optris
infrared thermometers

MS+红外测温仪操作手册

optris MS-C012005-B

简　介

感谢您选择 Optris MS 系列红外测温仪。红外测温仪可以直接测量目标温度而无需接触目标。其工作原理是通过测量目标发射的红外辐射强度计算出物体的表面温度。非接触测温是红外测温仪最大的优点，使用户可以方便地快速测量难以接近或移动中的物体。

MS系列红外测温仪重量轻、适合袋装，便于随身携带。该测温仪在操作方便的情况下具有测量精确、多信息显示的特点，可以在0~50℃的环境下使用。激光指示可以方便地瞄准目标。具有最小值/最大值保持、视听高低温报警等多种测量方式，可以在带背景光的显示屏上显示所有你所需要的信息。

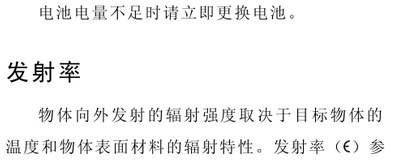
请确保所购买型号为你所要求的。

请在首次操作之前全面阅读此手册。

参　数

温度范围	-32~530℃(-20~980℉)
准确度	±1% 或 ±1℃　取大值　(0℃到530℃) ±1℃ ±0.07℃/℃　(-32℃到0℃)
重复精度	±0.5% 或 ±0.7℃　(0℃到530℃) ±0.7℃ ±0.05℃/℃　(-32℃到0℃)
光学分辨率(D:S)	20:1
显示分辨率	0.1℃(0.1℉)
响应时间	300ms
环境温度	0~50℃
相对湿度	10~95% RH(不结露，环境温度＜30℃)
存储温度	-20~60℃(不含电池)
光谱响应	8~14μm
发射率调整	0.100~1.000(步长0.001)
扫描/保持功能	有
最大值/最小值显示	有
背景光	有
高/低温报警功能	有
激光瞄准	≤1mW 650nm 激光等级II级
低电量报警	有
℃/℉选择	有
重量/尺寸	150g/190×40×45mm
电源	9V 碱性电池
电池寿命	20小时,激光与背景光使用占50%; 40小时,激光和背景光关闭

产品图片和描述



非接触红外测温仪的部分应用


电气设备维护


轴承、传送带、发动机热点检测


制造过程动态产品温度测量


热绝缘体能量泄露检测


车辆关键部件检测

附　件

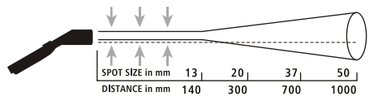
1）　使用手册/保修单
2）　9V电池
3）　腕带
4）　仪器套

＊ 当测温仪装入仪器套时请确认摆放方向，避免触发测量按键。

距离和光斑尺寸

精密的光学镜头和光学焦点设计，使距离测温仪140mm内的测量光斑直径为13mm，然后光斑尺寸会随着距离增加而增大，如1米处的光斑直径为50mm。测温仪距离与光斑尺寸的比率也称为光学分辨率,MS+的光学分辨率是20:1，相应的光斑尺寸可以通过距离和光斑尺寸的比率为20:1近似计算。

详细信息可以参照所附光路图。



光斑尺寸

被测目标的尺寸必须大于光斑尺寸。

MS系列红外测温仪确保你可以测量小到13mm的目标。

按　键

测量按键

圆形测量按键可进行温度测量。按下按键可进行温度测量，松开按键后温度数据会保持 7 秒。

模式按键

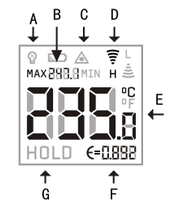
中心处带有圆形标志的按键为模式按键，每按此按键一次，　会进入下一个功能界面。例如：按一次激活发射率，再按一次则会保存发射率；激活最大值/最小值功能的设置。

上行/激光按键　设置激光或增加所选模式参数值。

下行/背光按键　设置背景光或减少所选模式参数值。

显　示

A　背景光标志
B　最大值/最小值
C　激光标志
D　高、低温报警
E　当前温度
F　发射率
G　保持功能



操　作

测　量:

让测温仪对准物体，按测量按键。显示器上显示当前目标温度并按预选模式显示本次测量的最大值或最小值。

保持功能:

