

Operating Manual

Monofunction simulator

Type SSG-1

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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Hazard signs and other symbols used:



CAUTION! Electric current!

This sign indicates dangers which could arise from handling of electric current.



WARNING! / CAUTION! Risk of injury!

This sign indicates dangers that cause personal injuries that can lead to health defects or cause considerable damage to property.



CAUTION! Material damage!

This sign indicates actions which could lead to possible damage to material or environmental damage.



ADHERE TO OPERATING MANUAL!



NOTICE!

This symbol indicates important notices, tips or information.



NO DOMESTIC WASTE!

The device must not be disposed of together with domestic waste.



Pay attention to and comply with information that is marked with this symbol.



Follow the specified instructions and steps.
Adhere to the given order.



Check the specified points or notices.

→ Reference to another section, document or source.

- Item.

Thank you for choosing this SELI precision measuring instrument, which incorporates our extensive experience in the manufacture of precision measuring appliances, which spans over more than a century.

We are thus able to continue our policy of constant innovation which has served our customers so well for more than 100 years. SELI welcomes any comments or suggestions you might have to enable us to perfect our know-how and make our future products even better.

LIMIT OF WARRANTY AND LIABILITY

SELI guarantees this product against defective materials and faulty manufacture under normal conditions of use and maintenance. The warranty lasts one year and takes effect on the date of shipping. Parts, repairs to the product and services are guaranteed for 90 days. This warranty only applies to the original purchaser or the end-user if the end-user is the customer of an SELI-approved distributor, and it does not apply to the fuses, interchangeable batteries or any product which, in the opinion of SELI, has been handled roughly, modified, neglected, damaged accidentally or subjected to abnormal utilization and handling conditions.

SELI-approved distributors shall apply this warranty to new and unused products sold to their customer, but they are not authorized to apply a more extensive or a different warranty in the name of SELI. The warranty support is offered if the product has been purchased through an SELI-approved point of sale or if the purchase has paid the applicable international price. SELI reserves the right to bill the purchaser for the costs of importing repair or replacement parts if the product purchased in a given country has been sent to another country for repair.

The warranty commitment of SELI is limited, at the choice of SELI, to reimbursement of the purchase price or the repair/replacement free of charge of a defective product returned within the warranty period to a servicing centre approved by SELI.

If you wish to apply invoke the warranty, contact the nearest SELI agency or send the product along with a description of the problem, carriage and insurance paid (free to shipping destination), to the nearest SELI-approved servicing centre. SELI declines all responsibility for damage incurred in transport. After repair under warranty the product will be returned to the purchaser, carriage expenses paid in advance (free to shipping destination).

If SELI judges that the problem has been caused by mistreatment, a modification, an accident or abnormal operating or handling conditions, SELI will submit a quotation for the cost of repair and will not begin the repair until it has been authorized to do so. After repair, the product will be returned to the purchaser, carriage expenses paid in advance, and the costs of repair and carriage will be invoiced to the purchaser.

THIS WARRANTY IS EXCLUSIVE AND REPLACES ALL OTHER WARRANTIES, WHETHER EXPLICIT OR IMPLICIT, INCLUDING, BUT NOT EXCLUSIVELY, ANY IMPLICIT WARRANTY CONCERNING THE FITNESS OF THE PRODUCT TO BE SOLD OR USED FOR A PREDETERMINED PURPOSE OR USE. SELI SHALL NOT BE HELD RESPONSIBLE FOR ANY SPECIFIC, INDIRECT OR ACCIDENTAL OR SUBSEQUENT DAMAGE OR LOSS OF DATA, WHETHER FURTHER TO INFRINGEMENT OF THE WARRANTY OBLIGATIONS, ON A CONTRACTUAL, NON-CONTRACTUAL OR OTHER BASIS.

Given that certain countries or states do not accept the limitations of an implicit warranty condition, or the exclusion or limitation of accidental or subsequent damage, the limitations and exclusions of this warranty may not apply to each buyer. If any provision of this warranty is considered invalid or inapplicable by a competent court, such a decision will in no way affect the validity or enforceable nature of any other provision.

Verification of content

The SSG-1 has been mechanically and electrically verified before shipping. The necessary precautions have been taken for it to reach the user undamaged.

It is nevertheless wise to make a quick check for any damage that might have been incurred in transport. If such is the case, immediately make the usual reservations with carrier.

The following standard accessories are supplied:

- This user manual
- Four 1.5V AA batteries
- A wrist-strap
- A protective sheath
- 2 test leads
- 2 croco clips

In case of return shipping, it is preferable to use the original packaging and to indicate the reasons for returning the instrument as clearly as possible in a note enclosed with the instrument.

1 General

1.1 Introduction

The SSG-1 is a hand-held process calibrator (conforming to EC standards). It is more particularly intended for calibration and maintenance. It can measure and generate electrical quantities either on site or in the laboratory. It fulfils voltage and current measuring and generation functions (DC or LF ramp signals) and a continuity test (on passive loop).

Owing to its monitoring (regulation) mechanism in transmission mode, the instrument cannot take measurements and transmit simultaneously.

The SSG-1 features numerous associated functions that extend its range of applications:

- Display of results in accordance with a linear conversion law or not.
- Generation of increments, single or cyclic ramp signals.

Its utilisation is facilitated by a series of improvements:

- Fast access to all the functions.
- Intuitive user interface.
- Graphic display of 160x160 pixels.
- Connection by 4-mm safety sockets.
- Powered by 4 AA batteries or a rechargeable battery pack with fast internal charger (option).

The instrument is enclosed in an ABS casing with an elastomer sheath (option).

1.2 General characteristics

- Hand-held instrument energized by 4 AA batteries (1.7 Ah Ni-MH battery pack on option).
- Operating time: 10 to 40 hours, depends on used function.
- Wrist-strap for carrying and use on sites
- Graphic 160 x 160 pixel liquid crystal display (LCD).
- Choice of language of the messages and programming functions, ranges and parameters on 6-key keypad + 1 navigator.
- Display backlighting accessible via the keypad, with the possibility of programming automatic extinction after a given period of inactivity.
- Presentation: ABS casing (elastomer sheath on option).
- Dimensions: 157 mm x 85 mm x 45 mm (without sheath).
- Weight: 306 g without sheath.
- Sealing IP54 in accordance with standard EN 60529.

1.3 Safety

1.3.1 Conformity with safety standards

The instrument complies with the standards in effect concerning both electrical safety (EN 61010) and electromagnetic compatibility of electrical measuring equipment (EMC: EN61326).

This user's manual contains information and warnings that must be adhered to in order to protect the user against the hazards of electric current, ensure safe operation of the appliance, and protect it against incorrect manipulations that could damage it or be detrimental to its safety of use.

1.3.2 Climate conditions

- Per publication CEI 359: operating category I.
- Standards application envelope from 0 to 2 200 m.
- Reference envelope: 23°C ± 5°C, relative humidity: 45% to 75%.
- Nominal operating envelope: -10°C to +50°C, relative humidity: 20% to 80% non-condensing.
- Extreme operating envelope: -15°C to +55°C, relative humidity: 10% to 80% (70% at 55°C).
- Extreme storage and transport envelope: -30°C to +60°C (without AA batteries or rechargeable battery pack).

