提供高端校正自动化解决方案

Provide high-end correcting automation solutions

国机集团 SINOMACH

SINOTEST 中机试验

校正自动化系统

高端智能校正自动化技术引领者

CORRECTING AUTOMATION SYSTEM

HIGH-END INTELLIGENT CORRECTING AUTOMATION TECHNOLOGY LEADER

中机试验官方微信平台
Official WeChat Platform of SINOTEST

400-965-1118
www.ccss.com.cn

中机试验装备股份有限公司 Sinotest Equipment Co.,ltd.

全国统一服务热线：**400-965-1118**

E-mail:sales@ccss.com.cn

传真号码:0431-85171288

官网:www.ccss.com.cn

总部地址:中国吉林省长春市越达路1118号

研发及营销中心地址:中国北京市朝阳区北沙滩一号院

Unified nationwide service hotline: 400-965-1118

E-mail: sales@ccss.com.cn

Fax number: 0431-85171288

Official website: www.ccss.com.cn

Headquarters address:
1118 Yueda Road, Changchun City, Jilin Province, China

Address of the Research, Development and Marketing Center:
No.1 Beishatan, Chaoyang District, Beijing, China

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企业简介
Corporate Profile

中机试验装备股份有限公司（简称：中机试验SINOTEST）始建于1959年（原名：机械工业部长春试验机研究所，曾用名长春机械科学研究院有限公司）。

中机试验-校正自动化事业部以国家机械工业校直设备工程研究中心为依托，拥有多项核心技术，专业致力于自动校直、校正类设备及相关产品的研发制造，多次获得国家级创新奖项。

作为全球最大的校正自动化装备产业基地，1994年至今，已为全球企业提供一千多台套校正自动化产品，为众多厂商提供了专业的解决方案，依靠先进的技术、可靠的质量和贴心的服务，与众多厂商达成战略合作，成为校正自动化装备领军品牌，享誉全球。

Sinotest Equipment Co., Ltd. (short name: SINOTEST) was founded in 1959 (original name: Changchun Research Institute for Testing Machines of the Ministry of Machine Building Industry; former name: Changchun Research Institute for Mechanical Science Co., Ltd.).

Relying on the National Straightening Equipment Engineering Research Center for Machine Building Industry, with multiple core technologies, Correcting Automation Division of SINOTEST is engaged in the research, development and manufacture of automatic straightening and correcting equipment and related products. It has won multiple national-level innovation awards.

As the largest industrial base for correcting automation equipment in the world, Correcting Automation Division of SINOTEST has provided over 1,000 correcting automation products for global enterprises, and professional solutions for many manufacturers since 1994. Relying on advanced technologies, reliable quality and considerate services, it has achieved strategic cooperation with many manufacturers, become a leading brand in the correcting automation equipment field and enjoyed good fame all over the world.

稳定的技术服务团队
Stable Technical Service Team

拥有60余人的营销、设计、生产、售后服务团队；

A marketing, design, production and after-sales service team consisting of over 60 employees.

专业的项目管理团队
Professional Project Management Team

采用SMART管理流程，提高项目管理透明度、效率，传递客户价值；

It has adopted the SMART management process, enhanced the project management transparency and efficiency and transferred customer values.

先进的质量管理体系
Advanced Quality Management System

获得ISO9001质量管理体系认证，欧盟CE认证，军工三级保密资质；

It has passed the ISO9001 Management System Certification and the CE Certification, and won the Third Level Confidentiality Qualification of the Military Industry.

完善的供应商管理体系
Perfect Supplier Management System

拥有全球范围内的战略合作伙伴；
拥有完善的采购体系及稳定的机加配套资源；

It has strategic partners all over the world.
It has a perfect procurement system and stable supporting resources for machining.

产品索引
Product Index

400-965-1118
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发展历程
Development History


第一代板卡式自动校直机
First-generation automatic board straightening machine

CIS-V1.0校直系统
CIS-V1.0 straightening system

1959

机械工业部
长春试验机研究所

Changchun Research Institute for Testing Machines of the Ministry of Machine Building Industry was founded.

