HIRDA-NK-A endoscopic pneumatic

Ultra-high temperature infrared thermal imaging temperature detection and analysis system

Technical specifications

Table of contents

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Product description

HIRDA-NK-A series endoscopic pneumatic ultra-high temperature infrared thermal imaging temperature detection and analysis system is a special closed-circuit television equipment specially used in high-temperature environments. The system consists of an infrared thermal imaging movement, a high-temperature resistant infrared thermal imaging lens, and an automatic It consists of retraction protection device, furnace wall installation kit, air filtration system and field equipment box, algorithm server and intelligent temperature measurement software.

The high-temperature-resistant infrared thermal imaging lens is installed in a telescopic metal protective cover. The high-temperature-resistant infrared thermal imaging lens is directly extended into the kiln (below 2000 ℃) through the telescopic device. The infrared thermal imaging core remains outside the furnace. Realize continuous real-time monitoring of the operating status of the furnace.

The shield is cooled by compressed cooling air or cooling water to make the infrared lens work at a more suitable temperature; at the same time, the lens is purged to prevent dust in the furnace from adhering to the lens protection window; the system has a built-in high-temperature protection circuit. If the cooling gas or cooling water circulates abnormally, the lens will be retracted to prevent damage by the high temperature in the furnace.

It has the characteristics of high temperature resistance, corrosion resistance and maintenance-free, and can display various complex working conditions inside the kiln in real time. It is suitable for various positive pressure kilns when the camera probe purges the compressed air normally.

System features

Equipped with all-weather passive infrared temperature measurement function

Adopt self-developed temperature measurement correction algorithm to achieve accurate temperature measurement

Supports onvif protocol and can be connected to mainstream NVR;

It does not rely on the system platform. You can log in to the IP directly through the web page to access images and configurations, and you can directly output alarm signals to PLC or alarms;

The telescopic length can be customized to suit kilns with various wall thicknesses

Spiral air curtain design, the lens does not accumulate dust

Overall stainless steel material, corrosion-resistant and temperature-resistant

Direct view endoscopic lens

Automatic exit protection device, exit fault indication

Pneumatic transmission mechanism

High temperature resistant optical pinhole lens with dustproof high temperature lens

Automatically exit the furnace when over-temperature, under-voltage, or power outage occur

Application scenarios

Cement plant kiln head, grate cooler blanking, steel plant heating furnace, annealing furnace, heat treatment furnace, garbage treatment plant incinerator and other industrial high-temperature furnaces.

System Utility Requirements

4.1 Power supply

On-site probe power supply 220VAC 50/60HZ power 50W/set

Control room power supply: 220VAC 50/60HZ power 100W

4.2 Compressed air

Compressed air temperature: ≤35℃

Compressed air pressure: ≥0.4 Mpa

Compressed air flow: 0.1-0.2m ^{3} /Min

4.3 Cooling water

Cooling water temperature: ≤35℃

Cooling water pressure: ≥0.4 Mpa

Cooling water flow: 30L /Min

Main technical indicators

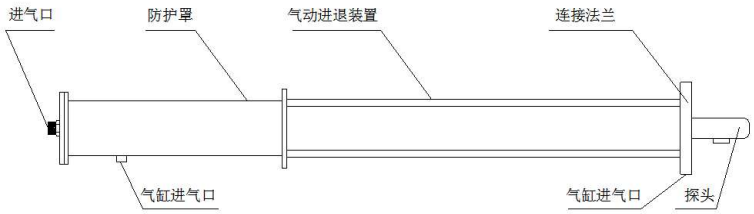
Use ambient temperature	Furnace temperature	≦ 2000 ℃
	control system	≦ 70 ℃
Automatically exit the device	Automatically exit protection function	The probe can automatically retreat from the furnace when there is a power outage, gas outage, over-temperature or under-voltage.

