏量 Correction amount
α	纠偏角度 Correction angle max. ± 5°	3	纠偏框架 Guiding frame
σ1	材料表面的基本张力 Web basic tension	4	传感器 Sensor
σ2	由于进料端纠偏辊筒的摆动所产生的应力分布 Tension distribution by pivoting action of roller frame at the infeed	5	出料端固定辊筒 Lock roller
σ3	由于出料端纠偏辊筒的摆动所产生的应力分布 Tension distribution by pivoting action of roller frame at the outfeed	LU	传送长 Transfer path
		L1	进料长度 Infeed path
		L2	出料长度 Outfeed path
		AB	操作宽度 Operating width

经验表面 L1、L2 长度需根据材料宽度的 0.5~1 倍幅宽预留。
Experience has shown that these paths should be the equivalent of 50 ~ 100 % of the web width.

DFS TYPE PIVOTING GUIDING FRAME

DFS 纠偏框架

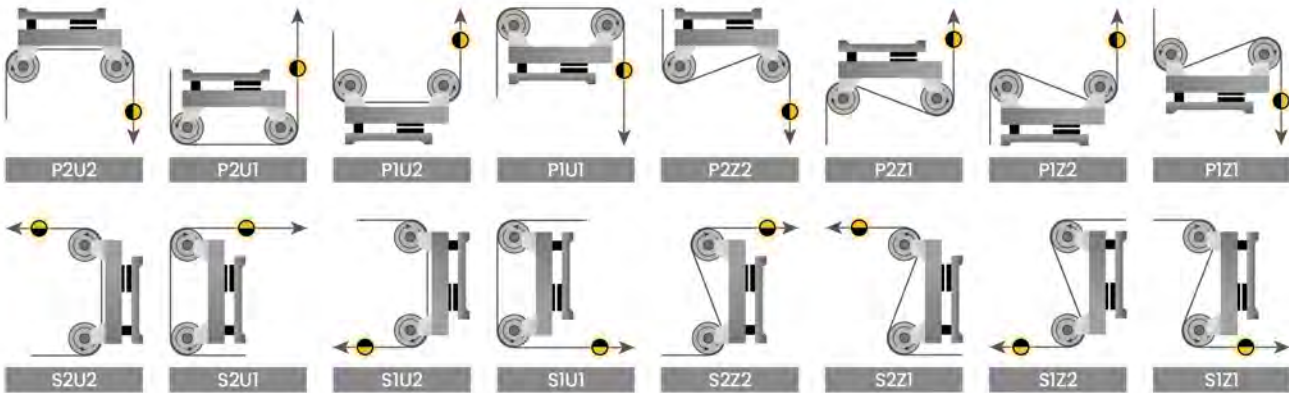


产品描述 PRODUCT DESCRIPTION

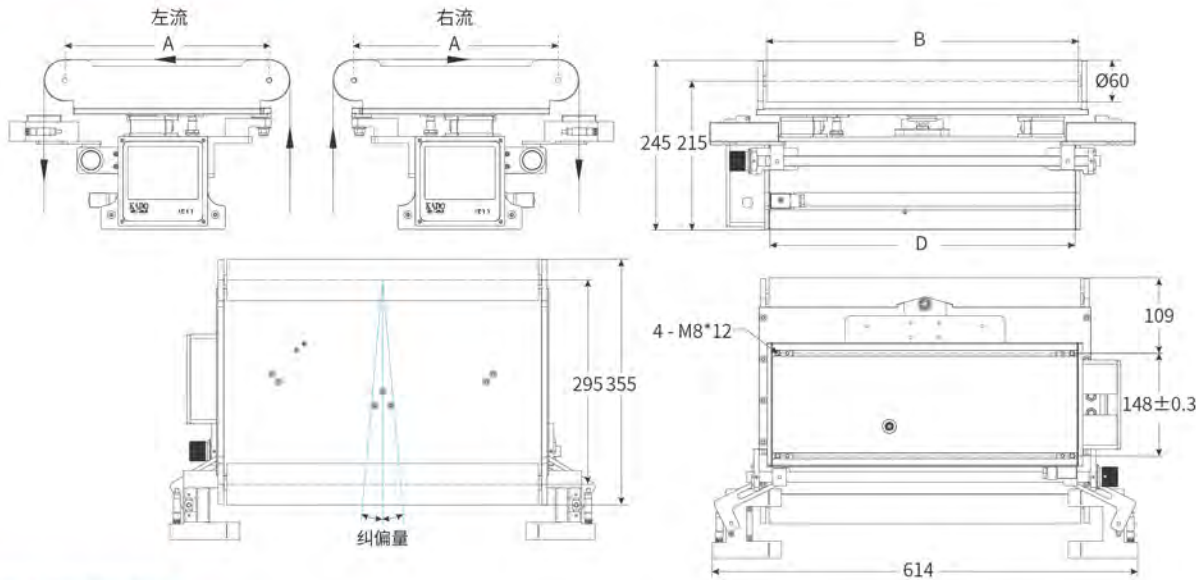
DFS 是集成了控制器和传感器的紧凑式旋转框架，可选用超声波传感器（US2014）红外线传感器（IR2014）和 CCD 传感器（CLS50），并可根据需求提供不同的辊筒材质轻松适用不同材质的带材进行在线纠偏。

DFS is a compact rotating frame integrated with sensor and controller. Ultrasonic sensor (US2014), infrared sensor (IR2014) and CCD sensor (CLS50) are available. And according to the demand to provide different roller material, it is easy to apply different materials of the strip for correction.

DF纠偏框架安装示意图 DF TYPE PIVOTING GUIDING FRAME INSTALLATION DIAGRAM



产品尺寸 DIMENSION



尺寸 DIMENSION

DFS 规格 Specification	A 辊径 Roller Diameter (mm)	B 辊长 Roller (mm)	C 跨距 Span (mm)	D 底座长 base Length (mm)	纠偏量 Web Correction (mm)	丝杆行程 Screw Journey (mm)
DFS2*60*250*200*L	60	200	250	250	±15	±8
DFS2*60*250*200*R	60	200	250	250	±15	±8
DFS2*60*250*250*L	60	250	250	250	±15	±8
DFS2*60*250*250*R	60	250	250	250	±15	±8
DFS2*60*305*300*L	60	300	305	290	±25	±16
DFS2*60*305*300*R	60	300	305	290	±25	±16
DFS2*60*305*350*L	60	350	305	340	±25	±16
DFS2*60*305*350*R	60	350	305	340	±25	±16
DFS2*60*305*400*L	60	400	305	390	±25	±16
DFS2*60*305*400*R	60	400	305	390	±25	±16
DFS2*60*355*450*L	60	450	355	440	±25	±16
DFS2*60*355*450*R	60	450	355	440	±25	±16
DFS2*60*355*500*L	60	500	355	490	±30	±16
DFS2*60*355*500*R	60	500	355	490	±30	±16
DFS2*60*355*550*L	60	550	355	540	±30	±16
DFS2*60*355*550*R	60	550	355	540	±30	±16

技术参数 TECHNICAL PARAMETER

工作电压 Operating voltage	24 V DC
辊筒直径 Roller diameter	60/80 mm
驱动器行程 Nominal actuating travel	±15 mm
响应速度 Responding speed	60 mm/s
适应线速 Adaptive line speed	500 m/min
适应张力 Web tension	500 N
位置精度 Positional accuracy	< 0.1 mm
纠偏角度 Rotation angle	< ± 5°
环境温度 Ambient temperature	+10 ~ +50 °C
防护等级 Protection class	IP 54

SF TYPE PIVOTING GUIDING FRAME

SF 纠偏框架



产品描述 PRODUCT DESCRIPTION

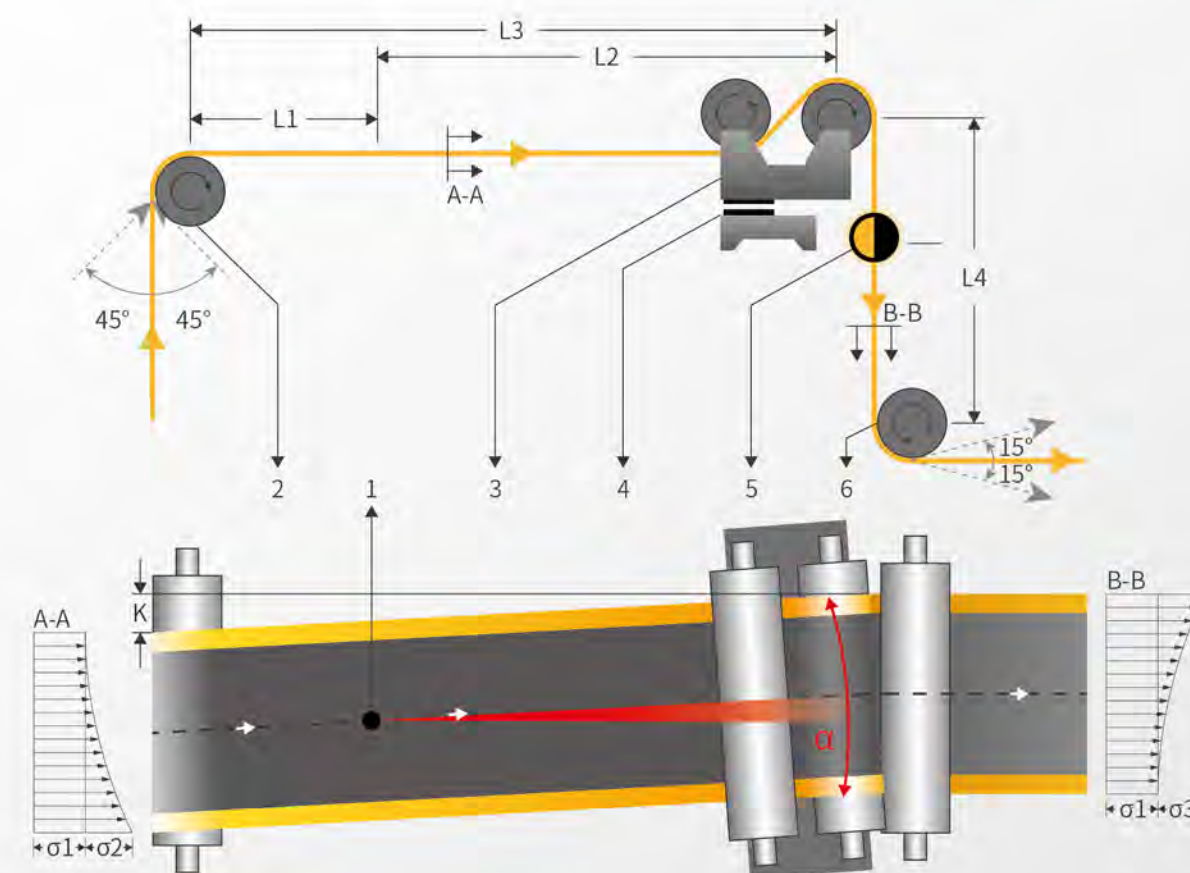
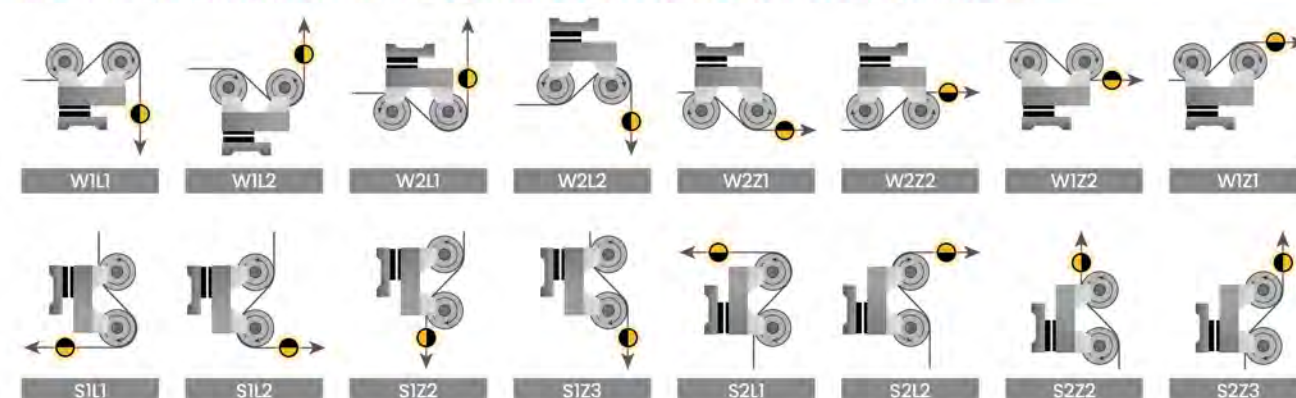
SF 型位移纠偏辊架由一个固定的下支架和一个上支架组成，有一个或两个纠偏辊筒。上支架绕着一个假想的支点移动，支点位于纠偏辊架外的进料端一侧。当进料路径发生偏差时，纠偏辊架平移至一边，使得物料在下一个辊筒处进入正确的设定位置。纠偏在进料区域完成。基于位移纠偏辊架的工作原理，位移纠偏辊架需要足够长的进料跨距和出料跨距。

They consist of a fixed base frame and a movable guide frame. The latter accommodates one or two positioning rollers and swivels round an imaginary pivot point on the infeed plane. When the feed path is deviated, the guiding roller frame is translated one side so that the material enters the correct set position at the next roller. Based on the working principle of the displacement correcting roller frame, the displacement correcting roller frame needs a sufficiently long feed span and discharge span.

