



主板A股代码 (Stock code): 603656

AI分选 绿色矿山新动能

AI SORTING, GREEN MINERALS'S NEW INNOVATION



合肥泰禾卓海智能科技有限公司

地址: 中国安徽合肥市肥西县新港工业园派河大道与蓬莱路交叉口 /

联系方式: 152-5512-4073 / 电话: +86-0551-68580856 / 出口专线: +86-551-65399015 /

客服中心: 400-660-9996 / 传真: +86-551-65399188 /

邮箱: company@aizhuohai.com / 邮编: 230601 /

网址: www.aizhuohai.com/

Hefei Taihe Zhuohai Intelligent Technology Co.,Ltd.

Address: Intersection of Paihe Avenue and Penglai Road, Xingang Industrial Park, Feixi County, Hefei City, Anhui Province, China /

Mobile: 152-5512-4073 / Tel: +86-551-68306035 / Export Tel: +86-551-65399015 /

Fax: +86-551-65399188 / Email: thsorter@chinataiho.com / Postal Code: 230601 /

URL: www.aizhuohai.com/

*因公司产品技术不断革新,本画册所列示的产品若涉及外观或性能等升级的,以实际升级后的产品性能为准。

Due to continuous innovation of our product technologies, if the products listed in this album involve upgrading of appearance or performance etc, the actual upgraded product performance shall prevail.

2022年12月



Photoelectric Intelligent Dry Type Coal Separator

PIDS光电智能干式选煤机

合肥泰禾卓海智能科技有限公司
Hefei Taihe Zhuohai Intelligent Technology Co.,Ltd.



INTELLIGENT INTELLIGENT CREATION INTELLIGENT FUTURE SHARING

智能 智创 智享未来

泰禾卓海——智能制造技术解决方案提供商

泰禾卓海以“引领智能制造”为深度发展方向。

为矿山行业提供自动化、智能化技术解决方案。

以快捷优质的服务、可持续的技术咨询，发扬“客户所需我之所做，我之所做客户所需”的核心理念。

为将泰禾卓海打造成智能制造领导领先品牌而不懈努力！

**Intelligent
Intelligent creation
Intelligent future sharing**

Taihe Zhuohai - intelligent manufacturing
technology solution provider

Taihe Zhuohai takes “leading intelligent manufacturing” as its in-depth development direction.

Provide automation and intelligent technology solutions for the mining industry.

With fast and high-quality services and sustainable technical consultation, we carry forward the core concept of “what customers need is what we do, what we do is what customers need”.

Make unremitting efforts to make Taihe Zhuohai a leading brand of intelligent manufacturing!

Company profile

企业概述

泰禾卓海将积极面对未来的激烈竞争，实现专注核心领域，打造一个生命力强劲的卓海品牌，秉承过去的辉煌，以零起点的心态继续努力，实现品牌的跳跃提升，向国际化现代企业集团迈进。

Taihe Zhuohai will actively face the fierce competition in the future, and focus on the core areas and build a Zhuohai brand with strong vitality, We will continue the glories in the past, work hard with a zero-based mindset, realize the leap promotion of brand and stride forward to an international modern enterprise group.



合肥泰禾卓海智能科技有限公司，以先进成像和AI图像识别为核心技术，是为矿山等行业的自动化、智能化升级提供智能装备和服务的高新技术型企业。

十四五以来，在国家大力倡导加速矿山智能化建设和节能减排的背景下，泰禾卓海以科学技术为引领，坚持自主研发。公司现拥有研发成员50多名，其中博士2名、硕士10余名。并与中科院、中国科学技术大学、中国矿业大学、安徽理工大学等科研机构 and 高校保持紧密合作。连续4次通过国家高新技术企业认定，获得国家科技创新基金项目2项，拥有专利、软件著作权400余项自主知识产权。为淮河能源、山东能源、陕煤集团、大同煤业、西山煤电等多家国内知名矿业集团提供产品及技术服务。

合肥泰禾智能科技集团股份有限公司成立于2004年，2017年在上交所主板上市（A股代码：603656），是一家专业从事基于人工智能、机器视觉、成套智能化装备研发应用的综合服务商，应用领域包括：AI农副食品分选、AI矿石分选、智能包装、智能装车。

泰禾智能作为CCD智能色选机的开创者，不断主导色选机市场的技术升级，并连续七届在中国国际粮油产品及设备技术展览会上荣获金奖；基于人工智能图像识别、机器学习技术，在大米、杂粮、茶叶色选机问世畅销后，陆续研发出塑料、工业盐、煤炭等工业智能分选设备；拓展研发出智能包装、智能装车系统等智能装备产品。凭借优良的品质和优质的服务，产品遍布全球80多个国家和地区。

Hefei Taihe Zhuohai Intelligent Technology Co., Ltd., with advanced imaging and AI image recognition as its core technology, is a high-tech enterprise providing intelligent equipment and services for automation and intelligent upgrading of mining and other industries.