松开测量按键，进入保持模式，当前温度值显示7秒。

关　机:

温度数据保持7秒后，测温仪自动关机。

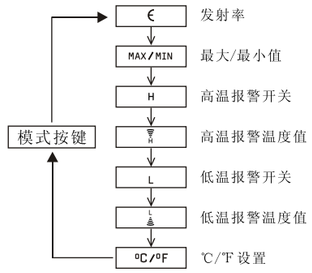
测量模式设置:

可以在模式设置中进行方式选择和参数设置：发射率设置，最大/最小温度显示，高/低温报警，高/低温报警温度值，℃/℉转换。松开测量按键，在保持模式下每按模式按键一次可以激活一个新的模式：显示器上会闪烁指示激活的模式。此时可以通过上行或下行按键选择或修改所需数值，再按模式按键一次储存选择设置，同时将进入下一个功能设置。如果7秒内没有进行新的操作，仪器自动关机。再次按测量按键后，按新的测量模式进行工作。

电池更换

需要更换电池时，电池盖位于仪器下侧，请向下推动电池盖，参见图片示意，取出电池并合上电池盖。

模式循环



按照上述模式循环可以激活任何需要修改的数据，显示器显示的闪烁图标表明何种模式已经被激活并处于可修改状态。

模式设置和参数调整

发射率设置

当仪器处于保持状态时:

按模式按键一次，进入发射率修正。

1）　发射率 ϵ = 闪烁。
2）　按上行按键，增加发射率值。
3）　按下行按键，减小发射率值。
4）　显示温度将随发射率值调整而改变。
　　再按模式按键一次储存设置。

最小/最大值显示设置

再次激活模式按键设置最大值或最小值显示。MAX 表示最大温度读数，MIN 表示当前测量的最小值。

高/低温报警设置

报警功能激活时会出现符号：H 或 L 在符号 H 或 L 闪烁时，通过上行按键和下行按键设置高/低温报警温度值。

℃/℉ 功能设置

用户可以选择摄氏或华氏作为显示温度。

激光设置

在测量模式下按上行按键可以打开或关闭激光。

背景光设置

测量或保持模式下按下行按键可以开启或关闭背景光。

快速查看功能

保持状态下按上行按键仪器可以巡回显示最小值和最大值。

电池电量指示

电池电量不足时请立即更换电池。

发射率

物体向外发射的辐射强度取决于目标物体的温度和物体表面材料的辐射特性。发射率（ϵ）参数描述物体向外辐射红外能量的能力。如果发射率选择过高，测温仪显示温度会低于目标真实温度--假设被测目标温度高于环境温度。

光亮或抛光表面会导致读数不准，解决方法是用胶带或黑漆覆盖测量表面。调节温度仪发射率为0.98后测量胶带或黑膝表面的温度。然后测定附近区域的温度并调节发射率真到测量数与有色表面相吻合。

发射率对照表

物体名称		发射率
		8-14 μm
铝	氧化	0.2-0.4
石棉		0.95
沥青		0.95
黑陶器		0.7
陶器		0.95
混凝土		0.95
铜	氧化	0.4-0.8
纺织品		0.95
玻璃	餐具	0.85
黄金		0.01-0.1
砂砾		0.95
冰		0.98
铁	氧化	0.5-0.9
碳胶		0.9
石墨	氧化	0.2-0.6
纸	各种颜色	0.95
塑胶	透明度>0.5mm	0.95
橡胶		0.95
沙子		0.9
雪		0.9
土壤		0.9-0.98
钢铁	氧化	0.7-0.9
水		0.93
木头	原木	0.9-0.95

提　示

1）　反光或抛光金属表面会导致读数不准确，参看本手册发射率部分。
2）　红外测温仪只能测量物体表面温度，不能穿透透明材料如玻璃或塑料进行测量。
3）　保持镜头清洁，远离蒸汽，灰尘，烟或其他微粒，以避免不准确测量。

激光警告

激光II级标准

请不要将激光直接对准眼睛或指向高反射物体表面。避免造成伤害。

注意:

所有的测温仪均需要避免以下情况:

1）　电磁场（EMF）
2）　静电
3）　热冲击(由于环境温度变化太大或过快变化引起)