技术参数 TECHNICAL PARAMETER

纠偏精度 Guiding accuracy	± 0.2 mm (depending on material)
辊面长度 Roller face width	400~2000 mm (>2 meters can be customized)
辊筒直径 Roller diameter D	100/120/160/200 mm (standard)
工作电压 Operating voltage	24 V DC
推 力 Force	500/1000/3000 N
温度环境 Ambient temperature	10 ~ 50 °C

SF纠偏框架安装示意图 SF TYPE PIVOTING GUIDING FRAME INSTALLATION DIAGRAM



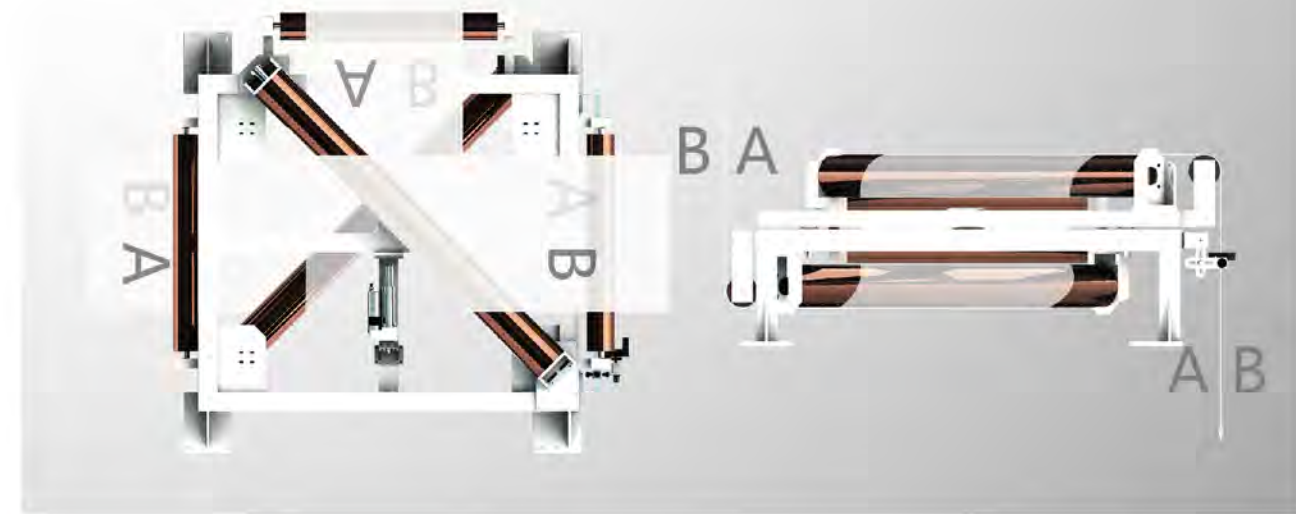
设计与布局要求 DESIGN LAYOUT REQUIREMENTS

A-A	入料端材料表面张力分布 Web tension distribution at infeed	1	旋转点 Rotation point
B-B	出料端材料表面张力分布 Web tension distribution at outfeed	2	进料端固定辊筒 Feed end roller
K	纠偏量 Correction amount	K	纠偏量 Correction amount
α	纠偏角度 Correction angle max. ± 5°	3	纠偏框架 Guiding frame
σ1	材料表面的基本张力 Web basic tension	4	传感器 Sensor
σ2	由于进料端纠偏辊筒的摆动所产生的应力分布 Tension distribution by pivoting action of roller frame at the infeed	5	出料端固定辊筒 Lock roller
σ3	由于出料端纠偏辊筒的摆动所产生的应力分布 Tension distribution by pivoting action of roller frame at the outfeed	L3	进料长度 Infeed path
		L4	出料长度 Outfeed path
		AB	操作宽度 Operating width

经验表明 L3 长度需根据材料宽度的 2 倍以上幅宽预留。L4 长度约 0.5~1 倍材料宽度预留。
The infeed path should be the equivalent of two to three times the web width, the outfeed path should be between 50 % and 100 % of the web width.

FLIP PIVOTING FRAME

翻转纠偏框架



产品描述 PRODUCT DESCRIPTION

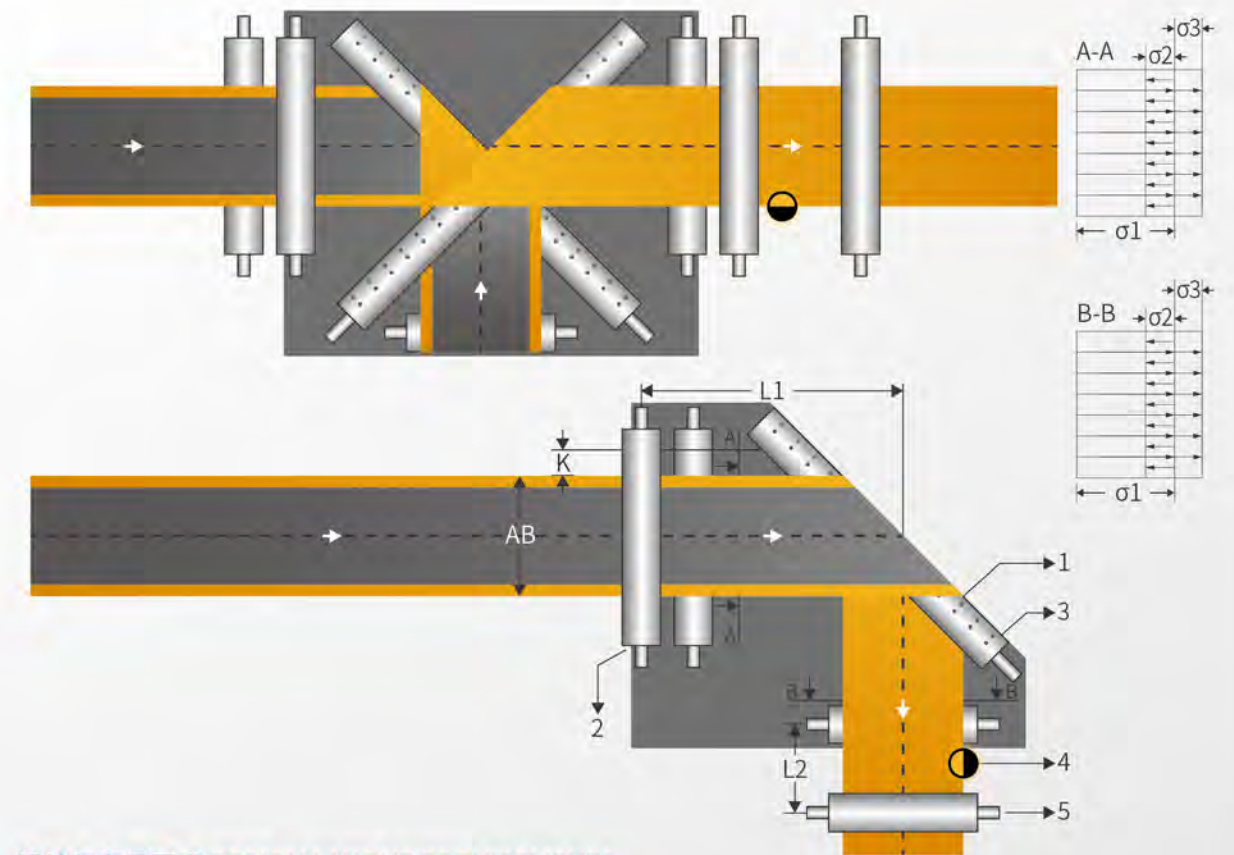
翻转纠偏系统基于一个简单的原理：入料过辊与转向辊成 45°角安装，而材料围绕转向辊以 180°缠绕运行。从而使材行进方向改变 90°的直接效果。为了同时校正材料位置，根据出料位置信号使转向辊平行于进料辊平面移动，从而在材料出料时将材料偏移到指定位置。另在转向辊与材料接触面之间增加空气垫有效减少材料刮花、磨损和打皱。

Web guiding turning bar systems is based on a simple principle: A bar is mounted at an angle of 45° to the longitudinal and transverse axes while the web runs over it with 180° wrapping. This has the immediate effect of changing the direction of web travel by 90°. To correct the web at the same time, the turning bar is moved parallel to the infeed plane according to the actuating signal, thus offsetting the web to the side as it runs off. In addition, the addition of an air cushion on the contact surface of the steering roller, effectively reduces material waste and wrinkles.

技术参数 TECHNICAL PARAMETER

纠偏精度 Guiding accuracy	± 0.2 mm (depending on material)
辊面长度 Roller face length	400~1200 mm (>1.2 meters can be customized)
工作电压 Operating voltage	24 V DC
推力 Force	500/1000/3000 N (Depending on equipment tension)
响应速度 Responding speed	Max 30 mm/s
温度环境 Ambient temperature	10 ~ 50 °C

* 详细参数需根据设备定制 Detailed parameters need to be customized according to the equipment



设计与布局要求 DESIGN LAYOUT REQUIREMENTS

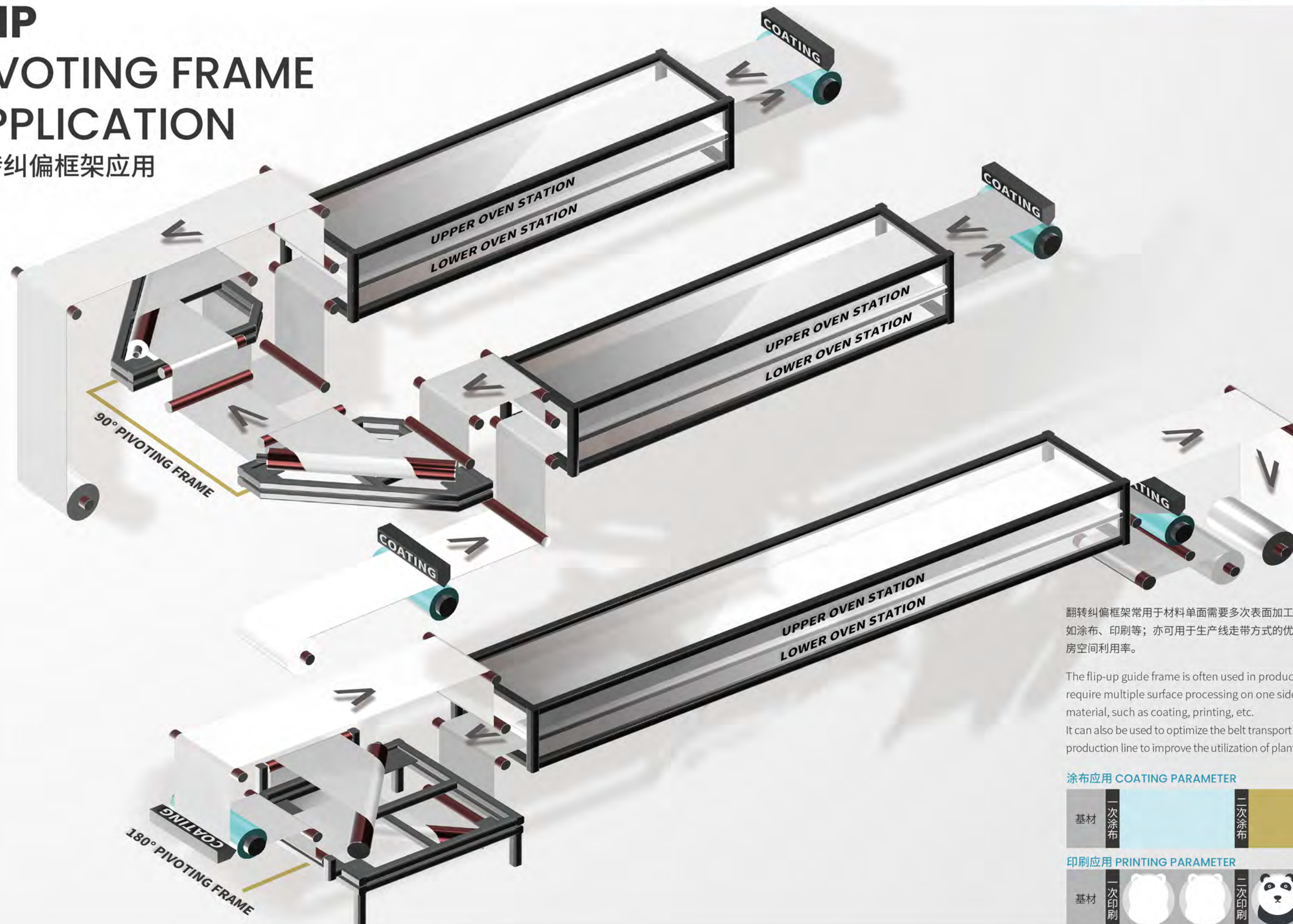
A-A	入料端材料表面张力分布 Web tension distribution at infeed	1	旋转点 Rotation point
B-B	出料端材料表面张力分布 Web tension distribution at outfeed	2	进料端固定辊筒 Feed end roller
K	纠偏量 Correction amount	K	纠偏量 Correction amount
σ_1	材料表面的基本张力 Web basic tension	3	纠偏框架 Guiding frame
σ_2	由于进料端纠偏辊筒的摆动所产生的应力分布 由于出料端纠偏辊筒的摆动所产生的应力分布 Tension distribution by pivoting action of roller frame at the infeed Tension distribution by pivoting action of roller frame at the outfeed	4	传感器 Sensor
σ_3		5	出料端固定辊筒 Lock roller
		L3	进料长度 Infeed path
		L4	出料长度 Outfeed path
		AB	操作宽度 Operating width

为了保护卷材表面，可以通过在 45°转向辊和卷材接触面之间插入气垫来减少摩擦，可以实现高达 ±1mm 的导向精度，为了改善动态调整，导辊与转向辊一起移动，引导辊和锁定辊之间的距离应预留对应材料幅宽的一半。传感器应尽可能靠近出料辊安装。

To protect the web surface, the friction can be reduced by inserting an air cushion between the turning bar and the web. Guiding precision of up to ± 1 mm can be achieved. For improved dynamic adjustment, a guide roller should also be moved together with the turning bar. The distance between the guide roller and the locking roller should correspond to half the web width. The sensor should be mounted immediately after the outfeed roller as close as possible.

