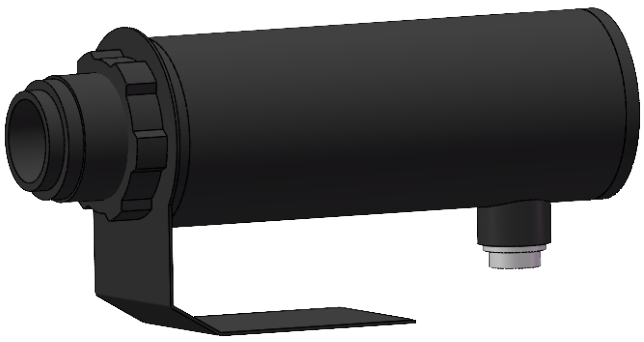
红外测温仪

T500-3014A



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产品特点

T500-3140A 红外测温仪是根据物体的红外辐射强度计算出物体的表面温度的测温设备，广泛应用于冶金等行业。

红外测温仪由以下部分组成：光学透镜、红外滤光片、探测器、放大及处理电子电路以及符合 NEMA-4 (IEC 529, IP65)标准的外壳。确保在严格的工业环境下可靠运行。输出标准电流信号，用以连接计算机、控制器、记录仪、报警器以及 A/D 接口。

主要特点：

- 无需接触即可测量物体的温度，可以方便地测量难以接近或移动的目标温度。
- 通过红外测温仪目镜的同轴瞄准，可以方便地指示测量点的中心位置，适合需要精确定点测量的小目标的温度。
- 提供两线制 4-20mA 电流输出，可以方便地安装在多种应用场合，特别适合于需要长距离、较强干扰的工业环境的安装使用。
- 红外测温仪为激光电路和测量电路提供不同的接线方式，方便用户的使用。
- 提供多种温度范围，不同的测量波长，不同的光学系数供用户选择，满足用户不同的测量要求。
- 具备现场发射率调节功能，方便用户针对不同的被测目标进行现场修正，提高测量结果的有效性，真实性。

工作原理：红外测温

由于任何物体都有红外辐射，对于同一物体，辐射强度会随着温度的变化而变化。相同温度下，不同物体的辐射强度取决于物体的材料，通常用发射率来描述各种材料发射红外辐射的特性。

红外测温仪通过设定物体的发射率等参数，利用光学组件感应物体的红外辐射频谱，由运算单元计算出物体的实际温度。红外测温仪使用的热辐射频谱的波长范围为 1μm - 1.6μm。

光路图

松开测温仪前端的锁紧顶丝，用户可以前后拉动黑色的调焦透镜组，使得被测物体在瞄准视场中清晰成像。此时的测温仪在测量目标处的测量尺寸最小。
假定此时测量距离为 L,测温仪在此距离上的测量直径为 M=L/距离系数。如果测量距离 L 为 10 米，测温仪距离系数为 250:1,测温仪测量直径则为 40 毫米。

注意：调焦完成后，应重新锁紧锁紧顶丝，以确保测量的可靠性。
下面的光路图表明了测温仪在测量点的测量直径。

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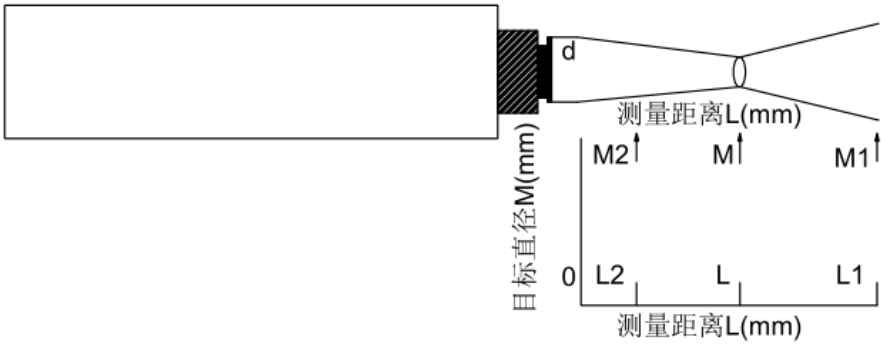

d:20mm表示有效口径
L：出厂标定时的距离
M：标定时的光点尺寸

当安装距离>L时：
M1=(L1/L)(M+d)-d

当安装距离<L时：
M2=(L2/L)(M-d)+d

技术参数

基本性能

型号	T500-3014A
环境等级	0-60℃
环境温度	-15—85℃
存储温度	10—95%（不结露）
材料	、 铝合金
尺寸	Φ58mm×190mm
重量	510g
振动	IEC 68-2-6：任意轴 11-200 Hz.3G
冲击	IEC 68-2-27：任意轴 11

