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Two-colour Infrared Thermometer

ST-300A/B/C

INTRODUCTION

ST300 series ratio infrared thermometer has a visual optical sighting, and also has waterproof, dustproof, high accuracy and repeatability characteristics. The thermometer adopts advanced DSP technology and intelligent data processing technology, which can display the temperature in the LED, and output temperature data via RS485; 4-20mA current output temperature data and relay intelligent alarm output. The DSP technology makes the instrument has the flexibility, accuracy, strong anti-interference, small equipment size, intelligent, high speed and other advantages, these are all analog signal processing technique and common SCM incomparable.

TECHNICAL SPECIFICATIONS

INDICATORS

(1) Measurement parameters

	ST300-A	ST300-B	ST300-B
Measuring Range	600ºC ~ 1400ºC	700ºC ~ 1800ºC	1000ºC ~ 3000ºC
Spectral Response	0.7μm ~ 1.3μm		
Resolution	150:1	300:1	
Measuring Accuracy	±1%		
Repeatability	±0.5%		
Response Time	≤100 ms		
Slope (2-color)	0.800 ~ 1.200		
Emissivity (1-color)	0.10 ~ 1.00		
Signal Processing	1 - color or 2 - color mode switching; peak hold; average; relay alarm		

(2) Basic parameters

Protection Grade	IP65
Operating Temperature	-20 ~ 60ºC
Relative Humidity	10% ~ 95% noncodensing
Weight	0.6Kg

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(3) Electrical parameters

Power Supply	24VDC, ±20%, 250mA
Power Rating	maximum 6W
Output	4~20mA
Digital Communication	RS485
Relay output	1A30VDC/0.5A125VAC, Impedance: ≤50mΩ

Features Indicators

Temperature measurements can be taken using either of the following modes:-

- **1-color mode**
  For standard Temperature measurements. The 1-color mode is best for measuring the temperature of targets in areas where no sighting obstructions, either solid or gaseous, exist. The 1-color mode is also best where the target completely fills the measurement spot and where the background or foreground are higher in temperature than the target.
- **2-color mode**
  Temperatures are determined from the ratio of two separate and overlapping infrared bands, get rid of the dependence on the absolute energy measurement. The 2-color mode is best for measuring the temperature of targets that are partially obscured (either intermittently or permanently) by other objects, openings, screens, or viewing windows that reduce energy, and by dirt, smoke, or steam in the atmosphere. The 2-color mode can also be used on targets that do not completely fill the measurement spot, provided the background is much cooler than the target.

  2-Color sensors measure closer to the highest temperature within the measured spot (spatial peak picking) instead of an average temperature. A 2-color sensor can be mounted farther away, even if the target does not fill the resulting spot size. The convenience is that you are not forced to install the sensor at some specific distance based upon target size and the sensor's optical resolution.

The Advantages of Ratio Infrared Thermometer

- 2-Color ratio technique to get rid of the dependence on the absolute energy measurements, can be more accurate, repeatable temperature measurements;
- 2-Color ratio technology eliminates most of the impact on the environment, such as dirty lens, dirty window, etc
- 2-Color ratio technique determines the principle goal of the measured temperature is the maximum temperature, the actual value is closer to the target temperature;
- Unknown emission rate, 2-color ratio technique has the absolute advantage of temperature measurement;
- Ratio infrared thermometer has all the features of ordinary monochromatic thermometer, and can be used as a monochrome thermometer.

APPLICATION

Typical Applications

(1) Partially Obscured Targets

The radiated energy from a target is, in most cases, equally reduced when objects or atmospheric materials block some portion of the optical field of view. It follows that the ratio of the energies is unaffected, and thus the measured temperatures remain accurate. A 2-color sensor is better than a 1-color sensor in the following conditions:

- Sighting paths are partially blocked.
- Dirt, smoke, or steam is in the atmosphere between the sensor and target.
- Measurements are made through items or areas that reduce emitted energy, such as grills, screens, small openings, or channels.
- Measurements are made through a viewing window that has unpredictable and changing infrared transmission due to accumulating dirt and/or moisture on the window surface.
- The sensor itself is subject to dirt and/or moisture accumulating on the lens surface.

(2) Targets Smaller Than Field of View

When a target is not large enough to fill the field of view, or if the target is moving within the field of view, radiated energies are equally reduced, but the ratio of the energies is unaffected and measured temperatures remain accurate. This remains true as long as the background temperature is much lower than the target's. The following examples show where 2-color sensors can be used when targets are smaller than the field of view:

- Measuring wire or rod—often too narrow for field of view or moving or vibrating unpredictably. It is much easier to obtain accurate results because sighting is less critical with 2-color sensors.
- Measuring molten glass streams—often narrow and difficult to sight consistently with single-wavelength sensors.

(3) Low or Changing Emissivities

If the emissivities in both wavelength (colors) were the same, as they would be for any blackbody (emissivity=1.0) or greybody (emissivity<1.0 but constant), then their ratio would be 1, and target emissivity would not be an influence. However, in nature there is no such thing as a greybody. The emissivity of all real objects changes with wavelength and temperature, at varying degrees, depending on the material.

When emissivity is uncertain or changing, a 2-color sensor can be more accurate than a 1-color instrument as long as the emissivity changes by the same factor in both wavelength bands. Note, however, that accurate measurement results are dependent on the application and the type of material being measured.

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