# CRANE(OVERHEADCRANE)ALARM

Product Selection Guide+ Internet of Things (IoT) Series Alarm Products

Official Website

Alibaba

*Using Technology To Benefit Humanity*
*Leading Life With Safety*


**Anshan Hongdun Safety Alarm Equipment Co., Ltd.**
**Suzhou Red Shield Intelligent Manufacturing Co.,Ltd.**

Address: No. 6 Guangxin Road, Lishan District, Anshan City, Liaoning Province
Website: www.hongdunalarm.com
Email: info@jsrst.com.cn
Postal Code: 114000



# CRANE(OVERHEADCRANE)ALARM

Product Selection Guide+ Internet of Things (IoT) Series Alarm Products





Anshan Hongdun Safety Alarm Equipment Co., Ltd.
Suzhou Red Shield Intelligent Manufacturing Co.,Ltd.

# ANSHAN HONGDUN SAFETY ALARM EQUIPMENT CO., LTD.




## COMPANY PROFILE

Anshan Hongdun Safety Alarm Equipment Co., Ltd. is a leading expert in a wide range of specialized fields including industrial safety alarms, industrial IoT intelligent safety systems, Artificial Intelligence (AI)-based machine vision systems, communication equipment, industrial safety automation, intelligent railway crossing alarm systems, and crane safety monitoring systems. In addition to offering cutting-edge products, the company provides comprehensive services, including the design, construction, and technical consulting for industrial safety intelligent control projects.




The research and production base of Anshan Hongdun Safety Alarm Equipment is located in the Liaoning Laser Industrial Park and covers a total area of 30,000 square meters. It is a national high-tech enterprise, a recommended brand in the alarm industry, a member of the China National Safety Production Association, the president unit of the Anshan Optoelectronics Association, a member of the Metallurgical Equipment Branch of the Chinese Society for Metals, a member of the Metallurgical Transportation Branch of the Chinese Society for Metals, and a member of the Bridge Crane Committee of the China Heavy Machinery Industry Association. The company has obtained ISO 9001 Quality Management System Certification, ISO 14001 Environmental Management System Certification, and OHSAS 18001 Occupational Health and Safety Management System Certification.. It is also recognized as a Guo Mingyi Love Enterprise Team and is a leader in the industrial intelligent safety alarm industry.



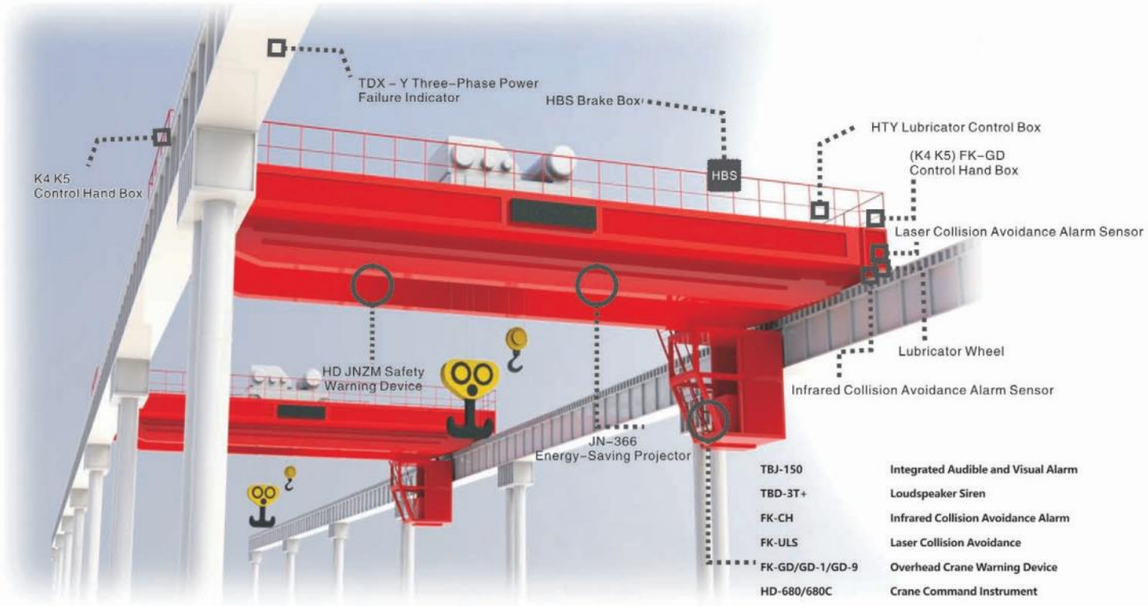

The company owns the Hongdun brand with 146 types of products. It has three modern production workshops and six automated production lines, with an annual production capacity of 500,000 units, making it the largest manufacturer in the Chinese industrial alarm industry. By collaborating with well-known domestic steel companies, including Baowu Group, Shougang Group, Ansteel Group, Hesteel Group, Shagang Group, and China Metallurgical Group Corporation (MCC), the company has become a leading enterprise in the industrial safety alarm industry in terms of longevity, technical strength, scale, customer base, and innovation capability.



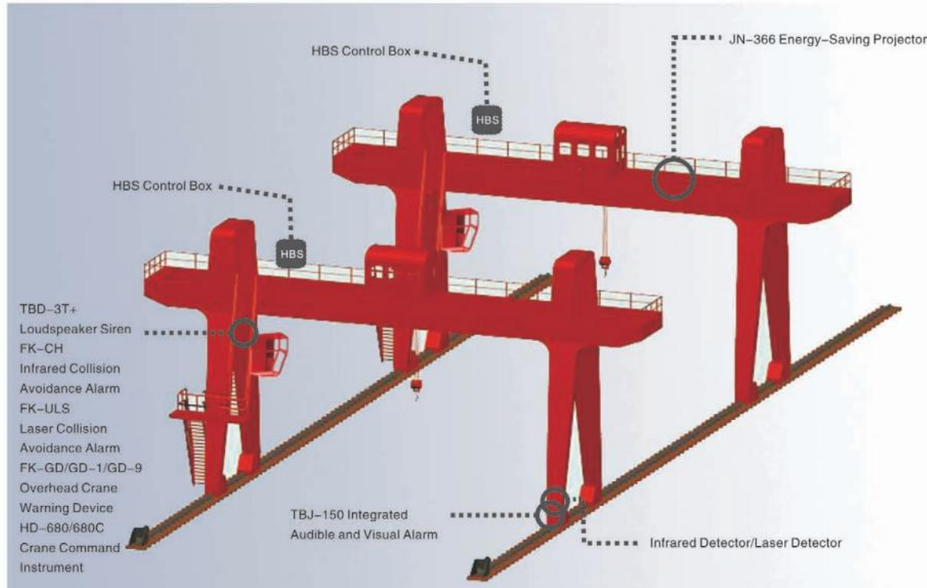
Globally recognized technological innovation. The company has a research team composed of domestic industry technical experts, industry-leading professional aging rooms and laboratories, and shares resources with several national testing institutions in Beijing, Liaoning, and other areas. It also has a long-term university-enterprise cooperation with the National Engineering Research Center for Laser Processing at Huazhong University of Science and Technology. The company currently holds 2 invention patents, 40 utility model patents, 7 design patents, and 9 software copyrights. Adhering to the philosophy of 'technological innovation,' the company leads in research and design, continuously launching industry-leading innovations.



# Overview Of Crane Safety Devices




① AI-Integrated Ladle Workstation with Wireless Monitoring System ② AI-Integrated Ladle Visualization and Thermal Imaging Online Safety Monitoring System ③ Wireless Motor Insulation Detection Device ④ Intelligent Online System for Wireless Vibration and Temperature Measurement ⑤AI Regional Protection and Alarm System




Executive Standard: GB/T28264–2017 Crane Safety Monitoring and Management System
GB6067.5–2014 Safety Regulations for Lifting Machinery
GB12602–2009 Overload Protection Device for Lifting Machinery
GB–T5972–2016 Maintenance, Inspection, and Scrapping of Crane Wire Ropes
GB–T24818.5–2009 Crane Channels and Safety Protection Measures

Note: The following steel mills are some (main) customers of our company

## Serving Customers

1、North China region

Tianjin City

Tianjin Steel Pipe Manufacturing Co., Ltd
Tianjin Xintian Steel Group Co., Ltd
Tianjin Tianfeng Steel Co., Ltd
Tianjin Dongfang Jiangtian Steel Sales Co., Ltd
Tianjin Tiantie Metallurgical Group Co., Ltd

Hebei Province

Hebei Iron and Steel Group Tangshan Iron and Steel Company
Hegang Group Hangang Company
Hebei Iron and Steel Group Chenggang Company
Hegang Group Xuangang Company
Hebei Iron and Steel Group Shigang Company
Hegang Group Leting Steel Co., Ltd
Shougang Corporation Qian'an Iron and Steel Company
Shougang Jingtang Steel United Co., Ltd
Xinxing Cast Pipe Co., Ltd
Xingtai Rolling Machinery Co., Ltd
Xingtai Iron and Steel Co., Ltd
Xingtai Delong Steel Industry Co., Ltd
Tangshan Delong Steel Co., Ltd
Tangshan Jianlong Special Steel Co., Ltd
Chengde Jianlong Special Steel Co., Ltd
Tangshan Ganglu Iron and Steel Co., Ltd
Hebei Jingye Group Co., Ltd
Hebei Zongheng Group Fengnan Iron and Steel Co., Ltd
Cangzhou China Railway Equipment Manufacturing Co., Ltd
Hebei Xinjin Steel Co., Ltd
Hebei Xinghua Steel Co., Ltd
Hebei Wenfeng Steel Co., Ltd
Jinding Heavy Industry Co., Ltd
Wu'an Yuhua Steel Co., Ltd
Wu'an Mingfang Steel Co., Ltd
Qian'an Yiliancheng Steel Co., Ltd
Qian'an Jiujiang Wire Co., Ltd
Tangshan Jing'an Iron and Steel Co., Ltd
Tangshan Shengfeng Steel Co., Ltd
Tangshan Guoyi Special Steel Co., Ltd
Hebei Qianjin Iron and Steel Group Co., Ltd
Tangshan Ruifeng Steel (Group) Co., Ltd
Tangshan Yanshan Iron and Steel Co., Ltd
Qinhuangdao Shouqin Metal Materials Co., Ltd
Qinhuangdao Hongxing Steel Co., Ltd
Qinhuangdao Anfeng Steel Co., Ltd
Tangshan Donghai Iron and Steel Group Co., Ltd

Shanxi Province

Taiyuan Iron and Steel (Group) Co., Ltd
Shougang Changzhi Iron and Steel Co., Ltd
Shanxi Jianlong Steel Co., Ltd
Shanxi Changping Iron and Steel Co., Ltd
Shanxi Xintai Steel Co., Ltd
Shanxi Meijin Steel Co., Ltd
Taiyuan Iron and Steel Group Linfen Iron and Steel Co., Ltd
Shanxi Liheng Steel Co., Ltd

Inner Mongolia Autonomous Region

Baotou Iron and Steel (Group) Co., Ltd
Baosteel Wuhai Wanteng Steel Co., Ltd
Baotou Da'an Iron and Steel Co., Ltd
Baotou Yaxin Longshun Special Steel Co., Ltd
Ulanhot Steel Co., Ltd

2、Northeast region

Liaoning Province

Ansteel Group Co., Ltd
Bengang Group Co., Ltd
Benxi Beiying Iron and Steel Group Co., Ltd
Fushun Special Steel Co., Ltd
Dalian Special Steel Co., Ltd
lingyuan iron and steel group co ltd
Fushun New Steel Co., Ltd
Minmetals Yingkou Medium Plate Co., Ltd
Jinzhou CITIC Ferroalloy Co., Ltd

Jilin Province

Jilin Jianlong Steel Co., Ltd
Jilin Henglian Precision Casting Technology Co., Ltd
Shougang Tonghua Iron and Steel Group Co., Ltd

Heilongjiang Province

Heilongjiang Jianlong Steel Co., Ltd
Jianlong Xilin Steel Co., Ltd
Jianlong Acheng Steel Co., Ltd
Jianlong Beiman Special Steel Co., Ltd

3、Central South Region

Henan Province

Anyang Iron and Steel Group Co., Ltd
Henan Jiyuan Iron and Steel (Group) Co., Ltd
Anyang Iron and Steel Group Xinyang Iron and Steel Co., Ltd
Henan Yaxin Steel Group Co., Ltd
Hebei Iron and Steel Group Wugang Company

Hubei province

China Baowu Wugang Group Co., Ltd
Baowu Group Yicheng Steel Co., Ltd
Hubei Jinshanglan Metallurgical Technology Co., Ltd
Hubei Xinye Steel Co., Ltd

Guizhou Province

Shougang Shuicheng Steel (Group) Co., Ltd
Shougang Guiyang Special Steel Co., Ltd

Hunan Province

Hunan Iron and Steel Group Co., Ltd
Xiangtan Iron and Steel Group Co., Ltd
Lianyuan Iron and Steel Group Co., Ltd
Hunan Hengyang Steel Pipe (Group) Co., Ltd

Guangdong Province

Baowu Group Guangdong Shaoguan Iron and Steel Co., Ltd
Baowu Group Zhanjiang Steel Co., Ltd
Yangchunxin Steel Co., Ltd
Guangdong Jinshanglan Metallurgical Technology Co., Ltd

Guangxi Autonomous Region

Guangxi Liuzhou Iron and Steel (Group) Co., Ltd
Guangxi Shenglong Metallurgical Co., Ltd

4、East China region

Shanghai City

China Baowu Group

Jiangsu Province

Nanjing Iron and Steel Group Co., Ltd
Jiangsu Shagang Group Co., Ltd
Jiangsu Yonggang Group Co., Ltd
Suzhou Suxin Special Steel Co., Ltd
Jiangyin Huaxi Iron and Steel Co., Ltd
Jiangsu Shente Steel Co., Ltd
Lianyungang Yaxin Steel Co., Ltd
Jiangsu Delong Nickel Industry Co., Ltd
Jiangsu Shenyuan Special Steel Co., Ltd
Jiangyin Xingcheng Special Steel Co., Ltd
Jiangsu Huaigang Special Steel Co., Ltd
Zhongtian Iron and Steel Group Co., Ltd
Jiangsu Xicheng Sanlian Holdings Group Co., Ltd
Jiangsu Binxin Iron and Steel Group Co., Ltd
Wuxi Xinsanzhou Special Steel Co., Ltd
Lianyungang Xingxin Steel Co., Ltd
Jiangsu Qinyou Special Steel Co., Ltd

Zhejiang Province

Hangzhou Iron and Steel Group Co., Ltd
Quzhou Yuanli Metal Products Co., Ltd
Ningbo Iron and Steel Co., Ltd
Zhenshi Group Dongfang Special Steel Co., Ltd
Zhejiang Qingshan Iron and Steel Co., Ltd

Anhui Province

Baowu Group Masteel Co., Ltd
Anhui Guihang Special Steel Co., Ltd

Jiangxi Province

Xinyu Iron and Steel Group Co., Ltd
Jiangxi Pinggang Industrial Co., Ltd
Fangda Special Steel Technology Co., Ltd

Fujian Province

Fujian Sansteel (Group) Co., Ltd
Sanbao Group Co., Ltd
Fuzhou Fuxin Special Steel Co., Ltd

Shandong Province

Shandong Iron and Steel Group Rizhao Co., Ltd
Jinan Group Co., Ltd
Laiwu Steel Group
Qingdao Iron and Steel Holding Group Co., Ltd
Shandong Shiheng Special Steel Group Co., Ltd
Rizhao Steel Holdings Group Co., Ltd
Mount Taishan Iron and Steel Group Co., Ltd
Weifang Special Steel Group Co., Ltd
Shandong Fulun Steel Co., Ltd
Shandong Laigang Yongfeng Steel Co., Ltd
Shandong Iron and Steel Group Yongfeng Zibo Co., Ltd
Shandong Chuanyang Group Co., Ltd
Xiwang Metal Technology Co., Ltd
Shandong Shouguang Juneng Special Steel Co., Ltd
Shandong Luli Steel Co., Ltd

5、Southwest region

Chongqing City

Chongqing Iron and Steel (Group) Co., Ltd

Sichuan Province

Pangang Group Panzhihua Steel Vanadium Co., Ltd
Pangang Group Xichang Steel Vanadium Co., Ltd
Pangang Group Jiangyou Changcheng Special Steel Co., Ltd
Sichuan Southwest Stainless Steel Co., Ltd
Sichuan Desheng Steel Co., Ltd

Yunnan Province

Kunming Iron and Steel Group Co., Ltd

6、Northwest region

Shaanxi Province

Shaanxi Longmen Iron and Steel Group Co., Ltd
Shaanxi Hanzhong Iron and Steel Group Co., Ltd
Shaanxi Lueyang Iron and Steel Co., Ltd

Gansu Province

Jiuquan Iron and Steel (Group) Co., Ltd
Jiuquan Iron and Steel (Group) Yuzhong Iron and Steel Company

Qinghai Province

Xining Special Steel Group Co., Ltd

Ningxia Autonomous Region

Ningxia Iron and Steel Group Co., Ltd

Xinjiang Autonomous Region

Baowu Group Xinjiang Bayi Iron and Steel Co., Ltd
Xinjiang Ili Iron and Steel Co., Ltd
Xinjiang Kunyu Iron and Steel Co., Ltd







# CONTENTS


P1 Company Profile
P2 Overview Of Crane Safety Devices
P3 Serving Clientele
P4 Contents
P5-8 ZD-GDR Series Artificial Intelligence(AI)-Integrated Ladle Workstation Wireless
P9-12 (AI)-Integrated Ladle Visualization Thermal Imaging Online Safety Monitoring System
P13-16 (AI) Regional Protection And Alarm System
P17-20 ZD Series Crane Safety Monitoring And Management System
P21-24 HD-IR Series Overhead Crane Motor Wireless Insulation Detection Device
P25-28 Intelligent Wireless Vibration Temperature Measurement Online Monitoring System
P29-30 FK-ULS30 Overhead Laser Collision Avoidance Alarm
P31-32 FK-CH Overhead Laser Collision Avoidance Alarm(Infrared Model)
P33-34 TBJ Series Integrated Audible And Visual Alarm
P35-36 TBD-3T+ Overhead Crane Loudspeaker
TBD-3D Wall-Mounted Overhead Crane Loudspeaker
P37 FK-GD/FK-GT100 Series Overhead Crane Warning Device
P38 FK-GLS Laser Collision Warning Device
P39 ZD-GZ1-SP4 Visual Intercom Device
P40 HTY-180/4L Rail Lubricator For Cranes
P41-42 HD-680/HD-680C Overhead Crane Dispatch Indicator
P43 TDX Series Three-Phase Power Failure Indicator
P44 TDX Series Phase Failure Signal Light
P45-46 Air Curtain Machine Series Products
P47-48 HD-JNZM-300/500 Safety Warning Projector
P49-50 JN-366/JN-366-50 Energy-Saving Projector
P51 JN-366H Series LED Energy-Saving Projectors
P52 HBS Overhead Crane Electronic Braking System
P53 HD-BATEQD Series Electromagnetic Crane Battery Power Detection Device
P54 HD-LX-01 Lifting Height Limiter(Laser Type)
P55 HD-Q21 Type Hoist Weight Limiter
P56 HTY-LST Series Hoist Steel Wire Rope Laser Cleaning And Oiling Machine
P57-58 HD-CAIU Unmanned Overhead Crane And Intelligent Dispatch System
P59-62 HD-CIMS Hoist Intelligent Maintenance Management System
P63-64 Intelligent Voice Monitoring And Alarm Device
P65-68 Forklift Visual Collision Avoidance System
P69-72 HD-AITT Belt Conveyor Artificial Intelligence (AI) Safety Inspection System

# ZD-GDR Series Artificial Intelligence (AI) -Integrated Ladle Workstation Wireless Monitoring System

National Patent Product Patent Number: ZL20222104509.4 Software Copyright Registration Number: 2022SR1231546

## PROJECT BACKGROUND

In the modern metallurgical industry, the operation of bridge cranes at workstations is becoming increasingly precise, requiring drivers to observe the status of workstations in a timely and accurate manner. However, due to the poor position of the cab and limited on-site visibility, serious accidents can occur if the hook is not fully seated. These accidents can lead to production delays or even casualties. There is an urgent need to solve such problems through a wireless workstation video system.

Our company's self-developed ZD-GDR series AI-Integrated Ladle Workstation Wireless Monitoring System utilizes advanced vehicle positioning system, video acquisition technology, wireless transmission technology, etc. to transmit workstation videos to the corresponding crane cab to assist the driver's field of view, avoiding blind spots in the driver's cab. In the future, the function can be expanded by adding artificial intelligence analysis and judgment of the hook in ear status, and outputting judgment results for monitoring.

## DESIGN PRINCIPLES

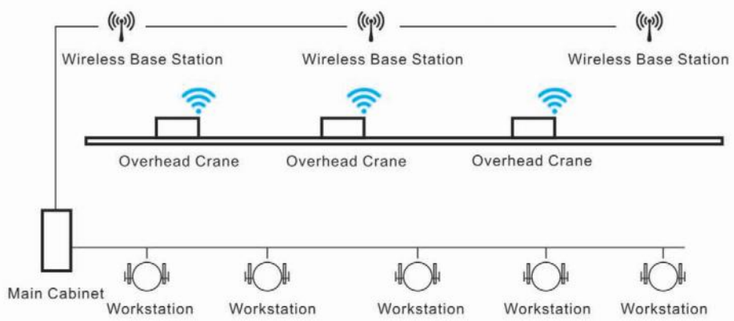
The ZD-GDR series AI-Integrated Ladle Workstation Wireless Monitoring System can effectively assist workers understand the coordination between double hooks and lifting ears. It monitors the posture during ladle lifting and ensures the safety of balance beam lifting ears in metallurgical steel packaging. It avoids serious safety accidents caused by ladle detachment due to inadequate hook installation, effectively improves work efficiency, increases safety, and reduces error rates.

The renovation plan can be executed according to site requirements. At the same time, **when the overhead crane is operating at the workstation, it can monitor the corresponding hook entering the lifting ear in real-time. The system is equipped with AI intelligent terminals that can analyze the hook positioning results.**

## SYSTEM INTRODUCTION

### 1. System Process

The overhead crane enters workstation A in the area and transmits real-time video signals to the driver's cab through a wireless base station. The intelligent display device immediately displays the video of workstation A; Enter location B and transmit real-time video signals to the driver's cab through a wireless base station. The intelligent display device immediately displays the video of location B;




### 2. Overhead Crane Positioning System

Install electronic tags at the workstation in the traveling area of the overhead crane, and install RFID recognition equipment at the corresponding position of the overhead crane. When the overhead crane arrives at the electronic tag, it reads the identification to determine where the overhead crane arrives at the workstation. The positioning range of the electronic tag is 1 meter, and the range of 1 meter before and after reaching the tag is considered as entering the workstation. No encoder is used, the original car wheels are not modified, and it does not affect wheel replacement. There is no risk of derailment without the addition of auxiliary wheels.



ZD-GDR Series Artificial Intelligence (AI) -Integrated Ladle Workstation Wireless Monitoring System

### 3. Workstation Video Acquisition Subsystem

Two high-definition network cameras are installed on both sides of the workstation to record the working video of the ladle ear axis from a front angle. The camera is equipped with a dust-proof and shockproof cover. The cover has an air-cooled interface, and if the on-site temperature is high, the user can access the compressed air on site.

### 4. Wireless Transmission Subsystem

The video captured by the camera is first transmitted to the ground wireless base station through optical fiber. The onboard wireless base station then receives the video and transmits it to the driver's cab display.