电气参数

型号	T500-3014A
电源	DC 24V，最大 500mA
模拟输出	4—20mA，最大回路阻抗 500Ω

测量参数

型号	T500-3014A
光谱范围	1.6μm
温度范围	300—1400℃
光学分辨率	250:1

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响应时间	10ms（95%）
系统精度	±1%
重复性	±0.2%
温度分辨率	1℃
温度系数	±0.05%

安装说明

电气安装

电源：推荐使用输出为 DC 24V/500mA 的线性稳压电源。

电缆连接：

为防止电磁而导致测量数据的异变，请保证以下防范措施。

- ❖ 测温仪、电源和二次仪表的安装尽可能远离任何可能造成电磁干扰的干扰源。
- ❖ 如果有必要，将测温仪绝缘安装以防止与大地形成回路。

注意：务必使用屏蔽电缆，传感头屏蔽线必须接地！

输出电缆：输出电缆可使用带屏蔽层的双绞线或多组绞线。导线截面积要求如下（铜芯）：

- ❖ 当长达 250m 时：0.2mm^2 截面积
- ❖ 当长达 650m 时：0.5mm^2 截面积

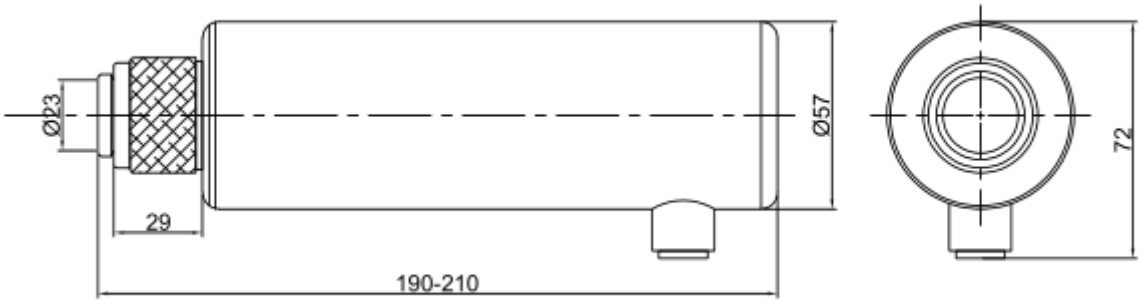
模拟输出：

以下为模拟输出接线表（标准电缆长度 1.5 米）

1	5	6	7	
红	黄	蓝	黑	透明
电源+	输出+	输出—	电源—	屏蔽

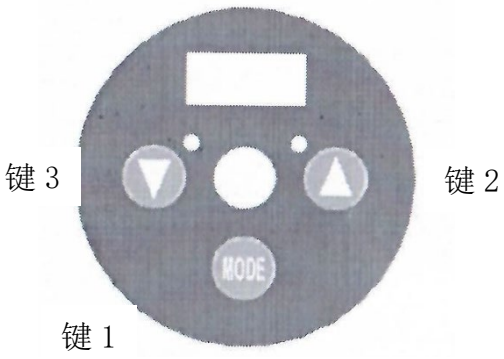
机械安装

测温仪探头可以通过安装螺母（标配）安装到安装支架上。不同的安装支架可以使传感头的调节更加方便，安装支架可以作为附件订购。在调整被测目标与传感头时必须确保光路无遮挡 。（参照光路图）



使用说明

设置面板



面板外观

LCD 显示

设置按键： 功能设置按键（键 1），上行按键（键 2 ），下行按键（键 3)。	LCD 显示： 16 段字符码 1 位，7 段数码 4 位，小数点 2 个。 当目标温度超过测量温度上限时：显示---H，并闪烁 当目标温度低于测量温度下限时：显示---L，并闪烁

