FLUKE.

576

Precision Infrared Thermometer

Users Manual

LIMITED WARRANTY AND LIMITATION OF LIABILITY

This Fluke product will be free from defects in material and workmanship for one year from the date of purchase. This warranty does not cover fuses, disposable batteries, or damage from accident, neglect, misuse, alteration, contamination, or abnormal conditions of operation or handling. Resellers are not authorized to extend any other warranty on Fluke's behalf. To obtain service during the warranty period, contact your nearest Fluke authorized service center to obtain return authorization information, then send the product to that Service Center with a description of the problem.

THIS WARRANTY IS YOUR ONLY REMEDY. NO OTHER WARRANTIES, SUCH AS FITNESS FOR A PARTICULAR PURPOSE, ARE EXPRESSED OR IMPLIED. FLUKE IS NOT LIABLE FOR ANY SPECIAL, INDIRECT, INCIDENTAL OR CONSE-QUENTIAL DAMAGES OR LOSSES, ARISING FROM ANY CAUSE OR THEORY. Since some states or countries do not allow the exclusion or limitation of an implied warranty or of incidental or consequential damages, this limitation of liability may not apply to you.

Safety Information

⚠ ⚠ **Warning**

A Warning identifies conditions and actions that pose hazards to the user. To avoid electrical shock or personal injury, follow these guidelines:

- ⚠ Do not point laser directly at eye or indirectly off reflective surfaces.
- Before using the thermometer inspect the case. Do not use the thermometer if it appears damaged. Look for cracks or missing plastic.
- Replace the batteries as soon as the battery indicator ▥ two or less segments.
- Do not use the thermometer if it operates abnormally. Protection may be impaired. When in doubt, have the thermometer serviced.
- Do not operate the thermometer around explosive gas, vapor, or dust.
- Do not connect the optional external probe to live electrical circuits.
- To avoid a burn hazard, remember that highly reflective objects will result in lower than actual temperature measurements.
- Do not use in a manner not specified by this manual or the protection supplied by the equipment may be impaired.

⚠ **Caution**

To avoid damaging the thermometer or the equipment under test protect them from the following:

- EMF (electro-magnetic fields) from arc welders, induction heaters, etc.
- Static electricity
- Thermal shock (caused by large or abrupt ambient temperature changes- allow 30 minutes for thermometer to stabilize before use).
- Do not leave the thermometer on or near objects of high temperature.

Table of Contents

Introduction

The Fluke Model 576 Infrared Thermometer (the thermometer) is for non-contact temperature measurement. This thermometer determines an object's surface temperature by measuring the amount of infrared energy radiated by the object's surface.

Contacting Fluke

To contact Fluke, call one of the following telephone numbers:

USA: 1-888-44-FLUKE (1-888-443-5853)
Canada: 1-800-36-FLUKE (1-800-363-5853)
Europe: +31 402-675-200
Japan: +81-3-3434-0181
Singapore: +65-738-5655
Anywhere in the world: +1-425-446-5500
For USA Service: 1-888-99-FLUKE (1-888-993-5853)

Or, visit Fluke's Web site at www.fluke.com.
To register your product, visit register.fluke.com.

Symbols and Safety Markings

Symbol	Explanation
⚠	Risk of danger. Important information. See Manual.
⚠	Hazardous voltage. Precedes warning
⚠	Warning. Laser.
CE	Conforms to requirements of European Union and European Free Trade Association (EFTA)
°C	Celsius
°F	Fahrenheit
▯▯	Battery

Laser ON and OFF
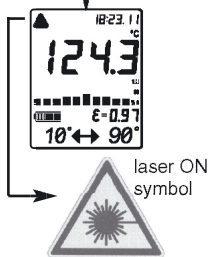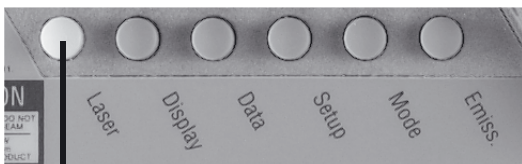
laser ON symbol

The laser sighting marks the spot size that includes the measured target.
To turn the laser On or Off, press the LASER button when the trigger is pulled. A laser symbol appears when the laser is on. The laser automatically turns off if you release

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Laser Warning and Serial Number Labels

IEC 825
(1994)