Since the 14th five-year plan, under the background of the national vigorously advocate to accelerate the intelligent construction of mines and energy saving and emission reduction, Taihe Zhuohai takes the lead of science and technology and insists on independent research and development. The company now has more than 50 R & D members, including 2 doctors and more than 10 masters. We also keep close cooperation with scientific research institutions and universities such as Chinese Academy of Sciences, University of Science and Technology of China, China University of Mining and Technology, Anhui University of Technology, etc. It has been recognized as a national high-tech enterprise for 4 times in a row, and has obtained 2 national science and technology innovation fund projects, and has more than 400 patents and software copyrights. We provide products and technical services for or many famous China mining groups such as Huaihe Energy, Shandong Energy, Shanxi Coal Group, Datong Coal, Xishan Coal and Electricity.

Hefei Taihe Intelligent Technology Group Co., Ltd., founded in 2004 and listed on the main board of Shanghai Stock Exchange in 2017 (Stock Code: 603656), is a comprehensive service provider specializing in the research and application of artificial intelligence, machine vision and complete sets of intelligent equipment. Its application fields include: AI agricultural and food sorting, AI ore sorting, intelligent packaging, intelligent truck loading.

As the pioneer of CCD intelligent color sorter, Taihe intelligent has continuously led the technical upgrading of color sorter industry, and won the Gold Award in China International Grain and oil products and equipment technology exhibition for seven consecutive years; based on artificial intelligence image recognition and machine learning technology, after the color sorter for rice, grains and tea came out and sold well, it successively developed intelligent sorters for such as plastic, industrial salt, coal and etc; developed intelligent packaging, intelligent loading system and other intelligent equipment products. With excellent quality and service, our products are distributed in more than 80 countries and regions around the world.

Enterprise Honors

企业荣誉



高新技术企业
High-Tech Enterprise

守合同重信用企业
Enterprise of Observing
Contract and Valuing Credit

两化融合管理体系贯标示范企业
Demonstration Enterprise of Implementing the
Standard of IT Application with Industrialization
Integration Management System

智能制造试点示范
Pilot Demonstration of
Intelligent Manufacturing



服务型制造示范项目
Service-oriented Manufacturing
Demonstration Project

安徽省工业设计中心
Anhui Industrial Design Center

安徽省专利金奖
Anhui Patent Gold Award

博士后科研工作站
Post-doctoral Research Center



AI分选 绿色矿山新动能

1. 一支高学位专业技术人员组成的研发技术团队
2. 与中科大安徽省光电子科学与技术重点实验室共同组建的“合肥市工业物料光电分选工程技术研究中心”
3. 国家级高新技术企业
4. 国家级企业技术中心
5. 中国驰名商标
6. 国家级守合同重信用企业
7. 国家两化融合管理体系贯标示范企业
8. 制造业单项冠军培育企业
9. 制造业与互联网融合发展试点示范企业
10. 国家智能制造试点示范项目

AI SORTING GREEN MINERALS'S NEW INNOVATION

1. A R&D technical team composed of highly educated professional technicians
2. “Hefei Industrial Material Photoelectric Separation Engineering Technology Research Center” was established by Zhuohai Intelligent and Anhui Key Laboratory of Optoelectronics Science and Technology of University of Science and Technology of China
3. National High-Tech Enterprise
4. National Enterprise Technology Center
5. Famous Trademark in China
6. National Enterprise of Observing Contract and Valuing Credit
7. Demonstration Enterprise of Implementing the Standard of IT Application with Industrialization Integration Management System
8. Cultivation Enterprise for Single Champion in Manufacturing Industry
9. Pilot Demonstration Enterprise of Integrated Development of Manufacturing Industry and Internet
10. National Intelligent Manufacturing Pilot Demonstration Project

Core Products

核心产品

产品介绍

Product Introduction

PIDS光电智能干式选煤机是一种基于先进成像和人工智能技术的干法选煤设备。利用X射线成像系统获取的物料特征，自动分析识别出煤和矸石，控制高压风对目标进行喷吹，实现全自动原煤分选。具有分选精度高，大幅减少用电和人力成本，设备易维护，煤种适应性强等优势。

Photoelectric intelligent dry type coal separator is a kind of dry type coal separation equipment based on advanced imaging and artificial intelligence technology. By using the material characteristics acquired by X-ray imaging system, coal and gangue can be automatically analyzed and identified, and the high-pressure air can be controlled to blow the target to realize fully-automatic raw coal separation. It has the advantages of high separation accuracy, greatly reducing the cost of electricity and manpower and featuring easy equipment maintenance and strong adaptability to coal types.

