Operating manual

Operating manual .....page 1 - 46

Monofunction simulator

Type UC TC.2



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Please keep this operating manual for future reference.
If the device is resold, please provide the operating manual along with it.

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0 About this operating manual

- The operating manual is aimed at specialists and semi-skilled personnel.
- Before each step, read through the relevant advice carefully and keep to the specified order.
- Thoroughly read and understand the information in the section “Safety”.

If you have any problems or questions, please contact your supplier or contact us directly at:

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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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Contents checks

The UC TC.2 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 guide
- 4 AA batteries (1.5V).
- 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.

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1 General

1.1 Introduction

The UC TC.2 is a portable thermocouple temperature calibrator (compliant with EC standards). It is especially designed for calibration and maintenance. It makes it possible to measure and to emit electrical measurements and to simulate temperatures both on site as well as in a laboratory. It performs voltage and temperature measuring and emission functions (continuous or LF ramps).

The UC TC.2 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 miniature flat plug.
- Power supply via 4 AA batteries or rechargeable batteries with internal charger (Option).

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

1.2 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

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1.3 Safety

1.3.1 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.

1.3.2 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).

1.3.3 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.

1.3.3.1 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.

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1.3.4 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.

1.3.5 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.

1.3.6 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...).

Never exceed the protection value limits indicated in the specifications.

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.

1.3.7 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.

1.3.8 Definitions

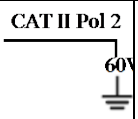
1.3.8.1 Definition of the category and degree of pollution

CAT II 60V:
This notion of categories determines the maximum voltage which can be applied to the measuring inputs (it is also referred to as the overvoltage category). For the UC TC.2, the ceiling overvoltage is (DC or AC)

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

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1.3.8.2 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

1.4 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.

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2 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.

2.1 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.



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2.1.1 The 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.



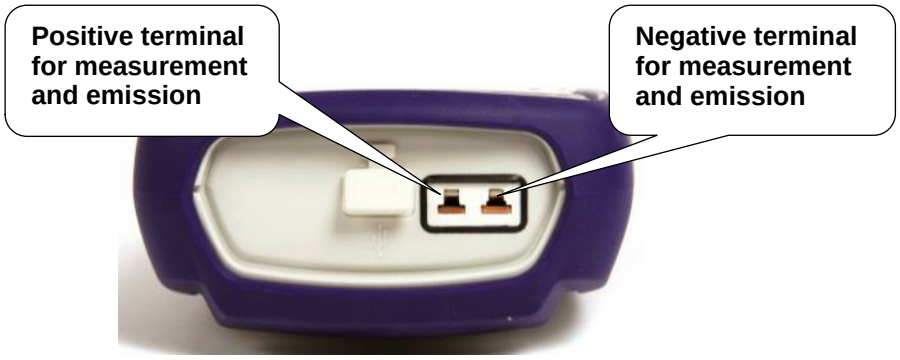
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2.1.2 The measuring and simulation terminals

The UC TC.2 is fitted with 2 safety bushes (4 mm in diameter) and a miniature flat plug for thermo-couples. This wiring is used both in measurement and emission mode (non-simultaneous).





2.1.3 The USB connector

The UC TC.2 is fitted with a USB connector (mini B) intended for uploading new software versions and device adjustment.

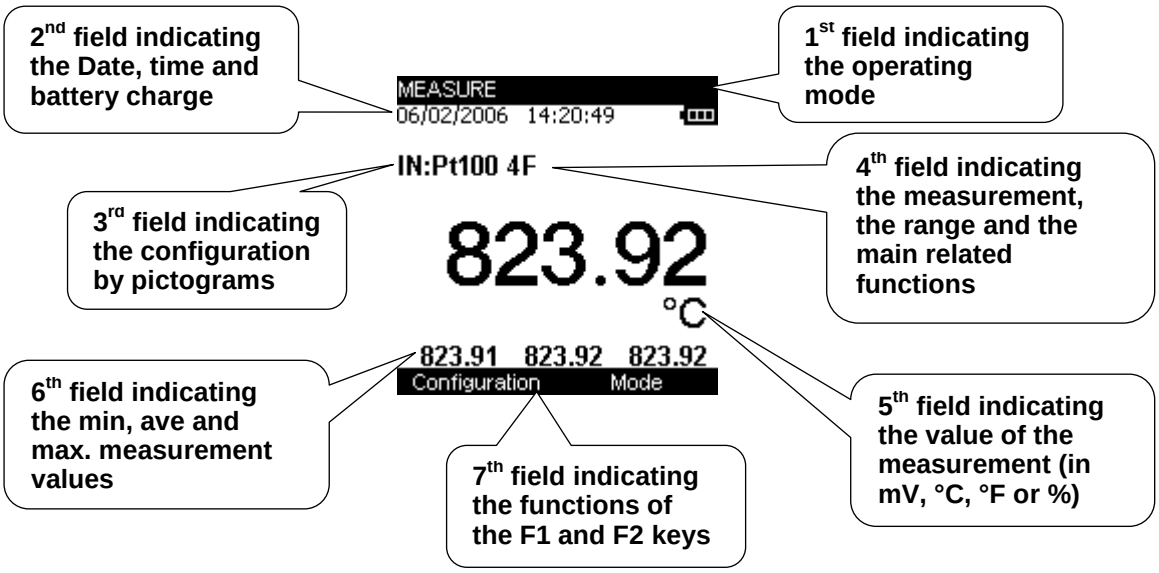


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2.1.4 The screen

The UC TC.2 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 or 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 gauge and certain related functions.
- The 5th field indicates the value of the measurement or of the emission. These values are expressed in mV, °C, °F or as a %.
- The 6th field indicates (in measurement mode) the min., average and max. values of the measurement.
- Lastly, the 7th field indicates the functionality 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
	%PE function (**P**leine **E**chelle: Full Scale)
	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)

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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

2.1.5 Getting started (after power-up)

On power-up (inserting the batteries or pack of batteries), 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.

