SEFRAM 9885

Operating manual

M9885A00

CE-Conformity

The product complies with the following standards:

EMC: EN 61326-1
Safety Regulations: EN 61010-1:1993/ A2:1995

The product accomplishes the requirements of the EMC Directive 89/336/EEC and of the low-voltage directive 73/23/EEC.

SEFRAM
32, rue E MARTEL
BP55
F42009 SAINT-ETIENNE
France

Scope of supply

- SEFRAM 9885 unit
- t/c insertion probe
- USB interface cable
- software
- pouch
- hard case
- operators manual

You will find the serial number on the unit. Always use this number when you contact the customer service concerning maintenance, additional order of components, spare parts or repairs.

Thank you for choosing the SEFRAM 9885 infrared thermometer.

Comments to this manual
Read the manual carefully before the initial start-up. The producer reserves the right to change the herein described specifications in case of technical advance of the product.

Orientation

! Icons for easy finding of chapters

Important information and notes

Operating elements on the SEFRAM 9885 unit | Buttons in the software

[► Reference to other chapters]

ADJUSTABLE VALUES

[Menu: Hint to menu items in the software]

Readings on the unit display | Readings in software screens

Warranty

Each single product passes through a quality process. Nevertheless, if failures occur please contact the customer service at once. The warranty period covers 24 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 damages, which result from misuse or neglect. The

warranty of SEFRAM 9885 expires if you open the product. The manufacturer offers a 3 month 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 sender. The manufacturer reserves the right to exchange components of the product instead of repairing it. If the failure results from misuse or neglect the user has to pay for the repair. In that case you may ask for a cost estimate beforehand.

Content

Basic Operation

Batteries

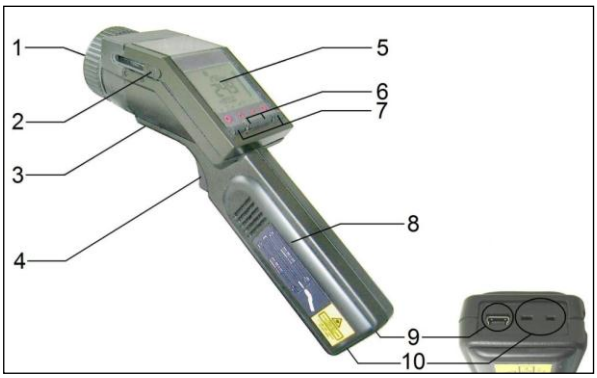
To open the battery compartment, press gently the cover lid on the left side of the handle in direction of the arrow (see picture). Insert the batteries (orientation as shown inside the compartment) and close the cover lid.

If the batteries are low the battery symbol will appear in the display. Please exchange the batteries immediately if the symbol is flashing.

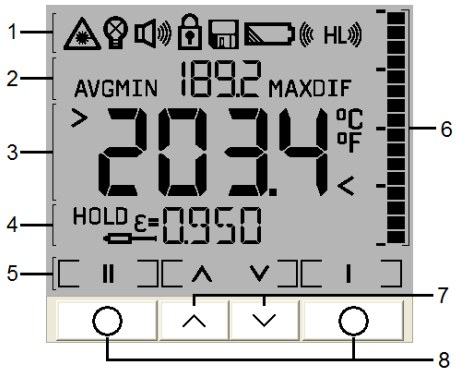
Please do not use old and new batteries together. Please use only alkaline or rechargeable batteries [Type: Mignon AA, R6, UM3].

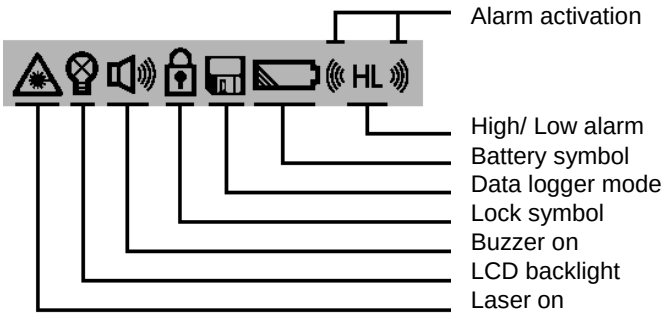
User interface

1	Precision glass optics
2	Optics toggle switch SF/ CF
3	Tripod mount
4	Trigger
5	Display
6	Up and Down buttons
7	Mode (I and II) buttons
8	Handle and Battery compartment
9	USB interface
10	t/c input



Display





Readings in the display

Status information

1	Status information	
2	Upper display:	Measurement functions (MIN-, MAX-, DIF-, AVG-indication), Data logger position
3	Main display:	IR-temperature and unit (°C/ °F)
4	Lower display:	HOLD, emissivity, probe temperature, data location and comment
5	Assignment of buttons: Mode I [I], Mode II [II], Up [Λ] and Down [V]	
6	Bar graph display	
7	Up- and Down button	
8	Mode buttons	

Measurement

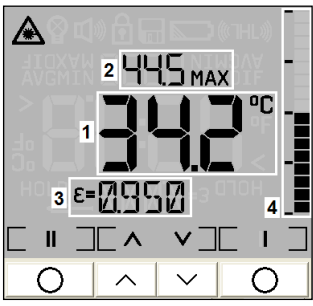
Handling

Please hold the unit as shown in the right figure and aim at the target. Pull the Trigger **[1]** and keep it pressed – if the laser is activated the true size and location of the measurement spot will be shown on the object surface. The temperature of the object is shown in the display **[2]**.

The SEFRAM 9885 can aSEFRAM 9885o be used in vertical position (measurement downwards). With this handling small objects like electronic SMD components can easily be aimed and measured. For this purpose please hold the unit as shown in the left figure. If the display switch is set to Auto (default setting) or set to On, the **I** -button gets automatically the function of the Trigger [1] and the readings in the display [2] are turned by 180° [► Flip-Display].

Please note, that at vertical use (Flip mode) in context with a switched display aSEFRAM 9885o the assignment of the Mode buttons (I and II) will change.

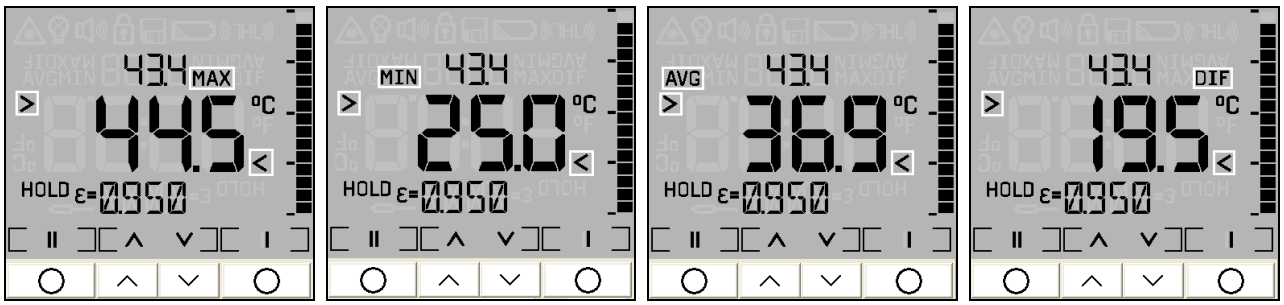
Measurement Functions



The measured temperature will be shown in the main display [1]. In the upper display the according maximum temperature [2] and in the lower display the set emissivity [3] will be displayed. The bar graph in the right part of the display [4] shows temperature trends. The scaling will be done automatically between minimum reading (no segment) and maximum reading (all segments).

