SIKA Simulator
UC RTD
Calibrator for RTD & Ω

Instructions Manual
Version V04

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Thanks

We would like to take advantage of this opportunity to thank you for choosing this SIKA *precision measuring device, the result of our hundred-year experience in manufacturing top-quality precision measuring devices.*
Consequently, we can continue to pursue this constant innovation policy, which has benefited our users for over 100 years. SIKA encourages all comments and welcomes any suggestions you might have in order to allow us to fine-tune our know-how and improve our future products.

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To benefit from the guarantee service, contact your nearest SIKA agency or send the product, along with a description of the problem, carriage and insurance paid (free to destination), to your nearest SIKA service centre. SIKA will not be held liable for any damage incurred during transport. Once repaired under guarantee, the product will be returned to the purchaser, carriage paid in advance (free to destination). If SIKA considers that the problem was caused by misuse, a modification, an accident or abnormal operating or handling conditions, SIKA shall provide an estimate of the repair costs and shall only begin the repair work once appropriate authorisation has been received. Once repaired, the product will be returned to the purchaser, carriage paid in advance, and the repair and transport costs will be invoiced to the latter.

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Contents checks

The UC RTD was checked mechanically and electrically prior to despatch. The necessary precautions have been taken to ensure it reaches the user without being damaged.
Nonetheless, it is wise to perform a rapid check to detect any deterioration which may have occurred during transport. If this is the case, inform the carrier immediately thereof.
The standard accessories are the following:

- This user's manual
- Four 1.5V AA batteries.
- A wrist-strap
- A protective sheath

If the product needs to be returned, use the original packaging where possible and indicate as clearly as possible the reasons for the return in a note accompanying the device.

Contents

A. GENERAL

A.1 Introduction

The UC RTD is a portable resistive sensor temperature calibrator (compliant with EC standards). It is especially designed for calibration and maintenance. It makes it possible to measure and to simulate temperatures both on site as well as in a laboratory.

The UC RTD features a large number of related functions which extend its range of application, including:

- Generation of default values, increases, single or cyclic ramps.
- Storage of acquisitions and display in the form of tables or trend curves.
- Use of calibrated sensors with their coefficients of correction

A range of improvements facilitates its operation:

- Rapid access to all functions.
- Intuitive user interface.
- 160x160 graphic display
- Connection via 4 mm safety plugs or a circular connector (4 pin).
- Power supply via 4 AA batteries or rechargeable batteries with rapid internal charger (Option).

The device is fitted in an elastomer-sheathed ABS case.

A.2 Parts

General characteristics:

- Portable device powered by 4 AA batteries (pack of Ni-MH storage batteries, 1.7 Ah optional).
- Hand strap for carrying and use on-site
- Graphic liquid crystal display: 160 x 160 pixels.
- Choice of language used for messages and programming of functions, gauges and parameters via 6-key keyboard + 1 navigator.
- Backlit display accessible via a keyboard key, with the possibility of automatic black-out after a specific programmable period of inactivity.
- Appearance: ABS case (elastomer-sheathed).
- Dimensions : 157 mm x 85 mm x 45 mm (without coating).
- Weight: 306 g without coating.
- IP54 tightness in compliance with standard EN 60529

A.3 Safety

A.3.1 Compliance with safety standards

The device complies with the applicable standards in force on the subject of electrical safety (EN 61010) as well as on the electromagnetic compatibility of the electrical measuring instruments (EMC: EN61326).

These instructions for use contain information and warnings which must be observed by the user to protect the latter against the dangers of electricity, to ensure the safe operation of the device and to protect it against any mishandling which could damage or compromise the safety of use of the device.

A.3.2 Environmental conditions

In accordance with publication CEI 359: operating category I.
Range of application of standards from 0 to 2200 m.
Reference temperature range: 23°C ± 5°C, relative humidity: 45 % to 75 %.
Nominal operating range: -10°C to +50°C, relative humidity: 20 % to 80 % non-condensing.
Operating range limit: -15°C to +55°C, relative humidity: 10 % to 80 % (70 % at 55°C).
Storage and transport temperature range limit: - 30°C to + 60°C (without the batteries).
(without AA batteries or rechargeable battery pack).

A.3.3 Worn devices

Worn electrical devices can pollute the environment. We recommend you refrain from disposing of this device in an ordinary waste bin, but rather that you use the recycling circuits available locally. If not, you can return the device to us, and we will take care of its disposal free of charge.

A.3.3.1 Waste generated by the device

List of waste classified according to the decree published in the Official French Gazette dated 20th April 2002. Decree no. 2002-540.

- **16.02.14: Waste originating from electronic equipment:**

→ Printed circuit boards making up the device.

- **16.06.02: Batteries and storage battery (dangerous**)

→ Alkaline Batteries (or NI-MH batteries).

- **15.01.02: Packaging**

→ ABS plastic device casing.
→ Elastomer conduit.

A.3.4 Device destruction procedure

Opening the device: unscrew the screw on the battery compartment, followed by the 5 screws securing the 2 shells. Separate the 2 shells. Separate the PCB from the upper shell.

With regard to the batteries, you will find them in the battery compartment (see commissioning chapter).

In the case of the pack of batteries, there are 2 contaminants: NI-MH (Nickel-Metal Hybride) batteries and a PCB. Separate these 2 items.

A.3.5 Instructions

The device was designed to operate safely if the instructions provided in the accompanying documents are followed. Any other use may jeopardise the safety of the operator. Any use other than those specified in the instructions is therefore dangerous and forbidden.

A.3.6 Making measurements

The measuring leads and wires must be in good condition and must be replaced if their insulation appears faulty (insulating material cut, burned, etc...).

When the instrument is connected to the measuring circuits the terminals can be dangerous, therefore do not place your hands near a terminal, whether used or not.

Never exceed the protection value limits indicated in the specifications.

When the order of size of the measured value is not known, ensure that the starting measurement range is has high as possible, or select automatic range change mode.

Before changing function, disconnect the measuring wires from the external circuit. When voltage measurements are being made, even weak ones, keep in mind that the circuits may feature a dangerous voltage for the operator compared to the ground.

Do not make any measurements when the device is linked up to another device using the USB link or when the batteries are being charged (option).

A.3.7 Defects and abnormal stresses

Every time you believe the protection may have been compromised, switch off the device and prevent it from being switched back on unexpectedly.
The protection may be impaired in the following cases, for example:

- The device is visibly worn.
- The device is no longer able to make precise measurements.
- The device was stored in unfavourable conditions.
- The device has undergone severe stresses during transport.

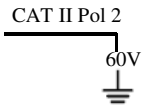
A.3.8 Definitions

A.3.8.1 Definition of the category and degree of pollution

CAT II 60V:
The notion of categories determines the maximum transient voltage that can be applied to the measurement inputs (it is also called overvoltage category). For the SIKA UC RTD, the maximum permissible overvoltage is 60V (DC or AC)

POL 2:
The notion of pollution determines the clearance between circuits. Degree 2 authorises temporary conductivity caused by condensation.

A.3.8.2 Table of symbols used

Symbol	Name
	Attention: see the accompanying documents
	Earth
	Compliant with the European Union directives
	Category II, Pollution 2. Maximum common mode voltage compared with the ground=60V

A.4 Maintenance

The device must always be repositioned in accordance with the instructions provided herein. Any incomplete or incorrect assembly could compromise the safety of the operator.

The authority responsible must regularly ensure that all safety-related items are not worn and ensure all the preventive maintenance operations required are performed.

Before opening the device for any maintenance operations, you must make sure that all the wires are disconnected from the appliance.

All adjustments, maintenance and repair work on the open device must be avoided as much as possible and, when these are indispensable, they must be performed by qualified staff, who are well aware of the risks involved.

B. USING THE INSTRUMENT

In order to use the device in all the safety required, all operators must read the paragraph on safety carefully, along with the paragraph below.

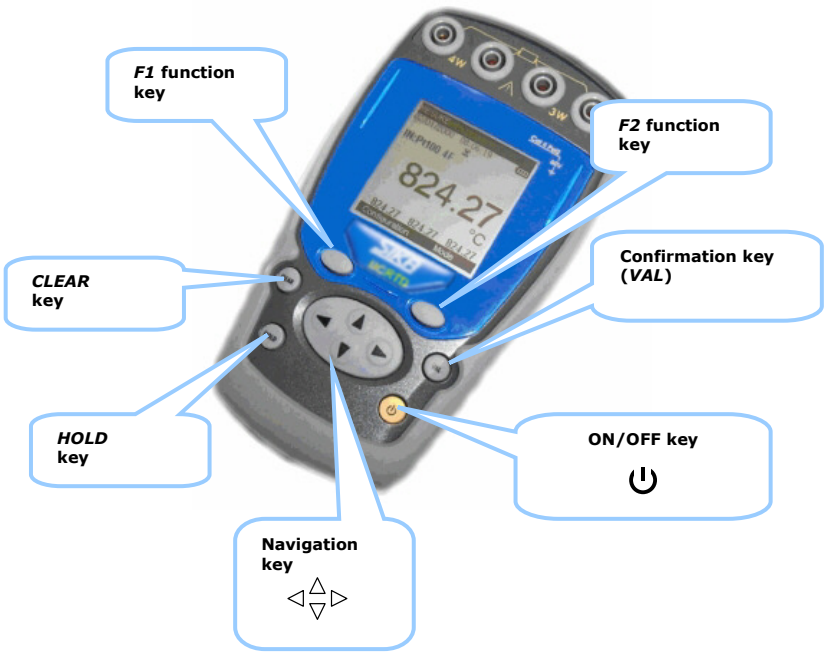
B.1 Power-up

The device is delivered with 4 AA batteries of 1.5V each. It is wise to place these batteries in the compartment provided for this purpose. To open up the compartment, unscrew the screw on the back of the box. Once the batteries are in place, screw the cover back on.
Observe the polarity: an incorrect battery positioning could damage the device. The correct polarity is indicated inside the compartment.
The figure below illustrates how to open the battery compartment as well as the correct positioning of each battery.

