AIT500
Infrared Thermodetector User Manual

Overview
AIT500C infrared thermometer (hereinafter referred to as the thermometer) can quickly and accurately determine the surface temperature of the target by measuring the infrared energy radiated by the target surface, which is suitable for non-contact temperature measurement. AIT500C is a thermometer with a D: S ratio of 12:1.

Safety Instructions
⚠ Warning:
In order to prevent eye damage or personal injury, please read the following safety instructions before using the product:
- Do not point the laser directly at persons or animals or indirectly through reflective surfaces.
- Do not look directly at the laser or with optical tools (binoculars, microscopes, etc.).

LASER RADIATION
DO NOT STARE INTO BEAM
CLASS 2 LASER PRODUCT
λ=630-670nm,＜1mW, EN60825-1:2014

Cautions:
- If the laser irradiates the user's eyes, please close the eyes immediately and turn the head away.
- Do not disassemble or refit the product and laser without permission.
- To ensure its safety and accuracy, this product should only be repaired by professional maintenance personnel using original replacement parts.
- Replace the batteries when the low battery indicator shows to prevent incorrect measurements.
- Please check the product before using it. If it is damaged, cracked on the surface or missing plastic parts, do not use it.
- Please refer to the emissivity information for the actual temperature. Highly reflective objects or transparent materials will make the actual temperature higher than the measured temperature. When measuring these objects, pay attention to the risk of burns.
- Do not use the product in an environment with flammable and explosive liquid, gas or dust.
- Do not use the product around the environment with steam, dust, or large temperature fluctuations. It may bring inaccurate results and risks.
- Put the product in the current environment for more than 30 minutes before using it to ensure measurement accuracy.
- Do not leave the thermometer on or near objects of high temperature.

Technical Indexes

Model	AIT500C
Optical resolution	12:1 (calculated at 95% energy)
Measurement range	-50℃～500℃ (-58℉～932℉)
LCD size	25*26mm
LCD display	Color EBTN
Accuracy	−50°C~0°C: ±(2℃+0.1℃/℃) 0°C~500°C: ± 2℃ or ± 2% (whichever is greater)
	-58°F~32°F: ± (4.0°F+0.1°F/°F) 32°F~932°F: ± 4.0°F or ± 2% (whichever is greater)
Temperature index	±0.1℃/℃ or ±0.1%/℃ whichever is greater (±0.1℉/℉ or ±0.1%/℉ whichever is greater)
Repeatability	±0.5℃ or ±0.5% whichever is greater (1℉ or 0.5% whichever is greater)
Emissivity	0.1~1.0 (adjustable, 0.95 by default)
Response time	≤250ms (95% of reading)
Spectral response	8μm～14μm
Auto power off	15s
Low battery indication	√
High/low temperature sound alarm	√
Data hold	√
Unit conversion (℃/℉)	√
MAX/MIN/AVG/DIF	√
Lock measurement	√
Laser	Ring laser, wavelength: 630nm~670nm, output power＜1mW, type: class 2
Operating temperature	0℃～50℃ (32℉～122℉)
Storage temperature	-20℃～60℃ (-4℉～140℉)
Operating humidity	＜90%RH (non-condensing)
Drop proof	1m
Battery type	2*AAA (zinc-manganese batteries)
Battery life	≥6h (continuous measurement mode with laser and backlight on)
Product color	Red + grey
Product weight	161.5g
Product size	146×94.5×46mm

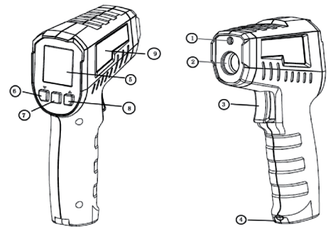
Safety Standards
CE certification: EN61326-1:2013; Safety standards of laser products: EN60825-1:2014

Reference Standard
JJG 856-2015

Characteristics
1) With ring laser, making the measurement indication area more accurate
2) Bright, easy-to-read and high-contrast color EBTN display
3) MAX/MIN/AVG/DIF hold
4) With buzzer sound alarm, can quickly find abnormalities
5) Trigger lock, suitable for processes that require temperature monitoring
6) Short press the "🔒" button in shutdown mode to take a measurement

