Multi-channel Infrared Radiation Measurement System

BEX-8209

Summary

The measurement of radiant intensity is becoming increasingly important for the development of high-tech fields such as aviation, aerospace, electronics, nuclear energy, materials, energy and metallurgy. As a standard radiation source, the blackbody is used as a standard object for thermal radiation research and is widely used as an absolute standard for infrared equipment. It can also be used as a standard to calibrate other radiation sources or infrared systems. The experiment device consisting of a heating source, infrared camera, guide rail and controller enables students to understand the concept of the blackbody and the principle of radiant temperature measurement, as well as the influence of color, materials, etc. on radiant temperature measurement.

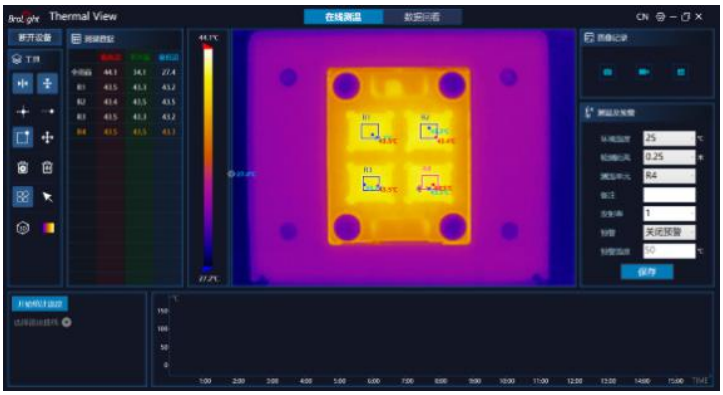
Features

1. Closed-loop feedback temperature control heating based on PID control.
2. 5-channel thermocouple sensors monitor temperature in real time.
3. Autonomous definition and division of the radiation source monitoring area.
4. Support for multi-channel synchronous real-time radiation temperature measurement.
5. Limiting the heating temperature of the radiation source to prevent burns.
6. The test sample block of the radiation source can be replaced.

Main Experiment Contents

1. Understand the principles of blackbody radiation and infrared temperature measurement.
2. Implement multi-channel measurement based on the radiation measurement principle.
3. Achieve blackbody temperature measurement based on the radiation measurement principle.
4. Understand the radiation measurement and emissivity of different materials.
5. Understand the temperature calibration methods and implementation approaches.

Experiment Contents and Typical Data



Specifications

NO.	Part Name	Main Parameter
1	Multi-channel Infrared Radiation Measurement Device Controller	Closed-loop feedback temperature control heating based on PID control 5-channel thermocouple sensors monitor temperature in real time Supports 4-channel calibration of temperature measurement area parameters
2	Multi-channel infrared radiation measurement device heating box	Can be heated up to 180°C
3	Track	Length 400mm
4	Adjustable Post Holder	adjustable range 25mm
5	Carrier	Width 50mm
6	Post	Length 90mm, metric thread
7	Infrared thermal imager (with connecting cable)	Pixel size: 12 um, Infrared resolution: 256 × 192
8	Temperature measurement sample group (blackbody)	The surface morphology samples contain four types of samples.
9	Temperature measurement sample group	The material samples include four types of samples.

Configuration List

12NO.	Part Name	Model	Qty.
1	Multi-channel Infrared Radiation Measurement Device Controller	BEM-5014	1
2	Multi-channel infrared radiation measurement device heating box	BEM-5027	1
3	Track	BEM-5201-04	1
4	Adjustable Post Holder	BEM-5205-25	1
5	Carrier	BEM-5204-50	1
6	Post	BEM-5209-09	1
7	Infrared thermal imager (with connecting cable)	L050005	1
8	Thermal imager mounting base	M030075T2	1
9	Thermal imager adapter ring	M030076T2	1
10	Temperature measurement sample group (blackbody)	Z010004T1	1
11	Temperature measurement sample group	Z010003T1	1