B.1.1 Keyboard

The keyboard features:

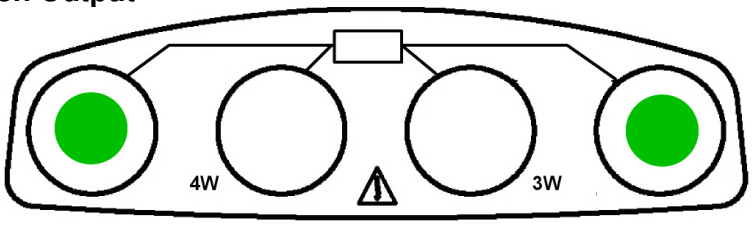
- 2 function keys (**F1** and **F2**) for the selection of the various menus displayed on the screen.
- The navigator, consisting of 4 arrows (up *(↑)*, down *(↑)*,right (→), left (←)
- A clear key (**CLEAR**).
- A device on/off and backlighting on/off key (**ON**/**OFF**).
  Press briefly to start the device. During operation, press briefly to turn the lighting on or off. Press it longer for 2 seconds to stop the device.
- A validation key (**VAL**).
- A **HOLD** key allows you to suspend a process temporarily (when pressed briefly). If you press it longer, this key makes it possible to switch from measuring mode to emission mode and vice-versa.



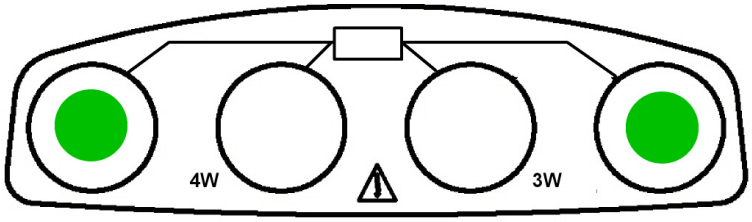
B.1.2 Measuring and simulation terminals

The UC RTD is fitted with 4 safety bushes (4 mm in diameter) ad a circular 4-point connector. This wiring is used both in measurement and emission mode (non-simultaneous).

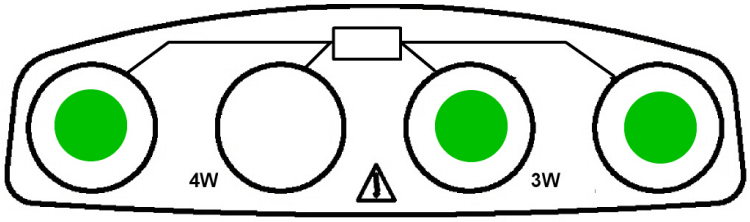
Simulation / Generation Output



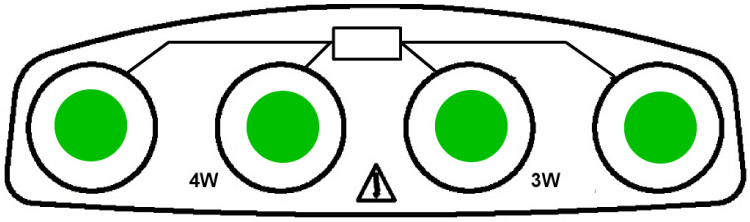
Measurement Input



2 wire measurement

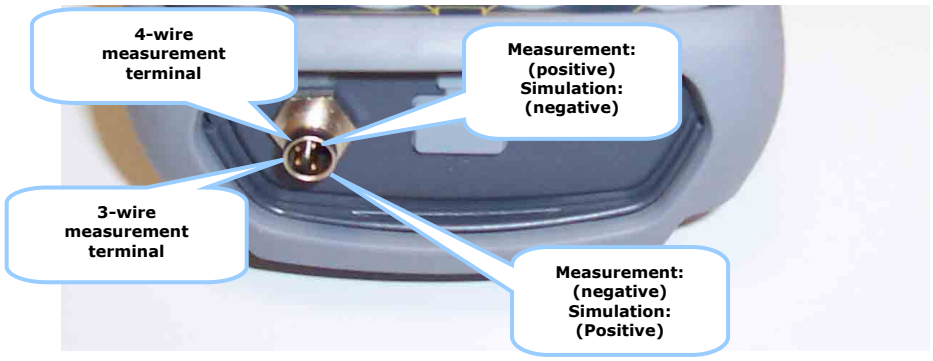


3 wire measurement



4 wire measurement

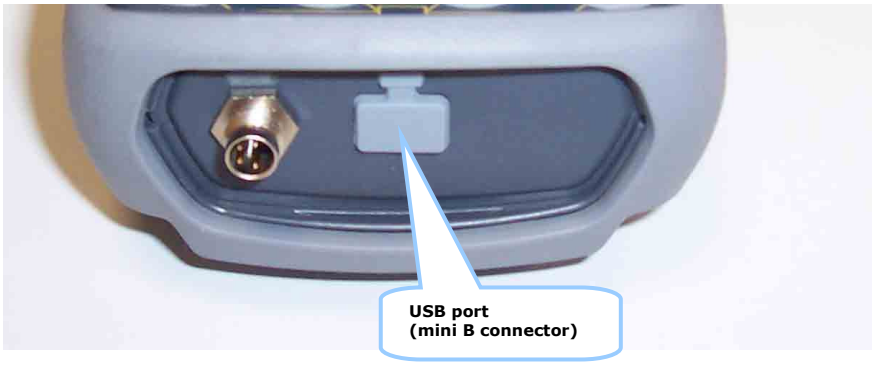
NOTE:
An adjustment of 2, 3 or 4 wire measurement is not necessary. The numbers of wires will be detected automatically.



NOTE:
When using the device with resistance measurement/simulators, you must respect the polarities.

B.1.3 USB connector

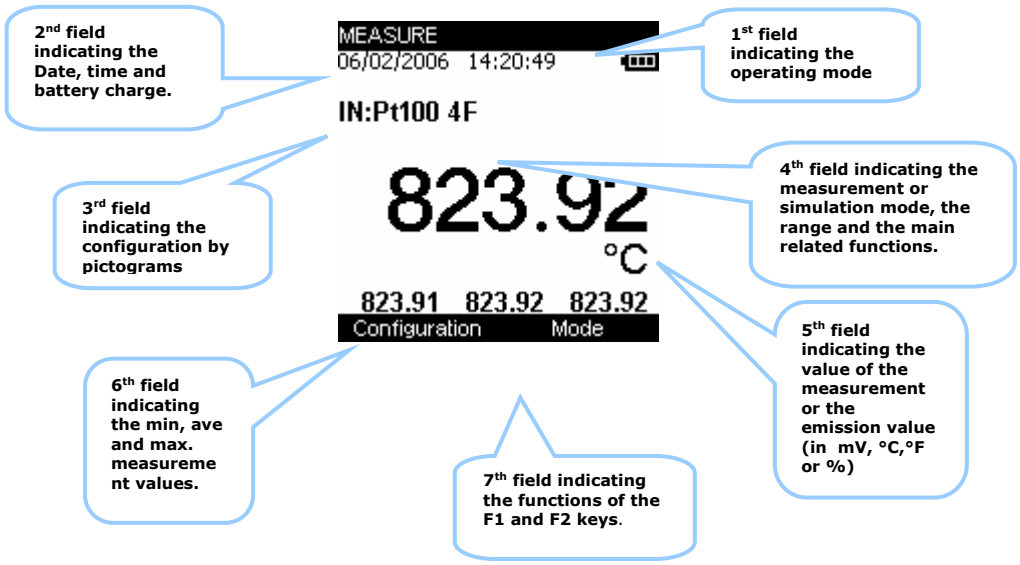
The UC RTD is fitted with a USB connector (mini B) intended for uploading new software versions, device adjustment and general connection to PC.



B.1.4 Screen

The UC RTD is fitted with a graphic LCD display with back-lighting. The display resolution is 160 x 160 pixels. In normal operating conditions, the display is divided up into seven horizontal fields:

- The 1st field indicates the operating mode (Measurement, emission).
- The 2nd field indicates the date, time and battery charge.
- The 3rd field is reserved for icons indicating the operating mode (related functions: Scaling, filtering…etc).
- The 4th field indicates the operating mode, the range and certain related functions.
- The 5th field indicates the value of the measurement or of the emission. These values are expressed in Ω, ℃, ℉ or as a %.
- The 6th field indicates (in measurement mode) the min., average and max. values of the measurement.
- The 7th field indicates the function of keys **F1** and **F2**.



The table below provides a definition of each pictogram displayed on the screen:

Symbol	Description
	Emission mode in increases
	Emission mode in single ramp
	Emission mode in cyclic ramp
	Scaling
	On hold
	Filtering
	%FS (full scale) function
	Error (over-calibration in measurement or error on the value emitted…)
	Incremental mode using the arrows
	Battery life indication
 1088	Acquisition in progress (the value on the right of the pictogram indicates the number of values recorded)

The table below provides a definition of each pictogram of the function keys

Symbol	Description
	Tab key
	Open a drop-down list
	Close a drop-down list
	Delete the selected item
	Clear the selection
	Add the item being edited

B.1.5 Getting started (after power-up)

On power-up (inserting the batteries or accu pack), the device is automatically turned on (loading the software in the memory). At this stage, we advise against connecting the device to an external circuit.To avoid any signal conflicts, the device switches to measurement mode.

