HIRDA-LZ
Infrared thermal imaging intelligent monitoring system for continuous casting steel billets
Technical Specifications

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catalogue

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Technical specificationssummary

In the continuous casting process, the production process of speed control and fixed length cutting control of the continuous casting machine is very sensitive to the billet temperature; the solidification time of the billet is much lower than that of the straightening roller and local chain fracture, the production quality decreases and the billet breaks may occur. If the temperature is too low, it is difficult to plastic and damage the life of production machinery. Therefore, the temperature of the billet is a parameter that cannot be ignored in the continuous casting process.

Infrared thermal imaging thermometer adopts advanced non-contact infrared detection technology to quickly, accurately, conveniently and intuitively display the surface temperature field distribution of the measured object, and measure the surface temperature of the object. Without requiring direct contact with the surface of the measured object, it can quickly test object surface temperature readings and can reliably measure hot, dangerous, or difficult to contact object surface temperatures. The infrared thermal imager measures very fast and can intuitively and continuously test the temperature change on the surface.

1 System introduction

1.1 System brief

HIRDA-LZ continuous casting billet infrared thermal imaging intelligent monitoring system is an infrared thermal imaging product specially used for continuous casting billet temperature monitoring. The system is mainly composed of infrared thermal imaging movement, infrared lens, air-cooled metal protective cover, thermal imager control cabinet, image algorithm server and client software.

The system adopts full-amplitude radiation temperature measurement technology, which can simultaneously obtain multipoint temperature value; temperature measurement range up to 2500℃; self-developed temperature measurement algorithm with high temperature measurement accuracy; metal shield design, IP66 protection grade; the system software can realize the functions of target infrared heat map display, thermal data collection, storage and analysis, alarm at high and low temperature, positioning and temperature tracking.

This product has been widely used in iron and steel metallurgy, non-ferrous metals, electric power, cement, glass and many other industries temperature monitoring.

The product field application map is shown in Figure 1.

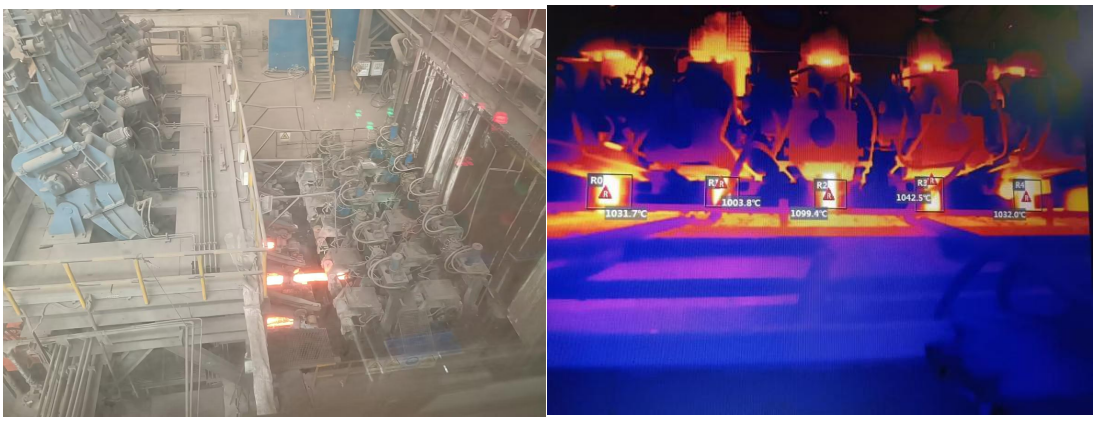


Figure 1 HIRDA-LZ intelligent monitoring system for continuous casting billet infrared thermal imaging

The system composition is shown in Figure Figure 22.