Hold function: The temperature will be displayed for 7 seconds after the Trigger is released. The display shows HOLD. The unit automatically switches off after this time if no button is pressed.

After taking a measurement the following functions can be displayed in turn by pressing the **Λ** -button (starting from the HOLD mode):



Maximum reading [MAX] Minimum reading [MIN] Average reading [AVG] Difference reading [DIF]

MAX: maximum value determined during measurement AVG: average value (related to duration of measurement)

MIN: minimum value determined during measurementDIF: the difference between MIN and MAX

These values will be shown in the main display, which is marked with the symboSEFRAM 9885 > and < in this case. The current temperature (in the HOLD mode: the last measured temperature) will be shown in the upper display.

After turning into the measure mode or after switch off of the unit the selected measurement function will be kept.

Recall (Last Value) The last measured value remains stored in the SEFRAM 9885 after switch off. To recall this value please press (in the switched off condition) the I - or II -button. The unit will be set into the HOLD mode.

In the emissivity menu the last measured temperature value can be corrected afterwards by changing the emissivity.

Display Backlight

Pull the Trigger (keep pressed) and *then* press the I -button to activate/ deactivate the display backlight. The symbol in the display flashes to confirm.

This function is not available in the Flip mode.

Default setting: Off

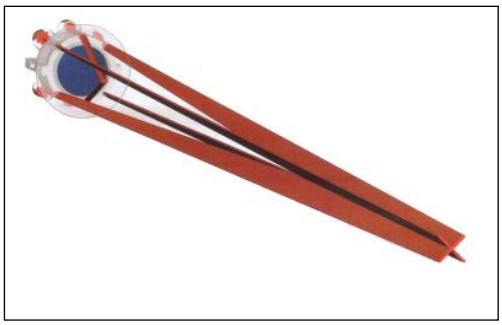
Laser Sighting

Pull the Trigger (keep pressed) and *then* the II -button to activate/ deactivate the laser. The laser symbol in the display (only if the trigger is pulled) indicates the active laser.

Default setting: On

WARNING: Do not point the laser directly at the eyes of persons or animaSEFRAM 9885! Do not stare into the laser beam. Avoid indirect exposure via reflective surfaces!

Optics

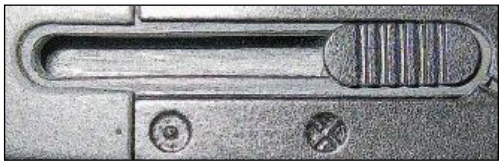


The SEFRAM 9885 has a switchable optics. The both possible operating modes are indicated as SF mode (Standard Focus) and CF mode (Close Focus).

In the SF mode (standard operating mode) objects ≥ 16mm can be measured. The measurement spot will be exactly marked with the patented crosshair laser, i.e. the real size and location of the spot is shown on the object – independently from the distance and with no optical offset (see right figure).

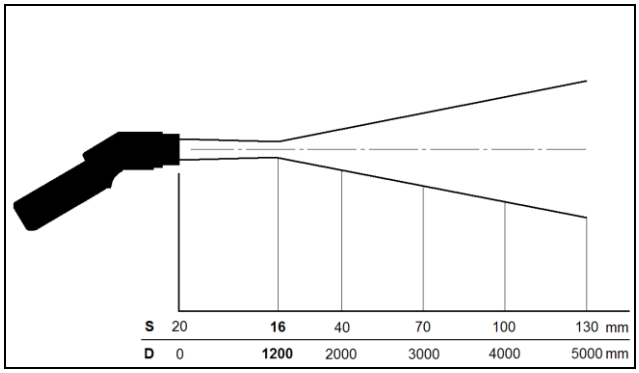
In the CF mode objects ≥ 1mm (e.g. electronic components) can be measured. In this operating mode a two point laser shows the spot on the target. Both laser beams are crossing at the focus distance (62mm from front of housing) and indicating at this distance the minimum spot size (Diameter: 1mm).

To switch between SF and CF mode please shift the Optic switch which is located besides the display, to the according position (see right figure).



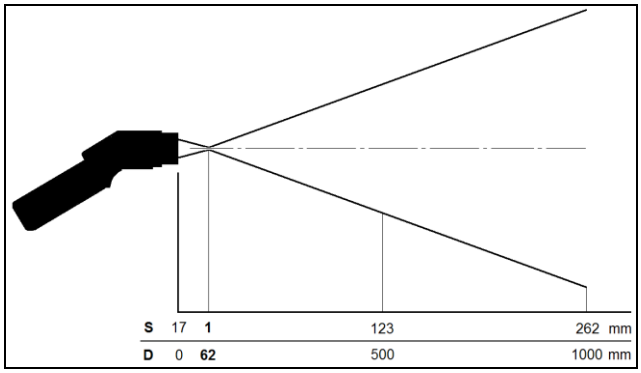
The symboSEFRAM 9885 on the housing have the following meaning:

[X] SF/ Crosshair laser



D:S (focus point) = 75:1/ 16 mm@ 1200 mm
D:S (far field) = 36:1

[•] CF/ Two point laser

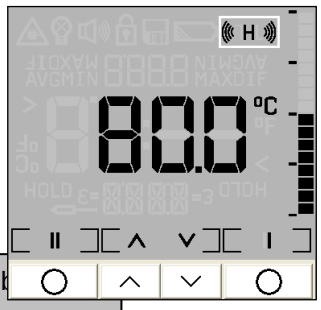


D:S (focus point) = 62:1/ 1 mm@ 62 mm
D:S (far field) = 4:1

D = Distance from front of the unit to the object
S = Spotsize

The measured area of the object (spot size) depends on the distance. For a correct measurement the spot size should at all times have at least the **same size like** the object or should be **smaller than** that.

Setup Menu 1



In this menu Emissivity, Alarm values and the Lock mode can be set up.
Each setting or change of values and parameters will be saved by pressing the Trigger or the I -button.

Trigger ⇒ SAVE ⇒ Measure mode

I ⇒ SAVE ⇒ next menu item

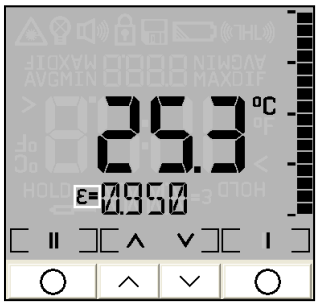
To activate the setup menu the unit must b
the HOLD mode.

If none of these buttons is pressed the made settings or changes will not be saved and the unit switches off after approx. 30 s.

ε

Emissivity Setting

The emissivity (ε - Epsilon) is a material constant which describes the ability of the body to emit infrared energy. It can range between 0 and 1 (0 and 100 %) [► Emissivity].