B.1.6 Operating modes

There are 2 different operating modes:

- Measurement of resistive sensors (displayed in Ω or °C or °F),
- Simulation of resistive sensors (value displayed in Ω or °C or °F),

The functional and electrical characteristics not to be exceeded are described below:

B.1.6.1 Resistance/temperature measurement

The following ranges are available:

Range	**400 Ω (for PT100)**	**3600 Ω (for PT1000)**
Resolution (display)	10 mΩ or 0.01 °C or 0.01 °F	100 mΩ or 0.01 °C or 0.01 °F
Scope of range:	0 Ω up to 400 Ω -220 °C up to 850 °C -364 °F up to 1562 °F	0 Ω to 3600 Ω -220 °C to 760 °C -364 °F up to 1400 °F
Scaling	yes	yes

B.1.6.2 Resistance/temperature simulation

The following ranges are available (for a current of 0.1 mA to 1 mA):

Range	**400 Ω (for PT100)**	**3500 Ω (for PT1000)**
Resolution (display)	1 mΩ or 0.01 °C or 0.01 °F	10 mΩ or 0.01 °C or 0.01 °F
Scope of range:	0 Ω to 400 Ω -220 °C to 850 °C -364 °F up to 1562 °F	0 Ω to 3500 Ω -220 °C to 715 °C -364 °F up to 1319 °F
Scaling	yes	yes

B.1.6.3 Electrical characteristics not to be exceeded.

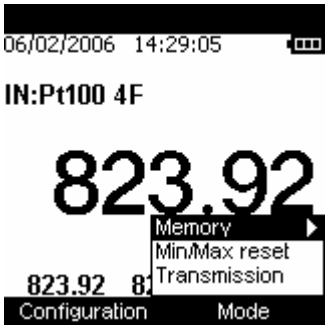
Function	**Range**	**max V_{in}**	**$I_{measurement}$**
$\Omega_{measurement}$	400 Ω / 3600 Ω	**60 V**	
$\Omega_{simulation}$	400 Ω / 3500 Ω		**5 mA**

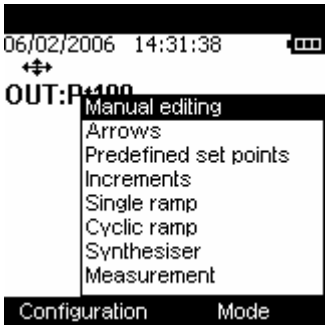
C. MODE PROGRAMMING

C.1.1 Resistance or temperature measurement using resistive sensors

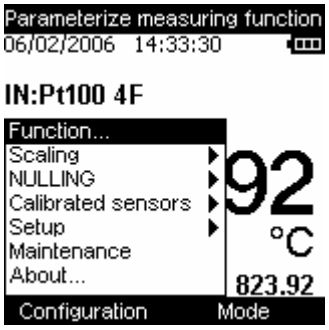
- The choice of measurement or emission mode is made using the **F2** key **(mode** menu**)**.
- Using the navigation keys *(*↑ and ↓*),* position the cursor in the **Measurement** field going down the menu.
- Confirm your choice using the **VAL** key.

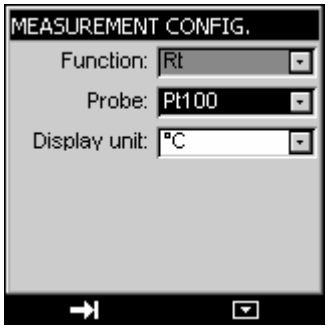
NOTE:
The measurement mode is the mode selected by default.





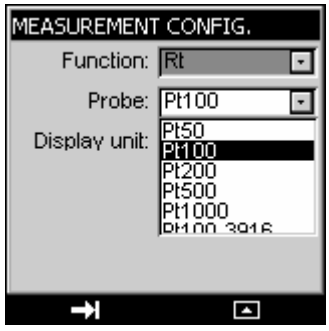
- The function type selection (Resistive sensor type) is made using the **F1** key **(configuration menu)**.
- Using the navigation keys *(*↑ and ↓*),* position the cursor in the f**unction** field.
- Confirm the latter using the **VAL** key.



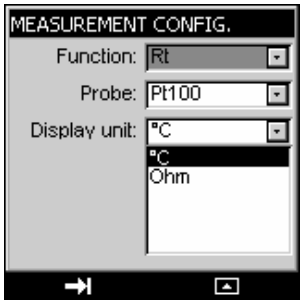


In the **MEASUREMENT CONFIG.** menu, position the cursor in the **Probe** field using the **F1** key.

- Enter the **Probe** menu using the **F2** key**.**
- Choose the type of sensor (PT50, PT100, PT200…), using the navigation keys *(*↑ and ↓*).*

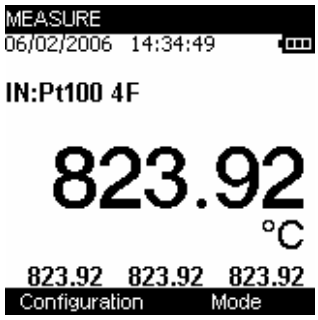


- Press **VAL** to confirm.
- Using the F1 key, define the **Unit** by positioning the cursor on it.
- Enter the menu by pressing **F2**.
- Using the navigation keys *(*↑ and ↓*)*, choose the unit.
- Press **VAL** to confirm.



NOTE:
Attention, the choice of °C or °F is made in the **Setup\Preferences\Display unit** menu

- Press **VAL** (again) to confirm the desired function and go back to the measurement screen.



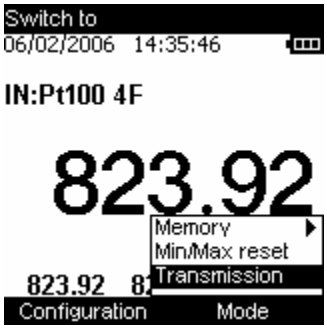
The **Measure** mode makes it possible to display the Min (bottom left), Average (bottom centre) and Max values (bottom right) from the last **min/max reset** command.

- Access this command by pressing the F2 key.
- Using the navigation keys *(*↑ and ↓*)*, position the cursor in the **min/max reset** field.
- Confirm the latter using the **VAL** key.

C.1.2 Resistance or temperature simulation using resistive sensors

To access the **Transmission** mode:

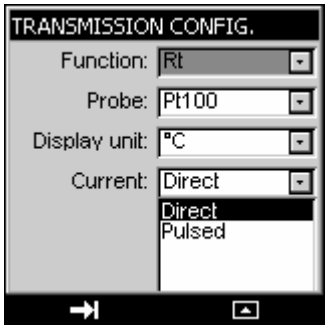
- The choice of **Transmission** mode is made using the **F2** key **(mode** menu**)**.
- Using the navigation keys *(*↑ and ↓*)*, position the cursor in the **Transmission** field going down the menu.
- Confirm your choice using the **VAL** key.



The function type selection (Resistive sensor type) and the choice of unit displayed is made using the **F1** key (**configuration menu**) as in the measurement mode (please refer to the previous chapter).

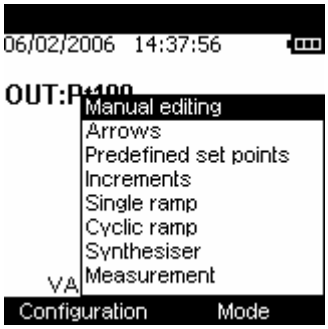
However, in simulation mode, when using an alternating current transmitter, you must indicate this to the device.

- In the **CONFIGURATION/MEASURE** menu, position the cursor in the **Current** field using the **F1** key.
- Enter the **Current** menu using the **F2** key**.**
- Choose the type of current (direct or alternating), using the navigation keys *(*↑ and ↓*).* Confirm using the **VAL** key.



Once you have confirmed the Emission mode and the type of sensor used, define the type of generation:

- Continuous (manual or arrows or default editing).
- Incremental (by step or default).
- Single ramp (only one ramp emitted).
- Cyclic ramp.
- Synthesiser ("automatic default").



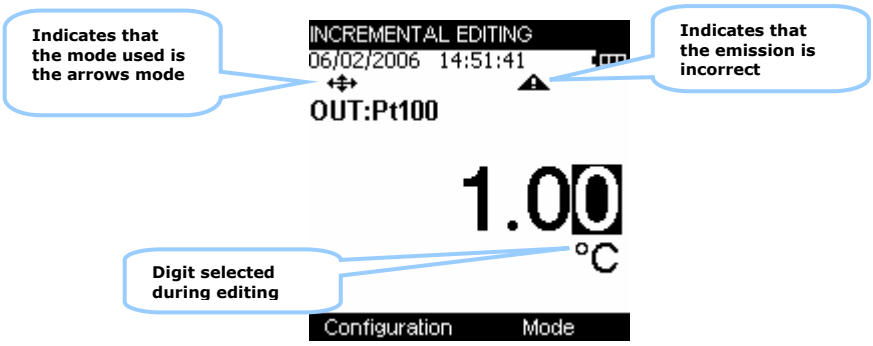
C.1.2.1 Manual editing

- Press the F2 key to display the edit menu.
- Using the navigation keys (↑ and ↓), choose the m**anual editing** mode and confirm (**VAL** key).
- Press **VAL** again and enter your value using the navigation keys:
  - ↑ and ↓ to increase or decrease the value
  - ← and → to select the digit to modify

NOTE:
If the Scaling mode is **ON**, the value to edit is expressed as a %, otherwise this value is expressed in Ω or ℃ or ℉.