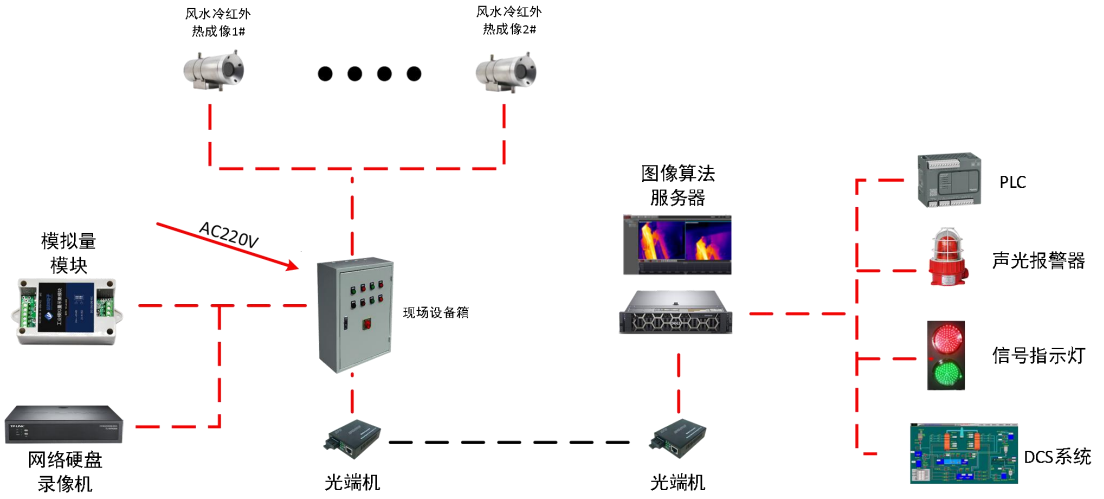


Figure 2 Block diagram of HIRDA-LZ

1.2 System characteristics

- Operating temperature range is wide, can work at-20℃ ~ + 60℃ ambient temperature;
- High protection level, the highest protection level can reach IP66;
- Full-screen real-time temperature measurement, wide coverage range;
- Without relying on the system platform, it can directly log in to the web page to access the image and configuration, and can directly output the alarm signal to the PLC or the alarm;
- Support the onvif protocol, can access to the mainstream NVR;
- Temperature data can be connected to the LED screen and the PLC;
- Electric / autofocus, at any time through the software to focus operation;
- Temperature measurement range can be customized, the maximum support-20℃ to 2500℃;
- The temperature measurement accuracy is better than ± 2℃ or ± 2%;
- Support the modbus protocol and can dock with the DCS system for temperature data transmission.

1.3 System utility requirements

2.3.1 Power supply

The field probe supplies 220VAC 50 / 60 HZ and power 50W / set

Power supply in the control room: 220VAC 50 / 60 HZ power: 300W

2.3.2 Cooling (purge) the gas

Gas type: dry compressed air or nitrogen, instrument gas

Compressed air temperature: 35℃

Compressed air pressure: 0.4 Mpa

Compressed air flow rate: 0.1-0.2m3/Min

2 application scenarios

Acquisition and analysis of continuous casting billet surface temperature.

3 system composition

HIRDA-LZ continuous casting billet infrared thermal imaging intelligent monitoring system is mainly measured by highly protective infrared thermal imaging

Thermometer, thermal imager control cabinet, image intelligent server, etc.

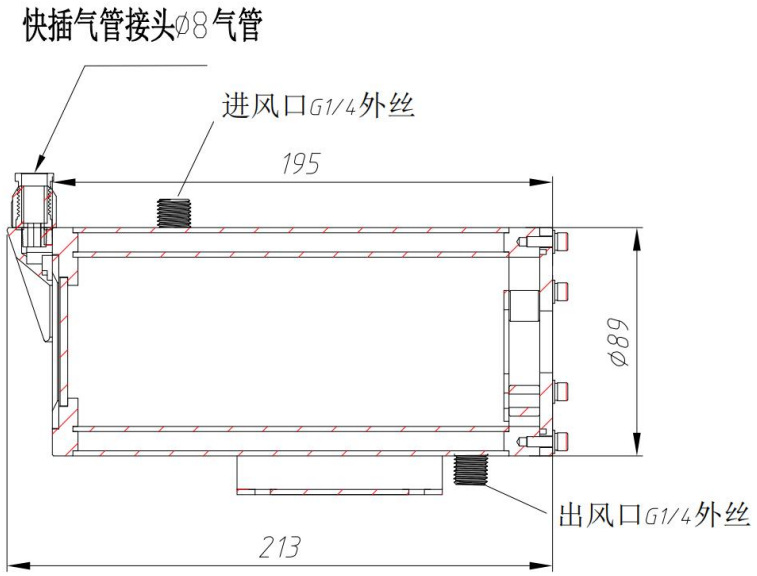
3.1 High-protective infrared thermal imaging thermometer