### 5. AI Analysis Module

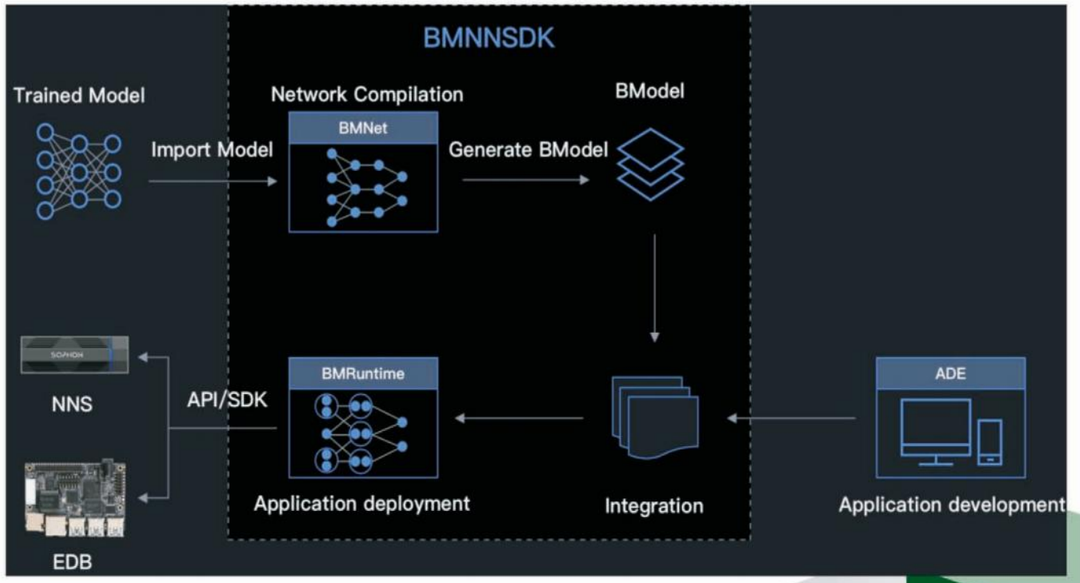
Install AI analysis terminals at ground workstations. Analyze the workstation video through AI analysis terminals to obtain the real-time status of the hook in place. Advanced AI technology is used to complete video analysis, edge computing TPU supports RISC-V ecology, supports DNN neural network model analysis, and compilation and adjustment for real-time reasoning in edge equipment, rapidly deploys existing mainstream models or trained neural network models, intelligently judges the positioning of the hook head and ladle ear (proximity, positioning, and disengagement), and acts as an auxiliary prompt to the driver. Triple confirmation is achieved by the driver and ground command personnel.

### The Learning Principles of AI Intelligent Analysis Terminals

**Machine Vision Sampling**

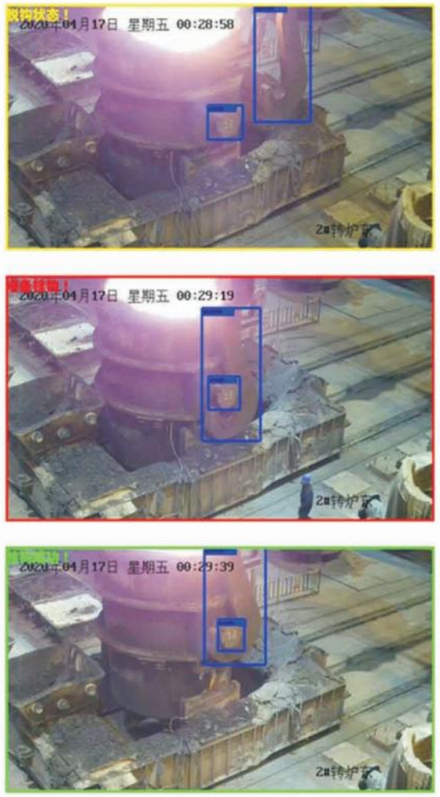
**Neural Network Learning and Analysis:** Through deep learning of neural networks, various feature codes can be detected and used to recognize states. This process allows the system to identify and interpret different features accurately.

**Edge Computing:** AI terminals, composed of AI chips, can independently perform analysis and identification without the need for server computing. These terminals can operate autonomously when power is off, unaffected by the central system, and provide millisecond-level response speeds.



# ZD-GDR Series Artificial Intelligence (AI) -Integrated Ladle Workstation Wireless Monitoring System

### 7. Demonstration of AI Analysis Results




- **AI Performance:** 21 TOPS(INT8)
- **GPU Type:** 384-core NVIDIA Volta GPU with 48 Tensor Cores
- **Maximum GPU Frequency:** 1100 MHZ
- **CPU:** 6-core NVIDIA Carmel ARMv8.2 64-bit
- **CPU Video Encoding:** 2x 4K60 | 4x 4K30 | 10x 1080p60 | 22x 1080p30(H.265)
- **Deep Learning Accelerators:** 2x NVDLA Engines
- **Vision Accelerator:** 7-Way VLIW Vision Processor

### 8. Onboard Display Module

Install a display in the cab of the overhead crane, divided into two screens to show videos of the left and right ladle ear axes at the corresponding workstations. Using AI video terminals, the system can display the analysis results of hook positioning.



ZD-GDR Series Artificial Intelligence (AI) -Integrated Ladle Workstation Wireless Monitoring System

INSTALLATION USE CASE



# (AI)-Integrated Ladle Visualization
# Thermal Imaging Online Safety Monitoring System

## PROJECT BACKGROUND

Metallurgical plant ladles, also known as molten steel ladles or large ladles, are equipment used to hold and pour molten steel and are key containers for refining molten steel outside the furnace. The outer shell of the ladle is typically welded from boiler steel plates, with thicknesses of the ladle wall and bottom steel plates ranging from 14-30mm and 24-40mm, respectively. The inner lining of a ladle generally consists of an insulation layer, a permanent layer, and a working layer. The insulation layer is tightly attached to the outer steel plate, with a thickness of about 10-15mm, mainly to reduce heat loss. The permanent layer is about 30-60mm thick and is used to prevent ladle burn-through. The working layer, which is in direct contact with the molten steel and slag, is prone to chemical erosion, mechanical wear, and damage from rapid temperature changes.

As a critical container for steelmaking, the stable operation of the ladle directly affects the efficiency of continuous operations and the safety of on-site workers.

According to incomplete statistics, each steel leakage incident results in direct losses exceeding 2 million yuan. If the ladle penetrates and leaks on the continuous casting platform, the loss can reach tens of millions of yuan. Therefore, our company has developed an online visual monitoring system for ladle thermal imaging, which monitors the temperature of the outer wall of the ladle and provides feedback on the wear of refractory materials in the inner lining. This enables timely warnings in case of temperature abnormalities, ensuring safe steelmaking production.

## CURRENT SITUATION AND ISSUES

Chemical erosion, mechanical vibration, and rapid cooling and heating can cause cracks, bulging, and detachment in the lining of the steelmaking intermediate ladle.Practice has shown that early defects in the inner lining of the ladle will gradually expand from points to the entire surface, eventually leading to complete failure.

## SOLUTION

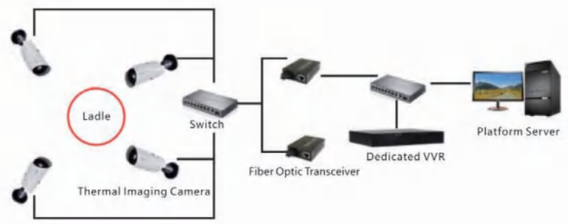
A steel ladle safety intelligent remote online automatic monitoring system is developed using intelligent data visualization and online thermal imaging technology. The system employs an intelligent infrared thermal imaging terminal, which creates clear thermal images of the steel ladle via infrared radiation detection. Through automated intelligent analysis, the system identifies abnormal temperature conditions in the ladle's internal refractory materials, enabling timely safety interventions.

This system solves challenges associated with high-temperature measurement and limited access in steelmaking processes by providing non-contact and automatic video temperature measurement. It offers high-resolution thermal imaging, unaffected by environmental factors, and accurately reflects temperature variations. The system efficiently detects cracks, detachment, and other defects in the refractory material, identifying the size, location, and severity of issues within the ladle.

Key benefits include 24-hour real-time monitoring, non-stop operation, timely alarms, and detailed reports, all contributing to improved operational reliability, time savings, and enhanced safety.

## CONSTITUTE

The ladle thermal imaging visual online monitoring system consists of four online terminals installed at 90-degree angles, providing comprehensive monitoring of the intermediate ladle. This system includes hardware components(infrared thermal imaging cameras, NVR, switch, etc.), transmission systems, and software systems. Each system is equipped with an independent server host and alarm, and can be deployed across regions via the internet(cloud).






# (AI)-Integrated Ladle Visualization
# Thermal Imaging Online Safety Monitoring System



### 1. Hardware system

Includes online infrared thermal imaging cameras, professional NVRs, protective compartments, network switches, displays, server hosts, power modules, signal transmission modules, auxiliary materials, and more.

### 2. Transmission System

After collecting the real-time temperature data of the outer part of the intermediate ladle, it is transmitted to the control room's NVR/computer host via optical fiber and network for real-time feedback. The system continuously records running video images and temperature data. When the real-time temperature of any area of the intermediate ladle exceeds the preset temperature, the system will automatically trigger an alarm, capture and store the alarm images, and track the location of the highest temperature. Relevant personnel can then detect abnormalities and potential defects in the first instance and arrange appropriate measures.

### 3. Storage System

The most important aspect of the video image acquisition system is the storage of video data. Based on the characteristics of the steel plant, a specialized intelligent NVR storage method is used for current terminal monitoring and storage. This storage solution supports RAID 5, RAID 6, and RAID 10 technologies to ensure data reliability and redundancy. Furthermore, since the storage is conducted through an IP-based approach, storage equipment can be distributed and managed centrally. Intelligent NVRs are separately deployed in the steel plant to monitor and control the thermal imaging of different areas. The video storage period can reach up to 30 days (the storage hard disk capacity can support up to 90 days).
The specific storage points of this solution are as follows:

Utilizing RAID 5, RAID 6, and RAID 10 technologies to achieve safe data storage management.
According to the actual needs of the steel plant, the monitoring adopts a code stream of 1Mbps for storage, meeting the 7x24 hours storage requirement, and ensuring the storage capacity has a backup capability of more than 90 days.
Storage Capacity Calculation:
Storage Capacity(MB) = Monitoring Points x Number of Recording Days × 24 × 60 × 60 × Bit rate(Mbps)/8
Example:1 channel at 1Mbps code stream stored for 1 day:1Mbps x 3600 seconds x 24 hours / 8 bits / 1024 = 12.515 GB

### 4. Platform Software System

The platform is a comprehensive management platform tailored for the metallurgical industry, specifically for online monitoring of steel ladles and intermediate ladles. It offers intelligent data visualization and a specialized application. The platform supports centralized management, distributed deployment, and multi-user remote access. It includes functions for temperature curve retrieval, temperature record inquiry, alarm pop-ups, voice prompts, and temperature alarm capture. It also supports alarm linkage recording, data reports, GIS maps, mobile app functionality, and can be customized according to user project requirements to meet diverse ladle monitoring needs.

The "Safety Production Monitoring and Control System" developed specifically for online monitoring of steel ladles and intermediate ladles features highly efficient intelligent AI algorithms. It does not require stopping production to capture images. During normal operation, the system automatically calculates temperature, with a maximum temperature measurement of up to 900°C. The system's intelligent analysis algorithms provide real-time temperature monitoring. If the temperature exceeds the preset parameters for normal intermediate ladle wall temperatures, the system will automatically trigger an alarm, capture alarm images, and link to alarm recordings. The system offers a simple and clear graphical user interface, enabling operators to easily and accurately adjust the alarm parameter temperatures.

## PLATFORM FEATURES

### Platform Technical Features

One-Click Installation: Installation requires no configuration and supports one-click rapid deployment, automatically launching all service components.
Zero Configuration: Default configurations include user permissions, server information, organizational structure, and policy strategies.
Customization Services: Meet the detailed functional customization needs of clients in the metallurgical industry.

# (AI)-Integrated Ladle Visualization
# Thermal Imaging Online Safety Monitoring System

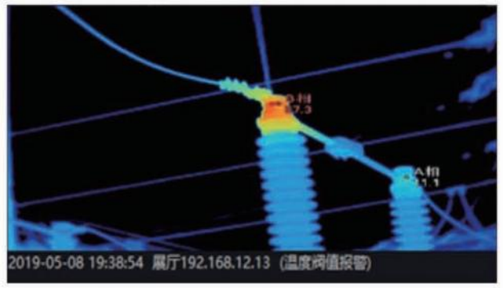
- **Modular Design**

Visual function modules, quick access to submenus



- **Multiple Alarm Notification Methods**

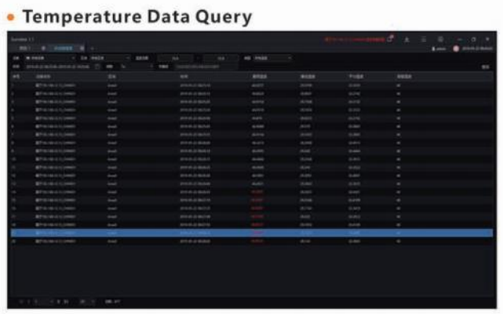
Alarm pop-ups, voice prompts, touch window maximization, and various other alarm notification methods




- **Multi-Level Electronic Map Management**

Supports multi-level electronic maps, with alarms linked to real-time video playback of specific locations on the map

- **Temporal Data Query**



- **Alarm Capture**

Automatically captures and stores images when an alarm signal is received, enhancing the image quantity and quality for better analysis.



- **Real-Time Temperature Curve**



- **Alarm Linkage Video Recording**

Records video linked to alarm signals. The intelligent NVR can record alarm videos, and the NVR can also store 24-hour historical data

- **One-Click Temperature Alarm Adjustment**

Allows for easy adjustment of alarm parameters and recordings with a single click.



# (AI)-Integrated Ladle Visualization
# Thermal Imaging Online Safety Monitoring System

## SYSTEM CHARACTERISTICS

**Accurate and Efficient Intelligent Algorithms Monitoring:** Using nearly 20 years of industry big data combined with neural networks, it achieves temperature measurement up to 900°C. The precise measurement calibration algorithm allows for a temperature accuracy of ±0.2°C. Intelligent monitoring and algorithmic analysis can identify and alarm abnormal temperature conditions in real-time. The high-precision AI model ensures the actual temperature deviation is within 30°C.

**Temperature Tracking:** Automatically adjusts the thermal image to specify areas for trend analysis, thereby identifying potential fault regions. Equipped with various temperature alarm functions, it enables more precise fault location tracking.

**24/7 Full-Time Monitoring:** Provides uninterrupted 365*24-hour monitoring. The platform can display real-time thermal images of the entire ladle, allowing users to analyze temperature anomalies and potential defects in the ladle.

**Real-Time Display:** The system can display the temperature and thermal images of the entire ladle in real-time, allowing operators to check the temperature at any location for recording, capturing, and analysis of anomalies. Comprehensive video streaming meets industrial real-time data acquisition requirements.

**Data Capture:** The system can capture and store thermal images and temperature data at predetermined intervals, facilitating later comprehensive analysis of the ladle's operation status.

**High Sensitivity Alarm and Notification:** When abnormal temperature conditions occur, the monitoring platform will detect and trigger an alarm. The NVR will automatically record images related to the alarm, and the platform can facilitate one-click transfer and retrieval of alarm recordings.

**Fault Diagnosis:** When equipment failure is detected, the system will promptly alert operators.

**Custom Alarm Thresholds and Levels:** The system allows setting different alarm thresholds and levels, helping operators accurately assess the urgency and severity of potential faults, thus enhancing response efficiency.

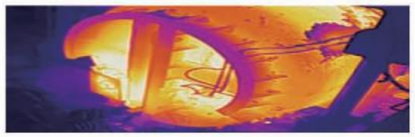
**Automatic Classification Storage:** Monitored data, abnormal data, and alarm information are automatically stored in the corresponding NVR or server database, ensuring quick and precise data retrieval.

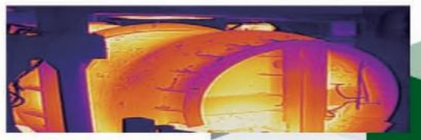
**Reporting Functions:** The system can generate various reports based on customer needs, allowing historical data to be exported as Word/Excel files.

## APPLICATION EFFECT

**The system's value is also reflected in the following aspects:**

1. **Prediction of Potential Steel Leaks:** The ladle monitoring system detects hot spots in the ladle before they become critical, allowing for timely preventive action before an emergency occurs.
2. **Temperature Monitoring of the Intermediate Ladle:** The system measures temperature distribution across the intermediate ladle, clearly displaying changes over time.
3. **Extended Service Life of Refractory Materials:** The system extends the service life of refractory materials by adapting to the current temperature conditions in the ladle. As long as the temperature remains within the preset range, the materials can be used safely and continuously, which significantly reducing labor and material costs and minimizing the number of ladles needed.
4. **Data Collection for Ladle Management:** The system provides reliable data on the ladle's condition, preventing safety hazards and extending the lifespan of refractory materials. This data also aids in tracing the production and usage of materials.
5. **Detection of Slag Channel Blockage:** The system detects and monitors slag channel blockages in the ladle, providing clear temperature readings of the slag and steel.





# (AI) Regional Protection And Alarm System

## SYSTEM OVERVIEW

In recent years, both the state and enterprises have increasingly emphasized safety production, integrating "prevention and control" and "prevention as the main focus" into the safety production guidelines for enterprises. A safe and civilized production environment is a basic requirement for enterprises.

In industries such as metallurgy, mining, petroleum, chemical, construction, steel plants, and ports, the working environments are relatively complex, and it is difficult to enter or manage restricted areas. There is a high risk of workers inadvertently entering hazardous areas. To address this issue, our company has independently developed an AI-based regional protection and alarm system to provide the first line of defense for industrial field safety. Using high-definition cameras as sensors and intelligent analysis terminals based on neural networks to analyze video footage, the system identifies and distributes boundary protection and alarm systems. Utilizing voice and light alarm equipment, the system warns workers to avoid restricted hazardous areas, preventing accidents and protecting worker safety, adhering to the basic principle of avoiding hazards and ensuring safety production.

## SYSTEM OBJECTIVES

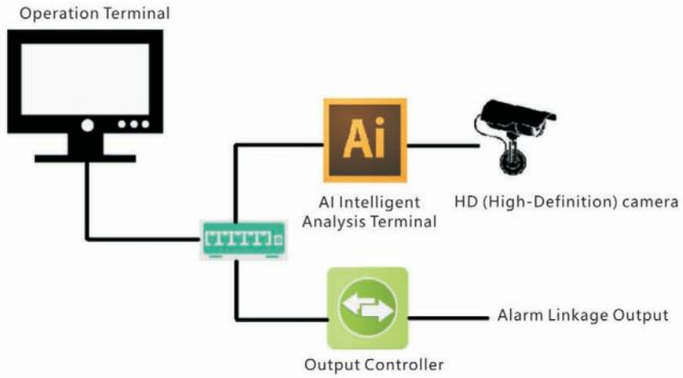
Guided by the comprehensive adoption of AI technology, the system achieves dynamic intelligent monitoring and real-time information control, enhancing safety capabilities and preventing potential hazards, progressively advancing into the Industry 4.0 era.

By leveraging video and AI technology, the system performs real-time video surveillance and intelligent identification, replacing manual patrols and physical barriers. Upon detecting violations, automatic alarms are triggered, enabling timely intervention to eliminate safety risks and ensure the safety of personnel in restricted areas, with the added capability of data analysis.

## SYSTEM COMPOSITION

### System Structure

The AI Regional Protection and Alarm System consists of video acquisition terminals, alarm systems, AI analysis terminals, network switches, and monitoring management terminals. The overall system architecture is as follows:




### System Composition

The AI Regional Protection and Alarm System's front-end equipment mainly includes video acquisition sensors, alarm devices, and AI intelligent analysis terminals.

**Dedicated Cameras:** HD video acquisition, configured according to on-site conditions, providing effective data transmission to AI intelligent analysis terminals through high-resolution encoding and broad video capture. Cameras use low-light technology to ensure video quality under various conditions.

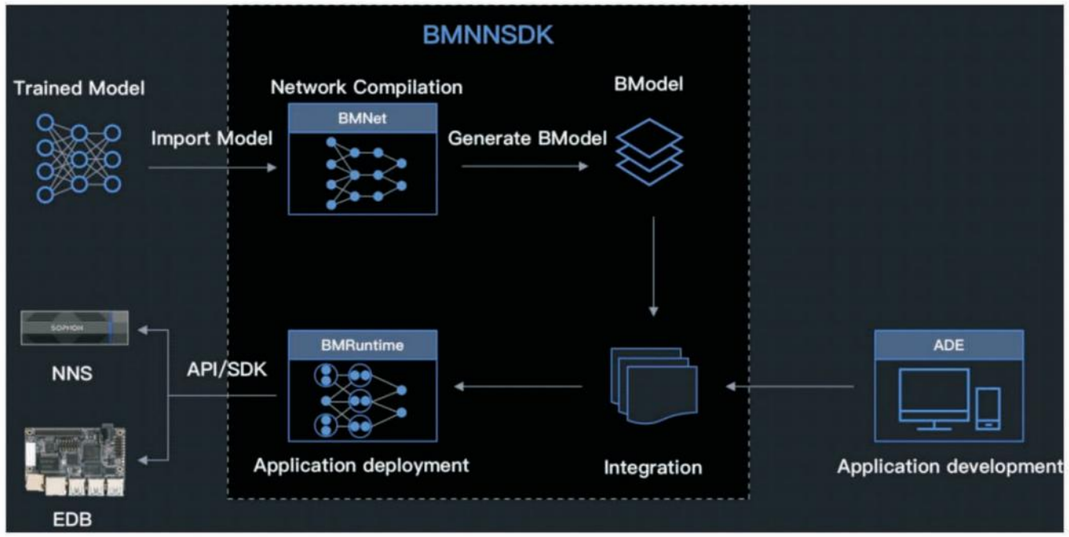
**Network Alarm Devices:** Integrated network audio-visual alarm devices(with voice alarms).



# (AI) Regional Protection And Alarm System

### ▶ AI Intelligent Analysis Terminal

The AI intelligent analysis terminal is the core equipment of this system. This system uses advanced AI technology to complete video analysis. Edge computing TPU supports RISC-V ecology and supports DNN/CNN/RNN/LSTM neural network models for analysis. Compilation and adjustment are performed in edge devices for real-time inference, rapidly deploying existing mainstream models or trained neural network models.




**Learning Principles of AI Intelligent Analysis Terminals**

- Machine Vision Sampling.
- Neural Network Learning and Analysis: Through deep learning of neural networks, various feature codes can be detected and used to recognize different human states, determining whether access to restricted areas is allowed.
- Edge Computing: AI intelligent terminals composed of AI chips can independently perform complete analysis and recognition without the need for server computation.

### ▶ Transmission Network

The AI intelligent analysis terminal transmits data information signals to the backend terminals via network switches, commonly using transmission networks including wired networks, wireless base station network transmission(WiFi, 3G/4G/5G, cloud), and the Internet.

### ▶ Data Monitoring and Management Terminal

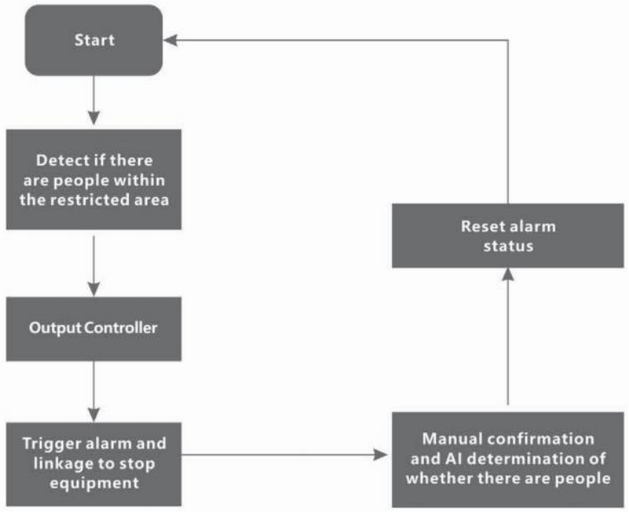
The data monitoring and management terminal's alarm system function module can realize sub-area alarm processing, alarm device configuration management, alarm information query management, and real-time monitoring functions. Through the signal output from the AI analysis terminal, it can achieve intelligent linkage control and equipment shutdown functions.

# (AI) Regional Protection And Alarm System

SYSTEM DESIGN

### ▶Operational Principle

AI intelligent analysis terminal is the core equipment of this system. The system uses advanced AI technology to complete video analysis, edge computing TPU to support RISC-V ecology, DNN/CNN/RNN/LSTM and other neural network models for analysis. Compilation and adjustment are performed in edge devices for real-time inference, rapidly deploying existing mainstream models or trained neural network models.