Setting range: 0,100...1,100 (values > 1,000 = amplification)
Default setting: 0,950

HOLD ⇒ II ⇒ ε flashes ⇒ Λ ⇒ INCREASE ε

⇒ V ⇒ DECREASE ε

(H)

High Alarm

Setting of a temperature value (alarm setpoint). If the temperature reading is *above* this setpoint a visual display colour = red + alarm symbol in info line and an acoustic signal (buzzer) will be generated:

Setting range: -35...900°C
Default setting: 900°C

HOLD ⇒ II ⇒ I ⇒ H flashes ⇒ Λ ⇒ INCREASE VALUE

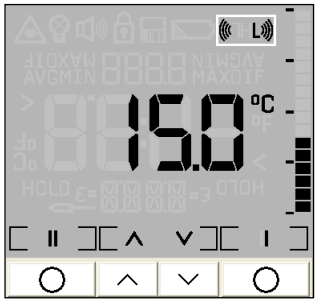
⇒ V ⇒ DECREASE VALUE

⇒ II ⇒ ACTIVATION/ DEACTIVATION ⇒ alarm symbol [beside H] on/ off

Low-Alarm

(L)

Setting of a temperature value (alarm setpoint). If the temperature reading is *below* this setpoint a visual display colour = blue + alarm symbol in info line and an acoustic signal (buzzer) will be generated:



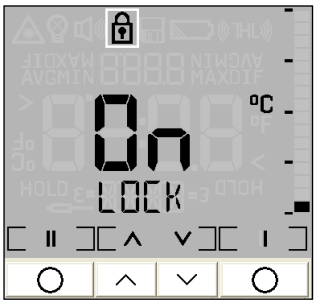
Setting range: -35...900°C
Default setting: -35°C

HOLD ⇒ II ⇒ 2x I ⇒ L flashes ⇒ Λ ⇒ INCREASE VALUE

⇒ V ⇒ DECREASE VALUE

⇒ II ⇒ ACTIVATION/ DEACTIVATION ⇒ alarm symbol [beside L] on/ off

Long-Term Measurement (Lock Mode)



This function allows a continuous measurement without pulling the trigger for that time. The laser is only working if the trigger is pulled.

Setting range: On/ Off
Default setting: Off

HOLD ⇒ II ⇒ 3x I ⇒ Lock symbol flashes ⇒ Λ ⇒ ON/ OFF

⇒ V ⇒ ON/ OFF

after setting to On:

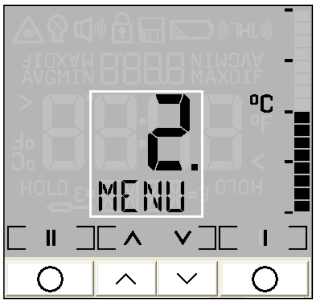
2x I ⇒ HOLD+Lock ⇒ Trigger ⇒ starting Measurement mode+Lock

Trigger ⇒ starting Measurement mode+Lock

You can deactivate the Lock function in the same order, but starting from Measurement mode+Lock.
The data logger functions are aSEFRAM 9885o available in the Lock mode Data Logger].

For a long-term temperature measurement of an object it is recommended to mount the unit on a tripod.

Setup Menu 2



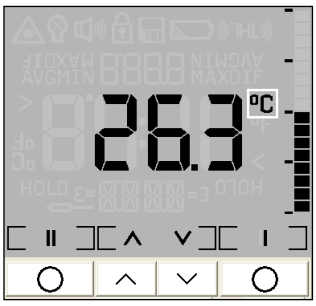
In this menu Temperature unit, Buzzer, Flip display and Factory default settings can be set up.

HOLD ⇒ II ⇒ 4x I ⇒ 2. Menu

The procedure is the same as described in the setup menu 1:

Trigger ⇒ SAVE ⇒ Measurement mode

I ⇒ SAVE ⇒ next menu item



°C

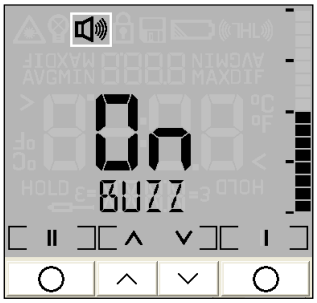
Temperature Unit

With this function you can switch the temperature unit in the display between °C und °F.

Setting range: °C/ °F
Default setting: °C

2. Menu ⇒ II ⇒ Temperature unit flashes ⇒ Λ ⇒ °C/ °F
⇒ V ⇒ °C/ °F

Buzzer

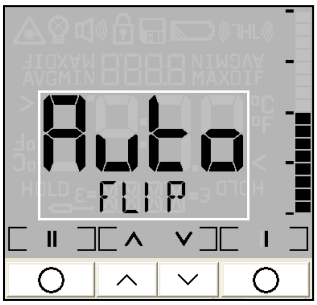


With this function the buzzer (acoustic alarm signal) can be switched on and off.
Independent from this the key tone (confirmation by pressing Mode, Up and Down button) will remain On.

Setting range: On/ Off
Default setting: On

2. Menu ⇒ II ⇒ I ⇒ Buzzer symbol flashes ⇒ Λ ⇒ ON/ OFF
⇒ V ⇒ ON/ OFF

Flip-Display

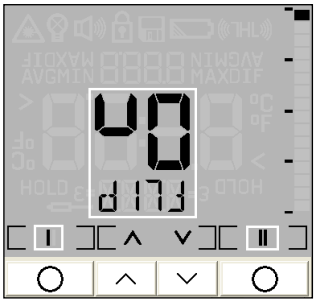


The SEFRAM 9885 has a so called Flip display (turn around display). As the unit can be used in horizontal and in vertical position (preferably in combination with the CF mode), the ability to switch allows a comfortable operation in both positions.

Setting range: Auto/ Off/ On
Default setting: Auto

2. Menu ⇒ II ⇒ 2x I ⇒ current setting ⇒ Λ ⇒ AUTO/ OFF/ ON
⇒ V ⇒ AUTO/ OFF/ ON

AUTO: automatic position detection (by internal position sensor) and display switch according to the handling of the unit
OFF: no switch (for reading at horizontal measurements)
ON: permanent switch for reading at vertical measurements)

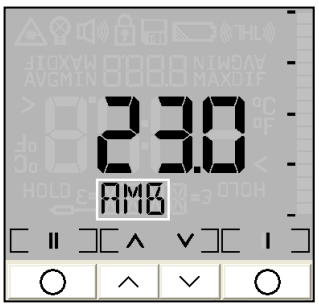


If ON is activated the display will switch immediately (see the right picture). Please note, that in this context SEFRAM 9885 the assignment of the Mode buttons (I und II) changes.

Ambient Temperature Compensation

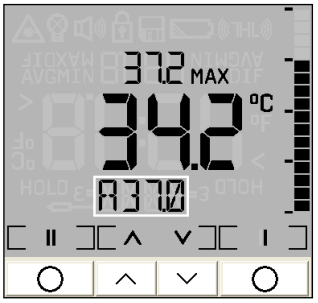
In dependence on the emissivity value a certain amount of ambient radiation will be reflected from the object surface. To compensate this impact you can use this function to enter a temperature value for the ambient radiation [Tamb]:

Setting range: -35...900°C
Default setting: deactivated



An activation of this function on the SEFRAM 9885 for the first time is only possible with the supplied software [► Device Setup].

