纸张定量和水分在线检测系统（QCS）

The Paper weight and moisture on-line measuring scanner(QCS)

在线质量分析和控制

在线质量分析和控制

Online quality control and analysis system

地址：山东省淄博市张店区华光路188号玉龙大厦B座716-724　网址：www.zbhhe.com
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淄博翰海电气设备有限公司是一家以无损检测和 QCS（质量控制系统）为主要业务的高科技企业，公司以人才为基础，以创新求发展、秉承科学严谨，品质第一、用户至上，真诚服务的企业精神，为用户提供高质量的产品和服务，产品除在国内得到广泛应用外，远销越南、菲律宾、泰国、印尼等东南亚国家，赢得了国内外用户的好评。

我公司自主开发的 Soft-X 和 β 射线测厚仪和 NIR 红外水分仪，采用模块化设计和标准化生产，已广泛应用于塑料、纺织、化工、制药、钢铁、能源、建材、轻工、造纸、环保等行业。具有可靠性高、系统开放、功能强大、维护简便的特点。

Zibo Hanhai Electrical Equipment Co., Ltd. is a high-tech enterprise with non-destructive testing and QCS (quality control system) as its main business. the company strives for development through innovation, adheres to the enterprise spirit of scientific and rigorous, quality first, customer first and sincere service, and provides users with high-quality products and services. In addition to being widely used in China, the products are still far away It is sold to Vietnam, Philippines, Thailand, Indonesia and other Southeast Asian countries, and has won praise from users at home and abroad.

The soft-x and β - ray thickness gauge and IR infrared moisture gauge developed by our company adopt modular design and standardized production, and have been widely used in plastic, textile, chemical, pharmaceutical, steel, energy, building materials, light industry, paper making, environmental protection and other industries. It has the characteristics of high reliability, open system, powerful function and easy maintenance

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辐射安全许可证

根据《中华人民共和国放射性污染防治法》和《放射性同位素与射线装置安全和防护条例》等法律法规的规定，经审查准予在许可种类和范围内从事活动。

单位名称：淄博翰海电气设备有限公司

地　　址：山东省淄博市高新区政通路135号高科技创业园A座423

法定代表人：任亚绒

种类和范围：生产、销售、使用Ⅲ类射线装置。

证书编号：鲁环辐证[03809]

有效期至：2025 年 07 月 01日

发证机关：淄博市生态环境局

发证日期：2020 年 07月 02日

中华人民共和国环境保护部制

β-Ray 在线定量仪：

1、采用β- Ray 技术，用户需办理放射性专用许可证等手续，我们可以代购；

2、完成对不同厚度（克重）材料的非接触精确测量，不会对被测介质造成任何损伤；

3. 不受材料颜色和抖动的影响；

4. 温度自动补偿和探头自动校准功能，克服了环境的影响；

5. 配套“O”型智能扫描架，实现 MD,CD 方向的定位扫描和控制；

6. 探头模块化设计，安装和检修更加方便；

β - ray on-line quantitative instrument:

1. For the use of β - ray technology, the special radioactive license and other procedures are required;

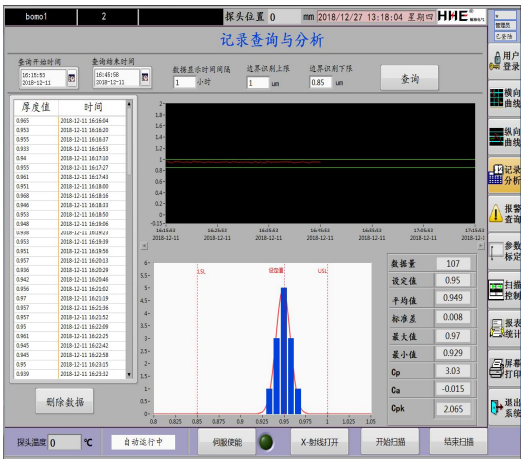
2. The non-contact accurate measurement of materials with different thickness (gram weight) is completed without any damage to the measured medium;

3. It is not affected by material color and jitter;

4. The function of automatic temperature compensation and probe calibration overcomes the influence of environment;

5. Equipped with "O" type intelligent scanning frame to realize the positioning scanning and control of MD and CD directions;

6. Modular design of probe makes installation and maintenance more convenient



技术参数：

1、定量检测范围：10-1000g/m^2

2、定量检测精度：±0.1g/m^2

3、定量测量误差：≤0. 1%

4、厚度测量范围：0. 005mm － 10mm(与材料密度和种类有关)；

5、厚度测量精度： CD（横向）方差均值精度小于±0.01;

MD（机械运动方向）动态精度小于±0.1um(与产品密度有关)

6、系统响应时间：≤10ms.

