

# To get

the full functionality of this manual we recommend to use Adobe® Acrobat Reader®5 or higher. It is available at:

<http://www.adobe.com>

Once you have open this manual in Acrobat Reader choose the tab “Bookmark” at the left to see the Table of Contents.

These headlines are linked with the corresponding chapters of the manual. Just click on a headline to see the chapter in the main window.

Sometimes you’ll find phrases in the text **marked red**. These will guide you to additional information. To go back to



the manual use this arrow button in the upper bar of Acrobat Reader.

**This chapter is dedicated to explore the unit and the software and to get familiar with its basic functions.**

It helps to get first results fast and easy.

It explains the software installation and how to use the unit with factory defaults. Please take a bit time and follow up carefully.

Once you feel trained enough go to the “**Expert Mode**” to find out what else this unit can do for you.

### Requirements

To use the unit and the software you need a Windows compatible PC with a minimal configuration:

- 200 Mhz processor (400 Mhz recommended)
- CD/DVD drive
- USB 1.1 - port
- 15 MByte free disk space on the hard drive

The software works with Windows®98, ME, XP and 2000.

**Note!** With a fresh set of **batteries**, the unit can store photographs for up to 2,000 hours. However, we recommend that you download photographs soon after you have taken them.

To avoid the loss of photos you should change the batteries within two minutes after the unit has shut down completely.

## Signs and Icons in the Manual



If you see this icon, use the unit to follow the steps described.



This icon shows that you can adjust values with these buttons on the unit.



To store these values press the **ENTER** button on the unit.



This icon shows that there are additional options related to the DIP-switch settings.



If you see this icon, the unit is connected to the PC.



If you see this icon, you should have started your PC and the companion Software delivered with your unit.

Software descriptions appear in a grey textbox

## Introduction

We hope that you enjoy using your photographic infrared thermometer!

It measures the amount of infrared energy emitted by a target object, and calculates the temperature of that object's surface. In addition, it takes a photo of the measured spot highlighted by a bright laser circle. In a few easy steps you can create reports that incorporate the photo of the target and also the temperature, location, date/time, and a description - all this can be customized by using the software delivered with the unit.

## Features

Your unit includes:

- A digital camera synchronized with the temperature measurement
- True Spot laser Sighting
- Nameable locations
- Adjustable emissivity
- High/Low alarm
- Data logger
- ...and a lot more!

## Delivery Content



The unit • Thermocouple Type K probe • Windows-based software on CD • USB cable • Two AA batteries • Manual on CD • Quick start

## Configuration of the PC

### Hardware Setup

#### 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 USB camera. A device driver is software needed by your PC to communicate with the unit. You will be asked three times to install a driver.

**Note!** During 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. It could happen, that Windows asks for the file STV680u.dll. This file is located in the drivers folder on the CD.



## Installing the software

### Software Setup

1. Insert the CD into your CD drive.
2. Double click on **setup.exe**.
3. Follow the instructions, shown on the screen.
4. Launch the software.

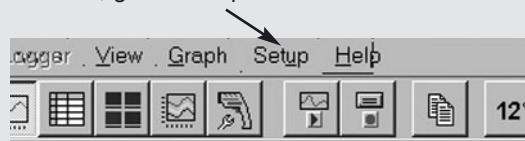
The software is now ready to use.

**Please read the following information first and configure language, time, and date if necessary.**

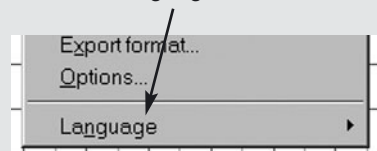
This configuration can be repeated at any time.

### Software Language

To choose one of the available languages of the software, go to "Setup".



Click on "Language" in the Pull Down menu.



Then make your selection.

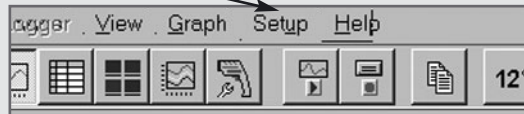


## Configure Date and Time

### Set Date and Time of the unit

To get the right date and time stamp in your picture, proceed with the following steps:

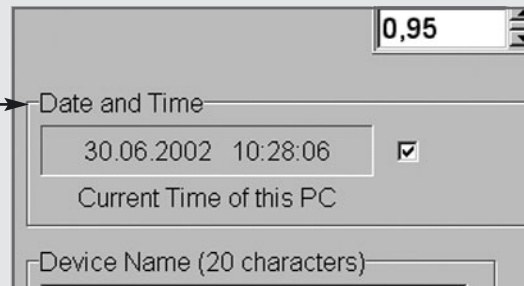
1. Choose "Setup" in the software's menu bar.