	Exit the device process	100-6 00mm , can be customized according to the thickness of the furnace
	Manual reach in and out function	有
control device	Integrated touch screen system	8 -way relay , 4- way transistor
	Three places control	Can realize on-site central control and mobile phone operation in three locations
Infrared thermal imaging	Detector type	Uncooled focal plane detector
	resolution	384×288
	lens focal length	3.3mm
	field of view	98 ° × 76 °
	Lens type	High temperature resistant pinhole lens
	Temperature measurement range	50℃ ~2000 ℃
	Temperature measurement accuracy	±2℃ or 2%
	network protocol	Support ONVIF/RTSP/FTP/PPPOE/DHCP/DDNS/NTP/UPnP/TCP
visible light camera	resolution	2 to 4 million pixels optional
	focal length	4.7~94mm 20 times
	dynamic range	120db
	ICR switching	support
	minimum illumination	Color 0.05lux@F1.6
	video compression	H.264/H.265
Vortex cooling tube (optional)	When the compressed air inlet is ≧0.35MP, the compressed air outlet temperature difference is 23 degrees	
Power supply requirements	Supply voltage	AC220V±10%
	Power supply frequency	50Hz
Installation distance	The maximum distance from the equipment to the on-site control box is 15 meters	

System composition

6.1 High temperature resistant probe

The high-temperature-resistant probe adopts an integrated design and has protection functions against high temperature, high pressure, corrosion, power outage, gas outage, etc. The integrated probe integrates a high-temperature infrared lens, infrared thermal imaging and a pneumatic advance and retreat device.



6.2 High temperature resistant infrared lens

The high-temperature resistant infrared lens housing is made of stainless steel, and the front-end imaging adopts the principle of micro-hole imaging. The diameter of the peep hole is 2mm, and a flange connection port is reserved for connection with infrared thermal imaging. The technical parameters are as follows:

Focal length: 3.3mm, 6mm and other focal lengths are optional;

Peephole diameter: Φ2mm;

High temperature resistance: <2000℃;

Low temperature resistance: -40℃;

Cooling medium: compressed air (no oil and no water);

Air inlet: Φ12, ZG1/2″;

Inlet pressure: 0.1～0.4MPa;

Cylinder air inlet: Φ12, ZG1/4″;

Cylinder air inlet pressure: 0.1~0.4MPa;

Environmental humidity: 10~90%, no condensation;

6.3 Pneumatic advance and retreat device

The high-temperature-resistant probe is integrated inside the pneumatic transmission device, and the reciprocating motion of the cylinder piston is used to realize the forward and backward movement of the camera probe. Advance and retreat indicators are installed on both sides of the front end of the pneumatic device to indicate the "advance" and "retreat" of the camera probe. The internal components of the cylinder are made of high-temperature-resistant and wear-resistant materials, and are suitable for operating in high-temperature, corrosive and dusty environments.

The main technical parameters are as follows:

Cylinder diameter: Φ100mm

Working stroke: can be customized according to the thickness of the furnace wall

Ambient temperature: -40℃～250℃

Air inlet: Φ12, ZG1/4″

Cylinder air inlet pressure 0.1～0.4MPa

6.4 Embedded parts

When installing the equipment, the embedded parts are installed in the monitoring hole in advance, and a special flange is connected to the camera probe. The embedded parts are made of high-temperature resistant stainless steel and equipped with a special installation guard plate, which is used to seal the surroundings of the monitoring hole and connect the embedded parts to the body. There are camera probe advance and retreat indicator pointers installed on both sides of the embedded part. An automatic door is installed at the rear end of the embedded part. When the camera probe advances, the automatic door is pushed open by the front end of the probe. When the camera probe exits, the automatic door automatically closes. , to protect the camera probe from being damaged by high-temperature dust inside the kiln after it exits the monitoring position due to the lack of protective compressed air.