model	PFCDG220-NSxxEx	
product picture		
Infrared resolution	384×288	640×480
Infrared lens matching	4、8	9.5、19
Infrared field of view Angle	60°、45°、25°、15°	
Infrared wavelength range	8～14μm	
Thermal sensitivity (NETD)	≤50mk@30℃	
frame frequency	25Hz	
focus	Electric / automatic	
Image algorithm	Gamma correction, and the enhancement algorithm	
temperature measurement accuracy	± 2℃ or ± 2%	
Temperature measurement range	Normal temperature file: -20℃ ~200℃ (optional) Medium temperature range: 150℃ ~650℃ (optional) High temperature gear: 350℃ ~1600℃ (standard)	
Video compression format	H.264/H.265	
data type	Raw temperature data for H264, H265, and 16 Bit	
Network standards	Gigabit net / adaptive 10M / 100M / 1000M	
Protocol support	IPv4/IPv6,TCP,UDP,NTP,HTTP,RTSP,RTP,ICMP,WebSocket,ONVIF	

Temperature output	Support the simulation amount of 4- -20 mA, RS485, and Modbus TCP / RTU
External trigger	Support for RS485 level and TTL level
levels of protection	IP66
size	Φ110mm×213mm
way to install	Equipped with a cloud stand
weight	≤5Kg
working temperature	-20℃～+200℃

3.2 Structure size of the whole machine

The structure size of the whole machine is shown in the following figure.



Size diagram of the PFCDG220-NSxxEx structures

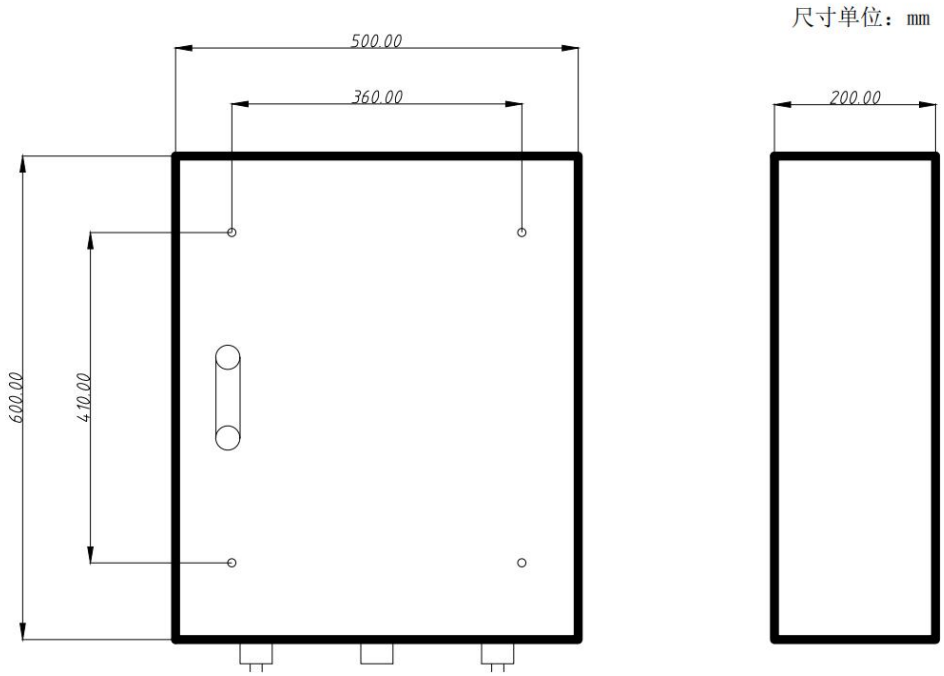
3.3 Thermal imager control cabinet

The thermal imager control cabinet includes the industrial Ethernet switch (photoelectric conversion), power adapter, filter,