1.3.3 Disposal of instrument at end of life

When the instrument reaches the end of its life we recommend that you dispose of it using the specialized waste disposal channels available in your region, and not the ordinary waste collection service, as the instrument contains elements that are environmental pollutants. Failing this, you can return the instrument to our company which will dispose of it free of charge.

List of classified waste materials in accordance with the decree published in the Official Journal of April 20, 2002. Decree No. 2002-540.

- **16.02.14: Waste from electronic equipment:**
→ Electronic boards incorporated in the instrument.
- **16.06.02: Cells and batteries (dangerous)**
→ Alkaline batteries (or NI-MH batteries).
- **15.01.02: Packaging**
→ Instrument casing in ABS plastic.
→ Elastomer protective sheath.

1.3.4 Instrument destruction procedure

To open the instrument: unscrew first the battery compartment cover screw, then the 5 screws fastening the 2 half-shells. Separate the 2 half-shells. Remove the electronic board from the topshell.

The batteries are housed in the battery compartment (see putting into service chapter).

With the battery pack option, there are 2 polluting elements: the NI-MH (Nickel-Metal Hybrid) batteries and an electronic board. Separate the 2 elements.

1.3.5 Instructions

The instrument has been designed to function in complete safety if the instructions given in the accompanying documents are applied. Use of the instrument in any other way can reduce operator safety, and is therefore dangerous and prohibited.

1.3.6 Taking measurements

The measuring leads and wires must be in good condition and be replaced if their insulation seems defective (insulation cut, burnt, 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 limit values indicated in the specifications.

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

Before changing function, disconnect the measuring wires from the external circuit. Remember that when taking even low current and/or voltage measurements, that the circuits can carry voltages which, with respect to earth, are hazardous for the operator.

Never take measurements when the instrument is connected to another appliance by the USB link or when charging the batteries (option)

1.3.7 Faults and abnormal stresses

Whenever the level of protection afforded by the instrument is suspected of being impaired, remove it from service and ensure it cannot be put back into service accidentally.

It can be feared that the protection might have been impaired if, for example:

- The instrument displays visible damage.
- The instrument is no longer capable of taking precise measurements.
- The instrument has been stored in unfavourable conditions.
- The instrument has suffered severe stresses during transport.

1.3.8 Definitions




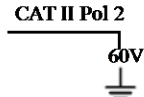
CAT II 60V :

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 SELI SSG-1, the maximum permissible overvoltage is 60V (DC or AC).

POL 2 :

The notion of pollution determines the isolation distance between the circuits. Level 2 allows temporary conductivity caused by condensation.

Symbols used

Symbol	Meaning
	Caution: see the accompanying documents
	Earth
	Conforms with the European Union directives
	Category II, Pollution 2. Maximum voltage rating with respect to earth=60V

1.4 Maintenance

The instrument must always be reassembled in accordance with the instructions given in this manual. Incomplete or incorrect assembly can jeopardize operator safety.

The authority in charge must check regularly that the safety components have not altered over time and perform all the necessary preventive maintenance operations.

Before opening the instrument for maintenance work, always ensure that all the wires have been disconnected from it.

Work (adjustment, servicing, repair) on the open instrument must be avoided insofar as possible, but if such work is absolutely necessary, it must be performed by qualified personnel that is well aware of the risks involved.

2 Using the instrument

To use the instrument in complete safety, all operators must read attentively the section relating to safety, and this section.

2.1 Putting into service

The instrument is supplied with four 1.5V AA batteries. The batteries must be installed in the battery compartment in the back of the instrument. To open the compartment, unscrew the cover screw. Screw the cover back on after inserting the batteries.

Pay attention to the polarity when installing the batteries as an error could damage the instrument. The polarity is indicated inside the compartment cover.

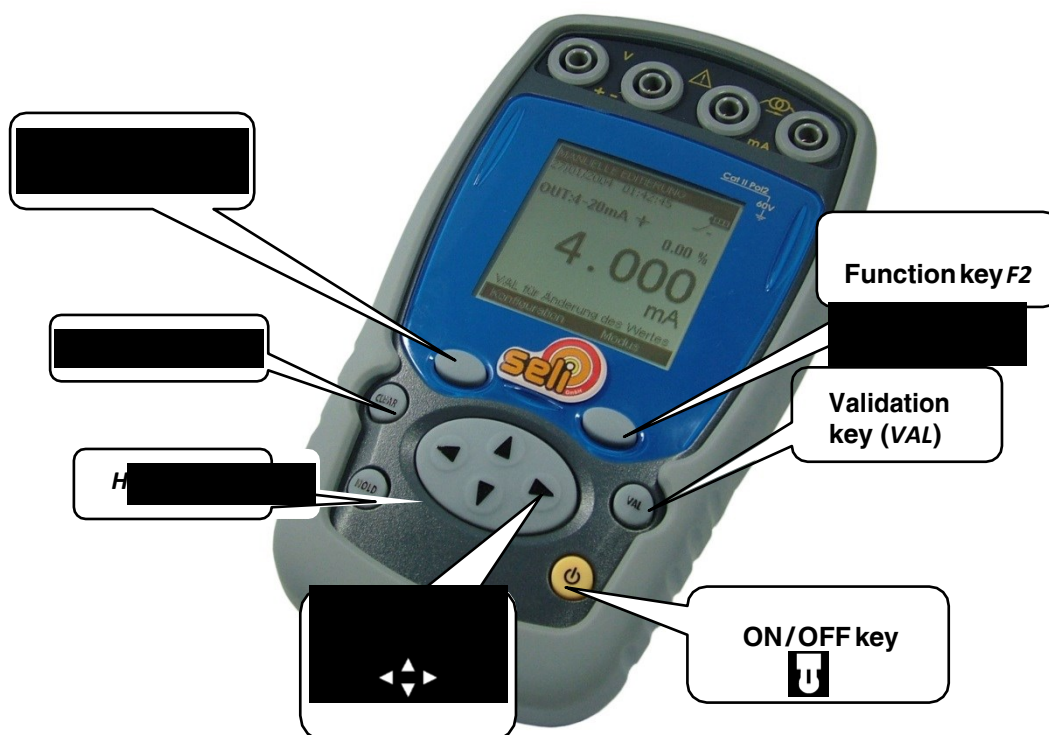
The following figure shows how to open the battery compartment and the direction of installation of each battery.



2.1.1 Keypad

The keypad:

- 2 function keys (**F1** and **F2**) for selecting the different menus displayed on the screen.
- The navigator consisting of 4 arrows (up (↑), down (↓), right (→), left (←))
- A cancel key (**CLEAR**).
- A key for switching the instrument and the backlighting on and off (**ON/OFF**).
One short press switches on the instrument. When in operation, one short press switches the lighting on or off. One long press (2 seconds) stops the instrument.
- A validation key (**VAL**).
- A **HOLD** key allows the temporary stopping of a process (short press). A long press on this key switches from measurement mode to transmission mode and vice versa.