2.1.6 Operating modes

There are 2 different operating modes:

- Thermocouple measurement (displayed in mV or °C or °F),
- Simulation of thermocouple/voltage emission (value displayed in mV or °C or °F).

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

2.1.6.1 Constant voltage measurement

Range	**+100mV**
Resolution (display)	1 µV or 0.01 °C or 0.01 °F
Scope of range	-10 mV to + 100 mV
Scaling	yes

2.1.6.2 Voltage emission

Range	**+ 80 mV**
Resolution (display)	1 µV or 0.01 °C or 0.01 °F
Scope of range	-9.5 mV to +80 mV
Scaling	yes

2.1.6.3 Electrical characteristics not to be exceeded.

Function	**Range**	**max V_{in}**	**Z_{load}**
$U_{measurement}$	**100 mV**	**60 V**	
$U_{emission}$	**80 mV**		**1000 Ω min**

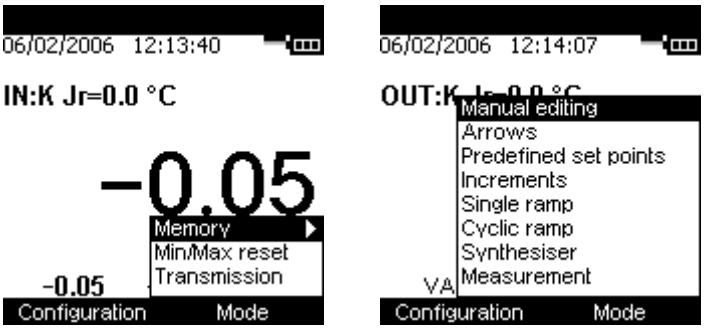
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3 Mode Programming

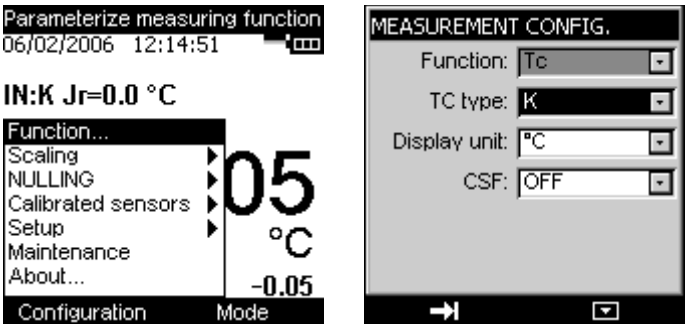
3.1.1 Voltage or temperature measurement by thermocouple

- 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 that the Measurement mode is the mode selected by default.

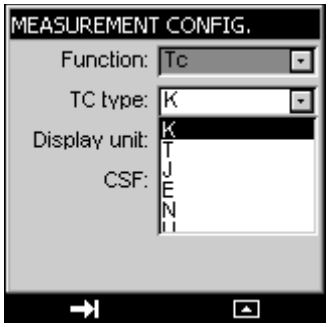


- The function type selection (Thermocouple type) is made using the **F1** key **(Configuration** menu**)**.
- Using the navigation keys *(*↑ and ↓*)*, position the cursor in the **Function** field.
- Confirm the latter using the **VAL** key.



In the **CONFIGURATION MESURE (MEASUREMENT CONFIGURATION)** menu, position the cursor in the **thermo** c**ouple** field using the **F1** key.

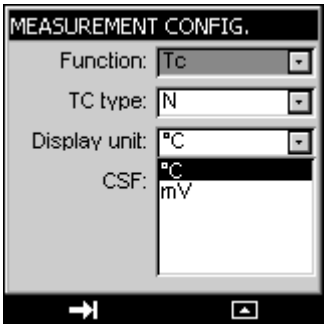
- Enter the **thermo couple** menu using the **F2** key**.**
- Choose the type of thermocouple (**K,T, J…**), using the navigation keys *(*↑ and ↓*)*.



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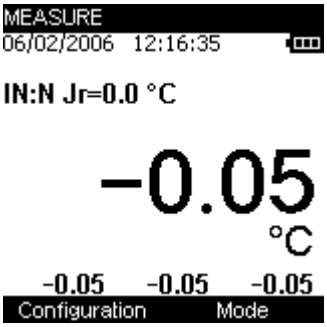
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- Press **VAL** to confirm.
- Using the F1 key, define the **Unit** by positioning the cursor on it.
- Enter the menu by pressing **F2**.
- Using the navigation keys *(*↑ and ↓*)*, choose the unit.
- Press **VAL** to confirm.



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

- Using the F1 key, define the CSF used by positioning the cursor on it.
- Enter the menu by pressing **F2**.
- Using the navigation keys *(*↑ and ↓*)*, choose the CSF (**OFF**: None, **ON**: internal or **programmed**).
- Press **VAL** to confirm.
- Press VAL (again) to confirm the desired function and go back to the measurement screen.



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

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

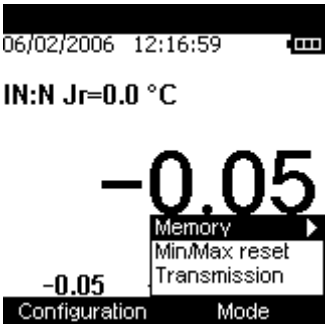
Note:
Following a significant thermal shock, it is advisable to allow the device to stabilise its temperature to use the internal reference junction (CSF) with the utmost precision.

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3.1.2 Voltage or temperature emission by thermocouple

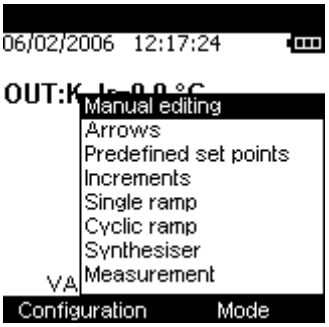
To access the **Emission** mode:

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



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

- Continuous (manual or arrows or default editing).
- Incremental (by step or “manual default”).
- By single ramp (only one ramp emitted).
- By cyclic ramp.
- Synthesiser ("automatic default”).



→ Voltage or temperature generation/manual editing?