Appearance

1	Laser
2	Infrared receiving window
3	Trigger
4	Battery door
5	LCD display
6	LOCK button
7	MODE button
8	LASER button
9	Laser warning label



LCD Indicators

🔒	Trigger lock
🔇	Buzzer
HOLD	Temperature hold
▭	Low battery
ε=0.88	Emissivity
MAX MIN AVG DIF	Measurement mode
HI LO	Temperature alarm
⚠	Laser
SCAN	Temperature measurement
℃℉	Temperature unit
888.8	Temperature main display
8888	Temperature secondary display

Operating Instructions

Startup
Short press (less than 0.5s) the trigger to turn on the thermometer, and the measured value before the last shutdown will be displayed. Pressing MODE button can view MAX/MIN/AVG/DIF.

Shutdown
The thermometer will automatically shut down after 15 seconds without any operation in the HOLD mode, and save the current measured value.

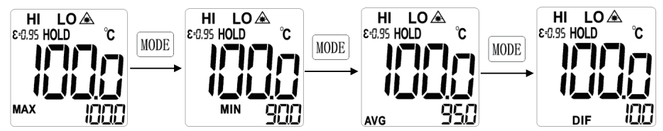
Manual Measurement
1) After aiming at the measured object, press the trigger and hold it. When the SCAN symbol is flashing, it means that the temperature is being measured, and the measurement result will be updated on the LCD.
2) Release the trigger, the SCAN symbol will disappear while the HOLD symbol will be displayed. The thermometer will stop measuring the temperature and keep the last measured value.

Lock Measurement
1) Short press the LOCK button to enter the lock measurement mode. The 🔒 symbol will be displayed on the LCD and the SCAN symbol will flash. The thermometer will measure the target temperature continuously without pressing the trigger all the time.
2) Press the trigger or short press the LOCK button again, the 🔒 and SCAN symbols will disappear while the HOLD symbol will appear. The thermometer will stop measuring and keep the last measured temperature.
3) Short press the LOCK button in the shutdown state to wake up the thermometer and enter the lock measurement mode.
4) If the LOCK button is pressed and not released for more than 3 seconds, it will be regarded as a misoperation.

Note: The measured target should be greater than 2 times the thermometer light spot diameter (S), and then the test distance (D) can be determined according to the D: S relationship diagram.

For example: when the user uses AIT500C to measure the temperature of an object with a diameter of about 4" (10cm), the most accurate spot diameter (S) of the thermometer is about 2" (5cm), and then it can be estimated based on the D:S relationship diagram that the measuring distance (D) is about 24" (60cm).

MAX/MIN/AVG/DIF Value
Short press the "MODE" button to switch among "MAX→MIN→AVG→DIF" measurement modes in sequence, and the temperature of the corresponding mode will be displayed in the secondary display position (as shown below).



Laser Indicator
Pressing the ⚠ button can turn on/off the laser indication function. When it is turned on, the laser symbol ⚠ will show on the LCD, and the laser will accurately indicate the measured position.

Note: Please follow the cautions when turning on the laser to avoid eyes injury.

High and Low Temperature Alarm
If the measured temperature is higher than the set high alarm limit, the HI symbol on the display will flash. If the sound alarm is turned on, the buzzer will beep.

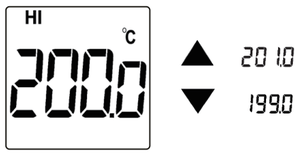
If the measured temperature is lower than the set low alarm limit, the LO symbol will flash. If the sound alarm is turned on, the buzzer will beep.

If the measured temperature value is within the range of high and low alarm limit, the HI/LO symbol will not show on the display.

Function Settings
In the HOLD interface, long press the "MODE" button for more than 2s to enter the high alarm limit →low alarm limit→emissivity→temperature unit→sound alarm and other function settings. Under these setting interfaces, the user can return to the HOLD interface by pressing the trigger or no operation for 10s.

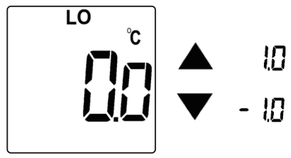
High Alarm Limit Setting

In the HOLD interface, long press the "MODE" button to enter the high alarm limit setting interface. The user can use "▼" or "▲" to adjust. Short pressing will add or subtract 1 to the value each time, and long pressing will add or subtract 10 each second.