LASER LIGHT
DO NOT STARE INTO BEAM
CLASS 2 LASER
< 1 mW / 635 nm

LASERLICHT
NICHT IN DEN STRAHL
BLICKEN
LASER KLASSE 2
< 1 mW / 635 nm

RAYONNEMENT LASER
NE PAS EXPOSER L'OEIL
AU RAYON LASER
LASER DE CLASSE 2
< 1 mW / 635 nm

RAYO LASER
NO FIJAR LA VISTA
EN EL RAYO
LASER CLASE 2
< 1 mW / 635 nm

P S
C
JQA

JISC6802-1989 クラス2レーザ製品
最大出力1mW 630-670nm
レーザ光をのぞきこまないこと
レーザ光を人に向けないこと
子供に使わせないこと

Avoid exposure - laser radiation
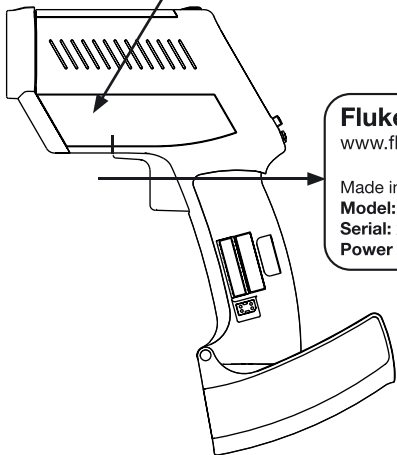is emitted from this aperture.
Complies with
FDA 21 CFR 1040.10 and 1040.11.

CAUTION
LASER RADIATION - DO NOT
STARE INTO BEAM
OUTPUT <1mW
WAVELENGTH 635 nm
CLASS II LASER PRODUCT

EVITE EXPOSIÇÃO - RADIAÇÃO LASER
EMITIDA ATRAVÉS DESTA ABERTURA
DE ACORDO COM
FDA 21 CFR SUBCAPÍTULO J

CAUTELA
RADIAÇÃO LASER - EVITE EXPOSIÇÃO
DIRETA AOS OHLOS
SAIDA < 1mW
COMPRIMENTO DE ONDA 630-670 nm
CLASSE II PRODUTO LASER

Fluke Corporation
www.fluke.com

Made in Germany Month Year
Model: Fluke xxx
Serial: xxxx xxx
Power Requirements: 3V

Delivery Content

- The unit
- Getting Started
- Two AA batteries
- Manual on CD
- Thermocouple type K probe
- Windows-based software on CD
- USB cable

Batteries and Measurement

To open the battery
compartment, press
gently on the top part of
the handle to release
the catch and pivot the
grip as shown in the
figure. Orient the batteries
(two alkaline R6 (AA,
UM3)) positive side up as
shown on the housing.

MEASUREMENT

To take a temperature
measurement, hold the
unit as shown. Aim at the
target. Pull the trigger (F).
The temperature of the
object being measured
is shown on the display
(B). The temperature will
be displayed for seven
seconds after trigger is
released.

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Using the Camera

In addition to the thermometer functionality the Model 576 comes with a digital built-in camera to documentate the measured places. The pictures include the measured values and additional information. the additional information is customizable via the IRGraph software.

How to use the camera

1. To switch on the unit, pull the trigger.
2. Press the "Enter" button to activate the camera while the display is active.
3. First the word "LOG" flashes and then the camera icon appears.

The unit is ready to use now. It is preset to take 26 high-resolution (640x480 pixel) pictures.

4. Pull the trigger and hold it. The laser circle shows where you are measuring.
5. Aim at the target. Be sure that the laser sighting is inside the target.
6. Gently release the trigger to record the photo and the temperature. Successful recording of picture and temperature is indicated by two short beeps and a green blinking LED above the display. The next location will be shown on the display.

Caution:

If you hear a longer beep and the LED above the display is shining red, look at the display. If you see "Use Flash!" and a flash symbol, repeat your last measurement. A green LED above the camera symbol

signals: "Flash has charged". The flash will now fire automatically.

7. For the next measurement, repeat points 5 and 6.
8. Once you have taken all your photos, connect the unit to the PC via USB.

See software and hardware set up on the next two pages.