2. Menu ⇒ II ⇒ 3x I ⇒ Tamb ⇒ Λ ⇒ INCREASE VALUE
⇒ V ⇒ DECREASE VALUE
⇒ II ⇒ ACTIVATE/ DEACTIVATE



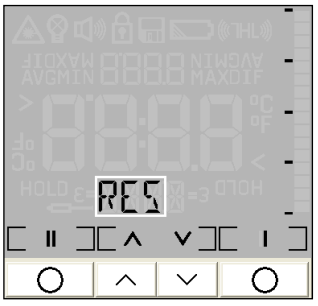
If the Tamb-function is activated, the current set Tamb-value can be easily displayed as follows:

Trigger + Λ ⇒ Toggle between **Emissivity** and **Tamb** in lower display

If, in addition, a thermocouple probe is connected, the lower display will toggle between Emissivity, *t/c probe temperature* and Tamb value.
[► Thermocouple Probe]

Reset

With this function the unit can be set back to the factory default values [► Factory Default Setting].



2. Menu ⇒ II ⇒ 3 or 4[1)] x I ⇒ RES ⇒ II ⇒ RES flashes ⇒ II ⇒ RESET
⇒ I ⇒ HOLD
⇒ Trigger ⇒ Measure mode

[1)] depends on the status of Tamb function

The stored values in the data logger will not be deleted with the reset function.

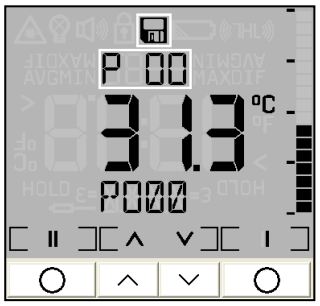
Data Logger

The SEFRAM 9885 has an internal data logger with a maximum capacity of 100 measurement protocoSEFRAM 9885.

Every protocol contains the following values:

Position number (P 00...P 99)	MAX-, MIN-, AVG- and DIF-value
Comment	Emissivity
IR temperature	Probe temperature (if connected)

Storing Data



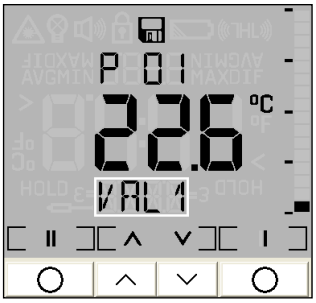
To store any data the unit must be in the HOLD mode. At first please take your measurement and after this release the Trigger:

HOLD ⇒ V ⇒ Disc symbol + next free Pos. [Pxx] ⇒ Λ ⇒ INCREASE POS.-NO.
⇒ V ⇒ DECREASE POS.-NO.
⇒ I ⇒ STORE ⇒ HOLD

If you pull the Trigger *no storage* will be made and the unit changes to the Measurement mode.
If no button will be pressed, also *no storage* will be made and the unit switches off after approx. 30 s.

> If the storage mode is started the next free position automatically will be shown.
> If you select an occupied position, the P flashes in the upper display.
> The storage function can aSEFRAM 9885o be executed after recall of the last value [► Recall (Last Value)]

Material- and Position-Names



You can assign a 4-digit alpha numeric description to any data logger position. This description will be shown in the bottom display and has the following presetting:

P000 (for position 1) – P099 (for position 100)

In the editing mode you can choose between 20 pre-defined descriptions (SURF, ENG, ..., GLAS, ..., PVC, etc.).
To do this please start the data logger mode and choose a desired position:

Disc symbol + choosen position [Pxx] ⇒ II ⇒ description flashes ⇒ Λ ⇒ SURF, ..., GLAS, ..., PVC, ...
⇒ V ⇒ PVC, ..., GLAS, ..., SURF, ...
⇒ I ⇒ SAVE

You can also define own descriptions. The following character set can be used:

[A...Z] [0...9] [-/<>] [empty]

Disc symbol + choosen position [Pxx] ⇒2x [II]⇒1. character flashes ⇒[Λ]⇒CHANGE VALUE

⇒[V]⇒CHANGE VALUE

⇒[II]⇒next character flashes ⇒[Λ]⇒CHANGE VALUE

⇒[V]⇒CHANGE VALUE

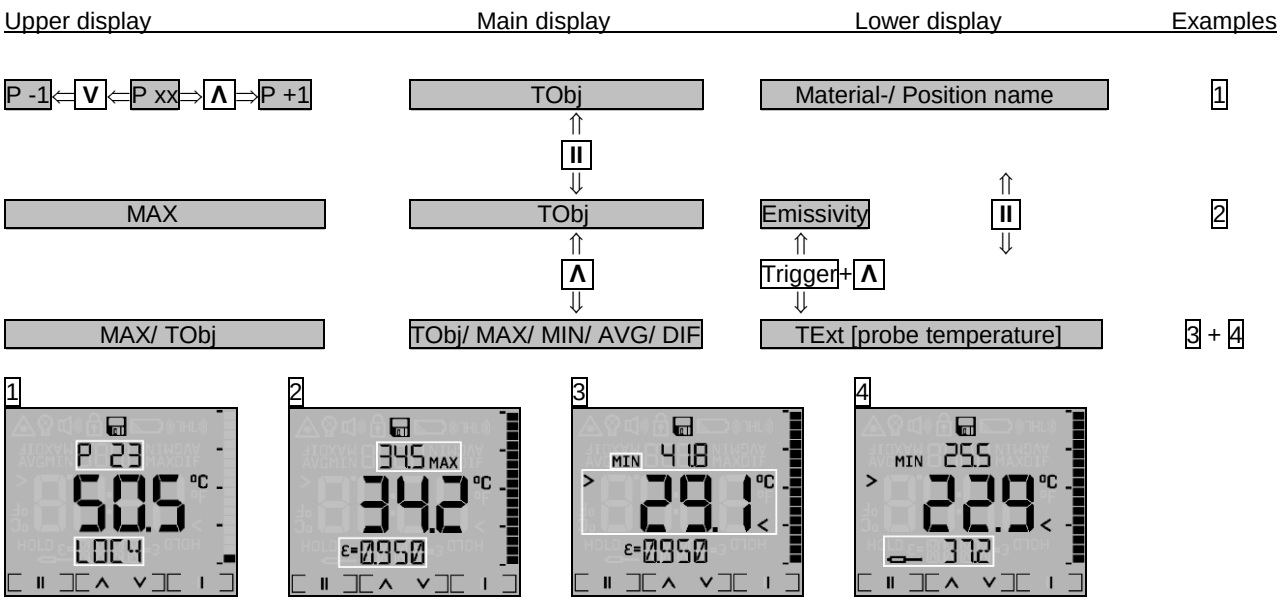
after input of all characters: ⇒[I]⇒SAVE

Data Logger Recall

To recall a stored measurement protocol the unit must be set into the Measure mode:

Trigger+ [V] [while keeping pressed the trigger]⇒Disc symbol flashes⇒P xx [starting with position 00]

To switch between the data logger positions and different displays please proceed as follows:



To leave the data logger mode please press again the Trigger+ [V] *simultaneously*.

If no button is pressed, the unit switches off after approx. 30 s.

Thermocouple Probe

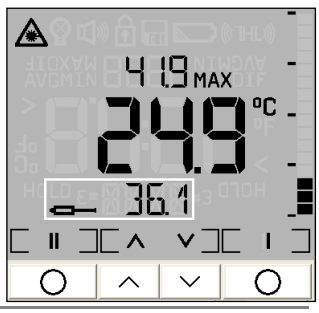
The SEFRAM 9885 has an input for thermocouple probes. You will find the connection at the end of the handle

[► User Interface]. You can connect the supplied insertion probe as well as any other t/c probe type K.