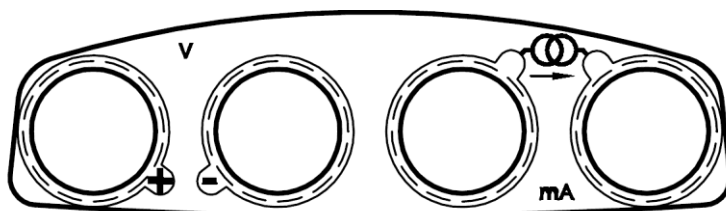


2.1.2 Terminals

The SSG-1 is equipped with 4 safety sockets (4 mm diameter). Two of these sockets are for voltage measurement and transmission, while the other two are for current measurement and transmission and the continuity test.



The figure below shows the inscription on the sockets of the UC mAV.2.



2.1.3 USB connector

The SSG-1 features a USB connector (mini B) for loading new software versions, adjusting the instrument and general connection to PC.



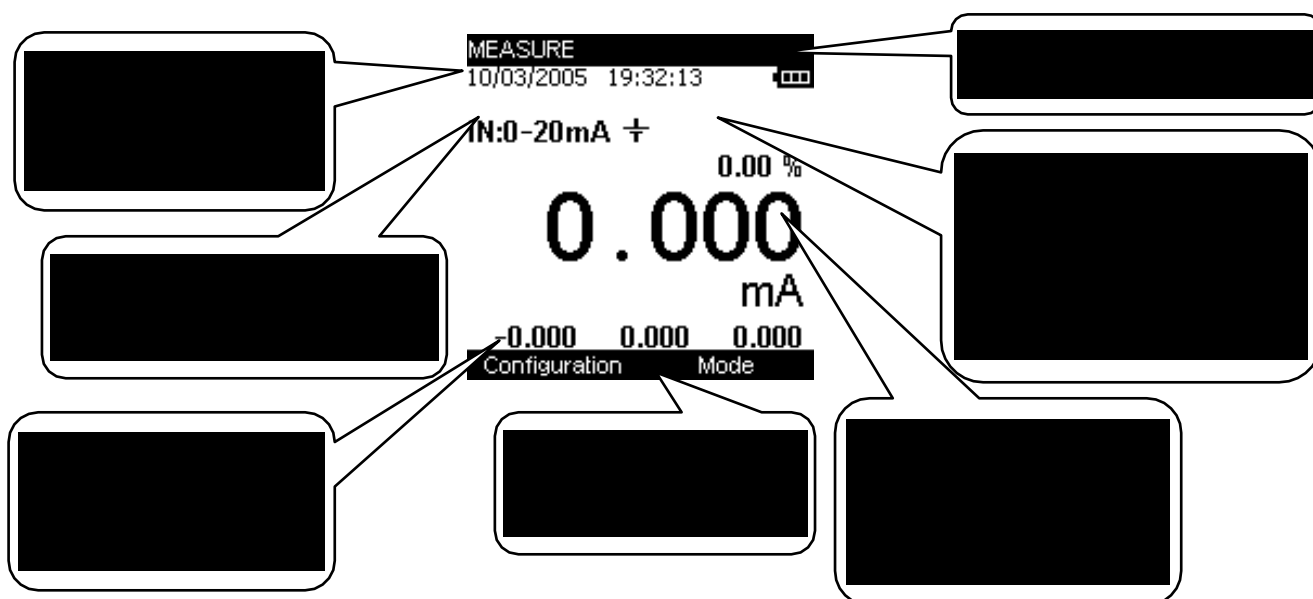
USB-port (mini B connector)

2.1.4 Screen


















The SSG-1 has a backlit graphic liquid crystal display (LCD), with a resolution of 160 x 160 pixels.

In normal operation, the display is divided into seven horizontal fields:


- The 1st field indicates the mode of operation (Measurement, transmission or continuity).
- The 2nd field indicates the date, time and battery charge.
- The 3rd field is reserved for the icons indicating the mode of operation (auxiliary functions: Scaling, filtering, etc.).
- The 4th indicates the mode of operation, the range, and certain auxiliary functions (scale, passive or active mode, Hart ...).
- The 5th field indicates the measured or transmitted value. The measured quantities are indicated in V, mA or %.
- The 6th field gives (in measurement mode) the minimum, mean and maximum values of the measurement.
- The 7th field indicates the functionality of keys **F1** and **F2**.



The following table gives the meaning of the pictograms that appear on the screen:







Symbol	Description
	Step increment transmission mode
	Single ramp signal transmission mode
	Cyclic ramp signal transmission mode
	Scaling
	Hold
	Quadratic scale
	Filtering
	%FS (full scale) function
	Valve test
	Warning: the SSG-1 is in error condition (range exceeded (1)...etc.)
	Incremental mode using the arrows
	Passive mode (the instrument delivers a +24V source to the sensor)
	Active mode (the instrument delivers no voltage source)
	Hart mode
	Caution: The current source cannot deliver the current demanded (unlooping probable).
	Caution: The voltage source cannot deliver the voltage demanded (output current probably too high).
	Battery life indicator.

Note:

When the range is exceeded (limits determined in the next chapter), the following pictogram  appears and the measurement display (5th field) indicates:

- :---- if the measured value is below the low limit.
- + :---- if the measured value is above the high limit.

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 Starting after powering on

At powering on (insertion of the AA batteries or rechargeable batteries), the instrument automatically starts functioning (loading of the software into memory). It is recommended not to connect the instrument to any external circuits during this period.

To avoid any signal conflicts, the instrument then enters measurement mode.

2.2 Operating modes

There are 5 main operating modes:

- Voltage measurement
- Current measurement
- Voltage transmission
- Current transmission
- Continuity test

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

2.2.1 Voltage (DC) measurement

The following ranges are available:

Range	0/10 V (Process)	25 V	50 V
Resolution (display)	1 mV (or 10 mV or 100 mV)	1 mV (or 10 mV or 100 mV)	1 mV (or 10 mV or 100 mV)
Extent of the range	-2 V up to 12 V	-2 V up to 25 V	-5 V up to 50 V

2.2.2 Current (DC) measurement

Range	0-20 mA (Process)	4-20 mA (Process)	25 mA
Resolution (display)	1 μ A (or 10 μ A or 100 μ A)	1 μ A (or 10 μ A or 100 μ A)	1 μ A (or 10 μ A or 100 μ A)
Extent of the range	-6 mA up to 24 mA	3.2 mA up to 24 mA	-6 mA up to 25 mA
Loop supply	YES	YES	YES
Scale	Linear or quadratic	Linear or quadratic	Linear

2.2.3 Voltage (DC) transmission

The following ranges are available:

Range	0/10 V	15 V
Resolution (display)	1 mV (or 10 mV or 100 mV)	1 mV (or 10 mV or 100 mV)
Extent of the range	0 V up to 12 V	0 V up to 15 V
Mode	Continuous Increments Ramp	Continuous Increments Ramp

2.2.4 Current (DC) transmission

The following ranges are available:

Range	0/20 mA	4/20 mA	25 mA
Resolution (display)	1 μ A (or 10 μ A or 100 μ A)	1 μ A (or 10 μ A or 100 μ A)	1 μ A (or 10 μ A or 100 μ A)
Extent of the range	+500 μ A up to +24 mA	+3.2 mA up to +24 mA	+500 μ A up to 25 mA
Mode	Continuous Increments Ramp Predefined (valve, %FS) linear or quadratic scale	Continuous Increments Ramp Predefined (valve, %FS) linear or quadratic scale	Continuous Increments Ramp

Note: Caution! Despite of a set point of 0 mA, a residual current of approx. 500 μ A can be fed in to the loop.