适用范围 Scope of application

替代手选；代替动筛排矸；缺水地区煤炭的分选；遇水易泥化的原煤分选；尾煤回收利用；煤矿井下智能排矸分选；其他非煤矿物的分选。

Replacing hand picking ; replacing movable sieve jigger ; separating coal in water shortage areas; separating raw coal with easy argillization in water; recycling tailing; underground coal mine intelligent gangue rejection; separating other non-coal minerals.

多年来，公司凭借雄厚的实力、良好的信誉以及严格的质量管理、优质的售后服务，赢得了社会广大用户的认可，保持企业强劲的凝聚力，同时产品高质量、服务高水平，是我们始终遵循的信念。

Over the years, the company has won the recognition from the majority of users in the society and maintained its strong cohesion with strong strength, good reputation, strict quality management and high-quality after-sales services. At the same time, providing the high quality of products and the high level of services is the belief we always follow.

01 布料子系统/Material distribution subsystem

由入料机构、振动筛、输送皮带等组成，将煤块均匀摊开，以便X射线对物料扫描成像。

It is composed of feeding mechanism, vibrating screen and conveyor belt. The coal can be distributed evenly so X-ray can better scan and image the material.

02 成像识别子系统 Image recognition subsystem

通过人工智能图像识别技术对X射线成像子系统获取的物料特征进行分析，识别出煤和矸石，结果输出给执行子系统。

Through the artificial intelligence image recognition technology, the material characteristics obtained by the X-ray imaging subsystem are analyzed, coal and gangue are identified, and the results are output to the executive subsystem.

03 执行子系统/Execution subsystem

电磁阀精准控制高压空气，对抛出的煤或矸石进行分选。

The solenoid valve precisely controls the high-pressure air to separate the thrown coal or gangue.