### ▶Front-End Custom Deployment Points

The deployment points for the front-end alarm equipment are distributed to directly impact the safety of the plant area. The AI Regional Protection and Alarm System plays a preventative role, preventing workers from entering restricted areas and preventing accidents. The system integrates alarming and monitoring, enabling field personnel and management to gain early awareness of abnormal situations, achieving the goal of safety prevention.

The deployment points are determined based on the actual site conditions, site size, and customer requirements for the restricted area. Implementing front-end equipment deployment points with a height to overall monitoring screen ratio of about 1:7 or more can achieve better monitoring results.

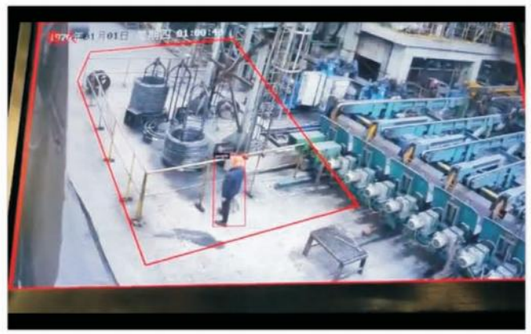
### ▶Functional Features

1. High-definition image capture, real-time playback, and historical replay.
2. Customizable suppression of historical alarms, no alarms for special images.
3. Linked signal output for easy integration with other devices.
4. Automatic detection, recognition, and alarming.
5. If someone enters a hazardous area, immediate audio-visual alarms are triggered, and a linked control signal is sent.
6. Lighter scene management with customizable monitoring zones.
7. High accuracy in monitoring on-site safety conditions.
8. AI-based automatic recognition with no human response required(or optional manual confirmation reset).

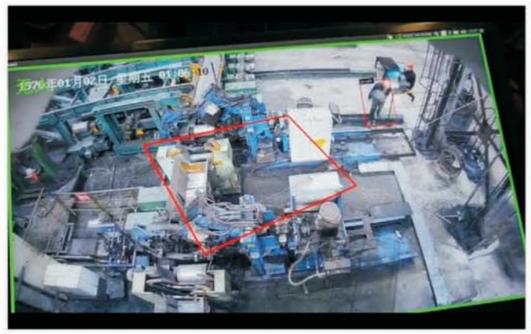


# (AI) Regional Protection And Alarm System

### ▶Installation Use Case









APPLICATION AREA



# ZD Series Crane Safety Monitoring And Management System

Compliant with GB/T 28264-2017 ("Safety Monitoring and Management Systems for Cranes") Inspection Requirements

Software Copyright: 2018SR546718

## SYSTEM INTRODUCTION

Our company independently developed the ZD Series Crane Safety Monitoring and Management System(abbreviated as "Black Box"), which complies with the "Crane Safety Technical Regulations" and the national standard GB/T 28264-2017("Safety Monitoring and Management Systems for Cranes") requirements. It is designed for cranes of various types and configurations(other cranes can be used as reference). The system mainly monitors crane-related parameters, conducts real-time status data collection, storage, and transmission. It facilitates crane maintenance personnel to understand the operating conditions of the equipment and carry out over-limit protection analysis and alarm. It also displays key data for on-site personnel through its terminals and enables remote real-time monitoring and analysis by transmitting data to the control center via wireless communication. The data is stored in the cloud for convenient access. Every crane black box can be connected to the system for comprehensive monitoring, effectively preventing and reducing the occurrence of accidents and facilitating quality supervision by departments.

## BACKGROUND

To ensure the safe use of lifting machinery, prevent and reduce accidents, protect the safety of people's lives and property, and promote economic and social development, according to the "Special Equipment Safety Law of the People's Republic of China" and the "Special Equipment Safety Supervision Regulations," the lifting machinery safety technical regulations are formulated.

On May 23, 2023, this regulation was approved and issued by the State Administration for Market Regulation. This regulation is based on the existing "Lifting Machinery Safety Supervision Regulations"(State Administration of Quality Supervision, Inspection and Quarantine Order No. 92), "Lifting Machinery Safety Technical Supervision Regulations - Bridge Cranes" (TSG Q0002—2008), "Lifting Machinery Type Test Rules" (TSG Q7002—2019), "Supervisory Inspection Rules for Installation, Transformation, and Major Repair of Lifting Machinery" (TSG Q7016—2016, including Amendment No. 1), "Periodic Inspection Rules for Lifting Machinery"(TSG Q7015—2016), and other foundations, integrating and optimizing to form a comprehensive safety technical specification for lifting machinery.

This regulation clarifies the basic safety requirements of lifting machinery, supplements design requirements, optimizes manufacturing, modification, installation, repair, and usage management requirements, further optimizes the inspection procedures, items, contents, and requirements for type testing, supervisory inspection, and periodic inspection, as well as the meanings of commonly used terms, providing important basis and support for better guiding and regulating the safety work of lifting machinery.

The lifting machinery safety technical regulations will be implemented from January 1, 2024. Before the issuance of this regulation, metallurgical bridge cranes above 10 tons that have already been manufactured and are in use should install safety monitoring management systems according to the requirements of this regulation before periodic inspections.

## PRODUCT FEATURES

- **Compliance with Crane Safety Technical Regulations Requirements**
- Complies with the requirements of the national standard GB/T 28264-2017 "Crane Equipment Safety Monitoring and Management System".
- Widely applicable in various types of cranes such as bridge, gantry, gantry, tower, cable, mast, mobile, etc.
- The overall system is designed for industrial use, providing dustproof, waterproof, and shockproof features with a long service life.
- Comprehensive functionality, capable of monitoring key operational parameters such as load weight, lifting height, and operating time.
- Data can be wirelessly transmitted to remote monitoring platforms for centralized equipment management.
- Provides real-time monitoring, recording, storage, and effective prevention of accidents for normal operation, full load, and overload conditions.
- The safety status of the crane can be recorded and stored in real time, effectively preventing and mitigating accidents.
- The data acquisition uses ARM 32-bit processing chip microcomputers with fast data processing speed and a sampling period of <100ms.
- Data can be collected without using a PLC, ensuring no impact on the original crane safety and reducing modification time.
- The positioning of large and small vehicles can be achieved without encoders, ensuring no impact on wheel replacement and no risk of derailment without auxiliary wheels.
- Strong communication capabilities, compatible with weighing instruments, frequency converters, PLCs, and other data interface equipment.
- Diverse system management ensures operational reliability.
- Diversified system permission management ensures operational reliability

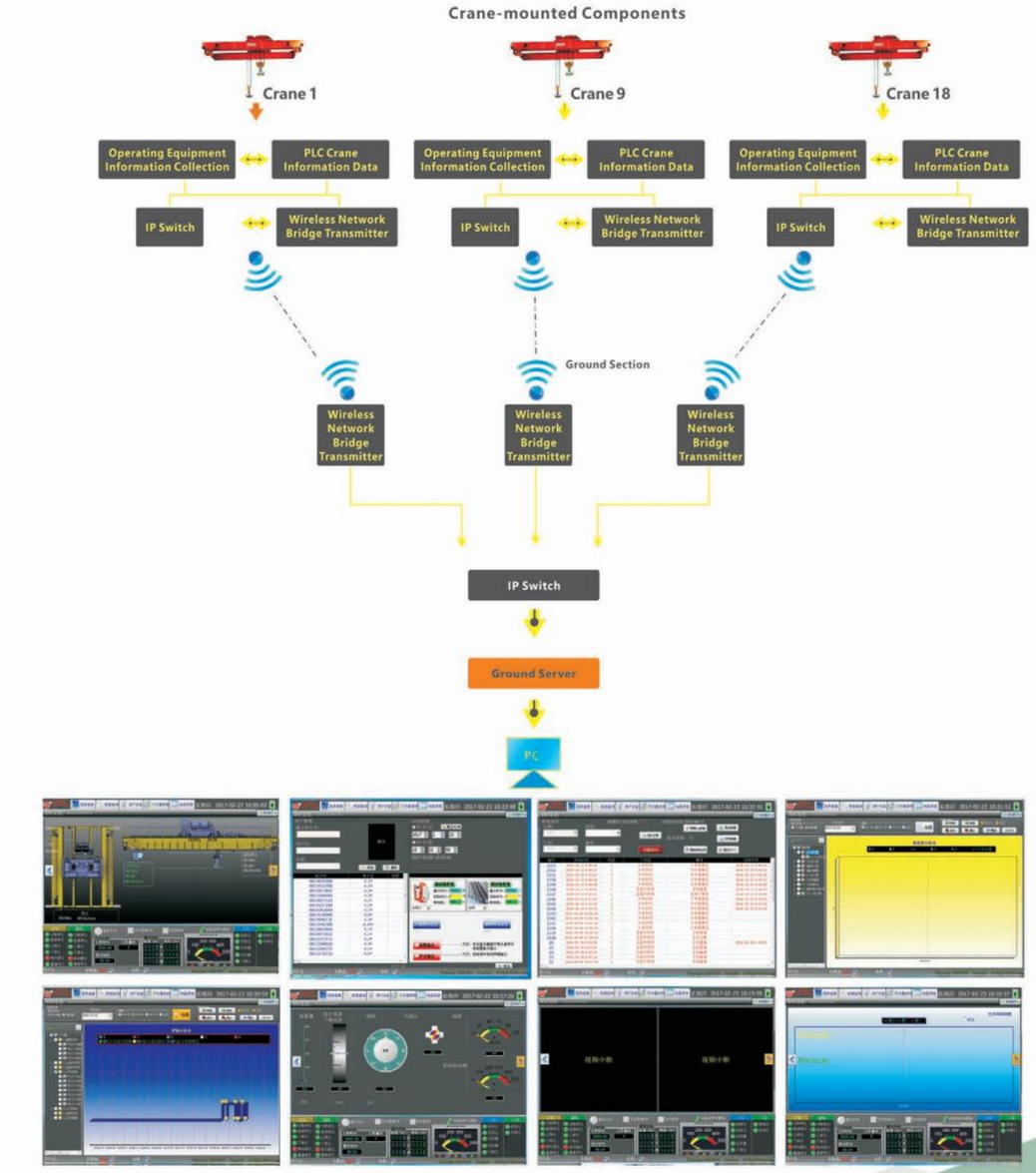


ZD Series Crane Safety Monitoring And Management System

Compliant with GB/T 28264-2017 ("Safety Monitoring and Management Systems for Cranes") Inspection Requirements

Software Copyright: 2018SR546718

## SYSTEM STRUCTURE DIAGRAM



# ZD Series Crane Safety Monitoring And Management System

Compliant with GB/T 28264-2017 ("Safety Monitoring and Management Systems for Cranes") Inspection Requirements

Software Copyright: 2018SR546718

## SYSTEM DESCRIPTION

### 1) Startup Interface and System Version Number

System Startup Interface: After the device is powered on, it starts automatically. The initial software interface is shown below. After the main interface starts, the device begins self-checking all equipment within the system to prevent errors caused by its own issues.



### 2) System Main Interface

After the device self-check is completed, the software enters the main interface operation. The main interface is divided into three parts: The upper left side displays the crane cabin view, showing the status of the small vehicle. The upper right side displays the crane side view, showing the crane motion and data such as main and auxiliary hook positions, lifting height, lowering speed, and real-time weighing data. The lower part of the interface displays various crane limits and the status of the current and voltage of the controllers.



### 3) Data Interface

The interface displays various monitoring data of the main lifting mechanism, auxiliary lifting mechanism, gantry mechanism, and main auxiliary trolley mechanism, including the three-phase current, voltage conditions, and motor temperature of each traveling motor, as well as the position and traveling speed of the trolley. It also shows parameters such as the lifting height of the main and auxiliary hooks, the lifting weight, and the lifting speed. The lower part of the interface displays critical information such as limit positions.













# ZD Series Crane Safety Monitoring And Management System

Compliant with GB/T 28264-2017 ("Safety Monitoring and Management Systems for Cranes") Inspection Requirements

Software Copyright: 2018SR546718

### 4) Query Interface

The system supports multiple query methods, including time period queries, equipment type queries, and event status queries. The query results can be exported in Excel format and automatically exported from a USB drive.



### 5) Settings Interface

This interface allows for setting user information and permissions, system time settings, time calibration, and equipment lifespan settings. It also includes alarm output settings. The system uses real-name verification for inspectors, incorporating a login photo reminder to prevent unauthorized operation by non-technical personnel.



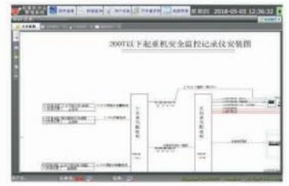
### 6) Data Analysis

The system can analyze collected switch volume and simulated volume data through graphical displays to help analyze the operational status of restart mechanisms. It aids in analyzing accident causes and other factors.



### 7) Overhead Crane Safety Monitoring System Circuit Diagram Display

The system includes a function to display the circuit diagrams of the full vehicle safety monitoring system, facilitating maintenance personnel in viewing and maintaining the diagrams.



### 1. Information Collection Source

| Number | Information Collection Source | | Bridge Crane |
|---|---|---|---|
| 1 | Load Lifting Limiter | | Should be collected |
| 2 | Lifting Height Limiter/ Lowering Depth Limiter | | Should be collected |
| 3 | Travel Range Limiter | | Should be collected |
| 4 | Interlock Safety Device | Door Limit | Should be collected |
| | | Operational Interlock Between Institution | Should be collected |
| 5 | Collision Avoidance Devices for The Same or Different Track Machines | | Should be collected |
| 6 | Overspeed Protection Device | | Should be collected |
| 7 | Lifting Mechanism Brake | | Should be collected |

### 2. Monitoring Parameters

| Number | Monitoring Items | Bridge Crane |
|---|---|---|
| 1 | Lifting Capacity | √ |
| 2 | Lifting Height/Descent Depth | √ |
| 3 | Travel Range | √ |
| 4 | Interlock Safety Device | √ |
| 5 | Safety Distance between Same or Different Track Machines | √ |
| 6 | Operation Commands | √ |
| 7 | Working Hours | √ |
| 8 | Cumulative Working Hours | √ |
| 9 | Each Working Cycle | √ |

### 3. Monitoring Status

| Number | Monitoring Projects | | Bridge Crane |
|---|---|---|---|
| 1 | Brake Status of Lifting Mechanism | | √ |
| 2 | Interlock Safety Device | Door Limit | √ |
| | | Operational Interlock Between Institution | √ |
| 3 | Video system | | √ |

# HD-IR Series Overhead Crane Motor Wireless Insulation Detection Device

## OVERVIEW

The HD-IR series wireless insulation detection system is a specialized insulation detection device designed for overhead crane motors. It can monitor the insulation resistance of the overhead crane motor in real time through a 4G network and provide early warnings based on the measured circuit insulation resistance to detect early insulation problems and effectively prevent motor reapplication after insulation failure, which could lead to accidents.

This system employs cloud technology, allowing users to view real-time insulation resistance conditions of the overhead crane motor through a computer or mobile terminal. In the event of an alarm, information will be reported to the mobile terminal and computer control page, prompting maintenance personnel to take note and address the issue promptly. Furthermore, remote control and monitoring operations can be performed through computers and mobile devices, making monitoring more convenient.

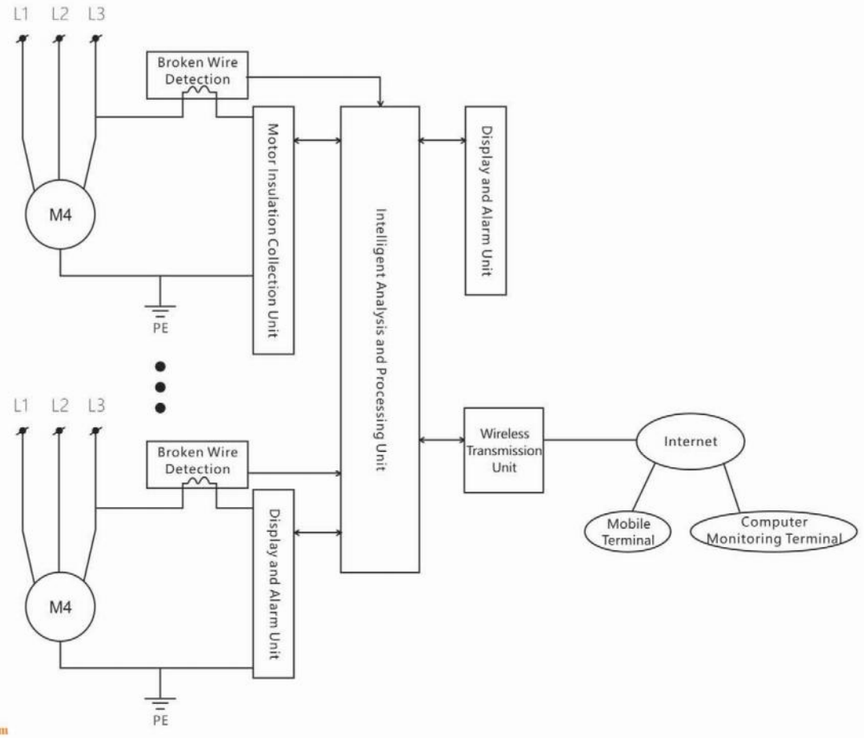
Product Application: Insulation monitoring for important motors in petroleum, petrochemical, mining, marine operations, offshore operations, ports.

Executive Standard: GB/T 755-2019 'Basic Technical Requirements for Rotating Electrical Machines', and IEC 61557-8:2007 'Electrical Safety in Low Voltage Distribution Systems up to 1000 V AC and 1500 V DC - Equipment for Testing, Measuring or Monitoring of Protective Measures - Part 8: Insulation Monitoring Devices for IT Systems'.

## PRODUCT FEATURES AND WORKING PRINCIPLE

Motor online insulation monitoring device: The system continuously monitors insulation during motor operation and shutdown. It automatically detects the leakage current between the motor windings and ground to obtain the insulation resistance value. When the preset alarm value is reached, the system will trigger an alarm; the preset alarm value can be set independently.

According to national standards, the cold state insulation resistance must be no less than 1 MΩ per 1000 V.






# HD-IR Series Overhead Crane Motor Wireless Insulation Detection Device

## ADVANTAGE

01. The intelligent system uses dual-circuit testing lines, with the ability to detect circuit disconnections and provide warnings. Current market products typically use single-circuit testing lines, which may incorrectly interpret high resistance as a disconnection. This product ensures motor circuit safety and prevents accidents;
02. Utilizes artificial intelligence (AI) control technology, providing strong anti-interference capabilities and stable, reliable operation;
03. Designed in strict accordance with national standards, the insulation test measures motor insulation with DC output voltages of 500V or 1000V, ensuring accuracy and resistance to site environmental interference. Current market products use AC low-voltage input circuits, which produce inaccurate results and are easily affected by site conditions;
04. When the system is running, it can monitor the insulation of the entire power system. Upon detecting a fault, the system can stop the motor and conduct "patrol" inspections of each circuit, quickly and accurately locating insulation faults. The insulation detection speed is faster than similar products on the market, making it more suitable for industrial environments;
05. Can monitor up to 16 motor circuits, with testing modes including "manual" and "automatic." In "manual" mode, the system tests specific motors by pressing the corresponding inspection button during downtime; in "automatic" mode, the system patrols all motors during downtime and accurately locates faulty motors;
06. Adopting 4G wireless network technology to achieve remote real-time online monitoring of motor insulation status;
07. Allows for automatic long-term monitoring of motors, reducing manual inspection labor and avoiding oversight;
08. Uses cloud platform remote monitoring technology to view motor insulation status via computer control pages and mobile terminals;
09. Equipped with a large industrial touch screen for a human-machine interface, displaying insulation values of up to 16 motor circuits and fault alarm indications, facilitating parameter viewing and setting by maintenance personnel;
10. Features data storage capabilities to review insulation status at various stages, record insulation values at fault occurrence, operation time, and recovery time, and retain fault history data for troubleshooting;
11. Convenient and flexible alarm and fault reset methods: Alarm reset can be remotely performed through mobile phones and computers;
12. Employs industrial control design with modular construction, shock resistance, corrosion resistance, and easy installation and maintenance.

## TECHNICAL SPECIFICATIONS

IP Rating: IP65;
Operating Temperature: -20 ℃~60 ℃;
Measurement Circuit: 4, 8, 16 (optional);
Measurement Range: 1K~5000K Ω, error: ± 1%;
Insulation Test Output Voltage:
0-1000V (adjustable); non-low voltage simulation testing

## MODEL DESCRIPTION

HD-IR-100: Standard model for overhead crane motor insulation detection system, equipped with high-end touch screen and PLC control system.
HD-IR-200: Intelligent model for overhead crane motor insulation detection system, based on the standard model, with the addition of cloud platform access allowing real-time viewing of motor insulation status via mobile and computer terminals, enabling maintenance personnel to promptly receive fault warnings and ensure safe production.

## EQUIPMENT INTRODUCTION

The system is equipped with an industrial touch screen, which can be monitored by touch screens, mobile phones, and computer web.
**(I) Touch Screen**
This diagram takes 4-way motor detection as an example, with 8 and 16 motor insulation detection options available;






# HD-IR Series Overhead Crane Motor Wireless Insulation Detection Device

**1. Query alarm records:**




**2. Query historical data records:**




**3. Insulation alarm:**

When the system detects a motor insulation fault, a prompt box will pop up, and a buzzer will sound to alert the user.

**(II) Mobile Terminal: Monitoring Page**

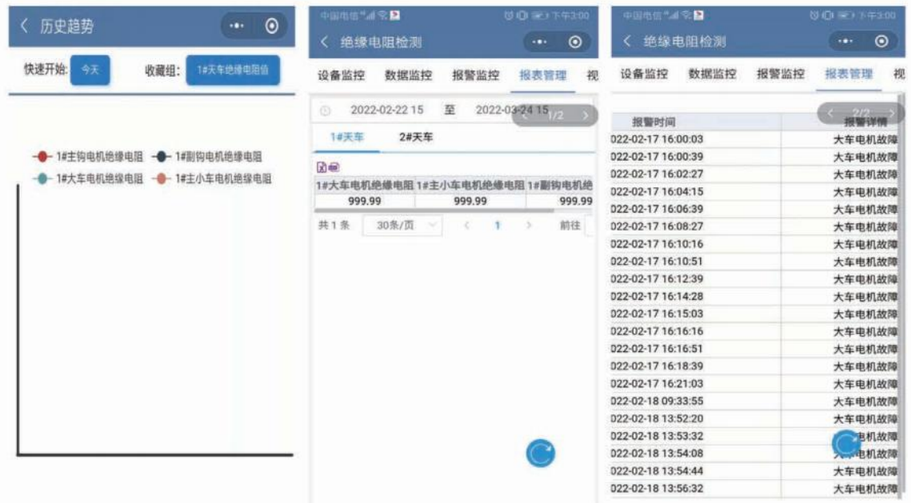
When the system detects a motor insulation fault, a prompt box will pop up, and a buzzer will sound to alert the user.





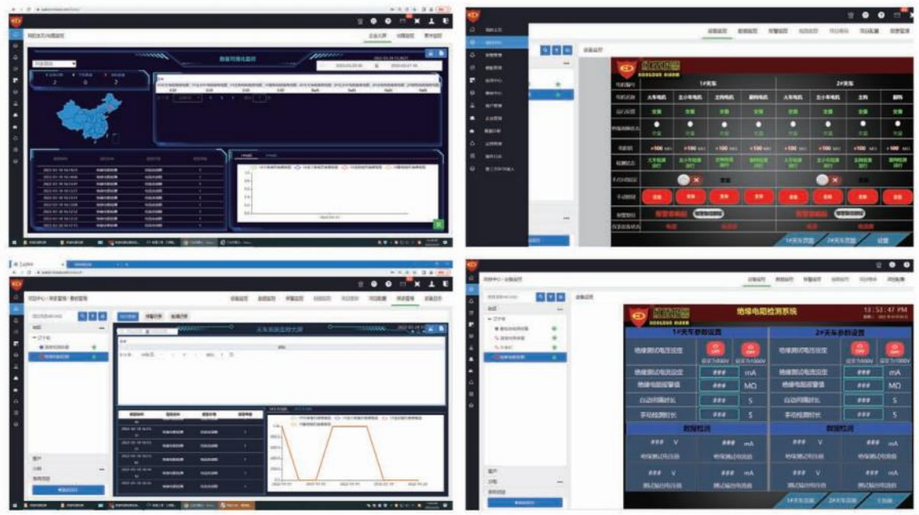

# HD-IR Series Overhead Crane Motor Wireless Insulation Detection Device

Report monitoring can view data records and alarm records




**(III) Computer Monitoring Platform**

After entering the website, the system can be remotely monitored, and parameter settings can be adjusted. Meanwhile, the report can be viewed on the large screen display



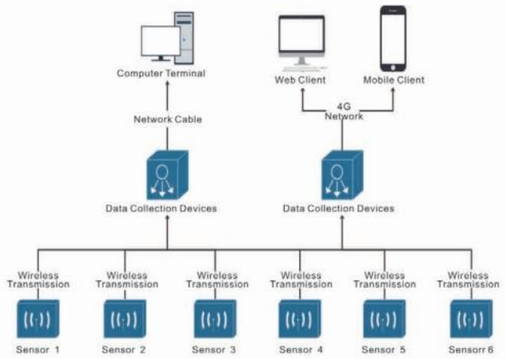
# Intelligent Wireless Vibration Temperature Measurement Online Monitoring System

## BACKGROUND

Currently, equipment maintenance and inspection mainly rely on manual efforts, which are affected by personnel quality and technical levels. Management blind spots and other factors may prevent the prediction of equipment failures, leading to sudden issues that disrupt normal production and cause subsequent equipment damage. With the development of new technologies such as cloud computing, big data, and the Internet of Things (IoT), there is a need to establish an intelligent monitoring system that continuously monitors vibration, mechanical vibrations of the vibrator, motor temperature, and other important operational signals to achieve real-time monitoring of the equipment's operating status.