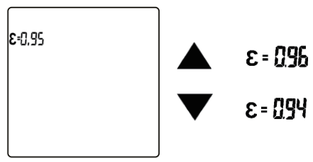
Low Alarm Limit Setting

In the HOLD interface, long press and then short press the "MODE" button once to enter the low alarm limit setting interface. The user can use "▼" or "▲" to adjust. Short pressing will add or subtract 1 to the value each time, and long pressing will add or subtract 10 each second.



Emissivity Setting

In the HOLD interface, long press the "MODE" button once and then short press the "MODE" button twice to enter the emissivity setting interface. The user can use "▼" or "▲" to adjust. Short pressing will add or subtract 0.01 to the value each time, and long pressing will add or subtract 0.1 each second.



Temperature Unit Setting

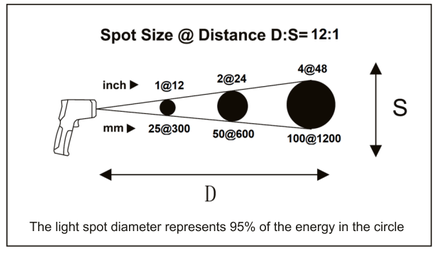
In the HOLD interface, long press the "MODE" button once and then short press the "MODE" button three times to enter the temperature unit setting interface. The user can use "▼" or "▲" to convert the unit **℃/℉**.

Sound Alarm Setting

In the HOLD interface, long press the "MODE" button once and then short press the "MODE" button four times to enter the sound alarm setting interface. The user can use "▼" or "▲" to turn on/off this function.

D: S (Distance to Spot Ratio)

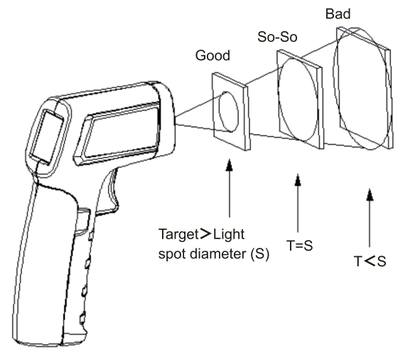
As the distance (D) between the thermometer and the measured target increases, the light spot diameter (S) of the measured area also increases.
The relationship between measurement distance and light spot diameter is shown in the figure below.



The light spot diameter represents 95% of the energy in the circle

Field of View

When measuring, make sure that the measured target is larger than the light spot diameter. The smaller the target, the closer the test distance should be (refer to D: S for the detailed light spot diameter). It is recommended that the measured target be larger than twice the light spot diameter of the thermometer.



Emissivity

Emissivity represents the material energy radiation. The emissivity of most organic materials, painted or oxidized surfaces is about 0.95. The user can use masking tapes or flat paints to cover the metal surface, use the high emissivity setting, and then wait for a period of time to make the surface temperatures of the tapes/flat paints and the covered object the same. At this point, the surface temperature of the tapes /flat paints is equal to the metal surface temperature. The following table shows the total emissivity ε of some metals and non-metals.

Measured surface	Emissivity
Metals	
Aluminum	
Oxide	0.2-0.4
A3003 Alloy	
Oxide	0.3
Crude	0.1-0.3
Brass	
Polishing	0.3
Oxide	0.5
Cuprum	
Oxide	0.4-0.8
Electrical terminal board	0.6
Hastelloy	
Alloy	0.3-0.8
Inconel	
Oxide	0.7-0.95
Abrasive blasting	0.3-0.6
Electropolishing	0.15
Ferrum	
Oxide	0.5-0.9
Rusting	0.5-0.7
Ferrum (casting)	
Oxide	0.6-0.95
Non-Oxide	0.2
Casting	0.2-0.3
Ferrum (forging)	
Passivating	0.9
Plumbum	
Crude	0.4
Oxide	0.2-0.6
Molybdenum	
Oxide	0.2-0.6
Nickel	
Oxide	0.2-0.5
Platinum	
Black	0.9
Steel	
Cold rolling	0.7-0.9
Burnishing	0.4-0.6
Polishing	0.1
Zinc	
Oxide	0.1
Non-Metals	
Asbestos	0.95
Asphalt	0.95
Basalt	0.7
Carbon	
Non-Oxide	0.8-0.9
Graphite	0.7-0.8
Carborundum	0.9
Ceramic	0.95
Clay	0.95
Concrete	0.95
Cloth	0.9
Glass	
Convex glass	0.76-0.8
Smooth glass	0.92-0.94
Nonex	0.78-0.82
Sheet material	0.96
Gypsum	0.8-0.95
Ice	0.98
Limestone	0.98
Paper	0.95
Plastic	0.95
Water	0.93
Soil	0.9-0.98
Wood	0.9-0.95