- Press the F2 key to display the edit menu.
- Using the navigation keys (↑ and ↓), choose the **Manual edit** mode and confirm (**VAL** key).
- Press **VAL** again and enter your value using the navigation keys:
  - o ↑ and ↓ to increase or decrease the value
  - o ← and → to select the digit to modify (hundreds/tens/unit/decimal place/hundreds).

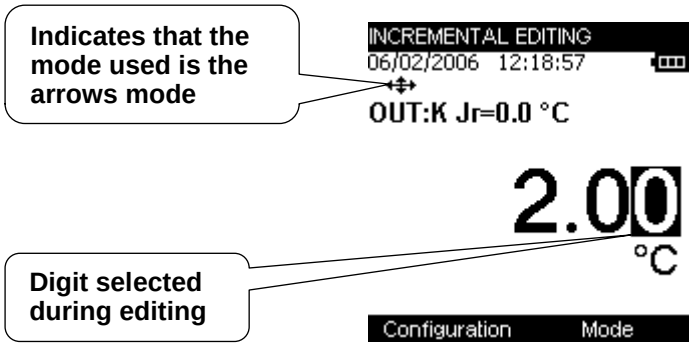
Note:
If the Scaling mode is **ON**, the value to edit is expressed as a %, otherwise this value is expressed in Volts or in °C or °F.

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→ Voltage or temperature generation/arrow editing?

- 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 (hundreds/tens/unit/decimal place/hundreds).



→ Voltage or temperature generation/incremental editing?

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

The values emitted are those defined in the **CONFIGURATION/RAMP** menu (see the chapter entitled Related functions).

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

→ Voltage or temperature generation/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 (see the chapter entitled Related functions).

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

→ Voltage or temperature generation/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 (see the chapter entitled Related functions).

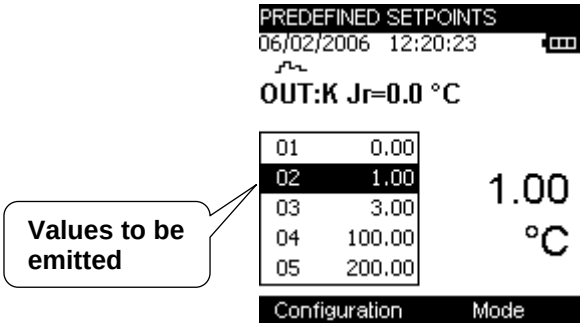
- Using the navigation key (↑), start the automatic increases phase (following the parameters programmed in the **CONFIGURATION/RAMP** menu).
- Using the navigation key (↓), you can decrease automatically starting from the max. programmed voltage (or temperature).
- Using the navigation key (→), you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

→ Voltage or temperature generation/default editing?

The default emission mode is a mode that makes it possible to generate manually the values stored for the synthesiser function.

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



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

→ Voltage or temperature generation/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** menu (see the chapter entitled Related functions).

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

The configuration of the parameters for the ramps and default values is explained in the chapter entitled “Related Functions”.

Notes:

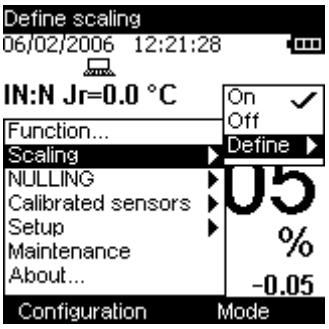
Following a significant thermal shock, it is advisable to allow the device to stabilise its temperature to use the internal reference junction (CSF) with the utmost precision.

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4 Related Functions

4.1 Scaling

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).

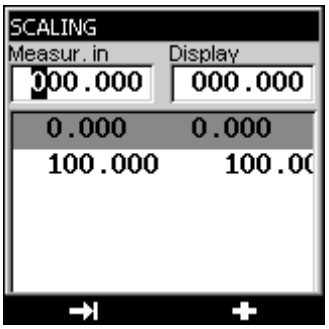
In measurement mode: X = Value measured
Y = Value displayed

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:

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

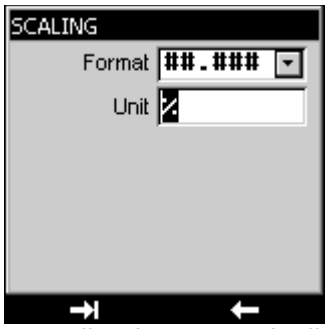
Use the function keys to edit the points:
To add a line: enter X and Y, then enable the ➕ function key.
To select a line in a list, use the Up and Down navigation keys.
To delete a selected line, use the ✂ key.
To move from one field to the next, use the ⇥ key.



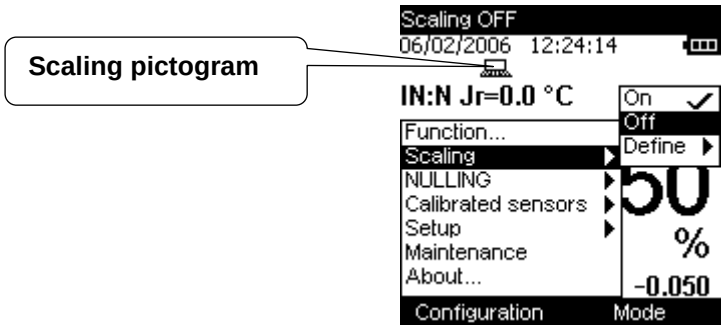
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The **Define/parameters** menu makes it possible to define the format (Number of digits displayed) and unit.

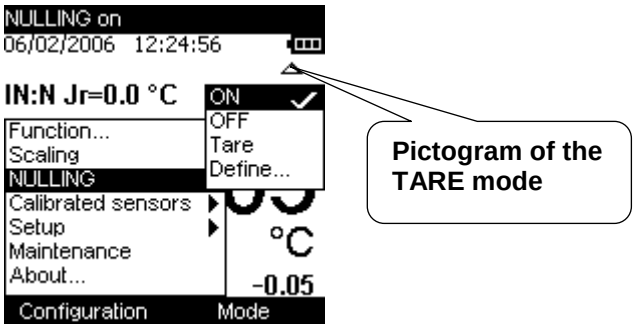


Once the parameters have been set, the scaling is automatically enabled. To disable it, enter the **Configuration/Scaling** menu, select **OFF** and confirm by pressing the **VAL** key.