C.1.2.2 Editing with arrow

- Press the F2 key to display the edit menu.
- Using the navigation keys (↑ and ↓), choose the **arrows** edit mode and confirm (**VAL** key).
- Use the navigation keys to enter the value:
  - ↑ and ↓ to increase or decrease the value
  - ← and → to select the digit to modify



C.1.2.3 Incremental editing

- Press the F2 key to display the edit menu.
- Using the navigation keys (↑ and ↓), choose the **INCREMENTS** mode and confirm (**VAL** key).

The values emitted are those defined in the **CONFIGURATION/RAMP** menu

a) automatically

- Using the navigation key (↑), start the automatic increases phase (following the parameters programmed in the (**CONFIGURATION/RAMP** menu).
- Using the navigation key (↓), you can decrease automatically starting from the max. programmed resistance (or temperature).

b) manually

- Using the navigation key (→), you can increase manually the resistance (or temperature) emitted (following the parameters programmed in the (**CONFIGURATION/RAMP** menu).
- Using the navigation key (←), you can decrease manually the resistance (or temperature) emitted starting from the max. programmed resistance.

C.1.2.4 Single ramp editing

- Press the F2 key to display the edit menu.
- Using the navigation keys (↑ and ↓), choose the **SINGLE RAMP** mode and confirm (**VAL** key).

The values emitted are those programmed in the **CONFIGURATION/RAMP** menu

a) automatically
- Using the navigation key (↑), start the automatic increases phase (following the parameters programmed in the **CONFIGURATION/RAMP** menu).
- Using the navigation key (↓), you can decrease automatically starting from the max. programmed resistance (or temperature).

b) manually
- Using the navigation key (→), you can increase manually the resistance (or temperature) emitted (following the parameters programmed in the **CONFIGURATION/RAMP** menu).
- Using the navigation key (←), you can decrease manually the resistance (or temperature) emitted starting from the max. programmed resistance (or temperature).

The Hold key allows you to stop generating or to resume it.
You can resume the generation of the ramp in step-by-step mode by pressing the navigation keys (← and →) or in automatic generation using the navigation keys (↑ and ↓).
You can delay the emission by a programmable amount of time
(in the **CONFIGURATION/RAMP/DELAY** menu).

C.1.2.5 Cyclic ramp editing

- Press the F2 key to display the edit menu.
- Using the navigation keys (↑ and ↓), choose the **CYCLIC RAMP** mode and confirm (**VAL** key).

The values emitted are those programmed in the **CONFIGURATION/RAMP** menu

a) automatically
- Using the navigation key (↑), start the automatic increases phase (following the parameters programmed in the (**CONFIGURATION/RAMP** menu).
- Using the navigation key (↓), you can decrease automatically starting from the max. programmed resistance (or temperature).

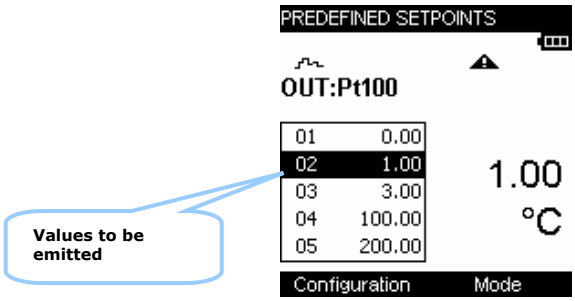
b) manually
- Using the navigation key (→), you can increase manually the resistance (or temperature) emitted (following the parameters programmed in the (**CONFIGURATION/RAMP** menu).
- Using the navigation key (←), you can decrease manually the resistance (or temperature) emitted starting from the max. programmed resistance (or temperature).

The Hold key allows you to stop generating or to resume it.
You can resume the generation of the ramp in step-by-step mode by pressing the navigation keys (← and →) or in automatic generation using the navigation keys (↑ and ↓).

C.1.2.6 Predefined editing

- Press the F2 key to display the edit menu.
- Using the navigation keys (↑ and ↓), choose the **Predefined setpoints** mode and confirm (**VAL** key).

The values emitted are those programmed in the **CONFIGURATION/POINTS**



- Using the navigation keys (↑ and ↓), select the value that needs to be emitted.
- Confirm using the **VAL** key.

C.1.2.7 Synthesiser

- Press the F2 key to display the edit menu.
- Using the navigation keys (↑ and ↓), choose the **Synthesiser** mode and confirm (**VAL** key).

The values emitted are those programmed in the **CONFIGURATION/SYNTHESISER**

a) automatically

- Using the navigation key (↑), start the automatic increases phase (following the parameters programmed in the **CONFIGURATION/Synthesiser** menu).
- Using the navigation key (↓), you can decrease automatically starting from the max. programmed resistance (or temperature).

b) manually

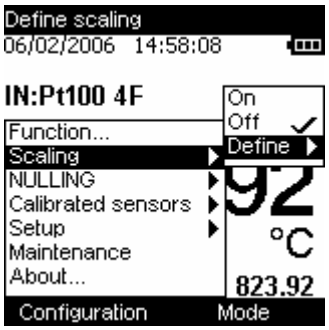
- Using the navigation key (→), you can increase manually the resistance (or temperature) emitted (following the parameters programmed in the **CONFIGURATION/Synthesiser** menu).
- Using the navigation key (←), you can decrease manually the resistance emitted starting from the max. programmed resistance (or temperature).

The Hold key allows you to stop generating or to resume it.
You can resume the generation of the ramp in step-by-step mode by pressing the navigation keys (← and →) or in automatic generation using the navigation keys (↑ and ↓).

D. RELATED FUNCTIONS

D.1 Scaling (linearisation)

The scale correction function performs conversion operations between the electrical values measured and the physical values converted.
This ***linearisation operation*** makes it possible to correct partially the errors induced by non-linear sensor/converter systems.
The Scaling function makes it possible to define up to 10 right-segments, i.e. 11 points, in order to approach as much as possible the non-linear response curve, and to make the scale corrections according to each segment.
The pictogram 💻 is displayed on the screen in the active window when the scaling function is enabled.



The **Define/list of points** menu makes it possible to program up to

10 lines of 2 values
X and Y= f(X)

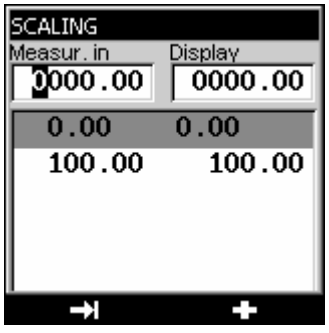
In measurement mode: X = Value measured
Y = Value Displayed.

In emission mode: X = Value displayed
Y = Value emitted.

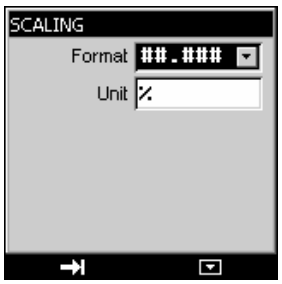
The lines entered are sorted according to the X in increasing order, to scale an X-value, the device seeks the 2 lines n and m=n+1 which frame it, and extrapolates linearly:

$$Y = Yn + (X-Xn) \times (Ym-Yn)/(Xm-Xn)$$

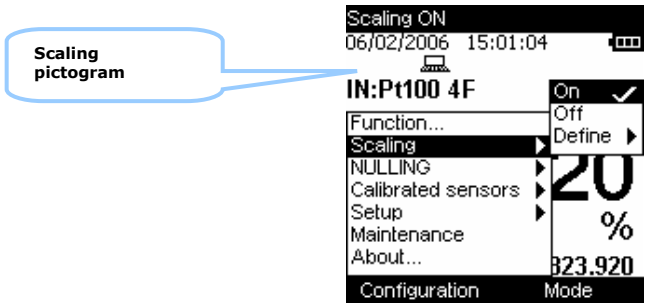
Use the function keys to edit the points:
To add a line: enter X and Y, then enable the ✚ function key.
To select a line in a list, use the Up and Down navigation keys.
To delete a selected line, use the ✂ key.
To move from one field to the next, use the ⇥ key.



The **Define/parameters** menu makes it possible to define the format (Number of digits displayed) and unit.

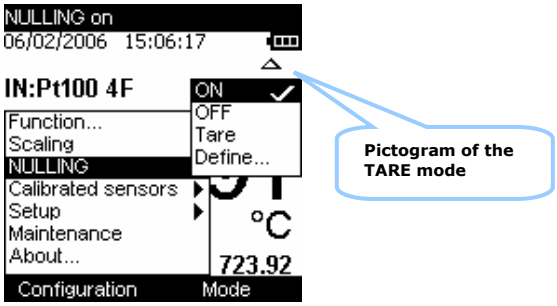


Once the parameters have been set, the scaling is automatically enabled. To disable it, enter the **Configuration/Scaling ON** menu, select **OFF** and confirm by pressing the **VAL** key.



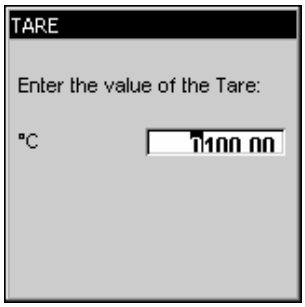
D.2 Nulling (tare/offset)

The relative measurement function available on the device makes it possible to cancel a constant or spurious value via programming.
When the relative measurement function is enabled, the symbol △ is displayed on the measurement screen.



The **NULLING/Define** menu makes it possible to program the value of the Tare (positive or negative). This value is obtained from the measurements:

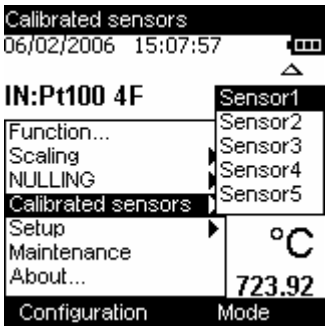
Value Displayed = Value measured – Value of the Tare



D.3 Calibrated sensors (point correction)

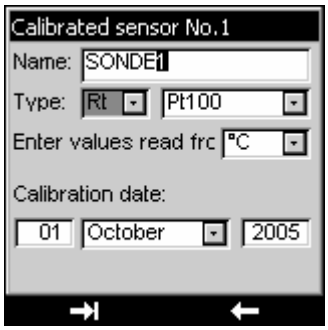
The calibrated sensors function of the device makes it possible to use sensors, the calibration (correction) coefficients of which are taken into consideration by the device during measurement.