参数设置

设置方式：

打开后盖，按 MODE 键，进入参数设置，使用向上按键、向下按键修改数值。使用 MODE 键确认。

按功能按键 MODE，进入基本参数设置状态。

在参数设置状态下，按上下行键，修改数值，按功能键确认数值并转入下一项。

设置的功能参数依次如下表 ：

参数项	参数显示
发射率	显示 EX.XXX,范围 0.10—1.00
平均时间	显示“A”XXX.X：0.1—999.9（单位为秒） 设置为“0”表示实时测量
峰值时间	显示“P”XXX.X：0.1—999.9（单位为秒） 设置为“0”表示实时测量
高温预警	显示“∧”XXX.X 或 XXXX “℃”或“℉”标志显示 设置回程阈值=XXXX “℃”或“℉”标志显示
低温预警	显示“∨”XXX.X 或 XXXX “℃”或“℉”标志显示 设置回程阈值=XXXX “℃”或“℉”标志显示
电流输出下限温度	显示“u”XXX.X 或 XXXX “℃”或“℉”标志显示
电流输出上限温度	显示“n”XXX.X 或 XXXX “℃”或“℉”标志显示

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恢复出厂预设值

- 显示 R FSET 表示仪表为工厂设置状态
- 显示 R USET 表示用户进行了其他设置

注意：为防止误操作，在此状态需要同时按向下键＋向上键 3 秒，方能恢复出厂设置。

参数项	出厂预设值
发射率	1.000
平均时间	0
峰值时间	0
报警	/

校准方法

- 首先使用接触式或探针式测温仪，测得目标的表面温度。
- 其次使用目视瞄准测温仪瞄准目标。
- 最后调整测温仪的发射率。使得显示温度与接触式或探针式测温仪的测量值相一致。

产品标准

本产品符合 89/336/CEE 电磁兼容性要求和以下标准：

- EN50082-2 (3/95)
- IEC 1000-4-2 /IEC 100-4-4 /IEC 1000-4-11
- ENV50140—ENV50141—ENV50204
- EN55001

可选附件

- 安装支架

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富工传感器(深圳)
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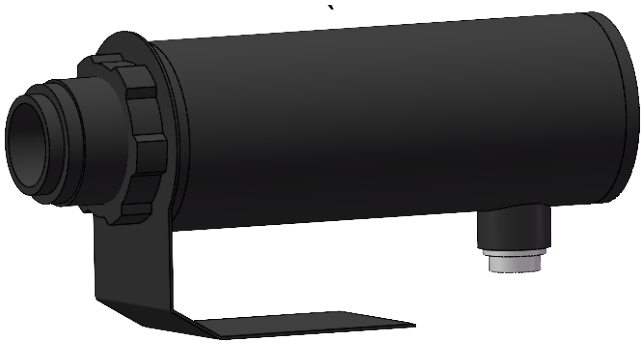
Infrared thermometer

T500-3014A



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Features

T500-3140A infrared thermometer is a temperature measuring device that calculates the surface temperature of an object according to its infrared radiation intensity. It is widely used in metallurgy and other industries.

The infrared thermometer consists of the following parts: optical lens, infrared filter, detector, amplification and processing electronic circuit, and enclosure conforming to NEMA-4 (IEC 529, IP65) standard. Ensure reliable operation under strict industrial environment. Output standard current signal to connect computer, controller, recorder, alarm and A/D interface.

Main features:

- The temperature of objects can be measured without touching, and the target temperature that is difficult to access or move can be easily measured.
- Through the coaxial aiming of the eyepiece of the infrared thermometer, the central position of the measuring point can be conveniently indicated, which is suitable for the temperature of small targets that need to be accurately measured at a fixed point.
- It provides two-wire 4-20mA current output, which can be easily installed in a variety of applications, especially suitable for the installation and use of industrial environments requiring long distance and strong interference.
- The infrared thermometer provides different wiring methods for the laser circuit and measurement circuit, which is convenient for users.
- Various temperature ranges, different measurement wavelengths, and different optical coefficients are available for users to choose to meet their different measurement requirements.
- It has the field emissivity adjustment function, which is convenient for users to conduct field correction for different measured targets, and improve the effectiveness and authenticity of the measurement results.

Principle of operation：Infrared thermometry

Since any object has infrared radiation, for the same object, the radiation intensity changes with temperature. At the same temperature, the radiation intensity of different objects depends on the material of the object, and the emissivity is usually used to describe the characteristics of infrared radiation emitted by various materials.

By setting parameters such as the emissivity of the object, the infrared thermometer uses the optical component to sense the infrared radiation spectrum of the object, and the actual temperature of the object is calculated by the arithmetic unit. Infrared thermometers use a spectrum of thermal radiation with a wavelength range of 1 μm to 1.6μm.