设备构成

布料系统

多谱段光电扫描成像系统

深度学习图像识别系统

执行系统

高压供气气站

辅助系统

Equipment composition

Material distribution system

Multispectral photoelectric scanning imaging system

Deep learning image recognition system

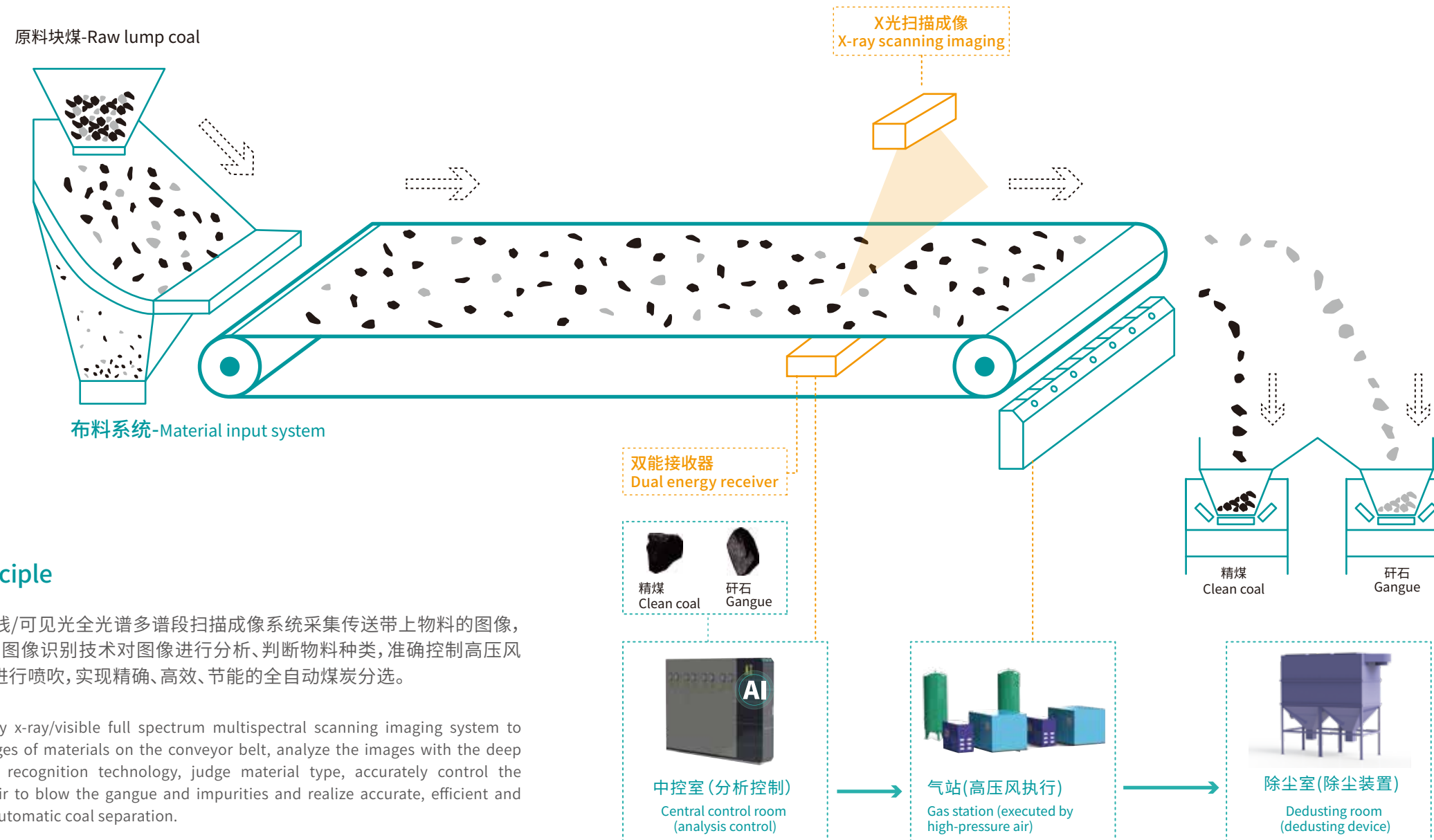
Execution system

High-pressure air supply station

Auxiliary system

工艺流程

Technological Process



基本原理

Basic principle

利用双能X射线/可见光全光谱多谱段扫描成像系统采集传送带上物料的图片，通过深度学习图像识别技术对图片进行分析、判断物料种类，准确控制高压风对矸石、杂质进行喷吹，实现精确、高效、节能的全自动煤炭分选。

Use dual energy x-ray/visible full spectrum multispectral scanning imaging system to collect the images of materials on the conveyor belt, analyze the images with the deep learning image recognition technology, judge material type, accurately control the high-pressure air to blow the gangue and impurities and realize accurate, efficient and energy-saving automatic coal separation.

技术特点

- NO.1 处理粒级宽
可处理25-600mm原煤。分选上限600mm, 下限25mm;
- NO.2 分选精度高
排矸率可达95%以上, 矸中带煤率小于2%, 分选效果明显;
- NO.3 处理能力大
针对不同粒级的物料, 处理量达55-400t/h;
- NO.4 智能化程度高
无需工人长期值守, 故障可自检。

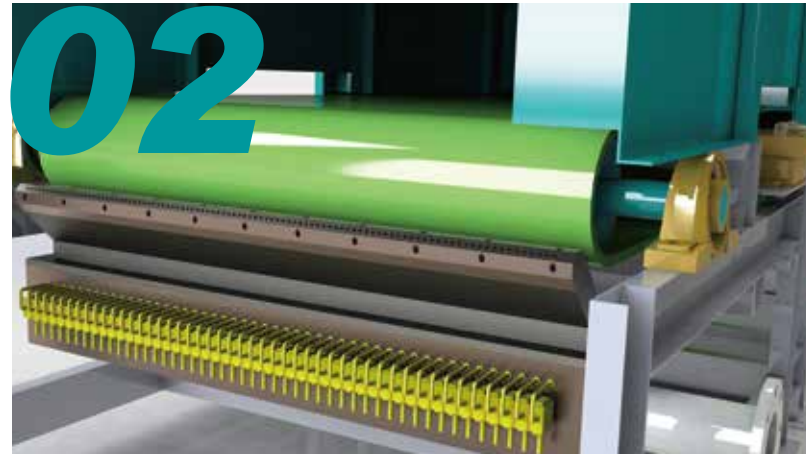
Technical features

Wide processing size range: It can handle 25-600mm raw coal. The upper limit of separation is 600mm and the lower limit is 25mm.

High separation accuracy: The rate of gangue removing is over 95%, the rate of coal in gangue is less than 2%, and the separation effect is significant.

Great processing capacity: The processing capacity is 55-400t/h for the materials with different particle sizes.

High-level intelligence: Workers are not required to be on duty for a long time, and the fault can be self-detected.



技术优势 Technical Advantages

先进的成像技术

在深入研究目标的辐射吸收特性的基础上, 优化设计了信号样式和成像光路; 采用匹配的多波段传感器, 最大程度突出目标的特征差异。

采用高规格工业X射线射源, 射线更均匀、稳定; 选用进口高性能双能量X射线探测器, 信噪比高、图像质量好。

Advanced imaging technology

On the basis of in-depth study on the radiation absorption characteristics of the target, the signal type and imaging optical path are optimized. The matched multi-band sensor is used to highlight the feature differences of the target to the greatest extent.

High-standard industrial X-ray source is adopted, which makes the ray more uniform and stable. Imported high-performance dual energy X-ray detector is adopted, which has high signal-to-noise ratio and good image quality.