FLIP PIVOTING FRAME APPLICATION

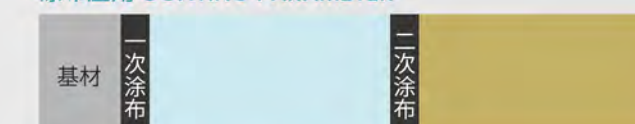
翻转纠偏框架应用



翻转纠偏框架常用于材料单面需要多次表面加工的生产线，例如涂布、印刷等；亦可用于生产线走带方式的优化从而提高厂房空间利用率。

The flip-up guide frame is often used in production lines that require multiple surface processing on one side of the material, such as coating, printing, etc. It can also be used to optimize the belt transport mode of the production line to improve the utilization of plant space.

涂布应用 COATING PARAMETER



印刷应用 PRINTING PARAMETER



ONLINE THICKNESS GAUGE

在线测厚仪

系统简介 SYSTEM INTRODUCTION

KADO 软件架构师升级新一代在线测量软件系统，基于准确的厚度和面密度测量，加入了前景估算法，功能更强大，算法更科学，实现对材料生产纵向和横向自动闭环控制，

KADO software architects upgraded a new generation of online measurement software system, based on accurate thickness and areal density measurement, adding foreground estimation method, more powerful functions, more scientific algorithms, and realizes automatic closed-loop control of vertical and horizontal material production.

闭环控制的应用，可大大减少对操作员工的依赖和长期的调试用料成本，从而减少长期的生产成本。丰富的数据图表和简明的软件功能模块，更简单的实现人机交互界面。

The application of closed-loop control can greatly reduce the dependence on operators and long-term debugging material costs, thereby reducing long-term production costs. Rich data charts and concise software function modules make it easier to realize human-computer interaction interface.

为什么使用在线测厚仪 WHY USE ONLINE THICKNESS GAUGE

因为这些问题限制了生产效率和产品质量。

Because These problems limit production efficiency and product quality.

涂布，表面涂层厚度受供料速度和加工环境会引起材料厚度或面密度不均匀。

Coating, the thickness of the surface coating is affected by the feeding speed and the processing environment, which will cause uneven material thickness or surface density.

轧制，轧辊的表面平整度、辊面平行、轧辊跳动等会引起厚度误差。

Rolling, roll surface flatness, roll surface parallel, roll jump, etc. will cause thickness errors.

复合，材料之间会添加粘合剂且不同材料厚度公差导致导致复合后材料厚度误差。

Composite, the adhesive will be added unevenly between the materials and the thickness tolerance of different materials will lead to the thickness error of the composite material.

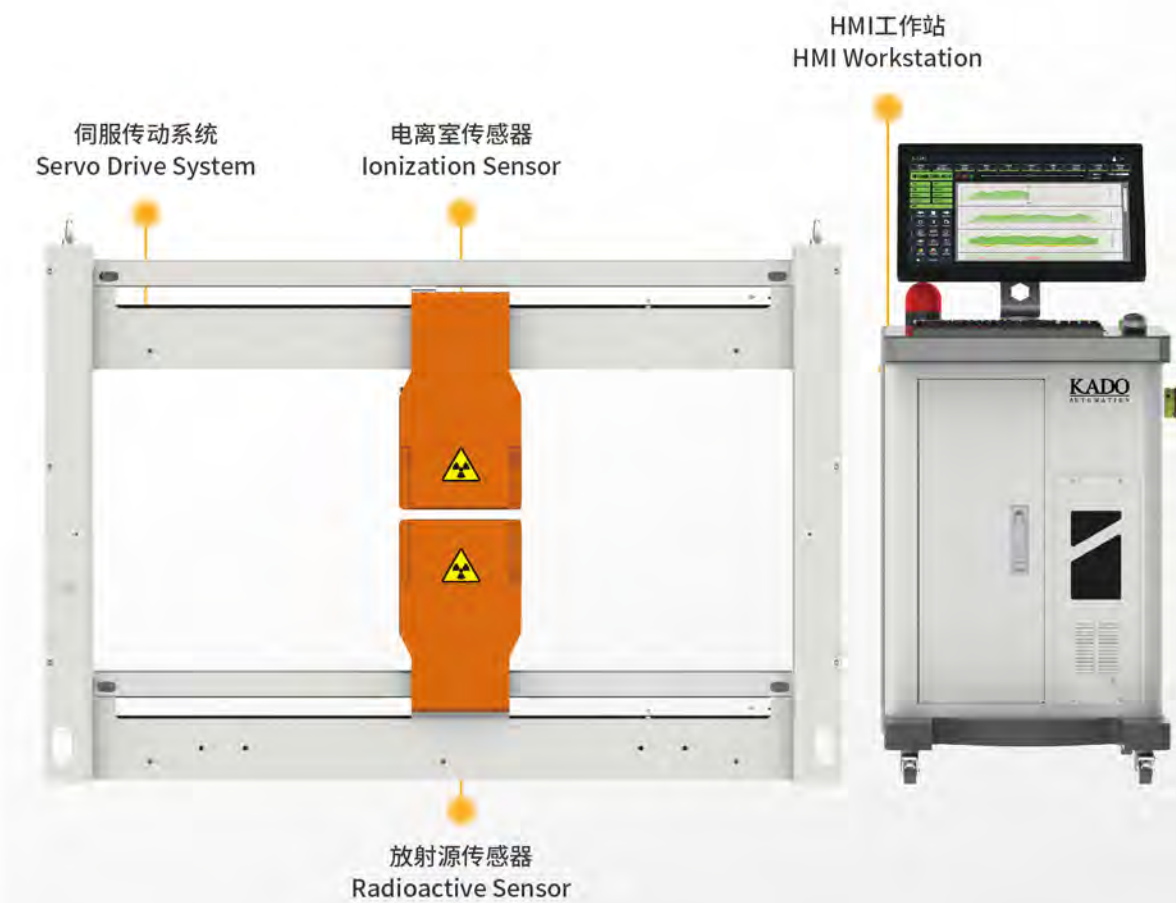
环境，加工过程中由于温度、张力等因素引起的材料厚度误差。

Environment, material thickness error caused by temperature, tension and other factors during processing.



SURFACE DENSITY MEASUREMENT SYSTEM

射线测厚仪



设备简介 EQUIPMENT INTRODUCTION

射线测厚仪采用β射线或 X 射线型传感器，一端为射线发射源，一端为射线探测器，待测物料放置在发射器和探测器之间，射线穿透被测物料时，辐射强度随之减弱，运用此原理对板材的面密度进行在线测量，该系统为板材涂布、覆膜等工艺提供的各种功能；即高速和高精度同步扫描，涂层和基材自动识别。

Surface density measurement system uses β-ray and X-ray sensor. One end is the source of emission and one end is a ray detector. The material to be tested is placed between the source and the detector. When the radiation passes through the object to be measured, the radiation intensity decreases. This principle is used to measure the areal density of the sheet. The system provides various functions for sheet coating, lamination etc. That is high-speed and high-precision synchronous scanning; coating and substrate automatic identification.

放射源传感器的区别 DIFFERENCES BETWEEN RADIOACTIVE SOURCE SENSORS

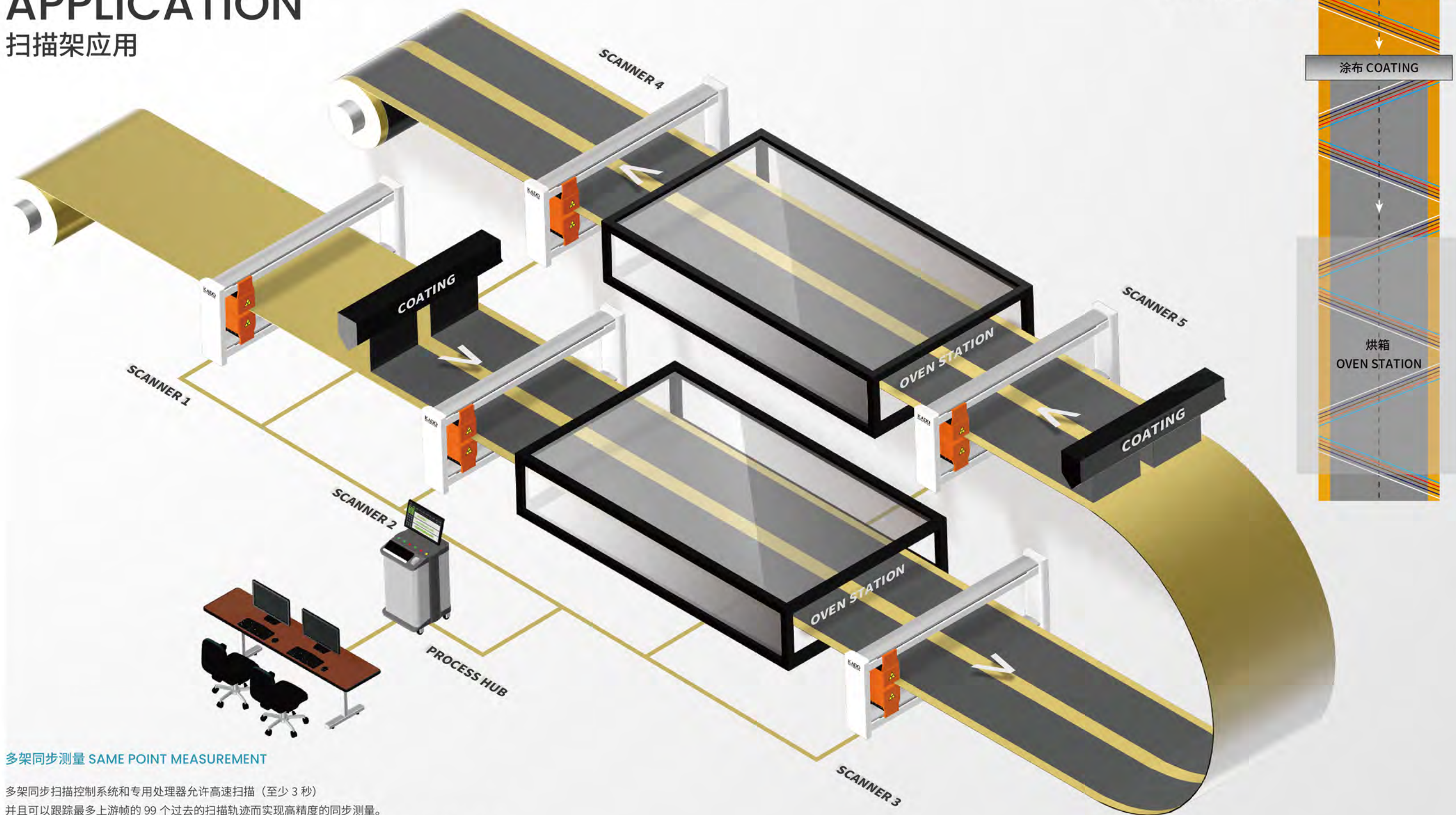
	X-Ray	β Kr85
射线稳定性 Radiation Stability	受管电压、管电流、供电时间影响，断电时可关闭射线 Affected by tube voltage, tube current and power supply time, the ray can be turned off when the power is off	无论使用与否，均会产生持续且稳定的射线 Continuous and steady radiation is produced whether used or not
物质吸收系数 Substance	适合测量纯净物质或单一成分材料 Suitable for measuring pure material or single component material	对不同物质的吸收系数波动小 The absorption coefficient of different substances fluctuates little
使用周期 Life cycle	3~5 年（由灯丝的功率和靶面材质决定） 3~5 Years (determined by filament power and target surface material)	半衰期为 :10.7 年 Half-life: 10.7 Years
采样光斑尺寸 Sampling spot size	20*20mm	20*20mm / 5*35mm

射线测厚仪技术参数 SURFACE DENSITY MEASUREMENT SYSTEM TECHNICAL PARAMETER

适应材料宽度 Adapt to material width	<5000mm	
传感器类型 sensor type	X-ray	β-ray (Kr 85)
光斑尺寸 Spot size	Ø20mm	Ø20mm or 5*30mm
扫描架结构 Scanner structure	O 型架	
校准方式 Calibration method	自动校准	
扫描架材质 Scanner material	钢结构	
采用频率 Frequency of use	100k Hz	
有效量程 Effective range	10~1200g/m ²	
相关性 Correlation	≥99%	
扫描速度 Scan speed	0~30m/min（可调）	
重复精度 Repeatability	16sec integration ±3σ ≤ ± 真实值 X0.025% or ±0.1g/ m ²	
设备功率 Equipment power	3kW	

SCANNING FRAME APPLICATION

扫描架应用



多架同步测量 SAME POINT MEASUREMENT

多架同步扫描控制系统和专用处理器允许高速扫描（至少 3 秒）

并且可以跟踪最多上游帧的 99 个过去的扫描轨迹而实现高精度的同步测量。

Multiple synchronous scan control systems and dedicated processors allow high speed scanning (at least 3 seconds) And it can track up to 99 past scanning tracks of the upstream frame to achieve high-precision synchronous measurement.