Optical path diagram

By releasing the locking top wire on the front end of the thermometer, the user can pull the black focusing lens group back and forth, so that the object is clearly imaged in the aiming field of view. At this time, the thermometer has the smallest measurement size at the measurement target.

Suppose the measuring distance is L at this time, and the measuring diameter of the thermometer at this distance is M = L/distance coefficient. If the measuring distance L is 10 meters, the thermometer distance factor is 250:1, and the thermometer measurement diameter is 40 mm.

Note: After the focus is completed, the locking wire should be re-locked to ensure the reliability of the measurement.

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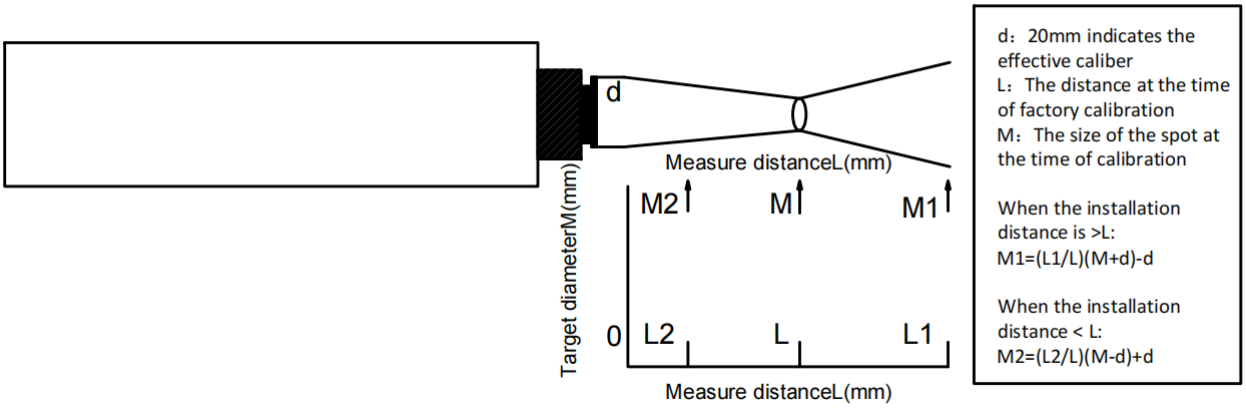

The optical path diagram below shows the measuring diameter of the thermometer at the measuring point.

Technical parameters

Basic performance

Model	T500-3014A
Environmental rating	0-60℃
Ambient temperature	-15—85℃
Storage temperature	10—95%（No condensation）
Material	、 Aluminum alloy
Size	Φ58mm×180mm
Weight	510g
Vibration	IEC 68-2-6：Any axis 11-200 Hz.3G
Impact	IEC 68-2-27：Any axis 11

Electrical parameters

Model	T500-3014A
power supply	DC 24V， 500mA MAX
Analog output	4—20mA，Maximum loop impedance 500Ω

Measurement parameters

Model	T500-3014A
Spectral range	1.6μm
Temperature range	300—1400℃
Optical resolution	250:1
Response time	10ms（95%）
System accuracy	±1%
repeatability	±0.2%
Temperature resolution	1℃
Temperature coefficient	±0.05%

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Installation instructions

Electrical installation

Power supply: A regulated linear power supply with an output of DC 24V/500mA is recommended.

Cable connection:

In order to prevent electromagnetic distortion of measurement data, please ensure the following precautions.

- The installation of thermometers, power supplies and secondary instruments is as far away as possible from any interference sources that may cause electromagnetic interference.
- If necessary, install the thermometer insulated to prevent the formation of loops with the earth.

Note: Be sure to use a shielded cable, the shielded wire of the sensor head must be grounded!

Output cable: The output cable can be a twisted pair with shield or multiple sets of twisted wires. The wire cross-sectional area requirements are as follows (copper core):

- When up to 250m: 0.2mm2 cross-sectional area
- When up to 650m: 0.5mm2 cross-sectional area