2. Go to "Device Alarm and Display"

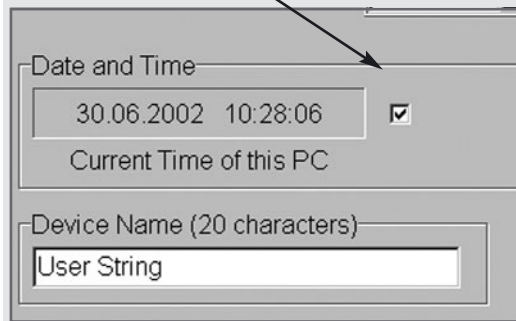


3. Look for "Date and Time" and verify that the correct values are shown (these values depend on your computer system settings)

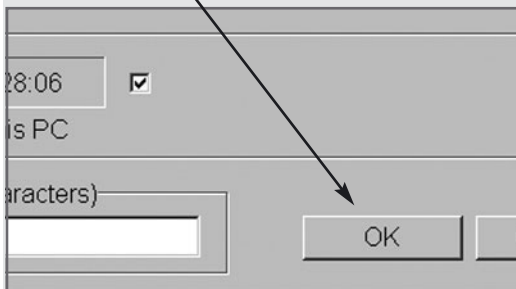


## Configure Date and Time

4. Enable the checkbox to the right of the values.



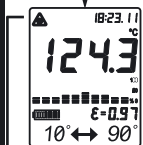
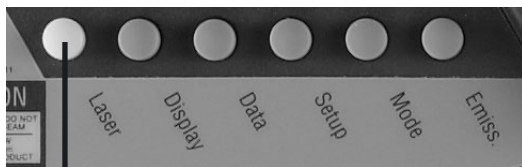
5. Click on "OK".



6. Disconnect the unit from the PC.



## Laser ON and OFF



laser ON symbol



The laser circle shows 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 the trigger.

### CAUTION!

**Do not stare into beam!**  
Avoid indirect exposure via reflective materials!

## Laser Warning Label



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



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



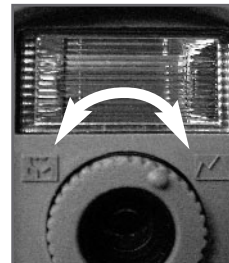
EVITE EXPOSICIÓN • RADIACIÓN LASER EMITIDA A TRAVÉS DE ESTA ABERTURA DE ACORDO CON FDA 21 CFR SUBCAPÍTULO J



## How to focus the camera

Simply turn the lens 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.

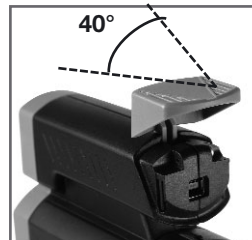


Between 0.25 m (10 in.) and 0.6 m (23 in.) adjust the lens in the middle of both symbols

Between 0.5 m (19 in.) and infinity adjust the lens to the mountain symbol.

## The view finder guide

This is a simple aid to understanding the camera's field of view. The opening angle of the lens is approximately 40°. Rotate the cap up to a horizontal position and look over it, as shown below. The embossed triangle will show you the approximate width of the photo.





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 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 circle 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 shining **LED** above the display. The next location will be shown on the display.

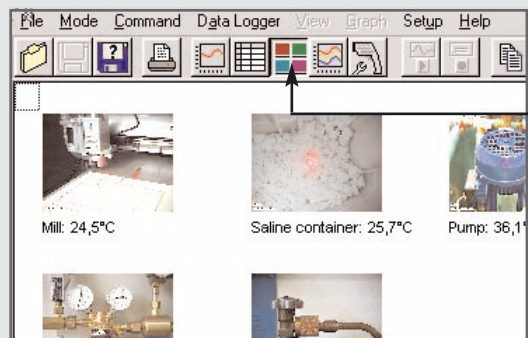
### Caution:

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 small green **LED** above the camera icon 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**.



9. Start the software on your PC. After a few seconds, the data download begins. Click on **“OK”** if a message about logger file and unit configuration incompatibility appears. Click on **“Yes”** if you are asked to download all images
10. See your pictures and data as a thumbnail collection.



11. If this doesn't happen automatically, toggle to this button.





### Additional software features

Once you have downloaded all data from the unit to the PC, save the data as library.lgg file.

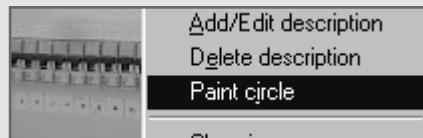


To edit a picture, click on it once with the left mouse button. It will be enlarged.

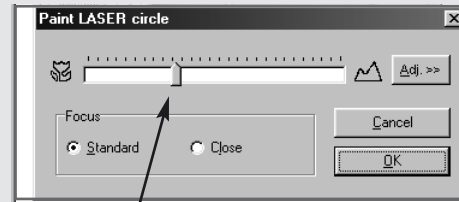


Now you are able to add descriptions to the photo or to insert a drawing of the laser circle. This may be necessary, if the ambient light was too bright while taking the photo and the laser circle is hard to see.

Right clicking on the photo will open a menu, where you can choose what you want to do.



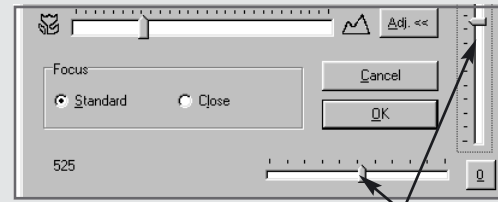
If you choose "Paint circle" the following window appears.