Focusing the Camera

To get sharp and clear pictures simply turn the focus ring depending on the distance of your target.
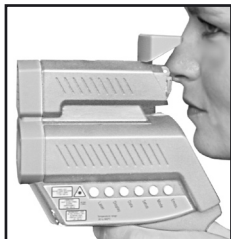
Between 0.2 m (8 in) and 0.3 m (12 in.) adjust the lens to the flower symbol.
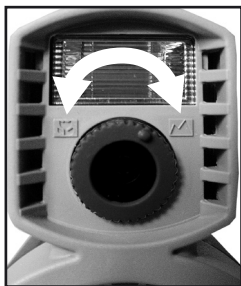
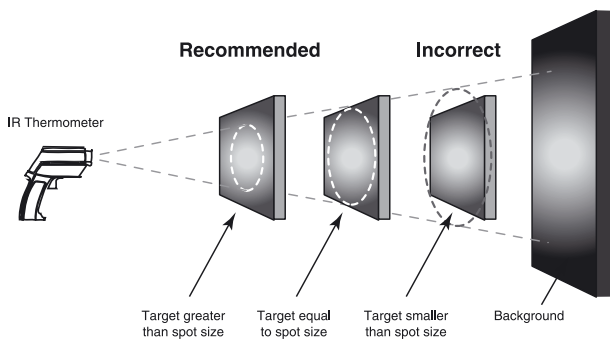Between 0.5 m (19 in) and infinity adjust the lens to the mountain symbol.

Between 0.25 m (10 in.) and 0.6 m (23 in.) adjust the lens in the middle of both symbols.

The View Finder Guide

Rotate the cap to a horizontal position and look over it, as shown below. The embossed triangle will show you the approximate width of the photo.

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Field of View

Recommended   **Incorrect**

IR Thermometer

Target greater than spot size   Target equal to spot size   Target smaller than spot size   Background
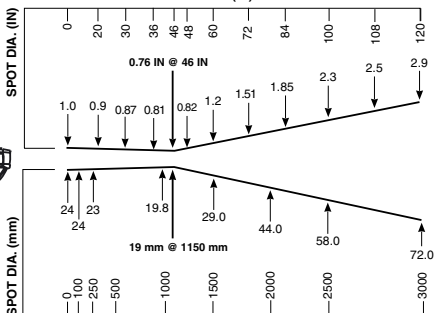
Make sure that the target is larger than the unit's spot size. The smaller the target, the closer you should be to it.

Spot Size

STANDARD MODEL
Optical Chart

DISTANCE: SENSOR TO OBJECT (IN)

SPOT DIA. (IN)

0 20 30 36 46 48 60 72 84 100 108 120

0.76 IN @ 46 IN

1.0 0.9 0.87 0.81 0.82 1.2 1.51 1.85 2.3 2.5 2.9

SPOT DIA. (mm)

24 24 23 19.8 29.0 44.0 58.0 72.0

19 mm @ 1150 mm

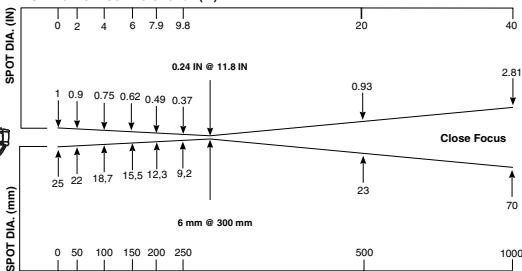0 100 250 500 1000 1500 2000 2500 3000

DISTANCE: SENSOR TO OBJECT (mm)
FOCUS POINT D:S = 60:1   FAR FIELD D:S = 35:1

CLOSE FOCUS MODEL
Optical Chart

DISTANCE: SENSOR TO OBJECT (IN)

SPOT DIA. (IN)

0 2 4 6 7.9 9.8 20 40

0.24 IN @ 11.8 IN

1 0.9 0.75 0.62 0.49 0.37 0.93 2.81

Close Focus

SPOT DIA. (mm)

25 22 18,7 15,5 12,3 9,2 23 70

6 mm @ 300 mm

0 50 100 150 200 250 500 1000

DISTANCE: SENSOR TO OBJECT (mm)
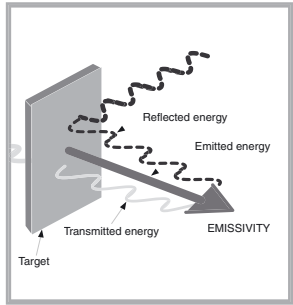FOCUS POINT D:S = 50:1   FAR FIELD D:S = 12:1