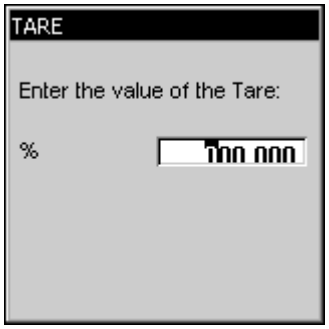
4.2 Nulling

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 **NULL/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

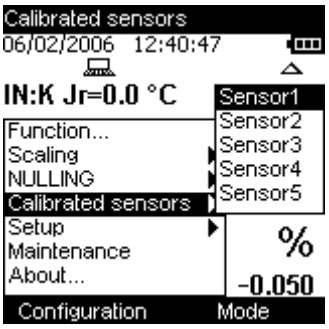


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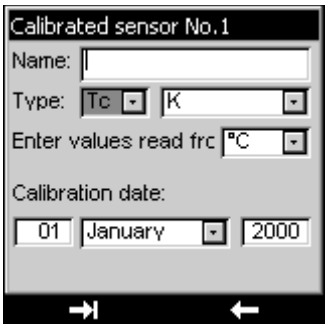
4.3 Calibrated sensors

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.

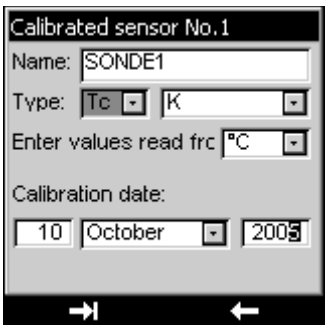
- Using the F1 key, enter the Configuration menu.
- Select the **Calibrated Sensors** function, followed by one of the 5 available sensors.



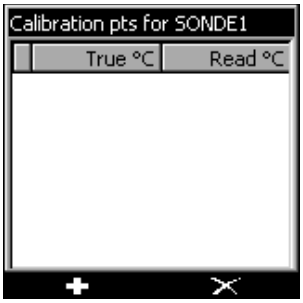
- Confirm (**VAL** key).



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



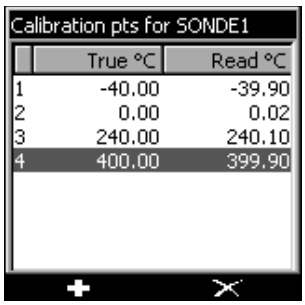
- Confirm your choice using the **VAL** key.



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- 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).

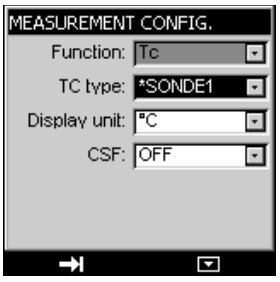


To delete a line, select it then use the key.
To edit a line, select it then use the navigation key (→) to make editing possible.

- 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.

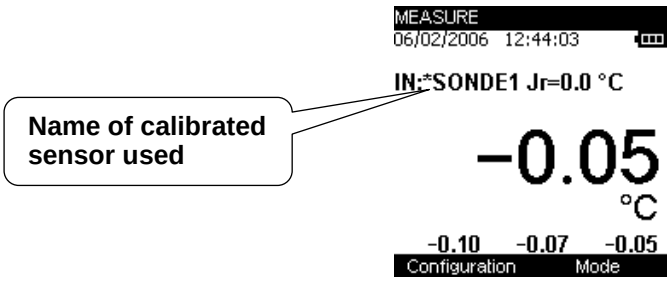
- In the **thermocouple** field, select sensor1 (SONDE1-SENSOR1 below).



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.

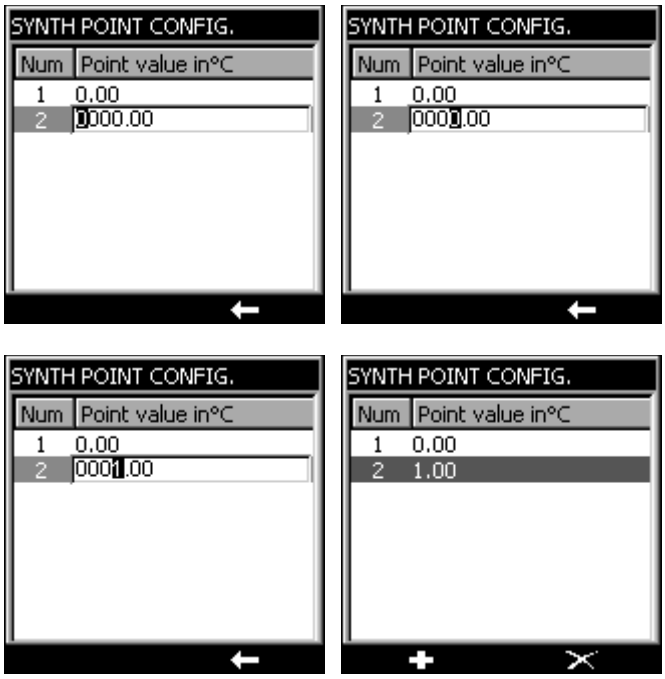


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4.4 Configuration of predefined set points

The configuration of default value 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.

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4.5 Storage of acquisitions in progress

The UC TC.2 is designed to store 10000 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:

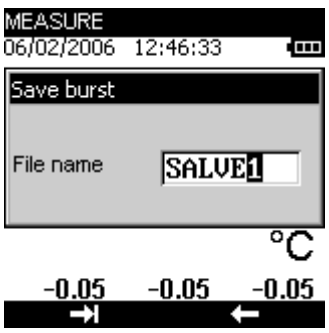
REC.MEASUREMENT:
Enable the triggering of an acquisition on a case-by-case basis.

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



If you wish to save it, 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.