1989

潜心研发
自动校直机。

automatic straight-ening machines were researched with great concentration.

1994

首台国产自动校直机诞生
打破国外产品的技术垄断。

the first domestic automatic straightening machine was made and the technical monopoly of foreign products was broken.


第二代数控自动校直机
Second-generation numerical control automatic straightening machines

CIS-V3.94校直系统
CIS-V3.94 straightening system

2009

长春汇凯科技有限公司成立，
建立自动校直机产业基地，
创立国家机械工业校直设备工程研究中心。

Changchun Huikai Technology Co., Ltd. was founded, an industrial base for automatic straightening machines was set up and the National Straightening Equipment Engineering Research Center for Machine Building was established.


第三代全伺服自动校直机
Third-generation full servo automatic straightening machines

CIS-V5.2校直系统
CIS-V5.2 straightening system

2012

自动校直机品牌享誉全球，
年产突破100台，出口土耳其、阿根廷、东南亚等国家及地区。

the automatic straightening machine brand enjoyed good fame all over the world, the annual output was over 100 machines and the machines were exported to some countries and regions such as Turkish, Argentina and some Southeast Asian countries.


第四代智能校直机
Fourth-generation intelligent straightening machines

“蓝舰智享”系列智能校直机
“Lanking Wisdom” series straightener

CIS-V8智能校正系统
CIS-V8 smart calibration system

2018

中机试验成功登陆新三板，
自动校直机销量突破1000台。

SINOTEST was successfully listed on the New Third Board and the sales volume of the automatic straightening machines was more than 1,000.

2019

打造国际一流的校正
自动化装备品牌。

the world-class correcting automation equipment brand was created.

应用领域
Application fields

纺织机械领域
Textile machinery field

传动领域
Transmission field

乘用车领域
Passenger vehicle field

商用车领域
Commercial vehicle field

轨道交通领域
Rail traffic field

机电工具领域
Electromechanical tool field

军工保障领域
Military industry support field

石油化工领域
Petrochemical field

工程机械领域
Construction machinery field

航空航天领域
Aerospace field

应用领域
Application fields

校正自动化事业部产品广泛应用于汽车、轨道交通、工程机械、军工保障、航空航天、石油化工、纺织机械、机电工具等领域。凭借雄厚的技术积淀和丰富的产品经验，根据客户具体需求，提供不同领域的校正自动化解决方案。

The products of Correcting Automation Division are widely applied in automobiles, rail traffic, construction machinery, military industry support, aerospace, petrochemical, textile machinery, electromechanical tools, etc. Relying on abundant technical accumulation and rich product experiences, provide correcting automation solutions for different fields according to the requirements of customers.

动力系统
Dynamic system

凸轮轴	camshaft
曲轴	crankshaft
气门	air valve
连杆	connecting rod

变速系统
Speed control system

齿轮轴	gear shaft
花键轴	splined shaft
输入输出轴	input shaft and output shaft
拨叉轴	shifting fork shaft
同步器齿圈	synchronizer ring gear

传动系统
Transmission system

等速传动轴	constant velocity drive shaft
非等速传动轴	non-constant velocity drive shaft
球笼半轴	constant velocity universal joint and axle shaft
中间轴	intermediate shaft

底盘系统
Chassis system

前桥	front axle
动力桥	power axle
支撑桥	support axle
锥度齿轮	bevel gear
半轴	axle shaft
同步器齿圈	synchronizer ring gear
支撑拉杆	support pull rod

转向系统
Steering system

转向齿轮	steering pinion
转向齿条	steering rack
转向拉杆	steering linkages
转向蜗杆	steering worm

减振系统
Shock absorption system

减振活塞杆	shock absorber piston rod
减振缸套	shock absorber cylinder liner
减振板簧	shock absorption leaf spring