With the distance slider you could adjust the size of the laser circle drawing corresponding to the original size of the real laser circle.

**NOTE: This feature will only work properly, if you have adjusted once the circle drawing to the camera with the following procedure:**

Take a photo - enlarge it in the software - draw a laser circle - adjust the size with the distance slider as shown above - adjust the place of the



circle by using "Adj." and then these sliders.

The drawing will be stored within the photo. The same happens with the description function.

With the "Copy image" function you can create a report easily by pasting the photo into a programme of your choice.

"Print Image" starts the printers dialog of your standard printer. Now you can print out a single photo.

**This chapter is dedicated to the advanced user and based on the “Basic Mode” part of this manual.**

We recommend going through this part step by step to get the most benefit out of the unit.

For additional information contact the manufacturer or refer to its website.  
(See back page of the cover of the printed manual.)

In the “Basic Mode” chapter you have seen how easy it is to use this unit and to store photos and data.

A special file has been created automatically by the unit, based on the factory defaults. This file is called “Logger” and has the extension “lgg”.

Under special circumstances it may happen, that the factory default settings don’t match your needs. In that case, it is possible to customize the factory default logger file.

You may wish, for instance, to name the locations where you want to measure or to add different emissivity values or special materials. Additionally it may necessary to add more than just temperature, location, date and time information to the photos.

All this is possible and explained in the next few pages

## How to create a logger file?

**Note!** The following operation will change the current settings in the unit!

Configure an inspection table using the menu SETUP/DEVICE LOGGER. The following screen display will appear.

Setup Data Logger						
No.	Name	Lo-Alarm	Hi-Alarm	EMS	Material Name	Image
1		-30,0	900,0	0,95	Free	<input checked="" type="checkbox"/>
2	Loc. 2	-30,0	900,0	0,95	Free	<input checked="" type="checkbox"/>
3	Loc. 3	-30,0	900,0	0,95	Free	<input checked="" type="checkbox"/>
4	Loc. 4	-30,0	900,0	0,95	Free	<input checked="" type="checkbox"/>
5	Loc. 5	-30,0	900,0	0,95	Free	<input checked="" type="checkbox"/>
6	Loc. 6	-30,0	900,0	0,95	Free	<input checked="" type="checkbox"/>
7	Loc. 7	-30,0	900,0	0,95	Free	<input checked="" type="checkbox"/>
8	Loc. 8	-30,0	900,0	0,95	Free	<input checked="" type="checkbox"/>
9	Loc. 9	-30,0	900,0	0,95	Free	<input checked="" type="checkbox"/>

Continue by setting the desired number of the inspection points to be measured in the table at

Image resolution  Low  High

Number of Used Positions

the lower right. In our example it is 5. Choose the desired image resolution. "High" means a resolution of 640x480 pixels, "Low" is 320x240 pixels.

Please note! In both modes you could configure up to 100 positions. If you have chosen "High" the maximum number of photos is 26.

In the "Low" resolution mode, you can take more than 100 photos. The camera memory can store up to 106 photos. This could be helpful, if you want to repeat a photo at a previous position.

Next, enter the name of the location and insert the related material from the material table by clicking here. For a known emissivity enter the value in the column EMS. In the column "Image" you could enable or disable taking a photo by checking the appropriate box

Setup Data Logger						
No.	Name	Lo-Alarm	Hi-Alarm	EMS	Material Name	Image
1	elect.01	0,0	50,0	0,95	Free	<input checked="" type="checkbox"/>
2	elect.02	0,0	50,0	0,95	Free	<input checked="" type="checkbox"/>
3	elect.03	0,0	50,0	0,95	Plastic	<input type="checkbox"/>
4	elect.04	0,0	50,0	0,95	Plastic	<input checked="" type="checkbox"/>
5	elect.05	0,0	50,0	0,85	Glass	<input checked="" type="checkbox"/>

The material names are stored in a material table file. This can be customized. See chapter "How to create a material table?"

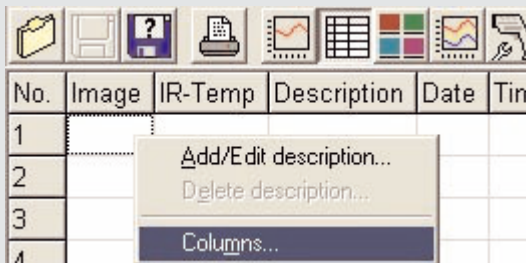
Save this logger file with a new name by clicking on the "Save as" button. With a click on "OK" transfer the table to the unit.