LASER THICKNESS GAUGE

激光测厚仪

设备简介 EQUIPMENT INTRODUCTION

采用激光位移传感器上下对射的方式成组安装，传感器分别测量被测材料上表面和下表面的距离位置，通过计算得到被测材料的厚度。搭载 KADO 自主研发的测量软件实现扫描测量、定点测量，单次 / 多次厚度轮廓曲线、分区、趋势线等质量数据显示；集成专业级 SPC 统计分析等多种过程控制解决方案，实时通讯系统与 CANOPEN 总线通信传输，保障高速测量响应。

The laser displacement sensor is installed in groups in the way of up and down. The sensor measures the distance and position of the upper surface and the lower surface of the material to be measured, and the thickness of the material to be measured is obtained by calculation. Equipped with measurement software independently developed by KADO to realize scanning measurement, fixed-point measurement, single/multiple thickness profile curve, partition, trend line and other quality data display; integrated professional-level SPC statistical analysis and various process control solutions, real-time communication system and CANOPEN bus communication transmission to ensure high-speed measurement response.

特点 FEATURES

独有的上下传感器激光同轴度调节模块，确保激光同轴度 $<0.01\text{mm}$ 。

Unique upper and lower sensor laser coaxiality adjustment module ensures laser coaxiality $<0.01\text{mm}$.

系统自动补偿及校准功能，保证测量精度稳定性最高 $<\pm 0.4\mu\text{m}$ 。

System automatically compensates and calibrates to ensure the highest accuracy of measurement accuracy $<\pm 0.4\mu\text{m}$.

扫描架采用大理石材质，刚性好，无应力变形。

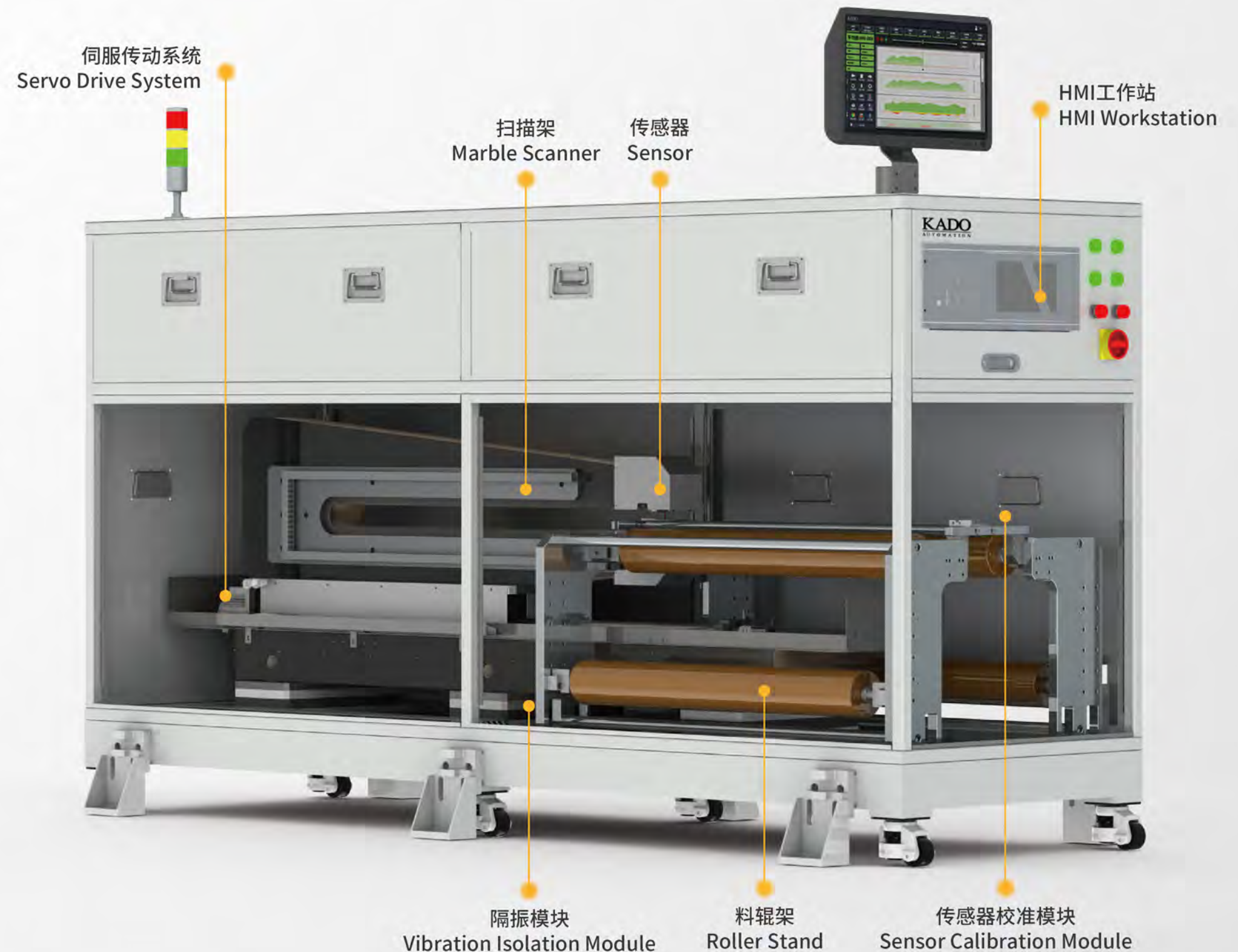
Scanning frame is made of marble, which has good rigidity and no stress deformation.

扫描架设计多层符合材料隔震，完全隔绝外部震动的影响。

Scanning frame design multi-layer conforms to the material isolation and completely isolates the influence of external vibration.

通过稳定的测量数据与轧机设备通讯实现轧制板材厚度闭环控制，提高用户产品一致性。

Through the stable measurement data and rolling mill equipment communication to achieve closed-loop control of rolling sheet thickness, improve user product consistency.

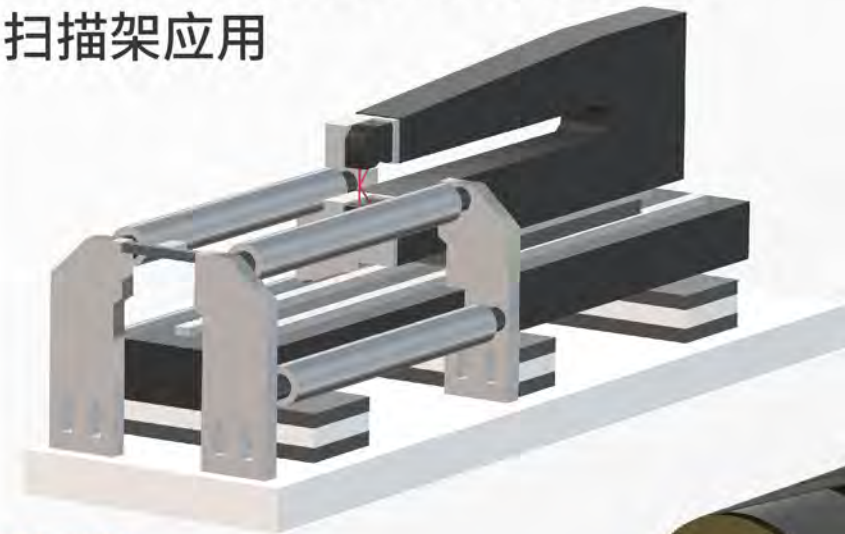


激光测厚仪技术参数 LASER THICKNESS GAUGE SYSTEM TECHNICAL PARAMETER

扫描架类型 Scanner type	高精度		标准型
	C 型扫描架	O 型扫描架	O 型扫描架
适应材料宽度 Adapt to material width	<850mm	<1600mm	<2000mm
传感器数量 Number of sensors	1 组激光位移传感器	1 组或 2 组激光位移传感器	1 组或三组激光位移传感器
校准方式 Calibration method	自动校准		自动校准
扫描架材质 Scanner material	大理石		钢结构
传感器分辨率 Sensor resolution	0.02μm		0.25μm
采用频率 Frequency of use	50k Hz		50k Hz
光斑尺寸 Spot size	25*1400μm		25*1400μm
有效量程 Effective range	±3mm		±10mm
相关性 Correlation	≥98%		≥95%
扫描速度 Scan speed	0~18m/min (可调)		0~15m/min
重复精度 Repeatability	±3σ ≤±0.4μm		±3σ ≤±0.02mm
设备功率 Equipment power	3kW		3kW

SCANNING FRAME APPLICATION

扫描架应用



C型扫描架
TYPE C SCANNING FRAME APPLICATION

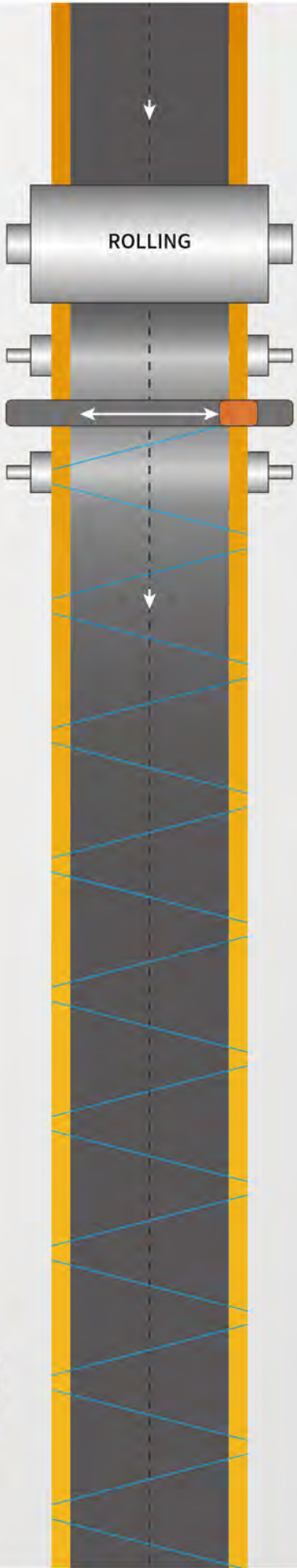


C 型扫描架常用于材料幅宽较小的生产线中，通常配置一组激光位移传感器，传感器分别固定在 C 型架的上悬臂和下悬臂端面，由伺服系统驱动 C 型架在材料宽度方向往复扫描；上、下传感器的相对位置固定不变能保障高精度的扫描测量。

The C-type scanning frame is often used in production lines with small material width, and is usually equipped with a set of laser displacement sensors. The sensors are respectively fixed on the upper and lower cantilever end faces of the C-shaped frame. The servo system drives the C-shaped frame to reciprocate in the width direction of the material Scanning; the relative position of the upper and lower sensors is fixed to ensure high-precision scanning measurement.

典型应用 TYPICAL APPLICATION

单点激光扫描测量
Single point laser scanning measurement.
激光测厚仪 C 型扫描架应用于电池极片辊压机
Laser thickness gauge C-scanning frame applied to battery pole piece roller press.