## FUNCTION DESCRIPTION

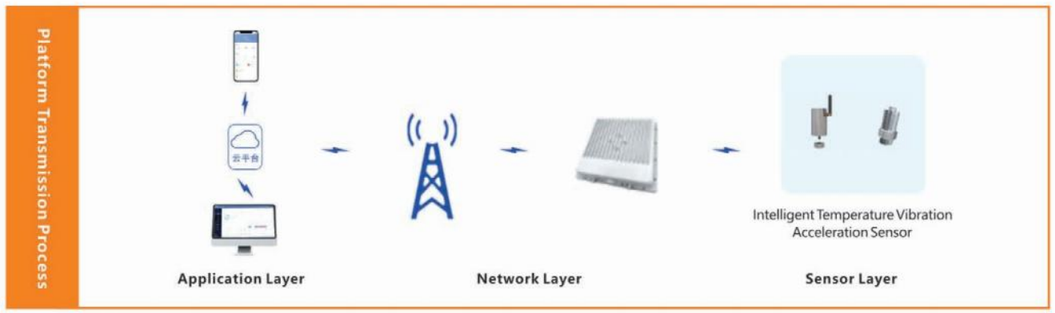
The intelligent wireless vibration temperature measurement online monitoring system collects temperature, three-axis vibration data, and other operational status data through sensors. It can detect hidden issues and predict potential faults in the equipment. This system can transmit the collected data to the monitoring system's backend and mobile terminals, enabling users to view and monitor in real-time. It is an intelligent, professional rotating equipment operation status monitoring system, integrating IoT technology, wireless technology, embedded technology, vibration sensing technology, temperature sensing technology, and low-power technology. It ensures the accuracy of vibration speed (characteristic value) and temperature measurements, as well as the security and stability of real-time data transmission. The system provides accurate and timely monitoring of rotating equipment operation status, enabling preventive maintenance and improving equipment safety.




## PRODUCT FEATURES

### Main Features

- LORA/NB IOT wireless transmission, eliminating the need for complex wiring;
- High precision, vibration accuracy ± 2%;
- Multi-level protection with strong anti-interference capabilities;
- Flexible installation methods: supports magnetic, screw, and adhesive installations.
- Convenient data viewing, supporting remote viewing on online platforms and mobile apps;
- Supports real-time viewing of sensor vibration and temperature status through control software;
- Alarm thresholds can be set for temperature vibration and other numerical values. If the limit is exceeded, alarm messages can be received through SMS, phone, WeChat, email, and other means to remind maintenance personnel to pay attention.






# Intelligent Wireless Vibration Temperature Measurement Online Monitoring System

## PRODUCT COMPOSITION

The system is composed of a three-axis temperature and vibration sensor, an intelligent wireless data collector, and a backend monitoring system.

**Speed-type Wireless Temperature Vibration Sensor**

| | |
|---|---|
| Function description: | Wireless three-axis temperature vibration sensor |
| Vibration measurement range (mm/s): | 0-50 |
| Vibration measurement accuracy (mm/s): | ± 1.5% |
| Measurement axes: | Three axis/single axis |
| Frequency range (Hz): | 10-1600 |
| Temperature measurement range (℃): | -40-150 |
| Temperature measurement accuracy (℃): | ± 0.5 |
| Power supply: | DC3.6V |
| Signal output: | Wireless |
| Wireless type: | L/Lorawan/cat1 |
| Transmission distance: | L: 3km cat1: Unlimited |
| Signal strength (dbm): | 5-15 |
| Protection level: | IP65 |
| Explosion-proof level: | Intrinsically safe EX ia IIC T4 |
| External dimensions (mm): | 40×70 |



**Intelligent Wireless Data Collector**

| | |
|---|---|
| Power supply: | DC12-36V |
| Function description: | Intelligent wireless acquisition device |
| Collection type: | Various types of wireless sensors |
| Communication protocol: | Modbus RTU/TCP |
| Operating temperature: | -40-85 ℃ |
| Operating humidity: | 0-95% RH |
| Receiving distance: | LoRa5km 4g: Unlimited |
| Output ports: | RS232、RS485、TCP |
| External dimensions: | 100mm * 72mm * 25mm |
| Installation method: | Fixed type (reserved mounting holes) |
| Service life: | >10 years |



### Mobile Network Client

The mobile app allows for remote real-time viewing of the device's vibration and temperature status and receiving alert information in a timely manner.

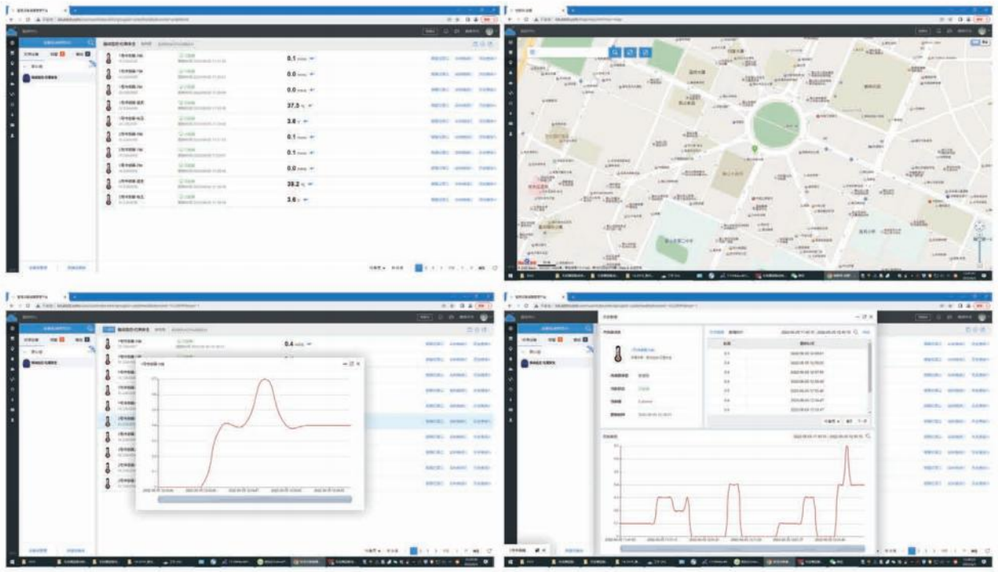





# Intelligent Wireless Vibration Temperature Measurement Online Monitoring System

### Cloud Network Client

Temperature and vibration sensors can set high and low alarm thresholds. Exceeding the thresholds can immediately trigger alerts via SMS, phone, WeChat, email, and other formats.



### Professional Industrial Control Software Online Monitoring System

The system can simultaneously monitor the vibration and temperature values of 300 sensors. It can set alarm thresholds, query historical data, and perform historical alarm queries.






# Intelligent Wireless Vibration Temperature Measurement Online Monitoring System

## APPLICATION SCENARIOS

Online measurement of vibration and temperature for rotating equipment such as motors, gearboxes, fans, generators, compressors, centrifuges, and pumps across various industries including coal mining, chemical industry, metallurgy, power generation, building materials, automotive, and machinery manufacturing.


Machine Room


Coal Mining

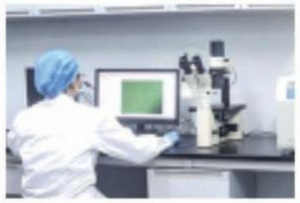

Chemical Industry


Workshop


Metallurgy


Electric Power


Machinery


Laboratory


Textile

## REFERENCED STANDARDS

GB/T 29531-2013 "Vibration Measurement and Evaluation Methods for Pumps"

GB 4832-1984 "Measurement Method for Vibration of Large Electric Machines"

GB/T 10068.2-1988 "Methods and Limits for Vibration Measurement of Rotating Electrical Machines - Vibration Limits"

GB14711-93 General Safety Requirements for Small and Medium Rotating Electrical Machines

GB/T 33904-2017 Industrial Internet of Things Instrument Service Agreement

GB/T 34072-2017 "Specification for IoT Temperature Transmitters"

# FK-ULS30 Overhead Laster Collision Avoidance Alarm

## PRODUCT INTRODUCTION

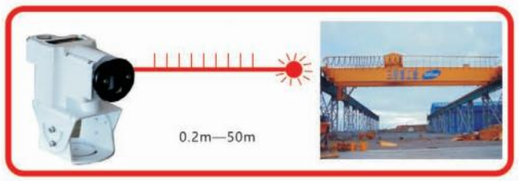
Patent Number
ZL202121013173.9
ZL202121122594.5
Software Copyright
2018SR546293

The overhead collision avoidance alarm adopts a laser distance sensor to directly measure the distance to an object. When the safety distance is reached, an alarm signal is simultaneously displayed with an LED signal. The alarm output can have two relays as switch signals, controlling the operation of braking devices or other equipment, to achieve pre-warning deceleration and alarm stop functions. The QFK-ULS series of collision avoidance alarms are the best collision avoidance alarm devices for overhead vehicles in metallurgy, mining, and other industries.

## APPLICATION SCOPE



1. The positioning of the aerial vehicle uses laser ranging sensors, and the position of the aerial vehicle is easily marked using a laser distance sensor, enabling automatic operations for the overhead vehicle, such as automatic deceleration and stopping.
2. The non-contact laser measurement technology of liquid and material level measurement makes it very convenient and simple to monitor liquid and material levels, even if the(simple warehouse) is filled with high-temperature or corrosive materials.
3. Automated stacking systems continuously monitor the position of goods and transmit data to PLCs, which then drive automated handling equipment to achieve automated stacking of goods. Choosing the QFK-ULS series laser distance sensors allows for accurate measurements within the range of 0.2K-50 meters, with simple and flexible operations. More importantly, it enables non-contact measurements, which are crucial when the measurement environment is complex or when the material temperature is very high or very low, making non-contact measurement necessary.







FK-ULS30-A
Single-Sided Laser Collision Avoidance Effect Diagram

FK-ULS30
Double-Sided Laser Collision Avoidance Effect Diagram

FK-ULS30-ZD
Single-Sided Laser Collision Avoidance Intelligent Model Effect Diagram

FK-ULS30-Z
Double-Sided Laser Collision Avoidance Intelligent Model Effect Diagram

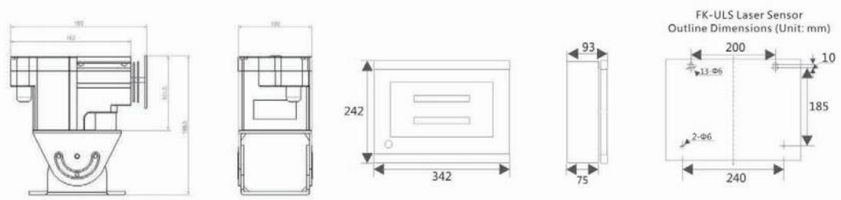


# FK-ULS30 Overhead Laster Collision Avoidance Alarm

## FEATURES

- From 0.2 meters to 50 meters, up to 200 meters(LS) Suitable for large ranges, with simple measurement in the 0.2K-50 meters range
- Precision up to 1.5mm(FK-LS) and 10mm(FK-ULS) Regardless of distance, it can maintain an accuracy of 1.5mm or 10mm
- Long term continuous measurement: Our equipment can be set to continuous mode. Once all configuration information is stored and the device is powered on, it can continuously measure without the need for any control units and applicable in any actual application environment
- Relay output interface: Direct connection to PLC machine through two sets of relay normally closed interfaces.
  Optional Standard Network Interface for remote data transmission
- Wide power supply range(limited to FK-LS): Sensor can operate normally within the voltage range of 9 to 30V
- Active self-check function: The main panel's "self-test" button can check the current status of the host, effectively avoiding accidents caused by host failures
- Power/Warning/Alarm/Stop/Fault Display: Current status of the equipment is displayed through five LED indicators. Easy to observe if the equipment is operating normally/fault. Simultaneously, an audible alarm signal is emitted.
- Suitable for low-temperature environments (limited to FK-LSXX): FK-LSXX series can operate normally in environments above -40 degrees Celsius.
  Durable metal shell IP65: The sturdy shell ensures that the equipment is protected in industrial applications and harsh environments from dust and water intrusion.

## EXTERNAL DIMENSIONS




## TECHNICAL PARAMETER

| | FK-ULS30 | FK-LS | FK-LS 4 |
|---|---|---|---|
| Measurement Range | FK-ULS10 (0.2-10m without reflector)FK-ULS30 (reflector for 0.2-30m) FK-ULS50 (reflector for 0.2-50m) | 0.2m to 200m, depending on target material, environment, and whether to use a reflector within 100m | |
| Maximum Deviation | ±18mm | ±5mm | |
| Measurement Reference | Front Surface | | |
| Laser Spot Diameter | Diameter: 6mm Distance: 10m Distance of 50m, diameter of 30mm Distance of 100m, diameter of 60mm | | |
| Power Supply | Main control unit:~220V 50Hz Sensor:DC15V Main control unit:~220V 50Hz Sensor:DC9-30V Main control unit:~220V 50Hz Sensor:DC24-30V | | |
| Physical Dimensions | 250×95×65mm | | |
| Operating Temperature | -10℃—+50℃ | -10℃—+50℃ | -40℃—+50℃ |
| Storage Temperature | -40℃—+70℃ | | |
| Shell | Ip65 | | |
| Weight | 680g | | |
| Output Switch Quantity | 3A Normally closed/open two contact point interfaces | | |
| Output Analog Quantity | Optional | Optional | Optional |

# FK-CH Overhead Laser Collision Avoidance Alarm (Infrared Model)

## PRODUCT INTRODUCTION

Cranes are frequently used in industries such as metallurgy, mining, and heavy industry, and simultaneous operation on the same track can easily lead to collisions, resulting in accidents. The FK-CH host and FK-HB infrared sensor constitutes a robust collision avoidance framework for cranes. This system is extensively applicable to specialized cranes across various industries and other industrial fields that use similar structural equipment.

The FK-HB infrared sensor employs imported industrial-grade chips, enabling adjustable detection distances in segmented intervals. The system features a proprietary design incorporating electrical isolation and electromagnetic shielding, conforming to GB/T14598 and IEC60255 standards, which ensures high precision in signal detection and rapid response. The alarm host utilizes a combined audio and visual alarm mechanism and can output switch signals to control the crane's operation, effectively ensuring the implementation of collision avoidance functions while maintaining a pre-warning status, thereby eliminating safety hazards in industrial production.

The FK-CH overhead collision avoidance alarm is deemed the premier collision prevention device for crane operations in heavy industries such as metallurgy.

The detection distance can be segmented and adjusted:

FK-HB Type I 10-meter sensor allows for adjustable detection distances between 3-10 meters

FK-HB Type II 15- meter sensor allows for adjustable detection distances between 3-15 meters

FK-HB Type III 20- meter sensor allows for adjustable detection distances between 3-20 meters

Note: The detection distances are contingent upon the actual site conditions and the properties of the detected objects; the specified distances represent the nominal settings.

## FEATURES

The imported infrared sensor has a long detection range, is safe and reliable, has minimal influencing factors, and offers excellent detection performance.

The detection distance can be freely adjusted between 3-20 meters.

When an alarm is triggered, there is a visual display, and switch signals can be output simultaneously to control the crane's braking mechanism.

The main unit has a metal shell, designed to be waterproof, dustproof, and corrosion-resistant, ensuring durability and robustness.

The sensor is compact, lightweight, and features reliable magnetic mounting, making it easy to attach. It requires minimal wiring and is simple to install and operate.

Optional standard network interface for remote data transmission

## COMPONENTS

1. One FK-CH Overhead collision avoidance alarm (infrared model) controller
2. Two FK-HB Infrared sensors



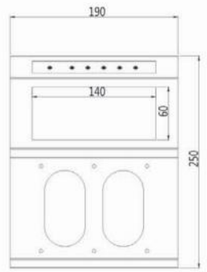

FK-CH Laser Collision Avoidance Alarm (Infrared Model) Controller



FK-CH Overhead Laser Collision Avoidance Alarm (Infrared Model)



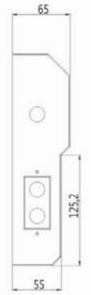

## EXTERNAL DIMENSIONS




Front View



Transparent View




SIDE VIEW



FK-HB Infrared Sensor

## TECHNICAL PARAMETER

| | |
|---|---|
| Operating Voltage | AC220V、50Hz |
| Signal Output | 3A normally closed/open two contact point interfaces (AC220V) |
| Display Mode | Segmented LED indicators |
| Display Color | Red |
| Relative Humidity | 95% |
| Response Time | 0.5S |
| Operating Temp. | -20 ℃ -60 ℃ |
| | FK-HB Type I 3-10m adjustable |
| Detection Distance | FK-HB Type I 3-15m adjustable |
| | FK-HB Type I 3-15m adjustable |

# TBJ Series Integrated Audible And Visual Alarm

National Patent Product Patent Number: ZL201730440822.6 Software Copyright Registration Number: 2018SR849506 Software Product Certificate Number: Liao C2018-0416



## PRODUCT INTRODUCTION

Cranes and other walking equipment are very important equipment in metallurgical enterprises. They are frequently used in outdoor operations, have low starting sounds, and are fast in speed. They are prone to safety accidents due to not being noticed by on-site personnel.

- Clear warning lights and signals can alert on-site personnel.
- The sturdy structure and protective cover of the alarm light protect the durability of this machine.
- The internal circuit has been treated with injection technology and waterproof process, making it suitable for harsh outdoor environments.
- 220V triggered and equipped with alarm lights and signals for easy installation and use. The alarm light cover is made of highly transparent material, and the alarm light is an LED strobe light.
- There are various sizes of 10W, 25W, 30W, and 50W alarm lights to choose from, including large and small ones. Additionally, various voice alarms can be added. Can add network interfaces, making it easy for PC remote control

## FEATURES

- 10W, 25W, 30W, 50W alarm sound options — Loud and clear sound.
- Explosionproof flashing warning lights with stainless steel protection — High brightness, impact resistance.
- Wind and rain-resistant electrical design — Waterproof, dustproof, reliable quality.
- Integrated warning lights and alarms — Easy installation.
- 220V AC immediate activation — Simple operation.
- High-brightness LED strobe lights — High quality, long lifespan, high brightness.

## TECHNICAL PARAMETER



**TBJ-100Integrated Audible and Visual Alarm**

Dimensions (H × L × W)
370×160×140mm

Operating Voltage: AC220V、50Hz
Alarm Power: 15W
Alarm Light Diameter: D=100mm
Activation Signal: AC220V
Shell Material: Cold-rolled steel plate, plastic spray coating



**TBJ-150C/TBJ-LY-25W (Integrated Audible and Visual Alarm (with voice broadcast)**

Dimensions (H × L × W)
370×180×155mm

Operating Voltage: AC220V、50Hz
Alarm Power: 25W
Alarm Light Diameter: D=160mm
Activation Signal: AC220V
Shell Material: Cold-rolled steel plate, plastic spray coating



**HBJ-5 Integrated Audible and Visual Alarm**

Dimensions (H × L × W)
110×220×275mm

Operating Voltage: AC220V、50Hz
Alarm Power: 10W
Alarm Light Diameter: D=100mm
Activation Signal: AC220V
Shell Material: Cold-rolled steel plate, plastic spray coating



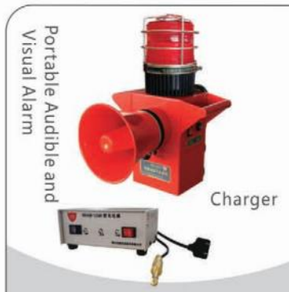
# TBJ Series Integrated Audible And Visual Alarm



**TBJ-150 Integrated Audible and Visual Alarm**

Dimensions (H × L × W)
265×380×150mm

Operating Voltage: AC220V、50Hz
Alarm Power: 25W
Alarm Light Diameter: D=160mm
Activation Signal: AC220V
Shell Material: Cast aluminum alloy, plastic spray coating




**TBJ-185 Integrated Dual-Tone Audible and Visual Alarm**

Dimensions (H × L × W)
224×320×215mm

Operating Voltage: 12V DC
Output Power: 10W RMS
Battery Capacity: 7Ah
Usage Time: 6-8 hours
Strobe Light: LED high brightness
Weight: 5.9Kg



**HBJ-200 Integrated Sound and Light Alarm**

Dimensions (H × L × W)
335×190×130mm

Operating Voltage: AC220V、50Hz
Alarm Power: 10W
Alarm Light Diameter: D=100mm
Activation Signal: AC220V
Shell Material: Cast aluminum alloy, plastic spray coating



**TBJ-30W Integrated Dual-Tone Audible and Visual Alarm**

Dimensions (H × L × W)
310×380×155mm

Operating Voltage: AC220V、50Hz
Alarm Power: 30W
Alarm Light Diameter: D=100mm
Activation Signal: AC220V
Shell Material: Cold-rolled steel plate, plastic spray coating



**Intelligent Audible and Visual Alarm Series**

### Technical Features:

1. The RST intelligent audible and visual alarm supports multiple data interfaces and can read various industrial on-site data (switch quantity, analog quantity).
2. The RST intelligent audible and visual alarm can connect to multiple devices, performing alarms, signal lights, voice, LED screens, projections, and linking other devices.
3. The RST intelligent audible and visual alarm supports multiple connection methods, including wired, Bluetooth, ZigBee, microwave, WLAN, and 5G.
4. The RST intelligent audible and visual alarm supports various display modes, devices, programming modes, button operations, connected pen-based settings, central server, mobile APP, etc.
5. Edge computing, distributed center, supports cloud computing.

### Intelligent Audible and Visual Alarm Series Classification:

- Xiao Hong Series: Switch quantity input, switch quantity output.
- Xiao Lan Series: Analog quantity input, switch quantity output.
- Xiao Zhi Series: Multiple input interfaces, intelligent output.
- Xiao Neng Series: Multiple data interfaces, full intelligent output, control on-site equipment automatic work.

# TBD-3T+ Overhead Crane Loudspeaker
# TBD-3D Wall-Mounted Overhead Crane Loudspeaker

**Software Copyright Registration Number: 2018SR868692  Software Product Certificate Number: Liao C2018-0417**

## PRODUCT INTRODUCTION

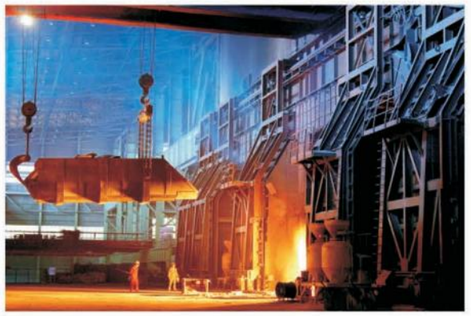
Overhead cranes play a crucial role in large enterprises, handling significant production tasks. Due to their standalone operation, there are numerous factors contributing to unsafe incidents. Based on the summary of existing products, a new generation of overhead crane loudspeakers has been developed. These loudspeakers can simultaneously alert on-site workers with various engineering alarm sounds and flashing light signals. The crane operator can use the loudspeaker to directly address the workers, and it can also automatically broadcast pre-recorded alarm messages. This product adopts an imported large-scale integrated circuit, is easy to use, supports new 485 communication interfaces, and can be networked or remotely controlled for alarm activation, shutdown, automatic point inspection, and increased safety in production systems.