7、精确控制： AGC 控制模头膨胀螺栓（压延设备的压辊间隙，伺服控制），精度可以做到±0.1um, 加热螺栓控制范围 0-100%功率可调。

8、精确定位： 采用伺服定位，控制探头移动速度和位移，位置精度±0.1mm，移动速度 0-250mm/s 可调，模头螺栓位置自动对齐;

9、边缘检测和分析：对于边缘要求的客户，可增加 EDA1.0 边缘算法库，检测精度±1mm;

10、使用环境：-5℃<环境温度<+40℃，测量介质表面温度小于 50℃；

11、冷却方式：提供水冷和风冷两种方式，可选择。

Technical parameters:

1. Quantitative detection range: 10-1000g / m2
2. The quantitative detection accuracy is + 0.1g/m2
3. Quantitative measurement error: ≤ 0.1%
4. Thickness measurement range: 0.005mm-10mm (related to material density and type);
5. Thickness measurement accuracy: CD (transverse) variance mean accuracy is less than + 0.1um;
MD (mechanical movement direction) dynamic accuracy is less than + 1um (related to product density)
6. System response time: ≤ 10ms
7. Precise control: control the die head expansion bolt (pressing roller clearance of calendering equipment, servo control), the precision can be + 1um (temperature control precision + 0.5 ℃), and the heating time control range is 10ms-10000ms.
8. Precise positioning: servo positioning is adopted to control the moving speed and displacement of the probe, the position accuracy is + 0.5mm, and the moving speed is adjustable from 0 to 250mm / s;
9. Edge detection and analysis: for customers with edge requirements, eda1.0 edge algorithm library can be added, with detection accuracy of + 1 mm;
10. Operating environment: - 5 ℃ < ambient temperature < + 40 ℃; measuring medium surface temperature is less than 50 ℃;
11. Cooling mode: water cooling and air cooling are available.

NIRM016 红外水分仪

目前,水分仪根据其测定原理的不同可分为：高频阻抗式、电容率式、微波式、中子式、红外吸收式等水分仪。在这些水分仪中，因红外吸收式水分仪能完全进行非接触测量，而且有快速、连续、测量范围大、准确度高、稳定性好等优点。所以，纸张水分在线检测仪通常选用红外吸收式的。红外水分仪又分为反射式和透射式水分仪；双波段、三波段和四波段水分仪。本公司研制的是四波段透射式红外水分仪

计算机通过标定好的计算公式只用水分测量值便可直接算出水分百分比，无须考虑克重，从而消除了重复偏差。

动态校正指在没有纸张通过水分探头间时，水分仪把此时测得的信号值保存起来，经过特定的计算公式来补偿由于元器件零点漂移、温度、灰尘等因素对测量值的偏差。

IRM016 infrared moisture meter

At present, moisture meter can be divided into high frequency impedance type, capacitance type, microwave type, neutron type, infrared absorption type and so on. Among these moisture meters, the infrared absorption moisture meter can completely carry out non-contact measurement, and has the advantages of fast, continuous, large measurement range, high accuracy and good stability. Therefore, the paper moisture online detector usually uses infrared absorption type. Infrared moisture meter is divided into reflection type and transmission type moisture meter, dual band, three band and four band moisture meter. The company developed a four band transmission infrared moisture meter

The computer can directly calculate the percentage of moisture by using the calibrated formula with only the measured value of moisture, without considering the gram weight, thus eliminating the repeated deviation.

Dynamic correction means that when there is no paper passing through the moisture probe, the moisture meter saves the measured signal value at this time, and compensates the deviation of the measured value due to zero drift of components, temperature, dust and other factors through a specific calculation formula.

X-ray 纸张灰分和定量测量仪

X-RAY 纸张灰分测量原理是根据纸张中的 CaCO3 或者 BaTIO3 等灰分对 X 射线有不同的吸收光谱，可以通过调节 X 射线的参数来改变光谱，最终确定灰分最大的响应频谱图，再利用伯尔定律可以确定纸张灰分的值。

X-ray paper ash content and quantitative measuring instrument

X-ray paper ash measurement principle is based on the paper CaCO3 or BaTiO3 ash has different absorption spectrum of X-ray, we can adjust the X-ray parameters to change the spectrum, finally determine the maximum response spectrum of ash, and then use Burr's law to determine the value of paper ash.