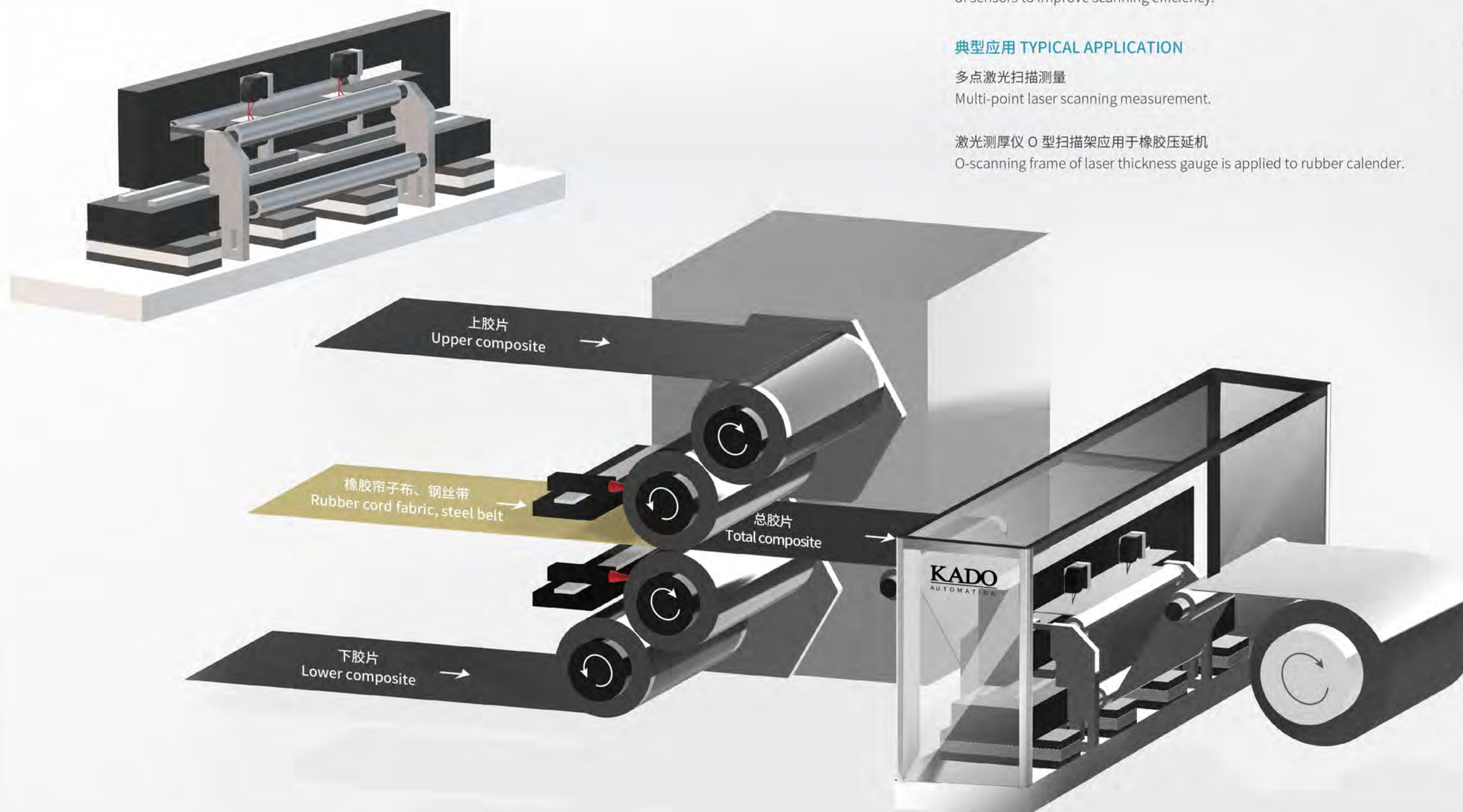


SCANNING FRAME APPLICATION

扫描架应用

O型扫描架

TYPE O SCANNING FRAME APPLICATION



O 型扫描架常用于材料幅宽大的生产线中，传感器成组安装在 O 型架的上下横梁上；由伺服系统驱动 O 型架在材料宽度方向往复扫描，可同时在扫描范围内配置多组激光位移传感器，以缩短各组传感器扫描范围从而提高扫描效率。

The O-shaped scanning frame is often used in the production line with large material width. The sensors are installed on the upper and lower beams of the O-shaped frame in groups; the O-shaped frame is driven by the servo system to reciprocate in the width direction of the material, and multiple sets of lasers can be configured in the scanning range at the same time. Displacement sensor, effectively shorten the scanning range of each group of sensors to improve scanning efficiency.

典型应用 TYPICAL APPLICATION

多点激光扫描测量
Multi-point laser scanning measurement.

激光测厚仪 O 型扫描架应用于橡胶压延机
O-scanning frame of laser thickness gauge is applied to rubber calender.



VISUAL INSPECTION SYSTEM SOLUTIONS

视觉检测系统

为什么使用视觉检测系统 WHY USE A VISION INSPECTION SYSTEM

代替人工目视检测 REPLACES MANUAL VISUAL INSPECTION

- 人工目视检测效率低且生产过程中不能做到 100% 全检；
The efficiency of manual visual inspection is low and 100% full inspection cannot be achieved in the production process.
- 判定不良品标准受个人主观意识影响；
The standard for judging defective products is affected by personal subjective consciousness.
- 企业用工成本高；
High labor cost for enterprises.

视觉检测能产生的效益 BENEFITS OF AUTOMATED VISUAL INSPECTION

- 在线做到 100% 全检
100% full inspection online.
- 减少目标不确定因素，有效把关；
Reduce target uncertainties and effectively check.
- 早期查找和消除不良，实现真正的生产过程控制；
Find and eliminate defects early to achieve real production process control.
- 高速测量，有效提高产能；
High-speed measurement, effectively improve production capacity.
- 减少生产材料试错损耗；
Reduce the trial and error loss of production materials.
- 减少人工，降低生产和维修成本；
Reduce labor, reduce production and maintenance costs.
- 有效分类产品质量等级；
Effectively classify product quality levels.

SYSTEM INTRODUCTION

系统简介

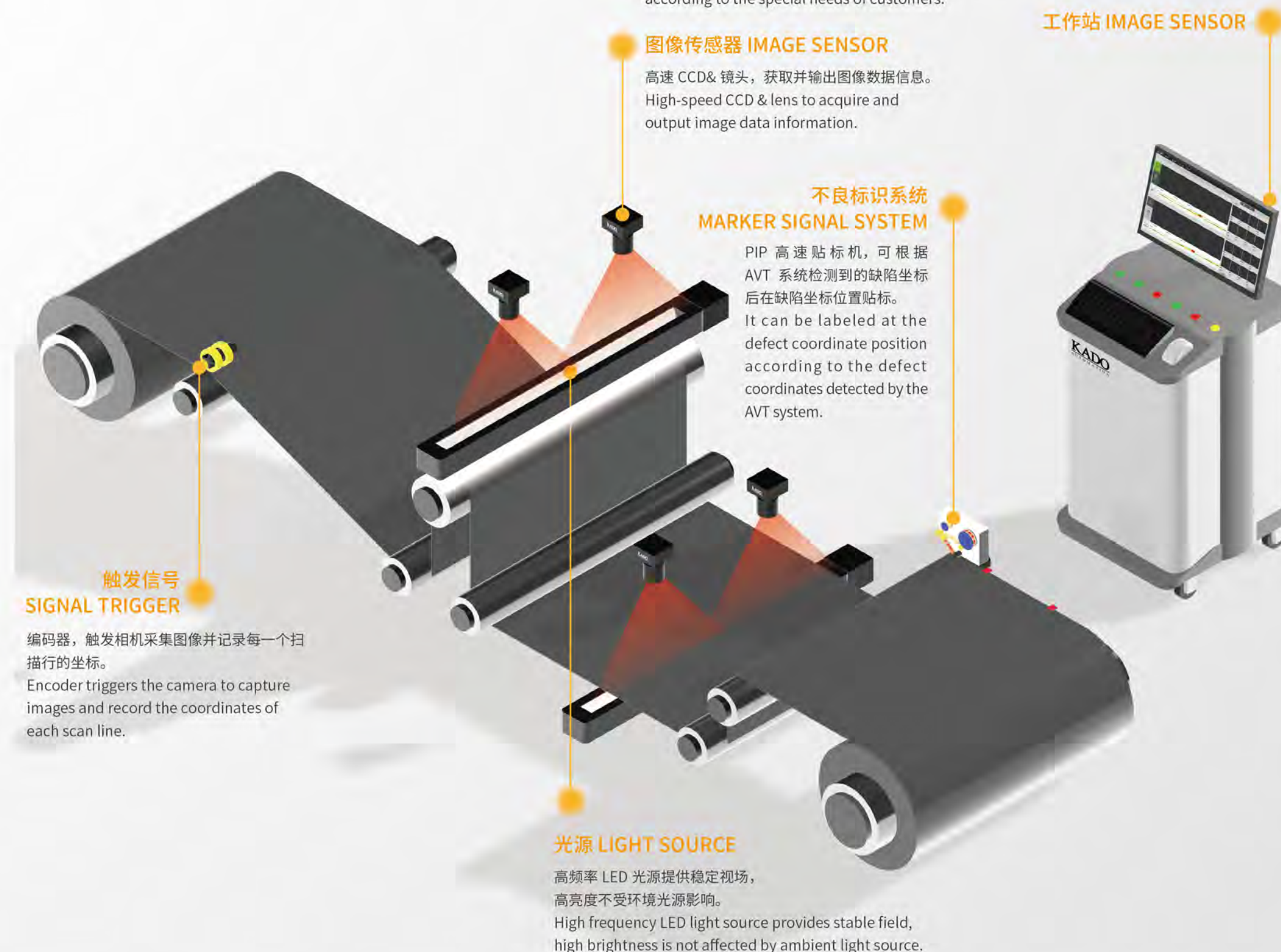
产品简介 PRODUCT INTRODUCTION

KADO 视觉检测系统是通过图像传感器（即图像摄取装置，分 CMOS 和 CCD 两种）将被摄取目标转换成图像信号，传送给专用的图像处理系统，根据像素分布和亮度、颜色等信息，转变成数字化信号；图像系统对这些信号进行各种运算来筛选检测目标的特征，并根据判别的结果来控制现场的设备动作，是帮助用户提高生产效率和产品质量的可靠解决方案。

KADO visual detection system is through the image sensor (that is, the image intake device, divided into CMOS and CCD two) will be ingestion target into image signals, transmitted to the dedicated image processing system, according to the pixel distribution and brightness, color and other information, into digital signals; The image system carries out various operations on these signals to screen the characteristics of detection targets, and controls the equipment action on site according to the discriminant results, which is a reliable solution to help users improve production efficiency and product quality.

特点 CHARACTERISTICS

- 模块化设计，维护便捷
Modular design, convenient maintenance
- 系统软件完全自主开发，定制解决方案全面；
The system software is completely independently developed and customized solutions are comprehensive;
- 灵活的光源配置方案，适用复杂的应用环境；
Flexible light source configuration scheme, suitable for complex application environment;
- 在线图像深度学习算法，缺陷分类准确率高；
Online image deep learning algorithm, defect classification accuracy is high;
- 稳定的尺寸检测与闭环控制且控制精度 $\leq \pm 0.3\text{mm}$ ；
Stable size detection and closed-loop control and control accuracy $\leq \pm 0.3\text{mm}$;



主控台，主要包含工控机及检测系统软件，工控机配置根据数据处理效率定制，软件为 KADO 自主开发，可根据客户特殊需求设计定制化方案。
Control platform mainly includes IPC and detection system software. The IPC configuration is customized according to the data processing efficiency. The software is developed independently by KADO, and the customized solution can be designed according to the special needs of customers.

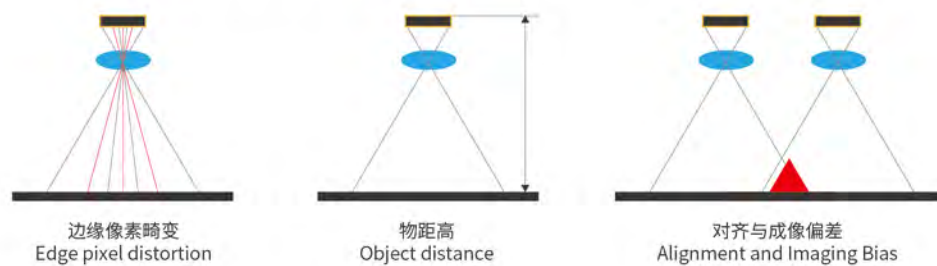
IMAGE SENSOR SELECTION

图像传感器的选择

CCD 线阵相机传感器 CCD LINEAR CAMERA SENSOR

应用时根据检测范围选配镜头和光源等组件，像元尺寸灵活且采集频率高；

In application, components such as lens and light source are selected according to the detection range, and the pixel size is flexible and the collection frequency is high.



CCD 相机参数 CCD CAMERA PARAMETER

分辨率 Resolution	2K、4K、8K、16K (1K=1024pixel)
行频 Frame rate	1~80kHz 高 (根据视野定制)
检测物距 Detection distance	High (Customized according to visual view) 受光学镜头特性影响较高
像素畸变 Pixel distortion	Highly affected by optical lens characteristics
通讯 Communication	Ethernet / Camera Link

CLS 线性图像传感器 CLS CMOS IMAGE SENSOR

集成感光元件、光源、透镜阵列等，成像畸变小，安装空间小等特点；

Integrated photosensitive element, light source, lens array, etc., small imaging distortion, small installation space, etc. Features.



CLS 传感器参数 CLS SENSOR PARAMETER

分辨率 Resolution	300dpi /inch (0.085mm) 600dpi /inch (0.042mm) 1200 dpi /inch (0.021mm)
行频 Frame rate	1~30 kHz
检测物距 Detection distance	14.8±1 mm
像素畸变 Pixel distortion	1: 1
通讯 Communication	Ethernet / Camera Link

光源的照射方式 CHOICE OF LIGHTING METHOD

一幅好的图像需具备对比度明显，背景与目标的边界清晰，背景淡化且均匀，颜色信息真实和亮度适中，为系统提供稳定的检测条件。

A good image needs to have obvious contrast, clear boundaries between the background and the target, the background is faded and uniform, the color information is true and the brightness is moderate, providing stable detection conditions for the system.