高效可靠气选执行子系统

执行子系统的高压风喷嘴呈阵列式布置, 根据被执行对象的位置和形状信息, 智能控制相应位置的多个空气喷嘴开合时间, 有效解决形状特殊、受力面小的不规则物块难以喷吹的问题, 实现精确喷吹分选。

当遇到不同灰分、不同含水量、不同批次的原煤时, 系统可在一定范围内自学习调整识别参数, 并可以根据矸石含量的多少, 灵活切换喷吹分选方案。

Executive subsystem of efficient and reliable air separation

The high-pressure air nozzles of the executive subsystem are arranged in an array. According to the position and shape information of the object to be executed, the opening and closing time of multiple air nozzles at the corresponding positions is intelligently controlled, which can effectively solve the problem that irregular objects with special shapes and small stress surfaces are difficult to be blown and achieve accurate blowing separation.

When encountering raw coal with different ash contents, moisture contents and batches, the system can self-study and adjust the identification parameters within a certain range and flexibly switch the blowing separation schemes according to the gangue content.

03

人工智能图像识别 Artificial intelligence image recognition

光电信号处理、分析

几何矫正辐射矫正
图像拼接数据配准
脉冲压缩

Photoelectric signal processing and analysis

Geometric and radiation correction
Image stitching data rectification
Pulse compression

建模, 特征抽取与浅层次学习

目标特征矢量模型
分类存储匹配识别

Modeling, feature extraction and shallow learning

Target eigenvector model
Classification storage matching recognition

基于深度学习的学习与训练

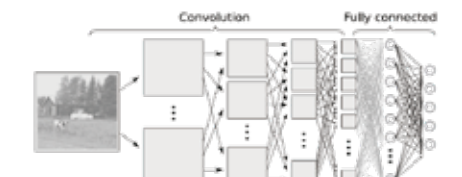
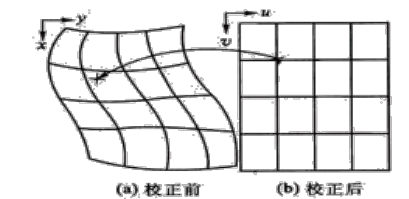
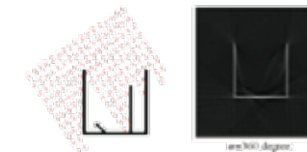
专用图像集
大规模GPU集群训练

Learning and training based on deep neural network

Dedicated image sets
Large-scale GPU cluster training

与人类视觉认知方式相同的智能化特征提取

Intelligent feature extraction in the same way as human visual cognition



技术参数

Technical Parameters

粒度25-100mm PIDS光电智能干选机

Particle size 25-100 mm Photoelectric intelligent dry type coal separator

型号-Model	PIDS 10S-A01	PIDS 12S-A01	PIDS 14S-A01	PIDS 16S-A01	PIDS 18S-A01	PIDS 20S-A01	PIDS 24S-A01
皮带宽度-Belt Width(mm)	1000	1200	1400	1600	1800	2000	2400
分选能力-Separation capacity(t/h)	55	65	80	90	100	115	140
系统功率-System power(kW)	80	100	110	130	150	180	220
平均功率-Average power(kW)	60	75	83	98	113	135	165

注：因各地区矿石不同，技术参数仅供参考，具体以实际设计为准。

Note: Due to different ores in different regions, the technical parameters are for reference only, and they shall be subject to the actual design.

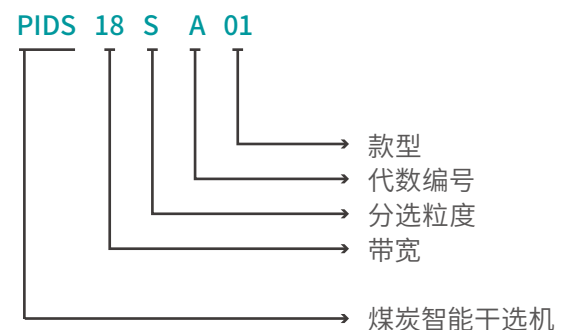
粒度50-300mm PIDS光电智能干选机

Particle size 50-300 mm Photoelectric intelligent dry type coal separator

型号-Model	PIDS 10M-A01	PIDS 12M-A01	PIDS 14M-A01	PIDS 16M-A01	PIDS 18M-A01	PIDS 20M-A01	PIDS 24M-A01
皮带宽度-Belt Width(mm)	1000	1200	1400	1600	1800	2000	2400
分选能力-Separation capacity(t/h)	80	110	130	150	180	200	240
系统功率-System power(kW)	80	100	110	130	150	180	220
平均功率-Average power(kW)	60	75	83	98	113	135	165

注：因各地区矿石不同，技术参数仅供参考，具体以实际设计为准。

Note: Due to different ores in different regions, the technical parameters are for reference only, and they shall be subject to the actual design.