X-ray 灰分仪和定量仪的特点：

1） 出厂前对厂家样品进行成分检测，测量灰分的吸收频谱图，无需现场测量；

2） 通过电压分段法测量不同灰分的含量，精度高 0.1%

3） X-ray 灰分仪是低辐射射线装置，无需办理放射源安全许可使用手续；

4） 先进的算法对灰分的标定非常重要，对灰分的测量，还受环境温度等影响，测量仪设置有自校准程序，克服环境对测量的影响。

5） X-Ray 还可以对纸张的定量进行检测（生产过程中密度稳定的产品），如箱板纸，牛皮纸等。

Characteristics of X-ray ash analyzer and quantitative analyzer:

1) Before leaving the factory, the components of the samples are tested, and the absorption spectrum of ash is measured, without on-site measurement;

2) The accuracy of the method is 0.1%

3) The X-ray ash analyzer is a low radiation device, which does not need to go through the procedures for the safe use of radioactive sources;

4) The advanced algorithm is very important for the ash calibration. The ash measurement is also affected by the ambient temperature. The measuring instrument is equipped with a self calibration program to overcome the impact of the environment on the measurement.

5) X-ray can also be used for quantitative detection of paper (products with stable density in the production process), such as cardboard, kraft paper, etc.

应用领域：

造纸、塑料薄膜、板材、片材、人造革；

金属压延：铝箔、铜箔、钢带；

复合材料：涂布、淋膜等；

织物与无纺布、纸张、橡胶板等

Application fields:

Paper,Plastic film, board, sheet and artificial leather;

Metal calendering: aluminum foil, copper foil, steel strip;

Composite materials: coating, coating, etc;

Fabrics and non-woven fabrics, paper, rubber sheet, etc

“O”型智能扫描仪(Smart Scanner)功能及特点：

1、定点测量和扫描测量

2、自动校准（标定）和手动校准（标定）

3、采用自整定、最优化、内模预估等控制算法，实现生产线的闭环控制，提高了产品质量，降低原材料的损耗。

4、为了使产品厚度（克重、水分）均匀，利用 CD 横向控制方式，自动调整挤出机构的唇板开启、压延机构的辊间隙、自动模头或自动交叉铺网机，造纸还要控制烘缸的进气压力，对水分进行控制。

5、纵向（MD)自动控制：线速度、计量泵转速、喂料、辊转速、挤出机螺杆转速、流量、压力、温度等。

6、CD 横向自动映射、自动膜边检测、自动分区控制、自动去除间隙功能、自动辊间隙控制、相邻执行机构单元限位保护及解耦

7、智能扫描架具有机械自补偿和探头定时自校准功能：消除了机械引起的测量误差和温度、环境变化对测量精度的影响；

8、扫描架机柜配置空调系统和通风系统，电气的运行环境温度控制在 30℃左右，保证了系统的运算速度和测量精度。

9、该系统和我们自主开发的微物料自动称量系统(HHE-ABS 系统)配合使用，可以实现生产线的全自动上料、分层测厚、质量管理及过程控制功能；

10、远程维护：通过互联网进行远程诊断和操作，及时解决现场存在的问题。用户也可以在办公室实时监控设备的运行情况，也可以将系统、设备的报警信息推送到用户的手机上。

Functions and features of "O" smart scanner:

1. Fixed point measurement and scanning measurement

2. Automatic calibration (calibration) and manual calibration (calibration)

3. Self tuning, optimization, internal model prediction and other control algorithms are used to realize the closed-loop control of the production line, improve the product quality and reduce the loss of raw materials.

4. In order to make the product thickness (gram weight and moisture) uniform, the CD lateral control mode is used to automatically adjust the opening of the lip of the extrusion mechanism, the roll gap of the calendering mechanism, the automatic die head or the automatic cross laying machine

5. MD automatic control: linear speed, metering pump speed, feeding, roller speed, extruder screw speed, flow, pressure, temperature, etc.