反射光源 Reflected light source

光源照射面积大且照射角度自由度高，适合检测材料上表面或者下表面应用。

The light source irradiation area is large and the irradiation Angle degree of freedom is high, suitable for detecting the upper or lower surface of the material application.

平行背光源 Parallel backlight

光线具有更高的方向性，

适合检测透光性材料和材料表面有穿透性的轮廓。

The light has higher directivity and is suitable for detecting light-transmitting materials and penetrating contours on the surface of the material.

同轴光源 Coaxial light source

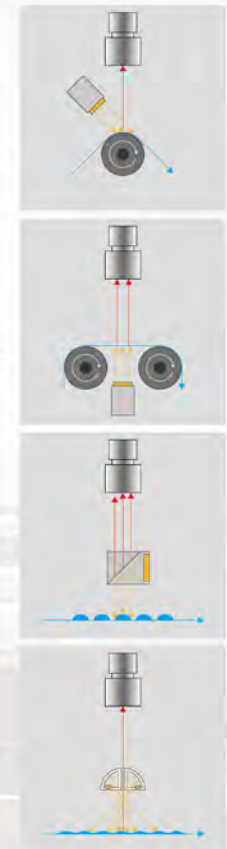
可以消除材料表面不平整引起的阴影，减少成像干扰。

It can eliminate the shadow caused by the uneven surface of the material and reduce the imaging interference.

穹顶光源 Dome reflection light source

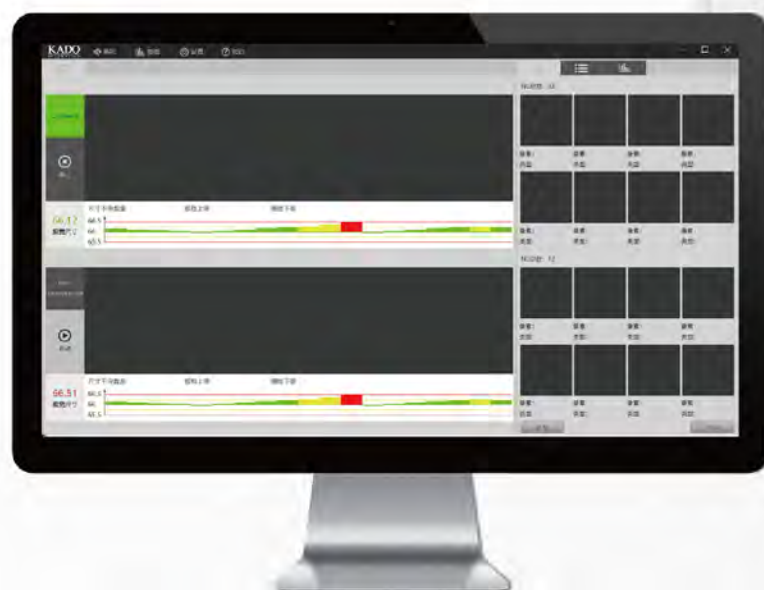
光线均匀，适合材料表面有纹理的低角度柔光检测。

Uniform light, suitable for low-angle soft light detection with textured material surfaces.



AVT ALMIGHTY VISUAL TITAN

AVT 全能视觉泰坦



产品简介 PRODUCT INTRODUCTION

AVT 全能视觉泰坦是针对表面缺陷检测应用进行开发的，应用于各种卷材加工产品的在线检测，配置的高速相机符合现代高速生产环境中必不可少的要求 - 具备出色的纵向分辨率。从模块化和标准化检测设备到定制系统，适合各种检测要求、各类检测任务以及客户对生产产品的质量管控。

Developed for surface defect inspection applications, the AVT Almighty Vision Titan is used for in-line inspection of a wide range of coil-processed products, with high-speed cameras that meet the essential requirements of modern high-speed production environments - with excellent longitudinal resolution. From modular and standardized testing equipment to customized systems, it is suitable for various testing requirements, various testing tasks and customer quality control of production products.

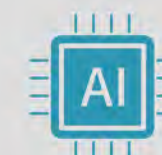
主要功能 THE MAIN FUNCTION



表面缺陷检测
Surface defect detection



缺陷自动分类
Defect automatic classification



图像深度学习
Image Deep Learning



缺陷分布地图
Defect distribution map



缺陷标记
Defect marking



横向尺寸检测
TD size detection

缺陷库 DEFECT LIBRARY

可根据行业应用经验快速导入检测阈值和参数库，提供精确检测，快速系统应用取得投资回报。

Based on industry application experience, the detection threshold and parameter library can be quickly imported to provide accurate detection and rapid system application to obtain return on investment.

缺陷分类 DEFECT CLASSIFICATION

搭载多级分类工具套件，基于自学习分类算法，可以更简单的辨别缺陷类型，帮助用户快速提高生产效率。

AVT is equipped with a multi-level classification tool suite, based on a self-learning classification algorithm, which can more easily identify defect types and help users quickly improve production efficiency.

识别的缺陷图像 DEFECT PICTURE DISPLAY



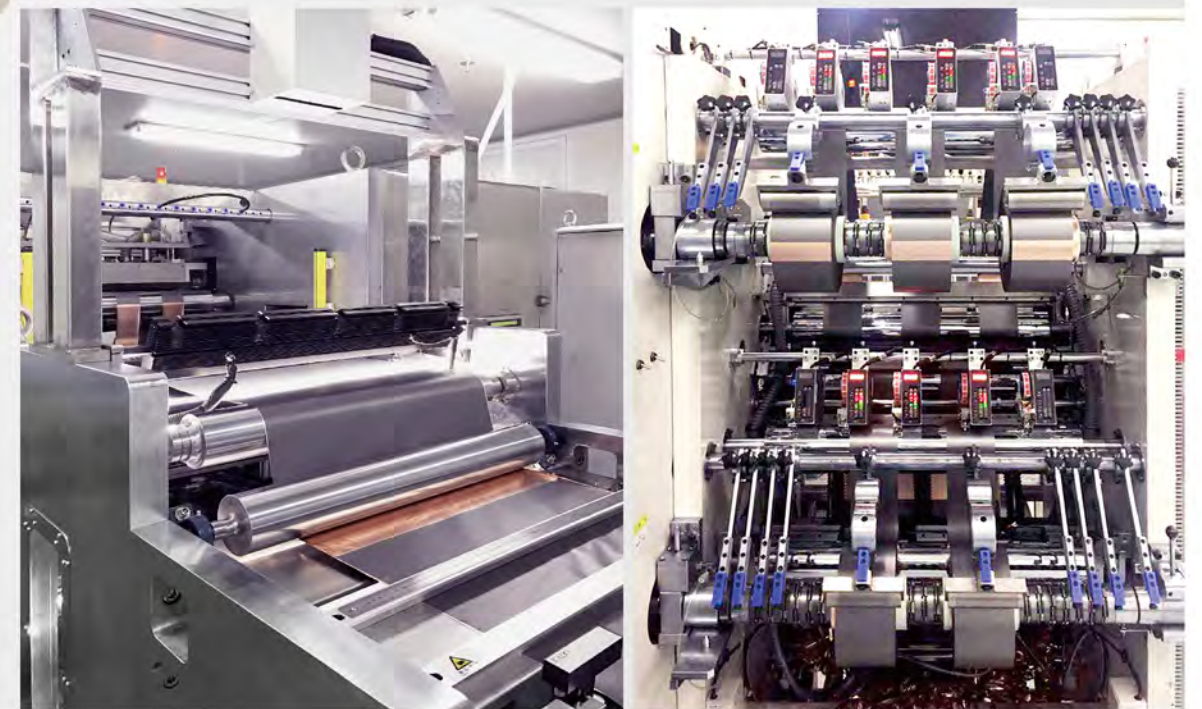
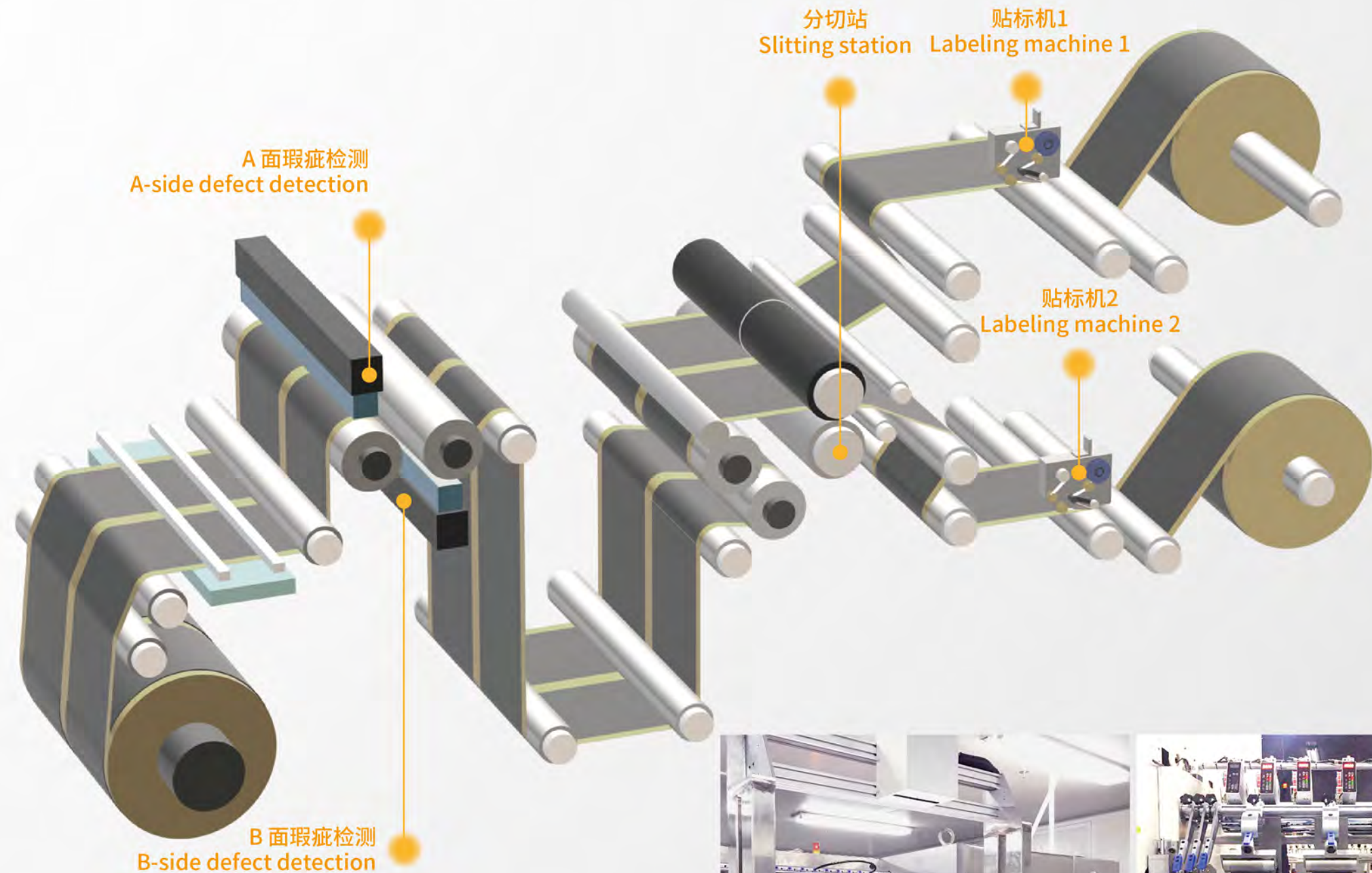
AVT ALMIGHTY VISUAL TITAN APPLICATION

AVT 全能视觉泰坦应用案例

电池极片分切 BATTERY POLE PIECE CUTTING

AVT 视觉检测系统在电池极片分切工艺中应用，分切前对极片 A 面和 B 面全幅面检测，根据分切宽度设置横向检测分区，在各分区配置贴标机，当出现缺陷时输出贴标信号给对应区域的极片进行自动标识。

The AVT visual inspection system is applied in the battery pole piece cutting process. Before cutting, the A and B sides of the pole piece are inspected in full width. According to the width of the cutting, the horizontal inspection area is set, and the labeling machine is arranged in each area. When defects occur Output the labeling signal to automatically mark the pole pieces in the corresponding area.



BVT BASIS VISUAL TITAN

BVT 基础视觉泰坦



产品简介 PRODUCT INTRODUCTION

BVT 基础视觉泰坦是针对表面特征尺寸检测应用进行开发的，常用于产品的尺寸加工中代替人工对产品进行在线检测，如涂布、分切、制片生产线。

The BVT Basis Vision Titan system is developed for the application of surface feature size detection, and is often used in product size processing to replace manual on-line inspection of products, such as coating, slitting, and filming production lines.