粒度 150-600mm PIDS光电智能干选机

Particle size 150-600mm Photoelectric intelligent dry type coal separator

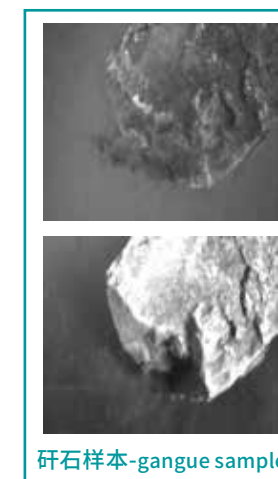
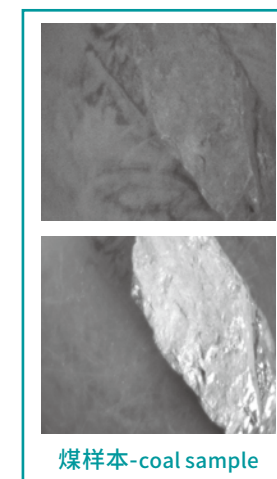
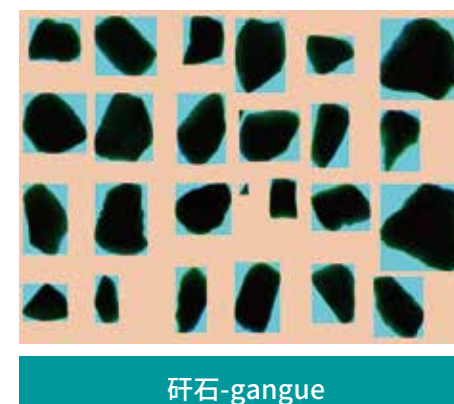
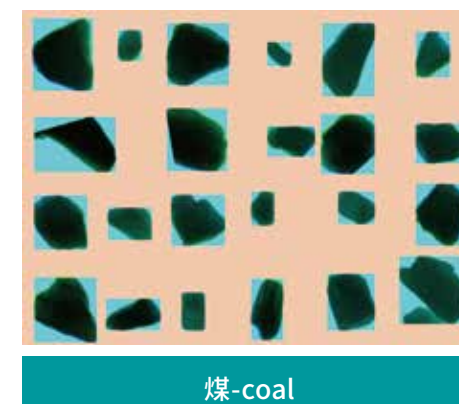
型号-Model	PIDS 16L-A01	PIDS 18L-A01	PIDS 20L-A01	PIDS 24L-A01
皮带宽度-Belt Width(mm)	1600	1800	2000	2400
分选能力-Separation capacity(t/h)	200	240	280	320
系统功率-System power(kW)	180	220	260	300
平均功率-Average power(kW)	135	165	195	225

注：因各地区矿石不同，技术参数仅供参考，具体以实际设计为准。

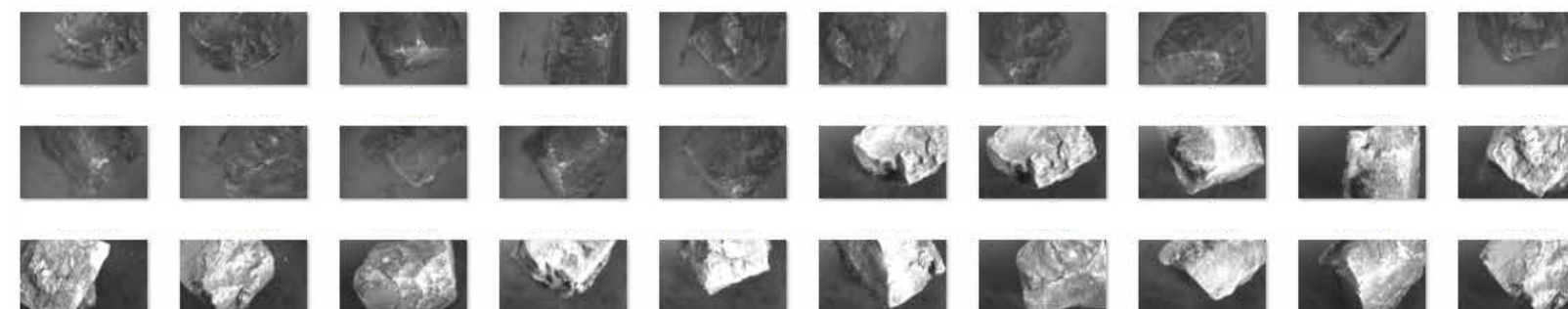
Note: Due to different ores in different regions, the technical parameters are for reference only, and they shall be subject to the actual design.