故障处理

现　象	问　题	解决方法
HHH	温度超出测量上限	选择在测量范围内的目标
LLL	温度超出测量下限	选择在测量范围内的目标
---	电池电量不足	立刻更换电池
电池电量指示	电量不足	检查/更换电池
显示面板无显示	电池没电/无电池	检查/更换电池
激光不工作	1. 电量不足或没电	1. 更换电池
	2. 激光关闭	2. 打开激光

保　修

每台仪器都经过质量检验程序，如果发生任何问题，请立刻联系服务部门。仪器从出厂起保质期为12个月。过保质期后，生产商对所维修或更换元件部分的保质期为6个月。如果因使用不当或疏忽造成仪器的电路开路以及电池不在保修范围。私自拆卸也不在保修之列。生产商不对间接的损害负责。

在保修期内若仪器出现问题，可以免费更换，标定或修理，期间发生的运费由发货人承担。生产商有权选择更换产品部件而不是修理。如果仪器故障是由于用户的使用不当或疏忽造成，用户必须负担维修费用，在这种情况下用户可以事先询问维修费用。

CE-标准

产品符合下列标准

EMC:	EN61326-1
安全标准:	EN6101-1
	EN60825-1

产品满足EMC 89/336/EEC和73/23/EEC低电压指示要求。

产品遵守欧盟标准。

CE

optris
infrared thermometers

optris MiniSight Plus

NONCONTACT THERMOMETER

INTRODUCTION

Thank you for choosing the optris MiniSight Plus infrared thermometer!

Infrared thermometers measure the object surface temperature without touching it. They determine the temperature on the basis of the emitted infrared radiation from an object.
Because of their ability to measure the surface temperature contactless, these thermometers enable the user to detect the temperature of inaccessible or moving objects without difficulties.
The optris MiniSight Plus infrared thermometer can follow you wherever you are as it is lightweight and fits easily into your shirt pocket.
Infrared thermometers combine a convenient operation with precise measurement and an informative display. They can be used in ambient temperatures ranging from 0 up to 50°C. Laser sighting helps to aim at objects.

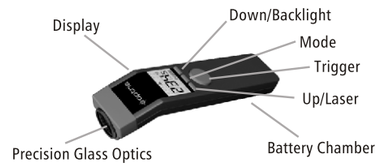
Various measurement functions like minimum and maximum value, hold function, high and low alarm provide you with all necessary information on a threeline backlit display.

Please read the manual completely before the initial operation.

SPECIFICATIONS

Temperature range	-32 ~ 530°C (-20 ~ 980°F)
System accuracy	± 1% or ±1°C from 0°C up to 530°C
	± 1°C ± 0.07°C / °C from 0°C up to -32°C
Repeatibility	0.5% or ± 0.7°C from 0°C up to 530°C
	± 0.7°C ± 0.05°C / °C from 0°C up to -32°C
Optical resolution (D:S)	20:1
Display resolution	0.1°C (0.1°F)
Response Time (95%)	300ms
Ambient temperature	0 ~ 50°C
Storage temperature	-20 ~ 60°C without battery
Spectral range	8 ~ 14 µm
Emissivity	0,100 ~ 1,000
Configuration	Min/Max/Scan/Hold/°C/°F
Display Backlight	Yes
Alarm functions	Visual and acoustic HIGH-/LOW-Alarm
Laser	<1 mW laser class IIa,
	laser beam with 9mm offset
Weight/Dimensions	150g; 190x38x45mm
Battery	9 V Alkaline battery
Battery life	20 hours with laser and backlight on 50%;
	40 hours with laser and backlight off
Low battery alarm	Yes
Relative humidity	10 ~ 95% RH non condensing
	with <30°C ambient temperature

PRODUCT PICTURE AND DESCRIPTION



SOME NONCONTACT THERMOMETER APPLICATIONS

Maintenance of electrical equipment

Hot spot detection on bearings, transmissions and motors

Temperature measurement of moving objects/products in the manufacturing process

Detection of energy losses on heat insulations

Inspection of critical components on vehicles

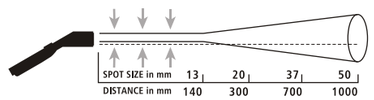
ACCESSORIES

Included:
1) Manual/Warranty
2) 9V alkaline battery
3) Wrist strap
4) Pouch: Make sure, that you insert the thermometer into the pouchlike shown in order to avoid unintended operation.