The main technical parameters are as follows:

Installation diameter: Φ108 (standard)

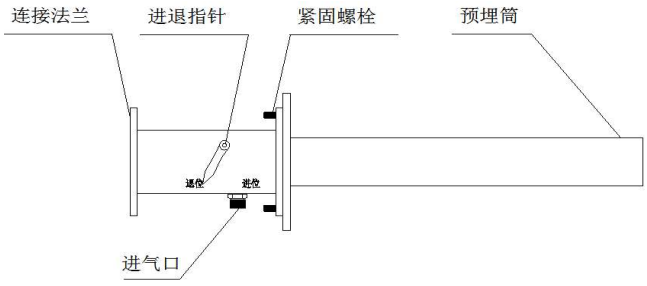
Buried depth: determined by furnace wall thickness

Ambient temperature: <2000 ℃

Cooling medium: compressed air

Air inlet: Φ12, ZG1/2″

Inlet pressure: 0.05～0.6MPa



6.5 Control cabinet

The control cabinet provides working power to the camera probe and fully automatically controls the advancement and retreat of the probe. It receives the encoded instructions from Yun Cheng and drives various control functions of the camera probe after conversion. The control cabinet can control the camera probe by accessing the operation controller.

The main technical parameters are as follows:

Power supply: 220VAC/50Hz

Power consumption: 50W

Control input: RS485

Control output: switch value

Power output: 12VDC/1.5A

Video input: IP network

Video output: network, optical fiber SC interface

Temperature control: 0-60 degrees

Air supply index: 0.4MPa ~ 1MPa, temperature ≤40℃, flow ≥3m3/h

Exhaust index:

Cylinder working gas: 0.1 MPa ~ 0.2 MPa, solenoid valve, two-way

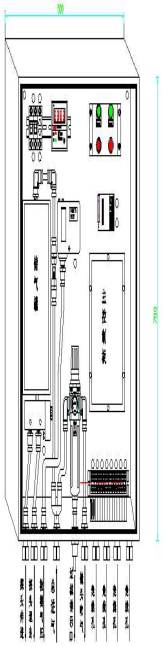
Cooling gas: 0.1 MPa ~ 0.3MPa, flow rate ≥2m3/h

Purge gas: 0.1 MPa ~ 0.3 MPa, with built-in air filtration, flow rate ≥0.2 m3/h

Protection level: IP65

Overall dimensions: 700 (width) × 500 (height) × 200 (depth)

Installation hole size: 640 (width) × 400 (height) × Φ10



6.6 stainless steel hose

Stainless steel hoses are resistant to high temperature, high pressure and corrosion. In order to facilitate the movement of the camera probe, stainless steel hoses are used as the connection medium for the cables and compressed air connected to the camera probe.

Diameter: Φ12, Φ10, Φ8, Φ6

Interface: ZG1/2″

Material: temperature-resistant stainless steel

6.7 High temperature resistant cables

Since the ambient temperature at the work site is generally high, in order to ensure the stability and reliability of communication and video transmission, the cables are made of high-temperature-resistant, fire-resistant, and shielded comprehensive cables.

The main technical parameters are as follows:

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

Rated voltage: 600V

Implementation standard: GJB773A-2000

Conductor: Stranded tinned copper wire

Color: red, black DC12V 0.5m ^{2} ; orange white, orange, green white, green, blue white, blue, gray white, gray network cable.

Insulator: Polytetrafluoroethylene (PTFE)

Performance: corrosion resistance, resistance to strong acid, resistance to strong alkali, resistance to oxidation; resistance to high voltage, non-flammable, non-aging

Test voltage: 7000V without breakdown

6.8 Optical cables and interfaces (on demand)

The control signals and video signals transmitted over long distances are transmitted using single-mode optical fiber. Optical fiber transmission has the characteristics of high signal quality and anti-interference, and the signal transmission distance can reach more than 20km. In addition, the system is equipped with SC-type optical cable interface to facilitate optical cable connection. The technical parameters are as follows:

Fiber type: single mode

Working wavelength: 13l0nm and 1550nm

Attenuation characteristics: 13l0nm wavelength is 0.36dB/km; 1550nm wavelength is 0.21dB/km