Lightning protection module, the main function is to provide reliable and stable power to infrared thermal image supply, network conversion (photoelectric conversion), data conversion.

- Input interface: 100M / 1000M Ethernet, RJ 45 interface

- Output interface: 1000M electrical port / light port
- Transmission rate: up to 1,000 M
- Standard: IEEE802.3, IEEE802.3u, IEEE802.3x
- Power supply: AC 220V± 10% 50W
- Ambient temperature: -20℃ ~60℃
- Ambient humidity: 90%
- External size: 500 (W) 600 (H) 200 (D) mm
- Size drawings:



3.4 High temperature resistant cable

Due to the ambient temperature of the work site is generally high, in order to ensure the stable and reliable transmission of communication and video transmission, the cables are comprehensive cables with high temperature resistance, fire resistance and shielding network.

The main technical parameters are listed as follows:

◆ Rated temperature: -65℃ ~ + 250℃ (maximum operating ambient temperature: 250℃, minimum operating ambient temperature: -65℃)

- Rated voltage: 600V
- Execution standard: GJB773A-2000
- Conductor: multiple-plated copper wire
- Color: red, black DC12V 0.5m2; orange white, orange, green white, green, blue white, blue, gray, gray network cable.
- Insulator: PTeflon (PTFE)
- Performance: corrosion resistance, strong acid resistance, strong alkali resistance, oxidation resistance; high voltage resistance, non-combustion, non-aging
- Test voltage: 7000V does not breakdown

3.5 Image smart server

- Intel ® Core ™ i7 processor (Quad-Core, 8MB,3.60GHz)
- Memory is 16GB 1600MHz DDR3 non-ECC
- Hard disk 256G solid-state + 1TB 3.5-inch SATA (7,200 Rpm) hard disk
- Display is 23.8 inches
- Windows 10 Professional version, a 64-bit operating system

3.6 Install the attachment

- 1 high-temperature resistant cable
- Adjustable cradle head holder
- Assembly and pre-commissioning before installation

4 operational software

4.1 software interface

The IRT system client software interface is shown in the figure below.