TBD-3T+ Overhead Crane Loudspeaker

## WORKING PRINCIPLE

The TBD-3T Overhead Crane Loudspeaker consists of an anti-interference microphone, a preamplifier, an alarm signal generator, an MCU, a 485-communication interface, an audio amplifier, a strobe light, a siren, and a power supply module. AC220V power is stepped down and rectified through a transformer and filter circuit, which then drives the power amplification circuit and strobe light. The pre-amplified voice signal is sent to the power amplification circuit, which drives the siren to issue an alarm. The system includes power protection and circuit overload protection.



## FEATURES

Car whistle sound, alarm sound, voice warning, etc., with 10 types of sounds to choose from(suitable for different on-site environments). It includes a 485-communication interface for real-time communication with upper PCs and integration into industrial networks.

25W high-volume alarm (loud and clear sound

High-brightness strobe light display(clear signal at night)

Convertible whistle alarm sound(Unique sound with long-distance propagation), handheld anti-noise microphone(amplified speech)

Integrated modular circuit(corrosion-resistant, long lifespan) automatic circuit protection, and self-alarming features (prevents short circuits, overload protection) to ensure system safety and longevity.

Working voltage connection terminal(easy to install)

External foot switch(convenient to use)




TBD-3D Wall-Mounted Overhead Crane Loudspeaker



TBD-3T+ Overhead Crane Loudspeaker
TBD-3D Wall-Mounted Overhead Crane Loudspeaker

Software Copyright Registration Number: 2018SR868692  Software Product Certificate Number: Liao C2018-0417

## TECHNICAL PARAMETER

| | |
|---|---|
| Model | TBD-3T+ |
| Microphone Sensitivity | ≤ 20mv |
| Audio Harmonic Distortion | 5% (1000Hz, 10W) |
| Operating Voltage | AC220V ± 10% 50Hz |
| Output Power | ≥ 25W |
| Strobe Light | 320mA/DC18V |
| Siren | 8 Ω, 80W |
| Alarm Sound | Ten adjustable alarm sounds |
| Communication Interface | 485 communication interface, optional network communication |

| | |
|---|---|
| Model | TBD-3D |
| Transmitter Sensitivity | ≤ 20mV |
| Sound Power | ≥ 25W (RMS value) |
| Audio Harmonic Distortion | 5% (at 1KHz and 10W) |
| Strobe Light | DC18V |
| Working Voltage | AC220V 50Hz |
| Alarm Sound | Eight adjustable alarm sounds |
| Speaker | 80W 8Ω |
| Dimensions (Mm): | 254×250×103 (W×H×D) |
| Installation Dimensions (Hole Diameter Φ6mm): | 242 x 198 (horizontal hole distance × vertical hole distance) |

## COMPLETENESS

1. One TBD-3T+/TBD-3D overhead crane loudspeaker host
2. 8Ω 80W high pitched horn, one horn
3. One anti noise handheld microphone
4. One 18V high brightness LED strobe light
5. Install a set of brackets

## INSTALLATION AND USEAGE

Install the support bracket in a suitable position on the wall inside the crane cab and secure the main unit. Connect the 220V power supply according to the diagram and label on the back of the main unit. Fix the strobe light and siren support bracket in an appropriate location, with the direction facing forward, and connect the output cable. Insert the microphone into the front panel microphone jack.

Usage: Turn the "Volume Control" knob to the minimum position. Turn on the power; the power indicator light will light up. Slowly rotate the volume control knob clockwise to increase the volume, then hold the microphone close to the mouth. If there is any feedback noise, reduce the volume until the sound is normal. When the crane needs to issue an audible and visual alarm during movement, press the push button or the external short-circuit switch(foot switch). At this point, the audible and visual alarm will sound, and it is possible to speak into the microphone.

For convenience, the unit is equipped with an "External Communication Switch" that can be connected to a foot switch.



Multi-Function Alarm Controller Software V2.0.0 Platform User Interface



Interface for Communication with Upper-Level Computer

Supports Multi-Function Alarm Controller Software V2.0.0

# FK-GD Series Overhead Crane Warning Device

**Patent Number: ZL201720751858.0 Software Copyright: 2018SR724673 Software Product Certificate Number: Liao C2018-0358**

## PRODUCT INTRODUCTION

- The housing is made of cast aluminum, which is durable and offers excellent waterproof performance, suitable for both indoor and outdoor use. The main control panel adopts an integrated design, allowing for installation without the need to open the panel
- Toggle switch with response indicator and voice communication function (FK-GT-100)
- Features an interlocking function with the operating status to reduce accidents during maintenance by prohibiting operations
- Audio, voice prompts, and flashing text displays provide clear warning signals
- The switch structure is sturdy, and the display control device is compact and easy to operate
- The switch can be wired or wireless (FK-GW) connected
- Optional standard network interfaces can be added for remote data transmission



## TECHNICAL PARAMETER

| Model / Parameter | FK-GD | FK-GD4 | FK-GD-1 | FK-GD-9 |
|---|---|---|---|---|
| Operation Method | Multi-key | Multi-key | Single-Key | Single-Key |
| Control Principle | Analog | Analog | Digital | Digital |
| Connection Method | Multi-circuit | Multi-circuit | Bus-type connection | Bus-type connection |
| Number Of Control Boxes | 4 units | 8 Units | 4 Units | 8 Units |
| Expandability | High expandability | High expandability | High Expandability | High Expandability |

# FK-GT100 Series Overhead Crane Warning Device




FK-GT100-1 Main Unit




FK-GT100-2 Terminal Unit

## TECHNICAL PARAMETER

| | |
|---|---|
| Power Supply: | AC220V 50Hz |
| Display Method: | High brightness LED |
| Output Nodes: | AC220V、3A |
| Dimensions: | Main Unit: 268 * 197 * 75 (mm) |
| | Switch: 274 * 213 * 80 (mm) |

FK-GT100-1 Main Unit

| | |
|---|---|
| Power Supply: | AC220V 50Hz |
| Display Method: | High brightness LED |
| Output Nodes: | AC220V、3A |
| Dimensions: | Main Unit: 178 * 213 * 80 (mm) |
| | Switch: 190 * 124 * 63 (mm) |

FK-GT100-2 Terminal Unit



# FK-GD Series Overhead Crane Warning Device

**Patent Number: ZL201720751858.0 Software Copyright: 2018SR724673 Software Product Certificate Number: Liao C2018-0358**

## PRODUCT INTRODUCTION

The FK-GLS Laser Collision Warning Device is designed and developed to solve the safe operation of large lifting machinery such as gantry cranes. The product combines the warning function of an alarm with laser collision warning. Compared to traditional alarm equipment, it has more advantages and advanced features.

The system's main unit adopts a mainstream embedded ARM platform with a 7-inch full-color LCD display, a high-brightness long-distance laser ranging positioning sensor, and a fully metal high-protection housing design. The positioning measurement is accurate, stable, and reliable. Combining multiple warning indicators enhances the safety of the crane.

The product can display and read out the position of various cranes in real-time and alert the distance, without needing to cut off the system to adjust the crane position. Simple settings can be done through the screen prompts. The output terminals for commands and alerts are set inside the crane' s control box and sensors, separated from the main unit. This ensures that even if the main unit is damaged, it will not affect the normal production work, effectively solving the serious issue of system paralysis often caused by main unit failures.

## PRODUCT FEATURES

- ARM embedded platform, high integration design, low power consumption, strong anti-interference ability
- All-metal chassis with excellent anti-seismic and anti-collision, and heat resistance
- 7-inch high-brightness full-color display, featuring a large screen and high resolution
- Simple operation with only 6 function keys for setup, providing comprehensive prompts and assistance throughout the process
- Real-time distance display on the screen, with voice alerts and real-time distance announcements when the preset alarm distance is reached
- The main unit supports various installation methods, including desktop and wall-mounted options
- Supports output current, voltage, and other external interfaces



FK-GLS Laser Collision Warning Device

# ZD-GZ1-SP4 Visual Intercom Device

**Patent Number: ZL2022879398.4 Software Copyright Number: 2021R11S1543861**

## OVERVIEW

In metallurgical industrial enterprises with numerous overhead cranes, the role of the boarding communication device is critically important. Serious boarding safety incidents often occur due to communication issues between boarding personnel and crane operators. The ZD-GZ1-SP4 visual intercom device is the best solution for preventing such safety incidents.

## COMPLETE SET OF VISUAL INTERCOM COMMUNICATORS

| Number | Name | Quantity |
|---|---|---|
| 1 | Visual Intercom Device Main Unit | 1 |
| 2 | Visual Intercom Device Display | 1 |
| 3 | Data Switch | 2 |
| 4 | Visual Network Intercom Terminal Box | 4 |
| 5 | High-Definition Infrared Network Camera | 2 |



Visual Network Intercom Terminal Box



Data Switch




Visual Intercom Device Display



High-Definition Infrared Network Camera

## VISUAL INTERCOM COMMUNICATOR USAGE CASES

1) Boarding at Gate #1:

When personnel need to board the vehicle, they press the "Request Boarding" button on the #1 gate intercom terminal. The device emits a sound, and the main unit displays "Person requesting boarding at #1 gate" and shows the video feed. If the driver allows boarding, they press the "Answer" button to establish a voice connection. The control room can then permit boarding by pressing the "Agree Boarding" button or cancel it by pressing the "Unlock" button. Once boarding is complete, the driver presses the "Unlock" button on the terminal to ensure safe departure.

2) Disembarking at Gate #1:

When personnel need to disembark, they press the "Request Disembark" button on the #1 gate intercom terminal. The device emits a sound, and the main unit displays "Person requesting disembark at #1 gate" and shows the video feed. If the driver allows disembarkation, they press the "Answer" button to establish a voice connection. The control room can then permit disembarkation by pressing the "Agree Disembark" button or cancel it by pressing the "Unlock" button. Once disembarkation is complete, the driver presses the "Unlock" button on the terminal to ensure safe departure.



# HTY-180/4l Rail Lubricator For Cranes

**Patent Number: ZL201721063845.0**

## TECHNICAL PARAMETER

The HTY-180/4L rail lubricator is commonly used. For cranes that are used infrequently or operated outdoors, the HTY-180/8L model lubricator is recommended.

| | HTY-180/4L |
|---|---|
| Electronic Oil Pump | Φ30×2 |
| Oil Pump Capacity | 4cc |
| Oil Tank Capacity | 4L |



## MODEL SELECTION

| | Model Type |
|---|---|
| Single-Side Rail Lubricator | HTY-180/4L-A |
| Double-Side Rail Lubricato | HTY-180/4L-B |

## DESCRIPTION AND APPLICATION

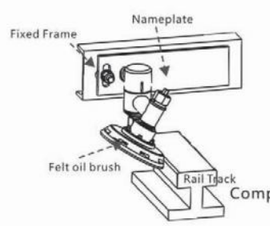
The HTY series crane rail lubricator includes the lubricator main unit, oil tank, and rubber hose.
The main body of the lubricator is composed of the following parts:

- Oil Wheel Assembly: Responsible for applying a minimal amount of oil directly to the rail.
- Main Lubricator Body: Houses the connection points for the pressure separator and includes the fixed mounting plate for installation on the oil tank.
- Fixed Frame Assembly: Ensures secure attachment of the lubricator to the oil tank.

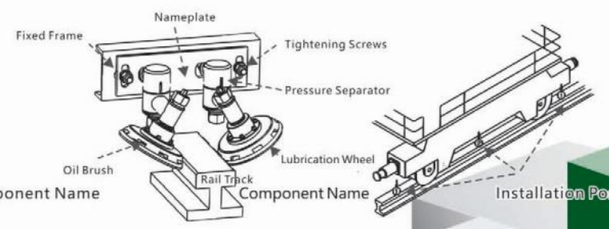
Each side of the lubricator features a pair of these components.
The lubricator applies oil by increasing pressure on both sides of the wheel flange as the crane moves. The electronic intelligent oil pump sends the appropriate amount of oil through the hose to the oil nozzle on the rail.
The HTY-180/4L and HTY-180/8L rail lubricators are designed to apply oil on both sides of the rail, achieving the following effects.

## EFFECTS AND FEATURES

- Reduces rail wear.
- Significantly reduces wheel wear, extending the wheel's service life.
- Decreases friction during crane operation, ensuring smoother movement.
- Reduces the operational load on the crane.
- Eases micro-motion during operation.
- Significantly reduces power consumption.
- Lowers maintenance costs.
- Prevents the phenomenon of rail squatting in crane operations.
- The built-in high-energy electronic oil pump provides adjustable and stable oil supply.
- The oil fringe prevents excessive oiling and protects against rain and dust.
- Ensures even distribution of oil, even when the crane is moving horizontally.
- Prevents derailment of the oil wheel from the rail.
- Allows simultaneous lubrication on both sides of the rail, reducing the number of lubricators needed and simplifying maintenance.




Single-Side Rail Lubricator




Double-Side Rail Lubricator

# HD-680/HD-680C Overhead Crane Dispatch Indicator

## PRODUCT INTRODUCTION

The HD-680 high-power overhead crane dispatch indicator is designed with imported microprocessor technology, serving as a multifunctional wireless dispatch system. It enables wireless intercom, data transmission, remote control communication, and more.

The HD-680C model is an extended version that integrates wireless intercom, data transmission, remote control technology, high-power audio broadcasting, sound alarms, voice prompts, and light display into one comprehensive system.

The device includes both wired and wireless audio broadcasting and various alarm sound and light indicator systems. The main unit is equipped with a loudspeaker for external broadcasting and has a quantity control alarm system. It is one of the most advanced and complete dispatch alarm devices currently available in China.

The wireless intercom dispatch function is primarily used for dispatching operations in metallurgical sites, including overhead cranes, slag vehicles, pushing vehicles, transfer vehicles, and equipment such as clamp vehicles. It facilitates command, communication, and information exchange in the field.



HD-680 Overhead Crane Dispatch Indicator



HD-680C Overhead Crane Dispatch Indicator

## FEATURES

The 5W high-power audio amplifier can amplify the caller's voice clearly and loudly, effectively overcoming the ambient noise in metallurgical sites. The 25W transmission power output can overcome interference from various electrical equipment and other devices, ensuring stable and clear communication signals. Data transmission and remote-control functions are designed to manage some dispersed equipment remotely.



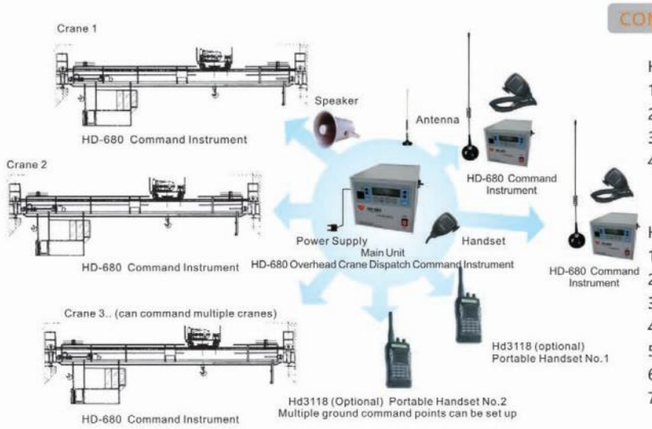


HD-680/HD-680C Overhead Crane Dispatch Indicator

## TECHNICAL PARAMETER

| | |
|---|---|
| Product Name | HD-680C |
| Operating Voltage | AC220V/50HZ ±10% |
| Transmission Power | ＜25W |
| Communication Range | ≥20Km |
| Frequency Range | 136MHz-162MHz 148MHz-174MHz<br>400MHz-430MHz 450MHz-490MHz |
| Audio Power | ≥ 5W(intercom) ≥ 20W(amplification) |
| Speaker Impedance | 5W 8 Ω(intercom) 80W 8 Ω(amplification) |
| Audio Distortion | 5%(1000 Hz 10 watt hours) |
| Strobe Light | 150mA/12VDC |
| Alarm Tone | 8 adjustable tones |
| External Dimensions | 346X312X146(mm) |

## SYSTEM STRUCTURE




## TECHNICAL PARAMETER

| | |
|---|---|
| Product Name | HD-680 |
| Operating Voltage | AC220V/50HZ |
| Transmission Power | ＜25W |
| Antenna | External antenna with magnetic base |
| Audio Power | 5W |
| Handset | Standard/Optional 16-button keypad |
| Operating Frequency Range | 136-162MHZ 148-174MHZ<br>400-430MHZ 450-490MHZ |

## FUNCTION DESCRIPTION

1. Enables ground personnel to use handheld devices for crane dispatch and command.
2. Allows communication between vehicles.
3. Enables crane operators to call maintenance personnel.
4. Control room personnel can perform remote crane dispatch and command.
5. Control room can call and direct maintenance personnel.

## COMPOSITION

HD-680
1. High-power wireless main unit: One unit
2. HMC-1 transmitter: One unit
3. External antenna: Three units
4. Speaker: One unit
   Note: The complete set does not include portable handsets, which are available separately.

HD-680C
1. HD-680C main unit: One unit
2. YHD80 speaker: One unit
3. YHD5 speaker: One unit
4. HMC-1 transmitter: One unit
5. HTE-3 alarm light: One unit
6. HMC-3 transmitter: One unit
7. Antenna and antenna base: One unit each

# TDX Series Three-Phase Power Failure Indicator

**Patent Number: ZI201922077006. X**

## PRODUCT INTRODUCTION

The TDX series three-phase power failure indicator is suitable for various industrial motors, lifting equipment, and other power equipment. It provides power status indication and power failure fault alarms. The unit features a metal spray plastic shell, with advantages such as dustproof, waterproof, corrosion resistance, impact resistance, and electrical interference resistance.

## FEATURES

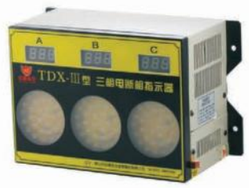
- 380V Digital Voltage Display: Accurately reflects on-site voltage changes, allowing monitoring of three-phase voltage balance.
- Tri-Color LED Indicators: Yellow, green, and red LEDs stay lit. When a phase is missing, the corresponding color LED flashes; voltage display extinguishes.
- Simultaneous Light and Sound Alarm: The indicator light flashes and the buzzer emits a "drip" sound to alert of faults.
- Low Voltage Alarm: When the voltage drops below 25% of the normal value, the indicator light immediately flashes an alarm.
- Direct Three-Phase Input: No need for additional wiring.
- LED Light Source: Provides high brightness and long lifespan.
- Optional Network Module: Allows data transmission to a host computer or PC for remote monitoring.

## TECHNICAL PARAMETERS

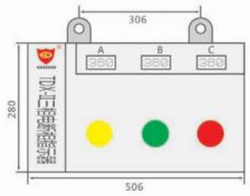
| | |
|---|---|
| Power Supply Voltage | AC380V(three-phase input) |
| Light Source | LED light tube |
| Material | Steel plate spray plastic |
| Lampshade Material | ABS engineering plastic |
| Indicator Colors | Yellow, green, red |
| Weather Resistance | Fully enclosed waterproof and dust proof |
| TDX-II Main Unit Dimensions | 506x280x60mm |
| TDX - III Main Unit Dimensions | 232x170x141mm |



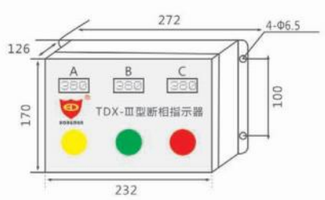
TDX-II Type Phase Failure Indicator



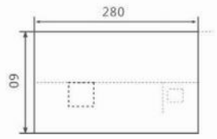
TDX-III Phase Failure Indicator



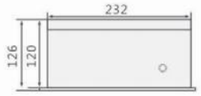

Front View




Perspective View




Side view




Bottom View

TDX-II Type Phase Failure Indicator
Specific External Dimensions

TDX-III Type Phase Failure Indicator
Specific External Dimensions



TDX Series Three-Phase Power Failure Indicator

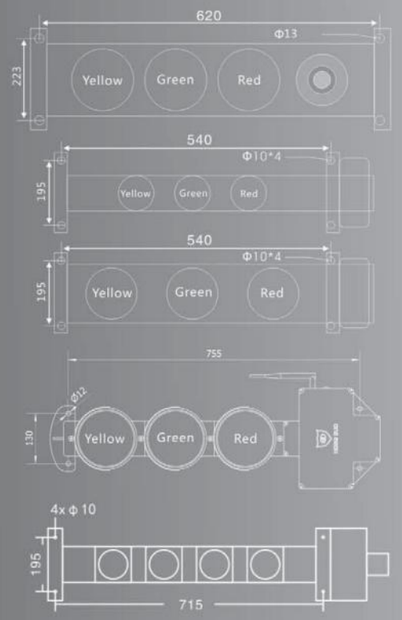
Patent Number: ZI201922077006. X




## TECHNICAL PARAMETER

| | |
|---|---|
| Flasher Voltage | AC380V |
| LED Lamp Voltage | DC 24V (with flasher) |
| LED Single Lamp Voltage | AC220V/380V (without flasher) |
| Material Quality | ABS Engineering Plastics |
| Color | Yellow, Green, Red |
| Light Source | LED Tube |
| Weather Resistance | All-weather dust and waterproof(IP65) |
| TDX-YY Type Specifications | L: 660 W: 243 T: 140(mm) |
| TDX-S Type Specifications | L: 750 W: 220 T: 100(mm) |
| TDX-Y Specifications | L: 750 W: 220 T: 100mm(mm) |
| TDX-YX Type Specifications | L: 855 W: 260 T: 130mm(mm) |
| TDX-YS Type Specifications | L: 855 W: 260 T: 130mm(mm) |

## Phase Failure Signal Light Installation Bracket Diagram




- The exterior is made of cold-rolled steel sheet with plastic spraying technology—Durable and corrosion-resistant.
- The LED light source uses a tube array—High brightness, long lifespan.
- Sealed with oxygen resin, multiple sealing structures—Protection rating Ip67.
- When a phase failure occurs, the corresponding indicator light flashes—Clear warning signal.
- Three different colored indicator lights correspond to the three phases—Signal indication is straightforward.
- Signal light is powered by low voltage 24V—Safe and reliable.
- No neutral wire is needed for the sliding contact line—Simple wiring (380V).

# Air Curtain Machine Series Products

**Patent Number: ZL201921916812.5**

## PRODUCT INTRODUCTION

During the cold winter season, heating is a crucial task. An unheated working environment significantly reduces the operational flexibility of workers, potentially leading to accidents. Moreover, it decreases the lifespan of equipment, especially switches, buttons, and automatic controllers, which are critical operation components. Providing a suitable working environment is fundamental to enhancing productivity and improving labor enthusiasm while ensuring production safety.

After thoroughly studying the production environment of various enterprises, we have designed a new structure of electric heating products. This electric heating product is suitable for any power source on-site. This heating product is convenient to install, requiring only a power connection and the flipping of a switch to quickly adjust the surrounding air temperature to a comfortable level for personnel. The product operates quietly without any noise, features corrosion-resistant components, and has a user-friendly design for easy maintenance and high efficiency. The high-efficiency heating elements ensure stable operation, uniform heat distribution, and a quiet design, making it ideal for continuous 24-hour operation in car workshops, control rooms, and general office heating needs.