6. CD transverse automatic mapping, automatic film edge detection, automatic partition control, automatic clearance removal function, automatic roll clearance control, adjacent actuator unit limit protection and decoupling

7. The intelligent scanning frame has the functions of mechanical self compensation and probe timing self calibration, which eliminates the measurement error caused by machinery and the influence of temperature and environmental changes on the measurement accuracy;

8. The scanning frame cabinet is equipped with air conditioning system and ventilation system, and the temperature of electrical operation environment is controlled at about 30 ℃, which ensures the calculation speed and measurement accuracy of the system.

9. The system and our self-developed micro material automatic weighing system (hhe-abs system) can realize the functions of automatic feeding, layered thickness measurement, quality management and process control;

10. Remote maintenance: remote diagnosis and operation through the Internet to solve the problems on site in time. Users can also monitor in real time in the office， It can also push the alarm information of the system and equipment to the user's mobile phone。

软件操作界面：

1、直方图、点位图和多种曲线形式显示（可自由选择），对应的位置做阀值检测和报警，以两种颜色实时显示横幅合格与不合格的部位数值，并可以保留横幅曲线，方便用户的横幅调整。

2、软件设置工程师和操作员两个级别，具有不同的操作权限；

3、先进的数据库管理，统计报表和历史数据的保存、查询；

4、包括最近 N 次扫描横向分布多轮廓图等显示画面；

5. 数据正态分析和质量控制参数 CPK 自动分析，指导生产的高质量运行；

6. 提供实时的 CD 扫描曲线，边缘检测精度±1mm;

7. 探头自动在线扫描，配合现场采样数据进行标定，使用更简单方便和准确；

Software operation interface:

1. Histogram, bitmap and various curves are displayed (optional). Threshold detection and alarm are made for the corresponding position. The qualified and unqualified parts of the banner are displayed in two colors in real time, and the banner curve can be retained to facilitate user's banner adjustment.

2. The software has two levels: engineer and operator, with different operation authority;

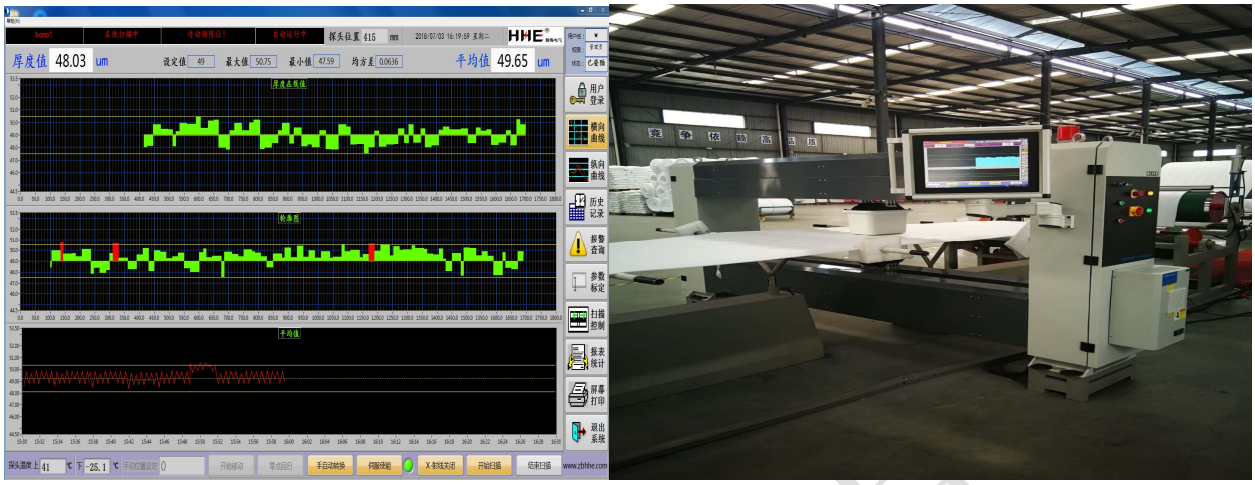
3. Advanced database management, statistical reports and historical data preservation, query;

4. Including the display screen of the most recent N scanning transverse distribution multi contour map and so on;

5. Normal analysis of data and automatic analysis of quality control parameter CPK to guide the high-quality operation of production;

6. Provide real-time CD scanning curve with edge detection accuracy of + 1 mm;

7. The probe can scan online automatically and calibrate with the field sampling data, so it is more simple, convenient and accurate to use;