To show the t/c temperature in the display, proceed as follows:

Trigger+ [Λ]⇒Toggle between **T/C probe temperature** and **Emissivity** [lower display]

If, in addition, the Tamb-function is activated, the lower display will toggle between Emissivity, t/c probe temperature and *Tamb value*.



[► Ambient Temperature Compensation]

The t/c probe in combination with the SEFRAM 9885 can be used to determine an unknown emissivity value [► Emissivity].

Software OptrisConnect

Installation and Start

Main functions:
- Download of logger data
- Display and record of temperature trends
- Setup of parameters

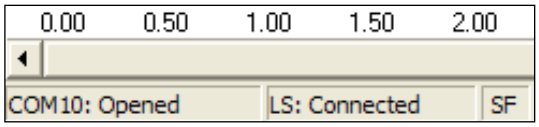
System requirements:
- Windows XP, 2000
- USB interface
- Hard disc with at least 30 MByte free space
- At least 128 MByte RAM
- CD-ROM drive

Insert the installation CD into the according drive on your computer. If the auto run option on your computer is activated the installation wizard will start automatically. Otherwise please start setup.exe on the CD-ROM. Follow the instructions of the wizard until the installation is finished.

The installation wizard will place a launch icon on the desktop and in the start menu: [Start]\Programs\Optris Gmbh\OptrisConnect.
If you want to uninstall the software from your system please use the uninstall icon in the start menu.

Connection to the Computer

Please connect the SEFRAM 9885 with your computer by using the special USB adapter cable. After you have started the software and the communication has been established the status line (below the time axis) will show the following information:



COMxx: Opened — active COM port if a USB adapter cable is connected

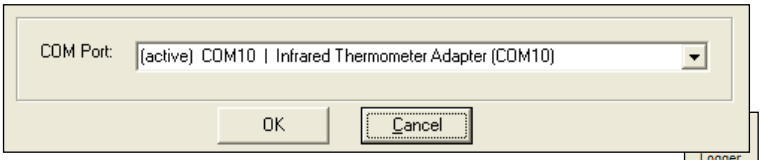
SEFRAM 9885: Connected — successful communication with the connected SEFRAM 9885

SF/ CF — selected optics mode on the SEFRAM 9885

Please use for a connection between the SEFRAM 9885 and a computer only the supplied USB adapter cable, as otherwise there will be no function.
The supplied connection cable is not a standard USB cable!

As long as the SEFRAM 9885 is connected to your computer it will be powered via the USB interface. In this case operation is aSEFRAM 9885o possible if no batteries are inside the unit. At digital communication the unit display shows the HOLD –mode but the unit is measuring continuously and is sending temperature data via the interface to the computer
[► Digital displays].

If you cannot establish a communication in spite of correct connection between SEFRAM 9885 and computer please choose the correct COM port under Menu: Setup\ Interface. If the USB adapter cable is connected this port is marked [Infrared Thermometer Adapter]:



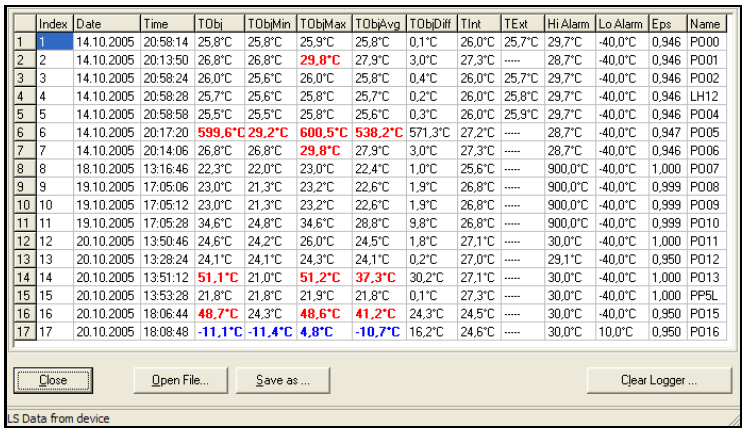
Language

You can select the desired language under Menu: Setup\

Data Logger Functions

To download the logger data from the unit please press the Logger -button [Menu: Measurement\ Download logger data].

All data from the logger will be displayed in an extra window as a table:



	Index	Date	Time	TObj	TObjMin	TObjMax	TObjAvg	TObjDiff	TInt	TExt	Hi Alarm	Lo Alarm	Eps	Name
1	1	14.10.2005	20:58:14	25,8°C	25,8°C	25,9°C	25,8°C	0,1°C	26,0°C	25,7°C	29,7°C	-40,0°C	0,946	P000
2	2	14.10.2005	20:13:50	26,8°C	26,8°C	**29,8°C**	27,9°C	3,0°C	27,3°C	-----	28,7°C	-40,0°C	0,946	P001
3	3	14.10.2005	20:58:24	26,0°C	25,6°C	26,0°C	25,8°C	0,4°C	26,0°C	25,7°C	29,7°C	-40,0°C	0,946	P002
4	4	14.10.2005	20:58:28	25,7°C	25,6°C	25,8°C	25,7°C	0,2°C	26,0°C	25,8°C	29,7°C	-40,0°C	0,946	LH12
5	5	14.10.2005	20:58:58	25,5°C	25,5°C	25,8°C	25,6°C	0,3°C	26,0°C	25,9°C	29,7°C	-40,0°C	0,946	P004
6	6	14.10.2005	20:17:20	**599,6°C**	**29,2°C**	**600,5°C**	**538,2°C**	571,3°C	27,2°C	-----	28,7°C	-40,0°C	0,947	P005
7	7	14.10.2005	20:14:06	26,8°C	26,8°C	**29,8°C**	27,9°C	3,0°C	27,3°C	-----	28,7°C	-40,0°C	0,946	P006
8	8	18.10.2005	13:16:46	22,3°C	22,0°C	23,0°C	22,4°C	1,0°C	25,6°C	-----	900,0°C	-40,0°C	1,000	P007
9	9	19.10.2005	17:05:06	23,0°C	21,3°C	23,2°C	22,6°C	1,9°C	26,8°C	-----	900,0°C	-40,0°C	0,999	P008
10	10	19.10.2005	17:05:12	23,0°C	21,3°C	23,2°C	22,6°C	1,9°C	26,8°C	-----	900,0°C	-40,0°C	0,999	P009
11	11	19.10.2005	17:05:28	34,6°C	24,8°C	34,6°C	28,8°C	9,8°C	26,8°C	-----	900,0°C	-40,0°C	0,999	P010
12	12	20.10.2005	13:50:46	24,6°C	24,2°C	26,0°C	24,5°C	1,8°C	27,1°C	-----	30,0°C	-40,0°C	1,000	P011
13	13	20.10.2005	13:28:24	24,1°C	24,1°C	24,3°C	24,1°C	0,2°C	27,0°C	-----	29,1°C	-40,0°C	0,950	P012
14	14	20.10.2005	13:51:12	**51,1°C**	21,0°C	**51,2°C**	**37,3°C**	30,2°C	27,1°C	-----	30,0°C	-40,0°C	1,000	P013
15	15	20.10.2005	13:53:28	21,8°C	21,8°C	21,9°C	21,8°C	0,1°C	27,3°C	-----	30,0°C	-40,0°C	1,000	PP5L
16	16	20.10.2005	18:06:44	**48,7°C**	24,3°C	**48,6°C**	**41,2°C**	24,3°C	24,5°C	-----	30,0°C	-40,0°C	0,950	P015
17	17	20.10.2005	18:08:48	**-11,1°C**	**-11,4°C**	**4,8°C**	**-10,7°C**	16,2°C	24,6°C	-----	30,0°C	10,0°C	0,950	P016

Columns in the logger table

Index	serial number
Date	date of measurement
Time	time of measurement
TObj	object temperature
TObj Min	min. object temperature
TObj Max	max. object temperature
TObj Avg	average object temperature
TObj Diff.	difference between TObj Min and TObj Max
TInt	internal unit temperature
TExt	t/c temperature (if connected)
Hi-Alarm	High-Alarm value
Lo-Alarm	Low-Alarm value
Eps	emissivity
Name	material or position name

Logger temperatures, on which the set High-Alarm value has been exceeded, will be shown in the table red and bold.