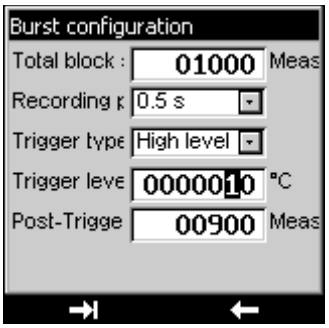
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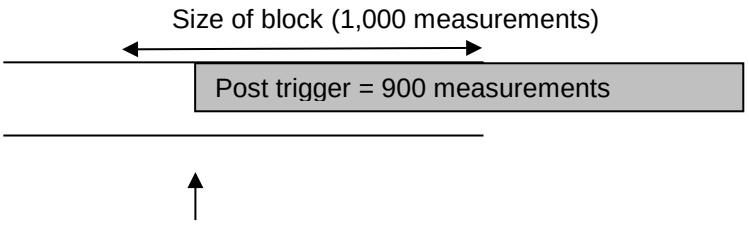
RUN:
Launches the storage of data following the parameters set in the “parameters” function. The pictogram is displayed on the measurement screen

STOP:
Stops the storage in progress.

PARAMETERS:
Allows you to define:
the size of the acquisition (max 10,000 values),
the sampling period from 0.5 S to 30 Min,
and the type of trigger (None, low level, high level).

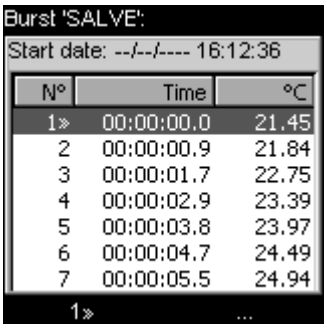
If you have selected a low level or high level trigger, you must define the trigger level and the number of data to record after this trigger (Post-trigger).





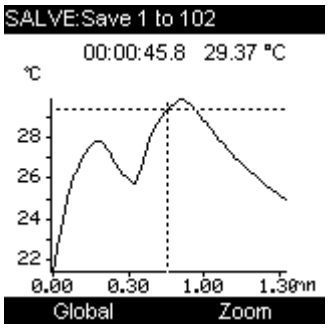
Trigger on programmed value = 10°C

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

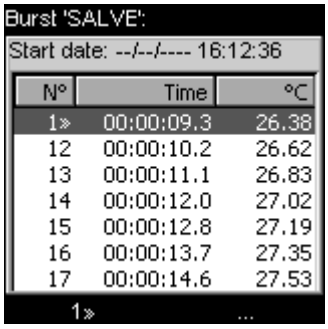


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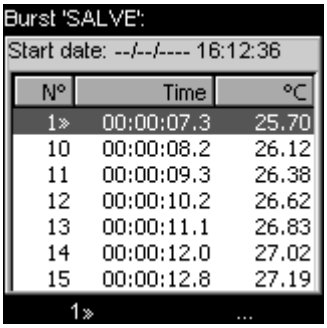
At this level, it is possible to
- display the trend curve entirely: press the F2 key (GRAPH).

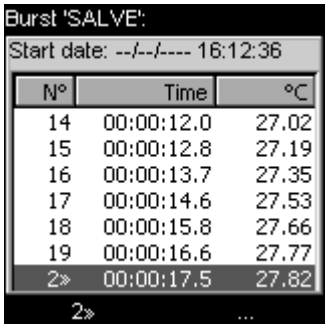


- or place markers so as to display in the form of a graph all the values included between these 2 markers. To do so, press the F2 key (…).



- 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>>).

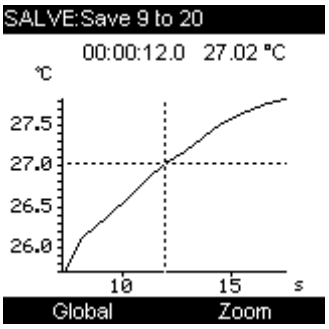




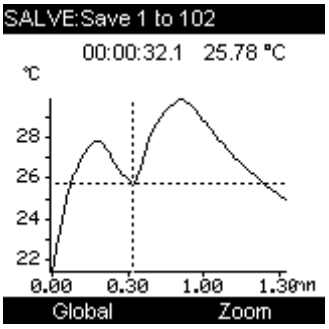
In this particular example, the graph will display values included between positions 10 and 20.

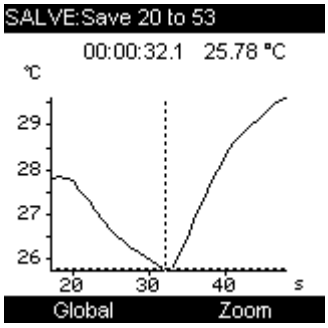
- Press the F2 key twice (…), to reach the **GRAPH** function, then press F2 to confirm.

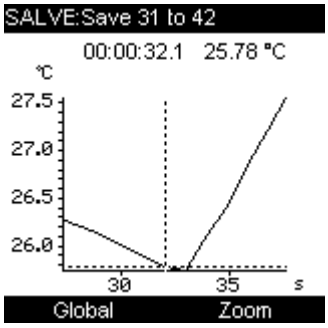
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At this level, you can display the whole curve or a zoom around the cursor. The cursor is moved using the navigation keys(← and →)



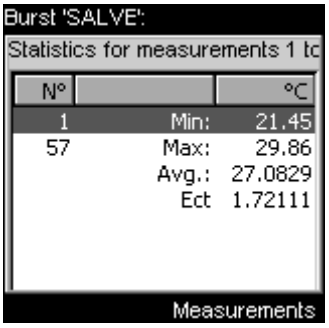




- Press **CLEAR** to return to the table of values.

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

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



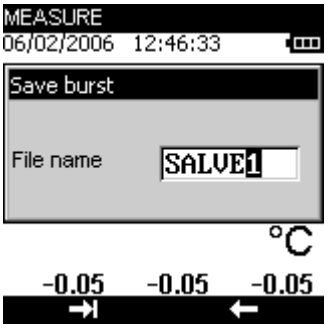
- Press F2 (measurements) to return to the table of values.
- Press **CLEAR** to quit the storage function.