主要功能 THE MAIN FUNCTION



横向与纵向尺寸检测
TD and MD size detection



表面缺陷检测
Surface defect detection



尺寸闭环控制
Closed-loop control



系统检测自点检
System check self-check

闭环控制 CLOSED-LOOP CONTROL

系统能根据被测材料的尺寸特征实时对比计算尺寸偏差并输出修正值，配合纠偏系统或伺服系统联动控制，使材料在线加工尺寸实现自动闭环调整。

The system can compare and calculate the size deviation in real time according to the size characteristics of the tested material and output the correction value, and cooperate with the Web guiding system or servo system linkage control to realize the automatic closed-loop adjustment of the processing size.

系统点检 SYSTEM SELF-INSPECTION

系统在运行前和运行中能根据设定的样本参数进行自动点检，有效防止检测基准异常引起系统测量偏差，帮助用户降低生产风险。

The system can perform automatic spot inspection according to the set sample parameters before and during operation, which can effectively prevent system measurement deviation caused by abnormal detection benchmarks and help users reduce production risks.

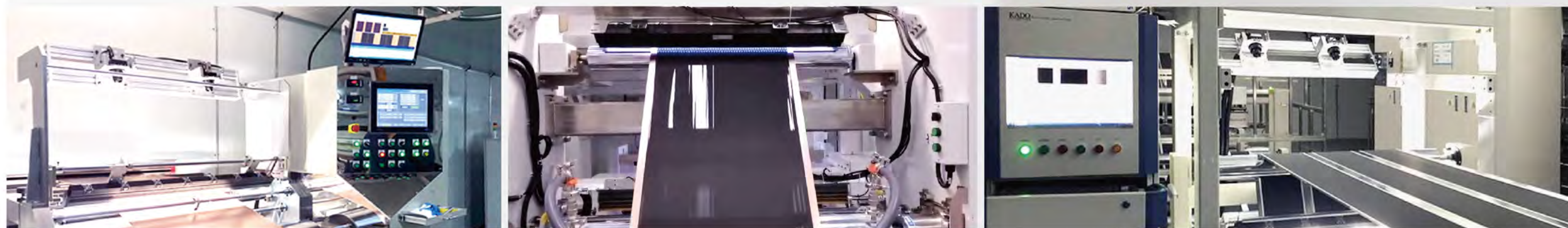
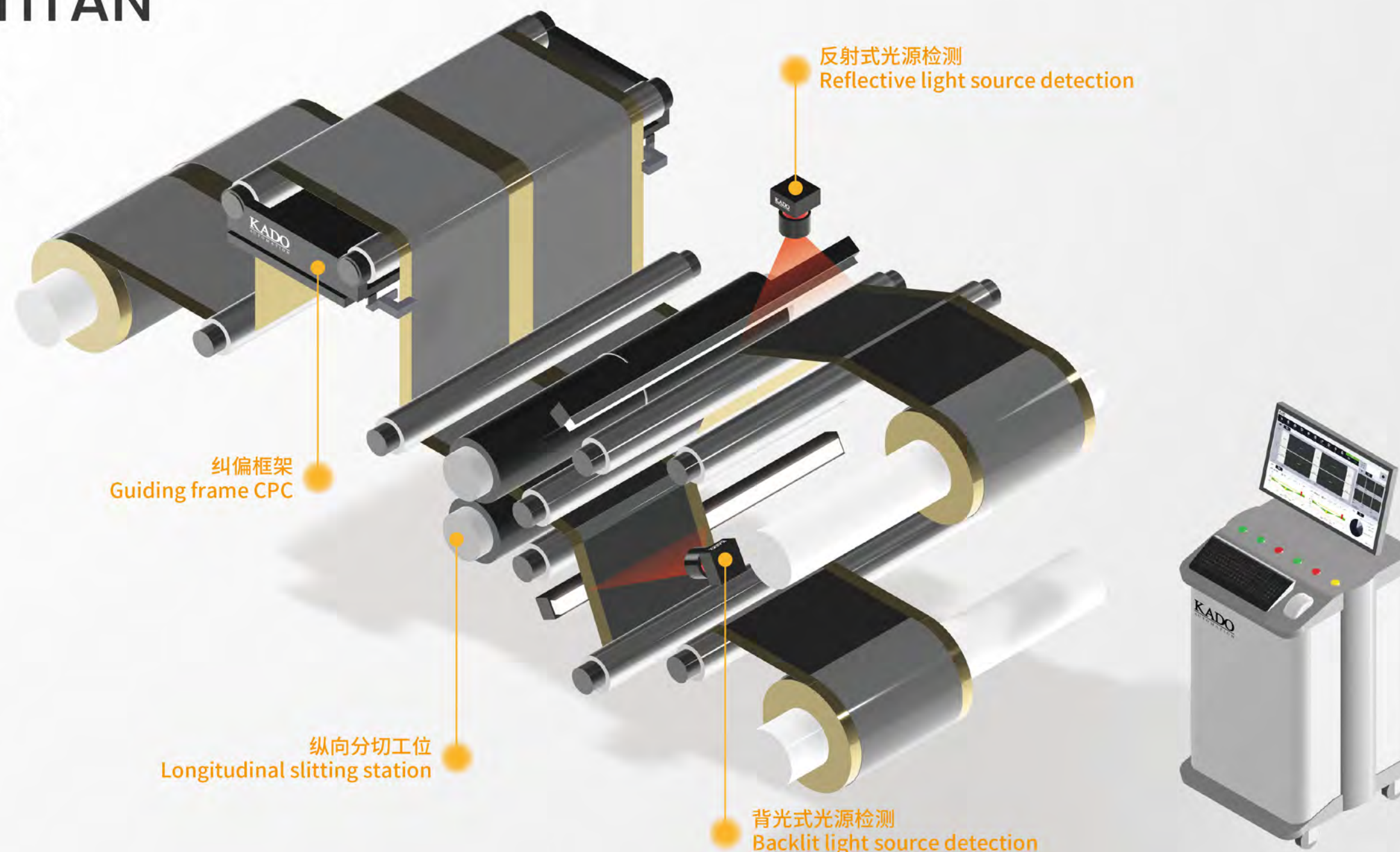
BVT BASIS VISUAL TITAN APPLICATION

BVT 基础视觉泰坦应用案例

尺寸检测的闭环控制 CLOSED LOOP CONTROL OF SIZE DETECTION

在分切工艺中，材料由于张力和板型不规则等因素会引起入料偏差，配置 BVT 视觉检测系统对分切后的材料尺寸进行在线测量，将尺寸差值与分切前的纠偏系统联动控制调整纠偏基准从而有效提高分切尺寸的准确率。

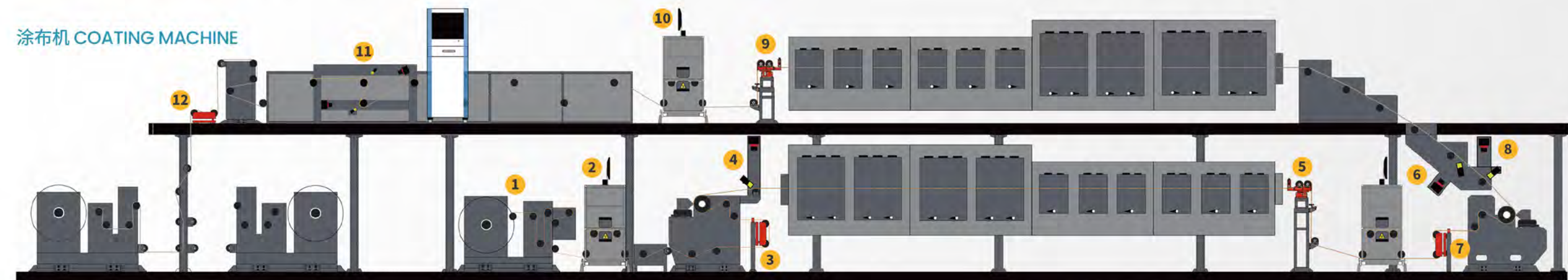
In the slitting process, the material will cause feed deviation due to factors such as tension and irregular plate shape. The BVT visual inspection system measures the size of the material after slitting online, and adjusts the deviation in real time according to the measurement difference. The benchmark can effectively improve the accuracy of the cutting size.



LI-BATTERY PRODUCTION LINE INSPECTION SOLUTION

锂电池生产线在线检测解决方案

KADO Professional Casts Quality



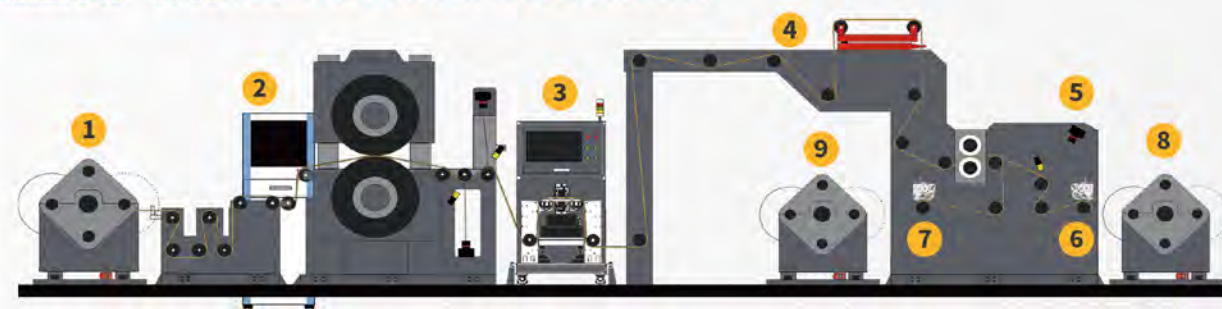
纠偏系统WEB GUIDING SYSTEMS

- 1 放卷纠偏 Unwinding guiding
- 3 7 12 DF型过程纠偏 DF Process guiding
- 5 9 SF型过程纠偏 SF Process guiding

面密度检测系统 (X、B射线) AREAL DENSITY DETECTION SYSTEM

- 2 6 10 基材面密度测量 BASE 01、TOP DRY 02、BOTTOM DRY 03
- 4 8 涂层宽度及对齐度检测 Coating width and alignment detection
- 11 表面瑕疵检测系统 Surface defect detection system

辊压分切一体机 ROLLING AND SLITTING MACHINE



纠偏系统WEB GUIDING SYSTEMS

- 1 8 9 收、放卷纠偏 Receiving and unwinding guiding
- 4 DF型过程纠偏 Pivoting frame system DF

视觉检测系统 VISUAL INSPECTION SYSTEM

- 2 辊压后极片表面缺陷检测 Surface defect detection of pole pieces after rolling
- 5 分切后极片宽度检测 Material width detection after slitting

激光测厚系统 LASER THICKNESS MEASUREMENT SYSTEM

- 3 辊压后极片厚度测量 Piece thickness measurement after rolling

贴标系统 LABELING SYSTEM

- 6 7 分切后表面缺陷标识系统 Surface defect identification system after slitting

模切分切一体机 DIE CUTTING MACHINE



纠偏系统WEB GUIDING SYSTEMS

- 1 放卷纠偏 Unwinding guiding
- 2 4 模切前与分切前DFS纠偏 DFS guiding before die-cut and after slitting

贴标系统 LABELING SYSTEM

- 6 分切后表面缺陷标识系统 Surface defect identification system after slitting

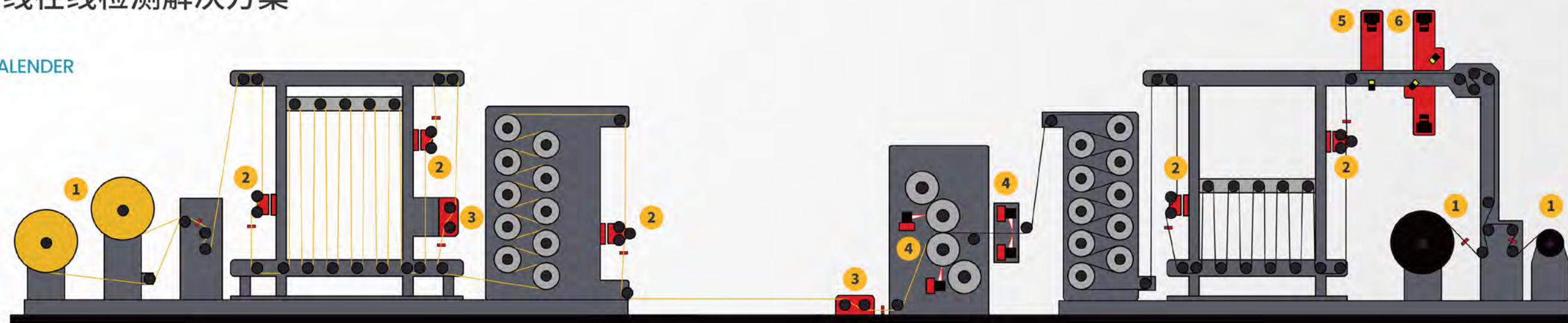
视觉检测系统 VISUAL INSPECTION SYSTEM

- 2 模切后视觉检测系统 Die-cut visual inspection system
- 5 分切后极片宽度检测系统 Pole piece width detection system slitting