Logger temperatures, on which the set Low-Alarm value has been fallen below, will be shown in the table blue and bold.

Save as... opens an explorer window to save the logger data on your computer [*.lgg]

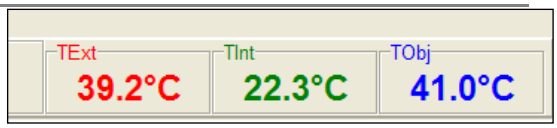
Open File... opens an explorer window to open existing logger files

Clear Logger... After confirmation of the security query all logger data inside the SEFRAM 9885 will be deleted

[unit display shows: CLR].

The status line inside the data logger window (beneath the table) shows the location and file name of the current data.

s



Time Stamp

If you store data inside your SEFRAM 9885 for the first time (after insertion of the batteries), an internal timer will be started automatically. After connection to a computer the timer will be synchronized with the computer time. After this every logger entry gets the date and time of taking the measurement.

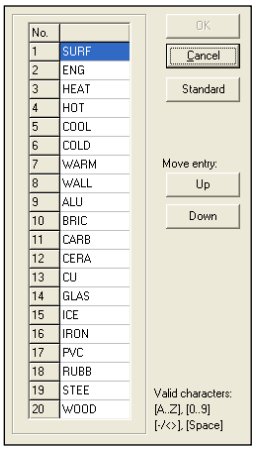
Please store the logger data on your computer before you **change the batteries. Otherwise an exactly assignment of** the time of measurement is not possible (Restart of the timer).

Material- and Position-Names

You can assign descriptions to each logger position whereat you can choose between 20 predefined descriptions or define own descriptions. The table of the predefined descriptions can be edited with the software.

To open the table please press the Names button [Menu: Device\ Material and location names]. Then mark the entry which you would like to edit with the cursor and enter the desired name. The maximum length is four digits. The following character set can be used: [A...Z] [0...9] [-/<>] [Space].

If a wrong input is made (no character/ more than 4 characters/ invalid character) the position number in the table appears red and the table cannot be closed with OK .



OK saves the changed table inside the SEFRAM 9885

Standard loads the standard table (factory default) in the connected unit

Up moves the selected entry up

Down moves the selected entry down

Digital Displays

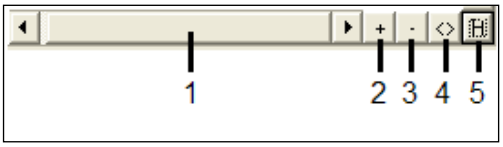
If the SEFRAM 9885 is connected to your computer and you start the software, the current temperature TObj will be shown as digital display (top right).
You can add additional displays for internal temperature TInt and temperature of a connected t/c probe TExt [Menu: View\ Digital displays].

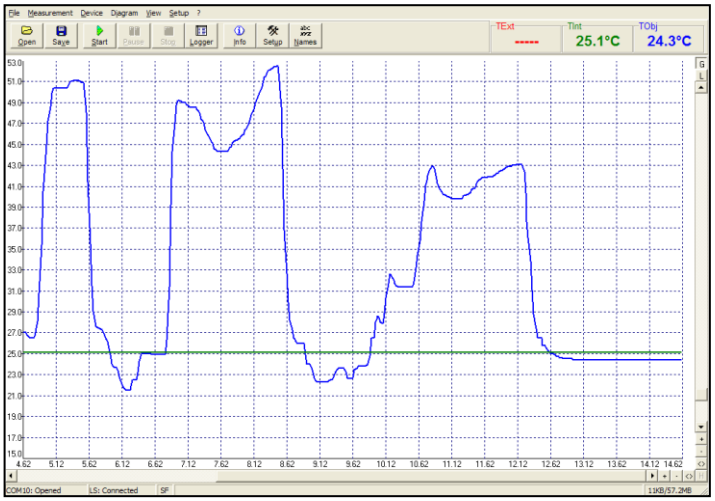
The once selected displays will aSEFRAM 9885o appear after a restart of the software. The size can be changed if you put the mouse cursor on the line beneath the displays and pull this down. The buttons of the tool bar will be moved or faded out (depending on the display size).

Diagram Functions

Starting the Measurement

To start a measurement, please press the Start button in the tool bar [Menu: Measurement\ Start].





Control elements of the time axis:	
1	Scroll bar
2	Zoom in (increase)
3	Zoom out (decrease)
4	Whole range
5	H: Hold/ C: Continue

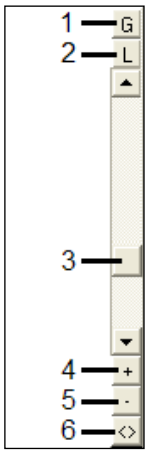
Any activation of a control element of the time axis will stop the further actualization of the measurement graph. The measurement itself continues in the background. To return to the current measurement graph please press the Pause button [Menu: Measurement\ Pause] or C.

During the stopped status any parts of the diagram can be selected with the Time scroll bar. With the zoom in-button + these parts can be stretched (enlarged) and with the zoom out-button – clinched (minimized).

Scaling of the temperature axis

With global scaling the temperature range of diagram will be adapted automatically to the respective peak values. The range will stay in setting during the whole measurement.

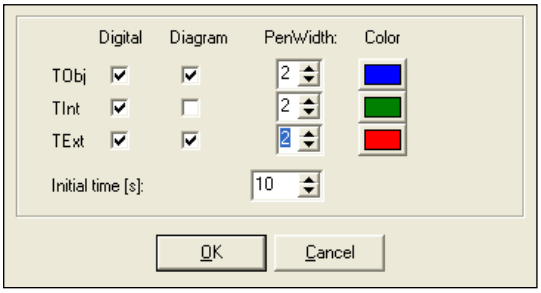
Control elements of the temperature axis:	
1	Global auto scaling
2	Local auto scaling
3	Scroll bar
4	Zoom in (increase)
5	Zoom out (decrease)
6	Whole range



With local scaling the temperature range of diagram will be adapted dynamically to the respective peak values. After the respective peak has left the diagram in the further process of the measurement, the range will be readapted. This option enables an optimum display of the temperature graph.

A manual scaling can be done at any time using the control elements of the temperature axis.