2.2.5 Continuity

Range	Continuity
Resolution	Open/Closed: closed for $Z=[0 \dots 1 \text{ k}\Omega \pm 10\%]$ open for $Z=[1 \text{ k}\Omega \pm 10\% \dots \infty]$

The loop to be tested is connected through the current channel. Caution! The tested loop must be ohmic and passive.

2.2.6 Maximum permissible electrical characteristics (values not to be exceeded)

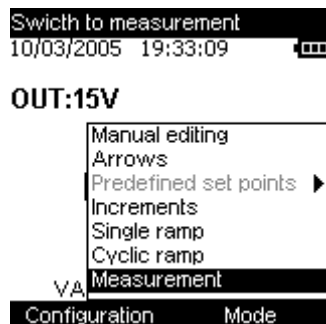
Function	Range	V _{in} max	I _{out} max	Z _{load}
Measurement U	0/10 V 25 V 50 V	60 V - -		
Transmission U	0/10 V 15 V		6 mA 5 mA	1500 Ω min 3000 Ω min
Measurement I	0/20 mA 4/20 mA 25 mA	60 V - -		
Transmission I	0/20 mA 4/20 mA 25 mA		24 mA - 25 mA	800 Ω max - -
Continuity		60 V		

3 Programming the modes

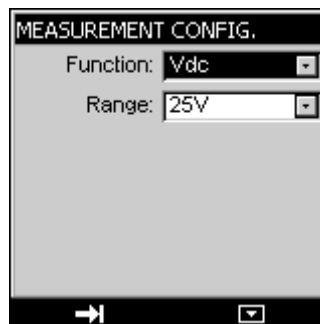
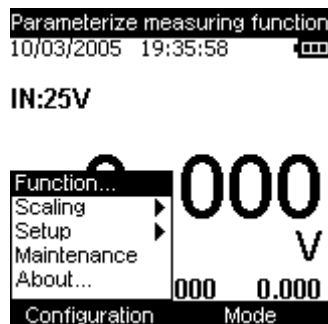
3.1 Voltage (DC) measurement

- Measurement or transmission mode is selected using key **F2 (mode menu)**.
- Using the navigation keys (↑ and ↓), move down through the menu to the **measurement** field.
- Press **VAL** to confirm.

The measurement mode is the mode selected by default.

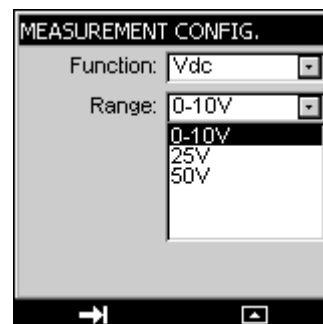


- The type of function (voltage or current) is selected using key **F1 (configuration menu)**.
- Using the navigation key (↑ and ↓), go onto the **function** field
- Press **VAL** to confirm.

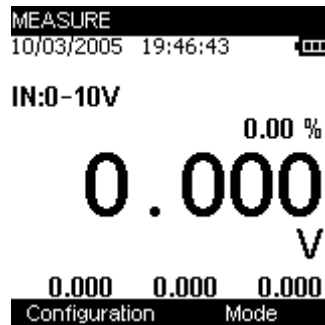


In the **MEASUREMENT CONFIGURATION** menu, go onto the **function** field using key **F1**.

- Go into the **function** menu by pressing **F2**.
- Select the type of function (**Vdc**) using the navigation keys.
- Press **VAL** to confirm.
- Using key **F1**, go onto **range** to define it.
- Go into the menu by pressing **F2**.
- Select the range using the navigation keys.
- Press **VAL** to confirm (the range).



- Press **VAL** again to confirm the desired function and call up the measurement screen.



Measurement mode provides for display of the Minimum (bottom left), Mean (bottom centre) and Maximum (bottom right) values since the last **min/max reset** command.

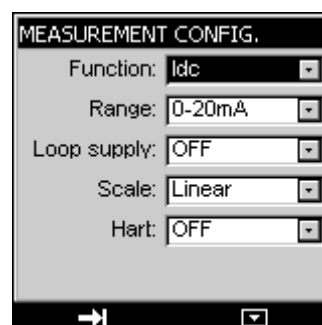
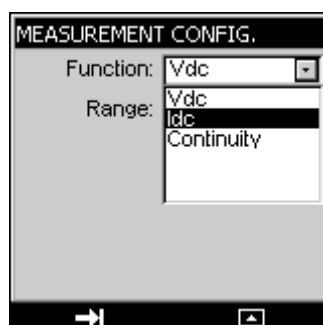
- This command is accessed through key F2.
- Using the navigation key, go onto the **min/max reset** field
- Press **VAL** to confirm.

3.2 Current (DC) measurement

- Measurement or transmission mode is selected using key **F2 (mode menu)**.
- Using the navigation keys, go onto the **measurement** field.
- Press **VAL** to confirm.

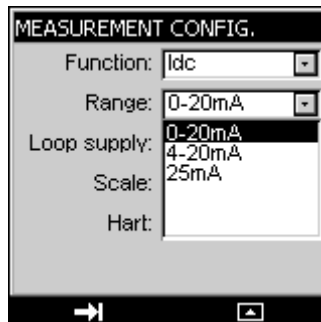
It should be noted that Measurement mode is the mode selected by default.

- The type of function (voltage or current) is selected using key **F1 (configuration menu)**.
- Using the navigation key, go onto the **function** field
- Press **VAL** to confirm.
- In the **MEASUREMENT CONFIGURATION** menu, go onto the **function** field using key **F1**.
- Go into the **function** menu by pressing **F2**.
- Select the type of function (**Idc**) using the navigation keys (\uparrow and \downarrow).



- Press **VAL** to confirm.

- Using key F1, go onto the **range** field and define the **range**.
- Go into the menu by pressing **F2**.
- Select the range using the navigation keys (0/20mA, 4/20mA or 25mA).



- Press **VAL** to confirm (the range).
- Other configuration parameters can be defined at this level, such as the current loop supply, type of scale and the Hart compatibility. These parameters are defined in the next chapter.
- Press **VAL** (again) to confirm the desired function and call up the measurement screen.

Measurement mode provides for display of the Minimum (bottom left), Mean (bottom centre) and Maximum (bottom right) values since the last **min/max reset** command.

- This command is accessed through key F2.
- Using the navigation key, go onto the **min/max reset** field
- Press **VAL** to confirm.

3.2.1 Auxiliary functions at current measurement

Auxiliary functions can be defined for all the ranges. Examples include:

- Supply of a +24 voltage to the sensors or not (passive or active mode)
- Linear or quadratic scale (for process ranges only).
- Hart compatibility (for process ranges only).

After selecting the function and range, the auxiliary functions described above must be defined.

→ Passive or active mode?

- Using key F1, go onto the **Loop Supply** field.
- Using the navigation keys (↑ and ↓), select the mode **ON** or **OFF** (passive or active).

This active or passive mode also concerns the passive mode of the Hart mode.