The measured spot size depends on the distance between the object you are measuring and the infrared thermometer.
The relationship between distance and spot size is 60:1(Standard Focus) or 50:1 (Close Focus) at the focus point. The D:S in the far field (>33ft/10m) is 35:1 (Standard) or 12:1 (Close Focus).
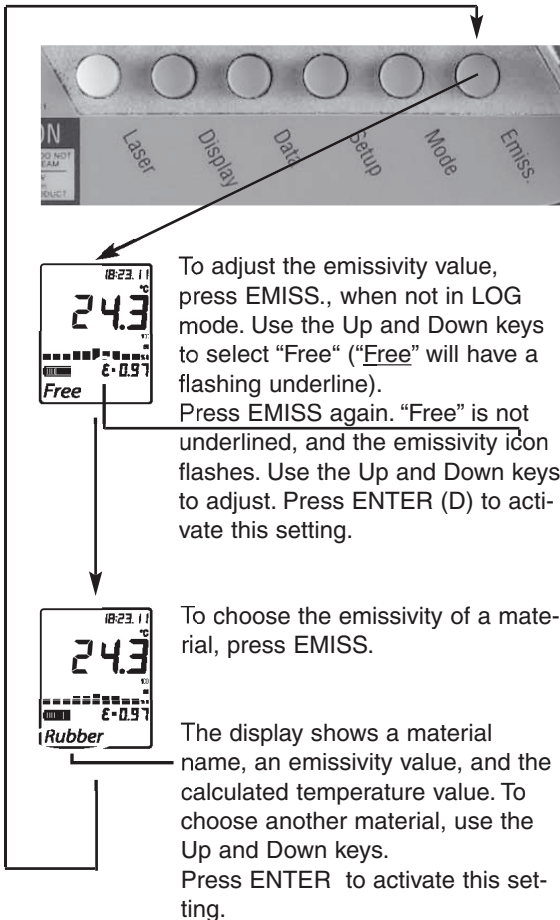
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Emissivity - Explanation

The amount of infrared energy radiated by an object depends on its emissivity and its temperature.
The emissivity depends on the material and its surface characteristics. For more accurate readings, adjust the emissivity value for the type of material being measured.

Emissivity

To adjust the emissivity value, press EMISS., when not in LOG mode. Use the Up and Down keys to select "Free" ("<u>Free</u>" will have a flashing underline).
Press EMISS again. "Free" is not underlined, and the emissivity icon flashes. Use the Up and Down keys to adjust. Press ENTER (D) to activate this setting.

To choose the emissivity of a material, press EMISS.

The display shows a material name, an emissivity value, and the calculated temperature value. To choose another material, use the Up and Down keys.
Press ENTER to activate this setting.

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Emissivity - Unknown Value

To adjust the unit's emissivity value for a
material with unknown emissivity, plug in the
probe.
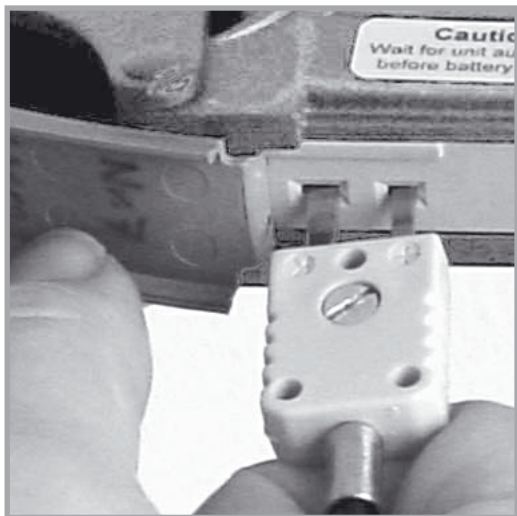
Pull the unit's trigger. Place the measuring
tip of the probe on the area to be measured.
Wait for the reading to stabilize.
Release the trigger.
Note the indicated probe temperature reading.
Pull the trigger again. Measure the same area
using infrared measurement.
Press the emissivity button. Use the Up and
Down keys to select the material name "Free"
which will be shown in the display. Press the
emissivity button again until the emissivity sign
flashes. Use the arrow keys to change the
emissivity value until the temperature matches
the probe's reading.