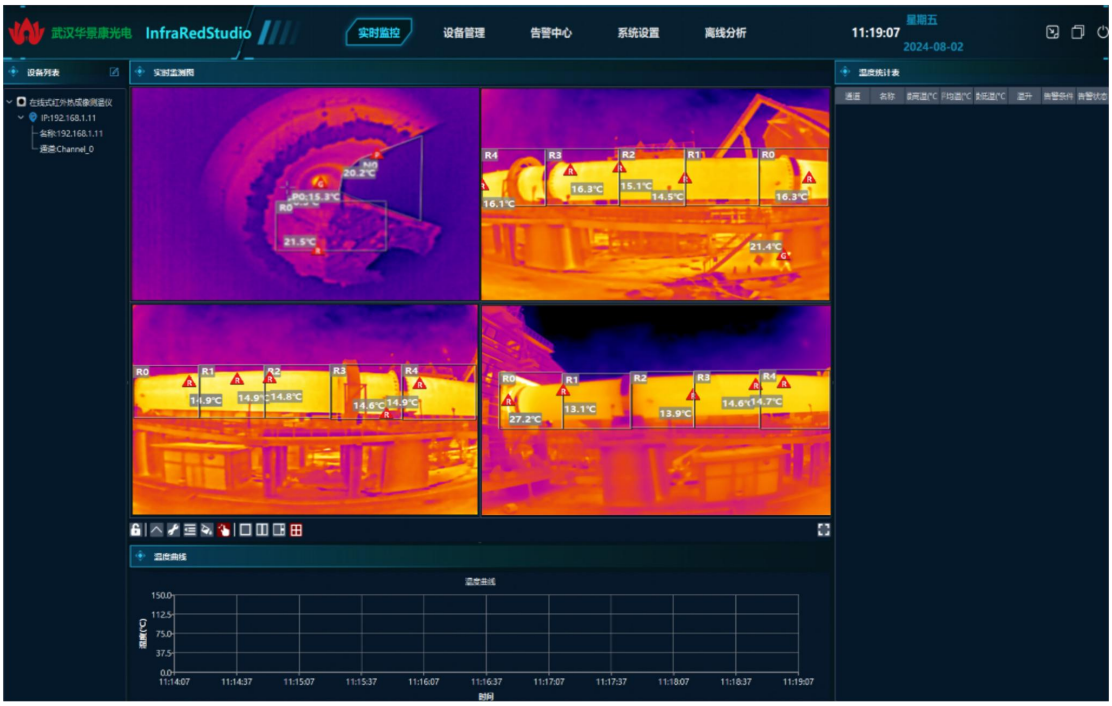


Figure 3. System software interface

The basic functions of the software are as follows:

1) Real-time video display

- Real-time display of full radiation heat map and HD visible light video;
- Up to 32 temperature measurement objects can be drawn, such as points, lines, circles, rectangles, and polygons;
- 3D temperature field and isotherm display, the temperature distribution is more intuitive;
- Up to 12 medium color palettes, suitable for more application scenarios;
- Multi-point temperature tracking of the maximum temperature, the lowest temperature and the average temperature;
- Up to 32 devices at the same time; automatic reconnection;
- Adaptive display resolution, support for portrait screen display.

2) Intelligent analysis

- Real-time display of temperature curve, custom display time period and temperature interval, temperature data can be stored in real-time;
- A variety of video formats for video recording, regular photography;
- Offline analysis of videos and pictures with temperature data;

- It can be corrected by adjusting the radiosity, reflection temperature, distance, secondary calibration and so on;
- Target profile extraction, size calculation.

3) Warning center

- High temperature, low temperature, interval temperature, temperature rise, temperature difference and other types, multi-level alarm;
- When the alarm, store short video, photos and temperature information and other logs to facilitate the query;
- IO, RS485, Modbus and other alarm output forms;
- Custom alarm threshold and level: assist the staff to evaluate the urgency and development situation of hidden dangers.

4) User management

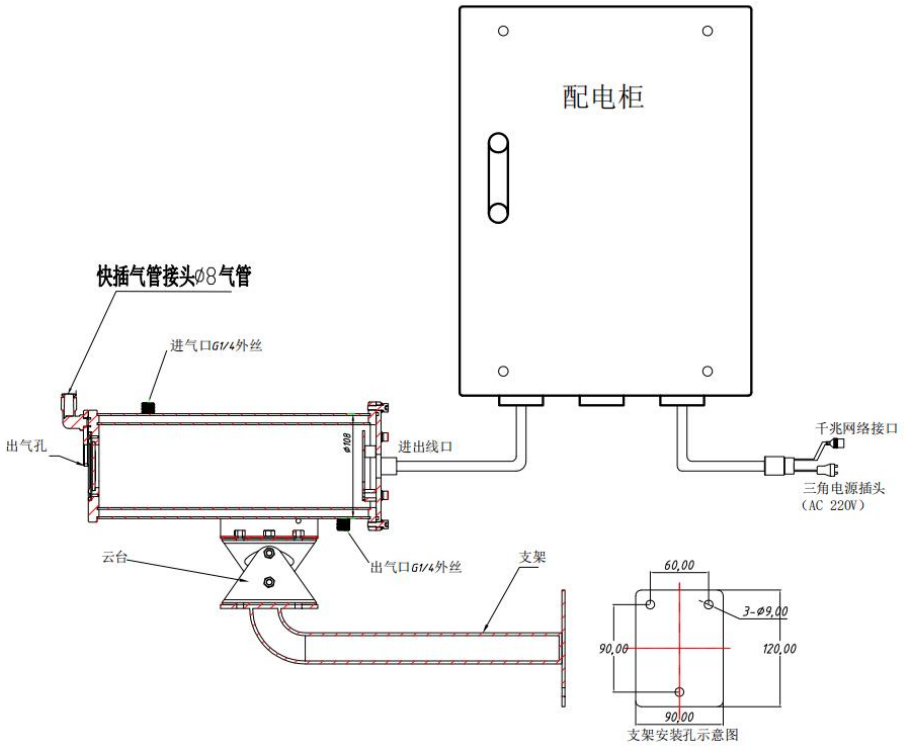
- Support for multi-user login;
- User rights can be set by levels.