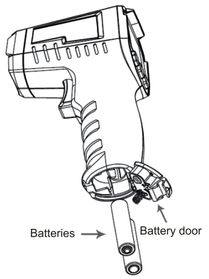
Maintenance

Cleaning

Blow away the fallen particles with clean compressed air, carefully wipe the lens surface with a moist swab, and clean the shell with a moist sponge or soft cloth. Be careful not to rinse with water or immerse it in water.

Replace Batteries

Install or replace two 1.5V batteries according to the following steps:
1. Remove the battery door
2. Install the batteries (pay attention to the polarity)
3. Close the battery door



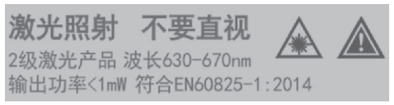
Troubleshooting

Phenomenon	Cause	Measure
Display OL	Measured value>maximum range	Stop measuring
Display -OL	Measured value<minimum range	Stop measuring
Display Err (startup)	Exceed the minimum or maximum operating temperature	Place the thermometer at 0°C-50°C (32°F-122°F) for 30 minutes
Battery symbol flashes	Low battery	Replace batteries
Laser is not working or dark	Low battery	Replace batteries
Inaccurate measurement	Unmatched emissivity, too far measurement distance, diameter of the measurement target<20mm	Refer to Field of View, D:S and other instructions in this manual

AIT500C
红外测温仪用户手册

概述
AIT500C型红外测温仪（以下简称测温仪）可通过测量目标表面所辐射的红外能量来快速准确的确定其表面温度，适用于非接触式测温。AIT500C为12:1 红外测温仪。

安全须知
⚠警告:
为了防止眼部损伤或人身伤害，使用产品前请先阅读以下安全须知:
- 请勿将激光直接或通过物体反射等间接的去照射人或动物。
- 请勿直视激光或通过光学工具（望远镜、显微镜等）直视激光，防止眼睛受到伤害。



⚠注意事项
- 如果激光照射到您的眼睛，请立即闭上眼睛并把头转开。
- 请勿私自拆卸或改装本产品及激光。
- 为确保产品的安全性及准确性，本产品仅由合格的专业维修人员使用原始的替换零件进行维修。
- 使用产品时如LCD显示屏上电池符号在闪烁，请立即更换电池，防止测量不准确。
- 使用产品前，请检测产品，如已经损坏、表面有裂痕或缺少胶件等，请勿使用。
- 请参阅辐射系数信息获取实际温度。高反射物体或透明材料会导致实际温度值比测得的温度值要高，测量这些物体时要注意烫伤危险。
- 请勿在具有易燃、易爆性的液体、气体或粉尘等环境中使用产品，以免引起火灾和爆炸。
- 请勿在蒸汽、粉尘、温度波动大的环境周围使用产品，可能会导致产品测量温度不准确而带来危险。
- 为了保证测量准确度，在使用产品之前将产品放于当前环境下待温30分钟以上。
- 避免让测温仪长时间靠近高温物体。

技术指标

产品型号	AIT500C
光学分辨率	12:1(95%能量时算出)
测量范围	-50℃～500℃ (-58℉～932℉)
LCD尺寸	25*26mm
LCD显示	EBTN彩屏
精度	-50°C～0°C：± (2℃+0.1℃/℃) 0°C～500°C：± 2℃或±2% 取最大值
	-58℉～32℉：± (4.0℉+0.1℉/℉) 32℉～932℉：±4.0℉或±2% 取最大值
温度系数	±0.1℃/℃或±0.1%/℃取较大值（±0.1℉/℉或±0.1%/℉取较大值）
重复性	±0.5℃或±0.5%取较大值（1℉或0.5%取较大值）
发射率	0.1～1.0可调节（默认0.95）
响应时间	≤250ms（读数的95%）
光谱响应	8μm～14μm
自动关机	15秒
低电压提示	√
高低温声音报警	√
数字保持	√
单位转换（℃/℉）	√
最大值/最小值/平均值/差值	√
锁定测量	√
激光	圆环激光瞄准，波长630nm～670nm, 输出功率＜1mW@10cm, 2级激光产品
工作温度	0℃～50℃ (32℉～122℉)
存储温度	-20℃～60℃ (-4℉～140℉)
工作湿度	＜90%Rh （非冷凝）
跌落测试	1米
电池类型	2*AAA（锌锰电池）
电池连续工作时间	≥6h（连续正常测量模式，激光和背光都开启时）
机身颜色	红色+灰色
机身重量	161.5g
机身尺寸	146*94.5*46mm