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Record 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 entered



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

Open 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.

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

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

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.

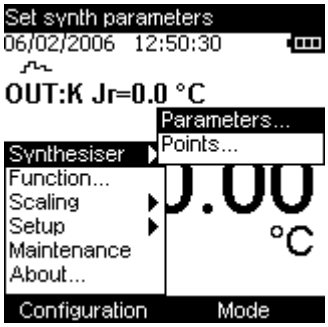
4.5.1 Synthesiser configuration

4.5.1.1 Configuration of synthesiser points

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

4.5.1.2 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



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



This screen allows you to configure the emission:

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

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

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

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

Time frame:
This is the time lapse between 2 repetitions.

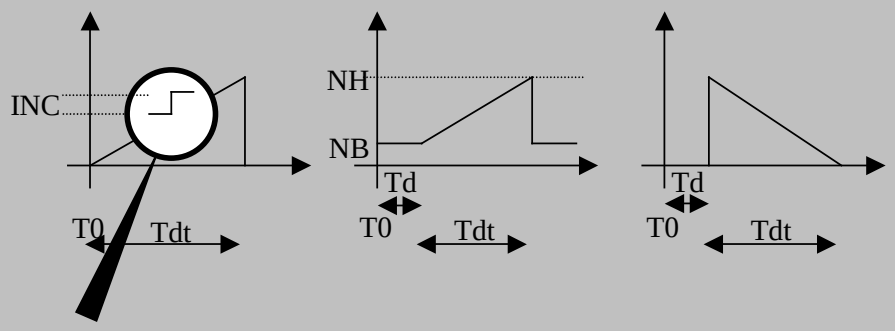
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4.5.2 Configuration of the ramp generation

The CONFIGURATION/RAMP menu is used for the generation of ramps by increases, single or cyclic.

→ Ramp by increases configuration?
The figure below illustrates the type of single ramp that can be generated and their parameters:

Programming parameters in **Increases** mode



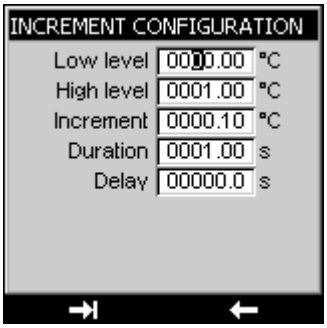
To : time pressing the generation start key
Td : **Time frame**
Tdt : **Duration**
NB : **Low Level**
NH : **High Level**
INC : **Increase** (value of increase as a %, in mVolt, °C or °F)

The **LOW level** and **HIGH level** levels are expressed:

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

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.

The **Time frame** 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 move to the next field.

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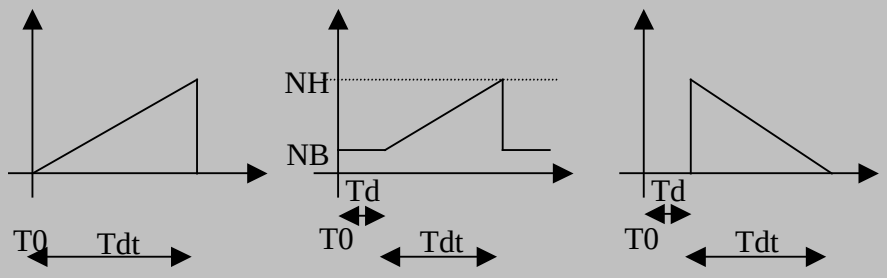
Use the navigation keys to enter the value:

- As a percentage of the gauge if the scaling mode is ON.
- ↑ and ↓ to increase or decrease the value
- ← and → to choose the hundreds/tens/units/decimal place/hundreds/thousands.

Press **VAL** to save the parameters.
To quit the menu without saving, press **CLEAR**.

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

Programming parameters in **Single Ramp** mode



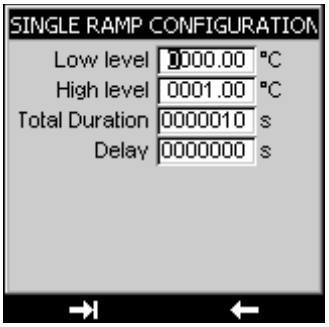
To : time pressing the generation start key
Td : **Time frame**
Tdt : **Total Time**
NB : **Low Level**
NH : **High Level**

The **LOW level** and **HIGH level** levels are expressed:

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

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 **Time frame** 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. Attention: the appropriate function mode must be programmed (**INCREASES** mode) to access the **CONFIGURATION/RAMP/SINGLE** menu.

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In the **CONFIGURATION/RAMP/SINGLE** menu, use the **F2** key to go to the next field.

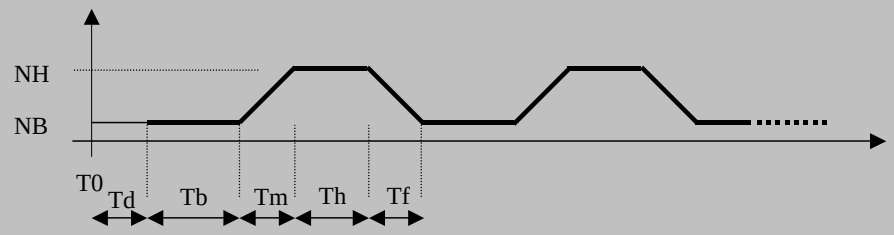
Use the navigation keys to enter the value:

- As a percentage of the gauge if the scaling mode is ON.
- ↑ and ↓ to increase or decrease the value
- ← and → to choose the hundreds/tens/units/decimal place/hundreds/thousands.

Press **VAL** to save the parameters.
To quit the menu without saving, press **CLEAR**.