DISTANCE AND SPOT SIZE

Due to the precision glass optics and its focusing, the measuring beam of the instrument has a diameter of 13mm at any distance within 140mm. The spot size grows with increasing distance. At the distance of 1m the spot size achieves a diameter of 5cm. The ratio of distance to spot size, also called optical resolution, is 20:1 within the close focus point at a distance of 1m.
The spot size of longer distances can be calculated by dividing the distance by factor 20.

OPTICAL DIAGRAMME



SPOT SIZE

The target area must be at least as large as the spot size. The optris MiniSight Plus thermometer enables you to measure objects as small as 13mm.

BUTTONS

Trigger:
The round button is the TRIGGER for the temperature measurement. By activating it you star tthe temperature measurement. As soon as you release the trigger, the temperature value will be for 7 seconds. The MAX- or MIN-value of the measurement is displayed.

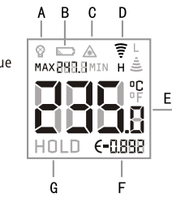
Mode-Button:
The centre button – marked with a circle – is the mode button. Each time you press it, you enter another function interface, e.g. one time to call emissivity, afterwards press it one time to store it, two times to call MIN/MAX function, press it one more time to store this function a.s.o.

Up/Laser:
With this button you set the laser and increase the chosen value.

Down/Display Backlight:
Use this button to activate the backlight and to reduce the chosen value.

DISPLAY

A Symbol for display backlight
B MAX/MIN: current & last value
C Laser symbol
D HIGH/LOW alarm
E Current temperature value
F Emissivity
G HOLD-function



OPERATION

TEMPERATURE MEASUREMENT:
Aim the thermometer a t a target and touch the TRIGGER. On the basis of all carried out settings the display shows the current temperature value.

HOLD-FUNCTION:
If you release the TRIGGER, the HOLD mode will show the temperature value for 7 seconds.

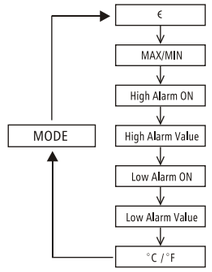
SHUT DOWN:
The temperature data will be kept for 7 seconds before the instrument shuts down automatically.

MEASURING MODE SETTING:
You may choose between the following mode settings: maximum/minimum temperature value, high/low alarm, emissivity adjustment,display backlight on/off, °C/°F.
Each time you release the TRIGGER button, the HOLD function will enable you to activate a new mode with the button. Press the MODE button once: by flashing the display will indicate the mode which is activated.
Now choose and modify the requested value by using the UP and DOWN buttons. Store the chosen setting by pressing the MODE button a second time. With the second pressing of the MODE button you simultaneously move into the next mode setting. Now proceed like before.
If you have not activated any button for 7 seconds, the instrument will shut down. By pressing the TRIGGER anew you will activate the last stored function settings on the display.

CHANGING THE BATTERIERS

In order to exchange the batteries, just press the cover lid on the bottom side of the thermometer downwards see illustration. Exchange the batteries and close the cover lid.

FUNCTIONS



The mode cycle illustrates the sequence of mode settings. The flashing icon on the display shows which mode is being activated and ready for modification.

SETTING THE EMISSIVITY

HOLD-Mode:
Press the MODE button once and enter the "emissivity setting":
1) EMISSIVITY ε = flashing
2) Press UP to increase the emissivity value
3) Press DOWN to reduce emissivity value
4) The temperature value displayed corresponds to the emissivity adjustment.

Press the MODE button a second time to store the setting.

SETTING THE MIN-/MAX-HOLD-FUNCTION:
While you set the adjusted emissivity with MODE, you simultaneously activate the next function: the MINIMUM and MAXIMUM HOLD function. MAX indicates the maximum temperature value, MIN the minimum value of the current measurement.

SETTING HIGH AND LOW ALARMS:
The alarm function is activated as soon as the display reads the sign: or
High and low alarms can be set by additionally activate or on the display with UP or DOWN.