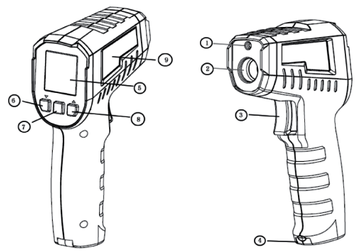
安规标准
CE认证：EN61326-1：2013 激光安全标准：EN60825-1：2014

参考标准
JJG 856-2015

产品特性
1) 圆环激光瞄准，使得测量指示区域更准确
2) 明亮、易于读取的彩色高对比度EBTN显示屏
3) 最大值/最小值/平均值/差值保持
4) 具有蜂鸣器声音报警提示功能，可快速发现异常
5) 扳机锁定，适用于需要对温度进行监控的工艺过程
6) 一键测量，关机模式下短按"🔒"按钮可启动一键测量，方便快捷

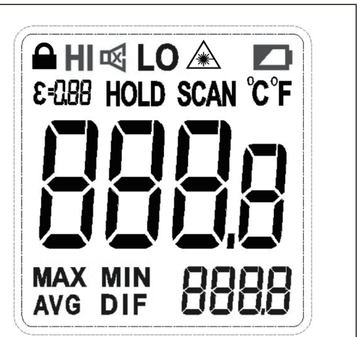
产品外观描述

1	激光
2	红外接收窗口
3	扳机
4	电池盖
5	LCD 显示
6	LOCK按钮
7	MODE按钮
8	LASER按钮
9	激光警告语标贴



LCD 功能描述

🔒	扳机锁定指示符
🔊	蜂鸣器指示符
HOLD	温度保持指示符
▭	电池低电指示符
ε=0.88	发射率指示
MAX MIN AVG DIF	测量模式指示
HI LO	温度测量报警指示符
⚠	激光指示符
SCAN	温度测量指示符
℃℉	温度单位指示符
8888	测量温度主显
8888	测量温度副显



产品操作说明
开机查看上一次关机前测量值
在测温仪关机状态下，短按（小于0.5秒）扳机测温仪开机，显示上一次关机前的测量值，通过短按MODE键可切换查看MAX/MIN/AVG/DIF值。

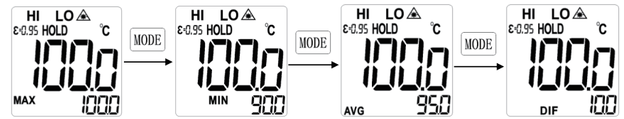
关机
测温仪在HOLD模式无任何操作15秒后自动关机，并保存当前保持的测量值。

手动测量功能
a、对准被测目标后扣动扳机并保持，当测温仪LCD上SCAN图标在闪烁时表示正在测量目标物体的温度，测量结果更新在LCD上。
b、松开扳机，测温仪LCD上SCAN图标消失，HOLD图标显示，测温仪停止测温且保持最后所测得温度值。

锁定测量功能
a、短按LOCK键进入锁定测量模式，测温仪显示器上🔒图标显示，SCAN图标闪烁，测温仪保持连续测量目标温度，无需一直长按扳机。
b、扣一下扳机或再次短按LOCK键，测温仪显示器上🔒图标消失，SCAN图标消失，HOLD图标显示，测温仪停止测量且保持最后所测得温度值。
c、关机状态下短按LOCK键可唤醒测温仪并进入锁定测量模式。
d、按下LOCK键超过3秒未释放，视为误操作，不对此次按键行为做处理。