Efficient electric heat exchange, rapid temperature rise
Long service life
Compact size, lightweight
Easy installation and operation
Reliable operation, gentle warm air, no noise
Fanless design

DN-3KW/2KW-A Electric Heater



TBD-A/B Overhead Crane Air Curtain




Efficient heat exchange
Rapid temperature rise, long service life
Adjustable warm/natural air
Compact size, lightweight
Safe, convenient, and reliable operation
Multiple speed control
Gentle airflow, low-noise design

DN-PTB Warm Air Curtain



DN-1500 Electric Heater



Air Curtain Machine Series Products




TBD-A/B Overhead Air Curtain Side View



Inside the Overhead Crane Cabin



Overhead Air Curtain

## TECHNICAL PARAMETER

**DN-3KW/2KW-A Electric Heater**

| | |
|---|---|
| Operating Voltage | DN-3KW/1.5KW-A AC220V |
| | DN-2KW/1KW-A AC220V |
| Heating Element | High-efficiency heat exchange electric heater |
| Heating Power and Efficiency | 2KW 28 kcal/min |
| | 3KW 42 kcal/min |
| Operation Mode | Continuous operation |
| Dimensions(L×W×H) | 600X200X500(mm) |
| Shell | Stainless steel plate |

**TBD-A/B Overhead Crane Air Curtain**

| | |
|---|---|
| Operating Voltage | TBD-A~220V，50Hz |
| | TBD-B~380V，50Hz |
| Heating Element | High-efficiency heat exchange electric wire |
| Heating Power and Efficiency | 2KW 28 kcal/H |
| | 4KW 56 kcal/H |
| Operation Mode | Continuous operation |
| Air Volume | 0.27 cubic meters/second |
| Noise | Low noise < 58dB |
| Dimensions (L×W×H) | 400x260x330(mm) |
| Shell | Steel plate sprayed with plastic |

**DN-1500 Electric Heater**

| | |
|---|---|
| Operating Voltage | AC220V |
| Heating Element | High-efficiency heat exchange electric wire |
| Heating Power and Efficiency | 1.5KW 22 kcal/min |
| Operation Mode | Continuous operation |
| Dimensions (L×W×H) | 250x360x290(mm) |
| Shell | Stainless steel plate |

**DN- PTB Warm Air Curtain Machine**

| | |
|---|---|
| Operating Voltage | AC220V 50Hz |
| Heating Element | Ceramic electric heater |
| Heating Power and Efficiency | 2KW |
| Operation Mode | 24/7 continuous operation |
| Dimensions (L×W×H) | 290 x 316 x 145(mm) |
| Shell | Steel plate sprayed with plastic |

## INSTALLATION AND USE

The TBD-A/B air curtain should be installed in a well-ventilated area, avoiding places from rainwater and debris. Connect to a power source, switch from natural air to hot air mode, selecting either 2000W or 4000W power for normal operation.

To extend the lifespan of the air curtain and prevent damage from sudden shutdowns, the unit is equipped with a temperature sensor and an independent natural air start switch to enhance the natural air function.

When turning off the heater, switch the heater off first, then select the natural air mode(switching the natural air/hot air switch to natural air mode). The fan will continue to run for 10-15 seconds before automatically stopping. At this point, the natural air switch can be turned on to start the fan(the heater will not operate), and then the small air switch can be turned off to return to the initial state.

During colder winter months, start the heater first, and the fan will begin operating later, The temperature sensor will detects the heater is functioning, and the fan will automatically start once the heater reaches the set temperature. The unit is designed with an external layout to prevent debris from obstructing heat dissipation.

The DN-3KW/1.5KW-A and DN-2KW/1KW-A electric heaters have high and low temperature two-stage adjustment switches. When the switch knob is turned to the low position, it indicates low-temperature working state; when the switch knob is turned to the high position, it indicates full-load working state, i.e., high-temperature state; when the switch is turned to the middle position, the electric heater stops working.

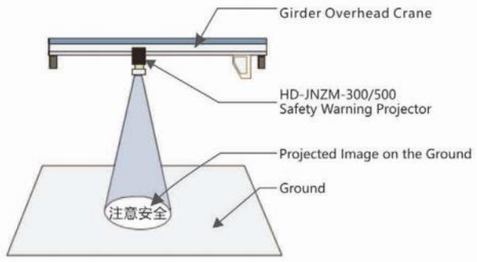
# HD-JNZM-300/500 Safety Warning Projector

**Patent Number: ZL201930670884.5**

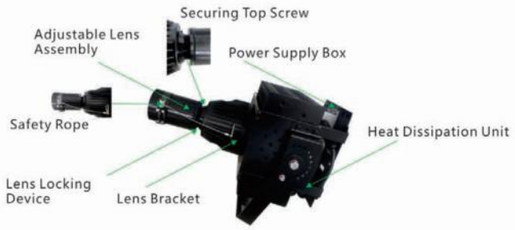
## OVERVIEW

In industries such as metallurgy and machinery manufacturing, numerous girder overhead crane are in operation. These machines often cause collisions and falls due to high noise levels and dim lighting conditions, leading to accidents that significantly impact the safety of ground workers. To mitigate these risks, our company has developed the HD-JNZM-300/500 Safety Warning Projector in collaboration with prominent domestic optical research institutes. When installed on girder overhead cranes, this device projects the operating path of the machine onto the ground. This allows ground personnel to visualize and avoid potential hazards, thus ensuring their safety.

## COMPOSITION AND FEATURES




## STRUCTURE AND PROJECTION EFFECT DIAGRAM



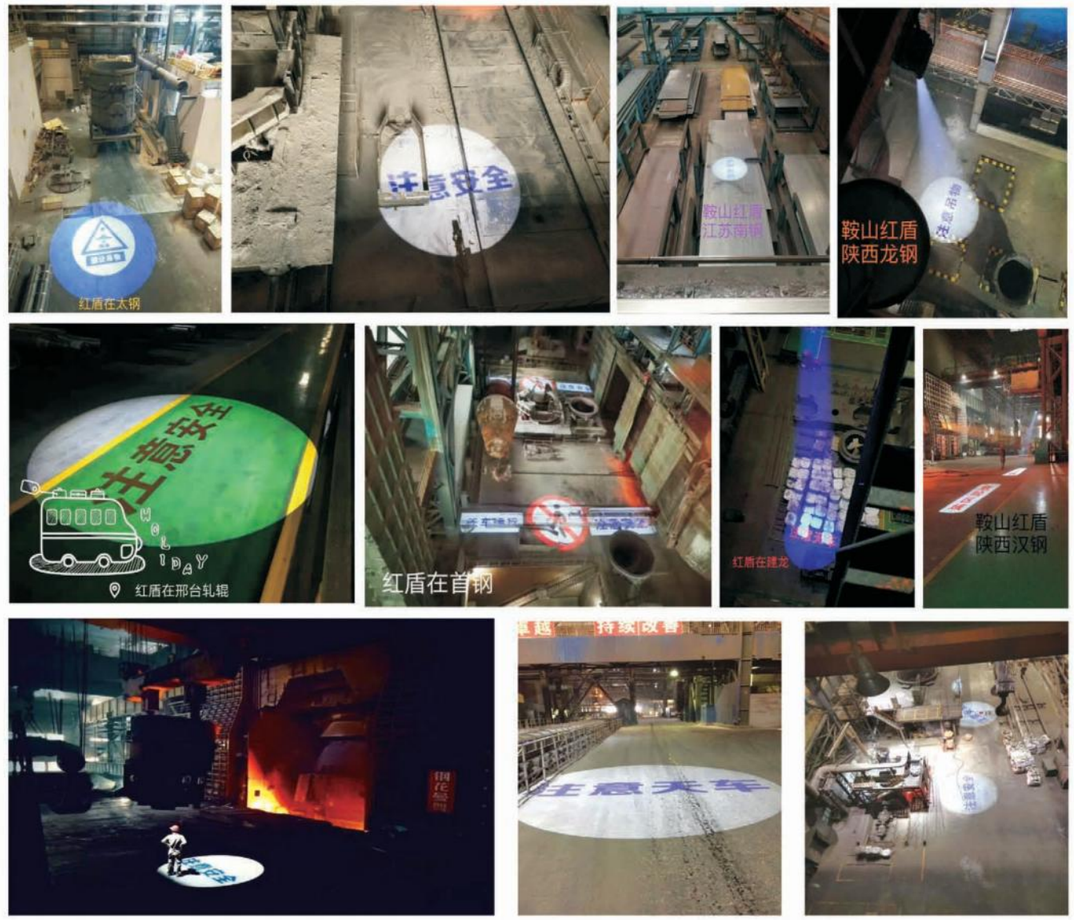

## PRODUCT TECHNICAL PARAMETERS

| Model | HD-JNZM-300 | HD-JNZM-500 |
|---|---|---|
| Parameter Name | Specification | Specification |
| Rated Voltage | AC85~265V | AC85~265V |
| Light Source Type | Ultra high-power LED | Ultra high-power LED |
| Light Source Lifespan | 30000h | 30000h |
| Luminous Flux | 30000lm | 50000lm |
| Color Temperature | 6500K | 6500K |
| Beam Angle | 15 degrees | 15 Degrees |
| Power Supply Type | Constant and Voltage Power Supply | Constant Current and Voltage Supply |
| Operational Temperature Range | -20~50 ℃ | -20~50 ℃ |
| Light Body Color | Black | Black |
| Protection Level | IP65 | IP65 |

The relationship between projection pattern and projection distance

D=0.3*h

| Projection Distance | Pattern Diameter |
|---|---|
| 1 | 0.3 |
| 5 | 1.5 |
| 10 | 3.0 |
| 15 | 4.5 |
| 20 | 6.0 |
| 25 | 7.5 |
| 30 | 9.0 |
| 35 | 10.5 |
| 40 | 12.0 |
| 45 | 13.5 |






# JN-366 Energy-Saving Projector

**Patent Number: ZL202120743396.4**

## TECHNICAL PARAMETER

| | |
|---|---|
| POWER: | 100w |
| INPUT VOLTAGE: | AC (90V~305V) |
| POWER FACTOR: | ≥ 0.96 |
| LUMINOUS EFFICIENCY: | 100-110Lm/W |
| COLOR RENDERING INDEX: | Ra>80 |
| COLOR TEMPERATURE: | 3000K~6500K |
| EMITTING COLOR: | White light, warm white (light yellow) |
| OPERATING ENVIRONMENT: | -40 ℃~80 ℃ |
| PROTECTION LEVEL: | IP66 |
| LIFESPAN: | >100000h |
| EXPLOSION-PROOF LEVEL: | Ex d IIBT4 Gb/Ex tD A21 IP66 T130 ℃ |
| WARRANTY: | JN-366A1: 1 year<br>JN-366A3: 3 years<br>JN-366A5 5 years |
| WEIGHT: | 7KG |






JN-366A Energy-Saving Projector
(Explosion-Proof Model)



JN-366 Energy-Saving Projector
(Long-Focus Model)

# JN-365 Energy-Saving Projector (Floodlight Model)



20W JN-365-20 — 30W JN-365-30 — 50W JN-365-50 — 100W JN-365-100 — 200W JN-365-200 — 300W JN-365-300

## TECHNICAL PARAMETER

| Name | Model | Power | Voltage | Emitting Color | Temperature Range | Protection Level | Dimensions (mm) |
|---|---|---|---|---|---|---|---|
| Energy-Saving Projector | JN-365-20 | 20W | AC90~260V | White/Warm White (Light Yellow) | -20℃~60℃ | Ip65 | 155X174X60 |
| Energy-Saving Projector | JN-365-30 | 30W | AC90~260V | White/Warm White (Light Yellow) | -20℃~60℃ | IP65 | 170X190X60 |
| Energy-Saving Projector | JN-365-50 | 50W | AC90-305V | White/Warm White (Light Yellow) | -20℃~60℃ | IP65 | 200X234X108 |
| Energy-Saving Projector | JN-365-100 | 100W | AC90-305V | White/Warm White (Light Yellow) | -20℃~60℃ | IP65 | 250X270X143 |
| Energy-Saving Projector | JN-365-200 | 200W | AC90-305V | White/Warm White (Light Yellow) | -20℃~60℃ | IP65 | 320X380X169 |
| Energy-Saving Projector | JN-365-300 | 300W | AC90-305V | White/Warm White (Light Yellow) | -20℃~60℃ | Ip65 | 763X286X125 |








# JN-366 Energy-Saving Projector
# JN-366-50 Energy-Saving Projector

**Patent Number: ZL202120743396.4**

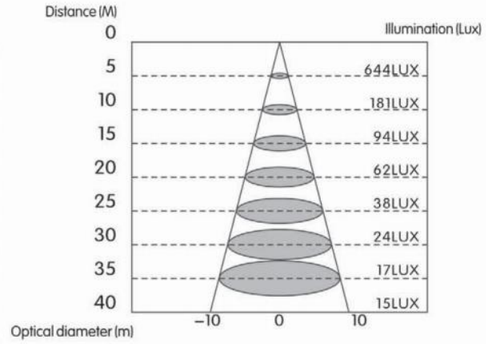
## PRODUCT FUNCTIONS AND FEATURES

The JN-365/366 overhead energy-saving projectors are newly developed products by our company. They feature high luminous efficiency, low power consumption, long lifespan, and strong fog enetration capabilities. These advantages make them suitable for a wide range of indoor and outdoor applications, including metallurgy, mining, construction sites, and large equipment areas. The long-focus model can project light farther.

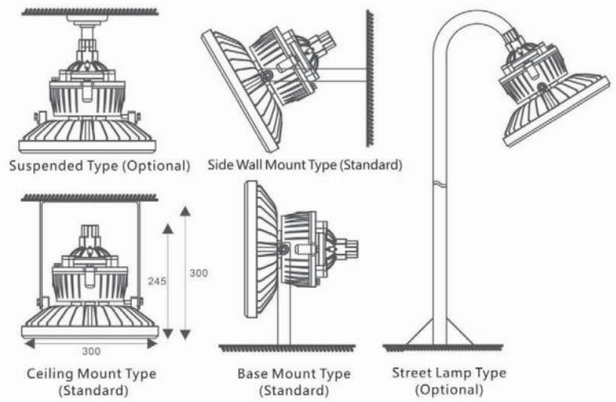
- High Energy Efficiency: Under the same lighting conditions, its energy consumption is only 1/4 of traditional lighting and 1/8 of white incandescent lighting, with good color rendering properties.
- Energy-Saving Performance: LED light source with low energy consumption and high light efficiency.
- Environmental Performance: The white LED light is soft and flicker-free, preventing visual fatigue among workers. The good electromagnetic compatibility ensures no interference with power sources.
- Mechanical Performance: The exterior is made of aluminum and glass, with high transparency and durability, allowing it to work normally in various harsh environments.
- Long Lifespan: More than 100,000 hours of use, maintenance-free, with no pollution.
- Power Efficiency: High power efficiency with a power factor of over 0.96.

Technical Parameters: JN-366 (100W)

| Focal Length (mm) | Distance (m) | Illuminance (LUX) | FC | Beam Diameter (m) |
|---|---|---|---|---|
| 40 | 5 | 644 | 60 | 3.6 |
| | 10 | 181 | 17 | 4.2 |
| | 15 | 94 | 9 | 7 |
| | 20 | 62 | 6 | 9 |
| | 25 | 38 | 3 | 12 |
| | 30 | 24 | 2 | 15 |
| | 35 | 17 | 2 | 18 |
| | 38 | 15 | 1 | 20 |




## EXTERNAL DIMENSIONS OF JN-366 (100W)







Jn-366-50 Energy-Saving Projector

# JN-366H Series LED Energy-Saving Projectors

**Patent Number: ZL202120743396.4**

## PRODUCT FEATURES

The JN-366H series LED energy-saving projector features high luminous efficiency, low power consumption, long lifespan, and strong fog penetration capability. It applies many advanced electronic technologies and is suitable for a wide range of products. It is widely used in metallurgy, mining, heavy industry, and other large-scale indoor and outdoor lighting needs, with long-focus models capable of projecting light further.

High vibration resistance, lightweight, small size, especially suitable for industrial lighting and harsh environments

High Energy Efficiency: Under the same lighting conditions, its energy consumption is only 1/4 of traditional lighting and 1/8 of white incandescent lighting, with excellent color rendering properties.

Energy-Saving Performance: LED light source with low energy consumption and high light efficiency.

Environmental Performance: The white LED light is soft and flicker-free, preventing visual fatigue among workers. It has good electromagnetic compatibility and does not interfere with power sources.

Heat Dissipation: Uses advanced heat dissipation technology with aluminum fins and copper heat pipes, significantly reducing the temperature rise and prolonging the light source life.

Long Lifespan: More than 100,000 hours of use, maintenance-free, and pollution-free.

High Reflective Coating: Reflectivity exceeds 92%, effectively directing light where needed, improving lighting effectiveness, water resistance, and anti-glare.

Lamp Dust and Mist Removal: Designed to be dust-proof and to clear fog, preventing condensation, improving product quality, and extending the product's lifespan.

216° Adjustable Angle: The 13 bracket adjustment points allow for angle adjustments up to 216°, providing flexible lighting angles.



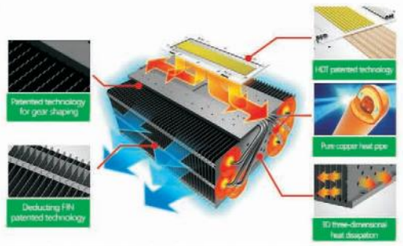

## TECHNICAL PARAMETER

| Name | Model | Power | Voltage | Protection Level | Dimensions (mm) | Weight |
|---|---|---|---|---|---|---|
| LED Energy-Saving Projector | JN-366H-100 | 100W | AC90~305V | Ip65 | 459X246X374 | 5.5kg |
| LED Energy-Saving Projector | JN-366H-120 | 120W | AC90~305V | IP65 | 467X266X374 | 5.5kg |
| LED Energy-Saving Projector | JN-366H-150 | 150W | AC90~305V | IP65 | 459X323X374 | 5.5kg |
| LED Energy-Saving Projector | JN-366H-200 | 200W | AC90~305V | IP65 | 467X266X374 | 6kg |
| LED Energy-Saving Projector | JN-366H-300 | 300W | AC90~305V | IP65 | 459X323X374 | 7kg |
| LED Energy-Saving Projector | JN-366H-400 | 400W | AC90~305V | IP65 | 497X323X374 | 7.5kg |

## Heat Pipe and Fin Technology for Heat Dissipation

Adopts heat pipe and fin heat dissipation technology. The heat generated by the light source is rapidly conducted to the fins through the heat pipes, where it dissipates quickly, achieving a significant reduction in light source temperature and extending the lifespan of the light source.






# HBS Overhead Crane Electronic Braking System



**Composition**

1 Main Control Box
1 Brake Pedal
15-meter Crane Foot
Pedal Connection Cable

**Patent Number: ZL20120069631.5**

## APPLICATION SCOPE

Strong operational capabilities, effectively enhancing production efficiency

High safety standards, effectively ensuring production safety

Easy installation

Cost-effective maintenance with standardized safe operations

Widely applicable to various rail-mounted equipment, such as bridge cranes and gantry cranes, in numerous modern large-scale production enterprises.

## TECHNICAL PARAMETER

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | Model | HBS-07A(B)、HBS-22A(B)、HBS-37A(B)、HBS-55A(B) | | HBS-07AH(BH)、HBS-22AH(BH)、HBS-37AH(BH)、HBS-55AH(BH) | | | |
| Selection Parameters | Category | Model | Dual-drive type A (Applicable for Crane Capacity) | Four-drive Type B (Applicable for Crane Capacity) | Dual-drive Type AH Large and Small Vehicle Mixed Control Brake (Applicablefor Crane Capacity) | | Four-drive Type Bh Large And Small Vehicle Mixed Control Brake (Applicable For Crane Capacity) | |
| | | HBS-07A(B) | 5-20T | 25-45T | HBS-07AH | 5-20T | HBS-07BH | 25-45T |
| | | HBS-22A(B) | 25-45T | 50-90T | HBS-22AH | 25-45T | HBS-22BH | 50-90T |
| | | HBS-37A(B) | 50-80T | 100-140T | HBS-37AH | 50-80T | HBS-37BH | 100-140T |
| | | HBS-55A(B) | 90-120T | 150-200T | HBS-55AH | 90-120T | HBS-55BH | 150-200T |
| Mechanical Parameters | Main Control Box Dimensions (mm) | Main Control Box Dimensions (mm) | 400*600 * 1500 (greater than 100T) 400 * 600 * 1000 (less than 100T) | 220 * 110 * 150 | Main Control Box Material | Steel Plate With Spray Paint | Brake Pedal Dimensions (mm) | Steel Plate With Spray Paint, Abs |
| | Ambient Temperature | −20 ° C~+50 ° C | Relative Humidity | ≤ 50% | Operating Voltage | 380V+15% | Completeness | 1 main control box, 1 brake pedal, and a 15-meter connection cable for the brake pedal. |

## DIFFERENCE FROM FOOT-PEDAL HYDRAULIC BRAKE SYSTEM

| | Foot-pedal Electronic Brake | Foot-pedal Hydraulic Brake |
|---|---|---|
| Price | Low | High |
| Lifespan | Long | Short |
| Installation | Simple, One Hour | Complex, Half A Day |
| Repair And Adjustment | Simple, Easy | Complex, Difficult |
| Maintenance Cost | Low | High |
| Maintenance Cycle | Basically No Maintenance Required | Requires Equipment Maintenance, Checks For Oil Leakage |
| Maintenance Personnel Requirements | Low | High |
| Spare Parts (hydraulic Valves) | Continue To Use | Original Spare Parts Cannot Be Used, New Spare Parts Required (wasteful, Brake Fluid Is Flammable And Hazardous) |
| Leakage Situation | None | Severe Oil Leakage, Environmental Pollution |

## Example of a 40-Ton Overhead Crane Retrofit

Using a 40-ton overhead crane as an example, installing this electronic brake system can extend its lifespan to 8 years.
Under the current braking system, the crane experiences about eight motor failures per year, with each motor replacement costing approximately 50,000 yuan, totaling 400,000 yuan annually.
If the crane has a lifespan of eight years, the current braking system will result in motor replacement costs of 3.2 million yuan over its lifetime.
This system can effectively enhance production efficiency, reduce the occurrence of safety accidents, and is an ideal device for brake control.

# HD-BATEQD Series
# Electromagnetic Crane Battery Power Detection Device

## PRODUCT INTRODUCTION

Batteries are an essential part of the power supply protection system, providing reliable support for the continuous operation of equipment. In the event of a sudden power outage, the battery pack can supply power to ensure the normal operation of systems such as electricity and communications. Currently, the power, communications, and railway industries widely use maintenance-free valve-regulated sealed lead-acid batteries, which do not require water refilling, and maintenance-free does not mean no maintenance at all.

After a period of use, lead-acid batteries are prone to issues such as the shedding of active materials, corrosion of positive plates, and sulfating, leading to a gradual decline in capacity. To estimate the effective time the battery pack can supply power, it is necessary to conduct power capacity tests.

In recent years, accidents caused by battery failures have continued to occur, seriously affecting and threatening the safe operation of equipment. Strengthening management and conducting effective inspections can significantly reduce accidents and prevent critical incidents such as communication interruptions. Routine maintenance and periodic inspections are crucial tasks. The electromagnetic crane battery power detection device is the optimal solution to these challenges.

## TECHNICAL FEATURES

The electromagnetic crane battery power detection device is an online fully automatic battery performance testing and monitoring system. With flexible and convenient installation methods, high reliability intelligent algorithms, high anti-interference ability and stability, it can adapt to various complex applications and provide you with safe and reliable battery monitoring and management solutions.

## SYSTEM FUNCTIONS

1. Real-time monitoring of battery voltage internal resistance temperature.
2. Real-time monitoring of UPS voltage and current.
3. Provide alerts to users in the shortest time when battery abnormalities occur.
4. Store and analyze battery historical data.
5. Visualize battery parameters.
6. Locate faulty batteries in the shortest time after a power outage.



- Real-Time Monitoring of Individual Battery Voltage
- Online Measurement of Individual Battery Internal Resistance
- Real Time Monitoring Of Battery Pack Charging/Discharge Current
- Real-Time Monitoring of Battery Pack Voltage
- Real Time Monitoring of Individual Battery Surface Temperature (Optional)

**Warning Items**

**Battery Pack**

Battery pack float charge voltage high/low warning
Battery pack discharge current overload warning
Battery pack charge current overload warning
Battery pack over-discharge warning

**Single Battery**

Single battery float charge voltage abnormal warning
Single battery internal resistance abnormal warning
Single battery over-discharge warning
Single battery open/short circuit warning



# HD-LX-01 Lifting Height Limiter (Laser Type)

## OVERVIEW

In industries such as metallurgy, mining, chemical engineering, and machinery, overhead cranes(commonly referred to as bridge cranes)and small vehicle hoisting drums often utilize shaft head limiters or fall limiters for safety purposes. Over prolonged use, these mechanical limiters are prone to failure, which can result in hooks exceeding safe operational distances, potentially leading to catastrophic incidents.

The HD-LX-01 Lifting Height Limiter represents our company's latest advancement in non-contact safety technology. This device employs a laser sensor as its detection element, ensuring precise and reliable measurement of hook lifting heights. It is extensively applicable across various industrial lifting equipment, offering enhanced safety and compliance with modern safety regulations in lifting operations.