→ Scale?

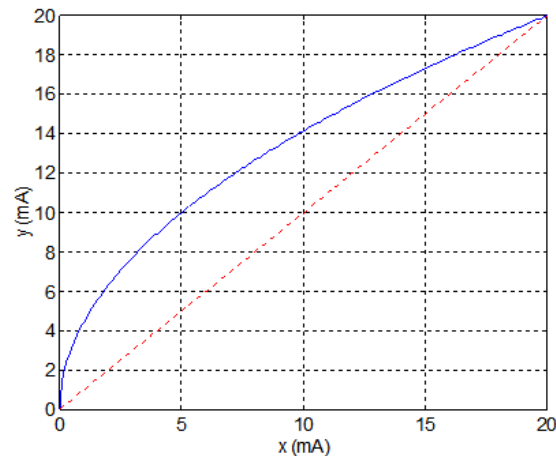
- Using key F1, go onto the **scale** field.
- Using the navigation keys (↑ and ↓), select **linear** or **quadratic** mode.

When quadratic scaling is activated, the SSG-1 takes the square root of its input and displays the result as a percentage. For example, if the SSG-1 is connected to the output of a differential pressure transmitter it displays a result proportional to the flow.

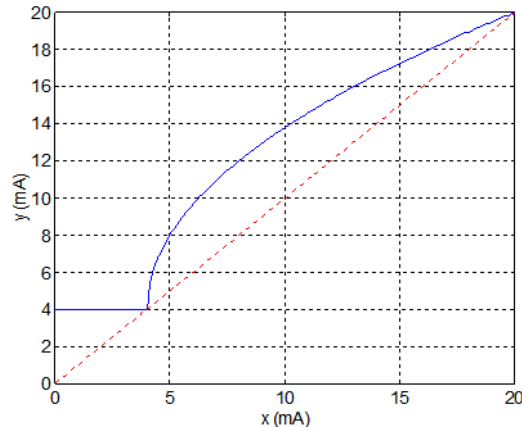
If the input current x varies between a and b , scaling complies with the formula below:

$$y = a + (b - a) \sqrt{\frac{(x - a)}{(b - a)}}$$

The scaling curve for the 0-20mA range is as follows:

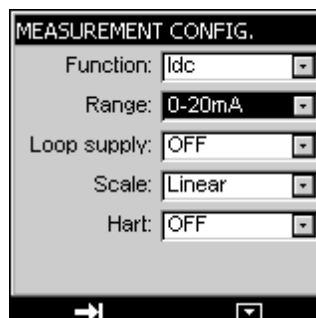


The scaling curve for the 4-20mA range is as follows:



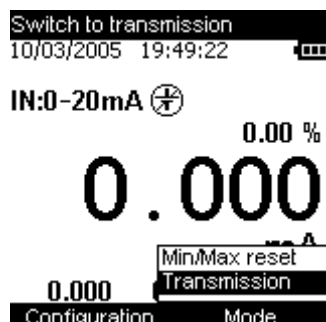
→ **Hart?**

- Using key F1, go onto the **Hart** field.
- Using the navigation keys (↑ and ↓), select the mode **ON** or **OFF**.



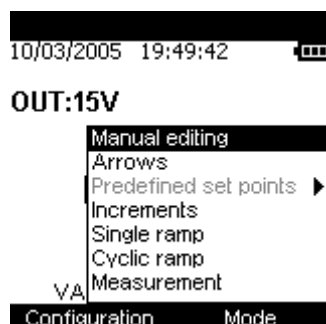
3.3 Voltage or current (DC) transmission

- Transmission mode is selected using key **F2 (mode menu)**.
- Using the navigation keys (↑ and ↓), move down through the menu to the **transmission** field.
- Press **VAL** to confirm.



After confirming Transmission mode, the type of generation must be defined:

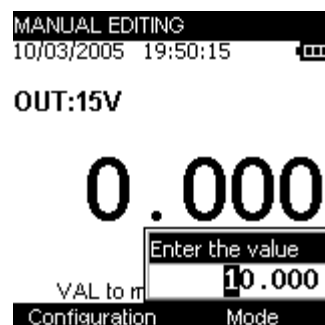
- Continuous (manual or incremental editing).
- Incremental (in steps).
- Single ramp (only one ramp signal transmitted).
- Cyclic ramp.



→ Voltage or power generation / Manual editing?

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

NOTE! If the Scaling mode is **ON**, the value to be edited is %, otherwise this value is in V.



→ Voltage or power generation/Editing with arrows?

- Press key F2 to display the edit menu.
- Using the navigation keys (↑ and ↓), select the **arrows** editing mode and confirm (**VAL** key).
- The value is entered using the navigation keys:
 - ↑ and ↓ to increment or decrement the value
 - ← and → to select the digit to modify.

→ Voltage or power generation/Incremental editing?

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

The value displayed is that programmed in the **CONFIGURATION/RAMP** menu.

- Using the navigation key (↑), start the automatic incrementing phase (according to the parameters programmed in the **CONFIGURATION/RAMP** menu).
- The voltage can be automatically decremented from the programmed maximum value using the navigation key (↓).
- The transmitted voltage can be manually incremented (according to the parameters programmed in the **CONFIGURATION/RAMP** menu) using the navigation key (→).
- The transmitted voltage can be manually decremented from the maximum programmed value using the navigation key (←).

→ Voltage or power generation/Single ramp editing?

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

The value displayed is that programmed in the **CONFIGURATION/RAMP** menu.

- Using the navigation key (↑), start the automatic incrementing phase (according to the parameters programmed in the **CONFIGURATION/RAMP** menu).
- The voltage can be automatically decremented from the programmed maximum value using the navigation key (↓).
- The transmitted voltage can be manually incremented (according to the parameters programmed in the **CONFIGURATION/RAMP** menu) using the navigation key (→).
- The transmitted voltage can be manually decremented from the maximum programmed value using the navigation key (←).

Ramp generation can be done step by step by pressing the navigation keys (← and →) and automatic generation restarted with the navigation keys (↑ and ↓).

The Hold key allows generation to be stopped and restarted.

Transmission can be delayed by a programmable length of time (in the **CONFIGURATION/RAMP/DELAY** menu).

→ Voltage or power generation/Cyclic ramp editing?

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

The value displayed is that programmed in the **CONFIGURATION/RAMP** menu.

- Using the navigation key (↑), start the automatic incrementing phase (according to the parameters programmed in the **CONFIGURATION/RAMP** menu).
- The voltage can be automatically decremented from the programmed maximum value using the navigation key (↓).
- The transmitted voltage can be manually incremented (according to the parameters programmed in the **CONFIGURATION/RAMP** menu) using the navigation key (→).
- The transmitted voltage can be manually decremented from the maximum programmed value using the navigation key (←).

Ramp generation can be done step by step by pressing the navigation keys (← and →) and automatic generation restarted with the navigation keys (↑ and ↓).

The Hold key allows generation to be stopped and restarted.

→ Predefined editing as valve test (Current transmission)?

Valve test transmission mode is a mode that transmits predefined current values (3.8 ; 4; 4.2; 8; 19; 20 und 21mA).

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

A transmission screen is displayed with a setpoint value of 3.8 mA.