大齿轮轴
Gear wheel shafts

直齿轮轴
spur gear shaft

锥度齿轮轴
bevel gear shaft

多级齿轮轴
multistage gear shaft

齿圈
Ring gears

内齿圈
internally toothed ring gear

外齿圈
externally toothed ring gear

轴承圈
bearing race

轨道交通
Rail traffic

车轴
axle

火车轨道
train track

航空航天
Aerospace

合金管材
tubular alloy product

合金部件
alloy part

工程机械
Construction machinery

缸体
cylinder block

缸套
cylinder liner

活塞杆
piston rod

军工保障
Military industry support

枪管
barrel with a caliber of less than 20 mm

炮管
barrel with a caliber of no less than 20 mm

石油化工
Petrochemical

螺杆
screw

钻具
drilling tool

抽油杆
sucker rod

机电工具
Electromechanical tools

电驱轴
armature shaft

转子轴
rotor shaft

钻头
drill bit

纺织机械
Textile machinery

罗拉
roller

主轴
spindle

锭杆
spindle blade

芯轴
axle

传动部件
Transmission parts

导轨
guide rail

丝杠
lead screw

方齿条
square rack

技术优势
Technical Advantages

对高效率的追求
Pursuit of High Efficiency

通过对伺服、传动技术的创新运用，不断提高各个环节的效率。

Constantly improve efficiency of each link by applying the innovation of servo and transmission technology.

对高精度的追求
Pursuit of High Precision

致力于对校正精度的极致追求，最高校直精度可达0.01mm。

Unremitting pursuit of highest correcting precision and the highest straightening precision can reach 0.01mm.

对校正工艺的不断创新
Constant Innovation of Correcting Technology

基于多年来对校正自动化技术的积累，持续优化创新，总结出切实可行的解决方案。

Based on the multi-year accumulation in the correcting automation technology, continue to optimize the innovation and find feasible solutions.

自动化、智能化的运营
Automatic Intelligent Operation

先进的专家智能控制系统、视觉技术、机器人等先进技术的应用，使得校正过程更加轻松、流畅。

The application of advanced technologies such as the advanced expert intelligence control system, visual technology and robotics makes the correcting process easier and smoother.

人机工程学设计
Ergonomic Design

基于人机工程学，追求卓越的操控体验，集稳定性、安全性、舒适性于一体。

Based on ergonomics, pursue excellent operation and control experience, and integrate stability, safety and comfort.

对连线技术的成熟运用
Mature Application of Wire Connection Technology

通过对相关配套技术的深入研究，成熟的数据传输接口技术使得校正设备能够轻松连线，进行智能化生产。

Based on in-depth research of relevant supporting technologies, mature data transmission interface technology enables correcting equipment to easily connect wires and intelligently carry out production.

校正设备
Correcting Equipment

校正自动化事业部为不同行业提供高性能、高可靠性、高精度的校正自动化装备。

Correcting Automation Division provides high-performance, high-reliability and high-precision correcting automation equipment for different industries.









校正设备
Correcting Equipment

凭借雄厚的技术积淀和丰富的产品经验，根据客户具体需求，提供各个领域的校正自动化解决方案。

Relying on abundant technical accumulation and rich product experiences, provide correcting automation solutions for different fields according to the requirements of customers.





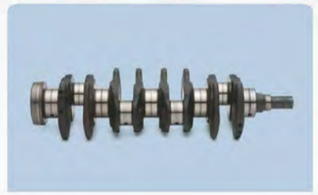



解决方案
Solutions

满足不同客户的需求，提供个性化解决方案。

Meet requirements of different customers and provide individualized solutions.

内燃机系统
Internal combustion engine system



变速箱系统
Gearbox system



传动系统
Transmission system



桥壳系统
Axle housing system



转向系统
Steering system



减振系统
Shock absorption system



解决方案
Solutions

满足不同客户的需求，提供个性化解决方案。

Meet requirements of different customers and provide individualized solutions.