应用效果

Application Effect



可见光线阵传感器数据样例-Samples of data of visible ray array sensor



客户应用案例 Customer Application Case



胜利一号矿坑下移动式褐煤智能干选项目 Shengliyihao Coal Mine

- ▶ **应用领域：极寒条件下露天煤矿坑下移动式中块煤智能干选**
国家能源北电胜利能源有限公司
处理能力可达260-320t/h；矸中带煤占比下降，煤中带矸率小于5%，矸石带煤率小于3%；降低用人成本，提能增效，提升工艺智能化、自动化水平，减少生产与管理人员成本；提高吨煤收益，通过智能分选，提升了褐煤产品的质量和减少热值损失，增加了收益。
- ▶ **Application field: intelligent dry separation of movable medium lump coal under pit in open pit coal mine under extremely cold conditions**
National Energy Nortel Shengli Energy Co., Ltd
The processing capacity can reach 260-320t/h; The percentage of coal with gangue in the gangue decreased, and the percentage of coal with gangue in the coal was less than 5%, and the percentage of coal with gangue was less than 3%; Reduce the cost of employment, improve energy efficiency, improve the level of process intelligence and automation, and reduce the cost of production and management personnel; carry the benefit of high tons of coal, through intelligent sorting, has improved the quality of lignite products, reduced the loss of calorific value, and increased the benefit.



煤峪口矿智能干选项目 Meiyukou Coal Mine

- ▶ **应用领域：替代人工手选**
晋能控股煤业集团有限公司煤峪口矿
矸中带煤率由5%下降至1.5%以下；降低人工成本，每年可省去捡矸工人和管理人员约20人，合计约100万/年；降低配套设备成本，减少刮板机和慢速皮带等附属设备的采购、损耗成本。
- ▶ **Application field: alternative manual selection**
Meiyukou Mine of Jinneng Holding Coal Group Co., Ltd
The coal carrying rate in the gangue is reduced from 5% to less than 1.5%; Reduce labor costs, and save about 20 waste pickers and management personnel every year, totaling about 1 million yuan/year; Reduce the cost of supporting equipment, and reduce the purchase and loss cost of auxiliary equipment such as scraper and slow belt.



淮矿张集智能干选项目 Huainan Zhangji Coal Mine

- ▶ **应用领域：原动筛排矸系统技术改造**
淮河能源（集团）股份有限公司
年产能760万吨，预估处理产能400万吨；矸中带煤比例由6%下降至1.5%以下；年度增收近1000万元；吨煤增加收益约50元。
- ▶ **Application field: technical transformation of waste discharge system of the original screen**
Huaihe Energy (Group) Co., Ltd
The annual production capacity is 7.6 million tons, and the estimated processing capacity is 4 million tons; The proportion of coal in gangue decreased from 6% to less than 1.5%; Annual increase of nearly 10 million yuan; The increased income per ton of coal is about 50 yuan.



唐家会选煤厂智能干选项目 Tangjiahui Coal Mine

- ▶ **应用领域：新建智能排矸车间**
鄂尔多斯市华兴能源有限责任公司
年产能900万吨，选煤厂水洗700万吨能力，智能干选300万吨能力；三产品智能干选系统，满足300-100（80）mm的块精煤（-1.6g/cm³）率小于2%，精煤带矸率小于3%；减少入洗原煤量（约40%），降低加工成本、减少煤泥；通过干选设备排出矸石，减少破碎系统负荷。
- ▶ **Application field: new intelligent waste discharge workshop**
Ordos Huaxing Energy Co., Ltd
The annual production capacity is 9 million tons, the water washing capacity of the coal preparation plant is 7 million tons, and the intelligent dry separation capacity is 3 million tons; Three product intelligent dry separation system, meeting 300-100 (80) mm lump clean coal (-1.6g/cm³) The rate is less than 2%, and the rate of clean coal with gangue is less than 3%; Reduce the amount of raw coal to be washed (about 40%), reduce processing costs and reduce coal slime; Waste is discharged through dry separation equipment to reduce the load of crushing system.

Win-win services

服务共赢

技术支持与服务

Technical support and services

公司不断加大对产品售后服务的支持力度，坚持“以客户为中心”的指导方针，做到客户有问题，快速反应，24小时达到客户现场，提供专业的培训及技术指导，免除客户使用公司产品的后顾之忧。

设备销售

泰禾卓海拥有完善的试验设备，为客户提供精准可靠的试验数据；参观设备使用现场，全面了解设备运营状况。同时结合客户需求和工艺流程，提供完美的设计方案，根据现场工况条件量身定制设备系统。拥有优秀的售后服务团队，能够及时解决客户问题。

代理合作

泰禾卓海面向煤炭行业精英，诚招代理商，提供灵活的合作方式，以寻求泰禾代理商、使用方合作共赢。

智能制造时代，技术发展日新月异，它正在改变着我们的生产、运营、管理方式；卓海面向行业客户，提供智能、高效、高质量、易扩展的行业解决方案，帮助客户实现智能造、信息化管理最佳实践，以满足行业需求。

We continuously strengthen the support for after-sales services of products, adhere to the guideline of “customer orientation”, make a quick response to customers’ problems, send personnel to the customer site within 24 hours and provide professional training and technical guidance to remove customers’ worries about using our products.