## COMPOSITION AND FEATURES

The laser sensor hardware utilizes imported industrial-grade chips, allowing for precise measurement of detection distances. It features an industry-leading design with electrical isolation and electromagnetic shielding, ensuring the latest technology is implemented. This technology complies with GB/T14598 and IEC60255 standards, guaranteeing accurate signal detection and rapid response.

The main unit employs an integrated audio-visual alarm system. When the hook reaches the predetermined limit position, the system outputs a switch signal to control the hoisting mechanism, preventing further elevation and effectively avoiding hook over-travel. This provides a critical safety feature for industrial operations by mitigating potential hazards.



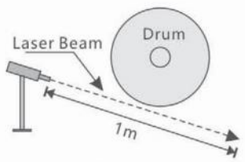
HD-LX-01
Main Unit



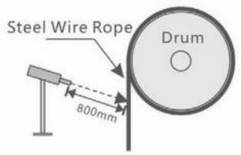
Laser Sensor

## INSTALLATION AND CONNECTION

The laser beam is factory-set with a distance of 1 meter. When the hook reaches the upper limit position, and the detected distance between the wire rope and the sensor is less than 1 meter(approximately 800 mm), the sensor is triggered to output an alarm signal. The specific distance should be adjusted based on actual on-site conditions.




Laser Path Unobstructed by Wire Rope (Normal State)




Laser Path Obstructed by Wire Rope (Position Reached State)





## TECHNICAL PARAMETERS

Laser Sensor Specifications

| | |
|---|---|
| Detection Distance | 1-50m |
| Response Time | 50mS |
| Precision | 5mm |
| Light Source | Laser |
| Operating Voltage | DC24V(provided by the main unit) |
| Environmental Temperature | -20 ° C~60 ° C |
| Relative Humidity | 95% |
| Installation Method | Pan-tilt bracket |
| Shell Material | Steel plate with spray paint |

Main Unit Specifications

| | |
|---|---|
| Audio Power | ≥ 3w |
| Operating Status Display | LED tube |
| Display Color | Red |
| Output Switch Quantity | 1 set |
| Contact Capacity | AC240V 3A 50Hz/DC24V 3A |
| Operating Voltage | AC220V 50Hz |
| Environmental Temperature | 10 ° C~60 ° C |
| Relative Humidity | 95% |
| Installation Method | Wall-mounted |
| External Dimensions(Unit: mm) | 261x89x213(width x depth x height) |
| Mounting Dimensions(Hole Diameter Φ6mm) | 212x173(horizontal x vertical) |

# HD-Q21 Type Hoist Weight Limiter

## OVERVIEW

The HD-Q21 type hoist weight limiter utilizes a software design with a modular mainboard structure, featuring high reliability, performance, and ease of installation. It fully complies with the "Overhead Hoisting Machinery Safety Protection Device Safety Technical Regulations"(GB12602-90)standard. It is mainly applicable for weight monitoring of two-point lifting hoists, such as main and auxiliary hooks or dual suspension points, double-girder bridge hoists, and lifting machines.

## PRODUCT FEATURES

1. This product employs a unique software design, offering extremely strong on-site interference resistance.
2. The product uses a zero-point automatic compensation technology, effectively eliminating the impact of long-term work on sensor drift, ensuring measurement accuracy.
3. All parts of the product have been adjusted to standard indicators using precision instruments, generally requiring no further adjustment upon installation.

## WORKING PRINCIPLE

When the hoist lifts an object, the sensor transmits a voltage signal proportional to the weight to the amplifier for magnification, followed by an A/D conversion into a digital signal, which is input into the microcontroller for intelligent processing. The final data is sent to the digital display for visualization. Simultaneously, the system compares the measured weight with the preset load limit. When the detected weight reaches or exceeds the preset limit, the limiter will sound an alarm to alert operators. Upon reaching an immediate alarm state, if the alarm persists beyond a specific threshold, the limiter will cut off the power to the hoist, stopping the hoist from moving in unsafe directions(without affecting movement in safe directions)to achieve overload protection.

## TECHNICAL PARAMETERS

1. Comprehensive System Error: ≤ 5% F · S(full scale)
2. Pre-alarm Point: 90% of rated load, yellow indicator light on, buzzer intermittent alarm.
3. Delayed Alarm Point: 105% of rated load, red indicator light on, buzzer continuous alarm, control relay delays for two seconds(actual power cut).
4. Immediate Alarm Point: 110% of rated load, red indicator light on, buzzer urgent alarm, control relay immediate action(power cut implemented) .
5. Relay Capacity: AC 250V, 10A.
6. Power Supply Voltage: AC 220V/AC 380V, 50HZ.
7. Operating Environment: -20°C to +60°C, 90% RH.
8. Sensor Overload Capacity: 1.5 times rated load.
9. Sensor Protection Level: Ip65.
10. Display Box Protection Level: Ip44.
11. Connection Cable: RVVP 4X0.4mm² or above, four-core shielded cable.





# HTY-LST Series
# Hoist Steel Wire Rope Laser Cleaning And Oiling Machine

## PRODUCT INTRODUCTION

The HTY-LST series hoist steel wire rope laser cleaning and oiling machine utilizes laser "green" cleaning technology by mixing compressed air with sprayed oil within the oil chamber. The specially designed sprayer evenly atomizes and coats the entire surface of the steel wire rope. After the solvent in the spray oil volatilizes, it forms a uniform film on the surface of the steel wire rope. This provides excellent penetration, optimizes internal lubrication of the steel wire rope, and reduces internal wear and tear caused by high loads. It represents a developmental trend in hoist steel wire rope lubrication.

## PRODUCT FEATURES

1. Laser cleaning removes dust from the surface of the steel wire rope, achieving the optimal environment for oiling.
2. Provides uniform oiling of the entire steel wire rope, ensuring even coating.
3. Achieves stable oiling results with precise control over oil quantity, preventing lubricant wastage.
4. Ensures the lubricant has good penetration, optimizing the internal lubrication of the steel wire rope.
5. Allows for oiling during the hoisting operation.

## EXPECTED BENEFITS

1. The HTY-LST series hoist steel wire rope laser cleaning and oiling machine uses laser cleaning technology to reduce friction during wire rope operation, increasing the lifespan of the wire rope.
2. The machine's automatic oil spraying can fully achieve the oiling effect of manual application. The spray temperature can be set above 140°C and maintained steadily. The sprayed lubricant's viscosity, penetration, and coating thickness uniformity are far superior to manual application.
3. Regular maintenance lubrication can be performed on the steel wire rope system, keeping it in excellent lubrication condition and extending its service life by 2 to 3 times. It reduces the material cost of hoist maintenance. Importantly, it significantly enhances the personal safety of inspection personnel by eliminating the safety hazards associated with manual oiling. Additionally, the oil spraying process does not require special downtime for maintenance, allowing oiling during hoisting operations, thus reducing the production losses caused by traditional oiling processes that require halting operations.

## CLEANING PRINCIPLE

Laser cleaning technology is a new type of "green" surface cleaning technology. It uses high-frequency and high-energy laser pulses to irradiate the working surface. The coating layer can instantly absorb the focused laser energy, causing the surface oil, rust, or coating to evaporate or peel off instantly, effectively and rapidly removing surface attachments or surface coatings.







# HD-CAIUUnmanned Overhead Crane And Intelligent Dispatch System

## OVERVIEW

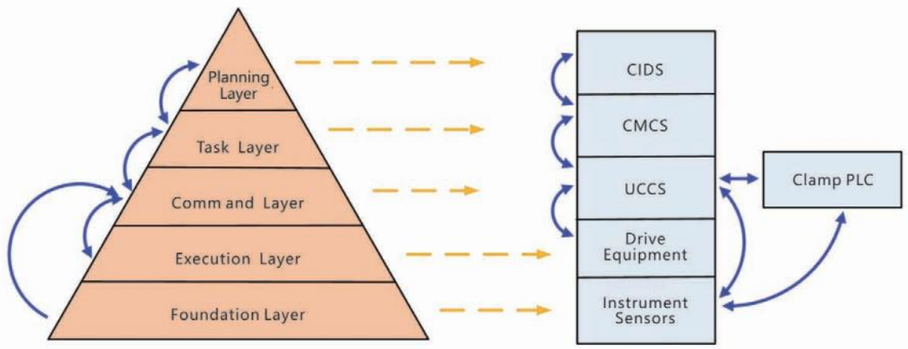
The unmanned overhead crane and intelligent dispatch system is an integrated system combining intelligence, informatization, and automation. It consists of the Crane Intelligent Dispatch System(CIDS), Crane Management Control System(CMCS), Unmanned Crane Control System(UCCS), vehicle identification system, portable human-machine interface, control room HMI, and data analysis system (PDA). The system is based on unmanned crane technology and actively implements real-time interaction of production information and logistics information, involving material distribution, feeding, production, unloading, storage, and cargo delivery. It establishes industry standards for intelligent logistics information of unmanned overhead cranes in the metallurgical industry, optimizing logistics process flow and significantly enhancing the operational safety metrics and efficiency of overhead crane operations. It provides strong support for improving enterprise safety production and efficiency.

## SYSTEM FEATURES

- Promotes the intelligent informatization of enterprise production, ensuring seamless data integration
- Optimizes personnel structure for efficient allocation of staff
- Ensures the quality of steel coil handling, preventing damage during operations
- Extends equipment maintenance cycles, reducing failure rates
- Standardizes crane operations to enhance operational efficiency
- Uses visual technology for three-dimensional perception of coil positioning, width, and height
- Implements dynamic adjustment models in storage areas, analyzing on-site coil handling for dynamic strategy adjustments
- Interacts with equipment to determine operational readiness and capability to engage with materials
- Utilizes obstacle recognition to determine crane travel paths
- Intelligently dispatches cranes, dynamically prioritizing operations for balanced logistics
- Coordinates with auxiliary equipment for dynamic position tracking of coils, increasing the success rate of first commands
- Analyzes and calculates crane handover efficiency, dynamically adjusting operations to reduce handover times
- The system performs operations autonomously, analyzing, reasoning, and making decisions to arrive at a singular conclusion

## SYSTEM ARCHITECTURE

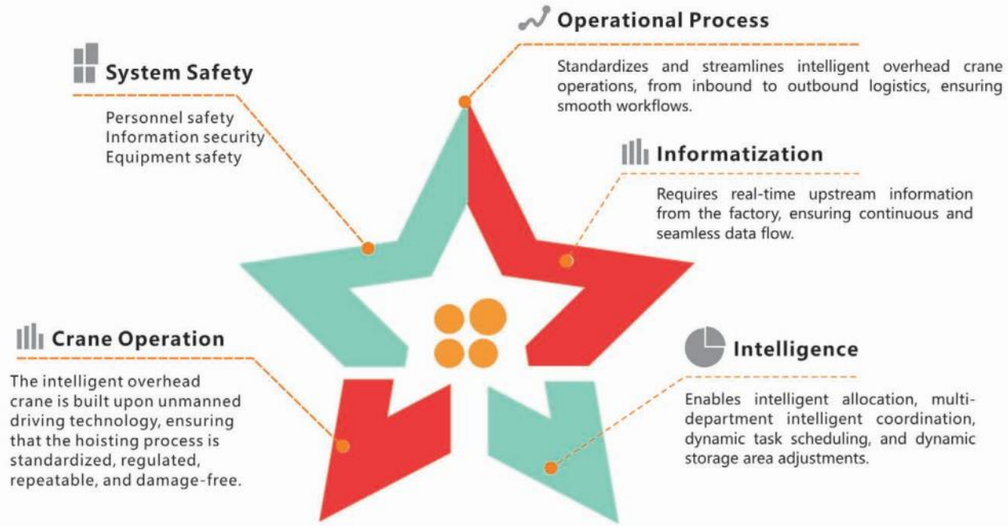
The system adopts a unified principle of management coordination and multi-department automatic control, dividing the system into five layers. Through interactive real-time data flow communication, it achieves crane control automation, production management intelligence, and logistics process simplification. Relying on the Internet of Things and Profibus industrial bus, it fully utilizes wireless networks and employs modular programming, ensuring unified management and execution, with clear hierarchies and complete functionality.



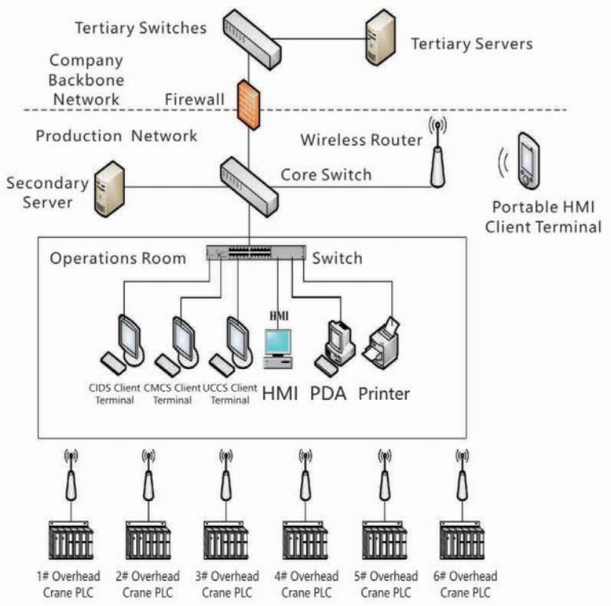



# HD-CAIU Unmanned Overhead Crane And Intelligent Dispatch System

## THE ADVANTAGES OF INTELLIGENT OVERHEAD CRANES




## NETWORK STRUCTURE





Server and Network Cabinets


PLC


Laser Sensor


Transmission Equipment

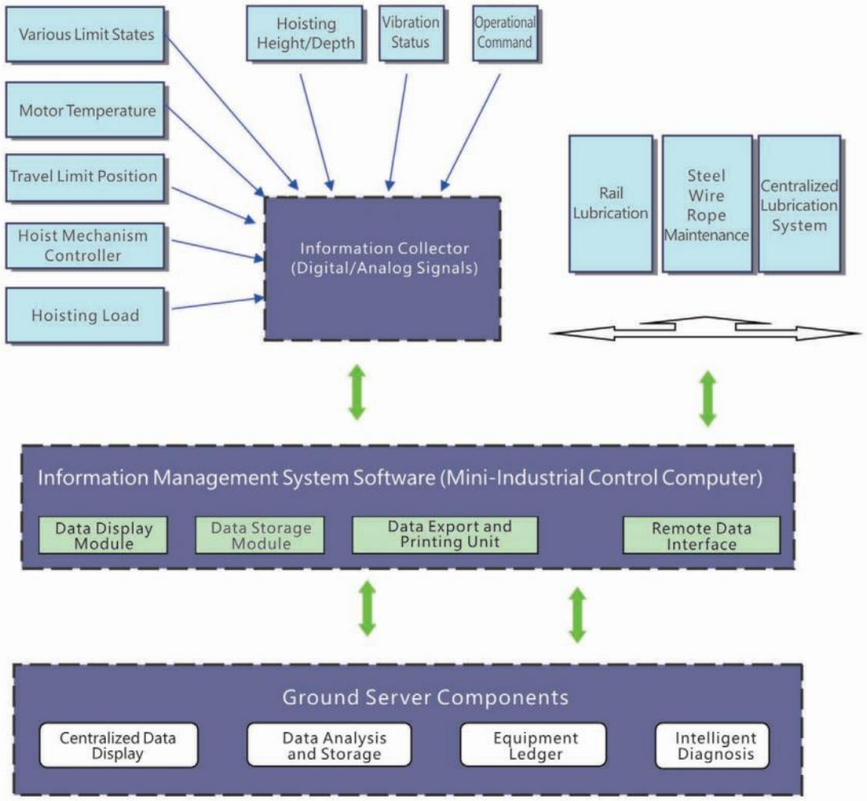
# HD-CIMS Crane Intelligent Maintenance Management System

## OVERVIEW

With the development of computer network technology, modern control technology, information transmission technology, and sensor technology, remote fault diagnosis and maintenance technology can rapidly mobilize diagnostic and maintenance resources, enabling swift, timely, and accurate diagnosis and maintenance of complex systems. Currently, due to the industrial sector's demand for predictive maintenance technology, research in the area of fault diagnosis is gradually shifting toward condition monitoring. The implementation of intelligent maintenance technology has established a robust foundation for preventive maintenance and fault diagnosis. As cranes are critical in steel production, ensuring the timely identification and resolution of malfunctions is essential to prevent costly production downtime.

Our company's independently developed Hoist Intelligent Maintenance Management System utilizes neural network-based diagnostic methodologies to perform intelligent diagnostic equipment management, effectively resolving various operational challenges.

## EQUIPMENT STRUCTURE DIAGRAM




The system uses a single crane collector to gather data, allowing the crane system to meet the requirements of national standard GB/T28264-2017 and perform basic management functions. It establishes a centralized management center on the ground for cranes, using both wireless and wired methods to collect information from each crane to the ground data server. The ground server provides comprehensive management of the cranes, maintains equipment records, analyzes all overhead crane data, performs remote diagnosis, and generates statistical reports.



# HD-CIMS Crane Intelligent Maintenance Management System

## INFORMATION COLLECTION

**A、Switching Signals**

1. Operation Command
2. Overspeed Switch Status
3. Limit Switch Status and Interlocking
4. Load Limiter Alarm Status
5. Fault Alarm Status of Adjustment Devices
6. Hoist Mechanism Controller Status
7. Safety Distance of The Same Track Running Mechanism
8. Reverse Status
9. Main Hoist Mechanism Contact Status, Etc.

**B、Analog Signals**

1. Hoisting Load
2. Hoisting Height/Lowering Depth
3. Travel Range of Large and Small Cars
4. Video Monitoring of Hoisting Hook Suspension Points
5. Motor and Reducer Temperature
6. Wheel Bearing Box Temperature
7. Electric Cabin and High Voltage Cabin Temperature
8. Vibration of Motor Transmission Shaft Position
9. Incoming Voltage and Motor Current

## MAINTENANCE-FREE FUNCTION

**1. Rail Lubrication**

Inspecting and replacing crane wheels and rails is highly challenging and can lead to safety hazards. Moreover, replacing wheels and rails requires halting crane operations, resulting in considerable disruptions to daily production activities. Practical experience demonstrates that lubricating the contact areas between the wheel flanges and the rails can mitigate the adverse effects of crane operations on the rails. Equipped with our company's rail lubrication system, effective lubrication and maintenance can be achieved, reducing wear and tear.

**2. Steel Wire Rope Lubrication**

In regular production processes, steel wire ropes are susceptible to defects such as cracks and pits, leading to severe corrosion damage. According to national standards, steel wire ropes must be periodically lubricated to prevent corrosion. Surface defects can accelerate wear and fatigue, potentially causing rope failure. Therefore, it is crucial to conduct regular lubrication maintenance to ensure proper operation and minimize abrasion.

Our company's steel wire rope lubrication system applies heated lubricant using a high-pressure pump, ensuring excellent penetration and optimizing internal lubrication. This process significantly reduces internal wear and tear under high tensile loads.



**3. Centralized Lubrication System**

The centralized automatic lubrication system is a new technology that has developed rapidly in recent years. It controls a single oil pump to lubricate dozens to hundreds of lubrication points simultaneously, overcoming the inefficiencies of manual lubrication and adequately meeting machinery lubrication requirements.

With our company's centralized automatic lubrication technology, not only can precise offline lubrication be achieved, but it can also be integrated with the appropriate control system to perform automatic lubrication. The centralized system ensures that lubrication points maintain optimal lubrication conditions. Lubrication operations are conducted seamlessly during machine operation, with no risk of missing hidden lubrication points. The lubrication process remains clean and uncontaminated, and if any lubrication faults occur, the system is equipped with diagnostic capabilities to promptly report and record the issues for swift resolution.

# HD-CIMS Crane Intelligent Maintenance Management System

## SOFTWARE FUNCTIONS

01. The system complies with the requirements of national standard GB/T28264-2017 for safety monitoring and information management systems.
02. The system offers real-time monitoring and diagnostic capabilities for critical equipment and associated switch states, leveraging diagnostic data models to assist maintenance personnel in quickly analyzing equipment faults and facilitating rapid fault elimination, thereby ensuring production efficiency and minimizing downtime.
03. Displays data flow information such as: breaker status, contactor status, load, pressure, variable frequency, and electrical device circuit status.
04. Displays operational commands, file status, forward contactor IO point, reverse contactor IO point, and acceleration contactor IO point status.
05. Real-time display of motor, reducer, wheel bearing box temperature, electric cabin, and high-voltage cabin temperature.
06. Real-time display of motor transmission shaft position vibration status.
07. Real-time display of incoming voltage and motor current.
08. Monitors server component status in real-time: CPU usage, memory usage, disk space, and remaining disk life.
09. Crane status changes can be queried. Users can query all collected data by device, date, time, and status as multiple data query points. Output formats and table structures can be freely selected.
10. The system can display data in real-time or historical mode using curves, with support for switching between real-time and historical modes. Historical modes support time-based queries, and monitoring software curves can be exported as PDF or JPEG files.
11. Equipment ledger and lifecycle analysis functions:
    (a) Establish an equipment ledger on the server, allowing users to manually or automatically import equipment information sheets according to specified formats.
    (b) The system supports regular inspections and required maintenance intervals of spare parts, allowing for comparison between replacement intervals and maintenance cycles, and timely notifications for maintenance personnel.
    (c) The system can provide maintenance personnel with suggestions based on the condition of spare parts.
12. Establish a basic model database based on lightweight networks:
    (a) The basic model database includes operational specifications, common fault solutions, production safety regulations, and standard parameters for equipment. Each model can complete data learning according to basic models to enhance the intelligent diagnosis system.
    (b) This regulatory function can be accessed by terminals at control points and uploaded to the recording server, tracking system monitoring, and regulatory operations.
13. Data transmission functions:
    (a) Recorded data is stored locally or remotely, allowing equipment to access recorded internal data to understand crane operational status (such as large vehicle position, hook position, and load weight information).
14. System setup and parameter management:
    (a) Users can view and set system parameters such as lubricant parameters and lubrication system settings.
15. System maintenance records:
    (a) Users can view and automatically manage maintenance data such as lubrication parameters and lubrication system data.





HD-CIMS Crane Intelligent Maintenance Management System

## SOFTWARE INTRODUCTION

**1) Startup Interface**



After the equipment is powered on, the system automatically launches. The initial startup interface, as shown in the left image, begins the process of self-checking all equipment connected to the system to prevent errors caused by equipment issues.

**2) Main System Interface**



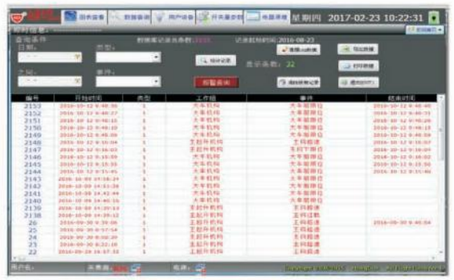
Once the equipment self-check is complete, the software transitions to the main interface for operation. The main interface is divided into three sections:
- Top Left: Displays a schematic of the crane with the status of the smaller car shown.
- Top Right: Shows a side view of the crane, where dynamic displays can be seen, along with the positions and actual loads of the main and auxiliary hooks.
- Bottom Section: Displays the status of various limit switches and controllers of the crane.

**3) Data Interface**



The upper section of the interface displays various monitoring data. The lower section continues to display important information such as limit positions.

**4) Query Interface**



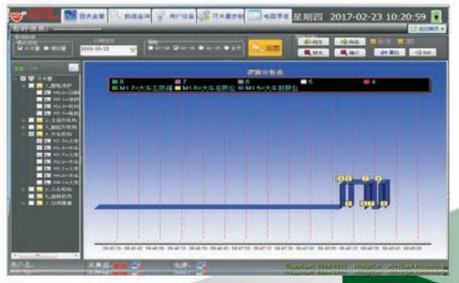
Supports various query methods, including time-based queries, device type queries, and event status queries. Query results can be exported in Excel format or automatically output to a USB drive.

**5) Settings Interface**



The upper section of the interface displays various monitoring data. The lower section continues to display important information such as limit positions.

**6) Data Analysis**



Analyzes collected switch signals and analog data.

# Intelligent Voice Monitoring And Alarm Device

## BACKGROUND

In industrial production, parameters such as temperature, pressure, altitude, and distance are commonly monitored variables. Therefore, certain devices are used to check for abnormal open and closed states of switch signals beyond limit parameters, issuing precise alarms. Currently, most alarm devices use analog circuits and digital logic circuits with contact relay control circuits. Essentially, they function as a one-to-one signal response: one input to one output.