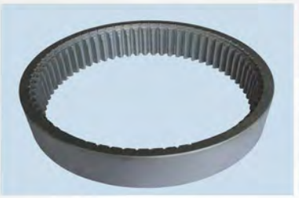
半轴校直
Axle shaft straightening

棒材管材校直
Bar and tube straightening

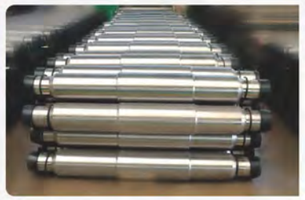
转子电驱校直
Rotor and armature straightening

罗拉锭杆校直
Roller and spindle blade straightening

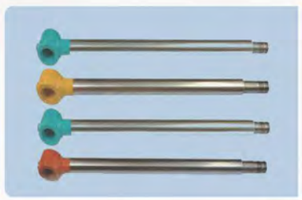
齿圈齿套校圆
Ring gear and sleeve gear rounding



轨道交通行业
Rail traffic industry



工程机械行业
Construction machinery industry



解决方案
Solutions

满足不同客户的需求，提供个性化解决方案。

Meet requirements of different customers and provide individualized solutions.

螺杆钻具校直
Screw and drilling tool straightening

多边棱柱校直
Multilateral prism straightening

导轨丝杠齿条校直
Guide rail, lead screw and rack straightening

项目 Item	标准机型 Standard model	专用机型 Special model
主机机型 Main machine type	C型和门型 C type and gate type	C型移动式和门型四立柱 Mobile C type and 4-column gate type
加载能力 Loading capacity	5kN~50kN/100kN~800kN/1000kN~2500kN 5kN~50kN/100kN~800kN/1000kN~2500kN	1000kN~10000kN 1000kN~10000kN
可校轴长 Correctable shaft length	60~2000mm 60~2000mm	1000~25000mm 1000~25000mm
修正点数 Number of correcting points	1~16点 1~16	
测量点数 Number of measuring points	1~16点 1~16	
传感器分辨率 Sensor resolution	0.001mm 0.001mm	
重复测量精度 Repeated measurement accuracy	0.005mm 0.005mm	
测量方式 Measurement mode	圆棒、半包容片、标准齿轮、激光测量、球头节圆测量 Round bar, semi-inclusive sheet, standard gear, laser measurement, ball pitch circle measurement	
最高校直精度 Highest straightening precision	0.01mm 0.01mm	
校直节拍 Straightening beat	60~450件/小时 60-450 pieces/hour	

配套应用
Supporting Applications

丰富的功能选项、满足更多的需求。

Abundant functional options enable more requirements to be met.

- 根据工件特点，设计满足需求的自动上下料系统。

  According to the characteristics of workpieces, design a material feeding and preparing system to meet the requirements.

- 机器人上下料模式，更加方便灵活，适用于各种机型的上下料，实现一对多上料。

  The material feeding and preparing mode of robots is a more convenient and flexible mode. It is applicable to material feeding and preparing for various types of machines and it can be used to feed materials to multiple different machines.

- 集自动排序、自动上料、自动校直、自动下料分选等多种功能于一体的自动校直线。

  It is an automatic straightening line with a variety of functions such as automatic sequencing, automatic material feeding, automatic straightening, and automatic material preparing and sorting.

01 裂纹检测系统
Crack Detection System

AE（声发射）技术是一种新型的无损检测技术，通过分析金属物体在产生裂纹时发出的声波信号来判断裂痕的存在及趋势。金属裂纹检测系统能够实时监测校直过程中工件内部裂纹的产生情况，结合校直机控制系统，对裂纹工件进行筛选。

Acoustic emission (AE) technique is a new non-destructive testing (NDT) technique. It judges the existence and trend of cracks by analyzing the acoustic wave signals emitted by a metal object with cracks. The metal crack detection system can monitor the crack generation within a workpiece in real time in the workpiece straightening process. It can screen workpieces with cracks, working with the control system of the straightening machine.