- Press the navigation keys (← and →) to increment or decrement the setpoint value.

→ Predefined editing as % FS (Current transmission)?

The "% FS" (percentage of full scale) transmission mode transmits predefined current values as following: 0% or. 2.5%, 25%, 50%, 75% und 100%.

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

A transmission screen is displayed with a setpoint value of 0.00% (at 4/20 mA) or 2.50% (at 0/20 mA).

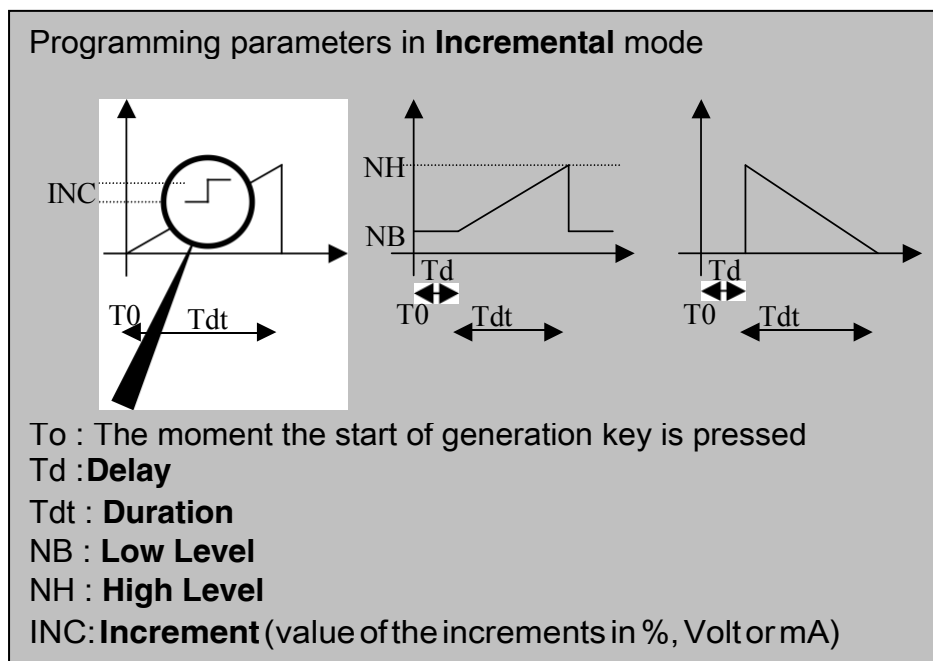
- Press the navigation keys (← and →) to increment or decrement the setpoint value.

3.3.1 Ramp configuration

The **CONFIGURATION/RAMP** menu is used for the generation of incremental, single ramp, cyclic ramp signals in both voltage and current.

→ Incremental signal configuration?

The figure below shows the type of incremental ramp signal that can be generated along with its parameters:



The **low level** and **high level** are given:

- As a percentage of the range if scaling mode is ON.
- In volts or mA if the scaling mode is OFF and depending on the type of quantity transmitted (voltage or current transmission).

The **duration** corresponds to the incrementation time it takes to go from **low level** to **high level** (and vice versa with decrementation). It is given in seconds and is limited to a maximum of 1000s.

The **delay** corresponds to the timeout that can be programmed between the moment the start of transmission key is pressed and the actual start of generation. It is given in seconds and is limited to a maximum of 1000s.

INCREMENT CONFIGURATION	
Low level	00.000 V
High level	10.000 V
Increment	00.100 V
Duration	001.00 s
Delay	0000.0 s

The **CONFIGURATION/RAMP** menu is accessed using key **F2**.

Use key **F2** to move from one field to the next.

The value is entered using the navigation keys:

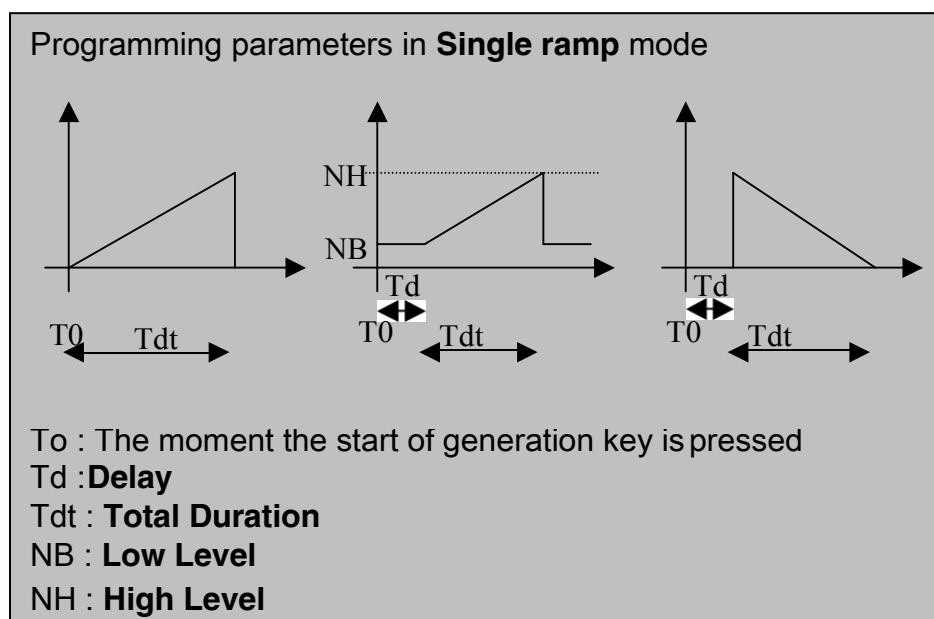
- As a percentage of the range if scaling mode is ON.
- \uparrow and \downarrow to increment or decrement the value
- \leftarrow and \rightarrow to select the digit.

Press **VAL** to save the parameters.

Press **CLEAR** to quit the menu without saving.

→ Single ramp signal configuration?

The figure below shows the type of single ramp that can be generated along with its parameters:

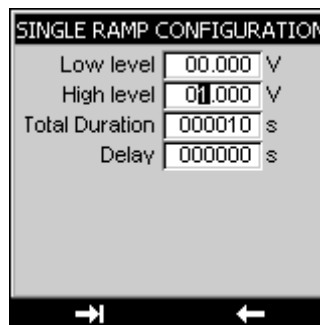


The **low level** and **high level** are given:

- As a percentage of the range if scaling mode is ON.
- In volts or mA if the scaling mode is OFF and depending on the type of quantity transmitted (voltage or current transmission).

The **total duration** corresponds to the incrementation time it takes to go from **low level** to **high level** (and vice versa with decrementation). It is given in seconds and is limited to a maximum of 1000s.

The **delay** corresponds to the timeout that can be programmed between the moment the start of transmission key is pressed and the actual start of generation. It is given in seconds and is limited to a maximum of 1000s.



SINGLE RAMP CONFIGURATION	
Low level	00.000 V
High level	01.000 V
Total Duration	000010 s
Delay	000000 s

Navigation arrows: → ←

The **CONFIGURATION/RAMP** menu is accessed using key **F2**. Note! The appropriate function mode (**INCREMENTS** mode) must have been programmed in order to access the **CONFIGURATION/RAMP/SINGLE** menu.