The Hongdun IoT Intelligent Voice Alarm Device can simultaneously monitor multiple parameters exceeding their limits, prioritize alarms, record alarm voice inputs, and transmit accurate alarm voice information and PLC commands via intelligent broadcasting equipment. This allows errors to be immediately identified upon alarm activation, preventing confusion between errors and critical signals that require urgent handling and avoiding serious safety incidents from continuous alarm signals.

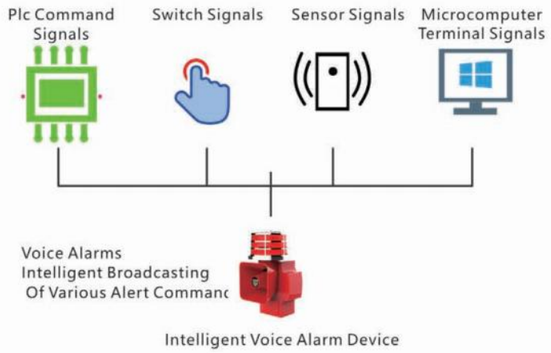
## SOLUTION

### Intelligent Voice Monitoring Alarm Device

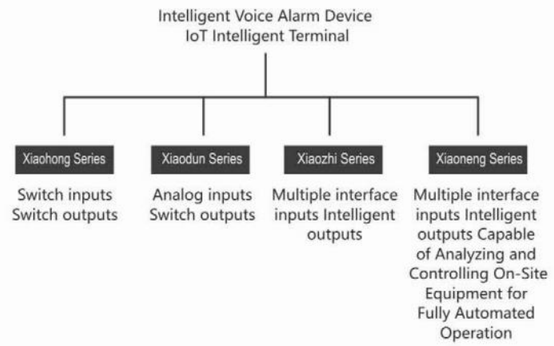
1) Multi-color design with a high-tech look
2) Selectable alarm volume, suitable for various scenarios and industries
3) Power selection based on environmental application to maximize efficiency



### Basic Architecture Of Intelligent Voice Monitoring And Alarm Device




### Intelligent Voice Monitoring Alarm Device's Technical Features and Development Directions




The intelligent voice monitoring alarm device can receive various signals, including PLC command signals, switch signals, sensor signals, and microcomputer terminal signals, and directly broadcast internal alert commands.

**Xiaohong Series:** Issues different alarms based on device status and operational commands; coordinates with other devices via command centers for unified alarms and data uploads.

**Xiaodun Series:** Issues different alarms based on device status and analog signals; coordinates with other devices via command centers; monitors changes in temperature, current, pressure, and position for comprehensive alerting.

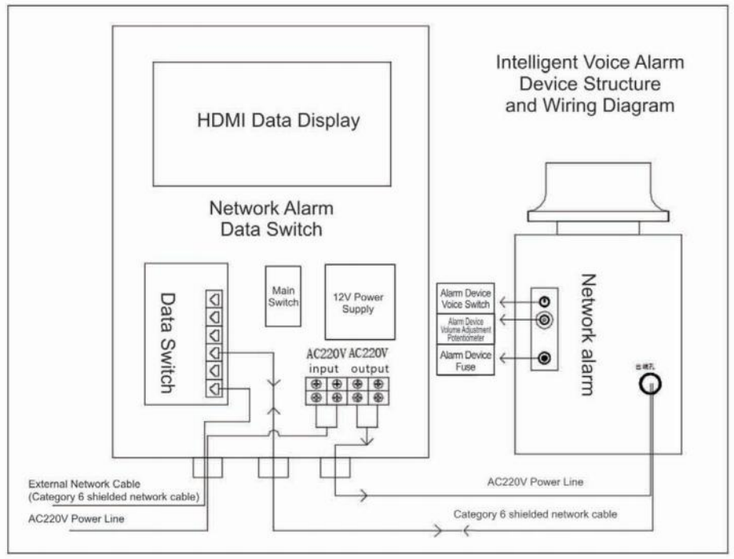
**Xiaozhi Series:** Collects real-time device status, intelligently responds, supports remote monitoring and control.

**Xiaoneng Series:** Collects comprehensive on-site device status, intelligently responds, supports remote monitoring and control, and coordinates operations.



Intelligent Voice Monitoring And Alarm Device

### Rizhao Steel - Application of Iron Alloy Feeding System




The intelligent voice monitoring alarm device dynamically scans the PLC's material weighing address. When a corresponding address position changes, it immediately retrieves the relevant silo, material weight, and other data. This data is converted into a voice message, which includes prompt messages, alloy name messages, and weight messages, forming a complete sentence for broadcast. This process completes a single voice announcement.

According to the voice library, the alarm phrases are as follows:

- "Furnace #4 starting to weigh materials: high-carbon pig iron, 1.5 tons"
- "Furnace #5 starting to weigh materials: manganese iron, 2.1 tons"
- "Furnace #6 starting to weigh materials: low-carbon pig iron, 0.6 tons"

### On-Site Images






# Forklift Visual Collision Avoidance System

## OVERVIEW

On June 19, 2020, the national standard GB/T 38893-2020 "Industrial Vehicle Safety Monitoring and Management System" was officially released and approved by the state. This standard specifies the structure of safety monitoring and management systems for industrial vehicles.

Our company's forklift visual collision avoidance system is professional safety equipment that meets national safety requirements. It can monitor, identify, and track people, objects, and other elements around the vehicle in real time. It performs location detection and issues sound and light alerts when a potential danger is detected, outputting signals to slow down the vehicle. The system effectively warns on-site personnel to quickly dodge and stay away, ensuring the safety of forklift operations.



## SYSTEM FUNCTIONS

### Pedestrian Detection (PDS)

Real-time detection and identification of pedestrians in the working environment to achieve pre-collision warnings.



### Blind Spot Monitoring

Real-time monitoring of the vehicle's surroundings up to a 360° range (with a single 100° view, supporting up to four views). Monitors blind spots in real time and alerts the vehicle when pedestrians enter dangerous proximity.



### Pedestrian Collision Warning (PCW)

Real-time monitoring of pedestrians. When pedestrians approach the vehicle dangerously, an audible warning is triggered. The system can output a cutoff signal (for vehicle speed limiting functions).



### Driving Video Recording (DVR)

Real-time recording of the vehicle's driving process locally, with a default storage duration of 14 days (640*480 resolution).



### Custom Alarm Zone Setting

Customize the alarm range according to the usage scenario to meet the personalized customer needs.



### Cloud Based Visualization System

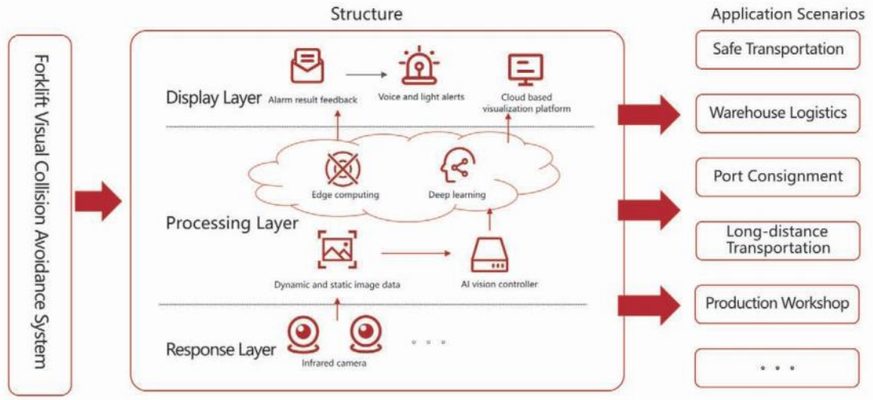
Analyzes alarm events, image visualizations, vehicle GPS positioning, route analysis, and electronic fence asset management.





Forklift Visual Collision Avoidance System

## SYSTEM ARCHITECTURE AND COMPOSITION




### System Compositions

- AI Vision Controller
- External Alarm Device
- Power Module
- Audible and Visual Alarm Device
- Infrared Cameras
- Industrial Display Screen
- Switch Signal Box
- HDMI Connection Cable



## SYSTEM ADVANTAGES

- ▶ Multiple warning systems, identifying potential hazards, avoiding collision accidents, and eliminating safety hazards;
- ▶ Real-time monitoring of vehicle safety, ensure vehicle safety and regulate driver behavior to reduce accident rates;
- ▶ Accident resolution, clarify accountability, leading to more precise planning and effective cost reduction;
- ▶ By analyzing data, conduct risk forecasting to enhance employee safety awareness and effectively improve enterprise management levels.

### Hardware Advantages

- 4-Channel Camera Expansion
- Edge Computing Recognition Acceleration
- Recognition Time < 300ms
- IPS Full View High-Brightness HD Screen
- High-Precision Recognition, Accuracy > 98%
- Support for Beidou/GPS Dual Mode Positioning, High Precision
- Efficient Fanless Heat Dissipation Design, Stable Continuous Operation
- 3.0TOPS Computing, High-Performance NPU and AI Platform
- Industrial High-Standard Structural Design and Use of Automotive-Grade Components
- Automotive-Grade Power Protection for Safety in Vehicle Applications

### Software Advantages

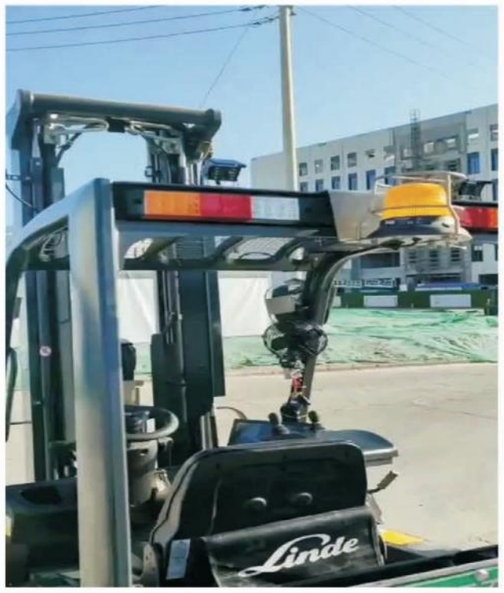
- Rapid deployment without the need for target area calibration
- Dynamic and static target recognition, precise and fast
- Visualized screen with integrated blind spot voice and light alerts
- Customized alarm area configuration for more flexible target recognition
- Stable and reliable Linux system
- Customer-configurable cloud visualization platform for alarm image review
- Vehicle GPS positioning, route tracking, vehicle electronic fence
- The system automatically saves 14 days of videos for customers to export and view
- Expandable to 4 x 100-degree wide-angle cameras for 360-degree detection
- Cloud data platform, cloud analysis of alarm events, viewing of alarm images

# Forklift Visual Collision Avoidance System

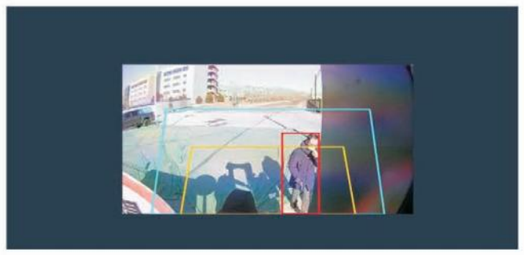
## APPLICATION SCENARIOS




## APPLICATION CASES







Forklift Visual Collision Avoidance System





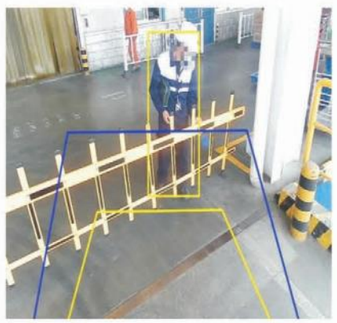














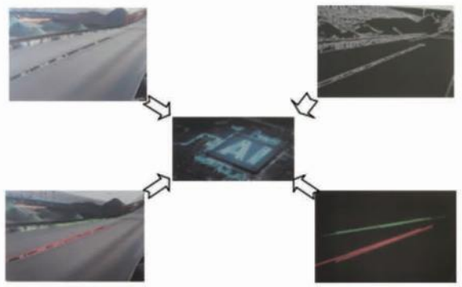


# HD-AITT Belt Conveyor (AI) Safety Inspection System

The belt conveyor is a critical piece of equipment used for transporting ore in metallurgical enterprises. During production, issues such as tears, abrasions, and foreign object intrusions can pose significant risks to safety and production continuity. Traditionally, manual inspections combined with various sensors have been used to prevent these issues, but their effectiveness has been inconsistent, leading to the occurrence of major accidents that are hard to predict or detect. Manual inspections also present safety hazards to personnel operating on-site.

Ensuring safety and minimizing the occurrence of serious belt conveyor accidents is crucial for safe production. Our company employ cutting-edge AI algorithms and boundary AI neural network chips from leading industry solutions, specifically tailored for the metallurgical industry's belt conveyor operations. By leveraging advanced technological methods and rigorous technical practices to classify and visualize data, we develop models and conduct in-depth training to fundamentally resolve issues related to belt conveyor tears and accidents during transport operations.

## PRODUCT INTRODUCTION




The AI Belt Conveyor Safety Inspection System developed by our company utilizes machine vision and AI technology to monitor belt conveyor loads, operational status, and safety conditions. It addresses issues such as belt misalignment, slippage, overflow, foreign objects, and tears, thus minimizing human intervention and achieving automation and unmanned operation. The system is capable of early detection of belt tears, analyzing the correlation between belt slippage and load, and providing multiple judgment criteria for belt damage. It continuously monitors the belt conveyor' s operational status to promptly identify and warn against potential belt accidents and safety hazards, thereby reducing the likelihood of belt failures and the associated economic losses from accidents.

## SYSTEM COMPONENTS

### Specialized Camera

The high-definition video camera is designed to effectively transmit data such as location, resolution, and frame rate to the AI intelligent analysis terminal. The camera performs well under low light conditions, with high image clarity and precise positioning using a high-performance GPU module, which significantly enhances target detection accuracy.

The camera also features AI-based smart cleaning capabilities, automatically activating a cleaning system based on the screen's clarity, using water jets to clean the lens, ensuring optimal visibility and alerting for low water levels.

### AI Intelligent Analysis Terminal

The AI intelligent analysis terminal can use AI learning to grasp object features in real-time for field video inspection and analysis. It utilizes advanced AI technology for video analytics and edge computing; supports RISC-V architecture with TPU; supports DNN/CNN/RNN/LSTM and other well-trained neural network models. It also interprets and adjusts in real-time at the edge for efficient deployment.

### Remote Server

The remote server enables centralized monitoring of all surveillance points, aggregates alert information, and remotely modifies various parameter functions of the monitoring points. Specific functions can be adjusted per customer requirements.

### Laser Line Auxiliary Device

A laser line is projected onto the belt to assist the camera in analyzing tear conditions, enhancing analysis accuracy, and minimizing false reports.

### Belt Positioning Device

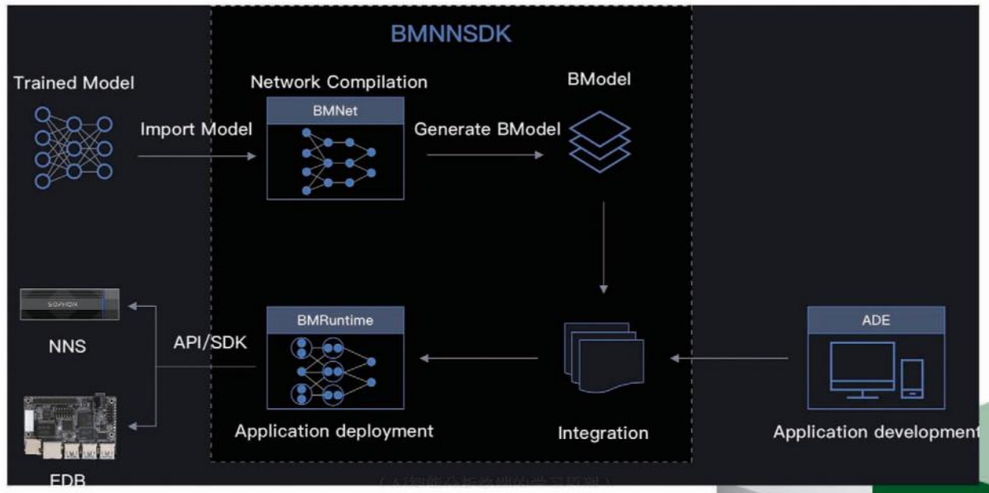


# HD-AITT Belt Conveyor (AI) Safety Inspection System

## SYSTEM FUNCTIONS AND FEATURES

The system is based on an AI intelligent analysis-driven conveyor belt protection and detection system. Functions include: camera vision recognition, high-precision laser auxiliary, and AI deep learning + edge computing to detect the operational status of conveyor belts and output alarm signals.

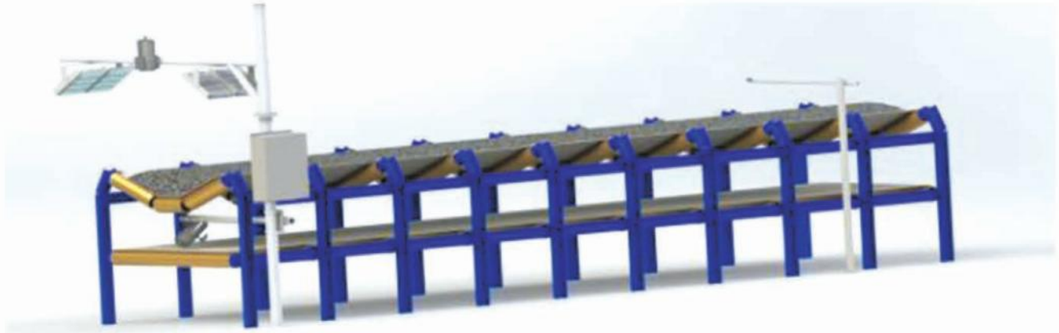
01. The conveyor belt protection and detection functionality uses AI intelligent terminals to analyze the status of the belt through neural network models. It monitors for conditions such as deviation, slippage, overload, foreign objects, and tears. When an abnormality occurs, the system promptly issues audio and visual warnings, dispatching control signals to intervene. Video evidence is retained, documenting the exact location, distance, and time of any tears.
02. The alarm inquiry function allows users to access historical records of alarms, including viewing alarm locations, times, and real-time video snapshots, with historical records preserved for over three months.
03. The system features a high-definition video capture capability, which enables real-time playback and historical review of captured video footage.
04. Through reinforcement learning, the system continuously improves its fault model capabilities. The AI terminal supports ongoing upgrades to its recognition capabilities, allowing enhancements in response to new demands through manual upgrades.
05. Users can set customizable alarm levels, defining alarm thresholds and linking signals to other equipment for seamless integration and automated response.
06. The system's intelligent self-adjustment functionality autonomously performs PID calculations, cleans camera housings, and initiates lens washing based on alerts of water scarcity, activating auxiliary lighting as required.
07. Equipped with cameras, encoders, LED lights, AI modules, and water tanks, the system provides comprehensive self-diagnosis and alarm capabilities, immediately issuing alarms and displaying internal system faults upon detecting any anomalies.
08. Images of belt tear incidents are automatically saved during alarm events to a designated file directory for user access, facilitating detailed examination and corrective actions (historical records are retained for more than three months).
09. High precision monitoring, capable of detecting tears as small as 5mm (for surface wear-through).
10. Field collection at 3 Megapixels, analyzes at a resolution of 1920*1080, with storage and transmission at a resolution of 640*480, enabling rapid operation in low-code stream speeds and precise high-code feature collection, minimizing false operations.



# HD-AITT Belt Conveyor (AI) Safety Inspection System

## FEATURES OF THE AI INTELLIGENT ANALYSIS TERMINAL DEVICE

The AI Intelligent Analysis Terminal employs a deep learning inference AI chip focused on edge applications. The TPU (Tensor Processing Unit) provides 10 TOPS (Tera Operations Per Second) of computational power under 8-bit integer operations. With Winograd convolution acceleration, the performance increases to 21 TOPS. The specially designed TPU driver efficiently supplies the processing cores with high-bandwidth data streams. The chip includes 2MB of memory, optimizing performance for data reuse and offering maximum programming flexibility. Mainstream deep learning frameworks such as Caffe and TensorFlow, along with common CNN (Convolutional Neural Network), RNN (Recurrent Neural Network), and DNN (Deep Neural Network) models, can be executed on the platform. Designed as a versatile acceleration platform for AI applications, it can serve as a coprocessor to accelerate deep learning inference tasks, capable of receiving video streams or other data via Ethernet or USB ports, and subsequently performing inference and other computer vision tasks.



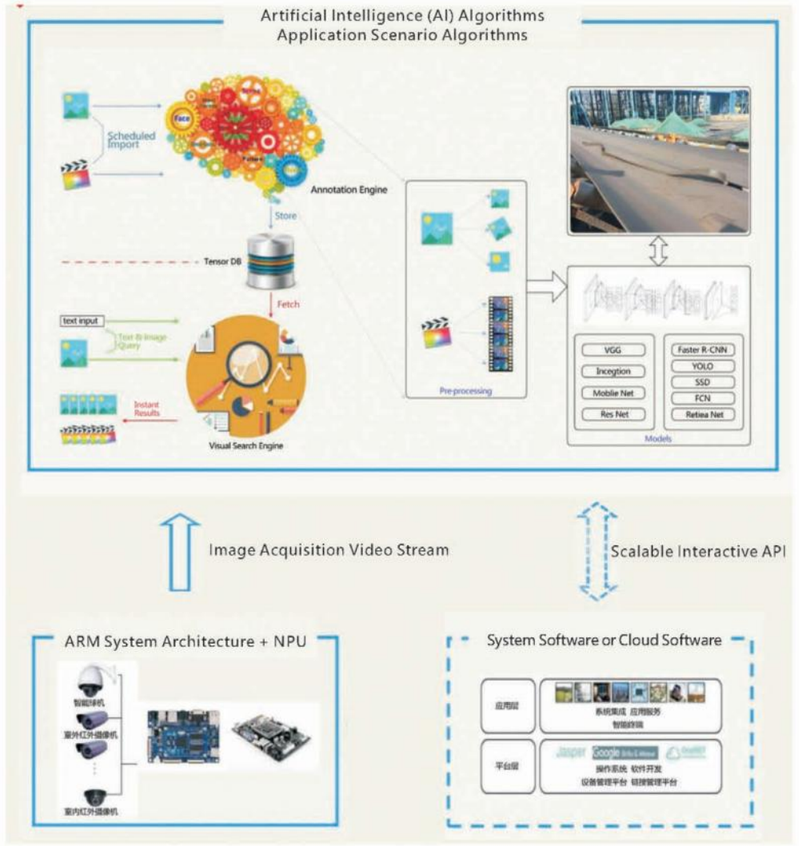
At the tail of the conveyor belt of the inspection machine, a high-definition camera with an AI module is installed above and below the belt at the drop point, continuously capturing images 24 hours a day. This enables real-time software analysis without delay, and in case of anomalies, alarms or associated control actions are triggered to prevent severe accidents. Unlike a human patrol inspecting the drop point for 24 hours, this system continuously monitors the belt, using AI to process and analyze video feeds or human eyes replaced with AI modules for intelligent judgment.

To prevent misguidance during conveyor operation, the Wiener filter method is used to restore degraded images. For real-time recognition of fast-moving belt tear patterns, the CamShift algorithm is employed to track and capture the target image of the moving belt tear sequence, while the Canny algorithm is used to extract the edges of the belt tear pattern and provide early warnings about the belt tear condition.





# HD-AITT Belt Conveyor (AI) Safety Inspection System




| Technical Core | Intelligent Analysis | Strong Reliability | Real-Time Monitoring | High Security | Accident Prevention |
|---|---|---|---|---|---|
| The modular camera is used for visual video streaming. The advanced neural network chip and AI software algorithms achieve real-time processing with low latency, high performance, and high reliability. | Based on AI vision neural network technology, the system's AI intelligence product can comprehensively judge the continuous supply chain breakpoints caused by belt tearing or foreign objects. | The system adopts a non-contact detection method to avoid equipment damage caused by harsh on-site environments. | Compared with manual inspection, the system is not affected by human factors, highlighting its comprehensive inspection features. | The system significantly reduces the workload of manual inspections, thereby reducing personal safety risks and the likelihood of injuries. | The system can proactively identify issues that were previously difficult to detect, such as foreign objects, cuts, and tears. |