Emissivity Table (Selected Values)

Aluminum*	0.30
Asbesto	0.95
Asphalt	0.95
Basalt	0.70
Brass*	0.50
Brick	0.90
Carbon	0.85
Ceramic	0.95
Concrete	0.95
Copper*	0.95
Dirt	0.94
Frozen food,	0.90
Hot food	0.93
Glass (plate)	0.85
Ice	0.98
Iron*	0.70
Lead*	0.50
Limestone	0.98
Oil	0.94
Paint	0.93
Paper	0.95
Plastic**	0.95
Rubber	0.95
Sand	0.90
Skin	0.98
Snow	0.90
Steel*	0.80
Textiles	0.94
Water	0.93
Wood***	0.94

* oxidized
** opaque, over 20 mils
*** natural

Hardware and Software Setup

IMPORTANT! Before you install the software you must connect the unit with the PC to configure the USB interface.

Proceed as follows:
Connect the unit to the PC via USB. New Hardware will be found. You have to install three different device drivers - two for USB ports and one for the camera. A driver is software needed by your PC to communicate with the thermometer and the camera. You will be asked three times to install a driver.

Note! During the driver installation, a message window could appear, indicating that a particular driver is not supported or authorized by Microsoft. Please ignore this message and continue with the installation.

The Windows Hardware Assistant will guide you through the installation process. If you are asked where to look for the drivers choose CD-ROM. In most cases, Windows will find the drivers automatically. If Windows asks for the file STV680u.dll please point to the driver's folder of the CD.

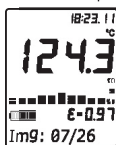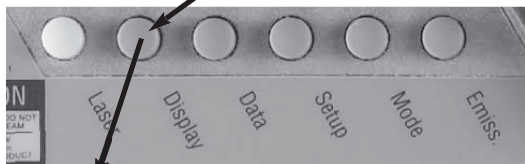For the software installation follow the information on the screen.
Start the software with a double-click on the IRGraph icon on the desktop.

The following screen appears
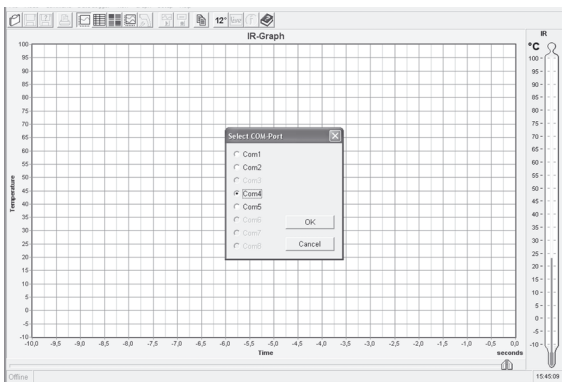
The complete description of the software features is in the help files of the software.

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Display

Press Display once to see how many photos are already taken. the total numbers of photos possible is displayed after the slash.

The last ten measurements are shown in the bar graph on the unit's display. Auto Range of the bar graph is automatically defined by the measured maximum and minimum value. Manual Range (Man Range) is user defined.

This sets up the BEGIN value for the graphic display of the bar graph. The graphic display shows the temperature as a picture.

This sets up the END value for the graphic display of the bar graph.

CYCLE allows the adjustment of the display interval of the bar graph.

Data
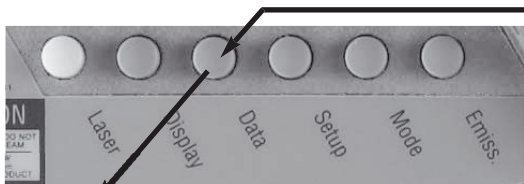
Press Data once to activate the log mode of the thermometer and the camera. With the appropriate logger file configuration, you can store temperature values and photos.

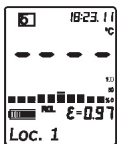The configuration of the logger file is performed by the companion software.