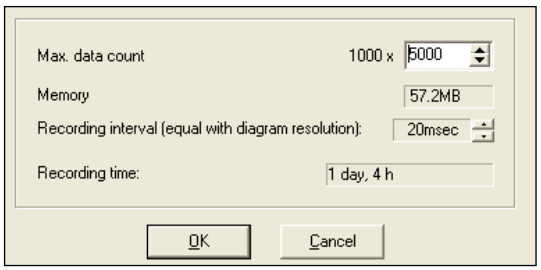
Activation of the desired option:
Control elements (temperature axis) or [Menu: Diagram].



Stop Measurement

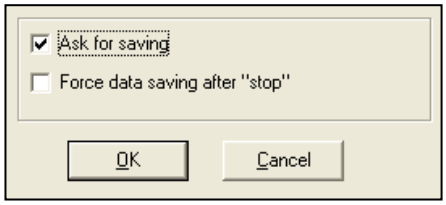
To stop the current measurement please press the Stop button [Menu: Measurement\ Stop].

The Save button [Menu: File\ Save as] opens an explorer window to select destination and file name [file type: *.dat].



Saving of Data

The menu item options [Menu: Setup\ Options] enables the following settings for data protection:



Ask for saving — if activated, each Stop and new Start will be followed by the query: There is unsaved Data. Save now? [Default setting: activated]

Force data saving after „stop“ — if activated, after each Stop an explorer window for saving of data will be opened automatically.

If non of both options is activated, a new measurement will be started after termination of one measurement and pressing of the Start button. In this case the former data are deleted!

Opening of Files

To open of a saved file please press the button Open [Menu: File\ Open]. You can select the desired file in the opening explorer window [file type: *.dat].

Diagram Settings

The menu item Settings [Menu: Diagram\ Settings] enables the selection of the following diagram options:

Diagram — Selection which signaSEFRAM 9885 should be displayed as graph [TObj, TInt, TExt]

Pen Width — Pen width of the temperature graphs [1...5]

Color — Color of the temperature graph and digital displays

Digital — Selection which signaSEFRAM 9885 should be displayed as digital display

Initial time — Time frame on the x-axis, which should be displayed at beginning of a measurement

Measurement Configuration
The menu item [Menu: Measurement\ Settings] opens the following dialog:

Max. data count	Limitation of the maximum	number of data values –
after	achievement the measure-	ment will be stopped
Memory	Memory, calculated from the	max data count value
(will be	displayed aSEFRAM 9885o in the status line)	

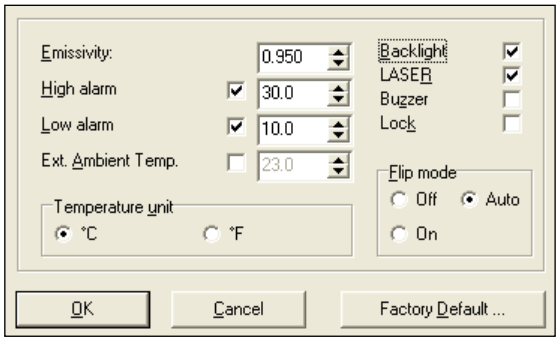
Recording interval — Time between single data [1ms...10s]

Recording time — maximum time of measurement, calculated from Max data count and Recording interval

> A change of the parameter Max data count will have influence on the Memory and Recording time.
> A change of the parameter Recording interval will have influence on the Recording time only.

Device Setup

The button Setup [Menu: Device\ Setup] opens a dialog window for setup of the following parameters of the SEFRAM 9885:



Emissivity	Backlight
High alarm	Laser
Low alarm	Buzzer
Ext. Ambient Temp.	Lock mode
Temperature unit	Flip mode

The first activation of Ext. Ambient Temp. will initiate this feature inside the SEFRAM 9885 unit. From this time the feature will appear in the *Setup Menu 2* on the unit, also if deactivated again in the device setup [► Ambient Temperature Compensation].

A reset of the unit to the factory default values [► Reset] will delete the display of this function during operation [Setup Menu 2].

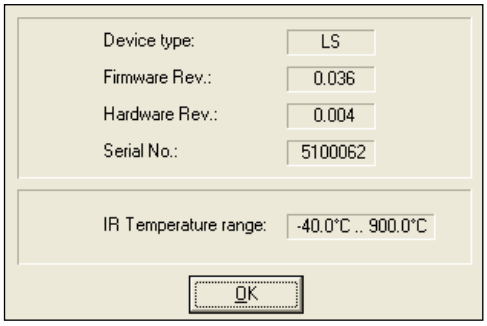
To load the factory default settings into the unit please press the Factory Default button (same functionality as ► Reset). An additional query avoids a reset of the unit by mistake.

> A change of parameters will be taken over from the connected unit *immediately* and vice versa.

Device Information

The button Info [Menu: Device\ Device Info] will display the following unit-specific information:

Device type	Description from the manufacturer
Firmware Rev.	Revision number of the internal software
Hardware Rev.	Revision number of the internal hardware
Serial No.	Serial number of the unit
IR Temperature range	Measurement range (IR)



Specification

Technical Data

Temperature range IR:	-35…900°C (-30…1650°F)
Temperature range probe:	-35…900°C (-30…1650°F)
Temperature unit:	°C/ °F (switchable)
Spectral range:	8…14µm
Optical resolution:	75:1 (16mm@1200mm/ 90% energy) switchable to CF (close focus): 1mm@62mm/ 90% energy
Minimum spot size:	1mm@62mm (CF mode)
Temperature resolution:	0,1°C
Accuracy IR [1]:	±0,75°C or ±0,75% of reading (whichever is greater)
Accuracy t/c input:	±0,75°C or ±1,0% of reading (whichever is greater)
Repeatability:	±0,5°C or ±0,5% of reading (whichever is greater)
Temperature coefficient [2]:	±0,05K/K or ±0,05%/K (whichever is greater)
Response time:	150 ms (95% signal)
Display:	LCD Flip Display with backlight (horizontal and vertical viewing directions controlled by position sensor)
Display backlight:	green and alarm colours (red/ blue)
Bar graph display:	auto scaling
Laser:	<1mW, class II, 630-650 nm SF: patented crosshair laser (crosshair size = spot size@ any distance) CF: two point laser (laser dot size = spot size@ focus distance)
Measurement functions:	MAX, MIN, DIF, AVG, HOLD
Alarm functions:	High and Low alarm, audible and visual
Emissivity/ Gain:	0,100…1,100 (adjustable)
Interface:	USB
Input:	t/c type K
Data Logger:	100 measurement protocoSEFRAM 9885 with time stamps, 4 digit location names (editable)
Software:	SEFRAM 9885connect oscilloscope software, 20 readings per second
Power supply:	2xAA (Mignon Alkaline) batteries or via USB cable (if connected to a PC)
Battery life time:	5h (operating with laser and backlight 50% on) 10h (operating with laser and no backlight) 25h (operating without laser and backlight)
Ambient temperature:	0 – 50°C
Storage temperature:	-30…65°C (without batteries)

Relative humidity:	10 – 95%, non condensing
EMI:	89/336/EWG
Weight:	420 g
Vibration:	IEC 68-2-6: 3G, 11 – 200Hz, any axis
Shock:	IEC 68-2-27: 50G, 11ms, any axis
Tripod mounting:	¼ - 20 UNC

[1] at 23°C ambient temperature and object temperature: 20…900°C
[2] below 20°C and above 30°C

Factory default settings

The unit has the following presettings at time of delivery:

Emissivity:	0,950	Lock:	Off
Optics:	SF	Buzzer:	On
High alarm:	900°C/ deactivated	Laser:	On
Low alarm:	-35°C/ deactivated	Display backlight:	Off
Temperature unit:	°C	Display turn:	Auto

The Reset function will set the unit back to these default values (exception: optics).