Use key **F2** to move from one field to the next in the **CONFIGURATION/RAMP/SINGLE** menu.

The value is entered using the navigation keys:

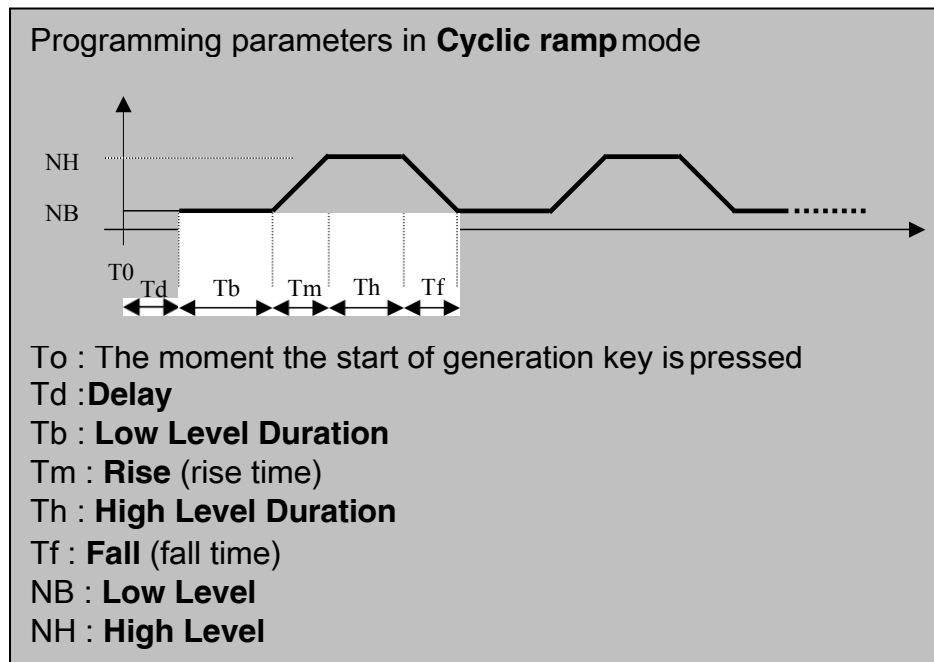
- As a percentage of the range if scaling mode is ON.
- ↑ and ↓ to increment or decrement the value
- ← and → to select the position.

Press **VAL** to save the parameters.

Press **CLEAR** to quit the menu without saving.

→ **Cyclic ramp signal configuration?**

The figure below shows the type of cyclic ramp signal that can be generated along with its parameters:



The **low level** and **high level** are given:

- As a percentage of the range if scaling mode is ON.
- In volts or mA if the scaling mode is OFF and depending on the type of quantity transmitted (voltage or current transmission).

The **low level duration**, **rise**, **high level duration**, **fall** and **delay** times are given in seconds and are limited to a maximum of 1000s.

The **repetitions** field gives the number of ramp signals to be generated. There can be a maximum of 1000 repetitions.

CYCLE RAMP CONFIG.	
Low level	00.000 V
High level	01.000 V
level duration	000010 s
Rise	000010 s
level duration	000010 s
Fall	000010 s
Repetitions	000001
Delay	000000 s

→ ←

The **CONFIGURATION/RAMP** menu is accessed using key **F2**. Note! It is vital to have programmed the appropriate function mode (**Single Ramp** mode) to access the **CONFIGURATION/RAMP/CYCLIC RAMP** menu.

Use key **F2** to move from one field to the next in the **CONFIGURATION/RAMP/CYCLIC RAMP** menu.

The value is entered using the navigation keys:

- As a percentage of the range if scaling mode is ON.
- \uparrow and \downarrow to increment or decrement the value
- \leftarrow and \rightarrow to select the digit.

Press **VAL** to save the parameters.

Press **CLEAR** to quit the menu without saving.

3.4 Continuityfunction

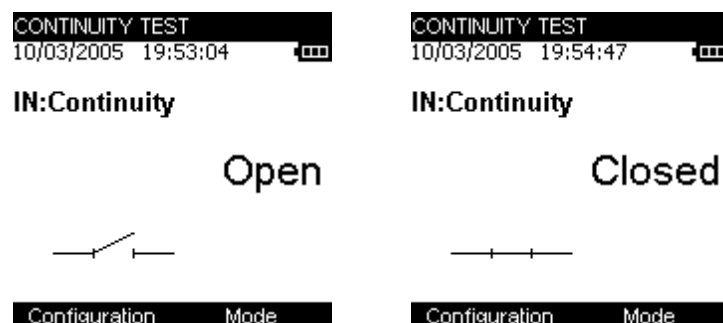
CONTINUITY mode is a MEASUREMENT mode applied to the current channel (I+, I- terminals).

It indicates whether the circuit (the loop) is open or closed. The circuit must be resistive with no active elements.

The loop shall be considered closed at loop impedances of 0 to 1 k Ω , and open at impedances above 1 k Ω .

- Select the measurement mode using key **F2 (mode menu)**.
- Using the navigation keys, move down through the menu to the **measurement** field.
- Press the **VAL** key to confirm.
- The type of function is selected using key **F1 (configuration menu)**.
- Using the navigation key, go onto the **function** field and press **VAL** to confirm.
- Using the navigation key (\uparrow and \downarrow), select the **continuity** function and press **VAL** to confirm.

Confirming the Continuity function calls up the following screen:

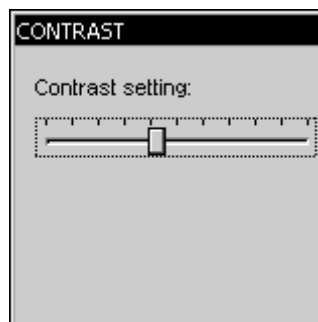


4 Parameter settings

4.1 Adjusting the contrast

The display contrast can be adjusted in the **CONFIGURATION/SETUP** menu.

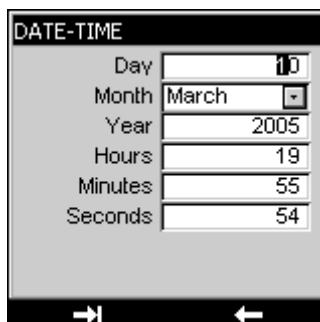
- This menu is accessed using key F1.
- Select the **Setup** field using the navigation keys (↑ and ↓), then confirm.
- Select the **Contrast** field using the navigation keys (↑ and ↓), then confirm.
- Increase or reduce the contrast using the navigation keys (← and →).



4.2 Adjusting the date and time

The date and time can be adjusted in the **CONFIGURATION/SETUP** menu.

- This menu is accessed using key F1.
- Select the **Setup** field using the navigation keys (↑ and ↓), then confirm.
- Select the **Date/Time** field using the navigation keys (↑ and ↓), then confirm.



- The various parameters are adjusted using the navigation keys (↑ and ↓).
- Use the navigation keys (← and →) to move from one field to the next.
- Press **VAL** to confirm.

4.3 Preferences menu

4.3.1 Adjusting the filtering

The adjustment of filter can be selected from the **CONFIGURATION/SETUP/PREFERENCE** menu. When measurements are taken on a noisy loop, the measurements can be filtered to render more stable the value indicated on the display.