Now go to the Logger view by clicking here and open the file you have just saved

No.	Image	IR-Temp	Description	Date	Time
1					

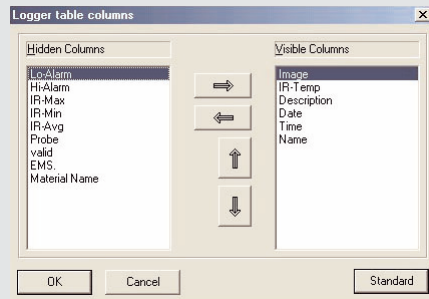


Now you can set up which data fields should be inserted in the photos after you have taken them. All columns you choose here will be included in the final photo. You can't delete any information from the photo itself. To open the sub-



menu simply right click into the table

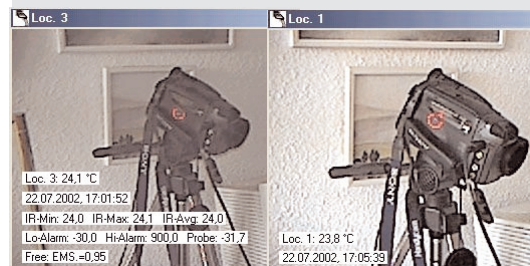
With the following dialog choose and order the columns.



**Note!** The more data you insert in the photo the more these data will hide the picture. Especially if your working in the low resolution mode, we recommend to choose only a few columns.

See the examples!

## Examples



Many columns  
chosen

Fewer columns  
chosen

Disconnect the unit from the PC and begin your inspection.

Once the inspection has been done, transfer data and photos to the PC. Connect the unit via USB to the computer, while the software is running. The data transfer begins automatically when the message "Connected" appears.



The photos and data appear in a thumbnail preview. To see the table click here.

No.	Image	IR-Temp	Description	Date	Time	N
1		24,5		11.07.2002	13:29:55	W
2		25,7	100	11.07.2002	13:30:03	S

With a right click into the table you open a sub menu.

Add/Edit description...

Delete description...

Columns...

By choosing “Columns” you can add or delete columns to show all the data you have saved.

Save the data. This will delete the unit’s memory and the unit is now ready for the next inspection.

Take your photos and data as described above and save them by pressing disc button into the same file as before.

The number of inspections is shown in the bot-



tom line of the window

To see changes of the temperature over time, you can create a routing graph.

This feature is very useful to monitor measurement points over time and identify problematic trends.

For instance, in electrical panels, it is difficult to find out that something is outside the normal temperature range, especially if the panel has live voltage. If you monitor the panel over time, you find out, where the problems are, before they become dangerous.

Go to



and then open the logger file you have just created.



The following dialog appears:

**Select Routing Data**

Curves	IR Temp	Probe Temp
1 Mill	<input checked="" type="checkbox"/>	<input type="checkbox"/>
2 Saline container	<input checked="" type="checkbox"/>	<input type="checkbox"/>
3 Pump	<input checked="" type="checkbox"/>	<input type="checkbox"/>
4 Filter	<input checked="" type="checkbox"/>	<input type="checkbox"/>
5 Temperature Display	<input checked="" type="checkbox"/>	<input type="checkbox"/>

Space of Time  
 user defined

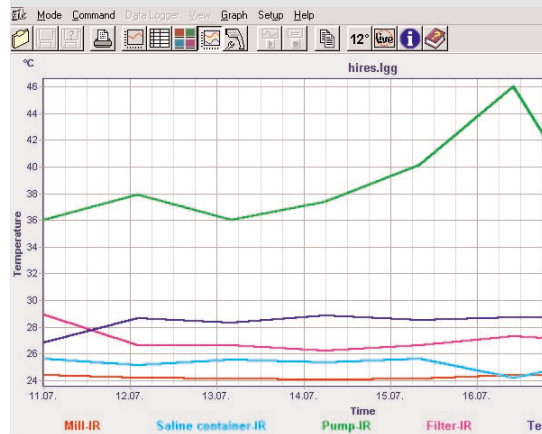
from: 11.07.2002 to: 18.07.2002  
 13:29:55 13:50:48

OK Cancel

Now select in the curves menu up to five objects measured and set up their appearance in the graph.

Then choose the time frame of the measurement.

The result will look as follows:



The routing graph

## Expert Mode



### How to create or edit a material table?

This function enables you to easily create customized material / emissivity tables that meet your requirements. You can then transfer the table, online, to your thermometer. Proceed as follows:

Choose the item DEVICE MATERIAL TABLE from the menu SETUP.

The following screen display appears.

No.	Material	EMS.
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		

### Creating a New Material Table

The cursor is located in the first line under the entry MATERIAL. Enter the name of the first material here. In the same line enter the associated emissivity under EMS. To access the other fields, use the keyboard or the mouse and fill in the complete table. Now save the table by clicking the button SAVE TO FILE. In the subsequent window (see next page) enter the file name; the file suffix "mat" is automatically appended.

Suchen in: Material

- DEMO
- DEUTSCH
- ENGLISH
- FACDEF
- FRANCE
- ITALIA
- Spanish
- test

Dateiname: MAT    Öffnen

Dateityp: Material Table File    Abbrechen

Save the file in a directory on the drive of your choice. We recommend the directory name "Material."

### Default Material Table

For your convenience we have provided a selection of 30 common materials. To access these, simply click FACTORY DEFAULT with the primary mouse button or choose a material table in the language you need by selecting LOAD FROM FILE.