- Using the F1 key, enter the Configuration menu.
- Select the **Calibrated sensors** function, followed by one of the 5 available sensors.

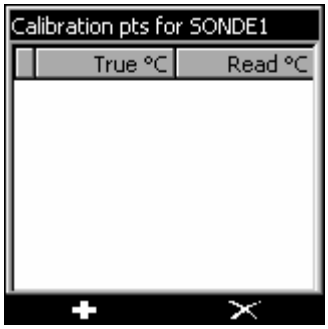


- Confirm by pressing ENTER.

- Enter the sensor information fields. Use the F1 function key (⇥) to move from one field to the next.

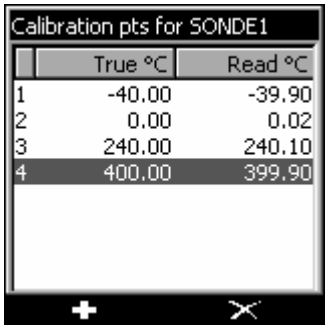


- Confirm your choice using the **VAL** key.



- To add a value in the table of calibration points, use the keys, enter the calibration points (real value and value read) then confirm using the **VAL** key.

Repeat this operation for all the calibration points (maximum of 4).

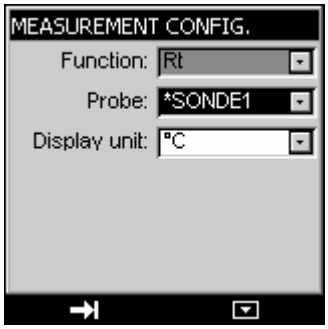


To delete a line, select it then use the key.
To edit a line, select it then use the navigation key (→) to make editing possible.

- Confirm using the **VAL** key to return to the measurement screen.

To ensure the measurements are made using the calibration coefficients defined earlier, go to the **configuration/function** menu.

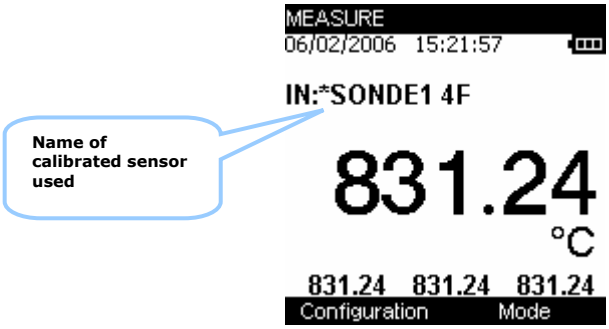
- In the **Sensor** field, select sensor1 (SONDE1-SENSOR1 below).



NOTE:
The calibrated sensors are at the top of the list and their name is preceded by a *.

- Confirm the latter using the **VAL** key.

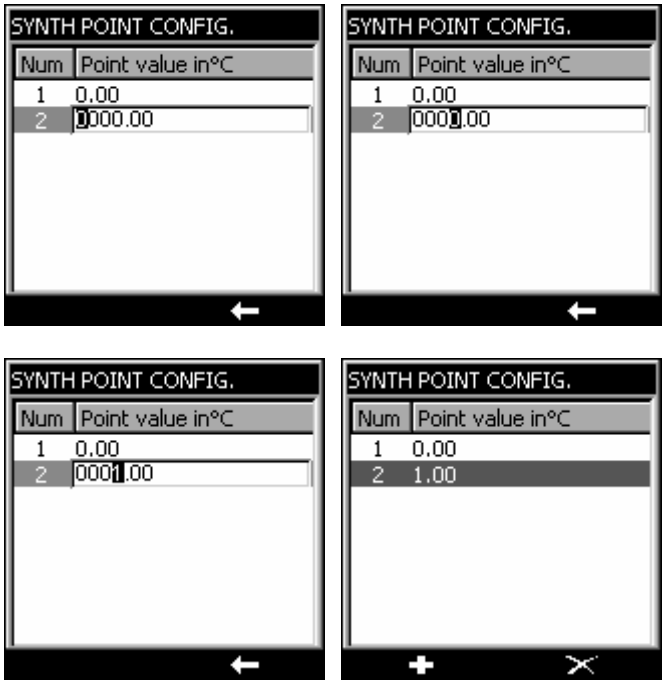
The chosen calibrated sensor is displayed in the measurement screen.



D.4 Configuration predefined set points

The configuration of predefined set points is performed in the **Configuration**/**Points** menu, obviously providing the **default values** mode has been confirmed.

- Using the F1 key, select the **Configuration**/**Points** menu.
- Confirm using the **VAL** key.
- Using the F1 key (✚) add a new value line to the table.
- Using the navigation keys (← and →), select the digit that requires editing.
- Using the navigation keys (↑ and ↓), increase the value of the selected digit.
- Confirm the line using the **VAL** key.



You can edit a value already recorded:

- Using the navigation keys (↑ and ↓), select the line requiring editing.
- Press the navigation key (→) to make editing possible.

You can delete a value already recorded:

- Using the navigation keys (↑ and ↓), select the line requiring deleting.
- Press the ✕ key to delete the line.

Notes:
A maximum of 100 values can be entered.

This table of values is also used for the Synthesiser mode; consequently all changes to this table entail a change to the synthesiser values.

D.5 Storage of acquisitions in progress

The UC RTD is designed to store 10000 measuring values in one or more acquisition bursts.

- Using the F2 key, enter the Mode menu.
- Select the **Memory** function.
- Confirm using the **VAL** key.

The drop-down list displays the following functions:

D.5.1 Save measurement

Enable the triggering of an acquisition on a case-by-case basis.

If an acquisition has already been opened, then the following screen is displayed:

Press the F2 key (YES) to confirm.

- You are then requested to enter the name of a file. Using the navigation keys (↑ and ↓), scroll down the letters.
- Using the navigation keys (← and →), move the cursor by one position.
- Using the F2 key(⬅), you can delete the characters entered

- Once you have entered the file name, confirm by pressing the **VAL** key.

D.5.2 Run

Launches the storage of data following the parameters set in the “parameters” function. The pictogram is displayed on the measurement screen

D.5.3 Stop

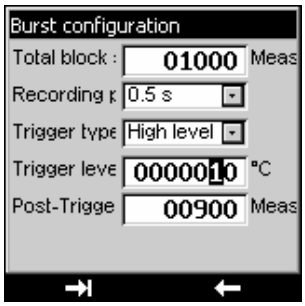
Stops the storage in progress.

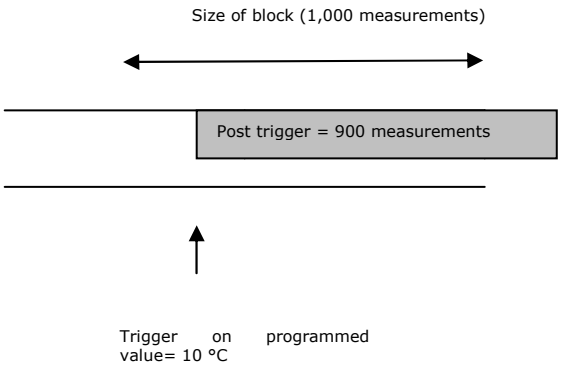
D.5.4 Parameters

Allows you to define:

- the size of the acquisition (max 10000 values),
- the sampling period from 0.5 S to 30 Min,
- and the type of trigger (None, low level, high level).

If you have selected a low level or high level trigger, you must define the trigger level and the number of data to record after this trigger (Post-trigger).



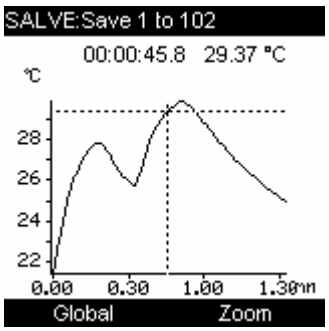


D.5.5 Display burst

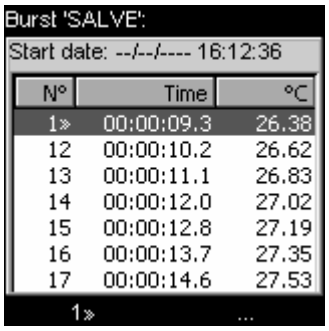
You can display the burst in the form of a table of values or a trend curve.

At this level, it is possible to

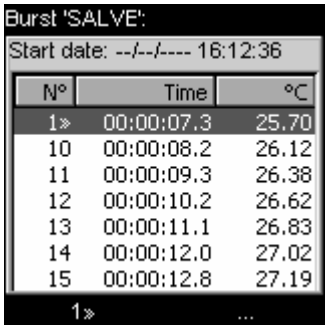
- display the trend curve entirely: press the F2 key (GRAPH).



- place markers so as to display in the form of a graph all the values included between these 2 markers. To do so, press the F2 key (…).

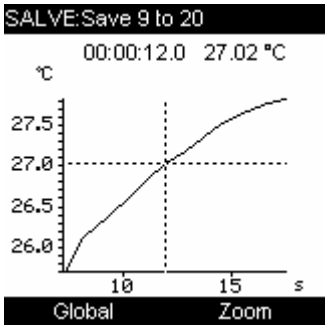


- Using the navigation keys (↑ and ↓), move the cursor to the value to be marked “value 1” and press the F1 key (1>>).
- For the second marker, press the F2 key (…) and using the navigation keys (↑ and ↓), move the cursor to the value to be marked “value 2” and press the F1 key (2>>).