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

Programming parameters in **Cyclic ramp** mode



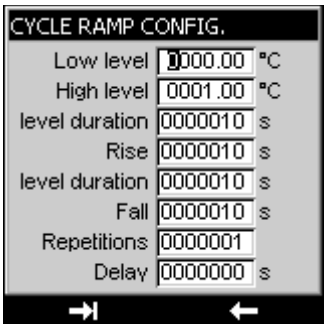
To : time pressing generation start key
Td : **Time frame**
Tb : **Low duration**
Tm : **Rise** (rise time)
Th : **High duration**
Tf : **Drop** (drop time)
NB : **Low Level**
NH : **High Level**

The **LOW level** and **HIGH level** levels are expressed:

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

The **Low Duration**, **Rise**, **High Duration**, **Drop** and **Time frame** durations are expressed in seconds. The max duration is limited to 1000s.

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



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Use the **F2** key to access the **CONFIGURATION/RAMP** menu. Attention: 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 increase or decrease the value
- ← and → to choose the hundreds/tens/units/decimal place/hundreds/thousands.

Press **VAL** to save the parameters.
To quit the menu without saving, press **CLEAR**.

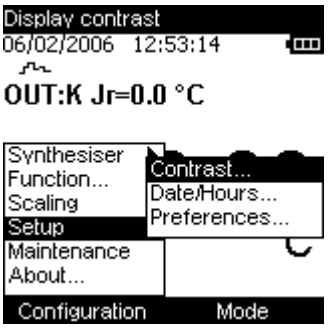
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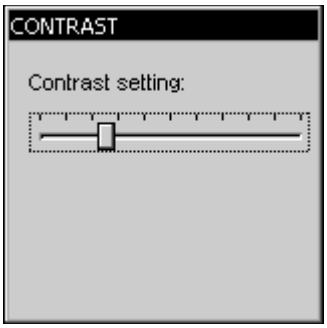
5 Parameter settings

5.1 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.





5.2 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/Time** 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.

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5.3 “Preferences” setting

5.3.1 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 and 2s). Select these values using the navigation keys (↑ and ↓).
- Confirm by pressing the VAL key.

5.3.2 Display resolution setting

In the **CONFIGURATION/SETUP/PREFERENCE** 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 **Resolution** field by pressing the F1 key.

Three types of resolution are available: high (res=1µV), medium (res=10µV) and low (res=100µV).

- Select this resolution using the navigation keys (↑ and ↓).
- Confirm by pressing the VAL key.

5.3.3 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** 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.
- Choose the manual or timed mode using the navigation keys (↑ and ↓).
- Confirm by pressing the VAL key.

5.3.4 “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 Beeping** field using the F1 key.
- Using the navigation keys (↑ and ↓), select the **ON** or **OFF** mode then confirm by pressing the VAL key (if the parameter settings are completed or go to the next field using the F1 key).

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5.3.5 Language setting

In the **CONFIGURATION/SETUP/PREFERENCES** menu, the interface language can be selected from French, English, German, 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.
- Using the navigation keys (↑ and ↓), select your desired language then confirm by pressing the VAL key (if the parameter settings are completed or go to the next field using the F1 key).

5.3.6 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 **TEMP unit** field using the F1 key.
- Using the navigation keys (↑ and ↓), select the desired unit then confirm by pressing the VAL key.

5.4 “Maintenance” menu

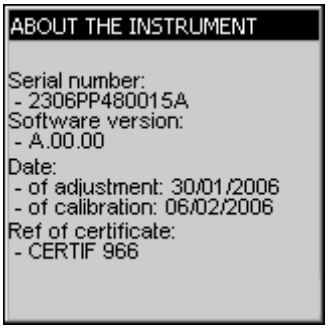
Not accessible to the user:
Consult SIKA who will indicate the procedure to follow for maintenance services.

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5.5 “About the instrument” menu

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

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



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6 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:

- 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 preheating.

Following a significant thermal shock, it is advisable to allow the device to stabilise its temperature to use the internal reference junction (CSF) with the utmost precision.

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

6.1 Measurement Function

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

6.1.1 Constant voltage (measurement)

The voltage measurement is made by configuring the device as follows:

Thermocouple: indifferent.
Unit: mV.
CSF: OFF.

Range	Scope of measurement	Resolution	Precision
100 mV	-10 mV up to 100mV	1 µV	0.020 % of rdg. + 3 µV

- Temperature coefficient < 15 ppm of rdg. /°C from 0°C to 18°C and from 28°C to 50 °C.
- R_{in} = 1 MΩ

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6.1.2 Temperature per thermocouple (measurement)

Type of sensors:
- Standardised in accordance with CEI 584-1/1995 (Thermocouples K, T, J, E, S, B, N).
- In accordance with Din 43710 (thermocouples U and L).
- In accordance with the HOSKINS table (thermocouple C).
- In accordance with the ENGELHARD table (platinum thermocouple).

Sensor	Scope of measurement	Resolution	Accuracy
K	-250 up to -200 °C -200 up to -120 °C -120 up to -50 °C -50 up to 1372 °C	0.20 °C 0.10 °C 0.05 °C 0.05 °C	0.90 °C 0.3 °C 0.02 % of rdg. + 0.12 °C 0.02 % of rdg. + 0.11 °C
T	-250 up to -200 °C -200 up to -50 °C -50 up to 400 °C	0.2 °C 0.05 °C 0.05 °C	0.80 °C 0.25 °C 0.02 % of rdg. + 0.09 °C
J	-210 up to -200 °C -200 up to -120 °C -120 up to 60 °C 60 up to 1200 °C	0.05 °C 0.05 °C 0.05 °C 0.05 °C	0.30 °C 0.25 °C 0.020 % of rdg. + 0.11 °C 0.020 % of rdg. + 0.09 °C
E	-250 up to -200 °C -200 up to -100 °C -100 up to 450 °C 450 up to 1000 °C	0.1 °C 0.05 °C 0.05 °C 0.05 °C	0.55 °C 0.20 °C 0.020 % of rdg. + 0.07 °C 0.020 % of rdg. + 0.05 °C
R	-50 up to 150 °C 150 up to 550 °C 550 up to 1768 °C	0.50 °C 0.20 °C 0.10 °C	0.95 °C 0.40 °C 0.020 % of rdg. + 0.30 °C
S	-50 up to 150 °C 150 up to 550 °C 550 up to 1768 °C	0.5 °C 0.2 °C 0.1 °C	0.85 °C 0.020 % of rdg. + 0.4 °C 0.020 % of rdg. + 0.3 °C
B	400 up to 900 °C 900 up to 1820 °C	0.2 °C 0.1 °C	0.95 °C 0.50 °C
U	-200 up to -100 °C -100 up to 600 °C	0.05 °C 0.05 °C	0.35 °C 0.20 °C
L	-200 up to -100 °C -100 up to 900 °C	0.05 °C 0.05 °C	0.30 °C 0.20 °C
C	-20 up to 900 °C 900 up to 2310 °C	0.1 °C 0.1 °C	0.30 °C 0.020 % of rdg.+ 0.15 °C
N	-240 up to -190 °C -190 up to -110 °C -110 up to 0 °C 0 up to 1300 °C	0.2 °C 0.1 °C 0.05 °C 0.05 °C	0.60 °C 0.25 °C 0.15 °C 0.020 % of rdg. + 0.07 °C
Platinum	- 100 up to 1400 °C	0.05 °C	0.3 °C
Mo	0 up to 1375 °C	0.05 °C	0.020 % of rdg. + 0.10 °C
NiMo/NiCo	- 50 up to 1410 °C	0.05 °C	0.020 % of rdg. + 0.35 °C