No.	Material	EMS.
1	Al, oxidiz.	0,30
2	Asbestos	0,95
3	Asphalt	0,95

A complete table will appear as shown above. By clicking OK you transfer this table to the unit.

### Editing an Existing Material Table

Just as easily you can edit a material table. To call up the table, choose the function LOAD FROM FILE in the editing window.

No.	Material	EMS.
1	Al, oxidiz.	0,30
2	Asbestos	0,95
3	Asphalt	0,95

By selecting and overwriting, you can modify the list as you prefer and then save it again.



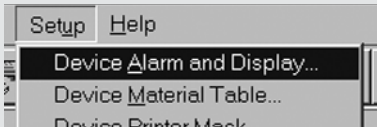
## Temperature Monitoring mode

Using the software, the unit can monitor temperature and take photos automatically. This happens when the temperature exceeds the preset values for high or low alarm.

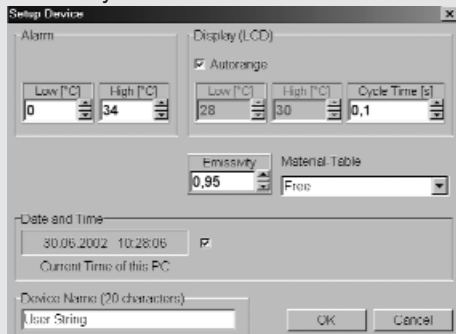
Proceed as follows:

Install the unit on a tripod.

Adjust the measurement direction with the help of the live video window of the software. Then go to “Setup” menu in the software and choose “Device Alarm and Display...”

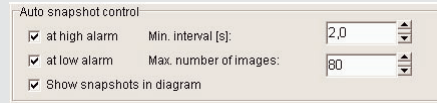


Choose the alarm values for which you want the unit to take a photo when exceeded. If necessary, choose the material of the target or emissivity value.



Then click “OK”. Now go to “Recording setup” in the setup menu. Mark when the snapshot should be taken - at high alarm or low alarm.

The “min. interval(s)” setting means that the unit only checks after this interval for the alarm values exceeded.



A photo will only be taken if an alarm is newly exceeded.

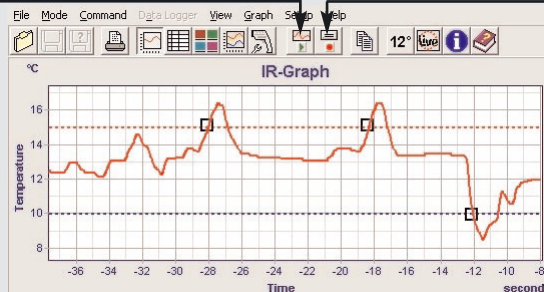
The snapshots will be taken in the measurement and recording mode.

But you can only save the data for later documentation in the recording mode.

The “Max. number of images” is limited only by hard disk space. The file size of a low resolution photo is approximate 30 kB and for high resolution 60 kB.

The live video window appears in both modes. Please do not close it. Otherwise the snapshot mode will not work.

To resize the live video window, simple click the right mouse button and choose another size.



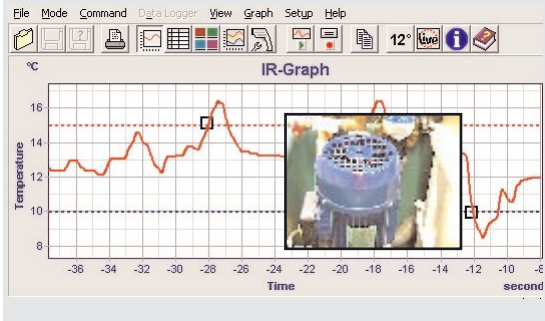
When you press the recording or measuring button again to stop the process, you will be prompted for a file in which to save the temperature data.




## Expert Mode



After taking the snapshot, you can see the photos by clicking on the square markers in the graph.



### Selecting a function

1. To switch on the unit pull and release the trigger.
2. While the display is active, push the button of the desired function.
3. Many of the functions are adjustable by using the Up and Down keys. For storing, press ENTER. 



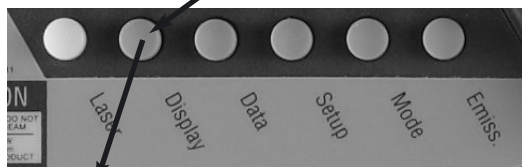
### The DIP switches

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

ON		
	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 flash used 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	

## Appendix A - Unit functions

### The Display button



Press Display once to see how many photos are already taken.



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.



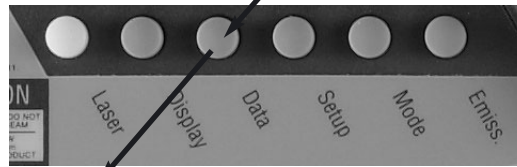
This sets up the END value for the graphic display of the bar graph.



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

## Appendix A - Unit functions

### The Data button



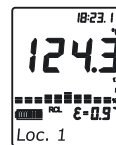
Press Data once to activate the log mode of the thermometer and the camera. With the right logger file configuration, you can store temperature values and photos.