5 Configuration list

order number	name	model	unit	quantity	remarks
1	High-temperature type infrared thermal imaging thermometer	PFCDG220-NS	short for Taizhou		
2	Thermal imager control cabinet	KZG-600×500×200	individual		
3	Image algorithm server	HIRDA-IDS	cover		Including hardware and software, display device
4	High temperature resistant cable	/	cover		
5	Install the attachment	HIRDA-FJ	cover		Including the mounting bracket and

					adjusting the cloud head
6	The 4-20 mA conversion module	HIRDA-DA	individual		apolegamy

6 Schematic diagram of the field installation



7 The division of labor

supplier:

1) Provide the manufacturing, transportation, guidance, installation and commissioning services of HIRDA-LZ continuous-cast billet infrared thermal imaging intelligent monitoring system, to ensure the normal operation of the system, ensure the integrity of the system, and meet the requirements of site use.
2) Responsible for selecting the equipment installation position of HIRDA-LZ continuous cast billet infrared thermal imaging intelligent monitoring system, and provide the equipment installation position map before construction.
3) Responsible for the training of the debugging, use, maintenance and maintenance of HIRDA-LZ infrared thermal imaging billet intelligent monitoring system, so that the buyer personnel can independently master the operation skills.
4) Provide product qualification certificate, inspection report, use and maintenance instructions and other relevant technical data.

demander:

1) Provide the relevant field data and design drawings required for the installation and commissioning of the HIRDA-LZ continuous cast billet IR thermal imaging intelligent monitoring system equipment.
2) Responsible for the power supply, optical fiber and cable piping, wiring and melting optical fiber work required by HIRDA-LZ continuous casting billet infrared thermal imaging intelligent monitoring system equipment.
3) Determine that the site meets the installation conditions required by the supplier, and notify the supplier's technical personnel in advance to participate in guiding the installation and commissioning.
4) The Demander shall assist to provide working conditions for the factory service personnel of the supplier.

8 acceptance level

1) It can display the infrared heat map of the measured target on the software interface of HIRDA-LZ continuous cast billet infrared thermal imaging intelligent

monitoring system, and the equipment maintains a good working effect under the condition of meeting the use requirements;

2) It can display the current equipment use status and record the temperature data;

3) Display the abnormal area of the measured target temperature, and prompt the alarm;

4) The supplier shall provide professional training to the personnel assigned by the demander.

9 After-sales commitment

1) The warranty period of HIRDA-LZ continuous casting billet infrared thermal imaging intelligent monitoring system is 12 months from the date of acceptance or 18 months after the arrival of the equipment (the warranty period of purchased products and servers including internal hardware is 12 months from the arrival date of delivery of the equipment).

2) If the thermal imager is damaged due to improper use, the demander shall order the spare parts in time, and the supplier shall provide the maintenance services.

3) HIRDA-LZ continuous casting billet infrared thermal imaging intelligent monitoring system software has been used for a long time, providing software upgrade service for free.

4) When receiving the call from the demander, the Supplier is responsible for guiding the demander to handle the fault; if the demander cannot solve the problem, the supplier promises to arrive to the site within 48 hours. Company service telephone number: 400-080-4288.