注意：测量时最好保证被测目标大于测温仪光点直径(S)的2倍，然后根据D:S关系图确定测试距离(D)。
例如：您用AIT500C测量直径约4″（10cm）物体的温度时，那么根据以上可知，测温仪的光点直径(S)约为2″（5cm）时最准确，然后根据D:S关系图就可以估算出测量距离(D)约为24″（60cm）。

MAX/MIN/AVG/DIF值读取
短按"MODE"按键可依次切换"MAX→MIN→AVG→DIF"测量模式指示器，在测量值副显位置会显示对应模式的温度值（如下图）。



激光指示功能打开与关闭
短按"⚠"键可打开或关闭激光指示功能。当激光指示功能打开时，LCD上的激光图标⚠显示，在温度测量过程中将为您指示所测量的位置。
注意：激光打开时请遵循激光注意事项，以免对人或动物的眼睛造成伤害。

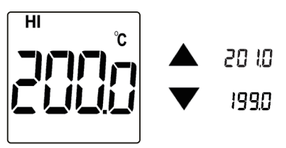
高温和低温限值报警功能
如果所测温度值高于所设置的高报警限值显示器上HI图标会闪烁报警，如声音报警功能打开，蜂鸣器会哔哔哔…的报警。

如果所测温度值低于所设置的低报警限值显示器上LO图标会闪烁报警，如声音报警功能打开，蜂鸣器会哔哔哔…的报警。

测温过程中，如果所测温度值在高低报警限值设置范围内，显示器上HI/LO图标将不显示。

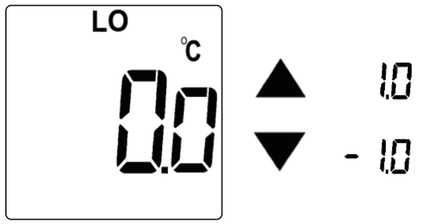
功能设置
在HOLD界面下，长按"MODE"键超过2秒可进入高报警限值→低报警限值→发射率→温度单位→声音报警等功能的设置，在这些功能设置界面下可通过扣动扳机或无操作10秒返回HOLD界面。

设置高报警限值
在HOLD界面下，长按"MODE"键，进入到高报警限值设置界面，通过"▲"键或"▼"键进行调整，短按每次数值加或减1，长按数值将每秒钟加或减10。



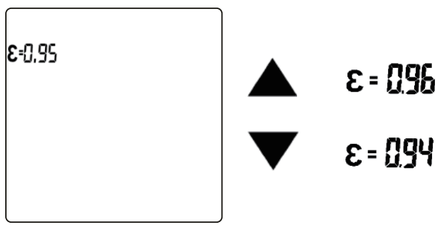
设置低报警限值

在HOLD界面下，长按“MODE”键一次，再短按“MODE”键1次，进入到低报警限值设置界面，通过“▲”键或“▼”键进行调整，短按每次数值加或减1，长按数值将每秒钟加或减10。



设置发射率

在HOLD界面下长按“MODE”键一次，再短按“MODE”键2次，进入到发射率设置界面，通过“▲”键或“▼”键进行调整，短按每次数值加或减0.01，长按数值将每秒钟加或减0.1。



设置温度单位

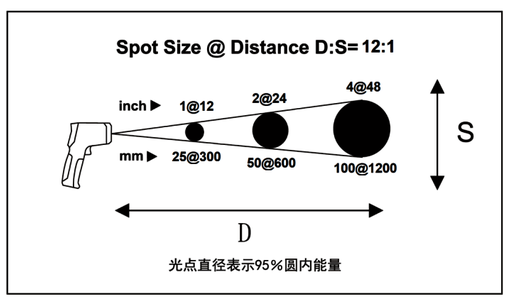
在HOLD界面下，长按“MODE”键一次，再短按“MODE”键3次，进入温度单位设置界面，然后通过“▲”键或“▼”键进行℃和℉单位的转换设置。