Troubleshooting

Display	Problem	Action
temperature reading: LLLL	object temperature below measurement range	choose target within measuring range
temperature reading: HHHH	object temperature above measurement range	choose target within measuring range
battery symbol is on or flashing	low batteries	check/ replace batteries
blank display	empty batteries	check/ replace batteries immediately
laser does not work	low batteries/ laser deactivated	see above activate the laser

Maintenance

Lens cleaning: Blow off loose particles using clean compressed air. The lens surface can be cleaned with a soft, humid tissue moistened with water or a water based glass cleaner.

PLEASE NOTE: Never use cleaning compounds which contain solvents (neither for the lens nor for the housing).

Cleaning the housing: To clean the exterior housing, use water or a mild commercial cleaner (use a humid tissue for this purpose).

WARNING: Do not touch live voltage with contact probe.

CAUTIONS: Avoid static electricity, arc welders, and induction heaters. Keep away from very strong EMF (electromagnetic fields). Don ' t leave the unit on or near objects of high temperature.
Avoid abrupt changes in ambient temperature. If this occurs, allow 20 minutes for thermal stabilization before use to prevent the possibility of inaccurate temperature readings.

In case of problems or questions which may arise when you use the SEFRAM 9885, please contact our service department. The customer service staff will support you with questions concerning the optimization of the work with the infrared thermometer, calibration procedures or with repairs.

Principle of Operation

Basics of Infrared Thermometry

Depending on the temperature each object emits a certain amount of infrared radiation. A change in the temperature of the object is accompanied by a change in the intensity of the radiation. For the measurement of "thermal radiation" infrared thermometry uses a wave-length ranging between 1 µ and 20 µm.
The intensity of the emitted radiation depends on the material. This material contingent constant is described with the help of the emissivity which is a known value for most materiaSEFRAM 9885 (see enclosed table emissivity).

Infrared thermometers are optoelectronic sensors. They calculate the surface temperature on the basis of the emitted infrared radiation from an object. The most important feature of infrared thermometers is that they enable the user to measure objects contactless. Consequently, these products help to measure the temperature of inaccessible or moving objects without difficulties. Infrared thermometers basically consist of the following components:

- lens
- spectral filter
- detector
- electronics (amplifier/ linearization/ signal processing)

The specifications of the lens decisively determine the optical path of the infrared thermometer, which is characterized by the ratio Distance to Spot size.
The spectral filter selects the wavelength range, which is relevant for the temperature measurement. The detector in cooperation with the processing electronics transforms the emitted infrared radiation into electrical signaSEFRAM 9885.

Emissivity

Definition

The intensity of infrared radiation, which is emitted by each body, depends on the temperature as well as on the radiation features of the surface material of the measuring object. The emissivity (ε – Epsilon) is used as a material constant factor to describe the ability of the body to emit infrared energy. It can range between 0 and 100 %. A "blackbody" is the ideal radiation source with an emissivity of 1,0 whereas a mirror shows an emissivity of 0,1.
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. A low emissivity (reflective surfaces) carries the risk of inaccurate measuring results by interfering infrared radiation emitted by background objects (flames, heating systems, chamottes). To minimize measuring errors in such cases, the handling should be performed very carefully and the unit should be protected against reflecting radiation sources.

Determination of unknown Emissivities

► First, determine the actual temperature of the measuring object with a thermocouple or contact sensor. Second, measure the temperature with the infrared thermometer and modify the emissivity until the displayed result corresponds to the actual temperature.

► If you monitor temperatures of up to 260 °C you may place a special plastic sticker onto the measuring object, which covers it completely. Now set the emissivity to 0,95 and take the temperature of the sticker. Afterwards, determine the temperature of the adjacent area on the measuring object and adjust the emissivity according to the value of the temperature of the sticker.

► Cove a part of the surface of the measuring object with a black, flat paint with an emissivity of 0,98. Adjust the emissivity of your infrared thermometer to 0,98 and take the temperature of the colored surface. Afterwards, determine the temperature of a directly adjacent area and modify the emissivity until the measured value corresponds to the temperature of the colored surface.

Characteristic Emissivities

In case none of the methods mentioned above help to determine the emissivity you may use the emissivity tables (Appendix A and B). These are average values, only. The actual emissivity of a material depends on the following factors:

- temperature
- measuring angle
- geometry of the surface
- thickness of the material
- constitution of the surface (polished, oxidized, rough, sandblast)
- spectral range of the measurement
- transmissivity (e.g. with thin films)

Appendix A – Emissivity Table MetaSEFRAM 9885

Material		typical Emissivity
Aluminium	non oxidized	0,02-0,1
	polished	0,02-0,1
	roughened	0,1-0,3
	oxidized	0,2-0,4
Brass	polished	0,01-0,05
	roughened	0,3
	oxidized	0,5
Copper	polished	0,03
	roughened	0,05-0,1
	oxidized	0,4-0,8
Chrome		0,02-0,2
Gold		0,01-0,1
Haynes	alloy	0,3-0,8
Inconel	electro polished	0,15
	sandblast	0,3-0,6
	oxidized	0,7-0,95
Iron	non oxidized	0,05-0,2
	rusted	0,5-0,7
	oxidized	0,5-0,9
	forged, blunt	0,9
Iron, casted	non oxidized	0,2
	oxidized	0,6-0,95
Lead	polished	0,05-0,1

Material		typical Emissivity
Lead	roughened	0,4
	oxidized	0,2-0,6
Magnesium		0,02-0,1
Mercury		0,05-0,15
Molybdenum	non oxidized	0,1
	oxidized	0,2-0,6
Monel (Ni-Cu)		0,1-0,14
Nickel	electrolytic	0,05-0,15
	oxidized	0,2-0,5
Platinum	black	0,9
Silver		0,02
Steel	polished plate	0,1
	rustless	0,1-0,8
	heavy plate	0,4-0,6
	cold-rolled	0,7-0,9
	oxidized	0,7-0,9
Tin	non oxidized	0,05
Titanium	polished	0,05-0,2
	oxidized	0,5-0,6
Wolfram	polished	0,03-0,1
Zinc	polished	0,02
	oxidized	0,1

Appendix B – Emissivity Table Non MetaSEFRAM 9885

Material		typical Emissivity
Asbestos		0,95
Asphalt		0,95
Basalt		0,7
Carbon	non oxidized	0,8-0,9
	graphite	0,7-0,8
Carborundum		0,9
Ceramic		0,95
Concrete		0,95
Glass		0,85
Grit		0,95
Gypsum		0,8-0,95
Ice		0,98
Limestone		0,98
Paint	non alkaline	0,9-0,95
Paper	any color	0,95
Plastic > 50 µm	non transparent	0,95
Rubber		0,95
Sand		0,9
Snow		0,9
Soil		0,9-0,98
Textiles		0,95
Water		0,93
Wood	natural	0,9-0,95

Notes