Equipment Sales

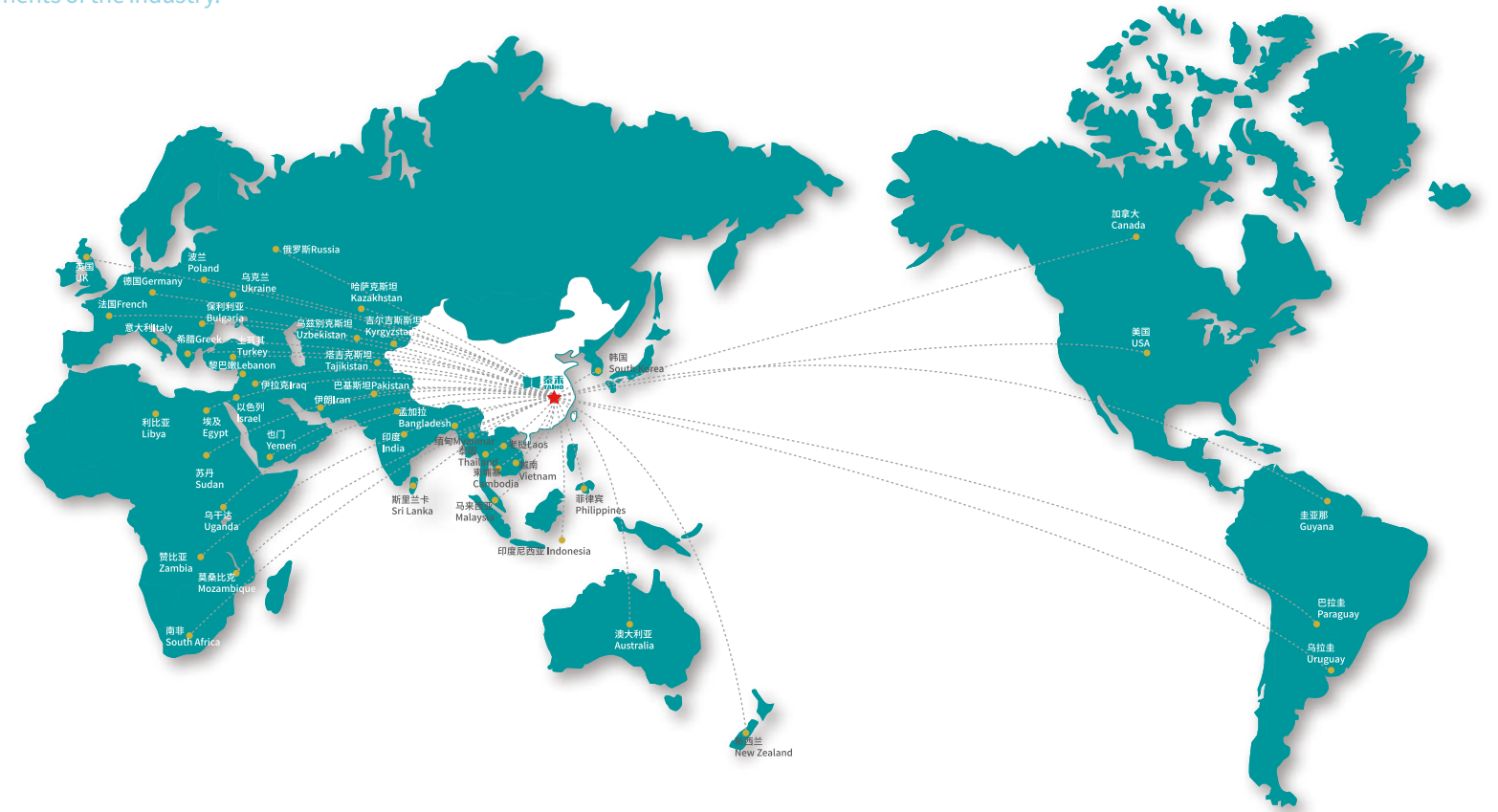
Taihe Zhuohai has perfect test equipments to provide customers with accurate and reliable test data. Customer can visit the equipment using site to fully understand the equipment operation status. Based on customer needs and technological processes, it provides a perfect design scheme, and customizes the equipment system according to the site conditions. With excellent after-sales service team, it can solve customers’ problems in time.

Agent cooperation

Facing the elites in coal industry, Taihe Zhuohai invites agents and provides flexible cooperation ways to seek win-win cooperation among Taiho agents and users.

In the era of intelligent manufacturing, technology is developing rapidly. It is changing our ways of production, operation and management.

Zhuohai provides intelligent, efficient, high-quality and expandable industry solutions for industry customers, help them realize the best practice of intelligent manufacturing and information management and meet the requirements of the industry.



及时、周到

上门服务

24-hour on-site service
fast response and
considerate



整机一年

免费维护和保养

One-year warranty
free maintenance



7x24小时

用户咨询服务

7*24 hours free
consultation
service



建立用户档案

实行跟踪服务

Establish user files,
implement tracking
services