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

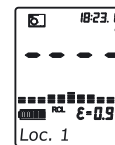
By pressing the Data button twice, one of the following four displays appears. "RCL" is displayed for the recall mode.



A photo and a temperature value have been stored at this Logger position.



Only a temperature value has been stored at this logger position.



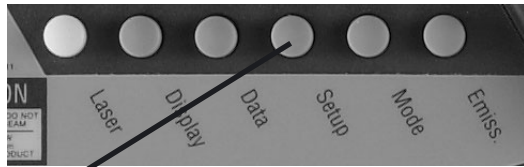
Camera is active at this logger position. Nothing has been stored.



Camera is inactive at this logger position. Nothing has been stored.

## Appendix A - Unit functions

### The Setup button - HiAL, LoAL, Time...

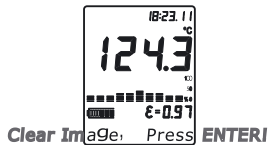


High alarm (HiAL) generates an audible and visual (flashing LED and laser) alarm if the temperature is above the setpoint.

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.

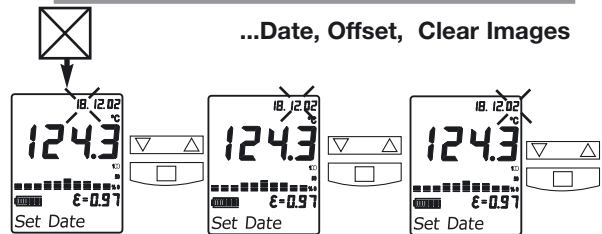


This feature deletes all photos from the unit's memory. "Clear Image Press Enter" is shown as a running string in the bottom line of the display **BE CAREFUL** if you use this function. The pictures cannot be restored.

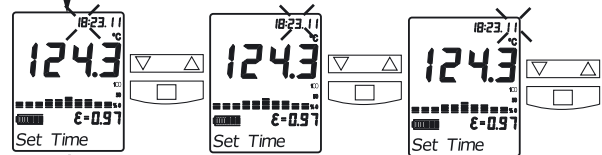


## Appendix A - Unit functions

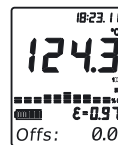
### ...Date, Offset, Clear Images



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.



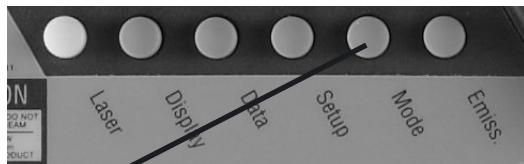
This function is used with a selected emissivity to add or subtract an offset value ( $\pm 10^{\circ}\text{C}/\pm 18^{\circ}\text{F}$ ) to the temperature value.

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

## Appendix A - Unit functions

### The Mode button - MINMAX, Material, MAX...



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 chosen 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).



## Appendix A - Unit functions

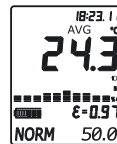
### ...MIN, DIF, AVG,



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 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).



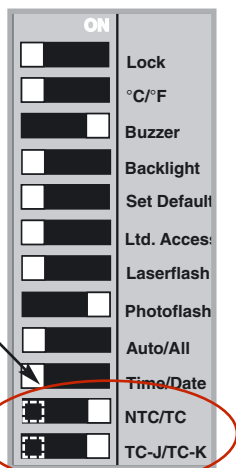
Next page

## The Mode button - Thermocouple Settings

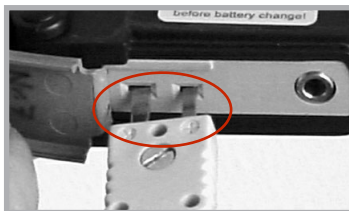


Open the battery compartment and set the switches ON or Off according to the desired probe type.

- NTC - thermistor
- TC - thermocouple
- Thermocouple type J
- Thermocouple type K

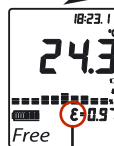
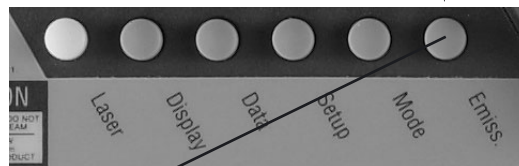


Connect the probe to the input. The input is located at the bottom of the handle behind the rubber cover.



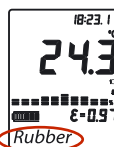
Press MODE, until the desired probe symbol (TC-K shown here) appears. The probe temperature is shown in the lower part of the display. The real time infrared temperature is shown in the main display.

## The Emiss. button



To adjust the emissivity value, press EMISS., when not in LOG mode. Use the Up and Down keys to select "Free" ("Free" 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.