By pressing the Data button twice, one of the following four displays appears.
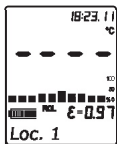"RCL" is displayed for the recall mode.
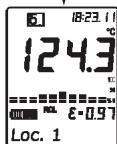
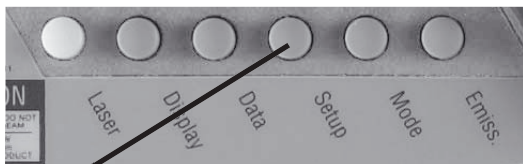| A photo and a temperature value have been stored at this Logger position. | Only a temperature value has been stored at this logger position. | Camera is active at this logger position. Nothing has been stored. | Camera is inactive at this logger position. Nothing has been stored. |

Setup

High alarm (HiAl) generates an audible and visual (flashing LED and laser) alarm if the temperature is above the setpoint.

The configuration of the alarm values can also be performed by the companion software.
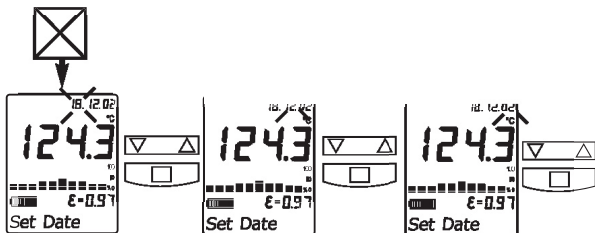
Low alarm (LoAl) generates an audible and visual (flashing LED and laser) alarm if the temperature is below the setpoint.

This feature deletes all photos from the unit's memory.
"Clear Image Press Enter" is shown as a running string in the bottom line of the display
BE CAREFUL if you use this function. The pictures cannot be restored.

Change the date using the Up and Down keys. Then press ENTER for each date segment to activate this date setting. The segment flashes while being set. The date is stored within the data logger.
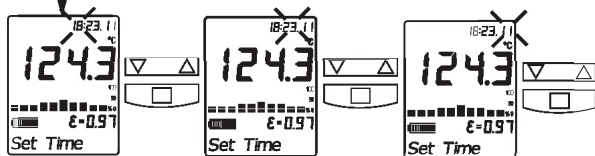
Change the time using the Up and Down keys. Then press ENTER for each time segment to activate this time setting. The segment flashes whilst being set. The time is stored within the data logger.


This function is used with a selected emissivity to add or subtract an offset value (±10°C/±18°F) to the temperature value.

The OFFSET feature allows the temperature values for several units to be matched, correcting for the allowed temperature tolerance difference between units. The OFFSET function can also be used to increase the accuracy for a narrow temperature range.

Back to the
Setup Button

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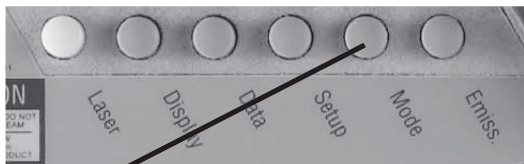
Mode

To show the minimum and maximum temperature values during a measurement at the bottom of the display, press MODE until the two values appear.

To show which specific material has been choosen for the specific location, press MODE until the name appears in the bottom line. If "Free" appears, you can change the emissivity settings by using the Emiss. button, when not in LOG mode. See chapter The Emiss. button!
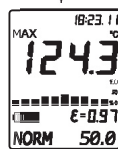
To activate the MAX mode, press MODE until the MAX symbol appears . The measured maximum temperature is displayed as long as the trigger is pulled or locked on. The real time temperature is shown in the lower part of the display (NORM).
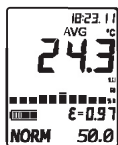
To activate the MIN mode, press MODE until the MIN symbol appears. The measured minimum temperature is displayed as long as the trigger is pulled or locked on. The real time temperature is shown in the lower part of the display (NORM)

To activate the DIF mode, press MODE until the DIF symbol appears. The difference between the measured max and min temperatures is displayed as long as the trigger is pulled or locked on. The real time temperature is shown in the lower part of the display (NORM).