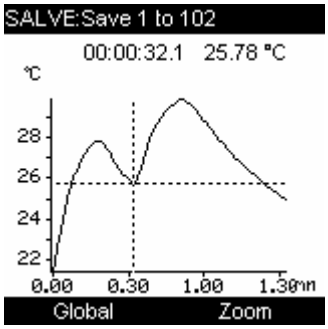


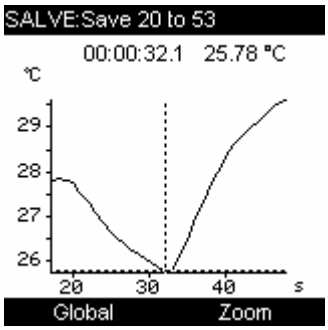
In this particular example, the graph will display values included between positions 9 and 20.

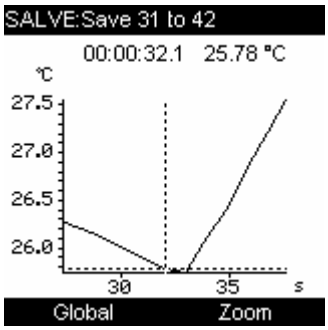
- Press the F2 key twice (…), to reach the **GRAPH** function, then press F2 to confirm.



At this level, you can display the whole curve or a zoom around the cursor. The cursor is moved using the navigation keys(← and →)



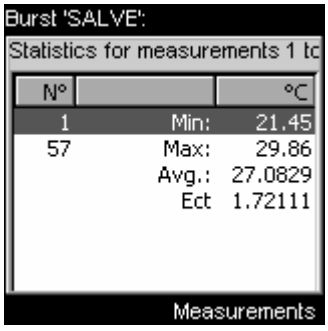




- Press **CLEAR** to return to the table of values.

At this level, you can find out some statistics on the measurements made (Min, Max, Avg (Average) and Ect (Shift)).

- Press the F2 key three times (…) followed by the F1 key (STAT).



- Press F2 (measurements) to return to the table of values.
- Press **CLEAR** to quit the storage function.

D.5.6 Save burst

This function makes it possible to record the burst in the memory.

- You are then requested to enter the name of a file. Using the navigation keys (↑ and ↓), scroll down the letters.
- Using the navigation keys (← and →), move the cursor by one position.
- Using the F2 key(⬅), you can delete the characters already entered

- Using the F2 key(⬅), you can delete the characters entered
- Once you have entered the file name, confirm by pressing the **VAL** key.

D.5.7 Open a burst

Allows you to choose a burst among many and to open it to display the values. At this level, you can obtain information on the acquisition burst, such as the number of measurements, the date of acquisition, the sensor used, etc.

D.5.8 New free burst

Allows you to start a new acquisition burst. If a burst is under way, you will be requested to save it.

D.5.9 Burst management

Allows you to display all the bursts recorded. At this level, you can delete one or all bursts.

D.5.10 Statistics

Allows you to find out the number of bursts recorded, the number of bytes free as well as the number of measurements which can be recorded.

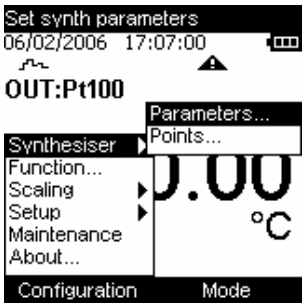
D.6 Synthesiser configuration

D.6.1 Configuration of synthesiser points

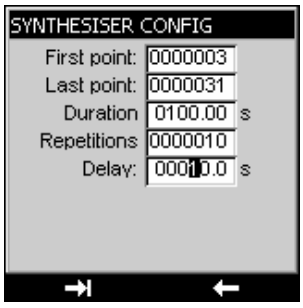
The configuration of the synthesiser points is identical to that of the default values.

D.6.2 Configuration of synthesiser parameters

The configuration of the synthesiser parameters is performed in the **Configuration/Synthesiser/Parameters** menu, obviously providing the Synthesiser mode has been confirmed. Careful, the values (points) must be recorded first



- Once you have selected the **Configuration/Synthesiser/ Parameters** (Configuration/Synthesiser/Parameters) menu, confirm by pressing the **VAL** key.



This screen allows you to configure the emission:

D.6.2.1 First point

This is the 1st point to be emitted. It is not necessarily the 1st point in the table of values.

D.6.2.2 Last point

This is the last point to be emitted. It is not necessarily the last point in the table of values but this point number must be below the number of points recorded. Should this not be the case, it will be impossible to record the configuration of the synthesiser parameters

D.6.2.3 Duration

This is the amount of time required for the emission of all the points that need to be emitted (Last point - first point).

D.6.2.4 Repetition

This is the number of cycles that need to be performed.

D.6.2.5 Delay

This is the time lapse between 2 repetitions

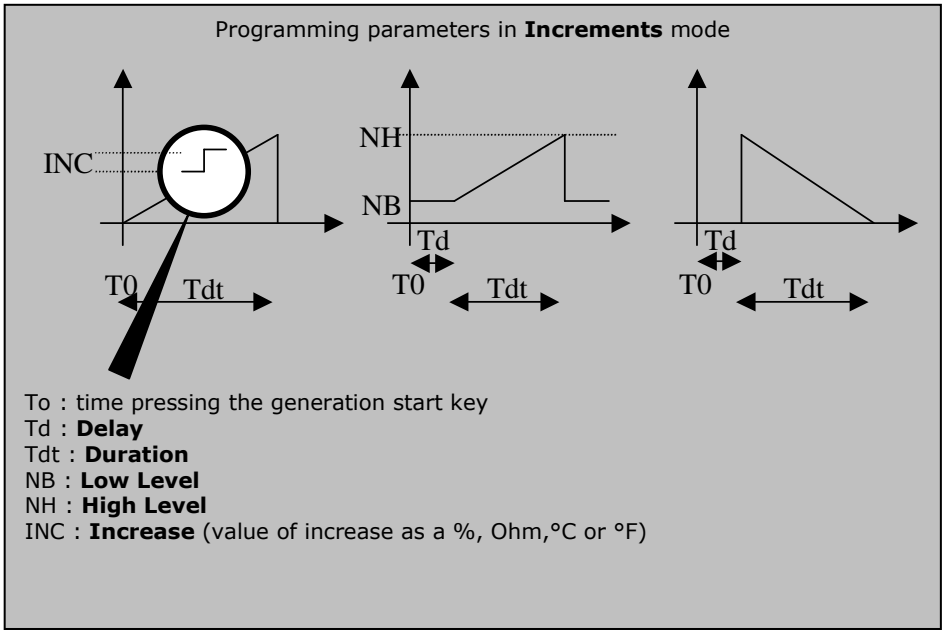
D.7 Configuration of the ramp generation

The **CONFIGURATION/RAMP** menu is used for the generation of ramps by

- incremental
- single ramp
- cyclic ramp

D.7.1 Incremental signal configuration

The figure below illustrates the type of incremental ramp that can be generated and their parameters:



a) LOW Level and HIGH Level

The low level and high level levels are expressed:

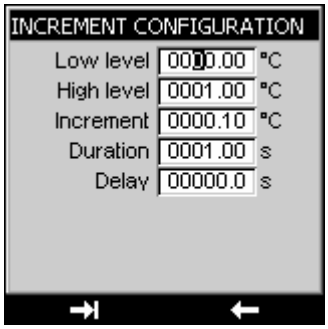
- As a percentage of the gauge if the scaling mode is ON.
- In ohm or in temperature units if the scaling mode is OFF and according to the type of value emitted (resistance or temperature simulation).

b) Duration

The duration corresponds to the amount of increase time required to go from the low level to the high level (and vice versa in the case of a decrease). It is expressed in seconds and the max time is limited to 1000s.

c) Delay

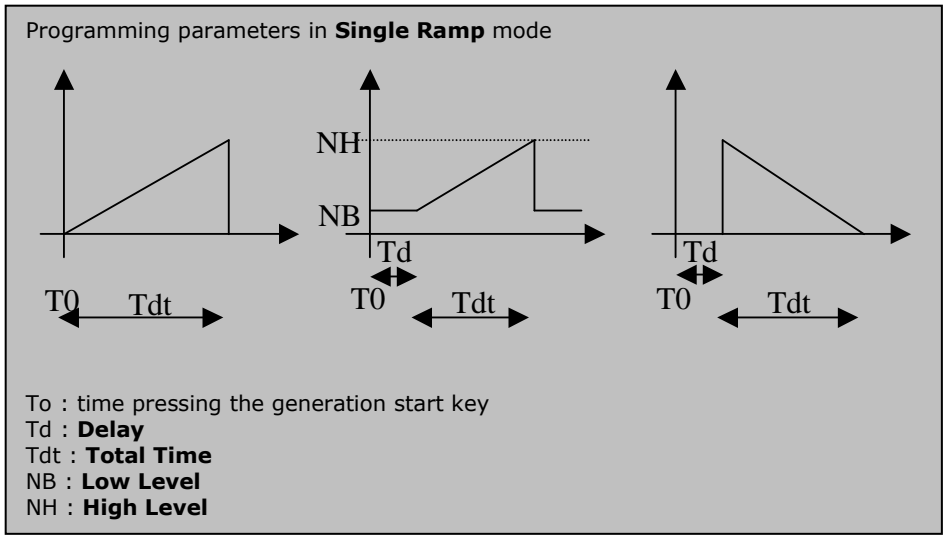
The delay corresponds to the amount of time you can have between pressing the emission start key and the actual starting of generation. It is expressed in seconds and the max time is limited to 1000s.