Bending loss: Φ75×100 turns, additional bending loss ≤0.5dB

Optical fiber interface: single mode SC

System software

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

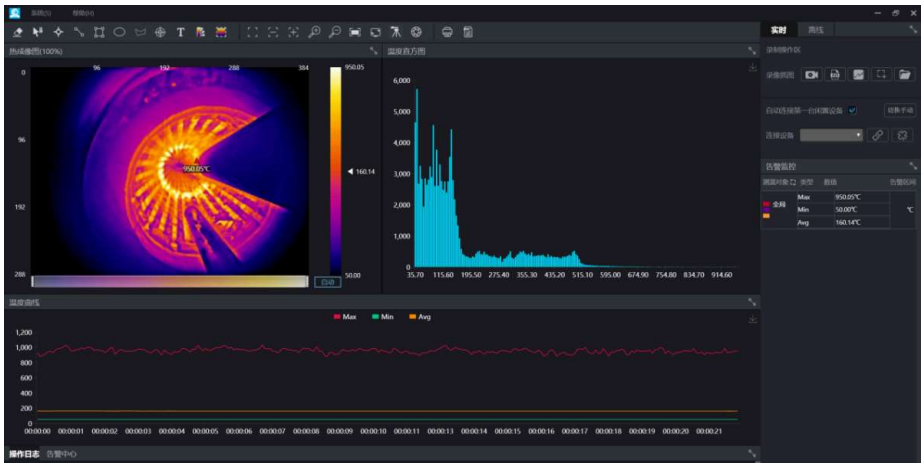


Figure 2 System software interface

The basic functions of the software are as follows:

1. Real-time video display: Real-time display of full radiation heat map and high-definition visible light video . The temperature at any location in the infrared heat map can be viewed , and abnormal conditions can be recorded, photographed, and analyzed.

2. Temperature tracking: Automatically analyze the temperature rise trend of the entire infrared heat map or specific areas to detect hidden danger areas early.

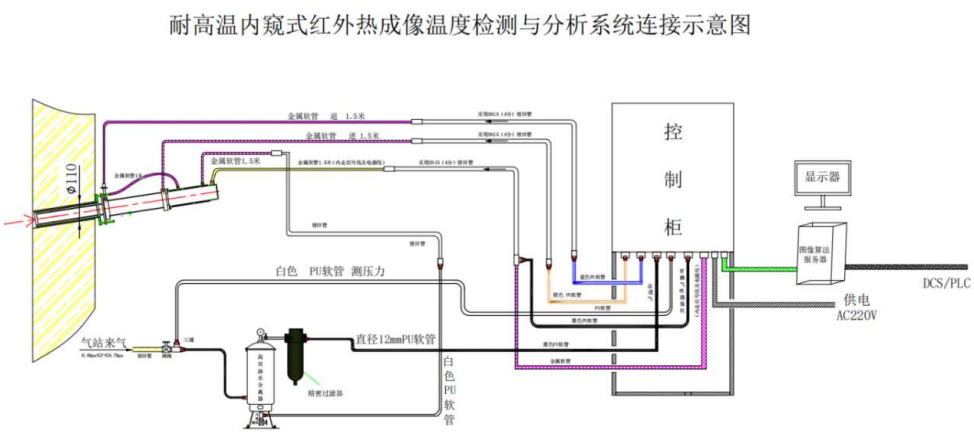
3. Data capture: Thermal imaging image data can be collected regularly to facilitate later analysis.

4. High temperature trigger shooting and alarm: When there is a temperature abnormality, the background can detect it in time and trigger an alarm . The software background will take infrared pictures and visible light pictures during the incident .

5. Fault self-diagnosis: When the terminal equipment fails, the system automatically alarms .

6. Customized alarm thresholds and levels: The system can define multiple different alarm thresholds and levels to assist staff in assessing the urgency and development trend of hidden dangers.

System wiring diagram



Configuration list

serial number	name	model	unit	quantity	Remark
1	Infrared thermal imaging movement	NX26Exx	台		Resolution: 384×288 Focal length: 3.3mm Temperature measurement range: 50~2000℃
2	High temperature resistant probe	HIRDA-HTP	个		
3	Pneumatic advance and retreat device	HIRDA-CY	个		
4	Embedded parts	HIRDA-EMB	个		
5	control cabinet	SEB752	个		
6	Image algorithm server	IDS	套		Including hardware and software, monitor
7	air compressor	YBM-15A	台		Optional
8	Cold dryer	S-100AFB	台		Optional
9	High temperature metal hose	φ12mm	套		
10	High temperature hose	φ12mm	套		
11	Matching cable	/	套		
12	Install accessories	HIRDA-FJ	套		