To activate the AVG mode, press MODE until the AVG symbol appears. The average value of measured temperatures is diplayed as long as the trigger is pulled or locked on. The real time temperature is shown in the lower part of the display (NORM).
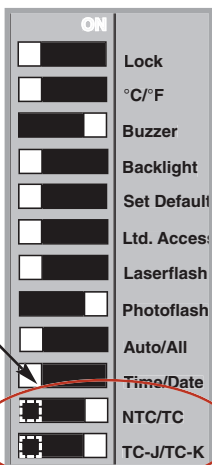
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Mode - Thermocouple Settings

	ON	
☐	■	**Lock**
☐	■	**°C/°F**
■	☐	**Buzzer**
☐	■	**Backlight**
☐	■	**Set Default**
☐	■	**Ltd. Acces**
☐	■	**Laserflash**
■	☐	**Photoflash**
☐	■	**Auto/All**
☐	■	**Time/Date**
☐	■	**NTC/TC**
☐	■	**TC-J/TC-K**

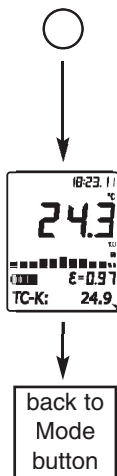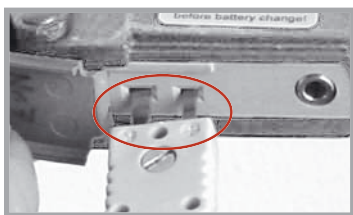Open the battery compartment and set the switches ON or Off according to the desired probe type.

NTC - thermistor ☐
TC - thermocouple ☐
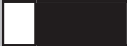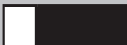Thermocouple type J ☐
Thermocouple type K ☐
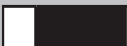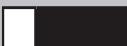
Connect the probe to the input. The input is located at the bottom of the handle behind the rubber cover.

Press MODE, until the desired probe symbol (TC-K shown here) appears. The probe temperature is shown in the *lower* part of the display. The real time infrared temperature is shown in the main display.

back to Mode button

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DIP Switches

Some functions of the unit be changed by using the DIP switches. These switches are located in the Battery compartement of the unit.

Switch	Description
Lock	Sets the unit into continuous measuring mode
°C/°F	Switches between degrees Celsius and Fahrenheit
Buzzer	Switches acoustic signals On or Off
Backlight	Switches the backlight of the display On or Off
Set Default	Sets the unit's values to default, if On
Ltd. Access	If On, the function buttons are blocked
Laserflash	If On, the laser will flash when temperature values exceed alarm
Photoflash	If On, photoflash is activated
Auto/All	Auto = automatic ...* All = every photo is taken with flash
Time/Date	Time or Date will be displayed
NTC/TC	Thermocouple settings - refer to the corresponding chapter
TC-J/TC-K	

*...photoflash at the same position is used after photo with insufficient light is attempted.

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Troubleshooting

Sometimes a long beep and the red LED above the display shines to indicate a problem, check your display to find out which problem has occured.

Symptom

Display Code	Problem	Action
Camera cannot send photos to the PC	Driver installation failed	Open Harware Manager on the PC to fix it
-O- -U-	Target temperature is over or under range	Select target within unit's specs
EEPROM-Err	EEPROM error	Contact Factory
CalAreaErr ProbCalEr	calibration errors	Contact Factory
Flash needs too long to charge or does not charge at all	Battery is low	Replace Batteries
Blank display	Battery is dead	Replace Batteries
Laser won't work	Low or dead battery	Replace Batteries
	Ambient above 45°C (113°F)	Operate unit in 45°C (113°F) ambient or below
Display "ON"	Display locked "ON"	Disconnect the unit from the PC
Photos lost	Batteries changed before shutdown or too long after removing old ones	Wait for shutdown to end. (blank screen) Change batteries within two minutes of removing old ones
PC displays "logger file does not match device logger setup"	The setup in the unit and in the PC software do not match	Click "OK". Either save the current data to a new file name or find the correct *.lgg file, open it in "Setup Device Logger", save, and redownload the data with the "Data Logger/Load Device Data Logger"

Symptom

Display Code	Problem	Action
Photo quality diminished with available light. (Abrupt transitions between color shades)	Light is insufficient for photo without flash	Use Photoflash always on (Dip switch "Auto/All"set to "All" or provide more ambient light.
Connection of unit to PC software does not happen when software started	Wrong com port selected or correct com port in use.	Select correct com or disconnect other device from correct com port
No picture in "Live" mode window	More than one video source is installed	Right mouse click on the "Live" mode window. Choose correct "Video source" in the menu.
Unit indicates "Use flash!" in bright light	The light is too bright for a photo	Go to next location or reduce brightness.
Unit leaves LOG after a photo and data recorded.	The last position has been used to record photo and data.	If another recording of the data and photo is required, then push Enter button and use arrow keys to re-record a position.
Photo Mem!	All memory for storing photos has been used.	1. Download existing photos and data and clear memory. - or - 2. If you don't mind losing photos in the unit, you can go to Setup in the unit, push the button until "Clear photo" appears in the display and press Enter.