- The **CONFIGURATION/RAMP** menu is accessed using key **F2**.
- Use the **F2** key to move to the next field.
- Use the navigation keys to enter the value:
  - As a percentage of the gauge if the scaling mode is ON.
  - ↑ and ↓ to increment or decrement the value
  - ← and → to select the position
- Press **VAL** to save the parameters.
- To quit the menu without saving, press **CLEAR**.

D.7.2 Single ramp signal configuration

The figure below illustrates the type of single ramp that can be generated and their parameters:



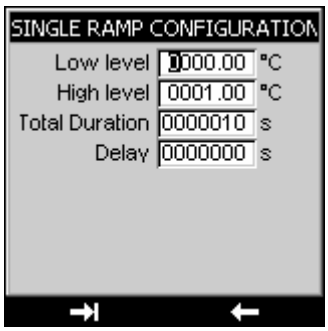
a) LOW Level and HIGH Level

The low level and high level levels are expressed:

- As a percentage of the gauge if the scaling mode is ON.
- In ohm or in temperature units if the scaling mode is OFF and according to the type of value emitted (resistance or temperature simulation).

b) Total Duration

The total duration corresponds to the amount of increase time required to go from the low level to the high level (and vice versa in the case of a decrease). It is expressed in seconds and the max time is limited to 1000s.The delay corresponds to the amount of time you can have between pressing the emission start key and the actual starting of generation. It is expressed in seconds and the max time is limited to 1000s.



- Use the **F2** key to access the **CONFIGURATION/RAMP** menu.

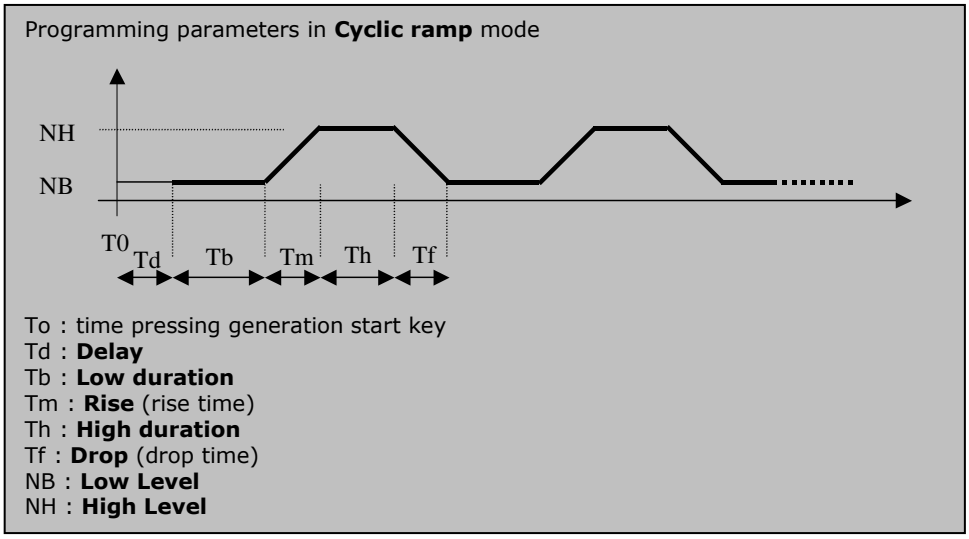
NOTE:

The appropriate function mode must be programmed (**INCREASES** mode) to access the **CONFIGURATION/RAMP/SINGLE** menu.

- In the **CONFIGURATION/RAMP/SINGLE** menu, use the **F2** key to go to the next field.
- Use the navigation keys to enter the value:
  - As a percentage of the gauge if the scaling mode is ON.
  - ↑ and ↓ to increment or decrement the value
  - ← and → to select the position
- Press **VAL** to save the parameters.
- To quit the menu without saving, press **CLEAR**.

D.7.3 Cyclic ramp signal configuration

The figure below illustrates the type of cycle ramp that can be generated and their parameters:



a) LOW Level and HIGH Level

The low level and high level levels are expressed:

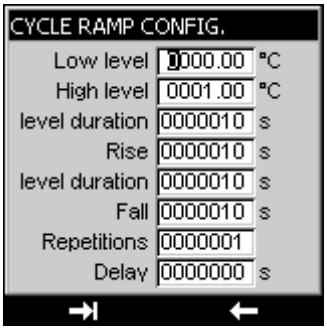
- As a percentage of the gauge if the scaling mode is ON.
- In ohm or in temperature units if the scaling mode is OFF and according to the type of value emitted (resistance or temperature simulation).

b) Low Level Duration, Rise, High Level Duration, Fall and Delay

The low duration, rise, high duration, fall and delay durations are expressed in seconds. The max duration is limited to 1000s.

c) Repetition

The repetitions field indicates the number of ramps that need to be generated. The number of repetitions is limited to 1000.



- Use the **F2** key to access the **CONFIGURATION/RAMP** menu.

NOTE:
The appropriate function mode must be programmed (**Single Ramp** mode) to access the **CONFIGURATION/RAMP/CYCLIC RAMP** menu.

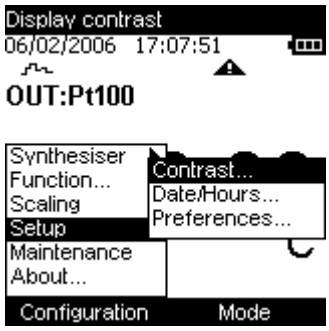
- In the **CONFIGURATION/RAMP/CYCLIC RAMP** menu, use the **F2** key to go to the next field.
- Use the navigation keys to enter the value:
  - As a percentage of the gauge if the scaling mode is ON.
  - ↑ and ↓ to increment or decrement the value
  - ← and → to select the position
- Press **VAL** to save the parameters.
- To quit the menu without saving, press **CLEAR**.

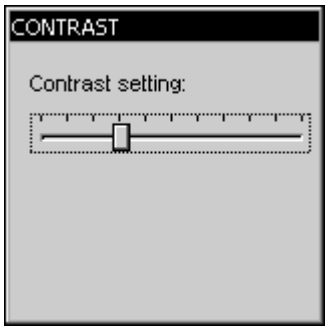
E. PARAMETER SETTINGS

E.1 Contrast adjustment

In the CONFIGURATION/SETUP menu, you can adjust the display contrast.

- Access this menu using the F1 key.
- Select the **Setup** field using the navigation keys (↑ and ↓), then confirm.
- Select the **Contrast** field using the navigation keys (↑ and ↓), then confirm.
- Using the navigation keys (← and →), increase or decrease the contrast as required.





E.2 Date and time setting

In the CONFIGURATION/SETUP menu, you can set the time and date.

- Access this menu using the F1 key.
- Select the **Setup** field using the navigation keys (↑ and ↓), then confirm.
- Select the **Date/hours** field using the navigation keys (↑ and ↓), then confirm.

- Use the navigation keys (↑ and ↓) to increase the various parameters.
- Use the navigation keys (← and →) to go to the next field.
- Press **VAL** to confirm.

E.3 "Preferences" setting

E.3.1 Filtering setting

In the event of noisy measurements, you can filter the latter to make the value displayed on the screen more stable.

- Access this menu using the **F1** key (configuration menu).
- Select the **Setup** field using the navigation keys (↑ and ↓), then confirm.
- Select the **Preferences** field using the navigation keys (↑ and ↓), then confirm.
- Select the **Filtering** field by pressing the F1 key.
  Four filtering values are available
  - OFF
  - 0.5s
  - 1s
  - 2s
- Select these values using the navigation keys (↑ and ↓).
- Confirm by pressing the VAL key.

E.3.2 Display resolution setting

In the **CONFIGURATION/SETUP/PREFERENCES** menu, you can select the desired display resolution:

- Access this menu using the **F1** key.
- Select the **Setup** field using the navigation keys (↑ and ↓), then confirm.
- Select the **Preferences** field using the navigation keys (↑ and ↓), then confirm.
- Select the **Display resol.** field by pressing the F1 key.
  Three type of resolution are then available:
  - high (res=1mV or 1µA),
  - medium (res=10mV or 10µA)
  - low (res=100mV or 100µA).
- Select this resolution using the navigation keys (↑ and ↓).
- Confirm by pressing the VAL key.

E.3.3 Lighting duration setting

In the same menu (**CONFIGURATION/SETUP/PREFERENCE**), you can control the duration of the lighting (manual, 10s or 1min). Press the **ON/OFF** key briefly to turn on the lighting for the selected duration (10s or 1min). Press it again briefly to start the timing or to turn off the lighting in the case of the **manual editing** mode.

- Access this menu using the **F1** key.
- Select the **Setup** field using the navigation keys (↑ and ↓), then confirm.
- Select the **Preferences** field using the navigation keys (↑ and ↓), then confirm.
- Select the **Lighting** field by pressing the F1 key.
  Three type of durations are then available:
  - 10 s
  - 1 min.
  - manuel
- Choose the manual or timed mode using the navigation keys (↑ and ↓).
- Confirm by pressing the VAL key.

E.3.4 Key beeping setting

In the **CONFIGURATION/SETUP/PREFERENCE** menu, you can emit a beeping sound every time a key is pressed:

- Access this menu using the F1 key.
- Select the **Setup** field using the navigation keys (↑ and ↓), then confirm.
- Select the **Preferences** field using the navigation keys (↑ and ↓), then confirm.
- Select the **Key beep** field using the F1 key.
- Using the navigation keys (↑ and ↓), select the **ON** or **OFF** mode
- Confirm by pressing the VAL key (if the parameter settings are completed or go to the next field using the F1 key).