产品特点 Product Characteristics

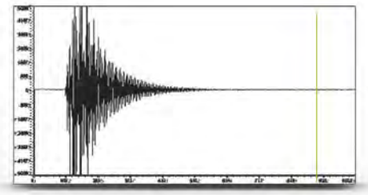
相对于常规的无损检测方法，声发射检测法
具有以下的优点：

- 动态检测，更客观地判断被校正工件是否存在裂纹缺陷；
- 灵敏度高，覆盖面积大，可实现远距离监测；
- 及时发现裂纹，指导设备停机及分选操作，防止压断工件；

Compared with the conventional non-destructive testing, acoustic emission testing has the following advantages:

· Dynamic testing, which can more objectively judge whether a straightened workpiece has cracks.
· High sensitivity and wide coverage, which make remote monitoring possible.
· Timely crack detection, which can direct equipment to stop and sort, and prevent workpieces from being broken.

为提高设备的可靠性、安全性和生产效率，本装置采用声发射技术，通过检测伴随材料变形、断裂应力改变而放出的AE波，对其相关参数进行分析评价，进而判断工件是否合格。与自动校直机产品完美结合，实现一机多用，完美替代传统探伤手段。



To enhance the reliability, safety and production efficiency of the equipment, this device adopts acoustic emission technique. It judges whether a workpiece is qualified by detecting the acoustic waves emitted by the workpiece due to its deformation and rupture stress change, and analyzing and evaluating the relevant parameters. It has been perfectly combined with the straightening machine, which enables the straightening machine to serve multiple purposes and completely replaces the traditional crack detection means.

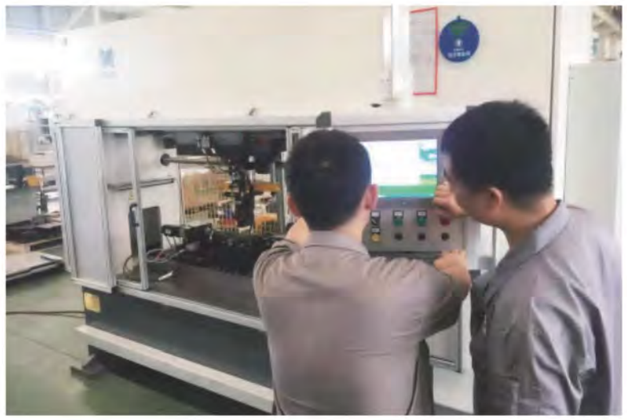
02 MES系统
Manufacturing Execution System

集成了多种数据接口，能够满足不同客户现场的数据传输需求，完美的与MES系统对接，满足客户的工艺要求。

With multiple data interfaces, it can meet the on-site data transmission requirements of different customers, perfectly match the manufacturing execution system and satisfy the process requirements of customers.

服务体系
Service System

01 生产调试团队
Production and commissioning team



02 研发设计团队
Research, development and design team

03 调试现场
Commissioning site

专业研发制造
Professional Research, Development and Manufacturing

专业的技术管理团队始终坚持创新引领和精益生产理念，打造一流产品，追求超高品质。
The professional technical management team always adheres to the philosophy of innovation orientation and lean production, creates first-rate products and pursues ultrahigh quality.

专业维护保养
Professional Maintenance

专业的售后服务人员将定期对设备进行维护保养，使设备保持最佳使用状态。
The professional after-sales service workers will regularly maintain the equipment to make it always in its best state.

专业升级改造
Professional Upgrade and Transformation

专业的售后服务人员可对机械、电气、软件系统进行升级改造，提升设备整体性能。
The professional after-sales service workers can upgrade and transform the mechanical system, electrical system and software system, and enhance the overall equipment performance.

核心技术
Core Technology

控制技术决定校正装备整体技术水平，我们总结过去多年、千台校正装备的应用经验，不断优化CIS智能校正系统，满足用户的差异化需求。

The control technology determines the overall technology level of correcting equipment. We have summed up the past multi-year application experiences of over 1,000 sets of correcting equipment and constantly optimized the correcting intelligence system (CIS) to meet the differentiated demands of customers.