设置声音报警打开或者关闭

在HOLD界面下，长按“MODE”键一次，再短按“MODE”键4次，然后通过“▲”键或“▼”键进行声音报警功能的打开或关闭设置。

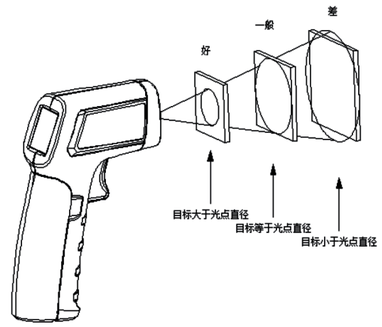
D:S（距离系数）

随着测温仪与被测目标距离（D）的增大，仪器所测区域的光点直径（S）也变大。
测温距离与光点直径的关系如下图所示。



视场

测量时要确保被测目标大于测温仪光点的直径，目标越小，则测试距离应越靠近（测温仪不同距离时的光点直径请参考D:S）。为获得最佳测量值，建议被测目标大于测温仪光点直径的2倍。



发射率

发射率表征的是材料能量辐射的象征。大多数有机材料、涂漆或氧化处理表面的发射率约为0.95。如果可能可用遮蔽胶带或无光黑漆将待测表面盖住使用高发射率设置，等待一段时间，使胶带或黑漆表达到下面所覆盖物体表面温度相同时，测量胶带或黑漆表面的温度，用以测量光亮的金属表面的温度。

下表给出了部分金属、非金属的总发射率 ε 。

所测表面	发射率
金属	
铝	
氧化	0.2-0.4
A3003合金	
氧化	0.3
粗糙	0.1-0.3
黄铜	
抛光	0.3
氧化	0.5
铜	
氧化	0.4-0.8
电气端子板	0.6
哈氏合金	
合金	0.3-0.8
铬镍铁合金	
氧化	0.7-0.95
喷砂	0.3-0.6
电抛光	0.15
铁	
氧化	0.5-0.9
生锈	0.5-0.7
铁（铸造）	
氧化	0.6-0.95
未氧化	0.2
熔铸	0.2-0.3
铁（锻造）	
钝化	0.9
铅	
粗糙	0.4
氧化	0.2-0.6
钼	
氧化	0.2-0.6
镍	
氧化	0.2-0.5
铂	
黑色	0.9
钢	
冷轧	0.7-0.9
打磨钢板	0.4-0.6
抛光钢板	0.1
锌	
氧化	0.1
非金属	
石棉	0.95
沥青	0.95
玄武岩	0.7
碳	
未氧化	0.8-0.9
石墨	0.7-0.8
碳化硅	0.9
陶瓷	0.95
粘土	0.95
混凝土	0.95
布料	0.9
玻璃	
凸面玻璃	0.76-0.8
光滑玻璃	0.92-0.94
铅硼玻璃	0.78-0.82
板材	0.96
石膏	0.8-0.95
冰	0.98
石灰石	0.98
纸张	0.95
塑料	0.95
水	0.93
土壤	0.9-0.98
木材	0.9-0.95

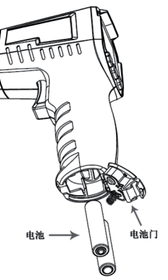
维护

清洁

使用干净的压缩空气吹走脱落的粒子，用清水湿润的棉签小心地擦拭镜片表面，用湿润的海绵或软布清洁产品外壳。注意不可用水冲洗或浸在水里。

更换电池

按以下步骤安装或更换两节1.5V电池：
1、打开电池盖
2、装入电池，注意极性正确
3、关闭电池盖



故障诊断

现象	原因	措施
测量时显示OL	测量值大于最大量程	停止测量
测量时显示-OL	测量值小于最小量程	停止测量
开机显示Err	超出最低或最高使用环境温度	将测温仪放置在0℃~50℃（32℉~122℉）环境下30分钟后可恢复
电池符号闪烁	电池电量低	更换电池
激光不工作或暗	电池电量低	更换电池
测量不准确	发射率不匹配、测量距离太远、测量目标直径小于20mm等	参阅说明书视场、D:S等说明

说明书菲林做货要求：

序号	项目	内容
1	尺寸	展开尺寸420×280±1MM　　折后尺寸（ 93.3x140mm）
2	材质	60g书纸
3	颜色	单色双面印刷
4	外观要求	完整清晰、版面整洁，无斑墨、残损、毛边、刀线错位等缺陷。
5	装订方式	无
6	表面处理	无
7	其它	无
版本		REV. 0

DWH 设 计		MODEL 机型：AIT500（UT306C改）	Part NO. 物料编号：
CHK 审核			
APPRO. 批准		UNI-T 优利德科技(中国)股份有限公司 UNI-TREND TECHNOLOGY（CHINA）CO., LTD.	