E.3.5 Language setting

In the **CONFIGURATION/SETUP/PREFERENCES** menu, you can choose whether to have the interface in French, English, Deutch, Italian or spanish.

- Access this menu using the F1 key.
- Select the **Setup** field using the navigation keys (↑ and ↓), then confirm.
- Select the **Preferences** field using the navigation keys (↑ and ↓), then confirm.
- Select the **Language** field using the F1 key.
  Five type of languages are then available:
    - German
    - English
    - Frensh
    - Spain
    - Italian
- Using the navigation keys (↑ and ↓), select your desired language
- Confirm by pressing the VAL key (if the parameter settings are completed or go to the next field using the F1 key).

E.3.6 Temperature unit setting

In the **CONFIGURATION/SETUP/PREFERENCES** menu, you can choose the temperature unit that will be displayed.

- Access this menu using the F1 key.
- Select the **Setup** field using the navigation keys (↑ and ↓), then confirm.
- Select the **Preferences** field using the navigation keys (↑ and ↓), then confirm.
- Select the **Unit of temp.** field using the F1 key.
  Two type of temperature units are then available:
    - ℃
    - ℉
- Using the navigation keys (↑ and ↓), select the desired unit
- Confirm by pressing the VAL key.

E.4 Maintenance menu

Not accessible to the user:
Consult SIKA who will indicate the procedure to follow for maintenance services.

E.5 About the instrument menu

In the **Configuration**/**About** menu, you can find out:

- The Serial number
- The software version
- The date of adjustement
- The date of calibration

F. TECHNICAL SPECIFICATIONS

In the context of metrological quality monitoring, the user may have to carry out a periodic performance verification.

The verification must take the standard metrological precautions into consideration. The following instructions are to be applied.

The operations are carried out under reference conditions, namely:

- Room temperature: 23°C ± 5°C.
- Relative humidity: 45% to 75%.

The standards that constitute the measuring chain must be such that the errors at the check points are known and are less than or equal to ± 0.008%.

It this verification reveals one or more characteristics of the instrument to be outside the tolerances specified in the technical specifications chapter, you can:

- Either carry out the adjustment procedure given in the maintenance document, which requires an instrument whose performance is at least as good at that used for the preceding verification.
- Or return the instrument to the address indicated below for verification and calibration. specifications

The precision expressions mentioned herein apply from + 18°C to + 28°C, unless otherwise specified, and are expressed in ± (n % L + C) where L = Reading and C = Constant expressed in practical units, for a confidence interval of 95%.

They apply to a device positioned in the reference conditions defined after fifteen minutes of pre-heating.

The precision includes the precision of the reference calibrations, the non-linearity, hysteresis, repetitiveness and long-term stability over the time period mentioned.

F.1 Measurement Function

Rated maximum voltage in common mode: 60 VDC or VAC.

F.1.1 Resistance measurement

The resistance measurement function is obtained by configuring the device as follows:

Sensor: PT100 and Unit: Ohm for the 400 Ω gauge.
Sensor: PT1000 and Unit: Ohm for the 3600 Ω gauge.

Range	Scope of measurement	Resolution	Precision
400 Ω	0 Ω up to 400 Ω	10 mΩ	0.012 % of rdg. + 10 mΩ
3600 Ω	0 Ω up to 3600 Ω	100 mΩ	0.012 % of rdg. +100 mΩ

Temperature coefficient < 10 ppm/°C from 0°C to 18°C and from 28°C to 50 °C.

- Automatic wiring diagram detection: 2 wires, 3 wires or 4 wires.
- In the 2-wire assembly, the measurement includes the line resistances.
- In the 3-wire assembly, add the line resistances imbalance.
- Measurement current 0.65 mA

F.1.2 Temperature by resistive sensors (measurement)

Sensor	Scope of measurement	Resolution	Precision
Pt 50 (α = 3851)	-220 °C up to 850 °C	0.01 °C	0.012 % of rdg. + 0.06 °C
Pt 100 (α = 3851)	-220 °C up to 850 °C	0.01 °C	0.012 % of rdg. + 0.05 °C
Pt 100 (α = 3916)	-200 °C up to 510 °C	0.01 °C	0.012 % of rdg. + 0.05 °C
Pt 100 (α = 3926)	-210 °C up to 850 °C	0.01 °C	0.012 % of rdg. + 0.05 °C
Pt 200 (α = 3851)	-220 °C up to 1200 °C	0.01 °C	0.012 % of rdg. + 0.12 °C
Pt 500 (α = 3851)	-220 °C up to 1200 °C	0.01 °C	0.012 % of rdg.+ 0.07 °C
Pt 1000 (α = 3851)	-220 °C up to 760 °C	0.01 °C	0.012 % of rdg.+ 0.05 °C
Ni 100 (α = 618)	-60 °C up to 180 °C	0.01 °C	0.012 % of rdg.+ 0.03 °C
Ni 120 (α = 672)	-40 °C up to 205 °C	0.01 °C	0.012 % of rdg.+ 0.03 °C
Ni 1000 (α = 618)	-60 °C up to 180 °C	0.01 °C	0.012 % of rdg.+ 0.03 °C
Cu 10 (α = 427)	-70 °C up to 150 °C	0.10 °C	0.012 % of rdg.+ 0.18 °C
Cu 50 (α = 428)	-50 °C up to 150 °C	0.01 °C	0.012 % of rdg. + 0.06 °C

- For negative temperatures, use the value displayed (of rdg.) and not its absolute value.
- Temperature coefficient: < 10 % of precision/°C.
- The above precision is given for a 4-wire connection to the temperature sensor.
- You should also take into consideration the actual error of the temperature sensor used, as well as the conditions of its setup.
- Measurement current: 0.65 mA

F.2 Simulation Function

F.2.1 Resistance simulation

The resistance simulation function is obtained by configuring the device as follows:

Sensor PT100 and Unit Ω or the 400 Ω range
Sensor PT1000 and Unit Ω for the 3500 Ω range

Range	Scope of measurement	Resolution	Current range	Precision
400 Ω (DC)	0 Ω up to 400 Ω	1 mΩ	0.1 mA to 1 mA	0.012 % of rdg. + 30 mΩ
400 Ω (AC)	0 Ω up to 400 Ω	1 mΩ	[0.5 mA to 1 mA] [0.1 mA to 0.5mA]	0.012 % of rdg.+ 30 mΩ 0.012 % of rdg.+ 80 mΩ (1)
3500 Ω (DC)	0 Ω up to 3500 Ω	10 mΩ	0.1 mA to 1.1mA	0.012% of rdg.+ 300 mΩ
3500 Ω (AC)	0 Ω up to 3500 Ω	10 mΩ	[0.1 mA to 0.5 mA] [0.5 mA to 1mA]	0.012 % of rdg.+ 300 mΩ 0.012 % of rdg.+ 800 mΩ (1)

Note 1: You can amend these specifications to 0.012 % of rdg. +30 mΩ for the 400 Ω gauge and to 0.012 % of rdg. + 300 mΩ for the 3500 Ω gauge by readjusting the device to the respective current range ([0.1 mA to 0.5 mA] and [0.5 mA to 1 mA])

- Temperature coefficient: < 10 % of precision/°C.
- The above precision is given for a 4-wire connection to the gauge.
- You should also take into consideration the actual error of the temperature sensor used, as well as the conditions of its setup.
- Set-up time: < 1 ms in “alternating current” mode.

F.2.2 Temperature by resistive sensors (simulation)

Sensor	Scope of measurement	Resolution	Precision
Pt 50 (α = 3851)	-220 °C up to 850 °C	0.01 °C	0.012 % of rdg. + 0.18 °C
Pt 100 (α = 3851)	-220 °C up to 850 °C	0.01 °C	0.012 % of rdg. + 0.12 °C
Pt 100 (α = 3916)	-200 °C up to 510 °C	0.01 °C	0.012 % of rdg. + 0.12 °C
Pt 100 (α = 3926)	-210 °C up to 850 °C	0.01 °C	0.012 % of rdg.+ 0.12 °C
Pt 200 (α = 3851)	-220 °C up to 1200 °C	0.01 °C	0.012 % of rdg.+ 0.33 °C
Pt 500 (α = 3851)	-220 °C up to 1200 °C	0.01 °C	0.012 % of rdg.+ 0.18 °C
Pt 1000 (α = 3851)	-220 °C up to 730 °C	0.01 °C	0.012 % of rdg.+ 0.08 °C
Ni 100 (α = 618)	-60 °C up to 180 °C	0.01 °C	0.012 % of rdg.+ 0.08 °C
Ni 120 (α = 672)	-40 °C up to 205 °C	0.01 °C	0.012 % of rdg.+ 0.08 °C
Ni 1000 (α = 618)	-60 °C up to 180 °C	0.01 °C	0.012 % of rdg.+ 0.08 °C
Cu 10 (α = 427)	-70 °C up to 150 °C	0.01 °C	0.012 % of rdg.+ 0.10 °C
Cu 50 (α = 428)	-50 °C up to 150 °C	0.01 °C	0.012 % of rdg.+ 0.15 °C

For negative temperatures, use the value displayed (of rdg.) and not its absolute value.

- Temperature coefficient: < 10 % of precision/°C.
- The above precision is given for a 4-wire connection to the gauge.
- You should also take into consideration the actual error of the temperature sensor used, as well as the conditions of its setup.
- These specifications are given for a measurement current of 0.1 mA to 1mA in direct current mode.

F.3 Power supply - Autonomy

The SIKA UC RTD is designed to function either with four 1.5V AA batteries or with a 4.8V battery pack.

The following autonomies are given for information.

Mode	Resistance measurement	Resistance simulation	Standby-Modus
Autonomy	40 h	33 h	> 95 days