- CIS智能校正系统适用于**WIN7、WIN10**等Windows操作平台；
- The correcting intelligence system (CIS) is applicable to the Windows operating system platform such as the Windows 7 platform and the Windows 10 platform.

- **多种MES通信接口**，与客户现场管理完美融合；
- With multiple MES communication interfaces, it can be perfectly combined with the on-site management of customers.

- 主流的伺服系统**总线控制功能**，高效快捷的运动控制方式，极大地提高了系统的运行速度；
- The mainstream servo system bus control function and the quick efficient motion control method have greatly improved the operating speed of the system.

- 强大的**专家智能控制系统与专家数据库系统结合**，指导校直参数自适应优化调节，提高校正节拍；
- The combination of the powerful expert intelligence control system with the expert database system directs the adaptive optimization and adjustment of straightening parameters and enhances the correcting speed.

- **远程协助、远程控制**功能，配合强大的专家日志系统，实时监控机器运行状态，能够方便地排查客户现场出现的问题，轻松地解决客户现场故障；
- The remote assistance and remote control functions work with the powerful expert log system and monitor the operating status of the machine in real time, which can facilitate the on-site troubleshooting at the customer’ s place.

- 基于傅里叶分析处理方法，结合**全新的数据拟合处理算法**，准确的分析出工件的缺陷与形状误差，保证了测量的稳定性与测量的精度；
- Based on the analysis and treatment method of Fourier, it can accurately analyze the defects and form errors of workpieces by combining the brand-new data fitting algorithm and ensure the measurement stability and precision.

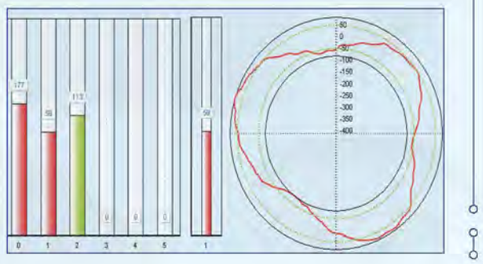
- 全新的校直策略，**集高点校直、顺序校直、混合校直、自由校直等多种校直策略于一体**，可适应不同工件特性的校直需求；
- The brand-new comprehensive straightening strategy integrating many straightening strategies such as high spot straightening, sequential straightening, mixed straightening and free straightening can be used to meet the straightening requirements of workpieces with different characteristics.

- **质量SPC系统**，通过数据统计与数据分析，优化产品生产工艺，降低不良品产生率，满足客户的质量控制需求；
- The Statistical Process Control (SPC) System for Quality optimizes the product manufacturing technology, reduces the percentage of defective products and meets the quality control requirements of customers through data statistics and data analyses.

- **灵活的人机交互接口**，允许客户根据实际生产需要，自行配置交互显示窗口。
- The flexible human-machine interactive interface allows customers to arrange their interactive display windows by themselves.

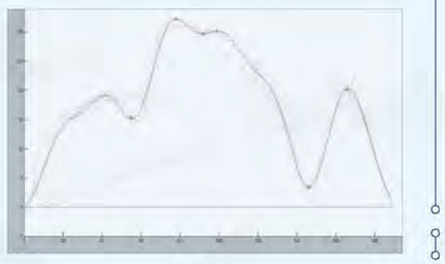
针对齿圈类工件，研发出CIS-R系统（软件已经取得专利保护），准确地分析出工件的形状误差、跳动误差、三角、四角、多边形圆数据，保证测量的准确性，校正的精确性。

We have developed the CIS-R System for ring gear workpieces (Patent protection for the software has been granted), which can accurately analyze the data on form errors, run-out errors, triangles, quadrangles, polygons and circles of the workpieces and ensure the measurement accuracy and the correcting precision.