Maintenance

Lens Cleaning:
Blow off loose particles using clean compressed air. Brush remaining debris away with a camel's hair brush.
Wipe the surface with a moist cotton swab. The swab may be moistened with water or a water based glass cleaner.
NOTE: DO NOT use solvents to clean the plastic lens.

Cleaning the Housing:
To clean the exterior housing, use soap and water or a mild commercial cleaner. Wipe with a damp sponge or soft rag.

CE Conformity

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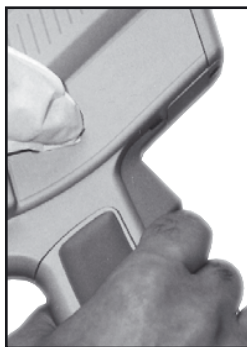
This instrument conforms to the following standards:
EMC: - EN 61326-1:1997+A1:1998+A2:2001
Safety: - EN 61010-1:2001
          - EN 60825-1:2001
This product herewith complies with the requirements of the EMC Directive 89/336/EEC and the Low Voltage Directive 73/23/EEC.
This instrument conforms to the Standards of the European Community.

Certification

The temperature sources used to calibrate this instrument are traceable to the U.S. National Institute of Standards and Technology (NIST) and the Deutscher Kalibrierdienst (DKD). Calibration certificates are available as an option.

Specifications

Temp. Range	- 30 to 900°C (- 25 to 1600°F)
Display Resolution	0.1°C (0.2°F)
Accuracy (Infrared) at 25°C (77°F) ambient temperature	± 0.75% of reading or ± 1 K (± 1.5°F), whichever is greater ± 2°C (± 4°F) for targets below -5°C (23°F)
Ambient Derating	< 0.05K/K or < 0.05%/K, whichever is greater at + 25°C (77°F) ± 25° (± 45°F)
Optical Resolution (Standard Focus)	60:1 (19mm spot size at 1.15 m) (0.75in. spot size at 3.8 feet)
Optical Resolution (Close Focus)	50:1 (6mm spot size at 0.3 m) (0.24in. spot size at 0.98 feet)
Accuracy (Thermocouple K & J)	± 2°C or ± 0.75%, whichever is greater
Accuracy (Thermistor)	-30 to 0°C (-22 to 32°F) ± 0.6K 0 to 70°C (32 to 158°F) ± 0.4K 70 to 100°C (158 to 212°F) ±1K 100 to 120°C (212 to 248°F) ±1.5K
Repeatability (Infrared)	± 0.5% of reading or ± 0.5°C (1°F), whichever is greater, ± 1°C (± 2°F) for targets below -5°C (23°F)
Response Time (95%)	250 mSec
Hot Spot Detection (30%)	85 mSec
Spectral Range	8 to 14 µm
Ambient Operating Range	0 to 50°C (32 to 122°F)
Storage Temperature	-20 to 50°C (-4 to 122°F) without batteries
Relative Humidity	10 to 90% at 30°C (86°F), non condensing
Analog Output (optional cable needed)	1 mV/°C (°F)
Digital Output	USB 1.1
Power	2 x 1.5 V Alkaline Type AA
Dimensions	240 x 170 x 50 mm (7.9 x 6.7 x 2 inches)
Tripod Mount	1/4"-20 UNC

Specifications of the Camera

Maximum Picture Number 640x480 Pixels (VGA)	26
Maximum Picture Number 320x240 Pixels (1/4 VGA)	100
Recharge Time for Flash	approx. 5 sec
Useful Flash Range: Standard Focus Close Focus	0.5 to 2 m (19 to 79 in.) 0.2 to 1 m (8 to 40 in)
Camera Lens	6 mm (app. equal to 42 mm on a 35 mm camera)
Focal Points	200 mm (8 in.)(Close-up) Infinity (Far Distance)
Light Sensitivity	6 lux
Shutter Speed	variable, max. 1/15 sec
Data Interface	USB 1.1
Image File Format	JPG