SETTING THE °C/°F FUNCTION:
You may choose to read the temperatures either with Celsius or Fahrenheit.

SETTING THE LASER:
The laser supports you in aiming at your target. Activate it by pressing the TRIGGER and UP buttons simultaneously.

SETTING THE DISPLAY BACKLIGHT:
The display backlight will be activated by pressing UP during measuring as well as during HOLD mode.

FAST SCANNING FUNCTION:
The instrument helps to quickly scan objects and afterwards read the minimum and maximum temperature value in the HOLD function by simply activating the UP button.

BATTERY ICON INDICATION:
Replace the battery as soon as the battery status is shown as low.

EMISSIVITY

The intensity of infrared radiation, which is emitted bye ach body, depends on the temperature as well as on the radiation features of the surface materia l of the measuring object.
The emissivity (ε = epsilon) is used as a stable factor of the material, with which to describe the ability of the body to emit infrared energy. If the emissivity chosen is too high, the infrared thermometer may display a temperature value which is much lower than the real temperature assuming the measuring object is warmer than its surroundings.

The measurement of metallic surfaces, in particular, requires a careful emissivity adjustment on the basis of the relevant values shown in the emissivity table.

EMISSIVITY TABLE

Material		Emissivity
		8 - 14 µ m
Aluminum	oxidized	0,2 - 0,4
Asbestos		0.95
Asphalt		0.95
Basalt		0.7
Ceramic		0.95
Concrete		0.95
Copper	oxidized	0,4 - 0,8
Fabric		0.95
Glass	plate	0.85
Gold		0,01 - 0,1
Gravel		0.95
Ice		0.98
Iron	oxidized	0,5 - 0,9
Karborundum		0.9
Lead	oxidized	0,2 - 0,6
Paper	each color	0.95
Plastics	transparent > 0,5 mm	0.95
Rubber		0.95
Sand		0.9
Snow		0.9
Soil		0,9 - 0,98
Steel	oxidized	0,7 - 0,9
Water		0.93
Wood	natural	0,9 - 0,95

IMPORTANT REMINDERS

1) Shiny or polished metallic surfaces may result in inaccurate reading results. Please see "MISSIVITY" for measuring surfaces.

2) Infrared thermometers measure the surface temperature of objects, only. They cannot measure through transparent material such as glass or plastic.
3) Keep the optics clean of steam, dust, smoke or other particles to prevent inaccurate measurement.

WARNING

Laser Class 2

Do not point the l aser directly at the eye or indirectly off reflective surfaces as this may cause serious damage!

All instruments should be protected from the following conditions:
1) Electromagnetic fields (EMF)
2) Static electricity
3) Thermal shock (caused by large or abrupt ambient temperature changes)

TROUBLESHOOTING

CODE	PROBLEM	ACTION
HHH (displayed temperature)	beyond MAX measuring limit	choose target within measuring specifications
LLL (displayed temperature)	beyond MIN measuring limit	choose target within measuring specification
Battery indicator	low battery	check/replace battery
Blank display	battery may be empty	check/replace battery
Laser does not work	(1) battery empty	(1) replace battery
	(2) laser	(2) activate laser

WARRANTY

Each product passes through a quality process. Nevertheless, if failures occur please contact the customer service at once.
The warranty period covers 12 months starting on the delivery date. After the warranty is expired the manufacturer guarantees additional 6 months warranty for all repaired or substituted product components. Warranty does not apply to electrical circuit breakers, primary batteries and dama ges, which result from misuse or neglect. The warranty also expire s if you open the product. The manufacturer offers a 3 months warranty for rechargeable batteries. The manufacturer is not liable for consequential damage.
If a failure occurs during the warranty period, the product will be replaced, calibrated or repaired without further charges. The freight costs will be paid by the sende. The manufacturer reserves the right to exchange components of the product instead of repairing it. If the failur e results from misuse or neglect the user has to pay for the repair. In that case you may ask for a cost estimate before hand.

CE - CONFORMITY

The product conforms to the following standards :
EMC: EN 61326-1
Safety standards: EN 61010 -1
EN 60825-1

The product accomplishes the requirements of the EMC directive 89/336/EEC and of the low voltage directive 73/23/EEC.
The instrument complies with the standards of the Europ ean Union.