TIRE PRODUCTION LINE ONLINE INSPECTION SOLUTION

轮胎生产线在线检测解决方案

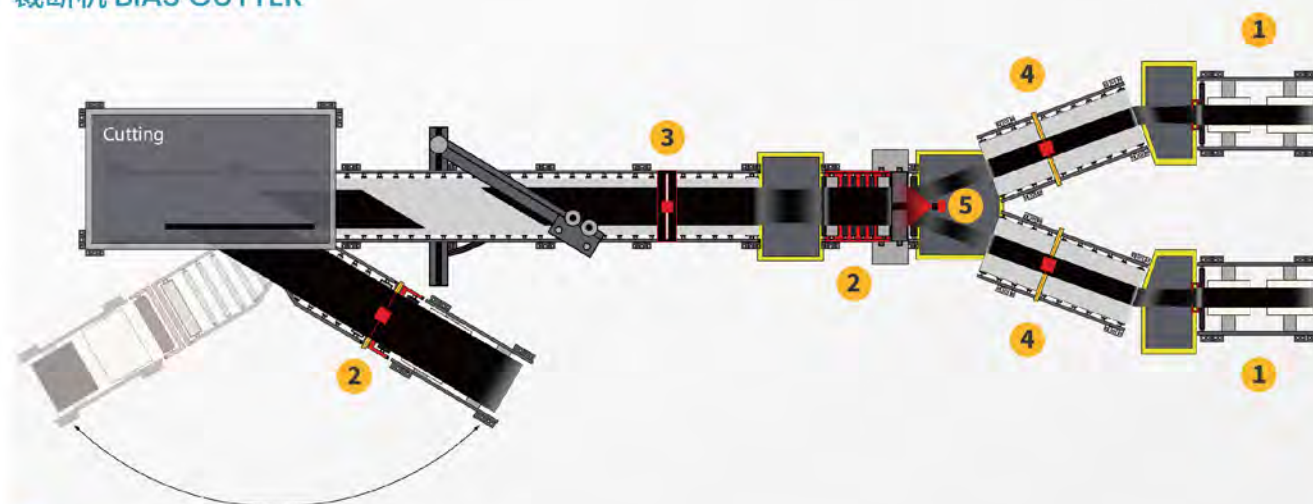
压延机 ROLL CALENDER



- 1 收、放卷纠偏 Receiving and unwinding guiding
- 2 3 SF型过程纠偏 SF Process guiding
- 4 激光测厚系统 Laser thickness measurement system

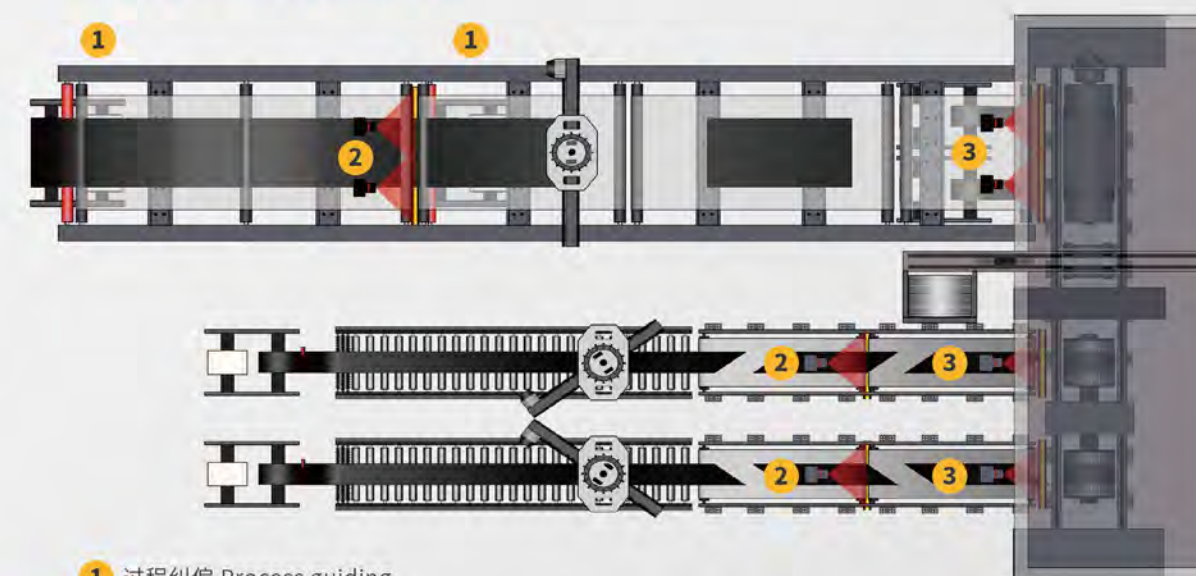
- 5 BVT 宽度检测 BVT width detection
- 6 表面缺陷检测 AVT Surface defect detection

裁断机 BIAS CUTTER



- 1 收卷纠偏 Receiving and unwinding guiding
- 2 异物检测 Foreign object detectio
- 3 斜裁拼接检测 Oblique stitching detection
- 4 BVT 宽度检测 BVT width detection
- 5 视觉纠偏 Visual Web guiding systems

成型机 FORMING MACHINE

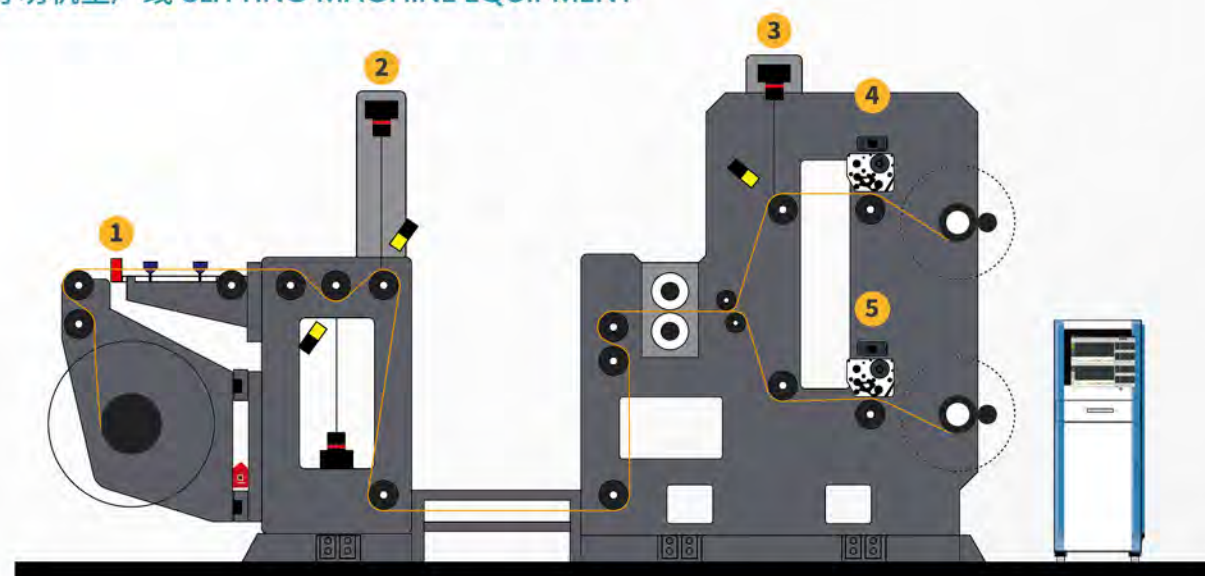


- 1 过程纠偏 Process guiding
- 2 AVT表面缺陷检测 AVT Surface defect detection
- 3 视觉纠偏 Visual Web guiding systems

FILM INDUSTRY ONLINE INSPECTION SOLUTION

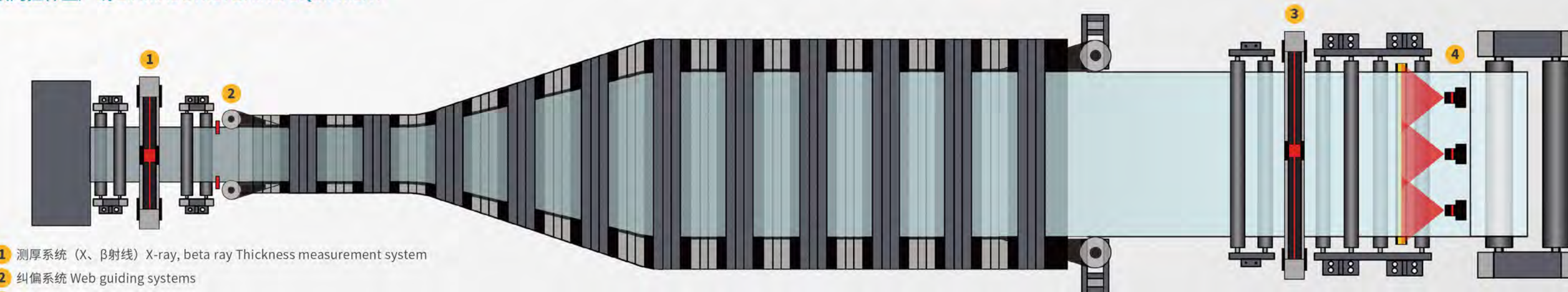
制膜行业在线检测解决方案

分切机生产线 SLITTING MACHINE EQUIPMENT



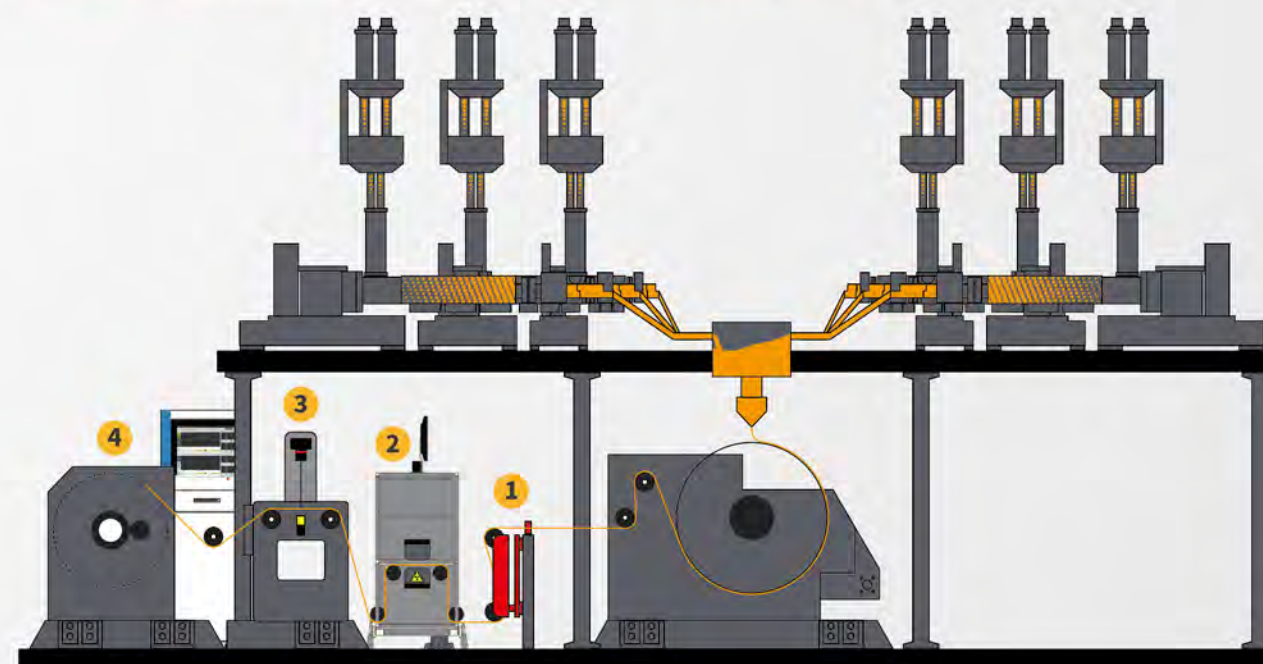
- 1 收卷纠偏 Receiving and unwinding guiding
- 2 3 视觉检测系统 Visual inspection system
- 4 5 高速贴标机 High-speed labeling machine

双向拉伸生产线 BIAXIAL STRETCHING EQUIPMENT



- 1 测厚系统 (X、β射线) X-ray, beta ray Thickness measurement system
- 2 纠偏系统 Web guiding systems
- 3 测厚系统 (X、β射线) X-ray, beta ray Thickness measurement system
- 4 AVT表面缺陷检测 AVT Surface defect detection

流延机生产线 CAST FILM MACHINES MACHINE EQUIPMENT



- 1 DF型过程纠偏 DF Process guiding
- 2 测厚系统 (X、β射线) X-ray, beta ray Thickness measurement system
- 3 AVT表面缺陷检测 AVT Surface defect detection
- 4 收卷纠偏 Receiving and unwinding guiding

PARTNER

合作伙伴

作为卷材加工行业的在线检测系统解决方案供应商，KADO 生产的产品涵盖了广泛的应用领域，KADO 能以丰富的解决方案和一流的产品质量满足用户的各种检测需求！

As an online detection system solution provider for web processing industries, KADO's products cover a wide range of applications. KADO can meet the various testing needs of users with rich solutions and first-class product quality!

联系我们：我们很乐意为您提供专业的建议。

Contact us: We are happy to provide you with professional advice.