The precision is guaranteed for a reference junction (JR) at 0 °C.
With the use of the internal JR (except for thermocouple B), add an additional uncertainty of 0.3 °C to 0 °C. For the other temperatures, it is a good idea to take into consideration the sensitivity of the thermocouple at the temperature (T) considered, namely an additional uncertainty of 0.3 °C * S(0°C)/S(T).

- Temperature coefficient: < 10 % of rdg/°C.
- You can, except for thermocouple B, choose the location of the reference junction (JR) by programming it on the keyboard:
  - o external at 0°C,
  - o internal (temperature compensation at the device terminals).
  - o by programming the temperature.

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6.2 Emission function

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

6.2.1 Constant voltage simulating

The voltage emission is made by configuring the device as follows:

Thermocouple: indifferent.
Unit: mV.
CSF: OFF.

Range	Scope of measure-ment	Resolution	Accuracy
80 mV	-9.5 mV up to 80 mV	1 µV	0.020 % of rdg. + 3 µV

- Temperature coefficient < 10 ppm of rdg. /°C from 0°C to 18°C and from 28°C to 50 °C.
- Internal resistance: R_{in} = 1 MΩ

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6.2.2 Temperature per thermocouple (simulating)

Type of sensors:
- Standardised in accordance with CEI 584-1/1995 (Thermocouples K, T, J, E, S, B, N).
- In accordance with Din 43710 (thermocouples U and L).
- In accordance with the HOSKINS table (thermocouple C).
- In accordance with the ENGELHARD table (platinum thermocouple).

Sensor	Scope of measurement	Resolution	Accuracy
K	-240 up to -50 °C -50 up to 120 °C 120 up to 1372 °C	0.20 °C 0.10 °C 0.05 °C	0.80 °C 0.30 °C 0.020 % of rdg. + 0.11 °C
T	-240 up to -100 °C -100 up to -40 °C -40 up to 400 °C	0.20 °C 0.05 °C 0.05 °C	0.50 °C 0.25 °C 0.020 % of rdg. + 0.10 °C
J	-210 up to 50 °C 50 up to 500 °C 500 up to 1200 °C	0.05 °C 0.05 °C 0.05 °C	0.35 °C 0.020 % of rdg. + 0.11 °C 0.020 % of rdg. + 0.09 °C
E	-240 up to -100 °C -100 up to 40 °C 40 up to 1000 °C	0.1 °C 0.1 °C 0.05 °C	0.55 °C 0.20 °C 0.020 % of rdg. + 0.06 °C
R	-50 up to 350 °C 350 up to 900 °C 900 up to 1768 °C	0.50 °C 0.20 °C 0.10 °C	0.95 °C 0.5 °C 0.020 % of rdg. + 0.30 °C
S	-50 up to 350 °C 350 up to 900 °C 900 up to 1768 °C	0.50 °C 0.20 °C 0.10 °C	0.90 °C 0.020 % of rdg. + 0.40 °C 0.020 % of rdg. + 0.30 °C
B	400 up to 850 °C 850 up to 1820 °C	0.20 °C 0.10 °C	0.95 °C 0.50 °C
U	-200 up to -70 °C -70 up to 600 °C	0.05 °C 0.05 °C	0.35 °C 0.20 °C
L	-200 up to -70 °C -70 up to 900 °C	0.05 °C 0.05 °C	0.30 °C 0.25 °C
C	-20 up to 900 °C 900 up to 2310 °C	0.10 °C 0.10 °C	0.35 °C 0.020 % of rdg.+ 0.15 °C
N	-240 up to 10 °C 10 up to 250 °C 250 up to 1300 °C	0.20 °C 0.10 °C 0.05 °C	0.90C 0.20 °C 0.020 % of rdg. + 0.09 °C
Platinum	- 100 up to + 1 400 °C	0.05 °C	0.35 °C
Mo	+ 0 up to + 1 375 °C	0.05 °C	0.25 °C
NiMo/NiCo	- 50 up to + 1 410 °C	0.05 °C	0.020 %of rdg. + 0.35 °C

The precision is guaranteed for a reference junction (JR) at 0 °C.
With the use of the internal JR (except for thermocouple B), add an additional uncertainty of 0.3 °C to 0 °C. For the other temperatures, it is a good idea to take into consideration the sensitivity of the thermocouple at the temperature (T) considered, namely an additional uncertainty of 0.3 °C*S(0 °C)/S(T).

- Temperature coefficient: < 10 % of rdg/ °C.
- You can, except for thermocouple B, choose the location of the reference junction (JR) by programming it on the keyboard:
  - external at 0 °C,
  - internal (temperature compensation at the device terminals).
  - by programming the temperature.

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6.3 Power supply – Autonomy

The SIKA UC TC.2 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

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