彩涂生产线（±1um Accuracy）

我们公司还为用户提供以下更多的测量选择

扫描架类型：

O 型机架 标准型（TJ10） 超宽型（TJ20）	 扫描幅宽≤4800，传感器装载数量≤3 台，可装载穿透式或反射式传感器； 扫描幅宽<8100；
C 型机架	扫描幅宽≤1350，传感器装在数量≤1 台，只能装载穿透式传感器；
T 型机架	扫描幅宽≤4500，传感器装在数量≤2 台，只能装载反射式传感器；

滑台式机架	扫描幅宽<2000，适用于空间狭窄的应用场合

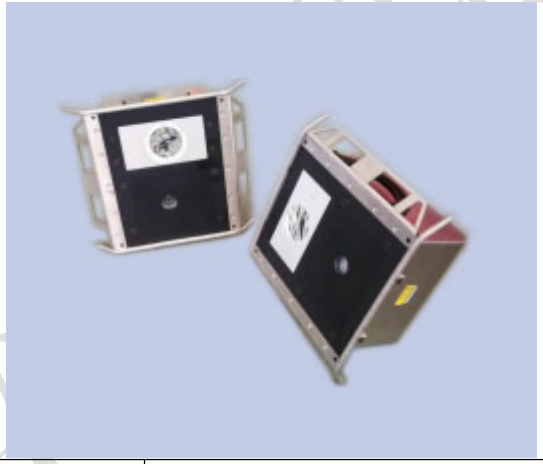
Our company also provides users with the following more measurement options

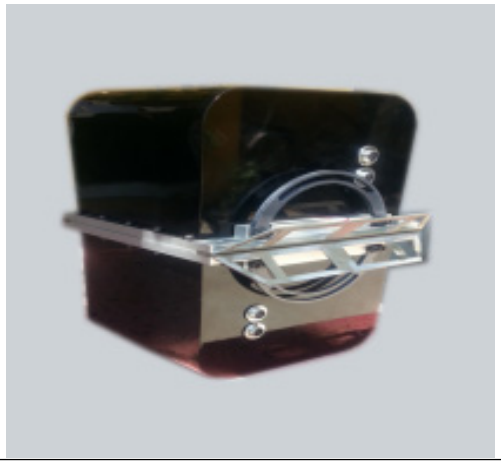
Scanner type:

O-frame Standard (tj10) Super wide type (tj20)	Scanning width ≤ 4800, number of sensors ≤ 3, and can be loaded with penetrating or reflective sensors; Scanning width < 8100;
The scanning width of C-type	rack is less than 1350, the number of sensors is less than or equal to 1, and only penetrating sensors can be loaded;
The T-frame has a scanning	width ≤ 4500, and the number of sensors is ≤ 2, so only reflective sensors can be loaded;
The scanning width of sliding platform	rack is less than 2000, which is suitable for narrow space applications

传感器类型：

Sensor type





穿透式传感器	β 射线 (β ray)	测量范围：10-1000 克/平方米 放射源种类：钷 147（^{147}Pm）；氪 85（^{85}Kr）；锶 90（^{85}Sr）；
	X 射线 (X Ray)	测量范围：5-2000 微米； 低能 X 射线<5Kev 电子伏特
	红外线 (infrared)	测量范围：0-90%（水分）

反射式传感器	红外线 infrared	测量范围：0-90%（水分）
	激光 laser	测量范围：0.01-100 毫米

Penetrating sensor	β ray	Measurement range: ：10-1000g/mm^2 Types of radioactive sources：^{147}Pm；^{85}Kr；^{85}Sr
	X Ray	Measurement range:：5-2000um； Low energy X-rays<5keV electron volts
	infrared	Measurement range：0-90%（water content）
Reflective sensor	infrared	Measurement range：0-90%（water content）
	laser	Measurement range：0.01-100mm

根据测量的材料不同，可以选择β射线、X射线、红外线、激光四种传感器中最合适的一种。所有传感器都是非接触式，不损害被测的材料，多层挤出流延膜的分层测厚，建议采用β射线探头，并和精确的分料计量上料系统配合，实现分层厚度的检测，精度会更高。

According to the different materials, the most suitable one of the four sensors can be selected. All sensors are non-contact and do not damage the material to be measured. It is recommended to use a β - ray probe to measure the layer thickness of multi-layer extruded tape casting film, and cooperate with the accurate feeding system to realize the detection of layer thickness, and the accuracy will be higher

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