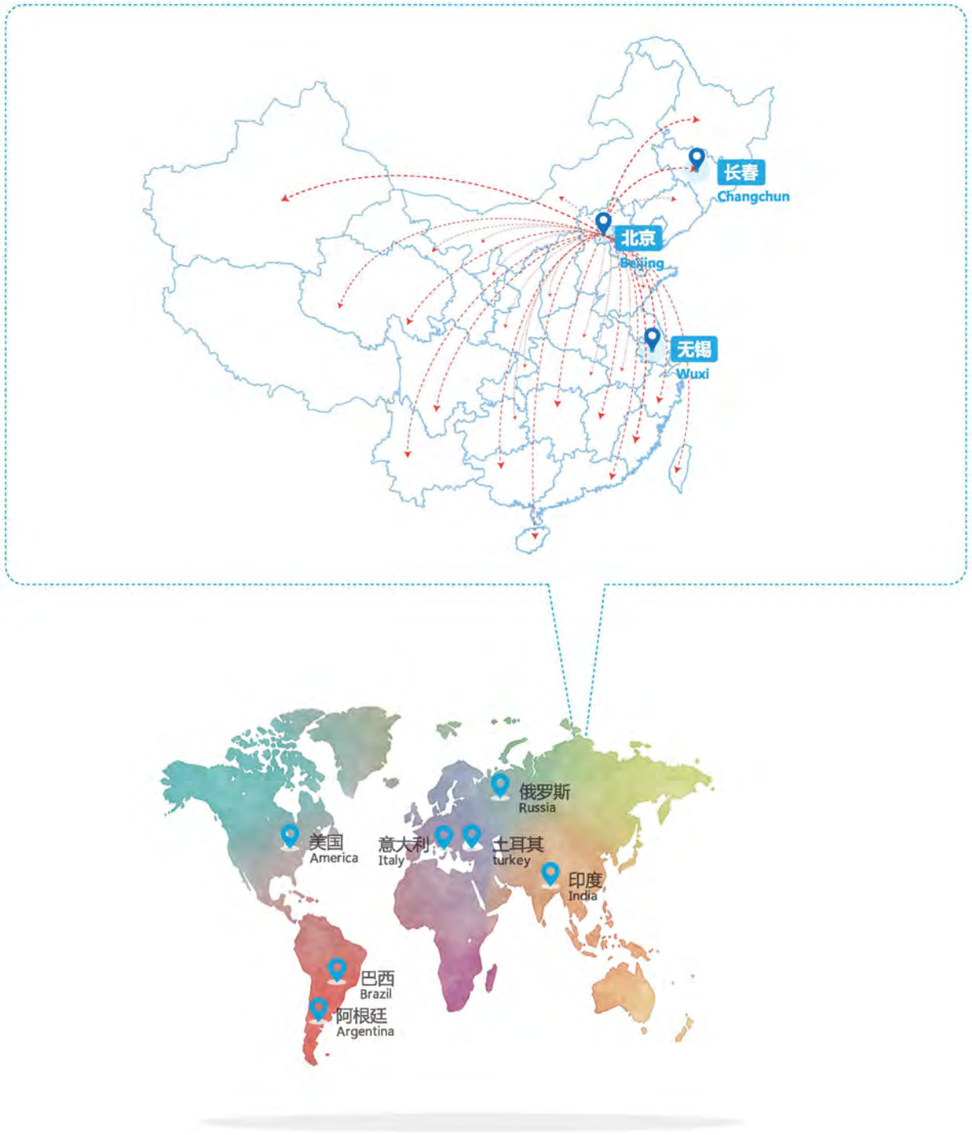


针对火车轨道、细长杆类工件，研发出CIS-L系统（软件已经取得专利保护），利用激光测量技术，结合先进的数据处理算法，准确地分析出工件各个高点与低点的位置，实现精准、快速校直。

We have developed the CIS-L System for train tracks and long and thin rod workpieces (Patent protection for the software has been granted), which can accurately find the positions of all the high spots and low spots of the workpieces through analyses, and it can quickly and accurately straighten the workpieces.



典型客户
Typical Customers



国内客户
Domestic customers

国际客户
International customers