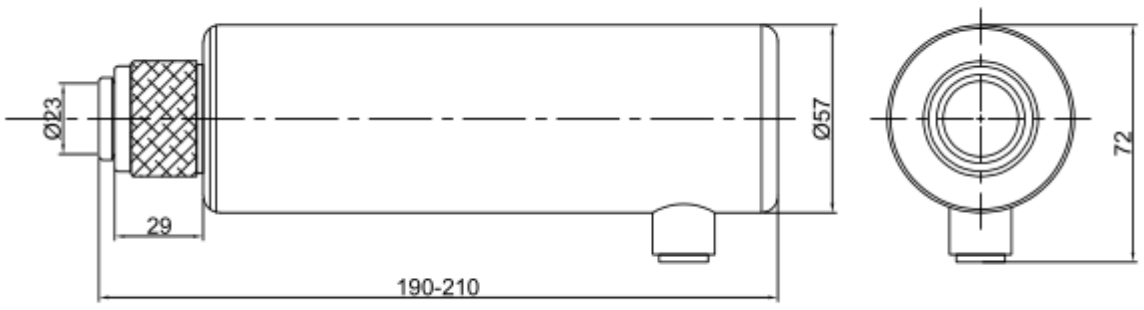
Analog output:

The following is an analog output wiring table (standard cable length 1.5 meters):

1	5	6	7	
Red	Yellow	Blue	Black	Transparent
Power+	Output +	Output—	Power—	Shield

Mechanical installation

The thermometer probe can be mounted to the mounting bracket via a mounting nut (standard). Different mounting brackets make the adjustment of the sensor head more convenient, and the mounting bracket can be ordered as an accessory. When adjusting the measured target and the sensing head, it must be ensured that the optical path is unobstructed. (Refer to the optical path diagram)



Instructions for use

Settings panel

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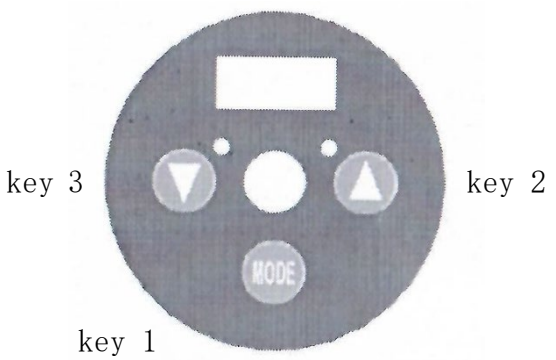 Panel appearance	 LCD display
Set button: Function setting button (key 1), up button (key 2), down button (key 3).	LCD display: 16 character codes 1 digit, 7 digits 4 digits, 2 decimal points. When the target temperature exceeds the upper limit of the measured temperature: ---H is displayed and flashes When the target temperature is below the lower limit of the measured temperature: ---L is displayed and flashes

Parameter settings

How to set up:

Open the back cover, press the MODE button, enter the parameter settings, and use the up and down keys to modify the values. USE THE MODE KEY TO CONFIRM.

Press the function button MODE to enter the basic parameter setting state.

In the parameter setting state, press the up and down keys to modify the value, press the function key to confirm the value, and go to the next item.

The function parameters set are as follows:

Parameter items	Parameter display
Emissivity	Display EX.XXX, range 0.10-1.00
Average time	Display "A" XXX.X: 0.1—999.9 (in seconds) Set to "0" for real-time measurement
Peak time	Display "P" XXX.X: 0.1—999.9 (in seconds) Set to "0" for real-time measurement
High temperature warning	Display "∧" XXX.X or XXXX "°C" or "°F" flag display Set backhaul threshold = XXXX "°C" or "°F" flag display
Low temperature warning	Display "∨" XXX.X or XXXX "°C" or "°F" flag display Set backhaul threshold = XXXX "°C" or "°F" flag display
Lower current output temperature	Display "u" XXX.X or XXXX "°C" or "°F" flag display
Current output upper limit temperature	Display "n" XXX.X or XXXX "°C" or "°F" flag display

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Factory reset to factory presets

- Display R FSET indicates that the meter is factory set status
- Displaying R USET indicates that the user made additional settings

Note: In order to prevent misoperation, you need to press the down arrow key + up arrow button at the same time for 3 seconds in this state to restore factory settings.

Parameter items	Factory presets
Emissivity	1.000
Average time	0
Peak time	0
alarm	/

Calibration method

- First, use a contact or probe thermometer to measure the surface temperature of the target.
- Second, use a visual aiming thermometer to aim at the target.
- Finally, adjust the emissivity of the thermometer. This makes the display temperature consistent with the measured value of a contact or probe thermometer.

Product standards

This product complies with 89/336/CEE electromagnetic compatibility requirements and the following standards:

- EN50082-2 (3/95)
- IEC 1000-4-2 /IEC 100-4-4 /IEC 1000-4-11
- ENV50140—ENV50141—ENV50204
- EN55001

Optional accessories

- Mounting bracket

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