- This menu is accessed using key **F1** (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 **F1**.
- Four filtering values are available (OFF, 0.5s, 1s and 2s). The value is selected using the navigation keys (↑ and ↓).
- Press **VAL** to confirm.

4.3.2 Adjusting display resolution

The display resolution can be selected from the **CONFIGURATION/SETUP/PREFERENCE** menu.

- This menu is accessed using key **F1**.
- 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 key **F1**.

Three type of resolution are then available:

high (res=1mV or 1μA),

medium (res=10mV or 10μA)

low (res=100mV or 100μA).

- Select the resolution using the navigation keys (↑ and ↓).
- Press **VAL** to confirm.

4.3.3 Adjusting the lighting duration

The duration of the lighting can be programmed in the menu

CONFIGURATION/SETUP/PREFERENCE. A short press on the **ON/OFF** key switches on the lighting for the selected period (10 s or 1 min). A second short press restarts the timeout or switches off the lighting in **manual** mode.

- This menu is accessed using key **F1**.
- 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.
- The mode (manual or timed) is selected using the navigation keys (↑ and ↓).
- Press **VAL** to confirm.

4.3.4 Adjusting the key beep

An audio beep can be set in the **CONFIGURATION/SETUP/PREFERENCE** menu to sound each time a key is pressed:

- This menu is accessed using key **F1**.
- 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 with the F1 key.
- Using the navigation keys (↑ and ↓) select **ON** or **OFF** mode
- Press **VAL** to confirm (if parameter setting is completed or go on to the next field using the F1 key).

4.3.5 Adjusting the language

The interface language can be selected to German, English, French, Spain or Italian in the **CONFIGURATION/SETUP/PREFERENCES** menu.

- This menu is accessed using key **F1**.
- 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 with the **F1** key.
- Using the navigation keys (↑ and ↓) select your language.
- Press **VAL** to confirm (if parameter setting is completed or go on to the next field using the F1 key).

4.4 Maintenance menu

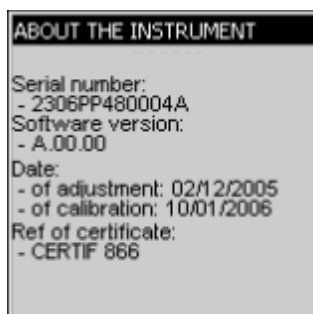
Not accessible to the user:

Consult SELI who will indicate the procedure to follow for maintenance services.

4.5 About menu

In the **CONFIGURATION/SETUP/ABOUT** menu you can find:

- The reference of the instrument
- The serial number
- The software version
- The name of the company



5 Technical specifications

In the context of metrological quality monitoring, the user may have to carry out 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: $23^{\circ}\text{C} \pm 5^{\circ}\text{C}$.
- 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 $\pm 0.008\%$.

If 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.

The indicated levels of precision apply at temperatures of $+18^{\circ}\text{C}$ to $+28^{\circ}\text{C}$, unless otherwise specified, and are expressed in $\pm (n \% R + C)$ where R = Reading and C = Constant expressed in practical units.

They apply to an instrument placed in the reference conditions defined elsewhere, after fifteen minutes of warming up.

The precision includes the precision of the reference standards, the non-linearity, the hysteresis, the repeatability and the long-term stability over the period mentioned.

The technical specifications are given for a confidence interval of 95%.

5.1 Measurement function

Measurement rate: 15m/s on average for 4 measurements.

Maximum rated voltage in common mode: 60 VDC or VAC.

5.1.1 Voltage (DC) measurement

Range	Min. resolution	Accuracy (1 year)	Measurement range
0 / 10 V	1 mV	0.015 % of reading + 2 mV	-2 V / 12 V
25 V	1 mV	0.015 % of reading + 2 mV	-2 V / 25 V
50 V	1 mV	0.015 % of reading + 4 mV	-5 V / 50 V

- Temperature coefficient < 15 ppm L / °C from 0°C to 18°C and from 28°C to 50°C.
- $R_{in} = 1 \text{ M}\Omega \pm 1 \%$.
- Series modes rejection: $\geq 60 \text{ dB}$ at 50 / 60 Hz.
- Common mode rejection: $\geq 120 \text{ dB}$ at 50 / 60 Hz.

5.1.2 Current (DC) measurement

Range	Min. Resolution	Accuracy (1 year)	Measurement range
0 / 20 mA	1 μA	0.015 % of reading + 2 μA	-2 mA / 24 mA
4 / 20 mA	1 μA	0.015 % of reading + 2,6 μA	3.2 mA / 24 mA
25 mA	1 μA	0.015 % of reading + 2 μA	-2 mA / 25 mA

- Temperature coefficient < 20 ppm / °C from 0°C to 18°C and from 28°C to 50°C.
- Possible loop power supply = $24 \text{ V} \pm 10\%$.
- $R_{in} < 30\Omega$
- HART compatibility: $R = 250 \Omega$
- Common mode rejection: $\geq 120 \text{ dB}$ at 50 and 60 Hz.

5.1.3 Continuity function

Maximum rated voltage in common mode: 60 VDC or VAC.

Range	Resolution	Remarks
Continuity	Open/Closed	closed at $Z=[0 \dots 1\text{K}\Omega]$ open at $Z=]1\text{k}\Omega \dots \infty[$

5.2 Transmission function

Maximum rated voltage in common mode: 60 VDC or VAC.

5.2.1 Voltage (DC) transmission

Range	Min. Resolution	Accuracy	Measurement range	Remarks
0 / 10 V	1 mV	0.015 % of reading + 2 mV	0 V / 12 V	$I_{out\ max} = 10\ mA$ (at 10 V)
15 V	1 mV	0.015 % of reading + 2 mV	0 V / 15 V	$I_{out\ max} = 10\ mA$ (at 10 V) $I_{out\ max} = 8\ mA$ (at 15 V)

- Temperature coefficient < 15 ppm/°C from 0°C to 18°C and from 28°C to 50°C.
- Rise time: < 1ms (0V to 15V across 1 MΩ load).
- Internal resistance: ≤ 1Ω
- VLF noise: < 1mV (at F < 100Hz).

5.2.2 Current (DC) transmission

Range	Min. Resolution	Accuracy	Measurement range
0 / 20 mA	1 μA	0.015 % of reading + 2 μA	500 μA / 24 mA
4 / 20 mA	1 μA	0.015 % of reading + 2.6 μA	3.2 mA / 24 mA
25 mA	1 μA	0.015 % of reading + 2 μA	500 μA / 25 mA

- Temperature coefficient < 20 ppm/°C from 0°C to 18°C and from 28°C to 50°C.
- Rise time: < 500 μS (0 to 20 mA across a 20-Ω load).
- VLF noise: < 1μA (at F < 100Hz).

5.3 Power supply – Autonomy


The SSG-1 is designed to function either with four 1.5 V AA batteries or with a 4.8 V battery pack.


The following autonomies are given for information.

Mode	Measurement U and I	Simulation (20mA/24V)	Standby mode
Autonomy	> 40 hours	> 10 hours	> 95 days

In standby mode (low power consumption), the SSG-1 is never completely turned off, thus preserving all stored information (time, last configuration, normalization ...).

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