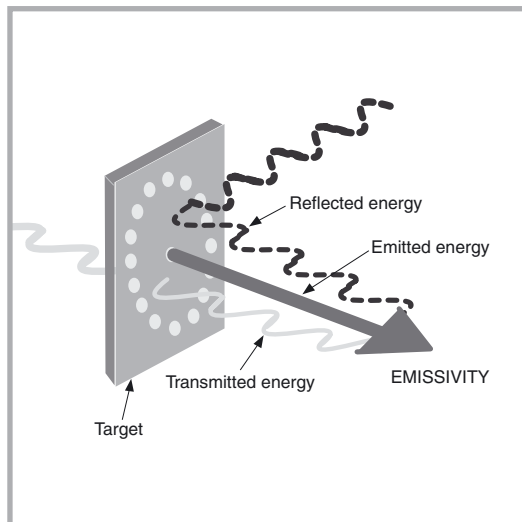
The display shows a material name, an emissivity value, and the calculated temperature value. To choose another material, use the Up and Down keys. Press ENTER to activate this setting.

### Emissivity explained

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.

**Note:** For more accurate readings, adjust the emissivity value for the type of material being measured.



### Unknown Emissivity Value

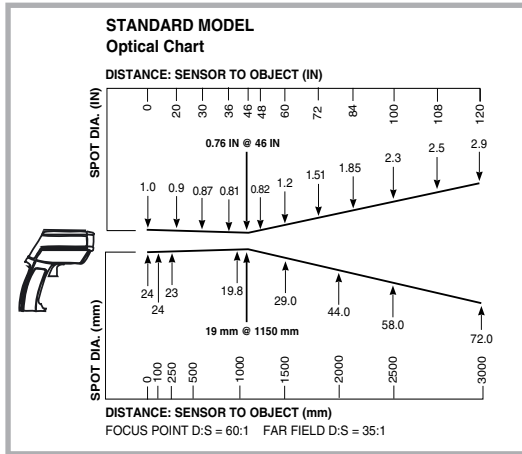
To adjust the unit's emissivity value for a material with unknown emissivity, plug in the probe.



Pull the unit's trigger. Place the measuring tip of the probe on the area to be measured. Wait for the reading to stabilize. Note the indicated probe temperature reading. Release the trigger. 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.

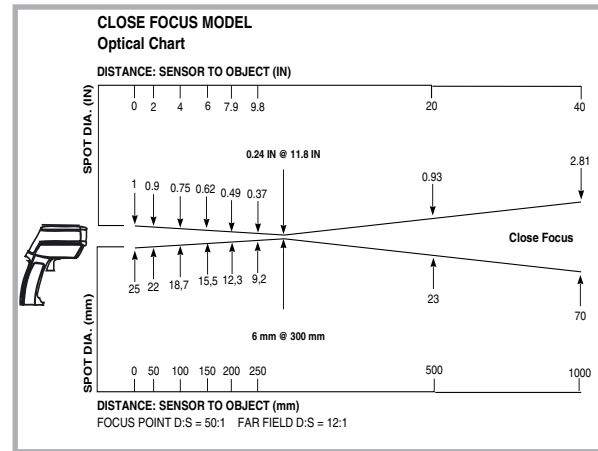


## Optical Resolution (Infrared Thermometer) Standard Focus Model



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 at the focus point. The D:S in the far field (>33ft/10m) is 35:1.

## Optical Resolution (Infrared Thermometer) Close Focus Model



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 50:1 at the focus point. The D:S in the far field is 12:1. The best distance between sensor and object is from 10 cm (4") up to 50 cm (20").



### Table of emissivity values of common materials

Aluminum*	0.30
Asbestos	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

### DIP switch settings - Factory Defaults

The DIP-switches are located in the battery compartment (8). In the beginning we recommend you use the default DIP-switch settings.

#### Factory Defaults DIP-Switch Settings

ON		ON	
<input type="checkbox"/>	Lock	<input type="checkbox"/>	Lock
<input type="checkbox"/>	°C/°F	<input type="checkbox"/>	°C/°F
<input type="checkbox"/>	Buzzer	<input type="checkbox"/>	Buzzer
<input type="checkbox"/>	Backlight	<input type="checkbox"/>	Backlight
<input type="checkbox"/>	Set Default	<input type="checkbox"/>	Set Default
<input type="checkbox"/>	Ltd. Access	<input type="checkbox"/>	Ltd. Access
<input type="checkbox"/>	Laserflash	<input type="checkbox"/>	Laserflash
<input type="checkbox"/>	Photoflash	<input type="checkbox"/>	Photoflash
<input type="checkbox"/>	Auto/All	<input type="checkbox"/>	Auto/All
<input type="checkbox"/>	Time/Date	<input type="checkbox"/>	Time/Date
<input type="checkbox"/>	NTC/TC	<input type="checkbox"/>	NTC/TC
<input type="checkbox"/>	TC-J/TC-K	<input type="checkbox"/>	TC-J/TC-K

Celsius setting shown

Fahrenheit setting shown

## 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 occurred.

### Symptom

Display Code	Problem	Action
Camera cannot send photos to the PC	Driver installation failed	Open Hardware Manager on the PC to fix it
-O- -U-	Target temperature is over or under range	Select target within unit's specs
EEPROM-Err CalAreaErr ProbCalEr	EEPROM error calibration errors	Contact Factory 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  Ambient above 45°C (113°F)	Replace Batteries  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. 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 reupload the data with the "Data Logger/Load Device Data Logger"

## Troubleshooting

### Symptom

Display Code	Problem	Action
Photo quality diminished with available light. (Abrupt transitions between color shades)	Light is sufficient 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 for the data and photos 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.



**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.



Don't leave the unit on or near objects of high temperature.

Avoid static electricity, arc welders, and induction heaters. Keep away from very strong EMF (electromagnetic fields).

**WARNING: DO NOT touch live voltage with contact probe.**

### Thermal Shock

Avoid abrupt changes in temperature. If this occurs, allow 40 minutes for thermal stabilization before use to prevent the possibility of inaccurate temperature readings.

SERIAL NUMBER LABEL



Manufacturer,  
Address

Made in Germany: Month, Year

**Model:** XXXXXXX

**Serial:** 000000-0000-0000

Power Requirements 3 V



This instrument conforms to the following standards:

EMC: - EN 61326-1

Safety: - EN 61010-1:1993 / A2:1995  
- EN 60825-1:1994

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 from the manufacturer.

## Secifications (Thermometer)

Temp. Range (Standard Model)	- 30 to 900°C (- 25 to 1600°F)
Temp. Range (Sub Zero Model)	- 50 to 500°C (-58 to 932°F)
Display Resolution	0.1°C (0.2°F)
Accuracy (Infrared, Standard Model) at 25°C (77°F) ambient temperature	± 0.75% of reading or ± 0.75°C (± 1.5°F), whichever is greater ± 2°C (± 4°F) for targets below -5°C (23°F)
Accuracy (Infrared, Sub Zero Model) at 25°C (77°F) ambient temperature	± 1% of reading or ± 1°C (2°F), whichever is greater for targets between - 5 to 500°C (23 to 932°F), ± 1.5°C (3°F) for targets between -30 to -5°C (-22 to 23°F) and ± 2°C (4°F) for targets between -50 to -30°C (-58 to - 22°F)
Ambient derating	< 0.05K/K or < 0.05%/K, whichever is greater at + 25°C (77°F) ± 25°C (± 45°F)
Optical Resolution (Standard Focus)	60:1 (19mm spot size at 1.15m.) (0.75in. spot size at 3.8 feet)
Optical Resolution (Close Focus)	50:1 ( 6mm spot size at 0.3m.) (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)	± 0.6°C
0 to 70°C (32 to 158°F)	± 0.4°C
70 to 100°C (158 to 212°F)	± 1°C
100 to 120°C (212 to 248°F)	± 1.5°C
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 95% at 30°C (86°F), non condensing
Analog output	1 mV/°C(°F)
Digital Output	USB 1.1
Power	2 x 1.5 V Alkaline Type AA
Battery Life (continuous use)	8 hrs (13 hrs with photo mode off)
Dimensions	240 x 170 x 50 mm (7.9 x 6.7 x 2 inches)
Tripod Mount	1/4"-20 UNC

## Secifications (Camera)

Maximum Picture Number 640x480 Pixels (VGA)	26
Maximum Picture Number 320x240 Pixels (1/4 VGA)	100
Recharge Time for Flash	app. 5 sec
Useful Flash Range	
Standard Focus	0.5 to 2m (19 to 79 in.)
Close Focus	0.2 to 1m ( 8 to 40 in)
Camera Lens	6 mm (approx. 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	variabel, max. 1/15 sec
Data Interface	USB 1.1
Image File Format	JPEG

### Factory defaults

	Default	Range
Emissivity/Gain	0.95	0.10 to 1.50 in steps of 0.01
Emissivity Table	Free	30 materials
Mode	normal	
Hi Alarm		
Standard model	900°C (1600°F)	-30 to 900°C (-25 to 1600°F)
Sub Zero model	500°C (932°F)	-50 to 500°C (-58 to 932°F)
Lo Alarm		
Standard model	-30°C (-25°F)	-30 to 900°C (-25 to 1600°F)
Sub Zero model	-50°C (-58°F)	-50 to 500°C (-58 to 932°F)
Offset Adjust	0°C (0°F)	-10 to 10°C (-18 to 18°F)
Graphic Display	Auto Range	Auto Range / Man Range
Cycle Time	0.2 sec	0.1 sec to 300 sec
Data logger	26 points	100 points max.
	pre-set with emissivity 0.95 adjustable only via Software	

## Batteries

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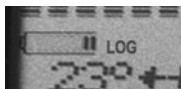
To open the battery compartment, press gently on the top part of the handle to release the catch and pivot the grip as shown in the figure on the cover of the printed manual. Position the batteries [two alkaline R6 (AA, UM3)], as shown on the housing. (See coverage of the printed manual)

### Caution:

Wait for unit Auto Shut down before battery change! You will see the message "Shut down" for a few seconds (max. 30 sec) on the display after the unit is used in LOG mode.

Download stored photos and data and remove batteries when you are not using the unit for a longer time!

If the battery life icon shows two or less illumi-



nated segments, be ready to replace the batteries since you are setting close to the end of battery life.